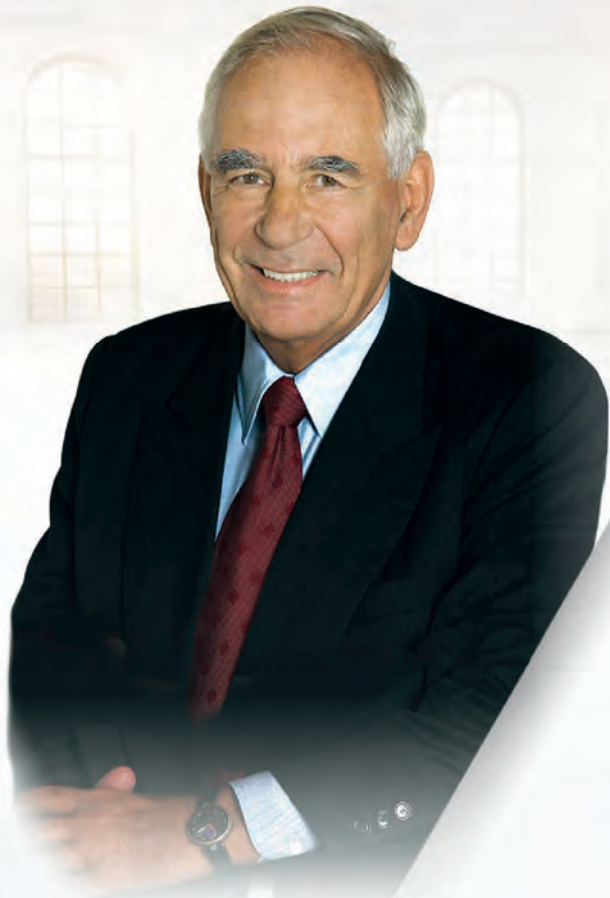


GÜHRING

PORAT



TARKKUUTTA



Dr. Jörg Gühring

Hallituksen puheenjohtaja



Oliver Gühring

Hallituksen jäsen
Myynti ja markkinointi

7000

Työntekijää
maailmanlaajuisesti



3500

Työntekijää
Saksassa



Sisäinen koulutus ja
jatkokoulutusohjelma



Kansainvälinen Know-How-siirto-
ohjelma työntekijöiden kesken
maailmanlaajuisesti



Dietmar Pfränger

Hallituksen jäsen
T&K, logistiikka, tekniikka ja tuotanto



Bernd Schatz

Hallituksen jäsen
Hallinto ja talous



Ydinryhmän
työkalut

90000

Vakioartikkeliä

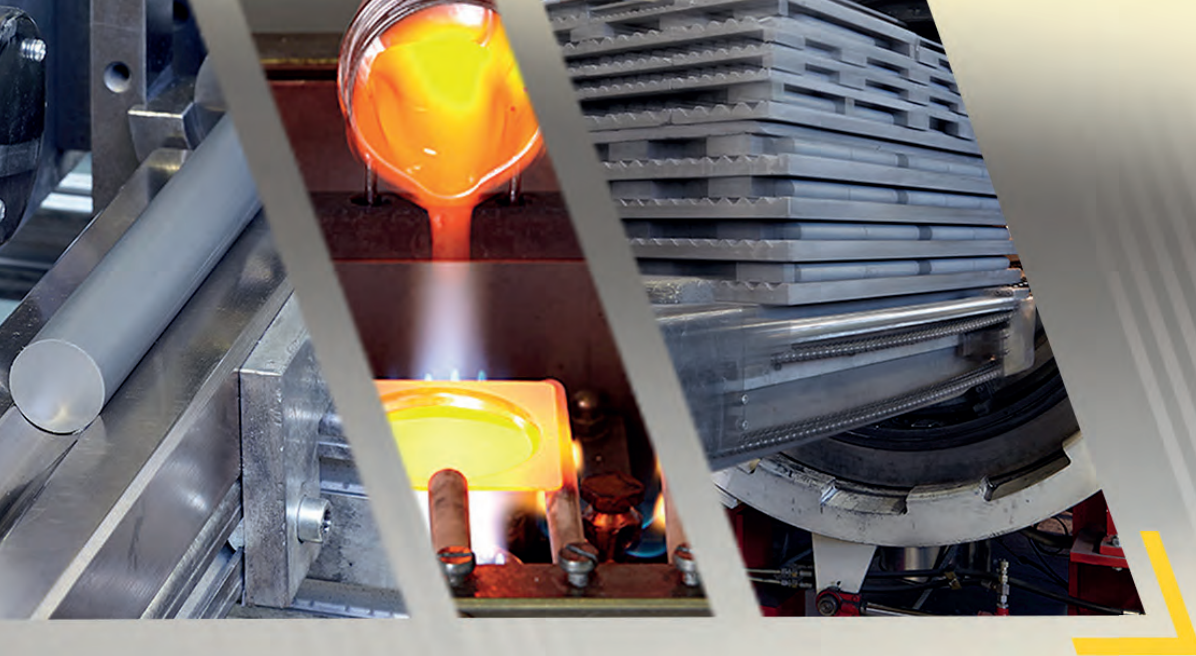
4000

Työkalumallit

55%
45%



■ Vakiotyökalut
■ Erikoistyökalut

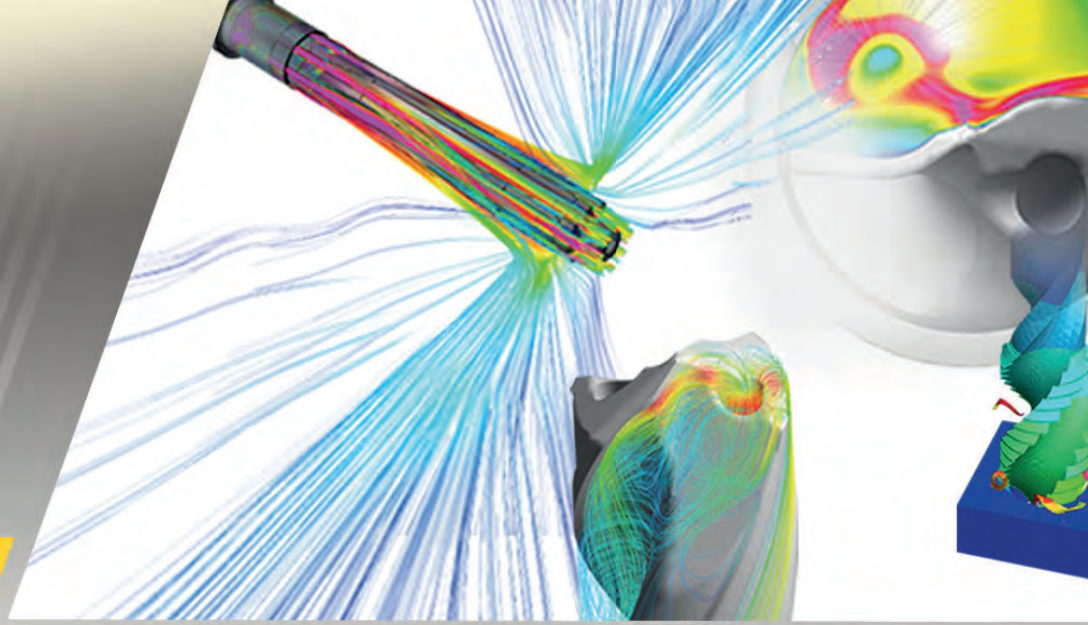


MATERIAALI
Oma kovametallivalmistus

Kaikkien työkaluparametrien
optimaalinen yhteensovitus
omien t&k osastojen avulla

KONE- & LAITERAKENNUS
Omat koneenrakennus- ja laiteyksiköt





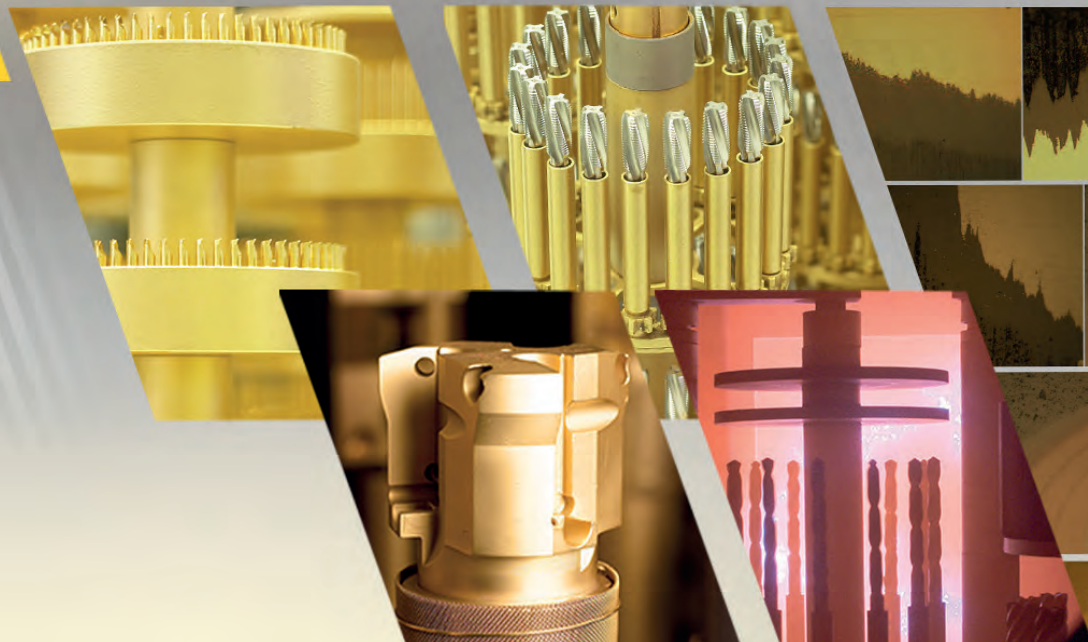
GEOMETRIAT

Omat t&k työkalujen kehitykseen



PINNOITTEET

Omat pinnoitelaiteet ja
pinnoitteiden kehitystyö

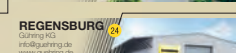
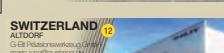
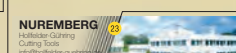
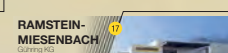
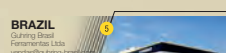
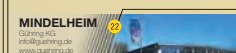
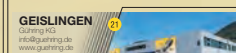
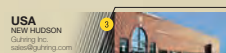
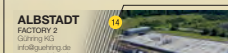
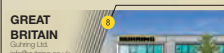
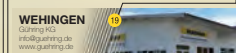
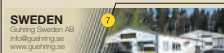
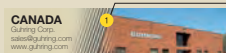


Kaikki yhdeltä toimittajalta - kattavasti ja maailmanlaajuisesti

Gühring kehittää ja valmistaa maailmanlaajuisen valmistusverkkonsa avulla työkaluja kaikille tärkeille markkina-alueille. Käyttäjät auto- ja ilmailuteollisuudessa sekä koneenrakennuksessa että yleiskonepajoissa voivat luottaa siihen että tiennäyttäjät työkalut ovat valmistettu maailmanlaajuisesti korkeimpien yhtenäisten standardien mukaisesti.

48
TYTÄRYHTIÖT

YLI 70
TUOTANTO-
JA HUOLTOLAITOSTA



Innovaativisilla teknologiolla Gühring vastaa asiakkaan vaatimuksiin prosessin suunnittelusta useisiin työkalujen käyttöominaisuuksiin - joustavasti, tarkasti, globaalisti. Täten asiantuntijamme ovat asiakkaiden käytettävissä omassa tuotannossaan. Tuotanto, huolto ja kontaktihenkilöt ovat saatavissa yhdeltä toimittajalta maailmanlaajuisesti.

Oma kovametallituotanto

Oma koneenrakennus

Omat pinnoitteet

Korkeimmat laatustandardit
maailmanlaajuisesti



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www.guehring.de

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info@guehring.dk
www.guehring.dk

RUSSIA 48
Güehring - Russland
info@guehring.ru
www.guehring.ru

KAIKKI MEILTÄ

Poriemme valikoima alkaa mikroporasta Ø 0,05 erikoisuutena Ø 180 mm asti sekä HSS ja TKM. 50.000 tuotetta kaikkiin sovellutuksiin.

KOVAMETALLISET TEHOPORAT

alkaen sivu 3

HT 800 VAIHTOKÄRKISET PORAT

alkaen sivu 123

HSS/HSCO KIERUKKAPORAT

▄▄▄ lieriövarrella

▄▄▄ Morsekartiovarrella

alkaen sivu 175, 435



KANUUNAPORA

1- ja 2-leikkuiset kanuunaporat
syvän reiän kierukkiporat

alkaen sivu 515

1:1



MIKROPORAT TKM + HSSE

alkaen sivu 645

ZOOM



NC-ALKUPORAT & KESKIÖPORAT

alkaen sivu 665



UPOTUSPORAT & VÄLJENNYSPORAT

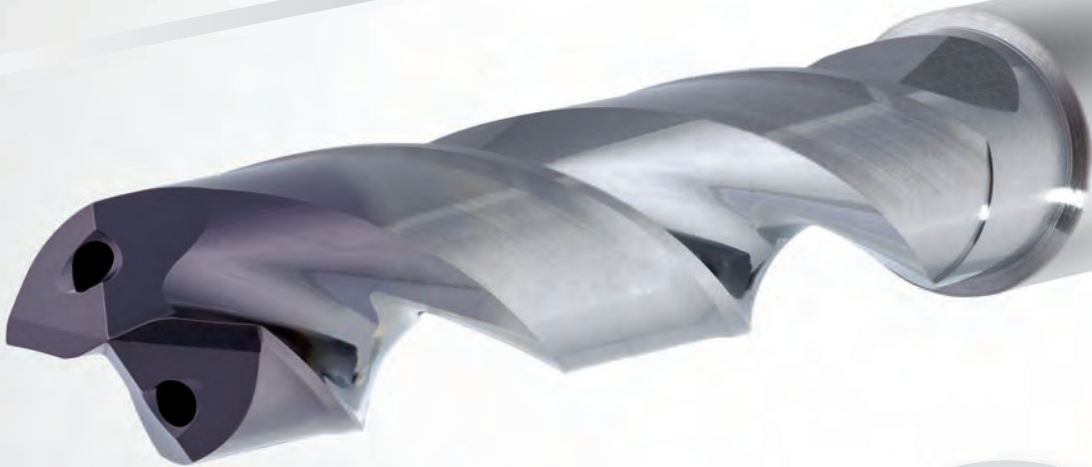
alkaen sivu 711

Uutuudet

Gühring luo standardin jokaiselle uutuudelle. Täydellisyys tutkimuksessa, kehityksessä ja työkalun valmistuksessa. Koneistuksen täydellisyys - on tavoitteemme.

**YKKÖSLAATU
TERÄKSEN TYÖSTÖSSÄ**

NEW



//RATIO//

RT 100 S

- // teräksen optimoitu mikrogeometria
- // suuret leikkuuarvot
- // työkalun pidempi kestoikä

→ alkaen sivu 59, 96



NEW

AeroX

- // HSCO8 kierukkaporat asennustöihin yleis- runsaastiseostetuille materiaaleille, titaanille ja alumiinille
- // nopeampi poraus johtuen optimoidusta 135° ristiinhionnasta

→ alkaen sivu 313

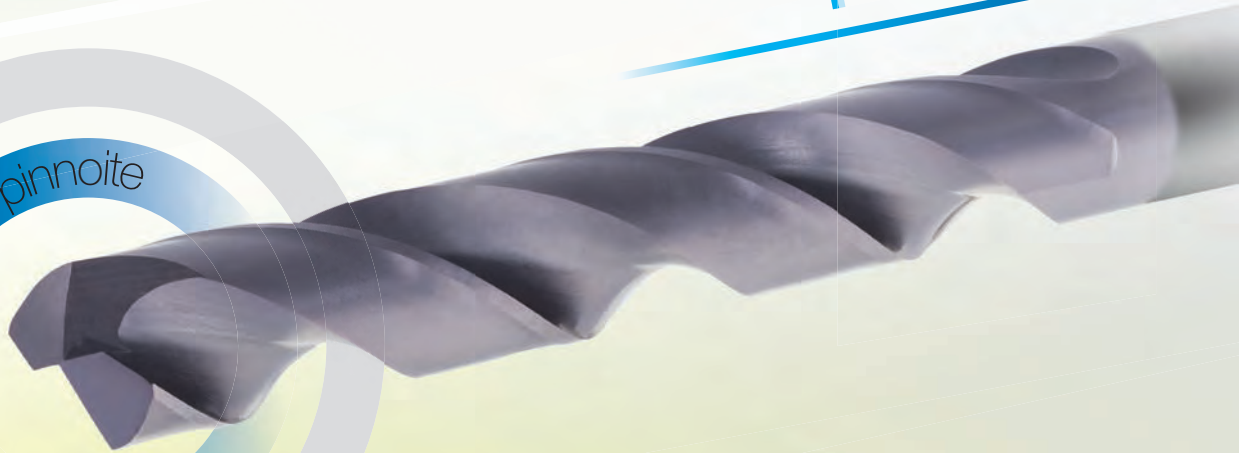
OPTIMOITU PORAN SYDÄNOSA
voimakkaasti pienennetty kartoitu sydänosa lisää työkalun vakautta ja samanaikaisesti pienentää voimia



NEW

135° ristiinhionta

NanoFIRE-pinnoite



Hyvä kulumis- ja lämmönkestävyys

M42 nanoFire

- // erittäin tehokas runsaasti seostetuille- ja suurlujuuksisille teräksille sekä erikoisseoksille
- // vakaa rakenne johtuen vakaasta sydänosasta, 135° ristiinhionnasta

→ alkaen sivu 317

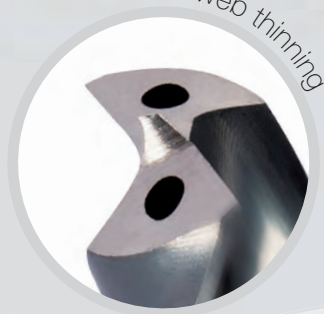
GÜHRING

NEW

HSS Jäähdytyskanavaporat

- // sopii teräspalkkien poraamiseen myös epävakaisissa olosuhteissa
- // paras jäähdytys aksiaalisella ja säteittäisellä nesteen tuonnilla
- // vähäinen jäysteen muodostus

→ alkaen sivu 499



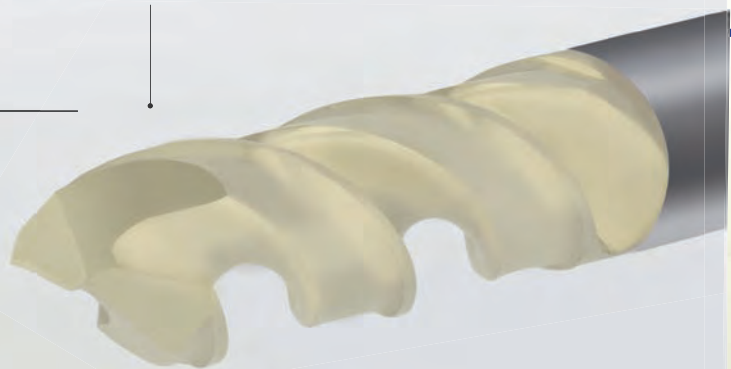
NEW

VA-HSCO Sirius Porat

- // pidempi työkalun kestoikä johtuen hyvin kulutusta kestävästä Sirius-pinnoitteesta yhdistettynä 130° ristinhiontaan

→ alkaen sivu 231

SIRIUS-pinnoite
maksimaalisen tehokas erityisesti
ruostumattomissa teräksissä



NanoFIRE-pinnoite
hyvä kulumis- ja lämmönkestävyys

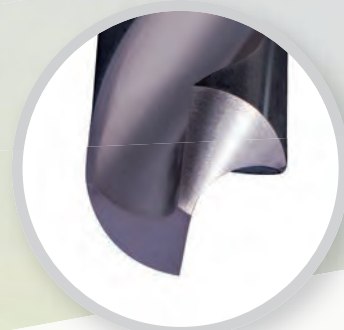
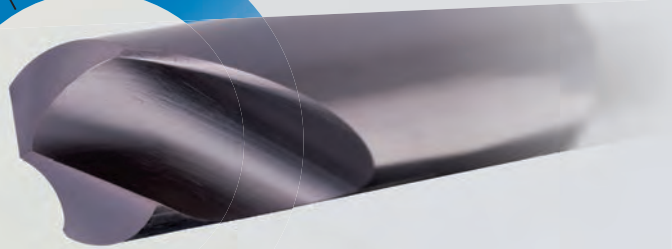
NEW

HSCO NC-alkuporat NanoFire-pinnoitteella

- // tarkka alkuporaus suurilla leikkuarvoilla ja hyvällä työkalun kestoiällä
- // hyvä tehokkuus johtuen nanoFire-pinnoitteesta

→ alkaen sivu 705

NanoFIRE-pinnoite



NEW

EB800 ohjainkiskot ja vaihtopalat uusilla pinnoitteilla

- // paras soveltuvuus koneistettaville materiaaleille johtuen eri pinnoitteista

→ alkaen sivu 556



GÜHRING

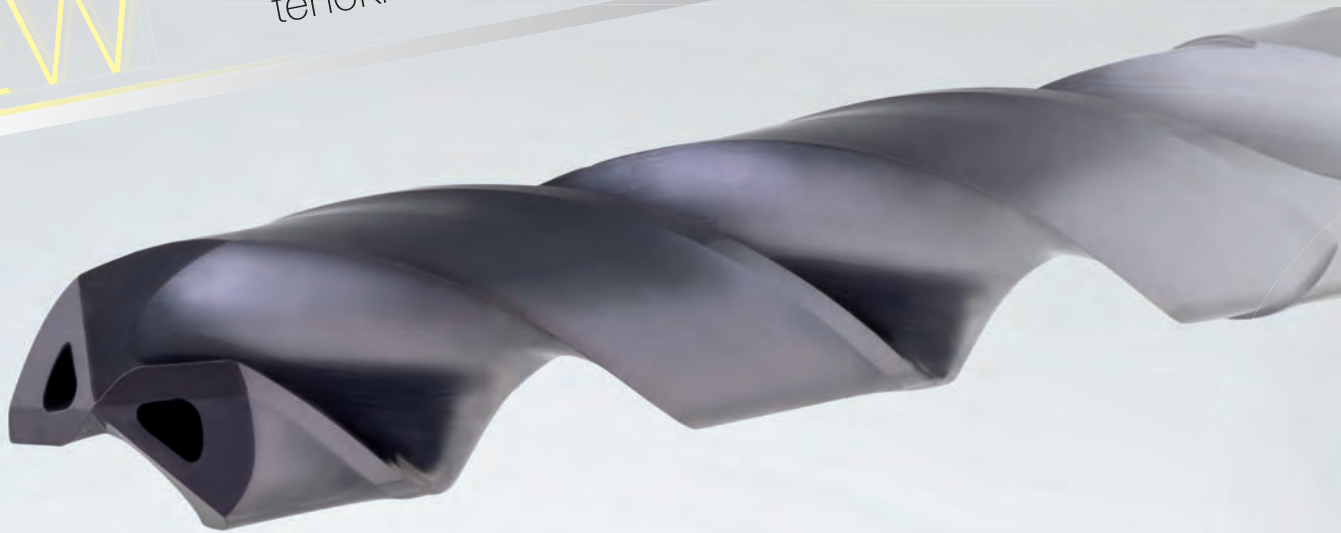
Innovaatiot

Uudet materiaalit vaativat tehokkaita koneistuksia. Gühring varmistaa teknologisen johtajuuden pyörivissä työkaluissa edellä käyvällä tutkimuksella ja idearikkaudellaan.

INNOVAATIVINEN SUUNNITTELU
tehokkaampaan jäähdytukseen

NEW

NEW



//RATIO//

RT 100 Trigon®

- // paras nestevirtausnopeus
- // erittäin sopiva ruostumattimille teräksille, titaani- ja erikoisseoksille
- // suurempi jäähdytysnesteen määrä

→ alkaen sivu 813



NEW

TALOUDELLISEMPAA PORAUSTA
alumiineissa



//RATIO//

RT 100 AL



- // kaikille pehmeille ja sitkeille alumiineille sekä takeina että valuina
- // erikoisporat Ø 3 mm - 20 mm ja syvyydet 12xD asti
- // märkä- ja pisaratyöstö mahdollista

→ alkaen sivu 815

NEW

NEW

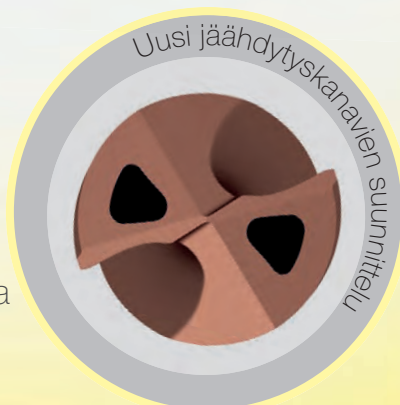


//RATIO//

RT 100 malli C

- // erityisen sopiva pitkälastuisten terästen työstöön
- // loistava lastunpiesto pienilläkin leikkuunopeuksilla
- // lastu-uran muoto ja leikkuusärmän geometria sopivat optimaalisesti työstöön

→ alkaen sivu 814



GÜHRING

T&K

KUITUVAHVISTEISET MUOVIT
työkaluratkaisuja erittäin kuluttaville aineille

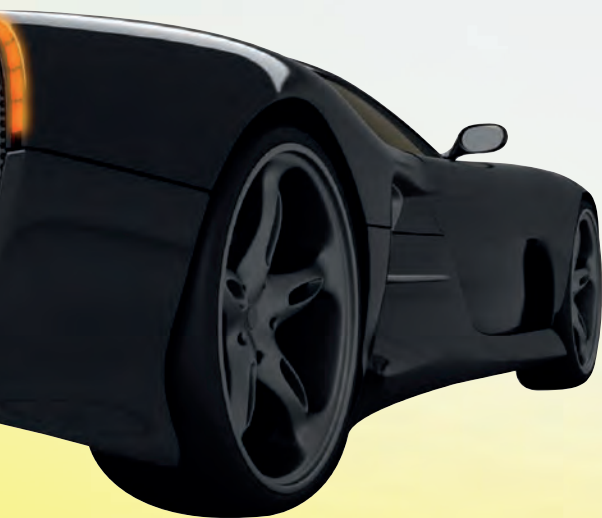
KUITUVAHVISTEISTEN MUOVIEN KONEISTUS

Parhaat työkalut lasikuituvahvisteisten muovien (GFRP) ja hiilikuituvahvisteisten muovien (CFRP) sekä pinotuille materiaaleille

- // komponentit ilman kuitukielekkeitä
- // kerrostumisista vapaa komponentin pinnanlaatu
- // „peel-up“ tai „push-out“ eivät vahingoita komponenttia
- // komponentin kuidun hajoamisen estäminen kun „pull-out“
- // minimoi jäysteen syntymistä
- // lämmön aiheuttaman vahingon estäminen

→ alkaen sivu 816

**KUITUVAHVISTEISEN
MUOVIEN PORAAMINEN**
parhaalla työstäjällä



GÜHRING

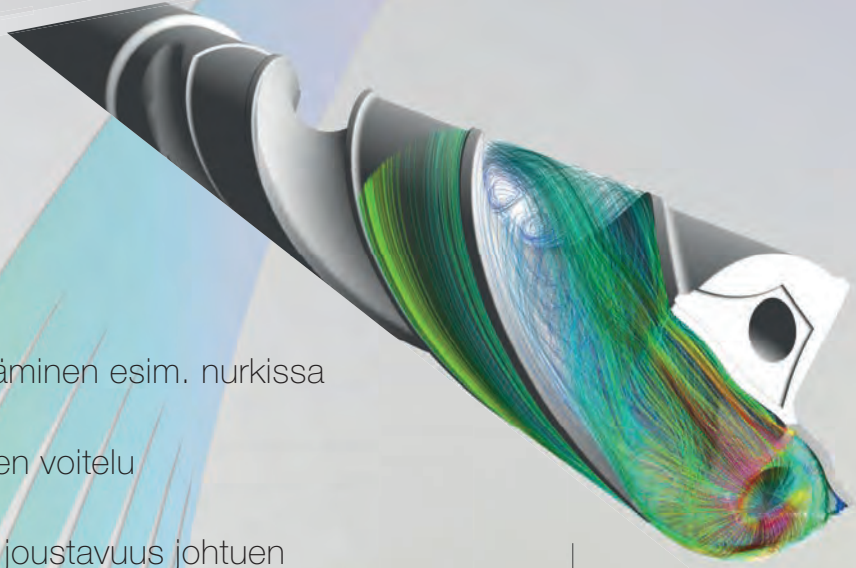
LASERVALMISTETTU PÄÄSTÖPINTA

kestöiän optimointi jäähdytysnesteen johtamisesta kohteeseen

EW

- // lämpövaikutuksen pienentäminen esim. nurkissa ja leikkusärmässä
- // parannettu jäähdytysnesteen voitelu
- // parannettu reiänlaatu
- // päästöpinnan suunnittelun joustavuus johtuen lasertyöstöstä

→ alkaen sivu 819



Simulaatio Laskennallisella Nesteliikkeellä

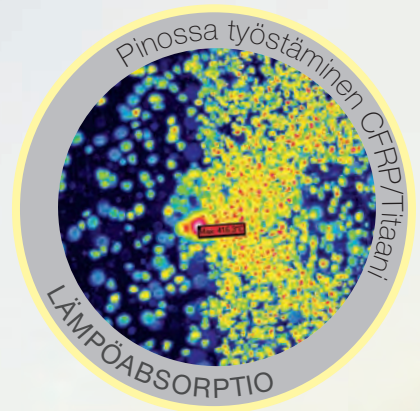
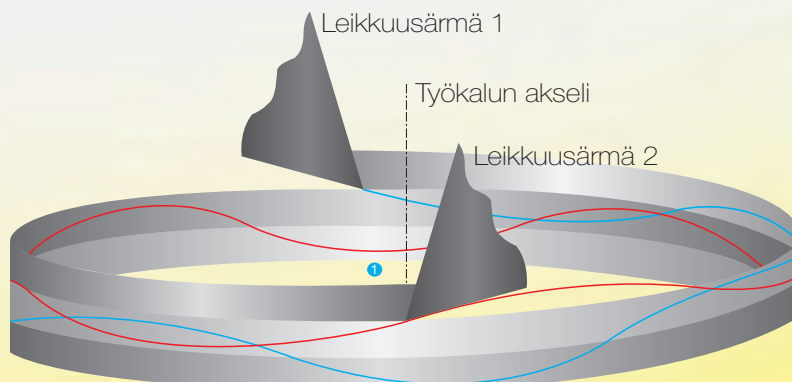
VÄRINÄTUETTU TYÖSTÖ

prosessin optimointi lisättyllä liikkeellä

NEW

- // hienompi lastunmuodostus/parempi lastunkatikko
- // parempi lastuvirta
- // lastun katkeaminen halutusta kohdasta
- // pienempi irtosärmän muodostus
- // pienemmät työstövoimat ja alhaisempi lämpötila

→ alkaen sivu 821



TEROITUS, PINNOITUS, PINNOITUKSEN POISTO,
TYÖKALUJEN MUUTOSTYÖT, PIENET SARJAT

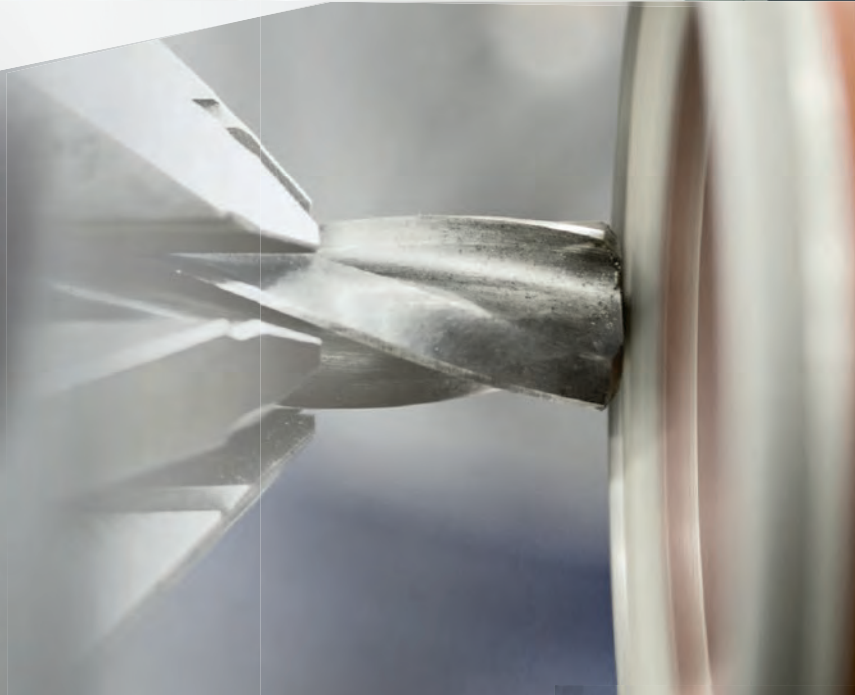
PALVELUKSESSANNE



Teroitus ja



pinnoituspalvelu



Asiakkaan vaatimusten mukaiset erikoistyökalut – Gühring'n resepti menestykselle

Vastaamme asiakkaan vaatimukseen **täydellisellä koneistuksella.**

Gühring tukee prosessin suunnittelusta sarjatuotannon valmistukseen **kekseliäiden ja innovatiivisten teknologien** sekä **asiantuntioden** avulla.



GÜHRING

Tuotantopaikkakunta Treuen



GÜHRING



PAIKKAKUNTA

TREUEN



KUVAKKEET

KATSAUS




















ISO koodi

P	Teräs, runsaasti seostettu teräs
M	Ruostumaton teräs
K	Harmaavalu-, pallografiittivalu- ja adusoituvalurauta
N	Alumiinille ja muille ei-rautametalleille
S	Erikois-, super- ja titaaniseokset
H	Karkaistu teräs ja kokillivalu

















Seuraavilla sivuilla löytyvät sovellus suositukset eri käyttökohteille ja yksityiskohtaiset tiedot max. vetomurtolujuudesta ja kovuudesta:

- hyvä soveltuvuus
- rajallinen soveltuvuus

Kuvakkeet

Materiaali	HSS	HSS-E	HSCO	M42	HSS-E-PM				
	Pikateräsyrsimet								
	HM		VHM						
	TKM hienorae (HM-UF)								
Leikkusyvyyttä	1xD	1,5xD	3xD	4xD	5xD	7xD	8xD	10xD
Ø-Toleranssi	m7	h5	h6	h7	h8	0/-0,004		
Varren muoto									
	DIN 6535 mukaan				lieriövarsi		kierukkaporat		
Leikkusuunta									
	oikeakät.			vasenkät.		neutral			
Sisäinen jäähditys									
	JK			ei JK					
Muoto	A	B	R					
Kärkikulma								
Kärjen kevennys									
Standardi	DIN 333	DIN 338	DIN 340	DIN 345	DIN 1869	DIN 6537 K	DIN 6537 L	DIN 6539
	DIN mukaan								
									
	Tehdas stdr. mukaan								
Malli	EB 100	GT 100	HT 800 WP	H	N	RT 100 T	RT 100 U	W

Pinnoitteet

- | | | | |
|--|--|---|--|
|  kirkas |  kullanuskea |  FIRE/nanoFIRE |  Signum |
|  höyrykäsittely |  TiAlN |  TiCN |  nikkelöity |
|  nitratu |  TiAlN SuperA |  TiN |  MolyGlide |
|  nitratut ohjainreun. |  TiAlN nanoA |  Sirius |  Carbo |

TYÖKALUN HELPPO VALINTA

QUICKFINDER

Käyttötarkoituksesta riippuen nopeasti ja helposti oikea työkalu

TEHOPORAT

P TERÄS **H** KARKAISTU TERÄS

QUICKFINDER

3xD 4xD 5xD 7xD 8xD 12xD

No 1 Paras työkalu yleiselle

No 1 Paras työkalu yleiselle ja kalle-tilaiselle 1600N/mm² asti

≤ 1400 N/mm²

≤ 1400 N/mm²

≤ 1600 N/mm²

≤ 1400 N/mm²

Ø 3,00 - 20,00 mm
Artikkelinro. 5759
alkaan sivu 59

Ø 3,00 - 20,00 mm
Artikkelinro. 2477
alkaan sivu 38

Ø 3,00 - 20,00 mm
Artikkelinro. 2480
alkaan sivu 16

Ø 3,00 - 20,00 mm
Artikkelinro. 8520
alkaan sivu 44

Ø 3,00 - 20,00 mm
Artikkelinro. 2479
alkaan sivu 61

Ø 3,00 - 20,00 mm
Artikkelinro. 4044
alkaan sivu 85

Ø 3,00 - 20,00 mm
Artikkelinro. 2996
alkaan sivu 30

Ø 3,00 - 20,00 mm
Artikkelinro. 8521
alkaan sivu 68

Ø 3,00 - 20,00 mm
Artikkelinro. 4044
alkaan sivu 90

Ø 1,40 - 3,00 mm
Artikkelinro. 5405
alkaan sivu 110

Ø 0,50 - 3,00 mm
Artikkelinro. 5400
alkaan sivu 108

Ø 3,00 - 20,00 mm
Artikkelinro. 5750
alkaan sivu 95

Ø 3,00 - 20,00 mm
Artikkelinro. 5525
alkaan sivu 100

Malli H karkaitulle teräkselle
Artikkelinro. 1946, s. 389

RT100 S jäähdyskanavilla

RT100 U jäähdyskanavilla

RT100 U jäähdyskanavia

RT100 HF jäähdyskanavilla

ExclusiveLine mikroporat jäähdyskanavilla

ExclusiveLine Mikroporat ilman jäähdyskanavia

NAVIGATOR

Koko ohjelma selkeästi näkyvillä - sisältää sovellus- ja leikkuuparametrisuositukset

TEHOPORAT

GUIDING NAVIGATOR

Suositellaan työkalun syöttöarvotulkko numero (SA nro) on merkitty valloilla. Kun valitset työkaluosi sopivinta työkälyä ja sen parametrejä, käytä myös nettisivujamme versioita GuidingNavigatorista www.tehoporat.fi

Artikkelin nro. NormDim Materiaali KM-tausta Pinnote Jäähdytys Ohjelma sivu

≤3xD Porausvyöry

1151	1151	2469	2477	2469	5510	5510	5520	5520
6537K	6537K	6537K	6537K	6537K	6537K	6537K	6537K	6537K
TKM	TKM	TKM	TKM	TKM	TKM	TKM	TKM	TKM
K/P	K/P	K/P	K/P	K/P	K/P	K/P	K/P	K/P
RT 60 U	RT 100 F RT 100 F RT 100 U	RT 100 F RT 100 F RT 100 U	RT 100 F RT 100 U RT 100 U	RT 100 U	RT 100 HF	RT 100 HF	RT 100 HF	RT 100 HF
akksiaal	akksiaal	akksiaal	akksiaal	akksiaal	akksiaal	akksiaal	akksiaal	akksiaal
55	53	54	43	52	39	41	48	50
							44	46

Syöttöarvotulkko nro.

Porauksen nopeus (mm/min)	1	2	3	4	5	6	7	8	9
0,50	0,004	0,006	0,009	0,008	0,010	0,012	0,014	0,016	0,018
1,00	0,008	0,012	0,017	0,014	0,018	0,021	0,023	0,027	0,031
2,00	0,015	0,022	0,031	0,024	0,031	0,036	0,041	0,047	0,054
3,00	0,022	0,032	0,044	0,034	0,044	0,051	0,057	0,065	0,074
4,00	0,030	0,042	0,056	0,043	0,054	0,062	0,070	0,080	0,091
5,00	0,038	0,052	0,068	0,053	0,065	0,075	0,084	0,096	0,108
6,00	0,046	0,062	0,080	0,062	0,075	0,086	0,097	0,110	0,124
8,00	0,062	0,084	0,110	0,084	0,100	0,114	0,128	0,144	0,162
10,00	0,078	0,104	0,136	0,104	0,124	0,141	0,159	0,178	0,200
12,00	0,094	0,124	0,162	0,124	0,147	0,167	0,188	0,210	0,234
16,00	0,124	0,162	0,210	0,162	0,194	0,221	0,250	0,280	0,312
20,00	0,154	0,200	0,258	0,200	0,240	0,276	0,314	0,354	0,396
25,00	0,194	0,250	0,318	0,250	0,300	0,348	0,396	0,444	0,492
31,00	0,234	0,300	0,378	0,300	0,360	0,414	0,468	0,522	0,576
40,00	0,300	0,390	0,492	0,390	0,468	0,534	0,600	0,666	0,732
50,00	0,378	0,492	0,618	0,492	0,588	0,672	0,756	0,840	0,924
63,00	0,474	0,600	0,756	0,600	0,720	0,816	0,912	1,008	1,104
80,00	0,600	0,756	0,954	0,756	0,912	1,038	1,176	1,314	1,452
100,00	0,756	0,954	1,206	0,954	1,140	1,296	1,452	1,608	1,764

Porauksen syvyys (mm)

1	2	3	4	5	6	7	8	9	
0,50	0,004	0,006	0,009	0,008	0,010	0,012	0,014	0,016	0,018
1,00	0,008	0,012	0,017	0,014	0,018	0,021	0,023	0,027	0,031
2,00	0,015	0,022	0,031	0,024	0,031	0,036	0,041	0,047	0,054
3,00	0,022	0,032	0,044	0,034	0,044	0,051	0,057	0,065	0,074
4,00	0,030	0,042	0,056	0,043	0,054	0,062	0,070	0,080	0,091
5,00	0,038	0,052	0,068	0,053	0,065	0,075	0,084	0,096	0,108
6,00	0,046	0,062	0,080	0,062	0,075	0,086	0,097	0,110	0,124
8,00	0,062	0,084	0,110	0,084	0,100	0,114	0,128	0,144	0,162
10,00	0,078	0,104	0,136	0,104	0,124	0,141	0,159	0,178	0,200
12,00	0,094	0,124	0,162	0,124	0,147	0,167	0,188	0,210	0,234
16,00	0,124	0,162	0,210	0,162	0,194	0,221	0,250	0,280	0,312
20,00	0,154	0,200	0,258	0,200	0,240	0,276	0,314	0,354	0,396
25,00	0,194	0,250	0,318	0,250	0,300	0,348	0,396	0,444	0,492
31,00	0,234	0,300	0,378	0,300	0,360	0,414	0,468	0,522	0,576
40,00	0,300	0,390	0,492	0,390	0,468	0,534	0,600	0,666	0,732
50,00	0,378	0,492	0,618	0,492	0,588	0,672	0,756	0,840	0,924
63,00	0,474	0,600	0,756	0,600	0,720	0,816	0,912	1,008	1,104
80,00	0,600	0,756	0,954	0,756	0,912	1,038	1,176	1,314	1,452
100,00	0,756	0,954	1,206	0,954	1,140	1,296	1,452	1,608	1,764

Porauksen syvyys (mm)

1	2	3	4	5	6	7	8	9	
0,50	0,004	0,006	0,009	0,008	0,010	0,012	0,014	0,016	0,018
1,00	0,008	0,012	0,017	0,014	0,018	0,021	0,023	0,027	0,031
2,00	0,015	0,022	0,031	0,024	0,031	0,036	0,041	0,047	0,054
3,00	0,022	0,032	0,044	0,034	0,044	0,051	0,057	0,065	0,074
4,00	0,030	0,042	0,056	0,043	0,054	0,062	0,070	0,080	0,091
5,00	0,038	0,052	0,068	0,053	0,065	0,075	0,084	0,096	0,108
6,00	0,046	0,062	0,080	0,062	0,075	0,086	0,097	0,110	0,124
8,00	0,062	0,084	0,110	0,084	0,100	0,114	0,128	0,144	0,162
10,00	0,078	0,104	0,136	0,104	0,124	0,141	0,159	0,178	0,200
12,00	0,094	0,124	0,162	0,124	0,147	0,167	0,188	0,210	0,234
16,00	0,124	0,162	0,210	0,162	0,194	0,221	0,250	0,280	0,312
20,00	0,154	0,200	0,258	0,200	0,240	0,276	0,314	0,354	0,396
25,00	0,194	0,250	0,318	0,250	0,300	0,348	0,396	0,444	0,492
31,00	0,234	0,300	0,378	0,300	0,360	0,414	0,468	0,522	0,576
40,00	0,300	0,390	0,492	0,390	0,468	0,534	0,600	0,666	0,732
50,00	0,378	0,492	0,618	0,492	0,588	0,672	0,756	0,840	0,924
63,00	0,474	0,600	0,756	0,600	0,720	0,816	0,912	1,008	1,104
80,00	0,600	0,756	0,954	0,756	0,912	1,038	1,176	1,314	1,452
100,00	0,756	0,954	1,206	0,954	1,140	1,296	1,452	1,608	1,764

Porauksen syvyys (mm)

1	2	3	4	5	6	7	8	9	
0,50	0,004	0,006	0,009	0,008	0,010	0,012	0,014	0,016	0,018
1,00	0,008	0,012	0,017	0,014	0,018	0,021	0,023	0,027	0,031
2,00	0,015	0,022	0,031	0,024	0,031	0,036	0,041	0,047	0,054
3,00	0,022	0,032	0,044	0,034	0,044	0,051	0,057	0,065	0,074
4,00	0,030	0,042	0,056	0,043	0,054	0,062	0,070	0,080	0,091
5,00	0,038	0,052	0,068	0,053	0,065	0,075	0,084	0,096	0,108
6,00	0,046	0,062	0,080	0,062	0,075	0,086	0,097	0,110	0,124
8,00	0,062	0,084	0,110	0,084	0,100	0,114	0,128	0,144	0,162
10,00	0,078	0,104	0,136	0,104	0,124	0,141	0,159	0,178	0,200
12,00	0,094	0,124	0,162	0,124	0,147	0,167	0,188	0,210	0,234
16,00	0,124	0,162	0,210	0,162	0,194	0,221	0,250	0,280	0,312
20,00	0,154	0,200	0,258	0,200	0,240	0,276	0,314	0,354	0,396
25,00	0,194	0,250	0,318	0,250	0,300	0,348	0,396	0,444	0,492
31,00	0,234	0,300	0,378	0,300	0,360	0,414	0,468	0,522	0,576
40,00	0,300	0,390	0,492	0,390	0,468	0,534	0,600	0,666	0,732
50,00	0,378	0,492	0,618	0,492	0,588	0,672	0,756	0,840	0,924
63,00	0,474	0,600	0,756	0,600	0,720	0,816	0,912	1,008	1,104
80,00	0,600	0,756	0,954	0,756	0,912	1,038	1,176	1,314	1,452
100,00	0,756	0,954	1,206	0,954	1,140	1,296	1,452	1,608	1,764

Porauksen syvyys (mm)

1	2	3	4	5	6	7	8	9	
0,50	0,004	0,006	0,009	0,008	0,010	0,012	0,014	0,016	0,018
1,00	0,008	0,012	0,017	0,014	0,018	0,021	0,023	0,027	0,031
2,00	0,015	0,022	0,031	0,024	0,031	0,036	0,041	0,047	0,054
3,00	0,022	0,032	0,044	0,034	0,044	0,051	0,057	0,065	0,074
4,00	0,030	0,042	0,056	0,043	0,054	0,062	0,070	0,080	0,091
5,00	0,038	0,052	0,068	0,053	0,065	0,075	0,084	0,096	0,108
6,00	0,046	0,062	0,080	0,062	0,075	0,086	0,097	0,110	0,124
8,00	0,062	0,084	0,110	0,084	0,100	0,114	0,128		

TUOTESIVU

Kaikki tieto yhdellä silmäyksellä

Tehoporat jäädytyskanavilla

3xD
RT 100
U
DIN
6537 K
140°
m7

P

M

K

N

S

H

Kärjen kevennys $\geq \varnothing 3,300$ • päästöhiottu kärki • pääleikkuusärmän suorasta
 • optimoitu leikkuu geometria

 rakenne- ja pintakarkaistut teräkset • automaattiteräkset, nuorutetut
 teräkset • seostetut teräkset < 1200 N/mm² asti • valut • pronssi, messinki
 • runsasseosteiset AISI-seokset

GÜHRINGNAVIGATOR

Leikkuuarvosivu 750

Materiaali	TKM
Pinta	S
Varren muoto	HE

Käyttösuositus:

- hyvä soveltuvuus
- rajallinen soveltuvuus

1 Artikkelinro. **1181**

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,300		6,000	62,000	20,000	36,000	10,500		12,000	102,000	55,000	45,000
3,400		6,000	62,000	20,000	36,000	10,600		12,000	102,000	55,000	45,000
4,000		6,000	66,000	24,000	36,000	10,700		12,000	102,000	55,000	45,000
5,000		6,000	66,000	28,000	36,000	10,800		12,000	102,000	55,000	45,000
5,500		6,000	66,000	28,000	36,000	11,000		12,000	102,000	55,000	45,000
5,600		6,000	66,000	28,000	36,000	11,300		12,000	102,000	55,000	45,000
5,800		6,000	66,000	28,000	36,000	11,500		12,000	102,000	55,000	45,000
6,000		6,000	66,000	28,000	36,000	11,510	29/64	12,000	102,000	55,000	45,000
6,100		8,000	79,000	34,000	36,000	11,910	15/32	12,000	102,000	55,000	45,000
6,200		8,000	79,000	34,000	36,000	12,000		12,000	102,000	55,000	45,000
6,300		8,000	79,000	34,000	36,000	12,100		14,000	107,000	60,000	45,000
6,400		8,000	79,000	34,000	36,000	12,300	31/64	14,000	107,000	60,000	45,000
6,600		8,000	79,000	34,000	36,000	12,500		14,000	107,000	60,000	45,000
6,800		8,000	79,000	34,000	36,000	12,700	1/2	14,000	107,000	60,000	45,000
7,000		8,000	79,000	34,000	36,000	12,900		14,000	107,000	60,000	45,000
7,100		8,000	79,000	41,000	36,000	13,000		14,000	107,000	60,000	45,000
7,140	9/32	8,000	79,000	41,000	36,000	13,500		14,000	107,000	60,000	45,000
7,400		8,000	79,000	41,000	36,000	13,890	35/64	14,000	107,000	60,000	45,000
7,500		8,000	79,000	41,000	36,000	14,000		14,000	107,000	60,000	45,000
7,540	19/64	8,000	79,000	41,000	36,000	14,500		16,000	115,000	65,000	48,000
7,800		8,000	79,000	41,000	36,000	14,680	37/64	16,000	115,000	65,000	48,000

2 Nimellismitta

Artikkeli nro.

Tilattaessa mainitse aina artikkelinumero ja nimellismitta esim.

Tehoporat jäädytyskanavilla koko 5,5 = **1181 5,500**

Hinta, katso erillinen hinnastomme.

Tämän julkaisun kopioiminen kokonaisuudessaan tai osittain on kielletty. Julkaisijoita ei voida pitää vastuussa minkäänlaisista virheistä, puutteista tai muutoksista.

Kaikkia tuotteita jotka ovat „DIN“ merkittyjä mutta eroavat luettelossa mainituista dimensioista, voidaan toimittaa mikäli ne ovat DIN standardien mukaisia.

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Tehoporat



Pikavalinta materiaaleittain	alkaen sivu 4
Sisällysluettelo	alkaen sivu 12
Ohjelma	alkaen sivu 16

Vaihtokärjet porausjärjestelmä T 800

Sisällysluettelo	alkaen sivu 124
Ohjelma	alkaen sivu 128

Lieriövaritiset kierukkiporat

Sisällysluettelo	alkaen sivu 176
Pikavalinta materiaaleittain	alkaen sivu 184
Ohjelma	alkaen sivu 192

Kartiovaritiset kierukkiporat

Sisällysluettelo	alkaen sivu 436
Pikavalinta materiaaleittain	alkaen sivu 440
Ohjelma	alkaen sivu 448

Kanuunapora

Sisällysluettelo	alkaen sivu 516
Ohjelma	alkaen sivu 523

Mikroporat

Sisällysluettelo	alkaen sivu 646
Ohjelma	alkaen sivu 649

Keskiöporat / NC-alkuporat

Sisällysluettelo	alkaen sivu 666
Ohjelma	alkaen sivu 668

Porrasperat / väljennysporat

Sisällysluettelo	alkaen sivu 712
Ohjelma	alkaen sivu 714

GÜHRING NAVIGATOR	alkaen sivu 749
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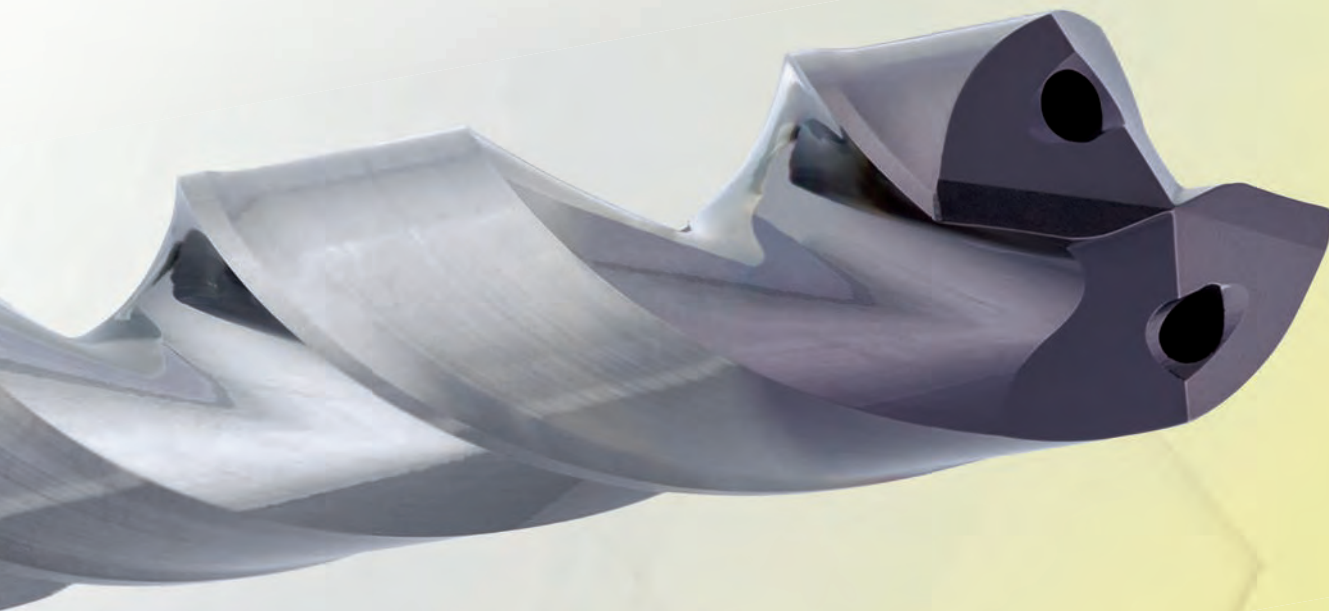
Tekninen osa	alkaen sivu 811
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Artikkelinro. Luettelo	alkaen sivu 871
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TEHOPORAT

Ratio®





TERÄS

KARKAISTU
TERÄS

3xD

4xD

5xD

7xD

 ≤ 1400
N/mm²

No 1

Ø 3,00 - 20,00 mm
Artikkelinro. 5759
alkaen sivu 59

No 1

Ø 3,00 - 20,00 mm
Artikkelinro. 2477
alkaen sivu 39

No 1

Ø 3,00 - 20,00 mm
Artikkelinro. 2479
alkaen sivu 61Ø 3,00 - 20,00 mm
Artikkelinro. 4044
alkaen sivu 85 ≤ 1400
N/mm²Ø 3,00 - 20,00 mm
Artikkelinro. 2480
alkaen sivu 16Ø 3,00 - 20,00 mm
Artikkelinro. 2996
alkaen sivu 30

No 1

Ø 3,00 - 20,00 mm
Artikkelinro. 8520
alkaen sivu 44

No 1

Ø 3,00 - 20,00 mm
Artikkelinro. 8521
alkaen sivu 68

No 1

Ø 3,00 - 26,00 mm
Artikkelinro. 8522
alkaen sivu 90 ≤ 1400
N/mm²

No 1

Ø 1,40 - 3,00 mm
Artikkelinro. 6405
alkaen sivu 110Ø 0,50 - 3,00 mm
Artikkelinro. 6400
alkaen sivu 108Ø 0,50 - 3,00 mm
Artikkelinro. 6401
alkaen sivu 109 ≤ 1400
N/mm²

15xD

20xD

25xD

30xD

No 1

Ø 1,40 - 3,00 mm
Artikkelinro. 6412
alkaen sivu 112

No 1

Ø 3,00 - 14,00 mm
Artikkelinro. 6509
alkaen sivu 102

No 1

Ø 3,00 - 14,00 mm
Artikkelinro. 6511
alkaen sivu 104

No 1

Ø 3,00 - 12,00 mm
Artikkelinro. 6512
alkaen sivu 105

No 1

Ø 3,00 - 10,00 mm
Artikkelinro. 6513
alkaen sivu 106



QUICKFINDER

8xD

12xD

No 1 Paras työkalu yleisteräksille

No 1 Paras työkalu yleisteräksille ja lujille träksille 1600N/mm² asti

No 1

Ø 3,00 - 20,00 mm
Artikkelinro. 5760
alkaen sivu 96



RT100 S jäähdytyskanavilla

No 1

Ø 3,00 - 20,00 mm
Artikkelinro. 5525
alkaen sivu 100



RT100 U jäähdytyskanavilla

Malli H karkaistuille teräksille
62 HRC asti
Artikkelinro. 1946, s. 389



RT100 U ilman jäähdytyskanavia



RT100 HF jäähdytyskanavilla

No 1

Ø 1,40 - 3,00 mm
Artikkelinro. 6408
alkaen sivu 111



ExclusiveLine mikroporat jäähdytyskanavilla



ExclusiveLine Mikroporat ilman jäähdytyskanavia

40xD

No 1

Ø 3,00 - 8,00 mm
Artikkelinro. 6514
alkaen sivu 107



ExclusiveLine mikroporat jäähdytyskanavilla



RT 100 T

RUOSTUMATON
TERÄSTITAANI,
ERIKOIS-SEOKSET

3xD

4xD

5xD

7xD

No 1 No 1

Ø 3,00 - 20,00 mm
Artikkelinro. 8510
alkaen sivu 48

No 1 No 1

Ø 3,00 - 20,00 mm
Artikkelinro. 8511
alkaen sivu 72

No 1

Ø 3,00 - 20,00 mm
Artikkelinro. 8520
alkaen sivu 44

No 1

Ø 3,00 - 20,00 mm
Artikkelinro. 8521
alkaen sivu 68

No 1

Ø 3,00 - 16,00 mm
Artikkelinro. 8522
alkaen sivu 90

S

Ø 3,50 - 20,00 mm
Artikkelinro. 2468
alkaen sivu 52

S

Ø 3,00 - 20,00 mm
Artikkelinro. 2478
alkaen sivu 76

No 1 No 1

Ø 1,40 - 3,00 mm
Artikkelinro. 6405
alkaen sivu 110

15xD

20xD

25xD

30xD

No 1 No 1

Ø 1,40 - 3,00 mm
Artikkelinro. 6412
alkaen sivu 112

No 1 No 1

Ø 3,00 - 14,00 mm
Artikkelinro. 6509
alkaen sivu 102

No 1 No 1

Ø 3,00 - 14,00 mm
Artikkelinro. 6511
alkaen sivu 104

No 1 No 1

Ø 3,00 - 12,00 mm
Artikkelinro. 6512
alkaen sivu 105

No 1 No 1

Ø 3,00 - 10,00 mm
Artikkelinro. 6513
alkaen sivu 106



QUICKFINDER

8xD

No 1 Paras työkalu ruostumattomalle teräkselle

No 1 Paras työkalu erikois- ja titaaniseoksille



RT100 VA



RT100 HF jäähdytyskanavilla



RT100 F jäähdytyskanavilla

No 1 **No 1**

Ø 1,40 - 3,00 mm
Artikkelinro. 6408
alkaen sivu 111



ExclusiveLine mikroporat
jäähdytyskanavilla

40xD



ExclusiveLine mikroporat
jäähdytyskanavilla

No 1 **No 1**

Ø 3,00 - 8,00 mm
Artikkelinro. 6514
alkaen sivu 107



RT 100 T



VALURAUTA

3xD

4xD

5xD

7xD

No 1

Ø 3,00 - 20,00 mm
Artikkelinro. 2477
alkaen sivu 39

Ø 3,00 - 20,00 mm
Artikkelinro. 2480
alkaen sivu 16

No 1

Ø 3,00 - 20,00 mm
Artikkelinro. 6501
alkaen sivu 82

Ø 3,00 - 20,00 mm
Artikkelinro. 2479
alkaen sivu 61

Ø 3,00 - 20,00 mm
Artikkelinro. 2996
alkaen sivu 30

No 1

Ø 4,00 - 20,00 mm
Artikkelinro. 6502
alkaen sivu 91

Ø 3,00 - 20,00 mm
Artikkelinro. 4044
alkaen sivu 85

No 1

Ø 3,00 - 20,00 mm
Artikkelinro. 768
alkaen sivu 56

Ø 3,00 - 20,00 mm
Artikkelinro. 769
alkaen sivu 93

No 1

Ø 1,40 - 3,00 mm
Artikkelinro. 6405
alkaen sivu 110

Ø 0,50 - 3,00 mm
Artikkelinro. 6400
alkaen sivu 108

Ø 0,50 - 3,00 mm
Artikkelinro. 6401
alkaen sivu 109

15xD

20xD

25xD

30xD

No 1

Ø 1,40 - 3,00 mm
Artikkelinro. 6412
alkaen sivu 112

No 1

Ø 3,00 - 14,00 mm
Artikkelinro. 6509
alkaen sivu 102

No 1

Ø 3,00 - 14,00 mm
Artikkelinro. 6511
alkaen sivu 104

No 1

Ø 3,00 - 12,00 mm
Artikkelinro. 6512
alkaen sivu 105

No 1

Ø 3,00 - 10,00 mm
Artikkelinro. 6513
alkaen sivu 106

Ø 5,00 - 14,00 mm
Artikkelinro. 773
alkaen sivu 103



QUICKFINDER

8xD

10xD

12xD

No 1 Paras työkalu


RT 100 R

No 1

Ø 3,00 - 20,00 mm
Artikkelinro. 5525
alkaen sivu 100



RT100 U jähdytyskanavilla



RT100 U ilman jähdytyskanavia

No 1

Ø 3,00 - 20,00 mm
Artikkelinro. 770
alkaen sivu 98



RT100 GG Valurauta

No 1

Ø 1,40 - 3,00 mm
Artikkelinro. 6408
alkaen sivu 111



ExclusiveLine mikroporat jähdytyskanavilla



ExclusiveLine Mikroporat ilman jähdytyskanavia

40xD



ExclusiveLine mikroporat jähdytyskanavilla

No 1

Ø 3,00 - 8,00 mm
Artikkelinro. 6514
alkaen sivu 107



RT 100 T



RT 150 GN



N

ALUMIINI, EI-RAUTAMETALLIT, MUOVIT

4xD

5xD

7xD

8xD

No 1

Ø 3,00 - 20,00 mm
 Artikkelinro. 6068
 alkaen sivu 58

No 1

Ø 3,00 - 19,50 mm
 Artikkelinro. 6069
 alkaen sivu 94

Ø 3,00 - 20,00 mm
 Artikkelinro. 2713
 alkaen sivu 113

No 1

Ø 3,00 - 20,00 mm*

No 1

Ø 1,40 - 3,00 mm
 Artikkelinro. 6405
 alkaen sivu 110

No 1

Ø 1,40 - 3,00 mm
 Artikkelinro. 6408
 alkaen sivu 111

15xD

20xD

25xD

30xD

No 1

Ø 5,00 - 14,00 mm
 Artikkelinro. 773
 alkaen sivu 103

No 1

Ø 3,00 - max. 14,00 mm*

No 1

Ø 1,40 - 3,00 mm
 Artikkelinro. 6412
 alkaen sivu 112

*erikoityökalut pyynnöstä



QUICKFINDER

10xD

No 1 Paras työkalu

No 1

Ø 3,00 - 19,50 mm
Artikkelinro. 6070
alkaen sivu 99



RT150 GG



FT 200 G jäähdytyskanavilla



RT100 AL



ExclusiveLine mikroporat jäähdytyskanavilla



RT 150 GN

Kuituporat
Artikkelinro. 1149
s. 431



RT 100 T Alumiini











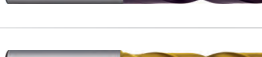



Malli N alumiinin ja
muovien työstöön
Artikkelinro. 732 s. 319












ExclusiveLine mikroporat jäähdytyskanavilla

P	M	K	N	S	H	Työkalun kuvaus	Poraus- syvyys	Varen muoto	Malli	Standardi	Materiaali	Pinta	d1/mm	Artikkeli nro.	Leikkuu- arvosivu	Sivu
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Tehoporat ilman jäähdytyskanavia























•	•	•	•	•	•		3xD	HA	RT100 U	DIN 6537K	VHM	F	3,000 - 20,000	2480	752	16
•	•	•	•	•	•		3xD	HE	RT100 U	DIN 6537K	VHM	F	3,100 - 20,000	2472	752	18
•	•	•	•	•	•		3xD	Cyl	RT100 U	DIN 6539	VHM	F	3,000 - 15,500	2473	752	20
•	•	•	•	•	•		3xD	HE	RT100 U	DIN 6537K	VHM	S	3,000 - 20,000	1184	752	21
•	•	•	•	•	•		3xD	Cyl	RT100 U	DIN 6539	VHM	S	3,000 - 16,000	1242	752	23
•	•	•	•	•	•		3xD	HA	RT100 HF	DIN 6537K	VHM	Y	3,000 - 20,000	8524	752	25
•	•	•	•	•	•		3xD	HA	RT100 F	DIN 6537K	VHM	F	3,700 - 12,000	2475	752	27
•	•	•	•	•	•		3xD	Cyl	RT100 F	DIN 6539	VHM	S	3,000 - 14,000	1702	752	28
•	•	•	•	•	•		5xD	HA	RT100 U	DIN 6537L	VHM	F	3,000 - 20,000	2996	756	30
•	•	•	•	•	•		5xD	HE	RT100 U	DIN 6537L	VHM	F	3,100 - 20,000	2719	756	32
•	•	•	•	•	•		5xD	Cyl	RT100 U	WN	VHM	F	5,000 - 14,000	2474	756	34
•	•	•	•	•	•		5xD	HA	RT100 U	DIN 6537L	VHM	S	3,300 - 12,000	2717	756	35
•	•	•	•	•	•		5xD	Cyl	RT100 U	WN	VHM	S	5,000 - 16,000	1243	756	36
•	•	•	•	•	•		5xD	HA	RT100 F	DIN 6537L	VHM	F	3,000 - 15,000	2712	756	38

Tehoporat jäähdytyskanavilla

•	•	•	•	•	•		3xD	HA	RT100 U	DIN 6537K	VHM	F	3,000 - 20,000	2477	750	39
•	•	•	•	•	•		3xD	HE	RT100 U	DIN 6537K	VHM	F	3,000 - 20,000	2469	750	41
•	•	•	•	•	•		3xD	HE	RT100 U	DIN 6537K	VHM	S	3,300 - 19,500	1181	750	43
•	•	•	•	•	•		3xD	HA	RT100 HF	DIN 6537K	VHM	Y	3,000 - 20,000	8520	750	44
•	•	•	•	•	•		3xD	HE	RT100 HF	DIN 6537K	VHM	Y	3,000 - 20,000	8620	750	46
•	•	•	•	•	•		3xD	HA	RT100 VA	DIN 6537K	VHM	a	3,000 - 20,000	8510	750	48
•	•	•	•	•	•		3xD	HE	RT100 VA	DIN 6537K	VHM	a	3,000 - 20,000	8610	750	50
•	•	•	•	•	•		3xD	HE	RT100 F	DIN 6537K	VHM	F	3,500 - 20,000	2468	750	52
•	•	•	•	•	•		3xD	HA	RT100 F	DIN 6537K	VHM	S	3,100 - 22,000	1660	750	53



P	M	K	N	S	H	Työkalun kuvaus	Poraus- syvyys	Varen muoto	Malli	Standardi	Materiaali	Pinta	d1/mm	Artikkeli nro.	Leikkuu- arvosivu	Sivu
○	○	○	○	●	○		3xD	HE	RT 100 F	DIN 6537K	VHM	S	4,000 - 25,000	1180	750	54
●	○	○	○				3xD	HE	RT 80U	DIN 6538K	HM	S	9,500 - 25,500	1171	750	55
			●	○			4xD	HA	RT 150 GG	WN	VHM	○	3,000 - 20,000	768	752	56
			○	●			4xD	HA	RT 150 GG	WN	VHM	○	3,000 - 20,000	6068	752	58
●	○	○	○	○	○		5xD	HA	RT 100 S	DIN 6537L	VHM	F	3,000 - 20,000	5759	754	59
●	○	●	○	○	○		5xD	HA	RT 100 U	DIN 6537L	VHM	F	3,000 - 20,000	2479	754	61
●	○	●	○	○	○		5xD	HE	RT 100 U	DIN 6537L	VHM	F	3,300 - 20,000	2471	754	63
●	○	●	○	○	○		5xD	HA	RT 100 U	DIN 6537L	VHM	S	3,000 - 19,500	1663	754	65
●	○	●	○	○	○		5xD	HE	RT 100 U	DIN 6537L	VHM	S	3,300 - 20,000	1183	754	66
●				●	○		5xD	HA	RT 100 HF	DIN 6537L	VHM	Y	3,000 - 20,000	8521	756	68
●				●	○		5xD	HE	RT 100 HF	DIN 6537L	VHM	Y	3,000 - 20,000	8621	756	70
				●			5xD	HA	RT 100 VA	DIN 6537L	VHM	a	3,000 - 20,000	8511	756	72
				●			5xD	HE	RT 100 VA	DIN 6537L	VHM	a	3,000 - 20,000	8611	756	74
○	○	○	○	●	○		5xD	HA	RT 100 F	DIN 6537L	VHM	F	3,000 - 20,000	2478	754	76
○	○	○	○	●	○		5xD	HE	RT 100 F	DIN 6537L	VHM	F	3,000 - 20,000	2470	754	77
○	○	○	○	●	○		5xD	HA	RT 100 F	DIN 6537L	VHM	S	3,000 - 23,500	1662	754	78
○	○	○	○	●	○		5xD	HE	RT 100 F	DIN 6537L	VHM	S	3,000 - 25,000	1182	754	80
				●			5xD	HA	RT 100 R	DIN 6537L	VHM	F	3,000 - 20,000	6501	754	82
●	○	○	○				5xD	HE	RT 80U	DIN 6538M	HM	S	9,800 - 25,500	1172	754	84
●	○	●	○	○	○		7xD	HA	RT 100 U	WN	VHM	F	3,000 - 20,000	4044	758	85
●	○	●	○	○	○		7xD	HE	RT 100 U	WN	VHM	F	3,000 - 19,500	4045	758	87
●	○	●	○	○	○		7xD	HA	RT 100 U	WN	VHM	S	3,000 - 19,500	2711	758	89
●				●	○		7xD	HA	RT 100 HF	WN	VHM	Y	3,000 - 16,000	8522	758	90
				●			7xD	HA	RT 100 R	WN	VHM	F	4,000 - 20,000	6502	758	91

P	M	K	N	S	H	Työkalun kuvaus	Poraus- syvyys	Varen muoto	Malli	Standardi	Materiaali	Pinta	d1/mm	Artikkeli nro.	Leikkuu- arvosivu	Sivu
	•	○					7xD	HA	RT 150 GG	WN	VHM	○	3,000 - 20,000	769	758	93
	○	•					7xD	HA	RT 150 GG	WN	VHM	○	3,000 - 19,500	6069	758	94
•	○	○	○				7xD	HE	RT 80U	DIN 6538L	HM	Ⓢ	9,600 - 25,000	1173	758	95
•	○	○	○	○			8xD	HA	RT 100 S	WN	VHM	Ⓡ	3,000 - 20,000	5760	758	96
	•	○					10xD	HA	RT 150 GG	WN	VHM	○	3,000 - 20,000	770	758	98
	○	•					10xD	HA	RT 150 GG	WN	VHM	○	3,000 - 19,500	6070	758	99
•	○	•	○	○			12xD	HA	RT 100 U	WN	VHM	Ⓡ	3,000 - 20,000	5525	758	100
•	•	○	○	○			15xD	HA	RT 100 T	WN	VHM	Ⓡ	3,000 - 14,000	6509	760	102
	•	•					15xD	HA	RT 150 GN	WN	VHM	○	5,000 - 14,000	773	760	103
•	•	○	○	○			20xD	HA	RT 100 T	WN	VHM	Ⓡ	3,000 - 14,000	6511	760	104
•	•	•	○	○			25xD	HA	RT 100 T	WN	VHM	Ⓡ	3,000 - 12,000	6512	760	105
•	•	•	○	○			30xD	HA	RT 100 T	WN	VHM	Ⓡ	3,000 - 10,000	6513	760	106
•	•	•	○	○			40xD	HA	RT 100 T	WN	VHM	Ⓡ	3,000 - 8,000	6514	760	107
ExclusiveLine Mikroporat ilman jäähdytyskanavia																
•	•	○	○	○			4xD	Cyl	N	WN	VHM	Ⓡ	0,500 - 3,000	6400	796	108
•	•	•	○	○			7xD	Cyl	N	WN	VHM	Ⓡ	0,500 - 3,000	6401	796	109
ExclusiveLine mikroporat jäähdytyskanavilla																
•	•	•	○	○			5xD	Cyl	N	WN	VHM	Ⓡ	1,400 - 3,000	6405	796	110
•	•	•	○	○			8xD	Cyl	N	WN	VHM	Ⓡ	1,400 - 3,000	6408	796	111
•	•	•	•	○			15xD	Cyl	N	WN	VHM	Ⓡ	1,400 - 3,000	6412	796	112
Tehoporat, 3-leikkuiset																
	•	•					5xD	HA	FT 200 G	DIN 6537L	VHM	○	3,000 - 20,000	2713	762	113
○	○	○					5xD	Cyl	GS 200 U	DIN 6539	VHM	Ⓢ	3,000 - 14,400	611	762	114
○	○	○					5xD	Cyl	GS 200 U	DIN 6539	VHM	○	3,000 - 20,000	731	762	115
	○	○					5xD	Cyl	GS 200 G	DIN 6539	VHM	○	3,570 - 12,500	745	762	116



P	M	K	N	S	H	Työkalun kuvaus	Poraus- syvyys	Varren muoto	Malli	Standardi	Materiaali	Pinta	d1/mm	Artikkeli nro.	Leikkuu- arvosivu	Sivu
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Tehoporat, 3-leikkuiset

			○	○			5xD	Cyl	GS 200 G	DIN 6539	VHM	○	3,000 - 20,000	1025	762	117
○			○	○			5xD	Cyl	GS 200 F	DIN 6539	VHM	Ⓢ	3,000 - 11,000	1027	762	119

Tehoupotusporat, 3-leikkuiset

			○	○			3xD	Cyl	GS 200 G	WN	VHM	○	3,400 - 20,000	1032		120
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Tehoporat ilman jäähdytyskanavia



P • Kärjen kevennys $\geq \varnothing 3,000$ • päästöhiottu kärki • pääleikkusuärmän suorasta
• optimoitu leikkuu geometria

M ○

K •

N ○

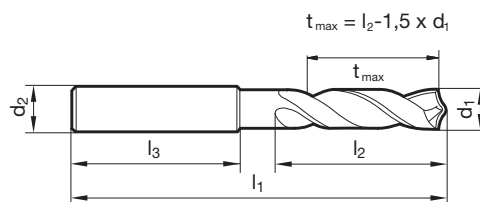
S ○

H ○

rakenne- ja pintakarkaistut teräkset • automaattiteräkset, nuorutetut teräkset • seostetut teräkset $< 1200 \text{ N/mm}^2$ asti • valut • pronssi, messinki • runsasseosteiset AlSi-seokset

GÜHRING NAVIGATOR

Leikkuuarvosivu 752



Artikkelinro.

2480

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,000		6,000	62,000	20,000	36,000	6,500		8,000	79,000	34,000	36,000
3,100		6,000	62,000	20,000	36,000	6,600		8,000	79,000	34,000	36,000
3,200		6,000	62,000	20,000	36,000	6,700		8,000	79,000	34,000	36,000
3,250		6,000	62,000	20,000	36,000	6,750	17/64	8,000	79,000	34,000	36,000
3,300		6,000	62,000	20,000	36,000	6,800		8,000	79,000	34,000	36,000
3,400		6,000	62,000	20,000	36,000	6,900		8,000	79,000	34,000	36,000
3,500		6,000	62,000	20,000	36,000	7,000		8,000	79,000	34,000	36,000
3,570	9/64	6,000	62,000	20,000	36,000	7,200		8,000	79,000	41,000	36,000
3,600		6,000	62,000	20,000	36,000	7,300		8,000	79,000	41,000	36,000
3,700		6,000	62,000	20,000	36,000	7,500		8,000	79,000	41,000	36,000
3,800		6,000	66,000	24,000	36,000	7,700		8,000	79,000	41,000	36,000
3,900		6,000	66,000	24,000	36,000	7,900		8,000	79,000	41,000	36,000
4,000		6,000	66,000	24,000	36,000	7,940	5/16	8,000	79,000	41,000	36,000
4,100		6,000	66,000	24,000	36,000	8,000		8,000	79,000	41,000	36,000
4,200		6,000	66,000	24,000	36,000	8,100		10,000	89,000	47,000	40,000
4,300		6,000	66,000	24,000	36,000	8,200		10,000	89,000	47,000	40,000
4,400		6,000	66,000	24,000	36,000	8,330	21/64	10,000	89,000	47,000	40,000
4,500		6,000	66,000	24,000	36,000	8,400		10,000	89,000	47,000	40,000
4,600		6,000	66,000	24,000	36,000	8,500		10,000	89,000	47,000	40,000
4,650		6,000	66,000	24,000	36,000	8,700		10,000	89,000	47,000	40,000
4,760	3/16	6,000	66,000	28,000	36,000	8,800		10,000	89,000	47,000	40,000
4,800		6,000	66,000	28,000	36,000	8,900		10,000	89,000	47,000	40,000
4,900		6,000	66,000	28,000	36,000	9,250		10,000	89,000	47,000	40,000
5,000		6,000	66,000	28,000	36,000	9,400		10,000	89,000	47,000	40,000
5,100		6,000	66,000	28,000	36,000	9,500		10,000	89,000	47,000	40,000
5,160	13/64	6,000	66,000	28,000	36,000	9,700		10,000	89,000	47,000	40,000
5,200		6,000	66,000	28,000	36,000	9,800		10,000	89,000	47,000	40,000
5,300		6,000	66,000	28,000	36,000	9,900		10,000	89,000	47,000	40,000
5,400		6,000	66,000	28,000	36,000	10,000		10,000	89,000	47,000	40,000
5,500		6,000	66,000	28,000	36,000	10,100		12,000	102,000	55,000	45,000
5,550		6,000	66,000	28,000	36,000	10,200		12,000	102,000	55,000	45,000
5,560	7/32	6,000	66,000	28,000	36,000	10,320	13/32	12,000	102,000	55,000	45,000
5,600		6,000	66,000	28,000	36,000	10,400		12,000	102,000	55,000	45,000
5,650		6,000	66,000	28,000	36,000	10,500		12,000	102,000	55,000	45,000
5,700		6,000	66,000	28,000	36,000	10,700		12,000	102,000	55,000	45,000
5,800		6,000	66,000	28,000	36,000	10,800		12,000	102,000	55,000	45,000
5,900		6,000	66,000	28,000	36,000	10,900		12,000	102,000	55,000	45,000
6,000		6,000	66,000	28,000	36,000	11,000		12,000	102,000	55,000	45,000
6,100		8,000	79,000	34,000	36,000	11,110	7/16	12,000	102,000	55,000	45,000
6,200		8,000	79,000	34,000	36,000	11,500		12,000	102,000	55,000	45,000
6,350	1/4	8,000	79,000	34,000	36,000	11,600		12,000	102,000	55,000	45,000
6,400		8,000	79,000	34,000	36,000	11,800		12,000	102,000	55,000	45,000



d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
11,910	15/32	12,000	102,000	55,000	45,000
12,000		12,000	102,000	55,000	45,000
12,100		14,000	107,000	60,000	45,000
12,200		14,000	107,000	60,000	45,000
12,500		14,000	107,000	60,000	45,000
12,700	1/2	14,000	107,000	60,000	45,000
12,800		14,000	107,000	60,000	45,000
13,000		14,000	107,000	60,000	45,000
13,100	33/64	14,000	107,000	60,000	45,000
13,500		14,000	107,000	60,000	45,000
14,000		14,000	107,000	60,000	45,000
14,200		16,000	115,000	65,000	48,000
14,290	9/16	16,000	115,000	65,000	48,000
14,400		16,000	115,000	65,000	48,000
14,500		16,000	115,000	65,000	48,000
14,700		16,000	115,000	65,000	48,000
14,800		16,000	115,000	65,000	48,000
15,000		16,000	115,000	65,000	48,000

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
15,100		16,000	115,000	65,000	48,000
15,200		16,000	115,000	65,000	48,000
15,300		16,000	115,000	65,000	48,000
15,500		16,000	115,000	65,000	48,000
15,600		16,000	115,000	65,000	48,000
15,700		16,000	115,000	65,000	48,000
16,000		16,000	115,000	65,000	48,000
16,500		18,000	123,000	73,000	48,000
17,000		18,000	123,000	73,000	48,000
17,500		18,000	123,000	73,000	48,000
18,000		18,000	123,000	73,000	48,000
18,500		20,000	131,000	79,000	50,000
19,000		20,000	131,000	79,000	50,000
19,500		20,000	131,000	79,000	50,000
20,000		20,000	131,000	79,000	50,000

Tehoporat ilman jäähdtyiskanavia


P • Kärjen kevennys $\geq \varnothing 3,100$ • päästöhiottu kärki • pääleikkusuärmän suorasta
• optimoitu leikkuu geometria

M ○

K •

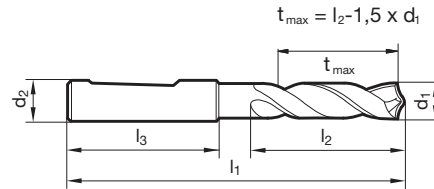
N ○ rakenne- ja pintakarkaistut teräkset • automaattiteräkset, nuorutetut

S ○ teräkset • seostetut teräkset $< 1200 \text{ N/mm}^2$ asti • valut • pronssi, messinki

H ○ • runsasseosteiset AlSi-seokset

GÜHRING NAVIGATOR

Leikkuuarvosivu 752



Artikkelinro.

2472

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,100		6,000	62,000	20,000	36,000	9,250		10,000	89,000	47,000	40,000
3,200		6,000	62,000	20,000	36,000	9,400		10,000	89,000	47,000	40,000
3,500		6,000	62,000	20,000	36,000	9,500		10,000	89,000	47,000	40,000
3,600		6,000	62,000	20,000	36,000	9,800		10,000	89,000	47,000	40,000
3,700		6,000	62,000	20,000	36,000	10,000		10,000	89,000	47,000	40,000
3,900		6,000	66,000	24,000	36,000	10,100		12,000	102,000	55,000	45,000
4,000		6,000	66,000	24,000	36,000	10,200		12,000	102,000	55,000	45,000
4,200		6,000	66,000	24,000	36,000	10,300		12,000	102,000	55,000	45,000
4,500		6,000	66,000	24,000	36,000	10,320	13/32	12,000	102,000	55,000	45,000
4,600		6,000	66,000	24,000	36,000	10,400		12,000	102,000	55,000	45,000
4,900		6,000	66,000	28,000	36,000	10,500		12,000	102,000	55,000	45,000
5,000		6,000	66,000	28,000	36,000	10,600		12,000	102,000	55,000	45,000
5,100		6,000	66,000	28,000	36,000	10,700		12,000	102,000	55,000	45,000
5,200		6,000	66,000	28,000	36,000	10,800		12,000	102,000	55,000	45,000
5,300		6,000	66,000	28,000	36,000	10,900		12,000	102,000	55,000	45,000
5,400		6,000	66,000	28,000	36,000	11,000		12,000	102,000	55,000	45,000
5,500		6,000	66,000	28,000	36,000	11,110	7/16	12,000	102,000	55,000	45,000
5,800		6,000	66,000	28,000	36,000	11,200		12,000	102,000	55,000	45,000
5,900		6,000	66,000	28,000	36,000	11,300		12,000	102,000	55,000	45,000
6,000		6,000	66,000	28,000	36,000	11,500		12,000	102,000	55,000	45,000
6,100		8,000	79,000	34,000	36,000	11,800		12,000	102,000	55,000	45,000
6,500		8,000	79,000	34,000	36,000	11,910	15/32	12,000	102,000	55,000	45,000
6,600		8,000	79,000	34,000	36,000	12,000		12,000	102,000	55,000	45,000
6,800		8,000	79,000	34,000	36,000	12,100		14,000	107,000	60,000	45,000
7,000		8,000	79,000	34,000	36,000	12,200		14,000	107,000	60,000	45,000
7,100		8,000	79,000	41,000	36,000	12,500		14,000	107,000	60,000	45,000
7,200		8,000	79,000	41,000	36,000	12,600		14,000	107,000	60,000	45,000
7,300		8,000	79,000	41,000	36,000	12,700	1/2	14,000	107,000	60,000	45,000
7,500		8,000	79,000	41,000	36,000	13,000		14,000	107,000	60,000	45,000
7,700		8,000	79,000	41,000	36,000	13,300		14,000	107,000	60,000	45,000
7,900		8,000	79,000	41,000	36,000	13,500		14,000	107,000	60,000	45,000
8,000		8,000	79,000	41,000	36,000	14,000		14,000	107,000	60,000	45,000
8,100		10,000	89,000	47,000	40,000	14,200		16,000	115,000	65,000	48,000
8,200		10,000	89,000	47,000	40,000	14,290	9/16	16,000	115,000	65,000	48,000
8,300		10,000	89,000	47,000	40,000	14,500		16,000	115,000	65,000	48,000
8,500		10,000	89,000	47,000	40,000	14,700		16,000	115,000	65,000	48,000
8,600		10,000	89,000	47,000	40,000	15,000		16,000	115,000	65,000	48,000
8,700		10,000	89,000	47,000	40,000	15,200		16,000	115,000	65,000	48,000
8,900		10,000	89,000	47,000	40,000	15,500		16,000	115,000	65,000	48,000
9,000		10,000	89,000	47,000	40,000	15,700		16,000	115,000	65,000	48,000
9,100		10,000	89,000	47,000	40,000	15,800		16,000	115,000	65,000	48,000
9,200		10,000	89,000	47,000	40,000	16,200		18,000	123,000	73,000	48,000



d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
16,300		18,000	123,000	73,000	48,000
16,500		18,000	123,000	73,000	48,000
17,000		18,000	123,000	73,000	48,000
17,500		18,000	123,000	73,000	48,000
18,000		18,000	123,000	73,000	48,000
18,300		20,000	131,000	79,000	50,000

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
18,500		20,000	131,000	79,000	50,000
19,000		20,000	131,000	79,000	50,000
19,500		20,000	131,000	79,000	50,000
20,000		20,000	131,000	79,000	50,000

Tehoporat ilman jäähdytyskanavia


P • Kärjen kevennys $\geq \varnothing 3,000$ • päästöhiottu kärki • pääleikkausärmän suorasta
• optimoitu leikkuu geometria

M ○

K •

N ○ rakenne- ja pintakarkaistut teräkset • automaattiteräkset, nuorrutetut teräkset • seostetut teräkset $< 1200 \text{ N/mm}^2$ asti • valut • pronssi, messinki
S ○ runsasseosteiset AlSi-seokset

H ○

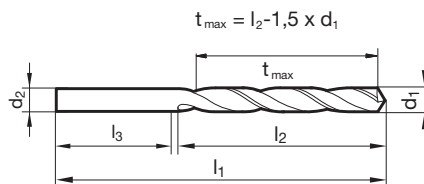
 Materiaali **TKM**

 Pinta **F**

Varren muoto lieriö

GÜHRING NAVIGATOR

Leikkuuarvosivu 752


 Artikkelinro. **2473**

d1		d2	l1	l2	l3
mm	inch	mm	mm	mm	mm
3,000		3,000	46,000	16,000	30,000
3,200		3,200	49,000	18,000	31,000
3,300		3,300	49,000	18,000	31,000
3,500		3,500	52,000	20,000	32,000
3,800		3,800	55,000	22,000	33,000
3,900		3,900	55,000	22,000	33,000
4,000		4,000	55,000	22,000	33,000
4,200		4,200	55,000	22,000	33,000
4,500		4,500	58,000	24,000	34,000
4,600		4,600	58,000	24,000	34,000
4,900		4,900	62,000	26,000	36,000
5,000		5,000	62,000	26,000	36,000
5,200		5,200	62,000	26,000	36,000
5,500		5,500	66,000	28,000	38,000
5,800		5,800	66,000	28,000	38,000
6,000		6,000	66,000	28,000	38,000
6,100		6,100	70,000	31,000	39,000
6,200		6,200	70,000	31,000	39,000

d1		d2	l1	l2	l3
mm	inch	mm	mm	mm	mm
6,400		6,400	70,000	31,000	39,000
7,000		7,000	74,000	34,000	40,000
7,400		7,400	74,000	34,000	40,000
8,100		8,100	79,000	37,000	42,000
8,500		8,500	79,000	37,000	42,000
8,800		8,800	84,000	40,000	44,000
9,100		9,100	84,000	40,000	44,000
9,400		9,400	84,000	40,000	44,000
10,000		10,000	89,000	43,000	46,000
10,200		10,200	89,000	43,000	46,000
10,500		10,500	89,000	43,000	46,000
11,500		11,500	95,000	47,000	48,000
11,800		11,800	95,000	47,000	48,000
12,000		12,000	102,000	51,000	51,000
12,500		12,500	102,000	51,000	51,000
14,000		14,000	107,000	54,000	53,000
15,500		15,500	115,000	58,000	57,000



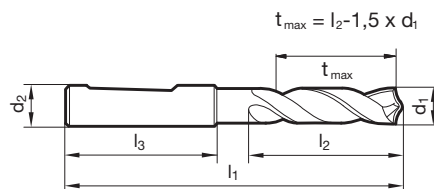
Tehoporat ilman jäähdytyskanavia



P ●	Kärjen kevennys $\geq \varnothing 3,000$ • päästöhiottu kärki • pääleikkuusärmän suorasta • optimoitu leikkuu geometria
M ○	
K ●	
N ○	rakenne- ja pintakarkaistut teräkset • automaattiteräkset, nuorutetut teräkset • seostetut teräkset < 1200 N/mm ² asti • valut • pronssi, messinki
S ○	• runsasseosteiset AlSi-seokset
H ○	

GÜHRING NAVIGATOR

Leikkuuarvosivu 752



Artikkelinro.

1184

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,000		6,000	62,000	20,000	36,000	6,700		8,000	79,000	34,000	36,000
3,100		6,000	62,000	20,000	36,000	6,750	17/64	8,000	79,000	34,000	36,000
3,200		6,000	62,000	20,000	36,000	6,800		8,000	79,000	34,000	36,000
3,300		6,000	62,000	20,000	36,000	7,000		8,000	79,000	34,000	36,000
3,400		6,000	62,000	20,000	36,000	7,140	9/32	8,000	79,000	41,000	36,000
3,500		6,000	62,000	20,000	36,000	7,200		8,000	79,000	41,000	36,000
3,570	9/64	6,000	62,000	20,000	36,000	7,300		8,000	79,000	41,000	36,000
3,600		6,000	62,000	20,000	36,000	7,400		8,000	79,000	41,000	36,000
3,700		6,000	62,000	20,000	36,000	7,500		8,000	79,000	41,000	36,000
3,800		6,000	66,000	24,000	36,000	7,540	19/64	8,000	79,000	41,000	36,000
3,900		6,000	66,000	24,000	36,000	7,600		8,000	79,000	41,000	36,000
3,970	5/32	6,000	66,000	24,000	36,000	7,700		8,000	79,000	41,000	36,000
4,000		6,000	66,000	24,000	36,000	7,900		8,000	79,000	41,000	36,000
4,100		6,000	66,000	24,000	36,000	7,940	5/16	8,000	79,000	41,000	36,000
4,200		6,000	66,000	24,000	36,000	8,000		8,000	79,000	41,000	36,000
4,400		6,000	66,000	24,000	36,000	8,100		10,000	89,000	47,000	40,000
4,500		6,000	66,000	24,000	36,000	8,200		10,000	89,000	47,000	40,000
4,600		6,000	66,000	24,000	36,000	8,300		10,000	89,000	47,000	40,000
4,700		6,000	66,000	24,000	36,000	8,330	21/64	10,000	89,000	47,000	40,000
4,760	3/16	6,000	66,000	28,000	36,000	8,400		10,000	89,000	47,000	40,000
4,800		6,000	66,000	28,000	36,000	8,500		10,000	89,000	47,000	40,000
4,900		6,000	66,000	28,000	36,000	8,700		10,000	89,000	47,000	40,000
5,000		6,000	66,000	28,000	36,000	8,800		10,000	89,000	47,000	40,000
5,100		6,000	66,000	28,000	36,000	8,900		10,000	89,000	47,000	40,000
5,160	13/64	6,000	66,000	28,000	36,000	9,000		10,000	89,000	47,000	40,000
5,200		6,000	66,000	28,000	36,000	9,100		10,000	89,000	47,000	40,000
5,300		6,000	66,000	28,000	36,000	9,200		10,000	89,000	47,000	40,000
5,400		6,000	66,000	28,000	36,000	9,300		10,000	89,000	47,000	40,000
5,500		6,000	66,000	28,000	36,000	9,400		10,000	89,000	47,000	40,000
5,560	7/32	6,000	66,000	28,000	36,000	9,500		10,000	89,000	47,000	40,000
5,600		6,000	66,000	28,000	36,000	9,520	3/8	10,000	89,000	47,000	40,000
5,700		6,000	66,000	28,000	36,000	9,600		10,000	89,000	47,000	40,000
5,900		6,000	66,000	28,000	36,000	9,700		10,000	89,000	47,000	40,000
5,950	15/64	6,000	66,000	28,000	36,000	9,800		10,000	89,000	47,000	40,000
6,000		6,000	66,000	28,000	36,000	9,900		10,000	89,000	47,000	40,000
6,100		8,000	79,000	34,000	36,000	9,920	25/64	10,000	89,000	47,000	40,000
6,200		8,000	79,000	34,000	36,000	10,000		10,000	89,000	47,000	40,000
6,300		8,000	79,000	34,000	36,000	10,100		12,000	102,000	55,000	45,000
6,350	1/4	8,000	79,000	34,000	36,000	10,200		12,000	102,000	55,000	45,000
6,400		8,000	79,000	34,000	36,000	10,300		12,000	102,000	55,000	45,000
6,500		8,000	79,000	34,000	36,000	10,320	13/32	12,000	102,000	55,000	45,000
6,600		8,000	79,000	34,000	36,000	10,500		12,000	102,000	55,000	45,000



d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
10,600		12,000	102,000	55,000	45,000
10,720	27/64	12,000	102,000	55,000	45,000
10,800		12,000	102,000	55,000	45,000
11,000		12,000	102,000	55,000	45,000
11,100		12,000	102,000	55,000	45,000
11,110	7/16	12,000	102,000	55,000	45,000
11,200		12,000	102,000	55,000	45,000
11,400		12,000	102,000	55,000	45,000
11,500		12,000	102,000	55,000	45,000
11,600		12,000	102,000	55,000	45,000
11,700		12,000	102,000	55,000	45,000
11,800		12,000	102,000	55,000	45,000
11,910	15/32	12,000	102,000	55,000	45,000
12,000		12,000	102,000	55,000	45,000
12,100		14,000	107,000	60,000	45,000
12,200		14,000	107,000	60,000	45,000
12,300	31/64	14,000	107,000	60,000	45,000
12,400		14,000	107,000	60,000	45,000
12,700	1/2	14,000	107,000	60,000	45,000
13,000		14,000	107,000	60,000	45,000
13,100	33/64	14,000	107,000	60,000	45,000
13,200		14,000	107,000	60,000	45,000
13,300		14,000	107,000	60,000	45,000
13,400		14,000	107,000	60,000	45,000
13,500		14,000	107,000	60,000	45,000
13,800		14,000	107,000	60,000	45,000
13,890	35/64	14,000	107,000	60,000	45,000
14,000		14,000	107,000	60,000	45,000
14,200		16,000	115,000	65,000	48,000
14,290	9/16	16,000	115,000	65,000	48,000
14,300		16,000	115,000	65,000	48,000
14,400		16,000	115,000	65,000	48,000
14,700		16,000	115,000	65,000	48,000
14,800		16,000	115,000	65,000	48,000
15,000		16,000	115,000	65,000	48,000
15,100		16,000	115,000	65,000	48,000

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
15,200		16,000	115,000	65,000	48,000
15,480	39/64	16,000	115,000	65,000	48,000
15,700		16,000	115,000	65,000	48,000
15,800		16,000	115,000	65,000	48,000
15,870	5/8	16,000	115,000	65,000	48,000
15,900		16,000	115,000	65,000	48,000
16,000		16,000	115,000	65,000	48,000
16,100		18,000	123,000	73,000	48,000
16,270	41/64	18,000	123,000	73,000	48,000
16,300		18,000	123,000	73,000	48,000
16,500		18,000	123,000	73,000	48,000
16,800		18,000	123,000	73,000	48,000
17,000		18,000	123,000	73,000	48,000
17,300		18,000	123,000	73,000	48,000
17,460	11/16	18,000	123,000	73,000	48,000
17,500		18,000	123,000	73,000	48,000
17,700		18,000	123,000	73,000	48,000
17,860	45/64	18,000	123,000	73,000	48,000
18,000		18,000	123,000	73,000	48,000
18,100		20,000	131,000	79,000	50,000
18,300		20,000	131,000	79,000	50,000
18,500		20,000	131,000	79,000	50,000
18,650	47/64	20,000	131,000	79,000	50,000
19,000		20,000	131,000	79,000	50,000
19,050	3/4	20,000	131,000	79,000	50,000
19,200		20,000	131,000	79,000	50,000
19,500		20,000	131,000	79,000	50,000
19,600		20,000	131,000	79,000	50,000
20,000		20,000	131,000	79,000	50,000



Tehoporat ilman jäähdytyskanavia



Materiaali

TKM

Pinta

S

Varren muoto

lieriö

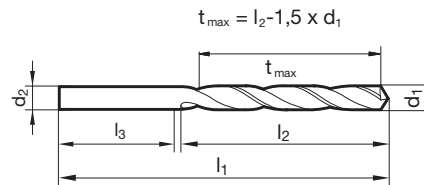
P • Kärjen kevennys $\geq \varnothing 3,000$ • päästöhiottu kärki • pääleikkuusärmän suorasta
• optimoitu leikkuu geometria

M ○**K** •**N** ○**S** ○**H** ○

rakenne- ja pintakarkaistut teräkset • automaattiteräkset, nuorutetut teräkset • seostetut teräkset $< 1200 \text{ N/mm}^2$ asti • valut • pronssi, messinki
• runsasseosteiset AlSi-seokset

GÜHRING NAVIGATOR

Leikkuuarvosivu 752



Artikkelinro.

1242

d1		d2	l1	l2	l3	d1		d2	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,000		3,000	46,000	16,000	30,000	6,350	1/4	6,350	70,000	31,000	39,000
3,100		3,100	49,000	18,000	31,000	6,400		6,400	70,000	31,000	39,000
3,170	1/8	3,170	49,000	18,000	31,000	6,500		6,500	70,000	31,000	39,000
3,200		3,200	49,000	18,000	31,000	6,600		6,600	70,000	31,000	39,000
3,300		3,300	49,000	18,000	31,000	6,700		6,700	70,000	31,000	39,000
3,400		3,400	52,000	20,000	32,000	6,750	17/64	6,750	74,000	34,000	40,000
3,500		3,500	52,000	20,000	32,000	6,800		6,800	74,000	34,000	40,000
3,570	9/64	3,570	52,000	20,000	32,000	6,900		6,900	74,000	34,000	40,000
3,600		3,600	52,000	20,000	32,000	7,000		7,000	74,000	34,000	40,000
3,700		3,700	52,000	20,000	32,000	7,100		7,100	74,000	34,000	40,000
3,800		3,800	55,000	22,000	33,000	7,140	9/32	7,140	74,000	34,000	40,000
3,900		3,900	55,000	22,000	33,000	7,200		7,200	74,000	34,000	40,000
3,970	5/32	3,970	55,000	22,000	33,000	7,300		7,300	74,000	34,000	40,000
4,000		4,000	55,000	22,000	33,000	7,400		7,400	74,000	34,000	40,000
4,100		4,100	55,000	22,000	33,000	7,500		7,500	74,000	34,000	40,000
4,200		4,200	55,000	22,000	33,000	7,540	19/64	7,540	79,000	37,000	42,000
4,300		4,300	58,000	24,000	34,000	7,600		7,600	79,000	37,000	42,000
4,370	11/64	4,370	58,000	24,000	34,000	7,700		7,700	79,000	37,000	42,000
4,400		4,400	58,000	24,000	34,000	7,800		7,800	79,000	37,000	42,000
4,500		4,500	58,000	24,000	34,000	7,900		7,900	79,000	37,000	42,000
4,600		4,600	58,000	24,000	34,000	7,940	5/16	7,940	79,000	37,000	42,000
4,700		4,700	58,000	24,000	34,000	8,000		8,000	79,000	37,000	42,000
4,760	3/16	4,760	62,000	26,000	36,000	8,100		8,100	79,000	37,000	42,000
4,800		4,800	62,000	26,000	36,000	8,200		8,200	79,000	37,000	42,000
4,900		4,900	62,000	26,000	36,000	8,300		8,300	79,000	37,000	42,000
5,000		5,000	62,000	26,000	36,000	8,330	21/64	8,330	79,000	37,000	42,000
5,100		5,100	62,000	26,000	36,000	8,400		8,400	79,000	37,000	42,000
5,160	13/64	5,160	62,000	26,000	36,000	8,500		8,500	79,000	37,000	42,000
5,200		5,200	62,000	26,000	36,000	8,600		8,600	84,000	40,000	44,000
5,300		5,300	62,000	26,000	36,000	8,700		8,700	84,000	40,000	44,000
5,400		5,400	66,000	28,000	38,000	8,730	11/32	8,730	84,000	40,000	44,000
5,500		5,500	66,000	28,000	38,000	8,800		8,800	84,000	40,000	44,000
5,560	7/32	5,560	66,000	28,000	38,000	8,900		8,900	84,000	40,000	44,000
5,600		5,600	66,000	28,000	38,000	9,000		9,000	84,000	40,000	44,000
5,700		5,700	66,000	28,000	38,000	9,100		9,100	84,000	40,000	44,000
5,800		5,800	66,000	28,000	38,000	9,130	23/64	9,130	84,000	40,000	44,000
5,900		5,900	66,000	28,000	38,000	9,200		9,200	84,000	40,000	44,000
5,950	15/64	5,950	66,000	28,000	38,000	9,300		9,300	84,000	40,000	44,000
6,000		6,000	66,000	28,000	38,000	9,400		9,400	84,000	40,000	44,000
6,100		6,100	70,000	31,000	39,000	9,500		9,500	84,000	40,000	44,000
6,200		6,200	70,000	31,000	39,000	9,520	3/8	9,520	89,000	43,000	46,000
6,300		6,300	70,000	31,000	39,000	9,600		9,600	89,000	43,000	46,000



d1		d2	l1	l2	l3
mm	inch	mm	mm	mm	mm
9,700		9,700	89,000	43,000	46,000
9,800		9,800	89,000	43,000	46,000
9,900		9,900	89,000	43,000	46,000
9,920	25/64	9,920	89,000	43,000	46,000
10,000		10,000	89,000	43,000	46,000
10,100		10,100	89,000	43,000	46,000
10,200		10,200	89,000	43,000	46,000
10,300		10,300	89,000	43,000	46,000
10,320	13/32	10,320	89,000	43,000	46,000
10,400		10,400	89,000	43,000	46,000
10,500		10,500	89,000	43,000	46,000
10,600		10,600	89,000	43,000	46,000
10,700		10,700	95,000	47,000	48,000
10,720	27/64	10,720	95,000	47,000	48,000
10,800		10,800	95,000	47,000	48,000
10,900		10,900	95,000	47,000	48,000
11,000		11,000	95,000	47,000	48,000
11,100		11,100	95,000	47,000	48,000
11,110	7/16	11,110	95,000	47,000	48,000
11,200		11,200	95,000	47,000	48,000
11,300		11,300	95,000	47,000	48,000
11,400		11,400	95,000	47,000	48,000
11,500		11,500	95,000	47,000	48,000
11,510	29/64	11,510	95,000	47,000	48,000

d1		d2	l1	l2	l3
mm	inch	mm	mm	mm	mm
11,600		11,600	95,000	47,000	48,000
11,800		11,800	95,000	47,000	48,000
11,900		11,900	102,000	51,000	51,000
11,910	15/32	11,910	102,000	51,000	51,000
12,000		12,000	102,000	51,000	51,000
12,500		12,500	102,000	51,000	51,000
12,700	1/2	12,700	102,000	51,000	51,000
13,000		13,000	102,000	51,000	51,000
13,500		13,500	107,000	54,000	53,000
14,000		14,000	107,000	54,000	53,000
14,500		14,500	111,000	56,000	55,000
15,000		15,000	111,000	56,000	55,000
15,500		15,500	115,000	58,000	57,000
16,000		16,000	115,000	58,000	57,000



Tehoporat ilman jäähdytyskanavia



P • Kärjen kevennys $\geq \varnothing 3,000$ • kartiovaippahionta • leikkusuärmä on hieman kovera • optimoitu leikkuu geometria

M

K

N

seostetut ja lujat teräkset 1600 N/mm² asti • Inconel, Hastelloy, Monel
• Titaani ja titaaniseokset

S •

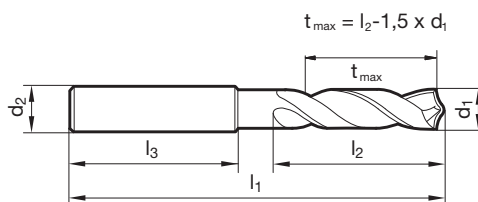
H ○

GÜHRING NAVIGATOR

Leikkuuarvosivu 752

Materiaali	TKM
Pinta	Y
Varren muoto	HA

Tehoporat



Artikkelinro.

8524

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,000		6,000	62,000	20,000	36,000	6,100		8,000	79,000	34,000	36,000
3,100		6,000	62,000	20,000	36,000	6,200		8,000	79,000	34,000	36,000
3,170	1/8	6,000	62,000	20,000	36,000	6,300		8,000	79,000	34,000	36,000
3,200		6,000	62,000	20,000	36,000	6,350	1/4	8,000	79,000	34,000	36,000
3,250		6,000	62,000	20,000	36,000	6,400		8,000	79,000	34,000	36,000
3,300		6,000	62,000	20,000	36,000	6,500		8,000	79,000	34,000	36,000
3,400		6,000	62,000	20,000	36,000	6,600		8,000	79,000	34,000	36,000
3,500		6,000	62,000	20,000	36,000	6,700		8,000	79,000	34,000	36,000
3,570	9/64	6,000	62,000	20,000	36,000	6,750	17/64	8,000	79,000	34,000	36,000
3,600		6,000	62,000	20,000	36,000	6,800		8,000	79,000	34,000	36,000
3,700		6,000	62,000	20,000	36,000	6,900		8,000	79,000	34,000	36,000
3,800		6,000	66,000	24,000	36,000	7,000		8,000	79,000	34,000	36,000
3,900		6,000	66,000	24,000	36,000	7,100		8,000	79,000	41,000	36,000
3,970	5/32	6,000	66,000	24,000	36,000	7,140	9/32	8,000	79,000	41,000	36,000
4,000		6,000	66,000	24,000	36,000	7,200		8,000	79,000	41,000	36,000
4,100		6,000	66,000	24,000	36,000	7,300		8,000	79,000	41,000	36,000
4,200		6,000	66,000	24,000	36,000	7,400		8,000	79,000	41,000	36,000
4,300		6,000	66,000	24,000	36,000	7,500		8,000	79,000	41,000	36,000
4,370	11/64	6,000	66,000	24,000	36,000	7,540	19/64	8,000	79,000	41,000	36,000
4,400		6,000	66,000	24,000	36,000	7,600		8,000	79,000	41,000	36,000
4,500		6,000	66,000	24,000	36,000	7,700		8,000	79,000	41,000	36,000
4,600		6,000	66,000	24,000	36,000	7,800		8,000	79,000	41,000	36,000
4,650		6,000	66,000	24,000	36,000	7,900		8,000	79,000	41,000	36,000
4,700		6,000	66,000	24,000	36,000	7,940	5/16	8,000	79,000	41,000	36,000
4,760	3/16	6,000	66,000	28,000	36,000	8,000		8,000	79,000	41,000	36,000
4,800		6,000	66,000	28,000	36,000	8,100		10,000	89,000	47,000	40,000
4,900		6,000	66,000	28,000	36,000	8,200		10,000	89,000	47,000	40,000
5,000		6,000	66,000	28,000	36,000	8,300		10,000	89,000	47,000	40,000
5,100		6,000	66,000	28,000	36,000	8,330	21/64	10,000	89,000	47,000	40,000
5,160	13/64	6,000	66,000	28,000	36,000	8,400		10,000	89,000	47,000	40,000
5,200		6,000	66,000	28,000	36,000	8,500		10,000	89,000	47,000	40,000
5,300		6,000	66,000	28,000	36,000	8,600		10,000	89,000	47,000	40,000
5,400		6,000	66,000	28,000	36,000	8,700		10,000	89,000	47,000	40,000
5,500		6,000	66,000	28,000	36,000	8,730	11/32	10,000	89,000	47,000	40,000
5,550		6,000	66,000	28,000	36,000	8,800		10,000	89,000	47,000	40,000
5,560	7/32	6,000	66,000	28,000	36,000	8,900		10,000	89,000	47,000	40,000
5,600		6,000	66,000	28,000	36,000	9,000		10,000	89,000	47,000	40,000
5,700		6,000	66,000	28,000	36,000	9,100		10,000	89,000	47,000	40,000
5,800		6,000	66,000	28,000	36,000	9,130	23/64	10,000	89,000	47,000	40,000
5,900		6,000	66,000	28,000	36,000	9,200		10,000	89,000	47,000	40,000
5,950	15/64	6,000	66,000	28,000	36,000	9,250		10,000	89,000	47,000	40,000
6,000		6,000	66,000	28,000	36,000	9,300		10,000	89,000	47,000	40,000



d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
9,400		10,000	89,000	47,000	40,000
9,500		10,000	89,000	47,000	40,000
9,520	3/8	10,000	89,000	47,000	40,000
9,600		10,000	89,000	47,000	40,000
9,700		10,000	89,000	47,000	40,000
9,800		10,000	89,000	47,000	40,000
9,900		10,000	89,000	47,000	40,000
9,920	25/64	10,000	89,000	47,000	40,000
10,000		10,000	89,000	47,000	40,000
10,100		12,000	102,000	55,000	45,000
10,200		12,000	102,000	55,000	45,000
10,300		12,000	102,000	55,000	45,000
10,320	13/32	12,000	102,000	55,000	45,000
10,400		12,000	102,000	55,000	45,000
10,500		12,000	102,000	55,000	45,000
10,600		12,000	102,000	55,000	45,000
10,700		12,000	102,000	55,000	45,000
10,800		12,000	102,000	55,000	45,000
10,900		12,000	102,000	55,000	45,000
11,000		12,000	102,000	55,000	45,000
11,100		12,000	102,000	55,000	45,000
11,110	7/16	12,000	102,000	55,000	45,000
11,200		12,000	102,000	55,000	45,000
11,300		12,000	102,000	55,000	45,000
11,400		12,000	102,000	55,000	45,000
11,500		12,000	102,000	55,000	45,000
11,600		12,000	102,000	55,000	45,000
11,700		12,000	102,000	55,000	45,000
11,800		12,000	102,000	55,000	45,000
11,900		12,000	102,000	55,000	45,000
11,910	15/32	12,000	102,000	55,000	45,000
12,000		12,000	102,000	55,000	45,000
12,200		14,000	107,000	60,000	45,000
12,500		14,000	107,000	60,000	45,000
12,700	1/2	14,000	107,000	60,000	45,000
12,800		14,000	107,000	60,000	45,000

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
13,000		14,000	107,000	60,000	45,000
13,300		14,000	107,000	60,000	45,000
13,500		14,000	107,000	60,000	45,000
13,700		14,000	107,000	60,000	45,000
14,000		14,000	107,000	60,000	45,000
14,200		16,000	115,000	65,000	48,000
14,290	9/16	16,000	115,000	65,000	48,000
14,300		16,000	115,000	65,000	48,000
14,500		16,000	115,000	65,000	48,000
14,700		16,000	115,000	65,000	48,000
15,000		16,000	115,000	65,000	48,000
15,200		16,000	115,000	65,000	48,000
15,300		16,000	115,000	65,000	48,000
15,500		16,000	115,000	65,000	48,000
15,700		16,000	115,000	65,000	48,000
16,000		16,000	115,000	65,000	48,000
16,300		18,000	123,000	73,000	48,000
16,500		18,000	123,000	73,000	48,000
16,900		18,000	123,000	73,000	48,000
17,000		18,000	123,000	73,000	48,000
17,300		18,000	123,000	73,000	48,000
17,500		18,000	123,000	73,000	48,000
18,000		18,000	123,000	73,000	48,000
18,500		20,000	131,000	79,000	50,000
18,900		20,000	131,000	79,000	50,000
19,000		20,000	131,000	79,000	50,000
19,050	3/4	20,000	131,000	79,000	50,000
19,300		20,000	131,000	79,000	50,000
19,500		20,000	131,000	79,000	50,000
20,000		20,000	131,000	79,000	50,000



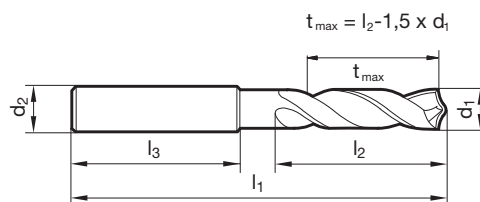
Tehoporat ilman jäähdytyskanavia



P	○	Kärjen kevennys $\geq \varnothing 5,000$ • kartiovaippahionta • pääleikkausärmän kaarteesta • optimoitu leikkuu geometria • terävästi leikkaava
M	○	
K	○	
N	○	runsasseosteiset teräkset • ruostumatt./haponk./kuumal. teräkset
S	●	• Inconel, Hastelloy, Monel • messinki, pronssit • alumiini ja Al-seokset
H	○	• Magnesium ja Mg-seokset • Titaani ja titaaniseokset • sintrattu pulveriteräs

GÜHRING NAVIGATOR

Leikkuuarvosivu 752



Artikkelinro.

2475

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
3,700		6,000	62,000	20,000	36,000
4,650		6,000	66,000	24,000	36,000
5,000		6,000	66,000	28,000	36,000
5,500		6,000	66,000	28,000	36,000
6,000		6,000	66,000	28,000	36,000
6,500		8,000	79,000	34,000	36,000
6,800		8,000	79,000	34,000	36,000
7,000		8,000	79,000	34,000	36,000
8,000		8,000	79,000	41,000	36,000
8,500		10,000	89,000	47,000	40,000
9,000		10,000	89,000	47,000	40,000
9,300		10,000	89,000	47,000	40,000

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
10,000		10,000	89,000	47,000	40,000
10,500		12,000	102,000	55,000	45,000
11,200		12,000	102,000	55,000	45,000
12,000		12,000	102,000	55,000	45,000



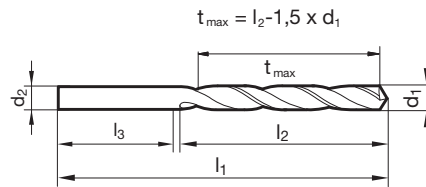
Tehoporat ilman jäähdytyskanavia



P	○	Kärjen kevennys $\geq \varnothing 3,000$ • kartiovaippahionta • pääleikkusuärmän kaarteesta • optimoitu leikkuu geometria • terävästi leikkaava
M	●	
K	○	
N	○	ruostumatt.-/haponk.-/kuumal. teräkset • Inconel, Hastelloy, Monel
S	○	• messinki, pronssit • alumiini ja Al-seokset • Magnesium ja Mg-seokset
H	○	• Titaani ja titaaniseokset • sintrattu pulveriteräs • runsasseosteiset teräkset

GÜHRING NAVIGATOR

Leikkuarvosivu 752



Artikkelinro.

1702

d1		d2	l1	l2	l3	d1		d2	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,000		3,000	46,000	16,000	30,000	6,400		6,400	70,000	31,000	39,000
3,100		3,100	49,000	18,000	31,000	6,500		6,500	70,000	31,000	39,000
3,170	1/8	3,170	49,000	18,000	31,000	6,600		6,600	70,000	31,000	39,000
3,200		3,200	49,000	18,000	31,000	6,700		6,700	70,000	31,000	39,000
3,300		3,300	49,000	18,000	31,000	6,750	17/64	6,750	74,000	34,000	40,000
3,400		3,400	52,000	20,000	32,000	6,800		6,800	74,000	34,000	40,000
3,500		3,500	52,000	20,000	32,000	6,900		6,900	74,000	34,000	40,000
3,570	9/64	3,570	52,000	20,000	32,000	7,000		7,000	74,000	34,000	40,000
3,600		3,600	52,000	20,000	32,000	7,100		7,100	74,000	34,000	40,000
3,700		3,700	52,000	20,000	32,000	7,140	9/32	7,140	74,000	34,000	40,000
3,800		3,800	55,000	22,000	33,000	7,200		7,200	74,000	34,000	40,000
3,900		3,900	55,000	22,000	33,000	7,300		7,300	74,000	34,000	40,000
3,970	5/32	3,970	55,000	22,000	33,000	7,400		7,400	74,000	34,000	40,000
4,000		4,000	55,000	22,000	33,000	7,540	19/64	7,540	79,000	37,000	42,000
4,100		4,100	55,000	22,000	33,000	7,600		7,600	79,000	37,000	42,000
4,200		4,200	55,000	22,000	33,000	7,700		7,700	79,000	37,000	42,000
4,300		4,300	58,000	24,000	34,000	7,800		7,800	79,000	37,000	42,000
4,370	11/64	4,370	58,000	24,000	34,000	7,900		7,900	79,000	37,000	42,000
4,400		4,400	58,000	24,000	34,000	7,940	5/16	7,940	79,000	37,000	42,000
4,500		4,500	58,000	24,000	34,000	8,000		8,000	79,000	37,000	42,000
4,600		4,600	58,000	24,000	34,000	8,100		8,100	79,000	37,000	42,000
4,700		4,700	58,000	24,000	34,000	8,200		8,200	79,000	37,000	42,000
4,760	3/16	4,760	62,000	26,000	36,000	8,300		8,300	79,000	37,000	42,000
4,800		4,800	62,000	26,000	36,000	8,330	21/64	8,330	79,000	37,000	42,000
4,900		4,900	62,000	26,000	36,000	8,400		8,400	79,000	37,000	42,000
5,000		5,000	62,000	26,000	36,000	8,500		8,500	79,000	37,000	42,000
5,100		5,100	62,000	26,000	36,000	8,600		8,600	84,000	40,000	44,000
5,160	13/64	5,160	62,000	26,000	36,000	8,700		8,700	84,000	40,000	44,000
5,200		5,200	62,000	26,000	36,000	8,730	11/32	8,730	84,000	40,000	44,000
5,300		5,300	62,000	26,000	36,000	8,800		8,800	84,000	40,000	44,000
5,400		5,400	66,000	28,000	38,000	8,900		8,900	84,000	40,000	44,000
5,500		5,500	66,000	28,000	38,000	9,000		9,000	84,000	40,000	44,000
5,560	7/32	5,560	66,000	28,000	38,000	9,100		9,100	84,000	40,000	44,000
5,600		5,600	66,000	28,000	38,000	9,130	23/64	9,130	84,000	40,000	44,000
5,700		5,700	66,000	28,000	38,000	9,400		9,400	84,000	40,000	44,000
5,800		5,800	66,000	28,000	38,000	9,500		9,500	84,000	40,000	44,000
5,950	15/64	5,950	66,000	28,000	38,000	9,520	3/8	9,520	89,000	43,000	46,000
6,000		6,000	66,000	28,000	38,000	9,600		9,600	89,000	43,000	46,000
6,100		6,100	70,000	31,000	39,000	9,700		9,700	89,000	43,000	46,000
6,200		6,200	70,000	31,000	39,000	9,800		9,800	89,000	43,000	46,000
6,300		6,300	70,000	31,000	39,000	9,900		9,900	89,000	43,000	46,000
6,350	1/4	6,350	70,000	31,000	39,000	9,920	25/64	9,920	89,000	43,000	46,000



d1		d2	l1	l2	l3
mm	inch	mm	mm	mm	mm
10,000		10,000	89,000	43,000	46,000
10,200		10,200	89,000	43,000	46,000
10,300		10,300	89,000	43,000	46,000
10,320	13/32	10,320	89,000	43,000	46,000
10,720	27/64	10,720	95,000	47,000	48,000
11,000		11,000	95,000	47,000	48,000
11,110	7/16	11,110	95,000	47,000	48,000
11,300		11,300	95,000	47,000	48,000
11,500		11,500	95,000	47,000	48,000
11,510	29/64	11,510	95,000	47,000	48,000
11,910	15/32	11,910	102,000	51,000	51,000
12,000		12,000	102,000	51,000	51,000

d1		d2	l1	l2	l3
mm	inch	mm	mm	mm	mm
12,300	31/64	12,300	102,000	51,000	51,000
12,500		12,500	102,000	51,000	51,000
12,700	1/2	12,700	102,000	51,000	51,000
13,000		13,000	102,000	51,000	51,000
13,500		13,500	107,000	54,000	53,000
14,000		14,000	107,000	54,000	53,000



Tehoporat ilman jäähdytyskanavia



P • Kärjen kevennys $\geq \varnothing 3,000$ • päästöhiottu kärki • pääleikkuusärmän suorasta
• optimoitu leikkuu geometria

M ○

K •

N ○

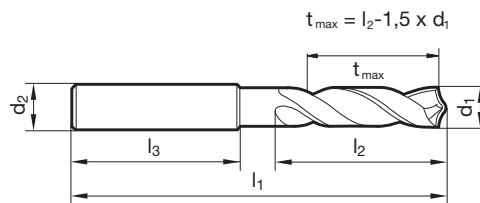
S ○

H ○

rakenne- ja pintakarkaistut teräkset • automaattiteräkset, nuorutetut teräkset • seostetut teräkset $< 1200 \text{ N/mm}^2$ asti • valut • pronssi, messinki • runsasseosteiset AlSi-seokset

GÜHRING NAVIGATOR

Leikkuuarvosivu 756



Artikkelinro.

2996

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,000		6,000	66,000	28,000	36,000	7,000		8,000	91,000	53,000	36,000
3,100		6,000	66,000	28,000	36,000	7,100		8,000	91,000	53,000	36,000
3,200		6,000	66,000	28,000	36,000	7,140	9/32	8,000	91,000	53,000	36,000
3,250		6,000	66,000	28,000	36,000	7,200		8,000	91,000	53,000	36,000
3,300		6,000	66,000	28,000	36,000	7,300		8,000	91,000	53,000	36,000
3,400		6,000	66,000	28,000	36,000	7,500		8,000	91,000	53,000	36,000
3,500		6,000	66,000	28,000	36,000	7,600		8,000	91,000	53,000	36,000
3,570	9/64	6,000	66,000	28,000	36,000	7,700		8,000	91,000	53,000	36,000
3,600		6,000	66,000	28,000	36,000	7,800		8,000	91,000	53,000	36,000
3,700		6,000	66,000	28,000	36,000	7,900		8,000	91,000	53,000	36,000
3,800		6,000	74,000	36,000	36,000	7,940	5/16	8,000	91,000	53,000	36,000
3,900		6,000	74,000	36,000	36,000	8,000		8,000	91,000	53,000	36,000
4,000		6,000	74,000	36,000	36,000	8,100		10,000	103,000	61,000	40,000
4,100		6,000	74,000	36,000	36,000	8,200		10,000	103,000	61,000	40,000
4,200		6,000	74,000	36,000	36,000	8,400		10,000	103,000	61,000	40,000
4,300		6,000	74,000	36,000	36,000	8,500		10,000	103,000	61,000	40,000
4,400		6,000	74,000	36,000	36,000	8,700		10,000	103,000	61,000	40,000
4,500		6,000	74,000	36,000	36,000	8,800		10,000	103,000	61,000	40,000
4,650		6,000	74,000	36,000	36,000	9,000		10,000	103,000	61,000	40,000
4,700		6,000	74,000	36,000	36,000	9,200		10,000	103,000	61,000	40,000
4,800		6,000	82,000	44,000	36,000	9,250		10,000	103,000	61,000	40,000
4,900		6,000	82,000	44,000	36,000	9,500		10,000	103,000	61,000	40,000
5,000		6,000	82,000	44,000	36,000	9,520	3/8	10,000	103,000	61,000	40,000
5,100		6,000	82,000	44,000	36,000	9,700		10,000	103,000	61,000	40,000
5,200		6,000	82,000	44,000	36,000	9,800		10,000	103,000	61,000	40,000
5,300		6,000	82,000	44,000	36,000	10,000		10,000	103,000	61,000	40,000
5,400		6,000	82,000	44,000	36,000	10,100		12,000	118,000	71,000	45,000
5,500		6,000	82,000	44,000	36,000	10,200		12,000	118,000	71,000	45,000
5,600		6,000	82,000	44,000	36,000	10,300		12,000	118,000	71,000	45,000
5,800		6,000	82,000	44,000	36,000	10,320	13/32	12,000	118,000	71,000	45,000
5,900		6,000	82,000	44,000	36,000	10,500		12,000	118,000	71,000	45,000
6,000		6,000	82,000	44,000	36,000	10,700		12,000	118,000	71,000	45,000
6,100		8,000	91,000	53,000	36,000	10,800		12,000	118,000	71,000	45,000
6,200		8,000	91,000	53,000	36,000	10,900		12,000	118,000	71,000	45,000
6,300		8,000	91,000	53,000	36,000	11,000		12,000	118,000	71,000	45,000
6,350	1/4	8,000	91,000	53,000	36,000	11,100		12,000	118,000	71,000	45,000
6,400		8,000	91,000	53,000	36,000	11,110	7/16	12,000	118,000	71,000	45,000
6,500		8,000	91,000	53,000	36,000	11,500		12,000	118,000	71,000	45,000
6,600		8,000	91,000	53,000	36,000	11,600		12,000	118,000	71,000	45,000
6,700		8,000	91,000	53,000	36,000	11,700		12,000	118,000	71,000	45,000
6,800		8,000	91,000	53,000	36,000	11,800		12,000	118,000	71,000	45,000
6,900		8,000	91,000	53,000	36,000	11,910	15/32	12,000	118,000	71,000	45,000



d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
12,000		12,000	118,000	71,000	45,000
12,100		14,000	124,000	77,000	45,000
12,200		14,000	124,000	77,000	45,000
12,400		14,000	124,000	77,000	45,000
12,500		14,000	124,000	77,000	45,000
12,600		14,000	124,000	77,000	45,000
12,700	1/2	14,000	124,000	77,000	45,000
12,800		14,000	124,000	77,000	45,000
13,100	33/64	14,000	124,000	77,000	45,000
13,300		14,000	124,000	77,000	45,000
13,500		14,000	124,000	77,000	45,000
13,700		14,000	124,000	77,000	45,000
14,000		14,000	124,000	77,000	45,000
14,200		16,000	133,000	83,000	48,000
14,290	9/16	16,000	133,000	83,000	48,000
14,300		16,000	133,000	83,000	48,000
14,400		16,000	133,000	83,000	48,000
14,500		16,000	133,000	83,000	48,000

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
14,700		16,000	133,000	83,000	48,000
14,800		16,000	133,000	83,000	48,000
15,100		16,000	133,000	83,000	48,000
15,200		16,000	133,000	83,000	48,000
15,300		16,000	133,000	83,000	48,000
15,500		16,000	133,000	83,000	48,000
15,600		16,000	133,000	83,000	48,000
15,700		16,000	133,000	83,000	48,000
15,800		16,000	133,000	83,000	48,000
16,000		16,000	133,000	83,000	48,000
16,500		18,000	143,000	93,000	48,000
17,000		18,000	143,000	93,000	48,000
17,500		18,000	143,000	93,000	48,000
18,000		18,000	143,000	93,000	48,000
18,500		20,000	153,000	101,000	50,000
19,000		20,000	153,000	101,000	50,000
19,500		20,000	153,000	101,000	50,000
20,000		20,000	153,000	101,000	50,000



Tehoporat ilman jäähdytyskanavia



P • Kärjen kevennys $\geq \varnothing 3,100$ • päästöhiottu kärki • pääleikkusärmän suorasta
• optimoitu leikkuu geometria

M ○

K •

N ○ rakenne- ja pintakarkaistut teräkset • automaattiteräkset, nuorutetut

teräkset • seostetut teräkset $< 1200 \text{ N/mm}^2$ asti • valut • pronssi, messinki

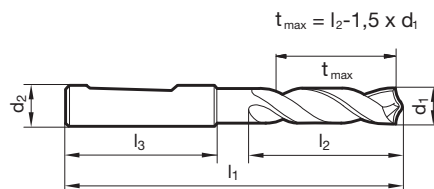
• runsasseosteiset AlSi-seokset

S ○

H ○

GÜHRING NAVIGATOR

Leikkuuarvosivu 756



Artikkelinro.

2719

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,100		6,000	66,000	28,000	36,000	7,800		8,000	91,000	53,000	36,000
3,200		6,000	66,000	28,000	36,000	7,900		8,000	91,000	53,000	36,000
3,500		6,000	66,000	28,000	36,000	8,000		8,000	91,000	53,000	36,000
3,600		6,000	66,000	28,000	36,000	8,100		10,000	103,000	61,000	40,000
3,700		6,000	66,000	28,000	36,000	8,200		10,000	103,000	61,000	40,000
3,800		6,000	74,000	36,000	36,000	8,300		10,000	103,000	61,000	40,000
3,900		6,000	74,000	36,000	36,000	8,400		10,000	103,000	61,000	40,000
4,000		6,000	74,000	36,000	36,000	8,500		10,000	103,000	61,000	40,000
4,100		6,000	74,000	36,000	36,000	8,600		10,000	103,000	61,000	40,000
4,200		6,000	74,000	36,000	36,000	8,700		10,000	103,000	61,000	40,000
4,400		6,000	74,000	36,000	36,000	8,900		10,000	103,000	61,000	40,000
4,500		6,000	74,000	36,000	36,000	9,000		10,000	103,000	61,000	40,000
4,600		6,000	74,000	36,000	36,000	9,100		10,000	103,000	61,000	40,000
4,700		6,000	74,000	36,000	36,000	9,200		10,000	103,000	61,000	40,000
4,800		6,000	82,000	44,000	36,000	9,250		10,000	103,000	61,000	40,000
4,900		6,000	82,000	44,000	36,000	9,400		10,000	103,000	61,000	40,000
5,000		6,000	82,000	44,000	36,000	9,500		10,000	103,000	61,000	40,000
5,160	13/64	6,000	82,000	44,000	36,000	9,600		10,000	103,000	61,000	40,000
5,200		6,000	82,000	44,000	36,000	9,700		10,000	103,000	61,000	40,000
5,300		6,000	82,000	44,000	36,000	9,900		10,000	103,000	61,000	40,000
5,400		6,000	82,000	44,000	36,000	10,100		12,000	118,000	71,000	45,000
5,500		6,000	82,000	44,000	36,000	10,320	13/32	12,000	118,000	71,000	45,000
5,550		6,000	82,000	44,000	36,000	10,400		12,000	118,000	71,000	45,000
5,600		6,000	82,000	44,000	36,000	10,500		12,000	118,000	71,000	45,000
5,700		6,000	82,000	44,000	36,000	10,600		12,000	118,000	71,000	45,000
5,900		6,000	82,000	44,000	36,000	10,700		12,000	118,000	71,000	45,000
6,000		6,000	82,000	44,000	36,000	10,800		12,000	118,000	71,000	45,000
6,100		8,000	91,000	53,000	36,000	10,900		12,000	118,000	71,000	45,000
6,200		8,000	91,000	53,000	36,000	11,100		12,000	118,000	71,000	45,000
6,300		8,000	91,000	53,000	36,000	11,110	7/16	12,000	118,000	71,000	45,000
6,400		8,000	91,000	53,000	36,000	11,200		12,000	118,000	71,000	45,000
6,500		8,000	91,000	53,000	36,000	11,300		12,000	118,000	71,000	45,000
6,600		8,000	91,000	53,000	36,000	11,400		12,000	118,000	71,000	45,000
6,700		8,000	91,000	53,000	36,000	11,500		12,000	118,000	71,000	45,000
6,800		8,000	91,000	53,000	36,000	11,600		12,000	118,000	71,000	45,000
7,000		8,000	91,000	53,000	36,000	11,700		12,000	118,000	71,000	45,000
7,100		8,000	91,000	53,000	36,000	11,800		12,000	118,000	71,000	45,000
7,200		8,000	91,000	53,000	36,000	11,900		12,000	118,000	71,000	45,000
7,300		8,000	91,000	53,000	36,000	11,910	15/32	12,000	118,000	71,000	45,000
7,500		8,000	91,000	53,000	36,000	12,200		14,000	124,000	77,000	45,000
7,600		8,000	91,000	53,000	36,000	12,500		14,000	124,000	77,000	45,000
7,700		8,000	91,000	53,000	36,000	12,700	1/2	14,000	124,000	77,000	45,000



d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
13,500		14,000	124,000	77,000	45,000
13,700		14,000	124,000	77,000	45,000
14,000		14,000	124,000	77,000	45,000
14,200		16,000	133,000	83,000	48,000
14,290	9/16	16,000	133,000	83,000	48,000
14,500		16,000	133,000	83,000	48,000
14,700		16,000	133,000	83,000	48,000
15,200		16,000	133,000	83,000	48,000
15,500		16,000	133,000	83,000	48,000
15,700		16,000	133,000	83,000	48,000
16,500		18,000	143,000	93,000	48,000
17,000		18,000	143,000	93,000	48,000

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
17,500		18,000	143,000	93,000	48,000
18,000		18,000	143,000	93,000	48,000
18,500		20,000	153,000	101,000	50,000
19,000		20,000	153,000	101,000	50,000
19,500		20,000	153,000	101,000	50,000
20,000		20,000	153,000	101,000	50,000



Tehoporat ilman jäähdytyskanavia



P • Kärjen kevennys $\geq \varnothing 5,000$ • päästöhiottu kärki • pääleikkusärmän suorasta
• optimoitu leikkuu geometria

M ○

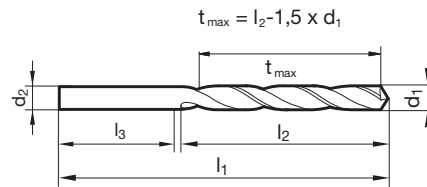
K •

N ○ rakenne- ja pintakarkaistut teräkset • automaattiteräkset, nuorutetut teräkset • seostetut teräkset $< 1200 \text{ N/mm}^2$ asti • valut • pronssi, messinki
S ○ runsasseosteiset AlSi-seokset

H ○

GÜHRING NAVIGATOR

Leikkuuarvosivu 756



Artikkelinro.

2474

d1		d2	l1	l2	l3
mm	inch	mm	mm	mm	mm
5,000		5,000	73,000	34,000	39,000
5,400		5,400	76,000	38,000	38,000
5,500		5,500	76,000	38,000	38,000
5,600		5,600	81,000	41,000	40,000
5,700		5,700	81,000	41,000	40,000
6,200		6,200	81,000	41,000	40,000
6,400		6,400	81,000	41,000	40,000
6,500		6,500	81,000	41,000	40,000
6,600		6,600	83,000	43,000	40,000
6,800		6,800	83,000	43,000	40,000
7,100		7,100	87,000	45,000	42,000
7,200		7,200	87,000	45,000	42,000
7,400		7,400	87,000	45,000	42,000
7,700		7,700	90,000	48,000	42,000
8,000		8,000	90,000	48,000	42,000
8,100		8,100	96,000	53,000	43,000
8,500		8,500	96,000	53,000	43,000
8,700		8,700	98,000	55,000	43,000

d1		d2	l1	l2	l3
mm	inch	mm	mm	mm	mm
9,000		9,000	98,000	55,000	43,000
9,200		9,200	102,000	58,000	44,000
9,300		9,300	102,000	58,000	44,000
9,700		9,700	105,000	60,000	45,000
9,800		9,800	105,000	60,000	45,000
10,200		10,200	112,000	66,000	46,000
10,300		10,300	112,000	66,000	46,000
10,400		10,400	112,000	66,000	46,000
10,500		10,500	112,000	66,000	46,000
10,600		10,600	114,000	68,000	46,000
10,800		10,800	114,000	68,000	46,000
10,900		10,900	114,000	68,000	46,000
11,000		11,000	114,000	68,000	46,000
11,600		11,600	121,000	73,000	48,000
11,800		11,800	121,000	73,000	48,000
13,000		13,000	137,000	78,000	59,000
14,000		14,000	147,000	86,000	61,000



Tehoporat ilman jäähdytyskanavia

Materiaali **TKM**Pinta **S**

Varren muoto HA

Tehoporat

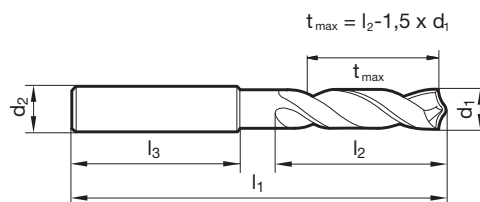
P • Kärjen kevennys $\geq \varnothing 3,300$ • päästöhiottu kärki • pääleikkuusärmän suorasta
• optimoitu leikkuu geometria

M ○**K** •**N** ○**S** ○**H** ○

rakenne- ja pintakarkaistut teräkset • automaattiteräkset, nuorrutetut teräkset • seostetut teräkset $< 1200 \text{ N/mm}^2$ asti • valut • pronssi, messinki
• runsasseosteiset AlSi-seokset

GÜHRING NAVIGATOR

Leikkuuarvosivu 756



Artikkelinro.

2717

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
3,300		6,000	66,000	28,000	36,000
3,500		6,000	66,000	28,000	36,000
5,000		6,000	82,000	44,000	36,000
5,500		6,000	82,000	44,000	36,000
6,800		8,000	91,000	53,000	36,000
7,500		8,000	91,000	53,000	36,000

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
8,000		8,000	91,000	53,000	36,000
8,500		10,000	103,000	61,000	40,000
10,200		12,000	118,000	71,000	45,000
11,000		12,000	118,000	71,000	45,000
11,200		12,000	118,000	71,000	45,000
12,000		12,000	118,000	71,000	45,000

Tehoporat ilman jäähdtyiskanavia


P • Kärjen kevennys $\geq \varnothing 5,000$ • päästöhiottu kärki • pääleikkuusärmän suorasta
• optimoitu leikkuu geometria

M ○

K •

N ○

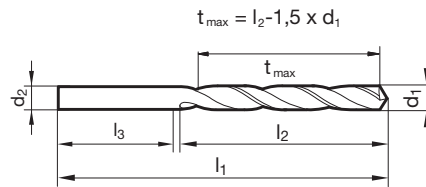
S ○

H ○

rakenne- ja pintakarkaistut teräkset • automaattiteräkset, nuorutetut teräkset • seostetut teräkset $< 1200 \text{ N/mm}^2$ asti • valut • pronssi, messinki • runsasseosteiset AlSi-seokset

GÜHRING NAVIGATOR

Leikkuuarvosivu 756



Artikkelinro.

1243

d1		d2	l1	l2	l3	d1		d2	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
5,000		5,000	73,000	34,000	39,000	8,330	21/64	8,330	96,000	53,000	43,000
5,100		5,100	76,000	38,000	38,000	8,400		8,400	96,000	53,000	43,000
5,160	13/64	5,160	76,000	38,000	38,000	8,500		8,500	96,000	53,000	43,000
5,200		5,200	76,000	38,000	38,000	8,600		8,600	98,000	55,000	43,000
5,300		5,300	76,000	38,000	38,000	8,700		8,700	98,000	55,000	43,000
5,400		5,400	76,000	38,000	38,000	8,730	11/32	8,730	98,000	55,000	43,000
5,500		5,500	76,000	38,000	38,000	8,800		8,800	98,000	55,000	43,000
5,560	7/32	5,560	81,000	41,000	40,000	8,900		8,900	98,000	55,000	43,000
5,600		5,600	81,000	41,000	40,000	9,000		9,000	98,000	55,000	43,000
5,700		5,700	81,000	41,000	40,000	9,100		9,100	102,000	58,000	44,000
5,800		5,800	81,000	41,000	40,000	9,130	23/64	9,130	102,000	58,000	44,000
5,900		5,900	81,000	41,000	40,000	9,200		9,200	102,000	58,000	44,000
5,950	15/64	5,950	81,000	41,000	40,000	9,300		9,300	102,000	58,000	44,000
6,000		6,000	81,000	41,000	40,000	9,500		9,500	102,000	58,000	44,000
6,100		6,100	81,000	41,000	40,000	9,520	3/8	9,520	105,000	60,000	45,000
6,200		6,200	81,000	41,000	40,000	9,600		9,600	105,000	60,000	45,000
6,300		6,300	81,000	41,000	40,000	9,700		9,700	105,000	60,000	45,000
6,350	1/4	6,350	81,000	41,000	40,000	9,800		9,800	105,000	60,000	45,000
6,400		6,400	81,000	41,000	40,000	9,900		9,900	105,000	60,000	45,000
6,500		6,500	81,000	41,000	40,000	9,920	25/64	9,920	105,000	60,000	45,000
6,600		6,600	83,000	43,000	40,000	10,000		10,000	105,000	60,000	45,000
6,700		6,700	83,000	43,000	40,000	10,100		10,100	112,000	66,000	46,000
6,750	17/64	6,750	83,000	43,000	40,000	10,200		10,200	112,000	66,000	46,000
6,800		6,800	83,000	43,000	40,000	10,300		10,300	112,000	66,000	46,000
6,900		6,900	83,000	43,000	40,000	10,320	13/32	10,320	112,000	66,000	46,000
7,000		7,000	83,000	43,000	40,000	10,400		10,400	112,000	66,000	46,000
7,100		7,100	87,000	45,000	42,000	10,500		10,500	112,000	66,000	46,000
7,140	9/32	7,140	87,000	45,000	42,000	10,600		10,600	114,000	68,000	46,000
7,200		7,200	87,000	45,000	42,000	10,700		10,700	114,000	68,000	46,000
7,300		7,300	87,000	45,000	42,000	10,720	27/64	10,720	114,000	68,000	46,000
7,400		7,400	87,000	45,000	42,000	10,800		10,800	114,000	68,000	46,000
7,500		7,500	87,000	45,000	42,000	10,900		10,900	114,000	68,000	46,000
7,540	19/64	7,540	90,000	48,000	42,000	11,000		11,000	114,000	68,000	46,000
7,600		7,600	90,000	48,000	42,000	11,100		11,100	118,000	71,000	47,000
7,700		7,700	90,000	48,000	42,000	11,110	7/16	11,110	118,000	71,000	47,000
7,800		7,800	90,000	48,000	42,000	11,400		11,400	118,000	71,000	47,000
7,900		7,900	90,000	48,000	42,000	11,500		11,500	118,000	71,000	47,000
7,940	5/16	7,940	90,000	48,000	42,000	11,600		11,600	121,000	73,000	48,000
8,000		8,000	90,000	48,000	42,000	11,700		11,700	121,000	73,000	48,000
8,100		8,100	96,000	53,000	43,000	11,800		11,800	121,000	73,000	48,000
8,200		8,200	96,000	53,000	43,000	11,900		11,900	121,000	73,000	48,000
8,300		8,300	96,000	53,000	43,000	11,910	15/32	11,910	121,000	73,000	48,000



d1		d2	l1	l2	l3
mm	inch	mm	mm	mm	mm
12,000		12,000	121,000	73,000	48,000
12,500		12,500	135,000	76,000	59,000
12,700	1/2	12,700	137,000	78,000	59,000
13,000		13,000	137,000	78,000	59,000
13,500		13,500	144,000	84,000	60,000
14,000		14,000	147,000	86,000	61,000

d1		d2	l1	l2	l3
mm	inch	mm	mm	mm	mm
14,500		14,500	151,000	89,000	62,000
15,000		15,000	153,000	91,000	62,000
15,500		15,500	157,000	94,000	63,000
16,000		16,000	160,000	96,000	64,000



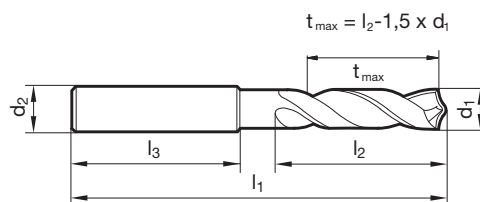
Tehoporat ilman jäähdytyskanavia



P	○	Kärjen kevennys $\geq \varnothing 3,000$ • kartiovaippahionta • pääleikkuusärmän kaarteesta • optimoitu leikkuu geometria • terävästi leikkaava
M	○	
K	○	
N	○	runsasseosteiset teräkset • ruostumatt./haponk./kuumal. teräkset
S	●	• Inconel, Hastelloy, Monel • messinki, pronssit • alumiini ja Al-seokset
H	○	• Magnesium ja Mg-seokset • Titaani ja titaaniseokset • sintrattu pulveriteräs

GÜHRING NAVIGATOR

Leikkuuarvosivu 756



Artikkelinro.

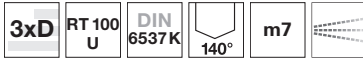
2712

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
3,000		6,000	66,000	28,000	36,000
3,300		6,000	66,000	28,000	36,000
3,500		6,000	66,000	28,000	36,000
4,000		6,000	74,000	36,000	36,000
4,500		6,000	74,000	36,000	36,000
5,000		6,000	82,000	44,000	36,000
6,800		8,000	91,000	53,000	36,000
7,000		8,000	91,000	53,000	36,000
7,500		8,000	91,000	53,000	36,000
8,000		8,000	91,000	53,000	36,000
10,000		10,000	103,000	61,000	40,000
10,200		12,000	118,000	71,000	45,000

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
10,500		12,000	118,000	71,000	45,000
12,000		12,000	118,000	71,000	45,000
15,000		16,000	133,000	83,000	48,000



Tehoporat jäähdytyskanavilla



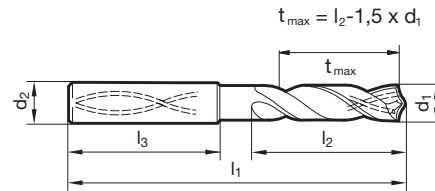
P ●	Kärjen kevennys $\geq \varnothing 3,000$ • päästöhiottu kärki • pääleikkusuärmän suorasta • optimoitu leikkuu geometria
M ○	
K ●	
N ○	rakenne- ja pintakarkaistut teräkset • automaattiteräkset, nuorutetut teräkset • seostetut teräkset $< 1200 \text{ N/mm}^2$ asti • valut • pronssi, messinki
S ○	• runsasseosteiset AlSi-seokset
H ○	

Materiaali **TKM**Pinta **F**

Varren muoto HA

GÜHRING NAVIGATOR

Leikkuuarvosivu 750



Artikkelinro.

2477

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,000		6,000	62,000	20,000	36,000	5,700		6,000	66,000	28,000	36,000
3,100		6,000	62,000	20,000	36,000	5,750		6,000	66,000	28,000	36,000
3,170	1/8	6,000	62,000	20,000	36,000	5,800		6,000	66,000	28,000	36,000
3,200		6,000	62,000	20,000	36,000	5,900		6,000	66,000	28,000	36,000
3,250		6,000	62,000	20,000	36,000	5,950	15/64	6,000	66,000	28,000	36,000
3,300		6,000	62,000	20,000	36,000	6,000		6,000	66,000	28,000	36,000
3,400		6,000	62,000	20,000	36,000	6,100		8,000	79,000	34,000	36,000
3,500		6,000	62,000	20,000	36,000	6,200		8,000	79,000	34,000	36,000
3,570	9/64	6,000	62,000	20,000	36,000	6,300		8,000	79,000	34,000	36,000
3,600		6,000	62,000	20,000	36,000	6,350	1/4	8,000	79,000	34,000	36,000
3,700		6,000	62,000	20,000	36,000	6,400		8,000	79,000	34,000	36,000
3,800		6,000	66,000	24,000	36,000	6,500		8,000	79,000	34,000	36,000
3,900		6,000	66,000	24,000	36,000	6,530		8,000	79,000	34,000	36,000
3,970	5/32	6,000	66,000	24,000	36,000	6,600		8,000	79,000	34,000	36,000
4,000		6,000	66,000	24,000	36,000	6,700		8,000	79,000	34,000	36,000
4,040		6,000	66,000	24,000	36,000	6,750	17/64	8,000	79,000	34,000	36,000
4,100		6,000	66,000	24,000	36,000	6,800		8,000	79,000	34,000	36,000
4,200		6,000	66,000	24,000	36,000	6,900		8,000	79,000	34,000	36,000
4,300		6,000	66,000	24,000	36,000	7,000		8,000	79,000	34,000	36,000
4,370	11/64	6,000	66,000	24,000	36,000	7,100		8,000	79,000	41,000	36,000
4,400		6,000	66,000	24,000	36,000	7,140	9/32	8,000	79,000	41,000	36,000
4,450		6,000	66,000	24,000	36,000	7,200		8,000	79,000	41,000	36,000
4,500		6,000	66,000	24,000	36,000	7,300		8,000	79,000	41,000	36,000
4,600		6,000	66,000	24,000	36,000	7,400		8,000	79,000	41,000	36,000
4,650		6,000	66,000	24,000	36,000	7,450		8,000	79,000	41,000	36,000
4,700		6,000	66,000	24,000	36,000	7,500		8,000	79,000	41,000	36,000
4,760	3/16	6,000	66,000	28,000	36,000	7,540	19/64	8,000	79,000	41,000	36,000
4,800		6,000	66,000	28,000	36,000	7,550		8,000	79,000	41,000	36,000
4,900		6,000	66,000	28,000	36,000	7,600		8,000	79,000	41,000	36,000
5,000		6,000	66,000	28,000	36,000	7,650		8,000	79,000	41,000	36,000
5,100		6,000	66,000	28,000	36,000	7,700		8,000	79,000	41,000	36,000
5,110		6,000	66,000	28,000	36,000	7,800		8,000	79,000	41,000	36,000
5,160	13/64	6,000	66,000	28,000	36,000	7,900		8,000	79,000	41,000	36,000
5,200		6,000	66,000	28,000	36,000	7,940	5/16	8,000	79,000	41,000	36,000
5,300		6,000	66,000	28,000	36,000	8,000		8,000	79,000	41,000	36,000
5,400		6,000	66,000	28,000	36,000	8,100		10,000	89,000	47,000	40,000
5,410		6,000	66,000	28,000	36,000	8,200		10,000	89,000	47,000	40,000
5,500		6,000	66,000	28,000	36,000	8,300		10,000	89,000	47,000	40,000
5,550		6,000	66,000	28,000	36,000	8,330	21/64	10,000	89,000	47,000	40,000
5,560	7/32	6,000	66,000	28,000	36,000	8,400		10,000	89,000	47,000	40,000
5,600		6,000	66,000	28,000	36,000	8,500		10,000	89,000	47,000	40,000
5,650		6,000	66,000	28,000	36,000	8,550		10,000	89,000	47,000	40,000

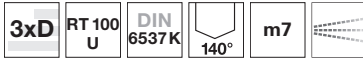


d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
8,600		10,000	89,000	47,000	40,000
8,700		10,000	89,000	47,000	40,000
8,730	11/32	10,000	89,000	47,000	40,000
8,800		10,000	89,000	47,000	40,000
8,900		10,000	89,000	47,000	40,000
9,000		10,000	89,000	47,000	40,000
9,050		10,000	89,000	47,000	40,000
9,100		10,000	89,000	47,000	40,000
9,130	23/64	10,000	89,000	47,000	40,000
9,200		10,000	89,000	47,000	40,000
9,250		10,000	89,000	47,000	40,000
9,300		10,000	89,000	47,000	40,000
9,340		10,000	89,000	47,000	40,000
9,400		10,000	89,000	47,000	40,000
9,500		10,000	89,000	47,000	40,000
9,520	3/8	10,000	89,000	47,000	40,000
9,550		10,000	89,000	47,000	40,000
9,600		10,000	89,000	47,000	40,000
9,700		10,000	89,000	47,000	40,000
9,800		10,000	89,000	47,000	40,000
9,900		10,000	89,000	47,000	40,000
9,920	25/64	10,000	89,000	47,000	40,000
10,000		10,000	89,000	15,000	40,000
10,100		12,000	102,000	55,000	45,000
10,200		12,000	102,000	55,000	45,000
10,300		12,000	102,000	55,000	45,000
10,320	13/32	12,000	102,000	55,000	45,000
10,400		12,000	102,000	55,000	45,000
10,500		12,000	102,000	55,000	45,000
10,600		12,000	102,000	55,000	45,000
10,700		12,000	102,000	55,000	45,000
10,720	27/64	12,000	102,000	55,000	45,000
10,800		12,000	102,000	55,000	45,000
10,900		12,000	102,000	55,000	45,000
11,000		12,000	102,000	55,000	45,000
11,100		12,000	102,000	55,000	45,000
11,110	7/16	12,000	102,000	55,000	45,000
11,200		12,000	102,000	55,000	45,000
11,300		12,000	102,000	55,000	45,000
11,400		12,000	102,000	55,000	45,000
11,500		12,000	102,000	55,000	45,000
11,510	29/64	12,000	102,000	55,000	45,000
11,600		12,000	102,000	55,000	45,000
11,700		12,000	102,000	55,000	45,000
11,800		12,000	102,000	55,000	45,000
11,900		12,000	102,000	55,000	45,000
11,910	15/32	12,000	102,000	55,000	45,000
12,000		12,000	102,000	55,000	45,000
12,100		14,000	107,000	60,000	45,000
12,200		14,000	107,000	60,000	45,000
12,300	31/64	14,000	107,000	60,000	45,000
12,400		14,000	107,000	60,000	45,000
12,500		14,000	107,000	60,000	45,000
12,600		14,000	107,000	60,000	45,000
12,700	1/2	14,000	107,000	60,000	45,000
12,800		14,000	107,000	60,000	45,000
12,900		14,000	107,000	60,000	45,000
13,000		14,000	107,000	60,000	45,000
13,200		14,000	107,000	60,000	45,000
13,300		14,000	107,000	60,000	45,000

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
13,490	17/32	14,000	107,000	60,000	45,000
13,500		14,000	107,000	60,000	45,000
13,550		14,000	107,000	60,000	45,000
13,700		14,000	107,000	60,000	45,000
13,890	35/64	14,000	107,000	60,000	45,000
13,900		14,000	107,000	60,000	45,000
14,000		14,000	107,000	60,000	45,000
14,200		16,000	115,000	65,000	48,000
14,290	9/16	16,000	115,000	65,000	48,000
14,300		16,000	115,000	65,000	48,000
14,500		16,000	115,000	65,000	48,000
14,680	37/64	16,000	115,000	65,000	48,000
14,700		16,000	115,000	65,000	48,000
14,900		16,000	115,000	65,000	48,000
15,000		16,000	115,000	65,000	48,000
15,080	19/32	16,000	115,000	65,000	48,000
15,100		16,000	115,000	65,000	48,000
15,300		16,000	115,000	65,000	48,000
15,480	39/64	16,000	115,000	65,000	48,000
15,500		16,000	115,000	65,000	48,000
15,700		16,000	115,000	65,000	48,000
15,800		16,000	115,000	65,000	48,000
15,870	5/8	16,000	115,000	65,000	48,000
15,900		16,000	115,000	65,000	48,000
16,000		16,000	115,000	65,000	48,000
16,270	41/64	18,000	123,000	73,000	48,000
16,500		18,000	123,000	73,000	48,000
16,670	21/32	18,000	123,000	73,000	48,000
16,700		18,000	123,000	73,000	48,000
16,900		18,000	123,000	73,000	48,000
17,000		18,000	123,000	73,000	48,000
17,070	43/64	18,000	123,000	73,000	48,000
17,300		18,000	123,000	73,000	48,000
17,460	11/16	18,000	123,000	73,000	48,000
17,500		18,000	123,000	73,000	48,000
17,700		18,000	123,000	73,000	48,000
17,860	45/64	18,000	123,000	73,000	48,000
17,900		18,000	123,000	73,000	48,000
18,000		18,000	123,000	73,000	48,000
18,260	23/32	20,000	131,000	79,000	50,000
18,300		20,000	131,000	79,000	50,000
18,500		20,000	131,000	79,000	50,000
18,700		20,000	131,000	79,000	50,000
19,000		20,000	131,000	79,000	50,000
19,050	3/4	20,000	131,000	79,000	50,000
19,250		20,000	131,000	79,000	50,000
19,446		20,000	131,000	79,000	50,000
19,500		20,000	131,000	79,000	50,000
19,700		20,000	131,000	79,000	50,000
19,840	25/32	20,000	131,000	79,000	50,000
19,900		20,000	131,000	79,000	50,000
20,000		20,000	131,000	79,000	50,000



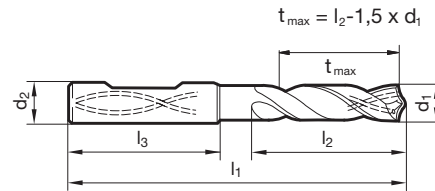
Tehoporat jäähdytyskanavilla



P ●	Kärjen kevennys $\geq \varnothing 3,000$ • päästöhiottu kärki • pääleikkusuärmän suorasta • optimoitu leikkuu geometria
M ○	
K ●	
N ○	rakenne- ja pintakarkaistut teräkset • automaattiteräkset, nuorutetut teräkset • seostetut teräkset $< 1200 \text{ N/mm}^2$ asti • valut • pronssi, messinki
S ○	• runsasseosteiset AlSi-seokset
H ○	

GÜHRING NAVIGATOR

Leikkuuarvosivu 750



Artikkelinro.

2469

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,000		6,000	62,000	20,000	36,000	8,550		10,000	89,000	47,000	40,000
3,200		6,000	62,000	20,000	36,000	8,600		10,000	89,000	47,000	40,000
3,250		6,000	62,000	20,000	36,000	8,700		10,000	89,000	47,000	40,000
3,300		6,000	62,000	20,000	36,000	8,800		10,000	89,000	47,000	40,000
3,400		6,000	62,000	20,000	36,000	9,000		10,000	89,000	47,000	40,000
3,500		6,000	62,000	20,000	36,000	9,050		10,000	89,000	47,000	40,000
3,800		6,000	66,000	24,000	36,000	9,200		10,000	89,000	47,000	40,000
3,970	5/32	6,000	66,000	24,000	36,000	9,250		10,000	89,000	47,000	40,000
4,000		6,000	66,000	24,000	36,000	9,300		10,000	89,000	47,000	40,000
4,100		6,000	66,000	24,000	36,000	9,500		10,000	89,000	47,000	40,000
4,200		6,000	66,000	24,000	36,000	9,550		10,000	89,000	47,000	40,000
4,300		6,000	66,000	24,000	36,000	9,600		10,000	89,000	47,000	40,000
4,370	11/64	6,000	66,000	24,000	36,000	9,800		10,000	89,000	47,000	40,000
4,400		6,000	66,000	24,000	36,000	10,100		12,000	102,000	55,000	45,000
4,450		6,000	66,000	24,000	36,000	10,200		12,000	102,000	55,000	45,000
4,500		6,000	66,000	24,000	36,000	10,300		12,000	102,000	55,000	45,000
4,700		6,000	66,000	24,000	36,000	10,400		12,000	102,000	55,000	45,000
4,800		6,000	66,000	28,000	36,000	10,500		12,000	102,000	55,000	45,000
5,000		6,000	66,000	28,000	36,000	10,700		12,000	102,000	55,000	45,000
5,100		6,000	66,000	28,000	36,000	10,900		12,000	102,000	55,000	45,000
5,300		6,000	66,000	28,000	36,000	11,000		12,000	102,000	55,000	45,000
5,500		6,000	66,000	28,000	36,000	11,110	7/16	12,000	102,000	55,000	45,000
5,600		6,000	66,000	28,000	36,000	11,300		12,000	102,000	55,000	45,000
5,650		6,000	66,000	28,000	36,000	11,400		12,000	102,000	55,000	45,000
5,750		6,000	66,000	28,000	36,000	11,500		12,000	102,000	55,000	45,000
5,800		6,000	66,000	28,000	36,000	11,550		12,000	102,000	55,000	45,000
6,100		8,000	79,000	34,000	36,000	11,600		12,000	102,000	55,000	45,000
6,200		8,000	79,000	34,000	36,000	11,700		12,000	102,000	55,000	45,000
6,500		8,000	79,000	34,000	36,000	11,800		12,000	102,000	55,000	45,000
6,600		8,000	79,000	34,000	36,000	11,900		12,000	102,000	55,000	45,000
6,700		8,000	79,000	34,000	36,000	11,910	15/32	12,000	102,000	55,000	45,000
6,800		8,000	79,000	34,000	36,000	12,000		12,000	102,000	55,000	45,000
7,000		8,000	79,000	34,000	36,000	12,100		14,000	107,000	60,000	45,000
7,100		8,000	79,000	41,000	36,000	12,200		14,000	107,000	60,000	45,000
7,200		8,000	79,000	41,000	36,000	12,500		14,000	107,000	60,000	45,000
7,450		8,000	79,000	41,000	36,000	12,700	1/2	14,000	107,000	60,000	45,000
7,500		8,000	79,000	41,000	36,000	13,000		14,000	107,000	60,000	45,000
7,650		8,000	79,000	41,000	36,000	13,100	33/64	14,000	107,000	60,000	45,000
8,000		8,000	79,000	41,000	36,000	13,300		14,000	107,000	60,000	45,000
8,200		10,000	89,000	47,000	40,000	13,400		14,000	107,000	60,000	45,000
8,400		10,000	89,000	47,000	40,000	13,500		14,000	107,000	60,000	45,000
8,500		10,000	89,000	47,000	40,000	13,550		14,000	107,000	60,000	45,000

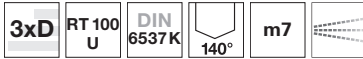


d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
13,700		14,000	107,000	60,000	45,000
14,200		16,000	115,000	65,000	48,000
14,290	9/16	16,000	115,000	65,000	48,000
14,500		16,000	115,000	65,000	48,000
14,800		16,000	115,000	65,000	48,000
15,000		16,000	115,000	65,000	48,000
15,100		16,000	115,000	65,000	48,000
15,200		16,000	115,000	65,000	48,000
15,300		16,000	115,000	65,000	48,000
15,500		16,000	115,000	65,000	48,000
15,550		16,000	115,000	65,000	48,000
15,600		16,000	115,000	65,000	48,000
15,700		16,000	115,000	65,000	48,000
15,900		16,000	115,000	65,000	48,000
16,000		16,000	115,000	65,000	48,000
16,100		18,000	123,000	73,000	48,000
16,200		18,000	123,000	73,000	48,000
16,500		18,000	123,000	73,000	48,000

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
16,900		18,000	123,000	73,000	48,000
17,000		18,000	123,000	73,000	48,000
17,300		18,000	123,000	73,000	48,000
17,500		18,000	123,000	73,000	48,000
17,550		18,000	123,000	73,000	48,000
17,900		18,000	123,000	73,000	48,000
18,000		18,000	123,000	73,000	48,000
18,300		20,000	131,000	79,000	50,000
18,500		20,000	131,000	79,000	50,000
18,900		20,000	131,000	79,000	50,000
19,000		20,000	131,000	79,000	50,000
19,300		20,000	131,000	79,000	50,000
19,500		20,000	131,000	79,000	50,000
19,550		20,000	131,000	79,000	50,000
19,900		20,000	131,000	79,000	50,000
20,000		20,000	131,000	79,000	50,000



Tehoporat jäähdytyskanavilla



P	•	Kärjen kevennys $\geq \varnothing 3,300$ • päästöhiottu kärki • pääleikkusuärmän suorasta • optimoitu leikkuu geometria
M	○	
K	•	
N	○	rakenne- ja pintakarkaistut teräkset • automaattiteräkset, nuorutetut teräkset • seostetut teräkset < 1200 N/mm ² asti • valut • pronssi, messinki
S	○	• runsasseosteiset AlSi-seokset
H	○	

Materiaali

TKM

Pinta

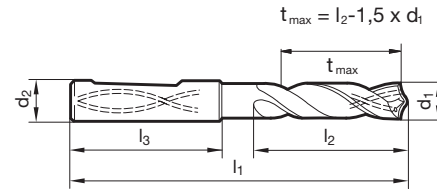
S

Varren muoto

HE

GÜHRING NAVIGATOR

Leikkuuarvosivu 750



Artikkelinro.

1181

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,300		6,000	62,000	20,000	36,000	10,500		12,000	102,000	55,000	45,000
3,400		6,000	62,000	20,000	36,000	10,600		12,000	102,000	55,000	45,000
4,000		6,000	66,000	24,000	36,000	10,700		12,000	102,000	55,000	45,000
5,000		6,000	66,000	28,000	36,000	10,800		12,000	102,000	55,000	45,000
5,500		6,000	66,000	28,000	36,000	11,000		12,000	102,000	55,000	45,000
5,600		6,000	66,000	28,000	36,000	11,300		12,000	102,000	55,000	45,000
5,800		6,000	66,000	28,000	36,000	11,500		12,000	102,000	55,000	45,000
6,000		6,000	66,000	28,000	36,000	11,510	29/64	12,000	102,000	55,000	45,000
6,100		8,000	79,000	34,000	36,000	11,910	15/32	12,000	102,000	55,000	45,000
6,200		8,000	79,000	34,000	36,000	12,000		12,000	102,000	55,000	45,000
6,300		8,000	79,000	34,000	36,000	12,100		14,000	107,000	60,000	45,000
6,400		8,000	79,000	34,000	36,000	12,300	31/64	14,000	107,000	60,000	45,000
6,600		8,000	79,000	34,000	36,000	12,500		14,000	107,000	60,000	45,000
6,800		8,000	79,000	34,000	36,000	12,700	1/2	14,000	107,000	60,000	45,000
7,000		8,000	79,000	34,000	36,000	12,900		14,000	107,000	60,000	45,000
7,100		8,000	79,000	41,000	36,000	13,000		14,000	107,000	60,000	45,000
7,140	9/32	8,000	79,000	41,000	36,000	13,500		14,000	107,000	60,000	45,000
7,400		8,000	79,000	41,000	36,000	13,890	35/64	14,000	107,000	60,000	45,000
7,500		8,000	79,000	41,000	36,000	14,000		14,000	107,000	60,000	45,000
7,540	19/64	8,000	79,000	41,000	36,000	14,500		16,000	115,000	65,000	48,000
7,800		8,000	79,000	41,000	36,000	14,680	37/64	16,000	115,000	65,000	48,000
7,940	5/16	8,000	79,000	41,000	36,000	14,900		16,000	115,000	65,000	48,000
8,000		8,000	79,000	41,000	36,000	15,000		16,000	115,000	65,000	48,000
8,100		10,000	89,000	47,000	40,000	15,480	39/64	16,000	115,000	65,000	48,000
8,200		10,000	89,000	47,000	40,000	15,500		16,000	115,000	65,000	48,000
8,400		10,000	89,000	47,000	40,000	16,100		18,000	123,000	73,000	48,000
8,500		10,000	89,000	47,000	40,000	16,200		18,000	123,000	73,000	48,000
8,700		10,000	89,000	47,000	40,000	16,500		18,000	123,000	73,000	48,000
8,800		10,000	89,000	47,000	40,000	17,000		18,000	123,000	73,000	48,000
9,000		10,000	89,000	47,000	40,000	17,500		18,000	123,000	73,000	48,000
9,200		10,000	89,000	47,000	40,000	17,700		18,000	123,000	73,000	48,000
9,700		10,000	89,000	47,000	40,000	18,000		18,000	123,000	73,000	48,000
9,800		10,000	89,000	47,000	40,000	18,700		20,000	131,000	79,000	50,000
10,000		10,000	89,000	47,000	40,000	19,000		20,000	131,000	79,000	50,000
10,200		12,000	102,000	55,000	45,000	19,500		20,000	131,000	79,000	50,000
10,300		12,000	102,000	55,000	45,000						



Tehoporat jäähdytyskanavilla



P • Kärjen kevennys $\geq \varnothing 3,000$ • kartiovaippahionta • leikkusuärmä on hieman kovera • optimoitu leikkuu geometria

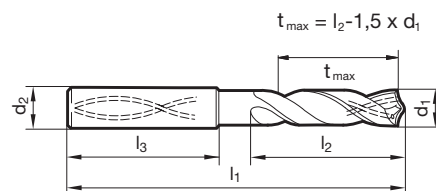
M**K****N**

seostetut ja lujat teräkset 1600 N/mm² asti • Inconel, Hastelloy, Monel
• Titaani ja titaaniseokset

S •**H** ○

GÜHRING NAVIGATOR

Leikkuarvosivu 750

Materiaali **TKM**Pinta **Y**Varren muoto **HA**Artikkelinro. **8520**

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,000		6,000	62,000	20,000	36,000	6,100		8,000	79,000	34,000	36,000
3,100		6,000	62,000	20,000	36,000	6,200		8,000	79,000	34,000	36,000
3,170	1/8	6,000	62,000	20,000	36,000	6,300		8,000	79,000	34,000	36,000
3,200		6,000	62,000	20,000	36,000	6,350	1/4	8,000	79,000	34,000	36,000
3,250		6,000	62,000	20,000	36,000	6,400		8,000	79,000	34,000	36,000
3,300		6,000	62,000	20,000	36,000	6,500		8,000	79,000	34,000	36,000
3,400		6,000	62,000	20,000	36,000	6,600		8,000	79,000	34,000	36,000
3,500		6,000	62,000	20,000	36,000	6,700		8,000	79,000	34,000	36,000
3,570	9/64	6,000	62,000	20,000	36,000	6,750	17/64	8,000	79,000	34,000	36,000
3,600		6,000	62,000	20,000	36,000	6,800		8,000	79,000	34,000	36,000
3,700		6,000	62,000	20,000	36,000	6,900		8,000	79,000	34,000	36,000
3,800		6,000	66,000	24,000	36,000	7,000		8,000	79,000	34,000	36,000
3,900		6,000	66,000	24,000	36,000	7,100		8,000	79,000	41,000	36,000
3,970	5/32	6,000	66,000	24,000	36,000	7,140	9/32	8,000	79,000	41,000	36,000
4,000		6,000	66,000	24,000	36,000	7,200		8,000	79,000	41,000	36,000
4,100		6,000	66,000	24,000	36,000	7,300		8,000	79,000	41,000	36,000
4,200		6,000	66,000	24,000	36,000	7,400		8,000	79,000	41,000	36,000
4,300		6,000	66,000	24,000	36,000	7,400		8,000	79,000	41,000	36,000
4,370	11/64	6,000	66,000	24,000	36,000	7,500		8,000	79,000	41,000	36,000
4,400		6,000	66,000	24,000	36,000	7,540	19/64	8,000	79,000	41,000	36,000
4,500		6,000	66,000	24,000	36,000	7,600		8,000	79,000	41,000	36,000
4,600		6,000	66,000	24,000	36,000	7,700		8,000	79,000	41,000	36,000
4,600		6,000	66,000	24,000	36,000	7,800		8,000	79,000	41,000	36,000
4,650		6,000	66,000	24,000	36,000	7,900		8,000	79,000	41,000	36,000
4,700		6,000	66,000	24,000	36,000	7,900	5/16	8,000	79,000	41,000	36,000
4,760	3/16	6,000	66,000	28,000	36,000	7,940		8,000	79,000	41,000	36,000
4,800		6,000	66,000	28,000	36,000	8,000		8,000	79,000	41,000	36,000
4,900		6,000	66,000	28,000	36,000	8,100		10,000	89,000	47,000	40,000
5,000		6,000	66,000	28,000	36,000	8,200		10,000	89,000	47,000	40,000
5,100		6,000	66,000	28,000	36,000	8,300		10,000	89,000	47,000	40,000
5,160	13/64	6,000	66,000	28,000	36,000	8,330	21/64	10,000	89,000	47,000	40,000
5,200		6,000	66,000	28,000	36,000	8,400		10,000	89,000	47,000	40,000
5,300		6,000	66,000	28,000	36,000	8,500		10,000	89,000	47,000	40,000
5,400		6,000	66,000	28,000	36,000	8,600		10,000	89,000	47,000	40,000
5,500		6,000	66,000	28,000	36,000	8,700		10,000	89,000	47,000	40,000
5,550		6,000	66,000	28,000	36,000	8,730	11/32	10,000	89,000	47,000	40,000
5,560	7/32	6,000	66,000	28,000	36,000	8,800		10,000	89,000	47,000	40,000
5,600		6,000	66,000	28,000	36,000	8,900		10,000	89,000	47,000	40,000
5,700		6,000	66,000	28,000	36,000	9,000		10,000	89,000	47,000	40,000
5,800		6,000	66,000	28,000	36,000	9,100		10,000	89,000	47,000	40,000
5,900		6,000	66,000	28,000	36,000	9,130	23/64	10,000	89,000	47,000	40,000
5,950	15/64	6,000	66,000	28,000	36,000	9,200		10,000	89,000	47,000	40,000
6,000		6,000	66,000	28,000	36,000	9,250		10,000	89,000	47,000	40,000
						9,300		10,000	89,000	47,000	40,000



d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
9,400		10,000	89,000	47,000	40,000
9,500		10,000	89,000	47,000	40,000
9,520	3/8	10,000	89,000	47,000	40,000
9,600		10,000	89,000	47,000	40,000
9,700		10,000	89,000	47,000	40,000
9,800		10,000	89,000	47,000	40,000
9,900		10,000	89,000	47,000	40,000
9,920	25/64	10,000	89,000	47,000	40,000
10,000		10,000	89,000	47,000	40,000
10,100		12,000	102,000	55,000	45,000
10,200		12,000	102,000	55,000	45,000
10,300		12,000	102,000	55,000	45,000
10,320	13/32	12,000	102,000	55,000	45,000
10,400		12,000	102,000	55,000	45,000
10,500		12,000	102,000	55,000	45,000
10,600		12,000	102,000	55,000	45,000
10,700		12,000	102,000	55,000	45,000
10,720	27/64	12,000	102,000	55,000	45,000
10,800		12,000	102,000	55,000	45,000
10,900		12,000	102,000	55,000	45,000
11,000		12,000	102,000	55,000	45,000
11,100		12,000	102,000	55,000	45,000
11,110	7/16	12,000	102,000	55,000	45,000
11,200		12,000	102,000	55,000	45,000
11,300		12,000	102,000	55,000	45,000
11,400		12,000	102,000	55,000	45,000
11,500		12,000	102,000	55,000	45,000
11,600		12,000	102,000	55,000	45,000
11,700		12,000	102,000	55,000	45,000
11,800		12,000	102,000	55,000	45,000
11,900		12,000	102,000	55,000	45,000
11,910	15/32	12,000	102,000	55,000	45,000
12,000		12,000	102,000	55,000	45,000
12,200		14,000	107,000	60,000	45,000
12,300	31/64	14,000	107,000	60,000	45,000
12,500		14,000	107,000	60,000	45,000

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
12,700		14,000	107,000	60,000	45,000
12,800	1/2	14,000	107,000	60,000	45,000
13,000		14,000	107,000	60,000	45,000
13,300		14,000	107,000	60,000	45,000
13,490	17/32	14,000	107,000	60,000	45,000
13,500		14,000	107,000	60,000	45,000
13,700		14,000	107,000	60,000	45,000
14,000		14,000	107,000	60,000	45,000
14,200		16,000	115,000	65,000	48,000
14,290	9/16	16,000	115,000	65,000	48,000
14,300		16,000	115,000	65,000	48,000
14,500		16,000	115,000	65,000	48,000
14,700		16,000	115,000	65,000	48,000
15,000		16,000	115,000	65,000	48,000
15,200		16,000	115,000	65,000	48,000
15,300		16,000	115,000	65,000	48,000
15,500		16,000	115,000	65,000	48,000
15,700		16,000	115,000	65,000	48,000
16,000		16,000	115,000	65,000	48,000
16,300		18,000	123,000	73,000	48,000
16,500		18,000	123,000	73,000	48,000
16,900		18,000	123,000	73,000	48,000
17,000		18,000	123,000	73,000	48,000
17,300		18,000	123,000	73,000	48,000
17,500		18,000	123,000	73,000	48,000
18,000		18,000	123,000	73,000	48,000
18,500		20,000	131,000	79,000	50,000
18,900		20,000	131,000	79,000	50,000
19,000		20,000	131,000	79,000	50,000
19,050	3/4	20,000	131,000	79,000	50,000
19,300		20,000	131,000	79,000	50,000
19,500		20,000	131,000	79,000	50,000
20,000		20,000	131,000	79,000	50,000



Tehoporat jäähdytyskanavilla



P • Kärjen kevennys $\geq \varnothing 3,000$ • kartiovaippahionta • leikkusärmä on hieman kovera • optimoitu leikkuu geometria

M**K****N**

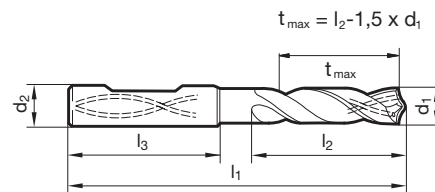
seostetut ja lujat teräkset 1600 N/mm² asti • Inconel, Hastelloy, Monel
• Titaani ja titaaniseokset

S •**H** ○

GÜHRING NAVIGATOR

Leikkuarvosivu 750

Materiaali	TKM
Pinta	Y
Varren muoto	HE



Artikkelinro.

8620

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,000		6,000	62,000	20,000	36,000	6,100		8,000	79,000	34,000	36,000
3,100		6,000	62,000	20,000	36,000	6,200		8,000	79,000	34,000	36,000
3,170	1/8	6,000	62,000	20,000	36,000	6,300		8,000	79,000	34,000	36,000
3,200		6,000	62,000	20,000	36,000	6,350	1/4	8,000	79,000	34,000	36,000
3,250		6,000	62,000	20,000	36,000	6,400		8,000	79,000	34,000	36,000
3,300		6,000	62,000	20,000	36,000	6,500		8,000	79,000	34,000	36,000
3,400		6,000	62,000	20,000	36,000	6,600		8,000	79,000	34,000	36,000
3,500		6,000	62,000	20,000	36,000	6,700		8,000	79,000	34,000	36,000
3,570	9/64	6,000	62,000	20,000	36,000	6,750	17/64	8,000	79,000	34,000	36,000
3,600		6,000	62,000	20,000	36,000	6,800		8,000	79,000	34,000	36,000
3,700		6,000	62,000	20,000	36,000	6,900		8,000	79,000	34,000	36,000
3,800		6,000	66,000	24,000	36,000	7,000		8,000	79,000	34,000	36,000
3,900		6,000	66,000	24,000	36,000	7,100		8,000	79,000	41,000	36,000
3,970	5/32	6,000	66,000	24,000	36,000	7,140	9/32	8,000	79,000	41,000	36,000
4,000		6,000	66,000	24,000	36,000	7,200		8,000	79,000	41,000	36,000
4,100		6,000	66,000	24,000	36,000	7,300		8,000	79,000	41,000	36,000
4,200		6,000	66,000	24,000	36,000	7,400		8,000	79,000	41,000	36,000
4,300		6,000	66,000	24,000	36,000	7,500		8,000	79,000	41,000	36,000
4,370	11/64	6,000	66,000	24,000	36,000	7,540	19/64	8,000	79,000	41,000	36,000
4,400		6,000	66,000	24,000	36,000	7,600		8,000	79,000	41,000	36,000
4,500		6,000	66,000	24,000	36,000	7,700		8,000	79,000	41,000	36,000
4,600		6,000	66,000	24,000	36,000	7,800		8,000	79,000	41,000	36,000
4,650		6,000	66,000	24,000	36,000	7,900		8,000	79,000	41,000	36,000
4,700		6,000	66,000	24,000	36,000	7,940	5/16	8,000	79,000	41,000	36,000
4,760	3/16	6,000	66,000	28,000	36,000	8,000		8,000	79,000	41,000	36,000
4,800		6,000	66,000	28,000	36,000	8,100		10,000	89,000	47,000	40,000
4,900		6,000	66,000	28,000	36,000	8,200		10,000	89,000	47,000	40,000
5,000		6,000	66,000	28,000	36,000	8,300		10,000	89,000	47,000	40,000
5,100		6,000	66,000	28,000	36,000	8,330	21/64	10,000	89,000	47,000	40,000
5,160	13/64	6,000	66,000	28,000	36,000	8,400		10,000	89,000	47,000	40,000
5,200		6,000	66,000	28,000	36,000	8,500		10,000	89,000	47,000	40,000
5,300		6,000	66,000	28,000	36,000	8,600		10,000	89,000	47,000	40,000
5,400		6,000	66,000	28,000	36,000	8,700		10,000	89,000	47,000	40,000
5,500		6,000	66,000	28,000	36,000	8,730	11/32	10,000	89,000	47,000	40,000
5,550		6,000	66,000	28,000	36,000	8,800		10,000	89,000	47,000	40,000
5,560	7/32	6,000	66,000	28,000	36,000	8,900		10,000	89,000	47,000	40,000
5,600		6,000	66,000	28,000	36,000	9,000		10,000	89,000	47,000	40,000
5,700		6,000	66,000	28,000	36,000	9,100		10,000	89,000	47,000	40,000
5,800		6,000	66,000	28,000	36,000	9,130	23/64	10,000	89,000	47,000	40,000
5,900		6,000	66,000	28,000	36,000	9,200		10,000	89,000	47,000	40,000
5,950	15/64	6,000	66,000	28,000	36,000	9,250		10,000	89,000	47,000	40,000
6,000		6,000	66,000	28,000	36,000	9,300		10,000	89,000	47,000	40,000

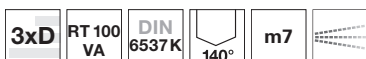


d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
9,400		10,000	89,000	47,000	40,000
9,500		10,000	89,000	47,000	40,000
9,520	3/8	10,000	89,000	47,000	40,000
9,600		10,000	89,000	47,000	40,000
9,700		10,000	89,000	47,000	40,000
9,800		10,000	89,000	47,000	40,000
9,900		10,000	89,000	47,000	40,000
9,920	25/64	10,000	89,000	47,000	40,000
10,000		10,000	89,000	47,000	40,000
10,100		12,000	102,000	55,000	45,000
10,200		12,000	102,000	55,000	45,000
10,300		12,000	102,000	55,000	45,000
10,320	13/32	12,000	102,000	55,000	45,000
10,400		12,000	102,000	55,000	45,000
10,500		12,000	102,000	55,000	45,000
10,600		12,000	102,000	55,000	45,000
10,700		12,000	102,000	55,000	45,000
10,800		12,000	102,000	55,000	45,000
10,900		12,000	102,000	55,000	45,000
11,000		12,000	102,000	55,000	45,000
11,100		12,000	102,000	55,000	45,000
11,110	7/16	12,000	102,000	55,000	45,000
11,200		12,000	102,000	55,000	45,000
11,300		12,000	102,000	55,000	45,000
11,400		12,000	102,000	55,000	45,000
11,500		12,000	102,000	55,000	45,000
11,600		12,000	102,000	55,000	45,000
11,700		12,000	102,000	55,000	45,000
11,800		12,000	102,000	55,000	45,000
11,900		12,000	102,000	55,000	45,000
11,910	15/32	12,000	102,000	55,000	45,000
12,000		12,000	102,000	55,000	45,000
12,200		14,000	107,000	60,000	45,000
12,500		14,000	107,000	60,000	45,000
12,700	1/2	14,000	107,000	60,000	45,000
12,800		14,000	107,000	60,000	45,000

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
13,000		14,000	107,000	60,000	45,000
13,300		14,000	107,000	60,000	45,000
13,500		14,000	107,000	60,000	45,000
13,700		14,000	107,000	60,000	45,000
14,000		14,000	107,000	60,000	45,000
14,200		16,000	115,000	65,000	48,000
14,290	9/16	16,000	115,000	65,000	48,000
14,300		16,000	115,000	65,000	48,000
14,500		16,000	115,000	65,000	48,000
14,700		16,000	115,000	65,000	48,000
15,000		16,000	115,000	65,000	48,000
15,200		16,000	115,000	65,000	48,000
15,300		16,000	115,000	65,000	48,000
15,500		16,000	115,000	65,000	48,000
15,700		16,000	115,000	65,000	48,000
16,000		16,000	115,000	65,000	48,000
16,300		18,000	123,000	73,000	48,000
16,500		18,000	123,000	73,000	48,000
16,900		18,000	123,000	73,000	48,000
17,000		18,000	123,000	73,000	48,000
17,300		18,000	123,000	73,000	48,000
17,500		18,000	123,000	73,000	48,000
18,000		18,000	123,000	73,000	48,000
18,500		20,000	131,000	79,000	50,000
18,900		20,000	131,000	79,000	50,000
19,000		20,000	131,000	79,000	50,000
19,050	3/4	20,000	131,000	79,000	50,000
19,300		20,000	131,000	79,000	50,000
19,500		20,000	131,000	79,000	50,000
20,000		20,000	131,000	79,000	50,000



Tehoporat jäähdytyskanavilla



P Kärjen kevennys $\geq \varnothing 3,000$ • päästöhiottu kärki • pääleikkausärmän suorasta
• optimoitu leikkuu geometria

M •**K**

N ruostumatt.-/haponk.-/kuumal. teräkset • Titaani ja titaaniseokset • Inconel,
Hastelloy, Monel

S •**H**

GÜHRING NAVIGATOR

Leikkuuarvosivu 750

Materiaali

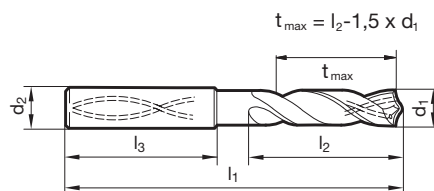
TKM

Pinta

a

Varren muoto

HA



Artikkelinro.

8510

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,000		6,000	62,000	20,000	36,000	6,100		8,000	79,000	34,000	36,000
3,100		6,000	62,000	20,000	36,000	6,200		8,000	79,000	34,000	36,000
3,170	1/8	6,000	62,000	20,000	36,000	6,300		8,000	79,000	34,000	36,000
3,200		6,000	62,000	20,000	36,000	6,350	1/4	8,000	79,000	34,000	36,000
3,250		6,000	62,000	20,000	36,000	6,400		8,000	79,000	34,000	36,000
3,300		6,000	62,000	20,000	36,000	6,500		8,000	79,000	34,000	36,000
3,400		6,000	62,000	20,000	36,000	6,600		8,000	79,000	34,000	36,000
3,500		6,000	62,000	20,000	36,000	6,700		8,000	79,000	34,000	36,000
3,570	9/64	6,000	62,000	20,000	36,000	6,750	17/64	8,000	79,000	34,000	36,000
3,600		6,000	62,000	20,000	36,000	6,800		8,000	79,000	34,000	36,000
3,700		6,000	62,000	20,000	36,000	6,900		8,000	79,000	34,000	36,000
3,800		6,000	66,000	24,000	36,000	7,000		8,000	79,000	34,000	36,000
3,900		6,000	66,000	24,000	36,000	7,100		8,000	79,000	41,000	36,000
3,970	5/32	6,000	66,000	24,000	36,000	7,140	9/32	8,000	79,000	41,000	36,000
4,000		6,000	66,000	24,000	36,000	7,200		8,000	79,000	41,000	36,000
4,100		6,000	66,000	24,000	36,000	7,300		8,000	79,000	41,000	36,000
4,200		6,000	66,000	24,000	36,000	7,400		8,000	79,000	41,000	36,000
4,300		6,000	66,000	24,000	36,000	7,500		8,000	79,000	41,000	36,000
4,370	11/64	6,000	66,000	24,000	36,000	7,540	19/64	8,000	79,000	41,000	36,000
4,400		6,000	66,000	24,000	36,000	7,600		8,000	79,000	41,000	36,000
4,500		6,000	66,000	24,000	36,000	7,700		8,000	79,000	41,000	36,000
4,600		6,000	66,000	24,000	36,000	7,800		8,000	79,000	41,000	36,000
4,650		6,000	66,000	24,000	36,000	7,900		8,000	79,000	41,000	36,000
4,700		6,000	66,000	24,000	36,000	7,940	5/16	8,000	79,000	41,000	36,000
4,760	3/16	6,000	66,000	28,000	36,000	8,000		8,000	79,000	41,000	36,000
4,800		6,000	66,000	28,000	36,000	8,100		10,000	89,000	47,000	40,000
4,900		6,000	66,000	28,000	36,000	8,200		10,000	89,000	47,000	40,000
5,000		6,000	66,000	28,000	36,000	8,300		10,000	89,000	47,000	40,000
5,100		6,000	66,000	28,000	36,000	8,330	21/64	10,000	89,000	47,000	40,000
5,160	13/64	6,000	66,000	28,000	36,000	8,400		10,000	89,000	47,000	40,000
5,200		6,000	66,000	28,000	36,000	8,500		10,000	89,000	47,000	40,000
5,300		6,000	66,000	28,000	36,000	8,600		10,000	89,000	47,000	40,000
5,400		6,000	66,000	28,000	36,000	8,700		10,000	89,000	47,000	40,000
5,500		6,000	66,000	28,000	36,000	8,730	11/32	10,000	89,000	47,000	40,000
5,550		6,000	66,000	28,000	36,000	8,800		10,000	89,000	47,000	40,000
5,560	7/32	6,000	66,000	28,000	36,000	8,900		10,000	89,000	47,000	40,000
5,600		6,000	66,000	28,000	36,000	9,000		10,000	89,000	47,000	40,000
5,700		6,000	66,000	28,000	36,000	9,100		10,000	89,000	47,000	40,000
5,800		6,000	66,000	28,000	36,000	9,130	23/64	10,000	89,000	47,000	40,000
5,900		6,000	66,000	28,000	36,000	9,200		10,000	89,000	47,000	40,000
5,950	15/64	6,000	66,000	28,000	36,000	9,250		10,000	89,000	47,000	40,000
6,000		6,000	66,000	28,000	36,000	9,300		10,000	89,000	47,000	40,000



d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
9,400		10,000	89,000	47,000	40,000
9,500		10,000	89,000	47,000	40,000
9,520	3/8	10,000	89,000	47,000	40,000
9,600		10,000	89,000	47,000	40,000
9,700		10,000	89,000	47,000	40,000
9,800		10,000	89,000	47,000	40,000
9,900		10,000	89,000	47,000	40,000
9,920	25/64	10,000	89,000	47,000	40,000
10,000		10,000	89,000	47,000	40,000
10,100		12,000	102,000	55,000	45,000
10,200		12,000	102,000	55,000	45,000
10,300		12,000	102,000	55,000	45,000
10,320	13/32	12,000	102,000	55,000	45,000
10,400		12,000	102,000	55,000	45,000
10,500		12,000	102,000	55,000	45,000
10,600		12,000	102,000	55,000	45,000
10,700		12,000	102,000	55,000	45,000
10,800		12,000	102,000	55,000	45,000
10,900		12,000	102,000	55,000	45,000
11,000		12,000	102,000	55,000	45,000
11,100		12,000	102,000	55,000	45,000
11,110	7/16	12,000	102,000	55,000	45,000
11,200		12,000	102,000	55,000	45,000
11,300		12,000	102,000	55,000	45,000
11,400		12,000	102,000	55,000	45,000
11,500		12,000	102,000	55,000	45,000
11,600		12,000	102,000	55,000	45,000
11,700		12,000	102,000	55,000	45,000
11,800		12,000	102,000	55,000	45,000
11,900		12,000	102,000	55,000	45,000
11,910	15/32	12,000	102,000	55,000	45,000
12,000		12,000	102,000	55,000	45,000
12,200		14,000	107,000	60,000	45,000
12,500		14,000	107,000	60,000	45,000
12,700	1/2	14,000	107,000	60,000	45,000
12,800		14,000	107,000	60,000	45,000

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
13,000		14,000	107,000	60,000	45,000
13,300		14,000	107,000	60,000	45,000
13,500		14,000	107,000	60,000	45,000
13,700		14,000	107,000	60,000	45,000
14,000		14,000	107,000	60,000	45,000
14,200		16,000	115,000	65,000	48,000
14,290	9/16	16,000	115,000	65,000	48,000
14,300		16,000	115,000	65,000	48,000
14,500		16,000	115,000	65,000	48,000
14,700		16,000	115,000	65,000	48,000
15,000		16,000	115,000	65,000	48,000
15,200		16,000	115,000	65,000	48,000
15,300		16,000	115,000	65,000	48,000
15,500		16,000	115,000	65,000	48,000
15,700		16,000	115,000	65,000	48,000
16,000		16,000	115,000	65,000	48,000
16,300		18,000	123,000	73,000	48,000
16,500		18,000	123,000	73,000	48,000
16,900		18,000	123,000	73,000	48,000
17,000		18,000	123,000	73,000	48,000
17,300		18,000	123,000	73,000	48,000
17,500		18,000	123,000	73,000	48,000
18,000		18,000	123,000	73,000	48,000
18,500		20,000	131,000	79,000	50,000
18,900		20,000	131,000	79,000	50,000
19,000		20,000	131,000	79,000	50,000
19,050	3/4	20,000	131,000	79,000	50,000
19,300		20,000	131,000	79,000	50,000
19,500		20,000	131,000	79,000	50,000
20,000		20,000	131,000	79,000	50,000



Tehoporat jäähdytyskanavilla



P Kärjen kevennys $\geq \varnothing 3,000$ • päästöhiottu kärki • pääleikkusuärmän suorasta
• optimoitu leikkuu geometria

M •**K**

N ruostumatt.-/haponk.-/kuumal. teräkset • Titaani ja titaaniseokset • Inconel,
Hastelloy, Monel

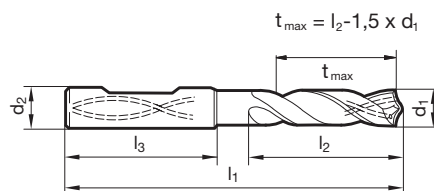
S •**H**

GÜHRING NAVIGATOR

Leikkuuarvosivu 750

Materiaali **TKM**Pinta **a**

Varren muoto HE

Artikkelinro. **8610**

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,000		6,000	62,000	20,000	36,000	6,100		8,000	79,000	34,000	36,000
3,100		6,000	62,000	20,000	36,000	6,200		8,000	79,000	34,000	36,000
3,170	1/8	6,000	62,000	20,000	36,000	6,300		8,000	79,000	34,000	36,000
3,200		6,000	62,000	20,000	36,000	6,350	1/4	8,000	79,000	34,000	36,000
3,250		6,000	62,000	20,000	36,000	6,400		8,000	79,000	34,000	36,000
3,300		6,000	62,000	20,000	36,000	6,500		8,000	79,000	34,000	36,000
3,400		6,000	62,000	20,000	36,000	6,600		8,000	79,000	34,000	36,000
3,500		6,000	62,000	20,000	36,000	6,700		8,000	79,000	34,000	36,000
3,570	9/64	6,000	62,000	20,000	36,000	6,750	17/64	8,000	79,000	34,000	36,000
3,600		6,000	62,000	20,000	36,000	6,800		8,000	79,000	34,000	36,000
3,700		6,000	62,000	20,000	36,000	6,900		8,000	79,000	34,000	36,000
3,800		6,000	66,000	24,000	36,000	7,000		8,000	79,000	34,000	36,000
3,900		6,000	66,000	24,000	36,000	7,100		8,000	79,000	41,000	36,000
3,970	5/32	6,000	66,000	24,000	36,000	7,140	9/32	8,000	79,000	41,000	36,000
4,000		6,000	66,000	24,000	36,000	7,200		8,000	79,000	41,000	36,000
4,100		6,000	66,000	24,000	36,000	7,300		8,000	79,000	41,000	36,000
4,200		6,000	66,000	24,000	36,000	7,400		8,000	79,000	41,000	36,000
4,300		6,000	66,000	24,000	36,000	7,500		8,000	79,000	41,000	36,000
4,370	11/64	6,000	66,000	24,000	36,000	7,540	19/64	8,000	79,000	41,000	36,000
4,400		6,000	66,000	24,000	36,000	7,600		8,000	79,000	41,000	36,000
4,500		6,000	66,000	24,000	36,000	7,700		8,000	79,000	41,000	36,000
4,600		6,000	66,000	24,000	36,000	7,800		8,000	79,000	41,000	36,000
4,650		6,000	66,000	24,000	36,000	7,900		8,000	79,000	41,000	36,000
4,700		6,000	66,000	24,000	36,000	7,940	5/16	8,000	79,000	41,000	36,000
4,760	3/16	6,000	66,000	28,000	36,000	8,000		8,000	79,000	41,000	36,000
4,800		6,000	66,000	28,000	36,000	8,100		10,000	89,000	47,000	40,000
4,900		6,000	66,000	28,000	36,000	8,200		10,000	89,000	47,000	40,000
5,000		6,000	66,000	28,000	36,000	8,300		10,000	89,000	47,000	40,000
5,100		6,000	66,000	28,000	36,000	8,330	21/64	10,000	89,000	47,000	40,000
5,160	13/64	6,000	66,000	28,000	36,000	8,400		10,000	89,000	47,000	40,000
5,200		6,000	66,000	28,000	36,000	8,500		10,000	89,000	47,000	40,000
5,300		6,000	66,000	28,000	36,000	8,600		10,000	89,000	47,000	40,000
5,400		6,000	66,000	28,000	36,000	8,700		10,000	89,000	47,000	40,000
5,500		6,000	66,000	28,000	36,000	8,730	11/32	10,000	89,000	47,000	40,000
5,550		6,000	66,000	28,000	36,000	8,800		10,000	89,000	47,000	40,000
5,560	7/32	6,000	66,000	28,000	36,000	8,900		10,000	89,000	47,000	40,000
5,600		6,000	66,000	28,000	36,000	9,000		10,000	89,000	47,000	40,000
5,700		6,000	66,000	28,000	36,000	9,100		10,000	89,000	47,000	40,000
5,800		6,000	66,000	28,000	36,000	9,130	23/64	10,000	89,000	47,000	40,000
5,900		6,000	66,000	28,000	36,000	9,200		10,000	89,000	47,000	40,000
5,950	15/64	6,000	66,000	28,000	36,000	9,250		10,000	89,000	47,000	40,000
6,000		6,000	66,000	28,000	36,000	9,300		10,000	89,000	47,000	40,000



d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
9,400		10,000	89,000	47,000	40,000
9,500		10,000	89,000	47,000	40,000
9,520	3/8	10,000	89,000	47,000	40,000
9,600		10,000	89,000	47,000	40,000
9,700		10,000	89,000	47,000	40,000
9,800		10,000	89,000	47,000	40,000
9,900		10,000	89,000	47,000	40,000
9,920	25/64	10,000	89,000	47,000	40,000
10,000		10,000	89,000	47,000	40,000
10,100		12,000	102,000	55,000	45,000
10,200		12,000	102,000	55,000	45,000
10,300		12,000	102,000	55,000	45,000
10,320	13/32	12,000	102,000	55,000	45,000
10,400		12,000	102,000	55,000	45,000
10,500		12,000	102,000	55,000	45,000
10,600		12,000	102,000	55,000	45,000
10,700		12,000	102,000	55,000	45,000
10,800		12,000	102,000	55,000	45,000
10,900		12,000	102,000	55,000	45,000
11,000		12,000	102,000	55,000	45,000
11,100		12,000	102,000	55,000	45,000
11,110	7/16	12,000	102,000	55,000	45,000
11,200		12,000	102,000	55,000	45,000
11,300		12,000	102,000	55,000	45,000
11,400		12,000	102,000	55,000	45,000
11,500		12,000	102,000	55,000	45,000
11,600		12,000	102,000	55,000	45,000
11,700		12,000	102,000	55,000	45,000
11,800		12,000	102,000	55,000	45,000
11,900		12,000	102,000	55,000	45,000
11,910	15/32	12,000	102,000	55,000	45,000
12,000		12,000	102,000	55,000	45,000
12,200		14,000	107,000	60,000	45,000
12,500		14,000	107,000	60,000	45,000
12,700	1/2	14,000	107,000	60,000	45,000
12,800		14,000	107,000	60,000	45,000

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
13,000		14,000	107,000	60,000	45,000
13,300		14,000	107,000	60,000	45,000
13,500		14,000	107,000	60,000	45,000
13,700		14,000	107,000	60,000	45,000
14,000		14,000	107,000	60,000	45,000
14,200		16,000	115,000	65,000	48,000
14,290	9/16	16,000	115,000	65,000	48,000
14,300		16,000	115,000	65,000	48,000
14,500		16,000	115,000	65,000	48,000
14,700		16,000	115,000	65,000	48,000
15,000		16,000	115,000	65,000	48,000
15,200		16,000	115,000	65,000	48,000
15,300		16,000	115,000	65,000	48,000
15,500		16,000	115,000	65,000	48,000
15,700		16,000	115,000	65,000	48,000
16,000		16,000	115,000	65,000	48,000
16,300		18,000	123,000	73,000	48,000
16,500		18,000	123,000	73,000	48,000
16,900		18,000	123,000	73,000	48,000
17,000		18,000	123,000	73,000	48,000
17,300		18,000	123,000	73,000	48,000
17,500		18,000	123,000	73,000	48,000
18,000		18,000	123,000	73,000	48,000
18,500		20,000	131,000	79,000	50,000
18,900		20,000	131,000	79,000	50,000
19,000		20,000	131,000	79,000	50,000
19,050	3/4	20,000	131,000	79,000	50,000
19,300		20,000	131,000	79,000	50,000
19,500		20,000	131,000	79,000	50,000
20,000		20,000	131,000	79,000	50,000



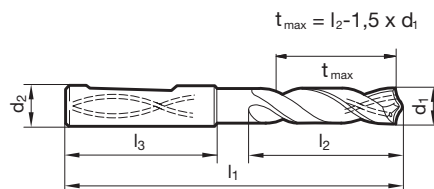
Tehoporat jäähdytyskanavilla



P	○	Kärjen keveys $\geq \varnothing 3,000$ • kartiovaippahionta • pääleikkusuärmän kaarteesta • optimoitu leikkuu geometria • terävästi leikkaava
M	○	
K	○	
N	○	runsasseosteiset teräkset • ruostumatt./-haponk./-kuumal. teräkset
S	●	• Inconel, Hastelloy, Monel • messinki, pronssit • alumiini ja Al-seokset
H	○	• Magnesium ja Mg-seokset • Titaani ja titaaniseokset • sintrattu pulveriteräs

GÜHRING NAVIGATOR

Leikkuarvosivu 750



Artikkelinro.

2468

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,500		6,000	62,000	20,000	36,000	10,800		12,000	102,000	55,000	45,000
3,700		6,000	62,000	20,000	36,000	11,000		12,000	102,000	55,000	45,000
3,800		6,000	66,000	24,000	36,000	11,300		12,000	102,000	55,000	45,000
4,000		6,000	66,000	24,000	36,000	11,500		12,000	102,000	55,000	45,000
4,200		6,000	66,000	24,000	36,000	11,800		12,000	102,000	55,000	45,000
4,500		6,000	66,000	24,000	36,000	12,000		12,000	102,000	55,000	45,000
5,000		6,000	66,000	28,000	36,000	12,200		14,000	107,000	60,000	45,000
5,200		6,000	66,000	28,000	36,000	12,300	31/64	14,000	107,000	60,000	45,000
5,500		6,000	66,000	28,000	36,000	12,500		14,000	107,000	60,000	45,000
5,800		6,000	66,000	28,000	36,000	12,700	1/2	14,000	107,000	60,000	45,000
6,000		6,000	66,000	28,000	36,000	13,000		14,000	107,000	60,000	45,000
6,300		8,000	79,000	34,000	36,000	13,500		14,000	107,000	60,000	45,000
6,800		8,000	79,000	34,000	36,000	14,000		14,000	107,000	60,000	45,000
6,900		8,000	79,000	34,000	36,000	14,500		16,000	115,000	65,000	48,000
7,000		8,000	79,000	34,000	36,000	15,000		16,000	115,000	65,000	48,000
7,500		8,000	79,000	41,000	36,000	15,500		16,000	115,000	65,000	48,000
8,000		8,000	79,000	41,000	36,000	16,000		16,000	115,000	65,000	48,000
8,100		10,000	89,000	47,000	40,000	16,500		18,000	123,000	73,000	48,000
8,200		10,000	89,000	47,000	40,000	17,000		18,000	123,000	73,000	48,000
8,300		10,000	89,000	47,000	40,000	17,500		18,000	123,000	73,000	48,000
8,500		10,000	89,000	47,000	40,000	17,500		18,000	123,000	73,000	48,000
8,600		10,000	89,000	47,000	40,000	18,000		18,000	123,000	73,000	48,000
9,000		10,000	89,000	47,000	40,000	20,000		20,000	131,000	79,000	50,000
9,500		10,000	89,000	47,000	40,000						
10,000		10,000	89,000	47,000	40,000						
10,100		12,000	102,000	55,000	45,000						
10,200		12,000	102,000	55,000	45,000						
10,300		12,000	102,000	55,000	45,000						
10,400		12,000	102,000	55,000	45,000						
10,500		12,000	102,000	55,000	45,000						



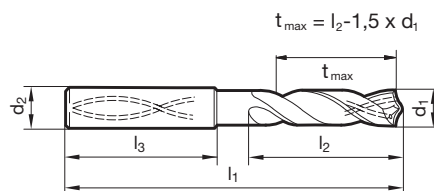
Tehoporat jäähdytyskanavilla



P	○	Kärjen kevennys $\geq \varnothing 3,000$ • kartiovaippahionta • pääleikkusärmän kaarteesta • optimoitu leikkuu geometria • terävästi leikkaava
M	○	
K	○	
N	○	runsasseosteiset teräkset • ruostumatt./haponk./kuumal. teräkset
S	●	• Inconel, Hastelloy, Monel • messinki, pronssit • alumiini ja Al-seokset
H	○	• Magnesium ja Mg-seokset • Titaani ja titaaniseokset • sintrattu pulveriteräs

GÜHRING NAVIGATOR

Leikkuuarvosivu 750



Artikkelinro.

1660

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,100		6,000	62,000	20,000	36,000	9,500		10,000	89,000	47,000	40,000
4,000		6,000	66,000	24,000	36,000	9,700		10,000	89,000	47,000	40,000
4,100		6,000	66,000	24,000	36,000	9,800		10,000	89,000	47,000	40,000
4,200		6,000	66,000	24,000	36,000	10,000		10,000	89,000	47,000	40,000
4,300		6,000	66,000	24,000	36,000	10,200		12,000	102,000	55,000	45,000
4,700		6,000	66,000	24,000	36,000	10,320	13/32	12,000	102,000	55,000	45,000
5,000		6,000	66,000	28,000	36,000	10,500		12,000	102,000	55,000	45,000
5,300		6,000	66,000	28,000	36,000	10,700		12,000	102,000	55,000	45,000
5,400		6,000	66,000	28,000	36,000	11,000		12,000	102,000	55,000	45,000
5,500		6,000	66,000	28,000	36,000	11,200		12,000	102,000	55,000	45,000
5,600		6,000	66,000	28,000	36,000	11,500		12,000	102,000	55,000	45,000
6,000		6,000	66,000	28,000	36,000	11,800		12,000	102,000	55,000	45,000
6,100		8,000	79,000	34,000	36,000	12,000		12,000	102,000	55,000	45,000
6,200		8,000	79,000	34,000	36,000	12,500		14,000	107,000	60,000	45,000
6,500		8,000	79,000	34,000	36,000	13,000		14,000	107,000	60,000	45,000
6,700		8,000	79,000	34,000	36,000	13,100	33/64	14,000	107,000	60,000	45,000
6,800		8,000	79,000	34,000	36,000	13,200		14,000	107,000	60,000	45,000
7,000		8,000	79,000	34,000	36,000	13,500		14,000	107,000	60,000	45,000
7,400		8,000	79,000	41,000	36,000	14,000		14,000	107,000	60,000	45,000
7,500		8,000	79,000	41,000	36,000	15,000		16,000	115,000	65,000	48,000
7,600		8,000	79,000	41,000	36,000	15,500		16,000	115,000	65,000	48,000
7,800		8,000	79,000	41,000	36,000	16,500		18,000	123,000	73,000	48,000
8,000		8,000	79,000	41,000	36,000	19,600		20,000	131,000	79,000	50,000
8,100		10,000	89,000	47,000	40,000	20,500		25,000	146,000	84,000	56,000
8,300		10,000	89,000	47,000	40,000	21,500		25,000	146,000	84,000	56,000
8,400		10,000	89,000	47,000	40,000	22,000		25,000	146,000	84,000	56,000
8,500		10,000	89,000	47,000	40,000						
8,800		10,000	89,000	47,000	40,000						
9,000		10,000	89,000	47,000	40,000						
9,200		10,000	89,000	47,000	40,000						



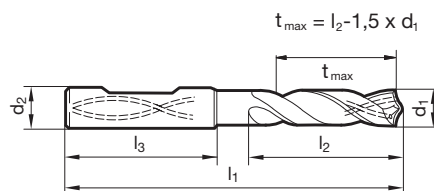
Tehoporat jäädytyskanavilla



P	○	Kärjen kevennys $\geq \varnothing 3,000$ • kartiovaippahionta • pääleikkausärmän kaarteesta • optimoitu leikkuu geometria • terävästi leikkaava
M	○	
K	○	
N	○	runsasseosteiset teräkset • ruostumatt./haponk./kuumal. teräkset
S	●	• Inconel, Hastelloy, Monel • messinki, pronssit • alumiini ja Al-seokset
H	○	• Magnesium ja Mg-seokset • Titaani ja titaaniseokset • sintrattu pulveriteräs

GÜHRING NAVIGATOR

Leikkuuarvosivu 750



Artikkelinro.

1180

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
4,000		6,000	66,000	24,000	36,000	10,720	27/64	12,000	102,000	55,000	45,000
4,100		6,000	66,000	24,000	36,000	10,800		12,000	102,000	55,000	45,000
4,200		6,000	66,000	24,000	36,000	11,000		12,000	102,000	55,000	45,000
4,300		6,000	66,000	24,000	36,000	11,100		12,000	102,000	55,000	45,000
4,500		6,000	66,000	24,000	36,000	11,200		12,000	102,000	55,000	45,000
5,000		6,000	66,000	28,000	36,000	11,400		12,000	102,000	55,000	45,000
5,200		6,000	66,000	28,000	36,000	11,500		12,000	102,000	55,000	45,000
5,300		6,000	66,000	28,000	36,000	11,510	29/64	12,000	102,000	55,000	45,000
5,400		6,000	66,000	28,000	36,000	11,800		12,000	102,000	55,000	45,000
5,500		6,000	66,000	28,000	36,000	11,910	15/32	12,000	102,000	55,000	45,000
5,800		6,000	66,000	28,000	36,000	12,000		12,000	102,000	55,000	45,000
5,950	15/64	6,000	66,000	28,000	36,000	12,200		14,000	107,000	60,000	45,000
6,000		6,000	66,000	28,000	36,000	12,300	31/64	14,000	107,000	60,000	45,000
6,200		8,000	79,000	34,000	36,000	12,600		14,000	107,000	60,000	45,000
6,300		8,000	79,000	34,000	36,000	13,000		14,000	107,000	60,000	45,000
6,500		8,000	79,000	34,000	36,000	13,500		14,000	107,000	60,000	45,000
6,600		8,000	79,000	34,000	36,000	14,000		14,000	107,000	60,000	45,000
6,800		8,000	79,000	34,000	36,000	14,290	9/16	16,000	115,000	65,000	48,000
7,000		8,000	79,000	34,000	36,000	14,500		16,000	115,000	65,000	48,000
7,140	9/32	8,000	79,000	41,000	36,000	15,000		16,000	115,000	65,000	48,000
7,300		8,000	79,000	41,000	36,000	15,500		16,000	115,000	65,000	48,000
7,600		8,000	79,000	41,000	36,000	16,000		16,000	115,000	65,000	48,000
7,800		8,000	79,000	41,000	36,000	16,500		18,000	123,000	73,000	48,000
8,000		8,000	79,000	41,000	36,000	17,500		18,000	123,000	73,000	48,000
8,100		10,000	89,000	47,000	40,000	18,000		18,000	123,000	73,000	48,000
8,200		10,000	89,000	47,000	40,000	18,500		20,000	131,000	79,000	50,000
8,330	21/64	10,000	89,000	47,000	40,000	19,000		20,000	131,000	79,000	50,000
8,400		10,000	89,000	47,000	40,000	19,450	49/64	20,000	131,000	79,000	50,000
8,500		10,000	89,000	47,000	40,000	20,000		20,000	131,000	79,000	50,000
8,800		10,000	89,000	47,000	40,000	20,500		25,000	146,000	84,000	56,000
9,200		10,000	89,000	47,000	40,000	21,000		25,000	146,000	84,000	56,000
9,500		10,000	89,000	47,000	40,000	22,000		25,000	146,000	84,000	56,000
9,600		10,000	89,000	47,000	40,000	22,500		25,000	153,000	91,000	56,000
9,700		10,000	89,000	47,000	40,000	23,000		25,000	153,000	91,000	56,000
9,800		10,000	89,000	47,000	40,000	24,000		25,000	153,000	91,000	56,000
10,000		10,000	89,000	47,000	40,000	25,000	63/64	25,000	153,000	91,000	56,000
10,100		12,000	102,000	55,000	45,000						
10,200		12,000	102,000	55,000	45,000						
10,300		12,000	102,000	55,000	45,000						
10,320	13/32	12,000	102,000	55,000	45,000						
10,400		12,000	102,000	55,000	45,000						
10,500		12,000	102,000	55,000	45,000						



Tehoporat jäähdytyskanavilla



P ● Kärjen kevennys $\geq \varnothing 9,500$ • kartiovaippahionta • HSS pidin kovajuotetulla palalla • vaimentaa värinää ja iskuja

M ○

K ○

N ○

S ○

H ○

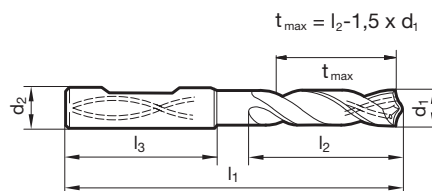
seostamattomat-/matalaseosteiset teräkset • harmaaavalurauta, pallografiittivalurauta • messinki, pronssit, muovit, grafiitti

GÜHRING NAVIGATOR

Leikkuarvosivu 750

Materiaali	KM
Pinta	S
Varren muoto	HE

Tehoporat



Artikkelinro.

1171

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
9,500		16,000	103,000	51,000	48,000	15,100		20,000	122,000	68,000	50,000
9,700		16,000	103,000	51,000	48,000	15,500		20,000	122,000	68,000	50,000
9,800		16,000	103,000	51,000	48,000	15,600		20,000	122,000	68,000	50,000
9,900		16,000	103,000	51,000	48,000	15,700		20,000	122,000	68,000	50,000
10,000		16,000	103,000	51,000	48,000	15,800		20,000	122,000	68,000	50,000
10,100		16,000	103,000	51,000	48,000	16,000		20,000	122,000	68,000	50,000
10,200		16,000	103,000	51,000	48,000	16,200		20,000	130,000	76,000	50,000
10,400		16,000	103,000	51,000	48,000	16,500		20,000	130,000	76,000	50,000
10,500		16,000	103,000	51,000	48,000	16,700		20,000	130,000	76,000	50,000
10,600		16,000	103,000	51,000	48,000	17,000		20,000	130,000	76,000	50,000
10,700		16,000	103,000	51,000	48,000	17,300		20,000	130,000	76,000	50,000
10,800		16,000	103,000	51,000	48,000	17,500		20,000	130,000	76,000	50,000
10,900		16,000	103,000	51,000	48,000	17,700		20,000	130,000	76,000	50,000
11,000		16,000	103,000	51,000	48,000	17,800		20,000	130,000	76,000	50,000
11,200		16,000	103,000	51,000	48,000	17,860	45/64	20,000	130,000	76,000	50,000
11,500		16,000	103,000	51,000	48,000	18,000		20,000	130,000	76,000	50,000
11,600		16,000	103,000	51,000	48,000	18,500		25,000	144,000	84,000	56,000
11,700		16,000	103,000	51,000	48,000	19,000		25,000	144,000	84,000	56,000
12,000		16,000	103,000	51,000	48,000	19,500		25,000	144,000	84,000	56,000
12,100		16,000	111,000	59,000	48,000	19,600		25,000	144,000	84,000	56,000
12,200		16,000	111,000	59,000	48,000	19,700		25,000	144,000	84,000	56,000
12,300	31/64	16,000	111,000	59,000	48,000	20,000		25,000	144,000	84,000	56,000
12,400		16,000	111,000	59,000	48,000	20,500		25,000	153,000	93,000	56,000
12,500		16,000	111,000	59,000	48,000	21,000		25,000	153,000	93,000	56,000
12,600		16,000	111,000	59,000	48,000	21,500		25,000	153,000	93,000	56,000
12,700	1/2	16,000	111,000	59,000	48,000	22,000		25,000	153,000	93,000	56,000
13,000		16,000	111,000	59,000	48,000	22,220	7/8	25,000	161,000	101,000	56,000
13,500		16,000	111,000	59,000	48,000	22,500		25,000	161,000	101,000	56,000
13,700		16,000	111,000	59,000	48,000	23,000		25,000	161,000	101,000	56,000
13,800		16,000	111,000	59,000	48,000	23,500		25,000	161,000	101,000	56,000
14,000		16,000	111,000	59,000	48,000	24,000		25,000	161,000	101,000	56,000
14,200		20,000	122,000	68,000	50,000	24,500		32,000	174,000	110,000	60,000
14,400		20,000	122,000	68,000	50,000	25,000	63/64	32,000	174,000	110,000	60,000
14,600		20,000	122,000	68,000	50,000	25,500		32,000	174,000	110,000	60,000
14,700		20,000	122,000	68,000	50,000						
15,000		20,000	122,000	68,000	50,000						



Tehoporat jäähdytyskanavilla



P Kärjen kevennys $\geq \varnothing 3,000$ • kartiovaippahionta • pienet halkaisijatoleranssit
 • erittäin hyvä reiän pinnanlaatu • huomio jäähdytysnesteen paine

M**K** •**N** ○ harmaavalu-, taottava- ja pallografiittivalurauta**S****H**

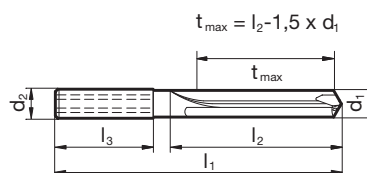
GÜHRING NAVIGATOR

Leikkuarvosivu 752

Materiaali **TKM**

Pinta ○

Varren muoto HA

Artikkelinro. **768**

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,000		6,000	66,000	24,000	36,000	6,750	17/64	8,000	91,000	53,000	36,000
3,100		6,000	66,000	24,000	36,000	6,800		8,000	91,000	53,000	36,000
3,200		6,000	66,000	24,000	36,000	6,900		8,000	91,000	53,000	36,000
3,300		6,000	66,000	24,000	36,000	7,000		8,000	91,000	53,000	36,000
3,400		6,000	66,000	24,000	36,000	7,100		8,000	91,000	53,000	36,000
3,500		6,000	66,000	24,000	36,000	7,140	9/32	8,000	91,000	53,000	36,000
3,600		6,000	66,000	24,000	36,000	7,200		8,000	91,000	53,000	36,000
3,700		6,000	66,000	24,000	36,000	7,300		8,000	91,000	53,000	36,000
3,800		6,000	74,000	30,000	36,000	7,400		8,000	91,000	53,000	36,000
3,900		6,000	74,000	30,000	36,000	7,500		8,000	91,000	53,000	36,000
4,000		6,000	74,000	30,000	36,000	7,540	19/64	8,000	91,000	53,000	36,000
4,100		6,000	74,000	30,000	36,000	7,600		8,000	91,000	53,000	36,000
4,200		6,000	74,000	30,000	36,000	7,700		8,000	91,000	53,000	36,000
4,300		6,000	74,000	30,000	36,000	7,800		8,000	91,000	53,000	36,000
4,400		6,000	74,000	30,000	36,000	7,900		8,000	91,000	53,000	36,000
4,500		6,000	74,000	30,000	36,000	7,940	5/16	8,000	91,000	53,000	36,000
4,600		6,000	74,000	30,000	36,000	8,000		8,000	91,000	53,000	36,000
4,700		6,000	74,000	30,000	36,000	8,100		10,000	103,000	61,000	40,000
4,800		6,000	74,000	36,000	36,000	8,200		10,000	103,000	61,000	40,000
4,900		6,000	74,000	36,000	36,000	8,300		10,000	103,000	61,000	40,000
5,000		6,000	74,000	36,000	36,000	8,330	21/64	10,000	103,000	61,000	40,000
5,100		6,000	74,000	36,000	36,000	8,400		10,000	103,000	61,000	40,000
5,160	13/64	6,000	74,000	36,000	36,000	8,500		10,000	103,000	61,000	40,000
5,200		6,000	74,000	36,000	36,000	8,600		10,000	103,000	61,000	40,000
5,300		6,000	74,000	36,000	36,000	8,700		10,000	103,000	61,000	40,000
5,400		6,000	74,000	36,000	36,000	8,730	11/32	10,000	103,000	61,000	40,000
5,500		6,000	74,000	36,000	36,000	8,800		10,000	103,000	61,000	40,000
5,560	7/32	6,000	74,000	36,000	36,000	8,900		10,000	103,000	61,000	40,000
5,600		6,000	74,000	36,000	36,000	9,000		10,000	103,000	61,000	40,000
5,700		6,000	74,000	36,000	36,000	9,100		10,000	103,000	61,000	40,000
5,800		6,000	74,000	36,000	36,000	9,130	23/64	10,000	103,000	61,000	40,000
5,900		6,000	74,000	36,000	36,000	9,200		10,000	103,000	61,000	40,000
5,950	15/64	6,000	74,000	36,000	36,000	9,300		10,000	103,000	61,000	40,000
6,000		6,000	74,000	36,000	36,000	9,400		10,000	103,000	61,000	40,000
6,100		8,000	91,000	53,000	36,000	9,500		10,000	103,000	61,000	40,000
6,200		8,000	91,000	53,000	36,000	9,520	3/8	10,000	103,000	61,000	40,000
6,300		8,000	91,000	53,000	36,000	9,600		10,000	103,000	61,000	40,000
6,350	1/4	8,000	91,000	53,000	36,000	9,700		10,000	103,000	61,000	40,000
6,400		8,000	91,000	53,000	36,000	9,800		10,000	103,000	61,000	40,000
6,500		8,000	91,000	53,000	36,000	9,900		10,000	103,000	61,000	40,000
6,600		8,000	91,000	53,000	36,000	9,920	25/64	10,000	103,000	61,000	40,000
6,700		8,000	91,000	53,000	36,000	10,000		10,000	103,000	61,000	40,000



d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
10,200		12,000	118,000	71,000	45,000
10,320	13/32	12,000	118,000	71,000	45,000
10,500		12,000	118,000	71,000	45,000
10,720	27/64	12,000	118,000	71,000	45,000
11,000		12,000	118,000	71,000	45,000
11,110	7/16	12,000	118,000	71,000	45,000
11,200		12,000	118,000	71,000	45,000
11,500		12,000	118,000	71,000	45,000
11,510	29/64	12,000	118,000	71,000	45,000
11,910	15/32	12,000	118,000	71,000	45,000
12,000		12,000	118,000	71,000	45,000
12,300	31/64	14,000	124,000	74,000	45,000
12,500		14,000	124,000	74,000	45,000
12,700	1/2	14,000	124,000	74,000	45,000
13,000		14,000	124,000	74,000	45,000
13,500		14,000	124,000	74,000	45,000
14,000		14,000	124,000	74,000	45,000
14,500		16,000	133,000	83,000	48,000

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
15,000		16,000	133,000	83,000	48,000
15,500		16,000	133,000	83,000	48,000
16,000		16,000	133,000	83,000	48,000
16,500		18,000	143,000	93,000	48,000
17,000		18,000	143,000	93,000	48,000
17,500		18,000	143,000	93,000	48,000
18,000		18,000	143,000	93,000	48,000
18,500		20,000	153,000	101,000	50,000
19,000		20,000	153,000	101,000	50,000
20,000		20,000	153,000	101,000	50,000

Tehoporat jäähdytyskanavilla


P Kärjen kevennys $\geq \varnothing 3,000$ • päästöhiottu kärki • pienet halkaisijatoleranssit
 • erittäin hyvä reiän pinnanlaatu • huomio optimaalinen nestepaine

M

K ○

N ● alumiini ja Al-seokset • Al-materiaalit suurella Si-pitoisuudella

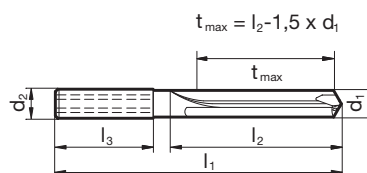
S

H

GÜHRING NAVIGATOR

Leikkuarvosivu 752

Materiaali	TKM
Pinta	○
Varren muoto	HA



Artikkelinro.

6068

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
3,000		6,000	66,000	24,000	36,000
3,200		6,000	66,000	24,000	36,000
3,300		6,000	66,000	24,000	36,000
3,500		6,000	66,000	24,000	36,000
3,800		6,000	74,000	30,000	36,000
3,900		6,000	74,000	30,000	36,000
4,000		6,000	74,000	30,000	36,000
4,200		6,000	74,000	30,000	36,000
5,000		6,000	74,000	36,000	36,000
5,300		6,000	74,000	36,000	36,000
5,400		6,000	74,000	36,000	36,000
5,500		6,000	74,000	36,000	36,000
5,800		6,000	74,000	36,000	36,000
6,000		6,000	74,000	36,000	36,000
6,100		8,000	91,000	53,000	36,000
6,350	1/4	8,000	91,000	53,000	36,000
6,400		8,000	91,000	53,000	36,000
6,800		8,000	91,000	53,000	36,000
7,000		8,000	91,000	53,000	36,000
7,100		8,000	91,000	53,000	36,000
7,300		8,000	91,000	53,000	36,000
7,800		8,000	91,000	53,000	36,000
8,100		10,000	103,000	61,000	40,000
8,300		10,000	103,000	61,000	40,000
8,500		10,000	103,000	61,000	40,000
8,700		10,000	103,000	61,000	40,000
8,730	11/32	10,000	103,000	61,000	40,000
9,000		10,000	103,000	61,000	40,000
9,200		10,000	103,000	61,000	40,000
9,700		10,000	103,000	61,000	40,000

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
10,000		10,000	103,000	61,000	40,000
10,200		12,000	118,000	71,000	45,000
10,500		12,000	118,000	71,000	45,000
10,720	27/64	12,000	118,000	71,000	45,000
11,000		12,000	118,000	71,000	45,000
11,110	7/16	12,000	118,000	71,000	45,000
11,500		12,000	118,000	71,000	45,000
12,000		12,000	118,000	71,000	45,000
12,300	31/64	14,000	124,000	74,000	45,000
12,500		14,000	124,000	74,000	45,000
12,700	1/2	14,000	124,000	74,000	45,000
13,000		14,000	124,000	74,000	45,000
13,500		14,000	124,000	74,000	45,000
14,000		14,000	124,000	74,000	45,000
15,000		16,000	133,000	83,000	48,000
16,000		16,000	133,000	83,000	48,000
16,500		18,000	143,000	93,000	48,000
17,000		18,000	143,000	93,000	48,000
17,500		18,000	143,000	93,000	48,000
18,000		18,000	143,000	93,000	48,000
18,500		20,000	153,000	101,000	50,000
19,500		20,000	153,000	101,000	50,000
20,000		20,000	153,000	101,000	50,000



Tehoporat jäähdytyskanavilla



P • päästöhiottu kärki • pääleikkuusärmän suorasta • optimoitu leikkuu geometria • maksimaalinen suorituskyky

M ○

K ○

N ○ rakenne- ja pintakarkaistut teräkset • automaattiteräkset, nuorutetut teräkset

S ○ • seostetut-/seostamattomat teräkset < 1400 N/mm² asti

H ○

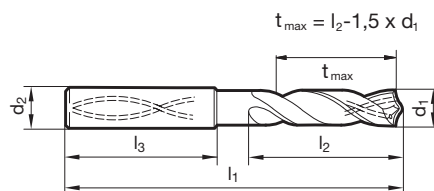
GÜHRING NAVIGATOR

Leikkuarvosivu 754

Materiaali **TKM**

Pinta **F**

Varren muoto HA



Artikkelinro.

5759

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,000		6,000	66,000	28,000	36,000	5,800		6,000	82,000	44,000	36,000
3,100		6,000	66,000	28,000	36,000	5,900		6,000	82,000	44,000	36,000
3,170	1/8	6,000	66,000	28,000	36,000	5,950	15/64	6,000	82,000	44,000	36,000
3,200		6,000	66,000	28,000	36,000	6,000		6,000	82,000	44,000	36,000
3,250		6,000	66,000	28,000	36,000	6,100		8,000	91,000	53,000	36,000
3,300		6,000	66,000	28,000	36,000	6,200		8,000	91,000	53,000	36,000
3,400		6,000	66,000	28,000	36,000	6,300		8,000	91,000	53,000	36,000
3,500		6,000	66,000	28,000	36,000	6,350	1/4	8,000	91,000	53,000	36,000
3,570	9/64	6,000	66,000	28,000	36,000	6,400		8,000	91,000	53,000	36,000
3,600		6,000	66,000	28,000	36,000	6,500		8,000	91,000	53,000	36,000
3,700		6,000	66,000	28,000	36,000	6,530		8,000	91,000	53,000	36,000
3,800		6,000	74,000	36,000	36,000	6,600		8,000	91,000	53,000	36,000
3,900		6,000	74,000	36,000	36,000	6,700		8,000	91,000	53,000	36,000
3,970	5/32	6,000	74,000	36,000	36,000	6,750	17/64	8,000	91,000	53,000	36,000
4,000		6,000	74,000	36,000	36,000	6,800		8,000	91,000	53,000	36,000
4,040		6,000	74,000	36,000	36,000	6,900		8,000	91,000	53,000	36,000
4,100		6,000	74,000	36,000	36,000	7,000		8,000	91,000	53,000	36,000
4,200		6,000	74,000	36,000	36,000	7,100		8,000	91,000	53,000	36,000
4,300		6,000	74,000	36,000	36,000	7,140	9/32	8,000	91,000	53,000	36,000
4,370	11/64	6,000	74,000	36,000	36,000	7,200		8,000	91,000	53,000	36,000
4,400		6,000	74,000	36,000	36,000	7,300		8,000	91,000	53,000	36,000
4,500		6,000	74,000	36,000	36,000	7,400		8,000	91,000	53,000	36,000
4,600		6,000	74,000	36,000	36,000	7,500		8,000	91,000	53,000	36,000
4,650		6,000	74,000	36,000	36,000	7,540	19/64	8,000	91,000	53,000	36,000
4,700		6,000	74,000	36,000	36,000	7,550		8,000	91,000	53,000	36,000
4,760	3/16	6,000	82,000	44,000	36,000	7,600		8,000	91,000	53,000	36,000
4,800		6,000	82,000	44,000	36,000	7,650		8,000	91,000	53,000	36,000
4,900		6,000	82,000	44,000	36,000	7,700		8,000	91,000	53,000	36,000
5,000		6,000	82,000	44,000	36,000	7,800		8,000	91,000	53,000	36,000
5,100		6,000	82,000	44,000	36,000	7,900		8,000	91,000	53,000	36,000
5,110		6,000	82,000	44,000	36,000	7,940	5/16	8,000	91,000	53,000	36,000
5,160	13/64	6,000	82,000	44,000	36,000	8,000		8,000	91,000	53,000	36,000
5,200		6,000	82,000	44,000	36,000	8,100		10,000	103,000	61,000	40,000
5,300		6,000	82,000	44,000	36,000	8,200		10,000	103,000	61,000	40,000
5,400		6,000	82,000	44,000	36,000	8,300		10,000	103,000	61,000	40,000
5,410		6,000	82,000	44,000	36,000	8,330	21/64	10,000	103,000	61,000	40,000
5,500		6,000	82,000	44,000	36,000	8,400		10,000	103,000	61,000	40,000
5,550		6,000	82,000	44,000	36,000	8,500		10,000	103,000	61,000	40,000
5,560	7/32	6,000	82,000	44,000	36,000	8,600		10,000	103,000	61,000	40,000
5,600		6,000	82,000	44,000	36,000	8,700		10,000	103,000	61,000	40,000
5,650		6,000	82,000	44,000	36,000	8,730	11/32	10,000	103,000	61,000	40,000
5,700		6,000	82,000	44,000	36,000	8,800		10,000	103,000	61,000	40,000



d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
8,900		10,000	103,000	61,000	40,000
9,000		10,000	103,000	61,000	40,000
9,100		10,000	103,000	61,000	40,000
9,130	23/64	10,000	103,000	61,000	40,000
9,200		10,000	103,000	61,000	40,000
9,250		10,000	103,000	61,000	40,000
9,300		10,000	103,000	61,000	40,000
9,340		10,000	103,000	61,000	40,000
9,400		10,000	103,000	61,000	40,000
9,500		10,000	103,000	61,000	40,000
9,520	3/8	10,000	103,000	61,000	40,000
9,550		10,000	103,000	61,000	40,000
9,600		10,000	103,000	61,000	40,000
9,700		10,000	103,000	61,000	40,000
9,800		10,000	103,000	61,000	40,000
9,900		10,000	103,000	61,000	40,000
9,920	25/64	10,000	103,000	61,000	40,000
10,000		10,000	103,000	61,000	40,000
10,100		12,000	118,000	71,000	45,000
10,200		12,000	118,000	71,000	45,000
10,300		12,000	118,000	71,000	45,000
10,320	13/32	12,000	118,000	71,000	45,000
10,400		12,000	118,000	71,000	45,000
10,500		12,000	118,000	71,000	45,000
10,600		12,000	118,000	71,000	45,000
10,700		12,000	118,000	71,000	45,000
10,720		12,000	118,000	71,000	45,000
10,800		12,000	118,000	71,000	45,000
10,900		12,000	118,000	71,000	45,000
11,000		12,000	118,000	71,000	45,000
11,100		12,000	118,000	71,000	45,000
11,110	7/16	12,000	118,000	71,000	45,000
11,200		12,000	118,000	71,000	45,000
11,300		12,000	118,000	71,000	45,000
11,400		12,000	118,000	71,000	45,000
11,500		12,000	118,000	71,000	45,000
11,510		12,000	118,000	71,000	45,000
11,550		12,000	118,000	71,000	45,000
11,600		12,000	118,000	71,000	45,000
11,700		12,000	118,000	71,000	45,000
11,800		12,000	118,000	71,000	45,000
11,900		12,000	118,000	71,000	45,000
11,910	15/32	12,000	118,000	71,000	45,000
12,000		12,000	118,000	71,000	45,000
12,100		14,000	124,000	77,000	45,000
12,200		14,000	124,000	77,000	45,000
12,300		14,000	124,000	77,000	45,000
12,400		14,000	124,000	77,000	45,000
12,500		14,000	124,000	77,000	45,000
12,600		14,000	124,000	77,000	45,000
12,700	1/2	14,000	124,000	77,000	45,000
12,800		14,000	124,000	77,000	45,000
12,900		14,000	124,000	77,000	45,000
13,000		14,000	124,000	77,000	45,000
13,100		14,000	124,000	77,000	45,000
13,200		14,000	124,000	77,000	45,000
13,300		14,000	124,000	77,000	45,000
13,400		14,000	124,000	77,000	45,000
13,490		14,000	124,000	77,000	45,000
13,500		14,000	124,000	77,000	45,000

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
13,600		14,000	124,000	77,000	45,000
13,700		14,000	124,000	77,000	45,000
13,800		14,000	124,000	77,000	45,000
13,890		14,000	124,000	77,000	45,000
13,900		14,000	124,000	77,000	45,000
14,000		14,000	124,000	77,000	45,000
14,100		16,000	133,000	83,000	48,000
14,200		16,000	133,000	83,000	48,000
14,290	9/16	16,000	133,000	83,000	48,000
14,400		16,000	133,000	83,000	48,000
14,500		16,000	133,000	83,000	48,000
14,600		16,000	133,000	83,000	48,000
14,680		16,000	133,000	83,000	48,000
14,700		16,000	133,000	83,000	48,000
14,800		16,000	133,000	83,000	48,000
14,900		16,000	133,000	83,000	48,000
15,000		16,000	133,000	83,000	48,000
15,080		16,000	133,000	83,000	48,000
15,100		16,000	133,000	83,000	48,000
15,200		16,000	133,000	83,000	48,000
15,300		16,000	133,000	83,000	48,000
15,400		16,000	133,000	83,000	48,000
15,480		16,000	133,000	83,000	48,000
15,500		16,000	133,000	83,000	48,000
15,550		16,000	133,000	83,000	48,000
15,600		16,000	133,000	83,000	48,000
15,700		16,000	133,000	83,000	48,000
15,800		16,000	133,000	83,000	48,000
15,870		16,000	133,000	83,000	48,000
15,900		16,000	133,000	83,000	48,000
16,000		16,000	133,000	83,000	48,000
16,270		18,000	143,000	93,000	48,000
16,500		18,000	143,000	93,000	48,000
16,670		18,000	143,000	93,000	48,000
16,700		18,000	143,000	93,000	48,000
16,900		18,000	143,000	93,000	48,000
17,000		18,000	143,000	93,000	48,000
17,070		18,000	143,000	93,000	48,000
17,460		18,000	143,000	93,000	48,000
17,500		18,000	143,000	93,000	48,000
17,550		18,000	143,000	93,000	48,000
17,700		18,000	143,000	93,000	48,000
17,860		18,000	143,000	93,000	48,000
18,000		18,000	143,000	93,000	48,000
18,260		20,000	153,000	101,000	50,000
18,500		20,000	153,000	101,000	50,000
18,700		20,000	153,000	101,000	50,000
18,900		20,000	153,000	101,000	50,000
19,000		20,000	153,000	101,000	50,000
19,050	3/4	20,000	153,000	101,000	50,000
19,250		20,000	153,000	101,000	50,000
19,300		20,000	153,000	101,000	50,000
19,446		20,000	153,000	101,000	50,000
19,500		20,000	153,000	101,000	50,000
19,550		20,000	153,000	101,000	50,000
19,700		20,000	153,000	101,000	50,000
19,840		20,000	153,000	101,000	50,000
20,000		20,000	153,000	101,000	50,000



Tehoporat jäähdytyskanavilla



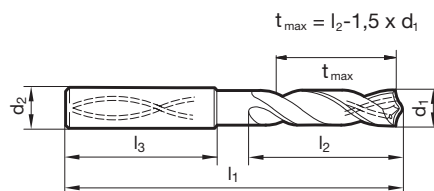
P ●	Kärjen kevennys $\geq \varnothing 3,000$ • päästöhiottu kärki • pääleikkusuärmän suorasta • optimoitu leikkuu geometria
M ○	
K ●	
N ○	rakenne- ja pintakarkaistut teräkset • automaattiteräkset, nuorutetut teräkset • seostetut teräkset $< 1200 \text{ N/mm}^2$ asti • valut • pronssi, messinki
S ○	• runsasseosteiset AlSi-seokset
H ○	

GÜHRING NAVIGATOR

Leikkuuarvosivu 754

Materiaali **TKM**Pinta **F**

Varren muoto HA



Artikkelinro.

2479

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,000		6,000	66,000	28,000	36,000	5,800		6,000	82,000	44,000	36,000
3,100		6,000	66,000	28,000	36,000	5,900		6,000	82,000	44,000	36,000
3,170	1/8	6,000	66,000	28,000	36,000	5,950	15/64	6,000	82,000	44,000	36,000
3,200		6,000	66,000	28,000	36,000	6,000		6,000	82,000	44,000	36,000
3,250		6,000	66,000	28,000	36,000	6,100		8,000	91,000	53,000	36,000
3,300		6,000	66,000	28,000	36,000	6,200		8,000	91,000	53,000	36,000
3,400		6,000	66,000	28,000	36,000	6,300		8,000	91,000	53,000	36,000
3,500		6,000	66,000	28,000	36,000	6,350	1/4	8,000	91,000	53,000	36,000
3,570	9/64	6,000	66,000	28,000	36,000	6,400		8,000	91,000	53,000	36,000
3,600		6,000	66,000	28,000	36,000	6,500		8,000	91,000	53,000	36,000
3,700		6,000	66,000	28,000	36,000	6,530		8,000	91,000	53,000	36,000
3,800		6,000	74,000	36,000	36,000	6,600		8,000	91,000	53,000	36,000
3,900		6,000	74,000	36,000	36,000	6,700		8,000	91,000	53,000	36,000
3,970	5/32	6,000	74,000	36,000	36,000	6,750	17/64	8,000	91,000	53,000	36,000
4,000		6,000	74,000	36,000	36,000	6,800		8,000	91,000	53,000	36,000
4,040		6,000	74,000	36,000	36,000	6,900		8,000	91,000	53,000	36,000
4,100		6,000	74,000	36,000	36,000	7,000		8,000	91,000	53,000	36,000
4,200		6,000	74,000	36,000	36,000	7,100		8,000	91,000	53,000	36,000
4,300		6,000	74,000	36,000	36,000	7,140	9/32	8,000	91,000	53,000	36,000
4,370	11/64	6,000	74,000	36,000	36,000	7,200		8,000	91,000	53,000	36,000
4,400		6,000	74,000	36,000	36,000	7,300		8,000	91,000	53,000	36,000
4,500		6,000	74,000	36,000	36,000	7,400		8,000	91,000	53,000	36,000
4,600		6,000	74,000	36,000	36,000	7,500		8,000	91,000	53,000	36,000
4,650		6,000	74,000	36,000	36,000	7,540	19/64	8,000	91,000	53,000	36,000
4,700		6,000	74,000	36,000	36,000	7,550		8,000	91,000	53,000	36,000
4,760	3/16	6,000	82,000	44,000	36,000	7,600		8,000	91,000	53,000	36,000
4,800		6,000	82,000	44,000	36,000	7,650		8,000	91,000	53,000	36,000
4,900		6,000	82,000	44,000	36,000	7,700		8,000	91,000	53,000	36,000
5,000		6,000	82,000	44,000	36,000	7,800		8,000	91,000	53,000	36,000
5,100		6,000	82,000	44,000	36,000	7,900		8,000	91,000	53,000	36,000
5,110		6,000	82,000	44,000	36,000	7,940	5/16	8,000	91,000	53,000	36,000
5,160	13/64	6,000	82,000	44,000	36,000	8,000		8,000	91,000	53,000	36,000
5,200		6,000	82,000	44,000	36,000	8,100		10,000	103,000	61,000	40,000
5,300		6,000	82,000	44,000	36,000	8,200		10,000	103,000	61,000	40,000
5,400		6,000	82,000	44,000	36,000	8,300		10,000	103,000	61,000	40,000
5,410		6,000	82,000	44,000	36,000	8,330	21/64	10,000	103,000	61,000	40,000
5,500		6,000	82,000	44,000	36,000	8,400		10,000	103,000	61,000	40,000
5,550		6,000	82,000	44,000	36,000	8,500		10,000	103,000	61,000	40,000
5,560	7/32	6,000	82,000	44,000	36,000	8,600		10,000	103,000	61,000	40,000
5,600		6,000	82,000	44,000	36,000	8,700		10,000	103,000	61,000	40,000
5,650		6,000	82,000	44,000	36,000	8,730	11/32	10,000	103,000	61,000	40,000
5,700		6,000	82,000	44,000	36,000	8,800		10,000	103,000	61,000	40,000



d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
8,900		10,000	103,000	61,000	40,000
9,000		10,000	103,000	61,000	40,000
9,100		10,000	103,000	61,000	40,000
9,130	23/64	10,000	103,000	61,000	40,000
9,200		10,000	103,000	61,000	40,000
9,250		10,000	103,000	61,000	40,000
9,300		10,000	103,000	61,000	40,000
9,340		10,000	103,000	61,000	40,000
9,400		10,000	103,000	61,000	40,000
9,500		10,000	103,000	61,000	40,000
9,520	3/8	10,000	103,000	61,000	40,000
9,550		10,000	103,000	61,000	40,000
9,600		10,000	103,000	61,000	40,000
9,700		10,000	103,000	61,000	40,000
9,800		10,000	103,000	61,000	40,000
9,900		10,000	103,000	61,000	40,000
9,920	25/64	10,000	103,000	61,000	40,000
10,000		10,000	103,000	61,000	40,000
10,100		12,000	118,000	71,000	45,000
10,200		12,000	118,000	71,000	45,000
10,300		12,000	118,000	71,000	45,000
10,320	13/32	12,000	118,000	71,000	45,000
10,400		12,000	118,000	71,000	45,000
10,500		12,000	118,000	71,000	45,000
10,600		12,000	118,000	71,000	45,000
10,700		12,000	118,000	71,000	45,000
10,720	27/64	12,000	118,000	71,000	45,000
10,800		12,000	118,000	71,000	45,000
10,900		12,000	118,000	71,000	45,000
11,000		12,000	118,000	71,000	45,000
11,100		12,000	118,000	71,000	45,000
11,110	7/16	12,000	118,000	71,000	45,000
11,200		12,000	118,000	71,000	45,000
11,300		12,000	118,000	71,000	45,000
11,400		12,000	118,000	71,000	45,000
11,500		12,000	118,000	71,000	45,000
11,510	29/64	12,000	118,000	71,000	45,000
11,550		12,000	118,000	71,000	45,000
11,600		12,000	118,000	71,000	45,000
11,700		12,000	118,000	71,000	45,000
11,800		12,000	118,000	71,000	45,000
11,900		12,000	118,000	71,000	45,000
11,910	15/32	12,000	118,000	71,000	45,000
12,000		12,000	118,000	71,000	45,000
12,100		14,000	124,000	77,000	45,000
12,200		14,000	124,000	77,000	45,000
12,300	31/64	14,000	124,000	77,000	45,000
12,400		14,000	124,000	77,000	45,000
12,500		14,000	124,000	77,000	45,000
12,600		14,000	124,000	77,000	45,000
12,700	1/2	14,000	124,000	77,000	45,000
12,800		14,000	124,000	77,000	45,000
13,000		14,000	124,000	77,000	45,000
13,100	33/64	14,000	124,000	77,000	45,000

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
13,200		14,000	124,000	77,000	45,000
13,490	17/32	14,000	124,000	77,000	45,000
13,500		14,000	124,000	77,000	45,000
13,600		14,000	124,000	77,000	45,000
13,700		14,000	124,000	77,000	45,000
13,800		14,000	124,000	77,000	45,000
13,890	35/64	14,000	124,000	77,000	45,000
13,900		14,000	124,000	77,000	45,000
14,000		14,000	124,000	77,000	45,000
14,100		16,000	133,000	83,000	48,000
14,200		16,000	133,000	83,000	48,000
14,290	9/16	16,000	133,000	83,000	48,000
14,500		16,000	133,000	83,000	48,000
14,680	37/64	16,000	133,000	83,000	48,000
14,700		16,000	133,000	83,000	48,000
14,800		16,000	133,000	83,000	48,000
15,000		16,000	133,000	83,000	48,000
15,080	19/32	16,000	133,000	83,000	48,000
15,100		16,000	133,000	83,000	48,000
15,200		16,000	133,000	83,000	48,000
15,480	39/64	16,000	133,000	83,000	48,000
15,500		16,000	133,000	83,000	48,000
15,600		16,000	133,000	83,000	48,000
15,700		16,000	133,000	83,000	48,000
15,800		16,000	133,000	83,000	48,000
15,870	5/8	16,000	133,000	83,000	48,000
15,900		16,000	133,000	83,000	48,000
16,000		16,000	133,000	83,000	48,000
16,270	41/64	18,000	143,000	93,000	48,000
16,500		18,000	143,000	93,000	48,000
16,670	21/32	18,000	143,000	93,000	48,000
16,700		18,000	143,000	93,000	48,000
17,000		18,000	143,000	93,000	48,000
17,070	43/64	18,000	143,000	93,000	48,000
17,460	11/16	18,000	143,000	93,000	48,000
17,500		18,000	143,000	93,000	48,000
17,700		18,000	143,000	93,000	48,000
17,860	45/64	18,000	143,000	93,000	48,000
18,000		18,000	143,000	93,000	48,000
18,260	23/32	20,000	153,000	101,000	50,000
18,500		20,000	153,000	101,000	50,000
18,700		20,000	153,000	101,000	50,000
18,900		20,000	153,000	101,000	50,000
19,000		20,000	153,000	101,000	50,000
19,050	3/4	20,000	153,000	101,000	50,000
19,250		20,000	153,000	101,000	50,000
19,300		20,000	153,000	101,000	50,000
19,446		20,000	153,000	101,000	50,000
19,500		20,000	153,000	101,000	50,000
19,700		20,000	153,000	101,000	50,000
19,840	25/32	20,000	153,000	101,000	50,000
20,000		20,000	153,000	101,000	50,000



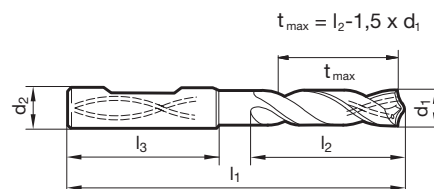
Tehoporat jäähdytyskanavilla



P ●	Kärjen keveys $\geq \varnothing 3,300$ • päästöhiottu kärki • pääleikkusärmän suorasta • optimoitu leikkuu geometria
M ○	
K ●	
N ○	rakenne- ja pintakarkaistut teräkset • automaattiteräkset, nuorutetut teräkset • seostetut teräkset $< 1200 \text{ N/mm}^2$ asti • valut • pronssi, messinki
S ○	• runsasseosteiset AlSi-seokset
H ○	

GÜHRING NAVIGATOR

Leikkuarvosivu 754

Materiaali **TKM**Pinta **F**Varren muoto **HE**

Artikkelinro.

2471

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,300		6,000	66,000	28,000	36,000	8,600		10,000	103,000	61,000	40,000
3,500		6,000	66,000	28,000	36,000	8,900		10,000	103,000	61,000	40,000
3,700		6,000	66,000	28,000	36,000	9,000		10,000	103,000	61,000	40,000
4,000		6,000	74,000	36,000	36,000	9,130	23/64	10,000	103,000	61,000	40,000
4,100		6,000	74,000	36,000	36,000	9,200		10,000	103,000	61,000	40,000
4,200		6,000	74,000	36,000	36,000	9,250		10,000	103,000	61,000	40,000
4,300		6,000	74,000	36,000	36,000	9,500		10,000	103,000	61,000	40,000
4,400		6,000	74,000	36,000	36,000	9,700		10,000	103,000	61,000	40,000
4,500		6,000	74,000	36,000	36,000	9,800		10,000	103,000	61,000	40,000
4,650		6,000	74,000	36,000	36,000	9,900		10,000	103,000	61,000	40,000
4,700		6,000	74,000	36,000	36,000	10,000		10,000	103,000	61,000	40,000
4,900		6,000	82,000	44,000	36,000	10,100		12,000	118,000	71,000	45,000
5,000		6,000	82,000	44,000	36,000	10,200		12,000	118,000	71,000	45,000
5,100		6,000	82,000	44,000	36,000	10,300		12,000	118,000	71,000	45,000
5,200		6,000	82,000	44,000	36,000	10,400		12,000	118,000	71,000	45,000
5,300		6,000	82,000	44,000	36,000	10,500		12,000	118,000	71,000	45,000
5,400		6,000	82,000	44,000	36,000	10,600		12,000	118,000	71,000	45,000
5,500		6,000	82,000	44,000	36,000	10,800		12,000	118,000	71,000	45,000
5,550		6,000	82,000	44,000	36,000	11,000		12,000	118,000	71,000	45,000
5,700		6,000	82,000	44,000	36,000	11,100		12,000	118,000	71,000	45,000
6,000		6,000	82,000	44,000	36,000	11,300		12,000	118,000	71,000	45,000
6,100		8,000	91,000	53,000	36,000	11,400		12,000	118,000	71,000	45,000
6,200		8,000	91,000	53,000	36,000	11,500		12,000	118,000	71,000	45,000
6,300		8,000	91,000	53,000	36,000	11,600		12,000	118,000	71,000	45,000
6,350	1/4	8,000	91,000	53,000	36,000	11,700		12,000	118,000	71,000	45,000
6,400		8,000	91,000	53,000	36,000	11,800		12,000	118,000	71,000	45,000
6,500		8,000	91,000	53,000	36,000	11,900		12,000	118,000	71,000	45,000
6,600		8,000	91,000	53,000	36,000	12,000		12,000	118,000	71,000	45,000
6,800		8,000	91,000	53,000	36,000	12,100		14,000	124,000	77,000	45,000
6,900		8,000	91,000	53,000	36,000	12,200		14,000	124,000	77,000	45,000
7,000		8,000	91,000	53,000	36,000	12,300	31/64	14,000	124,000	77,000	45,000
7,100		8,000	91,000	53,000	36,000	12,400		14,000	124,000	77,000	45,000
7,200		8,000	91,000	53,000	36,000	12,500		14,000	124,000	77,000	45,000
7,300		8,000	91,000	53,000	36,000	12,700	1/2	14,000	124,000	77,000	45,000
7,500		8,000	91,000	53,000	36,000	13,000		14,000	124,000	77,000	45,000
7,700		8,000	91,000	53,000	36,000	13,500		14,000	124,000	77,000	45,000
7,800		8,000	91,000	53,000	36,000	13,800		14,000	124,000	77,000	45,000
8,000		8,000	91,000	53,000	36,000	14,000		14,000	124,000	77,000	45,000
8,100		10,000	103,000	61,000	40,000	14,100		16,000	133,000	83,000	48,000
8,200		10,000	103,000	61,000	40,000	14,200		16,000	133,000	83,000	48,000
8,300		10,000	103,000	61,000	40,000	14,500		16,000	133,000	83,000	48,000
8,500		10,000	103,000	61,000	40,000	14,700		16,000	133,000	83,000	48,000



d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
15,000		16,000	133,000	83,000	48,000
15,200		16,000	133,000	83,000	48,000
15,500		16,000	133,000	83,000	48,000
15,800		16,000	133,000	83,000	48,000
16,500		18,000	143,000	93,000	48,000
17,000		18,000	143,000	93,000	48,000
17,300		18,000	143,000	93,000	48,000
17,500		18,000	143,000	93,000	48,000
18,000		18,000	143,000	93,000	48,000
18,200		20,000	153,000	101,000	50,000
18,500		20,000	153,000	101,000	50,000
18,600		20,000	153,000	101,000	50,000

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
19,000		20,000	153,000	101,000	50,000
19,050	3/4	20,000	153,000	101,000	50,000
19,500		20,000	153,000	101,000	50,000
20,000		20,000	153,000	101,000	50,000



Tehoporat jäähdytiskanavilla



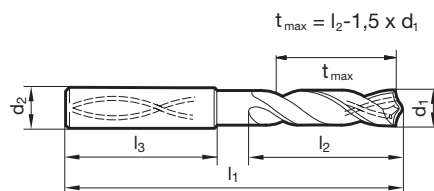
P ●	Kärjen keveys $\geq \varnothing 3,000$ • päästöhiottu kärki • pääleikkusärmän suorasta
M ○	• optimoitu leikkuu geometria
K ●	
N ○	rakenne- ja pintakarkaistut teräkset • automaattiteräkset, nuorutetut
S ○	teräkset • seostetut teräkset $< 1200 \text{ N/mm}^2$ asti • valut • pronssi, messinki
H ○	• runsasseosteiset AlSi-seokset

GÜHRING NAVIGATOR

Leikkuuarvosivu 754

Materiaali **TKM**Pinta **S**

Varren muoto HA



Artikkelinro.

1663

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,000		6,000	66,000	28,000	36,000	8,200		10,000	103,000	61,000	40,000
3,700		6,000	66,000	28,000	36,000	8,400		10,000	103,000	61,000	40,000
4,000		6,000	74,000	36,000	36,000	8,500		10,000	103,000	61,000	40,000
4,500		6,000	74,000	36,000	36,000	8,800		10,000	103,000	61,000	40,000
4,650		6,000	74,000	36,000	36,000	9,000		10,000	103,000	61,000	40,000
4,700		6,000	74,000	36,000	36,000	9,200		10,000	103,000	61,000	40,000
4,800		6,000	82,000	44,000	36,000	9,400		10,000	103,000	61,000	40,000
5,000		6,000	82,000	44,000	36,000	9,500		10,000	103,000	61,000	40,000
5,400		6,000	82,000	44,000	36,000	10,500		12,000	118,000	71,000	45,000
5,800		6,000	82,000	44,000	36,000	11,000		12,000	118,000	71,000	45,000
6,000		6,000	82,000	44,000	36,000	11,500		12,000	118,000	71,000	45,000
6,100		8,000	91,000	53,000	36,000	11,800		12,000	118,000	71,000	45,000
6,200		8,000	91,000	53,000	36,000	12,000		12,000	118,000	71,000	45,000
6,300		8,000	91,000	53,000	36,000	13,000		14,000	124,000	77,000	45,000
6,350	1/4	8,000	91,000	53,000	36,000	14,000		14,000	124,000	77,000	45,000
6,400		8,000	91,000	53,000	36,000	14,200		16,000	133,000	83,000	48,000
6,500		8,000	91,000	53,000	36,000	14,500		16,000	133,000	83,000	48,000
6,700		8,000	91,000	53,000	36,000	15,000		16,000	133,000	83,000	48,000
6,800		8,000	91,000	53,000	36,000	15,500		16,000	133,000	83,000	48,000
7,000		8,000	91,000	53,000	36,000	16,000		16,000	133,000	83,000	48,000
7,100		8,000	91,000	53,000	36,000	17,000		18,000	143,000	93,000	48,000
7,500		8,000	91,000	53,000	36,000	17,500		18,000	143,000	93,000	48,000
7,800		8,000	91,000	53,000	36,000	19,000		20,000	153,000	101,000	50,000
8,000		8,000	91,000	53,000	36,000	19,500		20,000	153,000	101,000	50,000



Tehoporat jäädytyskanavilla



P • Kärjen kevennys $\geq \varnothing 3,300$ • päästöhiottu kärki • pääleikkusärmän suorasta
• optimoitu leikkuu geometria

M ○

K •

N ○ rakenne- ja pintakarkaistut teräkset • automaattiteräkset, nuorutetut

S ○ teräkset • seostetut teräkset $< 1200 \text{ N/mm}^2$ asti • valut • pronssi, messinki

H ○ • runsasseosteiset AlSi-seokset

GÜHRING NAVIGATOR

Leikkuuarvosivu 754

Materiaali

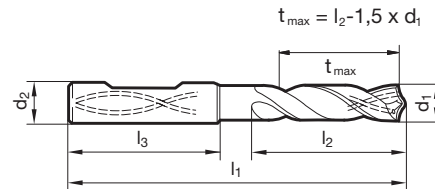
TKM

Pinta

S

Varren muoto

HE



Artikkelinro.

1183

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,300		6,000	66,000	28,000	36,000	7,200		8,000	91,000	53,000	36,000
4,000		6,000	74,000	36,000	36,000	7,300		8,000	91,000	53,000	36,000
4,100		6,000	74,000	36,000	36,000	7,400		8,000	91,000	53,000	36,000
4,200		6,000	74,000	36,000	36,000	7,500		8,000	91,000	53,000	36,000
4,300		6,000	74,000	36,000	36,000	7,540	19/64	8,000	91,000	53,000	36,000
4,370	11/64	6,000	74,000	36,000	36,000	7,600		8,000	91,000	53,000	36,000
4,400		6,000	74,000	36,000	36,000	7,700		8,000	91,000	53,000	36,000
4,500		6,000	74,000	36,000	36,000	7,800		8,000	91,000	53,000	36,000
4,600		6,000	74,000	36,000	36,000	7,900		8,000	91,000	53,000	36,000
4,650		6,000	74,000	36,000	36,000	7,940	5/16	8,000	91,000	53,000	36,000
4,700		6,000	74,000	36,000	36,000	8,000		8,000	91,000	53,000	36,000
4,760	3/16	6,000	82,000	44,000	36,000	8,100		10,000	103,000	61,000	40,000
4,800		6,000	82,000	44,000	36,000	8,200		10,000	103,000	61,000	40,000
4,900		6,000	82,000	44,000	36,000	8,300		10,000	103,000	61,000	40,000
5,000		6,000	82,000	44,000	36,000	8,330	21/64	10,000	103,000	61,000	40,000
5,100		6,000	82,000	44,000	36,000	8,400		10,000	103,000	61,000	40,000
5,160	13/64	6,000	82,000	44,000	36,000	8,500		10,000	103,000	61,000	40,000
5,200		6,000	82,000	44,000	36,000	8,600		10,000	103,000	61,000	40,000
5,300		6,000	82,000	44,000	36,000	8,700		10,000	103,000	61,000	40,000
5,400		6,000	82,000	44,000	36,000	8,730	11/32	10,000	103,000	61,000	40,000
5,500		6,000	82,000	44,000	36,000	8,800		10,000	103,000	61,000	40,000
5,560	7/32	6,000	82,000	44,000	36,000	8,900		10,000	103,000	61,000	40,000
5,600		6,000	82,000	44,000	36,000	9,000		10,000	103,000	61,000	40,000
5,700		6,000	82,000	44,000	36,000	9,100		10,000	103,000	61,000	40,000
5,800		6,000	82,000	44,000	36,000	9,130	23/64	10,000	103,000	61,000	40,000
5,900		6,000	82,000	44,000	36,000	9,200		10,000	103,000	61,000	40,000
5,950	15/64	6,000	82,000	44,000	36,000	9,300		10,000	103,000	61,000	40,000
6,000		6,000	82,000	44,000	36,000	9,400		10,000	103,000	61,000	40,000
6,100		8,000	91,000	53,000	36,000	9,500		10,000	103,000	61,000	40,000
6,200		8,000	91,000	53,000	36,000	9,520	3/8	10,000	103,000	61,000	40,000
6,300		8,000	91,000	53,000	36,000	9,600		10,000	103,000	61,000	40,000
6,350	1/4	8,000	91,000	53,000	36,000	9,700		10,000	103,000	61,000	40,000
6,400		8,000	91,000	53,000	36,000	9,800		10,000	103,000	61,000	40,000
6,500		8,000	91,000	53,000	36,000	9,900		10,000	103,000	61,000	40,000
6,600		8,000	91,000	53,000	36,000	9,920	25/64	10,000	103,000	61,000	40,000
6,700		8,000	91,000	53,000	36,000	10,000		10,000	103,000	61,000	40,000
6,750	17/64	8,000	91,000	53,000	36,000	10,100		12,000	118,000	71,000	45,000
6,800		8,000	91,000	53,000	36,000	10,200		12,000	118,000	71,000	45,000
6,900		8,000	91,000	53,000	36,000	10,300		12,000	118,000	71,000	45,000
7,000		8,000	91,000	53,000	36,000	10,320	13/32	12,000	118,000	71,000	45,000
7,100		8,000	91,000	53,000	36,000	10,400		12,000	118,000	71,000	45,000
7,140	9/32	8,000	91,000	53,000	36,000	10,500		12,000	118,000	71,000	45,000



d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
10,600		12,000	118,000	71,000	45,000
10,700		12,000	118,000	71,000	45,000
10,720	27/64	12,000	118,000	71,000	45,000
10,800		12,000	118,000	71,000	45,000
10,900		12,000	118,000	71,000	45,000
11,000		12,000	118,000	71,000	45,000
11,100	7/16	12,000	118,000	71,000	45,000
11,110		12,000	118,000	71,000	45,000
11,200		12,000	118,000	71,000	45,000
11,300		12,000	118,000	71,000	45,000
11,400		12,000	118,000	71,000	45,000
11,500		12,000	118,000	71,000	45,000
11,510	29/64	12,000	118,000	71,000	45,000
11,600		12,000	118,000	71,000	45,000
11,700		12,000	118,000	71,000	45,000
11,800		12,000	118,000	71,000	45,000
11,900		12,000	118,000	71,000	45,000
11,910	15/32	12,000	118,000	71,000	45,000
12,000		12,000	118,000	71,000	45,000
12,100		14,000	124,000	77,000	45,000
12,200		14,000	124,000	77,000	45,000
12,300	31/64	14,000	124,000	77,000	45,000
12,400		14,000	124,000	77,000	45,000
12,500		14,000	124,000	77,000	45,000
12,600		14,000	124,000	77,000	45,000
12,700	1/2	14,000	124,000	77,000	45,000
12,800		14,000	124,000	77,000	45,000
12,900		14,000	124,000	77,000	45,000
13,000		14,000	124,000	77,000	45,000
13,100	33/64	14,000	124,000	77,000	45,000
13,200		14,000	124,000	77,000	45,000
13,300		14,000	124,000	77,000	45,000
13,400		14,000	124,000	77,000	45,000
13,500		14,000	124,000	77,000	45,000
13,600		14,000	124,000	77,000	45,000
13,700		14,000	124,000	77,000	45,000
13,800		14,000	124,000	77,000	45,000
13,890	35/64	14,000	124,000	77,000	45,000
13,900		14,000	124,000	77,000	45,000
14,000		14,000	124,000	77,000	45,000
14,100		16,000	133,000	83,000	48,000
14,200		16,000	133,000	83,000	48,000
14,290	9/16	16,000	133,000	83,000	48,000
14,300		16,000	133,000	83,000	48,000
14,400		16,000	133,000	83,000	48,000
14,500		16,000	133,000	83,000	48,000
14,600		16,000	133,000	83,000	48,000
14,680	37/64	16,000	133,000	83,000	48,000
14,700		16,000	133,000	83,000	48,000
14,800		16,000	133,000	83,000	48,000
14,900		16,000	133,000	83,000	48,000
15,000		16,000	133,000	83,000	48,000
15,100		16,000	133,000	83,000	48,000
15,200		16,000	133,000	83,000	48,000

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
15,300		16,000	133,000	83,000	48,000
15,400		16,000	133,000	83,000	48,000
15,480	39/64	16,000	133,000	83,000	48,000
15,500		16,000	133,000	83,000	48,000
15,800		16,000	133,000	83,000	48,000
15,870	5/8	16,000	133,000	83,000	48,000
16,000		16,000	133,000	83,000	48,000
16,100		18,000	143,000	93,000	48,000
16,200		18,000	143,000	93,000	48,000
16,270	41/64	18,000	143,000	93,000	48,000
16,400		18,000	143,000	93,000	48,000
16,500		18,000	143,000	93,000	48,000
16,600		18,000	143,000	93,000	48,000
16,700		18,000	143,000	93,000	48,000
16,800		18,000	143,000	93,000	48,000
16,900		18,000	143,000	93,000	48,000
17,000		18,000	143,000	93,000	48,000
17,070	43/64	18,000	143,000	93,000	48,000
17,200		18,000	143,000	93,000	48,000
17,300		18,000	143,000	93,000	48,000
17,400		18,000	143,000	93,000	48,000
17,500		18,000	143,000	93,000	48,000
17,600		18,000	143,000	93,000	48,000
17,700		18,000	143,000	93,000	48,000
17,800		18,000	143,000	93,000	48,000
18,000		18,000	143,000	93,000	48,000
18,100		20,000	153,000	101,000	50,000
18,200		20,000	153,000	101,000	50,000
18,300		20,000	153,000	101,000	50,000
18,400		20,000	153,000	101,000	50,000
18,500		20,000	153,000	101,000	50,000
18,600		20,000	153,000	101,000	50,000
18,650	47/64	20,000	153,000	101,000	50,000
18,700		20,000	153,000	101,000	50,000
18,800		20,000	153,000	101,000	50,000
18,900		20,000	153,000	101,000	50,000
19,000		20,000	153,000	101,000	50,000
19,050	3/4	20,000	153,000	101,000	50,000
19,300		20,000	153,000	101,000	50,000
19,500		20,000	153,000	101,000	50,000
19,700		20,000	153,000	101,000	50,000
19,800		20,000	153,000	101,000	50,000
19,900		20,000	153,000	101,000	50,000
20,000		20,000	153,000	101,000	50,000



Tehoporat jäähdytyskanavilla



P • Kärjen kevennys $\geq \varnothing 3,000$ • kartiovaippahionta • leikkusärmä on hieman kovera • optimoitu leikkuu geometria

M**K****N**

seostetut ja lujat teräkset 1600 N/mm² asti • Inconel, Hastelloy, Monel
• Titaani ja titaaniseokset

S •**H** ○

GÜHRING NAVIGATOR

Leikkuarvosivu 756

Materiaali

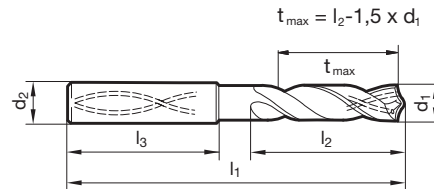
TKM

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Varren muoto

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Artikkelinro.

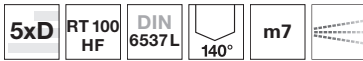
8521

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,000		6,000	66,000	28,000	36,000	6,100		8,000	91,000	53,000	36,000
3,100		6,000	66,000	28,000	36,000	6,200		8,000	91,000	53,000	36,000
3,170	1/8	6,000	66,000	28,000	36,000	6,300		8,000	91,000	53,000	36,000
3,200		6,000	66,000	28,000	36,000	6,350	1/4	8,000	91,000	53,000	36,000
3,250		6,000	66,000	28,000	36,000	6,400		8,000	91,000	53,000	36,000
3,300		6,000	66,000	28,000	36,000	6,500		8,000	91,000	53,000	36,000
3,400		6,000	66,000	28,000	36,000	6,600		8,000	91,000	53,000	36,000
3,500		6,000	66,000	28,000	36,000	6,700		8,000	91,000	53,000	36,000
3,570	9/64	6,000	66,000	28,000	36,000	6,750	17/64	8,000	91,000	53,000	36,000
3,600		6,000	66,000	28,000	36,000	6,800		8,000	91,000	53,000	36,000
3,700		6,000	66,000	28,000	36,000	6,900		8,000	91,000	53,000	36,000
3,800		6,000	74,000	36,000	36,000	7,000		8,000	91,000	53,000	36,000
3,900		6,000	74,000	36,000	36,000	7,100		8,000	91,000	53,000	36,000
3,970	5/32	6,000	74,000	36,000	36,000	7,140	9/32	8,000	91,000	53,000	36,000
4,000		6,000	74,000	36,000	36,000	7,200		8,000	91,000	53,000	36,000
4,100		6,000	74,000	36,000	36,000	7,300		8,000	91,000	53,000	36,000
4,200		6,000	74,000	36,000	36,000	7,400		8,000	91,000	53,000	36,000
4,300		6,000	74,000	36,000	36,000	7,500		8,000	91,000	53,000	36,000
4,370	11/64	6,000	74,000	36,000	36,000	7,540	19/64	8,000	91,000	53,000	36,000
4,400		6,000	74,000	36,000	36,000	7,600		8,000	91,000	53,000	36,000
4,500		6,000	74,000	36,000	36,000	7,700		8,000	91,000	53,000	36,000
4,600		6,000	74,000	36,000	36,000	7,800		8,000	91,000	53,000	36,000
4,650		6,000	74,000	36,000	36,000	7,900		8,000	91,000	53,000	36,000
4,700		6,000	74,000	36,000	36,000	7,940	5/16	8,000	91,000	53,000	36,000
4,760	3/16	6,000	82,000	44,000	36,000	8,000		8,000	91,000	53,000	36,000
4,800		6,000	82,000	44,000	36,000	8,100		10,000	103,000	61,000	40,000
4,900		6,000	82,000	44,000	36,000	8,200		10,000	103,000	61,000	40,000
5,000		6,000	82,000	44,000	36,000	8,300		10,000	103,000	61,000	40,000
5,100		6,000	82,000	44,000	36,000	8,330	21/64	10,000	103,000	61,000	40,000
5,160	13/64	6,000	82,000	44,000	36,000	8,400		10,000	103,000	61,000	40,000
5,200		6,000	82,000	44,000	36,000	8,500		10,000	103,000	61,000	40,000
5,300		6,000	82,000	44,000	36,000	8,600		10,000	103,000	61,000	40,000
5,400		6,000	82,000	44,000	36,000	8,700		10,000	103,000	61,000	40,000
5,500		6,000	82,000	44,000	36,000	8,730	11/32	10,000	103,000	61,000	40,000
5,550		6,000	82,000	44,000	36,000	8,800		10,000	103,000	61,000	40,000
5,560	7/32	6,000	82,000	44,000	36,000	8,900		10,000	103,000	61,000	40,000
5,600		6,000	82,000	44,000	36,000	9,000		10,000	103,000	61,000	40,000
5,700		6,000	82,000	44,000	36,000	9,100		10,000	103,000	61,000	40,000
5,800		6,000	82,000	44,000	36,000	9,130	23/64	10,000	103,000	61,000	40,000
5,900		6,000	82,000	44,000	36,000	9,200		10,000	103,000	61,000	40,000
5,950	15/64	6,000	82,000	44,000	36,000	9,250		10,000	103,000	61,000	40,000
6,000		6,000	82,000	44,000	36,000	9,300		10,000	103,000	61,000	40,000



d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
9,400		10,000	103,000	61,000	40,000
9,500		10,000	103,000	61,000	40,000
9,520	3/8	10,000	103,000	61,000	40,000
9,600		10,000	103,000	61,000	40,000
9,700		10,000	103,000	61,000	40,000
9,800		10,000	103,000	61,000	40,000
9,900		10,000	103,000	61,000	40,000
9,920	25/64	10,000	103,000	61,000	40,000
10,000		10,000	103,000	61,000	40,000
10,100		12,000	118,000	71,000	45,000
10,200		12,000	118,000	71,000	45,000
10,300		12,000	118,000	71,000	45,000
10,320	13/32	12,000	118,000	71,000	45,000
10,400		12,000	118,000	71,000	45,000
10,500		12,000	118,000	71,000	45,000
10,600		12,000	118,000	71,000	45,000
10,700		12,000	118,000	71,000	45,000
10,720	27/64	12,000	118,000	71,000	45,000
10,800		12,000	118,000	71,000	45,000
10,900		12,000	118,000	71,000	45,000
11,000		12,000	118,000	71,000	45,000
11,100		12,000	118,000	71,000	45,000
11,110	7/16	12,000	118,000	71,000	45,000
11,200		12,000	118,000	71,000	45,000
11,300		12,000	118,000	71,000	45,000
11,400		12,000	118,000	71,000	45,000
11,500		12,000	118,000	71,000	45,000
11,510	29/64	12,000	118,000	71,000	45,000
11,600		12,000	118,000	71,000	45,000
11,700		12,000	118,000	71,000	45,000
11,800		12,000	118,000	71,000	45,000
11,900		12,000	118,000	71,000	45,000
11,910	15/32	12,000	118,000	71,000	45,000
12,000		12,000	118,000	71,000	45,000
12,200		14,000	124,000	77,000	45,000
12,500		14,000	124,000	77,000	45,000

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
12,700	1/2	14,000	124,000	77,000	45,000
12,800		14,000	124,000	77,000	45,000
13,000		14,000	124,000	77,000	45,000
13,300		14,000	124,000	77,000	45,000
13,500		14,000	124,000	77,000	45,000
13,700		14,000	124,000	77,000	45,000
14,000		14,000	124,000	77,000	45,000
14,200		16,000	133,000	83,000	48,000
14,290	9/16	16,000	133,000	83,000	48,000
14,300		16,000	133,000	83,000	48,000
14,500		16,000	133,000	83,000	48,000
14,700		16,000	133,000	83,000	48,000
15,000		16,000	133,000	83,000	48,000
15,200		16,000	133,000	83,000	48,000
15,300		16,000	133,000	83,000	48,000
15,500		16,000	133,000	83,000	48,000
15,700		16,000	133,000	83,000	48,000
15,870	5/8	16,000	133,000	83,000	48,000
16,000		16,000	133,000	83,000	48,000
16,300		18,000	143,000	93,000	48,000
16,500		18,000	143,000	93,000	48,000
16,900		18,000	143,000	93,000	48,000
17,000		18,000	143,000	93,000	48,000
17,300		18,000	143,000	93,000	48,000
17,500		18,000	143,000	93,000	48,000
18,000		18,000	143,000	93,000	48,000
18,500		20,000	153,000	101,000	50,000
18,900		20,000	153,000	101,000	50,000
19,000		20,000	153,000	101,000	50,000
19,050	3/4	20,000	153,000	101,000	50,000
19,300		20,000	153,000	101,000	50,000
19,500		20,000	153,000	101,000	50,000
20,000		20,000	153,000	101,000	50,000

Tehoporat jäähdytyskanavilla


P • Kärjen kevennys $\geq \varnothing 3,000$ • kartiovaippahionta • leikkusuärmä on hieman kovera • optimoitu leikkuu geometria

M

K

N seostetut ja lujat teräkset 1600 N/mm² asti • Inconel, Hastelloy, Monel
• Titaani ja titaaniseokset

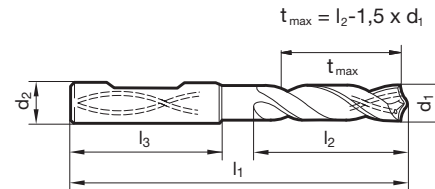
S •

H ○

GÜHRING NAVIGATOR

Leikkuuarvosivu 756

Materiaali	TKM
Pinta	Y
Varren muoto	HE



Artikkelinro.

8621

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,000		6,000	66,000	28,000	36,000	6,100		8,000	91,000	53,000	36,000
3,100		6,000	66,000	28,000	36,000	6,200		8,000	91,000	53,000	36,000
3,170	1/8	6,000	66,000	28,000	36,000	6,300		8,000	91,000	53,000	36,000
3,200		6,000	66,000	28,000	36,000	6,350	1/4	8,000	91,000	53,000	36,000
3,250		6,000	66,000	28,000	36,000	6,400		8,000	91,000	53,000	36,000
3,300		6,000	66,000	28,000	36,000	6,500		8,000	91,000	53,000	36,000
3,400		6,000	66,000	28,000	36,000	6,600		8,000	91,000	53,000	36,000
3,500		6,000	66,000	28,000	36,000	6,700		8,000	91,000	53,000	36,000
3,570	9/64	6,000	66,000	28,000	36,000	6,750	17/64	8,000	91,000	53,000	36,000
3,600		6,000	66,000	28,000	36,000	6,800		8,000	91,000	53,000	36,000
3,700		6,000	66,000	28,000	36,000	6,900		8,000	91,000	53,000	36,000
3,800		6,000	74,000	36,000	36,000	7,000		8,000	91,000	53,000	36,000
3,900		6,000	74,000	36,000	36,000	7,100		8,000	91,000	53,000	36,000
3,970	5/32	6,000	74,000	36,000	36,000	7,140	9/32	8,000	91,000	53,000	36,000
4,000		6,000	74,000	36,000	36,000	7,200		8,000	91,000	53,000	36,000
4,100		6,000	74,000	36,000	36,000	7,300		8,000	91,000	53,000	36,000
4,200		6,000	74,000	36,000	36,000	7,400		8,000	91,000	53,000	36,000
4,300		6,000	74,000	36,000	36,000	7,500		8,000	91,000	53,000	36,000
4,370	11/64	6,000	74,000	36,000	36,000	7,540	19/64	8,000	91,000	53,000	36,000
4,400		6,000	74,000	36,000	36,000	7,600		8,000	91,000	53,000	36,000
4,500		6,000	74,000	36,000	36,000	7,700		8,000	91,000	53,000	36,000
4,600		6,000	74,000	36,000	36,000	7,800		8,000	91,000	53,000	36,000
4,650		6,000	74,000	36,000	36,000	7,900		8,000	91,000	53,000	36,000
4,700		6,000	74,000	36,000	36,000	7,940	5/16	8,000	91,000	53,000	36,000
4,760	3/16	6,000	82,000	44,000	36,000	8,000		8,000	91,000	53,000	36,000
4,800		6,000	82,000	44,000	36,000	8,100		10,000	103,000	61,000	40,000
4,900		6,000	82,000	44,000	36,000	8,200		10,000	103,000	61,000	40,000
5,000		6,000	82,000	44,000	36,000	8,300		10,000	103,000	61,000	40,000
5,100		6,000	82,000	44,000	36,000	8,330	21/64	10,000	103,000	61,000	40,000
5,160	13/64	6,000	82,000	44,000	36,000	8,400		10,000	103,000	61,000	40,000
5,200		6,000	82,000	44,000	36,000	8,500		10,000	103,000	61,000	40,000
5,300		6,000	82,000	44,000	36,000	8,600		10,000	103,000	61,000	40,000
5,400		6,000	82,000	44,000	36,000	8,700		10,000	103,000	61,000	40,000
5,500		6,000	82,000	44,000	36,000	8,730	11/32	10,000	103,000	61,000	40,000
5,550		6,000	82,000	44,000	36,000	8,800		10,000	103,000	61,000	40,000
5,560	7/32	6,000	82,000	44,000	36,000	8,900		10,000	103,000	61,000	40,000
5,600		6,000	82,000	44,000	36,000	9,000		10,000	103,000	61,000	40,000
5,700		6,000	82,000	44,000	36,000	9,100		10,000	103,000	61,000	40,000
5,800		6,000	82,000	44,000	36,000	9,130	23/64	10,000	103,000	61,000	40,000
5,900		6,000	82,000	44,000	36,000	9,200		10,000	103,000	61,000	40,000
5,950	15/64	6,000	82,000	44,000	36,000	9,250		10,000	103,000	61,000	40,000
6,000		6,000	82,000	44,000	36,000	9,300		10,000	103,000	61,000	40,000



d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
9,400		10,000	103,000	61,000	40,000
9,500		10,000	103,000	61,000	40,000
9,520	3/8	10,000	103,000	61,000	40,000
9,600		10,000	103,000	61,000	40,000
9,700		10,000	103,000	61,000	40,000
9,800		10,000	103,000	61,000	40,000
9,900		10,000	103,000	61,000	40,000
9,920	25/64	10,000	103,000	61,000	40,000
10,000		10,000	103,000	61,000	40,000
10,100		12,000	118,000	71,000	45,000
10,200		12,000	118,000	71,000	45,000
10,300		12,000	118,000	71,000	45,000
10,320	13/32	12,000	118,000	71,000	45,000
10,400		12,000	118,000	71,000	45,000
10,500		12,000	118,000	71,000	45,000
10,600		12,000	118,000	71,000	45,000
10,700		12,000	118,000	71,000	45,000
10,800		12,000	118,000	71,000	45,000
10,900		12,000	118,000	71,000	45,000
11,000		12,000	118,000	71,000	45,000
11,100		12,000	118,000	71,000	45,000
11,110	7/16	12,000	118,000	71,000	45,000
11,200		12,000	118,000	71,000	45,000
11,300		12,000	118,000	71,000	45,000
11,400		12,000	118,000	71,000	45,000
11,500		12,000	118,000	71,000	45,000
11,600		12,000	118,000	71,000	45,000
11,700		12,000	118,000	71,000	45,000
11,800		12,000	118,000	71,000	45,000
11,900		12,000	118,000	71,000	45,000
11,910	15/32	12,000	118,000	71,000	45,000
12,000		12,000	118,000	71,000	45,000
12,200		14,000	124,000	77,000	45,000
12,500		14,000	124,000	77,000	45,000
12,700	1/2	14,000	124,000	77,000	45,000
12,800		14,000	124,000	77,000	45,000

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
13,000		14,000	124,000	77,000	45,000
13,300		14,000	124,000	77,000	45,000
13,500		14,000	124,000	77,000	45,000
13,700		14,000	124,000	77,000	45,000
14,000		14,000	124,000	77,000	45,000
14,200		16,000	133,000	83,000	48,000
14,290	9/16	16,000	133,000	83,000	48,000
14,300		16,000	133,000	83,000	48,000
14,500		16,000	133,000	83,000	48,000
14,700		16,000	133,000	83,000	48,000
15,000		16,000	133,000	83,000	48,000
15,200		16,000	133,000	83,000	48,000
15,300		16,000	133,000	83,000	48,000
15,500		16,000	133,000	83,000	48,000
15,700		16,000	133,000	83,000	48,000
16,000		16,000	133,000	83,000	48,000
16,300		18,000	143,000	93,000	48,000
16,500		18,000	143,000	93,000	48,000
16,900		18,000	143,000	93,000	48,000
17,000		18,000	143,000	93,000	48,000
17,300		18,000	143,000	93,000	48,000
17,500		18,000	143,000	93,000	48,000
18,000		18,000	143,000	93,000	48,000
18,500		20,000	153,000	101,000	50,000
18,900		20,000	153,000	101,000	50,000
19,000		20,000	153,000	101,000	50,000
19,050	3/4	20,000	153,000	101,000	50,000
19,300		20,000	153,000	101,000	50,000
19,500		20,000	153,000	101,000	50,000
20,000		20,000	153,000	101,000	50,000



Tehoporat jäähdytyskanavilla



P Kärjen kevennys $\geq \varnothing 3,000$ • päästöhiottu kärki • pääleikkusärmän suorasta
• optimoitu leikkuu geometria

M •**K****N**

ruostumatt./haponk./kuumal. teräkset • Titaani ja titaaniseokset • Inconel, Hastelloy, Monel

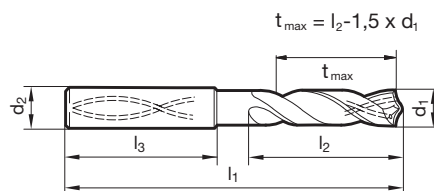
S •**H**

GÜHRING NAVIGATOR

Leikkuuarvosivu 756

Materiaali **TKM**Pinta **a**

Varren muoto HA

Artikkelinro. **8511**

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,000		6,000	66,000	28,000	36,000	6,100		8,000	91,000	53,000	36,000
3,100		6,000	66,000	28,000	36,000	6,200		8,000	91,000	53,000	36,000
3,170	1/8	6,000	66,000	28,000	36,000	6,300		8,000	91,000	53,000	36,000
3,200		6,000	66,000	28,000	36,000	6,350	1/4	8,000	91,000	53,000	36,000
3,250		6,000	66,000	28,000	36,000	6,400		8,000	91,000	53,000	36,000
3,300		6,000	66,000	28,000	36,000	6,500		8,000	91,000	53,000	36,000
3,400		6,000	66,000	28,000	36,000	6,600		8,000	91,000	53,000	36,000
3,500		6,000	66,000	28,000	36,000	6,700		8,000	91,000	53,000	36,000
3,570	9/64	6,000	66,000	28,000	36,000	6,750	17/64	8,000	91,000	53,000	36,000
3,600		6,000	66,000	28,000	36,000	6,800		8,000	91,000	53,000	36,000
3,700		6,000	66,000	28,000	36,000	6,900		8,000	91,000	53,000	36,000
3,800		6,000	74,000	36,000	36,000	7,000		8,000	91,000	53,000	36,000
3,900		6,000	74,000	36,000	36,000	7,100		8,000	91,000	53,000	36,000
3,970	5/32	6,000	74,000	36,000	36,000	7,140	9/32	8,000	91,000	53,000	36,000
4,000		6,000	74,000	36,000	36,000	7,200		8,000	91,000	53,000	36,000
4,100		6,000	74,000	36,000	36,000	7,300		8,000	91,000	53,000	36,000
4,200		6,000	74,000	36,000	36,000	7,400		8,000	91,000	53,000	36,000
4,300		6,000	74,000	36,000	36,000	7,500		8,000	91,000	53,000	36,000
4,370	11/64	6,000	74,000	36,000	36,000	7,540	19/64	8,000	91,000	53,000	36,000
4,400		6,000	74,000	36,000	36,000	7,600		8,000	91,000	53,000	36,000
4,500		6,000	74,000	36,000	36,000	7,700		8,000	91,000	53,000	36,000
4,600		6,000	74,000	36,000	36,000	7,800		8,000	91,000	53,000	36,000
4,650		6,000	74,000	36,000	36,000	7,900		8,000	91,000	53,000	36,000
4,700		6,000	74,000	36,000	36,000	7,940	5/16	8,000	91,000	53,000	36,000
4,760	3/16	6,000	82,000	44,000	36,000	8,000		8,000	91,000	53,000	36,000
4,800		6,000	82,000	44,000	36,000	8,100		10,000	103,000	61,000	40,000
4,900		6,000	82,000	44,000	36,000	8,200		10,000	103,000	61,000	40,000
5,000		6,000	82,000	44,000	36,000	8,300		10,000	103,000	61,000	40,000
5,100		6,000	82,000	44,000	36,000	8,330	21/64	10,000	103,000	61,000	40,000
5,160	13/64	6,000	82,000	44,000	36,000	8,400		10,000	103,000	61,000	40,000
5,200		6,000	82,000	44,000	36,000	8,500		10,000	103,000	61,000	40,000
5,300		6,000	82,000	44,000	36,000	8,600		10,000	103,000	61,000	40,000
5,400		6,000	82,000	44,000	36,000	8,700		10,000	103,000	61,000	40,000
5,500		6,000	82,000	44,000	36,000	8,730	11/32	10,000	103,000	61,000	40,000
5,550		6,000	82,000	44,000	36,000	8,800		10,000	103,000	61,000	40,000
5,560	7/32	6,000	82,000	44,000	36,000	8,900		10,000	103,000	61,000	40,000
5,600		6,000	82,000	44,000	36,000	9,000		10,000	103,000	61,000	40,000
5,700		6,000	82,000	44,000	36,000	9,100		10,000	103,000	61,000	40,000
5,800		6,000	82,000	44,000	36,000	9,130	23/64	10,000	103,000	61,000	40,000
5,900		6,000	82,000	44,000	36,000	9,200		10,000	103,000	61,000	40,000
5,950	15/64	6,000	82,000	44,000	36,000	9,250		10,000	103,000	61,000	40,000
6,000		6,000	82,000	44,000	36,000	9,300		10,000	103,000	61,000	40,000



d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
9,400		10,000	103,000	61,000	40,000
9,500		10,000	103,000	61,000	40,000
9,520	3/8	10,000	103,000	61,000	40,000
9,600		10,000	103,000	61,000	40,000
9,700		10,000	103,000	61,000	40,000
9,800		10,000	103,000	61,000	40,000
9,900		10,000	103,000	61,000	40,000
9,920	25/64	10,000	103,000	61,000	40,000
10,000		10,000	103,000	61,000	40,000
10,100		12,000	118,000	71,000	45,000
10,200		12,000	118,000	71,000	45,000
10,300		12,000	118,000	71,000	45,000
10,320	13/32	12,000	118,000	71,000	45,000
10,400		12,000	118,000	71,000	45,000
10,500		12,000	118,000	71,000	45,000
10,600		12,000	118,000	71,000	45,000
10,700		12,000	118,000	71,000	45,000
10,800		12,000	118,000	71,000	45,000
10,900		12,000	118,000	71,000	45,000
11,000		12,000	118,000	71,000	45,000
11,100		12,000	118,000	71,000	45,000
11,110	7/16	12,000	118,000	71,000	45,000
11,200		12,000	118,000	71,000	45,000
11,300		12,000	118,000	71,000	45,000
11,400		12,000	118,000	71,000	45,000
11,500		12,000	118,000	71,000	45,000
11,600		12,000	118,000	71,000	45,000
11,700		12,000	118,000	71,000	45,000
11,800		12,000	118,000	71,000	45,000
11,900		12,000	118,000	71,000	45,000
11,910	15/32	12,000	118,000	71,000	45,000
12,000		12,000	118,000	71,000	45,000
12,200		14,000	124,000	77,000	45,000
12,500		14,000	124,000	77,000	45,000
12,700	1/2	14,000	124,000	77,000	45,000
12,800		14,000	124,000	77,000	45,000

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
13,000		14,000	124,000	77,000	45,000
13,300		14,000	124,000	77,000	45,000
13,500		14,000	124,000	77,000	45,000
13,700		14,000	124,000	77,000	45,000
14,000		14,000	124,000	77,000	45,000
14,200		16,000	133,000	83,000	48,000
14,290	9/16	16,000	133,000	83,000	48,000
14,300		16,000	133,000	83,000	48,000
14,500		16,000	133,000	83,000	48,000
14,700		16,000	133,000	83,000	48,000
15,000		16,000	133,000	83,000	48,000
15,200		16,000	133,000	83,000	48,000
15,300		16,000	133,000	83,000	48,000
15,500		16,000	133,000	83,000	48,000
15,700		16,000	133,000	83,000	48,000
16,000		16,000	133,000	83,000	48,000
16,300		18,000	143,000	93,000	48,000
16,500		18,000	143,000	93,000	48,000
16,900		18,000	143,000	93,000	48,000
17,000		18,000	143,000	93,000	48,000
17,300		18,000	143,000	93,000	48,000
17,500		18,000	143,000	93,000	48,000
18,000		18,000	143,000	93,000	48,000
18,500		20,000	153,000	101,000	50,000
18,900		20,000	153,000	101,000	50,000
19,000		20,000	153,000	101,000	50,000
19,050	3/4	20,000	153,000	101,000	50,000
19,300		20,000	153,000	101,000	50,000
19,500		20,000	153,000	101,000	50,000
20,000		20,000	153,000	101,000	50,000



Tehoporat jäähdytyskanavilla



P Kärjen kevennys $\geq \varnothing 3,000$ • päästöhiottu kärki • pääleikkusuärmän suorasta
• optimoitu leikkuu geometria

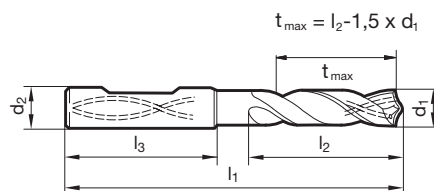
M •**K****N**

ruostumatt./haponk./kuumal. teräkset • Titaani ja titaaniseokset • Inconel, Hastelloy, Monel

S •**H**

GÜHRING NAVIGATOR

Leikkuuarvosivu 756

Materiaali **TKM**Pinta **a**Varren muoto **HE**Artikkelinro. **8611**

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,000		6,000	66,000	28,000	36,000	6,100		8,000	91,000	53,000	36,000
3,100		6,000	66,000	28,000	36,000	6,200		8,000	91,000	53,000	36,000
3,170	1/8	6,000	66,000	28,000	36,000	6,300		8,000	91,000	53,000	36,000
3,200		6,000	66,000	28,000	36,000	6,350	1/4	8,000	91,000	53,000	36,000
3,250		6,000	66,000	28,000	36,000	6,400		8,000	91,000	53,000	36,000
3,300		6,000	66,000	28,000	36,000	6,500		8,000	91,000	53,000	36,000
3,400		6,000	66,000	28,000	36,000	6,600		8,000	91,000	53,000	36,000
3,500		6,000	66,000	28,000	36,000	6,700		8,000	91,000	53,000	36,000
3,570	9/64	6,000	66,000	28,000	36,000	6,750	17/64	8,000	91,000	53,000	36,000
3,600		6,000	66,000	28,000	36,000	6,800		8,000	91,000	53,000	36,000
3,700		6,000	66,000	28,000	36,000	6,900		8,000	91,000	53,000	36,000
3,800		6,000	74,000	36,000	36,000	7,000		8,000	91,000	53,000	36,000
3,900		6,000	74,000	36,000	36,000	7,100		8,000	91,000	53,000	36,000
3,970	5/32	6,000	74,000	36,000	36,000	7,140	9/32	8,000	91,000	53,000	36,000
4,000		6,000	74,000	36,000	36,000	7,200		8,000	91,000	53,000	36,000
4,100		6,000	74,000	36,000	36,000	7,300		8,000	91,000	53,000	36,000
4,200		6,000	74,000	36,000	36,000	7,400		8,000	91,000	53,000	36,000
4,300		6,000	74,000	36,000	36,000	7,500		8,000	91,000	53,000	36,000
4,370	11/64	6,000	74,000	36,000	36,000	7,540	19/64	8,000	91,000	53,000	36,000
4,400		6,000	74,000	36,000	36,000	7,600		8,000	91,000	53,000	36,000
4,500		6,000	74,000	36,000	36,000	7,700		8,000	91,000	53,000	36,000
4,600		6,000	74,000	36,000	36,000	7,800		8,000	91,000	53,000	36,000
4,650		6,000	74,000	36,000	36,000	7,900		8,000	91,000	53,000	36,000
4,700		6,000	74,000	36,000	36,000	7,940	5/16	8,000	91,000	53,000	36,000
4,760	3/16	6,000	82,000	44,000	36,000	8,000		8,000	91,000	53,000	36,000
4,800		6,000	82,000	44,000	36,000	8,100		10,000	103,000	61,000	40,000
4,900		6,000	82,000	44,000	36,000	8,200		10,000	103,000	61,000	40,000
5,000		6,000	82,000	44,000	36,000	8,300		10,000	103,000	61,000	40,000
5,100		6,000	82,000	44,000	36,000	8,330	21/64	10,000	103,000	61,000	40,000
5,160	13/64	6,000	82,000	44,000	36,000	8,400		10,000	103,000	61,000	40,000
5,200		6,000	82,000	44,000	36,000	8,500		10,000	103,000	61,000	40,000
5,300		6,000	82,000	44,000	36,000	8,600		10,000	103,000	61,000	40,000
5,400		6,000	82,000	44,000	36,000	8,700		10,000	103,000	61,000	40,000
5,500		6,000	82,000	44,000	36,000	8,730	11/32	10,000	103,000	61,000	40,000
5,550		6,000	82,000	44,000	36,000	8,800		10,000	103,000	61,000	40,000
5,560	7/32	6,000	82,000	44,000	36,000	8,900		10,000	103,000	61,000	40,000
5,600		6,000	82,000	44,000	36,000	9,000		10,000	103,000	61,000	40,000
5,700		6,000	82,000	44,000	36,000	9,100		10,000	103,000	61,000	40,000
5,800		6,000	82,000	44,000	36,000	9,130	23/64	10,000	103,000	61,000	40,000
5,900		6,000	82,000	44,000	36,000	9,200		10,000	103,000	61,000	40,000
5,950	15/64	6,000	82,000	44,000	36,000	9,250		10,000	103,000	61,000	40,000
6,000		6,000	82,000	44,000	36,000	9,300		10,000	103,000	61,000	40,000



d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
9,400		10,000	103,000	61,000	40,000
9,500		10,000	103,000	61,000	40,000
9,520	3/8	10,000	103,000	61,000	40,000
9,600		10,000	103,000	61,000	40,000
9,700		10,000	103,000	61,000	40,000
9,800		10,000	103,000	61,000	40,000
9,900		10,000	103,000	61,000	40,000
9,920	25/64	10,000	103,000	61,000	40,000
10,000		10,000	103,000	61,000	40,000
10,100		12,000	118,000	71,000	45,000
10,200		12,000	118,000	71,000	45,000
10,300		12,000	118,000	71,000	45,000
10,320	13/32	12,000	118,000	71,000	45,000
10,400		12,000	118,000	71,000	45,000
10,500		12,000	118,000	71,000	45,000
10,600		12,000	118,000	71,000	45,000
10,700		12,000	118,000	71,000	45,000
10,800		12,000	118,000	71,000	45,000
10,900		12,000	118,000	71,000	45,000
11,000		12,000	118,000	71,000	45,000
11,100		12,000	118,000	71,000	45,000
11,110	7/16	12,000	118,000	71,000	45,000
11,200		12,000	118,000	71,000	45,000
11,300		12,000	118,000	71,000	45,000
11,400		12,000	118,000	71,000	45,000
11,500		12,000	118,000	71,000	45,000
11,600		12,000	118,000	71,000	45,000
11,700		12,000	118,000	71,000	45,000
11,800		12,000	118,000	71,000	45,000
11,900		12,000	118,000	71,000	45,000
11,910	15/32	12,000	118,000	71,000	45,000
12,000		12,000	118,000	71,000	45,000
12,200		14,000	124,000	77,000	45,000
12,500		14,000	124,000	77,000	45,000
12,700	1/2	14,000	124,000	77,000	45,000
12,800		14,000	124,000	77,000	45,000

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
13,000		14,000	124,000	77,000	45,000
13,300		14,000	124,000	77,000	45,000
13,500		14,000	124,000	77,000	45,000
13,700		14,000	124,000	77,000	45,000
14,000		14,000	124,000	77,000	45,000
14,200		16,000	133,000	83,000	48,000
14,290	9/16	16,000	133,000	83,000	48,000
14,300		16,000	133,000	83,000	48,000
14,500		16,000	133,000	83,000	48,000
14,700		16,000	133,000	83,000	48,000
15,000		16,000	133,000	83,000	48,000
15,200		16,000	133,000	83,000	48,000
15,300		16,000	133,000	83,000	48,000
15,500		16,000	133,000	83,000	48,000
15,700		16,000	133,000	83,000	48,000
16,000		16,000	133,000	83,000	48,000
16,300		18,000	143,000	93,000	48,000
16,500		18,000	143,000	93,000	48,000
16,900		18,000	143,000	93,000	48,000
17,000		18,000	143,000	93,000	48,000
17,300		18,000	143,000	93,000	48,000
17,500		18,000	143,000	93,000	48,000
18,000		18,000	143,000	93,000	48,000
18,500		20,000	153,000	101,000	50,000
18,900		20,000	153,000	101,000	50,000
19,000		20,000	153,000	101,000	50,000
19,050	3/4	20,000	153,000	101,000	50,000
19,300		20,000	153,000	101,000	50,000
19,500		20,000	153,000	101,000	50,000
20,000		20,000	153,000	101,000	50,000



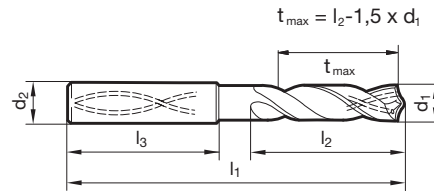
Tehoporat jäähdytyskanavilla



P	○	Kärjen kevennys $\geq \varnothing 3,000$ • kartiovaippahionta • pääleikkausärmän kaarteesta • optimoitu leikkuu geometria • terävästi leikkaava
M	○	
K	○	
N	○	runsasseosteiset teräkset • ruostumatt.-/haponk.-/kuumal. teräkset
S	●	• Inconel, Hastelloy, Monel • messinki, pronssit • alumiini ja Al-seokset
H	○	• Magnesium ja Mg-seokset • Titaani ja titaaniseokset • sintrattu pulveriteräs

GÜHRING NAVIGATOR

Leikkuuarvosivu 754



Artikkelinro.

