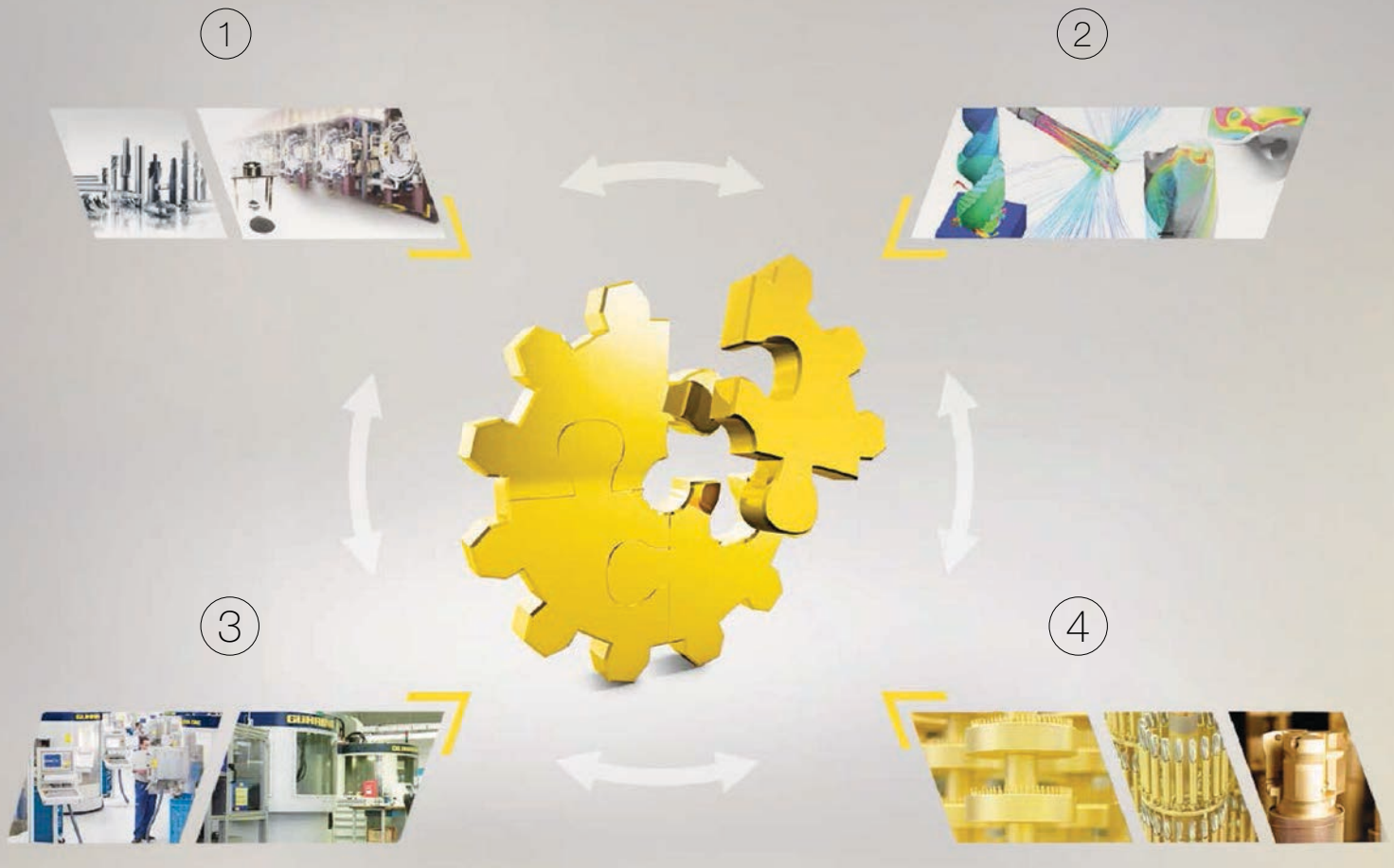
GUHRING

MILLING TOOLS 2014

POWER MILLING

Optimal co-ordination of all tool parameters thanks to own R&D sectors



① TOOL MATERIALS
Own carbide production

② GEOMETRIES
Own R&D for tool development

③ MACHINE & EQUIPMENT DIVISION
Own machine tool and equipment divisions

④ COATINGS
Own coating systems and own coating development

Everything from one supplier – comprehensive and global

With a global network of manufacturing sites Guhring develops and produces precision tools for all the important markets. Users from the automotive industry, the aerospace industry or the machine tool and general industry rely on the trend-setting tools manufactured world-wide at the highest level to uniform quality standards.

With innovative technologies Guhring meets specific customer requirements from process proposal to series application of the precision tools – flexibly, promptly, globally. For this, experts are in action internationally looking after customers on site. Production, service and contact persons are available from one supplier world-wide.

28
PRODUCTION CENTRES

47
SERVICE CENTRES

46
SUBSIDIARIES

USA
BROOKFIELD

SWITZERLAND
ALTDORF

MINDELHEIM

ITALY

BELARUS

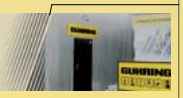
USA
NEW HUDSON

ALBSTADT
HEADQUARTER

ZORBAU

TURKEY

RUSSIA



MEXICO

ALBSTADT
FACTORY 2

CHEMNITZ

SOUTH AFRICA

INDIA

BRAZIL
DIADEMA

ALBSTADT
ONSTMETTINGEN

KULMBACH

VIETNAM

CHINA

BRAZIL
JOINVILLE

SIGMARINGEN
LAIZ

MARKT-ERLBACH

CZECH REPUBLIC

JAPAN

SWEDEN

SAARBRÜCKEN

NUREMBERG

AUSTRIA

KOREA

GREAT BRITAIN

WEHINGEN

TREUEN

HUNGARY

TAIWAN

NETHERLANDS

EISENACH

BERLIN
FACTORY 1

RUMANIA

AUSTRALIA

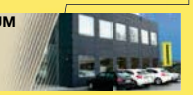
FRANCE

GEISLINGEN

BERLIN
FACTORY 2

POLAND
FACTORY 1

BELGIUM



Own carbide production // Own machine construction // Own coating plants // Highest quality standards world-wide

STEEL

General steel grades from low to high tensile strength (500-1400 N/mm^2); high-tensile heat-treatable and tool steels (- 48 HRC); hardened steels and chilled cast iron also above 63 HRC

CAST IRON

Cast iron types such as grey cast iron (GG25), spheroidal graphite iron, malleable cast iron and cast steel alloys, abrasive special cast alloys

ALUMINIUM

Aluminium wrought alloys; high-tensile aluminium; silicon-containing cast aluminium

N

STAINLESS STEEL

Stainless steels, acid- and heat-resistant alloys; titanium and nickel alloys; difficult-to-machine special alloys

M

Now even easier

and *quicker*

to the perfect Guhring milling cutter.

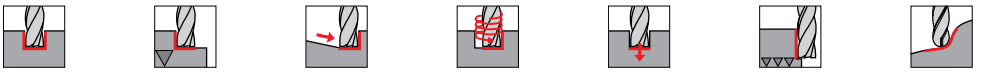
Chapter break-down into material classes

On the price and programme pages you will find suitability recommendations for every tool for the following application groups:

Application group	Material examples	Chapter
P	Steel, high-alloyed steel	Steel
M	Stainless steel	Stainless
K	Grey cast iron, spher, graphite/mall. cast iron	Steel
N	Aluminium and other non-ferrous metals	Aluminium and diamond
S	Special, super and titanium alloys	Stainless
H	Hardened steel and chilled cast iron	Steel and radius cutters

Pictograms

Application



Slotting · Roughing · Ramping · Helix · Drilling · Finishing · Copying

Milling conditions

Maximum volume · Maximum speed · Non-rigid conditions

Tool material

High-speed steel · Polycrystalline diamond · Finest grain solid carbide (carbide-UF)

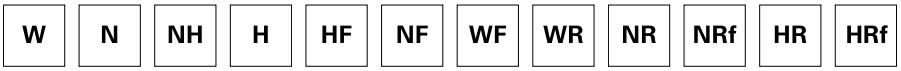
Shank form

to DIN 6535 · to DIN 1835 · Morse taper · Taper shank

Standard

to DIN · to Guhring

Type



Application range similar to DIN 1836

Length

short (DIN) · long (DIN) · medium length · extra length

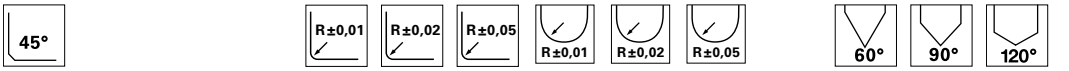
No. of cutting edges

no. of major cutting edges

Helix angle

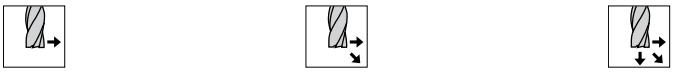
Size of helix angle / no. of different helix angles

Cutting edge form



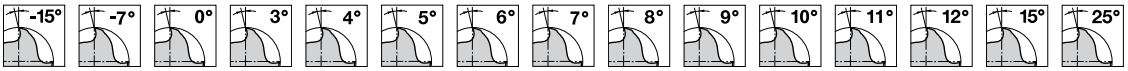
Corner chamfer · Radius with tolerance · Chamfer end mill angles

Feed



for lateral feed · for lateral feed and oblique plunging · for lateral feed, oblique plunging and drilling

Rake angle



Rake angle of circumference cutting edges

SELECT AND ORDER

This milling cutter catalogue is clearly arranged into manageable chapters for a quick and reliable selection of the optimal milling cutter.

- Material classes
- Fields of application
- Quick finder
- Navigator cutting data

When ordering please always state the **Guhring no. and the code no.**, i.e.:
"Ratio milling end mill standard RF 100 U, for nom.-Ø 3.00 mm" = **6706 3.000**

Guhring no.

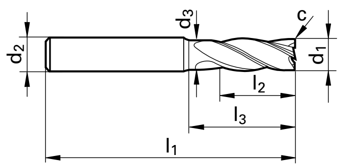
Steel, cast and hardened steel

Standard Ratio end mills RF 100 U

centre cutting

DIN 6527

	HA	HB
Tool material	Solid carbide	
Surface finish	FIRE	FIRE
Discount group	106	106
Guhring no.	**6706**	**3731**



Code no.

Code no.	d1 h10 mm	d2 h6 mm	d3 mm	l1 mm	l2 mm	l3 mm	c mm x 45°	Z	Availability	
3.000	3.000	6.000	2.800	50.00	5.00	12.00	0.10	4	●	●
4.000	4.000	6.000	3.800	54.00	8.00	15.00	0.10	4	●	●
5.000	5.000	6.000	4.800	54.00	9.00	15.00	0.10	4	●	●

Our price list no. 42 replaces all previous price lists. All prices in Euro plus surcharge and VAT.

Possible misprints or any type of intermediate changes do not entitle to any claims. All DIN marked products can be supplied deviating from the catalogue dimensions as long as they correspond to the specified DIN standard.