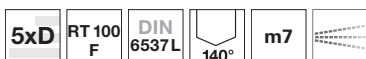
2478

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
3,000		6,000	66,000	28,000	36,000
3,300		6,000	66,000	28,000	36,000
3,500		6,000	66,000	28,000	36,000
4,000		6,000	74,000	36,000	36,000
4,200		6,000	74,000	36,000	36,000
4,800		6,000	82,000	44,000	36,000
5,000		6,000	82,000	44,000	36,000
5,500		6,000	82,000	44,000	36,000
6,000		6,000	82,000	44,000	36,000
6,500		8,000	91,000	53,000	36,000
6,800		8,000	91,000	53,000	36,000
7,000		8,000	91,000	53,000	36,000
7,400		8,000	91,000	53,000	36,000
7,500		8,000	91,000	53,000	36,000
7,550		8,000	91,000	53,000	36,000
7,700		8,000	91,000	53,000	36,000
8,000		8,000	91,000	53,000	36,000
8,500		10,000	103,000	61,000	40,000

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
9,000		10,000	103,000	61,000	40,000
9,500		10,000	103,000	61,000	40,000
10,000		10,000	103,000	61,000	40,000
10,200		12,000	118,000	71,000	45,000
11,000		12,000	118,000	71,000	45,000
11,200		12,000	118,000	71,000	45,000
11,300		12,000	118,000	71,000	45,000
12,000		12,000	118,000	71,000	45,000
13,000		14,000	124,000	77,000	45,000
13,500		14,000	124,000	77,000	45,000
14,000		14,000	124,000	77,000	45,000
14,500		16,000	133,000	83,000	48,000
16,000		16,000	133,000	83,000	48,000
17,000		18,000	143,000	93,000	48,000
17,500		18,000	143,000	93,000	48,000
20,000		20,000	153,000	101,000	50,000



Tehoporat jäähdytyskanavilla



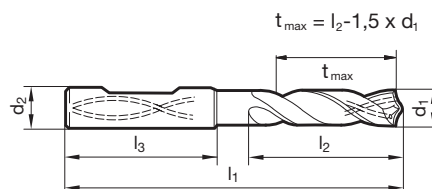
P	○	Kärjen kevennys $\geq \varnothing 3,000$ • kartiovaippahionta • pääleikkuusärmän kaarteesta • optimoitu leikkuu geometria • terävästi leikkaava
M	○	
K	○	
N	○	runsasseosteiset teräkset • ruostumatt./-haponk./-kuumal. teräkset
S	●	• Inconel, Hastelloy, Monel • messinki, pronssit • alumiini ja Al-seokset
H	○	• Magnesium ja Mg-seokset • Titaani ja titaaniseokset • sintrattu pulveriteräs

GÜHRING NAVIGATOR

Leikkuuarvosivu 754

Materiaali	TKM
Pinta	F
Varren muoto	HE

Tehoporat



Artikkelinro.

2470

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,000		6,000	66,000	28,000	36,000	9,000		10,000	103,000	61,000	40,000
3,500		6,000	66,000	28,000	36,000	9,200		10,000	103,000	61,000	40,000
4,000		6,000	74,000	36,000	36,000	9,300		10,000	103,000	61,000	40,000
4,200		6,000	74,000	36,000	36,000	9,500		10,000	103,000	61,000	40,000
5,000		6,000	82,000	44,000	36,000	9,700		10,000	103,000	61,000	40,000
5,100		6,000	82,000	44,000	36,000	10,000		10,000	103,000	61,000	40,000
5,200		6,000	82,000	44,000	36,000	10,100		12,000	118,000	71,000	45,000
5,300		6,000	82,000	44,000	36,000	10,200		12,000	118,000	71,000	45,000
5,400		6,000	82,000	44,000	36,000	10,500		12,000	118,000	71,000	45,000
5,500		6,000	82,000	44,000	36,000	11,000		12,000	118,000	71,000	45,000
5,600		6,000	82,000	44,000	36,000	11,100		12,000	118,000	71,000	45,000
5,800		6,000	82,000	44,000	36,000	11,400		12,000	118,000	71,000	45,000
6,000		6,000	82,000	44,000	36,000	11,500		12,000	118,000	71,000	45,000
6,100		8,000	91,000	53,000	36,000	11,700		12,000	118,000	71,000	45,000
6,200		8,000	91,000	53,000	36,000	11,800		12,000	118,000	71,000	45,000
6,500		8,000	91,000	53,000	36,000	12,000		12,000	118,000	71,000	45,000
6,600		8,000	91,000	53,000	36,000	12,200		14,000	124,000	77,000	45,000
6,700		8,000	91,000	53,000	36,000	12,500		14,000	124,000	77,000	45,000
6,800		8,000	91,000	53,000	36,000	13,000		14,000	124,000	77,000	45,000
7,000		8,000	91,000	53,000	36,000	13,500		14,000	124,000	77,000	45,000
7,100		8,000	91,000	53,000	36,000	14,000		14,000	124,000	77,000	45,000
7,200		8,000	91,000	53,000	36,000	14,100		16,000	133,000	83,000	48,000
7,600		8,000	91,000	53,000	36,000	14,500		16,000	133,000	83,000	48,000
7,700		8,000	91,000	53,000	36,000	15,000		16,000	133,000	83,000	48,000
8,000		8,000	91,000	53,000	36,000	16,000		16,000	133,000	83,000	48,000
8,100		10,000	103,000	61,000	40,000	16,500		18,000	143,000	93,000	48,000
8,500		10,000	103,000	61,000	40,000	17,000		18,000	143,000	93,000	48,000
8,600		10,000	103,000	61,000	40,000	17,500		18,000	143,000	93,000	48,000
8,700		10,000	103,000	61,000	40,000	18,000		18,000	143,000	93,000	48,000
8,800		10,000	103,000	61,000	40,000	20,000		20,000	153,000	101,000	50,000



Tehoporat jäähdytyskanavilla

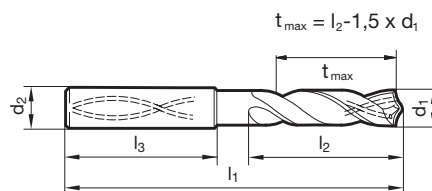


- P** ○ Kärjen kevennys $\geq \varnothing 3,000$ • kartiovaippahionta • pääleikkusärmän kaarteesta • optimoitu leikkuu geometria • terävästi leikkaava
- M** ○
- K** ○
- N** ○ runsasseosteiset teräkset • ruostumatt./haponk./kuumal. teräkset
• Inconel, Hastelloy, Monel • messinki, pronssit • alumiini ja Al-seokset
- S** • Magnesium ja Mg-seokset • Titaani ja titaaniseokset • sintrattu pulveriteräs
- H** ○

GÜHRING NAVIGATOR

Leikkuarvosivu 754

Materiaali	TKM
Pinta	Ⓢ
Varren muoto	HA



Artikkelinro.

1662

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,000		6,000	66,000	28,000	36,000	6,200		8,000	91,000	53,000	36,000
3,100		6,000	66,000	28,000	36,000	6,300		8,000	91,000	53,000	36,000
3,170	1/8	6,000	66,000	28,000	36,000	6,350	1/4	8,000	91,000	53,000	36,000
3,200		6,000	66,000	28,000	36,000	6,400		8,000	91,000	53,000	36,000
3,300		6,000	66,000	28,000	36,000	6,500		8,000	91,000	53,000	36,000
3,400		6,000	66,000	28,000	36,000	6,600		8,000	91,000	53,000	36,000
3,500		6,000	66,000	28,000	36,000	6,700		8,000	91,000	53,000	36,000
3,570	9/64	6,000	66,000	28,000	36,000	6,750	17/64	8,000	91,000	53,000	36,000
3,600		6,000	66,000	28,000	36,000	6,800		8,000	91,000	53,000	36,000
3,700		6,000	66,000	28,000	36,000	6,900		8,000	91,000	53,000	36,000
3,800		6,000	74,000	36,000	36,000	7,000		8,000	91,000	53,000	36,000
3,900		6,000	74,000	36,000	36,000	7,100		8,000	91,000	53,000	36,000
3,970	5/32	6,000	74,000	36,000	36,000	7,140	9/32	8,000	91,000	53,000	36,000
4,000		6,000	74,000	36,000	36,000	7,200		8,000	91,000	53,000	36,000
4,100		6,000	74,000	36,000	36,000	7,300		8,000	91,000	53,000	36,000
4,200		6,000	74,000	36,000	36,000	7,400		8,000	91,000	53,000	36,000
4,300		6,000	74,000	36,000	36,000	7,500		8,000	91,000	53,000	36,000
4,370	11/64	6,000	74,000	36,000	36,000	7,540	19/64	8,000	91,000	53,000	36,000
4,400		6,000	74,000	36,000	36,000	7,550		8,000	91,000	53,000	36,000
4,500		6,000	74,000	36,000	36,000	7,600		8,000	91,000	53,000	36,000
4,600		6,000	74,000	36,000	36,000	7,700		8,000	91,000	53,000	36,000
4,650		6,000	74,000	36,000	36,000	7,800		8,000	91,000	53,000	36,000
4,700		6,000	74,000	36,000	36,000	7,900		8,000	91,000	53,000	36,000
4,760	3/16	6,000	82,000	44,000	36,000	7,940	5/16	8,000	91,000	53,000	36,000
4,800		6,000	82,000	44,000	36,000	8,000		8,000	91,000	53,000	36,000
4,900		6,000	82,000	44,000	36,000	8,100		10,000	103,000	61,000	40,000
5,000		6,000	82,000	44,000	36,000	8,200		10,000	103,000	61,000	40,000
5,100		6,000	82,000	44,000	36,000	8,300		10,000	103,000	61,000	40,000
5,160	13/64	6,000	82,000	44,000	36,000	8,330	21/64	10,000	103,000	61,000	40,000
5,200		6,000	82,000	44,000	36,000	8,500		10,000	103,000	61,000	40,000
5,300		6,000	82,000	44,000	36,000	8,600		10,000	103,000	61,000	40,000
5,400		6,000	82,000	44,000	36,000	8,700		10,000	103,000	61,000	40,000
5,500		6,000	82,000	44,000	36,000	8,730	11/32	10,000	103,000	61,000	40,000
5,550		6,000	82,000	44,000	36,000	8,800		10,000	103,000	61,000	40,000
5,560	7/32	6,000	82,000	44,000	36,000	8,900		10,000	103,000	61,000	40,000
5,600		6,000	82,000	44,000	36,000	9,000		10,000	103,000	61,000	40,000
5,700		6,000	82,000	44,000	36,000	9,100		10,000	103,000	61,000	40,000
5,800		6,000	82,000	44,000	36,000	9,130	23/64	10,000	103,000	61,000	40,000
5,900		6,000	82,000	44,000	36,000	9,200		10,000	103,000	61,000	40,000
5,950	15/64	6,000	82,000	44,000	36,000	9,250		10,000	103,000	61,000	40,000
6,000		6,000	82,000	44,000	36,000	9,300		10,000	103,000	61,000	40,000
6,100		8,000	91,000	53,000	36,000	9,400		10,000	103,000	61,000	40,000



d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
9,500		10,000	103,000	61,000	40,000
9,520	3/8	10,000	103,000	61,000	40,000
9,600		10,000	103,000	61,000	40,000
9,800		10,000	103,000	61,000	40,000
9,900		10,000	103,000	61,000	40,000
9,920	25/64	10,000	103,000	61,000	40,000
10,000		10,000	103,000	61,000	40,000
10,100		12,000	118,000	71,000	45,000
10,200		12,000	118,000	71,000	45,000
10,300		12,000	118,000	71,000	45,000
10,320	13/32	12,000	118,000	71,000	45,000
10,500		12,000	118,000	71,000	45,000
10,700		12,000	118,000	71,000	45,000
10,720	27/64	12,000	118,000	71,000	45,000
10,800		12,000	118,000	71,000	45,000
11,000		12,000	118,000	71,000	45,000
11,100		12,000	118,000	71,000	45,000
11,110	7/16	12,000	118,000	71,000	45,000
11,200		12,000	118,000	71,000	45,000
11,300		12,000	118,000	71,000	45,000
11,400		12,000	118,000	71,000	45,000
11,500		12,000	118,000	71,000	45,000
11,510	29/64	12,000	118,000	71,000	45,000
11,700		12,000	118,000	71,000	45,000
11,910	15/32	12,000	118,000	71,000	45,000
12,000		12,000	118,000	71,000	45,000
12,100		14,000	124,000	77,000	45,000
12,200		14,000	124,000	77,000	45,000
12,300	31/64	14,000	124,000	77,000	45,000
12,500		14,000	124,000	77,000	45,000

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
12,700	1/2	14,000	124,000	77,000	45,000
12,800		14,000	124,000	77,000	45,000
13,000		14,000	124,000	77,000	45,000
13,200		14,000	124,000	77,000	45,000
13,500		14,000	124,000	77,000	45,000
14,000		14,000	124,000	77,000	45,000
14,500		16,000	133,000	83,000	48,000
15,000		16,000	133,000	83,000	48,000
15,500		16,000	133,000	83,000	48,000
16,000		16,000	133,000	83,000	48,000
16,500		18,000	143,000	93,000	48,000
17,000		18,000	143,000	93,000	48,000
17,500		18,000	143,000	93,000	48,000
18,000		18,000	143,000	93,000	48,000
19,000		20,000	153,000	101,000	50,000
20,000		20,000	153,000	101,000	50,000
20,500		25,000	165,000	105,000	56,000
21,000		25,000	165,000	105,000	56,000
22,500		25,000	180,000	117,000	56,000
23,500		25,000	180,000	117,000	56,000

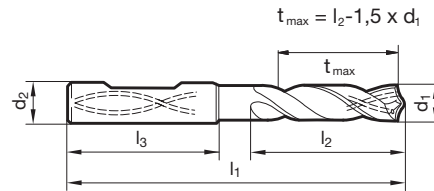
Tehoporat jäähdytyskanavilla


- P** ○ Kärjen kevennys $\geq \varnothing 10,100$ • kartiovaippahionta • päällekkäisyyssärmän kaarteesta • optimoitu leikkuu geometria • terävästi leikkaava
- M** ○
- K** ○
- N** ○ runsasseosteiset teräkset • ruostumatt./-haponk./-kuumal. teräkset
• Inconel, Hastelloy, Monel • messinki, pronssit • alumiini ja Al-seokset
- S** • Magnesium ja Mg-seokset • Titaani ja titaaniseokset • sintrattu pulveriteräs
- H** ○

GÜHRING NAVIGATOR

Leikkuuarvosivu 754

Materiaali	TKM
Pinta	S
Varren muoto	HE



Artikkelinro.

1182

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,000		6,000	66,000	28,000	36,000	9,000		10,000	103,000	61,000	40,000
4,000		6,000	74,000	36,000	36,000	9,130	23/64	10,000	103,000	61,000	40,000
4,200		6,000	74,000	36,000	36,000	9,200		10,000	103,000	61,000	40,000
4,300		6,000	74,000	36,000	36,000	9,300		10,000	103,000	61,000	40,000
4,400		6,000	74,000	36,000	36,000	9,400		10,000	103,000	61,000	40,000
4,500		6,000	74,000	36,000	36,000	9,500		10,000	103,000	61,000	40,000
4,600		6,000	74,000	36,000	36,000	9,600		10,000	103,000	61,000	40,000
4,800		6,000	82,000	44,000	36,000	9,700		10,000	103,000	61,000	40,000
4,900		6,000	82,000	44,000	36,000	9,800		10,000	103,000	61,000	40,000
5,000		6,000	82,000	44,000	36,000	9,920	25/64	10,000	103,000	61,000	40,000
5,100		6,000	82,000	44,000	36,000	10,000		10,000	103,000	61,000	40,000
5,200		6,000	82,000	44,000	36,000	10,100		12,000	118,000	71,000	45,000
5,300		6,000	82,000	44,000	36,000	10,200		12,000	118,000	71,000	45,000
5,400		6,000	82,000	44,000	36,000	10,300		12,000	118,000	71,000	45,000
5,500		6,000	82,000	44,000	36,000	10,500		12,000	118,000	71,000	45,000
5,600		6,000	82,000	44,000	36,000	10,700		12,000	118,000	71,000	45,000
5,800		6,000	82,000	44,000	36,000	10,800		12,000	118,000	71,000	45,000
6,000		6,000	82,000	44,000	36,000	11,000		12,000	118,000	71,000	45,000
6,100		8,000	91,000	53,000	36,000	11,100		12,000	118,000	71,000	45,000
6,200		8,000	91,000	53,000	36,000	11,200		12,000	118,000	71,000	45,000
6,300		8,000	91,000	53,000	36,000	11,500		12,000	118,000	71,000	45,000
6,500		8,000	91,000	53,000	36,000	11,800		12,000	118,000	71,000	45,000
6,600		8,000	91,000	53,000	36,000	12,000		12,000	118,000	71,000	45,000
6,700		8,000	91,000	53,000	36,000	12,500		14,000	124,000	77,000	45,000
6,800		8,000	91,000	53,000	36,000	12,800		14,000	124,000	77,000	45,000
6,900		8,000	91,000	53,000	36,000	12,900		14,000	124,000	77,000	45,000
7,000		8,000	91,000	53,000	36,000	13,000		14,000	124,000	77,000	45,000
7,140	9/32	8,000	91,000	53,000	36,000	13,200		14,000	124,000	77,000	45,000
7,200		8,000	91,000	53,000	36,000	13,500		14,000	124,000	77,000	45,000
7,400		8,000	91,000	53,000	36,000	13,890	35/64	14,000	124,000	77,000	45,000
7,500		8,000	91,000	53,000	36,000	14,000		14,000	124,000	77,000	45,000
7,600		8,000	91,000	53,000	36,000	14,100		16,000	133,000	83,000	48,000
7,800		8,000	91,000	53,000	36,000	14,500		16,000	133,000	83,000	48,000
7,900		8,000	91,000	53,000	36,000	14,600		16,000	133,000	83,000	48,000
8,000		8,000	91,000	53,000	36,000	15,000		16,000	133,000	83,000	48,000
8,100		10,000	103,000	61,000	40,000	15,500		16,000	133,000	83,000	48,000
8,200		10,000	103,000	61,000	40,000	16,000		16,000	133,000	83,000	48,000
8,300		10,000	103,000	61,000	40,000	16,500		18,000	143,000	93,000	48,000
8,500		10,000	103,000	61,000	40,000	16,600		18,000	143,000	93,000	48,000
8,600		10,000	103,000	61,000	40,000	17,000		18,000	143,000	93,000	48,000
8,700		10,000	103,000	61,000	40,000	17,500		18,000	143,000	93,000	48,000
8,800		10,000	103,000	61,000	40,000	18,000		18,000	143,000	93,000	48,000



d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
20,000		20,000	153,000	101,000	50,000
20,500		25,000	165,000	105,000	56,000
21,000		25,000	165,000	105,000	56,000
21,500		25,000	165,000	105,000	56,000
22,000		25,000	165,000	105,000	56,000
22,500		25,000	180,000	117,000	56,000

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
24,000		25,000	180,000	117,000	56,000
24,500		25,000	180,000	117,000	56,000
25,000	63/64	25,000	180,000	117,000	56,000



Tehoporat jäähdytyskanavilla

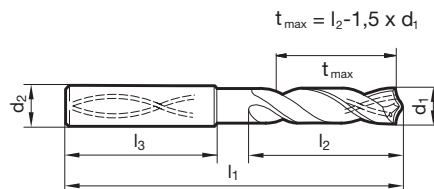


P	Kärjen kevennys $\geq \varnothing 3,000$ • patentoitu säteellinen kärjenhionta • pääleikkusärmän suorasta (korjauksella)
M	
K	•
N	pallografiittivalurauta GGV ja ADI, CDI • harmaavalu-, taottava- ja pallografiittivalurauta
S	
H	

GÜHRING NAVIGATOR

Leikkuuarvosivu 754

Materiaali	TKM
Pinta	F
Varren muoto	HA



Artikkelinro.

6501

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,000		6,000	66,000	28,000	36,000	7,940	5/16	8,000	91,000	53,000	36,000
3,170	1/8	6,000	66,000	28,000	36,000	8,000		8,000	91,000	53,000	36,000
3,200		6,000	66,000	28,000	36,000	8,100		10,000	103,000	61,000	40,000
3,300		6,000	66,000	28,000	36,000	8,200		10,000	103,000	61,000	40,000
3,400		6,000	66,000	28,000	36,000	8,300		10,000	103,000	61,000	40,000
3,500		6,000	66,000	28,000	36,000	8,330	21/64	10,000	103,000	61,000	40,000
3,600		6,000	66,000	28,000	36,000	8,500		10,000	103,000	61,000	40,000
3,800		6,000	74,000	36,000	36,000	8,600		10,000	103,000	61,000	40,000
4,000		6,000	74,000	36,000	36,000	8,700		10,000	103,000	61,000	40,000
4,100		6,000	74,000	36,000	36,000	8,800		10,000	103,000	61,000	40,000
4,200		6,000	74,000	36,000	36,000	8,900		10,000	103,000	61,000	40,000
4,300		6,000	74,000	36,000	36,000	9,000		10,000	103,000	61,000	40,000
4,400		6,000	74,000	36,000	36,000	9,100		10,000	103,000	61,000	40,000
4,500		6,000	74,000	36,000	36,000	9,200		10,000	103,000	61,000	40,000
4,600		6,000	74,000	36,000	36,000	9,250		10,000	103,000	61,000	40,000
4,650		6,000	74,000	36,000	36,000	9,300		10,000	103,000	61,000	40,000
4,800		6,000	82,000	44,000	36,000	9,400		10,000	103,000	61,000	40,000
5,000		6,000	82,000	44,000	36,000	9,500		10,000	103,000	61,000	40,000
5,100		6,000	82,000	44,000	36,000	9,520	3/8	10,000	103,000	61,000	40,000
5,160	13/64	6,000	82,000	44,000	36,000	9,600		10,000	103,000	61,000	40,000
5,300		6,000	82,000	44,000	36,000	9,700		10,000	103,000	61,000	40,000
5,500		6,000	82,000	44,000	36,000	9,800		10,000	103,000	61,000	40,000
5,550		6,000	82,000	44,000	36,000	9,900		10,000	103,000	61,000	40,000
5,560	7/32	6,000	82,000	44,000	36,000	9,920	25/64	10,000	103,000	61,000	40,000
5,600		6,000	82,000	44,000	36,000	10,000		10,000	103,000	61,000	40,000
5,700		6,000	82,000	44,000	36,000	10,100		12,000	118,000	71,000	45,000
5,800		6,000	82,000	44,000	36,000	10,200		12,000	118,000	71,000	45,000
5,900		6,000	82,000	44,000	36,000	10,400		12,000	118,000	71,000	45,000
6,000		6,000	82,000	44,000	36,000	10,500		12,000	118,000	71,000	45,000
6,350	1/4	8,000	91,000	53,000	36,000	10,600		12,000	118,000	71,000	45,000
6,500		8,000	91,000	53,000	36,000	10,700		12,000	118,000	71,000	45,000
6,600		8,000	91,000	53,000	36,000	10,720	27/64	12,000	118,000	71,000	45,000
6,750	17/64	8,000	91,000	53,000	36,000	10,800		12,000	118,000	71,000	45,000
6,800		8,000	91,000	53,000	36,000	10,900		12,000	118,000	71,000	45,000
6,900		8,000	91,000	53,000	36,000	11,000		12,000	118,000	71,000	45,000
7,000		8,000	91,000	53,000	36,000	11,100		12,000	118,000	71,000	45,000
7,200		8,000	91,000	53,000	36,000	11,110	7/16	12,000	118,000	71,000	45,000
7,300		8,000	91,000	53,000	36,000	11,200		12,000	118,000	71,000	45,000
7,400		8,000	91,000	53,000	36,000	11,300		12,000	118,000	71,000	45,000
7,500		8,000	91,000	53,000	36,000	11,500		12,000	118,000	71,000	45,000
7,800		8,000	91,000	53,000	36,000	11,600		12,000	118,000	71,000	45,000
7,900		8,000	91,000	53,000	36,000	11,700		12,000	118,000	71,000	45,000



d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
11,800		12,000	118,000	71,000	45,000
11,900		12,000	118,000	71,000	45,000
12,000		12,000	118,000	71,000	45,000
12,100		14,000	124,000	77,000	45,000
12,200		14,000	124,000	77,000	45,000
12,500		14,000	124,000	77,000	45,000
12,700	1/2	14,000	124,000	77,000	45,000
12,800		14,000	124,000	77,000	45,000
13,000		14,000	124,000	77,000	45,000
13,100	33/64	14,000	124,000	77,000	45,000
13,300		14,000	124,000	77,000	45,000
13,400		14,000	124,000	77,000	45,000
13,500		14,000	124,000	77,000	45,000
13,700		14,000	124,000	77,000	45,000
13,900		14,000	124,000	77,000	45,000
14,000		14,000	124,000	77,000	45,000
14,200		16,000	133,000	83,000	48,000
14,290	9/16	16,000	133,000	83,000	48,000
14,300		16,000	133,000	83,000	48,000
14,400		16,000	133,000	83,000	48,000
14,500		16,000	133,000	83,000	48,000
14,600		16,000	133,000	83,000	48,000
14,700		16,000	133,000	83,000	48,000
15,000		16,000	133,000	83,000	48,000

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
15,100		16,000	133,000	83,000	48,000
15,300		16,000	133,000	83,000	48,000
15,400		16,000	133,000	83,000	48,000
15,500		16,000	133,000	83,000	48,000
15,600		16,000	133,000	83,000	48,000
15,700		16,000	133,000	83,000	48,000
15,800		16,000	133,000	83,000	48,000
15,870	5/8	16,000	133,000	83,000	48,000
15,900		16,000	133,000	83,000	48,000
16,000		16,000	133,000	83,000	48,000
16,500		18,000	143,000	93,000	48,000
16,670	21/32	18,000	143,000	93,000	48,000
17,000		18,000	143,000	93,000	48,000
17,500		18,000	143,000	93,000	48,000
18,000		18,000	143,000	93,000	48,000
18,500		20,000	153,000	101,000	50,000
19,000		20,000	153,000	101,000	50,000
19,500		20,000	153,000	101,000	50,000
20,000		20,000	153,000	101,000	50,000



Tehoporat jäähdytyskanavilla



P ● Kärjen kevennys $\geq \varnothing 9,800$ • kartiovaippahionta • HSS pidin kovajuotetulla palalla • vaimentaa värinää ja iskuja

M ○

K ○

N ○ seostamattomat-/matalaseosteiset teräkset • harmaavalurauta, pallografiittivalurauta • messinki, pronssit, muovit, grafiitti

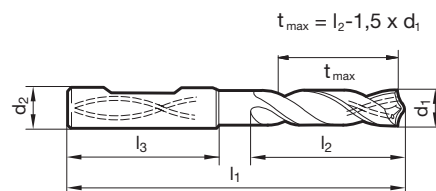
S ○

H ○

GÜHRING NAVIGATOR

Leikkuarvosivu 754

Materiaali	KM
Pinta	S
Varren muoto	HE



Artikkelinro.

1172

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
9,800	W	16,000	127,000	75,000	48,000	16,700		20,000	166,000	112,000	50,000
10,000		16,000	127,000	75,000	48,000	16,800		20,000	166,000	112,000	50,000
10,200		16,000	127,000	75,000	48,000	17,000		20,000	166,000	112,000	50,000
10,500		16,000	127,000	75,000	48,000	17,200		20,000	166,000	112,000	50,000
10,600		16,000	127,000	75,000	48,000	17,300		20,000	166,000	112,000	50,000
10,700		16,000	127,000	75,000	48,000	17,500		20,000	166,000	112,000	50,000
10,800		16,000	127,000	75,000	48,000	18,000		20,000	166,000	112,000	50,000
11,000		16,000	127,000	75,000	48,000	18,500		25,000	184,000	124,000	56,000
11,500		16,000	127,000	75,000	48,000	19,000		25,000	184,000	124,000	56,000
11,900		16,000	127,000	75,000	48,000	19,500		25,000	184,000	124,000	56,000
12,000		16,000	127,000	75,000	48,000	19,600		25,000	184,000	124,000	56,000
12,300	31/64	16,000	139,000	87,000	48,000	19,700		25,000	184,000	124,000	56,000
12,500		16,000	139,000	87,000	48,000	20,000		25,000	184,000	124,000	56,000
12,700	1/2	16,000	139,000	87,000	48,000	20,500		25,000	197,000	137,000	56,000
12,900		16,000	139,000	87,000	48,000	21,000		25,000	197,000	137,000	56,000
13,000		16,000	139,000	87,000	48,000	21,500		25,000	197,000	137,000	56,000
13,100	33/64	16,000	139,000	87,000	48,000	22,000		25,000	197,000	137,000	56,000
13,500		16,000	139,000	87,000	48,000	22,220	7/8	25,000	209,000	149,000	56,000
13,700		16,000	139,000	87,000	48,000	22,500		25,000	209,000	149,000	56,000
13,900		16,000	139,000	87,000	48,000	23,000		25,000	209,000	149,000	56,000
14,000		16,000	139,000	87,000	48,000	23,500		25,000	209,000	149,000	56,000
14,500		20,000	154,000	100,000	50,000	24,000		25,000	209,000	149,000	56,000
14,600		20,000	154,000	100,000	50,000	24,500		32,000	226,000	162,000	60,000
15,000		20,000	154,000	100,000	50,000	25,000	63/64	32,000	226,000	162,000	60,000
15,200		20,000	154,000	100,000	50,000	25,500		32,000	226,000	162,000	60,000
15,500		20,000	154,000	100,000	50,000						
15,700		20,000	154,000	100,000	50,000						
16,000		20,000	154,000	100,000	50,000						
16,200		20,000	166,000	112,000	50,000						
16,500		20,000	166,000	112,000	50,000						



Tehoporat jäähdytyskanavilla



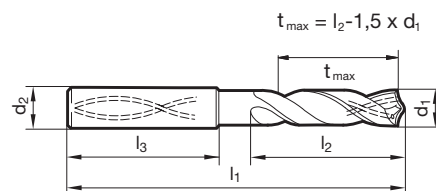
P ●	Kärjen kevennys $\geq \varnothing 3,000$ • päästöhiottu kärki • pääleikkusuärmän suorasta • optimoitu leikkuu geometria
M ○	
K ●	
N ○	rakenne- ja pintakarkaistut teräkset • automaattiteräkset, nuorutetut teräkset • seostetut teräkset < 1200 N/mm ² asti • valut • pronssi, messinki
S ○	• runsasseosteiset AlSi-seokset
H ○	

GÜHRING NAVIGATOR

Leikkuuarvosivu 758

Materiaali **TKM**Pinta **F**

Varren muoto HA



Artikkelinro.

4044

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,000		6,000	70,000	30,000	36,000	5,900		6,000	97,000	57,000	36,000
3,100		6,000	70,000	30,000	36,000	5,950	15/64	6,000	97,000	57,000	36,000
3,170	1/8	6,000	70,000	30,000	36,000	6,000		6,000	97,000	57,000	36,000
3,200		6,000	70,000	30,000	36,000	6,100		8,000	106,000	66,000	36,000
3,250		6,000	70,000	30,000	36,000	6,200		8,000	106,000	66,000	36,000
3,300		6,000	70,000	30,000	36,000	6,300		8,000	106,000	66,000	36,000
3,400		6,000	75,000	35,500	36,000	6,350	1/4	8,000	106,000	66,000	36,000
3,500		6,000	75,000	35,500	36,000	6,400		8,000	106,000	66,000	36,000
3,570	9/64	6,000	75,000	35,500	36,000	6,500		8,000	106,000	66,000	36,000
3,600		6,000	75,000	35,500	36,000	6,530		8,000	106,000	66,000	36,000
3,700		6,000	75,000	35,500	36,000	6,600		8,000	106,000	66,000	36,000
3,800		6,000	75,000	37,500	36,000	6,700		8,000	106,000	66,000	36,000
3,900		6,000	75,000	37,500	36,000	6,750	17/64	8,000	106,000	66,000	36,000
3,970	5/32	6,000	75,000	37,500	36,000	6,800		8,000	106,000	66,000	36,000
4,000		6,000	75,000	37,500	36,000	6,900		8,000	116,000	76,000	36,000
4,040		6,000	75,000	37,500	36,000	7,000		8,000	116,000	76,000	36,000
4,100		6,000	75,000	37,500	36,000	7,100		8,000	116,000	76,000	36,000
4,200		6,000	75,000	37,500	36,000	7,140	9/32	8,000	116,000	76,000	36,000
4,300		6,000	85,000	45,000	36,000	7,200		8,000	116,000	76,000	36,000
4,370	11/64	6,000	85,000	45,000	36,000	7,300		8,000	116,000	76,000	36,000
4,400		6,000	85,000	45,000	36,000	7,400		8,000	116,000	76,000	36,000
4,500		6,000	85,000	45,000	36,000	7,500		8,000	116,000	76,000	36,000
4,600		6,000	85,000	45,000	36,000	7,540	19/64	8,000	116,000	76,000	36,000
4,650		6,000	85,000	45,000	36,000	7,600		8,000	116,000	76,000	36,000
4,700		6,000	85,000	45,000	36,000	7,700		8,000	116,000	76,000	36,000
4,760	3/16	6,000	90,000	50,000	36,000	7,800		8,000	116,000	76,000	36,000
4,800		6,000	90,000	50,000	36,000	7,900		8,000	116,000	76,000	36,000
4,900		6,000	90,000	50,000	36,000	7,940	5/16	8,000	116,000	76,000	36,000
5,000		6,000	90,000	50,000	36,000	8,000		8,000	116,000	76,000	36,000
5,100		6,000	90,000	50,000	36,000	8,100		10,000	131,000	87,000	40,000
5,110		6,000	90,000	50,000	36,000	8,200		10,000	131,000	87,000	40,000
5,160	13/64	6,000	90,000	50,000	36,000	8,300		10,000	131,000	87,000	40,000
5,200		6,000	90,000	50,000	36,000	8,330	21/64	10,000	131,000	87,000	40,000
5,300		6,000	90,000	50,000	36,000	8,400		10,000	131,000	87,000	40,000
5,400		6,000	97,000	57,000	36,000	8,500		10,000	131,000	87,000	40,000
5,410		6,000	97,000	57,000	36,000	8,600		10,000	131,000	87,000	40,000
5,500		6,000	97,000	57,000	36,000	8,700		10,000	131,000	87,000	40,000
5,550		6,000	97,000	57,000	36,000	8,730	11/32	10,000	131,000	87,000	40,000
5,560	7/32	6,000	97,000	57,000	36,000	8,800		10,000	131,000	87,000	40,000
5,600		6,000	97,000	57,000	36,000	8,900		10,000	131,000	87,000	40,000
5,700		6,000	97,000	57,000	36,000	9,000		10,000	131,000	87,000	40,000
5,800		6,000	97,000	57,000	36,000	9,100		10,000	139,000	95,000	40,000



d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
9,130	23/64	10,000	139,000	95,000	40,000
9,200		10,000	139,000	95,000	40,000
9,250		10,000	139,000	95,000	40,000
9,300		10,000	139,000	95,000	40,000
9,340		10,000	139,000	95,000	40,000
9,400		10,000	139,000	95,000	40,000
9,500		10,000	139,000	95,000	40,000
9,520	3/8	10,000	139,000	95,000	40,000
9,600		10,000	139,000	95,000	40,000
9,700		10,000	139,000	95,000	40,000
9,800		10,000	139,000	95,000	40,000
9,900		10,000	139,000	95,000	40,000
9,920	25/64	10,000	139,000	95,000	40,000
10,000		10,000	139,000	95,000	40,000
10,100		12,000	155,000	106,000	45,000
10,200		12,000	155,000	106,000	45,000
10,300		12,000	155,000	106,000	45,000
10,320	13/32	12,000	155,000	106,000	45,000
10,400		12,000	155,000	106,000	45,000
10,500		12,000	155,000	106,000	45,000
10,600		12,000	155,000	106,000	45,000
10,700		12,000	155,000	106,000	45,000
10,720	27/64	12,000	155,000	106,000	45,000
10,800		12,000	155,000	106,000	45,000
10,900		12,000	155,000	106,000	45,000
11,000		12,000	155,000	106,000	45,000
11,100		12,000	163,000	114,000	45,000
11,110	7/16	12,000	163,000	114,000	45,000
11,200		12,000	163,000	114,000	45,000
11,300		12,000	163,000	114,000	45,000
11,400		12,000	163,000	114,000	45,000
11,500		12,000	163,000	114,000	45,000
11,510	29/64	12,000	163,000	114,000	45,000
11,600		12,000	163,000	114,000	45,000
11,700		12,000	163,000	114,000	45,000
11,800		12,000	163,000	114,000	45,000

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
11,900		12,000	163,000	114,000	45,000
11,910	15/32	12,000	163,000	114,000	45,000
12,000		12,000	163,000	114,000	45,000
12,100		14,000	182,000	133,000	45,000
12,200		14,000	182,000	133,000	45,000
12,300	31/64	14,000	182,000	133,000	45,000
12,500		14,000	182,000	133,000	45,000
12,700	1/2	14,000	182,000	133,000	45,000
13,000		14,000	182,000	133,000	45,000
13,100	33/64	14,000	182,000	133,000	45,000
13,490	17/32	14,000	182,000	133,000	45,000
13,500		14,000	182,000	133,000	45,000
13,890	35/64	14,000	182,000	133,000	45,000
14,000		14,000	182,000	133,000	45,000
14,100		16,000	204,000	152,000	48,000
14,200		16,000	204,000	152,000	48,000
14,290	9/16	16,000	204,000	152,000	48,000
14,500		16,000	204,000	152,000	48,000
15,000		16,000	204,000	152,000	48,000
15,100		16,000	204,000	152,000	48,000
15,480	39/64	16,000	204,000	152,000	48,000
15,500		16,000	204,000	152,000	48,000
15,870	5/8	16,000	204,000	152,000	48,000
16,000		16,000	204,000	152,000	48,000
16,500		18,000	223,000	171,000	48,000
16,900		18,000	223,000	171,000	48,000
17,000		18,000	223,000	171,000	48,000
17,500		18,000	223,000	171,000	48,000
18,000		18,000	223,000	171,000	48,000
18,500		20,000	244,000	190,000	50,000
18,900		20,000	244,000	190,000	50,000
19,000		20,000	244,000	190,000	50,000
19,050	3/4	20,000	244,000	190,000	50,000
19,500		20,000	244,000	190,000	50,000
20,000		20,000	244,000	190,000	50,000



Tehoporat jäähdytyskanavilla



P • Kärjen kevennys $\geq \varnothing 3,000$ • päästöhiottu kärki • pääleikkusuärmän suorasta
• optimoitu leikkuu geometria

M ○

K •

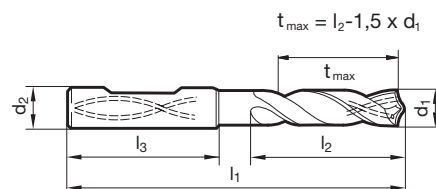
N ○ rakenne- ja pintakarkaistut teräkset • automaattiteräkset, nuorutetut teräkset • seostetut teräkset $< 1200 \text{ N/mm}^2$ asti • valut • pronssi, messinki

S ○

H ○ runsasseosteiset AlSi-seokset

GÜHRING NAVIGATOR

Leikkuuarvosivu 758

Materiaali **TKM**Pinta **F**Varren muoto **HE**

Artikkelinro.

4045

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,000		6,000	70,000	30,000	36,000	7,100		8,000	116,000	76,000	36,000
3,100		6,000	70,000	30,000	36,000	7,200		8,000	116,000	76,000	36,000
3,170	1/8	6,000	70,000	30,000	36,000	7,400		8,000	116,000	76,000	36,000
3,200		6,000	70,000	30,000	36,000	7,500		8,000	116,000	76,000	36,000
3,250		6,000	70,000	30,000	36,000	7,600		8,000	116,000	76,000	36,000
3,300		6,000	70,000	30,000	36,000	7,700		8,000	116,000	76,000	36,000
3,400		6,000	75,000	35,500	36,000	8,000		8,000	116,000	76,000	36,000
3,500		6,000	75,000	35,500	36,000	8,100		10,000	131,000	87,000	40,000
3,570	9/64	6,000	75,000	35,500	36,000	8,200		10,000	131,000	87,000	40,000
3,600		6,000	75,000	35,500	36,000	8,400		10,000	131,000	87,000	40,000
3,700		6,000	75,000	35,500	36,000	8,500		10,000	131,000	87,000	40,000
3,800		6,000	75,000	37,500	36,000	8,600		10,000	131,000	87,000	40,000
3,900		6,000	75,000	37,500	36,000	8,700		10,000	131,000	87,000	40,000
3,970	5/32	6,000	75,000	37,500	36,000	9,000		10,000	131,000	87,000	40,000
4,000		6,000	75,000	37,500	36,000	9,100		10,000	139,000	95,000	40,000
4,100		6,000	75,000	37,500	36,000	9,300		10,000	139,000	95,000	40,000
4,300		6,000	85,000	45,000	36,000	9,400		10,000	139,000	95,000	40,000
4,400		6,000	85,000	45,000	36,000	9,500		10,000	139,000	95,000	40,000
4,500		6,000	85,000	45,000	36,000	9,700		10,000	139,000	95,000	40,000
4,650		6,000	85,000	45,000	36,000	9,800		10,000	139,000	95,000	40,000
4,700		6,000	85,000	45,000	36,000	9,900		10,000	139,000	95,000	40,000
4,900		6,000	90,000	50,000	36,000	10,000		10,000	139,000	95,000	40,000
5,000		6,000	90,000	50,000	36,000	10,200		12,000	155,000	106,000	45,000
5,100		6,000	90,000	50,000	36,000	10,300		12,000	155,000	106,000	45,000
5,160	13/64	6,000	90,000	50,000	36,000	10,500		12,000	155,000	106,000	45,000
5,200		6,000	90,000	50,000	36,000	10,800		12,000	155,000	106,000	45,000
5,300		6,000	90,000	50,000	36,000	11,000		12,000	155,000	106,000	45,000
5,400		6,000	97,000	57,000	36,000	11,200		12,000	163,000	114,000	45,000
5,500		6,000	97,000	57,000	36,000	11,500		12,000	163,000	114,000	45,000
5,700		6,000	97,000	57,000	36,000	11,800		12,000	163,000	114,000	45,000
5,800		6,000	97,000	57,000	36,000	12,000		12,000	163,000	114,000	45,000
5,900		6,000	97,000	57,000	36,000	12,200		14,000	182,000	133,000	45,000
6,000		6,000	97,000	57,000	36,000	12,500		14,000	182,000	133,000	45,000
6,200		8,000	106,000	66,000	36,000	13,500		14,000	182,000	133,000	45,000
6,300		8,000	106,000	66,000	36,000	14,000		14,000	182,000	133,000	45,000
6,350	1/4	8,000	106,000	66,000	36,000	14,200		16,000	204,000	152,000	48,000
6,500		8,000	106,000	66,000	36,000	14,500		16,000	204,000	152,000	48,000
6,600		8,000	106,000	66,000	36,000	15,000		16,000	204,000	152,000	48,000
6,700		8,000	106,000	66,000	36,000	15,500		16,000	204,000	152,000	48,000
6,800		8,000	106,000	66,000	36,000	16,000		16,000	204,000	152,000	48,000
6,900		8,000	116,000	76,000	36,000	16,500		18,000	223,000	171,000	48,000
7,000		8,000	116,000	76,000	36,000	17,000		18,000	223,000	171,000	48,000



d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
17,500		18,000	223,000	171,000	48,000
18,000		18,000	223,000	171,000	48,000
18,500		20,000	244,000	190,000	50,000
19,050	3/4	20,000	244,000	190,000	50,000
19,500		20,000	244,000	190,000	50,000

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm



Tehoporat jäähdytyskanavilla

Materiaali **TKM**Pinta **S**

Varren muoto HA

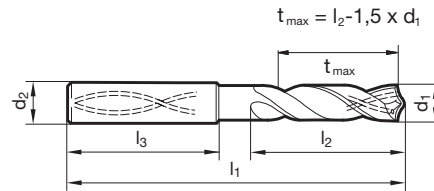
P • Kärjen kevennys $\geq \varnothing 3,000$ • päästöhiottu kärki • pääleikkusärmän suorasta
• optimoitu leikkuu geometria

M ○**K** •**N** ○**S** ○**H** ○

rakenne- ja pintakarkaistut teräkset • automaattiteräkset, nuorutetut teräkset • seostetut teräkset $< 1200 \text{ N/mm}^2$ asti • valut • pronssi, messinki • runsasseosteiset AlSi-seokset

GÜHRING NAVIGATOR

Leikkuuarvosivu 758



Artikkelinro.

2711

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
3,000		6,000	70,000	30,000	36,000
3,100		6,000	70,000	30,000	36,000
3,170	1/8	6,000	70,000	30,000	36,000
3,200		6,000	70,000	30,000	36,000
3,250		6,000	70,000	30,000	36,000
3,300		6,000	70,000	30,000	36,000
3,400		6,000	75,000	35,500	36,000
3,500		6,000	75,000	35,500	36,000
3,570	9/64	6,000	75,000	35,500	36,000
3,600		6,000	75,000	35,500	36,000
3,700		6,000	75,000	35,500	36,000
3,800		6,000	75,000	37,500	36,000
3,900		6,000	75,000	37,500	36,000
3,970	5/32	6,000	75,000	37,500	36,000
4,300		6,000	85,000	45,000	36,000
4,400		6,000	85,000	45,000	36,000
5,000		6,000	90,000	50,000	36,000
5,200		6,000	90,000	50,000	36,000
5,500		6,000	97,000	57,000	36,000
6,000		6,000	97,000	57,000	36,000
6,100		8,000	106,000	66,000	36,000
6,200		8,000	106,000	66,000	36,000
6,500		8,000	106,000	66,000	36,000
6,600		8,000	106,000	66,000	36,000
6,800		8,000	106,000	66,000	36,000
7,000		8,000	116,000	76,000	36,000
7,100		8,000	116,000	76,000	36,000
7,300		8,000	116,000	76,000	36,000
7,500		8,000	116,000	76,000	36,000
8,000		8,000	116,000	76,000	36,000
8,500		10,000	131,000	87,000	40,000
8,600		10,000	131,000	87,000	40,000
8,700		10,000	131,000	87,000	40,000
9,000		10,000	131,000	87,000	40,000
9,100		10,000	139,000	95,000	40,000
9,200		10,000	139,000	95,000	40,000

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
9,300		10,000	139,000	95,000	40,000
9,500		10,000	139,000	95,000	40,000
9,700		10,000	139,000	95,000	40,000
9,800		10,000	139,000	95,000	40,000
10,000		10,000	139,000	95,000	40,000
10,200		12,000	155,000	106,000	45,000
10,500		12,000	155,000	106,000	45,000
11,000		12,000	155,000	106,000	45,000
11,500		12,000	163,000	114,000	45,000
12,000		12,000	163,000	114,000	45,000
12,200		14,000	182,000	133,000	45,000
12,500		14,000	182,000	133,000	45,000
13,000		14,000	182,000	133,000	45,000
13,500		14,000	182,000	133,000	45,000
13,800		14,000	182,000	133,000	45,000
14,000		14,000	182,000	133,000	45,000
15,000		16,000	204,000	152,000	48,000
15,200		16,000	204,000	152,000	48,000
15,500		16,000	204,000	152,000	48,000
15,800		16,000	204,000	152,000	48,000
16,000		16,000	204,000	152,000	48,000
16,500		18,000	223,000	171,000	48,000
17,500		18,000	223,000	171,000	48,000
18,500		20,000	244,000	190,000	50,000
19,500		20,000	244,000	190,000	50,000



Tehoporat jäähdytyskanavilla



P • Kärjen kevennys $\geq \varnothing 3,000$ • kartiovaippahionta • leikkusuärmä on hieman kovera • optimoitu leikkuu geometria

M**K****N**

seostetut ja lujat teräkset 1600 N/mm² asti • Inconel, Hastelloy, Monel
• Titaani ja titaaniseokset

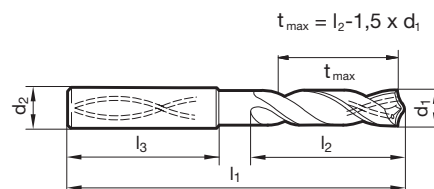
S •**H** ○

GÜHRING NAVIGATOR

Leikkuarvosivu 758

Materiaali **TKM**Pinta **Y**

Varren muoto HA



Artikkelinro.

8522

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,000		6,000	70,000	30,000	36,000	8,730	11/32	10,000	131,000	87,000	40,000
3,170	1/8	6,000	70,000	30,000	36,000	8,800		10,000	131,000	87,000	40,000
3,250		6,000	70,000	30,000	36,000	9,000		10,000	131,000	87,000	40,000
3,300		6,000	70,000	30,000	36,000	9,130	23/64	10,000	139,000	95,000	40,000
3,400		6,000	75,000	35,500	36,000	9,250		10,000	139,000	95,000	40,000
3,500		6,000	75,000	35,500	36,000	9,340		10,000	139,000	95,000	40,000
3,570	9/64	6,000	75,000	35,500	36,000	9,400		10,000	139,000	95,000	40,000
3,700		6,000	75,000	35,500	36,000	9,500		10,000	139,000	95,000	40,000
3,970	5/32	6,000	75,000	37,500	36,000	9,520	3/8	10,000	139,000	95,000	40,000
4,000		6,000	75,000	37,500	36,000	9,920	25/64	10,000	139,000	95,000	40,000
4,200		6,000	75,000	37,500	36,000	10,000		10,000	139,000	95,000	40,000
4,300		6,000	85,000	45,000	36,000	10,200		12,000	155,000	106,000	45,000
4,370	11/64	6,000	85,000	45,000	36,000	10,320	13/32	12,000	155,000	106,000	45,000
4,500		6,000	85,000	45,000	36,000	10,400		12,000	155,000	106,000	45,000
4,650		6,000	85,000	45,000	36,000	10,500		12,000	155,000	106,000	45,000
4,760	3/16	6,000	90,000	50,000	36,000	10,720	27/64	12,000	155,000	106,000	45,000
5,000		6,000	90,000	50,000	36,000	10,800		12,000	155,000	106,000	45,000
5,100		6,000	90,000	50,000	36,000	11,000		12,000	155,000	106,000	45,000
5,160	13/64	6,000	90,000	50,000	36,000	11,110	7/16	12,000	163,000	114,000	45,000
5,200		6,000	90,000	50,000	36,000	11,300		12,000	163,000	114,000	45,000
5,500		6,000	97,000	57,000	36,000	11,400		12,000	163,000	114,000	45,000
5,550		6,000	97,000	57,000	36,000	11,500		12,000	163,000	114,000	45,000
5,560	7/32	6,000	97,000	57,000	36,000	11,510	29/64	12,000	163,000	114,000	45,000
5,950	15/64	6,000	97,000	57,000	36,000	11,910	15/32	12,000	163,000	114,000	45,000
6,000		6,000	97,000	57,000	36,000	12,000		12,000	163,000	114,000	45,000
6,350	1/4	8,000	106,000	66,000	36,000	12,300	31/64	14,000	182,000	133,000	45,000
6,500		8,000	106,000	66,000	36,000	12,500		14,000	182,000	133,000	45,000
6,530		8,000	106,000	66,000	36,000	12,700	1/2	14,000	182,000	133,000	45,000
6,750	17/64	8,000	106,000	66,000	36,000	13,000		14,000	182,000	133,000	45,000
6,800		8,000	106,000	66,000	36,000	13,100	33/64	14,000	182,000	133,000	45,000
6,900		8,000	116,000	76,000	36,000	13,490	17/32	14,000	182,000	133,000	45,000
7,000		8,000	116,000	76,000	36,000	13,500		14,000	182,000	133,000	45,000
7,140	9/32	8,000	116,000	76,000	36,000	14,000		14,000	182,000	133,000	45,000
7,400		8,000	116,000	76,000	36,000	14,290	9/16	16,000	204,000	152,000	48,000
7,500		8,000	116,000	76,000	36,000	14,500		16,000	204,000	152,000	48,000
7,540	19/64	8,000	116,000	76,000	36,000	15,000		16,000	204,000	152,000	48,000
7,800		8,000	116,000	76,000	36,000	15,100		16,000	204,000	152,000	48,000
7,940	5/16	8,000	116,000	76,000	36,000	15,500		16,000	204,000	152,000	48,000
8,000		8,000	116,000	76,000	36,000	15,870	5/8	16,000	204,000	152,000	48,000
8,330	21/64	10,000	131,000	87,000	40,000	16,000		16,000	204,000	152,000	48,000
8,500		10,000	131,000	87,000	40,000						
8,600		10,000	131,000	87,000	40,000						



Tehoporat jäähdytyskanavilla



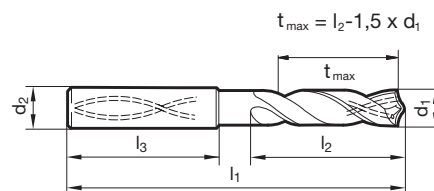
P	Kärjen kevennys $\geq \varnothing 4,000$ • patentoitu säteellinen kärjenhionta • pääleikkusärmän suorasta (korjauksella)
M	
K	•
N	pallografiittivalurauta GGV ja ADI, CDI • harmaavali-, taottava- ja pallografiittivalurauta
S	
H	

GÜHRING NAVIGATOR

Leikkuarvosivu 758

Materiaali	TKM
Pinta	F
Varren muoto	HA

Tehoporat



Artikkelinro.

6502

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
4,000		6,000	75,000	37,500	36,000	8,800		10,000	131,000	87,000	40,000
4,300		6,000	85,000	45,000	36,000	8,900		10,000	131,000	87,000	40,000
4,370	11/64	6,000	85,000	45,000	36,000	9,000		10,000	131,000	87,000	40,000
4,400		6,000	85,000	45,000	36,000	9,100		10,000	139,000	95,000	40,000
4,500		6,000	85,000	45,000	36,000	9,250		10,000	139,000	95,000	40,000
4,600		6,000	85,000	45,000	36,000	9,300		10,000	139,000	95,000	40,000
4,700		6,000	85,000	45,000	36,000	9,400		10,000	139,000	95,000	40,000
4,760	3/16	6,000	90,000	50,000	36,000	9,500		10,000	139,000	95,000	40,000
4,900		6,000	90,000	50,000	36,000	9,600		10,000	139,000	95,000	40,000
5,000		6,000	90,000	50,000	36,000	9,700		10,000	139,000	95,000	40,000
5,160	13/64	6,000	90,000	50,000	36,000	9,800		10,000	139,000	95,000	40,000
5,300		6,000	90,000	50,000	36,000	9,900		10,000	139,000	95,000	40,000
5,500		6,000	97,000	57,000	36,000	10,000		10,000	139,000	95,000	40,000
5,550		6,000	97,000	57,000	36,000	10,100		12,000	155,000	106,000	45,000
5,560	7/32	6,000	97,000	57,000	36,000	10,200		12,000	155,000	106,000	45,000
5,600		6,000	97,000	57,000	36,000	10,300		12,000	155,000	106,000	45,000
5,700		6,000	97,000	57,000	36,000	10,320	13/32	12,000	155,000	106,000	45,000
5,800		6,000	97,000	57,000	36,000	10,400		12,000	155,000	106,000	45,000
5,900		6,000	97,000	57,000	36,000	10,500		12,000	155,000	106,000	45,000
6,000		6,000	97,000	57,000	36,000	10,700		12,000	155,000	106,000	45,000
6,100		8,000	106,000	66,000	36,000	10,800		12,000	155,000	106,000	45,000
6,200		8,000	106,000	66,000	36,000	10,900		12,000	155,000	106,000	45,000
6,300		8,000	106,000	66,000	36,000	11,000		12,000	155,000	106,000	45,000
6,400		8,000	106,000	66,000	36,000	11,100		12,000	163,000	114,000	45,000
6,500		8,000	106,000	66,000	36,000	11,200		12,000	163,000	114,000	45,000
6,700		8,000	106,000	66,000	36,000	11,300		12,000	163,000	114,000	45,000
6,800		8,000	106,000	66,000	36,000	11,500		12,000	163,000	114,000	45,000
6,900		8,000	116,000	76,000	36,000	11,600		12,000	163,000	114,000	45,000
7,000		8,000	116,000	76,000	36,000	11,700		12,000	163,000	114,000	45,000
7,140	9/32	8,000	116,000	76,000	36,000	11,800		12,000	163,000	114,000	45,000
7,200		8,000	116,000	76,000	36,000	12,000		12,000	163,000	114,000	45,000
7,500		8,000	116,000	76,000	36,000	12,100		14,000	182,000	133,000	45,000
7,600		8,000	116,000	76,000	36,000	12,300	31/64	14,000	182,000	133,000	45,000
7,700		8,000	116,000	76,000	36,000	12,400		14,000	182,000	133,000	45,000
8,000		8,000	116,000	76,000	36,000	12,500		14,000	182,000	133,000	45,000
8,100		10,000	131,000	87,000	40,000	12,600		14,000	182,000	133,000	45,000
8,200		10,000	131,000	87,000	40,000	12,700	1/2	14,000	182,000	133,000	45,000
8,300		10,000	131,000	87,000	40,000	12,800		14,000	182,000	133,000	45,000
8,330	21/64	10,000	131,000	87,000	40,000	13,000		14,000	182,000	133,000	45,000
8,400		10,000	131,000	87,000	40,000	13,100	33/64	14,000	182,000	133,000	45,000
8,500		10,000	131,000	87,000	40,000	13,300		14,000	182,000	133,000	45,000
8,600		10,000	131,000	87,000	40,000	13,500		14,000	182,000	133,000	45,000

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
13,700		14,000	182,000	133,000	45,000
13,900		14,000	182,000	133,000	45,000
14,000		14,000	182,000	133,000	45,000
14,100		16,000	204,000	152,000	48,000
14,290	9/16	16,000	204,000	152,000	48,000
14,400		16,000	204,000	152,000	48,000
14,500		16,000	204,000	152,000	48,000
14,600		16,000	204,000	152,000	48,000
14,700		16,000	204,000	152,000	48,000
15,000		16,000	204,000	152,000	48,000
15,100		16,000	204,000	152,000	48,000
15,200		16,000	204,000	152,000	48,000
15,500		16,000	204,000	152,000	48,000
15,600		16,000	204,000	152,000	48,000
15,800		16,000	204,000	152,000	48,000
15,900		16,000	204,000	152,000	48,000
16,000		16,000	204,000	152,000	48,000
16,500		18,000	223,000	171,000	48,000

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
16,670	21/32	18,000	223,000	171,000	48,000
17,000		18,000	223,000	171,000	48,000
17,500		18,000	223,000	171,000	48,000
18,000		18,000	223,000	171,000	48,000
18,500		20,000	244,000	190,000	50,000
19,000		20,000	244,000	190,000	50,000
19,500		20,000	244,000	190,000	50,000
20,000		20,000	244,000	190,000	50,000



Tehoporat jäähdytyskanavilla



P Kärjen kevennys $\geq \varnothing 3,000$ • kartiovaippahionta • pienet halkaisijatoleranssit
 • erittäin hyvä reiän pinnanlaatu • huomio jäähdytysnesteen paine

M
K •
N ○ harmaavalu-, taottava- ja pallografiittivalurauta

S
H

GÜHRING NAVIGATOR

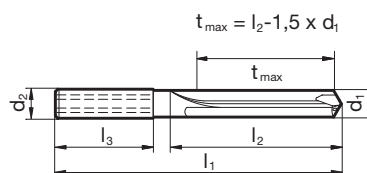
Leikkuarvosivu 758

Materiaali **TKM**

Pinta ○

Varren muoto HA

Tehoporat

Artikkelinro. **769**

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
3,000		6,000	74,000	32,000	36,000
3,100		6,000	74,000	32,000	36,000
3,200		6,000	74,000	32,000	36,000
3,300		6,000	74,000	32,000	36,000
3,500		6,000	74,000	34,000	36,000
3,600		6,000	74,000	34,000	36,000
3,700		6,000	74,000	34,000	36,000
3,800		6,000	97,000	45,000	36,000
3,900		6,000	97,000	45,000	36,000
4,000		6,000	97,000	45,000	36,000
4,100		6,000	97,000	45,000	36,000
4,200		6,000	97,000	45,000	36,000
4,300		6,000	97,000	45,000	36,000
4,400		6,000	97,000	45,000	36,000
4,500		6,000	97,000	45,000	36,000
4,700		6,000	97,000	45,000	36,000
4,800		6,000	97,000	57,000	36,000
4,900		6,000	97,000	57,000	36,000
5,000		6,000	97,000	57,000	36,000
5,160	13/64	6,000	97,000	57,000	36,000
5,500		6,000	97,000	57,000	36,000
6,000		6,000	97,000	57,000	36,000
6,350	1/4	8,000	116,000	76,000	36,000
6,500		8,000	116,000	76,000	36,000
6,800		8,000	116,000	76,000	36,000
7,000		8,000	116,000	76,000	36,000
7,140	9/32	8,000	116,000	76,000	36,000
7,500		8,000	116,000	76,000	36,000
7,800		8,000	116,000	76,000	36,000
7,940	5/16	8,000	116,000	76,000	36,000
8,000		8,000	116,000	76,000	36,000
8,330	21/64	10,000	139,000	95,000	40,000
8,500		10,000	139,000	95,000	40,000
8,730	11/32	10,000	139,000	95,000	40,000
9,000		10,000	139,000	95,000	40,000
9,130	23/64	10,000	139,000	95,000	40,000

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
9,500		10,000	139,000	95,000	40,000
9,520	3/8	10,000	139,000	95,000	40,000
10,000		10,000	139,000	95,000	40,000
10,200		12,000	163,000	114,000	45,000
10,320	13/32	12,000	163,000	114,000	45,000
10,500		12,000	163,000	114,000	45,000
10,720	27/64	12,000	163,000	114,000	45,000
11,000		12,000	163,000	114,000	45,000
11,110	7/16	12,000	163,000	114,000	45,000
11,500		12,000	163,000	114,000	45,000
11,510	29/64	12,000	163,000	114,000	45,000
12,000		12,000	163,000	114,000	45,000
12,300	31/64	14,000	182,000	133,000	45,000
12,500		14,000	182,000	133,000	45,000
12,700	1/2	14,000	182,000	133,000	45,000
13,000		14,000	182,000	133,000	45,000
13,500		14,000	182,000	133,000	45,000
14,000		14,000	182,000	133,000	45,000
14,500		16,000	204,000	152,000	48,000
15,000		16,000	204,000	152,000	48,000
15,500		16,000	204,000	152,000	48,000
16,000		16,000	204,000	152,000	48,000
16,500		18,000	223,000	171,000	48,000
17,000		18,000	223,000	171,000	48,000
17,500		18,000	223,000	171,000	48,000
18,000		18,000	223,000	171,000	48,000
18,500		20,000	244,000	190,000	50,000
19,000		20,000	244,000	190,000	50,000
20,000		20,000	244,000	190,000	50,000

Tehoporat jäähdytyskanavilla



P Kärjen kevennys $\geq \varnothing 3,000$ • päästöhiottu kärki • pienet halkaisijatoleranssit
 • erittäin hyvä reiän pinnanlaatu • huomio optimaalinen nestepaine

M

K ○

N • alumiini ja Al-seokset • Al-materiaalit suurella Si-pitoisuudella

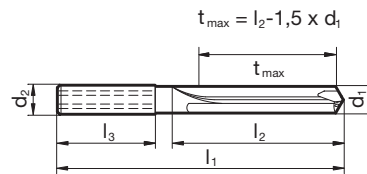
S

H

GÜHRING NAVIGATOR

Leikkuarvosivu 758

Materiaali	TKM
Pinta	○
Varren muoto	HA



Artikkelinro.

6069

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
3,000		6,000	74,000	32,000	36,000
3,200		6,000	74,000	32,000	36,000
3,300		6,000	74,000	32,000	36,000
3,500		6,000	74,000	34,000	36,000
3,600		6,000	74,000	34,000	36,000
4,000		6,000	97,000	45,000	36,000
4,200		6,000	97,000	45,000	36,000
4,300		6,000	97,000	45,000	36,000
4,500		6,000	97,000	45,000	36,000
5,000		6,000	97,000	57,000	36,000
6,000		6,000	97,000	57,000	36,000
6,350	1/4	8,000	116,000	76,000	36,000
6,500		8,000	116,000	76,000	36,000
6,800		8,000	116,000	76,000	36,000
7,000		8,000	116,000	76,000	36,000
7,800		8,000	116,000	76,000	36,000
8,000		8,000	116,000	76,000	36,000
8,500		10,000	139,000	95,000	40,000
8,730	11/32	10,000	139,000	95,000	40,000
9,000		10,000	139,000	95,000	40,000
9,500		10,000	139,000	95,000	40,000
9,520	3/8	10,000	139,000	95,000	40,000
10,000		10,000	139,000	95,000	40,000
10,200		12,000	163,000	114,000	45,000

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
10,320	13/32	12,000	163,000	114,000	45,000
10,500		12,000	163,000	114,000	45,000
10,720	27/64	12,000	163,000	114,000	45,000
11,000		12,000	163,000	114,000	45,000
12,000		12,000	163,000	114,000	45,000
12,300	31/64	14,000	182,000	133,000	45,000
12,500		14,000	182,000	133,000	45,000
12,700	1/2	14,000	182,000	133,000	45,000
13,000		14,000	182,000	133,000	45,000
13,500		14,000	182,000	133,000	45,000
14,000		14,000	182,000	133,000	45,000
14,500		16,000	204,000	152,000	48,000
15,000		16,000	204,000	152,000	48,000
15,500		16,000	204,000	152,000	48,000
16,000		16,000	204,000	152,000	48,000
16,500		18,000	223,000	171,000	48,000
17,000		18,000	223,000	171,000	48,000
18,000		18,000	223,000	171,000	48,000
18,500		20,000	244,000	190,000	50,000
19,000		20,000	244,000	190,000	50,000
19,500		20,000	244,000	190,000	50,000



Tehoporat jäähdytyskanavilla



P • Kärjen kevennys $\geq \varnothing 9,600$ • kartiovaippahionta • HSS pidin kovajuotetulla palalla • vaimentaa värinää ja iskuja

M ○

K ○

N ○

S ○

H ○

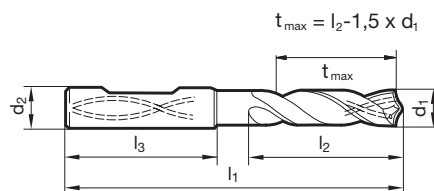
seostamattomat-/matalaseosteiset teräkset • harmaavalurauta, pallografiittivalurauta • messinki, pronssit, muovit, grafiitti

GÜHRING NAVIGATOR

Leikkuarvosivu 758

Materiaali	KM
Pinta	S
Varren muoto	HE

Tehoporat



Artikkelinro.

1173

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
9,600		16,000	151,000	99,000	48,000
9,700		16,000	151,000	99,000	48,000
10,000		16,000	151,000	99,000	48,000
10,200		16,000	151,000	99,000	48,000
10,400		16,000	151,000	99,000	48,000
11,000		16,000	151,000	99,000	48,000
11,500		16,000	151,000	99,000	48,000
11,700		16,000	151,000	99,000	48,000
12,000		16,000	151,000	99,000	48,000
12,200		16,000	167,000	115,000	48,000
12,400		16,000	167,000	115,000	48,000
12,500		16,000	167,000	115,000	48,000
12,700	1/2	16,000	167,000	115,000	48,000
13,000		16,000	167,000	115,000	48,000
13,500		16,000	167,000	115,000	48,000
14,000		16,000	167,000	115,000	48,000
14,500		20,000	186,000	132,000	50,000
15,000		20,000	186,000	132,000	50,000

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
15,700		20,000	186,000	132,000	50,000
15,800		20,000	186,000	132,000	50,000
16,000		20,000	186,000	132,000	50,000
16,500		20,000	202,000	148,000	50,000
17,000		20,000	202,000	148,000	50,000
17,200		20,000	202,000	148,000	50,000
17,460	11/16	20,000	202,000	148,000	50,000
17,500		20,000	202,000	148,000	50,000
18,000		20,000	202,000	148,000	50,000
18,500		25,000	224,000	164,000	56,000
19,000		25,000	224,000	164,000	56,000
20,000		25,000	224,000	164,000	56,000
21,000		25,000	241,000	181,000	56,000
22,000		25,000	241,000	181,000	56,000
22,500		25,000	257,000	197,000	56,000
25,000	63/64	32,000	278,000	214,000	60,000



Tehoporat jäähdytyskanavilla



P • päästöhiottu kärki • pääleikkuusärmän suorasta • optimoitu leikkuu geometria • maksimaalinen suorituskyky

M ○

K ○

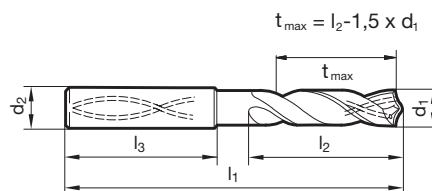
N ○ rakenne- ja pintakarkaistut teräkset • automaattiteräkset, nuorrutetut teräkset

S ○ • seostetut-/seostamattomat teräkset < 1400 N/mm² asti

H ○

GÜHRING NAVIGATOR

Leikkuarvosivu 758

Materiaali **TKM**Pinta **F**Varren muoto **HA****NEW**

Artikkelinro.

5760

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,000		6,000	70,000	30,000	36,000	5,900		6,000	97,000	57,000	36,000
3,100		6,000	70,000	30,000	36,000	5,950		6,000	97,000	57,000	36,000
3,170	1/8	6,000	70,000	30,000	36,000	6,000		6,000	97,000	57,000	36,000
3,200		6,000	70,000	30,000	36,000	6,100		8,000	106,000	66,000	36,000
3,250		6,000	70,000	30,000	36,000	6,200		8,000	106,000	66,000	36,000
3,300		6,000	70,000	30,000	36,000	6,300		8,000	106,000	66,000	36,000
3,400		6,000	75,000	35,500	36,000	6,350	1/4	8,000	106,000	66,000	36,000
3,500		6,000	75,000	35,500	36,000	6,400		8,000	106,000	66,000	36,000
3,570	9/64	6,000	75,000	35,500	36,000	6,500		8,000	106,000	66,000	36,000
3,600		6,000	75,000	35,500	36,000	6,530		8,000	106,000	66,000	36,000
3,700		6,000	75,000	35,500	36,000	6,600		8,000	106,000	66,000	36,000
3,800		6,000	75,000	37,500	36,000	6,700		8,000	106,000	66,000	36,000
3,900		6,000	75,000	37,500	36,000	6,750		8,000	106,000	66,000	36,000
3,970	5/32	6,000	75,000	37,500	36,000	6,800		8,000	106,000	66,000	36,000
4,000		6,000	75,000	37,500	36,000	6,900		8,000	116,000	76,000	36,000
4,040		6,000	75,000	37,500	36,000	7,000		8,000	116,000	76,000	36,000
4,100		6,000	75,000	37,500	36,000	7,100		8,000	116,000	76,000	36,000
4,200		6,000	75,000	37,500	36,000	7,140		8,000	116,000	76,000	36,000
4,300		6,000	85,000	45,000	36,000	7,200		8,000	116,000	76,000	36,000
4,370	11/64	6,000	85,000	45,000	36,000	7,300		8,000	116,000	76,000	36,000
4,400		6,000	85,000	45,000	36,000	7,400		8,000	116,000	76,000	36,000
4,500		6,000	85,000	45,000	36,000	7,500		8,000	116,000	76,000	36,000
4,600		6,000	85,000	45,000	36,000	7,540		8,000	116,000	76,000	36,000
4,650		6,000	85,000	45,000	36,000	7,600		8,000	116,000	76,000	36,000
4,700		6,000	85,000	45,000	36,000	7,700		8,000	116,000	76,000	36,000
4,760	3/16	6,000	90,000	50,000	36,000	7,800		8,000	116,000	76,000	36,000
4,800		6,000	90,000	50,000	36,000	7,900		8,000	116,000	76,000	36,000
4,900		6,000	90,000	50,000	36,000	7,940		8,000	116,000	76,000	36,000
5,000		6,000	90,000	50,000	36,000	8,000		8,000	116,000	76,000	36,000
5,100		6,000	90,000	50,000	36,000	8,100		10,000	131,000	87,000	40,000
5,110		6,000	90,000	50,000	36,000	8,200		10,000	131,000	87,000	40,000
5,160	13/64	6,000	90,000	50,000	36,000	8,300		10,000	131,000	87,000	40,000
5,200		6,000	90,000	50,000	36,000	8,330		10,000	131,000	87,000	40,000
5,300		6,000	90,000	50,000	36,000	8,400		10,000	131,000	87,000	40,000
5,400		6,000	97,000	57,000	36,000	8,500		10,000	131,000	87,000	40,000
5,410		6,000	97,000	57,000	36,000	8,600		10,000	131,000	87,000	40,000
5,500		6,000	97,000	57,000	36,000	8,700		10,000	131,000	87,000	40,000
5,550		6,000	97,000	57,000	36,000	8,730		10,000	131,000	87,000	40,000
5,560		6,000	97,000	57,000	36,000	8,800		10,000	131,000	87,000	40,000
5,600		6,000	97,000	57,000	36,000	8,900		10,000	131,000	87,000	40,000
5,700		6,000	97,000	57,000	36,000	9,000		10,000	131,000	87,000	40,000
5,800		6,000	97,000	57,000	36,000	9,100		10,000	139,000	95,000	40,000



d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
9,130		10,000	139,000	95,000	40,000
9,200		10,000	139,000	95,000	40,000
9,250		10,000	139,000	95,000	40,000
9,300		10,000	139,000	95,000	40,000
9,340		10,000	139,000	95,000	40,000
9,400		10,000	139,000	95,000	40,000
9,500		10,000	139,000	95,000	40,000
9,520	3/8	10,000	139,000	95,000	40,000
9,600		10,000	139,000	95,000	40,000
9,700		10,000	139,000	95,000	40,000
9,800		10,000	139,000	95,000	40,000
9,900		10,000	139,000	95,000	40,000
9,920		10,000	139,000	95,000	40,000
10,000		10,000	139,000	95,000	40,000
10,100		12,000	155,000	106,000	45,000
10,200		12,000	155,000	106,000	45,000
10,300		12,000	155,000	106,000	45,000
10,320		12,000	155,000	106,000	45,000
10,400		12,000	155,000	106,000	45,000
10,500		12,000	155,000	106,000	45,000
10,600		12,000	155,000	106,000	45,000
10,700		12,000	155,000	106,000	45,000
10,720		12,000	155,000	106,000	45,000
10,800		12,000	155,000	106,000	45,000
10,900		12,000	155,000	106,000	45,000
11,000		12,000	155,000	106,000	45,000
11,100		12,000	163,000	114,000	45,000
11,110		12,000	163,000	114,000	45,000
11,200		12,000	163,000	114,000	45,000
11,300		12,000	163,000	114,000	45,000
11,400		12,000	163,000	114,000	45,000
11,500		12,000	163,000	114,000	45,000
11,510		12,000	163,000	114,000	45,000
11,600		12,000	163,000	114,000	45,000
11,700		12,000	163,000	114,000	45,000
11,800		12,000	163,000	114,000	45,000
11,900		12,000	163,000	114,000	45,000
11,910		12,000	163,000	114,000	45,000
12,000		12,000	163,000	114,000	45,000
12,100		14,000	182,000	133,000	45,000
12,200		14,000	182,000	133,000	45,000
12,300		14,000	182,000	133,000	45,000

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
12,500		14,000	182,000	133,000	45,000
12,700	1/2	14,000	182,000	133,000	45,000
13,000		14,000	182,000	133,000	45,000
13,100		14,000	182,000	133,000	45,000
13,490		14,000	182,000	133,000	45,000
13,500		14,000	182,000	133,000	45,000
13,700		14,000	182,000	133,000	45,000
13,890		14,000	182,000	133,000	45,000
14,000		14,000	182,000	133,000	45,000
14,100		16,000	204,000	152,000	48,000
14,200		16,000	204,000	152,000	48,000
14,290		16,000	204,000	152,000	48,000
14,500		16,000	204,000	152,000	48,000
14,700		16,000	204,000	152,000	48,000
15,000		16,000	204,000	152,000	48,000
15,100		16,000	204,000	152,000	48,000
15,480		16,000	204,000	152,000	48,000
15,500		16,000	204,000	152,000	48,000
15,700		16,000	204,000	152,000	48,000
15,870		16,000	204,000	152,000	48,000
16,000		16,000	204,000	152,000	48,000
16,500		18,000	223,000	171,000	48,000
16,900		18,000	223,000	171,000	48,000
17,000		18,000	223,000	171,000	48,000
17,500		18,000	223,000	171,000	48,000
17,700		18,000	223,000	171,000	48,000
18,000		18,000	223,000	171,000	48,000
18,500		20,000	244,000	190,000	50,000
18,900		20,000	244,000	190,000	50,000
19,000		20,000	244,000	190,000	50,000
19,050	3/4	20,000	244,000	190,000	50,000
19,500		20,000	244,000	190,000	50,000
20,000		20,000	244,000	190,000	50,000



Tehoporat jäähdytyskanavilla



P Kärjen kevennys $\geq \varnothing 3,000$ • kartiovaippahionta • pienet halkaisijatoleranssit
 • erittäin hyvä reiän pinnanlaatu • huomio jäähdytysnesteen paine

M**K** •**N** ○ harmaavalu-, taottava- ja pallografiittivalurauta**S****H**

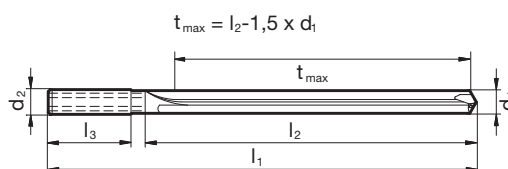
GÜHRING NAVIGATOR

Leikkuuarvosivu 758

Materiaali **TKM**

Pinta ○

Varren muoto HA

Artikkelinro. **770**

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,000		6,000	91,000	42,000	36,000	10,000		10,000	175,000	130,000	40,000
3,100		6,000	91,000	42,000	36,000	10,200		12,000	209,000	159,000	45,000
3,300		6,000	91,000	42,000	36,000	10,500		12,000	209,000	159,000	45,000
3,800		6,000	121,000	77,000	36,000	10,720	27/64	12,000	209,000	159,000	45,000
4,000		6,000	121,000	77,000	36,000	11,000		12,000	209,000	159,000	45,000
4,100		6,000	121,000	77,000	36,000	11,500		12,000	209,000	159,000	45,000
4,200		6,000	121,000	77,000	36,000	11,510	29/64	12,000	209,000	159,000	45,000
4,300		6,000	121,000	77,000	36,000	12,000		12,000	209,000	159,000	45,000
4,400		6,000	121,000	77,000	36,000	12,300	31/64	14,000	233,000	183,000	45,000
4,500		6,000	121,000	77,000	36,000	12,500		14,000	233,000	183,000	45,000
4,800		6,000	121,000	82,000	36,000	12,700	1/2	14,000	233,000	183,000	45,000
4,900		6,000	121,000	82,000	36,000	13,000		14,000	233,000	183,000	45,000
5,000		6,000	121,000	82,000	36,000	13,500		14,000	233,000	183,000	45,000
5,160	13/64	6,000	121,000	82,000	36,000	14,000		14,000	233,000	183,000	45,000
5,500		6,000	121,000	82,000	36,000	14,500		16,000	260,000	207,000	48,000
5,560	7/32	6,000	121,000	82,000	36,000	15,000		16,000	260,000	207,000	48,000
6,000		6,000	121,000	82,000	36,000	15,500		16,000	260,000	207,000	48,000
6,500		8,000	146,000	106,000	36,000	16,500		18,000	284,000	231,000	48,000
6,750	17/64	8,000	146,000	106,000	36,000	17,000		18,000	284,000	231,000	48,000
6,800		8,000	146,000	106,000	36,000	17,500		18,000	284,000	231,000	48,000
7,000		8,000	146,000	106,000	36,000	18,000		18,000	284,000	231,000	48,000
7,140	9/32	8,000	146,000	106,000	36,000	19,000		20,000	308,000	255,000	50,000
7,500		8,000	146,000	106,000	36,000	20,000		20,000	308,000	255,000	50,000
7,800		8,000	146,000	106,000	36,000						
7,940	5/16	8,000	146,000	106,000	36,000						
8,000		8,000	146,000	106,000	36,000						
8,500		10,000	175,000	130,000	40,000						
8,730	11/32	10,000	175,000	130,000	40,000						
9,000		10,000	175,000	130,000	40,000						
9,500		10,000	175,000	130,000	40,000						



Tehoporat jäähdytyskanavilla

Materiaali **TKM**

Pinta ○

Varren muoto HA

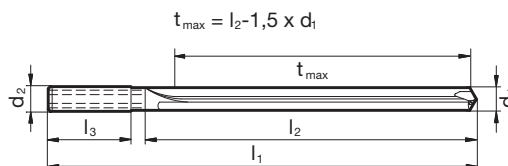
P Kärjen kevennys $\geq \varnothing 3,000$ • päästöhiottu kärki • pienet halkaisijatoleranssit
• erittäin hyvä reiän pinnanlaatu • huomio optimaalinen nestepaine

M**K** ○**N** ●**S****H**

alumiini ja Al-seokset • Al-materiaalit suurella Si-pitoisuudella

GÜHRING NAVIGATOR

Leikkuarvosivu 758



Artikkelinro.

6070

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
3,000		6,000	91,000	42,000	36,000
3,100		6,000	91,000	42,000	36,000
3,300		6,000	91,000	42,000	36,000
3,500		6,000	91,000	48,000	36,000
3,800		6,000	121,000	77,000	36,000
4,000		6,000	121,000	77,000	36,000
4,700		6,000	121,000	77,000	36,000
4,800		6,000	121,000	82,000	36,000
5,000		6,000	121,000	82,000	36,000
5,500		6,000	121,000	82,000	36,000
6,000		6,000	121,000	82,000	36,000
6,350	1/4	8,000	146,000	106,000	36,000
6,500		8,000	146,000	106,000	36,000
6,800		8,000	146,000	106,000	36,000
7,500		8,000	146,000	106,000	36,000
7,800		8,000	146,000	106,000	36,000
7,940	5/16	8,000	146,000	106,000	36,000
8,000		8,000	146,000	106,000	36,000
8,500		10,000	175,000	130,000	40,000
8,730	11/32	10,000	175,000	130,000	40,000
9,000		10,000	175,000	130,000	40,000
9,500		10,000	175,000	130,000	40,000
9,520	3/8	10,000	175,000	130,000	40,000
10,000		10,000	175,000	130,000	40,000

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
10,500		12,000	209,000	159,000	45,000
11,000		12,000	209,000	159,000	45,000
11,110	7/16	12,000	209,000	159,000	45,000
12,000		12,000	209,000	159,000	45,000
12,700	1/2	14,000	233,000	183,000	45,000
13,000		14,000	233,000	183,000	45,000
14,000		14,000	233,000	183,000	45,000
15,000		16,000	260,000	207,000	48,000
16,000		16,000	260,000	207,000	48,000
17,000		18,000	284,000	231,000	48,000
17,500		18,000	284,000	231,000	48,000
18,000		18,000	284,000	231,000	48,000
18,500		20,000	308,000	255,000	50,000
19,500		20,000	308,000	255,000	50,000



Tehoporat jäähdytyskanavilla



P • Kärjen kevennys $\geq \varnothing 3,000$ • päästöhiottu kärki • pääleikkuusärmän suorasta
• optimoitu leikkuu geometria

M ○

K •

N ○

S ○

H ○

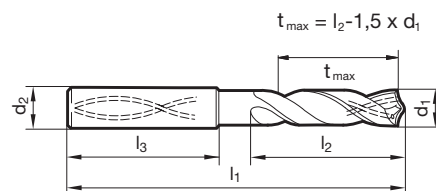
rakenne- ja pintakarkaistut teräkset • automaattiteräkset, nuorutetut teräkset • seostetut teräkset $< 1200 \text{ N/mm}^2$ asti • valut • pronssi, messinki • runsasseosteiset AlSi-seokset

GÜHRING NAVIGATOR

Leikkuarvosivu 758

Materiaali **TKM**Pinta **F**

Varren muoto HA



Artikkelinro.

5525

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,000		6,000	90,000	50,000	36,000	7,000		8,000	146,000	108,000	36,000
3,100		6,000	90,000	50,000	36,000	7,100		8,000	146,000	108,000	36,000
3,170	1/8	6,000	90,000	50,000	36,000	7,200		8,000	146,000	108,000	36,000
3,200		6,000	90,000	50,000	36,000	7,300		8,000	146,000	108,000	36,000
3,300		6,000	90,000	50,000	36,000	7,400		8,000	146,000	108,000	36,000
3,400		6,000	90,000	50,000	36,000	7,500		8,000	146,000	108,000	36,000
3,500		6,000	90,000	50,000	36,000	7,600		8,000	146,000	108,000	36,000
3,600		6,000	90,000	50,000	36,000	7,700		8,000	146,000	108,000	36,000
3,700		6,000	90,000	50,000	36,000	7,800		8,000	146,000	108,000	36,000
3,800		6,000	102,000	64,000	36,000	7,900		8,000	146,000	108,000	36,000
3,900		6,000	102,000	64,000	36,000	8,000		8,000	146,000	108,000	36,000
4,000		6,000	102,000	64,000	36,000	8,100		10,000	162,000	120,000	40,000
4,100		6,000	102,000	64,000	36,000	8,200		10,000	162,000	120,000	40,000
4,200		6,000	102,000	64,000	36,000	8,300		10,000	162,000	120,000	40,000
4,300		6,000	102,000	64,000	36,000	8,400		10,000	162,000	120,000	40,000
4,400		6,000	102,000	64,000	36,000	8,500		10,000	162,000	120,000	40,000
4,500		6,000	102,000	64,000	36,000	8,600		10,000	162,000	120,000	40,000
4,600		6,000	102,000	64,000	36,000	8,700		10,000	162,000	120,000	40,000
4,700		6,000	102,000	64,000	36,000	8,800		10,000	162,000	120,000	40,000
4,800		6,000	116,000	78,000	36,000	8,900		10,000	162,000	120,000	40,000
4,900		6,000	116,000	78,000	36,000	9,000		10,000	162,000	120,000	40,000
5,000		6,000	116,000	78,000	36,000	9,100		10,000	162,000	120,000	40,000
5,100		6,000	116,000	78,000	36,000	9,200		10,000	162,000	120,000	40,000
5,200		6,000	116,000	78,000	36,000	9,300		10,000	162,000	120,000	40,000
5,300		6,000	116,000	78,000	36,000	9,400		10,000	162,000	120,000	40,000
5,400		6,000	116,000	78,000	36,000	9,500		10,000	162,000	120,000	40,000
5,500		6,000	116,000	78,000	36,000	9,520	3/8	10,000	162,000	120,000	40,000
5,600		6,000	116,000	78,000	36,000	9,600		10,000	162,000	120,000	40,000
5,700		6,000	116,000	78,000	36,000	9,700		10,000	162,000	120,000	40,000
5,800		6,000	116,000	78,000	36,000	9,800		10,000	162,000	120,000	40,000
5,900		6,000	116,000	78,000	36,000	9,900		10,000	162,000	120,000	40,000
6,000		6,000	116,000	78,000	36,000	10,000		10,000	162,000	120,000	40,000
6,100		8,000	146,000	108,000	36,000	10,200		12,000	204,000	156,000	45,000
6,200		8,000	146,000	108,000	36,000	10,500		12,000	204,000	156,000	45,000
6,300		8,000	146,000	108,000	36,000	11,000		12,000	204,000	156,000	45,000
6,350	1/4	8,000	146,000	108,000	36,000	11,500		12,000	204,000	156,000	45,000
6,400		8,000	146,000	108,000	36,000	12,000		12,000	204,000	156,000	45,000
6,500		8,000	146,000	108,000	36,000	12,500		14,000	230,000	182,000	45,000
6,600		8,000	146,000	108,000	36,000	12,700	1/2	14,000	230,000	182,000	45,000
6,700		8,000	146,000	108,000	36,000	13,000		14,000	230,000	182,000	45,000
6,800		8,000	146,000	108,000	36,000	13,500		14,000	230,000	182,000	45,000
6,900		8,000	146,000	108,000	36,000	14,000		14,000	230,000	182,000	45,000



d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
14,500		16,000	260,000	208,000	48,000
15,000		16,000	260,000	208,000	48,000
15,500		16,000	260,000	208,000	48,000
16,000		16,000	260,000	208,000	48,000
16,500		18,000	285,000	234,000	48,000
17,000		18,000	285,000	234,000	48,000
17,500		18,000	285,000	234,000	48,000
18,000		18,000	285,000	234,000	48,000
18,500		20,000	310,000	258,000	50,000
19,000		20,000	310,000	258,000	50,000
19,050	3/4	20,000	310,000	258,000	50,000
19,500		20,000	310,000	258,000	50,000

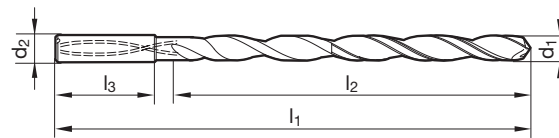
d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
20,000		20,000	310,000	258,000	50,000

Tehoporat jäähdytyskanavilla


P	•	Kärjen kevennys $\geq \varnothing 3,000$ • kartiovaippahionta • pääleikkusärmän kaarteesta • optimoitu lastu-uran muoto • jäähdytyskanavien max. halkaisija
M	•	• huomio jäähdytysnesteen paine
K	•	
N	○	rakenne- ja pintakarkaistut teräkset • automaattiteräkset, nuorutetut teräkset
S	○	• seostetut teräkset < 1200 N/mm ² asti • ruostumattomat teräkset • valut
H	○	

GÜHRING NAVIGATOR

Leikkuarvosivu 760



Artikkelinro.

6509

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,000		6,000	95,000	55,000	36,000	7,940	5/16	8,000	183,000	143,000	36,000
3,170	1/8	6,000	106,000	67,000	36,000	8,000		8,000	183,000	143,000	36,000
3,500		6,000	116,000	76,000	36,000	8,330	21/64	10,000	204,000	160,000	40,000
3,570	9/64	6,000	116,000	76,000	36,000	8,500		10,000	204,000	160,000	40,000
3,970	5/32	6,000	116,000	76,000	36,000	8,730	11/32	10,000	204,000	160,000	40,000
4,000		6,000	116,000	76,000	36,000	9,000		10,000	204,000	160,000	40,000
4,370	11/64	6,000	133,000	93,000	36,000	9,130	23/64	10,000	221,000	177,000	40,000
4,500		6,000	133,000	93,000	36,000	9,520	3/8	10,000	221,000	177,000	40,000
4,760	3/16	6,000	133,000	93,000	36,000	9,920	25/64	10,000	221,000	177,000	40,000
5,000		6,000	133,000	93,000	36,000	10,000		10,000	221,000	177,000	40,000
5,100		6,000	150,000	110,000	36,000	10,320	13/32	12,000	247,000	198,000	45,000
5,160	13/64	6,000	150,000	110,000	36,000	10,720	27/64	12,000	247,000	198,000	45,000
5,410		6,000	150,000	110,000	36,000	11,000		12,000	247,000	198,000	45,000
5,500		6,000	150,000	110,000	36,000	11,110	7/16	12,000	263,000	214,000	45,000
5,560	7/32	6,000	150,000	110,000	36,000	11,510	29/64	12,000	263,000	214,000	45,000
5,950	15/64	6,000	150,000	110,000	36,000	11,910	15/32	12,000	263,000	214,000	45,000
6,000		6,000	150,000	110,000	36,000	12,000		12,000	263,000	214,000	45,000
6,350	1/4	8,000	167,000	127,000	36,000	12,300	31/64	14,000	297,000	248,000	45,000
6,500		8,000	167,000	127,000	36,000	12,700	1/2	14,000	297,000	248,000	45,000
6,750	17/64	8,000	167,000	127,000	36,000	13,100	33/64	14,000	297,000	248,000	45,000
7,000		8,000	167,000	127,000	36,000	13,490	17/32	14,000	297,000	248,000	45,000
7,140	9/32	8,000	183,000	143,000	36,000	13,890	35/64	14,000	297,000	248,000	45,000
7,500		8,000	183,000	143,000	36,000	14,000		14,000	297,000	248,000	45,000
7,540	19/64	8,000	183,000	143,000	36,000			14,000	297,000	248,000	45,000



Tehoporat jäähdytyskanavilla



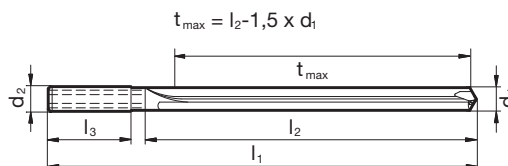
P	Kärjen kevennys $\geq \varnothing 5,000$ • kartiovaippahionta • negatiivinen nousu • mittoiltaan erittäin tarkkoille rei'ille • erittäin hyvä reiän pinnanlaatu • huomio jäähdytysnesteen paine
M	
K	•
N	• alumiini ja Al-seokset • Al-materiaalit suurella Si-pitoisuudella • harmaavalu-, taottava- ja pallografiittivalurauta
S	
H	

GÜHRING NAVIGATOR

Leikkuarvosivu 760

Materiaali	TKM
Pinta	○
Varren muoto	HA

Tehoporat



Artikkelinro.

773

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
5,000		6,000	145,000	105,000	36,000
6,000		6,000	145,000	105,000	36,000
8,000		8,000	180,000	137,000	36,000
9,000		10,000	217,000	170,000	40,000
10,000		10,000	217,000	170,000	40,000
11,000		12,000	258,000	205,000	45,000

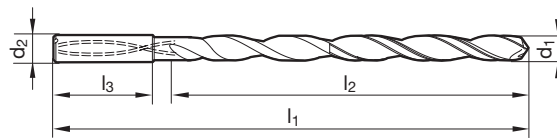
d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
12,000		12,000	258,000	205,000	45,000
14,000		14,000	290,000	236,000	45,000

Tehoporat jäähdytyskanavilla


P	•	Kärjen kevennys $\geq \varnothing 3,000$ • kartiovaippahionta • pääleikkuusärmän kaarteesta • optimoitu lastu-uran muoto • jäähdytyskanavien max. halkaisija
M	•	• huomio jäähdytysnesteen paine
K	•	
N	○	rakenne- ja pintakarkaistut teräkset • automaattiteräkset, nuorutetut teräkset
S	○	• seostetut teräkset < 1200 N/mm ² asti • ruostumattomat teräkset • valut
H	○	

GÜHRING NAVIGATOR

Leikkuarvosivu 760


 Artikkelinro. **6511**

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,000		6,000	110,000	70,000	36,000	8,730	11/32	10,000	249,000	205,000	40,000
3,100		6,000	123,000	83,000	36,000	9,000		10,000	249,000	205,000	40,000
3,170	1/8	6,000	123,000	83,000	36,000	9,130	23/64	10,000	271,000	227,000	40,000
3,500		6,000	136,000	96,000	36,000	9,520	3/8	10,000	271,000	227,000	40,000
3,570	9/64	6,000	136,000	96,000	36,000	9,920	25/64	10,000	271,000	227,000	40,000
3,970	5/32	6,000	136,000	96,000	36,000	10,000		10,000	271,000	227,000	40,000
4,000		6,000	136,000	96,000	36,000	10,320	13/32	12,000	302,000	253,000	45,000
4,200		6,000	158,000	118,000	36,000	10,720	27/64	12,000	302,000	253,000	45,000
4,370	11/64	6,000	158,000	118,000	36,000	11,000		12,000	302,000	253,000	45,000
4,500		6,000	158,000	118,000	36,000	11,110	7/16	12,000	323,000	274,000	45,000
4,760	3/16	6,000	158,000	118,000	36,000	11,510	29/64	12,000	323,000	274,000	45,000
5,000		6,000	158,000	118,000	36,000	11,910	15/32	12,000	323,000	274,000	45,000
5,100		6,000	180,000	140,000	36,000	12,000		12,000	323,000	274,000	45,000
5,160	13/64	6,000	180,000	140,000	36,000	12,300	31/64	14,000	367,000	318,000	45,000
5,410		6,000	180,000	140,000	36,000	12,700	1/2	14,000	367,000	318,000	45,000
5,500		6,000	180,000	140,000	36,000	13,100	33/64	14,000	367,000	318,000	45,000
5,560	7/32	6,000	180,000	140,000	36,000	13,490	17/32	14,000	367,000	318,000	45,000
5,950	15/64	6,000	180,000	140,000	36,000	13,890	35/64	14,000	367,000	318,000	45,000
6,000		6,000	180,000	140,000	36,000	14,000		14,000	367,000	318,000	45,000
6,350	1/4	8,000	202,000	162,000	36,000						
6,500		8,000	202,000	162,000	36,000						
6,750	17/64	8,000	202,000	162,000	36,000						
7,000		8,000	202,000	162,000	36,000						
7,140	9/32	8,000	223,000	183,000	36,000						
7,500		8,000	223,000	183,000	36,000						
7,540	19/64	8,000	223,000	183,000	36,000						
7,940	5/16	8,000	223,000	183,000	36,000						
8,000		8,000	223,000	183,000	36,000						
8,330	21/64	10,000	249,000	205,000	40,000						
8,500		10,000	249,000	205,000	40,000						



Tehoporat jäähdytyskanavilla



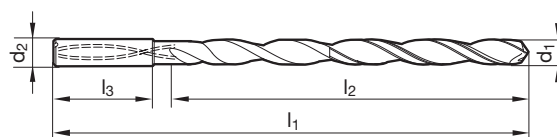
P	•	Kärjen kevennys $\geq \varnothing 3,000$ • kartiovaippahionta • pääleikkusärmän kaarteesta • optimoitu lastu-uran muoto • jäähdytyskanavien max. halkaisija
M	•	• huomio jäähdytysnesteen paine
K	•	
N	○	rakenne- ja pintakarkaistut teräkset • automaattiteräkset, nuorutetut teräkset
S	○	• seostetut teräkset < 1200 N/mm ² asti • ruostumattomat teräkset • valut
H	○	

GÜHRING NAVIGATOR

Leikkuarvosivu 760

Materiaali **TKM**Pinta **A**

Varren muoto HA



Artikkelinro.

6512

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,000		6,000	125,000	85,000	36,000	7,000		8,000	237,000	197,000	36,000
3,100		6,000	141,000	101,000	36,000	7,140	9/32	8,000	263,000	223,000	36,000
3,170	1/8	6,000	141,000	101,000	36,000	7,500		8,000	263,000	223,000	36,000
3,500		6,000	156,000	116,000	36,000	7,540	19/64	8,000	263,000	223,000	36,000
3,570	9/64	6,000	156,000	116,000	36,000	7,940	5/16	8,000	263,000	223,000	36,000
3,800		6,000	156,000	116,000	36,000	8,000		8,000	263,000	223,000	36,000
3,970	5/32	6,000	156,000	116,000	36,000	8,330	21/64	10,000	294,000	250,000	40,000
4,000		6,000	156,000	116,000	36,000	8,500		10,000	294,000	250,000	40,000
4,200		6,000	183,000	143,000	36,000	8,730	11/32	10,000	294,000	250,000	40,000
4,370	11/64	6,000	183,000	143,000	36,000	8,800		10,000	294,000	250,000	40,000
4,500		6,000	183,000	143,000	36,000	9,000		10,000	294,000	250,000	40,000
4,760	3/16	6,000	183,000	143,000	36,000	9,130	23/64	10,000	321,000	277,000	40,000
5,000		6,000	183,000	143,000	36,000	9,520	3/8	10,000	321,000	277,000	40,000
5,100		6,000	210,000	170,000	36,000	9,920	25/64	10,000	321,000	277,000	40,000
5,160	13/64	6,000	210,000	170,000	36,000	10,000		10,000	321,000	277,000	40,000
5,410		6,000	210,000	170,000	36,000	10,320	13/32	12,000	359,000	310,000	45,000
5,500		6,000	210,000	170,000	36,000	10,720	27/64	12,000	359,000	310,000	45,000
5,560	7/32	6,000	210,000	170,000	36,000	11,000		12,000	359,000	310,000	45,000
5,950	15/64	6,000	210,000	170,000	36,000	11,110	7/16	12,000	386,000	337,000	45,000
6,000		6,000	210,000	170,000	36,000	11,510	29/64	12,000	386,000	337,000	45,000
6,300		8,000	237,000	197,000	36,000	11,910	15/32	12,000	386,000	337,000	45,000
6,350	1/4	8,000	237,000	197,000	36,000	12,000		12,000	386,000	337,000	45,000
6,500		8,000	237,000	197,000	36,000						
6,750	17/64	8,000	237,000	197,000	36,000						



Tehoporat jäähdytyskanavilla

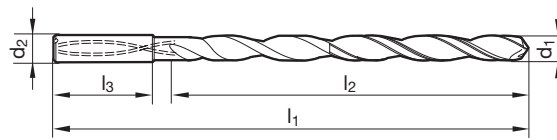


P	•	Kärjen kevennys $\geq \varnothing 3,000$ • kartiovaippahionta • pääleikkusärmän kaarteesta • optimoitu lastu-uran muoto • jäähdytyskanavien max. halkaisija
M	•	• huomio jäähdytysnesteen paine
K	•	
N	○	rakenne- ja pintakarkaistut teräkset • automaattiteräkset, nuorutetut teräkset
S	○	• seostetut teräkset < 1200 N/mm ² asti • ruostumattomat teräkset • valut
H	○	

GÜHRING NAVIGATOR

Leikkuarvosivu 760

Materiaali	TKM
Pinta	A
Varren muoto	HA



Artikkelinro.

6513

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
3,000		6,000	140,000	100,000	36,000
3,100		6,000	158,000	118,000	36,000
3,170	1/8	6,000	158,000	118,000	36,000
3,500		6,000	176,000	136,000	36,000
3,570	9/64	6,000	176,000	136,000	36,000
3,800		6,000	176,000	136,000	36,000
3,970	5/32	6,000	176,000	136,000	36,000
4,000		6,000	176,000	136,000	36,000
4,200		6,000	208,000	168,000	36,000
4,370	11/64	6,000	208,000	168,000	36,000
4,500		6,000	208,000	168,000	36,000
4,760	3/16	6,000	208,000	168,000	36,000
5,000		6,000	208,000	168,000	36,000
5,100		6,000	240,000	200,000	36,000
5,160	13/64	6,000	240,000	200,000	36,000
5,410		6,000	240,000	200,000	36,000
5,500		6,000	240,000	200,000	36,000
5,560	7/32	6,000	240,000	200,000	36,000
5,950	15/64	6,000	240,000	200,000	36,000
6,000		6,000	240,000	200,000	36,000
6,300		8,000	272,000	232,000	36,000
6,350	1/4	8,000	272,000	232,000	36,000
6,500		8,000	272,000	232,000	36,000
6,750	17/64	8,000	272,000	232,000	36,000

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
7,000		8,000	272,000	232,000	36,000
7,140	9/32	8,000	303,000	263,000	36,000
7,500		8,000	303,000	263,000	36,000
7,540	19/64	8,000	303,000	263,000	36,000
7,940	5/16	8,000	303,000	263,000	36,000
8,000		8,000	303,000	263,000	36,000
8,330	21/64	10,000	339,000	295,000	40,000
8,500		10,000	339,000	295,000	40,000
8,730	11/32	10,000	339,000	295,000	40,000
8,800		10,000	339,000	295,000	40,000
9,000		10,000	339,000	295,000	40,000
9,130	23/64	10,000	371,000	327,000	40,000
9,520	3/8	10,000	371,000	327,000	40,000
9,920	25/64	10,000	371,000	327,000	40,000
10,000		10,000	371,000	327,000	40,000



Tehoporat jäähdytyskanavilla



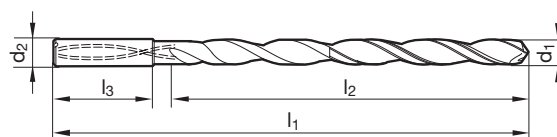
P	•	Kärjen kevennys $\geq \varnothing 3,000$ • kartiovaippahionta • pääleikkusärmän kaarteesta • optimoitu lastu-uran muoto • jäähdytyskanavien max. halkaisija
M	•	• huomio jäähdytysnesteen paine
K	•	
N	○	rakenne- ja pintakarkaistut teräkset • automaattiteräkset, nuorutetut teräkset
S	○	• seostetut teräkset < 1200 N/mm ² asti • ruostumattomat teräkset • valut
H	○	

GÜHRING NAVIGATOR

Leikkuarvosivu 760

Materiaali **TKM**Pinta **A**

Varren muoto HA

Artikkelinro. **6514**

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,000		6,000	170,000	130,000	36,000	5,950	15/64	6,000	300,000	260,000	36,000
3,100		6,000	193,000	153,000	36,000	6,000		6,000	300,000	260,000	36,000
3,170	1/8	6,000	193,000	153,000	36,000	6,300		8,000	322,000	282,000	36,000
3,500		6,000	193,000	153,000	36,000	6,350	1/4	8,000	322,000	282,000	36,000
3,570	9/64	6,000	216,000	176,000	36,000	6,500		8,000	322,000	282,000	36,000
3,800		6,000	216,000	176,000	36,000	6,750	17/64	8,000	342,000	302,000	36,000
3,970	5/32	6,000	216,000	176,000	36,000	7,000		8,000	342,000	302,000	36,000
4,000		6,000	216,000	176,000	36,000	7,140	9/32	8,000	363,000	323,000	36,000
4,200		6,000	238,000	198,000	36,000	7,500		8,000	363,000	323,000	36,000
4,370	11/64	6,000	238,000	198,000	36,000	7,540	19/64	8,000	383,000	343,000	36,000
4,500		6,000	238,000	198,000	36,000	7,940	5/16	8,000	383,000	343,000	36,000
4,760	3/16	6,000	258,000	218,000	36,000	8,000		8,000	383,000	343,000	36,000
5,000		6,000	258,000	218,000	36,000						
5,100		6,000	280,000	240,000	36,000						
5,160	13/64	6,000	280,000	240,000	36,000						
5,410		6,000	280,000	240,000	36,000						
5,500		6,000	280,000	240,000	36,000						
5,560	7/32	6,000	300,000	260,000	36,000						

ExclusiveLine Mikroporat ilman jäähdytyskanavia

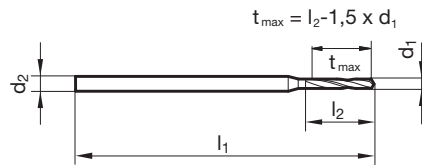

P	•	Kärjen kevennys $\geq \varnothing 0,500$ • päästöhiottu kärki • pääleikkusärmän suorasta • särmän valmistelu
M	•	
K	•	
N	○	rakenne- ja pintakarkaistut teräkset • automaattiteräkset, nuorrutetut teräkset • seostetut teräkset $< 1200 \text{ N/mm}^2$ asti • ruostumattomat teräkset • valut
S	○	
H		

 Materiaali **TKM**

 Pinta **A**

 Leikkusuunta **R**
GÜHRING NAVIGATOR

Leikkuuarvosivu 796


 Artikkelinro. **6400**

d1	d2 h6	l1	l2
mm	mm	mm	mm
0,500	3,000	47,000	3,000
0,550	3,000	47,000	3,300
0,600	3,000	47,000	3,600
0,650	3,000	47,000	3,900
0,700	3,000	47,000	4,200
0,750	3,000	47,000	4,500
0,800	3,000	47,000	4,800
0,850	3,000	47,000	5,100
0,900	3,000	47,000	5,400
0,950	3,000	47,000	5,700
1,000	3,000	47,000	6,000
1,050	3,000	47,000	6,300
1,100	3,000	47,000	6,600
1,150	3,000	47,000	6,900
1,200	3,000	47,000	7,200
1,250	3,000	47,000	7,500
1,300	3,000	47,000	7,800
1,350	3,000	47,000	8,100
1,400	3,000	47,000	8,400
1,450	3,000	47,000	8,700
1,500	3,000	47,000	9,000
1,550	3,000	47,000	9,300
1,590	3,000	47,000	9,600
1,600	3,000	47,000	9,600
1,650	3,000	47,000	9,900
1,700	3,000	47,000	10,200
1,750	3,000	47,000	10,500
1,800	3,000	52,000	10,800
1,850	3,000	52,000	11,100
1,900	3,000	52,000	11,400

d1	d2 h6	l1	l2
mm	mm	mm	mm
1,950	3,000	52,000	11,700
1,980	4,000	59,000	12,000
2,000	4,000	59,000	12,000
2,050	4,000	59,000	12,300
2,100	4,000	59,000	12,600
2,150	4,000	59,000	12,900
2,200	4,000	59,000	13,200
2,250	4,000	59,000	13,500
2,300	4,000	59,000	13,800
2,350	4,000	59,000	14,100
2,380	4,000	59,000	14,400
2,400	4,000	59,000	14,400
2,450	4,000	59,000	14,700
2,500	4,000	59,000	15,000
2,550	4,000	59,000	15,300
2,600	4,000	59,000	15,600
2,650	4,000	59,000	15,900
2,700	4,000	59,000	16,200
2,750	4,000	59,000	16,500
2,780	4,000	59,000	16,800
2,800	4,000	59,000	16,800
2,850	4,000	59,000	17,100
2,900	4,000	59,000	17,400
2,950	4,000	59,000	17,700
3,000	4,000	59,000	18,000


ExclusiveLine Mikroporat ilman jäähdytyskanavia

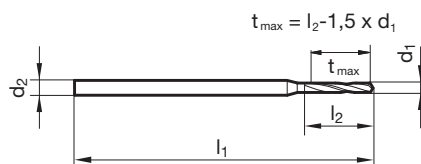

P	•	Kärjen kevennys $\geq \varnothing 0,500$ • päästöhiottu kärki • pääleikkusärmän suorasta • särmän valmistelu
M	•	
K	•	
N	○	rakenne- ja pintakarkaistut teräkset • automaattiteräkset, nuorrutetut teräkset • seostetut teräkset < 1200 N/mm ² asti • ruostumattomat teräkset • valut
S	○	
H		

Materiaali **TKM**Pinta **A**Leikkusuunta **R**

Tehoporat

GÜHRING NAVIGATOR

Leikkuarvosivu 796



Artikkelinro.

6401

d1	d2 h6	l1	l2
mm	mm	mm	mm
0,500	3,000	47,000	4,000
0,550	3,000	47,000	4,400
0,600	3,000	47,000	4,800
0,650	3,000	47,000	5,200
0,700	3,000	47,000	5,600
0,750	3,000	47,000	6,000
0,800	3,000	47,000	6,400
0,850	3,000	47,000	6,800
0,900	3,000	47,000	7,200
0,950	3,000	47,000	7,600
1,000	3,000	47,000	8,000
1,050	3,000	47,000	8,400
1,100	3,000	47,000	8,800
1,150	3,000	47,000	9,200
1,200	3,000	52,000	10,800
1,250	3,000	52,000	11,300
1,300	3,000	52,000	11,700
1,350	3,000	52,000	12,200
1,400	3,000	52,000	12,600
1,450	3,000	52,000	13,100
1,500	3,000	52,000	13,500
1,550	3,000	52,000	14,000
1,590	3,000	52,000	14,400
1,600	3,000	52,000	14,400
1,650	3,000	52,000	14,900
1,700	3,000	52,000	15,300
1,750	3,000	52,000	15,800
1,800	3,000	52,000	16,200
1,850	3,000	52,000	16,700
1,900	3,000	52,000	17,100

d1	d2 h6	l1	l2
mm	mm	mm	mm
1,950	3,000	52,000	17,600
1,980	4,000	63,000	18,000
2,000	4,000	63,000	18,000
2,050	4,000	63,000	18,500
2,100	4,000	63,000	18,900
2,150	4,000	63,000	19,400
2,200	4,000	63,000	19,800
2,250	4,000	63,000	20,300
2,300	4,000	63,000	20,700
2,350	4,000	63,000	21,200
2,380	4,000	63,000	21,600
2,400	4,000	63,000	21,600
2,450	4,000	63,000	22,100
2,500	4,000	63,000	22,500
2,550	4,000	63,000	23,000
2,600	4,000	67,000	23,400
2,650	4,000	67,000	23,900
2,700	4,000	67,000	24,300
2,750	4,000	67,000	24,800
2,780	4,000	67,000	25,200
2,800	4,000	67,000	25,200
2,850	4,000	67,000	25,700
2,900	4,000	67,000	26,100
2,950	4,000	67,000	26,600
3,000	4,000	67,000	27,000

ExclusiveLine mikroporat jäähdytyskanavilla


P • Kärjen kevennys $\geq \varnothing 1,400$ • päästöhiottu kärki • pääleikkusärmän suorasta • särmän valmistelu

M •

K •

N ○ rakenne- ja pintakarkaistut teräkset • automaattiteräkset, nuorrutetut teräkset • seostetut teräkset $< 1200 \text{ N/mm}^2$ asti • ruostumattomat teräkset • valut

S ○

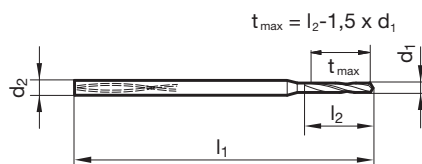
H

 Materiaali **TKM**

 Pinta **A**

 Leikkusuunta **R**
GÜHRING NAVIGATOR

Leikkuarvosivu 796



Artikkelinro.

6405

d1	d2 h6	l1	l2
mm	mm	mm	mm
1,400	4,000	52,000	11,000
1,450	4,000	52,000	12,000
1,500	4,000	52,000	12,000
1,550	4,000	52,000	12,000
1,590	4,000	52,000	13,000
1,600	4,000	52,000	13,000
1,650	4,000	52,000	13,000
1,700	4,000	56,000	14,000
1,750	4,000	56,000	14,000
1,800	4,000	56,000	14,000
1,850	4,000	56,000	15,000
1,900	4,000	56,000	15,000
1,950	4,000	56,000	16,000
1,980	4,000	56,000	16,000
2,000	4,000	56,000	16,000
2,050	4,000	56,000	16,000
2,100	4,000	62,000	17,000
2,150	4,000	62,000	17,000
2,200	4,000	62,000	18,000
2,250	4,000	62,000	18,000
2,300	4,000	62,000	18,000
2,350	4,000	62,000	19,000
2,380	4,000	62,000	19,000
2,400	4,000	62,000	19,000

d1	d2 h6	l1	l2
mm	mm	mm	mm
2,450	4,000	62,000	20,000
2,500	4,000	62,000	20,000
2,550	4,000	62,000	20,000
2,600	4,000	66,000	21,000
2,650	4,000	66,000	21,000
2,700	4,000	66,000	22,000
2,750	4,000	66,000	22,000
2,780	4,000	66,000	22,000
2,800	4,000	66,000	22,000
2,850	4,000	66,000	23,000
2,900	4,000	66,000	23,000
2,950	4,000	66,000	24,000
3,000	4,000	66,000	24,000


ExclusiveLine mikroporat jäähdytyskanavilla

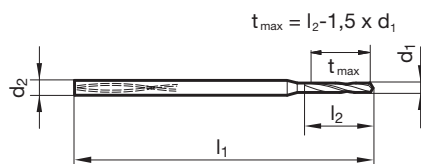

P	•	Kärjen kevennys $\geq \varnothing 1,400$ • päästöhiottu kärki • pääleikkusärmän suorasta • särmän valmistelu
M	•	
K	•	
N	○	rakenne- ja pintakarkaistut teräkset • automaattiteräkset, nuorrutetut teräkset • seostetut teräkset $< 1200 \text{ N/mm}^2$ asti • ruostumattomat teräkset • valut
S	○	
H		

Materiaali **TKM**Pinta **A**Leikkusuunta **R**

Tehoporat

GÜHRING NAVIGATOR

Leikkuarvosivu 796



Artikkelinro.

6408

d1	d2 h6	l1	l2
mm	mm	mm	mm
1,400	4,000	52,000	15,000
1,450	4,000	52,000	16,000
1,500	4,000	52,000	17,000
1,550	4,000	52,000	17,000
1,590	4,000	52,000	18,000
1,600	4,000	52,000	18,000
1,650	4,000	52,000	18,000
1,700	4,000	56,000	19,000
1,750	4,000	56,000	19,000
1,800	4,000	56,000	20,000
1,850	4,000	56,000	20,000
1,900	4,000	56,000	21,000
1,950	4,000	56,000	21,000
1,980	4,000	56,000	22,000
2,000	4,000	56,000	22,000
2,050	4,000	56,000	23,000
2,100	4,000	62,000	23,000
2,150	4,000	62,000	24,000
2,200	4,000	62,000	24,000
2,250	4,000	62,000	25,000
2,300	4,000	62,000	25,000
2,320	4,000	62,000	26,000
2,350	4,000	62,000	26,000
2,380	4,000	62,000	26,000

d1	d2 h6	l1	l2
mm	mm	mm	mm
2,400	4,000	62,000	26,000
2,450	4,000	62,000	27,000
2,500	4,000	62,000	28,000
2,550	4,000	62,000	28,000
2,600	4,000	66,000	29,000
2,650	4,000	66,000	29,000
2,700	4,000	66,000	30,000
2,750	4,000	66,000	30,000
2,780	4,000	66,000	31,000
2,800	4,000	66,000	31,000
2,850	4,000	66,000	31,000
2,900	4,000	66,000	32,000
2,950	4,000	66,000	32,000
3,000	4,000	66,000	33,000

ExclusiveLine mikroporat jäähdytyskanavilla


P • Kärjen kevennys $\geq \varnothing 1,400$ • päästöhiottu kärki • pääleikkusärmän suorasta • särmän valmistelu

M •

K •

N ○ rakenne- ja pintakarkaistut teräkset • automaattiteräkset, nuorrutetut teräkset • seostetut teräkset $< 1200 \text{ N/mm}^2$ asti • ruostumattomat teräkset • valut

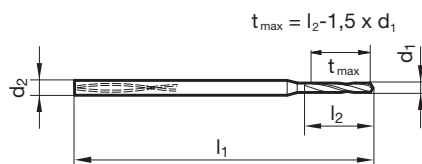
S ○

H

GÜHRING NAVIGATOR

Leikkuuarvosivu 796

Materiaali	TKM
Pinta	A
Leikkuusuunta	R



Artikkelinro.

6412

d1	d2 h6	l1	l2
mm	mm	mm	mm
1,400	4,000	62,000	25,000
1,500	4,000	62,000	27,000
1,590	4,000	62,000	29,000
1,600	4,000	62,000	29,000
1,700	4,000	70,000	31,000
1,800	4,000	70,000	32,000
1,900	4,000	70,000	34,000
1,980	4,000	70,000	36,000
2,000	4,000	70,000	36,000
2,100	4,000	78,000	38,000
2,200	4,000	78,000	40,000
2,300	4,000	78,000	42,000

d1	d2 h6	l1	l2
mm	mm	mm	mm
2,380	4,000	78,000	44,000
2,400	4,000	78,000	44,000
2,500	4,000	78,000	45,000
2,600	4,000	87,000	47,000
2,700	4,000	87,000	48,000
2,780	4,000	87,000	50,000
2,800	4,000	87,000	50,000
2,900	4,000	87,000	52,000
3,000	4,000	87,000	54,000



Tehoporat, 3-leikkuiset



P Kärjen kevennys $\geq \varnothing 3,000$ • spiro-kärki • avarat lastu-urat • optimaalinen keskitys • hakkaavaan työstöön

M

K •

N •

valurauta • pitkälastuiset Al-seokset • messinki, pronssit

S

H

Materiaali **TKM**

Pinta

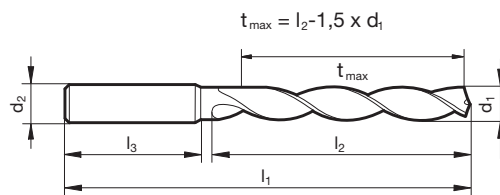
○

Varren muoto

HA

GÜHRING NAVIGATOR

Leikkuarvosivu 762



Artikkelinro.

2713

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
3,000		6,000	66,000	28,000	36,000
3,100		6,000	66,000	28,000	36,000
3,200		6,000	66,000	28,000	36,000
3,300		6,000	66,000	28,000	36,000
3,500		6,000	66,000	28,000	36,000
3,700		6,000	66,000	28,000	36,000
3,800		6,000	74,000	36,000	36,000
4,000		6,000	74,000	36,000	36,000
4,100		6,000	74,000	36,000	36,000
4,200		6,000	74,000	36,000	36,000
4,500		6,000	74,000	36,000	36,000
4,800		6,000	82,000	44,000	36,000
5,000		6,000	82,000	44,000	36,000
5,100		6,000	82,000	44,000	36,000
5,200		6,000	82,000	44,000	36,000
5,300		6,000	82,000	44,000	36,000
5,500		6,000	82,000	44,000	36,000
5,800		6,000	82,000	44,000	36,000
6,000		6,000	82,000	44,000	36,000
6,100		8,000	91,000	53,000	36,000
6,200		8,000	91,000	53,000	36,000
6,400		8,000	91,000	53,000	36,000
6,500		8,000	91,000	53,000	36,000
6,700		8,000	91,000	53,000	36,000
6,800		8,000	91,000	53,000	36,000
7,000		8,000	91,000	53,000	36,000
7,100		8,000	91,000	53,000	36,000
7,400		8,000	91,000	53,000	36,000
7,500		8,000	91,000	53,000	36,000
7,800		8,000	91,000	53,000	36,000
8,000		8,000	91,000	53,000	36,000
8,100		10,000	103,000	61,000	40,000
8,200		10,000	103,000	61,000	40,000
8,400		10,000	103,000	61,000	40,000
8,500		10,000	103,000	61,000	40,000
8,600		10,000	103,000	61,000	40,000

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
8,700		10,000	103,000	61,000	40,000
8,800		10,000	103,000	61,000	40,000
9,000		10,000	103,000	61,000	40,000
9,100		10,000	103,000	61,000	40,000
9,500		10,000	103,000	61,000	40,000
9,800		10,000	103,000	61,000	40,000
10,000		10,000	103,000	61,000	40,000
10,100		12,000	118,000	71,000	45,000
10,200		12,000	118,000	71,000	45,000
10,300		12,000	118,000	71,000	45,000
10,500		12,000	118,000	71,000	45,000
11,000		12,000	118,000	71,000	45,000
11,200		12,000	118,000	71,000	45,000
11,500		12,000	118,000	71,000	45,000
11,800		12,000	118,000	71,000	45,000
12,000		12,000	118,000	71,000	45,000
12,100		14,000	124,000	77,000	45,000
12,500		14,000	124,000	77,000	45,000
13,000		14,000	124,000	77,000	45,000
13,500		14,000	124,000	77,000	45,000
14,000		14,000	124,000	77,000	45,000
14,500		16,000	133,000	83,000	48,000
15,000		16,000	133,000	83,000	48,000
15,500		16,000	133,000	83,000	48,000
16,000		16,000	133,000	83,000	48,000
16,500		18,000	143,000	93,000	48,000
17,000		18,000	143,000	93,000	48,000
17,500		18,000	143,000	93,000	48,000
18,000		18,000	143,000	93,000	48,000
18,500		20,000	153,000	101,000	50,000
19,000		20,000	153,000	101,000	50,000
19,500		20,000	153,000	101,000	50,000
20,000		20,000	153,000	101,000	50,000



Tehoporat, 3-leikkuiset

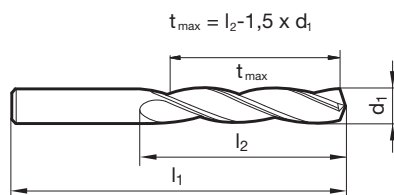


P ○ Kärjen kevennys $\geq \varnothing 3,000$ • päästöhiottu kärki • mittoiltaan erittäin tarkoilta reijille • erittäin hyvä reiän pinnanlaatu • hakkaavaan työstöön

M**K** ○**N** ○ valuteräs • seostetut-/seostamattomat teräkset $< 1000 \text{ N/mm}^2$ asti**S****H**

GÜHRING NAVIGATOR

Leikkuarvosivu 762



Artikkelinro.

611

d1		l1	l2
mm	inch	mm	mm
3,000		46,000	22,000
3,100		49,000	24,000
3,900		55,000	30,000
4,000		55,000	30,000
4,100		55,000	30,000
4,200		55,000	30,000
5,000		62,000	35,000
6,000		66,000	39,000
6,200		70,000	42,000
6,800		74,000	45,000
7,000		74,000	45,000
8,000		79,000	48,000

d1		l1	l2
mm	inch	mm	mm
8,500		79,000	48,000
10,000		89,000	55,000
10,200		89,000	55,000
12,000		102,000	65,000
14,000		107,000	66,000
14,400		111,000	70,000



Tehoporat, 3-leikkuiset

Materiaali **TKM**

Pinta ○

Varren muoto

lieriö

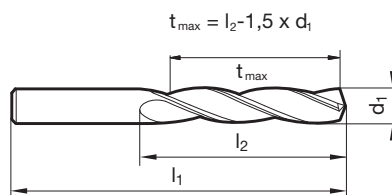
Tehoporat

P ○ Kärjen kevennys $\geq \varnothing 3,000$ • päästöhiottu kärki • mittoiltaan erittäin tarkoilte rei'ille • erittäin hyvä reiän pinnanlaatu • hakkaavaan työstöön

M**K** ○**N** ○valuteräs • seostetut-/seostamattomat teräkset $< 1000 \text{ N/mm}^2$ asti**S****H**

GÜHRING NAVIGATOR

Leikkuuarvosivu 762



Artikkelinro.

731

d1		l1	l2	d1		l1	l2
mm	inch	mm	mm	mm	inch	mm	mm
3,000		46,000	22,000	7,800		79,000	48,000
3,100		49,000	24,000	8,000		79,000	48,000
3,200		49,000	24,000	8,100		79,000	48,000
3,300		49,000	24,000	8,300		79,000	48,000
3,400		52,000	27,000	8,400		79,000	48,000
3,500		52,000	27,000	8,500		79,000	48,000
3,600		52,000	27,000	9,000		84,000	52,000
3,700		52,000	27,000	9,600		89,000	55,000
3,800		55,000	30,000	9,700		89,000	55,000
3,900		55,000	30,000	9,800		89,000	55,000
3,970	5/32	55,000	30,000	9,900		89,000	55,000
4,000		55,000	30,000	10,000		89,000	55,000
4,200		55,000	30,000	10,200		89,000	55,000
4,300		58,000	32,000	10,320	13/32	89,000	55,000
4,500		58,000	32,000	10,400		89,000	55,000
4,700		58,000	32,000	10,500		89,000	55,000
4,760	3/16	62,000	35,000	10,800		95,000	60,000
4,800		62,000	35,000	11,000		95,000	60,000
5,000		62,000	35,000	11,300		95,000	60,000
5,100		62,000	35,000	11,500		95,000	60,000
5,200		62,000	35,000	11,600		95,000	60,000
5,300		62,000	35,000	11,700		95,000	60,000
5,400		66,000	39,000	12,000		102,000	65,000
5,500		66,000	39,000	12,100		102,000	65,000
5,600		66,000	39,000	12,500		102,000	65,000
5,800		66,000	39,000	13,000		102,000	65,000
6,000		66,000	39,000	13,200		102,000	65,000
6,100		70,000	42,000	13,500		107,000	66,000
6,400		70,000	42,000	14,000		107,000	66,000
6,500		70,000	42,000	14,300		111,000	70,000
6,700		70,000	42,000	16,000		115,000	73,000
6,750	17/64	74,000	45,000	17,500		123,000	76,000
6,800		74,000	45,000	20,000		131,000	79,000
7,000		74,000	45,000				
7,500		74,000	45,000				
7,700		79,000	48,000				



Tehoporat, 3-leikkuiset



P Kärjen kevennys $\geq \varnothing 3,570$ • päästöhiottu kärki • mittoiltaan erittäin tarkoilte rei'ille • erittäin hyvä reiän pinnanlaatu • hakkaavaan työstöön

M**K** ○**N** ○

valut • Al-valuseokset

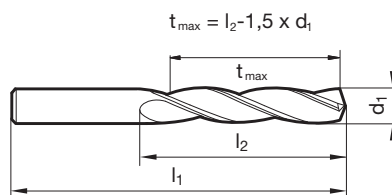
S**H**Materiaali **TKM**

Pinta ○

Varren muoto lieriö

GÜHRING NAVIGATOR

Leikkuarvosivu 762

Artikkelinro. **745**

d1		l1	l2
mm	inch	mm	mm
3,570	9/64	52,000	27,000
4,370	11/64	58,000	32,000
6,900		74,000	45,000
7,300		74,000	45,000
7,940	5/16	79,000	48,000
8,330	21/64	79,000	48,000

d1		l1	l2
mm	inch	mm	mm
8,800		84,000	52,000
9,700		89,000	55,000
10,720	27/64	95,000	60,000
12,500		102,000	65,000



Tehoporat, 3-leikkuiset



P Kärjen kevennys $\geq \varnothing 3,000$ • päästöhiottu kärki • mittoiltaan erittäin tarkoil-
le reille • erittäin hyvä reiän pinnanlaatu • hakkaavaan työstöön

M	
K	○
N	○
S	
H	

valut • Al-valuseokset

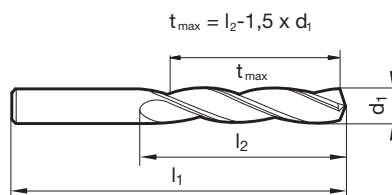
GÜHRING NAVIGATOR

Leikkuuarvosivu 762

Materiaali **TKM**

Pinta ○

Varren muoto lieriö



Artikkelinro.

1025

d1		l1	l2	d1		l1	l2
mm	inch	mm	mm	mm	inch	mm	mm
3,000		46,000	22,000	7,100		74,000	45,000
3,100		49,000	24,000	7,200		74,000	45,000
3,200		49,000	24,000	7,300		74,000	45,000
3,300		49,000	24,000	7,400		74,000	45,000
3,400		52,000	27,000	7,500		74,000	45,000
3,500		52,000	27,000	7,600		79,000	48,000
3,570	9/64	52,000	27,000	7,700		79,000	48,000
3,600		52,000	27,000	7,800		79,000	48,000
3,700		52,000	27,000	7,900		79,000	48,000
3,800		55,000	30,000	8,000		79,000	48,000
3,900		55,000	30,000	8,100		79,000	48,000
3,970	5/32	55,000	30,000	8,200		79,000	48,000
4,000		55,000	30,000	8,400		79,000	48,000
4,100		55,000	30,000	8,500		79,000	48,000
4,200		55,000	30,000	8,600		84,000	52,000
4,300		58,000	32,000	8,700		84,000	52,000
4,370	11/64	58,000	32,000	8,800		84,000	52,000
4,500		58,000	32,000	9,000		84,000	52,000
4,600		58,000	32,000	9,100		84,000	52,000
4,700		58,000	32,000	9,300		84,000	52,000
4,800		62,000	35,000	9,500		84,000	52,000
4,900		62,000	35,000	9,520	3/8	89,000	55,000
5,000		62,000	35,000	9,600		89,000	55,000
5,100		62,000	35,000	9,700		89,000	55,000
5,200		62,000	35,000	9,800		89,000	55,000
5,300		62,000	35,000	10,000		89,000	55,000
5,400		66,000	39,000	10,100		89,000	55,000
5,500		66,000	39,000	10,200		89,000	55,000
5,600		66,000	39,000	10,300		89,000	55,000
5,700		66,000	39,000	10,500		89,000	55,000
5,800		66,000	39,000	10,700		95,000	60,000
5,900		66,000	39,000	11,000		95,000	60,000
6,000		66,000	39,000	11,110	7/16	95,000	60,000
6,100		70,000	42,000	11,200		95,000	60,000
6,200		70,000	42,000	11,500		95,000	60,000
6,300		70,000	42,000	11,510	29/64	95,000	60,000
6,400		70,000	42,000	11,700		95,000	60,000
6,500		70,000	42,000	11,800		95,000	60,000
6,600		70,000	42,000	11,910	15/32	102,000	65,000
6,700		70,000	42,000	12,000		102,000	65,000
6,800		74,000	45,000	12,200		102,000	65,000
7,000		74,000	45,000	12,500		102,000	65,000



d1		l1	l2
mm	inch	mm	mm
12,700	1/2	102,000	65,000
13,000		102,000	65,000
13,500		107,000	66,000
13,800		107,000	66,000
14,000		107,000	66,000
14,300		111,000	70,000
14,500		111,000	70,000
15,000		111,000	70,000
15,870	5/8	115,000	73,000
16,000		115,000	73,000
17,000		119,000	73,000
18,500		127,000	76,000

d1		l1	l2
mm	inch	mm	mm
19,000		127,000	76,000
20,000		131,000	79,000



Tehoporat, 3-leikkuiset

Materiaali **TKM**Pinta **S**

Varren muoto lieriö

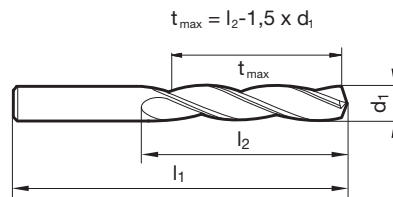
P ○ Kärjen kevennys $\geq \varnothing 3,000$ • päästöhiottu kärki • mittoiltaan erittäin tarkoilte rei'ille • erittäin hyvä reiän pinnanlaatu • hakkaavaan työstöön

M**K** ○

N ○ automaattiteräkset, rakenneteräkset • seostetut-/seostamattomat teräkset < 1000 N/mm² asti

S**H****GÜHRING** NAVIGATOR

Leikkuuarvosivu 762



Artikkelinro.

1027

d1		l1	l2
mm	inch	mm	mm
3,000		46,000	22,000
3,200		49,000	24,000
3,900		55,000	30,000
4,000		55,000	30,000
4,900		62,000	35,000
5,000		62,000	35,000
5,300		62,000	35,000
5,500		66,000	39,000
6,000		66,000	39,000
6,200		70,000	42,000
7,000		74,000	45,000
9,000		84,000	52,000

d1		l1	l2
mm	inch	mm	mm
10,000		89,000	55,000
11,000		95,000	60,000



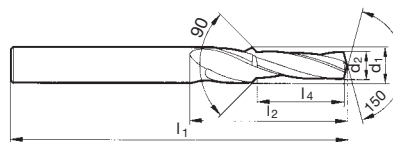
Tehopotusporat, 3-leikkuiset

Materiaali **TKM**

Pinta ○

Varren muoto lieriö

P Kärjen kevennys $\geq \varnothing 3,400$ • päästöhiottu kärki • mittoiltaan erittäin tarkkoille rei'ille • erittäin hyvä reiän pinnanlaatu • hakkaavaan työstöön

M**K** ○**N** ○**S** valut • Al-valuseokset**H**Artikkelinro. **1032**

d1	d2	l1	l2	l4	kierteelle
mm	mm	mm	mm	mm	
3,400	2,500	52,000	27,000	9,000	M 3
4,500	3,300	58,000	32,000	11,000	M 4
5,500	4,200	66,000	39,000	14,000	M 5
5,500	4,700	66,000	39,000	14,000	
6,600	5,000	70,000	42,000	16,000	M 6
9,000	6,800	84,000	52,000	22,000	M 8
11,000	8,500	95,000	60,000	28,000	M10
11,000	8,800	95,000	60,000	28,000	M10X1,25
13,500	10,200	107,000	66,000	33,000	M12
15,500	13,200	115,000	73,000	38,000	
17,500	15,000	123,000	76,000	41,000	M16 X1
20,000	16,000	131,000	79,000	43,000	M18X2



GM 300

Työkalujen pitimet jakiinnittimet
kaikkiin sovelluksiin



Lisää tietoa GM300-luettelosta.



VAIHTOKÄRJET PORAUS- JÄRJESTELMÄ T 800





HT 800 WP modulaarinen työkalujärjestelmä

Uusi Gühring HT 800 WP vaihtokärki-porajärjestelmä tarjoaa kestävän ja kustannusystävällisen ratkaisun pitimille ja rei'ille halkaisija välillä 11,5 – 40,0mm.

HT 800 WP porausjärjestelmä sopii hyvin suurten, tarkkojen reikien tekemiseen eri materiaaleihin energia-, auto-, metalli- tai teräsrakenneteollisuudessa.

PIDEMPI KESTOIKÄ

- vaihtokärjet vastaavat parhaiten eri materiaalien, muotojen ja pinnanlaatuojen vaatimuksiin
- parhaat työstötulokset teräksissä, ruostumattomissa teräksissä, valuraudoissa ja alumiinissa

PARAS LASTUNPOISTO

- erityinen lastu-uran poikkileikkaus
- erityisen pehmeä pinnan viimeistely

VAKAA PIDIN

- lähelle pitimen halkaisijaa porrastetut kaulan halkaisijat pienentävät kulumista
- parempi työkappaleen pinnanlaatu
- parempi työkalun ohjaus lisää tukevuutta
- pidempi työkalun kestoikä

TARKKA JA TUKEVA PALAN TASKU

- palan vaihto koneessa
- pidin pysyy kiinnitettynä
- työkalun vaihtoa ja esiasetusta ei tarvita
- parempi toimintavarmuus ja lyhyempi asetus aika

TÄYDELLINEN JÄÄHDYTYSNESTEVOITELU

- jäähdytiskanavat maksimaalisella poikkileikkauksella
- ulostulo lastu-urassa





Oikea pala jokaiselle materiaalille ja sovellukselle



Vaihtokärjet poraus-
järjestelmä T 800

HT 800 WP

Oikea pidin eri poraus syvyyksille ja sovelluksille

Artikkelinro.	4105	4106	4107	4108	4109	4110
Poraus syvyys	1 x D	1,5 x D	3 x D	5 x D	7 x D	10 x D
Pora-Ø	11,0 - 40,00	11,0 - 40,00	11,0 - 40,00	11,0 - 40,00	11,0 - 31,99	11,0 - 31,99
Varsi	DIN 6535-HE	DIN 6535-HE	DIN 6535-HE	DIN 6535-HE	DIN 6535-HE	DIN 6535-HE



Pilottipitimensä art.no. 4105 on tasku viistepalalle.
Tämä mahdollistaa yhtäaikaista pilottireiän porauksen ja 45° viisteen tekemisen.



P	M	K	N	S	H	Työkalun kuvaus	Poraus- syvyys	Varen muoto	Malli	Standardi	Materiaali	Pinta	d1/mm	Artikkeli nro.	Leikkuu- arvosivu	Sivu
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HT 800 runko

	1xD	HE	HT 800 WP	WN	Ni	4105	764	138
	1,5xD	HE	HT 800 WP	WN	Ni	4106	764	128
	3xD	HE	HT 800 WP	WN	Ni	4107	764	130
	5xD	HE	HT 800 WP	WN	Ni	4108	766	132
	7xD	HE	HT 800 WP	WN	Ni	4109	766	134
	10xD	HE	HT 800 WP	WN	Ni	4110	768	136

Vaihtokärjet poraus-
järjestelmä T 800

Vaihtokärjet HT 800

		HT 800 WP	WN	VHM	F	11,000 - 40,000	4113	764	142
		HT 800 WP	WN	VHM	○	11,000 - 40,000	4114	764	148
		HT 800 WP	WN	VHM	F	11,000 - 40,000	4112	764	139
		HT 800 WP	WN	VHM	a	11,000 - 40,000	4115	764	145
		HT 800 WP	WN	VHM	a	11,000 - 40,000	4111	768	151

Viistepalat HT 800

		WN	VHM	○	7635	156
		WN	VHM	S	7645	154
		WN	VHM	A	7632	155

Kiinnitysruuvit

	WN	6128	157
	WN	4071	158







RT 800 runko

	3xD	HE	RT800 WP	WN	Ni	5242	770	159
	5xD	HE	RT800 WP	WN	Ni	5243	770	160
	7xD	HE	RT800 WP	WN	Ni	5248	770	161

Vaihtokärjet RT 800

		RT800 WP	WN	VHM	F	16,000 - 40,500	2485	770	164
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P	M	K	N	S	H	Työkalun kuvaus	Poraus- syvyys	Varren muoto	Malli	Standardi	Materiaali	Pinta	d1/mm	Artikkeli nro.	Leikkuu- arvosivu	Sivu
Vaihtokärjet RT 800																
									RT800 WP	WN	VHM	○	16,000 - 40,000	2747	770	166
									RT800 WP	WN	VHM	Ⓢ	16,000 - 40,500	1047	770	162
Kiinnitysruuvit RT 800																
										WN				1071		168
Momenttiavaimet																
										WN				4915		169
Torx - kärkisarja																
										WN				4917		170
Torx-ruuviavain																
										WN				1612		171

Vaihtokärjet poraus-
järjestelmä T 800



HT 800 runko



Materiaali

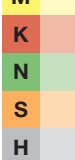
Pinta

Ni

Varren muoto

HE

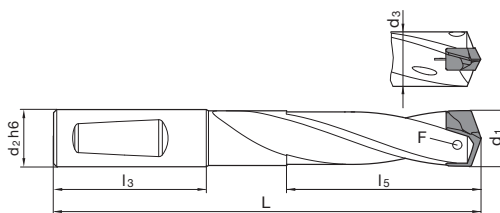
P nikkelöity • erittäin hyvä kulumiskestävyys • optimoitu lastu-uran muoto • optimoitu nestekanavien ulostulo • Kiinnitysruuvit art.nro. 4071 mukana • Ruuvimeisseli art.nro. 1612 mukana



Vaihtokärjet porausjärjestelmä T 800

GÜHRING NAVIGATOR

Leikkuarvosivu 764-768



Artikkelinro.

4106

d1	d2 h6	d3	L	l3	l5	F	koodinro.
mm	mm	mm	mm	mm	mm		
11,00-11,49	12,000	10,700	84,000	45,000	19,300	4071 2.200	11,000
11,00-11,49	12,700	10,700	84,000	45,000	19,300	4071 2.200	11,005
11,50-11,99	12,000	11,200	85,000	45,000	20,100	4071 2.200	11,500
11,50-11,99	12,700	11,200	85,000	45,000	20,100	4071 2.200	11,505
12,00-12,49	12,000	11,700	87,000	45,000	21,000	4071 2.201	12,000
12,00-12,49	12,700	11,700	87,000	45,000	21,000	4071 2.201	12,005
12,50-12,99	14,000	12,200	89,000	45,000	21,900	4071 2.201	12,500
12,50-12,99	15,875	12,200	89,000	45,000	21,900	4071 2.201	12,505
13,00-13,49	14,000	12,700	90,000	45,000	22,600	4071 2.500	13,000
13,00-13,49	15,875	12,700	90,000	45,000	22,600	4071 2.500	13,005
13,50-13,99	14,000	13,200	92,000	45,000	23,600	4071 2.500	13,500
13,50-13,99	15,875	13,200	92,000	45,000	23,600	4071 2.500	13,505
14,00-14,49	14,000	13,700	93,000	45,000	24,500	4071 3.000	14,000
14,00-14,49	15,875	13,700	93,000	45,000	24,500	4071 3.000	14,005
14,50-14,99	16,000	14,200	98,000	48,000	25,300	4071 3.000	14,500
14,50-14,99	15,875	14,200	98,000	48,000	25,300	4071 3.000	14,505
15,00-15,49	16,000	14,700	100,000	48,000	26,100	4071 3.001	15,000
15,00-15,49	15,875	14,700	100,000	48,000	26,100	4071 3.001	15,005
15,50-15,99	16,000	15,200	101,000	48,000	27,000	4071 3.001	15,500
15,50-15,99	15,875	15,200	101,000	48,000	27,000	4071 3.001	15,505
16,00-16,49	16,000	15,700	102,000	48,000	27,800	4071 3.500	16,000
16,00-16,49	15,875	15,700	102,000	48,000	27,800	4071 3.500	16,005
16,50-16,99	18,000	16,200	105,000	48,000	28,700	4071 3.500	16,500
16,50-16,99	19,050	16,200	105,000	48,000	28,700	4071 3.500	16,505
17,00-17,49	18,000	16,700	106,000	48,000	29,600	4071 3.500	17,000
17,00-17,49	19,050	16,700	106,000	48,000	29,600	4071 3.500	17,005
17,50-17,99	18,000	17,200	107,000	48,000	30,400	4071 3.500	17,500
17,50-17,99	19,050	17,200	107,000	48,000	30,400	4071 3.500	17,505
18,00-18,49	18,000	17,700	109,000	48,000	31,200	4071 4.000	18,000
18,00-18,49	19,050	17,700	109,000	48,000	31,200	4071 4.000	18,005
18,50-18,99	20,000	18,200	113,000	50,000	32,100	4071 4.000	18,500
18,50-18,99	19,050	18,200	113,000	50,000	32,100	4071 4.000	18,505
19,00-19,49	20,000	18,700	114,000	50,000	32,900	4071 4.000	19,000
19,00-19,49	19,050	18,700	114,000	50,000	32,900	4071 4.000	19,005
19,50-19,99	20,000	19,200	116,000	50,000	33,700	4071 4.000	19,500
19,50-19,99	19,050	19,200	116,000	50,000	33,700	4071 4.000	19,505
20,00-20,49	20,000	19,700	117,000	50,000	34,600	4071 4.500	20,000
20,00-20,49	19,050	19,700	117,000	50,000	34,600	4071 4.500	20,005
20,50-20,99	25,000	20,200	128,000	56,000	35,500	4071 4.500	20,500
20,50-20,99	25,400	20,200	128,000	56,000	35,500	4071 4.500	20,505
21,00-21,49	25,000	20,700	129,000	56,000	36,400	4071 4.500	21,000
21,00-21,49	25,400	20,700	129,000	56,000	36,400	4071 4.500	21,005



d1	d2 h6	d3	L	I3	I5	F	koodinro.
mm	mm	mm	mm	mm	mm		
21,50-21,99	25,000	21,200	130,000	56,000	37,200	4071 4.500	21,500
21,50-21,99	25,400	21,200	130,000	56,000	37,200	4071 4.500	21,505
22,00-22,49	25,000	21,700	131,000	56,000	38,000	4071 5.000	22,000
22,00-22,49	25,400	21,700	131,000	56,000	38,000	4071 5.000	22,005
22,50-22,99	25,000	22,200	134,000	56,000	38,900	4071 5.000	22,500
22,50-22,99	25,400	22,200	134,000	56,000	38,900	4071 5.000	22,505
23,00-23,49	25,000	22,700	135,000	56,000	39,800	4071 5.000	23,000
23,00-23,49	25,400	22,700	135,000	56,000	39,800	4071 5.000	23,005
23,50-23,99	25,000	23,200	137,000	56,000	40,600	4071 5.000	23,500
23,50-23,99	25,400	23,200	137,000	56,000	40,600	4071 5.000	23,505
24,00-24,49	25,000	23,700	138,000	56,000	41,500	4071 5.001	24,000
24,00-24,49	25,400	23,700	138,000	56,000	41,500	4071 5.001	24,005
24,50-24,99	25,000	24,200	140,000	56,000	42,300	4071 5.001	24,500
24,50-24,99	25,400	24,200	140,000	56,000	42,300	4071 5.001	24,505
25,00-25,49	25,000	24,700	142,000	56,000	43,200	4071 5.001	25,000
25,00-25,49	25,400	24,700	142,000	56,000	43,200	4071 5.001	25,005
25,50-25,99	32,000	25,200	148,000	60,000	44,000	4071 5.001	25,500
25,50-25,99	31,750	25,200	148,000	60,000	44,000	4071 5.001	25,505
26,00-26,49	32,000	25,700	151,000	60,000	44,300	4071 5.003	26,000
26,00-26,49	31,750	25,700	151,000	60,000	44,300	4071 5.003	26,005
26,50-26,99	32,000	26,200	153,000	60,000	45,100	4071 5.003	26,500
26,50-26,99	31,750	26,200	153,000	60,000	45,100	4071 5.003	26,505
27,00-27,49	32,000	26,700	155,000	60,000	46,000	4071 5.003	27,000
27,00-27,49	31,750	26,700	155,000	60,000	46,000	4071 5.003	27,005
27,50-27,99	32,000	27,200	156,000	60,000	46,800	4071 5.003	27,500
27,50-27,99	31,750	27,200	156,000	60,000	46,800	4071 5.003	27,505
28,00-28,49	32,000	27,700	157,000	60,000	47,700	4071 5.003	28,000
28,00-28,49	31,750	27,700	157,000	60,000	47,700	4071 5.003	28,005
28,50-28,99	32,000	28,200	159,000	60,000	48,500	4071 5.003	28,500
28,50-28,99	31,750	28,200	159,000	60,000	48,500	4071 5.003	28,505
29,00-29,49	32,000	28,700	161,000	60,000	49,400	4071 5.003	29,000
29,00-29,49	31,750	28,700	161,000	60,000	49,400	4071 5.003	29,005
29,50-29,99	32,000	29,200	162,000	60,000	50,200	4071 5.003	29,500
29,50-29,99	31,750	29,200	162,000	60,000	50,200	4071 5.003	29,505
30,00-30,49	32,000	29,700	164,000	60,000	50,900	4071 6.000	30,000
30,00-30,49	31,750	29,700	164,000	60,000	50,900	4071 6.000	30,005
30,50-30,99	32,000	30,200	166,000	60,000	51,700	4071 6.000	30,500
30,50-30,99	31,750	30,200	166,000	60,000	51,700	4071 6.000	30,505
31,00-31,49	32,000	30,700	167,000	60,000	52,600	4071 6.000	31,000
31,00-31,49	31,750	30,700	167,000	60,000	52,600	4071 6.000	31,005
31,50-31,99	32,000	31,200	168,000	60,000	53,400	4071 6.000	31,500
31,50-31,99	31,750	31,200	168,000	60,000	53,400	4071 6.000	31,505
32,00-32,99	32,000	31,700	172,000	60,000	55,100	4071 6.001	32,000
32,00-32,99	31,750	31,700	172,000	60,000	55,100	4071 6.001	32,005
33,00-33,99	32,000	32,700	175,000	60,000	56,800	4071 6.001	33,000
33,00-33,99	31,750	32,700	175,000	60,000	56,800	4071 6.001	33,005
34,00-34,99	32,000	33,700	178,000	60,000	58,500	4071 6.001	34,000
34,00-34,99	31,750	33,700	178,000	60,000	58,500	4071 6.001	34,005
35,00-35,99	32,000	34,700	181,000	60,000	60,200	4071 6.001	35,000
35,00-35,99	31,750	34,700	181,000	60,000	60,200	4071 6.001	35,005
36,00-36,99	32,000	35,700	184,000	60,000	61,800	4071 6.002	36,000
36,00-36,99	31,750	35,700	184,000	60,000	61,800	4071 6.002	36,005
37,00-37,99	32,000	36,700	188,000	60,000	63,500	4071 6.002	37,000
37,00-37,99	31,750	36,700	188,000	60,000	63,500	4071 6.002	37,005
38,00-38,99	32,000	37,700	191,000	60,000	65,200	4071 6.002	38,000
38,00-38,99	31,750	37,700	191,000	60,000	65,200	4071 6.002	38,005
39,00-40,00	32,000	38,700	194,000	60,000	66,900	4071 6.002	39,000
39,00-40,00	31,750	38,700	194,000	60,000	66,900	4071 6.002	39,005



HT 800 runko



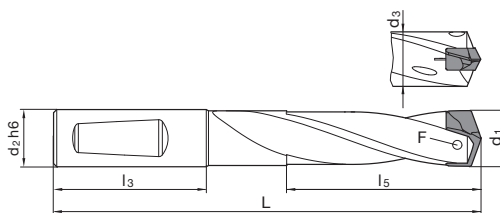
P nikkelöity • erittäin hyvä kulumiskestävyys • optimoitu lastu-uran muoto • optimoitu nestekanavien ulostulo • Kiinnitysruuvit art.nro. 4071 mukana • Ruuvimeisseli art.nro. 1612 mukana



Vaihtokärjet porausjärjestelmä T 800

GÜHRING NAVIGATOR

Leikkuuarvosivu 764-768



Artikkelinro. 4107

d1	d2 h6	d3	L	l3	l5	F	koodinro.
mm	mm	mm	mm	mm	mm		
11,00-11,49	12,000	10,700	101,000	45,000	36,600	4071 2.200	11,000
11,00-11,49	12,700	10,700	101,000	45,000	36,600	4071 2.200	11,005
11,50-11,99	12,000	11,200	103,000	45,000	38,100	4071 2.200	11,500
11,50-11,99	12,700	11,200	103,000	45,000	38,100	4071 2.200	11,505
12,00-12,49	12,000	11,700	106,000	45,000	39,700	4071 2.201	12,000
12,00-12,49	12,700	11,700	106,000	45,000	39,700	4071 2.201	12,005
12,50-12,99	14,000	12,200	108,000	45,000	41,300	4071 2.201	12,500
12,50-12,99	15,875	12,200	108,000	45,000	41,300	4071 2.201	12,505
13,00-13,49	14,000	12,700	110,000	45,000	42,900	4071 2.500	13,000
13,00-13,49	15,875	12,700	110,000	45,000	42,900	4071 2.500	13,005
13,50-13,99	14,000	13,200	113,000	45,000	44,600	4071 2.500	13,500
13,50-13,99	15,875	13,200	113,000	45,000	44,600	4071 2.500	13,505
14,00-14,49	14,000	13,700	115,000	45,000	46,200	4071 3.000	14,000
14,00-14,49	15,875	13,700	115,000	45,000	46,200	4071 3.000	14,005
14,50-14,99	16,000	14,200	120,000	48,000	47,800	4071 3.000	14,500
14,50-14,99	15,875	14,200	120,000	48,000	47,800	4071 3.000	14,505
15,00-15,49	16,000	14,700	123,000	48,000	49,300	4071 3.001	15,000
15,00-15,49	15,875	14,700	123,000	48,000	49,300	4071 3.001	15,005
15,50-15,99	16,000	15,200	125,000	48,000	50,900	4071 3.001	15,500
15,50-15,99	15,875	15,200	125,000	48,000	50,900	4071 3.001	15,505
16,00-16,49	16,000	15,700	127,000	48,000	52,900	4071 3.500	16,000
16,00-16,49	15,875	15,700	127,000	48,000	52,900	4071 3.500	16,005
16,50-16,99	18,000	16,200	130,000	48,000	54,100	4071 3.500	16,500
16,50-16,99	19,050	16,200	130,000	48,000	54,100	4071 3.500	16,505
17,00-17,49	18,000	16,700	132,000	48,000	55,800	4071 3.500	17,000
17,00-17,49	19,050	16,700	132,000	48,000	55,800	4071 3.500	17,005
17,50-17,99	18,000	17,200	134,000	48,000	57,400	4071 3.500	17,500
17,50-17,99	19,050	17,200	134,000	48,000	57,400	4071 3.500	17,505
18,00-18,49	18,000	17,700	137,000	48,000	58,900	4071 4.000	18,000
18,00-18,49	19,050	17,700	137,000	48,000	58,900	4071 4.000	18,005
18,50-18,99	20,000	18,200	141,000	50,000	60,500	4071 4.000	18,500
18,50-18,99	19,050	18,200	141,000	50,000	60,500	4071 4.000	18,505
19,00-19,49	20,000	18,700	143,000	50,000	62,100	4071 4.000	19,000
19,00-19,49	19,050	18,700	143,000	50,000	62,100	4071 4.000	19,005
19,50-19,99	20,000	19,200	146,000	50,000	63,700	4071 4.000	19,500
19,50-19,99	19,050	19,200	146,000	50,000	63,700	4071 4.000	19,505
20,00-20,49	20,000	19,700	148,000	50,000	65,300	4071 4.500	20,000
20,00-20,49	19,050	19,700	148,000	50,000	65,300	4071 4.500	20,005
20,50-20,99	25,000	20,200	159,000	56,000	67,000	4071 4.500	20,500
20,50-20,99	25,400	20,200	159,000	56,000	67,000	4071 4.500	20,505
21,00-21,49	25,000	20,700	161,000	56,000	68,600	4071 4.500	21,000
21,00-21,49	25,400	20,700	161,000	56,000	68,600	4071 4.500	21,005



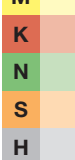
d1	d2 h6	d3	L	I3	I5	F	koodinro.
mm	mm	mm	mm	mm	mm		
21,50-21,99	25,000	21,200	163,000	56,000	70,100	4071 4.500	21,500
21,50-21,99	25,400	21,200	163,000	56,000	70,100	4071 4.500	21,505
22,00-22,49	25,000	21,700	165,000	56,000	71,700	4071 5.000	22,000
22,00-22,49	25,400	21,700	165,000	56,000	71,700	4071 5.000	22,005
22,50-22,99	25,000	22,200	168,000	56,000	73,300	4071 5.000	22,500
22,50-22,99	25,400	22,200	168,000	56,000	73,300	4071 5.000	22,505
23,00-23,49	25,000	22,700	170,000	56,000	74,900	4071 5.000	23,000
23,00-23,49	25,400	22,700	170,000	56,000	74,900	4071 5.000	23,005
23,50-23,99	25,000	23,200	173,000	56,000	76,500	4071 5.000	23,500
23,50-23,99	25,400	23,200	173,000	56,000	76,500	4071 5.000	23,505
24,00-24,49	25,000	23,700	175,000	56,000	78,100	4071 5.001	24,000
24,00-24,49	25,400	23,700	175,000	56,000	78,100	4071 5.001	24,005
24,50-24,99	25,000	24,200	177,000	56,000	79,700	4071 5.001	24,500
24,50-24,99	25,400	24,200	177,000	56,000	79,700	4071 5.001	24,505
25,00-25,49	25,000	24,700	180,000	56,000	81,300	4071 5.001	25,000
25,00-25,49	25,400	24,700	180,000	56,000	81,300	4071 5.001	25,005
25,50-25,99	32,000	25,200	187,000	60,000	82,900	4071 5.001	25,500
25,50-25,99	31,750	25,200	187,000	60,000	82,900	4071 5.001	25,505
26,00-26,49	32,000	25,700	191,000	60,000	84,000	4071 5.003	26,000
26,00-26,49	31,750	25,700	191,000	60,000	84,000	4071 5.003	26,005
26,50-26,99	32,000	26,200	193,000	60,000	86,100	4071 5.003	26,500
26,50-26,99	31,750	26,200	193,000	60,000	86,100	4071 5.003	26,505
27,00-27,49	32,000	26,700	196,000	60,000	87,200	4071 5.003	27,000
27,00-27,49	31,750	26,700	196,000	60,000	87,200	4071 5.003	27,005
27,50-27,99	32,000	27,200	198,000	60,000	88,900	4071 5.003	27,500
27,50-27,99	31,750	27,200	198,000	60,000	88,900	4071 5.003	27,505
28,00-28,49	32,000	27,700	200,000	60,000	90,400	4071 5.003	28,000
28,00-28,49	31,750	27,700	200,000	60,000	90,400	4071 5.003	28,005
28,50-28,99	32,000	28,200	202,000	60,000	92,500	4071 5.003	28,500
28,50-28,99	31,750	28,200	202,000	60,000	92,500	4071 5.003	28,505
29,00-29,49	32,000	28,700	205,000	60,000	94,600	4071 5.003	29,000
29,00-29,49	31,750	28,700	205,000	60,000	94,600	4071 5.003	29,005
29,50-29,99	32,000	29,200	207,000	60,000	95,100	4071 5.003	29,500
29,50-29,99	31,750	29,200	207,000	60,000	95,100	4071 5.003	29,505
30,00-30,49	32,000	29,700	210,000	60,000	96,700	4071 6.000	30,000
30,00-30,49	31,750	29,700	210,000	60,000	96,700	4071 6.000	30,005
30,50-30,99	32,000	30,200	212,000	60,000	98,300	4071 6.000	30,500
30,50-30,99	31,750	30,200	212,000	60,000	98,300	4071 6.000	30,505
31,00-31,49	32,000	30,700	214,000	60,000	99,800	4071 6.000	31,000
31,00-31,49	31,750	30,700	214,000	60,000	99,800	4071 6.000	31,005
31,50-31,99	32,000	31,200	216,000	60,000	101,400	4071 6.000	31,500
31,50-31,99	31,750	31,200	216,000	60,000	101,400	4071 6.000	31,505
32,00-32,99	32,000	31,700	221,000	60,000	104,600	4071 6.001	32,000
32,00-32,99	31,750	31,700	221,000	60,000	104,600	4071 6.001	32,005
33,00-33,99	32,000	32,700	226,000	60,000	107,800	4071 6.001	33,000
33,00-33,99	31,750	32,700	226,000	60,000	107,800	4071 6.001	33,005
34,00-34,99	32,000	33,700	230,000	60,000	111,000	4071 6.001	34,000
34,00-34,99	31,750	33,700	230,000	60,000	111,000	4071 6.001	34,005
35,00-35,99	32,000	34,700	235,000	60,000	114,200	4071 6.001	35,000
35,00-35,99	31,750	34,700	235,000	60,000	114,200	4071 6.001	35,005
36,00-36,99	32,000	35,700	240,000	60,000	117,300	4071 6.002	36,000
36,00-36,99	31,750	35,700	240,000	60,000	117,300	4071 6.002	36,005
37,00-37,99	32,000	36,700	245,000	60,000	120,500	4071 6.002	37,000
37,00-37,99	31,750	36,700	245,000	60,000	120,500	4071 6.002	37,005
38,00-38,99	32,000	37,700	249,000	60,000	123,700	4071 6.002	38,000
38,00-38,99	31,750	37,700	249,000	60,000	123,700	4071 6.002	38,005
39,00-40,00	32,000	38,700	254,000	60,000	126,900	4071 6.002	39,000
39,00-40,00	31,750	38,700	254,000	60,000	126,900	4071 6.002	39,005



HT 800 runko



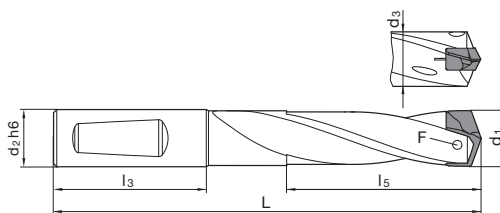
P nikkelöity • erittäin hyvä kulumiskestävyys • optimoitu lastu-uran muoto • optimoitu nestekanavien ulostulo • Kiinnitysruuvit art.nro. 4071 mukana • Ruuvimeisseli art.nro. 1612 mukana



Vaihtokärjet porausjärjestelmä T 800

GÜHRING NAVIGATOR

Leikkuuarvosivu 764-768



Materiaali

Pinta

Ni

Varren muoto

HE

Artikkelinro.

4108

d1	d2 h6	d3	L	l3	l5	F	koodinro.
mm	mm	mm	mm	mm	mm		
11,00-11,49	12,000	10,700	124,000	45,000	59,600	4071 2.200	11,000
11,00-11,49	12,700	10,700	124,000	45,000	59,600	4071 2.200	11,005
11,50-11,99	12,000	11,200	127,000	45,000	62,100	4071 2.200	11,500
11,50-11,99	12,700	11,200	127,000	45,000	62,100	4071 2.200	11,505
12,00-12,49	12,000	11,700	131,000	45,000	64,700	4071 2.201	12,000
12,00-12,49	12,700	11,700	131,000	45,000	64,700	4071 2.201	12,005
12,50-12,99	14,000	12,200	134,000	45,000	67,300	4071 2.201	12,500
12,50-12,99	15,875	12,200	134,000	45,000	67,300	4071 2.201	12,505
13,00-13,49	14,000	12,700	137,000	45,000	69,900	4071 2.500	13,000
13,00-13,49	15,875	12,700	137,000	45,000	69,900	4071 2.500	13,005
13,50-13,99	14,000	13,200	141,000	45,000	72,600	4071 2.500	13,500
13,50-13,99	15,875	13,200	141,000	45,000	72,600	4071 2.500	13,505
14,00-14,49	14,000	13,700	144,000	45,000	75,200	4071 3.000	14,000
14,00-14,49	15,875	13,700	144,000	45,000	75,200	4071 3.000	14,005
14,50-14,99	16,000	14,200	150,000	48,000	77,800	4071 3.000	14,500
14,50-14,99	15,875	14,200	150,000	48,000	77,800	4071 3.000	14,505
15,00-15,49	16,000	14,700	154,000	48,000	80,300	4071 3.001	15,000
15,00-15,49	15,875	14,700	154,000	48,000	80,300	4071 3.001	15,005
15,50-15,99	16,000	15,200	157,000	48,000	82,900	4071 3.001	15,500
15,50-15,99	15,875	15,200	157,000	48,000	82,900	4071 3.001	15,505
16,00-16,49	16,000	15,700	160,000	48,000	85,900	4071 3.500	16,000
16,00-16,49	15,875	15,700	160,000	48,000	85,900	4071 3.500	16,005
16,50-16,99	18,000	16,200	164,000	48,000	88,100	4071 3.500	16,500
16,50-16,99	19,050	16,200	164,000	48,000	88,100	4071 3.500	16,505
17,00-17,49	18,000	16,700	167,000	48,000	90,800	4071 3.500	17,000
17,00-17,49	19,050	16,700	167,000	48,000	90,800	4071 3.500	17,005
17,50-17,99	18,000	17,200	170,000	48,000	93,400	4071 3.500	17,500
17,50-17,99	19,050	17,200	170,000	48,000	93,400	4071 3.500	17,505
18,00-18,49	18,000	17,700	174,000	48,000	95,900	4071 4.000	18,000
18,00-18,49	19,050	17,700	174,000	48,000	95,900	4071 4.000	18,005
18,50-18,99	20,000	18,200	179,000	50,000	98,500	4071 4.000	18,500
18,50-18,99	19,050	18,200	179,000	50,000	98,500	4071 4.000	18,505
19,00-19,49	20,000	18,700	182,000	50,000	101,100	4071 4.000	19,000
19,00-19,49	19,050	18,700	182,000	50,000	101,100	4071 4.000	19,005
19,50-19,99	20,000	19,200	186,000	50,000	103,700	4071 4.000	19,500
19,50-19,99	19,050	19,200	186,000	50,000	103,700	4071 4.000	19,505
20,00-20,49	20,000	19,700	189,000	50,000	106,300	4071 4.500	20,000
20,00-20,49	19,050	19,700	189,000	50,000	106,300	4071 4.500	20,005
20,50-20,99	25,000	20,200	201,000	56,000	109,000	4071 4.500	20,500
20,50-20,99	25,400	20,200	201,000	56,000	109,000	4071 4.500	20,505
21,00-21,49	25,000	20,700	204,000	56,000	111,600	4071 4.500	21,000
21,00-21,49	25,400	20,700	204,000	56,000	111,600	4071 4.500	21,005



d1	d2 h6	d3	L	I3	I5	F	koodinro.
mm	mm	mm	mm	mm	mm		
21,50-21,99	25,000	21,200	207,000	56,000	114,100	4071 4.500	21,500
21,50-21,99	25,400	21,200	207,000	56,000	114,100	4071 4.500	21,505
22,00-22,49	25,000	21,700	210,000	56,000	116,700	4071 5.000	22,000
22,00-22,49	25,400	21,700	210,000	56,000	116,700	4071 5.000	22,005
22,50-22,99	25,000	22,200	214,000	56,000	119,300	4071 5.000	22,500
22,50-22,99	25,400	22,200	214,000	56,000	119,300	4071 5.000	22,505
23,00-23,49	25,000	22,700	217,000	56,000	121,900	4071 5.000	23,000
23,00-23,49	25,400	22,700	217,000	56,000	121,900	4071 5.000	23,005
23,50-23,99	25,000	23,200	221,000	56,000	124,500	4071 5.000	23,500
23,50-23,99	25,400	23,200	221,000	56,000	124,500	4071 5.000	23,505
24,00-24,49	25,000	23,700	224,000	56,000	127,100	4071 5.001	24,000
24,00-24,49	25,400	23,700	224,000	56,000	127,100	4071 5.001	24,005
24,50-24,99	25,000	24,200	227,000	56,000	129,700	4071 5.001	24,500
24,50-24,99	25,400	24,200	227,000	56,000	129,700	4071 5.001	24,505
25,00-25,49	25,000	24,700	231,000	56,000	132,300	4071 5.001	25,000
25,00-25,49	25,400	24,700	231,000	56,000	132,300	4071 5.001	25,005
25,50-25,99	32,000	25,200	239,000	60,000	134,900	4071 5.001	25,500
25,50-25,99	31,750	25,200	239,000	60,000	134,900	4071 5.001	25,505
26,00-26,49	32,000	25,700	244,000	60,000	137,000	4071 5.003	26,000
26,00-26,49	31,750	25,700	244,000	60,000	137,000	4071 5.003	26,005
26,50-26,99	32,000	26,200	247,000	60,000	140,000	4071 5.003	26,500
26,50-26,99	31,750	26,200	247,000	60,000	140,000	4071 5.003	26,505
27,00-27,49	32,000	26,700	251,000	60,000	142,200	4071 5.003	27,000
27,00-27,49	31,750	26,700	251,000	60,000	142,200	4071 5.003	27,005
27,50-27,99	32,000	27,200	254,000	60,000	144,800	4071 5.003	27,500
28,00-28,49	32,000	27,700	257,000	60,000	147,400	4071 5.003	28,000
28,00-28,49	31,750	27,700	257,000	60,000	147,400	4071 5.003	28,005
28,50-28,99	32,000	28,200	260,000	60,000	150,400	4071 5.003	28,500
28,50-28,99	31,750	28,200	260,000	60,000	150,400	4071 5.003	28,505
29,00-29,49	32,000	28,700	264,000	60,000	153,500	4071 5.003	29,000
29,00-29,49	31,750	28,700	264,000	60,000	153,500	4071 5.003	29,005
29,50-29,99	32,000	29,200	267,000	60,000	155,100	4071 5.003	29,500
30,00-30,49	32,000	29,700	271,000	60,000	157,600	4071 6.000	30,000
30,00-30,49	31,750	29,700	271,000	60,000	157,600	4071 6.000	30,005
30,50-30,99	32,000	30,200	274,000	60,000	160,200	4071 6.000	30,500
31,00-31,49	32,000	30,700	277,000	60,000	162,800	4071 6.000	31,000
31,50-31,99	32,000	31,200	280,000	60,000	165,400	4071 6.000	31,500
32,00-32,99	32,000	31,700	287,000	60,000	170,600	4071 6.001	32,000
32,00-32,99	31,750	31,700	287,000	60,000	170,600	4071 6.001	32,005
33,00-33,99	32,000	32,700	294,000	60,000	175,800	4071 6.001	33,000
33,00-33,99	31,750	32,700	294,000	60,000	175,800	4071 6.001	33,005
34,00-34,99	32,000	33,700	300,000	60,000	181,000	4071 6.001	34,000
34,00-34,99	31,750	33,700	300,000	60,000	181,000	4071 6.001	34,005
35,00-35,99	32,000	34,700	307,000	60,000	186,200	4071 6.001	35,000
35,00-35,99	31,750	34,700	307,000	60,000	186,200	4071 6.001	35,005
36,00-36,99	32,000	35,700	314,000	60,000	191,300	4071 6.002	36,000
37,00-37,99	32,000	36,700	321,000	60,000	196,500	4071 6.002	37,000
37,00-37,99	31,750	36,700	321,000	60,000	196,500	4071 6.002	37,005
38,00-38,99	32,000	37,700	327,000	60,000	201,700	4071 6.002	38,000
38,00-38,99	31,750	37,700	327,000	60,000	201,700	4071 6.002	38,005
39,00-40,00	32,000	38,700	334,000	60,000	206,900	4071 6.002	39,000



HT 800 runko



Materiaali

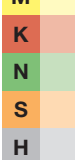
Pinta

Ni

Varren muoto

HE

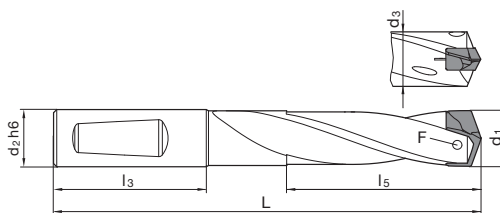
P nikkelöity • erittäin hyvä kulumiskestävyys • optimoitu lastu-uran muoto • optimoitu nestekanavien ulostulo • Kiinnitysruuvit art.nro. 4071 mukana • Ruuvimeisseli art.nro. 1612 mukana



Vaihtokärjet porausjärjestelmä T 800

GÜHRING NAVIGATOR

Leikkuuarvosivu 764-768



Artikkelinro.

4109

d1	d2 h6	d3	L	l3	l5	F	koodinro.
mm	mm	mm	mm	mm	mm		
11,00-11,49	12,000	10,700	147,000	45,000	82,600	4071 2.200	11,000
11,00-11,49	12,700	10,700	147,000	45,000	82,600	4071 2.200	11,005
11,50-11,99	12,000	11,200	151,000	45,000	86,100	4071 2.200	11,500
11,50-11,99	12,700	11,200	151,000	45,000	86,100	4071 2.200	11,505
12,00-12,49	12,000	11,700	156,000	45,000	89,700	4071 2.201	12,000
12,00-12,49	12,700	11,700	156,000	45,000	89,700	4071 2.201	12,005
12,50-12,99	14,000	12,200	160,000	45,000	93,300	4071 2.201	12,500
12,50-12,99	15,875	12,200	160,000	45,000	93,300	4071 2.201	12,505
13,00-13,49	14,000	12,700	164,000	45,000	96,900	4071 2.500	13,000
13,00-13,49	15,875	12,700	164,000	45,000	96,900	4071 2.500	13,005
13,50-13,99	14,000	13,200	169,000	45,000	100,600	4071 2.500	13,500
13,50-13,99	15,875	13,200	169,000	45,000	100,600	4071 2.500	13,505
14,00-14,49	14,000	13,700	173,000	45,000	104,200	4071 3.000	14,000
14,00-14,49	15,875	13,700	173,000	45,000	104,200	4071 3.000	14,005
14,50-14,99	16,000	14,200	180,000	48,000	107,800	4071 3.000	14,500
14,50-14,99	15,875	14,200	180,000	48,000	107,800	4071 3.000	14,505
15,00-15,49	16,000	14,700	185,000	48,000	111,300	4071 3.001	15,000
15,00-15,49	15,875	14,700	185,000	48,000	111,300	4071 3.001	15,005
15,50-15,99	16,000	15,200	189,000	48,000	114,900	4071 3.001	15,500
15,50-15,99	15,875	15,200	189,000	48,000	114,900	4071 3.001	15,505
16,00-16,49	16,000	15,700	193,000	48,000	118,900	4071 3.500	16,000
16,00-16,49	15,875	15,700	193,000	48,000	118,900	4071 3.500	16,005
16,50-16,99	18,000	16,200	198,000	48,000	122,100	4071 3.500	16,500
16,50-16,99	19,050	16,200	198,000	48,000	122,100	4071 3.500	16,505
17,00-17,49	18,000	16,700	202,000	48,000	125,800	4071 3.500	17,000
17,00-17,49	19,050	16,700	202,000	48,000	125,800	4071 3.500	17,005
17,50-17,99	18,000	17,200	206,000	48,000	129,400	4071 3.500	17,500
17,50-17,99	19,050	17,200	206,000	48,000	129,400	4071 3.500	17,505
18,00-18,49	18,000	17,700	211,000	48,000	132,900	4071 4.000	18,000
18,00-18,49	19,050	17,700	211,000	48,000	132,900	4071 4.000	18,005
18,50-18,99	20,000	18,200	217,000	50,000	136,500	4071 4.000	18,500
18,50-18,99	19,050	18,200	217,000	50,000	136,500	4071 4.000	18,505
19,00-19,49	20,000	18,700	221,000	50,000	140,100	4071 4.000	19,000
19,00-19,49	19,050	18,700	221,000	50,000	140,100	4071 4.000	19,005
19,50-19,99	20,000	19,200	226,000	50,000	143,700	4071 4.000	19,500
19,50-19,99	19,050	19,200	226,000	50,000	143,700	4071 4.000	19,505
20,00-20,49	20,000	19,700	230,000	50,000	147,300	4071 4.500	20,000
20,00-20,49	19,050	19,700	230,000	50,000	147,300	4071 4.500	20,005
20,50-20,99	25,000	20,200	243,000	56,000	151,000	4071 4.500	20,500
20,50-20,99	25,400	20,200	243,000	56,000	151,000	4071 4.500	20,505
21,00-21,49	25,000	20,700	247,000	56,000	154,600	4071 4.500	21,000
21,00-21,49	25,400	20,700	247,000	56,000	154,600	4071 4.500	21,005



d1	d2 h6	d3	L	I3	I5	F	koodinro.
mm	mm	mm	mm	mm	mm		
21,50-21,99	25,000	21,200	251,000	56,000	158,100	4071 4.500	21,500
21,50-21,99	25,400	21,200	251,000	56,000	158,100	4071 4.500	21,505
22,00-22,49	25,000	21,700	255,000	56,000	161,700	4071 5.000	22,000
22,00-22,49	25,400	21,700	255,000	56,000	161,700	4071 5.000	22,005
22,50-22,99	25,000	22,200	260,000	56,000	165,300	4071 5.000	22,500
22,50-22,99	25,400	22,200	260,000	56,000	165,300	4071 5.000	22,505
23,00-23,49	25,000	22,700	264,000	56,000	168,900	4071 5.000	23,000
23,00-23,49	25,400	22,700	264,000	56,000	168,900	4071 5.000	23,005
23,50-23,99	25,000	23,200	269,000	56,000	172,500	4071 5.000	23,500
23,50-23,99	25,400	23,200	269,000	56,000	172,500	4071 5.000	23,505
24,00-24,49	25,000	23,700	273,000	56,000	176,100	4071 5.001	24,000
24,00-24,49	25,400	23,700	273,000	56,000	176,100	4071 5.001	24,005
24,50-24,99	25,000	24,200	277,000	56,000	179,700	4071 5.001	24,500
24,50-24,99	25,400	24,200	277,000	56,000	179,700	4071 5.001	24,505
25,00-25,49	25,000	24,700	282,000	56,000	183,300	4071 5.001	25,000
25,00-25,49	25,400	24,700	282,000	56,000	183,300	4071 5.001	25,005
25,50-25,99	32,000	25,200	291,000	60,000	186,900	4071 5.001	25,500
25,50-25,99	31,750	25,200	291,000	60,000	186,900	4071 5.001	25,505
26,00-26,49	32,000	25,700	297,000	60,000	190,000	4071 5.003	26,000
26,00-26,49	31,750	25,700	297,000	60,000	190,000	4071 5.003	26,005
26,50-26,99	32,000	26,200	301,000	60,000	194,000	4071 5.003	26,500
26,50-26,99	31,750	26,200	301,000	60,000	194,000	4071 5.003	26,505
27,00-27,49	32,000	26,700	306,000	60,000	197,200	4071 5.003	27,000
27,00-27,49	31,750	26,700	306,000	60,000	197,200	4071 5.003	27,005
27,50-27,99	32,000	27,200	310,000	60,000	200,800	4071 5.003	27,500
27,50-27,99	31,750	27,200	310,000	60,000	200,800	4071 5.003	27,505
28,00-28,49	32,000	27,700	314,000	60,000	204,400	4071 5.003	28,000
28,00-28,49	31,750	27,700	314,000	60,000	204,400	4071 5.003	28,005
28,50-28,99	32,000	28,200	318,000	60,000	208,400	4071 5.003	28,500
28,50-28,99	31,750	28,200	318,000	60,000	208,400	4071 5.003	28,505
29,00-29,49	32,000	28,700	323,000	60,000	212,500	4071 5.003	29,000
29,00-29,49	31,750	28,700	323,000	60,000	212,500	4071 5.003	29,005
29,50-29,99	32,000	29,200	327,000	60,000	215,100	4071 5.003	29,500
29,50-29,99	31,750	29,200	327,000	60,000	215,100	4071 5.003	29,505
30,00-30,49	32,000	29,700	332,000	60,000	218,600	4071 6.000	30,000
30,00-30,49	31,750	29,700	332,000	60,000	218,600	4071 6.000	30,005
30,50-30,99	32,000	30,200	336,000	60,000	222,200	4071 6.000	30,500
30,50-30,99	31,750	30,200	336,000	60,000	222,200	4071 6.000	30,505
31,00-31,49	32,000	30,700	340,000	60,000	225,800	4071 6.000	31,000
31,00-31,49	31,750	30,700	340,000	60,000	225,800	4071 6.000	31,005
31,50-31,99	32,000	31,200	344,000	60,000	229,400	4071 6.000	31,500
31,50-31,99	31,750	31,200	344,000	60,000	229,400	4071 6.000	31,505
33,00-33,99	32,000	32,700	362,000	60,000	244,600	4071 6.001	33,000
39,00-40,00	32,000	38,700	413,000	60,000	287,400	4071 6.002	39,000



HT 800 runko



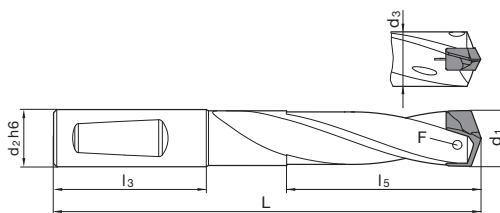
P nikkelöity • erittäin hyvä kulumiskestävyys • optimoitu lastu-uran muoto • optimoitu nestekanavien ulostulo • Kiinnitysruuvit art.nro. 4071 mukana • Ruuvimeisseli art.nro. 1612 mukana



Vaihtokärjet porausjärjestelmä T 800

GÜHRING NAVIGATOR

Leikkuarvosivu 764-768



Materiaali

Pinta

Ni

Varren muoto

HE

Artikkelinro.

4110

d1	d2 h6	d3	L	l3	l5	F	koodinro.
mm	mm	mm	mm	mm	mm		
11,00-11,49	12,000	10,700	182,000	45,000	117,100	4071 2.200	11,000
11,00-11,49	12,700	10,700	182,000	45,000	117,100	4071 2.200	11,005
11,50-11,99	12,000	11,200	187,000	45,000	122,100	4071 2.200	11,500
11,50-11,99	12,700	11,200	187,000	45,000	122,100	4071 2.200	11,505
12,00-12,49	12,000	11,700	194,000	45,000	127,200	4071 2.201	12,000
12,00-12,49	12,700	11,700	194,000	45,000	127,200	4071 2.201	12,005
12,50-12,99	14,000	12,200	199,000	45,000	132,300	4071 2.201	12,500
12,50-12,99	15,875	12,200	199,000	45,000	132,300	4071 2.201	12,505
13,00-13,49	14,000	12,700	205,000	45,000	137,500	4071 2.500	13,000
13,00-13,49	15,875	12,700	205,000	45,000	137,500	4071 2.500	13,005
13,50-13,99	14,000	13,200	211,000	45,000	142,500	4071 2.500	13,500
13,50-13,99	15,875	13,200	211,000	45,000	142,500	4071 2.500	13,505
14,00-14,49	14,000	13,700	217,000	45,000	147,700	4071 3.000	14,000
14,00-14,49	15,875	13,700	217,000	45,000	147,700	4071 3.000	14,005
14,50-14,99	16,000	14,200	225,000	48,000	152,800	4071 3.000	14,500
14,50-14,99	15,875	14,200	225,000	48,000	152,800	4071 3.000	14,505
15,00-15,49	16,000	14,700	232,000	48,000	157,800	4071 3.001	15,000
15,00-15,49	15,875	14,700	232,000	48,000	157,800	4071 3.001	15,005
15,50-15,99	16,000	15,200	237,000	48,000	162,900	4071 3.001	15,500
15,50-15,99	15,875	15,200	237,000	48,000	162,900	4071 3.001	15,505
16,00-16,49	16,000	15,700	243,000	48,000	168,000	4071 3.500	16,000
16,00-16,49	15,875	15,700	243,000	48,000	168,000	4071 3.500	16,005
16,50-16,99	18,000	16,200	249,000	48,000	170,000	4071 3.500	16,500
16,50-16,99	19,050	16,200	249,000	48,000	170,000	4071 3.500	16,505
17,00-17,49	18,000	16,700	255,000	48,000	178,300	4071 3.500	17,000
17,00-17,49	19,050	16,700	255,000	48,000	178,300	4071 3.500	17,005
17,50-17,99	18,000	17,200	260,000	48,000	183,500	4071 3.500	17,500
17,50-17,99	19,050	17,200	260,000	48,000	183,500	4071 3.500	17,505
18,00-18,49	18,000	17,700	267,000	48,000	188,400	4071 4.000	18,000
18,00-18,49	19,050	17,700	267,000	48,000	188,400	4071 4.000	18,005
18,50-18,99	20,000	18,200	274,000	50,000	193,500	4071 4.000	18,500
18,50-18,99	19,050	18,200	274,000	50,000	193,500	4071 4.000	18,505
19,00-19,49	20,000	18,700	280,000	50,000	198,700	4071 4.000	19,000
19,00-19,49	19,050	18,700	280,000	50,000	198,700	4071 4.000	19,005
19,50-19,99	20,000	19,200	286,000	50,000	203,700	4071 4.000	19,500
19,50-19,99	19,050	19,200	286,000	50,000	203,700	4071 4.000	19,505
20,00-20,49	20,000	19,700	292,000	50,000	208,900	4071 4.500	20,000
20,00-20,49	19,050	19,700	292,000	50,000	208,900	4071 4.500	20,005
20,50-20,99	25,000	20,200	306,000	56,000	214,000	4071 4.500	20,500
20,50-20,99	25,400	20,200	306,000	56,000	214,000	4071 4.500	20,505
21,00-21,49	25,000	20,700	312,000	56,000	219,100	4071 4.500	21,000
21,00-21,49	25,400	20,700	312,000	56,000	219,100	4071 4.500	21,005



d1	d2 h6	d3	L	I3	I5	F	koodinro.
mm	mm	mm	mm	mm	mm		
21,50-21,99	25,000	21,200	317,000	56,000	224,200	4071 4.500	21,500
21,50-21,99	25,400	21,200	317,000	56,000	224,200	4071 4.500	21,505
22,00-22,49	25,000	21,700	323,000	56,000	229,300	4071 5.000	22,000
22,00-22,49	25,400	21,700	323,000	56,000	229,300	4071 5.000	22,005
22,50-22,99	25,000	22,200	329,000	56,000	234,400	4071 5.000	22,500
22,50-22,99	25,400	22,200	329,000	56,000	234,400	4071 5.000	22,505
23,00-23,49	25,000	22,700	335,000	56,000	239,500	4071 5.000	23,000
23,00-23,49	25,400	22,700	335,000	56,000	239,500	4071 5.000	23,005
23,50-23,99	25,000	23,200	341,000	56,000	244,600	4071 5.000	23,500
23,50-23,99	25,400	23,200	341,000	56,000	244,600	4071 5.000	23,505
24,00-24,49	25,000	23,700	347,000	56,000	249,700	4071 5.001	24,000
24,00-24,49	25,400	23,700	347,000	56,000	249,700	4071 5.001	24,005
24,50-24,99	25,000	24,200	352,000	56,000	254,800	4071 5.001	24,500
24,50-24,99	25,400	24,200	352,000	56,000	254,800	4071 5.001	24,505
25,00-25,49	25,000	24,700	359,000	56,000	259,900	4071 5.001	25,000
25,00-25,49	25,400	24,700	359,000	56,000	259,900	4071 5.001	25,005
25,50-25,99	32,000	25,200	369,000	60,000	265,000	4071 5.001	25,500
25,50-25,99	31,750	25,200	369,000	60,000	265,000	4071 5.001	25,505
26,00-26,49	32,000	25,700	377,000	60,000	270,000	4071 5.003	26,000
26,00-26,49	31,750	25,700	377,000	60,000	270,000	4071 5.003	26,005
26,50-26,99	32,000	26,200	382,000	60,000	275,000	4071 5.003	26,500
26,50-26,99	31,750	26,200	382,000	60,000	275,000	4071 5.003	26,505
27,00-27,49	32,000	26,700	388,000	60,000	280,100	4071 5.003	27,000
27,00-27,49	31,750	26,700	388,000	60,000	280,100	4071 5.003	27,005
27,50-27,99	32,000	27,200	394,000	60,000	285,200	4071 5.003	27,500
27,50-27,99	31,750	27,200	394,000	60,000	285,200	4071 5.003	27,505
28,00-28,49	32,000	27,700	400,000	60,000	290,300	4071 5.003	28,000
28,00-28,49	31,750	27,700	400,000	60,000	290,300	4071 5.003	28,005
28,50-28,99	32,000	28,200	405,000	60,000	295,400	4071 5.003	28,500
28,50-28,99	31,750	28,200	405,000	60,000	295,400	4071 5.003	28,505
29,00-29,49	32,000	28,700	412,000	60,000	300,500	4071 5.003	29,000
29,00-29,49	31,750	28,700	412,000	60,000	300,500	4071 5.003	29,005
29,50-29,99	32,000	29,200	418,000	60,000	305,600	4071 5.003	29,500
29,50-29,99	31,750	29,200	418,000	60,000	305,600	4071 5.003	29,505
30,00-30,49	32,000	29,700	424,000	60,000	310,600	4071 6.000	30,000
30,00-30,49	31,750	29,700	424,000	60,000	310,600	4071 6.000	30,005
30,50-30,99	32,000	30,200	429,000	60,000	315,700	4071 6.000	30,500
30,50-30,99	31,750	30,200	429,000	60,000	315,700	4071 6.000	30,505
31,00-31,49	32,000	30,700	435,000	60,000	320,800	4071 6.000	31,000
31,00-31,49	31,750	30,700	435,000	60,000	320,800	4071 6.000	31,005
31,50-31,99	32,000	31,200	441,000	60,000	325,900	4071 6.000	31,500
31,50-31,99	31,750	31,200	441,000	60,000	325,900	4071 6.000	31,505



HT 800 runko



P nikkelöity • erittäin hyvä kulumiskestävyys • optimoitu lastu-uran muoto • optimoitu nestekanavien ulostulo • Kiinnitysruuvit art.nro. 4071 ja 6128 mukana • Ruuvimeisseli art.nro. 1612 mukana

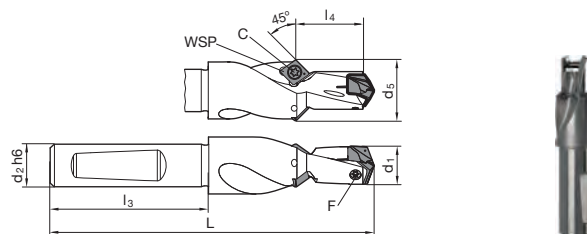
M
K
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S alkureikä ja viiste 45°
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Vaihtokärjet porausjärjestelmä T 800

GÜHRING NAVIGATOR

Leikkuuarvosivu 764-768

Materiaali	
Pinta	Ni
Varren muoto	HE



Artikkelinro. 4105

d1	d2 h6	d5	L	l3	l4	WSP	C	F	koodinro.
mm	mm	mm	mm	mm	mm				
11,00-11,99	12,000	17,000	81,000	45,000	12,000	CP..0502..	6128 2.000	4071 2.200	11,000
11,00-11,99	12,700	17,000	81,000	45,000	12,000	CP..0502..	6128 2.000	4071 2.200	11,005
12,00-12,99	12,000	18,000	84,000	45,000	13,000	CP..0502..	6128 2.000	4071 2.201	12,000
12,00-12,99	12,700	18,000	84,000	45,000	13,000	CP..0502..	6128 2.000	4071 2.201	12,005
13,00-13,99	14,000	18,000	86,000	45,000	14,000	CP..0502..	6128 2.000	4071 2.500	13,000
13,00-13,99	15,875	18,000	86,000	45,000	14,000	CP..0502..	6128 2.000	4071 2.500	13,005
14,00-15,99	16,000	18,000	93,000	48,000	16,000	CP..0502..	6128 2.000	4071 3.000	14,000
14,00-15,99	15,875	18,000	93,000	48,000	16,000	CP..0502..	6128 2.000	4071 3.000	14,005
16,00-17,99	18,000	20,000	99,000	48,000	18,000	CP..0602..	6128 2.500	4071 3.500	16,000
16,00-17,99	19,050	20,000	99,000	48,000	18,000	CP..0602..	6128 2.500	4071 3.500	16,005
18,00-19,99	20,000	22,000	106,000	50,000	20,000	CP..0602..	6128 2.500	4071 4.000	18,000
18,00-19,99	19,050	22,000	106,000	50,000	20,000	CP..0602..	6128 2.500	4071 4.000	18,005
20,00-21,99	25,000	25,000	117,000	56,000	22,000	CP..0602..	6128 2.500	4071 4.500	20,000
20,00-21,99	25,400	25,400	117,000	56,000	22,000	CP..0602..	6128 2.500	4071 4.500	20,005
22,00-23,99	25,000	26,000	122,000	56,000	24,000	CP..0602..	6128 2.500	4071 5.000	22,000
22,00-23,99	25,400	26,000	122,000	56,000	24,000	CP..0602..	6128 2.500	4071 5.000	22,005
24,00-25,99	25,000	28,000	128,000	56,000	26,000	CP..0602..	6128 2.500	4071 5.001	24,000
24,00-25,99	25,400	28,000	128,000	56,000	26,000	CP..0602..	6128 2.500	4071 5.001	24,005
26,00-27,99	32,000	32,000	142,000	60,000	28,000	CP..0602..	6128 2.500	4071 5.003	26,000
26,00-27,99	31,750	32,000	142,000	60,000	28,000	CP..0602..	6128 2.500	4071 5.003	26,005
28,00-29,99	32,000	34,000	147,000	60,000	30,000	CP..0602..	6128 2.500	4071 5.003	28,000
28,00-29,99	31,750	34,000	147,000	60,000	30,000	CP..09T3..	6128 2.500	4071 5.003	28,005
30,00-31,99	32,000	38,000	152,000	60,000	32,000	CP..09T3..	6128 4.006	4071 6.000	30,000
30,00-31,99	31,750	38,000	152,000	60,000	32,000	CP..09T3..	6128 4.006	4071 6.000	30,005
32,00-35,99	32,000	42,000	163,000	60,000	36,000	CP..09T3..	6128 4.006	4071 6.001	32,000
32,00-35,99	31,750	42,000	163,000	60,000	36,000	CP..09T3..	6128 4.006	4071 6.001	32,005
36,00-40,00	32,000	46,000	173,000	60,000	40,000	CP..09T3..	6128 4.006	4071 6.002	36,000
36,00-40,00	31,750	46,000	173,000	60,000	40,000	CP..09T3..	6128 4.006	4071 6.002	36,005



Vaihtokärjet HT 800



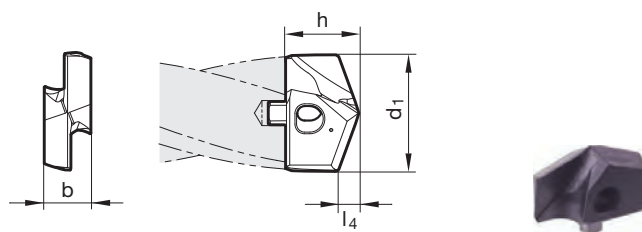
P ●	Kärjen kevennys $\geq \varnothing 11,000$ • päästöhiottu kärki
M ○	• pääleikkusuärmän suorasta (korjauksella) • Kiinnitysruuvit art. nro. 4071 mukana
K ○	
N □	
S □	rakenne- ja pintakarkaistut teräkset • automaattiteräkset, nuorrutetut teräkset • seostetut teräkset < 1200 N/mm ² asti
H □	

GÜHRING NAVIGATOR

Leikkuarvosivu 764-768

Materiaali **TKM**Pinta **F**

Varren muoto

Artikkelinro. **4112**

d1		l4	b	h	koodinro.
mm	inch	mm	mm	mm	
11,000		2,100	4,500	7,500	11,000
11,200		2,100	4,500	7,500	11,200
11,500		2,100	4,500	7,500	11,500
11,510	29/64	2,100	4,500	7,500	11,510
11,700		2,200	4,500	7,500	11,700
11,800		2,200	4,500	7,500	11,800
11,910	15/32	2,200	4,500	7,500	11,910
12,000		2,200	5,000	7,700	12,000
12,100		2,300	5,000	7,700	12,100
12,200		2,300	5,000	7,700	12,200
12,300	31/64	2,300	5,000	7,700	12,300
12,500		2,300	5,000	7,700	12,500
12,600		2,300	5,000	7,700	12,600
12,700	1/2	2,400	5,000	7,700	12,700
12,800		2,400	5,000	7,700	12,800
12,900		2,400	5,000	7,700	12,900
13,000		2,400	5,500	8,500	13,000
13,100	33/64	2,400	5,500	8,500	13,100
13,300		2,500	5,500	8,500	13,300
13,490	17/32	2,500	5,500	8,500	13,490
13,500		2,500	5,500	8,500	13,500
13,600		2,500	5,500	8,500	13,600
13,700		2,500	5,500	8,500	13,700
13,800		2,600	5,500	8,500	13,800
13,890	35/64	2,600	5,500	8,500	13,890
14,000		2,600	6,000	9,600	14,000
14,100		2,600	6,000	9,600	14,100
14,290	9/16	2,700	6,000	9,600	14,290
14,400		2,700	6,000	9,600	14,400
14,500		2,700	6,000	9,600	14,500
14,600		2,700	6,000	9,600	14,600
14,680	37/64	2,700	6,000	9,600	14,680
14,700		2,700	6,000	9,600	14,700
14,800		2,700	6,000	9,600	14,800
15,000		2,800	6,000	9,800	15,000
15,080	19/32	2,800	6,000	9,800	15,080
15,100		2,800	6,000	9,800	15,100
15,200		2,800	6,000	9,800	15,200
15,300		2,800	6,000	9,800	15,300
15,480	39/64	2,900	6,000	9,800	15,480
15,500		2,900	6,000	9,800	15,500
15,600		2,900	6,000	9,800	15,600



d1		l4	b	h	koodinro.
mm	inch	mm	mm	mm	
15,700		2,900	6,000	9,800	15,700
15,800		2,900	6,000	9,800	15,800
15,870	5/8	2,900	6,000	9,800	15,870
16,000		3,000	7,000	11,000	16,000
16,270	41/64	3,000	7,000	11,000	16,270
16,500		3,100	7,000	11,000	16,500
16,670	21/32	3,100	7,000	11,000	16,670
17,000		3,100	7,000	11,000	17,000
17,070	43/64	3,200	7,000	11,000	17,070
17,300		3,200	7,000	11,000	17,300
17,460	11/16	3,200	7,000	11,000	17,460
17,500		3,200	7,000	11,000	17,500
17,600		3,300	7,000	11,000	17,600
17,860	45/64	3,300	7,000	11,000	17,860
18,000		3,300	8,000	12,600	18,000
18,260	23/32	3,400	8,000	12,600	18,260
18,500		3,400	8,000	12,600	18,500
18,650	47/64	3,400	8,000	12,600	18,650
18,900		3,500	8,000	12,600	18,900
19,000		3,500	8,000	12,600	19,000
19,050	3/4	3,500	8,000	12,600	19,050
19,250		3,600	8,000	12,600	19,250
19,300		3,600	8,000	12,600	19,300
19,450	49/64	3,600	8,000	12,600	19,450
19,500		3,600	8,000	12,600	19,500
19,600		3,600	8,000	12,600	19,600
19,840	25/32	3,700	8,000	12,600	19,840
20,000		3,700	9,000	13,900	20,000
20,240	51/64	3,700	9,000	13,900	20,240
20,500		3,800	9,000	13,900	20,500
20,640	13/16	3,800	9,000	13,900	20,640
20,900		3,900	9,000	13,900	20,900
21,000		3,900	9,000	13,900	21,000
21,030	53/64	3,900	9,000	13,900	21,030
21,100		3,900	9,000	13,900	21,100
21,430	27/32	3,900	9,000	13,900	21,430
21,500		4,000	9,000	13,900	21,500
21,700		4,000	9,000	13,900	21,700
21,830	55/64	4,000	9,000	13,900	21,830
22,000		4,100	10,000	15,300	22,000
22,220	7/8	4,100	10,000	15,300	22,220
22,500		4,100	10,000	15,300	22,500
22,620	57/64	4,200	10,000	15,300	22,620
22,700		4,200	10,000	15,300	22,700
23,000		4,200	10,000	15,300	23,000
23,020	29/32	4,200	10,000	15,300	23,020
23,420	59/64	4,300	10,000	15,300	23,420
23,500		4,300	10,000	15,300	23,500
23,700		4,400	10,000	15,300	23,700
23,810	15/16	4,400	10,000	15,300	23,810
24,000		4,400	11,000	15,800	24,000
24,100		4,400	11,000	15,800	24,100
24,210	61/64	4,500	11,000	15,800	24,210
24,500		4,500	11,000	15,800	24,500
24,610	31/32	4,500	11,000	15,800	24,610
25,000	63/64	4,600	11,000	15,800	25,000
25,400	1	4,700	11,000	15,800	25,400
25,500		4,700	11,000	15,800	25,500
25,670		4,700	11,000	15,800	25,670
25,700		4,700	11,000	15,800	25,700
25,810		4,700	11,000	15,800	25,810
26,000		4,800	12,000	20,000	26,000
26,190	1 1/32	4,800	12,000	20,000	26,190
26,500		4,900	12,000	20,000	26,500
26,590	1 3/64	4,900	12,000	20,000	26,590
27,000		5,000	12,000	20,000	27,000
27,500		5,100	12,000	20,000	27,500
27,700		5,100	12,000	20,000	27,700
27,780	1 3/32	5,100	12,000	20,000	27,780
28,000		5,100	13,000	20,700	28,000
28,180	1 7/64	5,200	13,000	20,700	28,180
28,500		5,200	13,000	20,700	28,500



d1		l4	b	h	koodinro.
mm	inch	mm	mm	mm	
28,580		5,300	13,000	20,700	28,580
29,000		5,300	13,000	20,700	29,000
29,370	1 5/32	5,400	13,000	20,700	29,370
29,500		5,400	13,000	20,700	29,500
29,600		5,400	13,000	20,700	29,600
29,770	1 11/64	5,500	13,000	20,700	29,770
30,000		5,500	14,000	22,300	30,000
30,160	1 3/16	5,500	14,000	22,300	30,160
30,500		5,600	14,000	22,300	30,500
30,960	1 7/32	5,700	14,000	22,300	30,960
31,000		5,700	14,000	22,300	31,000
31,500		5,800	14,000	22,300	31,500
31,750	1 1/4	5,800	14,000	22,300	31,750
32,000		5,900	15,000	23,100	32,000
32,500		6,000	15,000	23,100	32,500
32,540	1 9/32	6,000	15,000	23,100	32,540
32,940	1 19/64	6,000	15,000	23,100	32,940
33,000		6,100	15,000	23,100	33,000
33,340	1 5/16	6,100	15,000	23,100	33,340
33,500		6,100	15,000	23,100	33,500
34,000		6,200	15,000	23,100	34,000
34,130	1 11/32	6,300	15,000	23,100	34,130
34,500		6,300	15,000	23,100	34,500
34,930		6,400	15,000	23,100	34,930
35,000		6,400	15,000	23,100	35,000
35,500		6,500	15,000	23,100	35,500
35,720	1 13/32	6,600	15,000	23,100	35,720
36,000		6,600	16,000	23,900	36,000
36,500		6,700	16,000	23,900	36,500
36,510	1 7/16	6,700	16,000	23,900	36,510
37,000		6,800	16,000	23,900	37,000
37,310	1 15/32	6,800	16,000	23,900	37,310
37,500		6,900	16,000	23,900	37,500
38,000		7,000	16,000	23,900	38,000
38,100	1 1/2	7,000	16,000	23,900	38,100
38,500	1 33/64	7,100	16,000	23,900	38,500
39,000		7,100	16,000	23,900	39,000
39,500		7,200	16,000	23,900	39,500
40,000		7,300	16,000	23,900	40,000



Vaihtokärjet HT 800

Materiaali **TKM**Pinta **F**

Varren muoto

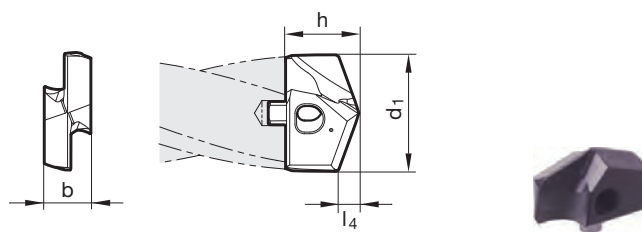
P ○ Kärjen kevennys $\geq \varnothing 11,000$ • päästöhiottu kärki
• pääleikkuusärmän suorasta (korjauksella) • Kiinnitysruuvit art. nro. 4071 mukana

M **K** ●
N
S pallografiittivalurauta GGV • harmaavalu-, taottava- ja pallografiittivalurauta
H

Vaihtokärjet porausjärjestelmä T 800

GÜHRING NAVIGATOR

Leikkuuarvosivu 764-768

Artikkelinro. **4113**

d1		l4	b	h	koodinro.
mm	inch	mm	mm	mm	
11,000		2,700	4,500	7,500	11,000
11,200		2,700	4,500	7,500	11,200
11,500		2,800	4,500	7,500	11,500
11,510	29/64	2,800	4,500	7,500	11,510
11,700		2,800	4,500	7,500	11,700
11,800		2,800	4,500	7,500	11,800
11,910	15/32	2,800	4,500	7,500	11,910
12,000		2,900	5,000	7,700	12,000
12,100		2,900	5,000	7,700	12,100
12,200		2,900	5,000	7,700	12,200
12,300	31/64	2,900	5,000	7,700	12,300
12,500		3,100	5,000	7,700	12,500
12,600		3,100	5,000	7,700	12,600
12,700	1/2	3,100	5,000	7,700	12,700
12,800		3,100	5,000	7,700	12,800
12,900		3,100	5,000	7,700	12,900
13,000		3,200	5,500	8,500	13,000
13,100	33/64	3,200	5,500	8,500	13,100
13,300		3,200	5,500	8,500	13,300
13,490	17/32	3,200	5,500	8,500	13,490
13,500		3,300	5,500	8,500	13,500
13,600		3,300	5,500	8,500	13,600
13,700		3,300	5,500	8,500	13,700
13,800		3,300	5,500	8,500	13,800
13,890	35/64	3,300	5,500	8,500	13,890
14,000		3,400	6,000	9,600	14,000
14,100		3,400	6,000	9,600	14,100
14,290	9/16	3,400	6,000	9,600	14,290
14,400		3,400	6,000	9,600	14,400
14,500		3,600	6,000	9,600	14,500
14,600		3,600	6,000	9,600	14,600
14,680	37/64	3,600	6,000	9,600	14,680
14,700		3,600	6,000	9,600	14,700
14,800		3,600	6,000	9,600	14,800
15,000		3,700	6,000	9,800	15,000
15,080	19/32	3,700	6,000	9,800	15,080
15,100		3,700	6,000	9,800	15,100
15,200		3,700	6,000	9,800	15,200
15,300		3,700	6,000	9,800	15,300
15,480	39/64	3,700	6,000	9,800	15,480
15,500		3,800	6,000	9,800	15,500
15,600		3,800	6,000	9,800	15,600



d1		l4	b	h	koodinro.
mm	inch	mm	mm	mm	
15,700		3,800	6,000	9,800	15,700
15,800		3,800	6,000	9,800	15,800
15,870	5/8	3,800	6,000	9,800	15,870
16,000		3,900	7,000	11,000	16,000
16,270	41/64	3,900	7,000	11,000	16,270
16,500		4,100	7,000	11,000	16,500
16,670	21/32	4,100	7,000	11,000	16,670
17,000		4,200	7,000	11,000	17,000
17,070	43/64	4,200	7,000	11,000	17,070
17,300		4,200	7,000	11,000	17,300
17,460	11/16	4,200	7,000	11,000	17,460
17,500		4,300	7,000	11,000	17,500
17,600		4,300	7,000	11,000	17,600
17,860	45/64	4,300	7,000	11,000	17,860
18,000		4,400	8,000	12,600	18,000
18,260	23/32	4,400	8,000	12,600	18,260
18,500		4,500	8,000	12,600	18,500
18,650	47/64	4,500	8,000	12,600	18,650
18,900		4,500	8,000	12,600	18,900
19,000		4,700	8,000	12,600	19,000
19,050	3/4	4,700	8,000	12,600	19,050
19,250		4,700	8,000	12,600	19,250
19,300		4,700	8,000	12,600	19,300
19,450	49/64	4,700	8,000	12,600	19,450
19,500		4,800	8,000	12,600	19,500
19,600		4,800	8,000	12,600	19,600
19,840	25/32	4,800	8,000	12,600	19,840
20,000		4,900	9,000	13,900	20,000
20,240	51/64	4,900	9,000	13,900	20,240
20,500		5,100	9,000	13,900	20,500
20,640	13/16	5,100	9,000	13,900	20,640
20,900		5,100	9,000	13,900	20,900
21,000		5,200	9,000	13,900	21,000
21,030	53/64	5,200	9,000	13,900	21,030
21,100		5,200	9,000	13,900	21,100
21,430	27/32	5,200	9,000	13,900	21,430
21,500		5,300	9,000	13,900	21,500
21,700		5,300	9,000	13,900	21,700
21,830	55/64	5,300	9,000	13,900	21,830
22,000		5,400	10,000	15,300	22,000
22,220	7/8	5,400	10,000	15,300	22,220
22,500		5,600	10,000	15,300	22,500
22,620	57/64	5,600	10,000	15,300	22,620
22,700		5,600	10,000	15,300	22,700
23,000		5,700	10,000	15,300	23,000
23,020	29/32	5,700	10,000	15,300	23,020
23,420	59/64	5,700	10,000	15,300	23,420
23,500		5,800	10,000	15,300	23,500
23,700		5,800	10,000	15,300	23,700
23,810	15/16	5,800	10,000	15,300	23,810
24,000		6,000	11,000	15,800	24,000
24,100		6,000	11,000	15,800	24,100
24,210	61/64	6,000	11,000	15,800	24,210
24,500		6,100	11,000	15,800	24,500
24,610	31/32	6,100	11,000	15,800	24,610
25,000	63/64	6,200	11,000	15,800	25,000
25,400	1	6,200	11,000	15,800	25,400
25,500		6,300	11,000	15,800	25,500
25,670		6,300	11,000	15,800	25,670
25,700		6,300	11,000	15,800	25,700
25,810		6,300	11,000	15,800	25,810
26,000		6,400	12,000	20,000	26,000
26,190	1 1/32	6,400	12,000	20,000	26,190
26,500		6,500	12,000	20,000	26,500
26,590	1 3/64	6,500	12,000	20,000	26,590
27,000		6,600	12,000	20,000	27,000
27,500		6,700	12,000	20,000	27,500
27,700		6,700	12,000	20,000	27,700
27,780	1 3/32	6,700	12,000	20,000	27,780
28,000		6,800	13,000	20,700	28,000
28,180	1 7/64	6,800	13,000	20,700	28,180
28,500		6,900	13,000	20,700	28,500



d1		l4	b	h	koodinro.
mm	inch	mm	mm	mm	
28,580		6,900	13,000	20,700	28,580
29,000		7,100	13,000	20,700	29,000
29,370	1 5/32	7,100	13,000	20,700	29,370
29,500		7,200	13,000	20,700	29,500
29,770	1 11/64	7,200	13,000	20,700	29,770
30,000		7,300	14,000	22,300	30,000
30,160	1 3/16	7,300	14,000	22,300	30,160
30,500		7,400	14,000	22,300	30,500
30,960	1 7/32	7,400	14,000	22,300	30,960
31,000		7,500	14,000	22,300	31,000
31,500		7,600	14,000	22,300	31,500
31,750	1 1/4	7,600	14,000	22,300	31,750
32,000		7,700	15,000	23,100	32,000
32,500		7,800	15,000	23,100	32,500
32,540	1 9/32	7,800	15,000	23,100	32,540
32,940	1 19/64	7,800	15,000	23,100	32,940
33,000		7,900	15,000	23,100	33,000
33,340	1 5/16	7,900	15,000	23,100	33,340
33,500		8,100	15,000	23,100	33,500
34,000		8,200	15,000	23,100	34,000
34,130	1 11/32	8,200	15,000	23,100	34,130
34,500		8,400	15,000	23,100	34,500
34,930		8,400	15,000	23,100	34,930
35,000		8,500	15,000	23,100	35,000
35,500		8,600	15,000	23,100	35,500
35,720	1 13/32	8,600	15,000	23,100	35,720
36,000		8,700	16,000	23,900	36,000
36,500		8,800	16,000	23,900	36,500
36,510	1 7/16	8,800	16,000	23,900	36,510
37,000		9,000	16,000	23,900	37,000
37,310	1 15/32	9,000	16,000	23,900	37,310
37,500		9,100	16,000	23,900	37,500
38,000		9,200	16,000	23,900	38,000
38,100	1 1/2	9,200	16,000	23,900	38,100
38,500	1 33/64	9,400	16,000	23,900	38,500
39,000		9,500	16,000	23,900	39,000
39,500		9,700	16,000	23,900	39,500
40,000		9,700	16,000	23,900	40,000

Vaihtokärjet poraus-
järjestelmä T 800



Vaihtokärjet HT 800



P	○	Kärjen kevennys $\geq \varnothing 11,000$ • kartiovaippahionta
M	●	• pääleikkusuärmän suorasta (korjauksella) • Kiinnitysruuvit art. nro. 4071 mukana
K		
N		
S	○	ruostumattomat teräkset
H	○	

GÜHRING NAVIGATOR

Leikkuarvosivu 764-768

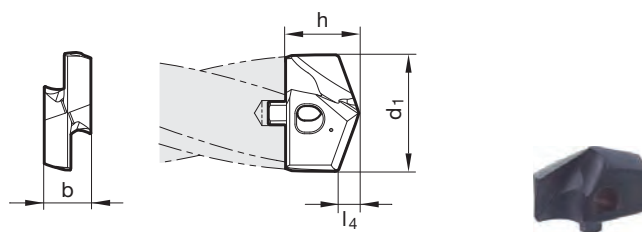
Materiaali

TKM

Pinta

a

Varren muoto



Artikkelinro.

4115

d1		l4	b	h	koodinro.
mm	inch	mm	mm	mm	
11,000		2,100	4,500	7,500	11,000
11,200		2,100	4,500	7,500	11,200
11,500		2,100	4,500	7,500	11,500
11,510	29/64	2,100	4,500	7,500	11,510
11,700		2,200	4,500	7,500	11,700
11,800		2,200	4,500	7,500	11,800
11,910	15/32	2,200	4,500	7,500	11,910
12,000		2,200	5,000	7,700	12,000
12,100		2,300	5,000	7,700	12,100
12,200		2,300	5,000	7,700	12,200
12,300	31/64	2,300	5,000	7,700	12,300
12,500		2,300	5,000	7,700	12,500
12,600		2,300	5,000	7,700	12,600
12,700	1/2	2,400	5,000	7,700	12,700
12,800		2,400	5,000	7,700	12,800
12,900		2,400	5,000	7,700	12,900
13,000		2,400	5,500	8,500	13,000
13,100	33/64	2,400	5,500	8,500	13,100
13,490	17/32	2,500	5,500	8,500	13,490
13,500		2,500	5,500	8,500	13,500
13,600		2,500	5,500	8,500	13,600
13,700		2,500	5,500	8,500	13,700
13,800		2,600	5,500	8,500	13,800
13,890	35/64	2,600	5,500	8,500	13,890
14,000		2,600	6,000	9,600	14,000
14,100		2,600	6,000	9,600	14,100
14,290	9/16	2,700	6,000	9,600	14,290
14,400		2,700	6,000	9,600	14,400
14,500		2,700	6,000	9,600	14,500
14,600		2,700	6,000	9,600	14,600
14,700		2,700	6,000	9,600	14,700
14,800		2,700	6,000	9,600	14,800
15,000		2,800	6,000	9,800	15,000
15,080	19/32	2,800	6,000	9,800	15,080
15,100		2,800	6,000	9,800	15,100
15,200		2,800	6,000	9,800	15,200
15,300		2,800	6,000	9,800	15,300
15,500		2,900	6,000	9,800	15,500
15,600		2,900	6,000	9,800	15,600
15,700		2,900	6,000	9,800	15,700
15,800		2,900	6,000	9,800	15,800
15,870	5/8	2,900	6,000	9,800	15,870



d1		l4	b	h	koodinro.
mm	inch	mm	mm	mm	
16,000		3,000	7,000	11,000	16,000
16,270	41/64	3,000	7,000	11,000	16,270
16,500		3,100	7,000	11,000	16,500
16,670	21/32	3,100	7,000	11,000	16,670
17,000		3,100	7,000	11,000	17,000
17,070	43/64	3,200	7,000	11,000	17,070
17,460	11/16	3,200	7,000	11,000	17,460
17,500		3,200	7,000	11,000	17,500
17,600		3,300	7,000	11,000	17,600
17,860	45/64	3,300	7,000	11,000	17,860
18,000		3,300	8,000	12,600	18,000
18,260	23/32	3,400	8,000	12,600	18,260
18,500		3,400	8,000	12,600	18,500
18,650	47/64	3,400	8,000	12,600	18,650
19,000		3,500	8,000	12,600	19,000
19,050	3/4	3,500	8,000	12,600	19,050
19,250		3,600	8,000	12,600	19,250
19,450	49/64	3,600	8,000	12,600	19,450
19,500		3,600	8,000	12,600	19,500
19,600		3,600	8,000	12,600	19,600
19,840	25/32	3,700	8,000	12,600	19,840
20,000		3,700	9,000	13,900	20,000
20,240	51/64	3,700	9,000	13,900	20,240
20,500		3,800	9,000	13,900	20,500
20,640	13/16	3,800	9,000	13,900	20,640
21,000		3,900	9,000	13,900	21,000
21,030	53/64	3,900	9,000	13,900	21,030
21,100		3,900	9,000	13,900	21,100
21,430	27/32	3,900	9,000	13,900	21,430
21,500		4,000	9,000	13,900	21,500
21,830	55/64	4,000	9,000	13,900	21,830
22,000		4,100	10,000	15,300	22,000
22,220	7/8	4,100	10,000	15,300	22,220
22,500		4,100	10,000	15,300	22,500
22,620	57/64	4,200	10,000	15,300	22,620
23,000		4,200	10,000	15,300	23,000
23,020	29/32	4,200	10,000	15,300	23,020
23,420	59/64	4,300	10,000	15,300	23,420
23,500		4,300	10,000	15,300	23,500
23,810	15/16	4,400	10,000	15,300	23,810
24,000		4,400	11,000	15,800	24,000
24,100		4,400	11,000	15,800	24,100
24,210	61/64	4,500	11,000	15,800	24,210
24,500		4,500	11,000	15,800	24,500
24,610	31/32	4,500	11,000	15,800	24,610
25,000	63/64	4,600	11,000	15,800	25,000
25,400	1	4,700	11,000	15,800	25,400
25,500		4,700	11,000	15,800	25,500
25,700		4,700	11,000	15,800	25,700
26,000		4,800	12,000	20,000	26,000
26,190	1 1/32	4,800	12,000	20,000	26,190
26,500		4,900	12,000	20,000	26,500
26,590	1 3/64	4,900	12,000	20,000	26,590
27,000		5,000	12,000	20,000	27,000
27,500		5,100	12,000	20,000	27,500
27,700		5,100	12,000	20,000	27,700
27,780	1 3/32	5,100	12,000	20,000	27,780
28,000		5,100	13,000	20,700	28,000
28,180	1 7/64	5,200	13,000	20,700	28,180
28,500		5,200	13,000	20,700	28,500
28,580		5,300	13,000	20,700	28,580
29,000		5,300	13,000	20,700	29,000
29,370	1 5/32	5,400	13,000	20,700	29,370
29,500		5,400	13,000	20,700	29,500
29,770	1 11/64	5,500	13,000	20,700	29,770
30,000		5,500	14,000	22,300	30,000
30,160	1 3/16	5,500	14,000	22,300	30,160
30,500		5,600	14,000	22,300	30,500
30,960	1 7/32	5,700	14,000	22,300	30,960
31,000		5,700	14,000	22,300	31,000
31,500		5,800	14,000	22,300	31,500
31,750	1 1/4	5,800	14,000	22,300	31,750



d1		l4	b	h	koodinro.
mm	inch	mm	mm	mm	
32,000		5,900	15,000	23,100	32,000
32,500		6,000	15,000	23,100	32,500
32,540	1 9/32	6,000	15,000	23,100	32,540
33,000		6,100	15,000	23,100	33,000
33,340	1 5/16	6,100	15,000	23,100	33,340
33,500		6,100	15,000	23,100	33,500
34,000		6,200	15,000	23,100	34,000
34,130	1 11/32	6,300	15,000	23,100	34,130
34,500		6,300	15,000	23,100	34,500
34,930		6,400	15,000	23,100	34,930
35,000		6,400	15,000	23,100	35,000
35,500		6,500	15,000	23,100	35,500
35,720	1 13/32	6,600	15,000	23,100	35,720
36,000		6,600	16,000	23,900	36,000
36,500		6,700	16,000	23,900	36,500
36,510	1 7/16	6,700	16,000	23,900	36,510
37,000		6,800	16,000	23,900	37,000
37,310	1 15/32	6,800	16,000	23,900	37,310
37,500		6,900	16,000	23,900	37,500
38,000		7,000	16,000	23,900	38,000
38,100	1 1/2	7,000	16,000	23,900	38,100
38,500	1 33/64	7,100	16,000	23,900	38,500
39,000		7,100	16,000	23,900	39,000
39,500		7,200	16,000	23,900	39,500
40,000		7,300	16,000	23,900	40,000



Vaihtokärjet HT 800



P Kärjen kevennys $\geq \varnothing 11,000$ • kartiovaippahionta
M • pääleikkusuärmän kaarteesta • Kiinnitysruuvit art.nro. 4071 mukana

K
N •
S alumiini ja Al-seokset • ei-rautametallit
H

Vaihtokärjet porausjärjestelmä T 800

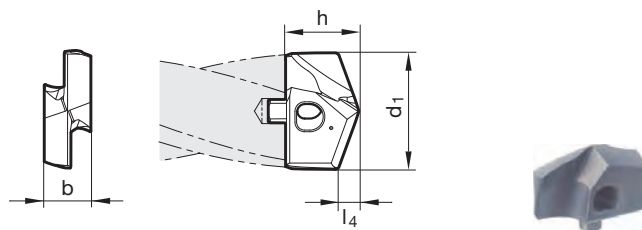
Materiaali **TKM**

Pinta ○

Varren muoto

GÜHRING NAVIGATOR

Leikkuarvosivu 764-768

Artikkelinro. **4114**

d1		l4	b	h	koodinro.
mm	inch	mm	mm	mm	
11,000		2,100	4,500	7,500	11,000
11,200		2,100	4,500	7,500	11,200
11,500		2,100	4,500	7,500	11,500
11,510	29/64	2,100	4,500	7,500	11,510
11,700		2,200	4,500	7,500	11,700
11,800		2,200	4,500	7,500	11,800
11,910	15/32	2,200	4,500	7,500	11,910
12,000		2,200	5,000	7,700	12,000
12,100		2,300	5,000	7,700	12,100
12,200		2,300	5,000	7,700	12,200
12,300	31/64	2,300	5,000	7,700	12,300
12,500		2,300	5,000	7,700	12,500
12,600		2,300	5,000	7,700	12,600
12,700	1/2	2,400	5,000	7,700	12,700
12,800		2,400	5,000	7,700	12,800
12,900		2,400	5,000	7,700	12,900
13,000		2,400	5,500	8,500	13,000
13,100	33/64	2,400	5,500	8,500	13,100
13,490	17/32	2,500	5,500	8,500	13,490
13,500		2,500	5,500	8,500	13,500
13,600		2,500	5,500	8,500	13,600
13,700		2,500	5,500	8,500	13,700
13,800		2,600	5,500	8,500	13,800
13,890	35/64	2,600	5,500	8,500	13,890
14,000		2,600	6,000	9,600	14,000
14,100		2,600	6,000	9,600	14,100
14,290	9/16	2,700	6,000	9,600	14,290
14,400		2,700	6,000	9,600	14,400
14,500		2,700	6,000	9,600	14,500
14,600		2,700	6,000	9,600	14,600
14,680	37/64	2,700	6,000	9,600	14,680
14,700		2,700	6,000	9,600	14,700
14,800		2,700	6,000	9,600	14,800
15,000		2,800	6,000	9,800	15,000
15,080	19/32	2,800	6,000	9,800	15,080
15,100		2,800	6,000	9,800	15,100
15,200		2,800	6,000	9,800	15,200
15,300		2,800	6,000	9,800	15,300
15,480	39/64	2,900	6,000	9,800	15,480
15,500		2,900	6,000	9,800	15,500
15,600		2,900	6,000	9,800	15,600
15,700		2,900	6,000	9,800	15,700



d1		l4	b	h	koodinro.
mm	inch	mm	mm	mm	
15,800		2,900	6,000	9,800	15,800
15,870	5/8	2,900	6,000	9,800	15,870
16,000		3,000	7,000	11,000	16,000
16,270	41/64	3,000	7,000	11,000	16,270
16,500		3,100	7,000	11,000	16,500
16,670	21/32	3,100	7,000	11,000	16,670
17,000		3,100	7,000	11,000	17,000
17,070	43/64	3,200	7,000	11,000	17,070
17,460	11/16	3,200	7,000	11,000	17,460
17,500		3,200	7,000	11,000	17,500
17,600		3,300	7,000	11,000	17,600
17,860	45/64	3,300	7,000	11,000	17,860
18,000		3,300	8,000	12,600	18,000
18,260	23/32	3,400	8,000	12,600	18,260
18,500		3,400	8,000	12,600	18,500
18,650	47/64	3,400	8,000	12,600	18,650
19,000		3,500	8,000	12,600	19,000
19,050	3/4	3,500	8,000	12,600	19,050
19,250		3,600	8,000	12,600	19,250
19,450	49/64	3,600	8,000	12,600	19,450
19,500		3,600	8,000	12,600	19,500
19,600		3,600	8,000	12,600	19,600
19,840	25/32	3,700	8,000	12,600	19,840
20,000		3,700	9,000	13,900	20,000
20,240	51/64	3,700	9,000	13,900	20,240
20,500		3,800	9,000	13,900	20,500
20,640	13/16	3,800	9,000	13,900	20,640
21,000		3,900	9,000	13,900	21,000
21,030	53/64	3,900	9,000	13,900	21,030
21,100		3,900	9,000	13,900	21,100
21,430	27/32	3,900	9,000	13,900	21,430
21,500		4,000	9,000	13,900	21,500
21,830	55/64	4,000	9,000	13,900	21,830
22,000		4,100	10,000	15,300	22,000
22,220	7/8	4,100	10,000	15,300	22,220
22,500		4,100	10,000	15,300	22,500
22,620	57/64	4,200	10,000	15,300	22,620
23,000		4,200	10,000	15,300	23,000
23,020	29/32	4,200	10,000	15,300	23,020
23,420	59/64	4,300	10,000	15,300	23,420
23,500		4,300	10,000	15,300	23,500
23,810	15/16	4,400	10,000	15,300	23,810
24,000		4,400	11,000	15,800	24,000
24,100		4,400	11,000	15,800	24,100
24,210	61/64	4,500	11,000	15,800	24,210
24,500		4,500	11,000	15,800	24,500
24,610	31/32	4,500	11,000	15,800	24,610
25,000	63/64	4,600	11,000	15,800	25,000
25,400	1	4,700	11,000	15,800	25,400
25,500		4,700	11,000	15,800	25,500
25,670		4,700	11,000	15,800	25,670
25,700		4,700	11,000	15,800	25,700
25,810		4,700	11,000	15,800	25,810
26,000		4,800	12,000	20,000	26,000
26,190	1 1/32	4,800	12,000	20,000	26,190
26,500		4,900	12,000	20,000	26,500
26,590	1 3/64	4,900	12,000	20,000	26,590
27,000		5,000	12,000	20,000	27,000
27,500		5,100	12,000	20,000	27,500
27,700		5,100	12,000	20,000	27,700
27,780	1 3/32	5,100	12,000	20,000	27,780
28,000		5,100	13,000	20,700	28,000
28,180	1 7/64	5,200	13,000	20,700	28,180
28,500		5,200	13,000	20,700	28,500
28,580		5,300	13,000	20,700	28,580
29,000		5,300	13,000	20,700	29,000
29,370	1 5/32	5,400	13,000	20,700	29,370
29,500		5,400	13,000	20,700	29,500
29,770	1 11/64	5,500	13,000	20,700	29,770
30,000		5,500	14,000	22,300	30,000
30,160	1 3/16	5,500	14,000	22,300	30,160
30,500		5,600	14,000	22,300	30,500



d1		l4	b	h	koodinro.
mm	inch	mm	mm	mm	
30,960	1 7/32	5,700	14,000	22,300	30,960
31,000		5,700	14,000	22,300	31,000
31,500		5,800	14,000	22,300	31,500
31,750	1 1/4	5,800	14,000	22,300	31,750
32,000		5,900	15,000	23,100	32,000
32,500		6,000	15,000	23,100	32,500
32,540	1 9/32	6,000	15,000	23,100	32,540
32,940	1 19/64	6,000	15,000	23,100	32,940
33,000		6,100	15,000	23,100	33,000
33,340	1 5/16	6,100	15,000	23,100	33,340
33,500		6,100	15,000	23,100	33,500
34,000		6,200	15,000	23,100	34,000
34,130	1 11/32	6,300	15,000	23,100	34,130
34,500		6,300	15,000	23,100	34,500
34,930		6,400	15,000	23,100	34,930
35,000		6,400	15,000	23,100	35,000
35,500		6,500	15,000	23,100	35,500
35,720	1 13/32	6,600	15,000	23,100	35,720
36,000		6,600	16,000	23,900	36,000
36,500		6,700	16,000	23,900	36,500
36,510	1 7/16	6,700	16,000	23,900	36,510
37,000		6,800	16,000	23,900	37,000
37,310	1 15/32	6,800	16,000	23,900	37,310
37,500		6,900	16,000	23,900	37,500
38,000		7,000	16,000	23,900	38,000
38,100	1 1/2	7,000	16,000	23,900	38,100
38,500	1 33/64	7,100	16,000	23,900	38,500
39,000		7,100	16,000	23,900	39,000
39,500		7,200	16,000	23,900	39,500
40,000		7,300	16,000	23,900	40,000

Vaihtokärjet poraus-
järjestelmä T 800



Vaihtokärjet HT 800



P	○	Kärjen kevennys $\geq \varnothing 11,000$ • päästöhiottu kärki
M	○	• pääleikkusuärmän suorasta (korjauksella) • Kiinnitysruuvit art. nro. 4071 mukana
K	○	
N	○	
S	○	Alkuporaus kaikkiin materiaaleihin
H	○	

GÜHRING NAVIGATOR

Leikkuarvosivu 768

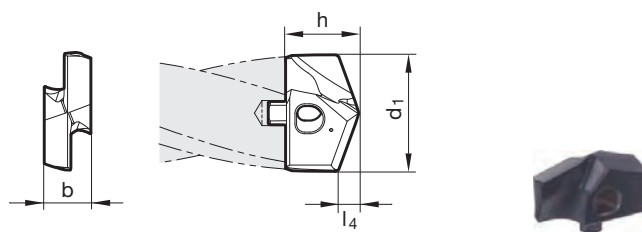
Materiaali

TKM

Pinta

a

Varren muoto



Artikkelinro.

4111

d1		l4	b	h	koodinro.
mm	inch	mm	mm	mm	
11,000		1,800	4,500	7,200	11,000
11,200		1,800	4,500	7,200	11,200
11,500		1,900	4,500	7,200	11,500
11,510	29/64	1,900	4,500	7,200	11,510
11,700		1,900	4,500	7,200	11,700
11,800		1,900	4,500	7,200	11,800
11,910	15/32	1,900	4,500	7,200	11,910
12,000		1,900	5,000	7,400	12,000
12,100		2,000	5,000	7,400	12,100
12,200		2,000	5,000	7,400	12,200
12,300	31/64	2,000	5,000	7,400	12,300
12,500		2,000	5,000	7,400	12,500
12,600		2,000	5,000	7,400	12,600
12,700	1/2	2,100	5,000	7,400	12,700
12,800		2,100	5,000	7,400	12,800
12,900		2,100	5,000	7,400	12,900
13,000		2,100	5,500	8,200	13,000
13,100	33/64	2,100	5,500	8,200	13,100
13,490	17/32	2,200	5,500	8,200	13,490
13,500		2,200	5,500	8,200	13,500
13,600		2,200	5,500	8,200	13,600
13,700		2,200	5,500	8,200	13,700
13,800		2,200	5,500	8,200	13,800
13,890	35/64	2,200	5,500	8,200	13,890
14,000		2,300	6,000	9,400	14,000
14,100		2,300	6,000	9,400	14,100
14,290	9/16	2,300	6,000	9,400	14,290
14,400		2,300	6,000	9,400	14,400
14,500		2,300	6,000	9,400	14,500
14,600		2,400	6,000	9,400	14,600
14,680	37/64	2,400	6,000	9,400	14,680
14,700		2,400	6,000	9,400	14,700
14,800		2,400	6,000	9,400	14,800
15,000		2,400	6,000	9,400	15,000
15,080	19/32	2,400	6,000	9,400	15,080
15,100		2,400	6,000	9,400	15,100
15,200		2,400	6,000	9,400	15,200
15,300		2,500	6,000	9,400	15,300
15,480	39/64	2,500	6,000	9,400	15,480
15,500		2,500	6,000	9,400	15,500
15,600		2,500	6,000	9,400	15,600
15,700		2,500	6,000	9,400	15,700



d1		l4	b	h	koodinro.
mm	inch	mm	mm	mm	
15,800		2,500	6,000	9,400	15,800
15,870	5/8	2,600	6,000	9,400	15,870
16,000		2,600	7,000	10,600	16,000
16,270	41/64	2,600	7,000	10,600	16,270
16,500		2,700	7,000	10,600	16,500
16,670	21/32	2,700	7,000	10,600	16,670
17,000		2,700	7,000	10,600	17,000
17,070	43/64	2,700	7,000	10,600	17,070
17,460	11/16	2,800	7,000	10,600	17,460
17,500		2,800	7,000	10,600	17,500
17,600		2,800	7,000	10,600	17,600
17,860	45/64	2,900	7,000	10,600	17,860
18,000		2,900	8,000	12,100	18,000
18,260	23/32	2,900	8,000	12,100	18,260
18,500		3,000	8,000	12,100	18,500
18,650	47/64	3,000	8,000	12,100	18,650
19,000		3,000	8,000	12,100	19,000
19,050	3/4	3,100	8,000	12,100	19,050
19,450	49/64	3,100	8,000	12,100	19,450
19,500		3,100	8,000	12,100	19,500
19,600		3,100	8,000	12,100	19,600
19,840	25/32	3,200	8,000	12,100	19,840
20,000		3,200	9,000	13,300	20,000
20,240	51/64	3,200	9,000	13,300	20,240
20,500		3,300	9,000	13,300	20,500
20,640	13/16	3,300	9,000	13,300	20,640
21,000		3,400	9,000	13,300	21,000
21,030	53/64	3,400	9,000	13,300	21,030
21,100		3,400	9,000	13,300	21,100
21,430	27/32	3,400	9,000	13,300	21,430
21,500		3,400	9,000	13,300	21,500
21,830	55/64	3,500	9,000	13,300	21,830
22,000		3,500	10,000	14,800	22,000
22,220	7/8	3,600	10,000	14,800	22,220
22,500		3,600	10,000	14,800	22,500
22,620	57/64	3,600	10,000	14,800	22,620
23,000		3,700	10,000	14,800	23,000
23,020	29/32	3,700	10,000	14,800	23,020
23,420	59/64	3,700	10,000	14,800	23,420
23,500		3,800	10,000	14,800	23,500
23,810	15/16	3,800	10,000	14,800	23,810
24,000		3,800	11,000	15,300	24,000
24,100		3,800	11,000	15,300	24,100
24,210	61/64	3,900	11,000	15,300	24,210
24,500		3,900	11,000	15,300	24,500
24,610	31/32	3,900	11,000	15,300	24,610
25,000	63/64	4,000	11,000	15,300	25,000
25,400	1	4,100	11,000	15,300	25,400
25,500		4,100	11,000	15,300	25,500
25,700		4,100	11,000	15,300	25,700
26,000		4,100	12,000	19,400	26,000
26,190	1 1/32	4,200	12,000	19,400	26,190
26,500		4,200	12,000	19,400	26,500
26,590	1 3/64	4,200	12,000	19,400	26,590
27,000		4,300	12,000	19,400	27,000
27,500		4,400	12,000	19,400	27,500
27,700		4,400	12,000	19,400	27,700
27,780	1 3/32	4,400	12,000	19,400	27,780
28,000		4,500	13,000	20,100	28,000
28,180	1 7/64	4,500	13,000	20,100	28,180
28,500		4,500	13,000	20,100	28,500
28,580		4,600	13,000	20,100	28,580
29,000		4,600	13,000	20,100	29,000
29,370	1 5/32	4,700	13,000	20,100	29,370
29,500		4,700	13,000	20,100	29,500
30,000		4,800	14,000	21,700	30,000
30,160	1 3/16	4,800	14,000	21,700	30,160
30,500		4,900	14,000	21,700	30,500
30,960	1 7/32	4,900	14,000	21,700	30,960
31,000		4,900	14,000	21,700	31,000
31,500		5,000	14,000	21,700	31,500
31,750	1 1/4	5,100	14,000	21,700	31,750



d1		l4	b	h	koodinro.
mm	inch	mm	mm	mm	
32,000		5,100	15,000	22,400	32,000
32,500		5,200	15,000	22,400	32,500
32,540	1 9/32	5,200	15,000	22,400	32,540
33,000		5,300	15,000	22,400	33,000
33,340	1 5/16	5,300	15,000	22,400	33,340
33,500		5,300	15,000	22,400	33,500
34,000		5,400	15,000	22,400	34,000
34,130	1 11/32	5,400	15,000	22,400	34,130
34,500		5,500	15,000	22,400	34,500
34,930		5,600	15,000	22,400	34,930
35,000		5,600	15,000	22,400	35,000
35,500		5,600	15,000	22,400	35,500
35,720	1 13/32	5,700	15,000	22,400	35,720
36,000		5,700	16,000	23,200	36,000
36,500		5,800	16,000	23,200	36,500
36,510	1 7/16	5,800	16,000	23,200	36,510
37,000		5,900	16,000	23,200	37,000
37,310	1 15/32	5,900	16,000	23,200	37,310
37,500		6,000	16,000	23,200	37,500
38,000		6,000	16,000	23,200	38,000
38,100	1 1/2	6,100	16,000	23,200	38,100
38,500	1 33/64	6,100	16,000	23,200	38,500
39,000		6,200	16,000	23,200	39,000
39,500		6,300	16,000	23,200	39,500
40,000		6,400	16,000	23,200	40,000



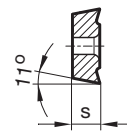
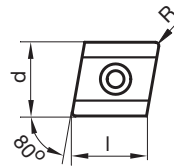
Viistepalat HT 800

Materiaali **TKM**Pinta **S**

Varren muoto

Vaihtokärjet poraus-
järjestelmä T 800

P	●	Kiinnitysruuvit art.nro. 6128 eivät sisälly toimitukseen
M	○	
K	○	
N	○	
S	○	seostettu-/seostamaton teräs ja valuteräs
H	○	

Artikkelinro. **7645**

ISO	d	s	R	l	koodinro.
	mm	mm	mm	mm	
CPGT050202FR-P	5,560	2,380	0,200	5,640	52,020
CPGT050204FR-P	5,560	2,380	0,400	5,640	52,040
CPGT060202FR-P	6,350	2,380	0,200	6,450	62,020
CPGT060204FR-P	6,350	2,380	0,400	6,450	62,040
CPGT09T308FR-P	9,525	3,970	0,800	9,670	93,080



Viistepalat HT 800

Materiaali **TKM**Pinta **A**

Varren muoto

P ○ Kiinnitysruuvit art.nro. 6128 eivät sisälly toimitukseen

M □

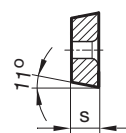
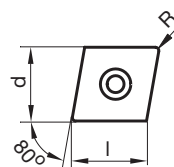
K ●

N □

S □

H □

harmaavalu-, taottava- ja pallografiittivalurauta

Artikkelinro. **7632**

ISO	d	s	R	l	koodinro.
	mm	mm	mm	mm	
CPGW050202FN-K	5,560	2,380	0,200	5,640	52,020
CPGW050204FN-K	5,560	2,380	0,400	5,640	52,040
CPGW060202FN-K	6,350	2,380	0,200	6,450	62,020
CPGW060204FN-K	6,350	2,380	0,400	6,450	62,040
CPGW09T308FN-K	9,525	3,970	0,800	9,670	93,080



Viistepalat HT 800



P Kiinnitysruuvit art.nro. 6128 eivät sisälly toimitukseen

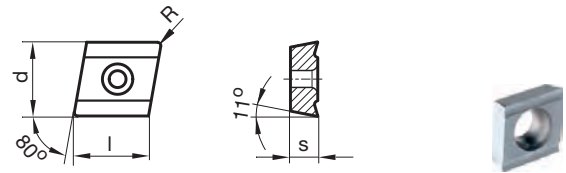


N • alumiini ja Al-seokset • ei-rautametallit

Materiaali **TKM**

Pinta ○

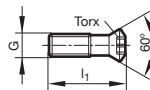
Varren muoto

Vaihtokärjet poraus-
järjestelmä T 800Artikkelinro. **7635**

ISO	d	s	R	l	koodinro.
	mm	mm	mm	mm	
CPGT050202FR-AL	5,560	2,380	0,200	5,640	52,020
CPGT050204FR-AL	5,560	2,380	0,400	5,640	52,040
CPGT060202FR-AL	6,350	2,380	0,200	6,450	62,020
CPGT060204FR-AL	6,350	2,380	0,400	6,450	62,040
CPGT09T308FR-AL	9,525	3,970	0,800	9,670	93,080



Kiinnitysruuvit



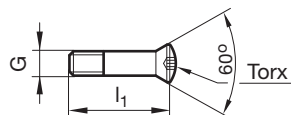
Artikkelinro.

6128

G	l1 mm	Torx	koodinro.
M2 x 5,5	5,500	T6	2,000
M2,2 x 5	5,000	T6	2,200
M2 x 5,3	5,300	T7	2,500
M2,5 x 6,5	6,500	T7	2,501
M2,5 x 5,7	5,700	T7	2,502
M3,5 x 10	10,000	T15	3,500
M3,5 x 12	12,000	T15	3,501
M3,5 x 8,5	8,500	T15	3,502
M3,5 x 8	8,000	T15	3,503
M4 x 13,5	13,500	T15	4,000
M4 x 8,4	8,400	T15	4,001
M4 x 10,8	10,800	T15	4,002
M4 x 0,5	11,000	T15	4,003
M4 x 9,5	9,500	T20	4,004
M4 x 0,5	9,000	T15	4,005
M4 x 9,5	9,500	T15	4,006
M4,5 x 11	11,000	T15	4,500
M4,5 x 7,5	7,500	T15	4,501
M4,5 x 11	11,000	T20	4,502
M5 x 17	17,000	T20	5,000
M5 x 11	11,000	T20	5,001



Kiinnitysruuvit



Artikkelinro.

4071

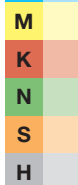
G	l1	Torx	koodinro.
	mm		
M1,6	4,000	T5	1,600
M1,6	4,400	T5	1,601
M2,2	9,500	T7	2,200
M2,2	10,500	T7	2,201
M2,2	5,600	T7	2,202
M2,2	4,600	T7	2,203
M2,5	11,400	T8	2,500
M2,5	6,400	T8	2,501
M2,5	5,200	T8	2,502
M3	13,100	T9	3,001
M3	6,400	T9	3,002
M3	8,000	T9	3,003
M3,5	14,250	T10	3,500
M4	16,000	T15	4,000
M4	7,700	T15	4,001
M4	10,600	T15	4,002
M4,5	18,000	T15	4,500
M5	19,750	T20	5,000
M5	21,750	T20	5,001
M5	14,200	T20	5,002
M5	23,400	T20	5,003
M6	27,000	T25	6,000
M6	28,500	T25	6,001
M6	32,500	T25	6,002



RT 800 runko



P Kärjen kevennys $\geq \text{Ø } 17,000$ • lyhyt rakenne • vaihtokärjen kiinnitysvarmistus pitimessä • Kiinnitysruuvit art.nro. 1071 mukana • Ruuvimeisseli art.nro. 1612 mukana



GÜHRING NAVIGATOR

Leikkuarvosivu 770

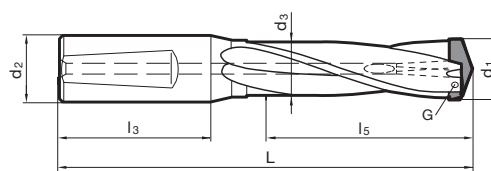
Materiaali

Pinta

Ni

Varren muoto

HE



Artikkelinro.

5242

d1	d2	d3	L	l3	l5	G	koodinro.
mm	mm	mm	mm	mm	mm		
16,00-17,00	20,000	15,700	130,000	50,000	54,000	1071 3.006	17,000
16,00-17,00	19,050	15,700	130,000	50,000	54,000	1071 3.006	17,005
17,01-17,99	20,000	16,700	130,000	50,000	54,000	1071 3.006	17,990
17,01-17,99	19,050	16,700	130,000	50,000	54,000	1071 3.006	17,995
18,00-19,00	20,000	17,700	138,000	50,000	60,000	1071 3.000	19,000
18,00-19,00	19,050	17,700	138,000	50,000	60,000	1071 3.000	19,005
19,01-20,00	20,000	18,700	138,000	50,000	60,000	1071 3.000	20,000
19,01-20,00	19,050	18,700	138,000	50,000	60,000	1071 3.000	20,005
20,01-21,00	25,000	19,700	153,000	56,000	66,000	1071 3.000	21,000
20,01-21,00	25,400	19,700	153,000	56,000	66,000	1071 3.000	21,005
21,01-22,50	25,000	20,700	153,000	56,000	66,000	1071 3.000	22,500
21,01-22,50	25,400	21,200	153,000	56,000	66,000	1071 3.000	22,505
22,51-24,00	25,000	22,200	161,000	56,000	72,000	1071 3.500	24,000
22,51-24,00	25,400	22,700	161,000	56,000	72,000	1071 3.500	24,005
24,01-25,50	25,000	23,700	170,000	56,000	78,000	1071 3.500	25,500
24,01-25,50	25,400	24,200	170,000	56,000	78,000	1071 3.500	25,505
25,51-27,50	32,000	25,200	182,000	60,000	84,000	1071 4.000	27,500
25,51-27,50	31,750	26,200	182,000	60,000	84,000	1071 4.000	27,505
27,51-29,50	32,000	27,200	190,000	60,000	90,000	1071 4.000	29,500
27,51-29,50	31,750	28,200	190,000	60,000	90,000	1071 4.000	29,505
29,51-32,00	32,000	29,200	198,000	60,000	96,000	1071 4.500	32,000
29,51-32,00	31,750	30,700	198,000	60,000	96,000	1071 4.500	32,005
32,01-34,50	32,000	31,700	206,000	60,000	102,000	1071 4.500	34,500
32,01-34,50	31,750	33,200	206,000	60,000	102,000	1071 4.500	34,505
34,51-37,50	32,000	34,000	218,000	60,000	114,000	1071 5.000	37,500
34,51-37,50	31,750	36,200	218,000	60,000	114,000	1071 5.000	37,505
37,51-40,50	32,000	37,000	231,000	60,000	120,000	1071 5.000	40,500
37,51-40,50	31,750	39,200	231,000	60,000	120,000	1071 5.000	40,505



RT 800 runko



Materiaali

Pinta

Ni

Varren muoto

HE

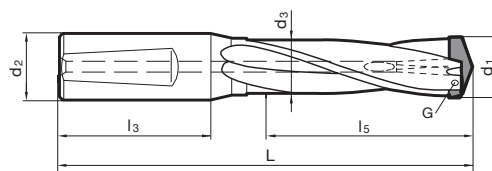
P Kärjen kevennys $\geq \text{Ø } 17,000$ • lyhyt rakenne • vaihtokärjen kiinnitysvarmistus pitimessä • Kiinnitysruuvit art.nro. 1071 mukana • Ruuvimeisseli art.nro. 1612 mukana



Vaihtokärjet porausjärjestelmä T 800

GÜHRING NAVIGATOR

Leikkuarvosivu 770



Artikkelinro.

5243

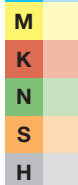
d1	d2	d3	L	l3	l5	G	koodinro.
mm	mm	mm	mm	mm	mm		
16,00-17,00	20,000	15,700	166,000	50,000	90,000	1071 3.006	17,000
16,00-17,00	19,050	15,700	166,000	50,000	90,000	1071 3.006	17,005
17,01-17,99	20,000	16,700	166,000	50,000	90,000	1071 3.006	17,990
17,01-17,99	19,050	16,700	166,000	50,000	90,000	1071 3.006	17,995
18,00-19,00	20,000	17,700	178,000	50,000	100,000	1071 3.000	19,000
18,00-19,00	19,050	17,700	178,000	50,000	100,000	1071 3.000	19,005
19,01-20,00	20,000	18,700	178,000	50,000	100,000	1071 3.000	20,000
19,01-20,00	19,050	18,700	178,000	50,000	100,000	1071 3.000	20,005
20,01-21,00	25,000	19,700	197,000	56,000	110,000	1071 3.000	21,000
20,01-21,00	25,400	19,700	197,000	56,000	110,000	1071 3.000	21,005
21,01-22,50	25,000	20,700	197,000	56,000	110,000	1071 3.000	22,500
21,01-22,50	25,400	21,200	197,000	56,000	110,000	1071 3.000	22,505
22,51-24,00	25,000	22,200	209,000	56,000	120,000	1071 3.500	24,000
22,51-24,00	25,400	22,700	209,000	56,000	120,000	1071 3.500	24,005
24,01-25,50	25,000	23,700	222,000	56,000	130,000	1071 3.500	25,500
24,01-25,50	25,400	24,200	222,000	56,000	130,000	1071 3.500	25,505
25,51-27,50	32,000	25,200	238,000	60,000	140,000	1071 4.000	27,500
25,51-27,50	31,750	26,200	238,000	60,000	140,000	1071 4.000	27,505
27,51-29,50	32,000	27,200	250,000	60,000	150,000	1071 4.000	29,500
27,51-29,50	31,750	28,200	250,000	60,000	150,000	1071 4.000	29,505
29,51-32,00	32,000	29,200	262,000	60,000	160,000	1071 4.500	32,000
29,51-32,00	31,750	30,700	262,000	60,000	160,000	1071 4.500	32,005
32,01-34,50	32,000	31,700	274,000	60,000	170,000	1071 4.500	34,500
32,01-34,50	31,750	33,200	274,000	60,000	170,000	1071 4.500	34,505
34,51-37,50	32,000	34,000	292,000	60,000	190,000	1071 5.000	37,500
34,51-37,50	31,750	36,200	292,000	60,000	190,000	1071 5.000	37,505
37,51-40,50	32,000	37,000	311,000	60,000	200,000	1071 5.000	40,500
37,51-40,50	31,750	39,200	311,000	60,000	200,000	1071 5.000	40,505



RT 800 runko



P Kärjen kevennys $\geq \varnothing 17,000$ • lyhyt rakenne • vaihtokärjen kiinnitysvarmistus pitimessä • Kiinnitysruuvit art.nro. 1071 mukana • Ruuvimeisseli art.nro. 1612 mukana



GÜHRING NAVIGATOR

Leikkuarvosivu 770

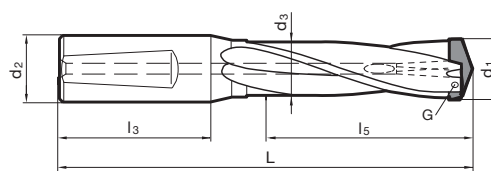
Materiaali

Pinta

Ni

Varren muoto

HE



Artikkelinro.

5248

d1	d2	d3	L	l3	l5	G	koodinro.
mm	mm	mm	mm	mm	mm		
16,00-17,00	20,000	15,700	202,000	50,000	126,000	1071 3.006	17,000
16,00-17,00	19,050	15,700	202,000	50,000	126,000	1071 3.006	17,005
17,01-17,99	20,000	16,700	202,000	50,000	126,000	1071 3.006	17,990
17,01-17,99	19,050	16,700	202,000	50,000	126,000	1071 3.006	17,995
18,00-19,00	20,000	17,700	218,000	50,000	140,000	1071 3.000	19,000
18,00-19,00	19,050	17,700	218,000	50,000	140,000	1071 3.000	19,005
19,01-20,00	20,000	18,700	218,000	50,000	140,000	1071 3.000	20,000
19,01-20,00	19,050	18,700	218,000	50,000	140,000	1071 3.000	20,005
20,01-21,00	25,000	19,700	241,000	56,000	154,000	1071 3.000	21,000
20,01-21,00	25,400	19,700	241,000	56,000	154,000	1071 3.000	21,005
21,01-22,50	25,000	20,700	241,000	56,000	154,000	1071 3.000	22,500
21,01-22,50	25,400	21,200	241,000	56,000	154,000	1071 3.000	22,505
22,51-24,00	25,000	22,200	257,000	56,000	168,000	1071 3.500	24,000
22,51-24,00	25,400	22,700	257,000	56,000	168,000	1071 3.500	24,005
24,01-25,50	25,000	23,700	274,000	56,000	182,000	1071 3.500	25,500
24,01-25,50	25,400	24,200	274,000	56,000	182,000	1071 3.500	25,505
25,51-27,50	32,000	25,200	294,000	60,000	196,000	1071 4.000	27,500
25,51-27,50	31,750	26,200	294,000	60,000	196,000	1071 4.000	27,505
27,51-29,50	32,000	27,200	310,000	60,000	210,000	1071 4.000	29,500
27,51-29,50	31,750	28,200	310,000	60,000	210,000	1071 4.000	29,505
29,51-32,00	32,000	29,200	326,000	60,000	224,000	1071 4.500	32,000
29,51-32,00	31,750	30,700	326,000	60,000	224,000	1071 4.500	32,005
32,01-34,50	32,000	31,700	342,000	60,000	238,000	1071 4.500	34,500
32,01-34,50	31,750	33,200	342,000	60,000	238,000	1071 4.500	34,505
34,51-37,50	32,000	34,000	366,000	60,000	266,000	1071 5.000	37,500
34,51-37,50	31,750	36,200	366,000	60,000	266,000	1071 5.000	37,505
37,51-40,50	32,000	37,000	391,000	60,000	280,000	1071 5.000	40,500
37,51-40,50	31,750	39,200	391,000	60,000	280,000	1071 5.000	40,505



Vaihtokärjet RT 800

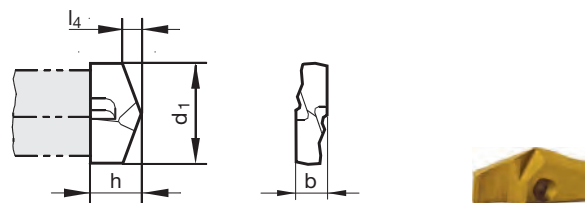
Materiaali **TKM**Pinta **S**

Varren muoto

P • Kärjen kevennys $\geq \varnothing 16,000$ • kartiovaippahionta
• pääleikkusuärmän kaarteesta • Kiinnitysruuvit art.nro. 1071 mukana

M ○**K** •**N** ○**S** ○**H** ○teräkset < 1000 N/mm²Vaihtokärjet poraus-
järjestelmä T 800**GÜHRING** NAVIGATOR

Leikkuarvosivu 770

Artikkelinro. **1047**

d1		l4	b	h	koodinro.
mm	inch	mm	mm	mm	
16,000		3,000	4,500	8,000	16,000
16,270	41/64	3,000	4,500	8,000	16,270
16,500		3,100	4,500	8,000	16,500
16,670	21/32	3,100	4,500	8,000	16,670
17,000		3,100	4,500	8,000	17,000
17,070	43/64	3,200	4,500	8,000	17,070
17,460	11/16	3,200	4,500	8,000	17,460
17,500		3,200	4,500	8,000	17,500
17,860	45/64	3,300	4,500	8,000	17,860
18,000		3,300	5,000	8,000	18,000
18,260	23/32	3,400	5,000	8,000	18,260
18,500		3,400	5,000	8,000	18,500
18,650	47/64	3,400	5,000	8,000	18,650
19,000		3,500	5,000	8,000	19,000
19,050	3/4	3,500	5,000	8,000	19,050
19,250		3,600	5,000	8,000	19,250
19,450	49/64	3,600	5,000	8,000	19,450
19,500		3,600	5,000	8,000	19,500
19,840	25/32	3,700	5,000	8,000	19,840
20,000		3,700	5,000	8,000	20,000
20,240	51/64	3,700	5,500	8,800	20,240
20,500		3,800	5,500	8,800	20,500
20,640	13/16	3,800	5,500	8,800	20,640
21,000		3,900	5,500	8,800	21,000
21,030	53/64	3,900	5,500	8,800	21,030
21,430	27/32	3,900	5,500	8,800	21,430
21,500		4,000	5,500	8,800	21,500
21,830	55/64	4,000	5,500	8,800	21,830
22,000		4,100	5,500	8,800	22,000
22,220	7/8	4,100	5,500	8,800	22,220
22,500		4,100	5,500	8,800	22,500
22,620	57/64	4,200	6,300	10,000	22,620
23,000		4,200	6,300	10,000	23,000
23,020	29/32	4,200	6,300	10,000	23,020
23,420	59/64	4,300	6,300	10,000	23,420
23,500		4,300	6,300	10,000	23,500
23,810	15/16	4,400	6,300	10,000	23,810
24,000		4,400	6,300	10,000	24,000
24,210	61/64	4,500	6,300	10,000	24,210
24,500		4,500	6,300	10,000	24,500
24,610	31/32	4,500	6,300	10,000	24,610
25,000	63/64	4,600	6,300	10,000	25,000



d1		l4	b	h	koodinro.
mm	inch	mm	mm	mm	
25,400	1	4,700	6,300	10,000	25,400
25,500		4,700	6,300	10,000	25,500
26,000		4,800	7,300	11,600	26,000
26,500		4,900	7,300	11,600	26,500
27,000		5,000	7,300	11,600	27,000
27,500		5,100	7,300	11,600	27,500
28,000		5,100	7,300	11,600	28,000
28,500		5,200	7,300	11,600	28,500
29,000		5,300	7,300	11,600	29,000
29,500		5,400	7,300	11,600	29,500
30,000		5,500	8,500	13,600	30,000
30,500		5,600	8,500	13,600	30,500
31,000		5,700	8,500	13,600	31,000
31,500		5,800	8,500	13,600	31,500
32,000		5,900	8,500	13,600	32,000
32,500		6,000	8,500	13,600	32,500
33,000		6,100	8,500	13,600	33,000
33,500		6,100	8,500	13,600	33,500
34,000		6,200	8,500	13,600	34,000
34,500		6,300	8,500	13,600	34,500
35,000		6,400	10,000	16,000	35,000
36,000		6,600	10,000	16,000	36,000
37,000		6,800	10,000	16,000	37,000
37,500		6,900	10,000	16,000	37,500
38,000		7,000	10,000	16,000	38,000
39,000		7,100	10,000	16,000	39,000
40,000		7,300	10,000	16,000	40,000
40,500		7,400	10,000	16,000	40,500

Vaihtokärjet poraus-
järjestelmä T 800



Vaihtokärjet RT 800

Materiaali **TKM**Pinta **F**

Varren muoto

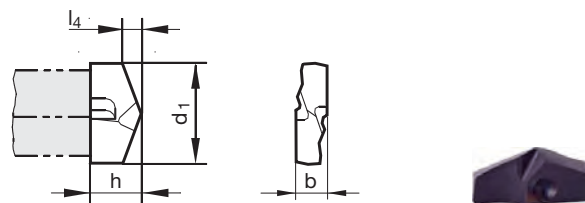
P • Kärjen kevennys $\geq \varnothing 16,000$ • kartiovaippahionta
• pääleikkusuärmän kaarteesta • Kiinnitysruuvit art.nro. 1071 mukana

M ○
K •
N ○
S teräkset $< 1000 \text{ N/mm}^2$
H

Vaihtokärjet porausjärjestelmä T 800

GÜHRING NAVIGATOR

Leikkuarvosivu 770

Artikkelinro. **2485**

d1		l4	b	h	koodinro.
mm	inch	mm	mm	mm	
16,000		3,000	4,500	8,000	16,000
16,270	41/64	3,000	4,500	8,000	16,270
16,500		3,100	4,500	8,000	16,500
16,670	21/32	3,100	4,500	8,000	16,670
17,000		3,100	4,500	8,000	17,000
17,070	43/64	3,200	4,500	8,000	17,070
17,460	11/16	3,200	4,500	8,000	17,460
17,500		3,200	4,500	8,000	17,500
17,860	45/64	3,300	4,500	8,000	17,860
18,000		3,300	5,000	8,000	18,000
18,260	23/32	3,400	5,000	8,000	18,260
18,500		3,400	5,000	8,000	18,500
18,650	47/64	3,400	5,000	8,000	18,650
19,000		3,500	5,000	8,000	19,000
19,050	3/4	3,500	5,000	8,000	19,050
19,250		3,600	5,000	8,000	19,250
19,450	49/64	3,600	5,000	8,000	19,450
19,500		3,600	5,000	8,000	19,500
19,840	25/32	3,700	5,000	8,000	19,840
20,000		3,700	5,000	8,000	20,000
20,240	51/64	3,700	5,500	8,800	20,240
20,500		3,800	5,500	8,800	20,500
20,640	13/16	3,800	5,500	8,800	20,640
21,000		3,900	5,500	8,800	21,000
21,030	53/64	3,900	5,500	8,800	21,030
21,430	27/32	3,900	5,500	8,800	21,430
21,500		4,000	5,500	8,800	21,500
21,830	55/64	4,000	5,500	8,800	21,830
22,000		4,100	5,500	8,800	22,000
22,220	7/8	4,100	5,500	8,800	22,220
22,500		4,100	5,500	8,800	22,500
22,620	57/64	4,200	6,300	10,000	22,620
23,000		4,200	6,300	10,000	23,000
23,020	29/32	4,200	6,300	10,000	23,020
23,420	59/64	4,300	6,300	10,000	23,420
23,500		4,300	6,300	10,000	23,500
23,810	15/16	4,400	6,300	10,000	23,810
24,000		4,400	6,300	10,000	24,000
24,210	61/64	4,500	6,300	10,000	24,210
24,500		4,500	6,300	10,000	24,500
24,610	31/32	4,500	6,300	10,000	24,610
25,000	63/64	4,600	6,300	10,000	25,000



d1		l4	b	h	koodinro.
mm	inch	mm	mm	mm	
25,400	1	4,700	6,300	10,000	25,400
25,500		4,700	6,300	10,000	25,500
26,000		4,800	7,300	11,600	26,000
26,500		4,900	7,300	11,600	26,500
27,000		5,000	7,300	11,600	27,000
27,500		5,100	7,300	11,600	27,500
28,000		5,100	7,300	11,600	28,000
28,500		5,200	7,300	11,600	28,500
29,000		5,300	7,300	11,600	29,000
29,500		5,400	7,300	11,600	29,500
30,000		5,500	8,500	13,600	30,000
30,500		5,600	8,500	13,600	30,500
31,000		5,700	8,500	13,600	31,000
31,500		5,800	8,500	13,600	31,500
32,000		5,900	8,500	13,600	32,000
32,500		6,000	8,500	13,600	32,500
33,000		6,100	8,500	13,600	33,000
33,500		6,100	8,500	13,600	33,500
34,000		6,200	8,500	13,600	34,000
34,500		6,300	8,500	13,600	34,500
35,000		6,400	10,000	16,000	35,000
36,000		6,600	10,000	16,000	36,000
37,000		6,800	10,000	16,000	37,000
37,500		6,900	10,000	16,000	37,500
38,000		7,000	10,000	16,000	38,000
39,000		7,100	10,000	16,000	39,000
40,000		7,300	10,000	16,000	40,000
40,500		7,400	10,000	16,000	40,500



Vaihtokärjet RT 800

Materiaali **TKM**

Pinta ○

Varren muoto

P Kärjen kevennys $\geq \varnothing 16,000$ • kartiovaippahionta
• pääleikkusuärmän kaarteesta • Kiinnitysruuvit art.nro. 1071 mukana

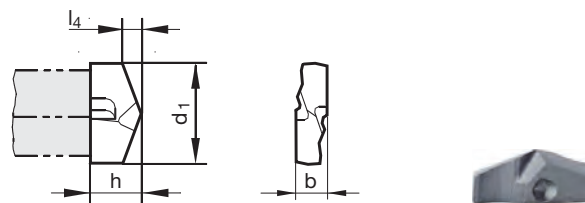
M**K** ○**N** •**S****H**

valurauta ja AISi-seokset

Vaihtokärjet poraus-
järjestelmä T 800

GÜHRING NAVIGATOR

Leikkuarvosivu 770

Artikkelinro. **2747**

d1		l4	b	h	koodinro.
mm	inch	mm	mm	mm	
16,000		3,000	4,500	8,000	16,000
16,500		3,100	4,500	8,000	16,500
17,000		3,100	4,500	8,000	17,000
17,070	43/64	3,200	4,500	8,000	17,070
17,500		3,200	4,500	8,000	17,500
18,000		3,300	5,000	8,000	18,000
18,260	23/32	3,400	5,000	8,000	18,260
18,650	47/64	3,400	5,000	8,000	18,650
19,000		3,500	5,000	8,000	19,000
19,050	3/4	3,500	5,000	8,000	19,050
19,250		3,600	5,000	8,000	19,250
19,450	49/64	3,600	5,000	8,000	19,450
19,500		3,600	5,000	8,000	19,500
19,840	25/32	3,700	5,000	8,000	19,840
20,000		3,700	5,000	8,000	20,000
20,500		3,800	5,500	8,800	20,500
20,640	13/16	3,800	5,500	8,800	20,640
21,000		3,900	5,500	8,800	21,000
21,030	53/64	3,900	5,500	8,800	21,030
21,430	27/32	3,900	5,500	8,800	21,430
21,830	55/64	4,000	5,500	8,800	21,830
22,000		4,100	5,500	8,800	22,000
23,000		4,200	6,300	10,000	23,000
23,420	59/64	4,300	6,300	10,000	23,420
23,500		4,300	6,300	10,000	23,500
24,000		4,400	6,300	10,000	24,000
24,210	61/64	4,500	6,300	10,000	24,210
24,500		4,500	6,300	10,000	24,500
25,000	63/64	4,600	6,300	10,000	25,000
25,500		4,700	6,300	10,000	25,500
26,000		4,800	7,300	11,600	26,000
26,500		4,900	7,300	11,600	26,500
27,000		5,000	7,300	11,600	27,000
27,500		5,100	7,300	11,600	27,500
28,000		5,100	7,300	11,600	28,000
29,500		5,400	7,300	11,600	29,500
30,000		5,500	8,500	13,600	30,000
30,500		5,600	8,500	13,600	30,500
31,000		5,700	8,500	13,600	31,000
31,500		5,800	8,500	13,600	31,500
32,000		5,900	8,500	13,600	32,000
32,500		6,000	8,500	13,600	32,500



d1		l4	b	h	koodinro.
mm	inch	mm	mm	mm	
33,000		6,100	8,500	13,600	33,000
33,500		6,100	8,500	13,600	33,500
34,000		6,200	8,500	13,600	34,000
34,500		6,300	8,500	13,600	34,500
35,000		6,400	10,000	16,000	35,000
36,000		6,600	10,000	16,000	36,000
37,000		6,800	10,000	16,000	37,000
39,000		7,100	10,000	16,000	39,000
40,000		7,300	10,000	16,000	40,000

Vaihtokärjet poraus-
järjestelmä T 800



Kiinnitysruuvit RT 800

Vaihtokärjet poraus-
järjestelmä T 800

Artikkelinro. 1071

G	l1	Torx	koodinro.
	mm		
M3 x 0,35	7,000	T6	3,000
M3 x 0,35	6,000	T6	3,006
M3,5 x 0,35	8,000	T7	3,500
M4 x 0,5	9,000	T8	4,000
M4 x 0,5	10,000	T8	4,500
M5 x 0,5	11,000	T10	5,000



Momenttiavaimet



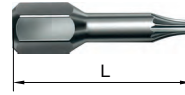
Artikkelinro.

4915

Pidin		Nm	Malli	koodinro.
1/4"	hexagonal	0,4-1	A	1,001
1/4"	hexagonal	0,8-2	A	2,000
1/4"	hexagonal	1-5	A	5,001
1/4"	hexagonal	2-8	A	8,000
1/4"	hexagonal	12	D	12,000
1/4"	hexagonal	5-14	D	14,000
3/8"	square	5-50	B	50,000
1/2"	square	20-200	C	200,000



Torx - kärkisarja

Vaihtokärjet poraus-
järjestelmä T 800

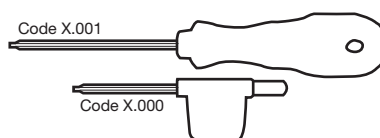
Artikkelinro.

4917

Pidin		Torx	L	koodinro.
			mm	
1/4	hexagonal	T5	25,000	5,000
1/4	hexagonal	T6	25,000	6,000
1/4	hexagonal	T7	25,000	7,000
1/4	hexagonal	T8	25,000	8,000
1/4	hexagonal	T9	25,000	9,000
1/4	hexagonal	T10	25,000	10,000
1/4	hexagonal	T15	25,000	15,000
1/4	hexagonal	T20	25,000	20,000
1/2	square	T25	25,000	25,000



Torx-ruuviavain



Artikkelinro.

1612

Torx	koodinro.
T5	5,001
T6	6,000
T6	6,001
T7	7,001
T8	8,000
T8	8,001
T9	9,001
T10	10,001
T15	15,000
T15	15,001
T20	20,001
T25	25,001
T30	30,001



HT 800 WP

Huomioi seuraavat asiat käyttäessäsi Gühring HT 800 WP työkaluja:

Suosittelimme aina palan vaihdon yhteydessä myös kiinnitysruuvin vaihtamista!
Jokaisen pitimen yhteydessä toimitetaan kiinnitysruuvi art.no. 4071, ja ruuvimeisseli art.no. 1612. Jokaisen vaihtopalan yhteydessä toimitetaan kiinnitysruuvi art.no. 4071.

Palan vaihdossa huomioi seuraavat kiinnitysruuvin momentit. Niiden noudattaminen on olennaista hyvän työstötuloksen saamiseksi.

Halkaisija-alue	11,0 - 12,99	13,0 - 13,99	14,0 - 15,99	16,0 - 17,99	18,0 - 19,99	20,0 - 21,99	22,0 - 29,99	30,0 - 40,00
Kierre	M2,2	M2,5	M3	M3,5	M4	M4,5	M5	M6
Torx-koko	T7	T8	T9	T10	T15	T15	T20	T25
Kiristysmomentti [Nm]	0,8	1,0	1,7	2,7	4,0	6,0	8,0	14,0

Kierteen lukitus (Loctite)!

- Läpiporauksessa ohjainreunojen on oltava kiinteässä kontaktissa materiaaliin. Ulostulossa suosittelimme syön pienentämistä.
- Porattaessa > 5xD reikiä suosittelimme käytettäväksi pilottiporaa art.no. 4105 ja pilottipalaa art.no. 4111. Vaihtoehtoisesti Tehoporia RT 100U ja RT 100VA voidaan myös käyttää.
- Porattaessa ilman keskiointiä suosittelimme syötön pienentämistä porauksen alussa.
- Älä käytä poraavaa työkalua hakkaavassa työstössä ilman koeajoa (urat, risteävät reiät). Hakkaavassa työstössä suosittelimme syötön pienentämistä mikäli mahdollista.
- HT 800 työkalut poikkeavat perinteisistä vaihtopalaporiista niin että ne soveltuvat myös levypakkojen poraukseen.
- Sorvissa (työkalu paikallaan) on varmistettava että työkalu on keskiöity kohdalleen.
- Parhaan mahdollisen työstötuloksen saavuttamiseksi on varmistettava tarpeellinen jäähdytysnesteen tai emulsion tuotto.
- Työkalu sopii vain varauksella pisaratyöstöön. Pisaratyöstöön suosittelimme erikoisesti siihen suunnitellamme työkaluja.

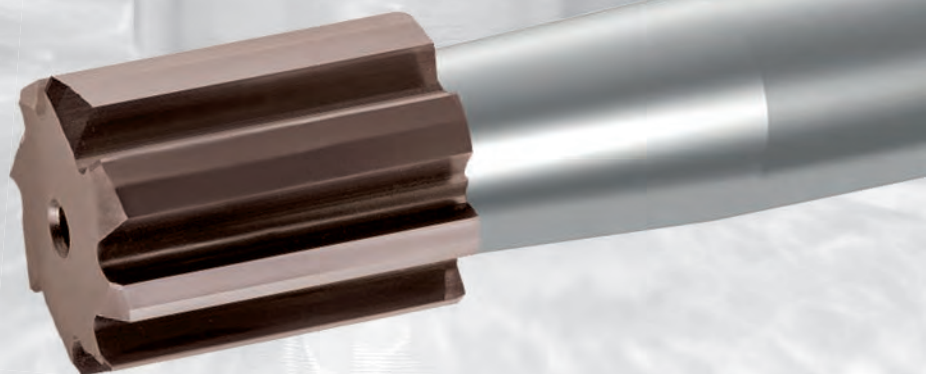
RT 800 WP

Huomioi seuraavat asiat käyttäessäsi Gühring RT 800 WP työkaluja:

- Läpiporauksessa on huolehdittava että molemmat ohjainreunat pysyvät kiinteässä kontaktissa aineseen.
- 7 x D reille suositellaan alkuporausta samansuuruisella tai isommalla kuin 140° suuruisella kärkikulmalla vähintään 2/3 halkaisijasta.
- Älä käytä työkalua hakkaavassa työstössä ilman koeajoa (urat, risteävät reiät). Hakkaavassa työstössä (max. 0,2 x D) suositellaan syötön pienentämistä milloin mahdollista.
- RT 800-työkalut sopivat perinteisistä vaihtopalaporiista myös levypakettien poraukseen.
- Paloja vaihdettaessa suositellaan vaihtamaan myös mukana tuleva kiinnitysruuvi (erityisellä kiinnitysaineella).