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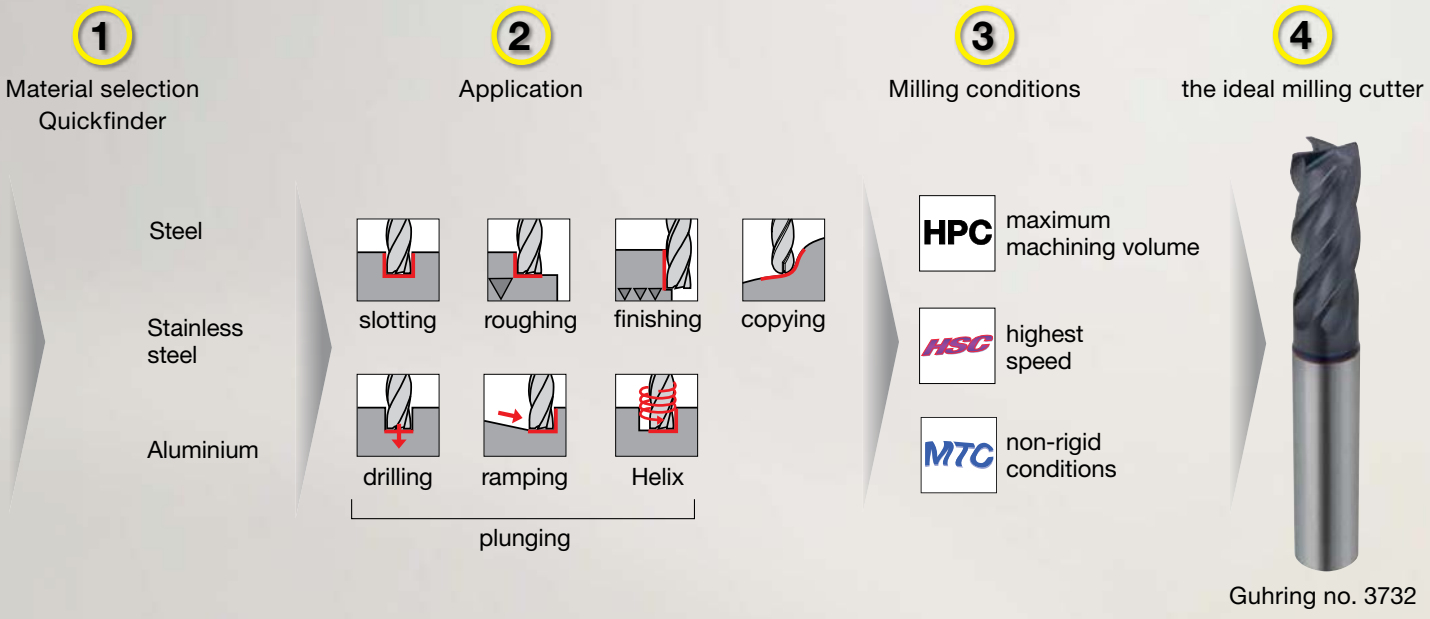
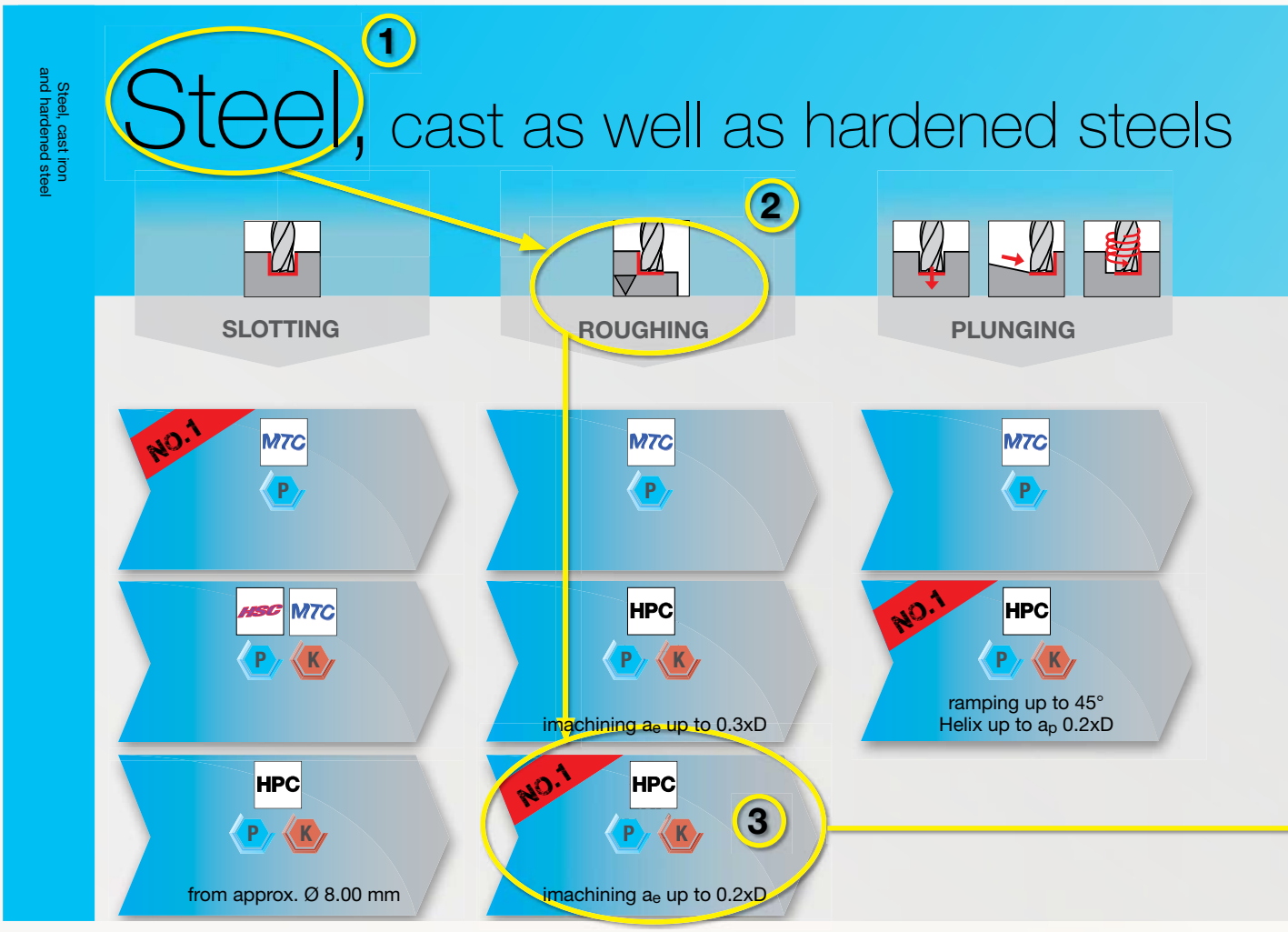
E-Mail: info@guehring.de

MILLING CUTTER SELECTION MADE EASY

Looking for a high-performance milling cutter for roughing operations in steel?
This is how you will find it:





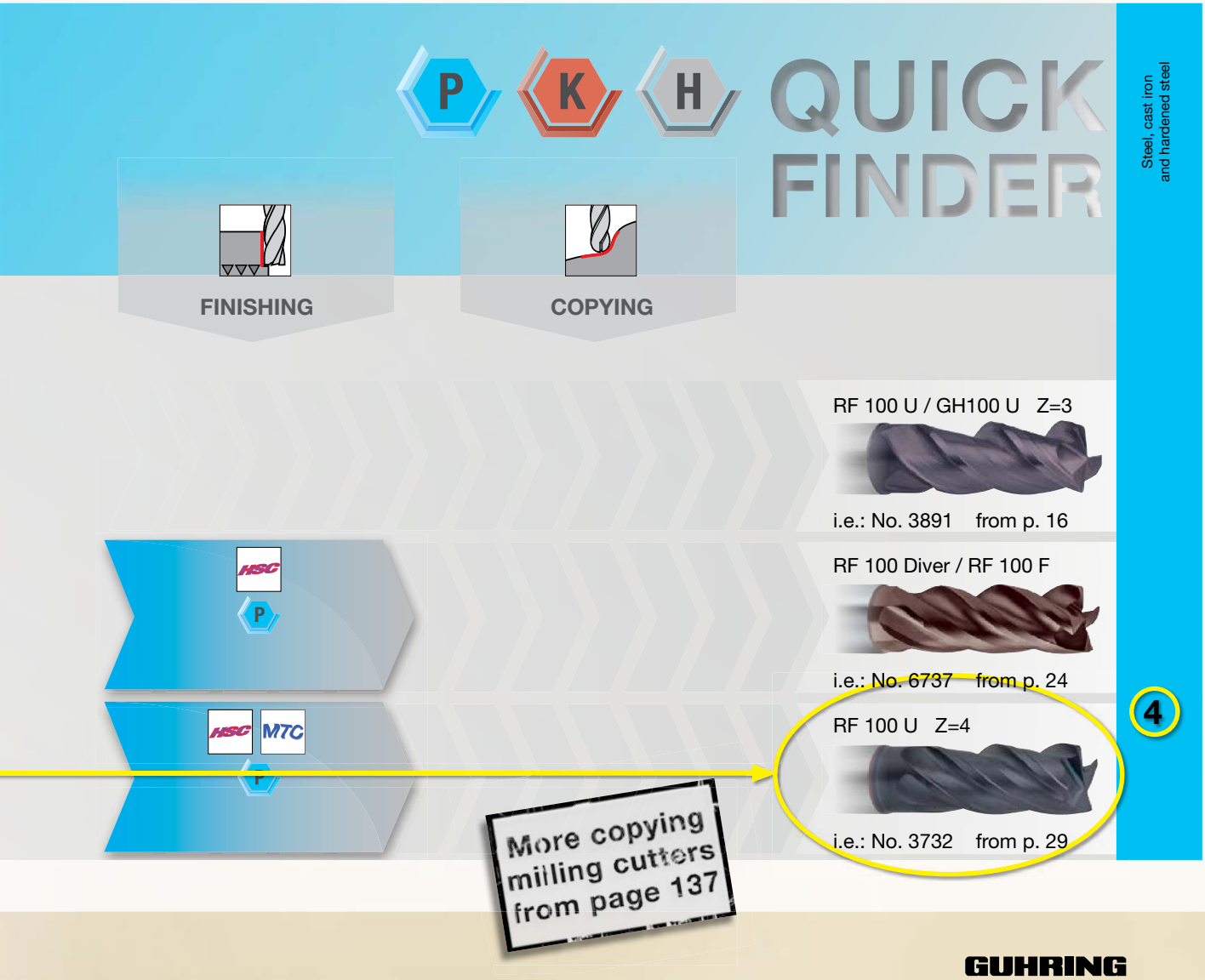
WITH QUICK-FINDER
QUICK AND SECURE TO THE IDEAL MILLING TOOL

1. Steel, aluminium, stainless steel? No matter what material you are machining, we have a suitable tool. Start with the material selection!

2. Want your milling cutters for roughing operations or even plunging? No problem. Select the column for the required application!

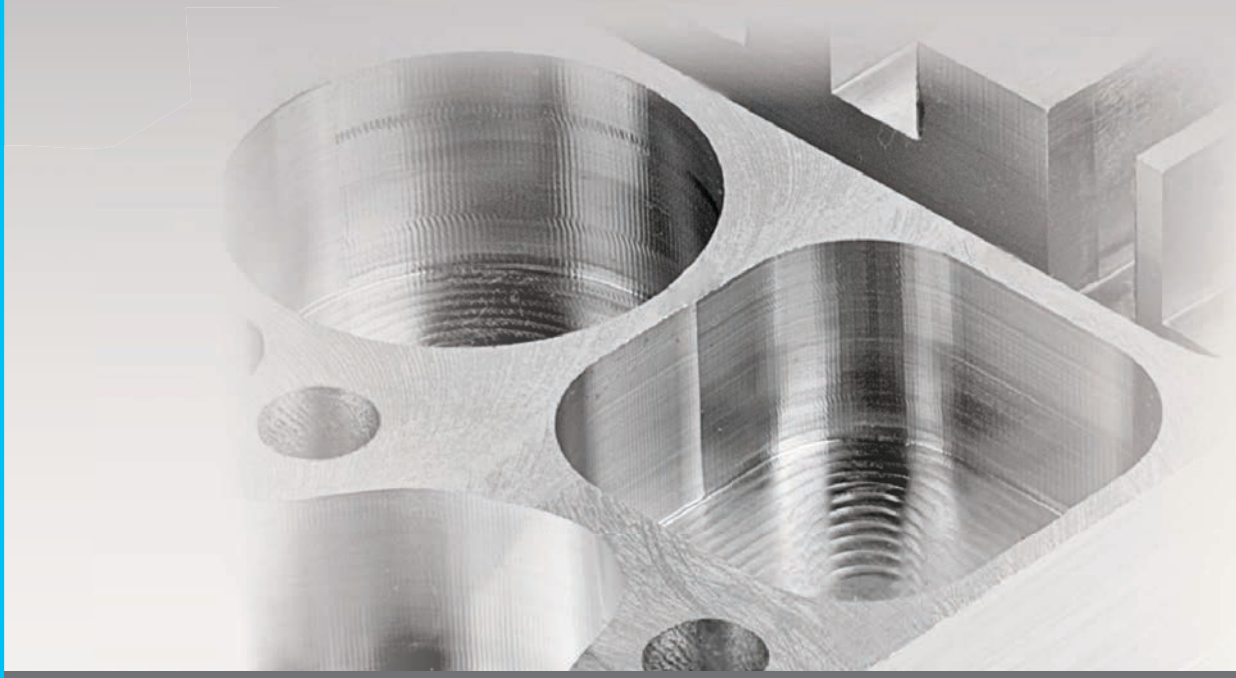
3. Non-rigid conditions or high-performance cutting? Depending on machine conditions and cutting parameters then take your present milling conditions into consideration!

4. You have found your ideal milling cutter and are referred to the appropriate page in the catalogue with dimensions and cutting data.