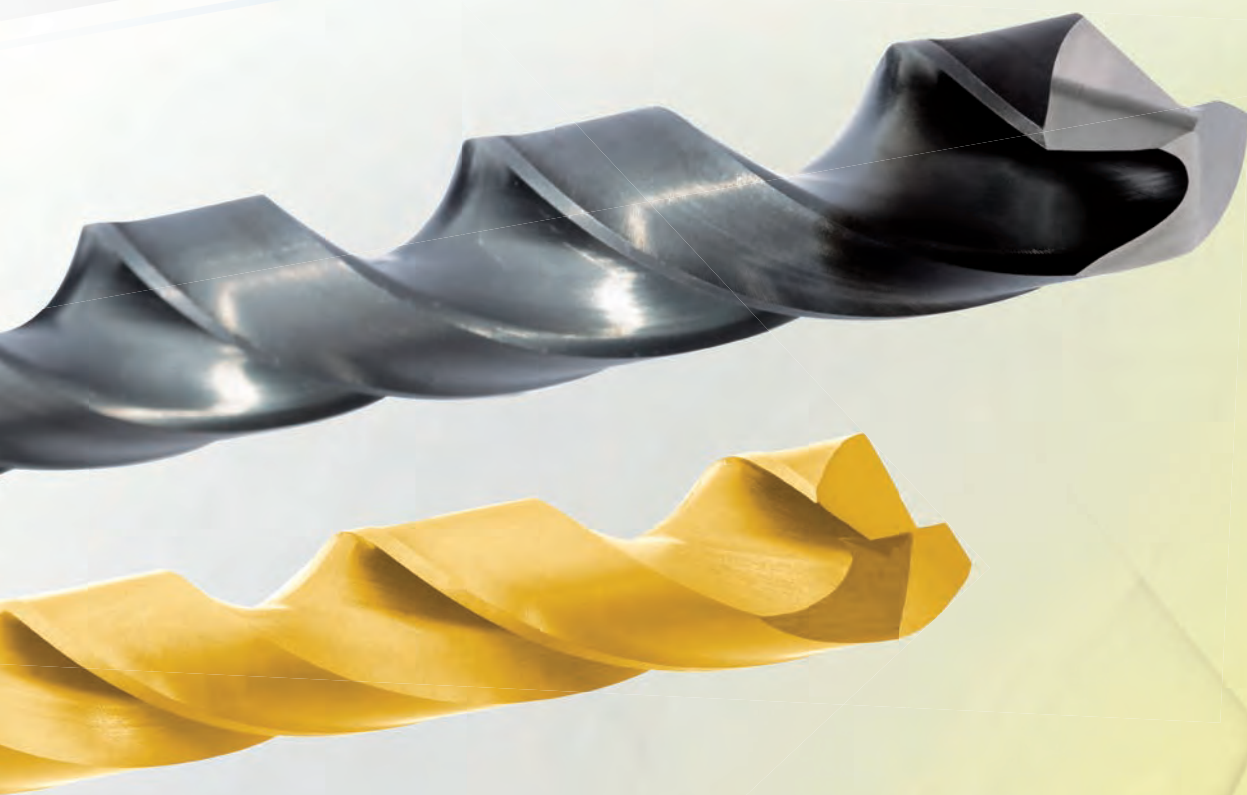
HR 500 T

Kovametalliset suurtehokalvimet
erilaisilla kiinnitysmahdollisuuksilla
HA-varresta johtuen





LIERIÖVARTISET KIERUKKAPORAT





P M K N S H						Työkalun kuvaus	Poraus- syvyys	Standardi	Malli	Leikkuu- suunta	Materiaali	Pinta	d1/mm	Artikkeli nro.	Leikkuu- arvosivu	Sivu
•	•	•	•	•	•		~3xD	DIN 1897	N	R	HSS		0,350 - 44,000	223	772	192
•	•	•	•	•	•		~3xD	DIN 1897	N	R	HSS		0,500 - 30,160	653	772	196
•	•	•	•	•	•		~3xD	DIN 1897	N	R	HSS		1,000 - 15,000	2460	772	199
•	•	•	•	•	•		~3xD	DIN 1897	N	L	HSS		0,320 - 50,000	226	772	200
•	•	•	•	•	•		~3xD	DIN 1897	N	L	HSS		0,900 - 13,000	672	772	203
•	•	•	•	•	•		~3xD	DIN 1897	H	R	HSS		0,690 - 21,000	224	772	204
•	•	•	•	•	•		~3xD	DIN 1897	H	L	HSS		0,750 - 24,000	227	772	206
•	•	•	•	•	•		~3xD	DIN 1897	W	R	HSS		1,000 - 20,000	225	772	208
•	•	•	•	•	•		~3xD	DIN 1897	W	L	HSS		1,000 - 20,000	228	772	210
•	•	•	•	•	•		~3xD	DIN 1897	GT 80	R	HSS		1,000 - 20,000	552	772	212
•	•	•	•	•	•		~3xD	DIN 1897	GT 80	L	HSS		1,000 - 19,840	553	772	215
•	•	•	•	•	•		~3xD	DIN 1897	GV 120	R	HSCO		0,400 - 48,000	329	772	218
•	•	•	•	•	•		~3xD	DIN 1897	GV 120	R	HSCO		0,500 - 15,500	659	774	222
•	•	•	•	•	•		~3xD	DIN 1897	GV 120	R	HSCO		1,000 - 13,000	2461	774	224
•	•	•	•	•	•		~3xD	DIN 1897	GV 120	L	HSCO		0,450 - 32,000	330	772	225
•	•	•	•	•	•		~3xD	DIN 1897	GT 80	R	HSCO		1,000 - 20,000	1228	774	227
•	•	•	•	•	•		~3xD	DIN 1897	GT 80	R	HSCO		1,000 - 16,000	2498	774	229
•	•	•	•	•	•		~3xD	DIN 1897	VA	R	HSCO		1,000 - 12,000	1261	772	230
•	•	•	•	•	•		~3xD	DIN 1897	VA	R	HSCO		1,000 - 13,000	572	774	231
•	•	•	•	•	•		~3xD	DIN 1897	P2000	R	HSCO		1,000 - 13,000	2048	774	233
•	•	•	•	•	•		~3xD	DIN 1897	N	R	M42		1,000 - 15,870	1259	772	235
•	•	•	•	•	•		~3xD	DIN 1897	GT 500	R	HSS-E-PM		1,000 - 14,290	515	774	237
•	•	•	•	•	•		3xD	DIN 6539	N	R	VHM		0,500 - 16,000	730	776	239
•	•	•	•	•	•		~3xD	DIN 6539	N	R	VHM		1,000 - 16,000	2463	776	241

Lieriövirtiset
kierukkaporat



P	M	K	N	S	H	Työkalun kuvaus	Poraus- syvyys	Standardi	Malli	Leikkuu- suunta	Materiaali	Pinta	d1/mm	Artikkeli nro.	Leikkuu- arvosivu	Sivu
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Erikoislyhyet porat

							~3xD	WN	N	R	VHM	○	0,500 - 6,500	702	776	243
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Normaaliporat

•	•	○					~5xD	DIN 338	N	R	HSS	○ _{2,36}	0,200 - 20,000	205	778	244
•	•	○					~5xD	DIN 338	N	R	HSS	Ⓢ	0,200 - 19,000	651	780	250
•	•	•					~5xD	DIN 338	N	R	HSS	F	1,000 - 14,500	2456	780	254
•	•	○					~5xD	DIN 338	N	R	HSS	○	2,400 - 5,610	560	778	256
•	•	○					~5xD	DIN 338	N	R	HSS	●	3,000 - 16,000	240	778	257
•	•	○					~5xD	DIN 338	N	L	HSS	○ _{6,00}	0,200 - 20,000	208	778	258
•	•	○					~5xD	DIN 338	N	L	HSS	Ⓢ	0,250 - 14,250	664	780	261
		•					~5xD	DIN 338	H	R	HSS	○	0,200 - 20,000	206	778	263
		•					~5xD	DIN 338	H	L	HSS	○	0,300 - 20,000	209	778	266
		•					~5xD	DIN 338	W	R	HSS	○	0,200 - 20,000	207	778	269
		•					~5xD	DIN 338	W	L	HSS	○	0,250 - 20,000	210	778	272
•	•	•					~5xD	DIN 338	GT 100	R	HSS	○ _{2,36}	0,600 - 16,000	549	778	274
•	•	•					~5xD	DIN 338	GT 100	R	HSS	Ⓢ	1,000 - 15,000	652	780	277
•	•	•					~5xD	DIN 338	GT 100	R	HSS	F	1,000 - 15,000	2457	780	280
•	•	•					~5xD	DIN 338	GT 100	L	HSS	○ _{2,36}	1,000 - 15,500	550	778	281
•	•	•					~5xD	DIN 338	GT 100	L	HSS	Ⓢ	1,300 - 9,800	665	780	283
•	○	•	○				~5xD	DIN 338	N	R	HSCO	○ _{2,36}	0,200 - 20,000	305	780	284
•	○	•	○				~5xD	DIN 338	N	R	HSCO	Ⓢ	1,200 - 13,000	2997	782	288
•	○	•	○				~5xD	DIN 338	N	L	HSCO	○ _{6,00}	0,360 - 18,500	308	780	289
•	○	•	•				~5xD	DIN 338	GT 100	R	HSCO	○ _{2,36}	1,000 - 16,000	622	780	291
•	○	•	○				~5xD	DIN 338	GT 100	R	HSCO	Ⓢ	1,000 - 15,000	658	782	294
•	○	•	•	○			~5xD	DIN 338	GT 100	R	HSCO	F	1,000 - 14,000	2459	782	296

Lieriövaritset
kierukkaporat



P	M	K	N	S	H	Työkalun kuvaus	Poraus- syvyys	Standardi	Malli	Leikkuu- suunta	Materiaali	Pinta	d1/mm	Artikkeli nro.	Leikkuu- arvosivu	Sivu
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Normaaliporat

•	○						~5xD	DIN 338	GT 100	(R)	HSCO	C	3,000 - 11,910	1221	782	298
○	•	○					~5xD	DIN 338	GT 100	(R)	HSCO	A	3,000 - 12,000	1223	782	299
○	•		•				~5xD	DIN 338	Ti	(R)	HSCO		0,200 - 19,000	605	780	301
○	•		•				~5xD	DIN 338	Ti	(R)	HSCO	S	0,500 - 14,500	657	782	304
○	•		•				~5xD	DIN 338	Ti	(R)	HSCO	F	0,400 - 15,000	2458	782	306
○	•		•				~5xD	DIN 338	Ti	(L)	HSCO		1,300 - 9,500	608	780	308
○	•	○	○				~5xD	DIN 338	VA	(R)	HSCO		1,000 - 13,000	1260	780	309
•	○	○	○				~5xD	DIN 338	P2000	(R)	HSCO		1,000 - 13,000	2047	784	311
•	•	•	•	○			~5xD	DIN 338	AeroX	(R)	M42		1,000 - 13,000	1018	784	313
•	○	○	•	•	○		~5xD	DIN 338	N	(R)	M42		0,400 - 16,000	1146	780	315
•	•	•	○	•			~5xD	DIN 338	N	(R)	M42	F	1,000 - 16,000	1199	784	317
○	○	○	•	○			~5xD	WN	N	(R)	VHM		1,000 - 12,700	732	784	319
○	○	○	•	○			~5xD	WN	N	(R)	VHM	F	1,000 - 12,700	2464	784	321
○	○	○		•			~5xD	WN	Duro 150	(R)	HM		3,000 - 14,000	710	776	323

Lieriövaritset
kierukkaporat

Pitkät kartiovartiset kierukkaporat

•	•	○					~10xD	DIN 339	N	(R)	HSS	$\begin{matrix} >0 \\ 2,36 \end{matrix}$	0,800 - 20,000	211	786	325
•	•	○					~10xD	DIN 339	N	(R)	HSS		2,400 - 5,000	561	786	327
•	•	•					~10xD	DIN 339	N	(R)	HSS	S	1,000 - 13,000	666	786	328
•	○	•	•	○			~10xD	DIN 339	N	(R)	HSCO	$\begin{matrix} >0 \\ 2,36 \end{matrix}$	1,100 - 19,000	311	792	330

Pitkät kierukkaporat

•	•	○					~10xD	DIN 340	N	(R)	HSS	$\begin{matrix} >0 \\ 2,36 \end{matrix}$	0,400 - 36,510	217	786	331
•	•	○					~10xD	DIN 340	N	(R)	HSS	S	0,500 - 22,220	667	786	334
•	•	○					~10xD	DIN 340	N	(L)	HSS	$\begin{matrix} >0 \\ 6,00 \end{matrix}$	0,450 - 29,000	220	786	336
•	•	○					~10xD	DIN 340	N	(R)	HSS		2,950 - 25,250	204	786	338
		•					~10xD	DIN 340	H	(R)	HSS		0,500 - 16,000	218	786	339



P	M	K	N	S	H	Työkalun kuvaus	Poraus- syvyys	Standardi	Malli	Leikkuu- suunta	Materiaali	Pinta	d1/mm	Artikkeli nro.	Leikkuu- arvosivu	Sivu
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Pitkät kierukkaporat

							~10xD	DIN 340	H	L	HSS	○	0,450 - 15,000	221	786	341
							~10xD	DIN 340	W	R	HSS	○	0,500 - 20,640	219	786	342
							~10xD	DIN 340	GT 100	R	HSS	○	1,000 - 14,000	535	786	344
							~10xD	DIN 340	GT 100	R	HSS	○	1,000 - 14,000	668	786	347
							~10xD	DIN 340	GT 100	R	HSS	○	1,000 - 10,000	2462	786	349
							~10xD	DIN 340	GT 100	L	HSS	○	1,400 - 13,000	506	786	350
							~10xD	DIN 340	GT 50	R	HSS	○	1,000 - 32,600	501	786	351
							~10xD	DIN 340	N	R	HSCO	○	0,500 - 22,000	317	792	353
							~10xD	DIN 340	GT 100	R	HSCO	○	1,000 - 16,000	336	792	355
							~10xD	DIN 340	GT 100	R	HSCO	○	1,000 - 12,000	396	792	357
							~10xD	DIN 340	Ti	R	HSCO	○	1,000 - 15,000	617	792	358
							~10xD	DIN 340	Ti	R	HSCO	○	1,000 - 10,200	669	792	360
							~10xD	WN	N	R	VHM	○	0,500 - 1,450	706	792	362

Lieriövaritset
kierukkaporat

Erikoispitkät kierukkaporat sarja 1

							~15xD	DIN 1869	N	R	HSS	○	1,600 - 13,000	235	788	363
							~15xD	DIN 1869	GT 100	R	HSS	○	1,950 - 13,000	502	790	365
							~15xD	DIN 1869	GT 100	R	HSS	○	2,000 - 12,700	670	790	367
							~15xD	DIN 1869	GT 50	R	HSS	○	2,000 - 12,700	524	788	368
							~15xD	DIN 1869	GT 100	R	HSCO	○	2,700 - 10,000	618	794	370

Erikoispitkät kierukkaporat sarja 2

							~20xD	DIN 1869	N	R	HSS	○	2,700 - 13,000	236	788	371
							~20xD	DIN 1869	GT 100	R	HSS	○	2,000 - 13,000	503	790	372
							~20xD	DIN 1869	GT 100	R	HSS	○	2,700 - 8,500	671	790	374
							~20xD	DIN 1869	GT 50	R	HSS	○	3,000 - 13,000	528	788	375
							~20xD	DIN 1869	GT 100	R	HSCO	○	3,000 - 10,000	619	794	376



P	M	K	N	S	H	Työkalun kuvaus	Poraus- syvyys	Standardi	Malli	Leikkuu- suunta	Materiaali	Pinta	d1/mm	Artikkeli nro.	Leikkuu- arvosivu	Sivu
Erikoispitkät kierukkaporat sarja 3																
•	•	•	•	•	•		~25xD	DIN 1869	N	(R)	HSS	○	3,500 - 13,000	237	788	377
•	•	•	•	•	•		~25xD	DIN 1869	GT 100	(R)	HSS	◐	2,500 - 13,000	504	790	378
○	•	•	•	•	•		~25xD	DIN 1869	GT 50	(R)	HSS	○	2,500 - 10,000	529	788	379
•	•	•	•	•	•		~25xD	DIN 1869	GT 100	(R)	HSCO	◐	2,500 - 13,000	571	794	380
Ylipitkät kierukkaporat																
•	•	•	•	•	•		>25xD	WN	GT 100	(R)	HSS	◐	6,000 - 12,000	242	790	381
•	•	•	•	•	•		>25xD	WN	GT 100	(R)	HSS	○	8,000 - 12,000	243	790	382
•	•	•	•	•	•		>25xD	WN	GT 100	(R)	HSS	○	10,000 - 12,000	244	790	383
Kierukkaporat suurennetulla lieriövarrella																
•	•	•	•	•	•		~3xD	WN	GU 500	(R)	HSCO	Ⓢ	2,000 - 20,000	512	774	384
•	•	•	•	•	•		~5xD	WN	GU 500	(R)	HSCO	Ⓢ	2,000 - 20,000	511	784	386
•	•	•	•	•	•		~5xD	WN	GT 500	(R)	HSS-E-PM	F	2,000 - 12,900	513	784	388
○	•	•	•	•	•		~3xD	DIN 6537 K	H	(R)	VHM	A	2,600 - 14,100	1946	776	389
Tankoporat, 6 tuumaiset																
•	•	•	•	•	•			NAS 907	N	(R)	HSS	○	1,500 - 8,000	577		390
•	•	•	•	•	•			NAS 907	N	(R)	HSS	◐ _{2,36}	1,500 - 8,000	579		391
Tankoporat, 12 tuumaiset																
•	•	•	•	•	•			NAS 907	N	(R)	HSS	○	1,500 - 8,000	578		392
•	•	•	•	•	•			NAS 907	N	(R)	HSS	◐ _{2,36}	1,500 - 8,000	580		393
Jäähdytyskanavaporat																
•	•	•	•	•	•		~10xD	WN	N	(R)	HSS	○	3,000 - 13,000	390	788	394
•	•	•	•	•	•		~5xD	WN	GT80 IK	(R)	HSCO	○	5,000 - 20,000	1131	784	395
•	•	•	•	•	•		~5xD	WN	GT80 IK	(R)	HSCO	Ⓢ	5,000 - 20,000	1132	784	396
HSS-E-PM Mikroporat ilman jäähdytyskanavia																
•	•	•	•	•	•		~5xD	DIN 1899	N	(R)	HSS-E-PM	○	0,050 - 1,920	301	796	397
•	•	•	•	•	•		~5xD	DIN 1899	N	(R)	HSS-E-PM	Ⓢ	0,160 - 1,900	660	796	400

Lieriövarteisat
kierukkaporat



P	M	K	N	S	H	Työkalun kuvaus	Poraus- syvyys	Standardi	Malli	Leikkuu- suunta	Materiaali	Pinta	d1/mm	Artikkeli nro.	Leikkuu- arvosivu	Sivu
HSS-E-PM Mikroporat ilman jäähdytyskanavia							~5xD	DIN 1899	N	L	HSS-E-PM	○	0,130 - 1,850	303	796	402
TKM Mikroporat ilman jäähdytyskanavia							~5xD	WN	N	R	VHM	○	0,200 - 1,400	701	796	404
								WN	N	R	VHM	ⓐ	0,100 - 3,000	3899	796	405
ExclusiveLine Mikroporat ilman jäähdytyskanavia							4xD	WN	N	R	VHM	ⓐ	0,500 - 3,000	6400	796	407
							7xD	WN	N	R	VHM	ⓐ	0,500 - 3,000	6401	796	408
ExclusiveLine mikroporat jäähdytyskanavilla							5xD	WN	N	R	VHM	ⓐ	1,400 - 3,000	6405	796	409
							8xD	WN	N	R	VHM	ⓐ	1,400 - 3,000	6408	796	410
							15xD	WN	N	R	VHM	ⓐ	1,400 - 3,000	6412	796	411
Porat 12.7 mm varrella								WN	N	R	HSS	●	13,000 - 28,570	268	778	412
Lyhyet porat 16.0 mm varrella								WN	V72	R	HSCO	○	16,000 - 40,000	128	772	413
Lyhyet porat 25.4 mm varrella								WN	V72	R	HSCO	○	25,000 - 40,000	129	772	414
								WN	V72	L	HSCO	○	25,000 - 39,000	136	772	415
Kartiosokkareiänporat								DIN 1898	N	R	HSS	● _{2,36} ^{>0}	2,000 - 12,000	531		416
Porasarjat							~5xD	DIN 338	N	R	HSS	● _{2,36} ^{>0}		201		417

Lieriövaritset
kierukkeporat



P	M	K	N	S	H	Työkalun kuvaus	Poraus- syvyys	Standardi	Malli	Leikkuu- suunta	Materiaali	Pinta	d1/mm	Artikkeli nro.	Leikkuu- arvosivu	Sivu
•	•	○					~5xD	DIN 338	N	R	HSS			200	418	
•	•	○					~5xD	DIN 338	N	R	HSS			17	419	
•	○	•	○				~5xD	DIN 338	N	R	HSCO			16	420	
○	•		•				~5xD	DIN 338	Ti	R	HSCO			18	421	
○	•	○	○				~5xD	DIN 338	VA	R	HSCO			195	422	
•	○	○	○				~5xD	DIN 338	P2000	R	HSCO			2049	423	
•	○	○	○				~3xD	DIN 1897	P2000	R	HSCO			2050	424	
•	•	•	•	•	○		~5xD	DIN 338	AeroX	R	M42			1083	425	

Lieriövartiset
kierukkaporat



P	M	K	N	S	H	Työkalun kuvaus	Poraus- syvyys	Standardi	Malli	Leikkuu- suunta	Materiaali	Pinta	d1/mm	Artikkeli nro.	Leikkuu- arvosivu	Sivu
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Porasarjat

											WN			36		426
											WN			73		427
											WN			11		428

Lieriövaritset
kierukkeporat

Erikoisporat KM-kärjellä

○	○	○						DIN 8037	N	R	HM	○	1,700 - 24,000	703	776	429
								DIN 8038	N	R	HM	○	1,900 - 24,000	704	776	430

FK-Porat

								WN	FK	R	VHM	○	2,500 - 10,000	1149	776	431
--	--	--	--	--	--	--	--	----	----	---	-----	---	----------------	------	-----	-----

Kovametallikärkiset lappuporat

○	○	○						WN	H	R	HM	○	3,000 - 12,000	707	776	432
---	---	---	--	--	--	--	--	----	---	---	----	---	----------------	-----	-----	-----

Kiviseinäporat

								WN	N	R	HM	○	4,000 - 12,000	716		433
--	--	--	--	--	--	--	--	----	---	---	----	---	----------------	-----	--	-----



P TERÄS

~ 3xD
DIN 1897

~ 5xD
DIN 338

~ 10xD
DIN 340

~ 15xD
DIN 1869
R1

No 1

Ø 1,00 - 14,00 mm
Artikkelinro. 2459
alkaen sivu 296



No 1

Ø 1,00 - 12,00 mm
Artikkelinro. 396
alkaen sivu 357



No 1

Ø 2,70 - 10,00 mm
Artikkelinro. 618
alkaen sivu 370



Ø 1,00 - 15,00 mm
Artikkelinro. 2457
alkaen sivu 280



Ø 1,00 - 10,00 mm
Artikkelinro. 2462
alkaen sivu 349



Ø 2,00 - 12,70 mm
Artikkelinro. 670
alkaen sivu 367



No 1

Ø 1,00 - 13,00 mm
Artikkelinro. 2461
alkaen sivu 224



Ø 1,00 - 15,00 mm
Artikkelinro. 2460
alkaen sivu 199



Ø 1,00 - 14,50 mm
Artikkelinro. 2456
alkaen sivu 254



Ø 0,50 - 22,22 mm
Artikkelinro. 667
alkaen sivu 334



Ø 1,60 - 13,00 mm
Artikkelinro. 235
alkaen sivu 363



Ø 1,20 - 13,00 mm
Artikkelinro. 2997
alkaen sivu 288



Ø 0,50 - 22,00 mm
Artikkelinro. 317
alkaen sivu 353



No 1

Ø 2,00 - 20,00 mm
Artikkelinro. 512
alkaen sivu 384



No 1

Ø 2,00 - 20,00 mm
Artikkelinro. 511
alkaen sivu 386



Ø 2,00 - 12,90 mm
Artikkelinro. 513
alkaen sivu 388



No 1

Ø 5,00 - 20,00 mm
Artikkelinro. 1132
alkaen sivu 396



KIINNITYKSEN
HELPOITAMISEKSI

SOVELTUU SISÄISELLE
JÄÄHDYTYKSELLE



QUICKFINDER

~20xD
DIN 1869
R2

~25xD
DIN 1869
R3

>25xD
Tehdas str.
erikoispitkä

No 1 Paras työkalu

No 1

Ø 3,00 - 10,00 mm
Artikkelinro. 619
alkaen sivu 376



No 1

Ø 2,50 - 13,00 mm
Artikkelinro. 571
alkaen sivu 380



GT100, HSCO

No 1

Ø 2,70 - 8,50 mm
Artikkelinro. 671
alkaen sivu 374



Ø 2,50 - 13,00 mm
Artikkelinro. 504
alkaen sivu 378



Ø 6,00 - 12,00 mm
Artikkelinro. 242
alkaen sivu 381



GT100, HSS



GV120, HSCO

Ø 2,70 - 13,00 mm
Artikkelinro. 236
alkaen sivu 371



Ø 3,50 - 13,00 mm
Artikkelinro. 237
alkaen sivu 377



Malli N, HSS



Malli N, HSCO



GU500, HSCO



GT500, HSS-E-PM



GT80IK, HSCO



RUOSTUMATON
TERÄS



TITAANI,
ERIKOIS-SEOKSET

~ 3xD
DIN 1897

~ 5xD
DIN 338

~ 10xD
DIN 340

~ 15xD
DIN 1869
R1

No 1 No 1

Ø 0,40 - 15,00 mm
Artikkelinro. 2458
alkaan sivu 306
F S ○

No 1 No 1

Ø 1,00 - 10,2 mm
Artikkelinro. 669
alkaan sivu 360
S ○

No 1 No 1

Ø 1,00 - 13,00 mm
Artikkelinro. 572
alkaan sivu 231
S ○

Ø 1,00 - 13,00 mm
Artikkelinro. 1260
alkaan sivu 309
○

No 1 No 1

Ø 1,00 - 14,00 mm
Artikkelinro. 2459
alkaan sivu 296
F S ○

Ø 1,00 - 12,00 mm
Artikkelinro. 396
alkaan sivu 357
F ○

Ø 2,70 - 10,00 mm
Artikkelinro. 618
alkaan sivu 370
○

Ø 1,00 - 13,00 mm
Artikkelinro. 2461
alkaan sivu 224
F S ○

Ø 1,00 - 15,87 mm
Artikkelinro. 1259
alkaan sivu 235
○

Ø 1,00 - 16,00 mm
Artikkelinro. 1199
alkaan sivu 317
F ○

No 1

Ø 2,00 - 20,00 mm
Artikkelinro. 512
alkaan sivu 384
S

No 1

Ø 2,00 - 20,00 mm
Artikkelinro. 511
alkaan sivu 386
S

Ø 2,00 - 12,900 mm
Artikkelinro. 513
alkaan sivu 388
F

KIINNITYKSEN
HELPOITTAMISEKSI

No 1 No 1

Ø 5,00 - 20,00 mm
Artikkelinro. 1132
alkaan sivu 396
S ○

SOVELTUU SISÄISELLE
JÄÄHDYTYKSELLE

Lieriövartiset Kieruk-
kaporat

suora lieriövarsi

yleisvarsi

jäähdytys-
kanavilla



QUICKFINDER

~20xD
DIN 1869
R2

~25xD
DIN 1869
R3

>25xD
Tehdas stdr.
erikoispitkä

No 1 Paras työkalu
ruostumattomalle teräkselle

No 1 Paras työkalu
erikois- ja Ti-seoksille



Malli Ti, HSCO



Malli VA, HSCO

No 1 **No 1**

Ø 3,00 - 10,00 mm
Artikkelinro. 619
alkaen sivu 376



No 1 **No 1**

Ø 2,50 - 13,00 mm
Artikkelinro. 571
alkaen sivu 380



GT100, HSCO



GV120, HSCO



Malli N, M42



GU500, HSCO



GT500, HSS-E-PM



GT801K, HSCO



K VALURAUTA

~ 3xD
DIN 1897

~ 5xD
DIN 338

~ 10xD
DIN 340

~ 15xD
DIN 1869
R1

Lieriövartiset Kieruk-
kaporat

suora lieriövarsi

yleisvarsi

jäähdytys-
kanavilla

No 1

Ø 1,00 - 14,00 mm
Artikkelinro. 2459
alkaan sivu 296



No 1

Ø 1,00 - 12,00 mm
Artikkelinro. 396
alkaan sivu 357



No 1

Ø 2,70 - 10,00 mm
Artikkelinro. 618
alkaan sivu 370



Ø 1,00 - 15,00 mm
Artikkelinro. 2457
alkaan sivu 280



Ø 1,00 - 10,00 mm
Artikkelinro. 2462
alkaan sivu 349



Ø 2,00 - 12,70 mm
Artikkelinro. 670
alkaan sivu 367



No 1

Ø 1,00 - 15,00 mm
Artikkelinro. 2460
alkaan sivu 199



Ø 1,00 - 14,50 mm
Artikkelinro. 2456
alkaan sivu 254



Ø 0,50 - 22,22 mm
Artikkelinro. 667
alkaan sivu 334



Ø 1,60 - 13,00 mm
Artikkelinro. 235
alkaan sivu 363



Ø 1,20 - 13,00 mm
Artikkelinro. 2997
alkaan sivu 288



Ø 0,50 - 22,00 mm
Artikkelinro. 317
alkaan sivu 353



No 1

Ø 2,00 - 20,00 mm
Artikkelinro. 512
alkaan sivu 384



No 1

Ø 2,00 - 20,00 mm
Artikkelinro. 511
alkaan sivu 386



Ø 2,00 - 12,90 mm
Artikkelinro. 513
alkaan sivu 388



KIINNITYKSEN
HELPOITAMISEKSI

No 1

Ø 5,00 - 20,00 mm
Artikkelinro. 1132
alkaan sivu 396



SOVELTUU SISÄISELLE
JÄÄHDYTYKSELLE



QUICKFINDER

~20xD
DIN 1869
R2

~25xD
DIN 1869
R3

>25xD
Tehdas str.
erikoispitkä

No 1 Paras työkalu

No 1

Ø 3,00 - 10,00 mm
Artikkelinro. 619
alkaen sivu 376



No 1

Ø 2,50 - 13,00 mm
Artikkelinro. 571
alkaen sivu 380



GT100, HSCO

No 1

Ø 2,70 - 8,50 mm
Artikkelinro. 671
alkaen sivu 374



Ø 2,50 - 13,00 mm
Artikkelinro. 504
alkaen sivu 378



Ø 6,00 - 12,00 mm
Artikkelinro. 242
alkaen sivu 381



GT100, HSS

Ø 2,70 - 13,00 mm
Artikkelinro. 236
alkaen sivu 371



Ø 3,50 - 13,00 mm
Artikkelinro. 237
alkaen sivu 377



Malli N, HSS



Malli N, HSCO



GU500, HSCO



GT500, HSS-E-PM



GT80IK, HSCO



N ALUMIINI, EI-RAUTAMETALLIT, MUOVIT

~ 3xD
DIN 1897

~ 5xD
DIN 338

~ 10xD
DIN 340

~ 15xD
DIN 1869
R1

No 1

Ø 1,00 - 20,00 mm
Artikkelinro. 225
alkaen sivu 208



No 1

Ø 0,20 - 20,00 mm
Artikkelinro. 207
alkaen sivu 269



No 1

Ø 0,50 - 20,64 mm
Artikkelinro. 219
alkaen sivu 342



Malli W pehmeille,
pitkälästäisille materiaaleille

No 1

Ø 0,69 - 21,00 mm
Artikkelinro. 224
alkaen sivu 204



No 1

Ø 0,20 - 20,00 mm
Artikkelinro. 206
alkaen sivu 263



No 1

Ø 0,50 - 16,00 mm
Artikkelinro. 218
alkaen sivu 339



Malli H koville,
hauraille materiaaleille

No 1

Ø 2,00 - 12,70 mm
Artikkelinro. 524
alkaen sivu 368



Malli GT50 pehmeille,
pitkälästäisille materiaaleille

Ø 1,00 - 32,60 mm
Artikkelinro. 501
alkaen sivu 351



Ø 1,00 - 15,50 mm
Artikkelinro. 550
alkaen sivu 281



Ø 1,00 - 14,00 mm
Artikkelinro. 535
alkaen sivu 344



Ø 1,95 - 13,00 mm
Artikkelinro. 502
alkaen sivu 365



Ø 1,00 - 16,00 mm
Artikkelinro. 622
alkaen sivu 291



Ø 1,00 - 16,00 mm
Artikkelinro. 336
alkaen sivu 355



Ø 2,70 - 10,00 mm
Artikkelinro. 618
alkaen sivu 370



No 1

Ø 2,00 - 20,00 mm
Artikkelinro. 512
alkaen sivu 384



No 1

Ø 2,00 - 20,00 mm
Artikkelinro. 511
alkaen sivu 386



KIINNITYKSEN
HELPOITTAMISEKSI

No 1

Ø 5,00 - 20,00 mm
Artikkelinro. 1131
alkaen sivu 395



SOVELTUU SISÄISELLE
JÄÄHDYTYKSELLE

Lieriövartiset Kieruk-
kaporat

suora lieriövarsi

yleisvarsi

jäähdytys-
kanavilla



QUICKFINDER

~20xD
DIN 1869
R2

~25xD
DIN 1869
R3

>25xD
Tehdas str.
erikoispitkä

No 1 Paras työkalu



Malli W, HSS



Malli H, HSS

No 1

Ø 3,00 - 13,00 mm
Artikkelinro. 528
alkaan sivu 375



No 1

Ø 2,50 - 10,00 mm
Artikkelinro. 529
alkaan sivu 379



GT50, HSS

No 1

Ø 2,70 - 8,50 mm
Artikkelinro. 671
alkaan sivu 374



Ø 2,50 - 13,00 mm
Artikkelinro. 504
alkaan sivu 378



Ø 6,00 - 12,00 mm
Artikkelinro. 242
alkaan sivu 381



GT100, HSS

Ø 3,00 - 10,00 mm
Artikkelinro. 619
alkaan sivu 376



Ø 2,50 - 13,00 mm
Artikkelinro. 571
alkaan sivu 380



GT100, HSCO



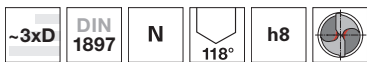
GU500, HSCO



GT80IK, HSCO



Erikoislyhyet porat



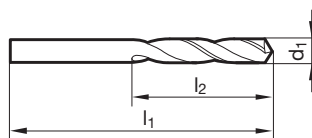
- P** • Kärjen kevennys $\geq \varnothing 1,000$ • kartiovaippahionta • automaatti-/revolverisorveille • myös käsiporakoneita varten
- M**
- K** •
- N** ○ ohutlevyt
- S**
- H**

GÜHRING NAVIGATOR

Leikkuarvosivu 772

Lieriövartiset
kierukkaporat

Materiaali	HSS
Pinta	$>0_{2,36}$
Leikkusuunta	



Artikkelinro. **223**

d1		l1	l2
mm	inch	mm	mm
0,350		19,000	2,000
0,400	1/64	19,000	2,500
0,480		19,000	2,500
0,500		20,000	3,000
0,550		21,000	3,500
0,575		21,000	3,500
0,600		21,000	3,500
0,650		22,000	4,000
0,660		22,000	4,000
0,700		23,000	4,500
0,720		23,000	4,500
0,750		23,000	4,500
0,790	1/32	24,000	5,000
0,800		24,000	5,000
0,820		24,000	5,000
0,850		24,000	5,000
0,890		25,000	5,500
0,900		25,000	5,500
0,930		25,000	5,500
0,950		25,000	5,500
0,980		26,000	6,000
1,000		26,000	6,000
1,020		26,000	6,000
1,030		26,000	6,000
1,040		26,000	6,000
1,050		26,000	6,000
1,070		28,000	7,000
1,090		28,000	7,000
1,100		28,000	7,000
1,110		28,000	7,000
1,120		28,000	7,000
1,150		28,000	7,000
1,180		28,000	7,000
1,190	3/64	30,000	8,000
1,200		30,000	8,000
1,220		30,000	8,000
1,250		30,000	8,000
1,260		30,000	8,000
1,280		30,000	8,000
1,300		30,000	8,000
1,320		30,000	8,000
1,350		32,000	9,000

d1		l1	l2
mm	inch	mm	mm
1,400		32,000	9,000
1,430		32,000	9,000
1,450		32,000	9,000
1,480		32,000	9,000
1,500		32,000	9,000
1,510		34,000	10,000
1,520		34,000	10,000
1,550		34,000	10,000
1,570		34,000	10,000
1,590	1/16	34,000	10,000
1,600		34,000	10,000
1,610		34,000	10,000
1,650		34,000	10,000
1,700		34,000	10,000
1,720		36,000	11,000
1,730		36,000	11,000
1,740		36,000	11,000
1,750		36,000	11,000
1,770		36,000	11,000
1,780		36,000	11,000
1,800		36,000	11,000
1,850		36,000	11,000
1,900		36,000	11,000
1,930		38,000	12,000
1,950		38,000	12,000
1,970		38,000	12,000
1,980	5/64	38,000	12,000
1,990		38,000	12,000
2,000		38,000	12,000
2,020		38,000	12,000
2,050		38,000	12,000
2,060		38,000	12,000
2,080		38,000	12,000
2,100		38,000	12,000
2,120		38,000	12,000
2,150		40,000	13,000
2,180		40,000	13,000
2,200		40,000	13,000
2,220		40,000	13,000
2,250		40,000	13,000
2,260		40,000	13,000
2,300		40,000	13,000



d1		l1	l2
mm	inch	mm	mm
2,350		40,000	13,000
2,370		43,000	14,000
2,380	3/32	43,000	14,000
2,400		43,000	14,000
2,420		43,000	14,000
2,440		43,000	14,000
2,450		43,000	14,000
2,480		43,000	14,000
2,490		43,000	14,000
2,500		43,000	14,000
2,520		43,000	14,000
2,530		43,000	14,000
2,550		43,000	14,000
2,580		43,000	14,000
2,600		43,000	14,000
2,640		43,000	14,000
2,650		43,000	14,000
2,700		46,000	16,000
2,710		46,000	16,000
2,750		46,000	16,000
2,780	7/64	46,000	16,000
2,790		46,000	16,000
2,800		46,000	16,000
2,820		46,000	16,000
2,850		46,000	16,000
2,870		46,000	16,000
2,900		46,000	16,000
2,920		46,000	16,000
2,950		46,000	16,000
2,970		46,000	16,000
3,000		46,000	16,000
3,020		49,000	18,000
3,050		49,000	18,000
3,100		49,000	18,000
3,150		49,000	18,000
3,170	1/8	49,000	18,000
3,200		49,000	18,000
3,220		49,000	18,000
3,250		49,000	18,000
3,260		49,000	18,000
3,300		49,000	18,000
3,350		49,000	18,000
3,400		52,000	20,000
3,450		52,000	20,000
3,500		52,000	20,000
3,550		52,000	20,000
3,570	9/64	52,000	20,000
3,580		52,000	20,000
3,600		52,000	20,000
3,650		52,000	20,000
3,660		52,000	20,000
3,700		52,000	20,000
3,730		52,000	20,000
3,750		52,000	20,000
3,800		55,000	22,000
3,850		55,000	22,000
3,860		55,000	22,000
3,900		55,000	22,000
3,910		55,000	22,000
3,950		55,000	22,000
3,960		55,000	22,000
3,970	5/32	55,000	22,000
3,990		55,000	22,000
4,000		55,000	22,000
4,020		55,000	22,000
4,040		55,000	22,000
4,050		55,000	22,000
4,080		55,000	22,000
4,090		55,000	22,000
4,100		55,000	22,000
4,150		55,000	22,000
4,200		55,000	22,000

d1		l1	l2
mm	inch	mm	mm
4,220		55,000	22,000
4,250		55,000	22,000
4,300		58,000	24,000
4,370	11/64	58,000	24,000
4,380		58,000	24,000
4,390		58,000	24,000
4,400		58,000	24,000
4,450		58,000	24,000
4,500		58,000	24,000
4,550		58,000	24,000
4,570		58,000	24,000
4,600		58,000	24,000
4,620		58,000	24,000
4,650		58,000	24,000
4,700		58,000	24,000
4,750		58,000	24,000
4,760	3/16	62,000	26,000
4,800		62,000	26,000
4,850		62,000	26,000
4,900		62,000	26,000
4,920		62,000	26,000
4,950		62,000	26,000
4,980		62,000	26,000
5,000		62,000	26,000
5,020		62,000	26,000
5,050		62,000	26,000
5,060		62,000	26,000
5,100		62,000	26,000
5,110		62,000	26,000
5,150		62,000	26,000
5,160	13/64	62,000	26,000
5,180		62,000	26,000
5,200		62,000	26,000
5,220		62,000	26,000
5,250		62,000	26,000
5,300		62,000	26,000
5,310		66,000	28,000
5,350		66,000	28,000
5,400		66,000	28,000
5,410		66,000	28,000
5,450		66,000	28,000
5,500		66,000	28,000
5,550		66,000	28,000
5,560	7/32	66,000	28,000
5,600		66,000	28,000
5,610		66,000	28,000
5,700		66,000	28,000
5,750		66,000	28,000
5,790		66,000	28,000
5,800		66,000	28,000
5,900		66,000	28,000
5,940		66,000	28,000
5,950	15/64	66,000	28,000
6,000		66,000	28,000
6,040		70,000	31,000
6,050		70,000	31,000
6,100		70,000	31,000
6,150		70,000	31,000
6,200		70,000	31,000
6,250		70,000	31,000
6,300		70,000	31,000
6,350	1/4	70,000	31,000
6,400		70,000	31,000
6,450		70,000	31,000
6,500		70,000	31,000
6,530		70,000	31,000
6,550		70,000	31,000
6,600		70,000	31,000
6,630		70,000	31,000
6,700		70,000	31,000
6,750	17/64	74,000	34,000
6,760		74,000	34,000



d1		l1	l2
mm	inch	mm	mm
6,800		74,000	34,000
6,850		74,000	34,000
6,900		74,000	34,000
6,950		74,000	34,000
7,000		74,000	34,000
7,030		74,000	34,000
7,050		74,000	34,000
7,100		74,000	34,000
7,140	9/32	74,000	34,000
7,150		74,000	34,000
7,200		74,000	34,000
7,250		74,000	34,000
7,300		74,000	34,000
7,370		74,000	34,000
7,400		74,000	34,000
7,450		74,000	34,000
7,490		74,000	34,000
7,500		74,000	34,000
7,540	19/64	79,000	37,000
7,550		79,000	37,000
7,600		79,000	37,000
7,670		79,000	37,000
7,700		79,000	37,000
7,750		79,000	37,000
7,800		79,000	37,000
7,850		79,000	37,000
7,900		79,000	37,000
7,940	5/16	79,000	37,000
8,000		79,000	37,000
8,030		79,000	37,000
8,050		79,000	37,000
8,100		79,000	37,000
8,150		79,000	37,000
8,200		79,000	37,000
8,250		79,000	37,000
8,300		79,000	37,000
8,330	21/64	79,000	37,000
8,400		79,000	37,000
8,430		79,000	37,000
8,450		79,000	37,000
8,500		79,000	37,000
8,550		84,000	40,000
8,600		84,000	40,000
8,610		84,000	40,000
8,650		84,000	40,000
8,700		84,000	40,000
8,730	11/32	84,000	40,000
8,750		84,000	40,000
8,800		84,000	40,000
8,840		84,000	40,000
8,900		84,000	40,000
8,950		84,000	40,000
9,000		84,000	40,000
9,050		84,000	40,000
9,090		84,000	40,000
9,100		84,000	40,000
9,130	23/64	84,000	40,000
9,150		84,000	40,000
9,200		84,000	40,000
9,250		84,000	40,000
9,270		84,000	40,000
9,300		84,000	40,000
9,340		84,000	40,000
9,350		84,000	40,000
9,400		84,000	40,000
9,500		84,000	40,000
9,520	3/8	89,000	43,000
9,580		89,000	43,000
9,600		89,000	43,000
9,650		89,000	43,000
9,700		89,000	43,000
9,750		89,000	43,000

d1		l1	l2
mm	inch	mm	mm
9,800		89,000	43,000
9,850		89,000	43,000
9,900		89,000	43,000
9,920	25/64	89,000	43,000
10,000		89,000	43,000
10,050		89,000	43,000
10,080		89,000	43,000
10,100		89,000	43,000
10,150		89,000	43,000
10,200		89,000	43,000
10,250		89,000	43,000
10,260		89,000	43,000
10,300		89,000	43,000
10,320	13/32	89,000	43,000
10,400		89,000	43,000
10,490		89,000	43,000
10,500		89,000	43,000
10,600		89,000	43,000
10,700		95,000	47,000
10,720	27/64	95,000	47,000
10,750		95,000	47,000
10,800		95,000	47,000
10,900		95,000	47,000
11,000		95,000	47,000
11,100		95,000	47,000
11,110	7/16	95,000	47,000
11,200		95,000	47,000
11,250		95,000	47,000
11,300		95,000	47,000
11,400		95,000	47,000
11,500		95,000	47,000
11,510	29/64	95,000	47,000
11,600		95,000	47,000
11,700		95,000	47,000
11,750		95,000	47,000
11,800		95,000	47,000
11,900		102,000	51,000
11,910	15/32	102,000	51,000
12,000		102,000	51,000
12,050		102,000	51,000
12,100		102,000	51,000
12,150		102,000	51,000
12,200		102,000	51,000
12,250		102,000	51,000
12,300	31/64	102,000	51,000
12,400		102,000	51,000
12,500		102,000	51,000
12,600		102,000	51,000
12,700	1/2	102,000	51,000
12,750		102,000	51,000
12,800		102,000	51,000
12,900		102,000	51,000
13,000		102,000	51,000
13,100	33/64	102,000	51,000
13,200		102,000	51,000
13,250		107,000	54,000
13,300		107,000	54,000
13,400		107,000	54,000
13,490	17/32	107,000	54,000
13,500		107,000	54,000
13,600		107,000	54,000
13,700		107,000	54,000
13,750		107,000	54,000
13,800		107,000	54,000
13,890	35/64	107,000	54,000
14,000		107,000	54,000
14,100		111,000	56,000
14,200		111,000	56,000
14,290	9/16	111,000	56,000
14,300		111,000	56,000
14,400		111,000	56,000
14,500		111,000	56,000

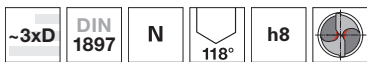


d1		l1	l2
mm	inch	mm	mm
14,600		111,000	56,000
14,680	37/64	111,000	56,000
14,700		111,000	56,000
14,750		111,000	56,000
14,800		111,000	56,000
14,900		111,000	56,000
15,000		111,000	56,000
15,080	19/32	115,000	58,000
15,100		115,000	58,000
15,200		115,000	58,000
15,250		115,000	58,000
15,400		115,000	58,000
15,480	39/64	115,000	58,000
15,500		115,000	58,000
15,600		115,000	58,000
15,700		115,000	58,000
15,750		115,000	58,000
15,800		115,000	58,000
15,870	5/8	115,000	58,000
16,000		115,000	58,000
16,100		119,000	60,000
16,150		119,000	60,000
16,200		119,000	60,000
16,250		119,000	60,000
16,270	41/64	119,000	60,000
16,300		119,000	60,000
16,500		119,000	60,000
16,670	21/32	119,000	60,000
16,750		119,000	60,000
17,000		119,000	60,000
17,070	43/64	123,000	62,000
17,100		123,000	62,000
17,200		123,000	62,000
17,250		123,000	62,000
17,460	11/16	123,000	62,000
17,500		123,000	62,000
17,600		123,000	62,000
17,750		123,000	62,000
17,860	45/64	123,000	62,000
18,000		123,000	62,000
18,100		127,000	64,000
18,200		127,000	64,000
18,250		127,000	64,000
18,260	23/32	127,000	64,000
18,500		127,000	64,000
18,650	47/64	127,000	64,000
18,750		127,000	64,000
19,000		127,000	64,000

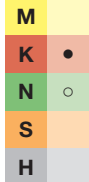
d1		l1	l2
mm	inch	mm	mm
19,050	3/4	131,000	66,000
19,100		131,000	66,000
19,250		131,000	66,000
19,500		131,000	66,000
19,840	25/32	131,000	66,000
20,000		131,000	66,000
20,100		136,000	68,000
20,240	51/64	136,000	68,000
20,250		136,000	68,000
20,500		136,000	68,000
20,640	13/16	136,000	68,000
20,750		136,000	68,000
20,800		136,000	68,000
21,000		136,000	68,000
21,030	53/64	136,000	68,000
21,430	27/32	141,000	70,000
21,500		141,000	70,000
21,830	55/64	141,000	70,000
22,000		141,000	70,000
22,220	7/8	141,000	70,000
22,500		146,000	72,000
23,000		146,000	72,000
23,020	29/32	146,000	72,000
23,420	59/64	146,000	72,000
23,500		146,000	72,000
23,810	15/16	151,000	75,000
24,000		151,000	75,000
24,210	61/64	151,000	75,000
24,500		151,000	75,000
24,610	31/32	151,000	75,000
25,000	63/64	151,000	75,000
25,400	1	156,000	78,000
26,000		156,000	78,000
26,500		156,000	78,000
27,000		162,000	81,000
27,500		162,000	81,000
28,000		162,000	81,000
28,570	1 1/8	168,000	84,000
29,000		168,000	84,000
29,370	1 5/32	168,000	84,000
30,000		168,000	84,000
31,000		174,000	87,000
32,000		180,000	90,000
33,000		180,000	90,000
40,000		200,000	100,000
44,000		214,000	108,000



Erikoislyhyet porat



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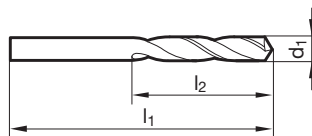
Pinta **S**

Leikkusuunta **R**

Lieriövärtiset
kierukkaporat

GÜHRING NAVIGATOR

Leikkuarvosivu 772



Artikkelinro. **653**

d1		l1	l2
mm	inch	mm	mm
0,500		20,000	3,000
0,600		21,000	3,500
0,700		23,000	4,500
0,750		23,000	4,500
0,790	1/32	24,000	5,000
0,800		24,000	5,000
0,900		25,000	5,500
1,000		26,000	6,000
1,020		26,000	6,000
1,050		26,000	6,000
1,070		28,000	7,000
1,090		28,000	7,000
1,100		28,000	7,000
1,110		28,000	7,000
1,120		28,000	7,000
1,150		28,000	7,000
1,180		28,000	7,000
1,190	3/64	30,000	8,000
1,200		30,000	8,000
1,250		30,000	8,000
1,300		30,000	8,000
1,320		30,000	8,000
1,350		32,000	9,000
1,400		32,000	9,000
1,450		32,000	9,000
1,500		32,000	9,000
1,510		34,000	10,000
1,550		34,000	10,000
1,590	1/16	34,000	10,000
1,600		34,000	10,000
1,610		34,000	10,000
1,650		34,000	10,000
1,700		34,000	10,000
1,750		36,000	11,000
1,780		36,000	11,000
1,800		36,000	11,000
1,850		36,000	11,000
1,900		36,000	11,000
1,930		38,000	12,000
1,950		38,000	12,000
1,980	5/64	38,000	12,000
1,990		38,000	12,000

d1		l1	l2
mm	inch	mm	mm
2,000		38,000	12,000
2,050		38,000	12,000
2,060		38,000	12,000
2,080		38,000	12,000
2,100		38,000	12,000
2,150		40,000	13,000
2,180		40,000	13,000
2,200		40,000	13,000
2,250		40,000	13,000
2,260		40,000	13,000
2,300		40,000	13,000
2,350		40,000	13,000
2,370		43,000	14,000
2,380	3/32	43,000	14,000
2,400		43,000	14,000
2,440		43,000	14,000
2,450		43,000	14,000
2,500		43,000	14,000
2,530		43,000	14,000
2,550		43,000	14,000
2,580		43,000	14,000
2,600		43,000	14,000
2,640		43,000	14,000
2,650		43,000	14,000
2,700		46,000	16,000
2,710		46,000	16,000
2,750		46,000	16,000
2,780	7/64	46,000	16,000
2,790		46,000	16,000
2,800		46,000	16,000
2,850		46,000	16,000
2,870		46,000	16,000
2,900		46,000	16,000
2,950		46,000	16,000
3,000		46,000	16,000
3,050		49,000	18,000
3,100		49,000	18,000
3,170	1/8	49,000	18,000
3,200		49,000	18,000
3,250		49,000	18,000
3,260		49,000	18,000
3,300		49,000	18,000



d1		l1	l2
mm	inch	mm	mm
3,400		52,000	20,000
3,450		52,000	20,000
3,500		52,000	20,000
3,550		52,000	20,000
3,570	9/64	52,000	20,000
3,600		52,000	20,000
3,650		52,000	20,000
3,660		52,000	20,000
3,700		52,000	20,000
3,730		52,000	20,000
3,750		52,000	20,000
3,800		55,000	22,000
3,860		55,000	22,000
3,900		55,000	22,000
3,970	5/32	55,000	22,000
3,990		55,000	22,000
4,000		55,000	22,000
4,040		55,000	22,000
4,050		55,000	22,000
4,090		55,000	22,000
4,100		55,000	22,000
4,150		55,000	22,000
4,200		55,000	22,000
4,250		55,000	22,000
4,300		58,000	24,000
4,370	11/64	58,000	24,000
4,390		58,000	24,000
4,400		58,000	24,000
4,500		58,000	24,000
4,570		58,000	24,000
4,600		58,000	24,000
4,620		58,000	24,000
4,650		58,000	24,000
4,700		58,000	24,000
4,750		58,000	24,000
4,760	3/16	62,000	26,000
4,800		62,000	26,000
4,850		62,000	26,000
4,900		62,000	26,000
4,920		62,000	26,000
4,950		62,000	26,000
4,980		62,000	26,000
5,000		62,000	26,000
5,050		62,000	26,000
5,060		62,000	26,000
5,100		62,000	26,000
5,110		62,000	26,000
5,160	13/64	62,000	26,000
5,180		62,000	26,000
5,200		62,000	26,000
5,250		62,000	26,000
5,300		62,000	26,000
5,310		66,000	28,000
5,400		66,000	28,000
5,410		66,000	28,000
5,450		66,000	28,000
5,500		66,000	28,000
5,520		66,000	28,000
5,560	7/32	66,000	28,000
5,600		66,000	28,000
5,610		66,000	28,000
5,700		66,000	28,000
5,750		66,000	28,000
5,800		66,000	28,000
5,900		66,000	28,000
5,950	15/64	66,000	28,000
6,000		66,000	28,000
6,040		70,000	31,000
6,050		70,000	31,000
6,100		70,000	31,000
6,150		70,000	31,000
6,200		70,000	31,000

d1		l1	l2
mm	inch	mm	mm
6,250		70,000	31,000
6,300		70,000	31,000
6,350	1/4	70,000	31,000
6,400		70,000	31,000
6,450		70,000	31,000
6,500		70,000	31,000
6,530		70,000	31,000
6,600		70,000	31,000
6,700		70,000	31,000
6,750	17/64	74,000	34,000
6,800		74,000	34,000
6,900		74,000	34,000
7,000		74,000	34,000
7,100		74,000	34,000
7,140	9/32	74,000	34,000
7,200		74,000	34,000
7,250		74,000	34,000
7,300		74,000	34,000
7,370		74,000	34,000
7,400		74,000	34,000
7,500		74,000	34,000
7,540	19/64	79,000	37,000
7,600		79,000	37,000
7,670		79,000	37,000
7,700		79,000	37,000
7,800		79,000	37,000
7,900		79,000	37,000
7,940	5/16	79,000	37,000
8,000		79,000	37,000
8,030		79,000	37,000
8,100		79,000	37,000
8,200		79,000	37,000
8,250		79,000	37,000
8,300		79,000	37,000
8,330	21/64	79,000	37,000
8,400		79,000	37,000
8,430		79,000	37,000
8,500		79,000	37,000
8,550		84,000	40,000
8,600		84,000	40,000
8,610		84,000	40,000
8,700		84,000	40,000
8,730	11/32	84,000	40,000
8,750		84,000	40,000
8,800		84,000	40,000
8,900		84,000	40,000
9,000		84,000	40,000
9,090		84,000	40,000
9,100		84,000	40,000
9,130	23/64	84,000	40,000
9,200		84,000	40,000
9,250		84,000	40,000
9,300		84,000	40,000
9,400		84,000	40,000
9,500		84,000	40,000
9,520	3/8	89,000	43,000
9,580		89,000	43,000
9,700		89,000	43,000
9,800		89,000	43,000
9,900		89,000	43,000
9,920	25/64	89,000	43,000
10,000		89,000	43,000
10,100		89,000	43,000
10,200		89,000	43,000
10,300		89,000	43,000
10,320	13/32	89,000	43,000
10,400		89,000	43,000
10,490		89,000	43,000
10,500		89,000	43,000
10,600		89,000	43,000
10,720	27/64	95,000	47,000
10,750		95,000	47,000



d1		l1	l2
mm	inch	mm	mm
10,800		95,000	47,000
11,000		95,000	47,000
11,110	7/16	95,000	47,000
11,200		95,000	47,000
11,300		95,000	47,000
11,400		95,000	47,000
11,500		95,000	47,000
11,510	29/64	95,000	47,000
11,750		95,000	47,000
11,800		95,000	47,000
11,900		102,000	51,000
11,910	15/32	102,000	51,000
12,000		102,000	51,000
12,100		102,000	51,000
12,200		102,000	51,000
12,300	31/64	102,000	51,000
12,500		102,000	51,000
12,700	1/2	102,000	51,000
12,800		102,000	51,000
13,000		102,000	51,000
13,100	33/64	102,000	51,000
13,490	17/32	107,000	54,000
13,500		107,000	54,000
13,700		107,000	54,000
13,800		107,000	54,000
13,890	35/64	107,000	54,000
14,000		107,000	54,000
14,200		111,000	56,000
14,290	9/16	111,000	56,000
14,500		111,000	56,000
14,800		111,000	56,000
14,900		111,000	56,000
15,000		111,000	56,000
15,080	19/32	115,000	58,000
15,250		115,000	58,000
15,500		115,000	58,000
15,800		115,000	58,000
15,870	5/8	115,000	58,000
16,000		115,000	58,000
16,250		119,000	60,000
16,270	41/64	119,000	60,000
16,500		119,000	60,000

d1		l1	l2
mm	inch	mm	mm
16,670	21/32	119,000	60,000
17,000		119,000	60,000
17,460	11/16	123,000	62,000
17,500		123,000	62,000
17,860	45/64	123,000	62,000
18,000		123,000	62,000
18,250		127,000	64,000
18,260	23/32	127,000	64,000
18,500		127,000	64,000
18,650	47/64	127,000	64,000
19,000		127,000	64,000
19,050	3/4	131,000	66,000
19,500		131,000	66,000
20,000		131,000	66,000
20,500		136,000	68,000
20,640	13/16	136,000	68,000
21,000		136,000	68,000
21,500		141,000	70,000
22,000		141,000	70,000
22,500		146,000	72,000
22,620	57/64	146,000	72,000
23,000		146,000	72,000
23,420	59/64	146,000	72,000
24,000		151,000	75,000
24,500		151,000	75,000
25,000	63/64	151,000	75,000
25,400	1	156,000	78,000
27,500		162,000	81,000
28,500		168,000	84,000
29,370	1 5/32	168,000	84,000
29,500		168,000	84,000
30,000		168,000	84,000
30,160	1 3/16	174,000	87,000



Eriköislyhyet porat



P • Kärjen kevennys $\geq \varnothing 1,000$ • kartiovaippahionta • automaatti-/revolverisorveille • myös käsiporakoneita varten

M

K •

N • ohutlevyt

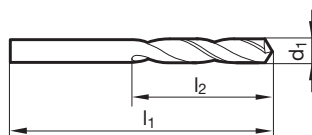
S

H

Materiaali **HSS**Pinta **F**Leikkusuunta **R**

GÜHRING NAVIGATOR

Leikkuarvosivu 772



Artikkelinro.

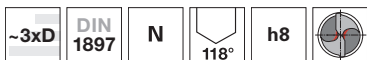
2460

d1		l1	l2
mm	inch	mm	mm
1,000		26,000	6,000
1,100		28,000	7,000
1,200		30,000	8,000
1,300		30,000	8,000
2,000		38,000	12,000
2,200		40,000	13,000
2,500		43,000	14,000
2,600		43,000	14,000
2,700		46,000	16,000
2,800		46,000	16,000
2,900		46,000	16,000
3,000		46,000	16,000
3,100		49,000	18,000
3,300		49,000	18,000
3,400		52,000	20,000
3,600		52,000	20,000
3,700		52,000	20,000
3,900		55,000	22,000
4,000		55,000	22,000
4,100		55,000	22,000
4,200		55,000	22,000
4,300		58,000	24,000
4,500		58,000	24,000
4,600		58,000	24,000
4,700		58,000	24,000
4,800		62,000	26,000
4,900		62,000	26,000
5,000		62,000	26,000
5,200		62,000	26,000
5,300		62,000	26,000
5,400		66,000	28,000
5,500		66,000	28,000
5,700		66,000	28,000
5,900		66,000	28,000
6,000		66,000	28,000
6,100		70,000	31,000

d1		l1	l2
mm	inch	mm	mm
6,200		70,000	31,000
6,300		70,000	31,000
6,600		70,000	31,000
6,700		70,000	31,000
6,800		74,000	34,000
7,100		74,000	34,000
7,300		74,000	34,000
7,500		74,000	34,000
7,800		79,000	37,000
8,300		79,000	37,000
8,500		79,000	37,000
8,700		84,000	40,000
8,800		84,000	40,000
8,900		84,000	40,000
9,000		84,000	40,000
9,100		84,000	40,000
9,300		84,000	40,000
9,600		89,000	43,000
9,800		89,000	43,000
9,900		89,000	43,000
10,000		89,000	43,000
10,100		89,000	43,000
10,500		89,000	43,000
11,200		95,000	47,000
12,200		102,000	51,000
12,300	31/64	102,000	51,000
12,700	1/2	102,000	51,000
12,800		102,000	51,000
13,500		107,000	54,000
14,500		111,000	56,000
15,000		111,000	56,000



Erikoislyhyet porat



P • Kärjen kevennys $\geq \varnothing 14,050$ • kartiovaippahionta • automaatti-/revolverisorveille



N ○ ohutlevyt

Materiaali **HSS**

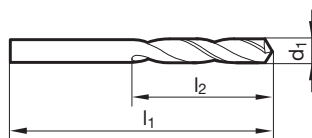
Pinta

Leikkusuunta

Lieriövartiset
kierukkaporat

GÜHRING NAVIGATOR

Leikkuarvosivu 772



Artikkelinro. **226**

d1		l1	l2
mm	inch	mm	mm
0,320		19,000	2,000
0,500		20,000	3,000
0,550		21,000	3,500
0,580		21,000	3,500
0,620		22,000	4,000
0,650		22,000	4,000
0,700		23,000	4,500
0,740		23,000	4,500
0,750		23,000	4,500
0,800		24,000	5,000
0,810		24,000	5,000
0,850		24,000	5,000
0,875		25,000	5,500
0,890		25,000	5,500
0,900		25,000	5,500
0,950		25,000	5,500
0,970		26,000	6,000
0,975		26,000	6,000
1,000		26,000	6,000
1,020		26,000	6,000
1,030		26,000	6,000
1,040		26,000	6,000
1,050		26,000	6,000
1,060		26,000	6,000
1,070		28,000	7,000
1,090		28,000	7,000
1,100		28,000	7,000
1,150		28,000	7,000
1,190	3/64	30,000	8,000
1,200		30,000	8,000
1,220		30,000	8,000
1,250		30,000	8,000
1,320		30,000	8,000
1,330		32,000	9,000
1,350		32,000	9,000
1,450		32,000	9,000
1,500		32,000	9,000
1,510		34,000	10,000
1,550		34,000	10,000
1,580		34,000	10,000
1,590	1/16	34,000	10,000
1,600		34,000	10,000

d1		l1	l2
mm	inch	mm	mm
1,610		34,000	10,000
1,650		34,000	10,000
1,670		34,000	10,000
1,700		34,000	10,000
1,720		36,000	11,000
1,750		36,000	11,000
1,780		36,000	11,000
1,800		36,000	11,000
1,810		36,000	11,000
1,850		36,000	11,000
1,900		36,000	11,000
1,930		38,000	12,000
1,940		38,000	12,000
1,950		38,000	12,000
1,980	5/64	38,000	12,000
1,990		38,000	12,000
2,000		38,000	12,000
2,010		38,000	12,000
2,050		38,000	12,000
2,060		38,000	12,000
2,080		38,000	12,000
2,100		38,000	12,000
2,180		40,000	13,000
2,200		40,000	13,000
2,220		40,000	13,000
2,260		40,000	13,000
2,300		40,000	13,000
2,350		40,000	13,000
2,360		40,000	13,000
2,370		43,000	14,000
2,380	3/32	43,000	14,000
2,400		43,000	14,000
2,440		43,000	14,000
2,450		43,000	14,000
2,490		43,000	14,000
2,500		43,000	14,000
2,520		43,000	14,000
2,530		43,000	14,000
2,550		43,000	14,000
2,580		43,000	14,000
2,600		43,000	14,000
2,640		43,000	14,000



d1		l1	l2
mm	inch	mm	mm
2,650		43,000	14,000
2,700		46,000	16,000
2,710		46,000	16,000
2,720		46,000	16,000
2,800		46,000	16,000
2,820		46,000	16,000
2,870		46,000	16,000
2,880		46,000	16,000
2,900		46,000	16,000
3,000		46,000	16,000
3,020		49,000	18,000
3,050		49,000	18,000
3,100		49,000	18,000
3,150		49,000	18,000
3,170	1/8	49,000	18,000
3,200		49,000	18,000
3,230		49,000	18,000
3,250		49,000	18,000
3,300		49,000	18,000
3,330		49,000	18,000
3,400		52,000	20,000
3,420		52,000	20,000
3,450		52,000	20,000
3,480		52,000	20,000
3,500		52,000	20,000
3,530		52,000	20,000
3,700		52,000	20,000
3,710		52,000	20,000
3,720		52,000	20,000
3,730		52,000	20,000
3,750		52,000	20,000
3,770		55,000	22,000
3,800		55,000	22,000
3,840		55,000	22,000
3,850		55,000	22,000
3,860		55,000	22,000
3,910		55,000	22,000
3,950		55,000	22,000
3,970	5/32	55,000	22,000
3,990		55,000	22,000
4,000		55,000	22,000
4,020		55,000	22,000
4,030		55,000	22,000
4,033		55,000	22,000
4,100		55,000	22,000
4,200		55,000	22,000
4,220		55,000	22,000
4,230		55,000	22,000
4,250		55,000	22,000
4,290		58,000	24,000
4,300		58,000	24,000
4,350		58,000	24,000
4,370	11/64	58,000	24,000
4,400		58,000	24,000
4,450		58,000	24,000
4,500		58,000	24,000
4,520		58,000	24,000
4,560		58,000	24,000
4,570		58,000	24,000
4,600		58,000	24,000
4,620		58,000	24,000
4,700		58,000	24,000
4,750		58,000	24,000
4,760	3/16	62,000	26,000
4,800		62,000	26,000
4,850		62,000	26,000
4,920		62,000	26,000
4,930		62,000	26,000
4,950		62,000	26,000
4,970		62,000	26,000
4,980		62,000	26,000
5,000		62,000	26,000

d1		l1	l2
mm	inch	mm	mm
5,050		62,000	26,000
5,100		62,000	26,000
5,110		62,000	26,000
5,150		62,000	26,000
5,160	13/64	62,000	26,000
5,180		62,000	26,000
5,200		62,000	26,000
5,220		62,000	26,000
5,250		62,000	26,000
5,300		62,000	26,000
5,310		66,000	28,000
5,400		66,000	28,000
5,410		66,000	28,000
5,450		66,000	28,000
5,500		66,000	28,000
5,560	7/32	66,000	28,000
5,600		66,000	28,000
5,610		66,000	28,000
5,620		66,000	28,000
5,700		66,000	28,000
5,750		66,000	28,000
5,790		66,000	28,000
5,800		66,000	28,000
5,900		66,000	28,000
5,940		66,000	28,000
5,950	15/64	66,000	28,000
6,000		66,000	28,000
6,040		70,000	31,000
6,150		70,000	31,000
6,170		70,000	31,000
6,200		70,000	31,000
6,250		70,000	31,000
6,300		70,000	31,000
6,350	1/4	70,000	31,000
6,400		70,000	31,000
6,500		70,000	31,000
6,530		70,000	31,000
6,540		70,000	31,000
6,550		70,000	31,000
6,570		70,000	31,000
6,600		70,000	31,000
6,630		70,000	31,000
6,700		70,000	31,000
6,750	17/64	74,000	34,000
6,800		74,000	34,000
6,900		74,000	34,000
6,920		74,000	34,000
7,000		74,000	34,000
7,030		74,000	34,000
7,100		74,000	34,000
7,140	9/32	74,000	34,000
7,200		74,000	34,000
7,250		74,000	34,000
7,350		74,000	34,000
7,370		74,000	34,000
7,400		74,000	34,000
7,450		74,000	34,000
7,490		74,000	34,000
7,500		74,000	34,000
7,540	19/64	79,000	37,000
7,550		79,000	37,000
7,700		79,000	37,000
7,750		79,000	37,000
7,800		79,000	37,000
7,900		79,000	37,000
7,940	5/16	79,000	37,000
8,000		79,000	37,000
8,030		79,000	37,000
8,100		79,000	37,000
8,200		79,000	37,000
8,300		79,000	37,000
8,330	21/64	79,000	37,000



d1		l1	l2
mm	inch	mm	mm
8,500		79,000	37,000
8,600		84,000	40,000
8,700		84,000	40,000
8,730	11/32	84,000	40,000
8,800		84,000	40,000
8,840		84,000	40,000
8,850		84,000	40,000
8,900		84,000	40,000
9,000		84,000	40,000
9,090		84,000	40,000
9,130	23/64	84,000	40,000
9,150		84,000	40,000
9,300		84,000	40,000
9,340		84,000	40,000
9,350		84,000	40,000
9,500		84,000	40,000
9,520	3/8	89,000	43,000
9,580		89,000	43,000
9,700		89,000	43,000
9,750		89,000	43,000
9,900		89,000	43,000
10,000		89,000	43,000
10,050		89,000	43,000
10,080		89,000	43,000
10,100		89,000	43,000
10,200		89,000	43,000
10,300		89,000	43,000
10,320	13/32	89,000	43,000
10,490		89,000	43,000
10,500		89,000	43,000
10,600		89,000	43,000
10,800		95,000	47,000
11,000		95,000	47,000
11,110	7/16	95,000	47,000
11,200		95,000	47,000
11,250		95,000	47,000
11,500		95,000	47,000
11,510	29/64	95,000	47,000
11,750		95,000	47,000
11,800		95,000	47,000
12,000		102,000	51,000
12,200		102,000	51,000
12,450		102,000	51,000
12,500		102,000	51,000
12,700	1/2	102,000	51,000
12,900		102,000	51,000
13,000		102,000	51,000
13,200		102,000	51,000
13,250		107,000	54,000
13,750		107,000	54,000
13,890	35/64	107,000	54,000
14,000		107,000	54,000
14,050		111,000	56,000
14,200		111,000	56,000

d1		l1	l2
mm	inch	mm	mm
14,250		111,000	56,000
14,290	9/16	111,000	56,000
14,500		111,000	56,000
14,700		111,000	56,000
15,000		111,000	56,000
15,200		115,000	58,000
15,480	39/64	115,000	58,000
15,600		115,000	58,000
15,750		115,000	58,000
15,870	5/8	115,000	58,000
16,000		115,000	58,000
16,200		119,000	60,000
16,500		119,000	60,000
16,670	21/32	119,000	60,000
17,000		119,000	60,000
17,070	43/64	123,000	62,000
17,750		123,000	62,000
18,000		123,000	62,000
18,500		127,000	64,000
19,050	3/4	131,000	66,000
19,840	25/32	131,000	66,000
20,000		131,000	66,000
20,640	13/16	136,000	68,000
21,000		136,000	68,000
21,250		141,000	70,000
21,750		141,000	70,000
21,830	55/64	141,000	70,000
22,000		141,000	70,000
22,400		141,000	70,000
23,000		146,000	72,000
24,000		151,000	75,000
25,500		156,000	78,000
26,190	1 1/32	156,000	78,000
26,590	1 3/64	162,000	81,000
26,990	1 1/16	162,000	81,000
27,380	1 5/64	162,000	81,000
29,000		168,000	84,000
30,960	1 7/32	174,000	87,000
31,500		174,000	87,000
32,150	1 17/64	180,000	90,000
32,940	1 19/64	180,000	90,000
33,000		180,000	90,000
34,500		186,000	93,000
34,920	1 3/8	186,000	93,000
36,000		193,000	96,000
37,000		193,000	96,000
40,000		200,000	100,000
45,000		214,000	108,000
48,000		228,000	116,000
50,000		228,000	116,000



Erikoislyhyet porat

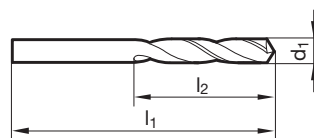


P	•	Kärjen kevennys $\geq \varnothing 2,400$ • kartiovaippahionta • automaatti-/revolverisorveille
M		
K	•	
N	o	ohutlevyt
S		
H		

GÜHRING NAVIGATOR

Leikkuarvosivu 772

Materiaali	HSS
Pinta	S
Leikkusuunta	L



Artikkelinro. **672**

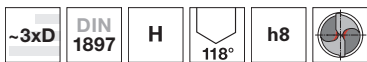
d1		l1	l2
mm	inch	mm	mm
0,900		25,000	5,500
0,950		25,000	5,500
1,000		26,000	6,000
1,100		28,000	7,000
1,400		32,000	9,000
1,500		32,000	9,000
1,600		34,000	10,000
1,800		36,000	11,000
2,000		38,000	12,000
2,100		38,000	12,000
2,200		40,000	13,000
2,300		40,000	13,000
2,350		40,000	13,000
2,400		43,000	14,000
2,500		43,000	14,000
2,550		43,000	14,000
2,700		46,000	16,000
2,800		46,000	16,000
2,920		46,000	16,000
3,000		46,000	16,000
3,100		49,000	18,000
3,150		49,000	18,000
3,200		49,000	18,000
3,300		49,000	18,000
3,400		52,000	20,000
3,500		52,000	20,000
3,800		55,000	22,000
3,900		55,000	22,000
4,000		55,000	22,000
4,200		55,000	22,000
4,250		55,000	22,000
4,300		58,000	24,000
4,400		58,000	24,000
4,600		58,000	24,000
4,700		58,000	24,000
4,800		62,000	26,000

d1		l1	l2
mm	inch	mm	mm
4,900		62,000	26,000
5,000		62,000	26,000
5,200		62,000	26,000
5,600		66,000	28,000
5,700		66,000	28,000
5,900		66,000	28,000
6,000		66,000	28,000
6,100		70,000	31,000
6,200		70,000	31,000
6,500		70,000	31,000
6,800		74,000	34,000
6,900		74,000	34,000
7,500		74,000	34,000
7,900		79,000	37,000
8,000		79,000	37,000
8,500		79,000	37,000
8,700		84,000	40,000
8,800		84,000	40,000
9,000		84,000	40,000
9,500		84,000	40,000
9,800		89,000	43,000
10,000		89,000	43,000
11,000		95,000	47,000
11,500		95,000	47,000
12,500		102,000	51,000
12,700	1/2	102,000	51,000
13,000		102,000	51,000

Lieriövartiset
kierukkaporat



Erikoislyhyet porat



P Kärjen kevennys $\geq \varnothing 14,500$ • kartiovaippahionta



N • kovat ja hauraat materiaalit • messinki, magnesium seokset • pronssi, fosforipronssi • liuskekivi, mico, pertinax

Materiaali **HSS**

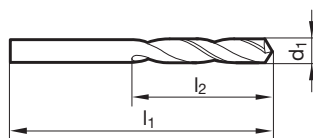
Pinta

Leikkusuunta

Lieriövartiset
kierukkaporat

GÜHRING NAVIGATOR

Leikkuarvosivu 772



Artikkelinro. **224**

d1		l1	l2
mm	inch	mm	mm
0,690		23,000	4,500
0,900		25,000	5,500
0,950		25,000	5,500
1,000		26,000	6,000
1,100		28,000	7,000
1,190	3/64	30,000	8,000
1,200		30,000	8,000
1,300		30,000	8,000
1,400		32,000	9,000
1,500		32,000	9,000
1,550		34,000	10,000
1,590	1/16	34,000	10,000
1,600		34,000	10,000
1,620		34,000	10,000
1,700		34,000	10,000
1,780		36,000	11,000
1,800		36,000	11,000
1,850		36,000	11,000
1,900		36,000	11,000
1,950		38,000	12,000
1,980	5/64	38,000	12,000
2,000		38,000	12,000
2,020		38,000	12,000
2,050		38,000	12,000
2,100		38,000	12,000
2,200		40,000	13,000
2,250		40,000	13,000
2,300		40,000	13,000
2,350		40,000	13,000
2,370		43,000	14,000
2,380	3/32	43,000	14,000
2,400		43,000	14,000
2,450		43,000	14,000
2,500		43,000	14,000
2,550		43,000	14,000
2,600		43,000	14,000
2,650		43,000	14,000
2,700		46,000	16,000
2,780	7/64	46,000	16,000
2,800		46,000	16,000
2,900		46,000	16,000
2,950		46,000	16,000

d1		l1	l2
mm	inch	mm	mm
3,000		46,000	16,000
3,100		49,000	18,000
3,170	1/8	49,000	18,000
3,200		49,000	18,000
3,250		49,000	18,000
3,300		49,000	18,000
3,350		49,000	18,000
3,400		52,000	20,000
3,500		52,000	20,000
3,570	9/64	52,000	20,000
3,600		52,000	20,000
3,650		52,000	20,000
3,700		52,000	20,000
3,800		55,000	22,000
3,850		55,000	22,000
3,900		55,000	22,000
3,970	5/32	55,000	22,000
4,000		55,000	22,000
4,050		55,000	22,000
4,100		55,000	22,000
4,200		55,000	22,000
4,250		55,000	22,000
4,300		58,000	24,000
4,370	11/64	58,000	24,000
4,400		58,000	24,000
4,450		58,000	24,000
4,500		58,000	24,000
4,600		58,000	24,000
4,700		58,000	24,000
4,760	3/16	62,000	26,000
4,800		62,000	26,000
4,900		62,000	26,000
5,000		62,000	26,000
5,100		62,000	26,000
5,200		62,000	26,000
5,300		62,000	26,000
5,400		66,000	28,000
5,500		66,000	28,000
5,560	7/32	66,000	28,000
5,600		66,000	28,000
5,700		66,000	28,000
5,800		66,000	28,000



d1		l1	l2
mm	inch	mm	mm
5,900		66,000	28,000
5,950	15/64	66,000	28,000
6,000		66,000	28,000
6,100		70,000	31,000
6,200		70,000	31,000
6,350	1/4	70,000	31,000
6,400		70,000	31,000
6,500		70,000	31,000
6,600		70,000	31,000
6,800		74,000	34,000
6,900		74,000	34,000
7,000		74,000	34,000
7,140	9/32	74,000	34,000
7,500		74,000	34,000
7,540	19/64	79,000	37,000
7,750		79,000	37,000
7,940	5/16	79,000	37,000
8,000		79,000	37,000
8,030		79,000	37,000
8,100		79,000	37,000
8,330	21/64	79,000	37,000
8,400		79,000	37,000
8,500		79,000	37,000
9,000		84,000	40,000

d1		l1	l2
mm	inch	mm	mm
9,200		84,000	40,000
9,500		84,000	40,000
9,920	25/64	89,000	43,000
10,000		89,000	43,000
10,320	13/32	89,000	43,000
10,500		89,000	43,000
10,720	27/64	95,000	47,000
11,000		95,000	47,000
11,110	7/16	95,000	47,000
11,500		95,000	47,000
11,910	15/32	102,000	51,000
12,000		102,000	51,000
12,500		102,000	51,000
13,000		102,000	51,000
14,000		107,000	54,000
14,500		111,000	56,000
15,000		111,000	56,000
16,000		115,000	58,000
17,000		119,000	60,000
18,000		123,000	62,000
19,000		127,000	64,000
20,000		131,000	66,000
21,000		136,000	68,000



Erikoislyhyet porat



P Kärjen kevennys $\geq \varnothing 15,000$ • kartiovaippahionta

M**K****N** •

koville ja hauraille aineille • messinki, magnesium seokset • pronssi, fosforipronssi • liuskekivi, mico, pertinax

S**H**

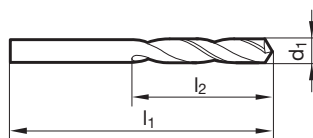
GÜHRING NAVIGATOR

Leikkuuarvosivu 772

Lieriövärtiset
kierukkaporatMateriaali **HSS**

Pinta ○

Leikkusuunta



Artikkelinro.

227

d1		l1	l2
mm	inch	mm	mm
0,750		23,000	4,500
1,040		26,000	6,000
1,150		28,000	7,000
1,190	3/64	30,000	8,000
1,200		30,000	8,000
1,350		32,000	9,000
1,540		34,000	10,000
1,590	1/16	34,000	10,000
1,700		34,000	10,000
1,800		36,000	11,000
1,900		36,000	11,000
1,950		38,000	12,000
1,980	5/64	38,000	12,000
2,100		38,000	12,000
2,150		40,000	13,000
2,200		40,000	13,000
2,370		43,000	14,000
2,380	3/32	43,000	14,000
2,480		43,000	14,000
2,500		43,000	14,000
2,580		43,000	14,000
2,600		43,000	14,000
2,700		46,000	16,000
2,780	7/64	46,000	16,000
2,800		46,000	16,000
2,900		46,000	16,000
3,000		46,000	16,000
3,100		49,000	18,000
3,170	1/8	49,000	18,000
3,200		49,000	18,000
3,350		49,000	18,000
3,400		52,000	20,000
3,500		52,000	20,000
3,570	9/64	52,000	20,000
3,600		52,000	20,000
3,700		52,000	20,000
3,970	5/32	55,000	22,000
4,100		55,000	22,000
4,250		55,000	22,000
4,300		58,000	24,000
4,370	11/64	58,000	24,000
4,600		58,000	24,000

d1		l1	l2
mm	inch	mm	mm
4,700		58,000	24,000
4,760	3/16	62,000	26,000
4,800		62,000	26,000
4,900		62,000	26,000
5,000		62,000	26,000
5,100		62,000	26,000
5,150		62,000	26,000
5,160	13/64	62,000	26,000
5,300		62,000	26,000
5,400		66,000	28,000
5,500		66,000	28,000
5,560	7/32	66,000	28,000
5,600		66,000	28,000
5,700		66,000	28,000
5,800		66,000	28,000
5,900		66,000	28,000
5,950	15/64	66,000	28,000
6,350	1/4	70,000	31,000
6,400		70,000	31,000
6,600		70,000	31,000
6,750	17/64	74,000	34,000
7,000		74,000	34,000
7,140	9/32	74,000	34,000
7,200		74,000	34,000
7,300		74,000	34,000
7,500		74,000	34,000
7,540	19/64	79,000	37,000
7,750		79,000	37,000
7,900		79,000	37,000
7,940	5/16	79,000	37,000
8,300		79,000	37,000
8,330	21/64	79,000	37,000
8,500		79,000	37,000
8,730	11/32	84,000	40,000
8,800		84,000	40,000
9,130	23/64	84,000	40,000
9,500		84,000	40,000
9,520	3/8	89,000	43,000
9,920	25/64	89,000	43,000
10,000		89,000	43,000
10,320	13/32	89,000	43,000
10,720	27/64	95,000	47,000



d1		l1	l2
mm	inch	mm	mm
11,000		95,000	47,000
11,110	7/16	95,000	47,000
11,510	29/64	95,000	47,000
11,910	15/32	102,000	51,000
13,500		107,000	54,000
15,000		111,000	56,000

d1		l1	l2
mm	inch	mm	mm
22,200		141,000	70,000
24,000		151,000	75,000



Erikoislyhyet porat



P Kärjen kevennys $\geq \varnothing 2,380$ • kartiovaippahionta



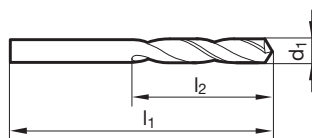
N • pehmeät ja pitkälastuiset materiaalit • Alumiini, pitkälastuiset Al-seokset
 • sinkki, puhdistettu kupari, silumiini, elektroni • muovi (pehmeä), puu

GÜHRING NAVIGATOR

Leikkuuarvosivu 772

Lieriövartiset
kierukkaporat

Materiaali	HSS
Pinta	○
Leikkusuunta	Ⓜ



Artikkelinro. **225**

d1		l1	l2
mm	inch	mm	mm
1,000		26,000	6,000
1,100		28,000	7,000
1,190	3/64	30,000	8,000
1,200		30,000	8,000
1,300		30,000	8,000
1,400		32,000	9,000
1,500		32,000	9,000
1,590	1/16	34,000	10,000
1,600		34,000	10,000
1,700		34,000	10,000
1,800		36,000	11,000
1,900		36,000	11,000
1,980	5/64	38,000	12,000
2,000		38,000	12,000
2,100		38,000	12,000
2,200		40,000	13,000
2,250		40,000	13,000
2,300		40,000	13,000
2,380	3/32	43,000	14,000
2,400		43,000	14,000
2,500		43,000	14,000
2,550		43,000	14,000
2,600		43,000	14,000
2,700		46,000	16,000
2,710		46,000	16,000
2,750		46,000	16,000
2,780	7/64	46,000	16,000
2,800		46,000	16,000
2,900		46,000	16,000
3,000		46,000	16,000
3,050		49,000	18,000
3,100		49,000	18,000
3,170	1/8	49,000	18,000
3,200		49,000	18,000
3,300		49,000	18,000
3,400		52,000	20,000
3,500		52,000	20,000
3,570	9/64	52,000	20,000
3,700		52,000	20,000
3,800		55,000	22,000
3,900		55,000	22,000
3,970	5/32	55,000	22,000

d1		l1	l2
mm	inch	mm	mm
4,000		55,000	22,000
4,100		55,000	22,000
4,200		55,000	22,000
4,300		58,000	24,000
4,370	11/64	58,000	24,000
4,400		58,000	24,000
4,500		58,000	24,000
4,600		58,000	24,000
4,760	3/16	62,000	26,000
4,800		62,000	26,000
4,900		62,000	26,000
5,000		62,000	26,000
5,100		62,000	26,000
5,200		62,000	26,000
5,250		62,000	26,000
5,300		62,000	26,000
5,560	7/32	66,000	28,000
5,700		66,000	28,000
5,900		66,000	28,000
5,950	15/64	66,000	28,000
6,000		66,000	28,000
6,100		70,000	31,000
6,200		70,000	31,000
6,300		70,000	31,000
6,350	1/4	70,000	31,000
6,400		70,000	31,000
6,500		70,000	31,000
6,530		70,000	31,000
6,600		70,000	31,000
6,800		74,000	34,000
6,900		74,000	34,000
7,000		74,000	34,000
7,100		74,000	34,000
7,140	9/32	74,000	34,000
7,300		74,000	34,000
7,500		74,000	34,000
7,540	19/64	79,000	37,000
7,600		79,000	37,000
7,800		79,000	37,000
7,940	5/16	79,000	37,000
8,000		79,000	37,000
8,200		79,000	37,000



d1		l1	l2
mm	inch	mm	mm
8,330	21/64	79,000	37,000
8,400		79,000	37,000
8,430		79,000	37,000
8,500		79,000	37,000
8,600		84,000	40,000
8,700		84,000	40,000
8,730	11/32	84,000	40,000
8,900		84,000	40,000
9,000		84,000	40,000
9,130	23/64	84,000	40,000
9,200		84,000	40,000
9,400		84,000	40,000
9,520	3/8	89,000	43,000
9,800		89,000	43,000
9,920	25/64	89,000	43,000
10,000		89,000	43,000
10,200		89,000	43,000
10,500		89,000	43,000

d1		l1	l2
mm	inch	mm	mm
10,720	27/64	95,000	47,000
11,000		95,000	47,000
11,110	7/16	95,000	47,000
12,000		102,000	51,000
12,100		102,000	51,000
12,500		102,000	51,000
12,700	1/2	102,000	51,000
12,800		102,000	51,000
13,000		102,000	51,000
14,500		111,000	56,000
15,000		111,000	56,000
16,000		115,000	58,000
17,500		123,000	62,000
18,000		123,000	62,000
19,050	3/4	131,000	66,000
19,750		131,000	66,000
20,000		131,000	66,000



Erikoislyhyet porat



P Kärjen kevennys $\geq \varnothing 2,380$ • kartiovaippahionta



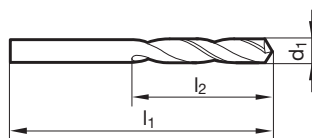
N • pehmeät ja pitkälastuiset materiaalit • Alumiini, pitkälastuiset Al-seokset
 • sinkki, puhdistettu kupari, silumiini, elektroni • muovi (pehmeä), puu

GÜHRING NAVIGATOR

Leikkuuarvosivu 772

Lieriövartiset
kierukkaporat

Materiaali	HSS
Pinta	○
Leikkusuunta	Ⓛ



Artikkelinro. **228**

d1		l1	l2
mm	inch	mm	mm
1,000		26,000	6,000
1,100		28,000	7,000
1,150		28,000	7,000
1,190	3/64	30,000	8,000
1,200		30,000	8,000
1,300		30,000	8,000
1,400		32,000	9,000
1,450		32,000	9,000
1,500		32,000	9,000
1,590	1/16	34,000	10,000
1,600		34,000	10,000
1,700		34,000	10,000
1,800		36,000	11,000
1,900		36,000	11,000
1,980	5/64	38,000	12,000
2,000		38,000	12,000
2,100		38,000	12,000
2,200		40,000	13,000
2,300		40,000	13,000
2,350		40,000	13,000
2,380	3/32	43,000	14,000
2,400		43,000	14,000
2,420		43,000	14,000
2,500		43,000	14,000
2,570		43,000	14,000
2,600		43,000	14,000
2,700		46,000	16,000
2,780	7/64	46,000	16,000
2,800		46,000	16,000
2,900		46,000	16,000
2,920		46,000	16,000
3,100		49,000	18,000
3,170	1/8	49,000	18,000
3,200		49,000	18,000
3,570	9/64	52,000	20,000
3,600		52,000	20,000
3,650		52,000	20,000
3,700		52,000	20,000
3,800		55,000	22,000
3,970	5/32	55,000	22,000
4,000		55,000	22,000
4,100		55,000	22,000

d1		l1	l2
mm	inch	mm	mm
4,200		55,000	22,000
4,300		58,000	24,000
4,370	11/64	58,000	24,000
4,390		58,000	24,000
4,400		58,000	24,000
4,500		58,000	24,000
4,600		58,000	24,000
4,760	3/16	62,000	26,000
4,800		62,000	26,000
4,900		62,000	26,000
5,100		62,000	26,000
5,160	13/64	62,000	26,000
5,200		62,000	26,000
5,400		66,000	28,000
5,600		66,000	28,000
5,700		66,000	28,000
5,800		66,000	28,000
5,900		66,000	28,000
5,950	15/64	66,000	28,000
6,100		70,000	31,000
6,150		70,000	31,000
6,350	1/4	70,000	31,000
6,500		70,000	31,000
6,700		70,000	31,000
6,750	17/64	74,000	34,000
6,800		74,000	34,000
6,900		74,000	34,000
7,000		74,000	34,000
7,140	9/32	74,000	34,000
7,400		74,000	34,000
7,500		74,000	34,000
7,540	19/64	79,000	37,000
7,800		79,000	37,000
7,940	5/16	79,000	37,000
8,330	21/64	79,000	37,000
8,400		79,000	37,000
8,730	11/32	84,000	40,000
9,000		84,000	40,000
9,130	23/64	84,000	40,000
9,500		84,000	40,000
9,920	25/64	89,000	43,000
10,320	13/32	89,000	43,000

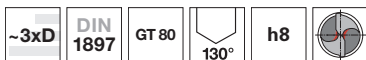


d1		l1	l2
mm	inch	mm	mm
10,500		89,000	43,000
10,720	27/64	95,000	47,000
11,110	7/16	95,000	47,000
11,500		95,000	47,000
11,910	15/32	102,000	51,000
12,300	31/64	102,000	51,000
12,500		102,000	51,000
12,700	1/2	102,000	51,000
12,800		102,000	51,000
13,000		102,000	51,000
13,500		107,000	54,000
14,000		107,000	54,000

d1		l1	l2
mm	inch	mm	mm
14,500		111,000	56,000
14,700		111,000	56,000
15,000		111,000	56,000
15,500		115,000	58,000
16,500		119,000	60,000
18,000		123,000	62,000
20,000		131,000	66,000



Erikoislyhyet porat



Materiaali **HSS**

Pinta

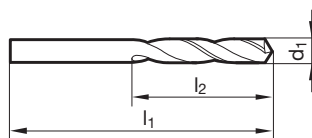
Leikkusuunta

- P** • Kärjen kevennys $\geq \varnothing 1,000$ • kartiovaippahionta • erikoislujille teräksille •
- M** ○
- K** ○
- N** • automaattiteräkset • ruostumatt./-haponk.teräkset • nuorrutetut ja pintakarkaistut teräkset $< 800 \text{ N/mm}^2$ asti • lyhyt-/keskipitkälästäiset Al/Cu-seokset
- S** ○
- H** ○

GÜHRING NAVIGATOR

Leikkuuarvosivu 772

Lieriövärtiset kierukkaporat



Artikkelinro. **552**

d1		l1	l2
mm	inch	mm	mm
1,000		26,000	6,000
1,020		26,000	6,000
1,040		26,000	6,000
1,050		26,000	6,000
1,070		28,000	7,000
1,090		28,000	7,000
1,100		28,000	7,000
1,150		28,000	7,000
1,180		28,000	7,000
1,190	3/64	30,000	8,000
1,200		30,000	8,000
1,250		30,000	8,000
1,300		30,000	8,000
1,320		30,000	8,000
1,350		32,000	9,000
1,400		32,000	9,000
1,450		32,000	9,000
1,500		32,000	9,000
1,510		34,000	10,000
1,530		34,000	10,000
1,550		34,000	10,000
1,590	1/16	34,000	10,000
1,600		34,000	10,000
1,610		34,000	10,000
1,650		34,000	10,000
1,700		34,000	10,000
1,750		36,000	11,000
1,780		36,000	11,000
1,800		36,000	11,000
1,820		36,000	11,000
1,850		36,000	11,000
1,900		36,000	11,000
1,930		38,000	12,000
1,950		38,000	12,000
1,980	5/64	38,000	12,000
1,990		38,000	12,000
2,000		38,000	12,000
2,050		38,000	12,000
2,060		38,000	12,000
2,080		38,000	12,000
2,100		38,000	12,000
2,130		40,000	13,000

d1		l1	l2
mm	inch	mm	mm
2,150		40,000	13,000
2,180		40,000	13,000
2,200		40,000	13,000
2,250		40,000	13,000
2,260		40,000	13,000
2,300		40,000	13,000
2,320		40,000	13,000
2,350		40,000	13,000
2,370		43,000	14,000
2,380	3/32	43,000	14,000
2,400		43,000	14,000
2,440		43,000	14,000
2,450		43,000	14,000
2,490		43,000	14,000
2,500		43,000	14,000
2,530		43,000	14,000
2,550		43,000	14,000
2,580		43,000	14,000
2,600		43,000	14,000
2,640		43,000	14,000
2,650		43,000	14,000
2,700		46,000	16,000
2,710		46,000	16,000
2,750		46,000	16,000
2,780	7/64	46,000	16,000
2,790		46,000	16,000
2,800		46,000	16,000
2,820		46,000	16,000
2,850		46,000	16,000
2,870		46,000	16,000
2,900		46,000	16,000
2,950		46,000	16,000
3,000		46,000	16,000
3,050		49,000	18,000
3,100		49,000	18,000
3,150		49,000	18,000
3,170	1/8	49,000	18,000
3,200		49,000	18,000
3,250		49,000	18,000
3,260		49,000	18,000
3,300		49,000	18,000
3,350		49,000	18,000



d1		l1	l2
mm	inch	mm	mm
3,400		52,000	20,000
3,450		52,000	20,000
3,500		52,000	20,000
3,550		52,000	20,000
3,570	9/64	52,000	20,000
3,600		52,000	20,000
3,650		52,000	20,000
3,660		52,000	20,000
3,700		52,000	20,000
3,730		52,000	20,000
3,750		52,000	20,000
3,800		55,000	22,000
3,850		55,000	22,000
3,860		55,000	22,000
3,900		55,000	22,000
3,910		55,000	22,000
3,950		55,000	22,000
3,970	5/32	55,000	22,000
3,990		55,000	22,000
4,000		55,000	22,000
4,040		55,000	22,000
4,050		55,000	22,000
4,090		55,000	22,000
4,100		55,000	22,000
4,150		55,000	22,000
4,200		55,000	22,000
4,220		55,000	22,000
4,250		55,000	22,000
4,300		58,000	24,000
4,350		58,000	24,000
4,370	11/64	58,000	24,000
4,390		58,000	24,000
4,400		58,000	24,000
4,450		58,000	24,000
4,500		58,000	24,000
4,550		58,000	24,000
4,570		58,000	24,000
4,600		58,000	24,000
4,620		58,000	24,000
4,650		58,000	24,000
4,700		58,000	24,000
4,750		58,000	24,000
4,760	3/16	62,000	26,000
4,800		62,000	26,000
4,850		62,000	26,000
4,900		62,000	26,000
4,920		62,000	26,000
4,950		62,000	26,000
4,980		62,000	26,000
5,000		62,000	26,000
5,050		62,000	26,000
5,060		62,000	26,000
5,100		62,000	26,000
5,110		62,000	26,000
5,160	13/64	62,000	26,000
5,180		62,000	26,000
5,200		62,000	26,000
5,220		62,000	26,000
5,300		62,000	26,000
5,310		66,000	28,000
5,400		66,000	28,000
5,410		66,000	28,000
5,500		66,000	28,000
5,560	7/32	66,000	28,000
5,600		66,000	28,000
5,610		66,000	28,000
5,700		66,000	28,000
5,790		66,000	28,000
5,800		66,000	28,000
5,900		66,000	28,000
5,940		66,000	28,000
5,950	15/64	66,000	28,000

d1		l1	l2
mm	inch	mm	mm
6,000		66,000	28,000
6,040		70,000	31,000
6,100		70,000	31,000
6,150		70,000	31,000
6,200		70,000	31,000
6,250		70,000	31,000
6,300		70,000	31,000
6,350	1/4	70,000	31,000
6,400		70,000	31,000
6,500		70,000	31,000
6,530		70,000	31,000
6,600		70,000	31,000
6,630		70,000	31,000
6,700		70,000	31,000
6,750	17/64	74,000	34,000
6,800		74,000	34,000
6,900		74,000	34,000
7,000		74,000	34,000
7,030		74,000	34,000
7,100		74,000	34,000
7,140	9/32	74,000	34,000
7,200		74,000	34,000
7,300		74,000	34,000
7,370		74,000	34,000
7,400		74,000	34,000
7,490		74,000	34,000
7,500		74,000	34,000
7,540	19/64	79,000	37,000
7,600		79,000	37,000
7,670		79,000	37,000
7,700		79,000	37,000
7,800		79,000	37,000
7,900		79,000	37,000
7,940	5/16	79,000	37,000
8,000		79,000	37,000
8,030		79,000	37,000
8,100		79,000	37,000
8,200		79,000	37,000
8,300		79,000	37,000
8,330	21/64	79,000	37,000
8,400		79,000	37,000
8,430		79,000	37,000
8,500		79,000	37,000
8,600		84,000	40,000
8,610		84,000	40,000
8,700		84,000	40,000
8,730	11/32	84,000	40,000
8,800		84,000	40,000
8,840		84,000	40,000
8,900		84,000	40,000
9,000		84,000	40,000
9,090		84,000	40,000
9,100		84,000	40,000
9,130	23/64	84,000	40,000
9,200		84,000	40,000
9,300		84,000	40,000
9,340		84,000	40,000
9,400		84,000	40,000
9,500		84,000	40,000
9,520	3/8	89,000	43,000
9,580		89,000	43,000
9,600		89,000	43,000
9,700		89,000	43,000
9,800		89,000	43,000
9,900		89,000	43,000
9,920	25/64	89,000	43,000
10,000		89,000	43,000
10,080		89,000	43,000
10,200		89,000	43,000
10,260		89,000	43,000
10,320	13/32	89,000	43,000
10,490		89,000	43,000



d1		l1	l2
mm	inch	mm	mm
10,500		89,000	43,000
10,600		89,000	43,000
10,720	27/64	95,000	47,000
10,800		95,000	47,000
11,000		95,000	47,000
11,110	7/16	95,000	47,000
11,200		95,000	47,000
11,300		95,000	47,000
11,400		95,000	47,000
11,500		95,000	47,000
11,510	29/64	95,000	47,000
11,800		95,000	47,000
11,910	15/32	102,000	51,000
12,000		102,000	51,000
12,300	31/64	102,000	51,000
12,400		102,000	51,000
12,500		102,000	51,000
12,700	1/2	102,000	51,000
12,900		102,000	51,000
13,000		102,000	51,000
13,100	33/64	102,000	51,000
13,490	17/32	107,000	54,000
13,500		107,000	54,000
13,890	35/64	107,000	54,000

d1		l1	l2
mm	inch	mm	mm
14,000		107,000	54,000
14,290	9/16	111,000	56,000
14,500		111,000	56,000
14,680	37/64	111,000	56,000
15,000		111,000	56,000
15,080	19/32	115,000	58,000
15,480	39/64	115,000	58,000
15,500		115,000	58,000
15,870	5/8	115,000	58,000
16,000		115,000	58,000
16,270	41/64	119,000	60,000
16,500		119,000	60,000
17,000		119,000	60,000
17,070	43/64	123,000	62,000
17,460	11/16	123,000	62,000
17,860	45/64	123,000	62,000
18,000		123,000	62,000
18,260	23/32	127,000	64,000
19,000		127,000	64,000
19,050	3/4	131,000	66,000
19,840	25/32	131,000	66,000
20,000		131,000	66,000

Lieriövirtiset
Kierukkaporat



Erikoislyhyet porat

Materiaali **HSS**

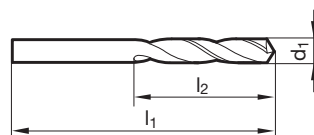
Pinta

Leikkusuunta

P	•	Kärjen kevennys $\geq \varnothing 1,000$ • kartiovaippahionta • erikoislujille teräksille •
M	○	
K	○	
N	•	automaattiteräkset • ruostumatt./-haponk.teräkset • nuorutetut ja pintakarkaistut teräkset < 800 N/mm ² asti • lyhyt-/keskipitkälästäiset Al/Cu-seokset
S	○	
H	○	

GÜHRING NAVIGATOR

Leikkuarvosivu 772

Artikkelinro. **553**

d1		l1	l2	d1		l1	l2
mm	inch	mm	mm	mm	inch	mm	mm
1,000		26,000	6,000	2,350		40,000	13,000
1,020		26,000	6,000	2,380	3/32	43,000	14,000
1,070		28,000	7,000	2,400		43,000	14,000
1,090		28,000	7,000	2,440		43,000	14,000
1,100		28,000	7,000	2,490		43,000	14,000
1,150		28,000	7,000	2,500		43,000	14,000
1,180		28,000	7,000	2,530		43,000	14,000
1,190	3/64	30,000	8,000	2,550		43,000	14,000
1,200		30,000	8,000	2,580		43,000	14,000
1,250		30,000	8,000	2,600		43,000	14,000
1,300		30,000	8,000	2,640		43,000	14,000
1,320		30,000	8,000	2,640		43,000	14,000
1,320		30,000	8,000	2,700		46,000	16,000
1,350		32,000	9,000	2,710		46,000	16,000
1,400		32,000	9,000	2,750		46,000	16,000
1,450		32,000	9,000	2,780	7/64	46,000	16,000
1,500		32,000	9,000	2,790		46,000	16,000
1,510		34,000	10,000	2,800		46,000	16,000
1,550		34,000	10,000	2,820		46,000	16,000
1,590	1/16	34,000	10,000	2,850		46,000	16,000
1,600		34,000	10,000	2,870		46,000	16,000
1,610		34,000	10,000	2,900		46,000	16,000
1,650		34,000	10,000	2,950		46,000	16,000
1,700		34,000	10,000	3,000		46,000	16,000
1,750		36,000	11,000	3,050		49,000	18,000
1,780		36,000	11,000	3,100		49,000	18,000
1,800		36,000	11,000	3,150		49,000	18,000
1,850		36,000	11,000	3,170	1/8	49,000	18,000
1,900		36,000	11,000	3,200		49,000	18,000
1,930		38,000	12,000	3,250		49,000	18,000
1,950		38,000	12,000	3,260		49,000	18,000
1,980	5/64	38,000	12,000	3,260		49,000	18,000
1,990		38,000	12,000	3,300		49,000	18,000
2,000		38,000	12,000	3,350		49,000	18,000
2,050		38,000	12,000	3,400		52,000	20,000
2,060		38,000	12,000	3,450		52,000	20,000
2,080		38,000	12,000	3,500		52,000	20,000
2,100		38,000	12,000	3,570	9/64	52,000	20,000
2,180		40,000	13,000	3,570		52,000	20,000
2,200		40,000	13,000	3,600		52,000	20,000
2,250		40,000	13,000	3,650		52,000	20,000
2,260		40,000	13,000	3,660		52,000	20,000
2,300		40,000	13,000	3,680		52,000	20,000
				3,700		52,000	20,000
				3,750		52,000	20,000



d1		l1	l2
mm	inch	mm	mm
3,800		55,000	22,000
3,850		55,000	22,000
3,860		55,000	22,000
3,900		55,000	22,000
3,910		55,000	22,000
3,950		55,000	22,000
3,970	5/32	55,000	22,000
3,990		55,000	22,000
4,000		55,000	22,000
4,040		55,000	22,000
4,050		55,000	22,000
4,090		55,000	22,000
4,100		55,000	22,000
4,150		55,000	22,000
4,200		55,000	22,000
4,220		55,000	22,000
4,250		55,000	22,000
4,300		58,000	24,000
4,370	11/64	58,000	24,000
4,390		58,000	24,000
4,400		58,000	24,000
4,450		58,000	24,000
4,500		58,000	24,000
4,550		58,000	24,000
4,570		58,000	24,000
4,600		58,000	24,000
4,620		58,000	24,000
4,650		58,000	24,000
4,700		58,000	24,000
4,760	3/16	62,000	26,000
4,800		62,000	26,000
4,850		62,000	26,000
4,900		62,000	26,000
4,920		62,000	26,000
4,950		62,000	26,000
4,980		62,000	26,000
5,000		62,000	26,000
5,060		62,000	26,000
5,100		62,000	26,000
5,110		62,000	26,000
5,160	13/64	62,000	26,000
5,180		62,000	26,000
5,200		62,000	26,000
5,220		62,000	26,000
5,300		62,000	26,000
5,500		66,000	28,000
5,560	7/32	66,000	28,000
5,600		66,000	28,000
5,610		66,000	28,000
5,700		66,000	28,000
5,790		66,000	28,000
5,800		66,000	28,000
5,900		66,000	28,000
5,940		66,000	28,000
5,950	15/64	66,000	28,000
6,000		66,000	28,000
6,050		70,000	31,000
6,100		70,000	31,000
6,150		70,000	31,000
6,200		70,000	31,000
6,250		70,000	31,000
6,350	1/4	70,000	31,000
6,400		70,000	31,000
6,500		70,000	31,000
6,530		70,000	31,000
6,600		70,000	31,000
6,630		70,000	31,000
6,700		70,000	31,000
6,750	17/64	74,000	34,000
6,800		74,000	34,000
6,900		74,000	34,000
7,000		74,000	34,000

d1		l1	l2
mm	inch	mm	mm
7,030		74,000	34,000
7,140	9/32	74,000	34,000
7,300		74,000	34,000
7,370		74,000	34,000
7,400		74,000	34,000
7,490		74,000	34,000
7,500		74,000	34,000
7,540	19/64	79,000	37,000
7,600		79,000	37,000
7,670		79,000	37,000
7,700		79,000	37,000
7,940	5/16	79,000	37,000
8,000		79,000	37,000
8,200		79,000	37,000
8,330	21/64	79,000	37,000
8,430		79,000	37,000
8,500		79,000	37,000
8,600		84,000	40,000
8,610		84,000	40,000
8,730	11/32	84,000	40,000
8,840		84,000	40,000
9,000		84,000	40,000
9,090		84,000	40,000
9,130	23/64	84,000	40,000
9,340		84,000	40,000
9,400		84,000	40,000
9,500		84,000	40,000
9,520	3/8	89,000	43,000
9,580		89,000	43,000
9,600		89,000	43,000
9,700		89,000	43,000
9,800		89,000	43,000
9,900		89,000	43,000
9,920	25/64	89,000	43,000
10,000		89,000	43,000
10,200		89,000	43,000
10,260		89,000	43,000
10,320	13/32	89,000	43,000
10,490		89,000	43,000
10,500		89,000	43,000
10,700		95,000	47,000
10,720	27/64	95,000	47,000
10,900		95,000	47,000
11,000		95,000	47,000
11,100		95,000	47,000
11,110	7/16	95,000	47,000
11,500		95,000	47,000
11,510	29/64	95,000	47,000
11,800		95,000	47,000
11,910	15/32	102,000	51,000
12,000		102,000	51,000
12,300	31/64	102,000	51,000
12,500		102,000	51,000
12,700	1/2	102,000	51,000
12,800		102,000	51,000
13,000		102,000	51,000
13,100	33/64	102,000	51,000
13,490	17/32	107,000	54,000
13,500		107,000	54,000
13,890	35/64	107,000	54,000
14,000		107,000	54,000
14,250		111,000	56,000
14,290	9/16	111,000	56,000
14,500		111,000	56,000
14,680	37/64	111,000	56,000
15,000		111,000	56,000
15,080	19/32	115,000	58,000
15,480	39/64	115,000	58,000
15,500		115,000	58,000
15,870	5/8	115,000	58,000
16,000		115,000	58,000
16,270	41/64	119,000	60,000



d1		l1	l2
mm	inch	mm	mm
17,070	43/64	123,000	62,000
17,460	11/16	123,000	62,000
17,860	45/64	123,000	62,000
18,000		123,000	62,000
18,260	23/32	127,000	64,000
18,500		127,000	64,000

d1		l1	l2
mm	inch	mm	mm
18,650	47/64	127,000	64,000
19,000		127,000	64,000
19,500		131,000	66,000
19,840	25/32	131,000	66,000



Erikoislyhyet porat



- P** • Kärjen kevennys $\geq \varnothing 1,000$ • kartiovaippahionta • Co-seosteinen pikateräs • parempi kulumiskestävyys
- M** •
- K** •
- N** ○ ruostumatt./-haponk.teräkset • jousiteräkset • austeniittiset teräkset • Hastelloy, Inconel, Nimonic
- S** •
- H** ○

Materiaali **HSCO**

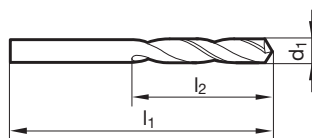
Pinta

Leikkusuunta

Lieriövärtiset kierukkaporat

GÜHRING NAVIGATOR

Leikkuarvosivu 772



Artikkelinro. **329**

d1		l1	l2
mm	inch	mm	mm
0,400	1/64	19,000	2,500
0,500		20,000	3,000
0,510		20,000	3,000
0,520		20,000	3,000
0,550		21,000	3,500
0,570		21,000	3,500
0,580		21,000	3,500
0,590		21,000	3,500
0,600		21,000	3,500
0,610		22,000	4,000
0,640		22,000	4,000
0,650		22,000	4,000
0,700		23,000	4,500
0,730		23,000	4,500
0,740		23,000	4,500
0,750		23,000	4,500
0,790	1/32	24,000	5,000
0,800		24,000	5,000
0,810		24,000	5,000
0,820		24,000	5,000
0,840		24,000	5,000
0,850		24,000	5,000
0,860		25,000	5,500
0,870		25,000	5,500
0,900		25,000	5,500
0,910		25,000	5,500
0,940		25,000	5,500
0,950		25,000	5,500
0,960		26,000	6,000
0,970		26,000	6,000
0,990		26,000	6,000
1,000		26,000	6,000
1,020		26,000	6,000
1,030		26,000	6,000
1,050		26,000	6,000
1,070		28,000	7,000
1,090		28,000	7,000
1,100		28,000	7,000
1,150		28,000	7,000
1,170		28,000	7,000
1,180		28,000	7,000
1,190	3/64	30,000	8,000

d1		l1	l2
mm	inch	mm	mm
1,200		30,000	8,000
1,210		30,000	8,000
1,230		30,000	8,000
1,250		30,000	8,000
1,280		30,000	8,000
1,300		30,000	8,000
1,320		30,000	8,000
1,330		32,000	9,000
1,350		32,000	9,000
1,370		32,000	9,000
1,400		32,000	9,000
1,450		32,000	9,000
1,470		32,000	9,000
1,500		32,000	9,000
1,510		34,000	10,000
1,550		34,000	10,000
1,570		34,000	10,000
1,590	1/16	34,000	10,000
1,600		34,000	10,000
1,610		34,000	10,000
1,630		34,000	10,000
1,650		34,000	10,000
1,680		34,000	10,000
1,700		34,000	10,000
1,730		36,000	11,000
1,750		36,000	11,000
1,780		36,000	11,000
1,800		36,000	11,000
1,820		36,000	11,000
1,830		36,000	11,000
1,850		36,000	11,000
1,900		36,000	11,000
1,930		38,000	12,000
1,950		38,000	12,000
1,970		38,000	12,000
1,980	5/64	38,000	12,000
1,990		38,000	12,000
2,000		38,000	12,000
2,030		38,000	12,000
2,050		38,000	12,000
2,060		38,000	12,000
2,080		38,000	12,000



d1		l1	l2
mm	inch	mm	mm
2,100		38,000	12,000
2,150		40,000	13,000
2,180		40,000	13,000
2,200		40,000	13,000
2,250		40,000	13,000
2,260		40,000	13,000
2,300		40,000	13,000
2,320		40,000	13,000
2,350		40,000	13,000
2,360		40,000	13,000
2,370		43,000	14,000
2,380	3/32	43,000	14,000
2,400		43,000	14,000
2,420		43,000	14,000
2,440		43,000	14,000
2,450		43,000	14,000
2,470		43,000	14,000
2,490		43,000	14,000
2,500		43,000	14,000
2,520		43,000	14,000
2,530		43,000	14,000
2,550		43,000	14,000
2,580		43,000	14,000
2,600		43,000	14,000
2,640		43,000	14,000
2,650		43,000	14,000
2,700		46,000	16,000
2,710		46,000	16,000
2,750		46,000	16,000
2,780	7/64	46,000	16,000
2,790		46,000	16,000
2,800		46,000	16,000
2,820		46,000	16,000
2,830		46,000	16,000
2,850		46,000	16,000
2,870		46,000	16,000
2,900		46,000	16,000
2,950		46,000	16,000
3,000		46,000	16,000
3,020		49,000	18,000
3,050		49,000	18,000
3,100		49,000	18,000
3,150		49,000	18,000
3,170	1/8	49,000	18,000
3,200		49,000	18,000
3,250		49,000	18,000
3,260		49,000	18,000
3,300		49,000	18,000
3,350		49,000	18,000
3,400		52,000	20,000
3,450		52,000	20,000
3,500		52,000	20,000
3,520		52,000	20,000
3,550		52,000	20,000
3,570	9/64	52,000	20,000
3,600		52,000	20,000
3,660		52,000	20,000
3,700		52,000	20,000
3,730		52,000	20,000
3,750		52,000	20,000
3,800		55,000	22,000
3,850		55,000	22,000
3,860		55,000	22,000
3,900		55,000	22,000
3,910		55,000	22,000
3,950		55,000	22,000
3,970	5/32	55,000	22,000
3,990		55,000	22,000
4,000		55,000	22,000
4,040		55,000	22,000
4,050		55,000	22,000
4,090		55,000	22,000

d1		l1	l2
mm	inch	mm	mm
4,100		55,000	22,000
4,150		55,000	22,000
4,200		55,000	22,000
4,220		55,000	22,000
4,250		55,000	22,000
4,300		58,000	24,000
4,350		58,000	24,000
4,370	11/64	58,000	24,000
4,390		58,000	24,000
4,400		58,000	24,000
4,450		58,000	24,000
4,500		58,000	24,000
4,550		58,000	24,000
4,570		58,000	24,000
4,600		58,000	24,000
4,620		58,000	24,000
4,650		58,000	24,000
4,700		58,000	24,000
4,750		58,000	24,000
4,760	3/16	62,000	26,000
4,800		62,000	26,000
4,850		62,000	26,000
4,900		62,000	26,000
4,920		62,000	26,000
4,950		62,000	26,000
4,980		62,000	26,000
5,000		62,000	26,000
5,020		62,000	26,000
5,050		62,000	26,000
5,060		62,000	26,000
5,100		62,000	26,000
5,110		62,000	26,000
5,150		62,000	26,000
5,160	13/64	62,000	26,000
5,180		62,000	26,000
5,200		62,000	26,000
5,220		62,000	26,000
5,250		62,000	26,000
5,300		62,000	26,000
5,310		66,000	28,000
5,350		66,000	28,000
5,400		66,000	28,000
5,410		66,000	28,000
5,450		66,000	28,000
5,500		66,000	28,000
5,550		66,000	28,000
5,560	7/32	66,000	28,000
5,600		66,000	28,000
5,610		66,000	28,000
5,700		66,000	28,000
5,750		66,000	28,000
5,790		66,000	28,000
5,800		66,000	28,000
5,850		66,000	28,000
5,900		66,000	28,000
5,940		66,000	28,000
5,950	15/64	66,000	28,000
6,000		66,000	28,000
6,040		70,000	31,000
6,050		70,000	31,000
6,100		70,000	31,000
6,150		70,000	31,000
6,200		70,000	31,000
6,250		70,000	31,000
6,300		70,000	31,000
6,320		70,000	31,000
6,350	1/4	70,000	31,000
6,400		70,000	31,000
6,450		70,000	31,000
6,500		70,000	31,000
6,530		70,000	31,000
6,550		70,000	31,000



d1		l1	l2
mm	inch	mm	mm
6,600		70,000	31,000
6,630		70,000	31,000
6,700		70,000	31,000
6,750	17/64	74,000	34,000
6,800		74,000	34,000
6,850		74,000	34,000
6,900		74,000	34,000
7,000		74,000	34,000
7,030		74,000	34,000
7,050		74,000	34,000
7,100		74,000	34,000
7,140	9/32	74,000	34,000
7,200		74,000	34,000
7,250		74,000	34,000
7,300		74,000	34,000
7,350		74,000	34,000
7,370		74,000	34,000
7,400		74,000	34,000
7,490		74,000	34,000
7,500		74,000	34,000
7,540	19/64	79,000	37,000
7,550		79,000	37,000
7,600		79,000	37,000
7,670		79,000	37,000
7,700		79,000	37,000
7,750		79,000	37,000
7,800		79,000	37,000
7,900		79,000	37,000
7,940	5/16	79,000	37,000
8,000		79,000	37,000
8,030		79,000	37,000
8,050		79,000	37,000
8,100		79,000	37,000
8,150		79,000	37,000
8,200		79,000	37,000
8,250		79,000	37,000
8,300		79,000	37,000
8,330	21/64	79,000	37,000
8,400		79,000	37,000
8,430		79,000	37,000
8,500		79,000	37,000
8,520		84,000	40,000
8,550		84,000	40,000
8,600		84,000	40,000
8,610		84,000	40,000
8,700		84,000	40,000
8,730	11/32	84,000	40,000
8,750		84,000	40,000
8,800		84,000	40,000
8,840		84,000	40,000
8,900		84,000	40,000
9,000		84,000	40,000
9,050		84,000	40,000
9,090		84,000	40,000
9,100		84,000	40,000
9,130	23/64	84,000	40,000
9,200		84,000	40,000
9,250		84,000	40,000
9,300		84,000	40,000
9,340		84,000	40,000
9,400		84,000	40,000
9,500		84,000	40,000
9,520	3/8	89,000	43,000
9,580		89,000	43,000
9,600		89,000	43,000
9,700		89,000	43,000
9,750		89,000	43,000
9,800		89,000	43,000
9,900		89,000	43,000
9,920	25/64	89,000	43,000
10,000		89,000	43,000
10,050		89,000	43,000

d1		l1	l2
mm	inch	mm	mm
10,080		89,000	43,000
10,100		89,000	43,000
10,200		89,000	43,000
10,300		89,000	43,000
10,320	13/32	89,000	43,000
10,400		89,000	43,000
10,490		89,000	43,000
10,500		89,000	43,000
10,600		89,000	43,000
10,700		95,000	47,000
10,720	27/64	95,000	47,000
10,800		95,000	47,000
10,900		95,000	47,000
11,000		95,000	47,000
11,100		95,000	47,000
11,110	7/16	95,000	47,000
11,200		95,000	47,000
11,250		95,000	47,000
11,300		95,000	47,000
11,400		95,000	47,000
11,500		95,000	47,000
11,510	29/64	95,000	47,000
11,600		95,000	47,000
11,700		95,000	47,000
11,800		95,000	47,000
11,910	15/32	102,000	51,000
12,000		102,000	51,000
12,100		102,000	51,000
12,200		102,000	51,000
12,300	31/64	102,000	51,000
12,500		102,000	51,000
12,600		102,000	51,000
12,700	1/2	102,000	51,000
12,800		102,000	51,000
12,900		102,000	51,000
13,000		102,000	51,000
13,100	33/64	102,000	51,000
13,200		102,000	51,000
13,490	17/32	107,000	54,000
13,500		107,000	54,000
13,600		107,000	54,000
13,750		107,000	54,000
13,800		107,000	54,000
13,890	35/64	107,000	54,000
14,000		107,000	54,000
14,200		111,000	56,000
14,290	9/16	111,000	56,000
14,500		111,000	56,000
14,680	37/64	111,000	56,000
14,750		111,000	56,000
15,000		111,000	56,000
15,080	19/32	115,000	58,000
15,480	39/64	115,000	58,000
15,500		115,000	58,000
15,870	5/8	115,000	58,000
16,000		115,000	58,000
16,200		119,000	60,000
16,270	41/64	119,000	60,000
16,500		119,000	60,000
16,670	21/32	119,000	60,000
17,000		119,000	60,000
17,070	43/64	123,000	62,000
17,460	11/16	123,000	62,000
17,500		123,000	62,000
17,860	45/64	123,000	62,000
18,000		123,000	62,000
18,500		127,000	64,000
18,650	47/64	127,000	64,000
19,000		127,000	64,000
19,050	3/4	131,000	66,000
19,450	49/64	131,000	66,000
19,500		131,000	66,000



d1		l1	l2
mm	inch	mm	mm
19,840	25/32	131,000	66,000
20,000		131,000	66,000
20,250		136,000	68,000
20,500	13/16	136,000	68,000
20,640		136,000	68,000
21,000		136,000	68,000
22,000		141,000	70,000
22,200		141,000	70,000
23,000	63/64	146,000	72,000
24,000		151,000	75,000
24,500		151,000	75,000
25,000		151,000	75,000

d1		l1	l2
mm	inch	mm	mm
25,400	1	156,000	78,000
25,500		156,000	78,000
26,000		156,000	78,000
28,000		162,000	81,000
48,000		228,000	116,000



Erikoislyhyet porat



- P** • Kärjen kevennys $\geq \varnothing 1,000$ • kartiovaippahionta • Co-seosteinen pikateräs • parempi kulumiskestävyys
- M** •
- K** •
- N** ○ ruostumatt./-haponk.teräkset • jousiteräkset • austeniittiset teräkset • Hastelloy, Inconel, Nimonic
- S** •
- H** ○

Materiaali **HSCO**

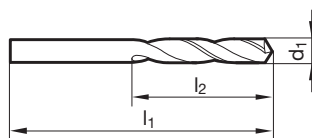
Pinta **S**

Leikkusuunta **R**

Lieriövärtiset kierukkaporat

GÜHRING NAVIGATOR

Leikkuarvosivu 774



Artikkelinro. **659**

d1		l1	l2
mm	inch	mm	mm
0,500		20,000	3,000
0,600		21,000	3,500
0,650		22,000	4,000
0,700		23,000	4,500
0,740		23,000	4,500
0,750		23,000	4,500
0,780		24,000	5,000
0,790	1/32	24,000	5,000
0,800		24,000	5,000
0,850		24,000	5,000
0,900		25,000	5,500
0,950		25,000	5,500
1,000		26,000	6,000
1,020		26,000	6,000
1,070		28,000	7,000
1,090		28,000	7,000
1,100		28,000	7,000
1,150		28,000	7,000
1,190	3/64	30,000	8,000
1,200		30,000	8,000
1,250		30,000	8,000
1,300		30,000	8,000
1,320		30,000	8,000
1,400		32,000	9,000
1,450		32,000	9,000
1,500		32,000	9,000
1,510		34,000	10,000
1,530		34,000	10,000
1,550		34,000	10,000
1,570		34,000	10,000
1,590	1/16	34,000	10,000
1,600		34,000	10,000
1,610		34,000	10,000
1,700		34,000	10,000
1,780		36,000	11,000
1,800		36,000	11,000
1,850		36,000	11,000
1,900		36,000	11,000
1,930		38,000	12,000
1,970		38,000	12,000
1,980	5/64	38,000	12,000
1,990		38,000	12,000

d1		l1	l2
mm	inch	mm	mm
2,000		38,000	12,000
2,050		38,000	12,000
2,080		38,000	12,000
2,100		38,000	12,000
2,180		40,000	13,000
2,200		40,000	13,000
2,250		40,000	13,000
2,260		40,000	13,000
2,300		40,000	13,000
2,350		40,000	13,000
2,370		43,000	14,000
2,380	3/32	43,000	14,000
2,400		43,000	14,000
2,440		43,000	14,000
2,450		43,000	14,000
2,490		43,000	14,000
2,500		43,000	14,000
2,530		43,000	14,000
2,550		43,000	14,000
2,580		43,000	14,000
2,600		43,000	14,000
2,640		43,000	14,000
2,700		46,000	16,000
2,710		46,000	16,000
2,780	7/64	46,000	16,000
2,800		46,000	16,000
2,820		46,000	16,000
2,850		46,000	16,000
2,900		46,000	16,000
2,950		46,000	16,000
3,000		46,000	16,000
3,030		49,000	18,000
3,050		49,000	18,000
3,100		49,000	18,000
3,170	1/8	49,000	18,000
3,200		49,000	18,000
3,250		49,000	18,000
3,260		49,000	18,000
3,300		49,000	18,000
3,350		49,000	18,000
3,400		52,000	20,000
3,450		52,000	20,000



d1		l1	l2
mm	inch	mm	mm
3,500		52,000	20,000
3,570	9/64	52,000	20,000
3,600		52,000	20,000
3,660		52,000	20,000
3,700		52,000	20,000
3,730		52,000	20,000
3,800		55,000	22,000
3,860		55,000	22,000
3,900		55,000	22,000
3,910		55,000	22,000
3,970	5/32	55,000	22,000
3,990		55,000	22,000
4,000		55,000	22,000
4,040		55,000	22,000
4,050		55,000	22,000
4,090		55,000	22,000
4,100		55,000	22,000
4,150		55,000	22,000
4,200		55,000	22,000
4,250		55,000	22,000
4,300		58,000	24,000
4,370	11/64	58,000	24,000
4,390		58,000	24,000
4,400		58,000	24,000
4,500		58,000	24,000
4,600		58,000	24,000
4,620		58,000	24,000
4,700		58,000	24,000
4,760	3/16	62,000	26,000
4,800		62,000	26,000
4,850		62,000	26,000
4,900		62,000	26,000
4,920		62,000	26,000
5,000		62,000	26,000
5,060		62,000	26,000
5,100		62,000	26,000
5,160	13/64	62,000	26,000
5,200		62,000	26,000
5,220		62,000	26,000
5,300		62,000	26,000
5,310		66,000	28,000
5,400		66,000	28,000
5,500		66,000	28,000
5,560	7/32	66,000	28,000
5,600		66,000	28,000
5,610		66,000	28,000
5,700		66,000	28,000
5,800		66,000	28,000
5,900		66,000	28,000
5,940		66,000	28,000
6,000		66,000	28,000
6,040		70,000	31,000
6,050		70,000	31,000
6,100		70,000	31,000
6,150		70,000	31,000
6,200		70,000	31,000
6,300		70,000	31,000
6,350	1/4	70,000	31,000
6,400		70,000	31,000
6,500		70,000	31,000
6,530		70,000	31,000
6,600		70,000	31,000
6,700		70,000	31,000
6,750	17/64	74,000	34,000
6,800		74,000	34,000
6,900		74,000	34,000
7,000		74,000	34,000
7,100		74,000	34,000
7,140	9/32	74,000	34,000
7,200		74,000	34,000
7,300		74,000	34,000
7,370		74,000	34,000

d1		l1	l2
mm	inch	mm	mm
7,400		74,000	34,000
7,490		74,000	34,000
7,500		74,000	34,000
7,540	19/64	79,000	37,000
7,600		79,000	37,000
7,700		79,000	37,000
7,800		79,000	37,000
7,900		79,000	37,000
7,940	5/16	79,000	37,000
8,000		79,000	37,000
8,100		79,000	37,000
8,200		79,000	37,000
8,300		79,000	37,000
8,400		79,000	37,000
8,500		79,000	37,000
8,600		84,000	40,000
8,610		84,000	40,000
8,700		84,000	40,000
8,730	11/32	84,000	40,000
8,800		84,000	40,000
8,840		84,000	40,000
9,000		84,000	40,000
9,100		84,000	40,000
9,130	23/64	84,000	40,000
9,200		84,000	40,000
9,300		84,000	40,000
9,400		84,000	40,000
9,500		84,000	40,000
9,520	3/8	89,000	43,000
9,600		89,000	43,000
9,700		89,000	43,000
9,800		89,000	43,000
9,920	25/64	89,000	43,000
10,000		89,000	43,000
10,100		89,000	43,000
10,200		89,000	43,000
10,250		89,000	43,000
10,320	13/32	89,000	43,000
10,500		89,000	43,000
10,720	27/64	95,000	47,000
10,800		95,000	47,000
10,900		95,000	47,000
11,000		95,000	47,000
11,110	7/16	95,000	47,000
11,500		95,000	47,000
12,000		102,000	51,000
12,100		102,000	51,000
12,200		102,000	51,000
12,300	31/64	102,000	51,000
12,500		102,000	51,000
12,700	1/2	102,000	51,000
12,800		102,000	51,000
13,000		102,000	51,000
13,300		107,000	54,000
13,490	17/32	107,000	54,000
13,500		107,000	54,000
14,000		107,000	54,000
14,290	9/16	111,000	56,000
14,500		111,000	56,000
15,000		111,000	56,000
15,500		115,000	58,000



Erikoislyhyet porat



P • Kärjen kevennys $\geq \varnothing 1,000$ • kartiovaippahionta • Co-seosteinen pikateräs • parempi kulumiskestävyys

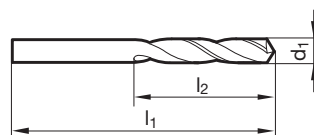
M •
K •
N ○ ruostumatt./-haponk.teräkset • jousiteräkset • austeniittiset teräkset
 • Hastelloy, Inconel, Nimonic

S •

H ○

GÜHRING NAVIGATOR

Leikkuarvosivu 774

Lieriövartiset
kierukkaporatMateriaali **HSC0**Pinta **F**Leikkusuunta **R**

Artikkelinro.

2461

d1		l1	l2
mm	inch	mm	mm
1,000		26,000	6,000
1,100		28,000	7,000
1,200		30,000	8,000
1,300		30,000	8,000
1,400		32,000	9,000
1,500		32,000	9,000
1,600		34,000	10,000
1,700		34,000	10,000
1,800		36,000	11,000
1,900		36,000	11,000
2,000		38,000	12,000
2,100		38,000	12,000
2,200		40,000	13,000
2,300		40,000	13,000
2,400		43,000	14,000
2,500		43,000	14,000
2,600		43,000	14,000
2,700		46,000	16,000
2,800		46,000	16,000
2,900		46,000	16,000
3,000		46,000	16,000
3,100		49,000	18,000
3,200		49,000	18,000
3,300		49,000	18,000
3,400		52,000	20,000
3,500		52,000	20,000
3,600		52,000	20,000
3,700		52,000	20,000
3,800		55,000	22,000
3,900		55,000	22,000
4,000		55,000	22,000
4,200		55,000	22,000
4,300		58,000	24,000
4,400		58,000	24,000
4,500		58,000	24,000
4,600		58,000	24,000
4,700		58,000	24,000
4,800		62,000	26,000
4,900		62,000	26,000
5,000		62,000	26,000
5,100		62,000	26,000
5,200		62,000	26,000

d1		l1	l2
mm	inch	mm	mm
5,300		62,000	26,000
5,400		66,000	28,000
5,500		66,000	28,000
5,600		66,000	28,000
5,800		66,000	28,000
6,000		66,000	28,000
6,100		70,000	31,000
6,200		70,000	31,000
6,300		70,000	31,000
6,400		70,000	31,000
6,500		70,000	31,000
6,600		70,000	31,000
6,800		74,000	34,000
6,900		74,000	34,000
7,000		74,000	34,000
7,200		74,000	34,000
7,300		74,000	34,000
7,400		74,000	34,000
7,500		74,000	34,000
7,600		79,000	37,000
7,800		79,000	37,000
8,000		79,000	37,000
8,100		79,000	37,000
8,200		79,000	37,000
8,300		79,000	37,000
8,500		79,000	37,000
8,600		84,000	40,000
8,700		84,000	40,000
8,800		84,000	40,000
9,000		84,000	40,000
9,200		84,000	40,000
9,300		84,000	40,000
9,500		84,000	40,000
9,800		89,000	43,000
10,000		89,000	43,000
10,200		89,000	43,000
10,500		89,000	43,000
11,000		95,000	47,000
11,500		95,000	47,000
12,000		102,000	51,000
13,000		102,000	51,000



Erikoislyhyet porat

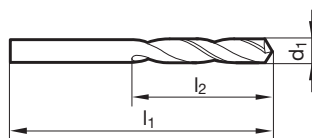


- P** • Kärjen kevennys $\geq \varnothing 2,370$ • kartiovaippahionta • Co-seosteinen pikateräs • parempi kulumiskestävyys
- M** •
- K** •
- N** ○ ruostumatt./-haponk.teräkset • jousiteräkset • austeniittiset teräkset • Hastelloy, Inconel, Nimonic
- S** •
- H** ○

GÜHRING NAVIGATOR

Leikkuarvosivu 772

Materiaali	HSCO
Pinta	$>0,600$
Leikkusuunta	



Artikkelinro. **330**

d1		l1	l2
mm	inch	mm	mm
0,450		19,000	2,500
0,500		20,000	3,000
0,620		22,000	4,000
0,700		23,000	4,500
0,710		23,000	4,500
0,750		23,000	4,500
0,800		24,000	5,000
0,900		25,000	5,500
1,000		26,000	6,000
1,030		26,000	6,000
1,040		26,000	6,000
1,050		26,000	6,000
1,060		26,000	6,000
1,090		28,000	7,000
1,150		28,000	7,000
1,170		28,000	7,000
1,180		28,000	7,000
1,190	3/64	30,000	8,000
1,200		30,000	8,000
1,210		30,000	8,000
1,220		30,000	8,000
1,230		30,000	8,000
1,300		30,000	8,000
1,320		30,000	8,000
1,350		32,000	9,000
1,420		32,000	9,000
1,450		32,000	9,000
1,470		32,000	9,000
1,500		32,000	9,000
1,510		34,000	10,000
1,530		34,000	10,000
1,550		34,000	10,000
1,590	1/16	34,000	10,000
1,600		34,000	10,000
1,610		34,000	10,000
1,650		34,000	10,000
1,700		34,000	10,000
1,780		36,000	11,000
1,800		36,000	11,000
1,930		38,000	12,000
1,980	5/64	38,000	12,000
1,990		38,000	12,000

d1		l1	l2
mm	inch	mm	mm
2,000		38,000	12,000
2,020		38,000	12,000
2,080		38,000	12,000
2,100		38,000	12,000
2,180		40,000	13,000
2,200		40,000	13,000
2,260		40,000	13,000
2,300		40,000	13,000
2,370		43,000	14,000
2,380	3/32	43,000	14,000
2,440		43,000	14,000
2,500		43,000	14,000
2,550		43,000	14,000
2,600		43,000	14,000
2,640		43,000	14,000
2,750		46,000	16,000
2,770		46,000	16,000
2,780	7/64	46,000	16,000
2,820		46,000	16,000
2,950		46,000	16,000
3,000		46,000	16,000
3,150		49,000	18,000
3,170	1/8	49,000	18,000
3,200		49,000	18,000
3,400		52,000	20,000
3,450		52,000	20,000
3,500		52,000	20,000
3,600		52,000	20,000
3,700		52,000	20,000
3,860		55,000	22,000
3,970	5/32	55,000	22,000
3,990		55,000	22,000
4,000		55,000	22,000
4,040		55,000	22,000
4,090		55,000	22,000
4,100		55,000	22,000
4,200		55,000	22,000
4,300		58,000	24,000
4,370	11/64	58,000	24,000
4,390		58,000	24,000
4,400		58,000	24,000
4,500		58,000	24,000

Lieriövärtiset kierukkaporat

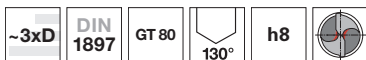


d1		l1	l2
mm	inch	mm	mm
4,570		58,000	24,000
4,620		58,000	24,000
4,760	3/16	62,000	26,000
4,850		62,000	26,000
4,920		62,000	26,000
4,980		62,000	26,000
5,000		62,000	26,000
5,100		62,000	26,000
5,110		62,000	26,000
5,160	13/64	62,000	26,000
5,200		62,000	26,000
5,220		62,000	26,000
5,310		66,000	28,000
5,400		66,000	28,000
5,410		66,000	28,000
5,500		66,000	28,000
5,560	7/32	66,000	28,000
5,600		66,000	28,000
5,610		66,000	28,000
5,700		66,000	28,000
5,750		66,000	28,000
5,800		66,000	28,000
5,900		66,000	28,000
6,000		66,000	28,000
6,040		70,000	31,000
6,300		70,000	31,000
6,400		70,000	31,000
6,500		70,000	31,000
6,600		70,000	31,000
6,750	17/64	74,000	34,000
6,800		74,000	34,000
7,000		74,000	34,000
7,030		74,000	34,000
7,050		74,000	34,000
7,100		74,000	34,000
7,140	9/32	74,000	34,000
7,370		74,000	34,000
7,490		74,000	34,000
7,540	19/64	79,000	37,000
7,600		79,000	37,000
7,700		79,000	37,000
7,900		79,000	37,000
8,000		79,000	37,000
8,030		79,000	37,000
8,330	21/64	79,000	37,000
8,430		79,000	37,000
8,500		79,000	37,000
8,610		84,000	40,000

d1		l1	l2
mm	inch	mm	mm
8,700		84,000	40,000
8,730	11/32	84,000	40,000
8,800		84,000	40,000
9,000		84,000	40,000
9,090		84,000	40,000
9,100		84,000	40,000
9,130	23/64	84,000	40,000
9,200		84,000	40,000
9,340		84,000	40,000
9,400		84,000	40,000
9,520	3/8	89,000	43,000
9,580		89,000	43,000
9,700		89,000	43,000
9,900		89,000	43,000
9,920	25/64	89,000	43,000
10,000		89,000	43,000
10,080		89,000	43,000
10,260		89,000	43,000
10,490		89,000	43,000
10,720	27/64	95,000	47,000
10,900		95,000	47,000
11,000		95,000	47,000
11,100		95,000	47,000
11,200		95,000	47,000
11,300		95,000	47,000
11,510	29/64	95,000	47,000
11,910	15/32	102,000	51,000
12,000		102,000	51,000
12,300	31/64	102,000	51,000
12,400		102,000	51,000
13,000		102,000	51,000
13,500		107,000	54,000
14,000		107,000	54,000
14,700		111,000	56,000
15,100		115,000	58,000
15,500		115,000	58,000
16,000		115,000	58,000
19,500		131,000	66,000
19,750		131,000	66,000
22,500		146,000	72,000
23,500		146,000	72,000
24,000		151,000	75,000
25,000	63/64	151,000	75,000
25,500		156,000	78,000
26,000		156,000	78,000
27,000		162,000	81,000
32,000		180,000	90,000



Erikoislyhyet porat

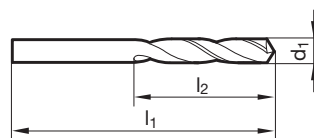


- P** ● Kärjen kevennys $\geq \varnothing 1,000$ • kartiovaippahionta • Co-seosteinen pikateräs • parempi kulumiskestävyys
- M** ○
- K** ○
- N** ○ erikoislujille teräksille • pitkälastuiset materiaalit $< 1000 \text{ N/mm}^2$ asti
- S** ○ Al- ja Cu-seokset • pehmeät pronssit • elektrolyyttinen kupari • hauras messinki
- H** ○

GÜHRING NAVIGATOR

Leikkuuarvosivu 774

Materiaali	HSCO
Pinta	S
Leikkusuunta	R



Lieriövartiset kierukkeporat

Artikkelinro. **1228**

d1		l1	l2
mm	inch	mm	mm
1,000		26,000	6,000
1,100		28,000	7,000
1,190	3/64	30,000	8,000
1,200		30,000	8,000
1,300		30,000	8,000
1,400		32,000	9,000
1,500		32,000	9,000
1,600		34,000	10,000
1,700		34,000	10,000
1,800		36,000	11,000
1,900		36,000	11,000
2,000		38,000	12,000
2,100		38,000	12,000
2,200		40,000	13,000
2,300		40,000	13,000
2,400		43,000	14,000
2,500		43,000	14,000
2,580		43,000	14,000
2,600		43,000	14,000
2,800		46,000	16,000
2,900		46,000	16,000
3,000		46,000	16,000
3,100		49,000	18,000
3,170	1/8	49,000	18,000
3,200		49,000	18,000
3,300		49,000	18,000
3,400		52,000	20,000
3,500		52,000	20,000
3,570	9/64	52,000	20,000
3,600		52,000	20,000
3,700		52,000	20,000
3,800		55,000	22,000
3,900		55,000	22,000
3,970	5/32	55,000	22,000
4,000		55,000	22,000
4,100		55,000	22,000
4,200		55,000	22,000
4,300		58,000	24,000
4,370	11/64	58,000	24,000
4,400		58,000	24,000
4,500		58,000	24,000
4,600		58,000	24,000

d1		l1	l2
mm	inch	mm	mm
4,700		58,000	24,000
4,760	3/16	62,000	26,000
4,800		62,000	26,000
4,900		62,000	26,000
5,000		62,000	26,000
5,100		62,000	26,000
5,160	13/64	62,000	26,000
5,200		62,000	26,000
5,300		62,000	26,000
5,400		66,000	28,000
5,500		66,000	28,000
5,560	7/32	66,000	28,000
5,600		66,000	28,000
5,700		66,000	28,000
5,800		66,000	28,000
5,900		66,000	28,000
6,000		66,000	28,000
6,100		70,000	31,000
6,200		70,000	31,000
6,350	1/4	70,000	31,000
6,400		70,000	31,000
6,500		70,000	31,000
6,600		70,000	31,000
6,700		70,000	31,000
6,750	17/64	74,000	34,000
6,800		74,000	34,000
6,900		74,000	34,000
7,000		74,000	34,000
7,140	9/32	74,000	34,000
7,200		74,000	34,000
7,300		74,000	34,000
7,400		74,000	34,000
7,500		74,000	34,000
7,540	19/64	79,000	37,000
7,800		79,000	37,000
7,940	5/16	79,000	37,000
8,000		79,000	37,000
8,100		79,000	37,000
8,200		79,000	37,000
8,300		79,000	37,000
8,330	21/64	79,000	37,000
8,500		79,000	37,000



d1		l1	l2
mm	inch	mm	mm
8,600		84,000	40,000
8,700		84,000	40,000
9,000		84,000	40,000
9,100		84,000	40,000
9,130	23/64	84,000	40,000
9,200		84,000	40,000
9,300		84,000	40,000
9,400		84,000	40,000
9,600		89,000	43,000
9,700		89,000	43,000
9,800		89,000	43,000
9,920	25/64	89,000	43,000
10,000		89,000	43,000
10,200		89,000	43,000
10,320	13/32	89,000	43,000
10,500		89,000	43,000
11,000		95,000	47,000
11,500		95,000	47,000
11,510	29/64	95,000	47,000
11,800		95,000	47,000
12,000		102,000	51,000
12,300	31/64	102,000	51,000
12,500		102,000	51,000
12,700	1/2	102,000	51,000

d1		l1	l2
mm	inch	mm	mm
12,800		102,000	51,000
13,000		102,000	51,000
13,100	33/64	102,000	51,000
13,490	17/32	107,000	54,000
13,500		107,000	54,000
14,000		107,000	54,000
14,500		111,000	56,000
15,000		111,000	56,000
15,500		115,000	58,000
16,000		115,000	58,000
16,500		119,000	60,000
17,000		119,000	60,000
17,500		123,000	62,000
18,000		123,000	62,000
18,500		127,000	64,000
19,000		127,000	64,000
20,000		131,000	66,000



Eriköislyhyet porat

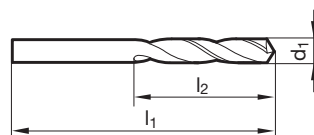


P ●	Kärjen kevennys $\geq \varnothing 1,000$ • kartiovaippahionta • Co-seosteinen pikateräs • parempi kulmiskestävyys
M ○	
K ○	
N ○	pitkälästuiset materiaalit $< 1000 \text{ N/mm}^2$ asti • Al- ja Cu-seokset • pehmeät pronssit • elektrolyttinen kupari • hauras messinki
S ○	
H ○	

Materiaali **HSCO**Pinta **F**Leikkusuunta **R**

GÜHRING NAVIGATOR

Leikkuarvosivu 774



Artikkelinro.

2498

d1		l1	l2
mm	inch	mm	mm
1,000		26,000	6,000
1,200		30,000	8,000
1,300		30,000	8,000
1,500		32,000	9,000
1,600		34,000	10,000
1,800		36,000	11,000
2,000		38,000	12,000
2,100		38,000	12,000
2,200		40,000	13,000
2,300		40,000	13,000
2,400		43,000	14,000
2,500		43,000	14,000
2,600		43,000	14,000
2,800		46,000	16,000
2,900		46,000	16,000
3,000		46,000	16,000
3,100		49,000	18,000
3,200		49,000	18,000
3,300		49,000	18,000
3,400		52,000	20,000
3,500		52,000	20,000
3,600		52,000	20,000
3,700		52,000	20,000
4,000		55,000	22,000
4,100		55,000	22,000
4,200		55,000	22,000
4,300		58,000	24,000
4,400		58,000	24,000
4,500		58,000	24,000
4,600		58,000	24,000
4,700		58,000	24,000
5,000		62,000	26,000
5,100		62,000	26,000
5,200		62,000	26,000
5,300		62,000	26,000
5,500		66,000	28,000

d1		l1	l2
mm	inch	mm	mm
5,600		66,000	28,000
6,000		66,000	28,000
6,200		70,000	31,000
6,500		70,000	31,000
6,600		70,000	31,000
6,800		74,000	34,000
6,900		74,000	34,000
7,000		74,000	34,000
7,500		74,000	34,000
7,600		79,000	37,000
7,700		79,000	37,000
7,800		79,000	37,000
8,000		79,000	37,000
8,500		79,000	37,000
8,600		84,000	40,000
9,000		84,000	40,000
9,300		84,000	40,000
9,500		84,000	40,000
10,000		89,000	43,000
10,200		89,000	43,000
10,500		89,000	43,000
10,800		95,000	47,000
11,000		95,000	47,000
11,800		95,000	47,000
12,000		102,000	51,000
12,500		102,000	51,000
13,000		102,000	51,000
13,500		107,000	54,000
14,000		107,000	54,000
14,500		111,000	56,000
15,000		111,000	56,000
16,000		115,000	58,000



Erikoislyhyet porat



- P** ○ kartiovaippahionta • Co-seosteinen pikateräs • parempi kulumiskestävyys
- M** ●
- K** ●
- N** ○ ruostumatt./-haponk./-kuumal. austeniittiset teräkset (V2A ja V4A)
- S** ○
- H** ●

Materiaali **HSC0**

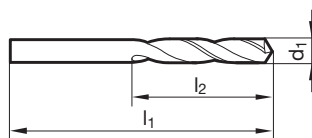
Pinta ○

Leikkusuunta

Lieriövartiset kierukkaporat

GÜHRING NAVIGATOR

Leikkuarvosivu 772



Artikkelinro. **1261**

d1		l1	l2
mm	inch	mm	mm
1,000		26,000	6,000
1,100		28,000	7,000
1,200		30,000	8,000
1,300		30,000	8,000
1,500		32,000	9,000
1,590	1/16	34,000	10,000
1,600		34,000	10,000
1,700		34,000	10,000
1,900		36,000	11,000
2,000		38,000	12,000
2,200		40,000	13,000
2,300		40,000	13,000
2,400		43,000	14,000
2,500		43,000	14,000
2,600		43,000	14,000
2,700		46,000	16,000
2,800		46,000	16,000
2,900		46,000	16,000
3,000		46,000	16,000
3,100		49,000	18,000
3,200		49,000	18,000
3,300		49,000	18,000
3,400		52,000	20,000
3,500		52,000	20,000
3,600		52,000	20,000
3,700		52,000	20,000
3,800		55,000	22,000
4,000		55,000	22,000
4,100		55,000	22,000
4,200		55,000	22,000
4,300		58,000	24,000
4,500		58,000	24,000
4,700		58,000	24,000
4,800		62,000	26,000
5,000		62,000	26,000
5,100		62,000	26,000
5,200		62,000	26,000
5,500		66,000	28,000
5,600		66,000	28,000
5,800		66,000	28,000
5,900		66,000	28,000
6,000		66,000	28,000

d1		l1	l2
mm	inch	mm	mm
6,100		70,000	31,000
6,300		70,000	31,000
6,400		70,000	31,000
6,500		70,000	31,000
6,600		70,000	31,000
6,800		74,000	34,000
7,000		74,000	34,000
7,100		74,000	34,000
7,200		74,000	34,000
7,300		74,000	34,000
7,400		74,000	34,000
7,500		74,000	34,000
7,700		79,000	37,000
7,800		79,000	37,000
7,900		79,000	37,000
8,000		79,000	37,000
8,300		79,000	37,000
8,400		79,000	37,000
8,500		79,000	37,000
8,600		84,000	40,000
8,700		84,000	40,000
8,800		84,000	40,000
9,000		84,000	40,000
9,100		84,000	40,000
9,300		84,000	40,000
9,500		84,000	40,000
9,900		89,000	43,000
10,000		89,000	43,000
10,200		89,000	43,000
10,900		95,000	47,000
11,500		95,000	47,000
12,000		102,000	51,000



Erikoislyhyet porat



P ○ Kärjen kevennys $\geq \varnothing 1,000$ • optimoitu ristiinhionta • Co-seosteinen pikateräs • parempi kulumiskestävyys

M ●

K ○

N ○ ruostumatt./haponk./kuumal. austeniittiset teräkset (V2A ja V4A)
• erikoisseokset

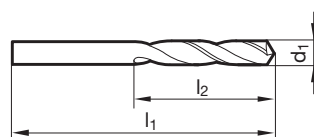
S ●

H ○

Materiaali **HSCO**Pinta **S**Leikkusuunta **R**

GÜHRING NAVIGATOR

Leikkuarvosivu 774



Artikkelinro.

572

d1		l1	l2
mm	inch	mm	mm
1,000		26,000	6,000
1,100		28,000	7,000
1,200		30,000	8,000
1,300		30,000	8,000
1,400		32,000	9,000
1,500		32,000	9,000
1,600		34,000	10,000
1,700		34,000	10,000
1,800		36,000	11,000
1,900		36,000	11,000
2,000		38,000	12,000
2,100		38,000	12,000
2,200		40,000	13,000
2,300		40,000	13,000
2,400		43,000	14,000
2,500		43,000	14,000
2,600		43,000	14,000
2,700		46,000	16,000
2,800		46,000	16,000
2,900		46,000	16,000
3,000		46,000	16,000
3,100		49,000	18,000
3,200		49,000	18,000
3,300		49,000	18,000
3,400		52,000	20,000
3,500		52,000	20,000
3,600		52,000	20,000
3,700		52,000	20,000
3,800		55,000	22,000
3,900		55,000	22,000
4,000		55,000	22,000
4,100		55,000	22,000
4,200		55,000	22,000
4,300		58,000	24,000
4,400		58,000	24,000
4,500		58,000	24,000
4,600		58,000	24,000
4,650		58,000	24,000
4,700		58,000	24,000
4,800		62,000	26,000
4,900		62,000	26,000
5,000		62,000	26,000

d1		l1	l2
mm	inch	mm	mm
5,100		62,000	26,000
5,200		62,000	26,000
5,300		62,000	26,000
5,400		66,000	28,000
5,500		66,000	28,000
5,550		66,000	28,000
5,600		66,000	28,000
5,700		66,000	28,000
5,800		66,000	28,000
5,900		66,000	28,000
6,000		66,000	28,000
6,100		70,000	31,000
6,200		70,000	31,000
6,300		70,000	31,000
6,400		70,000	31,000
6,500		70,000	31,000
6,600		70,000	31,000
6,700		70,000	31,000
6,800		74,000	34,000
6,900		74,000	34,000
7,000		74,000	34,000
7,100		74,000	34,000
7,200		74,000	34,000
7,300		74,000	34,000
7,400		74,000	34,000
7,450		74,000	34,000
7,500		74,000	34,000
7,600		79,000	37,000
7,700		79,000	37,000
7,800		79,000	37,000
7,900		79,000	37,000
8,000		79,000	37,000
8,100		79,000	37,000
8,200		79,000	37,000
8,300		79,000	37,000
8,400		79,000	37,000
8,500		79,000	37,000
8,600		84,000	40,000
8,700		84,000	40,000
8,800		84,000	40,000
8,900		84,000	40,000
9,000		84,000	40,000



d1		l1	l2
mm	inch	mm	mm
9,100		84,000	40,000
9,200		84,000	40,000
9,250		84,000	40,000
9,300		84,000	40,000
9,400		84,000	40,000
9,500		84,000	40,000
9,600		89,000	43,000
9,700		89,000	43,000
9,800		89,000	43,000
9,900		89,000	43,000
10,000		89,000	43,000
10,200		89,000	43,000

d1		l1	l2
mm	inch	mm	mm
10,500		89,000	43,000
11,000		95,000	47,000
11,200		95,000	47,000
11,500		95,000	47,000
11,800		95,000	47,000
12,000		102,000	51,000
12,500		102,000	51,000
13,000		102,000	51,000



Eriköislyhyet porat

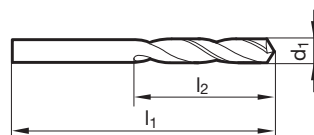


P ●	Kärjen kevennys $\geq \varnothing 1,000$ • kartiovaippahionta • yleiskäyttöön, aaltohionta • Co-seosteinen pikateräs • parempi kulumiskestävyys
M ○	• ammattilaiskäyttöön • myös käsiporakoneita varten
K ○	
N ○	pitkälastuiset teräkset < 1000 N/mm ² asti • valurauta ja AISi-seokset
S ○	
H ○	

Materiaali **HSCO**Pinta **M**Leikkusuunta **R**

GÜHRING NAVIGATOR

Leikkuarvosivu 774



Artikkelinro.

2048

d1		l1	l2
mm	inch	mm	mm
1,000		26,000	6,000
1,100		28,000	7,000
1,200		30,000	8,000
1,300		30,000	8,000
1,400		32,000	9,000
1,500		32,000	9,000
1,600		34,000	10,000
1,700		34,000	10,000
1,800		36,000	11,000
1,900		36,000	11,000
2,000		38,000	12,000
2,100		38,000	12,000
2,200		40,000	13,000
2,300		40,000	13,000
2,400		43,000	14,000
2,700		46,000	16,000
2,800		46,000	16,000
2,900		46,000	16,000
3,000		46,000	16,000
3,100		49,000	18,000
3,300		49,000	18,000
3,400		52,000	20,000
3,500		52,000	20,000
3,600		52,000	20,000
3,700		52,000	20,000
3,800		55,000	22,000
4,000		55,000	22,000
4,100		55,000	22,000
4,200		55,000	22,000
4,400		58,000	24,000
4,500		58,000	24,000
4,600		58,000	24,000
4,700		58,000	24,000
4,800		62,000	26,000
4,900		62,000	26,000
5,000		62,000	26,000
5,200		62,000	26,000
5,300		62,000	26,000
5,400		66,000	28,000
5,500		66,000	28,000
5,600		66,000	28,000
5,700		66,000	28,000

d1		l1	l2
mm	inch	mm	mm
5,800		66,000	28,000
6,000		66,000	28,000
6,100		70,000	31,000
6,200		70,000	31,000
6,300		70,000	31,000
6,400		70,000	31,000
6,500		70,000	31,000
6,600		70,000	31,000
6,700		70,000	31,000
6,900		74,000	34,000
7,000		74,000	34,000
7,100		74,000	34,000
7,200		74,000	34,000
7,300		74,000	34,000
7,400		74,000	34,000
7,500		74,000	34,000
7,600		79,000	37,000
7,700		79,000	37,000
7,800		79,000	37,000
7,900		79,000	37,000
8,000		79,000	37,000
8,100		79,000	37,000
8,200		79,000	37,000
8,300		79,000	37,000
8,400		79,000	37,000
8,500		79,000	37,000
8,600		84,000	40,000
8,700		84,000	40,000
8,800		84,000	40,000
8,900		84,000	40,000
9,000		84,000	40,000
9,100		84,000	40,000
9,200		84,000	40,000
9,300		84,000	40,000
9,400		84,000	40,000
9,500		84,000	40,000
9,600		89,000	43,000
9,700		89,000	43,000
9,800		89,000	43,000
9,900		89,000	43,000
10,000		89,000	43,000
10,200		89,000	43,000



d1		l1	l2
mm	inch	mm	mm
10,500		89,000	43,000
11,500		95,000	47,000
12,000		102,000	51,000
12,500		102,000	51,000
13,000		102,000	51,000

d1		l1	l2
mm	inch	mm	mm



Eriköislyhyet porat



P	•	Kärjen kevennys $\geq \varnothing 1,000$ • kartiovaippahionta • runsasseosteinen CoMo-teras • erittäin hyvä kulumiskestävyys
M	○	
K	○	
N	•	keski-/korkealujuuksiset CrNi-pohjaiset seokset • Hastelloy, Inconel, Nimonic • ruostumatt./haponk.-/kuumal. teräkset • kulutuskestävät levyteräkset • teräkset/pronssit < 1400 N/mm ²
S	•	
H	○	

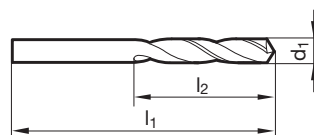
GÜHRING NAVIGATOR

Leikkuuarvosivu 772

Materiaali **M42**

Pinta ○

Leikkusuunta



Artikkelinro.

1259

d1		l1	l2
mm	inch	mm	mm
1,000		26,000	6,000
1,100		28,000	7,000
1,200		30,000	8,000
1,300		30,000	8,000
1,400		32,000	9,000
1,500		32,000	9,000
1,600		34,000	10,000
1,700		34,000	10,000
1,800		36,000	11,000
1,900		36,000	11,000
2,000		38,000	12,000
2,100		38,000	12,000
2,200		40,000	13,000
2,300		40,000	13,000
2,380	3/32	43,000	14,000
2,400		43,000	14,000
2,500		43,000	14,000
2,600		43,000	14,000
2,700		46,000	16,000
2,780	7/64	46,000	16,000
2,800		46,000	16,000
2,900		46,000	16,000
3,000		46,000	16,000
3,100		49,000	18,000
3,170	1/8	49,000	18,000
3,200		49,000	18,000
3,300		49,000	18,000
3,400		52,000	20,000
3,500		52,000	20,000
3,600		52,000	20,000
3,700		52,000	20,000
3,800		55,000	22,000
3,900		55,000	22,000
3,970	5/32	55,000	22,000
4,000		55,000	22,000
4,100		55,000	22,000
4,200		55,000	22,000
4,300		58,000	24,000
4,370	11/64	58,000	24,000
4,400		58,000	24,000
4,500		58,000	24,000
4,600		58,000	24,000

d1		l1	l2
mm	inch	mm	mm
4,700		58,000	24,000
4,760	3/16	62,000	26,000
4,800		62,000	26,000
4,900		62,000	26,000
5,000		62,000	26,000
5,100		62,000	26,000
5,200		62,000	26,000
5,300		62,000	26,000
5,400		66,000	28,000
5,500		66,000	28,000
5,560	7/32	66,000	28,000
5,600		66,000	28,000
5,700		66,000	28,000
5,800		66,000	28,000
5,950	15/64	66,000	28,000
6,000		66,000	28,000
6,100		70,000	31,000
6,200		70,000	31,000
6,300		70,000	31,000
6,350	1/4	70,000	31,000
6,400		70,000	31,000
6,500		70,000	31,000
6,600		70,000	31,000
6,800		74,000	34,000
7,000		74,000	34,000
7,100		74,000	34,000
7,140	9/32	74,000	34,000
7,200		74,000	34,000
7,300		74,000	34,000
7,400		74,000	34,000
7,500		74,000	34,000
7,540	19/64	79,000	37,000
7,600		79,000	37,000
7,700		79,000	37,000
7,800		79,000	37,000
7,900		79,000	37,000
7,940	5/16	79,000	37,000
8,000		79,000	37,000
8,100		79,000	37,000
8,200		79,000	37,000
8,300		79,000	37,000
8,330	21/64	79,000	37,000



d1		l1	l2
mm	inch	mm	mm
8,500		79,000	37,000
8,600		84,000	40,000
8,700		84,000	40,000
9,000		84,000	40,000
9,300		84,000	40,000
9,400		84,000	40,000
9,500		84,000	40,000
9,800		89,000	43,000
9,900		89,000	43,000
10,000		89,000	43,000
10,500		89,000	43,000
11,000		95,000	47,000

d1		l1	l2
mm	inch	mm	mm
11,500		95,000	47,000
12,000		102,000	51,000
12,500		102,000	51,000
12,700	1/2	102,000	51,000
13,000		102,000	51,000
14,000		107,000	54,000
15,000		111,000	56,000
15,870	5/8	115,000	58,000



Erikoislyhyet porat

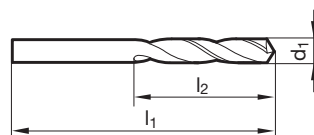


P ●	Kärjen kevennys $\geq \varnothing 1,000$ • kartiovaippakärki erikoisella mallin B kärjenkevennyksellä • PM HSCO-pikateräs • erittäin tukeva • erittäin hyvä kulumiskestävyys
M ○	
K ●	
N ○	lujat materiaalit, runsasseosteiset teräkset • nuorutus- ja hiilikarkaistut teräkset • valurauta, messinki, pronssi
S ○	
H ○	

Materiaali **HSS-E-PM**Pinta **F**Leikkusuunta **R**

GÜHRING NAVIGATOR

Leikkuarvosivu 774



Artikkelinro.

515

d1		l1	l2	d1		l1	l2
mm	inch	mm	mm	mm	inch	mm	mm
1,000		26,000	6,000	2,640		43,000	14,000
1,020		26,000	6,000	2,700		46,000	16,000
1,040		26,000	6,000	2,710		46,000	16,000
1,070		28,000	7,000	2,780	7/64	46,000	16,000
1,090		28,000	7,000	2,790		46,000	16,000
1,100		28,000	7,000	2,800		46,000	16,000
1,180		28,000	7,000	2,820		46,000	16,000
1,190	3/64	30,000	8,000	2,870		46,000	16,000
1,200		30,000	8,000	2,900		46,000	16,000
1,300		30,000	8,000	2,950		46,000	16,000
1,320		30,000	8,000	3,000		46,000	16,000
1,400		32,000	9,000	3,050		49,000	18,000
1,500		32,000	9,000	3,100		49,000	18,000
1,510		34,000	10,000	3,170	1/8	49,000	18,000
1,590	1/16	34,000	10,000	3,200		49,000	18,000
1,600		34,000	10,000	3,260		49,000	18,000
1,610		34,000	10,000	3,300		49,000	18,000
1,700		34,000	10,000	3,400		52,000	20,000
1,780		36,000	11,000	3,450		52,000	20,000
1,800		36,000	11,000	3,500		52,000	20,000
1,850		36,000	11,000	3,570	9/64	52,000	20,000
1,900		36,000	11,000	3,600		52,000	20,000
1,930		38,000	12,000	3,660		52,000	20,000
1,980	5/64	38,000	12,000	3,700		52,000	20,000
1,990		38,000	12,000	3,730		52,000	20,000
2,000		38,000	12,000	3,800		55,000	22,000
2,060		38,000	12,000	3,860		55,000	22,000
2,080		38,000	12,000	3,900		55,000	22,000
2,100		38,000	12,000	3,910		55,000	22,000
2,180		40,000	13,000	3,970	5/32	55,000	22,000
2,200		40,000	13,000	3,990		55,000	22,000
2,260		40,000	13,000	4,000		55,000	22,000
2,300		40,000	13,000	4,040		55,000	22,000
2,370		43,000	14,000	4,090		55,000	22,000
2,380	3/32	43,000	14,000	4,100		55,000	22,000
2,400		43,000	14,000	4,200		55,000	22,000
2,440		43,000	14,000	4,220		55,000	22,000
2,490		43,000	14,000	4,300		58,000	24,000
2,500		43,000	14,000	4,370	11/64	58,000	24,000
2,530		43,000	14,000	4,390		58,000	24,000
2,580		43,000	14,000	4,400		58,000	24,000
2,600		43,000	14,000	4,500		58,000	24,000



d1		l1	l2
mm	inch	mm	mm
4,570		58,000	24,000
4,600		58,000	24,000
4,620		58,000	24,000
4,650		58,000	24,000
4,700		58,000	24,000
4,760	3/16	62,000	26,000
4,800		62,000	26,000
4,850		62,000	26,000
4,900		62,000	26,000
4,920		62,000	26,000
4,980		62,000	26,000
5,000		62,000	26,000
5,060		62,000	26,000
5,100		62,000	26,000
5,110		62,000	26,000
5,160	13/64	62,000	26,000
5,180		62,000	26,000
5,200		62,000	26,000
5,220		62,000	26,000
5,300		62,000	26,000
5,310		66,000	28,000
5,400		66,000	28,000
5,410		66,000	28,000
5,500		66,000	28,000
5,560	7/32	66,000	28,000
5,600		66,000	28,000
5,610		66,000	28,000
5,700		66,000	28,000
5,790		66,000	28,000
5,800		66,000	28,000
5,900		66,000	28,000
5,940		66,000	28,000
5,950	15/64	66,000	28,000
6,000		66,000	28,000
6,040		70,000	31,000
6,100		70,000	31,000
6,150		70,000	31,000
6,200		70,000	31,000
6,250		70,000	31,000
6,300		70,000	31,000
6,350	1/4	70,000	31,000
6,400		70,000	31,000
6,500		70,000	31,000
6,530		70,000	31,000
6,600		70,000	31,000
6,630		70,000	31,000
6,700		70,000	31,000
6,750	17/64	74,000	34,000
6,800		74,000	34,000
6,900		74,000	34,000
7,000		74,000	34,000
7,030		74,000	34,000
7,100		74,000	34,000
7,140	9/32	74,000	34,000
7,200		74,000	34,000
7,300		74,000	34,000
7,370		74,000	34,000
7,400		74,000	34,000
7,490		74,000	34,000
7,500		74,000	34,000
7,540	19/64	79,000	37,000
7,600		79,000	37,000
7,670		79,000	37,000
7,700		79,000	37,000
7,800		79,000	37,000
7,900		79,000	37,000

d1		l1	l2
mm	inch	mm	mm
7,940	5/16	79,000	37,000
8,000		79,000	37,000
8,030		79,000	37,000
8,100		79,000	37,000
8,200		79,000	37,000
8,300		79,000	37,000
8,330	21/64	79,000	37,000
8,400		79,000	37,000
8,430		79,000	37,000
8,500		79,000	37,000
8,600		84,000	40,000
8,610		84,000	40,000
8,730	11/32	84,000	40,000
8,800		84,000	40,000
8,840		84,000	40,000
8,900		84,000	40,000
9,000		84,000	40,000
9,090		84,000	40,000
9,130	23/64	84,000	40,000
9,200		84,000	40,000
9,300		84,000	40,000
9,340		84,000	40,000
9,350		84,000	40,000
9,400		84,000	40,000
9,500		84,000	40,000
9,520	3/8	89,000	43,000
9,580		89,000	43,000
9,600		89,000	43,000
9,700		89,000	43,000
9,800		89,000	43,000
9,920	25/64	89,000	43,000
10,000		89,000	43,000
10,080		89,000	43,000
10,200		89,000	43,000
10,260		89,000	43,000
10,320	13/32	89,000	43,000
10,490		89,000	43,000
10,500		89,000	43,000
10,720	27/64	95,000	47,000
11,000		95,000	47,000
11,110	7/16	95,000	47,000
11,500		95,000	47,000
11,510	29/64	95,000	47,000
11,800		95,000	47,000
11,910	15/32	102,000	51,000
12,000		102,000	51,000
12,300	31/64	102,000	51,000
12,500		102,000	51,000
12,700	1/2	102,000	51,000
13,000		102,000	51,000
13,100	33/64	102,000	51,000
13,490	17/32	107,000	54,000
13,500		107,000	54,000
14,000		107,000	54,000
14,290	9/16	111,000	56,000



Eriköislyhyet porat



P	○	Kärjen kevennys $\geq \varnothing 2,060$ • päästöhiottu kärki • pääleikkusärmän suorasta
M	○	
K	○	
N	●	rakenne- ja pintakarkaistut teräkset • automaattiteräkset, nuorrutetut teräkset • harmaavalurauta • pronssi, messinki • alumiini ja Al-seokset
S	○	• Magnesium ja Mg-seokset • muovit ja kuituvahvisteiset muovit
H		

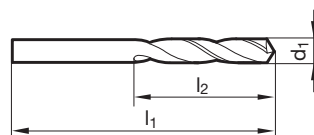
Materiaali **TKM**

Pinta ○

Leikkusuunta

GÜHRING NAVIGATOR

Leikkuarvosivu 776



Artikkelinro.

730

d1		l1	l2
mm	inch	mm	mm
0,500		20,000	3,000
0,600		21,000	3,500
0,700		23,000	4,500
0,800		24,000	5,000
0,900		25,000	5,500
1,000		26,000	6,000
1,020		26,000	6,000
1,040		26,000	6,000
1,070		28,000	7,000
1,090		28,000	7,000
1,100		28,000	7,000
1,180		28,000	7,000
1,190	3/64	30,000	8,000
1,200		30,000	8,000
1,300		30,000	8,000
1,320		30,000	8,000
1,400		32,000	9,000
1,500		32,000	9,000
1,510		34,000	10,000
1,590	1/16	34,000	10,000
1,600		34,000	10,000
1,610		34,000	10,000
1,700		34,000	10,000
1,780		36,000	11,000
1,800		36,000	11,000
1,850		36,000	11,000
1,900		36,000	11,000
1,930		38,000	12,000
1,980	5/64	38,000	12,000
1,990		38,000	12,000
2,000		38,000	12,000
2,060		38,000	12,000
2,080		38,000	12,000
2,100		38,000	12,000
2,180		40,000	13,000
2,200		40,000	13,000
2,250		40,000	13,000
2,260		40,000	13,000
2,300		40,000	13,000
2,370		43,000	14,000
2,380	3/32	43,000	14,000
2,400		43,000	14,000

d1		l1	l2
mm	inch	mm	mm
2,440		43,000	14,000
2,490		43,000	14,000
2,500		43,000	14,000
2,530		43,000	14,000
2,580		43,000	14,000
2,600		43,000	14,000
2,640		43,000	14,000
2,700		46,000	16,000
2,710		46,000	16,000
2,780	7/64	46,000	16,000
2,790		46,000	16,000
2,800		46,000	16,000
2,820		46,000	16,000
2,870		46,000	16,000
2,900		46,000	16,000
2,950		46,000	16,000
3,000		46,000	16,000
3,050		49,000	18,000
3,100		49,000	18,000
3,170	1/8	49,000	18,000
3,200		49,000	18,000
3,260		49,000	18,000
3,300		49,000	18,000
3,400		52,000	20,000
3,450		52,000	20,000
3,500		52,000	20,000
3,570	9/64	52,000	20,000
3,600		52,000	20,000
3,660		52,000	20,000
3,700		52,000	20,000
3,730		52,000	20,000
3,800		55,000	22,000
3,860		55,000	22,000
3,900		55,000	22,000
3,910		55,000	22,000
3,970	5/32	55,000	22,000
3,990		55,000	22,000
4,000		55,000	22,000
4,040		55,000	22,000
4,100		55,000	22,000
4,200		55,000	22,000
4,220		55,000	22,000



d1		l1	l2
mm	inch	mm	mm
4,300		58,000	24,000
4,370	11/64	58,000	24,000
4,390		58,000	24,000
4,400		58,000	24,000
4,500		58,000	24,000
4,570		58,000	24,000
4,600		58,000	24,000
4,620		58,000	24,000
4,700		58,000	24,000
4,760	3/16	62,000	26,000
4,800		62,000	26,000
4,850		62,000	26,000
4,900		62,000	26,000
4,920		62,000	26,000
4,980		62,000	26,000
5,000		62,000	26,000
5,060		62,000	26,000
5,100		62,000	26,000
5,110		62,000	26,000
5,160	13/64	62,000	26,000
5,180		62,000	26,000
5,200		62,000	26,000
5,220		62,000	26,000
5,300		62,000	26,000
5,310		66,000	28,000
5,400		66,000	28,000
5,410		66,000	28,000
5,500		66,000	28,000
5,560	7/32	66,000	28,000
5,600		66,000	28,000
5,700		66,000	28,000
5,790		66,000	28,000
5,800		66,000	28,000
5,900		66,000	28,000
5,940		66,000	28,000
5,950	15/64	66,000	28,000
6,000		66,000	28,000
6,040		70,000	31,000
6,100		70,000	31,000
6,150		70,000	31,000
6,200		70,000	31,000
6,250		70,000	31,000
6,300		70,000	31,000
6,350	1/4	70,000	31,000
6,400		70,000	31,000
6,500		70,000	31,000
6,530		70,000	31,000
6,600		70,000	31,000
6,630		70,000	31,000
6,700		70,000	31,000
6,750	17/64	74,000	34,000
6,800		74,000	34,000
6,900		74,000	34,000
7,000		74,000	34,000
7,030		74,000	34,000
7,100		74,000	34,000
7,140	9/32	74,000	34,000
7,200		74,000	34,000
7,300		74,000	34,000
7,370		74,000	34,000
7,400		74,000	34,000
7,490		74,000	34,000
7,500		74,000	34,000
7,540	19/64	79,000	37,000
7,600		79,000	37,000
7,670		79,000	37,000

d1		l1	l2
mm	inch	mm	mm
7,700		79,000	37,000
7,800		79,000	37,000
7,900		79,000	37,000
7,940	5/16	79,000	37,000
8,000		79,000	37,000
8,030		79,000	37,000
8,100		79,000	37,000
8,200		79,000	37,000
8,300		79,000	37,000
8,330	21/64	79,000	37,000
8,400		79,000	37,000
8,430		79,000	37,000
8,500		79,000	37,000
8,600		84,000	40,000
8,610		84,000	40,000
8,700		84,000	40,000
8,730	11/32	84,000	40,000
8,800		84,000	40,000
8,840		84,000	40,000
8,900		84,000	40,000
9,000		84,000	40,000
9,090		84,000	40,000
9,100		84,000	40,000
9,130	23/64	84,000	40,000
9,200		84,000	40,000
9,300		84,000	40,000
9,340		84,000	40,000
9,400		84,000	40,000
9,500		84,000	40,000
9,520	3/8	89,000	43,000
9,580		89,000	43,000
9,600		89,000	43,000
9,700		89,000	43,000
9,800		89,000	43,000
9,900		89,000	43,000
9,920	25/64	89,000	43,000
10,000		89,000	43,000
10,080		89,000	43,000
10,200		89,000	43,000
10,260		89,000	43,000
10,300		89,000	43,000
10,320	13/32	89,000	43,000
10,490		89,000	43,000
10,500		89,000	43,000
10,720	27/64	95,000	47,000
11,000		95,000	47,000
11,110	7/16	95,000	47,000
11,500		95,000	47,000
11,510	29/64	95,000	47,000
11,700		95,000	47,000
11,910	15/32	102,000	51,000
12,000		102,000	51,000
12,300	31/64	102,000	51,000
12,500		102,000	51,000
12,700	1/2	102,000	51,000
13,000		102,000	51,000
13,490	17/32	107,000	54,000
14,000		107,000	54,000
14,290	9/16	111,000	56,000
15,000		111,000	56,000
16,000		115,000	58,000



Eriköislyhyet porat

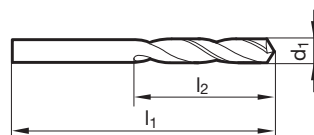


P	○	Kärjen kevennys $\geq \varnothing 2,060$ • päästöhiottu kärki • pääleikkusärmän suorasta
M	○	
K	○	
N	●	rakenne- ja pintakarkaistut teräkset • automaattiteräkset, nuorrutetut teräkset • valut • messinki • Al-materiaalit suurella Si-pitoisuudella
S	○	• Magnesium ja Mg-seokset • muovit ja kuituvahvisteiset muovit
H		

Materiaali **TKM**Pinta **F**Leikkusuunta **R**

GÜHRING NAVIGATOR

Leikkuarvosivu 776



Artikkelinro.

2463

d1		l1	l2
mm	inch	mm	mm
1,000		26,000	6,000
1,020		26,000	6,000
1,040		26,000	6,000
1,070		28,000	7,000
1,090		28,000	7,000
1,100		28,000	7,000
1,180		28,000	7,000
1,190	3/64	30,000	8,000
1,200		30,000	8,000
1,300		30,000	8,000
1,320		30,000	8,000
1,400		32,000	9,000
1,500		32,000	9,000
1,510		34,000	10,000
1,590	1/16	34,000	10,000
1,600		34,000	10,000
1,610		34,000	10,000
1,700		34,000	10,000
1,780		36,000	11,000
1,800		36,000	11,000
1,850		36,000	11,000
1,900		36,000	11,000
1,930		38,000	12,000
1,980	5/64	38,000	12,000
1,990		38,000	12,000
2,000		38,000	12,000
2,060		38,000	12,000
2,080		38,000	12,000
2,100		38,000	12,000
2,180		40,000	13,000
2,200		40,000	13,000
2,250		40,000	13,000
2,260		40,000	13,000
2,300		40,000	13,000
2,370		43,000	14,000
2,380	3/32	43,000	14,000
2,400		43,000	14,000
2,440		43,000	14,000
2,490		43,000	14,000
2,500		43,000	14,000
2,530		43,000	14,000
2,580		43,000	14,000

d1		l1	l2
mm	inch	mm	mm
2,600		43,000	14,000
2,640		43,000	14,000
2,700		46,000	16,000
2,710		46,000	16,000
2,780	7/64	46,000	16,000
2,790		46,000	16,000
2,800		46,000	16,000
2,820		46,000	16,000
2,870		46,000	16,000
2,900		46,000	16,000
2,950		46,000	16,000
3,000		46,000	16,000
3,050		49,000	18,000
3,100		49,000	18,000
3,170	1/8	49,000	18,000
3,200		49,000	18,000
3,260		49,000	18,000
3,300		49,000	18,000
3,400		52,000	20,000
3,450		52,000	20,000
3,500		52,000	20,000
3,570	9/64	52,000	20,000
3,600		52,000	20,000
3,660		52,000	20,000
3,700		52,000	20,000
3,730		52,000	20,000
3,800		55,000	22,000
3,860		55,000	22,000
3,900		55,000	22,000
3,910		55,000	22,000
3,970	5/32	55,000	22,000
3,990		55,000	22,000
4,000		55,000	22,000
4,040		55,000	22,000
4,090		55,000	22,000
4,100		55,000	22,000
4,200		55,000	22,000
4,220		55,000	22,000
4,300		58,000	24,000
4,370	11/64	58,000	24,000
4,390		58,000	24,000
4,400		58,000	24,000



d1		l1	l2
mm	inch	mm	mm
4,500		58,000	24,000
4,570		58,000	24,000
4,600		58,000	24,000
4,620		58,000	24,000
4,700		58,000	24,000
4,760	3/16	62,000	26,000
4,800		62,000	26,000
4,850		62,000	26,000
4,900		62,000	26,000
4,920		62,000	26,000
4,980		62,000	26,000
5,000		62,000	26,000
5,060		62,000	26,000
5,100		62,000	26,000
5,110		62,000	26,000
5,160	13/64	62,000	26,000
5,180		62,000	26,000
5,200		62,000	26,000
5,220		62,000	26,000
5,300		62,000	26,000
5,310		66,000	28,000
5,400		66,000	28,000
5,410		66,000	28,000
5,500		66,000	28,000
5,560	7/32	66,000	28,000
5,600		66,000	28,000
5,610		66,000	28,000
5,700		66,000	28,000
5,790		66,000	28,000
5,800		66,000	28,000
5,900		66,000	28,000
5,940		66,000	28,000
5,950	15/64	66,000	28,000
6,000		66,000	28,000
6,040		70,000	31,000
6,100		70,000	31,000
6,150		70,000	31,000
6,200		70,000	31,000
6,250		70,000	31,000
6,300		70,000	31,000
6,350	1/4	70,000	31,000
6,400		70,000	31,000
6,500		70,000	31,000
6,530		70,000	31,000
6,600		70,000	31,000
6,630		70,000	31,000
6,700		70,000	31,000
6,750	17/64	74,000	34,000
6,800		74,000	34,000
6,900		74,000	34,000
7,000		74,000	34,000
7,030		74,000	34,000
7,100		74,000	34,000
7,140	9/32	74,000	34,000
7,200		74,000	34,000
7,300		74,000	34,000
7,370		74,000	34,000
7,400		74,000	34,000
7,500		74,000	34,000
7,540	19/64	79,000	37,000
7,600		79,000	37,000
7,670		79,000	37,000
7,700		79,000	37,000
7,800		79,000	37,000
7,900		79,000	37,000
7,940	5/16	79,000	37,000

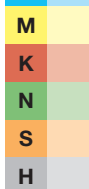
d1		l1	l2
mm	inch	mm	mm
8,000		79,000	37,000
8,030		79,000	37,000
8,100		79,000	37,000
8,200		79,000	37,000
8,300		79,000	37,000
8,330	21/64	79,000	37,000
8,400		79,000	37,000
8,430		79,000	37,000
8,500		79,000	37,000
8,600		84,000	40,000
8,610		84,000	40,000
8,700		84,000	40,000
8,730	11/32	84,000	40,000
8,800		84,000	40,000
8,840		84,000	40,000
8,900		84,000	40,000
9,000		84,000	40,000
9,090		84,000	40,000
9,100		84,000	40,000
9,130	23/64	84,000	40,000
9,200		84,000	40,000
9,300		84,000	40,000
9,340		84,000	40,000
9,400		84,000	40,000
9,500		84,000	40,000
9,520	3/8	89,000	43,000
9,580		89,000	43,000
9,600		89,000	43,000
9,700		89,000	43,000
9,800		89,000	43,000
9,900		89,000	43,000
9,920	25/64	89,000	43,000
10,000		89,000	43,000
10,080		89,000	43,000
10,200		89,000	43,000
10,260		89,000	43,000
10,300		89,000	43,000
10,320	13/32	89,000	43,000
10,490		89,000	43,000
10,500		89,000	43,000
10,720	27/64	95,000	47,000
11,000		95,000	47,000
11,110	7/16	95,000	47,000
11,500		95,000	47,000
11,510	29/64	95,000	47,000
11,910	15/32	102,000	51,000
12,000		102,000	51,000
12,300	31/64	102,000	51,000
12,700	1/2	102,000	51,000
13,000		102,000	51,000
13,490	17/32	107,000	54,000
14,000		107,000	54,000
14,290	9/16	111,000	56,000
15,000		111,000	56,000
16,000		115,000	58,000



Erikoislyhyet porat



P päästöhiottu kärki • pääleikkusärmän suorasta

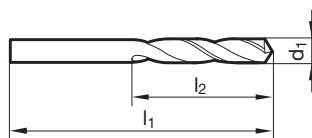


N lasikuituvahvistetut muovit • kestumuovit jotka kuluttavat sekä ohjainreunee ja leikkusärmää

GÜHRING NAVIGATOR

Leikkuuarvosivu 776

Materiaali	TKM
Pinta	○
Leikkusuunta	Ⓜ



Artikkelinro. **702**

d1		l1	l2
mm	inch	mm	mm
0,500		30,000	6,500
0,550		30,000	6,500
0,600		30,000	6,500
0,650		30,000	6,500
0,700		30,000	6,500
0,750		30,000	8,500
0,800		30,000	8,500
0,900		30,000	9,500
1,000		30,000	11,000
1,050		30,000	11,000
1,100		30,000	11,000
1,200		30,000	13,000
1,350		30,000	13,000
1,400		30,000	13,000
1,450		30,000	13,000
1,500		30,000	13,000
1,600		40,000	17,500
1,650		40,000	17,500
1,700		40,000	17,500
1,800		40,000	17,500
1,850		40,000	17,500
1,900		40,000	17,500
2,000		40,000	17,500
2,010		40,000	17,500
2,050		40,000	17,500
2,100		40,000	17,500
2,200		40,000	17,500
2,260		40,000	17,500
2,300		40,000	17,500
2,400		40,000	17,500
2,490		40,000	17,500
2,500		40,000	17,500
2,530		45,000	20,000
2,600		45,000	20,000
2,700		45,000	20,000
2,800		45,000	20,000

d1		l1	l2
mm	inch	mm	mm
3,000		45,000	20,000
3,050		50,000	22,000
3,100		50,000	22,000
3,200		50,000	22,000
3,260		50,000	22,000
3,300		50,000	22,000
3,400		50,000	22,000
3,450		50,000	22,000
3,500		50,000	22,000
3,570	9/64	50,000	22,000
3,600		50,000	22,000
3,910		50,000	22,000
4,000		50,000	22,000
4,200		50,000	25,000
4,300		50,000	25,000
4,400		50,000	25,000
4,700		50,000	25,000
5,000		50,000	25,000
5,200		50,000	25,000
5,310		50,000	25,000
5,610		50,000	25,000
5,790		50,000	25,000
5,950	15/64	50,000	25,000
6,000		50,000	25,000
6,250		65,000	30,000
6,350	1/4	65,000	30,000
6,500		65,000	30,000

Lieriövartiset
kierukkaporat



Normaaliporat



P • Kärjen kevennys $\geq \varnothing 1,000$ • kartiovaippahionta

M

K •

N ○ seostettu-/seostamaton teräs ja valuteräs • harmaavalu-, taottava- ja pallografiittivalurauta • sintrattu pulveriteräs, uushopea ja grafiitti

S

H

GÜHRING NAVIGATOR

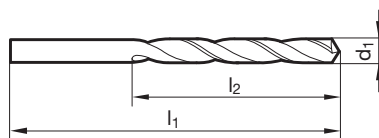
Leikkuuarvosivu 778

Lieriövärtiset
kierukkaporat

Materiaali **HSS**

Pinta

Leikkusuunta



Artikkelinro. **205**

d1		l1	l2
mm	inch	mm	mm
0,200		19,000	2,500
0,210		19,000	2,500
0,220		19,000	2,500
0,230		19,000	2,500
0,240		19,000	2,500
0,250		19,000	3,000
0,260		19,000	3,000
0,270		19,000	3,000
0,280		19,000	3,000
0,290		19,000	3,000
0,300		19,000	3,000
0,310		19,000	4,000
0,320		19,000	4,000
0,330		19,000	4,000
0,340		19,000	4,000
0,350		19,000	4,000
0,360		19,000	4,000
0,370		19,000	4,000
0,380		19,000	4,000
0,390		20,000	5,000
0,400	1/64	20,000	5,000
0,410		20,000	5,000
0,420		20,000	5,000
0,430		20,000	5,000
0,440		20,000	5,000
0,450		20,000	5,000
0,460		20,000	5,000
0,470		20,000	5,000
0,480		20,000	5,000
0,490		22,000	6,000
0,500		22,000	6,000
0,510		22,000	6,000
0,520		22,000	6,000
0,530		22,000	6,000
0,540		24,000	7,000
0,550		24,000	7,000
0,560		24,000	7,000
0,570		24,000	7,000
0,580		24,000	7,000
0,590		24,000	7,000
0,600		24,000	7,000
0,610		26,000	8,000

d1		l1	l2
mm	inch	mm	mm
0,620		26,000	8,000
0,630		26,000	8,000
0,640		26,000	8,000
0,650		26,000	8,000
0,660		26,000	8,000
0,670		26,000	8,000
0,680		28,000	9,000
0,690		28,000	9,000
0,700		28,000	9,000
0,710		28,000	9,000
0,720		28,000	9,000
0,730		28,000	9,000
0,740		28,000	9,000
0,750		28,000	9,000
0,760		30,000	10,000
0,770		30,000	10,000
0,780		30,000	10,000
0,790	1/32	30,000	10,000
0,800		30,000	10,000
0,810		30,000	10,000
0,820		30,000	10,000
0,830		30,000	10,000
0,840		30,000	10,000
0,850		30,000	10,000
0,860		32,000	11,000
0,870		32,000	11,000
0,880		32,000	11,000
0,890		32,000	11,000
0,900		32,000	11,000
0,910		32,000	11,000
0,920		32,000	11,000
0,930		32,000	11,000
0,940		32,000	11,000
0,950		32,000	11,000
0,960		34,000	12,000
0,970		34,000	12,000
0,980		34,000	12,000
0,990		34,000	12,000
1,000		34,000	12,000
1,010		34,000	12,000
1,020		34,000	12,000
1,030		34,000	12,000



d1		l1	l2
mm	inch	mm	mm
1,040		34,000	12,000
1,050		34,000	12,000
1,060		34,000	12,000
1,070		36,000	14,000
1,080		36,000	14,000
1,090		36,000	14,000
1,100		36,000	14,000
1,110		36,000	14,000
1,120		36,000	14,000
1,130		36,000	14,000
1,140		36,000	14,000
1,150		36,000	14,000
1,160		36,000	14,000
1,170		36,000	14,000
1,180		36,000	14,000
1,190	3/64	38,000	16,000
1,200		38,000	16,000
1,210		38,000	16,000
1,220		38,000	16,000
1,230		38,000	16,000
1,240		38,000	16,000
1,250		38,000	16,000
1,260		38,000	16,000
1,270		38,000	16,000
1,280		38,000	16,000
1,290		38,000	16,000
1,300		38,000	16,000
1,310		38,000	16,000
1,320		38,000	16,000
1,330		40,000	18,000
1,340		40,000	18,000
1,350		40,000	18,000
1,360		40,000	18,000
1,370		40,000	18,000
1,380		40,000	18,000
1,390		40,000	18,000
1,400		40,000	18,000
1,410		40,000	18,000
1,420		40,000	18,000
1,430		40,000	18,000
1,440		40,000	18,000
1,450		40,000	18,000
1,460		40,000	18,000
1,470		40,000	18,000
1,480		40,000	18,000
1,490		40,000	18,000
1,500		40,000	18,000
1,510		43,000	20,000
1,520		43,000	20,000
1,530		43,000	20,000
1,540		43,000	20,000
1,550		43,000	20,000
1,560		43,000	20,000
1,570		43,000	20,000
1,580		43,000	20,000
1,590	1/16	43,000	20,000
1,600		43,000	20,000
1,610		43,000	20,000
1,620		43,000	20,000
1,630		43,000	20,000
1,640		43,000	20,000
1,650		43,000	20,000
1,660		43,000	20,000
1,670		43,000	20,000
1,680		43,000	20,000
1,690		43,000	20,000
1,700		43,000	20,000
1,710		46,000	22,000
1,720		46,000	22,000
1,730		46,000	22,000
1,740		46,000	22,000
1,750		46,000	22,000

d1		l1	l2
mm	inch	mm	mm
1,760		46,000	22,000
1,770		46,000	22,000
1,780		46,000	22,000
1,790		46,000	22,000
1,800		46,000	22,000
1,810		46,000	22,000
1,820		46,000	22,000
1,830		46,000	22,000
1,840		46,000	22,000
1,850		46,000	22,000
1,860		46,000	22,000
1,870		46,000	22,000
1,880		46,000	22,000
1,890		46,000	22,000
1,900		46,000	22,000
1,910		49,000	24,000
1,920		49,000	24,000
1,930		49,000	24,000
1,940		49,000	24,000
1,950		49,000	24,000
1,960		49,000	24,000
1,970		49,000	24,000
1,980	5/64	49,000	24,000
1,990		49,000	24,000
2,000		49,000	24,000
2,010		49,000	24,000
2,020		49,000	24,000
2,030		49,000	24,000
2,040		49,000	24,000
2,050		49,000	24,000
2,060		49,000	24,000
2,070		49,000	24,000
2,080		49,000	24,000
2,090		49,000	24,000
2,100		49,000	24,000
2,110		49,000	24,000
2,120		49,000	24,000
2,130		53,000	27,000
2,140		53,000	27,000
2,150		53,000	27,000
2,170		53,000	27,000
2,180		53,000	27,000
2,200		53,000	27,000
2,210		53,000	27,000
2,220		53,000	27,000
2,230		53,000	27,000
2,240		53,000	27,000
2,250		53,000	27,000
2,260		53,000	27,000
2,270		53,000	27,000
2,280		53,000	27,000
2,290		53,000	27,000
2,300		53,000	27,000
2,320		53,000	27,000
2,330		53,000	27,000
2,340		53,000	27,000
2,350		53,000	27,000
2,360		53,000	27,000
2,370		57,000	30,000
2,380	3/32	57,000	30,000
2,390		57,000	30,000
2,400		57,000	30,000
2,420		57,000	30,000
2,430		57,000	30,000
2,440		57,000	30,000
2,450		57,000	30,000
2,460		57,000	30,000
2,470		57,000	30,000
2,480		57,000	30,000
2,490		57,000	30,000
2,500		57,000	30,000
2,510		57,000	30,000



d1		l1	l2
mm	inch	mm	mm
2,520		57,000	30,000
2,530		57,000	30,000
2,540		57,000	30,000
2,550		57,000	30,000
2,570		57,000	30,000
2,580		57,000	30,000
2,600		57,000	30,000
2,610		57,000	30,000
2,620		57,000	30,000
2,630		57,000	30,000
2,640		57,000	30,000
2,650		57,000	30,000
2,660		61,000	33,000
2,670		61,000	33,000
2,680		61,000	33,000
2,700		61,000	33,000
2,710		61,000	33,000
2,720		61,000	33,000
2,730		61,000	33,000
2,750		61,000	33,000
2,760		61,000	33,000
2,780	7/64	61,000	33,000
2,790		61,000	33,000
2,800		61,000	33,000
2,820		61,000	33,000
2,830		61,000	33,000
2,850		61,000	33,000
2,870		61,000	33,000
2,880		61,000	33,000
2,900		61,000	33,000
2,910		61,000	33,000
2,920		61,000	33,000
2,930		61,000	33,000
2,940		61,000	33,000
2,950		61,000	33,000
2,960		61,000	33,000
2,970		61,000	33,000
2,980		61,000	33,000
2,990		61,000	33,000
3,000		61,000	33,000
3,010		65,000	36,000
3,020		65,000	36,000
3,030		65,000	36,000
3,040		65,000	36,000
3,050		65,000	36,000
3,060		65,000	36,000
3,070		65,000	36,000
3,080		65,000	36,000
3,100		65,000	36,000
3,120		65,000	36,000
3,130		65,000	36,000
3,150		65,000	36,000
3,160		65,000	36,000
3,170	1/8	65,000	36,000
3,180		65,000	36,000
3,200		65,000	36,000
3,220		65,000	36,000
3,230		65,000	36,000
3,250		65,000	36,000
3,260		65,000	36,000
3,300		65,000	36,000
3,320		65,000	36,000
3,330		65,000	36,000
3,350		65,000	36,000
3,360		70,000	39,000
3,370		70,000	39,000
3,380		70,000	39,000
3,400		70,000	39,000
3,420		70,000	39,000
3,450		70,000	39,000
3,500		70,000	39,000
3,520		70,000	39,000

d1		l1	l2
mm	inch	mm	mm
3,550		70,000	39,000
3,570	9/64	70,000	39,000
3,600		70,000	39,000
3,610		70,000	39,000
3,620		70,000	39,000
3,650		70,000	39,000
3,660		70,000	39,000
3,680		70,000	39,000
3,700		70,000	39,000
3,725		70,000	39,000
3,730		70,000	39,000
3,750		70,000	39,000
3,800		75,000	43,000
3,820		75,000	43,000
3,830		75,000	43,000
3,850		75,000	43,000
3,860		75,000	43,000
3,870		75,000	43,000
3,900		75,000	43,000
3,910		75,000	43,000
3,920		75,000	43,000
3,930		75,000	43,000
3,940		75,000	43,000
3,950		75,000	43,000
3,970	5/32	75,000	43,000
3,980		75,000	43,000
3,990		75,000	43,000
4,000		75,000	43,000
4,010		75,000	43,000
4,020		75,000	43,000
4,030		75,000	43,000
4,040		75,000	43,000
4,050		75,000	43,000
4,060		75,000	43,000
4,070		75,000	43,000
4,080		75,000	43,000
4,090		75,000	43,000
4,100		75,000	43,000
4,120		75,000	43,000
4,150		75,000	43,000
4,200		75,000	43,000
4,220		75,000	43,000
4,250		75,000	43,000
4,270		80,000	47,000
4,300		80,000	47,000
4,320		80,000	47,000
4,350		80,000	47,000
4,370	11/64	80,000	47,000
4,380		80,000	47,000
4,390		80,000	47,000
4,400		80,000	47,000
4,420		80,000	47,000
4,450		80,000	47,000
4,500		80,000	47,000
4,520		80,000	47,000
4,530		80,000	47,000
4,550		80,000	47,000
4,570		80,000	47,000
4,600		80,000	47,000
4,620		80,000	47,000
4,650		80,000	47,000
4,700		80,000	47,000
4,730		80,000	47,000
4,750		80,000	47,000
4,760	3/16	86,000	52,000
4,770		86,000	52,000
4,800		86,000	52,000
4,830		86,000	52,000
4,850		86,000	52,000
4,860		86,000	52,000
4,900		86,000	52,000
4,920		86,000	52,000



d1		l1	l2
mm	inch	mm	mm
4,930		86,000	52,000
4,950		86,000	52,000
4,970		86,000	52,000
4,980		86,000	52,000
5,000		86,000	52,000
5,020		86,000	52,000
5,025		86,000	52,000
5,030		86,000	52,000
5,050		86,000	52,000
5,060		86,000	52,000
5,080		86,000	52,000
5,100		86,000	52,000
5,110		86,000	52,000
5,120		86,000	52,000
5,150		86,000	52,000
5,160	13/64	86,000	52,000
5,180		86,000	52,000
5,190		86,000	52,000
5,200		86,000	52,000
5,220		86,000	52,000
5,250		86,000	52,000
5,260		86,000	52,000
5,300		86,000	52,000
5,310		93,000	57,000
5,350		93,000	57,000
5,400		93,000	57,000
5,410		93,000	57,000
5,420		93,000	57,000
5,450		93,000	57,000
5,500		93,000	57,000
5,550		93,000	57,000
5,560	7/32	93,000	57,000
5,600		93,000	57,000
5,610		93,000	57,000
5,630		93,000	57,000
5,650		93,000	57,000
5,700		93,000	57,000
5,750		93,000	57,000
5,790		93,000	57,000
5,800		93,000	57,000
5,850		93,000	57,000
5,900		93,000	57,000
5,920		93,000	57,000
5,930		93,000	57,000
5,940		93,000	57,000
5,950	15/64	93,000	57,000
5,960		93,000	57,000
5,970		93,000	57,000
5,980		93,000	57,000
5,990		93,000	57,000
6,000		93,000	57,000
6,030		101,000	63,000
6,040		101,000	63,000
6,050		101,000	63,000
6,100		101,000	63,000
6,150		101,000	63,000
6,170		101,000	63,000
6,200		101,000	63,000
6,210		101,000	63,000
6,220		101,000	63,000
6,250		101,000	63,000
6,300		101,000	63,000
6,350	1/4	101,000	63,000
6,380		101,000	63,000
6,400		101,000	63,000
6,450		101,000	63,000
6,500		101,000	63,000
6,530		101,000	63,000
6,550		101,000	63,000
6,600		101,000	63,000
6,630		101,000	63,000
6,650		101,000	63,000

d1		l1	l2
mm	inch	mm	mm
6,700		101,000	63,000
6,750	17/64	109,000	69,000
6,760		109,000	69,000
6,800		109,000	69,000
6,850		109,000	69,000
6,900		109,000	69,000
6,950		109,000	69,000
7,000		109,000	69,000
7,030		109,000	69,000
7,040		109,000	69,000
7,050		109,000	69,000
7,070		109,000	69,000
7,100		109,000	69,000
7,130		109,000	69,000
7,140	9/32	109,000	69,000
7,150		109,000	69,000
7,200		109,000	69,000
7,250		109,000	69,000
7,300		109,000	69,000
7,320		109,000	69,000
7,350		109,000	69,000
7,370		109,000	69,000
7,400		109,000	69,000
7,450		109,000	69,000
7,490		109,000	69,000
7,500		109,000	69,000
7,540	19/64	117,000	75,000
7,550		117,000	75,000
7,600		117,000	75,000
7,650		117,000	75,000
7,670		117,000	75,000
7,700		117,000	75,000
7,750		117,000	75,000
7,800		117,000	75,000
7,850		117,000	75,000
7,900		117,000	75,000
7,940	5/16	117,000	75,000
7,950		117,000	75,000
7,980		117,000	75,000
8,000		117,000	75,000
8,030		117,000	75,000
8,050		117,000	75,000
8,100		117,000	75,000
8,130		117,000	75,000
8,150		117,000	75,000
8,200		117,000	75,000
8,250		117,000	75,000
8,300		117,000	75,000
8,330	21/64	117,000	75,000
8,350		117,000	75,000
8,400		117,000	75,000
8,430		117,000	75,000
8,450		117,000	75,000
8,500		117,000	75,000
8,550		125,000	81,000
8,600		125,000	81,000
8,610		125,000	81,000
8,650		125,000	81,000
8,700		125,000	81,000
8,730	11/32	125,000	81,000
8,750		125,000	81,000
8,800		125,000	81,000
8,840		125,000	81,000
8,850		125,000	81,000
8,900		125,000	81,000
8,950		125,000	81,000
9,000		125,000	81,000
9,050		125,000	81,000
9,090		125,000	81,000
9,100		125,000	81,000
9,130	23/64	125,000	81,000
9,150		125,000	81,000



d1		l1	l2
mm	inch	mm	mm
9,200		125,000	81,000
9,250		125,000	81,000
9,300		125,000	81,000
9,340		125,000	81,000
9,350		125,000	81,000
9,400		125,000	81,000
9,450		125,000	81,000
9,500		125,000	81,000
9,510		133,000	87,000
9,520	3/8	133,000	87,000
9,570		133,000	87,000
9,580		133,000	87,000
9,600		133,000	87,000
9,650		133,000	87,000
9,700		133,000	87,000
9,750		133,000	87,000
9,800		133,000	87,000
9,850		133,000	87,000
9,900		133,000	87,000
9,920	25/64	133,000	87,000
9,950		133,000	87,000
10,000		133,000	87,000
10,050		133,000	87,000
10,080		133,000	87,000
10,100		133,000	87,000
10,150		133,000	87,000
10,200		133,000	87,000
10,250		133,000	87,000
10,260		133,000	87,000
10,300		133,000	87,000
10,320	13/32	133,000	87,000
10,350		133,000	87,000
10,400		133,000	87,000
10,450		133,000	87,000
10,490		133,000	87,000
10,500		133,000	87,000
10,550		133,000	87,000
10,600		133,000	87,000
10,700		142,000	94,000
10,720	27/64	142,000	94,000
10,750		142,000	94,000
10,800		142,000	94,000
10,900		142,000	94,000
11,000		142,000	94,000
11,050		142,000	94,000
11,100		142,000	94,000
11,110	7/16	142,000	94,000
11,150		142,000	94,000
11,200		142,000	94,000
11,250		142,000	94,000
11,300		142,000	94,000
11,350		142,000	94,000
11,400		142,000	94,000
11,500		142,000	94,000
11,510	29/64	142,000	94,000
11,600		142,000	94,000
11,700		142,000	94,000
11,750		142,000	94,000
11,800		142,000	94,000
11,900		151,000	101,000
11,910	15/32	151,000	101,000
12,000		151,000	101,000
12,050		151,000	101,000
12,100		151,000	101,000
12,200		151,000	101,000
12,250		151,000	101,000
12,300	31/64	151,000	101,000
12,400		151,000	101,000
12,500		151,000	101,000
12,600		151,000	101,000
12,650		151,000	101,000
12,700	1/2	151,000	101,000

d1		l1	l2
mm	inch	mm	mm
12,750		151,000	101,000
12,800		151,000	101,000
12,850		151,000	101,000
12,900		151,000	101,000
13,000		151,000	101,000
13,100	33/64	151,000	101,000
13,200		151,000	101,000
13,250		160,000	108,000
13,300		160,000	108,000
13,400		160,000	108,000
13,490	17/32	160,000	108,000
13,500		160,000	108,000
13,530		160,000	108,000
13,600		160,000	108,000
13,700		160,000	108,000
13,750		160,000	108,000
13,800		160,000	108,000
13,890	35/64	160,000	108,000
13,900		160,000	108,000
14,000		160,000	108,000
14,100		169,000	114,000
14,200		169,000	114,000
14,250		169,000	114,000
14,290	9/16	169,000	114,000
14,300		169,000	114,000
14,400		169,000	114,000
14,450		169,000	114,000
14,500		169,000	114,000
14,600		169,000	114,000
14,680	37/64	169,000	114,000
14,700		169,000	114,000
14,750		169,000	114,000
14,800		169,000	114,000
14,900		169,000	114,000
15,000		169,000	114,000
15,080	19/32	178,000	120,000
15,100		178,000	120,000
15,200		178,000	120,000
15,250		178,000	120,000
15,300		178,000	120,000
15,400		178,000	120,000
15,480	39/64	178,000	120,000
15,500		178,000	120,000
15,600		178,000	120,000
15,700		178,000	120,000
15,750		178,000	120,000
15,800		178,000	120,000
15,870	5/8	178,000	120,000
15,900		178,000	120,000
16,000		178,000	120,000
16,100		184,000	125,000
16,200		184,000	125,000
16,250		184,000	125,000
16,270	41/64	184,000	125,000
16,300		184,000	125,000
16,400		184,000	125,000
16,500		184,000	125,000
16,600		184,000	125,000
16,670	21/32	184,000	125,000
16,700		184,000	125,000
16,750		184,000	125,000
16,800		184,000	125,000
16,900		184,000	125,000
17,000		184,000	125,000
17,070	43/64	191,000	130,000
17,200		191,000	130,000
17,250		191,000	130,000
17,300		191,000	130,000
17,400		191,000	130,000
17,460	11/16	191,000	130,000
17,500		191,000	130,000
17,600		191,000	130,000



d1		l1	l2
mm	inch	mm	mm
17,700		191,000	130,000
17,750		191,000	130,000
17,800		191,000	130,000
17,860	45/64	191,000	130,000
17,900		191,000	130,000
18,000		191,000	130,000
18,100		198,000	135,000
18,200		198,000	135,000
18,260	23/32	198,000	135,000
18,400		198,000	135,000
18,500		198,000	135,000
18,650	47/64	198,000	135,000

d1		l1	l2
mm	inch	mm	mm
18,750		198,000	135,000
18,800		198,000	135,000
19,000		198,000	135,000
19,050	3/4	205,000	140,000
19,100		205,000	140,000
19,200		205,000	140,000
19,250		205,000	140,000
19,500		205,000	140,000
19,600		205,000	140,000
19,750		205,000	140,000
19,840	25/32	205,000	140,000
20,000		205,000	140,000



Normaaliporat



P • Kärjen kevennys $\geq \varnothing 1,000$ • kartiovaippahionta



N ○ seostettu-/seostamaton teräs ja valuteräs • harmaavalu-, taottava- ja pallografiittivalurauta • sintrattu pulveriteräs, uushopea ja grafiitti

Materiaali **HSS**

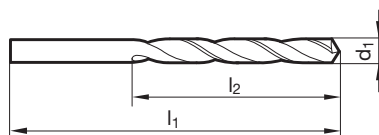
Pinta **S**

Leikkusuunta **R**

Lieriövartiset
kierukkaporat

GÜHRING NAVIGATOR

Leikkuarvosivu 780



Artikkelinro. **651**

d1		l1	l2
mm	inch	mm	mm
0,200		19,000	2,500
0,250		19,000	3,000
0,280		19,000	3,000
0,300		19,000	3,000
0,310		19,000	4,000
0,320		19,000	4,000
0,330		19,000	4,000
0,340		19,000	4,000
0,360		19,000	4,000
0,370		19,000	4,000
0,380		19,000	4,000
0,390		20,000	5,000
0,400	1/64	20,000	5,000
0,410		20,000	5,000
0,420		20,000	5,000
0,430		20,000	5,000
0,440		20,000	5,000
0,450		20,000	5,000
0,460		20,000	5,000
0,470		20,000	5,000
0,480		20,000	5,000
0,490		22,000	6,000
0,500		22,000	6,000
0,510		22,000	6,000
0,520		22,000	6,000
0,530		22,000	6,000
0,540		24,000	7,000
0,550		24,000	7,000
0,570		24,000	7,000
0,580		24,000	7,000
0,590		24,000	7,000
0,600		24,000	7,000
0,610		26,000	8,000
0,620		26,000	8,000
0,630		26,000	8,000
0,640		26,000	8,000
0,650		26,000	8,000
0,660		26,000	8,000
0,680		28,000	9,000
0,690		28,000	9,000
0,700		28,000	9,000
0,710		28,000	9,000

d1		l1	l2
mm	inch	mm	mm
0,720		28,000	9,000
0,740		28,000	9,000
0,750		28,000	9,000
0,770		30,000	10,000
0,780		30,000	10,000
0,790	1/32	30,000	10,000
0,800		30,000	10,000
0,810		30,000	10,000
0,820		30,000	10,000
0,830		30,000	10,000
0,840		30,000	10,000
0,850		30,000	10,000
0,860		32,000	11,000
0,870		32,000	11,000
0,880		32,000	11,000
0,890		32,000	11,000
0,900		32,000	11,000
0,910		32,000	11,000
0,920		32,000	11,000
0,930		32,000	11,000
0,940		32,000	11,000
0,950		32,000	11,000
0,960		34,000	12,000
0,970		34,000	12,000
0,980		34,000	12,000
0,990		34,000	12,000
1,000		34,000	12,000
1,020		34,000	12,000
1,030		34,000	12,000
1,040		34,000	12,000
1,050		34,000	12,000
1,060		34,000	12,000
1,070		36,000	14,000
1,080		36,000	14,000
1,090		36,000	14,000
1,100		36,000	14,000
1,110		36,000	14,000
1,120		36,000	14,000
1,130		36,000	14,000
1,140		36,000	14,000
1,150		36,000	14,000
1,160		36,000	14,000



d1		l1	l2
mm	inch	mm	mm
1,170		36,000	14,000
1,180		36,000	14,000
1,190	3/64	38,000	16,000
1,200		38,000	16,000
1,210		38,000	16,000
1,220		38,000	16,000
1,240		38,000	16,000
1,250		38,000	16,000
1,260		38,000	16,000
1,270		38,000	16,000
1,280		38,000	16,000
1,300		38,000	16,000
1,320		38,000	16,000
1,330		40,000	18,000
1,340		40,000	18,000
1,350		40,000	18,000
1,400		40,000	18,000
1,420		40,000	18,000
1,430		40,000	18,000
1,450		40,000	18,000
1,460		40,000	18,000
1,470		40,000	18,000
1,480		40,000	18,000
1,490		40,000	18,000
1,500		40,000	18,000
1,510		43,000	20,000
1,520		43,000	20,000
1,530		43,000	20,000
1,540		43,000	20,000
1,550		43,000	20,000
1,560		43,000	20,000
1,570		43,000	20,000
1,590	1/16	43,000	20,000
1,600		43,000	20,000
1,610		43,000	20,000
1,620		43,000	20,000
1,640		43,000	20,000
1,650		43,000	20,000
1,660		43,000	20,000
1,680		43,000	20,000
1,700		43,000	20,000
1,710		46,000	22,000
1,720		46,000	22,000
1,730		46,000	22,000
1,750		46,000	22,000
1,770		46,000	22,000
1,780		46,000	22,000
1,800		46,000	22,000
1,820		46,000	22,000
1,830		46,000	22,000
1,850		46,000	22,000
1,870		46,000	22,000
1,900		46,000	22,000
1,910		49,000	24,000
1,930		49,000	24,000
1,950		49,000	24,000
1,960		49,000	24,000
1,970		49,000	24,000
1,980	5/64	49,000	24,000
1,990		49,000	24,000
2,000		49,000	24,000
2,020		49,000	24,000
2,030		49,000	24,000
2,050		49,000	24,000
2,060		49,000	24,000
2,080		49,000	24,000
2,100		49,000	24,000
2,150		53,000	27,000
2,180		53,000	27,000
2,200		53,000	27,000
2,250		53,000	27,000
2,260		53,000	27,000

d1		l1	l2
mm	inch	mm	mm
2,300		53,000	27,000
2,350		53,000	27,000
2,370		57,000	30,000
2,380	3/32	57,000	30,000
2,400		57,000	30,000
2,440		57,000	30,000
2,450		57,000	30,000
2,490		57,000	30,000
2,500		57,000	30,000
2,520		57,000	30,000
2,530		57,000	30,000
2,550		57,000	30,000
2,580		57,000	30,000
2,600		57,000	30,000
2,640		57,000	30,000
2,650		57,000	30,000
2,700		61,000	33,000
2,710		61,000	33,000
2,720		61,000	33,000
2,750		61,000	33,000
2,780	7/64	61,000	33,000
2,790		61,000	33,000
2,800		61,000	33,000
2,820		61,000	33,000
2,850		61,000	33,000
2,870		61,000	33,000
2,900		61,000	33,000
2,950		61,000	33,000
3,000		61,000	33,000
3,020		65,000	36,000
3,030		65,000	36,000
3,050		65,000	36,000
3,100		65,000	36,000
3,150		65,000	36,000
3,170	1/8	65,000	36,000
3,200		65,000	36,000
3,250		65,000	36,000
3,260		65,000	36,000
3,300		65,000	36,000
3,350		65,000	36,000
3,400		70,000	39,000
3,450		70,000	39,000
3,500		70,000	39,000
3,550		70,000	39,000
3,570	9/64	70,000	39,000
3,600		70,000	39,000
3,650		70,000	39,000
3,660		70,000	39,000
3,700		70,000	39,000
3,730		70,000	39,000
3,750		70,000	39,000
3,800		75,000	43,000
3,850		75,000	43,000
3,860		75,000	43,000
3,900		75,000	43,000
3,910		75,000	43,000
3,950		75,000	43,000
3,970	5/32	75,000	43,000
3,990		75,000	43,000
4,000		75,000	43,000
4,040		75,000	43,000
4,050		75,000	43,000
4,070		75,000	43,000
4,090		75,000	43,000
4,100		75,000	43,000
4,150		75,000	43,000
4,200		75,000	43,000
4,220		75,000	43,000
4,250		75,000	43,000
4,300		80,000	47,000
4,350		80,000	47,000
4,370	11/64	80,000	47,000



d1		l1	l2
mm	inch	mm	mm
4,390		80,000	47,000
4,400		80,000	47,000
4,450		80,000	47,000
4,500		80,000	47,000
4,550		80,000	47,000
4,570		80,000	47,000
4,600		80,000	47,000
4,620		80,000	47,000
4,650		80,000	47,000
4,700		80,000	47,000
4,750		80,000	47,000
4,760	3/16	86,000	52,000
4,800		86,000	52,000
4,850		86,000	52,000
4,900		86,000	52,000
4,920		86,000	52,000
4,950		86,000	52,000
4,980		86,000	52,000
5,000		86,000	52,000
5,020		86,000	52,000
5,050		86,000	52,000
5,060		86,000	52,000
5,100		86,000	52,000
5,110		86,000	52,000
5,150		86,000	52,000
5,160	13/64	86,000	52,000
5,180		86,000	52,000
5,200		86,000	52,000
5,220		86,000	52,000
5,250		86,000	52,000
5,300		86,000	52,000
5,310		93,000	57,000
5,400		93,000	57,000
5,410		93,000	57,000
5,450		93,000	57,000
5,500		93,000	57,000
5,550		93,000	57,000
5,560	7/32	93,000	57,000
5,600		93,000	57,000
5,610		93,000	57,000
5,650		93,000	57,000
5,700		93,000	57,000
5,750		93,000	57,000
5,790		93,000	57,000
5,800		93,000	57,000
5,850		93,000	57,000
5,900		93,000	57,000
5,940		93,000	57,000
5,950	15/64	93,000	57,000
6,000		93,000	57,000
6,040		101,000	63,000
6,050		101,000	63,000
6,100		101,000	63,000
6,150		101,000	63,000
6,200		101,000	63,000
6,250		101,000	63,000
6,300		101,000	63,000
6,350	1/4	101,000	63,000
6,400		101,000	63,000
6,500		101,000	63,000
6,530		101,000	63,000
6,550		101,000	63,000
6,600		101,000	63,000
6,630		101,000	63,000
6,650		101,000	63,000
6,700		101,000	63,000
6,750	17/64	109,000	69,000
6,800		109,000	69,000
6,850		109,000	69,000
6,900		109,000	69,000
7,000		109,000	69,000
7,020		109,000	69,000

d1		l1	l2
mm	inch	mm	mm
7,030		109,000	69,000
7,050		109,000	69,000
7,100		109,000	69,000
7,140	9/32	109,000	69,000
7,200		109,000	69,000
7,250		109,000	69,000
7,300		109,000	69,000
7,370		109,000	69,000
7,400		109,000	69,000
7,450		109,000	69,000
7,490		109,000	69,000
7,500		109,000	69,000
7,540	19/64	117,000	75,000
7,600		117,000	75,000
7,670		117,000	75,000
7,700		117,000	75,000
7,750		117,000	75,000
7,800		117,000	75,000
7,900		117,000	75,000
7,940	5/16	117,000	75,000
8,000		117,000	75,000
8,030		117,000	75,000
8,050		117,000	75,000
8,100		117,000	75,000
8,150		117,000	75,000
8,200		117,000	75,000
8,250		117,000	75,000
8,300		117,000	75,000
8,330	21/64	117,000	75,000
8,400		117,000	75,000
8,430		117,000	75,000
8,450		117,000	75,000
8,500		117,000	75,000
8,600		125,000	81,000
8,610		125,000	81,000
8,700		125,000	81,000
8,730	11/32	125,000	81,000
8,750		125,000	81,000
8,800		125,000	81,000
8,840		125,000	81,000
8,850		125,000	81,000
8,900		125,000	81,000
9,000		125,000	81,000
9,050		125,000	81,000
9,090		125,000	81,000
9,100		125,000	81,000
9,130	23/64	125,000	81,000
9,200		125,000	81,000
9,250		125,000	81,000
9,300		125,000	81,000
9,340		125,000	81,000
9,350		125,000	81,000
9,400		125,000	81,000
9,500		125,000	81,000
9,520	3/8	133,000	87,000
9,550		133,000	87,000
9,580		133,000	87,000
9,600		133,000	87,000
9,700		133,000	87,000
9,750		133,000	87,000
9,800		133,000	87,000
9,900		133,000	87,000
9,920	25/64	133,000	87,000
10,000		133,000	87,000
10,060		133,000	87,000
10,080		133,000	87,000
10,100		133,000	87,000
10,200		133,000	87,000
10,250		133,000	87,000
10,260		133,000	87,000
10,300		133,000	87,000
10,320	13/32	133,000	87,000



d1		l1	l2
mm	inch	mm	mm
10,400		133,000	87,000
10,490		133,000	87,000
10,500		133,000	87,000
10,550		133,000	87,000
10,600		133,000	87,000
10,700		142,000	94,000
10,720	27/64	142,000	94,000
10,750		142,000	94,000
10,800		142,000	94,000
10,900		142,000	94,000
11,000		142,000	94,000
11,100		142,000	94,000
11,110	7/16	142,000	94,000
11,200		142,000	94,000
11,250		142,000	94,000
11,300		142,000	94,000
11,400		142,000	94,000
11,500		142,000	94,000
11,510	29/64	142,000	94,000
11,600		142,000	94,000
11,650		142,000	94,000
11,700		142,000	94,000
11,750		142,000	94,000
11,800		142,000	94,000
11,900		151,000	101,000
11,910	15/32	151,000	101,000
12,000		151,000	101,000
12,100		151,000	101,000
12,200		151,000	101,000
12,250		151,000	101,000
12,300	31/64	151,000	101,000
12,400		151,000	101,000
12,500		151,000	101,000
12,600		151,000	101,000
12,700	1/2	151,000	101,000
12,800		151,000	101,000
12,900		151,000	101,000
13,000		151,000	101,000
13,100	33/64	151,000	101,000
13,200		151,000	101,000
13,490	17/32	160,000	108,000
13,500		160,000	108,000

d1		l1	l2
mm	inch	mm	mm
13,700		160,000	108,000
13,750		160,000	108,000
13,800		160,000	108,000
13,890	35/64	160,000	108,000
13,900		160,000	108,000
14,000		160,000	108,000
14,100		169,000	114,000
14,200		169,000	114,000
14,250		169,000	114,000
14,290	9/16	169,000	114,000
14,300		169,000	114,000
14,400		169,000	114,000
14,500		169,000	114,000
14,680	37/64	169,000	114,000
15,000		169,000	114,000
15,080	19/32	178,000	120,000
15,250		178,000	120,000
15,480	39/64	178,000	120,000
15,500		178,000	120,000
15,800		178,000	120,000
15,870	5/8	178,000	120,000
16,000		178,000	120,000
16,500		184,000	125,000
16,750		184,000	125,000
17,000		184,000	125,000
17,250		191,000	130,000
17,500		191,000	130,000
18,000		191,000	130,000
18,500		198,000	135,000
18,800		198,000	135,000
19,000		198,000	135,000



Normaaliporat



P • Kärjen kevennys $\geq \varnothing 1,000$ • kartiovaippahionta



N • seostettu-/seostamaton teräs ja valuteräs • harmaavalu-, taottava- ja pallografiittivalurauta • sintrattu pulveriteräs, uushopea ja grafiitti

Materiaali **HSS**

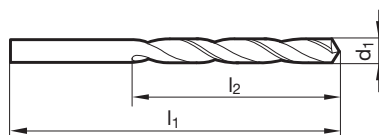
Pinta **F**

Leikkusuunta **R**

Lieriövartiset
kierukkaporat

GÜHRING NAVIGATOR

Leikkuarvosivu 780



Artikkelinro. **2456**

d1		l1	l2
mm	inch	mm	mm
1,000		34,000	12,000
1,100		36,000	14,000
1,200		38,000	16,000
1,300		38,000	16,000
1,400		40,000	18,000
1,500		40,000	18,000
1,600		43,000	20,000
1,700		43,000	20,000
1,800		46,000	22,000
1,900		46,000	22,000
2,000		49,000	24,000
2,100		49,000	24,000
2,200		53,000	27,000
2,300		53,000	27,000
2,400		57,000	30,000
2,500		57,000	30,000
2,600		57,000	30,000
2,700		61,000	33,000
2,800		61,000	33,000
2,900		61,000	33,000
3,000		61,000	33,000
3,100		65,000	36,000
3,200		65,000	36,000
3,300		65,000	36,000
3,400		70,000	39,000
3,500		70,000	39,000
3,600		70,000	39,000
3,700		70,000	39,000
3,800		75,000	43,000
3,900		75,000	43,000
4,000		75,000	43,000
4,100		75,000	43,000
4,200		75,000	43,000
4,300		80,000	47,000
4,400		80,000	47,000
4,500		80,000	47,000
4,600		80,000	47,000
4,800		86,000	52,000
5,000		86,000	52,000
5,100		86,000	52,000
5,200		86,000	52,000
5,500		93,000	57,000

d1		l1	l2
mm	inch	mm	mm
5,600		93,000	57,000
5,700		93,000	57,000
5,800		93,000	57,000
5,900		93,000	57,000
6,000		93,000	57,000
6,100		101,000	63,000
6,200		101,000	63,000
6,300		101,000	63,000
6,400		101,000	63,000
6,500		101,000	63,000
6,600		101,000	63,000
6,700		101,000	63,000
6,800		109,000	69,000
6,900		109,000	69,000
7,000		109,000	69,000
7,200		109,000	69,000
7,300		109,000	69,000
7,400		109,000	69,000
7,500		109,000	69,000
7,600		117,000	75,000
7,700		117,000	75,000
7,800		117,000	75,000
7,900		117,000	75,000
8,000		117,000	75,000
8,100		117,000	75,000
8,200		117,000	75,000
8,300		117,000	75,000
8,500		117,000	75,000
8,600		125,000	81,000
8,700		125,000	81,000
8,800		125,000	81,000
8,900		125,000	81,000
9,000		125,000	81,000
9,500		125,000	81,000
9,600		133,000	87,000
9,700		133,000	87,000
9,800		133,000	87,000
9,900		133,000	87,000
10,000		133,000	87,000
10,100		133,000	87,000
10,200		133,000	87,000
10,300		133,000	87,000



d1		l1	l2
mm	inch	mm	mm
10,400		133,000	87,000
10,700		142,000	94,000
11,000		142,000	94,000
11,100		142,000	94,000
11,400		142,000	94,000
11,700		142,000	94,000

d1		l1	l2
mm	inch	mm	mm
11,900		151,000	101,000
12,700	1/2	151,000	101,000
13,000		151,000	101,000
14,000		160,000	108,000
14,500		169,000	114,000



Normaaliporat



Materiaali **HSS**

Pinta ○

Leikkusuunta

P • Kärjen kevennys ≥ Ø 2,370 • kartiovaippahionta

M

K •

N ○ seostettu-/seostamaton teräs ja valuteräs • harmaavalu-, taottava- ja pallografiittivalurauta • sintrattu pulveriteräs, uushopea ja grafiitti

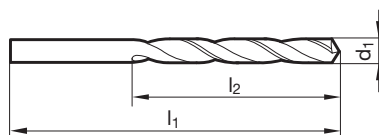
S

H

GÜHRING NAVIGATOR

Leikkuarvosivu 778

Lieriövartiset
kierukkaporat



Artikkelinro. **560**

d1		l1	l2
mm	inch	mm	mm
2,400		57,000	30,000
2,500		57,000	30,000
2,580		57,000	30,000
2,600		57,000	30,000
2,640		57,000	30,000
2,700		61,000	33,000
2,710		61,000	33,000
2,750		61,000	33,000
2,790		61,000	33,000
2,800		61,000	33,000
2,820		61,000	33,000
2,850		61,000	33,000
2,870		61,000	33,000
2,950		61,000	33,000
3,000		61,000	33,000
3,050		65,000	36,000
3,200		65,000	36,000
3,240		65,000	36,000
3,260		65,000	36,000
3,300		65,000	36,000
3,400		70,000	39,000
3,450		70,000	39,000
3,500		70,000	39,000
3,570	9/64	70,000	39,000
3,600		70,000	39,000
3,650		70,000	39,000
3,660		70,000	39,000
3,700		70,000	39,000
3,730		70,000	39,000
3,800		75,000	43,000

d1		l1	l2
mm	inch	mm	mm
3,860		75,000	43,000
3,900		75,000	43,000
3,950		75,000	43,000
3,970	5/32	75,000	43,000
4,000		75,000	43,000
4,200		75,000	43,000
4,300		80,000	47,000
4,370	11/64	80,000	47,000
4,500		80,000	47,000
4,550		80,000	47,000
4,600		80,000	47,000
4,620		80,000	47,000
4,650		80,000	47,000
4,700		80,000	47,000
4,760	3/16	86,000	52,000
4,800		86,000	52,000
4,850		86,000	52,000
4,900		86,000	52,000
4,920		86,000	52,000
4,950		86,000	52,000
5,000		86,000	52,000
5,100		86,000	52,000
5,200		86,000	52,000
5,300		86,000	52,000
5,610		93,000	57,000



Normaaliporat

Materiaali **HSS**

Pinta



Leikkusuunta



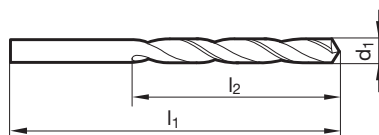
P • Kärjen kevennys $\geq \varnothing 3,000$ • kartiovaippahionta • vääntiöllä ~ DIN 1809

M**K** •**N** ○

seostettu-/seostamaton teräs ja valuteräs • harmaavalu-, taottava- ja pallografiittivalurauta • sintrattu pulveriteräs, uushopea ja grafiitti

S**H****GÜHRING** NAVIGATOR

Leikkuuarvosivu 778



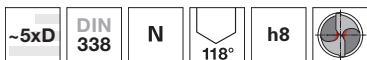
Artikkelinro.

240

d1		l1	l2	d1		l1	l2
mm	inch	mm	mm	mm	inch	mm	mm
3,000		61,000	33,000	6,800		109,000	69,000
3,100		65,000	36,000	6,900		109,000	69,000
3,200		65,000	36,000	7,000		109,000	69,000
3,300		65,000	36,000	7,100		109,000	69,000
3,400		70,000	39,000	7,200		109,000	69,000
3,500		70,000	39,000	7,500		109,000	69,000
3,600		70,000	39,000	7,600		117,000	75,000
3,700		70,000	39,000	7,700		117,000	75,000
3,800		75,000	43,000	7,800		117,000	75,000
3,900		75,000	43,000	8,000		117,000	75,000
3,970	5/32	75,000	43,000	8,100		117,000	75,000
4,000		75,000	43,000	8,200		117,000	75,000
4,100		75,000	43,000	8,300		117,000	75,000
4,200		75,000	43,000	8,400		117,000	75,000
4,300		80,000	47,000	8,500		117,000	75,000
4,400		80,000	47,000	8,600		125,000	81,000
4,500		80,000	47,000	8,700		125,000	81,000
4,600		80,000	47,000	8,800		125,000	81,000
4,700		80,000	47,000	9,000		125,000	81,000
4,800		86,000	52,000	9,100		125,000	81,000
4,900		86,000	52,000	9,250		125,000	81,000
5,000		86,000	52,000	9,300		125,000	81,000
5,100		86,000	52,000	9,400		125,000	81,000
5,200		86,000	52,000	9,500		125,000	81,000
5,250		86,000	52,000	9,600		133,000	87,000
5,300		86,000	52,000	9,800		133,000	87,000
5,400		93,000	57,000	10,000		133,000	87,000
5,500		93,000	57,000	10,100		133,000	87,000
5,600		93,000	57,000	10,200		133,000	87,000
5,700		93,000	57,000	10,500		133,000	87,000
5,800		93,000	57,000	11,000		142,000	94,000
5,850		93,000	57,000	11,500		142,000	94,000
5,900		93,000	57,000	12,000		151,000	101,000
6,000		93,000	57,000	13,000		151,000	101,000
6,050		101,000	63,000	13,490	17/32	160,000	108,000
6,100		101,000	63,000	15,000		169,000	114,000
6,200		101,000	63,000	16,000		178,000	120,000
6,300		101,000	63,000				
6,400		101,000	63,000				
6,500		101,000	63,000				
6,600		101,000	63,000				
6,700		101,000	63,000				



Normaaliporat



P • Kärjen kevennys $\geq \varnothing 14,700$ • kartiovaippahionta



N ○ seostettu-/seostamaton teräs ja valuteräs • harmaavalu-, taottava- ja pallografiittivalurauta • sintrattu pulveriteräs, uushopea ja grafiitti

Materiaali **HSS**

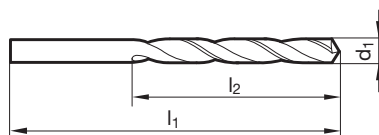
Pinta

Leikkusuunta

Lieriövartiset
kierukkaporat

GÜHRING NAVIGATOR

Leikkuarvosivu 778



Artikkelinro. **208**

d1		l1	l2
mm	inch	mm	mm
0,200		19,000	2,500
0,240		19,000	2,500
0,290		19,000	3,000
0,300		19,000	3,000
0,340		19,000	4,000
0,350		19,000	4,000
0,360		19,000	4,000
0,370		19,000	4,000
0,390		20,000	5,000
0,400	1/64	20,000	5,000
0,410		20,000	5,000
0,420		20,000	5,000
0,430		20,000	5,000
0,440		20,000	5,000
0,450		20,000	5,000
0,460		20,000	5,000
0,470		20,000	5,000
0,480		20,000	5,000
0,500		22,000	6,000
0,510		22,000	6,000
0,520		22,000	6,000
0,530		22,000	6,000
0,540		24,000	7,000
0,550		24,000	7,000
0,560		24,000	7,000
0,570		24,000	7,000
0,580		24,000	7,000
0,600		24,000	7,000
0,610		26,000	8,000
0,620		26,000	8,000
0,630		26,000	8,000
0,640		26,000	8,000
0,650		26,000	8,000
0,660		26,000	8,000
0,670		26,000	8,000
0,680		28,000	9,000
0,690		28,000	9,000
0,700		28,000	9,000
0,710		28,000	9,000
0,720		28,000	9,000
0,730		28,000	9,000
0,740		28,000	9,000

d1		l1	l2
mm	inch	mm	mm
0,750		28,000	9,000
0,770		30,000	10,000
0,775		30,000	10,000
0,780		30,000	10,000
0,790	1/32	30,000	10,000
0,800		30,000	10,000
0,810		30,000	10,000
0,820		30,000	10,000
0,830		30,000	10,000
0,840		30,000	10,000
0,850		30,000	10,000
0,860		32,000	11,000
0,870		32,000	11,000
0,880		32,000	11,000
0,890		32,000	11,000
0,900		32,000	11,000
0,910		32,000	11,000
0,930		32,000	11,000
0,950		32,000	11,000
0,960		34,000	12,000
0,970		34,000	12,000
0,980		34,000	12,000
0,990		34,000	12,000
1,000		34,000	12,000
1,020		34,000	12,000
1,040		34,000	12,000
1,050		34,000	12,000
1,070		36,000	14,000
1,080		36,000	14,000
1,090		36,000	14,000
1,100		36,000	14,000
1,110		36,000	14,000
1,120		36,000	14,000
1,130		36,000	14,000
1,150		36,000	14,000
1,170		36,000	14,000
1,180		36,000	14,000
1,190	3/64	38,000	16,000
1,200		38,000	16,000
1,210		38,000	16,000
1,220		38,000	16,000
1,250		38,000	16,000



d1		l1	l2
mm	inch	mm	mm
1,270		38,000	16,000
1,290		38,000	16,000
1,300		38,000	16,000
1,310		38,000	16,000
1,320		38,000	16,000
1,350		40,000	18,000
1,380		40,000	18,000
1,390		40,000	18,000
1,400		40,000	18,000
1,420		40,000	18,000
1,430		40,000	18,000
1,450		40,000	18,000
1,465		40,000	18,000
1,470		40,000	18,000
1,490		40,000	18,000
1,500		40,000	18,000
1,510		43,000	20,000
1,550		43,000	20,000
1,590	1/16	43,000	20,000
1,600		43,000	20,000
1,610		43,000	20,000
1,620		43,000	20,000
1,630		43,000	20,000
1,650		43,000	20,000
1,660		43,000	20,000
1,700		43,000	20,000
1,720		46,000	22,000
1,750		46,000	22,000
1,760		46,000	22,000
1,770		46,000	22,000
1,780		46,000	22,000
1,790		46,000	22,000
1,800		46,000	22,000
1,820		46,000	22,000
1,830		46,000	22,000
1,840		46,000	22,000
1,850		46,000	22,000
1,880		46,000	22,000
1,900		46,000	22,000
1,930		49,000	24,000
1,940		49,000	24,000
1,950		49,000	24,000
1,970		49,000	24,000
1,980	5/64	49,000	24,000
2,000		49,000	24,000
2,040		49,000	24,000
2,050		49,000	24,000
2,080		49,000	24,000
2,100		49,000	24,000
2,120		49,000	24,000
2,150		53,000	27,000
2,180		53,000	27,000
2,200		53,000	27,000
2,240		53,000	27,000
2,250		53,000	27,000
2,260		53,000	27,000
2,300		53,000	27,000
2,320		53,000	27,000
2,350		53,000	27,000
2,360		53,000	27,000
2,370		57,000	30,000
2,380	3/32	57,000	30,000
2,400		57,000	30,000
2,420		57,000	30,000
2,440		57,000	30,000
2,450		57,000	30,000
2,490		57,000	30,000
2,500		57,000	30,000
2,530		57,000	30,000
2,550		57,000	30,000
2,570		57,000	30,000
2,580		57,000	30,000

d1		l1	l2
mm	inch	mm	mm
2,600		57,000	30,000
2,640		57,000	30,000
2,650		57,000	30,000
2,660		61,000	33,000
2,670		61,000	33,000
2,700		61,000	33,000
2,710		61,000	33,000
2,730		61,000	33,000
2,750		61,000	33,000
2,780	7/64	61,000	33,000
2,800		61,000	33,000
2,870		61,000	33,000
2,880		61,000	33,000
2,900		61,000	33,000
2,910		61,000	33,000
2,950		61,000	33,000
2,970		61,000	33,000
3,000		61,000	33,000
3,020		65,000	36,000
3,030		65,000	36,000
3,050		65,000	36,000
3,100		65,000	36,000
3,150		65,000	36,000
3,170	1/8	65,000	36,000
3,200		65,000	36,000
3,220		65,000	36,000
3,250		65,000	36,000
3,260		65,000	36,000
3,280		65,000	36,000
3,300		65,000	36,000
3,320		65,000	36,000
3,330		65,000	36,000
3,340		65,000	36,000
3,370		70,000	39,000
3,380		70,000	39,000
3,400		70,000	39,000
3,450		70,000	39,000
3,470		70,000	39,000
3,500		70,000	39,000
3,530		70,000	39,000
3,570	9/64	70,000	39,000
3,600		70,000	39,000
3,650		70,000	39,000
3,700		70,000	39,000
3,750		70,000	39,000
3,800		75,000	43,000
3,850		75,000	43,000
3,870		75,000	43,000
3,900		75,000	43,000
3,910		75,000	43,000
3,950		75,000	43,000
3,970	5/32	75,000	43,000
4,000		75,000	43,000
4,050		75,000	43,000
4,090		75,000	43,000
4,100		75,000	43,000
4,130		75,000	43,000
4,150		75,000	43,000
4,200		75,000	43,000
4,250		75,000	43,000
4,300		80,000	47,000
4,350		80,000	47,000
4,370	11/64	80,000	47,000
4,390		80,000	47,000
4,400		80,000	47,000
4,450		80,000	47,000
4,500		80,000	47,000
4,520		80,000	47,000
4,530		80,000	47,000
4,550		80,000	47,000
4,570		80,000	47,000
4,600		80,000	47,000



d1		l1	l2
mm	inch	mm	mm
4,680		80,000	47,000
4,750		80,000	47,000
4,760	3/16	86,000	52,000
4,800		86,000	52,000
4,850		86,000	52,000
4,900		86,000	52,000
4,920		86,000	52,000
4,930		86,000	52,000
4,950		86,000	52,000
4,970		86,000	52,000
4,980		86,000	52,000
5,000		86,000	52,000
5,060		86,000	52,000
5,080		86,000	52,000
5,100		86,000	52,000
5,110		86,000	52,000
5,160	13/64	86,000	52,000
5,200		86,000	52,000
5,220		86,000	52,000
5,300		86,000	52,000
5,400		93,000	57,000
5,500		93,000	57,000
5,520		93,000	57,000
5,560	7/32	93,000	57,000
5,600		93,000	57,000
5,610		93,000	57,000
5,650		93,000	57,000
5,700		93,000	57,000
5,750		93,000	57,000
5,800		93,000	57,000
5,850		93,000	57,000
5,900		93,000	57,000
5,940		93,000	57,000
5,950	15/64	93,000	57,000
6,000		93,000	57,000
6,100		101,000	63,000
6,200		101,000	63,000
6,300		101,000	63,000
6,350	1/4	101,000	63,000
6,400		101,000	63,000
6,450		101,000	63,000
6,500		101,000	63,000
6,530		101,000	63,000
6,550		101,000	63,000
6,570		101,000	63,000
6,600		101,000	63,000
6,630		101,000	63,000
6,700		101,000	63,000
6,800		109,000	69,000
6,880		109,000	69,000
6,900		109,000	69,000
6,910		109,000	69,000
6,950		109,000	69,000
7,000		109,000	69,000
7,030		109,000	69,000
7,040		109,000	69,000
7,100		109,000	69,000
7,140	9/32	109,000	69,000
7,200		109,000	69,000
7,220		109,000	69,000
7,300		109,000	69,000
7,400		109,000	69,000
7,490		109,000	69,000
7,500		109,000	69,000
7,520		117,000	75,000
7,540	19/64	117,000	75,000
7,550		117,000	75,000
7,600		117,000	75,000
7,700		117,000	75,000
7,800		117,000	75,000
7,850		117,000	75,000
7,900		117,000	75,000

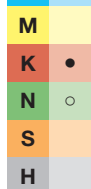
d1		l1	l2
mm	inch	mm	mm
7,940	5/16	117,000	75,000
8,000		117,000	75,000
8,100		117,000	75,000
8,200		117,000	75,000
8,330	21/64	117,000	75,000
8,500		117,000	75,000
8,600		125,000	81,000
8,610		125,000	81,000
8,650		125,000	81,000
8,700		125,000	81,000
8,800		125,000	81,000
9,000		125,000	81,000
9,100		125,000	81,000
9,130	23/64	125,000	81,000
9,200		125,000	81,000
9,300		125,000	81,000
9,400		125,000	81,000
9,500		125,000	81,000
9,520	3/8	133,000	87,000
9,600		133,000	87,000
9,700		133,000	87,000
9,750		133,000	87,000
9,900		133,000	87,000
9,920	25/64	133,000	87,000
10,000		133,000	87,000
10,080		133,000	87,000
10,100		133,000	87,000
10,200		133,000	87,000
10,300		133,000	87,000
10,500		133,000	87,000
10,750		142,000	94,000
11,000		142,000	94,000
11,110	7/16	142,000	94,000
11,250		142,000	94,000
11,500		142,000	94,000
11,510	29/64	142,000	94,000
11,800		142,000	94,000
11,900		151,000	101,000
11,910	15/32	151,000	101,000
12,000		151,000	101,000
12,300	31/64	151,000	101,000
12,500		151,000	101,000
12,600		151,000	101,000
12,700	1/2	151,000	101,000
12,750		151,000	101,000
12,800		151,000	101,000
13,000		151,000	101,000
13,250		160,000	108,000
13,400		160,000	108,000
13,600		160,000	108,000
13,750		160,000	108,000
13,800		160,000	108,000
14,000		160,000	108,000
14,700		169,000	114,000
14,800		169,000	114,000
14,900		169,000	114,000
15,000		169,000	114,000
15,050		178,000	120,000
15,500		178,000	120,000
15,600		178,000	120,000
15,700		178,000	120,000
15,750		178,000	120,000
15,800		178,000	120,000
15,870	5/8	178,000	120,000
16,000		178,000	120,000
17,250		191,000	130,000
17,500		191,000	130,000
19,000		198,000	135,000
19,050	3/4	205,000	140,000
19,500		205,000	140,000
20,000		205,000	140,000



Normaaliporat



P • Kärjen kevennys $\geq \varnothing 2,380$ • kartiovaippahionta

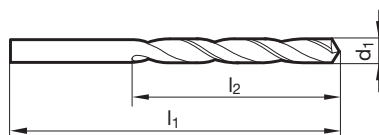


N ○ seostettu-/seostamaton teräs ja valuteräs • harmaavalu-, taottava- ja pallografiittivalurauta • sintrattu pulveriteräs, uushopea ja grafiitti

GÜHRING NAVIGATOR

Leikkuuarvosivu 780

Materiaali	HSS
Pinta	S
Leikkusuunta	L



Lierivartiset
kierukkaporat

Artikkelinro. **664**

d1		l1	l2
mm	inch	mm	mm
0,250		19,000	3,000
0,420		20,000	5,000
0,430		20,000	5,000
0,450		20,000	5,000
0,500		22,000	6,000
0,550		24,000	7,000
0,575		24,000	7,000
0,600		24,000	7,000
0,670		26,000	8,000
0,680		28,000	9,000
0,770		30,000	10,000
0,800		30,000	10,000
0,900		32,000	11,000
0,950		32,000	11,000
1,000		34,000	12,000
1,040		34,000	12,000
1,050		34,000	12,000
1,070		36,000	14,000
1,090		36,000	14,000
1,100		36,000	14,000
1,150		36,000	14,000
1,180		36,000	14,000
1,190	3/64	38,000	16,000
1,200		38,000	16,000
1,250		38,000	16,000
1,300		38,000	16,000
1,320		38,000	16,000
1,400		40,000	18,000
1,420		40,000	18,000
1,450		40,000	18,000
1,500		40,000	18,000
1,550		43,000	20,000
1,580		43,000	20,000
1,590	1/16	43,000	20,000
1,600		43,000	20,000
1,650		43,000	20,000
1,700		43,000	20,000
1,750		46,000	22,000
1,800		46,000	22,000
1,850		46,000	22,000
1,900		46,000	22,000
2,000		49,000	24,000

d1		l1	l2
mm	inch	mm	mm
2,050		49,000	24,000
2,100		49,000	24,000
2,150		53,000	27,000
2,300		53,000	27,000
2,360		53,000	27,000
2,380	3/32	57,000	30,000
2,400		57,000	30,000
2,450		57,000	30,000
2,500		57,000	30,000
2,580		57,000	30,000
2,600		57,000	30,000
2,650		57,000	30,000
2,700		61,000	33,000
2,710		61,000	33,000
2,750		61,000	33,000
2,780	7/64	61,000	33,000
2,800		61,000	33,000
2,850		61,000	33,000
2,870		61,000	33,000
2,900		61,000	33,000
2,950		61,000	33,000
3,000		61,000	33,000
3,050		65,000	36,000
3,100		65,000	36,000
3,170	1/8	65,000	36,000
3,200		65,000	36,000
3,300		65,000	36,000
3,400		70,000	39,000
3,500		70,000	39,000
3,570	9/64	70,000	39,000
3,700		70,000	39,000
3,750		70,000	39,000
3,800		75,000	43,000
3,970	5/32	75,000	43,000
4,000		75,000	43,000
4,100		75,000	43,000
4,200		75,000	43,000
4,300		80,000	47,000
4,370	11/64	80,000	47,000
4,400		80,000	47,000
4,500		80,000	47,000
4,700		80,000	47,000



d1		l1	l2
mm	inch	mm	mm
4,760	3/16	86,000	52,000
4,800		86,000	52,000
4,900		86,000	52,000
5,000		86,000	52,000
5,060		86,000	52,000
5,100		86,000	52,000
5,160	13/64	86,000	52,000
5,200		86,000	52,000
5,300		86,000	52,000
5,400		93,000	57,000
5,410		93,000	57,000
5,500		93,000	57,000
5,560	7/32	93,000	57,000
5,700		93,000	57,000
5,950	15/64	93,000	57,000
6,000		93,000	57,000
6,200		101,000	63,000
6,250		101,000	63,000
6,350	1/4	101,000	63,000
6,400		101,000	63,000
6,700		101,000	63,000
6,800		109,000	69,000
7,000		109,000	69,000
7,140	9/32	109,000	69,000
7,200		109,000	69,000
7,300		109,000	69,000
7,500		109,000	69,000
7,540	19/64	117,000	75,000
7,850		117,000	75,000
7,900		117,000	75,000

d1		l1	l2
mm	inch	mm	mm
8,000		117,000	75,000
8,500		117,000	75,000
8,730	11/32	125,000	81,000
8,800		125,000	81,000
9,100		125,000	81,000
9,130	23/64	125,000	81,000
9,400		125,000	81,000
9,500		125,000	81,000
9,600		133,000	87,000
9,800		133,000	87,000
9,920	25/64	133,000	87,000
10,000		133,000	87,000
10,200		133,000	87,000
10,320	13/32	133,000	87,000
10,900		142,000	94,000
11,000		142,000	94,000
12,000		151,000	101,000
12,400		151,000	101,000
12,500		151,000	101,000
13,500		160,000	108,000
14,250		169,000	114,000



Normaaliporat



P Kärjen kevennys $\geq \varnothing 14,500$ • kartiovaippahionta



N • kovat ja hauraat materiaalit • messinki, magnesium seokset • pronssi, fosforipronssi • liuskekivi, mico, pertinax

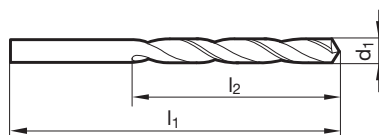
Materiaali **HSS**

Pinta ○

Leikkusuunta

GÜHRING NAVIGATOR

Leikkuarvosivu 778



Artikkelinro. **206**

d1		l1	l2
mm	inch	mm	mm
0,200		19,000	2,500
0,210		19,000	2,500
0,220		19,000	2,500
0,240		19,000	2,500
0,250		19,000	3,000
0,280		19,000	3,000
0,290		19,000	3,000
0,300		19,000	3,000
0,310		19,000	4,000
0,320		19,000	4,000
0,340		19,000	4,000
0,350		19,000	4,000
0,400	1/64	20,000	5,000
0,410		20,000	5,000
0,420		20,000	5,000
0,440		20,000	5,000
0,450		20,000	5,000
0,460		20,000	5,000
0,480		20,000	5,000
0,500		22,000	6,000
0,520		22,000	6,000
0,530		22,000	6,000
0,550		24,000	7,000
0,560		24,000	7,000
0,570		24,000	7,000
0,600		24,000	7,000
0,620		26,000	8,000
0,640		26,000	8,000
0,650		26,000	8,000
0,660		26,000	8,000
0,670		26,000	8,000
0,680		28,000	9,000
0,690		28,000	9,000
0,700		28,000	9,000
0,710		28,000	9,000
0,720		28,000	9,000
0,730		28,000	9,000
0,740		28,000	9,000
0,750		28,000	9,000
0,760		30,000	10,000
0,770		30,000	10,000
0,780		30,000	10,000

d1		l1	l2
mm	inch	mm	mm
0,790	1/32	30,000	10,000
0,800		30,000	10,000
0,810		30,000	10,000
0,820		30,000	10,000
0,830		30,000	10,000
0,840		30,000	10,000
0,850		30,000	10,000
0,860		32,000	11,000
0,870		32,000	11,000
0,880		32,000	11,000
0,890		32,000	11,000
0,900		32,000	11,000
0,910		32,000	11,000
0,930		32,000	11,000
0,950		32,000	11,000
0,960		34,000	12,000
0,970		34,000	12,000
0,980		34,000	12,000
0,990		34,000	12,000
1,000		34,000	12,000
1,020		34,000	12,000
1,030		34,000	12,000
1,040		34,000	12,000
1,050		34,000	12,000
1,060		34,000	12,000
1,070		36,000	14,000
1,080		36,000	14,000
1,100		36,000	14,000
1,120		36,000	14,000
1,130		36,000	14,000
1,140		36,000	14,000
1,150		36,000	14,000
1,160		36,000	14,000
1,180		36,000	14,000
1,190	3/64	38,000	16,000
1,200		38,000	16,000
1,220		38,000	16,000
1,230		38,000	16,000
1,250		38,000	16,000
1,270		38,000	16,000
1,280		38,000	16,000
1,300		38,000	16,000

Lieriövärtiset
kierukkaporat



d1		l1	l2
mm	inch	mm	mm
1,320		38,000	16,000
1,330		40,000	18,000
1,350		40,000	18,000
1,370		40,000	18,000
1,380		40,000	18,000
1,400		40,000	18,000
1,420		40,000	18,000
1,430		40,000	18,000
1,440		40,000	18,000
1,450		40,000	18,000
1,470		40,000	18,000
1,480		40,000	18,000
1,490		40,000	18,000
1,500		40,000	18,000
1,520		43,000	20,000
1,530		43,000	20,000
1,540		43,000	20,000
1,550		43,000	20,000
1,590	1/16	43,000	20,000
1,600		43,000	20,000
1,620		43,000	20,000
1,650		43,000	20,000
1,670		43,000	20,000
1,700		43,000	20,000
1,720		46,000	22,000
1,730		46,000	22,000
1,750		46,000	22,000
1,780		46,000	22,000
1,800		46,000	22,000
1,820		46,000	22,000
1,850		46,000	22,000
1,870		46,000	22,000
1,900		46,000	22,000
1,920		49,000	24,000
1,950		49,000	24,000
1,960		49,000	24,000
1,980	5/64	49,000	24,000
2,000		49,000	24,000
2,010		49,000	24,000
2,020		49,000	24,000
2,030		49,000	24,000
2,040		49,000	24,000
2,050		49,000	24,000
2,060		49,000	24,000
2,070		49,000	24,000
2,080		49,000	24,000
2,100		49,000	24,000
2,120		49,000	24,000
2,150		53,000	27,000
2,180		53,000	27,000
2,200		53,000	27,000
2,220		53,000	27,000
2,230		53,000	27,000
2,250		53,000	27,000
2,270		53,000	27,000
2,300		53,000	27,000
2,320		53,000	27,000
2,350		53,000	27,000
2,380	3/32	57,000	30,000
2,400		57,000	30,000
2,450		57,000	30,000
2,470		57,000	30,000
2,480		57,000	30,000
2,500		57,000	30,000
2,520		57,000	30,000
2,530		57,000	30,000
2,550		57,000	30,000
2,570		57,000	30,000
2,600		57,000	30,000
2,640		57,000	30,000
2,650		57,000	30,000
2,700		61,000	33,000

d1		l1	l2
mm	inch	mm	mm
2,710		61,000	33,000
2,750		61,000	33,000
2,780	7/64	61,000	33,000
2,800		61,000	33,000
2,820		61,000	33,000
2,840		61,000	33,000
2,850		61,000	33,000
2,900		61,000	33,000
2,920		61,000	33,000
2,950		61,000	33,000
2,970		61,000	33,000
3,000		61,000	33,000
3,010		65,000	36,000
3,020		65,000	36,000
3,030		65,000	36,000
3,040		65,000	36,000
3,050		65,000	36,000
3,060		65,000	36,000
3,070		65,000	36,000
3,100		65,000	36,000
3,120		65,000	36,000
3,150		65,000	36,000
3,170	1/8	65,000	36,000
3,200		65,000	36,000
3,220		65,000	36,000
3,250		65,000	36,000
3,260		65,000	36,000
3,300		65,000	36,000
3,350		65,000	36,000
3,400		70,000	39,000
3,410		70,000	39,000
3,450		70,000	39,000
3,470		70,000	39,000
3,500		70,000	39,000
3,520		70,000	39,000
3,550		70,000	39,000
3,570	9/64	70,000	39,000
3,600		70,000	39,000
3,650		70,000	39,000
3,700		70,000	39,000
3,720		70,000	39,000
3,750		70,000	39,000
3,800		75,000	43,000
3,830		75,000	43,000
3,850		75,000	43,000
3,870		75,000	43,000
3,880		75,000	43,000
3,900		75,000	43,000
3,910		75,000	43,000
3,950		75,000	43,000
3,970	5/32	75,000	43,000
4,000		75,000	43,000
4,020		75,000	43,000
4,040		75,000	43,000
4,050		75,000	43,000
4,070		75,000	43,000
4,100		75,000	43,000
4,150		75,000	43,000
4,200		75,000	43,000
4,250		75,000	43,000
4,300		80,000	47,000
4,350		80,000	47,000
4,370	11/64	80,000	47,000
4,400		80,000	47,000
4,420		80,000	47,000
4,450		80,000	47,000
4,500		80,000	47,000
4,600		80,000	47,000
4,650		80,000	47,000
4,700		80,000	47,000
4,750		80,000	47,000
4,760	3/16	86,000	52,000



d1		l1	l2
mm	inch	mm	mm
4,800		86,000	52,000
4,850		86,000	52,000
4,900		86,000	52,000
4,950		86,000	52,000
5,000		86,000	52,000
5,050		86,000	52,000
5,100		86,000	52,000
5,150		86,000	52,000
5,160	13/64	86,000	52,000
5,200		86,000	52,000
5,250		86,000	52,000
5,300		86,000	52,000
5,310		93,000	57,000
5,400		93,000	57,000
5,450		93,000	57,000
5,500		93,000	57,000
5,560	7/32	93,000	57,000
5,600		93,000	57,000
5,700		93,000	57,000
5,750		93,000	57,000
5,800		93,000	57,000
5,850		93,000	57,000
5,900		93,000	57,000
5,950	15/64	93,000	57,000
6,000		93,000	57,000
6,050		101,000	63,000
6,100		101,000	63,000
6,150		101,000	63,000
6,200		101,000	63,000
6,250		101,000	63,000
6,300		101,000	63,000
6,350	1/4	101,000	63,000
6,400		101,000	63,000
6,450		101,000	63,000
6,500		101,000	63,000
6,530		101,000	63,000
6,550		101,000	63,000
6,600		101,000	63,000
6,700		101,000	63,000
6,750	17/64	109,000	69,000
6,800		109,000	69,000
6,900		109,000	69,000
7,000		109,000	69,000
7,050		109,000	69,000
7,100		109,000	69,000
7,140	9/32	109,000	69,000
7,200		109,000	69,000
7,250		109,000	69,000
7,300		109,000	69,000
7,350		109,000	69,000
7,400		109,000	69,000
7,500		109,000	69,000
7,540	19/64	117,000	75,000
7,600		117,000	75,000
7,700		117,000	75,000
7,800		117,000	75,000
7,850		117,000	75,000
7,900		117,000	75,000
7,940	5/16	117,000	75,000
8,000		117,000	75,000
8,050		117,000	75,000
8,100		117,000	75,000
8,200		117,000	75,000
8,250		117,000	75,000
8,300		117,000	75,000
8,330	21/64	117,000	75,000

d1		l1	l2
mm	inch	mm	mm
8,400		117,000	75,000
8,500		117,000	75,000
8,600		125,000	81,000
8,700		125,000	81,000
8,730	11/32	125,000	81,000
8,750		125,000	81,000
8,800		125,000	81,000
8,900		125,000	81,000
9,000		125,000	81,000
9,100		125,000	81,000
9,130	23/64	125,000	81,000
9,200		125,000	81,000
9,250		125,000	81,000
9,300		125,000	81,000
9,400		125,000	81,000
9,500		125,000	81,000
9,520	3/8	133,000	87,000
9,600		133,000	87,000
9,700		133,000	87,000
9,800		133,000	87,000
9,900		133,000	87,000
9,920	25/64	133,000	87,000
10,000		133,000	87,000
10,100		133,000	87,000
10,150		133,000	87,000
10,200		133,000	87,000
10,250		133,000	87,000
10,300		133,000	87,000
10,320	13/32	133,000	87,000
10,500		133,000	87,000
10,600		133,000	87,000
10,720	27/64	142,000	94,000
10,800		142,000	94,000
10,900		142,000	94,000
11,000		142,000	94,000
11,100		142,000	94,000
11,110	7/16	142,000	94,000
11,200		142,000	94,000
11,400		142,000	94,000
11,500		142,000	94,000
11,510	29/64	142,000	94,000
11,700		142,000	94,000
11,900		151,000	101,000
12,000		151,000	101,000
12,100		151,000	101,000
12,200		151,000	101,000
12,300	31/64	151,000	101,000
12,500		151,000	101,000
12,700	1/2	151,000	101,000
12,800		151,000	101,000
13,000		151,000	101,000
13,200		151,000	101,000
13,500		160,000	108,000
14,000		160,000	108,000
14,500		169,000	114,000
15,000		169,000	114,000
15,500		178,000	120,000
16,000		178,000	120,000
17,000		184,000	125,000
18,000		191,000	130,000
19,000		198,000	135,000
20,000		205,000	140,000

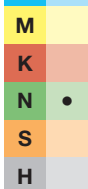


Normaaliporat

Materiaali **HSS**

Pinta ○

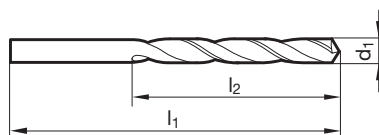
Leikkusuunta

P Kärjen kevennys $\geq \varnothing 14,200$ • kartiovaippahionta

• kovat ja hauraat materiaalit • messinki, magnesium seokset • pronssi, fosforipronssi • liuskekivi, mico, pertinax

GÜHRING NAVIGATOR

Leikkuarvosivu 778

Lieriövartiset
kierukkaporat

Artikkelinro.

209

d1		l1	l2	d1		l1	l2
mm	inch	mm	mm	mm	inch	mm	mm
0,300		19,000	3,000	1,130		36,000	14,000
0,400	1/64	20,000	5,000	1,150		36,000	14,000
0,450		20,000	5,000	1,160		36,000	14,000
0,480		20,000	5,000	1,165		36,000	14,000
0,490		22,000	6,000	1,170		36,000	14,000
0,500		22,000	6,000	1,200		38,000	16,000
0,530		22,000	6,000	1,210		38,000	16,000
0,540		24,000	7,000	1,220		38,000	16,000
0,550		24,000	7,000	1,230		38,000	16,000
0,580		24,000	7,000	1,240		38,000	16,000
0,590		24,000	7,000	1,250		38,000	16,000
0,600		24,000	7,000	1,260		38,000	16,000
0,620		26,000	8,000	1,270		38,000	16,000
0,640		26,000	8,000	1,280		38,000	16,000
0,660		26,000	8,000	1,300		38,000	16,000
0,670		26,000	8,000	1,320		38,000	16,000
0,680		28,000	9,000	1,380		40,000	18,000
0,700		28,000	9,000	1,400		40,000	18,000
0,710		28,000	9,000	1,410		40,000	18,000
0,720		28,000	9,000	1,450		40,000	18,000
0,730		28,000	9,000	1,480		40,000	18,000
0,740		28,000	9,000	1,500		40,000	18,000
0,750		28,000	9,000	1,520		43,000	20,000
0,780		30,000	10,000	1,550		43,000	20,000
0,800		30,000	10,000	1,560		43,000	20,000
0,810		30,000	10,000	1,600		43,000	20,000
0,860		32,000	11,000	1,610		43,000	20,000
0,880		32,000	11,000	1,620		43,000	20,000
0,900		32,000	11,000	1,640		43,000	20,000
0,910		32,000	11,000	1,650		43,000	20,000
0,920		32,000	11,000	1,670		43,000	20,000
0,940		32,000	11,000	1,680		43,000	20,000
0,950		32,000	11,000	1,700		43,000	20,000
0,960		34,000	12,000	1,720		46,000	22,000
0,970		34,000	12,000	1,730		46,000	22,000
1,000		34,000	12,000	1,740		46,000	22,000
1,020		34,000	12,000	1,750		46,000	22,000
1,030		34,000	12,000	1,800		46,000	22,000
1,060		34,000	12,000	1,810		46,000	22,000
1,080		36,000	14,000	1,820		46,000	22,000
1,100		36,000	14,000	1,830		46,000	22,000
1,120		36,000	14,000	1,850		46,000	22,000



d1		l1	l2
mm	inch	mm	mm
1,860		46,000	22,000
1,870		46,000	22,000
1,890		46,000	22,000
1,900		46,000	22,000
1,930		49,000	24,000
1,980	5/64	49,000	24,000
2,000		49,000	24,000
2,030		49,000	24,000
2,050		49,000	24,000
2,060		49,000	24,000
2,100		49,000	24,000
2,140		53,000	27,000
2,150		53,000	27,000
2,200		53,000	27,000
2,220		53,000	27,000
2,230		53,000	27,000
2,240		53,000	27,000
2,250		53,000	27,000
2,280		53,000	27,000
2,290		53,000	27,000
2,300		53,000	27,000
2,350		53,000	27,000
2,380	3/32	57,000	30,000
2,390		57,000	30,000
2,400		57,000	30,000
2,420		57,000	30,000
2,450		57,000	30,000
2,470		57,000	30,000
2,500		57,000	30,000
2,520		57,000	30,000
2,530		57,000	30,000
2,550		57,000	30,000
2,570		57,000	30,000
2,600		57,000	30,000
2,650		57,000	30,000
2,700		61,000	33,000
2,750		61,000	33,000
2,800		61,000	33,000
2,820		61,000	33,000
2,830		61,000	33,000
2,850		61,000	33,000
2,900		61,000	33,000
2,930		61,000	33,000
3,000		61,000	33,000
3,030		65,000	36,000
3,050		65,000	36,000
3,070		65,000	36,000
3,080		65,000	36,000
3,100		65,000	36,000
3,150		65,000	36,000
3,160		65,000	36,000
3,170	1/8	65,000	36,000
3,175		65,000	36,000
3,200		65,000	36,000
3,250		65,000	36,000
3,270		65,000	36,000
3,300		65,000	36,000
3,340		65,000	36,000
3,350		65,000	36,000
3,380		70,000	39,000
3,400		70,000	39,000
3,450		70,000	39,000
3,470		70,000	39,000
3,500		70,000	39,000
3,550		70,000	39,000
3,580		70,000	39,000
3,650		70,000	39,000
3,700		70,000	39,000
3,710		70,000	39,000
3,730		70,000	39,000
3,830		75,000	43,000
3,900		75,000	43,000

d1		l1	l2
mm	inch	mm	mm
3,950		75,000	43,000
3,960		75,000	43,000
4,000		75,000	43,000
4,050		75,000	43,000
4,070		75,000	43,000
4,100		75,000	43,000
4,120		75,000	43,000
4,200		75,000	43,000
4,220		75,000	43,000
4,250		75,000	43,000
4,280		80,000	47,000
4,300		80,000	47,000
4,370	11/64	80,000	47,000
4,400		80,000	47,000
4,450		80,000	47,000
4,500		80,000	47,000
4,550		80,000	47,000
4,600		80,000	47,000
4,700		80,000	47,000
4,800		86,000	52,000
4,850		86,000	52,000
4,870		86,000	52,000
4,950		86,000	52,000
5,000		86,000	52,000
5,050		86,000	52,000
5,100		86,000	52,000
5,200		86,000	52,000
5,250		86,000	52,000
5,300		86,000	52,000
5,400		93,000	57,000
5,500		93,000	57,000
5,650		93,000	57,000
5,800		93,000	57,000
5,850		93,000	57,000
6,000		93,000	57,000
6,050		101,000	63,000
6,100		101,000	63,000
6,120		101,000	63,000
6,130		101,000	63,000
6,150		101,000	63,000
6,250		101,000	63,000
6,300		101,000	63,000
6,450		101,000	63,000
6,500		101,000	63,000
6,650		101,000	63,000
6,700		101,000	63,000
6,900		109,000	69,000
7,000		109,000	69,000
7,100		109,000	69,000
7,150		109,000	69,000
7,200		109,000	69,000
7,220		109,000	69,000
7,300		109,000	69,000
7,350		109,000	69,000
7,550		117,000	75,000
7,750		117,000	75,000
7,800		117,000	75,000
8,000		117,000	75,000
8,050		117,000	75,000
8,100		117,000	75,000
8,300		117,000	75,000
8,400		117,000	75,000
8,450		117,000	75,000
8,500		117,000	75,000
8,600		125,000	81,000
8,800		125,000	81,000
9,000		125,000	81,000
9,100		125,000	81,000
9,250		125,000	81,000
9,400		125,000	81,000
9,500		125,000	81,000
9,750		133,000	87,000



d1		l1	l2
mm	inch	mm	mm
9,800		133,000	87,000
9,850		133,000	87,000
10,000		133,000	87,000
10,500		133,000	87,000
11,100		142,000	94,000
11,400		142,000	94,000
11,500		142,000	94,000
12,050		151,000	101,000
12,100		151,000	101,000
12,150		151,000	101,000
12,200		151,000	101,000
12,300	31/64	151,000	101,000
12,800		151,000	101,000
13,100	33/64	151,000	101,000
13,300		160,000	108,000
13,500		160,000	108,000
13,800		160,000	108,000
14,200		169,000	114,000

d1		l1	l2
mm	inch	mm	mm
14,300		169,000	114,000
14,400		169,000	114,000
14,500		169,000	114,000
15,100		178,000	120,000
15,300		178,000	120,000
15,500		178,000	120,000
16,000		178,000	120,000
17,000		184,000	125,000
18,000		191,000	130,000
20,000		205,000	140,000

Lieriövaritset
kierukkaporat



Normaaliporat

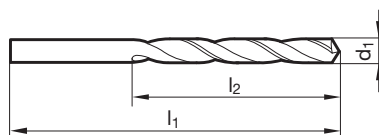


- P** Kärjen kevennys $\geq \varnothing 14,500$ • kartiovaippahionta
- M**
- K**
- N** • pehmeät ja pitkälästiset materiaalit • Alumiini, pitkälästiset Al-seokset
- S** • sinkki, puhdistettu kupari, silumiini, elektroni • pehmeät muovit • puu
- H**

GÜHRING NAVIGATOR

Leikkuuarvosivu 778

Materiaali	HSS
Pinta	○
Leikkusuunta	Ⓜ



Artikkelinro. **207**

d1		l1	l2
mm	inch	mm	mm
0,200		19,000	2,500
0,250		19,000	3,000
0,300		19,000	3,000
0,340		19,000	4,000
0,350		19,000	4,000
0,400	1/64	20,000	5,000
0,410		20,000	5,000
0,450		20,000	5,000
0,460		20,000	5,000
0,500		22,000	6,000
0,520		22,000	6,000
0,550		24,000	7,000
0,570		24,000	7,000
0,600		24,000	7,000
0,610		26,000	8,000
0,620		26,000	8,000
0,650		26,000	8,000
0,660		26,000	8,000
0,700		28,000	9,000
0,720		28,000	9,000
0,750		28,000	9,000
0,790	1/32	30,000	10,000
0,800		30,000	10,000
0,810		30,000	10,000
0,840		30,000	10,000
0,850		30,000	10,000
0,860		32,000	11,000
0,870		32,000	11,000
0,900		32,000	11,000
0,950		32,000	11,000
0,970		34,000	12,000
0,990		34,000	12,000
1,000		34,000	12,000
1,010		34,000	12,000
1,020		34,000	12,000
1,050		34,000	12,000
1,100		36,000	14,000
1,110		36,000	14,000
1,120		36,000	14,000
1,140		36,000	14,000
1,150		36,000	14,000
1,180		36,000	14,000

d1		l1	l2
mm	inch	mm	mm
1,190	3/64	38,000	16,000
1,200		38,000	16,000
1,220		38,000	16,000
1,250		38,000	16,000
1,270		38,000	16,000
1,280		38,000	16,000
1,300		38,000	16,000
1,330		40,000	18,000
1,350		40,000	18,000
1,380		40,000	18,000
1,400		40,000	18,000
1,420		40,000	18,000
1,430		40,000	18,000
1,450		40,000	18,000
1,500		40,000	18,000
1,510		43,000	20,000
1,520		43,000	20,000
1,530		43,000	20,000
1,550		43,000	20,000
1,570		43,000	20,000
1,580		43,000	20,000
1,590	1/16	43,000	20,000
1,600		43,000	20,000
1,610		43,000	20,000
1,630		43,000	20,000
1,650		43,000	20,000
1,660		43,000	20,000
1,680		43,000	20,000
1,700		43,000	20,000
1,750		46,000	22,000
1,770		46,000	22,000
1,780		46,000	22,000
1,800		46,000	22,000
1,820		46,000	22,000
1,850		46,000	22,000
1,900		46,000	22,000
1,920		49,000	24,000
1,930		49,000	24,000
1,950		49,000	24,000
1,980	5/64	49,000	24,000
2,000		49,000	24,000
2,020		49,000	24,000

Lieriövärtiset kierukkaporat



d1		l1	l2
mm	inch	mm	mm
2,030		49,000	24,000
2,050		49,000	24,000
2,060		49,000	24,000
2,080		49,000	24,000
2,100		49,000	24,000
2,150		53,000	27,000
2,200		53,000	27,000
2,250		53,000	27,000
2,270		53,000	27,000
2,300		53,000	27,000
2,320		53,000	27,000
2,350		53,000	27,000
2,380	3/32	57,000	30,000
2,400		57,000	30,000
2,450		57,000	30,000
2,500		57,000	30,000
2,530		57,000	30,000
2,550		57,000	30,000
2,600		57,000	30,000
2,650		57,000	30,000
2,700		61,000	33,000
2,730		61,000	33,000
2,750		61,000	33,000
2,780	7/64	61,000	33,000
2,800		61,000	33,000
2,820		61,000	33,000
2,830		61,000	33,000
2,850		61,000	33,000
2,900		61,000	33,000
2,930		61,000	33,000
2,950		61,000	33,000
3,000		61,000	33,000
3,030		65,000	36,000
3,050		65,000	36,000
3,100		65,000	36,000
3,150		65,000	36,000
3,170	1/8	65,000	36,000
3,200		65,000	36,000
3,250		65,000	36,000
3,260		65,000	36,000
3,300		65,000	36,000
3,350		65,000	36,000
3,380		70,000	39,000
3,400		70,000	39,000
3,450		70,000	39,000
3,500		70,000	39,000
3,550		70,000	39,000
3,570	9/64	70,000	39,000
3,600		70,000	39,000
3,650		70,000	39,000
3,700		70,000	39,000
3,730		70,000	39,000
3,750		70,000	39,000
3,800		75,000	43,000
3,850		75,000	43,000
3,900		75,000	43,000
3,950		75,000	43,000
3,970	5/32	75,000	43,000
4,000		75,000	43,000
4,030		75,000	43,000
4,040		75,000	43,000
4,050		75,000	43,000
4,100		75,000	43,000
4,150		75,000	43,000
4,200		75,000	43,000
4,220		75,000	43,000
4,250		75,000	43,000
4,300		80,000	47,000
4,350		80,000	47,000
4,370	11/64	80,000	47,000
4,390		80,000	47,000
4,400		80,000	47,000

d1		l1	l2
mm	inch	mm	mm
4,500		80,000	47,000
4,550		80,000	47,000
4,600		80,000	47,000
4,620		80,000	47,000
4,650		80,000	47,000
4,700		80,000	47,000
4,750		80,000	47,000
4,760	3/16	86,000	52,000
4,800		86,000	52,000
4,850		86,000	52,000
4,900		86,000	52,000
5,000		86,000	52,000
5,030		86,000	52,000
5,050		86,000	52,000
5,100		86,000	52,000
5,160	13/64	86,000	52,000
5,200		86,000	52,000
5,250		86,000	52,000
5,300		86,000	52,000
5,400		93,000	57,000
5,450		93,000	57,000
5,500		93,000	57,000
5,550		93,000	57,000
5,560	7/32	93,000	57,000
5,600		93,000	57,000
5,700		93,000	57,000
5,750		93,000	57,000
5,800		93,000	57,000
5,900		93,000	57,000
5,950	15/64	93,000	57,000
6,000		93,000	57,000
6,050		101,000	63,000
6,100		101,000	63,000
6,150		101,000	63,000
6,200		101,000	63,000
6,250		101,000	63,000
6,300		101,000	63,000
6,350	1/4	101,000	63,000
6,400		101,000	63,000
6,500		101,000	63,000
6,530		101,000	63,000
6,550		101,000	63,000
6,600		101,000	63,000
6,630		101,000	63,000
6,650		101,000	63,000
6,700		101,000	63,000
6,750	17/64	109,000	69,000
6,800		109,000	69,000
6,850		109,000	69,000
6,900		109,000	69,000
7,000		109,000	69,000
7,100		109,000	69,000
7,140	9/32	109,000	69,000
7,200		109,000	69,000
7,250		109,000	69,000
7,300		109,000	69,000
7,400		109,000	69,000
7,490		109,000	69,000
7,500		109,000	69,000
7,540	19/64	117,000	75,000
7,600		117,000	75,000
7,700		117,000	75,000
7,750		117,000	75,000
7,800		117,000	75,000
7,900		117,000	75,000
7,940	5/16	117,000	75,000
8,000		117,000	75,000
8,030		117,000	75,000
8,100		117,000	75,000
8,200		117,000	75,000
8,300		117,000	75,000
8,400		117,000	75,000



d1		l1	l2
mm	inch	mm	mm
8,450		117,000	75,000
8,500		117,000	75,000
8,600		125,000	81,000
8,700		125,000	81,000
8,730	11/32	125,000	81,000
8,750		125,000	81,000
8,800		125,000	81,000
8,840		125,000	81,000
8,900		125,000	81,000
9,000		125,000	81,000
9,090		125,000	81,000
9,100		125,000	81,000
9,130	23/64	125,000	81,000
9,200		125,000	81,000
9,250		125,000	81,000
9,300		125,000	81,000
9,340		125,000	81,000
9,400		125,000	81,000
9,500		125,000	81,000
9,520	3/8	133,000	87,000
9,600		133,000	87,000
9,700		133,000	87,000
9,800		133,000	87,000
9,900		133,000	87,000
9,920	25/64	133,000	87,000
10,000		133,000	87,000
10,080		133,000	87,000
10,100		133,000	87,000
10,200		133,000	87,000
10,250		133,000	87,000
10,260		133,000	87,000
10,400		133,000	87,000
10,500		133,000	87,000
10,700		142,000	94,000
10,800		142,000	94,000
10,900		142,000	94,000

d1		l1	l2
mm	inch	mm	mm
11,000		142,000	94,000
11,100		142,000	94,000
11,200		142,000	94,000
11,500		142,000	94,000
11,510	29/64	142,000	94,000
11,600		142,000	94,000
11,700		142,000	94,000
11,800		142,000	94,000
11,900		151,000	101,000
12,000		151,000	101,000
12,100		151,000	101,000
12,200		151,000	101,000
12,500		151,000	101,000
12,600		151,000	101,000
12,700	1/2	151,000	101,000
12,800		151,000	101,000
12,900		151,000	101,000
13,000		151,000	101,000
13,100	33/64	151,000	101,000
13,200		151,000	101,000
13,500		160,000	108,000
13,800		160,000	108,000
14,000		160,000	108,000
14,500		169,000	114,000
14,700		169,000	114,000
15,000		169,000	114,000
15,600		178,000	120,000
16,000		178,000	120,000
16,500		184,000	125,000
17,000		184,000	125,000
17,500		191,000	130,000
18,000		191,000	130,000
20,000		205,000	140,000



Normaaliporat



P Kärjen kevennys $\geq \varnothing 14,500$ • kartiovaippahionta



N • pehmeät ja pitkälästiset materiaalit • Alumiini, pitkälästiset Al-seokset
 • sinkki, puhdistettu kupari, silumiini, elektroni • pehmeät muovit • puu

Materiaali **HSS**

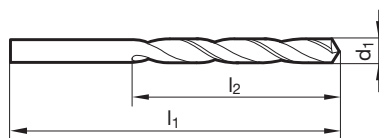
Pinta

Leikkusuunta

Lieriövaritiset
kierukkaporat

GÜHRING NAVIGATOR

Leikkuarvosivu 778



Artikkelinro. **210**

d1		l1	l2
mm	inch	mm	mm
0,250		19,000	3,000
0,270		19,000	3,000
0,280		19,000	3,000
0,320		19,000	4,000
0,330		19,000	4,000
0,340		19,000	4,000
0,360		19,000	4,000
0,390		20,000	5,000
0,400	1/64	20,000	5,000
0,410		20,000	5,000
0,420		20,000	5,000
0,430		20,000	5,000
0,450		20,000	5,000
0,470		20,000	5,000
0,490		22,000	6,000
0,500		22,000	6,000
0,525		22,000	6,000
0,530		22,000	6,000
0,560		24,000	7,000
0,590		24,000	7,000
0,600		24,000	7,000
0,610		26,000	8,000
0,660		26,000	8,000
0,710		28,000	9,000
0,720		28,000	9,000
0,730		28,000	9,000
0,740		28,000	9,000
0,750		28,000	9,000
0,760		30,000	10,000
0,770		30,000	10,000
0,790	1/32	30,000	10,000
0,800		30,000	10,000
0,810		30,000	10,000
0,825		30,000	10,000
0,840		30,000	10,000
0,850		30,000	10,000
0,860		32,000	11,000
0,880		32,000	11,000
0,890		32,000	11,000
0,900		32,000	11,000
0,950		32,000	11,000
0,970		34,000	12,000

d1		l1	l2
mm	inch	mm	mm
0,980		34,000	12,000
0,990		34,000	12,000
1,000		34,000	12,000
1,020		34,000	12,000
1,050		34,000	12,000
1,070		36,000	14,000
1,100		36,000	14,000
1,120		36,000	14,000
1,150		36,000	14,000
1,210		38,000	16,000
1,220		38,000	16,000
1,250		38,000	16,000
1,290		38,000	16,000
1,300		38,000	16,000
1,320		38,000	16,000
1,400		40,000	18,000
1,450		40,000	18,000
1,480		40,000	18,000
1,500		40,000	18,000
1,540		43,000	20,000
1,550		43,000	20,000
1,580		43,000	20,000
1,600		43,000	20,000
1,630		43,000	20,000
1,700		43,000	20,000
1,750		46,000	22,000
1,800		46,000	22,000
1,850		46,000	22,000
1,950		49,000	24,000
2,000		49,000	24,000
2,150		53,000	27,000
2,200		53,000	27,000
2,300		53,000	27,000
2,320		53,000	27,000
2,340		53,000	27,000
2,350		53,000	27,000
2,380	3/32	57,000	30,000
2,450		57,000	30,000
2,500		57,000	30,000
2,530		57,000	30,000
2,550		57,000	30,000
2,570		57,000	30,000



d1		l1	l2
mm	inch	mm	mm
2,600		57,000	30,000
2,650		57,000	30,000
2,700		61,000	33,000
2,750		61,000	33,000
2,800		61,000	33,000
2,900		61,000	33,000
2,950		61,000	33,000
2,970		61,000	33,000
3,000		61,000	33,000
3,130		65,000	36,000
3,170	1/8	65,000	36,000
3,200		65,000	36,000
3,250		65,000	36,000
3,280		65,000	36,000
3,300		65,000	36,000
3,380		70,000	39,000
3,400		70,000	39,000
3,450		70,000	39,000
3,500		70,000	39,000
3,550		70,000	39,000
3,600		70,000	39,000
3,650		70,000	39,000
3,700		70,000	39,000
3,750		70,000	39,000
3,800		75,000	43,000
3,820		75,000	43,000
3,860		75,000	43,000
3,900		75,000	43,000
3,910		75,000	43,000
3,920		75,000	43,000
4,000		75,000	43,000
4,030		75,000	43,000
4,050		75,000	43,000
4,100		75,000	43,000
4,200		75,000	43,000
4,400		80,000	47,000
4,500		80,000	47,000
4,520		80,000	47,000
4,550		80,000	47,000
4,600		80,000	47,000
4,700		80,000	47,000
4,720		80,000	47,000
4,750		80,000	47,000
4,850		86,000	52,000
4,900		86,000	52,000
4,950		86,000	52,000
5,000		86,000	52,000
5,020		86,000	52,000
5,100		86,000	52,000
5,150		86,000	52,000
5,200		86,000	52,000
5,400		93,000	57,000
5,450		93,000	57,000
5,500		93,000	57,000
5,560	7/32	93,000	57,000
5,600		93,000	57,000
5,620		93,000	57,000
5,800		93,000	57,000
5,850		93,000	57,000
5,900		93,000	57,000
5,950	15/64	93,000	57,000
6,000		93,000	57,000
6,030		101,000	63,000
6,050		101,000	63,000
6,080		101,000	63,000
6,100		101,000	63,000

d1		l1	l2
mm	inch	mm	mm
6,150		101,000	63,000
6,200		101,000	63,000
6,400		101,000	63,000
6,450		101,000	63,000
6,600		101,000	63,000
6,700		101,000	63,000
6,750	17/64	109,000	69,000
6,800		109,000	69,000
6,900		109,000	69,000
6,950		109,000	69,000
7,000		109,000	69,000
7,100		109,000	69,000
7,250		109,000	69,000
7,350		109,000	69,000
7,400		109,000	69,000
7,450		109,000	69,000
7,500		109,000	69,000
7,600		117,000	75,000
7,900		117,000	75,000
8,050		117,000	75,000
8,250		117,000	75,000
8,300		117,000	75,000
8,600		125,000	81,000
8,700		125,000	81,000
8,750		125,000	81,000
9,350		125,000	81,000
9,400		125,000	81,000
9,500		125,000	81,000
9,650		133,000	87,000
9,700		133,000	87,000
9,750		133,000	87,000
9,800		133,000	87,000
10,000		133,000	87,000
10,200		133,000	87,000
10,500		133,000	87,000
10,700		142,000	94,000
10,750		142,000	94,000
11,100		142,000	94,000
11,500		142,000	94,000
11,750		142,000	94,000
11,800		142,000	94,000
11,950		151,000	101,000
12,100		151,000	101,000
12,200		151,000	101,000
12,250		151,000	101,000
12,500		151,000	101,000
12,800		151,000	101,000
13,200		151,000	101,000
14,500		169,000	114,000
15,000		169,000	114,000
15,500		178,000	120,000
16,000		178,000	120,000
16,200		184,000	125,000
17,000		184,000	125,000
17,300		191,000	130,000
17,500		191,000	130,000
17,600		191,000	130,000
18,000		191,000	130,000
19,000		198,000	135,000
19,500		205,000	140,000
19,800		205,000	140,000
20,000		205,000	140,000



Normaaliporat



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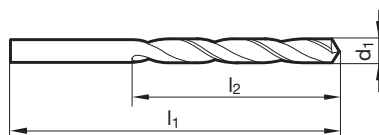
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GÜHRING NAVIGATOR

Leikkuarvosivu 778



Artikkelinro. **549**

d1		l1	l2
mm	inch	mm	mm
0,600		24,000	7,000
0,700		28,000	9,000
0,710		28,000	9,000
0,790	1/32	30,000	10,000
0,800		30,000	10,000
0,890		32,000	11,000
0,900		32,000	11,000
0,950		32,000	11,000
0,970		34,000	12,000
0,990		34,000	12,000
1,000		34,000	12,000
1,020		34,000	12,000
1,040		34,000	12,000
1,050		34,000	12,000
1,070		36,000	14,000
1,090		36,000	14,000
1,100		36,000	14,000
1,150		36,000	14,000
1,180		36,000	14,000
1,190	3/64	38,000	16,000
1,200		38,000	16,000
1,220		38,000	16,000
1,230		38,000	16,000
1,240		38,000	16,000
1,250		38,000	16,000
1,300		38,000	16,000
1,305		38,000	16,000
1,320		38,000	16,000
1,350		40,000	18,000
1,400		40,000	18,000
1,450		40,000	18,000
1,500		40,000	18,000
1,510		43,000	20,000
1,520		43,000	20,000
1,530		43,000	20,000
1,550		43,000	20,000
1,560		43,000	20,000
1,570		43,000	20,000
1,580		43,000	20,000
1,590	1/16	43,000	20,000
1,600		43,000	20,000
1,610		43,000	20,000

d1		l1	l2
mm	inch	mm	mm
1,620		43,000	20,000
1,650		43,000	20,000
1,660		43,000	20,000
1,670		43,000	20,000
1,680		43,000	20,000
1,690		43,000	20,000
1,700		43,000	20,000
1,720		46,000	22,000
1,750		46,000	22,000
1,780		46,000	22,000
1,800		46,000	22,000
1,820		46,000	22,000
1,850		46,000	22,000
1,860		46,000	22,000
1,900		46,000	22,000
1,930		49,000	24,000
1,950		49,000	24,000
1,980	5/64	49,000	24,000
1,990		49,000	24,000
2,000		49,000	24,000
2,020		49,000	24,000
2,050		49,000	24,000
2,060		49,000	24,000
2,080		49,000	24,000
2,100		49,000	24,000
2,150		53,000	27,000
2,180		53,000	27,000
2,200		53,000	27,000
2,250		53,000	27,000
2,260		53,000	27,000
2,300		53,000	27,000
2,330		53,000	27,000
2,350		53,000	27,000
2,370		57,000	30,000
2,380	3/32	57,000	30,000
2,400		57,000	30,000
2,420		57,000	30,000
2,440		57,000	30,000
2,450		57,000	30,000
2,480		57,000	30,000
2,490		57,000	30,000
2,500		57,000	30,000



d1		l1	l2
mm	inch	mm	mm
2,530		57,000	30,000
2,550		57,000	30,000
2,580		57,000	30,000
2,600		57,000	30,000
2,640		57,000	30,000
2,650		57,000	30,000
2,700		61,000	33,000
2,710		61,000	33,000
2,750		61,000	33,000
2,780	7/64	61,000	33,000
2,790		61,000	33,000
2,800		61,000	33,000
2,820		61,000	33,000
2,850		61,000	33,000
2,870		61,000	33,000
2,900		61,000	33,000
2,950		61,000	33,000
2,980		61,000	33,000
3,000		61,000	33,000
3,030		65,000	36,000
3,050		65,000	36,000
3,080		65,000	36,000
3,100		65,000	36,000
3,150		65,000	36,000
3,170	1/8	65,000	36,000
3,200		65,000	36,000
3,220		65,000	36,000
3,230		65,000	36,000
3,250		65,000	36,000
3,260		65,000	36,000
3,300		65,000	36,000
3,350		65,000	36,000
3,400		70,000	39,000
3,450		70,000	39,000
3,500		70,000	39,000
3,550		70,000	39,000
3,570	9/64	70,000	39,000
3,580		70,000	39,000
3,600		70,000	39,000
3,660		70,000	39,000
3,680		70,000	39,000
3,700		70,000	39,000
3,730		70,000	39,000
3,750		70,000	39,000
3,800		75,000	43,000
3,860		75,000	43,000
3,870		75,000	43,000
3,900		75,000	43,000
3,910		75,000	43,000
3,950		75,000	43,000
3,970	5/32	75,000	43,000
3,990		75,000	43,000
4,000		75,000	43,000
4,040		75,000	43,000
4,050		75,000	43,000
4,090		75,000	43,000
4,100		75,000	43,000
4,150		75,000	43,000
4,200		75,000	43,000
4,210		75,000	43,000
4,220		75,000	43,000
4,250		75,000	43,000
4,300		80,000	47,000
4,370	11/64	80,000	47,000
4,390		80,000	47,000
4,400		80,000	47,000
4,450		80,000	47,000
4,500		80,000	47,000
4,550		80,000	47,000
4,570		80,000	47,000
4,600		80,000	47,000
4,620		80,000	47,000

d1		l1	l2
mm	inch	mm	mm
4,650		80,000	47,000
4,700		80,000	47,000
4,750		80,000	47,000
4,760	3/16	86,000	52,000
4,800		86,000	52,000
4,850		86,000	52,000
4,900		86,000	52,000
4,920		86,000	52,000
4,950		86,000	52,000
4,980		86,000	52,000
5,000		86,000	52,000
5,030		86,000	52,000
5,050		86,000	52,000
5,060		86,000	52,000
5,100		86,000	52,000
5,110		86,000	52,000
5,150		86,000	52,000
5,160	13/64	86,000	52,000
5,180		86,000	52,000
5,200		86,000	52,000
5,220		86,000	52,000
5,250		86,000	52,000
5,300		86,000	52,000
5,310		93,000	57,000
5,350		93,000	57,000
5,400		93,000	57,000
5,410		93,000	57,000
5,450		93,000	57,000
5,500		93,000	57,000
5,550		93,000	57,000
5,560	7/32	93,000	57,000
5,600		93,000	57,000
5,610		93,000	57,000
5,650		93,000	57,000
5,700		93,000	57,000
5,750		93,000	57,000
5,790		93,000	57,000
5,800		93,000	57,000
5,850		93,000	57,000
5,900		93,000	57,000
5,940		93,000	57,000
5,950	15/64	93,000	57,000
6,000		93,000	57,000
6,040		101,000	63,000
6,050		101,000	63,000
6,100		101,000	63,000
6,150		101,000	63,000
6,200		101,000	63,000
6,250		101,000	63,000
6,300		101,000	63,000
6,350	1/4	101,000	63,000
6,400		101,000	63,000
6,500		101,000	63,000
6,530		101,000	63,000
6,550		101,000	63,000
6,600		101,000	63,000
6,630		101,000	63,000
6,700		101,000	63,000
6,750	17/64	109,000	69,000
6,800		109,000	69,000
6,830		109,000	69,000
6,900		109,000	69,000
7,000		109,000	69,000
7,030		109,000	69,000
7,040		109,000	69,000
7,050		109,000	69,000
7,100		109,000	69,000
7,140	9/32	109,000	69,000
7,200		109,000	69,000
7,250		109,000	69,000
7,290		109,000	69,000
7,300		109,000	69,000



d1		l1	l2
mm	inch	mm	mm
7,370		109,000	69,000
7,400		109,000	69,000
7,490		109,000	69,000
7,500		109,000	69,000
7,540	19/64	117,000	75,000
7,580		117,000	75,000
7,600		117,000	75,000
7,670		117,000	75,000
7,700		117,000	75,000
7,750		117,000	75,000
7,800		117,000	75,000
7,900		117,000	75,000
7,940	5/16	117,000	75,000
8,000		117,000	75,000
8,030		117,000	75,000
8,100		117,000	75,000
8,200		117,000	75,000
8,250		117,000	75,000
8,300		117,000	75,000
8,330	21/64	117,000	75,000
8,400		117,000	75,000
8,430		117,000	75,000
8,500		117,000	75,000
8,600		125,000	81,000
8,610		125,000	81,000
8,700		125,000	81,000
8,730	11/32	125,000	81,000
8,750		125,000	81,000
8,800		125,000	81,000
8,840		125,000	81,000
8,900		125,000	81,000
9,000		125,000	81,000
9,090		125,000	81,000
9,100		125,000	81,000
9,130	23/64	125,000	81,000
9,200		125,000	81,000
9,250		125,000	81,000
9,300		125,000	81,000
9,340		125,000	81,000
9,350		125,000	81,000
9,400		125,000	81,000
9,500		125,000	81,000
9,520	3/8	133,000	87,000
9,580		133,000	87,000
9,600		133,000	87,000
9,700		133,000	87,000
9,750		133,000	87,000
9,800		133,000	87,000
9,900		133,000	87,000
9,920	25/64	133,000	87,000
10,000		133,000	87,000
10,080		133,000	87,000
10,100		133,000	87,000
10,200		133,000	87,000
10,260		133,000	87,000
10,300		133,000	87,000
10,320	13/32	133,000	87,000
10,400		133,000	87,000
10,490		133,000	87,000
10,500		133,000	87,000

d1		l1	l2
mm	inch	mm	mm
10,600		133,000	87,000
10,700		142,000	94,000
10,720	27/64	142,000	94,000
10,750		142,000	94,000
10,800		142,000	94,000
10,900		142,000	94,000
11,000		142,000	94,000
11,100		142,000	94,000
11,110	7/16	142,000	94,000
11,200		142,000	94,000
11,300		142,000	94,000
11,400		142,000	94,000
11,500		142,000	94,000
11,510	29/64	142,000	94,000
11,600		142,000	94,000
11,700		142,000	94,000
11,750		142,000	94,000
11,800		142,000	94,000
11,900		151,000	101,000
11,910	15/32	151,000	101,000
12,000		151,000	101,000
12,100		151,000	101,000
12,150		151,000	101,000
12,200		151,000	101,000
12,250		151,000	101,000
12,300	31/64	151,000	101,000
12,400		151,000	101,000
12,500		151,000	101,000
12,700	1/2	151,000	101,000
12,750		151,000	101,000
12,800		151,000	101,000
12,900		151,000	101,000
13,000		151,000	101,000
13,100	33/64	151,000	101,000
13,200		151,000	101,000
13,490	17/32	160,000	108,000
13,500		160,000	108,000
13,600		160,000	108,000
13,700		160,000	108,000
13,890	35/64	160,000	108,000
14,000		160,000	108,000
14,250		169,000	114,000
14,290	9/16	169,000	114,000
14,500		169,000	114,000
14,680	37/64	169,000	114,000
15,000		169,000	114,000
15,080	19/32	178,000	120,000
15,400		178,000	120,000
15,480	39/64	178,000	120,000
15,500		178,000	120,000
15,750		178,000	120,000
15,870	5/8	178,000	120,000
16,000		178,000	120,000



Normaaliporat



P • Kärjen kevennys $\geq \varnothing 1,000$ • kartiovaippahionta • avarat lastu-urat
• erityisesti yli 3xD porausvyvyksille



N • harmaavalurauta • teräkset < 1000 N/mm² • Ei suositella: CrNi-teräkset, ruostumattomat teräkset

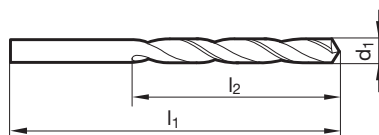
Materiaali **HSS**

Pinta **S**

Leikkusuunta **R**

GÜHRING NAVIGATOR

Leikkuuarvosivu 780



Lieriövartiset
kierukkaporat

Artikkelinro. **652**

d1		l1	l2
mm	inch	mm	mm
1,000		34,000	12,000
1,020		34,000	12,000
1,040		34,000	12,000
1,070		36,000	14,000
1,090		36,000	14,000
1,100		36,000	14,000
1,180		36,000	14,000
1,190	3/64	38,000	16,000
1,200		38,000	16,000
1,220		38,000	16,000
1,250		38,000	16,000
1,300		38,000	16,000
1,320		38,000	16,000
1,350		40,000	18,000
1,400		40,000	18,000
1,450		40,000	18,000
1,500		40,000	18,000
1,510		43,000	20,000
1,530		43,000	20,000
1,550		43,000	20,000
1,590	1/16	43,000	20,000
1,600		43,000	20,000
1,610		43,000	20,000
1,650		43,000	20,000
1,700		43,000	20,000
1,720		46,000	22,000
1,750		46,000	22,000
1,780		46,000	22,000
1,800		46,000	22,000
1,850		46,000	22,000
1,900		46,000	22,000
1,930		49,000	24,000
1,950		49,000	24,000
1,980	5/64	49,000	24,000
1,990		49,000	24,000
2,000		49,000	24,000
2,060		49,000	24,000
2,080		49,000	24,000
2,100		49,000	24,000
2,150		53,000	27,000
2,180		53,000	27,000
2,200		53,000	27,000

d1		l1	l2
mm	inch	mm	mm
2,250		53,000	27,000
2,260		53,000	27,000
2,300		53,000	27,000
2,350		53,000	27,000
2,370		57,000	30,000
2,380	3/32	57,000	30,000
2,400		57,000	30,000
2,440		57,000	30,000
2,450		57,000	30,000
2,490		57,000	30,000
2,500		57,000	30,000
2,530		57,000	30,000
2,550		57,000	30,000
2,580		57,000	30,000
2,600		57,000	30,000
2,640		57,000	30,000
2,650		57,000	30,000
2,700		61,000	33,000
2,710		61,000	33,000
2,750		61,000	33,000
2,780	7/64	61,000	33,000
2,790		61,000	33,000
2,800		61,000	33,000
2,820		61,000	33,000
2,850		61,000	33,000
2,870		61,000	33,000
2,900		61,000	33,000
2,950		61,000	33,000
3,000		61,000	33,000
3,050		65,000	36,000
3,100		65,000	36,000
3,170	1/8	65,000	36,000
3,200		65,000	36,000
3,250		65,000	36,000
3,260		65,000	36,000
3,300		65,000	36,000
3,350		65,000	36,000
3,400		70,000	39,000
3,450		70,000	39,000
3,500		70,000	39,000
3,570	9/64	70,000	39,000
3,600		70,000	39,000



d1		l1	l2
mm	inch	mm	mm
3,650		70,000	39,000
3,660		70,000	39,000
3,700		70,000	39,000
3,730		70,000	39,000
3,750		70,000	39,000
3,800		75,000	43,000
3,860		75,000	43,000
3,900		75,000	43,000
3,910		75,000	43,000
3,970	5/32	75,000	43,000
3,990		75,000	43,000
4,000		75,000	43,000
4,040		75,000	43,000
4,050		75,000	43,000
4,090		75,000	43,000
4,100		75,000	43,000
4,200		75,000	43,000
4,220		75,000	43,000
4,250		75,000	43,000
4,300		80,000	47,000
4,370	11/64	80,000	47,000
4,390		80,000	47,000
4,400		80,000	47,000
4,450		80,000	47,000
4,500		80,000	47,000
4,570		80,000	47,000
4,600		80,000	47,000
4,620		80,000	47,000
4,700		80,000	47,000
4,760	3/16	86,000	52,000
4,800		86,000	52,000
4,850		86,000	52,000
4,900		86,000	52,000
4,920		86,000	52,000
4,980		86,000	52,000
5,000		86,000	52,000
5,060		86,000	52,000
5,100		86,000	52,000
5,110		86,000	52,000
5,160	13/64	86,000	52,000
5,180		86,000	52,000
5,200		86,000	52,000
5,220		86,000	52,000
5,300		86,000	52,000
5,310		93,000	57,000
5,400		93,000	57,000
5,410		93,000	57,000
5,500		93,000	57,000
5,560	7/32	93,000	57,000
5,600		93,000	57,000
5,610		93,000	57,000
5,700		93,000	57,000
5,750		93,000	57,000
5,790		93,000	57,000
5,800		93,000	57,000
5,900		93,000	57,000
5,940		93,000	57,000
5,950	15/64	93,000	57,000
6,000		93,000	57,000
6,040		101,000	63,000
6,100		101,000	63,000
6,150		101,000	63,000
6,200		101,000	63,000
6,250		101,000	63,000
6,300		101,000	63,000
6,350	1/4	101,000	63,000
6,400		101,000	63,000
6,500		101,000	63,000
6,530		101,000	63,000
6,600		101,000	63,000
6,630		101,000	63,000
6,700		101,000	63,000

d1		l1	l2
mm	inch	mm	mm
6,750	17/64	109,000	69,000
6,800		109,000	69,000
6,900		109,000	69,000
7,000		109,000	69,000
7,030		109,000	69,000
7,100		109,000	69,000
7,140	9/32	109,000	69,000
7,200		109,000	69,000
7,300		109,000	69,000
7,370		109,000	69,000
7,400		109,000	69,000
7,490		109,000	69,000
7,500		109,000	69,000
7,540	19/64	117,000	75,000
7,600		117,000	75,000
7,670		117,000	75,000
7,700		117,000	75,000
7,800		117,000	75,000
7,900		117,000	75,000
7,940	5/16	117,000	75,000
8,000		117,000	75,000
8,030		117,000	75,000
8,100		117,000	75,000
8,200		117,000	75,000
8,330	21/64	117,000	75,000
8,400		117,000	75,000
8,430		117,000	75,000
8,500		117,000	75,000
8,600		125,000	81,000
8,610		125,000	81,000
8,730	11/32	125,000	81,000
8,800		125,000	81,000
8,840		125,000	81,000
8,900		125,000	81,000
9,000		125,000	81,000
9,100		125,000	81,000
9,130	23/64	125,000	81,000
9,200		125,000	81,000
9,300		125,000	81,000
9,340		125,000	81,000
9,400		125,000	81,000
9,500		125,000	81,000
9,520	3/8	133,000	87,000
9,600		133,000	87,000
9,700		133,000	87,000
9,800		133,000	87,000
9,900		133,000	87,000
9,920	25/64	133,000	87,000
10,000		133,000	87,000
10,200		133,000	87,000
10,300		133,000	87,000
10,320	13/32	133,000	87,000
10,490		133,000	87,000
10,500		133,000	87,000
10,700		142,000	94,000
10,720	27/64	142,000	94,000
11,000		142,000	94,000
11,110	7/16	142,000	94,000
11,200		142,000	94,000
11,500		142,000	94,000
11,510	29/64	142,000	94,000
11,600		142,000	94,000
11,910	15/32	151,000	101,000
12,000		151,000	101,000
12,300	31/64	151,000	101,000
12,500		151,000	101,000
12,600		151,000	101,000
12,700	1/2	151,000	101,000
13,000		151,000	101,000
13,100	33/64	151,000	101,000
13,490	17/32	160,000	108,000
13,890	35/64	160,000	108,000



d1		l1	l2
mm	inch	mm	mm
14,000		160,000	108,000
14,290	9/16	169,000	114,000
15,000		169,000	114,000

d1		l1	l2
mm	inch	mm	mm



Normaaliporat

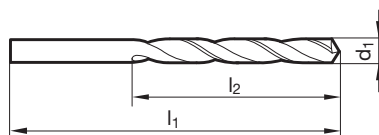


P	•	Kärjen kevennys $\geq \varnothing 1,000$ • kartiovaippahionta • avarat lastu-urat • erityisesti yli 3xD porausvyvyksille
M		
K	•	
N	•	harmaavalurauta • teräkset < 1000 N/mm ² • Ei suositella: CrNi-teräkset, ruostumattomat teräkset
S		
H		

Materiaali **HSS**Pinta **F**Leikkusuunta **R**

GÜHRING NAVIGATOR

Leikkuarvosivu 780



Artikkelinro.