STEEL

hardened steel and cast iron



APPLICATION EXAMPLE

HPC roughing

Dry machining in steel 16 MnCr5 (1.7131)

RF100 U 16 mm; Guhring no. 3732 16.0

a_e = 30 mm / a_p = 4 mm
v_c = 280 m/min
f_z = 0.13 mm

v_f = 2880 mm/min

Metal removal rate Q = 345 cm^3/min

HPC slotting

Wet machining in steel 42CrMo4 (1.7225)

RF100 Diver 11,7 mm; Guhring no. 6736 11.7

a_e = 16 mm / a_p = 16 mm
v_c = 500 m/min
f_z = 0.094 mm

v_f = 3740 mm/min

Metal removal rate Q = 957 cm^3/min

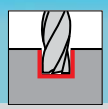
STEEL

Solid carbide HPC
high-performance milling cutter
for steel, cast iron and hardened steel

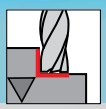
K H

P

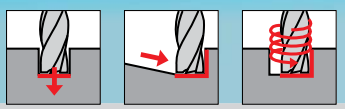
Steel, cast as well as hardened steels



SLOTTING



ROUGHING



PLUNGING

NO.1 MTC P

HSC MTC P K

HPC P K
from approx. Ø 8.00 mm

MTC P K
with Guhrojet up to a_p 2xD

HPC P H
up to 54 HRC

MTC P

HPC P K
imachining a_e up to 0.3xD

NO.1 HPC P K
imachining a_e up to 0.2xD

HPC MTC P K

HPC P
imachining a_e up to 0.15xD

HPC P H
with a_e up to 0.1xD
up to 63 HRC

HPC P H
a_e up to 0.2xD

MTC P

NO.1 HPC P K
ramping up to 45°
Helix up to a_p 0.2xD

HPC P K

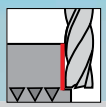
HPC P H
up to 54 HRC

HPC HIGH-PERFORMANCE CUTTING
for max. metal removal rates / time; rigid conditions, high performance, good cooling, quick de-clamping

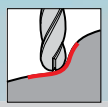
HSC HIGH SPEED CUTTING
with high speeds / high feed rate low performance, low feed rate

MTC MILL TURN CENTER driven tools
non-rigid conditions, low drive power medium to long de-clamping, moderate cooling

P K H QUICK FINDER



FINISHING



COPYING

RF 100 U / GH100 U Z=3

i.e.: No. 3891 from p. 16

HSC P

RF 100 Diver / RF 100 F

i.e.: No. 6737 from p. 24

HSC MTC P

RF 100 U Z=4

i.e.: No. 3732 from p. 29

More copying milling cutters from page 137

RF 100 U HF / RS 100 U

i.e.: No. 3507 from p. 36

NO.1 HSC P

RF 100 SF

i.e.: No. 6709 from p. 44

HSC P H

up to 63 HRC

RF 100 H

i.e.: No. 3895 from p. 52

HSC P H

NO.1 HSC P H

from 30 - 63 HRC

GF 300 T

i.e.: No. 3361 from p. 53

P STEEL & high-alloyed steel

K GREY CAST IRON, spheroidal & mall. cast iron

H HARDENED STEEL & chilled cast iron

NO. 1 IDEAL TOOL

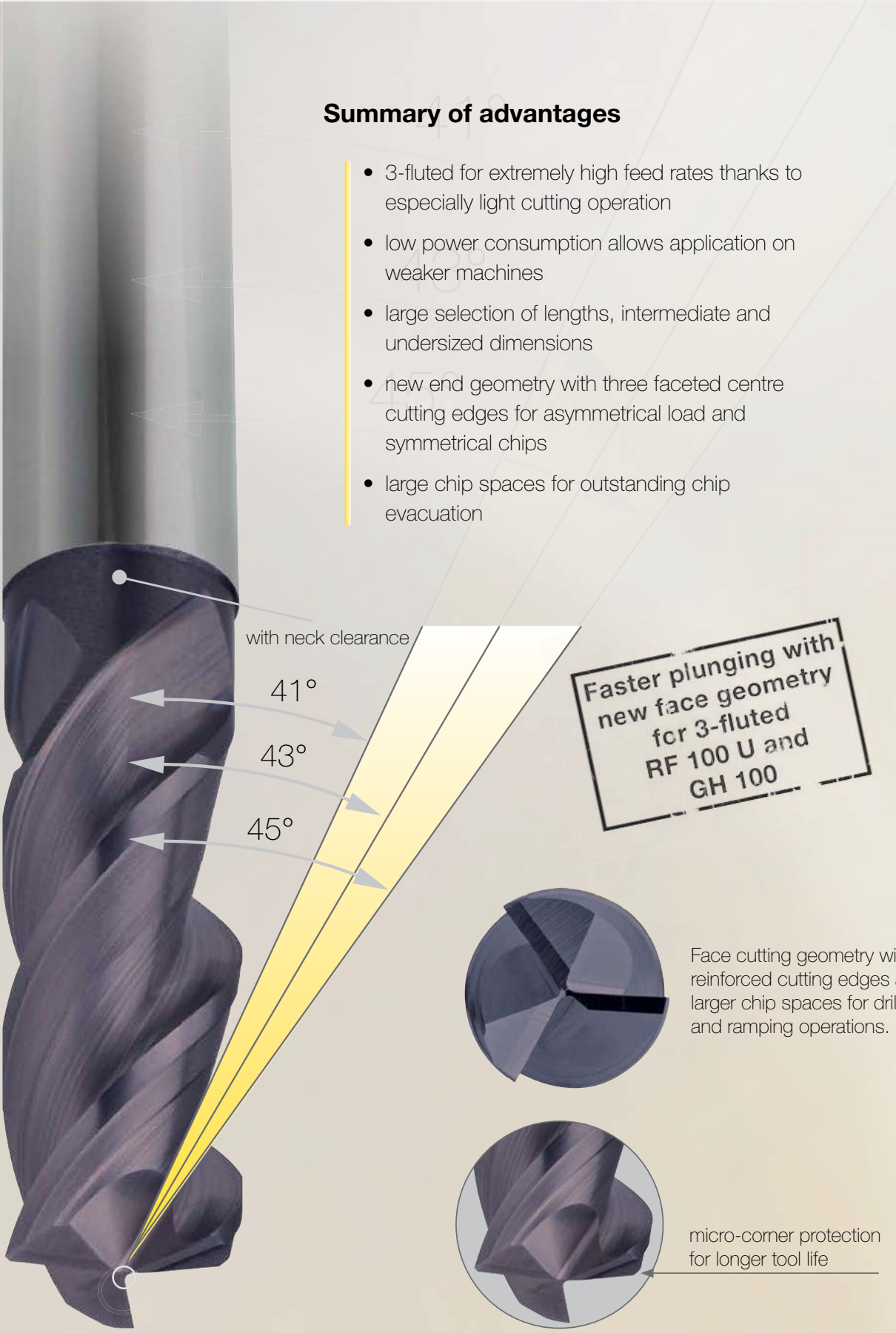
EXPLANATIONS for the Quickfinder see p. 6-7

RF 100 U - High-performance end mills

for materials up to 1600 N/mm^2 (48 HRC)

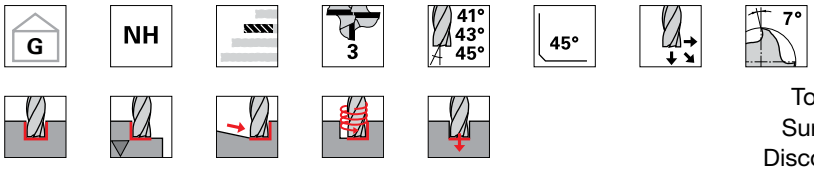
Summary of advantages

- 3-fluted for extremely high feed rates thanks to especially light cutting operation
- low power consumption allows application on weaker machines
- large selection of lengths, intermediate and undersized dimensions
- new end geometry with three faceted centre cutting edges for asymmetrical load and symmetrical chips
- large chip spaces for outstanding chip evacuation

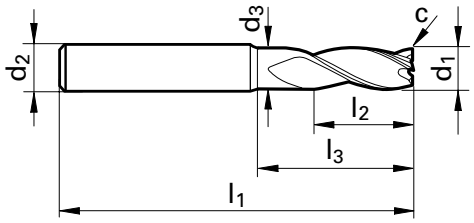


Standard Ratio end mills RF 100 U (3-fluted)

centre cutting



	HA	HB
Tool material	Solid carbide	
Surface finish	FIRE	FIRE
Discount group	106	106
Guhring no.	**3893**	**3894**



Code no.	d1 e8	d2 h6	d3	l1	l2	l3	c	Z	Availability	
	mm	mm	mm	mm	mm	mm	mm x 45°			
3.000	3.000	6.000	2.800	57.00	4.00	15.00	0.03	3	●	●
4.000	4.000	6.000	3.800	57.00	5.00	18.00	0.06	3	●	●
5.000	5.000	6.000	4.800	57.00	6.00	18.00	0.08	3	●	●
6.000	6.000	6.000	5.700	57.00	7.00	20.00	0.09	3	●	●
8.000	8.000	8.000	7.700	63.00	9.00	26.00	0.12	3	●	●
10.000	10.000	10.000	9.500	72.00	11.00	30.00	0.15	3	●	●
12.000	12.000	12.000	11.500	83.00	12.00	36.00	0.18	3	●	●
16.000	16.000	16.000	15.500	92.00	16.00	42.00	0.19	3	●	●

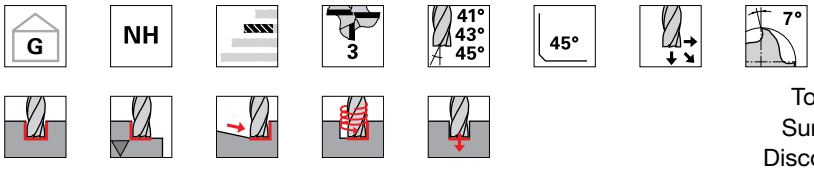
Cutting values: Slotting* (detailed cutting values see p. 269)

ISO Code	Hardness	Feed depth a_p	Feed width a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 3	6	8	10	12	16	20
P Steel	≤ 850 N/mm²	1xd	1xd	180	0.018	0.035	0.045	0.06	0.07	0.09	0.1
	850 - 1400 N/mm²	1xd	1xd	160	0.018	0.035	0.045	0.06	0.07	0.09	0.1
M Stainless steel	≤ 750 N/mm²	1xd	1xd	120	0.015	0.03	0.04	0.05	0.06	0.07	0.09
	≥ 750 N/mm²	1xd	1xd	80	0.015	0.025	0.035	0.045	0.05	0.065	0.08
K Cast mat.	≥ 240 HB 30	1xd	1xd	140	0.02	0.04	0.05	0.065	0.08	0.095	0.11

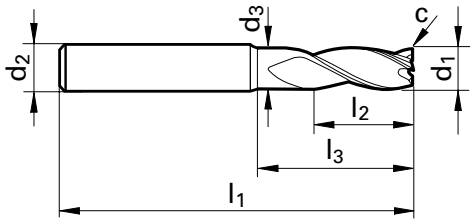
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life.

Standard Ratio end mills RF 100 U (3-fluted)

centre cutting



	HA	HB
Tool material	Solid carbide	
Surface finish	FIRE	FIRE
Discount group	106	106
Guhring no.	**3891**	**3892**



Code no.	d1 e8	d2 h6	d3	l1	l2	l3	c	Z	Availability	
	mm	mm	mm	mm	mm	mm	mm x 45°			
3.000	3.000	6.000	2.800	57.00	8.00	15.00	0.03	3	●	●
3.500	3.500	6.000	3.300	57.00	10.00	15.00	0.05	3	●	●
3.700	3.700	6.000	3.500	57.00	11.00	15.00	0.06	3	●	●
4.000	4.000	6.000	3.800	57.00	11.00	18.00	0.06	3	●	●
4.500	4.500	6.000	4.300	57.00	11.00	18.00	0.07	3	●	●
4.700	4.700	6.000	4.500	57.00	13.00	18.00	0.07	3	●	●
5.000	5.000	6.000	4.800	57.00	13.00	18.00	0.08	3	●	●
5.500	5.500	6.000	5.300	57.00	13.00	19.40	0.08	3	●	●
5.700	5.700	6.000	5.500	57.00	13.00	20.40	0.09	3	●	●
6.000	6.000	6.000	5.700	57.00	13.00	20.00	0.09	3	●	●
6.500	6.500	8.000	6.200	63.00	16.00	24.40	0.10	3	●	●
7.000	7.000	8.000	6.700	63.00	16.00	24.90	0.11	3	●	●
7.500	7.500	8.000	7.200	63.00	19.00	25.30	0.11	3	●	●
8.000	8.000	8.000	7.700	63.00	19.00	26.00	0.12	3	●	●
8.500	8.500	10.000	8.200	72.00	19.00	29.40	0.13	3	●	●
9.000	9.000	10.000	8.700	72.00	19.00	29.90	0.14	3	●	●
9.500	9.500	10.000	9.200	72.00	22.00	30.30	0.14	3	●	●
10.000	10.000	10.000	9.500	72.00	22.00	30.00	0.15	3	●	●
12.000	12.000	12.000	11.500	83.00	26.00	36.00	0.18	3	●	●
16.000	16.000	16.000	15.500	92.00	32.00	42.00	0.19	3	●	●
20.000	20.000	20.000	19.500	104.00	38.00	52.00	0.24	3	●	●

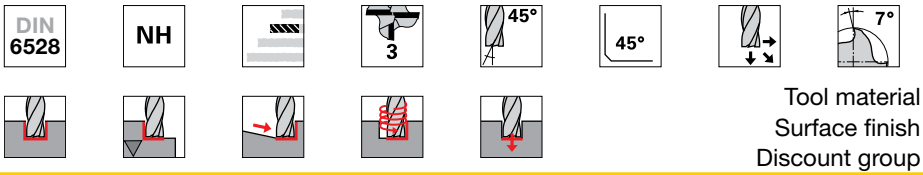
Cutting values: Slotting* (detailed cutting values see p. 269)

ISO Code	Hardness	Feed depth a_p	Feed width a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 3	6	8	10	12	16	20
P Steel	≤ 850 N/mm²	1xd	1xd	180	0.018	0.035	0.045	0.06	0.07	0.09	0.1
	850 - 1400 N/mm²	1xd	1xd	160	0.018	0.035	0.045	0.06	0.07	0.09	0.1
M Stainless steel	≤ 750 N/mm²	1xd	1xd	120	0.015	0.03	0.04	0.05	0.06	0.07	0.09
	≥ 750 N/mm²	1xd	1xd	80	0.015	0.025	0.035	0.045	0.05	0.065	0.08
K Cast mat.	≥ 240 HB 30	1xd	1xd	140	0.02	0.04	0.05	0.065	0.08	0.095	0.11

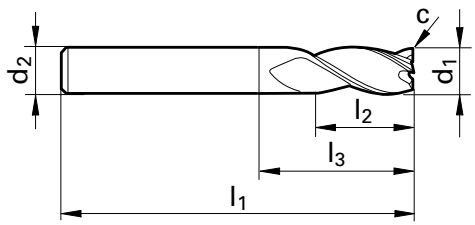
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life.