2457

d1		l1	l2
mm	inch	mm	mm
1,000		34,000	12,000
1,300		38,000	16,000
1,500		40,000	18,000
1,600		43,000	20,000
1,700		43,000	20,000
1,800		46,000	22,000
2,000		49,000	24,000
2,100		49,000	24,000
2,400		57,000	30,000
2,800		61,000	33,000
2,900		61,000	33,000
3,000		61,000	33,000
3,100		65,000	36,000
3,200		65,000	36,000
3,300		65,000	36,000
3,400		70,000	39,000
3,500		70,000	39,000
3,600		70,000	39,000
3,800		75,000	43,000
4,000		75,000	43,000
4,200		75,000	43,000
4,300		80,000	47,000
4,400		80,000	47,000
4,700		80,000	47,000
4,800		86,000	52,000
4,900		86,000	52,000
5,000		86,000	52,000
5,100		86,000	52,000
5,400		93,000	57,000
5,500		93,000	57,000

d1		l1	l2
mm	inch	mm	mm
5,600		93,000	57,000
5,700		93,000	57,000
6,000		93,000	57,000
6,100		101,000	63,000
6,200		101,000	63,000
6,600		101,000	63,000
6,800		109,000	69,000
7,000		109,000	69,000
7,100		109,000	69,000
7,200		109,000	69,000
7,300		109,000	69,000
7,400		109,000	69,000
7,900		117,000	75,000
8,000		117,000	75,000
8,100		117,000	75,000
8,400		117,000	75,000
8,500		117,000	75,000
8,700		125,000	81,000
8,800		125,000	81,000
8,900		125,000	81,000
9,100		125,000	81,000
9,400		125,000	81,000
9,600		133,000	87,000
9,700		133,000	87,000
10,300		133,000	87,000
10,700		142,000	94,000
11,400		142,000	94,000
11,700		142,000	94,000
11,800		142,000	94,000
15,000		169,000	114,000



Normaaliporat

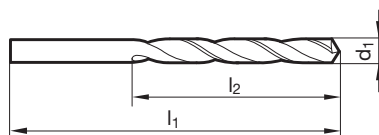


- P** • Kärjen kevennys $\geq \varnothing 1,000$ • kartiovaippahionta • avarat lastu-urat • erityisesti yli 3xD porausvyvyksille
- M**
- K** •
- N** • harmaavalurauta • teräkset < 1000 N/mm² • Ei suositella: CrNi-teräkset, ruostumattomat teräkset
- S**
- H**

GÜHRING NAVIGATOR

Leikkuuarvosivu 778

Materiaali	HSS
Pinta	
Leikkusuunta	



Artikkelinro. **550**

d1		l1	l2	d1		l1	l2
mm	inch	mm	mm	mm	inch	mm	mm
1,000		34,000	12,000	2,750		61,000	33,000
1,300		38,000	16,000	2,780	7/64	61,000	33,000
1,350		40,000	18,000	2,790		61,000	33,000
1,400		40,000	18,000	2,800		61,000	33,000
1,450		40,000	18,000	2,870		61,000	33,000
1,485		40,000	18,000	2,900		61,000	33,000
1,490		40,000	18,000	2,950		61,000	33,000
1,500		40,000	18,000	3,000		61,000	33,000
1,550		43,000	20,000	3,020		65,000	36,000
1,580		43,000	20,000	3,050		65,000	36,000
1,590	1/16	43,000	20,000	3,100		65,000	36,000
1,600		43,000	20,000	3,150		65,000	36,000
1,650		43,000	20,000	3,170	1/8	65,000	36,000
1,700		43,000	20,000	3,175	1/8	65,000	36,000
1,780		46,000	22,000	3,200		65,000	36,000
1,800		46,000	22,000	3,250		65,000	36,000
1,850		46,000	22,000	3,260		65,000	36,000
1,900		46,000	22,000	3,300		65,000	36,000
1,950		49,000	24,000	3,350		65,000	36,000
1,980	5/64	49,000	24,000	3,400		70,000	39,000
2,000		49,000	24,000	3,450		70,000	39,000
2,030		49,000	24,000	3,500		70,000	39,000
2,050		49,000	24,000	3,550		70,000	39,000
2,080		49,000	24,000	3,570	9/64	70,000	39,000
2,100		49,000	24,000	3,600		70,000	39,000
2,150		53,000	27,000	3,650		70,000	39,000
2,200		53,000	27,000	3,660		70,000	39,000
2,250		53,000	27,000	3,700		70,000	39,000
2,260		53,000	27,000	3,750		70,000	39,000
2,300		53,000	27,000	3,800		75,000	43,000
2,350		53,000	27,000	3,860		75,000	43,000
2,370		57,000	30,000	3,900		75,000	43,000
2,380	3/32	57,000	30,000	3,990		75,000	43,000
2,400		57,000	30,000	4,000		75,000	43,000
2,490		57,000	30,000	4,040		75,000	43,000
2,500		57,000	30,000	4,100		75,000	43,000
2,530		57,000	30,000	4,200		75,000	43,000
2,550		57,000	30,000	4,300		80,000	47,000
2,580		57,000	30,000	4,370	11/64	80,000	47,000
2,600		57,000	30,000	4,450		80,000	47,000
2,670		61,000	33,000	4,500		80,000	47,000
2,700		61,000	33,000	4,600		80,000	47,000

Lieriövärtiset
kierukkaporat



d1		l1	l2
mm	inch	mm	mm
4,620		80,000	47,000
4,760	3/16	86,000	52,000
4,900		86,000	52,000
5,000		86,000	52,000
5,100		86,000	52,000
5,200		86,000	52,000
5,300		86,000	52,000
5,400		93,000	57,000
5,500		93,000	57,000
5,560	7/32	93,000	57,000
5,600		93,000	57,000
5,700		93,000	57,000
5,750		93,000	57,000
5,790		93,000	57,000
5,800		93,000	57,000
5,850		93,000	57,000
5,900		93,000	57,000
5,950	15/64	93,000	57,000
6,000		93,000	57,000
6,100		101,000	63,000
6,200		101,000	63,000
6,350	1/4	101,000	63,000
6,400		101,000	63,000
6,500		101,000	63,000
6,600		101,000	63,000
6,750	17/64	109,000	69,000
6,800		109,000	69,000
6,900		109,000	69,000
7,000		109,000	69,000
7,140	9/32	109,000	69,000
7,200		109,000	69,000
7,300		109,000	69,000
7,400		109,000	69,000
7,500		109,000	69,000
7,540	19/64	117,000	75,000
7,600		117,000	75,000

d1		l1	l2
mm	inch	mm	mm
7,700		117,000	75,000
7,900		117,000	75,000
7,940	5/16	117,000	75,000
8,000		117,000	75,000
8,100		117,000	75,000
8,330	21/64	117,000	75,000
8,400		117,000	75,000
8,500		117,000	75,000
8,700		125,000	81,000
8,730	11/32	125,000	81,000
8,800		125,000	81,000
9,000		125,000	81,000
9,200		125,000	81,000
9,400		125,000	81,000
9,520	3/8	133,000	87,000
9,600		133,000	87,000
9,700		133,000	87,000
10,000		133,000	87,000
10,200		133,000	87,000
10,300		133,000	87,000
10,600		133,000	87,000
10,800		142,000	94,000
11,100		142,000	94,000
11,110	7/16	142,000	94,000
11,900		151,000	101,000
12,400		151,000	101,000
12,800		151,000	101,000
14,290	9/16	169,000	114,000
15,000		169,000	114,000
15,500		178,000	120,000



Normaaliporat



- P** • Kärjen kevennys $\geq \varnothing 1,300$ • kartiovaippahionta • avarat lastu-urat
• erityisesti yli 3xD porausvyvyksille
- M**
- K** •
- N** • harmaavalurauta • teräkset < 1000 N/mm² • Ei suositella: CrNi-teräkset, ruostumattomat teräkset
- S**
- H**

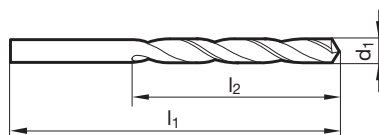
Materiaali **HSS**

Pinta **S**

Leikkusuunta **L**

GÜHRING NAVIGATOR

Leikkuarvosivu 780



Lieriövartiset kierukkaporat

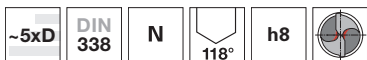
Artikkelinro. **665**

d1		l1	l2
mm	inch	mm	mm
1,300		38,000	16,000
1,400		40,000	18,000
1,500		40,000	18,000
1,550		43,000	20,000
1,590	1/16	43,000	20,000
1,600		43,000	20,000
1,650		43,000	20,000
1,700		43,000	20,000
1,800		46,000	22,000
1,900		46,000	22,000
1,980	5/64	49,000	24,000
2,000		49,000	24,000
2,100		49,000	24,000
2,200		53,000	27,000
2,260		53,000	27,000
2,300		53,000	27,000
2,380	3/32	57,000	30,000
2,400		57,000	30,000
2,500		57,000	30,000
2,530		57,000	30,000
2,580		57,000	30,000
2,600		57,000	30,000
2,700		61,000	33,000
2,780	7/64	61,000	33,000
2,800		61,000	33,000
2,950		61,000	33,000
3,000		61,000	33,000
3,100		65,000	36,000
3,170	1/8	65,000	36,000
3,200		65,000	36,000
3,300		65,000	36,000
3,400		70,000	39,000
3,450		70,000	39,000
3,570	9/64	70,000	39,000
3,700		70,000	39,000
3,800		75,000	43,000

d1		l1	l2
mm	inch	mm	mm
3,900		75,000	43,000
4,000		75,000	43,000
4,300		80,000	47,000
4,400		80,000	47,000
4,500		80,000	47,000
4,700		80,000	47,000
4,760	3/16	86,000	52,000
4,800		86,000	52,000
4,900		86,000	52,000
5,000		86,000	52,000
5,100		86,000	52,000
5,300		86,000	52,000
5,400		93,000	57,000
5,500		93,000	57,000
5,700		93,000	57,000
5,800		93,000	57,000
5,900		93,000	57,000
6,000		93,000	57,000
6,500		101,000	63,000
7,000		109,000	69,000
7,100		109,000	69,000
7,140	9/32	109,000	69,000
7,540	19/64	117,000	75,000
7,800		117,000	75,000
7,940	5/16	117,000	75,000
8,600		125,000	81,000
9,130	23/64	125,000	81,000
9,500		125,000	81,000
9,520	3/8	133,000	87,000
9,800		133,000	87,000



Normaaliporat



P • Kärjen kevennys $\geq \varnothing 1,000$ • kartiovaippahionta • Co-seosteinen pikateräs • parempi kulumiskestävyys

M ○

K •

N ○ seostettu-/seostamaton teräs ja valuteräs • valut yli 800 N/mm²

S • kuuma- ja kylmävalssatut teräkset • pienikitkaiset laakeriteräkset

H • runsasseosteiset teräkset • nuorrutus- ja hiilikarkaistut teräkset

GÜHRING NAVIGATOR

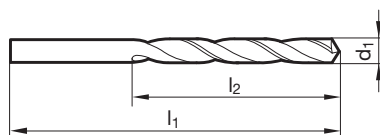
Leikkuuarvosivu 780

Lieriövartiset
kierukkaporat

Materiaali **HSCO**

Pinta

Leikkusuunta



Artikkelinro. **305**

d1		l1	l2
mm	inch	mm	mm
0,200		19,000	2,500
0,220		19,000	2,500
0,230		19,000	2,500
0,250		19,000	3,000
0,260		19,000	3,000
0,270		19,000	3,000
0,280		19,000	3,000
0,300		19,000	3,000
0,310		19,000	4,000
0,320		19,000	4,000
0,330		19,000	4,000
0,340		19,000	4,000
0,350		19,000	4,000
0,360		19,000	4,000
0,370		19,000	4,000
0,380		19,000	4,000
0,390		20,000	5,000
0,400	1/64	20,000	5,000
0,410		20,000	5,000
0,420		20,000	5,000
0,430		20,000	5,000
0,440		20,000	5,000
0,450		20,000	5,000
0,460		20,000	5,000
0,470		20,000	5,000
0,480		20,000	5,000
0,490		22,000	6,000
0,500		22,000	6,000
0,510		22,000	6,000
0,520		22,000	6,000
0,530		22,000	6,000
0,540		24,000	7,000
0,550		24,000	7,000
0,560		24,000	7,000
0,570		24,000	7,000
0,580		24,000	7,000
0,590		24,000	7,000
0,600		24,000	7,000
0,610		26,000	8,000
0,620		26,000	8,000
0,640		26,000	8,000
0,650		26,000	8,000

d1		l1	l2
mm	inch	mm	mm
0,660		26,000	8,000
0,670		26,000	8,000
0,680		28,000	9,000
0,700		28,000	9,000
0,710		28,000	9,000
0,720		28,000	9,000
0,730		28,000	9,000
0,740		28,000	9,000
0,750		28,000	9,000
0,760		30,000	10,000
0,770		30,000	10,000
0,780		30,000	10,000
0,790	1/32	30,000	10,000
0,800		30,000	10,000
0,810		30,000	10,000
0,820		30,000	10,000
0,830		30,000	10,000
0,840		30,000	10,000
0,850		30,000	10,000
0,860		32,000	11,000
0,870		32,000	11,000
0,880		32,000	11,000
0,890		32,000	11,000
0,900		32,000	11,000
0,910		32,000	11,000
0,920		32,000	11,000
0,930		32,000	11,000
0,940		32,000	11,000
0,950		32,000	11,000
0,960		34,000	12,000
0,970		34,000	12,000
0,980		34,000	12,000
0,990		34,000	12,000
1,000		34,000	12,000
1,010		34,000	12,000
1,020		34,000	12,000
1,030		34,000	12,000
1,040		34,000	12,000
1,050		34,000	12,000
1,070		36,000	14,000
1,080		36,000	14,000
1,090		36,000	14,000



d1		l1	l2
mm	inch	mm	mm
1,100		36,000	14,000
1,120		36,000	14,000
1,130		36,000	14,000
1,140		36,000	14,000
1,150		36,000	14,000
1,160		36,000	14,000
1,170		36,000	14,000
1,180		36,000	14,000
1,190	3/64	38,000	16,000
1,200		38,000	16,000
1,210		38,000	16,000
1,220		38,000	16,000
1,230		38,000	16,000
1,250		38,000	16,000
1,260		38,000	16,000
1,280		38,000	16,000
1,290		38,000	16,000
1,300		38,000	16,000
1,310		38,000	16,000
1,320		38,000	16,000
1,330		40,000	18,000
1,350		40,000	18,000
1,360		40,000	18,000
1,370		40,000	18,000
1,380		40,000	18,000
1,400		40,000	18,000
1,410		40,000	18,000
1,420		40,000	18,000
1,430		40,000	18,000
1,440		40,000	18,000
1,450		40,000	18,000
1,460		40,000	18,000
1,470		40,000	18,000
1,480		40,000	18,000
1,490		40,000	18,000
1,500		40,000	18,000
1,510		43,000	20,000
1,520		43,000	20,000
1,530		43,000	20,000
1,540		43,000	20,000
1,550		43,000	20,000
1,560		43,000	20,000
1,570		43,000	20,000
1,580		43,000	20,000
1,590	1/16	43,000	20,000
1,600		43,000	20,000
1,610		43,000	20,000
1,620		43,000	20,000
1,640		43,000	20,000
1,650		43,000	20,000
1,660		43,000	20,000
1,670		43,000	20,000
1,680		43,000	20,000
1,700		43,000	20,000
1,710		46,000	22,000
1,720		46,000	22,000
1,730		46,000	22,000
1,740		46,000	22,000
1,750		46,000	22,000
1,760		46,000	22,000
1,780		46,000	22,000
1,790		46,000	22,000
1,800		46,000	22,000
1,810		46,000	22,000
1,820		46,000	22,000
1,830		46,000	22,000
1,840		46,000	22,000
1,850		46,000	22,000
1,860		46,000	22,000
1,900		46,000	22,000
1,910		49,000	24,000
1,930		49,000	24,000

d1		l1	l2
mm	inch	mm	mm
1,950		49,000	24,000
1,960		49,000	24,000
1,970		49,000	24,000
1,980	5/64	49,000	24,000
1,990		49,000	24,000
2,000		49,000	24,000
2,010		49,000	24,000
2,020		49,000	24,000
2,030		49,000	24,000
2,040		49,000	24,000
2,050		49,000	24,000
2,060		49,000	24,000
2,070		49,000	24,000
2,080		49,000	24,000
2,100		49,000	24,000
2,120		49,000	24,000
2,150		53,000	27,000
2,180		53,000	27,000
2,200		53,000	27,000
2,230		53,000	27,000
2,250		53,000	27,000
2,260		53,000	27,000
2,300		53,000	27,000
2,320		53,000	27,000
2,350		53,000	27,000
2,370		57,000	30,000
2,380	3/32	57,000	30,000
2,400		57,000	30,000
2,440		57,000	30,000
2,450		57,000	30,000
2,470		57,000	30,000
2,490		57,000	30,000
2,500		57,000	30,000
2,510		57,000	30,000
2,520		57,000	30,000
2,530		57,000	30,000
2,550		57,000	30,000
2,580		57,000	30,000
2,600		57,000	30,000
2,640		57,000	30,000
2,650		57,000	30,000
2,700		61,000	33,000
2,710		61,000	33,000
2,750		61,000	33,000
2,780	7/64	61,000	33,000
2,790		61,000	33,000
2,800		61,000	33,000
2,820		61,000	33,000
2,850		61,000	33,000
2,870		61,000	33,000
2,900		61,000	33,000
2,920		61,000	33,000
2,950		61,000	33,000
3,000		61,000	33,000
3,020		65,000	36,000
3,030		65,000	36,000
3,050		65,000	36,000
3,100		65,000	36,000
3,150		65,000	36,000
3,170	1/8	65,000	36,000
3,200		65,000	36,000
3,250		65,000	36,000
3,260		65,000	36,000
3,300		65,000	36,000
3,330		65,000	36,000
3,350		65,000	36,000
3,400		70,000	39,000
3,450		70,000	39,000
3,500		70,000	39,000
3,550		70,000	39,000
3,570	9/64	70,000	39,000
3,600		70,000	39,000



d1		l1	l2
mm	inch	mm	mm
3,650		70,000	39,000
3,660		70,000	39,000
3,700		70,000	39,000
3,730		70,000	39,000
3,750		70,000	39,000
3,800		75,000	43,000
3,850		75,000	43,000
3,860		75,000	43,000
3,900		75,000	43,000
3,910		75,000	43,000
3,970	5/32	75,000	43,000
3,990		75,000	43,000
4,000		75,000	43,000
4,020		75,000	43,000
4,040		75,000	43,000
4,050		75,000	43,000
4,070		75,000	43,000
4,090		75,000	43,000
4,100		75,000	43,000
4,120		75,000	43,000
4,150		75,000	43,000
4,170		75,000	43,000
4,200		75,000	43,000
4,220		75,000	43,000
4,250		75,000	43,000
4,300		80,000	47,000
4,370	11/64	80,000	47,000
4,390		80,000	47,000
4,400		80,000	47,000
4,450		80,000	47,000
4,500		80,000	47,000
4,550		80,000	47,000
4,570		80,000	47,000
4,600		80,000	47,000
4,620		80,000	47,000
4,650		80,000	47,000
4,700		80,000	47,000
4,750		80,000	47,000
4,760	3/16	86,000	52,000
4,800		86,000	52,000
4,850		86,000	52,000
4,900		86,000	52,000
4,920		86,000	52,000
4,980		86,000	52,000
5,000		86,000	52,000
5,020		86,000	52,000
5,050		86,000	52,000
5,060		86,000	52,000
5,100		86,000	52,000
5,110		86,000	52,000
5,150		86,000	52,000
5,160	13/64	86,000	52,000
5,180		86,000	52,000
5,200		86,000	52,000
5,220		86,000	52,000
5,250		86,000	52,000
5,300		86,000	52,000
5,310		93,000	57,000
5,400		93,000	57,000
5,410		93,000	57,000
5,450		93,000	57,000
5,500		93,000	57,000
5,550		93,000	57,000
5,560	7/32	93,000	57,000
5,600		93,000	57,000
5,610		93,000	57,000
5,650		93,000	57,000
5,700		93,000	57,000
5,750		93,000	57,000
5,790		93,000	57,000
5,800		93,000	57,000
5,850		93,000	57,000

d1		l1	l2
mm	inch	mm	mm
5,900		93,000	57,000
5,940		93,000	57,000
5,950	15/64	93,000	57,000
6,000		93,000	57,000
6,040		101,000	63,000
6,050		101,000	63,000
6,100		101,000	63,000
6,150		101,000	63,000
6,200		101,000	63,000
6,250		101,000	63,000
6,300		101,000	63,000
6,350	1/4	101,000	63,000
6,400		101,000	63,000
6,450		101,000	63,000
6,500		101,000	63,000
6,530		101,000	63,000
6,600		101,000	63,000
6,630		101,000	63,000
6,700		101,000	63,000
6,750	17/64	109,000	69,000
6,760		109,000	69,000
6,800		109,000	69,000
6,850		109,000	69,000
6,900		109,000	69,000
6,950		109,000	69,000
7,000		109,000	69,000
7,030		109,000	69,000
7,050		109,000	69,000
7,100		109,000	69,000
7,140	9/32	109,000	69,000
7,200		109,000	69,000
7,250		109,000	69,000
7,300		109,000	69,000
7,370		109,000	69,000
7,400		109,000	69,000
7,490		109,000	69,000
7,500		109,000	69,000
7,540	19/64	117,000	75,000
7,600		117,000	75,000
7,670		117,000	75,000
7,700		117,000	75,000
7,750		117,000	75,000
7,800		117,000	75,000
7,900		117,000	75,000
7,940	5/16	117,000	75,000
8,000		117,000	75,000
8,030		117,000	75,000
8,050		117,000	75,000
8,100		117,000	75,000
8,150		117,000	75,000
8,200		117,000	75,000
8,250		117,000	75,000
8,300		117,000	75,000
8,330	21/64	117,000	75,000
8,400		117,000	75,000
8,430		117,000	75,000
8,500		117,000	75,000
8,600		125,000	81,000
8,610		125,000	81,000
8,700		125,000	81,000
8,730	11/32	125,000	81,000
8,750		125,000	81,000
8,800		125,000	81,000
8,840		125,000	81,000
8,900		125,000	81,000
9,000		125,000	81,000
9,090		125,000	81,000
9,100		125,000	81,000
9,130	23/64	125,000	81,000
9,200		125,000	81,000
9,250		125,000	81,000
9,300		125,000	81,000



d1		l1	l2
mm	inch	mm	mm
9,340		125,000	81,000
9,400		125,000	81,000
9,500		125,000	81,000
9,520	3/8	133,000	87,000
9,580		133,000	87,000
9,600		133,000	87,000
9,700		133,000	87,000
9,750		133,000	87,000
9,800		133,000	87,000
9,900		133,000	87,000
9,920	25/64	133,000	87,000
10,000		133,000	87,000
10,050		133,000	87,000
10,080		133,000	87,000
10,100		133,000	87,000
10,200		133,000	87,000
10,250		133,000	87,000
10,260		133,000	87,000
10,300		133,000	87,000
10,320	13/32	133,000	87,000
10,400		133,000	87,000
10,490		133,000	87,000
10,500		133,000	87,000
10,600		133,000	87,000
10,700		142,000	94,000
10,720	27/64	142,000	94,000
10,750		142,000	94,000
10,800		142,000	94,000
10,900		142,000	94,000
11,000		142,000	94,000
11,100		142,000	94,000
11,110	7/16	142,000	94,000
11,200		142,000	94,000
11,250		142,000	94,000
11,300		142,000	94,000
11,400		142,000	94,000
11,500		142,000	94,000
11,510	29/64	142,000	94,000
11,600		142,000	94,000
11,700		142,000	94,000
11,750		142,000	94,000
11,800		142,000	94,000
11,900		151,000	101,000
11,910	15/32	151,000	101,000
12,000		151,000	101,000
12,100		151,000	101,000
12,200		151,000	101,000
12,250		151,000	101,000

d1		l1	l2
mm	inch	mm	mm
12,300	31/64	151,000	101,000
12,400		151,000	101,000
12,500		151,000	101,000
12,600		151,000	101,000
12,700	1/2	151,000	101,000
12,750		151,000	101,000
12,800		151,000	101,000
12,900		151,000	101,000
13,000		151,000	101,000
13,100	33/64	151,000	101,000
13,200		151,000	101,000
13,300		160,000	108,000
13,490	17/32	160,000	108,000
13,500		160,000	108,000
13,600		160,000	108,000
13,700		160,000	108,000
13,750		160,000	108,000
13,800		160,000	108,000
13,890	35/64	160,000	108,000
13,900		160,000	108,000
14,000		160,000	108,000
14,100		169,000	114,000
14,200		169,000	114,000
14,290	9/16	169,000	114,000
14,500		169,000	114,000
14,680	37/64	169,000	114,000
15,000		169,000	114,000
15,250		178,000	120,000
15,480	39/64	178,000	120,000
15,500		178,000	120,000
15,750		178,000	120,000
15,870	5/8	178,000	120,000
16,000		178,000	120,000
16,500		184,000	125,000
16,670	21/32	184,000	125,000
17,000		184,000	125,000
17,460	11/16	191,000	130,000
17,500		191,000	130,000
18,000		191,000	130,000
18,500		198,000	135,000
19,000		198,000	135,000
19,500		205,000	140,000
20,000		205,000	140,000



Normaaliporat



P • Kärjen kevennys $\geq \varnothing 1,200$ • kartiovaippahionta • Co-seosteinen pikateräs • parempi kulumiskestävyys

M ○

K •

N ○ seosteiset ja runsasseosteiset teräkset • valut yli 800 N/mm² • kuuma- ja kylmävalssatut teräkset • pienikitkaiset laakeriteräkset • runsasseosteiset teräkset • nuorutus- ja hiilikarkaistut teräkset

S ○

H ○

Materiaali **HSCO**

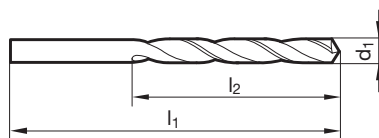
Pinta **S**

Leikkusuunta **R**

Lieriövartiset
kierukkaporat

GÜHRING NAVIGATOR

Leikkuarvosivu 782



Artikkelinro. **2997**

d1		l1	l2
mm	inch	mm	mm
1,200		38,000	16,000
1,300		38,000	16,000
1,400		40,000	18,000
1,500		40,000	18,000
1,600		43,000	20,000
1,700		43,000	20,000
1,800		46,000	22,000
1,900		46,000	22,000
2,000		49,000	24,000
2,100		49,000	24,000
2,200		53,000	27,000
2,300		53,000	27,000
2,500		57,000	30,000
2,700		61,000	33,000
2,800		61,000	33,000
2,900		61,000	33,000
3,000		61,000	33,000
3,100		65,000	36,000
3,300		65,000	36,000
3,400		70,000	39,000
3,500		70,000	39,000
3,600		70,000	39,000
3,700		70,000	39,000
3,800		75,000	43,000
3,900		75,000	43,000
4,000		75,000	43,000
4,100		75,000	43,000
4,200		75,000	43,000
4,300		80,000	47,000
4,500		80,000	47,000
4,700		80,000	47,000
4,800		86,000	52,000
4,900		86,000	52,000
5,000		86,000	52,000
5,200		86,000	52,000
5,300		86,000	52,000
5,400		93,000	57,000
5,500		93,000	57,000
5,600		93,000	57,000
5,800		93,000	57,000
6,000		93,000	57,000
6,100		101,000	63,000

d1		l1	l2
mm	inch	mm	mm
6,300		101,000	63,000
6,400		101,000	63,000
6,500		101,000	63,000
6,600		101,000	63,000
6,700		101,000	63,000
6,800		109,000	69,000
6,900		109,000	69,000
7,000		109,000	69,000
7,100		109,000	69,000
7,300		109,000	69,000
7,400		109,000	69,000
7,500		109,000	69,000
7,600		117,000	75,000
7,700		117,000	75,000
7,800		117,000	75,000
7,900		117,000	75,000
8,000		117,000	75,000
8,200		117,000	75,000
8,400		117,000	75,000
8,500		117,000	75,000
8,800		125,000	81,000
8,900		125,000	81,000
9,000		125,000	81,000
9,300		125,000	81,000
9,400		125,000	81,000
9,500		125,000	81,000
9,600		133,000	87,000
9,700		133,000	87,000
9,800		133,000	87,000
9,900		133,000	87,000
10,000		133,000	87,000
10,300		133,000	87,000
10,500		133,000	87,000
10,800		142,000	94,000
11,000		142,000	94,000
11,200		142,000	94,000
11,500		142,000	94,000
12,000		151,000	101,000
12,500		151,000	101,000
12,700	1/2	151,000	101,000
13,000		151,000	101,000



Normaaliporat



- P** • Kärjen kevennys $\geq \varnothing 2,370$ • kartiovaippahionta • Co-seosteinen pikateräs • parempi kulumiskestävyys
- M** ○
- K** •
- N** ○ seosteiset ja runsasseosteiset teräkset • valut yli 800 N/mm² • kuuma- ja kylmävalssatut teräkset • pienikitkaiset laakeriteräkset • runsasseosteiset teräkset • nuorutus- ja hiilikarkaistut teräkset
- S** ○
- H** ○

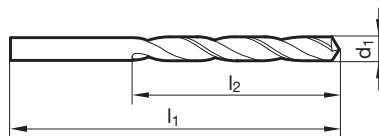
Materiaali **HSCO**

Pinta $>0_{6,00}$

Leikkusuunta

GÜHRING NAVIGATOR

Leikkuuarvosivu 780



Lieriövärtiset kierukkaporat

Artikkelinro. **308**

d1		l1	l2
mm	inch	mm	mm
0,360		19,000	4,000
0,390		20,000	5,000
0,500		22,000	6,000
0,560		24,000	7,000
0,590		24,000	7,000
0,600		24,000	7,000
0,620		26,000	8,000
0,630		26,000	8,000
0,650		26,000	8,000
0,750		28,000	9,000
0,780		30,000	10,000
0,800		30,000	10,000
0,820		30,000	10,000
0,900		32,000	11,000
0,910		32,000	11,000
0,920		32,000	11,000
0,930		32,000	11,000
0,950		32,000	11,000
0,980		34,000	12,000
1,000		34,000	12,000
1,020		34,000	12,000
1,030		34,000	12,000
1,050		34,000	12,000
1,080		36,000	14,000
1,100		36,000	14,000
1,150		36,000	14,000
1,180		36,000	14,000
1,190	3/64	38,000	16,000
1,200		38,000	16,000
1,210		38,000	16,000
1,230		38,000	16,000
1,320		38,000	16,000
1,330		40,000	18,000
1,350		40,000	18,000
1,400		40,000	18,000
1,430		40,000	18,000
1,450		40,000	18,000
1,470		40,000	18,000
1,480		40,000	18,000
1,490		40,000	18,000
1,510		43,000	20,000
1,520		43,000	20,000

d1		l1	l2
mm	inch	mm	mm
1,600		43,000	20,000
1,610		43,000	20,000
1,620		43,000	20,000
1,700		43,000	20,000
1,720		46,000	22,000
1,750		46,000	22,000
1,780		46,000	22,000
1,800		46,000	22,000
1,830		46,000	22,000
1,850		46,000	22,000
1,900		46,000	22,000
1,930		49,000	24,000
1,950		49,000	24,000
1,980	5/64	49,000	24,000
2,000		49,000	24,000
2,050		49,000	24,000
2,060		49,000	24,000
2,080		49,000	24,000
2,100		49,000	24,000
2,180		53,000	27,000
2,200		53,000	27,000
2,250		53,000	27,000
2,260		53,000	27,000
2,350		53,000	27,000
2,370		57,000	30,000
2,380	3/32	57,000	30,000
2,400		57,000	30,000
2,500		57,000	30,000
2,520		57,000	30,000
2,530		57,000	30,000
2,600		57,000	30,000
2,640		57,000	30,000
2,750		61,000	33,000
2,780	7/64	61,000	33,000
2,790		61,000	33,000
2,800		61,000	33,000
2,820		61,000	33,000
2,950		61,000	33,000
3,000		61,000	33,000
3,030		65,000	36,000
3,050		65,000	36,000
3,100		65,000	36,000

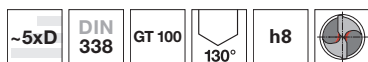


d1		l1	l2
mm	inch	mm	mm
3,150		65,000	36,000
3,170	1/8	65,000	36,000
3,200		65,000	36,000
3,300		65,000	36,000
3,400		70,000	39,000
3,420		70,000	39,000
3,450		70,000	39,000
3,500		70,000	39,000
3,530		70,000	39,000
3,650		70,000	39,000
3,660		70,000	39,000
3,700		70,000	39,000
3,800		75,000	43,000
3,860		75,000	43,000
3,900		75,000	43,000
3,910		75,000	43,000
3,970	5/32	75,000	43,000
3,990		75,000	43,000
4,000		75,000	43,000
4,040		75,000	43,000
4,050		75,000	43,000
4,090		75,000	43,000
4,150		75,000	43,000
4,200		75,000	43,000
4,220		75,000	43,000
4,300		80,000	47,000
4,350		80,000	47,000
4,370	11/64	80,000	47,000
4,390		80,000	47,000
4,400		80,000	47,000
4,500		80,000	47,000
4,620		80,000	47,000
4,650		80,000	47,000
4,700		80,000	47,000
4,760	3/16	86,000	52,000
4,800		86,000	52,000
4,830		86,000	52,000
4,900		86,000	52,000
5,000		86,000	52,000
5,060		86,000	52,000
5,110		86,000	52,000
5,160	13/64	86,000	52,000
5,180		86,000	52,000
5,200		86,000	52,000
5,220		86,000	52,000
5,300		86,000	52,000
5,310		93,000	57,000
5,400		93,000	57,000
5,410		93,000	57,000
5,550		93,000	57,000
5,560	7/32	93,000	57,000
5,570		93,000	57,000
5,610		93,000	57,000
5,700		93,000	57,000
5,800		93,000	57,000
5,900		93,000	57,000
5,940		93,000	57,000
5,950	15/64	93,000	57,000
6,000		93,000	57,000
6,100		101,000	63,000
6,250		101,000	63,000
6,300		101,000	63,000
6,350	1/4	101,000	63,000
6,400		101,000	63,000
6,530		101,000	63,000
6,700		101,000	63,000

d1		l1	l2
mm	inch	mm	mm
6,750	17/64	109,000	69,000
7,040		109,000	69,000
7,370		109,000	69,000
7,400		109,000	69,000
7,490		109,000	69,000
7,500		109,000	69,000
7,540	19/64	117,000	75,000
7,600		117,000	75,000
7,670		117,000	75,000
7,700		117,000	75,000
8,000		117,000	75,000
8,030		117,000	75,000
8,040		117,000	75,000
8,300		117,000	75,000
8,330	21/64	117,000	75,000
8,600		125,000	81,000
8,610		125,000	81,000
8,700		125,000	81,000
8,730	11/32	125,000	81,000
8,800		125,000	81,000
8,840		125,000	81,000
9,000		125,000	81,000
9,090		125,000	81,000
9,100		125,000	81,000
9,130	23/64	125,000	81,000
9,200		125,000	81,000
9,300		125,000	81,000
9,340		125,000	81,000
9,400		125,000	81,000
9,500		125,000	81,000
9,520	3/8	133,000	87,000
9,600		133,000	87,000
9,800		133,000	87,000
9,900		133,000	87,000
9,920	25/64	133,000	87,000
10,000		133,000	87,000
10,080		133,000	87,000
10,260		133,000	87,000
10,320	13/32	133,000	87,000
10,490		133,000	87,000
10,800		142,000	94,000
11,000		142,000	94,000
11,110	7/16	142,000	94,000
11,200		142,000	94,000
11,400		142,000	94,000
11,500		142,000	94,000
11,510	29/64	142,000	94,000
11,910	15/32	151,000	101,000
12,050		151,000	101,000
12,250		151,000	101,000
12,300	31/64	151,000	101,000
12,500		151,000	101,000
12,700	1/2	151,000	101,000
13,750		160,000	108,000
14,300		169,000	114,000
14,500		169,000	114,000
16,200		184,000	125,000
16,500		184,000	125,000
18,000		191,000	130,000
18,500		198,000	135,000



Normaaliporat

Materiaali **HSCO**

Pinta

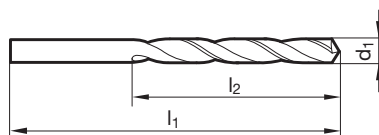
Leikkusuunta

P • Kärjen kevennys $\geq \varnothing 1,000$ • kartiovaippahionta • Co-seosteinen pikateräs • avarat lastu-urat • parempi kulumiskestävyys • erityisesti yli 3xD poraussyvyyksille

M ○
K •
N • seostettu-/seostamaton teräs • valut yli 800 N/mm² • kuuma- ja kylmävalssatut teräkset • pienikitkaiset laakeriteräkset • runsasseosteiset teräkset • nuorrutus- ja hiilikarkaistut teräkset

H**GÜHRING** NAVIGATOR

Leikkuarvosivu 780



Artikkelinro.

622

d1		l1	l2	d1		l1	l2
mm	inch	mm	mm	mm	inch	mm	mm
1,000		34,000	12,000	2,080		49,000	24,000
1,020		34,000	12,000	2,100		49,000	24,000
1,040		34,000	12,000	2,150		53,000	27,000
1,050		34,000	12,000	2,180		53,000	27,000
1,070		36,000	14,000	2,200		53,000	27,000
1,090		36,000	14,000	2,250		53,000	27,000
1,100		36,000	14,000	2,260		53,000	27,000
1,130		36,000	14,000	2,300		53,000	27,000
1,150		36,000	14,000	2,350		53,000	27,000
1,180		36,000	14,000	2,370		57,000	30,000
1,190	3/64	38,000	16,000	2,380	3/32	57,000	30,000
1,200		38,000	16,000	2,400		57,000	30,000
1,250		38,000	16,000	2,420		57,000	30,000
1,270		38,000	16,000	2,440		57,000	30,000
1,300		38,000	16,000	2,450		57,000	30,000
1,320		38,000	16,000	2,490		57,000	30,000
1,350		40,000	18,000	2,500		57,000	30,000
1,400		40,000	18,000	2,530		57,000	30,000
1,430		40,000	18,000	2,550		57,000	30,000
1,440		40,000	18,000	2,580		57,000	30,000
1,450		40,000	18,000	2,600		57,000	30,000
1,500		40,000	18,000	2,640		57,000	30,000
1,510		43,000	20,000	2,650		57,000	30,000
1,550		43,000	20,000	2,700		61,000	33,000
1,590	1/16	43,000	20,000	2,710		61,000	33,000
1,600		43,000	20,000	2,750		61,000	33,000
1,610		43,000	20,000	2,780	7/64	61,000	33,000
1,650		43,000	20,000	2,790		61,000	33,000
1,700		43,000	20,000	2,800		61,000	33,000
1,780		46,000	22,000	2,820		61,000	33,000
1,800		46,000	22,000	2,850		61,000	33,000
1,850		46,000	22,000	2,870		61,000	33,000
1,900		46,000	22,000	2,900		61,000	33,000
1,920		49,000	24,000	2,950		61,000	33,000
1,930		49,000	24,000	3,000		61,000	33,000
1,950		49,000	24,000	3,050		65,000	36,000
1,960		49,000	24,000	3,100		65,000	36,000
1,980	5/64	49,000	24,000	3,150		65,000	36,000
1,990		49,000	24,000	3,170	1/8	65,000	36,000
2,000		49,000	24,000	3,200		65,000	36,000
2,050		49,000	24,000	3,250		65,000	36,000
2,060		49,000	24,000	3,260		65,000	36,000



d1		l1	l2
mm	inch	mm	mm
3,300		65,000	36,000
3,400		70,000	39,000
3,450		70,000	39,000
3,500		70,000	39,000
3,570	9/64	70,000	39,000
3,600		70,000	39,000
3,650		70,000	39,000
3,660		70,000	39,000
3,700		70,000	39,000
3,730		70,000	39,000
3,800		75,000	43,000
3,860		75,000	43,000
3,900		75,000	43,000
3,910		75,000	43,000
3,970	5/32	75,000	43,000
3,990		75,000	43,000
4,000		75,000	43,000
4,020		75,000	43,000
4,040		75,000	43,000
4,050		75,000	43,000
4,090		75,000	43,000
4,100		75,000	43,000
4,150		75,000	43,000
4,200		75,000	43,000
4,220		75,000	43,000
4,250		75,000	43,000
4,300		80,000	47,000
4,370	11/64	80,000	47,000
4,390		80,000	47,000
4,400		80,000	47,000
4,500		80,000	47,000
4,550		80,000	47,000
4,570		80,000	47,000
4,600		80,000	47,000
4,620		80,000	47,000
4,650		80,000	47,000
4,700		80,000	47,000
4,750		80,000	47,000
4,760	3/16	86,000	52,000
4,800		86,000	52,000
4,850		86,000	52,000
4,900		86,000	52,000
4,920		86,000	52,000
4,980		86,000	52,000
5,000		86,000	52,000
5,060		86,000	52,000
5,100		86,000	52,000
5,110		86,000	52,000
5,160	13/64	86,000	52,000
5,180		86,000	52,000
5,200		86,000	52,000
5,220		86,000	52,000
5,250		86,000	52,000
5,300		86,000	52,000
5,310		93,000	57,000
5,400		93,000	57,000
5,410		93,000	57,000
5,500		93,000	57,000
5,560	7/32	93,000	57,000
5,600		93,000	57,000
5,610		93,000	57,000
5,700		93,000	57,000
5,750		93,000	57,000
5,790		93,000	57,000
5,800		93,000	57,000
5,900		93,000	57,000
5,940		93,000	57,000
5,950	15/64	93,000	57,000
6,000		93,000	57,000
6,040		101,000	63,000
6,050		101,000	63,000
6,100		101,000	63,000

d1		l1	l2
mm	inch	mm	mm
6,150		101,000	63,000
6,200		101,000	63,000
6,250		101,000	63,000
6,300		101,000	63,000
6,350	1/4	101,000	63,000
6,400		101,000	63,000
6,500		101,000	63,000
6,530		101,000	63,000
6,600		101,000	63,000
6,630		101,000	63,000
6,650		101,000	63,000
6,700		101,000	63,000
6,750	17/64	109,000	69,000
6,800		109,000	69,000
6,900		109,000	69,000
7,000		109,000	69,000
7,030		109,000	69,000
7,100		109,000	69,000
7,140	9/32	109,000	69,000
7,200		109,000	69,000
7,300		109,000	69,000
7,370		109,000	69,000
7,400		109,000	69,000
7,450		109,000	69,000
7,490		109,000	69,000
7,500		109,000	69,000
7,540	19/64	117,000	75,000
7,600		117,000	75,000
7,670		117,000	75,000
7,700		117,000	75,000
7,750		117,000	75,000
7,800		117,000	75,000
7,900		117,000	75,000
7,940	5/16	117,000	75,000
8,000		117,000	75,000
8,030		117,000	75,000
8,100		117,000	75,000
8,200		117,000	75,000
8,300		117,000	75,000
8,330	21/64	117,000	75,000
8,400		117,000	75,000
8,430		117,000	75,000
8,500		117,000	75,000
8,600		125,000	81,000
8,610		125,000	81,000
8,700		125,000	81,000
8,730	11/32	125,000	81,000
8,800		125,000	81,000
8,840		125,000	81,000
8,900		125,000	81,000
9,000		125,000	81,000
9,090		125,000	81,000
9,100		125,000	81,000
9,130	23/64	125,000	81,000
9,200		125,000	81,000
9,300		125,000	81,000
9,340		125,000	81,000
9,400		125,000	81,000
9,500		125,000	81,000
9,520	3/8	133,000	87,000
9,580		133,000	87,000
9,600		133,000	87,000
9,700		133,000	87,000
9,800		133,000	87,000
9,900		133,000	87,000
9,920	25/64	133,000	87,000
10,000		133,000	87,000
10,080		133,000	87,000
10,100		133,000	87,000
10,200		133,000	87,000
10,250		133,000	87,000
10,260		133,000	87,000



d1		l1	l2
mm	inch	mm	mm
10,300		133,000	87,000
10,320	13/32	133,000	87,000
10,400		133,000	87,000
10,500		133,000	87,000
10,600		133,000	87,000
10,700		142,000	94,000
10,720	27/64	142,000	94,000
10,800		142,000	94,000
10,900		142,000	94,000
11,000		142,000	94,000
11,100		142,000	94,000
11,110	7/16	142,000	94,000
11,200		142,000	94,000
11,300		142,000	94,000
11,400		142,000	94,000
11,500		142,000	94,000
11,510	29/64	142,000	94,000
11,600		142,000	94,000

d1		l1	l2
mm	inch	mm	mm
11,700		142,000	94,000
11,800		142,000	94,000
11,910	15/32	151,000	101,000
12,000		151,000	101,000
12,500		151,000	101,000
12,700	1/2	151,000	101,000
12,800		151,000	101,000
13,000		151,000	101,000
13,500		160,000	108,000
13,800		160,000	108,000
14,000		160,000	108,000
16,000		178,000	120,000



Normaaliporat



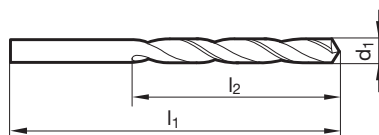
- P** • Kärjen kevennys $\geq \varnothing 1,000$ • kartiovaippahionta • Co-seosteinen pikateräs • avarat lastu-urat • parempi kulumiskestävyys • erityisesti yli 3xD porausvyvyksille
- M** ○
- K** •
- N** ○ seosteiset ja runsasseosteiset teräkset • valut yli 800 N/mm² • kuuma- ja kylmävalssatut teräkset • pienikitkaiset laakeriteräkset • runsasseosteiset teräkset • nuorutus- ja hiilikarkaistut teräkset
- S** ○
- H** ○

Materiaali	HSCO
Pinta	S
Leikkusuunta	R

Lieriövartiset kierukkaporat

GÜHRING NAVIGATOR

Leikkuarvosivu 782



Artikkelinro. **658**

d1		l1	l2	d1		l1	l2
mm	inch	mm	mm	mm	inch	mm	mm
1,000		34,000	12,000	2,300		53,000	27,000
1,020		34,000	12,000	2,350		53,000	27,000
1,050		34,000	12,000	2,370		57,000	30,000
1,070		36,000	14,000	2,380	3/32	57,000	30,000
1,100		36,000	14,000	2,400		57,000	30,000
1,130		36,000	14,000	2,440		57,000	30,000
1,150		36,000	14,000	2,450		57,000	30,000
1,190	3/64	38,000	16,000	2,490		57,000	30,000
1,200		38,000	16,000	2,500		57,000	30,000
1,300		38,000	16,000	2,530		57,000	30,000
1,320		38,000	16,000	2,550		57,000	30,000
1,350		40,000	18,000	2,580		57,000	30,000
1,400		40,000	18,000	2,600		57,000	30,000
1,430		40,000	18,000	2,640		57,000	30,000
1,450		40,000	18,000	2,650		57,000	30,000
1,500		40,000	18,000	2,700		61,000	33,000
1,510		43,000	20,000	2,750		61,000	33,000
1,550		43,000	20,000	2,780	7/64	61,000	33,000
1,590	1/16	43,000	20,000	2,790		61,000	33,000
1,600		43,000	20,000	2,800		61,000	33,000
1,610		43,000	20,000	2,820		61,000	33,000
1,630		43,000	20,000	2,870		61,000	33,000
1,650		43,000	20,000	2,900		61,000	33,000
1,700		43,000	20,000	2,950		61,000	33,000
1,780		46,000	22,000	3,000		61,000	33,000
1,800		46,000	22,000	3,050		65,000	36,000
1,850		46,000	22,000	3,100		65,000	36,000
1,900		46,000	22,000	3,170	1/8	65,000	36,000
1,930		49,000	24,000	3,200		65,000	36,000
1,950		49,000	24,000	3,250		65,000	36,000
1,980	5/64	49,000	24,000	3,260		65,000	36,000
1,990		49,000	24,000	3,300		65,000	36,000
2,000		49,000	24,000	3,400		70,000	39,000
2,050		49,000	24,000	3,450		70,000	39,000
2,060		49,000	24,000	3,500		70,000	39,000
2,080		49,000	24,000	3,570	9/64	70,000	39,000
2,100		49,000	24,000	3,600		70,000	39,000
2,150		53,000	27,000	3,660		70,000	39,000
2,180		53,000	27,000	3,700		70,000	39,000
2,200		53,000	27,000	3,750		70,000	39,000
2,250		53,000	27,000	3,800		75,000	43,000
2,260		53,000	27,000	3,860		75,000	43,000



d1		l1	l2
mm	inch	mm	mm
3,900		75,000	43,000
3,970	5/32	75,000	43,000
4,000		75,000	43,000
4,030		75,000	43,000
4,040		75,000	43,000
4,050		75,000	43,000
4,090		75,000	43,000
4,100		75,000	43,000
4,200		75,000	43,000
4,220		75,000	43,000
4,250		75,000	43,000
4,300		80,000	47,000
4,370	11/64	80,000	47,000
4,400		80,000	47,000
4,500		80,000	47,000
4,570		80,000	47,000
4,600		80,000	47,000
4,620		80,000	47,000
4,700		80,000	47,000
4,760	3/16	86,000	52,000
4,800		86,000	52,000
4,850		86,000	52,000
4,900		86,000	52,000
4,920		86,000	52,000
4,980		86,000	52,000
5,000		86,000	52,000
5,060		86,000	52,000
5,100		86,000	52,000
5,160	13/64	86,000	52,000
5,200		86,000	52,000
5,300		86,000	52,000
5,400		93,000	57,000
5,500		93,000	57,000
5,560	7/32	93,000	57,000
5,600		93,000	57,000
5,610		93,000	57,000
5,700		93,000	57,000
5,790		93,000	57,000
5,800		93,000	57,000
5,850		93,000	57,000
5,900		93,000	57,000
5,950	15/64	93,000	57,000
6,000		93,000	57,000
6,100		101,000	63,000
6,150		101,000	63,000
6,200		101,000	63,000
6,300		101,000	63,000
6,350	1/4	101,000	63,000
6,400		101,000	63,000
6,500		101,000	63,000
6,530		101,000	63,000
6,600		101,000	63,000
6,700		101,000	63,000
6,750	17/64	109,000	69,000
6,800		109,000	69,000
6,900		109,000	69,000
7,000		109,000	69,000
7,100		109,000	69,000
7,140	9/32	109,000	69,000
7,200		109,000	69,000

d1		l1	l2
mm	inch	mm	mm
7,300		109,000	69,000
7,400		109,000	69,000
7,500		109,000	69,000
7,600		117,000	75,000
7,700		117,000	75,000
7,800		117,000	75,000
7,900		117,000	75,000
7,940	5/16	117,000	75,000
8,000		117,000	75,000
8,100		117,000	75,000
8,200		117,000	75,000
8,300		117,000	75,000
8,400		117,000	75,000
8,500		117,000	75,000
8,600		125,000	81,000
8,700		125,000	81,000
8,730	11/32	125,000	81,000
8,750		125,000	81,000
8,800		125,000	81,000
8,900		125,000	81,000
9,000		125,000	81,000
9,130	23/64	125,000	81,000
9,200		125,000	81,000
9,300		125,000	81,000
9,400		125,000	81,000
9,500		125,000	81,000
9,520	3/8	133,000	87,000
9,600		133,000	87,000
9,700		133,000	87,000
9,800		133,000	87,000
9,900		133,000	87,000
9,920	25/64	133,000	87,000
10,000		133,000	87,000
10,100		133,000	87,000
10,200		133,000	87,000
10,300		133,000	87,000
10,320	13/32	133,000	87,000
10,500		133,000	87,000
10,720	27/64	142,000	94,000
10,800		142,000	94,000
11,000		142,000	94,000
11,110	7/16	142,000	94,000
11,200		142,000	94,000
11,500		142,000	94,000
11,700		142,000	94,000
11,800		142,000	94,000
11,910	15/32	151,000	101,000
12,000		151,000	101,000
12,500		151,000	101,000
12,800		151,000	101,000
13,000		151,000	101,000
13,500		160,000	108,000
13,800		160,000	108,000
14,000		160,000	108,000
14,500		169,000	114,000
15,000		169,000	114,000



Normaaliporat



- P** • Kärjen kevennys $\geq \varnothing 1,000$ • kartiovaippahionta • Co-seosteinen pikateräs • avarat lastu-urat • parempi kulumiskestävyys • erityisesti yli 3xD porausvyvyksille
- M** ○
- K** •
- N** • seosteiset ja runsasseosteiset teräkset • valut yli 800 N/mm² • kuuma- ja kylmävalssatut teräkset • pienikitkaiset laakeriteräkset • runsasseosteiset teräkset • nuorutus- ja hiilikarkaistut teräkset
- S** ○
- H** ○

Materiaali **HSCO**

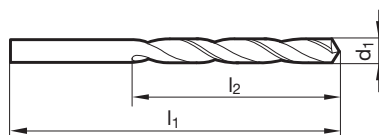
Pinta **F**

Leikkusuunta **R**

Lieriövartiset kierukkaporat

GÜHRING NAVIGATOR

Leikkuuarvosivu 782



Artikkelinro. **2459**

d1		l1	l2
mm	inch	mm	mm
1,000		34,000	12,000
1,100		36,000	14,000
1,200		38,000	16,000
1,300		38,000	16,000
1,400		40,000	18,000
1,500		40,000	18,000
1,600		43,000	20,000
1,700		43,000	20,000
1,800		46,000	22,000
1,900		46,000	22,000
2,000		49,000	24,000
2,100		49,000	24,000
2,200		53,000	27,000
2,300		53,000	27,000
2,400		57,000	30,000
2,500		57,000	30,000
2,600		57,000	30,000
2,700		61,000	33,000
2,800		61,000	33,000
2,900		61,000	33,000
3,000		61,000	33,000
3,100		65,000	36,000
3,200		65,000	36,000
3,300		65,000	36,000
3,400		70,000	39,000
3,500		70,000	39,000
3,600		70,000	39,000
3,700		70,000	39,000
3,800		75,000	43,000
3,900		75,000	43,000
4,000		75,000	43,000
4,100		75,000	43,000
4,200		75,000	43,000
4,300		80,000	47,000
4,400		80,000	47,000
4,500		80,000	47,000
4,600		80,000	47,000
4,700		80,000	47,000
4,800		86,000	52,000
4,900		86,000	52,000
5,000		86,000	52,000
5,100		86,000	52,000

d1		l1	l2
mm	inch	mm	mm
5,200		86,000	52,000
5,300		86,000	52,000
5,400		93,000	57,000
5,500		93,000	57,000
5,600		93,000	57,000
5,700		93,000	57,000
5,800		93,000	57,000
5,900		93,000	57,000
6,000		93,000	57,000
6,100		101,000	63,000
6,200		101,000	63,000
6,300		101,000	63,000
6,400		101,000	63,000
6,500		101,000	63,000
6,600		101,000	63,000
6,700		101,000	63,000
6,800		109,000	69,000
6,900		109,000	69,000
7,000		109,000	69,000
7,100		109,000	69,000
7,300		109,000	69,000
7,400		109,000	69,000
7,500		109,000	69,000
7,700		117,000	75,000
7,800		117,000	75,000
7,900		117,000	75,000
8,000		117,000	75,000
8,100		117,000	75,000
8,200		117,000	75,000
8,300		117,000	75,000
8,400		117,000	75,000
8,500		117,000	75,000
8,600		125,000	81,000
8,700		125,000	81,000
8,800		125,000	81,000
9,000		125,000	81,000
9,200		125,000	81,000
9,400		125,000	81,000
9,500		125,000	81,000
9,700		133,000	87,000
9,800		133,000	87,000
9,900		133,000	87,000



d1		l1	l2
mm	inch	mm	mm
10,000		133,000	87,000
10,200		133,000	87,000
10,300		133,000	87,000
10,400		133,000	87,000
10,500		133,000	87,000
11,000		142,000	94,000

d1		l1	l2
mm	inch	mm	mm
11,500		142,000	94,000
12,000		151,000	101,000
13,000		151,000	101,000
14,000		160,000	108,000



Normaaliporat



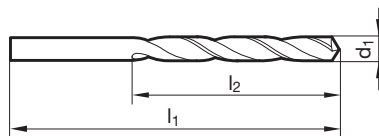
- P** • Kärjen kevennys $\geq \varnothing 3,000$ • kartiovaippahionta • Co-seosteinen pikateräs • avarat lastu-urat • parempi kulumiskestävyys • erityisesti yli 3xD porausvyvyksille
- M**
- K** ○
- N** seosteiset ja runsasseosteiset teräkset • valut yli 800 N/mm² • kuuma- ja kylmävalssatut teräkset • pienikitkaiset laakeriteräkset • runsasseosteiset teräkset • nuorrutus- ja hiilikarkaistut teräkset
- S**
- H**

Materiaali	HSCO
Pinta	C
Leikkusuunta	R

Lieriövaritset kierukkaporat

GÜHRING NAVIGATOR

Leikkuuarvosivu 782



Artikkelinro. **1221**

d1		l1	l2
mm	inch	mm	mm
3,000		61,000	33,000
3,050		65,000	36,000
3,100		65,000	36,000
3,170	1/8	65,000	36,000
3,200		65,000	36,000
3,300		65,000	36,000
3,400		70,000	39,000
3,450		70,000	39,000
3,500		70,000	39,000
3,570	9/64	70,000	39,000
3,600		70,000	39,000
3,660		70,000	39,000
3,700		70,000	39,000
3,750		70,000	39,000
3,800		75,000	43,000
3,900		75,000	43,000
3,970	5/32	75,000	43,000
4,000		75,000	43,000
4,050		75,000	43,000
4,100		75,000	43,000
4,200		75,000	43,000
4,300		80,000	47,000
4,370	11/64	80,000	47,000
4,500		80,000	47,000
4,700		80,000	47,000
4,760	3/16	86,000	52,000
4,800		86,000	52,000
4,900		86,000	52,000
4,920		86,000	52,000
4,980		86,000	52,000
5,000		86,000	52,000
5,100		86,000	52,000
5,200		86,000	52,000
5,400		93,000	57,000
5,500		93,000	57,000
5,560	7/32	93,000	57,000
5,700		93,000	57,000
5,900		93,000	57,000
6,000		93,000	57,000
6,100		101,000	63,000
6,200		101,000	63,000
6,300		101,000	63,000

d1		l1	l2
mm	inch	mm	mm
6,350	1/4	101,000	63,000
6,400		101,000	63,000
6,600		101,000	63,000
6,700		101,000	63,000
6,800		109,000	69,000
6,900		109,000	69,000
7,000		109,000	69,000
7,100		109,000	69,000
7,400		109,000	69,000
7,800		117,000	75,000
7,900		117,000	75,000
8,000		117,000	75,000
8,200		117,000	75,000
8,300		117,000	75,000
8,400		117,000	75,000
8,500		117,000	75,000
8,600		125,000	81,000
8,700		125,000	81,000
8,900		125,000	81,000
9,000		125,000	81,000
9,130	23/64	125,000	81,000
9,500		125,000	81,000
9,520	3/8	133,000	87,000
9,900		133,000	87,000
9,920	25/64	133,000	87,000
10,000		133,000	87,000
10,100		133,000	87,000
10,200		133,000	87,000
10,400		133,000	87,000
10,700		142,000	94,000
11,200		142,000	94,000
11,910	15/32	151,000	101,000



Normaaliporat

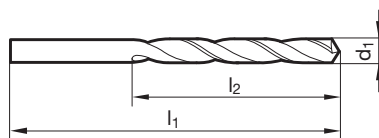


- P** ○ Kärjen kevennys ≥ Ø 3,000 • kartiovaippahionta • Co-seosteinen pikateräs • avarat lastu-urat • parempi kulumiskestävyys • erityisesti yli 3xD porausvyvyksille
- M** ○
- K** ●
- N** ○ seosteiset ja runsasseosteiset teräkset • valut yli 800 N/mm² • kuuma- ja kylmälvalssatut teräkset • pienikitkaiset laakeriteräkset • runsasseosteiset teräkset • nuorrutus- ja hiilikarkaistut teräkset
- S** ○
- H** ○

GÜHRING NAVIGATOR

Leikkuuarvosivu 782

Materiaali	HSCO
Pinta	A
Leikkusuunta	R



Artikkelinro.

1223

d1		l1	l2
mm	inch	mm	mm
3,000		61,000	33,000
3,050		65,000	36,000
3,100		65,000	36,000
3,170	1/8	65,000	36,000
3,200		65,000	36,000
3,300		65,000	36,000
3,500		70,000	39,000
3,600		70,000	39,000
3,700		70,000	39,000
3,800		75,000	43,000
3,860		75,000	43,000
3,900		75,000	43,000
3,970	5/32	75,000	43,000
4,000		75,000	43,000
4,040		75,000	43,000
4,100		75,000	43,000
4,200		75,000	43,000
4,300		80,000	47,000
4,370	11/64	80,000	47,000
4,400		80,000	47,000
4,500		80,000	47,000
4,600		80,000	47,000
4,700		80,000	47,000
4,760	3/16	86,000	52,000
4,800		86,000	52,000
4,900		86,000	52,000
4,920		86,000	52,000
4,980		86,000	52,000
5,000		86,000	52,000
5,100		86,000	52,000
5,160	13/64	86,000	52,000
5,200		86,000	52,000
5,300		86,000	52,000
5,400		93,000	57,000
5,500		93,000	57,000
5,600		93,000	57,000
5,700		93,000	57,000
5,800		93,000	57,000
5,900		93,000	57,000
5,950	15/64	93,000	57,000
6,000		93,000	57,000
6,100		101,000	63,000

d1		l1	l2
mm	inch	mm	mm
6,300		101,000	63,000
6,350	1/4	101,000	63,000
6,400		101,000	63,000
6,500		101,000	63,000
6,600		101,000	63,000
6,700		101,000	63,000
6,900		109,000	69,000
7,000		109,000	69,000
7,100		109,000	69,000
7,200		109,000	69,000
7,300		109,000	69,000
7,400		109,000	69,000
7,500		109,000	69,000
7,600		117,000	75,000
7,700		117,000	75,000
7,800		117,000	75,000
7,900		117,000	75,000
7,940	5/16	117,000	75,000
8,000		117,000	75,000
8,100		117,000	75,000
8,200		117,000	75,000
8,300		117,000	75,000
8,400		117,000	75,000
8,500		117,000	75,000
8,600		125,000	81,000
8,700		125,000	81,000
8,730	11/32	125,000	81,000
8,800		125,000	81,000
9,000		125,000	81,000
9,130	23/64	125,000	81,000
9,200		125,000	81,000
9,500		125,000	81,000
9,520	3/8	133,000	87,000
9,530		133,000	87,000
9,800		133,000	87,000
9,900		133,000	87,000
9,920	25/64	133,000	87,000
10,000		133,000	87,000
10,100		133,000	87,000
10,200		133,000	87,000
10,300		133,000	87,000
10,400		133,000	87,000

Lieriövartiset kierukkeporat



d1		l1	l2
mm	inch	mm	mm
10,500		133,000	87,000
10,700		142,000	94,000
10,720	27/64	142,000	94,000
10,800		142,000	94,000
11,000		142,000	94,000
11,110	7/16	142,000	94,000

d1		l1	l2
mm	inch	mm	mm
11,200		142,000	94,000
11,500		142,000	94,000
11,700		142,000	94,000
12,000		151,000	101,000



Normaaliporat



P ○ Kärjen kevennys $\geq \varnothing 0,970$ • kartiovaippahionta • Co-seosteinen pikateräs • parempi kulumiskestävyys

M ●

K ●

N Titaani ja titaaniseokset • ruostumatt.-/haponk.-/kuumal. austeniittiset teräkset • lujat- ja lyhytlastuiset teräkset yli 900 N/mm² • Hastelloy, Inconel, Nimonic

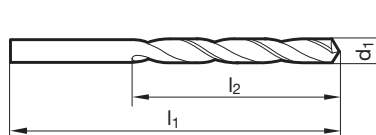
S ●

H ●

GÜHRING NAVIGATOR

Leikkuuarvosivu 780

Materiaali	HSCO
Pinta	○
Leikkusuunta	Ⓜ



Artikkelinro.

605

d1		l1	l2
mm	inch	mm	mm
0,200		19,000	2,500
0,300		19,000	3,000
0,380		19,000	4,000
0,400	1/64	20,000	5,000
0,440		20,000	5,000
0,450		20,000	5,000
0,500		22,000	6,000
0,510		22,000	6,000
0,530		22,000	6,000
0,550		24,000	7,000
0,570		24,000	7,000
0,580		24,000	7,000
0,600		24,000	7,000
0,610		26,000	8,000
0,640		26,000	8,000
0,650		26,000	8,000
0,700		28,000	9,000
0,710		28,000	9,000
0,720		28,000	9,000
0,750		28,000	9,000
0,760		30,000	10,000
0,790	1/32	30,000	10,000
0,800		30,000	10,000
0,810		30,000	10,000
0,820		30,000	10,000
0,830		30,000	10,000
0,840		30,000	10,000
0,850		30,000	10,000
0,860		32,000	11,000
0,870		32,000	11,000
0,880		32,000	11,000
0,887		32,000	11,000
0,890		32,000	11,000
0,900		32,000	11,000
0,910		32,000	11,000
0,920		32,000	11,000
0,940		32,000	11,000
0,950		32,000	11,000
0,980		34,000	12,000
0,990		34,000	12,000
1,000		34,000	12,000
1,020		34,000	12,000

d1		l1	l2
mm	inch	mm	mm
1,040		34,000	12,000
1,050		34,000	12,000
1,070		36,000	14,000
1,080		36,000	14,000
1,090		36,000	14,000
1,100		36,000	14,000
1,140		36,000	14,000
1,150		36,000	14,000
1,160		36,000	14,000
1,180		36,000	14,000
1,190	3/64	38,000	16,000
1,200		38,000	16,000
1,210		38,000	16,000
1,220		38,000	16,000
1,230		38,000	16,000
1,250		38,000	16,000
1,290		38,000	16,000
1,300		38,000	16,000
1,320		38,000	16,000
1,350		40,000	18,000
1,400		40,000	18,000
1,450		40,000	18,000
1,460		40,000	18,000
1,500		40,000	18,000
1,510		43,000	20,000
1,520		43,000	20,000
1,530		43,000	20,000
1,550		43,000	20,000
1,570		43,000	20,000
1,590	1/16	43,000	20,000
1,600		43,000	20,000
1,610		43,000	20,000
1,620		43,000	20,000
1,650		43,000	20,000
1,680		43,000	20,000
1,700		43,000	20,000
1,730		46,000	22,000
1,750		46,000	22,000
1,780		46,000	22,000
1,800		46,000	22,000
1,820		46,000	22,000
1,850		46,000	22,000

Lieriövärtiset
kierukkaporat



d1		l1	l2
mm	inch	mm	mm
1,900		46,000	22,000
1,930		49,000	24,000
1,950		49,000	24,000
1,970		49,000	24,000
1,980	5/64	49,000	24,000
1,990		49,000	24,000
2,000		49,000	24,000
2,020		49,000	24,000
2,030		49,000	24,000
2,050		49,000	24,000
2,080		49,000	24,000
2,100		49,000	24,000
2,120		49,000	24,000
2,150		53,000	27,000
2,180		53,000	27,000
2,200		53,000	27,000
2,250		53,000	27,000
2,260		53,000	27,000
2,300		53,000	27,000
2,320		53,000	27,000
2,350		53,000	27,000
2,370		57,000	30,000
2,380	3/32	57,000	30,000
2,400		57,000	30,000
2,450		57,000	30,000
2,490		57,000	30,000
2,500		57,000	30,000
2,530		57,000	30,000
2,550		57,000	30,000
2,600		57,000	30,000
2,650		57,000	30,000
2,700		61,000	33,000
2,710		61,000	33,000
2,750		61,000	33,000
2,780	7/64	61,000	33,000
2,790		61,000	33,000
2,800		61,000	33,000
2,810		61,000	33,000
2,820		61,000	33,000
2,850		61,000	33,000
2,870		61,000	33,000
2,900		61,000	33,000
2,950		61,000	33,000
3,000		61,000	33,000
3,030		65,000	36,000
3,050		65,000	36,000
3,100		65,000	36,000
3,150		65,000	36,000
3,170	1/8	65,000	36,000
3,200		65,000	36,000
3,250		65,000	36,000
3,260		65,000	36,000
3,300		65,000	36,000
3,350		65,000	36,000
3,400		70,000	39,000
3,450		70,000	39,000
3,500		70,000	39,000
3,550		70,000	39,000
3,570	9/64	70,000	39,000
3,600		70,000	39,000
3,650		70,000	39,000
3,700		70,000	39,000
3,750		70,000	39,000
3,790		75,000	43,000
3,800		75,000	43,000
3,900		75,000	43,000
3,950		75,000	43,000
3,970	5/32	75,000	43,000
3,980		75,000	43,000
4,000		75,000	43,000
4,040		75,000	43,000
4,050		75,000	43,000

d1		l1	l2
mm	inch	mm	mm
4,100		75,000	43,000
4,150		75,000	43,000
4,200		75,000	43,000
4,220		75,000	43,000
4,250		75,000	43,000
4,300		80,000	47,000
4,350		80,000	47,000
4,370	11/64	80,000	47,000
4,400		80,000	47,000
4,450		80,000	47,000
4,500		80,000	47,000
4,570		80,000	47,000
4,600		80,000	47,000
4,650		80,000	47,000
4,700		80,000	47,000
4,750		80,000	47,000
4,760	3/16	86,000	52,000
4,790		86,000	52,000
4,800		86,000	52,000
4,850		86,000	52,000
4,900		86,000	52,000
5,000		86,000	52,000
5,050		86,000	52,000
5,100		86,000	52,000
5,110		86,000	52,000
5,160	13/64	86,000	52,000
5,200		86,000	52,000
5,250		86,000	52,000
5,300		86,000	52,000
5,400		93,000	57,000
5,410		93,000	57,000
5,500		93,000	57,000
5,550		93,000	57,000
5,560	7/32	93,000	57,000
5,600		93,000	57,000
5,610		93,000	57,000
5,700		93,000	57,000
5,750		93,000	57,000
5,800		93,000	57,000
5,900		93,000	57,000
5,950	15/64	93,000	57,000
6,000		93,000	57,000
6,050		101,000	63,000
6,080		101,000	63,000
6,100		101,000	63,000
6,200		101,000	63,000
6,300		101,000	63,000
6,350	1/4	101,000	63,000
6,400		101,000	63,000
6,500		101,000	63,000
6,600		101,000	63,000
6,700		101,000	63,000
6,750	17/64	109,000	69,000
6,800		109,000	69,000
6,900		109,000	69,000
7,000		109,000	69,000
7,100		109,000	69,000
7,140	9/32	109,000	69,000
7,200		109,000	69,000
7,300		109,000	69,000
7,400		109,000	69,000
7,500		109,000	69,000
7,540	19/64	117,000	75,000
7,600		117,000	75,000
7,700		117,000	75,000
7,800		117,000	75,000
7,900		117,000	75,000
7,940	5/16	117,000	75,000
8,000		117,000	75,000
8,100		117,000	75,000
8,200		117,000	75,000
8,300		117,000	75,000



d1		l1	l2
mm	inch	mm	mm
8,330	21/64	117,000	75,000
8,400		117,000	75,000
8,500		117,000	75,000
8,550		125,000	81,000
8,600		125,000	81,000
8,700		125,000	81,000
8,730	11/32	125,000	81,000
8,800		125,000	81,000
8,900		125,000	81,000
9,000		125,000	81,000
9,100		125,000	81,000
9,130	23/64	125,000	81,000
9,200		125,000	81,000
9,300		125,000	81,000
9,400		125,000	81,000
9,500		125,000	81,000
9,520	3/8	133,000	87,000
9,600		133,000	87,000
9,700		133,000	87,000
9,800		133,000	87,000
9,900		133,000	87,000
9,920	25/64	133,000	87,000
10,000		133,000	87,000
10,100		133,000	87,000
10,200		133,000	87,000
10,300		133,000	87,000
10,320	13/32	133,000	87,000
10,400		133,000	87,000
10,500		133,000	87,000
10,600		133,000	87,000
10,700		142,000	94,000
10,720	27/64	142,000	94,000
10,800		142,000	94,000
11,000		142,000	94,000
11,100		142,000	94,000
11,110	7/16	142,000	94,000

d1		l1	l2
mm	inch	mm	mm
11,200		142,000	94,000
11,300		142,000	94,000
11,500		142,000	94,000
11,510	29/64	142,000	94,000
11,600		142,000	94,000
11,700		142,000	94,000
11,750		142,000	94,000
11,800		142,000	94,000
11,900		151,000	101,000
11,910	15/32	151,000	101,000
12,000		151,000	101,000
12,100		151,000	101,000
12,200		151,000	101,000
12,300	31/64	151,000	101,000
12,500		151,000	101,000
12,700	1/2	151,000	101,000
12,800		151,000	101,000
13,000		151,000	101,000
13,100	33/64	151,000	101,000
13,500		160,000	108,000
13,800		160,000	108,000
13,890	35/64	160,000	108,000
13,970		160,000	108,000
14,000		160,000	108,000
14,290	9/16	169,000	114,000
14,500		169,000	114,000
14,680	37/64	169,000	114,000
15,000		169,000	114,000
15,500		178,000	120,000
16,000		178,000	120,000
16,500		184,000	125,000
17,000		184,000	125,000
17,500		191,000	130,000
18,000		191,000	130,000
19,000		198,000	135,000



Normaaliporat



P ○ Kärjen kevennys $\geq \varnothing 1,000$ • kartiovaippahionta • Co-seosteinen pikateräs • parempi kulumiskestävyys

M ●

K ●

N ●

S ●

H ●

Titaani ja titaaniseokset • ruostumatt.-/haponk.-/kuumal. austeniittiset teräkset • lujat- ja lyhytlastuiset teräkset yli 900 N/mm² • Hastelloy, Inconel, Nimonic

Materiaali **HSC0**

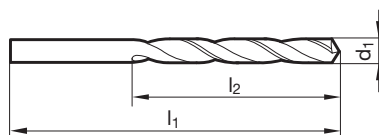
Pinta **S**

Leikkusuunta **R**

GÜHRING NAVIGATOR

Leikkuuarvosivu 782

Lieriövartiset
kierukkaporat



Artikkelinro. **657**

d1		l1	l2
mm	inch	mm	mm
0,500		22,000	6,000
0,530		22,000	6,000
0,600		24,000	7,000
0,650		26,000	8,000
0,700		28,000	9,000
0,750		28,000	9,000
0,800		30,000	10,000
0,850		30,000	10,000
0,880		32,000	11,000
0,900		32,000	11,000
0,920		32,000	11,000
0,940		32,000	11,000
0,950		32,000	11,000
1,000		34,000	12,000
1,050		34,000	12,000
1,100		36,000	14,000
1,150		36,000	14,000
1,180		36,000	14,000
1,190	3/64	38,000	16,000
1,200		38,000	16,000
1,210		38,000	16,000
1,250		38,000	16,000
1,300		38,000	16,000
1,320		38,000	16,000
1,350		40,000	18,000
1,390		40,000	18,000
1,400		40,000	18,000
1,450		40,000	18,000
1,500		40,000	18,000
1,510		43,000	20,000
1,520		43,000	20,000
1,550		43,000	20,000
1,590	1/16	43,000	20,000
1,600		43,000	20,000
1,610		43,000	20,000
1,620		43,000	20,000
1,650		43,000	20,000
1,700		43,000	20,000
1,750		46,000	22,000
1,780		46,000	22,000
1,800		46,000	22,000
1,850		46,000	22,000

d1		l1	l2
mm	inch	mm	mm
1,900		46,000	22,000
1,950		49,000	24,000
1,980	5/64	49,000	24,000
2,000		49,000	24,000
2,050		49,000	24,000
2,100		49,000	24,000
2,150		53,000	27,000
2,200		53,000	27,000
2,250		53,000	27,000
2,260		53,000	27,000
2,300		53,000	27,000
2,350		53,000	27,000
2,380	3/32	57,000	30,000
2,400		57,000	30,000
2,440		57,000	30,000
2,500		57,000	30,000
2,530		57,000	30,000
2,550		57,000	30,000
2,600		57,000	30,000
2,700		61,000	33,000
2,750		61,000	33,000
2,780	7/64	61,000	33,000
2,800		61,000	33,000
2,820		61,000	33,000
2,900		61,000	33,000
2,950		61,000	33,000
3,000		61,000	33,000
3,050		65,000	36,000
3,100		65,000	36,000
3,150		65,000	36,000
3,170	1/8	65,000	36,000
3,200		65,000	36,000
3,250		65,000	36,000
3,260		65,000	36,000
3,300		65,000	36,000
3,350		65,000	36,000
3,400		70,000	39,000
3,500		70,000	39,000
3,570	9/64	70,000	39,000
3,600		70,000	39,000
3,650		70,000	39,000
3,700		70,000	39,000

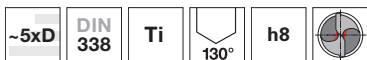


d1		l1	l2
mm	inch	mm	mm
3,750		70,000	39,000
3,800		75,000	43,000
3,900		75,000	43,000
3,970	5/32	75,000	43,000
4,000		75,000	43,000
4,050		75,000	43,000
4,100		75,000	43,000
4,200		75,000	43,000
4,250		75,000	43,000
4,300		80,000	47,000
4,350		80,000	47,000
4,370	11/64	80,000	47,000
4,400		80,000	47,000
4,500		80,000	47,000
4,600		80,000	47,000
4,700		80,000	47,000
4,760	3/16	86,000	52,000
4,800		86,000	52,000
4,900		86,000	52,000
5,000		86,000	52,000
5,050		86,000	52,000
5,100		86,000	52,000
5,110		86,000	52,000
5,160	13/64	86,000	52,000
5,200		86,000	52,000
5,300		86,000	52,000
5,400		93,000	57,000
5,500		93,000	57,000
5,560	7/32	93,000	57,000
5,600		93,000	57,000
5,610		93,000	57,000
5,700		93,000	57,000
5,800		93,000	57,000
5,900		93,000	57,000
5,950	15/64	93,000	57,000
6,000		93,000	57,000
6,100		101,000	63,000
6,200		101,000	63,000
6,300		101,000	63,000
6,350	1/4	101,000	63,000
6,400		101,000	63,000
6,500		101,000	63,000
6,600		101,000	63,000
6,700		101,000	63,000
6,750	17/64	109,000	69,000
6,800		109,000	69,000
6,900		109,000	69,000
7,000		109,000	69,000
7,100		109,000	69,000
7,140	9/32	109,000	69,000
7,200		109,000	69,000
7,300		109,000	69,000
7,400		109,000	69,000
7,500		109,000	69,000

d1		l1	l2
mm	inch	mm	mm
7,540	19/64	117,000	75,000
7,600		117,000	75,000
7,700		117,000	75,000
7,800		117,000	75,000
7,900		117,000	75,000
7,940	5/16	117,000	75,000
8,000		117,000	75,000
8,100		117,000	75,000
8,200		117,000	75,000
8,300		117,000	75,000
8,400		117,000	75,000
8,500		117,000	75,000
8,550		125,000	81,000
8,600		125,000	81,000
8,700		125,000	81,000
8,730	11/32	125,000	81,000
8,800		125,000	81,000
8,900		125,000	81,000
9,000		125,000	81,000
9,100		125,000	81,000
9,200		125,000	81,000
9,300		125,000	81,000
9,400		125,000	81,000
9,500		125,000	81,000
9,520	3/8	133,000	87,000
9,600		133,000	87,000
9,700		133,000	87,000
9,800		133,000	87,000
9,900		133,000	87,000
10,000		133,000	87,000
10,100		133,000	87,000
10,200		133,000	87,000
10,300		133,000	87,000
10,320	13/32	133,000	87,000
10,400		133,000	87,000
10,500		133,000	87,000
10,800		142,000	94,000
11,000		142,000	94,000
11,110	7/16	142,000	94,000
11,200		142,000	94,000
11,500		142,000	94,000
11,910	15/32	151,000	101,000
12,000		151,000	101,000
12,100		151,000	101,000
12,300	31/64	151,000	101,000
12,500		151,000	101,000
12,700	1/2	151,000	101,000
13,000		151,000	101,000
13,500		160,000	108,000
14,000		160,000	108,000
14,500		169,000	114,000



Normaaliporat



P ○ Kärjen kevennys $\geq \varnothing 1,000$ • kartiovaippahionta • Co-seosteinen pikateräs • parempi kulumiskestävyys

M ●

K ●

N Titaani ja titaaniseokset • ruostumatt.-/haponk.-/kuumal. austeniittiset teräkset • lujat- ja lyhytlastuiset teräkset yli 900 N/mm² • Hastelloy, Inconel, Nimonic

S ●

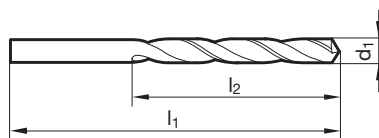
H ●

GÜHRING NAVIGATOR

Leikkuuarvosivu 782

Lieriövärtiset kierukkaporat

Materiaali	HSCO
Pinta	F
Leikkusuunta	R



Artikkelinro.

2458

d1		l1	l2
mm	inch	mm	mm
0,400	1/64	20,000	5,000
0,810		30,000	10,000
1,000		34,000	12,000
1,100		36,000	14,000
1,190	3/64	38,000	16,000
1,200		38,000	16,000
1,300		38,000	16,000
1,400		40,000	18,000
1,500		40,000	18,000
1,530		43,000	20,000
1,590	1/16	43,000	20,000
1,600		43,000	20,000
1,650		43,000	20,000
1,700		43,000	20,000
1,800		46,000	22,000
1,900		46,000	22,000
1,980	5/64	49,000	24,000
2,000		49,000	24,000
2,050		49,000	24,000
2,100		49,000	24,000
2,200		53,000	27,000
2,300		53,000	27,000
2,370		57,000	30,000
2,380	3/32	57,000	30,000
2,400		57,000	30,000
2,500		57,000	30,000
2,600		57,000	30,000
2,700		61,000	33,000
2,750		61,000	33,000
2,780	7/64	61,000	33,000
2,800		61,000	33,000
2,900		61,000	33,000
3,000		61,000	33,000
3,100		65,000	36,000
3,170	1/8	65,000	36,000
3,200		65,000	36,000
3,300		65,000	36,000
3,400		70,000	39,000
3,500		70,000	39,000
3,570	9/64	70,000	39,000
3,600		70,000	39,000
3,700		70,000	39,000

d1		l1	l2
mm	inch	mm	mm
3,800		75,000	43,000
3,900		75,000	43,000
3,970	5/32	75,000	43,000
4,000		75,000	43,000
4,100		75,000	43,000
4,150		75,000	43,000
4,200		75,000	43,000
4,220		75,000	43,000
4,300		80,000	47,000
4,370	11/64	80,000	47,000
4,400		80,000	47,000
4,500		80,000	47,000
4,600		80,000	47,000
4,700		80,000	47,000
4,760	3/16	86,000	52,000
4,800		86,000	52,000
4,900		86,000	52,000
5,000		86,000	52,000
5,050		86,000	52,000
5,100		86,000	52,000
5,160	13/64	86,000	52,000
5,200		86,000	52,000
5,300		86,000	52,000
5,400		93,000	57,000
5,500		93,000	57,000
5,560	7/32	93,000	57,000
5,600		93,000	57,000
5,700		93,000	57,000
5,800		93,000	57,000
5,900		93,000	57,000
5,950	15/64	93,000	57,000
6,000		93,000	57,000
6,100		101,000	63,000
6,200		101,000	63,000
6,300		101,000	63,000
6,350	1/4	101,000	63,000
6,400		101,000	63,000
6,500		101,000	63,000
6,600		101,000	63,000
6,700		101,000	63,000
6,750	17/64	109,000	69,000
6,800		109,000	69,000

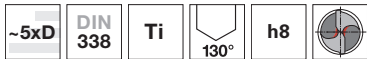


d1		l1	l2
mm	inch	mm	mm
6,900		109,000	69,000
7,000		109,000	69,000
7,140	9/32	109,000	69,000
7,400		109,000	69,000
7,500		109,000	69,000
7,540	19/64	117,000	75,000
7,600		117,000	75,000
7,800		117,000	75,000
7,900		117,000	75,000
7,940	5/16	117,000	75,000
8,000		117,000	75,000
8,100		117,000	75,000
8,200		117,000	75,000
8,300		117,000	75,000
8,330	21/64	117,000	75,000
8,400		117,000	75,000
8,500		117,000	75,000
8,600		125,000	81,000
8,700		125,000	81,000
8,730	11/32	125,000	81,000
8,800		125,000	81,000
9,000		125,000	81,000
9,130	23/64	125,000	81,000
9,200		125,000	81,000
9,300		125,000	81,000
9,400		125,000	81,000
9,500		125,000	81,000
9,520	3/8	133,000	87,000
9,600		133,000	87,000
9,700		133,000	87,000

d1		l1	l2
mm	inch	mm	mm
9,800		133,000	87,000
9,920	25/64	133,000	87,000
10,000		133,000	87,000
10,100		133,000	87,000
10,200		133,000	87,000
10,300		133,000	87,000
10,320	13/32	133,000	87,000
10,400		133,000	87,000
10,500		133,000	87,000
10,720	27/64	142,000	94,000
11,000		142,000	94,000
11,110	7/16	142,000	94,000
11,500		142,000	94,000
11,510	29/64	142,000	94,000
11,910	15/32	151,000	101,000
12,000		151,000	101,000
12,300	31/64	151,000	101,000
12,500		151,000	101,000
12,700	1/2	151,000	101,000
13,000		151,000	101,000
13,100	33/64	151,000	101,000
13,490	17/32	160,000	108,000
14,000		160,000	108,000
14,290	9/16	169,000	114,000
14,500		169,000	114,000
15,000		169,000	114,000



Normaaliporat



P ○ Kärjen kevennys $\geq \varnothing 1,000$ • kartiovaippahionta • Co-seosteinen pikateräs • parempi kulumiskestävyys

M ●

K ●

N Titaani ja titaaniseokset • ruostumatt.-/haponk.-/kuumal. austeniittiset teräkset • lujat- ja lyhytlastuiset teräkset yli 900 N/mm² • Hastelloy, Inconel, Nimonic

S ●

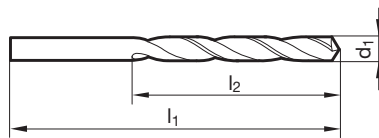
H ●

GÜHRING NAVIGATOR

Leikkuuarvosivu 780

Lieriövärtiset
kierukkaporat

Materiaali	HSCO
Pinta	○
Leikkuusuunta	Ⓛ



Artikkelinro.

608

d1		l1	l2
mm	inch	mm	mm
1,300		38,000	16,000
1,320		38,000	16,000
1,350		40,000	18,000
1,400		40,000	18,000
1,600		43,000	20,000
1,620		43,000	20,000
1,640		43,000	20,000
1,700		43,000	20,000
1,800		46,000	22,000
1,900		46,000	22,000
1,950		49,000	24,000
2,000		49,000	24,000
2,150		53,000	27,000
2,400		57,000	30,000
2,500		57,000	30,000
2,600		57,000	30,000
2,750		61,000	33,000
2,800		61,000	33,000
3,000		61,000	33,000
3,300		65,000	36,000
3,320		65,000	36,000
3,400		70,000	39,000
3,500		70,000	39,000
3,550		70,000	39,000
3,600		70,000	39,000
3,650		70,000	39,000
3,700		70,000	39,000
3,900		75,000	43,000
4,000		75,000	43,000
4,250		75,000	43,000
4,300		80,000	47,000
4,400		80,000	47,000
4,500		80,000	47,000
4,700		80,000	47,000
4,800		86,000	52,000
4,900		86,000	52,000

d1		l1	l2
mm	inch	mm	mm
4,920		86,000	52,000
5,000		86,000	52,000
5,200		86,000	52,000
5,400		93,000	57,000
5,450		93,000	57,000
5,580		93,000	57,000
5,600		93,000	57,000
5,700		93,000	57,000
5,800		93,000	57,000
5,900		93,000	57,000
6,000		93,000	57,000
6,300		101,000	63,000
6,600		101,000	63,000
6,900		109,000	69,000
7,000		109,000	69,000
7,100		109,000	69,000
7,300		109,000	69,000
7,400		109,000	69,000
7,500		109,000	69,000
7,600		117,000	75,000
7,700		117,000	75,000
7,800		117,000	75,000
7,900		117,000	75,000
8,100		117,000	75,000
8,400		117,000	75,000
8,750		125,000	81,000
8,800		125,000	81,000
9,100		125,000	81,000
9,200		125,000	81,000
9,300		125,000	81,000
9,500		125,000	81,000



Normaaliporat



- P** ○ kartiovaippahionta • Co-seosteinen pikateräs • parempi kulumiskestävyys
- M** ●
- K** ●
- N** ○ ruostumatt./-haponk./-kuumal. austeniittiset teräkset (V2A ja V4A)
- S** ○
- H** ●

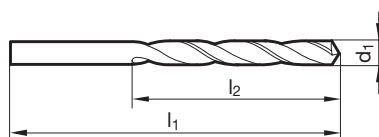
Materiaali **HSCO**

Pinta ○

Leikkusuunta

GÜHRING NAVIGATOR

Leikkuarvosivu 780



Artikkelinro. **1260**

d1		l1	l2	d1		l1	l2
mm	inch	mm	mm	mm	inch	mm	mm
1,000		34,000	12,000	5,100		86,000	52,000
1,100		36,000	14,000	5,200		86,000	52,000
1,200		38,000	16,000	5,300		86,000	52,000
1,300		38,000	16,000	5,400		93,000	57,000
1,400		40,000	18,000	5,500		93,000	57,000
1,500		40,000	18,000	5,600		93,000	57,000
1,600		43,000	20,000	5,700		93,000	57,000
1,700		43,000	20,000	5,800		93,000	57,000
1,800		46,000	22,000	5,900		93,000	57,000
1,900		46,000	22,000	6,000		93,000	57,000
2,000		49,000	24,000	6,100		101,000	63,000
2,100		49,000	24,000	6,200		101,000	63,000
2,200		53,000	27,000	6,300		101,000	63,000
2,300		53,000	27,000	6,400		101,000	63,000
2,400		57,000	30,000	6,500		101,000	63,000
2,500		57,000	30,000	6,600		101,000	63,000
2,600		57,000	30,000	6,700		101,000	63,000
2,700		61,000	33,000	6,800		109,000	69,000
2,800		61,000	33,000	6,900		109,000	69,000
2,900		61,000	33,000	7,000		109,000	69,000
3,000		61,000	33,000	7,100		109,000	69,000
3,100		65,000	36,000	7,200		109,000	69,000
3,200		65,000	36,000	7,300		109,000	69,000
3,300		65,000	36,000	7,400		109,000	69,000
3,400		70,000	39,000	7,500		109,000	69,000
3,500		70,000	39,000	7,700		117,000	75,000
3,570	9/64	70,000	39,000	7,800		117,000	75,000
3,600		70,000	39,000	7,900		117,000	75,000
3,700		70,000	39,000	8,000		117,000	75,000
3,800		75,000	43,000	8,100		117,000	75,000
3,900		75,000	43,000	8,200		117,000	75,000
4,000		75,000	43,000	8,300		117,000	75,000
4,100		75,000	43,000	8,400		117,000	75,000
4,200		75,000	43,000	8,500		117,000	75,000
4,300		80,000	47,000	8,600		125,000	81,000
4,400		80,000	47,000	8,700		125,000	81,000
4,500		80,000	47,000	8,800		125,000	81,000
4,600		80,000	47,000	8,900		125,000	81,000
4,700		80,000	47,000	9,000		125,000	81,000
4,800		86,000	52,000	9,100		125,000	81,000
4,900		86,000	52,000	9,200		125,000	81,000
5,000		86,000	52,000	9,400		125,000	81,000

Lieriövärtiset
kierukkaporat



d1		l1	l2
mm	inch	mm	mm
9,500		125,000	81,000
9,600		133,000	87,000
9,700		133,000	87,000
9,800		133,000	87,000
9,920	25/64	133,000	87,000
10,000		133,000	87,000
10,100		133,000	87,000
10,200		133,000	87,000
10,300		133,000	87,000
10,500		133,000	87,000
10,600		133,000	87,000
10,800		142,000	94,000

d1		l1	l2
mm	inch	mm	mm
11,000		142,000	94,000
11,200		142,000	94,000
11,500		142,000	94,000
11,800		142,000	94,000
11,900		151,000	101,000
12,000		151,000	101,000
12,500		151,000	101,000
13,000		151,000	101,000



Normaaliporat



P ● Kärjen kevennys $\geq \varnothing 1,000$ • kartiovaippahionta • yleiskäyttöön, aaltohionta • Co-seosteinen pikateräs • parempi kulumiskestävyys

M ○

K ○

N ○ teräkset $< 1000 \text{ N/mm}^2$ • AlSi-seokset

S ○

H ○

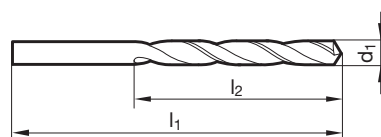
GÜHRING NAVIGATOR

Leikkuuarvosivu 784

Materiaali **HSCO**

Pinta

Leikkusuunta



Artikkelinro.

2047

d1		l1	l2	d1		l1	l2
mm	inch	mm	mm	mm	inch	mm	mm
1,000		34,000	12,000	5,200		86,000	52,000
1,100		36,000	14,000	5,300		86,000	52,000
1,200		38,000	16,000	5,400		93,000	57,000
1,300		38,000	16,000	5,500		93,000	57,000
1,400		40,000	18,000	5,600		93,000	57,000
1,500		40,000	18,000	5,700		93,000	57,000
1,600		43,000	20,000	5,800		93,000	57,000
1,700		43,000	20,000	5,900		93,000	57,000
1,800		46,000	22,000	6,000		93,000	57,000
1,900		46,000	22,000	6,100		101,000	63,000
2,000		49,000	24,000	6,200		101,000	63,000
2,100		49,000	24,000	6,300		101,000	63,000
2,200		53,000	27,000	6,400		101,000	63,000
2,300		53,000	27,000	6,500		101,000	63,000
2,400		57,000	30,000	6,600		101,000	63,000
2,500		57,000	30,000	6,700		101,000	63,000
2,600		57,000	30,000	6,800		109,000	69,000
2,700		61,000	33,000	6,900		109,000	69,000
2,800		61,000	33,000	7,000		109,000	69,000
2,900		61,000	33,000	7,100		109,000	69,000
3,000		61,000	33,000	7,200		109,000	69,000
3,100		65,000	36,000	7,300		109,000	69,000
3,200		65,000	36,000	7,400		109,000	69,000
3,300		65,000	36,000	7,500		109,000	69,000
3,400		70,000	39,000	7,600		117,000	75,000
3,500		70,000	39,000	7,700		117,000	75,000
3,600		70,000	39,000	7,800		117,000	75,000
3,700		70,000	39,000	7,900		117,000	75,000
3,800		75,000	43,000	8,000		117,000	75,000
3,900		75,000	43,000	8,100		117,000	75,000
4,000		75,000	43,000	8,200		117,000	75,000
4,100		75,000	43,000	8,300		117,000	75,000
4,200		75,000	43,000	8,400		117,000	75,000
4,300		80,000	47,000	8,500		117,000	75,000
4,400		80,000	47,000	8,600		125,000	81,000
4,500		80,000	47,000	8,700		125,000	81,000
4,600		80,000	47,000	8,800		125,000	81,000
4,700		80,000	47,000	8,900		125,000	81,000
4,800		86,000	52,000	9,000		125,000	81,000
4,900		86,000	52,000	9,100		125,000	81,000
5,000		86,000	52,000	9,200		125,000	81,000
5,100		86,000	52,000	9,300		125,000	81,000



d1		l1	l2
mm	inch	mm	mm
9,400		125,000	81,000
9,500		125,000	81,000
9,600		133,000	87,000
9,700		133,000	87,000
9,800		133,000	87,000
9,900		133,000	87,000
10,000		133,000	87,000
10,200		133,000	87,000
10,500		133,000	87,000
11,000		142,000	94,000
11,500		142,000	94,000
12,000		151,000	101,000

d1		l1	l2
mm	inch	mm	mm
12,500		151,000	101,000
13,000		151,000	101,000



AeroX ristiinhiotut porat



P	•	Kärjen kevennys $\geq \varnothing 1,000$ • optimoitu ristiinhiointi • 8%-seostettu HSCO pikateräs parempi työkalun kestoikä, parempi lämmönkestävyys ja kuumalujuus
M	•	
K	•	
N	•	seostamattomat- ja runsaasti seostetut teräkset • valut • ei-rautametallit
S	•	• Titaani ja titaaniseokset
H	○	

Materiaali **M42**

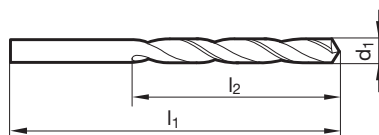
Pinta

Leikkusuunta



GÜHRING NAVIGATOR

Leikkuarvosivu 784

Artikkelinro. **1018**

d1		l1	l2	d1		l1	l2
mm	inch	mm	mm	mm	inch	mm	mm
1,000		34,000	12,000	4,400		80,000	47,000
1,100		36,000	14,000	4,500		80,000	47,000
1,200		38,000	16,000	4,600		80,000	47,000
1,300		38,000	16,000	4,700		80,000	47,000
1,400		40,000	18,000	4,760	3/16	86,000	52,000
1,500		40,000	18,000	4,800		86,000	52,000
1,590	1/16	43,000	20,000	4,900		86,000	52,000
1,600		43,000	20,000	5,000		86,000	52,000
1,700		43,000	20,000	5,100		86,000	52,000
1,800		46,000	22,000	5,160	13/64	86,000	52,000
1,900		46,000	22,000	5,200		86,000	52,000
1,980	5/64	49,000	24,000	5,300		86,000	52,000
2,000		49,000	24,000	5,400		93,000	57,000
2,100		49,000	24,000	5,500		93,000	57,000
2,200		53,000	27,000	5,560	7/32	93,000	57,000
2,300		53,000	27,000	5,600		93,000	57,000
2,380	3/32	57,000	30,000	5,700		93,000	57,000
2,400		57,000	30,000	5,800		93,000	57,000
2,500		57,000	30,000	5,900		93,000	57,000
2,600		57,000	30,000	5,950	15/64	93,000	57,000
2,700		61,000	33,000	6,000		93,000	57,000
2,780	7/64	61,000	33,000	6,100		101,000	63,000
2,800		61,000	33,000	6,200		101,000	63,000
2,900		61,000	33,000	6,300		101,000	63,000
3,000		61,000	33,000	6,350	1/4	101,000	63,000
3,100		65,000	36,000	6,400		101,000	63,000
3,170	1/8	65,000	36,000	6,500		101,000	63,000
3,200		65,000	36,000	6,600		101,000	63,000
3,250		65,000	36,000	6,700		101,000	63,000
3,300		65,000	36,000	6,800		109,000	69,000
3,400		70,000	39,000	6,900		109,000	69,000
3,500		70,000	39,000	7,000		109,000	69,000
3,570	9/64	70,000	39,000	7,100		109,000	69,000
3,600		70,000	39,000	7,140	9/32	109,000	69,000
3,700		70,000	39,000	7,200		109,000	69,000
3,800		75,000	43,000	7,300		109,000	69,000
3,900		75,000	43,000	7,400		109,000	69,000
3,970	5/32	75,000	43,000	7,500		109,000	69,000
4,000		75,000	43,000	7,540	19/64	117,000	75,000
4,100		75,000	43,000	7,600		117,000	75,000
4,200		75,000	43,000	7,700		117,000	75,000
4,300		80,000	47,000	7,800		117,000	75,000



d1		l1	l2
mm	inch	mm	mm
7,900		117,000	75,000
7,940	5/16	117,000	75,000
8,000		117,000	75,000
8,100		117,000	75,000
8,200		117,000	75,000
8,300		117,000	75,000
8,330	21/64	117,000	75,000
8,400		117,000	75,000
8,500		117,000	75,000
8,600		125,000	81,000
8,700		125,000	81,000
8,730	11/32	125,000	81,000
8,800		125,000	81,000
8,900		125,000	81,000
9,000		125,000	81,000
9,100		125,000	81,000
9,130	23/64	125,000	81,000
9,200		125,000	81,000
9,300		125,000	81,000
9,500		125,000	81,000
9,520	3/8	133,000	87,000
9,600		133,000	87,000
9,700		133,000	87,000
9,800		133,000	87,000

d1		l1	l2
mm	inch	mm	mm
9,900		133,000	87,000
9,920	25/64	133,000	87,000
10,000		133,000	87,000
10,100		133,000	87,000
10,200		133,000	87,000
10,300		133,000	87,000
10,320	13/32	133,000	87,000
10,500		133,000	87,000
10,720	27/64	142,000	94,000
10,800		142,000	94,000
11,000		142,000	94,000
11,110	7/16	142,000	94,000
11,500		142,000	94,000
11,510	29/64	142,000	94,000
11,910	15/32	151,000	101,000
12,000		151,000	101,000
12,200		151,000	101,000
12,300	31/64	151,000	101,000
12,500		151,000	101,000
12,700	1/2	151,000	101,000
12,800		151,000	101,000
13,000		151,000	101,000



Normaaliporat



P	•	Kärjen kevennys $\geq \varnothing 1,000$ • kartiovaippahionta • runsasseosteinen CoMo-teras • erittäin hyvä kulumiskestävyys
M	○	
K	○	
N	•	keski-/korkealujuuksiset CrNi-pohjaiset seokset • Hastelloy, Inconel, Nimonic • ruostumatt./haponk./kuumal. teräkset • kulutuskestävät levyteräkset • teräkset/pronssit < 1400 N/mm ²
S	•	
H	○	

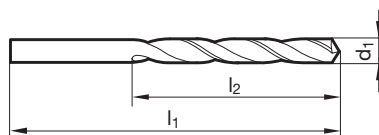
Materiaali **M42**

Pinta ○

Leikkusuunta

GÜHRING NAVIGATOR

Leikkuarvosivu 780



Artikkelinro.

1146

d1		l1	l2	d1		l1	l2
mm	inch	mm	mm	mm	inch	mm	mm
0,400	1/64	20,000	5,000	4,200		75,000	43,000
0,500		22,000	6,000	4,300		80,000	47,000
0,800		30,000	10,000	4,400		80,000	47,000
0,900		32,000	11,000	4,500		80,000	47,000
1,000		34,000	12,000	4,600		80,000	47,000
1,100		36,000	14,000	4,700		80,000	47,000
1,200		38,000	16,000	4,760	3/16	86,000	52,000
1,300		38,000	16,000	4,800		86,000	52,000
1,400		40,000	18,000	4,900		86,000	52,000
1,500		40,000	18,000	5,000		86,000	52,000
1,590	1/16	43,000	20,000	5,100		86,000	52,000
1,600		43,000	20,000	5,200		86,000	52,000
1,700		43,000	20,000	5,300		86,000	52,000
1,800		46,000	22,000	5,400		93,000	57,000
1,900		46,000	22,000	5,500		93,000	57,000
1,980	5/64	49,000	24,000	5,600		93,000	57,000
2,000		49,000	24,000	5,700		93,000	57,000
2,100		49,000	24,000	5,800		93,000	57,000
2,200		53,000	27,000	5,900		93,000	57,000
2,300		53,000	27,000	5,950	15/64	93,000	57,000
2,380	3/32	57,000	30,000	6,000		93,000	57,000
2,400		57,000	30,000	6,100		101,000	63,000
2,500		57,000	30,000	6,200		101,000	63,000
2,600		57,000	30,000	6,300		101,000	63,000
2,700		61,000	33,000	6,350	1/4	101,000	63,000
2,780	7/64	61,000	33,000	6,400		101,000	63,000
2,800		61,000	33,000	6,500		101,000	63,000
2,900		61,000	33,000	6,600		101,000	63,000
3,000		61,000	33,000	6,700		101,000	63,000
3,100		65,000	36,000	6,750	17/64	109,000	69,000
3,170	1/8	65,000	36,000	6,800		109,000	69,000
3,200		65,000	36,000	6,900		109,000	69,000
3,300		65,000	36,000	7,000		109,000	69,000
3,400		70,000	39,000	7,100		109,000	69,000
3,500		70,000	39,000	7,200		109,000	69,000
3,600		70,000	39,000	7,300		109,000	69,000
3,700		70,000	39,000	7,400		109,000	69,000
3,800		75,000	43,000	7,500		109,000	69,000
3,900		75,000	43,000	7,540	19/64	117,000	75,000
3,970	5/32	75,000	43,000	7,600		117,000	75,000
4,000		75,000	43,000	7,700		117,000	75,000
4,100		75,000	43,000	7,800		117,000	75,000

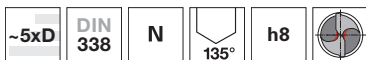


d1		l1	l2
mm	inch	mm	mm
7,900		117,000	75,000
8,000		117,000	75,000
8,100		117,000	75,000
8,200		117,000	75,000
8,300		117,000	75,000
8,330	21/64	117,000	75,000
8,400		117,000	75,000
8,500		117,000	75,000
8,600		125,000	81,000
8,700		125,000	81,000
8,730	11/32	125,000	81,000
8,800		125,000	81,000
8,900		125,000	81,000
9,000		125,000	81,000
9,100		125,000	81,000
9,130	23/64	125,000	81,000
9,200		125,000	81,000
9,300		125,000	81,000
9,400		125,000	81,000
9,500		125,000	81,000
9,600		133,000	87,000
9,700		133,000	87,000
9,800		133,000	87,000
9,900		133,000	87,000

d1		l1	l2
mm	inch	mm	mm
9,920	25/64	133,000	87,000
10,000		133,000	87,000
10,200		133,000	87,000
10,500		133,000	87,000
11,000		142,000	94,000
11,500		142,000	94,000
11,510	29/64	142,000	94,000
11,910	15/32	151,000	101,000
12,000		151,000	101,000
12,300	31/64	151,000	101,000
12,500		151,000	101,000
13,000		151,000	101,000
13,100	33/64	151,000	101,000
13,500		160,000	108,000
14,000		160,000	108,000
15,000		169,000	114,000
15,870	5/8	178,000	120,000
16,000		178,000	120,000



Normaaliporat

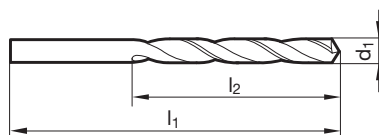


- P** • Kärjen kevennys $\geq \varnothing 1,000$ • optimoitu ristiinhionta • 8%-seostettu HSCO pikateräs • erittäin hyvä kulumiskestävyys
- M** •
- K** •
- N** ○ keski-/korkealujuuksiset CrNi-pohjaiset seokset • Hastelloy, Inconel, Nimonic • ruostumatt./haponk./kuumal. teräkset • kulutuskestävät levyteräkset • teräkset/pronssit < 1400 N/mm²
- S** •
- H** •

GÜHRING NAVIGATOR

Leikkuuarvosivu 784

Materiaali	M42
Pinta	F
Leikkusuunta	R



Artikkelinro. **1199**

d1		l1	l2	d1		l1	l2
mm	inch	mm	mm	mm	inch	mm	mm
1,000		34,000	12,000	4,760	3/16	86,000	52,000
1,100		36,000	14,000	4,800		86,000	52,000
1,200		38,000	16,000	4,900		86,000	52,000
1,300		38,000	16,000	5,000		86,000	52,000
1,400		40,000	18,000	5,100		86,000	52,000
1,500		40,000	18,000	5,160	13/64	86,000	52,000
1,590	1/16	43,000	20,000	5,200		86,000	52,000
1,600		43,000	20,000	5,300		86,000	52,000
1,700		43,000	20,000	5,400		93,000	57,000
1,800		46,000	22,000	5,500		93,000	57,000
1,900		46,000	22,000	5,600		93,000	57,000
2,000		49,000	24,000	5,700		93,000	57,000
2,100		49,000	24,000	5,800		93,000	57,000
2,200		53,000	27,000	5,900		93,000	57,000
2,300		53,000	27,000	5,950	15/64	93,000	57,000
2,380	3/32	57,000	30,000	6,000		93,000	57,000
2,400		57,000	30,000	6,100		101,000	63,000
2,500		57,000	30,000	6,200		101,000	63,000
2,600		57,000	30,000	6,300		101,000	63,000
2,700		61,000	33,000	6,350	1/4	101,000	63,000
2,800		61,000	33,000	6,400		101,000	63,000
2,900		61,000	33,000	6,500		101,000	63,000
3,000		61,000	33,000	6,600		101,000	63,000
3,100		65,000	36,000	6,700		101,000	63,000
3,170	1/8	65,000	36,000	6,750	17/64	109,000	69,000
3,200		65,000	36,000	6,800		109,000	69,000
3,300		65,000	36,000	6,900		109,000	69,000
3,400		70,000	39,000	7,000		109,000	69,000
3,500		70,000	39,000	7,100		109,000	69,000
3,600		70,000	39,000	7,200		109,000	69,000
3,700		70,000	39,000	7,300		109,000	69,000
3,800		75,000	43,000	7,400		109,000	69,000
3,900		75,000	43,000	7,500		109,000	69,000
3,970	5/32	75,000	43,000	7,600		117,000	75,000
4,000		75,000	43,000	7,700		117,000	75,000
4,100		75,000	43,000	7,800		117,000	75,000
4,200		75,000	43,000	7,900		117,000	75,000
4,300		80,000	47,000	8,000		117,000	75,000
4,400		80,000	47,000	8,100		117,000	75,000
4,500		80,000	47,000	8,200		117,000	75,000
4,600		80,000	47,000	8,300		117,000	75,000
4,700		80,000	47,000	8,400		117,000	75,000

Lieriövärtiset kierukkeporat



d1		l1	l2
mm	inch	mm	mm
8,500		117,000	75,000
8,600		125,000	81,000
8,700		125,000	81,000
8,730		125,000	81,000
8,800		125,000	81,000
8,900		125,000	81,000
9,000		125,000	81,000
9,100		125,000	81,000
9,200		125,000	81,000
9,300		125,000	81,000
9,400		125,000	81,000
9,500		125,000	81,000
9,600		133,000	87,000
9,700		133,000	87,000
9,800		133,000	87,000
9,900		133,000	87,000
9,920	25/64	133,000	87,000
10,000		133,000	87,000

d1		l1	l2
mm	inch	mm	mm
10,100		133,000	87,000
10,200		133,000	87,000
10,500		133,000	87,000
10,800		142,000	94,000
11,000		142,000	94,000
11,200		142,000	94,000
11,500		142,000	94,000
11,800		142,000	94,000
11,910	15/32	151,000	101,000
12,000		151,000	101,000
12,200		151,000	101,000
12,500		151,000	101,000
13,000		151,000	101,000
14,000		160,000	108,000
15,000		169,000	114,000
16,000		178,000	120,000



Normaaliporat



P	○	Kärjen kevennys $\geq \varnothing 2,060$ • päästöhiottu kärki • pääleikkusärmän suorasta
M	○	
K	○	
N	●	rakenne- ja pintakarkaistut teräkset • automaattiteräkset, nuorrutetut teräkset • harmaavalurauta • pronssi, messinki • alumiini ja Al-seokset
S	○	• Magnesium ja Mg-seokset • muovit ja kuituvahvisteiset muovit
H		

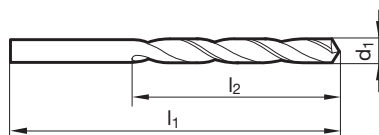
Materiaali **TKM**

Pinta ○

Leikkusuunta

GÜHRING NAVIGATOR

Leikkuuarvosivu 784



Artikkelinro.

732

d1		l1	l2	d1		l1	l2
mm	inch	mm	mm	mm	inch	mm	mm
1,000		34,000	12,000	2,640		57,000	30,000
1,020		34,000	12,000	2,700		61,000	33,000
1,040		34,000	12,000	2,710		61,000	33,000
1,070		36,000	14,000	2,780	7/64	61,000	33,000
1,090		36,000	14,000	2,790		61,000	33,000
1,100		36,000	14,000	2,800		61,000	33,000
1,180		36,000	14,000	2,820		61,000	33,000
1,190	3/64	38,000	16,000	2,870		61,000	33,000
1,200		38,000	16,000	2,900		61,000	33,000
1,300		38,000	16,000	2,950		61,000	33,000
1,320		38,000	16,000	3,000		61,000	33,000
1,400		40,000	18,000	3,050		65,000	36,000
1,500		40,000	18,000	3,100		65,000	36,000
1,510		43,000	20,000	3,170	1/8	65,000	36,000
1,590	1/16	43,000	20,000	3,200		65,000	36,000
1,600		43,000	20,000	3,260		65,000	36,000
1,610		43,000	20,000	3,300		65,000	36,000
1,700		43,000	20,000	3,400		70,000	39,000
1,780		46,000	22,000	3,450		70,000	39,000
1,800		46,000	22,000	3,500		70,000	39,000
1,850		46,000	22,000	3,570	9/64	70,000	39,000
1,900		46,000	22,000	3,600		70,000	39,000
1,930		49,000	24,000	3,660		70,000	39,000
1,980	5/64	49,000	24,000	3,700		70,000	39,000
1,990		49,000	24,000	3,730		70,000	39,000
2,000		49,000	24,000	3,800		75,000	43,000
2,060		49,000	24,000	3,860		75,000	43,000
2,080		49,000	24,000	3,900		75,000	43,000
2,100		49,000	24,000	3,910		75,000	43,000
2,180		53,000	27,000	3,970	5/32	75,000	43,000
2,200		53,000	27,000	3,990		75,000	43,000
2,260		53,000	27,000	4,000		75,000	43,000
2,300		53,000	27,000	4,040		75,000	43,000
2,370		57,000	30,000	4,090		75,000	43,000
2,380	3/32	57,000	30,000	4,100		75,000	43,000
2,400		57,000	30,000	4,200		75,000	43,000
2,440		57,000	30,000	4,220		75,000	43,000
2,490		57,000	30,000	4,300		80,000	47,000
2,500		57,000	30,000	4,370	11/64	80,000	47,000
2,530		57,000	30,000	4,390		80,000	47,000
2,580		57,000	30,000	4,400		80,000	47,000
2,600		57,000	30,000	4,500		80,000	47,000



d1		l1	l2
mm	inch	mm	mm
4,570		80,000	47,000
4,600		80,000	47,000
4,620		80,000	47,000
4,700		80,000	47,000
4,760	3/16	86,000	52,000
4,800		86,000	52,000
4,850		86,000	52,000
4,900		86,000	52,000
4,920		86,000	52,000
4,980		86,000	52,000
5,000		86,000	52,000
5,060		86,000	52,000
5,100		86,000	52,000
5,110		86,000	52,000
5,160	13/64	86,000	52,000
5,180		86,000	52,000
5,200		86,000	52,000
5,220		86,000	52,000
5,300		86,000	52,000
5,310		93,000	57,000
5,400		93,000	57,000
5,410		93,000	57,000
5,500		93,000	57,000
5,560	7/32	93,000	57,000
5,600		93,000	57,000
5,610		93,000	57,000
5,700		93,000	57,000
5,790		93,000	57,000
5,800		93,000	57,000
5,900		93,000	57,000
5,940		93,000	57,000
5,950	15/64	93,000	57,000
6,000		93,000	57,000
6,040		101,000	63,000
6,100		101,000	63,000
6,150		101,000	63,000
6,200		101,000	63,000
6,250		101,000	63,000
6,300		101,000	63,000
6,350	1/4	101,000	63,000
6,400		101,000	63,000
6,500		101,000	63,000
6,530		101,000	63,000
6,600		101,000	63,000
6,630		101,000	63,000
6,700		101,000	63,000
6,750	17/64	109,000	69,000
6,800		109,000	69,000
6,900		109,000	69,000
7,000		109,000	69,000
7,030		109,000	69,000
7,100		109,000	69,000
7,140	9/32	109,000	69,000
7,200		109,000	69,000
7,300		109,000	69,000
7,370		109,000	69,000
7,400		109,000	69,000
7,490		109,000	69,000
7,500		109,000	69,000
7,540	19/64	117,000	75,000

d1		l1	l2
mm	inch	mm	mm
7,600		117,000	75,000
7,670		117,000	75,000
7,700		117,000	75,000
7,800		117,000	75,000
7,900		117,000	75,000
7,940	5/16	117,000	75,000
8,000		117,000	75,000
8,030		117,000	75,000
8,100		117,000	75,000
8,200		117,000	75,000
8,300		117,000	75,000
8,330	21/64	117,000	75,000
8,400		117,000	75,000
8,430		117,000	75,000
8,500		117,000	75,000
8,600		125,000	81,000
8,610		125,000	81,000
8,700		125,000	81,000
8,730	11/32	125,000	81,000
8,800		125,000	81,000
8,840		125,000	81,000
8,900		125,000	81,000
9,000		125,000	81,000
9,090		125,000	81,000
9,100		125,000	81,000
9,130	23/64	125,000	81,000
9,200		125,000	81,000
9,300		125,000	81,000
9,340		125,000	81,000
9,400		125,000	81,000
9,500		125,000	81,000
9,520	3/8	133,000	87,000
9,580		133,000	87,000
9,600		133,000	87,000
9,700		133,000	87,000
9,800		133,000	87,000
9,900		133,000	87,000
9,920	25/64	133,000	87,000
10,000		133,000	87,000
10,080		133,000	87,000
10,200		133,000	87,000
10,260		133,000	87,000
10,300		133,000	87,000
10,320	13/32	133,000	87,000
10,490		133,000	87,000
10,500		133,000	87,000
10,720	27/64	142,000	94,000
11,000		142,000	94,000
11,110	7/16	142,000	94,000
11,500		142,000	94,000
11,510	29/64	142,000	94,000
11,910	15/32	151,000	101,000
12,000		151,000	101,000
12,300	31/64	151,000	101,000
12,700	1/2	151,000	101,000



Normaaliporat

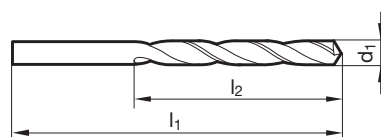


P	○	Kärjen kevennys $\geq \varnothing 2,060$ • päästöhiottu kärki • pääleikkusärmän suorasta
M	○	
K	○	
N	●	rakenne- ja pintakarkaistut teräkset • automaattiteräkset, nuorrutetut teräkset • valut • messinki • Al-materiaalit suurella Si-pitoisuudella
S	○	• Magnesium ja Mg-seokset • muovit ja kuituvahvisteiset muovit
H		

Materiaali **TKM**Pinta **F**Leikkusuunta **R**

GÜHRING NAVIGATOR

Leikkuarvosivu 784



Artikkelinro.

2464

d1		l1	l2	d1		l1	l2
mm	inch	mm	mm	mm	inch	mm	mm
1,000		34,000	12,000	2,640		57,000	30,000
1,020		34,000	12,000	2,700		61,000	33,000
1,040		34,000	12,000	2,710		61,000	33,000
1,070		36,000	14,000	2,780	7/64	61,000	33,000
1,090		36,000	14,000	2,790		61,000	33,000
1,100		36,000	14,000	2,800		61,000	33,000
1,180		36,000	14,000	2,820		61,000	33,000
1,190	3/64	38,000	16,000	2,870		61,000	33,000
1,200		38,000	16,000	2,900		61,000	33,000
1,300		38,000	16,000	2,950		61,000	33,000
1,320		38,000	16,000	3,000		61,000	33,000
1,400		40,000	18,000	3,050		65,000	36,000
1,500		40,000	18,000	3,100		65,000	36,000
1,510		43,000	20,000	3,170	1/8	65,000	36,000
1,590	1/16	43,000	20,000	3,200		65,000	36,000
1,600		43,000	20,000	3,260		65,000	36,000
1,610		43,000	20,000	3,300		65,000	36,000
1,700		43,000	20,000	3,400		70,000	39,000
1,780		46,000	22,000	3,450		70,000	39,000
1,800		46,000	22,000	3,500		70,000	39,000
1,850		46,000	22,000	3,570	9/64	70,000	39,000
1,900		46,000	22,000	3,600		70,000	39,000
1,930		49,000	24,000	3,660		70,000	39,000
1,980	5/64	49,000	24,000	3,700		70,000	39,000
1,990		49,000	24,000	3,730		70,000	39,000
2,000		49,000	24,000	3,800		75,000	43,000
2,060		49,000	24,000	3,860		75,000	43,000
2,080		49,000	24,000	3,900		75,000	43,000
2,100		49,000	24,000	3,910		75,000	43,000
2,180		53,000	27,000	3,970	5/32	75,000	43,000
2,200		53,000	27,000	3,990		75,000	43,000
2,260		53,000	27,000	4,000		75,000	43,000
2,300		53,000	27,000	4,040		75,000	43,000
2,370		57,000	30,000	4,090		75,000	43,000
2,380	3/32	57,000	30,000	4,100		75,000	43,000
2,400		57,000	30,000	4,200		75,000	43,000
2,440		57,000	30,000	4,220		75,000	43,000
2,490		57,000	30,000	4,300		80,000	47,000
2,500		57,000	30,000	4,370	11/64	80,000	47,000
2,530		57,000	30,000	4,390		80,000	47,000
2,580		57,000	30,000	4,400		80,000	47,000
2,600		57,000	30,000	4,500		80,000	47,000



d1		l1	l2
mm	inch	mm	mm
4,570		80,000	47,000
4,600		80,000	47,000
4,620		80,000	47,000
4,700		80,000	47,000
4,760	3/16	86,000	52,000
4,800		86,000	52,000
4,850		86,000	52,000
4,900		86,000	52,000
4,920		86,000	52,000
4,980		86,000	52,000
5,000		86,000	52,000
5,060		86,000	52,000
5,100		86,000	52,000
5,110		86,000	52,000
5,160	13/64	86,000	52,000
5,180		86,000	52,000
5,200		86,000	52,000
5,220		86,000	52,000
5,300		86,000	52,000
5,310		93,000	57,000
5,400		93,000	57,000
5,410		93,000	57,000
5,500		93,000	57,000
5,560	7/32	93,000	57,000
5,600		93,000	57,000
5,610		93,000	57,000
5,700		93,000	57,000
5,790		93,000	57,000
5,800		93,000	57,000
5,900		93,000	57,000
5,940		93,000	57,000
5,950	15/64	93,000	57,000
6,000		93,000	57,000
6,040		101,000	63,000
6,100		101,000	63,000
6,150		101,000	63,000
6,200		101,000	63,000
6,250		101,000	63,000
6,300		101,000	63,000
6,350	1/4	101,000	63,000
6,400		101,000	63,000
6,500		101,000	63,000
6,530		101,000	63,000
6,600		101,000	63,000
6,630		101,000	63,000
6,700		101,000	63,000
6,750	17/64	109,000	69,000
6,800		109,000	69,000
6,900		109,000	69,000
7,000		109,000	69,000
7,030		109,000	69,000
7,100		109,000	69,000
7,140	9/32	109,000	69,000
7,200		109,000	69,000
7,300		109,000	69,000
7,370		109,000	69,000
7,400		109,000	69,000
7,490		109,000	69,000
7,500		109,000	69,000
7,540	19/64	117,000	75,000

d1		l1	l2
mm	inch	mm	mm
7,600		117,000	75,000
7,670		117,000	75,000
7,700		117,000	75,000
7,800		117,000	75,000
7,900		117,000	75,000
7,940	5/16	117,000	75,000
8,000		117,000	75,000
8,030		117,000	75,000
8,100		117,000	75,000
8,200		117,000	75,000
8,300		117,000	75,000
8,330	21/64	117,000	75,000
8,400		117,000	75,000
8,430		117,000	75,000
8,500		117,000	75,000
8,600		125,000	81,000
8,610		125,000	81,000
8,700		125,000	81,000
8,730	11/32	125,000	81,000
8,800		125,000	81,000
8,840		125,000	81,000
8,900		125,000	81,000
9,000		125,000	81,000
9,090		125,000	81,000
9,100		125,000	81,000
9,130	23/64	125,000	81,000
9,200		125,000	81,000
9,300		125,000	81,000
9,340		125,000	81,000
9,400		125,000	81,000
9,500		125,000	81,000
9,520	3/8	133,000	87,000
9,580		133,000	87,000
9,600		133,000	87,000
9,700		133,000	87,000
9,800		133,000	87,000
9,900		133,000	87,000
9,920	25/64	133,000	87,000
10,000		133,000	87,000
10,080		133,000	87,000
10,200		133,000	87,000
10,260		133,000	87,000
10,300		133,000	87,000
10,320	13/32	133,000	87,000
10,490		133,000	87,000
10,500		133,000	87,000
10,720	27/64	142,000	94,000
11,000		142,000	94,000
11,110	7/16	142,000	94,000
11,500		142,000	94,000
11,510	29/64	142,000	94,000
11,910	15/32	151,000	101,000
12,000		151,000	101,000
12,300	31/64	151,000	101,000
12,700	1/2	151,000	101,000



Normaaliporat



P ○ Kärjen kevennys $\geq \varnothing 2,700$ • päästöhiottu kärki • erikoispora
• kovametallileikkuulla

M

K ○

N

S

H •

kuluttavat materiaalit • nuorrutetut-/karkaistut teräkset • kokillivalu, Mn-teräs, kovat pronssit

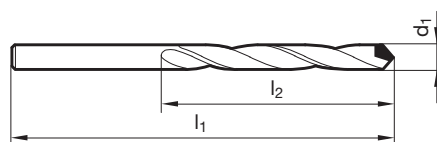
Materiaali **KM**

Pinta ○

Leikkusuunta

GÜHRING NAVIGATOR

Leikkuarvosivu 776



Artikkelinro.

710

d1		l1	l2
mm	inch	mm	mm
3,000		61,000	33,000
3,100		65,000	36,000
3,300		65,000	36,000
3,400		70,000	39,000
3,500		70,000	39,000
4,000		75,000	43,000
4,200		75,000	43,000
4,500		80,000	47,000
4,700		80,000	47,000
5,000		86,000	52,000
5,100		86,000	52,000
5,500		93,000	57,000
6,000		93,000	57,000
6,300		101,000	63,000
6,500		101,000	63,000
6,800		109,000	69,000
7,000		109,000	69,000
7,100		109,000	69,000

d1		l1	l2
mm	inch	mm	mm
7,200		109,000	69,000
7,400		109,000	69,000
7,500		109,000	69,000
8,000		117,000	75,000
8,500		117,000	75,000
9,000		125,000	81,000
9,500		125,000	81,000
10,000		133,000	87,000
10,200		133,000	87,000
11,000		142,000	94,000
12,000		151,000	101,000
12,500		151,000	101,000
13,000		151,000	101,000
14,000		160,000	108,000

HSS erikoisporat

Erikoiskohteisiin suunnitellut pikateräsporot.

Gühring kunnostautuu erikoisesti pikaterästyökalujen valmistuksessa yli sadan vuoden kokemuksella. Käytössä huippu teknologia, erikoistyökalujen nopea valmistus, eri sovelluksiin sopivat pinnoitteet ja paras mahdollinen hinta-laatusuhde.

Onpa kyseessä mikroporat, upotusporat tai monilastu-uraiset työkalut – voitte luottaa mahtavaan kokemukseemme HSS-sektorilla.





Pitkät kartiovartiset kierukkaporat



P • Kärjen kevennys $\geq \varnothing 1,000$ • kartiovaippahionta • porausholkin läpi porausta varten

M**K** •**N** ○**S****H**

seostettu-/seostamaton teräs ja valuteräs • harmaavalu-, taottava- ja pallografiittivalurauta • sintrattu pulveriteräs, uushopea ja grafiitti

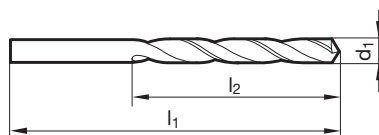
Materiaali **HSS**

Pinta

Leikkusuunta

GÜHRING NAVIGATOR

Leikkuarvosivu 786



Artikkelinro.

211

d1		l1	l2	d1		l1	l2
mm	inch	mm	mm	mm	inch	mm	mm
0,800		42,000	22,000	2,350		70,000	44,000
1,000		48,000	26,000	2,360		70,000	44,000
1,050		48,000	26,000	2,400		74,000	47,000
1,080		50,000	28,000	2,450		74,000	47,000
1,100		50,000	28,000	2,470		74,000	47,000
1,110		50,000	28,000	2,500		74,000	47,000
1,150		50,000	28,000	2,550		74,000	47,000
1,200		52,000	30,000	2,600		74,000	47,000
1,230		52,000	30,000	2,620		74,000	47,000
1,250		52,000	30,000	2,650		74,000	47,000
1,300		52,000	30,000	2,680		79,000	51,000
1,350		55,000	33,000	2,700		79,000	51,000
1,380		55,000	33,000	2,730		79,000	51,000
1,400		55,000	33,000	2,800		79,000	51,000
1,430		55,000	33,000	2,900		79,000	51,000
1,450		55,000	33,000	2,950		79,000	51,000
1,460		55,000	33,000	2,960		79,000	51,000
1,480		55,000	33,000	3,000		79,000	51,000
1,500		55,000	33,000	3,050		84,000	55,000
1,520		58,000	35,000	3,070		84,000	55,000
1,580		58,000	35,000	3,100		84,000	55,000
1,600		58,000	35,000	3,150		84,000	55,000
1,620		58,000	35,000	3,170	1/8	84,000	55,000
1,650		58,000	35,000	3,200		84,000	55,000
1,700		58,000	35,000	3,250		84,000	55,000
1,800		62,000	38,000	3,300		84,000	55,000
1,810		62,000	38,000	3,400		91,000	60,000
1,850		62,000	38,000	3,480		91,000	60,000
1,870		62,000	38,000	3,500		91,000	60,000
1,900		62,000	38,000	3,600		91,000	60,000
1,930		66,000	41,000	3,700		91,000	60,000
1,980	5/64	66,000	41,000	3,730		91,000	60,000
1,990		66,000	41,000	3,800		96,000	64,000
2,000		66,000	41,000	3,900		96,000	64,000
2,020		66,000	41,000	3,950		96,000	64,000
2,030		66,000	41,000	4,000		96,000	64,000
2,050		66,000	41,000	4,100		96,000	64,000
2,100		66,000	41,000	4,200		96,000	64,000
2,150		70,000	44,000	4,300		102,000	69,000
2,200		70,000	44,000	4,400		102,000	69,000
2,220		70,000	44,000	4,500		102,000	69,000
2,320		70,000	44,000	4,580		102,000	69,000



d1		l1	l2
mm	inch	mm	mm
4,600		102,000	69,000
4,700		102,000	69,000
4,750		102,000	69,000
4,800		108,000	74,000
4,900		108,000	74,000
4,950		108,000	74,000
5,000		108,000	74,000
5,100		108,000	74,000
5,200		108,000	74,000
5,300		108,000	74,000
5,330		116,000	80,000
5,350		116,000	80,000
5,400		116,000	80,000
5,500		116,000	80,000
5,550		116,000	80,000
5,600		116,000	80,000
5,700		116,000	80,000
5,800		116,000	80,000
5,900		116,000	80,000
6,000		116,000	80,000
6,100		124,000	86,000
6,150		124,000	86,000
6,200		124,000	86,000
6,350	1/4	124,000	86,000
6,400		124,000	86,000
6,500		124,000	86,000
6,600		124,000	86,000
6,700		124,000	86,000
6,800		133,000	93,000
6,900		133,000	93,000
7,000		133,000	93,000
7,050		133,000	93,000
7,100		133,000	93,000
7,150		133,000	93,000
7,200		133,000	93,000
7,300		133,000	93,000
7,400		133,000	93,000
7,600		142,000	100,000
7,750		142,000	100,000
7,800		142,000	100,000
7,950		142,000	100,000
8,000		142,000	100,000
8,100		142,000	100,000
8,120		142,000	100,000
8,200		142,000	100,000
8,300		142,000	100,000
8,500		142,000	100,000
8,600		151,000	107,000

d1		l1	l2
mm	inch	mm	mm
8,700		151,000	107,000
8,730	11/32	151,000	107,000
8,900		151,000	107,000
9,000		151,000	107,000
9,100		151,000	107,000
9,200		151,000	107,000
9,300		151,000	107,000
9,500		151,000	107,000
9,600		162,000	116,000
9,650		162,000	116,000
9,700		162,000	116,000
9,750		162,000	116,000
9,800		162,000	116,000
10,000		162,000	116,000
10,200		162,000	116,000
10,500		162,000	116,000
10,800		173,000	125,000
10,900		173,000	125,000
11,000		173,000	125,000
11,300		173,000	125,000
11,400		173,000	125,000
11,500		173,000	125,000
11,700		173,000	125,000
11,750		173,000	125,000
12,000		184,000	134,000
12,100		184,000	134,000
12,300	31/64	184,000	134,000
12,500		184,000	134,000
13,000		184,000	134,000
13,200		184,000	134,000
13,500		194,000	142,000
13,800		194,000	142,000
14,200		202,000	147,000
14,500		202,000	147,000
15,000		202,000	147,000
15,500		211,000	153,000
16,500		218,000	159,000
17,000		218,000	159,000
18,000		226,000	165,000
18,250		234,000	171,000
18,500		234,000	171,000
19,000		234,000	171,000
19,500		242,000	177,000
20,000		242,000	177,000



Pitkät kartiovartiset kierukkaporat

Materiaali **HSS**

Pinta ○

Leikkusuunta

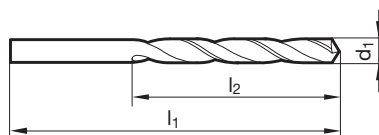
P • Kärjen kevennys $\geq \varnothing 2,400$ • kartiovaippahionta • porausholkin läpi porausta varten

M**K** •**N** ○**S****H**

seostettu-/seostamaton teräs ja valuteräs • harmaavalu-, taottava- ja pallografiittivalurauta • sintrattu pulveriteräs, uushopea ja grafiitti

GÜHRING NAVIGATOR

Leikkuarvosivu 786



Artikkelinro.

561

d1		l1	l2
mm	inch	mm	mm
2,400		74,000	47,000
2,500		74,000	47,000
2,600		74,000	47,000
3,000		79,000	51,000
3,100		84,000	55,000
3,120		84,000	55,000
3,200		84,000	55,000
3,300		84,000	55,000
4,000		96,000	64,000
4,250		96,000	64,000
4,400		102,000	69,000
4,800		108,000	74,000

d1		l1	l2
mm	inch	mm	mm
5,000		108,000	74,000



Pitkät kartiovartiset kierukkaporat



P • Kärjen kevennys $\geq \varnothing 1,000$ • kartiovaippahionta • porausholkin läpi porausta varten

M

K •

N • seostettu-/seostamaton teräs ja valuteräs • harmaavalu-, taottava- ja pallografiittivalurauta • sintrattu pulveriteräs, uushopea ja grafiitti

S

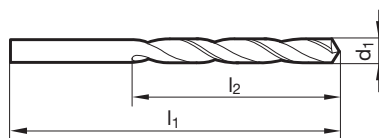
H

GÜHRING NAVIGATOR

Leikkuuarvosivu 786

Lieriövartiset
kierukkaporat

Materiaali	HSS
Pinta	S
Leikkusuunta	R



Artikkelinro.

666

d1		l1	l2
mm	inch	mm	mm
1,000		48,000	26,000
1,100		50,000	28,000
1,200		52,000	30,000
1,280		52,000	30,000
1,300		52,000	30,000
1,350		55,000	33,000
1,400		55,000	33,000
1,450		55,000	33,000
1,500		55,000	33,000
1,510		58,000	35,000
1,550		58,000	35,000
1,600		58,000	35,000
1,700		58,000	35,000
1,800		62,000	38,000
1,900		62,000	38,000
1,980	5/64	66,000	41,000
1,990		66,000	41,000
2,000		66,000	41,000
2,020		66,000	41,000
2,100		66,000	41,000
2,200		70,000	44,000
2,300		70,000	44,000
2,400		74,000	47,000
2,450		74,000	47,000
2,500		74,000	47,000
2,550		74,000	47,000
2,600		74,000	47,000
2,800		79,000	51,000
2,900		79,000	51,000
3,000		79,000	51,000
3,100		84,000	55,000
3,150		84,000	55,000
3,200		84,000	55,000
3,300		84,000	55,000
3,400		91,000	60,000
3,500		91,000	60,000
3,570	9/64	91,000	60,000
3,600		91,000	60,000
3,700		91,000	60,000
3,800		96,000	64,000
3,900		96,000	64,000
4,000		96,000	64,000

d1		l1	l2
mm	inch	mm	mm
4,100		96,000	64,000
4,200		96,000	64,000
4,300		102,000	69,000
4,400		102,000	69,000
4,500		102,000	69,000
4,600		102,000	69,000
4,800		108,000	74,000
5,000		108,000	74,000
5,100		108,000	74,000
5,150		108,000	74,000
5,300		108,000	74,000
5,400		116,000	80,000
5,500		116,000	80,000
5,600		116,000	80,000
5,700		116,000	80,000
5,800		116,000	80,000
6,000		116,000	80,000
6,100		124,000	86,000
6,200		124,000	86,000
6,350	1/4	124,000	86,000
6,400		124,000	86,000
6,500		124,000	86,000
6,600		124,000	86,000
6,700		124,000	86,000
6,800		133,000	93,000
6,900		133,000	93,000
7,000		133,000	93,000
7,100		133,000	93,000
7,200		133,000	93,000
7,300		133,000	93,000
7,500		133,000	93,000
7,600		142,000	100,000
7,700		142,000	100,000
7,800		142,000	100,000
7,900		142,000	100,000
7,940	5/16	142,000	100,000
8,000		142,000	100,000
8,200		142,000	100,000
8,500		142,000	100,000
8,600		151,000	107,000
9,000		151,000	107,000
9,600		162,000	116,000

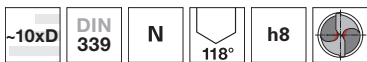


d1		l1	l2
mm	inch	mm	mm
9,800		162,000	116,000
10,000		162,000	116,000
10,200		162,000	116,000
11,000		173,000	125,000
11,500		173,000	125,000
11,910	15/32	184,000	134,000

d1		l1	l2
mm	inch	mm	mm
12,500		184,000	134,000
13,000		184,000	134,000



Pitkät kartiovirtiset kierukkaporat



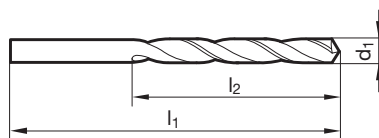
- P** • Kärjen kevennys $\geq \varnothing 1,100$ • kartiovaippahionta • Co-seosteinen pikateräs • parempi kulumiskestävyys • porausholkin läpi porausta varten
- M** ○
- K** •
- N** • seostetut/seostomattomat teräkset ja valut > yli 800 N/mm² • kuuma- ja kylmävalssatut teräkset • pienikitkaiset laakeriteräkset • runsasseosteiset teräkset • nuorrutus- ja hiilikarkaistut teräkset
- S** ○
- H** ○

Materiaali	HSCO
Pinta	$\frac{+0}{-2,36}$
Leikkusuunta	(R)

Lieriövirtiset kierukkaporat

GÜHRING NAVIGATOR

Leikkuarvosivu 792



Artikkelinro. **311**

d1		l1	l2
mm	inch	mm	mm
1,100		50,000	28,000
1,300		52,000	30,000
1,500		55,000	33,000
1,600		58,000	35,000
1,800		62,000	38,000
1,900		62,000	38,000
1,950		66,000	41,000
2,000		66,000	41,000
2,500		74,000	47,000
3,000		79,000	51,000
3,100		84,000	55,000
3,200		84,000	55,000
4,000		96,000	64,000
4,500		102,000	69,000
5,000		108,000	74,000
5,100		108,000	74,000
6,100		124,000	86,000
6,400		124,000	86,000

d1		l1	l2
mm	inch	mm	mm
6,800		133,000	93,000
7,000		133,000	93,000
8,200		142,000	100,000
8,500		142,000	100,000
10,000		162,000	116,000
10,800		173,000	125,000
17,500		226,000	165,000
19,000		234,000	171,000



Pitkät kierukkaporat



P • Kärjen kevennys $\geq \varnothing 1,000$ • kartiovaippahionta • syville rei'ille

M

K •

N ○

S

H

seostettu-/seostamaton teräs ja valuteräs • harmaavalu-, taottava- ja pallografiittivalurauta • sintrattu pulveriteräs, uushopea ja grafiitti

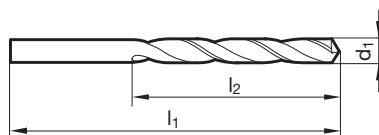
Materiaali **HSS**

Pinta $\text{Ra} > 0,236$

Leikkusuunta

GÜHRING NAVIGATOR

Leikkuuarvosivu 786



Artikkelinro.

217

d1		l1	l2
mm	inch	mm	mm
0,400	1/64	30,000	10,000
0,440		30,000	10,000
0,450		30,000	10,000
0,470		30,000	10,000
0,500		32,000	12,000
0,520		32,000	12,000
0,550		35,000	15,000
0,570		35,000	15,000
0,600		35,000	15,000
0,620		38,000	18,000
0,650		38,000	18,000
0,700		42,000	21,000
0,730		42,000	21,000
0,750		42,000	21,000
0,760		46,000	25,000
0,790	1/32	46,000	25,000
0,800		46,000	25,000
0,820		46,000	25,000
0,850		46,000	25,000
0,900		51,000	29,000
0,910		51,000	29,000
0,920		51,000	29,000
0,950		51,000	29,000
0,970		56,000	33,000
1,000		56,000	33,000
1,040		56,000	33,000
1,050		56,000	33,000
1,080		60,000	37,000
1,090		60,000	37,000
1,100		60,000	37,000
1,120		60,000	37,000
1,130		60,000	37,000
1,150		60,000	37,000
1,180		60,000	37,000
1,190	3/64	65,000	41,000
1,200		65,000	41,000
1,250		65,000	41,000
1,300		65,000	41,000
1,350		70,000	45,000
1,400		70,000	45,000
1,450		70,000	45,000
1,490		70,000	45,000

d1		l1	l2
mm	inch	mm	mm
1,500		70,000	45,000
1,510		76,000	50,000
1,550		76,000	50,000
1,590	1/16	76,000	50,000
1,600		76,000	50,000
1,610		76,000	50,000
1,650		76,000	50,000
1,700		76,000	50,000
1,750		80,000	53,000
1,780		80,000	53,000
1,800		80,000	53,000
1,850		80,000	53,000
1,900		80,000	53,000
1,930		85,000	56,000
1,950		85,000	56,000
1,980	5/64	85,000	56,000
2,000		85,000	56,000
2,030		85,000	56,000
2,050		85,000	56,000
2,060		85,000	56,000
2,080		85,000	56,000
2,100		85,000	56,000
2,150		90,000	59,000
2,200		90,000	59,000
2,250		90,000	59,000
2,260		90,000	59,000
2,300		90,000	59,000
2,350		90,000	59,000
2,370		95,000	62,000
2,380	3/32	95,000	62,000
2,400		95,000	62,000
2,420		95,000	62,000
2,440		95,000	62,000
2,450		95,000	62,000
2,490		95,000	62,000
2,500		95,000	62,000
2,550		95,000	62,000
2,580		95,000	62,000
2,600		95,000	62,000
2,620		95,000	62,000
2,640		95,000	62,000
2,650		95,000	62,000



d1		I1	I2
mm	inch	mm	mm
2,700		100,000	66,000
2,710		100,000	66,000
2,750		100,000	66,000
2,780	7/64	100,000	66,000
2,790		100,000	66,000
2,800		100,000	66,000
2,820		100,000	66,000
2,850		100,000	66,000
2,870		100,000	66,000
2,900		100,000	66,000
2,950		100,000	66,000
3,000		100,000	66,000
3,030		106,000	69,000
3,050		106,000	69,000
3,100		106,000	69,000
3,150		106,000	69,000
3,170	1/8	106,000	69,000
3,200		106,000	69,000
3,250		106,000	69,000
3,260		106,000	69,000
3,300		106,000	69,000
3,350		106,000	69,000
3,400		112,000	73,000
3,450		112,000	73,000
3,500		112,000	73,000
3,550		112,000	73,000
3,570	9/64	112,000	73,000
3,600		112,000	73,000
3,650		112,000	73,000
3,660		112,000	73,000
3,700		112,000	73,000
3,750		112,000	73,000
3,800		119,000	78,000
3,850		119,000	78,000
3,860		119,000	78,000
3,900		119,000	78,000
3,910		119,000	78,000
3,950		119,000	78,000
3,970	5/32	119,000	78,000
3,990		119,000	78,000
4,000		119,000	78,000
4,030		119,000	78,000
4,040		119,000	78,000
4,050		119,000	78,000
4,090		119,000	78,000
4,100		119,000	78,000
4,150		119,000	78,000
4,200		119,000	78,000
4,220		119,000	78,000
4,250		119,000	78,000
4,300		126,000	82,000
4,350		126,000	82,000
4,370	11/64	126,000	82,000
4,390		126,000	82,000
4,400		126,000	82,000
4,450		126,000	82,000
4,500		126,000	82,000
4,570		126,000	82,000
4,600		126,000	82,000
4,650		126,000	82,000
4,700		126,000	82,000
4,750		126,000	82,000
4,760	3/16	132,000	87,000
4,800		132,000	87,000
4,850		132,000	87,000
4,900		132,000	87,000
4,920		132,000	87,000
4,950		132,000	87,000
4,980		132,000	87,000
5,000		132,000	87,000
5,030		132,000	87,000
5,050		132,000	87,000

d1		I1	I2
mm	inch	mm	mm
5,060		132,000	87,000
5,100		132,000	87,000
5,110		132,000	87,000
5,150		132,000	87,000
5,160	13/64	132,000	87,000
5,180		132,000	87,000
5,200		132,000	87,000
5,220		132,000	87,000
5,250		132,000	87,000
5,300		132,000	87,000
5,310		139,000	91,000
5,350		139,000	91,000
5,400		139,000	91,000
5,410		139,000	91,000
5,450		139,000	91,000
5,500		139,000	91,000
5,550		139,000	91,000
5,560	7/32	139,000	91,000
5,600		139,000	91,000
5,650		139,000	91,000
5,700		139,000	91,000
5,750		139,000	91,000
5,790		139,000	91,000
5,800		139,000	91,000
5,900		139,000	91,000
5,950	15/64	139,000	91,000
6,000		139,000	91,000
6,060		148,000	97,000
6,100		148,000	97,000
6,200		148,000	97,000
6,250		148,000	97,000
6,300		148,000	97,000
6,350	1/4	148,000	97,000
6,400		148,000	97,000
6,500		148,000	97,000
6,600		148,000	97,000
6,700		148,000	97,000
6,750	17/64	156,000	102,000
6,800		156,000	102,000
6,900		156,000	102,000
7,000		156,000	102,000
7,100		156,000	102,000
7,140	9/32	156,000	102,000
7,200		156,000	102,000
7,250		156,000	102,000
7,300		156,000	102,000
7,400		156,000	102,000
7,500		156,000	102,000
7,540	19/64	165,000	109,000
7,600		165,000	109,000
7,700		165,000	109,000
7,750		165,000	109,000
7,800		165,000	109,000
7,900		165,000	109,000
7,940	5/16	165,000	109,000
8,000		165,000	109,000
8,100		165,000	109,000
8,200		165,000	109,000
8,250		165,000	109,000
8,300		165,000	109,000
8,330	21/64	165,000	109,000
8,400		165,000	109,000
8,500		165,000	109,000
8,600		175,000	115,000
8,700		175,000	115,000
8,730	11/32	175,000	115,000
8,750		175,000	115,000
8,800		175,000	115,000
8,900		175,000	115,000
9,000		175,000	115,000
9,100		175,000	115,000
9,130	23/64	175,000	115,000



d1		l1	l2
mm	inch	mm	mm
9,200		175,000	115,000
9,300		175,000	115,000
9,400		175,000	115,000
9,500		175,000	115,000
9,520	3/8	184,000	121,000
9,600		184,000	121,000
9,700		184,000	121,000
9,750		184,000	121,000
9,800		184,000	121,000
9,900		184,000	121,000
9,920	25/64	184,000	121,000
10,000		184,000	121,000
10,100		184,000	121,000
10,200		184,000	121,000
10,250		184,000	121,000
10,300		184,000	121,000
10,320	13/32	184,000	121,000
10,400		184,000	121,000
10,500		184,000	121,000
10,700		195,000	128,000
10,720	27/64	195,000	128,000
10,750		195,000	128,000
10,800		195,000	128,000
11,000		195,000	128,000
11,110	7/16	195,000	128,000
11,200		195,000	128,000
11,400		195,000	128,000
11,500		195,000	128,000
11,510	29/64	195,000	128,000
11,600		195,000	128,000
11,700		195,000	128,000
11,750		195,000	128,000
11,800		195,000	128,000
11,910	15/32	205,000	134,000
12,000		205,000	134,000
12,100		205,000	134,000
12,200		205,000	134,000
12,300	31/64	205,000	134,000
12,500		205,000	134,000
12,700	1/2	205,000	134,000
12,800		205,000	134,000
13,000		205,000	134,000
13,200		205,000	134,000
13,490	17/32	214,000	140,000
13,500		214,000	140,000
13,800		214,000	140,000
13,890	35/64	214,000	140,000
14,000		214,000	140,000
14,200		220,000	144,000
14,250		220,000	144,000
14,290	9/16	220,000	144,000
14,490		220,000	144,000
14,500		220,000	144,000
14,900		220,000	144,000

d1		l1	l2
mm	inch	mm	mm
15,000		220,000	144,000
15,080	19/32	227,000	149,000
15,200		227,000	149,000
15,250		227,000	149,000
15,400		227,000	149,000
15,480	39/64	227,000	149,000
15,500		227,000	149,000
15,600		227,000	149,000
15,870	5/8	227,000	149,000
16,000		227,000	149,000
16,270	41/64	235,000	154,000
16,500		235,000	154,000
16,670	21/32	235,000	154,000
17,000		235,000	154,000
17,070	43/64	241,000	158,000
17,460	11/16	241,000	158,000
17,500		241,000	158,000
18,000		241,000	158,000
18,500		247,000	162,000
18,650	47/64	247,000	162,000
19,000		247,000	162,000
19,050	3/4	254,000	166,000
19,500		254,000	166,000
20,000		254,000	166,000
20,500		261,000	171,000
20,640	13/16	261,000	171,000
21,000		261,000	171,000
21,500		268,000	176,000
22,000		268,000	176,000
23,300		275,000	180,000
23,810	15/16	282,000	185,000
24,000		282,000	185,000
25,000	63/64	282,000	185,000
26,190	1 1/32	290,000	190,000
26,500		290,000	190,000
26,990	1 1/16	298,000	195,000
28,570	1 1/8	307,000	201,000
29,000		307,000	201,000
29,370	1 5/32	307,000	201,000
29,500		307,000	201,000
30,160	1 3/16	316,000	207,000
30,960	1 7/32	316,000	207,000
31,000		316,000	207,000
36,510	1 7/16	345,000	225,000



Pitkät kierukkaporat



- P** • Kärjen kevennys $\geq \varnothing 1,000$ • kartiovaippahionta • syville rei'ille
- M** •
- K** •
- N** ○ seostettu-/seostamaton teräs ja valuteräs • harmaavalu-, taottava- ja pallografiittivalurauta • sintrattu pulveriteräs, uushopea ja grafiitti
- S** •
- H** •

Materiaali **HSS**

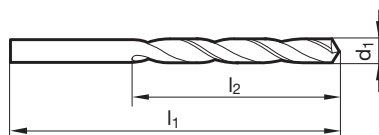
Pinta **S**

Leikkusuunta **R**



GÜHRING NAVIGATOR

Leikkuarvosivu 786



Artikkelinro. **667**

d1		l1	l2	d1		l1	l2
mm	inch	mm	mm	mm	inch	mm	mm
0,500		32,000	12,000	2,800		100,000	66,000
0,600		35,000	15,000	2,850		100,000	66,000
0,700		42,000	21,000	2,870		100,000	66,000
0,750		42,000	21,000	2,900		100,000	66,000
0,800		46,000	25,000	3,000		100,000	66,000
0,900		51,000	29,000	3,030		106,000	69,000
0,950		51,000	29,000	3,050		106,000	69,000
1,000		56,000	33,000	3,100		106,000	69,000
1,100		60,000	37,000	3,170	1/8	106,000	69,000
1,150		60,000	37,000	3,200		106,000	69,000
1,200		65,000	41,000	3,250		106,000	69,000
1,250		65,000	41,000	3,260		106,000	69,000
1,300		65,000	41,000	3,300		106,000	69,000
1,350		70,000	45,000	3,350		106,000	69,000
1,400		70,000	45,000	3,400		112,000	73,000
1,450		70,000	45,000	3,500		112,000	73,000
1,500		70,000	45,000	3,570	9/64	112,000	73,000
1,550		76,000	50,000	3,600		112,000	73,000
1,590	1/16	76,000	50,000	3,650		112,000	73,000
1,600		76,000	50,000	3,700		112,000	73,000
1,650		76,000	50,000	3,730		112,000	73,000
1,700		76,000	50,000	3,750		112,000	73,000
1,800		80,000	53,000	3,800		119,000	78,000
1,850		80,000	53,000	3,850		119,000	78,000
1,900		80,000	53,000	3,900		119,000	78,000
1,950		85,000	56,000	3,950		119,000	78,000
1,980	5/64	85,000	56,000	3,970	5/32	119,000	78,000
2,000		85,000	56,000	4,000		119,000	78,000
2,100		85,000	56,000	4,050		119,000	78,000
2,200		90,000	59,000	4,100		119,000	78,000
2,300		90,000	59,000	4,200		119,000	78,000
2,350		90,000	59,000	4,250		119,000	78,000
2,370		95,000	62,000	4,300		126,000	82,000
2,380	3/32	95,000	62,000	4,370	11/64	126,000	82,000
2,440		95,000	62,000	4,400		126,000	82,000
2,450		95,000	62,000	4,500		126,000	82,000
2,500		95,000	62,000	4,570		126,000	82,000
2,530		95,000	62,000	4,600		126,000	82,000
2,650		95,000	62,000	4,620		126,000	82,000
2,700		100,000	66,000	4,650		126,000	82,000
2,750		100,000	66,000	4,700		126,000	82,000
2,780	7/64	100,000	66,000	4,750		126,000	82,000



d1		l1	l2
mm	inch	mm	mm
4,760	3/16	132,000	87,000
4,850		132,000	87,000
4,900		132,000	87,000
5,000		132,000	87,000
5,100		132,000	87,000
5,160	13/64	132,000	87,000
5,200		132,000	87,000
5,250		132,000	87,000
5,300		132,000	87,000
5,310		139,000	91,000
5,400		139,000	91,000
5,410		139,000	91,000
5,500		139,000	91,000
5,560	7/32	139,000	91,000
5,600		139,000	91,000
5,610		139,000	91,000
5,700		139,000	91,000
5,790		139,000	91,000
5,900		139,000	91,000
6,000		139,000	91,000
6,100		148,000	97,000
6,200		148,000	97,000
6,250		148,000	97,000
6,350	1/4	148,000	97,000
6,400		148,000	97,000
6,500		148,000	97,000
6,600		148,000	97,000
6,750	17/64	156,000	102,000
6,800		156,000	102,000
7,000		156,000	102,000
7,100		156,000	102,000
7,140	9/32	156,000	102,000
7,200		156,000	102,000
7,250		156,000	102,000
7,300		156,000	102,000
7,370		156,000	102,000
7,400		156,000	102,000
7,500		156,000	102,000
7,540	19/64	165,000	109,000
7,700		165,000	109,000
7,940	5/16	165,000	109,000
8,000		165,000	109,000
8,050		165,000	109,000
8,100		165,000	109,000
8,200		165,000	109,000
8,250		165,000	109,000
8,300		165,000	109,000
8,400		165,000	109,000
8,500		165,000	109,000
8,700		175,000	115,000
8,730	11/32	175,000	115,000
8,800		175,000	115,000
8,900		175,000	115,000
9,000		175,000	115,000

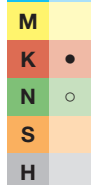
d1		l1	l2
mm	inch	mm	mm
9,100		175,000	115,000
9,300		175,000	115,000
9,400		175,000	115,000
9,500		175,000	115,000
9,520	3/8	184,000	121,000
9,700		184,000	121,000
9,900		184,000	121,000
9,920	25/64	184,000	121,000
10,000		184,000	121,000
10,200		184,000	121,000
10,320	13/32	184,000	121,000
10,500		184,000	121,000
10,720	27/64	195,000	128,000
10,800		195,000	128,000
10,900		195,000	128,000
11,000		195,000	128,000
11,110	7/16	195,000	128,000
11,500		195,000	128,000
11,750		195,000	128,000
11,910	15/32	205,000	134,000
12,000		205,000	134,000
12,500		205,000	134,000
12,700	1/2	205,000	134,000
13,000		205,000	134,000
13,490	17/32	214,000	140,000
13,500		214,000	140,000
13,800		214,000	140,000
13,890	35/64	214,000	140,000
14,000		214,000	140,000
14,290	9/16	220,000	144,000
14,500		220,000	144,000
14,750		220,000	144,000
14,800		220,000	144,000
14,900		220,000	144,000
15,000		220,000	144,000
15,080	19/32	227,000	149,000
16,000		227,000	149,000
16,500		235,000	154,000
16,670	21/32	235,000	154,000
16,750		235,000	154,000
17,000		235,000	154,000
17,460	11/16	241,000	158,000
18,000		241,000	158,000
18,250		247,000	162,000
22,220	7/8	268,000	176,000



Pitkät kierukkaporat



P • Kärjen kevennys $\geq \varnothing 14,750$ • kartiovaippahionta • syville rei'ille
 • porausholkin läpi porausta varten



N ○ seostettu-/seostamaton teräs ja valuteräs • harmaavalu-, taottava- ja pallografiittivalurauta • sintrattu pulveriteräs, uushopea ja grafiitti

Materiaali **HSS**

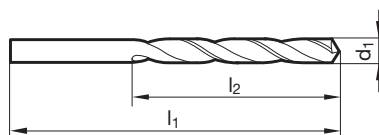
Pinta

Leikkusuunta

Lieriövartiset
kierukkaporat

GÜHRING NAVIGATOR

Leikkuarvosivu 786



Artikkelinro. **220**

d1		l1	l2
mm	inch	mm	mm
0,450		30,000	10,000
0,470		30,000	10,000
0,900		51,000	29,000
0,950		51,000	29,000
1,100		60,000	37,000
1,150		60,000	37,000
1,200		65,000	41,000
1,250		65,000	41,000
1,400		70,000	45,000
1,450		70,000	45,000
1,500		70,000	45,000
1,600		76,000	50,000
1,630		76,000	50,000
1,660		76,000	50,000
1,730		80,000	53,000
1,800		80,000	53,000
1,850		80,000	53,000
1,900		80,000	53,000
2,000		85,000	56,000
2,300		90,000	59,000
2,500		95,000	62,000
2,700		100,000	66,000
2,750		100,000	66,000
2,900		100,000	66,000
2,950		100,000	66,000
3,000		100,000	66,000
3,050		106,000	69,000
3,070		106,000	69,000
3,100		106,000	69,000
3,250		106,000	69,000
3,300		106,000	69,000
3,350		106,000	69,000
3,400		112,000	73,000
3,500		112,000	73,000
3,550		112,000	73,000
3,600		112,000	73,000
3,700		112,000	73,000
3,800		119,000	78,000
4,000		119,000	78,000
4,050		119,000	78,000
4,250		119,000	78,000
4,300		126,000	82,000

d1		l1	l2
mm	inch	mm	mm
4,500		126,000	82,000
4,600		126,000	82,000
4,780		132,000	87,000
4,800		132,000	87,000
4,950		132,000	87,000
5,000		132,000	87,000
5,100		132,000	87,000
5,200		132,000	87,000
5,600		139,000	91,000
5,700		139,000	91,000
6,000		139,000	91,000
6,050		148,000	97,000
6,100		148,000	97,000
6,400		148,000	97,000
6,500		148,000	97,000
6,600		148,000	97,000
6,800		156,000	102,000
7,200		156,000	102,000
7,500		156,000	102,000
7,800		165,000	109,000
8,000		165,000	109,000
8,100		165,000	109,000
8,250		165,000	109,000
8,400		165,000	109,000
8,800		175,000	115,000
9,000		175,000	115,000
9,520	3/8	184,000	121,000
9,700		184,000	121,000
9,800		184,000	121,000
9,900		184,000	121,000
10,000		184,000	121,000
10,100		184,000	121,000
10,500		184,000	121,000
11,000		195,000	128,000
11,500		195,000	128,000
11,900		205,000	134,000
12,000		205,000	134,000
12,200		205,000	134,000
12,500		205,000	134,000
13,000		205,000	134,000
13,500		214,000	140,000
14,750		220,000	144,000



d1		l1	l2
mm	inch	mm	mm
19,000		247,000	162,000
20,000		254,000	166,000
22,000		268,000	176,000
25,000	63/64	282,000	185,000
25,500		290,000	190,000
29,000		307,000	201,000

d1		l1	l2
mm	inch	mm	mm



Pitkät kierukkaporat



P • Kärjen kevennys $\geq \varnothing 2,950$ • kartiovaippahionta • vääntiöllä

M

K •

N ○ seostettu-/seostamaton teräs ja valuteräs • harmaavalu-, taottava- ja pallografiittivalurauta • sintrattu pulveriteräs, uushopea ja grafiitti

S

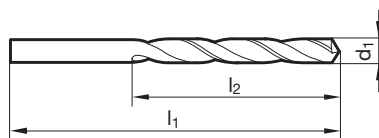
H

GÜHRING NAVIGATOR

Leikkuuarvosivu 786

Lieriövartiset
kierukkaporat

Materiaali	HSS
Pinta	●
Leikkusuunta	Ⓜ



Artikkelinro.

204

d1		l1	l2
mm	inch	mm	mm
2,950		100,000	66,000
3,000		100,000	66,000
3,100		106,000	69,000
3,170	1/8	106,000	69,000
3,200		106,000	69,000
3,300		106,000	69,000
3,400		112,000	73,000
3,500		112,000	73,000
3,600		112,000	73,000
3,800		119,000	78,000
3,900		119,000	78,000
4,000		119,000	78,000
4,050		119,000	78,000
4,100		119,000	78,000
4,200		119,000	78,000
4,250		119,000	78,000
4,300		126,000	82,000
4,400		126,000	82,000
4,500		126,000	82,000
4,760	3/16	132,000	87,000
4,800		132,000	87,000
5,000		132,000	87,000
5,080		132,000	87,000
5,100		132,000	87,000
5,200		132,000	87,000
5,500		139,000	91,000
5,600		139,000	91,000
5,800		139,000	91,000
5,850		139,000	91,000
5,900		139,000	91,000
6,000		139,000	91,000
6,100		148,000	97,000
6,200		148,000	97,000
6,300		148,000	97,000
6,350	1/4	148,000	97,000
6,400		148,000	97,000
6,500		148,000	97,000
6,600		148,000	97,000
6,700		148,000	97,000
6,750	17/64	156,000	102,000
6,800		156,000	102,000
6,900		156,000	102,000

d1		l1	l2
mm	inch	mm	mm
7,000		156,000	102,000
7,400		156,000	102,000
7,500		156,000	102,000
7,600		165,000	109,000
7,700		165,000	109,000
7,800		165,000	109,000
8,000		165,000	109,000
8,100		165,000	109,000
8,200		165,000	109,000
8,250		165,000	109,000
8,400		165,000	109,000
8,450		165,000	109,000
8,500		165,000	109,000
8,600		175,000	115,000
8,750		175,000	115,000
8,800		175,000	115,000
9,000		175,000	115,000
9,300		175,000	115,000
9,400		175,000	115,000
9,700		184,000	121,000
9,800		184,000	121,000
9,900		184,000	121,000
10,000		184,000	121,000
10,200		184,000	121,000
10,300		184,000	121,000
10,400		184,000	121,000
10,500		184,000	121,000
10,800		195,000	128,000
11,600		195,000	128,000
12,000		205,000	134,000
13,000		205,000	134,000
25,250		290,000	190,000



Pitkät kierukkaporat

Materiaali **HSS**

Pinta ○

Leikkusuunta

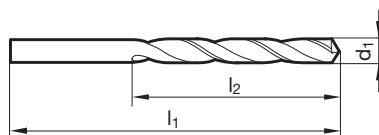
P Kärjen kevennys $\geq \varnothing 15,000$ • kartiovaippahionta • syville rei'ille

M**K****N** •

kovat ja hauraat materiaalit • messinki, magnesium seokset • pronssi, fosforipronssi • liuskekivi, mico, pertinax

S**H****GÜHRING** NAVIGATOR

Leikkuarvosivu 786



Artikkelinro.

218

d1		l1	l2	d1		l1	l2
mm	inch	mm	mm	mm	inch	mm	mm
0,500		32,000	12,000	2,300		90,000	59,000
0,520		32,000	12,000	2,350		90,000	59,000
0,550		35,000	15,000	2,400		95,000	62,000
0,600		35,000	15,000	2,500		95,000	62,000
0,650		38,000	18,000	2,550		95,000	62,000
0,700		42,000	21,000	2,600		95,000	62,000
0,750		42,000	21,000	2,650		95,000	62,000
0,800		46,000	25,000	2,700		100,000	66,000
0,820		46,000	25,000	2,800		100,000	66,000
0,840		46,000	25,000	2,830		100,000	66,000
0,850		46,000	25,000	2,870		100,000	66,000
0,900		51,000	29,000	2,900		100,000	66,000
0,950		51,000	29,000	2,940		100,000	66,000
0,970		56,000	33,000	3,000		100,000	66,000
1,000		56,000	33,000	3,020		106,000	69,000
1,050		56,000	33,000	3,050		106,000	69,000
1,100		60,000	37,000	3,060		106,000	69,000
1,150		60,000	37,000	3,100		106,000	69,000
1,200		65,000	41,000	3,150		106,000	69,000
1,250		65,000	41,000	3,180		106,000	69,000
1,300		65,000	41,000	3,200		106,000	69,000
1,400		70,000	45,000	3,250		106,000	69,000
1,500		70,000	45,000	3,270		106,000	69,000
1,550		76,000	50,000	3,300		106,000	69,000
1,560		76,000	50,000	3,400		112,000	73,000
1,570		76,000	50,000	3,500		112,000	73,000
1,580		76,000	50,000	3,550		112,000	73,000
1,600		76,000	50,000	3,600		112,000	73,000
1,650		76,000	50,000	3,800		119,000	78,000
1,700		76,000	50,000	3,900		119,000	78,000
1,750		80,000	53,000	4,000		119,000	78,000
1,800		80,000	53,000	4,030		119,000	78,000
1,820		80,000	53,000	4,100		119,000	78,000
1,850		80,000	53,000	4,200		119,000	78,000
1,900		80,000	53,000	4,300		126,000	82,000
1,950		85,000	56,000	4,400		126,000	82,000
2,000		85,000	56,000	4,500		126,000	82,000
2,050		85,000	56,000	4,600		126,000	82,000
2,100		85,000	56,000	4,700		126,000	82,000
2,180		90,000	59,000	4,760	3/16	132,000	87,000
2,200		90,000	59,000	4,800		132,000	87,000
2,250		90,000	59,000	4,900		132,000	87,000



d1		l1	l2
mm	inch	mm	mm
5,000		132,000	87,000
5,100		132,000	87,000
5,200		132,000	87,000
5,300		132,000	87,000
5,400		139,000	91,000
5,450		139,000	91,000
5,500		139,000	91,000
5,600		139,000	91,000
5,900		139,000	91,000
5,950	15/64	139,000	91,000
6,000		139,000	91,000
6,100		148,000	97,000
6,200		148,000	97,000
6,300		148,000	97,000
6,420		148,000	97,000
6,500		148,000	97,000
6,600		148,000	97,000
6,700		148,000	97,000
6,800		156,000	102,000
6,900		156,000	102,000
7,000		156,000	102,000
7,200		156,000	102,000
7,350		156,000	102,000
7,500		156,000	102,000

d1		l1	l2
mm	inch	mm	mm
8,000		165,000	109,000
8,200		165,000	109,000
8,300		165,000	109,000
8,700		175,000	115,000
9,000		175,000	115,000
9,500		175,000	115,000
9,700		184,000	121,000
9,900		184,000	121,000
10,000		184,000	121,000
11,250		195,000	128,000
12,100		205,000	134,000
14,000		214,000	140,000
15,000		220,000	144,000
16,000		227,000	149,000

Lieriövaritset
kierukkaporat



Pitkät kierukkaporat



P Kärjen kevennys $\geq \varnothing 15,000$ • kartiovaippahionta • syville rei'ille

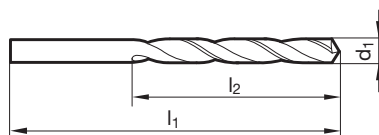


N • kovat ja hauraat materiaalit • messinki, magnesium seokset • pronssi, fosforipronssi • liuskekivi, mico, pertinax

GÜHRING NAVIGATOR

Leikkuuarvosivu 786

Materiaali	HSS
Pinta	○
Leikkusuunta	Ⓛ



Artikkelinro.

221

d1		l1	l2
mm	inch	mm	mm
0,450		30,000	10,000
0,600		35,000	15,000
0,650		38,000	18,000
0,900		51,000	29,000
1,100		60,000	37,000
1,240		65,000	41,000
1,300		65,000	41,000
1,320		65,000	41,000
1,370		70,000	45,000
1,400		70,000	45,000
1,500		70,000	45,000
1,550		76,000	50,000
1,800		80,000	53,000
1,850		80,000	53,000
2,000		85,000	56,000
2,160		90,000	59,000
2,180		90,000	59,000
2,200		90,000	59,000
2,270		90,000	59,000
2,350		90,000	59,000
2,850		100,000	66,000
2,900		100,000	66,000
2,950		100,000	66,000
3,000		100,000	66,000
3,170	1/8	106,000	69,000
3,200		106,000	69,000
3,250		106,000	69,000
3,400		112,000	73,000
3,450		112,000	73,000
3,500		112,000	73,000

d1		l1	l2
mm	inch	mm	mm
3,510		112,000	73,000
3,700		112,000	73,000
4,100		119,000	78,000
4,200		119,000	78,000
4,400		126,000	82,000
4,500		126,000	82,000
4,900		132,000	87,000
5,000		132,000	87,000
5,050		132,000	87,000
5,100		132,000	87,000
5,400		139,000	91,000
5,600		139,000	91,000
5,900		139,000	91,000
6,000		139,000	91,000
6,800		156,000	102,000
8,000		165,000	109,000
9,000		175,000	115,000
12,800		205,000	134,000
15,000		220,000	144,000

Lieriövärtiset
kierukkaporat



Pitkät kierukkaporat



P Kärjen kevennys $\geq \varnothing 14,500$ • kartiovaippahionta • syville rei'ille



N • pehmeät ja pitkälastuiset materiaalit • Alumiini, pitkälastuiset Al-seokset
 • sinkki, puhdistettu kupari, silumiini, elektroni • muovi (pehmeä), puu

Materiaali **HSS**

Pinta

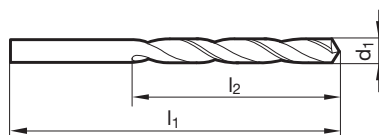
Leikkusuunta



Lieriövartiset
kierukkaporat

GÜHRING NAVIGATOR

Leikkuarvosivu 786



Artikkelinro. **219**

d1		l1	l2
mm	inch	mm	mm
0,500		32,000	12,000
0,600		35,000	15,000
0,650		38,000	18,000
0,700		42,000	21,000
0,740		42,000	21,000
0,750		42,000	21,000
0,800		46,000	25,000
0,850		46,000	25,000
0,900		51,000	29,000
0,950		51,000	29,000
0,970		56,000	33,000
0,980		56,000	33,000
1,000		56,000	33,000
1,100		60,000	37,000
1,180		60,000	37,000
1,190	3/64	65,000	41,000
1,200		65,000	41,000
1,220		65,000	41,000
1,250		65,000	41,000
1,300		65,000	41,000
1,350		70,000	45,000
1,370		70,000	45,000
1,400		70,000	45,000
1,440		70,000	45,000
1,500		70,000	45,000
1,520		76,000	50,000
1,600		76,000	50,000
1,610		76,000	50,000
1,650		76,000	50,000
1,700		76,000	50,000
1,750		80,000	53,000
1,760		80,000	53,000
1,770		80,000	53,000
1,780		80,000	53,000
1,800		80,000	53,000
1,850		80,000	53,000
1,900		80,000	53,000
1,950		85,000	56,000
1,970		85,000	56,000
2,000		85,000	56,000
2,050		85,000	56,000
2,070		85,000	56,000

d1		l1	l2
mm	inch	mm	mm
2,100		85,000	56,000
2,150		90,000	59,000
2,200		90,000	59,000
2,250		90,000	59,000
2,300		90,000	59,000
2,350		90,000	59,000
2,380	3/32	95,000	62,000
2,400		95,000	62,000
2,430		95,000	62,000
2,450		95,000	62,000
2,490		95,000	62,000
2,500		95,000	62,000
2,550		95,000	62,000
2,600		95,000	62,000
2,650		95,000	62,000
2,700		100,000	66,000
2,710		100,000	66,000
2,750		100,000	66,000
2,800		100,000	66,000
2,850		100,000	66,000
2,880		100,000	66,000
2,900		100,000	66,000
2,950		100,000	66,000
3,000		100,000	66,000
3,100	1/8	106,000	69,000
3,170		106,000	69,000
3,180		106,000	69,000
3,200		106,000	69,000
3,250		106,000	69,000
3,260		106,000	69,000
3,300		106,000	69,000
3,350		106,000	69,000
3,400		112,000	73,000
3,500		112,000	73,000
3,550		112,000	73,000
3,600		112,000	73,000
3,650		112,000	73,000
3,700		112,000	73,000
3,750		112,000	73,000
3,800		119,000	78,000
3,830		119,000	78,000
3,900		119,000	78,000

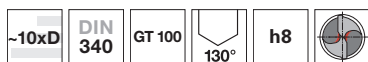


d1		l1	l2
mm	inch	mm	mm
3,920		119,000	78,000
3,990		119,000	78,000
4,000		119,000	78,000
4,100		119,000	78,000
4,150		119,000	78,000
4,200		119,000	78,000
4,250		119,000	78,000
4,300		126,000	82,000
4,400		126,000	82,000
4,500		126,000	82,000
4,700		126,000	82,000
4,800		132,000	87,000
4,830		132,000	87,000
4,870		132,000	87,000
4,900		132,000	87,000
4,950		132,000	87,000
5,000		132,000	87,000
5,100		132,000	87,000
5,200		132,000	87,000
5,300		132,000	87,000
5,400		139,000	91,000
5,430		139,000	91,000
5,500		139,000	91,000
5,650		139,000	91,000
5,700		139,000	91,000
5,800		139,000	91,000
5,900		139,000	91,000
5,980		139,000	91,000
6,000		139,000	91,000
6,100		148,000	97,000
6,250		148,000	97,000
6,300		148,000	97,000
6,400		148,000	97,000
6,500		148,000	97,000
6,600		148,000	97,000
6,700		148,000	97,000
6,800		156,000	102,000
6,900		156,000	102,000
7,000		156,000	102,000
7,100		156,000	102,000
7,300		156,000	102,000
7,400		156,000	102,000
7,450		156,000	102,000
7,500		156,000	102,000
7,540	19/64	165,000	109,000
7,550		165,000	109,000
7,670		165,000	109,000
7,700		165,000	109,000

d1		l1	l2
mm	inch	mm	mm
7,850		165,000	109,000
7,900		165,000	109,000
7,950		165,000	109,000
8,000		165,000	109,000
8,200		165,000	109,000
8,300		165,000	109,000
8,500		165,000	109,000
8,550		175,000	115,000
8,600		175,000	115,000
8,700		175,000	115,000
8,750		175,000	115,000
8,800		175,000	115,000
8,900		175,000	115,000
9,000		175,000	115,000
9,100		175,000	115,000
9,500		175,000	115,000
9,700		184,000	121,000
9,800		184,000	121,000
9,900		184,000	121,000
10,000		184,000	121,000
10,300		184,000	121,000
10,700		195,000	128,000
10,750		195,000	128,000
11,000		195,000	128,000
11,300		195,000	128,000
11,400		195,000	128,000
12,000		205,000	134,000
13,100	33/64	205,000	134,000
13,500		214,000	140,000
13,750		214,000	140,000
14,000		214,000	140,000
14,500		220,000	144,000
15,000		220,000	144,000
15,500		227,000	149,000
17,000		235,000	154,000
18,000		241,000	158,000
18,250		247,000	162,000
19,000		247,000	162,000
19,840	25/32	254,000	166,000
20,000		254,000	166,000
20,640	13/16	261,000	171,000



Pitkät kierukkaporat



- P** • Kärjen kevennys $\geq \varnothing 1,000$ • kartiovaippahionta • avarat lastu-urat
- M** •
- K** •
- N** • valurauta ja teräs $< 1000/\text{mm}^2$ asti • Ei suositella: CrNi-teräkset, ruostumattomat teräkset
- S** •
- H** •

Materiaali **HSS**

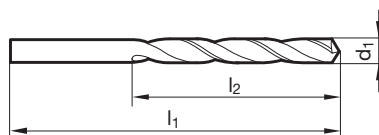
Pinta

Leikkusuunta

Lieriövartiset kierukkaporat

GÜHRING NAVIGATOR

Leikkuarvosivu 786



Artikkelinro. **535**

d1		l1	l2
mm	inch	mm	mm
1,000		56,000	33,000
1,020		56,000	33,000
1,040		56,000	33,000
1,050		56,000	33,000
1,070		60,000	37,000
1,090		60,000	37,000
1,100		60,000	37,000
1,150		60,000	37,000
1,180		60,000	37,000
1,190	3/64	65,000	41,000
1,200		65,000	41,000
1,250		65,000	41,000
1,300		65,000	41,000
1,320		65,000	41,000
1,350		70,000	45,000
1,400		70,000	45,000
1,450		70,000	45,000
1,500		70,000	45,000
1,510		76,000	50,000
1,520		76,000	50,000
1,550		76,000	50,000
1,590	1/16	76,000	50,000
1,600		76,000	50,000
1,650		76,000	50,000
1,670		76,000	50,000
1,700		76,000	50,000
1,750		80,000	53,000
1,780		80,000	53,000
1,800		80,000	53,000
1,850		80,000	53,000
1,900		80,000	53,000
1,930		85,000	56,000
1,950		85,000	56,000
1,980	5/64	85,000	56,000
1,990		85,000	56,000
2,000		85,000	56,000
2,050		85,000	56,000
2,060		85,000	56,000
2,080		85,000	56,000
2,100		85,000	56,000
2,150		90,000	59,000
2,180		90,000	59,000

d1		l1	l2
mm	inch	mm	mm
2,200		90,000	59,000
2,250		90,000	59,000
2,260		90,000	59,000
2,300		90,000	59,000
2,350		90,000	59,000
2,370		95,000	62,000
2,380	3/32	95,000	62,000
2,400		95,000	62,000
2,440		95,000	62,000
2,450		95,000	62,000
2,480		95,000	62,000
2,490		95,000	62,000
2,500		95,000	62,000
2,530		95,000	62,000
2,550		95,000	62,000
2,580		95,000	62,000
2,600		95,000	62,000
2,640		95,000	62,000
2,650		95,000	62,000
2,700		100,000	66,000
2,710		100,000	66,000
2,750		100,000	66,000
2,780	7/64	100,000	66,000
2,790		100,000	66,000
2,800		100,000	66,000
2,820		100,000	66,000
2,830		100,000	66,000
2,850		100,000	66,000
2,870		100,000	66,000
2,900		100,000	66,000
2,940		100,000	66,000
2,950		100,000	66,000
3,000		100,000	66,000
3,050		106,000	69,000
3,100		106,000	69,000
3,150		106,000	69,000
3,170	1/8	106,000	69,000
3,200		106,000	69,000
3,250		106,000	69,000
3,260		106,000	69,000
3,270		106,000	69,000
3,300		106,000	69,000



d1		l1	l2
mm	inch	mm	mm
3,400		112,000	73,000
3,450		112,000	73,000
3,500		112,000	73,000
3,550		112,000	73,000
3,570	9/64	112,000	73,000
3,600		112,000	73,000
3,660		112,000	73,000
3,700		112,000	73,000
3,730		112,000	73,000
3,750		112,000	73,000
3,800		119,000	78,000
3,860		119,000	78,000
3,900		119,000	78,000
3,910		119,000	78,000
3,970	5/32	119,000	78,000
3,990		119,000	78,000
4,000		119,000	78,000
4,040		119,000	78,000
4,050		119,000	78,000
4,090		119,000	78,000
4,100		119,000	78,000
4,130		119,000	78,000
4,150		119,000	78,000
4,200		119,000	78,000
4,220		119,000	78,000
4,250		119,000	78,000
4,300		126,000	82,000
4,350		126,000	82,000
4,370	11/64	126,000	82,000
4,390		126,000	82,000
4,400		126,000	82,000
4,500		126,000	82,000
4,570		126,000	82,000
4,600		126,000	82,000
4,620		126,000	82,000
4,700		126,000	82,000
4,750		126,000	82,000
4,760	3/16	132,000	87,000
4,800		132,000	87,000
4,850		132,000	87,000
4,900		132,000	87,000
4,920		132,000	87,000
4,980		132,000	87,000
5,000		132,000	87,000
5,050		132,000	87,000
5,060		132,000	87,000
5,100		132,000	87,000
5,110		132,000	87,000
5,160	13/64	132,000	87,000
5,180		132,000	87,000
5,200		132,000	87,000
5,220		132,000	87,000
5,250		132,000	87,000
5,300		132,000	87,000
5,310		139,000	91,000
5,400		139,000	91,000
5,410		139,000	91,000
5,500		139,000	91,000
5,560	7/32	139,000	91,000
5,600		139,000	91,000
5,610		139,000	91,000
5,700		139,000	91,000
5,750		139,000	91,000
5,790		139,000	91,000
5,800		139,000	91,000
5,900		139,000	91,000
5,940		139,000	91,000
5,950	15/64	139,000	91,000
6,000		139,000	91,000
6,040		148,000	97,000
6,050		148,000	97,000
6,100		148,000	97,000

d1		l1	l2
mm	inch	mm	mm
6,150		148,000	97,000
6,200		148,000	97,000
6,250		148,000	97,000
6,300		148,000	97,000
6,350	1/4	148,000	97,000
6,400		148,000	97,000
6,500		148,000	97,000
6,530		148,000	97,000
6,600		148,000	97,000
6,630		148,000	97,000
6,700		148,000	97,000
6,750	17/64	156,000	102,000
6,800		156,000	102,000
6,900		156,000	102,000
6,910		156,000	102,000
7,000		156,000	102,000
7,030		156,000	102,000
7,040		156,000	102,000
7,100		156,000	102,000
7,140	9/32	156,000	102,000
7,200		156,000	102,000
7,300		156,000	102,000
7,370		156,000	102,000
7,400		156,000	102,000
7,490		156,000	102,000
7,500		156,000	102,000
7,540	19/64	165,000	109,000
7,600		165,000	109,000
7,670		165,000	109,000
7,700		165,000	109,000
7,750		165,000	109,000
7,800		165,000	109,000
7,850		165,000	109,000
7,900		165,000	109,000
7,940	5/16	165,000	109,000
8,000		165,000	109,000
8,030		165,000	109,000
8,100		165,000	109,000
8,200		165,000	109,000
8,250		165,000	109,000
8,300		165,000	109,000
8,330	21/64	165,000	109,000
8,400		165,000	109,000
8,430		165,000	109,000
8,500		165,000	109,000
8,600		175,000	115,000
8,610		175,000	115,000
8,700		175,000	115,000
8,730	11/32	175,000	115,000
8,800		175,000	115,000
8,840		175,000	115,000
8,900		175,000	115,000
9,000		175,000	115,000
9,090		175,000	115,000
9,100		175,000	115,000
9,130	23/64	175,000	115,000
9,200		175,000	115,000
9,300		175,000	115,000
9,340		175,000	115,000
9,350		175,000	115,000
9,400		175,000	115,000
9,500		175,000	115,000
9,520	3/8	184,000	121,000
9,600		184,000	121,000
9,700		184,000	121,000
9,800		184,000	121,000
9,900		184,000	121,000
9,920	25/64	184,000	121,000
10,000		184,000	121,000
10,080		184,000	121,000
10,100		184,000	121,000
10,200		184,000	121,000

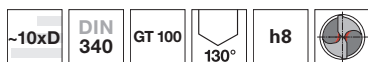


d1		l1	l2
mm	inch	mm	mm
10,300		184,000	121,000
10,320	13/32	184,000	121,000
10,400		184,000	121,000
10,490		184,000	121,000
10,500		184,000	121,000
10,600		184,000	121,000
10,720	27/64	195,000	128,000
10,800		195,000	128,000
10,900		195,000	128,000
11,000		195,000	128,000
11,100		195,000	128,000
11,110	7/16	195,000	128,000
11,300		195,000	128,000
11,400		195,000	128,000
11,500		195,000	128,000
11,800		195,000	128,000
11,900		205,000	134,000
11,910	15/32	205,000	134,000

d1		l1	l2
mm	inch	mm	mm
12,000		205,000	134,000
12,150		205,000	134,000
12,300	31/64	205,000	134,000
12,500		205,000	134,000
12,600		205,000	134,000
12,700	1/2	205,000	134,000
13,000		205,000	134,000
13,100	33/64	205,000	134,000
13,490	17/32	214,000	140,000
13,500		214,000	140,000
13,700		214,000	140,000
13,890	35/64	214,000	140,000
13,900		214,000	140,000
14,000		214,000	140,000



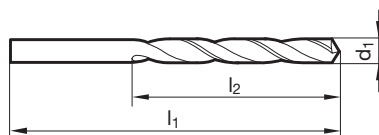
Pitkät kierukkaporat



P	•	Kärjen kevennys $\geq \varnothing 1,000$ • kartiovaippahionta • avarat lastu-urat
M		• riittämättömään lastunpoistoon
K	•	
N	•	valurauta ja teräs $< 1000/\text{mm}^2$ asti • Ei suositella: CrNi-teräkset, ruostumattomat teräkset
S		
H		

GÜHRING NAVIGATOR

Leikkuuarvosivu 786

Materiaali **HSS**Pinta **S**Leikkusuunta **R**

Artikkelinro.

668

d1		l1	l2
mm	inch	mm	mm
1,000		56,000	33,000
1,090		60,000	37,000
1,100		60,000	37,000
1,180		60,000	37,000
1,190	3/64	65,000	41,000
1,200		65,000	41,000
1,300		65,000	41,000
1,320		65,000	41,000
1,400		70,000	45,000
1,500		70,000	45,000
1,510		76,000	50,000
1,590	1/16	76,000	50,000
1,600		76,000	50,000
1,650		76,000	50,000
1,700		76,000	50,000
1,800		80,000	53,000
1,850		80,000	53,000
1,900		80,000	53,000
1,930		85,000	56,000
1,950		85,000	56,000
1,980	5/64	85,000	56,000
1,990		85,000	56,000
2,000		85,000	56,000
2,060		85,000	56,000
2,080		85,000	56,000
2,100		85,000	56,000
2,180		90,000	59,000
2,200		90,000	59,000
2,260		90,000	59,000
2,300		90,000	59,000
2,380	3/32	95,000	62,000
2,400		95,000	62,000
2,490		95,000	62,000
2,500		95,000	62,000
2,530		95,000	62,000
2,550		95,000	62,000
2,580		95,000	62,000
2,600		95,000	62,000
2,640		95,000	62,000
2,700		100,000	66,000
2,710		100,000	66,000
2,780	7/64	100,000	66,000

d1		l1	l2
mm	inch	mm	mm
2,800		100,000	66,000
2,820		100,000	66,000
2,850		100,000	66,000
2,870		100,000	66,000
2,900		100,000	66,000
2,950		100,000	66,000
3,000		100,000	66,000
3,050		106,000	69,000
3,100		106,000	69,000
3,170	1/8	106,000	69,000
3,200		106,000	69,000
3,250		106,000	69,000
3,260		106,000	69,000
3,300		106,000	69,000
3,400		112,000	73,000
3,450		112,000	73,000
3,500		112,000	73,000
3,570	9/64	112,000	73,000
3,600		112,000	73,000
3,700		112,000	73,000
3,730		112,000	73,000
3,750		112,000	73,000
3,800		119,000	78,000
3,860		119,000	78,000
3,870		119,000	78,000
3,900		119,000	78,000
3,910		119,000	78,000
3,970	5/32	119,000	78,000
4,000		119,000	78,000
4,040		119,000	78,000
4,090		119,000	78,000
4,100		119,000	78,000
4,200		119,000	78,000
4,220		119,000	78,000
4,300		126,000	82,000
4,370	11/64	126,000	82,000
4,400		126,000	82,000
4,500		126,000	82,000
4,600		126,000	82,000
4,700		126,000	82,000
4,760	3/16	132,000	87,000
4,800		132,000	87,000

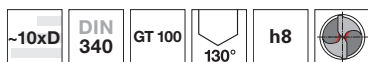


d1		l1	l2
mm	inch	mm	mm
4,850		132,000	87,000
4,900		132,000	87,000
4,910		132,000	87,000
4,920		132,000	87,000
5,000		132,000	87,000
5,060		132,000	87,000
5,100		132,000	87,000
5,160	13/64	132,000	87,000
5,200		132,000	87,000
5,300		132,000	87,000
5,400		139,000	91,000
5,500		139,000	91,000
5,560	7/32	139,000	91,000
5,600		139,000	91,000
5,700		139,000	91,000
5,800		139,000	91,000
5,900		139,000	91,000
5,950	15/64	139,000	91,000
6,000		139,000	91,000
6,040		148,000	97,000
6,100		148,000	97,000
6,150		148,000	97,000
6,200		148,000	97,000
6,250		148,000	97,000
6,300		148,000	97,000
6,350	1/4	148,000	97,000
6,400		148,000	97,000
6,500		148,000	97,000
6,530		148,000	97,000
6,600		148,000	97,000
6,630		148,000	97,000
6,700		148,000	97,000
6,750	17/64	156,000	102,000
6,760		156,000	102,000
6,800		156,000	102,000
6,900		156,000	102,000
7,000		156,000	102,000
7,100		156,000	102,000
7,140	9/32	156,000	102,000
7,250		156,000	102,000
7,300		156,000	102,000
7,370		156,000	102,000
7,490		156,000	102,000
7,500		156,000	102,000
7,600		165,000	109,000
7,700		165,000	109,000
7,800		165,000	109,000
7,900		165,000	109,000

d1		l1	l2
mm	inch	mm	mm
7,940	5/16	165,000	109,000
8,000		165,000	109,000
8,200		165,000	109,000
8,300		165,000	109,000
8,400		165,000	109,000
8,430		165,000	109,000
8,500		165,000	109,000
8,600		175,000	115,000
8,610		175,000	115,000
8,700		175,000	115,000
8,730	11/32	175,000	115,000
8,800		175,000	115,000
8,900		175,000	115,000
9,000		175,000	115,000
9,130	23/64	175,000	115,000
9,200		175,000	115,000
9,340		175,000	115,000
9,400		175,000	115,000
9,500		175,000	115,000
9,520	3/8	184,000	121,000
9,700		184,000	121,000
9,900		184,000	121,000
9,920	25/64	184,000	121,000
10,000		184,000	121,000
10,100		184,000	121,000
10,200		184,000	121,000
10,320	13/32	184,000	121,000
10,500		184,000	121,000
11,000		195,000	128,000
11,110	7/16	195,000	128,000
11,500		195,000	128,000
11,510	29/64	195,000	128,000
11,910	15/32	205,000	134,000
12,000		205,000	134,000
12,300	31/64	205,000	134,000
12,700	1/2	205,000	134,000
13,000		205,000	134,000
14,000		214,000	140,000



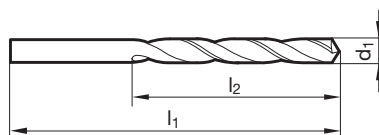
Pitkät kierukkaporat



P	•	Kärjen kevennys $\geq \varnothing 1,000$ • kartiovaippahionta • avarat lastu-urat
M		• riittämättömään lastunpoistoon
K	•	
N	•	valurauta ja teräs < 1000/mm ² asti • Ei suositella: CrNi-teräkset, ruostumattomat teräkset
S		
H		

Materiaali **HSS**Pinta **F**Leikkusuunta **R****GÜHRING** NAVIGATOR

Leikkuarvosivu 786



Artikkelinro.

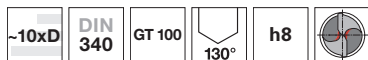
2462

d1		l1	l2
mm	inch	mm	mm
1,000		56,000	33,000
1,100		60,000	37,000
1,200		65,000	41,000
1,300		65,000	41,000
1,500		70,000	45,000
1,600		76,000	50,000
1,700		76,000	50,000
1,800		80,000	53,000
1,900		80,000	53,000
2,000		85,000	56,000
2,100		85,000	56,000
2,200		90,000	59,000
2,300		90,000	59,000
2,400		95,000	62,000
2,500		95,000	62,000
2,600		95,000	62,000
2,800		100,000	66,000
2,900		100,000	66,000
3,000		100,000	66,000
3,100		106,000	69,000
3,200		106,000	69,000
3,300		106,000	69,000
3,400		112,000	73,000
3,500		112,000	73,000

d1		l1	l2
mm	inch	mm	mm
3,800		119,000	78,000
4,000		119,000	78,000
4,200		119,000	78,000
4,300		126,000	82,000
4,500		126,000	82,000
4,800		132,000	87,000
5,000		132,000	87,000
5,200		132,000	87,000
5,400		139,000	91,000
5,500		139,000	91,000
6,000		139,000	91,000
6,100		148,000	97,000
6,200		148,000	97,000
6,500		148,000	97,000
6,600		148,000	97,000
6,800		156,000	102,000
7,000		156,000	102,000
7,200		156,000	102,000
7,300		156,000	102,000
7,600		165,000	109,000
8,000		165,000	109,000
9,000		175,000	115,000
10,000		184,000	121,000



Pitkät kierukkaporat



- P** • Kärjen kevennys $\geq \varnothing 1,400$ • kartiovaippahionta • avarat lastu-urat • riittämättömään lastunpoistoon
- M**
- K** •
- N** • valurauta ja teräs $< 1000/\text{mm}^2$ asti • Ei suositella: CrNi-teräkset, ruostumattomat teräkset
- S**
- H**

Materiaali **HSS**

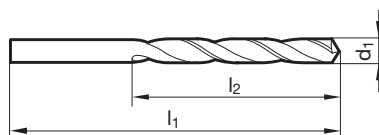
Pinta

Leikkusuunta

Lieriövartiset
kierukkaporat

GÜHRING NAVIGATOR

Leikkuarvosivu 786



Artikkelinro. **506**

d1		l1	l2
mm	inch	mm	mm
1,400		70,000	45,000
1,500		70,000	45,000
1,600		76,000	50,000
1,680		76,000	50,000
1,800		80,000	53,000
1,850		80,000	53,000
2,000		85,000	56,000
2,200		90,000	59,000
2,300		90,000	59,000
2,350		90,000	59,000
2,500		95,000	62,000
2,800		100,000	66,000
3,000		100,000	66,000
3,050		106,000	69,000
3,200		106,000	69,000
3,300		106,000	69,000
3,400		112,000	73,000
3,500		112,000	73,000
3,550		112,000	73,000
3,800		119,000	78,000
3,950		119,000	78,000
4,000		119,000	78,000
4,400		126,000	82,000
4,500		126,000	82,000

d1		l1	l2
mm	inch	mm	mm
4,600		126,000	82,000
4,760	3/16	132,000	87,000
4,800		132,000	87,000
4,950		132,000	87,000
5,160	13/64	132,000	87,000
5,200		132,000	87,000
5,400		139,000	91,000
5,600		139,000	91,000
5,700		139,000	91,000
5,800		139,000	91,000
5,900		139,000	91,000
6,000		139,000	91,000
7,400		156,000	102,000
7,800		165,000	109,000
8,500		165,000	109,000
9,000		175,000	115,000
9,900		184,000	121,000
10,320	13/32	184,000	121,000
11,000		195,000	128,000
11,500		195,000	128,000
11,600		195,000	128,000
12,000		205,000	134,000
12,500		205,000	134,000
13,000		205,000	134,000



Pitkät kierukkaporat

Materiaali **HSS**

Pinta ○

Leikkusuunta

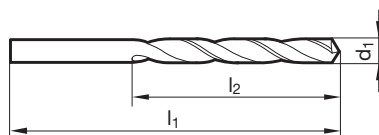
P ○ Kärjen kevennys $\geq \varnothing 2,370$ • kartiovaippahionta • erittäin suuri lastu-ura



N • pitkälastuiset materiaalit $< 500 \text{ N/mm}^2$ • niukkaseosteiset teräkset
 • Alumiini, pitkälastuiset Al-seokset • sinkki, puhdistettu kupari, silumiini,
 elektroni • zamakki, argalium, pehmeät muovit ,puu

GÜHRING NAVIGATOR

Leikkuarvosivu 786



Artikkelinro.

501

d1		l1	l2	d1		l1	l2
mm	inch	mm	mm	mm	inch	mm	mm
1,000		56,000	33,000	2,350		90,000	59,000
1,020		56,000	33,000	2,370		95,000	62,000
1,030		56,000	33,000	2,380	3/32	95,000	62,000
1,040		56,000	33,000	2,400		95,000	62,000
1,070		60,000	37,000	2,440		95,000	62,000
1,090		60,000	37,000	2,450		95,000	62,000
1,100		60,000	37,000	2,490		95,000	62,000
1,180		60,000	37,000	2,500		95,000	62,000
1,190	3/64	65,000	41,000	2,520		95,000	62,000
1,200		65,000	41,000	2,530		95,000	62,000
1,250		65,000	41,000	2,550		95,000	62,000
1,300		65,000	41,000	2,580		95,000	62,000
1,320		65,000	41,000	2,600		95,000	62,000
1,400		70,000	45,000	2,640		95,000	62,000
1,450		70,000	45,000	2,650		95,000	62,000
1,480		70,000	45,000	2,700		100,000	66,000
1,500		70,000	45,000	2,710		100,000	66,000
1,510		76,000	50,000	2,750		100,000	66,000
1,550		76,000	50,000	2,780	7/64	100,000	66,000
1,590	1/16	76,000	50,000	2,790		100,000	66,000
1,600		76,000	50,000	2,800		100,000	66,000
1,610		76,000	50,000	2,820		100,000	66,000
1,700		76,000	50,000	2,850		100,000	66,000
1,750		80,000	53,000	2,870		100,000	66,000
1,780		80,000	53,000	2,900		100,000	66,000
1,800		80,000	53,000	2,950		100,000	66,000
1,850		80,000	53,000	3,000		100,000	66,000
1,900		80,000	53,000	3,050		106,000	69,000
1,930		85,000	56,000	3,100		106,000	69,000
1,950		85,000	56,000	3,170	1/8	106,000	69,000
1,980	5/64	85,000	56,000	3,200		106,000	69,000
1,990		85,000	56,000	3,250		106,000	69,000
2,000		85,000	56,000	3,260		106,000	69,000
2,050		85,000	56,000	3,300		106,000	69,000
2,060		85,000	56,000	3,350		106,000	69,000
2,080		85,000	56,000	3,400		112,000	73,000
2,100		85,000	56,000	3,450		112,000	73,000
2,180		90,000	59,000	3,500		112,000	73,000
2,200		90,000	59,000	3,570	9/64	112,000	73,000
2,250		90,000	59,000	3,600		112,000	73,000
2,260		90,000	59,000	3,650		112,000	73,000
2,300		90,000	59,000	3,660		112,000	73,000



Lieriövartiset
kierukkaporat

d1		l1	l2
mm	inch	mm	mm
3,700		112,000	73,000
3,800		119,000	78,000
3,860		119,000	78,000
3,900		119,000	78,000
3,910		119,000	78,000
3,970	5/32	119,000	78,000
3,990		119,000	78,000
4,000		119,000	78,000
4,040		119,000	78,000
4,050		119,000	78,000
4,090		119,000	78,000
4,100		119,000	78,000
4,200		119,000	78,000
4,220		119,000	78,000
4,250		119,000	78,000
4,300		126,000	82,000
4,350		126,000	82,000
4,370	11/64	126,000	82,000
4,400		126,000	82,000
4,500		126,000	82,000
4,570		126,000	82,000
4,600		126,000	82,000
4,620		126,000	82,000
4,700		126,000	82,000
4,750		126,000	82,000
4,760	3/16	132,000	87,000
4,800		132,000	87,000
4,850		132,000	87,000
4,900		132,000	87,000
4,920		132,000	87,000
4,980		132,000	87,000
5,000		132,000	87,000
5,060		132,000	87,000
5,100		132,000	87,000
5,110		132,000	87,000
5,160	13/64	132,000	87,000
5,180		132,000	87,000
5,200		132,000	87,000
5,300		132,000	87,000
5,310		139,000	91,000
5,400		139,000	91,000
5,410		139,000	91,000
5,500		139,000	91,000
5,560	7/32	139,000	91,000
5,600		139,000	91,000
5,610		139,000	91,000
5,650		139,000	91,000
5,700		139,000	91,000
5,790		139,000	91,000
5,800		139,000	91,000
5,900		139,000	91,000
5,940		139,000	91,000
5,950	15/64	139,000	91,000
6,000		139,000	91,000
6,030		148,000	97,000
6,040		148,000	97,000
6,150		148,000	97,000
6,200		148,000	97,000
6,250		148,000	97,000
6,300		148,000	97,000
6,350	1/4	148,000	97,000
6,400		148,000	97,000
6,500		148,000	97,000
6,530		148,000	97,000
6,600		148,000	97,000
6,630		148,000	97,000
6,700		148,000	97,000
6,750	17/64	156,000	102,000
6,800		156,000	102,000
6,900		156,000	102,000
7,000		156,000	102,000
7,040		156,000	102,000

d1		l1	l2
mm	inch	mm	mm
7,100		156,000	102,000
7,140	9/32	156,000	102,000
7,300		156,000	102,000
7,370		156,000	102,000
7,490		156,000	102,000
7,500		156,000	102,000
7,540	19/64	165,000	109,000
7,600		165,000	109,000
7,670		165,000	109,000
7,900		165,000	109,000
7,940	5/16	165,000	109,000
8,000		165,000	109,000
8,025		165,000	109,000
8,030		165,000	109,000
8,100		165,000	109,000
8,200		165,000	109,000
8,330	21/64	165,000	109,000
8,430		165,000	109,000
8,500		165,000	109,000
8,600		175,000	115,000
8,610		175,000	115,000
8,700		175,000	115,000
8,730	11/32	175,000	115,000
8,750		175,000	115,000
8,900		175,000	115,000
9,000		175,000	115,000
9,090		175,000	115,000
9,100		175,000	115,000
9,130	23/64	175,000	115,000
9,300		175,000	115,000
9,340		175,000	115,000
9,350		175,000	115,000
9,400		175,000	115,000
9,500		175,000	115,000
9,520	3/8	184,000	121,000
9,580		184,000	121,000
9,600		184,000	121,000
9,800		184,000	121,000
9,900		184,000	121,000
9,920	25/64	184,000	121,000
10,000		184,000	121,000
10,080		184,000	121,000
10,200		184,000	121,000
10,260		184,000	121,000
10,320	13/32	184,000	121,000
10,500		184,000	121,000
10,600		184,000	121,000
10,700		195,000	128,000
10,720	27/64	195,000	128,000
10,800		195,000	128,000
11,000		195,000	128,000
11,110	7/16	195,000	128,000
11,200		195,000	128,000
11,400		195,000	128,000
11,500		195,000	128,000
11,510	29/64	195,000	128,000
11,750		195,000	128,000
11,800		195,000	128,000
11,900		205,000	134,000
11,910	15/32	205,000	134,000
12,000		205,000	134,000
12,200		205,000	134,000
12,300	31/64	205,000	134,000
12,500		205,000	134,000
12,700	1/2	205,000	134,000
13,000		205,000	134,000
13,100	33/64	205,000	134,000
13,490	17/32	214,000	140,000
14,000		214,000	140,000
32,600		325,000	213,000



Pitkät kierukkaporat



- P** • Kärjen kevennys $\geq \varnothing 1,000$ • kartiovaippahionta • Co-seosteinen pikateräs • parempi kulumiskestävyys
- M** ○
- K** •
- N** • seostetut/seostomattomat teräkset ja valut > yli 800 N/mm² • kuuma- ja kylmävalssatut teräkset • pienikitkaiset laakeriteräkset • runsasseosteiset teräkset • nuorutus- ja hiilikarkaistut teräkset
- S** ○
- H** ○

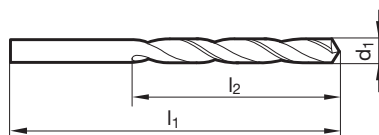
Materiaali **HSCO**

Pinta

Leikkusuunta

GÜHRING NAVIGATOR

Leikkuarvosivu 792



Artikkelinro. **317**

d1		l1	l2
mm	inch	mm	mm
0,500		32,000	12,000
0,600		35,000	15,000
0,700		42,000	21,000
0,750		42,000	21,000
0,800		46,000	25,000
0,850		46,000	25,000
0,900		51,000	29,000
0,950		51,000	29,000
0,960		56,000	33,000
1,000		56,000	33,000
1,020		56,000	33,000
1,050		56,000	33,000
1,100		60,000	37,000
1,150		60,000	37,000
1,190	3/64	65,000	41,000
1,200		65,000	41,000
1,250		65,000	41,000
1,300		65,000	41,000
1,350		70,000	45,000
1,400		70,000	45,000
1,450		70,000	45,000
1,500		70,000	45,000
1,510		76,000	50,000
1,550		76,000	50,000
1,590	1/16	76,000	50,000
1,600		76,000	50,000
1,650		76,000	50,000
1,700		76,000	50,000
1,780		80,000	53,000
1,800		80,000	53,000
1,850		80,000	53,000
1,900		80,000	53,000
1,950		85,000	56,000
1,980	5/64	85,000	56,000
2,000		85,000	56,000
2,050		85,000	56,000
2,060		85,000	56,000
2,100		85,000	56,000
2,200		90,000	59,000
2,300		90,000	59,000
2,380	3/32	95,000	62,000
2,400		95,000	62,000

d1		l1	l2
mm	inch	mm	mm
2,500		95,000	62,000
2,600		95,000	62,000
2,700		100,000	66,000
2,780	7/64	100,000	66,000
2,800		100,000	66,000
2,900		100,000	66,000
3,000		100,000	66,000
3,050		106,000	69,000
3,100		106,000	69,000
3,170	1/8	106,000	69,000
3,200		106,000	69,000
3,250		106,000	69,000
3,300		106,000	69,000
3,400		112,000	73,000
3,500		112,000	73,000
3,550		112,000	73,000
3,570	9/64	112,000	73,000
3,600		112,000	73,000
3,700		112,000	73,000
3,800		119,000	78,000
3,900		119,000	78,000
3,970	5/32	119,000	78,000
4,000		119,000	78,000
4,040		119,000	78,000
4,100		119,000	78,000
4,200		119,000	78,000
4,300		126,000	82,000
4,370	11/64	126,000	82,000
4,400		126,000	82,000
4,500		126,000	82,000
4,600		126,000	82,000
4,700		126,000	82,000
4,760	3/16	132,000	87,000
4,800		132,000	87,000
4,850		132,000	87,000
4,900		132,000	87,000
5,000		132,000	87,000
5,050		132,000	87,000
5,100		132,000	87,000
5,160	13/64	132,000	87,000
5,200		132,000	87,000
5,300		132,000	87,000

Lieriövärtiset
kierukkaporat

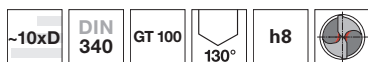


d1		l1	l2
mm	inch	mm	mm
5,400		139,000	91,000
5,500		139,000	91,000
5,560	7/32	139,000	91,000
5,600		139,000	91,000
5,700		139,000	91,000
5,800		139,000	91,000
5,900		139,000	91,000
5,950	15/64	139,000	91,000
6,000		139,000	91,000
6,100		148,000	97,000
6,200		148,000	97,000
6,300		148,000	97,000
6,350	1/4	148,000	97,000
6,400		148,000	97,000
6,500		148,000	97,000
6,600		148,000	97,000
6,630		148,000	97,000
6,750	17/64	156,000	102,000
6,800		156,000	102,000
6,900		156,000	102,000
7,000		156,000	102,000
7,140	9/32	156,000	102,000
7,200		156,000	102,000
7,500		156,000	102,000
7,540	19/64	165,000	109,000
7,600		165,000	109,000
7,700		165,000	109,000
7,800		165,000	109,000
7,940	5/16	165,000	109,000
8,000		165,000	109,000
8,200		165,000	109,000
8,330	21/64	165,000	109,000
8,430		165,000	109,000
8,500		165,000	109,000
8,600		175,000	115,000
8,730	11/32	175,000	115,000
8,800		175,000	115,000
9,000		175,000	115,000
9,130	23/64	175,000	115,000
9,200		175,000	115,000
9,300		175,000	115,000
9,500		175,000	115,000

d1		l1	l2
mm	inch	mm	mm
9,520	3/8	184,000	121,000
9,700		184,000	121,000
9,920	25/64	184,000	121,000
10,000		184,000	121,000
10,100		184,000	121,000
10,200		184,000	121,000
10,320	13/32	184,000	121,000
10,500		184,000	121,000
10,720	27/64	195,000	128,000
10,750		195,000	128,000
10,800		195,000	128,000
11,000		195,000	128,000
11,110	7/16	195,000	128,000
11,200		195,000	128,000
11,500		195,000	128,000
11,510	29/64	195,000	128,000
11,910	15/32	205,000	134,000
12,000		205,000	134,000
12,300	31/64	205,000	134,000
12,500		205,000	134,000
12,700	1/2	205,000	134,000
13,000		205,000	134,000
13,100	33/64	205,000	134,000
13,500		214,000	140,000
13,700		214,000	140,000
13,890	35/64	214,000	140,000
13,900		214,000	140,000
14,000		214,000	140,000
14,290	9/16	220,000	144,000
14,400		220,000	144,000
14,600		220,000	144,000
14,680	37/64	220,000	144,000
14,700		220,000	144,000
14,750		220,000	144,000
14,900		220,000	144,000
15,000		220,000	144,000
15,080	19/32	227,000	149,000
15,480	39/64	227,000	149,000
15,800		227,000	149,000
15,870	5/8	227,000	149,000
16,000		227,000	149,000
22,000		268,000	176,000



Pitkät kierukkaporat



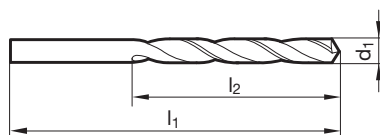
P	•	Kärjen kevennys $\geq \varnothing 1,000$ • kartiovaippahionta • Co-seosteinen pikateräs • avarat lastu-urat • parempi kulumiskestävyys
M	•	• riittämättömään lastunpoistoon
K	•	
N	•	seostetut/seostomattomat teräkset ja valut > yli 800 N/mm ² • kuuma- ja kylmävalssatut teräkset • pienikitkaiset laakeriteräkset • runsasseosteiset teräkset • nuorutus- ja hiilikarkaistut teräkset
S	•	
H	○	

Materiaali **HSCO**Pinta $> \frac{\varnothing}{2.36}$

Leikkusuunta

GÜHRING NAVIGATOR

Leikkuarvosivu 792



Artikkelinro.

336

d1		l1	l2	d1		l1	l2
mm	inch	mm	mm	mm	inch	mm	mm
1,000		56,000	33,000	2,440		95,000	62,000
1,020		56,000	33,000	2,450		95,000	62,000
1,040		56,000	33,000	2,490		95,000	62,000
1,070		60,000	37,000	2,500		95,000	62,000
1,090		60,000	37,000	2,530		95,000	62,000
1,100		60,000	37,000	2,550		95,000	62,000
1,180		60,000	37,000	2,580		95,000	62,000
1,190	3/64	65,000	41,000	2,600		95,000	62,000
1,200		65,000	41,000	2,640		95,000	62,000
1,250		65,000	41,000	2,700		100,000	66,000
1,300		65,000	41,000	2,710		100,000	66,000
1,320		65,000	41,000	2,750		100,000	66,000
1,400		70,000	45,000	2,780	7/64	100,000	66,000
1,500		70,000	45,000	2,790		100,000	66,000
1,510		76,000	50,000	2,800		100,000	66,000
1,550		76,000	50,000	2,820		100,000	66,000
1,590	1/16	76,000	50,000	2,850		100,000	66,000
1,600		76,000	50,000	2,870		100,000	66,000
1,610		76,000	50,000	2,900		100,000	66,000
1,700		76,000	50,000	2,950		100,000	66,000
1,750		80,000	53,000	3,000		100,000	66,000
1,780		80,000	53,000	3,050		106,000	69,000
1,800		80,000	53,000	3,100		106,000	69,000
1,850		80,000	53,000	3,170	1/8	106,000	69,000
1,900		80,000	53,000	3,200		106,000	69,000
1,930		85,000	56,000	3,260		106,000	69,000
1,980	5/64	85,000	56,000	3,300		106,000	69,000
1,990		85,000	56,000	3,400		112,000	73,000
2,000		85,000	56,000	3,440		112,000	73,000
2,050		85,000	56,000	3,450		112,000	73,000
2,060		85,000	56,000	3,500		112,000	73,000
2,080		85,000	56,000	3,570	9/64	112,000	73,000
2,100		85,000	56,000	3,600		112,000	73,000
2,180		90,000	59,000	3,660		112,000	73,000
2,200		90,000	59,000	3,700		112,000	73,000
2,250		90,000	59,000	3,730		112,000	73,000
2,260		90,000	59,000	3,750		112,000	73,000
2,300		90,000	59,000	3,800		119,000	78,000
2,350		90,000	59,000	3,860		119,000	78,000
2,370		95,000	62,000	3,900		119,000	78,000
2,380	3/32	95,000	62,000	3,910		119,000	78,000
2,400		95,000	62,000	3,970	5/32	119,000	78,000

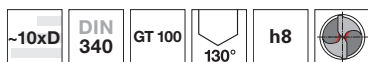


d1		l1	l2
mm	inch	mm	mm
3,990		119,000	78,000
4,000		119,000	78,000
4,040		119,000	78,000
4,090		119,000	78,000
4,100		119,000	78,000
4,200		119,000	78,000
4,220		119,000	78,000
4,300		126,000	82,000
4,370	11/64	126,000	82,000
4,390		126,000	82,000
4,400		126,000	82,000
4,500		126,000	82,000
4,570		126,000	82,000
4,600		126,000	82,000
4,620		126,000	82,000
4,700		126,000	82,000
4,760	3/16	132,000	87,000
4,800		132,000	87,000
4,850		132,000	87,000
4,900		132,000	87,000
4,920		132,000	87,000
4,980		132,000	87,000
5,000		132,000	87,000
5,060		132,000	87,000
5,100		132,000	87,000
5,110		132,000	87,000
5,160	13/64	132,000	87,000
5,180		132,000	87,000
5,200		132,000	87,000
5,220		132,000	87,000
5,300		132,000	87,000
5,310		139,000	91,000
5,400		139,000	91,000
5,410		139,000	91,000
5,500		139,000	91,000
5,560	7/32	139,000	91,000
5,600		139,000	91,000
5,610		139,000	91,000
5,700		139,000	91,000
5,790		139,000	91,000
5,800		139,000	91,000
5,900		139,000	91,000
5,940		139,000	91,000
5,950	15/64	139,000	91,000
6,000		139,000	91,000
6,040		148,000	97,000
6,100		148,000	97,000
6,150		148,000	97,000
6,200		148,000	97,000
6,250		148,000	97,000
6,300		148,000	97,000
6,350	1/4	148,000	97,000
6,400		148,000	97,000
6,500		148,000	97,000
6,530		148,000	97,000
6,600		148,000	97,000
6,630		148,000	97,000
6,700		148,000	97,000
6,750	17/64	156,000	102,000
6,800		156,000	102,000

d1		l1	l2
mm	inch	mm	mm
6,900		156,000	102,000
7,000		156,000	102,000
7,030		156,000	102,000
7,100		156,000	102,000
7,140	9/32	156,000	102,000
7,200		156,000	102,000
7,300		156,000	102,000
7,370		156,000	102,000
7,400		156,000	102,000
7,490		156,000	102,000
7,500		156,000	102,000
7,540	19/64	165,000	109,000
7,670		165,000	109,000
7,700		165,000	109,000
7,800		165,000	109,000
7,900		165,000	109,000
7,940	5/16	165,000	109,000
8,000		165,000	109,000
8,030		165,000	109,000
8,100		165,000	109,000
8,200		165,000	109,000
8,300		165,000	109,000
8,400		165,000	109,000
8,500		165,000	109,000
8,600		175,000	115,000
8,610		175,000	115,000
8,700		175,000	115,000
8,730	11/32	175,000	115,000
8,800		175,000	115,000
8,840		175,000	115,000
8,900		175,000	115,000
9,000		175,000	115,000
9,090		175,000	115,000
9,100		175,000	115,000
9,200		175,000	115,000
9,300		175,000	115,000
9,350		175,000	115,000
9,400		175,000	115,000
9,500		175,000	115,000
9,520	3/8	184,000	121,000
9,700		184,000	121,000
9,750		184,000	121,000
9,800		184,000	121,000
9,900		184,000	121,000
10,000		184,000	121,000
10,200		184,000	121,000
10,500		184,000	121,000
10,750		195,000	128,000
10,800		195,000	128,000
10,900		195,000	128,000
11,000		195,000	128,000
11,500		195,000	128,000
11,800		195,000	128,000
12,000		205,000	134,000
12,500		205,000	134,000
13,000		205,000	134,000
15,500		227,000	149,000
16,000		227,000	149,000



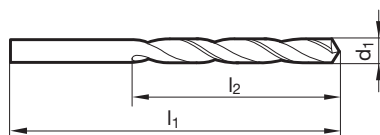
Pitkät kierukkaporat



P	•	Kärjen kevennys $\geq \varnothing 1,000$ • kartiovaippahionta • Co-seosteinen pikateräs • avarat lastu-urat • erittäin hyvä kulumiskestävyys
M	•	• riittämättömään lastunpoistoon
K	•	
N	•	seostetut/seostomattomat teräkset ja valut > yli 800 N/mm ² • kuuma- ja kylmävalssatut teräkset • pienikitkaiset laakeriteräkset • runsasseosteiset teräkset • nuorutus- ja hiilikarkaistut teräkset
S	•	
H	○	

Materiaali **HSCO**Pinta **F**Leikkusuunta **R****GÜHRING** NAVIGATOR

Leikkuarvosivu 792



Artikkelinro.

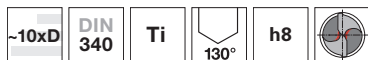
396

d1		l1	l2
mm	inch	mm	mm
1,000		56,000	33,000
1,100		60,000	37,000
1,200		65,000	41,000
1,300		65,000	41,000
1,500		70,000	45,000
1,600		76,000	50,000
1,800		80,000	53,000
1,900		80,000	53,000
2,000		85,000	56,000
2,100		85,000	56,000
2,200		90,000	59,000
2,300		90,000	59,000
2,400		95,000	62,000
2,500		95,000	62,000
2,700		100,000	66,000
2,800		100,000	66,000
2,900		100,000	66,000
3,000		100,000	66,000
3,100		106,000	69,000
3,200		106,000	69,000
3,300		106,000	69,000
3,400		112,000	73,000
3,500		112,000	73,000
3,600		112,000	73,000
3,800		119,000	78,000
3,900		119,000	78,000
4,000		119,000	78,000
4,100		119,000	78,000
4,200		119,000	78,000
4,500		126,000	82,000
4,800		132,000	87,000
5,000		132,000	87,000
5,100		132,000	87,000
5,200		132,000	87,000
5,400		139,000	91,000
5,500		139,000	91,000

d1		l1	l2
mm	inch	mm	mm
5,800		139,000	91,000
5,900		139,000	91,000
6,000		139,000	91,000
6,200		148,000	97,000
6,500		148,000	97,000
6,700		148,000	97,000
6,800		156,000	102,000
7,000		156,000	102,000
7,200		156,000	102,000
7,400		156,000	102,000
7,500		156,000	102,000
7,600		165,000	109,000
7,700		165,000	109,000
7,800		165,000	109,000
7,900		165,000	109,000
8,000		165,000	109,000
8,200		165,000	109,000
8,300		165,000	109,000
8,500		165,000	109,000
8,600		175,000	115,000
8,800		175,000	115,000
8,900		175,000	115,000
9,000		175,000	115,000
9,100		175,000	115,000
9,200		175,000	115,000
9,300		175,000	115,000
9,500		175,000	115,000
9,600		184,000	121,000
9,700		184,000	121,000
10,000		184,000	121,000
10,200		184,000	121,000
10,500		184,000	121,000
11,000		195,000	128,000
11,500		195,000	128,000
12,000		205,000	134,000



Pitkät kierukkaporat



P ○ Kärjen kevennys $\geq \varnothing 1,000$ • kartiovaippahionta • Co-seosteinen pikateräs • parempi kulumiskestävyys

M ●

K ●

N ●

S ●

H ●

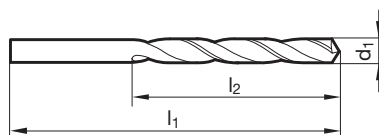
Titaani ja titaaniseokset • ruostumatt.-/haponk.-/kuumal. austeniittiset teräkset • lujat- ja lyhytlastuiset teräkset yli 900 N/mm² • pienikitkaiset laakeriteräkset • Hastelloy, Inconel, Nimonic

GÜHRING NAVIGATOR

Leikkuuarvosivu 792

Lieriövartiset
kierukkaporat

Materiaali	HSCO
Pinta	○
Leikkusuunta	Ⓜ



Artikkelinro.

617

d1		l1	l2
mm	inch	mm	mm
1,000		56,000	33,000
1,100		60,000	37,000
1,200		65,000	41,000
1,300		65,000	41,000
1,400		70,000	45,000
1,450		70,000	45,000
1,500		70,000	45,000
1,590	1/16	76,000	50,000
1,600		76,000	50,000
1,610		76,000	50,000
1,650		76,000	50,000
1,700		76,000	50,000
1,750		80,000	53,000
1,800		80,000	53,000
1,850		80,000	53,000
1,900		80,000	53,000
1,930		85,000	56,000
1,950		85,000	56,000
1,980	5/64	85,000	56,000
2,000		85,000	56,000
2,050		85,000	56,000
2,100		85,000	56,000
2,150		90,000	59,000
2,200		90,000	59,000
2,260		90,000	59,000
2,300		90,000	59,000
2,380	3/32	95,000	62,000
2,400		95,000	62,000
2,450		95,000	62,000
2,500		95,000	62,000
2,550		95,000	62,000
2,600		95,000	62,000
2,700		100,000	66,000
2,780	7/64	100,000	66,000
2,800		100,000	66,000
2,900		100,000	66,000
3,000		100,000	66,000
3,050		106,000	69,000
3,100		106,000	69,000
3,170	1/8	106,000	69,000
3,200		106,000	69,000
3,250		106,000	69,000

d1		l1	l2
mm	inch	mm	mm
3,300		106,000	69,000
3,400		112,000	73,000
3,450		112,000	73,000
3,500		112,000	73,000
3,570	9/64	112,000	73,000
3,600		112,000	73,000
3,700		112,000	73,000
3,800		119,000	78,000
3,900		119,000	78,000
3,970	5/32	119,000	78,000
4,000		119,000	78,000
4,050		119,000	78,000
4,100		119,000	78,000
4,200		119,000	78,000
4,300		126,000	82,000
4,400		126,000	82,000
4,500		126,000	82,000
4,600		126,000	82,000
4,700		126,000	82,000
4,760	3/16	132,000	87,000
4,800		132,000	87,000
4,900		132,000	87,000
4,950		132,000	87,000
5,000		132,000	87,000
5,100		132,000	87,000
5,160	13/64	132,000	87,000
5,200		132,000	87,000
5,300		139,000	91,000
5,400		139,000	91,000
5,500		139,000	91,000
5,600		139,000	91,000
5,700		139,000	91,000
5,800		139,000	91,000
6,000		148,000	97,000
6,100		148,000	97,000
6,200		148,000	97,000
6,300		148,000	97,000
6,350	1/4	148,000	97,000
6,400		148,000	97,000
6,500		148,000	97,000
6,600		148,000	97,000
6,700		148,000	97,000

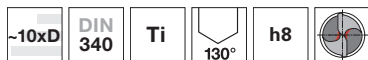


d1		l1	l2
mm	inch	mm	mm
6,750	17/64	156,000	102,000
6,800		156,000	102,000
6,900		156,000	102,000
7,000		156,000	102,000
7,100		156,000	102,000
7,140	9/32	156,000	102,000
7,250		156,000	102,000
7,400		156,000	102,000
7,500		156,000	102,000
7,540	19/64	165,000	109,000
7,700		165,000	109,000
7,800		165,000	109,000
7,940	5/16	165,000	109,000
8,000		165,000	109,000
8,100		165,000	109,000
8,200		165,000	109,000
8,300		165,000	109,000
8,330	21/64	165,000	109,000
8,400		165,000	109,000
8,500		165,000	109,000
8,600		175,000	115,000
8,700		175,000	115,000
8,730	11/32	175,000	115,000
8,800		175,000	115,000

d1		l1	l2
mm	inch	mm	mm
9,000		175,000	115,000
9,100		175,000	115,000
9,500		175,000	115,000
9,520	3/8	184,000	121,000
9,800		184,000	121,000
10,000		184,000	121,000
10,200		184,000	121,000
10,500		184,000	121,000
11,000		195,000	128,000
11,110	7/16	195,000	128,000
11,510	29/64	195,000	128,000
12,000		205,000	134,000
12,500		205,000	134,000
13,000		205,000	134,000
15,000		220,000	144,000



Pitkät kierukkaporat



P ○ Kärjen kevennys $\geq \varnothing 1,000$ • kartiovaippahionta • Co-seosteinen pikateräs • parempi kulumiskestävyys

M ●

K ●

N ●

S ●

H ●

Titaani ja titaaniseokset • ruostumatt.-/haponk.-/kuumal. austeniittiset teräkset • lujat- ja lyhytlastuiset teräkset yli 900 N/mm² • pienikitkaiset laakeriteräkset • Hastelloy, Inconel, Nimonic

Materiaali **HSCO**

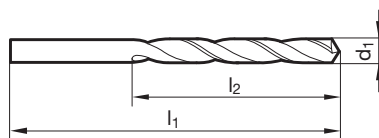
Pinta **S**

Leikkusuunta **R**

Lieriövartiset
kierukkaporat

GÜHRING NAVIGATOR

Leikkuarvosivu 792



Artikkelinro. **669**

d1		l1	l2
mm	inch	mm	mm
1,000		56,000	33,000
1,200		65,000	41,000
1,300		65,000	41,000
1,400		70,000	45,000
1,500		70,000	45,000
1,590	1/16	76,000	50,000
1,600		76,000	50,000
1,700		76,000	50,000
1,800		80,000	53,000
1,900		80,000	53,000
1,980	5/64	85,000	56,000
2,000		85,000	56,000
2,050		85,000	56,000
2,100		85,000	56,000
2,200		90,000	59,000
2,300		90,000	59,000
2,380	3/32	95,000	62,000
2,400		95,000	62,000
2,500		95,000	62,000
2,600		95,000	62,000
2,700		100,000	66,000
2,750		100,000	66,000
2,780	7/64	100,000	66,000
2,800		100,000	66,000
2,900		100,000	66,000
3,000		100,000	66,000
3,100		106,000	69,000
3,170	1/8	106,000	69,000
3,200		106,000	69,000
3,250		106,000	69,000
3,300		106,000	69,000
3,400		112,000	73,000
3,500		112,000	73,000
3,570	9/64	112,000	73,000
3,600		112,000	73,000
3,700		112,000	73,000
3,800		119,000	78,000
3,900		119,000	78,000
3,970	5/32	119,000	78,000
4,000		119,000	78,000
4,100		119,000	78,000
4,200		119,000	78,000

d1		l1	l2
mm	inch	mm	mm
4,300		126,000	82,000
4,370	11/64	126,000	82,000
4,400		126,000	82,000
4,500		126,000	82,000
4,700		126,000	82,000
4,760	3/16	132,000	87,000
4,800		132,000	87,000
5,000		132,000	87,000
5,100		132,000	87,000
5,160	13/64	132,000	87,000
5,200		132,000	87,000
5,300		132,000	87,000
5,500		139,000	91,000
5,600		139,000	91,000
5,700		139,000	91,000
5,800		139,000	91,000
6,000		139,000	91,000
6,100		148,000	97,000
6,200		148,000	97,000
6,300		148,000	97,000
6,350	1/4	148,000	97,000
6,400		148,000	97,000
6,500		148,000	97,000
6,700		148,000	97,000
6,750	17/64	156,000	102,000
6,800		156,000	102,000
7,000		156,000	102,000
7,100		156,000	102,000
7,140	9/32	156,000	102,000
7,200		156,000	102,000
7,400		156,000	102,000
7,500		156,000	102,000
7,540	19/64	165,000	109,000
7,800		165,000	109,000
7,900		165,000	109,000
7,940	5/16	165,000	109,000
8,000		165,000	109,000
8,200		165,000	109,000
8,500		165,000	109,000
8,730	11/32	175,000	115,000
9,000		175,000	115,000
9,130	23/64	175,000	115,000



d1		l1	l2
mm	inch	mm	mm
9,300		175,000	115,000
9,500		175,000	115,000
9,520	3/8	184,000	121,000
10,000		184,000	121,000
10,200		184,000	121,000

d1		l1	l2
mm	inch	mm	mm



Pitkät kierukkaporat



P päästöhiottu kärki • pääleikkusärmän suorasta



N lasikuituvahvistetut muovit • kestumuovit jotka kuluttavat sekä ohjainreunee ja leikkusärmää

Materiaali **TKM**

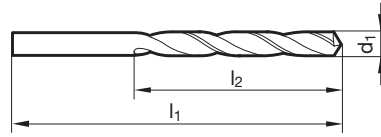
Pinta ○

Leikkusuunta

Lieriövartiset
kierukkaporat

GÜHRING NAVIGATOR

Leikkuarvosivu 792



Artikkelinro. **706**

d1		l1	l2
mm	inch	mm	mm
0,500		38,000	8,500
0,600		38,000	9,500
0,650		38,000	10,500
0,700		38,000	10,500
0,750		38,000	12,500
0,800		38,000	12,500
0,850		38,000	14,500
0,900		38,000	14,500
1,000		38,000	17,000
1,050		38,000	17,000
1,100		38,000	17,000
1,400		38,000	17,000

d1		l1	l2
mm	inch	mm	mm
1,450		38,000	17,000



Erikoispitkät kierukkaporat sarja 1

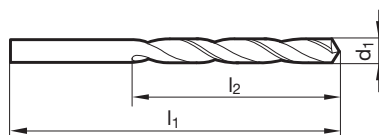


- P** • Kärjen kevennys $\geq \varnothing 2,380$ • kartiovaippahionta • erittäin syville rei'ille
- M**
- K** •
- N** ○ seostettu-/seostamaton teräs ja valuteräs • harmaavalu-, taottava- ja pallografiittivalurauta • sintrattu pulveriteräs, uushopea ja grafiitti
- S**
- H**

GÜHRING NAVIGATOR

Leikkuuarvosivu 788

Materiaali	HSS
Pinta	$>0_{2,36}$
Leikkusuunta	R



Artikkelinro. **235**

d1		l1	l2
mm	inch	mm	mm
1,600		115,000	75,000
1,700		115,000	75,000
1,800		120,000	80,000
1,900		120,000	80,000
1,930		125,000	85,000
1,950		125,000	85,000
2,000		125,000	85,000
2,050		125,000	85,000
2,100		125,000	85,000
2,200		135,000	90,000
2,300		135,000	90,000
2,350		135,000	90,000
2,380	3/32	140,000	95,000
2,400		140,000	95,000
2,500		140,000	95,000
2,600		140,000	95,000
2,700		150,000	100,000
2,800		150,000	100,000
2,900		150,000	100,000
3,000		150,000	100,000
3,100		155,000	105,000
3,170	1/8	155,000	105,000
3,200		155,000	105,000
3,250		155,000	105,000
3,300		155,000	105,000
3,400		165,000	115,000
3,500		165,000	115,000
3,570	9/64	165,000	115,000
3,600		165,000	115,000
3,650		165,000	115,000
3,700		165,000	115,000
3,750		165,000	115,000
3,800		175,000	120,000
3,900		175,000	120,000
3,970	5/32	175,000	120,000
4,000		175,000	120,000
4,100		175,000	120,000
4,200		175,000	120,000
4,300		185,000	125,000
4,370	11/64	185,000	125,000
4,400		185,000	125,000
4,500		185,000	125,000

d1		l1	l2
mm	inch	mm	mm
4,600		185,000	125,000
4,700		185,000	125,000
4,760	3/16	195,000	135,000
4,800		195,000	135,000
4,900		195,000	135,000
5,000		195,000	135,000
5,100		195,000	135,000
5,200		195,000	135,000
5,300		195,000	135,000
5,340		205,000	140,000
5,400		205,000	140,000
5,500		205,000	140,000
5,560	7/32	205,000	140,000
5,600		205,000	140,000
5,700		205,000	140,000
5,800		205,000	140,000
5,900		205,000	140,000
6,000		205,000	140,000
6,100		215,000	150,000
6,200		215,000	150,000
6,250		215,000	150,000
6,300	1/4	215,000	150,000
6,350		215,000	150,000
6,400		215,000	150,000
6,500		215,000	150,000
6,600		215,000	150,000
6,700		215,000	150,000
6,750	17/64	225,000	155,000
6,800		225,000	155,000
7,000		225,000	155,000
7,200		225,000	155,000
7,400		225,000	155,000
7,500		225,000	155,000
7,700		240,000	165,000
7,800		240,000	165,000
7,900		240,000	165,000
7,940	5/16	240,000	165,000
8,000		240,000	165,000
8,100		240,000	165,000
8,200		240,000	165,000
8,330	21/64	240,000	165,000
8,400		240,000	165,000

Lieriövaritset
kierukkaporat

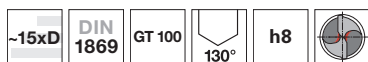


d1		l1	l2
mm	inch	mm	mm
8,500		240,000	165,000
8,700		250,000	175,000
8,730	11/32	250,000	175,000
8,800		250,000	175,000
8,900		250,000	175,000
9,000		250,000	175,000
9,130	23/64	250,000	175,000
9,500		250,000	175,000
9,520	3/8	265,000	185,000
9,600		265,000	185,000
9,700		265,000	185,000
9,800		265,000	185,000
9,900		265,000	185,000
9,920	25/64	265,000	185,000
10,000		265,000	185,000
10,100		265,000	185,000
10,200		265,000	185,000
10,250		265,000	185,000

d1		l1	l2
mm	inch	mm	mm
10,320	13/32	265,000	185,000
10,500		265,000	185,000
11,000		280,000	195,000
11,500		280,000	195,000
11,510	29/64	280,000	195,000
11,800		280,000	195,000
12,000		295,000	205,000
12,100		295,000	205,000
12,250		295,000	205,000
12,300	31/64	295,000	205,000
12,500		295,000	205,000
12,700	1/2	295,000	205,000
13,000		295,000	205,000



Erikoispitkät kierukkaporat sarja 1

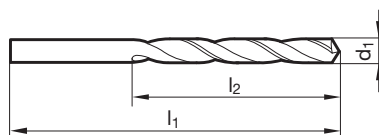


- P** • Kärjen kevennys $\geq \varnothing 1,950$ • kartiovaippahionta • avarat lastu-urat
- M**
- K** • erittäin syville rei'ille • riittämättömään lastunpoistoon
- N** • valurauta ja teräs $< 1000/\text{mm}^2$ asti • Ei suositella: CrNi-teräkset, ruostumattomat teräkset
- S**
- H**

GÜHRING NAVIGATOR

Leikkuuarvosivu 790

Materiaali	HSS
Pinta	
Leikkusuunta	



Artikkelinro. **502**

d1		l1	l2
mm	inch	mm	mm
1,950		125,000	85,000
2,000		125,000	85,000
2,050		125,000	85,000
2,100		125,000	85,000
2,200		135,000	90,000
2,300		135,000	90,000
2,370		140,000	95,000
2,380	3/32	140,000	95,000
2,400		140,000	95,000
2,500		140,000	95,000
2,550		140,000	95,000
2,580		140,000	95,000
2,600		140,000	95,000
2,700		150,000	100,000
2,780	7/64	150,000	100,000
2,800		150,000	100,000
2,850		150,000	100,000
2,870		150,000	100,000
2,900		150,000	100,000
2,950		150,000	100,000
3,000		150,000	100,000
3,030		155,000	105,000
3,100		155,000	105,000
3,170	1/8	155,000	105,000
3,200		155,000	105,000
3,250		155,000	105,000
3,300		155,000	105,000
3,400		165,000	115,000
3,500		165,000	115,000
3,570	9/64	165,000	115,000
3,600		165,000	115,000
3,700		165,000	115,000
3,750		165,000	115,000
3,800		175,000	120,000
3,860		175,000	120,000
3,900		175,000	120,000
3,970	5/32	175,000	120,000
4,000		175,000	120,000
4,100		175,000	120,000
4,200		175,000	120,000
4,300		185,000	125,000
4,370	11/64	185,000	125,000

d1		l1	l2
mm	inch	mm	mm
4,400		185,000	125,000
4,500		185,000	125,000
4,570		185,000	125,000
4,600		185,000	125,000
4,700		185,000	125,000
4,760	3/16	195,000	135,000
4,800		195,000	135,000
4,900		195,000	135,000
5,000		195,000	135,000
5,100		195,000	135,000
5,110		195,000	135,000
5,160	13/64	195,000	135,000
5,200		195,000	135,000
5,300		195,000	135,000
5,400		205,000	140,000
5,500		205,000	140,000
5,560	7/32	205,000	140,000
5,600		205,000	140,000
5,700		205,000	140,000
5,750		205,000	140,000
5,800		205,000	140,000
5,900		205,000	140,000
5,950	15/64	205,000	140,000
6,000		205,000	140,000
6,100		215,000	150,000
6,200		215,000	150,000
6,250		215,000	150,000
6,300		215,000	150,000
6,350	1/4	215,000	150,000
6,400		215,000	150,000
6,500		215,000	150,000
6,600		215,000	150,000
6,700		215,000	150,000
6,750	17/64	225,000	155,000
6,800		225,000	155,000
6,900		225,000	155,000
7,000		225,000	155,000
7,100		225,000	155,000
7,200		225,000	155,000
7,300		225,000	155,000
7,500		225,000	155,000
7,540	19/64	240,000	165,000

Lieriövärtiset
kierukkaporat

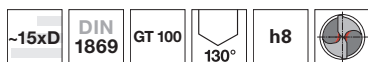


d1		l1	l2
mm	inch	mm	mm
7,700		240,000	165,000
7,750		240,000	165,000
7,800		240,000	165,000
7,900		240,000	165,000
7,940	5/16	240,000	165,000
8,000		240,000	165,000
8,100		240,000	165,000
8,200		240,000	165,000
8,300		240,000	165,000
8,330	21/64	240,000	165,000
8,400		240,000	165,000
8,430		240,000	165,000
8,500		240,000	165,000
8,600		250,000	175,000
8,700		250,000	175,000
8,730	11/32	250,000	175,000
8,800		250,000	175,000
9,000		250,000	175,000
9,200		250,000	175,000
9,300		250,000	175,000
9,400		250,000	175,000
9,500		250,000	175,000
9,520	3/8	265,000	185,000
9,600		265,000	185,000

d1		l1	l2
mm	inch	mm	mm
9,700		265,000	185,000
9,800		265,000	185,000
9,900		265,000	185,000
9,920	25/64	265,000	185,000
10,000		265,000	185,000
10,200		265,000	185,000
10,320	13/32	265,000	185,000
10,500		265,000	185,000
10,720	27/64	280,000	195,000
11,000		280,000	195,000
11,110	7/16	280,000	195,000
11,200		280,000	195,000
11,500		280,000	195,000
11,510	29/64	280,000	195,000
11,750		280,000	195,000
11,800		280,000	195,000
12,000		295,000	205,000
12,500		295,000	205,000
12,700	1/2	295,000	205,000
13,000		295,000	205,000



Erikoispitkät kierukkaporat sarja 1

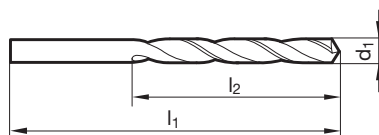


- P** • Kärjen kevennys $\geq \varnothing 1,980$ • kartiovaippahionta • avarat lastu-urat • erittäin syville rei'ille • riittämättömään lastunpoistoon
- M**
- K** •
- N** • valurauta ja teräs < 1000/mm² asti • Ei suositella: CrNi-teräkset, ruostumattomat teräkset
- S** ○
- H**

GÜHRING NAVIGATOR

Leikkuuarvosivu 790

Materiaali	HSS
Pinta	S
Leikkusuunta	R



Artikkelinro. **670**

d1		l1	l2
mm	inch	mm	mm
2,000		125,000	85,000
2,100		125,000	85,000
2,200		135,000	90,000
2,300		135,000	90,000
2,380	3/32	140,000	95,000
2,400		140,000	95,000
2,500		140,000	95,000
2,780	7/64	150,000	100,000
2,800		150,000	100,000
2,950		150,000	100,000
3,000		150,000	100,000
3,100		155,000	105,000
3,170	1/8	155,000	105,000
3,200		155,000	105,000
3,300		155,000	105,000
3,500		165,000	115,000
3,570	9/64	165,000	115,000
3,600		165,000	115,000
3,800		175,000	120,000
3,970	5/32	175,000	120,000
4,000		175,000	120,000
4,200		175,000	120,000
4,370	11/64	185,000	125,000
4,500		185,000	125,000
4,600		185,000	125,000
4,760	3/16	195,000	135,000
4,800		195,000	135,000
5,000		195,000	135,000
5,100		195,000	135,000
5,160	13/64	195,000	135,000
5,200		195,000	135,000
5,500		205,000	140,000
5,560	7/32	205,000	140,000
6,000		205,000	140,000
6,100		215,000	150,000
6,200		215,000	150,000

d1		l1	l2
mm	inch	mm	mm
6,350	1/4	215,000	150,000
6,500		215,000	150,000
6,600		215,000	150,000
6,800		225,000	155,000
7,000		225,000	155,000
7,140	9/32	225,000	155,000
7,500		225,000	155,000
7,540	19/64	240,000	165,000
7,940	5/16	240,000	165,000
8,000		240,000	165,000
8,200		240,000	165,000
8,500		240,000	165,000
8,730	11/32	250,000	175,000
9,000		250,000	175,000
9,520	3/8	265,000	185,000
9,600		265,000	185,000
9,920	25/64	265,000	185,000
10,000		265,000	185,000
10,900		280,000	195,000
11,000		280,000	195,000
11,900		295,000	205,000
11,910	15/32	295,000	205,000
12,000		295,000	205,000
12,500		295,000	205,000
12,700	1/2	295,000	205,000

Lieriövartiset
kierukkaporat



Erikoispitkät kierukkaporat sarja 1



P ○ Kärjen kevennys $\geq \varnothing 2,380$ • kartiovaippahionta • erittäin syville rei'ille

M**K****N** ●**S****H**

pitkälästiset materiaalit $< 500 \text{ N/mm}^2$ • niukkaseosteiset teräkset
• Alumiini, pitkälästiset Al-seokset • sinkki, puhdistettu kupari, silumiini,
elektroni • zamakki, argalium, pehmeät muovit ,puu

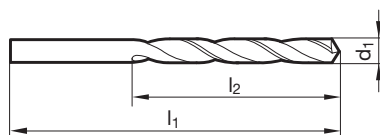
Materiaali **HSS**

Pinta ○

Leikkusuunta

GÜHRING NAVIGATOR

Leikkuuarvosivu 788

Lieriövärtiset
kierukkaporat

Artikkelinro.

524

d1		l1	l2
mm	inch	mm	mm
2,000		125,000	85,000
2,100		125,000	85,000
2,200		135,000	90,000
2,300		135,000	90,000
2,350		135,000	90,000
2,380	3/32	140,000	95,000
2,400		140,000	95,000
2,450		140,000	95,000
2,500		140,000	95,000
2,600		140,000	95,000
2,780	7/64	150,000	100,000
2,800		150,000	100,000
2,900		150,000	100,000
2,950		150,000	100,000
3,000		150,000	100,000
3,100		155,000	105,000
3,170	1/8	155,000	105,000
3,200		155,000	105,000
3,300		155,000	105,000
3,350		155,000	105,000
3,400		165,000	115,000
3,450		165,000	115,000
3,500		165,000	115,000
3,530		165,000	115,000
3,570	9/64	165,000	115,000
3,600		165,000	115,000
3,800		175,000	120,000
3,900		175,000	120,000
3,970	5/32	175,000	120,000
4,000		175,000	120,000
4,100		175,000	120,000
4,200		175,000	120,000
4,250		175,000	120,000
4,300		185,000	125,000
4,370	11/64	185,000	125,000
4,400		185,000	125,000
4,500		185,000	125,000
4,760	3/16	195,000	135,000
4,900		195,000	135,000
5,000		195,000	135,000
5,100		195,000	135,000
5,160	13/64	195,000	135,000

d1		l1	l2
mm	inch	mm	mm
5,200		195,000	135,000
5,400		205,000	140,000
5,600		205,000	140,000
5,700		205,000	140,000
5,800		205,000	140,000
5,900		205,000	140,000
5,950	15/64	205,000	140,000
6,000		205,000	140,000
6,100		215,000	150,000
6,350	1/4	215,000	150,000
6,400		215,000	150,000
6,500		215,000	150,000
6,600		215,000	150,000
6,750	17/64	225,000	155,000
6,800		225,000	155,000
7,000		225,000	155,000
7,100		225,000	155,000
7,140	9/32	225,000	155,000
7,300		225,000	155,000
7,400		225,000	155,000
7,500		225,000	155,000
7,540	19/64	240,000	165,000
7,800		240,000	165,000
7,900		240,000	165,000
7,940	5/16	240,000	165,000
8,000		240,000	165,000
8,100		240,000	165,000
8,330	21/64	240,000	165,000
8,600		250,000	175,000
8,730	11/32	250,000	175,000
8,900		250,000	175,000
9,000		250,000	175,000
9,130	23/64	250,000	175,000
9,200		250,000	175,000
9,500		250,000	175,000
9,520	3/8	265,000	185,000
9,920	25/64	265,000	185,000
10,000		265,000	185,000
10,320	13/32	265,000	185,000
10,500		265,000	185,000
11,000		280,000	195,000
11,110	7/16	280,000	195,000

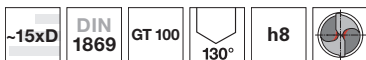


d1		l1	l2
mm	inch	mm	mm
11,500		280,000	195,000
11,910	15/32	295,000	205,000
12,000		295,000	205,000
12,700	1/2	295,000	205,000

d1		l1	l2
mm	inch	mm	mm



Erikoispitkät kierukkaporat sarja 1



P	•	Kärjen kevennys $\geq \varnothing 2,700$ • kartiovaippahionta • Co-seosteinen pikateräs • avarat lastu-urat • parempi kulumiskestävyys • erittäin syville rei'ille • riittämättömään lastunpoistoon
M	•	
K	•	
N	•	erikoislujat teräkset ja valuteräkset • harmaaalu-, taottava- ja pallografiittivalurauta
S	•	
H	○	

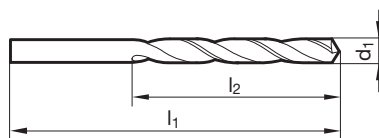
GÜHRING NAVIGATOR

Leikkuuarvosivu 794

Materiaali **HSCO**

Pinta

Leikkusuunta



Artikkelinro.

618

d1		l1	l2
mm	inch	mm	mm
2,700		150,000	100,000
2,900		150,000	100,000
3,000		150,000	100,000
3,100		155,000	105,000
3,170	1/8	155,000	105,000
3,200		155,000	105,000
3,300		155,000	105,000
3,400		165,000	115,000
3,500		165,000	115,000
3,570	9/64	165,000	115,000
3,600		165,000	115,000
3,700		165,000	115,000
3,750		165,000	115,000
3,800		175,000	120,000
3,970	5/32	175,000	120,000
4,000		175,000	120,000
4,100		175,000	120,000
4,200		175,000	120,000
4,300		185,000	125,000
4,370	11/64	185,000	125,000
4,400		185,000	125,000
4,500		185,000	125,000
4,600		185,000	125,000
4,760	3/16	195,000	135,000
4,800		195,000	135,000
4,850		195,000	135,000
5,000		195,000	135,000
5,100		195,000	135,000
5,160	13/64	195,000	135,000
5,200		195,000	135,000
5,300		195,000	135,000
5,400		205,000	140,000
5,500		205,000	140,000
5,560	7/32	205,000	140,000
5,600		205,000	140,000
5,700		205,000	140,000

d1		l1	l2
mm	inch	mm	mm
5,800		205,000	140,000
6,000		205,000	140,000
6,100		215,000	150,000
6,200		215,000	150,000
6,300		215,000	150,000
6,350	1/4	215,000	150,000
6,400		215,000	150,000
6,500		215,000	150,000
6,600		215,000	150,000
6,700		215,000	150,000
6,750	17/64	225,000	155,000
6,800		225,000	155,000
7,000		225,000	155,000
7,140	9/32	225,000	155,000
7,400		225,000	155,000
7,500		225,000	155,000
7,540	19/64	240,000	165,000
7,700		240,000	165,000
7,800		240,000	165,000
7,940	5/16	240,000	165,000
8,000		240,000	165,000
8,200		240,000	165,000
8,330	21/64	240,000	165,000
8,500		240,000	165,000
8,700		250,000	175,000
8,730	11/32	250,000	175,000
8,800		250,000	175,000
9,000		250,000	175,000
9,130	23/64	250,000	175,000
9,400		250,000	175,000
9,500		250,000	175,000
9,520	3/8	265,000	185,000
9,700		265,000	185,000
10,000		265,000	185,000



Erikoispitkät kierukkaporat sarja 2

Materiaali **HSS**

Pinta

Leikkusuunta



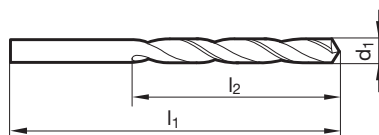
P • Kärjen kevennys $\geq \varnothing 2,700$ • kartiovaippahionta • erittäin syville rei'ille

M**K** •**N** ○

seostettu-/seostamaton teräs ja valuteräs • harmaavalu-, taottava- ja pallografiittivalurauta • sintrattu pulveriteräs, uushopea ja grafiitti

S**H****GÜHRING** NAVIGATOR

Leikkuarvosivu 788



Artikkelinro.

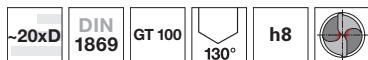
236

d1		l1	l2
mm	inch	mm	mm
2,700		190,000	130,000
2,800		190,000	130,000
2,900		190,000	130,000
3,000		190,000	130,000
3,100		200,000	135,000
3,170	1/8	200,000	135,000
3,200		200,000	135,000
3,300		200,000	135,000
3,500		210,000	145,000
3,570	9/64	210,000	145,000
3,600		210,000	145,000
3,800		220,000	150,000
3,970	5/32	220,000	150,000
4,000		220,000	150,000
4,100		220,000	150,000
4,200		220,000	150,000
4,500		235,000	160,000
4,760	3/16	245,000	170,000
4,800		245,000	170,000
4,900		245,000	170,000
5,000		245,000	170,000
5,200		245,000	170,000
5,500		260,000	180,000
5,560	7/32	260,000	180,000
5,800		260,000	180,000
5,900		260,000	180,000
5,950	15/64	260,000	180,000
6,000		260,000	180,000
6,200		275,000	190,000
6,350	1/4	275,000	190,000

d1		l1	l2
mm	inch	mm	mm
6,500		275,000	190,000
6,700		275,000	190,000
6,800		290,000	200,000
7,000		290,000	200,000
7,140	9/32	290,000	200,000
7,500		290,000	200,000
7,540	19/64	305,000	210,000
7,800		305,000	210,000
7,940	5/16	305,000	210,000
8,000		305,000	210,000
8,100		305,000	210,000
8,500		305,000	210,000
8,700		320,000	220,000
8,730	11/32	320,000	220,000
8,800		320,000	220,000
8,900		320,000	220,000
9,000		320,000	220,000
9,130	23/64	320,000	220,000
9,500		320,000	220,000
9,800		340,000	235,000
10,000		340,000	235,000
10,200		340,000	235,000
10,500		340,000	235,000
11,000		365,000	250,000
11,110	7/16	365,000	250,000
11,500		365,000	250,000
11,510	29/64	365,000	250,000
11,750		365,000	250,000
12,000		375,000	260,000
13,000		375,000	260,000



Erikoispitkät kierukkaporat sarja 2



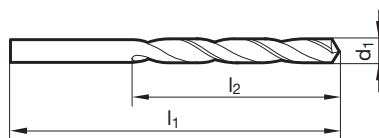
- P** • Kärjen kevennys $\geq \varnothing 2,000$ • kartiovaippahionta • avarat lastu-urat
- M** • erittäin syville rei'ille • riittämättömään lastunpoistoon
- K** •
- N** • valurauta ja teräs $< 1000/\text{mm}^2$ asti • Ei suositella: CrNi-teräkset, ruostumattomat teräkset
- S**
- H**

GÜHRING NAVIGATOR

Leikkuuarvosivu 790

Lieriövartiset kierukkaporat

Materiaali	HSS
Pinta	
Leikkusuunta	



Artikkelinro. **503**

d1		l1	l2
mm	inch	mm	mm
2,000		160,000	110,000
2,200		170,000	115,000
2,300		170,000	115,000
2,500		180,000	120,000
2,800		190,000	130,000
3,000		190,000	130,000
3,030		200,000	135,000
3,100		200,000	135,000
3,170	1/8	200,000	135,000
3,200		200,000	135,000
3,300		200,000	135,000
3,400		210,000	145,000
3,500		210,000	145,000
3,570	9/64	210,000	145,000
3,600		210,000	145,000
3,700		210,000	145,000
3,800		220,000	150,000
3,900		220,000	150,000
3,970	5/32	220,000	150,000
4,000		220,000	150,000
4,100		220,000	150,000
4,200		220,000	150,000
4,300		235,000	160,000
4,370	11/64	235,000	160,000
4,400		235,000	160,000
4,500		235,000	160,000
4,760	3/16	245,000	170,000
4,800		245,000	170,000
4,900		245,000	170,000
5,000		245,000	170,000
5,100		245,000	170,000
5,160	13/64	245,000	170,000
5,200		245,000	170,000
5,300		245,000	170,000
5,400		260,000	180,000
5,500		260,000	180,000
5,560	7/32	260,000	180,000
5,700		260,000	180,000
5,800		260,000	180,000
5,900		260,000	180,000
5,950	15/64	260,000	180,000
6,000		260,000	180,000

d1		l1	l2
mm	inch	mm	mm
6,100		275,000	190,000
6,150		275,000	190,000
6,200		275,000	190,000
6,350	1/4	275,000	190,000
6,400		275,000	190,000
6,500		275,000	190,000
6,600		275,000	190,000
6,700		275,000	190,000
6,750	17/64	290,000	200,000
6,800		290,000	200,000
6,900		290,000	200,000
7,000		290,000	200,000
7,140	9/32	290,000	200,000
7,500		290,000	200,000
7,540	19/64	305,000	210,000
7,800		305,000	210,000
7,940	5/16	305,000	210,000
8,000		305,000	210,000
8,200		305,000	210,000
8,330	21/64	305,000	210,000
8,500		305,000	210,000
8,600		320,000	220,000
8,730	11/32	320,000	220,000
8,800		320,000	220,000
9,000		320,000	220,000
9,100		320,000	220,000
9,130	23/64	320,000	220,000
9,500		320,000	220,000
9,520	3/8	340,000	235,000
9,700		340,000	235,000
9,800		340,000	235,000
9,920	25/64	340,000	235,000
10,000		340,000	235,000
10,200		340,000	235,000
10,500		340,000	235,000
10,720	27/64	365,000	250,000
11,000		365,000	250,000
11,110	7/16	365,000	250,000
11,500		365,000	250,000
11,510	29/64	365,000	250,000
11,750		365,000	250,000
11,910	15/32	375,000	260,000



d1		l1	l2
mm	inch	mm	mm
12,000		375,000	260,000
12,300	31/64	375,000	260,000
12,500		375,000	260,000
12,700	1/2	375,000	260,000
13,000		375,000	260,000

d1		l1	l2
mm	inch	mm	mm



Erikoispitkät kierukkaporat sarja 2

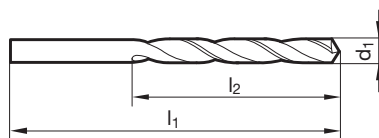


P • Kärjen kevennys $\geq \varnothing 2,300$ • kartiovaippahionta • avarat lastu-urat
• erittäin syville rei'ille • riittämättömään lastunpoistoon

M**K** •**N** • valurauta ja teräs $< 1000/\text{mm}^2$ asti • Ei suositella: CrNi-teräkset, ruostumattomat teräkset**S** ○**H**

GÜHRING NAVIGATOR

Leikkuarvosivu 790

Lieriövärtiset
kierukkaporatMateriaali **HSS**Pinta **S**Leikkusuunta **R**

Artikkelinro.

671

d1		l1	l2
mm	inch	mm	mm
2,700		190,000	130,000
2,800		190,000	130,000
3,000		190,000	130,000
3,100		200,000	135,000
3,170	1/8	200,000	135,000
3,200		200,000	135,000
3,500		210,000	145,000
3,570	9/64	210,000	145,000
3,970	5/32	220,000	150,000
4,000		220,000	150,000
4,090		220,000	150,000
4,370	11/64	235,000	160,000
4,400		235,000	160,000
4,500		235,000	160,000
4,600		235,000	160,000
4,760	3/16	245,000	170,000
4,800		245,000	170,000
5,000		245,000	170,000

d1		l1	l2
mm	inch	mm	mm
5,300		245,000	170,000
5,500		260,000	180,000
5,560	7/32	260,000	180,000
6,000		260,000	180,000
6,350	1/4	275,000	190,000
6,500		275,000	190,000
6,750	17/64	290,000	200,000
6,800		290,000	200,000
7,000		290,000	200,000
7,140	9/32	290,000	200,000
7,500		290,000	200,000
7,940	5/16	305,000	210,000
8,000		305,000	210,000
8,500		305,000	210,000



Erikoispitkät kierukkaporat sarja 2

Materiaali **HSS**

Pinta



Leikkusuunta



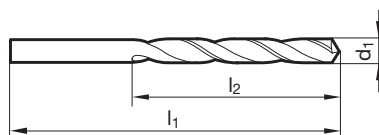
P ○ Kärjen kevennys $\geq \varnothing 2,800$ • kartiovaippahionta • erittäin syville rei'ille

M**K****N** ●

pitkälästusiset materiaalit $< 500 \text{ N/mm}^2$ • niukkaseosteiset teräkset
 • Alumiini, pitkälästusiset Al-seokset • sinkki, puhdistettu kupari, silumiini,
 elektroni • zamakki, argalium, pehmeät muovit ,puu

S**H****GÜHRING** NAVIGATOR

Leikkuarvosivu 788



Artikkelinro.

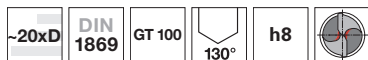
528

d1		l1	l2
mm	inch	mm	mm
3,000		190,000	130,000
3,030		200,000	135,000
3,100		200,000	135,000
3,170	1/8	200,000	135,000
3,500		210,000	145,000
3,650		210,000	145,000
3,800		220,000	150,000
4,000		220,000	150,000
4,200		220,000	150,000
4,500		235,000	160,000
4,760	3/16	245,000	170,000
4,800		245,000	170,000
5,000		245,000	170,000
5,110		245,000	170,000
5,500		260,000	180,000
5,800		260,000	180,000
6,000		260,000	180,000
7,000		290,000	200,000

d1		l1	l2
mm	inch	mm	mm
7,500		290,000	200,000
8,000		305,000	210,000
8,500		305,000	210,000
9,000		320,000	220,000
10,000		340,000	235,000
10,500		340,000	235,000
11,500		365,000	250,000
13,000		375,000	260,000



Erikoispitkät kierukkaporat sarja 2



- P** • Kärjen kevennys $\geq \varnothing 3,000$ • kartiovaippahionta • Co-seosteinen pikateräs • avarat lastu-urat • parempi kulumiskestävyys • erittäin syville rei'ille • riittämättömään lastunpoistoon
- M** •
- K** •
- N** • erikoislujat teräkset ja valuteräkset • harmaavalu-, taottava- ja pallografiittivalurauta
- S** •
- H** ○

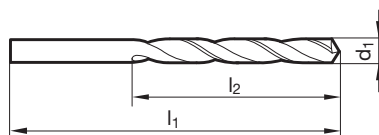
GÜHRING NAVIGATOR

Leikkuuarvosivu 794

Lieriövartiset
kierukkaporatMateriaali **HSCO**

Pinta

Leikkusuunta



Artikkelinro.

619

d1		l1	l2
mm	inch	mm	mm
3,000		190,000	130,000
3,170	1/8	200,000	135,000
3,200		200,000	135,000
3,300		200,000	135,000
3,500		210,000	145,000
3,570	9/64	210,000	145,000
3,970	5/32	220,000	150,000
4,000		220,000	150,000
4,100		220,000	150,000
4,200		220,000	150,000
4,370	11/64	235,000	160,000
4,500		235,000	160,000
4,760	3/16	245,000	170,000
4,800		245,000	170,000
4,900		245,000	170,000
5,000		245,000	170,000
5,200		245,000	170,000
5,500		260,000	180,000
5,560	7/32	260,000	180,000
5,950	15/64	260,000	180,000
6,000		260,000	180,000
6,100		275,000	190,000
6,200		275,000	190,000
6,350	1/4	275,000	190,000

d1		l1	l2
mm	inch	mm	mm
6,500		275,000	190,000
6,750	17/64	290,000	200,000
6,800		290,000	200,000
7,000		290,000	200,000
7,140	9/32	290,000	200,000
7,400		290,000	200,000
7,500		290,000	200,000
7,540	19/64	305,000	210,000
7,600		305,000	210,000
7,940	5/16	305,000	210,000
8,000		305,000	210,000
8,200		305,000	210,000
8,500		305,000	210,000
8,730	11/32	320,000	220,000
9,000		320,000	220,000
9,130	23/64	320,000	220,000
9,500		320,000	220,000
9,520	3/8	340,000	235,000
9,600		340,000	235,000
9,900		340,000	235,000
10,000		340,000	235,000



Erikoispitkät kierukkaporat sarja 3

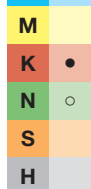


Materiaali **HSS**

Pinta

Leikkusuunta

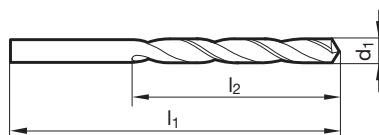
P • Kärjen kevennys $\geq \varnothing 3,500$ • kartiovaippahionta • erittäin syville rei'ille



N ○ seostettu-/seostamaton teräs ja valuteräs • harmaavalu-, taottava- ja pallografiittivalurauta • sintrattu pulveriteräs, uushopea ja grafiitti

GÜHRING NAVIGATOR

Leikkuarvosivu 788



Artikkelinro. **237**

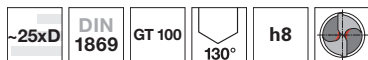
d1		l1	l2
mm	inch	mm	mm
3,500		265,000	180,000
3,800		280,000	190,000
4,000		280,000	190,000
4,100		280,000	190,000
4,200		280,000	190,000
4,500		295,000	200,000
5,000		315,000	210,000
5,200		315,000	210,000
5,500		330,000	225,000
5,800		330,000	225,000
5,900		330,000	225,000
6,000		330,000	225,000
6,100		350,000	235,000
6,200		350,000	235,000
6,500		350,000	235,000
6,700		350,000	235,000
6,800		370,000	250,000
7,000		370,000	250,000

d1		l1	l2
mm	inch	mm	mm
7,500		370,000	250,000
7,800		390,000	265,000
8,000		390,000	265,000
8,500		390,000	265,000
9,000		410,000	280,000
9,500		410,000	280,000
9,800		430,000	295,000
10,000		430,000	295,000
10,300		430,000	295,000
10,500		430,000	295,000
11,000		455,000	310,000
11,500		455,000	310,000
11,750		455,000	310,000
12,000		480,000	330,000
12,500		480,000	330,000
13,000		480,000	330,000

Lieriövaritset
kierukkaporat



Erikoispitkät kierukkaporat sarja 3



P • Kärjen kevennys $\geq \varnothing 2,500$ • kartiovaippahionta • avarat lastu-urat
• riittämättömään lastunpoistoon • erittäin syville rei'ille

M**K** •**N** • valurauta ja teräs $< 1000/\text{mm}^2$ asti • Ei suositella: CrNi-teräkset, ruostumattomat teräkset**S****H**

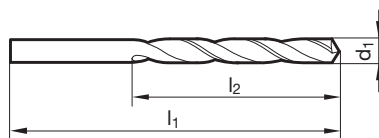
GÜHRING NAVIGATOR

Leikkuuarvosivu 790

Lieriövärtiset
kierukkaporatMateriaali **HSS**

Pinta

Leikkusuunta



Artikkelinro.

504

d1		l1	l2
mm	inch	mm	mm
2,500		225,000	150,000
3,000		240,000	160,000
3,100		250,000	170,000
3,170	1/8	250,000	170,000
3,200		250,000	170,000
3,300		250,000	170,000
3,400		265,000	180,000
3,500		265,000	180,000
3,570	9/64	265,000	180,000
3,600		265,000	180,000
3,700		265,000	180,000
3,800		280,000	190,000
3,900		280,000	190,000
3,970	5/32	280,000	190,000
4,000		280,000	190,000
4,100		280,000	190,000
4,200		280,000	190,000
4,300		295,000	200,000
4,370	11/64	295,000	200,000
4,400		295,000	200,000
4,500		295,000	200,000
4,600		295,000	200,000
4,760	3/16	315,000	210,000
4,800		315,000	210,000
4,900		315,000	210,000
5,000		315,000	210,000
5,100		315,000	210,000
5,200		315,000	210,000
5,500		330,000	225,000
5,560	7/32	330,000	225,000
5,800		330,000	225,000
5,950	15/64	330,000	225,000
6,000		330,000	225,000
6,100		350,000	235,000
6,200		350,000	235,000
6,300		350,000	235,000
6,350	1/4	350,000	235,000
6,400		350,000	235,000
6,500		350,000	235,000
6,700		350,000	235,000
6,750	17/64	370,000	250,000
6,800		370,000	250,000

d1		l1	l2
mm	inch	mm	mm
7,000		370,000	250,000
7,140	9/32	370,000	250,000
7,200		370,000	250,000
7,500		370,000	250,000
7,540	19/64	390,000	265,000
7,750		390,000	265,000
7,800		390,000	265,000
7,940	5/16	390,000	265,000
8,000		390,000	265,000
8,200		390,000	265,000
8,330	21/64	390,000	265,000
8,500		390,000	265,000
8,600		410,000	280,000
8,730	11/32	410,000	280,000
8,800		410,000	280,000
8,900		410,000	280,000
9,000		410,000	280,000
9,200		410,000	280,000
9,500		410,000	280,000
9,520	3/8	430,000	295,000
9,530		430,000	295,000
9,920	25/64	430,000	295,000
10,000		430,000	295,000
10,320	13/32	430,000	295,000
10,500		430,000	295,000
10,720	27/64	455,000	310,000
11,000		455,000	310,000
11,110	7/16	455,000	310,000
11,500		455,000	310,000
12,000		480,000	330,000
12,200		480,000	330,000
12,500		480,000	330,000
13,000		480,000	330,000



Erikoispitkät kierukkaporat sarja 3



Materiaali **HSS**

Pinta ○

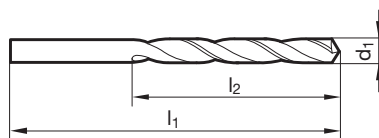
Leikkusuunta

P ○ Kärjen kevennys $\geq \varnothing 2,500$ • kartiovaippahionta • erittäin syville rei'ille

- M**
- K**
- N** ● pitkälastuiset materiaalit $< 500 \text{ N/mm}^2$ • niukkaseosteiset teräkset
- S** ● Alumiini, pitkälastuiset Al-seokset • sinkki, puhdistettu kupari, silumiini, elektroni • zamakki, argalium, pehmeät muovit ,puu
- H**

GÜHRING NAVIGATOR

Leikkuarvosivu 788



Artikkelinro. **529**

d1		l1	l2
mm	inch	mm	mm
2,500		225,000	150,000
3,000		240,000	160,000
3,500		265,000	180,000
3,800		280,000	190,000
4,000		280,000	190,000
4,500		295,000	200,000
5,000		315,000	210,000
6,000		330,000	225,000
6,500		350,000	235,000
6,700		350,000	235,000
6,800		370,000	250,000
7,500		370,000	250,000

d1		l1	l2
mm	inch	mm	mm
8,000		390,000	265,000
9,500		410,000	280,000
10,000		430,000	295,000

Lieriövärtiset
kierukkaporat



Erikoispitkät kierukkaporat sarja 3



- P** • Kärjen kevennys $\geq \varnothing 2,500$ • kartiovaippahionta • Co-seosteinen pikateräs • avarat lastu-urat • parempi kulumiskestävyys • erittäin syville rei'ille • riittämättömään lastunpoistoon
- M** •
- K** •
- N** • erikoislujat teräkset ja valuteräkset • harmaavalu-, taottava- ja pallografiittivalurauta
- S** •
- H** ○

Materiaali **HSCO**

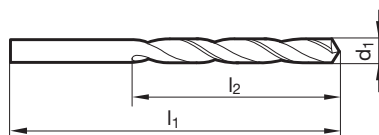
Pinta

Leikkusuunta

Lieriövaritset
kierukkaporat

GÜHRING NAVIGATOR

Leikkuarvosivu 794



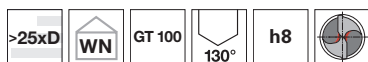
Artikkelinro. **571**

d1		l1	l2
mm	inch	mm	mm
2,500		225,000	150,000
3,000		240,000	160,000
3,100		250,000	170,000
3,170	1/8	250,000	170,000
3,200		250,000	170,000
3,300		250,000	170,000
3,400		265,000	180,000
3,500		265,000	180,000
3,700		265,000	180,000
3,800		280,000	190,000
3,900		280,000	190,000
3,970	5/32	280,000	190,000
4,000		280,000	190,000
4,100		280,000	190,000
4,200		280,000	190,000
4,300		295,000	200,000
4,500		295,000	200,000
4,600		295,000	200,000
4,760	3/16	315,000	210,000
4,800		315,000	210,000
4,900		315,000	210,000
5,000		315,000	210,000
5,100		315,000	210,000
5,200		315,000	210,000
5,500		330,000	225,000
5,560	7/32	330,000	225,000
5,800		330,000	225,000
5,950	15/64	330,000	225,000
6,000		330,000	225,000
6,100		350,000	235,000
6,200		350,000	235,000
6,300		350,000	235,000
6,350	1/4	350,000	235,000
6,400		350,000	235,000
6,500		350,000	235,000
6,700		350,000	235,000

d1		l1	l2
mm	inch	mm	mm
6,750	17/64	370,000	250,000
6,800		370,000	250,000
7,000		370,000	250,000
7,140	9/32	370,000	250,000
7,200		370,000	250,000
7,500		370,000	250,000
7,750		390,000	265,000
7,800		390,000	265,000
7,940	5/16	390,000	265,000
8,000		390,000	265,000
8,200		390,000	265,000
8,500		390,000	265,000
8,600		410,000	280,000
8,730	11/32	410,000	280,000
8,800		410,000	280,000
9,000		410,000	280,000
9,500		410,000	280,000
9,520	3/8	430,000	295,000
10,000		430,000	295,000
10,320	13/32	430,000	295,000
10,500		430,000	295,000
10,720	27/64	455,000	310,000
11,000		455,000	310,000
11,110	7/16	455,000	310,000
11,500		455,000	310,000
12,000		480,000	330,000
12,200		480,000	330,000
12,500		480,000	330,000
13,000		480,000	330,000



Ylipitkät kierukkaporat

Materiaali **HSS**

Pinta

Leikkusuunta

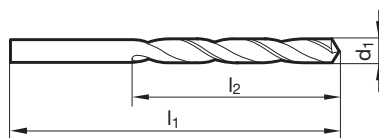
P • Kärjen kevennys $\geq \varnothing 6,000$ • kartiovaippahionta • avarat lastu-urat
 • erittäin syville rei'ille • riittämättömään lastunpoistoon

M**K** •

N • valurauta ja teräs $< 1000/\text{mm}^2$ asti • Ei suositella: CrNi-teräkset,
 ruostumattomat teräkset

S**H****GÜHRING** NAVIGATOR

Leikkuarvosivu 790



Artikkelinro.

242

d1		l1	l2
mm	inch	mm	mm
6,000		500,000	400,000
8,000		500,000	400,000
10,000		600,000	500,000
11,000		600,000	500,000
12,000		600,000	500,000

d1		l1	l2
mm	inch	mm	mm



Ylipitkät kierukkaporat



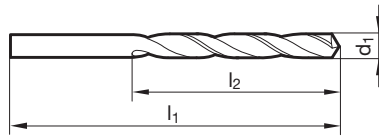
- P** • Kärjen kevennys $\geq \varnothing 8,000$ • kartiovaippahionta • avarat lastu-urat
- M** • erittäin syville rei'ille • riittämättömään lastunpoistoon
- K** •
- N** • valurauta ja teräs $< 1000/\text{mm}^2$ asti • Ei suositella: CrNi-teräkset, ruostumattomat teräkset
- S**
- H**

Materiaali	HSS
Pinta	○
Leikkusuunta	Ⓜ

Lieriövartiset kierukkaporat

GÜHRING NAVIGATOR

Leikkuuarvosivu 790



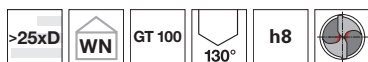
Artikkelinro. **243**

d1		l1	l2
mm	inch	mm	mm
8,000		750,000	650,000
10,000		750,000	650,000
11,000		750,000	650,000
12,000		750,000	650,000

d1		l1	l2
mm	inch	mm	mm



Ylipitkät kierukkaporat

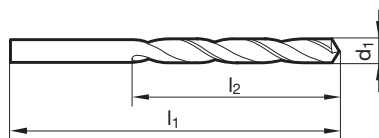


- P** • Kärjen kevennys $\geq \varnothing 10,000$ • kartiovaippahionta • avarat lastu-urat
- M** • erittäin syville rei'ille • riittämättömään lastunpoistoon
- K** •
- N** • valurauta ja teräs $< 1000/\text{mm}^2$ asti • Ei suositella: CrNi-teräkset, ruostumattomat teräkset
- S**
- H**

GÜHRING NAVIGATOR

Leikkuarvosivu 790

Materiaali	HSS
Pinta	○
Leikkusuunta	Ⓜ



Artikkelinro. **244**

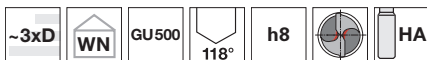
d1		l1	l2
mm	inch	mm	mm
10,000		1000,000	850,000
11,000		1000,000	850,000
12,000		1000,000	850,000

d1		l1	l2
mm	inch	mm	mm

Lieriövärtiset
kierukkaporat



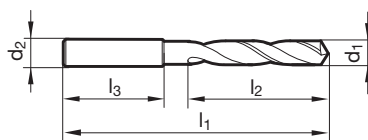
Kierukkaporat suurennetulla lieriövarrella



- P** • Kärjen kevennys $\geq \varnothing 2,000$ • päästöhiottu kärki • Co-seosteinen pikateräs • matalampi syöttövoima välttämätön • matalampi vääntömomentti välttämätön • parempi kulumiskestävyys • yleiskäyttöön
- M** •
- K** •
- N** • seostetut-/seostamattomat teräkset $< 800 \text{ N/mm}^2$ asti • kylmä-/kuumalujäteräkset • ruostumattomat teräkset • ei-rautametallit • valut
- S** • muovit
- H**

Materiaali **HSCO**Pinta **S**Leikkusuunta **R****GÜHRING** NAVIGATOR

Leikkuarvosivu 774

Lieriövarteisat
kierukkaporat

Artikkelinro.

512

d1	d2 h6	l1	l2	l3	d1	d2 h6	l1	l2	l3
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
2,000	3,000	44,000	12,000	28,000	5,800	6,000	72,000	28,000	36,000
2,100	3,000	44,000	12,000	28,000	5,900	6,000	72,000	28,000	36,000
2,200	3,000	45,000	13,000	28,000	5,950	6,000	72,000	28,000	36,000
2,300	3,000	45,000	13,000	28,000	6,000	6,000	72,000	28,000	36,000
2,400	3,000	46,000	14,000	28,000	6,100	8,000	75,000	31,000	36,000
2,500	3,000	46,000	14,000	28,000	6,200	8,000	75,000	31,000	36,000
2,600	3,000	46,000	14,000	28,000	6,300	8,000	75,000	31,000	36,000
2,700	3,000	48,000	16,000	28,000	6,350	8,000	75,000	31,000	36,000
2,780	3,000	48,000	16,000	28,000	6,400	8,000	75,000	31,000	36,000
2,800	3,000	48,000	16,000	28,000	6,500	8,000	75,000	31,000	36,000
2,900	3,000	48,000	16,000	28,000	6,600	8,000	75,000	31,000	36,000
3,000	3,000	48,000	16,000	28,000	6,750	8,000	78,000	34,000	36,000
3,100	4,000	50,000	18,000	28,000	6,800	8,000	78,000	34,000	36,000
3,170	4,000	50,000	18,000	28,000	6,900	8,000	78,000	34,000	36,000
3,200	4,000	50,000	18,000	28,000	7,000	8,000	78,000	34,000	36,000
3,300	4,000	50,000	18,000	28,000	7,100	8,000	78,000	34,000	36,000
3,400	4,000	52,000	20,000	28,000	7,140	8,000	78,000	34,000	36,000
3,500	4,000	52,000	20,000	28,000	7,200	8,000	78,000	34,000	36,000
3,570	4,000	52,000	20,000	28,000	7,300	8,000	78,000	34,000	36,000
3,600	4,000	52,000	20,000	28,000	7,500	8,000	78,000	34,000	36,000
3,700	4,000	52,000	20,000	28,000	7,600	8,000	81,000	37,000	36,000
3,800	4,000	54,000	22,000	28,000	7,800	8,000	81,000	37,000	36,000
3,900	4,000	54,000	22,000	28,000	7,900	8,000	81,000	37,000	36,000
4,000	4,000	54,000	22,000	28,000	7,940	8,000	81,000	37,000	36,000
4,100	6,000	66,000	22,000	36,000	8,000	8,000	81,000	37,000	36,000
4,200	6,000	66,000	22,000	36,000	8,100	10,000	87,000	37,000	40,000
4,300	6,000	68,000	24,000	36,000	8,200	10,000	87,000	37,000	40,000
4,370	6,000	68,000	24,000	36,000	8,300	10,000	87,000	37,000	40,000
4,400	6,000	68,000	24,000	36,000	8,330	10,000	87,000	37,000	40,000
4,500	6,000	68,000	24,000	36,000	8,500	10,000	87,000	37,000	40,000
4,700	6,000	68,000	24,000	36,000	8,600	10,000	91,000	40,000	40,000
4,760	6,000	70,000	26,000	36,000	8,730	10,000	91,000	40,000	40,000
4,800	6,000	70,000	26,000	36,000	8,800	10,000	91,000	40,000	40,000
4,900	6,000	70,000	26,000	36,000	8,900	10,000	91,000	40,000	40,000
5,000	6,000	70,000	26,000	36,000	9,000	10,000	91,000	40,000	40,000
5,100	6,000	70,000	26,000	36,000	9,100	10,000	91,000	40,000	40,000
5,200	6,000	70,000	26,000	36,000	9,130	10,000	91,000	40,000	40,000
5,300	6,000	70,000	26,000	36,000	9,200	10,000	91,000	40,000	40,000
5,400	6,000	72,000	28,000	36,000	9,300	10,000	91,000	40,000	40,000
5,500	6,000	72,000	28,000	36,000	9,400	10,000	91,000	40,000	40,000
5,560	6,000	72,000	28,000	36,000	9,500	10,000	91,000	40,000	40,000
5,600	6,000	72,000	28,000	36,000	9,520	10,000	93,000	43,000	40,000

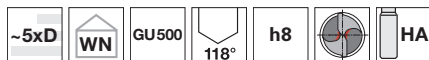


d1	d2 h6	l1	l2	l3
mm	mm	mm	mm	mm
9,800	10,000	93,000	43,000	40,000
9,900	10,000	93,000	43,000	40,000
9,920	10,000	93,000	43,000	40,000
10,000	10,000	93,000	43,000	40,000
10,100	12,000	100,000	43,000	45,000
10,200	12,000	100,000	43,000	45,000
10,300	12,000	100,000	43,000	45,000
10,320	12,000	100,000	43,000	45,000
10,500	12,000	100,000	43,000	45,000
10,800	12,000	104,000	47,000	45,000
11,000	12,000	104,000	47,000	45,000
11,100	12,000	104,000	47,000	45,000
11,110	12,000	104,000	47,000	45,000
11,200	12,000	104,000	47,000	45,000
11,300	12,000	104,000	47,000	45,000
11,400	12,000	104,000	47,000	45,000
11,500	12,000	104,000	47,000	45,000
11,510	12,000	104,000	47,000	45,000

d1	d2 h6	l1	l2	l3
mm	mm	mm	mm	mm
11,700	12,000	104,000	47,000	45,000
11,800	12,000	104,000	47,000	45,000
12,000	12,000	108,000	51,000	45,000
12,300	16,000	111,000	51,000	48,000
12,500	16,000	111,000	51,000	48,000
13,000	16,000	111,000	51,000	48,000
13,490	16,000	114,000	54,000	48,000
13,500	16,000	114,000	54,000	48,000
14,000	16,000	114,000	54,000	48,000
15,000	16,000	116,000	56,000	48,000
16,000	16,000	118,000	58,000	48,000
16,500	20,000	126,000	60,000	50,000
16,670	20,000	126,000	60,000	50,000
17,500	20,000	128,000	62,000	50,000
18,000	20,000	128,000	62,000	50,000
18,500	20,000	130,000	64,000	50,000
19,500	20,000	132,000	66,000	50,000
20,000	20,000	132,000	66,000	50,000



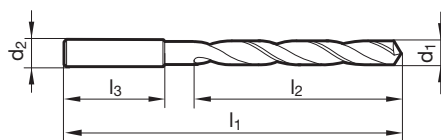
Kierukkaporat suurennetulla lieriövarrella



P	•	Kärjen kevennys $\geq \varnothing 2,000$ • päästöhiottu kärki • Co-seosteinen pikateräs • matalampi syöttövoima välttämätön • matalampi vääntömomentti välttämätön • parempi kulumiskestävyys • yleiskäyttöön
M	•	
K	•	
N	•	seostetut-/seostamattomat teräkset < 800 N/mm ² asti • kylmä-/kuumalujateräkset • ruostumattomat teräkset • ei-rautametallit • valut
S	•	muovit
H		

GÜHRING NAVIGATOR

Leikkuarvosivu 784

Lieriövartiset
kierukkaporatMateriaali **HSCO**Pinta **S**Leikkusuunta **R**

Artikkelinro.

511

d1	d2 h6	l1	l2	l3	d1	d2 h6	l1	l2	l3
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
2,000	3,000	56,000	24,000	28,000	6,300	8,000	107,000	63,000	36,000
2,100	3,000	56,000	24,000	28,000	6,350	8,000	107,000	63,000	36,000
2,300	3,000	59,000	27,000	28,000	6,400	8,000	107,000	63,000	36,000
2,380	3,000	62,000	30,000	28,000	6,500	8,000	107,000	63,000	36,000
2,400	3,000	62,000	30,000	28,000	6,600	8,000	107,000	63,000	36,000
2,500	3,000	62,000	30,000	28,000	6,750	8,000	113,000	69,000	36,000
2,600	3,000	62,000	30,000	28,000	6,800	8,000	113,000	69,000	36,000
2,780	3,000	65,000	33,000	28,000	6,900	8,000	113,000	69,000	36,000
2,800	3,000	65,000	33,000	28,000	7,000	8,000	113,000	69,000	36,000
2,900	3,000	65,000	33,000	28,000	7,100	8,000	113,000	69,000	36,000
3,000	3,000	65,000	33,000	28,000	7,140	8,000	113,000	69,000	36,000
3,100	4,000	68,000	36,000	28,000	7,200	8,000	113,000	69,000	36,000
3,200	4,000	68,000	36,000	28,000	7,300	8,000	113,000	69,000	36,000
3,300	4,000	68,000	36,000	28,000	7,400	8,000	113,000	69,000	36,000
3,400	4,000	71,000	39,000	28,000	7,500	8,000	113,000	69,000	36,000
3,500	4,000	71,000	39,000	28,000	7,540	8,000	119,000	75,000	36,000
3,570	4,000	71,000	39,000	28,000	7,550	8,000	119,000	75,000	36,000
3,900	4,000	75,000	43,000	28,000	7,600	8,000	119,000	75,000	36,000
3,970	4,000	75,000	43,000	28,000	7,700	8,000	119,000	75,000	36,000
4,000	4,000	75,000	43,000	28,000	7,800	8,000	119,000	75,000	36,000
4,200	6,000	87,000	43,000	36,000	7,900	8,000	119,000	75,000	36,000
4,300	6,000	91,000	47,000	36,000	8,000	8,000	119,000	75,000	36,000
4,370	6,000	91,000	47,000	36,000	8,100	10,000	125,000	75,000	40,000
4,400	6,000	91,000	47,000	36,000	8,200	10,000	125,000	75,000	40,000
4,500	6,000	91,000	47,000	36,000	8,300	10,000	125,000	75,000	40,000
4,650	6,000	91,000	47,000	36,000	8,330	10,000	125,000	75,000	40,000
4,700	6,000	91,000	47,000	36,000	8,500	10,000	125,000	75,000	40,000
4,760	6,000	96,000	52,000	36,000	8,600	10,000	131,000	81,000	40,000
4,800	6,000	96,000	52,000	36,000	8,730	10,000	131,000	81,000	40,000
4,900	6,000	96,000	52,000	36,000	8,800	10,000	131,000	81,000	40,000
5,000	6,000	96,000	52,000	36,000	8,900	10,000	131,000	81,000	40,000
5,100	6,000	96,000	52,000	36,000	9,000	10,000	131,000	81,000	40,000
5,160	6,000	96,000	52,000	36,000	9,100	10,000	131,000	81,000	40,000
5,200	6,000	96,000	52,000	36,000	9,130	10,000	131,000	81,000	40,000
5,300	6,000	96,000	52,000	36,000	9,400	10,000	131,000	81,000	40,000
5,400	6,000	101,000	57,000	36,000	9,500	10,000	131,000	81,000	40,000
5,500	6,000	101,000	57,000	36,000	9,520	10,000	137,000	87,000	40,000
5,600	6,000	101,000	57,000	36,000	9,550	10,000	137,000	87,000	40,000
5,800	6,000	101,000	57,000	36,000	9,600	10,000	137,000	87,000	40,000
5,900	6,000	101,000	57,000	36,000	9,900	10,000	137,000	87,000	40,000
6,000	6,000	101,000	57,000	36,000	9,920	10,000	137,000	87,000	40,000
6,100	8,000	107,000	63,000	36,000	10,000	10,000	137,000	87,000	40,000

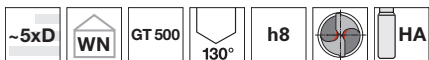


d1	d2 h6	l1	l2	l3
mm	mm	mm	mm	mm
10,100	12,000	144,000	87,000	45,000
10,200	12,000	144,000	87,000	45,000
10,400	12,000	144,000	87,000	45,000
10,500	12,000	144,000	87,000	45,000
10,600	12,000	144,000	87,000	45,000
10,800	12,000	151,000	94,000	45,000
11,000	12,000	151,000	94,000	45,000
11,110	12,000	151,000	94,000	45,000
11,200	12,000	151,000	94,000	45,000
11,300	12,000	151,000	94,000	45,000
11,510	12,000	151,000	94,000	45,000
11,800	12,000	151,000	94,000	45,000
11,910	12,000	158,000	101,000	45,000
12,000	12,000	158,000	101,000	45,000
12,200	16,000	161,000	101,000	48,000
12,500	16,000	161,000	101,000	48,000
12,700	16,000	161,000	101,000	48,000
13,000	16,000	161,000	101,000	48,000

d1	d2 h6	l1	l2	l3
mm	mm	mm	mm	mm
13,500	16,000	166,000	106,000	48,000
13,890	16,000	166,000	106,000	48,000
14,000	16,000	166,000	106,000	48,000
14,500	16,000	169,000	109,000	48,000
15,000	16,000	169,000	109,000	48,000
15,500	16,000	172,000	112,000	48,000
16,000	16,000	172,000	112,000	48,000
16,500	20,000	181,000	115,000	50,000
17,000	20,000	181,000	115,000	50,000
17,460	20,000	184,000	118,000	50,000
17,500	20,000	184,000	118,000	50,000
18,000	20,000	184,000	118,000	50,000
19,000	20,000	188,000	122,000	50,000
19,500	20,000	191,000	125,000	50,000
20,000	20,000	191,000	125,000	50,000



Kierukkaporat suurennetulla lieriövarrella



- P** • Kärjen kevennys $\geq \varnothing 2,000$ • kartiovaippakärki erikoisella mallin B kärjenkevennyksellä • PM HSCO-pikateräs • erittäin tukeva • erittäin hyvä kulumiskestävyys
- M** ○
- K** •
- N** ○ lujat materiaalit, runsasseosteiset teräkset • nuorutus- ja hiilikarkaistut teräkset • valurauta, messinki, pronssi
- S** ○
- H** ○

Materiaali **HSS-E-PM**

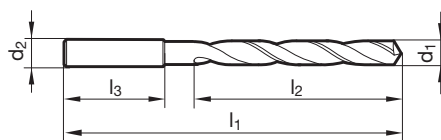
Pinta **F**

Leikkusuunta **R**



GÜHRING NAVIGATOR

Leikkuarvosivu 784



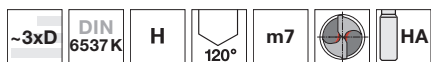
Artikkelinro. **513**

d1	d2 h6	l1	l2	l3
mm	mm	mm	mm	mm
2,000	3,000	56,000	24,000	28,000
2,100	3,000	56,000	24,000	28,000
2,380	3,000	62,000	30,000	28,000
2,500	3,000	62,000	30,000	28,000
2,780	3,000	65,000	33,000	28,000
3,000	3,000	65,000	33,000	28,000
3,170	4,000	68,000	36,000	28,000
3,300	4,000	68,000	36,000	28,000
3,500	4,000	71,000	39,000	28,000
3,570	4,000	71,000	39,000	28,000
3,970	4,000	75,000	43,000	28,000
4,000	4,000	75,000	43,000	28,000
4,200	6,000	87,000	43,000	36,000
4,370	6,000	91,000	47,000	36,000
4,500	6,000	91,000	47,000	36,000
4,650	6,000	91,000	47,000	36,000
4,760	6,000	96,000	52,000	36,000
4,800	6,000	96,000	52,000	36,000
5,000	6,000	96,000	52,000	36,000
5,100	6,000	96,000	52,000	36,000
5,160	6,000	96,000	52,000	36,000
5,200	6,000	96,000	52,000	36,000
5,300	6,000	96,000	52,000	36,000
5,500	6,000	101,000	57,000	36,000
5,800	6,000	101,000	57,000	36,000
6,000	6,000	101,000	57,000	36,000
6,350	8,000	107,000	63,000	36,000
6,500	8,000	107,000	63,000	36,000
6,600	8,000	107,000	63,000	36,000
6,750	8,000	113,000	69,000	36,000
6,800	8,000	113,000	69,000	36,000
7,000	8,000	113,000	69,000	36,000
7,140	8,000	113,000	69,000	36,000
7,400	8,000	113,000	69,000	36,000
7,500	8,000	113,000	69,000	36,000
7,540	8,000	119,000	75,000	36,000

d1	d2 h6	l1	l2	l3
mm	mm	mm	mm	mm
7,800	8,000	119,000	75,000	36,000
7,940	8,000	119,000	75,000	36,000
8,000	8,000	119,000	75,000	36,000
8,330	10,000	125,000	75,000	40,000
8,500	10,000	125,000	75,000	40,000
8,730	10,000	131,000	81,000	40,000
8,800	10,000	131,000	81,000	40,000
9,000	10,000	131,000	81,000	40,000
9,130	10,000	131,000	81,000	40,000
9,300	10,000	131,000	81,000	40,000
9,500	10,000	131,000	81,000	40,000
9,520	10,000	137,000	87,000	40,000
9,600	10,000	137,000	87,000	40,000
9,800	10,000	137,000	87,000	40,000
9,920	10,000	137,000	87,000	40,000
10,000	10,000	137,000	87,000	40,000
10,200	12,000	144,000	87,000	45,000
10,500	12,000	144,000	87,000	45,000
10,600	12,000	144,000	87,000	45,000
10,700	12,000	151,000	94,000	45,000
10,900	12,000	151,000	94,000	45,000
11,000	12,000	151,000	94,000	45,000
11,100	12,000	151,000	94,000	45,000
11,300	12,000	151,000	94,000	45,000
11,400	12,000	151,000	94,000	45,000
11,500	12,000	151,000	94,000	45,000
11,900	12,000	158,000	101,000	45,000
12,000	12,000	158,000	101,000	45,000
12,200	14,000	161,000	101,000	45,000
12,300	14,000	161,000	101,000	45,000
12,400	14,000	161,000	101,000	45,000
12,500	14,000	161,000	101,000	45,000
12,600	14,000	161,000	101,000	45,000
12,700	14,000	161,000	101,000	45,000
12,900	14,000	161,000	101,000	45,000



Kierukkaporat suurennetulla lieriövarrella

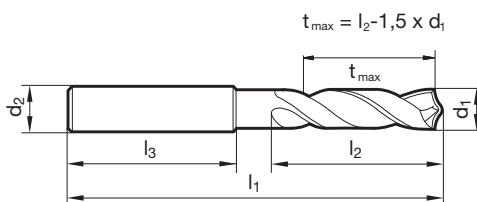


- P** ○ Kärjen kevennys $\geq \varnothing 2,600$ • päästöhiottu kärki • pääleikkuusärmän suorasta (korjauksella)
- M** □
- K** ○
- N** □ karkaistut teräkset < 62 HRC asti
- S** □
- H** •

GÜHRING NAVIGATOR

Leikkuuarvosivu 776

Materiaali	TKM
Pinta	A
Leikkusuunta	R



Lieriövaritset
kierukkaporat

Artikkelinro. **1946**

d1	d2 h6	l1	l2	l3
mm	mm	mm	mm	mm
2,600	6,000	62,000	20,000	36,000
3,000	6,000	62,000	20,000	36,000
3,400	6,000	62,000	20,000	36,000
4,000	6,000	66,000	24,000	36,000
4,300	6,000	66,000	24,000	36,000
5,000	6,000	66,000	28,000	36,000
5,100	6,000	66,000	28,000	36,000
5,600	6,000	66,000	28,000	36,000
6,000	6,000	66,000	28,000	36,000
6,900	8,000	79,000	34,000	36,000
7,100	8,000	79,000	41,000	36,000
8,000	8,000	79,000	41,000	36,000

d1	d2 h6	l1	l2	l3
mm	mm	mm	mm	mm
8,600	10,000	89,000	47,000	40,000
9,100	10,000	89,000	47,000	40,000
10,000	10,000	89,000	47,000	40,000
10,400	12,000	102,000	55,000	45,000
10,600	12,000	102,000	55,000	45,000
11,100	12,000	102,000	55,000	45,000
12,000	12,000	102,000	55,000	45,000
14,100	16,000	115,000	65,000	48,000



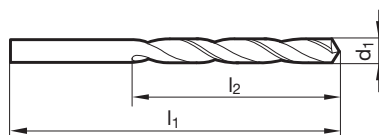
Tankoporat, 6 tuumaiset



- P** • Kärjen kevennys $\geq \varnothing 1,500$ • kartiovaippahionta
- M**
- K** •
- N** • Al-seosteiset levyt • laminoidut laatat (sandwichrakenteet) • teräs ja valurauta
- S**
- H**

Materiaali	HSS
Pinta	○
Leikkusuunta	Ⓜ

Lierivartiset Kierukkaporat



Artikkelinro. **577**

d1		l1	l2
mm	inch	mm	mm
1,500		153,000	23,000
1,590	1/16	153,000	26,000
1,650		153,000	26,000
1,750		153,000	26,000
1,780		153,000	26,000
1,900		153,000	26,000
1,930		153,000	29,000
1,980	5/64	153,000	29,000
1,990		153,000	29,000
2,000		153,000	29,000
2,100		153,000	29,000
2,300		153,000	32,500
2,380	3/32	153,000	37,000
2,400		153,000	37,000
2,490		153,000	37,000
2,500		153,000	37,000
2,530		153,000	37,000
2,580		153,000	37,000
2,870		153,000	42,000
2,950		153,000	42,000
3,000		153,000	42,000
3,170	1/8	153,000	42,000
3,200		153,000	42,000
3,260		153,000	42,000
3,500		154,000	49,000
3,570	9/64	154,000	49,000
3,800		154,000	55,000
3,860		154,000	55,000
3,910		154,000	55,000
3,970	5/32	154,000	55,000
4,000		154,000	55,000
4,040		154,000	55,000
4,090		154,000	55,000
4,220		154,000	55,000
4,390		154,000	60,000
4,500		154,000	60,000

d1		l1	l2
mm	inch	mm	mm
4,570		154,000	60,000
4,700		154,000	60,000
4,760	3/16	154,000	63,500
4,800		154,000	63,500
4,850		154,000	63,500
4,920		154,000	63,500
4,980		154,000	63,500
5,000		154,000	63,500
5,160	13/64	154,000	63,500
5,500		154,000	68,500
5,560	7/32	154,000	68,500
5,800		154,000	68,500
5,940		154,000	68,500
5,950	15/64	154,000	68,500
6,040		154,000	75,000
6,150		154,000	75,000
6,200		154,000	75,000
6,250		154,000	75,000
6,350	1/4	154,000	75,000
6,530		154,000	75,000
6,800		155,000	80,000
7,000		155,000	80,000
7,700		155,000	90,000
7,940	5/16	155,000	90,000
8,000		155,000	90,000

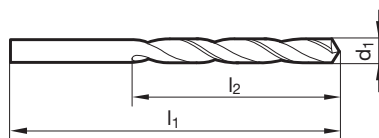


Tankoporat, 6 tuumaiset



- P** • Kärjen kevennys $\geq \varnothing 1,500$ • kartiovaippahionta
- M**
- K** •
- N** • Al-seosteiset levyt • laminoidut laatat (sandwichrakenteet) • teräs ja valurauta
- S**
- H**

Materiaali	HSS
Pinta	$\text{Ra} >0,2,36$
Leikkusuunta	



Lieriövaritset kierukkeporat

Artikkelinro. **579**

d1		l1	l2
mm	inch	mm	mm
1,500		153,000	23,000
1,590	1/16	153,000	26,000
1,780		153,000	26,000
1,980	5/64	153,000	29,000
2,000		153,000	29,000
2,380	3/32	153,000	37,000
2,400		153,000	37,000
2,490		153,000	37,000
2,500		153,000	37,000
2,580		153,000	37,000
2,640		153,000	37,000
2,710		153,000	42,000
2,780	7/64	153,000	42,000
2,790		153,000	42,000
2,820		153,000	42,000
2,870		153,000	42,000
2,950		153,000	42,000
3,000		153,000	42,000
3,050		153,000	42,000
3,170	1/8	153,000	42,000
3,200		153,000	42,000
3,260		153,000	42,000
3,450		154,000	49,000
3,500		154,000	49,000
3,570	9/64	154,000	49,000
3,600		154,000	49,000
3,660		154,000	49,000
3,700		154,000	49,000
3,800		154,000	55,000
3,970	5/32	154,000	55,000

d1		l1	l2
mm	inch	mm	mm
3,990		154,000	55,000
4,000		154,000	55,000
4,040		154,000	55,000
4,090		154,000	55,000
4,370	11/64	154,000	60,000
4,390		154,000	60,000
4,500		154,000	60,000
4,570		154,000	60,000
4,620		154,000	60,000
4,760	3/16	154,000	63,500
4,800		154,000	63,500
4,850		154,000	63,500
4,920		154,000	63,500
4,980		154,000	63,500
5,000		154,000	63,500
5,160	13/64	154,000	63,500
5,560	7/32	154,000	68,500
5,800		154,000	68,500
5,940		154,000	68,500
5,950	15/64	154,000	68,500
6,040		154,000	75,000
6,250		154,000	75,000
6,350	1/4	154,000	75,000
6,450		154,000	75,000
6,530		154,000	75,000
6,750	17/64	155,000	80,000
7,940	5/16	155,000	90,000
8,000		155,000	90,000



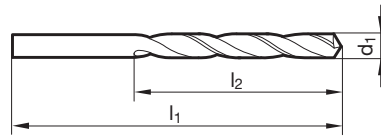
Tankoporat, 12 tuumaiset



- P** • Kärjen kevennys $\geq \varnothing 1,500$ • kartiovaippahionta
- M**
- K** •
- N** • Al-seosteiset levyt • laminoidut laatat (sandwichrakenteet) • teräs ja valurauta
- S**
- H**

Materiaali	HSS
Pinta	○
Leikkusuunta	Ⓜ

Lieriövartiset
kierukkaporat



Artikkelinro. 578

d1		l1	l2
mm	inch	mm	mm
1,500		306,000	23,000
1,590	1/16	306,000	26,000
1,780		306,000	26,000
1,850		306,000	26,000
1,930		306,000	29,000
2,000		306,000	29,000
2,180		306,000	32,500
2,260		306,000	32,500
2,380	3/32	306,000	37,000
2,440		306,000	37,000
2,490		306,000	37,000
2,500		306,000	37,000
2,580		306,000	37,000
2,640		306,000	37,000
2,790		306,000	42,000
2,820		306,000	42,000
3,000		306,000	42,000
3,170	1/8	306,000	42,000
3,200		306,000	42,000
3,260		306,000	42,000
3,500		308,000	49,000
3,570	9/64	308,000	49,000
3,660		308,000	49,000
3,800		308,000	55,000
3,970	5/32	308,000	55,000
4,000		308,000	55,000
4,040		308,000	55,000
4,090		308,000	55,000
4,220		308,000	55,000
4,370	11/64	308,000	60,000

d1		l1	l2
mm	inch	mm	mm
4,390		308,000	60,000
4,500		308,000	60,000
4,570		308,000	60,000
4,620		308,000	60,000
4,700		308,000	60,000
4,760	3/16	308,000	63,500
4,800		308,000	63,500
4,850		308,000	63,500
4,920		308,000	63,500
4,980		308,000	63,500
5,000		308,000	63,500
5,160	13/64	308,000	63,500
5,500		308,000	68,500
5,800		308,000	68,500
5,950	15/64	308,000	68,500
6,000		308,000	68,500
6,040		308,000	75,000
6,350	1/4	308,000	75,000
6,530		308,000	75,000
7,000		310,000	80,000
8,000		310,000	90,000

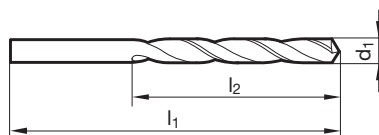


Tankoporat, 12 tuumaiset



- P** • Kärjen kevennys $\geq \varnothing 1,500$ • kartiovaippahionta
- M**
- K** •
- N** • Al-seosteiset levyt • laminoidut laatat (sandwichrakenteet) • teräs ja valurauta
- S**
- H**

Materiaali	HSS
Pinta	$\text{Ra} > 0,2,36$
Leikkusuunta	



Lieriövaritset kierukkaporat

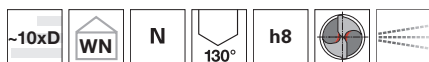
Artikkelinro. **580**

d1		l1	l2
mm	inch	mm	mm
1,500		306,000	23,000
1,590	1/16	306,000	26,000
1,780		306,000	26,000
1,980	5/64	306,000	29,000
2,000		306,000	29,000
2,380	3/32	306,000	37,000
2,490		306,000	37,000
2,500		306,000	37,000
2,580		306,000	37,000
2,640		306,000	37,000
2,710		306,000	42,000
2,780	7/64	306,000	42,000
2,790		306,000	42,000
2,820		306,000	42,000
2,870		306,000	42,000
2,950		306,000	42,000
3,000		306,000	42,000
3,170	1/8	306,000	42,000
3,260		306,000	42,000
3,450		308,000	49,000
3,500		308,000	49,000
3,660		308,000	49,000
3,730		308,000	49,000
3,800		308,000	55,000
3,970	5/32	308,000	55,000
3,990		308,000	55,000
4,000		308,000	55,000
4,040		308,000	55,000
4,300		308,000	60,000
4,370	11/64	308,000	60,000

d1		l1	l2
mm	inch	mm	mm
4,390		308,000	60,000
4,500		308,000	60,000
4,570		308,000	60,000
4,620		308,000	60,000
4,700		308,000	60,000
4,760	3/16	308,000	63,500
4,800		308,000	63,500
4,850		308,000	63,500
4,920		308,000	63,500
4,980		308,000	63,500
5,000		308,000	63,500
5,060		308,000	63,500
5,110		308,000	63,500
5,160	13/64	308,000	63,500
5,560	7/32	308,000	68,500
5,790		308,000	68,500
5,940		308,000	68,500
5,950	15/64	308,000	68,500
6,000		308,000	68,500
6,040		308,000	75,000
6,150		308,000	75,000
6,250		308,000	75,000
6,350	1/4	308,000	75,000
6,530		308,000	75,000
7,940	5/16	310,000	90,000
8,000		310,000	90,000



Jäähdytyskanavaporat



Materiaali **HSS**

Pinta ○

Leikkusuunta

P ● Kärjen kevennys $\geq \varnothing 3,000$ • kartiovaippahionta • myös poraholkin läpi porausta varten • erityisesti yli 5xD poraussyvyyksille

M ○

K ●

N ● laminoitu pelti • teräs ja valuteräs, harmaavalurauta • austeniittiset teräkset < 800 N/mm² asti

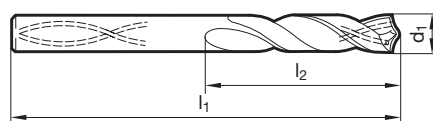
S ○

H ○

GÜHRING NAVIGATOR

Leikkuarvosivu 788

Lieriövaritiset
kierukkaporat



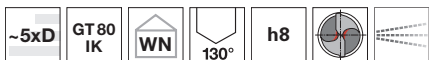
Artikkelinro. **390**

d1	l1	l2
mm	mm	mm
3,000	100,000	66,000
3,300	106,000	69,000
3,500	112,000	73,000
4,000	119,000	78,000
4,200	119,000	78,000
4,500	126,000	82,000
5,000	132,000	87,000
5,500	139,000	91,000
6,000	139,000	91,000
6,500	148,000	97,000
6,800	156,000	102,000
6,900	156,000	102,000
7,000	156,000	102,000
7,500	156,000	102,000
8,000	165,000	109,000
8,500	165,000	109,000
9,000	175,000	115,000
9,500	175,000	115,000

d1	l1	l2
mm	mm	mm
10,000	184,000	121,000
10,200	184,000	121,000
10,500	184,000	121,000
11,000	195,000	128,000
11,500	195,000	128,000
12,000	205,000	134,000
13,000	205,000	134,000



Jäähdytyskanavaporat



Materiaali **HSCO**

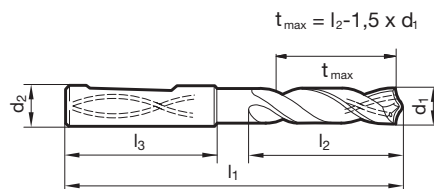
Pinta ○

Varren muoto HE

- P** ● Kärjen kevennys ≥ Ø 5,000 • kartiovaippahionta • Co-seosteinen pikateräs
- M** ●
- K** ●
- N** ● pitkälästuiset materiaalit < 1000 N/mm² asti • ruostumattomat teräkset
- S** ● • valut • ei-rautametallit
- H** ○

GÜHRING NAVIGATOR

Leikkuuarvosivu 784



Lieriövartiset kierukkeaporat

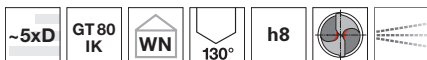
Artikkelinro. **1131**

d1		d6 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
5,000		6,000	82,000	44,000	36,000
5,500		6,000	82,000	44,000	36,000
6,000		6,000	82,000	44,000	36,000
6,350	1/4	8,000	91,000	53,000	36,000
6,800		8,000	91,000	53,000	36,000
7,140	9/32	8,000	91,000	53,000	36,000
7,800		8,000	91,000	53,000	36,000
8,000		8,000	91,000	53,000	36,000
9,000		10,000	103,000	61,000	40,000
9,500		10,000	103,000	61,000	40,000
10,000		10,000	103,000	61,000	40,000
10,200		12,000	118,000	71,000	45,000
10,320	13/32	12,000	118,000	71,000	45,000
10,500		12,000	118,000	71,000	45,000
11,000		12,000	118,000	71,000	45,000
11,500		12,000	118,000	71,000	45,000
12,000		12,000	118,000	71,000	45,000
12,500		14,000	124,000	77,000	45,000

d1		d6 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
13,000		14,000	124,000	77,000	45,000
13,500		14,000	124,000	77,000	45,000
14,000		14,000	124,000	77,000	45,000
14,290	9/16	16,000	133,000	83,000	48,000
15,000		16,000	133,000	83,000	48,000
15,500		16,000	133,000	83,000	48,000
15,870	5/8	16,000	133,000	83,000	48,000
16,000		16,000	133,000	83,000	48,000
16,500		18,000	143,000	93,000	48,000
17,000		18,000	143,000	93,000	48,000
17,500		18,000	143,000	93,000	48,000
18,000		18,000	143,000	93,000	48,000
18,500		20,000	153,000	101,000	50,000
19,500		20,000	153,000	101,000	50,000
20,000		20,000	153,000	101,000	50,000



Jäähdytyskanavaporat



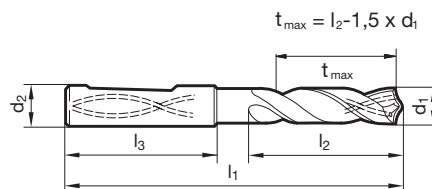
- P** • Kärjen kevennys $\geq \varnothing 5,000$ • kartiovaippahionta • Co-seosteinen pikateräs • parempi kulumiskestävyys
- M** •
- K** •
- N** • pitkälästuiset materiaalit $< 1000 \text{ N/mm}^2$ asti • ruostumattomat teräkset • valut • ei-rautametallit
- S** •
- H** ○

Materiaali	HSCO
Pinta	S
Varren muoto	HE

Lieriövärtiset kierukkaporat

GÜHRING NAVIGATOR

Leikkuuarvosivu 784



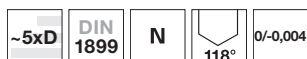
Artikkelinro. **1132**

d1		d6 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
5,000		6,000	82,000	44,000	36,000
5,500		6,000	82,000	44,000	36,000
6,000		6,000	82,000	44,000	36,000
6,500		8,000	91,000	53,000	36,000
6,800		8,000	91,000	53,000	36,000
7,000		8,000	91,000	53,000	36,000
7,500		8,000	91,000	53,000	36,000
7,800		8,000	91,000	53,000	36,000
8,000		8,000	91,000	53,000	36,000
8,500		10,000	103,000	61,000	40,000
9,000		10,000	103,000	61,000	40,000
9,500		10,000	103,000	61,000	40,000
10,000		10,000	103,000	61,000	40,000
10,200		12,000	118,000	71,000	45,000
10,320	13/32	12,000	118,000	71,000	45,000
10,500		12,000	118,000	71,000	45,000
11,000		12,000	118,000	71,000	45,000
11,500		12,000	118,000	71,000	45,000

d1		d6 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
12,000		12,000	118,000	71,000	45,000
12,500		14,000	124,000	77,000	45,000
13,000		14,000	124,000	77,000	45,000
13,500		14,000	124,000	77,000	45,000
14,000		14,000	124,000	77,000	45,000
14,500		16,000	133,000	83,000	48,000
15,000		16,000	133,000	83,000	48,000
15,500		16,000	133,000	83,000	48,000
15,870	5/8	16,000	133,000	83,000	48,000
16,000		16,000	133,000	83,000	48,000
16,500		18,000	143,000	93,000	48,000
17,000		18,000	143,000	93,000	48,000
17,500		18,000	143,000	93,000	48,000
18,000		18,000	143,000	93,000	48,000
19,000		20,000	153,000	101,000	50,000
19,500		20,000	153,000	101,000	50,000
20,000		20,000	153,000	101,000	50,000



HSS-E-PM Mikroporat ilman jäähdytyskanavia

Materiaali **HSS-E-PM**

Pinta



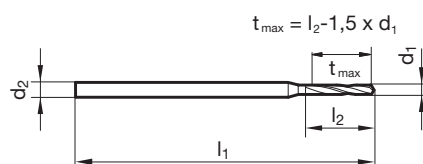
Leikkusuunta



P	•	päästöhiottu kärki • vahvistetulla varrella • $\varnothing 0.15\text{ mm}$ Co-seosteinen pikateräs
M	•	
K	•	
N	•	runsasseosteiset teräkset
S	○	
H		

GÜHRING NAVIGATOR

Leikkuarvosivu 796



Artikkelinro.