Slot drills GH 100 U (3-fluted)

centre cutting



	HA	HA
Tool material	Solid carbide	
Surface finish	bright	FIRE
Discount group	106	106
Guhring no.	**3203**	**3741**



Code no.	d1 h10	d2 h6	l1	l2	l3	c	Z	Availability	
	mm	mm	mm	mm	mm	mm x 45°			
2.000	2.000	2.000	32.00	6.00	8.00	0.02	3	●	●
2.500	2.500	2.500	32.00	7.00	9.00	0.03	3	●	●
3.000	3.000	3.000	38.00	7.00	10.00	0.03	3	●	●
3.500	3.500	3.500	50.00	7.00	22.00	0.05	3	●	●
4.000	4.000	4.000	50.00	8.00	22.00	0.06	3	●	●
4.500	4.500	4.500	50.00	8.00	22.00	0.07	3	●	●
5.000	5.000	5.000	50.00	10.00	22.00	0.08	3	●	●
5.500	5.500	5.500	57.00	10.00	21.00	0.08	3	●	●
6.000	6.000	6.000	57.00	10.00	21.00	0.09	3	●	●
6.500	6.500	6.500	60.00	13.00	24.00	0.10	3	●	●
7.000	7.000	7.000	60.00	13.00	24.00	0.11	3	●	●
7.500	7.500	7.500	63.00	16.00	27.00	0.11	3	●	●
8.000	8.000	8.000	63.00	16.00	27.00	0.12	3	●	●
8.500	8.500	8.500	67.00	16.00	27.00	0.13	3	●	●
9.000	9.000	9.000	67.00	16.00	27.00	0.14	3	●	●
9.500	9.500	9.500	72.00	19.00	32.00	0.14	3	●	●
10.000	10.000	10.000	72.00	19.00	32.00	0.15	3	●	●
11.000	11.000	11.000	83.00	22.00	38.00	0.17	3	●	●
12.000	12.000	12.000	83.00	22.00	38.00	0.18	3	●	●
13.000	13.000	13.000	83.00	22.00	38.00	0.20	3	●	●
14.000	14.000	14.000	83.00	22.00	38.00	0.21	3	●	●
15.000	15.000	15.000	92.00	26.00	44.00	0.23	3	●	●
16.000	16.000	16.000	92.00	26.00	44.00	0.19	3	●	●
18.000	18.000	18.000	92.00	26.00	44.00	0.22	3	●	●

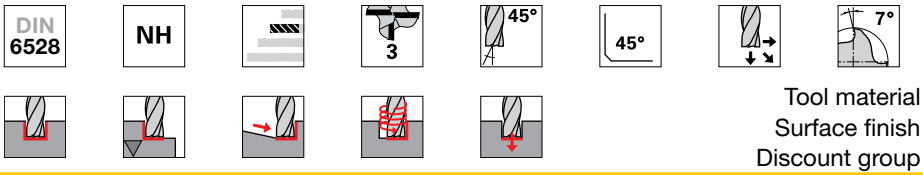
Cutting values: Slotting* (detailed cutting values see p. 271)

ISO Code	Hardness	Feed depth a_p	Feed width a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 3	6	8	10	12	16	20
P Steel	≤ 850 N/mm²	1xd	1xd	180	0.016	0.032	0.041	0.054	0.063	0.081	0.09
	850 - 1400 N/mm²	1xd	1xd	120	0.013	0.024	0.032	0.044	0.052	0.064	0.076
M Stainless steel	≤ 750 N/mm²	1xd	1xd	100	0.014	0.027	0.036	0.045	0.054	0.063	0.081
	≥ 750 N/mm²	1xd	1xd	60	0.011	0.023	0.027	0.036	0.041	0.054	0.063
K Cast mat.	≥ 240 HB 30	1xd	1xd	115	0.014	0.027	0.036	0.05	0.059	0.072	0.086
N Aluminium	≤ 7% Si	1xd	1xd	180	0.014	0.027	0.036	0.05	0.059	0.072	0.086

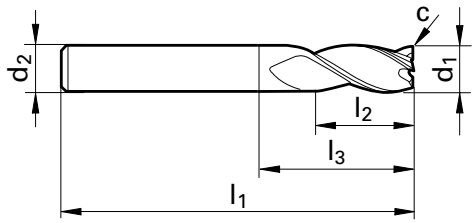
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life.
All recommendations are valid for coated tools. For bright milling cutters please v_c -40 % and f_z -25 %!

Slot drills GH 100 U (3-fluted)

centre cutting



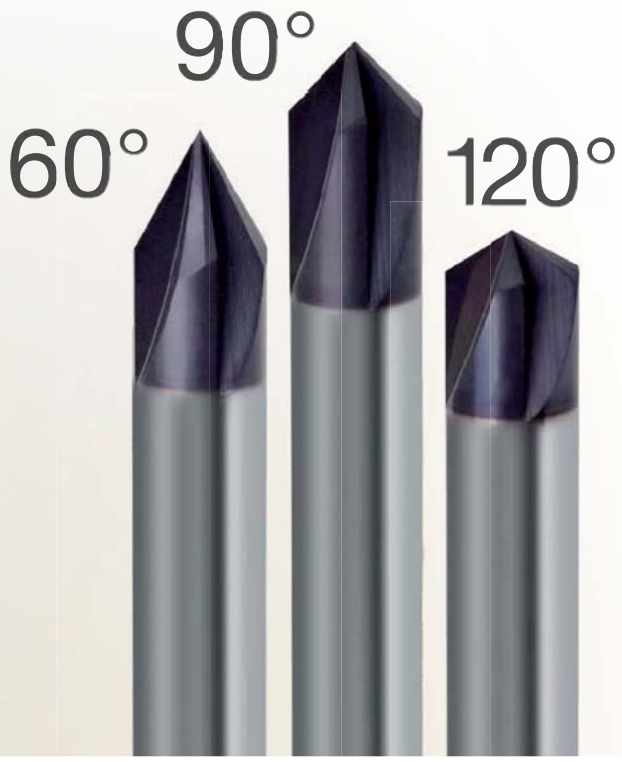
Tool material	Solid carbide	
Surface finish	bright	FIRE
Discount group	106	106
Guhring no.	**3203**	**3741**



Code no.	d1 h10	d2 h6	l1	l2	l3	c	Z	Availability	
	mm	mm	mm	mm	mm	mm x 45°			
20.000	20.000	20.000	104.00	32.00	54.00	0.24	3	●	●

Chamfering milling cutters

with radial relief geometry for chamfering, de-burring and contour operations



Summary of advantages

- radially relief ground
- universal application for all materials
- wear-resistant TiAlN-coating

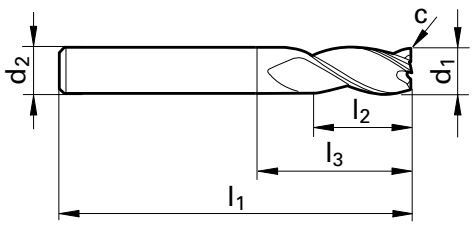
Programme from page 180.

Slot drills GH 100 U (3-fluted)

centre cutting

DIN 6527 | NH | 3 | 45° | 45° | 7°

	HA	HA
Tool material	Solid carbide	
Surface finish	bright	FIRE
Discount group	106	106
Guhring no.	**3193**	**3540**



Code no.	d1 h10	d2 h6	l1	l2	l3	c	Z	Availability	
	mm	mm	mm	mm	mm	mm x 45°			
3.000	3.000	6.000	50.00	4.00	7.90	0.03	3	●	●
4.000	4.000	6.000	54.00	5.00	8.90	0.06	3	●	●
5.000	5.000	6.000	54.00	6.00	11.40	0.08	3	●	●
6.000	6.000	6.000	54.00	7.00	18.00	0.09	3	●	●
7.000	7.000	8.000	58.00	8.00	16.40	0.11	3	●	●
8.000	8.000	8.000	58.00	9.00	22.00	0.12	3	●	●
9.000	9.000	10.000	66.00	10.00	19.40	0.14	3	●	●
10.000	10.000	10.000	66.00	11.00	26.00	0.15	3	●	●
12.000	12.000	12.000	73.00	12.00	28.00	0.18	3	●	●
14.000	14.000	14.000	75.00	14.00	30.00	0.21	3	●	●
16.000	16.000	16.000	82.00	16.00	34.00	0.19	3	●	●
18.000	18.000	18.000	84.00	18.00	36.00	0.22	3	●	●
20.000	20.000	20.000	92.00	20.00	42.00	0.24	3	●	●

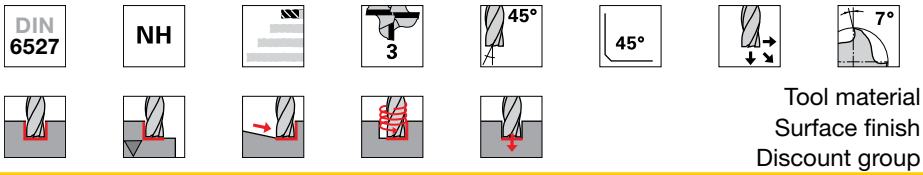
Cutting values: Slotting* (detailed cutting values see p. 271)

ISO Code	Hardness	Feed depth a_p	Feed width a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 3	6	8	10	12	16	20
P Steel	≤ 850 N/mm²	1xd	1xd	180	0.016	0.032	0.041	0.054	0.063	0.081	0.09
	850 - 1400 N/mm²	1xd	1xd	120	0.013	0.024	0.032	0.044	0.052	0.064	0.076
M Stainless steel	≤ 750 N/mm²	1xd	1xd	100	0.014	0.027	0.036	0.045	0.054	0.063	0.081
	≥ 750 N/mm²	1xd	1xd	60	0.011	0.023	0.027	0.036	0.041	0.054	0.063
K Cast mat.	≥ 240 HB 30	1xd	1xd	115	0.014	0.027	0.036	0.05	0.059	0.072	0.086
N Aluminium	≤ 7% Si	1xd	1xd	180	0.014	0.027	0.036	0.05	0.059	0.072	0.086

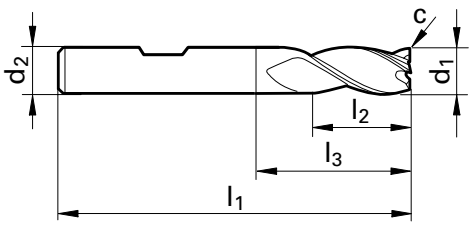
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life.
All recommendations are valid for coated tools. For bright milling cutters please v_c -40 % and f_z -25 %!

Slot drills GH 100 U (3-fluted)

centre cutting



Tool material	**Solid carbide**
Surface finish	FIRE
Discount group	106
Guhring no.	**3729**



Code no.	d1 h10	d2 h6	l1	l2	l3	c	Z	Availability
	mm	mm	mm	mm	mm	mm x 45°		
3.000	3.000	6.000	50.00	4.00	7.90	0.03	3	●
4.000	4.000	6.000	54.00	5.00	8.90	0.06	3	●
5.000	5.000	6.000	54.00	6.00	11.40	0.08	3	●
6.000	6.000	6.000	54.00	7.00	18.00	0.09	3	●
7.000	7.000	8.000	58.00	8.00	16.40	0.11	3	●
8.000	8.000	8.000	58.00	9.00	22.00	0.12	3	●
9.000	9.000	10.000	66.00	10.00	19.40	0.14	3	●
10.000	10.000	10.000	66.00	11.00	26.00	0.15	3	●
12.000	12.000	12.000	73.00	12.00	28.00	0.18	3	●
14.000	14.000	14.000	75.00	14.00	30.00	0.21	3	●
16.000	16.000	16.000	82.00	16.00	34.00	0.19	3	●
18.000	18.000	18.000	84.00	18.00	36.00	0.22	3	●
20.000	20.000	20.000	92.00	20.00	42.00	0.24	3	●

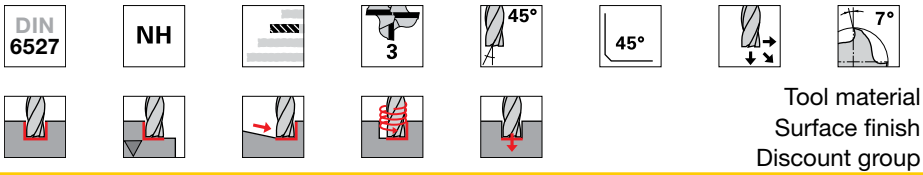
Cutting values: Slotting* (detailed cutting values see p. 271)

ISO Code	Hardness	Feed depth a_p	Feed width a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 3	6	8	10	12	16	20
P Steel	≤ 850 N/mm²	1xd	1xd	180	0.016	0.032	0.041	0.054	0.063	0.081	0.09
	850 - 1400 N/mm²	1xd	1xd	120	0.013	0.024	0.032	0.044	0.052	0.064	0.076
M Stainless steel	≤ 750 N/mm²	1xd	1xd	100	0.014	0.027	0.036	0.045	0.054	0.063	0.081
	≥ 750 N/mm²	1xd	1xd	60	0.011	0.023	0.027	0.036	0.041	0.054	0.063
K Cast mat.	≥ 240 HB 30	1xd	1xd	115	0.014	0.027	0.036	0.05	0.059	0.072	0.086
N Aluminium	≤ 7% Si	1xd	1xd	180	0.014	0.027	0.036	0.05	0.059	0.072	0.086

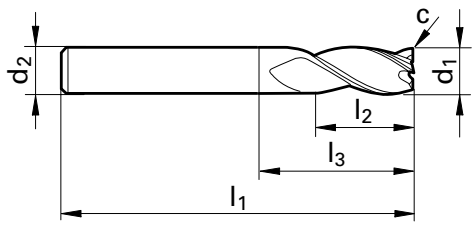
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life.

Slot drills GH 100 U (3-fluted)

centre cutting



	HA	HA
Tool material	Solid carbide	
Surface finish	bright	FIRE
Discount group	106	106
Guhring no.	**3196**	**3636**



Code no.	d1 h10	d2 h6	l1	l2	l3	c	Z	Availability	
	mm	mm	mm	mm	mm	mm x 45°			
1.000	1.000	3.000	38.00	2.00	3.40	0.01	3	●	●
1.500	1.500	3.000	38.00	3.00	5.90	0.02	3	●	●
2.000	2.000	6.000	57.00	6.00	8.90	0.02	3	●	●
2.500	2.500	6.000	57.00	7.00	9.90	0.03	3	●	●
3.000	3.000	6.000	57.00	7.00	10.90	0.03	3	●	●
3.500	3.500	6.000	57.00	7.00	10.90	0.05	3	●	●
4.000	4.000	6.000	57.00	8.00	11.90	0.06	3	●	●
4.500	4.500	6.000	57.00	8.00	13.40	0.07	3	●	●
5.000	5.000	6.000	57.00	10.00	15.40	0.08	3	●	●
6.000	6.000	6.000	57.00	10.00	21.00	0.09	3	●	●
7.000	7.000	8.000	63.00	13.00	21.40	0.11	3	●	●
8.000	8.000	8.000	63.00	16.00	27.00	0.12	3	●	●
9.000	9.000	10.000	72.00	16.00	25.40	0.14	3	●	●
10.000	10.000	10.000	72.00	19.00	32.00	0.15	3	●	●
12.000	12.000	12.000	83.00	22.00	38.00	0.18	3	●	●
14.000	14.000	14.000	83.00	22.00	38.00	0.21	3	●	●
14.001	14.000	16.000	92.00	26.00	43.00	0.21	3	●	●
16.000	16.000	16.000	92.00	26.00	44.00	0.19	3	●	●
18.000	18.000	18.000	92.00	26.00	44.00	0.22	3	●	●
18.001	18.000	20.000	104.00	32.00	53.00	0.22	3	●	●
20.000	20.000	20.000	104.00	32.00	54.00	0.24	3	●	●

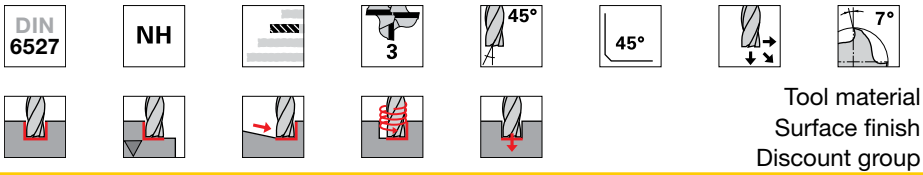
Cutting values: Slotting* (detailed cutting values see p. 271)

ISO Code	Hardness	Feed depth a_p	Feed width a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 3	6	8	10	12	16	20
P Steel	≤ 850 N/mm²	1xd	1xd	180	0.016	0.032	0.041	0.054	0.063	0.081	0.09
	850 - 1400 N/mm²	1xd	1xd	120	0.013	0.024	0.032	0.044	0.052	0.064	0.076
M Stainless steel	≤ 750 N/mm²	1xd	1xd	100	0.014	0.027	0.036	0.045	0.054	0.063	0.081
	≥ 750 N/mm²	1xd	1xd	60	0.011	0.023	0.027	0.036	0.041	0.054	0.063
K Cast mat.	≥ 240 HB 30	1xd	1xd	115	0.014	0.027	0.036	0.05	0.059	0.072	0.086
N Aluminium	≤ 7% Si	1xd	1xd	180	0.014	0.027	0.036	0.05	0.059	0.072	0.086

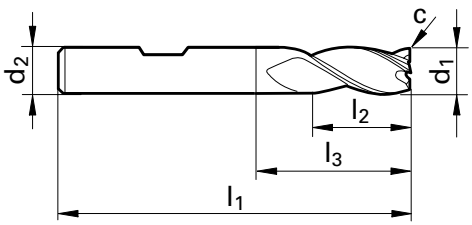
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life.
All recommendations are valid for coated tools. For bright milling cutters please v_c -40 % and f_z -25 %!

Slot drills GH 100 U (3-fluted)

centre cutting



	HB
Tool material	Solid carbide
Surface finish	FIRE
Discount group	106
Guhring no.	3730



Code no.	d1 h10	d2 h6	l1	l2	l3	c	Z	Availability
	mm	mm	mm	mm	mm	mm x 45°		
3.000	3.000	6.000	57.00	7.00	10.90	0.03	3	●
3.500	3.500	6.000	57.00	7.00	10.90	0.05	3	●
4.000	4.000	6.000	57.00	8.00	11.90	0.06	3	●
4.500	4.500	6.000	57.00	8.00	13.40	0.07	3	●
5.000	5.000	6.000	57.00	10.00	15.40	0.08	3	●
6.000	6.000	6.000	57.00	10.00	21.00	0.09	3	●
7.000	7.000	8.000	63.00	13.00	21.40	0.11	3	●
8.000	8.000	8.000	63.00	16.00	27.00	0.12	3	●
9.000	9.000	10.000	72.00	16.00	25.40	0.14	3	●
10.000	10.000	10.000	72.00	19.00	32.00	0.15	3	●
12.000	12.000	12.000	83.00	22.00	38.00	0.18	3	●
14.000	14.000	14.000	83.00	22.00	38.00	0.21	3	●
16.000	16.000	16.000	92.00	26.00	44.00	0.19	3	●
18.000	18.000	18.000	92.00	26.00	44.00	0.22	3	●
20.000	20.000	20.000	104.00	32.00	54.00	0.24	3	●

Cutting values: Slotting* (detailed cutting values see p. 271)

ISO Code	Hardness	Feed depth a_p	Feed width a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 3	6	8	10	12	16	20
P Steel	≤ 850 N/mm²	1xd	1xd	180	0.016	0.032	0.041	0.054	0.063	0.081	0.09
	850 - 1400 N/mm²	1xd	1xd	120	0.013	0.024	0.032	0.044	0.052	0.064	0.076
M Stainless steel	≤ 750 N/mm²	1xd	1xd	100	0.014	0.027	0.036	0.045	0.054	0.063	0.081
	≥ 750 N/mm²	1xd	1xd	60	0.011	0.023	0.027	0.036	0.041	0.054	0.063
K Cast mat.	≥ 240 HB 30	1xd	1xd	115	0.014	0.027	0.036	0.05	0.059	0.072	0.086
N Aluminium	≤ 7% Si	1xd	1xd	180	0.014	0.027	0.036	0.05	0.059	0.072	0.086

* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life.

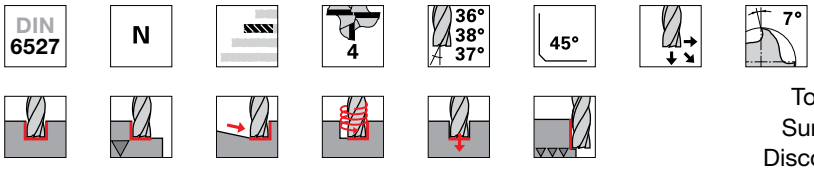
45° plunging, milling with extreme metal removal rate: RF 100 Diver

Ramping, driling, slotting roughing & finishing: at maximum speed, with only one tool, in all materials

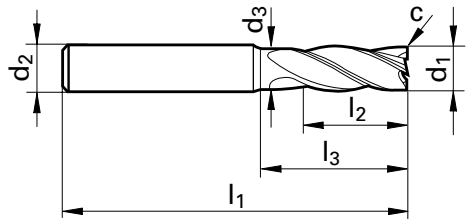
Guhring TV
or scan in code and watch video

Ratio end mills RF 100 DIVER

centre cutting



	HA	HB
Tool material	Solid carbide	
Surface finish	Signum	Signum
Discount group	106	106
Guhring no.	**6737**	**6736**



Code no.	d1 h10	d2 h6	d3	l1	l2	l3	c	Z	Availability	
	mm	mm	mm	mm	mm	mm	mm x 45°			
5.700	5.700	6.000	5.500	57.00	13.00	20.40	0.06	4	●	●
7.700	7.700	8.000	7.400	63.00	19.00	26.50	0.08	4	●	●
9.700	9.700	10.000	9.400	72.00	22.00	31.50	0.10	4	●	●
11.700	11.700	12.000	11.200	83.00	26.00	37.30	0.12	4	●	●
13.700	13.700	14.000	13.200	83.00	26.00	37.30	0.14	4	●	●
15.600	15.600	16.000	15.100	92.00	32.00	43.20	0.16	4	●	●
19.500	19.500	20.000	19.000	104.00	38.00	53.10	0.20	4	●	●

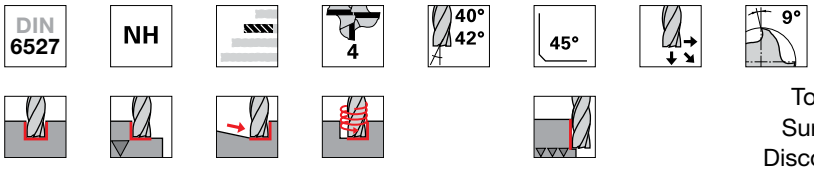
Cutting values: Ramping, slotting and HPC-milling* (detailed cutting values see p. 268)

ISO Code	Hardness	Feed depth a_p	Rampen max. Winkel	Cutting speed v_c	fz (mm/z) with nom. Ø 5,7	7,7	9,7	11,7	15,6	19,5
P Steel	≤ 850 N/mm²	1xd	45°	270	0.025	0.035	0.05	0.06	0.08	0.1
	850 - 1400 N/mm²	1xd	30°	240	0.025	0.03	0.045	0.05	0.07	0.085
M Stainless steel	≤ 750 N/mm²	1xd	10°	120	0.02	0.03	0.045	0.06	0.065	0.075
	≥ 750 N/mm²	1xd	5°	80	0.02	0.03	0.04	0.045	0.06	0.07
K Cast mat.	≥ 240 HB 30	1xd	45°	180	0.025	0.035	0.05	0.06	0.08	0.1
N Aluminium	≤ 7% Si	1xd	30°	420	0.03	0.04	0.065	0.08	0.095	0.11
S Ti sp.alloys	up to 1300 N/mm²	0.6xd	10°	60	0.02	0.03	0.04	0.045	0.06	0.07

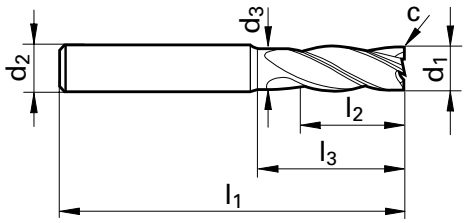
* for trochoidal milling and imachining with a_p 2xd and a_e 0.15 xd the cutting speed and feed rate can be increased by 50 %.