301

d1	d2	l1	l2	d1	d2	l1	l2
mm	mm	mm	mm	mm	mm	mm	mm
0,050	1,000	25,000	0,400	0,275	1,000	25,000	1,900
0,060	1,000	25,000	0,400	0,280	1,000	25,000	1,900
0,070	1,000	25,000	0,500	0,285	1,000	25,000	1,900
0,075	1,000	25,000	0,500	0,290	1,000	25,000	1,900
0,080	1,000	25,000	0,500	0,295	1,000	25,000	1,900
0,090	1,000	25,000	0,500	0,300	1,000	25,000	1,900
0,100	1,000	25,000	0,500	0,305	1,000	25,000	2,400
0,105	1,000	25,000	0,500	0,310	1,000	25,000	2,400
0,110	1,000	25,000	0,500	0,315	1,000	25,000	2,400
0,115	1,000	25,000	0,500	0,320	1,000	25,000	2,400
0,120	1,000	25,000	0,500	0,325	1,000	25,000	2,400
0,121	1,000	25,000	0,800	0,330	1,000	25,000	2,400
0,125	1,000	25,000	0,800	0,335	1,000	25,000	2,400
0,128	1,000	25,000	0,800	0,340	1,000	25,000	2,400
0,130	1,000	25,000	0,800	0,345	1,000	25,000	2,400
0,140	1,000	25,000	0,800	0,350	1,000	25,000	2,400
0,143	1,000	25,000	0,800	0,355	1,000	25,000	2,400
0,145	1,000	25,000	0,800	0,360	1,000	25,000	2,400
0,147	1,000	25,000	0,800	0,365	1,000	25,000	2,400
0,150	1,000	25,000	0,800	0,370	1,000	25,000	2,400
0,155	1,000	25,000	1,100	0,375	1,000	25,000	2,400
0,160	1,000	25,000	1,100	0,380	1,000	25,000	2,400
0,170	1,000	25,000	1,100	0,385	1,000	25,000	3,000
0,175	1,000	25,000	1,100	0,390	1,000	25,000	3,000
0,180	1,000	25,000	1,100	0,395	1,000	25,000	3,000
0,185	1,000	25,000	1,100	0,400	1,000	25,000	3,000
0,190	1,000	25,000	1,100	0,405	1,000	25,000	3,000
0,195	1,000	25,000	1,500	0,410	1,000	25,000	3,000
0,200	1,000	25,000	1,500	0,415	1,000	25,000	3,000
0,205	1,000	25,000	1,500	0,420	1,000	25,000	3,000
0,210	1,000	25,000	1,500	0,425	1,000	25,000	3,000
0,215	1,000	25,000	1,500	0,430	1,000	25,000	3,000
0,220	1,000	25,000	1,500	0,432	1,000	25,000	3,000
0,225	1,000	25,000	1,500	0,435	1,000	25,000	3,000
0,230	1,000	25,000	1,500	0,440	1,000	25,000	3,000
0,235	1,000	25,000	1,500	0,445	1,000	25,000	3,000
0,240	1,000	25,000	1,500	0,450	1,000	25,000	3,000
0,245	1,000	25,000	1,900	0,455	1,000	25,000	3,000
0,250	1,000	25,000	1,900	0,460	1,000	25,000	3,000
0,255	1,000	25,000	1,900	0,470	1,000	25,000	3,000
0,260	1,000	25,000	1,900	0,475	1,000	25,000	3,000
0,265	1,000	25,000	1,900	0,480	1,000	25,000	3,000
0,270	1,000	25,000	1,900	0,485	1,000	25,000	3,400



d1	d2	l1	l2
mm	mm	mm	mm
0,490	1,000	25,000	3,400
0,495	1,000	25,000	3,400
0,500	1,000	25,000	3,400
0,505	1,000	25,000	3,400
0,510	1,000	25,000	3,400
0,515	1,000	25,000	3,400
0,520	1,000	25,000	3,400
0,525	1,000	25,000	3,400
0,530	1,000	25,000	3,400
0,535	1,000	25,000	3,900
0,540	1,000	25,000	3,900
0,545	1,000	25,000	3,900
0,550	1,000	25,000	3,900
0,560	1,000	25,000	3,900
0,570	1,000	25,000	3,900
0,580	1,000	25,000	3,900
0,585	1,000	25,000	3,900
0,590	1,000	25,000	3,900
0,595	1,000	25,000	3,900
0,600	1,000	25,000	3,900
0,605	1,000	25,000	4,200
0,610	1,000	25,000	4,200
0,615	1,000	25,000	4,200
0,620	1,000	25,000	4,200
0,625	1,000	25,000	4,200
0,630	1,000	25,000	4,200
0,632	1,000	25,000	4,200
0,640	1,000	25,000	4,200
0,650	1,000	25,000	4,200
0,655	1,000	25,000	4,200
0,660	1,000	25,000	4,200
0,665	1,000	25,000	4,200
0,670	1,000	25,000	4,200
0,675	1,000	25,000	4,800
0,680	1,000	25,000	4,800
0,690	1,000	25,000	4,800
0,695	1,000	25,000	4,800
0,700	1,000	25,000	4,800
0,705	1,000	25,000	4,800
0,710	1,000	25,000	4,800
0,720	1,000	25,000	4,800
0,725	1,000	25,000	4,800
0,730	1,000	25,000	4,800
0,740	1,000	25,000	4,800
0,750	1,000	25,000	4,800
0,760	1,000	25,000	5,300
0,770	1,000	25,000	5,300
0,780	1,000	25,000	5,300
0,790	1,000	25,000	5,300
0,795	1,500	25,000	5,300
0,800	1,500	25,000	5,300
0,810	1,500	25,000	5,300
0,820	1,500	25,000	5,300
0,825	1,500	25,000	5,300
0,830	1,500	25,000	5,300
0,840	1,500	25,000	5,300
0,845	1,500	25,000	5,300
0,850	1,500	25,000	5,300
0,860	1,500	25,000	6,000
0,870	1,500	25,000	6,000
0,880	1,500	25,000	6,000
0,890	1,500	25,000	6,000
0,900	1,500	25,000	6,000
0,910	1,500	25,000	6,000
0,920	1,500	25,000	6,000
0,925	1,500	25,000	6,000
0,930	1,500	25,000	6,000
0,940	1,500	25,000	6,000
0,950	1,500	25,000	6,000
0,960	1,500	25,000	6,800
0,970	1,500	25,000	6,800
0,980	1,500	25,000	6,800

d1	d2	l1	l2
mm	mm	mm	mm
0,990	1,500	25,000	6,800
1,000	1,500	25,000	6,800
1,010	1,500	25,000	6,800
1,020	1,500	25,000	6,800
1,030	1,500	25,000	6,800
1,040	1,500	25,000	6,800
1,050	1,500	25,000	6,800
1,055	1,500	25,000	6,800
1,060	1,500	25,000	6,800
1,070	1,500	25,000	7,600
1,080	1,500	25,000	7,600
1,090	1,500	25,000	7,600
1,100	1,500	25,000	7,600
1,110	1,500	25,000	7,600
1,120	1,500	25,000	7,600
1,130	1,500	25,000	7,600
1,140	1,500	25,000	7,600
1,150	1,500	25,000	7,600
1,160	1,500	25,000	7,600
1,170	1,500	25,000	7,600
1,180	1,500	25,000	7,600
1,190	1,500	25,000	8,500
1,200	1,500	25,000	8,500
1,210	1,500	25,000	8,500
1,220	1,500	25,000	8,500
1,230	1,500	25,000	8,500
1,240	1,500	25,000	8,500
1,250	1,500	25,000	8,500
1,260	1,500	25,000	8,500
1,265	1,500	25,000	8,500
1,270	1,500	25,000	8,500
1,280	1,500	25,000	8,500
1,290	1,500	25,000	8,500
1,300	1,500	25,000	8,500
1,310	1,500	25,000	8,500
1,320	1,500	25,000	8,500
1,325	1,500	25,000	9,500
1,330	1,500	25,000	9,500
1,340	1,500	25,000	9,500
1,350	1,500	25,000	9,500
1,370	1,500	25,000	9,500
1,380	1,500	25,000	9,500
1,390	1,500	25,000	9,500
1,400	1,500	25,000	9,500
1,410	1,500	25,000	9,500
1,420	1,500	25,000	9,500
1,430	1,500	25,000	9,500
1,440	1,500	25,000	9,500
1,450	1,500	25,000	9,500
1,460	2,000	30,000	9,500
1,470	2,000	30,000	9,500
1,500	2,000	30,000	9,500
1,520	2,000	30,000	10,600
1,530	2,000	30,000	10,600
1,540	2,000	30,000	10,600
1,550	2,000	30,000	10,600
1,590	2,000	30,000	10,600
1,600	2,000	30,000	10,600
1,610	2,000	30,000	10,600
1,630	2,000	30,000	10,600
1,640	2,000	30,000	10,600
1,650	2,000	30,000	10,600
1,660	2,000	30,000	10,600
1,690	2,000	30,000	10,600
1,700	2,000	30,000	10,600
1,710	2,000	30,000	11,800
1,715	2,000	30,000	11,800
1,730	2,000	30,000	11,800
1,745	2,000	30,000	11,800
1,750	2,000	30,000	11,800
1,775	2,000	30,000	11,800
1,800	2,000	30,000	11,800

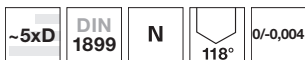


d1	d2	l1	l2
mm	mm	mm	mm
1,830	2,000	30,000	11,800
1,840	2,000	30,000	11,800
1,850	2,000	30,000	11,800
1,860	2,000	30,000	11,800
1,900	2,000	30,000	11,800
1,920	2,000	30,000	13,200

d1	d2	l1	l2
mm	mm	mm	mm



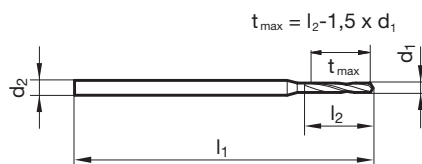
HSS-E-PM Mikroporat ilman jäähdytyskanavia



P •	päästöhiottu kärki • vahvistetulla varrella • parempi kulumiskestävyys
M •	
K •	
N •	runsasseosteiset teräkset
S ○	
H	

Materiaali **HSS-E-PM**Pinta **S**Leikkusuunta **R****GÜHRING** NAVIGATOR

Leikkuarvosivu 796

Lieriövärtiset
kierukkaporat

Artikkelinro.

660

d1	d2	l1	l2
mm	mm	mm	mm
0,160	1,000	25,000	1,100
0,170	1,000	25,000	1,100
0,180	1,000	25,000	1,100
0,190	1,000	25,000	1,100
0,200	1,000	25,000	1,500
0,210	1,000	25,000	1,500
0,220	1,000	25,000	1,500
0,230	1,000	25,000	1,500
0,240	1,000	25,000	1,500
0,250	1,000	25,000	1,900
0,255	1,000	25,000	1,900
0,260	1,000	25,000	1,900
0,265	1,000	25,000	1,900
0,270	1,000	25,000	1,900
0,280	1,000	25,000	1,900
0,290	1,000	25,000	1,900
0,295	1,000	25,000	1,900
0,300	1,000	25,000	1,900
0,305	1,000	25,000	2,400
0,310	1,000	25,000	2,400
0,320	1,000	25,000	2,400
0,325	1,000	25,000	2,400
0,330	1,000	25,000	2,400
0,340	1,000	25,000	2,400
0,350	1,000	25,000	2,400
0,360	1,000	25,000	2,400
0,370	1,000	25,000	2,400
0,380	1,000	25,000	2,400
0,390	1,000	25,000	3,000
0,400	1,000	25,000	3,000
0,410	1,000	25,000	3,000
0,420	1,000	25,000	3,000
0,430	1,000	25,000	3,000
0,440	1,000	25,000	3,000
0,450	1,000	25,000	3,000
0,460	1,000	25,000	3,000
0,470	1,000	25,000	3,000
0,480	1,000	25,000	3,000
0,490	1,000	25,000	3,400
0,500	1,000	25,000	3,400
0,510	1,000	25,000	3,400
0,520	1,000	25,000	3,400

d1	d2	l1	l2
mm	mm	mm	mm
0,530	1,000	25,000	3,400
0,540	1,000	25,000	3,900
0,550	1,000	25,000	3,900
0,560	1,000	25,000	3,900
0,570	1,000	25,000	3,900
0,580	1,000	25,000	3,900
0,590	1,000	25,000	3,900
0,600	1,000	25,000	3,900
0,610	1,000	25,000	4,200
0,620	1,000	25,000	4,200
0,630	1,000	25,000	4,200
0,640	1,000	25,000	4,200
0,650	1,000	25,000	4,200
0,660	1,000	25,000	4,200
0,670	1,000	25,000	4,200
0,680	1,000	25,000	4,800
0,690	1,000	25,000	4,800
0,700	1,000	25,000	4,800
0,710	1,000	25,000	4,800
0,720	1,000	25,000	4,800
0,730	1,000	25,000	4,800
0,740	1,000	25,000	4,800
0,750	1,000	25,000	4,800
0,760	1,000	25,000	5,300
0,770	1,000	25,000	5,300
0,780	1,000	25,000	5,300
0,790	1,000	25,000	5,300
0,800	1,500	25,000	5,300
0,810	1,500	25,000	5,300
0,820	1,500	25,000	5,300
0,830	1,500	25,000	5,300
0,840	1,500	25,000	5,300
0,850	1,500	25,000	5,300
0,860	1,500	25,000	6,000
0,870	1,500	25,000	6,000
0,880	1,500	25,000	6,000
0,900	1,500	25,000	6,000
0,910	1,500	25,000	6,000
0,920	1,500	25,000	6,000
0,940	1,500	25,000	6,000
0,950	1,500	25,000	6,000
0,960	1,500	25,000	6,800

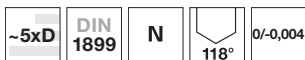


d1	d2	l1	l2
mm	mm	mm	mm
0,970	1,500	25,000	6,800
0,980	1,500	25,000	6,800
1,000	1,500	25,000	6,800
1,020	1,500	25,000	6,800
1,040	1,500	25,000	6,800
1,050	1,500	25,000	6,800
1,070	1,500	25,000	7,600
1,080	1,500	25,000	7,600
1,100	1,500	25,000	7,600
1,150	1,500	25,000	7,600
1,180	1,500	25,000	7,600
1,190	1,500	25,000	8,500

d1	d2	l1	l2
mm	mm	mm	mm
1,200	1,500	25,000	8,500
1,220	1,500	25,000	8,500
1,250	1,500	25,000	8,500
1,300	1,500	25,000	8,500
1,350	1,500	25,000	9,500
1,390	1,500	25,000	9,500
1,400	1,500	25,000	9,500
1,420	1,500	25,000	9,500
1,450	1,500	25,000	9,500
1,500	2,000	30,000	9,500
1,800	2,000	30,000	11,800
1,900	2,000	30,000	11,800



HSS-E-PM Mikroporat ilman jäähdytyskanavia



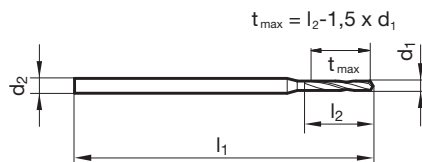
P	•	päästöhiottu kärki • vahvistetulla varrella • $\varnothing 0.15\text{ mm}$ Co-seosteinen pikateräs
M	•	
K	•	
N	•	runsasseosteiset teräkset
S	○	
H		

GÜHRING NAVIGATOR

Leikkuuarvosivu 796

Lieriövärtiset
kierukkaporat

Materiaali	HSS-E-PM
Pinta	○
Leikkusuunta	Ⓛ



Artikkelinro.

303

d1	d2	l1	l2
mm	mm	mm	mm
0,130	1,000	25,000	0,800
0,140	1,000	25,000	0,800
0,150	1,000	25,000	0,800
0,155	1,000	25,000	1,100
0,160	1,000	25,000	1,100
0,170	1,000	25,000	1,100
0,175	1,000	25,000	1,100
0,180	1,000	25,000	1,100
0,185	1,000	25,000	1,100
0,190	1,000	25,000	1,100
0,195	1,000	25,000	1,500
0,200	1,000	25,000	1,500
0,210	1,000	25,000	1,500
0,215	1,000	25,000	1,500
0,220	1,000	25,000	1,500
0,225	1,000	25,000	1,500
0,230	1,000	25,000	1,500
0,235	1,000	25,000	1,500
0,240	1,000	25,000	1,500
0,245	1,000	25,000	1,900
0,250	1,000	25,000	1,900
0,255	1,000	25,000	1,900
0,260	1,000	25,000	1,900
0,265	1,000	25,000	1,900
0,270	1,000	25,000	1,900
0,275	1,000	25,000	1,900
0,280	1,000	25,000	1,900
0,290	1,000	25,000	1,900
0,295	1,000	25,000	1,900
0,300	1,000	25,000	1,900
0,310	1,000	25,000	2,400
0,315	1,000	25,000	2,400
0,330	1,000	25,000	2,400
0,340	1,000	25,000	2,400
0,345	1,000	25,000	2,400
0,350	1,000	25,000	2,400
0,355	1,000	25,000	2,400
0,360	1,000	25,000	2,400
0,370	1,000	25,000	2,400
0,380	1,000	25,000	2,400
0,390	1,000	25,000	3,000
0,400	1,000	25,000	3,000

d1	d2	l1	l2
mm	mm	mm	mm
0,410	1,000	25,000	3,000
0,415	1,000	25,000	3,000
0,420	1,000	25,000	3,000
0,430	1,000	25,000	3,000
0,435	1,000	25,000	3,000
0,440	1,000	25,000	3,000
0,450	1,000	25,000	3,000
0,460	1,000	25,000	3,000
0,465	1,000	25,000	3,000
0,470	1,000	25,000	3,000
0,480	1,000	25,000	3,000
0,485	1,000	25,000	3,400
0,490	1,000	25,000	3,400
0,495	1,000	25,000	3,400
0,500	1,000	25,000	3,400
0,510	1,000	25,000	3,400
0,520	1,000	25,000	3,400
0,525	1,000	25,000	3,400
0,540	1,000	25,000	3,900
0,545	1,000	25,000	3,900
0,550	1,000	25,000	3,900
0,555	1,000	25,000	3,900
0,565	1,000	25,000	3,900
0,570	1,000	25,000	3,900
0,580	1,000	25,000	3,900
0,590	1,000	25,000	3,900
0,600	1,000	25,000	3,900
0,615	1,000	25,000	4,200
0,620	1,000	25,000	4,200
0,630	1,000	25,000	4,200
0,640	1,000	25,000	4,200
0,650	1,000	25,000	4,200
0,660	1,000	25,000	4,200
0,670	1,000	25,000	4,200
0,675	1,000	25,000	4,800
0,680	1,000	25,000	4,800
0,685	1,000	25,000	4,800
0,690	1,000	25,000	4,800
0,695	1,000	25,000	4,800
0,700	1,000	25,000	4,800
0,710	1,000	25,000	4,800
0,720	1,000	25,000	4,800



d1	d2	l1	l2
mm	mm	mm	mm
0,740	1,000	25,000	4,800
0,750	1,000	25,000	4,800
0,760	1,000	25,000	5,300
0,770	1,000	25,000	5,300
0,780	1,000	25,000	5,300
0,790	1,000	25,000	5,300
0,800	1,500	25,000	5,300
0,805	1,500	25,000	5,300
0,810	1,500	25,000	5,300
0,820	1,500	25,000	5,300
0,830	1,500	25,000	5,300
0,840	1,500	25,000	5,300
0,850	1,500	25,000	5,300
0,855	1,500	25,000	6,000
0,860	1,500	25,000	6,000
0,870	1,500	25,000	6,000
0,880	1,500	25,000	6,000
0,885	1,500	25,000	6,000
0,890	1,500	25,000	6,000
0,900	1,500	25,000	6,000
0,910	1,500	25,000	6,000
0,915	1,500	25,000	6,000
0,920	1,500	25,000	6,000
0,925	1,500	25,000	6,000
0,935	1,500	25,000	6,000
0,940	1,500	25,000	6,000
0,950	1,500	25,000	6,000
0,960	1,500	25,000	6,800
0,970	1,500	25,000	6,800
0,975	1,500	25,000	6,800
0,980	1,500	25,000	6,800
0,985	1,500	25,000	6,800
0,990	1,500	25,000	6,800
1,000	1,500	25,000	6,800
1,005	1,500	25,000	6,800
1,020	1,500	25,000	6,800

d1	d2	l1	l2
mm	mm	mm	mm
1,030	1,500	25,000	6,800
1,040	1,500	25,000	6,800
1,050	1,500	25,000	6,800
1,060	1,500	25,000	6,800
1,080	1,500	25,000	7,600
1,085	1,500	25,000	7,600
1,090	1,500	25,000	7,600
1,100	1,500	25,000	7,600
1,110	1,500	25,000	7,600
1,120	1,500	25,000	7,600
1,125	1,500	25,000	7,600
1,150	1,500	25,000	7,600
1,160	1,500	25,000	7,600
1,170	1,500	25,000	7,600
1,180	1,500	25,000	7,600
1,200	1,500	25,000	8,500
1,250	1,500	25,000	8,500
1,270	1,500	25,000	8,500
1,280	1,500	25,000	8,500
1,285	1,500	25,000	8,500
1,290	1,500	25,000	8,500
1,310	1,500	25,000	8,500
1,330	1,500	25,000	9,500
1,350	1,500	25,000	9,500
1,360	1,500	25,000	9,500
1,375	1,500	25,000	9,500
1,400	1,500	25,000	9,500
1,405	1,500	25,000	9,500
1,425	1,500	25,000	9,500
1,450	1,500	25,000	9,500
1,460	2,000	30,000	9,500
1,500	2,000	30,000	9,500
1,600	2,000	30,000	10,600
1,615	2,000	30,000	10,600
1,800	2,000	30,000	11,800
1,850	2,000	30,000	11,800



TKM Mikroporat ilman jäähdytyskanavia



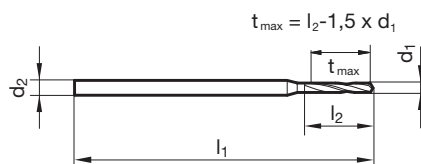
- P** ● Kärjen kevennys $\geq \varnothing 0,800$ • päästöhiottu kärki • pääleikkusärmän suorasta
- M** ○
- K** ●
- N** ○ rakenne- ja pintakarkaistut teräkset • valut • pronssi, messinki • alumiini ja Al-seokset • Magnesium ja Mg-seokset • muovit ja kuituvahvisteiset muovit
- S** ○
- H** ○

Materiaali	TKM
Pinta	○
Leikkusuunta	Ⓜ

Lieriövärtiset kierukkaporat

GÜHRING NAVIGATOR

Leikkuarvosivu 796



Artikkelinro. **701**

d1	d2	l1	l2
mm	mm	mm	mm
0,200	1,000	25,000	1,500
0,220	1,000	25,000	1,500
0,250	1,000	25,000	1,900
0,260	1,000	25,000	1,900
0,280	1,000	25,000	1,900
0,300	1,000	25,000	1,900
0,330	1,000	25,000	2,400
0,350	1,000	25,000	2,400
0,400	1,000	25,000	3,000
0,450	1,000	25,000	3,000
0,500	1,000	25,000	3,400
0,600	1,000	25,000	3,900
0,650	1,000	25,000	4,200
0,700	1,000	25,000	4,800
0,750	1,000	25,000	4,800
0,800	1,500	25,000	5,300
0,810	1,500	25,000	5,300
0,830	1,500	25,000	5,300

d1	d2	l1	l2
mm	mm	mm	mm
0,850	1,500	25,000	5,300
0,900	1,500	25,000	6,000
1,000	1,500	25,000	6,800
1,050	1,500	25,000	6,800
1,100	1,500	25,000	7,600
1,150	1,500	25,000	7,600
1,200	1,500	25,000	8,500
1,250	1,500	25,000	8,500
1,300	1,500	25,000	8,500
1,350	1,500	25,000	9,500
1,400	1,500	25,000	9,500



TKM Mikroporat ilman jäähdytyskanavia



P • Kärjen kevennys $\geq \varnothing 0,800$ • päästöhiottu kärki

M

K •

N

S

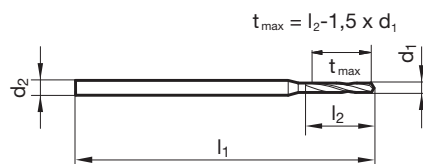
H

rakenne- ja pintakarkaistut teräkset • automaattiteräkset, nuorrutetut teräkset • seostetut teräkset $< 1200 \text{ N/mm}^2$ asti • valut

Materiaali **TKM**Pinta **A**Leikkusuunta **R**

GÜHRING NAVIGATOR

Leikkuarvosivu 796

Lieriövartiset
kierukkaporat

Artikkelinro.

3899

d1	d2 h6	l1	l2
mm	mm	mm	mm
0,100	3,000	38,000	1,200
0,150	3,000	38,000	2,000
0,200	3,000	38,000	2,500
0,250	3,000	38,000	3,000
0,260	3,000	38,000	3,000
0,270	3,000	38,000	3,000
0,280	3,000	38,000	3,000
0,300	3,000	38,000	5,000
0,310	3,000	38,000	5,000
0,330	3,000	38,000	5,000
0,350	3,000	38,000	6,000
0,360	3,000	38,000	6,000
0,370	3,000	38,000	6,000
0,380	3,000	38,000	6,000
0,400	3,000	38,000	7,000
0,410	3,000	38,000	7,000
0,430	3,000	38,000	7,000
0,440	3,000	38,000	7,000
0,450	3,000	38,000	7,000
0,480	3,000	38,000	7,000
0,500	3,000	38,000	7,000
0,510	3,000	38,000	7,000
0,530	3,000	38,000	7,000
0,550	3,000	38,000	7,000
0,570	3,000	38,000	7,000
0,600	3,000	38,000	7,000
0,640	3,000	38,000	7,000
0,650	3,000	38,000	7,000
0,660	3,000	38,000	7,000
0,680	3,000	38,000	7,000
0,700	3,000	38,000	8,000
0,710	3,000	38,000	8,000
0,720	3,000	38,000	8,000
0,740	3,000	38,000	8,000
0,750	3,000	38,000	8,000
0,760	3,000	38,000	8,000
0,770	3,000	38,000	8,000
0,780	3,000	38,000	8,000
0,790	3,000	38,000	8,000
0,800	3,000	38,000	10,000
0,810	3,000	38,000	10,000
0,820	3,000	38,000	10,000

d1	d2 h6	l1	l2
mm	mm	mm	mm
0,830	3,000	38,000	10,000
0,840	3,000	38,000	10,000
0,850	3,000	38,000	10,000
0,860	3,000	38,000	10,000
0,870	3,000	38,000	10,000
0,880	3,000	38,000	10,000
0,890	3,000	38,000	10,000
0,900	3,000	38,000	10,000
0,910	3,000	38,000	10,000
0,920	3,000	38,000	10,000
0,930	3,000	38,000	10,000
0,940	3,000	38,000	10,000
0,950	3,000	38,000	10,000
0,960	3,000	38,000	10,000
0,970	3,000	38,000	10,000
0,980	3,000	38,000	10,000
0,990	3,000	38,000	10,000
1,000	3,000	38,000	10,000
1,010	3,000	38,000	10,000
1,020	3,000	38,000	10,000
1,050	3,000	38,000	10,000
1,060	3,000	38,000	10,000
1,070	3,000	38,000	10,000
1,090	3,000	38,000	10,000
1,100	3,000	38,000	10,000
1,110	3,000	38,000	10,000
1,150	3,000	38,000	10,000
1,170	3,000	38,000	10,000
1,190	3,000	38,000	10,000
1,200	3,000	38,000	10,000
1,210	3,000	38,000	10,000
1,220	3,000	38,000	10,000
1,230	3,000	38,000	10,000
1,240	3,000	38,000	10,000
1,260	3,000	38,000	10,000
1,270	3,000	38,000	10,000
1,280	3,000	38,000	10,000
1,300	3,000	38,000	10,000
1,370	3,000	38,000	10,000
1,400	3,000	38,000	10,000
1,420	3,000	38,000	10,000
1,450	3,000	38,000	10,000



d1	d2 h6	l1	l2
mm	mm	mm	mm
1,490	3,000	38,000	10,000
1,500	3,000	38,000	10,000
1,510	3,000	38,000	10,000
1,520	3,000	38,000	10,000
1,550	3,000	38,000	10,000
1,560	3,000	38,000	10,000
1,580	3,000	38,000	10,000
1,590	3,000	38,000	10,000
1,600	3,000	38,000	12,000
1,630	3,000	38,000	12,000
1,650	3,000	38,000	12,000
1,700	3,000	38,000	12,000
1,750	3,000	38,000	12,000
1,800	3,000	38,000	12,000
1,810	3,000	38,000	12,000
1,820	3,000	38,000	12,000
1,830	3,000	38,000	12,000
1,840	3,000	38,000	12,000
1,850	3,000	38,000	12,000
1,860	3,000	38,000	12,000
1,900	3,000	38,000	12,000
1,920	3,000	38,000	12,000
1,950	3,000	38,000	12,000
1,980	3,000	38,000	12,000

d1	d2 h6	l1	l2
mm	mm	mm	mm
2,000	3,000	38,000	12,000
2,050	3,000	38,000	12,000
2,100	3,000	38,000	12,000
2,150	3,000	38,000	12,000
2,200	3,000	38,000	12,000
2,400	3,000	38,000	12,000
2,500	3,000	38,000	12,000
2,550	3,000	38,000	12,000
2,600	3,000	38,000	12,000
2,750	3,000	38,000	12,000
2,800	3,000	38,000	12,000
2,950	3,000	38,000	12,000
3,000	3,000	38,000	12,000



ExclusiveLine Mikroporat ilman jäähdytyskanavia

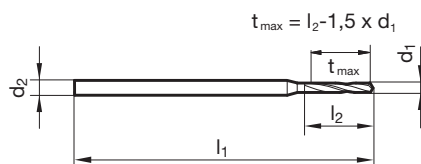


- P** • Kärjen kevennys $\geq \varnothing 0,500$ • päästöhiottu kärki • pääleikkusärmän suorasta • särmän valmistelu
- M** •
- K** •
- N** ○ rakenne- ja pintakarkaistut teräkset • automaattiteräkset, nuorrutetut teräkset • seostetut teräkset $< 1200 \text{ N/mm}^2$ asti • ruostumattomat teräkset • valut
- S** ○
- H**

GÜHRING NAVIGATOR

Leikkuuarvosivu 796

Materiaali	TKM
Pinta	A
Leikkusuunta	R



Lieriovärtiset
kierukkaporat

Artikkelinro. **6400**

d1	d2 h6	l1	l2
mm	mm	mm	mm
0,500	3,000	47,000	3,000
0,550	3,000	47,000	3,300
0,600	3,000	47,000	3,600
0,650	3,000	47,000	3,900
0,700	3,000	47,000	4,200
0,750	3,000	47,000	4,500
0,800	3,000	47,000	4,800
0,850	3,000	47,000	5,100
0,900	3,000	47,000	5,400
0,950	3,000	47,000	5,700
1,000	3,000	47,000	6,000
1,050	3,000	47,000	6,300
1,100	3,000	47,000	6,600
1,150	3,000	47,000	6,900
1,200	3,000	47,000	7,200
1,250	3,000	47,000	7,500
1,300	3,000	47,000	7,800
1,350	3,000	47,000	8,100
1,400	3,000	47,000	8,400
1,450	3,000	47,000	8,700
1,500	3,000	47,000	9,000
1,550	3,000	47,000	9,300
1,590	3,000	47,000	9,600
1,600	3,000	47,000	9,600
1,650	3,000	47,000	9,900
1,700	3,000	47,000	10,200
1,750	3,000	47,000	10,500
1,800	3,000	52,000	10,800
1,850	3,000	52,000	11,100
1,900	3,000	52,000	11,400

d1	d2 h6	l1	l2
mm	mm	mm	mm
1,950	3,000	52,000	11,700
1,980	4,000	59,000	12,000
2,000	4,000	59,000	12,000
2,050	4,000	59,000	12,300
2,100	4,000	59,000	12,600
2,150	4,000	59,000	12,900
2,200	4,000	59,000	13,200
2,250	4,000	59,000	13,500
2,300	4,000	59,000	13,800
2,350	4,000	59,000	14,100
2,380	4,000	59,000	14,400
2,400	4,000	59,000	14,400
2,450	4,000	59,000	14,700
2,500	4,000	59,000	15,000
2,550	4,000	59,000	15,300
2,600	4,000	59,000	15,600
2,650	4,000	59,000	15,900
2,700	4,000	59,000	16,200
2,750	4,000	59,000	16,500
2,780	4,000	59,000	16,800
2,800	4,000	59,000	16,800
2,850	4,000	59,000	17,100
2,900	4,000	59,000	17,400
2,950	4,000	59,000	17,700
3,000	4,000	59,000	18,000



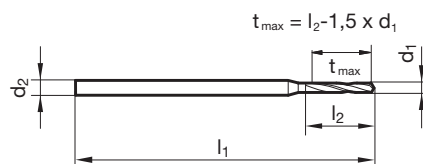
ExclusiveLine Mikroporat ilman jäähdytyskanavia



P	•	Kärjen kevennys $\geq \varnothing 0,500$ • päästöhiottu kärki • pääleikkusärmän suorasta • särmän valmistelu
M	•	
K	•	
N	○	rakenne- ja pintakarkaistut teräkset • automaattiteräkset, nuorrutetut teräkset • seostetut teräkset $< 1200 \text{ N/mm}^2$ asti • ruostumattomat teräkset • valut
S	○	
H		

GÜHRING NAVIGATOR

Leikkuarvosivu 796



Artikkelinro.

6401

d1	d2 h6	l1	l2
mm	mm	mm	mm
0,500	3,000	47,000	4,000
0,550	3,000	47,000	4,400
0,600	3,000	47,000	4,800
0,650	3,000	47,000	5,200
0,700	3,000	47,000	5,600
0,750	3,000	47,000	6,000
0,800	3,000	47,000	6,400
0,850	3,000	47,000	6,800
0,900	3,000	47,000	7,200
0,950	3,000	47,000	7,600
1,000	3,000	47,000	8,000
1,050	3,000	47,000	8,400
1,100	3,000	47,000	8,800
1,150	3,000	47,000	9,200
1,200	3,000	52,000	10,800
1,250	3,000	52,000	11,300
1,300	3,000	52,000	11,700
1,350	3,000	52,000	12,200
1,400	3,000	52,000	12,600
1,450	3,000	52,000	13,100
1,500	3,000	52,000	13,500
1,550	3,000	52,000	14,000
1,590	3,000	52,000	14,400
1,600	3,000	52,000	14,400
1,650	3,000	52,000	14,900
1,700	3,000	52,000	15,300
1,750	3,000	52,000	15,800
1,800	3,000	52,000	16,200
1,850	3,000	52,000	16,700
1,900	3,000	52,000	17,100

d1	d2 h6	l1	l2
mm	mm	mm	mm
1,950	3,000	52,000	17,600
1,980	4,000	63,000	18,000
2,000	4,000	63,000	18,000
2,050	4,000	63,000	18,500
2,100	4,000	63,000	18,900
2,150	4,000	63,000	19,400
2,200	4,000	63,000	19,800
2,250	4,000	63,000	20,300
2,300	4,000	63,000	20,700
2,350	4,000	63,000	21,200
2,380	4,000	63,000	21,600
2,400	4,000	63,000	21,600
2,450	4,000	63,000	22,100
2,500	4,000	63,000	22,500
2,550	4,000	63,000	23,000
2,600	4,000	67,000	23,400
2,650	4,000	67,000	23,900
2,700	4,000	67,000	24,300
2,750	4,000	67,000	24,800
2,780	4,000	67,000	25,200
2,800	4,000	67,000	25,200
2,850	4,000	67,000	25,700
2,900	4,000	67,000	26,100
2,950	4,000	67,000	26,600
3,000	4,000	67,000	27,000



ExclusiveLine mikroporat jäähdytyskanavilla



- P** • Kärjen kevennys $\geq \varnothing 1,400$ • päästöhiottu kärki • pääleikkusärmän suorasta • särmän valmistelu
- M** •
- K** •
- N** ○ rakenne- ja pintakarkaistut teräkset • automaattiteräkset, nuorrutetut teräkset • seostetut teräkset $< 1200 \text{ N/mm}^2$ asti • ruostumattomat teräkset • valut
- S** ○
- H**

Materiaali **TKM**

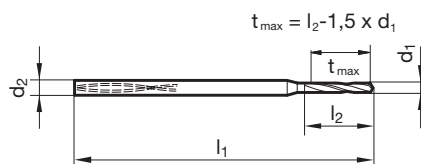
Pinta **A**

Leikkusuunta **R**



GÜHRING NAVIGATOR

Leikkuarvosivu 796



Lieriövartiset
kierukkaporat

Artikkelinro. **6405**

d1	d2 h6	l1	l2
mm	mm	mm	mm
1,400	4,000	52,000	11,000
1,450	4,000	52,000	12,000
1,500	4,000	52,000	12,000
1,550	4,000	52,000	12,000
1,590	4,000	52,000	13,000
1,600	4,000	52,000	13,000
1,650	4,000	52,000	13,000
1,700	4,000	56,000	14,000
1,750	4,000	56,000	14,000
1,800	4,000	56,000	14,000
1,850	4,000	56,000	15,000
1,900	4,000	56,000	15,000
1,950	4,000	56,000	16,000
1,980	4,000	56,000	16,000
2,000	4,000	56,000	16,000
2,050	4,000	56,000	16,000
2,100	4,000	62,000	17,000
2,150	4,000	62,000	17,000
2,200	4,000	62,000	18,000
2,250	4,000	62,000	18,000
2,300	4,000	62,000	18,000
2,350	4,000	62,000	19,000
2,380	4,000	62,000	19,000
2,400	4,000	62,000	19,000

d1	d2 h6	l1	l2
mm	mm	mm	mm
2,450	4,000	62,000	20,000
2,500	4,000	62,000	20,000
2,550	4,000	62,000	20,000
2,600	4,000	66,000	21,000
2,650	4,000	66,000	21,000
2,700	4,000	66,000	22,000
2,750	4,000	66,000	22,000
2,780	4,000	66,000	22,000
2,800	4,000	66,000	22,000
2,850	4,000	66,000	23,000
2,900	4,000	66,000	23,000
2,950	4,000	66,000	24,000
3,000	4,000	66,000	24,000



ExclusiveLine mikroporat jäähdytyskanavilla

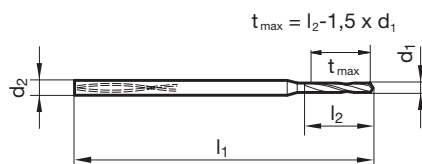


P	•	Kärjen kevennys $\geq \varnothing 1,400$ • päästöhiottu kärki • pääleikkusärmän suorasta • särmän valmistelu
M	•	
K	•	
N	○	rakenne- ja pintakarkaistut teräkset • automaattiteräkset, nuorrutetut teräkset • seostetut teräkset < 1200 N/mm ² asti • ruostumattomat teräkset • valut
S	○	
H		

Materiaali **TKM**Pinta **A**Leikkusuunta **R**

GÜHRING NAVIGATOR

Leikkuarvosivu 796



Artikkelinro.

6408

d1	d2 h6	l1	l2
mm	mm	mm	mm
1,400	4,000	52,000	15,000
1,450	4,000	52,000	16,000
1,500	4,000	52,000	17,000
1,550	4,000	52,000	17,000
1,590	4,000	52,000	18,000
1,600	4,000	52,000	18,000
1,650	4,000	52,000	18,000
1,700	4,000	56,000	19,000
1,750	4,000	56,000	19,000
1,800	4,000	56,000	20,000
1,850	4,000	56,000	20,000
1,900	4,000	56,000	21,000
1,950	4,000	56,000	21,000
1,980	4,000	56,000	22,000
2,000	4,000	56,000	22,000
2,050	4,000	56,000	23,000
2,100	4,000	62,000	23,000
2,150	4,000	62,000	24,000
2,200	4,000	62,000	24,000
2,250	4,000	62,000	25,000
2,300	4,000	62,000	25,000
2,320	4,000	62,000	26,000
2,350	4,000	62,000	26,000
2,380	4,000	62,000	26,000

d1	d2 h6	l1	l2
mm	mm	mm	mm
2,400	4,000	62,000	26,000
2,450	4,000	62,000	27,000
2,500	4,000	62,000	28,000
2,550	4,000	62,000	28,000
2,600	4,000	66,000	29,000
2,650	4,000	66,000	29,000
2,700	4,000	66,000	30,000
2,750	4,000	66,000	30,000
2,780	4,000	66,000	31,000
2,800	4,000	66,000	31,000
2,850	4,000	66,000	31,000
2,900	4,000	66,000	32,000
2,950	4,000	66,000	32,000
3,000	4,000	66,000	33,000

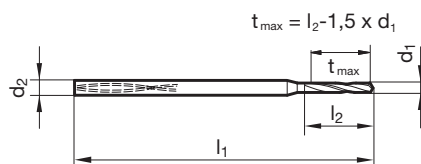

ExclusiveLine mikroporat jäähdytyskanavilla


P	•	Kärjen kevennys $\geq \varnothing 1,400$ • päästöhiottu kärki • pääleikkusärmän suorasta • särmän valmistelu
M	•	
K	•	
N	○	rakenne- ja pintakarkaistut teräkset • automaattiteräkset, nuorrutetut teräkset • seostetut teräkset $< 1200 \text{ N/mm}^2$ asti • ruostumattomat teräkset • valut
S	○	
H		

GÜHRING NAVIGATOR

Leikkuarvosivu 796

Materiaali	TKM
Pinta	A
Leikkusuunta	R

Lieriövartiset
kierukkaporat

Artikkelinro.

6412

d1	d2 h6	l1	l2
mm	mm	mm	mm
1,400	4,000	62,000	25,000
1,500	4,000	62,000	27,000
1,590	4,000	62,000	29,000
1,600	4,000	62,000	29,000
1,600	4,000	62,000	29,000
1,700	4,000	70,000	31,000
1,800	4,000	70,000	32,000
1,900	4,000	70,000	34,000
1,980	4,000	70,000	36,000
2,000	4,000	70,000	36,000
2,100	4,000	78,000	38,000
2,200	4,000	78,000	40,000
2,300	4,000	78,000	42,000

d1	d2 h6	l1	l2
mm	mm	mm	mm
2,380	4,000	78,000	44,000
2,400	4,000	78,000	44,000
2,500	4,000	78,000	45,000
2,600	4,000	87,000	47,000
2,700	4,000	87,000	48,000
2,780	4,000	87,000	50,000
2,800	4,000	87,000	50,000
2,900	4,000	87,000	52,000
3,000	4,000	87,000	54,000



Porat 12.7 mm varrella

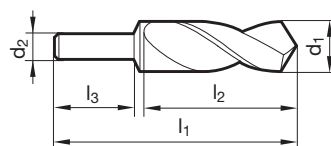
Materiaali **HSS**

Pinta

Leikkusuunta

**P** • Kärjen kevennys $\geq \varnothing 14,290$ • kartiovaippahionta • yhtenäisellä varrella**M****K** •**N** ○ seostettu-/seostamaton teräs ja valuteräs • harmaavalu-, taottava- ja pallografiittivalurauta • sintrattu pulveriteräs, uushopea ja grafiitti**S****H****GÜHRING** NAVIGATOR

Leikkuarvosivu 778

Lieriövaritiset
kierukkaporat

Artikkelinro.

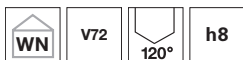
268

d1	d2	l1	l2	l3
mm	mm	mm	mm	mm
13,000	12,700	156,000	82,000	57,000
13,490	12,700	156,000	82,000	57,000
13,500	12,700	156,000	82,000	57,000
14,000	12,700	156,000	82,000	57,000
14,290	12,700	157,000	83,000	57,000
14,500	12,700	157,000	83,000	57,000
15,000	12,700	157,000	83,000	57,000
15,500	12,700	157,000	83,000	57,000
15,870	12,700	157,000	83,000	57,000
16,000	12,700	157,000	83,000	57,000
16,500	12,700	158,000	84,000	57,000
16,670	12,700	158,000	84,000	57,000
17,000	12,700	158,000	84,000	57,000
17,460	12,700	158,000	84,000	57,000
17,500	12,700	158,000	84,000	57,000
18,000	12,700	158,000	84,000	57,000
19,000	12,700	158,000	84,000	57,000
19,050	12,700	159,000	85,000	57,000

d1	d2	l1	l2	l3
mm	mm	mm	mm	mm
19,840	12,700	159,000	85,000	57,000
20,000	12,700	159,000	85,000	57,000
21,000	12,700	159,000	85,000	57,000
21,430	12,700	159,000	85,000	57,000
22,000	12,700	159,000	85,000	57,000
22,220	12,700	159,000	85,000	57,000
23,000	12,700	159,000	85,000	57,000
23,020	12,700	159,000	85,000	57,000
23,810	12,700	160,000	86,000	57,000
24,000	12,700	160,000	86,000	57,000
25,000	12,700	160,000	86,000	57,000
25,400	12,700	160,000	86,000	57,000
28,570	12,700	160,000	86,000	57,000



Lyhyet porat 16.0 mm varrella

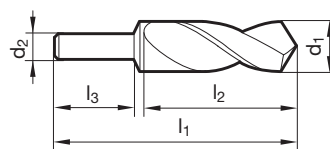


- P** • ilman kärjen hiontaa • Co-seosteinen pikateräs • parempi kulumiskestävyys • yhtenäisellä varrella • aihio, keskiökuopat molemmissa päissä • korjauksille, esim. halk., upotus- tai muotohionta
- M** •
- K** ○
- N** ○ vaikeasti työstettävälle materiaaleille • ruostumatt.-/haponk.teräkset • jousiteräkset • austeniittiset teräkset
- S** ○
- H**

GÜHRING NAVIGATOR

Leikkuuarvosivu 772

Materiaali	HSCO
Pinta	○
Leikkusuunta	Ⓜ



Lieriövartiset
kierukkaporat

Artikkelinro. **128**

d1	d2	l1	l2	l3
mm	mm	mm	mm	mm
16,000	16,000	130,000	88,000	42,000
16,500	16,000	130,000	88,000	40,000
17,000	16,000	130,000	88,000	40,000
17,500	16,000	130,000	88,000	40,000
18,000	16,000	130,000	88,000	40,000
19,000	16,000	130,000	88,000	40,000
20,000	16,000	130,000	88,000	40,000
20,500	16,000	130,000	88,000	40,000
21,000	16,000	130,000	88,000	40,000
21,500	16,000	130,000	88,000	40,000
22,000	16,000	130,000	88,000	40,000
22,500	16,000	130,000	88,000	40,000
23,000	16,000	130,000	88,000	40,000
23,500	16,000	130,000	88,000	40,000
24,000	16,000	130,000	88,000	40,000
24,500	16,000	130,000	88,000	40,000
25,000	16,000	130,000	88,000	40,000
25,500	16,000	140,000	98,000	40,000

d1	d2	l1	l2	l3
mm	mm	mm	mm	mm
26,000	16,000	140,000	98,000	40,000
27,000	16,000	140,000	98,000	40,000
28,000	16,000	140,000	98,000	40,000
28,500	16,000	140,000	98,000	40,000
30,000	16,000	140,000	98,000	40,000
31,000	16,000	140,000	98,000	40,000
32,000	16,000	140,000	98,000	40,000
35,000	16,000	140,000	98,000	40,000
38,000	16,000	140,000	98,000	40,000
40,000	16,000	140,000	98,000	40,000



Lyhyet porat 25.4 mm varrella



P •	ilman kärjen hiontaa • Co-seosteinen pikateräs • parempi kulumiskestävyys • yhtenäisellä varrella • aihio, keskiökuopat molemmissa päissä • korjauksille, esim. halk., upotus- tai muotohionta
M •	
K ○	
N ○	ruostumatt./haponk.teräkset • vaikeasti työstettävälle materiaaleille • jousiteräkset • austeniittiset teräkset
S ○	
H	

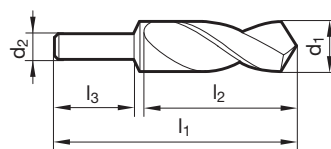
Materiaali **HSCO**

Pinta ○

Leikkusuunta

GÜHRING NAVIGATOR

Leikkuarvosivu 772

Lieriövärtiset
kierukkaporat

Artikkelinro.

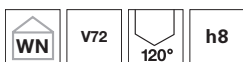
129

d1	d2	l1	l2	l3
mm	mm	mm	mm	mm
25,000	25,400	140,000	93,000	45,000
26,000	25,400	140,000	93,000	45,000
28,000	25,400	140,000	93,000	45,000
29,500	25,400	140,000	93,000	45,000
30,000	25,400	140,000	93,000	45,000
32,000	25,400	140,000	93,000	45,000
33,000	25,400	140,000	93,000	45,000
34,000	25,400	140,000	93,000	45,000
35,000	25,400	140,000	93,000	45,000
36,000	25,400	140,000	93,000	45,000
37,000	25,400	140,000	93,000	45,000
38,000	25,400	140,000	93,000	45,000

d1	d2	l1	l2	l3
mm	mm	mm	mm	mm
40,000	25,400	140,000	93,000	45,000



Lyhyet porat 25.4 mm varrella

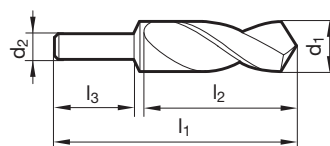


- P** • ilman kärjen hiontaa • Co-seosteinen pikateräs • parempi kulumiskestävyys • yhtenäisellä varrella • aihio, keskiökuopat molemmissa päissä • korjauksille, esim. halk., upotus- tai muotohionta
- M** •
- K** ○
- N** ○ vaikeasti työstettävälle materiaaleille • ruostumatt.-/haponk. teräkset • jousiteräkset • austeniittiset teräkset
- S** ○
- H**

GÜHRING NAVIGATOR

Leikkuarvosivu 772

Materiaali	HSCO
Pinta	○
Leikkusuunta	Ⓛ



Lieriövaritset
kierukkaporat

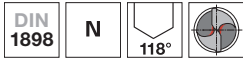
Artikkelinro. **136**

d1	d2	l1	l2	l3
mm	mm	mm	mm	mm
25,000	25,400	140,000	93,000	45,000
25,500	25,400	140,000	93,000	45,000
26,000	25,400	140,000	93,000	45,000
26,500	25,400	140,000	93,000	45,000
27,500	25,400	140,000	93,000	45,000
29,500	25,400	140,000	93,000	45,000

d1	d2	l1	l2	l3
mm	mm	mm	mm	mm
36,000	25,400	140,000	93,000	45,000
38,000	25,400	140,000	93,000	45,000
39,000	25,400	140,000	93,000	45,000



Kartiosokkareinäporat



Materiaali **HSS**

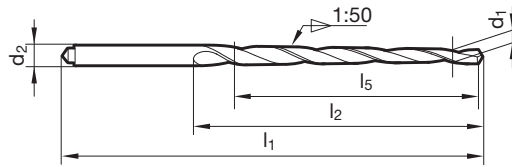
Pinta $\sqrt{2,36}$

Leikkusuunta R

P • Kärjen kevennys $\geq \varnothing 1,000$ • kartiovaippahionta • kartiorei'ille
M ○ kartiosokille DIN 1 (uusi DIN EN 22339) ja DIN 7978 (uusi DIN EN 28736)
 mukaan • vääntiöllä

- K** •
- N** ○
- S**
- H**

Lieriövartiset
kierukkaporat



Artikkelinro. **531**

d1	d2	l1	l2	l5
mm	mm	mm	mm	mm
2,000	3,150	86,000	52,000	48,000
2,500	3,150	86,000	52,000	48,000
3,000	4,000	100,000	63,000	58,000
3,500	5,000	112,000	74,000	68,000
4,000	5,000	112,000	74,000	68,000
4,500	6,300	122,000	81,000	73,000

d1	d2	l1	l2	l5
mm	mm	mm	mm	mm
5,000	6,300	122,000	81,000	73,000
5,500	8,000	160,000	114,000	105,000
6,000	8,000	160,000	114,000	105,000
8,000	10,000	207,000	157,000	145,000
10,000	12,500	245,000	190,000	175,000
12,000	16,000	290,000	228,000	210,000



Porasarjat



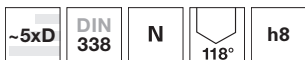
P • kartiovaippahionta • Gühring porat ovat saatavina myös sarjoina. Kotikäyttöön voidaan toimittaa muovialustilla olevia. Kovempaan käyttöön laaikoissa olevia. Muut tarjouksen mukaan.

Materiaali **HSS**Pinta Leikkusuunta Lieriövärtiset
kierukkaporatArtikkelinro. **201**

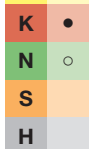
d1	n jaolla	lkm/sarja	koodinro.
mm	mm		
1,0-5,0	0,1	41	0,011
5,1-10,0	0,1	50	0,012
1,0-10,0	0,5	19	0,013
1,0-13,0	0,5	25	0,014
1,0-5,9	0,1	50	0,015
6,0-10,0	0,1	41	0,016
1,0-10,5	0,5	24	0,018
1,0-10,5	0,5	32	0,019
1/16 - 1/2	1/64	29	0,021
1,02-5,79	1/64	60	0,026



Porasarja ilman koteloa



P • kartiovaippahionta • Gühring porat ovat saatavina myös sarjoina. Kotikäyttöön voidaan toimittaa muovialustilla olevia. Kovempaan käyttöön laaikoissa olevia. Muut tarjouksen mukaan.



Materiaali **HSS**

Pinta

Leikkusuunta



Artikkelinro. **200**

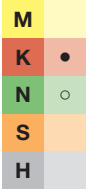
d1	n jaolla	lkm/sarja	koodinro.
mm	mm		
1,0-5,0	0,1	41	0,011
5,1-10,0	0,1	50	0,012
1,0-10,0	0,5	19	0,013
1,0-13,0	0,5	25	0,014
1,0-5,9	0,1	50	0,015
6,0-10,0	0,1	41	0,016
1,0-10,5	0,5	24	0,018



Porasarjat



P • kartiovaippahionta • Gühring porat ovat saatavina myös sarjoina. Kotikäyttöön voidaan toimittaa muovialustilla olevia. Kovempaan käyttöön laaikoissa olevia. Muut tarjouksen mukaan.

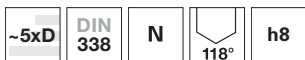
Materiaali **HSS**Pinta **S**Leikkusuunta **R**Lieriövärtiset
kierukkeporat

Artikkelinro. 17

d1	n jaolla	lkm/sarja	koodinro.
mm	mm		
1,0-10,0	0,5	19	6,013
1,0-13,0	0,5	25	6,014
1,0-5,9	0,1	50	6,015
6,0-10,0	0,1	41	6,016
1/16 - 1/2	1/64	29	6,021



Porasarjat



P • kartiovaippahionta • Gühring porat ovat saatavina myös sarjoina. Kotikäyttöön voidaan toimittaa muovialustilla olevia. Kovempaan käyttöön laaikoissa olevia. Muut tarjouksen mukaan.

- M** ○
- K** •
- N** ○
- S** ○
- H** ○

Lieriövartiset
kierukkaporat

Materiaali	HSCO
Pinta	●
Leikkusuunta	Ⓜ

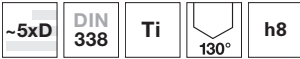


Artikkelinro. **16**

d1	n jaolla	lkm/sarja	koodinro.
mm	mm		
1,0-10,0	0,5	19	3,013
1,0-13,0	0,5	25	3,014
1,0-5,9	0,1	50	3,015
6,0-10,0	0,1	41	3,016
1/16 - 1/2	1/64	29	3,021



Porasarjat



P ○ kartiovaippahionta • Gühring porat ovat saatavana myös sarjoina. Kotikäyttöön voidaan toimittaa muovialustilla olevia. Kovempaan käyttöön laaikoissa olevia. Muut tarjouksen mukaan.

Materiaali **HSCO**

Pinta ○

Leikkusuunta

Lieriövärtiset
kierukkeporatArtikkelinro. **18**

d1	n jaolla	lkm/sarja	koodinro.
mm	mm		
1,0-10,0	0,5	19	8,013
1,0-13,0	0,5	25	8,014
1,0-5,9	0,1	50	8,015
6,0-10,0	0,1	41	8,016
1,0-10,5	0,5	24	8,018



Porasarjat



P ○ kartiovaippahionta • Gühring porat ovat saatavina myös sarjoina. Kotikäyttöön voidaan toimittaa muovialustilla olevia. Kovempaan käyttöön laaikoissa olevia. Muut tarjouksen mukaan.

- M** ●
- K**
- N** ○
- S** ○
- H**

Materiaali	HSCO
Pinta	○
Leikkusuunta	Ⓜ



Artikkelinro. **195**

d1	n jaolla	lkm/sarja	koodinro.
mm	mm		
1,0-13,0	0,5	25	8,014
1,0-10,5	0,5	24	8,018

Lieriövärtiset
kierukkaporat



Porasarjat



P ● kartiovaippahionta • Gühring porat ovat saatavina myös sarjoina. Kotikäyttöön voidaan toimittaa muovialustilla olevia. Kovempaan käyttöön laaikoissa olevia. Muut tarjouksen mukaan.

Materiaali **HSCO**

Pinta

Leikkusuunta

Lieriövirtiset
kierukkeporat

Artikkelinro.

2049

d1	n jaolla	lkm/sarja	koodinro.
mm	mm		
1,0-13,0	0,5	25	0,014
1,0-10,0	0,5	19	0,013
1,0-10,5	0,5	24	0,018
1,0-5,0	0,1	41	0,011
5,1-10,0	0,1	50	0,012



Porasarjat



P • kartiovaippahionta • Gühring porat ovat saatavina myös sarjoina. Kotikäyttöön voidaan toimittaa muovialustilla olevia. Kovempaan käyttöön laaikoissa olevia. Muut tarjouksen mukaan.

- M** ○
- K** ○
- N** ○
- S** ○
- H** ○

Materiaali **HSCO**

Pinta **M**

Leikkusuunta **R**



Artikkelinro. **2050**

d1	n jaolla	lkm/sarja	koodinro.
mm	mm		
1,0-10,0	0,5	19	0,013
5,1-10,0	0,1	50	0,012

Lieriövärtiset
kierukkaporat



AeroX porasarjat



P	•	optimoitu ristiinhionta • 8%-seostettu HSCO pikateräs • Gühring porat ovat saatavana myös sarjoina. Kotikäyttöön voidaan toimittaa muovialustilla olevia. Kovempaan käyttöön laaikoissa olevia. Muut tarjouksen mukaan.
M	•	
K	•	
N	•	seostamattomat- ja runsaasti seostetut teräkset • valut • ei-rautametallit
S	•	• Titaani ja titaaniseokset
H	○	

Materiaali **M42**

Pinta

Leikkusuunta

Lieriövartiset
kierukkeporatArtikkelinro. **1083**

d1	n jaolla	lkm/sarja	koodinro.
mm	mm		
1,0-13,0	0,5	25	0,014
1,0-10,0	0,5	19	0,013



Porasarjat



Pelkkä kotelo



Artikkelinro.

36

d1 mm	n jaolla mm	lkm/sarja	koodinro.
1,0-13,0			0,214
1,0-10,0			0,213
1,0-5,9			0,215
6,0-10,0			0,216
1,0-10,5			0,218



Porasarjat



Pelkkä kotelo



Lieriövartiset
kierukkeporat

Artikkelinro.

73

d1	n jaolla	lkm/sarja	koodinro.
mm	mm		
1,0-13,0			0,614



Porasarjat



Pelkkä muovipidike



Artikkelinro.

11

d1 mm	n jaolla mm	lkm/sarja	koodinro.
1,0-13,0			0,114
5,1-10,0			0,112
1,0-5,0			0,111
1,0-5,9			0,115
1,0-10,0			0,113
1/16 - 1/2			0,121
1/16 - 1/2			0,122



Erikoisporat KM-kärjellä

Materiaali **KM**

Pinta ○

Leikkusuunta

P ○ Kärjen kevennys $\geq \varnothing 1,700$ • päästöhiottu kärki • kovametallileikkuulla

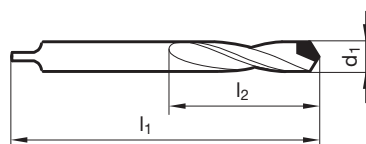
M**K** ○**N**

jousiteräs • kokillivalu yli 300 HB • puhdas molybdeeni • kovat pronssit

S**H** ○

GÜHRING NAVIGATOR

Leikkuarvosivu 776

Artikkelinro. **703**

d1	l1	l2
mm	mm	mm
1,700	45,000	18,000
2,600	50,000	20,000
2,700	50,000	20,000
2,900	50,000	20,000
3,000	50,000	20,000
3,100	56,000	25,000
3,200	56,000	25,000
3,250	56,000	25,000
3,300	56,000	25,000
3,500	56,000	25,000
3,700	56,000	25,000
3,800	56,000	25,000
3,900	56,000	25,000
4,000	56,000	25,000
4,100	63,000	28,000
4,200	63,000	28,000
4,300	63,000	28,000
4,500	63,000	28,000
4,800	63,000	28,000
4,900	63,000	28,000
5,000	63,000	28,000
5,100	71,000	32,000
5,200	71,000	32,000
5,300	71,000	32,000
5,400	71,000	32,000
5,500	71,000	32,000
5,800	71,000	32,000
6,000	71,000	32,000
6,200	71,000	32,000
6,300	71,000	32,000
6,350	71,000	32,000
6,400	71,000	32,000
6,500	71,000	32,000
6,700	80,000	40,000
6,800	80,000	40,000
7,000	80,000	40,000

d1	l1	l2
mm	mm	mm
7,200	80,000	40,000
7,500	80,000	40,000
7,800	80,000	40,000
8,000	80,000	40,000
8,200	90,000	50,000
8,400	90,000	50,000
8,500	90,000	50,000
9,000	90,000	50,000
9,500	90,000	50,000
9,800	100,000	56,000
10,000	100,000	56,000
10,200	100,000	56,000
10,400	100,000	56,000
10,500	100,000	56,000
11,000	100,000	56,000
11,500	112,000	63,000
12,000	112,000	63,000
12,500	112,000	63,000
12,700	112,000	63,000
13,000	112,000	63,000
13,500	125,000	71,000
14,000	125,000	71,000
14,500	125,000	71,000
15,000	125,000	71,000
15,500	140,000	80,000
16,000	140,000	80,000
16,500	140,000	80,000
17,000	140,000	80,000
17,500	160,000	90,000
18,000	160,000	90,000
19,000	160,000	90,000
19,500	160,000	90,000
20,000	160,000	90,000
21,000	160,000	90,000
22,000	160,000	90,000
24,000	170,000	100,000



Erikoisporat KM-kärjellä



P Kärjen kevennys $\geq \varnothing 1,500$ • päästöhiottu kärki • kovametallileikkuulla



N lasikuituvahvistetut muovit • kestopuovitt jotka kuluttavat sekä ohjainreunee ja leikkusuärmää

Materiaali **KM**

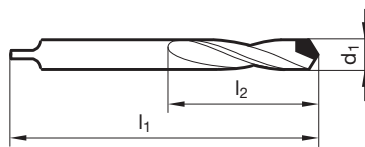
Pinta ○

Leikkusuunta

Lieriövartiset
kierukkaporat

GÜHRING NAVIGATOR

Leikkuarvosivu 776



Artikkelinro. **704**

d1	l1	l2
mm	mm	mm
1,900	45,000	18,000
2,200	45,000	18,000
3,100	56,000	25,000
3,200	56,000	25,000
3,500	56,000	25,000
4,200	63,000	28,000

d1	l1	l2
mm	mm	mm
5,000	63,000	28,000
6,000	71,000	32,000
8,000	80,000	40,000
24,000	170,000	100,000



FK-Porat



P	Kärjen kevennys $\geq \varnothing 2,380$ • kärjen erikoishionta
M	
K	
N	kuituvahvisteiset muovit
S	
H	

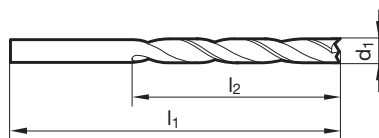
Materiaali **TKM**

Pinta ○

Leikkusuunta

GÜHRING NAVIGATOR

Leikkuarvosivu 776



Artikkelinro. **1149**

d1		l1	l2
mm	inch	mm	mm
2,500		43,000	14,000
3,200		49,000	18,000
3,570	9/64	52,000	20,000
4,000		55,000	22,000
4,760	3/16	62,000	26,000
5,000		62,000	26,000

d1		l1	l2
mm	inch	mm	mm
6,000		66,000	28,000
8,000		79,000	37,000
10,000		89,000	43,000

Lieriövartiset
kierukkeporat



Kovametallikärkiset lappuporat



- P** ○ Kärjen kevennys $\geq \varnothing 3,000$ • päästöhiottu kärki • erikoispora • vaikeissa olosuhteet
- M** □
- K** ○
- N** □ kokillivalu • kova teräs
- S** □
- H** ○

Materiaali **KM**

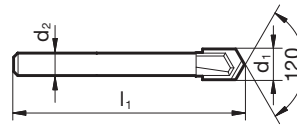
Pinta ○

Leikkusuunta **R**

Lieriövärtiset
kierukkaporat

GÜHRING NAVIGATOR

Leikkuarvosivu 776



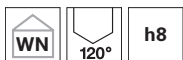
Artikkelinro. **707**

d1	l1	l2
mm	mm	mm
3,000	50,000	
5,000	63,000	
5,500	70,000	
6,000	70,000	
8,000	80,000	
9,000	90,000	

d1	l1	l2
mm	mm	mm
12,000	112,000	

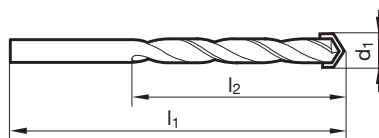


Kiviseinäporat



- P** päästöhiottu kärki • kovametallileikkuulla • pora- ja iskuporakoneille
- M** • tiiliä poratessa ei iskutoimintoa!
- K**
- N** tiili, betoni, keraamiset osat
- S**
- H**

Materiaali	KM
Pinta	○
Leikkusuunta	Ⓜ



Lieriövartiset
kierukkaporat

Artikkelinro. **716**

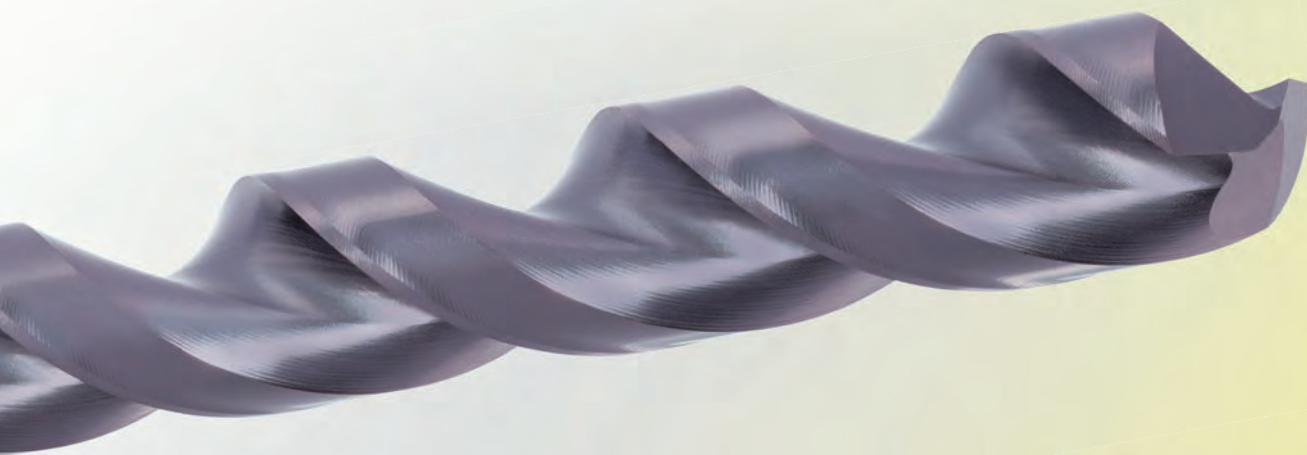
d1	l1	l2
mm	mm	mm
4,000	75,000	40,000
5,000	85,000	50,000
6,000	100,000	60,000
8,000	120,000	80,000
10,000	120,000	80,000
12,000	150,000	90,000

d1	l1	l2
mm	mm	mm



KARTIOVARTISET KIERUKKAPORAT

Kartiovartiset
kierukkaporat





P	M	K	N	S	H	Työkalun kuvaus	Poraus- syvyys	Standardi	Malli	Leikkuu- suunta	Materiaali	Pinta	d1/mm	Artikkeli nro.	Leikkuu- arvosivu	Sivu
Normaaliporat																
•	•	•	•	•	•		~3xD	WN	GV 120	R	HSCO	○	8,100 - 38,000	363	772	448
•	•	•	•	•	•		~3xD	WN	GV 120	R	HSCO	Ⓢ	10,500 - 31,000	663	774	449
Kierukkaporat																
•	•	•	•	•	•		~5xD	DIN 345	N	R	HSS	○ _{2,36}	2,380 - 96,000	245	778	450
•	•	•	•	•	•		~5xD	DIN 345	N	R	HSS	○ _{16,0}	10,000 - 28,000	592	778	454
•	•	•	•	•	•		~5xD	DIN 345	N	R	HSS	Ⓢ	3,000 - 31,000	654	780	455
•	•	•	•	•	•		~5xD	DIN 345	N	L	HSS	○	6,000 - 60,000	248	778	457
•	•	•	•	•	•		~5xD	DIN 345	N	R	HSS	○	8,500 - 59,000	229	778	458
•	•	•	•	•	•		~5xD	DIN 345	H	R	HSS	○	6,700 - 25,250	246	778	459
•	•	•	•	•	•		~5xD	DIN 345	W	R	HSS	○	3,200 - 32,000	247	778	460
•	•	•	•	•	•		~5xD	DIN 345	GT 100	R	HSS	○ _{16,0}	7,940 - 31,750	558	778	461
•	•	•	•	•	•		~5xD	DIN 345	GT 100	R	HSS	Ⓢ	7,940 - 31,500	606	780	462
•	•	•	•	•	•		~5xD	DIN 345	N	R	HSCO	○	4,000 - 50,000	345	780	463
•	•	•	•	•	•		~5xD	DIN 345	N	R	HSCO	Ⓢ	8,000 - 30,000	661	782	465
•	•	•	•	•	•		~5xD	DIN 345	GT 100	R	HSCO	○ _{16,0}	10,000 - 39,000	645	780	466
•	•	•	•	•	•		~5xD	DIN 345	GT 100	R	HSCO	Ⓢ	10,000 - 23,810	662	782	467
•	•	•	•	•	•		~5xD	DIN 345	GT 100	R	HSCO	Ⓒ	10,000 - 30,160	1222	782	468
•	•	•	•	•	•		~5xD	DIN 345	GT 100	R	HSCO	Ⓐ	10,400 - 30,160	1224	782	469
•	•	•	•	•	•		~5xD	DIN 345	VA	R	HSCO	○	10,000 - 34,000	1262	780	470
•	•	•	•	•	•		~5xD	DIN 346	N	R	HSS	○	10,000 - 73,000	251	778	471
•	•	•	•	•	•		~5xD	DIN 346	N	R	HSCO	○	12,000 - 31,500	351	780	472
Pitkät kartiovartiset kierukkaporat																
•	•	•	•	•	•		~10xD	DIN 341	N	R	HSS	○	2,900 - 50,000	257	786	473
•	•	•	•	•	•		~10xD	DIN 341	N	R	HSS	Ⓢ	5,500 - 22,000	655	786	475
•	•	•	•	•	•		~10xD	DIN 341	GT 100	R	HSS	○ _{16,0}	5,500 - 32,000	551	786	476

Kartiovartiset
kierukkaporat



P	M	K	N	S	H	Työkalun kuvaus	Poraus- syvyys	Standardi	Malli	Leikkuu- suunta	Materiaali	Pinta	d1/mm	Artikkeli nro.	Leikkuu- arvosivu	Sivu
•	•	•					~10xD	DIN 341	GT 100	(R)	HSS	Ⓢ	7,000 - 23,000	656	786	478
○		•					~10xD	DIN 341	GT 50	(R)	HSS	○	5,500 - 29,500	505	786	479
•	○	•	•	○			~10xD	DIN 341	N	(R)	HSCO	●	4,750 - 40,000	357	792	480
•	•	•	•	○			~10xD	DIN 341	GT 100	(R)	HSCO	● ^{>0/160}	10,000 - 26,000	623	792	481
•	•	○					~10xD	WN	N	(R)	HSS	●	10,000 - 29,000	523	786	482
Pitkät kartiovartiset kierukkaporat																
•	•	○					~15xD	DIN 1870	N	(R)	HSS	●	8,000 - 50,000	266	788	483
•	•	•					~15xD	DIN 1870	GT 100	(R)	HSS	● ^{>0/160}	8,000 - 30,000	526	790	484
○		•					~15xD	DIN 1870	GT 50	(R)	HSS	○	8,500 - 33,000	525	788	485
•	•	•	•	○			~15xD	DIN 1870	GT 100	(R)	HSCO	● ^{>0/160}	9,520 - 30,000	620	794	486
Erikoispitkät kierukkaporat sarja 1																
•	•	○					~20xD	DIN 1870	N	(R)	HSS	●	8,000 - 45,000	267	788	487
•	•	•					~20xD	DIN 1870	GT 100	(R)	HSS	● ^{>0/160}	8,000 - 30,000	527	790	488
○		•					~20xD	DIN 1870	GT 50	(R)	HSS	○	8,500 - 31,000	542	788	489
•	•	•	•	○			~20xD	DIN 1870	GT 100	(R)	HSCO	● ^{>0/160}	9,520 - 23,420	621	794	490
Erikoispitkät kierukkaporat sarja 2																
•	•	•					>20xD	WN	GT 100	(R)	HSS	●	6,000 - 7,500	563	790	491
•	•	•					>20xD	WN	GT 100	(R)	HSS	●	6,000 - 10,000	564	790	492
•	•	•					>20xD	WN	GT 100	(R)	HSS	● ^{>0/160}	6,000 - 17,000	565	790	493
•	•	•					>20xD	WN	GT 100	(R)	HSS	● ^{>0/160}	8,000 - 40,000	566	790	494
•	•	•					>20xD	WN	GT 100	(R)	HSS	● ^{>0/160}	14,000 - 40,000	293	790	495
•	•	•					>20xD	WN	GT 100	(R)	HSS	○	14,000 - 18,000	298	790	496
•	•	•					>20xD	WN	GT 100	(R)	HSS	○	14,000 - 18,000	299	790	497
Ylipitkät kierukkaporat																
•	○	•	•				~7xD	WN	N	(R)	HSS	●	9,920 - 23,020	269	788	498
Lyhyet jäähdytyskanavaporat																

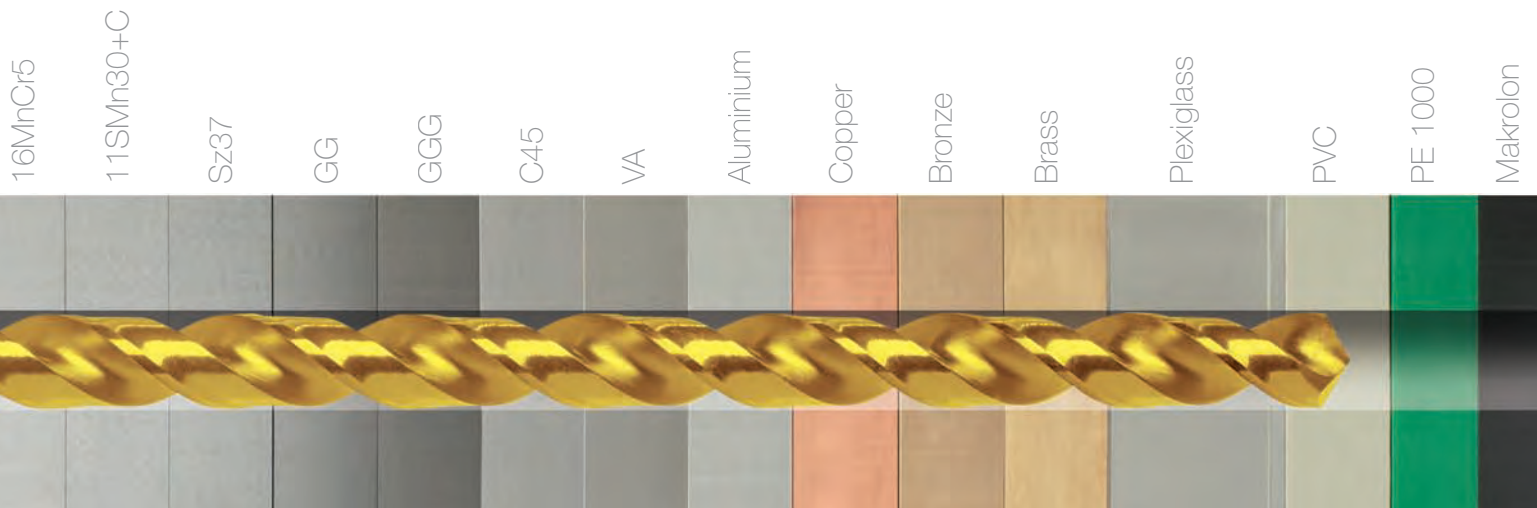
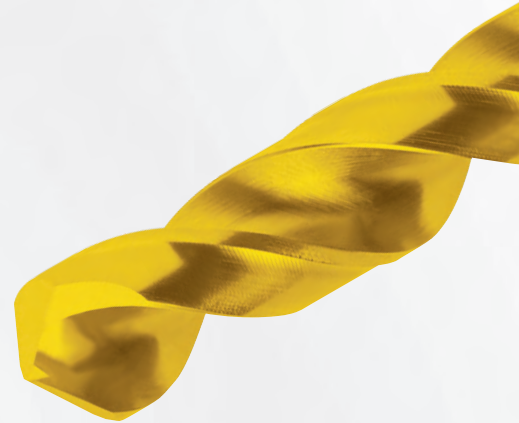
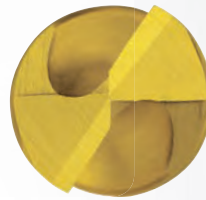


P	M	K	N	S	H	Työkalun kuvaus	Poraus- syvyys	Standardi	Malli	Leikkuu- suunta	Materiaali	Pinta	d1/mm	Artikkeli nro.	Leikkuu- arvosivu	Sivu
Jäähdytyskanavaporat, lastu-ura Tehass stdr.																
•	○	•	•					WN	N	R	HSS	●	8,000 - 50,000	254	788	499
•	○	•	•					WN	N	R	HSS	●	8,000 - 42,000	255	788	500
Jäähdytyskanavaporat, lastu-ura DIN 341																
•	○	•	•				~10xD	WN	N	R	HSS	●	10,000 - 32,000	1101	788	501
•	○	•	•				~10xD	WN	N	R	HSS	●	10,000 - 40,000	270	788	502
•	○	•	•				~10xD	WN	N	R	HSS	●	10,000 - 44,450	271	788	503
•	○	•	•				~10xD	WN	N	R	HSS	●	10,000 - 44,450	272	788	504
•	•	•	•	○			~10xD	WN	GT 100	R	HSCO	●	11,000 - 34,920	370	794	505
•	•	•	•	○			~10xD	WN	GT 100	R	HSCO	●	11,000 - 34,920	371	794	506
•	•	•	•	○			~10xD	WN	GT 100	R	HSCO	●	12,500 - 34,000	372	794	507
Jäähdytyskanavaporat, lastu-ura DIN 1870																
•	•	•	•	○			~15xD	WN	GT 100	R	HSCO	●	11,000 - 34,000	374	794	508
•	•	•	•	○			~15xD	WN	GT 100	R	HSCO	●	11,000 - 34,000	375	794	509
•	•	•	•	○			~15xD	WN	GT 100	R	HSCO	●	11,000 - 29,000	376	794	510
Kartiosokkareiänporat																
•	○	•	○					DIN 1898	N	R	HSS	●	5,000 - 25,000	532		511
Erikoisporat KM-kärjellä																
○	○	○	○					DIN 8041	N	R	HM	○	8,000 - 40,000	705	776	512

GU 500

HSCO-porat yleiskäyttöön

- yleiskäyttöön useimmille materiaaleille
- 4-päästöeroitus erinomaiselle keskitykselle ja erityisen tarkoille rei'ille
- pienet syöttö- ja momenttiarvot johtuen tarkkaan hiotusta geometriasta
- hyvä lastunpoisto lastu-uran muodosta johtuen



GU 500 - yleiskäyttöön useimmille materiaaleille

Rakenne- ja hiilliteräkset · runsaastiseostetut teräkset 850 N/mm² asti · ruostumattomat teräkset · valumateriaalit
ei-rautametallit, Al, Mg-seokset, muovit



TERÄS

~ 3xD
Tehdas stdr.

~ 5xD
DIN 345

~ 10xD
DIN 341

~ 15xD
DIN 1870
R1

No 1

Ø 3,00 - 31,00 mm
Artikkelinro. 654
alkaen sivu 455



No 1

Ø 5,50 - 22,00 mm
Artikkelinro. 655
alkaen sivu 475



Ø 8,00 - 50,00 mm
Artikkelinro. 266
alkaen sivu 483



Ø 8,00 - 30,00 mm
Artikkelinro. 661
alkaen sivu 465



Ø 4,75 - 40,00 mm
Artikkelinro. 357
alkaen sivu 480



Ø 7,94 - 31,50 mm
Artikkelinro. 606
alkaen sivu 462



Ø 7,00 - 23,00 mm
Artikkelinro. 656
alkaen sivu 478



Ø 8,00 - 30,00 mm
Artikkelinro. 526
alkaen sivu 484



Ø 10,00 - 23,81 mm
Artikkelinro. 662
alkaen sivu 467



Ø 10,00 - 26,00 mm
Artikkelinro. 623
alkaen sivu 481



Ø 9,52 - 30,00 mm
Artikkelinro. 620
alkaen sivu 486



No 1

Ø 10,50 - 31,00 mm
Artikkelinro. 663
alkaen sivu 449



~ 10xD
Lastu-ura pituus
DIN 341

~ 15xD
Lastu-ura pituus
DIN 1870 R1

No 1

Ø 10,00 - 32,00 mm
Artikkelinro. 1101
alkaen sivu 501



Ø 11,00 - 34,92 mm
Artikkelinro. 370
alkaen sivu 505



No 1

Ø 11,00 - 34,00 mm
Artikkelinro. 374
alkaen sivu 508





QUICKFINDER

~20xD
DIN 1870
R2

>20xD
Tehdas stdr.
erikoispitkä

No 1 Paras työkalu

Ø 8,00 - 45,00 mm
Artikkelinro. 267
alkaen sivu 487



Malli N, HSS



Malli N, HSCO

Ø 8,00 - 30,00 mm
Artikkelinro. 527
alkaen sivu 488



No 1

Ø 8,00 - 40,00 mm
Artikkelinro. 566
alkaen sivu 494



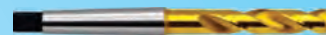
GT100, HSS

No 1

Ø 9,52 - 23,42 mm
Artikkelinro. 621
alkaen sivu 490



GT100, HSCO



GV120, HSCO



Malli N, HSS



GT100, HSCO

RUOSTUMATON
TERÄSTITAANI,
ERIKOIS-SEOKSET~ 3xD
Tehdas stdr.~ 5xD
DIN 345~ 10xD
DIN 341~ 15xD
DIN 1870
R1

No 1 No 1

Ø 10,00 - 34,00 mm
Artikkelinro. 1262
alkaen sivu 470

No 1 No 1

Ø 10,00 - 23,81 mm
Artikkelinro. 662
alkaen sivu 467Ø 10,00 - 26,00 mm
Artikkelinro. 623
alkaen sivu 481

No 1 No 1

Ø 9,52 - 30,00 mm
Artikkelinro. 620
alkaen sivu 486

No 1 No 1

Ø 10,50 - 31,00 mm
Artikkelinro. 663
ab S.449Ø 8,00 - 30,00 mm
Artikkelinro. 661
alkaen sivu 465Ø 4,75 - 40,00 mm
Artikkelinro. 357
alkaen sivu 480~ 10xD
Lastu-ura pituus
DIN 341~ 15xD
Lastu-ura pituus
DIN 1870 R1

No 1 No 1

Ø 11,00 - 34,92 mm
Artikkelinro. 370
alkaen sivu 505

No 1 No 1

Ø 11,00 - 34,00 mm
Artikkelinro. 374
alkaen sivu 508

ilman jäähdytyskanavia

jäähdytyskanavilla

Kartiovartiset kieruk-
kaporat



QUICKFINDER

~20xD
DIN 1870
R2

>20xD
Tehdas stdr.
erikoispitkä

No 1 Paras työkalu
ruostumattomalle teräkselle

No 1 Paras työkalu
erikois- ja Ti-seoksille

No 1 **No 1**

Ø 9,52 - 23,42 mm
Artikkelinro. 621
alkaen sivu 490



Malli VA, HSCO



GT100, HSCO



GV120, HSCO



Malli N, HSCO



GT100, HSCO



K VALURAUTA

~ 3xD
Tehdas stdr.

~ 5xD
DIN 345

~ 10xD
DIN 341

~ 15xD
DIN 1870
R1

No 1

Ø 3,00 - 31,00 mm
Artikkelinro. 654
alkaen sivu 455



No 1

Ø 5,50 - 22,00 mm
Artikkelinro. 655
alkaen sivu 475



Ø 8,00 - 50,00 mm
Artikkelinro. 266
alkaen sivu 483



Ø 8,00 - 30,00 mm
Artikkelinro. 661
alkaen sivu 465



Ø 4,75 - 40,00 mm
Artikkelinro. 357
alkaen sivu 480



Ø 7,94 - 31,50 mm
Artikkelinro. 606
alkaen sivu 462



Ø 7,00 - 23,00 mm
Artikkelinro. 656
alkaen sivu 478



Ø 8,00 - 30,00 mm
Artikkelinro. 526
alkaen sivu 484



Ø 10,00 - 23,81 mm
Artikkelinro. 662
alkaen sivu 467



Ø 10,00 - 26,00 mm
Artikkelinro. 623
alkaen sivu 481



Ø 9,52 - 30,00 mm
Artikkelinro. 620
alkaen sivu 486



No 1

Ø 10,50 - 31,00 mm
Artikkelinro. 663
alkaen sivu 449



~ 10xD
Lastu-ura pituus
DIN 341

~ 15xD
Lastu-ura pituus
DIN 1870 R1

No 1

Ø 10,00 - 32,00 mm
Artikkelinro. 1101
alkaen sivu 501



Ø 11,00 - 34,92 mm
Artikkelinro. 370
alkaen sivu 505



No 1

Ø 11,00 - 34,00 mm
Artikkelinro. 374
alkaen sivu 508





QUICKFINDER

~20xD
DIN 1870
R2

>20xD
Tehdas stdr.
erikoispitkä

No 1 Paras
työkalu

Ø 8,00 - 45,00 mm
Artikkelinro. 267
alkaen sivu 487



Malli N, HSS



Malli N, HSCO

Ø 8,00 - 30,00 mm
Artikkelinro. 527
alkaen sivu 488



No 1

Ø 8,00 - 40,00 mm
Artikkelinro. 566
alkaen sivu 494



GT100, HSS

No 1

Ø 9,52 - 23,42 mm
Artikkelinro. 621
alkaen sivu 490



GT100, HSCO



GV120, HSCO



Malli N, HSS



GT100, HSCO



ALUMIINI, EI-RAUTAMETALLIT, MUOVIT

~ 3xD
Tehdas stdr.

~ 5xD
DIN 345

~ 10xD
DIN 341

~ 15xD
DIN 1870
R1

No 1

Ø 3,20 - 32,00 mm
Artikkelinro. 247
alkaen sivu 460



Malli W pehmeille,
pitkälästusille materiaaleille

No 1

Ø 6,70 - 25,25 mm
Artikkelinro. 246
alkaen sivu 459



Malli H pehmeille,
pitkälästusille materiaaleille

No 1

Ø 5,50 - 29,50 mm
Artikkelinro. 505
alkaen sivu 479



No 1

Ø 8,50 - 33,00 mm
Artikkelinro. 525
alkaen sivu 485



Malli GT50 pehmeille,
pitkälästusille materiaaleille

Ø 7,94 - 31,75 mm
Artikkelinro. 558
alkaen sivu 461



Ø 5,50 - 32,00 mm
Artikkelinro. 551
alkaen sivu 476



Ø 8,00 - 30,00 mm
Artikkelinro. 526
alkaen sivu 484



Ø 10,00 - 39,00 mm
Artikkelinro. 645
alkaen sivu 466



Ø 10,00 - 26,00 mm
Artikkelinro. 623
alkaen sivu 481



Ø 9,52 - 30,00 mm
Artikkelinro. 620
alkaen sivu 486



~ 10xD
Lastu-ura pituus
DIN 341

~ 15xD
Lastu-ura pituus
DIN 1870 R1

No 1

Ø 10,00 - 32,00 mm
Artikkelinro. 1101
alkaen sivu 501



Ø 11,00 - 34,92 mm
Artikkelinro. 370
alkaen sivu 505



No 1

Ø 11,00 - 34,00 mm
Artikkelinro. 374
alkaen sivu 508



ilman jäähdytyskanavia

jäähdytyskanavilla

Kartiovartiset kieruk-
kaporat



QUICKFINDER

~20xD
DIN 1870
R2

>20xD
Tehdas stdr.
erikoispitkä

No 1 Paras työkalu



Malli W, HSS



Malli H, HSS

No 1

Ø 8,50 - 31,00 mm
Artikkelinro. 542
alkaen sivu 489



GT50, HSS

No 1

Ø 8,00 - 30,00 mm
Artikkelinro. 527
alkaen sivu 488



Ø 8,00 - 40,00 mm
Artikkelinro. 566
alkaen sivu 494



GT100, HSS

Ø 9,52 - 23,42 mm
Artikkelinro. 621
alkaen sivu 490



GT100, HSCO



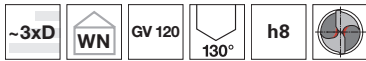
Malli N, HSS



GT100, HSCO



Normaaliporat



P • Kärjen kevennys $\geq \varnothing 7,000$ • kartiovaippahionta • Co-seosteinen pikateräs • parempi kulumiskestävyys

M •

K •

N ○ vaikeasti työstettävälle materiaaleille • ruostumatt.-/haponk.teräkset
• jousiteräkset, austeniittiset teräkset

S •

H ○

GÜHRING NAVIGATOR

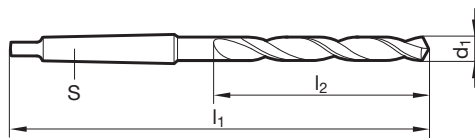
Leikkuuarvosivu 772

Materiaali **HSCO**

Pinta



Leikkusuunta



Artikkelinro.

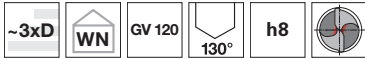
363

d1		S	l1	l2
mm	inch		mm	mm
8,100		MK-1	130,000	49,000
8,200		MK-1	130,000	49,000
8,300		MK-1	130,000	49,000
8,500		MK-1	130,000	49,000
8,600		MK-1	134,000	53,000
8,730	11/32	MK-1	134,000	53,000
9,000		MK-1	134,000	53,000
9,520	3/8	MK-1	138,000	57,000
9,920	25/64	MK-1	138,000	57,000
10,000		MK-1	138,000	57,000
10,100		MK-1	138,000	57,000
10,200		MK-1	138,000	57,000
10,500		MK-1	138,000	57,000
11,000		MK-1	142,000	61,000
11,750		MK-1	142,000	61,000
12,000		MK-1	147,000	66,000
12,500		MK-1	147,000	66,000
12,700	1/2	MK-1	147,000	66,000
13,000		MK-1	147,000	66,000
13,490	17/32	MK-2	168,000	70,000
13,500		MK-2	168,000	70,000
14,000		MK-2	168,000	70,000
14,500		MK-2	172,000	74,000
15,000		MK-2	172,000	74,000
15,500		MK-2	176,000	78,000
16,000		MK-2	176,000	78,000
16,500		MK-2	179,000	81,000
17,000		MK-2	179,000	81,000
17,500		MK-2	183,000	85,000
18,000		MK-2	183,000	85,000

d1		S	l1	l2
mm	inch		mm	mm
18,500		MK-2	186,000	88,000
19,000		MK-2	186,000	88,000
19,450	49/64	MK-3	212,000	91,000
20,000		MK-3	212,000	91,000
20,500		MK-3	216,000	95,000
20,900		MK-3	216,000	95,000
21,000		MK-3	216,000	95,000
21,500		MK-3	219,000	98,000
22,000		MK-3	219,000	98,000
22,220	7/8	MK-3	219,000	98,000
23,000		MK-3	222,000	101,000
23,020	29/32	MK-3	222,000	101,000
24,000		MK-3	225,000	104,000
24,500		MK-3	225,000	104,000
25,000	63/64	MK-3	225,000	104,000
26,000		MK-4	256,000	107,000
26,500		MK-4	256,000	107,000
27,000		MK-4	259,000	110,000
27,500		MK-4	259,000	110,000
28,000		MK-4	259,000	110,000
29,000		MK-4	263,000	114,000
29,370	1 5/32	MK-4	263,000	114,000
30,000		MK-4	263,000	114,000
32,000		MK-4	269,000	120,000
33,000		MK-4	269,000	120,000
37,000		MK-4	276,000	127,000
38,000		MK-5	317,000	130,000



Normaaliporat



P • Kärjen kevennys $\geq \varnothing 9,000$ • kartiovaippahionta • Co-seosteinen pikateräs • parempi kulumiskestävyys

M •

K •

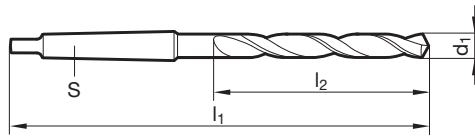
N ○ vaikeasti työstettävälle materiaaleille • ruostumatt./haponk. teräkset
• jousiteräkset, austeniittiset teräkset

S •

H ○

Materiaali **HSCO**Pinta **S**Leikkusuunta **R****GÜHRING** NAVIGATOR

Leikkuarvosivu 774



Artikkelinro.

663Kartiovartiset kieruk-
kaporat

d1		S	l1	l2
mm	inch		mm	mm
10,500		MK-1	138,000	57,000
10,750		MK-1	142,000	61,000
11,500		MK-1	142,000	61,000
12,500		MK-1	147,000	66,000
13,500		MK-2	168,000	70,000
14,000		MK-2	168,000	70,000
14,250		MK-2	172,000	74,000
15,000		MK-2	172,000	74,000
16,000		MK-2	176,000	78,000
16,500		MK-2	179,000	81,000
17,000		MK-2	179,000	81,000
17,500		MK-2	183,000	85,000

d1		S	l1	l2
mm	inch		mm	mm
18,000		MK-2	183,000	85,000
19,000		MK-2	186,000	88,000
20,000		MK-3	212,000	91,000
21,000		MK-3	216,000	95,000
22,000		MK-3	219,000	98,000
23,000		MK-3	222,000	101,000
25,000	63/64	MK-3	225,000	104,000
27,000		MK-4	259,000	110,000
29,000		MK-4	263,000	114,000
30,000		MK-4	263,000	114,000
31,000		MK-4	266,000	117,000



Kierukkaporat

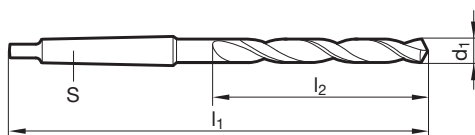
Materiaali **HSS**

Pinta

Leikkusuunta

P • Kärjen kevennys $\geq \varnothing 14,050$ • kartiovaippahionta**N** ○ seostettu-/seostamaton teräs ja valuteräs • harmaavalu-, taottava- ja pallografiittivalurauta • sintrattu pulveriteräs, uushopea ja grafiitti**GÜHRING** NAVIGATOR

Leikkuuarvosivu 778

Artikkelinno. **245**

d1		S	l1	l2
mm	inch		mm	mm
2,380	3/32	MK-1	111,000	30,000
2,400		MK-1	111,000	30,000
2,450		MK-1	111,000	30,000
2,500		MK-1	111,000	30,000
2,650		MK-1	111,000	30,000
2,780	7/64	MK-1	114,000	33,000
2,900		MK-1	114,000	33,000
3,000		MK-1	114,000	33,000
3,050		MK-1	117,000	36,000
3,170	1/8	MK-1	117,000	36,000
3,200		MK-1	117,000	36,000
3,250		MK-1	117,000	36,000
3,300		MK-1	117,000	36,000
3,450		MK-1	120,000	39,000
3,500		MK-1	120,000	39,000
3,570	9/64	MK-1	120,000	39,000
3,600		MK-1	120,000	39,000
3,970	5/32	MK-1	124,000	43,000
4,000		MK-1	124,000	43,000
4,200		MK-1	124,000	43,000
4,250		MK-1	124,000	43,000
4,300		MK-1	128,000	47,000
4,370	11/64	MK-1	128,000	47,000
4,400		MK-1	128,000	47,000
4,500		MK-1	128,000	47,000
4,600		MK-1	128,000	47,000
4,750		MK-1	128,000	47,000
4,760	3/16	MK-1	133,000	52,000
4,800		MK-1	133,000	52,000
5,000		MK-1	133,000	52,000
5,100		MK-1	133,000	52,000
5,160	13/64	MK-1	133,000	52,000
5,200		MK-1	133,000	52,000
5,250		MK-1	133,000	52,000
5,300		MK-1	133,000	52,000
5,500		MK-1	138,000	57,000
5,560	7/32	MK-1	138,000	57,000
5,600		MK-1	138,000	57,000
5,700		MK-1	138,000	57,000
5,750		MK-1	138,000	57,000
5,800		MK-1	138,000	57,000
5,900		MK-1	138,000	57,000

d1		S	l1	l2
mm	inch		mm	mm
5,950	15/64	MK-1	138,000	57,000
6,000		MK-1	138,000	57,000
6,050		MK-1	144,000	63,000
6,100		MK-1	144,000	63,000
6,200		MK-1	144,000	63,000
6,300		MK-1	144,000	63,000
6,350	1/4	MK-1	144,000	63,000
6,400		MK-1	144,000	63,000
6,500		MK-1	144,000	63,000
6,600		MK-1	144,000	63,000
6,700		MK-1	144,000	63,000
6,750	17/64	MK-1	150,000	69,000
6,800		MK-1	150,000	69,000
6,900		MK-1	150,000	69,000
7,000		MK-1	150,000	69,000
7,140	9/32	MK-1	150,000	69,000
7,200		MK-1	150,000	69,000
7,250		MK-1	150,000	69,000
7,300		MK-1	150,000	69,000
7,400		MK-1	150,000	69,000
7,500		MK-1	150,000	69,000
7,540	19/64	MK-1	156,000	75,000
7,600		MK-1	156,000	75,000
7,700		MK-1	156,000	75,000
7,750		MK-1	156,000	75,000
7,800		MK-1	156,000	75,000
7,900		MK-1	156,000	75,000
7,940	5/16	MK-1	156,000	75,000
8,000		MK-1	156,000	75,000
8,050		MK-1	156,000	75,000
8,100		MK-1	156,000	75,000
8,200		MK-1	156,000	75,000
8,250		MK-1	156,000	75,000
8,300		MK-1	156,000	75,000
8,330	21/64	MK-1	156,000	75,000
8,400		MK-1	156,000	75,000
8,500		MK-1	156,000	75,000
8,600		MK-1	162,000	81,000
8,700		MK-1	162,000	81,000
8,730	11/32	MK-1	162,000	81,000
8,750		MK-1	162,000	81,000
8,800		MK-1	162,000	81,000



d1		S	I1	I2
mm	inch		mm	mm
8,900		MK-1	162,000	81,000
9,000		MK-1	162,000	81,000
9,050		MK-1	162,000	81,000
9,100		MK-1	162,000	81,000
9,130	23/64	MK-1	162,000	81,000
9,200		MK-1	162,000	81,000
9,250		MK-1	162,000	81,000
9,300		MK-1	162,000	81,000
9,500		MK-1	162,000	81,000
9,520	3/8	MK-1	168,000	87,000
9,750		MK-1	168,000	87,000
9,800		MK-1	168,000	87,000
9,900		MK-1	168,000	87,000
9,920	25/64	MK-1	168,000	87,000
10,000		MK-1	168,000	87,000
10,100		MK-1	168,000	87,000
10,200		MK-1	168,000	87,000
10,250		MK-1	168,000	87,000
10,300		MK-1	168,000	87,000
10,320	13/32	MK-1	168,000	87,000
10,400		MK-1	168,000	87,000
10,500		MK-1	168,000	87,000
10,520		MK-1	168,000	87,000
10,600		MK-1	168,000	87,000
10,700		MK-1	175,000	94,000
10,720	27/64	MK-1	175,000	94,000
10,750		MK-1	175,000	94,000
10,800		MK-1	175,000	94,000
10,900		MK-1	175,000	94,000
11,000		MK-1	175,000	94,000
11,100		MK-1	175,000	94,000
11,110	7/16	MK-1	175,000	94,000
11,200		MK-1	175,000	94,000
11,250		MK-1	175,000	94,000
11,300		MK-1	175,000	94,000
11,500		MK-1	175,000	94,000
11,600		MK-1	175,000	94,000
11,700		MK-1	175,000	94,000
11,750		MK-1	175,000	94,000
11,800		MK-1	175,000	94,000
11,900		MK-1	182,000	101,000
11,910	15/32	MK-1	182,000	101,000
12,000		MK-1	182,000	101,000
12,100		MK-1	182,000	101,000
12,200		MK-1	182,000	101,000
12,250		MK-1	182,000	101,000
12,300	31/64	MK-1	182,000	101,000
12,500		MK-1	182,000	101,000
12,550		MK-1	182,000	101,000
12,600		MK-1	182,000	101,000
12,700	1/2	MK-1	182,000	101,000
12,750		MK-1	182,000	101,000
12,800		MK-1	182,000	101,000
12,900		MK-1	182,000	101,000
13,000		MK-1	182,000	101,000
13,100	33/64	MK-1	182,000	101,000
13,200		MK-1	182,000	101,000
13,250		MK-1	189,000	108,000
13,300		MK-1	189,000	108,000
13,490	17/32	MK-1	189,000	108,000
13,500		MK-1	189,000	108,000
13,600		MK-1	189,000	108,000
13,700		MK-1	189,000	108,000
13,750		MK-1	189,000	108,000
13,800		MK-1	189,000	108,000
13,890	35/64	MK-1	189,000	108,000
14,000		MK-1	189,000	108,000
14,050		MK-2	212,000	114,000
14,100		MK-2	212,000	114,000
14,200		MK-2	212,000	114,000
14,250		MK-2	212,000	114,000
14,290	9/16	MK-2	212,000	114,000

d1		S	I1	I2
mm	inch		mm	mm
14,300		MK-2	212,000	114,000
14,400		MK-2	212,000	114,000
14,500		MK-2	212,000	114,000
14,600		MK-2	212,000	114,000
14,680	37/64	MK-2	212,000	114,000
14,700		MK-2	212,000	114,000
14,750		MK-2	212,000	114,000
14,800		MK-2	212,000	114,000
14,900		MK-2	212,000	114,000
15,000		MK-2	212,000	114,000
15,080	19/32	MK-2	218,000	120,000
15,100		MK-2	218,000	120,000
15,200		MK-2	218,000	120,000
15,250		MK-2	218,000	120,000
15,300		MK-2	218,000	120,000
15,400		MK-2	218,000	120,000
15,500		MK-2	218,000	120,000
15,600		MK-2	218,000	120,000
15,700		MK-2	218,000	120,000
15,750		MK-2	218,000	120,000
15,800		MK-2	218,000	120,000
15,870	5/8	MK-2	218,000	120,000
15,900		MK-2	218,000	120,000
16,000		MK-2	218,000	120,000
16,100		MK-2	223,000	125,000
16,200		MK-2	223,000	125,000
16,250		MK-2	223,000	125,000
16,270	41/64	MK-2	223,000	125,000
16,300		MK-2	223,000	125,000
16,400		MK-2	223,000	125,000
16,500		MK-2	223,000	125,000
16,670	21/32	MK-2	223,000	125,000
16,700		MK-2	223,000	125,000
16,750		MK-2	223,000	125,000
16,800		MK-2	223,000	125,000
17,000		MK-2	223,000	125,000
17,070	43/64	MK-2	228,000	130,000
17,100		MK-2	228,000	130,000
17,250		MK-2	228,000	130,000
17,300		MK-2	228,000	130,000
17,400		MK-2	228,000	130,000
17,460	11/16	MK-2	228,000	130,000
17,500		MK-2	228,000	130,000
17,600		MK-2	228,000	130,000
17,700		MK-2	228,000	130,000
17,750		MK-2	228,000	130,000
17,800		MK-2	228,000	130,000
17,860	45/64	MK-2	228,000	130,000
17,900		MK-2	228,000	130,000
18,000		MK-2	228,000	130,000
18,100		MK-2	233,000	135,000
18,200		MK-2	233,000	135,000
18,250		MK-2	233,000	135,000
18,260	23/32	MK-2	233,000	135,000
18,300		MK-2	233,000	135,000
18,500		MK-2	233,000	135,000
18,650	47/64	MK-2	233,000	135,000
18,750		MK-2	233,000	135,000
18,800		MK-2	233,000	135,000
18,900		MK-2	233,000	135,000
19,000		MK-2	233,000	135,000
19,050	3/4	MK-2	238,000	140,000
19,100		MK-2	238,000	140,000
19,200		MK-2	238,000	140,000
19,250		MK-2	238,000	140,000
19,450	49/64	MK-2	238,000	140,000
19,500		MK-2	238,000	140,000
19,700		MK-2	238,000	140,000
19,750		MK-2	238,000	140,000
19,800		MK-2	238,000	140,000
19,840	25/32	MK-2	238,000	140,000
20,000		MK-2	238,000	140,000



d1		S	l1	l2
mm	inch		mm	mm
20,100		MK-2	243,000	145,000
20,200		MK-2	243,000	145,000
20,250		MK-2	243,000	145,000
20,300		MK-2	243,000	145,000
20,400		MK-2	243,000	145,000
20,500		MK-2	243,000	145,000
20,640	13/16	MK-2	243,000	145,000
20,750		MK-2	243,000	145,000
21,000		MK-2	243,000	145,000
21,030	53/64	MK-2	243,000	145,000
21,100		MK-2	243,000	145,000
21,200		MK-2	243,000	145,000
21,250		MK-2	248,000	150,000
21,430	27/32	MK-2	248,000	150,000
21,500		MK-2	248,000	150,000
21,750		MK-2	248,000	150,000
21,830	55/64	MK-2	248,000	150,000
22,000		MK-2	248,000	150,000
22,100		MK-2	248,000	150,000
22,200		MK-2	248,000	150,000
22,220	7/8	MK-2	248,000	150,000
22,250		MK-2	248,000	150,000
22,400		MK-2	248,000	150,000
22,500		MK-2	253,000	155,000
22,620	57/64	MK-2	253,000	155,000
22,750		MK-2	253,000	155,000
23,000		MK-2	253,000	155,000
23,020	29/32	MK-2	253,000	155,000
23,250		MK-3	276,000	155,000
23,420	59/64	MK-3	276,000	155,000
23,500		MK-3	276,000	155,000
23,750		MK-3	281,000	160,000
23,810	15/16	MK-3	281,000	160,000
23,900		MK-3	281,000	160,000
24,000		MK-3	281,000	160,000
24,100		MK-3	281,000	160,000
24,210	61/64	MK-3	281,000	160,000
24,250		MK-3	281,000	160,000
24,500		MK-3	281,000	160,000
24,610	31/32	MK-3	281,000	160,000
24,750		MK-3	281,000	160,000
25,000	63/64	MK-3	281,000	160,000
25,100		MK-3	286,000	165,000
25,200		MK-3	286,000	165,000
25,250		MK-3	286,000	165,000
25,400	1	MK-3	286,000	165,000
25,500		MK-3	286,000	165,000
25,750		MK-3	286,000	165,000
25,800	1 1/64	MK-3	286,000	165,000
26,000		MK-3	286,000	165,000
26,190	1 1/32	MK-3	286,000	165,000
26,250		MK-3	286,000	165,000
26,500		MK-3	286,000	165,000
26,590	1 3/64	MK-3	291,000	170,000
26,750		MK-3	291,000	170,000
26,990	1 1/16	MK-3	291,000	170,000
27,000		MK-3	291,000	170,000
27,500		MK-3	291,000	170,000
27,750		MK-3	291,000	170,000
27,780	1 3/32	MK-3	291,000	170,000
28,000		MK-3	291,000	170,000
28,250		MK-3	296,000	175,000
28,500		MK-3	296,000	175,000
28,570	1 1/8	MK-3	296,000	175,000
28,750		MK-3	296,000	175,000
29,000		MK-3	296,000	175,000
29,250		MK-3	296,000	175,000
29,500		MK-3	296,000	175,000
29,750		MK-3	296,000	175,000
30,000		MK-3	296,000	175,000
30,100		MK-3	301,000	180,000
30,160	1 3/16	MK-3	301,000	180,000

d1		S	l1	l2
mm	inch		mm	mm
30,250		MK-3	301,000	180,000
30,500		MK-3	301,000	180,000
30,560	1 13/64	MK-3	301,000	180,000
30,750		MK-3	301,000	180,000
31,000		MK-3	301,000	180,000
31,250		MK-3	301,000	180,000
31,500		MK-3	301,000	180,000
31,750	1 1/4	MK-3	306,000	185,000
32,000		MK-4	334,000	185,000
32,150	1 17/64	MK-4	334,000	185,000
32,250		MK-4	334,000	185,000
32,500		MK-4	334,000	185,000
32,750		MK-4	334,000	185,000
33,000		MK-4	334,000	185,000
33,340	1 5/16	MK-4	334,000	185,000
33,500		MK-4	334,000	185,000
34,000		MK-4	339,000	190,000
34,500		MK-4	339,000	190,000
34,750		MK-4	339,000	190,000
34,920	1 3/8	MK-4	339,000	190,000
35,000		MK-4	339,000	190,000
35,500		MK-4	339,000	190,000
36,000		MK-4	344,000	195,000
36,500		MK-4	344,000	195,000
36,750		MK-4	344,000	195,000
37,000		MK-4	344,000	195,000
37,310	1 15/32	MK-4	344,000	195,000
37,500		MK-4	344,000	195,000
37,700	1 31/64	MK-4	349,000	200,000
38,000		MK-4	349,000	200,000
38,100	1 1/2	MK-4	349,000	200,000
38,500	1 33/64	MK-4	349,000	200,000
39,000		MK-4	349,000	200,000
39,500		MK-4	349,000	200,000
39,690	1 9/16	MK-4	349,000	200,000
40,000		MK-4	349,000	200,000
40,500		MK-4	354,000	205,000
40,750		MK-4	354,000	205,000
40,800		MK-4	354,000	205,000
41,000		MK-4	354,000	205,000
41,270	1 5/8	MK-4	354,000	205,000
41,500		MK-4	354,000	205,000
42,000		MK-4	354,000	205,000
42,500		MK-4	354,000	205,000
43,000		MK-4	359,000	210,000
43,500		MK-4	359,000	210,000
44,000		MK-4	359,000	210,000
44,450	1 3/4	MK-4	359,000	210,000
44,500		MK-4	359,000	210,000
45,000		MK-4	359,000	210,000
45,500		MK-4	364,000	215,000
46,000		MK-4	364,000	215,000
46,430	1 53/64	MK-4	364,000	215,000
46,500		MK-4	364,000	215,000
47,000		MK-4	364,000	215,000
47,230	1 55/64	MK-4	364,000	215,000
47,500		MK-4	364,000	215,000
47,620	1 7/8	MK-4	369,000	220,000
48,000		MK-4	369,000	220,000
48,020	1 57/64	MK-4	369,000	220,000
48,500		MK-4	369,000	220,000
48,820	1 59/64	MK-4	369,000	220,000
49,000		MK-4	369,000	220,000
49,500		MK-4	369,000	220,000
49,610	1 61/64	MK-4	369,000	220,000
50,000		MK-4	369,000	220,000
50,500		MK-4	374,000	225,000
50,800	2	MK-4	374,000	225,000
51,000		MK-5	412,000	225,000
52,000		MK-5	412,000	225,000
53,000		MK-5	412,000	225,000
53,390		MK-5	417,000	230,000



d1		S	l1	l2
mm	inch		mm	mm
53,400		MK-5	417,000	230,000
54,000		MK-5	417,000	230,000
55,000		MK-5	417,000	230,000
56,000		MK-5	417,000	230,000
57,000		MK-5	422,000	235,000
58,000		MK-5	422,000	235,000
59,000		MK-5	422,000	235,000
60,000		MK-5	422,000	235,000
61,000		MK-5	427,000	240,000
62,000		MK-5	427,000	240,000
63,000		MK-5	427,000	240,000
63,500	2 1/2	MK-5	432,000	245,000
65,000		MK-5	432,000	245,000
66,670	2 5/8	MK-5	432,000	245,000
67,500		MK-5	437,000	250,000
68,000		MK-5	437,000	250,000
69,850	2 3/4	MK-5	437,000	250,000
70,000		MK-5	437,000	250,000

d1		S	l1	l2
mm	inch		mm	mm
71,500		MK-5	442,000	255,000
72,000		MK-5	442,000	255,000
75,000		MK-5	442,000	255,000
76,990	3 1/32	MK-6	514,000	260,000
77,000		MK-6	514,000	260,000
77,790	3 1/16	MK-6	514,000	260,000
78,580	3 3/32	MK-6	514,000	260,000
79,500		MK-6	514,000	260,000
87,310	3 7/16	MK-6	524,000	270,000
89,000		MK-6	524,000	270,000
92,500		MK-6	529,000	275,000
93,000		MK-6	529,000	275,000
94,000		MK-6	529,000	275,000
94,500		MK-6	529,000	275,000
95,250	3 3/4	MK-6	534,000	280,000
95,500		MK-6	534,000	280,000
96,000		MK-6	534,000	280,000



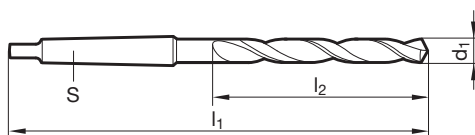
Kierukkaporat

Materiaali **HSS**Pinta  $\frac{>0}{16,0}$ Leikkusuunta 

P • Kärjen kevennys $\geq \varnothing 10,000$ • kartiovaippahionta • vaativaan käyttöön terästeollisuudessa

M**K** •**N** ○ seostettu-/seostamaton teräs ja valuteräs**S****H****GÜHRING** NAVIGATOR

Leikkuarvosivu 778

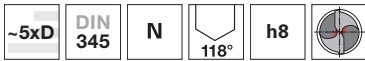
Artikkelinro. **592**

d1		S	l1	l2
mm	inch		mm	mm
10,000		MK-1	168,000	87,000
10,320	13/32	MK-1	168,000	87,000
11,000		MK-1	175,000	94,000
11,110	7/16	MK-1	175,000	94,000
11,500		MK-1	175,000	94,000
11,910	15/32	MK-1	182,000	101,000
12,000		MK-1	182,000	101,000
12,700	1/2	MK-1	182,000	101,000
13,000		MK-1	182,000	101,000
13,490	17/32	MK-1	189,000	108,000
13,500		MK-1	189,000	108,000
14,000		MK-1	189,000	108,000

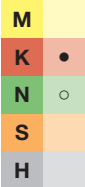
d1		S	l1	l2
mm	inch		mm	mm
14,290	9/16	MK-2	212,000	114,000
15,080	19/32	MK-2	218,000	120,000
17,000		MK-2	223,000	125,000
18,000		MK-2	228,000	130,000
19,050	3/4	MK-2	238,000	140,000
19,840	25/32	MK-2	238,000	140,000
20,000		MK-2	238,000	140,000
21,430	27/32	MK-2	248,000	150,000
22,000		MK-2	248,000	150,000
23,000		MK-2	253,000	155,000
28,000		MK-3	291,000	170,000



Kierukkaporat

Materiaali **HSS**Pinta **S**Leikkusuunta **R**

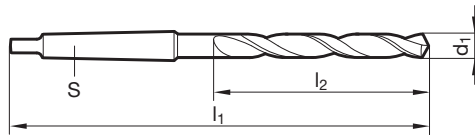
P • Kärjen kevennys $\geq \varnothing 3,000$ • kartiovaippahionta



N ○ seostettu-/seostamaton teräs ja valuteräs • harmaavalu-, taottava- ja pallografiittivalurauta • sintrattu pulveriteräs, uushopea ja grafiitti

GÜHRING NAVIGATOR

Leikkuarvosivu 780



Artikkelinro.

654

d1		S	l1	l2	d1		S	l1	l2
mm	inch		mm	mm	mm	inch		mm	mm
3,000		MK-1	114,000	33,000	11,110	7/16	MK-1	175,000	94,000
3,170	1/8	MK-1	117,000	36,000	11,200		MK-1	175,000	94,000
3,500		MK-1	120,000	39,000	11,250		MK-1	175,000	94,000
3,970	5/32	MK-1	124,000	43,000	11,500		MK-1	175,000	94,000
4,000		MK-1	124,000	43,000	11,510	29/64	MK-1	175,000	94,000
4,100		MK-1	124,000	43,000	11,750		MK-1	175,000	94,000
4,370	11/64	MK-1	128,000	47,000	11,910	15/32	MK-1	182,000	101,000
4,500		MK-1	128,000	47,000	12,000		MK-1	182,000	101,000
4,760	3/16	MK-1	133,000	52,000	12,200		MK-1	182,000	101,000
5,000		MK-1	133,000	52,000	12,400		MK-1	182,000	101,000
5,160	13/64	MK-1	133,000	52,000	12,500		MK-1	182,000	101,000
5,560	7/32	MK-1	138,000	57,000	12,700	1/2	MK-1	182,000	101,000
6,000		MK-1	138,000	57,000	12,750		MK-1	182,000	101,000
6,500		MK-1	144,000	63,000	13,000		MK-1	182,000	101,000
6,750	17/64	MK-1	150,000	69,000	13,250		MK-1	189,000	108,000
6,800		MK-1	150,000	69,000	13,490	17/32	MK-1	189,000	108,000
7,000		MK-1	150,000	69,000	13,500		MK-1	189,000	108,000
7,100		MK-1	150,000	69,000	13,890	35/64	MK-1	189,000	108,000
7,140	9/32	MK-1	150,000	69,000	14,000		MK-1	189,000	108,000
7,400		MK-1	150,000	69,000	14,200		MK-2	212,000	114,000
7,700		MK-1	156,000	75,000	14,250		MK-2	212,000	114,000
8,000		MK-1	156,000	75,000	14,290	9/16	MK-2	212,000	114,000
8,500		MK-1	156,000	75,000	14,500		MK-2	212,000	114,000
8,730	11/32	MK-1	162,000	81,000	14,680	37/64	MK-2	212,000	114,000
8,800		MK-1	162,000	81,000	14,750		MK-2	212,000	114,000
9,000		MK-1	162,000	81,000	14,900		MK-2	212,000	114,000
9,400		MK-1	162,000	81,000	15,000		MK-2	212,000	114,000
9,520	3/8	MK-1	168,000	87,000	15,250		MK-2	218,000	120,000
9,600		MK-1	168,000	87,000	15,500		MK-2	218,000	120,000
9,750		MK-1	168,000	87,000	15,750		MK-2	218,000	120,000
9,800		MK-1	168,000	87,000	15,870	5/8	MK-2	218,000	120,000
10,000		MK-1	168,000	87,000	16,000		MK-2	218,000	120,000
10,200		MK-1	168,000	87,000	16,200		MK-2	223,000	125,000
10,250		MK-1	168,000	87,000	16,500		MK-2	223,000	125,000
10,300		MK-1	168,000	87,000	17,000		MK-2	223,000	125,000
10,320	13/32	MK-1	168,000	87,000	17,070	43/64	MK-2	228,000	130,000
10,400		MK-1	168,000	87,000	17,250		MK-2	228,000	130,000
10,500		MK-1	168,000	87,000	17,500		MK-2	228,000	130,000
10,720	27/64	MK-1	175,000	94,000	17,750		MK-2	228,000	130,000
10,750		MK-1	175,000	94,000	18,000		MK-2	228,000	130,000
10,800		MK-1	175,000	94,000	18,250		MK-2	233,000	135,000
11,000		MK-1	175,000	94,000	18,260	23/32	MK-2	233,000	135,000

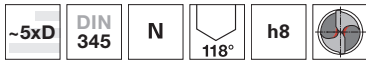


d1		S	l1	l2
mm	inch		mm	mm
18,500		MK-2	233,000	135,000
18,650	47/64	MK-2	233,000	135,000
19,000		MK-2	233,000	135,000
19,050	3/4	MK-2	238,000	140,000
19,450	49/64	MK-2	238,000	140,000
19,500		MK-2	238,000	140,000
19,750		MK-2	238,000	140,000
19,840	25/32	MK-2	238,000	140,000
20,000		MK-2	238,000	140,000
20,250		MK-2	243,000	145,000
20,500		MK-2	243,000	145,000
20,640	13/16	MK-2	243,000	145,000
20,750		MK-2	243,000	145,000
21,000		MK-2	243,000	145,000
21,250		MK-2	248,000	150,000
21,500		MK-2	248,000	150,000
21,750		MK-2	248,000	150,000
21,830	55/64	MK-2	248,000	150,000
22,000		MK-2	248,000	150,000
22,220	7/8	MK-2	248,000	150,000
22,500		MK-2	253,000	155,000
23,000		MK-2	253,000	155,000
23,500		MK-3	276,000	155,000
23,750		MK-3	281,000	160,000

d1		S	l1	l2
mm	inch		mm	mm
24,000		MK-3	281,000	160,000
24,500		MK-3	281,000	160,000
24,750		MK-3	281,000	160,000
25,000	63/64	MK-3	281,000	160,000
25,400	1	MK-3	286,000	165,000
25,500		MK-3	286,000	165,000
26,000		MK-3	286,000	165,000
26,500		MK-3	286,000	165,000
26,990	1 1/16	MK-3	291,000	170,000
27,000		MK-3	291,000	170,000
27,380	1 5/64	MK-3	291,000	170,000
28,000		MK-3	291,000	170,000
28,500		MK-3	296,000	175,000
28,570	1 1/8	MK-3	296,000	175,000
29,000		MK-3	296,000	175,000
29,500		MK-3	296,000	175,000
29,750		MK-3	296,000	175,000
30,000		MK-3	296,000	175,000
30,500		MK-3	301,000	180,000
31,000		MK-3	301,000	180,000



Kierukkaporat

Materiaali **HSS**

Pinta



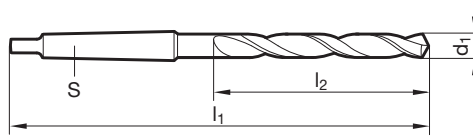
Leikkusuunta



P • Kärjen kevennys $\geq \emptyset$ 14,750 • kartiovaippahionta

M**K** •**N** ○ seostettu-/seostamaton teräs ja valuteräs • harmaavalu-, taottava- ja pallografiittivalurauta • sintrattu pulveriteräs, uushopea ja grafiitti**S****H****GÜHRING** NAVIGATOR

Leikkuarvosivu 778



Artikkelinro.

248Kartiovartiset
kierukkaporat

d1		S	l1	l2
mm	inch		mm	mm
6,000		MK-1	138,000	57,000
8,000		MK-1	156,000	75,000
8,100		MK-1	156,000	75,000
8,400		MK-1	156,000	75,000
8,500		MK-1	156,000	75,000
9,000		MK-1	162,000	81,000
10,500		MK-1	168,000	87,000
11,000		MK-1	175,000	94,000
11,500		MK-1	175,000	94,000
13,000		MK-1	182,000	101,000
14,000		MK-1	189,000	108,000
15,000		MK-2	212,000	114,000
17,200		MK-2	228,000	130,000
18,000		MK-2	228,000	130,000
20,000		MK-2	238,000	140,000
20,500		MK-2	243,000	145,000
25,500		MK-3	286,000	165,000
28,000		MK-3	291,000	170,000

d1		S	l1	l2
mm	inch		mm	mm
29,000		MK-3	296,000	175,000
30,500		MK-3	301,000	180,000
32,500		MK-4	334,000	185,000
33,000		MK-4	334,000	185,000
34,000		MK-4	339,000	190,000
38,000		MK-4	349,000	200,000
40,000		MK-4	349,000	200,000
60,000		MK-5	422,000	235,000



Kierukkaporat



P • Kärjen kevennys $\geq \varnothing 8,500$ • kartiovaippahionta • parempi lastun katkeaminen • erityisesti pyörivätyökäly- ja monikarakoneille joissa vähän lastutilaa

K •
N ○ pitkälästäiset materiaalit

S
H

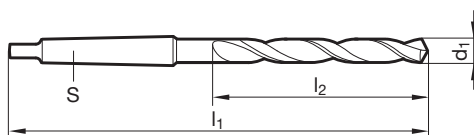
GÜHRING NAVIGATOR

Leikkuuarvosivu 778

Materiaali **HSS**

Pinta

Leikkusuunta



Artikkelinro.

229

d1		S	l1	l2
mm	inch		mm	mm
8,500		MK-1	156,000	75,000
8,730	11/32	MK-1	162,000	81,000
9,000		MK-1	162,000	81,000
9,500		MK-1	162,000	81,000
9,520	3/8	MK-1	168,000	87,000
11,000		MK-1	175,000	94,000
11,910	15/32	MK-1	182,000	101,000
12,250		MK-1	182,000	101,000
12,500		MK-1	182,000	101,000
13,000		MK-1	182,000	101,000
13,250		MK-1	189,000	108,000
13,490	17/32	MK-1	189,000	108,000
14,000		MK-1	189,000	108,000
14,290	9/16	MK-2	212,000	114,000
14,500		MK-2	212,000	114,000
15,000		MK-2	212,000	114,000
15,080	19/32	MK-2	218,000	120,000
16,000		MK-2	218,000	120,000
18,000		MK-2	228,000	130,000
18,250		MK-2	233,000	135,000
19,500		MK-2	238,000	140,000
19,840	25/32	MK-2	238,000	140,000
20,000		MK-2	238,000	140,000
20,640	13/16	MK-2	243,000	145,000

d1		S	l1	l2
mm	inch		mm	mm
21,000		MK-2	243,000	145,000
22,000		MK-2	248,000	150,000
22,220	7/8	MK-2	248,000	150,000
23,810	15/16	MK-3	281,000	160,000
25,000	63/64	MK-3	281,000	160,000
25,400	1	MK-3	286,000	165,000
26,000		MK-3	286,000	165,000
26,190	1 1/32	MK-3	286,000	165,000
26,500		MK-3	286,000	165,000
35,000		MK-4	339,000	190,000
39,500		MK-4	349,000	200,000
42,500		MK-4	354,000	205,000
43,500		MK-4	359,000	210,000
46,040	1 13/16	MK-4	364,000	215,000
46,500		MK-4	364,000	215,000
47,500		MK-4	364,000	215,000
56,000		MK-5	417,000	230,000
57,000		MK-5	422,000	235,000
58,000		MK-5	422,000	235,000
59,000		MK-5	422,000	235,000



Kierukkaporat

Materiaali **HSS**

Pinta



Leikkusuunta



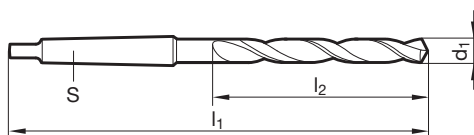
P Kärjen kevennys $\geq \varnothing 14,500$ • kartiovaippahionta

M**K****N** •

kovat ja hauraat materiaalit • messinki, magnesium seokset • pronssi, fosforipronssi • liuskekivi, mico, pertinax

S**H****GÜHRING** NAVIGATOR

Leikkuarvosivu 778



Artikkelinro.

246

d1		S	l1	l2
mm	inch		mm	mm
6,700		MK-1	144,000	63,000
8,200		MK-1	156,000	75,000
11,000		MK-1	175,000	94,000
11,750		MK-1	175,000	94,000
12,600		MK-1	182,000	101,000
12,800		MK-1	182,000	101,000
13,750		MK-1	189,000	108,000
14,500		MK-2	212,000	114,000
15,000		MK-2	212,000	114,000
15,500		MK-2	218,000	120,000
16,000		MK-2	218,000	120,000
16,500		MK-2	223,000	125,000

d1		S	l1	l2
mm	inch		mm	mm
17,000		MK-2	223,000	125,000
20,500		MK-2	243,000	145,000
22,000		MK-2	248,000	150,000
22,250		MK-2	248,000	150,000
23,000		MK-2	253,000	155,000
25,000	63/64	MK-3	281,000	160,000
25,250		MK-3	286,000	165,000



Kierukkaporat

Materiaali **HSS**

Pinta ○

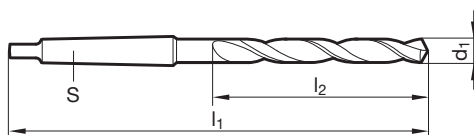
Leikkusuunta

P Kärjen kevennys $\geq \varnothing 14,100$ • kartiovaippahionta

N • pehmeät ja pitkälästiset materiaalit • Alumiini, pitkälästiset Al-seokset
 • sinkki, puhdistettu kupari, silumiini, elektroni

GÜHRING NAVIGATOR

Leikkuarvosivu 778



Artikkelinro.

247

d1		S	l1	l2
mm	inch		mm	mm
3,200		MK-1	117,000	36,000
3,300		MK-1	117,000	36,000
3,800		MK-1	124,000	43,000
4,000		MK-1	124,000	43,000
5,000		MK-1	133,000	52,000
5,400		MK-1	138,000	57,000
5,500		MK-1	138,000	57,000
6,000		MK-1	138,000	57,000
6,300		MK-1	144,000	63,000
6,500		MK-1	144,000	63,000
6,600		MK-1	144,000	63,000
6,750	17/64	MK-1	150,000	69,000
6,800		MK-1	150,000	69,000
7,000		MK-1	150,000	69,000
7,500		MK-1	150,000	69,000
7,750		MK-1	156,000	75,000
8,000		MK-1	156,000	75,000
9,200		MK-1	162,000	81,000
9,500		MK-1	162,000	81,000
9,750		MK-1	168,000	87,000
9,800		MK-1	168,000	87,000
12,000		MK-1	182,000	101,000
12,500		MK-1	182,000	101,000
13,000		MK-1	182,000	101,000

d1		S	l1	l2
mm	inch		mm	mm
13,200		MK-1	182,000	101,000
14,000		MK-1	189,000	108,000
16,000		MK-2	218,000	120,000
17,000		MK-2	223,000	125,000
18,000		MK-2	228,000	130,000
18,500		MK-2	233,000	135,000
19,000		MK-2	233,000	135,000
20,000		MK-2	238,000	140,000
21,000		MK-2	243,000	145,000
22,000		MK-2	248,000	150,000
23,000		MK-2	253,000	155,000
27,000		MK-3	291,000	170,000
27,200		MK-3	291,000	170,000
27,250		MK-3	291,000	170,000
27,500		MK-3	291,000	170,000
28,000		MK-3	291,000	170,000
28,500		MK-3	296,000	175,000
30,300		MK-3	301,000	180,000
30,500		MK-3	301,000	180,000
31,000		MK-3	301,000	180,000
31,500		MK-3	301,000	180,000
32,000		MK-4	334,000	185,000



Kierukkaporat

Materiaali **HSS**

Pinta

Leikkusuunta

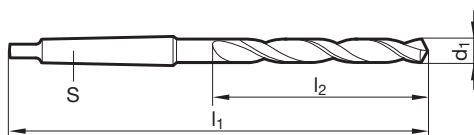
P • Kärjen kevennys $\geq \varnothing 7,940$ • kartiovaippahionta • avarat lastu-urat
• erityisesti yli 3xD porausvyyksille

M**K** •

N • valurauta ja teräs $< 1000/\text{mm}^2$ asti • Ei suositella: CrNi-teräkset, ruostumattomat teräkset

S**H****GÜHRING** NAVIGATOR

Leikkuarvosivu 778

Artikkelinro. **558**

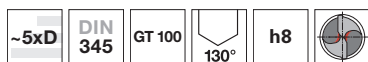
d1		S	l1	l2
mm	inch		mm	mm
7,940	5/16	MK-1	156,000	75,000
8,000		MK-1	156,000	75,000
8,250		MK-1	156,000	75,000
9,500		MK-1	162,000	81,000
10,000		MK-1	168,000	87,000
10,250		MK-1	168,000	87,000
11,000		MK-1	175,000	94,000
11,110	7/16	MK-1	175,000	94,000
12,700	1/2	MK-1	182,000	101,000
12,750		MK-1	182,000	101,000
13,000		MK-1	182,000	101,000
13,250		MK-1	189,000	108,000
14,000		MK-1	189,000	108,000
14,290	9/16	MK-2	212,000	114,000
14,500		MK-2	212,000	114,000
17,500		MK-2	228,000	130,000
18,000		MK-2	228,000	130,000
19,500		MK-2	238,000	140,000

d1		S	l1	l2
mm	inch		mm	mm
20,000		MK-2	238,000	140,000
20,500		MK-2	243,000	145,000
21,000		MK-2	243,000	145,000
21,250		MK-2	248,000	150,000
27,500		MK-3	291,000	170,000
28,500		MK-3	296,000	175,000
28,570	1 1/8	MK-3	296,000	175,000
29,500		MK-3	296,000	175,000
30,160	1 3/16	MK-3	301,000	180,000
30,500		MK-3	301,000	180,000
31,500		MK-3	301,000	180,000
31,750	1 1/4	MK-3	306,000	185,000

Kartiovartiset
kierukkaporat



Kierukkaporat

Materiaali **HSS**Pinta **S**Leikkusuunta **R**

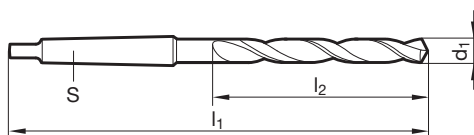
P • Kärjen kevennys $\geq \varnothing 7,940$ • kartiovaippahionta • avarat lastu-urat
• erityisesti yli 3xD porausvyvyksille

M**K** •

N • valurauta ja teräs $< 1000/\text{mm}^2$ asti • Ei suositella: CrNi-teräkset, ruostumattomat teräkset

S**H****GÜHRING** NAVIGATOR

Leikkuarvosivu 780



Artikkelinro.

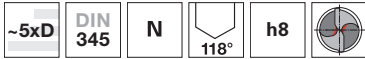
606

d1		S	l1	l2
mm	inch		mm	mm
7,940	5/16	MK-1	156,000	75,000
8,750		MK-1	162,000	81,000
9,000		MK-1	162,000	81,000
9,520	3/8	MK-1	168,000	87,000
10,000		MK-1	168,000	87,000
11,110	7/16	MK-1	175,000	94,000
12,250		MK-1	182,000	101,000
12,500		MK-1	182,000	101,000
12,750		MK-1	182,000	101,000
14,000		MK-1	189,000	108,000
14,500		MK-2	212,000	114,000
15,750		MK-2	218,000	120,000

d1		S	l1	l2
mm	inch		mm	mm
15,870	5/8	MK-2	218,000	120,000
17,500		MK-2	228,000	130,000
23,500		MK-3	276,000	155,000
23,810	15/16	MK-3	281,000	160,000
25,400	1	MK-3	286,000	165,000
26,990	1 1/16	MK-3	291,000	170,000
28,500		MK-3	296,000	175,000
28,570	1 1/8	MK-3	296,000	175,000
29,000		MK-3	296,000	175,000
31,500		MK-3	301,000	180,000



Kierukkaporat



P ●	Kärjen kevennys $\geq \varnothing 3,000$ • kartiovaippahionta • Co-seosteinen pikateräs • parempi kulumiskestävyys
M ○	
K ●	
N ○	seostetut/seostomattomat teräkset ja valut $> 800 \text{ N/mm}^2$ • kuuma- ja kylmävalssatut teräkset • pienikitkaiset laakeriteräkset • runsasseosteiset teräkset • nuorutus- ja hiilikarkaistut teräkset
S ○	
H ○	

Materiaali **HSCO**

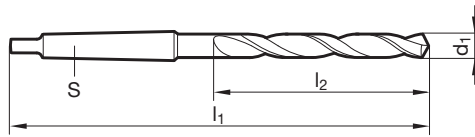
Pinta



Leikkusuunta

**GÜHRING** NAVIGATOR

Leikkuarvosivu 780



Artikkelinro.

345

d1		S	l1	l2	d1		S	l1	l2
mm	inch		mm	mm	mm	inch		mm	mm
4,000		MK-1	124,000	43,000	12,700	1/2	MK-1	182,000	101,000
5,000		MK-1	133,000	52,000	12,750		MK-1	182,000	101,000
5,200		MK-1	133,000	52,000	13,000		MK-1	182,000	101,000
5,500		MK-1	138,000	57,000	13,100	33/64	MK-1	182,000	101,000
6,000		MK-1	138,000	57,000	13,200		MK-1	182,000	101,000
6,500		MK-1	144,000	63,000	13,250		MK-1	189,000	108,000
6,700		MK-1	144,000	63,000	13,490	17/32	MK-1	189,000	108,000
6,750	17/64	MK-1	150,000	69,000	13,500		MK-1	189,000	108,000
6,800		MK-1	150,000	69,000	13,700		MK-1	189,000	108,000
7,000		MK-1	150,000	69,000	13,750		MK-1	189,000	108,000
7,500		MK-1	150,000	69,000	13,800		MK-1	189,000	108,000
8,000		MK-1	156,000	75,000	13,900		MK-1	189,000	108,000
8,200		MK-1	156,000	75,000	14,000		MK-1	189,000	108,000
8,500		MK-1	156,000	75,000	14,100		MK-2	212,000	114,000
8,700		MK-1	162,000	81,000	14,200		MK-2	212,000	114,000
9,000		MK-1	162,000	81,000	14,250		MK-2	212,000	114,000
9,500		MK-1	162,000	81,000	14,290	9/16	MK-2	212,000	114,000
9,520	3/8	MK-1	168,000	87,000	14,500		MK-2	212,000	114,000
10,000		MK-1	168,000	87,000	14,750		MK-2	212,000	114,000
10,100		MK-1	168,000	87,000	15,000		MK-2	212,000	114,000
10,150		MK-1	168,000	87,000	15,080	19/32	MK-2	218,000	120,000
10,200		MK-1	168,000	87,000	15,250		MK-2	218,000	120,000
10,250		MK-1	168,000	87,000	15,500		MK-2	218,000	120,000
10,320	13/32	MK-1	168,000	87,000	15,750		MK-2	218,000	120,000
10,500		MK-1	168,000	87,000	15,870	5/8	MK-2	218,000	120,000
10,700		MK-1	175,000	94,000	16,000		MK-2	218,000	120,000
10,720	27/64	MK-1	175,000	94,000	16,100		MK-2	223,000	125,000
10,750		MK-1	175,000	94,000	16,250		MK-2	223,000	125,000
10,800		MK-1	175,000	94,000	16,270	41/64	MK-2	223,000	125,000
11,000		MK-1	175,000	94,000	16,500		MK-2	223,000	125,000
11,110	7/16	MK-1	175,000	94,000	16,670	21/32	MK-2	223,000	125,000
11,200		MK-1	175,000	94,000	16,750		MK-2	223,000	125,000
11,500		MK-1	175,000	94,000	17,000		MK-2	223,000	125,000
11,600		MK-1	175,000	94,000	17,460	11/16	MK-2	228,000	130,000
11,750		MK-1	175,000	94,000	17,500		MK-2	228,000	130,000
11,800		MK-1	175,000	94,000	17,750		MK-2	228,000	130,000
11,900		MK-1	182,000	101,000	17,860	45/64	MK-2	228,000	130,000
12,000		MK-1	182,000	101,000	18,000		MK-2	228,000	130,000
12,100		MK-1	182,000	101,000	18,200		MK-2	233,000	135,000
12,200		MK-1	182,000	101,000	18,250		MK-2	233,000	135,000
12,250		MK-1	182,000	101,000	18,260	23/32	MK-2	233,000	135,000
12,500		MK-1	182,000	101,000	18,500		MK-2	233,000	135,000

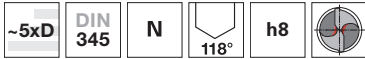


d1		S	l1	l2
mm	inch		mm	mm
18,650	47/64	MK-2	233,000	135,000
18,750		MK-2	233,000	135,000
19,000		MK-2	233,000	135,000
19,050	3/4	MK-2	238,000	140,000
19,250		MK-2	238,000	140,000
19,500		MK-2	238,000	140,000
19,750		MK-2	238,000	140,000
19,840	25/32	MK-2	238,000	140,000
20,000		MK-2	238,000	140,000
20,250		MK-2	243,000	145,000
20,500		MK-2	243,000	145,000
20,640	13/16	MK-2	243,000	145,000
20,750		MK-2	243,000	145,000
21,000		MK-2	243,000	145,000
21,250		MK-2	248,000	150,000
21,500		MK-2	248,000	150,000
22,000		MK-2	248,000	150,000
22,220	7/8	MK-2	248,000	150,000
22,250		MK-2	248,000	150,000
22,500		MK-2	253,000	155,000
22,620	57/64	MK-2	253,000	155,000
23,000		MK-2	253,000	155,000
23,020	29/32	MK-2	253,000	155,000
23,500		MK-3	276,000	155,000
24,000		MK-3	281,000	160,000
24,210	61/64	MK-3	281,000	160,000
24,500		MK-3	281,000	160,000
25,000	63/64	MK-3	281,000	160,000
25,250		MK-3	286,000	165,000
25,400	1	MK-3	286,000	165,000

d1		S	l1	l2
mm	inch		mm	mm
25,500		MK-3	286,000	165,000
26,000		MK-3	286,000	165,000
26,500		MK-3	286,000	165,000
27,000		MK-3	291,000	170,000
27,500		MK-3	291,000	170,000
28,000		MK-3	291,000	170,000
28,500		MK-3	296,000	175,000
28,570	1 1/8	MK-3	296,000	175,000
29,000		MK-3	296,000	175,000
29,500		MK-3	296,000	175,000
30,000		MK-3	296,000	175,000
30,500		MK-3	301,000	180,000
31,000		MK-3	301,000	180,000
31,500		MK-3	301,000	180,000
31,750	1 1/4	MK-3	306,000	185,000
32,000		MK-4	334,000	185,000
32,500		MK-4	334,000	185,000
33,000		MK-4	334,000	185,000
34,000		MK-4	339,000	190,000
35,000		MK-4	339,000	190,000
36,000		MK-4	344,000	195,000
37,000		MK-4	344,000	195,000
38,000		MK-4	349,000	200,000
39,000		MK-4	349,000	200,000
40,000		MK-4	349,000	200,000
42,000		MK-4	354,000	205,000
42,070	1 21/32	MK-4	354,000	205,000
43,000		MK-4	359,000	210,000
45,000		MK-4	359,000	210,000
50,000		MK-4	369,000	220,000



Kierukkaporat



P • Kärjen kevennys $\geq \varnothing 7,940$ • kartiovaippahionta • Co-seosteinen pikateräs • parempi kulumiskestävyys

M ○

K •

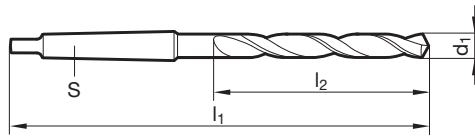
N ○ seostetut/seostomattomat teräkset ja valut $> 800 \text{ N/mm}^2$ • kuuma- ja kylmävalssatut teräkset • pienikitkaiset laakeriteräkset • runsasseosteiset teräkset • nuorutus- ja hiilikarkaistut teräkset

S ○

H ○

Materiaali **HSCO**Pinta **S**Leikkusuunta **R****GÜHRING** NAVIGATOR

Leikkuarvosivu 782



Artikkelinro.

661Kartiovartiset
kierukkaporat

d1		S	l1	l2
mm	inch		mm	mm
8,000		MK-1	156,000	75,000
8,500		MK-1	156,000	75,000
9,000		MK-1	162,000	81,000
9,500		MK-1	162,000	81,000
9,520	3/8	MK-1	168,000	87,000
10,000		MK-1	168,000	87,000
11,000		MK-1	175,000	94,000
12,000		MK-1	182,000	101,000
12,500		MK-1	182,000	101,000
12,700	1/2	MK-1	182,000	101,000
13,000		MK-1	182,000	101,000
13,500		MK-1	189,000	108,000
14,000		MK-1	189,000	108,000
14,500		MK-2	212,000	114,000
15,000		MK-2	212,000	114,000
16,000		MK-2	218,000	120,000
17,000		MK-2	223,000	125,000
17,070	43/64	MK-2	228,000	130,000

d1		S	l1	l2
mm	inch		mm	mm
17,460	11/16	MK-2	228,000	130,000
17,500		MK-2	228,000	130,000
18,000		MK-2	228,000	130,000
19,000		MK-2	233,000	135,000
19,500		MK-2	238,000	140,000
20,000		MK-2	238,000	140,000
21,000		MK-2	243,000	145,000
22,000		MK-2	248,000	150,000
23,000		MK-2	253,000	155,000
23,810	15/16	MK-3	281,000	160,000
25,000	63/64	MK-3	281,000	160,000
26,000		MK-3	286,000	165,000
26,500		MK-3	286,000	165,000
26,990	1 1/16	MK-3	291,000	170,000
29,000		MK-3	296,000	175,000
30,000		MK-3	296,000	175,000



Kierukkaporat



P • Kärjen kevennys $\geq \varnothing 9,520$ • kartiovaippahionta • Co-seosteinen pikateräs • avarat lastu-urat • parempi kulumiskestävyys • erityisesti yli 3xD porausvyvyksille

M ○
K •
N ○ seostetut/seostomattomat teräkset ja valut > yli 1000 N/mm² • kuuma- ja kylmävalssatut teräkset • pienikitkaiset laakeriteräkset • runsasseosteiset teräkset • nuorutus- ja hiilikarkaistut teräkset

S
H

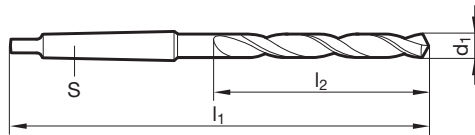
Materiaali **HSCO**

Pinta

Leikkusuunta

GÜHRING NAVIGATOR

Leikkuarvosivu 780



Artikkelinro.

645

d1		S	l1	l2
mm	inch		mm	mm
10,000		MK-1	168,000	87,000
10,100		MK-1	168,000	87,000
10,200		MK-1	168,000	87,000
10,500		MK-1	168,000	87,000
10,720	27/64	MK-1	175,000	94,000
10,800		MK-1	175,000	94,000
11,000		MK-1	175,000	94,000
11,500		MK-1	175,000	94,000
11,510	29/64	MK-1	175,000	94,000
12,000		MK-1	182,000	101,000
12,500		MK-1	182,000	101,000
13,000		MK-1	182,000	101,000
13,300		MK-1	189,000	108,000
13,500		MK-1	189,000	108,000
14,000		MK-1	189,000	108,000
14,250		MK-2	212,000	114,000
14,290	9/16	MK-2	212,000	114,000
14,500		MK-2	212,000	114,000
15,000		MK-2	212,000	114,000
15,250		MK-2	218,000	120,000
15,500		MK-2	218,000	120,000
15,750		MK-2	218,000	120,000
16,000		MK-2	218,000	120,000
16,500		MK-2	223,000	125,000
16,670	21/32	MK-2	223,000	125,000
17,000		MK-2	223,000	125,000
17,250		MK-2	228,000	130,000
17,460	11/16	MK-2	228,000	130,000
17,500		MK-2	228,000	130,000
18,000		MK-2	228,000	130,000

d1		S	l1	l2
mm	inch		mm	mm
18,250		MK-2	233,000	135,000
18,500		MK-2	233,000	135,000
19,000		MK-2	233,000	135,000
20,000		MK-2	238,000	140,000
20,500		MK-2	243,000	145,000
21,000		MK-2	243,000	145,000
22,000		MK-2	248,000	150,000
22,220	7/8	MK-2	248,000	150,000
22,620	57/64	MK-2	253,000	155,000
23,000		MK-2	253,000	155,000
24,000		MK-3	281,000	160,000
24,210	61/64	MK-3	281,000	160,000
24,610	31/32	MK-3	281,000	160,000
25,000	63/64	MK-3	281,000	160,000
26,000		MK-3	286,000	165,000
26,500		MK-3	286,000	165,000
27,780	1 3/32	MK-3	291,000	170,000
28,570	1 1/8	MK-3	296,000	175,000
30,000		MK-3	296,000	175,000
31,000		MK-3	301,000	180,000
33,000		MK-4	334,000	185,000
35,000		MK-4	339,000	190,000
37,000		MK-4	344,000	195,000
38,000		MK-4	349,000	200,000
39,000		MK-4	349,000	200,000



Kierukkaporat



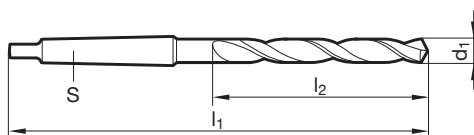
P • Kärjen kevennys $\geq \varnothing 10,000$ • kartiovaippahionta • Co-seosteinen pikateräs • avarat lastu-urat • parempi kulumiskestävyys • erityisesti yli 3xD poraussyvyyksille

M ○
K •
N ○ seostetut/seostomattomat teräkset ja valut $> \text{yli } 1000 \text{ N/mm}^2$ • kuuma- ja kylmävalssatut teräkset • pienikitkaiset laakeriteräkset • runsasseosteiset teräkset • nuorutus- ja hiilikarkaistut teräkset

S
H

Materiaali **HSCO**Pinta **S**Leikkusuunta **R****GÜHRING** NAVIGATOR

Leikkuarvosivu 782



Artikkelinro.

662

d1		S	l1	l2
mm	inch		mm	mm
10,000		MK-1	168,000	87,000
10,200		MK-1	168,000	87,000
11,000		MK-1	175,000	94,000
11,110	7/16	MK-1	175,000	94,000
11,400		MK-1	175,000	94,000
12,200		MK-1	182,000	101,000
12,300	31/64	MK-1	182,000	101,000
12,500		MK-1	182,000	101,000
13,000		MK-1	182,000	101,000
14,000		MK-1	189,000	108,000
14,290	9/16	MK-2	212,000	114,000
15,000		MK-2	212,000	114,000

d1		S	l1	l2
mm	inch		mm	mm
16,000		MK-2	218,000	120,000
17,460	11/16	MK-2	228,000	130,000
17,500		MK-2	228,000	130,000
18,000		MK-2	228,000	130,000
20,000		MK-2	238,000	140,000
20,500		MK-2	243,000	145,000
21,000		MK-2	243,000	145,000
22,000		MK-2	248,000	150,000
23,000		MK-2	253,000	155,000
23,500		MK-3	276,000	155,000
23,810	15/16	MK-3	281,000	160,000



Kierukkaporat



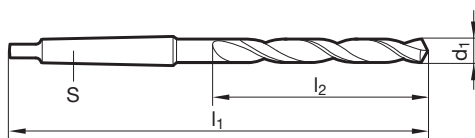
P • Kärjen kevennys $\geq \varnothing 10,000$ • kartiovaippahionta • Co-seosteinen pikateräs • avarat lastu-urat • parempi kulumiskestävyys • erityisesti yli 3xD poraussyvyyksille

M •
K ○
N seostetut/seostomattomat teräkset ja valut $> \text{yli } 1000 \text{ N/mm}^2$ • kuuma- ja kylmävalssatut teräkset • pienikitkaiset laakeriteräkset • runsasseosteiset teräkset • nuorutus- ja hiilikarkaistut teräkset

S
H

GÜHRING NAVIGATOR

Leikkuuarvosivu 782

Materiaali **HSCO**Pinta **C**Leikkusuunta **R**

Artikkelinro.

1222

d1		S	l1	l2
mm	inch			
10,000		MK-1	168,000	87,000
10,200		MK-1	168,000	87,000
11,000		MK-1	175,000	94,000
11,110	7/16	MK-1	175,000	94,000
12,500		MK-1	182,000	101,000
12,700	1/2	MK-1	182,000	101,000
14,200		MK-2	212,000	114,000
15,870	5/8	MK-2	218,000	120,000
16,500		MK-2	223,000	125,000
16,670	21/32	MK-2	223,000	125,000
17,460	11/16	MK-2	228,000	130,000
19,500		MK-2	238,000	140,000

d1		S	l1	l2
mm	inch			
23,500		MK-3	276,000	155,000
23,810	15/16	MK-3	281,000	160,000
25,500		MK-3	286,000	165,000
26,990	1 1/16	MK-3	291,000	170,000
27,500		MK-3	291,000	170,000
29,500		MK-3	296,000	175,000
30,160	1 3/16	MK-3	301,000	180,000



Kierukkaporat



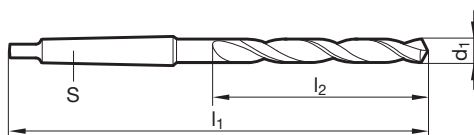
P ○ Kärjen kevennys $\geq \varnothing 10,400$ • kartiovaippahionta • Co-seosteinen pikateräs • avarat lastu-urat • parempi kulumiskestävyys • erityisesti yli 3xD porausvyvyksille

M ○
K ●
N ○ seostetut/seostomattomat teräkset ja valut > yli 1000 N/mm² • kuuma- ja kylmävalssatut teräkset • pienikitkaiset laakeriteräkset • runsasseosteiset teräkset • nuorutus- ja hiilikarkaistut teräkset

S ○
H ○

Materiaali **HSCO**Pinta **A**Leikkusuunta **R****GÜHRING** NAVIGATOR

Leikkuarvosivu 782



Artikkelinro.

1224

d1		S	l1	l2
mm	inch		mm	mm
10,400		MK-1	168,000	87,000
11,110	7/16	MK-1	175,000	94,000
12,300	31/64	MK-1	182,000	101,000
12,700	1/2	MK-1	182,000	101,000
14,200		MK-2	212,000	114,000
14,290	9/16	MK-2	212,000	114,000
15,870	5/8	MK-2	218,000	120,000
16,000		MK-2	218,000	120,000
16,500		MK-2	223,000	125,000
19,000		MK-2	233,000	135,000
19,500		MK-2	238,000	140,000
23,810	15/16	MK-3	281,000	160,000

d1		S	l1	l2
mm	inch		mm	mm
25,500		MK-3	286,000	165,000
26,990	1 1/16	MK-3	291,000	170,000
27,000		MK-3	291,000	170,000
28,000		MK-3	291,000	170,000
28,500		MK-3	296,000	175,000
29,000		MK-3	296,000	175,000
29,500		MK-3	296,000	175,000
30,160	1 3/16	MK-3	301,000	180,000



Kierukkaporat



P ○	kartiovaippahionta • Co-seosteinen pikateräs • parempi kulumiskestävyys
M ●	
K ●	
N ○	ruostumatt./-haponk./-kuumal. austeniittiset teräkset (V2A ja V4A)
S ○	
H ○	

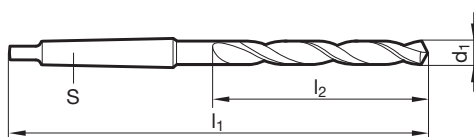
GÜHRING NAVIGATOR

Leikkuuarvosivu 780

Materiaali **HSC0**

Pinta ○

Leikkusuunta



Artikkelinro.

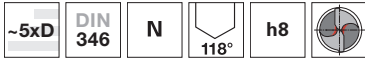
1262

d1		S	l1	l2
mm	inch		mm	mm
10,000		MK-1	168,000	87,000
10,200		MK-1	168,000	87,000
10,500		MK-1	168,000	87,000
10,800		MK-1	175,000	94,000
11,000		MK-1	175,000	94,000
11,200		MK-1	175,000	94,000
11,800		MK-1	175,000	94,000
12,000		MK-1	182,000	101,000
12,300	31/64	MK-1	182,000	101,000
12,500		MK-1	182,000	101,000
13,000		MK-1	182,000	101,000
13,490	17/32	MK-1	189,000	108,000
13,500		MK-1	189,000	108,000
13,800		MK-1	189,000	108,000
14,000		MK-1	189,000	108,000
14,250		MK-2	212,000	114,000
14,500		MK-2	212,000	114,000
14,750		MK-2	212,000	114,000
15,000		MK-2	212,000	114,000
15,250		MK-2	218,000	120,000
15,480	39/64	MK-2	218,000	120,000
15,500		MK-2	218,000	120,000
16,000		MK-2	218,000	120,000
16,250		MK-2	223,000	125,000
16,500		MK-2	223,000	125,000
17,000		MK-2	223,000	125,000
17,500		MK-2	228,000	130,000
18,000		MK-2	228,000	130,000
18,500		MK-2	233,000	135,000
19,000		MK-2	233,000	135,000

d1		S	l1	l2
mm	inch		mm	mm
19,500		MK-2	238,000	140,000
20,000		MK-2	238,000	140,000
20,500		MK-2	243,000	145,000
21,000		MK-2	243,000	145,000
21,500		MK-2	248,000	150,000
21,750		MK-2	248,000	150,000
22,000		MK-2	248,000	150,000
22,500		MK-2	253,000	155,000
23,000		MK-2	253,000	155,000
23,420	59/64	MK-3	276,000	155,000
24,000		MK-3	281,000	160,000
24,500		MK-3	281,000	160,000
25,000	63/64	MK-3	281,000	160,000
25,500		MK-3	286,000	165,000
26,000		MK-3	286,000	165,000
26,500		MK-3	286,000	165,000
27,000		MK-3	291,000	170,000
27,500		MK-3	291,000	170,000
28,000		MK-3	291,000	170,000
28,500		MK-3	296,000	175,000
29,000		MK-3	296,000	175,000
30,000		MK-3	296,000	175,000
32,000		MK-4	334,000	185,000
34,000		MK-4	339,000	190,000



Kierukkaporat



P • Kärjen kevennys $\geq \varnothing 14,200$ • kartiovaippahionta • ylikoko varsi

M

K •

N ○ seostetut/seostamattomat teräkset ja valuteräkset • harmaavalu-, taottava- ja pallografiittivalurauta • sintrattu pulveriteräs, uushopea ja grafiitti

S

H

Materiaali **HSS**

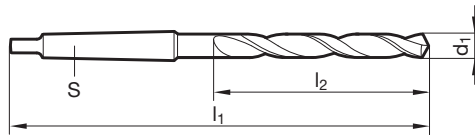
Pinta



Leikkusuunta

**GÜHRING** NAVIGATOR

Leikkuarvosivu 778



Artikkelinro.

251

d1		S	l1	l2
mm	inch		mm	mm
10,000		MK-2	185,000	87,000
10,500		MK-2	185,000	87,000
11,000		MK-2	192,000	94,000
11,910	15/32	MK-2	199,000	101,000
12,000		MK-2	199,000	101,000
12,250		MK-2	199,000	101,000
12,500		MK-2	199,000	101,000
13,000		MK-2	199,000	101,000
13,100	33/64	MK-2	199,000	101,000
13,250		MK-2	206,000	108,000
13,490	17/32	MK-2	206,000	108,000
13,500		MK-2	206,000	108,000
13,890	35/64	MK-2	206,000	108,000
14,000		MK-2	206,000	108,000
16,700		MK-3	246,000	125,000
17,000		MK-3	246,000	125,000
17,250		MK-3	251,000	130,000
18,250		MK-3	256,000	135,000
18,260	23/32	MK-3	256,000	135,000
18,650	47/64	MK-3	256,000	135,000
18,750		MK-3	256,000	135,000
19,000		MK-3	256,000	135,000
19,050	3/4	MK-3	261,000	140,000
19,450	49/64	MK-3	261,000	140,000
19,840	25/32	MK-3	261,000	140,000
20,000		MK-3	261,000	140,000
20,250		MK-3	266,000	145,000
20,640	13/16	MK-3	266,000	145,000
21,000		MK-3	266,000	145,000
21,030	53/64	MK-3	266,000	145,000

d1		S	l1	l2
mm	inch		mm	mm
21,430	27/32	MK-3	271,000	150,000
21,500		MK-3	271,000	150,000
22,000		MK-3	271,000	150,000
22,220	7/8	MK-3	271,000	150,000
23,000		MK-3	276,000	155,000
23,020	29/32	MK-3	276,000	155,000
27,500		MK-4	319,000	170,000
27,750		MK-4	319,000	170,000
27,780	1 3/32	MK-4	319,000	170,000
28,000		MK-4	319,000	170,000
28,180	1 7/64	MK-4	324,000	175,000
28,500		MK-4	324,000	175,000
28,570	1 1/8	MK-4	324,000	175,000
28,970	1 9/64	MK-4	324,000	175,000
29,770	1 11/64	MK-4	324,000	175,000
31,500		MK-4	329,000	180,000
32,000		MK-5	372,000	185,000
36,000		MK-5	382,000	195,000
40,080	1 37/64	MK-5	392,000	205,000
41,000		MK-5	392,000	205,000
41,500		MK-5	392,000	205,000
42,070	1 21/32	MK-5	392,000	205,000
44,050	1 47/64	MK-5	397,000	210,000
45,000		MK-5	397,000	210,000
46,040	1 13/16	MK-5	402,000	215,000
47,000		MK-5	402,000	215,000
49,000		MK-5	407,000	220,000
49,500		MK-5	407,000	220,000
73,000		MK-6	509,000	255,000



Kierukkaporat

Materiaali **HSCO**

Pinta

Leikkusuunta

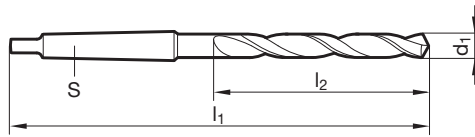
P • Kärjen kevennys $\geq \varnothing 10,000$ • kartiovaippahionta • Co-seosteinen pikateräs • parempi kulumiskestävyys • ylikoko varsi

M ○**K** •

N • seostetut/seostomattomat teräkset ja valut $> 800 \text{ N/mm}^2$ • kuuma- ja kylmävalssatut teräkset • pienikitkaiset laakeriteräkset • runsasseosteiset teräkset • nuorutus- ja hiilikarkaistut teräkset

S**H****GÜHRING** NAVIGATOR

Leikkuarvosivu 780

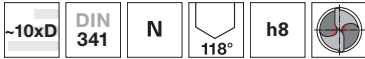
Artikkelinro. **351**

d1		S	l1	l2
mm	inch		mm	mm
12,000		MK-2	199,000	101,000
13,000		MK-2	199,000	101,000
14,000		MK-2	206,000	108,000
17,500		MK-3	251,000	130,000
18,500		MK-3	256,000	135,000
20,000		MK-3	261,000	140,000
21,000		MK-3	266,000	145,000
21,500		MK-3	271,000	150,000
22,750		MK-3	276,000	155,000
23,000		MK-3	276,000	155,000
29,000		MK-4	324,000	175,000
30,000		MK-4	324,000	175,000

d1		S	l1	l2
mm	inch		mm	mm
31,000		MK-4	329,000	180,000
31,500		MK-4	329,000	180,000



Pitkät kartiovartiset kierukkaporat



P • Kärjen kevennys $\geq \varnothing 14,100$ • kartiovaippahionta • porausholkin läpi porausta varten

M

K •

N ○ seostettu-/seostamaton teräs ja valuteräs • harmaavalu-, taottava- ja pallografiittivalurauta • sintrattu pulveriteräs, uushopea ja grafiitti

S

H

Materiaali **HSS**

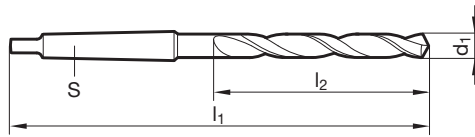
Pinta



Leikkusuunta

**GÜHRING** NAVIGATOR

Leikkuarvosivu 786



Artikkelinro.

257

d1		S	l1	l2	d1		S	l1	l2
mm	inch		mm	mm	mm	inch		mm	mm
2,900		MK-1	132,000	51,000	9,900		MK-1	197,000	116,000
3,900		MK-1	145,000	64,000	10,000		MK-1	197,000	116,000
4,000		MK-1	145,000	64,000	10,050		MK-1	197,000	116,000
4,100		MK-1	145,000	64,000	10,100		MK-1	197,000	116,000
4,200		MK-1	145,000	64,000	10,200		MK-1	197,000	116,000
4,500		MK-1	150,000	69,000	10,250		MK-1	197,000	116,000
4,700		MK-1	150,000	69,000	10,300		MK-1	197,000	116,000
5,000		MK-1	155,000	74,000	10,400		MK-1	197,000	116,000
5,100		MK-1	155,000	74,000	10,500		MK-1	197,000	116,000
5,200		MK-1	155,000	74,000	10,600		MK-1	197,000	116,000
5,250		MK-1	155,000	74,000	10,700		MK-1	206,000	125,000
5,500		MK-1	161,000	80,000	10,750		MK-1	206,000	125,000
5,800		MK-1	161,000	80,000	10,800		MK-1	206,000	125,000
6,000		MK-1	161,000	80,000	10,900		MK-1	206,000	125,000
6,500		MK-1	167,000	86,000	11,000		MK-1	206,000	125,000
6,700		MK-1	167,000	86,000	11,250		MK-1	206,000	125,000
6,800		MK-1	174,000	93,000	11,400		MK-1	206,000	125,000
7,000		MK-1	174,000	93,000	11,500		MK-1	206,000	125,000
7,100		MK-1	174,000	93,000	11,750		MK-1	206,000	125,000
7,200		MK-1	174,000	93,000	11,800		MK-1	206,000	125,000
7,300		MK-1	174,000	93,000	12,000		MK-1	215,000	134,000
7,400		MK-1	174,000	93,000	12,100		MK-1	215,000	134,000
7,500		MK-1	174,000	93,000	12,200		MK-1	215,000	134,000
7,600		MK-1	181,000	100,000	12,250		MK-1	215,000	134,000
7,800		MK-1	181,000	100,000	12,300	31/64	MK-1	215,000	134,000
8,000		MK-1	181,000	100,000	12,400		MK-1	215,000	134,000
8,050		MK-1	181,000	100,000	12,500		MK-1	215,000	134,000
8,200		MK-1	181,000	100,000	12,600		MK-1	215,000	134,000
8,250		MK-1	181,000	100,000	13,000		MK-1	215,000	134,000
8,500		MK-1	181,000	100,000	13,100	33/64	MK-1	215,000	134,000
8,600		MK-1	188,000	107,000	13,200		MK-1	215,000	134,000
8,750		MK-1	188,000	107,000	13,490	17/32	MK-1	223,000	142,000
8,800		MK-1	188,000	107,000	13,500		MK-1	223,000	142,000
8,900		MK-1	188,000	107,000	13,750		MK-1	223,000	142,000
9,000		MK-1	188,000	107,000	13,900		MK-1	223,000	142,000
9,100		MK-1	188,000	107,000	14,000		MK-1	223,000	142,000
9,300		MK-1	188,000	107,000	14,100		MK-2	245,000	147,000
9,400		MK-1	188,000	107,000	14,250		MK-2	245,000	147,000
9,500		MK-1	188,000	107,000	14,290	9/16	MK-2	245,000	147,000
9,600		MK-1	197,000	116,000	14,300		MK-2	245,000	147,000
9,700		MK-1	197,000	116,000	14,400		MK-2	245,000	147,000
9,800		MK-1	197,000	116,000	14,500		MK-2	245,000	147,000



d1		S	l1	l2
mm	inch		mm	mm
14,750		MK-2	245,000	147,000
14,900		MK-2	245,000	147,000
15,000		MK-2	245,000	147,000
15,200		MK-2	251,000	153,000
15,250		MK-2	251,000	153,000
15,500		MK-2	251,000	153,000
15,600		MK-2	251,000	153,000
15,750		MK-2	251,000	153,000
16,000		MK-2	251,000	153,000
16,100		MK-2	257,000	159,000
16,200		MK-2	257,000	159,000
16,250		MK-2	257,000	159,000
16,500		MK-2	257,000	159,000
16,670	21/32	MK-2	257,000	159,000
16,750		MK-2	257,000	159,000
17,000		MK-2	257,000	159,000
17,250		MK-2	263,000	165,000
17,460	11/16	MK-2	263,000	165,000
17,500		MK-2	263,000	165,000
17,750		MK-2	263,000	165,000
18,000		MK-2	263,000	165,000
18,250		MK-2	269,000	171,000
18,500		MK-2	269,000	171,000
18,750		MK-2	269,000	171,000
19,000		MK-2	269,000	171,000
19,500		MK-2	275,000	177,000
19,750		MK-2	275,000	177,000
19,840	25/32	MK-2	275,000	177,000
20,000		MK-2	275,000	177,000
20,250		MK-2	282,000	184,000
20,500		MK-2	282,000	184,000
20,640	13/16	MK-2	282,000	184,000
21,000		MK-2	282,000	184,000
21,500		MK-2	289,000	191,000
21,750		MK-2	289,000	191,000
21,830	55/64	MK-2	289,000	191,000
22,000		MK-2	289,000	191,000
22,220	7/8	MK-2	289,000	191,000
22,250		MK-2	289,000	191,000
22,500		MK-2	296,000	198,000
23,000		MK-2	296,000	198,000
23,500		MK-3	319,000	198,000
23,750		MK-3	327,000	206,000
23,810	15/16	MK-3	327,000	206,000
24,000		MK-3	327,000	206,000
24,250		MK-3	327,000	206,000
24,500		MK-3	327,000	206,000
25,000	63/64	MK-3	327,000	206,000

Kartiovaritset
kierukkaporat

d1		S	l1	l2
mm	inch		mm	mm
25,250		MK-3	335,000	214,000
25,500		MK-3	335,000	214,000
26,000		MK-3	335,000	214,000
26,500		MK-3	335,000	214,000
26,590	1 3/64	MK-3	343,000	222,000
26,990	1 1/16	MK-3	343,000	222,000
27,000		MK-3	343,000	222,000
27,380	1 5/64	MK-3	343,000	222,000
27,500		MK-3	343,000	222,000
28,000		MK-3	343,000	222,000
28,500		MK-3	351,000	230,000
29,000		MK-3	351,000	230,000
29,500		MK-3	351,000	230,000
30,000		MK-3	351,000	230,000
30,500		MK-3	360,000	239,000
31,000		MK-3	360,000	239,000
32,000		MK-4	397,000	248,000
33,000		MK-4	397,000	248,000
33,500		MK-4	397,000	248,000
34,000		MK-4	406,000	257,000
35,000		MK-4	406,000	257,000
36,000		MK-4	416,000	267,000
36,120	1 27/64	MK-4	416,000	267,000
36,910	1 29/64	MK-4	416,000	267,000
37,000		MK-4	416,000	267,000
37,500		MK-4	416,000	267,000
38,000		MK-4	426,000	277,000
39,000		MK-4	426,000	277,000
39,500		MK-4	426,000	277,000
40,000		MK-4	426,000	277,000
40,080	1 37/64	MK-4	436,000	287,000
40,880	1 39/64	MK-4	436,000	287,000
41,000		MK-4	436,000	287,000
41,670	1 41/64	MK-4	436,000	287,000
42,000		MK-4	436,000	287,000
43,000		MK-4	447,000	298,000
43,660	1 23/32	MK-4	447,000	298,000
44,000		MK-4	447,000	298,000
45,000		MK-4	447,000	298,000
46,830	1 27/32	MK-4	459,000	310,000
48,000		MK-4	470,000	321,000
49,000		MK-4	470,000	321,000
50,000		MK-4	470,000	321,000



Normaaliporat

Materiaali **HSS**Pinta **S**Leikkusuunta **R**

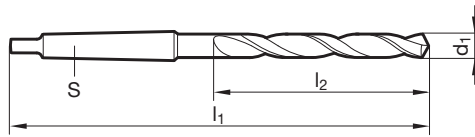
P • Kärjen kevennys $\geq \varnothing 4,000$ • kartiovaippahionta • porausholkin läpi porausta varten

M**K** •**N** ○**S****H**

seostettu-/seostamaton teräs ja valuteräs • harmaavalu-, taottava- ja pallografiittivalurauta • sintrattu pulveriteräs, uushopea ja grafiitti

GÜHRING NAVIGATOR

Leikkuarvosivu 786

Artikkelinro. **655**

d1		S	l1	l2
mm	inch		mm	mm
5,500		MK-1	161,000	80,000
6,000		MK-1	161,000	80,000
6,800		MK-1	174,000	93,000
7,000		MK-1	174,000	93,000
7,300		MK-1	174,000	93,000
8,000		MK-1	181,000	100,000
8,200		MK-1	181,000	100,000
8,400		MK-1	181,000	100,000
8,500		MK-1	181,000	100,000
8,600		MK-1	188,000	107,000
8,700		MK-1	188,000	107,000
8,800		MK-1	188,000	107,000
9,000		MK-1	188,000	107,000
9,500		MK-1	188,000	107,000
10,000		MK-1	197,000	116,000
10,050		MK-1	197,000	116,000
10,100		MK-1	197,000	116,000
10,200		MK-1	197,000	116,000
10,400		MK-1	197,000	116,000
10,500		MK-1	197,000	116,000
11,000		MK-1	206,000	125,000
11,400		MK-1	206,000	125,000
11,500		MK-1	206,000	125,000
11,750		MK-1	206,000	125,000

d1		S	l1	l2
mm	inch		mm	mm
12,000		MK-1	215,000	134,000
12,500		MK-1	215,000	134,000
13,000		MK-1	215,000	134,000
13,500		MK-1	223,000	142,000
14,000		MK-1	223,000	142,000
14,250		MK-2	245,000	147,000
14,500		MK-2	245,000	147,000
14,750		MK-2	245,000	147,000
15,000		MK-2	245,000	147,000
15,250		MK-2	251,000	153,000
15,870	5/8	MK-2	251,000	153,000
17,000		MK-2	257,000	159,000
17,500		MK-2	263,000	165,000
18,000		MK-2	263,000	165,000
21,000		MK-2	282,000	184,000
22,000		MK-2	289,000	191,000



Pitkät kartiovartiset kierukkaporat



P • Kärjen kevennys $\geq \varnothing 5,500$ • kartiovaippahionta • avarat lastu-urat
• riittämättömään lastunpoistoon

M**K** •

N • valurauta ja teräs $< 1000/\text{mm}^2$ asti • Ei suositella: CrNi-teräkset, ruostumattomat teräkset

S**H**

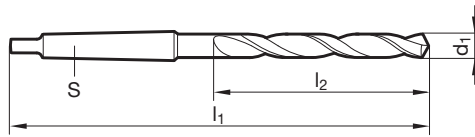
GÜHRING NAVIGATOR

Leikkuuarvosivu 786

Materiaali **HSS**

Pinta

Leikkusuunta



Artikkelinro.

551

d1		S	l1	l2
mm	inch		mm	mm
5,500		MK-1	161,000	80,000
5,550		MK-1	161,000	80,000
6,350	1/4	MK-1	167,000	86,000
6,500		MK-1	167,000	86,000
6,750	17/64	MK-1	174,000	93,000
6,800		MK-1	174,000	93,000
7,000		MK-1	174,000	93,000
7,500		MK-1	174,000	93,000
7,940	5/16	MK-1	181,000	100,000
8,000		MK-1	181,000	100,000
8,100		MK-1	181,000	100,000
8,200		MK-1	181,000	100,000
8,300		MK-1	181,000	100,000
8,330	21/64	MK-1	181,000	100,000
8,500		MK-1	181,000	100,000
8,600		MK-1	188,000	107,000
8,700		MK-1	188,000	107,000
8,750		MK-1	188,000	107,000
9,000		MK-1	188,000	107,000
9,500		MK-1	188,000	107,000
9,520	3/8	MK-1	197,000	116,000
9,800		MK-1	197,000	116,000
9,900		MK-1	197,000	116,000
9,920	25/64	MK-1	197,000	116,000
10,000		MK-1	197,000	116,000
10,200		MK-1	197,000	116,000
10,250		MK-1	197,000	116,000
10,320	13/32	MK-1	197,000	116,000
10,500		MK-1	197,000	116,000
10,750		MK-1	206,000	125,000
11,000		MK-1	206,000	125,000
11,110	7/16	MK-1	206,000	125,000
11,500		MK-1	206,000	125,000
11,510	29/64	MK-1	206,000	125,000
11,750		MK-1	206,000	125,000
11,800		MK-1	206,000	125,000
12,000		MK-1	215,000	134,000
12,300	31/64	MK-1	215,000	134,000
12,500		MK-1	215,000	134,000
12,700	1/2	MK-1	215,000	134,000
12,800		MK-1	215,000	134,000
13,000		MK-1	215,000	134,000

d1		S	l1	l2
mm	inch		mm	mm
13,100	33/64	MK-1	215,000	134,000
13,490	17/32	MK-1	223,000	142,000
13,500		MK-1	223,000	142,000
13,800		MK-1	223,000	142,000
13,890	35/64	MK-1	223,000	142,000
14,000		MK-1	223,000	142,000
14,200		MK-2	245,000	147,000
14,250		MK-2	245,000	147,000
14,290	9/16	MK-2	245,000	147,000
14,500		MK-2	245,000	147,000
14,750		MK-2	245,000	147,000
15,000		MK-2	245,000	147,000
15,250		MK-2	251,000	153,000
15,480	39/64	MK-2	251,000	153,000
15,750		MK-2	251,000	153,000
16,000		MK-2	251,000	153,000
16,500		MK-2	257,000	159,000
16,670	21/32	MK-2	257,000	159,000
17,000		MK-2	257,000	159,000
17,460	11/16	MK-2	263,000	165,000
17,500		MK-2	263,000	165,000
18,000		MK-2	263,000	165,000
18,260	23/32	MK-2	269,000	171,000
19,000		MK-2	269,000	171,000
19,500		MK-2	275,000	177,000
19,840	25/32	MK-2	275,000	177,000
20,000		MK-2	275,000	177,000
21,000		MK-2	282,000	184,000
22,000		MK-2	289,000	191,000
23,000		MK-2	296,000	198,000
23,020	29/32	MK-2	296,000	198,000
23,500		MK-3	319,000	198,000
24,000		MK-3	327,000	206,000
25,000	63/64	MK-3	327,000	206,000
26,000		MK-3	335,000	214,000
26,590	1 3/64	MK-3	343,000	222,000
28,570	1 1/8	MK-3	351,000	230,000
28,900		MK-3	351,000	230,000
28,970	1 9/64	MK-3	351,000	230,000
29,000		MK-3	351,000	230,000
30,000		MK-3	351,000	230,000
30,500		MK-3	360,000	239,000

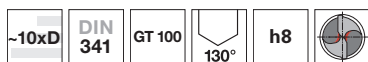


d1		S	l1	l2
mm	inch		mm	mm
30,560	1 13/64	MK-3	360,000	239,000
30,960	1 7/32	MK-3	360,000	239,000
31,000		MK-3	360,000	239,000
31,500		MK-3	360,000	239,000
32,000		MK-4	397,000	248,000

d1		S	l1	l2
mm	inch		mm	mm



Pitkät kartiovartiset kierukkaporat



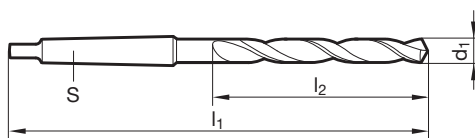
P • Kärjen kevennys $\geq \varnothing 5,600$ • kartiovaippahionta • avarat lastu-urat
• riittämättömään lastunpoistoon



N • valurauta ja teräs $< 1000/\text{mm}^2$ asti • Ei suositella: CrNi-teräkset, ruostumattomat teräkset

GÜHRING NAVIGATOR

Leikkuuarvosivu 786

Materiaali **HSS**Pinta **S**Leikkusuunta **R**

Artikkelinro.

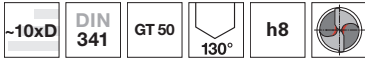
656

d1		S	l1	l2
mm	inch		mm	mm
7,000		MK-1	174,000	93,000
9,000		MK-1	188,000	107,000
9,500		MK-1	188,000	107,000
9,920	25/64	MK-1	197,000	116,000
10,000		MK-1	197,000	116,000
10,200		MK-1	197,000	116,000
10,320	13/32	MK-1	197,000	116,000
10,500		MK-1	197,000	116,000
11,000		MK-1	206,000	125,000
11,110	7/16	MK-1	206,000	125,000
11,500		MK-1	206,000	125,000
12,000		MK-1	215,000	134,000
12,500		MK-1	215,000	134,000
13,000		MK-1	215,000	134,000
13,800		MK-1	223,000	142,000
14,000		MK-1	223,000	142,000
14,500		MK-2	245,000	147,000
15,000		MK-2	245,000	147,000

d1		S	l1	l2
mm	inch		mm	mm
16,000		MK-2	251,000	153,000
16,670	21/32	MK-2	257,000	159,000
17,460	11/16	MK-2	263,000	165,000
17,500		MK-2	263,000	165,000
18,000		MK-2	263,000	165,000
19,050	3/4	MK-2	275,000	177,000
20,500		MK-2	282,000	184,000
20,640	13/16	MK-2	282,000	184,000
21,500		MK-2	289,000	191,000
23,000		MK-2	296,000	198,000



Pitkät kartiovartiset kierukkaporat

Materiaali **HSS**

Pinta ○

Leikkusuunta

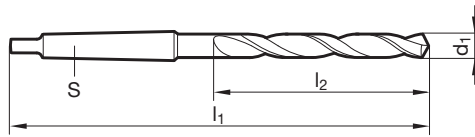
P ○ Kärjen kevennys $\geq \varnothing 4,200$ • kartiovaippahionta • erittäin suuri lastu-ura



N • pitkälästäiset materiaalit $< 500 \text{ N/mm}^2$ • niukkaseosteiset teräkset
 • Alumiini, pitkälästäiset Al-seokset • sinkki, puhdistettu kupari, silumiini, elektroni • zamakki, argalium, pehmeät muovit ,puu

GÜHRING NAVIGATOR

Leikkuarvosivu 786



Artikkelinro.

505Kartiovartiset
kierukkaporat

d1		S	l1	l2	d1		S	l1	l2
mm	inch		mm	mm	mm	inch		mm	mm
5,500		MK-1	161,000	80,000	10,700		MK-1	206,000	125,000
5,600		MK-1	161,000	80,000	10,750		MK-1	206,000	125,000
5,800		MK-1	161,000	80,000	10,800		MK-1	206,000	125,000
6,000		MK-1	161,000	80,000	11,200		MK-1	206,000	125,000
6,100		MK-1	167,000	86,000	11,500		MK-1	206,000	125,000
6,300		MK-1	167,000	86,000	11,800		MK-1	206,000	125,000
6,500		MK-1	167,000	86,000	12,000		MK-1	215,000	134,000
6,700		MK-1	167,000	86,000	12,200		MK-1	215,000	134,000
6,800		MK-1	174,000	93,000	12,500		MK-1	215,000	134,000
7,000		MK-1	174,000	93,000	12,700	1/2	MK-1	215,000	134,000
7,200		MK-1	174,000	93,000	12,800		MK-1	215,000	134,000
7,300		MK-1	174,000	93,000	13,250		MK-1	223,000	142,000
7,500		MK-1	174,000	93,000	13,750		MK-1	223,000	142,000
7,700		MK-1	181,000	100,000	13,800		MK-1	223,000	142,000
7,950		MK-1	181,000	100,000	14,200		MK-2	245,000	147,000
8,000		MK-1	181,000	100,000	14,250		MK-2	245,000	147,000
8,200		MK-1	181,000	100,000	14,300		MK-2	245,000	147,000
8,300		MK-1	181,000	100,000	14,500		MK-2	245,000	147,000
8,400		MK-1	181,000	100,000	15,000		MK-2	245,000	147,000
8,500		MK-1	181,000	100,000	16,000		MK-2	251,000	153,000
8,600		MK-1	188,000	107,000	16,500		MK-2	257,000	159,000
9,050		MK-1	188,000	107,000	16,800		MK-2	257,000	159,000
9,300		MK-1	188,000	107,000	18,500		MK-2	269,000	171,000
9,500		MK-1	188,000	107,000	19,250		MK-2	275,000	177,000
9,600		MK-1	197,000	116,000	21,000		MK-2	282,000	184,000
9,700		MK-1	197,000	116,000	23,500		MK-3	319,000	198,000
9,800		MK-1	197,000	116,000	24,000		MK-3	327,000	206,000
10,000		MK-1	197,000	116,000	29,000		MK-3	351,000	230,000
10,200		MK-1	197,000	116,000	29,500		MK-3	351,000	230,000
10,250		MK-1	197,000	116,000					



Pitkät kartiovartiset kierukkaporat



P • Kärjen kevennys $\geq \varnothing 4,750$ • kartiovaippahionta • Co-seosteinen pikateräs • parempi kulumiskestävyys • porausholkin läpi porausta varten

M ○

K •

N •

S ○

H

seostetut/seostamattomat teräkset ja valut < 800 N/mm² • kuuma- ja kylmävalssatut teräkset • pienikitkaiset laakeriteräkset • runsasseosteiset teräkset • nuorutus- ja hiilikarkaistut teräkset

Materiaali **HSCO**

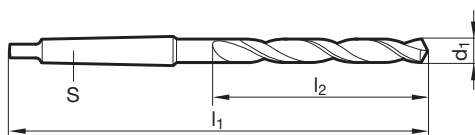
Pinta



Leikkusuunta

**GÜHRING** NAVIGATOR

Leikkuarvosivu 792



Artikkelinro.

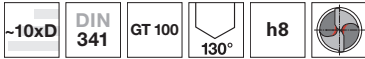
357

d1		S	l1	l2
mm	inch		mm	mm
4,750		MK-1	150,000	69,000
5,000		MK-1	155,000	74,000
5,400		MK-1	161,000	80,000
6,000		MK-1	161,000	80,000
6,750	17/64	MK-1	174,000	93,000
6,800		MK-1	174,000	93,000
7,000		MK-1	174,000	93,000
8,000		MK-1	181,000	100,000
8,200		MK-1	181,000	100,000
8,500		MK-1	181,000	100,000
8,800		MK-1	188,000	107,000
9,000		MK-1	188,000	107,000
9,500		MK-1	188,000	107,000
9,800		MK-1	197,000	116,000
10,000		MK-1	197,000	116,000
10,200		MK-1	197,000	116,000
10,250		MK-1	197,000	116,000
10,500		MK-1	197,000	116,000
11,000		MK-1	206,000	125,000
11,500		MK-1	206,000	125,000
12,000		MK-1	215,000	134,000
12,250		MK-1	215,000	134,000
12,500		MK-1	215,000	134,000
13,000		MK-1	215,000	134,000

d1		S	l1	l2
mm	inch		mm	mm
13,500		MK-1	223,000	142,000
14,000		MK-1	223,000	142,000
14,500		MK-2	245,000	147,000
14,750		MK-2	245,000	147,000
15,000		MK-2	245,000	147,000
15,500		MK-2	251,000	153,000
16,000		MK-2	251,000	153,000
16,750		MK-2	257,000	159,000
17,000		MK-2	257,000	159,000
17,500		MK-2	263,000	165,000
18,000		MK-2	263,000	165,000
20,000		MK-2	275,000	177,000
21,000		MK-2	282,000	184,000
22,000		MK-2	289,000	191,000
23,000		MK-2	296,000	198,000
24,000		MK-3	327,000	206,000
25,000	63/64	MK-3	327,000	206,000
26,000		MK-3	335,000	214,000
26,500		MK-3	335,000	214,000
27,000		MK-3	343,000	222,000
28,000		MK-3	343,000	222,000
30,000		MK-3	351,000	230,000
33,000		MK-4	397,000	248,000
40,000		MK-4	426,000	277,000



Pitkät kartiovartiset kierukkaporat



P •	Kärjen kevennys $\geq \varnothing 10,000$ • kartiovaippahionta • Co-seosteinen pikateräs • avarat lastu-urat • parempi kulumiskestävyys
M •	
K •	seostetut/seostomattomat teräkset ja valut $> 800 \text{ N/mm}^2$ • kuuma- ja kylmävalssatut teräkset • pienikitkaiset laakeriteräkset • runsasseosteiset teräkset • nuorutus- ja hiilikarkaistut teräkset
N •	
S •	
H ○	

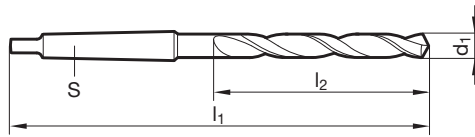
Materiaali **HSCO**

Pinta

Leikkusuunta

GÜHRING NAVIGATOR

Leikkuarvosivu 792

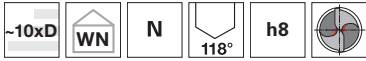
Artikkelinro. **623**Kartiovartiset
kierukkaporat

d1		S	l1	l2
mm	inch		mm	mm
10,000		MK-1	197,000	116,000
10,200		MK-1	197,000	116,000
10,320	13/32	MK-1	197,000	116,000
10,500		MK-1	197,000	116,000
10,800		MK-1	206,000	125,000
11,000		MK-1	206,000	125,000
11,200		MK-1	206,000	125,000
11,500		MK-1	206,000	125,000
11,510	29/64	MK-1	206,000	125,000
11,800		MK-1	206,000	125,000
12,000		MK-1	215,000	134,000
12,200		MK-1	215,000	134,000
12,400		MK-1	215,000	134,000
12,500		MK-1	215,000	134,000
13,000		MK-1	215,000	134,000
13,490	17/32	MK-1	223,000	142,000
13,500		MK-1	223,000	142,000
13,890	35/64	MK-1	223,000	142,000
14,000		MK-1	223,000	142,000
14,200		MK-2	245,000	147,000
14,290	9/16	MK-2	245,000	147,000
14,500		MK-2	245,000	147,000
14,680	37/64	MK-2	245,000	147,000
15,000		MK-2	245,000	147,000

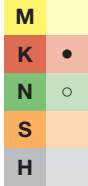
d1		S	l1	l2
mm	inch		mm	mm
15,500		MK-2	251,000	153,000
16,000		MK-2	251,000	153,000
16,500		MK-2	257,000	159,000
17,000		MK-2	257,000	159,000
17,460	11/16	MK-2	263,000	165,000
17,500		MK-2	263,000	165,000
18,000		MK-2	263,000	165,000
18,500		MK-2	269,000	171,000
19,000		MK-2	269,000	171,000
19,500		MK-2	275,000	177,000
20,000		MK-2	275,000	177,000
20,500		MK-2	282,000	184,000
21,000		MK-2	282,000	184,000
22,000		MK-2	289,000	191,000
22,500		MK-2	296,000	198,000
24,000		MK-3	327,000	206,000
25,000	63/64	MK-3	327,000	206,000
26,000		MK-3	335,000	214,000



Pitkät kartiovartiset kierukkaporat



P • Kärjen kevennys $\geq \varnothing 16,500$ • kartiovaippahionta • ylikoko varsi
• porausholkin läpi porausta varten



N ○ seostettu-/seostamaton teräs ja valuteräs • harmaavalu-, taottava- ja pallografiittivalurauta • sintrattu pulveriteräs, uushopea ja grafiitti

Materiaali **HSS**

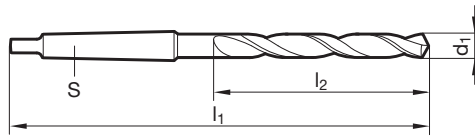
Pinta



Leikkusuunta

**GÜHRING** NAVIGATOR

Leikkuarvosivu 786



Artikkelinro.

523

d1		S	l1	l2
mm	inch		mm	mm
10,000		MK-2	214,000	116,000
11,000		MK-2	223,000	125,000
12,300	31/64	MK-2	232,000	134,000
12,500		MK-2	232,000	134,000
14,000		MK-2	240,000	142,000
21,000		MK-3	305,000	184,000

d1		S	l1	l2
mm	inch		mm	mm
23,000		MK-3	319,000	198,000
29,000		MK-4	379,000	230,000



Erikoispitkät kierukkaporat sarja 1



• Kärjen kevennys $\geq \varnothing 7,800$ • kartiovaippahionta • erittäin syville rei'ille

o seostettu-/seostamaton teräs ja valuteräs • harmaavalu-, taottava- ja pallografiittivalurauta • sintrattu pulveriteräs, uushopea ja grafiitti

Materiaali **HSS**

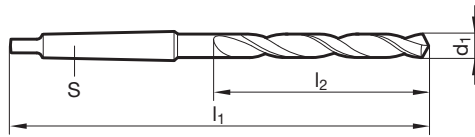
Pinta



Leikkusuunta

**GÜHRING** NAVIGATOR

Leikkuuarvosivu 788



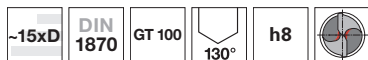
Artikkelinro.

266

d1		S	l1	l2	d1		S	l1	l2
mm	inch		mm	mm	mm	inch		mm	mm
8,000		MK-1	265,000	165,000	20,500		MK-2	385,000	260,000
8,500		MK-1	265,000	165,000	20,640	13/16	MK-2	385,000	260,000
9,000		MK-1	275,000	175,000	21,000		MK-2	385,000	260,000
9,500		MK-1	275,000	175,000	21,430	27/32	MK-2	405,000	270,000
10,000		MK-1	285,000	185,000	21,500		MK-2	405,000	270,000
10,200		MK-1	285,000	185,000	22,000		MK-2	405,000	270,000
10,250		MK-1	285,000	185,000	22,500		MK-2	405,000	270,000
10,500		MK-1	285,000	185,000	23,000		MK-2	405,000	270,000
11,000		MK-1	300,000	195,000	23,020	29/32	MK-2	405,000	270,000
11,400		MK-1	300,000	195,000	23,500		MK-3	425,000	270,000
11,500		MK-1	300,000	195,000	24,000		MK-3	440,000	290,000
11,750		MK-1	300,000	195,000	24,500		MK-3	440,000	290,000
11,800		MK-1	300,000	195,000	25,000	63/64	MK-3	440,000	290,000
12,000		MK-1	310,000	205,000	26,000		MK-3	440,000	290,000
12,200		MK-1	310,000	205,000	26,500		MK-3	440,000	290,000
12,500		MK-1	310,000	205,000	27,000		MK-3	460,000	305,000
12,700	1/2	MK-1	310,000	205,000	28,000		MK-3	460,000	305,000
13,000		MK-1	310,000	205,000	30,000		MK-3	460,000	305,000
13,500		MK-1	325,000	220,000	30,500		MK-3	480,000	320,000
13,750		MK-1	325,000	220,000	31,000		MK-3	480,000	320,000
14,000		MK-1	325,000	220,000	32,000		MK-4	505,000	320,000
14,290	9/16	MK-2	340,000	220,000	33,000		MK-4	505,000	320,000
14,500		MK-2	340,000	220,000	34,000		MK-4	530,000	340,000
15,000		MK-2	340,000	220,000	35,000		MK-4	530,000	340,000
15,250		MK-2	355,000	230,000	36,000		MK-4	530,000	340,000
15,500		MK-2	355,000	230,000	38,000		MK-4	555,000	360,000
15,750		MK-2	355,000	230,000	39,000		MK-4	555,000	360,000
15,800		MK-2	355,000	230,000	40,000		MK-4	555,000	360,000
16,000		MK-2	355,000	230,000	42,000		MK-4	555,000	360,000
16,250		MK-2	355,000	230,000	45,000		MK-4	585,000	385,000
16,500		MK-2	355,000	230,000	45,240	1 25/32	MK-4	585,000	385,000
16,670	21/32	MK-2	355,000	230,000	48,000		MK-4	605,000	405,000
17,000		MK-2	355,000	230,000	50,000		MK-4	605,000	405,000
17,500		MK-2	370,000	245,000					
17,750		MK-2	370,000	245,000					
18,000		MK-2	370,000	245,000					
18,500		MK-2	370,000	245,000					
18,650	47/64	MK-2	370,000	245,000					
19,000		MK-2	370,000	245,000					
19,500		MK-2	385,000	260,000					
19,750		MK-2	385,000	260,000					
20,000		MK-2	385,000	260,000					



Erikoispitkät kierukkaporat sarja 1



P	•	Kärjen kevennys $\geq \varnothing 5,800$ • kartiovaippahionta • avarat lastu-urat
M		• erittäin syville rei'ille • riittämättömään lastunpoistoon
K	•	
N	•	valurauta ja teräs < 1000/mm ² asti • Ei suositella: CrNi-teräkset, ruostumattomat teräkset
S		
H		

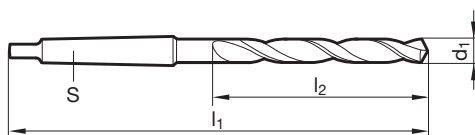
GÜHRING NAVIGATOR

Leikkuuarvosivu 790

Materiaali **HSS**

Pinta

Leikkusuunta



Artikkelinro.

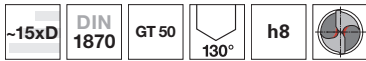
526

d1		S	l1	l2
mm	inch		mm	mm
8,000		MK-1	265,000	165,000
8,500		MK-1	265,000	165,000
8,600		MK-1	275,000	175,000
8,700		MK-1	275,000	175,000
9,000		MK-1	275,000	175,000
9,500		MK-1	275,000	175,000
9,520	3/8	MK-1	285,000	185,000
9,800		MK-1	285,000	185,000
10,000		MK-1	285,000	185,000
10,200		MK-1	285,000	185,000
10,500		MK-1	285,000	185,000
10,720	27/64	MK-1	300,000	195,000
11,000		MK-1	300,000	195,000
11,110	7/16	MK-1	300,000	195,000
11,500		MK-1	300,000	195,000
11,510	29/64	MK-1	300,000	195,000
11,750		MK-1	300,000	195,000
12,000		MK-1	310,000	205,000
12,500		MK-1	310,000	205,000
12,700	1/2	MK-1	310,000	205,000
12,800		MK-1	310,000	205,000
13,000		MK-1	310,000	205,000
13,490	17/32	MK-1	325,000	220,000
13,500		MK-1	325,000	220,000
14,000		MK-1	325,000	220,000
14,200		MK-2	340,000	220,000
14,290	9/16	MK-2	340,000	220,000
14,500		MK-2	340,000	220,000
15,000		MK-2	340,000	220,000
15,500		MK-2	355,000	230,000

d1		S	l1	l2
mm	inch		mm	mm
15,870	5/8	MK-2	355,000	230,000
16,000		MK-2	355,000	230,000
16,500		MK-2	355,000	230,000
17,000		MK-2	355,000	230,000
17,460	11/16	MK-2	370,000	245,000
17,500		MK-2	370,000	245,000
18,000		MK-2	370,000	245,000
18,500		MK-2	370,000	245,000
19,000		MK-2	370,000	245,000
19,500		MK-2	385,000	260,000
20,000		MK-2	385,000	260,000
20,500		MK-2	385,000	260,000
21,000		MK-2	385,000	260,000
21,500		MK-2	405,000	270,000
22,000		MK-2	405,000	270,000
23,000		MK-2	405,000	270,000
24,000		MK-3	440,000	290,000
25,000	63/64	MK-3	440,000	290,000
26,000		MK-3	440,000	290,000
26,500		MK-3	440,000	290,000
28,000		MK-3	460,000	305,000
28,500		MK-3	460,000	305,000
29,000		MK-3	460,000	305,000
30,000		MK-3	460,000	305,000



Erikoispitkät kierukkaporat sarja 1

Materiaali **HSS**

Pinta ○

Leikkusuunta

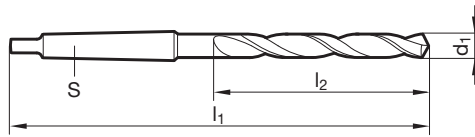
P ○ Kärjen kevennys $\geq \varnothing 7,900$ • kartiovaippahionta • erittäin syville rei'ille
• pehmeille ja pitkäkestäville materiaaleille

M**K****N** ●**S****H**

pitkälästiset materiaalit $< 500 \text{ N/mm}^2$ • niukkaseosteiset teräkset
• Alumiini, pitkäkestäiset Al-seokset • sinkki, puhdistettu kupari, silumiini,
elektroni • zamakki, argalium, pehmeät muovit ,puu

GÜHRING NAVIGATOR

Leikkuarvosivu 788



Artikkelinro.

525

d1		S	l1	l2
mm	inch		mm	mm
8,500		MK-1	265,000	165,000
8,700		MK-1	275,000	175,000
9,000		MK-1	275,000	175,000
9,500		MK-1	275,000	175,000
10,000		MK-1	285,000	185,000
10,500		MK-1	285,000	185,000
11,000		MK-1	300,000	195,000
12,000		MK-1	310,000	205,000
12,500		MK-1	310,000	205,000
13,000		MK-1	310,000	205,000
13,500		MK-1	325,000	220,000
14,000		MK-1	325,000	220,000
15,000		MK-2	340,000	220,000
15,500		MK-2	355,000	230,000
16,000		MK-2	355,000	230,000
18,000		MK-2	370,000	245,000
19,500		MK-2	385,000	260,000
21,000		MK-2	385,000	260,000

d1		S	l1	l2
mm	inch		mm	mm
23,000		MK-2	405,000	270,000
24,000		MK-3	440,000	290,000
24,300		MK-3	440,000	290,000
24,380		MK-3	440,000	290,000
24,500		MK-3	440,000	290,000
25,500		MK-3	440,000	290,000
26,500		MK-3	440,000	290,000
27,500		MK-3	460,000	305,000
28,000		MK-3	460,000	305,000
29,000		MK-3	460,000	305,000
31,000		MK-3	480,000	320,000
33,000		MK-4	505,000	320,000



Erikoispitkät kierukkaporat sarja 1

Materiaali **HSCO**

Pinta

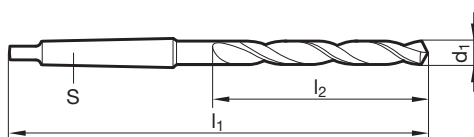
Leikkusuunta

P • Kärjen kevennys $\geq \varnothing 9,520$ • kartiovaippahionta • Co-seosteinen pikateräs • avarat lastu-urat • parempi kulumiskestävyys • erittäin syville rei'ille • riittämättömään lastunpoistoon

M •
K •
N • erikoislujat teräkset ja valuteräkset • harmaavalu-, taottava- ja pallografiittivalurauta
S •
H ○

GÜHRING NAVIGATOR

Leikkuarvosivu 794

Artikkelinro. **620**

d1		S	l1	l2
mm	inch		mm	mm
9,520	3/8	MK-1	285,000	185,000
10,000		MK-1	285,000	185,000
10,200		MK-1	285,000	185,000
10,320	13/32	MK-1	285,000	185,000
10,500		MK-1	285,000	185,000
11,000		MK-1	300,000	195,000
11,110	7/16	MK-1	300,000	195,000
11,500		MK-1	300,000	195,000
11,510	29/64	MK-1	300,000	195,000
12,000		MK-1	310,000	205,000
12,300	31/64	MK-1	310,000	205,000
12,500		MK-1	310,000	205,000
12,700	1/2	MK-1	310,000	205,000
13,000		MK-1	310,000	205,000
13,500		MK-1	325,000	220,000
14,000		MK-1	325,000	220,000
14,290	9/16	MK-2	340,000	220,000
14,500		MK-2	340,000	220,000
15,000		MK-2	340,000	220,000
15,080	19/32	MK-2	355,000	230,000
15,500		MK-2	355,000	230,000
16,000		MK-2	355,000	230,000
16,500		MK-2	355,000	230,000
17,000		MK-2	355,000	230,000

d1		S	l1	l2
mm	inch		mm	mm
17,500		MK-2	370,000	245,000
18,000		MK-2	370,000	245,000
18,500		MK-2	370,000	245,000
19,000		MK-2	370,000	245,000
20,000		MK-2	385,000	260,000
21,000		MK-2	385,000	260,000
21,830		MK-2	405,000	270,000
22,000		MK-2	405,000	270,000
22,620		MK-2	405,000	270,000
23,000		MK-2	405,000	270,000
25,500		MK-3	440,000	290,000
26,000		MK-3	440,000	290,000
27,180		MK-3	460,000	305,000
29,370	1 5/32	MK-3	460,000	305,000
30,000		MK-3	460,000	305,000



Erikoispitkät kierukkaporat sarja 2

Materiaali **HSS**

Pinta

Leikkusuunta



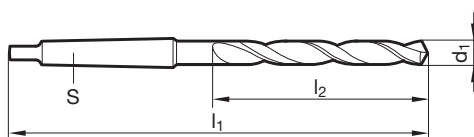
P • Kärjen kevennys $\geq \varnothing 7,700$ • kartiovaippahionta • erittäin syville rei'ille

M**K** •**N** ○**S****H**

seostettu-/seostamaton teräs ja valuteräs • harmaavalu-, taottava- ja pallografiittivalurauta • sintrattu pulveriteräs, uushopea ja grafiitti

GÜHRING NAVIGATOR

Leikkuarvosivu 788



Artikkelinro.

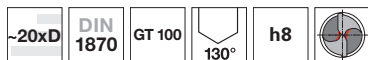
267

d1		S	l1	l2
mm	inch		mm	mm
8,000		MK-1	330,000	210,000
8,500		MK-1	330,000	210,000
9,000		MK-1	345,000	220,000
10,000		MK-1	360,000	235,000
10,200		MK-1	360,000	235,000
10,500		MK-1	360,000	235,000
11,000		MK-1	375,000	250,000
11,500		MK-1	375,000	250,000
11,750		MK-1	375,000	250,000
11,800		MK-1	375,000	250,000
12,000		MK-1	395,000	260,000
13,000		MK-1	395,000	260,000
13,490	17/32	MK-1	410,000	275,000
13,500		MK-1	410,000	275,000
14,000		MK-1	410,000	275,000
14,500		MK-2	425,000	275,000
15,000		MK-2	425,000	275,000
15,480	39/64	MK-2	445,000	295,000
15,500		MK-2	445,000	295,000
16,000		MK-2	445,000	295,000
16,500		MK-2	445,000	295,000
17,000		MK-2	445,000	295,000
17,070	43/64	MK-2	465,000	310,000
17,500		MK-2	465,000	310,000
18,000		MK-2	465,000	310,000
18,500		MK-2	465,000	310,000
19,000		MK-2	465,000	310,000
19,050	3/4	MK-2	490,000	325,000
19,500		MK-2	490,000	325,000
20,000		MK-2	490,000	325,000

d1		S	l1	l2
mm	inch		mm	mm
20,640	13/16	MK-2	490,000	325,000
21,000		MK-2	490,000	325,000
21,430	27/32	MK-2	515,000	345,000
21,500		MK-2	515,000	345,000
21,830	55/64	MK-2	515,000	345,000
22,000		MK-2	515,000	345,000
22,800		MK-2	515,000	345,000
23,000		MK-2	515,000	345,000
23,020	29/32	MK-2	515,000	345,000
23,750		MK-3	555,000	365,000
23,810	15/16	MK-3	555,000	365,000
24,000		MK-3	555,000	365,000
24,500		MK-3	555,000	365,000
25,000	63/64	MK-3	555,000	365,000
26,000		MK-3	555,000	365,000
28,000		MK-3	580,000	385,000
29,500		MK-3	580,000	385,000
30,000		MK-3	580,000	385,000
31,000		MK-3	610,000	410,000
32,000		MK-4	635,000	410,000
34,000		MK-4	665,000	430,000
40,000		MK-4	695,000	460,000
45,000		MK-4	735,000	490,000



Erikoispitkät kierukkaporat sarja 2



P • Kärjen kevennys $\geq \varnothing 7,800$ • kartiovaippahionta • avarat lastu-urat
• riittämättömään lastunpoistoon • erittäin syville rei'ille

M

K •

N • valurauta ja teräs $< 1000/\text{mm}^2$ asti • Ei suositella: CrNi-teräkset, ruostumattomat teräkset

S

H

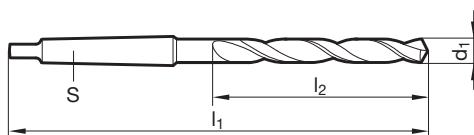
GÜHRING NAVIGATOR

Leikkuuarvosivu 790

Materiaali **HSS**

Pinta

Leikkusuunta



Artikkelinro.

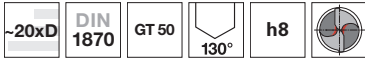
527

d1		S	l1	l2
mm	inch		mm	mm
8,000		MK-1	330,000	210,000
8,400		MK-1	330,000	210,000
8,500		MK-1	330,000	210,000
9,000		MK-1	345,000	220,000
9,500		MK-1	345,000	220,000
10,000		MK-1	360,000	235,000
10,500		MK-1	360,000	235,000
11,000		MK-1	375,000	250,000
11,110	7/16	MK-1	375,000	250,000
11,500		MK-1	375,000	250,000
11,510	29/64	MK-1	375,000	250,000
11,800		MK-1	375,000	250,000
11,910	15/32	MK-1	395,000	260,000
12,000		MK-1	395,000	260,000
12,500		MK-1	395,000	260,000
12,700	1/2	MK-1	395,000	260,000
13,000		MK-1	395,000	260,000
13,500		MK-1	410,000	275,000
13,700		MK-1	410,000	275,000
13,800		MK-1	410,000	275,000
13,890	35/64	MK-1	410,000	275,000
14,000		MK-1	410,000	275,000
14,290	9/16	MK-2	425,000	275,000
14,500		MK-2	425,000	275,000
15,000		MK-2	425,000	275,000
15,500		MK-2	445,000	295,000
16,000		MK-2	445,000	295,000
16,500		MK-2	445,000	295,000
17,000		MK-2	445,000	295,000
17,070	43/64	MK-2	465,000	310,000

d1		S	l1	l2
mm	inch		mm	mm
17,500		MK-2	465,000	310,000
17,800		MK-2	465,000	310,000
18,000		MK-2	465,000	310,000
18,500		MK-2	465,000	310,000
19,000		MK-2	465,000	310,000
19,450	49/64	MK-2	490,000	325,000
19,500		MK-2	490,000	325,000
20,000		MK-2	490,000	325,000
20,500		MK-2	490,000	325,000
21,000		MK-2	490,000	325,000
21,030	53/64	MK-2	490,000	325,000
21,430	27/32	MK-2	515,000	345,000
22,000		MK-2	515,000	345,000
23,000		MK-2	515,000	345,000
23,020	29/32	MK-2	515,000	345,000
23,810	15/16	MK-3	555,000	365,000
24,000		MK-3	555,000	365,000
24,210	61/64	MK-3	555,000	365,000
25,000	63/64	MK-3	555,000	365,000
26,000		MK-3	555,000	365,000
26,190	1 1/32	MK-3	555,000	365,000
26,500		MK-3	555,000	365,000
27,000		MK-3	580,000	385,000
28,000		MK-3	580,000	385,000
28,750		MK-3	580,000	385,000
29,000		MK-3	580,000	385,000
29,500		MK-3	580,000	385,000
30,000		MK-3	580,000	385,000



Erikoispitkät kierukkaporat sarja 2

Materiaali **HSS**

Pinta ○

Leikkusuunta

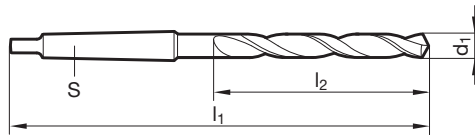
P ○ Kärjen kevennys $\geq \varnothing 8,000$ • kartiovaippahionta • erittäin syville rei'ille



N ● pitkälastuiset materiaalit $< 500 \text{ N/mm}^2$ • niukkaseosteiset teräkset
 • Alumiini, pitkälastuiset Al-seokset • sinkki, puhdistettu kupari, silumiini, elektroni • zamakki, argalium, pehmeät muovit ,puu

GÜHRING NAVIGATOR

Leikkuarvosivu 788



Artikkelinro.

542Kartiovartiset
kierukkaporat

d1		S	l1	l2
mm	inch		mm	mm
8,500		MK-1	330,000	210,000
8,600		MK-1	345,000	220,000
8,800		MK-1	345,000	220,000
9,000		MK-1	345,000	220,000
9,500		MK-1	345,000	220,000
10,500		MK-1	360,000	235,000
10,700		MK-1	375,000	250,000
11,000		MK-1	375,000	250,000
11,500		MK-1	375,000	250,000
12,000		MK-1	395,000	260,000
12,500		MK-1	395,000	260,000
13,000		MK-1	395,000	260,000
13,500		MK-1	410,000	275,000
14,500		MK-2	425,000	275,000
15,000		MK-2	425,000	275,000
17,000		MK-2	445,000	295,000
17,500		MK-2	465,000	310,000
20,500		MK-2	490,000	325,000

d1		S	l1	l2
mm	inch		mm	mm
21,000		MK-2	490,000	325,000
21,500		MK-2	515,000	345,000
22,000		MK-2	515,000	345,000
23,000		MK-2	515,000	345,000
24,000		MK-3	555,000	365,000
24,500		MK-3	555,000	365,000
25,500		MK-3	555,000	365,000
26,000		MK-3	555,000	365,000
26,500		MK-3	555,000	365,000
27,500		MK-3	580,000	385,000
28,000		MK-3	580,000	385,000
29,000		MK-3	580,000	385,000
29,500		MK-3	580,000	385,000
30,000		MK-3	580,000	385,000
31,000		MK-3	610,000	410,000



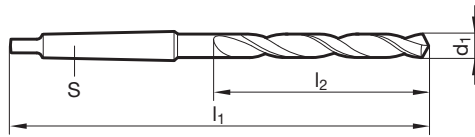
Erikoispitkät kierukkaporat sarja 2



P	•	Kärjen kevennys $\geq \varnothing 9,520$ • kartiovaippahionta • Co-seosteinen pikateräs • avarat lastu-urat • parempi kulumiskestävyys
M	•	• riittämättömään lastunpoistoon • erittäin syville rei'ille
K	•	
N	•	erikoislujat teräkset ja valuteräkset • harmaavalu-, taottava- ja pallografiittivalurauta
S	•	
H	○	

GÜHRING NAVIGATOR

Leikkuuarvosivu 794

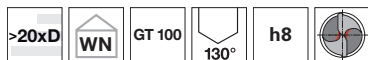
Materiaali **HSCO**Pinta  $\geq \frac{0}{16,0}$ Leikkusuunta Artikkelinro. **621**

d1		S	l1	l2
mm	inch		mm	mm
9,520	3/8	MK-1	360,000	235,000
10,000		MK-1	360,000	235,000
10,500		MK-1	360,000	235,000
10,720	27/64	MK-1	375,000	250,000
11,000		MK-1	375,000	250,000
11,500		MK-1	375,000	250,000
11,510	29/64	MK-1	375,000	250,000
12,000		MK-1	395,000	260,000
12,500		MK-1	395,000	260,000
12,700	1/2	MK-1	395,000	260,000
13,000		MK-1	395,000	260,000
13,500		MK-1	410,000	275,000

d1		S	l1	l2
mm	inch		mm	mm
14,000		MK-1	410,000	275,000
14,500		MK-2	425,000	275,000
15,000		MK-2	425,000	275,000
16,000		MK-2	445,000	295,000
16,270		MK-2	445,000	295,000
18,000		MK-2	465,000	310,000
18,500		MK-2	465,000	310,000
19,000		MK-2	465,000	310,000
20,000		MK-2	490,000	325,000
21,430	27/32	MK-2	515,000	345,000
23,420	59/64	MK-3	535,000	345,000



Ylipitkät kierukkaporat



P	•	Kärjen kevennys $\geq \varnothing 6,000$ • kartiovaippahionta • avarat lastu-urat
M		• riittämättömään lastunpoistoon • erittäin syville rei'ille
K	•	
N	•	valurauta ja teräs $< 1000/\text{mm}^2$ asti • Ei suositella: CrNi-teräkset, ruostumattomat teräkset
S		
H		

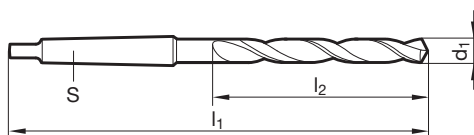
Materiaali **HSS**

Pinta

Leikkusuunta

GÜHRING NAVIGATOR

Leikkuarvosivu 790



Artikkelinro.

563

d1		S	l1	l2
mm	inch			
6,000		MK-1	200,000	120,000
6,500		MK-1	200,000	120,000
7,000		MK-1	200,000	120,000
7,500		MK-1	200,000	120,000

d1		S	l1	l2
mm	inch			

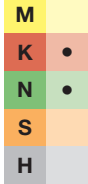
Kartiovartiset
kierukkaporat



Ylipitkät kierukkaporat



- P** • Kärjen kevennys $\geq \varnothing 6,000$ • kartiovaippahionta • avarat lastu-urat
• riittämättömään lastunpoistoon • erittäin syville rei'ille



- N** • valurauta ja teräs $< 1000/\text{mm}^2$ asti • Ei suositella: CrNi-teräkset, ruostumattomat teräkset

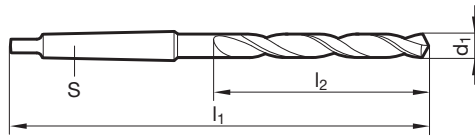
Materiaali **HSS**

Pinta

Leikkusuunta

GÜHRING NAVIGATOR

Leikkuarvosivu 790



Artikkelinro.

564

d1		S	l1	l2
mm	inch		mm	mm
6,000		MK-1	300,000	220,000
6,500		MK-1	300,000	220,000
7,000		MK-1	300,000	220,000
8,000		MK-1	350,000	270,000
8,500		MK-1	350,000	270,000
9,000		MK-1	350,000	270,000

d1		S	l1	l2
mm	inch		mm	mm
10,000		MK-1	350,000	270,000



Ylipitkät kierukkaporat



- P** • Kärjen kevennys $\geq \varnothing 6,000$ • kartiovaippahionta • avarat lastu-urat
• riittämättömään lastunpoistoon • erittäin syville rei'ille

M**K****N****S****H**

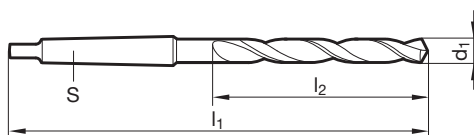
- valurauta ja teräs $< 1000/\text{mm}^2$ asti • Ei suositella: CrNi-teräkset, ruostumattomat teräkset

Materiaali **HSS**Pinta $>0/16,0$

Leikkusuunta

GÜHRING NAVIGATOR

Leikkuarvosivu 790



Artikkelinro.

565

d1		S	l1	l2
mm	inch		mm	mm
6,000		MK-1	425,000	345,000
6,500		MK-1	425,000	345,000
7,000		MK-1	425,000	345,000
7,500		MK-1	425,000	345,000
8,000		MK-1	425,000	345,000
8,500		MK-1	425,000	345,000
9,000		MK-1	425,000	345,000
10,000		MK-1	425,000	345,000
11,000		MK-1	425,000	345,000
12,000		MK-1	425,000	345,000
13,000		MK-1	425,000	345,000
14,000		MK-1	425,000	345,000

d1		S	l1	l2
mm	inch		mm	mm
15,000		MK-2	425,000	325,000
16,000		MK-2	425,000	325,000
17,000		MK-2	425,000	325,000



Ylipitkät kierukkaporat



- P** • Kärjen kevennys $\geq \varnothing 8,000$ • kartiovaippahionta • avarat lastu-urat
• riittämättömään lastunpoistoon • erittäin syville rei'ille

M**K** •

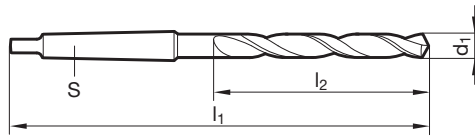
- N** • valurauta ja teräs $< 1000/\text{mm}^2$ asti • Ei suosittella: CrNi-teräkset, ruostumattomat teräkset

S**H**Materiaali **HSS**Pinta >0
16,0

Leikkusuunta

GÜHRING NAVIGATOR

Leikkuarvosivu 790

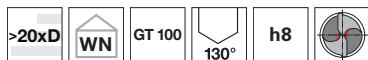
Artikkelinro. **566**

d1		S	l1	l2
mm	inch		mm	mm
8,000		MK-1	500,000	420,000
8,500		MK-1	500,000	420,000
9,000		MK-1	500,000	420,000
9,500		MK-1	500,000	420,000
10,000		MK-1	500,000	420,000
11,000		MK-1	500,000	420,000
12,000		MK-1	500,000	420,000
13,000		MK-1	500,000	420,000
14,000		MK-1	500,000	420,000
15,000		MK-2	500,000	400,000
16,000		MK-2	500,000	400,000
17,000		MK-2	500,000	400,000

d1		S	l1	l2
mm	inch		mm	mm
18,000		MK-2	500,000	400,000
19,000		MK-2	500,000	400,000
20,000		MK-2	500,000	400,000
21,000		MK-2	500,000	400,000
22,000		MK-2	500,000	400,000
35,000		MK-4	500,000	350,000
40,000		MK-4	500,000	350,000



Ylipitkät kierukkaporat

Materiaali **HSS**Pinta  $\frac{+0}{-16,0}$ Leikkusuunta 

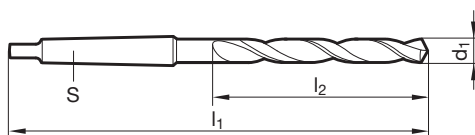
P • Kärjen kevennys $\geq \varnothing 14,000$ • kartiovaippahionta • avarat lastu-urat
• riittämättömään lastunpoistoon • erittäin syville rei'ille

M**K** •

N • valurauta ja teräs $< 1000/\text{mm}^2$ asti • Ei suositella: CrNi-teräkset,
ruostumattomat teräkset

S**H****GÜHRING** NAVIGATOR

Leikkuarvosivu 790



Artikkelinro.

293

d1		S	l1	l2
mm	inch		mm	mm
14,000		MK-1	600,000	500,000
15,000		MK-2	600,000	500,000
16,000		MK-2	600,000	500,000
17,000		MK-2	600,000	500,000
18,000		MK-2	600,000	500,000
19,000		MK-2	600,000	500,000
20,000		MK-2	600,000	500,000
21,000		MK-2	600,000	500,000
22,000		MK-2	600,000	500,000
23,000		MK-2	600,000	500,000
24,000		MK-3	600,000	475,000
25,000	63/64	MK-3	600,000	475,000

d1		S	l1	l2
mm	inch		mm	mm
26,000		MK-3	600,000	475,000
28,000		MK-3	600,000	475,000
30,000		MK-3	600,000	475,000
32,000		MK-4	600,000	450,000
35,000		MK-4	600,000	450,000
38,000		MK-4	600,000	450,000
40,000		MK-4	600,000	450,000



Ylipitkät kierukkaporat

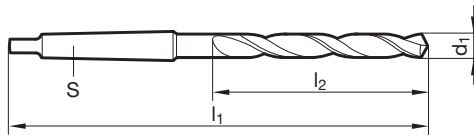


P	•	Kärjen kevennys $\geq \varnothing 14,000$ • kartiovaippahionta • avarat lastu-urat
M		• riittämättömään lastunpoistoon • erittäin syville rei'ille
K	•	
N	•	valurauta ja teräs < 1000/mm ² asti • Ei suositella: CrNi-teräkset, ruostumattomat teräkset
S		
H		

GÜHRING NAVIGATOR

Leikkuarvosivu 790

Materiaali	HSS
Pinta	○
Leikkusuunta	Ⓜ



Artikkelinro.

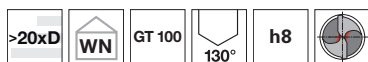
298

d1		S	l1	l2
mm	inch			
14,000		MK-1	750,000	650,000
15,000		MK-2	750,000	650,000
16,000		MK-2	750,000	650,000
18,000		MK-2	750,000	650,000

d1		S	l1	l2
mm	inch			



Ylipitkät kierukkaporat

Materiaali **HSS**

Pinta ○

Leikkusuunta

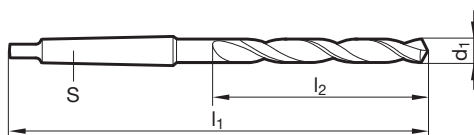
P • Kärjen kevennys $\geq \varnothing 14,000$ • kartiovaippahionta • avarat lastu-urat
• riittämättömään lastunpoistoon • erittäin syville rei'ille

M**K** •

N • valurauta ja teräs $< 1000/\text{mm}^2$ asti • Ei suositella: CrNi-teräkset,
ruostumattomat teräkset

S**H****GÜHRING** NAVIGATOR

Leikkuarvosivu 790

Artikkelinro. **299**

d1		S	l1	l2
mm	inch			
14,000		MK-1	1000,000	850,000
15,000		MK-2	1000,000	850,000
16,000		MK-2	1000,000	850,000
18,000		MK-2	1000,000	850,000

d1		S	l1	l2
mm	inch			

Kartiovartiset
kierukkaporat



Lyhyet jäädytyskanavaporat



P • Kärjen kevennys $\geq \varnothing 9,520$ • kartiovaippahionta • porausholkin läpi porausta varten • säteittäinen jäädytysnesteen tuonti Gühring nesterenkaiden kautta

M ○

K •

N • laminoitu pelti • teräs ja valuteräs, harmaavalurauta • austeniittiset teräkset $< 800 \text{ N/mm}^2$ asti

S

H

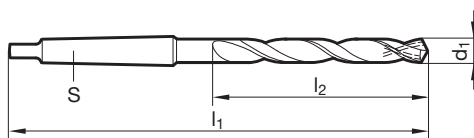
GÜHRING NAVIGATOR

Leikkuuarvosivu 788

Materiaali **HSS**

Pinta

Leikkusuunta



Artikkelinro.

269

d1		S	l1	l2
mm	inch		mm	mm
9,920	25/64	MK-1	197,000	101,000
10,320	13/32	MK-1	197,000	101,000
10,500		MK-1	197,000	101,000
11,000		MK-1	206,000	110,000
11,110	7/16	MK-1	206,000	110,000
11,500		MK-1	206,000	110,000
12,500		MK-1	215,000	119,000
12,700	1/2	MK-1	215,000	119,000
12,800		MK-1	215,000	119,000
13,000		MK-1	215,000	119,000
13,200		MK-1	215,000	119,000
13,490	17/32	MK-1	223,000	127,000
13,500		MK-1	223,000	127,000
13,800		MK-1	223,000	127,000
14,000		MK-1	223,000	127,000
14,250		MK-2	245,000	133,000
14,290	9/16	MK-2	245,000	133,000
14,500		MK-2	245,000	133,000
15,000		MK-2	245,000	133,000
15,080	19/32	MK-2	251,000	139,000
15,150		MK-2	251,000	139,000
15,180		MK-2	251,000	139,000
15,250		MK-2	251,000	139,000
15,870	5/8	MK-2	251,000	139,000
16,000		MK-2	251,000	139,000
16,500		MK-2	257,000	145,000
16,670	21/32	MK-2	257,000	145,000
16,750		MK-2	257,000	145,000
17,000		MK-2	257,000	145,000
17,100		MK-2	263,000	151,000

d1		S	l1	l2
mm	inch		mm	mm
17,460	11/16	MK-2	263,000	151,000
17,500		MK-2	263,000	151,000
17,750		MK-2	263,000	151,000
18,000		MK-2	263,000	151,000
18,260	23/32	MK-2	269,000	157,000
18,500		MK-2	269,000	157,000
19,000		MK-2	269,000	157,000
19,050	3/4	MK-2	275,000	163,000
19,200		MK-2	275,000	163,000
19,250		MK-2	275,000	163,000
19,500		MK-2	275,000	163,000
19,750		MK-2	275,000	163,000
19,840	25/32	MK-2	275,000	163,000
20,250		MK-2	282,000	170,000
20,640	13/16	MK-2	282,000	170,000
20,750		MK-2	282,000	170,000
21,000		MK-2	282,000	170,000
21,430	27/32	MK-2	289,000	177,000
21,500		MK-2	289,000	177,000
22,220	7/8	MK-2	289,000	177,000
23,020	29/32	MK-2	296,000	184,000


Jäähdytyskanavaporat, lastu-ura Tehass stdr.


P	•	Kärjen kevennys $\geq \text{Ø } 8,000$ • kartiovaippahionta • aksiaalinen ja säteittäinen jäähdytysnesteen syöttö Morse-kartion läpi (vastaa DIN 228 muoto BK) • jäähdytysnesteen syötön avaus ja sulkeminen mahdollista mukana tulevalla ruuvilla
M	○	
K	•	
N	•	soveltuu teräspalkkien rei'ittämiseen • laminoitu pelti • teräs ja valuteräs, harmaavalurauta • austeniittiset teräkset $< 800 \text{ N/mm}^2$ asti
S		
H		

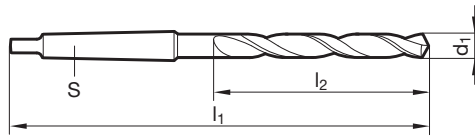
Materiaali **HSS**

Pinta

Leikkusuunta


GÜHRING NAVIGATOR

Leikkuarvosivu 788



Artikkelinro.

254

Kartiovartiset
kierukkaporat

d1		S	l1	l2
mm	inch		mm	mm
8,000		MK-2	268,000	116,000
9,000		MK-2	268,000	116,000
10,000		MK-3	268,000	116,000
10,500		MK-3	268,000	116,000
11,000		MK-3	278,000	125,000
12,000		MK-3	287,000	134,000
13,000		MK-3	287,000	134,000
13,500		MK-3	285,000	142,000
14,000		MK-3	285,000	142,000
15,000		MK-3	300,000	147,000
16,000		MK-3	306,000	153,000
17,000		MK-3	311,000	159,000
17,500		MK-3	318,000	165,000
18,000		MK-3	318,000	165,000
19,000		MK-3	324,000	171,000
20,000		MK-3	330,000	177,000
21,000		MK-3	343,000	184,000
22,000		MK-3	350,000	191,000
23,000		MK-3	357,000	198,000
24,000		MK-3	365,000	206,000
25,000	63/64	MK-3	365,000	206,000
26,000		MK-3	373,000	214,000
27,000		MK-4	407,000	222,000
28,000		MK-4	407,000	222,000

d1		S	l1	l2
mm	inch		mm	mm
29,000		MK-4	410,000	225,000
30,000		MK-4	410,000	225,000
31,000		MK-4	410,000	225,000
32,000		MK-4	410,000	225,000
33,000		MK-4	410,000	225,000
34,000		MK-4	410,000	225,000
35,000		MK-4	410,000	225,000
36,000		MK-4	410,000	225,000
37,000		MK-4	410,000	225,000
38,000		MK-4	410,000	225,000
39,000		MK-4	410,000	225,000
40,000		MK-4	410,000	225,000
41,000		MK-4	410,000	225,000
42,000		MK-4	410,000	225,000
43,000		MK-4	410,000	225,000
44,000		MK-4	410,000	225,000
45,000		MK-4	410,000	225,000
46,000		MK-4	410,000	225,000
47,000		MK-4	410,000	225,000
48,000		MK-4	410,000	225,000
49,000		MK-4	410,000	225,000
50,000		MK-4	410,000	225,000



Jäähdytyskanavaporat, lastu-ura Tehass stdr.



- P** • Kärjen kevennys $\geq \varnothing 8,000$ • kartiovaippahionta • erikoiskärki 170° kulmalla ja 90° kärkipiikillä • erittäin hyvä itsekeskityvyys • aksiaalinen ja säteittäinen jäähdytysnesteen syöttö Morse-kartion läpi (vastaa DIN 228 muoto BK) • jäähdytysnesteen syötön avaus ja sulkeminen mahdollista mukana tulevalla ruuvilla
- M** ○
- K** •
- N** • soveltuu teräspalkkien rei'ittämiseen • teräs ja valuteräs, harmaaavalurauta • austeniittiset teräkset $< 800 \text{ N/mm}^2$ asti
- S**
- H**

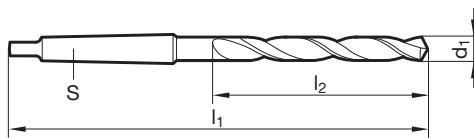
Materiaali **HSS**

Pinta

Leikkusuunta

**GÜHRING** NAVIGATOR

Leikkuarvosivu 788



Artikkelinro.

255

d1		S	l1	l2
mm	inch		mm	mm
8,000		MK-2	268,000	116,000
9,000		MK-2	268,000	116,000
10,000		MK-3	268,000	116,000
10,500		MK-3	268,000	116,000
11,000		MK-3	278,000	125,000
12,000		MK-3	287,000	134,000
13,000		MK-3	287,000	134,000
13,500		MK-3	285,000	142,000
14,000		MK-3	285,000	142,000
15,000		MK-3	300,000	147,000
16,000		MK-3	306,000	153,000
17,000		MK-3	311,000	159,000
17,500		MK-3	318,000	165,000
18,000		MK-3	318,000	165,000
19,000		MK-3	324,000	171,000
20,000		MK-3	330,000	177,000
21,000		MK-3	343,000	184,000
22,000		MK-3	350,000	191,000
23,000		MK-3	357,000	198,000
24,000		MK-3	365,000	206,000
25,000	63/64	MK-3	365,000	206,000
26,000		MK-3	373,000	214,000
27,000		MK-4	375,000	193,000
28,000		MK-4	375,000	193,000

d1		S	l1	l2
mm	inch		mm	mm
29,000		MK-4	375,000	193,000
30,000		MK-4	375,000	193,000
31,000		MK-4	375,000	193,000
32,000		MK-4	375,000	193,000
33,000		MK-4	375,000	193,000
34,000		MK-4	375,000	193,000
35,000		MK-4	375,000	193,000
36,000		MK-4	375,000	193,000
37,000		MK-4	375,000	193,000
38,000		MK-4	375,000	193,000
39,000		MK-4	375,000	193,000
40,000		MK-4	375,000	193,000
41,000		MK-4	375,000	193,000
42,000		MK-4	375,000	193,000


Jäähdytyskanavaporat, lastu-ura DIN 341


P • Kärjen kevennys $\geq \varnothing 10,000$ • kartiovaippahionta • Ohjainholkin läpiporaukseen. Jäähdytysnesteen syöttö DIN 228 BK mukaisesti.

M ○

K •

N • laminoitu pelti • teräs ja valuteräs, harmaaavurauta • austeniittiset teräkset $< 800 \text{ N/mm}^2$ asti

S

H

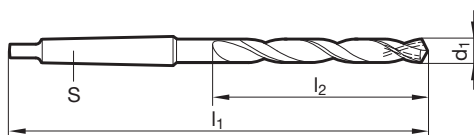
Materiaali **HSS**

Pinta

Leikkusuunta

GÜHRING NAVIGATOR

Leikkuuarvosivu 788



Artikkelinro.

1101

d1		S	l1	l2
mm	inch		mm	mm
10,000		MK-2	223,000	116,000
10,500		MK-2	223,000	116,000
11,000		MK-2	232,000	125,000
11,500		MK-2	232,000	125,000
12,000		MK-2	241,000	134,000
12,500		MK-2	241,000	134,000
13,000		MK-2	241,000	134,000
13,500		MK-2	249,000	142,000
14,000		MK-2	249,000	142,000
14,750		MK-2	254,000	147,000
15,000		MK-2	254,000	147,000
16,000		MK-2	260,000	153,000
16,250		MK-2	266,000	159,000
17,000		MK-2	266,000	159,000
17,500		MK-2	272,000	165,000
18,000		MK-2	272,000	165,000
19,000		MK-2	278,000	171,000
20,000		MK-2	284,000	177,000

d1		S	l1	l2
mm	inch		mm	mm
21,000		MK-2	291,000	184,000
22,000		MK-2	298,000	191,000
24,000		MK-3	332,000	206,000
25,000	63/64	MK-3	332,000	206,000
26,000		MK-3	340,000	214,000
28,000		MK-3	348,000	222,000
29,000		MK-3	356,000	230,000
30,000		MK-3	356,000	230,000
32,000		MK-4	409,000	248,000



Jäähdytyskanavaporat, lastu-ura DIN 341

Materiaali **HSS**

Pinta

Leikkusuunta

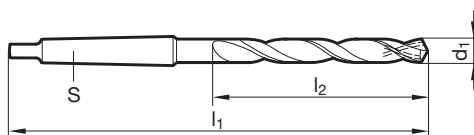
P • Kärjen kevennys $\geq \varnothing 10,000$ • kartiovaippahionta • porausholkin läpi porausta varten • aksiaalinen jäähdytysnesteen tuonti Morsekartion läpi

M ○**K** •

N • laminoitu pelti • teräs ja valuteräs, harmaavalurauta • austeniittiset teräkset $< 800 \text{ N/mm}^2$ asti

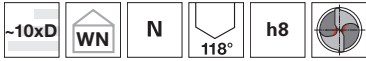
S**H****GÜHRING** NAVIGATOR

Leikkuarvosivu 788

Artikkelinro. **270**

d1		S	l1	l2
mm	inch		mm	mm
10,000		MK-2	233,000	116,000
11,000		MK-2	242,000	125,000
12,000		MK-2	251,000	134,000
13,000		MK-2	251,000	134,000
13,200		MK-2	251,000	134,000
13,500		MK-2	259,000	142,000
14,000		MK-2	259,000	142,000
14,290	9/16	MK-2	264,000	147,000
15,000		MK-2	264,000	147,000
15,500		MK-2	270,000	153,000
16,000		MK-2	270,000	153,000
16,500		MK-2	276,000	159,000
17,000		MK-2	276,000	159,000
17,460	11/16	MK-2	282,000	165,000
17,500		MK-2	282,000	165,000
18,000		MK-2	282,000	165,000
18,500		MK-3	307,000	171,000
19,000		MK-3	307,000	171,000
19,500		MK-3	313,000	177,000
20,000		MK-3	313,000	177,000
20,500		MK-3	320,000	184,000
21,000		MK-3	320,000	184,000
22,000		MK-3	327,000	191,000
23,000		MK-3	334,000	198,000

d1		S	l1	l2
mm	inch		mm	mm
23,020	29/32	MK-3	334,000	198,000
24,000		MK-3	342,000	206,000
25,000	63/64	MK-3	342,000	206,000
26,000		MK-3	350,000	214,000
26,500		MK-3	350,000	214,000
27,000		MK-4	385,000	222,000
28,000		MK-4	385,000	222,000
29,000		MK-4	393,000	230,000
29,500		MK-4	393,000	230,000
30,000		MK-4	393,000	230,000
32,000		MK-4	421,000	248,000
33,000		MK-4	421,000	248,000
34,000		MK-4	430,000	257,000
35,000		MK-4	430,000	257,000
40,000		MK-4	450,000	277,000


Jäähdytyskanavaporat, lastu-ura DIN 341


P ●	Kärjen kevennys $\geq \varnothing 10,000$ • kartiovaippahionta • porausholkin läpi porausta varten • säteittäinen jäähdytysnesteen tuonti Gühring nesterenkaiden kautta
M ○	
K ●	
N ●	laminoitu pelti • teräs ja valuteräs, harmaavalurauta • austeniittiset teräkset < 800 N/mm ² asti
S ○	
H ○	

Materiaali **HSS**

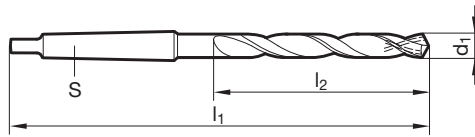
Pinta



Leikkusuunta


GÜHRING NAVIGATOR

Leikkuarvosivu 788



Artikkelinro.

271

d1		S	l1	l2
mm	inch		mm	mm
10,000		MK-2	233,000	116,000
10,500		MK-2	233,000	116,000
10,720	27/64	MK-2	242,000	125,000
11,000		MK-2	242,000	125,000
11,510	29/64	MK-2	242,000	125,000
11,910	15/32	MK-2	251,000	134,000
12,300	31/64	MK-2	251,000	134,000
13,000		MK-2	251,000	134,000
13,800		MK-2	259,000	142,000
14,000		MK-2	259,000	142,000
14,250		MK-2	264,000	147,000
14,290	9/16	MK-2	264,000	147,000
14,500		MK-2	264,000	147,000
15,000		MK-2	264,000	147,000
15,080	19/32	MK-2	270,000	153,000
15,500		MK-2	270,000	153,000
16,000		MK-2	270,000	153,000
16,500		MK-2	276,000	159,000
17,000		MK-2	276,000	159,000
17,250		MK-2	282,000	165,000
17,500		MK-2	282,000	165,000
18,250		MK-3	307,000	171,000
18,500		MK-3	307,000	171,000
19,050	3/4	MK-3	313,000	177,000

d1		S	l1	l2
mm	inch		mm	mm
19,500		MK-3	313,000	177,000
19,840	25/32	MK-3	313,000	177,000
20,000		MK-3	313,000	177,000
20,250		MK-3	320,000	184,000
22,500		MK-3	334,000	198,000
23,000		MK-3	334,000	198,000
23,750		MK-3	342,000	206,000
24,250		MK-3	342,000	206,000
24,610	31/32	MK-3	342,000	206,000
25,400	1	MK-3	350,000	214,000
26,000		MK-3	350,000	214,000
26,990	1 1/16	MK-4	385,000	222,000
27,780	1 3/32	MK-4	385,000	222,000
28,570	1 1/8	MK-4	393,000	230,000
28,750		MK-4	393,000	230,000
29,000		MK-4	393,000	230,000
29,500		MK-4	393,000	230,000
30,000		MK-4	393,000	230,000
30,500		MK-4	402,000	239,000
34,000		MK-4	430,000	257,000
44,450		MK-4	471,000	298,000



Jäähdytyskanavaporat, lastu-ura DIN 341

Materiaali **HSS**

Pinta

Leikkusuunta



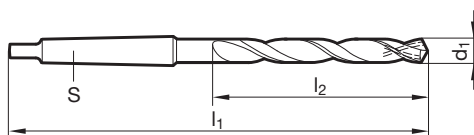
P • Kärjen kevennys $\geq \varnothing 10,000$ • kartiovaippahionta • porausholkin läpi porausta varten • säteittäinen jäähdytysnesteen tuonti Morsekartioon

M ○**K** •

N • laminoitu pelti • teräs ja valuteräs, harmaaavurauta • austeniittiset teräkset $< 800 \text{ N/mm}^2$ asti

S**H****GÜHRING** NAVIGATOR

Leikkuarvosivu 788



Artikkelinro.

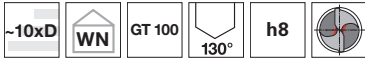
272

d1		S	l1	l2
mm	inch		mm	mm
10,000		MK-2	233,000	116,000
12,500		MK-2	251,000	134,000
13,200		MK-2	251,000	134,000
13,500		MK-2	259,000	142,000
14,750		MK-2	264,000	147,000
15,500		MK-2	270,000	153,000
15,870	5/8	MK-2	270,000	153,000
16,500		MK-2	276,000	159,000
16,670	21/32	MK-2	276,000	159,000
17,000		MK-2	276,000	159,000
18,000		MK-2	282,000	165,000
18,500		MK-3	307,000	171,000

d1		S	l1	l2
mm	inch		mm	mm
20,000		MK-3	313,000	177,000
22,000		MK-3	327,000	191,000
22,500		MK-3	334,000	198,000
24,000		MK-3	342,000	206,000
26,000		MK-3	350,000	214,000
26,990	1 1/16	MK-4	385,000	222,000
29,500		MK-4	393,000	230,000
32,000		MK-4	421,000	248,000
44,450	1 3/4	MK-4	471,000	298,000



Jäähdytyskanavaporat, lastu-ura DIN 341



- P** • Kärjen kevennys $\geq \varnothing 11,000$ • kartiovaippahionta • aksiaalinen jäähdytysnesteen tuonti Morsekartion läpi • Co-seosteinen pikateräs
M • parempi kulumiskestävyys • porausholkin läpi porausta varten

- K** •
N • lujat ja erikoislujat teräkset • valuteräs, harmaavalurauta • ruostumatt.-/haponk.-/kuumal. teräkset • vetmurtolujuus 1300 N/mm² asti
S •
H ○

Materiaali **HSCO**

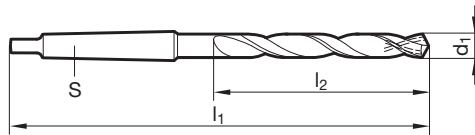
Pinta



Leikkusuunta

**GÜHRING** NAVIGATOR

Leikkuarvosivu 794



Artikkelinro.

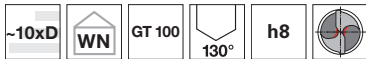
370Kartiovartiset
kierukkaporat

d1		S	l1	l2
mm	inch		mm	mm
11,000		MK-2	242,000	125,000
12,000		MK-2	251,000	134,000
12,500		MK-2	251,000	134,000
13,000		MK-2	251,000	134,000
13,500		MK-2	259,000	142,000
14,000		MK-2	259,000	142,000
15,000		MK-2	264,000	147,000
15,080	19/32	MK-2	270,000	153,000
16,000		MK-2	270,000	153,000
17,000		MK-2	276,000	159,000
17,500		MK-2	282,000	165,000
18,000		MK-2	282,000	165,000
18,500		MK-3	307,000	171,000
19,000		MK-3	307,000	171,000
20,000		MK-3	313,000	177,000
21,000		MK-3	320,000	184,000
21,500		MK-3	327,000	191,000
22,000		MK-3	327,000	191,000

d1		S	l1	l2
mm	inch		mm	mm
24,000		MK-3	342,000	206,000
24,610	31/32	MK-3	342,000	206,000
29,370	1 5/32	MK-4	393,000	230,000
29,500		MK-4	393,000	230,000
30,000		MK-4	393,000	230,000
30,960	1 7/32	MK-4	402,000	239,000
31,000		MK-4	402,000	239,000
32,000		MK-4	421,000	248,000
32,250		MK-4	421,000	248,000
32,500		MK-4	421,000	248,000
32,540	1 9/32	MK-4	421,000	248,000
33,000		MK-4	421,000	248,000
34,130	1 11/32	MK-4	430,000	257,000
34,920	1 3/8	MK-4	430,000	257,000



Jäähdytyskanavaporat, lastu-ura DIN 341

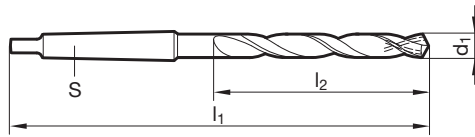


P	•	Kärjen kevennys $\geq \varnothing 11,000$ • kartiovaippahionta • säteittäinen jäähdytysnesteen tuonti Gühring nesterenkaiden kautta • Co-seosteinen
M	•	pikateräs • parempi kulumiskestävyys • porausholkin läpi porausta varten
K	•	
N	•	lujat ja erikoislujat teräkset • valuteräs, harmaavalurauta • ruostumatt.-/haponk.-/kuumal. teräkset • vetmurtolujuus 1300 N/mm ² asti
S	•	
H	○	

GÜHRING NAVIGATOR

Leikkuuarvosivu 794

Materiaali	HSCO
Pinta	
Leikkuusuunta	



Artikkelinro.

371

d1		S	l1	l2
mm	inch		mm	mm
11,000		MK-2	242,000	125,000
11,110	7/16	MK-2	242,000	125,000
11,500		MK-2	242,000	125,000
12,300	31/64	MK-2	251,000	134,000
12,500		MK-2	251,000	134,000
12,800		MK-2	251,000	134,000
13,000		MK-2	251,000	134,000
13,490	17/32	MK-2	259,000	142,000
13,500		MK-2	259,000	142,000
14,000		MK-2	259,000	142,000
14,290	9/16	MK-2	264,000	147,000
14,500		MK-2	264,000	147,000
15,000		MK-2	264,000	147,000
16,000		MK-2	270,000	153,000
16,500		MK-2	276,000	159,000
16,670	21/32	MK-2	276,000	159,000
17,000		MK-2	276,000	159,000
17,460	11/16	MK-2	282,000	165,000
18,260	23/32	MK-3	307,000	171,000
19,500		MK-3	313,000	177,000
19,840	25/32	MK-3	313,000	177,000
20,500		MK-3	320,000	184,000
20,640	13/16	MK-3	320,000	184,000
21,000		MK-3	320,000	184,000

d1		S	l1	l2
mm	inch		mm	mm
21,500		MK-3	327,000	191,000
22,220	7/8	MK-3	327,000	191,000
22,500		MK-3	334,000	198,000
23,020	29/32	MK-3	334,000	198,000
23,810	15/16	MK-3	342,000	206,000
28,570	1 1/8	MK-4	393,000	230,000
29,000		MK-4	393,000	230,000
30,000		MK-4	393,000	230,000
30,960	1 7/32	MK-4	402,000	239,000
31,750	1 1/4	MK-4	411,000	248,000
32,000		MK-4	421,000	248,000
32,540	1 9/32	MK-4	421,000	248,000
33,340	1 5/16	MK-4	421,000	248,000
34,000		MK-4	430,000	257,000
34,920	1 3/8	MK-4	430,000	257,000

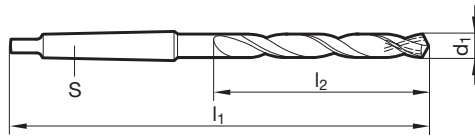

Jäähdytyskanavaporat, lastu-ura DIN 341


P	•	Kärjen kevennys $\geq \varnothing 11,500$ • kartiovaippahionta • säteittäinen jäähdytysnesteen tuonti Morsekartioon • Co-seosteinen pikateräs
M	•	• parempi kulumiskestävyys • porausholkin läpi porausta varten
K	•	
N	•	lujat ja erikoislujat teräkset • valuteräs, harmaavalurauta • ruostumatt.-/haponk.-/kuumal. teräkset • vetmurtolujuus 1300 N/mm ² asti
S	•	
H	○	

GÜHRING NAVIGATOR

Leikkuarvosivu 794

Materiaali	HSCO
Pinta	●
Leikkusuunta	Ⓜ



Artikkelinro.

372

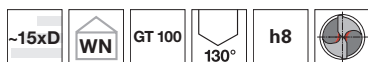
 Kartiovaritset
kierukkaporat

d1		S	l1	l2
mm	inch		mm	mm
12,500		MK-2	251,000	134,000
12,700	1/2	MK-2	251,000	134,000
14,000		MK-2	259,000	142,000
16,000		MK-2	270,000	153,000
17,000		MK-2	276,000	159,000
18,500		MK-3	307,000	171,000

d1		S	l1	l2
mm	inch		mm	mm
21,500		MK-3	327,000	191,000
23,810	15/16	MK-3	342,000	206,000
27,000		MK-4	385,000	222,000
30,000		MK-4	393,000	230,000
34,000		MK-4	430,000	257,000



Jäähdytyskanavaporat, lastu-ura DIN 1870

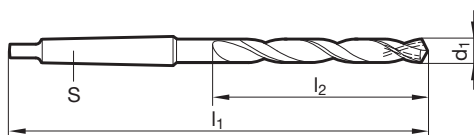


P	•	Kärjen kevennys $\geq \varnothing 11,000$ • kartiovaippahionta • aksiaalinen jäähdytysnesteen tuonti Morsekartion läpi • Co-seosteinen pikateräs
M	•	• parempi kulumiskestävyys • porausholkin läpi porausta varten
K	•	
N	•	lujat ja erikoislujat teräkset • valuteräs, harmaaavalurauta • ruostumatt.-/haponk.-/kuumal. teräkset • vetmurtolujuus 1300 N/mm ² asti
S	•	
H	○	

GÜHRING NAVIGATOR

Leikkuuarvosivu 794

Materiaali	HSCO
Pinta	
Leikkusuunta	



Artikkelinro.

374

d1		S	l1	l2
mm	inch		mm	mm
11,000		MK-2	312,000	195,000
12,000		MK-2	322,000	205,000
12,300	31/64	MK-2	322,000	205,000
12,500		MK-2	322,000	205,000
13,000		MK-2	322,000	205,000
14,000		MK-2	337,000	220,000
15,000		MK-2	337,000	220,000
16,000		MK-2	347,000	230,000
16,500		MK-2	347,000	230,000
17,500		MK-2	362,000	245,000
18,000		MK-2	362,000	245,000
18,500		MK-3	381,000	245,000
19,840	25/32	MK-3	396,000	260,000
20,000		MK-3	396,000	260,000
21,000		MK-3	396,000	260,000
21,430	27/32	MK-3	406,000	270,000
21,500		MK-3	406,000	270,000
24,610	31/32	MK-3	426,000	290,000

d1		S	l1	l2
mm	inch		mm	mm
28,570	1 1/8	MK-4	468,000	305,000
28,750		MK-4	468,000	305,000
29,370	1 5/32	MK-4	468,000	305,000
30,960	1 7/32	MK-4	483,000	320,000
32,250		MK-4	493,000	320,000
32,540	1 9/32	MK-4	493,000	320,000
34,000		MK-4	513,000	340,000


Jäähdytyskanavaporat, lastu-ura DIN 1870


P	•	Kärjen kevennys $\geq \varnothing 11,000$ • kartiovaippahionta • säteittäinen jäähdytysnesteen tuonti Gühring nesterenkaiden kautta • Co-seosteinen
M	•	pikateräs • parempi kulumiskestävyys • porausholkin läpi porausta varten
K	•	
N	•	lujat ja erikoislujat teräkset • valuteräs, harmaaavalurauta • ruostumatt.-/haponk.-/kuumal. teräkset • vetmurtolujuus 1300 N/mm ² asti
S	•	
H	○	

Materiaali **HSCO**

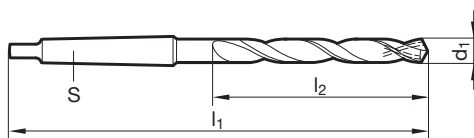
Pinta



Leikkusuunta


GÜHRING NAVIGATOR

Leikkuarvosivu 794



Artikkelinro.

375

d1		S	l1	l2
mm	inch		mm	mm
11,000		MK-2	312,000	195,000
11,110	7/16	MK-2	312,000	195,000
11,510	29/64	MK-2	312,000	195,000
12,800		MK-2	322,000	205,000
13,500		MK-2	337,000	220,000
18,260	23/32	MK-3	381,000	245,000
19,000		MK-3	381,000	245,000
21,000		MK-3	396,000	260,000
21,430	27/32	MK-3	406,000	270,000
24,500		MK-3	426,000	290,000
25,000	63/64	MK-3	426,000	290,000
25,400	1	MK-3	426,000	290,000

d1		S	l1	l2
mm	inch		mm	mm
26,500		MK-3	426,000	290,000
28,570	1 1/8	MK-4	468,000	305,000
30,960	1 7/32	MK-4	483,000	320,000
32,540	1 9/32	MK-4	493,000	320,000
33,340	1 5/16	MK-4	493,000	320,000
34,000		MK-4	513,000	340,000



Jäähdytyskanavaporat, lastu-ura DIN 1870

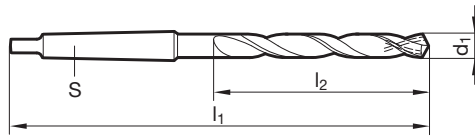


P	•	Kärjen kevennys $\geq \varnothing 11,000$ • kartiovaippahionta • säteittäinen jäähdytysnesteen tuonti Morsekartioon • Co-seosteinen pikateräs
M	•	• parempi kulumiskestävyys • porausholkin läpi porausta varten
K	•	
N	•	lujat ja erikoislujat teräkset • valuteräs, harmaavalurauta • ruostumatt.-/haponk.-/kuumal. teräkset • vetmurtolujuus 1300 N/mm ² asti
S	•	
H	○	

GÜHRING NAVIGATOR

Leikkuarvosivu 794

Materiaali	HSCO
Pinta	●
Leikkusuunta	Ⓜ



Artikkelinro.

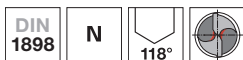
376

d1		S	l1	l2
mm	inch			
11,000		MK-2	312,000	195,000
13,000		MK-2	322,000	205,000
14,000		MK-2	337,000	220,000
16,500		MK-2	347,000	230,000
18,000		MK-2	362,000	245,000
19,840	25/32	MK-3	396,000	260,000

d1		S	l1	l2
mm	inch			
21,500		MK-3	406,000	270,000
27,780	1 3/32	MK-4	468,000	305,000
29,000		MK-4	468,000	305,000



Kartiosokkareiänporat

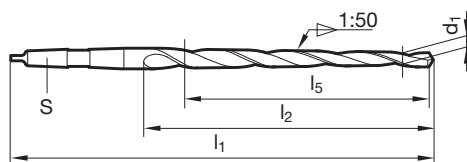
Materiaali **HSS**

Pinta

Leikkusuunta

P • Kärjen kevennys $\geq \varnothing 5,000$ • kartiovaippahionta •

P	•
M	○
K	•
N	○
S	○
H	○



Artikkelinro.

532

d1	S	l1	l2	l5
mm		mm	mm	mm
5,000	MK-1	155,000	81,000	73,000
6,000	MK-1	187,000	108,000	105,000
8,000	MK-1	227,000	149,000	145,000
10,000	MK-1	257,000	180,000	175,000
12,000	MK-2	315,000	219,000	210,000
13,000	MK-2	325,000	229,000	220,000

d1	S	l1	l2	l5
mm		mm	mm	mm
14,000	MK-2	325,000	229,000	220,000
16,000	MK-2	335,000	239,000	230,000
20,000	MK-3	377,000	263,000	250,000
25,000	MK-3	427,000	311,000	300,000



Erikoisporat KM-kärjellä

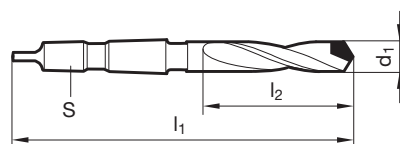
Materiaali **KM**

Pinta ○

Leikkusuunta

P ○ Kärjen kevennys $\geq \varnothing 8,000$ • päästöhiottu kärki • kovametallileikkuulla**M****K** ○**N** jousiteräs • kokillivalu yli 300 HB • puhdas molybdeeni • kovat pronssit**S****H** ○**GÜHRING** NAVIGATOR

Leikkuarvosivu 776

Artikkelinro. **705**

d1		S	l1	l2
mm	inch		mm	mm
8,000		MK-1	130,000	40,000
8,500		MK-1	135,000	45,000
10,000		MK-1	140,000	50,000
10,200		MK-1	140,000	50,000
10,500		MK-1	140,000	50,000
11,000		MK-1	140,000	50,000
11,500		MK-1	146,000	56,000
12,000		MK-1	146,000	56,000
13,000		MK-1	146,000	56,000
13,500		MK-2	168,000	63,000
14,000		MK-2	168,000	63,000
14,500		MK-2	168,000	63,000
15,000		MK-2	168,000	63,000
15,500		MK-2	175,000	70,000
16,000		MK-2	175,000	70,000
16,500		MK-2	175,000	70,000
17,000		MK-2	175,000	70,000
17,500		MK-2	185,000	80,000
18,000		MK-2	185,000	80,000
19,000		MK-2	185,000	80,000
19,500		MK-3	215,000	90,000
20,000		MK-3	215,000	90,000
21,000		MK-3	215,000	90,000
21,500		MK-3	215,000	90,000

d1		S	l1	l2
mm	inch		mm	mm
22,000		MK-3	215,000	90,000
23,000		MK-3	225,000	100,000
24,000		MK-3	225,000	100,000
24,500		MK-3	225,000	100,000
25,000	63/64	MK-3	225,000	100,000
26,000		MK-4	260,000	110,000
26,500		MK-4	260,000	110,000
27,000		MK-4	260,000	110,000
28,000		MK-4	260,000	110,000
30,000		MK-4	275,000	125,000
32,000		MK-4	275,000	125,000
33,000		MK-4	290,000	140,000
38,000		MK-4	310,000	160,000
40,000		MK-4	310,000	160,000

HSK-A morsekartiopitimet

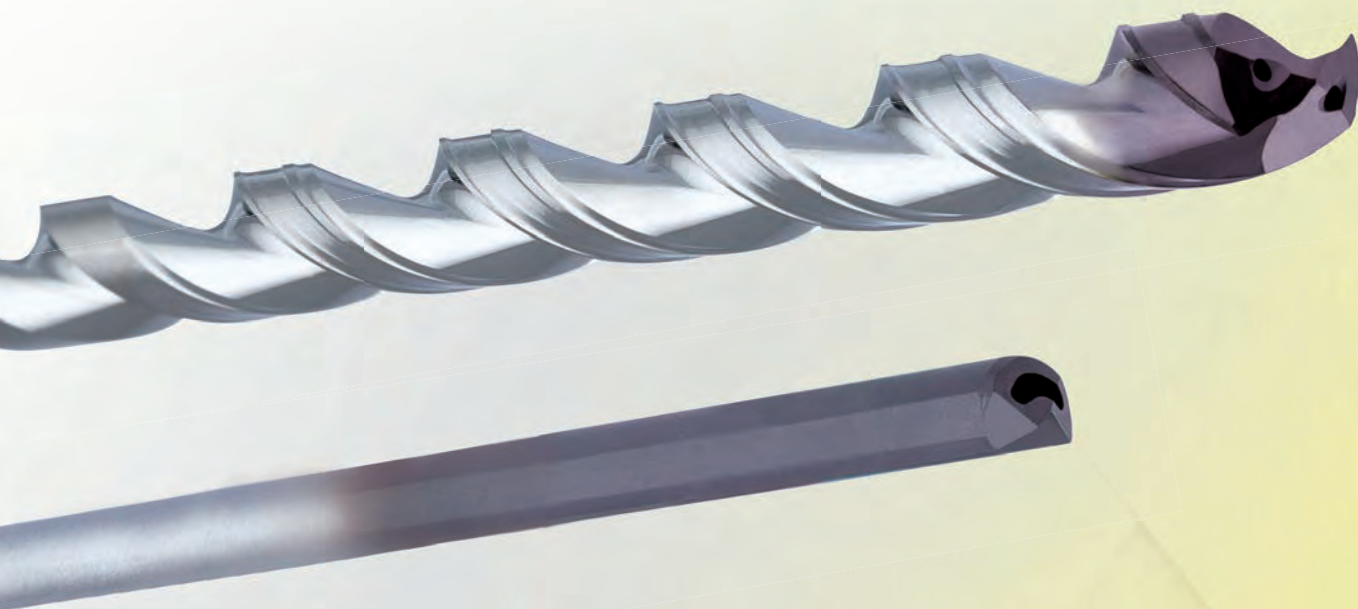
Lehdellisten morsekartioden
kiinnittämiseen.



Lisää tietoa GM 300-luettelosta.



KANUUNAPORA





KOVAMETALLISET SYVÄNREIÄN
KIERUKKAPORAT



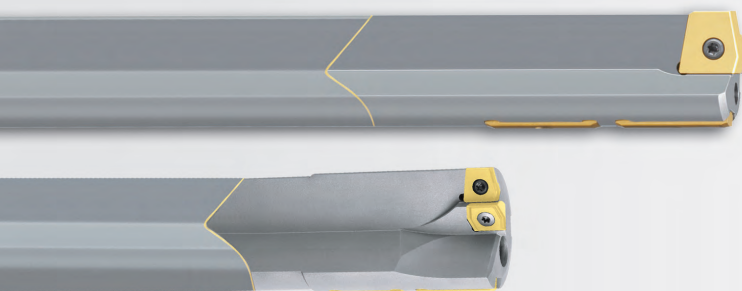
KOVAMETALLISET 1-LEIK.
KANUUNAPORAT
EB 100



1-LEIK. KM-KÄRKISET
KANUUNAPORAT
EB 80



2-LEIK. KM-KÄRKISET
KANUUNAPORAT
ZB 80



MODULAARISET 1-LEIK.
KANUUNAPORAT
EB 800



SYVÄNREIÄN KIERUKKAPORAT
HSS/HSCO



- TKM-syvänreiänporat suuremmille leikkuu- ja syöttönopeuksille
- Porausvyvyys 15xD – 40xD
- nimellis-Ø 3,00 – 14,00 mm
- pitkä työkalun kesto ja nopeampi työstöaika
- sopivat lähes kaikille materiaaleille

alkaen sivu 523

- 1-leik. kanuunaporat erittäin tarkoille toleransseille
- valmistus alkaen nimellis-Ø 0,9 mm
- nimellis-Ø 16,00 mm asti
- lastu-uran pituus 500,00 mm asti; kuitenkin max. 100xD
- 80xD asti yhdellä työkalulla
- sopivat lähes kaikille materiaaleille

alkaen sivu 529

- 1-leik. kanuunaporat juotetulla km-päällä
- kokopituus 3000,00 mm asti
- nimellis-Ø 2,00 – 40,00 mm
- laaja valinnan mahdollisuus esim. pallopää tai upotuspora
- sopivat lähes kaikille materiaaleille

alkaen sivu 540

Kanuunapora

- 2-leik. kanuunaporat juotetulla km-päällä
- nimellis-Ø 6,00 – 30,00 mm
- sopivat täydellisesti GG25, GGG40, GGV
- erittäin suuret jäähdytyskanavat
- optimoitu kärkigeometria

alkaen sivu 551

- 1-leik. kanuunapora vaihtopaloilla ja ohjainkiskoilla
- nimellis-Ø 12,00 – 52,00 mm
- runkojen porrastus 0,5mm välein
- kaikki yhdistelmät eri kovametallien ja piinoitteiden välillä mahdollista
- sopii lähes kaikille materiaaleille






alkaen sivu 553

- syvänreiänkierukkaporat HSS/HSCO vakaaseen työstöön
- halkaisija-alue 0,40 – 50,00 mm
- lastu-uran pituus 850 mm asti
- saatavana lieriö- tai kartiovarrella
- sopii monille materiaaleille

alkaen sivu 580

P	M	K	N	S	H	Työkalun kuvaus	Poraus- syvyys	Standardi	Malli	Leikkuu- suunta	Materiaali	Pinta	d1/mm	Artikkeli nro.	Leikkuu- arvosivu	Sivu
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Tehoporat jäädytyskanavilla

•	•	•	•	•	•		15xD	WN	RT 100 T	R	VHM	A	3,000 - 14,000	6509	760	523
•	•	•	•	•	•		20xD	WN	RT 100 T	R	VHM	A	3,000 - 14,000	6511	760	524
•	•	•	•	•	•		25xD	WN	RT 100 T	R	VHM	A	3,000 - 12,000	6512	760	525
•	•	•	•	•	•		30xD	WN	RT 100 T	R	VHM	A	3,000 - 10,000	6513	760	526
•	•	•	•	•	•		40xD	WN	RT 100 T	R	VHM	A	3,000 - 8,000	6514	760	527

Kanuunapora EB 100

•	•	•	•	•	•		25xD	WN	EB 100	R	VHM	a	2,380 - 12,000	5646	808	529
•	•	•	•	•	•		50xD	WN	EB 100	R	VHM	a	2,380 - 8,000	5647	808	530
•	•	•	•	•	•		75xD	WN	EB 100	R	VHM	a	2,380 - 6,000	5648	808	531
•	•	•	•	•	•		45,00	WN	EB 100	R	VHM	○	1,200 - 3,200	5024	808	532
•	•	•	•	•	•		45,00	WN	EB 100	R	VHM	A	1,200 - 3,200	5632	808	533
•	•	•	•	•	•		80,00	WN	EB 100	R	VHM	○	1,200 - 5,000	5020	808	534
•	•	•	•	•	•		80,00	WN	EB 100	R	VHM	A	1,200 - 5,000	5633	808	535
•	•	•	•	•	•		120,00	WN	EB 100	R	VHM	○	1,500 - 5,000	5026	808	536
•	•	•	•	•	•		120,00	WN	EB 100	R	VHM	A	1,500 - 5,000	5637	808	537
•	•	•	•	•	•		160,00	WN	EB 100	R	VHM	○	1,500 - 8,000	5021	808	538
•	•	•	•	•	•		160,00	WN	EB 100	R	VHM	A	1,500 - 8,000	5638	808	539

Kanuunapora EB 80

•	•	•	•	•	•		20xD	WN	EB 80	R	HM	S	4,000 - 12,000	5018	808	540
•	•	•	•	•	•		20xD	WN	EB 80	R	HM	C	3,970 - 12,700	5639	808	541
•	•	•	•	•	•		30xD	WN	EB 80	R	HM	S	4,000 - 12,000	5460	808	542
•	•	•	•	•	•		30xD	WN	EB 80	R	HM	C	3,970 - 12,700	5640	808	543
•	•	•	•	•	•		40xD	WN	EB 80	R	HM	○	4,000 - 12,000	5689	808	544
•	•	•	•	•	•		40xD	WN	EB 80	R	HM	S	4,000 - 12,000	5022	808	545
•	•	•	•	•	•		40xD	WN	EB 80	R	HM	C	3,970 - 12,700	5641	808	546



P	M	K	N	S	H	Työkalun kuvaus	Poraus- syvyys	Standardi	Malli	Leikkuu- suunta	Materiaali	Pinta	d1/mm	Artikkeli nro.	Leikkuu- arvosivu	Sivu
Kanuunapora EB 80																
•	•	•	•	•	•		80xD	WN	EB 80	R	HM	○	3,970 - 11,950	5690	808	547
•	•	•	•	•	•		80xD	WN	EB 80	R	HM	Ⓢ	4,950 - 11,950	5023	808	548
○	•	○	•	○	○		80xD	WN	EB 80	R	HM	Ⓢ	4,950 - 12,650	5642	808	549
•	•	•	•	•	•		1100,00	WN	EB 80	R	HM	Ⓢ	6,000 - 22,000	5164	808	550
Kanuunapora ZB 80 (2-leikkuinen)																
•	•	•	•	•	•		30xD	WN	ZB 80	R	HM	○	8,000 - 12,000	5019	808	551
•	•	•	•	•	•		30xD	WN	ZB 80	R	HM	○	8,000 - 12,000	5643	808	552
Kanuunapora EB 800 vaihtopalalla																
•	•	•	•	•	•		30xD	WN	EB 800	R	HM	Ⓢ	12,000 - 24,000	5644	808	555
Torx-ruuviavain																
•	•	•	•	•	•			WN						1612		558
Momenttiavaimet																
•	•	•	•	•	•			WN						4915		559
Torx - kärkisarja																
•	•	•	•	•	•			WN						4917		560
Kiinnitysruuvit																
•	•	•	•	•	•			WN						4071		561
Poraholkit																
•	•	•	•	•	•			WN			VHM			5748		565
•	•	•	•	•	•			WN			HSS			5747		566
Tiivisterenkaat 1-leikkuisille kanuunaporille																
•	•	•	•	•	•			WN						5752		569
Muotoillut tukiholkit 1-leikkuisille kanuunaporille																
•	•	•	•	•	•			WN						5750		571
Tukiholkit 1- ja 2-leikkuisille kanuunaporille																
•	•	•	•	•	•			WN						5749		573

P	M	K	N	S	H	Työkalun kuvaus	Poraus- syvyys	Standardi	Malli	Leikkuu- suunta	Materiaali	Pinta	d1/mm	Artikkeli nro.	Leikkuu- arvosivu	Sivu
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Tiivisterenkaat 2-leikkuisille kanuunaporille

														5753		575
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Muotoillut tukiholkit 2-leikkuisille kanuunaporille

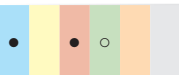







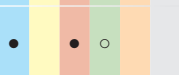







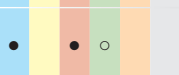







































































































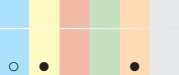







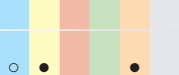







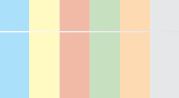







														5751		576
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Säätöruuvit

														5754		577
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														5755		578
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Pitkät kierukkaporat











								0,400 - 36,510	217	786	580
								0,500 - 22,220	667	786	583
								0,450 - 29,000	220	786	585
								2,950 - 25,250	204	786	587
								0,500 - 16,000	218	786	588
								0,450 - 15,000	221	786	590
								0,500 - 20,640	219	786	591
								1,000 - 14,000	535	786	593
								1,000 - 14,000	668	786	596
								1,000 - 10,000	2462	786	598
								1,400 - 13,000	506	786	599
								1,000 - 32,600	501	786	600
								0,500 - 22,000	317	792	602
								1,000 - 16,000	336	792	604
								1,000 - 12,000	396	792	606
								1,000 - 15,000	617	792	607
								1,000 - 10,200	669	792	609
								0,500 - 1,450	706	792	611









P	M	K	N	S	H	Työkalun kuvaus	Poraus- syvyys	Standardi	Malli	Leikkuu- suunta	Materiaali	Pinta	d1/mm	Artikkeli nro.	Leikkuu- arvosivu	Sivu
•	•	•	•	•	•		~15xD	DIN 1869	N	(R)	HSS		1,600 - 13,000	235	788	612
•	•	•	•	•	•		~15xD	DIN 1869	GT 100	(R)	HSS		1,950 - 13,000	502	790	614
•	•	•	•	•	•		~15xD	DIN 1869	GT 100	(R)	HSS		2,000 - 12,700	670	790	616
•	•	•	•	•	•		~15xD	DIN 1869	GT 50	(R)	HSS		2,000 - 12,700	524	788	617
•	•	•	•	•	•		~15xD	DIN 1869	GT 100	(R)	HSCO		2,700 - 10,000	618	794	619
Erikoispitkät kierukkaporat sarja 2																
•	•	•	•	•	•		~20xD	DIN 1869	N	(R)	HSS		2,700 - 13,000	236	788	620
•	•	•	•	•	•		~20xD	DIN 1869	GT 100	(R)	HSS		2,000 - 13,000	503	790	621
•	•	•	•	•	•		~20xD	DIN 1869	GT 100	(R)	HSS		2,700 - 8,500	671	790	623
•	•	•	•	•	•		~20xD	DIN 1869	GT 50	(R)	HSS		3,000 - 13,000	528	788	624
•	•	•	•	•	•		~20xD	DIN 1869	GT 100	(R)	HSCO		3,000 - 10,000	619	794	625
Erikoispitkät kierukkaporat sarja 3																
•	•	•	•	•	•		~25xD	DIN 1869	N	(R)	HSS		3,500 - 13,000	237	788	626
•	•	•	•	•	•		~25xD	DIN 1869	GT 100	(R)	HSS		2,500 - 13,000	504	790	627
•	•	•	•	•	•		~25xD	DIN 1869	GT 50	(R)	HSS		2,500 - 10,000	529	788	628
•	•	•	•	•	•		~25xD	DIN 1869	GT 100	(R)	HSCO		2,500 - 13,000	571	794	629
Ylipitkät kierukkaporat																
•	•	•	•	•	•		>25xD	WN	GT 100	(R)	HSS		6,000 - 12,000	242	790	630
•	•	•	•	•	•		>25xD	WN	GT 100	(R)	HSS		8,000 - 12,000	243	790	631
•	•	•	•	•	•		>25xD	WN	GT 100	(R)	HSS		10,000 - 12,000	244	790	632
Erikoispitkät kierukkaporat sarja 1																
•	•	•	•	•	•		~15xD	DIN 1870	N	(R)	HSS		8,000 - 50,000	266	788	633
•	•	•	•	•	•		~15xD	DIN 1870	GT 100	(R)	HSS		8,000 - 30,000	526	790	634
•	•	•	•	•	•		~15xD	DIN 1870	GT 50	(R)	HSS		8,500 - 33,000	525	788	635
•	•	•	•	•	•		~15xD	DIN 1870	GT 100	(R)	HSCO		9,520 - 30,000	620	794	636

P	M	K	N	S	H	Työkalun kuvaus	Poraus- syvyys	Standardi	Malli	Leikkuu- suunta	Materiaali	Pinta	d1/mm	Artikkeli nro.	Leikkuu- arvosivu	Sivu
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Erikoispitkät kierukkaporat sarja 2

•	•	○					~20xD	DIN 1870	N		HSS		8,000 - 45,000	267	788	637
•	•	•					~20xD	DIN 1870	GT 100		HSS		8,000 - 30,000	527	790	638
○		•					~20xD	DIN 1870	GT 50		HSS		8,500 - 31,000	542	788	639
•	•	•	•	○			~20xD	DIN 1870	GT 100		HSCO		9,520 - 23,420	621	794	640

Jäähdytyskanavaporat, lastu-ura DIN 1870

•	•	•	•	•	○		~15xD	WN	GT 100		HSCO		11,000 - 34,000	374	794	641
•	•	•	•	•	○		~15xD	WN	GT 100		HSCO		11,000 - 34,000	375	794	642
•	•	•	•	•	○		~15xD	WN	GT 100		HSCO		11,000 - 29,000	376	794	643



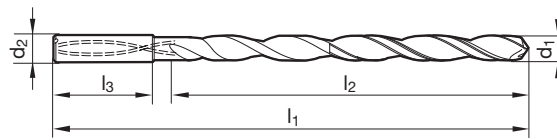
Tehoporat jäähdytyskanavilla



P	•	Kärjen kevennys $\geq \varnothing 3,000$ • kartiovaippahionta • pääleikkusärmän kaarteesta • optimoitu lastu-uran muoto • jäähdytyskanavien max. halkaisija
M	•	• huomio jäähdytysnesteen paine
K	•	
N	○	rakenne- ja pintakarkaistut teräkset • automaattiteräkset, nuorutetut teräkset
S	○	• seostetut teräkset < 1200 N/mm ² asti • ruostumattomat teräkset • valut
H	○	

GÜHRING NAVIGATOR

Leikkuarvosivu 760



Artikkelinro.

6509

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,000		6,000	95,000	55,000	36,000	7,940	5/16	8,000	183,000	143,000	36,000
3,170	1/8	6,000	106,000	67,000	36,000	8,000		8,000	183,000	143,000	36,000
3,500		6,000	116,000	76,000	36,000	8,330	21/64	10,000	204,000	160,000	40,000
3,570	9/64	6,000	116,000	76,000	36,000	8,500		10,000	204,000	160,000	40,000
3,970	5/32	6,000	116,000	76,000	36,000	8,730	11/32	10,000	204,000	160,000	40,000
4,000		6,000	116,000	76,000	36,000	9,000		10,000	204,000	160,000	40,000
4,370	11/64	6,000	133,000	93,000	36,000	9,130	23/64	10,000	221,000	177,000	40,000
4,500		6,000	133,000	93,000	36,000	9,520	3/8	10,000	221,000	177,000	40,000
4,760	3/16	6,000	133,000	93,000	36,000	9,920	25/64	10,000	221,000	177,000	40,000
5,000		6,000	133,000	93,000	36,000	10,000		10,000	221,000	177,000	40,000
5,100		6,000	150,000	110,000	36,000	10,320	13/32	12,000	247,000	198,000	45,000
5,160	13/64	6,000	150,000	110,000	36,000	10,720	27/64	12,000	247,000	198,000	45,000
5,410		6,000	150,000	110,000	36,000	11,000		12,000	247,000	198,000	45,000
5,500		6,000	150,000	110,000	36,000	11,110	7/16	12,000	263,000	214,000	45,000
5,560	7/32	6,000	150,000	110,000	36,000	11,510	29/64	12,000	263,000	214,000	45,000
5,950	15/64	6,000	150,000	110,000	36,000	11,910	15/32	12,000	263,000	214,000	45,000
6,000		6,000	150,000	110,000	36,000	12,000		12,000	263,000	214,000	45,000
6,350	1/4	8,000	167,000	127,000	36,000	12,300	31/64	14,000	297,000	248,000	45,000
6,500		8,000	167,000	127,000	36,000	12,700	1/2	14,000	297,000	248,000	45,000
6,750	17/64	8,000	167,000	127,000	36,000	13,100	33/64	14,000	297,000	248,000	45,000
7,000		8,000	167,000	127,000	36,000	13,490	17/32	14,000	297,000	248,000	45,000
7,140	9/32	8,000	183,000	143,000	36,000	13,890	35/64	14,000	297,000	248,000	45,000
7,500		8,000	183,000	143,000	36,000	14,000		14,000	297,000	248,000	45,000
7,540	19/64	8,000	183,000	143,000	36,000			14,000	297,000	248,000	45,000

Käruunapora



Tehoporat jäähdytyskanavilla

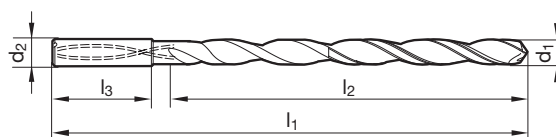


- P** • Kärjen kevennys $\geq \varnothing 3,000$ • kartiovaippahionta • pääleikkuusärmän kaarteesta • optimoitu lastu-uran muoto • jäähdytyskanavien max. halkaisija
- M** • • huomio jäähdytysnesteen paine
- K** •
- N** ○ rakenne- ja pintakarkaistut teräkset • automaattiteräkset, nuorutetut teräkset
- S** ○ • seostetut teräkset < 1200 N/mm² asti • ruostumattomat teräkset • valut
- H** ○

GÜHRING NAVIGATOR

Leikkuarvosivu 760

Materiaali	TKM
Pinta	A
Varren muoto	HA



Artikkelinro. **6511**

Käynnäpöytä

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
3,000		6,000	110,000	70,000	36,000
3,100		6,000	123,000	83,000	36,000
3,170	1/8	6,000	123,000	83,000	36,000
3,500		6,000	136,000	96,000	36,000
3,570	9/64	6,000	136,000	96,000	36,000
3,970	5/32	6,000	136,000	96,000	36,000
4,000		6,000	136,000	96,000	36,000
4,200		6,000	158,000	118,000	36,000
4,370	11/64	6,000	158,000	118,000	36,000
4,500		6,000	158,000	118,000	36,000
4,760	3/16	6,000	158,000	118,000	36,000
5,000		6,000	158,000	118,000	36,000
5,100		6,000	180,000	140,000	36,000
5,160	13/64	6,000	180,000	140,000	36,000
5,410		6,000	180,000	140,000	36,000
5,500		6,000	180,000	140,000	36,000
5,560	7/32	6,000	180,000	140,000	36,000
5,950	15/64	6,000	180,000	140,000	36,000
6,000		6,000	180,000	140,000	36,000
6,350	1/4	8,000	202,000	162,000	36,000
6,500		8,000	202,000	162,000	36,000
6,750	17/64	8,000	202,000	162,000	36,000
7,000		8,000	202,000	162,000	36,000
7,140	9/32	8,000	223,000	183,000	36,000
7,500		8,000	223,000	183,000	36,000
7,540	19/64	8,000	223,000	183,000	36,000
7,940	5/16	8,000	223,000	183,000	36,000
8,000		8,000	223,000	183,000	36,000
8,330	21/64	10,000	249,000	205,000	40,000
8,500		10,000	249,000	205,000	40,000

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
8,730	11/32	10,000	249,000	205,000	40,000
9,000		10,000	249,000	205,000	40,000
9,130	23/64	10,000	271,000	227,000	40,000
9,520	3/8	10,000	271,000	227,000	40,000
9,920	25/64	10,000	271,000	227,000	40,000
10,000		10,000	271,000	227,000	40,000
10,320	13/32	12,000	302,000	253,000	45,000
10,720	27/64	12,000	302,000	253,000	45,000
11,000		12,000	302,000	253,000	45,000
11,110	7/16	12,000	323,000	274,000	45,000
11,510	29/64	12,000	323,000	274,000	45,000
11,910	15/32	12,000	323,000	274,000	45,000
12,000		12,000	323,000	274,000	45,000
12,300	31/64	14,000	367,000	318,000	45,000
12,700	1/2	14,000	367,000	318,000	45,000
13,100	33/64	14,000	367,000	318,000	45,000
13,490	17/32	14,000	367,000	318,000	45,000
13,890	35/64	14,000	367,000	318,000	45,000
14,000		14,000	367,000	318,000	45,000



Tehoporat jäähdytyskanavilla

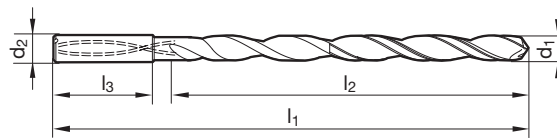


P	•	Kärjen kevennys $\geq \varnothing 3,000$ • kartiovaippahionta • pääleikkusärmän kaarteesta • optimoitu lastu-uran muoto • jäähdytyskanavien max. halkaisija
M	•	• huomio jäähdytysnesteen paine
K	•	
N	○	rakenne- ja pintakarkaistut teräkset • automaattiteräkset, nuorutetut teräkset
S	○	• seostetut teräkset < 1200 N/mm ² asti • ruostumattomat teräkset • valut
H	○	

GÜHRING NAVIGATOR

Leikkuarvosivu 760

Materiaali	TKM
Pinta	A
Varren muoto	HA



Artikkelinro.

6512

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,000		6,000	125,000	85,000	36,000	7,000		8,000	237,000	197,000	36,000
3,100		6,000	141,000	101,000	36,000	7,140	9/32	8,000	263,000	223,000	36,000
3,170	1/8	6,000	141,000	101,000	36,000	7,500		8,000	263,000	223,000	36,000
3,500		6,000	156,000	116,000	36,000	7,540	19/64	8,000	263,000	223,000	36,000
3,570	9/64	6,000	156,000	116,000	36,000	7,940	5/16	8,000	263,000	223,000	36,000
3,800		6,000	156,000	116,000	36,000	8,000		8,000	263,000	223,000	36,000
3,970	5/32	6,000	156,000	116,000	36,000	8,330	21/64	10,000	294,000	250,000	40,000
4,000		6,000	156,000	116,000	36,000	8,500		10,000	294,000	250,000	40,000
4,200		6,000	183,000	143,000	36,000	8,730	11/32	10,000	294,000	250,000	40,000
4,370	11/64	6,000	183,000	143,000	36,000	8,800		10,000	294,000	250,000	40,000
4,500		6,000	183,000	143,000	36,000	9,000		10,000	294,000	250,000	40,000
4,760	3/16	6,000	183,000	143,000	36,000	9,130	23/64	10,000	321,000	277,000	40,000
5,000		6,000	183,000	143,000	36,000	9,520	3/8	10,000	321,000	277,000	40,000
5,100		6,000	210,000	170,000	36,000	9,920	25/64	10,000	321,000	277,000	40,000
5,160	13/64	6,000	210,000	170,000	36,000	10,000		10,000	321,000	277,000	40,000
5,410		6,000	210,000	170,000	36,000	10,320	13/32	12,000	359,000	310,000	45,000
5,500		6,000	210,000	170,000	36,000	10,720	27/64	12,000	359,000	310,000	45,000
5,560	7/32	6,000	210,000	170,000	36,000	11,000		12,000	359,000	310,000	45,000
5,950	15/64	6,000	210,000	170,000	36,000	11,110	7/16	12,000	386,000	337,000	45,000
6,000		6,000	210,000	170,000	36,000	11,510	29/64	12,000	386,000	337,000	45,000
6,300		8,000	237,000	197,000	36,000	11,910	15/32	12,000	386,000	337,000	45,000
6,350	1/4	8,000	237,000	197,000	36,000	12,000		12,000	386,000	337,000	45,000
6,500		8,000	237,000	197,000	36,000						
6,750	17/64	8,000	237,000	197,000	36,000						



Tehoporat jäähdytyskanavilla



- P** • Kärjen kevennys $\geq \varnothing 3,000$ • kartiovaippahionta • pääleikkusärmän kaarteesta • optimoitu lastu-uran muoto • jäähdytyskanavien max. halkaisija
M • huomio jäähdytysnesteen paine

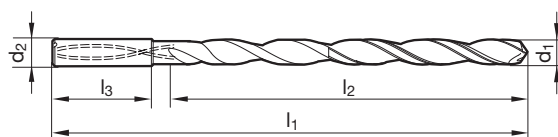
- K** •
N ○ rakenne- ja pintakarkaistut teräkset • automaattiteräkset, nuorutetut teräkset
S ○ seostetut teräkset $< 1200 \text{ N/mm}^2$ asti • ruostumattomat teräkset • valut
H ○

GÜHRING NAVIGATOR

Leikkuuarvosivu 760

Materiaali **TKM**Pinta **A**

Varren muoto HA

Artikkelinro. **6513**

Kanunapora

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,000		6,000	140,000	100,000	36,000	7,000		8,000	272,000	232,000	36,000
3,100		6,000	158,000	118,000	36,000	7,140	9/32	8,000	303,000	263,000	36,000
3,170	1/8	6,000	158,000	118,000	36,000	7,500		8,000	303,000	263,000	36,000
3,500		6,000	176,000	136,000	36,000	7,540	19/64	8,000	303,000	263,000	36,000
3,570	9/64	6,000	176,000	136,000	36,000	7,940	5/16	8,000	303,000	263,000	36,000
3,800		6,000	176,000	136,000	36,000	8,000		8,000	303,000	263,000	36,000
3,970	5/32	6,000	176,000	136,000	36,000	8,330	21/64	10,000	339,000	295,000	40,000
4,000		6,000	176,000	136,000	36,000	8,500		10,000	339,000	295,000	40,000
4,200		6,000	208,000	168,000	36,000	8,730	11/32	10,000	339,000	295,000	40,000
4,370	11/64	6,000	208,000	168,000	36,000	8,800		10,000	339,000	295,000	40,000
4,500		6,000	208,000	168,000	36,000	9,000		10,000	339,000	295,000	40,000
4,760	3/16	6,000	208,000	168,000	36,000	9,130	23/64	10,000	371,000	327,000	40,000
5,000		6,000	208,000	168,000	36,000	9,520	3/8	10,000	371,000	327,000	40,000
5,100		6,000	240,000	200,000	36,000	9,920	25/64	10,000	371,000	327,000	40,000
5,160	13/64	6,000	240,000	200,000	36,000	10,000		10,000	371,000	327,000	40,000
5,410		6,000	240,000	200,000	36,000						
5,500		6,000	240,000	200,000	36,000						
5,560	7/32	6,000	240,000	200,000	36,000						
5,950	15/64	6,000	240,000	200,000	36,000						
6,000		6,000	240,000	200,000	36,000						
6,300		8,000	272,000	232,000	36,000						
6,350	1/4	8,000	272,000	232,000	36,000						
6,500		8,000	272,000	232,000	36,000						
6,750	17/64	8,000	272,000	232,000	36,000						



Tehoporat jäähdytyskanavilla

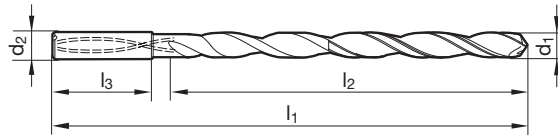


P	•	Kärjen kevennys $\geq \varnothing 3,000$ • kartiovaippahionta • pääleikkusärmän kaarteesta • optimoitu lastu-uran muoto • jäähdytyskanavien max. halkaisija
M	•	• huomio jäähdytysnesteen paine
K	•	
N	○	rakenne- ja pintakarkaistut teräkset • automaattiteräkset, nuorutetut teräkset
S	○	• seostetut teräkset < 1200 N/mm ² asti • ruostumattomat teräkset • valut
H	○	

GÜHRING NAVIGATOR

Leikkuarvosivu 760

Materiaali	TKM
Pinta	A
Varren muoto	HA



Artikkelinro.

6514

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,000		6,000	170,000	130,000	36,000	5,950	15/64	6,000	300,000	260,000	36,000
3,100		6,000	193,000	153,000	36,000	6,000		6,000	300,000	260,000	36,000
3,170	1/8	6,000	193,000	153,000	36,000	6,300		8,000	322,000	282,000	36,000
3,500		6,000	193,000	153,000	36,000	6,350	1/4	8,000	322,000	282,000	36,000
3,570	9/64	6,000	216,000	176,000	36,000	6,500		8,000	322,000	282,000	36,000
3,800		6,000	216,000	176,000	36,000	6,750	17/64	8,000	342,000	302,000	36,000
3,970	5/32	6,000	216,000	176,000	36,000	7,000		8,000	342,000	302,000	36,000
4,000		6,000	216,000	176,000	36,000	7,140	9/32	8,000	363,000	323,000	36,000
4,200		6,000	238,000	198,000	36,000	7,500		8,000	363,000	323,000	36,000
4,370	11/64	6,000	238,000	198,000	36,000	7,540	19/64	8,000	383,000	343,000	36,000
4,500		6,000	238,000	198,000	36,000	7,940	5/16	8,000	383,000	343,000	36,000
4,760	3/16	6,000	258,000	218,000	36,000	8,000		8,000	383,000	343,000	36,000
5,000		6,000	258,000	218,000	36,000						
5,100		6,000	280,000	240,000	36,000						
5,160	13/64	6,000	280,000	240,000	36,000						
5,410		6,000	280,000	240,000	36,000						
5,500		6,000	280,000	240,000	36,000						
5,560	7/32	6,000	300,000	260,000	36,000						

Käruunapora



Kanuunaporién nopea huolto

Huollamme teidán erikoiskanuunaparát muutamassa päivässä saatuamme ne: Gühring'n super nopea kanuunapora palvelu mahdollistaa tämän.

EB 100

Valinta mahdollisuuksia:

- lastu-uran pituus:

45 mm Ø 1,2 / 1,5 / 1,59 / 1,6 / 1,98 / 2,0 / 2,5 / 2,7 / 3,0 / 3,2

80 mm Ø 1,5 / 1,59 / 1,6 / 1,98 / 2,0 / 2,5 / 2,7 / 3,0 / 3,2 / 3,5 / 4,0 / 4,2 / 4,5 / 5,0

120 mm Ø 1,5 / 1,59 / 1,6 / 1,98 / 2,0 / 2,5 / 2,7 / 3,0 / 3,2 / 3,5 / 4,0 / 4,2 / 4,5 / 5,0

160 mm Ø 1,5 / 1,59 / 1,6 / 1,98 / 2,0 / 2,5 / 2,7 / 3,0 / 3,2 / 3,5 / 4,0 / 4,2 / 4,5 / 5,0 /
6,0 / 8,0

- erikoisratkaisu: nimellishalkaisija 0,9 - 16,0 mm, max. lastu-uran pituus 500mm
- kovametallilaatu: K30/K40
- pään muoto: G
- kirkas tai pinnoitettu
- vakiopidin

Erikoistyökalujen valmistusaika 15 työpäivää

EB 80

Valinta mahdollisuuksia:

- nimellishalkaisija 2,0 - 13,9 mm 0,1 mm välein
- nimellishalkaisija 14,0 - 22,0 mm 0,5 mm välein
- kokopituus 1.200 mm asti, min. lastu-uran pituus 20xD
- pään muoto G
- vakio pidin
- kovametallilaatu K15
- kirkas, vakio kärjenhionta valuraudalle ja alumiinille
- S-pinnoite (TiN) lastunmurtajalla pikälastuisille teräksille
- sopivalla pinnoitteella

Erikoistyökalujen valmistusaika 10 työpäivää



Kanuunapora EB 100

Materiaali **TKM**Pinta **a**

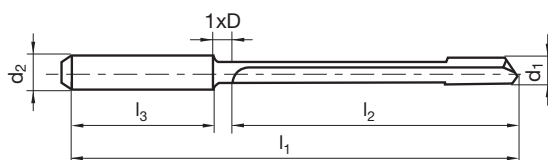
Varren muoto HA

P • kärjen muoto G • TKM-varsi kartiollisella MQL-päällä, d1 = 3 mm tai d2 = 6 mm

P	•
M	•
K	○
N	
S	○
H	○

GÜHRING NAVIGATOR

Leikkuarvosivu 808

Artikkelinro. **5646**

d1 h5		d2 h6	l1	l2	l3	koodinro.
mm	inch	mm	mm	mm	mm	
2,380	3/32	4,000	100,000	70,000	28,000	2,380
2,500		4,000	115,000	85,000	28,000	2,500
2,780	7/64	4,000	115,000	85,000	28,000	2,780
3,000		6,000	145,000	105,000	36,000	3,000
3,170	1/8	6,000	145,000	105,000	36,000	3,170
3,500		6,000	145,000	105,000	36,000	3,500
3,570	9/64	6,000	160,000	120,000	36,000	3,570
3,970	5/32	6,000	160,000	120,000	36,000	3,970
4,000		6,000	160,000	120,000	36,000	4,000
4,370	11/64	6,000	220,000	180,000	36,000	4,370
4,760	3/16	6,000	220,000	180,000	36,000	4,760
5,000		6,000	220,000	180,000	36,000	5,000
5,160	13/64	6,000	220,000	180,000	36,000	5,160
5,560	7/32	6,000	220,000	180,000	36,000	5,560
5,950	15/64	6,000	220,000	180,000	36,000	5,950
6,000		6,000	220,000	180,000	36,000	6,000
6,350	1/4	8,000	260,000	210,000	36,000	6,350
6,750	17/64	8,000	260,000	210,000	36,000	6,750
7,000		8,000	260,000	210,000	36,000	7,000
7,140	9/32	8,000	285,000	240,000	36,000	7,140
7,540	19/64	8,000	285,000	240,000	36,000	7,540
7,940	5/16	8,000	285,000	240,000	36,000	7,940
8,000		8,000	285,000	240,000	36,000	8,000
9,000		10,000	350,000	300,000	40,000	9,000
10,000		10,000	350,000	300,000	40,000	10,000
11,000		12,000	420,000	360,000	45,000	11,000
12,000		12,000	420,000	360,000	45,000	12,000

Kanuunapora



Kanuunapora EB 100

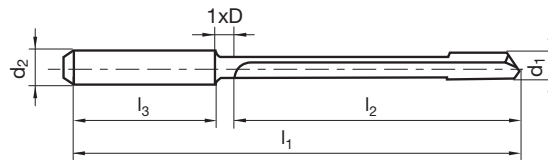
Materiaali **TKM**Pinta **a**

Varren muoto HA

P	•	kärjen muoto G • TKM-varsi kartiollisella MQL-päällä, d1 = 3 mm tai d2 = 6 mm
M	•	
K	○	
N	○	
S	○	
H	○	

GÜHRING NAVIGATOR

Leikkuarvosivu 808

Artikkelinro. **5647**

d1 h5		d2 h6	l1	l2	l3	koodinro.
mm	inch	mm	mm	mm	mm	
2,380	3/32	4,000	160,000	130,000	28,000	2,380
2,500		4,000	185,000	155,000	28,000	2,500
2,780	7/64	4,000	185,000	155,000	28,000	2,780
3,000		6,000	230,000	190,000	36,000	3,000
3,170	1/8	6,000	230,000	190,000	36,000	3,170
3,500		6,000	230,000	190,000	36,000	3,500
3,570	9/64	6,000	260,000	220,000	36,000	3,570
3,970	5/32	6,000	260,000	220,000	36,000	3,970
4,000		6,000	260,000	220,000	36,000	4,000
4,370	11/64	6,000	370,000	330,000	36,000	4,370
4,760	3/16	6,000	370,000	330,000	36,000	4,760
5,000		6,000	370,000	330,000	36,000	5,000
5,160	13/64	6,000	370,000	330,000	36,000	5,160
5,560	7/32	6,000	370,000	330,000	36,000	5,560
5,950	15/64	6,000	370,000	330,000	36,000	5,950
6,000		6,000	370,000	330,000	36,000	6,000
6,350	1/4	8,000	430,000	385,000	36,000	6,350
6,750	17/64	8,000	430,000	385,000	36,000	6,750
7,000		8,000	430,000	385,000	36,000	7,000
7,140	9/32	8,000	485,000	440,000	36,000	7,140
7,540	19/64	8,000	485,000	440,000	36,000	7,540
7,940	5/16	8,000	485,000	440,000	36,000	7,940
8,000		8,000	485,000	440,000	36,000	8,000



Kanuunapora EB 100

Materiaali **TKM**Pinta **a**

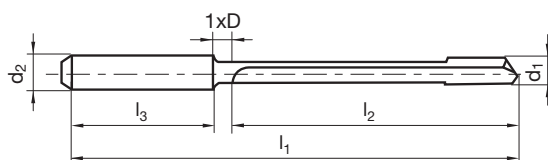
Varren muoto HA

P • kärjen muoto G • TKM-varsi kartiollisella MQL-päällä, d1 = 3 mm tai d2 = 6 mm

P	•
M	•
K	○
N	
S	○
H	○

GÜHRING NAVIGATOR

Leikkuarvosivu 808

Artikkelinro. **5648**

d1 h5		d2 h6		l1	l2	l3	koodinro.
mm	inch	mm	mm	mm	mm	mm	
2,380	3/32	4,000	220,000	190,000	28,000	2,380	
2,500		4,000	255,000	220,000	28,000	2,500	
2,780	7/64	4,000	255,000	220,000	28,000	2,780	
3,000		6,000	320,000	280,000	36,000	3,000	
3,170	1/8	6,000	320,000	280,000	36,000	3,170	
3,500		6,000	320,000	280,000	36,000	3,500	
3,570	9/64	6,000	360,000	320,000	36,000	3,570	
3,970	5/32	6,000	360,000	320,000	36,000	3,970	
4,000		6,000	360,000	320,000	36,000	4,000	
4,370	11/64	6,000	525,000	485,000	36,000	4,370	
4,760	3/16	6,000	525,000	485,000	36,000	4,760	
5,000		6,000	525,000	485,000	36,000	5,000	
5,160	13/64	6,000	525,000	485,000	36,000	5,160	
5,560	7/32	6,000	525,000	485,000	36,000	5,560	
5,950	15/64	6,000	525,000	485,000	36,000	5,950	
6,000		6,000	525,000	485,000	36,000	6,000	

Kanuunapora



Kanuunapora EB 100

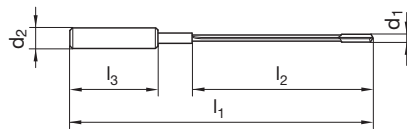


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M	<input type="radio"/>	
K	<input type="radio"/>	
N	<input checked="" type="radio"/>	
S	<input checked="" type="radio"/>	
H	<input type="radio"/>	

GÜHRING NAVIGATOR

Leikkuarvosivu 808

Materiaali	TKM
Pinta	○
Varren muoto	HA



Artikkelinro. **5024**

Kanuunapora

d1 h5		d2 h6		l1	l2	l3	koodinro.
mm	inch	mm		mm	mm	mm	
1,200		4,000		90,000	45,000	28,000	1,200
1,500		4,000		90,000	45,000	28,000	1,500
1,590	1/16	4,000		90,000	45,000	28,000	1,590
1,600		4,000		90,000	45,000	28,000	1,600
1,980	5/64	4,000		90,000	45,000	28,000	1,980
2,000		4,000		90,000	45,000	28,000	2,000
2,500		10,000		100,000	45,000	40,000	2,500
2,700		10,000		100,000	45,000	40,000	2,700
3,000		10,000		100,000	45,000	40,000	3,000
3,200		10,000		100,000	45,000	40,000	3,200



Kanuunapora EB 100



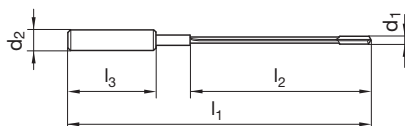
P	•	lastu-uran pituus 45 mm • kärjen muoto G
M	○	
K	•	
N	○	
S	○	
H	○	

GÜHRING NAVIGATOR

Leikkuarvosivu 808

Materiaali **TKM**Pinta **A**

Varren muoto HA

Artikkelinro. **5632**

d1 h5		d2 h6	l1	l2	l3	koodinro.
mm	inch	mm	mm	mm	mm	
1,200		4,000	90,000	45,000	28,000	1,200
1,500		4,000	90,000	45,000	28,000	1,500
1,590	1/16	4,000	90,000	45,000	28,000	1,590
1,600		4,000	90,000	45,000	28,000	1,600
1,980	5/64	4,000	90,000	45,000	28,000	1,980
2,000		4,000	90,000	45,000	28,000	2,000
2,500		10,000	100,000	45,000	40,000	2,500
2,700		10,000	100,000	45,000	40,000	2,700
3,000		10,000	100,000	45,000	40,000	3,000
3,200		10,000	100,000	45,000	40,000	3,200

Kanuunapora



Kanuunapora EB 100



P	○	lastu-uran pituus 80 mm • kärjen muoto G
M	○	
K	○	
N	●	
S	●	
H	○	

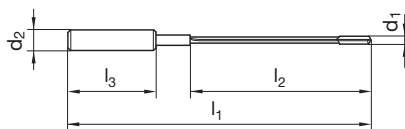
GÜHRING NAVIGATOR

Leikkuarvosivu 808

Materiaali **TKM**

Pinta ○

Varren muoto HA

Artikkelinro. **5020**

Kanuunapora

d1 h5		d2 h6	l1	l2	l3	koodinro.
mm	inch	mm	mm	mm	mm	
1,200		4,000	125,000	80,000	28,000	1,200
1,500		4,000	125,000	80,000	28,000	1,500
1,590	1/16	4,000	125,000	80,000	28,000	1,590
1,600		4,000	125,000	80,000	28,000	1,600
1,980	5/64	4,000	125,000	80,000	28,000	1,980
2,000		4,000	125,000	80,000	28,000	2,000
2,500		10,000	135,000	80,000	40,000	2,500
2,700		10,000	135,000	80,000	40,000	2,700
3,000		10,000	135,000	80,000	40,000	3,000
3,200		10,000	135,000	80,000	40,000	3,200
3,500		10,000	135,000	80,000	40,000	3,500
4,000		10,000	135,000	80,000	40,000	4,000
4,200		10,000	135,000	80,000	40,000	4,200
4,500		10,000	135,000	80,000	40,000	4,500
5,000		10,000	135,000	80,000	40,000	5,000



Kanuunapora EB 100

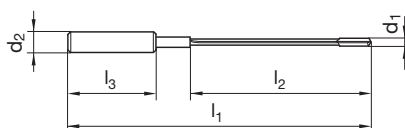


P	•	lastu-uran pituus 80 mm • kärjen muoto G
M	○	
K	•	
N	○	
S	○	
H	○	

GÜHRING NAVIGATOR

Leikkuarvosivu 808

Materiaali	TKM
Pinta	A
Varren muoto	HA



Artikkelinro. 5633

d1 h5		d2 h6	l1	l2	l3	koodinro.
mm	inch	mm	mm	mm	mm	
1,200		4,000	125,000	80,000	28,000	1,200
1,500		4,000	125,000	80,000	28,000	1,500
1,590	1/16	4,000	125,000	80,000	28,000	1,590
1,600		4,000	125,000	80,000	28,000	1,600
1,980	5/64	4,000	125,000	80,000	28,000	1,980
2,000		4,000	125,000	80,000	28,000	2,000
2,500		10,000	135,000	80,000	40,000	2,500
2,700		10,000	135,000	80,000	40,000	2,700
3,000		10,000	135,000	80,000	40,000	3,000
3,200		10,000	135,000	80,000	40,000	3,200
3,500		10,000	135,000	80,000	40,000	3,500
4,000		10,000	135,000	80,000	40,000	4,000
4,200		10,000	135,000	80,000	40,000	4,200
4,500		10,000	135,000	80,000	40,000	4,500
5,000		10,000	135,000	80,000	40,000	5,000

Kanuunapora



Kanuunapora EB 100

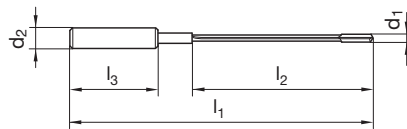


P	○	lastu-uran pituus 120 mm • kärjen muoto G
M	○	
K	○	
N	●	
S	●	
H	○	

GÜHRING NAVIGATOR

Leikkuarvosivu 808

Materiaali	TKM
Pinta	○
Varren muoto	HA



Artikkelinro. **5026**

Kanuunapora

d1 h5		d2 h6		l1	l2	l3	koodinro.
mm	inch	mm		mm	mm	mm	
1,500		4,000		165,000	120,000	28,000	1,500
1,590	1/16	4,000		165,000	120,000	28,000	1,590
1,600		4,000		165,000	120,000	28,000	1,600
1,980	5/64	4,000		165,000	120,000	28,000	1,980
2,000		4,000		165,000	120,000	28,000	2,000
2,500		10,000		175,000	120,000	40,000	2,500
2,700		10,000		175,000	120,000	40,000	2,700
3,000		10,000		175,000	120,000	40,000	3,000
3,200		10,000		175,000	120,000	40,000	3,200
3,500		10,000		175,000	120,000	40,000	3,500
4,000		10,000		175,000	120,000	40,000	4,000
4,200		10,000		175,000	120,000	40,000	4,200
4,500		10,000		175,000	120,000	40,000	4,500
5,000		10,000		175,000	120,000	40,000	5,000



Kanuunapora EB 100

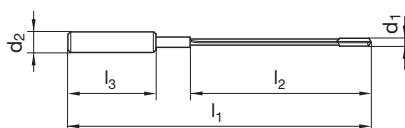


P	•	lastu-uran pituus 120 mm • kärjen muoto G
M	○	
K	•	
N	○	
S	○	
H	○	

GÜHRING NAVIGATOR

Leikkuarvosivu 808

Materiaali	TKM
Pinta	A
Varren muoto	HA



Artikkelinro. 5637

d1 h5		d2 h6	l1	l2	l3	koodinro.
mm	inch	mm	mm	mm	mm	
1,500		4,000	165,000	120,000	28,000	1,500
1,590	1/16	4,000	165,000	120,000	28,000	1,590
1,600		4,000	165,000	120,000	28,000	1,600
1,980	5/64	4,000	165,000	120,000	28,000	1,980
2,000		4,000	165,000	120,000	28,000	2,000
2,500		10,000	175,000	120,000	40,000	2,500
2,700		10,000	175,000	120,000	40,000	2,700
3,000		10,000	175,000	120,000	40,000	3,000
3,200		10,000	175,000	120,000	40,000	3,200
3,500		10,000	175,000	120,000	40,000	3,500
4,000		10,000	175,000	120,000	40,000	4,000
4,200		10,000	175,000	120,000	40,000	4,200
4,500		10,000	175,000	120,000	40,000	4,500
5,000		10,000	175,000	120,000	40,000	5,000

Kanuunapora



Kanuunapora EB 100

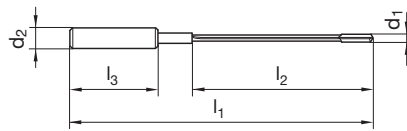


P	○	lastu-uran pituus 160 mm • kärjen muoto G
M	○	
K	○	
N	●	
S	●	
H	○	

GÜHRING NAVIGATOR

Leikkuarvosivu 808

Materiaali	TKM
Pinta	○
Varren muoto	HA



Artikkelinro. **5021**

Kanuunapora

d1 h5		d2 h6	l1	l2	l3	koodinro.
mm	inch	mm	mm	mm	mm	
1,500		4,000	205,000	160,000	28,000	1,500
1,590	1/16	4,000	205,000	160,000	28,000	1,590
1,600		4,000	205,000	160,000	28,000	1,600
1,980	5/64	4,000	205,000	160,000	28,000	1,980
2,000		4,000	205,000	160,000	28,000	2,000
2,500		10,000	215,000	160,000	40,000	2,500
2,700		10,000	215,000	160,000	40,000	2,700
3,000		10,000	215,000	160,000	40,000	3,000
3,200		10,000	215,000	160,000	40,000	3,200
3,500		10,000	215,000	160,000	40,000	3,500
4,000		10,000	215,000	160,000	40,000	4,000
4,200		10,000	215,000	160,000	40,000	4,200
4,500		10,000	215,000	160,000	40,000	4,500
5,000		10,000	215,000	160,000	40,000	5,000
6,000		16,000	225,000	160,000	48,000	6,000
8,000		16,000	225,000	160,000	48,000	8,000



Kanuunapora EB 100

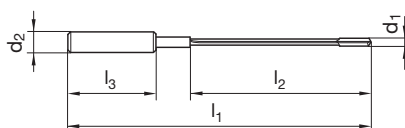


P	•	lastu-uran pituus 160 mm • kärjen muoto G
M	○	
K	•	
N	○	
S	○	
H	○	

GÜHRING NAVIGATOR

Leikkuarvosivu 808

Materiaali	TKM
Pinta	A
Varren muoto	HA



Artikkelinro. 5638

d1 h5		d2 h6		l1	l2	l3	koodinro.
mm	inch	mm		mm	mm	mm	
1,500		4,000		205,000	160,000	28,000	1,500
1,590	1/16	4,000		205,000	160,000	28,000	1,590
1,600		4,000		205,000	160,000	28,000	1,600
1,980	5/64	4,000		205,000	160,000	28,000	1,980
2,000		4,000		205,000	160,000	28,000	2,000
2,500		10,000		215,000	160,000	40,000	2,500
2,700		10,000		215,000	160,000	40,000	2,700
3,000		10,000		215,000	160,000	40,000	3,000
3,200		10,000		215,000	160,000	40,000	3,200
3,500		10,000		215,000	160,000	40,000	3,500
4,000		10,000		215,000	160,000	40,000	4,000
4,200		10,000		215,000	160,000	40,000	4,200
4,500		10,000		215,000	160,000	40,000	4,500
5,000		10,000		215,000	160,000	40,000	5,000
6,000		16,000		225,000	160,000	48,000	6,000
8,000		16,000		225,000	160,000	48,000	8,000

Kanuunapora



Kanuunapora EB 80

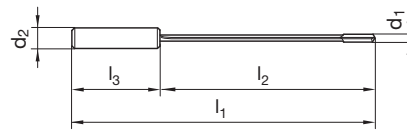


P	•	suuremmalla jäähdytysreikäillä • kärjen muoto G • sivuttaisilla lastunmurtaajilla
M	○	
K	•	
N	○	
S	○	
H	○	

GÜHRING NAVIGATOR

Leikkuuarvosivu 808

Materiaali	KM
Pinta	S
Varren muoto	HA

Artikkelinro. **5018**

d1 h5		d2 h6	l1	l2	l3	koodinro.
mm	inch	mm	mm	mm	mm	
4,000		12,000	150,000	100,000	45,000	4,000
4,200		12,000	160,000	110,000	45,000	4,200
4,500		12,000	170,000	120,000	45,000	4,500
5,000		16,000	180,000	130,000	48,000	5,000
5,500		16,000	190,000	140,000	48,000	5,500
6,000		16,000	210,000	160,000	48,000	6,000
6,500		16,000	220,000	170,000	48,000	6,500
7,000		16,000	235,000	185,000	48,000	7,000
8,000		16,000	260,000	210,000	48,000	8,000
9,000		16,000	280,000	230,000	48,000	9,000
10,000		20,000	320,000	260,000	50,000	10,000
12,000		20,000	370,000	310,000	50,000	12,000



Kanuunapora EB 80

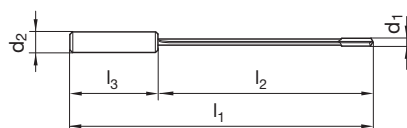


P	○	kärjen muoto G
M	●	
K	○	
N	○	
S	●	
H	○	

GÜHRING NAVIGATOR

Leikkuarvosivu 808

Materiaali	KM
Pinta	Ⓢ
Varren muoto	HA



Artikkelinro. 5639

d1 h5		d2 h6	l1	l2	l3	koodinro.
mm	inch	mm	mm	mm	mm	
3,970	5/32	10,000	150,000	100,000	40,000	3,970
4,000		12,000	150,000	100,000	45,000	4,000
5,000		16,000	180,000	130,000	48,000	5,000
5,156	13/64	16,000	180,000	130,000	48,000	5,156
6,000		16,000	210,000	160,000	48,000	6,000
6,350	1/4	16,000	220,000	170,000	48,000	6,350
7,000		16,000	235,000	185,000	48,000	7,000
7,938	5/16	16,000	260,000	210,000	48,000	7,938
8,000		16,000	260,000	210,000	48,000	8,000
9,000		16,000	280,000	230,000	48,000	9,000
9,525	3/8	16,000	290,000	240,000	48,000	9,525
10,000		20,000	320,000	260,000	50,000	10,000
11,000		20,000	340,000	290,000	50,000	11,000
11,113	7/16	20,000	340,000	290,000	50,000	11,113
12,000		20,000	370,000	310,000	50,000	12,000
12,700	1/2	20,000	385,000	330,000	50,000	12,700

Kanuunapora



Kanuunapora EB 80

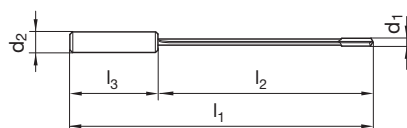


P	•	suuremmalla jäähditysreiällä • kärjen muoto G • sivuttaisilla lastunmurtaajilla
M	○	
K	•	
N	○	
S	○	
H	○	

GÜHRING NAVIGATOR

Leikkuuarvosivu 808

Materiaali	KM
Pinta	S
Varren muoto	HA



Artikkelinro. 5460

d1 h5		d2 h6	l1	l2	l3	koodinro.
mm	inch	mm	mm	mm	mm	
4,000		12,000	200,000	155,000	45,000	4,000
4,200		12,000	210,000	165,000	45,000	4,200
4,500		12,000	220,000	175,000	45,000	4,500
5,000		16,000	230,000	182,000	48,000	5,000
5,500		16,000	245,000	197,000	48,000	5,500
6,000		16,000	260,000	212,000	48,000	6,000
6,500		16,000	275,000	227,000	48,000	6,500
7,000		16,000	290,000	242,000	48,000	7,000
8,000		16,000	320,000	272,000	48,000	8,000
9,000		16,000	350,000	302,000	48,000	9,000
10,000		20,000	400,000	350,000	50,000	10,000
12,000		20,000	450,000	400,000	50,000	12,000



Kanuunapora EB 80

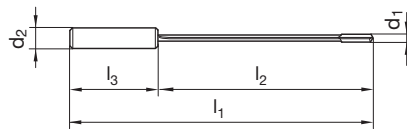


P	○	kärjen muoto G
M	●	
K	○	
N	○	
S	●	
H	○	

GÜHRING NAVIGATOR

Leikkuarvosivu 808

Materiaali	KM
Pinta	Ⓢ
Varren muoto	HA



Artikkelinro. 5640

d1 h5		d2 h6	l1	l2	l3	koodinro.
mm	inch	mm	mm	mm	mm	
3,970	5/32	10,000	200,000	155,000	40,000	3,970
4,000		12,000	200,000	155,000	45,000	4,000
5,000		16,000	230,000	182,000	48,000	5,000
5,156	13/64	16,000	230,000	182,000	48,000	5,156
6,000		16,000	260,000	212,000	48,000	6,000
6,350	1/4	16,000	275,000	227,000	48,000	6,350
7,000		16,000	290,000	242,000	48,000	7,000
7,938	5/16	16,000	320,000	272,000	48,000	7,938
8,000		16,000	320,000	272,000	48,000	8,000
9,000		16,000	350,000	302,000	48,000	9,000
9,525	3/8	16,000	380,000	330,000	48,000	9,525
10,000		20,000	400,000	350,000	50,000	10,000
11,000		20,000	430,000	380,000	50,000	11,000
11,113	7/16	20,000	430,000	380,000	50,000	11,113
12,000		20,000	450,000	400,000	50,000	12,000
12,700	1/2	20,000	500,000	450,000	50,000	12,700

Kanuunapora



Kanuunapora EB 80



P	•	suuremmalla jäähdytysreillä • kärjen muoto G • sivuttaisilla lastunmurtaajilla
M	○	
K	•	
N	○	
S	○	
H	○	

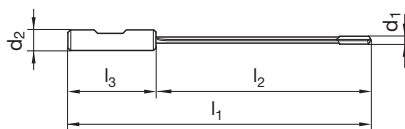
GÜHRING NAVIGATOR

Leikkuarvosivu 808

Materiaali **KM**

Pinta ○

Varren muoto HB

Artikkelinro. **5689**

Kanuunapora

d1 h5		d2 h6	l1	l2	l3	koodinro.
mm	inch	mm	mm	mm	mm	
4,000		12,000	230,000	185,000	45,000	4,000
5,000		16,000	280,000	232,000	48,000	5,000
6,000		16,000	320,000	272,000	48,000	6,000
8,000		16,000	420,000	372,000	48,000	8,000
10,000		20,000	510,000	460,000	50,000	10,000
12,000		20,000	600,000	550,000	50,000	12,000



Kanuunapora EB 80

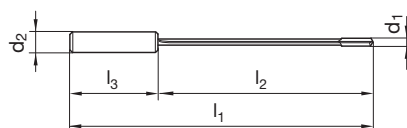


P	•	suuremmalla jäähdytysreillä • kärjen muoto G • sivuttaisilla lastunmurtaajilla
M	○	
K	•	
N	○	
S	○	
H	○	

GÜHRING NAVIGATOR

Leikkuarvosivu 808

Materiaali	KM
Pinta	S
Varren muoto	HA



Artikkelinro. 5022

d1 h5		d2 h6	l1	l2	l3	koodinro.
mm	inch	mm	mm	mm	mm	
4,000		12,000	230,000	185,000	45,000	4,000
4,200		12,000	240,000	195,000	45,000	4,200
4,500		12,000	250,000	205,000	45,000	4,500
5,000		16,000	280,000	232,000	48,000	5,000
5,500		16,000	300,000	252,000	48,000	5,500
6,000		16,000	320,000	272,000	48,000	6,000
6,500		16,000	340,000	292,000	48,000	6,500
7,000		16,000	370,000	322,000	48,000	7,000
8,000		16,000	420,000	372,000	48,000	8,000
9,000		16,000	450,000	402,000	48,000	9,000
10,000		20,000	510,000	460,000	50,000	10,000
12,000		20,000	600,000	550,000	50,000	12,000

Kanuunapora



Kanuunapora EB 80

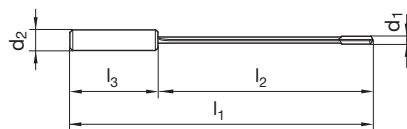


P	○	kärjen muoto G
M	●	
K	○	
N	○	
S	●	
H	○	

GÜHRING NAVIGATOR

Leikkuarvosivu 808

Materiaali	KM
Pinta	Ⓢ
Varren muoto	HA



Artikkelinro. 5641

d1 h5		d2 h6	l1	l2	l3	koodinro.
mm	inch	mm	mm	mm	mm	
3,970	5/32	10,000	230,000	185,000	40,000	3,970
4,000		12,000	230,000	185,000	45,000	4,000
5,000		16,000	280,000	232,000	48,000	5,000
5,156	13/64	16,000	280,000	232,000	48,000	5,156
6,000		16,000	320,000	272,000	48,000	6,000
6,350	1/4	16,000	340,000	292,000	48,000	6,350
7,000		16,000	370,000	322,000	48,000	7,000
7,938	5/16	16,000	420,000	372,000	48,000	7,938
8,000		16,000	420,000	372,000	48,000	8,000
9,000		16,000	450,000	402,000	48,000	9,000
9,525	3/8	16,000	480,000	432,000	48,000	9,525
10,000		20,000	510,000	460,000	50,000	10,000
11,000		20,000	550,000	500,000	50,000	11,000
11,113	7/16	20,000	550,000	500,000	50,000	11,113
12,000		20,000	600,000	550,000	50,000	12,000
12,700	1/2	20,000	635,000	585,000	50,000	12,700



Kanuunapora EB 80



P	•	suuremmalla jäähditysreiällä • kärjen muoto G • sivuttaisilla lastunmurtaajilla
M	○	
K	•	
N	○	maksimi porausvyvyys työkalulla 40xD, syvemille porausvyvyksille käytä art.no. 5689 ensimmäisenä työkaluna
S	○	
H	○	

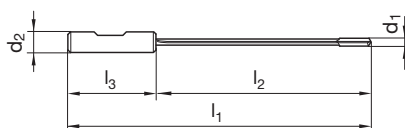
GÜHRING NAVIGATOR

Leikkuarvosivu 808

Materiaali **KM**

Pinta ○

Varren muoto HB

Artikkelinro. **5690**

d1 h5		d2 h6	l1	l2	l3	koodinro.
mm	inch	mm	mm	mm	mm	
3,970	5/32	10,000	390,000	350,000	40,000	3,970
4,950		16,000	480,000	432,000	48,000	4,950
5,950	15/64	16,000	560,000	512,000	48,000	5,950
7,950		16,000	740,000	692,000	48,000	7,950
9,950		20,000	910,000	860,000	50,000	9,950
11,950		20,000	1080,000	1030,000	50,000	11,950

Kanuunapora



Kanuunapora EB 80

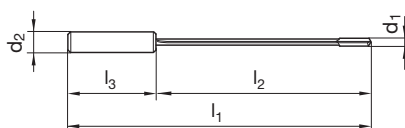


P	•	suuremmalla jäähdytysreiällä • kärjen muoto G • sivuttaisilla lastunmurtaajilla
M	○	
K	•	
N	○	maksimi poraussyvyys yhdellä kerralla 40xD, suuremmille syvyyksille alkuporaus nro:lla 5022 suositeltava
S	○	
H	○	

GÜHRING NAVIGATOR

Leikkuuarvosivu 808

Materiaali	KM
Pinta	S
Varren muoto	HA



Artikkelinro. 5023

d1 h5		d2 h6	l1	l2	l3	koodinro.
mm	inch	mm	mm	mm	mm	
4,950		16,000	480,000	432,000	48,000	4,950
5,950	15/64	16,000	560,000	512,000	48,000	5,950
7,950		16,000	740,000	692,000	48,000	7,950
9,950		20,000	910,000	860,000	50,000	9,950
11,950		20,000	1080,000	1030,000	50,000	11,950



Kanuunapora EB 80

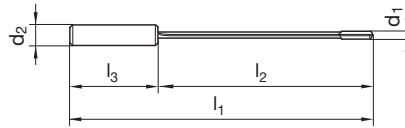


P	○	kärjen muoto G
M	●	
K	○	
N	■	maksimi porausvyvyys työkalulla 40xD, syvemille porausvyvyyksille käytä art.no. 5641 ensimmäisenä työkaluna
S	●	
H	○	

GÜHRING NAVIGATOR

Leikkuarvosivu 808

Materiaali	KM
Pinta	Ⓢ
Varren muoto	HA



Artikkelinro. 5642

d1 h5		d2 h6	l1	l2	l3	koodinro.
mm	inch	mm	mm	mm	mm	
4,950		16,000	480,000	432,000	48,000	4,950
5,106		16,000	480,000	432,000	48,000	5,106
5,950	15/64	16,000	560,000	512,000	48,000	5,950
6,300		16,000	590,000	542,000	48,000	6,300
6,950		16,000	650,000	602,000	48,000	6,950
7,888		16,000	740,000	692,000	48,000	7,888
7,950		16,000	740,000	692,000	48,000	7,950
8,950		16,000	820,000	772,000	48,000	8,950
9,475		16,000	870,000	822,000	48,000	9,475
9,950		20,000	910,000	860,000	50,000	9,950
10,950		20,000	995,000	945,000	50,000	10,950
11,063		20,000	995,000	945,000	50,000	11,063
11,950		20,000	1080,000	1030,000	50,000	11,950
12,650		20,000	1140,000	1090,000	50,000	12,650

Kanuunapora



Kanuunapora EB 80

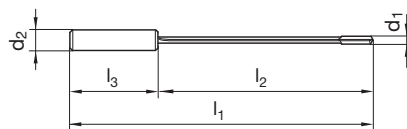


P	•	kokopituus =1100,00mm • kärjen muoto G • pidin kanuunaporakoneisiin (T3.1)
M	○	
K	•	
N	•	
S	○	
H	○	

GÜHRING NAVIGATOR

Leikkuarvosivu 808

Materiaali	KM
Pinta	S
Varren muoto	lieriö



Artikkelinro. 5164

d1 h5		d2 h6	l1	l2	l3	koodinro.
mm	inch	mm	mm	mm	mm	
6,000		25,000	1100,000	1010,000	70,000	6,000
7,000		25,000	1100,000	1010,000	70,000	7,000
8,000		25,000	1100,000	1010,000	70,000	8,000
10,000		25,000	1100,000	1010,000	70,000	10,000
12,000		25,000	1100,000	1010,000	70,000	12,000
16,000		25,000	1100,000	1010,000	70,000	16,000
20,000		25,000	1100,000	1010,000	70,000	20,000
22,000		25,000	1100,000	1000,000	70,000	22,000



Kanuunapora ZB 80 (2-leikkuinen)

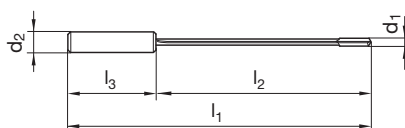


P	4-päästöeroitus • alumiinille
M	
K	
N	•
S	
H	

GÜHRING NAVIGATOR

Leikkuarvosivu 808

Materiaali	KM
Pinta	○
Varren muoto	HA



Artikkelinro. 5019

d1 h5	d2	l1	l2	l3	koodinro.
mm	mm	mm	mm	mm	
8,000	16,000	330,000	280,000	48,000	8,000
10,000	20,000	390,000	340,000	50,000	10,000
12,000	20,000	450,000	400,000	50,000	12,000

Kanuunapora



Kanuunapora ZB 80 (2-leikkuinen)

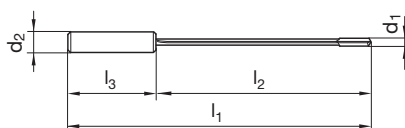


P	4-päästöeroitus • valumateriaaleille
M	
K	•
N	
S	
H	

GÜHRING NAVIGATOR

Leikkuarvosivu 808

Materiaali	KM
Pinta	○
Varren muoto	HA



Artikkelinro. 5643

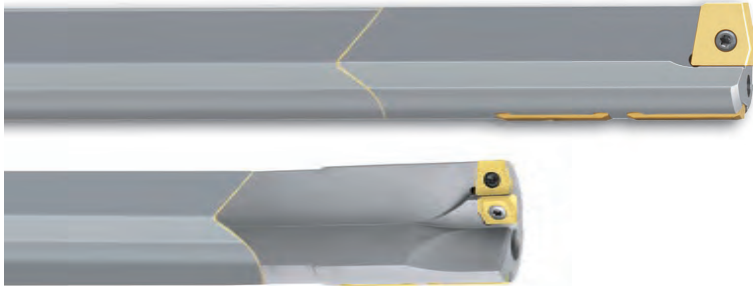
d1 h5	d2	l1	l2	l3	koodinro.
mm	mm	mm	mm	mm	
8,000	16,000	330,000	280,000	48,000	8,000
10,000	20,000	390,000	340,000	50,000	10,000
12,000	20,000	450,000	400,000	50,000	12,000

Kanuunapora



EB 800

- Tilauksesta $\varnothing 52,00\text{mm}$
- Vaihtopalat ja tukikiskot vakiona 1/10mm jaolla, erikoistilauksesta 1/100mm jaolla kiintein lisäkustannuksin hinnoiteltuna



1-leikkuiset Gühring-kanuunaporat vaihtopaloilla ja tukikiskoilla voidaan myös valmistaa erikoistyökaluina asiakkaan toivomusten mukaan. Ne soveltuvat lähes kaikille materiaaleille halkaisija alue 12,00 mm – 52,00 mm, kokonaispituuteen 3000 mm asti.

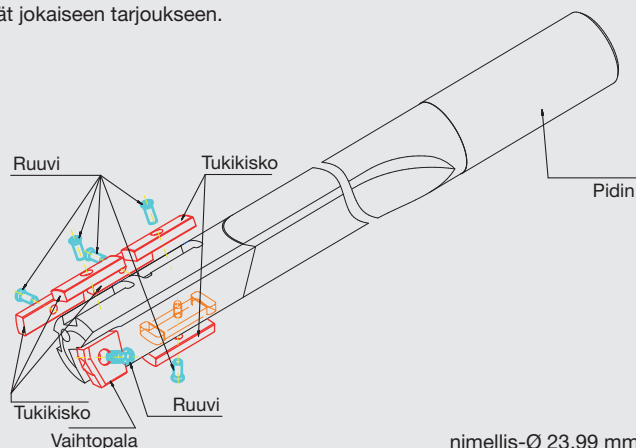
Etusi ovat:

- Sekä vaihtopalat että vaihdettavat tukikiskot mahdollistavat eri kovametallilaatujen ja pinnoitteiden parhaimman hyödyntämisen
- Tarkkuusvalmistetut vaihtopalat ja tukikiskot helpottavat esiasetusäättöjä
- Erikoisvalmisteiset tukikiskot tehdään erityisesti teidän sovelluskohteeseenne valitusta kovametallista. Ne ovat käännettävissä l. kaksinkertainen työkalun kestoikä. Lisäksi ne voidaan pinnoittaa kaikilla Gühring-pinnoitteilla.
- Tarkkuudella valmistettujen palojen taskujen ja palojen itsensä ansiosta saavutetaan erittäin vakaa työkalu.
- Kalliit seisokit voidaan välttää, sillä komponentit voidaan vaihtaa poistamatta työkalua koneesta.
- Kallis uudelleenhiointa vältetään vaihtopaletekniiikan avulla

- Työstettävän kohteen mukaan suoritettu vaihtopalaavainta varmistaa optimaalisen lastuamisen - myös vaikeasti työstettävien materiaalien tapauksissa.
- Keskenään vaihtokelpoiset palat valmistetaan erikoiskovametallista jotta ne sopisivat juuri asiakkaan kanuunaporaukseen. Lisäksi kaikki Gühring-pinnoitteet on valittavissa.
- Nimellishalkaisijaa voidaan muuttaa tietyllä halkaisijavälillä yksinkertaisesti vaihtamalla vain yksi komponentti
- Pidin valmistetaan nuorrutusteräksestä
 - DIN 6535 HA - DIN 6535 HB
 - DIN 6535 HE - DIN 1835 E
 Voimme myös valmistaa kanuunaporan juuri teidän vaatimusten mukaisesti.

Huom: - lyhyin lastu-uranpituus 15 x D
- mahd. halkaisijatoleranssi IT9/IT10

Piirustukset sekä kaikki Gühring numerot ja määrittelyt sisältyvät jokaiseen tarjoukseen.



nimellis-Ø 23,99 mm asti 4 ohjainkiskoa
lähtien nimellis-Ø 24,00 mm 5 ohjainkiskoa

Kiristysmomentit - Ohjearvot

Ulkoisen vaihtopala

Koko	Halkaisija in mm	ISO metrinen kierre mm	Torx-Koko	Kiristysmomentti [Nm]
0.	12,00 – 15,99	M2,5 x 5,2	T8	1,00
1.	16,00 – 19,99	M3,0 x 6,4	T9	1,40
2.	20,00 – 25,99	M4,0 x 7,7	T15	2,50
3.	26,00 – 29,99	M4,0 x 10,6	T15	2,50
4.	30,00 – 33,99	M4,0 x 10,6	T15	2,50
5.	34,00 – 37,99	M5,0 x 14,2	T20	5,00
6.	38,00 – 40,00	M5,0 x 14,2	T20	5,00
7.	40,01 – 43,99	M3,0 x 6,4	T9	1,40
8.	44,00 – 47,99	M4,0 x 7,7	T15	2,50
9.	48,00 – 52,00	M4,0 x 10,6	T15	2,50

Sisäinen vaihtopala

Koko	Halkaisija in mm	ISO metrinen kierre mm	Torx-Koko	Kiristysmomentti [Nm]
7. – 9.	40,01 – 52,00	M4,5 x 11,8	T15	3,00

Ohjainkiskot

Koko	Halkaisija in mm	ISO metrinen kierre mm	Torx-Koko	Kiristysmomentti [Nm]
0.	12,00 – 15,99	M1,6 x 4,4	T5	0,40
1.	16,00 – 17,99	M2,2 x 4,6	T7	0,60
1.	18,00 – 19,99	M2,2 x 5,6	T7	0,60
2.	20,00 – 22,49	M2,5 x 5,2	T8	1,00
2.	22,50 – 25,99	M2,5 x 6,4	T8	1,00
3.	26,00 – 29,99	M2,5 x 6,4	T8	1,00
4. – 9.	30,00 – 52,00	M3,0 x 8,0	T9	1,40



Kanuunapora EB 800 vaihtopalalla



P	•
M	○
K	○
N	•
S	○
H	

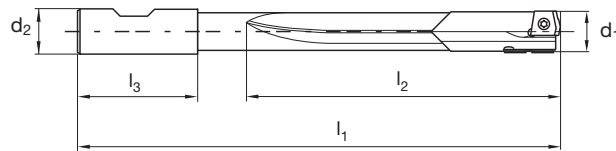
vaihtopaloilla • keskenään vaihdettavilla tukilistoilla • ruuvimeisselillä
 • ruuveilla • yleiskäyttöön • tilaa momenttiavain art.no. 4915 erikseen

 Materiaali **KM**

 Pinta **S**

 Varren muoto **HB**
GÜHRING NAVIGATOR

Leikkuuarvosivu 808







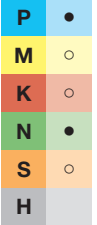

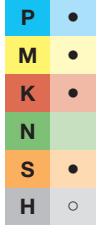






 Artikkelinro. **5644**

d1 h8		d2	l1	l2	l3	koodinro.
mm	inch	mm	mm	mm	mm	
12,000		20,000	446,000	384,000	50,000	12,000
12,700	1/2	20,000	468,000	406,000	50,000	12,700
14,000		20,000	510,000	448,000	50,000	14,000
15,000		25,000	548,000	480,000	56,000	15,000
16,000		25,000	580,000	512,000	56,000	16,000
18,000		25,000	644,000	576,000	56,000	18,000
20,000		32,000	712,000	640,000	60,000	20,000
24,000		32,000	840,000	768,000	60,000	24,000










Kanuunapora



Tilauksesta Ø 12,0 – 52, 0 mm, maksimipituus 3000 mm

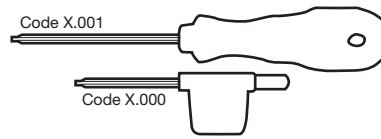
Koko	Halkaisija / pidinalue	Runko / pidin	Vaihtopalat (ulkoinen)				Tarvikkeet	
								
			TiN-pinnoitettu	FIRE-pinnoitettu	Signum-pinnoitettu	TiAlN nanoA-pinnoitettu		
0.	Ø12.00 - Ø12.49 Ø12.50 - Ø12.99 Ø13.00 - Ø13.49 Ø13.50 - Ø13.99 Ø14.00 - Ø14.49 Ø14.50 - Ø14.99 Ø15.00 - Ø15.49 Ø15.50 - Ø15.99	Peruspudin / pidin asiakkaan pyynnöstä, kokopituus 3000 mm asti, lastu-uran pituus lähtien 10xD Vaihtoehto: Vakio-ohjelma Artikkelinro. 5644 halkaisija 12,00 mm - 24,00 mm suosituimmat koot TiN vaihtopalat ja TiN ohjainkiskot					Artikkelinro. 4071 2.502 T8 M2.5x 5.2	Artikkelinro. 1612 8.001
	1.		Ø16.00 - Ø16.49 Ø16.50 - Ø16.99 Ø17.00 - Ø17.49 Ø17.50 - Ø17.99 Ø18.00 - Ø18.49 Ø18.50 - Ø18.99 Ø19.00 - Ø19.49 Ø19.50 - Ø19.99					Artikkelinro. 4071 3.002 T9 M3x6.4
2.			Ø20.00 - Ø20.49 Ø20.50 - Ø20.99 Ø21.00 - Ø21.49 Ø21.50 - Ø21.99 Ø22.00 - Ø22.49 Ø22.50 - Ø22.99 Ø23.00 - Ø23.49 Ø23.50 - Ø23.99 Ø24.00 - Ø24.49 Ø24.50 - Ø24.99 Ø25.00 - Ø25.49 Ø25.50 - Ø25.99	Artikkelinro. 5029 + nimellis-Ø = tilausnumero	Artikkelinro. 5704 + nimellis-Ø = tilausnumero	Artikkelinro. 5702 + nimellis-Ø = tilausnumero	Artikkelinro. 5706 + nimellis-Ø = tilausnumero	Artikkelinro. 4071 4.001 T15 M4x7.7
	3.		Ø26.00 - Ø26.49 Ø26.50 - Ø26.99 Ø27.00 - Ø27.49 Ø27.50 - Ø27.99 Ø28.00 - Ø28.49 Ø28.50 - Ø28.99 Ø29.00 - Ø29.49 Ø29.50 - Ø29.99					
4.			Ø30.00 - Ø30.49 Ø30.50 - Ø30.99 Ø31.00 - Ø31.49 Ø31.50 - Ø31.99 Ø32.00 - Ø32.49 Ø32.50 - Ø32.99 Ø33.00 - Ø33.49 Ø33.50 - Ø33.99	Artikkelinro. 4071 5.002 T20 M5x14.2				
	5.		Ø34.00 - Ø34.49 Ø34.50 - Ø34.99 Ø35.00 - Ø35.49 Ø35.50 - Ø35.99 Ø36.00 - Ø36.49 Ø36.50 - Ø36.99 Ø37.00 - Ø37.49 Ø37.50 - Ø37.99		Artikkelinro. 4071 3.002 TX9 M3x6.4			
6.			Ø38.00 - Ø38.49 Ø38.50 - Ø38.99 Ø39.00 - Ø39.49 Ø39.50 - Ø40.00	Artikkelinro. 4071 4.001 TX15 M4x7.7				
	7.		Ø40.01 - Ø40.49 Ø40.50 - Ø40.99 Ø41.00 - Ø41.49 Ø41.50 - Ø41.99 Ø42.00 - Ø42.49 Ø42.50 - Ø42.99 Ø43.00 - Ø43.49 Ø43.50 - Ø43.99		Artikkelinro. 4071 4.002 TX15 M4x10.6			
8.			Ø44.00 - Ø44.49 Ø44.50 - Ø44.99 Ø45.00 - Ø45.49 Ø45.50 - Ø45.99 Ø46.00 - Ø46.49 Ø46.50 - Ø46.99 Ø47.00 - Ø47.49 Ø47.50 - Ø47.99	Artikkelinro. 4071 4.002 TX15 M4x10.6				
	9.		Ø48.00 - Ø48.49 Ø48.50 - Ø48.99 Ø49.00 - Ø49.49 Ø49.50 - Ø49.99 Ø50.00 - Ø50.49 Ø50.50 - Ø50.99 Ø51.00 - Ø51.49 Ø51.50 - Ø52.00					



Vaihtopalat (sisäinen)	Ruuvi	Ruuviavain	Ohjainkiskot				Ruuvi	Ruuviavain																																																
			TiN-pinnoitettu	FIRE-pinnoitettu	Signum-pinnoitettu	TiAIN nanoA-pinnoitettu																																																		
																																																								
			<table border="1"> <tr><td>P</td><td>•</td></tr> <tr><td>M</td><td>○</td></tr> <tr><td>K</td><td>○</td></tr> <tr><td>N</td><td>•</td></tr> <tr><td>S</td><td>○</td></tr> <tr><td>H</td><td>○</td></tr> </table>	P	•	M	○	K	○	N	•	S	○	H	○	<table border="1"> <tr><td>P</td><td>•</td></tr> <tr><td>M</td><td>○</td></tr> <tr><td>K</td><td>•</td></tr> <tr><td>N</td><td>○</td></tr> <tr><td>S</td><td>○</td></tr> <tr><td>H</td><td>○</td></tr> </table>	P	•	M	○	K	•	N	○	S	○	H	○	<table border="1"> <tr><td>P</td><td>•</td></tr> <tr><td>M</td><td>•</td></tr> <tr><td>K</td><td>•</td></tr> <tr><td>N</td><td>•</td></tr> <tr><td>S</td><td>•</td></tr> <tr><td>H</td><td>○</td></tr> </table>	P	•	M	•	K	•	N	•	S	•	H	○	<table border="1"> <tr><td>P</td><td>○</td></tr> <tr><td>M</td><td>•</td></tr> <tr><td>K</td><td>○</td></tr> <tr><td>N</td><td>○</td></tr> <tr><td>S</td><td>•</td></tr> <tr><td>H</td><td>○</td></tr> </table>	P	○	M	•	K	○	N	○	S	•	H	○	Artikkelinro. 4071 1.601 T5 M1.6x4.4	Artikkelinro. 1612 5.001
P	•																																																							
M	○																																																							
K	○																																																							
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S	•																																																							
H	○																																																							
							Artikkelinro. 4071 2.203 T7 / M2.2x 4,6	Artikkelinro. 1612 7.001																																																
							Artikkelinro. 4071 2.202 T7 / M2.2x5.6																																																	
			Artikkelinro. 5030 + nimellis-Ø = tilausnumero	Artikkelinro. 5705 + nimellis-Ø = tilausnumero	Artikkelinro. 5703 + nimellis-Ø = tilausnumero	Artikkelinro. 5707 + nimellis-Ø = tilausnumero	Artikkelinro. 4071 2.502 T8 M2.5x 5.2	Artikkelinro. 1612 8.001																																																
							Artikkelinro. 4071 2.501 T8 M2.5x6.4																																																	
							Artikkelinro. 4071 3.003 T9 M3x8	Artikkelinro. 1612 9.001																																																
kirkas Erikoistyökalu TiN Erikoistyökalu FIRE Erikoistyökalu	Artikkelinro. 4071 4.501 T15 M4.5x11.8	Artikkelinro. 1612 15.001	Erikoistyökalu	Erikoistyökalu	Erikoistyökalu	Erikoistyökalu																																																		



Torx-ruuviavain



Artikkelinro.

1612

Koko	koodinro.
T5	5,001
T7	7,001
T8	8,001
T9	9,001
T15	15,001
T20	20,001



Momenttiavaimet



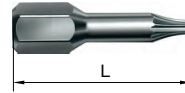
Artikkelinro.

4915

Pidin		Nm	Malli	koodinro.
1/4"	hexagonal	0,4-1	A	1,001
1/4"	hexagonal	1-5	A	5,001



Torx - kärkisarja



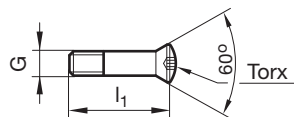
Artikkelinro.

4917

Pidin		Torx	L	koodinro.
			mm	
1/4	hexagonal	T5	25,000	5,000
1/4	hexagonal	T7	25,000	7,000
1/4	hexagonal	T8	25,000	8,000
1/4	hexagonal	T9	25,000	9,000
1/4	hexagonal	T15	25,000	15,000
1/4	hexagonal	T20	25,000	20,000



Kiinnitysruuvit



Artikkelinro.

4071

G	l1	Torx	koodinro.
	mm		
M1,6	4,400	T5	1,601
M2,2	5,600	T7	2,202
M2,2	4,600	T7	2,203
M2,5	6,400	T8	2,501
M2,5	5,200	T8	2,502
M3	6,400	T9	3,002
M3	8,000	T9	3,003
M4	7,700	T15	4,001
M4	10,600	T15	4,002
M5	14,200	T20	5,002



TEROITUSLAITTEISTO 1-LEIKKUISILLE KANUUNAPORILLE

Kanuunapora

Poranpidin TBM 116 1-leikkuisille kanuunaporille

TBM 116 on manuaalikäyttöinen yleishiontakone. Sen kompakti muotoilu yhdistettynä Gühring'in 1-leik. kanuunaporien teroitussjärjestelmään ja kaksoishiomalaiikkaan tekee siitä täydellisen 1-leik. kanuunaporien teroituskoneen. Se sopii erityisesti lukumäärällisesti pienten ja keskisuurten sarjojen teroitukseen, jossa teroitettavien työkalujen pituudet ja halkaisijat vaihtelevat. Lisäksi se mahdollistaa muiden modifikaativaihtoehtojen ohessa suhteellisen helposti lastunmurtajauran lisäämisen.

Toimitettavat tuotteet:

Teroituskone kahdella korkeatehoisella valolähteellä, sekä kahdella 220V pistokkeella (hiontajärjestelmä ja hiontalaiikka eivät sisälly tuotteeseen).

Koneen tiedot:

Syöttöteho vaatimukset 380V/50Hz. Hiomalaiikan nopeus 2850 rpm, hiomalaiikan max. halkaisija 150mm.

Artikkelinumero: 600 127 170





Teroituskone TBV 116 1-leikkuisille kanuunaporille Ø 3 – 30mm

Kiinnitin on suunniteltu 1-leik. kanuunaporiin, halkaisijaltaan 3 – 30mm, teroitukseen. Se sopii erinomaisesti sekä vakio- että erikoisteroituksille. Lyhyestä keskiö holkista johtuen lastu-uran minimipituudella ei ole merkitystä. Lisäksi pidin on varustettu tukirungolla pitkiä työkaluja varten. TBV 116 on siten todella monikäyttöinen ja sitä voidaan käyttää minkä tahansa manuaalisen työkaluhiontakoneen kanssa. TBV 116:n kanssa suosittelemme kaksoishiomalaikkaa DSS 125.

Huom:

1-leik. kanuunaporiin lastu-uran avauskulma on 120°, eikä sitä siten voi kiinnittää holkkiin sellaisenaan. Työkalu voi tällöin rikkiäntua.

Artikkelinumero: 600 127 171



Teroituskone TBV 216 1-leikkuisille kanuunaporille Ø 1 – 6mm

Uusi TBV 216 kiinnitinyksikkö pienille 1-leik. kanuunaporille, 1,0 – 6,0mm max. pituudeltaan 350mm, on helppo käsitellä ja se mahdollistaa 1-leik. kanuunaporiin teroituksen tai modifioinnin pelkästään neljällä liikkeellä. Teroitus suoritetaan 3-ulotteisella heilurimekanismilla jolloin kärjen kulmalle saadaan laaja vaihteluväli. Jokainen kulma on erikseen säädettävissä ja tarvittaessa korjattavissa.

Suosittelimme käytettäväksi yksiosaista hiontalaikkaamme ESS 125

Sisältäen:

- ohjausholkisarjan halkaisijoille 1,0 / 1,5 / 2,0 / 2,5 / 3,0 / 3,5mm
- useita pitimiä
- mikroskoopin keskitystä varten
- kohdevalon ja suurennuslasin

Artikkelinumero: 600 132 346



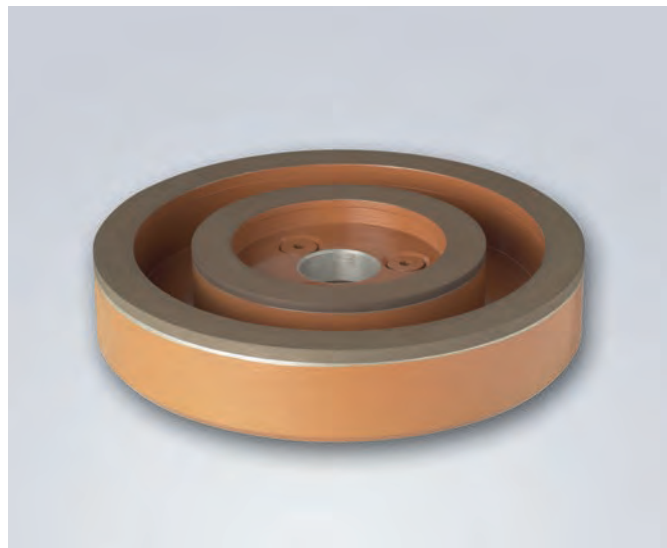
Kaksiosainen hiontalaikka DSS 125

Kaksiosainen DSS hiontalaikka on tukevasti ankkuroitu ja tasapainotettu hiomalaikkayksikkö. Se koostuu karkeasta, ulommasta timanttilaikasta jolla suoritetaan karkeahionta, sekä hienorakeisemmasta sisälaikasta jolla saadaan leikkausärmille korkealaatuinen viimeistely. Tietyin väliajoin kannattaa käyttää puhdistuskiveä hiontapölyn poistoon, sillä muuten laikka voi lämmetä liikaa ja tuhota kovametallisen leikkausärmän.

DSS 125 koostuu:

- ulkolaikasta Ø 125mm, pinnoitelevyys 10mm, pinnoitepaksuus 3mm, reikä Ø 20mm, laatu D 126
- sisälaikasta Ø 75mm, pinnoitelevyys 10mm, pinnoitepaksuus 2mm, reikä Ø 20mm, laatu D 46

Artikkelinumero: 400 110 098



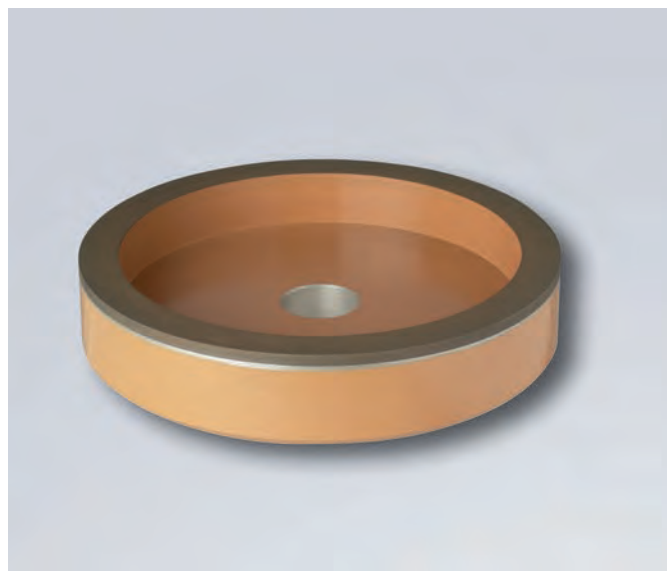
ESS 125 hiontalaikka

ESS 125 on hienorakeinen timanttilaikka jolla saadaan leikkausärmille hyvä viimeistely. Tietyin väliajoin kannattaa käyttää puhdistuskiveä hiontapölyn poistoon, sillä muuten laikka voi lämmetä liikaa ja tuhota kovametallisen leikkausärmän.

ESS 125 koostuu:

- laikasta Ø 125mm, pinnoitelevyys 10mm, pinnoitepaksuus 3mm, reikä Ø 20mm, laatu D 25

Artikkelinumero: 400 119 203



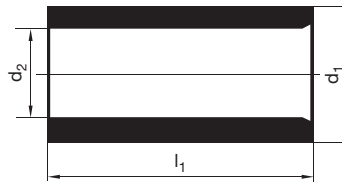


Poraholkit



Materiaali

TKM



Artikkelinro.

5748

d2	d1	l1	koodinro.
mm	mm	mm	
0,900	3,000	9,000	0,900
1,590	4,000	9,000	1,590
1,600	4,000	9,000	1,600
1,605	4,000	9,000	1,605
2,000	5,000	9,000	2,000
2,030	5,000	9,000	2,030
2,040	5,000	9,000	2,040
2,500	5,000	9,000	2,500
3,000	6,000	12,000	3,000
3,500	7,000	12,000	3,500
3,750	7,000	12,000	3,750
4,000	7,000	12,000	4,000
4,500	8,000	12,000	4,500
5,000	8,000	12,000	5,000
5,200	10,000	16,000	5,200
5,500	10,000	16,000	5,500
5,515	10,000	16,000	5,515
5,525	10,000	16,000	5,525
6,000	10,000	16,000	6,000
6,100	12,000	16,000	6,100
6,900	12,000	16,000	6,900
7,100	12,000	16,000	7,100
8,000	12,000	16,000	8,000
8,015	12,000	16,000	8,015
8,510	15,000	20,000	8,510
10,000	15,000	20,000	10,000
10,920	18,000	20,000	10,920
11,000	18,000	20,000	11,000
12,000	18,000	20,000	12,000
12,030	18,000	20,000	12,030

d2	d1	l1	koodinro.
mm	mm	mm	
12,600	22,000	28,000	12,600
14,000	22,000	28,000	14,000
14,030	22,000	28,000	14,030
14,400	22,000	28,000	14,400
16,000	26,000	28,000	16,000
16,030	26,000	28,000	16,030
16,200	26,000	28,000	16,200
18,000	26,000	28,000	18,000
18,030	26,000	28,000	18,030
18,050	26,000	28,000	18,050
20,000	30,000	36,000	20,000
20,030	30,000	36,000	20,030
22,000	30,000	36,000	22,000
22,030	30,000	36,000	22,030
22,120	35,000	36,000	22,120
23,500	35,000	36,000	23,500
24,000	35,000	36,000	24,000
24,030	35,000	36,000	24,030
25,000	35,000	36,000	25,000
26,000	35,000	36,000	26,000
30,000	42,000	45,000	30,000
34,000	48,000	45,000	34,000
40,000	55,000	55,000	40,000

Poraholkit



Materiaali

HSS


Artikkelinro.

5747

d2	d1	l1	koodinro.	d2	d1	l1	koodinro.
mm	mm	mm		mm	mm	mm	
0,900	3,000	9,000	0,900	6,800	12,000	16,000	6,800
1,600	4,000	9,000	1,600	7,000	12,000	16,000	7,000
2,000	5,000	9,000	2,000	7,100	12,000	16,000	7,100
2,200	5,000	9,000	2,200	7,400	12,000	16,000	7,400
2,340	5,000	9,000	2,340	7,500	12,000	16,000	7,500
2,700	6,000	12,000	2,700	7,600	12,000	16,000	7,600
3,000	6,000	12,000	3,000	7,800	12,000	16,000	7,800
3,100	6,000	12,000	3,100	7,830	12,000	16,000	7,830
3,255	6,000	12,000	3,255	7,938	12,000	16,000	7,938
3,300	6,000	12,000	3,300	8,000	12,000	16,000	8,000
3,400	7,000	12,000	3,400	8,020	12,000	16,000	8,020
3,500	7,000	12,000	3,500	8,050	12,000	16,000	8,050
3,650	7,000	12,000	3,650	8,100	15,000	20,000	8,100
3,700	7,000	12,000	3,700	8,500	15,000	20,000	8,500
3,800	7,000	12,000	3,800	8,530	15,000	20,000	8,530
4,000	7,000	12,000	4,000	8,800	15,000	20,000	8,800
4,100	8,000	12,000	4,100	9,000	15,000	20,000	9,000
4,300	8,000	12,000	4,300	9,100	15,000	20,000	9,100
4,500	8,000	12,000	4,500	9,200	15,000	20,000	9,200
4,600	8,000	12,000	4,600	9,300	15,000	20,000	9,300
4,760	8,000	12,000	4,760	9,500	15,000	20,000	9,500
4,763	8,000	12,000	4,763	9,525	15,000	20,000	9,525
4,800	8,000	12,000	4,800	9,530	15,000	20,000	9,530
5,000	8,000	12,000	5,000	9,570	15,000	20,000	9,570
5,020	8,000	12,000	5,020	9,652	15,000	20,000	9,652
5,100	10,000	16,000	5,100	9,800	15,000	20,000	9,800
5,200	10,000	16,000	5,200	10,000	15,000	20,000	10,000
5,300	10,000	16,000	5,300	10,100	18,000	20,000	10,100
5,500	10,000	16,000	5,500	10,600	18,000	20,000	10,600
5,600	10,000	16,000	5,600	11,080	18,000	20,000	11,080
5,800	10,000	16,000	5,800	11,100	18,000	20,000	11,100
6,000	10,000	16,000	6,000	11,113	18,000	20,000	11,113
6,050	10,000	16,000	6,050	11,500	18,000	20,000	11,500
6,100	12,000	16,000	6,100	11,600	18,000	20,000	11,600
6,300	12,000	16,000	6,300	12,000	18,000	20,000	12,000
6,350	12,000	16,000	6,350	12,020	18,000	20,000	12,020
6,370	12,000	16,000	6,370	12,100	22,000	28,000	12,100
6,502	12,000	16,000	6,502	12,530	22,000	28,000	12,530
6,600	12,000	16,000	6,600	12,600	22,000	28,000	12,600
6,730	12,000	16,000	6,730	12,700	22,000	28,000	12,700
6,731	12,000	16,000	6,731	12,800	22,000	28,000	12,800
6,750	12,000	16,000	6,750	12,954	22,000	28,000	12,954



d2	d1	l1	koodinro.
mm	mm	mm	
13,000	22,000	28,000	13,000
13,400	22,000	28,000	13,400
13,500	22,000	28,000	13,500
13,700	22,000	28,000	13,700
13,800	22,000	28,000	13,800
14,000	22,000	28,000	14,000
14,310	22,000	28,000	14,310
14,620	22,000	28,000	14,620
14,770	22,000	28,000	14,770
15,000	22,000	28,000	15,000
15,875	26,000	28,000	15,875
16,000	26,000	28,000	16,000
16,330	26,000	28,000	16,330
17,040	26,000	28,000	17,040
17,080	26,000	28,000	17,080
18,000	26,000	28,000	18,000
18,255	30,000	36,000	18,255
18,450	30,000	36,000	18,450
19,000	30,000	36,000	19,000
19,050	30,000	36,000	19,050
19,300	30,000	36,000	19,300
19,700	30,000	36,000	19,700
20,000	30,000	36,000	20,000
21,050	30,000	36,000	21,050

d2	d1	l1	koodinro.
mm	mm	mm	
22,000	30,000	36,000	22,000
22,100	35,000	36,000	22,100
22,120	35,000	36,000	22,120
22,225	35,000	36,000	22,225
23,500	35,000	36,000	23,500
24,000	35,000	36,000	24,000
24,500	35,000	36,000	24,500
25,000	35,000	36,000	25,000
25,250	35,000	36,000	25,250
25,400	35,000	36,000	25,400
26,000	35,000	36,000	26,000
28,000	42,000	45,000	28,000
28,169	42,000	45,000	28,169
30,000	42,000	45,000	30,000
30,100	48,000	45,000	30,100
34,000	48,000	45,000	34,000
38,100	55,000	55,000	38,100
40,000	55,000	55,000	40,000

Tarvikkeita kanuunaporakoneille

Perinteisiin työstökoneisiin verrattuina tietyt lisätarvikkeet kuten ohjainholkit, tiivistysrenkaat, tukiholkit jne. kuuluvat kanuunaporakoneiden vakiokalustoon. Näiden tuotteiden valikoima löytyy seuraavilta sivuilta.



Piirros voi poiketa alkuperäisestä

Osat

Tiivisterenkaat ja ohjainholkit, artikkelinumerot 5749, 5750, 5751, 5752 ja 5753, viittaavat aina kyseessä olevaa kanuunaporaan halkaisijaan. Tilatessasi anna aina art.no. + koodino. seuraavasta taulukosta!

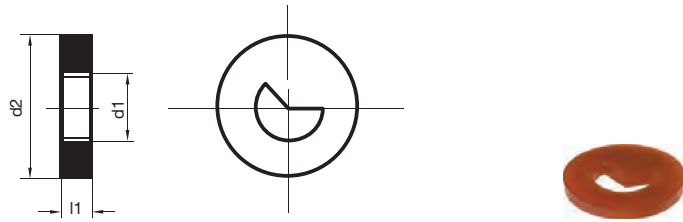
Taulukko koodino. / kanuunaporaan lisävarusteet

Koodinro.	kanuunaporalle halkaisija d1	
	alkaan mm	asti mm
1,900	2,000	2,099
2,000	2,100	2,199
2,100	2,200	2,299
2,200	2,300	2,399
2,300	2,400	2,499
2,400	2,500	2,599
2,500	2,600	2,699
2,600	2,700	2,799
2,700	2,800	2,899
2,800	2,900	3,099
3,000	3,100	3,359
3,200	3,360	3,459
3,300	3,460	3,559
3,400	3,560	3,799
3,600	3,800	3,959
3,700	3,960	4,259
4,000	4,260	4,499
4,200	4,500	4,749
4,500	4,750	4,999
4,700	5,000	5,249
5,000	5,250	5,499
5,200	5,500	5,749
5,500	5,750	5,999
5,700	6,000	6,249
6,000	6,250	6,449
6,200	6,450	6,749
6,500	6,750	6,999
6,700	7,000	7,299
7,000	7,300	7,599
7,300	7,600	7,799
7,500	7,800	7,999
7,700	8,000	8,299
8,000	8,300	8,699
8,400	8,700	8,999
8,700	9,000	9,299
9,000	9,300	9,699

Koodinro.	kanuunaporalle halkaisija d1	
	alkaan mm	asti mm
9,400	9,700	9,999
9,700	10,000	10,299
10,000	10,300	10,799
10,500	10,800	11,299
11,000	11,300	11,799
11,500	11,800	12,399
12,000	12,400	12,899
12,500	12,900	13,399
13,000	13,400	13,899
13,500	13,900	14,399
14,000	14,400	14,899
14,500	14,900	15,399
15,000	15,400	15,899
15,500	15,900	16,399
16,000	16,400	16,899
16,500	16,900	17,399
17,000	17,400	17,899
17,500	17,900	18,399
18,000	18,400	19,509
19,000	19,510	20,509
20,000	20,510	21,509
21,000	21,510	22,609
22,000	22,610	23,609
23,000	23,610	24,609
24,000	24,610	25,609
25,000	25,610	26,609
26,000	26,610	27,609
27,000	27,610	28,609
28,000	28,610	29,609
29,000	29,610	30,609
30,000	30,610	32,609
32,000	32,610	34,699
34,000	34,700	36,699
36,000	36,700	38,699
38,000	38,700	40,000



Tiivisterenkaat 1-leikkuisille kanuunaporille



Artikkelinro.

5752

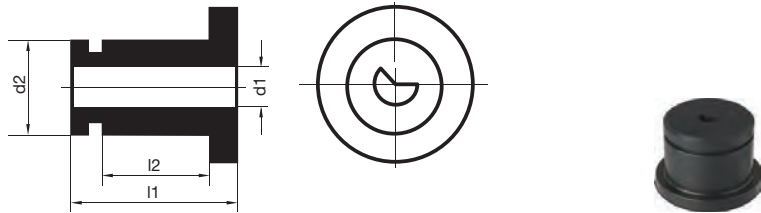
d1 mm	Ø-alue	d2 mm	l1 mm	koodinro.
2,100	2,200-2,299	20,000	4,000	2,100
2,200	2,300-2,399	20,000	4,000	2,200
2,600	2,700-2,799	20,000	4,000	2,600
2,800	2,900-3,099	20,000	4,000	2,800
3,000	3,100-3,359	20,000	4,000	3,000
3,300	3,460-3,559	20,000	4,000	3,300
3,400	3,560-3,799	20,000	4,000	3,400
3,600	3,800-3,959	20,000	4,000	3,600
3,700	3,960-4,259	20,000	4,000	3,700
4,000	4,260-4,499	20,000	4,000	4,000
4,200	4,500-4,749	20,000	4,000	4,200
4,500	4,750-4,999	20,000	4,000	4,500
4,700	5,000-5,249	20,000	4,000	4,700
5,000	5,250-5,499	32,000	4,000	5,000
5,200	5,500-5,749	32,000	4,000	5,200
5,500	5,750-5,999	32,000	4,000	5,500
5,700	6,000-6,249	32,000	4,000	5,700
6,000	6,250-6,449	32,000	4,000	6,000
6,200	6,450-6,749	32,000	4,000	6,200
6,500	6,750-6,999	32,000	4,000	6,500
6,700	7,000-7,299	32,000	4,000	6,700
7,000	7,300-7,599	32,000	4,000	7,000
7,300	7,600-7,799	32,000	4,000	7,300
7,500	7,800-7,999	32,000	4,000	7,500
7,700	8,000-8,299	32,000	4,000	7,700
8,000	8,300-8,699	32,000	4,000	8,000
8,400	8,700-8,999	32,000	4,000	8,400
8,700	9,000-9,299	32,000	4,000	8,700
9,000	9,300-9,699	32,000	4,000	9,000
9,400	9,700-9,999	32,000	4,000	9,400
9,700	10,000-10,299	32,000	4,000	9,700
10,000	11,300-11,799	32,000	4,000	10,000
10,500	10,800-11,299	32,000	4,000	10,500
11,000	11,300-11,799	32,000	4,000	11,000
11,500	11,800-12,399	32,000	4,000	11,500
12,000	12,400-12,899	32,000	4,000	12,000
12,500	12,900-13,399	32,000	4,000	12,500
13,500	13,900-14,399	32,000	4,000	13,500
14,000	14,400-14,899	32,000	4,000	14,000
14,500	14,900-15,399	32,000	4,000	14,500
15,000	15,400-15,899	32,000	4,000	15,000
15,500	15,900-16,399	40,000	4,000	15,500
16,500	16,900-17,399	40,000	4,000	16,500
17,000	17,400-17,899	40,000	4,000	17,000
17,500	17,900-18,399	40,000	4,000	17,500
18,000	18,400-19,509	40,000	4,000	18,000
19,000	19,510-20,509	40,000	4,000	19,000
20,000	20,510-21,509	40,000	4,000	20,000



d1	Ø-alue	d2	l1	koodinro.
mm		mm	mm	
21,000	21,510-22,609	40,000	4,000	21,000
22,000	22,610-23,609	40,000	4,000	22,000
23,000	23,610-24,609	40,000	4,000	23,000
24,000	24,610-25,609	40,000	4,000	24,000
25,000	25,610-26,609	40,000	4,000	25,000
27,000	27,610-28,609	90,000	4,000	27,000
29,000	29,610-30,609	90,000	4,000	29,000
30,000	30,610-32,609	90,000	4,000	30,000
32,000	32,610-34,699	90,000	4,000	32,000
36,000	36,700-38,699	90,000	4,000	36,000
38,000	38,700-40,000	90,000	4,000	38,000



Muotoillut tukiholkit 1-leikkuisille kanuunaporille



Artikkelinro.

5750

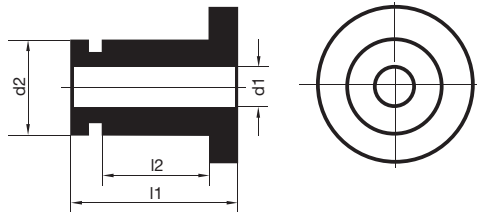
d1	Ø-alue	d2	l1	l2	koodinro.
mm		mm	mm	mm	
2,100	2,200-2,299	20,000	20,000	12,000	202,100
2,600	2,700-2,799	20,000	20,000	12,000	202,600
2,800	2,900-3,099	20,000	20,000	12,000	202,800
3,000	3,100-3,359	20,000	20,000	12,000	203,000
3,300	3,460-3,559	20,000	20,000	12,000	203,300
3,700	3,960-4,259	20,000	20,000	12,000	203,700
4,700	5,000-5,249	20,000	20,000	12,000	204,700
5,700	6,000-6,249	20,000	20,000	12,000	205,700
6,700	7,000-7,299	20,000	20,000	12,000	206,700
7,700	8,000-8,299	20,000	20,000	12,000	207,700
8,000	8,300-8,699	20,000	20,000	12,000	208,000
8,700	9,000-9,299	20,000	20,000	12,000	208,700
9,700	10,000-10,299	20,000	20,000	12,000	209,700
11,500	11,800-12,399	20,000	20,000	12,000	211,500
3,700	3,960-4,259	30,000	26,000	13,000	303,700
4,000	4,260-4,499	30,000	26,000	13,000	304,000
4,200	4,500-4,749	30,000	26,000	13,000	304,200
4,500	4,750-4,999	30,000	26,000	13,000	304,500
4,700	5,000-5,249	30,000	26,000	13,000	304,700
5,000	5,250-5,499	30,000	26,000	13,000	305,000
5,200	5,500-5,749	30,000	26,000	13,000	305,200
5,500	5,750-5,999	30,000	26,000	13,000	305,500
5,700	6,000-6,249	30,000	26,000	13,000	305,700
6,000	6,250-6,449	30,000	26,000	13,000	306,000
6,200	6,450-6,749	30,000	26,000	13,000	306,200
6,500	6,750-6,999	30,000	26,000	13,000	306,500
6,700	7,000-7,299	30,000	26,000	13,000	306,700
7,000	7,300-7,599	30,000	26,000	13,000	307,000
7,300	7,600-7,799	30,000	26,000	13,000	307,300
7,500	7,800-7,999	30,000	26,000	13,000	307,500
7,700	8,000-8,299	30,000	26,000	13,000	307,700
8,000	8,300-8,699	30,000	26,000	13,000	308,000
8,400	8,700-8,999	30,000	26,000	13,000	308,400
8,700	9,000-9,299	30,000	26,000	13,000	308,700
9,000	9,300-9,699	30,000	26,000	13,000	309,000
9,400	9,700-9,999	30,000	26,000	13,000	309,400
9,700	10,000-10,299	30,000	26,000	13,000	309,700
10,000	10,300-10,799	30,000	26,000	13,000	310,000
10,500	10,800-11,299	30,000	26,000	13,000	310,500
11,000	11,300-11,799	30,000	26,000	13,000	311,000
11,500	11,800-12,399	30,000	26,000	13,000	311,500
12,000	12,400-12,899	30,000	26,000	13,000	312,000
12,500	12,900-13,399	30,000	26,000	13,000	312,500
13,500	13,900-14,399	30,000	26,000	13,000	313,500
14,000	14,400-14,899	30,000	26,000	13,000	314,000
14,500	14,900-15,399	30,000	26,000	13,000	314,500
15,000	15,400-15,899	30,000	26,000	13,000	315,000
15,500	15,900-16,399	30,000	26,000	13,000	315,500



d1	Ø-alue	d2	l1	l2	koodinro.
mm		mm	mm	mm	
16,500	16,900-17,399	30,000	26,000	13,000	316,500
17,000	17,400-17,899	30,000	26,000	13,000	317,000
17,500	17,900-18,399	30,000	26,000	13,000	317,500
18,000	18,400-19,509	30,000	26,000	13,000	318,000
19,000	19,510-20,509	30,000	26,000	13,000	319,000
21,000	21,510-22,609	30,000	26,000	13,000	321,000
20,000	20,510-21,509	45,000	26,000	16,000	420,000
21,000	21,510-22,609	45,000	26,000	16,000	421,000
22,000	22,610-23,609	45,000	26,000	16,000	422,000
23,000	23,610-24,609	45,000	26,000	16,000	423,000
24,000	24,610-25,609	45,000	26,000	16,000	424,000
25,000	25,610-26,609	45,000	26,000	16,000	425,000
27,000	27,610-28,609	45,000	26,000	16,000	427,000
28,000	28,610-29,609	45,000	26,000	16,000	428,000
29,000	29,610-30,609	45,000	26,000	16,000	429,000
30,000	30,610-32,609	45,000	26,000	16,000	430,000
32,000	32,610-34,699	45,000	26,000	16,000	432,000
34,000	34,700-36,699	45,000	26,000	16,000	434,000



Tukiholkit 1- ja 2-leikkuisille kanuunaporille



Artikkelinro.

5749

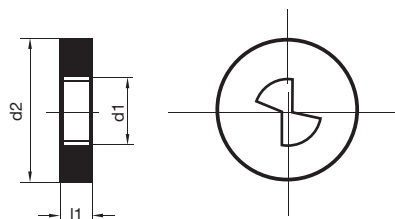
d1	Ø-alue	d2	l1	l2	koodinro.
mm		mm	mm	mm	
3,000	3,100-3,359	20,000	22,000	12,000	203,000
3,700	3,960-4,259	20,000	22,000	12,000	203,700
4,500	4,750-4,999	20,000	22,000	12,000	204,500
4,700	5,000-5,249	20,000	22,000	12,000	204,700
5,700	6,000-6,249	20,000	22,000	12,000	205,700
8,000	8,300-8,699	20,000	22,000	12,000	208,000
9,700	10,000-10,299	20,000	22,000	12,000	209,700
2,200	2,300-2,399	30,000	26,000	13,000	302,200
3,000	3,100-3,359	30,000	26,000	13,000	303,000
3,300	3,460-3,559	30,000	26,000	13,000	303,300
3,400	3,560-3,799	30,000	26,000	13,000	303,400
3,600	3,800-3,959	30,000	26,000	13,000	303,600
3,700	3,960-4,259	30,000	26,000	13,000	303,700
4,000	4,260-4,499	30,000	26,000	13,000	304,000
4,200	4,500-4,749	30,000	26,000	13,000	304,200
4,500	4,750-4,999	30,000	26,000	13,000	304,500
4,700	5,000-5,249	30,000	26,000	13,000	304,700
5,000	5,250-5,499	30,000	26,000	13,000	305,000
5,200	5,500-5,749	30,000	26,000	13,000	305,200
5,500	5,750-5,999	30,000	26,000	13,000	305,500
5,700	6,000-6,249	30,000	26,000	13,000	305,700
6,000	6,250-6,449	30,000	26,000	13,000	306,000
6,200	6,450-6,749	30,000	26,000	13,000	306,200
6,700	7,000-7,299	30,000	26,000	13,000	306,700
7,500	7,800-7,999	30,000	26,000	13,000	307,500
7,700	8,000-8,299	30,000	26,000	13,000	307,700
8,700	9,000-9,299	30,000	26,000	13,000	308,700
9,000	9,300-9,699	30,000	26,000	13,000	309,000
9,700	10,000-10,299	30,000	26,000	13,000	309,700
10,000	10,300-10,799	30,000	26,000	13,000	310,000
10,500	10,800-11,299	30,000	26,000	13,000	310,500
11,000	11,300-11,799	30,000	26,000	13,000	311,000
11,500	11,800-12,399	30,000	26,000	13,000	311,500
12,000	12,400-12,899	30,000	26,000	13,000	312,000
12,500	12,900-13,399	30,000	26,000	13,000	312,500
13,500	13,900-14,399	30,000	26,000	13,000	313,500
14,000	14,400-14,899	30,000	26,000	13,000	314,000
14,500	14,900-15,399	30,000	26,000	13,000	314,500
15,000	15,400-15,899	30,000	26,000	13,000	315,000
15,500	15,900-16,399	30,000	26,000	13,000	315,500
16,600	17,900-18,399	30,000	26,000	13,000	316,600
17,000	17,400-17,899	30,000	26,000	13,000	317,000
17,500	17,900-18,399	30,000	26,000	13,000	317,500
18,000	18,400-19,509	30,000	26,000	13,000	318,000
19,000	19,510-20,509	30,000	26,000	13,000	319,000
20,000	20,510-21,509	30,000	26,000	13,000	320,000
21,000	21,510-22,609	30,000	26,000	13,000	321,000
22,000	22,610-23,609	30,000	26,000	13,000	322,000



d1	Ø-alue	d2	l1	l2	koodinro.
mm		mm	mm	mm	
23,000	23,610-24,609	30,000	26,000	13,000	323,000
24,000	24,610-25,609	30,000	26,000	13,000	324,000
4,700	5,000-5,249	45,000	26,000	16,000	404,700
6,200	6,450-6,749	45,000	26,000	16,000	406,200
7,500	7,800-7,999	45,000	26,000	16,000	407,500
7,700	8,000-8,299	45,000	26,000	16,000	407,700
9,000	9,300-9,699	45,000	26,000	16,000	409,000
9,400	9,700-9,999	45,000	26,000	16,000	409,400
9,700	10,000-10,299	45,000	26,000	16,000	409,700
11,500	11,800-12,399	45,000	26,000	16,000	411,500
14,000	14,400-14,899	45,000	26,000	16,000	414,000
15,000	15,400-15,899	45,000	26,000	16,000	415,000
15,500	15,900-16,399	45,000	26,000	16,000	415,500
17,500	17,900-18,399	45,000	26,000	16,000	417,500
18,000	18,400-19,509	45,000	26,000	16,000	418,000
19,000	19,510-20,509	45,000	26,000	16,000	419,000
21,000	21,510-22,609	45,000	26,000	16,000	421,000
24,000	24,610-25,609	45,000	26,000	16,000	424,000
25,000	25,610-26,609	45,000	26,000	16,000	425,000
26,000	26,610-27,609	45,000	26,000	16,000	426,000
27,000	27,610-28,609	45,000	26,000	16,000	427,000
29,000	29,610-30,609	45,000	26,000	16,000	429,000
32,000	32,610-34,699	45,000	26,000	16,000	432,000



Tiivisterenkaat 2-leikkuisille kanuunaporille



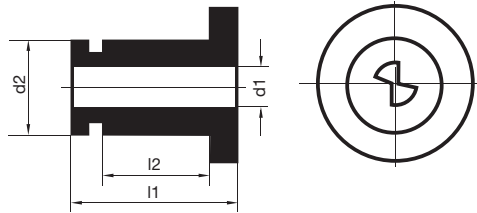
Artikkelinro.

5753

d1 mm	Ø-alue	d2 mm	l1 mm	koodinro.
5,700	6,000-6,249	32,000	4,000	5,700
7,700	8,000-8,299	32,000	4,000	7,700
8,700	9,000-9,299	32,000	4,000	8,700
9,000	9,300-9,699	32,000	4,000	9,000
9,700	10,000-10,299	32,000	4,000	9,700
11,500	11,800-12,399	32,000	4,000	11,500
13,500	13,900-14,399	32,000	4,000	13,500
15,500	15,900-16,399	40,000	4,000	15,500
19,000	19,510-20,509	40,000	4,000	19,000
23,000	23,610-24,609	40,000	4,000	23,000
25,000	25,610-26,609	40,000	4,000	25,000



Muotoillut tukiholkit 2-leikkuisille kanuunaporille



Artikkelinro.

5751

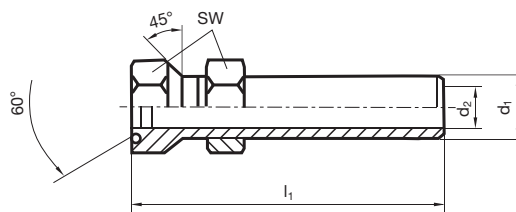
d1	Ø-alue	d2	l1	l2	koodinro.
mm		mm	mm	mm	
5,700	6,000-6,249	20,000	20,000	12,000	205,700
9,700	10,000-10,299	20,000	20,000	12,000	209,700
6,500	6,750-6,999	30,000	26,000	13,000	306,500
6,700	7,000-7,299	30,000	26,000	13,000	306,700
7,700	8,000-8,299	30,000	26,000	13,000	307,700
9,400	9,700-9,999	30,000	26,000	13,000	309,400
9,700	10,000-10,299	30,000	26,000	13,000	309,700
11,500	11,800-12,399	30,000	26,000	13,000	311,500
15,000	15,400-15,899	30,000	26,000	13,000	315,000
15,500	15,900-16,399	30,000	26,000	13,000	315,500
16,600	17,900-18,399	30,000	26,000	13,000	316,600
17,000	17,400-17,899	30,000	26,000	13,000	317,000
17,500	17,900-18,399	30,000	26,000	13,000	317,500
8,700	9,000-9,299	45,000	26,000	16,000	408,700
13,500	13,900-14,399	45,000	26,000	16,000	413,500
19,000	19,510-20,509	45,000	26,000	16,000	419,000
23,000	23,610-24,609	45,000	26,000	16,000	423,000
24,000	24,610-25,609	45,000	26,000	16,000	424,000
25,000	25,610-26,609	45,000	26,000	16,000	425,000
26,000	26,610-27,609	45,000	26,000	16,000	426,000
27,000	27,610-28,609	45,000	26,000	16,000	427,000



Säätöruuvit



Asennusruuvit ilman tiivistettä



Artikkelinro.

5754

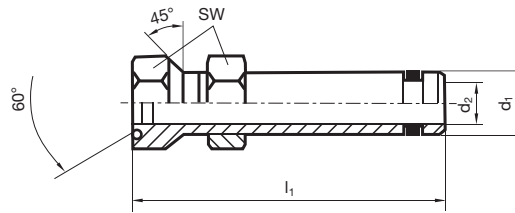
d1	d2	l1	SW	koodinro.
	mm	mm	mm	
M6 x 0,5	3,500	26,000	9,000	6,000
M10 x 1	6,000	38,000	13,000	10,000
M16 x 1,5	10,000	57,000	22,000	16,000



Säätöruuvit



Asennusruuvit tiivisteillä



Artikkelinro.

5755

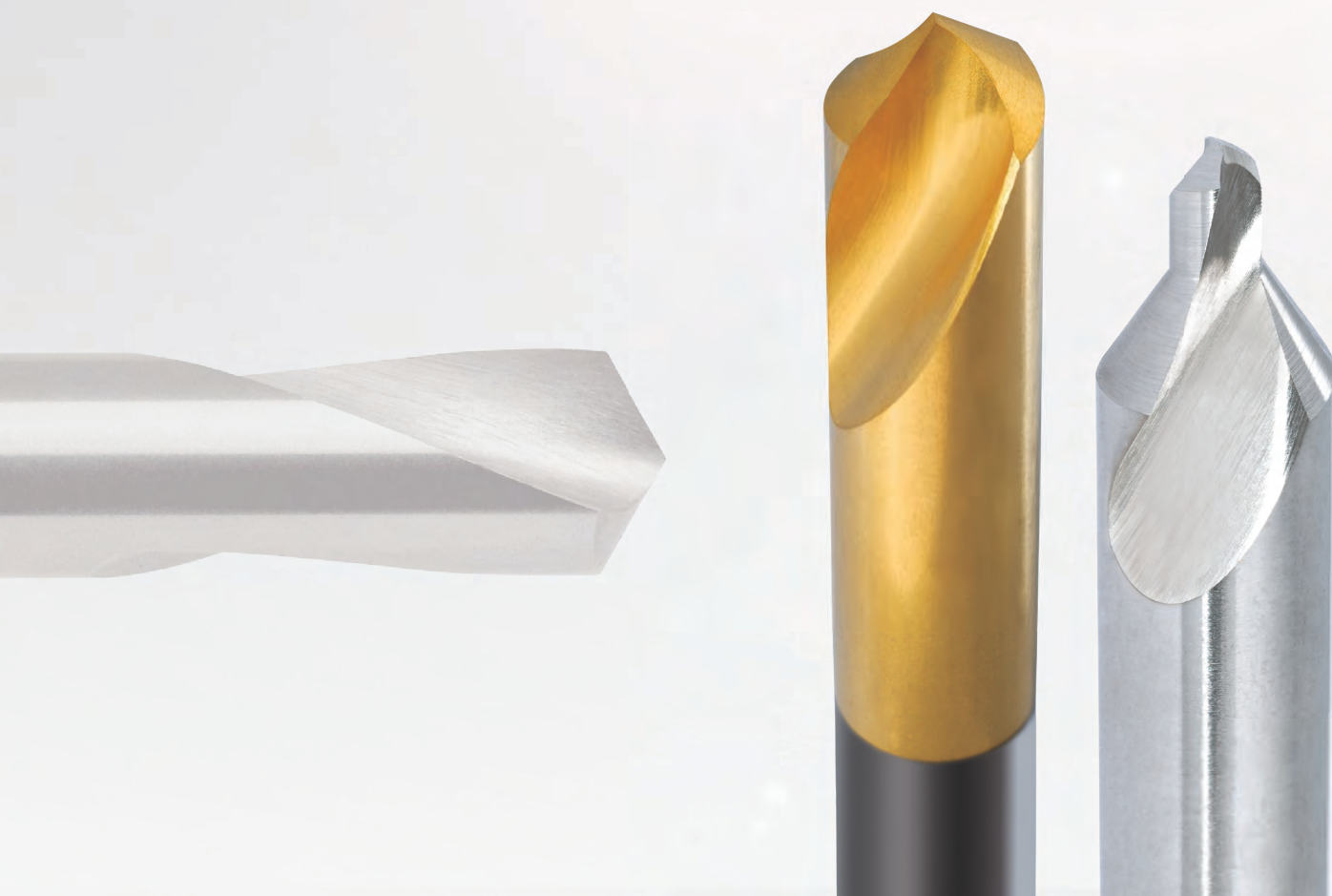
d1	d2	l1	SW	koodinro.
	mm	mm	mm	
M6 x 0,5	3,500	45,000	9,000	6,000
M10 x 1	6,000	50,000	13,000	10,000
M16 x 1,5	10,000	65,000	22,000	16,000
M24X1,5	16,000	90,000	30,000	24,000

NC-alkuporat ja keskiöporat

Käytettäessä pitkiä kierukkaporia suositlemme alkuporausta.

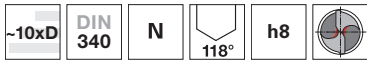
Meidän NC-alkuporat sopivat täydellisesti tähän tarkoitukseen.

Muotoreikien valmistukseen suositlemme keskiöporiamme.

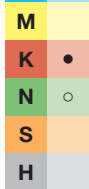




Pitkät kierukkaporat



P • Kärjen kevennys $\geq \varnothing 1,000$ • kartiovaippahionta • syville rei'ille



N ○ seostettu-/seostamaton teräs ja valuteräs • harmaavalu-, taottava- ja pallografiittivalurauta • sintrattu pulveriteräs, uushopea ja grafiitti

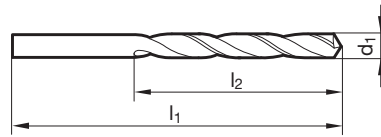
Materiaali **HSS**

Pinta

Leikkusuunta

GÜHRING NAVIGATOR

Leikkuarvosivu 786



Artikkelinro. **217**

Kanunapora

d1		l1	l2	d1		l1	l2
mm	inch	mm	mm	mm	inch	mm	mm
0,400	1/64	30,000	10,000	1,500		70,000	45,000
0,440		30,000	10,000	1,510		76,000	50,000
0,450		30,000	10,000	1,550		76,000	50,000
0,470		30,000	10,000	1,590	1/16	76,000	50,000
0,500		32,000	12,000	1,600		76,000	50,000
0,520		32,000	12,000	1,610		76,000	50,000
0,550		35,000	15,000	1,650		76,000	50,000
0,570		35,000	15,000	1,700		76,000	50,000
0,600		35,000	15,000	1,750		80,000	53,000
0,620		38,000	18,000	1,780		80,000	53,000
0,650		38,000	18,000	1,800		80,000	53,000
0,700		42,000	21,000	1,850		80,000	53,000
0,730		42,000	21,000	1,900		80,000	53,000
0,750		42,000	21,000	1,930		85,000	56,000
0,760		46,000	25,000	1,950		85,000	56,000
0,790	1/32	46,000	25,000	1,980	5/64	85,000	56,000
0,800		46,000	25,000	2,000		85,000	56,000
0,820		46,000	25,000	2,030		85,000	56,000
0,850		46,000	25,000	2,050		85,000	56,000
0,900		51,000	29,000	2,060		85,000	56,000
0,910		51,000	29,000	2,080		85,000	56,000
0,920		51,000	29,000	2,100		85,000	56,000
0,950		51,000	29,000	2,150		90,000	59,000
0,970		56,000	33,000	2,200		90,000	59,000
1,000		56,000	33,000	2,250		90,000	59,000
1,040		56,000	33,000	2,260		90,000	59,000
1,050		56,000	33,000	2,300		90,000	59,000
1,080		60,000	37,000	2,350		90,000	59,000
1,090		60,000	37,000	2,370		95,000	62,000
1,100		60,000	37,000	2,380	3/32	95,000	62,000
1,120		60,000	37,000	2,400		95,000	62,000
1,130		60,000	37,000	2,420		95,000	62,000
1,150		60,000	37,000	2,440		95,000	62,000
1,180		60,000	37,000	2,450		95,000	62,000
1,190	3/64	65,000	41,000	2,490		95,000	62,000
1,200		65,000	41,000	2,500		95,000	62,000
1,250		65,000	41,000	2,550		95,000	62,000
1,300		65,000	41,000	2,580		95,000	62,000
1,350		70,000	45,000	2,600		95,000	62,000
1,400		70,000	45,000	2,620		95,000	62,000
1,450		70,000	45,000	2,640		95,000	62,000
1,490		70,000	45,000	2,650		95,000	62,000



d1		l1	l2
mm	inch	mm	mm
2,700		100,000	66,000
2,710		100,000	66,000
2,750		100,000	66,000
2,780	7/64	100,000	66,000
2,790		100,000	66,000
2,800		100,000	66,000
2,820		100,000	66,000
2,850		100,000	66,000
2,870		100,000	66,000
2,900		100,000	66,000
2,950		100,000	66,000
3,000		100,000	66,000
3,030		106,000	69,000
3,050		106,000	69,000
3,100		106,000	69,000
3,150		106,000	69,000
3,170	1/8	106,000	69,000
3,200		106,000	69,000
3,250		106,000	69,000
3,260		106,000	69,000
3,300		106,000	69,000
3,350		106,000	69,000
3,400		112,000	73,000
3,450		112,000	73,000
3,500		112,000	73,000
3,550		112,000	73,000
3,570	9/64	112,000	73,000
3,600		112,000	73,000
3,650		112,000	73,000
3,660		112,000	73,000
3,700		112,000	73,000
3,750		112,000	73,000
3,800		119,000	78,000
3,850		119,000	78,000
3,860		119,000	78,000
3,900		119,000	78,000
3,910		119,000	78,000
3,950		119,000	78,000
3,970	5/32	119,000	78,000
3,990		119,000	78,000
4,000		119,000	78,000
4,030		119,000	78,000
4,040		119,000	78,000
4,050		119,000	78,000
4,090		119,000	78,000
4,100		119,000	78,000
4,150		119,000	78,000
4,200		119,000	78,000
4,220		119,000	78,000
4,250		119,000	78,000
4,300		126,000	82,000
4,350		126,000	82,000
4,370	11/64	126,000	82,000
4,390		126,000	82,000
4,400		126,000	82,000
4,450		126,000	82,000
4,500		126,000	82,000
4,570		126,000	82,000
4,600		126,000	82,000
4,650		126,000	82,000
4,700		126,000	82,000
4,750		126,000	82,000
4,760	3/16	132,000	87,000
4,800		132,000	87,000
4,850		132,000	87,000
4,900		132,000	87,000
4,920		132,000	87,000
4,950		132,000	87,000
4,980		132,000	87,000
5,000		132,000	87,000
5,030		132,000	87,000
5,050		132,000	87,000

d1		l1	l2
mm	inch	mm	mm
5,060		132,000	87,000
5,100		132,000	87,000
5,110		132,000	87,000
5,150		132,000	87,000
5,160	13/64	132,000	87,000
5,180		132,000	87,000
5,200		132,000	87,000
5,220		132,000	87,000
5,250		132,000	87,000
5,300		132,000	87,000
5,310		139,000	91,000
5,350		139,000	91,000
5,400		139,000	91,000
5,410		139,000	91,000
5,450		139,000	91,000
5,500		139,000	91,000
5,550		139,000	91,000
5,560	7/32	139,000	91,000
5,600		139,000	91,000
5,650		139,000	91,000
5,700		139,000	91,000
5,750		139,000	91,000
5,790		139,000	91,000
5,800		139,000	91,000
5,900		139,000	91,000
5,950	15/64	139,000	91,000
6,000		139,000	91,000
6,060		148,000	97,000
6,100		148,000	97,000
6,200		148,000	97,000
6,250		148,000	97,000
6,300		148,000	97,000
6,350	1/4	148,000	97,000
6,400		148,000	97,000
6,500		148,000	97,000
6,600		148,000	97,000
6,700		148,000	97,000
6,750	17/64	156,000	102,000
6,800		156,000	102,000
6,900		156,000	102,000
7,000		156,000	102,000
7,100		156,000	102,000
7,140	9/32	156,000	102,000
7,200		156,000	102,000
7,250		156,000	102,000
7,300		156,000	102,000
7,400		156,000	102,000
7,500		156,000	102,000
7,540	19/64	165,000	109,000
7,600		165,000	109,000
7,700		165,000	109,000
7,750		165,000	109,000
7,800		165,000	109,000
7,900		165,000	109,000
7,940	5/16	165,000	109,000
8,000		165,000	109,000
8,100		165,000	109,000
8,200		165,000	109,000
8,250		165,000	109,000
8,300		165,000	109,000
8,330	21/64	165,000	109,000
8,400		165,000	109,000
8,500		165,000	109,000
8,600		175,000	115,000
8,700		175,000	115,000
8,730	11/32	175,000	115,000
8,750		175,000	115,000
8,800		175,000	115,000
8,900		175,000	115,000
9,000		175,000	115,000
9,100		175,000	115,000
9,130	23/64	175,000	115,000

Kanunapora



d1		l1	l2
mm	inch	mm	mm
9,200		175,000	115,000
9,300		175,000	115,000
9,400		175,000	115,000
9,500		175,000	115,000
9,520	3/8	184,000	121,000
9,600		184,000	121,000
9,700		184,000	121,000
9,750		184,000	121,000
9,800		184,000	121,000
9,900		184,000	121,000
9,920	25/64	184,000	121,000
10,000		184,000	121,000
10,100		184,000	121,000
10,200		184,000	121,000
10,250		184,000	121,000
10,300		184,000	121,000
10,320	13/32	184,000	121,000
10,400		184,000	121,000
10,500		184,000	121,000
10,700		195,000	128,000
10,720	27/64	195,000	128,000
10,750		195,000	128,000
10,800		195,000	128,000
11,000		195,000	128,000
11,110	7/16	195,000	128,000
11,200		195,000	128,000
11,400		195,000	128,000
11,500		195,000	128,000
11,510	29/64	195,000	128,000
11,600		195,000	128,000
11,700		195,000	128,000
11,750		195,000	128,000
11,800		195,000	128,000
11,910	15/32	205,000	134,000
12,000		205,000	134,000
12,100		205,000	134,000
12,200		205,000	134,000
12,300	31/64	205,000	134,000
12,500		205,000	134,000
12,700	1/2	205,000	134,000
12,800		205,000	134,000
13,000		205,000	134,000
13,200		205,000	134,000
13,490	17/32	214,000	140,000
13,500		214,000	140,000
13,800		214,000	140,000
13,890	35/64	214,000	140,000
14,000		214,000	140,000
14,200		220,000	144,000
14,250		220,000	144,000
14,290	9/16	220,000	144,000
14,490		220,000	144,000
14,500		220,000	144,000
14,900		220,000	144,000

d1		l1	l2
mm	inch	mm	mm
15,000		220,000	144,000
15,080	19/32	227,000	149,000
15,200		227,000	149,000
15,250		227,000	149,000
15,400		227,000	149,000
15,480	39/64	227,000	149,000
15,500		227,000	149,000
15,600		227,000	149,000
15,870	5/8	227,000	149,000
16,000		227,000	149,000
16,270	41/64	235,000	154,000
16,500		235,000	154,000
16,670	21/32	235,000	154,000
17,000		235,000	154,000
17,070	43/64	241,000	158,000
17,460	11/16	241,000	158,000
17,500		241,000	158,000
18,000		241,000	158,000
18,500		247,000	162,000
18,650	47/64	247,000	162,000
19,000		247,000	162,000
19,050	3/4	254,000	166,000
19,500		254,000	166,000
20,000		254,000	166,000
20,500		261,000	171,000
20,640	13/16	261,000	171,000
21,000		261,000	171,000
21,500		268,000	176,000
22,000		268,000	176,000
23,300		275,000	180,000
23,810	15/16	282,000	185,000
24,000		282,000	185,000
25,000	63/64	282,000	185,000
26,190	1 1/32	290,000	190,000
26,500		290,000	190,000
26,990	1 1/16	298,000	195,000
28,570	1 1/8	307,000	201,000
29,000		307,000	201,000
29,370	1 5/32	307,000	201,000
29,500		307,000	201,000
30,160	1 3/16	316,000	207,000
30,960	1 7/32	316,000	207,000
31,000		316,000	207,000
36,510	1 7/16	345,000	225,000



Pitkät kierukkaporat



P • Kärjen kevennys $\geq \varnothing 1,000$ • kartiovaippahionta • syville rei'ille
 • porausholkin läpi porausta varten

M

K •

N ○ seostettu-/seostamaton teräs ja valuteräs • harmaavalu-, taottava- ja pallografiittivalurauta • sintrattu pulveriteräs, uushopea ja grafiitti

S

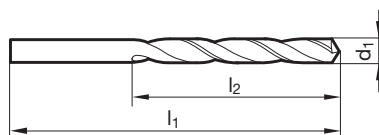
H

 Materiaali **HSS**

 Pinta **S**

 Leikkusuunta **R**
GÜHRING NAVIGATOR

Leikkuuarvosivu 786



Artikkelinro.

667

d1		l1	l2	d1		l1	l2
mm	inch	mm	mm	mm	inch	mm	mm
0,500		32,000	12,000	2,800		100,000	66,000
0,600		35,000	15,000	2,850		100,000	66,000
0,700		42,000	21,000	2,870		100,000	66,000
0,750		42,000	21,000	2,900		100,000	66,000
0,800		46,000	25,000	3,000		100,000	66,000
0,900		51,000	29,000	3,030		106,000	69,000
0,950		51,000	29,000	3,050		106,000	69,000
1,000		56,000	33,000	3,100		106,000	69,000
1,100		60,000	37,000	3,170	1/8	106,000	69,000
1,150		60,000	37,000	3,200		106,000	69,000
1,200		65,000	41,000	3,250		106,000	69,000
1,250		65,000	41,000	3,260		106,000	69,000
1,300		65,000	41,000	3,300		106,000	69,000
1,350		70,000	45,000	3,350		106,000	69,000
1,400		70,000	45,000	3,400		112,000	73,000
1,450		70,000	45,000	3,500		112,000	73,000
1,500		70,000	45,000	3,570	9/64	112,000	73,000
1,550		76,000	50,000	3,600		112,000	73,000
1,590	1/16	76,000	50,000	3,650		112,000	73,000
1,600		76,000	50,000	3,700		112,000	73,000
1,650		76,000	50,000	3,730		112,000	73,000
1,700		76,000	50,000	3,750		112,000	73,000
1,800		80,000	53,000	3,800		119,000	78,000
1,850		80,000	53,000	3,850		119,000	78,000
1,900		80,000	53,000	3,900		119,000	78,000
1,950		85,000	56,000	3,950		119,000	78,000
1,980	5/64	85,000	56,000	3,970	5/32	119,000	78,000
2,000		85,000	56,000	4,000		119,000	78,000
2,100		85,000	56,000	4,050		119,000	78,000
2,200		90,000	59,000	4,100		119,000	78,000
2,300		90,000	59,000	4,200		119,000	78,000
2,350		90,000	59,000	4,250		119,000	78,000
2,370		95,000	62,000	4,300		126,000	82,000
2,380	3/32	95,000	62,000	4,370	11/64	126,000	82,000
2,440		95,000	62,000	4,400		126,000	82,000
2,450		95,000	62,000	4,500		126,000	82,000
2,500		95,000	62,000	4,570		126,000	82,000
2,530		95,000	62,000	4,600		126,000	82,000
2,650		95,000	62,000	4,620		126,000	82,000
2,700		100,000	66,000	4,650		126,000	82,000
2,750		100,000	66,000	4,700		126,000	82,000
2,780	7/64	100,000	66,000	4,750		126,000	82,000

Kanuunapora



d1		l1	l2
mm	inch	mm	mm
4,760	3/16	132,000	87,000
4,850		132,000	87,000
4,900		132,000	87,000
5,000		132,000	87,000
5,100		132,000	87,000
5,160	13/64	132,000	87,000
5,200		132,000	87,000
5,250		132,000	87,000
5,300		132,000	87,000
5,310		139,000	91,000
5,400		139,000	91,000
5,410		139,000	91,000
5,500		139,000	91,000
5,560	7/32	139,000	91,000
5,600		139,000	91,000
5,610		139,000	91,000
5,700		139,000	91,000
5,790		139,000	91,000
5,900		139,000	91,000
6,000		139,000	91,000
6,100		148,000	97,000
6,200		148,000	97,000
6,250		148,000	97,000
6,350	1/4	148,000	97,000
6,400		148,000	97,000
6,500		148,000	97,000
6,600		148,000	97,000
6,750	17/64	156,000	102,000
6,800		156,000	102,000
7,000		156,000	102,000
7,100		156,000	102,000
7,140	9/32	156,000	102,000
7,200		156,000	102,000
7,250		156,000	102,000
7,300		156,000	102,000
7,370		156,000	102,000
7,400		156,000	102,000
7,500		156,000	102,000
7,540	19/64	165,000	109,000
7,700		165,000	109,000
7,940	5/16	165,000	109,000
8,000		165,000	109,000
8,050		165,000	109,000
8,100		165,000	109,000
8,200		165,000	109,000
8,250		165,000	109,000
8,300		165,000	109,000
8,400		165,000	109,000
8,500		165,000	109,000
8,700		175,000	115,000
8,730	11/32	175,000	115,000
8,800		175,000	115,000
8,900		175,000	115,000
9,000		175,000	115,000

d1		l1	l2
mm	inch	mm	mm
9,100		175,000	115,000
9,300		175,000	115,000
9,400		175,000	115,000
9,500		175,000	115,000
9,520	3/8	184,000	121,000
9,700		184,000	121,000
9,900		184,000	121,000
9,920	25/64	184,000	121,000
10,000		184,000	121,000
10,200		184,000	121,000
10,320	13/32	184,000	121,000
10,500		184,000	121,000
10,720	27/64	195,000	128,000
10,800		195,000	128,000
10,900		195,000	128,000
11,000		195,000	128,000
11,110	7/16	195,000	128,000
11,500		195,000	128,000
11,750		195,000	128,000
11,910	15/32	205,000	134,000
12,000		205,000	134,000
12,500		205,000	134,000
12,700	1/2	205,000	134,000
13,000		205,000	134,000
13,490	17/32	214,000	140,000
13,500		214,000	140,000
13,800		214,000	140,000
13,890	35/64	214,000	140,000
14,000		214,000	140,000
14,290	9/16	220,000	144,000
14,500		220,000	144,000
14,750		220,000	144,000
14,800		220,000	144,000
14,900		220,000	144,000
15,000		220,000	144,000
15,080	19/32	227,000	149,000
16,000		227,000	149,000
16,500		235,000	154,000
16,670	21/32	235,000	154,000
16,750		235,000	154,000
17,000		235,000	154,000
17,460	11/16	241,000	158,000
18,000		241,000	158,000
18,250		247,000	162,000
22,220	7/8	268,000	176,000



Pitkät kierukkaporat



P • Kärjen kevennys $\geq \varnothing 14,750$ • kartiovaippahionta • syville rei'ille
 • porausholkin läpi porausta varten

M

K •

N ○ seostettu-/seostamaton teräs ja valuteräs • harmaavalu-, taottava- ja
 pallografiittivalurauta • sintrattu pulveriteräs, uushopea ja grafiitti

S

H

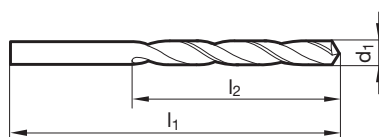
 Materiaali **HSS**

Pinta

Leikkusuunta

GÜHRING NAVIGATOR

Leikkuuarvosivu 786



Artikkelinro.

220

d1		l1	l2	d1		l1	l2
mm	inch	mm	mm	mm	inch	mm	mm
0,450		30,000	10,000	4,500		126,000	82,000
0,470		30,000	10,000	4,600		126,000	82,000
0,900		51,000	29,000	4,780		132,000	87,000
0,950		51,000	29,000	4,800		132,000	87,000
1,100		60,000	37,000	4,950		132,000	87,000
1,150		60,000	37,000	5,000		132,000	87,000
1,200		65,000	41,000	5,100		132,000	87,000
1,250		65,000	41,000	5,200		132,000	87,000
1,400		70,000	45,000	5,600		139,000	91,000
1,450		70,000	45,000	5,700		139,000	91,000
1,500		70,000	45,000	6,000		139,000	91,000
1,600		76,000	50,000	6,050		148,000	97,000
1,630		76,000	50,000	6,100		148,000	97,000
1,660		76,000	50,000	6,400		148,000	97,000
1,730		80,000	53,000	6,500		148,000	97,000
1,800		80,000	53,000	6,600		148,000	97,000
1,850		80,000	53,000	6,800		156,000	102,000
1,900		80,000	53,000	7,200		156,000	102,000
2,000		85,000	56,000	7,500		156,000	102,000
2,300		90,000	59,000	7,800		165,000	109,000
2,500		95,000	62,000	8,000		165,000	109,000
2,700		100,000	66,000	8,100		165,000	109,000
2,750		100,000	66,000	8,250		165,000	109,000
2,900		100,000	66,000	8,400		165,000	109,000
2,950		100,000	66,000	8,800		175,000	115,000
3,000		100,000	66,000	9,000		175,000	115,000
3,050		106,000	69,000	9,520	3/8	184,000	121,000
3,070		106,000	69,000	9,700		184,000	121,000
3,100		106,000	69,000	9,800		184,000	121,000
3,250		106,000	69,000	9,900		184,000	121,000
3,300		106,000	69,000	10,000		184,000	121,000
3,350		106,000	69,000	10,100		184,000	121,000
3,400		112,000	73,000	10,500		184,000	121,000
3,500		112,000	73,000	11,000		195,000	128,000
3,550		112,000	73,000	11,500		195,000	128,000
3,600		112,000	73,000	11,900		205,000	134,000
3,700		112,000	73,000	12,000		205,000	134,000
3,800		119,000	78,000	12,200		205,000	134,000
4,000		119,000	78,000	12,500		205,000	134,000
4,050		119,000	78,000	13,000		205,000	134,000
4,250		119,000	78,000	13,500		214,000	140,000
4,300		126,000	82,000	14,750		220,000	144,000



d1		l1	l2
mm	inch	mm	mm
19,000		247,000	162,000
20,000		254,000	166,000
22,000		268,000	176,000
25,000	63/64	282,000	185,000
25,500		290,000	190,000
29,000		307,000	201,000

d1		l1	l2
mm	inch	mm	mm



Pitkät kierukkaporat



P • Kärjen kevennys $\geq \varnothing 2,950$ • kartiovaippahionta • vääntiöllä

M

K •

N ○ seostettu-/seostamaton teräs ja valuteräs • harmaavalu-, taottava- ja pallografiittivalurauta • sintrattu pulveriteräs, uushopea ja grafiitti

S

H

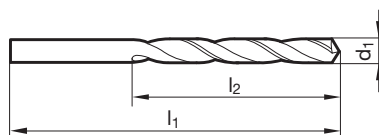
 Materiaali **HSS**

Pinta

Leikkusuunta

GÜHRING NAVIGATOR

Leikkuuarvosivu 786



Artikkelinro.

204

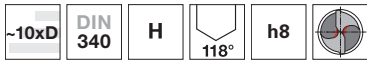
d1		l1	l2
mm	inch	mm	mm
2,950		100,000	66,000
3,000		100,000	66,000
3,100		106,000	69,000
3,170	1/8	106,000	69,000
3,200		106,000	69,000
3,300		106,000	69,000
3,400		112,000	73,000
3,500		112,000	73,000
3,600		112,000	73,000
3,800		119,000	78,000
3,900		119,000	78,000
4,000		119,000	78,000
4,050		119,000	78,000
4,100		119,000	78,000
4,200		119,000	78,000
4,250		119,000	78,000
4,300		126,000	82,000
4,400		126,000	82,000
4,500		126,000	82,000
4,760	3/16	132,000	87,000
4,800		132,000	87,000
5,000		132,000	87,000
5,080		132,000	87,000
5,100		132,000	87,000
5,200		132,000	87,000
5,500		139,000	91,000
5,600		139,000	91,000
5,800		139,000	91,000
5,850		139,000	91,000
5,900		139,000	91,000
6,000		139,000	91,000
6,100		148,000	97,000
6,200		148,000	97,000
6,300		148,000	97,000
6,350	1/4	148,000	97,000
6,400		148,000	97,000
6,500		148,000	97,000
6,600		148,000	97,000
6,700		148,000	97,000
6,750	17/64	156,000	102,000
6,800		156,000	102,000
6,900		156,000	102,000

d1		l1	l2
mm	inch	mm	mm
7,000		156,000	102,000
7,400		156,000	102,000
7,500		156,000	102,000
7,600		165,000	109,000
7,700		165,000	109,000
7,800		165,000	109,000
8,000		165,000	109,000
8,100		165,000	109,000
8,200		165,000	109,000
8,250		165,000	109,000
8,400		165,000	109,000
8,450		165,000	109,000
8,500		165,000	109,000
8,600		175,000	115,000
8,750		175,000	115,000
8,800		175,000	115,000
9,000		175,000	115,000
9,300		175,000	115,000
9,400		175,000	115,000
9,700		184,000	121,000
9,800		184,000	121,000
9,900		184,000	121,000
10,000		184,000	121,000
10,200		184,000	121,000
10,300		184,000	121,000
10,400		184,000	121,000
10,500		184,000	121,000
10,800		195,000	128,000
11,600		195,000	128,000
12,000		205,000	134,000
13,000		205,000	134,000
25,250		290,000	190,000

Kanuunapora



Pitkät kierukkaporat



P Kärjen kevennys $\geq \varnothing 15,000$ • kartiovaippahionta • syville rei'ille

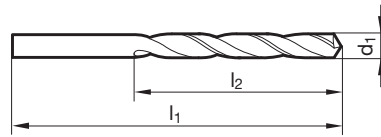


N • kovat ja hauraat materiaalit • messinki, magnesium seokset • pronssi, fosforipronssi • liuskekivi, mico, pertinax

GÜHRING NAVIGATOR

Leikkuuarvosivu 786

Materiaali	HSS
Pinta	○
Leikkusuunta	Ⓜ



Artikkelinro. **218**

Kanunapora

d1		l1	l2	d1		l1	l2
mm	inch	mm	mm	mm	inch	mm	mm
0,500		32,000	12,000	2,300		90,000	59,000
0,520		32,000	12,000	2,350		90,000	59,000
0,550		35,000	15,000	2,400		95,000	62,000
0,600		35,000	15,000	2,500		95,000	62,000
0,650		38,000	18,000	2,550		95,000	62,000
0,700		42,000	21,000	2,600		95,000	62,000
0,750		42,000	21,000	2,650		95,000	62,000
0,800		46,000	25,000	2,700		100,000	66,000
0,820		46,000	25,000	2,800		100,000	66,000
0,840		46,000	25,000	2,830		100,000	66,000
0,850		46,000	25,000	2,870		100,000	66,000
0,900		51,000	29,000	2,900		100,000	66,000
0,950		51,000	29,000	2,940		100,000	66,000
0,970		56,000	33,000	3,000		100,000	66,000
1,000		56,000	33,000	3,020		106,000	69,000
1,050		56,000	33,000	3,050		106,000	69,000
1,100		60,000	37,000	3,060		106,000	69,000
1,150		60,000	37,000	3,100		106,000	69,000
1,200		65,000	41,000	3,150		106,000	69,000
1,250		65,000	41,000	3,180		106,000	69,000
1,300		65,000	41,000	3,200		106,000	69,000
1,400		70,000	45,000	3,250		106,000	69,000
1,500		70,000	45,000	3,270		106,000	69,000
1,550		76,000	50,000	3,300		106,000	69,000
1,560		76,000	50,000	3,400		112,000	73,000
1,570		76,000	50,000	3,500		112,000	73,000
1,580		76,000	50,000	3,550		112,000	73,000
1,600		76,000	50,000	3,600		112,000	73,000
1,650		76,000	50,000	3,800		119,000	78,000
1,700		76,000	50,000	3,900		119,000	78,000
1,750		80,000	53,000	4,000		119,000	78,000
1,800		80,000	53,000	4,030		119,000	78,000
1,820		80,000	53,000	4,100		119,000	78,000
1,850		80,000	53,000	4,200		119,000	78,000
1,900		80,000	53,000	4,300		126,000	82,000
1,950		85,000	56,000	4,400		126,000	82,000
2,000		85,000	56,000	4,500		126,000	82,000
2,050		85,000	56,000	4,600		126,000	82,000
2,100		85,000	56,000	4,700		126,000	82,000
2,180		90,000	59,000	4,760	3/16	132,000	87,000
2,200		90,000	59,000	4,800		132,000	87,000
2,250		90,000	59,000	4,900		132,000	87,000

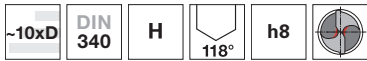


d1		l1	l2
mm	inch	mm	mm
5,000		132,000	87,000
5,100		132,000	87,000
5,200		132,000	87,000
5,300		132,000	87,000
5,400		139,000	91,000
5,450		139,000	91,000
5,500		139,000	91,000
5,600		139,000	91,000
5,900		139,000	91,000
5,950	15/64	139,000	91,000
6,000		139,000	91,000
6,100		148,000	97,000
6,200		148,000	97,000
6,300		148,000	97,000
6,420		148,000	97,000
6,500		148,000	97,000
6,600		148,000	97,000
6,700		148,000	97,000
6,800		156,000	102,000
6,900		156,000	102,000
7,000		156,000	102,000
7,200		156,000	102,000
7,350		156,000	102,000
7,500		156,000	102,000

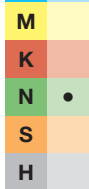
d1		l1	l2
mm	inch	mm	mm
8,000		165,000	109,000
8,200		165,000	109,000
8,300		165,000	109,000
8,700		175,000	115,000
9,000		175,000	115,000
9,500		175,000	115,000
9,700		184,000	121,000
9,900		184,000	121,000
10,000		184,000	121,000
11,250		195,000	128,000
12,100		205,000	134,000
14,000		214,000	140,000
15,000		220,000	144,000
16,000		227,000	149,000



Pitkät kierukkaporat



P Kärjen kevennys $\geq \varnothing 15,000$ • kartiovaippahionta • syville rei'ille

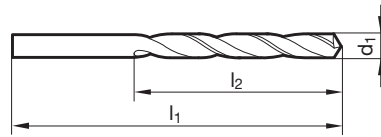


N • kovat ja hauraat materiaalit • messinki, magnesium seokset • pronssi, fosforipronssi • liuskekivi, mico, pertinax

GÜHRING NAVIGATOR

Leikkuarvosivu 786

Materiaali	HSS
Pinta	○
Leikkusuunta	Ⓛ



Artikkelinro.

221

Kanunapora

d1		l1	l2
mm	inch	mm	mm
0,450		30,000	10,000
0,600		35,000	15,000
0,650		38,000	18,000
0,900		51,000	29,000
1,100		60,000	37,000
1,240		65,000	41,000
1,300		65,000	41,000
1,320		65,000	41,000
1,370		70,000	45,000
1,400		70,000	45,000
1,500		70,000	45,000
1,550		76,000	50,000
1,800		80,000	53,000
1,850		80,000	53,000
2,000		85,000	56,000
2,160		90,000	59,000
2,180		90,000	59,000
2,200		90,000	59,000
2,270		90,000	59,000
2,350		90,000	59,000
2,850		100,000	66,000
2,900		100,000	66,000
2,950		100,000	66,000
3,000		100,000	66,000
3,170	1/8	106,000	69,000
3,200		106,000	69,000
3,250		106,000	69,000
3,400		112,000	73,000
3,450		112,000	73,000
3,500		112,000	73,000

d1		l1	l2
mm	inch	mm	mm
3,510		112,000	73,000
3,700		112,000	73,000
4,100		119,000	78,000
4,200		119,000	78,000
4,400		126,000	82,000
4,500		126,000	82,000
4,900		132,000	87,000
5,000		132,000	87,000
5,050		132,000	87,000
5,100		132,000	87,000
5,400		139,000	91,000
5,600		139,000	91,000
5,900		139,000	91,000
6,000		139,000	91,000
6,800		156,000	102,000
8,000		165,000	109,000
9,000		175,000	115,000
12,800		205,000	134,000
15,000		220,000	144,000



Pitkät kierukkaporat


 Materiaali **HSS**

Pinta ○

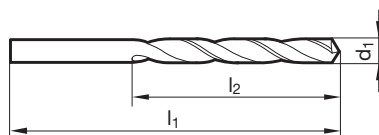
Leikkusuunta

P Kärjen kevennys $\geq \varnothing 14,500$ • kartiovaippahionta • syville rei'ille

N • pehmeät ja pitkälastiset materiaalit • Alumiini, pitkälastiset Al-seokset
 • sinkki, puhdistettu kupari, silumiini, elektroni • muovi (pehmeä), puu

GÜHRING NAVIGATOR

Leikkuuarvosivu 786



Artikkelinro.

219

d1		l1	l2	d1		l1	l2
mm	inch	mm	mm	mm	inch	mm	mm
0,500		32,000	12,000	2,100		85,000	56,000
0,600		35,000	15,000	2,150		90,000	59,000
0,650		38,000	18,000	2,200		90,000	59,000
0,700		42,000	21,000	2,250		90,000	59,000
0,740		42,000	21,000	2,300		90,000	59,000
0,750		42,000	21,000	2,350		90,000	59,000
0,800		46,000	25,000	2,380	3/32	95,000	62,000
0,850		46,000	25,000	2,400		95,000	62,000
0,900		51,000	29,000	2,430		95,000	62,000
0,950		51,000	29,000	2,450		95,000	62,000
0,970		56,000	33,000	2,490		95,000	62,000
0,980		56,000	33,000	2,500		95,000	62,000
1,000		56,000	33,000	2,550		95,000	62,000
1,100		60,000	37,000	2,600		95,000	62,000
1,180		60,000	37,000	2,650		95,000	62,000
1,190	3/64	65,000	41,000	2,700		100,000	66,000
1,200		65,000	41,000	2,710		100,000	66,000
1,220		65,000	41,000	2,750		100,000	66,000
1,250		65,000	41,000	2,800		100,000	66,000
1,300		65,000	41,000	2,850		100,000	66,000
1,350		70,000	45,000	2,880		100,000	66,000
1,370		70,000	45,000	2,900		100,000	66,000
1,400		70,000	45,000	2,950		100,000	66,000
1,440		70,000	45,000	3,000		100,000	66,000
1,500		70,000	45,000	3,100		106,000	69,000
1,520		76,000	50,000	3,170	1/8	106,000	69,000
1,600		76,000	50,000	3,180		106,000	69,000
1,610		76,000	50,000	3,200		106,000	69,000
1,650		76,000	50,000	3,250		106,000	69,000
1,700		76,000	50,000	3,260		106,000	69,000
1,750		80,000	53,000	3,300		106,000	69,000
1,760		80,000	53,000	3,350		106,000	69,000
1,770		80,000	53,000	3,400		112,000	73,000
1,780		80,000	53,000	3,500		112,000	73,000
1,800		80,000	53,000	3,550		112,000	73,000
1,850		80,000	53,000	3,600		112,000	73,000
1,900		80,000	53,000	3,650		112,000	73,000
1,950		85,000	56,000	3,700		112,000	73,000
1,970		85,000	56,000	3,750		112,000	73,000
2,000		85,000	56,000	3,800		119,000	78,000
2,050		85,000	56,000	3,830		119,000	78,000
2,070		85,000	56,000	3,900		119,000	78,000

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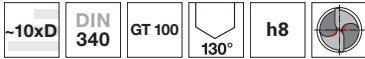


d1		l1	l2
mm	inch	mm	mm
3,920		119,000	78,000
3,990		119,000	78,000
4,000		119,000	78,000
4,100		119,000	78,000
4,150		119,000	78,000
4,200		119,000	78,000
4,250		119,000	78,000
4,300		126,000	82,000
4,400		126,000	82,000
4,500		126,000	82,000
4,700		126,000	82,000
4,800		132,000	87,000
4,830		132,000	87,000
4,870		132,000	87,000
4,900		132,000	87,000
4,950		132,000	87,000
5,000		132,000	87,000
5,100		132,000	87,000
5,200		132,000	87,000
5,300		132,000	87,000
5,400		139,000	91,000
5,430		139,000	91,000
5,500		139,000	91,000
5,650		139,000	91,000
5,700		139,000	91,000
5,800		139,000	91,000
5,900		139,000	91,000
5,980		139,000	91,000
6,000		139,000	91,000
6,100		148,000	97,000
6,250		148,000	97,000
6,300		148,000	97,000
6,400		148,000	97,000
6,500		148,000	97,000
6,600		148,000	97,000
6,700		148,000	97,000
6,800		156,000	102,000
6,900		156,000	102,000
7,000		156,000	102,000
7,100		156,000	102,000
7,300		156,000	102,000
7,400		156,000	102,000
7,450		156,000	102,000
7,500		156,000	102,000
7,540	19/64	165,000	109,000
7,550		165,000	109,000
7,670		165,000	109,000
7,700		165,000	109,000

d1		l1	l2
mm	inch	mm	mm
7,850		165,000	109,000
7,900		165,000	109,000
7,950		165,000	109,000
8,000		165,000	109,000
8,200		165,000	109,000
8,300		165,000	109,000
8,500		165,000	109,000
8,550		175,000	115,000
8,600		175,000	115,000
8,700		175,000	115,000
8,750		175,000	115,000
8,800		175,000	115,000
8,900		175,000	115,000
9,000		175,000	115,000
9,100		175,000	115,000
9,500		175,000	115,000
9,700		184,000	121,000
9,800		184,000	121,000
9,900		184,000	121,000
10,000		184,000	121,000
10,300		184,000	121,000
10,700		195,000	128,000
10,750		195,000	128,000
11,000		195,000	128,000
11,300		195,000	128,000
11,400		195,000	128,000
12,000		205,000	134,000
13,100	33/64	205,000	134,000
13,500		214,000	140,000
13,750		214,000	140,000
14,000		214,000	140,000
14,500		220,000	144,000
15,000		220,000	144,000
15,500		227,000	149,000
17,000		235,000	154,000
18,000		241,000	158,000
18,250		247,000	162,000
19,000		247,000	162,000
19,840	25/32	254,000	166,000
20,000		254,000	166,000
20,640	13/16	261,000	171,000



Pitkät kierukkaporat



P • Kärjen kevennys $\geq \varnothing 1,000$ • kartiovaippahionta • avarat lastu-urat
• riittämättömään lastunpoistoon

M

K •

N • valurauta ja teräs $< 1000/\text{mm}^2$ asti • Ei suositella: CrNi-teräkset, ruostumattomat teräkset

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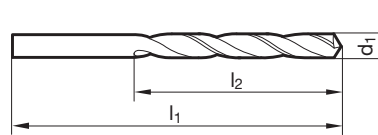
 Materiaali **HSS**

Pinta

Leikkusuunta

GÜHRING NAVIGATOR

Leikkuarvosivu 786



Artikkelinro.

535

d1		l1	l2	d1		l1	l2
mm	inch	mm	mm	mm	inch	mm	mm
1,000		56,000	33,000	2,200		90,000	59,000
1,020		56,000	33,000	2,250		90,000	59,000
1,040		56,000	33,000	2,260		90,000	59,000
1,050		56,000	33,000	2,300		90,000	59,000
1,070		60,000	37,000	2,350		90,000	59,000
1,090		60,000	37,000	2,370		95,000	62,000
1,100		60,000	37,000	2,380	3/32	95,000	62,000
1,150		60,000	37,000	2,400		95,000	62,000
1,180		60,000	37,000	2,440		95,000	62,000
1,190	3/64	65,000	41,000	2,450		95,000	62,000
1,200		65,000	41,000	2,480		95,000	62,000
1,250		65,000	41,000	2,490		95,000	62,000
1,300		65,000	41,000	2,500		95,000	62,000
1,320		65,000	41,000	2,530		95,000	62,000
1,350		70,000	45,000	2,550		95,000	62,000
1,400		70,000	45,000	2,580		95,000	62,000
1,450		70,000	45,000	2,600		95,000	62,000
1,500		70,000	45,000	2,640		95,000	62,000
1,510		76,000	50,000	2,650		95,000	62,000
1,520		76,000	50,000	2,700		100,000	66,000
1,550		76,000	50,000	2,710		100,000	66,000
1,590	1/16	76,000	50,000	2,750		100,000	66,000
1,600		76,000	50,000	2,780	7/64	100,000	66,000
1,650		76,000	50,000	2,790		100,000	66,000
1,670		76,000	50,000	2,800		100,000	66,000
1,700		76,000	50,000	2,820		100,000	66,000
1,750		80,000	53,000	2,830		100,000	66,000
1,780		80,000	53,000	2,850		100,000	66,000
1,800		80,000	53,000	2,870		100,000	66,000
1,850		80,000	53,000	2,900		100,000	66,000
1,900		80,000	53,000	2,940		100,000	66,000
1,930		85,000	56,000	2,950		100,000	66,000
1,950		85,000	56,000	3,000		100,000	66,000
1,980	5/64	85,000	56,000	3,050		106,000	69,000
1,990		85,000	56,000	3,100		106,000	69,000
2,000		85,000	56,000	3,150		106,000	69,000
2,050		85,000	56,000	3,170	1/8	106,000	69,000
2,060		85,000	56,000	3,200		106,000	69,000
2,080		85,000	56,000	3,250		106,000	69,000
2,100		85,000	56,000	3,260		106,000	69,000
2,150		90,000	59,000	3,270		106,000	69,000
2,180		90,000	59,000	3,300		106,000	69,000



d1		l1	l2
mm	inch	mm	mm
3,400		112,000	73,000
3,450		112,000	73,000
3,500		112,000	73,000
3,550		112,000	73,000
3,570	9/64	112,000	73,000
3,600		112,000	73,000
3,660		112,000	73,000
3,700		112,000	73,000
3,730		112,000	73,000
3,750		112,000	73,000
3,800		119,000	78,000
3,860		119,000	78,000
3,900		119,000	78,000
3,910		119,000	78,000
3,970	5/32	119,000	78,000
3,990		119,000	78,000
4,000		119,000	78,000
4,040		119,000	78,000
4,050		119,000	78,000
4,090		119,000	78,000
4,100		119,000	78,000
4,130		119,000	78,000
4,150		119,000	78,000
4,200		119,000	78,000
4,220		119,000	78,000
4,250		119,000	78,000
4,300		126,000	82,000
4,350		126,000	82,000
4,370	11/64	126,000	82,000
4,390		126,000	82,000
4,400		126,000	82,000
4,500		126,000	82,000
4,570		126,000	82,000
4,600		126,000	82,000
4,620		126,000	82,000
4,700		126,000	82,000
4,750		126,000	82,000
4,760	3/16	132,000	87,000
4,800		132,000	87,000
4,850		132,000	87,000
4,900		132,000	87,000
4,920		132,000	87,000
4,980		132,000	87,000
5,000		132,000	87,000
5,050		132,000	87,000
5,060		132,000	87,000
5,100		132,000	87,000
5,110		132,000	87,000
5,160	13/64	132,000	87,000
5,180		132,000	87,000
5,200		132,000	87,000
5,220		132,000	87,000
5,250		132,000	87,000
5,300		132,000	87,000
5,310		139,000	91,000
5,400		139,000	91,000
5,410		139,000	91,000
5,500		139,000	91,000
5,560	7/32	139,000	91,000
5,600		139,000	91,000
5,610		139,000	91,000
5,700		139,000	91,000
5,750		139,000	91,000
5,790		139,000	91,000
5,800		139,000	91,000
5,900		139,000	91,000
5,940		139,000	91,000
5,950	15/64	139,000	91,000
6,000		139,000	91,000
6,040		148,000	97,000
6,050		148,000	97,000
6,100		148,000	97,000

d1		l1	l2
mm	inch	mm	mm
6,150		148,000	97,000
6,200		148,000	97,000
6,250		148,000	97,000
6,300		148,000	97,000
6,350	1/4	148,000	97,000
6,400		148,000	97,000
6,500		148,000	97,000
6,530		148,000	97,000
6,600		148,000	97,000
6,630		148,000	97,000
6,700		148,000	97,000
6,750	17/64	156,000	102,000
6,800		156,000	102,000
6,900		156,000	102,000
6,910		156,000	102,000
7,000		156,000	102,000
7,030		156,000	102,000
7,040		156,000	102,000
7,100		156,000	102,000
7,140	9/32	156,000	102,000
7,200		156,000	102,000
7,300		156,000	102,000
7,370		156,000	102,000
7,400		156,000	102,000
7,490		156,000	102,000
7,500		156,000	102,000
7,540	19/64	165,000	109,000
7,600		165,000	109,000
7,670		165,000	109,000
7,700		165,000	109,000
7,750		165,000	109,000
7,800		165,000	109,000
7,850		165,000	109,000
7,900		165,000	109,000
7,940	5/16	165,000	109,000
8,000		165,000	109,000
8,030		165,000	109,000
8,100		165,000	109,000
8,200		165,000	109,000
8,250		165,000	109,000
8,300		165,000	109,000
8,330	21/64	165,000	109,000
8,400		165,000	109,000
8,430		165,000	109,000
8,500		165,000	109,000
8,600		175,000	115,000
8,610		175,000	115,000
8,700		175,000	115,000
8,730	11/32	175,000	115,000
8,800		175,000	115,000
8,840		175,000	115,000
8,900		175,000	115,000
9,000		175,000	115,000
9,090		175,000	115,000
9,100		175,000	115,000
9,130	23/64	175,000	115,000
9,200		175,000	115,000
9,300		175,000	115,000
9,340		175,000	115,000
9,350		175,000	115,000
9,400		175,000	115,000
9,500		175,000	115,000
9,520	3/8	184,000	121,000
9,600		184,000	121,000
9,700		184,000	121,000
9,800		184,000	121,000
9,900		184,000	121,000
9,920	25/64	184,000	121,000
10,000		184,000	121,000
10,080		184,000	121,000
10,100		184,000	121,000
10,200		184,000	121,000

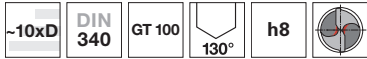


d1		l1	l2
mm	inch	mm	mm
10,300		184,000	121,000
10,320	13/32	184,000	121,000
10,400		184,000	121,000
10,490		184,000	121,000
10,500		184,000	121,000
10,600		184,000	121,000
10,720	27/64	195,000	128,000
10,800		195,000	128,000
10,900		195,000	128,000
11,000		195,000	128,000
11,100		195,000	128,000
11,110	7/16	195,000	128,000
11,300		195,000	128,000
11,400		195,000	128,000
11,500		195,000	128,000
11,800		195,000	128,000
11,900		205,000	134,000
11,910	15/32	205,000	134,000

d1		l1	l2
mm	inch	mm	mm
12,000		205,000	134,000
12,150		205,000	134,000
12,300	31/64	205,000	134,000
12,500		205,000	134,000
12,600		205,000	134,000
12,700	1/2	205,000	134,000
13,000		205,000	134,000
13,100	33/64	205,000	134,000
13,490	17/32	214,000	140,000
13,500		214,000	140,000
13,700		214,000	140,000
13,890	35/64	214,000	140,000
13,900		214,000	140,000
14,000		214,000	140,000



Pitkät kierukkaporat

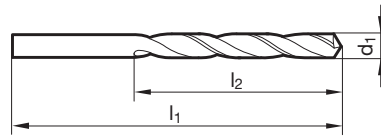


- P** • Kärjen kevennys $\geq \varnothing 1,000$ • kartiovaippahionta • avarat lastu-urat • riittämättömään lastunpoistoon
- M**
- K** •
- N** • valurauta ja teräs $< 1000/\text{mm}^2$ asti • Ei suositella: CrNi-teräkset, ruostumattomat teräkset
- S**
- H**

GÜHRING NAVIGATOR

Leikkuuarvosivu 786

Materiaali	HSS
Pinta	S
Leikkusuunta	R



Artikkelinro. **668**

Käynnäpöytä

d1		l1	l2	d1		l1	l2
mm	inch	mm	mm	mm	inch	mm	mm
1,000		56,000	33,000	2,800		100,000	66,000
1,090		60,000	37,000	2,820		100,000	66,000
1,100		60,000	37,000	2,850		100,000	66,000
1,180		60,000	37,000	2,870		100,000	66,000
1,190	3/64	65,000	41,000	2,900		100,000	66,000
1,200		65,000	41,000	2,950		100,000	66,000
1,300		65,000	41,000	3,000		100,000	66,000
1,320		65,000	41,000	3,050		106,000	69,000
1,400		70,000	45,000	3,100		106,000	69,000
1,500		70,000	45,000	3,170	1/8	106,000	69,000
1,510		76,000	50,000	3,200		106,000	69,000
1,590	1/16	76,000	50,000	3,250		106,000	69,000
1,600		76,000	50,000	3,260		106,000	69,000
1,650		76,000	50,000	3,300		106,000	69,000
1,700		76,000	50,000	3,400		112,000	73,000
1,800		80,000	53,000	3,450		112,000	73,000
1,850		80,000	53,000	3,500		112,000	73,000
1,900		80,000	53,000	3,570	9/64	112,000	73,000
1,930		85,000	56,000	3,600		112,000	73,000
1,950		85,000	56,000	3,700		112,000	73,000
1,980	5/64	85,000	56,000	3,730		112,000	73,000
1,990		85,000	56,000	3,750		112,000	73,000
2,000		85,000	56,000	3,800		119,000	78,000
2,060		85,000	56,000	3,860		119,000	78,000
2,080		85,000	56,000	3,870		119,000	78,000
2,100		85,000	56,000	3,900		119,000	78,000
2,180		90,000	59,000	3,910		119,000	78,000
2,200		90,000	59,000	3,970	5/32	119,000	78,000
2,260		90,000	59,000	4,000		119,000	78,000
2,300		90,000	59,000	4,040		119,000	78,000
2,380	3/32	95,000	62,000	4,090		119,000	78,000
2,400		95,000	62,000	4,100		119,000	78,000
2,490		95,000	62,000	4,200		119,000	78,000
2,500		95,000	62,000	4,220		119,000	78,000
2,530		95,000	62,000	4,300		126,000	82,000
2,550		95,000	62,000	4,370	11/64	126,000	82,000
2,580		95,000	62,000	4,400		126,000	82,000
2,600		95,000	62,000	4,500		126,000	82,000
2,640		95,000	62,000	4,600		126,000	82,000
2,700		100,000	66,000	4,700		126,000	82,000
2,710		100,000	66,000	4,760	3/16	132,000	87,000
2,780	7/64	100,000	66,000	4,800		132,000	87,000



d1		l1	l2
mm	inch	mm	mm
4,850		132,000	87,000
4,900		132,000	87,000
4,910		132,000	87,000
4,920		132,000	87,000
5,000		132,000	87,000
5,060		132,000	87,000
5,100		132,000	87,000
5,160	13/64	132,000	87,000
5,200		132,000	87,000
5,300		132,000	87,000
5,400		139,000	91,000
5,500		139,000	91,000
5,560	7/32	139,000	91,000
5,600		139,000	91,000
5,700		139,000	91,000
5,800		139,000	91,000
5,900		139,000	91,000
5,950	15/64	139,000	91,000
6,000		139,000	91,000
6,040		148,000	97,000
6,100		148,000	97,000
6,150		148,000	97,000
6,200		148,000	97,000
6,250		148,000	97,000
6,300		148,000	97,000
6,350	1/4	148,000	97,000
6,400		148,000	97,000
6,500		148,000	97,000
6,530		148,000	97,000
6,600		148,000	97,000
6,630		148,000	97,000
6,700		148,000	97,000
6,750	17/64	156,000	102,000
6,760		156,000	102,000
6,800		156,000	102,000
6,900		156,000	102,000
7,000		156,000	102,000
7,100		156,000	102,000
7,140	9/32	156,000	102,000
7,250		156,000	102,000
7,300		156,000	102,000
7,370		156,000	102,000
7,490		156,000	102,000
7,500		156,000	102,000
7,600		165,000	109,000
7,700		165,000	109,000
7,800		165,000	109,000
7,900		165,000	109,000

d1		l1	l2
mm	inch	mm	mm
7,940	5/16	165,000	109,000
8,000		165,000	109,000
8,200		165,000	109,000
8,300		165,000	109,000
8,400		165,000	109,000
8,430		165,000	109,000
8,500		165,000	109,000
8,600		175,000	115,000
8,610		175,000	115,000
8,700		175,000	115,000
8,730	11/32	175,000	115,000
8,800		175,000	115,000
8,900		175,000	115,000
9,000		175,000	115,000
9,130	23/64	175,000	115,000
9,200		175,000	115,000
9,340		175,000	115,000
9,400		175,000	115,000
9,500		175,000	115,000
9,520	3/8	184,000	121,000
9,700		184,000	121,000
9,900		184,000	121,000
9,920	25/64	184,000	121,000
10,000		184,000	121,000
10,100		184,000	121,000
10,200		184,000	121,000
10,320	13/32	184,000	121,000
10,500		184,000	121,000
11,000		195,000	128,000
11,110	7/16	195,000	128,000
11,500		195,000	128,000
11,510	29/64	195,000	128,000
11,910	15/32	205,000	134,000
12,000		205,000	134,000
12,300	31/64	205,000	134,000
12,700	1/2	205,000	134,000
13,000		205,000	134,000
14,000		214,000	140,000



Pitkät kierukkaporat

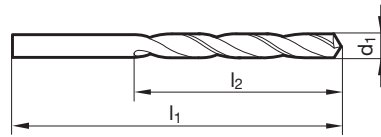


- P** • Kärjen kevennys $\geq \varnothing 1,000$ • kartiovaippahionta • avarat lastu-urat
• riittämättömään lastunpoistoon
- M**
- K** •
- N** • valurauta ja teräs $< 1000/\text{mm}^2$ asti • Ei suositella: CrNi-teräkset, ruostumattomat teräkset
- S**
- H**

GÜHRING NAVIGATOR

Leikkuuarvosivu 786

Materiaali	HSS
Pinta	F
Leikkusuunta	R



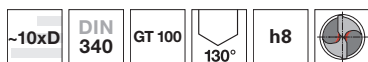
Artikkelinro. **2462**

Kanunapora

d1		l1	l2	d1		l1	l2
mm	inch	mm	mm	mm	inch	mm	mm
1,000		56,000	33,000	3,800		119,000	78,000
1,100		60,000	37,000	4,000		119,000	78,000
1,200		65,000	41,000	4,200		119,000	78,000
1,300		65,000	41,000	4,300		126,000	82,000
1,500		70,000	45,000	4,500		126,000	82,000
1,600		76,000	50,000	4,800		132,000	87,000
1,700		76,000	50,000	5,000		132,000	87,000
1,800		80,000	53,000	5,200		132,000	87,000
1,900		80,000	53,000	5,400		139,000	91,000
2,000		85,000	56,000	5,500		139,000	91,000
2,100		85,000	56,000	6,000		139,000	91,000
2,200		90,000	59,000	6,100		148,000	97,000
2,300		90,000	59,000	6,200		148,000	97,000
2,400		95,000	62,000	6,500		148,000	97,000
2,500		95,000	62,000	6,600		148,000	97,000
2,600		95,000	62,000	6,800		156,000	102,000
2,800		100,000	66,000	7,000		156,000	102,000
2,900		100,000	66,000	7,200		156,000	102,000
3,000		100,000	66,000	7,300		156,000	102,000
3,100		106,000	69,000	7,600		165,000	109,000
3,200		106,000	69,000	8,000		165,000	109,000
3,300		106,000	69,000	9,000		175,000	115,000
3,400		112,000	73,000	10,000		184,000	121,000
3,500		112,000	73,000				



Pitkät kierukkaporat



P	•	Kärjen kevennys $\geq \varnothing 1,400$ • kartiovaippahionta • avarat lastu-urat
M		• riittämättömään lastunpoistoon
K	•	
N	•	valurauta ja teräs $< 1000/\text{mm}^2$ asti • Ei suositella: CrNi-teräkset, ruostumattomat teräkset
S		
H		

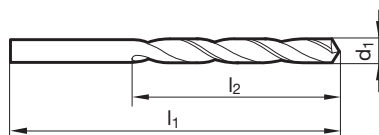
 Materiaali **HSS**

Pinta

Leikkusuunta

GÜHRING NAVIGATOR

Leikkuarvosivu 786

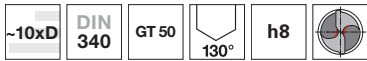

 Artikkelinro. **506**

d1		l1	l2	d1		l1	l2
mm	inch	mm	mm	mm	inch	mm	mm
1,400		70,000	45,000	4,600		126,000	82,000
1,500		70,000	45,000	4,760	3/16	132,000	87,000
1,600		76,000	50,000	4,800		132,000	87,000
1,680		76,000	50,000	4,950		132,000	87,000
1,800		80,000	53,000	5,160	13/64	132,000	87,000
1,850		80,000	53,000	5,200		132,000	87,000
2,000		85,000	56,000	5,400		139,000	91,000
2,200		90,000	59,000	5,600		139,000	91,000
2,300		90,000	59,000	5,700		139,000	91,000
2,350		90,000	59,000	5,800		139,000	91,000
2,500		95,000	62,000	5,900		139,000	91,000
2,800		100,000	66,000	6,000		139,000	91,000
3,000		100,000	66,000	7,400		156,000	102,000
3,050		106,000	69,000	7,800		165,000	109,000
3,200		106,000	69,000	8,500		165,000	109,000
3,300		106,000	69,000	9,000		175,000	115,000
3,400		112,000	73,000	9,900		184,000	121,000
3,500		112,000	73,000	10,320	13/32	184,000	121,000
3,550		112,000	73,000	11,000		195,000	128,000
3,800		119,000	78,000	11,500		195,000	128,000
3,950		119,000	78,000	11,600		195,000	128,000
4,000		119,000	78,000	12,000		205,000	134,000
4,400		126,000	82,000	12,500		205,000	134,000
4,500		126,000	82,000	13,000		205,000	134,000

Kanuunapora



Pitkät kierukkaporat



- P** ○ Kärjen kevennys $\geq \varnothing 2,370$ • kartiovaippahionta • erittäin suuri lastu-ura
- M** □
- K** □
- N** ● pitkälastuiset materiaalit $< 500 \text{ N/mm}^2$ • niukkaseosteiset teräkset
- S** □ • Alumiini, pitkälastuiset Al-seokset • sinkki, puhdistettu kupari, silumiini, elektroni • zamakki, argalium, pehmeät muovit ,puu
- H** □

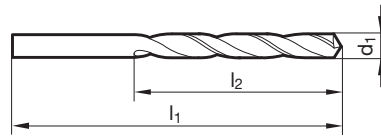
Materiaali **HSS**

Pinta ○

Leikkusuunta

GÜHRING NAVIGATOR

Leikkuuarvosivu 786



Artikkelinro. **501**

Käynnäpöytä

d1		l1	l2	d1		l1	l2
mm	inch	mm	mm	mm	inch	mm	mm
1,000		56,000	33,000	2,350		90,000	59,000
1,020		56,000	33,000	2,370		95,000	62,000
1,030		56,000	33,000	2,380	3/32	95,000	62,000
1,040		56,000	33,000	2,400		95,000	62,000
1,070		60,000	37,000	2,440		95,000	62,000
1,090		60,000	37,000	2,450		95,000	62,000
1,100		60,000	37,000	2,490		95,000	62,000
1,180		60,000	37,000	2,500		95,000	62,000
1,190	3/64	65,000	41,000	2,520		95,000	62,000
1,200		65,000	41,000	2,530		95,000	62,000
1,250		65,000	41,000	2,550		95,000	62,000
1,300		65,000	41,000	2,580		95,000	62,000
1,320		65,000	41,000	2,600		95,000	62,000
1,400		70,000	45,000	2,640		95,000	62,000
1,450		70,000	45,000	2,650		95,000	62,000
1,480		70,000	45,000	2,700		100,000	66,000
1,500		70,000	45,000	2,710		100,000	66,000
1,510		76,000	50,000	2,750		100,000	66,000
1,550		76,000	50,000	2,780	7/64	100,000	66,000
1,590	1/16	76,000	50,000	2,790		100,000	66,000
1,600		76,000	50,000	2,800		100,000	66,000
1,610		76,000	50,000	2,820		100,000	66,000
1,700		76,000	50,000	2,850		100,000	66,000
1,750		80,000	53,000	2,870		100,000	66,000
1,780		80,000	53,000	2,900		100,000	66,000
1,800		80,000	53,000	2,950		100,000	66,000
1,850		80,000	53,000	3,000		100,000	66,000
1,900		80,000	53,000	3,050		106,000	69,000
1,930		85,000	56,000	3,100		106,000	69,000
1,950		85,000	56,000	3,170	1/8	106,000	69,000
1,980	5/64	85,000	56,000	3,200		106,000	69,000
1,990		85,000	56,000	3,250		106,000	69,000
2,000		85,000	56,000	3,260		106,000	69,000
2,050		85,000	56,000	3,300		106,000	69,000
2,060		85,000	56,000	3,350		106,000	69,000
2,080		85,000	56,000	3,400		112,000	73,000
2,100		85,000	56,000	3,450		112,000	73,000
2,180		90,000	59,000	3,500		112,000	73,000
2,200		90,000	59,000	3,570	9/64	112,000	73,000
2,250		90,000	59,000	3,600		112,000	73,000
2,260		90,000	59,000	3,650		112,000	73,000
2,300		90,000	59,000	3,660		112,000	73,000



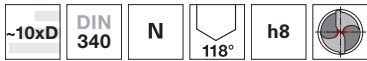
d1		l1	l2
mm	inch	mm	mm
3,700		112,000	73,000
3,800		119,000	78,000
3,860		119,000	78,000
3,900		119,000	78,000
3,910		119,000	78,000
3,970	5/32	119,000	78,000
3,990		119,000	78,000
4,000		119,000	78,000
4,040		119,000	78,000
4,050		119,000	78,000
4,090		119,000	78,000
4,100		119,000	78,000
4,200		119,000	78,000
4,220		119,000	78,000
4,250		119,000	78,000
4,300		126,000	82,000
4,350		126,000	82,000
4,370	11/64	126,000	82,000
4,400		126,000	82,000
4,500		126,000	82,000
4,570		126,000	82,000
4,600		126,000	82,000
4,620		126,000	82,000
4,700		126,000	82,000
4,750		126,000	82,000
4,760	3/16	132,000	87,000
4,800		132,000	87,000
4,850		132,000	87,000
4,900		132,000	87,000
4,920		132,000	87,000
4,980		132,000	87,000
5,000		132,000	87,000
5,060		132,000	87,000
5,100		132,000	87,000
5,110		132,000	87,000
5,160	13/64	132,000	87,000
5,180		132,000	87,000
5,200		132,000	87,000
5,300		132,000	87,000
5,310		139,000	91,000
5,400		139,000	91,000
5,410		139,000	91,000
5,500		139,000	91,000
5,560	7/32	139,000	91,000
5,600		139,000	91,000
5,610		139,000	91,000
5,650		139,000	91,000
5,700		139,000	91,000
5,790		139,000	91,000
5,800		139,000	91,000
5,900		139,000	91,000
5,940		139,000	91,000
5,950	15/64	139,000	91,000
6,000		139,000	91,000
6,030		148,000	97,000
6,040		148,000	97,000
6,150		148,000	97,000
6,200		148,000	97,000
6,250		148,000	97,000
6,300		148,000	97,000
6,350	1/4	148,000	97,000
6,400		148,000	97,000
6,500		148,000	97,000
6,530		148,000	97,000
6,600		148,000	97,000
6,630		148,000	97,000
6,700		148,000	97,000
6,750	17/64	156,000	102,000
6,800		156,000	102,000
6,900		156,000	102,000
7,000		156,000	102,000
7,040		156,000	102,000

d1		l1	l2
mm	inch	mm	mm
7,100		156,000	102,000
7,140	9/32	156,000	102,000
7,300		156,000	102,000
7,370		156,000	102,000
7,490		156,000	102,000
7,500		156,000	102,000
7,540	19/64	165,000	109,000
7,600		165,000	109,000
7,670		165,000	109,000
7,900		165,000	109,000
7,940	5/16	165,000	109,000
8,000		165,000	109,000
8,025		165,000	109,000
8,030		165,000	109,000
8,100		165,000	109,000
8,200		165,000	109,000
8,330	21/64	165,000	109,000
8,430		165,000	109,000
8,500		165,000	109,000
8,600		175,000	115,000
8,610		175,000	115,000
8,700		175,000	115,000
8,730	11/32	175,000	115,000
8,750		175,000	115,000
8,900		175,000	115,000
9,000		175,000	115,000
9,090		175,000	115,000
9,100		175,000	115,000
9,130	23/64	175,000	115,000
9,300		175,000	115,000
9,340		175,000	115,000
9,350		175,000	115,000
9,400		175,000	115,000
9,500		175,000	115,000
9,520	3/8	184,000	121,000
9,580		184,000	121,000
9,600		184,000	121,000
9,800		184,000	121,000
9,900		184,000	121,000
9,920	25/64	184,000	121,000
10,000		184,000	121,000
10,080		184,000	121,000
10,200		184,000	121,000
10,260		184,000	121,000
10,320	13/32	184,000	121,000
10,500		184,000	121,000
10,600		184,000	121,000
10,700		195,000	128,000
10,720	27/64	195,000	128,000
10,800		195,000	128,000
11,000		195,000	128,000
11,110	7/16	195,000	128,000
11,200		195,000	128,000
11,400		195,000	128,000
11,500		195,000	128,000
11,510	29/64	195,000	128,000
11,750		195,000	128,000
11,800		195,000	128,000
11,900		205,000	134,000
11,910	15/32	205,000	134,000
12,000		205,000	134,000
12,200		205,000	134,000
12,300	31/64	205,000	134,000
12,500		205,000	134,000
12,700	1/2	205,000	134,000
13,000		205,000	134,000
13,100	33/64	205,000	134,000
13,490	17/32	214,000	140,000
14,000		214,000	140,000
32,600		325,000	213,000

Kanunnapora



Pitkät kierukkaporat



- P** ● Kärjen kevennys $\geq \varnothing 1,000$ • kartiovaippahionta • Co-seosteinen pikateräs • parempi kulumiskestävyys
- M** ○
- K** ●
- N** ● seostetut/seostomattomat teräkset ja valut > yli 800 N/mm² • kuuma- ja kylmävalssatut teräkset • pienikitkaiset laakeriteräkset • runsasseosteiset teräkset • nuorutus- ja hiilikarkaistut teräkset
- S** ○
- H** ○

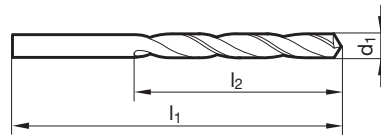
Materiaali **HSCO**

Pinta

Leikkusuunta

GÜHRING NAVIGATOR

Leikkuarvosivu 792



Artikkelinro. **317**

Käynnäpöytä

d1		l1	l2	d1		l1	l2
mm	inch	mm	mm	mm	inch	mm	mm
0,500		32,000	12,000	2,500		95,000	62,000
0,600		35,000	15,000	2,600		95,000	62,000
0,700		42,000	21,000	2,700		100,000	66,000
0,750		42,000	21,000	2,780	7/64	100,000	66,000
0,800		46,000	25,000	2,800		100,000	66,000
0,850		46,000	25,000	2,900		100,000	66,000
0,900		51,000	29,000	3,000		100,000	66,000
0,950		51,000	29,000	3,050		106,000	69,000
0,960		56,000	33,000	3,100		106,000	69,000
1,000		56,000	33,000	3,170	1/8	106,000	69,000
1,020		56,000	33,000	3,200		106,000	69,000
1,050		56,000	33,000	3,250		106,000	69,000
1,100		60,000	37,000	3,300		106,000	69,000
1,150		60,000	37,000	3,400		112,000	73,000
1,190	3/64	65,000	41,000	3,500		112,000	73,000
1,200		65,000	41,000	3,550		112,000	73,000
1,250		65,000	41,000	3,570	9/64	112,000	73,000
1,300		65,000	41,000	3,600		112,000	73,000
1,350		70,000	45,000	3,700		112,000	73,000
1,400		70,000	45,000	3,800		119,000	78,000
1,450		70,000	45,000	3,900		119,000	78,000
1,500		70,000	45,000	3,970	5/32	119,000	78,000
1,510		76,000	50,000	4,000		119,000	78,000
1,550		76,000	50,000	4,040		119,000	78,000
1,590	1/16	76,000	50,000	4,100		119,000	78,000
1,600		76,000	50,000	4,200		119,000	78,000
1,650		76,000	50,000	4,300		126,000	82,000
1,700		76,000	50,000	4,370	11/64	126,000	82,000
1,780		80,000	53,000	4,400		126,000	82,000
1,800		80,000	53,000	4,500		126,000	82,000
1,850		80,000	53,000	4,600		126,000	82,000
1,900		80,000	53,000	4,700		126,000	82,000
1,950		85,000	56,000	4,760	3/16	132,000	87,000
1,980	5/64	85,000	56,000	4,800		132,000	87,000
2,000		85,000	56,000	4,850		132,000	87,000
2,050		85,000	56,000	4,900		132,000	87,000
2,060		85,000	56,000	5,000		132,000	87,000
2,100		85,000	56,000	5,050		132,000	87,000
2,200		90,000	59,000	5,100		132,000	87,000
2,300		90,000	59,000	5,160	13/64	132,000	87,000
2,380	3/32	95,000	62,000	5,200		132,000	87,000
2,400		95,000	62,000	5,300		132,000	87,000

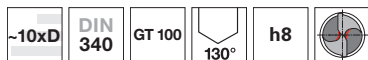


d1		l1	l2
mm	inch	mm	mm
5,400		139,000	91,000
5,500		139,000	91,000
5,560	7/32	139,000	91,000
5,600		139,000	91,000
5,700		139,000	91,000
5,800		139,000	91,000
5,900		139,000	91,000
5,950	15/64	139,000	91,000
6,000		139,000	91,000
6,100		148,000	97,000
6,200		148,000	97,000
6,300		148,000	97,000
6,350	1/4	148,000	97,000
6,400		148,000	97,000
6,500		148,000	97,000
6,600		148,000	97,000
6,630		148,000	97,000
6,750	17/64	156,000	102,000
6,800		156,000	102,000
6,900		156,000	102,000
7,000		156,000	102,000
7,140	9/32	156,000	102,000
7,200		156,000	102,000
7,500		156,000	102,000
7,540	19/64	165,000	109,000
7,600		165,000	109,000
7,700		165,000	109,000
7,800		165,000	109,000
7,940	5/16	165,000	109,000
8,000		165,000	109,000
8,200		165,000	109,000
8,330	21/64	165,000	109,000
8,430		165,000	109,000
8,500		165,000	109,000
8,600		175,000	115,000
8,730	11/32	175,000	115,000
8,800		175,000	115,000
9,000		175,000	115,000
9,130	23/64	175,000	115,000
9,200		175,000	115,000
9,300		175,000	115,000
9,500		175,000	115,000

d1		l1	l2
mm	inch	mm	mm
9,520	3/8	184,000	121,000
9,700		184,000	121,000
9,920	25/64	184,000	121,000
10,000		184,000	121,000
10,100		184,000	121,000
10,200		184,000	121,000
10,320	13/32	184,000	121,000
10,500		184,000	121,000
10,720	27/64	195,000	128,000
10,750		195,000	128,000
10,800		195,000	128,000
11,000		195,000	128,000
11,110	7/16	195,000	128,000
11,200		195,000	128,000
11,500		195,000	128,000
11,510	29/64	195,000	128,000
11,910	15/32	205,000	134,000
12,000		205,000	134,000
12,300	31/64	205,000	134,000
12,500		205,000	134,000
12,700	1/2	205,000	134,000
13,000		205,000	134,000
13,100	33/64	205,000	134,000
13,500		214,000	140,000
13,700		214,000	140,000
13,890	35/64	214,000	140,000
13,900		214,000	140,000
14,000		214,000	140,000
14,290	9/16	220,000	144,000
14,400		220,000	144,000
14,600		220,000	144,000
14,680	37/64	220,000	144,000
14,700		220,000	144,000
14,750		220,000	144,000
14,900		220,000	144,000
15,000		220,000	144,000
15,080	19/32	227,000	149,000
15,480	39/64	227,000	149,000
15,800		227,000	149,000
15,870	5/8	227,000	149,000
16,000		227,000	149,000
22,000		268,000	176,000



Pitkät kierukkaporat



- P** • Kärjen kevennys $\geq \varnothing 1,000$ • kartiovaippahionta • Co-seosteinen pikateräs • avarat lastu-urat • parempi kulumiskestävyys
- M** • • riittämättömään lastunpoistoon
- K** •
- N** • seostetut/seostomattomat teräkset ja valut > yli 800 N/mm² • kuuma- ja kylmävalssatut teräkset • pienikitkaiset laakeriteräkset • runsasseosteiset teräkset • nuorutus- ja hiilikarkaistut teräkset
- S**
- H** ○

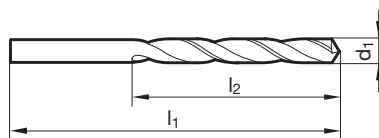
Materiaali **HSCO**

Pinta

Leikkusuunta

GÜHRING NAVIGATOR

Leikkuarvosivu 792



Artikkelinro. **336**

Kanunapora

d1		l1	l2	d1		l1	l2
mm	inch	mm	mm	mm	inch	mm	mm
1,000		56,000	33,000	2,440		95,000	62,000
1,020		56,000	33,000	2,450		95,000	62,000
1,040		56,000	33,000	2,490		95,000	62,000
1,070		60,000	37,000	2,500		95,000	62,000
1,090		60,000	37,000	2,530		95,000	62,000
1,100		60,000	37,000	2,550		95,000	62,000
1,180		60,000	37,000	2,580		95,000	62,000
1,190	3/64	65,000	41,000	2,600		95,000	62,000
1,200		65,000	41,000	2,640		95,000	62,000
1,250		65,000	41,000	2,700		100,000	66,000
1,300		65,000	41,000	2,710		100,000	66,000
1,320		65,000	41,000	2,750		100,000	66,000
1,400		70,000	45,000	2,780	7/64	100,000	66,000
1,500		70,000	45,000	2,790		100,000	66,000
1,510		76,000	50,000	2,800		100,000	66,000
1,550		76,000	50,000	2,820		100,000	66,000
1,590	1/16	76,000	50,000	2,850		100,000	66,000
1,600		76,000	50,000	2,870		100,000	66,000
1,610		76,000	50,000	2,900		100,000	66,000
1,700		76,000	50,000	2,950		100,000	66,000
1,750		80,000	53,000	3,000		100,000	66,000
1,780		80,000	53,000	3,050		106,000	69,000
1,800		80,000	53,000	3,100		106,000	69,000
1,850		80,000	53,000	3,170	1/8	106,000	69,000
1,900		80,000	53,000	3,200		106,000	69,000
1,930		85,000	56,000	3,260		106,000	69,000
1,980	5/64	85,000	56,000	3,300		106,000	69,000
1,990		85,000	56,000	3,400		112,000	73,000
2,000		85,000	56,000	3,440		112,000	73,000
2,050		85,000	56,000	3,450		112,000	73,000
2,060		85,000	56,000	3,500		112,000	73,000
2,080		85,000	56,000	3,570	9/64	112,000	73,000
2,100		85,000	56,000	3,600		112,000	73,000
2,180		90,000	59,000	3,660		112,000	73,000
2,200		90,000	59,000	3,700		112,000	73,000
2,250		90,000	59,000	3,730		112,000	73,000
2,260		90,000	59,000	3,750		112,000	73,000
2,300		90,000	59,000	3,800		119,000	78,000
2,350		90,000	59,000	3,860		119,000	78,000
2,370		95,000	62,000	3,900		119,000	78,000
2,380	3/32	95,000	62,000	3,910		119,000	78,000
2,400		95,000	62,000	3,970	5/32	119,000	78,000

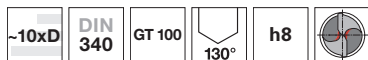


d1		I1	I2
mm	inch	mm	mm
3,990		119,000	78,000
4,000		119,000	78,000
4,040		119,000	78,000
4,090		119,000	78,000
4,100		119,000	78,000
4,200		119,000	78,000
4,220		119,000	78,000
4,300		126,000	82,000
4,370	11/64	126,000	82,000
4,390		126,000	82,000
4,400		126,000	82,000
4,500		126,000	82,000
4,570		126,000	82,000
4,600		126,000	82,000
4,620		126,000	82,000
4,700		126,000	82,000
4,760	3/16	132,000	87,000
4,800		132,000	87,000
4,850		132,000	87,000
4,900		132,000	87,000
4,920		132,000	87,000
4,980		132,000	87,000
5,000		132,000	87,000
5,060		132,000	87,000
5,100		132,000	87,000
5,110		132,000	87,000
5,160	13/64	132,000	87,000
5,180		132,000	87,000
5,200		132,000	87,000
5,220		132,000	87,000
5,300		132,000	87,000
5,310		139,000	91,000
5,400		139,000	91,000
5,410		139,000	91,000
5,500		139,000	91,000
5,560	7/32	139,000	91,000
5,600		139,000	91,000
5,610		139,000	91,000
5,700		139,000	91,000
5,790		139,000	91,000
5,800		139,000	91,000
5,900		139,000	91,000
5,940		139,000	91,000
5,950	15/64	139,000	91,000
6,000		139,000	91,000
6,040		148,000	97,000
6,100		148,000	97,000
6,150		148,000	97,000
6,200		148,000	97,000
6,250		148,000	97,000
6,300		148,000	97,000
6,350	1/4	148,000	97,000
6,400		148,000	97,000
6,500		148,000	97,000
6,530		148,000	97,000
6,600		148,000	97,000
6,630		148,000	97,000
6,700		148,000	97,000
6,750	17/64	156,000	102,000
6,800		156,000	102,000

d1		I1	I2
mm	inch	mm	mm
6,900		156,000	102,000
7,000		156,000	102,000
7,030		156,000	102,000
7,100		156,000	102,000
7,140	9/32	156,000	102,000
7,200		156,000	102,000
7,300		156,000	102,000
7,370		156,000	102,000
7,400		156,000	102,000
7,490		156,000	102,000
7,500		156,000	102,000
7,540	19/64	165,000	109,000
7,670		165,000	109,000
7,700		165,000	109,000
7,800		165,000	109,000
7,900		165,000	109,000
7,940	5/16	165,000	109,000
8,000		165,000	109,000
8,030		165,000	109,000
8,100		165,000	109,000
8,200		165,000	109,000
8,300		165,000	109,000
8,400		165,000	109,000
8,500		165,000	109,000
8,600		175,000	115,000
8,610		175,000	115,000
8,700		175,000	115,000
8,730	11/32	175,000	115,000
8,800		175,000	115,000
8,840		175,000	115,000
8,900		175,000	115,000
9,000		175,000	115,000
9,090		175,000	115,000
9,100		175,000	115,000
9,200		175,000	115,000
9,300		175,000	115,000
9,350		175,000	115,000
9,400		175,000	115,000
9,500		175,000	115,000
9,520	3/8	184,000	121,000
9,700		184,000	121,000
9,750		184,000	121,000
9,800		184,000	121,000
9,900		184,000	121,000
10,000		184,000	121,000
10,200		184,000	121,000
10,500		184,000	121,000
10,750		195,000	128,000
10,800		195,000	128,000
10,900		195,000	128,000
11,000		195,000	128,000
11,500		195,000	128,000
11,800		195,000	128,000
12,000		205,000	134,000
12,500		205,000	134,000
13,000		205,000	134,000
15,500		227,000	149,000
16,000		227,000	149,000



Pitkät kierukkaporat

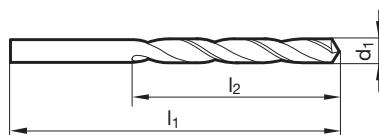


- P** • Kärjen kevennys $\geq \varnothing 1,000$ • kartiovaippahionta • Co-seosteinen pikateräs • avarat lastu-urat • erittäin hyvä kulumiskestävyys
- M** • riittämättömään lastunpoistoon
- K** •
- N** • seostetut/seostomattomat teräkset ja valut > yli 800 N/mm² • kuuma- ja kylmävalssatut teräkset • pienikitkaiset laakeriteräkset • runsasseosteiset teräkset • nuorrutus- ja hiilikarkaistut teräkset
- S**
- H** ○

GÜHRING NAVIGATOR

Leikkuuarvosivu 792

Materiaali	HSCO
Pinta	F
Leikkusuunta	R



Artikkelinro. **396**

Kanunapora

d1		l1	l2	d1		l1	l2
mm	inch	mm	mm	mm	inch	mm	mm
1,000		56,000	33,000	5,800		139,000	91,000
1,100		60,000	37,000	5,900		139,000	91,000
1,200		65,000	41,000	6,000		139,000	91,000
1,300		65,000	41,000	6,200		148,000	97,000
1,500		70,000	45,000	6,500		148,000	97,000
1,600		76,000	50,000	6,700		148,000	97,000
1,800		80,000	53,000	6,800		156,000	102,000
1,900		80,000	53,000	7,000		156,000	102,000
2,000		85,000	56,000	7,200		156,000	102,000
2,100		85,000	56,000	7,400		156,000	102,000
2,200		90,000	59,000	7,500		156,000	102,000
2,300		90,000	59,000	7,600		165,000	109,000
2,400		95,000	62,000	7,700		165,000	109,000
2,500		95,000	62,000	7,800		165,000	109,000
2,700		100,000	66,000	7,900		165,000	109,000
2,800		100,000	66,000	8,000		165,000	109,000
2,900		100,000	66,000	8,200		165,000	109,000
3,000		100,000	66,000	8,300		165,000	109,000
3,100		106,000	69,000	8,500		165,000	109,000
3,200		106,000	69,000	8,600		175,000	115,000
3,300		106,000	69,000	8,800		175,000	115,000
3,400		112,000	73,000	8,900		175,000	115,000
3,500		112,000	73,000	9,000		175,000	115,000
3,600		112,000	73,000	9,100		175,000	115,000
3,800		119,000	78,000	9,200		175,000	115,000
3,900		119,000	78,000	9,300		175,000	115,000
4,000		119,000	78,000	9,500		175,000	115,000
4,100		119,000	78,000	9,600		184,000	121,000
4,200		119,000	78,000	9,700		184,000	121,000
4,500		126,000	82,000	10,000		184,000	121,000
4,800		132,000	87,000	10,200		184,000	121,000
5,000		132,000	87,000	10,500		184,000	121,000
5,100		132,000	87,000	11,000		195,000	128,000
5,200		132,000	87,000	11,500		195,000	128,000
5,400		139,000	91,000	12,000		205,000	134,000
5,500		139,000	91,000				



Pitkät kierukkaporat



P ○ Kärjen kevennys ≥ Ø 1,000 • kartiovaippahionta • Co-seosteinen pikateräs • parempi kulumiskestävyys

M ●

K ●

N ●

S ●

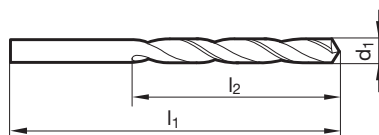
H ●

Titaani ja titaaniseokset • ruostumatt.-/haponk.-/kuumal. austeniittiset teräkset • Lujat- ja lyhytlastuiset teräkset yli 900 N/mm² • pienikitkaiset laakeriteräkset • Hastelloy, Inconel, Nimonic

GÜHRING NAVIGATOR

Leikkuuarvosivu 792

Materiaali	HSCO
Pinta	○
Leikkusuunta	Ⓜ



Artikkelinro.

617

d1		l1	l2
mm	inch	mm	mm
1,000		56,000	33,000
1,100		60,000	37,000
1,200		65,000	41,000
1,300		65,000	41,000
1,400		70,000	45,000
1,450		70,000	45,000
1,500		70,000	45,000
1,590	1/16	76,000	50,000
1,600		76,000	50,000
1,610		76,000	50,000
1,650		76,000	50,000
1,700		76,000	50,000
1,750		80,000	53,000
1,800		80,000	53,000
1,850		80,000	53,000
1,900		80,000	53,000
1,930		85,000	56,000
1,950		85,000	56,000
1,980	5/64	85,000	56,000
2,000		85,000	56,000
2,050		85,000	56,000
2,100		85,000	56,000
2,150		90,000	59,000
2,200		90,000	59,000
2,260		90,000	59,000
2,300		90,000	59,000
2,380	3/32	95,000	62,000
2,400		95,000	62,000
2,450		95,000	62,000
2,500		95,000	62,000
2,550		95,000	62,000
2,600		95,000	62,000
2,700		100,000	66,000
2,780	7/64	100,000	66,000
2,800		100,000	66,000
2,900		100,000	66,000
3,000		100,000	66,000
3,050		106,000	69,000
3,100		106,000	69,000
3,170	1/8	106,000	69,000
3,200		106,000	69,000
3,250		106,000	69,000

d1		l1	l2
mm	inch	mm	mm
3,300		106,000	69,000
3,400		112,000	73,000
3,450		112,000	73,000
3,500		112,000	73,000
3,570	9/64	112,000	73,000
3,600		112,000	73,000
3,700		112,000	73,000
3,800		119,000	78,000
3,900		119,000	78,000
3,970	5/32	119,000	78,000
4,000		119,000	78,000
4,050		119,000	78,000
4,100		119,000	78,000
4,200		119,000	78,000
4,300		126,000	82,000
4,400		126,000	82,000
4,500		126,000	82,000
4,600		126,000	82,000
4,700		126,000	82,000
4,760	3/16	132,000	87,000
4,800		132,000	87,000
4,900		132,000	87,000
4,950		132,000	87,000
5,000		132,000	87,000
5,100		132,000	87,000
5,160	13/64	132,000	87,000
5,200		132,000	87,000
5,300		139,000	91,000
5,400		139,000	91,000
5,500		139,000	91,000
5,600		139,000	91,000
5,700		139,000	91,000
5,800		139,000	91,000
6,000		148,000	97,000
6,100		148,000	97,000
6,200		148,000	97,000
6,300		148,000	97,000
6,350	1/4	148,000	97,000
6,400		148,000	97,000
6,500		148,000	97,000
6,600		148,000	97,000
6,700		148,000	97,000

Kanunapora

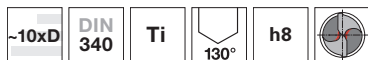


d1		l1	l2
mm	inch	mm	mm
6,750	17/64	156,000	102,000
6,800		156,000	102,000
6,900		156,000	102,000
7,000		156,000	102,000
7,100		156,000	102,000
7,140	9/32	156,000	102,000
7,250		156,000	102,000
7,400		156,000	102,000
7,500		156,000	102,000
7,540	19/64	165,000	109,000
7,700		165,000	109,000
7,800		165,000	109,000
7,940	5/16	165,000	109,000
8,000		165,000	109,000
8,100		165,000	109,000
8,200		165,000	109,000
8,300		165,000	109,000
8,330	21/64	165,000	109,000
8,400		165,000	109,000
8,500		165,000	109,000
8,600		175,000	115,000
8,700		175,000	115,000
8,730	11/32	175,000	115,000
8,800		175,000	115,000

d1		l1	l2
mm	inch	mm	mm
9,000		175,000	115,000
9,100		175,000	115,000
9,500		175,000	115,000
9,520	3/8	184,000	121,000
9,800		184,000	121,000
10,000		184,000	121,000
10,200		184,000	121,000
10,500		184,000	121,000
11,000		195,000	128,000
11,110	7/16	195,000	128,000
11,510	29/64	195,000	128,000
12,000		205,000	134,000
12,500		205,000	134,000
13,000		205,000	134,000
15,000		220,000	144,000



Pitkät kierukkaporat



P ○ Kärjen kevennys $\geq \varnothing 1,000$ • kartiovaippahionta • Co-seosteinen pikateräs • parempi kulumiskestävyys

M ●

K ●

N ●

S ●

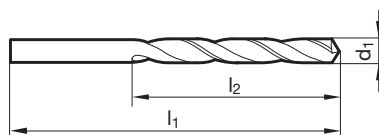
H ●

Titaani ja titaaniseokset • ruostumatt.-/haponk.-/kuumal. austeniittiset teräkset • lujat- ja lyhytlastuiset teräkset yli 900 N/mm² • pienikitkaiset laakeriteräkset • Hastelloy, Inconel, Nimonic

GÜHRING NAVIGATOR

Leikkuuarvosivu 792

Materiaali	HSCO
Pinta	S
Leikkusuunta	R



Artikkelinro.

669

d1		l1	l2
mm	inch	mm	mm
1,000		56,000	33,000
1,200		65,000	41,000
1,300		65,000	41,000
1,400		70,000	45,000
1,500		70,000	45,000
1,590	1/16	76,000	50,000
1,600		76,000	50,000
1,700		76,000	50,000
1,800		80,000	53,000
1,900		80,000	53,000
1,980	5/64	85,000	56,000
2,000		85,000	56,000
2,050		85,000	56,000
2,100		85,000	56,000
2,200		90,000	59,000
2,300		90,000	59,000
2,380	3/32	95,000	62,000
2,400		95,000	62,000
2,500		95,000	62,000
2,600		95,000	62,000
2,700		100,000	66,000
2,750		100,000	66,000
2,780	7/64	100,000	66,000
2,800		100,000	66,000
2,900		100,000	66,000
3,000		100,000	66,000
3,100		106,000	69,000
3,170	1/8	106,000	69,000
3,200		106,000	69,000
3,250		106,000	69,000
3,300		106,000	69,000
3,400		112,000	73,000
3,500		112,000	73,000
3,570	9/64	112,000	73,000
3,600		112,000	73,000
3,700		112,000	73,000
3,800		119,000	78,000
3,900		119,000	78,000
3,970	5/32	119,000	78,000
4,000		119,000	78,000
4,100		119,000	78,000
4,200		119,000	78,000

d1		l1	l2
mm	inch	mm	mm
4,300		126,000	82,000
4,370	11/64	126,000	82,000
4,400		126,000	82,000
4,500		126,000	82,000
4,700		126,000	82,000
4,760	3/16	132,000	87,000
4,800		132,000	87,000
5,000		132,000	87,000
5,100		132,000	87,000
5,160	13/64	132,000	87,000
5,200		132,000	87,000
5,300		132,000	87,000
5,500		139,000	91,000
5,600		139,000	91,000
5,700		139,000	91,000
5,800		139,000	91,000
6,000		139,000	91,000
6,100		148,000	97,000
6,200		148,000	97,000
6,300		148,000	97,000
6,350	1/4	148,000	97,000
6,400		148,000	97,000
6,500		148,000	97,000
6,700		148,000	97,000
6,750	17/64	156,000	102,000
6,800		156,000	102,000
7,000		156,000	102,000
7,100		156,000	102,000
7,140	9/32	156,000	102,000
7,200		156,000	102,000
7,400		156,000	102,000
7,500		156,000	102,000
7,540	19/64	165,000	109,000
7,800		165,000	109,000
7,900		165,000	109,000
7,940	5/16	165,000	109,000
8,000		165,000	109,000
8,200		165,000	109,000
8,500		165,000	109,000
8,730	11/32	175,000	115,000
9,000		175,000	115,000
9,130	23/64	175,000	115,000

Kanunapora

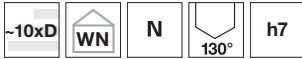


d1		l1	l2
mm	inch	mm	mm
9,300		175,000	115,000
9,500		175,000	115,000
9,520	3/8	184,000	121,000
10,000		184,000	121,000
10,200		184,000	121,000

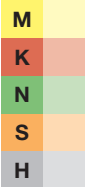
d1		l1	l2
mm	inch	mm	mm



Pitkät kierukkaporat



P päästöhiottu kärki • pääleikkusärmän suorasta



N lasikuituvahvistetut muovit • kestumuovit jotka kuluttavat sekä ohjainreunee ja leikkusärmää

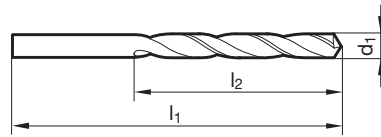
 Materiaali **TKM**

Pinta ○

Leikkusuunta

GÜHRING NAVIGATOR

Leikkuuarvosivu 792



Artikkelinro.

706

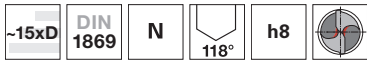
d1		l1	l2
mm	inch	mm	mm
0,500		38,000	8,500
0,600		38,000	9,500
0,650		38,000	10,500
0,700		38,000	10,500
0,750		38,000	12,500
0,800		38,000	12,500
0,850		38,000	14,500
0,900		38,000	14,500
1,000		38,000	17,000
1,050		38,000	17,000
1,100		38,000	17,000
1,400		38,000	17,000

d1		l1	l2
mm	inch	mm	mm
1,450		38,000	17,000

Kanuunapora



Erikoispitkät kierukkaporat sarja 1



- P** • Kärjen kevennys $\geq \varnothing 2,380$ • kartiovaippahionta • erittäin syville rei'ille
- M**
- K** •
- N** ○ seostettu-/seostamaton teräs ja valuteräs • harmaavalu-, taottava- ja pallografiittivalurauta • sintrattu pulveriteräs, uushopea ja grafiitti
- S**
- H**

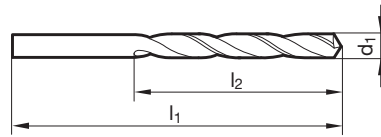
Materiaali **HSS**

Pinta

Leikkusuunta

GÜHRING NAVIGATOR

Leikkuarvosivu 788



Artikkelinro. **235**

Kanunapora

d1		l1	l2	d1		l1	l2
mm	inch	mm	mm	mm	inch	mm	mm
1,600		115,000	75,000	4,600		185,000	125,000
1,700		115,000	75,000	4,700		185,000	125,000
1,800		120,000	80,000	4,760	3/16	195,000	135,000
1,900		120,000	80,000	4,800		195,000	135,000
1,930		125,000	85,000	4,900		195,000	135,000
1,950		125,000	85,000	5,000		195,000	135,000
2,000		125,000	85,000	5,100		195,000	135,000
2,050		125,000	85,000	5,200		195,000	135,000
2,100		125,000	85,000	5,300		195,000	135,000
2,200		135,000	90,000	5,340		205,000	140,000
2,300		135,000	90,000	5,400		205,000	140,000
2,350		135,000	90,000	5,500		205,000	140,000
2,380	3/32	140,000	95,000	5,560	7/32	205,000	140,000
2,400		140,000	95,000	5,600		205,000	140,000
2,500		140,000	95,000	5,700		205,000	140,000
2,600		140,000	95,000	5,800		205,000	140,000
2,700		150,000	100,000	5,900		205,000	140,000
2,800		150,000	100,000	6,000		205,000	140,000
2,900		150,000	100,000	6,100		215,000	150,000
3,000		150,000	100,000	6,200		215,000	150,000
3,100		155,000	105,000	6,250		215,000	150,000
3,170	1/8	155,000	105,000	6,300		215,000	150,000
3,200		155,000	105,000	6,350	1/4	215,000	150,000
3,250		155,000	105,000	6,400		215,000	150,000
3,300		155,000	105,000	6,500		215,000	150,000
3,400		165,000	115,000	6,600		215,000	150,000
3,500		165,000	115,000	6,700		215,000	150,000
3,570	9/64	165,000	115,000	6,750	17/64	225,000	155,000
3,600		165,000	115,000	6,800		225,000	155,000
3,650		165,000	115,000	7,000		225,000	155,000
3,700		165,000	115,000	7,200		225,000	155,000
3,750		165,000	115,000	7,400		225,000	155,000
3,800		175,000	120,000	7,500		225,000	155,000
3,900		175,000	120,000	7,700		240,000	165,000
3,970	5/32	175,000	120,000	7,800		240,000	165,000
4,000		175,000	120,000	7,900		240,000	165,000
4,100		175,000	120,000	7,940	5/16	240,000	165,000
4,200		175,000	120,000	8,000		240,000	165,000
4,300		185,000	125,000	8,100		240,000	165,000
4,370	11/64	185,000	125,000	8,200		240,000	165,000
4,400		185,000	125,000	8,330	21/64	240,000	165,000
4,500		185,000	125,000	8,400		240,000	165,000



d1		l1	l2
mm	inch	mm	mm
8,500		240,000	165,000
8,700		250,000	175,000
8,730	11/32	250,000	175,000
8,800		250,000	175,000
8,900		250,000	175,000
9,000		250,000	175,000
9,130	23/64	250,000	175,000
9,500		250,000	175,000
9,520	3/8	265,000	185,000
9,600		265,000	185,000
9,700		265,000	185,000
9,800		265,000	185,000
9,900		265,000	185,000
9,920	25/64	265,000	185,000
10,000		265,000	185,000
10,100		265,000	185,000
10,200		265,000	185,000
10,250		265,000	185,000

d1		l1	l2
mm	inch	mm	mm
10,320	13/32	265,000	185,000
10,500		265,000	185,000
11,000		280,000	195,000
11,500		280,000	195,000
11,510	29/64	280,000	195,000
11,800		280,000	195,000
12,000		295,000	205,000
12,100		295,000	205,000
12,250		295,000	205,000
12,300	31/64	295,000	205,000
12,500		295,000	205,000
12,700	1/2	295,000	205,000
13,000		295,000	205,000



Erikoispitkät kierukkaporat sarja 1



- P** • Kärjen kevennys $\geq \varnothing 1,950$ • kartiovaippahionta • avarat lastu-urat
- M**
- K** •
- N** • valurauta ja teräs $< 1000/\text{mm}^2$ asti • Ei suositella: CrNi-teräkset, ruostumattomat teräkset
- S**
- H**

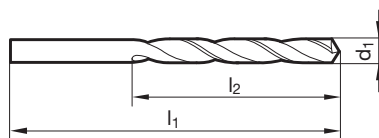
Materiaali **HSS**

Pinta

Leikkusuunta

GÜHRING NAVIGATOR

Leikkuarvosivu 790



Artikkelinro. **502**

Kanunapora

d1		l1	l2	d1		l1	l2
mm	inch	mm	mm	mm	inch	mm	mm
1,950		125,000	85,000	4,400		185,000	125,000
2,000		125,000	85,000	4,500		185,000	125,000
2,050		125,000	85,000	4,570		185,000	125,000
2,100		125,000	85,000	4,600		185,000	125,000
2,200		135,000	90,000	4,700		185,000	125,000
2,300		135,000	90,000	4,760	3/16	195,000	135,000
2,370		140,000	95,000	4,800		195,000	135,000
2,380	3/32	140,000	95,000	4,900		195,000	135,000
2,400		140,000	95,000	5,000		195,000	135,000
2,500		140,000	95,000	5,100		195,000	135,000
2,550		140,000	95,000	5,110		195,000	135,000
2,580		140,000	95,000	5,160	13/64	195,000	135,000
2,600		140,000	95,000	5,200		195,000	135,000
2,700		150,000	100,000	5,300		195,000	135,000
2,780	7/64	150,000	100,000	5,400		205,000	140,000
2,800		150,000	100,000	5,500		205,000	140,000
2,850		150,000	100,000	5,560	7/32	205,000	140,000
2,870		150,000	100,000	5,600		205,000	140,000
2,900		150,000	100,000	5,700		205,000	140,000
2,950		150,000	100,000	5,750		205,000	140,000
3,000		150,000	100,000	5,800		205,000	140,000
3,030		155,000	105,000	5,900		205,000	140,000
3,100		155,000	105,000	5,950	15/64	205,000	140,000
3,170	1/8	155,000	105,000	6,000		205,000	140,000
3,200		155,000	105,000	6,100		215,000	150,000
3,250		155,000	105,000	6,200		215,000	150,000
3,300		155,000	105,000	6,250		215,000	150,000
3,400		165,000	115,000	6,300		215,000	150,000
3,500		165,000	115,000	6,350	1/4	215,000	150,000
3,570	9/64	165,000	115,000	6,400		215,000	150,000
3,600		165,000	115,000	6,500		215,000	150,000
3,700		165,000	115,000	6,600		215,000	150,000
3,750		165,000	115,000	6,700		215,000	150,000
3,800		175,000	120,000	6,750	17/64	225,000	155,000
3,860		175,000	120,000	6,800		225,000	155,000
3,900		175,000	120,000	6,900		225,000	155,000
3,970	5/32	175,000	120,000	7,000		225,000	155,000
4,000		175,000	120,000	7,100		225,000	155,000
4,100		175,000	120,000	7,200		225,000	155,000
4,200		175,000	120,000	7,300		225,000	155,000
4,300		185,000	125,000	7,500		225,000	155,000
4,370	11/64	185,000	125,000	7,540	19/64	240,000	165,000

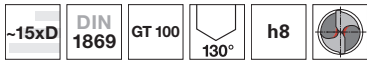


d1		l1	l2
mm	inch	mm	mm
7,700		240,000	165,000
7,750		240,000	165,000
7,800		240,000	165,000
7,900		240,000	165,000
7,940	5/16	240,000	165,000
8,000		240,000	165,000
8,100		240,000	165,000
8,200		240,000	165,000
8,300		240,000	165,000
8,330	21/64	240,000	165,000
8,400		240,000	165,000
8,430		240,000	165,000
8,500		240,000	165,000
8,600		250,000	175,000
8,700		250,000	175,000
8,730	11/32	250,000	175,000
8,800		250,000	175,000
9,000		250,000	175,000
9,200		250,000	175,000
9,300		250,000	175,000
9,400		250,000	175,000
9,500		250,000	175,000
9,520	3/8	265,000	185,000
9,600		265,000	185,000

d1		l1	l2
mm	inch	mm	mm
9,700		265,000	185,000
9,800		265,000	185,000
9,900		265,000	185,000
9,920	25/64	265,000	185,000
10,000		265,000	185,000
10,200		265,000	185,000
10,320	13/32	265,000	185,000
10,500		265,000	185,000
10,720	27/64	280,000	195,000
11,000		280,000	195,000
11,110	7/16	280,000	195,000
11,200		280,000	195,000
11,500		280,000	195,000
11,510	29/64	280,000	195,000
11,750		280,000	195,000
11,800		280,000	195,000
12,000		295,000	205,000
12,500		295,000	205,000
12,700	1/2	295,000	205,000
13,000		295,000	205,000



Erikoispitkät kierukkaporat sarja 1

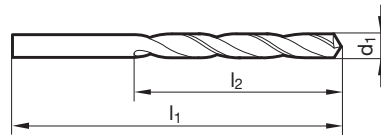


- P** • Kärjen kevennys $\geq \varnothing 1,980$ • kartiovaippahionta • avarat lastu-urat
- M**
- K** • erittäin syville rei'ille • riittämättömään lastunpoistoon
- N** • valurauta ja teräs $< 1000/\text{mm}^2$ asti • Ei suositella: CrNi-teräkset, ruostumattomat teräkset
- S** ○
- H**

GÜHRING NAVIGATOR

Leikkuuarvosivu 790

Materiaali	HSS
Pinta	S
Leikkusuunta	R



Artikkelinro. **670**

Kanunapora

d1		l1	l2
mm	inch	mm	mm
2,000		125,000	85,000
2,100		125,000	85,000
2,200		135,000	90,000
2,300		135,000	90,000
2,380	3/32	140,000	95,000
2,400		140,000	95,000
2,500		140,000	95,000
2,780	7/64	150,000	100,000
2,800		150,000	100,000
2,950		150,000	100,000
3,000		150,000	100,000
3,100		155,000	105,000
3,170	1/8	155,000	105,000
3,200		155,000	105,000
3,300		155,000	105,000
3,500		165,000	115,000
3,570	9/64	165,000	115,000
3,600		165,000	115,000
3,800		175,000	120,000
3,970	5/32	175,000	120,000
4,000		175,000	120,000
4,200		175,000	120,000
4,370	11/64	185,000	125,000
4,500		185,000	125,000
4,600		185,000	125,000
4,760	3/16	195,000	135,000
4,800		195,000	135,000
5,000		195,000	135,000
5,100		195,000	135,000
5,160	13/64	195,000	135,000
5,200		195,000	135,000
5,500		205,000	140,000
5,560	7/32	205,000	140,000
6,000		205,000	140,000
6,100		215,000	150,000
6,200		215,000	150,000

d1		l1	l2
mm	inch	mm	mm
6,350	1/4	215,000	150,000
6,500		215,000	150,000
6,600		215,000	150,000
6,800		225,000	155,000
7,000		225,000	155,000
7,140	9/32	225,000	155,000
7,500		225,000	155,000
7,540	19/64	240,000	165,000
7,940	5/16	240,000	165,000
8,000		240,000	165,000
8,200		240,000	165,000
8,500		240,000	165,000
8,730	11/32	250,000	175,000
9,000		250,000	175,000
9,520	3/8	265,000	185,000
9,600		265,000	185,000
9,920	25/64	265,000	185,000
10,000		265,000	185,000
10,900		280,000	195,000
11,000		280,000	195,000
11,900		295,000	205,000
11,910	15/32	295,000	205,000
12,000		295,000	205,000
12,500		295,000	205,000
12,700	1/2	295,000	205,000



Erikoispitkät kierukkaporat sarja 1



P	○	Kärjen kevennys $\geq \varnothing 2,380$ • kartiovaippahionta • erittäin syville rei'ille
M		
K		
N	●	pitkälästiset materiaalit $< 500 \text{ N/mm}^2$ • niukkaseosteiset teräkset
S		• Alumiini, pitkälästiset Al-seokset • sinkki, puhdistettu kupari, silumiini, elektroni • zamakki, argalium, pehmeät muovit ,puu
H		

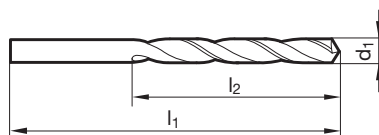
 Materiaali **HSS**

Pinta ○

Leikkusuunta

GÜHRING NAVIGATOR

Leikkuuarvosivu 788



Artikkelinro.

524

d1		l1	l2	d1		l1	l2
mm	inch	mm	mm	mm	inch	mm	mm
2,000		125,000	85,000	5,200		195,000	135,000
2,100		125,000	85,000	5,400		205,000	140,000
2,200		135,000	90,000	5,600		205,000	140,000
2,300		135,000	90,000	5,700		205,000	140,000
2,350		135,000	90,000	5,800		205,000	140,000
2,380	3/32	140,000	95,000	5,900		205,000	140,000
2,400		140,000	95,000	5,950	15/64	205,000	140,000
2,450		140,000	95,000	6,000		205,000	140,000
2,500		140,000	95,000	6,100		215,000	150,000
2,600		140,000	95,000	6,350	1/4	215,000	150,000
2,780	7/64	150,000	100,000	6,400		215,000	150,000
2,800		150,000	100,000	6,500		215,000	150,000
2,900		150,000	100,000	6,600		215,000	150,000
2,950		150,000	100,000	6,750	17/64	225,000	155,000
3,000		150,000	100,000	6,800		225,000	155,000
3,100		155,000	105,000	7,000		225,000	155,000
3,170	1/8	155,000	105,000	7,100		225,000	155,000
3,200		155,000	105,000	7,140	9/32	225,000	155,000
3,300		155,000	105,000	7,300		225,000	155,000
3,350		155,000	105,000	7,400		225,000	155,000
3,400		165,000	115,000	7,500		225,000	155,000
3,450		165,000	115,000	7,540	19/64	240,000	165,000
3,500		165,000	115,000	7,800		240,000	165,000
3,530		165,000	115,000	7,900		240,000	165,000
3,570	9/64	165,000	115,000	7,940	5/16	240,000	165,000
3,600		165,000	115,000	8,000		240,000	165,000
3,800		175,000	120,000	8,100		240,000	165,000
3,900		175,000	120,000	8,330	21/64	240,000	165,000
3,970	5/32	175,000	120,000	8,600		250,000	175,000
4,000		175,000	120,000	8,730	11/32	250,000	175,000
4,100		175,000	120,000	8,900		250,000	175,000
4,200		175,000	120,000	9,000		250,000	175,000
4,250		175,000	120,000	9,130	23/64	250,000	175,000
4,300		185,000	125,000	9,200		250,000	175,000
4,370	11/64	185,000	125,000	9,500		250,000	175,000
4,400		185,000	125,000	9,520	3/8	265,000	185,000
4,500		185,000	125,000	9,920	25/64	265,000	185,000
4,760	3/16	195,000	135,000	10,000		265,000	185,000
4,900		195,000	135,000	10,320	13/32	265,000	185,000
5,000		195,000	135,000	10,500		265,000	185,000
5,100		195,000	135,000	11,000		280,000	195,000
5,160	13/64	195,000	135,000	11,110	7/16	280,000	195,000

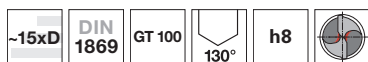


d1		l1	l2
mm	inch	mm	mm
11,500		280,000	195,000
11,910	15/32	295,000	205,000
12,000		295,000	205,000
12,700	1/2	295,000	205,000

d1		l1	l2
mm	inch	mm	mm



Erikoispitkät kierukkaporat sarja 1



P	•	Kärjen kevennys $\geq \varnothing 2,700$ • kartiovaippahionta • Co-seosteinen pikateräs • avarat lastu-urat • parempi kulumiskestävyys • erittäin syville rei'ille • riittämättömään lastunpoistoon
M	•	
K	•	
N	•	erikoislujat teräkset ja valuteräkset • harmaaalu-, taottava- ja pallografiittivalurauta
S	•	
H	○	

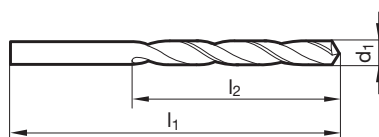
 Materiaali **HSCO**

Pinta

Leikkusuunta

GÜHRING NAVIGATOR

Leikkuuarvosivu 794


 Artikkelinro. **618**

d1		l1	l2	d1		l1	l2
mm	inch	mm	mm	mm	inch	mm	mm
2,700		150,000	100,000	5,800		205,000	140,000
2,900		150,000	100,000	6,000		205,000	140,000
3,000		150,000	100,000	6,100		215,000	150,000
3,100		155,000	105,000	6,200		215,000	150,000
3,170	1/8	155,000	105,000	6,300		215,000	150,000
3,200		155,000	105,000	6,350	1/4	215,000	150,000
3,300		155,000	105,000	6,400		215,000	150,000
3,400		165,000	115,000	6,500		215,000	150,000
3,500		165,000	115,000	6,600		215,000	150,000
3,570	9/64	165,000	115,000	6,700		215,000	150,000
3,600		165,000	115,000	6,750	17/64	225,000	155,000
3,700		165,000	115,000	6,800		225,000	155,000
3,750		165,000	115,000	7,000		225,000	155,000
3,800		175,000	120,000	7,140	9/32	225,000	155,000
3,970	5/32	175,000	120,000	7,400		225,000	155,000
4,000		175,000	120,000	7,500		225,000	155,000
4,100		175,000	120,000	7,540	19/64	240,000	165,000
4,200		175,000	120,000	7,700		240,000	165,000
4,300		185,000	125,000	7,800		240,000	165,000
4,370	11/64	185,000	125,000	7,940	5/16	240,000	165,000
4,400		185,000	125,000	8,000		240,000	165,000
4,500		185,000	125,000	8,200		240,000	165,000
4,600		185,000	125,000	8,330	21/64	240,000	165,000
4,760	3/16	195,000	135,000	8,500		240,000	165,000
4,800		195,000	135,000	8,700		250,000	175,000
4,850		195,000	135,000	8,730	11/32	250,000	175,000
5,000		195,000	135,000	8,800		250,000	175,000
5,100		195,000	135,000	9,000		250,000	175,000
5,160	13/64	195,000	135,000	9,130	23/64	250,000	175,000
5,200		195,000	135,000	9,400		250,000	175,000
5,300		195,000	135,000	9,500		250,000	175,000
5,400		205,000	140,000	9,520	3/8	265,000	185,000
5,500		205,000	140,000	9,700		265,000	185,000
5,560	7/32	205,000	140,000	10,000		265,000	185,000
5,600		205,000	140,000				
5,700		205,000	140,000				

Kanuunapora



Erikoispitkät kierukkaporat sarja 2

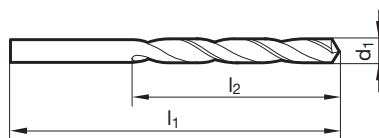


- P** • Kärjen kevennys $\geq \varnothing 2,700$ • kartiovaippahionta • erittäin syville rei'ille
- M**
- K** •
- N** ○ seostettu-/seostamaton teräs ja valuteräs • harmaavalu-, taottava- ja pallografiittivalurauta • sintrattu pulveriteräs, uushopea ja grafiitti
- S**
- H**

GÜHRING NAVIGATOR

Leikkuuarvosivu 788

Materiaali	HSS
Pinta	●
Leikkusuunta	Ⓜ



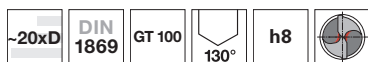
Artikkelinro. **236**

Käynnäpöytä

d1		l1	l2	d1		l1	l2
mm	inch	mm	mm	mm	inch	mm	mm
2,700		190,000	130,000	6,500		275,000	190,000
2,800		190,000	130,000	6,700		275,000	190,000
2,900		190,000	130,000	6,800		290,000	200,000
3,000		190,000	130,000	7,000		290,000	200,000
3,100		200,000	135,000	7,140	9/32	290,000	200,000
3,170	1/8	200,000	135,000	7,500		290,000	200,000
3,200		200,000	135,000	7,540	19/64	305,000	210,000
3,300		200,000	135,000	7,800		305,000	210,000
3,500		210,000	145,000	7,940	5/16	305,000	210,000
3,570	9/64	210,000	145,000	8,000		305,000	210,000
3,600		210,000	145,000	8,100		305,000	210,000
3,800		220,000	150,000	8,500		305,000	210,000
3,970	5/32	220,000	150,000	8,700		320,000	220,000
4,000		220,000	150,000	8,730	11/32	320,000	220,000
4,100		220,000	150,000	8,800		320,000	220,000
4,200		220,000	150,000	8,900		320,000	220,000
4,500		235,000	160,000	9,000		320,000	220,000
4,760	3/16	245,000	170,000	9,130	23/64	320,000	220,000
4,800		245,000	170,000	9,500		320,000	220,000
4,900		245,000	170,000	9,800		340,000	235,000
5,000		245,000	170,000	10,000		340,000	235,000
5,200		245,000	170,000	10,200		340,000	235,000
5,500		260,000	180,000	10,500		340,000	235,000
5,560	7/32	260,000	180,000	11,000		365,000	250,000
5,800		260,000	180,000	11,110	7/16	365,000	250,000
5,900		260,000	180,000	11,500		365,000	250,000
5,950	15/64	260,000	180,000	11,510	29/64	365,000	250,000
6,000		260,000	180,000	11,750		365,000	250,000
6,200		275,000	190,000	12,000		375,000	260,000
6,350	1/4	275,000	190,000	13,000		375,000	260,000



Erikoispitkät kierukkaporat sarja 2



P	•	Kärjen kevennys $\geq \varnothing 2,000$ • kartiovaippahionta • avarat lastu-urat
M		• erittäin syville rei'ille • riittämättömään lastunpoistoon
K	•	
N	•	valurauta ja teräs $< 1000/\text{mm}^2$ asti • Ei suositella: CrNi-teräkset, ruostumattomat teräkset
S		
H		

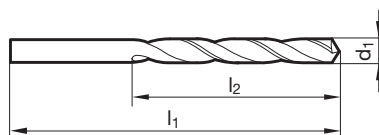
 Materiaali **HSS**

Pinta

Leikkusuunta

GÜHRING NAVIGATOR

Leikkuuarvosivu 790


 Artikkelinro. **503**

d1		l1	l2	d1		l1	l2
mm	inch	mm	mm	mm	inch	mm	mm
2,000		160,000	110,000	6,100		275,000	190,000
2,200		170,000	115,000	6,150		275,000	190,000
2,300		170,000	115,000	6,200		275,000	190,000
2,500		180,000	120,000	6,350	1/4	275,000	190,000
2,800		190,000	130,000	6,400		275,000	190,000
3,000		190,000	130,000	6,500		275,000	190,000
3,030		200,000	135,000	6,600		275,000	190,000
3,100		200,000	135,000	6,700		275,000	190,000
3,170	1/8	200,000	135,000	6,750	17/64	290,000	200,000
3,200		200,000	135,000	6,800		290,000	200,000
3,300		200,000	135,000	6,900		290,000	200,000
3,400		210,000	145,000	7,000		290,000	200,000
3,500		210,000	145,000	7,140	9/32	290,000	200,000
3,570	9/64	210,000	145,000	7,500		290,000	200,000
3,600		210,000	145,000	7,540	19/64	305,000	210,000
3,700		210,000	145,000	7,800		305,000	210,000
3,800		220,000	150,000	7,940	5/16	305,000	210,000
3,900		220,000	150,000	8,000		305,000	210,000
3,970	5/32	220,000	150,000	8,200		305,000	210,000
4,000		220,000	150,000	8,330	21/64	305,000	210,000
4,100		220,000	150,000	8,500		305,000	210,000
4,200		220,000	150,000	8,600		320,000	220,000
4,300		235,000	160,000	8,730	11/32	320,000	220,000
4,370	11/64	235,000	160,000	8,800		320,000	220,000
4,400		235,000	160,000	9,000		320,000	220,000
4,500		235,000	160,000	9,100		320,000	220,000
4,760	3/16	245,000	170,000	9,130	23/64	320,000	220,000
4,800		245,000	170,000	9,500		320,000	220,000
4,900		245,000	170,000	9,520	3/8	340,000	235,000
5,000		245,000	170,000	9,700		340,000	235,000
5,100		245,000	170,000	9,800		340,000	235,000
5,160	13/64	245,000	170,000	9,920	25/64	340,000	235,000
5,200		245,000	170,000	10,000		340,000	235,000
5,300		245,000	170,000	10,200		340,000	235,000
5,400		260,000	180,000	10,500		340,000	235,000
5,500		260,000	180,000	10,720	27/64	365,000	250,000
5,560	7/32	260,000	180,000	11,000		365,000	250,000
5,700		260,000	180,000	11,110	7/16	365,000	250,000
5,800		260,000	180,000	11,500		365,000	250,000
5,900		260,000	180,000	11,510	29/64	365,000	250,000
5,950	15/64	260,000	180,000	11,750		365,000	250,000
6,000		260,000	180,000	11,910	15/32	375,000	260,000

Kanuunapora



d1		l1	l2
mm	inch	mm	mm
12,000		375,000	260,000
12,300	31/64	375,000	260,000
12,500		375,000	260,000
12,700	1/2	375,000	260,000
13,000		375,000	260,000

d1		l1	l2
mm	inch	mm	mm



Erikoispitkät kierukkaporat sarja 2

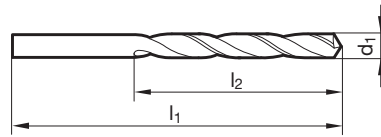


P	•	Kärjen kevennys $\geq \varnothing 2,300$ • kartiovaippahionta • avarat lastu-urat
M		• erittäin syville rei'ille • riittämättömään lastunpoistoon
K	•	
N	•	valurauta ja teräs $< 1000/\text{mm}^2$ asti • Ei suositella: CrNi-teräkset, ruostumattomat teräkset
S	○	
H		

GÜHRING NAVIGATOR

Leikkuarvosivu 790

Materiaali	HSS
Pinta	S
Leikkusuunta	R



Artikkelinro.

671

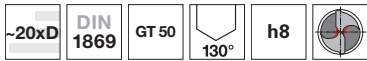
d1		l1	l2
mm	inch	mm	mm
2,700		190,000	130,000
2,800		190,000	130,000
3,000		190,000	130,000
3,100		200,000	135,000
3,170	1/8	200,000	135,000
3,200		200,000	135,000
3,500		210,000	145,000
3,570	9/64	210,000	145,000
3,970	5/32	220,000	150,000
4,000		220,000	150,000
4,090		220,000	150,000
4,370	11/64	235,000	160,000
4,400		235,000	160,000
4,500		235,000	160,000
4,600		235,000	160,000
4,760	3/16	245,000	170,000
4,800		245,000	170,000
5,000		245,000	170,000

d1		l1	l2
mm	inch	mm	mm
5,300		245,000	170,000
5,500		260,000	180,000
5,560	7/32	260,000	180,000
6,000		260,000	180,000
6,350	1/4	275,000	190,000
6,500		275,000	190,000
6,750	17/64	290,000	200,000
6,800		290,000	200,000
7,000		290,000	200,000
7,140	9/32	290,000	200,000
7,500		290,000	200,000
7,940	5/16	305,000	210,000
8,000		305,000	210,000
8,500		305,000	210,000

Kanuunapora



Erikoispitkät kierukkaporat sarja 2



P ○ Kärjen kevennys $\geq \varnothing 2,800$ • kartiovaippahionta • erittäin syville rei'ille

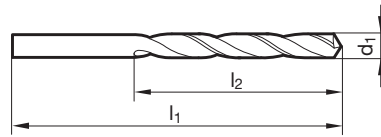


N ● pitkälastuiset materiaalit $< 500 \text{ N/mm}^2$ • niukkaseosteiset teräkset
 • Alumiini, pitkälastuiset Al-seokset • sinkki, puhdistettu kupari, silumiini, elektroni • zamakki, argalium, pehmeät muovit ,puu

GÜHRING NAVIGATOR

Leikkuarvosivu 788

Materiaali	HSS
Pinta	○
Leikkusuunta	Ⓜ



Artikkelinro. **528**

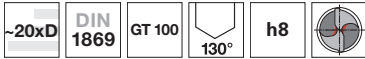
Kanunapora

d1		l1	l2
mm	inch	mm	mm
3,000		190,000	130,000
3,030		200,000	135,000
3,100		200,000	135,000
3,170	1/8	200,000	135,000
3,500		210,000	145,000
3,650		210,000	145,000
3,800		220,000	150,000
4,000		220,000	150,000
4,200		220,000	150,000
4,500		235,000	160,000
4,760	3/16	245,000	170,000
4,800		245,000	170,000
5,000		245,000	170,000
5,110		245,000	170,000
5,500		260,000	180,000
5,800		260,000	180,000
6,000		260,000	180,000
7,000		290,000	200,000

d1		l1	l2
mm	inch	mm	mm
7,500		290,000	200,000
8,000		305,000	210,000
8,500		305,000	210,000
9,000		320,000	220,000
10,000		340,000	235,000
10,500		340,000	235,000
11,500		365,000	250,000
13,000		375,000	260,000



Erikoispitkät kierukkaporat sarja 2



P	•	Kärjen kevennys $\geq \varnothing 3,000$ • kartiovaippahionta • Co-seosteinen pikateräs • avarat lastu-urat • parempi kulumiskestävyys • erittäin syville rei'ille • riittämättömään lastunpoistoon
M	•	
K	•	
N	•	erikoislujat teräkset ja valuteräkset • harmaavalu-, taottava- ja pallografiittivalurauta
S	•	
H	○	

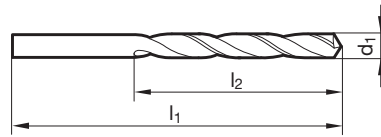
 Materiaali **HSCO**

Pinta

Leikkusuunta

GÜHRING NAVIGATOR

Leikkuuarvosivu 794

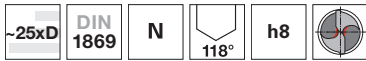

 Artikkelinro. **619**

d1		l1	l2
mm	inch	mm	mm
3,000		190,000	130,000
3,170	1/8	200,000	135,000
3,200		200,000	135,000
3,300		200,000	135,000
3,500		210,000	145,000
3,570	9/64	210,000	145,000
3,970	5/32	220,000	150,000
4,000		220,000	150,000
4,100		220,000	150,000
4,200		220,000	150,000
4,370	11/64	235,000	160,000
4,500		235,000	160,000
4,760	3/16	245,000	170,000
4,800		245,000	170,000
4,900		245,000	170,000
5,000		245,000	170,000
5,200		245,000	170,000
5,500		260,000	180,000
5,560	7/32	260,000	180,000
5,950	15/64	260,000	180,000
6,000		260,000	180,000
6,100		275,000	190,000
6,200		275,000	190,000
6,350	1/4	275,000	190,000

d1		l1	l2
mm	inch	mm	mm
6,500		275,000	190,000
6,750	17/64	290,000	200,000
6,800		290,000	200,000
7,000		290,000	200,000
7,140	9/32	290,000	200,000
7,400		290,000	200,000
7,500		290,000	200,000
7,540	19/64	305,000	210,000
7,600		305,000	210,000
7,940	5/16	305,000	210,000
8,000		305,000	210,000
8,200		305,000	210,000
8,500		305,000	210,000
8,730	11/32	320,000	220,000
9,000		320,000	220,000
9,130	23/64	320,000	220,000
9,500		320,000	220,000
9,520	3/8	340,000	235,000
9,600		340,000	235,000
9,900		340,000	235,000
10,000		340,000	235,000



Erikoispitkät kierukkaporat sarja 3



- P** • Kärjen kevennys $\geq \varnothing 3,500$ • kartiovaippahionta • erittäin syville rei'ille
- M**
- K** •
- N** ○ seostettu-/seostamaton teräs ja valuteräs • harmaavalu-, taottava- ja pallografiittivalurauta • sintrattu pulveriteräs, uushopea ja grafiitti
- S**
- H**

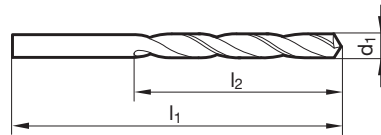
Materiaali **HSS**

Pinta

Leikkusuunta

GÜHRING NAVIGATOR

Leikkuuarvosivu 788



Artikkelinro. **237**

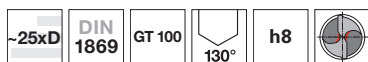
Kanunapora

d1		l1	l2
mm	inch	mm	mm
3,500		265,000	180,000
3,800		280,000	190,000
4,000		280,000	190,000
4,100		280,000	190,000
4,200		280,000	190,000
4,500		295,000	200,000
5,000		315,000	210,000
5,200		315,000	210,000
5,500		330,000	225,000
5,800		330,000	225,000
5,900		330,000	225,000
6,000		330,000	225,000
6,100		350,000	235,000
6,200		350,000	235,000
6,500		350,000	235,000
6,700		350,000	235,000
6,800		370,000	250,000
7,000		370,000	250,000

d1		l1	l2
mm	inch	mm	mm
7,500		370,000	250,000
7,800		390,000	265,000
8,000		390,000	265,000
8,500		390,000	265,000
9,000		410,000	280,000
9,500		410,000	280,000
9,800		430,000	295,000
10,000		430,000	295,000
10,300		430,000	295,000
10,500		430,000	295,000
11,000		455,000	310,000
11,500		455,000	310,000
11,750		455,000	310,000
12,000		480,000	330,000
12,500		480,000	330,000
13,000		480,000	330,000



Erikoispitkät kierukkaporat sarja 3



P	•	Kärjen kevennys $\geq \varnothing 2,500$ • kartiovaippahionta • avarat lastu-urat
M		• riittämättömään lastunpoistoon • erittäin syville rei'ille
K	•	
N	•	valurauta ja teräs $< 1000/\text{mm}^2$ asti • Ei suositella: CrNi-teräkset, ruostumattomat teräkset
S		
H		

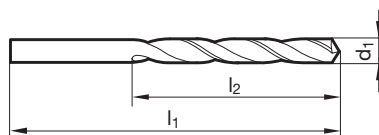
GÜHRING NAVIGATOR

Leikkuuarvosivu 790

 Materiaali **HSS**

Pinta

Leikkusuunta



Artikkelinro.

504

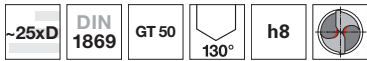
d1		l1	l2
mm	inch	mm	mm
2,500		225,000	150,000
3,000		240,000	160,000
3,100		250,000	170,000
3,170	1/8	250,000	170,000
3,200		250,000	170,000
3,300		250,000	170,000
3,400		265,000	180,000
3,500		265,000	180,000
3,570	9/64	265,000	180,000
3,600		265,000	180,000
3,700		265,000	180,000
3,800		280,000	190,000
3,900		280,000	190,000
3,970	5/32	280,000	190,000
4,000		280,000	190,000
4,100		280,000	190,000
4,200		280,000	190,000
4,300		295,000	200,000
4,370	11/64	295,000	200,000
4,400		295,000	200,000
4,500		295,000	200,000
4,600		295,000	200,000
4,760	3/16	315,000	210,000
4,800		315,000	210,000
4,900		315,000	210,000
5,000		315,000	210,000
5,100		315,000	210,000
5,200		315,000	210,000
5,500		330,000	225,000
5,560	7/32	330,000	225,000
5,800		330,000	225,000
5,950	15/64	330,000	225,000
6,000		330,000	225,000
6,100		350,000	235,000
6,200		350,000	235,000
6,300		350,000	235,000
6,350	1/4	350,000	235,000
6,400		350,000	235,000
6,500		350,000	235,000
6,700		350,000	235,000
6,750	17/64	370,000	250,000
6,800		370,000	250,000

d1		l1	l2
mm	inch	mm	mm
7,000		370,000	250,000
7,140	9/32	370,000	250,000
7,200		370,000	250,000
7,500		370,000	250,000
7,540	19/64	390,000	265,000
7,750		390,000	265,000
7,800		390,000	265,000
7,940	5/16	390,000	265,000
8,000		390,000	265,000
8,200		390,000	265,000
8,330	21/64	390,000	265,000
8,500		390,000	265,000
8,600		410,000	280,000
8,730	11/32	410,000	280,000
8,800		410,000	280,000
8,900		410,000	280,000
9,000		410,000	280,000
9,200		410,000	280,000
9,500		410,000	280,000
9,520	3/8	430,000	295,000
9,530		430,000	295,000
9,920	25/64	430,000	295,000
10,000		430,000	295,000
10,320	13/32	430,000	295,000
10,500		430,000	295,000
10,720	27/64	455,000	310,000
11,000		455,000	310,000
11,110	7/16	455,000	310,000
11,500		455,000	310,000
12,000		480,000	330,000
12,200		480,000	330,000
12,500		480,000	330,000
13,000		480,000	330,000

Kanuunapora



Erikoispitkät kierukkaporat sarja 3



P ○ Kärjen kevennys $\geq \varnothing 2,500$ • kartiovaippahionta • erittäin syville rei'ille

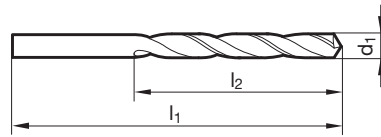


N ● pitkälastuiset materiaalit $< 500 \text{ N/mm}^2$ • niukkaseosteiset teräkset
 • Alumiini, pitkälastuiset Al-seokset • sinkki, puhdistettu kupari, silumiini,
 elektroni • zamakki, argalium, pehmeät muovit ,puu

GÜHRING NAVIGATOR

Leikkuarvosivu 788

Materiaali	HSS
Pinta	○
Leikkusuunta	Ⓜ



Artikkelinro. **529**

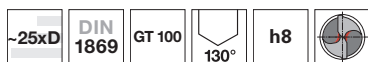
Kanunapora

d1		l1	l2
mm	inch	mm	mm
2,500		225,000	150,000
3,000		240,000	160,000
3,500		265,000	180,000
3,800		280,000	190,000
4,000		280,000	190,000
4,500		295,000	200,000
5,000		315,000	210,000
6,000		330,000	225,000
6,500		350,000	235,000
6,700		350,000	235,000
6,800		370,000	250,000
7,500		370,000	250,000

d1		l1	l2
mm	inch	mm	mm
8,000		390,000	265,000
9,500		410,000	280,000
10,000		430,000	295,000



Erikoispitkät kierukkaporat sarja 3



P	•	Kärjen kevennys $\geq \varnothing 2,500$ • kartiovaippahionta • Co-seosteinen pikateräs • avarat lastu-urat • parempi kulumiskestävyys • erittäin syville rei'ille • riittämättömään lastunpoistoon
M	•	
K	•	
N	•	erikoislujat teräkset ja valuteräkset • harmaavalu-, taottava- ja pallografiittivalurauta
S	•	
H	○	

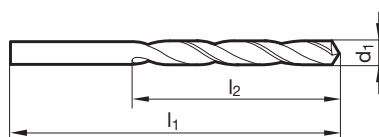
 Materiaali **HSCO**

Pinta

Leikkusuunta

GÜHRING NAVIGATOR

Leikkuuarvosivu 794


 Artikkelinro. **571**

d1		l1	l2	d1		l1	l2
mm	inch	mm	mm	mm	inch	mm	mm
2,500		225,000	150,000	6,750	17/64	370,000	250,000
3,000		240,000	160,000	6,800		370,000	250,000
3,100		250,000	170,000	7,000		370,000	250,000
3,170	1/8	250,000	170,000	7,140	9/32	370,000	250,000
3,200		250,000	170,000	7,200		370,000	250,000
3,300		250,000	170,000	7,500		370,000	250,000
3,400		265,000	180,000	7,750		390,000	265,000
3,500		265,000	180,000	7,800		390,000	265,000
3,700		265,000	180,000	7,940	5/16	390,000	265,000
3,800		280,000	190,000	8,000		390,000	265,000
3,900		280,000	190,000	8,200		390,000	265,000
3,970	5/32	280,000	190,000	8,500		390,000	265,000
4,000		280,000	190,000	8,600		410,000	280,000
4,100		280,000	190,000	8,730	11/32	410,000	280,000
4,200		280,000	190,000	8,800		410,000	280,000
4,300		295,000	200,000	9,000		410,000	280,000
4,500		295,000	200,000	9,500		410,000	280,000
4,600		295,000	200,000	9,520	3/8	430,000	295,000
4,760	3/16	315,000	210,000	10,000		430,000	295,000
4,800		315,000	210,000	10,320	13/32	430,000	295,000
4,900		315,000	210,000	10,500		430,000	295,000
5,000		315,000	210,000	10,720	27/64	455,000	310,000
5,100		315,000	210,000	11,000		455,000	310,000
5,200		315,000	210,000	11,110	7/16	455,000	310,000
5,500		330,000	225,000	11,500		455,000	310,000
5,560	7/32	330,000	225,000	12,000		480,000	330,000
5,800		330,000	225,000	12,200		480,000	330,000
5,950	15/64	330,000	225,000	12,500		480,000	330,000
6,000		330,000	225,000	13,000		480,000	330,000
6,100		350,000	235,000				
6,200		350,000	235,000				
6,300		350,000	235,000				
6,350	1/4	350,000	235,000				
6,400		350,000	235,000				
6,500		350,000	235,000				
6,700		350,000	235,000				

Kanuunapora



Ylipitkät kierukkaporat

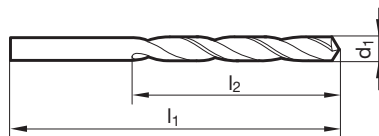


- P** • Kärjen kevennys $\geq \varnothing 6,000$ • kartiovaippahionta • avarat lastu-urat
- M** • erittäin syville rei'ille • riittämättömään lastunpoistoon
- K** •
- N** • valurauta ja teräs $< 1000/\text{mm}^2$ asti • Ei suositella: CrNi-teräkset, ruostumattomat teräkset
- S**
- H**

GÜHRING NAVIGATOR

Leikkuarvosivu 790

Materiaali	HSS
Pinta	
Leikkusuunta	



Artikkelinro. **242**

Kanunapora

d1		l1	l2
mm	inch	mm	mm
6,000		500,000	400,000
8,000		500,000	400,000
10,000		600,000	500,000
11,000		600,000	500,000
12,000		600,000	500,000

d1		l1	l2
mm	inch	mm	mm



Ylipitkät kierukkaporat

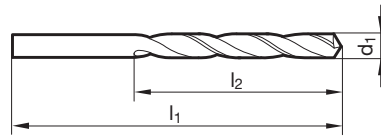


- P** • Kärjen kevennys $\geq \varnothing 8,000$ • kartiovaippahionta • avarat lastu-urat
- M** • erittäin syville rei'ille • riittämättömään lastunpoistoon
- K** •
- N** • valurauta ja teräs $< 1000/\text{mm}^2$ asti • Ei suositella: CrNi-teräkset, ruostumattomat teräkset
- S**
- H**

GÜHRING NAVIGATOR

Leikkuarvosivu 790

Materiaali	HSS
Pinta	○
Leikkusuunta	Ⓜ



Artikkelinro. **243**

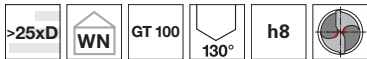
d1		l1	l2
mm	inch	mm	mm
8,000		750,000	650,000
10,000		750,000	650,000
11,000		750,000	650,000
12,000		750,000	650,000

d1		l1	l2
mm	inch	mm	mm

Käruunapora



Ylipitkät kierukkaporat

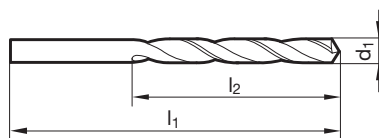


- P** • Kärjen kevennys $\geq \varnothing 10,000$ • kartiovaippahionta • avarat lastu-urat
• erittäin syville rei'ille • riittämättömään lastunpoistoon
- M**
- K** •
- N** • valurauta ja teräs $< 1000/\text{mm}^2$ asti • Ei suositella: CrNi-teräkset, ruostumattomat teräkset
- S**
- H**

GÜHRING NAVIGATOR

Leikkuarvosivu 790

Materiaali	HSS
Pinta	○
Leikkusuunta	Ⓜ



Artikkelinro. 244

Käynnäpöytä

d1		l1	l2
mm	inch	mm	mm
10,000		1000,000	850,000
11,000		1000,000	850,000
12,000		1000,000	850,000

d1		l1	l2
mm	inch	mm	mm



Erikoispitkät kierukkaporat sarja 1


 Materiaali **HSS**

Pinta

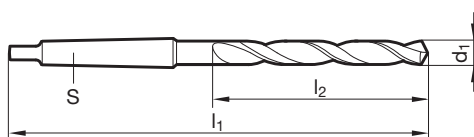
Leikkusuunta



P	•	Kärjen kevennys $\geq \varnothing 7,800$ • kartiovaippahionta • erittäin syville rei'ille
M		
K	•	
N	○	seostettu-/seostamaton teräs ja valuteräs • harmaavalu-, taottava- ja pallografiittivalurauta • sintrattu pulveriteräs, uushopea ja grafiitti
S		
H		

GÜHRING NAVIGATOR

Leikkuuarvosivu 788



Artikkelinro.

266

d1		S	l1	l2	d1		S	l1	l2
mm	inch		mm	mm	mm	inch		mm	mm
8,000		MK-1	265,000	165,000	20,500		MK-2	385,000	260,000
8,500		MK-1	265,000	165,000	20,640	13/16	MK-2	385,000	260,000
9,000		MK-1	275,000	175,000	21,000		MK-2	385,000	260,000
9,500		MK-1	275,000	175,000	21,430	27/32	MK-2	405,000	270,000
10,000		MK-1	285,000	185,000	21,500		MK-2	405,000	270,000
10,200		MK-1	285,000	185,000	22,000		MK-2	405,000	270,000
10,250		MK-1	285,000	185,000	22,500		MK-2	405,000	270,000
10,500		MK-1	285,000	185,000	23,000		MK-2	405,000	270,000
11,000		MK-1	300,000	195,000	23,020	29/32	MK-2	405,000	270,000
11,400		MK-1	300,000	195,000	23,500		MK-3	425,000	270,000
11,500		MK-1	300,000	195,000	24,000		MK-3	440,000	290,000
11,750		MK-1	300,000	195,000	24,500		MK-3	440,000	290,000
11,800		MK-1	300,000	195,000	25,000	63/64	MK-3	440,000	290,000
12,000		MK-1	310,000	205,000	26,000		MK-3	440,000	290,000
12,200		MK-1	310,000	205,000	26,500		MK-3	440,000	290,000
12,500		MK-1	310,000	205,000	27,000		MK-3	460,000	305,000
12,700	1/2	MK-1	310,000	205,000	28,000		MK-3	460,000	305,000
13,000		MK-1	310,000	205,000	30,000		MK-3	460,000	305,000
13,500		MK-1	325,000	220,000	30,500		MK-3	480,000	320,000
13,750		MK-1	325,000	220,000	31,000		MK-3	480,000	320,000
14,000		MK-1	325,000	220,000	32,000		MK-4	505,000	320,000
14,290	9/16	MK-2	340,000	220,000	33,000		MK-4	505,000	320,000
14,500		MK-2	340,000	220,000	34,000		MK-4	530,000	340,000
15,000		MK-2	340,000	220,000	35,000		MK-4	530,000	340,000
15,250		MK-2	355,000	230,000	36,000		MK-4	530,000	340,000
15,500		MK-2	355,000	230,000	38,000		MK-4	555,000	360,000
15,750		MK-2	355,000	230,000	39,000		MK-4	555,000	360,000
15,800		MK-2	355,000	230,000	40,000		MK-4	555,000	360,000
16,000		MK-2	355,000	230,000	42,000		MK-4	555,000	360,000
16,250		MK-2	355,000	230,000	45,000		MK-4	585,000	385,000
16,500		MK-2	355,000	230,000	45,240	1 25/32	MK-4	585,000	385,000
16,670	21/32	MK-2	355,000	230,000	48,000		MK-4	605,000	405,000
17,000		MK-2	355,000	230,000	50,000		MK-4	605,000	405,000
17,500		MK-2	370,000	245,000					
17,750		MK-2	370,000	245,000					
18,000		MK-2	370,000	245,000					
18,500		MK-2	370,000	245,000					
18,650	47/64	MK-2	370,000	245,000					
19,000		MK-2	370,000	245,000					
19,500		MK-2	385,000	260,000					
19,750		MK-2	385,000	260,000					
20,000		MK-2	385,000	260,000					

Kanuunapora



Erikoispitkät kierukkaporat sarja 1

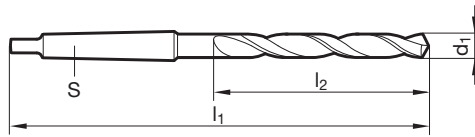


- P** • Kärjen kevennys $\geq \varnothing 5,800$ • kartiovaippahionta • avarat lastu-urat
- M** • erittäin syville rei'ille • riittämättömään lastunpoistoon
- K** •
- N** • valurauta ja teräs $< 1000/\text{mm}^2$ asti • Ei suositella: CrNi-teräkset, ruostumattomat teräkset
- S**
- H**

GÜHRING NAVIGATOR

Leikkuuarvosivu 790

Materiaali	HSS
Pinta	$>0/16,0$
Leikkusuunta	



Artikkelinro.

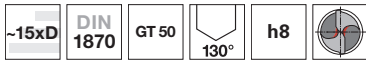
526

Käynnäpöytä

d1		S	l1	l2	d1		S	l1	l2
mm	inch		mm	mm	mm	inch		mm	mm
8,000		MK-1	265,000	165,000	15,870	5/8	MK-2	355,000	230,000
8,500		MK-1	265,000	165,000	16,000		MK-2	355,000	230,000
8,600		MK-1	275,000	175,000	16,500		MK-2	355,000	230,000
8,700		MK-1	275,000	175,000	17,000		MK-2	355,000	230,000
9,000		MK-1	275,000	175,000	17,460	11/16	MK-2	370,000	245,000
9,500		MK-1	275,000	175,000	17,500		MK-2	370,000	245,000
9,520	3/8	MK-1	285,000	185,000	18,000		MK-2	370,000	245,000
9,800		MK-1	285,000	185,000	18,500		MK-2	370,000	245,000
10,000		MK-1	285,000	185,000	19,000		MK-2	370,000	245,000
10,200		MK-1	285,000	185,000	19,500		MK-2	385,000	260,000
10,500		MK-1	285,000	185,000	20,000		MK-2	385,000	260,000
10,720	27/64	MK-1	300,000	195,000	20,500		MK-2	385,000	260,000
11,000		MK-1	300,000	195,000	21,000		MK-2	385,000	260,000
11,110	7/16	MK-1	300,000	195,000	21,500		MK-2	405,000	270,000
11,500		MK-1	300,000	195,000	22,000		MK-2	405,000	270,000
11,510	29/64	MK-1	300,000	195,000	23,000		MK-2	405,000	270,000
11,750		MK-1	300,000	195,000	24,000		MK-3	440,000	290,000
12,000		MK-1	310,000	205,000	25,000	63/64	MK-3	440,000	290,000
12,500		MK-1	310,000	205,000	26,000		MK-3	440,000	290,000
12,700	1/2	MK-1	310,000	205,000	26,500		MK-3	440,000	290,000
12,800		MK-1	310,000	205,000	28,000		MK-3	460,000	305,000
13,000		MK-1	310,000	205,000	28,500		MK-3	460,000	305,000
13,490	17/32	MK-1	325,000	220,000	29,000		MK-3	460,000	305,000
13,500		MK-1	325,000	220,000	30,000		MK-3	460,000	305,000
14,000		MK-1	325,000	220,000					
14,200		MK-2	340,000	220,000					
14,290	9/16	MK-2	340,000	220,000					
14,500		MK-2	340,000	220,000					
15,000		MK-2	340,000	220,000					
15,500		MK-2	355,000	230,000					



Erikoispitkät kierukkaporat sarja 1


 Materiaali **HSS**

Pinta ○

Leikkusuunta (R)

P ○ Kärjen kevennys $\geq \varnothing 7,900$ • kartiovaippahionta • erittäin syville rei'ille
• pehmeille ja pitkäkastusille materiaaleille

M

K

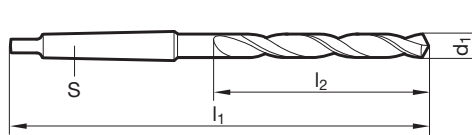
N ● pitkäkastuiset materiaalit $< 500 \text{ N/mm}^2$ • niukkaseosteiset teräkset

S ● Alumiini, pitkäkastuiset Al-seokset • sinkki, puhdistettu kupari, silumiini, elektroni • zamakki, argalium, pehmeät muovit ,puu

H

GÜHRING NAVIGATOR

Leikkuuarvosivu 788



Artikkelinro.

525

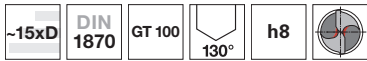
d1		S	l1	l2
mm	inch		mm	mm
8,500		MK-1	265,000	165,000
8,700		MK-1	275,000	175,000
9,000		MK-1	275,000	175,000
9,500		MK-1	275,000	175,000
10,000		MK-1	285,000	185,000
10,500		MK-1	285,000	185,000
11,000		MK-1	300,000	195,000
12,000		MK-1	310,000	205,000
12,500		MK-1	310,000	205,000
13,000		MK-1	310,000	205,000
13,500		MK-1	325,000	220,000
14,000		MK-1	325,000	220,000
15,000		MK-2	340,000	220,000
15,500		MK-2	355,000	230,000
16,000		MK-2	355,000	230,000
18,000		MK-2	370,000	245,000
19,500		MK-2	385,000	260,000
21,000		MK-2	385,000	260,000

d1		S	l1	l2
mm	inch		mm	mm
23,000		MK-2	405,000	270,000
24,000		MK-3	440,000	290,000
24,300		MK-3	440,000	290,000
24,380		MK-3	440,000	290,000
24,500		MK-3	440,000	290,000
25,500		MK-3	440,000	290,000
26,500		MK-3	440,000	290,000
27,500		MK-3	460,000	305,000
28,000		MK-3	460,000	305,000
29,000		MK-3	460,000	305,000
31,000		MK-3	480,000	320,000
33,000		MK-4	505,000	320,000

Kanuunapora



Erikoispitkät kierukkaporat sarja 1



- P** • Kärjen kevennys $\geq \varnothing 9,520$ • kartiovaippahionta • Co-seosteinen pikateräs • avarat lastu-urat • parempi kulumiskestävyys • erittäin syville rei'ille • riittämättömään lastunpoistoon
- M** •
- K** •
- N** • erikoislujat teräkset ja valuteräkset • harmaavalu-, taottava- ja pallografiittivalurauta
- S** •
- H** ○

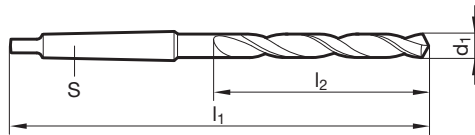
Materiaali **HSCO**

Pinta

Leikkusuunta

GÜHRING NAVIGATOR

Leikkuarvosivu 794



Artikkelinro. **620**

Käynnäpöytä

d1		S	l1	l2
mm	inch		mm	mm
9,520	3/8	MK-1	285,000	185,000
10,000		MK-1	285,000	185,000
10,200		MK-1	285,000	185,000
10,320	13/32	MK-1	285,000	185,000
10,500		MK-1	285,000	185,000
11,000		MK-1	300,000	195,000
11,110	7/16	MK-1	300,000	195,000
11,500		MK-1	300,000	195,000
11,510	29/64	MK-1	300,000	195,000
12,000		MK-1	310,000	205,000
12,300	31/64	MK-1	310,000	205,000
12,500		MK-1	310,000	205,000
12,700	1/2	MK-1	310,000	205,000
13,000		MK-1	310,000	205,000
13,500		MK-1	325,000	220,000
14,000		MK-1	325,000	220,000
14,290	9/16	MK-2	340,000	220,000
14,500		MK-2	340,000	220,000
15,000		MK-2	340,000	220,000
15,080	19/32	MK-2	355,000	230,000
15,500		MK-2	355,000	230,000
16,000		MK-2	355,000	230,000
16,500		MK-2	355,000	230,000
17,000		MK-2	355,000	230,000

d1		S	l1	l2
mm	inch		mm	mm
17,500		MK-2	370,000	245,000
18,000		MK-2	370,000	245,000
18,500		MK-2	370,000	245,000
19,000		MK-2	370,000	245,000
20,000		MK-2	385,000	260,000
21,000		MK-2	385,000	260,000
21,830		MK-2	405,000	270,000
22,000		MK-2	405,000	270,000
22,620		MK-2	405,000	270,000
23,000		MK-2	405,000	270,000
25,500		MK-3	440,000	290,000
26,000		MK-3	440,000	290,000
27,180		MK-3	460,000	305,000
29,370	1 5/32	MK-3	460,000	305,000
30,000		MK-3	460,000	305,000



Erikoispitkät kierukkaporat sarja 2


 Materiaali **HSS**

Pinta

Leikkusuunta

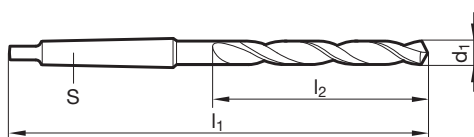

P • Kärjen kevennys $\geq \varnothing 7,700$ • kartiovaippahionta • erittäin syville rei'ille

M
K •

N ○ seostettu-/seostamaton teräs ja valuteräs • harmaavalu-, taottava- ja pallografiittivalurauta • sintrattu pulveriteräs, uushopea ja grafiitti

S
H
GÜHRING NAVIGATOR

Leikkuarvosivu 788



Artikkelinro.

267

d1		S	l1	l2
mm	inch		mm	mm
8,000		MK-1	330,000	210,000
8,500		MK-1	330,000	210,000
9,000		MK-1	345,000	220,000
10,000		MK-1	360,000	235,000
10,200		MK-1	360,000	235,000
10,500		MK-1	360,000	235,000
11,000		MK-1	375,000	250,000
11,500		MK-1	375,000	250,000
11,750		MK-1	375,000	250,000
11,800		MK-1	375,000	250,000
12,000		MK-1	395,000	260,000
13,000		MK-1	395,000	260,000
13,490	17/32	MK-1	410,000	275,000
13,500		MK-1	410,000	275,000
14,000		MK-1	410,000	275,000
14,500		MK-2	425,000	275,000
15,000		MK-2	425,000	275,000
15,480	39/64	MK-2	445,000	295,000
15,500		MK-2	445,000	295,000
16,000		MK-2	445,000	295,000
16,500		MK-2	445,000	295,000
17,000		MK-2	445,000	295,000
17,070	43/64	MK-2	465,000	310,000
17,500		MK-2	465,000	310,000
18,000		MK-2	465,000	310,000
18,500		MK-2	465,000	310,000
19,000		MK-2	465,000	310,000
19,050	3/4	MK-2	490,000	325,000
19,500		MK-2	490,000	325,000
20,000		MK-2	490,000	325,000

d1		S	l1	l2
mm	inch		mm	mm
20,640	13/16	MK-2	490,000	325,000
21,000		MK-2	490,000	325,000
21,430	27/32	MK-2	515,000	345,000
21,500		MK-2	515,000	345,000
21,830	55/64	MK-2	515,000	345,000
22,000		MK-2	515,000	345,000
22,800		MK-2	515,000	345,000
23,000		MK-2	515,000	345,000
23,020	29/32	MK-2	515,000	345,000
23,750		MK-3	555,000	365,000
23,810	15/16	MK-3	555,000	365,000
24,000		MK-3	555,000	365,000
24,500		MK-3	555,000	365,000
25,000	63/64	MK-3	555,000	365,000
26,000		MK-3	555,000	365,000
28,000		MK-3	580,000	385,000
29,500		MK-3	580,000	385,000
30,000		MK-3	580,000	385,000
31,000		MK-3	610,000	410,000
32,000		MK-4	635,000	410,000
34,000		MK-4	665,000	430,000
40,000		MK-4	695,000	460,000
45,000		MK-4	735,000	490,000

Kanuunapora



Erikoispitkät kierukkaporat sarja 2

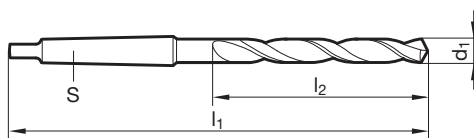


- P** • Kärjen kevennys $\geq \varnothing 7,800$ • kartiovaippahionta • avarat lastu-urat • riittämättömään lastunpoistoon • erittäin syville rei'ille
- M**
- K** •
- N** • valurauta ja teräs $< 1000/\text{mm}^2$ asti • Ei suositella: CrNi-teräkset, ruostumattomat teräkset
- S**
- H**

GÜHRING NAVIGATOR

Leikkuuarvosivu 790

Materiaali	HSS
Pinta	$>0/16,0$
Leikkusuunta	



Artikkelinro.

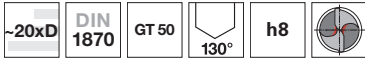
527

Käynnäpöytä

d1		S	l1	l2	d1		S	l1	l2
mm	inch		mm	mm	mm	inch		mm	mm
8,000		MK-1	330,000	210,000	17,500		MK-2	465,000	310,000
8,400		MK-1	330,000	210,000	17,800		MK-2	465,000	310,000
8,500		MK-1	330,000	210,000	18,000		MK-2	465,000	310,000
9,000		MK-1	345,000	220,000	18,500		MK-2	465,000	310,000
9,500		MK-1	345,000	220,000	19,000		MK-2	465,000	310,000
10,000		MK-1	360,000	235,000	19,450	49/64	MK-2	490,000	325,000
10,500		MK-1	360,000	235,000	19,500		MK-2	490,000	325,000
11,000		MK-1	375,000	250,000	20,000		MK-2	490,000	325,000
11,110	7/16	MK-1	375,000	250,000	20,500		MK-2	490,000	325,000
11,500		MK-1	375,000	250,000	21,000		MK-2	490,000	325,000
11,510	29/64	MK-1	375,000	250,000	21,030	53/64	MK-2	490,000	325,000
11,800		MK-1	375,000	250,000	21,430	27/32	MK-2	515,000	345,000
11,910	15/32	MK-1	395,000	260,000	22,000		MK-2	515,000	345,000
12,000		MK-1	395,000	260,000	23,000		MK-2	515,000	345,000
12,500		MK-1	395,000	260,000	23,020	29/32	MK-2	515,000	345,000
12,700	1/2	MK-1	395,000	260,000	23,810	15/16	MK-3	555,000	365,000
13,000		MK-1	395,000	260,000	24,000		MK-3	555,000	365,000
13,500		MK-1	410,000	275,000	24,210	61/64	MK-3	555,000	365,000
13,700		MK-1	410,000	275,000	25,000	63/64	MK-3	555,000	365,000
13,800		MK-1	410,000	275,000	26,000		MK-3	555,000	365,000
13,890	35/64	MK-1	410,000	275,000	26,190	1 1/32	MK-3	555,000	365,000
14,000		MK-1	410,000	275,000	26,500		MK-3	555,000	365,000
14,290	9/16	MK-2	425,000	275,000	27,000		MK-3	580,000	385,000
14,500		MK-2	425,000	275,000	28,000		MK-3	580,000	385,000
15,000		MK-2	425,000	275,000	28,750		MK-3	580,000	385,000
15,500		MK-2	445,000	295,000	29,000		MK-3	580,000	385,000
16,000		MK-2	445,000	295,000	29,500		MK-3	580,000	385,000
16,500		MK-2	445,000	295,000	30,000		MK-3	580,000	385,000
17,000		MK-2	445,000	295,000					
17,070	43/64	MK-2	465,000	310,000					



Erikoispitkät kierukkaporat sarja 2


 Materiaali **HSS**

Pinta ○

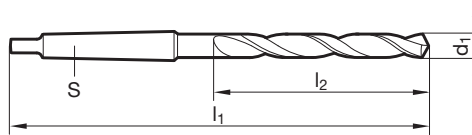
Leikkusuunta

P ○ Kärjen kevennys $\geq \varnothing 8,000$ • kartiovaippahionta • erittäin syville rei'ille

N ● pitkälastuiset materiaalit $< 500 \text{ N/mm}^2$ • niukkaseosteiset teräkset
 • Alumiini, pitkälastuiset Al-seokset • sinkki, puhdistettu kupari, silumiini,
 elektroni • zamakki, argalium, pehmeät muovit ,puu

GÜHRING NAVIGATOR

Leikkuarvosivu 788

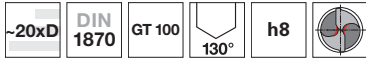

 Artikkelinro. **542**

d1		S	l1	l2
mm	inch		mm	mm
8,500		MK-1	330,000	210,000
8,600		MK-1	345,000	220,000
8,800		MK-1	345,000	220,000
9,000		MK-1	345,000	220,000
9,500		MK-1	345,000	220,000
10,500		MK-1	360,000	235,000
10,700		MK-1	375,000	250,000
11,000		MK-1	375,000	250,000
11,500		MK-1	375,000	250,000
12,000		MK-1	395,000	260,000
12,500		MK-1	395,000	260,000
13,000		MK-1	395,000	260,000
13,500		MK-1	410,000	275,000
14,500		MK-2	425,000	275,000
15,000		MK-2	425,000	275,000
17,000		MK-2	445,000	295,000
17,500		MK-2	465,000	310,000
20,500		MK-2	490,000	325,000

d1		S	l1	l2
mm	inch		mm	mm
21,000		MK-2	490,000	325,000
21,500		MK-2	515,000	345,000
22,000		MK-2	515,000	345,000
23,000		MK-2	515,000	345,000
24,000		MK-3	555,000	365,000
24,500		MK-3	555,000	365,000
25,500		MK-3	555,000	365,000
26,000		MK-3	555,000	365,000
26,500		MK-3	555,000	365,000
27,500		MK-3	580,000	385,000
28,000		MK-3	580,000	385,000
29,000		MK-3	580,000	385,000
29,500		MK-3	580,000	385,000
30,000		MK-3	580,000	385,000
31,000		MK-3	610,000	410,000



Erikoispitkät kierukkaporat sarja 2

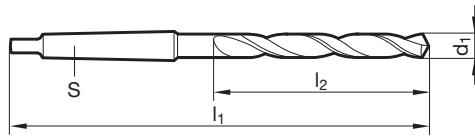


- P** • Kärjen kevennys $\geq \varnothing 9,520$ • kartiovaippahionta • Co-seosteinen pikateräs • avarat lastu-urat • parempi kulumiskestävyys
- M** • riittämättömään lastunpoistoon • erittäin syville rei'ille
- K** •
- N** • erikoislujat teräkset ja valuteräkset • harmaavalu-, taottava- ja pallografiittivalurauta
- S** •
- H** ○

GÜHRING NAVIGATOR

Leikkuuarvosivu 794

Materiaali	HSCO
Pinta	>0 16,0
Leikkusuunta	(R)



Artikkelinro. **621**

Käynnäpöytä

d1		S	l1	l2
mm	inch		mm	mm
9,520	3/8	MK-1	360,000	235,000
10,000		MK-1	360,000	235,000
10,500		MK-1	360,000	235,000
10,720	27/64	MK-1	375,000	250,000
11,000		MK-1	375,000	250,000
11,500		MK-1	375,000	250,000
11,510	29/64	MK-1	375,000	250,000
12,000		MK-1	395,000	260,000
12,500		MK-1	395,000	260,000
12,700	1/2	MK-1	395,000	260,000
13,000		MK-1	395,000	260,000
13,500		MK-1	410,000	275,000

d1		S	l1	l2
mm	inch		mm	mm
14,000		MK-1	410,000	275,000
14,500		MK-2	425,000	275,000
15,000		MK-2	425,000	275,000
16,000		MK-2	445,000	295,000
16,270		MK-2	445,000	295,000
18,000		MK-2	465,000	310,000
18,500		MK-2	465,000	310,000
19,000		MK-2	465,000	310,000
20,000		MK-2	490,000	325,000
21,430	27/32	MK-2	515,000	345,000
23,420	59/64	MK-3	535,000	345,000

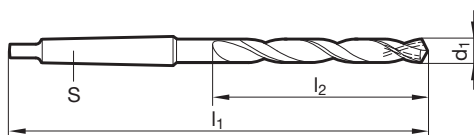

Jäähdytyskanavaporat, lastu-ura DIN 1870


P	•	Kärjen kevennys $\geq \varnothing 11,000$ • kartiovaippahionta • aksiaalinen jäähdytysnesteen tuonti Morsekartion läpi • Co-seosteinen pikateräs
M	•	• parempi kulumiskestävyys • porausholkin läpi porausta varten
K	•	
N	•	lujat ja erikoislujat teräkset • valuteräs, harmaavalurauta • ruostumatt.-/haponk.-/kuumal. teräkset • vetmurtolujuus 1300 N/mm ² asti
S	•	
H	○	

GÜHRING NAVIGATOR

Leikkuuarvosivu 794

Materiaali	HSCO
Pinta	●
Leikkusuunta	Ⓜ



Artikkelinro.

374

d1		S	l1	l2
mm	inch		mm	mm
11,000		MK-2	312,000	195,000
12,000		MK-2	322,000	205,000
12,300	31/64	MK-2	322,000	205,000
12,500		MK-2	322,000	205,000
13,000		MK-2	322,000	205,000
14,000		MK-2	337,000	220,000
15,000		MK-2	337,000	220,000
16,000		MK-2	347,000	230,000
16,500		MK-2	347,000	230,000
17,500		MK-2	362,000	245,000
18,000		MK-2	362,000	245,000
18,500		MK-3	381,000	245,000
19,840	25/32	MK-3	396,000	260,000
20,000		MK-3	396,000	260,000
21,000		MK-3	396,000	260,000
21,430	27/32	MK-3	406,000	270,000
21,500		MK-3	406,000	270,000
24,610	31/32	MK-3	426,000	290,000

d1		S	l1	l2
mm	inch		mm	mm
28,570	1 1/8	MK-4	468,000	305,000
28,750		MK-4	468,000	305,000
29,370	1 5/32	MK-4	468,000	305,000
30,960	1 7/32	MK-4	483,000	320,000
32,250		MK-4	493,000	320,000
32,540	1 9/32	MK-4	493,000	320,000
34,000		MK-4	513,000	340,000

Kanuunapora



Jäähdytyskanavaporat, lastu-ura DIN 1870

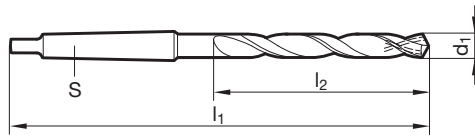


- P** • Kärjen kevennys $\geq \varnothing 11,000$ • kartiovaippahionta • säteittäinen jäähdytysnesteen tuonti Gühring nesterenkaiden kautta • Co-seosteinen
- M** • pikateräs • parempi kulumiskestävyys • porausholkin läpi porausta varten
- K** •
- N** • lujat ja erikoislujat teräkset • valuteräs, harmaaavalurauta • ruostumatt.-/haponk.-/kuumal. teräkset • vetmurtolujuus 1300 N/mm² asti
- S** •
- H** ○

GÜHRING NAVIGATOR

Leikkuuarvosivu 794

Materiaali	HSCO
Pinta	●
Leikkusuunta	Ⓜ



Artikkelinro. **375**

Kanunapora

d1		S	l1	l2
mm	inch			
11,000		MK-2	312,000	195,000
11,110	7/16	MK-2	312,000	195,000
11,510	29/64	MK-2	312,000	195,000
12,800		MK-2	322,000	205,000
13,500		MK-2	337,000	220,000
18,260	23/32	MK-3	381,000	245,000
19,000		MK-3	381,000	245,000
21,000		MK-3	396,000	260,000
21,430	27/32	MK-3	406,000	270,000
24,500		MK-3	426,000	290,000
25,000	63/64	MK-3	426,000	290,000
25,400	1	MK-3	426,000	290,000

d1		S	l1	l2
mm	inch			
26,500		MK-3	426,000	290,000
28,570	1 1/8	MK-4	468,000	305,000
30,960	1 7/32	MK-4	483,000	320,000
32,540	1 9/32	MK-4	493,000	320,000
33,340	1 5/16	MK-4	493,000	320,000
34,000		MK-4	513,000	340,000

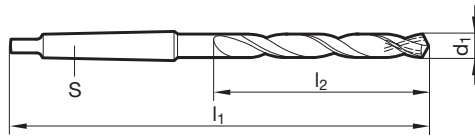

Jäähdytyskanavaporat, lastu-ura DIN 1870


P	•	Kärjen kevennys $\geq \varnothing 11,000$ • kartiovaippahionta • säteittäinen jäähdytysnesteen tuonti Morsekartioon • Co-seosteinen pikateräs
M	•	• parempi kulumiskestävyys • porausholkin läpi porausta varten
K	•	
N	•	lujat ja erikoislujat teräkset • valuteräs, harmaavalurauta • ruostumatt.-/haponk.-/kuumal. teräkset • vetmurtolujuus 1300 N/mm ² asti
S	•	
H	○	

GÜHRING NAVIGATOR

Leikkuarvosivu 794

Materiaali	HSCO
Pinta	●
Leikkusuunta	Ⓜ



Artikkelinro.

376

d1		S	l1	l2
mm	inch		mm	mm
11,000		MK-2	312,000	195,000
13,000		MK-2	322,000	205,000
14,000		MK-2	337,000	220,000
16,500		MK-2	347,000	230,000
18,000		MK-2	362,000	245,000
19,840	25/32	MK-3	396,000	260,000

d1		S	l1	l2
mm	inch		mm	mm
21,500		MK-3	406,000	270,000
27,780	1 3/32	MK-4	468,000	305,000
29,000		MK-4	468,000	305,000

Kanuunapora



MIKROPORAT

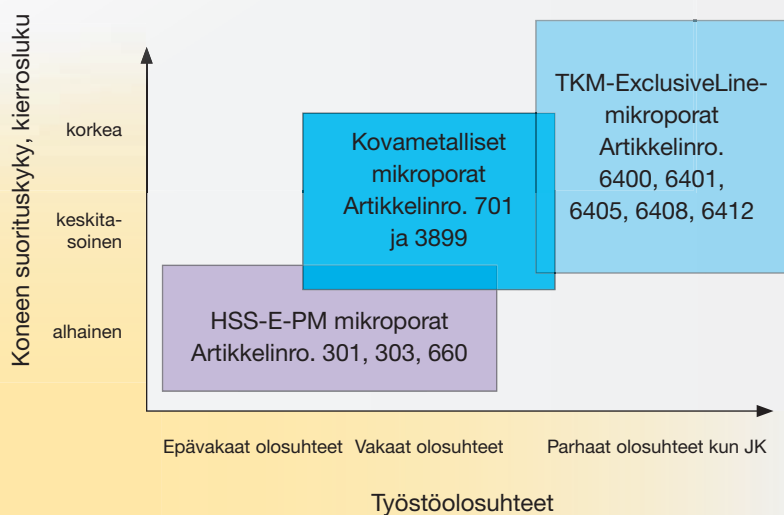


Mikroporan mallit

EDUT JA SOVELLETUKSET

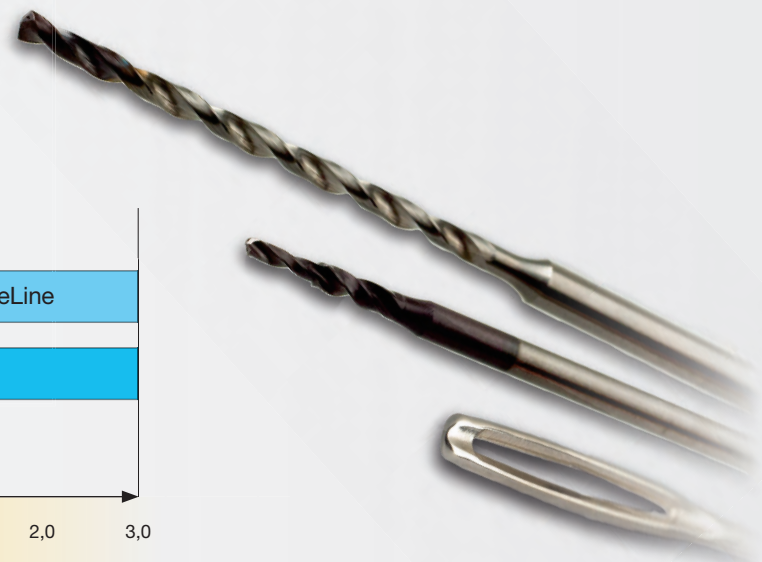
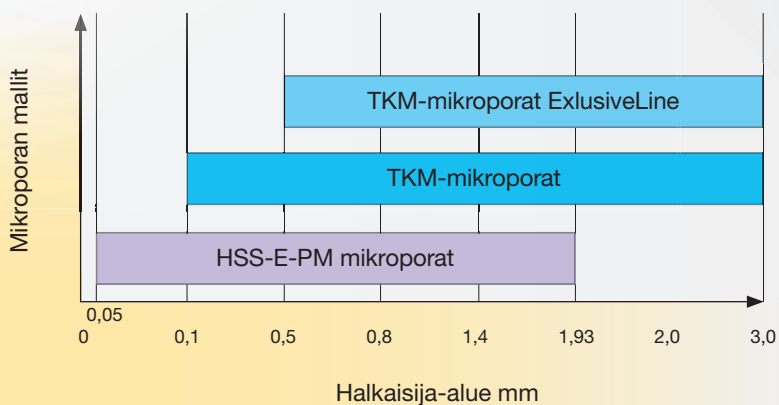
Massatuotantoon suurille sarjoille tehokkaille ja jäähdytyskanvallisille koneille kuten myös pienempään

sarjatuotantoon heikompi-tasoisille koneille Gühring tarjoaa vaikeimpiinkin koneistuuksiin parhaimmat ratkaisut.



OHJELMAN LAAJUUS

Gühring-mikroporaohjelma TKM- ja HSS-E-PM-mikroporilla kattavat halkaisija-alueen 0,05 mm - 3,0 mm:



Gühring'n mikroporaohjelmassa ovat kovametalliset ja pulverimetallurgiset pikateräsporat (HSS-E-PM) jotka sopivat optimaalisesti pienten reikien valmistukseen.

Pienten tarkkojen reikien valmistaminen vaatii maksimaalista laatua ja on yksi vaativimmista poraus operaatioista. Gühring tarjoaa vakio-ohjelmastaan tähän optimaalisimman mikroporan.



HSS-E-PM MIKROPORAT

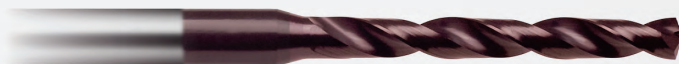
Gühring'n mikroporissa pulverimetallurginen HSS-E teräs vaikuttaa voimakkaasti kulumiskestävyyteen, lujaan sitkeyteen ja leikkuusärmien vakauteen jotka ovat erittäin tärkeitä epävakaissa työstöolosuhteissa. Pulverimetallurgisesti valmistettu HSS-E teräs on erittäin tasalaatuista mikä varmistaa pitkän kestävyuden mikroporissa.



HSS-E-PM mikroporot sopivat hyvin esim. monikarakoneisiin, koneisiin joissa on nopeus rajoituksia tai pienten sarjojen tuotantoon missä ne tarjoavat parhaan hinta-hyötysuhteen. Pidemmän kestoian ja suurempien leikkuunopeuksien vaatimuksiin Gühring tarjoaa vakionan TiN-pinnoitetut HSS-E-PM mikroporot. Myös erikoiskohteisiin kuten vasenkätisiin poriin Gühring tarjoaa vakioratkaisun.

TKM-MIKROPORAT

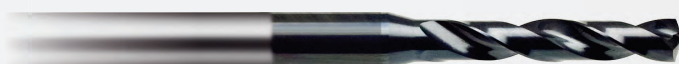
Gühring kovametalliset ilman jäähdytyskanavia olevat mikroporot kattavat halkaisija-alueen 0,1-0,3m. Kovametallisilla mikroporilla voidaan käyttää suurempia leikkuuarvoja ja saada pidempi työkalun kestoikä kun kone on vakaampi ja voimakkaampi kuin käytettäessä HSS-E-PM mikroporia.



Syy tähän on se, että hienoraekovametalli on erittäin kovaa, lämmön- ja kulumiskestävää joista seuraa kovametallisten mikroporien erinomainen kestävyys.

TKM-EXCLUSIVELINE-MIKROPORAT MYÖS JÄÄHDYTYSKANAVILLA

TKM-mikroporot jäähdytyskanavilla tai ilman mahdollistavat suurteho koneistuksen lähes kaikille materiaaleille. Mikroporista saadaan irti täysi tehokkuus suurissa sarjoissa hyvissä kone olosuhteissa, suurilla karanopeuksilla. Siksi 2-päästötroitus yhdessä pääsärmän hoonauksen kanssa mahdollistavat suuret leikkuuarvot ja parhaan lastun katkeamisen. Lastutilla erikoisella lastu-uran muodolla poistaa lastut turvallisesti reiästä. Poraussyvyyksille 4xD ja 7xD ilman jäähdytyskanavia olevat mikroporot ovat saatavana halkaisija-alueella 0,5-3,0mm.



Erityisesti porattaessa syviä reikiä 5xD, 8xD ja 15xD kovametallisilla mikroporilla niin sisäinen jäähdytys parantaa huomattavasti niiden ominaisuuksia. Työkalun optimaalisesta geometriasta johtuen Gühring 15xD TKM-mikroporaa ei tarvitse ajaa katkoilla. Työkalut on suunniteltu niin että TKM-mikroporat 4xD ilman JK ja 5xD JK:lla sopivat hyvin alkuporiksi 15xD mikroporalle JK:lla.

Mikroporat

ERIKOISRATKAISUT ASIAKKAAN PYYNNÖSTÄ

Mikroporien vakio-ohjelman lisäksi Gühring toimittaa HSS-E-PM ja TKM-mikroporia erikoisina asiakkaan vaatimusten mukaisesti. Joihin kuuluu:



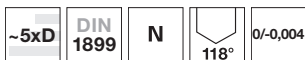
- välikoot vakio-ohjelmaan
- porras- tai upotusporat
- erikoispituus 30xD asti
- erilaiset varsi mahdollisuudet
- vaihtoehtoiset pinnoitteet



P	M	K	N	S	H	Työkalun kuvaus	Poraus- syvyys	Standardi	Malli	Leikkuu- suunta	Materiaali	Pinta	d1/mm	Artikkeli nro.	Leikkuu- arvosivu	Sivu
HSS-E-PM Mikroporat ilman jäähdytyskanavia																
•	•	•	•	•	•		~5xD	DIN 1899	N	R	HSS-E-PM	○	0,050 - 1,920	301	796	649
•	•	•	•	•	•		~5xD	DIN 1899	N	R	HSS-E-PM	Ⓢ	0,160 - 1,900	660	796	652
•	•	•	•	•	•		~5xD	DIN 1899	N	L	HSS-E-PM	○	0,130 - 1,850	303	796	654
TKM Mikroporat ilman jäähdytyskanavia																
•	•	•	•	•	•		~5xD	WN	N	R	VHM	○	0,200 - 1,400	701	796	656
•	•	•	•	•	•			WN	N	R	VHM	Ⓐ	0,100 - 3,000	3899	796	657
ExclusiveLine Mikroporat ilman jäähdytyskanavia																
•	•	•	•	•	•		4xD	WN	N	R	VHM	Ⓐ	0,500 - 3,000	6400	796	659
•	•	•	•	•	•		7xD	WN	N	R	VHM	Ⓐ	0,500 - 3,000	6401	796	660
ExclusiveLine Mikroporat jäähdytyskanavilla																
•	•	•	•	•	•		5xD	WN	N	R	VHM	Ⓐ	1,400 - 3,000	6405	796	661
•	•	•	•	•	•		8xD	WN	N	R	VHM	Ⓐ	1,400 - 3,000	6408	796	662
•	•	•	•	•	•		15xD	WN	N	R	VHM	Ⓐ	1,400 - 3,000	6412	796	663



HSS-E-PM Mikroporat ilman jäähdytyskanavia

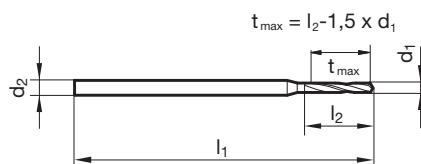


- P** • päästöhiottu kärki • vahvistetulla varrella • $\varnothing 0.15\text{ mm}$ Co-seosteinen pikateräs
- M** •
- K** •
- N** • runsasseosteiset teräkset
- S** ○
- H** □

Materiaali	HSS-E-PM
Pinta	○
Leikkusuunta	Ⓜ

GÜHRING NAVIGATOR

Leikkuarvosivu 796



Artikkelinro. 301

d1	d2	l1	l2
mm	mm	mm	mm
0,050	1,000	25,000	0,400
0,060	1,000	25,000	0,400
0,070	1,000	25,000	0,500
0,075	1,000	25,000	0,500
0,080	1,000	25,000	0,500
0,090	1,000	25,000	0,500
0,100	1,000	25,000	0,500
0,105	1,000	25,000	0,500
0,110	1,000	25,000	0,500
0,115	1,000	25,000	0,500
0,120	1,000	25,000	0,500
0,121	1,000	25,000	0,800
0,125	1,000	25,000	0,800
0,128	1,000	25,000	0,800
0,130	1,000	25,000	0,800
0,140	1,000	25,000	0,800
0,143	1,000	25,000	0,800
0,145	1,000	25,000	0,800
0,147	1,000	25,000	0,800
0,150	1,000	25,000	0,800
0,155	1,000	25,000	1,100
0,160	1,000	25,000	1,100
0,170	1,000	25,000	1,100
0,175	1,000	25,000	1,100
0,180	1,000	25,000	1,100
0,190	1,000	25,000	1,100
0,195	1,000	25,000	1,500
0,200	1,000	25,000	1,500
0,205	1,000	25,000	1,500
0,210	1,000	25,000	1,500
0,215	1,000	25,000	1,500
0,220	1,000	25,000	1,500
0,225	1,000	25,000	1,500
0,230	1,000	25,000	1,500
0,235	1,000	25,000	1,500
0,240	1,000	25,000	1,500
0,245	1,000	25,000	1,900
0,250	1,000	25,000	1,900
0,255	1,000	25,000	1,900
0,260	1,000	25,000	1,900
0,265	1,000	25,000	1,900
0,270	1,000	25,000	1,900

d1	d2	l1	l2
mm	mm	mm	mm
0,275	1,000	25,000	1,900
0,280	1,000	25,000	1,900
0,285	1,000	25,000	1,900
0,290	1,000	25,000	1,900
0,295	1,000	25,000	1,900
0,300	1,000	25,000	1,900
0,305	1,000	25,000	2,400
0,310	1,000	25,000	2,400
0,315	1,000	25,000	2,400
0,320	1,000	25,000	2,400
0,325	1,000	25,000	2,400
0,330	1,000	25,000	2,400
0,335	1,000	25,000	2,400
0,340	1,000	25,000	2,400
0,345	1,000	25,000	2,400
0,350	1,000	25,000	2,400
0,355	1,000	25,000	2,400
0,360	1,000	25,000	2,400
0,365	1,000	25,000	2,400
0,370	1,000	25,000	2,400
0,375	1,000	25,000	2,400
0,380	1,000	25,000	2,400
0,385	1,000	25,000	3,000
0,390	1,000	25,000	3,000
0,400	1,000	25,000	3,000
0,405	1,000	25,000	3,000
0,410	1,000	25,000	3,000
0,415	1,000	25,000	3,000
0,420	1,000	25,000	3,000
0,425	1,000	25,000	3,000
0,430	1,000	25,000	3,000
0,432	1,000	25,000	3,000
0,435	1,000	25,000	3,000
0,440	1,000	25,000	3,000
0,445	1,000	25,000	3,000
0,450	1,000	25,000	3,000
0,455	1,000	25,000	3,000
0,460	1,000	25,000	3,000
0,470	1,000	25,000	3,000
0,475	1,000	25,000	3,000
0,480	1,000	25,000	3,000
0,485	1,000	25,000	3,400

Mikroporat



d1	d2	l1	l2
mm	mm	mm	mm
0,490	1,000	25,000	3,400
0,495	1,000	25,000	3,400
0,500	1,000	25,000	3,400
0,505	1,000	25,000	3,400
0,510	1,000	25,000	3,400
0,515	1,000	25,000	3,400
0,520	1,000	25,000	3,400
0,525	1,000	25,000	3,400
0,530	1,000	25,000	3,400
0,535	1,000	25,000	3,900
0,540	1,000	25,000	3,900
0,545	1,000	25,000	3,900
0,550	1,000	25,000	3,900
0,560	1,000	25,000	3,900
0,570	1,000	25,000	3,900
0,580	1,000	25,000	3,900
0,585	1,000	25,000	3,900
0,590	1,000	25,000	3,900
0,595	1,000	25,000	3,900
0,600	1,000	25,000	3,900
0,605	1,000	25,000	4,200
0,610	1,000	25,000	4,200
0,615	1,000	25,000	4,200
0,620	1,000	25,000	4,200
0,625	1,000	25,000	4,200
0,630	1,000	25,000	4,200
0,632	1,000	25,000	4,200
0,640	1,000	25,000	4,200
0,650	1,000	25,000	4,200
0,655	1,000	25,000	4,200
0,660	1,000	25,000	4,200
0,665	1,000	25,000	4,200
0,670	1,000	25,000	4,200
0,675	1,000	25,000	4,800
0,680	1,000	25,000	4,800
0,690	1,000	25,000	4,800
0,695	1,000	25,000	4,800
0,700	1,000	25,000	4,800
0,705	1,000	25,000	4,800
0,710	1,000	25,000	4,800
0,720	1,000	25,000	4,800
0,725	1,000	25,000	4,800
0,730	1,000	25,000	4,800
0,740	1,000	25,000	4,800
0,750	1,000	25,000	4,800
0,760	1,000	25,000	5,300
0,770	1,000	25,000	5,300
0,780	1,000	25,000	5,300
0,790	1,000	25,000	5,300
0,795	1,500	25,000	5,300
0,800	1,500	25,000	5,300
0,810	1,500	25,000	5,300
0,820	1,500	25,000	5,300
0,825	1,500	25,000	5,300
0,830	1,500	25,000	5,300
0,840	1,500	25,000	5,300
0,845	1,500	25,000	5,300
0,850	1,500	25,000	5,300
0,860	1,500	25,000	6,000
0,870	1,500	25,000	6,000
0,880	1,500	25,000	6,000
0,890	1,500	25,000	6,000
0,900	1,500	25,000	6,000
0,910	1,500	25,000	6,000
0,920	1,500	25,000	6,000
0,925	1,500	25,000	6,000
0,930	1,500	25,000	6,000
0,940	1,500	25,000	6,000
0,950	1,500	25,000	6,000
0,960	1,500	25,000	6,800
0,970	1,500	25,000	6,800
0,980	1,500	25,000	6,800

d1	d2	l1	l2
mm	mm	mm	mm
0,990	1,500	25,000	6,800
1,000	1,500	25,000	6,800
1,010	1,500	25,000	6,800
1,020	1,500	25,000	6,800
1,030	1,500	25,000	6,800
1,040	1,500	25,000	6,800
1,050	1,500	25,000	6,800
1,055	1,500	25,000	6,800
1,060	1,500	25,000	6,800
1,070	1,500	25,000	7,600
1,080	1,500	25,000	7,600
1,090	1,500	25,000	7,600
1,100	1,500	25,000	7,600
1,110	1,500	25,000	7,600
1,120	1,500	25,000	7,600
1,130	1,500	25,000	7,600
1,140	1,500	25,000	7,600
1,150	1,500	25,000	7,600
1,160	1,500	25,000	7,600
1,170	1,500	25,000	7,600
1,180	1,500	25,000	7,600
1,190	1,500	25,000	8,500
1,200	1,500	25,000	8,500
1,210	1,500	25,000	8,500
1,220	1,500	25,000	8,500
1,230	1,500	25,000	8,500
1,240	1,500	25,000	8,500
1,250	1,500	25,000	8,500
1,260	1,500	25,000	8,500
1,265	1,500	25,000	8,500
1,270	1,500	25,000	8,500
1,280	1,500	25,000	8,500
1,290	1,500	25,000	8,500
1,300	1,500	25,000	8,500
1,310	1,500	25,000	8,500
1,320	1,500	25,000	8,500
1,325	1,500	25,000	9,500
1,330	1,500	25,000	9,500
1,340	1,500	25,000	9,500
1,350	1,500	25,000	9,500
1,370	1,500	25,000	9,500
1,380	1,500	25,000	9,500
1,390	1,500	25,000	9,500
1,400	1,500	25,000	9,500
1,410	1,500	25,000	9,500
1,420	1,500	25,000	9,500
1,430	1,500	25,000	9,500
1,440	1,500	25,000	9,500
1,450	1,500	25,000	9,500
1,460	2,000	30,000	9,500
1,470	2,000	30,000	9,500
1,500	2,000	30,000	9,500
1,520	2,000	30,000	10,600
1,530	2,000	30,000	10,600
1,540	2,000	30,000	10,600
1,550	2,000	30,000	10,600
1,590	2,000	30,000	10,600
1,600	2,000	30,000	10,600
1,610	2,000	30,000	10,600
1,630	2,000	30,000	10,600
1,640	2,000	30,000	10,600
1,650	2,000	30,000	10,600
1,660	2,000	30,000	10,600
1,690	2,000	30,000	10,600
1,700	2,000	30,000	10,600
1,710	2,000	30,000	11,800
1,715	2,000	30,000	11,800
1,730	2,000	30,000	11,800
1,745	2,000	30,000	11,800
1,750	2,000	30,000	11,800
1,775	2,000	30,000	11,800
1,800	2,000	30,000	11,800



d1	d2	l1	l2
mm	mm	mm	mm
1,830	2,000	30,000	11,800
1,840	2,000	30,000	11,800
1,850	2,000	30,000	11,800
1,860	2,000	30,000	11,800
1,900	2,000	30,000	11,800
1,920	2,000	30,000	13,200

d1	d2	l1	l2
mm	mm	mm	mm

HSS-E-PM Mikroporat ilman jäähdytyskanavia



- P** • päästöhiottu kärki • vahvistetulla varrella • parempi kulumiskestävyys
- M** •
- K** •
- N** • runsasseosteiset teräkset
- S** ○
- H** □

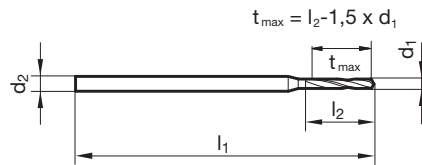
Materiaali **HSS-E-PM**

Pinta **S**

Leikkusuunta **R**

GÜHRING NAVIGATOR

Leikkuarvosivu 796



Artikkelinro. **660**

Mikroporat

d1	d2	l1	l2	d1	d2	l1	l2
mm	mm	mm	mm	mm	mm	mm	mm
0,160	1,000	25,000	1,100	0,530	1,000	25,000	3,400
0,170	1,000	25,000	1,100	0,540	1,000	25,000	3,900
0,180	1,000	25,000	1,100	0,550	1,000	25,000	3,900
0,190	1,000	25,000	1,100	0,560	1,000	25,000	3,900
0,200	1,000	25,000	1,500	0,570	1,000	25,000	3,900
0,210	1,000	25,000	1,500	0,580	1,000	25,000	3,900
0,220	1,000	25,000	1,500	0,590	1,000	25,000	3,900
0,230	1,000	25,000	1,500	0,600	1,000	25,000	3,900
0,240	1,000	25,000	1,500	0,610	1,000	25,000	4,200
0,250	1,000	25,000	1,900	0,620	1,000	25,000	4,200
0,255	1,000	25,000	1,900	0,630	1,000	25,000	4,200
0,260	1,000	25,000	1,900	0,640	1,000	25,000	4,200
0,265	1,000	25,000	1,900	0,650	1,000	25,000	4,200
0,270	1,000	25,000	1,900	0,660	1,000	25,000	4,200
0,280	1,000	25,000	1,900	0,670	1,000	25,000	4,200
0,290	1,000	25,000	1,900	0,680	1,000	25,000	4,800
0,295	1,000	25,000	1,900	0,690	1,000	25,000	4,800
0,300	1,000	25,000	1,900	0,700	1,000	25,000	4,800
0,305	1,000	25,000	2,400	0,710	1,000	25,000	4,800
0,310	1,000	25,000	2,400	0,720	1,000	25,000	4,800
0,320	1,000	25,000	2,400	0,730	1,000	25,000	4,800
0,325	1,000	25,000	2,400	0,740	1,000	25,000	4,800
0,330	1,000	25,000	2,400	0,750	1,000	25,000	4,800
0,340	1,000	25,000	2,400	0,760	1,000	25,000	5,300
0,350	1,000	25,000	2,400	0,770	1,000	25,000	5,300
0,360	1,000	25,000	2,400	0,780	1,000	25,000	5,300
0,370	1,000	25,000	2,400	0,790	1,000	25,000	5,300
0,380	1,000	25,000	2,400	0,800	1,500	25,000	5,300
0,390	1,000	25,000	3,000	0,810	1,500	25,000	5,300
0,400	1,000	25,000	3,000	0,820	1,500	25,000	5,300
0,410	1,000	25,000	3,000	0,830	1,500	25,000	5,300
0,420	1,000	25,000	3,000	0,840	1,500	25,000	5,300
0,430	1,000	25,000	3,000	0,850	1,500	25,000	5,300
0,440	1,000	25,000	3,000	0,860	1,500	25,000	6,000
0,450	1,000	25,000	3,000	0,870	1,500	25,000	6,000
0,460	1,000	25,000	3,000	0,880	1,500	25,000	6,000
0,470	1,000	25,000	3,000	0,900	1,500	25,000	6,000
0,480	1,000	25,000	3,000	0,910	1,500	25,000	6,000
0,490	1,000	25,000	3,400	0,920	1,500	25,000	6,000
0,500	1,000	25,000	3,400	0,940	1,500	25,000	6,000
0,510	1,000	25,000	3,400	0,950	1,500	25,000	6,000
0,520	1,000	25,000	3,400	0,960	1,500	25,000	6,800



d1	d2	l1	l2
mm	mm	mm	mm
0,970	1,500	25,000	6,800
0,980	1,500	25,000	6,800
1,000	1,500	25,000	6,800
1,020	1,500	25,000	6,800
1,040	1,500	25,000	6,800
1,050	1,500	25,000	6,800
1,070	1,500	25,000	7,600
1,080	1,500	25,000	7,600
1,100	1,500	25,000	7,600
1,150	1,500	25,000	7,600
1,180	1,500	25,000	7,600
1,190	1,500	25,000	8,500

d1	d2	l1	l2
mm	mm	mm	mm
1,200	1,500	25,000	8,500
1,220	1,500	25,000	8,500
1,250	1,500	25,000	8,500
1,300	1,500	25,000	8,500
1,350	1,500	25,000	9,500
1,390	1,500	25,000	9,500
1,400	1,500	25,000	9,500
1,420	1,500	25,000	9,500
1,450	1,500	25,000	9,500
1,500	2,000	30,000	9,500
1,800	2,000	30,000	11,800
1,900	2,000	30,000	11,800


HSS-E-PM Mikroporat ilman jäähdytyskanavia



P	•	päästöhiottu kärki • vahvistetulla varrella • $\varnothing 0.15\text{ mm}$ Co-seosteinen pikateräs
M	•	
K	•	
N	•	runsasseosteiset teräkset
S	○	
H		

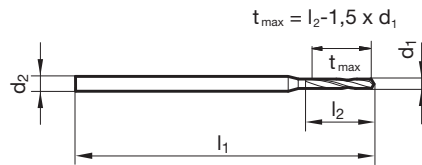
Materiaali **HSS-E-PM**

Pinta ○

Leikkusuunta 

GÜHRING NAVIGATOR

Leikkuarvosivu 796



Artikkelinro.

303

Mikroporat

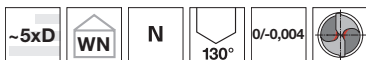
d1	d2	l1	l2	d1	d2	l1	l2
mm	mm	mm	mm	mm	mm	mm	mm
0,130	1,000	25,000	0,800	0,410	1,000	25,000	3,000
0,140	1,000	25,000	0,800	0,415	1,000	25,000	3,000
0,150	1,000	25,000	0,800	0,420	1,000	25,000	3,000
0,155	1,000	25,000	1,100	0,430	1,000	25,000	3,000
0,160	1,000	25,000	1,100	0,435	1,000	25,000	3,000
0,170	1,000	25,000	1,100	0,440	1,000	25,000	3,000
0,175	1,000	25,000	1,100	0,450	1,000	25,000	3,000
0,180	1,000	25,000	1,100	0,460	1,000	25,000	3,000
0,185	1,000	25,000	1,100	0,465	1,000	25,000	3,000
0,190	1,000	25,000	1,100	0,470	1,000	25,000	3,000
0,195	1,000	25,000	1,500	0,480	1,000	25,000	3,000
0,200	1,000	25,000	1,500	0,485	1,000	25,000	3,400
0,210	1,000	25,000	1,500	0,490	1,000	25,000	3,400
0,215	1,000	25,000	1,500	0,495	1,000	25,000	3,400
0,220	1,000	25,000	1,500	0,500	1,000	25,000	3,400
0,225	1,000	25,000	1,500	0,510	1,000	25,000	3,400
0,230	1,000	25,000	1,500	0,520	1,000	25,000	3,400
0,235	1,000	25,000	1,500	0,525	1,000	25,000	3,400
0,240	1,000	25,000	1,500	0,540	1,000	25,000	3,900
0,245	1,000	25,000	1,900	0,545	1,000	25,000	3,900
0,250	1,000	25,000	1,900	0,550	1,000	25,000	3,900
0,255	1,000	25,000	1,900	0,555	1,000	25,000	3,900
0,260	1,000	25,000	1,900	0,565	1,000	25,000	3,900
0,265	1,000	25,000	1,900	0,570	1,000	25,000	3,900
0,270	1,000	25,000	1,900	0,580	1,000	25,000	3,900
0,275	1,000	25,000	1,900	0,590	1,000	25,000	3,900
0,280	1,000	25,000	1,900	0,600	1,000	25,000	3,900
0,290	1,000	25,000	1,900	0,615	1,000	25,000	4,200
0,295	1,000	25,000	1,900	0,620	1,000	25,000	4,200
0,300	1,000	25,000	1,900	0,630	1,000	25,000	4,200
0,310	1,000	25,000	2,400	0,640	1,000	25,000	4,200
0,315	1,000	25,000	2,400	0,650	1,000	25,000	4,200
0,330	1,000	25,000	2,400	0,660	1,000	25,000	4,200
0,340	1,000	25,000	2,400	0,670	1,000	25,000	4,200
0,345	1,000	25,000	2,400	0,675	1,000	25,000	4,800
0,350	1,000	25,000	2,400	0,680	1,000	25,000	4,800
0,355	1,000	25,000	2,400	0,685	1,000	25,000	4,800
0,360	1,000	25,000	2,400	0,690	1,000	25,000	4,800
0,370	1,000	25,000	2,400	0,695	1,000	25,000	4,800
0,380	1,000	25,000	2,400	0,700	1,000	25,000	4,800
0,390	1,000	25,000	3,000	0,710	1,000	25,000	4,800
0,400	1,000	25,000	3,000	0,720	1,000	25,000	4,800



d1	d2	l1	l2
mm	mm	mm	mm
0,740	1,000	25,000	4,800
0,750	1,000	25,000	4,800
0,760	1,000	25,000	5,300
0,770	1,000	25,000	5,300
0,780	1,000	25,000	5,300
0,790	1,000	25,000	5,300
0,800	1,500	25,000	5,300
0,805	1,500	25,000	5,300
0,810	1,500	25,000	5,300
0,820	1,500	25,000	5,300
0,830	1,500	25,000	5,300
0,840	1,500	25,000	5,300
0,850	1,500	25,000	5,300
0,855	1,500	25,000	6,000
0,860	1,500	25,000	6,000
0,870	1,500	25,000	6,000
0,880	1,500	25,000	6,000
0,885	1,500	25,000	6,000
0,890	1,500	25,000	6,000
0,900	1,500	25,000	6,000
0,910	1,500	25,000	6,000
0,915	1,500	25,000	6,000
0,920	1,500	25,000	6,000
0,925	1,500	25,000	6,000
0,935	1,500	25,000	6,000
0,940	1,500	25,000	6,000
0,950	1,500	25,000	6,000
0,960	1,500	25,000	6,800
0,970	1,500	25,000	6,800
0,975	1,500	25,000	6,800
0,980	1,500	25,000	6,800
0,985	1,500	25,000	6,800
0,990	1,500	25,000	6,800
1,000	1,500	25,000	6,800
1,005	1,500	25,000	6,800
1,020	1,500	25,000	6,800

d1	d2	l1	l2
mm	mm	mm	mm
1,030	1,500	25,000	6,800
1,040	1,500	25,000	6,800
1,050	1,500	25,000	6,800
1,060	1,500	25,000	6,800
1,080	1,500	25,000	7,600
1,085	1,500	25,000	7,600
1,090	1,500	25,000	7,600
1,100	1,500	25,000	7,600
1,110	1,500	25,000	7,600
1,120	1,500	25,000	7,600
1,125	1,500	25,000	7,600
1,150	1,500	25,000	7,600
1,160	1,500	25,000	7,600
1,170	1,500	25,000	7,600
1,180	1,500	25,000	7,600
1,200	1,500	25,000	8,500
1,250	1,500	25,000	8,500
1,270	1,500	25,000	8,500
1,280	1,500	25,000	8,500
1,285	1,500	25,000	8,500
1,290	1,500	25,000	8,500
1,310	1,500	25,000	8,500
1,330	1,500	25,000	9,500
1,350	1,500	25,000	9,500
1,360	1,500	25,000	9,500
1,375	1,500	25,000	9,500
1,400	1,500	25,000	9,500
1,405	1,500	25,000	9,500
1,425	1,500	25,000	9,500
1,450	1,500	25,000	9,500
1,460	2,000	30,000	9,500
1,500	2,000	30,000	9,500
1,600	2,000	30,000	10,600
1,615	2,000	30,000	10,600
1,800	2,000	30,000	11,800
1,850	2,000	30,000	11,800

Mikroporat

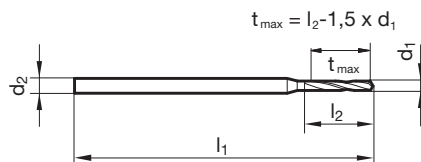
TKM Mikroporat ilman jäähdytyskanavia


- | | |
|------------|--|
| P ● | Kärjen kevennys $\geq \varnothing 0,800$ • päästöhiottu kärki • pääleikkusärmän suorasta |
| M ○ | |
| K ● | |
| N ○ | rakenne- ja pintakarkaistut teräkset • valut • pronssi, messinki • alumiini ja Al-seokset • Magnesium ja Mg-seokset • muovit ja kuituvahvisteiset muovit |
| S ○ | |
| H ○ | |

GÜHRING NAVIGATOR

Leikkuuarvosivu 796

Materiaali	TKM
Pinta	○
Leikkusuunta	Ⓜ


 Artikkelinro. **701**

d1	d2	l1	l2
mm	mm	mm	mm
0,200	1,000	25,000	1,500
0,220	1,000	25,000	1,500
0,250	1,000	25,000	1,900
0,260	1,000	25,000	1,900
0,280	1,000	25,000	1,900
0,300	1,000	25,000	1,900
0,330	1,000	25,000	2,400
0,350	1,000	25,000	2,400
0,400	1,000	25,000	3,000
0,450	1,000	25,000	3,000
0,500	1,000	25,000	3,400
0,600	1,000	25,000	3,900
0,650	1,000	25,000	4,200
0,700	1,000	25,000	4,800
0,750	1,000	25,000	4,800
0,800	1,500	25,000	5,300
0,810	1,500	25,000	5,300
0,830	1,500	25,000	5,300

d1	d2	l1	l2
mm	mm	mm	mm
0,850	1,500	25,000	5,300
0,900	1,500	25,000	6,000
1,000	1,500	25,000	6,800
1,050	1,500	25,000	6,800
1,100	1,500	25,000	7,600
1,150	1,500	25,000	7,600
1,200	1,500	25,000	8,500
1,250	1,500	25,000	8,500
1,300	1,500	25,000	8,500
1,350	1,500	25,000	9,500
1,400	1,500	25,000	9,500

Mikroporat



TKM Mikroporat ilman jäähdytyskanavia



P • Kärjen kevennys ≥ Ø 0,800 • päästöhiottu kärki



N rakenne- ja pintakarkaistut teräkset • automaattiteräkset, nuorrutetut teräkset • seostetut teräkset < 1200 N/mm² asti • valut

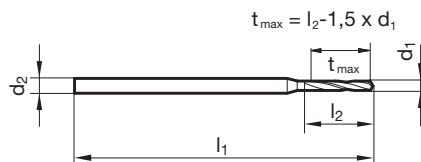
Materiaali **TKM**

Pinta **A**

Leikkusuunta **R**

GÜHRING NAVIGATOR

Leikkuarvosivu 796



Artikkelinro. **3899**

d1	d2 h6	l1	l2
mm	mm	mm	mm
0,100	3,000	38,000	1,200
0,150	3,000	38,000	2,000
0,200	3,000	38,000	2,500
0,250	3,000	38,000	3,000
0,260	3,000	38,000	3,000
0,270	3,000	38,000	3,000
0,280	3,000	38,000	3,000
0,300	3,000	38,000	5,000
0,310	3,000	38,000	5,000
0,330	3,000	38,000	5,000
0,350	3,000	38,000	6,000
0,360	3,000	38,000	6,000
0,370	3,000	38,000	6,000
0,380	3,000	38,000	6,000
0,400	3,000	38,000	7,000
0,410	3,000	38,000	7,000
0,430	3,000	38,000	7,000
0,440	3,000	38,000	7,000
0,450	3,000	38,000	7,000
0,480	3,000	38,000	7,000
0,500	3,000	38,000	7,000
0,510	3,000	38,000	7,000
0,530	3,000	38,000	7,000
0,550	3,000	38,000	7,000
0,570	3,000	38,000	7,000
0,600	3,000	38,000	7,000
0,640	3,000	38,000	7,000
0,650	3,000	38,000	7,000
0,660	3,000	38,000	7,000
0,680	3,000	38,000	7,000
0,700	3,000	38,000	8,000
0,710	3,000	38,000	8,000
0,720	3,000	38,000	8,000
0,740	3,000	38,000	8,000
0,750	3,000	38,000	8,000
0,760	3,000	38,000	8,000
0,770	3,000	38,000	8,000
0,780	3,000	38,000	8,000
0,790	3,000	38,000	8,000
0,800	3,000	38,000	10,000
0,810	3,000	38,000	10,000
0,820	3,000	38,000	10,000

d1	d2 h6	l1	l2
mm	mm	mm	mm
0,830	3,000	38,000	10,000
0,840	3,000	38,000	10,000
0,850	3,000	38,000	10,000
0,860	3,000	38,000	10,000
0,870	3,000	38,000	10,000
0,880	3,000	38,000	10,000
0,890	3,000	38,000	10,000
0,900	3,000	38,000	10,000
0,910	3,000	38,000	10,000
0,920	3,000	38,000	10,000
0,930	3,000	38,000	10,000
0,940	3,000	38,000	10,000
0,950	3,000	38,000	10,000
0,960	3,000	38,000	10,000
0,970	3,000	38,000	10,000
0,980	3,000	38,000	10,000
0,990	3,000	38,000	10,000
1,000	3,000	38,000	10,000
1,010	3,000	38,000	10,000
1,020	3,000	38,000	10,000
1,050	3,000	38,000	10,000
1,060	3,000	38,000	10,000
1,070	3,000	38,000	10,000
1,090	3,000	38,000	10,000
1,100	3,000	38,000	10,000
1,110	3,000	38,000	10,000
1,150	3,000	38,000	10,000
1,170	3,000	38,000	10,000
1,190	3,000	38,000	10,000
1,200	3,000	38,000	10,000
1,210	3,000	38,000	10,000
1,220	3,000	38,000	10,000
1,230	3,000	38,000	10,000
1,240	3,000	38,000	10,000
1,260	3,000	38,000	10,000
1,270	3,000	38,000	10,000
1,280	3,000	38,000	10,000
1,300	3,000	38,000	10,000
1,370	3,000	38,000	10,000
1,400	3,000	38,000	10,000
1,420	3,000	38,000	10,000
1,450	3,000	38,000	10,000

Mikroporat



d1	d2 h6	l1	l2
mm	mm	mm	mm
1,490	3,000	38,000	10,000
1,500	3,000	38,000	10,000
1,510	3,000	38,000	10,000
1,520	3,000	38,000	10,000
1,550	3,000	38,000	10,000
1,560	3,000	38,000	10,000
1,580	3,000	38,000	10,000
1,590	3,000	38,000	10,000
1,600	3,000	38,000	12,000
1,630	3,000	38,000	12,000
1,650	3,000	38,000	12,000
1,700	3,000	38,000	12,000
1,750	3,000	38,000	12,000
1,800	3,000	38,000	12,000
1,810	3,000	38,000	12,000
1,820	3,000	38,000	12,000
1,830	3,000	38,000	12,000
1,840	3,000	38,000	12,000
1,850	3,000	38,000	12,000
1,860	3,000	38,000	12,000
1,900	3,000	38,000	12,000
1,920	3,000	38,000	12,000
1,950	3,000	38,000	12,000
1,980	3,000	38,000	12,000

d1	d2 h6	l1	l2
mm	mm	mm	mm
2,000	3,000	38,000	12,000
2,050	3,000	38,000	12,000
2,100	3,000	38,000	12,000
2,150	3,000	38,000	12,000
2,200	3,000	38,000	12,000
2,400	3,000	38,000	12,000
2,500	3,000	38,000	12,000
2,550	3,000	38,000	12,000
2,600	3,000	38,000	12,000
2,750	3,000	38,000	12,000
2,800	3,000	38,000	12,000
2,950	3,000	38,000	12,000
3,000	3,000	38,000	12,000


ExclusiveLine Mikroporat ilman jäähdytyskanavia
Materiaali **TKM**Pinta **A**Leikkusuunta **R**

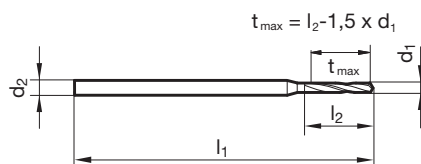
P • Kärjen kevennys $\geq \varnothing 0,500$ • päästöhiottu kärki • pääleikkusuärmän suorasta • särmän valmistelu

M •**K** •

N ○ rakenne- ja pintakarkaistut teräkset • automaattiteräkset, nuorrutetut teräkset • seostetut teräkset $< 1200 \text{ N/mm}^2$ asti • ruostumattomat teräkset • valut

S ○**H**
GÜHRING NAVIGATOR

Leikkuarvosivu 796



Artikkelinro.

6400

d1	d2 h6	l1	l2
mm	mm	mm	mm
0,500	3,000	47,000	3,000
0,550	3,000	47,000	3,300
0,600	3,000	47,000	3,600
0,650	3,000	47,000	3,900
0,700	3,000	47,000	4,200
0,750	3,000	47,000	4,500
0,800	3,000	47,000	4,800
0,850	3,000	47,000	5,100
0,900	3,000	47,000	5,400
0,950	3,000	47,000	5,700
1,000	3,000	47,000	6,000
1,050	3,000	47,000	6,300
1,100	3,000	47,000	6,600
1,150	3,000	47,000	6,900
1,200	3,000	47,000	7,200
1,250	3,000	47,000	7,500
1,300	3,000	47,000	7,800
1,350	3,000	47,000	8,100
1,400	3,000	47,000	8,400
1,450	3,000	47,000	8,700
1,500	3,000	47,000	9,000
1,550	3,000	47,000	9,300
1,590	3,000	47,000	9,600
1,600	3,000	47,000	9,600
1,650	3,000	47,000	9,900
1,700	3,000	47,000	10,200
1,750	3,000	47,000	10,500
1,800	3,000	52,000	10,800
1,850	3,000	52,000	11,100
1,900	3,000	52,000	11,400

d1	d2 h6	l1	l2
mm	mm	mm	mm
1,950	3,000	52,000	11,700
1,980	4,000	59,000	12,000
2,000	4,000	59,000	12,000
2,050	4,000	59,000	12,300
2,100	4,000	59,000	12,600
2,150	4,000	59,000	12,900
2,200	4,000	59,000	13,200
2,250	4,000	59,000	13,500
2,300	4,000	59,000	13,800
2,350	4,000	59,000	14,100
2,380	4,000	59,000	14,400
2,400	4,000	59,000	14,400
2,450	4,000	59,000	14,700
2,500	4,000	59,000	15,000
2,550	4,000	59,000	15,300
2,600	4,000	59,000	15,600
2,650	4,000	59,000	15,900
2,700	4,000	59,000	16,200
2,750	4,000	59,000	16,500
2,780	4,000	59,000	16,800
2,800	4,000	59,000	16,800
2,850	4,000	59,000	17,100
2,900	4,000	59,000	17,400
2,950	4,000	59,000	17,700
3,000	4,000	59,000	18,000

Mikroporat

ExclusiveLine Mikroporat ilman jäähdytyskanavia

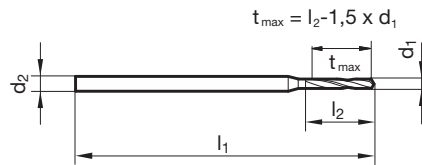

P	•	Kärjen kevennys $\geq \varnothing 0,500$ • päästöhiottu kärki • pääleikkusärmän suorasta • särmän valmistelu
M	•	
K	•	
N	○	rakenne- ja pintakarkaistut teräkset • automaattiteräkset, nuorrutetut teräkset • seostetut teräkset $< 1200 \text{ N/mm}^2$ asti • ruostumattomat teräkset • valut
S	○	
H		

 Materiaali **TKM**

 Pinta **A**

 Leikkusuunta **R**
GÜHRING NAVIGATOR

Leikkuarvosivu 796


 Artikkelinro. **6401**

d1	d2 h6	l1	l2	d1	d2 h6	l1	l2
mm	mm	mm	mm	mm	mm	mm	mm
0,500	3,000	47,000	4,000	1,950	3,000	52,000	17,600
0,550	3,000	47,000	4,400	1,980	4,000	63,000	18,000
0,600	3,000	47,000	4,800	2,000	4,000	63,000	18,000
0,650	3,000	47,000	5,200	2,050	4,000	63,000	18,500
0,700	3,000	47,000	5,600	2,100	4,000	63,000	18,900
0,750	3,000	47,000	6,000	2,150	4,000	63,000	19,400
0,800	3,000	47,000	6,400	2,200	4,000	63,000	19,800
0,850	3,000	47,000	6,800	2,250	4,000	63,000	20,300
0,900	3,000	47,000	7,200	2,300	4,000	63,000	20,700
0,950	3,000	47,000	7,600	2,350	4,000	63,000	21,200
1,000	3,000	47,000	8,000	2,380	4,000	63,000	21,600
1,050	3,000	47,000	8,400	2,400	4,000	63,000	21,600
1,100	3,000	47,000	8,800	2,450	4,000	63,000	22,100
1,150	3,000	47,000	9,200	2,500	4,000	63,000	22,500
1,200	3,000	52,000	10,800	2,550	4,000	63,000	23,000
1,250	3,000	52,000	11,300	2,600	4,000	67,000	23,400
1,300	3,000	52,000	11,700	2,650	4,000	67,000	23,900
1,350	3,000	52,000	12,200	2,700	4,000	67,000	24,300
1,400	3,000	52,000	12,600	2,750	4,000	67,000	24,800
1,450	3,000	52,000	13,100	2,780	4,000	67,000	25,200
1,500	3,000	52,000	13,500	2,800	4,000	67,000	25,200
1,550	3,000	52,000	14,000	2,850	4,000	67,000	25,700
1,590	3,000	52,000	14,400	2,900	4,000	67,000	26,100
1,600	3,000	52,000	14,400	2,950	4,000	67,000	26,600
1,650	3,000	52,000	14,900	3,000	4,000	67,000	27,000
1,700	3,000	52,000	15,300				
1,750	3,000	52,000	15,800				
1,800	3,000	52,000	16,200				
1,850	3,000	52,000	16,700				
1,900	3,000	52,000	17,100				

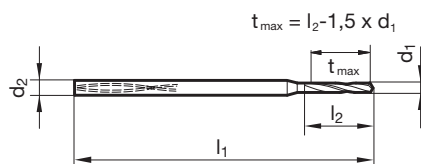
Mikroporat


ExclusiveLine Mikroporat jäähdytyskanavilla


P	•	Kärjen kevennys $\geq \varnothing 1,400$ • päästöhiottu kärki • pääleikkusärmän suorasta • särmän valmistelu
M	•	
K	•	
N	○	rakenne- ja pintakarkaistut teräkset • automaattiteräkset, nuorrutetut teräkset • seostetut teräkset $< 1200 \text{ N/mm}^2$ asti • ruostumattomat teräkset • valut
S	○	
H		

Materiaali **TKM**Pinta **A**Leikkusuunta **R**
GÜHRING NAVIGATOR

Leikkuarvosivu 796



Artikkelinro.