Ratio end mills RF 100 F

centre cutting



	HA	HB
Tool material	Solid carbide	
Surface finish	FIRE	FIRE
Discount group	106	106
Guhring no.	**3629**	**3630**



Code no.	d1 h10	d2 h6	d3	l1	l2	l3	c	Z	Availability	
	mm	mm	mm	mm	mm	mm	mm x 45°			
4.000	4.000	6.000	3.800	57.00	11.00	18.00	0.10	4	●	●
5.000	5.000	6.000	4.800	57.00	13.00	18.00	0.10	4	●	●
6.000	6.000	6.000	5.700	57.00	13.00	20.00	0.15	4	●	●
8.000	8.000	8.000	7.700	63.00	19.00	26.00	0.15	4	●	●
10.000	10.000	10.000	9.500	72.00	22.00	30.00	0.20	4	●	●
12.000	12.000	12.000	11.500	83.00	26.00	36.00	0.20	4	●	●
16.000	16.000	16.000	15.500	92.00	32.00	42.00	0.35	4	●	●
20.000	20.000	20.000	19.500	104.00	38.00	52.00	0.45	4	●	●

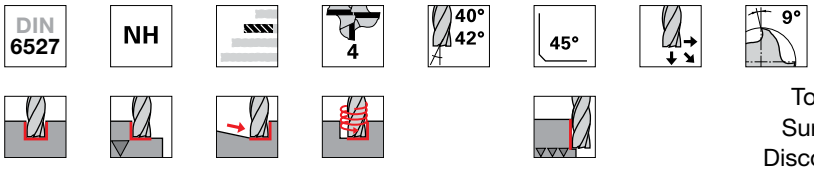
Cutting values: HPC-roughing* (detailed cutting values see p. 269)

ISO Code	Hardness	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 3	6	8	10	12	16	20	25
P Steel	≤ 850 N/mm²	2xd	0.3xd	200	0.02	0.04	0.055	0.07	0.085	0.1	0.12	0.17
	850 - 1400 N/mm²	2xd	0.3xd	180	0.02	0.04	0.055	0.07	0.085	0.1	0.12	0.17
M Stainless steel	≤ 750 N/mm²	2xd	0.3xd	140	0.018	0.035	0.045	0.06	0.07	0.09	0.1	0.15
	≥ 750 N/mm²	2xd	0.3xd	120	0.016	0.03	0.04	0.055	0.065	0.08	0.095	0.014

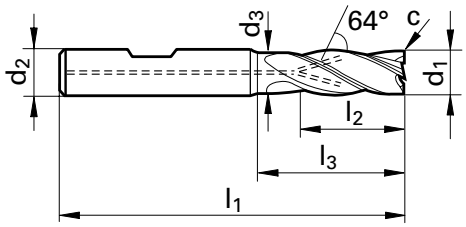
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life.
** for trochoidal milling and imachining with a_e 0.1-0.2xd the cutting speed and feed rate can be increased by 50 %.

Ratio end mills RF 100 F

centre cutting



	HB
Tool material	Solid carbide
Surface finish	FIRE
Discount group	106
Guhring no.	3366



Code no.	d1 h10	d2 h6	d3	l1	l2	l3	c	Z	Availability
	mm	mm	mm	mm	mm	mm	mm x 45°		
6.000	6.000	6.000	5.700	57.00	13.00	20.00	0.15	4	●
8.000	8.000	8.000	7.700	63.00	19.00	26.00	0.15	4	●
10.000	10.000	10.000	9.500	72.00	22.00	30.00	0.20	4	●
12.000	12.000	12.000	11.500	83.00	26.00	36.00	0.20	4	●
16.000	16.000	16.000	15.500	92.00	32.00	42.00	0.35	4	●
20.000	20.000	20.000	19.500	104.00	38.00	52.00	0.45	4	●

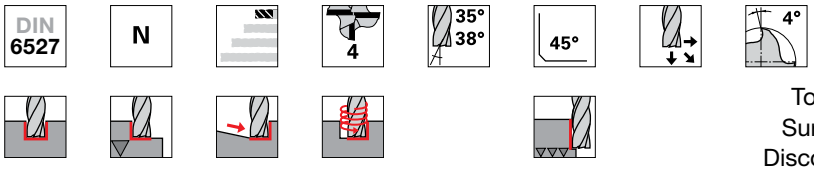
Cutting values: HPC-roughing* (detailed cutting values see p. 269)

ISO Code	Hardness	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 3	6	8	10	12	16	20	25
P Steel	≤ 850 N/mm²	2xd	0.3xd	200	0.02	0.04	0.055	0.07	0.085	0.1	0.12	0.17
	850 - 1400 N/mm²	2xd	0.3xd	180	0.02	0.04	0.055	0.07	0.085	0.1	0.12	0.17
M Stainless steel	≤ 750 N/mm²	2xd	0.3xd	140	0.018	0.035	0.045	0.06	0.07	0.09	0.1	0.15
	≥ 750 N/mm²	2xd	0.3xd	120	0.016	0.03	0.04	0.055	0.065	0.08	0.095	0.014

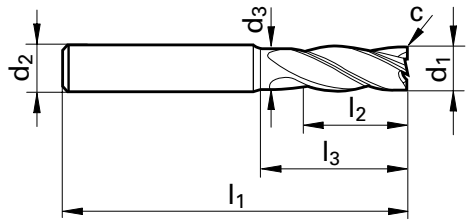
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life.
** for trochoidal milling and imachining with a_e 0.1-0.2xd the cutting speed and feed rate can be increased by 50 %.

Standard Ratio end mills RF 100 U

centre cutting



Tool material	Solid carbide	
Surface finish	FIRE	FIRE
Discount group	106	106
Guhring no.	**6706**	**3731**



Code no.	d1 h10	d2 h6	d3	l1	l2	l3	c	Z	Availability	
	mm	mm	mm	mm	mm	mm	mm x 45°			
3.000	3.000	6.000	2.800	50.00	5.00	12.00	0.10	4	●	●
4.000	4.000	6.000	3.800	54.00	8.00	15.00	0.10	4	●	●
5.000	5.000	6.000	4.800	54.00	9.00	15.00	0.10	4	●	●
6.000	6.000	6.000	5.700	54.00	10.00	17.00	0.15	4	●	●
8.000	8.000	8.000	7.700	58.00	12.00	21.00	0.15	4	●	●
10.000	10.000	10.000	9.500	66.00	14.00	24.00	0.20	4	●	●
12.000	12.000	12.000	11.500	73.00	16.00	26.00	0.20	4	●	●
14.000	14.000	14.000	13.500	75.00	18.00	28.00	0.25	4	●	●
16.000	16.000	16.000	15.500	82.00	22.00	32.00	0.35	4	●	●
18.000	18.000	18.000	17.500	84.00	24.00	34.00	0.40	4	●	●
20.000	20.000	20.000	19.500	92.00	26.00	40.00	0.45	4	●	●

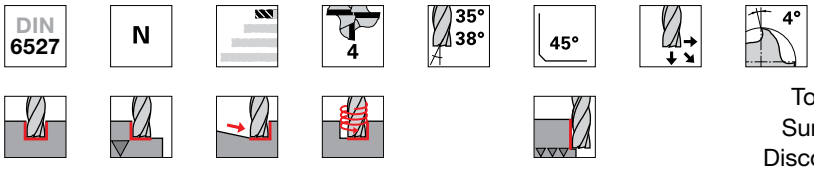
Cutting values: HPC-roughing* (detailed cutting values see p. 269)

ISO Code	Hardness	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 3	6	8	10	12	16	20	25
P Steel	≤ 850 N/mm²	2xd	0.3xd	200	0.02	0.04	0.055	0.07	0.085	0.1	0.12	0.17
	850 - 1400 N/mm²	2xd	0.3xd	180	0.02	0.04	0.055	0.07	0.085	0.1	0.12	0.17
K Cast mat.	≥ 240 HB 30	2xd	0.4xd	180	0.02	0.04	0.05	0.065	0.08	0.095	0.11	0.16

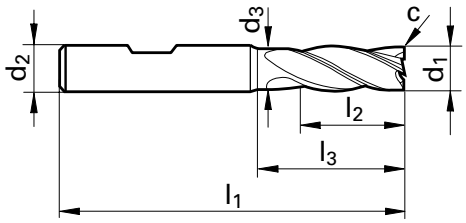
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life.
** for trochoidal milling and imachining with a_e 0.1-0.2xd the cutting speed and feed rate can be increased by 50 %.

Standard Ratio end mills RF 100 U

centre cutting



	HB
Tool material	Solid carbide
Surface finish	bright
Discount group	106
Guhring no.	3200



Code no.	d1 h10	d2 h6	d3	l1	l2	l3	c	Z	Availability
	mm	mm	mm	mm	mm	mm	mm x 45°		
6.000	6.000	6.000	5.700	54.00	10.00	17.00	0.15	4	●
8.000	8.000	8.000	7.700	58.00	12.00	21.00	0.15	4	●
10.000	10.000	10.000	9.500	66.00	14.00	24.00	0.20	4	●
12.000	12.000	12.000	11.500	73.00	16.00	26.00	0.20	4	●
14.000	14.000	14.000	13.500	75.00	18.00	28.00	0.25	4	●
16.000	16.000	16.000	15.500	82.00	22.00	32.00	0.35	4	●
18.000	18.000	18.000	17.500	84.00	24.00	34.00	0.40	4	●
20.000	20.000	20.000	19.500	92.00	26.00	40.00	0.45	4	●

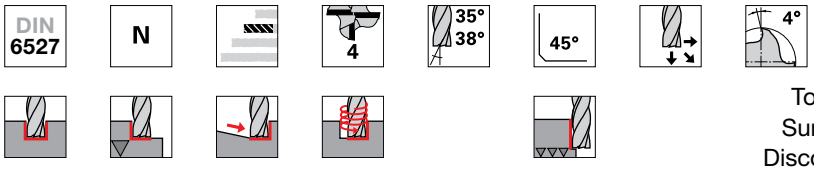
Cutting values: HPC-roughing* (detailed cutting values see p. 269)

ISO Code	Hardness	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 3	6	8	10	12	16	20	25
P Steel	≤ 850 N/mm²	2xd	0.3xd	200	0.02	0.04	0.055	0.07	0.085	0.1	0.12	0.17
	850 - 1400 N/mm²	2xd	0.3xd	180	0.02	0.04	0.055	0.07	0.085	0.1	0.12	0.17
K Cast mat.	≥ 240 HB 30	2xd	0.4xd	180	0.02	0.04	0.05	0.065	0.08	0.095	0.11	0.16

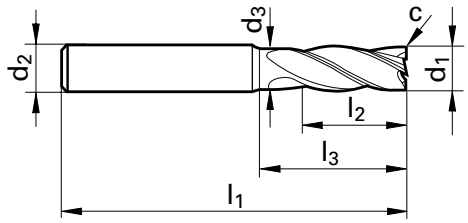
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life.
** for trochoidal milling and imachining with a_e 0.1-0.2xd the cutting speed and feed rate can be increased by 50 %.
All recommendations are valid for coated tools. For bright milling cutters please v_c -40 % and f_z -25 %!

Standard Ratio end mills RF 100 U

centre cutting



	Solid carbide	
Tool material	FIRE	FIRE
Surface finish		
Discount group	106	106
Guhring no.	**3736**	**3732**



Code no.	d1 h10	d2 h6	d3	l1	l2	l3	c	Z	Availability	
	mm	mm	mm	mm	mm	mm	mm x 45°			
3.000	3.000	6.000	2.800	57.00	8.00	15.00	0.10	4	●	●
4.000	4.000	6.000	3.800	57.00	11.00	18.00	0.10	4	●	●
5.000	5.000	6.000	4.800	57.00	13.00	18.00	0.10	4	●	●
6.000	6.000	6.000	5.700	57.00	13.00	20.00	0.15	4	●	●
8.000	8.000	8.000	7.700	63.00	19.00	26.00	0.15	4	●	●
10.000	10.000	10.000	9.500	72.00	22.00	30.00	0.20	4	●	●
12.000	12.000	12.000	11.500	83.00	26.00	36.00	0.20	4	●	●
14.000	14.000	14.000	13.500	83.00	26.00	36.00	0.25	4	●	●
16.000	16.000	16.000	15.500	92.00	32.00	42.00	0.35	4	●	●
18.000	18.000	18.000	17.500	92.00	32.00	42.00	0.40	4	●	●
20.000	20.000	20.000	19.500	104.00	38.00	52.00	0.45	4	●	●
25.000	25.000	25.000	24.000	121.00	45.00	63.00	0.60	4	●	●

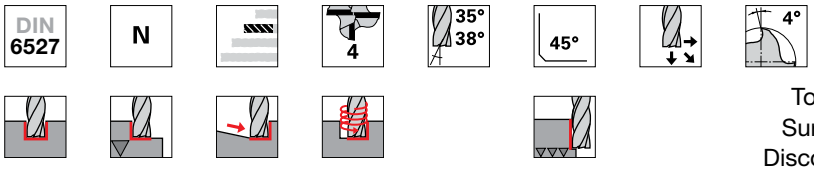
Cutting values: HPC-roughing* (detailed cutting values see p. 269)

ISO Code	Hardness	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 3	6	8	10	12	16	20	25
P Steel	≤ 850 N/mm²	2xd	0.3xd	200	0.02	0.04	0.055	0.07	0.085	0.1	0.12	0.17
	850 - 1400 N/mm²	2xd	0.3xd	180	0.02	0.04	0.055	0.07	0.085	0.1	0.12	0.17
K Cast mat.	≥ 240 HB 30	2xd	0.4xd	180	0.02	0.04	0.05	0.065	0.08	0.095	0.11	0.16

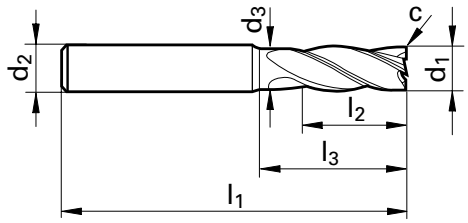
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life.
** for trochoidal milling and imachining with a_e 0.1-0.2xd the cutting speed and feed rate can be increased by 50 %.