6405

d1	d2 h6	l1	l2
mm	mm	mm	mm
1,400	4,000	52,000	11,000
1,450	4,000	52,000	12,000
1,500	4,000	52,000	12,000
1,550	4,000	52,000	12,000
1,590	4,000	52,000	13,000
1,600	4,000	52,000	13,000
1,650	4,000	52,000	13,000
1,700	4,000	56,000	14,000
1,750	4,000	56,000	14,000
1,800	4,000	56,000	14,000
1,850	4,000	56,000	15,000
1,900	4,000	56,000	15,000
1,950	4,000	56,000	16,000
1,980	4,000	56,000	16,000
2,000	4,000	56,000	16,000
2,050	4,000	56,000	16,000
2,100	4,000	62,000	17,000
2,150	4,000	62,000	17,000
2,200	4,000	62,000	18,000
2,250	4,000	62,000	18,000
2,300	4,000	62,000	18,000
2,350	4,000	62,000	19,000
2,380	4,000	62,000	19,000
2,400	4,000	62,000	19,000

d1	d2 h6	l1	l2
mm	mm	mm	mm
2,450	4,000	62,000	20,000
2,500	4,000	62,000	20,000
2,550	4,000	62,000	20,000
2,600	4,000	66,000	21,000
2,650	4,000	66,000	21,000
2,700	4,000	66,000	22,000
2,750	4,000	66,000	22,000
2,780	4,000	66,000	22,000
2,800	4,000	66,000	22,000
2,850	4,000	66,000	23,000
2,900	4,000	66,000	23,000
2,950	4,000	66,000	24,000
3,000	4,000	66,000	24,000

ExclusiveLine Mikroporat jäähdytyskanavilla

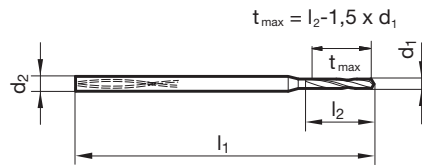

- P** • Kärjen kevennys $\geq \varnothing 1,400$ • päästöhiottu kärki • pääleikkusärmän suorasta • särmän valmistelu
- M** •
- K** •
- N** ○ rakenne- ja pintakarkaistut teräkset • automaattiteräkset, nuorrutetut teräkset • seostetut teräkset $< 1200 \text{ N/mm}^2$ asti • ruostumattomat teräkset • valut
- S** ○
- H**

 Materiaali **TKM**

 Pinta **A**

 Leikkusuunta **R**
GÜHRING NAVIGATOR

Leikkuuarvosivu 796


 Artikkelinro. **6408**

d1	d2 h6	l1	l2
mm	mm	mm	mm
1,400	4,000	52,000	15,000
1,450	4,000	52,000	16,000
1,500	4,000	52,000	17,000
1,550	4,000	52,000	17,000
1,590	4,000	52,000	18,000
1,600	4,000	52,000	18,000
1,650	4,000	52,000	18,000
1,700	4,000	56,000	19,000
1,750	4,000	56,000	19,000
1,800	4,000	56,000	20,000
1,850	4,000	56,000	20,000
1,900	4,000	56,000	21,000
1,950	4,000	56,000	21,000
1,980	4,000	56,000	22,000
2,000	4,000	56,000	22,000
2,050	4,000	56,000	23,000
2,100	4,000	62,000	23,000
2,150	4,000	62,000	24,000
2,200	4,000	62,000	24,000
2,250	4,000	62,000	25,000
2,300	4,000	62,000	25,000
2,320	4,000	62,000	26,000
2,350	4,000	62,000	26,000
2,380	4,000	62,000	26,000

d1	d2 h6	l1	l2
mm	mm	mm	mm
2,400	4,000	62,000	26,000
2,450	4,000	62,000	27,000
2,500	4,000	62,000	28,000
2,550	4,000	62,000	28,000
2,600	4,000	66,000	29,000
2,650	4,000	66,000	29,000
2,700	4,000	66,000	30,000
2,750	4,000	66,000	30,000
2,780	4,000	66,000	31,000
2,800	4,000	66,000	31,000
2,850	4,000	66,000	31,000
2,900	4,000	66,000	32,000
2,950	4,000	66,000	32,000
3,000	4,000	66,000	33,000

Mikroporat

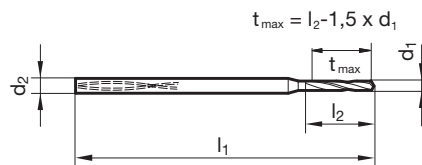

ExclusiveLine Mikroporat jäähdytyskanavilla


P	•	Kärjen kevennys $\geq \varnothing 1,400$ • päästöhiottu kärki • pääleikkusärmän suorasta • särmän valmistelu
M	•	
K	•	
N	○	rakenne- ja pintakarkaistut teräkset • automaattiteräkset, nuorrutetut teräkset • seostetut teräkset $< 1200 \text{ N/mm}^2$ asti • ruostumattomat teräkset • valut
S	○	
H		

GÜHRING NAVIGATOR

Leikkuuarvosivu 796

Materiaali	TKM
Pinta	A
Leikkuusuunta	R



Artikkelinro.

6412

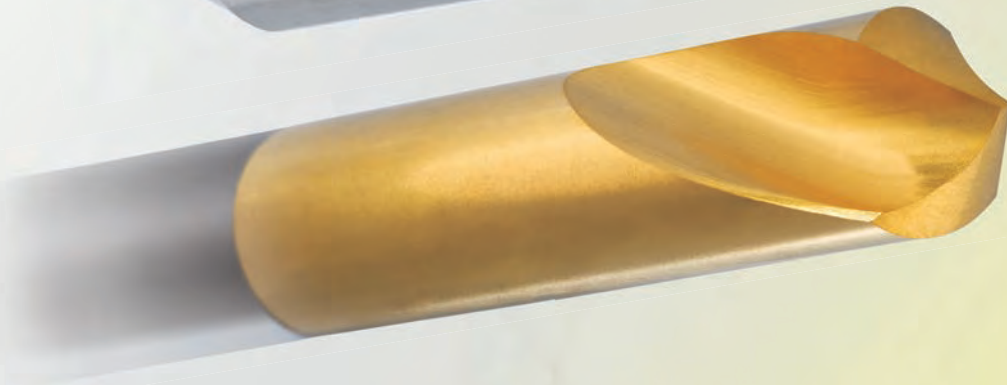
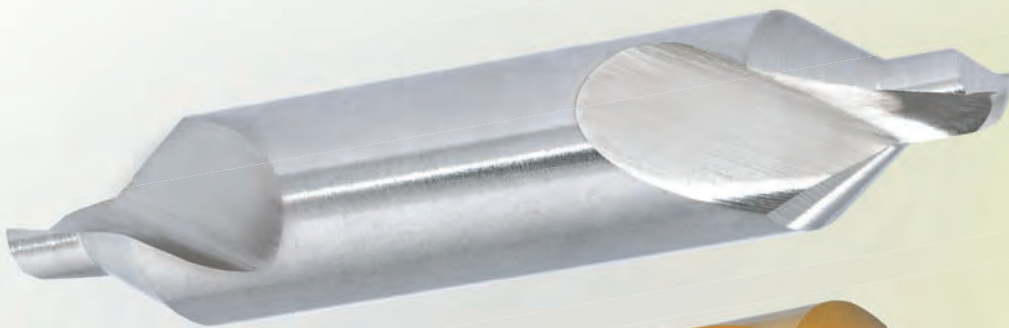
d1	d2 h6	l1	l2
mm	mm	mm	mm
1,400	4,000	62,000	25,000
1,500	4,000	62,000	27,000
1,590	4,000	62,000	29,000
1,600	4,000	62,000	29,000
1,700	4,000	70,000	31,000
1,800	4,000	70,000	32,000
1,900	4,000	70,000	34,000
1,980	4,000	70,000	36,000
2,000	4,000	70,000	36,000
2,100	4,000	78,000	38,000
2,200	4,000	78,000	40,000
2,300	4,000	78,000	42,000

d1	d2 h6	l1	l2
mm	mm	mm	mm
2,380	4,000	78,000	44,000
2,400	4,000	78,000	44,000
2,500	4,000	78,000	45,000
2,600	4,000	87,000	47,000
2,700	4,000	87,000	48,000
2,780	4,000	87,000	50,000
2,800	4,000	87,000	50,000
2,900	4,000	87,000	52,000
3,000	4,000	87,000	54,000

Mikroporat



KESKIÖPORAT / NC-ALKUPORAT





P	M	K	N	S	H	Työkalun kuvaus	Varren muoto	Standardi	Muoto	Leikkusuunta	Materiaali	Pinta	d1/mm	Artikkeli no.	Leikkuarvosivu	Sivu
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Keskiöporat ilman tasopintaa

•	•	•	•	•	•		Cyl	DIN 333	A	R	HSS	○	0,500 - 12,500	581	802	668
•	•	•	•	•	•		Cyl	DIN 333	A	R	HSS	Ⓢ	0,500 - 8,000	613	802	669
•	•	•	•	•	•		Cyl	DIN 333	A	L	HSS	○	0,500 - 12,500	582		670
•	•	•	•	•	•		Cyl	DIN 333	A	R	HSS	○	1,000 - 12,500	590		671
•	•	•	•	•	•		Cyl	DIN 333	R	R	HSS	○	0,500 - 12,500	583	802	672
•	•	•	•	•	•		Cyl	DIN 333	R	R	HSS	Ⓢ	0,800 - 8,000	614	802	673
•	•	•	•	•	•		Cyl	DIN 333	R	L	HSS	○	0,800 - 5,000	584		674
•	•	•	•	•	•		Cyl	DIN 333	B	R	HSS	○	1,000 - 10,000	585	802	675
•	•	•	•	•	•		Cyl	DIN 333	B	L	HSS	○	1,000 - 10,000	586		676
•	•	•	•	•	•		Cyl	DIN 333	B	R	HSS	○	1,000 - 6,300	591		677
•	•	•	•	•	•		Cyl	ASME B94.11 M	A	R	HSS	○	1,190 - 7,940	594		678
•	•	•	•	•	•		Cyl	ASME B94.11 M	B	R	HSS	○	1,190 - 6,350	595		679
•	•	•	•	•	•		Cyl	BS 328	A	R	HSS	○	1,190 - 7,940	292	802	680
•	•	•	•	•	•		Cyl	BS 328	A	L	HSS	○	1,190 - 7,940	294		681
•	•	•	•	•	•		Cyl	DIN 333	A	R	HSCO	○	1,000 - 4,000	381	802	682
○	○	○	○	○	○		Cyl	WN	A	R	VHM	○	0,500 - 6,300	736		683
•	•	•	•	•	•		Cyl	WN	A	R	HSS	○	0,500 - 10,000	281		684
•	•	•	•	•	•		Cyl	WN	A	L	HSS	○	0,800 - 5,000	282		685
•	•	•	•	•	•		Cyl	WN	R	R	HSS	○	0,500 - 10,000	283		686
•	•	•	•	•	•		Cyl	WN	R	L	HSS	○	1,600 - 4,000	284		687
•	•	•	•	•	•		Cyl	WN	B	R	HSS	○	1,000 - 6,300	285		688
•	•	•	•	•	•		Cyl	WN	A	R	HSS	○	1,000 - 3,150	280	802	689

Keskiöporat tasohionnalla

•	•	•	•	•	•		Cyl	DIN 333	A	R	HSS	○	1,600 - 10,000	587	802	690
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Keskiöporat / NC-alkuporat



P	M	K	N	S	H	Työkalun kuvaus	Varren muoto	Standardi	Muoto	Leikkusuunta	Materiaali	Pinta	d1/mm	Artikkeli nro.	Leikkuu-arvosivu	Sivu
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Keskiöporat tasohionnalla

•	○	•	•	○		Cyl	DIN 333	R		HSS	○	1,000 - 10,000	588	802	691
•	○	•	•	○		Cyl	DIN 333	B		HSS	○	1,600 - 8,000	589		692
•	○	•	•	○		Cyl	DIN 333	A		HSS	○	1,600 - 10,000	287		693
•	○	•	•	○		Cyl	DIN 333	R		HSS	○	2,000 - 8,000	288		694
•	○	•	•	○		Cyl	WN	B		HSS	○	1,600 - 5,000	289		695

NC-alkuporat 90°

•	○	•	•	○		Cyl	WN			HSS	○	3,000 - 25,400	557	798	696
•	○	•	•	○		Cyl	WN			HSS	Ⓢ	3,000 - 25,400	568	798	697
•	•	•	•	○		B	WN			HSCO	○	3,000 - 20,000	1136	798	698
•	•	•	•	○		B	WN			HSCO	Ⓡ	3,000 - 20,000	1133	798	699
•	○	•	•	○		Cyl	WN			HSS	○	6,350 - 25,400	559	798	700
○	○	○	○	○		Cyl	WN			VHM	○	4,000 - 20,000	723		701

NC-alkuporat 120°

•	○	•	•	○		Cyl	WN			HSS	○	3,000 - 25,400	556	798	702
•	○	•	•	○		Cyl	WN			HSS	Ⓢ	3,000 - 25,000	567	798	703
•	•	•	•	○		B	WN			HSCO	○	3,000 - 20,000	1134	798	704
•	•	•	•	○		B	WN			HSCO	Ⓡ	3,000 - 20,000	1135	798	705
○	○	○	○	○		HA	WN			VHM	○	5,000 - 20,000	724		706

NC-alkuporat 142°

○	○	○	○	○		HB	WN			VHM	○	4,000 - 20,000	546		707
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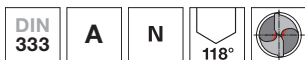
Pop-niittiporat

•	○	•	•	○		Cyl	WN			HSS		1,500 - 10,000	554		708
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Keskiöporat / NC-alkuporat



Keskiöporat ilman tasopintaa

Materiaali **HSS**

Pinta ○

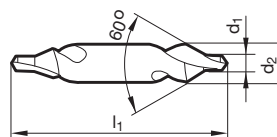
Leikkusuunta

P • Kärjen kevennys $\geq \varnothing 2,000$ • kartiovaippahionta • ilman suojaupotusta
M ○ keskiöporaus DIN 332 mukaan, osa 1, muoto A • $d1 \leq 0,8$ mm: ei kaksipäinen

K •
N •
S ○
H

GÜHRING NAVIGATOR

Leikkuarvosivu 802

Artikkelinro. **581**

d1	d2	l1
mm	mm	mm
0,500	3,150	25,000
0,800	3,150	25,000
1,000	3,150	31,500
1,250	3,150	31,500
1,600	4,000	35,500
2,000	5,000	40,000
2,500	6,300	45,000
3,150	8,000	50,000
4,000	10,000	56,000
5,000	12,500	63,000
6,300	16,000	71,000
8,000	20,000	80,000

d1	d2	l1
mm	mm	mm
10,000	25,000	100,000
12,500	31,500	125,000



Keskiöporat ilman tasopintaa



- P** • Kärjen kevennys $\geq \varnothing 2,000$ • kartiovaippahionta • ilman suojaupotusta
- M** ○ keskiöporaus DIN 332 mukaan, osa 1, muoto A • $d1 \leq 0,8$ mm: ei kaksipäinen • parempi kulumiskestävyys
- K** •
- N** •
- S** ○
- H**

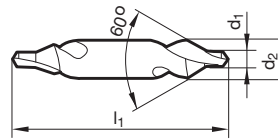
Materiaali **HSS**

Pinta **S**

Leikkusuunta **R**

GÜHRING NAVIGATOR

Leikkuarvosivu 802



Artikkelinro. **613**

d1	d2	l1
mm	mm	mm
0,500	3,150	25,000
0,800	3,150	25,000
1,000	3,150	31,500
1,250	3,150	31,500
1,600	4,000	35,500
2,000	5,000	40,000

d1	d2	l1
mm	mm	mm
2,500	6,300	45,000
3,150	8,000	50,000
4,000	10,000	56,000
5,000	12,500	63,000
6,300	16,000	71,000
8,000	20,000	80,000



Keskiöporat ilman tasopintaa

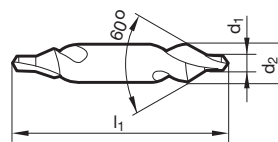
Materiaali **HSS**

Pinta ○

Leikkusuunta

P • Kärjen kevennys $\geq \varnothing 2,000$ • kartiovaippahionta • ilman suojaupotusta
M ○ keskiöporaus DIN 332 mukaan, osa 1, muoto A • $d1 \leq 0,8$ mm: ei kaksipäinen

K •
N •
S ○
H ○

Artikkelinro. **582**

d1	d2	l1
mm	mm	mm
0,500	3,150	25,000
0,800	3,150	25,000
1,000	3,150	31,500
1,250	3,150	31,500
1,600	4,000	35,500
2,000	5,000	40,000
2,500	6,300	45,000
3,150	8,000	50,000
4,000	10,000	56,000
5,000	12,500	63,000
6,300	16,000	71,000
8,000	20,000	80,000

d1	d2	l1
mm	mm	mm
10,000	25,000	100,000
12,500	31,500	125,000



Keskiöporat ilman tasopintaa

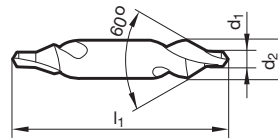
Materiaali **HSS**

Pinta ○

Leikkusuunta

P ● Kärjen kevennys $\geq \varnothing 2,000$ • kartiovaippahionta • vahvennettu kaula rikkoutumisen estämiseksi • ilman suojaupotusta • syvennys upotuksen ja reiän välissä lisä voiteluaineelle • keskiöporaus DIN 332 mukaan, osa 1, muoto A

M	○
K	●
N	●
S	○
H	○



Artikkelinro.

590

d1	d2	l1
mm	mm	mm
1,000	3,150	31,500
1,250	3,150	31,500
1,600	4,000	35,500
2,000	5,000	40,000
2,500	6,300	45,000
3,150	8,000	50,000

d1	d2	l1
mm	mm	mm
4,000	10,000	56,000
5,000	12,500	63,000
6,300	16,000	71,000
8,000	20,000	80,000
10,000	25,000	100,000
12,500	31,500	125,000



Keskiöporat ilman tasopintaa

Materiaali **HSS**

Pinta ○

Leikkusuunta

P ● Kärjen kevennys $\geq \varnothing 2,000$ • kartiovaippahionta • oikea asemointi sorvin kärkien väliin • keskiöireille DIN 332 mukaan, osa 1, muoto R • $d1 \leq 0,8$ mm: ei kaksipäinen

M ○

K ●

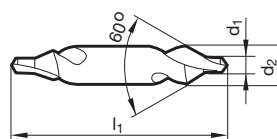
N ●

S ○

H ○

GÜHRING NAVIGATOR

Leikkuarvosivu 802



Artikkelinro.

583

d1	d2	l1
mm	mm	mm
0,500	3,150	25,000
0,800	3,150	25,000
1,000	3,150	31,500
1,250	3,150	31,500
1,600	4,000	35,500
2,000	5,000	40,000
2,500	6,300	45,000
3,150	8,000	50,000
4,000	10,000	56,000
5,000	12,500	63,000
6,300	16,000	71,000
8,000	20,000	80,000

d1	d2	l1
mm	mm	mm
10,000	25,000	100,000
12,500	31,500	125,000



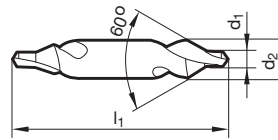
Keskiöporat ilman tasopintaa

Materiaali **HSS**Pinta **S**Leikkusuunta **R**

P • Kärjen kevennys $\geq \varnothing 2,000$ • kartiovaippahionta • parempi kulumiskestävyys • oikea asemointi sorvin kärkien väliin • keskiöreille DIN 332 mukaan, osa 1, muoto R • $d1 \leq 0,8$ mm: ei kaksipäinen

**GÜHRING** NAVIGATOR

Leikkuarvosivu 802



Artikkelinro.

614

d1	d2	l1
mm	mm	mm
0,800	3,150	25,000
1,000	3,150	31,500
1,250	3,150	31,500
1,600	4,000	35,500
2,000	5,000	40,000
2,500	6,300	45,000

d1	d2	l1
mm	mm	mm
3,150	8,000	50,000
4,000	10,000	56,000
5,000	12,500	63,000
6,300	16,000	71,000
8,000	20,000	80,000



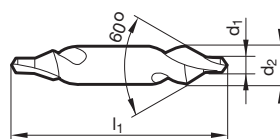
Keskiöporat ilman tasopintaa

Materiaali **HSS**

Pinta ○

Leikkusuunta □L

P ● Kärjen kevennys $\geq \varnothing 2,000$ • kartiovaippahionta • oikea asemointi sorvin kärkien väliin • keskiöreille DIN 332 mukaan, osa 1, muoto R • $d1 \leq 0,8$ mm: ei kaksipäinen

M ○**K** ●**N** ●**S** ○**H** ○

Artikkelinro.

584

d1	d2	l1
mm	mm	mm
0,800	3,150	25,000
1,000	3,150	31,500
1,250	3,150	31,500
1,600	4,000	35,500
2,000	5,000	40,000
2,500	6,300	45,000

d1	d2	l1
mm	mm	mm
3,150	8,000	50,000
4,000	10,000	56,000
5,000	12,500	63,000



Keskiöporat ilman tasopintaa



Materiaali **HSS**

Pinta ○

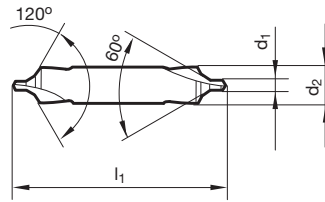
Leikkusuunta

P ● Kärjen kevennys $\geq \varnothing 2,000$ • kartiovaippahionta • keskiöporaus DIN 332 mukaan, osa 1, muoto B • 120° suojaviisteellä

- M** ○
- K** ●
- N** ●
- S** ○
- H** ○

GÜHRING NAVIGATOR

Leikkuarvosivu 802



Artikkelinro. **585**

d1	d2	l1
mm	mm	mm
1,000	4,000	35,500
1,250	5,000	40,000
1,600	6,300	45,000
2,000	8,000	50,000
2,500	10,000	56,000
3,150	11,200	60,000

d1	d2	l1
mm	mm	mm
4,000	14,000	67,000
5,000	18,000	75,000
6,300	20,000	80,000
8,000	25,000	100,000
10,000	31,500	125,000



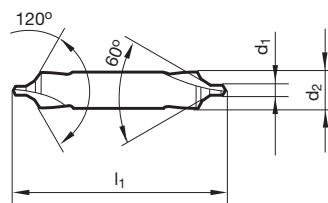
Keskiöporat ilman tasopintaa

Materiaali **HSS**

Pinta ○

Leikkusuunta

P ● Kärjen kevennys $\geq \varnothing 2,000$ • kartiovaippahionta • keskiöporaus DIN 332 mukaan, osa 1, muoto B • 120° suojaviisteellä

M ○**K** ●**N** ●**S** ○**H** ○

Artikkelinro.

586

d1	d2	l1
mm	mm	mm
1,000	4,000	35,500
1,250	5,000	40,000
1,600	6,300	45,000
2,000	8,000	50,000
2,500	10,000	56,000
3,150	11,200	60,000

d1	d2	l1
mm	mm	mm
4,000	14,000	67,000
5,000	18,000	75,000
6,300	20,000	80,000
8,000	25,000	100,000
10,000	31,500	125,000



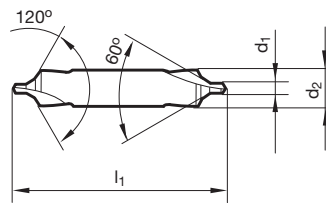
Keskiöporat ilman tasopintaa

Materiaali **HSS**

Pinta ○

Leikkusuunta

P ● Kärjen kevennys $\geq \varnothing 2,000$ • kartiovaippahionta • vahvennettu kaula rikkoutumisen estämiseksi • syvennys upotuksen ja reiän välissä lisävoiteluaineelle • keskiöporaus DIN 332 mukaan, osa 1, muoto B • 120° suojaviisteellä

K ●**N** ●**S** ○**H** ○

Artikkelinro.

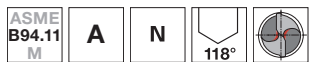
591

d1	d2	l1
mm	mm	mm
1,000	4,000	35,500
1,600	6,300	45,000
2,000	8,000	50,000
2,500	10,000	56,000
3,150	11,200	60,000
4,000	14,000	67,000

d1	d2	l1
mm	mm	mm
5,000	18,000	75,000
6,300	20,000	80,000



Keskiöporat ilman tasopintaa

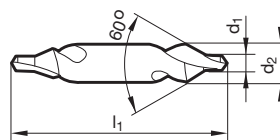
Materiaali **HSS**

Pinta ○

Leikkusuunta

P ● Kärjen kevennys $\geq \varnothing 1,980$ • kartiovaippahionta • keskiöintiporaus muoto
A US standardi

M	○
K	●
N	●
S	○
H	○



Artikkelinro.

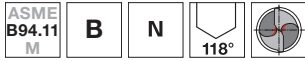
594

Koko	d1		d2	l1	koodinro.
	mm	inch			
1	1,190	3/64	3,170	32,000	1,190
2	1,980	5/64	4,760	48,000	1,980
3	2,780	7/64	6,350	51,000	2,780
4	3,170	1/8	7,940	54,000	3,170
5	4,760	3/16	11,110	70,000	4,760
6	5,560	7/32	12,700	76,000	5,560

Koko	d1		d2	l1	koodinro.
	mm	inch			
7	6,350	1/4	15,870	83,000	6,350
8	7,940	5/16	19,050	89,000	7,940



Keskiöporat ilman tasopintaa

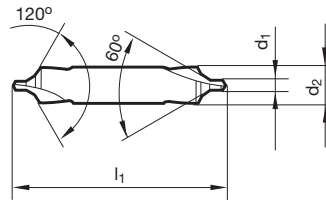
Materiaali **HSS**

Pinta ○

Leikkusuunta

P ● Kärjen kevennys $\geq \varnothing 2,380$ • kartiovaippahionta • keskiöintiporaus muoto
B US standardi

P	●
M	○
K	●
N	●
S	○
H	



Artikkelinro.

595

Koko	d1		d2	l1	koodinro.
	mm	inch	mm	mm	
11	1,190	3/64	3,170	32,000	1,190
12	1,590	1/16	4,760	48,000	1,590
13	2,380	3/32	6,350	51,000	2,380
14	2,780	7/64	7,940	54,000	2,780
15	3,970	5/32	11,110	70,000	3,970
16	4,760	3/16	12,700	76,000	4,760

Koko	d1		d2	l1	koodinro.
	mm	inch	mm	mm	
17	5,560	7/32	15,870	83,000	5,560
18	6,350	1/4	19,050	89,000	6,350



Keskiöporat ilman tasopintaa

Materiaali **HSS**

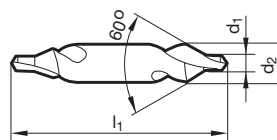
Pinta ○

Leikkusuunta

P ● Kärjen kevennys $\geq \varnothing 1,190$ • kartiovaippahionta • keskiöintiporaus muoto
A Britttistr.

**GÜHRING** NAVIGATOR

Leikkuarvosivu 802



Artikkelinro.

292

Koko	d1		d2	l1	koodinro.
	mm	inch			
1	1,190	3/64	3,170	38,000	1,190
2	1,590	1/16	4,760	44,000	1,590
3	2,380	3/32	6,350	51,000	2,380
4	3,170	1/8	7,940	57,000	3,170
5	4,760	3/16	11,110	63,000	4,760
6	6,350	1/4	15,870	76,000	6,350

Koko	d1		d2	l1	koodinro.
	mm	inch			
7	7,940	5/16	19,050	89,000	7,940



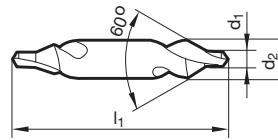
Keskiöporat ilman tasopintaa

Materiaali **HSS**

Pinta ○

Leikkusuunta

P ● Kärjen kevennys $\geq \varnothing 1,190$ ● kartiovaippahionta ● keskiöntiporaus muoto
A Brittitidr.

M ○**K** ●**N** ●**S** ○**H**

Artikkelinro.

294

Koko	d1		d2	l1	koodinro.
	mm	inch	mm	mm	
1	1,190	3/64	3,170	38,000	1,190
2	1,590	1/16	4,760	44,000	1,590
3	2,380	3/32	6,350	51,000	2,380
4	3,170	1/8	7,940	57,000	3,170
5	4,760	3/16	11,110	63,000	4,760
6	6,350	1/4	15,870	76,000	6,350

Koko	d1		d2	l1	koodinro.
	mm	inch	mm	mm	
7	7,940	5/16	19,050	89,000	7,940



Keskiöporat ilman tasopintaa



P	•	Kärjen kevennys $\geq \varnothing 2,000$ • kartiovaippahionta • ilman suojaupotusta
M	•	• parempi kulumiskestävyys • keskiöporaus DIN 332 mukaan, osa 1, muoto A
K	•	
N	•	materiaalit yli 800 N/mm ² • ruostumat./-haponkest./-kuumalujat CrNi-teräkset
S	○	
H		

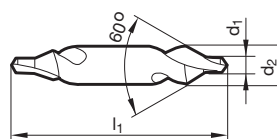
Materiaali **HSCO**

Pinta ○

Leikkusuunta

GÜHRING NAVIGATOR

Leikkuarvosivu 802

Artikkelinro. **381**

d1	d2	l1
mm	mm	mm
1,000	3,150	31,500
1,250	3,150	31,500
1,600	4,000	35,500
2,000	5,000	40,000
2,500	6,300	45,000
3,150	8,000	50,000

d1	d2	l1
mm	mm	mm
4,000	10,000	56,000



Keskiöporat ilman tasopintaa

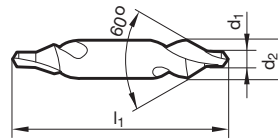


Materiaali **TKM**

Pinta ○

Leikkusuunta

- P** ○ Kärjen kevennys $\geq \varnothing 2,000$ • kartiovaippahionta • ilman suojaupotusta
- M** ○ • keskiöporaus DIN 332 mukaan, osa 1, muoto A • $d1 \leq 0,8$ mm: ei kaksipäinen
- K** ○
- N** ○ universal materiaali sopivuus
- S** ○
- H** ○



Artikkelinro. **736**

d1	d2	l1
mm	mm	mm
0,500	3,150	25,000
0,800	3,150	25,000
1,000	3,150	31,500
1,250	3,150	31,500
1,600	4,000	35,500
2,000	5,000	40,000

d1	d2	l1
mm	mm	mm
2,500	6,300	45,000
3,150	8,000	50,000
4,000	10,000	56,000
5,000	12,500	63,000
6,300	16,000	71,000



Keskiöporat ilman tasopintaa

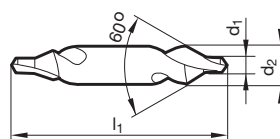
Materiaali **HSS**

Pinta ○

Leikkusuunta

- P** ● Kärjen kevennys $\geq \varnothing 2,000$ • kartiovaippahionta • ilman suojaupotusta
 • keskiöoreille DIN 332 mukaan, (julkaisu 09.1960 peruttu) sivu 1, muoto A
M ○ • $d1 \leq 0,8$ mm: ei kaksipäinen

- K** ●
N ●
S ○
H ●

Artikkelinro. **281**

d1	d2	l1
mm	mm	mm
0,500	3,150	25,000
1,000	3,150	31,500
1,250	4,000	35,500
1,600	5,000	40,000
2,000	6,300	45,000
2,500	8,000	50,000

d1	d2	l1
mm	mm	mm
3,150	10,000	56,000
4,000	12,500	63,000
5,000	16,000	71,000
6,300	20,000	80,000
8,000	25,000	100,000
10,000	31,500	125,000



Keskiöporat ilman tasopintaa



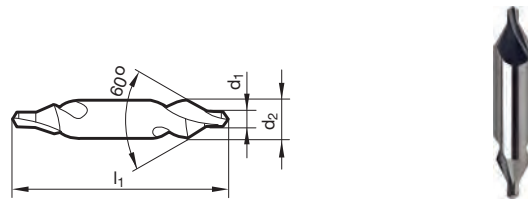
Materiaali **HSS**

Pinta ○

Leikkusuunta

- P** ● Kärjen kevennys $\geq \varnothing 2,000$ • kartiovaippahionta • ilman suojaupotusta
- M** ○ • keskiöireille DIN 332 mukaan, (julkaisu 09.1960 peruttu) sivu 1, muoto A
- K** ● • $d1 \leq 0,8$ mm: ei kaksipäinen

- N** ●
- S** ○
- H** ○



Artikkelinro. **282**

d1	d2	l1
mm	mm	mm
0,800	3,150	25,000
1,250	4,000	35,500
1,600	5,000	40,000
2,000	6,300	45,000
2,500	8,000	50,000
3,150	10,000	56,000

d1	d2	l1
mm	mm	mm
4,000	12,500	63,000
5,000	16,000	71,000



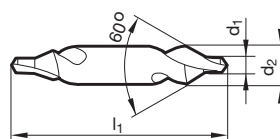
Keskiöporat ilman tasopintaa

Materiaali **HSS**

Pinta ○

Leikkusuunta

P ● Kärjen kevennys $\geq \varnothing 2,000$ • kartiovaippahionta • oikea asemointi sorvin kärkien väliin • keskiöporaus DIN 332 mukaan, lomake 1, muoto R • $d1 \leq 0,8$ mm: ei kaksipäinen

M ○**K** ●**N** ●**S** ○**H** ○

Artikkelinro.

283

d1	d2	l1
mm	mm	mm
0,500	3,150	25,000
0,800	3,150	25,000
1,000	3,150	31,500
1,250	4,000	35,500
1,600	5,000	40,000
2,000	6,300	45,000
2,500	8,000	50,000
3,150	10,000	56,000
4,000	12,500	63,000
5,000	16,000	71,000
6,300	20,000	80,000
8,000	25,000	100,000

d1	d2	l1
mm	mm	mm
10,000	31,500	125,000



Keskiöporat ilman tasopintaa



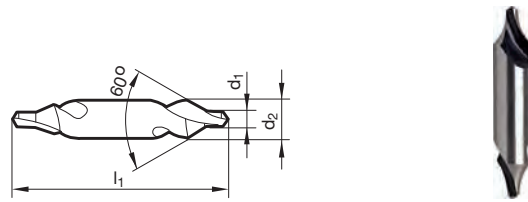
Materiaali **HSS**

Pinta ○

Leikkusuunta □L

P ● Kärjen kevennys $\geq \varnothing 2,000$ • kartiovaippahionta • oikea asemointi sorvin kärkien väliin • keskiöporaus DIN 332 mukaan, lomake 1, muoto R

- M** ○
- K** ●
- N** ●
- S** ○
- H** ○



Artikkelinro. **284**

d1	d2	l1
mm	mm	mm
1,600	5,000	40,000
2,000	6,300	45,000
2,500	8,000	50,000
3,150	10,000	56,000
4,000	12,500	63,000

d1	d2	l1
mm	mm	mm



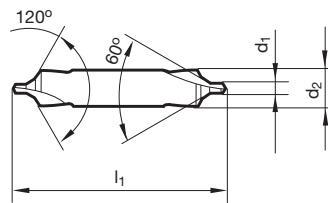
Keskiöporat ilman tasopintaa

Materiaali **HSS**

Pinta ○

Leikkusuunta

P ● Kärjen kevennys $\geq \varnothing 2,000$ • kartiovaippahionta • keskiöreille DIN 332 mukaan, (julkaisu 09.1960 peruttu) sivu 1, muoto B • 120° suojaviisteellä

M ○**K** ●**N** ●**S** ○**H** ○

Artikkelinro.

285

d1	d2	l1
mm	mm	mm
1,000	6,300	40,000
1,600	8,000	50,000
2,000	10,000	56,000
2,500	11,200	63,000
3,150	14,000	71,000
4,000	16,000	80,000

d1	d2	l1
mm	mm	mm
5,000	20,000	90,000
6,300	25,000	100,000



Keskiöporat ilman tasopintaa



P • Kärjen kevennys $\geq \varnothing 2,000$ • kartiovaippahionta • erikoispitkät keskiöporat • ilman suojaupotusta • keskiöreille DIN 332 mukaan, sivu 1, muoto A • syvyyttä vaativille keskiöreille

- M** ○
- K** •
- N** •
- S** ○
- H** ○

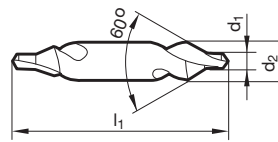
Materiaali **HSS**

Pinta ○

Leikkusuunta

GÜHRING NAVIGATOR

Leikkuarvosivu 802



Artikkelinro. **280**

d1	d2	l1
mm	mm	mm
1,000	4,000	120,000
1,600	5,000	120,000
2,000	6,000	120,000
2,500	8,000	120,000
3,150	10,000	120,000

d1	d2	l1
mm	mm	mm



Keskiöporat tasohionalla

Materiaali **HSS**

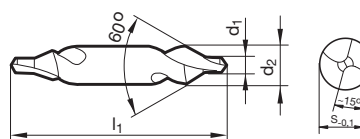
Pinta ○

Leikkusuunta

P ● Kärjen kevennys $\geq \varnothing 2,000$ • kartiovaippahionta • keskiöporaus DIN 332 mukaan, osa 1, muoto A • ilman suojaupotusta

**GÜHRING** NAVIGATOR

Leikkuarvosivu 802

Artikkelinro. **587**

d1	d2	l1	S
mm	mm	mm	mm
1,600	4,000	35,500	3,250
2,000	5,000	40,000	4,200
2,500	6,300	45,000	5,350
3,150	8,000	50,000	6,950
4,000	10,000	56,000	8,400
5,000	12,500	63,000	10,950

d1	d2	l1	S
mm	mm	mm	mm
6,300	16,000	71,000	14,000
8,000	20,000	80,000	17,900
10,000	25,000	100,000	22,500



Keskiöporat tasohionnalla

Materiaali **HSS**

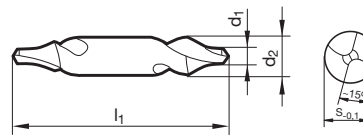
Pinta ○

Leikkusuunta

P ● Kärjen kevennys $\geq \varnothing 2,000$ • kartiovaippahionta • oikea asemointi sorvin kärkien väliin • keskiöreille DIN 332 mukaan, osa 1, muoto R

**GÜHRING** NAVIGATOR

Leikkuarvosivu 802



Artikkelinro.

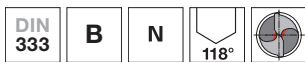
588

d1	d2	l1	S
mm	mm	mm	mm
1,000	3,150	31,500	2,350
2,000	5,000	40,000	4,200
2,500	6,300	45,000	5,350
3,150	8,000	50,000	6,950
4,000	10,000	56,000	8,400
5,000	12,500	63,000	10,950

d1	d2	l1	S
mm	mm	mm	mm
6,300	16,000	71,000	14,000
8,000	20,000	80,000	17,900
10,000	25,000	100,000	22,500



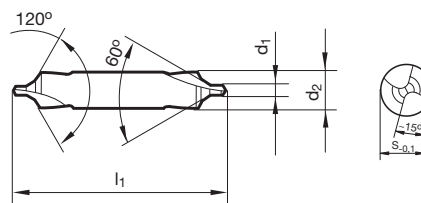
Keskiöporat tasohionnalla

Materiaali **HSS**

Pinta ○

Leikkusuunta

P ● Kärjen kevennys $\geq \varnothing 2,000$ • kartiovaippahionta • keskiöporaus DIN 332 mukaan, osa 1, muoto B • 120° suojaviisteellä

Artikkelinro. **589**

d1	d2	l1	S
mm	mm	mm	mm
1,600	6,300	45,000	5,350
2,000	8,000	50,000	6,950
2,500	10,000	56,000	8,400
3,150	11,200	60,000	10,000
4,000	14,000	67,000	12,650
5,000	18,000	75,000	16,400

d1	d2	l1	S
mm	mm	mm	mm
6,300	20,000	80,000	17,900
8,000	25,000	100,000	22,500



Keskiöporat tasohionnalla

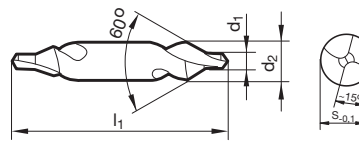
Materiaali **HSS**

Pinta ○

Leikkusuunta

P ● Kärjen kevennys $\geq \varnothing 2,000$ • kartiovaippahionta • ilman suojaupotusta
 • keskiöreille DIN 332 mukaan, (julkaisu 09.1960 peruttu) sivu 1, muoto A

P	●
M	○
K	●
N	●
S	○
H	



Artikkelinro.

287

d1	d2	l1	S
mm	mm	mm	mm
1,600	5,000	40,000	4,200
2,000	6,300	45,000	5,350
2,500	8,000	50,000	6,850
3,150	10,000	56,000	8,400
4,000	12,500	63,000	10,650
5,000	16,000	71,000	13,650

d1	d2	l1	S
mm	mm	mm	mm
6,300	20,000	80,000	17,400
8,000	25,000	100,000	21,900
10,000	31,500	125,000	27,100



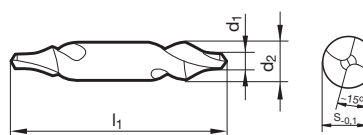
Keskiöporat tasohionnalla

Materiaali **HSS**

Pinta ○

Leikkusuunta

P ● Kärjen kevennys $\geq \varnothing 2,000$ • kartiovaippahionta • oikea asemointi sorvin kärkien väliin • keskiöporaus DIN 332 mukaan, lomake 1, muoto R

M ○**K** ●**N** ●**S** ○**H** ○Artikkelinro. **288**

d1	d2	l1	S
mm	mm	mm	mm
2,000	6,300	45,000	5,350
2,500	8,000	50,000	6,850
3,150	10,000	56,000	8,400
4,000	12,500	63,000	10,650
5,000	16,000	71,000	13,650
6,300	20,000	80,000	17,400

d1	d2	l1	S
mm	mm	mm	mm
8,000	25,000	100,000	21,900



Keskiöporat tasohionnalla



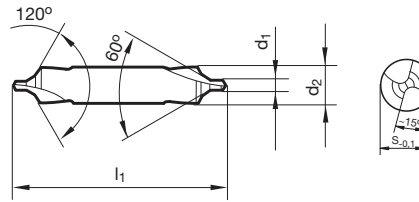
Materiaali **HSS**

Pinta ○

Leikkusuunta

P ● Kärjen kevennys $\geq \varnothing 2,000$ • kartiovaippahionta • keskiöreille DIN 332 mukaan, (julkaisu 09.1960 peruttu) sivu 1, muoto B • 120° suojaviisteellä

- M** ○
- K** ●
- N** ●
- S** ○
- H** ○



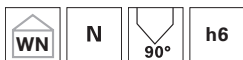
Artikkelinro. **289**

d1	d2	l1	S
mm	mm	mm	mm
1,600	8,000	50,000	6,500
2,000	10,000	56,000	7,950
2,500	11,200	63,000	9,500
3,150	14,000	71,000	12,000
4,000	16,000	80,000	14,400
5,000	20,000	90,000	18,400

d1	d2	l1	S
mm	mm	mm	mm



NC-alkuporat 90°



P • kartiovaippahionta • vain alkuporausta varten

P	•
M	○
K	•
N	•
S	○
H	

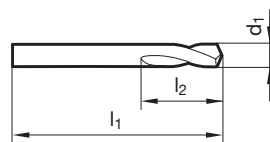
Materiaali **HSS**

Pinta ○

Leikkusuunta

GÜHRING NAVIGATOR

Leikkuarvosivu 798



Artikkelinro.

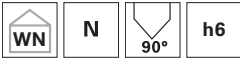
557

d1		l1	l2
mm	inch	mm	mm
3,000		46,000	12,000
4,000		55,000	12,000
5,000		62,000	14,000
6,000		66,000	16,000
6,350	1/4	70,000	17,000
8,000		79,000	21,000
9,000		84,000	22,000
9,520	3/8	89,000	25,000
10,000		89,000	25,000
12,000		102,000	30,000
12,700	1/2	102,000	30,000
13,000		102,000	30,000

d1		l1	l2
mm	inch	mm	mm
14,000		107,000	33,500
15,870	5/8	115,000	37,500
16,000		115,000	37,500
19,050	3/4	131,000	45,000
20,000		131,000	45,000
25,000	63/64	151,000	53,000
25,400	1	156,000	53,000



NC-alkuporat 90°

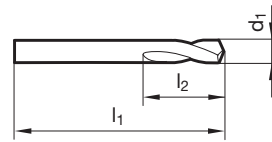


P	•	kartiovaippahionta • vain alkuporausta varten
M	○	
K	•	
N	•	
S	○	
H		

Materiaali **HSS**Pinta **S**Leikkusuunta **R**

GÜHRING NAVIGATOR

Leikkuarvosivu 798



Artikkelinro.

568

d1		l1	l2
mm	inch	mm	mm
3,000		46,000	12,000
4,000		55,000	12,000
5,000		62,000	14,000
6,000		66,000	16,000
6,350	1/4	70,000	17,000
8,000		79,000	21,000
9,520	3/8	89,000	25,000
10,000		89,000	25,000
12,000		102,000	30,000
12,700	1/2	102,000	30,000
15,870	5/8	115,000	37,500
16,000		115,000	37,500

d1		l1	l2
mm	inch	mm	mm
19,050	3/4	131,000	45,000
20,000		131,000	45,000
25,000	63/64	151,000	53,000
25,400	1	156,000	53,000



NC-alkuporat 90°



P • kartiovaippahionta • vain alkuporausta varten • $\geq \varnothing 6.0$ mm tasopinnalla
 DIN 1835-B mukaisesti • Co-seosteinen pikateräs • parempi kulumiskestävyys

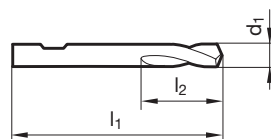
Materiaali **HSC6**

Pinta ○

Leikkusuunta

**GÜHRING** NAVIGATOR

Leikkuarvosivu 798



Artikkelinro.

1136

d1		l1	l2
mm	inch	mm	mm
3,000		46,000	12,000
4,000		55,000	12,000
5,000		62,000	14,000
6,000		66,000	16,000
8,000		79,000	21,000
10,000		89,000	25,000

d1		l1	l2
mm	inch	mm	mm
12,000		102,000	30,000
16,000		115,000	37,500
20,000		131,000	45,000



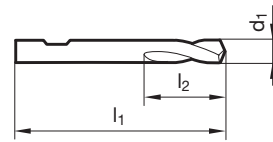
NC-alkuporat 90°

Materiaali **HSCO**Pinta **F**Leikkusuunta **R****NEW**

P • kartiovaippahionta • vain alkuporausta varten • $\geq \varnothing 6.0$ mm tasopinnalla
 DIN 1835-B mukaisesti • Co-seosteinen pikateräs • parempi kulumiskestävyys

**GÜHRING** NAVIGATOR

Leikkuarvosivu 798



Artikkelinro.

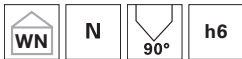
1133

d1		l1	l2
mm	inch	mm	mm
3,000		46,000	12,000
4,000		55,000	12,000
5,000		62,000	14,000
6,000		66,000	16,000
8,000		79,000	21,000
10,000		89,000	25,000

d1		l1	l2
mm	inch	mm	mm
12,000		102,000	30,000
16,000		115,000	37,500
20,000		131,000	45,000



NC-alkuporat 90°



P • kartiovaippahionta • vain alkuporausta varten



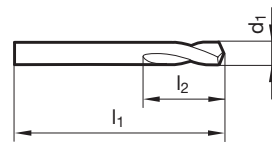
GÜHRING NAVIGATOR

Leikkuarvosivu 798

Materiaali **HSS**

Pinta ○

Leikkusuunta

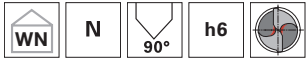
Artikkelinro. **559**

d1		l1	l2
mm	inch	mm	mm
6,350	1/4	105,000	17,000
8,000		118,000	21,000
9,520	3/8	132,000	25,000
12,700	1/2	159,000	30,000
15,870	5/8	186,000	37,500
19,050	3/4	213,000	45,000

d1		l1	l2
mm	inch	mm	mm
25,400	1	216,000	53,000

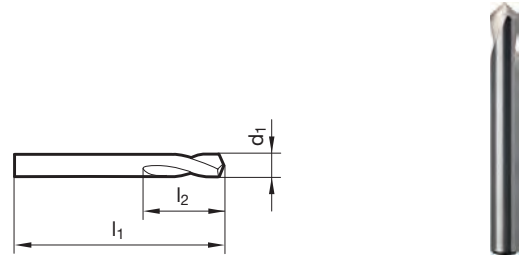


NC-alkuporat 90°



- P** ○ Kärjen kevennys $\geq \varnothing 6,000$ • päästöhiottu kärki • vain alkuporausta varten
- M** ○
- K** ○
- N** ○ universal materiaali sopivuus
- S** ○
- H** ○

Materiaali	TKM
Pinta	○
Leikkusuunta	Ⓜ



Artikkelinro. **723**

d1		l1	l2
mm	inch	mm	mm
4,000		55,000	12,000
5,000		62,000	14,000
6,000		66,000	16,000
6,350	1/4	70,000	17,000
8,000		79,000	21,000
9,520	3/8	89,000	25,000
10,000		89,000	25,000
12,000		102,000	30,000
12,700	1/2	102,000	30,000
15,870	5/8	115,000	37,500
16,000		115,000	37,500
19,050	3/4	131,000	45,000

d1		l1	l2
mm	inch	mm	mm
20,000		131,000	45,000

Keskiöporat / NC-alkuporat



NC-alkuporat 120°



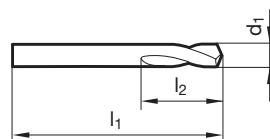
P • kartiovaippahionta • vain alkuporausta varten

P	•
M	○
K	•
N	•
S	○
H	

GÜHRING NAVIGATOR

Leikkuarvosivu 798

Materiaali	HSS
Pinta	○
Leikkusuunta	



Artikkelinro.

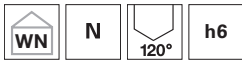
556

d1		l1	l2
mm	inch	mm	mm
3,000		46,000	12,000
4,000		55,000	12,000
5,000		62,000	14,000
5,600		66,000	16,000
6,000		66,000	16,000
6,350	1/4	70,000	17,000
6,500		70,000	17,000
7,000		74,000	19,000
8,000		79,000	21,000
9,520	3/8	89,000	25,000
10,000		89,000	25,000
11,550		95,000	28,000

d1		l1	l2
mm	inch	mm	mm
12,000		102,000	30,000
12,700	1/2	102,000	30,000
14,000		107,000	33,500
15,000		111,000	33,500
15,870	5/8	115,000	37,500
16,000		115,000	37,500
19,000		127,000	40,000
19,050	3/4	131,000	45,000
20,000		131,000	45,000
25,000	63/64	151,000	53,000
25,400	1	156,000	53,000



NC-alkuporat 120°

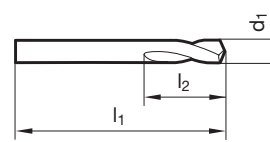


P • kartiovaippahionta • vain alkuporausta varten

P	•
M	○
K	•
N	•
S	○
H	

Materiaali **HSS**Pinta **S**Leikkusuunta **R****GÜHRING** NAVIGATOR

Leikkuarvosivu 798



Artikkelinro.

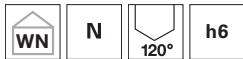
567

d1		l1	l2
mm	inch	mm	mm
3,000		46,000	12,000
4,000		55,000	12,000
5,000		62,000	14,000
6,000		66,000	16,000
6,350	1/4	70,000	17,000
8,000		79,000	21,000
9,520	3/8	89,000	25,000
10,000		89,000	25,000
12,000		102,000	30,000
12,700	1/2	102,000	30,000
15,870	5/8	115,000	37,500
16,000		115,000	37,500

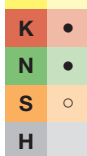
d1		l1	l2
mm	inch	mm	mm
19,050	3/4	131,000	45,000
20,000		131,000	45,000
25,000	63/64	151,000	53,000



NC-alkuporat 120°



P • kartiovaippahionta • vain alkuporausta varten • $\geq \text{Ø } 6.0 \text{ mm}$ tasopinnalla
 DIN 1835-B mukaisesti • Co-seosteinen pikateräs • parempi kulumiskestävyys

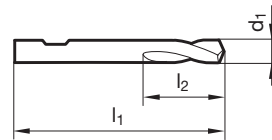
Materiaali **HSCO**

Pinta ○

Leikkusuunta

NEW**GÜHRING** NAVIGATOR

Leikkuarvosivu 798



Artikkelinro.

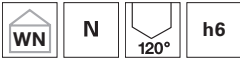
1134

d1		l1	l2
mm	inch	mm	mm
3,000		46,000	12,000
4,000		55,000	12,000
5,000		62,000	14,000
6,000		66,000	16,000
8,000		79,000	21,000
10,000		89,000	25,000

d1		l1	l2
mm	inch	mm	mm
12,000		102,000	30,000
16,000		115,000	37,500
20,000		131,000	45,000



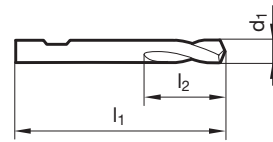
NC-alkuporat 120°

Materiaali **HSCO**Pinta **F**Leikkusuunta **R****NEW**

P • kartiovaippahionta • vain alkuporausta varten • $\geq \text{Ø } 6.0 \text{ mm}$ tasopinnalla
 DIN 1835-B mukaisesti • Co-seosteinen pikateräs • parempi kulumiskestävyys

**GÜHRING** NAVIGATOR

Leikkuarvosivu 798



Artikkelinro.

1135

d1		l1	l2
mm	inch	mm	mm
3,000		46,000	12,000
4,000		55,000	12,000
5,000		62,000	14,000
6,000		66,000	16,000
8,000		79,000	21,000
10,000		89,000	25,000

d1		l1	l2
mm	inch	mm	mm
12,000		102,000	30,000
16,000		115,000	37,500
20,000		131,000	45,000



NC-alkuporat 120°



P ○ Kärjen kevennys $\geq \varnothing 13,500$ • päästöhiottu kärki • vain alkuporausta varten

M ○

K ○

N ○ universal materiaali sopivuus

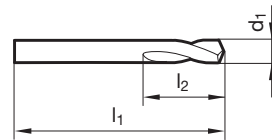
S ○

H ○

Materiaali **TKM**

Pinta ○

Leikkusuunta



Artikkelinro.

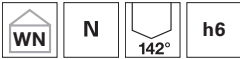
724

d1		l1	l2
mm	inch	mm	mm
5,000		62,000	14,000
6,000		66,000	16,000
6,350	1/4	70,000	17,000
8,000		79,000	21,000
9,520	3/8	89,000	25,000
10,000		89,000	25,000

d1		l1	l2
mm	inch	mm	mm
12,000		102,000	30,000
12,700	1/2	102,000	30,000
15,870	5/8	115,000	37,500
16,000		115,000	37,500
19,050	3/4	131,000	45,000
20,000		131,000	45,000



NC-alkuporat 142°



P ○ päästöhiottu kärki • vain alkuporausta varten • $\geq \varnothing 6,0$ mm kiinnitystasolla varrenmuoto HB

M ○

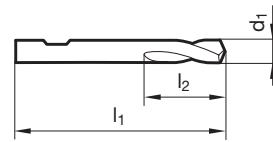
K ○

N ○ universal materiaali sopivuus

S ○

H ○

Materiaali	TKM
Pinta	○
Leikkusuunta	Ⓜ



Artikkelinro.

546

d1		l1	l2
mm	inch	mm	mm
4,000		55,000	12,000
5,000		62,000	14,000
6,000		66,000	16,000
8,000		79,000	21,000
10,000		89,000	25,000
12,000		102,000	30,000

d1		l1	l2
mm	inch	mm	mm
16,000		115,000	37,500
20,000		131,000	45,000



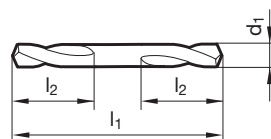
Pop-niittiporat

Materiaali **HSS**

Pinta

Leikkusuunta

P • Kärjen kevennys $\geq \varnothing 1,450$ • kartiovaippahionta • molemminpuoliseen käyttöön • autoteollisuudessa käsin käytettävälle porakoneelle

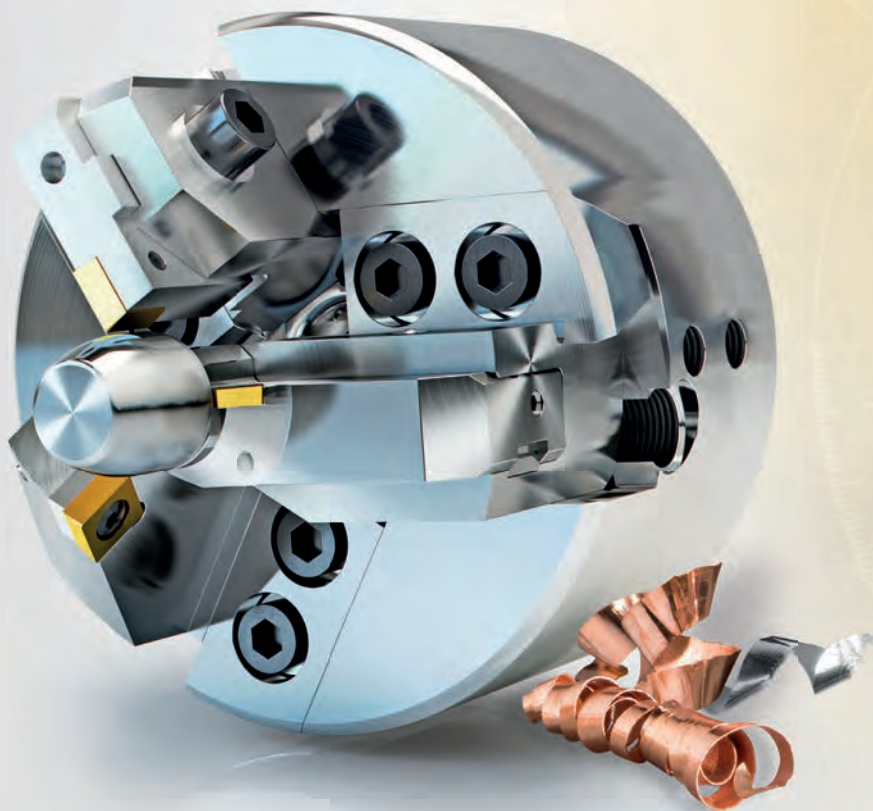
M ○**K** •**N** • ohutlevyt**S** ○**H**Artikkelinro. **554**

d1	l1	l2
mm	mm	mm
1,500	32,000	6,000
1,900	36,000	7,100
2,000	38,000	7,500
2,100	38,000	7,500
2,200	40,000	8,500
2,300	40,000	8,500
2,400	43,000	9,500
2,450	43,000	9,500
2,500	43,000	9,500
2,600	43,000	9,500
2,700	46,000	10,600
2,780	46,000	10,600
2,800	46,000	10,600
2,900	46,000	10,600
3,000	46,000	10,600
3,050	49,000	11,200
3,100	49,000	11,200
3,170	49,000	11,200
3,200	49,000	11,200
3,260	49,000	11,200
3,300	49,000	11,200
3,500	52,000	12,500
3,570	52,000	12,500
3,600	52,000	12,500
3,650	52,000	12,500
3,700	52,000	12,500
3,800	55,000	14,000
3,970	55,000	14,000
4,000	55,000	14,000
4,100	55,000	14,000
4,200	55,000	14,000
4,300	58,000	15,500
4,500	58,000	15,500
4,600	58,000	15,500
4,760	62,000	17,000
4,800	62,000	17,000

d1	l1	l2
mm	mm	mm
4,900	62,000	17,000
5,000	62,000	17,000
5,100	62,000	17,000
5,200	62,000	17,000
5,300	62,000	17,000
5,400	66,000	19,000
5,500	66,000	19,000
5,560	66,000	19,000
5,600	66,000	19,000
5,800	66,000	19,000
5,900	66,000	19,000
5,950	66,000	19,000
6,000	66,000	19,000
6,100	70,000	21,200
6,350	70,000	21,200
6,500	70,000	21,200
6,800	74,000	23,600
7,000	74,000	23,600
7,100	74,000	23,600
7,500	74,000	23,600
7,940	79,000	25,000
8,000	79,000	25,000
8,500	79,000	25,000
8,600	84,000	25,000
9,000	84,000	25,000
9,500	84,000	25,000
9,520	89,000	25,000
10,000	89,000	25,000

GE 100

Monitoiminen työkalujärjestelmä
viimeistely työstöön.
Jopa 5 työsuoritusta yhdellä työkalulla.



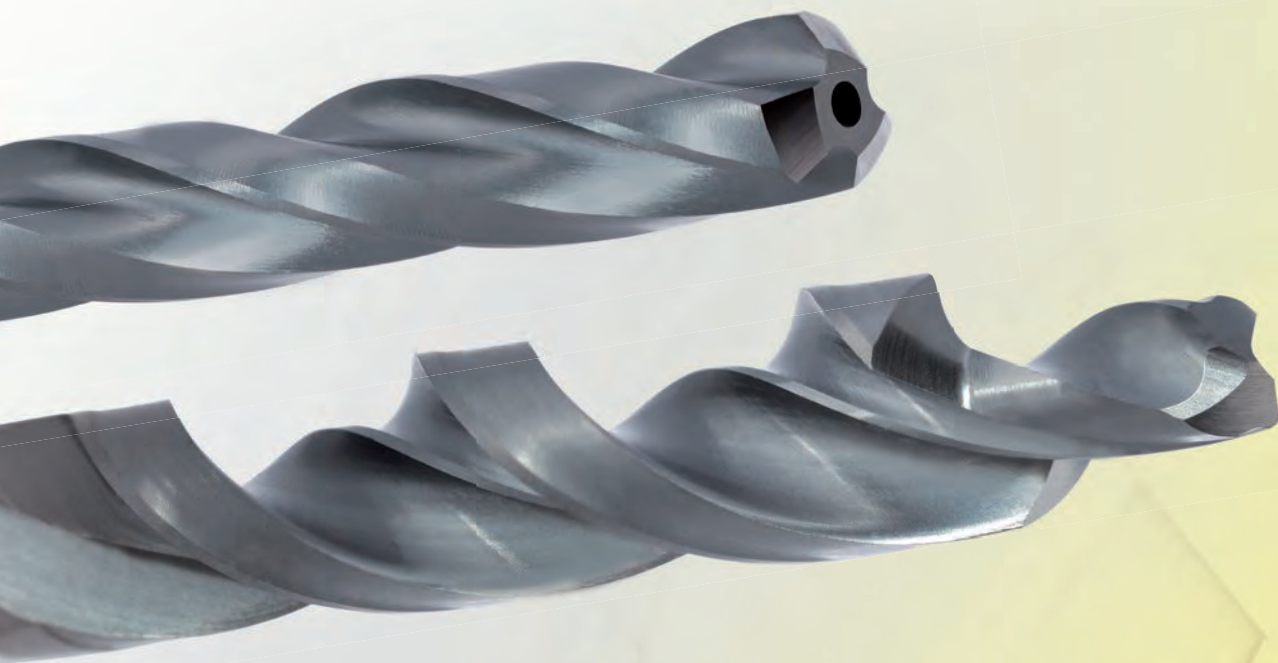
Kaksi tai neljä säädettävää pidintä
yhdessä keskiö- tai upotusporan
kanssa vähentää työstöajan
sekunteihin.



Lisää tietoa GE 100-luettelosta.



PORRASPORAT / VÄLJENNYSPORAT





P	M	K	N	S	H	Työkalun kuvaus	Standardi	Muoto	Malli	Leikkusuunta	Materiaali	Pinta	d1/mm	Artikkeli nro.	Leikkuarvosivu	Sivu
Upotusporat DIN 332 keskitystä varten																
•	•	•	•	•	•		WN	D	N	R	HSS	●	8,000 - 40,000	274	804	714
•	•	•	•	•	•		WN	DR	N	R	HSS	●	8,000 - 40,000	574	804	715
•	•	•	•	•	•		WN	D	N	R	HSS	●	8,000 - 20,000	575	804	716
•	•	•	•	•	•		WN	D	N	R	HSS	●	14,000 - 40,000	576	804	717
Lyhyet upotusporat																
•	•	•	•	•	•		WN		N	R	HSS	○	6,000 - 19,000	378	804	718
•	•	•	•	•	•		WN		N	R	HSS	○	6,600 - 21,500	1147	804	719
•	•	•	•	•	•		WN		N	R	HSS	○	6,000 - 18,000	379	804	720
•	•	•	•	•	•		WN		N	R	HSS	○	3,400 - 13,500	380	804	721
Lieriövaritiset porrasporat																
•	•	•	•	•	•		DIN 8374	A	N	R	HSS	●	6,000 - 15,000	536	806	722
•	•	•	•	•	•		DIN 8374	B	N	R	HSS	●	7,500 - 19,000	569	806	723
•	•	•	•	•	•		WN		N	R	HSS	●	6,600 - 17,200	636	806	724
•	•	•	•	•	•		WN		N	R	HSS	●	6,000 - 8,000	638	806	725
•	•	•	•	•	•		DIN 8376		N	R	HSS	●	6,000 - 18,000	538	806	726
○	○	○	○	○	○		WN		N	R	VHM	○	6,000 - 15,000	738		727
•	•	•	•	•	•		WN		N	R	HSS	●	5,900 - 17,500	514	806	728
•	•	•	•	•	•		DIN 8378		N	R	HSS	●	3,400 - 13,500	540	806	729
○	○	○	○	○	○		WN		N	R	VHM	○	4,500 - 11,000	739		730
Porrasporat, kartiovaritiset																
•	•	•	•	•	•		WN		N	R	HSS	●	11,500 - 23,000	637	806	731
•	•	•	•	•	•		WN		N	R	HSS	●	11,000 - 29,000	537	806	732
•	•	•	•	•	•		WN		N	R	HSS	●	18,000 - 26,000	639	806	733
•	•	•	•	•	•		DIN 8377		N	R	HSS	●	10,000 - 33,000	539	806	734
•	•	•	•	•	•		WN		N	R	HSS	●	9,400 - 33,000	520	806	735

Porrasporat / väljennysporat

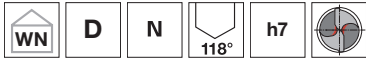


P	M	K	N	S	H	Työkälu kuvaus	Standardi	Muoto	Malli	Leikkusuunta	Materiaali	Pinta	d1/mm	Artikkeli nro.	Leikkuarvosivu	Sivu	
						Porrasperat, kartiovartiset											
•	○	•	○				DIN 8379		N	R	HSS	●	9,000 - 22,000	541	806	736	
						Lieriövartiset väljennysporat											
•	○	•	○				DIN 344		N	R	HSS	●	3,800 - 20,000	533	800	737	
○	○	○	○	○	○		WN		N	R	HM	○	3,800 - 15,000	750		739	
						Väljennysporat, kartiovartiset											
•	○	•	○				DIN 343		N	R	HSS	●	7,800 - 50,000	534	800	740	
•	○	•	•	○			DIN 343		N	R	HSCO	●	8,500 - 26,000	634	800	742	
•	○	•	○				DIN 1864		N	R	HSS	●	5,000 - 30,000	555	800	743	
•	○	•	•	○			DIN 1864		N	R	HSCO	●	8,000 - 15,000	635	800	744	
○	○	○	○	○	○		WN		N	R	HM	○	28,700 - 39,600	729		745	
						Kartiosokkarelänporat											
•	○	•	○				DIN 1898		N	R	HSS	● _{2,36}	2,000 - 12,000	531		746	
•	○	•	○				DIN 1898		N	R	HSS	●	5,000 - 25,000	532		747	

Porrasperat / väljennysporat



Upotusporat DIN 332 keskitystä varten

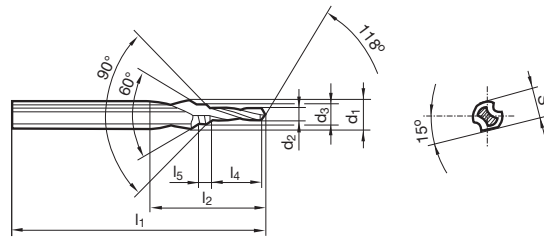


- P** • Kärjen kevennys $\geq \varnothing 8,000$ • kärjrn kevennyksen arvo viittaa nimellis- \varnothing
- M** ○ d1 • kartiovaippahionta • tasohiottu varsi • 60° kärkiupotinkulma
- K** • • kierteen alkureiänporaus DIN 332, lomake 2, muoto D • käyttö keskiöinti- ja katkaisukoneissa
- N** •
- S** ○
- H**

Materiaali	HSS
Pinta	●
Leikkusuunta	Ⓜ

GÜHRING NAVIGATOR

Leikkuuarvosivu 804

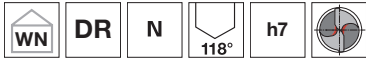


Artikkelinro. **274**

d1 h7	d2 h8	d3	l1	l2	l4	l5	S	kierteelle
mm	mm	mm	mm	mm	mm	mm	mm	
8,000	3,300	4,300	63,000	23,000	11,000	1,600	6,750	M 4
10,000	4,200	5,300	67,000	27,000	13,000	2,150	8,450	M 5
12,500	5,000	6,400	71,000	33,000	16,000	2,900	10,450	M 6
14,000	6,800	8,400	88,000	41,000	19,500	3,500	12,500	M 8
16,000	8,500	10,500	94,000	47,000	23,000	4,700	14,850	M10
20,000	10,200	13,000	105,000	59,000	28,000	6,500	18,450	M12
25,000	14,000	17,000	132,000	67,000	33,000	8,300	23,400	M16
31,500	17,500	21,000	145,000	76,500	38,000	10,350	29,350	M20
40,000	21,000	25,000	160,000	90,000	45,000	12,000	36,500	M24



Upotusporat DIN 332 keskitystä varten

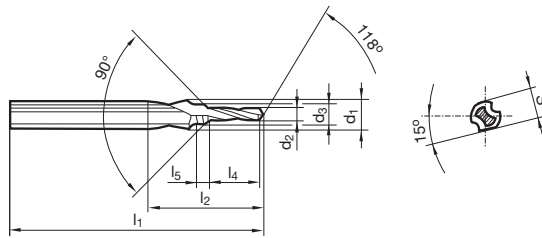


- P** • Kärjen kevennys $\geq \varnothing 8,000$ • kärjrn kevennyksen arvo viittaa nimellis- \varnothing
- M** ○ d1 • kartiovaippahionta • tasohiottu varsi • 60° kärkiupotinkulma
- K** • • kierteen alkureiänporaus DIN 332 mukaan, lomake 2, muoto DR
- N** • • käyttö keskiöinti- ja katkaisukoneissa
- S** ○
- H** ○

Materiaali	HSS
Pinta	●
Leikkusuunta	Ⓜ

GÜHRING NAVIGATOR

Leikkuarvosivu 804

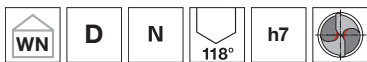


Artikkelinro. **574**

d1 h7	d2 h8	d3	l1	l2	l4	l5	S	kierteelle
mm	mm	mm	mm	mm	mm	mm	mm	
8,000	3,300	4,300	63,000	23,000	11,000	1,600	6,750	M 4
10,000	4,200	5,300	67,000	27,000	13,000	2,150	8,450	M 5
12,500	5,000	6,400	71,000	33,000	16,000	2,900	10,450	M 6
14,000	6,800	8,400	88,000	41,000	19,500	3,500	12,500	M 8
16,000	8,500	10,500	94,000	47,000	23,000	4,700	14,850	M10
20,000	10,200	13,000	105,000	59,000	28,000	6,500	18,450	M12
25,000	14,000	17,000	132,000	67,000	33,000	8,300	23,400	M16
31,500	17,500	21,000	145,000	76,500	38,000	10,350	29,350	M20
40,000	21,000	25,000	160,000	90,000	45,000	12,000	36,500	M24



Upotusporat DIN 332 keskitystä varten



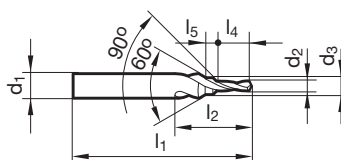
P • Kärjen kevennys $\geq \varnothing 8,000$ • kärjrn kevennyksen arvo viittaa nimellis- $\varnothing d1$ • kartiovaippahionta • 60° kärkiupotinkulma • kierteen alkureiänporaus DIN 332, lomake 2, muoto D

- K** •
- N** •
- S** ○
- H**

GÜHRING NAVIGATOR

Leikkuarvosivu 804

Materiaali	HSS
Pinta	●
Leikkusuunta	Ⓜ

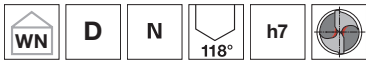


Artikkelinro. **575**

d1 h7	d2 h8	d3	l1	l2	l4	l5	kierteelle
mm	mm	mm	mm	mm	mm	mm	
8,000	3,300	4,300	63,000	23,000	11,000	1,600	M 4
10,000	4,200	5,300	67,000	27,000	13,000	2,150	M 5
12,500	5,000	6,400	71,000	33,000	16,000	2,900	M 6
14,000	6,800	8,400	88,000	41,000	19,500	3,500	M 8
16,000	8,500	10,500	94,000	47,000	23,000	4,700	M10
20,000	10,200	13,000	105,000	59,000	28,000	6,500	M12



Upotusporat DIN 332 keskitystä varten



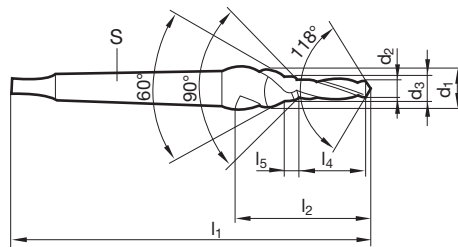
P • Kärjen kevennys $\geq \varnothing 14,000$ • kärjrn kevennyksen arvo viittaa nimellis- $\varnothing d1$ • kartiovaippahionta • 60° kärkiupotinkulma • kierteen alkureiänporaus DIN 332, lomake 2, muoto D

- K** •
- N** •
- S** ○
- H** ○

Materiaali	HSS
Pinta	●
Leikkusuunta	Ⓜ

GÜHRING NAVIGATOR

Leikkuarvosivu 804



Artikkelinro. **576**

d1 h7	d2 h8	d3	l1	l2	l4	l5	kierteelle
mm	mm	mm	mm	mm	mm	mm	
14,000	6,800	8,400	110,000	41,000	19,500	3,500	M 8
16,000	8,500	10,500	131,000	47,000	23,000	4,700	M10
20,000	10,200	13,000	145,000	59,000	28,000	6,500	M12
25,000	14,000	17,000	172,000	67,000	33,000	8,300	M16
31,500	17,500	21,000	184,000	76,500	38,000	10,350	M20
40,000	21,000	25,000	222,000	90,000	45,000	12,000	M24



Lyhyet upotusporat

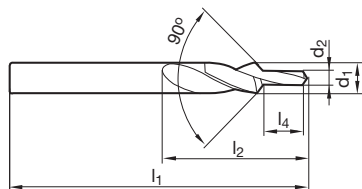


- P** • Kärjen kevennys $\geq \varnothing 6,000$ • kärjn kevennyksen arvo viittaa nimellis- \varnothing d1 • kartiovaippahionta • erittäin suuri kiertöjäykkyys • CNC- ja NC-koneille • läpiporaus DIN EN 20273 mukaan, hieno toleranssi • 90° ruuvinpäänupotukselle DIN 74 mukaan, muoto A • f pienemmän halkaisijan mukaan • vc suuremman halkaisijan mukaan
- M** ○
- K** •
- N** •
- S** ○
- H** ○

Materiaali	HSS
Pinta	○
Leikkusuunta	Ⓜ

GÜHRING NAVIGATOR

Leikkuarvosivu 804



Artikkelinro. 378

d1	d2 h6	l1	l2	l4	kierteelle
mm	mm	mm	mm	mm	
6,000	3,200	66,000	28,000	9,000	M 3
8,000	4,300	79,000	37,000	11,000	M 4
10,000	5,300	89,000	43,000	13,000	M 5
11,500	6,400	95,000	47,000	15,000	M 6
15,000	8,400	111,000	56,000	19,000	M 8
19,000	10,500	127,000	64,000	23,000	M 10



Lyhyet upotusporat

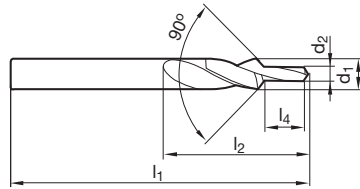


- P** • Kärjen kevennys $\geq \varnothing 6,600$ • kärjn kevennyksen arvo viittaa nimellis- $\varnothing d1$ • kartiovaippahionta • erittäin suuri kiertöjäykkyys • CNC- ja NC-koneille • läpireille DIN EN 20273 mukaan, keskisuuri sovite • 90° ruuvinpäänupotukselle DIN 74 mukaan, muoto A • f pienemmän halkaisijan mukaan • vc suuremman halkaisijan mukaan
- M** ○
- K** •
- N** •
- S** ○
- H** ○

Materiaali	HSS
Pinta	○
Leikkusuunta	Ⓜ

GÜHRING NAVIGATOR

Leikkuarvosivu 804



Artikkelinro. **1147**

d1	d2 h6	l1	l2	l4	kierteelle
mm	mm	mm	mm	mm	
6,600	3,400	70,000	31,000	9,000	M 3
9,000	4,500	84,000	40,000	11,000	M 4
11,000	5,500	95,000	47,000	13,000	M 5
13,000	6,600	102,000	51,000	15,000	M 6
17,200	9,000	123,000	62,000	19,000	M 8
21,500	11,000	141,000	70,000	23,000	M 10



Lyhyet upotusporat

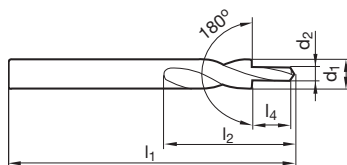


- P** • Kärjen kevennys $\geq \varnothing 6,000$ • kärjn kevennyksen arvo viittaa nimellis- \varnothing d1 • kartiovaippahionta • erittäin suuri kiertöjäykkyys • CNC- ja NC-koneille • läpireille DIN EN 20273 mukaan, keskisuuri sovite
- M** ○
- K** • ruuvikannan upotuksille 180° DIN 974, sarja 1 mukaan • ruuveille DIN 6912, 7984, 34821, DIN EN ISO 1207, 4762, 14579, 14580 • f pienemmän halkaisijan mukaan • vc suuremman halkaisijan mukaan
- N** •
- S** ○
- H** ○

GÜHRING NAVIGATOR

Leikkuuarvosivu 804

Materiaali	HSS
Pinta	○
Leikkusuunta	Ⓜ



Artikkelinro. **379**

d1	d2 h6	l1	l2	l4	kierteelle
mm	mm	mm	mm	mm	
6,000	3,400	66,000	28,000	9,000	M 3
8,000	4,500	79,000	37,000	11,000	M 4
10,000	5,500	89,000	43,000	13,000	M 5
11,000	6,600	95,000	47,000	15,000	M 6
15,000	9,000	111,000	56,000	19,000	M 8
18,000	11,000	123,000	62,000	23,000	M 10



Lyhyet upotusporat



- P** • Kärjen kevennys $\geq \varnothing 3,400$ • kärjn kevennyksen arvo viittaa nimellis- \varnothing d1 • kartiovaippahionta • erittäin suuri kiertöjäykkyys • CNC- ja
- M** ○ NC-koneille • kierteen alkureiänporaus DIN 336 mukaan • 90°
- K** • kärkiupotukselle läpireille DIN EN 20273 mukaan, keskisovite • f pienemmän halkaisijan mukaan • vc suuremman halkaisijan mukaan
- N** •
- S** ○
- H** ○

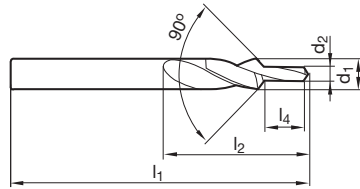
Materiaali **HSS**

Pinta ○

Leikkusuunta

GÜHRING NAVIGATOR

Leikkuarvosivu 804



Artikkelinro. **380**

d1	d2 h6	l1	l2	l4	kierteelle
mm	mm	mm	mm	mm	
3,400	2,500	52,000	20,000	8,800	M 3
4,500	3,300	58,000	24,000	11,400	M 4
5,500	4,200	66,000	28,000	13,600	M 5
6,600	5,000	70,000	31,000	16,500	M 6
9,000	6,800	84,000	40,000	21,000	M 8
11,000	8,500	95,000	47,000	25,500	M 10
13,500	10,200	107,000	54,000	30,000	M 12



Lieriövartiset porrasporat

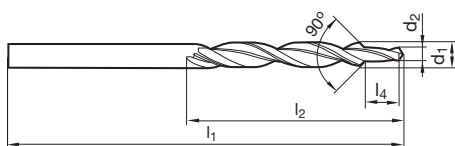


- P** • Kärjen kevennys $\geq \varnothing 6,000$ • kärjn kevennyksen arvo viittaa nimellis- $\varnothing d1$ • kartiovaippahionta • läpiporaus DIN EN 20273 mukaan, hieno toleranssi • ruuvinkannan 90° upotuksille • f pienemmän halkaisijan mukaan • vc suuremman halkaisijan mukaan
- M** ○
- K** •
- N** ○
- S** ○
- H** ○

GÜHRING NAVIGATOR

Leikkuuarvosivu 806

Materiaali	HSS
Pinta	●
Leikkusuunta	Ⓜ

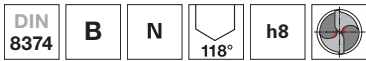


Artikkelinro. **536**

d1 h8	d2 h9	l1	l2	l4	kierteelle
mm	mm	mm	mm	mm	
6,000	3,200	93,000	57,000	9,000	M 3
8,000	4,300	117,000	75,000	11,000	M 4
10,000	5,300	133,000	87,000	13,000	M 5
11,500	6,400	142,000	94,000	15,000	M 6
15,000	8,400	169,000	114,000	19,000	M 8



Lieriövartiset porrasporat



P • Kärjen kevennys $\geq \varnothing 7,500$ • kärjn kevennyksen arvo viittaa nimellis- $\varnothing d1$ • kartiovaippahionta • läpireille DIN EN 20273 mukaan, keskisuuri sovite • 90° ruuvinpäänupotukselle DIN 74, muoto A ja F • f pienemmän halkaisijan mukaan • vc suuremman halkaisijan mukaan



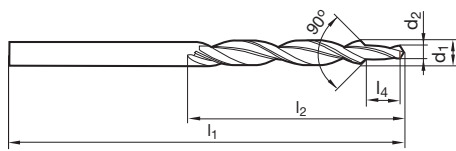
Materiaali **HSS**

Pinta

Leikkusuunta

GÜHRING NAVIGATOR

Leikkuarvosivu 806



Artikkelinro. **569**

d1 h8	d2 h9	l1	l2	l4	kierteelle
mm	mm	mm	mm	mm	
7,500	3,400	109,000	69,000	9,000	M 3
9,700	4,500	133,000	87,000	11,000	M 4
12,000	5,500	151,000	101,000	13,000	M 5
14,500	6,600	169,000	114,000	15,000	M 6
19,000	9,000	198,000	135,000	19,000	M 8



Lieriövartiset porrasporat

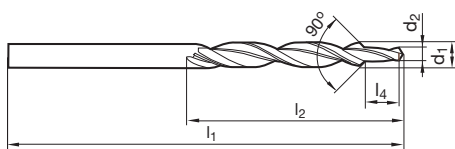


- P** • Kärjen kevennys $\geq \varnothing 6,600$ • kärjn kevennyksen arvo viittaa nimellis- $\varnothing d1$ • kartiovaippahionta • läpireille DIN EN 20273 mukaan, keskisuuri sovite • 90° ruuvinpäänupotukselle DIN 74 mukaan (julkaisu 12.1980 peruttu), muoto A ja B • f pienemmän halkaisijan mukaan • vc suuremman halkaisijan mukaan
- M** ○
- K** •
- N** ○
- S**
- H**

GÜHRING NAVIGATOR

Leikkuuarvosivu 806

Materiaali	HSS
Pinta	●
Leikkusuunta	Ⓜ



Artikkelinro. **636**

d1 h8	d2 h9	l1	l2	l4	kierteelle
mm	mm	mm	mm	mm	
6,600	3,400	101,000	63,000	9,000	M 3
9,000	4,500	125,000	81,000	11,000	M 4
11,000	5,500	142,000	94,000	13,000	M 5
13,000	6,600	151,000	101,000	15,000	M 6
17,200	9,000	191,000	130,000	19,000	M 8



Lieriövartiset porrasporat



Materiaali **HSS**

Pinta

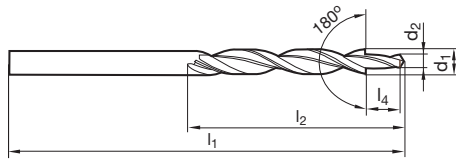
Leikkusuunta

P • Kärjen kevennys $\geq \varnothing 6,000$ • kärjn kevennyksen arvo viittaa nimellis- $\varnothing d1$ • kartiovaippahionta • läpiporaus DIN EN 20273 mukaan, hieno toleranssi • ruuvikannan upotuksille 180° DIN 974, sarja 1 mukaan • • f pienemmän halkaisijan mukaan • vc suuremman halkaisijan mukaan

- M** ○
- K** •
- N** ○
- S** ○
- H** ○

GÜHRING NAVIGATOR

Leikkuarvosivu 806



Artikkelinro. **638**

d1 h8	d2 h9	l1	l2	l4	kierteelle
mm	mm	mm	mm	mm	
6,000	3,200	93,000	57,000	9,000	M 3
8,000	4,300	117,000	75,000	11,000	M 4



Lieriövartiset porrasporat

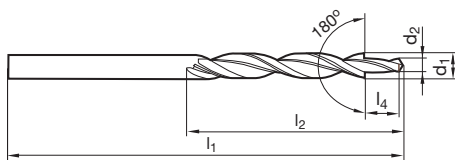


- P** • Kärjen kevennys $\geq \varnothing 6,000$ • kärjn kevennyksen arvo viittaa nimellis- $\varnothing d1$ • kartiovaippahionta • läpireille DIN EN 20273 mukaan, keskisuuri sovite • ruuvikannan upotuksille 180° DIN 974, sarja 1 mukaan • ruuveille DIN 6912, 7984, 34821, DIN EN ISO 1207, 4762, 14579, 14580 und DIN 7513, 7516, 7500-1 • f pienemmän halkaisijan mukaan • vc suuremman halkaisijan mukaan
- M** ○
- K** •
- N** ○
- S** ○
- H** ○

GÜHRING NAVIGATOR

Leikkuuarvosivu 806

Materiaali	HSS
Pinta	●
Leikkusuunta	Ⓜ



Artikkelinro. 538

d1 h8	d2 h9	l1	l2	l4	kierteelle
mm	mm	mm	mm	mm	
6,000	3,400	93,000	57,000	9,000	M 3
8,000	4,500	117,000	75,000	11,000	M 4
10,000	5,500	133,000	87,000	13,000	M 5
11,000	6,600	142,000	94,000	15,000	M 6
15,000	9,000	169,000	114,000	19,000	M 8
18,000	11,000	191,000	130,000	23,000	M 10



Lieriövartiset porrasporat

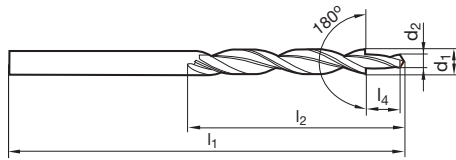


Materiaali **TKM**

Pinta ○

Leikkusuunta

- P** ○ Kärjen kevennys $\geq \varnothing 6,000$ • kartiovaippahionta • läpireille DIN EN 20273 mukaan, keskisuuri sovite • ruuvikannan upotuksille 180° DIN 974, sarja 1 mukaan • • f pienemmän halkaisijan mukaan • vc suuremman halkaisijan mukaan
- M** ○
- K** ○
- N** ○
- S** ○ universal materiaali sopivuus
- H** ○



Artikkelinro. **738**

d1 h8	d2 h9	l1	l2	l4	kierteelle
mm	mm	mm	mm	mm	
6,000	3,400	93,000	57,000	9,000	M 3
8,000	4,500	117,000	75,000	11,000	M 4
10,000	5,500	133,000	87,000	13,000	M 5
11,000	6,600	142,000	94,000	15,000	M 6
15,000	9,000	169,000	114,000	19,000	M 8



Lieriövartiset porrasporat



Materiaali **HSS**

Pinta

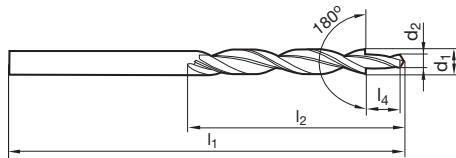
Leikkusuunta

P • Kärjen kevennys $\geq \varnothing 5,900$ • kärjn kevennyksen arvo viittaa nimellis- $\varnothing d1$ • kartiovaippahionta • • ruuveille DIN 84, 912, 6912 • f pienemmän halkaisijan mukaan • vc suuremman halkaisijan mukaan

- M** ○
- K** •
- N** ○
- S** ○
- H** ○

GÜHRING NAVIGATOR

Leikkuarvosivu 806



Artikkelinro. **514**

d1 h8	d2 h9	l1	l2	l4	kierteelle
mm	mm	mm	mm	mm	
5,900	3,200	93,000	57,000	11,000	M 3
7,400	4,300	109,000	69,000	13,000	M 4
8,000	4,800	117,000	75,000	13,000	M 4
9,400	5,300	125,000	81,000	16,000	M 5
10,000	5,800	133,000	87,000	16,000	M 5
10,400	6,400	133,000	87,000	19,000	M 6
11,000	7,000	142,000	94,000	19,000	M 6
13,500	8,400	160,000	108,000	22,000	M 8
16,500	10,500	184,000	125,000	25,000	M 10
17,500	11,500	191,000	130,000	25,000	M 10



Lieriövartiset porrasporat

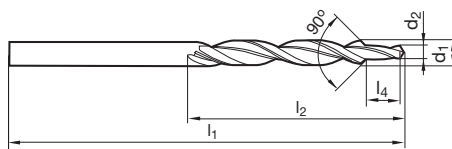


- P** ● Kärjen kevennys $\geq \varnothing 3,400$ • kärjn kevennyksen arvo viittaa nimellis- \varnothing d1 • kartiovaippahionta • kierteen alkureiänporaus DIN 336 mukaan
- M** ○ • 90° kärkiupotukselle läpireille DIN EN 20273 mukaan, keskisovite • f pienemmän halkaisijan mukaan • vc suuremman halkaisijan mukaan
- K** ●
- N** ○
- S** ○
- H** ○

GÜHRING NAVIGATOR

Leikkuuarvosivu 806

Materiaali	HSS
Pinta	●
Leikkusuunta	Ⓜ



Artikkelinro. **540**

d1 h8	d2 h9	l1	l2	l4	kierteelle
mm	mm	mm	mm	mm	
3,400	2,500	70,000	39,000	8,800	M 3
4,500	3,300	80,000	47,000	11,400	M 4
5,500	4,200	93,000	57,000	13,600	M 5
6,600	5,000	101,000	63,000	16,500	M 6
9,000	6,800	125,000	81,000	21,000	M 8
11,000	8,500	142,000	94,000	25,500	M 10
13,500	10,200	160,000	108,000	30,000	M 12

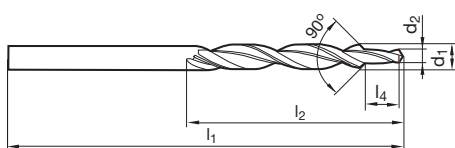


Lieriövartiset porrasporat



- P** ○ Kärjen kevennys $\geq \varnothing 4,500$ • kartiovaippahionta • kierteen alkureiänporaus DIN 336 mukaan • 90° kärkiupotukselle läpireille DIN EN 20273 mukaan, keskisovite • f pienemmän halkaisijan mukaan • vc suuremman halkaisijan mukaan
- M** ○
- K** ○
- N** ○
- S** ○ universal materiaali sopivuus
- H** ○

Materiaali	TKM
Pinta	○
Leikkusuunta	Ⓜ

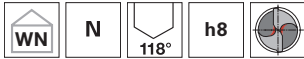


Artikkelinro. 739

d1 h8	d2 h9	l1	l2	l4	kierteelle
mm	mm	mm	mm	mm	
4,500	3,300	80,000	47,000	11,400	M 4
5,500	4,200	93,000	57,000	13,600	M 5
6,600	5,000	101,000	63,000	16,500	M 6
9,000	6,800	125,000	81,000	21,000	M 8
11,000	8,500	142,000	94,000	25,500	M 10



Porrasperat, kartiovartiset



Materiaali **HSS**

Pinta



Leikkusuunta

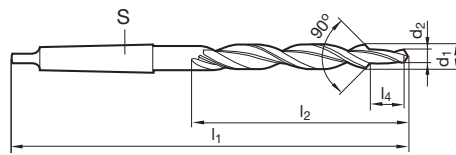


P • Kärjen kevennys $\geq \varnothing 11,500$ • kärjrn kevennyksen arvo viittaa nimellis- \varnothing d1 • kartiovaippahionta • läpiporaus DIN EN 20273 mukaan, hieno toleranssi • 90° ruuvinpäänupotukselle DIN 74 mukaan (julkaisu 12.1980 peruttu), muoto A, hieno sovite • f pienemmän halkaisijan mukaan • vc suuremman halkaisijan mukaan



GÜHRING NAVIGATOR

Leikkuarvosivu 806



Artikkelinro.

637

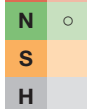
d1 h8	d2 h9	S	l1	l2	l4	kierteelle
mm	mm		mm	mm	mm	
11,500	6,400	MK-1	175,000	94,000	15,000	M 6
15,000	8,400	MK-2	212,000	114,000	19,000	M 8
19,000	10,500	MK-2	233,000	135,000	23,000	M 10
23,000	13,000	MK-2	253,000	155,000	27,000	M 12



Porrasporat, kartiovartiset



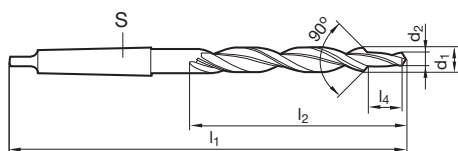
P • Kärjen kevennys $\geq \varnothing 11,000$ • kärjrn kevennyksen arvo viittaa nimellis- $\varnothing d1$ • kartiovaippahionta • läpireille DIN EN 20273 mukaan, keskiuuri sovite • 90° ruuvinpäänupotukselle DIN 74 mukaan (julkaisu 12.1980 peruttu), muoto A ja B • f pienemmän halkaisijan mukaan • vc suuremman halkaisijan mukaan



GÜHRING NAVIGATOR

Leikkuuarvosivu 806

Materiaali	HSS
Pinta	●
Leikkusuunta	Ⓜ



Artikkelinro. **537**

d1 h8	d2 h9	S	l1	l2	l4	kierteelle
mm	mm		mm	mm	mm	
11,000	5,500	MK-1	175,000	94,000	13,000	M 5
17,200	9,000	MK-2	228,000	130,000	19,000	M 8
21,500	11,000	MK-2	248,000	150,000	23,000	M 10
26,000	14,000	MK-3	286,000	165,000	27,000	M 12
29,000	16,000	MK-3	296,000	175,000	31,000	M 14



Porrasporat, kartiovartiset


 Materiaali **HSS**

Pinta



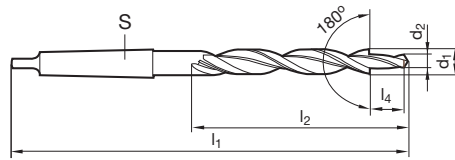
Leikkusuunta



- P** • Kärjen kevennys $\geq \varnothing 10,000$ • kärjrn kevennyksen arvo viittaa nimellis- \varnothing
M ○ d1 • kartiovaippahionta • läpiporaus DIN EN 20273 mukaan, hieno
 toleranssi • ruuvikannan upotuksille 180° DIN 974, sarja 1 mukaan
K • ruuveille DIN 6912, 7984, 34821, DIN EN ISO 1207, 4762, 14579, 14580
N ○ • f pienemmän halkaisijan mukaan • vc suuremman halkaisijan mukaan
S ○
H ○

GÜHRING NAVIGATOR

Leikkuarvosivu 806



Artikkelinro.

639

d1 h8	d2 h9	S	l1	l2	l4	kierteelle
mm	mm		mm	mm	mm	
18,000	10,500	MK-2	228,000	130,000	23,000	M 10
20,000	13,000	MK-2	238,000	140,000	27,000	M 12
26,000	17,000	MK-3	286,000	165,000	35,000	M 16



Porrasporat, kartiovartiset

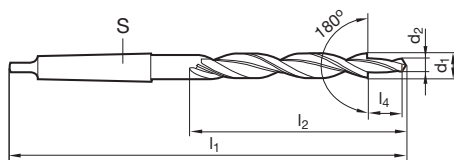


- P** • Kärjen kevennys $\geq \varnothing 10,000$ • kärjrn kevennyksen arvo viittaa nimellis- \varnothing d1 • kartiovaippahionta • läpireille DIN EN 20273 mukaan, keski-suuri sovite • ruuvikannan upotuksille 180° DIN 974, sarja 1 mukaan • ruuveille DIN 6912, 7984, 34821, DIN EN ISO 1207, 4762, 14579, 14580 und DIN 7513, 7516, 7500-1 • f pienemmän halkaisijan mukaan • vc suuremman halkaisijan mukaan
- M** ○
- K** •
- N** ○
- S** ○
- H** ○

GÜHRING NAVIGATOR

Leikkuuarvosivu 806

Materiaali	HSS
Pinta	●
Leikkuusuunta	Ⓜ

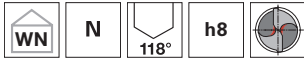


Artikkelinro. **539**

d1 h8	d2 h9	S	l1	l2	l4	kierteelle
mm	mm		mm	mm	mm	
10,000	5,500	MK-1	168,000	87,000	13,000	M 5
11,000	6,600	MK-1	175,000	94,000	15,000	M 6
15,000	9,000	MK-2	212,000	114,000	19,000	M 8
18,000	11,000	MK-2	228,000	130,000	23,000	M 10
20,000	13,500	MK-2	238,000	140,000	27,000	M 12
26,000	17,500	MK-3	286,000	165,000	35,000	M 16
30,000	20,000	MK-3	296,000	175,000	39,000	M 18
33,000	22,000	MK-4	334,000	185,000	43,000	M 20



Porrasperat, kartiovartiset

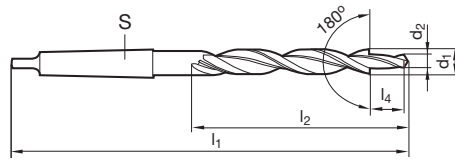


- P** ● Kärjen kevennys $\geq \varnothing 9,400$ • kärjn kevennyksen arvo viittaa nimellis- \varnothing d1 • kartiovaippahionta • läpiporaukselle vanhoilla upotinmuodoilla
- M** ○ H, J, K, DIN 75 mukaan, lomake 2, keski- ja hienosovitteille • ruuveille DIN 84, 912, 6912 • f pienemmän halkaisijan mukaan • vc suuremman halkaisijan mukaan
- K** ●
- N** ○
- S** ○
- H** ○

GÜHRING NAVIGATOR

Leikkuuarvosivu 806

Materiaali	HSS
Pinta	●
Leikkuusuunta	Ⓜ



Artikkelinro. **520**

d1 h8	d2 h9	S	l1	l2	l4	kierteelle
mm	mm		mm	mm	mm	
9,400	5,300	MK-1	162,000	81,000	16,000	M 5
10,000	5,800	MK-1	168,000	87,000	16,000	M 5
11,000	7,000	MK-1	175,000	94,000	19,000	M 6
13,500	8,400	MK-1	189,000	108,000	22,000	M 8
16,500	10,500	MK-2	223,000	125,000	25,000	M 10
17,500	11,500	MK-2	228,000	130,000	25,000	M 10
19,000	13,000	MK-2	233,000	135,000	28,000	M 12
20,000	14,000	MK-2	238,000	140,000	28,000	M 12
23,000	15,000	MK-2	253,000	155,000	30,000	M 14
24,000	16,000	MK-3	281,000	160,000	30,000	M 14
25,000	17,000	MK-3	281,000	160,000	33,000	M 16
26,000	18,000	MK-3	286,000	165,000	33,000	M 16
28,000	19,000	MK-3	291,000	170,000	36,000	M 18
29,000	20,000	MK-3	296,000	175,000	36,000	M 18
31,000	21,000	MK-3	301,000	180,000	39,000	M 20
33,000	23,000	MK-4	334,000	185,000	39,000	M 20

Porrasperat /
väljennysporat



Porrasporat, kartiovartiset

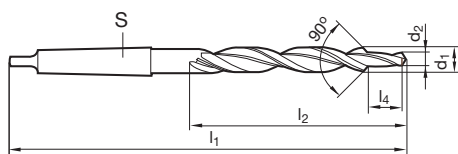


- P** • Kärjen kevennys $\geq \varnothing 9,000$ • kärjn kevennyksen arvo viittaa nimellis- $\varnothing d1$ • kartiovaippahionta • kierteen alkureiänporaus DIN 336 mukaan
- M** ○ • 90° kärkiupotukselle läpireille DIN EN 20273 mukaan, keskisovite • f pienemmän halkaisijan mukaan • vc suuremman halkaisijan mukaan
- K** •
- N** ○
- S** ○
- H** ○

GÜHRING NAVIGATOR

Leikkuuarvosivu 806

Materiaali	HSS
Pinta	●
Leikkusuunta	Ⓜ



Artikkelinro. **541**

d1 h8	d2 h9	S	l1	l2	l4	kierteelle
mm	mm		mm	mm	mm	
9,000	6,800	MK-1	162,000	81,000	21,000	M 8
11,000	8,500	MK-1	175,000	94,000	25,500	M 10
13,500	10,200	MK-1	189,000	108,000	30,000	M 12
15,500	12,000	MK-2	218,000	120,000	34,500	M 14
17,500	14,000	MK-2	228,000	130,000	38,500	M 16
20,000	15,500	MK-2	238,000	140,000	43,500	M 18
22,000	17,500	MK-2	248,000	150,000	47,500	M 20



Lieriövartiset väljennysporat

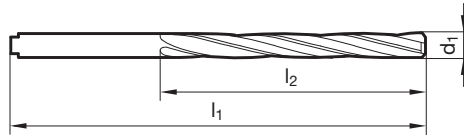


- P** • kartiovaippahionta • erittäin tukeva • esiporatuille/-valetuille/meistetyille reille • vääntiöllä ~ DIN 1809 • korjaa suoruusvirheet • korjaa pyöreysvirheet • parantaa reiän pinnan laatua • viisteen halk. < kierteen alkureikään • huomio alkureiän min. halkaisija • viimeistelykalvinta väljennysporauksen jälkeen
- M** ○
- K** •
- N** ○
- S**
- H**

Materiaali	HSS
Pinta	●
Leikkusuunta	Ⓜ

GÜHRING NAVIGATOR

Leikkuuarvosivu 800



Artikkelinro. **533**

d1	l1	l2	d0 ≥	d1	l1	l2	d0 ≥
mm	mm	mm	mm	mm	mm	mm	mm
3,800	96,000	64,000	2,80	8,200	142,000	100,000	5,60
4,000	96,000	64,000	2,80	8,250	142,000	100,000	5,60
4,100	96,000	64,000	2,80	8,300	142,000	100,000	5,60
4,400	102,000	69,000	3,20	8,400	142,000	100,000	5,60
4,500	102,000	69,000	3,20	8,500	142,000	100,000	5,60
4,600	102,000	69,000	3,20	8,600	151,000	107,000	6,30
4,750	102,000	69,000	3,20	8,700	151,000	107,000	6,30
4,800	108,000	74,000	3,50	8,800	151,000	107,000	6,30
4,900	108,000	74,000	3,50	8,850	151,000	107,000	6,30
5,000	108,000	74,000	3,50	9,000	151,000	107,000	6,30
5,050	108,000	74,000	3,50	9,100	151,000	107,000	6,30
5,100	108,000	74,000	3,50	9,200	151,000	107,000	6,30
5,300	108,000	74,000	3,50	9,300	151,000	107,000	6,30
5,400	116,000	80,000	4,20	9,400	151,000	107,000	6,30
5,500	116,000	80,000	4,20	9,500	151,000	107,000	6,30
5,550	116,000	80,000	4,20	9,650	162,000	116,000	7,00
5,750	116,000	80,000	4,20	9,800	162,000	116,000	7,00
5,800	116,000	80,000	4,20	10,000	162,000	116,000	7,00
5,850	116,000	80,000	4,20	10,100	162,000	116,000	7,00
5,900	116,000	80,000	4,20	10,200	162,000	116,000	7,00
6,000	116,000	80,000	4,20	10,300	162,000	116,000	7,00
6,100	124,000	86,000	4,20	10,500	162,000	116,000	7,00
6,200	124,000	86,000	4,20	10,600	162,000	116,000	7,00
6,250	124,000	86,000	4,20	10,700	173,000	125,000	7,70
6,300	124,000	86,000	4,20	10,750	173,000	125,000	7,70
6,400	124,000	86,000	4,20	10,750	173,000	125,000	7,70
6,400	124,000	86,000	4,20	11,000	173,000	125,000	7,70
6,500	124,000	86,000	4,20	11,250	173,000	125,000	7,70
6,700	124,000	86,000	4,20	11,300	173,000	125,000	7,70
6,800	133,000	93,000	4,90	11,750	184,000	134,000	8,40
7,000	133,000	93,000	4,90	11,800	184,000	134,000	8,40
7,150	133,000	93,000	4,90	12,000	184,000	134,000	8,40
7,200	133,000	93,000	4,90	12,200	184,000	134,000	8,40
7,250	133,000	93,000	4,90	12,500	184,000	134,000	8,40
7,500	133,000	93,000	4,90	12,750	184,000	134,000	9,10
7,600	142,000	100,000	5,60	13,000	184,000	134,000	9,10
7,700	142,000	100,000	5,60	13,500	194,000	142,000	9,80
7,750	142,000	100,000	5,60	13,750	194,000	142,000	9,80
7,800	142,000	100,000	5,60	14,000	194,000	142,000	9,80
7,950	142,000	100,000	5,60	15,000	202,000	147,000	10,50
8,000	142,000	100,000	5,60	15,750	211,000	153,000	11,20
8,050	142,000	100,000	5,60	16,000	211,000	153,000	11,20
8,100	142,000	100,000	5,60	17,000	218,000	159,000	11,90

Porrasporat / väljennysporat

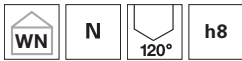


d1	l1	l2	d0 ≥
mm	mm	mm	mm
18,000	226,000	165,000	12,60
20,000	242,000	177,000	14,00

d1	l1	l2	d0 ≥
mm	mm	mm	mm



Lieriövartiset väljennysporat

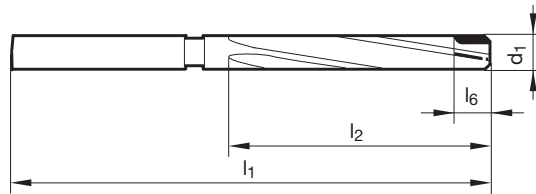


Materiaali **KM**

Pinta ○

Leikkusuunta

- P** ○ kartiovaippahionta • kovametallileikkuulla • esiporatuille/-valetuille/-meistetyille reille • korjaa suoruusvirheet • korjaa pyöreysvirheet
- M** ○ • parantaa reiän pinnan laatua • viisteen halk. < kierteen alkureikään
- K** ○ • huomio alkureiän min. halkaisija
- N** ○
- S** ○ universal materiaali sopivuus
- H** ○



Artikkelinro. **750**

d1	l1	l2	l6	d0 ≥
mm	mm	mm	mm	mm
3,800	96,000	64,000		2,800
4,800	108,000	74,000		3,500
5,000	108,000	74,000		3,500
5,800	116,000	80,000		4,200
6,000	116,000	80,000		4,200
7,000	133,000	93,000		4,900

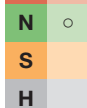
d1	l1	l2	l6	d0 ≥
mm	mm	mm	mm	mm
7,800	142,000	100,000		5,600
8,000	142,000	100,000		5,600
14,000	194,000	142,000	19,000	9,800
15,000	202,000	147,000	19,000	10,500



Väljennysporat, kartiovirtiset



P • kartiovaippahionta • erittäin tukeva • esiporatuille/-valetuille/-meistetyille reille • korjaa suoruusvirheet • korjaa pyöreysvirheet • parantaa reiän pinnan laatua • viisteen halk. < kierteen alkureikään • huomio alkureiän min. halkaisija • viimeistelykalvinta väljennysporauksen jälkeen



Materiaali **HSS**

Pinta

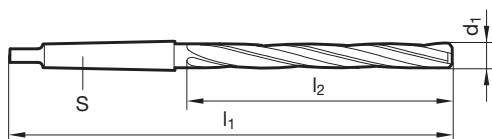


Leikkusuunta



GÜHRING NAVIGATOR

Leikkuarvosivu 800



Artikkelinro.

534

d1	S	l1	l2	d0 ≥
mm		mm	mm	mm
7,800	MK-1	156,000	75,000	5,60
8,000	MK-1	156,000	75,000	5,60
8,100	MK-1	156,000	75,000	5,60
8,800	MK-1	162,000	81,000	6,30
9,000	MK-1	162,000	81,000	6,30
9,200	MK-1	162,000	81,000	6,30
9,700	MK-1	168,000	87,000	7,00
9,800	MK-1	168,000	87,000	7,00
9,900	MK-1	168,000	87,000	7,00
10,000	MK-1	168,000	87,000	7,00
10,100	MK-1	168,000	87,000	7,00
10,200	MK-1	168,000	87,000	7,00
10,750	MK-1	175,000	94,000	7,70
11,000	MK-1	175,000	94,000	7,70
11,100	MK-1	175,000	94,000	7,70
11,250	MK-1	175,000	94,000	7,70
11,500	MK-1	175,000	94,000	7,70
11,750	MK-1	182,000	101,000	8,40
11,800	MK-1	182,000	101,000	8,40
12,000	MK-1	182,000	101,000	8,40
12,200	MK-1	182,000	101,000	8,40
12,300	MK-1	182,000	101,000	8,40
12,500	MK-1	182,000	101,000	8,40
12,700	MK-1	182,000	101,000	9,10
12,750	MK-1	182,000	101,000	9,10
13,000	MK-1	182,000	101,000	9,10
13,250	MK-1	189,000	108,000	9,80
13,500	MK-1	189,000	108,000	9,80
13,750	MK-1	189,000	108,000	9,80
13,800	MK-1	189,000	108,000	9,80
14,000	MK-1	189,000	108,000	9,80
14,100	MK-2	212,000	114,000	10,50
14,200	MK-2	212,000	114,000	10,50
14,450	MK-2	212,000	114,000	10,50
14,500	MK-2	212,000	114,000	10,50
14,750	MK-2	212,000	114,000	10,50
15,000	MK-2	212,000	114,000	10,50
15,250	MK-2	218,000	120,000	11,20
15,500	MK-2	218,000	120,000	11,20
15,750	MK-2	218,000	120,000	11,20
16,000	MK-2	218,000	120,000	11,20
16,150	MK-2	223,000	125,000	11,90

d1	S	l1	l2	d0 ≥
mm		mm	mm	mm
16,200	MK-2	223,000	125,000	11,90
16,250	MK-2	223,000	125,000	11,90
16,500	MK-2	223,000	125,000	11,90
16,750	MK-2	223,000	125,000	11,90
17,000	MK-2	223,000	125,000	11,90
17,500	MK-2	228,000	130,000	12,60
17,750	MK-2	228,000	130,000	12,60
18,000	MK-2	228,000	130,000	12,60
18,100	MK-2	233,000	135,000	13,30
18,250	MK-2	233,000	135,000	13,30
18,500	MK-2	233,000	135,000	13,30
18,700	MK-2	233,000	135,000	13,30
18,750	MK-2	233,000	135,000	13,30
18,800	MK-2	233,000	135,000	13,30
19,000	MK-2	233,000	135,000	13,30
19,250	MK-2	238,000	140,000	14,00
19,500	MK-2	238,000	140,000	14,00
19,700	MK-2	238,000	140,000	14,00
19,750	MK-2	238,000	140,000	14,00
20,000	MK-2	238,000	140,000	14,00
20,200	MK-2	243,000	145,000	14,60
20,250	MK-2	243,000	145,000	14,60
20,500	MK-2	243,000	145,000	14,60
20,700	MK-2	243,000	145,000	14,60
20,750	MK-2	243,000	145,000	14,60
21,000	MK-2	243,000	145,000	14,60
21,500	MK-2	248,000	150,000	15,30
21,700	MK-2	248,000	150,000	15,30
21,750	MK-2	248,000	150,000	15,30
22,000	MK-2	248,000	150,000	15,30
22,250	MK-2	248,000	150,000	15,30
22,400	MK-2	248,000	150,000	15,30
22,500	MK-2	253,000	155,000	16,00
22,700	MK-2	253,000	155,000	16,00
23,000	MK-2	253,000	155,000	16,00
23,500	MK-2	253,000	155,000	16,00
23,700	MK-3	281,000	160,000	16,60
24,000	MK-3	281,000	160,000	16,60
24,200	MK-3	281,000	160,000	16,60
24,500	MK-3	281,000	160,000	17,30
24,700	MK-3	281,000	160,000	17,30
24,750	MK-3	281,000	160,000	17,30
25,000	MK-3	281,000	160,000	17,30

Porrasporat / väljennysporat



d1	S	l1	l2	d0 ≥
mm		mm	mm	mm
25,250	MK-3	286,000	165,000	18,00
25,500	MK-3	286,000	165,000	18,00
25,600	MK-3	286,000	165,000	18,00
25,700	MK-3	286,000	165,000	18,00
26,000	MK-3	286,000	165,000	18,00
26,500	MK-3	286,000	165,000	18,00
26,700	MK-3	291,000	170,000	18,60
27,000	MK-3	291,000	170,000	18,60
27,500	MK-3	291,000	170,000	18,60
27,700	MK-3	291,000	170,000	19,30
28,000	MK-3	291,000	170,000	19,30
28,700	MK-3	296,000	175,000	20,00
29,000	MK-3	296,000	175,000	20,00
29,500	MK-3	296,000	175,000	20,50
29,700	MK-3	296,000	175,000	20,50
29,750	MK-3	296,000	175,000	20,50
30,000	MK-3	296,000	175,000	20,50
30,500	MK-3	301,000	180,000	21,00
30,600	MK-3	301,000	180,000	21,00
31,000	MK-3	301,000	180,000	21,00
31,600	MK-4	334,000	185,000	22,00
32,000	MK-4	334,000	185,000	22,00
32,600	MK-4	334,000	185,000	23,00
33,000	MK-4	334,000	185,000	23,00

d1	S	l1	l2	d0 ≥
mm		mm	mm	mm
33,600	MK-4	339,000	190,000	24,00
34,000	MK-4	339,000	190,000	24,00
34,600	MK-4	339,000	190,000	25,00
35,000	MK-4	339,000	190,000	25,00
35,600	MK-4	344,000	195,000	25,50
36,000	MK-4	344,000	195,000	25,50
36,600	MK-4	344,000	195,000	26,00
37,600	MK-4	349,000	200,000	26,50
38,000	MK-4	349,000	200,000	26,50
39,000	MK-4	349,000	200,000	27,00
39,600	MK-4	349,000	200,000	28,00
40,000	MK-4	349,000	200,000	28,00
44,000	MK-4	359,000	210,000	30,50
44,600	MK-4	359,000	210,000	31,00
45,000	MK-4	359,000	210,000	31,00
50,000	MK-4	369,000	220,000	34,50



Väljennysporat, kartiohartiset



P • kartiovaippahionta • erittäin tukeva • esiporatuille/-valetuille/-meistetyille reille • korjaa suoruusvirheet • korjaa pyöreysvirheet • parantaa reiän pinnan laatua • viisteen halk. < kierteen alkureikään • huomio alkureiän min. halkaisija • viimeistelykalvinta väljennysporauksen jälkeen



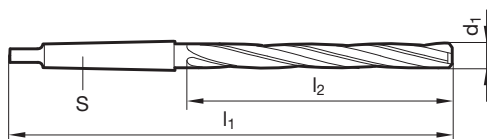
Materiaali **HSCO**

Pinta

Leikkusuunta

GÜHRING NAVIGATOR

Leikkuarvosivu 800



Artikkelinro. **634**

d1	S	l1	l2	d0 ≥
mm		mm	mm	mm
8,500	MK-1	156,000	75,000	5,60
9,000	MK-1	162,000	81,000	6,30
9,800	MK-1	168,000	87,000	7,00
10,750	MK-1	175,000	94,000	7,70
11,750	MK-1	182,000	101,000	8,40
12,000	MK-1	182,000	101,000	8,40
12,500	MK-1	182,000	101,000	8,40
12,750	MK-1	182,000	101,000	9,10
13,000	MK-1	182,000	101,000	9,10
14,000	MK-1	189,000	108,000	9,80
14,750	MK-2	212,000	114,000	10,50
15,750	MK-2	218,000	120,000	11,20

d1	S	l1	l2	d0 ≥
mm		mm	mm	mm
16,000	MK-2	218,000	120,000	11,20
16,500	MK-2	223,000	125,000	11,90
17,000	MK-2	223,000	125,000	11,90
18,000	MK-2	228,000	130,000	12,60
19,700	MK-2	238,000	140,000	14,00
20,000	MK-2	238,000	140,000	14,00
21,000	MK-2	243,000	145,000	14,60
22,000	MK-2	248,000	150,000	15,30
23,000	MK-2	253,000	155,000	16,00
24,000	MK-3	281,000	160,000	16,60
25,000	MK-3	281,000	160,000	17,30
26,000	MK-3	286,000	165,000	18,00



Väljennysporat, kartiovartistet



P • kartiovaippahionta • erittäin tukeva • esiporatuille/-valetuille/-meistetyille reille • korjaa suoruusvirheet • korjaa pyöreysvirheet • parantaa reiän pinnan laatua • viisteen halk. < kierteen alkureikään • huomio alkureiän min. halkaisija • viimeistelykalvinta väljennysporauksen jälkeen


 Materiaali **HSS**

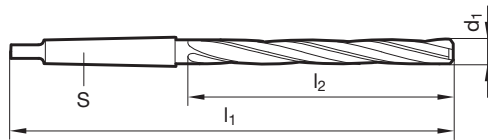
Pinta



Leikkusuunta


GÜHRING NAVIGATOR

Leikkuuarvosivu 800



Artikkelinro.

555

d1	S	l1	l2	d0 ≥
mm		mm	mm	mm
5,000	MK-1	155,000	74,000	3,50
8,000	MK-1	181,000	100,000	5,60
8,800	MK-1	188,000	107,000	6,30
9,000	MK-1	188,000	107,000	6,30
9,700	MK-1	197,000	116,000	7,00
9,800	MK-1	197,000	116,000	7,00
10,000	MK-1	197,000	116,000	7,00
10,100	MK-1	197,000	116,000	7,00
10,500	MK-1	197,000	116,000	7,00
11,100	MK-1	206,000	125,000	7,70
11,750	MK-1	215,000	134,000	8,40
12,000	MK-1	215,000	134,000	8,40
12,750	MK-1	215,000	134,000	9,10
13,000	MK-1	215,000	134,000	9,10
13,750	MK-1	223,000	142,000	9,80
14,000	MK-1	223,000	142,000	9,80
15,000	MK-2	245,000	147,000	10,50
15,750	MK-2	251,000	153,000	11,20

d1	S	l1	l2	d0 ≥
mm		mm	mm	mm
16,000	MK-2	251,000	153,000	11,20
17,750	MK-2	263,000	165,000	12,60
19,000	MK-2	269,000	171,000	13,30
19,700	MK-2	275,000	177,000	14,00
20,000	MK-2	275,000	177,000	14,00
20,700	MK-2	282,000	184,000	14,60
21,000	MK-2	282,000	184,000	14,60
21,700	MK-2	289,000	191,000	15,30
22,000	MK-2	289,000	191,000	15,30
22,700	MK-2	296,000	198,000	16,00
23,000	MK-2	296,000	198,000	16,00
24,000	MK-3	327,000	206,000	16,60
25,000	MK-3	327,000	206,000	17,30
25,700	MK-3	335,000	214,000	18,00
30,000	MK-3	351,000	230,000	20,50



Väljennysporat, kartiovartiset

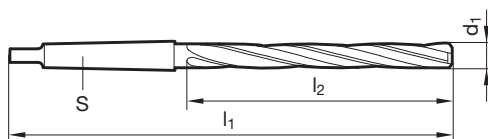
DIN 1864	N	120°	h8
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P	•	kartiovaippahionta • erittäin tukeva • esiporatuille/-valetuille/-meistetyille reille • korjaa suoruusvirheet • korjaa pyöreysvirheet • parantaa reiän pinnan laatua • viisteen halk. < kierteen alkureikään • huomio alkureiän min. halkaisija • viimeistelykalvinta väljennysporauksen jälkeen
M	○	
K	•	
N	•	
S	○	
H		

GÜHRING NAVIGATOR

Leikkuarvosivu 800

Materiaali	HSCO
Pinta	●
Leikkusuunta	Ⓜ



Artikkelinro. 635

d1	S	l1	l2	d0 ≥
mm		mm	mm	mm
8,000	MK-1	181,000	100,000	5,60
10,000	MK-1	197,000	116,000	7,00
14,000	MK-1	223,000	142,000	9,80
15,000	MK-2	245,000	147,000	10,50

d1	S	l1	l2	d0 ≥
mm		mm	mm	mm



Väljennysporat, kartiovirtiset



P	○	kartiovaippahionta • kovametallileikkuulla • esiporatuille/-valetuille/-meistetyille reille • korjaa suoruusvirheet • korjaa pyöreysvirheet
M	○	• parantaa reiän pinnan laatua • viisteen halk. < kierteen alkureikään
K	○	• huomio alkureiän min. halkaisija
N	○	
S	○	universal materiaali sopivuus
H	○	

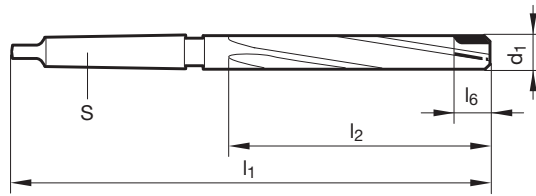
 Materiaali **KM**

Pinta ○

Leikkusuunta

GÜHRING NAVIGATOR

Leikkuarvosivu 800



Artikkelinro.

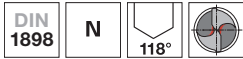
729

d1	S	l1	l2	l6	d0 ≥
mm		mm	mm	mm	mm
28,700	MK-3	296,000	175,000	25,000	21,0
29,700	MK-3	296,000	175,000	25,000	22,0
30,600	MK-3	301,000	180,000	25,000	23,0
31,600	MK-4	334,000	185,000	25,000	24,0
33,000	MK-4	334,000	185,000	25,000	25,0
33,600	MK-4	339,000	190,000	25,000	26,0

d1	S	l1	l2	l6	d0 ≥
mm		mm	mm	mm	mm
34,000	MK-4	339,000	190,000	25,000	26,0
36,000	MK-4	344,000	195,000	25,000	28,0
37,600	MK-4	349,000	200,000	25,000	30,0
38,600	MK-4	349,000	200,000	25,000	31,0
39,000	MK-4	349,000	200,000	25,000	31,0
39,600	MK-4	349,000	200,000	25,000	32,0



Kartiosokkareinäporat



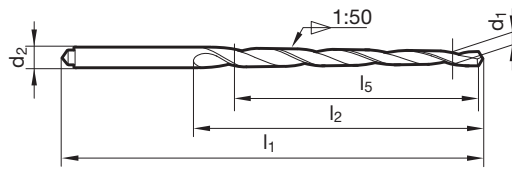
Materiaali **HSS**

Pinta

Leikkusuunta

P • Kärjen kevennys $\geq \varnothing 1,000$ • kartiovaippahionta • kartiorei'ille
M ○ kartiosokille DIN 1 (uusi DIN EN 22339) ja DIN 7978 (uusi DIN EN 28736)
 mukaan • vääntiöllä

- K** •
- N** ○
- S**
- H**



Artikkelinro. **531**

d1	d2	l1	l2	l5
mm	mm	mm	mm	mm
2,000	3,150	86,000	52,000	48,000
2,500	3,150	86,000	52,000	48,000
3,000	4,000	100,000	63,000	58,000
3,500	5,000	112,000	74,000	68,000
4,000	5,000	112,000	74,000	68,000
4,500	6,300	122,000	81,000	73,000

d1	d2	l1	l2	l5
mm	mm	mm	mm	mm
5,000	6,300	122,000	81,000	73,000
5,500	8,000	160,000	114,000	105,000
6,000	8,000	160,000	114,000	105,000
8,000	10,000	207,000	157,000	145,000
10,000	12,500	245,000	190,000	175,000
12,000	16,000	290,000	228,000	210,000

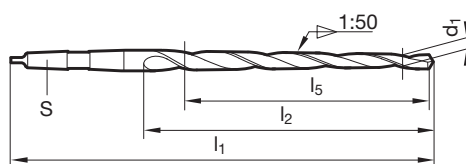


Kartiosokkareiänporat



- P** • Kärjen kevennys $\geq \varnothing 5,000$ • kartiovaippahionta •
- M** ○
- K** •
- N** ○
- S** ○
- H** ○

Materiaali	HSS
Pinta	●
Leikkusuunta	Ⓜ



Artikkelinro. **532**

d1	d2	l1	l2	l5
mm	mm	mm	mm	mm
5,000		155,000	81,000	73,000
6,000		187,000	108,000	105,000
8,000		227,000	149,000	145,000
10,000		257,000	180,000	175,000
12,000		315,000	219,000	210,000
13,000		325,000	229,000	220,000

d1	d2	l1	l2	l5
mm	mm	mm	mm	mm
14,000		325,000	229,000	220,000
16,000		335,000	239,000	230,000
20,000		377,000	263,000	250,000
25,000		427,000	311,000	300,000

Porrasporat / väljennysporat

GUILLERMO

NAVARRO

BRING

GÜHRING NAVIGATOR

GATOR



GÜHRING NAVIGATOR

Suosittelavan työkalun syöttöarvotaulukon numero (SA nro.) on merkitty vahvalla.
Kun valitset työkohteeseesi sopivinta työkalua ja sen parametrejä, käytä myös nettipohjaista versiota GühringNavigator:sta: www.guehring.fi.

Artikkeli nro.
 Norm/DIN
 Materiaali
 KM-laatu
 Malli
 Pinnoite
 Jäähdytys
 Ohjelma sivu

Porat-Ø mm	Syöttöarvotaulukko nro.								
	1	2	3	4	5	6	7	8	9
	f (mm/kierros)								
0,50	0,004	0,006	0,007	0,008	0,010	0,012	0,014	0,016	0,019
1,00	0,006	0,008	0,012	0,014	0,016	0,018	0,020	0,023	0,025
2,00	0,020	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125
2,50	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160
3,15	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,160
4,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,200
5,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250
6,30	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315
8,00	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,315
10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630
20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630
25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800
31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000
40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250
50,00	0,250	0,310	0,400	0,500	0,630	0,800	1,000	1,250	1,250
63,00	0,315	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600
80,00	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600	2,000

Jäähdytysaine:

- Ilma
- Öljy
- Emulsio

Jäähdytyskanavat:

- Ⓜ ilman jäähdytyskanavia
- Ⓜ jäähdytyskanavilla

Raaka-aineryhmä	Materiaaliesimerkkejä, uusi kuvaus (sulussa vanha kuvaus) Vahvalla painettu = DIN EN mukainen materiaali nro.	Vetolujuus N/mm ²	Kovuus	Jäähdytysaine
Yleiset rakenneteräkset	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2) 1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤500 ≤1000		○
Automaattiteräkset	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 ≤1000		○
Seostamattomat nuorutetut teräkset	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤700 ≤850 ≤1000		○
Seostetut nuorutetut teräkset	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	≤1000 ≤1400		○
Seostamattomat hiiletysteräkset	1.0301 (C10), 1.1121 C10E (Ck10)	≤850		●
Seostetut hiiletysteräkset	1.7276 10CrMo11, 1.5125 11MnSi6 1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5	≤1000 ≤1400		●
Nitrausteräkset	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≤1000 ≤1400		●
Työkaluteräkset	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 ≤1400		●
Pikateräkset	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≤1400		●
Jousiteräkset	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤350 HB	●
Karkaistut teräkset	-		≤48 HRC ≤66 HRC	●
Ruostumat teräkset, rikitetyt austeniittiset martensiittiset	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9 1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A) 1.4057 X20CrNi172 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤900 ≤1100 ≤1500		●
Valurauta	0.6010 EN-GJL-100 (GG10), 0.6020 EN-GJL-200 (GG20) 0.6025 EN-GJL-250 (GG25), 0.6035 EN-GJL-350 (GG35)		≤240 HB ≤350 HB	○
Pallografiitti ja adusoitu valu	0.7050 EN-GJS-500-7 (GGG50), 0.8035 EN-GJMW-350-4 (GTW35) 0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)		≤240 HB ≤350 HB	○
Kokillivalu	-		≤350 HB	○
Uudet valumateriaalit GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo 6		≤220 HB ≤300 HB	○
Uudet valumateriaalit ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	≤1000 ≤1400		○
Erikoisseos	Nimonic, Inconel, Monel, Hastelloy	≤2000		●
Titaani ja titaaniseokset	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤850 ≤1400		●
Alumiini ja alumiiniseokset	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		○
Muokattavat alumiiniseokset	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤650		○
Alumiinivaluseokset ≤ 10 % Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		○
> 24 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		○
Magnesiumseokset	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤400		○
Niukkaseosteinen kupari	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤500		○
Messinki, lyhytlästuihin pitkälästuihin	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600 ≤600		○
Pronssit, lyhytlästuihin	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0790 CuNi18Zn19Pb	≤600 ≤850		○
Pronssit, pitkälästuihin	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 ≤1000		○
Muovi, duroplastinen	Epoksihartsit, Resopal, Pertinax, Moltopren	≤150		○
Muovi, termoplastinen	Plexiglas, Hostalen, Novodur, Makralon	≤100		○
Muovi, aramidikuituvahvisteinen	Kevlar	≤1000		○
lasi-/hiilikuituvahvisteinen	GFK/CFK	≤1000		○



≤3xD Porausvyvyys

1171
6538K
KM
P
RT 80 U
S
akksiaal
55

1660	1180	1181
6537K	6537K	6537K
TKM	TKM	TKM
K/P	K/P	K/P
RT 100 F	RT 100 F	RT 100 U
S	S	S
akksiaal	akksiaal	akksiaal
53	54	43

2468	2477	2469
6537K	6537K	6537K
TKM	TKM	TKM
K/P	K/P	K/P
RT 100 F	RT 100 U	RT 100 U
F	F	F
akksiaal	akksiaal	akksiaal
52	39	41

8510	8610
6537K	6537K
TKM	TKM
K/P	K/P
RT 100 VA	
a	a
akksiaal	akksiaal
48	50

8520	8620
6537K	6537K
TKM	TKM
K/P	K/P
RT 100 HF	
Y	Y
akksiaal	akksiaal
44	46



V _c m/min	SA nro.	V _c m/min	Syöttöarvotaulukko nro.			V _c m/min	Syöttöarvotaulukko nro.			V _c m/min	Syöttöarvotaulukko nro.			V _c m/min	Syöttöarvotaulukko nro.		
95	6	110	6	6	6	145	7	7	7				145	7	7		
80	5	90	5	5	5	120	6	6	6				120	6	6		
95	7	130	7	7	7	170	8	8	8				170	8	8		
75	6	110	7	7	7	145	8	8	8				145	8	8		
80	6	100	7	7	7	130	8	8	8				130	8	8		
75	6	95	6	6	6	125	7	7	7				125	7	7		
70	6	90	6	6	6	120	7	7	7				120	7	7		
75	6	90	6	6	6	120	7	7	7				120	7	7		
60	5	80	6	6	6	105	7	7	7				105	7	7		
90	7	110	7	7	7	145	8	8	8				145	8	8		
75	6	90	6	6	6	120	7	7	7				120	7	7		
60	5	65	4	4	4	85	5	5	5				85	5	5		
75	6	85	6	6	6	110	7	7	7				110	7	7		
60	5	80	4	4	5	105	5	5	5				105	5	5		
45	5	60	5	5	5	80	6	6	6				80	6	6		
35	5	50	4	4	4	65	5	5	5				65	5	5		
40	4	45	3	3	3	60	4	4	4				60	4	4		
		45	2	2	2	60	3	3	3				60	3	3		
		40	2	2	2	55	3	3	3				55	3	3		
		20	1	1	1	35	2	2	2				35	2	2		
40	2	45	4	4	4	60	5	5	5	80	5	5					
35	2	40	2	2	2	55	2	2	2	60	2-3	2-3					
35	2	35	4	4	4	45	5	5	5	80	5	5					
150	7	160	8	8	8	210	9	9	9								
110	7	120	8	8	8	160	9	9	9								
110	7	100	8	8	8	140	9	9	9								
90	6	95	7	7	7	130	8	8	8								
		30	2	2	2	40	3	3	3								
		25	3	3	3	35	4	4	4	30	4	4	35	4	4		
		35	3	3	3	45	4	4	4	45	4	4	45	4	4		
		30	2	2	2	40	3	3	3	40	3	3	40	3	3		
200	8	240	8	8	8	310	9	9	9								
200	8	240	8	8	8	310	9	9	9								
170	8	200	8	8	8	260	9	9	9								
140	7	170	8	8	8	220	9	9	9								
		230	7	7	7	280	8	8	8								
		95	6	6	6	125	7	7	7								
		250	7	7	7	325	8	8	8								
		170	6	6	6	220	7	7	7								
		95	6	6	6	125	7	7	7								
		80	5	5	5	105	6	6	6								
		70	5	5	5	90	6	6	6								
		60	5	5	5	80	6	6	6								





GÜHRING NAVIGATOR

Suosittelavan työkalun syöttöarvotaulukon numero (SA nro.) on merkitty vahvalle.
Kun valitset työkohteeseesi sopivinta työkalua ja sen parametrejä, käytä myös nettipohjaista versiota GühringNavigator:sta: www.guehring.fi.

Artikkeli nro.
Norm/DIN
Materiaali
KM-laatu
Malli
Pinnoite
Jäähdytys
Ohjelma sivu

Porat-Ø mm	Syöttöarvotaulukko nro.								
	1	2	3	4	5	6	7	8	9
	f (mm/kierros)								
0,50	0,004	0,006	0,007	0,008	0,010	0,012	0,014	0,016	0,019
1,00	0,006	0,008	0,012	0,014	0,016	0,018	0,020	0,023	0,025
2,00	0,020	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125
2,50	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160
3,15	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,160
4,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,200
5,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250
6,30	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315
8,00	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,315
10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630
20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630
25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800
31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000
40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250
50,00	0,250	0,310	0,400	0,500	0,630	0,800	1,000	1,250	1,250
63,00	0,315	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600
80,00	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600	2,000

Al

sopii erityisesti
alumiinin työstöön

G

sopii erityisesti
valuraudan työstöön

Jäähdytysaine:

○ Ilma

● Öljy

● Emulsio

Jäähdytyskanavat:

Ⓢ ilman jäähdytyskanavia

Ⓢ jäähdytyskanavilla

Raaka-aineryhmä	Materiaaliesimerkkejä, uusi kuvaus (sulussa vanha kuvaus) Vahvalle painettu = DIN EN mukainen materiaali nro.	Vetolujuus N/mm ²	Kovuus	Jäähdytysaine
Yleiset rakenneteräkset	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2)	≤500		●
	1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤1000		●
Automaattiteräkset	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36)	≤850		●
	1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤1000		●
Seostamattomat nuorutetut teräkset	1.0402 C22, 1.1178 C30E (Ck30)	≤700		●
	1.0503 C45, 1.1191 C45E (Ck45)	≤850		●
	1.0601 C60, 1.1221 C60E (Ck60)	≤1000		●
Seostetut nuorutetut teräkset	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4	≤1000		●
	1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	≤1400		●
Seostamattomat hiiletysteräkset	1.0301 (C10), 1.1121 C10E (Ck10)	≤850		●
Seostetut hiiletysteräkset	1.7276 10CrMo11, 1.5125 11MnSi6	≤1000		●
	1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5	≤1400		●
Nitrausteräkset	1.8504 34CrAl6	≤1000		●
	1.8519 31CrMoV9, 1.8550 34CrAlNi7	≤1400		●
Työkaluteräkset	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9	≤850		●
	1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤1400		●
Pikateräkset	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≤1400		●
Jousiteräkset	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤350 HB	●
Karkaistut teräkset	-		≤48 HRC	●
			≤66 HRC	●
Ruostumat teräkset, rikitetyt austeniittiset martensiittiset	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9	≤900		●
	1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A)	≤1100		●
	1.4057 X20CrNi172 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤1500		●
Valurauta	0.6010 EN-GJL-100 (GG10), 0.6020 EN-GJL-200 (GG20)		≤240 HB	●○
	0.6025 EN-GJL-250 (GG25), 0.6035 EN-GJL-350 (GG35)		≤350 HB	●○
Pallografiitti ja adusoitu valu	0.7050 EN-GJS-500-7 (GGG50), 0.8035 EN-GJMW-350-4 (GTW35)		≤240 HB	●○
	0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)		≤350 HB	●○
Kokillivalu	-		≤350 HB	●○
Uudet valumateriaalit GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35)		≤220 HB	●○
	EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo 6		≤300 HB	●○
Uudet valumateriaalit ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000)	≤1000		●○
	EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	≤1400		●○
Erikoisseos	Nimonic, Inconel, Monel, Hastelloy	≤2000		●
Titaani ja titaaniseokset	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2	≤850		●
	3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤1400		●
Alumiini ja alumiiniseokset	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		●
Muokattavat alumiiniseokset	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤650		●
Alumiinivaluseokset ≤ 10 % Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		●
> 24 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		●
Magnesiumseokset	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤400		●
Niukkaseosteinen kupari	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤500		●
Messinki, lyhytlästuihin pitkälästuihin	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2	≤600		●
	2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600		●
Pronssit, lyhytlästuihin	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn	≤600		●
	2.0790 CuNi18Zn19Pb	≤850		●
Pronssit, pitkälästuihin	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10	≤850		●
	2.0980 CuAl11Ni, 2.1247 CuBe2	≤1000		●
Muovi, duroplastinen	Epoksihartsit, Resopal, Pertinax, Moltopren	≤150		○
Muovi, termoplastinen	Plexiglas, Hostalen, Novodur, Makralon	≤100		○
Muovi, aramidikuituvahvisteine	Kevlar	≤1000		○
lasi-/hiilikuituvahvisteinen	GFK/CFK	≤1000		○



≤3xD Porausyvyys

1702	1184	1242
6539	6537K	6539
TKM	TKM	TKM
K/P	K/P	K/P
RT 100 F	RT 100 U	RT 100 U
S	S	S
28	21	23

2475	2480	2472	2473
6537K	6537K	6537K	6539
TKM	TKM	TKM	TKM
K/P	K/P	K/P	K/P
RT 100 F	RT 100 U	RT 100 U	RT 100 U
F	F	F	F
27	16	18	20

8524
6537K
TKM
K/P
RT 100 HF
Y
25

≤4xD

768	6068
WN	WN
TKM	TKM
K	K
RT 150 GG	RT 150 GG
○	○
aksaal	aksaal
56	58
Al	G



V _c m/min	Syöttöarvotaulukko nro.		
100	6	6	6
85	5	5	5
110	7	7	7
85	6	6	6
90	6	6	6
85	6	6	6
80	6	6	6
80	6	6	6
75	5	5	5
100	7	7	7
90	6	6	6
65	4	4	4
75	5	5	5
70	4	4	4
50	5	5	5
40	4	4	4
40	3		
35	2	2	2
35	1	1	1
20	1	1	1
40	2	2	2
15	2	1	1
35	2	2	2
160	7	7	7
120	7	7	7
120	7	6	6
95	7	6	6
25	2	2	2
20	3	3	3
15	1	1	1
15	1	1	1
200	8	8	8
200	8	8	8
170	8	8	8
140	7	7	7
200	7	7	7
80	6	6	6
210	7	7	7
140	6	6	6
80	5	5	5
65	5	5	5
60	4	4	4
45	4	4	4

V _c m/min	Syöttöarvotaulukko nro.			
130	7	7	7	7
110	6	6	6	6
145	8	8	8	8
110	7	7	7	7
120	7	7	7	7
110	7	7	7	7
105	7	7	7	7
105	7	7	7	7
100	6	6	6	6
130	8	8	8	8
120	7	7	7	7
85	5	5	5	5
100	6	6	6	6
90	5	5	5	5
65	6	6	6	6
55	5	5	5	5
55	4			
45	3	3	3	3
40	1	1	1	1
20	1	1	1	1
40	2	2	2	2
15	1	1	1	1
35	2	2	2	2
210	8	8	8	8
155	8	8	8	8
155	8	7	7	7
125	8	7	7	7
35	3	3	3	3
25	4	4	4	4
15	1	1	1	1
15	1	1	1	1
260	9	9	9	9
260	9	9	9	9
220	9	8	8	8
180	8	8	8	8
260	8	8	8	8
105	7	7	7	7
270	8	8	8	8
180	7	7	7	7
105	6	6	6	6
85	6	6	6	6
80	5	5	5	5
60	5	5	5	5

V _c m/min	SA nro.
130	7
110	6
145	8
110	7
120	7
110	7
105	7
105	7
100	6
130	8
120	7
85	5
100	6
90	5
65	6
55	5
55	4
45	3
40	1
20	1
40	2
15	1
35	2
25	4
15	1
15	1
410	9
410	9
380	9
330	9
280	9
110	6
80	5

V _c m/min	Syöttöarvotaulukko nro.	
120	7	7
100	7	7
90	7	7
80	7	7
40	2	2
410	9	7
410	9	7
380	9	7
330	9	7
280	9	9
110	6	6
80	5	5



GÜHRINGNAVIGATOR

Suosittelavan työkalun syöttöarvotaulukon numero (SA nro.) on merkitty vahvalle.
Kun valitset työkohteeseesi sopivinta työkalua ja sen parametrejä, käytä myös nettipohjaista versiota GühringNavigator:sta: www.guehring.fi.

- Artikkeli nro.
- Norm/DIN
- Materiaali
- KM-laatu
- Malli
- Pinnoite
- Jäähdytys
- Ohjelma sivu

Porat-Ø mm	Syöttöarvotaulukko nro.								
	1	2	3	4	5	6	7	8	9
	f (mm/kierros)								
0,50	0,004	0,006	0,007	0,008	0,010	0,012	0,014	0,016	0,019
1,00	0,006	0,008	0,012	0,014	0,016	0,018	0,020	0,023	0,025
2,00	0,020	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125
2,50	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160
3,15	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,160
4,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,200
5,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250
6,30	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315
8,00	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,315
10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630
20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630
25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800
31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000
40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250
50,00	0,250	0,310	0,400	0,500	0,630	0,800	1,000	1,250	1,250
63,00	0,315	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600
80,00	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600	2,000

Jäähdytysaine:

- Ilma
- Öljy
- Emulsio

Jäähdytyskanavat:

- ilman jäähdytyskanavia
- jäähdytyskanavilla

Raaka-aineryhmä	Materiaaliesimerkkejä, uusi kuvaus (sulussa vanha kuvaus) Vahvalla painettu = DIN EN mukainen materiaali nro.	Vetolujuus N/mm ²	Kovuus	Jäähdytysaine
Yleiset rakenneteräkset	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2) 1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤500 ≤1000		<input type="radio"/>
Automaattiteräkset	1.0718 11SMnB30 (9SMnB28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 ≤1000		<input type="radio"/>
Seostamattomat nuorutetut teräkset	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤700 ≤850 ≤1000		<input type="radio"/>
Seostetut nuorutetut teräkset	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	≤1000 ≤1400		<input type="radio"/>
Seostamattomat hiiletysteräkset	1.0301 (C10), 1.1121 C10E (Ck10)	≤850		<input type="radio"/>
Seostetut hiiletysteräkset	1.7276 10CrMo11, 1.5125 11MnSi6 1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5	≤1000 ≤1400		<input type="radio"/>
Nitrausteräkset	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≤1000 ≤1400		<input type="radio"/>
Työkaluteräkset	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 ≤1400		<input type="radio"/>
Pikateräkset	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≤1400		<input type="radio"/>
Jousiteräkset	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤350 HB	<input type="radio"/>
Karkaistut teräkset	-		≤48 HRC ≤66 HRC	<input type="radio"/>
Ruostumat teräkset, rikitetyt austeniittiset martensiittiset	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9 1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A) 1.4057 X20CrNi172 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤900 ≤1100 ≤1500		<input type="radio"/>
Valurauta	0.6010 EN-GJL-100 (GG10), 0.6020 EN-GJL-200 (GG20) 0.6025 EN-GJL-250 (GG25), 0.6035 EN-GJL-350 (GG35)		≤240 HB ≤350 HB	<input type="radio"/>
Pallografiitti ja adusoitu valu	0.7050 EN-GJS-500-7 (GGG50), 0.8035 EN-GJMW-350-4 (GTW35) 0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)		≤240 HB ≤350 HB	<input type="radio"/>
Kokillivalu	-		≤350 HB	<input type="radio"/>
Uudet valumateriaalit GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo 6		≤220 HB ≤300 HB	<input type="radio"/>
Uudet valumateriaalit ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	≤1000 ≤1400		<input type="radio"/>
Erikoisseos	Nimonic, Inconel, Monel, Hastelloy	≤2000		<input type="radio"/>
Titaani ja titaaniseokset	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤850 ≤1400		<input type="radio"/>
Alumiini ja alumiiniseokset	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		<input type="radio"/>
Muokattavat alumiiniseokset	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤650		<input type="radio"/>
Alumiinivaluseokset ≤ 10 % Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		<input type="radio"/>
Alumiinivaluseokset > 24 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		<input type="radio"/>
Magnesiumseokset	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤400		<input type="radio"/>
Niukkaseosteinen kupari	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤500		<input type="radio"/>
Messinki, lyhytlästuihin pitkälästuihin	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600 ≤600		<input type="radio"/>
Pronssit, lyhytlästuihin	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0790 CuNi18Zn19Pb	≤600 ≤850		<input type="radio"/>
Pronssit, pitkälästuihin	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 ≤1000		<input type="radio"/>
Muovi, duroplastinen	Epoksihartsit, Resopal, Pertinax, Moltopren	≤150		<input type="radio"/>
Muovi, termoplastinen	Plexiglas, Hostalen, Novodur, Makralon	≤100		<input type="radio"/>
Muovi, aramidikuituvahvisteinen	Kevlar	≤1000		<input type="radio"/>
lasi-/hiilikuituvahvisteinen	GFK/CFK	≤1000		<input type="radio"/>



≤5xD Porausvyvyys

1172	6501	1662	1182	1663	1183	2478	2470	2479	2471	5759
6538M	6537L	6537L	6537L	6537L	6537L	6537L	6537L	6537L	6537L	6537L
KM	TKM	TKM	TKM	TKM	TKM	TKM	TKM	TKM	TKM	TKM
P	K/P	K/P	K/P	K/P	K/P	K/P	K/P	K/P	K/P	K/P
RT 80 U	RT 100 R	RT 100 F	RT 100 F	RT 100 U	RT 100 U	RT 100 F	RT 100 F	RT 100 U	RT 100 U	RT 100 S
S	F	S	S	S	S	F	F	F	F	F
aksiaal	aksiaal	aksiaal	aksiaal	aksiaal	aksiaal	aksiaal	aksiaal	aksiaal	aksiaal	aksiaal
84	82	78	80	65	66	76	77	61	63	59



Vc m/min	SA nro.	Vc m/min	SA nro.	Vc m/min	Syöttöarvotaulukko nro.				Vc m/min	Syöttöarvotaulukko nro.				Vc m/min	SA nro.
95	5			110	6	6	6	6	145	7	7	7	7	145-230	8
80	4			90	5	5	5	5	120	6	6	6	6	120-220	7
95	6			130	7	7	7	7	170	8	8	8	8	170-260	8
75	5			110	7	7	7	7	145	8	8	8	8	145-230	8
80	5			100	7	7	7	7	130	8	8	8	8	130-220	8
75	5			95	6	6	6	6	125	7	7	7	7	125-210	7
75	5			90	6	6	6	6	120	7	7	7	7	120-200	7
75	5			90	6	6	6	6	120	7	7	7	7	120-210	7
55	4			80	6	6	6	6	105	7	7	7	7	105-200	7
90	6			110	7	7	7	7	145	8	8	8	8	145-230	8
75	5			90	6	6	6	6	120	7	7	7	7	120-210	7
55	4			80	6	6	6	6	105	7	7	7	7	105-200	7
70	5			85	6	6	6	6	105	7	7	7	7	110-150	7
55	4			80	4	4	5	5	100	5	5	5	5	100-150	5
40	4			60	5	5	5	5	70	6	6	6	6	70-120	6
35	4			50	4	4	4	4	55	5	5	5	5	55-100	5
40	3			45	3	3	4	4	60	4	4	5	5	60-100	5
				45	2	2	2	2	60	3	3	3	3	60-100	5
				40	2	2	2	2	55	3	3	3	3		
				25	1	1	1	1	35	2	2	2	2		
40	2			45	4	4	4	4	60	5	5	5	5		
35	2			40	2	2	2	2	55	2	2	2	2		
35	2			35	4	4	4	4	50	5	5	5	5		
150	6	210	9	160	8	8	8	8	195	9	9	9	9		
110	6	160	9	120	8	8	8	8	160	9	9	9	9		
110	6	160	9	100	8	8	8	8	140	9	9	9	9		
90	5	130	8	95	7	7	7	7	130	8	8	8	8		
				30	2	2	2	2	40	3	3	3	3		
		130	8												
		100	8												
		80	8												
		60	8												
				25	3	3	3	3	35	4	4	4	4		
				35	3	3	3	3	45	4	4	4	4		
				30	2	2	2	2	40	3	3	3	3		
200	7			240	8	8	8	8	310	9	9	9	9		
200	7			240	8	8	8	8	310	9	9	9	9		
170	7			200	8	8	8	8	260	9	9	9	9		
140	6			170	8	8	8	8	220	9	9	9	9		
				230	7	7	7	7	280	8	8	8	8		
				95	6	6	6	6	125	7	7	7	7		
				250	7	7	7	7	325	8	8	8	8		
				170	6	6	6	6	220	7	7	7	7		
				95	6	6	6	6	125	7	7	7	7		
				80	5	5	5	5	105	6	6	6	6		
				70	5	5	5	5	90	6	6	6	6		
				60	5	5	5	5	80	6	6	6	6		



GÜHRING NAVIGATOR

Suosittelavan työkalun syöttöarvotaulukon numero (SA nro.) on merkitty vahvalla.
Kun valitset työkohteeseen sopivinta työkalua ja sen parametrejä, käytä myös nettipohjaista versiota GühringNavigator:sta: www.guehring.fi.

- Artikkeli nro.
- Norm/DIN
- Materiaali
- KM-laatu
- Malli
- Pinnoite
- Jäähdytys
- Ohjelma sivu

Porat-Ø mm	Syöttöarvotaulukko nro.								
	1	2	3	4	5	6	7	8	9
	f (mm/kierros)								
0,50	0,004	0,006	0,007	0,008	0,010	0,012	0,014	0,016	0,019
1,00	0,006	0,008	0,012	0,014	0,016	0,018	0,020	0,023	0,025
2,00	0,020	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125
2,50	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160
3,15	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,160
4,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,200
5,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250
6,30	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315
8,00	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,315
10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630
20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630
25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800
31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000
40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250
50,00	0,250	0,310	0,400	0,500	0,630	0,800	1,000	1,250	1,250
63,00	0,315	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600
80,00	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600	2,000

Jäähdytysaine:

- Ilma
- Öljy
- ⊙ Emulsio

Jäähdytyskanavat:

- Ⓜ ilman jäähdytyskanavia
- Ⓜ jäähdytyskanavilla

Raaka-aineryhmä	Materiaaliesimerkkejä, uusi kuvaus (sulussa vanha kuvaus) Vahvalla painettu = DIN EN mukainen materiaali nro.	Vetolujuus N/mm ²	Kovuus	Jäähdytysaine
Yleiset rakenneteräkset	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2) 1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤500 ≤1000		○
Automaattiteräkset	1.0718 11SMnBp30 (9SMnBp28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 ≤1000		○
Seostamattomat nuorutetut teräkset	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤700 ≤850 ≤1000		○
Seostetut nuorutetut teräkset	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	≤1000 ≤1400		○
Seostamattomat hiiletysteräkset	1.0301 (C10), 1.1121 C10E (Ck10)	≤850		○
Seostetut hiiletysteräkset	1.7276 10CrMo11, 1.5125 11MnSi6 1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5	≤1000 ≤1400		●
Nitrausteräkset	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≤1000 ≤1400		●
Työkäluteräkset	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 ≤1400		○
Pikateräkset	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≤1400		●
Jousiteräkset	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤350 HB	●
Karkaistut teräkset	-		≤48 HRC ≤66 HRC	●
Ruostumat teräkset, rikitetyt austeniittiset martensiittiset	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9 1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A) 1.4057 X20CrNi172 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤900 ≤1100 ≤1500		●
Valurauta	0.6010 EN-GJL-100 (GG10), 0.6020 EN-GJL-200 (GG20) 0.6025 EN-GJL-250 (GG25), 0.6035 EN-GJL-350 (GG35)		≤240 HB ≤350 HB	○
Pallografiitti ja adusoitu valu	0.7050 EN-GJS-500-7 (GGG50), 0.8035 EN-GJMW-350-4 (GTW35) 0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)		≤240 HB ≤350 HB	○
Kokillivalu	-		≤350 HB	○
Uudet valumateriaalit GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo 6		≤220 HB ≤300 HB	○
Uudet valumateriaalit ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	≤1000 ≤1400		○
Erikoisseos	Nimonic, Inconel, Monel, Hastelloy	≤2000		●
Titaani ja titaaniseokset	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤850 ≤1400		●
Alumiini ja alumiiniseokset	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		○
Muokattavat alumiiniseokset	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤650		○
Alumiinivaluseokset ≤ 10 % Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		○
> 24 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		○
Magnesiumseokset	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤400		○
Niukkaseosteinen kupari	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤500		○
Messinki, lyhytlastuinen pitkälastuiset	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600 ≤600		○
Pronssit, lyhytlastuiset	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0790 CuNi18Zn19Pb	≤600 ≤850		○
Pronssit, pitkälastuiset	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 ≤1000		●
Muovi, duroplastinen	Epoksihartsit, Resopal, Pertinax, Moltopren	≤150		○
Muovi, termoplastinen	Plexiglas, Hostalen, Novodur, Makralon	≤100		○
Muovi, aramidikuituvahvisteine	Kevlar	≤1000		○
lasi-/hiilikuituvahvisteinen	GFK/CFK	≤1000		○



≤5xD Porausvyvyys

8511	8611
6537L	6537L
TKM	TKM
K/P	K/P
RT 100 VA	RT 100 VA
a	a
aksiaal	aksiaal
72	74

8521	8621
6537L	6537L
TKM	TKM
K/P	K/P
RT 100 HF	RT 100 HF
Y	Y
aksiaal	aksiaal
68	70

1243	2717
WN	6537L
TKM	TKM
K/P	K/P
RT 100 U	RT 100 U
S	S
36	35

2712	2474	2996	2719
6537L	WN	6537L	6537L
TKM	TKM	TKM	TKM
K/P	K/P	K/P	K/P
RT 100 F	RT 100 U	RT 100 U	RT 100 U
F	F	F	F
38	34	30	32



V _c m/min	Syöttöarvotaulukko nro.		V _c m/min	Syöttöarvotaulukko nro.		V _c m/min	Syöttöarvotaulukko nro.						
			145	7	7	100	6	6	130	7	7	7	7
			120	6	6	85	5	5	110	6	6	6	6
			170	8	8	110	7	7	145	8	8	8	8
			145	8	8	85	6	6	110	7	7	7	7
			130	8	8	90	6	6	120	7	7	7	7
			125	7	7	85	6	6	110	7	7	7	7
			120	7	7	80	6	6	105	7	7	7	7
			120	7	7	80	6	6	105	7	7	7	7
			105	7	7	75	5	5	100	6	6	6	6
			145	8	8	100	7	7	130	8	8	8	8
			120	7	7	90	6	6	120	7	7	7	7
			85	5	5	65	4	4	85	5	5	5	5
			110	7	7	75	5	5	100	6	6	6	6
			105	5	5	70	4	4	90	5	5	5	5
			80	6	6	50	5	5	65	6	6	6	6
			65	5	5	40	4	4	55	5	5	5	5
			60	4	4				55	4			
			60	3	3	35	2	2	45	3	3	3	3
			55	3	3	35	1	1	35	1	1	1	1
			35	2	2	20	1	1	20	1	1	1	1
80	5	5				40	2	2	45	2	2	2	2
60	2-3	2-3				15	1	1	15	1	1	1	1
80	5	5				35	2	2	35	2	1	2	2
						160	7	7	210	8	8	8	8
						120	7	7	155	8	8	8	8
						120	6	6	145	8	7	7	7
						95	6	6	125	8	7	7	7
						25	2	2	35	3	3	3	3
30	4	4	35	4	4	20	3	3	25	4	4	4	4
45	4	4	45	4	4	15	1	1	15	1	1	1	1
40	3	3	40	3	3	15	1	1	15	1	1	1	1
						200	8	8	260	9	9	9	9
						200	8	8	260	9	9	9	9
						170	8	8	235	9	9	9	9
						140	7	7	170	8	8	8	8
						200	7	7	260	8	8	8	8
						80	6	6	105	7	7	7	7
						210	7	7	270	8	8	8	8
						140	6	6	180	7	7	7	7
						80	5	5	105	6	6	6	6
						65	5	5	85	6	6	6	6
						60	4	4	80	5	5	5	5
						45	4	4	60	5	5	5	5

**GÜHRING** NAVIGATOR

Suosittelavan työkalun syöttöarvotaulukon numero (SA nro.) on merkitty vahvalle.

Kun valitset työkohteeseesi sopivinta työkalua ja sen parametrejä, käytä myös nettipohjaista versiota GühringNavigator:sta: www.guehring.fi.

Alkureikä tarvitaan aina kun porataan yli 7 x D syvyyteen

1. Alkureiän voi porata lyhyellä, tukevalla poralla. Poran halkaisija tulisi olla 0,01 - 0,02 mm suurempi kuin tehoporran halkaisija. Poraussyvyys $\geq 1 \times D$.

2. Vaihtoehtoisesti samalla tehoporalla voi porata myös alkureiän.

Leikkunopeutta ja syöttöä on tällöin vähennettävää 30-40%.

3. Jäähdytyspainesuositus: 40 bar.

Turvallisuuden takia on erittäin tärkeää ettei pora pyöri > 6000rpm ilman tuentaa.. Keskipakovoimat voivat rikkoa nämä pitkät työkalut ennenkuin ne tavoittavat työkappaleen!

Artikkeli nro.

Norm/DIN

Materiaali

KM-laatu

Malli

Pinnoite

Jäähdytys

Ohjelma sivu

Porat-Ø mm	Syöttöarvotaulukko nro.								
	1	2	3	4	5	6	7	8	9
	f (mm/kierros)								
0,50	0,004	0,006	0,007	0,008	0,010	0,012	0,014	0,016	0,019
1,00	0,006	0,008	0,012	0,014	0,016	0,018	0,020	0,023	0,025
2,00	0,020	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125
2,50	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160
3,15	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,160
4,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,200
5,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250
6,30	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315
8,00	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,315
10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630
20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630
25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800
31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000
40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250
50,00	0,250	0,310	0,400	0,500	0,630	0,800	1,000	1,250	1,250
63,00	0,315	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600
80,00	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600	2,000

Al

sopii erityisesti
alumiinin työstöön

G

sopii erityisesti
valuraudan työstöön

Jäähdytysaine:

○ Ilma

● Öljy

● Emulsio

Jäähdytyskanavat:

Ⓜ ilman jäähdytyskanavia

Ⓜ jäähdytyskanavilla

Raaka-aineryhmä	Materiaaliesimerkkejä, uusi kuvaus (suluisia vanha kuvaus) Vahvalle painettu = DIN EN mukainen materiaali nro.	Vetolujuus N/mm ²	Kovuus	Jäähdytysaine
Yleiset rakenneteräkset	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2) 1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤500 ≤1000		●
Automaattiteräkset	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 ≤1000		●
Seostamattomat nuorutetut teräkset	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤700 ≤850 ≤1000		●
Seostetut nuorutetut teräkset	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	≤1000 ≤1400		●
Seostamattomat hiiletysteräkset	1.0301 (C10), 1.1121 C10E (Ck10)	≤850		●
Seostetut hiiletysteräkset	1.7276 10CrMo11, 1.5125 11MnSi6 1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5	≤1000 ≤1400		●
Nitrausteräkset	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≤1000 ≤1400		●
Työkaluteräkset	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 ≤1400		●
Pikateräkset	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≤1400		●
Jousiteräkset	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤350 HB	●
Karkaistut teräkset	-		≤48 HRC ≤66 HRC	●
Ruostumat teräkset, rikitetyt austeniittiset martensiittiset	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9 1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A) 1.4057 X20CrNi172 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤900 ≤1100 ≤1500		●
Valurauta	0.6010 EN-GJL-100 (GG10), 0.6020 EN-GJL-200 (GG20) 0.6025 EN-GJL-250 (GG25), 0.6035 EN-GJL-350 (GG35)		≤240 HB ≤350 HB	●
Pallografiitti ja adusoitu valu	0.7050 EN-GJS-500-7 (GGG50), 0.8035 EN-GJMW-350-4 (GTW35) 0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)		≤240 HB ≤350 HB	●
Kokillivalu	-		≤350 HB	●
Uudet valumateriaalit GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo 6		≤220 HB ≤300 HB	●
Uudet valumateriaalit ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	≤1000 ≤1400		●
Erikoisseos	Nimonic, Inconel, Monel, Hastelloy	≤2000		●
Titaani ja titaaniseokset	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤850 ≤1400		●
Alumiini ja alumiiniseokset	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		●
Muokattavat alumiiniseokset	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤650		●
Alumiinivaluseokset ≤ 10 % Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		●
Alumiinivaluseokset > 24 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		●
Magnesiumseokset	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤400		●
Niukkaseosteinen kupari	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤500		●
Messinki, lyhytlästuiset pitkälästuiset	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600 ≤600		●
Pronssit, lyhytlästuiset	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0790 CuNi18Zn19Pb	≤600 ≤850		●
Pronssit, pitkälästuiset	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 ≤1000		●
Muovi, duroplastinen	Epoksihartsit, Resopal, Pertinax, Moltopren	≤150		○
Muovi, termoplastinen	Plexiglas, Hostalen, Novodur, Makralon	≤100		○
Muovi, aramidikuituvahvisteine	Kevlar	≤1000		○
lasi-/hiilikuituvahvisteinen	GFK/CFK	≤1000		○



≤7xD Porausvyvys

1173
6538L
KM
P
RT80U
S
aksiaal
95

769 6069
WN WN
TKM
K K
RT 150 GG
aksiaal aksiaal
93 94

2711
WN
TKM
K/P
RT100U
S
aksiaal
89

4044 4045
WN WN
TKM
K/P K/P
RT 100 U
F **F**
aksiaal aksiaal
85 87

6502
WN
TKM
K/P
RT100R
F
aksiaal
91

8522
WN
TKM
K/P
RT100HF
Y
aksiaal
90

≤8xD

5760
6537L
TKM
K/P
RT100S
F
aksiaal
96

≤10xD

770 6070
WN WN
TKM
K K
RT 150 GG
aksiaal aksiaal
98 99

≤12xD

5525
WN
TKM
K/P
RT100U
F
aksiaal
100



Vc m/min	SA nro.	Vc m/min	SA nro.	Vc m/min	SA nro.	Vc m/min	SA nro.	Vc m/min	SA nro.	Vc m/min	SA nro.	Vc m/min	SA nro.	Vc m/min	SA nro.	Vc m/min	SA nro.	Vc m/min	SA nro.		
95	4			110	5	145	6 6			145	6	145-230	7					110	6		
75	3			90	4	120	5 5			120	5	120-220	6					110	5		
90	5			130	6	170	7 7			170	7	170-260	7					110	7		
75	4			110	6	145	7 7			145	7	145-230	7					100	7		
80	4			100	6	130	7 7			130	7	130-220	7					110	7		
75	4			95	5	125	6 6			125	6	125-210	6					110	6		
60	4			90	5	120	6 6			120	6	120-200	6					100	6		
75	4			90	5	120	6 6			120	6	120-210	6					110	6		
60	3			80	5	105	6 6			105	6	105-200	6					105	6		
90	5			110	6	145	7 7			145	7	145-230	7					110	7		
75	4			90	5	120	6 6			120	6	120-210	6					110	6		
55	3			65	3	85	4 4			85	4	105-200	5					85	4		
75	4			80	5	110	6 6			110	6	110-150	6					100	6		
55	3			75	4	105	4 4			105	4	100-150	4					80	4		
40	3			55	4	80	5 5			80	5	70-120	5					80	5		
35	3			40	3	65	4 4			65	4	65-100	4					65	4		
40	2			45	2	60	4 4			60	3	60-100	4					50	4		
				45	1	60	2 2			60	2	60-100	4					50	2		
				40	1	55	2 2			55	2										
				25	1	35	1 1			35	1										
35	1			45	3	60	4 4											60	4		
33	1			40	2	55	2 2											55	2		
25	1			35	3	45	4 4											45	4		
150	5	120	6 7	150	7	195	8 8	210	8							120	6 6	120	8		
110	5	100	6 7	120	7	160	8 8	160	8							100	6 6	120	8		
110	5	90	6 7	100	7	140	8 8	160	8							90	6 6	100	8		
90	4	80	6 7	95	6	130	7 7	130	7							80	6 6	90	7		
		40	2 2	30	1	40	2 2									40	1 2				
								130	7												
								100	7												
								80	7												
								60	7												
										35	3										
										45	3										
										40	4										
180	6	410	8 7	240	7	310	8 8									410	8 6	150	8		
180	6	410	8 7	240	7	310	8 8									410	8 6	150	8		
160	6	380	8 8	200	7	260	8 8									380	8 6	150	8		
130	5	330	8 8	170	7	220	8 8									330	8 6	120	8		
				230	6	280	7 7												150	7	
				95	6	125	6 6												80	6	
				280	7 7	325	7 7									280	7 7		120	7	
				170	6	220	6 6												120	6	
				110	6 6	95	6 6									110	6 6		40	6	
				80	5 5	80	5 5									80	5 5				
						70	5 5														
						60	5 5													40	5

Navigator

**GÜHRING**NAVIGATOR

Suosittelavan työkalun syöttöarvotaulukon numero (SA nro.) on merkitty vahvalla.
Kun valitset työkohteeseesi sopivinta työkalua ja sen parametrejä, käytä myös nettipohjaista versiota GühringNavigator:sta: www.guehring.fi.

Artikkeli nro.
Norm/DIN
Materiaali
KM-laatu
Malli
Pinnoite
Jäähdytys
Ohjelma sivu

Porat-Ø mm	Syöttöarvotaulukko nro.								
	1	2	3	4	5	6	7	8	9
	f (mm/kierros)								
0,50	0,004	0,006	0,007	0,008	0,010	0,012	0,014	0,016	0,019
1,00	0,006	0,008	0,012	0,014	0,016	0,018	0,020	0,023	0,025
2,00	0,020	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125
2,50	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160
3,15	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,160
4,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,200
5,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250
6,30	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315
8,00	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,315
10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630
20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630
25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800
31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000
40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250
50,00	0,250	0,310	0,400	0,500	0,630	0,800	1,000	1,250	1,250
63,00	0,315	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600
80,00	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600	2,000

Jäähdy-tysaine:

- Ilma
- Öljy
- Emulsio

Jäähdytyskanavat:

- Ⓜ ilman jäähdytyskanavia
- Ⓜ jäähdytyskanavilla

Raaka-aineryhmä	Materiaaliesimerkkejä, uusi kuvaus (sulussa vanha kuvaus) Vahvalla painettu = DIN EN mukainen materiaali nro.	Vetolujuus N/mm ²	Kovuus	Jäähdytysaine
Yleiset rakenneteräkset	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2) 1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤500 ≤1000		○
Automaattiteräkset	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 ≤1000		○
Seostamattomat nuorutetut teräkset	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤700 ≤850 ≤1000		○
Seostetut nuorutetut teräkset	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	≤1000 ≤1400		○
Seostamattomat hiiletysteräkset	1.0301 (C10), 1.1121 C10E (Ck10)	≤850		○
Seostetut hiiletysteräkset	1.7276 10CrMo11, 1.5125 11MnSi6 1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5	≤1000 ≤1400		●
Nitrausteräkset	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≤1000 ≤1400		○
Työkäluoteräkset	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 ≤1400		○
Pikateräkset	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≤1400		●
Jousiteräkset	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤350 HB	●
Karkaistut teräkset	-		≤48 HRC ≤66 HRC	●
Ruostumat teräkset, rikitetyt austeniittiset martensiittiset	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9 1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A) 1.4057 X20CrNi172 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤900 ≤1100 ≤1500		●
Valurauta	0.6010 EN-GJL-100 (GG10), 0.6020 EN-GJL-200 (GG20) 0.6025 EN-GJL-250 (GG25), 0.6035 EN-GJL-350 (GG35)		≤240 HB ≤350 HB	○
Pallografiitti ja adusoitu valu	0.7050 EN-GJS-500-7 (GGG50), 0.8035 EN-GJMW-350-4 (GTW35) 0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)		≤240 HB ≤350 HB	○
Kokillivalu	-		≤350 HB	○
Uudet valumateriaalit GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo 6		≤220 HB ≤300 HB	○
Uudet valumateriaalit ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	≤1000 ≤1400		○
Erikoisseos	Nimonic, Inconel, Monel, Hastelloy	≤2000		●
Titaani ja titaaniseokset	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤850 ≤1400		●
Alumiini ja alumiiniseokset	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		○
Muokattavat alumiiniseokset	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤650		○
Alumiinivaluseokset ≤ 10 % Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		○
> 24 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		○
Magnesiumseokset	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤400		○
Niukkaseosteinen kupari	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤500		○
Messinki, lyhytlästuihin pitkälästuihin	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600 ≤600		○
Pronssit, lyhytlästuihin	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0790 CuNi18Zn19Pb	≤600 ≤850		○
Pronssit, pitkälästuihin	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 ≤1000		○
Muovi, duroplastinen	Epoksihartsit, Resopal, Pertinax, Moltopren	≤150		○
Muovi, termoplastinen	Plexiglas, Hostalen, Novodur, Makralon	≤100		○
Muovi, aramidikuituvahvisteinen	Kevlar	≤1000		○
lasi-/hiilikuituvahvisteinen	GFK/CFK	≤1000		○



GÜHRING NAVIGATOR

Suosittelavan työkalun syöttöarvotaulukon numero (SA nro.) on merkitty vahvalla.
Kun valitset työkohteeseen sopivinta työkalua ja sen parametrejä, käytä myös nettipohjaista versiota GühringNavigator:sta: www.guehring.fi.

Artikkeli nro.
 Norm/DIN
 Materiaali
 KM-laatu
 Malli
 Pinnoite
 Jäähdytys
 Ohjelma sivu

Porat-Ø mm	Syöttöarvotaulukko nro.								
	1	2	3	4	5	6	7	8	9
	f (mm/kierros)								
0,50	0,004	0,006	0,007	0,008	0,010	0,012	0,014	0,016	0,019
1,00	0,006	0,008	0,012	0,014	0,016	0,018	0,020	0,023	0,025
2,00	0,020	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125
2,50	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160
3,15	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,160
4,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,200
5,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250
6,30	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315
8,00	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,315
10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630
20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630
25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800
31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000
40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250
50,00	0,250	0,310	0,400	0,500	0,630	0,800	1,000	1,250	1,250
63,00	0,315	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600
80,00	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600	2,000

Jäähdytysaine:

- Ilma
- Öljy
- Emulsio

Jäähdytyskanavat:

- Ⓜ ilman jäähdytyskanavia
- Ⓜ jäähdytyskanavilla

Raaka-aineryhmä	Materiaaliesimerkkejä, uusi kuvaus (sulussa vanha kuvaus) Vahvalla painettu = DIN EN mukainen materiaali nro.	Vetolujuus N/mm ²	Kovuus	Jäähdytysaine
Yleiset rakenneteräkset	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2) 1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤500 ≤1000		○
Automaattiteräkset	1.0718 11SMnBp30 (9SMnBp28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 ≤1000		○
Seostamattomat nuorutetut teräkset	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤700 ≤850 ≤1000		○
Seostetut nuorutetut teräkset	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	≤1000 ≤1400		○
Seostamattomat hiiletysteräkset	1.0301 (C10), 1.1121 C10E (Ck10)	≤850		○
Seostetut hiiletysteräkset	1.7276 10CrMo11, 1.5125 11MnSi6 1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5	≤1000 ≤1400		●
Nitrausteräkset	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≤1000 ≤1400		●
Työkaluteräkset	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 ≤1400		●
Pikateräkset	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≤1400		●
Jousiteräkset	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤350 HB	●
Karkaistut teräkset	-		≤48 HRC ≤66 HRC	●
Ruostumat teräkset, rikitetyt austeniittiset martensiittiset	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9 1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A) 1.4057 X20CrNi172 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤900 ≤1100 ≤1500		●
Valurauta	0.6010 EN-GJL-100 (GG10), 0.6020 EN-GJL-200 (GG20) 0.6025 EN-GJL-250 (GG25), 0.6035 EN-GJL-350 (GG35)		≤240 HB ≤350 HB	○
Pallografiitti ja adusoitu valu	0.7050 EN-GJS-500-7 (GGG50), 0.8035 EN-GJMW-350-4 (GTW35) 0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)		≤240 HB ≤350 HB	○
Kokillivalu	-		≤350 HB	○
Uudet valumateriaalit GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo 6		≤220 HB ≤300 HB	○
Uudet valumateriaalit ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	≤1000 ≤1400		○
Erikoisseos	Nimonic, Inconel, Monel, Hastelloy	≤2000		●
Titaani ja titaaniseokset	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤850 ≤1400		●
Alumiini ja alumiiniseokset	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		○
Muokattavat alumiiniseokset	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤650		○
Alumiinivaluseokset ≤ 10 % Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		○
> 24 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		○
Magnesiumseokset	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤400		○
Niukkaseosteinen kupari	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤500		○
Messinki, lyhytlästuihin pitkälästuihin	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600 ≤600		○
Pronssit, lyhytlästuihin	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0790 CuNi18Zn19Pb	≤600 ≤850		○
Pronssit, pitkälästuihin	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 ≤1000		○
Muovi, duroplastinen	Epoksihartsit, Resopal, Pertinax, Moltopren	≤150		○
Muovi, termoplastinen	Plexiglas, Hostalen, Novodur, Makralon	≤100		○
Muovi, aramidikuituvahvisteinen	Kevlar	≤1000		○
lasi-/hiilikuituvahvisteinen	GFK/CFK	≤1000		○

**GUHRING NAVIGATOR**

Suosittelavan työkalun syöttöarvotaulukon numero (SA nro.) on merkitty vahvalla.
Kun valitset työkohteeseen sopivinta työkalua ja sen parametrejä, käytä myös nettipohjaista versiota GühringNavigatorista: www.guehring.fi.

Artikkeli nro.
Norm/DIN
Materiaali
KM-laatu
Poraussyvyys
Pinnoite
Käyttökohde
Ohjelma sivu

Porat-Ø mm	Syöttöarvotaulukko nro.								
	1	2	3	4	5	6	7	8	9
	f (mm/kierros)								
5,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250
6,30	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315
8,00	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,315
10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630
20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630
25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800
31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000
40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250
50,00	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250	1,250
63,00	0,315	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600
80,00	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600	2,000

Jäähdytysaine:

○ Ilma

● Öljy

● Emulsio

Raaka-aineryhmä	Materiaaliesimerkkejä, uusi kuvaus (suluisia vanha kuvaus) Vahvalla painettu = DIN EN mukainen materiaali nro.	Vetolujuus N/mm ²	Kovuus	Jäähdytysaine
Yleiset rakenneteräkset	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2) 1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤500 ≤1000		○
Automaattiteräkset	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 ≤1000		○
Seostamattomat nuorrutetut teräkset	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤700 ≤850 ≤1000		○
Seostetut nuorrutetut teräkset	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	≤1000 ≤1400		○
Seostamattomat hiilletysteräkset	1.0301 (C10), 1.1121 C10E (Ck10)	≤850		○
Seostetut hiilletysteräkset	1.7276 10CrMo11, 1.5125 11MnSi6 1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5	≤1000 ≤1400		●
Nitrausteräkset	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≤1000 ≤1400		●
Työkäluteräkset	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 ≤1400		○
Pikateräkset	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≤1400		●
Jousiteräkset	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤350 HB	●
Karkaistut teräkset	–		≤48 HRC ≤66 HRC	●
Ruostumat teräkset, rikitetyt austeniittiset martensiittiset	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9 1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A) 1.4057 X20CrNi172 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤900 ≤1100 ≤1500		●
Valurauta	0.6010 EN-GJL-100 (GG10), 0.6020 EN-GJL-200 (GG20) 0.6025 EN-GJL-250 (GG25), 0.6035 EN-GJL-350 (GG35)		≤240 HB ≤350 HB	○
Pallografiitti ja adusoitu valu	0.7050 EN-GJS-500-7 (GGG50), 0.8035 EN-GJMW-350-4 (GTW35) 0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)		≤240 HB ≤350 HB	○
Kokillivalu	–		≤350 HB	○
Uudet valumateriaalit GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo 6		≤220 HB ≤300 HB	○
Uudet valumateriaalit ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	≤1000 ≤1400		○
Erikoisseos	Nimonic, Inconel, Monel, Hastelloy	≤2000		●
Titaani ja titaaniseokset	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤850 ≤1400		●
Alumiini ja alumiiniseokset	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		○
Muokattavat alumiiniseokset	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤650		○
Alumiinivaluseokset ≤ 10 % Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		○
> 24 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		○
Magnesiumseokset	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤400		○
Niukkaseosteinen kupari	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤500		○
Messinki, lyhytlastuinen pitkälastuinen	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600 ≤600		○
Pronssit, lyhytlastuiset	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0790 CuNi18Zn19Pb	≤600 ≤850		○
Pronssit, pitkälastuiset	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 ≤1000		○
Muovi, duroplastinen	Epoksihartsit, Resopal, Pertinax, Moltopren	≤150		○
Muovi, termoplastinen	Plexiglas, Hostalen, Novodur, Makralon	≤100		○
Muovi, aramidikuituvahvisteinen	Kevlar	≤1000		○
lasi-/hiilikuituvahvisteinen	GFK/CFK	≤1000		○



HT 800 WP ≤1,5xD

≤3xD

4112
WN
TKM
K/P
1,5xD
F
teräs
139

4115
WN
TKM
K/P
1,5xD
a
RST
145

4113
WN
TKM
K/P
1,5xD
F
valurauta
142

4114
WN
TKM
K/P
1,5xD
○
Al ja seok.
148

4112
WN
TKM
K/P
3xD
F
teräs
139

4115
WN
TKM
K/P
3xD
a
RST
145

4113
WN
TKM
K/P
3xD
F
valurauta
142

4114
WN
TKM
K/P
3xD
○
Al ja seok.
148



V _c m/min	SA nro.	V _c m/min	SA nro.	V _c m/min	SA nro.	V _c m/min	SA nro.	V _c m/min	SA nro.	V _c m/min	SA nro.	V _c m/min	SA nro.
130	6												
110	5												
130	7												
110	6												
130	6												
125	6												
110	5												
110	6												
90	5												
130	7												
110	6												
70	4												
105	5												
70	4												
60	5												
55	4												
55	3												
50	2												
		25	2							25	2		
		55	3							55	3		
		40	3							40	3		
		35	3							35	3		
				100	6							100	6
				90	6							90	6
				120	7							120	7
				100	6							100	6
		90	6							90	6		
				80	5							80	5
				80	5							80	5
				80	5							80	5
				80	5							80	5
		25	2							25	2		
		40	3							40	3		
		35	2							35	2		
						200	7					200	7
						180	7					180	7
						150	7					150	7
						120	7					120	7
						180	7					180	7
						70	6					70	6
						180	7					180	7
						120	6					120	6
						70	6					70	6
						50	6					50	6
						45	6					45	6
						35	5					35	5

Navigator

**GUHRING NAVIGATOR**

Suosittelavan työkalun syöttöarvotaulukon numero (SA nro.) on merkitty vahvalla.
Kun valitset työkohteeseesi sopivinta työkalua ja sen parametrejä, käytä myös nettipohjaista versiota GühringNavigatorista: www.guehring.fi.

Artikkeli nro.
 Norm/DIN
 Materiaali
 KM-laatu
 Poraussyvyys
 Pinnoite
 Käyttökohde
 Ohjelma sivu

Porat-Ø mm	Syöttöarvotaulukko nro.								
	1	2	3	4	5	6	7	8	9
	f (mm/kierros)								
5,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250
6,30	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315
8,00	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,315
10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630
20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630
25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800
31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000
40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250
50,00	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250	1,250
63,00	0,315	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600
80,00	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600	2,000

Jäähdytysaine:

○ Ilma

● Öljy

● Emulsio

Raaka-aineryhmä	Materiaaliesimerkkejä, uusi kuvaus (suluisia vanha kuvaus) Vahvalla painettu = DIN EN mukainen materiaali nro.	Vetolujuus N/mm ²	Kovuus	Jäähdytysaine
Yleiset rakenneteräkset	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2) 1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤500 ≤1000		○
Automaattiteräkset	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 ≤1000		○
Seostamattomat nuorutetut teräkset	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤700 ≤850 ≤1000		○
Seostetut nuorutetut teräkset	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	≤1000 ≤1400		○
Seostamattomat hillelysteräkset	1.0301 (C10), 1.1121 C10E (Ck10)	≤850		○
Seostetut hillelysteräkset	1.7276 10CrMo11, 1.5125 11MnSi6 1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5	≤1000 ≤1400		●
Nitrausteräkset	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≤1000 ≤1400		●
Työkaluteräkset	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 ≤1400		○
Pikateräkset	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≤1400		●
Jousiteräkset	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤350 HB	●
Karkaistut teräkset	-		≤48 HRC ≤66 HRC	●
Ruostumat teräkset, rikitetyt austeniittiset martensiittiset	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9 1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A) 1.4057 X20CrNi172 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤900 ≤1100 ≤1500		●
Valurauta	0.6010 EN-GJL-100 (GG10), 0.6020 EN-GJL-200 (GG20) 0.6025 EN-GJL-250 (GG25), 0.6035 EN-GJL-350 (GG35)		≤240 HB ≤350 HB	○
Pallografiitti ja adusoitu valu	0.7050 EN-GJS-500-7 (GGG50), 0.8035 EN-GJMW-350-4 (GTW35) 0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)		≤240 HB ≤350 HB	○
Kokillivalu	-		≤350 HB	○
Uudet valumateriaalit GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo 6		≤220 HB ≤300 HB	○
Uudet valumateriaalit ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	≤1000 ≤1400		○
Erikoisseos	Nimonic, Inconel, Monel, Hastelloy	≤2000		●
Titaani ja titaaniseokset	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤850 ≤1400		●
Alumiini ja alumiiniseokset	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		○
Muokattavat alumiiniseokset	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤650		○
Alumiinivaluseokset ≤ 10 % Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		○
> 24 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		○
Magnesiumseokset	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤400		○
Niukkaseosteinen kupari	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤500		○
Messinki, lyhytlastuinen pitkälastuinen	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600 ≤600		○
Pronssit, lyhytlastuiset	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0790 CuNi18Zn19Pb	≤600 ≤850		○
Pronssit, pitkälastuiset	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 ≤1000		○
Muovi, duroplastinen	Epoksihartsit, Resopal, Pertinax, Moltopren	≤150		○
Muovi, termoplastinen	Plexiglas, Hostalen, Novodur, Makralon	≤100		○
Muovi, aramidikuituvahvisteinen	Kevlar	≤1000		○
lasi-/hiilikuituvahvisteinen	GFK/CFK	≤1000		○



HT 800 WP ≤5xD

4112
WN
TKM
K/P
5xD
F
teräs
139

4115
WN
TKM
K/P
5xD
a
RST
145

4113
WN
TKM
K/P
5xD
F
valurauta
142

4114
WN
TKM
K/P
5xD
○
Al ja seok.
148

≤7xD

4112
WN
TKM
K/P
7xD
F
teräs
139

4115
WN
TKM
K/P
7xD
a
RST
145

4113
WN
TKM
K/P
7xD
F
valurauta
142

4114
WN
TKM
K/P
7xD
○
Al ja seok.
148



V _c m/min	SA nro.	V _c m/min	SA nro.	V _c m/min	SA nro.	V _c m/min	SA nro.	V _c m/min	SA nro.	V _c m/min	SA nro.	V _c m/min	SA nro.
125	6							120	5				
105	5							105	4				
125	7							120	6				
105	6							105	5				
125	6							120	5				
120	6							110	5				
105	5							100	4				
105	6							100	5				
85	5							85	4				
125	7							120	6				
105	6							100	5				
70	4							70	4				
105	5							105	4				
70	4							70	3				
55	5							55	4				
50	4							50	3				
55	3							55	2				
50	2							50	2				
		25	2							25	1		
		55	3							55	2		
		40	3							40	2		
		35	3							35	2		
				100	6							80	6
				90	6							70	6
				120	7							100	7
				100	6							80	6
		90	6							70	6		
				80	5							60	5
				80	5							60	5
				80	5							60	5
				80	5							60	5
		25	2							25	1		
		40	3							40	2		
		35	2							35	1		
						180	7					180	6
						180	7					180	6
						140	7					140	6
						110	7					110	6
						180	7					180	6
						70	6					70	5
						180	7					180	6
						120	6					120	5
						70	6					70	5
						50	6					50	5
						45	6					45	5
						35	5					35	4

Navigator

**GUHRING NAVIGATOR**

Suosittelavan työkalun syöttöarvotaulukon numero (SA nro.) on merkitty vahvalla.
Kun valitset työkohteeseesi sopivinta työkalua ja sen parametrejä, käytä myös nettipohjaista versiota GühringNavigatorista: www.guehring.fi.

Artikkeli nro.
 Norm/DIN
 Materiaali
 KM-laatu
 Poraussyvyys
 Pinnoite
 Käyttökohde
 Ohjelma sivu

Porat-Ø mm	Syöttöarvotaulukko nro.								
	1	2	3	4	5	6	7	8	9
	f (mm/kierros)								
5,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250
6,30	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315
8,00	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,315
10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630
20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630
25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800
31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000
40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250
50,00	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250	1,250
63,00	0,315	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600
80,00	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600	2,000

Jäähdytysaine:

- Ilma
 ● Öljy
 ● Emulsio

Raaka-aineryhmä	Materiaaliesimerkkejä, uusi kuvaus (suluisia vanha kuvaus) Vahvalla painettu = DIN EN mukainen materiaali nro.	Vetolujuus N/mm ²	Kovuus	Jäähdytysaine
Yleiset rakenneteräkset	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2) 1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤500 ≤1000		○
Automaattiteräkset	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 ≤1000		○
Seostamattomat nuorrutetut teräkset	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤700 ≤850 ≤1000		○
Seostetut nuorrutetut teräkset	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	≤1000 ≤1400		○
Seostamattomat hiilletysteräkset	1.0301 (C10), 1.1121 C10E (Ck10)	≤850		○
Seostetut hiilletysteräkset	1.7276 10CrMo11, 1.5125 11MnSi6 1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5	≤1000 ≤1400		●
Nitrausteräkset	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≤1000 ≤1400		●
Työkaluteräkset	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 ≤1400		○
Pikateräkset	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≤1400		●
Jousiteräkset	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤350 HB	●
Karkaistut teräkset	-		≤48 HRC ≤66 HRC	●
Ruostumat teräkset, rikitetyt austeniittiset martensiittiset	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9 1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A) 1.4057 X20CrNi172 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤900 ≤1100 ≤1500		●
Valurauta	0.6010 EN-GJL-100 (GG10), 0.6020 EN-GJL-200 (GG20) 0.6025 EN-GJL-250 (GG25), 0.6035 EN-GJL-350 (GG35)		≤240 HB ≤350 HB	○
Pallografiitti ja adusoitu valu	0.7050 EN-GJS-500-7 (GGG50), 0.8035 EN-GJMW-350-4 (GTW35) 0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)		≤240 HB ≤350 HB	○
Kokillivalu	-		≤350 HB	○
Uudet valumateriaalit GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo 6		≤220 HB ≤300 HB	○
Uudet valumateriaalit ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	≤1000 ≤1400		○
Erikoisseos	Nimonic, Inconel, Monel, Hastelloy	≤2000		●
Titaani ja titaaniseokset	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤850 ≤1400		●
Alumiini ja alumiiniseokset	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		○
Muokattavat alumiiniseokset	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤650		○
Alumiinivaluseokset ≤ 10 % Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		○
> 24 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		○
Magnesiumseokset	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤400		○
Niukkaseosteinen kupari	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤500		○
Messinki, lyhytlastuinen pitkälastuinen	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600 ≤600		○
Pronssit, lyhytlastuiset	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0790 CuNi18Zn19Pb	≤600 ≤850		○
Pronssit, pitkälastuiset	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 ≤1000		○
Muovi, duroplastinen	Epoksihartsit, Resopal, Pertinax, Moltopren	≤150		○
Muovi, termoplastinen	Plexiglas, Hostalen, Novodur, Makralon	≤100		○
Muovi, aramidikuituvahvisteinen	Kevlar	≤1000		○
lasi-/hiilikuituvahvisteinen	GFK/CFK	≤1000		○



HT 800 WP ≤10xD

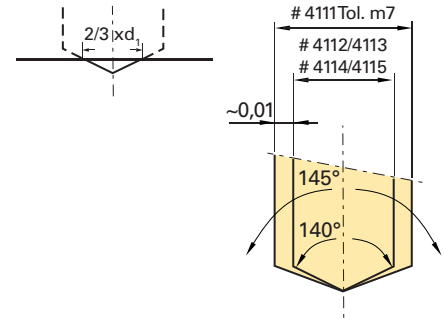
4112
WN
TKM
K/P
10xD
F
teräs
139

4115
WN
TKM
K/P
10xD
a
RST
145

4113
WN
TKM
K/P
10xD
F
valurauta
142

4114
WN
TKM
K/P
10xD
○
Al ja seok.
148

4111
WN
TKM
K/P
1xD
a
alku./viist.
151



- läpärei'ille ohjainreunojen on pysyttävä jatkuvassa kontaktissa Lisäksi suosittelemme syötön pienentämistä ennen läpimenoa.
- suuremmille porausvyvyyksille kuin 5xD suosittelemme keskiön tai alkuporauksen tekemistä, art. nro. 4105 ja art.nro. 4111. Vaihtoehtoisesti – riippuen työstettävästä aineesta – Tehoporia RT 100 U ja RT 100 VA voidaan myös käyttää.
- ilman esiporausta suosittelemme syötön pienentämistä porauksen aloituksessa.
- älä käytä poraustyökälua hakkaavaan työstöön ilman testiä (urat, risteävät reiät), hakkaavalle työstölle (max. 0,2 x D) suositellaan syöttöarvon pienentämistä milloin vaan se on mahdollista
- vastoin kuin perinteiset vaihtopalat, HT 800 työkalu sopivat myös pakattujen levyjen poraukseen
- sorvissa (liikkumaton työkalu) on varmistettava työkalun tarkka keskeisyys
- optimaalisen työstötuloksen saavuttamiseksi tarvitaan riittävä emulsion tai öljyn tuotto jäähdytysnesteenä
- työkalu sopii vain rajoitetusti kuiva- tai pisaratyöstöön. Pisaratyöstöön suosittelemme kartiomallisia varsia kuten myös Gühring'in pisaratyöstö komponentteja. Kysykää lisää myyntihenkilökunnaltamme.



V _c m/min	SA nro.	V _c m/min	SA nro.	V _c m/min	SA nro.	V _c m/min	SA nro.	V _c m/min	SA nro.
100	5							130	6
95	4							110	5
100	6							130	7
95	5							110	6
100	5							130	6
95	5							125	6
90	4							110	5
90	5							110	6
85	4							90	5
100	6							130	7
90	5							110	6
70	4							70	4
95	4							105	5
70	3							70	4
55	4							60	5
50	3							55	4
55	2							55	3
50	2							50	2
		25	1					25	2
		55	2					55	3
		40	2					40	3
		35	2					35	3
				80	6			100	6
				70	6			90	6
				100	7			120	7
				80	6			100	6
		70	6					90	6
				60	5			80	5
				60	5			80	5
				60	5			80	5
				60	5			80	5
		25	1					25	2
		40	2					40	3
		35	1					35	2
						150	6	200	7
						150	6	180	7
						130	6	150	7
						105	6	120	7
						150	6	180	7
						70	5	70	6
						150	6	180	7
						110	5	120	6
						70	5	70	6
						50	5	50	6
						45	5	45	6
						35	4	35	5

**GUHRING** NAVIGATOR

Suosittelavan työkalun syöttöarvotaulukon numero (SA nro.) on merkitty vahvalla.
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Artikkeli nro.
 Norm/DIN
 Materiaali
 KM-laatu
 Poraussyvyys
 Pinnoite
 Käyttökohde
 Ohjelma sivu

Porat-Ø mm	Syöttöarvotaulukko nro.								
	1	2	3	4	5	6	7	8	9
	f (mm/kierros)								
5,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250
6,30	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315
8,00	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,315
10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630
20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630
25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800
31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000
40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250
50,00	0,250	0,310	0,400	0,500	0,630	0,800	1,000	1,250	1,250
63,00	0,315	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600
80,00	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600	2,000

Jäähdytysaine:

○ Ilma

● Öljy

● Emulsio

Raaka-aineryhmä	Materiaaliesimerkkejä, uusi kuvaus (suluisia vanha kuvaus) Vahvalla painettu = DIN EN mukainen materiaali nro.	Vetolujuus N/mm ²	Kovuus	Jäähdytysaine
Yleiset rakenneteräkset	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2) 1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤500 ≤1000		○
Automaattiteräkset	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 ≤1000		○
Seostamattomat nuorrutetut teräkset	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤700 ≤850 ≤1000		○
Seostetut nuorrutetut teräkset	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	≤1000 ≤1400		○
Seostamattomat hillelysteräkset	1.0301 (C10), 1.1121 C10E (Ck10)	≤850		○
Seostetut hillelysteräkset	1.7276 10CrMo11, 1.5125 11MnSi6 1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5	≤1000 ≤1400		●
Nitrausteräkset	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≤1000 ≤1400		●
Työkäluteräkset	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 ≤1400		○
Pikateräkset	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≤1400		●
Jousiteräkset	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤350 HB	●
Karkaistut teräkset	-		≤48 HRC ≤66 HRC	●
Ruostumat teräkset, rikitetyt austeniittiset martensiittiset	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9 1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A) 1.4057 X20CrNi172 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤900 ≤1100 ≤1500		●
Valurauta	0.6010 EN-GJL-100 (GG10), 0.6020 EN-GJL-200 (GG20) 0.6025 EN-GJL-250 (GG25), 0.6035 EN-GJL-350 (GG35)		≤240 HB ≤350 HB	○
Pallografiitti ja adusoitu valu	0.7050 EN-GJS-500-7 (GGG50), 0.8035 EN-GJMW-350-4 (GTW35) 0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)		≤240 HB ≤350 HB	○
Kokillivalu	-		≤350 HB	○
Uudet valumateriaalit GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo 6		≤220 HB ≤300 HB	○
Uudet valumateriaalit ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	≤1000 ≤1400		○
Erikoisseos	Nimonic, Inconel, Monel, Hastelloy	≤2000		●
Titaani ja titaaniseokset	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤850 ≤1400		●
Alumiini ja alumiiniseokset	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		○
Muokattavat alumiiniseokset	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤650		○
Alumiinivaluseokset ≤ 10 % Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		○
> 24 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		○
Magnesiumseokset	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤400		○
Niukkaseosteinen kupari	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤500		○
Messinki, lyhytlastuinen pitkälastuinen	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600 ≤600		○
Pronssit, lyhytlastuiset	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0790 CuNi18Zn19Pb	≤600 ≤850		○
Pronssit, pitkälastuiset	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 ≤1000		○
Muovi, duroplastinen	Epoksihartsit, Resopal, Pertinax, Moltopren	≤150		○
Muovi, termoplastinen	Plexiglas, Hostalen, Novodur, Makralon	≤100		○
Muovi, aramidikuituvahvisteinen	Kevlar	≤1000		○
lasi-/hiilikuituvahvisteinen	GFK/CFK	≤1000		○



GÜHRING NAVIGATOR

Suosittelavan työkalun syöttöarvotaulukon numero (SA nro.) on merkitty vahvalla.
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Artikkeli nro.

Artikkeli nro.

Norm/DIN

Materiaali

Pinnoite

Malli

Ohjelma sivu

Porat-Ø mm	Syöttöarvotaulukko nro.								
	1	2	3	4	5	6	7	8	9
	f (mm/kierros)								
0,50	0,004	0,006	0,007	0,008	0,010	0,012	0,014	0,016	0,019
1,00	0,006	0,008	0,012	0,014	0,016	0,018	0,020	0,023	0,025
2,00	0,020	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125
2,50	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160
3,15	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,160
4,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,200
5,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250
6,30	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315
8,00	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,315
10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630
20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630
25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800
31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000
40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250
50,00	0,250	0,310	0,400	0,500	0,630	0,800	1,000	1,250	1,250
63,00	0,315	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600
80,00	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600	2,000

Jäähdytysaine:

- Ilma
- Öljy
- Emulsio

Jäähdytyskanavat:

- ilman jäähdytyskanavia
- jäähdytyskanavilla

Raaka-aineryhmä	Materiaaliesimerkkejä, uusi kuvaus (sulussa vanha kuvaus) Vahvalla painettu = DIN EN mukainen materiaali nro.	Vetolujuus N/mm ²	Kovuus	Jäähdytysaine
Yleiset rakenneteräkset	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2) 1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤500 ≤1000		
Automaattiteräkset	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 ≤1000		
Seostamattomat nuorutetut teräkset	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤700 ≤850 ≤1000		
Seostetut nuorutetut teräkset	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	≤1000 ≤1400		
Seostamattomat hiiletysteräkset	1.0301 (C10), 1.1121 C10E (Ck10)	≤850		
Seostetut hiiletysteräkset	1.7276 10CrMo11, 1.5125 11MnSi6 1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5	≤1000 ≤1400		
Nitrausteräkset	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≤1000 ≤1400		
Työkaluteräkset	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 ≤1400		
Pikateräkset	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≤1400		
Jousiteräkset	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤350 HB	
Karkaistut teräkset	-		≤48 HRC ≤66 HRC	
Ruostumat, teräkset, rikitetyt austeniittiset martensiittiset	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9 1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A) 1.4057 X20CrNi172 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤900 ≤1100 ≤1500		
Valurauta	0.6010 EN-GJL-100 (GG10), 0.6020 EN-GJL-200 (GG20) 0.6025 EN-GJL-250 (GG25), 0.6035 EN-GJL-350 (GG35)		≤240 HB ≤350 HB	
Pallografiitti ja adusoitu valu	0.7050 EN-GJS-500-7 (GGG50), 0.8035 EN-GJMW-350-4 (GTW35) 0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)		≤240 HB ≤350 HB	
Kokillivalu	-		≤350 HB	
Uudet valumateriaalit GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo 6		≤220 HB ≤300 HB	
Uudet valumateriaalit ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	≤1000 ≤1400		
Erikoisseos	Nimonic, Inconel, Monel, Hastelloy	≤2000		
Titaani ja titaaniseokset	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤850 ≤1400		
Alumiini ja alumiiniseokset	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		
Muokattavat alumiiniseokset	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤650		
Alumiinivaluseokset ≤ 10 % Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		
> 24 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		
Magnesiumseokset	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤400		
Niukkaseosteinen kupari	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤500		
Messinki, lyhytlastuinen pitkälastuiset	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600 ≤600		
Pronssit, lyhytlastuiset	2.1090 CuSn7Zn19Pb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0790 CuNi18Zn19Pb	≤600 ≤850		
Pronssit, pitkälastuiset	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 ≤1000		
Muovi, duroplastinen	Epoksihartsit, Resopal, Pertinax, Moltopren	≤150		
Muovi, termoplastinen	Plexiglas, Hostalen, Novodur, Makralon	≤100		
Muovi, aramidikuituvahvisteine	Kevlar	≤1000		
lasi-/hiilikuituvahvisteinen	GFK/CFK	≤1000		



GÜHRING NAVIGATOR

Suosittelavan työkalun syöttöarvotaulukon numero (SA nro.) on merkitty vahvalla.
Kun valitset työkohteeseesi sopivinta työkalua ja sen parametrejä, käytä myös nettipohjaista versiota GühringNavigator:sta: www.guehring.fi.

- Artikkeli nro.**
- Norm/DIN**
- Materiaali**
- Pinnoite**
- Malli**
- Ohjelma sivu**

Porat-Ø mm	Syöttöarvotaulukko nro.								
	1	2	3	4	5	6	7	8	9
	f (mm/kierros)								
0,50	0,004	0,006	0,007	0,008	0,010	0,012	0,014	0,016	0,019
1,00	0,006	0,008	0,012	0,014	0,016	0,018	0,020	0,023	0,025
2,00	0,020	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125
2,50	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160
3,15	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,160
4,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,200
5,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250
6,30	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315
8,00	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,315
10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630
20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630
25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800
31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000
40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250
50,00	0,250	0,310	0,400	0,500	0,630	0,800	1,000	1,250	1,250
63,00	0,315	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600
80,00	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600	2,000

Jäähdy-tysaine:

- Ilma
- Öljy
- Emulsio

Jäähdytyskanavat:

- ilman jäähdytyskanavia
- jäähdytyskanavilla

Raaka-aineryhmä	Materiaaliesimerkkejä, uusi kuvaus (sulussa vanha kuvaus) Vahvalla painettu = DIN EN mukainen materiaali nro.	Vetolujuus N/mm ²	Kovuus	Jäähdy- tysaine
Yleiset rakenneteräkset	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2) 1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤500 ≤1000		<input type="radio"/>
Automaattiteräkset	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 ≤1000		<input type="radio"/>
Seostamattomat nuorutetut teräkset	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤700 ≤850 ≤1000		<input type="radio"/>
Seostetut nuorutetut teräkset	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	≤1000 ≤1400		<input type="radio"/>
Seostamattomat hiiletysteräkset	1.0301 (C10), 1.1121 C10E (Ck10)	≤850		<input type="radio"/>
Seostetut hiiletysteräkset	1.7276 10CrMo11, 1.5125 11MnSi6 1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5	≤1000 ≤1400		<input type="radio"/>
Nitrausteräkset	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≤1000 ≤1400		<input type="radio"/>
Työkaluteräkset	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 ≤1400		<input type="radio"/>
Pikateräkset	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≤1400		<input type="radio"/>
Jousiteräkset	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤350 HB	<input type="radio"/>
Karkaistut teräkset	-		≤48 HRC ≤66 HRC	<input type="radio"/>
Ruostumat teräkset, rikitetyt austeniittiset martensiittiset	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9 1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A) 1.4057 X20CrNi172 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤900 ≤1100 ≤1500		<input type="radio"/>
Valurauta	0.6010 EN-GJL-100 (GG10), 0.6020 EN-GJL-200 (GG20) 0.6025 EN-GJL-250 (GG25), 0.6035 EN-GJL-350 (GG35)		≤240 HB ≤350 HB	<input type="radio"/>
Pallografiitti ja adusoitu valu	0.7050 EN-GJS-500-7 (GGG50), 0.8035 EN-GJMW-350-4 (GTW35) 0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)		≤240 HB ≤350 HB	<input type="radio"/>
Kokillivalu	-		≤350 HB	<input type="radio"/>
Uudet valumateriaalit GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo 6		≤220 HB ≤300 HB	<input type="radio"/>
Uudet valumateriaalit ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	≤1000 ≤1400		<input type="radio"/>
Erikoisseos	Nimonic, Inconel, Monel, Hastelloy	≤2000		<input type="radio"/>
Titaani ja titaaniseokset	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤850 ≤1400		<input type="radio"/>
Alumiini ja alumiiniseokset	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		<input type="radio"/>
Muokattavat alumiiniseokset	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤650		<input type="radio"/>
Alumiinivaluseokset ≤ 10 % Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		<input type="radio"/>
> 24 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		<input type="radio"/>
Magnesiumseokset	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤400		<input type="radio"/>
Niukkaseosteinen kupari	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤500		<input type="radio"/>
Messinki, lyhytlästuihin pitkälästuiset	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600 ≤600		<input type="radio"/>
Pronssit, lyhytlästuiset	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0790 CuNi18Zn19Pb	≤600 ≤850		<input type="radio"/>
Pronssit, pitkälästuiset	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 ≤1000		<input type="radio"/>
Muovi, duroplastinen	Epoksihartsit, Resopal, Pertinax, Moltopren	≤150		<input type="radio"/>
Muovi, termoplastinen	Plexiglas, Hostalen, Novodur, Makralon	≤100		<input type="radio"/>
Muovi, aramidikuituvahvisteine	Kevlar	≤1000		<input type="radio"/>
lasi-/hiilikuituvahvisteinen	GFK/CFK	≤1000		<input type="radio"/>

≤3xD Porausvyvyys

572	2048	1228	2498	659	663	2461	512	515
1897	1897	1897	1897	1897	WN	1897	WN	1897
HSCO	HSCO	HSCO	HSCO	HSCO	HSCO	HSCO	HSCO	HSS-E-PM
S	M	S	F	S	S	F	S	F
VA	P2000	GT 80	GT 80	GV 120	GV 120	GV 120	GU 500	GT 500
231	233	227	229	222	449	224	384	237



Vc m/min	SA nro.	Vc m/min	SA nro.	Vc m/min	SA nro.	Vc m/min	SA nro.	Vc m/min	Syöttöarvotaulukko nro.	Vc m/min	SA nro.	Vc m/min	SA nro.	Vc m/min	SA nro.	
38	6	35	6	38	6	42	6	38	5	5	42	6	45	6	42	6
33	5	30	5	33	5	36	5	33	4	4	36	5	35	5	37	5
44	6	40	6	44	6	48	7	44	5	5	48	6	50	6	47	7
42	5	40	5	38	5	42	6	38	5	5	42	6	40	6	44	6
44	5	40	5	44	6	48	6	44	5	5	48	6	44	6	47	6
44	5	40	5	44	5	48	6	44	5	5	48	6	44	6	47	6
		35	4	38	4	42	5	38	4	4	42	5	40	5	44	5
		25	4	27	4	30	5	27	4	4	30	5	27	4	30	4
		20	3	22	3	24	4	22	3	3	24	4	22	3	25	3
40	6	40	6	44	4	48	4	44	4	4	48	5	44	6	47	4
		20	4	22	4	24	5	22	4	4	24	5	22	4	25	5
		15	3	18	3	20	4	18	3	3	20	4	18	3	20	4
		20	4	22	4	24	5	22	4	4	24	5	22	4	25	5
		15	3	18	3	20	4	18	3	3	20	4	16	3	18	4
		18	4	19	4	21	5	19	4	4	21	5	20	4	22	5
		12	3	14	3	16	4	14	3	3	16	4	15	3	17	4
		12	3	14	3	17	4	14	3	3	17	4	13	3	17	4
		8	2	9	2	11	3	9	2	2	11	3	9	2	12	2
								4	1	1	5	2				
20	4	14	4	15	4	17	4	20	4	4	22	5	20	4	22	4
15	3	10	3	10	3	12	3	15	3	3	17	4	16	4	18	3
18	3	12	3	12	3	14	3	18	3	3	20	4	18	4	20	3
30	6	38	6	45	6	50	7	40	6	6	45	7	45	6	50	7
30	6	30	6	40	6	45	7	35	6	6	40	7	40	6	44	7
		30	6	33	6	36	7	33	6	6	36	7	40	6	45	7
		25	6	27	6	29	7	27	6	6	29	7	30	6	33	7
		10	3	8	3	10	4	12	3	3	14	4			16	4
8	1	5	2					6	2	2	7	2			6	2
12	2							11	2	2	12	3				
8	2							7	2	2	8	3				
90	7	90	7										70	7		
90	7	90	7										70	7		
80	7	80	7										85	7		
70	6	70	6										70	6		
70	6	85	6										80	6		
70	5	80	5	88	5	96	6						80	5	80	5
60	5	70	5	77	5	84	6						77	5		
40	5	40	5	44	5	48	6						44	5	60	5
35	4	40	4	45	5	50	5	45	5	5	50	6	50	4	50	5
33	4	30	4	40	4	45	5	40	4	4	45	5	40	4	44	5
20	4	25	4	22	4	25	5	23	4	4	26	5	32	4	33	5
15	4	15	4	17	4	20	5	17	4	4	20	5	28	4	28	5
		20	4	22	4	24	5						25	4	25	5
30	4	25	5	27	5	30	5						27	4		

Navigator

GÜHRING NAVIGATOR

Suosittelavan työkalun syöttöarvotaulukon numero (SA nro.) on merkitty vahvalla.
Kun valitset työkohteeseesi sopivinta työkalua ja sen parametrejä, käytä myös nettipohjaista versiota GühringNavigator:sta: www.guehring.fi.

Artikkeli nro.
Norm/DIN
Materiaali
KM-laatu
Pinnoite
Malli
Ohjelma sivu

Porat-Ø mm	Syöttöarvotaulukko nro.								
	1	2	3	4	5	6	7	8	9
	f (mm/kierros)								
0,50	0,004	0,006	0,007	0,008	0,010	0,012	0,014	0,016	0,019
1,00	0,006	0,008	0,012	0,014	0,016	0,018	0,020	0,023	0,025
2,00	0,020	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125
2,50	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160
3,15	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,160
4,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,200
5,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250
6,30	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315
8,00	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,315
10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630
20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630
25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800
31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000
40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250
50,00	0,250	0,310	0,400	0,500	0,630	0,800	1,000	1,250	1,250
63,00	0,315	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600
80,00	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600	2,000

Jäähdytysaine:

- Ilma
- Öljy
- Emulsio

Jäähdytyskanavat:

- Ⓜ ilman jäähdytyskanavia
- Ⓜ jäähdytyskanavilla

Raaka-aineryhmä	Materiaaliesimerkkejä, uusi kuvaus (sulussa vanha kuvaus) Vahvalla painettu = DIN EN mukainen materiaali nro.	Vetolujuus N/mm ²	Kovuus	Jäähdytysaine
Yleiset rakenneteräkset	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2) 1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤500 ≤1000		○
Automaattiteräkset	1.0718 11SMnB30 (9SMnB28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 ≤1000		○
Seostamattomat nuorutetut teräkset	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤700 ≤850 ≤1000		○
Seostetut nuorutetut teräkset	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	≤1000 ≤1400		○
Seostamattomat hiiletysteräkset	1.0301 (C10), 1.1121 C10E (Ck10)	≤850		○
Seostetut hiiletysteräkset	1.7276 10CrMo11, 1.5125 11MnSi6 1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5	≤1000 ≤1400		●
Nitrausteräkset	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≤1000 ≤1400		●
Työkäluteräkset	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 ≤1400		○
Pikateräkset	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≤1400		●
Jousiteräkset	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤350 HB	●
Karkaistut teräkset	-		≤48 HRC ≤66 HRC	●
Ruostumat teräkset, rikitetyt austeniittiset martensiittiset	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9 1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A) 1.4057 X20CrNi172 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤900 ≤1100 ≤1500		●
Valurauta	0.6010 EN-GJL-100 (GG10), 0.6020 EN-GJL-200 (GG20) 0.6025 EN-GJL-250 (GG25), 0.6035 EN-GJL-350 (GG35)		≤240 HB ≤350 HB	○
Pallografiitti ja adusoitu valu	0.7050 EN-GJS-500-7 (GGG50), 0.8035 EN-GJMW-350-4 (GTW35) 0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)		≤240 HB ≤350 HB	○
Kokillivalu	-		≤350 HB	○
Uudet valumateriaalit GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo 6		≤220 HB ≤300 HB	○
Uudet valumateriaalit ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	≤1000 ≤1400		○
Erikoisseos	Nimonic, Inconel, Monel, Hastelloy	≤2000		●
Titaani ja titaaniseokset	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤850 ≤1400		●
Alumiini ja alumiiniseokset	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		○
Muokattavat alumiiniseokset	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤650		○
Alumiinivaluseokset ≤ 10 % Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		○
> 24 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		○
Magnesiumseokset	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤400		○
Niukkaseosteinen kupari	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤500		○
Messinki, lyhytlästuihin pitkälästuihin	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600 ≤600		○
Pronssit, lyhytlästuihin	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0790 CuNi18Zn19Pb	≤600 ≤850		○
Pronssit, pitkälästuihin	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 ≤1000		○
Muovi, duroplastinen	Epoksihartsit, Resopal, Pertinax, Moltopren	≤150		○
Muovi, termoplastinen	Plexiglas, Hostalen, Novodur, Makralon	≤100		○
Muovi, aramidikuituvahvisteinen	Kevlar	≤1000		○
lasi-/hiilikuituvahvisteinen	GFK/CFK	≤1000		○



≤3xD Porausvyys

730	702	1149	710	703	705	704	707
6539	WN	WN	WN	8037	8041	8038	WN
TKM	TKM	TKM	KM	KM	KM	KM	KM
K10/K20							
○	○	○	○	○	○	○	○
N	N	N	Duro 150	N	N	N	H
239	243	431	323	429	512	430	432

2463	1946
6539	6537K
TKM	TKM
K/P	K/P
F	A
N	H
241	389



V _c m/min	Syöttöarvotaulukko nro.							V _c m/min	SA nro.	V _c m/min	SA nro.
80	4							104	5		
70	4							91	5		
80	5		4	4	4			104	6		
70	4		3	3	3			91	5		
80	4							104	5		
70	4							91	5		
60	4							78	5		
60	4							78	5		
80	5							104	6	80	6
60	4							78	5		
50	4							65	5	65	4
50	3							65	4	80	4
25	2		2	2	2		2	32	3		
20	2		3	3	3			26	4	40	2
10			2	2	2					30	1
25	2							32	2		
15	1							20	1		
25	2							32	2		
90	4		4	4	4			117	5	90	8
80	4		4	4	4			104	5	80	8
80	4		4	4	4			91	5	80	8
70	4		4	4	4			104	5	70	7
10			1	1	1		1			30	2
15	2							20	2		
15	1							15	1		
15	1							15	1		
200	7							260	8		
200	7							260	8		
150	6							195	7		
120	6							156	7		
180	6							234	6		
80	5							104	6		
180	5		5	5	5			234	6		
180	5		5	5	5			234	6		
120	5							156	6		
120	5							156	6		
70	4							91	5		
50	3							65	4		
50	4	4						65	5		
40	3	3				3		52	4		
150			1								
80	3	3				2		104	4		

Navigator

GÜHRING NAVIGATOR

Suosittelavan työkalun syöttöarvotaulukon numero (SA nro.) on merkitty vahvalla.
Kun valitset työkohteeseesi sopivinta työkalua ja sen parametrejä, käytä myös nettipohjaista versiota GühringNavigator:sta: www.guehring.fi.

- Artikkeli nro.
- Artikkeli nro.
- Norm/DIN
- Materiaali
- Pinnoite
- Malli
- Ohjelma sivu

Porat-Ø mm	Syöttöarvotaulukko nro.								
	1	2	3	4	5	6	7	8	9
	f (mm/kierros)								
0,50	0,004	0,006	0,007	0,008	0,010	0,012	0,014	0,016	0,019
1,00	0,006	0,008	0,012	0,014	0,016	0,018	0,020	0,023	0,025
2,00	0,020	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125
2,50	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160
3,15	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,160
4,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,200
5,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250
6,30	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315
8,00	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,315
10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630
20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630
25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800
31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000
40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250
50,00	0,250	0,310	0,400	0,500	0,630	0,800	1,000	1,250	1,250
63,00	0,315	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600
80,00	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600	2,000

Jäähdytysaine:

- Ilma
- Öljy
- Emulsio

Jäähdytyskanavat:

- ilman jäähdytyskanavia
- jäähdytyskanavilla

Raaka-aineryhmä	Materiaaliesimerkkejä, uusi kuvaus (sulussa vanha kuvaus) Vahvalla painettu = DIN EN mukainen materiaali nro.	Vetolujuus N/mm ²	Kovuus	Jäähdytysaine
Yleiset rakenneteräkset	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2) 1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤500 ≤1000		
Automaattiteräkset	1.0718 11SMnB30 (9SMnB28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 ≤1000		
Seostamattomat nuorrutetut teräkset	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤700 ≤850 ≤1000		
Seostetut nuorrutetut teräkset	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	≤1000 ≤1400		
Seostamattomat hiiletysteräkset	1.0301 (C10), 1.1121 C10E (Ck10)	≤850		
Seostetut hiiletysteräkset	1.7276 10CrMo11, 1.5125 11MnSi6 1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5	≤1000 ≤1400		
Nitrausteräkset	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≤1000 ≤1400		
Työkaluteräkset	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 ≤1400		
Pikateräkset	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≤1400		
Jousiteräkset	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤350 HB	
Karkaistut teräkset	-		≤48 HRC ≤66 HRC	
Ruostumat teräkset, rikitetyt austeniittiset martensiittiset	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9 1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A) 1.4057 X20CrNi172 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤900 ≤1100 ≤1500		
Valurauta	0.6010 EN-GJL-100 (GG10), 0.6020 EN-GJL-200 (GG20) 0.6025 EN-GJL-250 (GG25), 0.6035 EN-GJL-350 (GG35)		≤240 HB ≤350 HB	
Pallografiitti ja adusoitu valu	0.7050 EN-GJS-500-7 (GGG50), 0.8035 EN-GJMW-350-4 (GTW35) 0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)		≤240 HB ≤350 HB	
Kokillivalu	-		≤350 HB	
Uudet valumateriaalit GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo 6		≤220 HB ≤300 HB	
Uudet valumateriaalit ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	≤1000 ≤1400		
Erikoisseos	Nimonic, Inconel, Monel, Hastelloy	≤2000		
Titaani ja titaaniseokset	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤850 ≤1400		
Alumiini ja alumiiniseokset	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		
Muokattavat alumiiniseokset	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤650		
Alumiinivaluseokset ≤ 10 % Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		
> 24 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		
Magnesiumseokset	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤400		
Niukkaseosteinen kupari	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤500		
Messinki, lyhytlästuihin pitkälästuihin	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600 ≤600		
Pronssit, lyhytlästuihin	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0790 CuNi18Zn19Pb	≤600 ≤850		
Pronssit, pitkälästuihin	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 ≤1000		
Muovi, duroplastinen	Epoksihartsit, Resopal, Pertinax, Moltopren	≤150		
Muovi, termoplastinen	Plexiglas, Hostalen, Novodur, Makralon	≤100		
Muovi, aramidikuituvahvisteinen	Kevlar	≤1000		
lasi-/hiilikuituvahvisteinen	GFK/CFK	≤1000		



≤5xD Poraussyvyys

560	205	240	268	229	245	592	251	206	246	207	247	549	558
	208			248				209		210		550	
338	338	338	WN	345	345	345	346	338	345	338	345	338	345
HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS
N	N	N	N	N	N	N	N	H	H	W	W	GT 100	GT 100
256	244/258	257	412	458/457	450	454	471	263/266	459	269/272	460	274/281	461





V _c m/min	Syöttöarvotaulukko nro.												
27	6	6	6	6	6	6	6	6				6	6
22	5	5	5	5	5	5	5	5				5	5
30	6	6	6	6	6	6	6	6				6	6
30	5	5	5	5	5	5	5	5				5	5
25	5	5	5	5	5	5	5	5				5	5
25	5	5	5	5	5	5	5	5				5	5
30	6	6	6	6	6	6	6	6				6	6
16		4	4	4	4	4	4	4				4	4
30	6	6	6	6	6	6	6	6				6	6
30	6	6	6	6	6	6	6	6				6	6
25	6	6	6	6	6	6	6	6				6	6
25	6	6	6	6	6	6	6	6				6	6
80											7	7	
80											7	7	
70	7	7	7	7	7	7	7	7			7	7	7
70	6	6	6	6	6	6	6	6				6	6
50	6	6	6	6	6	6	6	6	6	6		6	6
50	5	5	5	5	5	5	5	5			5	5	5
70									6	6			
40	5	5	5	5	5	5	5	5				5	5
30	4	4	4	4	4	4	4	4	4	4			
25	4	4	4	4	4	4	4	4					
15	4	4	4	4	4	4	4	4				4	4
18	4	4	4	4	4	4	4	4	4	4		4	4
28	5	5	5	5	5	5	5	5	5	5	5		

Navigator

GÜHRING NAVIGATOR

Suosittelavan työkalun syöttöarvotaulukon numero (SA nro.) on merkitty vahvalla.
Kun valitset työkohteeseesi sopivinta työkalua ja sen parametrejä, käytä myös nettipohjaista versiota GühringNavigator:sta: www.guehring.fi.



- Artikkeli nro. 
- Artikkeli nro. 
- Norm/DIN
- Materiaali
- Pinoite
- Malli
- Ohjelma sivu
























Porat-Ø mm	Syöttöarvotaulukko nro.								
	1	2	3	4	5	6	7	8	9
	f (mm/kierros)								
0,50	0,004	0,006	0,007	0,008	0,010	0,012	0,014	0,016	0,019
1,00	0,006	0,008	0,012	0,014	0,016	0,018	0,020	0,023	0,025
2,00	0,020	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125
2,50	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160
3,15	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,160
4,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,200
5,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250
6,30	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315
8,00	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,315
10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630
20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630
25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800
31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000
40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250
50,00	0,250	0,310	0,400	0,500	0,630	0,800	1,000	1,250	1,250
63,00	0,315	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600
80,00	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600	2,000

Jäähdytysaine:

-  Ilma
-  Öljy
-  Emulsio

Jäähdytyskanavat:

-  ilman jäähdytyskanavia
-  jäähdytyskanavilla

Raaka-aineryhmä	Materiaaliesimerkkejä, uusi kuvaus (sulussa vanha kuvaus) Vahvalla painettu = DIN EN mukainen materiaali nro.	Vetolujuus N/mm ²	Kovuus	Jäähdytysaine
Yleiset rakenneteräkset	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2) 1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤500 ≤1000		
Automaattiteräkset	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 ≤1000		
Seostamattomat nuorutetut teräkset	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤700 ≤850 ≤1000		
Seostetut nuorutetut teräkset	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	≤1000 ≤1400		
Seostamattomat hiiletysteräkset	1.0301 (C10), 1.1121 C10E (Ck10)	≤850		
Seostetut hiiletysteräkset	1.7276 10CrMo11, 1.5125 11MnSi6 1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5	≤1000 ≤1400		
Nitrausteräkset	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≤1000 ≤1400		
Työkaluteräkset	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 ≤1400		
Pikateräkset	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≤1400		
Jousiteräkset	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤350 HB	
Karkaistut teräkset	-		≤48 HRC ≤66 HRC	
Ruostumat teräkset, rikitetyt austeniittiset martensiittiset	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9 1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A) 1.4057 X20CrNi172 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤900 ≤1100 ≤1500		
Valurauta	0.6010 EN-GJL-100 (GG10), 0.6020 EN-GJL-200 (GG20) 0.6025 EN-GJL-250 (GG25), 0.6035 EN-GJL-350 (GG35)		≤240 HB ≤350 HB	
Pallografiitti ja adusoitu valu	0.7050 EN-GJS-500-7 (GGG50), 0.8035 EN-GJMW-350-4 (GTW35) 0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)		≤240 HB ≤350 HB	
Kokillivalu	-		≤350 HB	
Uudet valumateriaalit GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo 6		≤220 HB ≤300 HB	
Uudet valumateriaalit ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	≤1000 ≤1400		
Erikoisseos	Nimonic, Inconel, Monel, Hastelloy	≤2000		
Titaani ja titaaniseokset	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤850 ≤1400		
Alumiini ja alumiiniseokset	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		
Muokattavat alumiiniseokset	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤650		
Alumiinivaluseokset ≤ 10 % Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		
Alumiinivaluseokset > 24 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		
Magnesiumseokset	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤400		
Niukkaseosteinen kupari	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤500		
Messinki, lyhytlästuihin pitkälästuihin	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600 ≤600		
Pronssit, lyhytlästuihin	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0790 CuNi18Zn19Pb	≤600 ≤850		
Pronssit, pitkälästuihin	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 ≤1000		
Muovi, duroplastinen	Epoksihartsit, Resopal, Pertinax, Moltopren	≤150		
Muovi, termoplastinen	Plexiglas, Hostalen, Novodur, Makralon	≤100		
Muovi, aramidikuituvahvisteinen	Kevlar	≤1000		
lasi-/hiilikuituvahvisteinen	GFK/CFK	≤1000		

GÜHRING NAVIGATOR

Suosittelavan työkalun syöttöarvotaulukon numero (SA nro.) on merkitty vahvalla.
Kun valitset työkohteeseesi sopivinta työkalua ja sen parametrejä, käytä myös nettipohjaista versiota GühringNavigator:sta: www.guehring.fi.

Artikkeli nro.
 Norm/DIN
 Materiaali
 Pinnoite
 Malli
 Ohjelma sivu

Porat-Ø mm	Syöttöarvotaulukko nro.								
	1	2	3	4	5	6	7	8	9
	f (mm/kierros)								
0,50	0,004	0,006	0,007	0,008	0,010	0,012	0,014	0,016	0,019
1,00	0,006	0,008	0,012	0,014	0,016	0,018	0,020	0,023	0,025
2,00	0,020	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125
2,50	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160
3,15	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,160
4,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,200
5,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250
6,30	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315
8,00	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,315
10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630
20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630
25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800
31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000
40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250
50,00	0,250	0,310	0,400	0,500	0,630	0,800	1,000	1,250	1,250
63,00	0,315	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600
80,00	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600	2,000

Jäähdytysaine:

- Ilma
- Öljy
- Emulsio

Jäähdytyskanavat:

- ilman jäähdytyskanavia
- jäähdytyskanavilla

Raaka-aineryhmä	Materiaaliesimerkkejä, uusi kuvaus (sulussa vanha kuvaus) Vahvalla painettu = DIN EN mukainen materiaali nro.	Vetolujuus N/mm ²	Kovuus	Jäähdytysaine
Yleiset rakenneteräkset	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2) 1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤500 ≤1000		<input type="radio"/>
Automaattiteräkset	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 ≤1000		<input type="radio"/>
Seostamattomat nuorutetut teräkset	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤700 ≤850 ≤1000		<input type="radio"/>
Seostetut nuorutetut teräkset	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	≤1000 ≤1400		<input type="radio"/>
Seostamattomat hiiletysteräkset	1.0301 (C10), 1.1121 C10E (Ck10)	≤850		<input type="radio"/>
Seostetut hiiletysteräkset	1.7276 10CrMo11, 1.5125 11MnSi6 1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5	≤1000 ≤1400		<input type="radio"/>
Nitrausteräkset	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≤1000 ≤1400		<input type="radio"/>
Työkäluteräkset	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 ≤1400		<input type="radio"/>
Pikateräkset	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≤1400		<input type="radio"/>
Jousiteräkset	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤350 HB	<input type="radio"/>
Karkaistut teräkset	-		≤48 HRC ≤66 HRC	<input type="radio"/>
Ruostumat teräkset, rikitetyt austeniittiset martensiittiset	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9 1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A) 1.4057 X20CrNi172 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤900 ≤1100 ≤1500		<input type="radio"/>
Valurauta	0.6010 EN-GJL-100 (GG10), 0.6020 EN-GJL-200 (GG20) 0.6025 EN-GJL-250 (GG25), 0.6035 EN-GJL-350 (GG35)		≤240 HB ≤350 HB	<input type="radio"/>
Pallografiitti ja adusoitu valu	0.7050 EN-GJS-500-7 (GGG50), 0.8035 EN-GJMW-350-4 (GTW35) 0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)		≤240 HB ≤350 HB	<input type="radio"/>
Kokillivalu	-		≤350 HB	<input type="radio"/>
Uudet valumateriaalit GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo 6		≤220 HB ≤300 HB	<input type="radio"/>
Uudet valumateriaalit ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	≤1000 ≤1400		<input type="radio"/>
Erikoisseos	Nimonic, Inconel, Monel, Hastelloy	≤2000		<input type="radio"/>
Titaani ja titaaniseokset	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤850 ≤1400		<input type="radio"/>
Alumiini ja alumiiniseokset	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		<input type="radio"/>
Muokattavat alumiiniseokset	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤650		<input type="radio"/>
Alumiinivaluseokset ≤ 10 % Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		<input type="radio"/>
> 24 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		<input type="radio"/>
Magnesiumseokset	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤400		<input type="radio"/>
Niukkaseosteinen kupari	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤500		<input type="radio"/>
Messinki, lyhytlästuihin pitkälästuihin	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600 ≤600		<input type="radio"/>
Pronssit, lyhytlästuihin	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0790 CuNi18Zn19Pb	≤600 ≤850		<input type="radio"/>
Pronssit, pitkälästuihin	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 ≤1000		<input type="radio"/>
Muovi, duroplastinen	Epoksihartsit, Resopal, Pertinax, Moltopren	≤150		<input type="radio"/>
Muovi, termoplastinen	Plexiglas, Hostalen, Novodur, Makralon	≤100		<input type="radio"/>
Muovi, aramidikuituvahvisteinen	Kevlar	≤1000		<input type="radio"/>
lasi-/hiilikuituvahvisteinen	GFK/CFK	≤1000		<input type="radio"/>

≤5xD Poraussyvyys

2997	661	658	662	657
338	345	338	345	338
HSCO	HSCO	HSCO	HSCO	HSCO
S	S	S	S	S
N	N	GT 100	GT 100	Ti
288	465	294	467	304

2459	2458
338	338
HSCO	HSCO
F	F
GT 100	Ti
296	306

1223	1224	1221	1222
338	345	338	345
HSCO	HSCO	HSCO	HSCO
A	A	C	C
GT 100	GT 100	GT 100	GT 100
299	469	298	468



V _c m/min	Syöttöarvotaulukko nro.				
38	6	6	6	6	
33	5	5	5	5	
44	5	5	5	5	
38	5	5	5	5	
44	5	5	5	5	
38	4	4	4	4	
27	4	4	4	4	
22	3	3	3	3	3
44	4	4	4	4	
22	4	4	4	4	
18	3	3	3	3	
22	4	4	4	4	
18	3	3	3	3	
19	4	4	4	4	
14	3	3	3	3	
14	3	3	3	3	3
9	2	2			2
20	4	4	4	4	4
15	3	3			3
18			3	3	3
40	6	6	6	6	
35	6	6	6	6	
33	6	6	6	6	
27	6	6	6	6	
12					3
6					2
11					2
7					2
88	5	5	5	5	
40	4	4			
22	4	4	4	4	
17	4	4	4	4	4
22	4	4	4	4	

V _c m/min	Syöttöarvotaulukko nro.	
42	6	
36	5	
48	6	
42	6	
48	6	
42	5	
30	5	
34	4	4
48	6	
24	5	
20	4	
24	5	
20	4	
21	5	
16	4	
17	4	4
11	3	2
6	1	
22	5	5
17	4	3
20	4	4
45	7	
40	7	
36	7	
29	7	
14	4	3
7		2
12		2
8		2
85	8	
72	7	
96	6	
40		
25	5	
20	5	4
24	5	

V _c m/min	Syöttöarvotaulukko nro.			
42			6	6
36			6	6
48			6	6
42	5	5	6	6
42			5	5
30			5	5
34			4	4
48			7	7
24			5	5
20			4	4
20			5	5
15			4	4
21			5	5
16			4	4
17			4	4
11			3	3
22			5	5
18			4	4
45	7	7		
40	7	7		
36	7	7		
29	7	7		
85	7	7		
96	6	6		
25	5	5		
20	5	5		
24	5	5		

GÜHRING NAVIGATOR

Suosittelavan työkalun syöttöarvotaulukon numero (SA nro.) on merkitty vahvalla.
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Artikkeli nro.
Norm/DIN
Materiaali
Pinnoite
Malli
Jäähdytys
Ohjelma sivu

Porat-Ø mm	Syöttöarvotaulukko nro.								
	1	2	3	4	5	6	7	8	9
	f (mm/kierros)								
0,50	0,004	0,006	0,007	0,008	0,010	0,012	0,014	0,016	0,019
1,00	0,006	0,008	0,012	0,014	0,016	0,018	0,020	0,023	0,025
2,00	0,020	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125
2,50	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160
3,15	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,160
4,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,200
5,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250
6,30	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315
8,00	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,315
10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630
20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630
25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800
31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000
40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250
50,00	0,250	0,310	0,400	0,500	0,630	0,800	1,000	1,250	1,250
63,00	0,315	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600
80,00	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600	2,000

Jäähdytysaine:

- Ilma
- Öljy
- Emulsio

Jäähdytyskanavat:

- ilman jäähdytyskanavia
- jäähdytyskanavilla

Raaka-aineryhmä	Materiaaliesimerkkejä, uusi kuvaus (sulussa vanha kuvaus) Vahvalla painettu = DIN EN mukainen materiaali nro.	Vetolujuus N/mm ²	Kovuus	Jäähdytysaine
Yleiset rakenneteräkset	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2) 1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤500 ≤1000		<input type="radio"/>
Automaattiteräkset	1.0718 11SMnB30 (9SMnB28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 ≤1000		<input type="radio"/>
Seostamattomat nuorutetut teräkset	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤700 ≤850 ≤1000		<input type="radio"/>
Seostetut nuorutetut teräkset	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	≤1000 ≤1400		<input type="radio"/>
Seostamattomat hiiletysteräkset	1.0301 (C10), 1.1121 C10E (Ck10)	≤850		<input type="radio"/>
Seostetut hiiletysteräkset	1.7276 10CrMo11, 1.5125 11MnSi6 1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5	≤1000 ≤1400		<input type="radio"/>
Nitrausteräkset	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≤1000 ≤1400		<input type="radio"/>
Työkaluteräkset	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 ≤1400		<input type="radio"/>
Pikateräkset	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≤1400		<input type="radio"/>
Jousiteräkset	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤350 HB	<input type="radio"/>
Karkaistut teräkset	-		≤48 HRC ≤66 HRC	<input type="radio"/>
Ruostumat teräkset, rikitetyt austeniittiset martensiittiset	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9 1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A) 1.4057 X20CrNi172 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤900 ≤1100 ≤1500		<input type="radio"/>
Valurauta	0.6010 EN-GJL-100 (GG10), 0.6020 EN-GJL-200 (GG20) 0.6025 EN-GJL-250 (GG25), 0.6035 EN-GJL-350 (GG35)		≤240 HB ≤350 HB	<input type="radio"/>
Pallografiitti ja adusoitu valu	0.7050 EN-GJS-500-7 (GGG50), 0.8035 EN-GJMW-350-4 (GTW35) 0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)		≤240 HB ≤350 HB	<input type="radio"/>
Kokillivalu	-		≤350 HB	<input type="radio"/>
Uudet valumateriaalit GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo 6		≤220 HB ≤300 HB	<input type="radio"/>
Uudet valumateriaalit ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	≤1000 ≤1400		<input type="radio"/>
Erikoisseos	Nimonic, Inconel, Monel, Hastelloy	≤2000		<input type="radio"/>
Titaani ja titaaniseokset	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤850 ≤1400		<input type="radio"/>
Alumiini ja alumiiniseokset	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		<input type="radio"/>
Muokattavat alumiiniseokset	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤650		<input type="radio"/>
Alumiinivaluseokset ≤ 10 % Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		<input type="radio"/>
> 24 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		<input type="radio"/>
Magnesiumseokset	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤400		<input type="radio"/>
Niukkaseosteinen kupari	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤500		<input type="radio"/>
Messinki, lyhytlastuinen pitkälastuiset	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600 ≤600		<input type="radio"/>
Pronssit, lyhytlastuiset	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0790 CuNi18Zn19Pb	≤600 ≤850		<input type="radio"/>
Pronssit, pitkälastuiset	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 ≤1000		<input type="radio"/>
Muovi, duroplastinen	Epoksihartsit, Resopal, Pertinax, Moltopren	≤150		<input type="radio"/>
Muovi, termoplastinen	Plexiglas, Hostalen, Novodur, Makralon	≤100		<input type="radio"/>
Muovi, aramidikuituvahvisteine	Kevlar	≤1000		<input type="radio"/>
lasi-/hiilikuituvahvisteinen	GFK/CFK	≤1000		<input type="radio"/>



≤5xD Poraussyvyys

1199	1018	2047	511	513	1131	1132	732	2464
338	338	338	WN	WN	WN	WN	WN	WN
M42	M42	HSCO	HSCO	HSS-E-PM	HSCO	HSCO	TKM	TKM
F nano			S	F		S		F
N	AeroX	P2000	GU 500	GT 500	GT 80 IK	GT 80 IK	N	N
ilman	ilman	ilman	ilman	ilman	kanssa	kanssa	ilman	ilman
317	313	311	386	388	395	396	319	321



V _c m/min	SA nro.	V _c m/min	SA nro.	V _c m/min	SA nro.	V _c m/min	SA nro.	V _c m/min	SA nro.	V _c m/min	SA nro.	V _c m/min	SA nro.	V _c m/min	SA nro.	V _c m/min	SA nro.	V _c m/min	SA nro.
42	6	35	6	35	6	45	6	42	6	48	7	60	7	80	4	100	5		
36	5	30	5	30	5	35	5	37	5	38	6	48	6	70	4	90	5		
48	6	40	6	40	6	50	6	47	6	48	7	60	7	80	5	100	6		
42	5	40	5	40	5	40	6	44	6	38	6	48	6	70	4	90	4		
44	6	40	5	40	5	44	6	47	6	48	6	60	6	80	4	100	5		
44	5	40	5	40	5	44	6	47	6	48	6	60	6	70	4	90	5		
42	5	35	4	35	4	40	5	44	5	38	5	50	5	60	4	80	5		
30	4	20	4	25	4	27	4	30	4	28	5	33	5	60	4	80	5		
25	3	16	3	20	3	22	3	25	3	26	4	31	4						
40	6	36	6	40	6	44	6	47	3	43	7	55	7	80	5	100	6		
25	3	20	3	20	4	22	4	25	4	25	5	31	5	60	4	80	5		
20	3	15	3	15	3	18	3	20	3	24	4	31	4						
20	3	16	4	20	4	22	4	25	4	25	5	30	5	50	4	65	5		
18	3	12	3	15	3	16	3	18	4	20	4	24	4						
21	4	15	3	18	4	20	4	22	5	24	5	30	5	50	3	65	3		
16	3	12	3	12	3	15	3	17	4	16	4	20	4						
17	3	15	3	12	3	13	3	14	4	14	4	18	4						
11	2	8	2	8	2	9	2	12	2	12	3	15	3	25	2	30	3		
6	1	4	1							4	3	5	3	20	2	20	2		
20	4	18	3	14	4	20	4	22	4	20	5	25	5	25	2	30	2		
15	3	14	3	10	3	16	4	18	3	14	4	18	4	15	1	20	1		
18	3	16	3	12	3	18	4	20	3	16	4	20	4	25	2	30	2		
45	6	35	6	38	6	45	6	50	7	48	7	60	7	90	4	115	5		
40	6	30	6	30	6	40	6	40	7	38	7	48	7	80	4	100	5		
36	6	30	6	30	6	40	6	44	7	42	7	52	7	70	4	90	5		
29	6	28	6	25	6	30	6	33	7	32	7	40	7	80	4	80	5		
14	3	10	3	10	3			16	4	12	4	15	4						
9	1	8	1	5	2			6	2	10	2	12	2	15	2	20	3		
12	2	10	2							14	3	18	3	15	1	15	1		
8	2	6	2							10	3	12	3	15	1	15	1		
		90	7	90	7	70	7							200	7	260	8		
		90	7	90	7	70	7							200	7	260	8		
80	7	80	7	80	7	85	7			95	7	120	7	150	6	195	7		
70	6	70	6	70	6	70	6			75	8	95	8	120	6	155	7		
80	6	70	6	85	6	80	6							180	5	235	6		
70	5	70	5	80	5	80	5	50	5	90	6	100	6	80	5	100	6		
60	5	60	5	70	5	77	5							180	5	235	6		
40	5	40	5	40	5	44	5	60	5	45	6	55	6	180	5	235	6		
35	4	35	4	40	4	50	4	50	5					120	5	155	6		
33	4	33	4	30	4	40	4	44	5	48	5	60	5	120	5	155	6		
20	4	20	4	25	4	32	4	33	5	45	5	55	5	70	4	90	5		
15	4	15	4	15	4	28	4	28	5	38	5	45	5	50	3	65	4		
		20	4	20	4	25	4	25	4					50	4	50	5		
		30	5	25	5	27	4			38	6	48	6	40	3	65	4		
														80	3	100	4		

Navigator

GÜHRING NAVIGATOR

Suosittelavan työkalun syöttöarvotaulukon numero (SA nro.) on merkitty vahvalle.
Kun valitset työkohteeseesi sopivinta työkalua ja sen parametrejä, käytä myös nettipohjaista versiota GühringNavigator:sta: www.guehring.fi.

- Artikkeli nro.
- Artikkeli nro.
- Norm/DIN
- Materiaali
- Pinnoite
- Malli
- Jäähdytys
- Ohjelma sivu

Porat-Ø mm	Syöttöarvotaulukko nro.								
	1	2	3	4	5	6	7	8	9
	f (mm/kierros)								
0,50	0,004	0,006	0,007	0,008	0,010	0,012	0,014	0,016	0,019
1,00	0,006	0,008	0,012	0,014	0,016	0,018	0,020	0,023	0,025
2,00	0,020	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125
2,50	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160
3,15	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,160
4,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,200
5,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250
6,30	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315
8,00	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,315
10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630
20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630
25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800
31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000
40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250
50,00	0,250	0,310	0,400	0,500	0,630	0,800	1,000	1,250	1,250
63,00	0,315	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600
80,00	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600	2,000

Jäähdytysaine:







- Ilma
- Öljy
- Emulsio







Jäähdytyskanavat:






- ilman jäähdytyskanavia
- jäähdytyskanavilla


Raaka-aineryhmä	Materiaaliesimerkkejä, uusi kuvaus (sulussa vanha kuvaus) Vahvalle painettu = DIN EN mukainen materiaali nro.	Vetolujuus N/mm ²	Kovuus	Jäähdytysaine
Yleiset rakenneteräkset	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2) 1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤500 ≤1000		
Automaattiteräkset	1.0718 11SMnB30 (9SMnB28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 ≤1000		
Seostamattomat nuorutetut teräkset	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤700 ≤850 ≤1000		
Seostetut nuorutetut teräkset	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	≤1000 ≤1400		
Seostamattomat hiiletysteräkset	1.0301 (C10), 1.1121 C10E (Ck10)	≤850		
Seostetut hiiletysteräkset	1.7276 10CrMo11, 1.5125 11MnSi6 1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5	≤1000 ≤1400		
Nitrausteräkset	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≤1000 ≤1400		
Työkäluteräkset	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 ≤1400		
Pikateräkset	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≤1400		
Jousiteräkset	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤350 HB	
Karkaistut teräkset	-		≤48 HRC ≤66 HRC	
Ruostumat teräkset, rikitetyt austeniittiset martensiittiset	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9 1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A) 1.4057 X20CrNi172 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤900 ≤1100 ≤1500		
Valurauta	0.6010 EN-GJL-100 (GG10), 0.6020 EN-GJL-200 (GG20) 0.6025 EN-GJL-250 (GG25), 0.6035 EN-GJL-350 (GG35)		≤240 HB ≤350 HB	
Pallografiitti ja adusoitu valu	0.7050 EN-GJS-500-7 (GGG50), 0.8035 EN-GJMW-350-4 (GTW35) 0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)		≤240 HB ≤350 HB	
Kokillivalu	-		≤350 HB	
Uudet valumateriaalit GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo 6		≤220 HB ≤300 HB	
Uudet valumateriaalit ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	≤1000 ≤1400		
Erikoisseos	Nimonic, Inconel, Monel, Hastelloy	≤2000		
Titaani ja titaaniseokset	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤850 ≤1400		
Alumiini ja alumiiniseokset	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		
Muokattavat alumiiniseokset	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤650		
Alumiinivaluseokset ≤ 10 % Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		
> 24 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		
Magnesiumseokset	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤400		
Niukkaseosteinen kupari	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤500		
Messinki, lyhytlästuihin pitkälästuihin	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600 ≤600		
Pronssit, lyhytlästuihin	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0790 CuNi18Zn19Pb	≤600 ≤850		
Pronssit, pitkälästuihin	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 ≤1000		
Muovi, duroplastinen	Epoksihartsit, Resopal, Pertinax, Moltopren	≤150		
Muovi, termoplastinen	Plexiglas, Hostalen, Novodur, Makralon	≤100		
Muovi, aramidikuituvahvisteinen	Kevlar	≤1000		
lasi-/hiilikuituvahvisteinen	GFK/CFK	≤1000		

≤10xD Porausvyvyys

561	211	204	217	257	523
220					
339	339	340	340	341	WN
HSS	HSS	HSS	HSS	HSS	HSS
					
N	N	N	N	N	N
ilman	ilman	ilman	ilman	ilman	ilman
327	325	338	331/336	473	482

218	219	501	505	535	551
221					
340	340	340	341	340	341
HSS	HSS	HSS	HSS	HSS	HSS
					
H	W	GT50	GT50	GT100	GT100
ilman	ilman	ilman	ilman	ilman	ilman
339/341	342	351	479	344/350	476

666	667	655	668	656
339				
340	341	340	341	
HSS	HSS	HSS	HSS	HSS
				
N	N	N	GT100	GT100
ilman	ilman	ilman	ilman	ilman
328	334	475	347	478

2462
340
HSS

GT100
ilman
349



V _c m/min	Syöttöarvotaulukko nro.					
24	6	6	6	6	6	6
20	5	5	5	5	5	5
27	6	6	6	6	6	6
27	5	5	5	5	5	5
22	5	5	5	5	5	5
22	5	5	5	5	5	5
27	6	6	6	6	6	6
14	4	4	4	4	4	4
27	6	6	6	6	6	6
27	6	6	6	6	6	6
22	6	6	6	6	6	6
18	6	6	6	6	6	6
45	7	7	7	7	7	7
45	6	6	6	6	6	6
63	6	6	6	6	6	6
54	5	5	5	5	5	5
36	5	5	5	5	5	5
28	4	4	4	4	4	4
22	4	4	4	4	4	4
22	4	4	4	4	4	4
14	4	4	4	4	4	4
22	5	5	5	5	5	5

V _c m/min	Syöttöarvotaulukko nro.			
24				6 6
20				5 5
27				6 6
27				5 5
22				5 5
22				5 5
27				6 6
14			4 4	
27				6 6
27				6 6
22				6 6
18				6 6
65	7	7	7	
65	7	7	7	
45	7			7 7
45				6 6
63	6		6 6	
54		5		5 5
63	6			
36				5 5
28	4			
22				4 4
14	4			4 4
22	5	5	5	5

V _c m/min	Syöttöarvotaulukko nro.					SA nro.
28	6	6	6	6	6	30 7
22	5	5	5	5	5	24 6
30	6	6	6	6	6	33 7
30	5	5	5	5	5	33 6
25	5	5	5	5	5	28 6
25	5	5	5	5	5	28 6
22	4	4	4	4	4	24 5
18	4	4	4	4	4	23 5
30	6	6	6	6	6	33 7
14	4	4	4	4	4	18 5
12	4	4	4	4	4	15 5
16	4	4	4	4	4	19 5
10	3	3	3	3	3	13 4
30	6	6	6	6	6	33 7
30	6	6	6	6	6	33 7
24	6	6	6	6	6	26 7
20	6	6	6	6	6	22 7
50	7	7	7	7	7	55 8
50	6	6	6	6	6	55 7
70	6	6	6	6	6	70
60	5	5	5	5	5	65 6
40	5	5	5	5	5	44 6
30	4	4	4	4	4	30
25	4	4	4	4	4	25
14	4	4	4	4	4	16 5
12	4	4	4	4	4	14 5
18	4	4	4	4	4	23 5
32	5	5	5	5	5	32

Navigator

GÜHRING NAVIGATOR

Suosittelavan työkalun syöttöarvotaulukon numero (SA nro.) on merkitty vahvalla.
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Artikkeli nro.
Norm/DIN
Materiaali
Pinnoite
Malli
Jäähdytys
Ohjelma sivu

Porat-Ø mm	Syöttöarvotaulukko nro.								
	1	2	3	4	5	6	7	8	9
	f (mm/kierros)								
0,50	0,004	0,006	0,007	0,008	0,010	0,012	0,014	0,016	0,019
1,00	0,006	0,008	0,012	0,014	0,016	0,018	0,020	0,023	0,025
2,00	0,020	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125
2,50	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160
3,15	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,160
4,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,200
5,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250
6,30	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315
8,00	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,315
10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630
20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630
25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800
31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000
40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250
50,00	0,250	0,310	0,400	0,500	0,630	0,800	1,000	1,250	1,250
63,00	0,315	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600
80,00	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600	2,000

Jäähdytysaine:

- Ilma
- Öljy
- Emulsio

Jäähdytyskanavat:

- Ⓜ ilman jäähdytyskanavia
- Ⓜ jäähdytyskanavilla

Raaka-aineryhmä	Materiaaliesimerkkejä, uusi kuvaus (sulussa vanha kuvaus) Vahvalla painettu = DIN EN mukainen materiaali nro.	Vetolujuus N/mm ²	Kovuus	Jäähdytysaine
Yleiset rakenneteräkset	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2) 1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤500 ≤1000		○
Automaattiteräkset	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 ≤1000		○
Seostamattomat nuorutetut teräkset	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤700 ≤850 ≤1000		○
Seostetut nuorutetut teräkset	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	≤1000 ≤1400		○
Seostamattomat hiiletysteräkset	1.0301 (C10), 1.1121 C10E (Ck10)	≤850		○
Seostetut hiiletysteräkset	1.7276 10CrMo11, 1.5125 11MnSi6 1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5	≤1000 ≤1400		●
Nitrausteräkset	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≤1000 ≤1400		●
Työkäluteräkset	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 ≤1400		●
Pikateräkset	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≤1400		●
Jousiteräkset	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤350 HB	●
Karkaistut teräkset	-		≤48 HRC ≤66 HRC	●
Ruostumat teräkset, rikitetyt austeniittiset martensiittiset	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9 1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A) 1.4057 X20CrNi172 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤900 ≤1100 ≤1500		●
Valurauta	0.6010 EN-GJL-100 (GG10), 0.6020 EN-GJL-200 (GG20) 0.6025 EN-GJL-250 (GG25), 0.6035 EN-GJL-350 (GG35)		≤240 HB ≤350 HB	○
Pallografiitti ja adusoitu valu	0.7050 EN-GJS-500-7 (GGG50), 0.8035 EN-GJMW-350-4 (GTW35) 0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)		≤240 HB ≤350 HB	○
Kokillivalu	-		≤350 HB	○
Uudet valumateriaalit GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo 6		≤220 HB ≤300 HB	○
Uudet valumateriaalit ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	≤1000 ≤1400		○
Erikoisseos	Nimonic, Inconel, Monel, Hastelloy	≤2000		●
Titaani ja titaaniseokset	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤850 ≤1400		●
Alumiini ja alumiiniseokset	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		○
Muokattavat alumiiniseokset	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤650		○
Alumiinivaluseokset ≤ 10 % Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		○
> 24 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		○
Magnesiumseokset	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤400		○
Niukkaseosteinen kupari	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤500		○
Messinki, lyhytlastuinen pitkälastuiset	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600 ≤600		○
Pronssit, lyhytlastuiset	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0790 CuNi18Zn19Pb	≤600 ≤850		○
Pronssit, pitkälastuiset	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 ≤1000		○
Muovi, duroplastinen	Epoksihartsit, Resopal, Pertinax, Moltopren	≤150		○
Muovi, termoplastinen	Plexiglas, Hostalen, Novodur, Makralon	≤100		○
Muovi, aramidikuituvahvisteine	Kevlar	≤1000		○
lasi-/hiilikuituvahvisteinen	GFK/CFK	≤1000		○



GÜHRING NAVIGATOR

Suosittelavan työkalun syöttöarvotaulukon numero (SA nro.) on merkitty vahvalla.
Kun valitset työkohteeseesi sopivinta työkalua ja sen parametrejä, käytä myös nettipohjaista versiota GühringNavigator:sta: www.guehring.fi.

Artikkeli nro.
Norm/DIN
Materiaali
Pinnoite
Malli
Ohjelma sivu

Porat-Ø mm	Syöttöarvotaulukko nro.								
	1	2	3	4	5	6	7	8	9
	f (mm/kierros)								
0,50	0,004	0,006	0,007	0,008	0,010	0,012	0,014	0,016	0,019
1,00	0,006	0,008	0,012	0,014	0,016	0,018	0,020	0,023	0,025
2,00	0,020	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125
2,50	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160
3,15	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,160
4,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,200
5,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250
6,30	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315
8,00	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,315
10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630
20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630
25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800
31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000
40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250
50,00	0,250	0,310	0,400	0,500	0,630	0,800	1,000	1,250	1,250
63,00	0,315	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600
80,00	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600	2,000

Jäähdy-tysaine:

- Ilma
- Öljy
- Emulsio

Jäähdytyskanavat:

- ilman jäähdytyskanavia
- jäähdytyskanavilla

Raaka-aineryhmä	Materiaaliesimerkkejä, uusi kuvaus (sulussa vanha kuvaus) Vahvalla painettu = DIN EN mukainen materiaali nro.	Vetolujuus N/mm ²	Kovuus	Jäähdytysaine
Yleiset rakenneteräkset	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2) 1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤500 ≤1000		<input type="radio"/>
Automaattiteräkset	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 ≤1000		<input type="radio"/>
Seostamattomat nuorutetut teräkset	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤700 ≤850 ≤1000		<input type="radio"/>
Seostetut nuorutetut teräkset	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	≤1000 ≤1400		<input type="radio"/>
Seostamattomat hiiletysteräkset	1.0301 (C10), 1.1121 C10E (Ck10)	≤850		<input type="radio"/>
Seostetut hiiletysteräkset	1.7276 10CrMo11, 1.5125 11MnSi6 1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5	≤1000 ≤1400		<input checked="" type="radio"/>
Nitrausteräkset	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≤1000 ≤1400		<input checked="" type="radio"/>
Työkäluteräkset	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 ≤1400		<input checked="" type="radio"/>
Pikateräkset	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≤1400		<input checked="" type="radio"/>
Jousiteräkset	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤350 HB	<input checked="" type="radio"/>
Karkaistut teräkset	-		≤48 HRC ≤66 HRC	<input checked="" type="radio"/>
Ruostumat teräkset, rikitetyt austeniittiset martensiittiset	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9 1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A) 1.4057 X20CrNi172 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤900 ≤1100 ≤1500		<input checked="" type="radio"/>
Valurauta	0.6010 EN-GJL-100 (GG10), 0.6020 EN-GJL-200 (GG20) 0.6025 EN-GJL-250 (GG25), 0.6035 EN-GJL-350 (GG35)		≤240 HB ≤350 HB	<input type="radio"/>
Pallografiitti ja adusoitu valu	0.7050 EN-GJS-500-7 (GGG50), 0.8035 EN-GJMW-350-4 (GTW35) 0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)		≤240 HB ≤350 HB	<input type="radio"/>
Kokillivalu	-		≤350 HB	<input type="radio"/>
Uudet valumateriaalit GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo 6		≤220 HB ≤300 HB	<input type="radio"/>
Uudet valumateriaalit ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	≤1000 ≤1400		<input type="radio"/>
Erikoisseos	Nimonic, Inconel, Monel, Hastelloy	≤2000		<input checked="" type="radio"/>
Titaani ja titaaniseokset	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤850 ≤1400		<input checked="" type="radio"/>
Alumiini ja alumiiniseokset	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		<input type="radio"/>
Muokattavat alumiiniseokset	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤650		<input type="radio"/>
Alumiinivaluseokset ≤ 10 % Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		<input type="radio"/>
Alumiinivaluseokset > 24 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		<input type="radio"/>
Magnesiumseokset	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤400		<input type="radio"/>
Niukkaseosteinen kupari	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤500		<input type="radio"/>
Messinki, lyhytlästuihin pitkälästuihin	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600 ≤600		<input type="radio"/>
Pronssit, lyhytlästuihin	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0790 CuNi18Zn19Pb	≤600 ≤850		<input checked="" type="radio"/>
Pronssit, pitkälästuihin	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 ≤1000		<input checked="" type="radio"/>
Muovi, duroplastinen	Epoksihartsit, Resopal, Pertinax, Moltopren	≤150		<input type="radio"/>
Muovi, termoplastinen	Plexiglas, Hostalen, Novodur, Makralon	≤100		<input type="radio"/>
Muovi, aramidikuituvahvisteinen	Kevlar	≤1000		<input type="radio"/>
lasi-/hiilikuituvahvisteinen	GFK/CFK	≤1000		<input type="radio"/>

GÜHRING NAVIGATOR

Suosittelavan työkalun syöttöarvotaulukon numero (SA nro.) on merkitty vahvalla.
Kun valitset työkohteeseesi sopivinta työkalua ja sen parametrejä, käytä myös nettipohjaista versiota GühringNavigator:sta: www.guehring.fi.

- Artikkeli nro.
- Norm/DIN
- Materiaali
- KM-laatu
- Pinnoite
- Malli
- Ohjelma sivu

Porat-Ø mm	Syöttöarvotaulukko nro.								
	1	2	3	4	5	6	7	8	9
	f (mm/kierros)								
0,50	0,004	0,006	0,007	0,008	0,010	0,012	0,014	0,016	0,019
1,00	0,006	0,008	0,012	0,014	0,016	0,018	0,020	0,023	0,025
2,00	0,020	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125
2,50	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160
3,15	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,160
4,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,200
5,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250
6,30	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315
8,00	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,315
10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630
20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630
25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800
31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000
40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250
50,00	0,250	0,310	0,400	0,500	0,630	0,800	1,000	1,250	1,250
63,00	0,315	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600
80,00	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600	2,000

Jäähdytysaine:

- Ilma
- Öljy
- Emulsio

Jäähdytyskanavat:

- Ⓜ ilman jäähdytyskanavia
- Ⓜ jäähdytyskanavilla

Raaka-aineryhmä	Materiaaliesimerkkejä, uusi kuvaus (sulussa vanha kuvaus) Vahvalla painettu = DIN EN mukainen materiaali nro.	Vetolujuus N/mm ²	Kovuus	Jäähdytysaine
Yleiset rakenneteräkset	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2) 1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤500 ≤1000		○
Automaattiteräkset	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 ≤1000		○
Seostamattomat nuorutetut teräkset	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤700 ≤850 ≤1000		○
Seostetut nuorutetut teräkset	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	≤1000 ≤1400		○
Seostamattomat hiiletysteräkset	1.0301 (C10), 1.1121 C10E (Ck10)	≤850		○
Seostetut hiiletysteräkset	1.7276 10CrMo11, 1.5125 11MnSi6 1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5	≤1000 ≤1400		●
Nitrausteräkset	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≤1000 ≤1400		●
Työkaluteräkset	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 ≤1400		●
Pikateräkset	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≤1400		●
Jousiteräkset	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤350 HB	●
Karkaistut teräkset	-		≤48 HRC ≤66 HRC	●
Ruostumat teräkset, rikitetyt austeniittiset martensiittiset	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9 1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A) 1.4057 X20CrNi172 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤900 ≤1100 ≤1500		●
Valurauta	0.6010 EN-GJL-100 (GG10), 0.6020 EN-GJL-200 (GG20) 0.6025 EN-GJL-250 (GG25), 0.6035 EN-GJL-350 (GG35)		≤240 HB ≤350 HB	○
Pallografiitti ja adusoitu valu	0.7050 EN-GJS-500-7 (GGG50), 0.8035 EN-GJMW-350-4 (GTW35) 0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)		≤240 HB ≤350 HB	○
Kokillivalu	-		≤350 HB	○
Uudet valumateriaalit GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo 6		≤220 HB ≤300 HB	○
Uudet valumateriaalit ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	≤1000 ≤1400		○
Erikoisseos	Nimonic, Inconel, Monel, Hastelloy	≤2000		●
Titaani ja titaaniseokset	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤850 ≤1400		●
Alumiini ja alumiiniseokset	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		○
Muokattavat alumiiniseokset	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤650		○
Alumiinivaluseokset ≤ 10 % Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		○
> 24 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		○
Magnesiumseokset	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤400		○
Niukkaseosteinen kupari	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤500		○
Messinki, lyhytlästuihin pitkälästuihin	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600 ≤600		○
Pronssit, lyhytlästuihin	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0790 CuNi18Zn19Pb	≤600 ≤850		○
Pronssit, pitkälästuihin	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 ≤1000		○
Muovi, duroplastinen	Epoksihartsit, Resopal, Pertinax, Moltopren	≤150		○
Muovi, termoplastinen	Plexiglas, Hostalen, Novodur, Makralon	≤100		○
Muovi, aramidikuituvahvisteinen	Kevlar	≤1000		○
lasi-/hiilikuituvahvisteinen	GFK/CFK	≤1000		○



≤10xD Porausvyvyys

311	317	357	336	623	617
339	340	341	340	341	340
HSCO	HSCO	HSCO	HSCO	HSCO	HSCO

N	N	N	GT 100	GT 100	Ti
330	353	480	355	481	358

669
340
HSCO

S
Ti
360

396
340
HSCO

F
GT 100
357

706
WN
TKM

K10/K20
N
362



Vc m/min	Syöttöarvotaulukko nro.						Vc m/min	SA nro.	Vc m/min	SA nro.	Vc m/min	SA nro.
33	5	5	5	5	5	5			36	5		
27	5	5	5	5	5	5			30	4		
36	5	5	5	5	5	5			40	5		
32	5	5	5	5	5	5			36	5		
36	5	5	5	5	5	5			40	5		
36	5	5	5	5	5	5			40	5		
22	4	4	4	4	4	4			26	4		
18	4	4	4	4	4	4			18	4		
14	3	3	3	3	3	3	15	3	15	3		
32	5	5	5	5	5	5			32	5		
18	4	4	4	4	4	4			20	4		
13	3	3	3	3	3	3	13	3	18	3		
14	4	4	4	4	4	4			18	4		
10	3	3	3	3	3	3	10	3	12	3		
13	4	4	4	4	4	4			15	4		
10	3	3	3	3	3	3	10	3	12	3		
12	3	3	3	3	3	3	10	3	14	3		
6	2	2	2	2	2	2	8	2	9	3		
4				1	1	1			5	1		
12	4	4	4	4	4	4	15	4	14	4		
8	3	3	3	2	2	3	10	3	10	3		
10	3	3	3	3	3	3	13	3	12	3		
32	6	6	6	6	6	6			35	6		
27	6	6	6	6	6	6			30	6		
26	6	6	6	6	6	6			30	6		
24	6	6	6	6	6	6			26	6		
6	3	3	3	3	3	3	6	3	12	3		
5	1	1	1				6	1				
8							10	2				
5							6	2				
70				7	7				77	7		
60				6	6				66	6		
60						5						
36	5	5	5	5	5				40	6		
54				5	5							
36	5	5	5	5	5				40	6		
30	4	4	4	5	5							
24	4	4	4	5	5							
18	4	4	4	4	4				21	5		
13	4	4	4	4	4		25	4	15	5		
16	4	4	4	4	4				30	5	50	4
26						4					40	3
											80	3

Navigator

GÜHRING NAVIGATOR

Suosittelavan työkalun syöttöarvotaulukon numero (SA nro.) on merkitty vahvalla.
Kun valitset työkohteeseesi sopivinta työkalua ja sen parametrejä, käytä myös nettipohjaista versiota GühringNavigator:sta: www.guehring.fi.

Artikkeli nro.
Norm/DIN
Materiaali
Pinnoite
Malli
Jäähdytys
Ohjelma sivu

Porat-Ø mm	Syöttöarvotaulukko nro.								
	1	2	3	4	5	6	7	8	9
	f (mm/kierros)								
0,50	0,004	0,006	0,007	0,008	0,010	0,012	0,014	0,016	0,019
1,00	0,006	0,008	0,012	0,014	0,016	0,018	0,020	0,023	0,025
2,00	0,020	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125
2,50	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160
3,15	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,160
4,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,200
5,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250
6,30	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315
8,00	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,315
10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630
20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630
25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800
31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000
40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250
50,00	0,250	0,310	0,400	0,500	0,630	0,800	1,000	1,250	1,250
63,00	0,315	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600
80,00	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600	2,000

Jäähdytysaine:

- Ilma
- Öljy
- Emulsio





Jäähdytyskanavat:


- ilman jäähdytyskanavia
- jäähdytyskanavilla




Raaka-aineryhmä	Materiaaliesimerkkejä, uusi kuvaus (sulussa vanha kuvaus) Vahvalla painettu = DIN EN mukainen materiaali nro.	Vetolujuus N/mm ²	Kovuus	Jäähdytysaine
Yleiset rakenneteräkset	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2) 1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤500 ≤1000		<input type="radio"/>
Automaattiteräkset	1.0718 11SMnB30 (9SMnB28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 ≤1000		<input type="radio"/>
Seostamattomat nuorutetut teräkset	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤700 ≤850 ≤1000		<input type="radio"/>
Seostetut nuorutetut teräkset	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	≤1000 ≤1400		<input type="radio"/>
Seostamattomat hiiletysteräkset	1.0301 (C10), 1.1121 C10E (Ck10)	≤850		<input type="radio"/>
Seostetut hiiletysteräkset	1.7276 10CrMo11, 1.5125 11MnSi6 1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5	≤1000 ≤1400		<input type="radio"/>
Nitrausteräkset	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≤1000 ≤1400		<input type="radio"/>
Työkäluoteräkset	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 ≤1400		<input type="radio"/>
Pikateräkset	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≤1400		<input type="radio"/>
Jousiteräkset	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤350 HB	<input type="radio"/>
Karkaistut teräkset	-		≤48 HRC ≤66 HRC	<input type="radio"/>
Ruostumat teräkset, rikitetyt austeniittiset martensiittiset	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9 1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A) 1.4057 X20CrNi172 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤900 ≤1100 ≤1500		<input type="radio"/>
Valurauta	0.6010 EN-GJL-100 (GG10), 0.6020 EN-GJL-200 (GG20) 0.6025 EN-GJL-250 (GG25), 0.6035 EN-GJL-350 (GG35)		≤240 HB ≤350 HB	<input type="radio"/>
Pallografiitti ja adusoitu valu	0.7050 EN-GJS-500-7 (GGG50), 0.8035 EN-GJMW-350-4 (GTW35) 0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)		≤240 HB ≤350 HB	<input type="radio"/>
Kokillivalu	-		≤350 HB	<input type="radio"/>
Uudet valumateriaalit GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo 6		≤220 HB ≤300 HB	<input type="radio"/>
Uudet valumateriaalit ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	≤1000 ≤1400		<input type="radio"/>
Erikoisseos	Nimonic, Inconel, Monel, Hastelloy	≤2000		<input type="radio"/>
Titaani ja titaaniseokset	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤850 ≤1400		<input type="radio"/>
Alumiini ja alumiiniseokset	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		<input type="radio"/>
Muokattavat alumiiniseokset	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤650		<input type="radio"/>
Alumiinivaluseokset ≤ 10 % Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		<input type="radio"/>
> 24 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		<input type="radio"/>
Magnesiumseokset	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤400		<input type="radio"/>
Niukkaseosteinen kupari	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤500		<input type="radio"/>
Messinki, lyhytlästuihin pitkälästuihin	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600 ≤600		<input type="radio"/>
Pronssit, lyhytlästuihin	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0790 CuNi18Zn19Pb	≤600 ≤850		<input type="radio"/>
Pronssit, pitkälästuihin	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 ≤1000		<input type="radio"/>
Muovi, duroplastinen	Epoksihartsit, Resopal, Pertinax, Moltopren	≤150		<input type="radio"/>
Muovi, termoplastinen	Plexiglas, Hostalen, Novodur, Makralon	≤100		<input type="radio"/>
Muovi, aramidikuituvahvisteinen	Kevlar	≤1000		<input type="radio"/>
lasi-/hiilikuituvahvisteinen	GFK/CFK	≤1000		<input type="radio"/>






>10xD Poraussyvyys

618	619	620	621
1869 R1	1869 R2	1870 R1	1870 R2
HSCO	HSCO	HSCO	HSCO
			
GT 100	GT 100	GT 100	GT 100
ilman	ilman	ilman	ilman
370	376	486	490

571
1869 R3
HSCO

GT 100
ilman
380

370	371	372
WN	WN	WN
HSCO	HSCO	HSCO
		
GT 100	GT 100	GT 100
kanssa	kanssa	kanssa
505	506	507

374	375	376
WN	WN	WN
HSCO	HSCO	HSCO
		
GT 100	GT 100	GT 100
kanssa	kanssa	kanssa
508	509	510



V _c m/min	Syöttöarvotaulukko nro.			
30	4	4	4	4
25	4	4	4	4
33	4	4	4	4
30	4	4	4	4
33	4	4	4	4
33	4	4	4	4
20	3	3	3	3
14	3	3	3	3
10	2	2	2	2
29	4	4	4	4
14	3	3	3	3
10	2	2	2	2
10	3	3	3	3
8	2	2	2	2
11	3	3	3	3
8	2	2	2	2
8	2	2	2	2
5	1	1	1	1
3	1	1	1	1
10	3	3	3	3
8	2	2	2	2
10	2	2	2	2
20	5	5	5	5
16	5	5	5	5
5	2	2	2	2
5	1	1	1	1
6	1	1	1	1
5	1	1	1	1
50	6	6	6	6
40	5	5	5	5
30	4	4	4	4
45	4	4	4	4
30	4	4	4	4
25	4	4	4	4
20	4	4	4	4
16	3	3	3	3
10	3	3	3	3
14	3	3	3	3
20	3	3	3	3

V _c m/min	SA nro.
30	4
25	4
33	4
30	4
33	4
33	4
20	3
14	3
10	2
29	4
14	3
10	2
10	3
8	2
11	3
8	2
8	2
5	1
3	1
10	3
8	2
10	2
20	5
16	5
5	2
5	1
6	1
5	1
50	6
40	5
30	4
45	4
30	4
25	4
20	4
16	3
10	3
14	3
20	3

V _c m/min	Syöttöarvotaulukko nro.		
35	6	6	6
30	5	5	5
30	6	6	6
30	5	5	5
35	5	5	5
29	5	5	5
22	4	4	4
18	4	4	4
14	3	3	3
35	6	6	6
18	4	4	4
14	3	3	3
14	4	4	4
12	3	3	3
15	4	4	4
11	3	3	3
11	3	3	3
8	2	2	2
4	2	2	2
14	4	4	4
10	3	3	3
12	3	3	3
30	6	6	6
24	6	6	6
24	6	6	6
20	6	6	6
8	3	3	3
8	1	1	1
10	2	2	2
8	2	2	2
60	7	7	7
50	6	6	6
38	5	5	5
55	5	5	5
36	5	5	5
24	4	4	4
20	4	4	4
14	4	4	4
25	5	5	5

V _c m/min	Syöttöarvotaulukko nro.		
30	5	5	5
25	4	4	4
30	5	5	5
25	4	4	4
30	4	4	4
25	4	4	4
18	3	3	3
16	3	3	3
12	2	2	2
30	5	5	5
16	3	3	3
12	2	2	2
12	3	3	3
10	2	2	2
13	3	3	3
9	2	2	2
9	2	2	2
6	2	2	2
4	1	1	1
12	3	3	3
8	2	2	2
12	2	2	2
28	5	5	5
22	5	5	5
22	5	5	5
18	5	5	5
6	2	2	2
6	1	1	1
8	2	2	2
6	2	2	2
55	6	6	6
44	5	5	5
35	4	4	4
50	4	4	4
33	4	4	4
22	4	4	4
18	4	4	4
12	4	4	4
25	4	4	4

Navigator



GÜHRING NAVIGATOR

Suosittelavan työkalun syöttöarvotaulukon numero (SA nro.) on merkitty vahvalla.
Kun valitset työkohteeseesi sopivinta työkalua ja sen parametrejä, käytä myös nettipohjaista versiota GühringNavigator:sta: www.guehring.fi.

Artikkeli nro.

Artikkeli nro.

Norm/DIN

Materiaali

KM-laatu

Pinnoite

Malli

Jäähdytys

Ohjelma sivu

Porat-Ø mm	Syöttöarvotaulukko nro.								
	101	102	103	104	105	106	107	108	109
	f (mm/kierros)								
0,10	0,002	0,003	0,003	0,004	0,006	0,007	0,010	0,013	0,016
0,16	0,002	0,003	0,004	0,005	0,007	0,009	0,012	0,016	0,022
0,25	0,003	0,004	0,005	0,007	0,009	0,011	0,014	0,019	0,024
0,30	0,004	0,005	0,007	0,009	0,011	0,015	0,019	0,025	0,033
0,50	0,005	0,007	0,008	0,011	0,014	0,019	0,024	0,031	0,041
0,63	0,007	0,009	0,012	0,015	0,020	0,026	0,034	0,044	0,057
0,80	0,010	0,013	0,016	0,020	0,024	0,031	0,038	0,048	0,060
1,00	0,020	0,024	0,029	0,035	0,041	0,050	0,060	0,072	0,086
1,50	0,030	0,035	0,040	0,046	0,052	0,060	0,069	0,080	0,092
2,00	0,040	0,046	0,053	0,061	0,070	0,080	0,093	0,106	0,122

Porat-Ø mm	Syöttöarvotaulukko nro. Artikkelin nro. 6400/6401/6408/6412												
	56	57	58	59	60	61	62	63	64	65	66	67	68
	f (mm/kierros)												
0,50	0,006	0,012	0,018	0,022	0,030	0,035	0,040	0,045	0,050	0,050	0,055	0,060	0,060
0,80	0,008	0,016	0,024	0,032	0,040	0,050	0,060	0,070	0,080	0,080	0,080	0,090	0,090
1,00	0,012	0,022	0,032	0,042	0,060	0,070	0,080	0,090	0,100	0,100	0,110	0,110	0,120
1,50	0,021	0,036	0,051	0,066	0,090	0,100	0,120	0,130	0,150	0,150	0,160	0,170	0,180
2,00	0,032	0,052	0,072	0,092	0,120	0,140	0,160	0,180	0,200	0,210	0,220	0,230	0,240
2,50	0,045	0,070	0,095	0,120	0,150	0,170	0,200	0,220	0,250	0,260	0,270	0,280	0,300
3,00	0,060	0,090	0,120	0,150	0,180	0,210	0,240	0,270	0,300	0,310	0,330	0,340	0,360

Jäähdytysaine:

- Ilma
- Öljy
- Emulsio

Jäähdytyskanavat:

- ilman jäähdytyskanavia
- jäähdytyskanavilla

Raaka-aineryhmä	Materiaaliesimerkkejä, uusi kuvaus (sulussa vanha kuvaus) Vahvalla painettu = DIN EN mukainen materiaali nro.	Vetolujuus N/mm ²	Kovuus	Jäähdytysaine
Yleiset rakenneteräkset	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2) 1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤500 ≤1000		
Automaattiteräkset	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 ≤1000		
Seostamattomat nuorutetut teräkset	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤700 ≤850 ≤1000		
Seostetut nuorutetut teräkset	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	≤1000 ≤1400		
Seostamattomat hiiletysteräkset	1.0301 (C10), 1.1121 C10E (Ck10)	≤850		
Seostetut hiiletysteräkset	1.7276 10CrMo11, 1.5125 11MnSi6 1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5	≤1000 ≤1400		
Nitrausteräkset	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≤1000 ≤1400		
Työkäluteräkset	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 ≤1400		
Pikateräkset	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≤1400		
Jousiteräkset	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤350 HB	
Karkaistut teräkset	-		≤48 HRC ≤66 HRC	
Ruostumat teräkset, rikitetyt austeniittiset martensiittiset	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9 1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A) 1.4057 X20CrNi172 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤900 ≤1100 ≤1500		
Valurauta	0.6010 EN-GJL-100 (GG10), 0.6020 EN-GJL-200 (GG20) 0.6025 EN-GJL-250 (GG25), 0.6035 EN-GJL-350 (GG35)		≤240 HB ≤350 HB	
Pallografiitti ja adusoitu valu	0.7050 EN-GJS-500-7 (GGG50), 0.8035 EN-GJMW-350-4 (GTW35) 0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)		≤240 HB ≤350 HB	
Kokillivalu	-		≤350 HB	
Uudet valumateriaalit GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo 6		≤220 HB ≤300 HB	
Uudet valumateriaalit ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	≤1000 ≤1400		
Erikoisseos	Nimonic, Inconel, Monel, Hastelloy	≤2000		
Titaani ja titaaniseokset	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤850 ≤1400		
Alumiini ja alumiiniseokset	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		
Muokattavat alumiiniseokset	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤650		
Alumiinivaluseokset ≤ 10 % Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		
> 24 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		
Magnesiumseokset	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤400		
Niukkaseosteinen kupari	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤500		
Messinki, lyhytlästuihin pitkälästuihin	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600 ≤600		
Pronssit, lyhytlästuihin	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0790 CuNi18Zn19Pb	≤600 ≤850		
Pronssit, pitkälästuihin	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 ≤1000		
Muovi, duroplastinen	Epoksihartsit, Resopal, Pertinax, Moltopren	≤150		
Muovi, termoplastinen	Plexiglas, Hostalen, Novodur, Makralon	≤100		
Muovi, aramidikuituvahvisteinen	Kevlar	≤1000		
lasi-/hiilikuituvahvisteinen	GFK/CFK	≤1000		



GÜHRING NAVIGATOR NC-alkuporat

Suosittelavan työkalun syöttöarvotaulukon numero (SA nro.) on merkitty vahvalla.
Kun valitset työkohteeseesi sopivinta työkalua ja sen parametrejä, käytä myös nettipohjaista versiota GühringNavigator:sta: www.guehring.fi.

Artikkeli nro.
 Norm/DIN
 Materiaali
 Pinnoite
 Malli
 Kärkikulma °
 Ohjelma sivu

Porat-Ø mm	Syöttöarvotaulukko nro.								
	1	2	3	4	5	6	7	8	9
	f (mm/kierros)								
0,50	0,004	0,006	0,007	0,008	0,010	0,012	0,014	0,016	0,019
1,00	0,006	0,008	0,012	0,014	0,016	0,018	0,020	0,023	0,025
2,00	0,020	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125
2,50	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160
3,15	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,160
4,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,200
5,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250
6,30	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315
8,00	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,315
10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630
20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630
25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800
31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000
40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250
50,00	0,250	0,310	0,400	0,500	0,630	0,800	1,000	1,250	1,250
63,00	0,315	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600
80,00	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600	2,000

Jäähdytysaine:

- Ilma
 ● Öljy
 ● Emulsio

Jäähdytyskanavat:

- Ⓜ ilman jäähdytyskanavia
 Ⓜ jäähdytyskanavilla

Raaka-aineryhmä	Materiaaliesimerkkejä, uusi kuvaus (sulussa vanha kuvaus) Vahvalla painettu = DIN EN mukainen materiaali nro.	Vetolujuus N/mm ²	Kovuus	Jäähdytysaine
Yleiset rakenneteräkset	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2) 1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤500 ≤1000		○
Automaattiteräkset	1.0718 11SMnB30 (9SMnB28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 ≤1000		○
Seostamattomat nuorutetut teräkset	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤700 ≤850 ≤1000		○
Seostetut nuorutetut teräkset	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	≤1000 ≤1400		○
Seostamattomat hiiletysteräkset	1.0301 (C10), 1.1121 C10E (Ck10)	≤850		○
Seostetut hiiletysteräkset	1.7276 10CrMo11, 1.5125 11MnSi6 1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5	≤1000 ≤1400		●
Nitrausteräkset	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≤1000 ≤1400		●
Työkaluteräkset	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 ≤1400		○
Pikateräkset	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≤1400		●
Jousiteräkset	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤350 HB	●
Karkaistut teräkset	-		≤48 HRC ≤66 HRC	●
Ruostumat teräkset, rikitetyt austeniittiset martensiittiset	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9 1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A) 1.4057 X20CrNi172 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤900 ≤1100 ≤1500		●
Valurauta	0.6010 EN-GJL-100 (GG10), 0.6020 EN-GJL-200 (GG20) 0.6025 EN-GJL-250 (GG25), 0.6035 EN-GJL-350 (GG35)		≤240 HB ≤350 HB	○
Pallografiitti ja adusoitu valu	0.7050 EN-GJS-500-7 (GGG50), 0.8035 EN-GJMW-350-4 (GTW35) 0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)		≤240 HB ≤350 HB	○
Kokillivalu	-		≤350 HB	○
Uudet valumateriaalit GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo 6		≤220 HB ≤300 HB	○
Uudet valumateriaalit ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	≤1000 ≤1400		○
Erikoisseos	Nimonic, Inconel, Monel, Hastelloy	≤2000		●
Titaani ja titaaniseokset	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤850 ≤1400		●
Alumiini ja alumiiniseokset	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		○
Muokattavat alumiiniseokset	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤650		○
Alumiinivaluseokset ≤ 10 % Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		○
> 24 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		○
Magnesiumseokset	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤400		○
Niukkaseosteinen kupari	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤500		○
Messinki, lyhytlästuihin pitkälästuihin	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600 ≤600		○
Pronssit, lyhytlästuihin	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0790 CuNi18Zn19Pb	≤600 ≤850		○
Pronssit, pitkälästuihin	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 ≤1000		○
Muovi, duroplastinen	Epoksihartsit, Resopal, Pertinax, Moltopren	≤150		○
Muovi, termoplastinen	Plexiglas, Hostalen, Novodur, Makralon	≤100		○
Muovi, aramidikuituvahvisteinen	Kevlar	≤1000		○
lasi-/hiilikuituvahvisteinen	GFK/CFK	≤1000		○

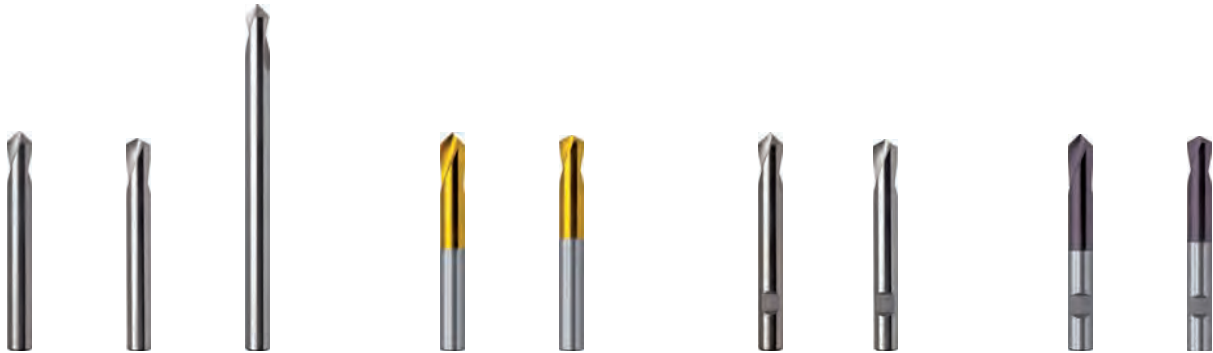


557	556	559
WN		
HSS		
○	○	○
N	N	N
90	120	90
696	702	700

568	567
WN	
HSS	
Ⓢ	Ⓢ
N	N
90	120
697	703

1136	1134
WN	
HSCO	
○	○
N	N
90	120
698	704

1133	1135
WN	
HSCO	
Ⓢ	Ⓢ
N	N
90	120
699	705



V _c m/min	Syöttöarvotaulukko nro.		
30	6	6	6
25	5	5	5
32	6	6	6
30	5	5	5
25	5	5	5
25	5	5	5
20	4	4	4
15	4	4	4
12	3	3	3
30	6	6	6
15	4	4	4
8	3	3	3
16	4	4	4
10	3	3	3
6	3	3	3
8	3	3	3
30	6	6	6
30	6	6	6
25	6	6	6
20	6	6	6
70	7	7	7
70	7	7	7
50	7	7	7
50	6	6	6
70	6	6	6
60	5	5	5
60	5	5	5
40	5	5	5
30	4	4	4
25	4	4	4
15	4	4	4
12	4	4	4
18	4	4	4
28	5	5	5

V _c m/min	Syöttöarvotaulukko nro.	
32	6	6
26	5	5
35	6	6
33	5	5
28	5	5
28	5	5
25	4	4
22	4	4
17	3	3
33	6	6
20	4	4
12	3	3
14	4	4
18	4	4
12	3	3
8	3	3
10	3	3
8	3	3
10	3	3
33	6	6
33	6	6
28	6	6
22	6	6
60	6	6
80	6	6
65	5	5
70	5	5
45	5	5
33	4	4
27	4	4
16	4	4
15	4	4
22	4	4
36	5	5

V _c m/min	Syöttöarvotaulukko nro.	
35	6	6
30	5	5
40	5	5
40	5	5
35	5	5
35	5	5
30	4	4
22	4	4
17	3	3
33	6	6
20	4	4
15	3	3
14	4	4
12	3	3
18	4	4
12	3	3
8	3	3
8	2	2
12	3	3
10	3	3
10	3	3
33	6	6
33	6	6
30	6	6
25	6	6
6	1	1
8	2	2
6	2	2
80	7	7
80	7	7
60	7	7
60	6	6
70	6	6
65	5	5
70	5	5
45	5	5
35	4	4
33	4	4
20	4	4
15	4	4
22	4	4
36	5	5

V _c m/min	Syöttöarvotaulukko nro.	
42	6	6
36	5	5
48	6	6
42	6	6
44	6	6
44	6	6
40	5	5
27	4	4
22	3	3
37	6	6
22	4	4
18	3	3
19	4	4
15	3	3
21	4	4
16	3	3
12	3	3
10	2	2
18	3	3
15	3	3
12	3	3
38	6	6
35	6	6
33	6	6
28	6	6
7	1	1
10	2	2
8	2	2
85	7	7
65	7	7
65	6	6
80	6	6
70	5	5
75	5	5
50	5	5
45	5	5
40	4	4
25	4	4
20	4	4
25	4	4
40	4	4

Navigator



GÜHRING NAVIGATOR Väljennysporat

Suosittelavan työkalun syöttöarvotaulukon numero (SA nro.) on merkitty vahvalla.
Kun valitset työkohteeseesi sopivinta työkalua ja sen parametrejä, käytä myös nettipohjaista versiota GühringNavigator:sta: www.guehring.fi.

- Artikkeli nro.
- Norm/DIN
- Materiaali
- Pinnoite
- Malli
- Ohjelma sivu

Porat-Ø mm	Syöttöarvotaulukko nro.								
	1	2	3	4	5	6	7	8	9
	f (mm/kierros)								
0,50	0,004	0,006	0,007	0,008	0,010	0,012	0,014	0,016	0,019
1,00	0,006	0,008	0,012	0,014	0,016	0,018	0,020	0,023	0,025
2,00	0,020	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125
2,50	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160
3,15	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,160
4,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,200
5,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250
6,30	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315
8,00	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,315
10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630
20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630
25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800
31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000
40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250
50,00	0,250	0,310	0,400	0,500	0,630	0,800	1,000	1,250	1,250
63,00	0,315	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600
80,00	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600	2,000

Jäähdytysaine:

- Ilma
- Öljy
- Emulsio

Jäähdytyskanavat:

- ilman jäähdytyskanavia
- jäähdytyskanavilla

Raaka-aineryhmä	Materiaaliesimerkkejä, uusi kuvaus (sulussa vanha kuvaus) Vahvalla painettu = DIN EN mukainen materiaali nro.	Vetolujuus N/mm ²	Kovuus	Jäähdytysaine
Yleiset rakenneteräkset	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2) 1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤500 ≤1000		<input type="radio"/>
Automaattiteräkset	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 ≤1000		<input type="radio"/>
Seostamattomat nuorutetut teräkset	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤700 ≤850 ≤1000		<input type="radio"/>
Seostetut nuorutetut teräkset	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	≤1000 ≤1400		<input type="radio"/>
Seostamattomat hiiletysteräkset	1.0301 (C10), 1.1121 C10E (Ck10)	≤850		<input type="radio"/>
Seostetut hiiletysteräkset	1.7276 10CrMo11, 1.5125 11MnSi6 1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5	≤1000 ≤1400		<input type="radio"/>
Nitrausteräkset	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≤1000 ≤1400		<input type="radio"/>
Työkaluteräkset	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 ≤1400		<input type="radio"/>
Pikateräkset	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≤1400		<input type="radio"/>
Jousiteräkset	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤350 HB	<input type="radio"/>
Karkaistut teräkset	-		≤48 HRC ≤66 HRC	<input type="radio"/>
Ruostumat teräkset, rikitetyt austeniittiset martensiittiset	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9 1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A) 1.4057 X20CrNi172 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤900 ≤1100 ≤1500		<input type="radio"/>
Valurauta	0.6010 EN-GJL-100 (GG10), 0.6020 EN-GJL-200 (GG20) 0.6025 EN-GJL-250 (GG25), 0.6035 EN-GJL-350 (GG35)		≤240 HB ≤350 HB	<input type="radio"/>
Pallografiitti ja adusoitu valu	0.7050 EN-GJS-500-7 (GGG50), 0.8035 EN-GJMW-350-4 (GTW35) 0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)		≤240 HB ≤350 HB	<input type="radio"/>
Kokillivalu	-		≤350 HB	<input type="radio"/>
Uudet valumateriaalit GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo 6		≤220 HB ≤300 HB	<input type="radio"/>
Uudet valumateriaalit ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	≤1000 ≤1400		<input type="radio"/>
Erikoisseos	Nimonic, Inconel, Monel, Hastelloy	≤2000		<input type="radio"/>
Titaani ja titaaniseokset	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤850 ≤1400		<input type="radio"/>
Alumiini ja alumiiniseokset	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		<input type="radio"/>
Muokattavat alumiiniseokset	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤650		<input type="radio"/>
Alumiinivaluseokset ≤ 10 % Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		<input type="radio"/>
Alumiinivaluseokset > 24 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		<input type="radio"/>
Magnesiumseokset	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤400		<input type="radio"/>
Niukkaseosteinen kupari	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤500		<input type="radio"/>
Messinki, lyhytlastuinen pitkälastuiset	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600 ≤600		<input type="radio"/>
Pronssit, lyhytlastuiset	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0790 CuNi18Zn19Pb	≤600 ≤850		<input type="radio"/>
Pronssit, pitkälastuiset	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 ≤1000		<input type="radio"/>
Muovi, duroplastinen	Epoksihartsit, Resopal, Pertinax, Moltopren	≤150		<input type="radio"/>
Muovi, termoplastinen	Plexiglas, Hostalen, Novodur, Makralon	≤100		<input type="radio"/>
Muovi, aramidikuituvahvisteinen	Kevlar	≤1000		<input type="radio"/>
lasi-/hiilikuituvahvisteinen	GFK/CFK	≤1000		<input type="radio"/>



533	534	555
DIN 344	DIN 343	DIN 1864
HSS		
N	N	N
737	740	743

634	635
DIN 343	DIN 1864
HSCO	
N	N
742	744



V _c m/min	Syöttöarvotaulukko nro.		
27	4	4	4
20	4	4	4
28	4	4	4
25	4	4	4
22	4	4	4
20	4	4	4
18	3	3	3
15	4	4	4
8	3	3	3
23	5	5	5
15	4	4	4
8	3	3	3
10	4	4	4
8	3	3	3
10	3	3	3
6	3	3	3
6	3	3	3
5	2	2	2
8	2	2	2
6	2	2	2
5	2	2	2
20	6	6	6
20	5	5	5
18	6	6	6
16	5	5	5
3	1	1	1
5	2	2	2
4	2	2	2
60	7	7	7
60	7	7	7
36	6	6	6
36	6	6	6
40	6	6	6
50	5	5	5
50	5	5	5
30	5	5	5
30	4	4	4
25	4	4	4
15	4	4	4
15	4	4	4
15	4	4	4
25	5	5	5

V _c m/min	Syöttöarvotaulukko nro.	
30	4	4
25	4	4
32	4	4
30	4	4
25	4	4
22	4	4
20	3	3
17	4	4
10	3	3
25	5	5
17	4	4
10	3	3
13	4	4
10	3	3
13	3	3
8	3	3
8	3	3
6	2	2
10	2	2
8	2	2
6	2	2
25	6	6
25	5	5
20	6	6
18	5	5
4	1	1
6	2	2
5	2	2
70	7	7
70	7	7
40	6	6
40	6	6
50	6	6
55	5	5
55	5	5
35	5	5
35	4	4
30	4	4
20	4	4
18	4	4
20	4	4
30	5	5

GÜHRING NAVIGATOR Keskiöporat

Suosittelavan työkalun syöttöarvotaulukon numero (SA nro.) on merkitty vahvalla.
Kun valitset työkohteeseesi sopivinta työkalua ja sen parametrejä, käytä myös nettipohjaista versiota GühringNavigator:sta: www.guehring.fi.



Artikkeli nro. 
 Norm/DIN
 Materiaali
 Pinnoite
 Malli
 Ohjelma sivu































Porat-Ø mm	Syöttöarvotaulukko nro.								
	1	2	3	4	5	6	7	8	9
	f (mm/U)								
0,50	0,004	0,006	0,007	0,008	0,010	0,012	0,014	0,016	0,019
1,00	0,006	0,008	0,012	0,014	0,016	0,018	0,020	0,023	0,025
2,00	0,020	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125
2,50	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160
3,15	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,160
4,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,200
5,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250
6,30	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315
8,00	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,315
10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630
20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630
25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800
31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000
40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250
50,00	0,250	0,310	0,400	0,500	0,630	0,800	1,000	1,250	1,250
63,00	0,315	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600
80,00	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600	2,000

Jäähdytysaine:

-  Ilma
-  Öljy
-  Emulsio

Jäähdytyskanavat:

-  ilman jäähdytyskanavia
-  jäähdytyskanavilla

Raaka-aineryhmä	Materiaaliesimerkkejä, uusi kuvaus (sulussa vanha kuvaus) Vahvalla painettu = DIN EN mukainen materiaali nro.	Vetolujuus N/mm ²	Kovuus	Jäähdytysaine
Yleiset rakenneteräkset	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2) 1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤500 ≤1000		 
Automaattiteräkset	1.0718 11SMnB30 (9SMnB28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 ≤1000		 
Seostamattomat nuorutetut teräkset	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤700 ≤850 ≤1000		  
Seostetut nuorutetut teräkset	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	≤1000 ≤1400		 
Seostamattomat hillelysteräkset	1.0301 (C10), 1.1121 C10E (Ck10)	≤850		
Seostetut hillelysteräkset	1.7276 10CrMo11, 1.5125 11MnSi6 1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5	≤1000 ≤1400		 
Nitrausteräkset	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≤1000 ≤1400		 
Työkäluteräkset	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 ≤1400		 
Pikateräkset	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≤1400		
Jousiteräkset	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤350 HB	
Karkaistut teräkset	-		≤48 HRC ≤66 HRC	 
Ruostumat teräkset, rikitetyt austeniittiset martensiittiset	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9 1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A) 1.4057 X20CrNi172 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤900 ≤1100 ≤1500		  
Valurauta	0.6010 EN-GJL-100 (GG10), 0.6020 EN-GJL-200 (GG20) 0.6025 EN-GJL-250 (GG25), 0.6035 EN-GJL-350 (GG35)		≤240 HB ≤350 HB	 
Pallografiitti ja adusoitu valu	0.7050 EN-GJS-500-7 (GGG50), 0.8035 EN-GJMW-350-4 (GTW35) 0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)		≤240 HB ≤350 HB	 
Kokillivalu	-		≤350 HB	
Uudet valumateriaalit GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo 6		≤220 HB ≤300 HB	 
Uudet valumateriaalit ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	≤1000 ≤1400		
Erikoisseos	Nimonic, Inconel, Monel, Hastelloy	≤2000		
Titaani ja titaaniseokset	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤850 ≤1400		
Alumiini ja alumiiniseokset	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		
Muokattavat alumiiniseokset	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤650		
Alumiinivaluseokset ≤ 10 % Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		
> 24 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		
Magnesiumseokset	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤400		
Niukkaseosteinen kupari	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤500		
Messinki, lyhytlastuinen pitkälastuiset	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600 ≤600		
Pronssit, lyhytlastuiset	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0790 CuNi18Zn19Pb	≤600 ≤850		
Pronssit, pitkälastuiset	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 ≤1000		
Muovi, duroplastinen	Bakelit, Resopal, Pertinax, Moltopren	≤150		
Muovi, termoplastinen	Plexiglas, Hostalen, Novodur, Makralon	≤100		
Muovi, aramidikuituvahvisteine	Kevlar	≤1000		
lasi-/hiilikuituvahvisteinen	GFK/CFK	≤1000		



581	583	585	280	292	587	588
DIN 333			WN	BS 328	DIN 333	
HSS						
○	○	○	○	○	○	○
A	R	B	B	A	A	R
668	672	675	689	680	690	691

613	614
DIN 333	
HSS	
Ⓢ	Ⓢ
A	R
669	673

381
DIN 333
HSCO
○
A
682



V _c m/min	Syöttöarvotaulukko nro.						
30	4	4	4	4	4	4	4
25	4	4	4	4	4	4	4
30	4	4	4	4	4	4	4
30	4	4	4	4	4	4	4
25	4	4	4	4	4	4	4
20	4	4	4	4	4	4	4
20	3	3	3	3	3	3	3
15	4	4	4	4	4	4	4
8	3	3	3	3	3	3	3
25	5	5	5	5	5	5	5
15	4	4	4	4	4	4	4
8	3	3	3	3	3	3	3
10	4	4	4	4	4	4	4
8	3	3	3	3	3	3	3
10	3	3	3	3	3	3	3
6	3	3	3	3	3	3	3
6	3	3	3	3	3	3	3
5	2	2	2	2	2	2	2
10	3	3	3	3	3	3	3
8	3	3	3	3	3	3	3
6	3	3	3	3	3	3	3
20	6	6	6	6	6	6	6
20	5	5	5	5	5	5	5
25	6	6	6	6	6	6	6
20	5	5	5	5	5	5	5
3	1	1	1	1	1	1	1
5	2	2	2	2	2	2	2
4	2	2	2	2	2	2	2
70	7	7	7	7	7	7	7
70	7	7	7	7	7	7	7
40	6	6	6	6	6	6	6
40	6	6	6	6	6	6	6
60	6	6	6	6	6	6	6
50	5	5	5	5	5	5	5
60	5	5	5	5	5	5	5
40	5	5	5	5	5	5	5
30	4	4	4	4	4	4	4
25	4	4	4	4	4	4	4
15	4	4	4	4	4	4	4
15	4	4	4	4	4	4	4
15	4	4	4	4	4	4	4
25	5	5	5	5	5	5	5

V _c m/min	Syöttöarvotaulukko nro.		V _c m/min	Syöttöarvotaulukko nro.
35	4	4	35	4
30	4	4	30	4
35	4	4	35	4
35	4	4	35	4
30	4	4	30	4
25	4	4	25	4
22	3	3	22	3
17	4	4	17	4
10	3	3	10	3
30	5	5	30	5
18	4	4	18	4
10	3	3	10	3
13	4	4	13	4
10	3	3	10	3
13	3	3	13	3
8	3	3	8	3
8	3	3	8	3
8	2	2	8	2
15	3	3	15	3
10	3	3	10	3
8	3	3	8	3
25	6	6	25	6
25	5	5	25	5
30	6	6	30	6
25	5	5	25	5
6	1	1	6	1
6	2	2	6	2
5	2	2	5	2
80	7	7	80	7
80	7	7	80	7
50	6	6	50	6
70	6	6	70	6
60	5	5	60	5
70	5	5	70	5
45	5	5	45	5
35	4	4	35	4
30	4	4	30	4
20	4	4	20	4
18	4	4	18	4
20	4	4	20	4
30	5	5	30	5

**GÜHRING** NAVIGATOR Uputusporat keskitystä varten / Lyhyet upotusporat

Suosittelavan työkalun syöttöarvotaulukon numero (SA nro.) on merkitty vahvalla.
Kun valitset työkohteeseesi sopivinta työkalua ja sen parametrejä, käytä myös nettipohjaista versiota GühringNavigator:sta: www.guehring.fi.