Standard Ratio end mills RF 100 U

centre cutting



	HA	HB
Tool material	Solid carbide	
Surface finish	bright	bright
Discount group	106	106
Guhring no.	**3208**	**3201**



Code no.	d1 h10	d2 h6	d3	l1	l2	l3	c	Z	Availability	
	mm	mm	mm	mm	mm	mm	mm x 45°			
4.000	4.000	6.000	3.800	57.00	11.00	18.00	0.10	4	●	●
5.000	5.000	6.000	4.800	57.00	13.00	18.00	0.10	4	●	●
6.000	6.000	6.000	5.700	57.00	13.00	20.00	0.15	4	●	●
8.000	8.000	8.000	7.700	63.00	19.00	26.00	0.15	4	●	●
10.000	10.000	10.000	9.500	72.00	22.00	30.00	0.20	4	●	●
12.000	12.000	12.000	11.500	83.00	26.00	36.00	0.20	4	●	●
14.000	14.000	14.000	13.500	83.00	26.00	36.00	0.25	4	●	●
16.000	16.000	16.000	15.500	92.00	32.00	42.00	0.35	4	●	●
18.000	18.000	18.000	17.500	92.00	32.00	42.00	0.40	4	●	●
20.000	20.000	20.000	19.500	104.00	38.00	52.00	0.45	4	●	●
25.000	25.000	25.000	24.000	121.00	45.00	63.00	0.60	4	●	●

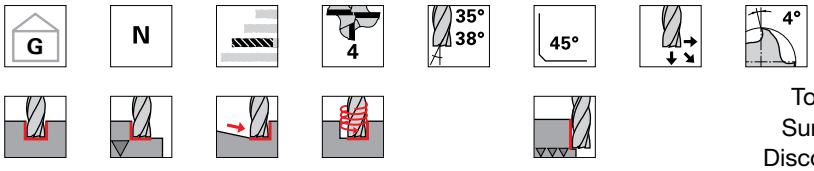
Cutting values: HPC-roughing* (detailed cutting values see p. 269)

ISO Code	Hardness	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 3	6	8	10	12	16	20	25
P Steel	≤ 850 N/mm²	2xd	0.3xd	200	0.02	0.04	0.055	0.07	0.085	0.1	0.12	0.17
	850 - 1400 N/mm²	2xd	0.3xd	180	0.02	0.04	0.055	0.07	0.085	0.1	0.12	0.17
K Cast mat.	≥ 240 HB 30	2xd	0.4xd	180	0.02	0.04	0.05	0.065	0.08	0.095	0.11	0.16

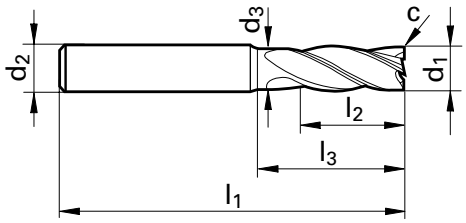
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life.
** for trochoidal milling and imachining with a_e 0.1-0.2xd the cutting speed and feed rate can be increased by 50 %.
All recommendations are valid for coated tools. For bright milling cutters please v_c -40 % and f_z -25 %!

Standard Ratio end mills RF 100 U

centre cutting



	HA	HB
Tool material	Solid carbide	
Surface finish	FIRE	FIRE
Discount group	106	106
Guhring no.	**3837**	**3838**



Code no.	d1 h10	d2 h6	d3	l1	l2	l3	c	Z	Availability	
	mm	mm	mm	mm	mm	mm	mm x 45°			
6.000	6.000	6.000	5.700	65.00	13.00	28.00	0.15	4	●	●
8.000	8.000	8.000	7.700	75.00	19.00	38.00	0.15	4	●	●
10.000	10.000	10.000	9.500	80.00	22.00	38.00	0.20	4	●	●
12.000	12.000	12.000	11.500	93.00	26.00	46.00	0.20	4	●	●
16.000	16.000	16.000	15.500	108.00	32.00	58.00	0.35	4	●	●
20.000	20.000	20.000	19.500	126.00	38.00	74.00	0.45	4	●	●

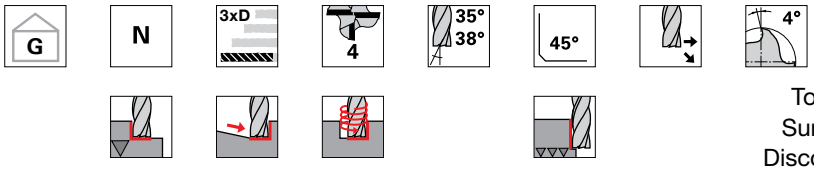
Cutting values: HPC-roughing* (detailed cutting values see p. 269)

ISO Code	Hardness	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 3	6	8	10	12	16	20	25
P Steel	≤ 850 N/mm²	2xd	0.3xd	200	0.02	0.04	0.055	0.07	0.085	0.1	0.12	0.17
	850 - 1400 N/mm²	2xd	0.3xd	180	0.02	0.04	0.055	0.07	0.085	0.1	0.12	0.17
K Cast mat.	≥ 240 HB 30	2xd	0.4xd	180	0.02	0.04	0.05	0.065	0.08	0.095	0.11	0.16

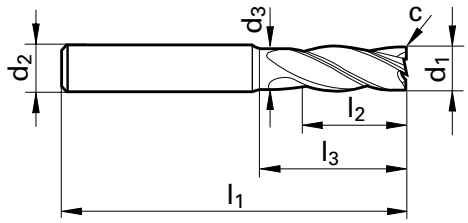
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life.
** for trochoidal milling and imachining with a_e 0.1-0.2xd the cutting speed and feed rate can be increased by 50 %.

Standard Ratio end mills RF 100 U

centre cutting



Tool material	Solid carbide	
Surface finish	FIRE	FIRE
Discount group	106	106
Guhring no.	**3839**	**3871**



Code no.	d1 h10	d2 h6	d3	l1	l2	l3	c	Z	Availability	
	mm	mm	mm	mm	mm	mm	mm x 45°			
6.000	6.000	6.000	5.700	65.00	18.00	28.00	0.15	4	●	●
8.000	8.000	8.000	7.700	75.00	24.00	38.00	0.15	4	●	●
10.000	10.000	10.000	9.500	80.00	30.00	38.00	0.20	4	●	●
12.000	12.000	12.000	11.500	93.00	36.00	46.00	0.20	4	●	●
16.000	16.000	16.000	15.500	108.00	48.00	58.00	0.35	4	●	●
20.000	20.000	20.000	19.500	126.00	60.00	74.00	0.45	4	●	●

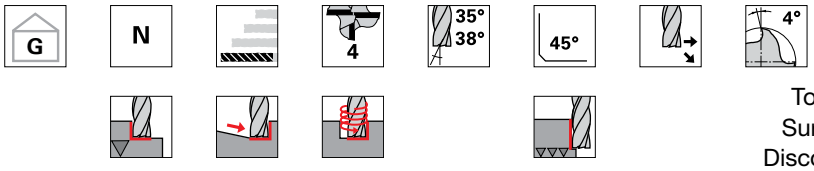
Cutting values: HPC-roughing* (detailed cutting values see p. 269)

ISO Code	Hardness	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 3	6	8	10	12	16	20	25
P Steel	≤ 850 N/mm²	2xd	0.3xd	200	0.02	0.04	0.055	0.07	0.085	0.1	0.12	0.17
	850 - 1400 N/mm²	2xd	0.3xd	180	0.02	0.04	0.055	0.07	0.085	0.1	0.12	0.17
K Cast mat.	≥ 240 HB 30	2xd	0.4xd	180	0.02	0.04	0.05	0.065	0.08	0.095	0.11	0.16

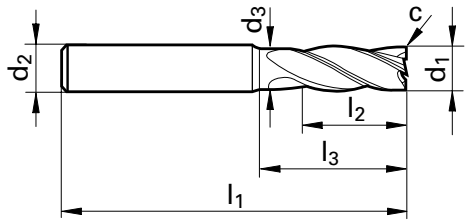
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life.
** for trochoidal milling and imachining with a_e 0.1-0.2xd the cutting speed and feed rate can be increased by 50 %.

Standard Ratio end mills RF 100 U

centre cutting



Tool material	Solid carbide	
Surface finish	bright	FIRE
Discount group	106	106
Guhring no.	**3209**	**3627**



Code no.	d1 h10	d2 h6	d3	l1	l2	l3	c	Z	Availability	
	mm	mm	mm	mm	mm	mm	mm x 45°			
10.000	10.000	10.000	9.500	100.00	40.00	48.00	0.20	4	●	●
12.000	12.000	12.000	11.500	150.00	45.00	58.00	0.20	4	●	●
14.000	14.000	14.000	13.500	150.00	45.00	58.00	0.25	4	●	●
16.000	16.000	16.000	15.500	150.00	65.00	78.00	0.35	4	●	●
18.000	18.000	18.000	17.500	150.00	65.00	78.00	0.40	4	●	●
20.000	20.000	20.000	19.500	150.00	65.00	78.00	0.45	4	●	●
25.000	25.000	25.000	24.000	150.00	75.00	92.00	0.60	4	●	●

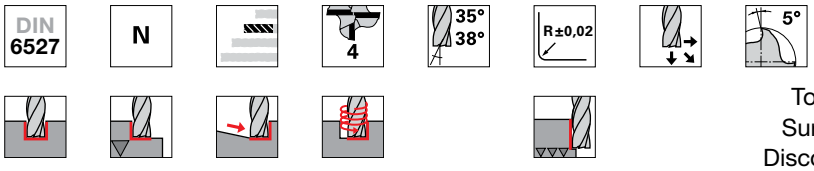
Cutting values: HPC-roughing* (detailed cutting values see p. 269)

ISO Code	Hardness	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 3	6	8	10	12	16	20	25
P Steel	≤ 850 N/mm²	3xd	0.25xd	200	0.02	0.04	0.055	0.07	0.085	0.1	0.12	0.17
	850 - 1400 N/mm²	3xd	0.15xd	180	0.02	0.04	0.055	0.07	0.085	0.1	0.12	0.17
K Cast mat.	≥ 240 HB 30	3xd	0.25xd	180	0.02	0.04	0.05	0.065	0.08	0.095	0.11	0.16

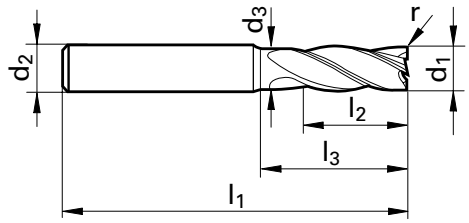
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life.
** for trochoidal milling and imachining with a_e 0.1-0.2xd the cutting speed and feed rate can be increased by 50 %.
All recommendations are valid for coated tools. For bright milling cutters please v_c -40 % and f_z -25 %!