Artikkeli nro. 
 Norm/DIN
 Materiaali
 Pinnoite
 Malli
 Ohjelma sivu

Porat-Ø mm	Syöttöarvotaulukko nro.								
	1	2	3	4	5	6	7	8	9
	f (mm/U)								
0,50	0,004	0,006	0,007	0,008	0,010	0,012	0,014	0,016	0,019
1,00	0,006	0,008	0,012	0,014	0,016	0,018	0,020	0,023	0,025
2,00	0,020	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125
2,50	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160
3,15	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,160
4,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,200
5,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250
6,30	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315
8,00	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,315
10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630
20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630
25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800
31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000
40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250
50,00	0,250	0,310	0,400	0,500	0,630	0,800	1,000	1,250	1,250
63,00	0,315	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600
80,00	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600	2,000

Jäähdytysaine:

- Ilma
 ● Öljy
 ● Emulsio

Jäähdytyskanavat:

- Ⓜ ilman jäähdytyskanavia
 Ⓜ jäähdytyskanavilla

Raaka-aineryhmä	Materiaaliesimerkkejä, uusi kuvaus (sulussa vanha kuvaus) Vahvalla painettu = DIN EN mukainen materiaali nro.	Vetolujuus N/mm ²	Kovuus	Jäähdytysaine
Yleiset rakenneteräkset	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2) 1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤500 ≤1000		○ ○
Automaattiteräkset	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 ≤1000		○ ○
Seostamattomat nuorutetut teräkset	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤700 ≤850 ≤1000		○ ○ ○
Seostetut nuorutetut teräkset	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	≤1000 ≤1400		○ ○
Seostamattomat hiiletysteräkset	1.0301 (C10), 1.1121 C10E (Ck10)	≤850		○
Seostetut hiiletysteräkset	1.7276 10CrMo11, 1.5125 11MnSi6 1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5	≤1000 ≤1400		○ ○
Nitrausteräkset	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≤1000 ≤1400		○ ○
Työkäluteräkset	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 ≤1400		○ ○
Pikateräkset	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≤1400		○
Jousiteräkset	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤350 HB	○
Karkaistut teräkset	-		≤48 HRC ≤66 HRC	○ ○
Ruostumat teräkset, rikitetyt austeniittiset martensiittiset	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9 1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A) 1.4057 X20CrNi172 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤900 ≤1100 ≤1500		○ ○ ○
Valurauta	0.6010 EN-GJL-100 (GG10), 0.6020 EN-GJL-200 (GG20) 0.6025 EN-GJL-250 (GG25), 0.6035 EN-GJL-350 (GG35)		≤240 HB ≤350 HB	○ ○
Pallografiitti ja adusoitu valu	0.7050 EN-GJS-500-7 (GGG50), 0.8035 EN-GJMW-350-4 (GTW35) 0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)		≤240 HB ≤350 HB	○ ○
Kokillivalu	-		≤350 HB	○
Uudet valumateriaalit GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo 6		≤220 HB ≤300 HB	○ ○
Uudet valumateriaalit ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	≤1000 ≤1400		○ ○
Erikoisseos	Nimonic, Inconel, Monel, Hastelloy	≤2000		○
Titaani ja titaaniseokset	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤850 ≤1400		○ ○
Alumiini ja alumiiniseokset	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		○
Muokattavat alumiiniseokset	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤650		○
Alumiinivaluseokset ≤ 10 % Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		○
> 24 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		○
Magnesiumseokset	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤400		○
Niukkaseosteinen kupari	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤500		○
Messinki, lyhytlästuiset pitkälästuiset	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600 ≤600		○ ○
Pronssit, lyhytlästuiset	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0790 CuNi18Zn19Pb	≤600 ≤850		○ ○
Pronssit, pitkälästuiset	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 ≤1000		○ ○
Muovi, duroplastinen	Bakelit, Resopal, Pertinax, Moltopren	≤150		○
Muovi, termoplastinen	Plexiglas, Hostalen, Novodur, Makralon	≤100		○
Muovi, aramidikuituvahvisteine	Kevlar	≤1000		○
lasi-/hiilikuituvahvisteinen	GFK/CFK	≤1000		○



274	574	575	576
WN			
HSS			
●	●	●	●
N	N	N	N
714	715	716	717

378	1147	379	380
WN			
HSS			
○	○	○	○
N	N	N	N
718	719	720	721



V _c m/min	Syöttöarvotaulukko nro.			
30	4	4	4	4
25	4	4	4	4
30	4	4	4	4
30	4	4	4	4
25	4	4	4	4
20	4	4	4	4
20	3	3	3	3
15	4	4	4	4
8	3	3	3	3
25	5	5	5	5
15	4	4	4	4
8	3	3	3	3
10	4	4	4	4
8	3	3	3	3
10	3	3	3	3
6	3	3	3	3
6	3	3	3	3
5	2	2	2	2
8	2	2	2	2
6	2	2	2	2
5	2	2	2	2
20	6	6	6	6
20	5	5	5	5
25	6	6	6	6
20	5	5	5	5
3	1	1	1	1
5	2	2	2	2
4	2	2	2	2
60	7	7	7	7
60	7	7	7	7
40	6	6	6	6
40	6	6	6	6
40	6	6	6	6
50	5	5	5	5
60	5	5	5	5
40	5	5	5	5
30	4	4	4	4
25	4	4	4	4
15	4	4	4	4
15	4	4	4	4
15	4	4	4	4
25	5	5	5	5

V _c m/min	Syöttöarvotaulukko nro.			
30	4	4	4	4
25	4	4	4	4
30	4	4	4	4
30	4	4	4	4
25	4	4	4	4
20	4	4	4	4
20	3	3	3	3
15	4	4	4	4
8	3	3	3	3
25	5	5	5	5
15	4	4	4	4
8	3	3	3	3
10	4	4	4	4
8	3	3	3	3
10	3	3	3	3
6	3	3	3	3
6	3	3	3	3
5	2	2	2	2
8	2	2	2	2
6	2	2	2	2
5	2	2	2	2
20	6	6	6	6
20	5	5	5	5
25	6	6	6	6
20	5	5	5	5
3	1	1	1	1
5	2	2	2	2
4	2	2	2	2
60	7	7	7	7
60	7	7	7	7
40	6	6	6	6
40	6	6	6	6
40	6	6	6	6
50	5	5	5	5
60	5	5	5	5
40	5	5	5	5
30	4	4	4	4
25	4	4	4	4
15	4	4	4	4
15	4	4	4	4
15	4	4	4	4
25	5	5	5	5

**GÜHRING** NAVIGATOR Porrasporat

Suosittelavan työkalun syöttöarvotaulukon numero (SA nro.) on merkitty vahvalla.
Kun valitset työkohteeseesi sopivinta työkalua ja sen parametrejä, käytä myös nettipohjaista versiota GühringNavigator:sta: www.guehring.fi.

Artikkeli nro.

Norm/DIN

Materiaali

Pinnoite

Malli

Ohjelma sivu

Porat-Ø mm	Syöttöarvotaulukko nro.								
	1	2	3	4	5	6	7	8	9
	f (mm/kierros)								
0,50	0,004	0,006	0,007	0,008	0,010	0,012	0,014	0,016	0,019
1,00	0,006	0,008	0,012	0,014	0,016	0,018	0,020	0,023	0,025
2,00	0,020	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125
2,50	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160
3,15	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,160
4,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,200
5,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250
6,30	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315
8,00	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,315
10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630
20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630
25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800
31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000
40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250
50,00	0,250	0,310	0,400	0,500	0,630	0,800	1,000	1,250	1,250
63,00	0,315	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600
80,00	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600	2,000

Jäähdytysaine:

- Ilma
● Öljy
● Emulsio

Jäähdytyskanavat:

- Ⓜ ilman jäähdytyskanavia
Ⓜ jäähdytyskanavilla

Raaka-aineryhmä	Materiaaliesimerkkejä, uusi kuvaus (sulussa vanha kuvaus) Vahvalla painettu = DIN EN mukainen materiaali nro.	Vetolujuus N/mm ²	Kovuus	Jäähdytysaine
Yleiset rakenneteräkset	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2) 1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤500 ≤1000		○
Automaattiteräkset	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 ≤1000		○
Seostamattomat nuorutetut teräkset	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤700 ≤850 ≤1000		○
Seostetut nuorutetut teräkset	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	≤1000 ≤1400		○
Seostamattomat hiiletysteräkset	1.0301 (C10), 1.1121 C10E (Ck10)	≤850		○
Seostetut hiiletysteräkset	1.7276 10CrMo11, 1.5125 11MnSi6 1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5	≤1000 ≤1400		●
Nitrausteräkset	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≤1000 ≤1400		○
Työkaluteräkset	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 ≤1400		○
Pikateräkset	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≤1400		●
Jousiteräkset	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤350 HB	●
Karkaistut teräkset	-		≤48 HRC ≤66 HRC	●
Ruostumat teräkset, rikitetyt austeniittiset martensiittiset	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9 1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A) 1.4057 X20CrNi172 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤900 ≤1100 ≤1500		●
Valurauta	0.6010 EN-GJL-100 (GG10), 0.6020 EN-GJL-200 (GG20) 0.6025 EN-GJL-250 (GG25), 0.6035 EN-GJL-350 (GG35)		≤240 HB ≤350 HB	○
Pallografiitti ja adusoitu valu	0.7050 EN-GJS-500-7 (GGG50), 0.8035 EN-GJMW-350-4 (GTW35) 0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)		≤240 HB ≤350 HB	○
Kokillivalu	-		≤350 HB	○
Uudet valumateriaalit GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo 6		≤220 HB ≤300 HB	○
Uudet valumateriaalit ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	≤1000 ≤1400		○
Erikoisseos	Nimonic, Inconel, Monel, Hastelloy	≤2000		○
Titaani ja titaaniseokset	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤850 ≤1400		○
Alumiini ja alumiiniseokset	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		○
Muokattavat alumiiniseokset	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤650		○
Alumiinivaluseokset ≤ 10 % Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		○
Alumiinivaluseokset > 24 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		○
Magnesiumseokset	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤400		○
Niukkaseosteinen kupari	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤500		○
Messinki, lyhytlästuihin pitkälästuihin	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600 ≤600		○
Pronssit, lyhytlästuihin	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0790 CuNi18Zn19Pb	≤600 ≤850		○
Pronssit, pitkälästuihin	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 ≤1000		○
Muovi, duroplastinen	Bakelit, Resopal, Pertinax, Moltopren	≤150		○
Muovi, termoplastinen	Plexiglas, Hostalen, Novodur, Makralon	≤100		○
Muovi, aramidikuituvahvisteinen	Kevlar	≤1000		○
lasi-/hiilikuituvahvisteinen	GFK/CFK	≤1000		○



536	569	636	638	538	514	540	637	537	639	539	520	541		
DIN 8374		WN		DIN 8376		WN		DIN 8378		WN		DIN 8377	WN	DIN 8379
HSS														
●	●	●	●	●	●	●	●	●	●	●	●	●		
N	N	N	N	N	N	N	N	N	N	N	N	N		
722	723	724	725	726	728	729	731	732	733	734	735	736		



V _c m/min	Syöttöarvotaulukko nro.												
30	4	4	4	4	4	4	4	4	4	4	4	4	4
25	4	4	4	4	4	4	4	4	4	4	4	4	4
30	4	4	4	4	4	4	4	4	4	4	4	4	4
30	4	4	4	4	4	4	4	4	4	4	4	4	4
25	4	4	4	4	4	4	4	4	4	4	4	4	4
20	4	4	4	4	4	4	4	4	4	4	4	4	4
20	3	3	3	3	3	3	3	3	3	3	3	3	3
15	4	4	4	4	4	4	4	4	4	4	4	4	4
8	3	3	3	3	3	3	3	3	3	3	3	3	3
25	5	5	5	5	5	5	5	5	5	5	5	5	5
15	4	4	4	4	4	4	4	4	4	4	4	4	4
8	3	3	3	3	3	3	3	3	3	3	3	3	3
10	4	4	4	4	4	4	4	4	4	4	4	4	4
8	3	3	3	3	3	3	3	3	3	3	3	3	3
10	3	3	3	3	3	3	3	3	3	3	3	3	3
6	3	3	3	3	3	3	3	3	3	3	3	3	3
6	3	3	3	3	3	3	3	3	3	3	3	3	3
5	2	2	2	2	2	2	2	2	2	2	2	2	2
8	2	2	2	2	2	2	2	2	2	2	2	2	2
6	2	2	2	2	2	2	2	2	2	2	2	2	2
5	2	2	2	2	2	2	2	2	2	2	2	2	2
20	6	6	6	6	6	6	6	6	6	6	6	6	6
20	5	5	5	5	5	5	5	5	5	5	5	5	5
25	6	6	6	6	6	6	6	6	6	6	6	6	6
20	5	5	5	5	5	5	5	5	5	5	5	5	5
3	1	1	1	1	1	1	1	1	1	1	1	1	1
5	2	2	2	2	2	2	2	2	2	2	2	2	2
4	2	2	2	2	2	2	2	2	2	2	2	2	2
60	7	7	7	7	7	7	7	7	7	7	7	7	7
60	7	7	7	7	7	7	7	7	7	7	7	7	7
40	6	6	6	6	6	6	6	6	6	6	6	6	6
40	6	6	6	6	6	6	6	6	6	6	6	6	6
40	6	6	6	6	6	6	6	6	6	6	6	6	6
50	5	5	5	5	5	5	5	5	5	5	5	5	5
60	5	5	5	5	5	5	5	5	5	5	5	5	5
40	5	5	5	5	5	5	5	5	5	5	5	5	5
30	4	4	4	4	4	4	4	4	4	4	4	4	4
25	4	4	4	4	4	4	4	4	4	4	4	4	4
15	4	4	4	4	4	4	4	4	4	4	4	4	4
15	4	4	4	4	4	4	4	4	4	4	4	4	4
15	4	4	4	4	4	4	4	4	4	4	4	4	4
25	5	5	5	5	5	5	5	5	5	5	5	5	5

Navigator

Pora Ø mm alkaan	Syöttö sarake no.							
	11	12	13	14	15	16	17	18
	f (mm/kiertos.)							
1,50	0,002	0,004	0,006	0,008	0,012	0,020	0,032	0,045
2,00	0,003	0,005	0,007	0,010	0,016	0,028	0,046	0,055
2,50	0,004	0,006	0,008	0,012	0,018	0,030	0,054	0,070
4,00	0,005	0,007	0,010	0,016	0,025	0,043	0,065	0,085
6,00	0,007	0,009	0,013	0,024	0,035	0,061	0,085	0,120
8,00	0,010	0,014	0,022	0,032	0,045	0,068	0,100	0,150
10,00	0,012	0,016	0,028	0,040	0,055	0,075	0,120	0,160
14,00	0,020	0,025	0,035	0,050	0,065	0,085	0,130	0,180
18,00	0,025	0,030	0,040	0,055	0,070	0,095	0,145	0,200
20,00	0,026	0,035	0,045	0,060	0,080	0,110	0,180	0,250
24,00	0,027	0,036	0,047	0,065	0,085	0,130	0,185	0,300
28,00	0,028	0,038	0,049	0,068	0,090	0,140	0,195	0,350
30,00	0,030	0,040	0,050	0,070	0,100	0,150	0,200	0,400
35,00	0,035	0,045	0,055	0,075	0,120	0,180	0,250	0,450
40,00	0,040	0,050	0,060	0,080	0,150	0,200	0,300	0,500

*Syöttöaste vaihtelee suositellun pinoituksen perusteella. Kaikissa tapauksissa pinoittamattomien porien soveltuvuutta ei voida taata.



Kanuunaporian tulee olla tuettuina alkuporauksen aikana.
Kanuunaporia ei saa koskaan käyttää täydellä nopeudella ilman tuentaa konepajoissa

Käyttöohjeita

- porausvyödytys ollessa yli 40 x D suosittelemme kahden tai useamman kanuunaporan käyttöä, esim. Ø 10 x 400mm ja Ø 9,95 x 800mm.
- porattaessa syvempiä reikiä kuin 40 x D tulisi kanuunapora asettaa alkureikään vasenkätisesti.
- pitkälaistusten materiaalien porauksessa suosittelemme käytettäväksi kiilloitetulla lastu-uralla olevia kanuunaporia
- yleisesti ottaen suosittelemme vähintään 10 %:sen emulsioon käyttöä
- pitkälaistuselke alumiinille 1-leikkuiset kanuunaporat tulisi tilata 180° kärkkikulmalla ja isolla nestereikäällä
- porattaessa alumiiniin jonka Si - pitoisuus pienempi kuin 1 %, ts. suositeltu leikkunopeus vc > 160 m/min, suosittelemme portaittaista nopeuden nostoa sekä alkureiän tekoa 3 x D syvyyteen asti.

Toimenpidejärjestys kanuunaporauksessa

- Ohjausreiän poraus (L = 1,5 x D, toleranssi G9)
- Aloita alhaisella kierrosnopeudella, n. 200 kierr./min, syöttö n. 500 mm/min.
- jäähdytysaineen paineen ja virtausnopeuden asetus.
- suoritetaan kertaporaus vaadittuun syvyyteen ilman katkoja kun porataan pituus-halkaisija suhteessa syvä reikiä (esim. EB 100 160mm lastu-uralla), suosittelemme pienentämään leikkunopeutta n.75% optimista ensimmäisen 25mm matkalla
- jäähdytyksen poiskytkentä saavutettaessa tavoitesyvyyts
- terän poisto pikaliikkeellä pysäytettynä

Jäähdytysneste

- Emulsio
- Öljy
- Ilma

EB100

1-leikkuiset kanuunaporat

Kovametalli*

0,9 ... 12,0



≤35xD

>35xD

Materiaaliryhmä	Materiaaliesimerkkejä Lihavoidut arvot = DIN EN 10 027 materiaali nro.	Vetomurto- Kovuus lujuus N/mm ²	Jäähdytys- neste	suosit. pinoite*	≤35xD		>35xD	
					Vc m/min	Syöttö sar. nro.	Vc m/min	Syöttö sar. nro.
Yleiset rakenneteräkset	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345	≤500	○	○	100	15	100	15
	1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937	≤1000	○		85	15	85	15
Automaattiteräkset	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37	≤850	○	○	90	15	90	15
	1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb2	≤1000	○		80	15	80	15
Seostamattomat nuorutusteräkset	1.0402 C22, 1.1178 C30E (Ck30)	≤700	○	○	80	14	80	14
	1.0503 C45, 1.1191 C45E (Ck45)	≤850	○		75	14	75	14
Seostetut nuorutusteräkset	1.0601 C60, 1.1221 C60E (Ck60)	≤1000	○	○	75	14	75	14
	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4	≤1000	○		65	14	65	14
Seostamattomat hiiletysteräkset	1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	≤1400	○	○	80	15	80	15
	1.0301 (C10), 1.1121 C10E (Ck10)	≤850	○		75	14	75	14
Seostetut hiiletysteräkset	1.7276 10CrMo11, 1.5125 11MnSi6	≤1000	○	○	65	14	65	14
	1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5	≤1400	○		75	14	75	14
Nitratut teräkset	1.8504 34CrAl6	≤1000	○	○	65	14	65	14
	1.8519 31CrMoV9, 1.8550 34CrAlNi7	≤1400	○		75	13	75	13
Työkälyteräkset	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9	≤850	○	○	65	13	65	13
	1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6	≤1400	○		55	12	55	12
Pikateräkset	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≤1400	○	○	65	13	65	13
	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)	≤350 HB	○		30	13	30	13
Karkaistut teräkset	-	≤48 HRC	○	○	25	10	25	14
	-	≤66 HRC	○		40	14	40	14
Ruostumattomat teräkset, rikitetyt austeniittiset	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105	≤900	○	○	35	14	35	14
	1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10	≤1100	○		35	14	35	14
Martensitiittiset	1.4057 X20CrNi172 (X17CrNi16-2), 1.4122	≤1500	○	○	85	16	85	16
	0.6010 EN-GJL-100 (GG10), 0.6020 EN-GJL-200 (GG20)	≤240 HB	○		80	16	80	16
Valurauta	0.6025 EN-GJL-250 (GG25), 0.6035 EN-GJL-350 (GG35)	≤350 HB	○	○	80	15	80	15
	0.7050 EN-GJS-500-7 (GGG50), 0.8035	≤240 HB	○		70	15	70	15
Pallografiittivalu ja adusoitu valurauta	0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2	≤350 HB	○	○	55	14	55	14
	Kokilivalu	≤350 HB	○					
Uudet valumateriaalit CGI	EN-GJV250 (GGV25), EN-GJV350 (GGV35)	≤220 HB	○	○				
	EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo 6	≤300 HB	○					
Uudet valumateriaalit ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000)	≤1000	○	○				
	EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	≤1400	○					
Erikoiseseokset	Nimonic, Inconel, Monel, Hastelloy	≤2000	○	○	20	12	20	12
Ti ja Ti-seokset	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2	≤850	○		35	12	35	12
Alumiini ja Al-seokset	3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5	≤1400	○	○	30	12	30	12
	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400	○		150	17	150	17
Muokattavat Al-seokset	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si	≤650	○	○	120	19	120	19
Al valuseokset ≤ 10 % Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600	○		120	20	120	20
> 10 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600	○	130	18	130	18	
Magnesiumseokset	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05	≤400	○	○	110	17	110	17
Kupari, matalaseosteinen	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤500	○		75	15	75	15
Messinki, lyhytlaistuin	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410	≤600	○	○	120	18	120	18
	2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600	○		90	18	90	18
Pronssi, lyhytlaistuin	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176	≤600	○	○	95	17	95	17
	2.0790 CuNi18Zn19Pb	≤850	○		75	17	75	17
Pronssi, pitkälaistuin	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10	≤850	○	○	70	17	70	17
	2.0980 CuAl11Ni, 2.1247 CuBe2	≤1000	○		60	17	60	17
Kestomuovit	Bakelit, Resopal, Pertinax, Moltopren	≤150	○	○	75	15	75	15
Lämpökäsitettävät muovit	Plexiglas, Hostalen, Novodur, Makralon	≤100	○		70	15	70	15
Kevlar	Kevlar	≤1000	○	○	60	14	60	14
Lasi-, hiilikuituvahvisteiset muovit	GFK/CFK	≤1000	○		50	14	50	14



Käytäntö

Parhaimman mahdollisen poraustuloksen saamiseksi syväreian porilla RT 100 T, kun poraus aloitetaan säteellisestä tai epätasaisesta pinnasta , suosittelemme seuraavia toimenpiteitä:

1. Jyrsimällä taso Gühring'in poraavalla tehojyrsimellä RF 100 U. Tason täytyy olla oikeassa kulmassa porauksen aloitukseen.
2. Tekemällä ohjainreikä (toleranssi G9), vähintään syvydeltään 1 x D. Tähän suosittelemme Tehoporaamme RT 100 U tai vastaavasti RT 100 F. Johtuen 140° kärkikulmasta ja m7 toleranssista nämä Tehoporat sopivat tähän erinomaisesti.
3. RT 100 T syväreianpora syötetään alkureikään nopeudella 300rpm ja syötöllä 500mm/min.
4. Säädetään jäähdystynesteen paine ja nopeus.
5. Jatkuva poraus vaadittuun syvyyteen ilman nostoja.
6. Läpirei'ille taso ulostulolla ts. 90° vähennä syöttöarvoa Vf 50%:iin 1mm ennen läpäisyä
7. Läpirei'ille epätasaisella ulostulolla vähennä syöttöarvoa Vf 40%:iin 1mm ennen läpäisyä.
8. Saavutettaessa poraussyvyys, pysäytä kara ja jäähdystynesteen syöttö. Ulosveto pikaliikkeellä.



Tehojyrsin malli RT 100 U, artikkelinro. 3736

Johtuen muuttuvista nousukulmista , Gühring'in FIRE – pinnoitettu Tehojyrsin RF 100 U tarjoaa parhaat leikkuunopeudet ja työkalunkestoiän viimeistelyyn ja rouhintaan teräksissä ja valuissa sekä myös Ti- ja Ni-seoksissa.



Tehopora RT 100 U, artikkelinro. 2477

Tehopora RT 100 F, artikkelinro. 1660

Johtuen erityisestä leikkuusärmän geometriasta, Gühring'in Tehoporat takaavat hyvän itse keskittävyyden ja reikien suoruuden. Malli U sopii erityisesti teräksille ja runsasseosteisille Al-seoksille. Malli F puolestaan runsaastiseostetuille-, ruostumattomille- ja haponkestäville sekä kuumalujille teräksille, alumiinille ja Al-seoksille, magnesiumille ja Mg-seoksille sekä titaanille ja Ti-seoksille.

EB80

1-leikkuiset kanuunaporat

Kovametallipää

2,0 ... 40,0



ZB80

2-leikkuiset kanuunaporat

Kovametallipää

6,0 ... 27,0



EB800

1-leikkuiset kanuunaporat

Vaihtopaloilla

12,0 ... 40,0



suosit. pinnoite*	≤35xD		>35xD		suosit. pinnoite*	≤35xD		>35xD		suosit. pinnoite*	≤35xD		>35xD		
	Vc m/min	Syöttö sar. nro.	Vc m/min	Syöttö sar. nro.		Vc m/min	Syöttö sar. nro.	Vc m/min	Syöttö sar. nro.		Vc m/min	Syöttö sar. nro.	Vc m/min	Syöttö sar. nro.	
T	100	14	95	13											
	85	14	80	13						T	90	15	85	15	
	90	14	85	13							80	15	75	15	
T	80	14	75	13						T	85	16	80	16	
	90	13	85	12							75	16	70	16	
T	80	13	75	12						T	85	15	80	15	
	75	13	70	12							80	15	75	15	
	75	13	70	12						T	75	15	70	15	
T	65	13	60	12							75	15	70	15	
	80	14	75	13						T	65	15	60	15	
T	75	13	70	12							80	15	75	15	
	65	13	60	12						T	75	15	70	15	
	75	13	70	12							70	15	65	15	
C	65	13	60	12						T	70	15	65	15	
	75	12	70	11							60	15	55	15	
C	65	12	60	11						T	65	14	60	14	
	55	11	50	11							60	14	55	14	
C	65	12	60	12						T	55	14	50	14	
	30	12	25	11							65	15	60	15	
	25	11	20	11						T	30	13	25	13	
	55	13	50	12							25	12	20	12	
C	45	13	40	12						T	50	14	45	14	
	35	13	35	12							45	14	40	14	
	85	15	80	14						F	40	14	35	14	
	80	15	75	14		85	18	80	17		85	16	80	16	
	80	14	75	13		80	18	75	17		80	16	75	16	
	70	14	65	13		75	17	70	16		75	16	70	16	
	55	13	50	12		70	17	65	16		70	16	65	16	
						65	16	60	15		55	15	50	15	
C	20	11	20	11							F	25	13	20	13
	35	11	30	11								35	13	30	13
	30	11	25	11								30	12	25	12
C	150	16	140	15		120	18	115	17		F	140	16	135	16
	120	15	115	14		110	18	105	17			125	16	120	16
	150	16	140	15		135	18	130	17			170	17	165	17
	130	16	120	15		120	17	115	16			140	17	135	17
	110	16	100	15								115	16	110	16
	75	14	70	13							F	75	15	70	15
	120	17	115	16								120	17	115	17
	90	17	85	16		130	18	125	17			90	17	85	17
	95	16	90	15		120	18	115	17			95	17	90	17
	75	16	70	15		110	17	105	16			75	17	70	17
	70	16	65	15		110	17	105	16			70	17	65	17
	60	16	55	15		95	17	90	16			60	17	55	17
	75	14	70	13		95	17	90	16			75	16	70	16
	70	14	65	13								70	16	65	16
	60	13	55	12								60	15	55	15
	50	13	45	12								50	15	45	15

Navigator



TECHNICAL SECTION





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RT 100 TRIGON®

Innovative Design for more efficient cooling

In stainless steels the high chrome and nickel content ensures a high corrosion resistance and high tensile strength. Consequently, however, the machinability of the material decreases, process temperatures

increase. Nevertheless, RT 100 TRIGON® ensures high cutting speeds and feed rates – made possible by the innovative coolant duct geometry.

Flute form

A specially developed flute form with the highest surface finish as well as the 4-facet point geometry ensures optimal chip generation and cutting characteristics.



Corner preparation

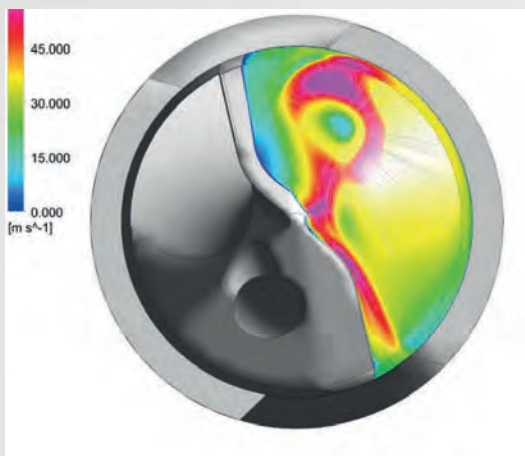
The TiAlN based coating and special corner preparation reduces the extreme stresses on the cutting edge during machining and provides high wear resistance.



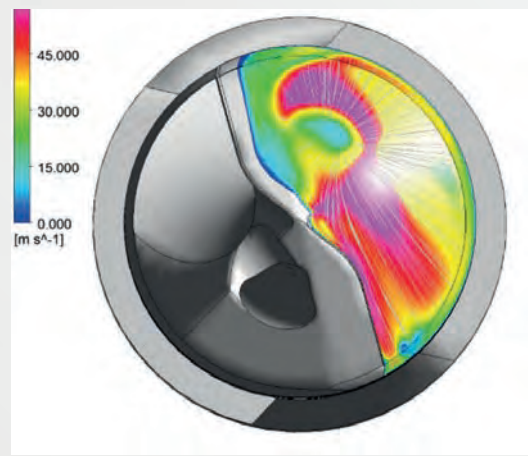
The new form of coolant duct optimises the coolant volume, the flow rate and the flow direction, extreme process temperatures are optimally dissipated. In comparison to

conventional round coolant ducts the cooling medium is specifically guided to the most stressed areas, the major cutting edge and the cutting edge corners of the drill.

Conventional coolant duct



Trigon coolant duct design



Flow characteristics in comparison



RT 100 C

The Ratio drill for the machining of long chipping steels

Cutting edge geometry

Major cutting edges with a concave form ensure perfect penetration and cutting characteristics when machining long-chipping steels. Cutting forces and temperatures are considerably reduced.

Flute form

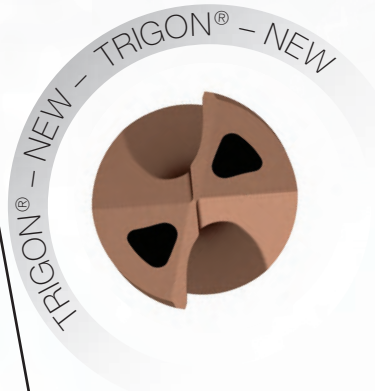
The flute form with narrow geometry, especially designed for long-chipping steels, ensures optimal chip generation characteristics even at low cutting speeds.

A high surface quality and a excellent coating ensure optimal chip evacuation. High process temperatures are dissipated safely.

- special solution
- Ø 3-20 mm
- up to 7xD drilling depth
- from Ø 6.0 mm with new TRIGON® coolant duct design

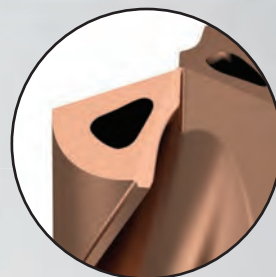
New coolant duct design

The new form of coolant duct optimises the coolant volume, the flow rate and the flow direction, extreme process temperatures are optimally dissipated. In comparison to conventional round coolant ducts the cooling medium is specifically guided to the most stressed areas, the major cutting edge and the cutting edge corners of the drill.



Cutting edge preparation

RT 100 type C impresses with its special cutting edge preparation that is complemented with its edge geometry and excellent surface quality. The tool life is increased considerably and in addition the formation of micro cracks and built-up edges is avoided.





RT 100 AL

Guhring's new solid carbide drill for the machining of aluminium materials

For aluminium drilling chip formation with chip evacuation are both of vital importance.

With RT 100 AL optimal chip formation is achieved at the cutting edge in the entire material range – from tough aluminium wrought alloys to aluminium cast alloys with high silicon content.

Extremely high surface finish quality of web thinning, front face and clearance rake areas

- reduction in process temperatures
- prevents formation of built-up edges

Open point geometry and cutting edge form:

- optimal chip formation behaviour

Sharp, micro-treated cutting edges

- perfect cutting behaviour, also in heat-treated AISi-alloys
- short chip fracture also in aluminium wrought alloys

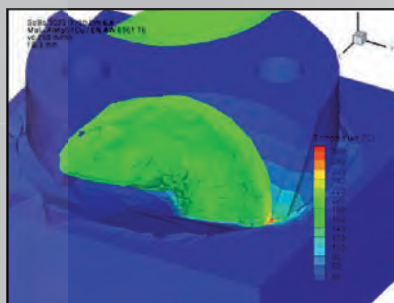
Flute geometry

- polished flutes for optimal chip evacuation
- minimising friction
- prevention of material adhesion

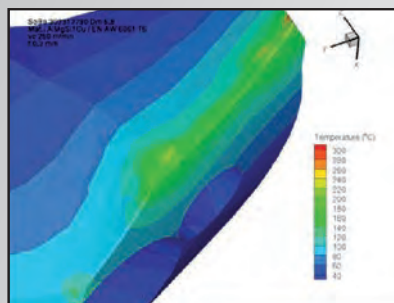


RT 100 AL distinguishes itself thanks to an ideal geometry with high surface finish qualities in the web thinning, front face and clearance rake areas. Micro-treated cutting edges and corners complement the point geometry and ensure perfect cutting behaviour, low process temperatures prevent the formation of built-up edges when machining aluminium.

Chip formation



Temperature distribution at cutting edge



The tools are designed with a bright finish, for heavily abrasive aluminium materials an additional head coating for further tool life improvement is possible.

Special dimensions as well as single- or multi-step tools are available on request



Fibre composite plastics (FCP's)

Modern fibre composite plastics (FCP's) are making an entry into a broad range of industrial applications for reasons of efficiency, weight reduction, strength and dynamics. With their specific properties they extend the group of conventional metal lightweight construction materials such as aluminium- and titanium-alloys. FCP's or multi-material systems, ie. a mixture of FCP and metallic materials, are therefore no longer exclusively retained for the aerospace industry, motorsport and other high-end applications.

It is especially worth high-lighting the great growth in the vehicle and commercial vehicle technology, the wind energy sector as well as general mechanical engineering. FCP's are applied where high specific strength and low weight as well as high dynamic or energy efficient processes can be found.

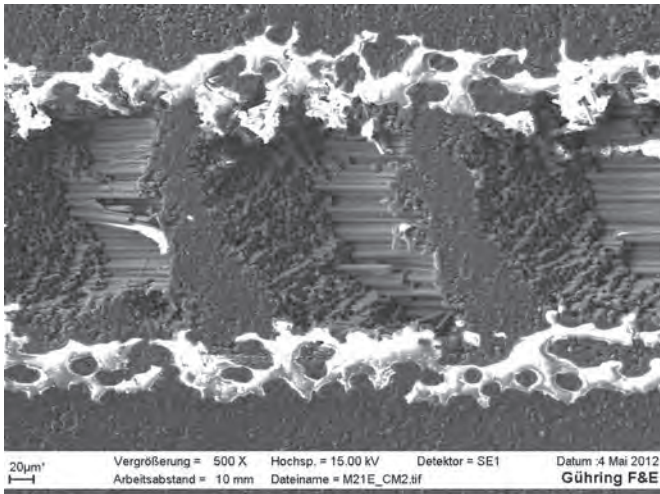
Since the mid 1980's Guhring has provided tooling solutions in the standard and special sector for the machining of FCP's. This long-term experience resulted in the development of a wide variety of specialised high-performance tools, adapted to different conditions and application cases such as manual drilling, drilling with drill feed units, machining with robots or machining in conventional machining centres.

Guhring tools for the machining of FCP meet the general requirements for the machining of modern lightweight construction materials.

- Components without fibre projections
- Delamination-free component surface
- No component damage through "peel-up" or "push-out"
- Prevention of split fibres "pull-outs" on component
 - Minimising burr development
 - Prevention of thermal damage

For the machining of FCP materials without component damage, cutting edge quality and wear resistance of the tool material are of absolute importance. Pre-requisite for a process reliable separation of the heavily abrasive fibres, especially

materials with a fibre volume ratio of more than 55 percent, is a sharp cutting edge.



CFRP cutting area with 500-fold magnification

The scanning electron microscope shows how the materials fibre structure and fibre direction is retained after machining. Fibres are neither pressed into the matrix, nor torn out of the composite.



GFRP / CFRP

Glass fibre reinforced plastics (GFRP) are industrially applied in large volume for wind energy applications as well as in the transportation and construction sector. GFRP is generally only applied for moderately load bearing components, mostly large area shell components. The lesser load bearing GFRP components are in many cases preferred to the lighter carbon fibre reinforced plastics (CFRP) as they can be produced considerably more cost-efficient and are easier to machine.

Carbon reinforced plastics (CFRP) by comparison have considerably higher strength. Depending on the manufacturing process and fibre diameter, pure carbon fibres achieve a higher tensile strength weight ratio compared with steel materials. For this reason CFRP is extensively used for high load bearing structural components.

To protect the fibres in CFRP and GFRP from applied forces they are bedded into a matrix. The ratio of fibre to matrix determines the so-called fibre volume ratio and in heavily stressed CFRP components it can be up to 65 percent. For finish machining the type of fibre and fibre direction of the components must be observed. The fibre direction with CFRP is the deciding factor for the tendency for the material to delaminate and fibre splitting. Therefore, unidirectional layers especially at the hole exit tend to delaminate heavily. The tendency to delaminate must be counteracted with the tool geometry.



The machining of CFRP and GFRP materials require specific tooling solutions especially designed to suit the heavily abrasive fibres. To prevent typical FCP component damage, Guhring provides application specific high-performance tools.

This prevents the material from delaminating due to targeted control of the cutting forces.

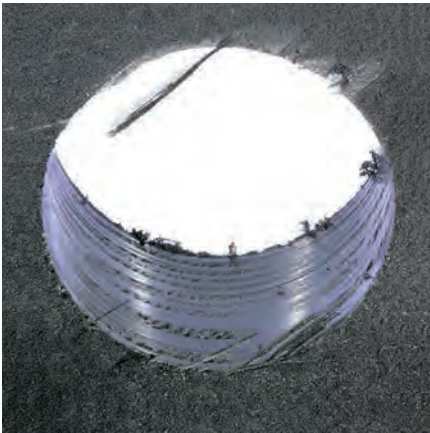




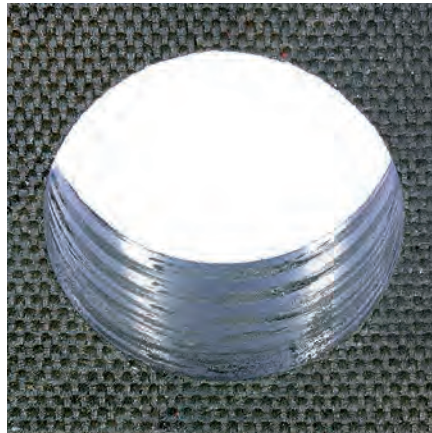
FCP drilling operations

For drilling operations, specific drilling tools with different point geometries are applied. Thanks to specifically designed tools, the fibres can be reliably separated in unidirectional fibre layers as well as in fabric layers. Delamination on the component

surface on tool entry and exit (“peel up” / “push out”) as well as in the component can be prevented.



Hole D = 6.35 mm
With fibre projection on cover coating and delamination



Hole D = 6.35 mm
CFRP with fabric layer, optimal machining quality



Hole D = 6.35 mm
Unidirectional CFRP with optimal machining quality

Stack materials

The combination of at least two different materials with differing properties is described as a stack material or just stack. Often applied material pairings for lightweight construction applications are CFRP/titanium as well as CFRP/aluminium. But also other combinations of the materials CFRP, titanium, stainless steel and aluminium in different combinations are possible. To insert the connection elements, the different materials must be machined together in a process. The challenge for cutting tools during the machining process results from the very different material properties and the machining strategies of the combined materials. When machining CFRP/titanium stacks CFRP is heavily abrasive and quickly leads to a rounding of the cutting edges of the tool. Titanium in contrast is very tough and causes high machining temperatures due to its low thermal conductivity. The CFRP is very quickly damaged when machining due to high machining forces and temperatures. Despite the different materials a secure accurate machining process must be ensured over a long tool life.

Guhring also provides special solid carbide, coated carbide and PCD tooling solutions for this material group. They are specially adapted to the respective material structure and ensure chip evacuation as well as uniform hole diameters across all materials.





Laser structured clearance

Tool life optimisation thanks to cooling lubrication guided to the target location

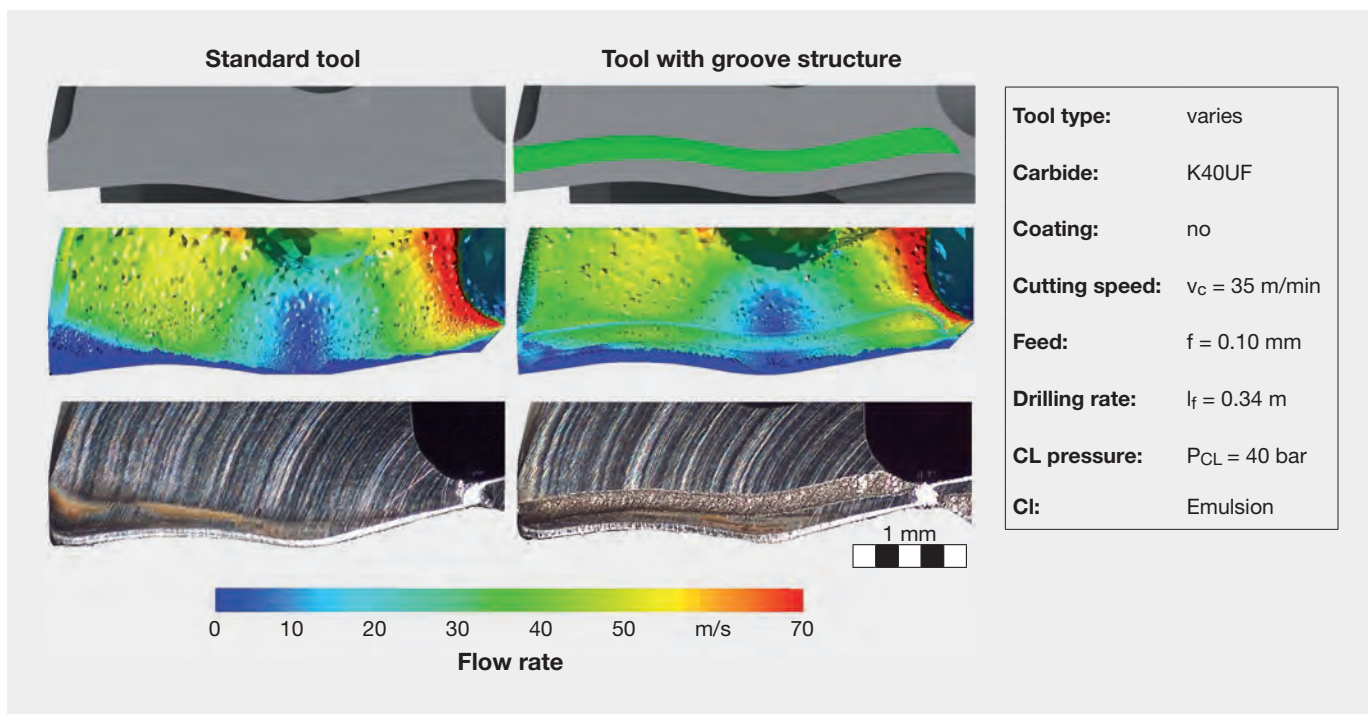
With drilling operations a high quantity of cooling lubrication (CL) does not always lead to the desired result as it must be supplied to the target location. For this laser machining of drilling tools offers innovative design possibilities. The cross-section of the coolant ducts and their position within the clearance constitute important factors for influencing the cooling lubrication during the drilling operation. Furthermore, structures within the clearance as well as adjacent surface areas can influence the flow behaviour of the cooling lubrication. These structures are generated by laser machining. The aim is to

guide and aim the CL at the most stressed areas, especially those subject to high thermal stresses. They include the cutting lip and the outer corners for example. The reduced thermal stress slows wear development and increases tool life. Applications are all drilling operations where tools are subject to high thermal stresses. The hole quality is improved thanks to the improved cooling lubrication and accompanied by reduced temperatures.

Simulation with Computational Fluid Dynamics (CFD)

The influence of the coolant duct diameter as well as of the generated structures on CL flow can be analysed in more detail by the application of CFD simulation. Initial examinations were carried out on a simple groove structure that follows the cutting edge at a constant distance of approximately 150 μm . The groove had a depth of approximately 50 μm . CFD simulations carried out confirm the positive influence on the cooling lubrication flow and an improved cooling of thermally high-stressed areas. Larger areas near the outer corner that beforehand were virtually not reached by the CL due to the small volume between the drill clearance and the base of the hole now receives increased cooling lubrication by guiding the flow and the increased space.

The brownish deposits on the clearance of the tools applied for the machining of nickel base alloy Inconel 718 confirm the increased cooling performance in these areas. The spatial expansion as well as the intensity of deposits consisting of burnt CL limits the machined groove to the area between outer corner and laser structure. Reducing the thermal stress increases the achievable tool life and improves the achievable hole quality when machining Inconel 718.

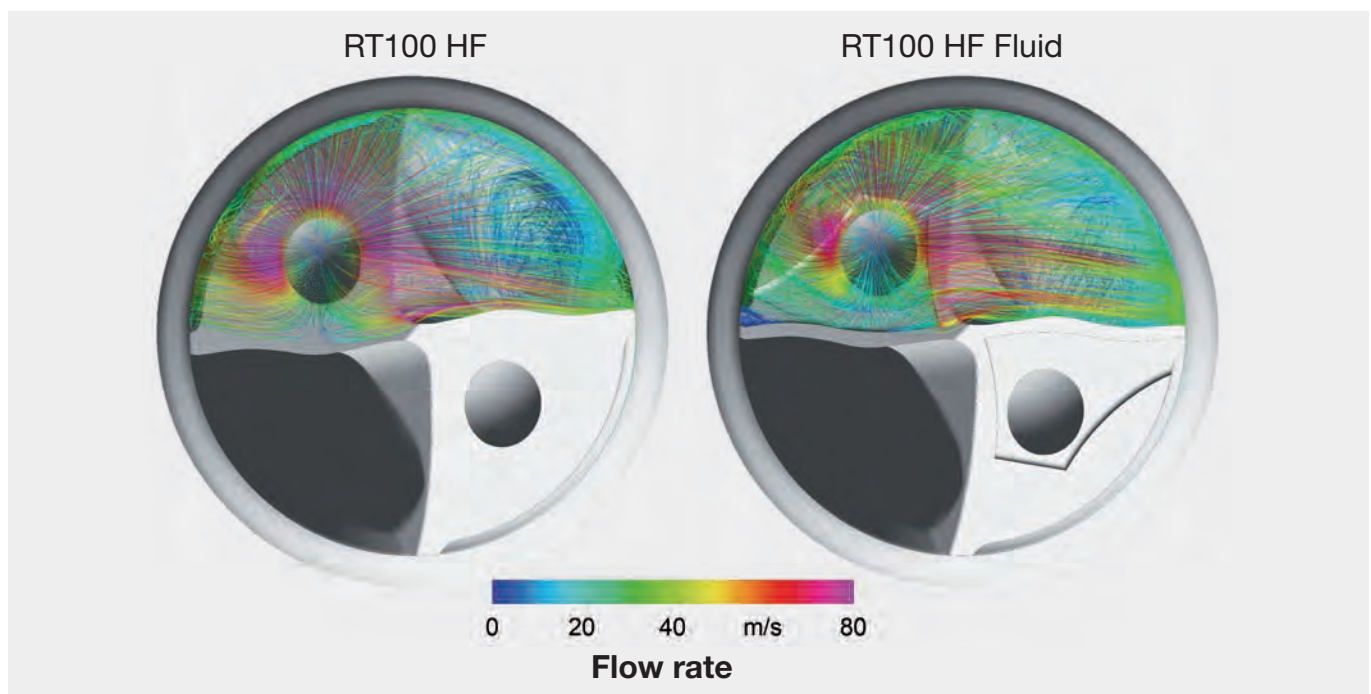




Viewing complex structures

Based on the results of simple structures, further development led to more complex forms in order to further improve the CL guidance. As the laser machining of tools provides a high degree of design freedom, significantly more elaborate forms have been realised that cannot be produced by any other machining processes. The laser structure adaptations include the form, the position and the degree of erosion in order to ensure an optimal cooling lubrication. CFD simulation was also applied here in order to analyse the influence of the different forms on the flow behaviour of the CL, how the swirl development in the outer corner further increases the cooling effect of the CL in detail.

With the further developed structure to guide the CL to the target location – called FLUID – further significant improvements based on the simple structure were possible regarding the wear behaviour of the drilling tool. In parallel to the development of the structure examinations were carried out to laser machining itself to prevent edge zone damage as well as too high peak-to-valley heights that could have a negative influence on the flow. Current laser machining achieves surface qualities of $R_z < 5 \mu\text{m}$ independent of the carbide surface qualities to be machined without evoking performance limiting edge zone damage. In addition, the clearance structure has no relevant influence on the adhesion of possible tool coatings.



Application fields

Such modified tools are to be applied especially in materials under high thermal stresses when machined. This is the case in stainless steels, titanium-alloys as well as nickel based alloys. Current developments are therefore driven by the machining of Inconel 718. Its properties cause extreme thermo-mechanical stresses and therefore considerably limit tool life as well as

productivity. A targeted manipulation of the cooling lubrication flow offers considerable potential benefits for optimising such machining operations.



Process optimisation when machining with added movement

The machining of new materials with fibre reinforced materials to very tough materials such as titanium- or copper-alloys as well as very brittle ceramic materials poses a challenge for conventional machining because of the extreme wear and chip formation behaviour. New approaches for process optimisation

by added motion in feed direction open new opportunities for improved chip formation, reduced process forces and higher quality of the produced surfaces as well as maximising the achievable tool life.

Basic considerations

When adding axial movements via a continuous feed movement, different frequency ranges from a few Hertz up to several thousand Hertz are applied depending on the application case. In addition, a defined modification of effective direction angle and an increase in tool cutting edge speed is made. Dependent on the application and tool type, various effects are achieved by vibration supported machining.

Machining with added movement is currently applied for the machining of difficult-to-machine materials such as super-alloys, fibre-reinforced plastics and stack-materials as well as long-chipping alloys, for example, lead-free copper-alloys. With added vibration, one differentiates between low-frequency and high-frequency vibrations.

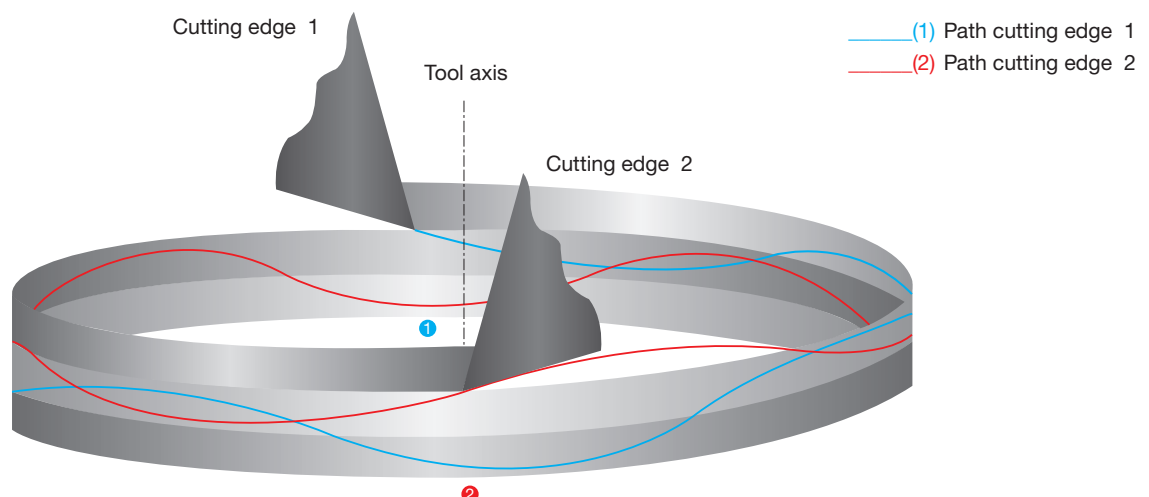
- more favourable chip formation/improved chip fracture
- improved chip evacuation
- production of predetermined breaking point in chip
- reduced built up edge
- prolonging tool life
- reduced machining forces
- reduced temperatures

1.) Low-frequency impulse

With low-frequency impulse frequencies to 1 kHz and amplitudes up to 0.5 mm are used. This category also includes programmed pecking by lifting the tool or an interrupted feed movement by dwelling cycles. On conventional machining centres, this discontinuous feed movement cannot be increased unrestrictedly due to the limited dynamics of axial movement. To achieve added movement with frequencies matching multiple spindle machines, special mechanical transmissions are applied.

These transmissions can be directly integrated in the machine or designed as gear heads attached to the spindle. The stroke is mechanically produced by the gear ratio in the feed axis or by moving over a corresponding cam disc.

Deviating from a spiral-shaped cutting path with a constant chip thickness when drilling with a constant feed rate, the addition of axial movement results in varying chip thickness.





Low-frequency added axial movement enables the production of controllable chips, even with ductile materials. The amplitude of the added axial movement controls the chip thickness. The amplitude setting can be changed to control the chip as a

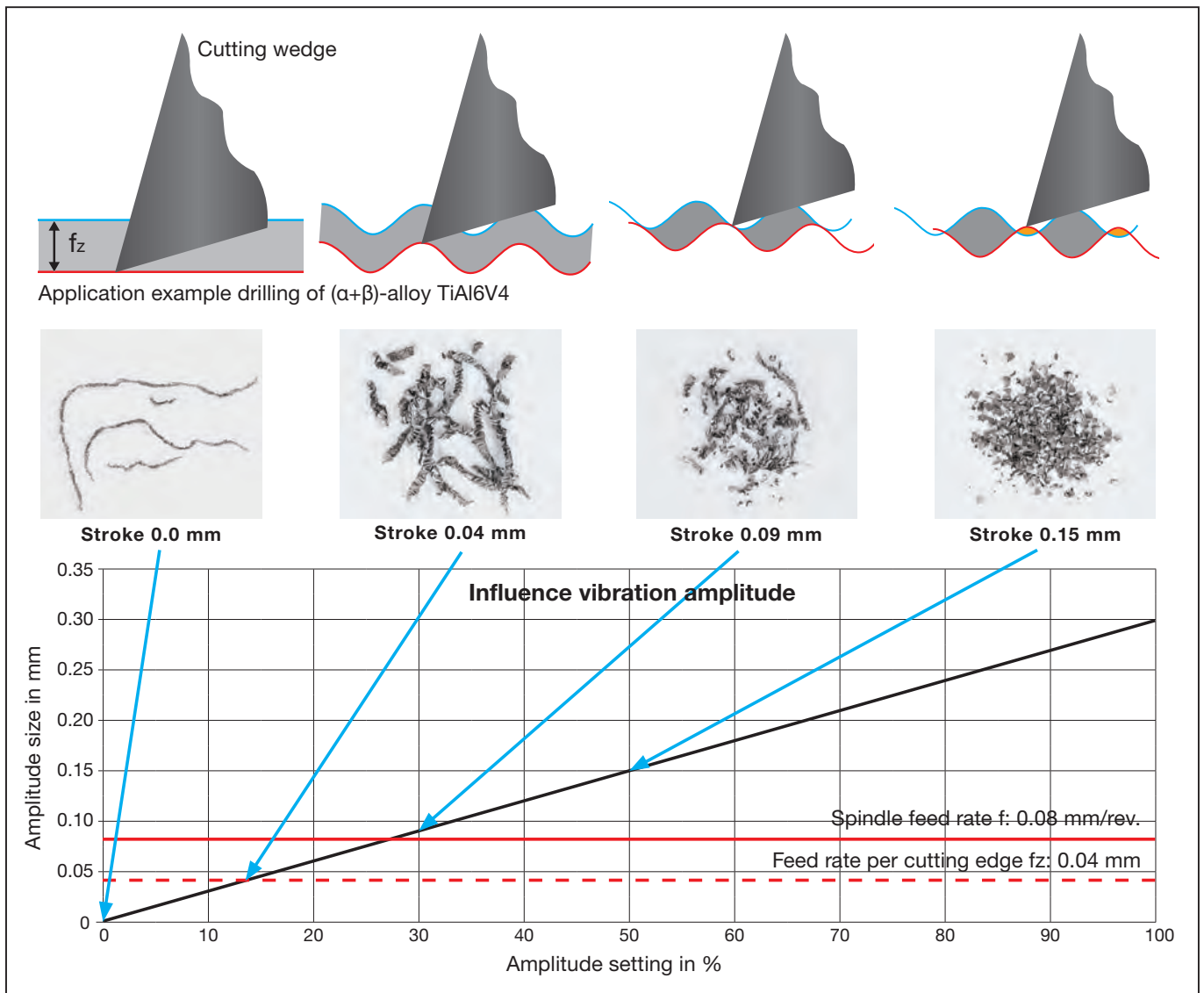
peck and therefore an interruption of the chip formation. With rotational speed linked frequency, the number of pecks can be determined.

Influence of vibration on chip formation

In a test, holes were produced in a standard titanium-alloy (TiAl6V4), where the levels of vibration were varied. All tests were carried out completely dry with identical drilling tools of diameter $d = 6.35$ mm. The cutting rates were $v_c = 30$ m/min and $f = 0.08$ mm/rev.

An observation of the produced chips clearly shows the influence of amplitude on the chip formation. Already an amplitude in the height of the chip thickness clearly reduces the chip length. To produce very short chips, without exception in ductile materials, the amplitude must be selected considerably higher than the feed rate of the cutting edges. Therefore, the

cutting edge completely lifts-off the workpiece surface and the chip formation process is specifically interrupted. Machining with applied vibration is already well established for the machining of hybrid material combinations, so-called sandwich or stack materials. Here, leaching in fibre composite layers can be prevented and machining temperatures reduced in total thanks to securing the chip break.

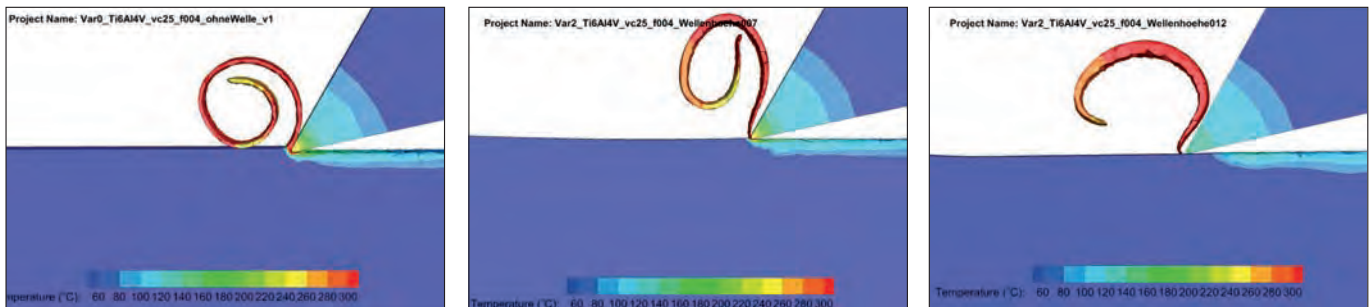




Influence of applied vibration on the process temperature

With the assistance of the Finite-Element-Method (FEM) the chip formation at the cutting edge is simulated for different application conditions. The following images show a the chip in a FEM simulation. The results of the simulation show the increasing chip thickness and shortening of the chip with the

amplitude of the vibration. Furthermore, it shows with a continuous cut a higher temperature level is achieved at the cutting edge

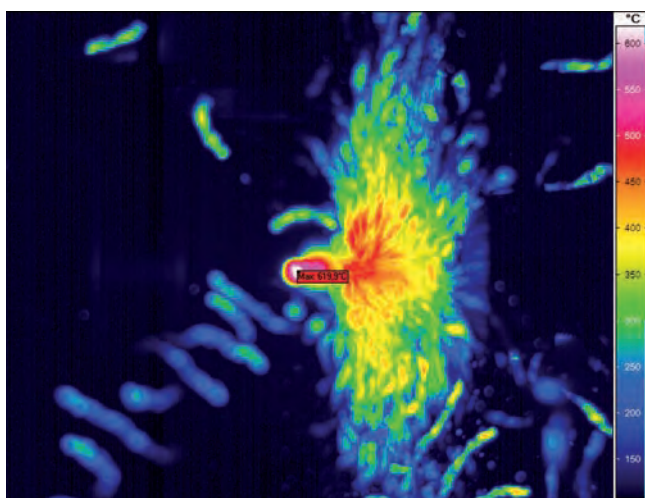


This becomes especially clear when comparing the machining temperatures when machining CFRP/titanium material combinations. Identical drilling tools with diameter $d = 6.35$ mm were applied dry for the test. The cutting rates were $vc = 30$ m/min and $f = 0.08$ mm/rev.

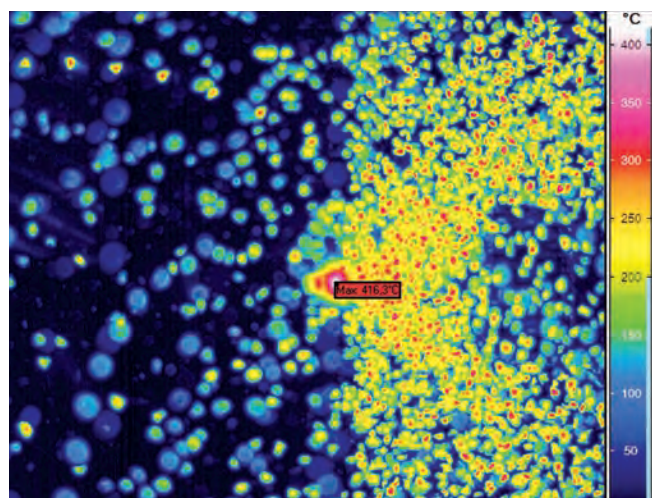
The heat created during the machining of a CFRP/titanium stack material is recorded in real time with a thermography camera. The test panel had a total thickness of 20 mm, 6 mm CFRP and 14 mm titanium (TiAl6V4). It was drilled so that the remaining residual wall was 1.5 mm to the panel face. A comparison of the temperature at the cutting edge on exit of the material and chip temperature was measured to show the dif-

ference between conventional machining and machining with vibration. Without vibration, a maximum temperature of 600° C was measured at the cutting edge. With vibration the maximum temperature under identical conditions was reduced by approximately a third to under 450° C. Furthermore, a considerably improved hole quality and increased tool life was achieved thanks to an improved chip break.

Recording stack machining CFRP / ($\alpha+\beta$)-alloy TiAl6V4



Conventional dry
 ϑ_{max} : 619 °C



Vibration supported dry
 ϑ_{max} : 416 °C

Technical section



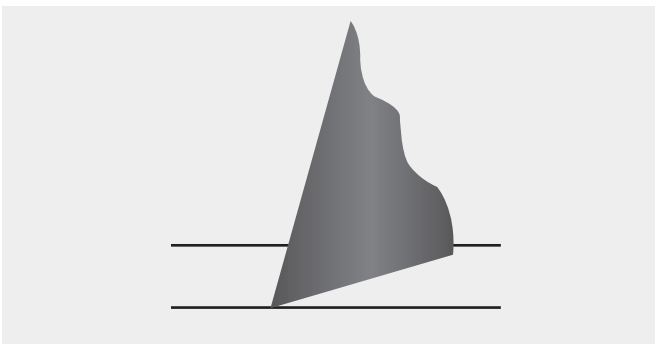
2.) High-frequency impulse (ultra-sound supported)

With high-frequency impulse metal-cutting manufacturing processes – also called ultra-sound supported – an overlaying of the conventional process kinematics with an oscillating tool movement in axial direction takes place exhibiting a considerably higher frequency of > 16.55 kHz in contrast to a low-frequency impulse. The maximum achievable amplitude at the tool point, mostly between $2...30$ μm , is heavily dependent on the combination of tool, impulse system and power applied, as the oscillation results from the impulse of the tool with its resonance frequency.

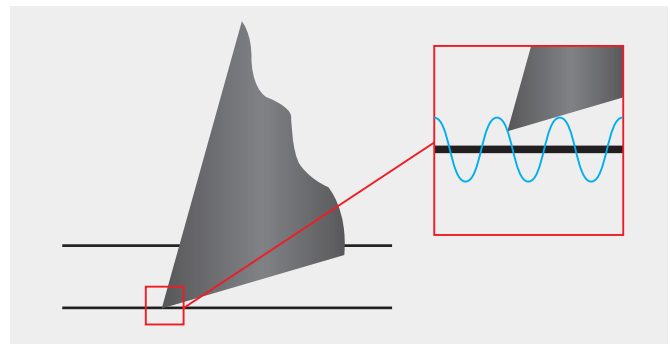
The impulse takes place via actuator, consisting of a generator, converter, booster and the combination of tool and holder, the so-called sonotrode. The generator converts electrical energy into high-frequency sine oscillation that is transferred to the converter. The booster transforms from the converter received vibration amplitude and transfers it enlarged to the sonotrode in which the electrical energy is converted into mechanical energy by piezo actuators.

The combination of feed movement and an oscillating linear movement also enables a more economical machining of high-tensile materials such as ceramic composite materials. Previously, ultra-sound supported machining was predominantly applied for the machining of so-called advance materials such as glass, ceramics and carbide using tools with geometrically undefined cutting edges. High-frequency impulse machining is increasingly applied also in the machining with a defined cutting edge thanks to the drilling and milling of composite materials such as fibre reinforced plastics, sandwich structures and foam. When machining with a defined cutting edge a micro-break-up supports the machining of the material partly visible affecting the surface quality and resulting in a reduction of the process forces.

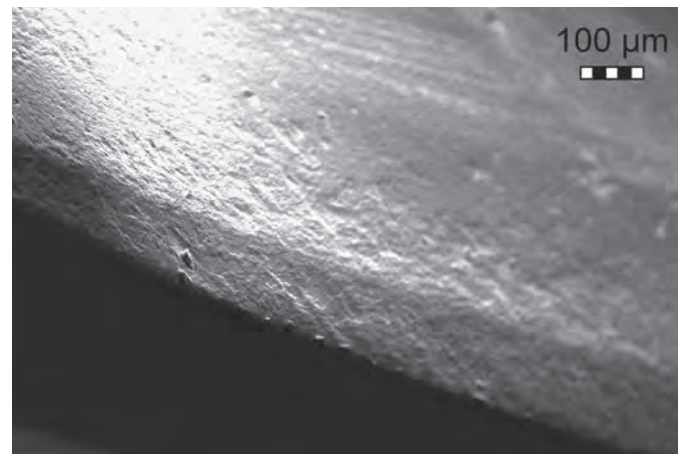
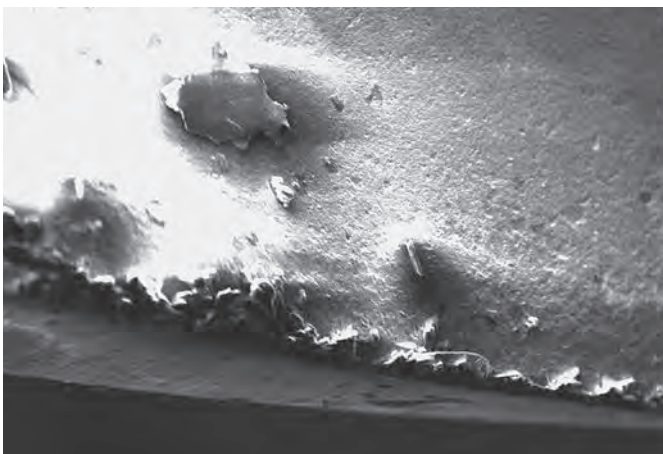
Alongside positively influencing the wear behaviour when machining steel materials, a reduction in edge build-up can be identified when drilling nickel based alloys.



Without ultra-sound support



With ultra-sound support

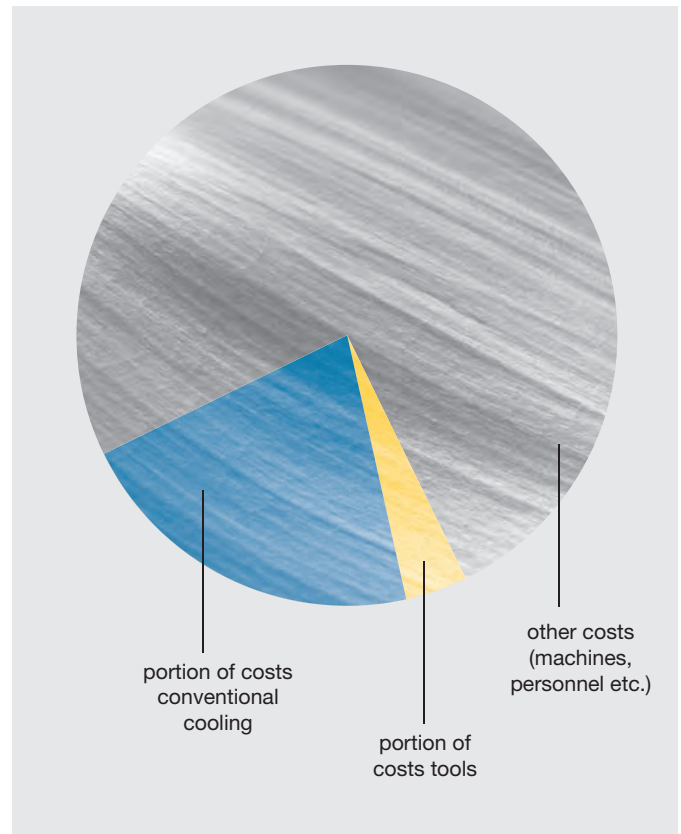


MQL technology

Basics

Alongside the machine and tooling the costs for coolant are a considerable portion of the overall cost of the machining process. Therefore, a reduction in the cooling lubrication requirements offers a potential for cost savings.

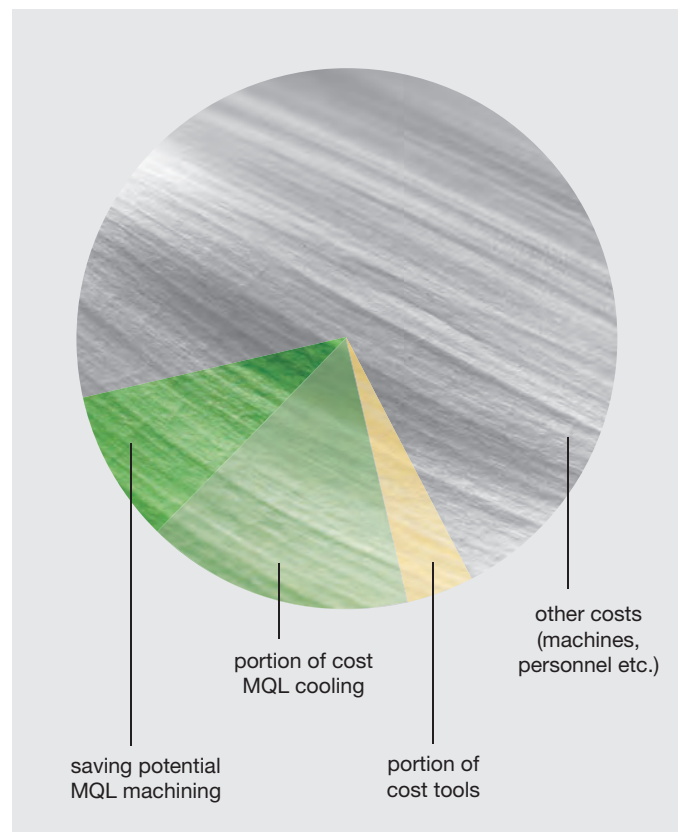
The reduction of cooling lubricants is not only cost saving but is also of benefit to the environment and health protection. Guhring is one of the pioneers in the research and development of MQL that began in the mid 1990's.



The aim of MQL machining

The acquisition of a new MQL cooling lubricant system is significantly less expensive than conventional cooling!

- reduction of thermal stresses at the tool point
- less tool wear
- effective chip evacuation from deep holes
- reduction of cooling lubricant requirement
- high cooling and lubrication effect especially in deep holes
- lowering the resulting costs such as:
 - component cleaning costs
 - cooling lubricant disposal costs
 - swarf disposal costs
- environment and health protection



Technical section



The development of present-day MQL systems

Thanks to the research in MQL machining Guhring created the pre-condition for a practical MQL technology. From the clamping set to the tool's cutting edge all the components were integrated in the development – the result was the first MQL delivery system.

Features:

- modular constructed and standardised system
- MQL and conventional clamping set are freely interchangeable thanks to an identical spindle contour
- hydraulic, shrink fit and synchro chucks are all designed for the MQL clamping set



Guhring's current MQL system

By incorporating the MQL length adjustment screw to Guhring's first MQL delivery system in 2007, the original drawback was eliminated. There is, therefore, currently a MQL delivery system available to the customer that optimally meets the requirements of the present-day production process.

Features of the first Guhring MQL delivery system:

- no lubricant delays
- special MQL coolant delivery unit
- MQL suitable tool shank end
- tapered length setting screw

The user, therefore, benefits from a standardised system and a clearly reduced stock keeping thanks to compatible components.



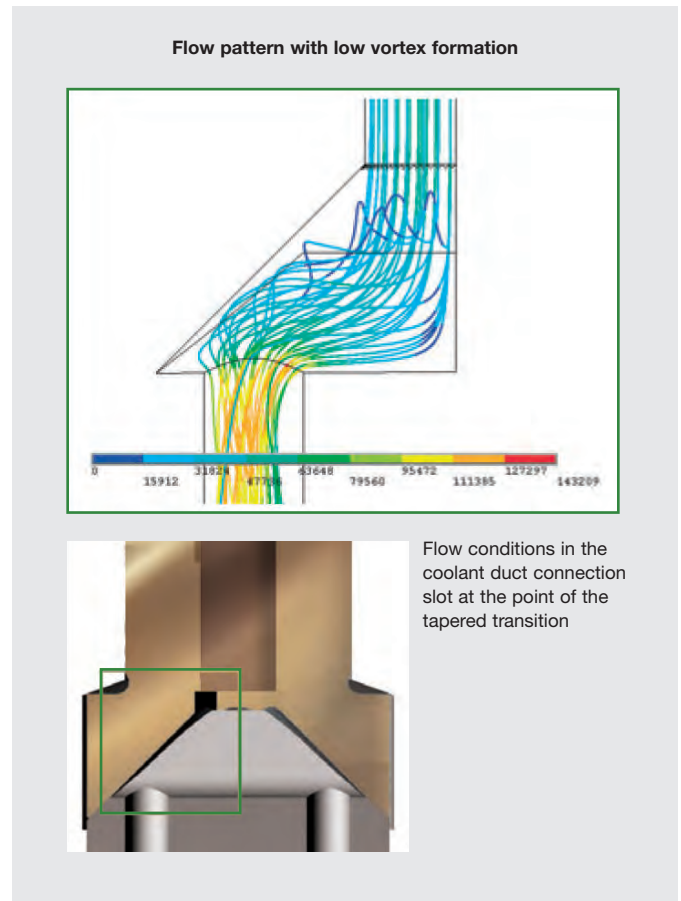


**Optimally formed shank end!
For a secure MQL delivery**

The delivery of these extremely low coolant quantities directly to the effective area is of utmost importance. Hereby, the geometric design of the shank end plays a significant role! The Guhring developed conical shank end optimally satisfies the relevant MQL conditions.

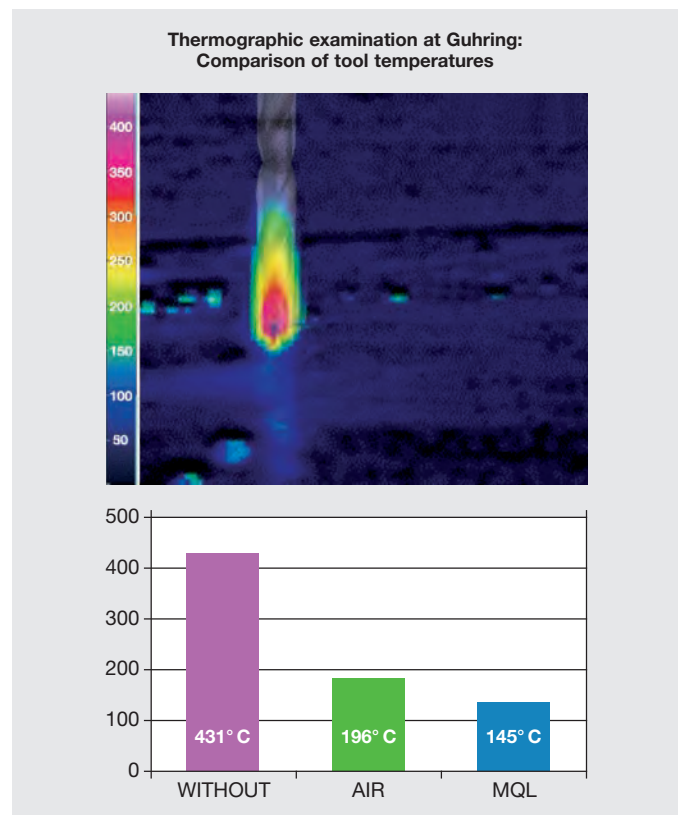
Advantages of the tapered shank end:

- no lubricant delays
- minimal dead area
- simple operation
- cost-efficient production



Keeping a cool point

With MQL the process temperature can be considerably reduced in comparison to dry machining resulting in longer tool life and an increased process reliability.



Technical section



The best form for MQL!

Optimal MQL machining results thanks to the optimised tool geometry of RT 100 T!



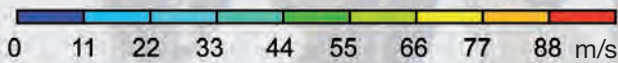
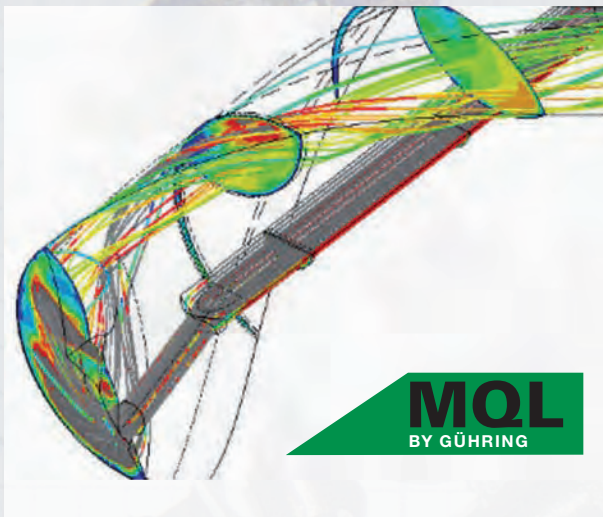
1. Flute cross section:

The flute geometry of Guhring MQL tools ensures short chips that are optimally evacuated from deep holes.

2. Maximum coolant duct cross-section:

The cooling lubricant supply as well as the chip evacuation have been optimised through the tool' maximum coolant duct cross-section.

Flow speed comparison



The flow speed

in the flute with MQL is 30.4 m/s.

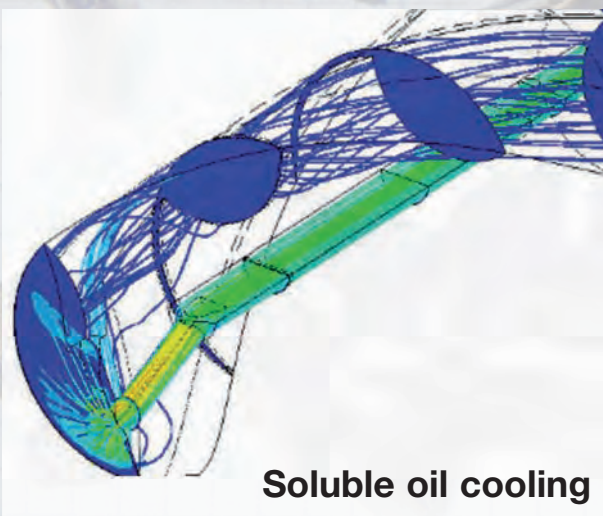
The volume with MQL

is 6.960 l/h (std.litres air/h).

Tool Ø = 11.7 mm

Pressure at pump = 6 bar

Pressure at tool = 4 bar



The flow speed

In the flute with soluble oil is 3.5 m/s.

The volume with soluble oil

is 600 l/h (std.litres air/h).

Tool Ø = 11.7 mm

Pressure at pump = 60 bar

Pressure at tool = 31 bar

MQL system types

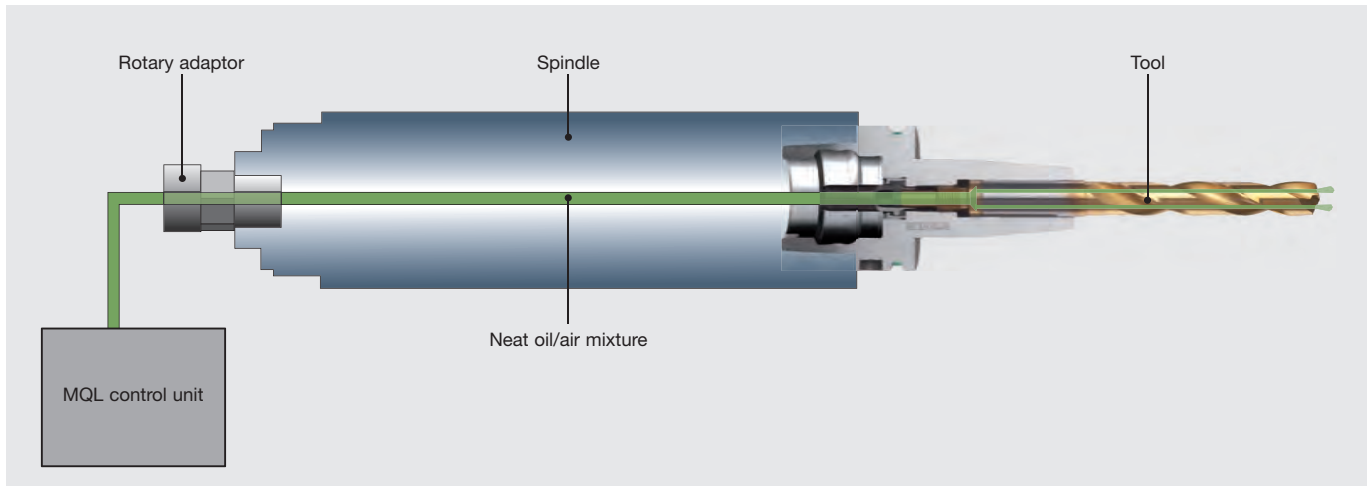
The provision of the MQL medium to the tool can be achieved in two ways: the aerosol mixture can be prepared outside the machine and conveyed to the machining location (1-channel system) or compressed air and MQL medium are conveyed separately to the mixing chamber where they are then mixed together (2-channel system). The aerosol feed to the

machining location is achieved via a suitable minimal quantity lubrication rotary adaptor (preferably with axial flowthrough), the spindle, the clamping system and finally the cutting tool. Unavoidable cross-section modifications should be as streamlined as possible.

1-channel MQL system

With a 1-channel MQL system, a lubricating aerosol is created in a separate MQL unit attached to the machine tool. Special nozzle systems inside a pressurised container create a lubricating aerosol via a regulated compressed air feed,

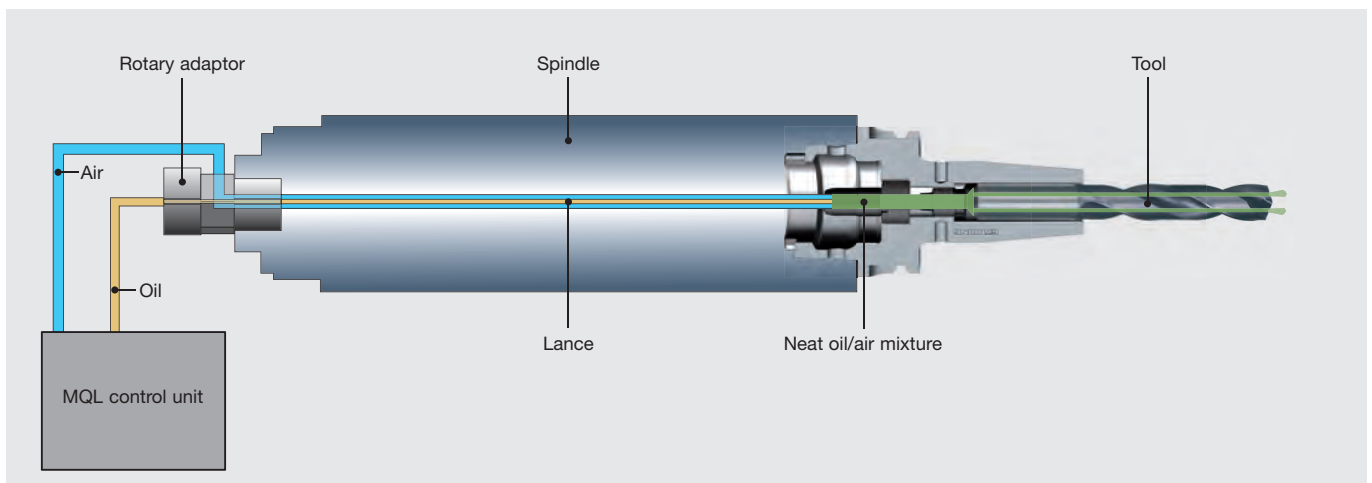
its neat oil content adjustable and then maintained within the physical limits by the MQL control.



The 2-channel MQL system

With a 2-channel system the neat oil reaches the rotary adaptor from the unit via a ring line and a as short as possible stub line. In it is incorporated a quick valve that regulates minute quantities of neat oil. The neat oil is transported into the tool holder via a lance attached in the spindle. The second channel of the rotary adaptor is used for the air supply to the tool holder. Only at this point the air is mixed with the neat oil.

To achieve this, the tool holder possesses a pressed-in pipe nozzle in which the mixing chamber is located. Neat oil and air can be mixed with this system in more or less any quantities. The route from the mixing chamber to the point of destination is only minimal resulting in a rapid response time and allowing a very quick alteration of the volume of neat oil.



Technical section

Bright finish



Especially for the machining of wrought and cast aluminium alloys with a high silicon content, un-coated drills offer a very good machining performance. In order to counter adhesive (formation of built-up edges), these tools are optimally suited to this field of application thanks to a special geometry combined with a high surface quality in the point thinning, flute and clearance areas.

Steam tempered/nitrided surface finish



A steam tempered surface finish provides an improved corrosion protection as well as an improved tribological behaviour of the tools thanks to the oxidation of the surface area (approx. 3 to 10 μm). Nitriding the land is recommended for abrasive applications, it increases the hardness of the surface on the land and therefore improves wear resistance of the tool. However, using hard material / soft material coatings often provide better results, this type of surface treatment is becoming increasingly less important.

TiN-coating



Max. application temperature: $<600^{\circ}\text{C}$
 Colour: Golden yellow
 Structure: Single-layer
 Hardness: 2300 HV0.05

Introduced by Gühring at the beginning of the 1980's, TiN-coating is applied to HSS and carbide for drilling operations as a cost-efficient general purpose coating.

FIRE/nanoFIRE-coating



Max. application temperature: $<800^{\circ}\text{C}$
 Colour: Violet
 Structure: Multi-layer
 Hardness: 3300 HV0.05

FIRE and nanoFIRE coatings contain aluminium, titanium and nitrogen. These coatings were introduced towards the end of the 1990's and are a further development of the TiN-coating. They excel thanks to increased hardness and good thermochemical resistance, they are suitable for HSS and carbide.



Raptor-coating



Max. application temperature: < 800°C
 Colour: Pale golden
 Structure: Multi-layer
 Hardness: 3300 HV0.05

The TiN/ TiAlN-multi-layer structure of Raptor is the key component for the good performance when machining steel. Thanks to the additional friction reducing top layer coating, based on zircon, the performance could now be further extended for steels that tend to adhere during machining (i.e. ferritic, austenitic and Duplex steels).

TiAlN-coating



Max. application temperature: <800° C
 Colour: Violet
 Structure: Single-layer
 Hardness: 3300 HV0.05

The TiAlN-coating displays similar characteristics to FIRE and nanoFire and with its single-layer structure is mostly applied in the field of micro-precision drills.

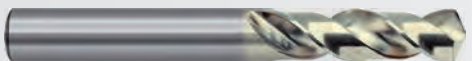
nanoA-coating



Max. application temperature: <900° C
 Colour: Blue violet
 Structure: Multi-layer, nano-structured
 Hardness: 3300 HV0.05

TiAlN based nanoA has proven itself in the machining of stainless steels and is suitable for drilling cast iron, nickel based alloys and cobalt chrome alloys. Thanks to its nano-layered structure the fracture growth is delayed. Furthermore, thanks to its adapted composition it possesses a higher thermo-chemical resistance than for example TiAlN.

Sirius-coating



Max. application temperature: < 900°C
 Colour: Pale golden
 Structure: Multi-layer, nano-structured
 Hardness: 3400 HV0.05

Sirius, essentially based on AlTiN is especially suitable for the machining of stainless steels. Thanks to the nano-structured design it displays good hardness and toughness. The zircon containing top layer coating is to largely eliminate chemical reactions with the material and therefore encourage chip evacuation.

Signum-coating



Max. application temperature: <math><800^{\circ}\text{C}</math>
 Colour: Bronze
 Structure: Multi-layered nano-composite
 Hardness: 5500 HV0.05

The Signum-coating belongs to the group of Nano-composites. The micro-structure features extremely fine TiAlN nano-crystals bedded into a glass-like, high temperature resistant silicon nitride matrix. This results in a high hardness especially making the Signum-coating the first choice for hardened steels and cast materials.

Endurum-coating



Max. application temperature: <math><800^{\circ}\text{C}</math>
 Colour: Copper
 Structure: Multi-layered nano-composite
 Hardness: 4000 HV0.05

Endurum-coating, another coating of the Nano-composite family, this was specifically designed for the machining of carbon, free-cutting and manganese alloyed steels.

Zenit-coating



Max. application temperature: <math><700^{\circ}\text{C}</math>
 Colour: Pale gold
 Structure: Multi-layer, nano-structured
 Hardness: 2500 HV0.05

The nano-structured Zenit-coating was specifically optimised for the machining of titanium-alloys. The special structure as well as the composition contribute to a significant reduction of tribochemical wear and therefore make it a true specialist. In parallel it also achieves good results when drilling aluminium cast alloys with moderate silicon content.

Ice-coating



Max. application temperature: <math><1000^{\circ}\text{C}</math>
 Colour: Metallic grey
 Structure: Multi-layer
 Hardness: 3500 HV0.05

The titanium, aluminium and chrome based Ice-coating specialises in the machining of non-ferrous metals such as, copper alloys, bronze and brass.



Carbo-coating

Max. application temperature: <math>< 500^{\circ}\text{C}</math>
Colour: Grey black
Structure: Single-layer
Hardness: 5000 HV0.05



The Carbo-coating is part of the DLC-coating group (DLC – diamond-like-carbon). These carbon coatings possess diamond-like characteristics. The Carbo-coating displays a very high hardness due to its composition of 100% carbon and structure (ta-C). It explains the outstanding performance when drilling non-ferrous metals such as, wrought and cast aluminium alloys (<math>< 12\% \text{ Si}</math>), copper, brass and bronze. In addition, it is suitable for plastics and wood.

Cristall-coating

Max. application temperature: <math>< 600^{\circ}\text{C}</math>
Colour: Grey black
Structure: Single-layer
Hardness: 8000 HV0.05



Cristall-coating is a pure crystalline diamond coating that does not lag behind natural diamond in anything. With many interesting physical properties it impresses with its extreme hardness. Therefore, the micro-crystalline Cristall-coating is exceptionally suited for the machining of highly abrasive materials such as, fibre-reinforced plastics, ceramic, graphite and cast aluminium alloys with a high silicon content (> 12%). This coating can only be applied on special carbide grades for technical process reasons.



	Drilling		
	Carbide		HSS
	conventional	MQL	
C-steels, Free-cutting steels, Mn-steels	Endurum	Endurum	Fire
	Raptor	Raptor	-
	Fire	Fire	-
Steel, low-alloyed	Fire	Fire	Fire
	Endurum	Endurum	TiN
	Raptor	Raptor	
Steel, alloyed	Fire	Fire	Fire
	Signum nanoA	Signum nanoA	TiN
	Signum	Signum	-
Steel, hardened <55 HRC	Fire	Fire	-
	TiAlN	TiAlN	-
	Signum	Signum	-
Steel, hardened 55-65 HRC	Fire	Fire	-
	TiAlN	TiAlN	-
	Signum	Signum	-
Steel, stainless and acid resistant	nanoA	nanoA	Sirius
	Sirius	Sirius	Fire
	Endurum	Endurum	TiN
Cast iron	Signum	Signum	Fire
	Fire	Fire	-
	nanoA	nanoA	-
Aluminium wrought alloys	bright	bright	bright
	Carbo	Carbo	Carbo
	Cristall	Cristall	-
Aluminium cast alloys (< 12% silicon)	bright	bright	bright
	Zenit	Zenit	Zenit
	Carbo	Carbo	Carbo
Aluminium cast alloys (≥ 12% silicon)	Cristall	Cristall	-
	-	-	-
	-	-	-
Nickel based alloys (i.e. Inconel)	nanoA	nanoA	Fire
	Signum	Signum	-
	Fire	Fire	-
Titanium / titanium alloys	Zenit	Zenit	Fire
	nanoA	nanoA	-
Copper / bronze / brass	ICE	ICE	TiN
	Carbo	Carbo	-
Cobalt chrome alloys	nanoA	nanoA	-
	Signum	Signum	-
	Fire	Fire	-
Precious metals	nanoA	nanoA	-
Ceramic	Cristall	Cristall	-
Plastics, non-reinforced	Carbo	-	-
Plastics, fibre-reinforced	Cristall	Cristall	-
	Signum	Signum	-

Note:

The overview shows the general application recommendations for Gühring coatings. Prioritisation is from top to bottom.



Centring and pilot drilling

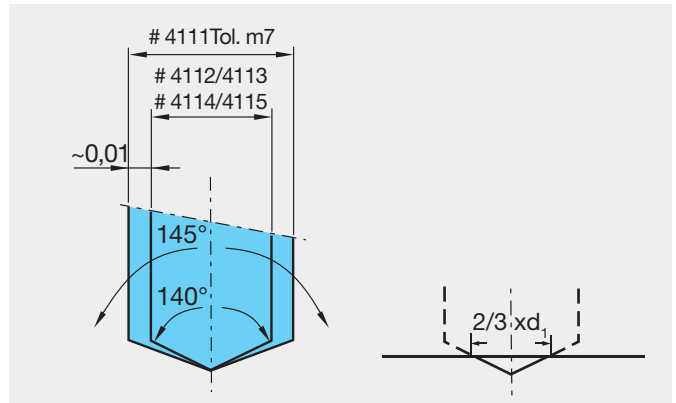
Centring and pilot drilling for HT 800

Generally we recommend centring/pilot drilling for HT 800 with drilling depths above $5xD$.

When centring, the drilling diameter should be approximately $2/3$ of the hole diameter to be produced.

With pilot drilling we recommend a drilling depth of $1xD$. In addition, the point angle as well as the diameter of the pilot drill should be larger than the point angle and the diameter of the following drill.

To ensure this, we recommend the application of the adapted pilot drilling inserts art. no 4111 with 145° point angle and m7 diameter tolerance in an extra short, rigid holder art. no. 4105.



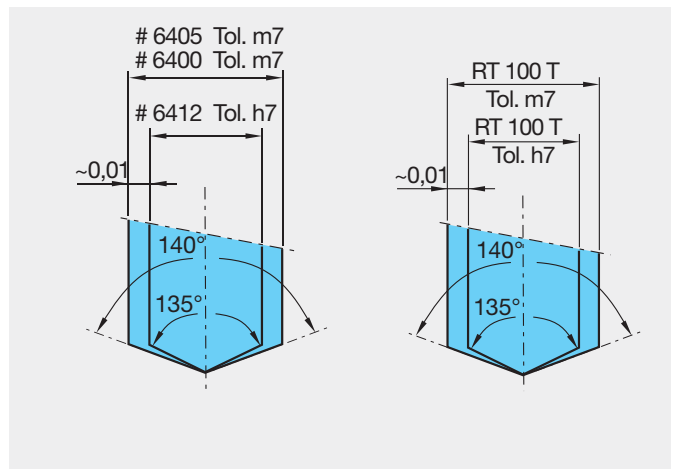
Centring and pilot drilling for solid carbide

When applying solid carbide drills for drilling depths $7xD$ to $12xD$ we recommend centring or the production of a pilot hole with a depth of $1xD$ to $2xD$.

With drilling depths larger than $12xD$ a pilot hole with a depth of $1xD$ to $2xD$ is imperative.

With pilot drilling for the Exclusive Line micro-precision drill with $15xD$ (art. no. 6412) we recommend the application of Exclusive Line micro-precision drill $4xD$ without internal cooling (art. no. 6400) or $5xD$ with internal cooling (art. no. 6405), as they are optimally adapted regarding point angle and diameter tolerance.

When pilot drilling for deep hole drills eg. type RT100T, a Ratio drill type RT100U with internal cooling, $3xD$ (e.g. art. no. 2477) can be applied, as it is optimally suited regarding point angle and diameter tolerance.



Centring and pilot drilling for HSS

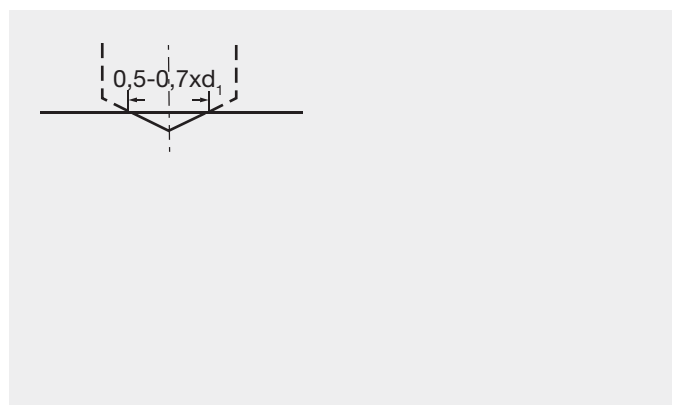
Centring with drill lengths to DIN 340

When using long series drills (DIN340) in HSS/HSCO, we recommend spot drilling with a spotting diameter of 0.5 to $0.7xD$ (D = drill diameter). HSS NC spotting drills are optimally suited for this process. Detailed information regarding NC spotting drills can be found in the NC spot drilling section.

Pilot drilling with drill lengths to DIN 1869

When applying extra length HSS/HSCO drills to DIN 1869 we recommend the production of a pilot hole with a depth of $1xD$ to $2xD$.

Stub drills type GV 120 to DIN 1897 are optimally suited.





NC spotting drills

NC spotting drills

When producing accurately positioned holes, holes with close diameter tolerances, deep holes or generally with unfavourably shaped workpieces (round, rough. etc.) it's recommended to use a NC spotting drill. This ensures the following drill, drills accurately and prevents the drill from running off.

NC spotting drills can also be used to produce chamfers or countersinks (when using a spot drill with a larger diameter than the actual hole) and centring in one operation.

NC spotting drills are designed with a very short flute length and without body clearance to ensure a very rigid design and therefore accurately positioned spotting. Due to the design, NC spot drills are only suitable for spotting, drilling depths must not exceed the length of the point geometry.

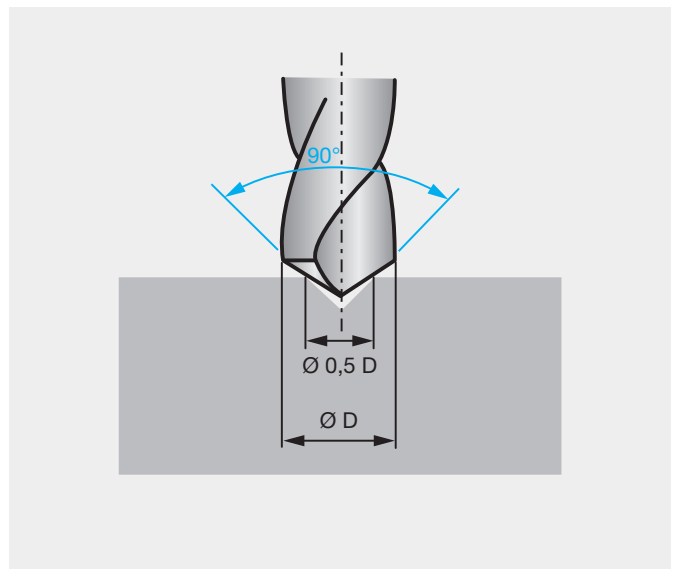
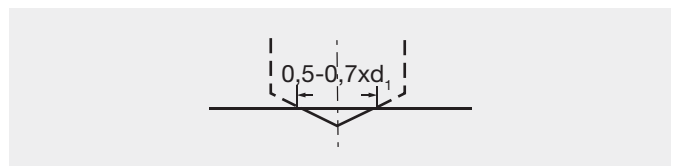
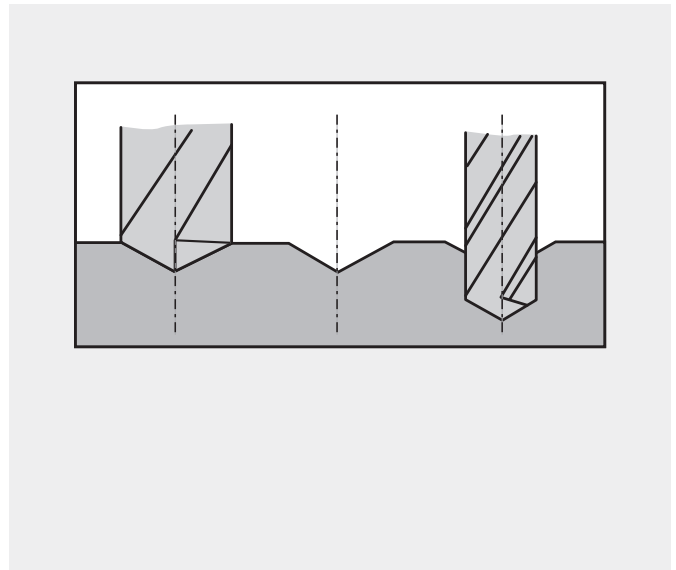
Selecting an NC spotting drill

Ideally, the spotting diameter should be chosen between 0.5 to $0.7 \times D$.

90° NC spotting drills

NC spotting drills with a 90° point angle are ideally suited for spotting if the following HSS/HSCO drills have a relatively large chisel edge. This ensures that the following HSS/HSCO drill drills with the cutting lip first and is guided by the most stable points of the cutting edge.

In addition, NC spotting drills with a 90° point angle are used to produce a 90° countersink and centre in one operation if the spotting diameter is larger than the actual hole diameter.

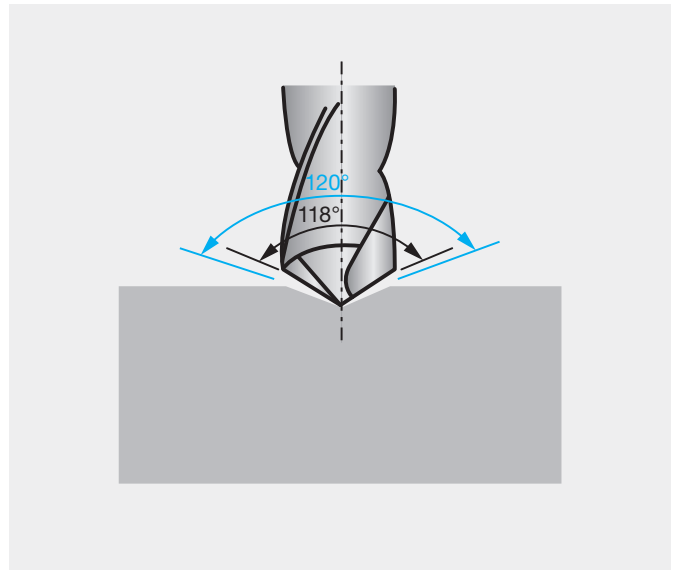




NC spotting drills

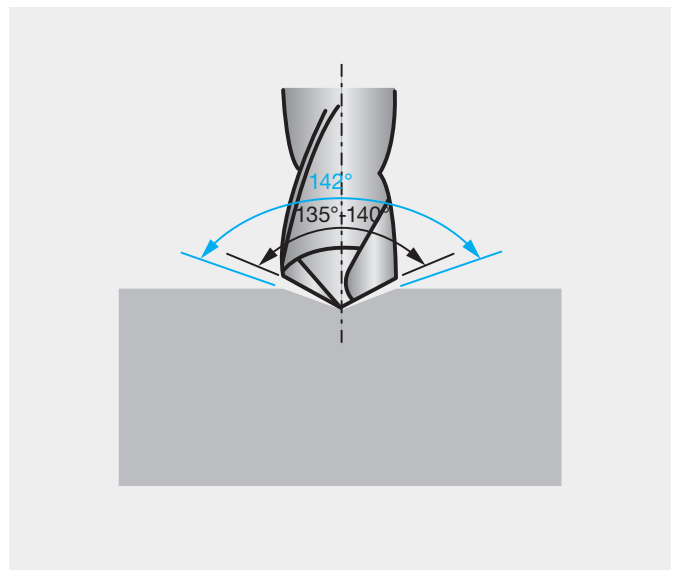
120° NC-spotting drills

NC-spotting drills with a 120° point angle are specially suited for spotting operations if the actual hole is subsequently produced with HSS/HSCO drills with a 118° point angle. This ensures the following HSS/HSCO drill spots with the point first and is well guided.






142° NC-spotting drills

NC-spotting drills with 142° point angle are specially suited for spotting operations if the actual hole is subsequently produced with carbide drills with a 135° - 140° point angle. This ensures the following carbide drill spots with the point first, centers and is well guided. If the cutting corners of the carbide drill meet the material to be machined before the point, there is the risk of corner crumbling with carbide drills.



NC spotting drills

90°	120°	142°
		



Coolant pressure and volumes Ratio drills

The illustrated optimum, good and minimum required coolant volume apply only to spiral-fluted Ratio drills type RT 100. In contrast to the pressure, which is a feature of the machine tool; the cooling system fitted to it and also the possibility of leakage, volume does not depend on the machine (fig. 1). The pressure figures given are therefore recommendations which serve only as guidelines. Ratio drills type RT 80 with central coolant duct are subject to different standards (fig. 2). The diagrams shown are for Ratio drills in their most important application, machining of steel. But they are also guidelines for the machining of other materials, primarily because the highest coolant pressures are constantly required for the machining of steel. The effects of cooling using straight-fluted Ratio drills type RT 150 is particularly sensitive and is clearly demonstrated in the examples for particular workpiece materials. For example, the loss in tool life through low pressures when machining grey cast iron is considerably higher than when machining AISi

alloys. But this is only the case when the AISi alloy is short-chipping! The absolute necessary minimum pressure or good pressure should, when machining cast iron, be generally a little higher than for AISi machining (figures 3 and 4).

The recommended values are to be used only for drilling depths of up to approx. 5 x D. Deeper holes should be produced with tools having internal coolant ducts, as for example RT 150 GN, otherwise the production of deeper holes (depending on the material) becomes uneconomical.

Required coolant pressures
 optimum pressure
 good pressure
 minimum pressure

Required coolant volumes
 optimum volume
 good volume
 minimum volume

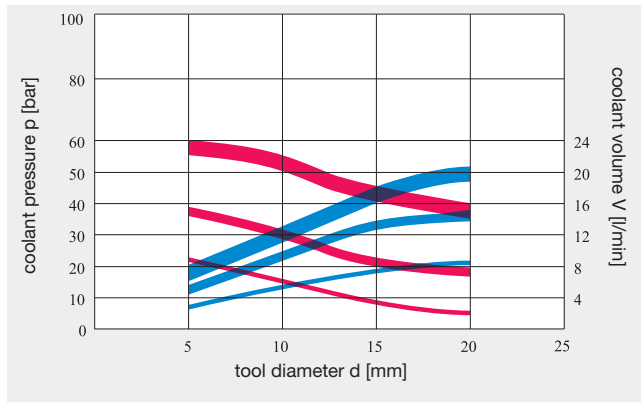


fig. 1: Required coolant pressures and volumes for RT 100 Ratio drills with internal spiral coolant ducts.

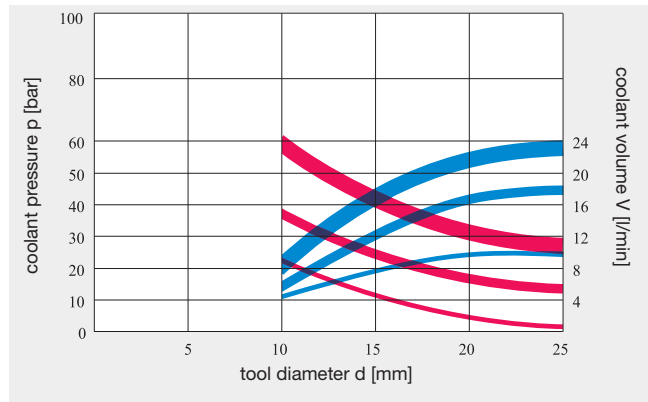


fig. 2: Required coolant pressures and volumes for RT 80 Ratio drills with central internal coolant duct.

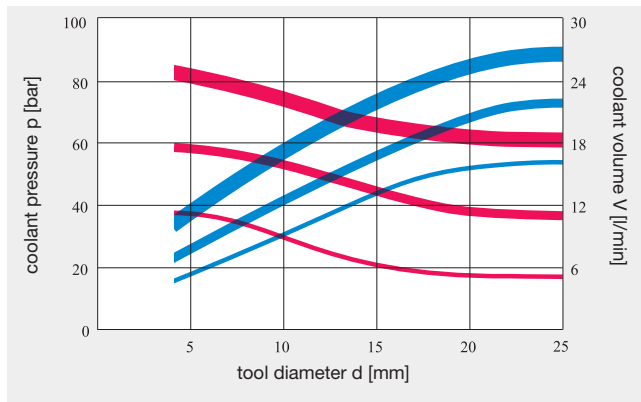


fig. 3: Required coolant pressures and volumes for straight-fluted Ratio drill type 150 GG when machining cast iron.

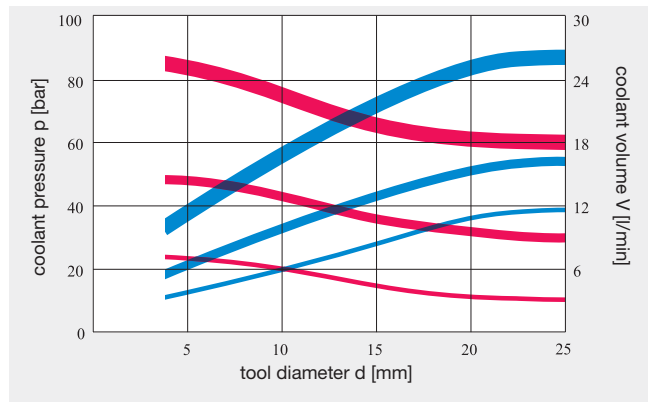


fig. 4: Required coolant pressures and volumes for straight-fluted Ratio drill type 150 GG when machining AISi7.

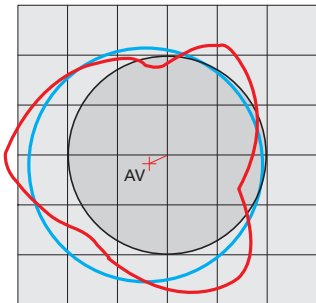


Typical hole quality characteristics

1. in 42CrMo4V, Ø 14.5 mm

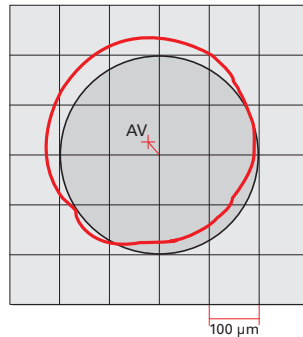
HSS drills, type N
Gühring no. 651 **S**

vc = 25 m/min
f = 0.25 mm/rev.
+Rmax = 131.8 µm
-Rmax = -49.1 µm
actual D = 14.566 mm
dRmax = 103.5 µm
AV = 49.2 µm
Ra = 2.6 µm, Rz = 6.8 µm **IT12**



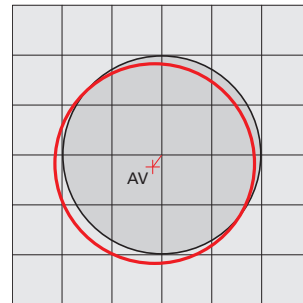
Ratio drills, type RT 80
Gühring no. 1171 **S**

vc = 70 m/min
f = 0.25 mm/rev.
+Rmax = 42.7 µm
-Rmax = -29.6 µm
actual D = 14.515 mm
dRmax = 12.9 µm
AV = 35.3 µm
Ra = 1.4 µm, Rz = 4.31 µm **IT9**



Ratio drills, type RT 100
Gühring no. 1181 **S**

vc = 70 m/min
f = 0.25 mm/rev.
+Rmax = 26.7 µm
-Rmax = -17.2 µm
actual D = 14.509 mm
dRmax = 5.2 µm
AV = 22.8 µm
Ra = 1.04 µm, Rz = 3.2 µm **IT8**



The overall total of the maximum positive and negative deviations is the sum of the total run-out in relation to the black circle as measured on standard instruments (dRmax). The red lines at the hole centres indicate the direction and amplitude of the displacements AV (Axis Shifting) of the produced hole from the true centre point. The parameter showing the largest deviation is decisive for the IT quality class of the hole in relation to the tool diameter.

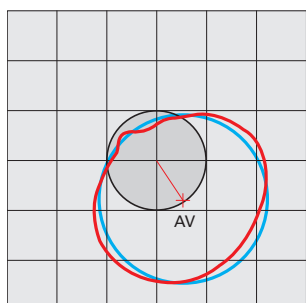
The black circle in the diagram represents the nominal hole diameter which the tool should ideally produce. The red circle indicates the form actually produced.

The mean value of the radius of the red circle, i.e. the average diameter, is shown by the blue circle. (with our Ratio drills the average diameter is practically identical to the actual diameter produced).

2. in GGG40, Ø 10.0 mm

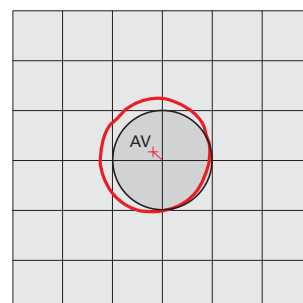
HSS drills, type N
Gühring no. 651 **S**

vc = 30 m/min
f = 0.2 mm/rev.
actual D = 10.077 mm
+Rmax = 106 µm
-Rmax = -28 µm
dRmax = 42 µm
AV = 68.5 µm
Ra = 3.7 µm, Rz = 17.2 µm **IT12**



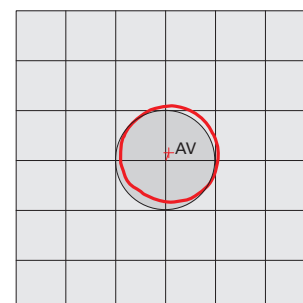
Ratio drills, type RT 100
Gühring no. 1181 **S**

vc = 90 m/min
f = 0.3 mm/rev.
actual D = 10.027 mm
+Rmax = 34 µm
-Rmax = -9.2 µm
dRmax = 6.5 µm
AV = 22.5 µm
Ra = 2.2 µm, Rz = 11.5 µm **IT9**



Ratio drills, type RT 150 GG
Gühring no. 768 **O**

vc = 130 m/min
f = 0.2 mm/rev.
actual D = 9.994 mm
+Rmax = 11.5 µm
-Rmax = -18 µm
dRmax = 5 µm
AV = 14 µm
Ra = 1.99 µm, Rz = 11.2 µm **IT8**





A brief introduction to the subject of deep hole gun drilling

In the machining world, drilling depths of $10xD$ and deeper are regarded as deep hole drilling operations, whereby smaller drilling depths can naturally also be produced with gun drills. Advantage is taken of the positive side effects, as for example good surface quality, low deviation from concentricity and optimised alignment accuracy..

High pressure cooling - has become a matter of course.

In recent years, internal cooling has established itself for all drilling tools. Coolants are now living up to their name and being supplied via coolant ducts to where they are urgently required. Considerable improvements in tool life and less breakages have been achieved by this measure for twist drills, taps etc.

Every conventional machine tool currently on the market can be supplied with high pressure internal cooling and is therefore also suitable for deep hole drilling.

The share of gun drills on machining centres, lathes etc. is forever gaining more importance. The process is therefore increasing in popularity in the machining world.



**All gun drills must have support for the pilot hole.
Gun drills must never operate at full speed without support in the machine shop.**

Attention!

Gun drills with steel shanks are predominantly NOT suitable for shrink fitting! (exception T16 see next page)

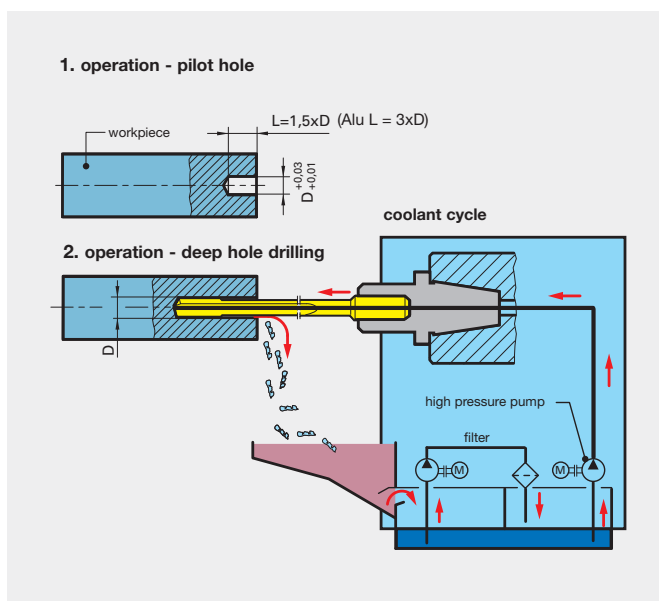
Typical procedure with all gun drills on conventional machine tools

- production of pilot hole ($L \approx 3xD$, tolerance H8)
- enter at low revolutions, approx. 200 rev./min, feed rate approx. 500 mm/min. With tools for drilling depths in excess than $40xD$ enter the pilot hole revolving in left hand direction.
- setting of coolant pressure and revolutions
- uninterrupted drilling to required drilling depth without wood pecking. When applying gun drills with increased length-diameter-ratio, we recommend machining with reduced cutting parameters (approx. 75% of the optimal cutting speed) up to a drilling depth of approx. 25 mm.
- switching off coolant supply after reaching the required hole depth
- withdrawal in top gear (max. 10 m/min) with stationary spindle

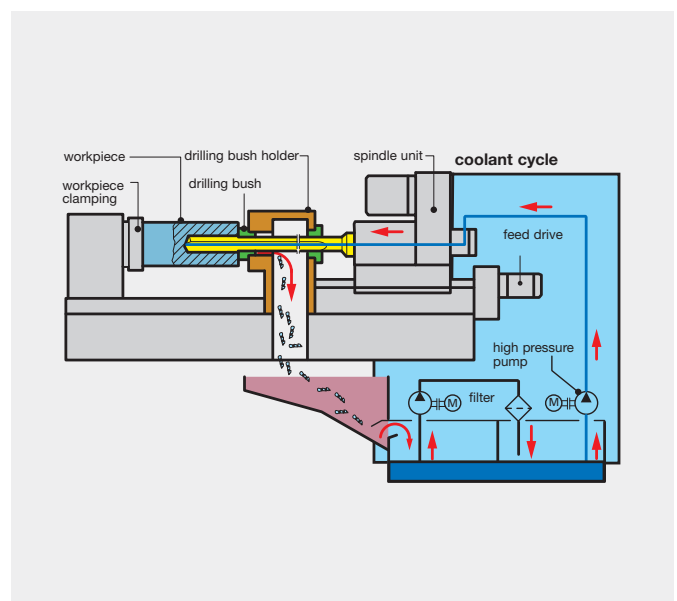
Application advice

- For drilling depths in excess than $40xD$ we recommend the use of two or more gun drills, e. g. $\varnothing 10 \times 400$ mm and $\varnothing 9.95 \times 800$ mm.
- Gun drills for drilling depths of more than $40xD$ should enter the pilot hole revolving in the left hand direction.
- When changing tools for drilling depths of more than $40xD$, the tool can be damped by switching on coolant supply for just one second.
- Generally we recommend the use of soluble oil with a minimum oil content of 10 %.
- Single-fluted gun drills for long-chipping aluminium should be supplied with point grind 180° and coolant chamber.
- For optimized bore straightness an additional cylindrical guide part can be used (optional).

Deep hole drilling on conventional machine tools



Deep hole drilling machines





The range of drivers introduced below is available ex stock. However, it only represents a small selection of drivers from our complete range. We naturally also produce individual drivers of

the highest precision to customer drawings. Attention! EB 100 requires drivers with positioning lugs. Further information on request.

Drivers for deep drilling machines

1

code no.	d ₁	l ₁	l ₂	l ₃
1.1	10	40	24	-
1.2	10	40	24	45
1.3	10	40	24	55
1.4	16	45	31,2	-
1.5	25	70	34	-
1.6	25	70	34	78

5

code no.	d ₁	l ₁	l ₂
5.1	10	60	20
5.2	16	80	28
5.3	25	100	50
5.4	10	100	-
5.5	10	110	-

2

code no.	d ₁	l ₁	l ₂	l ₃
2.1	16	50	47	-
2.2	16	50	47	55
2.3	16	50	47	70

6

code no.	d ₁	l ₁
6.1	12,7	38
6.2	19,05	70
6.3	38,1	70

3

code no.	d ₁	l ₁	l ₂	l ₃
3.1	25	70	34	100

7

code no.	d ₁	l ₁	l ₂
7.1	16	112	73
7.2	20	126	82

4

code no.	d ₁	l ₁
4.1	19,05	70
4.2	12,70	70
4.3	25,40	70
4.4	31,75	-
4.5	36,10	70

Drivers to DIN 1835

form E

9

code no.	d ₁	l ₁
9.1	8	36
9.2	10	40
9.3	12	45
9.4	16	48
9.5	20	50
9.6	25	56
9.7	32	60
9.8	31,75	70
9.9	38,1	70
9.10	40	70

Drivers to DIN 6535

form HA

10

code no.	d ₁	l ₁
10.1	8	36
10.2	10	40
10.3	12	45
10.4	16	48
10.5	20	50
10.6	25	56
10.7	32	60
10.8	25	70
10.9	40	70

Drivers to VDI-draft

12

code no.	d ₁	l ₁
12.1	10	68
12.2	16	90
12.3	25	112

Drivers to DIN 6535

form HB

8

with code no. 8.6, 8.7, 8.8

code no.	d ₁	l ₁
8.1	8	36
8.2	10	40
8.3	12	45
8.4	16	48
8.5	20	50
8.6	25	56
8.7	32	60
8.8	40	70

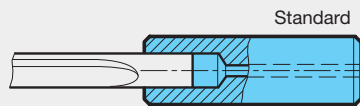
Drivers to Speed-Bit-System

13

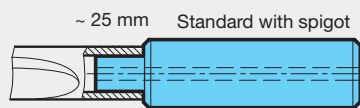
code no.	d ₁	l ₁	l ₂
13.1	16	40	16
13.2	25	50	25
13.2	35,6	60	-

Driver variations to suit gun drill tubes

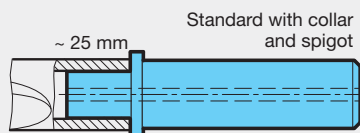
Solution for nom.-Ø < driver-Ø
(difference must be appr. 6 mm):
tube shank installed in driver



Solution for nom.-Ø ≠ driver-Ø
(close to parallel):
tube shank installed over spigot



Solution for nom.-Ø > driver-Ø:
tube shank installed over spigot,
inside-Ø of tube shank > driver-Ø,
tube shank fits against collar shoulder.



similar form HA (shrinkable)

16

code no.	d ₁	l ₁
16.1	10	50
16.2	16	64
16.3	20	70
16.4	25	81
16.5	32	92

similar form HE

17

code no.	d ₁	l ₁
17.1	19,05	70
17.2	25,40	70
17.3	31,75	70
17.4	38,1	70

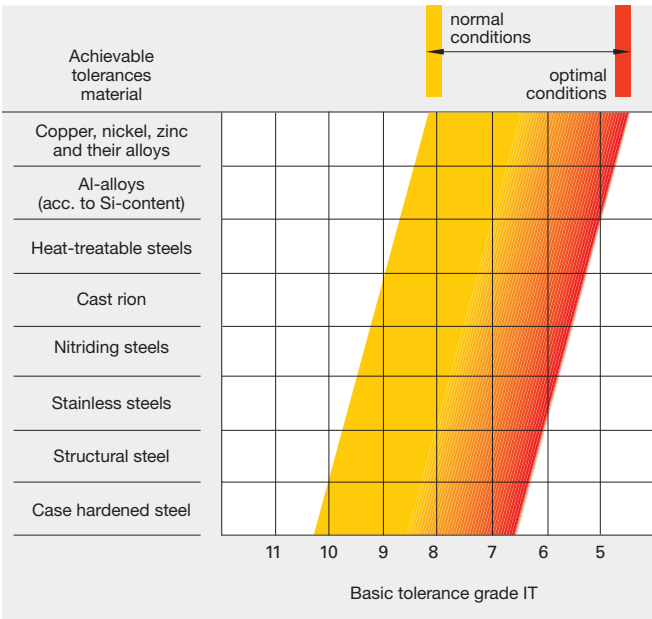
also be used for deep hole drilling machines



Single fluted gun drill accuracy

Basic tolerances*

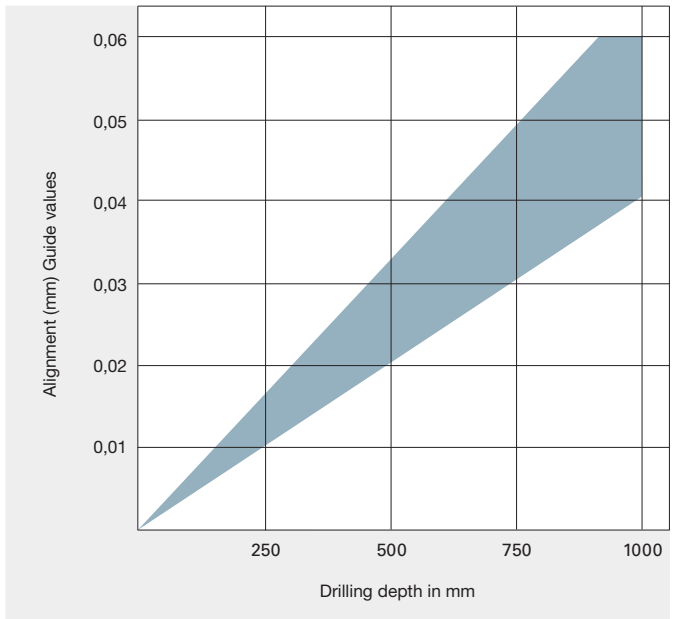
The application of single-fluted gun drills can achieve a lower basic tolerance, as the cutting forces at the cutting edge are absorbed by the supporting strips, unlike twist drills where the slightest deviation of the two cutting edges causes a larger hole.



Alignment accuracy*

Because brazed single-fluted gun drills always have the precision carbide head brazed on to a flexible tube, the tool achieves very accurate aligned holes remaining unaffected by possible concentricity errors.

However, extreme material fluctuations and other influencing factors can impair the alignment accuracy.

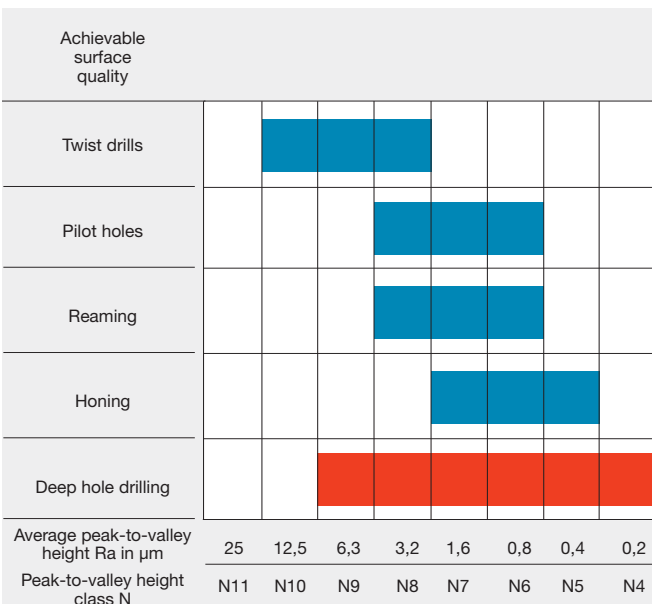


Surface quality*

The forces at the cutting edge are absorbed by the support bushes, which in return burnishes the surface.

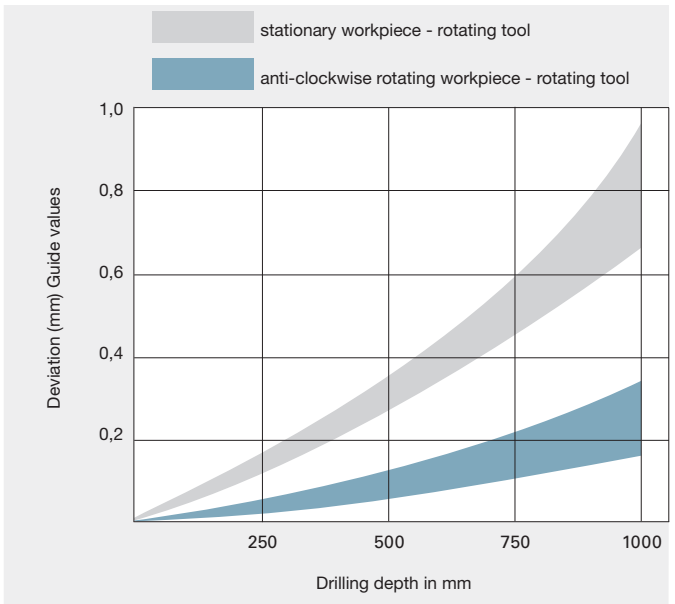
Lubrication between the supporting strips and hole surface is therefore very important.

The better the lubricant, the better the surface quality.



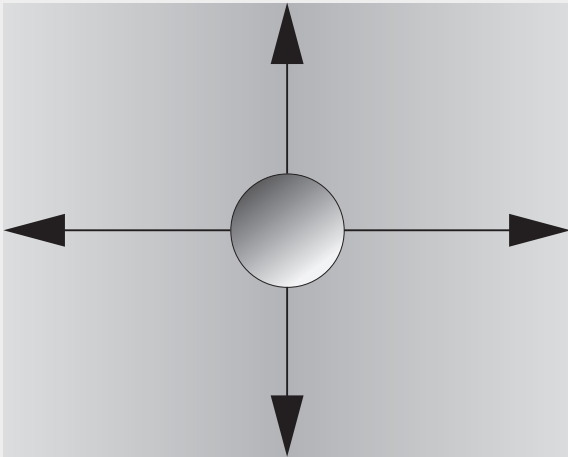
Deviation from concentricity*

When a hole is produced with, for example, a commercial twist drill, the quality of the point grind affects the concentricity of the hole. An imbalance of forces is created at the cutting edges. With gun drills, these cutting forces are absorbed by the supporting strips, resulting in excellent concentricity.

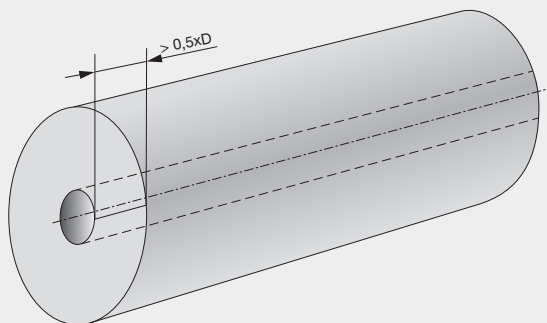


* gun drills with two cutting edges – straight-fluted as well as spiral-fluted – achieve approx. twice of the values stated

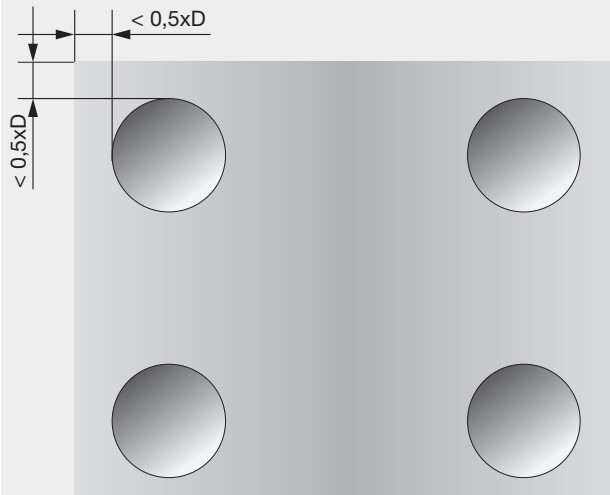
Hole straightness/deviation



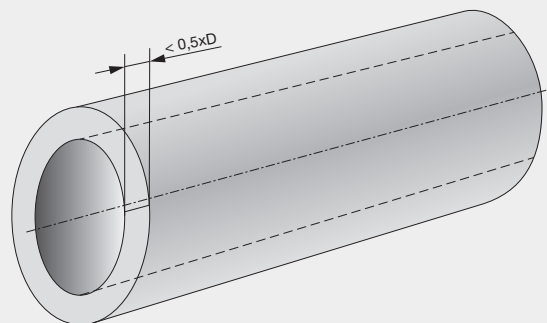
Hole distance to edge $> 0.5xD$



sufficient wall distance
($> 0.5xD$) > optimal



Hole distance to edge $< 0.5xD$



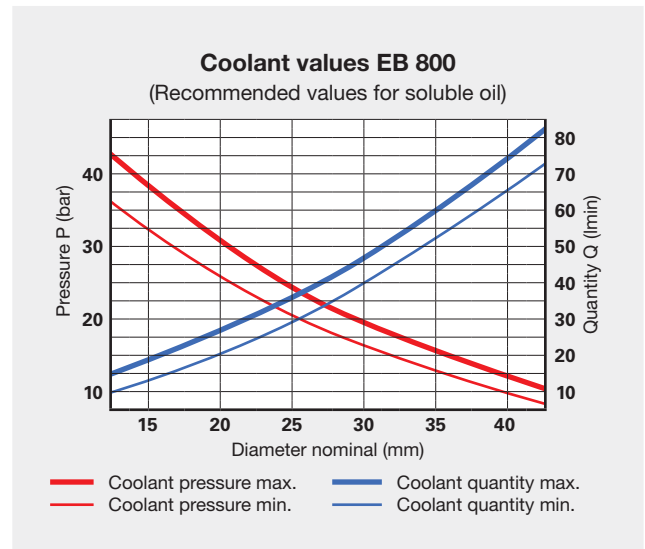
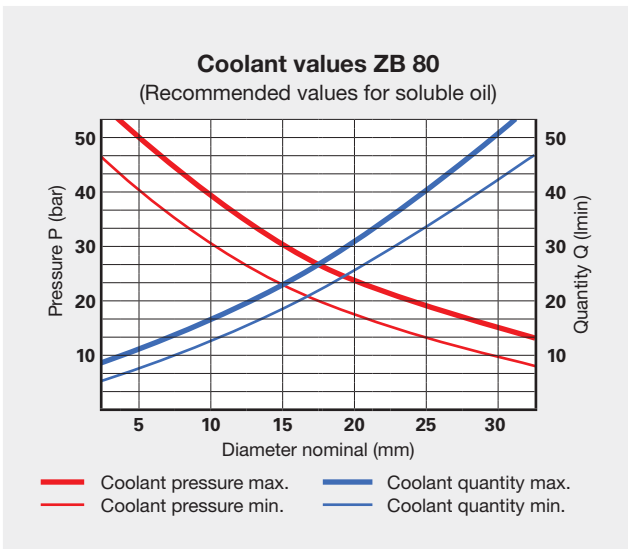
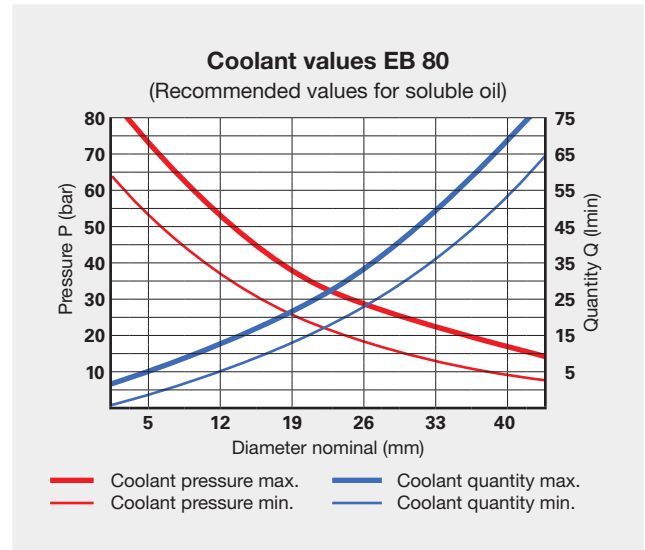
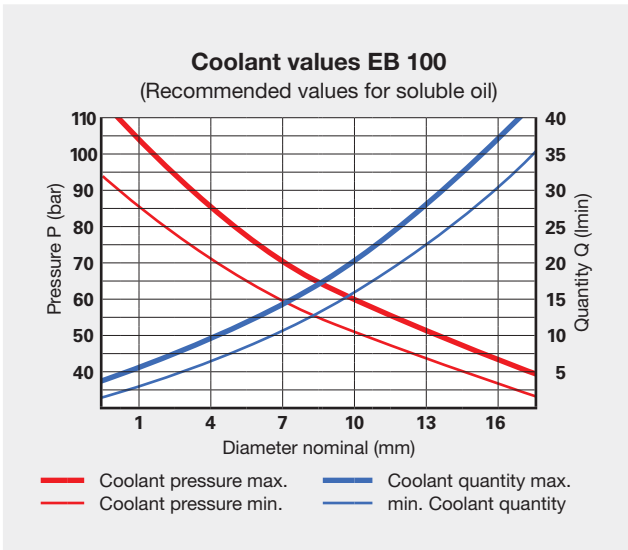
Minimum distance ($0.5xD$)
falling short → can lead to losses
in hole straightnes



Coolant values

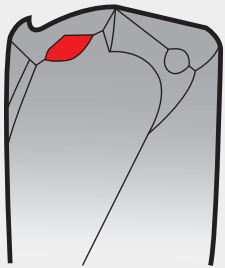
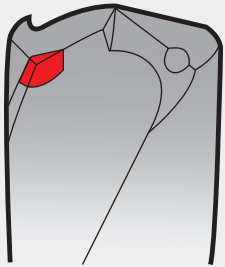
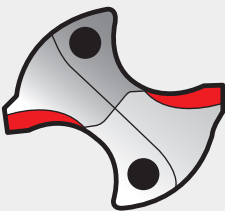
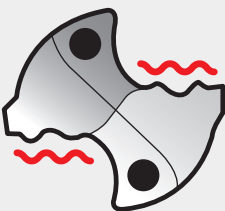
Please note:

- All gun drills must be applied with internal cooling, either air, water or oil. Without internal cooling the chips cannot be evacuated.
- All gun drills can be applied with oil as the medium for internal cooling. However, in this case a 30% higher pressure is required in order to achieve the same coolant volume.
- When MQL is applied with gun drills an increase in pressure may be necessary for smaller nominal diameters dependent on the pressure of the MQL system.
- If the cooling lubricant data is insufficient the cutting parameters may be reduced. Pressure boosting systems are also possible.
- With increased gun drill length a pressure increase has to be expected to transport the required coolant volume through the coolant ducts.



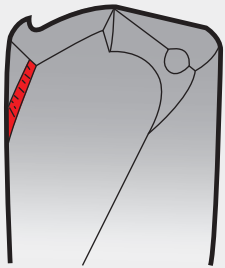
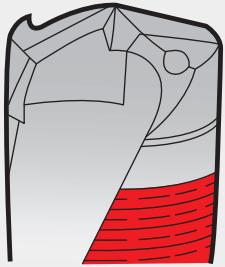
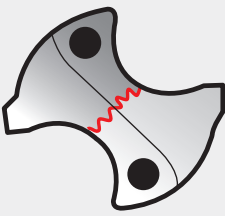
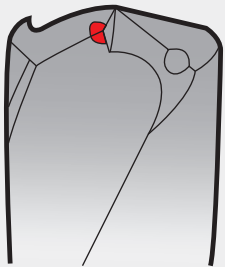


Application/Troubleshooting

Problem	Cause	Remedy
1. Cutting edge build up 	<ul style="list-style-type: none"> ■ low cutting speed ■ excessive honing of cutting lip ■ bright finish cutting lip 	<ul style="list-style-type: none"> ■ increase cutting speed ■ reduce cutting lip honing ■ have tool coated
2. Crumbling of outer corners 	<ul style="list-style-type: none"> ■ non rigid conditions, insufficient workpiece clamping ■ deviation from concentricity too large ■ interrupted cut 	<ul style="list-style-type: none"> ■ rigid clamping of workpiece ■ check and correct concentricity if possible ■ reduce feed
3. Heavy wear at flank 	<ul style="list-style-type: none"> ■ cutting speed too high ■ feed too low ■ clearance angle too small 	<ul style="list-style-type: none"> ■ reduce cutting speed ■ increase feed ■ increase clearance angle
4. Crumbling on cutting lips 	<ul style="list-style-type: none"> ■ non rigid conditions, insufficient workpiece clamping ■ interrupted cut ■ max. wear values exceeded ■ incorrect tool type 	<ul style="list-style-type: none"> ■ rigid clamping of workpiece ■ reduce feed ■ reduce tool change intervals ■ apply suitable tool)

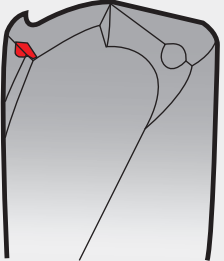
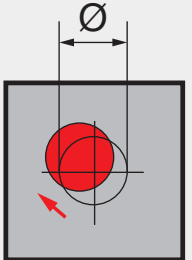
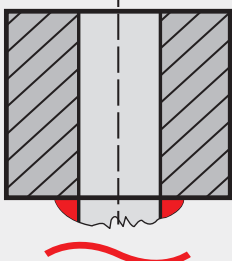
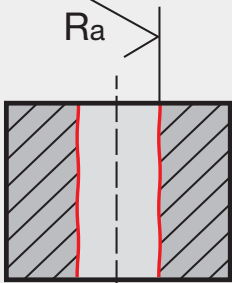


Application/Troubleshooting

Problem	Cause	Remedy
5. Land wear 	<ul style="list-style-type: none"> ■ non rigid conditions, insufficient workpiece clamping ■ deviation from concentricity too large ■ back taper too small ■ incorrect coolant (oil), coolant too weak 	<ul style="list-style-type: none"> ■ rigid clamping of workpiece ■ check and correct concentricity if possible ■ reduce tool change intervals ■ increase strength of coolant or use neat oil
6. Scoring on tool body 	<ul style="list-style-type: none"> ■ non rigid conditions, insufficient workpiece clamping ■ deviation from concentricity too large ■ interrupted cut ■ abrasive workpiece material 	<ul style="list-style-type: none"> ■ rigid clamping of workpiece ■ check and correct concentricity if possible ■ increase back taper ■ increase strength of coolant or use neat oil
7. Heavy chisel edge wear 	<ul style="list-style-type: none"> ■ cutting speed too low ■ feed too high ■ excessive honing of cutting lip 	<ul style="list-style-type: none"> ■ increase cutting speed ■ reduce feed ■ reduce cutting lip honing
8. Crumbling at intersection, web thinning and cutting lip 	<ul style="list-style-type: none"> ■ clearance angle too small ■ excessive honing of cutting lip ■ incorrect tool type 	<ul style="list-style-type: none"> ■ increase clearance angle ■ reduce cutting lip honing ■ apply suitable tool



Application/Troubleshooting

Problem	Cause	Remedy
9. Plastic deformation of outer corner 	<ul style="list-style-type: none"> ■ cutting speed too high ■ insufficient coolant volume ■ incorrect or no honing at corner 	<ul style="list-style-type: none"> ■ reduce cutting speed ■ increase volume/pressure ■ correct honing
10. Misalignment 	<ul style="list-style-type: none"> ■ non rigid conditions, insufficient workpiece clamping ■ deviation from concentricity too large ■ spotting area transverse ■ chisel edge too large 	<ul style="list-style-type: none"> ■ rigid clamping of workpiece ■ check and correct concentricity if possible ■ use milling cutter (2-fluted) for spotting ■ reduce chisel edge
11. Heavy burring on breakthrough 	<ul style="list-style-type: none"> ■ feed too high ■ max. wear values exceeded ■ excessive honing of cutting lip 	<ul style="list-style-type: none"> ■ reduce feed ■ reduce tool change intervals ■ reduce cutting lip honing
12. Unsatisfactory surface quality 	<ul style="list-style-type: none"> ■ non rigid conditions, insufficient workpiece clamping ■ deviation from concentricity too large ■ insufficient coolant volume 	<ul style="list-style-type: none"> ■ rigid clamping of workpiece ■ check and correct concentricity if possible ■ increase volume/pressure



High speed steels

We only produce tools in the highest quality, carefully selected high speed grades. Depending on the alloying component, the tools have specific properties suited to the application case:

Tungsten, molybdenum: Increases the temper resistance and the wear resistance.

Vanadium: Increases the wear resistance.

Cobalt: Increases the wear resistance, increases the thermal hardness.

Gühring description	Type	Field of application, properties
HSS	Conventional high speed steel	Standard tool material for universal applications
HSCO / HSS-E	Cobalt-alloyed high speed steel	Tool material with high thermal hardness for increased demands, especially suitable for higher machining temperatures or unfavourable cooling.
M42	8% cobalt-alloyed high speed steel	Tool material with increased thermal resistance and hardness, suitable for machining difficult-to-machine materials.
HSS-E		
HSS-E-PM	Powder metallurgically produced cobalt-alloyed high speed steel	Tool material with a very dense and uniform structure. High hardness and thermal resistance, high wear resistance and cutting edge stability.



The most important carbide grades for Guhring tools

The following table lists the most important carbides that are available from Guhring ex-stock for general applications. Further carbide grades are available on request and detailed information can be found at www.guehring-carbide.de

In more than 80% of applications known to Guhring, the results of DK460UF carbide grade tools together with a specially adapted coating could not be surpassed by any other carbide grades, including coated tools. This and the availability of the material ex-stock simplify tool selection immensely. For further information regarding the application of other carbide grades please contact our technical engineers.

Grade	Co-content [M-%]	Tungsten carbide grain size [µm]	Hardness [HV]	ISO classification [ISO 513]	Characteristics
DK460UF K40UF	10	0,6	1620	K20-K40	A carbide grade with wide range of application possibilities. It is applied, mostly coated, for the machining of steel, soft Al alloys, cast iron as well as "super alloys" such as Inconel 718. This grade is the backbone of our carbide production.
DK500UF K44UF	12	0,5	1690	K20-K30	The grade has been especially developed for hard machining. It possesses a higher hardness and deformation tolerance in comparison to DK460UF. Due to the high Co-content, a coated application is strongly recommended.
DK255F	8	0,7	1720	K20	The grade is recommended for hard machining, the machining of high tensile grey cast iron and hard AlSi-alloys. Dry machining is possible. A coated application is preferable.
DK120	6	1,3	1620	K15-K20	The grade is especially suitable for the application with diamond coating.
DK120UF	7	0,7	1850	K05-K10	Ultra fine grain type offering extreme wear resistance, suitable for absolutely rigid machines, preferred for reamers.
K55SF	9	0,2-0,4	1920	K05-K10	For application with high wear resistant materials, stainless steels, composite materials such as Kevlar and GRP, high speed machining and dry machining.
DK400N	10	0,7	1580	K20-K40	An extremely tough grade for the machining of high heat resistant metals.
DK256EH	10	0,6	1750	K20	The grade is especially suitable for the machining of nickel-based alloys.
K6UF	6	0,6	1870	K05-K10	Ultra fine grain type offering extreme wear resistance. Especially suitable for application with high wear resistant materials, composite materials, GRP and Kevlar.
K5UF	5	0,5	2010	K05-K10	Newly developed extremely hard grade for drilling and reaming. Especially suitable for application with composite materials and GRP.



Superhard tool materials

It is not only the extreme hardness of superhard tool materials but also their high heat-resistance which enables highest cutting rates and increased productivity. PCD (Poly-Crystalline Diamond) stands for maximum wear resistance. PCD's main field of application is the machining of aluminium and fibre

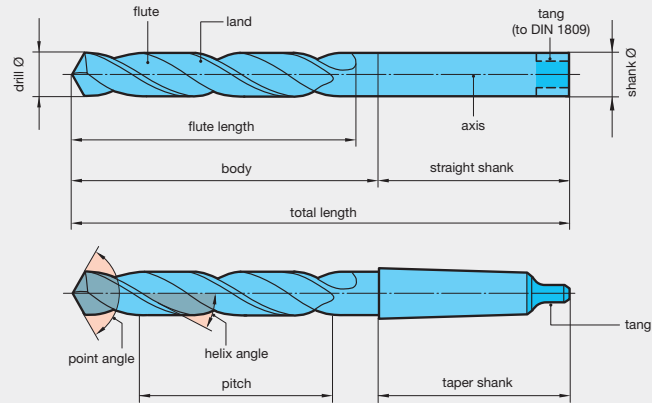
composites. PcBN (Polycrystalline cubic Boron Nitride) finds application in ferrous materials. To unfold the full potential of these tool materials, the application on the most rigid of machine tools is recommended

Gühring description	Classification	Range of application	Average grain size	Diamond content
PCD	Fine grain	Aluminium and AlSi-alloys <10%Si, magnesium alloys, brass, copper, bronze, excellent cutting edge quality, high abrasion resistance, excellent surface qualities.	2-4 µm	> 90% PCD
	Medium grain	Universal grade (general finishing applications) AlSi-alloys <14%Si, copper alloys, graphite and graphite composite materials, fibre composite plastics, unsintered ceramic and carbide (<15% binding metal content) excellent resistance, good surface qualities.	5-10 µm	approx. 92% PCD
	Coarse grain	Roughing applications AlSi-alloys >14%Si and other abrasive machining applications, MMC, sintered ceramic and carbide (<15% binding metal content, extreme abrasion resistance, high shock resistance, long tool life with acceptable surface quality.	>25 µm	approx. 94% PCD
	Mixed grain	Abrasive machining applications (i.e.: >14% AlSi-alloys, MMC, fibre composite plastics) highest wear resistance, excellent shock resistance, extreme abrasion resistance with good edge roughness, long tool life with good surface quality.	4 µm+ 25 µm	approx. 95% PCD
PcBN 10..	Low CBN-content with carbide base	For finish machining of case hardened, hardened heat-treatable and tool steels, suitable for continuous and medium to heavily interrupted cutting with ap smaller 0.3 mm. High wear resistance, resistance to impact, temperature resistance, toughness.	<1-4 µm	40-65% CBN
PcBN 20..	High CBN-content with carbide base	For the machining of perlitic grey cast iron (> 45 HRC), PM-steels, chilled cast iron. Application in continuous and interrupted cutting with ap of 0.5-1.5 mm. High wear resistance, resistance to impact.	2-3 µm	70-90% CBN
PcBN 30..	High CBN-content without carbide base	Massive PcBN tool material suitable for roughing operations. Perlitic grey cast iron, hard casting, hardened steels. For application in clamping holders, drilling and boring tools, milling heads with jaw clamping. High wear resistance, resistance to impact.	2-20 µm	70-87% CBN

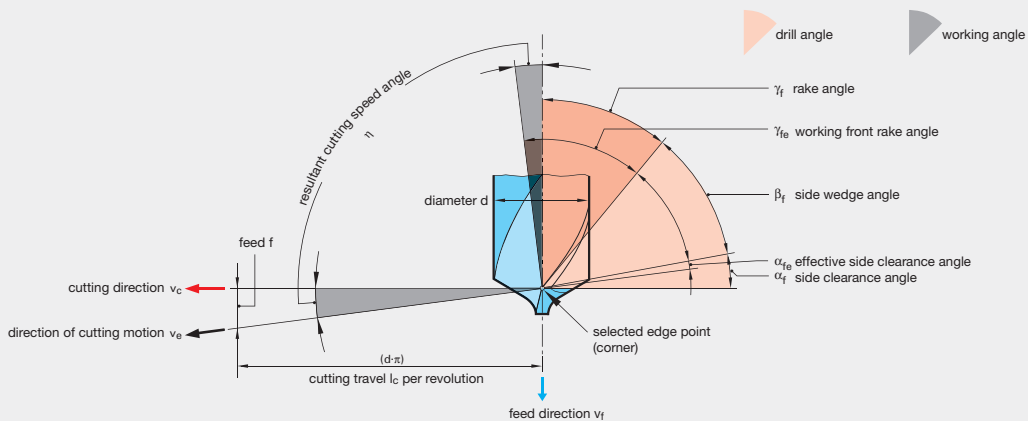
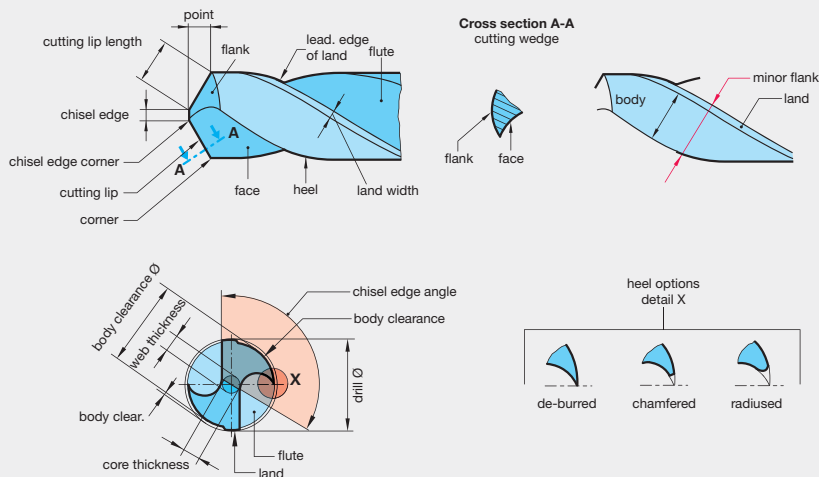


Definitions, dimensions and angles DIN ISO 5419 (extract; edition 06/98)

Twist drills with straight/Morse taper shank



Cutting portion

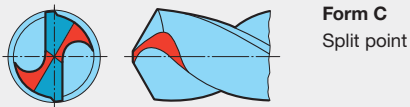
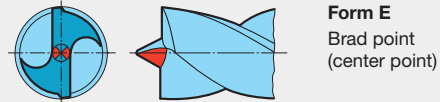
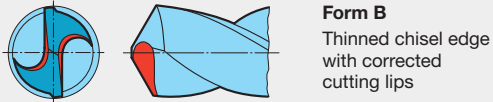
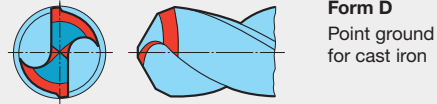
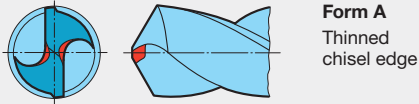


Technical section



Special point geometry and manufacturing tolerances

Special point geometry to DIN 1412 (extract; edition 03/01)



Twist drill manufacturing tolerances to DIN ISO 286, part 2

diameter (nominal size) up to and incl. mm	tolerance range μm	
	h8	h7
0.38 ... 0.60	10	7
0.95	12	8
3.00	14	10
6.00	18	12
10.00	22	15
18.00	27	18
30.00	33	21
50.00	39	25
80.00	46	30
120.00	54	35

* If you need tolerances other than ISO h8 please let us know. Additional charges for closer diameter tolerance see additional charges at the end of chapter Drilling Tools.

Reference to other relevant standards

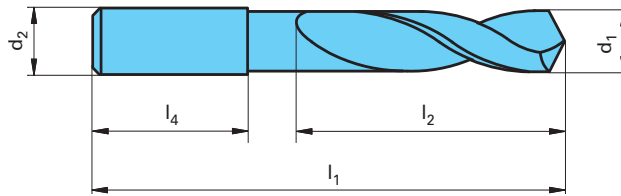
- DIN 228 Part 1 machine tapers; Morse tapers and metric tapers, taper shank
- DIN 1414-1 Directions for design and use for high speed steel twist drills
- DIN 6580 Definitions of the metal-cutting industry; motions and geometry of the cutting process
- DIN 6581 Definitions of the metal-cutting industry; Cutting portion reference systems and angles

The standard descriptions above are given with the permission from the German Standards Institute (Deutsches Institut für Normung). The most recent editions of the standard sheets apply and are available in DIN A 4 format from Beuth-Verlag GmbH, D-10787 Berlin.

Carbide twist drills (Ratio drills)

Carbide twist drills (Ratio drills) DIN 6537

Applies to solid carbide twist drills with 2 or 3 cutting edges and straight shank to DIN 6535

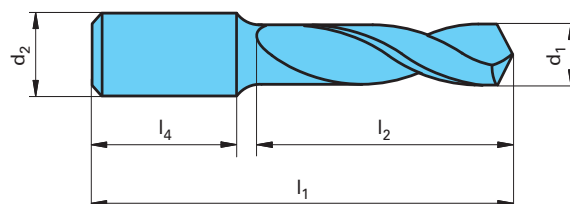


Dimensions in mm

nom. Ø-range up to d1m7	shank Ø d2h6	Ratio drills for 3 x D		Ratio drills for 5 x D		shank length l4
		overall length l1	max. flute length l2	overall length l1	max. flute length l2	
		2.9...3.75	6	62	20	
4.75	6	66	24	74	36	36
6.00	6	66	28	82	44	36
7.00	8	79	34	91	53	36
8.00	8	79	41	91	53	36
10.00	10	89	47	103	61	40
12.00	12	102	55	118	71	45
14.00	14	107	60	124	77	45
16.00	16	115	65	133	83	48
18.00	18	123	73	143	93	48
20.00	20	131	79	153	101	50

Carbide twist drills (Ratio drills) DIN 6538

Applies to twist drills with brazed carbide tip or head with reinforced straight shank (steel) to DIN 6535. The brazed head can be a part or the complete cutting portion.



Dimensions in mm

nom. Ø-range up to d1h7	shank Ø d2h6	Ratio drills for 3 x D		Ratio drills for 5 x D		Ratio drills for 7 x D		shank length l4
		overall length l1	max. flute length l2	overall length l1	max. flute length l2	overall length l1	max. flute length l2	
		9.5...12.0	16	103	51	127	75	
14.0	16	111	59	139	87	167	115	48
16.0	20	122	68	154	100	186	132	50
18.0	20	130	76	166	112	202	148	50
20.0	25	144	84	184	124	224	164	56
22.0	25	153	93	197	137	241	181	56
24.0	25	161	101	209	149	257	197	56
26.0	32	174	110	226	162	278	214	60
28.0	32	182	118	238	174	294	230	60
30.0	32	190	126	250	186	310	246	60

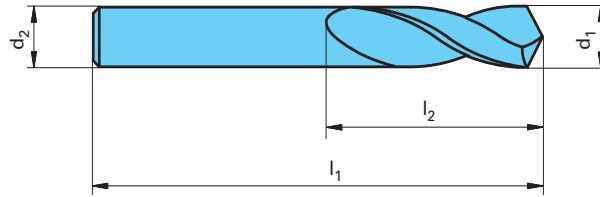
Technical section



Carbide twist drills (Ratio drills)

Carbide twist drills (Ratio drills) DIN 6539

Applies to solid carbide twist drills with parallel shank, i.e. equal nom. drill and shank diameter.



Dimensions in mm

nom. Ø-range up to (= shank Ø d2) d1	overall length		flute length	
	l1		l2	
1.90...2.12	38	12		
2.36	40	13		
2.65	43	14		
3.00	46	16		
3.35	49	18		
3.75	52	20		
4.25	55	22		
4.75	58	24		
5.30	62	26		
6.00	66	28		
6.70	70	31		
7.50	74	34		
8.00	79	37		
8.50	79	37		
9.50	84	40		

nom. Ø-range up to (= shank Ø d2) d1	overall length		flute length	
	l1		l2	
10.00	89	43		
10.60	89	43		
11.80	95	47		
12.00	102	51		
13.20	102	51		
14.00	107	54		
15.00	111	56		
16.00	115	58		
17.00	119	60		
18.00	123	62		
19.00	127	64		
20.00	131	66		

Straight shank twist drills

dia. to (incl.) mm	DIN 338		DIN 339		DIN 340		DIN 1897		DIN 1869 Extra length twist drills					
	total length mm	flute length mm	total length mm	flute length mm	total length mm	flute length mm	total length mm	flute length mm	series 1		series 2		series 3	
									total length mm	flute length mm	total length mm	flute length mm	total length mm	flute length mm
≤ 0.24	19	2.5					19	1.5						
0.30	19	3					19	1.5						
0.38	19	4					19	2						
0.48	20	5			30*	10*	19	2.5						
0.53	22	6			32*	12*	20	3						
0.60	24	7	32*	15*	35*	15*	21	3.5						
0.67	26	8	36*	18*	38*	18*	22	4						
0.75	28	9	39*	20*	42*	21*	23	4.5						
0.85	30	10	42*	22*	46*	25*	24	5						
0.95	32	11	45*	24*	51*	29*	25	5.5						
1.06	34	12	48	26	56	33	26	6						
1.18	36	14	50	28	60	37	28	7						
1.32	38	16	52	30	65	41	30	8						
1.50	40	18	55	33	70	45	32	9						
1.70	43	20	58	35	76	50	34	10	115*	75*				
1.90	46	22	62	38	80	53	36	11	120*	80*				
2.12	49	24	66	41	85	56	38	12	125	85	160*	110*	205*	135*
2.36	53	27	70	44	90	59	40	13	135	90	170*	115*	215*	145*
2.65	57	30	74	47	95	62	43	14	140	95	180*	120*	225*	150*
3.00	61	33	79	51	100	66	46	16	150	100	190	130	240*	160*
3.35	65	36	84	55	106	69	49	18	155	105	200	135	250*	170*
3.75	70	39	91	60	112	73	52	20	165	115	210	145	265	180
4.25	75	43	96	64	119	78	55	22	175	120	220	150	280	190
4.75	80	47	102	69	126	82	58	24	185	125	235	160	295	200
5.30	86	52	108	74	132	87	62	26	195	135	245	170	315	210
6.00	93	57	116	80	139	91	66	28	205	140	260	180	330	225
6.70	101	63	124	86	148	97	70	31	215	150	275	190	350	235
7.50	109	69	133	93	156	102	74	34	225	155	290	200	370	250
8.50	117	75	142	100	165	109	79	37	240	165	305	210	390	265
9.50	125	81	151	107	175	115	84	40	250	175	320	220	410	280
10.60	133	87	162	116	184	121	89	43	265	185	340	235	430	295
11.80	142	94	173	125	195	128	95	47	280*	195*	365*	250*	455*	310*
13.20	151	101	184	134	205	134	102	51	295*	205*	375*	260*	480*	330*
14.00	160	108	194	142	214	140	107	54						
15.00	169	114	202	147	220	144	111	56						
16.00	178	120	211	153	227	149	115	58						
17.00	184	125	218	159	235	154	119	60						
18.00	191	130	226	165	241	158	123	62						
19.00	198	135	234	171	247	162	127	64						
20.00	205	140	242	177	254	166	131	66						
21.20					261	171	136	68						
22.40					268	176	141	70						
23.60					275	180	146	72						
25.00					282	185	151	75						
26.50					290	190	156	78						
28.00					298	195	162	81						
30.00					307	201	168	84						
31.50					316	207	174	87						
33.50							180	90						
35.50							186	93						
37.50							193	96						
40.00							200	100						
42.50							207	104						
45.00							214	108						
47.50							221	112						
50.00							228	116						

* Gühring std.

Gühring delivers twist drills to Gühring standard up to total length of 1000 mm
Gühring no. 242, 243, 244



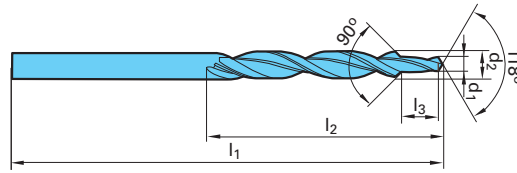
Morse taper twist drills

dia. to (incl.) mm	DIN 345			DIN 346			DIN 341			Bushing drills with oversized taper*			GV/VA-drills* for drilling difficult materials			DIN 1870 Extra length twist drills					
	total length	flute length	Morse taper	total length	flute length	Morse taper	total length	flute length	Morse taper	total length	flute length	Morse taper	total length	flute length	Morse taper	series 1			series 2		
																mm	mm	mm	mm	mm	mm
2.65	111*	30*	1*																		
3.00	114	33	1																		
3.35	117	36	1																		
3.75	120	39	1																		
4.25	124	43	1				145*	64*	1*												
4.75	128	47	1				150*	69*	1*												
5.30	133	52	1				155	74	1												
6.00	138	57	1				161	80	1												
6.70	144	63	1				167	86	1												
7.50	150	69	1				174	93	1												
8.50	156	75	1				181	100	1				130	49	1	265	165	1	330	210	1
9.50	162	81	1				188	107	1				134	53	1	275	175	1	345	220	1
10.60	168	87	1	185*	87*	2*	197	116	1	214	116	2	138	57	1	285	185	1	360	235	1
11.80	175	94	1	192*	94*	2*	206	125	1	223	125	2	142	61	1	300	195	1	375	250	1
13.20	182	101	1	199	101	2	215	134	1	232	134	2	147	66	1	310	205	1	395	260	1
14.00	189	108	1	206	108	2	223	142	1	240	142	2	168	70	2	325	220	1	410	275	1
15.00	212	114	2	235*	114*	3*	245	147	2	268	147	3	172	74	2	340	220	2	425	275	2
16.00	218	120	2	241*	120*	3*	251	153	2	274	153	3	176	78	2	355	230	2	445	295	2
17.00	223	125	2	246*	125*	3*	257	159	2	280	159	3	179	81	2	355	230	2	445	295	2
18.00	228	130	2	251*	130*	3*	263	165	2	286	165	3	183	85	2	370	245	2	465	310	2
19.00	233	135	2	256	135	3	269	171	2	292	171	3	186	88	2	370	245	2	465	310	2
20.00	238	140	2	261	140	3	275	177	2	298	177	3	212	91	3	385	260	2	490	325	2
21.20	243	145	2	266	145	3	282	184	2	305	184	3	216	95	3	385	260	3	490	325	3
22.40	248	150	2	271	150	3	289	191	2	312	191	3	219	98	3	405	270	3	515	345	3
23.02	253	155	2	276	155	3	296	198	2	319	198	3	222	101	3	405	270	3	515	345	3
23.60	276	155	3	304*	155*	4*	319	198	3	347	198	4	222	101	3	425	270	3	535	345	3
25.00	281	160	3	309*	160*	4*	327	206	3	355	206	4	225	104	3	440	290	3	555	365	3
26.50	286	165	3	314*	165*	4*	335	214	3	363	214	4	256	107	4	440	290	3	555	365	3
28.00	291	170	3	319	170	4	343	222	3	371	222	4	259	110	4	460	305	3	580	385	3
30.00	296	175	3	324	175	4	351	230	3	379	230	4	263	114	4	460	305	3	580	385	3
31.50	301	180	3	329	180	4	360	239	3	388	239	4	266	117	4	480	320	3	610	410	3
31.75	306	185	3	334	185	4	369	248	3	397	248	4	269	120	4	480	320	3	610	410	3
33.50	334	185	4	372*	185*	5*	397	248	4	435	248	5	269	120	4	505	320	4	635	410	4
35.50	339	190	4	377*	190*	5*	406	257	4				272	123	4	530	340	4	665	430	4
37.50	344	195	4	382*	195*	5*	416	267	4				276	127	4	530	340	4	665	430	4
40.00	349	200	4	387*	200*	5*	426	277	4				317	130	5	555	360	4	695	460	4
42.50	354	205	4	392	205	5	436	287	4				320	133	5	555	360	4	695	460	4
45.00	359	210	4	397	210	5	447	298	4				323	136	5	585	385	4	735	490	4
47.50	364	215	4	402	215	5	459	310	4							585	385	4	735	490	4
50.00	369	220	4	407	220	5	470	321	4							605	405	4	765	510	4
50.80	374	225	4	412	225	5	475*	326*	4*												
53.00	412	225	5	479*	225*	6*	513*	326*	5*												
56.00	417	230	5	484*	230*	6*	518*	331*	5*												
60.00	422	235	5	489*	235*	6*	523*	336*	5*												
63.00	427	240	5	494*	240*	6*															
67.00	432	245	5	499	245	6															
71.00	437	250	5	504	250	6															
75.00	442	255	5	509	255	6															
76.50	447	260	5	514	260	6															
80.00	514	260	6																		
85.00	519	265	6																		
90.00	524	270	6																		
95.00	529	275	6																		
100.00	534	280	6																		
106.00	539*	285*	6*																		

Gühring delivers twist drills to Gühring standard up to total length of 1000 mm Gühring no. 293, 298, 299, 563, 564, 565, 566

* Gühring std.

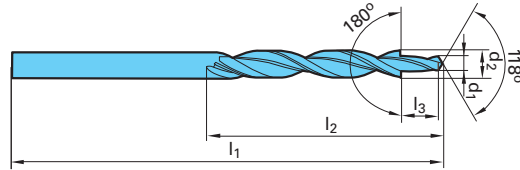
Straight shank subland drills, 90° step angle



body Ø d2 h8 mm	step Ø d1 h9 mm	overall length l1 mm	step length l2 mm	step length l3 mm	for thread	range of application
			HSS DIN 8378/	Carbide Guhring std.		
3.4	2.5	70	39	8.8	M 3	For tapping size holes to DIN 336 and countersinks in accordance with clearance holes to DIN-ISO 273 (old) and DIN EN 20273 »medial tolerance«.
4.5	3.3	80	47	11.4	M 4	
5.5	4.2	93	57	13.6	M 5	
6.6	5.0	101	63	16.5	M 6	
9.0	6.8	125	81	21.0	M 8	
11.0	8.5	142	94	25.5	M10	
13.5	10.2	160	108	30.0	M12	
DIN 8374 for countersinks, fine tolerance						
6.0	3.2	93	57	9.0	M 3	For clearance holes to DIN-ISO 273 (old), DIN EN 20273 »fine tolerance« and screwhead countersinks form A and B to DIN 74 part 1 (old) »fine tolerance« and screwhead countersinks to DIN 74 form F. For screws to DIN 963 (old) and DIN 964 (old).
8.0	4.3	117	75	11.0	M 4	
10.0	5.3	133	87	13.0	M 5	
11.5	6.4	142	94	15.0	M 6	
15.0	8.4	169	114	19.0	M 8	
19.0	10.5	198	135	23.0	M10	
Guhring std. for countersinks, medial tolerance						
6.6	3.4	101	63	9.0	M 3	For clearance holes to DIN-ISO 273 (old) and screwhead countersinks form A and B to DIN 74 part 1 (old) »medial tolerance«. For screws to DIN 963 (old) and DIN 964 (old).
9.0	4.5	125	81	11.0	M 4	
11.0	5.5	142	94	13.0	M 5	
13.0	6.6	151	101	15.0	M 6	
17.2	9.0	191	130	19.0	M 8	
DIN 8374 for countersinks, medial tolerance						
7.5	3.4	109	69	9.0	M 3	For clearance holes to DIN-ISO 273 (old) and screwhead countersinks form A and B to DIN 74 part 1 (old) »medial tolerance«. For screws to DIN 963 (old) and DIN 964 (old).
9.7	4.5	133	87	11.0	M 4	
12.0	5.5	151	101	13.0	M 5	
14.5	6.6	169	114	15.0	M 6	
19.9	9.0	198	135	19.0	M 8	



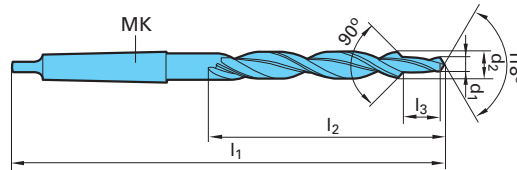
Straight shank subland drills, 180° step angle



body Ø d2 h8 mm	step Ø d1 h9 mm	overall length l1 mm	flute length l2 mm	step length l3 mm	for thread	range of application
			HSS DIN 8376/	Carbide	Guhring std.	
6.0**	3.4	93**	57**	9.0	M 3	For clearance holes to DIN-ISO 273 (old), DIN EN 20273 »medial tolerance«, screwhead countersinks to DIN 974-1 and screwhead countersinks form H, J and K to DIN 74 part 2 (old): »medial tolerance«. For screws to DIN 84 (old), 912 (old), 6912, 7513 and DIN 7984.
6.5	3.4	101	63	9.0	M 3	
8.0	4.5	117	75	11.0	M 4	
10.0	5.5	133	87	13.0	M 5	
11.0	6.6	142	94	15.0	M 6	
15.0	9.0	169	114	19.0	M 8	
18.0	11.0	191	130	23.0	M10	
Guhring std.						
6.0	3.2	93	57	9.0	M 3	For clearance holes to DIN-ISO 273 (old) and screwhead countersinks form H, J and K to DIN 74 part 2 (old): »fine tolerance«. For screws to DIN 84 (old), 912 (old), 6912, 7513 and DIN 7984.
8.0	4.3	117	75	11.0	M 4	
Guhring std. for countersinks, fine tolerance (old*)						
5.9	3.2	93	57	11.0	M 3	For screws to DIN 84 (old), DIN 912 (old) and DIN 6912. For old type screwhead countersinks form H, J and K to DIN 75 part 2: »fine tolerance«.
7.4	4.3	109	69	13.0	M 4	
9.4	5.3	125	81	16.0	M 5	
10.4	6.4	133	87	19.0	M 6	
13.5	8.4	160	108	22.0	M 8	
16.5	10.5	184	125	25.0	M10	
Guhring std. for countersinks, medial tolerance (old*)						
8.0	4.8	117	75	13.0	M 3	For screws to DIN 84 (old), DIN 912 (old) and DIN 6912. For old type screwhead countersinks form H, J and K to DIN 75 part 2: »medial tolerance«.
10.0	5.8	133	87	16.0	M 4	
11.0	7.0	142	94	19.0	M 5	
14.5	9.5	169	114	22.0	M 6	
17.5	11.5	191	130	25.0	M 8	

* DIN 75, part 2; ** Guhring std

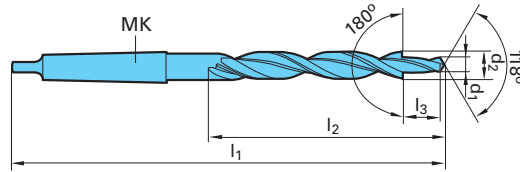
Morse taper subland drills, 90° step angle



body Ø d2 h8 mm	step Ø d1 h9 mm	overall length l1 mm	flute length l2 mm	Morse taper MK	step length l3 mm	for thread	range of application
Gühring std.							
11.0	5.5	175	94	1	13.0	M 5	For clearance holes to DIN-ISO 273 (old), DIN EN 20273 »medial tolerance«, screwhead countersinks to DIN 74 form F and screwhead countersinks form A and B to DIN 74 part 1 (old) »medial tolerance«. For screws to DIN 963 (old) and DIN 964 (old).
13.0	6.6	182	101	1	15.0	M 6	
17.2	9.0	228	130	2	19.0	M 8	
21.5	11.0	248	150	2	23.0	M10	
26.0	14.0	286	165	3	27.0	M12	
29.0	16.0	296	175	3	31.0	M14	
DIN 8375							
12.0	5.5	182	101	1	13.0	M 5	For clearance holes to DIN-ISO 273 (old), DIN EN 20273 »medial tolerance«, screwhead countersinks to DIN 74 form F and screwhead countersinks form A and B to DIN 74 part 1 (old) »medial tolerance«. For screws to DIN 963 (old) and DIN 964 (old).
14.5	6.6	---	108	1	15.0	M 6	
19.0	9.0	253	135	2	19.0	M 8	
23.0	11.0	248	155	2	23.0	M10	
Gühring std.							
11.5	6.4	175	94	1	15.0	M 6	For clearance holes to DIN-ISO 273 (old) and screwhead countersinks form A and B to DIN 74 part 1 (old) »fine tolerance«. For screws to DIN 963 (old) and DIN 964 (old).
15.0	8.4	212	114	2	19.0	M 8	
19.0	10.5	233	135	2	23.0	M10	
23.0	13.0	253	155	2	27.0	M12	
26.0	15.0	286	165	3	31.0	M14	
30.0	17.0	296	175	3	35.0	M16	
DIN 8379							
9.0	6.8	162	81	1	21.0	M 8	For tapping size holes to DIN 336, DIN EN 20273 »medial tolerance« and countersinks in accordance with clearance holes to DIN-ISO 273 (old).
11.0	8.5	175	94	1	25.5	M10	
13.5	10.2	189	108	1	30.0	M12	
15.5	12.0	218	120	2	34.5	M14	
17.5	14.0	228	130	2	38.5	M16	
20.0	15.5	238	140	2	43.5	M18	
22.0	17.5	248	150	2	47.5	M20	



Morse taper subland drills, 180° step angle



body Ø d2 h8 mm	step Ø d1 h9 mm	overall length l1 mm	flute length l2 mm	Morse taper MK	step length l3 mm	for thread	range of application					
HSS DIN 8377/				Carbide Guhring std.								
10,0	5,5	168	87	1	13,0	M 5	For clearance holes to DIN-ISO 273 (old), DIN EN 20273 »medial tolerance«, screwhead countersinks to DIN 974-1 and screwhead countersinks form H, J and K to DIN 74 part 2 (old): »medial tolerance«. For screws to DIN 84 (old), 912 (old), 6912, 7513 and DIN 7984.					
11,0	6,6	175	94	1	15,0	M 6						
15,0	9,0	212	114	2	19,0	M 8						
18,0	11,0	228	130	2	23,0	M10						
20,0	13,5	238	140	2	27,0	M12						
24,0	15,5	281	160	3	31,0	M14						
26,0	17,5	286	165	3	35,0	M16						
30,0	20,0	296	175	3	39,0	M18						
33,0	22,0	334	185	4	43,0	M20						
Guhring std.												
10,0	5,3	168	87	1	13,0	M 5	For clearance holes to DIN-ISO 273 (old) and screwhead countersinks form H, J and K to DIN 74 part 2 (old): »fine tolerance«. For screws to DIN 84 (old), 912 (old), 6912, 7513 and DIN 7984.					
11,0	6,4	175	94	1	15,0	M 6						
15,0	8,4	212	114	2	19,0	M 8						
18,0	10,5	228	130	2	23,0	M10						
20,0	13,0	238	140	2	27,0	M12						
24,0	15,0	281	160	3	31,0	M14						
26,0	17,0	286	165	3	35,0	M16						
Werksnorm für Senkungen, Ausführung fein (alt*)												
9,4	5,3	162	81	1	16,0	M 5	For screws DIN 84 (old), DIN 912 (old) and DIN 6912. For old countersinks form H, J and K to DIN 75 part 2: »fine tolerance«.					
10,4	6,4	168	87	1	19,0	M 6						
13,5	8,4	189	108	1	22,0	M 8						
16,5	10,5	223	125	2	25,0	M10						
19,0	13,0	233	135	2	28,0	M12						
23,0	15,0	253	155	2	30,0	M14						
25,0	17,0	281	160	3	33,0	M16						
28,0	19,0	291	170	3	36,0	M18						
31,0	21,0	301	180	3	39,0	M 20						
Werksnorm für Senkungen, Ausführung mittel (alt*)												
10,0	5,8	168	87	1	16,0	M 5	For screws DIN 84 (old), DIN 6912. For old countersinks form H, J and K to DIN 75 part 2: »medial tolerance«.					
11,0	7,0	175	94	1	19,0	M 6						
14,5	9,5	212	114	2	22,0	M 8						
17,5	11,5	228	130	2	25,0	M10						
20,0	14,0	238	140	2	28,0	M12						
24,0	16,0	281	160	3	30,0	M14						
26,0	18,0	286	165	3	33,0	M16						
29,0	20,0	296	175	3	36,0	M18						
33,0	23,0	334	185	4	39,0	M20						
inches	mm	inches	mm	inches	mm	inches	mm	MK	inches	mm	for thread	range of application
British Standard												
19/32	15.08	25/64	9.92	8 5/8	219	4 3/4	121	2	3/4	19.05	3/8 inch	For British Standard caphead screws.
21/32	16.67	29/64	11.51	8 3/4	222	4 7/8	124	2	7/8	22.22	7/16 inch	
25/32	19.84	33/64	13.10	9 3/8	238	5 1/2	140	2	1	25.40	1/2 inch	

* DIN 75, part 2

Straight shank core drills

Shell-core drills

diameter up to incl. mm	DIN 344					DIN 222		
	overall length mm	flute length mm	diameter up to incl. mm	overall length mm	flute length mm	nom. Ø up to incl. mm	overall length mm	nom. Ø of hole mm
4.25	96*	64*	11.70	173	125	35.5	45	13
4.75	102*	69*	13.20	184	134	45.0	50	16
5.30	108	74	14.00	194	142	53.0	56	19
6.00	116	80	15.00	202	147	63.0	63	22
6.70	124	86	16.00	211	153	75.0	71	27
7.50	133	93	17.00	218	159	90.0	80	32
8.50	142	100	18.00	226	165	101.6	90	40
9.50	151	107	19.00	234	171			
10.60	162	116	20.00	242	177			

Taper shank core drills

diameter up to incl. mm	DIN 343			DIN 1864		
	overall length mm	flute length mm	Morse taper	overall length mm	flute length mm	Morse taper
7.50	150*	69*	1*	174*	93*	1*
8.50	156*	75*	1*	181*	100*	1*
9.50	162	81	1	188	107	1
10.60	168	87	1	197	116	1
11.70	175	94	1	206	125	1
13.20	182	101	1	215	134	1
14.00	189	108	1	223	142	1
15.00	212	114	2	245	147	2
16.00	218	120	2	251	153	2
17.00	223	125	2	257	159	2
18.00	228	130	2	263	165	2
19.00	233	135	2	269	171	2
20.00	238	140	2	275	177	2
21.20	243	145	2	282	184	2
22.40	248	150	2	289	191	2
23.60	253	155	2	296	198	2
25.00	281	160	3	327	206	3
26.50	286	165	3	335	214	3
28.00	291	170	3	343	222	3
30.00	296	175	3	351	230	3
31.50	301	180	3	360	239	3
33.50	334	185	4			
35.50	339	190	4			
37.50	344	195	4			
40.00	349	200	4			
42.50	354	205	4			
45.00	359	210	4			
47.50	364	215	4			
50.00	369	220	4			

*Gühring std.

Micro-precision drills (total length 25 mm)

DIN 1899					
diameter up to incl. mm	shank Ø mm	flute length mm	diameter up to incl. mm	shank Ø mm	flute length mm
from 0.1 . . . 0.12	1.0	0.5	0.67	1.0	4.2
0.15	1.0	0.8	0.75	1.0	4.8
0.19	1.0	1.1	0.79	1.0	5.3
0.24	1.0	1.5	0.85	1.5	5.3
0.30	1.0	1.9	0.95	1.5	6.0
0.38	1.0	2.4	1.06	1.5	6.8
0.48	1.0	3.0	1.18	1.5	7.6
0.53	1.0	3.4	1.32	1.5	8.5
0.60	1.0	3.9	1.45	1.5	9.5

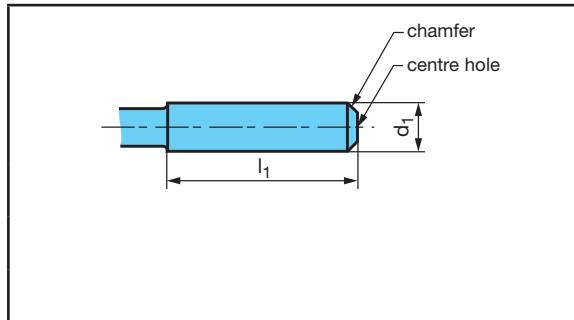
Technical section



High speed steel straight shanks, DIN 1835-1 (extract)

Form A, plain

Dimensions in mm



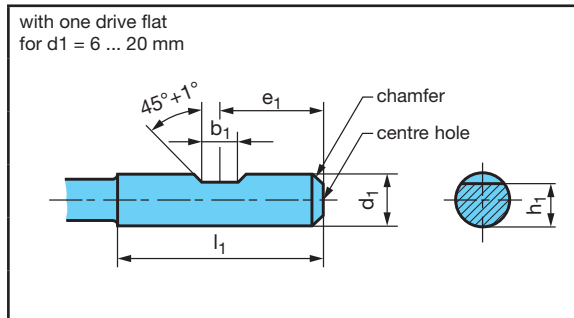
d ₁	h ₈	l ₁
3	0	+2 0
4	0	+2 0
5	0	+2 0
6	0	+2 0
8	0	+2 0
10	0	+2 0

d ₁	h ₈	l ₁
12	0	+2 0
16	0	+2 0
20	0	+2 0
25	0	+2 0
32	0	+2 0
40	0	+2 0

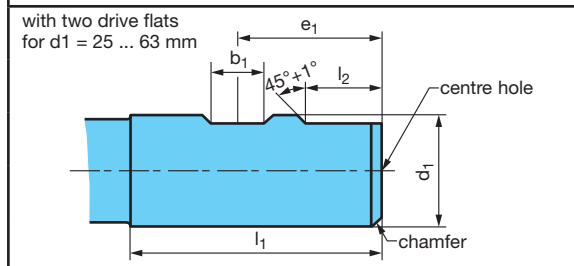
d ₁	h ₈	l ₁
50	0	+2 0
63	0	+2 0

Form B, with drive flat

Dimensions in mm

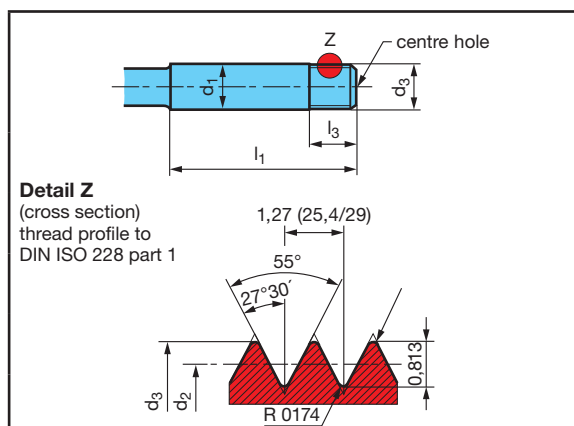


d ₁	b ₁	e ₁	h ₁	l ₁	l ₂	centre hole form R DIN 332 sect. 1
6	+0,05 0	0 -1	h13	+2 0	+1 0	1.6x2.5
8	4.2	18	4.8	36	-	1.6x3.35
10	5.5	18	6.6	36	-	1.6x3.35
12	7	20	8.4	40	-	1.6x3.35
16	8	22.5	10.4	45	-	1.6x3.35
20	10	24	14.2	48	-	2.0x4.25
25	11	25	18.2	50	-	2.5x5.3
32	12	32	23	56	17	2.5x5.3
40	14	36	30	60	19	3.15x6.7
50	14	40	38	70	19	3.15x6.7
63	18	45	47.8	80	23	3.15x6.7
	18	50	60.8	90	23	3.15x6.7



Form D, screwed shank

Dimensions in mm



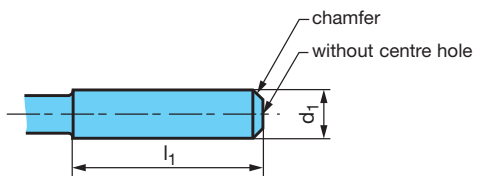
d ₁	d ₃	tol. zone	d ₂	tol. zone	l ₁	l ₃	centre hole form R DIN 332 sect. 1
h8					+2 0	+2 0	
6	5.9	0 -0.1	5.087	0 -0.1	36	10	1.6 x 2.5
10	9.9	0 -0.1	9.087	0 -0.1	40	10	1.6 x 3.35
12	11.9	0 -0.1	11.087	0 -0.1	45	10	1.6 x 3.35
16	15.9	0 -0.1	15.087	0 -0.1	48	10	2.0 x 4.25
20	19.9	0 -0.15	19.087	0 -0.15	50	15	2.5 x 5.3
25	24.9	0 -0.15	24.087	0 -0.15	56	15	2.5 x 5.3
32	31.9	0 -0.15	31.087	0 -0.15	60	15	3.15 x 6.7

Technical section

Carbide straight shanks DIN 6535 for twist drills and end mills

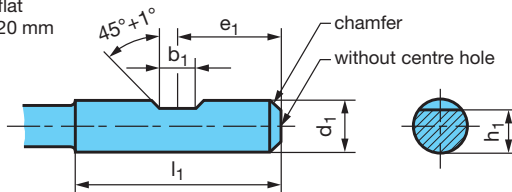
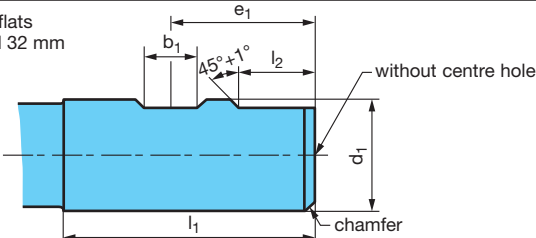
Form HA, plain

Dimensions in mm

	d ₁	l ₁	d ₁	l ₁
	h6	+2 0	h6	+2 0
	2	28	14	45
	3	28	16	48
	4	28	18	48
	5	28	20	50
	6	36	25	56
	8	36	32	60
	10	40		
	12	45		

Form HB, with drive flat

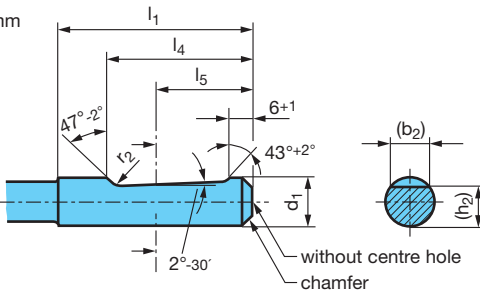
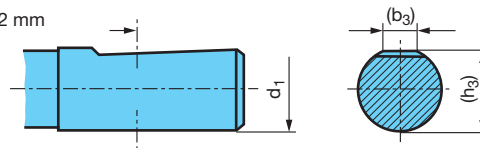
Dimensions in mm

<p>with one drive flat for d₁ = 6 and 20 mm</p> 	d ₁	b ₁	e ₁	h ₁	l ₁	l ₂
	h6	+0,05 0	0 -1	h11	+2 0	+1 0
	6	4.2	18	5.1	36	-
	8	5.5	18	6.9	36	-
	10	7	20	8.5	40	-
	12	8	22.5	10.4	45	-
	14	8	22.5	12.7	45	-
	16	10	24	14.2	48	-
	18	10	24	16.2	48	-
	20	11	25	18.2	50	-
<p>with two drive flats for d₁ = 25 and 32 mm</p> 	25	12	32	23	56	17
	32	14	36	30	60	19

Form HE, with whistle notch flat without coolant ducts*

* Design: Straight shanks to DIN 6335 are available with or without oil feed holes. Applications for various tools, dimensions and position of oil feed holes are fully described within the standard range sections.

Dimensions in mm

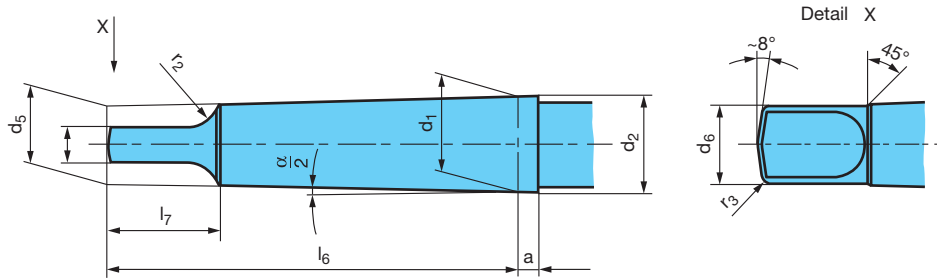
<p>for d₁ = 6 to 20 mm</p> 	d ₁	(b ₂)	(b ₃)	h ₂	(h ₃)	l ₁	l ₄	l ₅	r ₂
	h6	≈		h11		+2 0	0 -1	Dim. nom.	min.
	6	4,3	-	5,1	-	36	25	18	1,2
	8	5,5	-	6,9	-	36	25	18	1,2
	10	7,1	-	8,5	-	40	28	20	1,2
	12	8,2	-	10,4	-	45	33	22,5	1,2
	14	8,1	-	12,7	-	45	33	22,5	1,2
	16	10,1	-	14,2	-	48	36	24	1,6
	18	10,8	-	16,2	-	48	36	24	1,6
	20	11,4	-	18,2	-	50	38	25	1,6
<p>for d₁ = 25 and 32 mm</p> 	25	13,6	9,3	23,0	24,1	56	44	32	1,6
	32	15,5	9,9	30,0	31,2	60	48	35	1,6

Technical section



Morse taper shanks DIN 228 part 1 (extract)

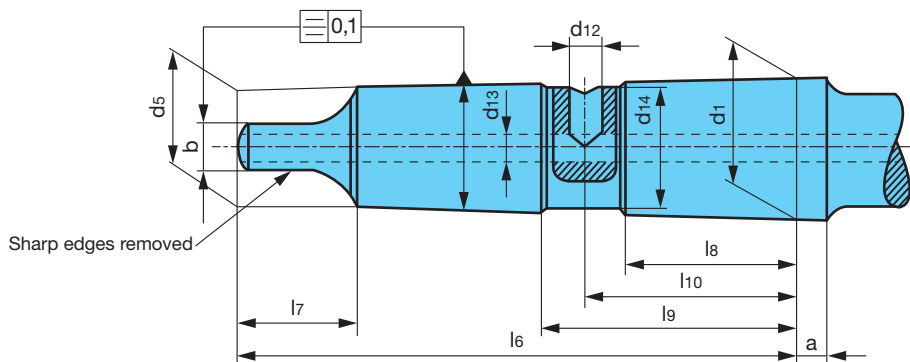
Form B, Morse taper with tang



Dimensions in mm

Shank to DIN 228 form B Size	a	Limiting dimensions	b	d ₁	d ₂ ≈	d ₅ ≈	d ₆ max.	l ₆ -1	l ₇ max.	r ₂ max.	r ₃ ≈	$\frac{\alpha}{2}$
MK 1	3.5	+1.4 0	5.2	12.065	12.2	9.0	8.7	62	13.5	5	1.2	1°25'43"
MK 2	5.0	+1.4 0	6.3	17.780	18.0	14.0	13.5	75	16	6	1.6	1°25'50"
MK 3	5.0	+1.7 0	7.9	23.825	24.1	19.1	18.5	94	20	7	2	1°26'16"
MK 4	6.5	+1.9 0	11.9	31.267	31.6	25.2	24.5	117.5	24	8	2.5	1°29'15"
MK 5	6.5	+1.9 0	15.9	44.399	44.7	36.5	35.7	149.5	29	10	3	1°30'26"

Form BK, Morse taper with tang and coolant lubricant delivery



Dimensions in mm

Shank to DIN 228 form BK Size	a ±0.1	Limiting dimensions	b h13	d ₁	d ₅ ≈	d ₁₂	d ₁₃	d ₁₄ 0 -0.01	l ₆ 0 -1	l ₇ max.	l ₈	l ₉	l ₁₀
MK 1	3.5	+1.4 0	5.2	12.065	9.0	-	-	-	62	13.5	-	-	-
MK 2	5	+1.4 0	6.3	17.780	14.0	4.2	4.2	15.0	75	16	20	34	27
MK 3	5	+1.7 0	7.9	23.825	19.1	5.0	5.0	21.0	94	20	29	43	36
MK 4	6.5	+1.9 0	11.9	31.267	25.2	6.8	6.8	28.0	117.5	24	39	55	47
MK 5	6.5	+1.9 0	15.9	44.399	36.5	8.5	8.5	40.0	149.5	29	51	69	60

Tolerances core drills

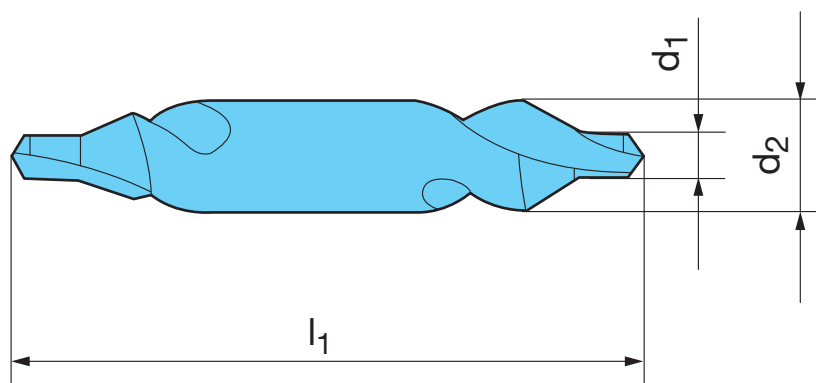
DIN 333	
Ø-range d1 mm	tolerance zones from d1 mm
0,50 – 2,50	0 +0,14
3,15 – 5,00	0 +0,18
6,30 – 10,00	0 +0,22
12,50	0 +0,27

for Guhring nos. 285/286	
Ø-range d1 mm	tolerance zones from d1 mm
1,00 – 1,25	0 +0,10
1,60 – 3,15	0 +0,15
3,15 – 10,00	0 +0,20

to B.S. 328	
Ø-range d1 mm	tolerance zones from d1 mm
1,19 – 1,59	0 ±0,05
2,38 – 3,17	0 ±0,07
4,76	0 ±0,07
6,35 – 7,94	0 ±0,12

to B.S. 328	
Ø-range d1 mm	tolerance zones from d1 mm
3,17 – 4,76	-0,020
6,35	-0,025
7,94 – 11,11	-0,050
15,87 – 19,05	-0,050

to ASA	
Ø-range d1 mm	tolerance zones from d1 mm
all	0 +0,07 mm





Tapping size holes for thread cutting

Std. ISO metric threads DIN 13					ISO metric fine threads DIN 13					UNC threads ASME B1.1				
nom. Ø	pitch P	tapping size hole Ø DIN 336	core Ø of int. thread 6H*		nom. Ø	pitch P	tapping size hole Ø DIN 336	core Ø of int. thread 6H		nom. Ø	pitch P	tapping size hole Ø DIN 336	core Ø of int. thread 2B	
mm	mm	mm	min. mm	max. mm	mm	mm	mm	min. mm	max. mm	mm	mm	mm	min. mm	max. mm
M 1	0.25	0.75	0.729	0.785	M 2.5 x	0.35	2.15	2.121	2.221	M 22 x	1.00	21.00	20.917	21.153
M 1.1	0.25	0.85	0.829	0.885	M 3.0 x	0.35	2.65	2.621	2.721	M 22 x	1.50	20.50	20.376	20.676
M 1.2	0.25	0.95	0.929	0.985	M 3.5 x	0.35	3.15	3.121	3.221	M 22 x	2.00	20.00	19.835	20.210
M 1.4	0.30	1.10	1.075	1.142	M 4.0 x	0.50	3.50	3.459	3.599	M 24 x	1.00	23.00	22.917	23.153
M 1.6	0.35	1.25	1.221	1.321	M 4.5 x	0.50	4.00	3.959	4.099	M 24 x	1.50	22.50	22.376	22.676
M 1.8	0.35	1.45	1.421	1.521	M 5.0 x	0.50	4.50	4.459	4.599	M 24 x	2.00	22.00	21.835	22.210
M 2	0.40	1.60	1.567	1.679	M 5.5 x	0.50	5.00	4.959	5.099	M 25 x	1.00	24.00	23.917	24.153
M 2.2	0.45	1.75	1.713	1.838	M 6.0 x	0.75	5.20	5.188	5.378	M 25 x	1.50	23.50	23.376	23.676
M 2.5	0.45	2.05	2.013	2.138	M 7.0 x	0.75	6.20	6.188	6.378	M 25 x	2.00	23.00	22.835	23.210
M 3	0.50	2.50	2.459	2.599	M 8.0 x	0.50	7.50	7.459	7.599	M 27 x	1.00	26.00	25.917	26.153
M 3.5	0.60	2.90	2.850	3.010	M 8.0 x	0.75	7.20	7.188	7.378	M 27 x	1.50	25.50	25.376	25.676
M 4	0.70	3.30	3.242	3.422	M 8.0 x	1.00	7.00	6.917	7.153	M 27 x	2.00	25.00	24.835	25.210
M 4.5	0.75	3.70	3.688	3.878	M 9.0 x	0.75	8.20	8.188	8.378	M 28 x	1.00	27.00	26.917	27.153
M 5	0.80	4.20	4.134	4.334	M 9.0 x	1.00	8.00	7.917	8.153	M 28 x	1.50	26.50	26.376	26.676
M 6	1.00	5.00	4.917	5.153	M 10 x	0.75	9.20	9.188	9.378	M 28 x	2.00	26.00	25.835	26.210
M 7	1.00	6.00	5.917	6.153	M 10 x	1.00	9.00	8.917	9.153	M 30 x	1.00	29.00	28.917	29.153
M 8	1.25	6.80	6.647	6.912	M 10 x	1.25	8.80	8.647	8.912	M 30 x	1.50	28.50	28.376	28.676
M 9	1.25	7.80	7.647	7.912	M 11 x	0.75	10.20	10.188	10.378	M 30 x	2.00	28.00	27.835	28.210
M 10	1.50	8.50	8.376	8.676	M 11 x	1.00	10.00	9.917	10.153	M 30 x	3.00	27.00	26.752	27.252
M 11	1.50	9.50	9.376	9.676	M 12 x	1.00	11.00	10.917	11.153	M 32 x	1.50	30.50	30.376	30.676
M 12	1.75	10.20	10.106	10.441	M 12 x	1.25	10.80	10.647	10.912	M 32 x	2.00	30.00	29.835	30.210
M 14	2.00	12.00	11.835	12.210	M 12 x	1.50	10.50	10.376	10.676	M 33 x	1.50	31.50	31.376	31.676
M 16	2.00	14.00	13.835	14.210	M 14 x	1.00	13.00	12.917	13.153	M 33 x	2.00	31.00	30.835	31.210
M 18	2.50	15.50	15.294	15.744	M 14 x	1.25	12.80	12.647	12.912	M 33 x	3.00	30.00	29.752	30.252
M 20	2.50	17.50	17.294	17.744	M 14 x	1.50	12.50	12.376	12.676	M 35 x	1.50	33.50	33.376	33.676
M 22	2.50	19.50	19.294	19.744	M 15 x	1.00	14.00	13.917	14.153	M 36 x	1.50	34.50	34.376	34.676
M 24	3.00	21.00	20.752	21.252	M 15 x	1.50	13.50	13.376	13.676					
M 27	3.00	24.00	23.752	24.252	M 16 x	1.00	15.00	14.917	15.153					
M 30	3.50	26.50	26.211	26.771	M 16 x	1.25	14.80	14.647	14.912					
M 33	3.50	29.50	29.211	29.771	M 16 x	1.50	14.50	14.376	14.676					
M 36	4.00	32.00	31.670	32.270	M 17 x	1.00	16.00	15.917	16.153					
M 39	4.00	35.00	34.670	35.270	M 17 x	1.50	15.50	15.376	15.676					
M 42	4.50	37.50	37.129	37.799	M 18 x	1.00	17.00	16.917	17.153					
M 45	4.50	40.50	40.129	40.799	M 18 x	1.50	16.50	16.376	16.676					
M 48	5.00	43.00	42.587	43.297	M 20 x	1.00	19.00	18.917	19.153					
M 52	5.00	47.00	46.587	47.297	M 20 x	1.50	18.50	18.376	18.676					
M 56	5.50	50.50	50.046	50.796	M 20 x	2.00	18.00	17.835	18.210					

* M 1.1 up to M 1.4 tapping size hole of int. thread 5H

MJ threads DIN ISO 5855					UNJC threads ISO 3161				UNJF threads ISO 3161						
nom. Ø	x	pitch P	tapping size hole Ø DIN 336	core Ø of int. thread 5H*		nom. Ø	threads	tapping size hole Ø DIN 336	core Ø of int. thread 3B		nom. Ø	threads	tapping size hole Ø DIN 336	core Ø of int. thread 3B	
mm		mm	mm	min. mm	max. mm		per inch	mm	min. mm	max. mm		per inch	mm	min. mm	max. mm
MJ 3	x	0.50	2.60	2.513	2.653	Nr. 6	- 32	2.85	2.733	2.939	Nr. 6	- 40	3.00	2.888	3.053
MJ 4	x	0.70	3.40	3.318	3.498	Nr. 8	- 32	3.55	3.393	3.599	Nr. 8	- 36	3.60	3.480	3.663
MJ 5	x	0.80	4.30	4.221	4.421	Nr. 10	- 24	4.00	3.795	4.064	Nr. 10	- 32	4.20	4.054	4.255
MJ 6	x	0.50	5.55	5.513	5.625	Nr. 12	- 24	4.60	4.455	4.704	Nr. 12	- 28	4.75	4.602	4.816
MJ 6	x	0.75	5.35	5.269	5.419	1/4	- 20	5.30	5.113	5.387	1/4	- 28	5.60	5.466	5.662
MJ 6	x	1.00	5.10	5.026	5.216	5/16	- 18	6.75	6.563	6.833	5/16	- 24	7.00	6.906	7.109
MJ 8	x	0.50	7.55	7.513	7.625	3/8	- 16	8.20	7.978	8.255	3/8	- 24	8.60	8.494	8.679
MJ 8	x	0.75	7.35	7.269	7.419	7/16	- 14	9.60	9.346	9.639	7/16	- 20	10.00	9.876	10.084
MJ 8	x	1.00	7.10	7.026	7.216	1/2	- 13	11.00	10.798	11.095	1/2	- 20	11.60	11.463	11.661
MJ 8	x	1.25	6.90	6.782	6.994	9/16	- 12	12.40	12.228	12.482	9/16	- 18	13.00	12.913	13.122
MJ 10	x	1.00	9.10	9.026	9.216	5/8	- 11	13.80	13.627	13.904	5/8	- 18	14.60	14.501	14.702
MJ 10	x	1.25	8.90	8.782	8.994										
MJ 10	x	1.50	8.60	8.539	8.775										
MJ 12	x	1.75	10.40	10.295	10.560										
MJ 16	x	2.00	14.20	14.051	14.351										

* MJ3 x 0.50 up to MJ 5 x 0.80 tapping size hole of int. thread 6H

Technical section



UNF threads ASME B1.1					BSW (Whitworth) threads BS84					(Whitworth) threads (DIN-ISO 228-1)					Steel armoured conduit threads to DIN 40430				
nom. Ø	threads per inch	tapping size hole Ø DIN 336 mm	core Ø of int. thread 2B min. mm max. mm		nom. Ø	threads per inch	tapping size hole Ø DIN 336 mm	core Ø of int. thread 2B min. mm max. mm		nom. Ø	threads per inch	tapping size hole Ø DIN 336 mm	core Ø of int. thread min. mm max. mm		nom. Ø	threads per inch	tapping size hole Ø mm	core Ø of int. thread min. mm max. mm	
Nr. 1 - 72	72	1.55	1.473	1.610	W 1/16	60	1.20	1.045	1.230	G 1/16	28	6.80	6.561	6.843	Pg 7	20	11.40	11.280	11.430
Nr. 2 - 64	64	1.85	1.755	1.910	W 3/32	48	1.80	1.704	1.912	G 1/8	28	8.80	8.566	8.848	Pg 9	18	14.00	13.860	14.010
Nr. 3 - 56	56	2.15	2.024	2.197	W 1/8	40	2.50	2.362	2.591	G 1/4	19	11.80	11.445	11.890	Pg 11	18	17.30	17.260	17.410
Nr. 4 - 48	48	2.40	2.271	2.459	W 5/32	32	3.20	2.952	3.214	G 3/8	19	15.25	14.950	15.395	Pg 13.5	18	19.00	19.060	19.210
Nr. 5 - 44	44	2.70	2.550	2.741	W 3/16	24	3.60	3.407	3.745	G 1/2	14	19.00	18.631	19.172	Pg 16	18	21.30	21.160	21.310
Nr. 6 - 40	40	2.95	2.819	3.023	W 7/32	24	4.50	4.201	4.539	G 5/8	14	21.00	20.587	21.128	Pg 21	16	26.90	26.780	27.030
Nr. 8 - 36	36	3.50	3.404	3.607	W 1/4	20	5.10	4.724	5.156	G 3/4	14	24.50	24.117	24.658	Pg 29	16	35.50	35.480	35.730
Nr. 10 - 32	32	4.10	3.962	4.166	W 5/16	18	6.50	6.130	6.590	G 7/8	14	28.25	27.877	28.418	Pg 36	16	45.50	45.480	45.730
Nr. 12 - 28	28	4.60	4.496	4.724	W 3/8	16	7.90	7.492	7.987	G 1	11	30.75	30.291	30.931	Pg 42	16	52.50	52.480	52.730
1/4 - 28	28	5.50	5.359	5.588	W 7/16	14	9.20	8.789	9.330	G 1 1/8	11	35.50	34.939	35.579	Pg 48	16	57.80	57.780	58.030
5/16 - 24	24	6.90	6.782	7.036	W 1/2	12	10.50	9.989	10.591	G 1 1/4	11	39.50	38.952	39.592					
3/8 - 24	24	8.50	8.382	8.636	W 9/16	12	12.00	11.577	12.179	G 1 1/2	11	45.25	44.845	45.485					
7/16 - 20	20	9.90	9.728	10.033	W 5/8	11	13.50	12.918	13.558	G 1 3/4	11	51.00	50.788	51.428					
1/2 - 20	20	11.50	11.328	11.608	W 3/4	10	16.25	15.797	16.483	G 2	11	57.00	56.656	57.296					
9/16 - 18	18	12.90	12.751	13.081	W 7/8	9	19.25	18.611	19.353										
5/8 - 18	18	14.50	14.351	14.681	W 1	8	22.00	21.334	22.147										
3/4 - 16	16	17.50	17.323	17.678	W 1 1/8	7	24.50	23.928	24.832										
7/8 - 14	14	20.40	20.269	20.650	W 1 1/4	7	27.75	27.103	28.007										
1 - 12	12	23.25	23.114	23.571	W 1 3/8	6	30.50	29.504	30.528										
1 1/8 - 12	12	26.50	26.289	26.746	W 1 1/2	6	33.50	32.679	33.703										
1 1/4 - 12	12	29.50	29.464	29.921	W 1 5/8	5	35.50	34.769	35.963										
1 3/8 - 12	12	32.75	32.639	33.096	W 1 3/4	5	39.00	37.944	39.138										
1 1/2 - 12	12	36.00	35.814	36.271	W 2	4.5	44.50	43.571	44.877										

**NPT ANSI B 2.1
American tapered pipe thread 1:16**

Version A (avoid if possible)		Version B		nom. Ø	threads per inch	tapp. size hole Ø cylindrical (A) d ₁	tapp. size hole Ø conical (B) D ₁	cutting depth ET mm	cutting depth BT (min) mm
				1/16	27	6.15	6.39	9.29	10.7
				1/8	27	8.40	8.74	9.32	10.8
				1/4	18	11.10	11.36	13.52	15.6
				3/8	18	14.30	14.80	13.83	16.0
				1/2	14	17.90	18.32	18.07	20.8
				3/4	14	23.30	23.67	18.55	21.3
				1	11.5	29.00	29.69	22.29	25.6
				1 1/4	11.5	37.70	38.45	22.80	26.1
				1 1/2	11.5	43.70	44.52	22.80	26.1
				2	11.5	55.60	56.56	23.20	26.5
				2 1/2	8	66.30	67.62	31.75	36.3
				3	8	82.30	83.52	33.74	38.5

Metric/metric fine EG-threads (EG M14 x 1.25) for wire thread inserts DIN 8140					UNC (UNC-STI) EG-threads for wire thread inserts ASME B18.29.1					UNF (UNF-STI) EG-threads for wire thread inserts ASME B18.29.1				
nom. Ø	x pitch P	tapping size hole Ø DIN 336 mm	core Ø of int. thread min. mm max. mm		nom. Ø	threads per inch	tapping size hole Ø mm	core Ø of int. thread min. mm max. mm		nom. Ø	threads per inch	tapping size hole Ø mm	core Ø of int. thread min. mm max. mm	
EG M 4 x 0.70	0.70	4.20	4.152	4.292	EG Nr. 6 - 32	32	3.80	3.678	3.879	EG Nr. 6 - 40	40	3.70	3.644	3.818
EG M 5 x 0.80	0.80	5.25	5.174	5.334	EG Nr. 8 - 32	32	4.40	4.338	4.524	EG Nr. 8 - 36	36	4.40	4.321	4.498
EG M 6 x 1.00	1.00	6.30	6.217	6.407	EG Nr. 10 - 24	24	5.20	5.055	5.283	EG Nr. 10 - 32	32	5.10	4.999	5.184
EG M 8 x 1.25	1.25	8.40	8.271	8.483	EG Nr. 12 - 24	24	5.80	5.715	5.944	EG Nr. 12 - 28	28	5.70	5.682	5.809
EG M10 x 1.50	1.50	10.50	10.324	10.560	EG 1/4 - 20	20	6.70	6.624	6.868	EG 1/4 - 28	28	6.60	6.546	6.721
EG M12 x 1.75	1.75	12.50	12.379	12.644	EG 5/16 - 18	18	8.40	8.242	8.489	EG 5/16 - 24	24	8.25	8.166	8.352
EG M14 x 1.25	1.25	14.40	14.271	14.483	EG 3/8 - 16	16	10.00	9.868	10.127	EG 3/8 - 24	24	9.80	9.754	9.931
EG M16 x 2.00	2.00	16.50	16.433	16.733	EG 7/16 - 14	14	11.60	11.506	11.783	EG 7/16 - 20	20	11.50	11.389	11.585
					EG 1/2 - 13	13	13.30	13.122	13.393	EG 1/2 - 20	20	13.10	12.974	13.172
					EG 9/16 - 12	12	14.90	14.747	15.032	EG 9/16 - 18	18	14.70	14.592	14.798
					EG 5/8 - 11	11	16.50	16.375	16.673	EG 5/8 - 18	18	16.25	16.180	16.386



Recommended tapping size holes for thread forming

Std. ISO metric threads DIN 13						ISO metric fine threads DIN 13																
nom. Ø	pitch P	tapp. size hole Ø	tapp. size hole Ø		core Ø of int. thread 7H*		nom. Ø	x	pitch P	tapp. size hole Ø	tapp. size hole Ø		core Ø of int. thread 7H*		nom. Ø	x	pitch P	tapp. size hole Ø	tapp. size hole Ø		core Ø of int. thread 7H*	
			min.	max.	min.	max.					min.	max.	min.	max.					min.	max.	min.	max.
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
M 2	0.40	1.85	1.84	1.88	1.567	1.679	M 2.5	x	0.35	2.35	2.35	2.38	2.121	2.221	M 17	x	1.50	16.30	16.26	16.38	15.376	15.751
M 2.2	0.45	2.00	2.01	2.05	1.713	1.838	M 3	x	0.35	2.85	2.85	2.88	2.621	2.721	M 18	x	1.00	17.55	17.52	17.62	16.917	17.217
M 2.5	0.45	2.30	2.28	2.32	2.013	2.138	M 4	x	0.35	3.85	3.85	3.88	3.621	3.721	M 18	x	1.50	17.30	17.26	17.38	16.376	16.751
M 3	0.50	2.80	2.78	2.85	2.459	2.639	M 4	x	0.50	3.80	3.78	3.83	3.459	3.639	M 18	x	2.00	17.10	17.05	17.20	15.835	16.310
M 3.5	0.60	3.25	3.23	3.30	2.850	3.050	M 5	x	0.50	4.80	4.78	4.83	4.459	4.639	M 20	x	1.00	19.55	19.52	19.62	18.917	19.217
M 4	0.70	3.70	3.68	3.76	3.242	3.466	M 5.5	x	0.50	5.30	5.28	5.33	4.959	5.139	M 20	x	1.50	19.30	19.26	19.38	18.376	19.751
M 4.5	0.75	4.20					M 6	x	0.75	5.65	5.62	5.70	5.188	5.424	M 24	x	1.00	23.55	23.52	23.62	22.917	23.217
M 5	0.80	4.65	4.62	4.71	4.134	4.384	M 7	x	0.75	6.65	6.62	6.70	6.188	6.424	M 24	x	1.50	23.30	23.26	23.38	22.376	22.751
M 6	1.00	5.55	5.52	5.62	4.917	5.217	M 8	x	0.75	7.65	7.62	7.70	7.188	7.424	M 24	x	2.00	23.10	23.05	23.20	21.835	22.310
M 7	1.00	6.55	6.52	6.62	5.917	6.217	M 8	x	1.00	7.55	7.52	7.62	6.917	7.217	M 27	x	1.50	26.30	26.26	26.38	25.376	25.751
M 8	1.25	7.40	7.36	7.47	6.647	6.982	M 9	x	0.75	8.65	8.62	8.70	8.188	8.424	M 30	x	1.50	29.30	29.26	29.38	28.376	28.751
M 9	1.25	8.40	8.36	8.47	7.647	7.982	M 9	x	1.00	8.55	8.52	8.62	7.917	8.217	M 33	x	1.50	32.30	32.26	32.38	31.376	31.751
M 10	1.50	9.30	9.26	9.38	8.376	8.751	M 10	x	0.75	9.65	9.62	9.70	9.188	9.424	M 36	x	1.50	35.30	35.26	35.38	34.376	34.751
M 11	1.50	10.30	10.26	10.38	9.376	9.751	M 10	x	1.00	9.55	9.52	9.62	8.917	9.217	M 39	x	1.50	38.30	38.26	38.38	37.376	37.751
M 12	1.75	11.20	11.15	11.29	10.106	10.531	M 10	x	1.25	9.40	9.36	9.47	8.647	8.982	M 42	x	1.50	41.30	41.26	41.38	42.376	42.751
M 14	2.00	13.10	13.05	13.20	11.835	12.310	M 11	x	0.75	10.65	10.62	10.70	10.188	10.424								
M 16	2.00	15.10	15.05	15.20	13.835	14.310	M 11	x	1.00	10.55	10.52	10.62	9.917	10.217								
M 18	2.50	16.90	16.83	17.02	15.294	15.854	M 12	x	1.00	11.55	11.52	11.62	10.917	11.217								
M 20	2.50	18.90	18.83	19.02	17.294	17.854	M 12	x	1.25	11.40	11.36	11.47	10.647	10.982								
M 22	2.50	20.90	20.83	21.02	19.294	19.854	M 12	x	1.50	11.30	11.26	11.38	10.376	10.751								
M 24	3.00	22.70	22.62	22.80	20.752	21.382	M 14	x	1.00	13.55	13.52	13.62	12.917	13.217								
M 27	3.00	25.70	25.62	25.80	23.752	24.382	M 14	x	1.25	13.40	13.36	13.47	12.647	12.982								
M 30	3.50	28.50	28.40	28.60	26.211	26.921	M 14	x	1.50	13.30	13.26	13.38	12.376	12.751								
M 33	3.50	31.50	31.40	31.60	29.211	29.921	M 15	x	1.00	14.55	14.52	14.62	13.917	14.217								
M 36	4.00	34.30	34.17	34.40	31.670	32.420	M 15	x	1.50	14.30	14.26	14.38	13.376	13.751								
M 39	4.00	37.30	37.17	37.40	34.670	35.420	M 16	x	1.00	15.55	15.52	15.62	14.917	15.217								
M 42	4.50	40.10	39.95	40.20	37.129	37.979	M 16	x	1.50	15.30	15.26	15.38	14.376	14.751								
							M 17	x	1.00	16.55	16.52	16.62	15.917	16.217								

* M 2 up to M 2.5 tapping size hole of int. thread 6H

* M 2.5 x 0.35 up to M 4 x 0.35 tapping size hole of int. thread 6H

Tapping size hole diameter tolerance zone for thread forming (to DIN 13, section 50)

Due to the tensile strength it is not necessary to adhere to the tapping size hole diameter tolerance class 6H; tolerance class 7H satisfies the requirement that the flank coverage of external and internal threads should not fall below 0.32 x P. In addition, formed threads generally possess a higher tensile strength in comparison to cut threads thanks to an uninterrupted grain flow and subsequent work hardening.

UNC threads ASME B1.1						UNF threads ASME B1.1						(Whitworth) threads DIN EN ISO 228-1									
nom. Ø	threads per inch	tapp. size hole Ø	tapp. size hole Ø		core Ø of int. thread		nom. Ø	threads per inch	tapp. size hole Ø	tapp. size hole Ø		core Ø of int. thread		nom. Ø	threads per inch	tapp. size hole Ø	tapp. size hole Ø		core Ø of int. thread		
			min.	max.	min.	max.				min.	max.	min.	max.				min.	max.			
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm		
Nr. 1	- 64	1.68	1.67	1.70	1.425	1.580	Nr. 1	- 72	1.70	1.69	1.72	1.473	1.610	G 1/16	28	7.30	7.28	7.35	6.561	6.843	
Nr. 2	- 56	1.98	1.97	2.01	1.694	1.872	Nr. 2	- 64	2.00	1.99	2.03	1.755	1.910	G 1/8	28	9.30	9.28	9.35	8.566	8.848	
Nr. 3	- 48	2.28	2.27	2.32	1.941	2.146	Nr. 3	- 56	2.30	2.29	2.34	2.024	2.197	G 1/4	19	12.50	12.48	12.55	11.445	11.890	
Nr. 4	- 40	2.55	2.54	2.59	2.157	2.385	Nr. 4	- 48	2.60	2.59	2.63	2.271	2.459	G 3/8	19	16.00	15.98	16.05	14.950	15.395	
Nr. 5	- 40	2.90	2.89	2.94	2.487	2.698	Nr. 5	- 44	2.90	2.89	2.93	2.550	2.741	G 1/2	14	20.00	19.98	20.12	18.631	19.172	
Nr. 6	- 32	3.15	3.14	3.19	2.642	2.896	Nr. 6	- 40	3.20	3.19	3.24	2.819	3.023	G 5/8	14	22.00	21.98	22.12	20.587	21.128	
Nr. 8	- 32	3.80	3.78	3.82	3.302	3.531	Nr. 8	- 36	3.85	3.83	3.88	3.404	3.607	G 3/4	14	25.50	25.48	25.62	24.117	24.658	
Nr. 10	- 24	4.35	4.33	4.39	3.683	3.937	Nr. 10	- 32	4.45	4.43	4.49	3.962	4.166	G 7/8	14	29.25	29.23	29.37	27.877	28.418	
Nr. 12	- 24	5.00	4.97	5.03	4.343	4.597	Nr. 12	- 28	5.10	5.07	5.13	4.496	4.724	G 1	11	32.00	31.98	32.15	30.291	30.931	
1/4	- 20	5.75	5.72	5.80	4.978	5.258	1/4	- 28	5.95	5.92	5.99	5.359	5.588	G 1 1/4	11	40.75	40.70	40.85	38.952	39.592	
5/16	- 18	7.30	7.26	7.37	6.401	6.731	5/16	- 24	7.45	7.42	7.50	6.782	7.036								
3/8	- 16	8.80	8.77	8.88	7.798	8.153	3/8	- 24	9.05	9.02	9.10	8.838	9.136								
7/16	- 14	10.30	10.27	10.37	9.144	9.550	7/16	- 20	10.55	10.48	10.58	9.728	10.033								
1/2	- 13	11.80	11.77	11.88	10.592	11.024	1/2	- 20	12.10	12.08	12.18	11.328	11.608								
9/16	- 12	13.30	13.28	13.39	11.989	12.446	9/16	- 18	13.65	13.61	13.72	12.751	13.081								
5/8	- 11	14.80	14.78	14.90	13.386	13.868	5/8	- 18	15.25	15.21	15.32	14.351	14.681								
3/4	- 10	17.90	17.85	17.97	16.307	16.840	3/4	- 16	18.35	18.30	18.41	17.323	17.678								
7/8	- 9	21.00	20.95	21.10	19.177	19.761	7/8	- 14	21.40	21.35	21.49	20.269	20.650								
1	- 8	24.00	23.95	24.12	21.971	22.606	1	- 12	24.45	24.40	24.54	23.114	23.571								



From 1/64 to 11 63/64

Size (inch)	mm	Part of inch (decimal)	Size (inch)	mm	Part of inch (decimal)	Size (inch)	mm	Part of inch (decimal)	Size (inch)	mm	Part of inch (decimal)
-	0.10	0.0039	51	1.70	0.0670	4	5.31	0.2090	-	14.00	0.5512
97	0.15	0.0059		1.75	0.0689	3	5.41	0.213	9/16	14.29	0.5625
96	0.16	0.0063	50	1.78	0.0700		5.50	0.2165		14.50	0.5709
95	0.17	0.0067		1.80	0.0709	7/32	5.56	0.2188	37/64	14.68	0.5781
94	0.18	0.0071	49	1.85	0.0730	2	5.61	0.221	-	15.00	0.5906
93	0.19	0.0075		1.90	0.0748	1	5.79	0.228	19/32	15.08	0.5938
92	0.20	0.0079	48	1.93	0.0760	A	5.94	0.234	39/64	15.48	0.6094
91	0.21	0.0083		1.95	0.0768	15/64	5.95	0.2344		15.50	0.6102
90	0.22	0.0087	5/64	1.98	0.0781	-	6.00	0.2362	5/8	15.88	0.625
89	0.23	0.0091	47	1.99	0.0785	B	6.05	0.238	-	16.00	0.6299
88	0.24	0.0095	-	2.00	0.0787	C	6.15	0.242	41/64	16.27	0.6406
-	0.25	0.0098		2.05	0.0807	D	6.25	0.246		16.50	0.6496
87	0.25	0.0100	46	2.06	0.0810	1/4	6.35	0.25	21/32	16.67	0.6562
	0.26	0.0102	45	2.08	0.0820	E	6.35	0.25	-	17.00	0.6693
86	0.27	0.0105		2.15	0.0846		6.50	0.2559	43/64	17.07	0.6719
	0.27	0.0106	44	2.18	0.0860	F	6.53	0.257	11/16	17.46	0.6875
85	0.28	0.0110	43	2.26	0.0890	G	6.63	0.261		17.50	0.689
	0.29	0.0114	42	2.37	0.0935	17/64	6.75	0.2656	45/64	17.86	0.7031
84	0.29	0.0115	3/32	2.38	0.0938		6.75	0.2657	-	18.00	0.7087
-	0.30	0.0118	41	2.44	0.0960	H	6.76	0.266	23/32	18.26	0.7188
83	0.30	0.0120	40	2.50	0.0980	I	6.91	0.272		18.50	0.7283
82	0.32	0.0125	39	2.53	0.0995	-	7.00	0.2756	47/64	18.65	0.7344
	0.32	0.0126	38	2.58	0.1015	J	7.04	0.2772	-	19.00	0.748
81	0.33	0.0130	37	2.64	0.1040	K	7.14	0.281	3/4	19.05	0.75
80	0.34	0.0135	36	2.71	0.1065	9/32	7.14	0.2812	49/64	19.45	0.7656
79	0.37	0.0145	7/64	2.78	0.1094	L	7.37	0.29		19.50	0.7677
1/64	0.40	0.0156	35	2.79	0.11	M	7.49	0.2949	25/32	19.84	0.7812
78	0.41	0.0160	34	2.82	0.111		7.50	0.2953	-	20.00	0.7874
77	0.46	0.0180	33	2.87	0.113	19/64	7.54	0.2969	51/64	20.24	0.7969
-	0.50	0.0197		2.90	0.1142	N	7.67	0.3020		20.50	0.8071
76	0.51	0.0200	32	2.95	0.116		7.75	0.3051	13/16	20.64	0.8125
75	0.53	0.0210	-	3.00	0.1181	5/16	7.94	0.3125	-	21.00	0.8268
74	0.57	0.0225	31	3.05	0.12	-	8.00	0.315	53/64	21.03	0.8281
-	0.60	0.0236	1/8	3.18	0.125	O	8.03	0.316	27/32	21.43	0.8438
73	0.61	0.0240	30	3.26	0.1285	P	8.20	0.323		21.50	0.8465
72	0.64	0.0250		3.30	0.1299	21/64	8.33	0.3281	55/64	21.84	0.8594
71	0.66	0.0260	29	3.45	0.136	Q	8.43	0.332	-	22.00	0.8661
-	0.70	0.0276		3.50	0.1378		8.50	0.3346	7/8	22.23	0.875
70	0.71	0.0280	28	3.57	0.1405	R	8.61	0.339		22.50	0.8858
69	0.74	0.0292	9/64	3.57	0.1406	11/32	8.73	0.3438	57/64	22.62	0.8906
-	0.75	0.0295	27	3.66	0.144		8.75	0.3445	-	23.00	0.9055
68	0.79	0.0310	26	3.73	0.147	S	8.84	0.348	29/32	23.02	0.9062
1/32	0.79	0.0313		3.75	0.1476	-	9.00	0.3543	59/64	23.42	0.9219
-	0.80	0.0315	25	3.80	0.1495	T	9.09	0.358		23.50	0.9252
67	0.81	0.0320	24	3.86	0.152	23/64	9.13	0.3594	15/16	23.81	0.9375
66	0.84	0.0330	23	3.91	0.154	U	9.35	0.368	-	24.00	0.9449
65	0.89	0.0350	5/32	3.97	0.1562		9.50	0.374	61/64	24.21	0.9531
-	0.90	0.0354	22	3.99	0.157	3/8	9.53	0.375		24.50	0.9646
64	0.91	0.0360	-	4.00	0.1575	V	9.56	0.377	31/32	24.61	0.9688
63	0.94	0.0370	21	4.04	0.159	W	9.80	0.386	-	25.00	0.9843
62	0.97	0.0380	20	4.09	0.161	25/64	9.92	0.3906	63/64	25.00	0.9844
61	0.99	0.0390		4.20	0.1654	-	10.00	0.3937	1	25.40	1.00
-	1.00	0.0394	19	4.22	0.166	X	10.08	0.397			
60	1.02	0.0400	18	4.31	0.1695	Y	10.26	0.4040			
59	1.04	0.0410	11/64	4.37	0.1719	13/32	10.32	0.4062			
58	1.07	0.0420	17	4.39	0.173	Z	10.49	0.413			
57	1.09	0.0430	16	4.50	0.177		10.50	0.4134			
56	1.18	0.0465	15	4.57	0.18	27/64	10.72	0.4219			
3/64	1.19	0.0469	14	4.62	0.182	-	11.00	0.4331			
	1.20	0.0472	13	4.70	0.185	7/16	11.11	0.4375			
	1.25	0.0492	3/16	4.76	0.1875		11.50	0.4528			
	1.30	0.0512	12	4.80	0.189	29/64	11.51	0.4531			
55	1.32	0.0520	11	4.85	0.191	15/32	11.91	0.4688			
54	1.40	0.0550	10	4.91	0.1935	-	12.00	0.4724			
	1.45	0.0571	9	4.98	0.196	31/64	12.30	0.4844			
	1.50	0.0591	-	5.00	0.1968		12.50	0.4921			
53	1.51	0.0595	8	5.05	0.199	1/2	12.70	0.50			
	1.55	0.0610	7	5.11	0.2010	-	13.00	0.5118			
1/16	1.59	0.0625	13/64	5.16	0.2031	33/64	13.10	0.5156			
	1.60	0.0630	6	5.18	0.2040	17/32	13.49	0.5312			
52	1.61	0.0635	5	5.22	0.2055		13.50	0.5315			
	1.65	0.0650		5.25	0.2067	35/64	13.89	0.5469			

1 inch = 25.400 0 mm, see DIN 4890 (issue 2/75)



The new material abbreviations (selection)

mat. nos.	abbreviation old	abbreviation new	mat. nos.	abbreviation old	abbreviation new	mat. nos.	abbreviation old	abbreviation new	mat. nos.	abbreviation old	abbreviation new
0.6010	GG10	EN-GJL-100	1.0728	60 S 20	-	1.4436	X5CrNiMo 17 13 3	X3CrNiMo17-13-3	1.7043	-	38Cr4
0.6020	GG20	EN-GJL-200	1.0736	9 SMn 36	11SMn37	1.4438	X2CrNiMo 18 16 4	X2CrNiMo18-15-4	1.7147	20 MnCr 5	20MnCr5
0.6025	GG25	EN-GJL-250	1.0737	9 SMnPb 36	11SMnPb37	1.4460	X4CrNiMo27 5 2	X3CrNiMoN27-5-2	1.7149	20 MnCrS 5	20MnCrS5
0.6035	GG35	EN-GJL-350	1.0756	35 SPb 20	35SPb20	1.4462	X2CrNiMoN225 3	X2CrNiMoN22-5-3	1.7176	55 Cr 3	55Cr3
0.7050	GGG50	EN-GJS-500-7	1.0757	45 SPb 20	46SPb20	1.4509	X6CrTiNb 18	X2CrTiNb18	1.7182	27 MnCrB 5 2	27MnCrB5-2
0.7070	GGG70	EN-GJS-700-2	1.0760	-	38SMn26	1.4510	X6CrTi 17	X3CrTi17	1.7185	33 MnCrB 5 2	33MnCrB5-2
0.8035	GTW35	EN-GJMW-350-4	1.0761	-	38SMnPb26	1.4511	X6CrNb 17	X3CrNb17	1.7189	39 MnCrB 6 2	39MnCrB6-2
0.8155	GTS55	EN-GJMB-550-4	1.0762	-	44SMn28	1.4512	X6CrTi 12	X2CrTi12	1.7213	25 CrMoS 4	25CrMoS4
0.8170	GTS70	EN-GJMB-700-2	1.0763	-	44SMnPb28	1.4520	X1CrTi 15	X2CrTi17	1.7218	25 CrMo 4	25CrMo4
1.0022	St 01Z	-	1.0873	-	DC06 [Fe P06]	1.4521	X2CrMoTi 18 2	X2CrMoTi18-2	1.7219	-	26CrMo4-2
1.0035	St 33	S185	1.1103	ESTe 255	S255NL1	1.4522	X2CrMoNb 18 2	X2CrMoNb18-2	1.7220	34 CrMo 4	34CrMo4
1.0039	St 37 -2	S235JRH	1.1105	ESTe 315	S315NL1	1.4532	X7CrNiMoAl 15 7	X8CrNiMoAl15-7-2	1.7225	42 CrMo 4	42CrMo4
1.0044	St 44 -2	S275JR	1.1121	Ck 10	C10E	1.4541	X6CrNiTi18 10	X6CrNiTi18-10	1.7226	34 CrMoS 4	34CrMoS4
1.0050	St 50 -2	E295	1.1141	Ck15	C15E	1.4542	X5CrNiCuNb 17 4	X5CrNiCuNb16-4	1.7227	42 CrMoS 4	42CrMoS4
1.0060	St 60 -2	E335	1.1151	Ck 22	C22E	1.4550	X6CrNiNb 18 10	X6CrNiNb18-10	1.7228	50 CrMo 4	50CrMo4
1.0070	St 70 -2	E360	1.1158	Ck 25	C25E	1.4558	X2NiCrAlTi 32 20	X2NiCrAlTi32-20	1.7264	20 CrMo 5	20CrMo5
1.0114	St 37 -3U	S235J0	1.1170	28 Mn 6	28Mn6	1.4567	X3CrNiCu 18 9 X	X3CrNiCu18-9-4	1.7321	20 MoCr 4	20MoCr4
1.0226	St 02Z	DX51D	1.1178	Ck 30	C30E	1.4568	X7CrNiAl 17 7	X7CrNiAl17-7	1.7323	20 MoCrS 4	20MoCrS4
1.0242	StE 250 -2Z	S250GD	1.1181	Ck 35	C35E	1.4571	-	X6CrNiMoTi17-12-2	1.7333	22 CrMoS 3 5	22CrMoS3-5
1.0244	StE 280 -2Z	S280GD	1.1186	Ck 40	C40E	1.4577	X3CrNiMoTi 25 25	X3CrNiMoTi25-25	1.7335	13 CrMo 4 4	13CrMo4-5
1.0250	StE 320 -3Z	S320GD	1.1191	Ck 45	C45E	1.4592	X1CrMoTi 29 4	X2CrMoTi29-4	1.7362	12 CrMo 19 5	12CrMo19-5
1.0301	C 10	-	1.1203	Ck 55	C55E	1.4713	X10CrAl 7	X10CrAlSi7	1.7380	10 CrMo 9 10	10CrMo9-10
1.0302	C 10 Pb	-	1.1206	Ck 50	C50E	1.4724	X10CrAl 13	X10CrAlSi13	1.7383	-	11CrMo9-10
1.0306	St 06 Z	DX54D	1.1221	Ck 60	C60E	1.4742	X10CrAl 18	X10CrAlSi18	1.7779	-	20CrMoV13-5-5
1.0312	St 15	DC05 [Fe P05]	1.1241	Cm 50	C50R	1.4762	X10CrAl 24	X10CrAlSi25	1.8159	50 CrV 4	51CrV4
1.0319	RRStE 210.7	L210GA	1.1750	C 75 W	C75W	1.4821	X20CrNiSi 25 4	X20CrNiSi25-4	1.8504	34 CrAl 6	34CrAl6
1.0322	-	DX56D	1.2067	102 Cr 6	102Cr6	1.4828	X15CrNiSi 20 12	X15CrNiSi20-12	1.8519	31 CrMoV 9	31CrMoV9
1.0330	St 12 [St 2]	DC01 [Fe P01]	1.2080	-	X210Cr12	1.4833	X7CrNi 23 14	X7CrNi23-12	1.8550	34 CrAlNi 7	34CrAlNi7
1.0333	USt 13	-	1.2083	-	X42Cr13	1.4841	X15CrNiSi 25 20	X15CrNiSi25-21	1.8807	13 MnNiMoV 5 4	13MnNiMoV5-4
1.0338	St 14 [St 4]	DC04 [Fe P04]	1.2419	-	105WCr6	1.4845	X12CrNi 25 21	X12CrNi25-21	1.8812	18 MnMoV 5 2	18MnMoV5-2
1.0345	H I	P235GH	1.2767	-	X45NiCrMo4	1.4864	X12NiCrSi 36 16	X12NiCrSi35-16	1.8815	18 MnMoV 6 3	18MnMoV6-3
1.0347	RRSt 13 [RRSt 3]	DC03 [Fe P03]	1.3243	S6-5-2-5	S 6-5-2-5	1.4878	X12CrNiTi18 9	X10CrNiTi18-10	1.8821	StE 355 TM	P355M
1.0348	UH I	P195GH	1.3343	S6-5-2	S 6-5-2	1.4903	-	X10CrMoVNb9-1	1.8824	StE 420 TM	P420M
1.0350	St 03Z	DX52D	1.3344	S6-5-3	S 6-5-3	1.5022	55 Si 7	55Si7	1.8826	StE 460 TM	P460M
1.0355	St 05Z	DX53D	1.4000	X6Cr 13	X6Cr13	1.5131	50 MnSi 4	50MnSi4	1.8828	ESTe 420 TM	P420ML2
1.0356	TTSt 35 N	P215NL	1.4002	X6CrAl 13	X6CrAl13	1.5415	15 Mo 3	16Mo3	1.8831	ESTe 460 TM	P460ML2
1.0358	St 05 Z	-	1.4003	X2Cr 11	X2CrNi12	1.5530	21 MnB 5	20MnB5	1.8832	TStE 355 TM	P355ML1
1.0401	C 15	-	1.4005	-	X12CrS13	1.5531	30 MnB 5	30MnB5	1.8835	TStE 420 TM	P420ML1
1.0402	C 22	C22	1.4006	X10Cr 13	X12Cr13	1.5532	38 MnB 5	38MnB5	1.8837	StE 460 TM	P460ML1
1.0403	C 15 Pb	-	1.4016	X6Cr 17	X6Cr17	1.5637	10 Ni 14	12Ni14	1.8879	StE ...	P690Q
1.0406	C 25	C25	1.4021	X20Cr 13	X20Cr13	1.5662	-	X11CrMo5+I	1.8880	WStE ...	P690QH
1.0419	St 52.0	L355	1.4028	X30Cr 13	X30Cr13	1.5680	-	X12Ni5	1.8881	TStE ...	P690QL1
1.0424	St 45.8 (ersetzt)	P265	1.4031	X38Cr 13	X38Cr13	1.5710	36 NiCr 6	36NiCr6	1.8882	10 MnTi 3	10MnTi3
1.0424	St 42.8 (ersetzt)	P265	1.4034	X46Cr 13	X46Cr13	1.5715	-	16NiCrS4	1.8888	ESTe ...	P690QL2
1.0425	H2	P265GH	1.4037	X65Cr13	X65Cr13	1.5752	14 NiCr 14	15NiCr13	1.8900	StE 380	S380N
1.0429	StE 290.7 TM	L290MB	1.4057	X20CrNi 17 2	X17CrNi16-2	1.6210	15 MnNi 6 3	15MnNi6-3	1.8901	StE 460	S460N
1.0457	StE 240.7	L245NB	1.4104	X12CrMoS 17	X14CrMoS17	1.6211	16 MnNi 6 3	16MnNi6-3	1.8902	StE 420	S420N
1.0459	RRStE 240.7	L245GA	1.4105	X4CrMoS 18	X6CrMoS17	1.6310	20 MnMoNi 5 5	20MnMoNi5-5	1.8903	TStE 460	S460NL
1.0461	StE 255	S255N	1.4109	X65CrMo 14	X70CrMo15	1.6311	20 MnMoNi 4 5	20MnMoNi4-5	1.8905	StE 460	P460N
1.0473	19 Mn 6	P355GH	1.4110	X55CrMo 14	X55CrMo14	1.6341	11 NiMoV 5 3	11NiMoV5-3	1.8907	StE 500	S500N
1.0481	17 Mn 4	P295GH	1.4112	X90CrMoV 18	X90CrMoV18	1.6368	15 NiCuMoNb 5	15NiCuMoNb5	1.8910	StE 380	S380NL
1.0484	StE 290.7	L290NB	1.4113	X6CrMo 17 1	X6CrMo17-1	1.6511	36 CrNiMo 4	36CrNiMo4	1.8911	ESTe 380	S380NL1
1.0486	StE 285	P275N	1.4116	X45CrMoV 15	X50CrMoV15	1.6523	21 NiCrMo 2	21NiCrMo2-2	1.8912	TStE 420	S420NL
1.0501	C 35	C35	1.4120	X20CrMo 13	X20CrMo13	1.6526	21 NiCrMoS 2	21NiCrMoS2-2	1.8913	ESTe 420	S420NL1
1.0503	C 45	C45	1.4122	X35CrMo 17	X39CrMo17-1	1.6580	30 CrNiMo 8	30CrNiMo8	1.8915	TStE 460	P460NL1
1.0505	StE 315	P315N	1.4125	X105CrMo 17	X105CrMo17	1.6582	34 CrNiMo 6	34CrNiMo6	1.8917	WStE 500	S500NL
1.0511	C 40	C40	1.4301	X5CrNi 18 10	X5CrNi18-10	1.6587	17 CrNiMo 6	18CrNiMo7-6	1.8918	ESTe 460	P460NL2
1.0528	C 30	C30	1.4303	X5CrNi 18 12	X4CrNi18-12	1.7003	38 Cr 2	38Cr2	1.8919	ESTe 500	S500NL1
1.0529	StE 350 -3Z	S350GD	1.4305	X10CrNiS 18 9	X8CrNiS18-9	1.7006	46 Cr 2	46Cr2	1.8930	WStE 380	P380NH
1.0535	C 55	C55	1.4306	X2CrNi 19 11	X2CrNi19-11	1.7016	17 Cr 3	17Cr3	1.8932	WStE 420	P420NH
1.0539	StE 355N	S355NH	1.4310	X12CrNi 17 7	X10CrNi18-8	1.7023	38 CrS 2	38CrS2	1.8935	WStE 460	P460NH
1.0540	C 50	C50	1.4311	X2CrNiN 18 10	X2CrNiN18-10	1.7025	46 CrS 2	46CrS2	1.8937	TStE 500	P500NH
1.0547	St 52 -3U	S355J0H	1.4313	X4CrNi 13 4	X3CrNiMo13-4	1.7030	28 Cr 4	28Cr4	1.8972	StE 415.7	L415NB
1.0582	StE 360.7	L360NB	1.4318	X2CrNiN 18 7	X2CrNiN18-7	1.7033	34 Cr 4	34Cr4	1.8973	StE 415.7 TM	L415MB
1.0601	C 60	C60	1.4335	X1CrNi 25 21	X1CrNi25-21	1.7034	37 Cr 4	37Cr4	1.8975	StE 445.7 TM	L450MB
1.0710	15 S 10	-	1.4361	X1CrNiSi 18 15	X1CrNiSi18-15-4	1.7035	41 Cr 4	41Cr4	1.8977	StE 480.7 TM	L485MB
1.0715	9 SMn 28	11SMn30	1.4362	X2CrNiN 23 4	X2CrNiN23-4	1.7036	28 CrS 4	28CrS4	1.8978	StE 550.7 TM	L555MB
1.0718	9 SMnPb 28	11SMnPb30	1.4401	X5CrNiMo 17 12 2	X5CrNiMo17-12-2	1.7037	34 CrS 4	34CrS4			
1.0721	10 S 20	10S20	1.4404	X2CrNiMo 17 13 2	X2CrNiMo17-12-2	1.7038	37 CrS 4	37CrS4			
1.0722	10 S Pb 20	10SPb20	1.4410	X10CrNiMo 18 9	X2CrNiMoN25-7-4	1.7039	41 CrS 4	41CrS4			
1.0726	35 S 20	35S20	1.4418	X4CrNiMo 16 5	X4CrNiMo16-5-1	1.7131	16 MnCr 5	16MnCr5			
1.0727	45 S 20	46S20	1.4435	X2CrNiMo 18 14 3	X2CrNiMo18-14-3	1.7139	16 MnCrS 5	16MnCrS5			

ARTIKKELINRO, LUETTELO

BRING
GÜH



Artikkelinro.	Sivu	Poraus- vyyys	Standardi	Kuvaus	Materiaali	Malli	Muoto
11	428		Tehdas stdr.	Porasarjat			
16	420	~5xD	DIN 338	Porasarjat	HSCO	N	
17	419	~5xD	DIN 338	Porasarjat	HSS	N	
18	421	~5xD	DIN 338	Porasarjat	HSCO	Ti	
36	426		Tehdas stdr.	Porasarjat			
73	427		Tehdas stdr.	Porasarjat			
128	413		Tehdas stdr.	Lyhyet porat 16.0 mm varrella	HSCO	V72	
129	414		Tehdas stdr.	Lyhyet porat 25.4 mm varrella	HSCO	V72	
136	415		Tehdas stdr.	Lyhyet porat 25.4 mm varrella	HSCO	V72	
195	422	~5xD	DIN 338	Porasarjat	HSCO	VA	
200	418	~5xD	DIN 338	Porasarja ilman koteloa	HSS	N	
201	417	~5xD	DIN 338	Porasarjat	HSS	N	
204	338, 587	~10xD	DIN 340	Pitkät kierukkiporat	HSS	N	
205	244	~5xD	DIN 338	Normaaliporat	HSS	N	
206	263	~5xD	DIN 338	Normaaliporat	HSS	H	
207	269	~5xD	DIN 338	Normaaliporat	HSS	W	
208	258	~5xD	DIN 338	Normaaliporat	HSS	N	
209	266	~5xD	DIN 338	Normaaliporat	HSS	H	
210	272	~5xD	DIN 338	Normaaliporat	HSS	W	
211	325	~10xD	DIN 339	Pitkät kartioartiset kierukkiporat	HSS	N	
217	331, 580	~10xD	DIN 340	Pitkät kierukkiporat	HSS	N	
218	339, 588	~10xD	DIN 340	Pitkät kierukkiporat	HSS	H	
219	342, 591	~10xD	DIN 340	Pitkät kierukkiporat	HSS	W	
220	336, 585	~10xD	DIN 340	Pitkät kierukkiporat	HSS	N	
221	341, 590	~10xD	DIN 340	Pitkät kierukkiporat	HSS	H	
223	192	~3xD	DIN 1897	Erikoislyhyet porat	HSS	N	
224	204	~3xD	DIN 1897	Erikoislyhyet porat	HSS	H	
225	208	~3xD	DIN 1897	Erikoislyhyet porat	HSS	W	
226	200	~3xD	DIN 1897	Erikoislyhyet porat	HSS	N	
227	206	~3xD	DIN 1897	Erikoislyhyet porat	HSS	H	
228	210	~3xD	DIN 1897	Erikoislyhyet porat	HSS	W	
229	458	~5xD	DIN 345	Kierukkiporat	HSS	N	
235	363, 612	~15xD	DIN 1869	Erikoispitkät kierukkiporat sarja 1	HSS	N	
236	371, 620	~20xD	DIN 1869	Erikoispitkät kierukkiporat sarja 2	HSS	N	
237	377, 626	~25xD	DIN 1869	Erikoispitkät kierukkiporat sarja 3	HSS	N	
240	257	~5xD	DIN 338	Normaaliporat	HSS	N	
242	381, 630	>25xD	Tehdas stdr.	Ylipitkät kierukkiporat	HSS	GT 100	
243	382, 631	>25xD	Tehdas stdr.	Ylipitkät kierukkiporat	HSS	GT 100	
244	383, 632	>25xD	Tehdas stdr.	Ylipitkät kierukkiporat	HSS	GT 100	
245	450	~5xD	DIN 345	Kierukkiporat	HSS	N	
246	459	~5xD	DIN 345	Kierukkiporat	HSS	H	
247	460	~5xD	DIN 345	Kierukkiporat	HSS	W	
248	457	~5xD	DIN 345	Kierukkiporat	HSS	N	
251	471	~5xD	DIN 346	Kierukkiporat	HSS	N	
254	499		Tehdas stdr.	Jäähdytyskanavaporat, lastu-ura Tehass stdr.	HSS	N	
255	500		Tehdas stdr.	Jäähdytyskanavaporat, lastu-ura Tehass stdr.	HSS	N	
257	473	~10xD	DIN 341	Pitkät kartioartiset kierukkiporat	HSS	N	
266	483, 633	~15xD	DIN 1870	Erikoispitkät kierukkiporat sarja 1	HSS	N	
267	487, 637	~20xD	DIN 1870	Erikoispitkät kierukkiporat sarja 2	HSS	N	
268	412		Tehdas stdr.	Porat 12.7 mm varrella	HSS	N	
269	498	~7xD	Tehdas stdr.	Lyhyet jäähdytyskanavaporat	HSS	N	
270	502	~10xD	Tehdas stdr.	Jäähdytyskanavaporat, lastu-ura DIN 341	HSS	N	
271	503	~10xD	Tehdas stdr.	Jäähdytyskanavaporat, lastu-ura DIN 341	HSS	N	
272	504	~10xD	Tehdas stdr.	Jäähdytyskanavaporat, lastu-ura DIN 341	HSS	N	
274	714		Tehdas stdr.	Upotusporat DIN 332 keskitystä varten	HSS	N	D
280	689		Tehdas stdr.	Keskiöporat ilman tasopintaa	HSS	N	A
281	684		Tehdas stdr.	Keskiöporat ilman tasopintaa	HSS	N	A
282	685		Tehdas stdr.	Keskiöporat ilman tasopintaa	HSS	N	A
283	686		Tehdas stdr.	Keskiöporat ilman tasopintaa	HSS	N	R
284	687		Tehdas stdr.	Keskiöporat ilman tasopintaa	HSS	N	R
285	688		Tehdas stdr.	Keskiöporat ilman tasopintaa	HSS	N	B
287	693		DIN 333	Keskiöporat tasohionnalla	HSS	N	A
288	694		DIN 333	Keskiöporat tasohionnalla	HSS	N	R
289	695		Tehdas stdr.	Keskiöporat tasohionnalla	HSS	N	B
292	680		BS 328	Keskiöporat ilman tasopintaa	HSS	N	A
293	495	>20xD	Tehdas stdr.	Ylipitkät kierukkiporat	HSS	GT 100	
294	681		BS 328	Keskiöporat ilman tasopintaa	HSS	N	A
298	496	>20xD	Tehdas stdr.	Ylipitkät kierukkiporat	HSS	GT 100	
299	497	>20xD	Tehdas stdr.	Ylipitkät kierukkiporat	HSS	GT 100	
301	397, 649	~5xD	DIN 1899	HSS-E-PM Mikroporat ilman jäähdytyskanavia	HSS-E-PM	N	
303	402, 654	~5xD	DIN 1899	HSS-E-PM Mikroporat ilman jäähdytyskanavia	HSS-E-PM	N	
305	284	~5xD	DIN 338	Normaaliporat	HSCO	N	



Artikkelinro.	Sivu	Poraus- vyys	Standardi	Kuvaus	Materiaali	Malli	Muoto
308	289	~5xD	DIN 338	Normaaliporat	HSCO	N	
311	330	~10xD	DIN 339	Pitkät kartioartiset kierukkaporat	HSCO	N	
317	353, 602	~10xD	DIN 340	Pitkät kierukkaporat	HSCO	N	
329	218	~3xD	DIN 1897	Erikoislyhyet porat	HSCO	GV 120	
330	225	~3xD	DIN 1897	Erikoislyhyet porat	HSCO	GV 120	
336	355, 604	~10xD	DIN 340	Pitkät kierukkaporat	HSCO	GT 100	
345	463	~5xD	DIN 345	Kierukkaporat	HSCO	N	
351	472	~5xD	DIN 346	Kierukkaporat	HSCO	N	
357	480	~10xD	DIN 341	Pitkät kartioartiset kierukkaporat	HSCO	N	
363	448	~3xD	Tehdas stdr.	Normaaliporat	HSCO	GV 120	
370	505	~10xD	Tehdas stdr.	Jäähdytyskanavaporat, lastu-ura DIN 341	HSCO	GT 100	
371	506	~10xD	Tehdas stdr.	Jäähdytyskanavaporat, lastu-ura DIN 341	HSCO	GT 100	
372	507	~10xD	Tehdas stdr.	Jäähdytyskanavaporat, lastu-ura DIN 341	HSCO	GT 100	
374	508, 641	~15xD	Tehdas stdr.	Jäähdytyskanavaporat, lastu-ura DIN 1870	HSCO	GT 100	
375	509, 642	~15xD	Tehdas stdr.	Jäähdytyskanavaporat, lastu-ura DIN 1870	HSCO	GT 100	
376	510, 643	~15xD	Tehdas stdr.	Jäähdytyskanavaporat, lastu-ura DIN 1870	HSCO	GT 100	
378	718		Tehdas stdr.	Lyhyet upotusporat	HSS	N	
379	720		Tehdas stdr.	Lyhyet upotusporat	HSS	N	
380	721		Tehdas stdr.	Lyhyet upotusporat	HSS	N	
381	682		DIN 333	Keskiöporat ilman tasopintaa	HSCO	N	A
390	394	~10xD	Tehdas stdr.	Jäähdytyskanavaporat	HSS	N	
396	357, 606	~10xD	DIN 340	Pitkät kierukkaporat	HSCO	GT 100	
501	351, 600	~10xD	DIN 340	Pitkät kierukkaporat	HSS	GT 50	
502	365, 614	~15xD	DIN 1869	Erikoispitkät kierukkaporat sarja 1	HSS	GT 100	
503	372, 621	~20xD	DIN 1869	Erikoispitkät kierukkaporat sarja 2	HSS	GT 100	
504	378, 627	~25xD	DIN 1869	Erikoispitkät kierukkaporat sarja 3	HSS	GT 100	
505	479	~10xD	DIN 341	Pitkät kartioartiset kierukkaporat	HSS	GT 50	
506	350, 599	~10xD	DIN 340	Pitkät kierukkaporat	HSS	GT 100	
511	386	~5xD	Tehdas stdr.	Kierukkaporat suurennetulla lieriövarrella	HSCO	GU 500	
512	384	~3xD	Tehdas stdr.	Kierukkaporat suurennetulla lieriövarrella	HSCO	GU 500	
513	388	~5xD	Tehdas stdr.	Kierukkaporat suurennetulla lieriövarrella	HSS-E-PM	GT 500	
514	728		Tehdas stdr.	Lieriöartiset porrasporat	HSS	N	
515	237	~3xD	DIN 1897	Erikoislyhyet porat	HSS-E-PM	GT 500	
520	735		Tehdas stdr.	Porrasporat, kartioartiset	HSS	N	
523	482	~10xD	Tehdas stdr.	Pitkät kartioartiset kierukkaporat	HSS	N	
524	368, 617	~15xD	DIN 1869	Erikoispitkät kierukkaporat sarja 1	HSS	GT 50	
525	485, 635	~15xD	DIN 1870	Erikoispitkät kierukkaporat sarja 1	HSS	GT 50	
526	484, 634	~15xD	DIN 1870	Erikoispitkät kierukkaporat sarja 1	HSS	GT 100	
527	488, 638	~20xD	DIN 1870	Erikoispitkät kierukkaporat sarja 2	HSS	GT 100	
528	375, 624	~20xD	DIN 1869	Erikoispitkät kierukkaporat sarja 2	HSS	GT 50	
529	379, 628	~25xD	DIN 1869	Erikoispitkät kierukkaporat sarja 3	HSS	GT 50	
531	416, 746		DIN 1898	Kartiosokkareiänporat	HSS	N	
532	511, 747		DIN 1898	Kartiosokkareiänporat	HSS	N	
533	737		DIN 344	Lieriöartiset väljennysporat	HSS	N	
534	740		DIN 343	Väljennysporat, kartioartiset	HSS	N	
535	344, 593	~10xD	DIN 340	Pitkät kierukkaporat	HSS	GT 100	
536	722		DIN 8374	Lieriöartiset porrasporat	HSS	N	A
537	732		Tehdas stdr.	Porrasporat, kartioartiset	HSS	N	
538	726		DIN 8376	Lieriöartiset porrasporat	HSS	N	
539	734		DIN 8377	Porrasporat, kartioartiset	HSS	N	
540	729		DIN 8378	Lieriöartiset porrasporat	HSS	N	
541	736		DIN 8379	Porrasporat, kartioartiset	HSS	N	
542	489, 639	~20xD	DIN 1870	Erikoispitkät kierukkaporat sarja 2	HSS	GT 50	
546	707		Tehdas stdr.	NC-alkuporat 142°	TKM	N	
549	274	~5xD	DIN 338	Normaaliporat	HSS	GT 100	
550	281	~5xD	DIN 338	Normaaliporat	HSS	GT 100	
551	476	~10xD	DIN 341	Pitkät kartioartiset kierukkaporat	HSS	GT 100	
552	212	~3xD	DIN 1897	Erikoislyhyet porat	HSS	GT 80	
553	215	~3xD	DIN 1897	Erikoislyhyet porat	HSS	GT 80	
554	708		Tehdas stdr.	Pop-niittiporat	HSS	DK 77	
555	743		DIN 1864	Väljennysporat, kartioartiset	HSS	N	
556	702		Tehdas stdr.	NC-alkuporat 120°	HSS	N	
557	696		Tehdas stdr.	NC-alkuporat 90°	HSS	N	
558	461	~5xD	DIN 345	Kierukkaporat	HSS	GT 100	
559	700		Tehdas stdr.	NC-alkuporat 90°	HSS	N	
560	256	~5xD	DIN 338	Normaaliporat	HSS	N	
561	327	~10xD	DIN 339	Pitkät kartioartiset kierukkaporat	HSS	N	
563	491	>20xD	Tehdas stdr.	Ylipitkät kierukkaporat	HSS	GT 100	
564	492	>20xD	Tehdas stdr.	Ylipitkät kierukkaporat	HSS	GT 100	
565	493	>20xD	Tehdas stdr.	Ylipitkät kierukkaporat	HSS	GT 100	
566	494	>20xD	Tehdas stdr.	Ylipitkät kierukkaporat	HSS	GT 100	
567	703		Tehdas stdr.	NC-alkuporat 120°	HSS	N	



Artikkelinro.	Sivu	Poraus- vyys	Standardi	Kuvaus	Materiaali	Malli	Muoto
568	697		Tehdas stdr.	NC-alkuporat 90°	HSS	N	
569	723		DIN 8374	Lieriövaritset porrasporat	HSS	N	B
571	380, 629	~25xD	DIN 1869	Erikoispitkät kierukkaporat sarja 3	HSCO	GT 100	
572	231	~3xD	DIN 1897	Erikoislyhyet porat	HSCO	VA	
574	715		Tehdas stdr.	Upotusporat DIN 332 keskitystä varten	HSS	N	DR
575	716		Tehdas stdr.	Upotusporat DIN 332 keskitystä varten	HSS	N	D
576	717		Tehdas stdr.	Upotusporat DIN 332 keskitystä varten	HSS	N	D
577	390		NAS 907	Tankoporat, 6 tuumaiset	HSS	N	
578	392		NAS 907	Tankoporat, 12 tuumaiset	HSS	N	
579	391		NAS 907	Tankoporat, 6 tuumaiset	HSS	N	
580	393		NAS 907	Tankoporat, 12 tuumaiset	HSS	N	
581	668		DIN 333	Keskiöporat ilman tasopintaa	HSS	N	A
582	670		DIN 333	Keskiöporat ilman tasopintaa	HSS	N	A
583	672		DIN 333	Keskiöporat ilman tasopintaa	HSS	N	R
584	674		DIN 333	Keskiöporat ilman tasopintaa	HSS	N	R
585	675		DIN 333	Keskiöporat ilman tasopintaa	HSS	N	B
586	676		DIN 333	Keskiöporat ilman tasopintaa	HSS	N	B
587	690		DIN 333	Keskiöporat tasohionnalla	HSS	N	A
588	691		DIN 333	Keskiöporat tasohionnalla	HSS	N	R
589	692		DIN 333	Keskiöporat tasohionnalla	HSS	N	B
590	671		DIN 333	Keskiöporat ilman tasopintaa	HSS	N	A
591	677		DIN 333	Keskiöporat ilman tasopintaa	HSS	N	B
592	454	~5xD	DIN 345	Kierukkaporat	HSS	N	
594	678		ASME B94.11 M	Keskiöporat ilman tasopintaa	HSS	N	A
595	679		ASME B94.11 M	Keskiöporat ilman tasopintaa	HSS	N	B
605	301	~5xD	DIN 338	Normaaliporat	HSCO	Ti	
606	462	~5xD	DIN 345	Kierukkaporat	HSS	GT 100	
608	308	~5xD	DIN 338	Normaaliporat	HSCO	Ti	
611	114	5xD	DIN 6539	Tehoporat, 3-leikkuiset	TKM	GS 200 U	
613	669		DIN 333	Keskiöporat ilman tasopintaa	HSS	N	A
614	673		DIN 333	Keskiöporat ilman tasopintaa	HSS	N	R
617	358, 607	~10xD	DIN 340	Pitkät kierukkaporat	HSCO	Ti	
618	370, 619	~15xD	DIN 1869	Erikoispitkät kierukkaporat sarja 1	HSCO	GT 100	
619	376, 625	~20xD	DIN 1869	Erikoispitkät kierukkaporat sarja 2	HSCO	GT 100	
620	486, 636	~15xD	DIN 1870	Erikoispitkät kierukkaporat sarja 1	HSCO	GT 100	
621	490, 640	~20xD	DIN 1870	Erikoispitkät kierukkaporat sarja 2	HSCO	GT 100	
622	291	~5xD	DIN 338	Normaaliporat	HSCO	GT 100	
623	481	~10xD	DIN 341	Pitkät kartiovaritset kierukkaporat	HSCO	GT 100	
634	742		DIN 343	Väljennysporat, kartiovaritset	HSCO	N	
635	744		DIN 1864	Väljennysporat, kartiovaritset	HSCO	N	
636	724		Tehdas stdr.	Lieriövaritset porrasporat	HSS	N	
637	731		Tehdas stdr.	Porrasporat, kartiovaritset	HSS	N	
638	725		Tehdas stdr.	Lieriövaritset porrasporat	HSS	N	
639	733		Tehdas stdr.	Porrasporat, kartiovaritset	HSS	N	
645	466	~5xD	DIN 345	Kierukkaporat	HSCO	GT 100	
651	250	~5xD	DIN 338	Normaaliporat	HSS	N	
652	277	~5xD	DIN 338	Normaaliporat	HSS	GT 100	
653	196	~3xD	DIN 1897	Erikoislyhyet porat	HSS	N	
654	455	~5xD	DIN 345	Kierukkaporat	HSS	N	
655	475	~10xD	DIN 341	Normaaliporat	HSS	N	
656	478	~10xD	DIN 341	Pitkät kartiovaritset kierukkaporat	HSS	GT 100	
657	304	~5xD	DIN 338	Normaaliporat	HSCO	Ti	
658	294	~5xD	DIN 338	Normaaliporat	HSCO	GT 100	
659	222	~3xD	DIN 1897	Erikoislyhyet porat	HSCO	GV 120	
660	400, 652	~5xD	DIN 1899	HSS-E-PM Mikroporat ilman jäähdytyskanavia	HSS-E-PM	N	
661	465	~5xD	DIN 345	Kierukkaporat	HSCO	N	
662	467	~5xD	DIN 345	Kierukkaporat	HSCO	GT 100	
663	449	~3xD	Tehdas stdr.	Normaaliporat	HSCO	GV 120	
664	261	~5xD	DIN 338	Normaaliporat	HSS	N	
665	283	~5xD	DIN 338	Normaaliporat	HSS	GT 100	
666	328	~10xD	DIN 339	Pitkät kartiovaritset kierukkaporat	HSS	N	
667	334, 583	~10xD	DIN 340	Pitkät kierukkaporat	HSS	N	
668	347, 596	~10xD	DIN 340	Pitkät kierukkaporat	HSS	GT 100	
669	360, 609	~10xD	DIN 340	Pitkät kierukkaporat	HSCO	Ti	
670	367, 616	~15xD	DIN 1869	Erikoispitkät kierukkaporat sarja 1	HSS	GT 100	
671	374, 623	~20xD	DIN 1869	Erikoispitkät kierukkaporat sarja 2	HSS	GT 100	
672	203	~3xD	DIN 1897	Erikoislyhyet porat	HSS	N	
701	404, 656	~5xD	Tehdas stdr.	TKM Mikroporat ilman jäähdytyskanavia	TKM	N	
702	243	~3xD	Tehdas stdr.	Erikoislyhyet porat	TKM	N	
703	429		DIN 8037	Erikoisporat KM-kärjellä	KM	N	
704	430		DIN 8038	Erikoisporat KM-kärjellä	KM	N	
705	512		DIN 8041	Erikoisporat KM-kärjellä	KM	N	



Artikkelinro.	Sivu	Poraussyvyys	Standardi	Kuvaus	Materiaali	Malli	Muoto
706	362, 611	~10xD	Tehdas stdr.	Pitkät kierukkiporat	TKM	N	
707	432		Tehdas stdr.	Kovametallikärkiset lappuporat	KM	H	
710	323	~5xD	Tehdas stdr.	Normaaliporat	KM	Duro 150	
716	433		Tehdas stdr.	Kiviseinäporat	KM	N	
723	701		Tehdas stdr.	NC-alkuporat 90°	TKM	N	
724	706		Tehdas stdr.	NC-alkuporat 120°	TKM	N	
729	745		Tehdas stdr.	Väljennysporat, kartiovartiset	KM	N	
730	239	3xD	DIN 6539	Erikoislyhyet porat	TKM	N	
731	115	5xD	DIN 6539	Tehoporat, 3-leikkuiset	TKM	GS 200 U	
732	319	~5xD	Tehdas stdr.	Normaaliporat	TKM	N	
736	683		Tehdas stdr.	Keskiöporat ilman tasopintaa	TKM	N	A
738	727		Tehdas stdr.	Lieriövaritiset porrasporat	TKM	N	
739	730		Tehdas stdr.	Lieriövaritiset porrasporat	TKM	N	
745	116	5xD	DIN 6539	Tehoporat, 3-leikkuiset	TKM	GS 200 G	
750	739		Tehdas stdr.	Lieriövaritiset väljennysporat	KM	N	
768	56	4xD	Tehdas stdr.	Tehoporat jäähdytyskanavilla	TKM	RT 150 GG	
769	93	7xD	Tehdas stdr.	Tehoporat jäähdytyskanavilla	TKM	RT 150 GG	
770	98	10xD	Tehdas stdr.	Tehoporat jäähdytyskanavilla	TKM	RT 150 GG	
773	103	15xD	Tehdas stdr.	Tehoporat jäähdytyskanavilla	TKM	RT 150 GN	
1018	313	~5xD	DIN 338	AeroX ristiinhiotut porat	M42	AeroX	
1025	117	5xD	DIN 6539	Tehoporat, 3-leikkuiset	TKM	GS 200 G	
1027	119	5xD	DIN 6539	Tehoporat, 3-leikkuiset	TKM	GS 200 F	
1032	120	3xD	Tehdas stdr.	Tehouputusporat, 3-leikkuiset	TKM	GS 200 G	
1047	162		Tehdas stdr.	Vaihtokärjet RT 800	TKM	RT 800 WP	
1071	168		Tehdas stdr.	Kiinnitysruuvit RT 800			
1083	425	~5xD	DIN 338	AeroX porasarjat	M42	AeroX	
1101	501	~10xD	Tehdas stdr.	Jäähdytyskanavaporat, lastu-ura DIN 341	HSS	N	
1131	395	~5xD	Tehdas stdr.	Jäähdytyskanavaporat	HSCO	GT 80 IK	
1132	396	~5xD	Tehdas stdr.	Jäähdytyskanavaporat	HSCO	GT 80 IK	
1133	699		Tehdas stdr.	NC-alkuporat 90°	HSCO	N	
1134	704		Tehdas stdr.	NC-alkuporat 120°	HSCO	N	
1135	705		Tehdas stdr.	NC-alkuporat 120°	HSCO	N	
1136	698		Tehdas stdr.	NC-alkuporat 90°	HSCO	N	
1146	315	~5xD	DIN 338	Normaaliporat	M42	N	
1147	719		Tehdas stdr.	Lyhyet upotusporat	HSS	N	
1149	431		Tehdas stdr.	FK-Porat	TKM	FK	
1171	55	3xD	DIN 6538K	Tehoporat jäähdytyskanavilla	KM	RT 80 U	
1172	84	5xD	DIN 6538M	Tehoporat jäähdytyskanavilla	KM	RT 80 U	
1173	95	7xD	DIN 6538L	Tehoporat jäähdytyskanavilla	KM	RT 80 U	
1180	54	3xD	DIN 6537K	Tehoporat jäähdytyskanavilla	TKM	RT 100 F	
1181	43	3xD	DIN 6537K	Tehoporat jäähdytyskanavilla	TKM	RT 100 U	
1182	80	5xD	DIN 6537L	Tehoporat jäähdytyskanavilla	TKM	RT 100 F	
1183	66	5xD	DIN 6537L	Tehoporat jäähdytyskanavilla	TKM	RT 100 U	
1184	21	3xD	DIN 6537K	Tehoporat ilman jäähdytyskanavia	TKM	RT 100 U	
1199	317	~5xD	DIN 338	Normaaliporat	M42	N	
1221	298	~5xD	DIN 338	Normaaliporat	HSCO	GT 100	
1222	468	~5xD	DIN 345	Kierukkiporat	HSCO	GT 100	
1223	299	~5xD	DIN 338	Normaaliporat	HSCO	GT 100	
1224	469	~5xD	DIN 345	Kierukkiporat	HSCO	GT 100	
1228	227	~3xD	DIN 1897	Erikoislyhyet porat	HSCO	GT 80	
1242	23	3xD	DIN 6539	Tehoporat ilman jäähdytyskanavia	TKM	RT 100 U	
1243	36	5xD	Tehdas stdr.	Tehoporat ilman jäähdytyskanavia	TKM	RT 100 U	
1259	235	~3xD	DIN 1897	Erikoislyhyet porat	M42	N	
1260	309	~5xD	DIN 338	Normaaliporat	HSCO	VA	
1261	230	~3xD	DIN 1897	Erikoislyhyet porat	HSCO	VA	
1262	470	~5xD	DIN 345	Kierukkiporat	HSCO	VA	
1612	171, 558		Tehdas stdr.	Torx-ruuviavain			
1660	53	3xD	DIN 6537K	Tehoporat jäähdytyskanavilla	TKM	RT 100 F	
1662	78	5xD	DIN 6537L	Tehoporat jäähdytyskanavilla	TKM	RT 100 F	
1663	65	5xD	DIN 6537L	Tehoporat jäähdytyskanavilla	TKM	RT 100 U	
1702	28	3xD	DIN 6539	Tehoporat ilman jäähdytyskanavia	TKM	RT 100 F	
1946	389	~3xD	DIN 6537K	Kierukkiporat suurennetulla lieriövarrella	TKM	H	
2047	311	~5xD	DIN 338	Normaaliporat	HSCO	P2000	
2048	233	~3xD	DIN 1897	Erikoislyhyet porat	HSCO	P2000	
2049	423	~5xD	DIN 338	Porasarjat	HSCO	P2000	
2050	424	~3xD	DIN 1897	Porasarjat	HSCO	P2000	
2456	254	~5xD	DIN 338	Normaaliporat	HSS	N	
2457	280	~5xD	DIN 338	Normaaliporat	HSS	GT 100	
2458	306	~5xD	DIN 338	Normaaliporat	HSCO	Ti	
2459	296	~5xD	DIN 338	Normaaliporat	HSCO	GT 100	
2460	199	~3xD	DIN 1897	Erikoislyhyet porat	HSS	N	
2461	224	~3xD	DIN 1897	Erikoislyhyet porat	HSCO	GV 120	

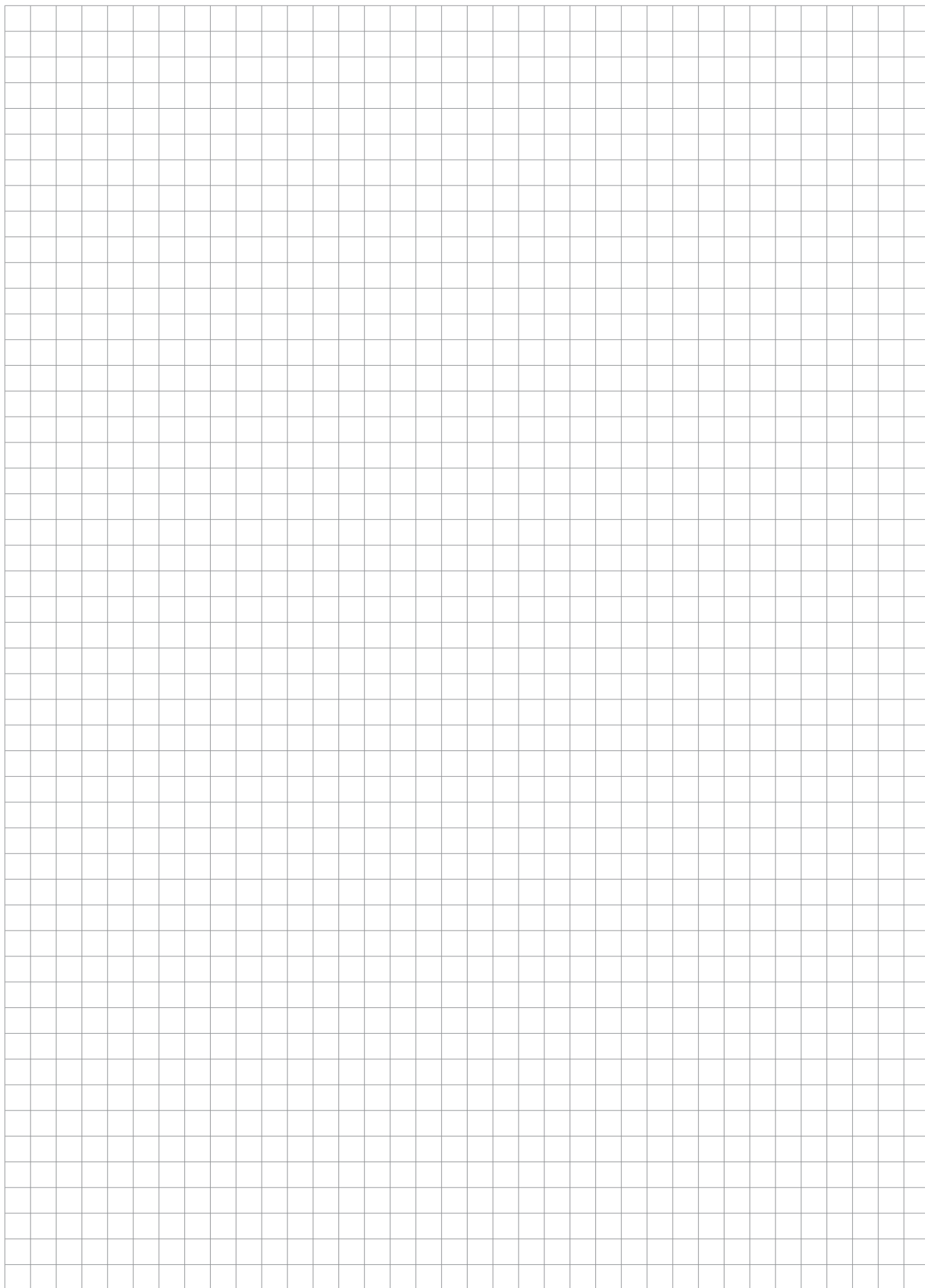


Artikkelinro.	Sivu	Poraussyvyys	Standardi	Kuvaus	Materiaali	Malli	Muoto
2462	349, 598	~10xD	DIN 340	Pitkät kierukkaporat	HSS	GT 100	
2463	241	~3xD	DIN 6539	Erikoislyhyet porat	TKM	N	
2464	321	~5xD	Tehdas stdr.	Normaaliporat	TKM	N	
2468	52	3xD	DIN 6537K	Tehoporat jäähdytyskanavilla	TKM	RT 100 F	
2469	41	3xD	DIN 6537K	Tehoporat jäähdytyskanavilla	TKM	RT 100 U	
2470	77	5xD	DIN 6537L	Tehoporat jäähdytyskanavilla	TKM	RT 100 F	
2471	63	5xD	DIN 6537L	Tehoporat jäähdytyskanavilla	TKM	RT 100 U	
2472	18	3xD	DIN 6537K	Tehoporat ilman jäähdytyskanavia	TKM	RT 100 U	
2473	20	3xD	DIN 6539	Tehoporat ilman jäähdytyskanavia	TKM	RT 100 U	
2474	34	5xD	Tehdas stdr.	Tehoporat ilman jäähdytyskanavia	TKM	RT 100 U	
2475	27	3xD	DIN 6537K	Tehoporat ilman jäähdytyskanavia	TKM	RT 100 F	
2477	39	3xD	DIN 6537K	Tehoporat jäähdytyskanavilla	TKM	RT 100 U	
2478	76	5xD	DIN 6537L	Tehoporat jäähdytyskanavilla	TKM	RT 100 F	
2479	61	5xD	DIN 6537L	Tehoporat jäähdytyskanavilla	TKM	RT 100 U	
2480	16	3xD	DIN 6537K	Tehoporat ilman jäähdytyskanavia	TKM	RT 100 U	
2485	164		Tehdas stdr.	Vaihtokärjet RT 800	TKM	RT 800 WP	
2498	229	~3xD	DIN 1897	Erikoislyhyet porat	HSCO	GT 80	
2711	89	7xD	Tehdas stdr.	Tehoporat jäähdytyskanavilla	TKM	RT 100 U	
2712	38	5xD	DIN 6537L	Tehoporat ilman jäähdytyskanavia	TKM	RT 100 F	
2713	113	5xD	DIN 6537L	Tehoporat, 3-leikkuiset	TKM	FT 200 G	
2717	35	5xD	DIN 6537L	Tehoporat ilman jäähdytyskanavia	TKM	RT 100 U	
2719	32	5xD	DIN 6537L	Tehoporat ilman jäähdytyskanavia	TKM	RT 100 U	
2747	166		Tehdas stdr.	Vaihtokärjet RT 800	TKM	RT 800 WP	
2996	30	5xD	DIN 6537L	Tehoporat ilman jäähdytyskanavia	TKM	RT 100 U	
2997	288	~5xD	DIN 338	Normaaliporat	HSCO	N	
3899	405, 657		Tehdas stdr.	TKM Mikroporat ilman jäähdytyskanavia	TKM	N	
4044	85	7xD	Tehdas stdr.	Tehoporat jäähdytyskanavilla	TKM	RT 100 U	
4045	87	7xD	Tehdas stdr.	Tehoporat jäähdytyskanavilla	TKM	RT 100 U	
4071	158, 561		Tehdas stdr.	Kiinnitysruuvit			
4105	138	1xD	Tehdas stdr.	HT 800 runko		HT 800 WP	
4106	128	1,5xD	Tehdas stdr.	HT 800 runko		HT 800 WP	
4107	130	3xD	Tehdas stdr.	HT 800 runko		HT 800 WP	
4108	132	5xD	Tehdas stdr.	HT 800 runko		HT 800 WP	
4109	134	7xD	Tehdas stdr.	HT 800 runko		HT 800 WP	
4110	136	10xD	Tehdas stdr.	HT 800 runko		HT 800 WP	
4111	151		Tehdas stdr.	Vaihtokärjet HT 800	TKM	HT 800 WP	
4112	139		Tehdas stdr.	Vaihtokärjet HT 800	TKM	HT 800 WP	
4113	142		Tehdas stdr.	Vaihtokärjet HT 800	TKM	HT 800 WP	
4114	148		Tehdas stdr.	Vaihtokärjet HT 800	TKM	HT 800 WP	
4115	145		Tehdas stdr.	Vaihtokärjet HT 800	TKM	HT 800 WP	
4915	169, 559		Tehdas stdr.	Momenttiavaimet			
4917	170, 560		Tehdas stdr.	Torx - kärkisarja			
5018	540	20xD	Tehdas stdr.	Kanuunapora EB 80	KM	EB 80	
5019	551	30xD	Tehdas stdr.	Kanuunapora ZB 80 (2-leikkuiinen)	KM	ZB 80	
5020	534	80.000	Tehdas stdr.	Kanuunapora EB 100	TKM	EB 100	
5021	538	160.000	Tehdas stdr.	Kanuunapora EB 100	TKM	EB 100	
5022	545	40xD	Tehdas stdr.	Kanuunapora EB 80	KM	EB 80	
5023	548	80xD	Tehdas stdr.	Kanuunapora EB 80	KM	EB 80	
5024	532	45.000	Tehdas stdr.	Kanuunapora EB 100	TKM	EB 100	
5026	536	120.000	Tehdas stdr.	Kanuunapora EB 100	TKM	EB 100	
5164	550	1100.000	Tehdas stdr.	Kanuunapora EB 80	KM	EB 80	
5242	159	3xD	Tehdas stdr.	RT 800 runko		RT 800 WP	
5243	160	5xD	Tehdas stdr.	RT 800 runko		RT 800 WP	
5248	161	7xD	Tehdas stdr.	RT 800 runko		RT 800 WP	
5460	542	30xD	Tehdas stdr.	Kanuunapora EB 80	KM	EB 80	
5525	100	12xD	Tehdas stdr.	Tehoporat jäähdytyskanavilla	TKM	RT 100 U	
5632	533	45.000	Tehdas stdr.	Kanuunapora EB 100	TKM	EB 100	
5633	535	80.000	Tehdas stdr.	Kanuunapora EB 100	TKM	EB 100	
5637	537	120.000	Tehdas stdr.	Kanuunapora EB 100	TKM	EB 100	
5638	539	160.000	Tehdas stdr.	Kanuunapora EB 100	TKM	EB 100	
5639	541	20xD	Tehdas stdr.	Kanuunapora EB 80	KM	EB 80	
5640	543	30xD	Tehdas stdr.	Kanuunapora EB 80	KM	EB 80	
5641	546	40xD	Tehdas stdr.	Kanuunapora EB 80	KM	EB 80	
5642	549	80xD	Tehdas stdr.	Kanuunapora EB 80	KM	EB 80	
5643	552	30xD	Tehdas stdr.	Kanuunapora ZB 80 (2-leikkuiinen)	KM	ZB 80	
5644	555	30xD	Tehdas stdr.	Kanuunapora EB 800 vaihtopalalla	KM	EB 800	
5646	529	25xD	Tehdas stdr.	Kanuunapora EB 100	TKM	EB 100	
5647	530	50xD	Tehdas stdr.	Kanuunapora EB 100	TKM	EB 100	
5648	531	75xD	Tehdas stdr.	Kanuunapora EB 100	TKM	EB 100	
5689	544	40xD	Tehdas stdr.	Kanuunapora EB 80	KM	EB 80	
5690	547	80xD	Tehdas stdr.	Kanuunapora EB 80	KM	EB 80	
5747	566		Tehdas stdr.	Poraholkit	HSS		

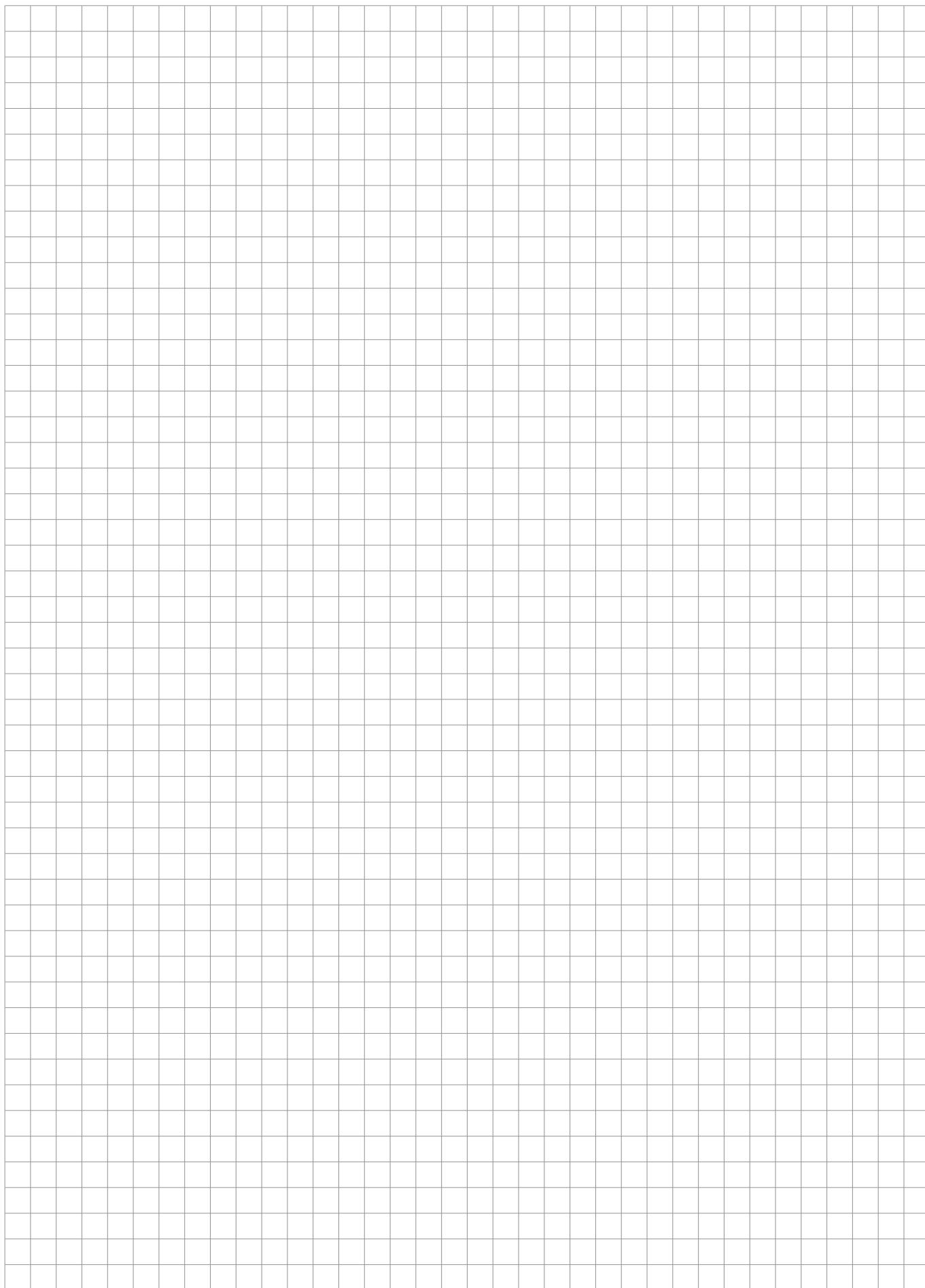


Artikkelinro.	Sivu	Poraus- vyys	Standardi	Kuvaus	Materiaali	Malli	Muoto
5748	565		Tehdas stdr.	Poraholkit	TKM		
5749	573		Tehdas stdr.	Tukiholkit 1- ja 2-leikkuisille kanuunaporille			
5750	571		Tehdas stdr.	Muotoillut tukiholkit 1-leikkuisille kanuunaporille			
5751	576		Tehdas stdr.	Muotoillut tukiholkit 2-leikkuisille kanuunaporille			
5752	569		Tehdas stdr.	Tiivisterenkaat 1-leikkuisille kanuunaporille			
5753	575		Tehdas stdr.	Tiivisterenkaat 2-leikkuisille kanuunaporille			
5754	577		Tehdas stdr.	Säätöruuvit			
5755	578		Tehdas stdr.	Säätöruuvit			
5759	59	5xD	DIN 6537L	Tehoporat jäähdytyskanavilla	TKM	RT 100 S	
5760	96	8xD	Tehdas stdr.	Tehoporat jäähdytyskanavilla	TKM	RT 100 S	
6068	58	4xD	Tehdas stdr.	Tehoporat jäähdytyskanavilla	TKM	RT 150 GG	
6069	94	7xD	Tehdas stdr.	Tehoporat jäähdytyskanavilla	TKM	RT 150 GG	
6070	99	10xD	Tehdas stdr.	Tehoporat jäähdytyskanavilla	TKM	RT 150 GG	
6128	157		Tehdas stdr.	Kiinnitysruuvit			
6400	108, 407, 659	4xD	Tehdas stdr.	ExclusiveLine Mikroporat ilman jäähdytyskanavia	TKM	N	
6401	109, 408, 660	7xD	Tehdas stdr.	ExclusiveLine Mikroporat ilman jäähdytyskanavia	TKM	N	
6405	110, 409, 661	5xD	Tehdas stdr.	ExclusiveLine mikroporat jäähdytyskanavilla	TKM	N	
6408	111, 410, 662	8xD	Tehdas stdr.	ExclusiveLine mikroporat jäähdytyskanavilla	TKM	N	
6412	112, 411, 663	15xD	Tehdas stdr.	ExclusiveLine mikroporat jäähdytyskanavilla	TKM	N	
6501	82	5xD	DIN 6537L	Tehoporat jäähdytyskanavilla	TKM	RT 100 R	
6502	91	7xD	Tehdas stdr.	Tehoporat jäähdytyskanavilla	TKM	RT 100 R	
6509	102, 523	15xD	Tehdas stdr.	Tehoporat jäähdytyskanavilla	TKM	RT 100 T	
6511	104, 524	20xD	Tehdas stdr.	Tehoporat jäähdytyskanavilla	TKM	RT 100 T	
6512	105, 525	25xD	Tehdas stdr.	Tehoporat jäähdytyskanavilla	TKM	RT 100 T	
6513	106, 526	30xD	Tehdas stdr.	Tehoporat jäähdytyskanavilla	TKM	RT 100 T	
6514	107, 527	40xD	Tehdas stdr.	Tehoporat jäähdytyskanavilla	TKM	RT 100 T	
7632	155		Tehdas stdr.	Viistepalat HT 800	TKM		
7635	156		Tehdas stdr.	Viistepalat HT 800	TKM		
7645	154		Tehdas stdr.	Viistepalat HT 800	TKM		
8510	48	3xD	DIN 6537K	Tehoporat jäähdytyskanavilla	TKM	RT 100 VA	
8511	72	5xD	DIN 6537L	Tehoporat jäähdytyskanavilla	TKM	RT 100 VA	
8520	44	3xD	DIN 6537K	Tehoporat jäähdytyskanavilla	TKM	RT 100 HF	
8521	68	5xD	DIN 6537L	Tehoporat jäähdytyskanavilla	TKM	RT 100 HF	
8522	90	7xD	Tehdas stdr.	Tehoporat jäähdytyskanavilla	TKM	RT 100 HF	
8524	25	3xD	DIN 6537K	Tehoporat ilman jäähdytyskanavia	TKM	RT 100 HF	
8610	50	3xD	DIN 6537K	Tehoporat jäähdytyskanavilla	TKM	RT 100 VA	
8611	74	5xD	DIN 6537L	Tehoporat jäähdytyskanavilla	TKM	RT 100 VA	
8620	46	3xD	DIN 6537K	Tehoporat jäähdytyskanavilla	TKM	RT 100 HF	
8621	70	5xD	DIN 6537L	Tehoporat jäähdytyskanavilla	TKM	RT 100 HF	

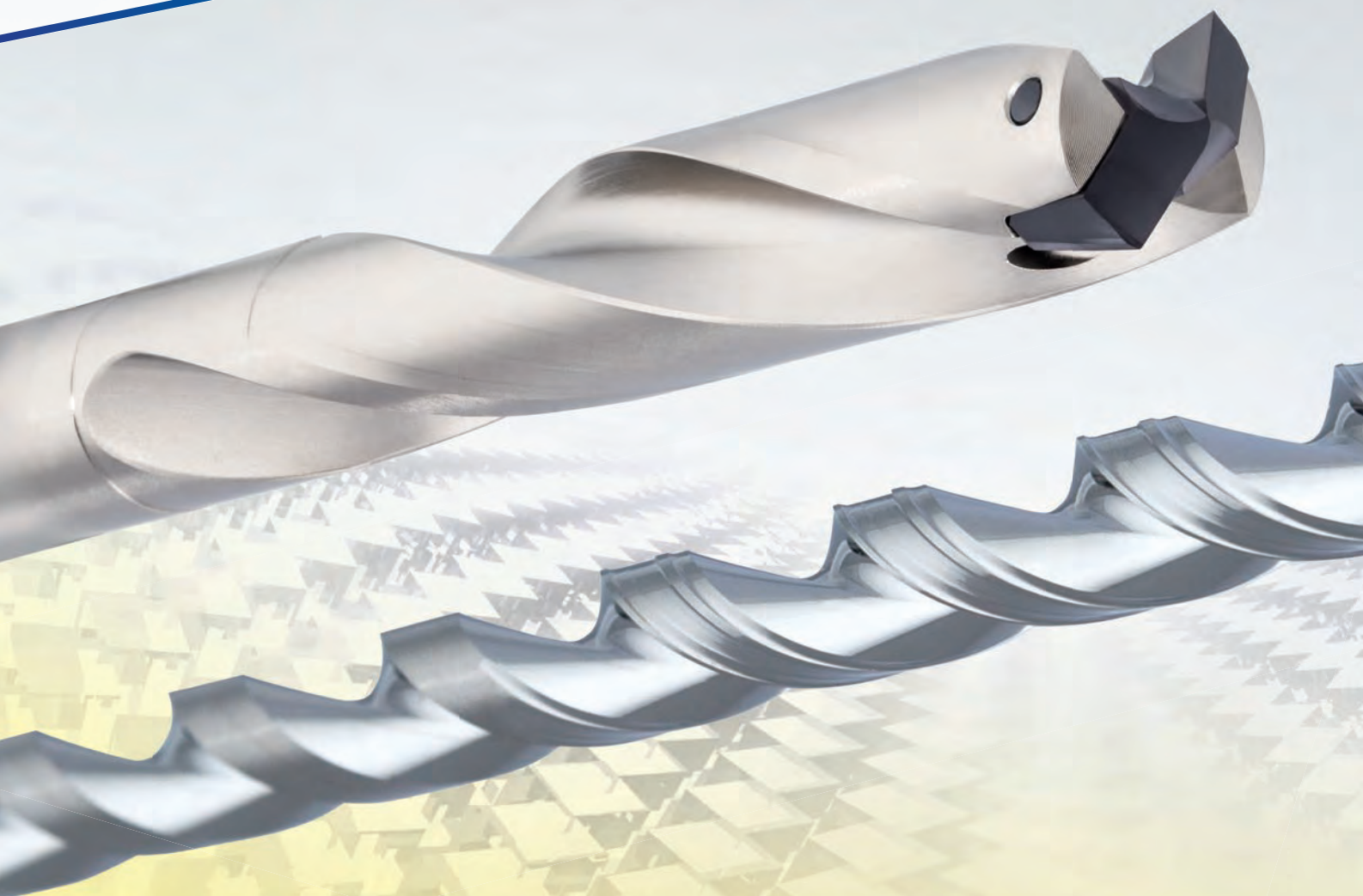


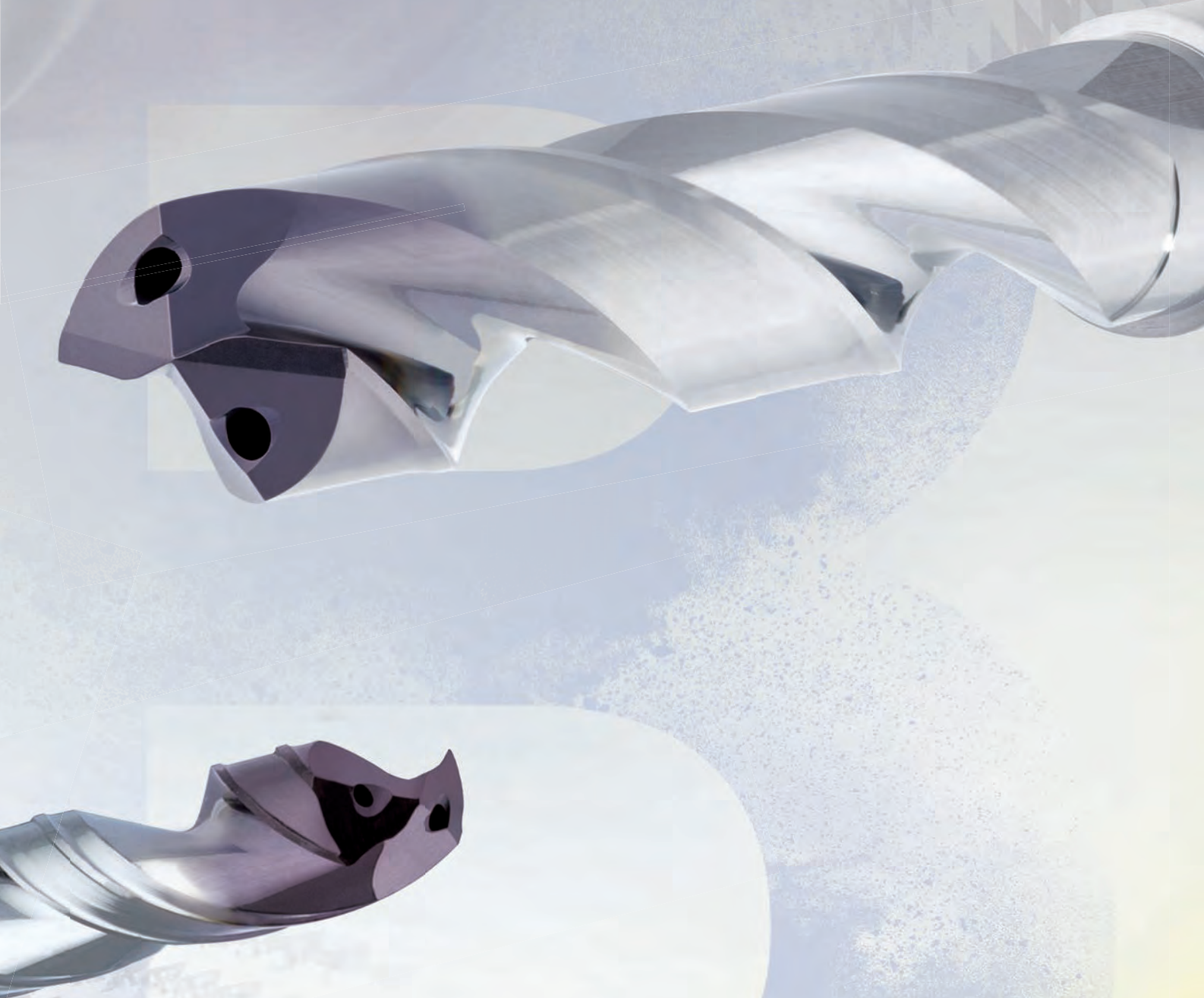






Täydellisyys porauksessa





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