Standard Ratio end mills RF 100 U

centre cutting



	HA	HB
Tool material	Solid carbide	
Surface finish	FIRE	FIRE
Discount group	106	106
Guhring no.	**3872**	**3873**



Code no.	d1 h10	d2 h6	d3	l1	l2	l3	r	Z	Availability	
	mm	mm	mm	mm	mm	mm	mm			
6.005	6.000	6.000	5.700	57.00	13.00	20.00	0.50	4	●	●
6.010	6.000	6.000	5.700	57.00	13.00	20.00	1.00	4	●	●
6.020	6.000	6.000	5.700	57.00	13.00	20.00	2.00	4	●	●
8.005	8.000	8.000	7.700	63.00	19.00	26.00	0.50	4	●	●
8.010	8.000	8.000	7.700	63.00	19.00	26.00	1.00	4	●	●
8.020	8.000	8.000	7.700	63.00	19.00	26.00	2.00	4	●	●
10.005	10.000	10.000	9.500	72.00	22.00	30.00	0.50	4	●	●
10.010	10.000	10.000	9.500	72.00	22.00	30.00	1.00	4	●	●
10.020	10.000	10.000	9.500	72.00	22.00	30.00	2.00	4	●	●
12.005	12.000	12.000	11.500	83.00	26.00	36.00	0.50	4	●	●
12.010	12.000	12.000	11.500	83.00	26.00	36.00	1.00	4	●	●
12.020	12.000	12.000	11.500	83.00	26.00	36.00	2.00	4	●	●
16.005	16.000	16.000	15.500	92.00	32.00	42.00	0.50	4	●	●
16.010	16.000	16.000	15.500	92.00	32.00	42.00	1.00	4	●	●
16.020	16.000	16.000	15.500	92.00	32.00	42.00	2.00	4	●	●
16.030	16.000	16.000	15.500	92.00	32.00	42.00	3.00	4	●	●
20.005	20.000	20.000	19.500	104.00	38.00	52.00	0.50	4	●	●
20.010	20.000	20.000	19.500	104.00	38.00	52.00	1.00	4	●	●
20.020	20.000	20.000	19.500	104.00	38.00	52.00	2.00	4	●	●
20.030	20.000	20.000	19.500	104.00	38.00	52.00	3.00	4	●	●
25.020	25.000	25.000	24.000	121.00	45.00	63.00	2.00	4	●	●
25.030	25.000	25.000	24.000	121.00	45.00	63.00	3.00	4	●	●

Cutting values: HPC-roughing* (detailed cutting values see p. 269)

ISO Code	Hardness	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 3	6	8	10	12	16	20	25
P Steel	≤ 850 N/mm²	2xd	0.3xd	200	0.02	0.04	0.055	0.07	0.085	0.1	0.12	0.17
	850 - 1400 N/mm²	2xd	0.3xd	180	0.02	0.04	0.055	0.07	0.085	0.1	0.12	0.17
K Cast mat.	≥ 240 HB 30	2xd	0.4xd	180	0.02	0.04	0.05	0.065	0.08	0.095	0.11	0.16

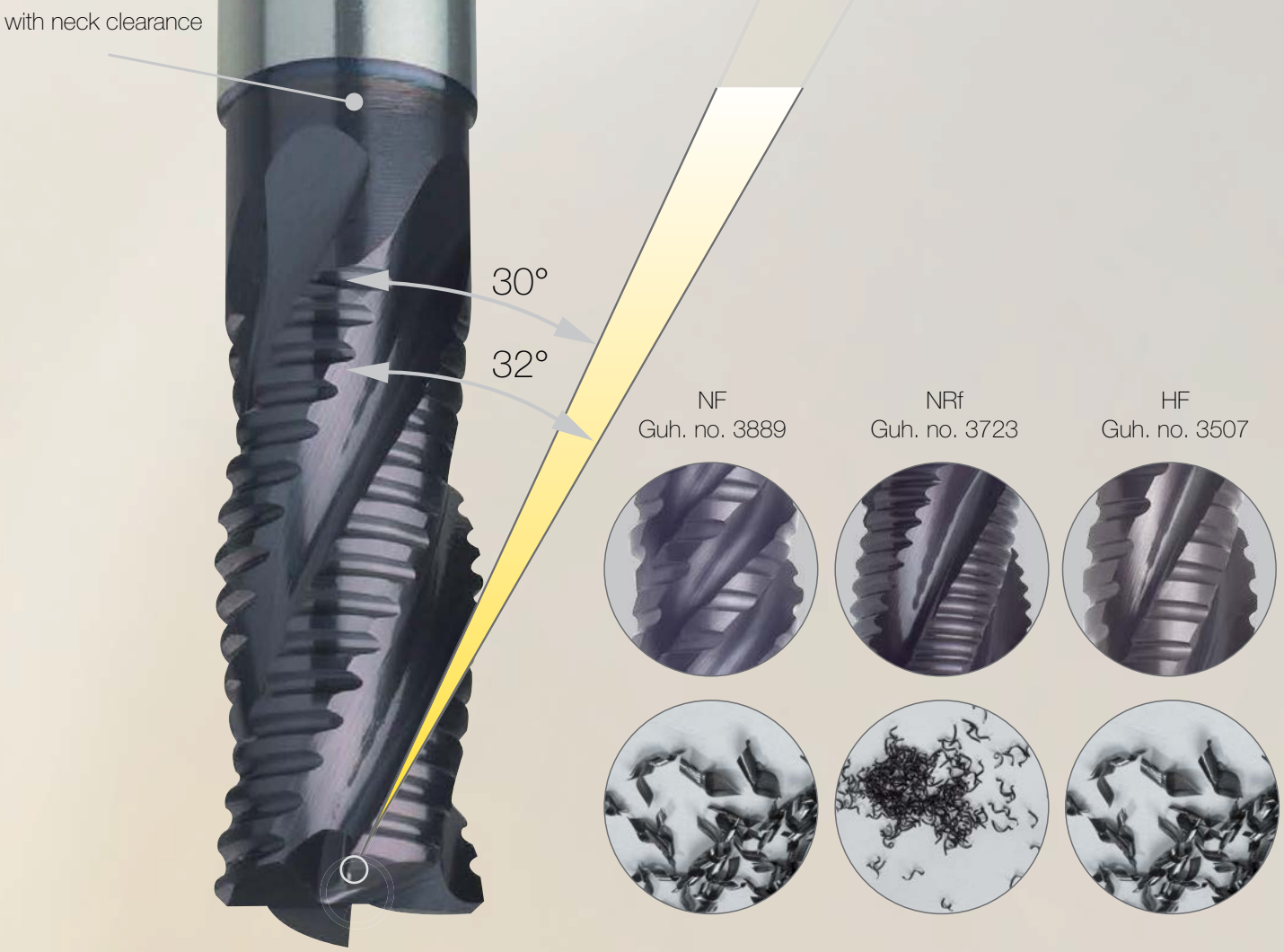
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life.
** for trochoidal milling and imachining with a_e 0.1-0.2xd the cutting speed and feed rate can be increased by 50 %.

RF 100 U/HF - High performance roughing end mills

for steel and cast materials

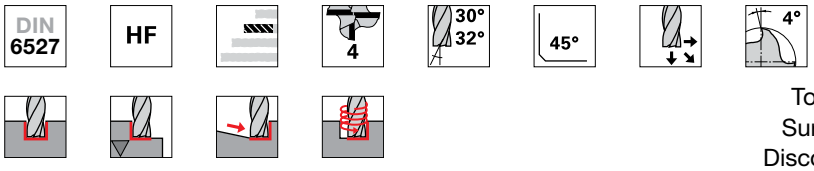
Summary of advantages

- innovative roughing geometry produces smaller chips
- slotting and roughing with large cutting widths and depths
- low power consumption and cutting forces therefore suitability on non-rigid machines

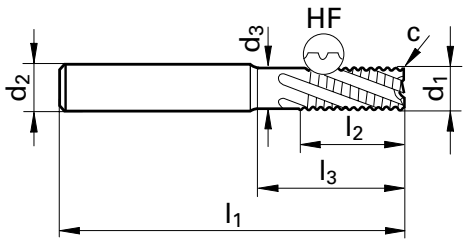


Standard Ratio end mills RF 100 U

centre cutting



	HA	HB
Tool material	Solid carbide	
Surface finish	FIRE	FIRE
Discount group	106	106
Guhring no.	**3507**	**3508**



Code no.	d1 h10	d2 h6	d3	l1	l2	l3	c	Z	Availability	
	mm	mm	mm	mm	mm	mm	mm x 45°			
6.000	6.000	6.000	5.700	57.00	13.00	20.00	0.30	4	●	●
8.000	8.000	8.000	7.700	63.00	19.00	26.00	0.30	4	●	●
10.000	10.000	10.000	9.500	72.00	22.00	30.00	0.30	4	●	●
12.000	12.000	12.000	11.500	83.00	26.00	36.00	0.50	4	●	●
16.000	16.000	16.000	15.500	92.00	32.00	42.00	0.50	4	●	●
20.000	20.000	20.000	19.500	104.00	38.00	52.00	0.50	4	●	●
25.000	25.000	25.000	24.000	121.00	45.00	63.00	0.60	4	●	●

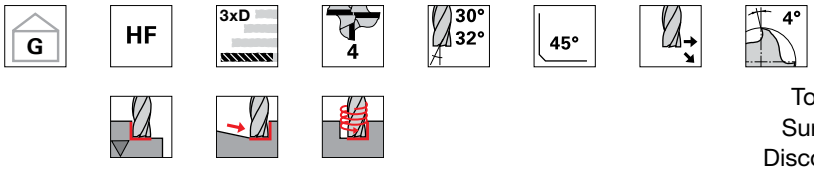
Cutting values: HPC-roughing* (detailed cutting values see p. 270)

ISO Code	Hardness	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 3	6	8	10	12	16	20	25
P Steel	≤ 850 N/mm²	2xd	0.5xd	180	0.015	0.025	0.035	0.045	0.05	0.065	0.08	0.12
	850 - 1400 N/mm²	2xd	0.4xd	160	0.015	0.025	0.035	0.045	0.05	0.065	0.08	0.12
K Cast mat.	≥ 240 HB 30	2xd	0.4xd	160	0.015	0.025	0.035	0.045	0.05	0.065	0.08	0.12

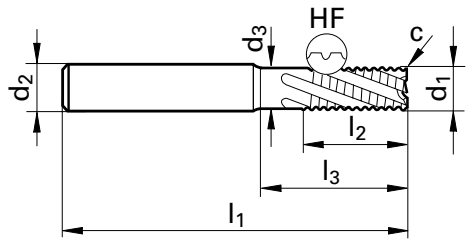
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life.
** for slotting the cutting speed and feed rate should be reduced by 30 %.

Standard Ratio end mills RF 100 U

centre cutting



Tool material	Solid carbide	
Surface finish	FIRE	FIRE
Discount group	106	106
Guhring no.	**3509**	**3522**



Code no.	d1 h10	d2 h6	d3	l1	l2	l3	c	Z	Availability	
	mm	mm	mm	mm	mm	mm	mm x 45°			
6.000	6.000	6.000	5.700	65.00	18.00	28.00	0.30	4	●	●
8.000	8.000	8.000	7.700	75.00	24.00	38.00	0.30	4	●	●
10.000	10.000	10.000	9.500	80.00	30.00	38.00	0.30	4	●	●
12.000	12.000	12.000	11.500	93.00	36.00	46.00	0.50	4	●	●
16.000	16.000	16.000	15.500	108.00	48.00	58.00	0.50	4	●	●
20.000	20.000	20.000	19.500	126.00	60.00	74.00	0.50	4	●	●

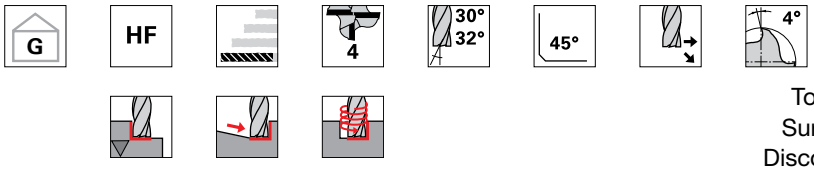
Cutting values: HPC-roughing* (detailed cutting values see p. 270)

ISO Code	Hardness	Feed depth a_p	Feed width a_e	Cutting speed ** v_c	fz (mm/z) with nom. Ø 3	6	8	10	12	16	20	25
P Steel	≤ 850 N/mm²	2xd	0.2xd	160	0.015	0.025	0.035	0.045	0.05	0.065	0.08	0.12
	850 - 1400 N/mm²	2xd	0.15xd	130	0.015	0.025	0.035	0.045	0.05	0.065	0.08	0.12
K Cast mat.	≥ 240 HB 30	2xd	0.25xd	140	0.015	0.025	0.035	0.045	0.05	0.065	0.08	0.12

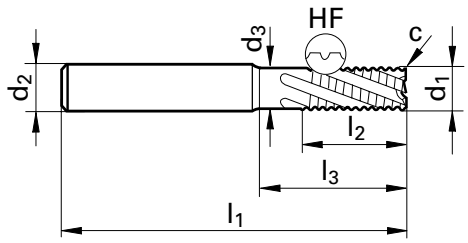
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life.
** for slotting the cutting speed and feed rate should be reduced by 50 %.

Standard Ratio end mills RF 100 U

centre cutting



	~HA	~HB
Tool material	Solid carbide	
Surface finish	FIRE	FIRE
Discount group	106	106
Guhring no.	**3598**	**3600**



Code no.	d1 h10	d2 h6	d3	l1	l2	l3	c	Z	Availability	
	mm	mm	mm	mm	mm	mm	mm x 45°			
6.000	6.000	6.000	5.700	75.00	13.00	34.00	0.30	4	●	●
8.000	8.000	8.000	7.700	100.00	19.00	49.00	0.30	4	●	●
10.000	10.000	10.000	9.500	100.00	22.00	48.00	0.30	4	●	●
12.000	12.000	12.000	11.500	150.00	26.00	58.00	0.50	4	●	●
16.000	16.000	16.000	15.500	150.00	32.00	78.00	0.50	4	●	●
20.000	20.000	20.000	19.500	150.00	38.00	78.00	0.50	4	●	●

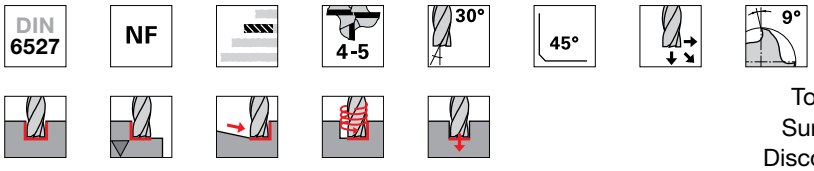
Cutting values: HPC-roughing* (detailed cutting values see p. 270)

ISO Code	Hardness	Feed depth a_p	Feed width a_e	Cutting speed ** v_c	fz (mm/z) with nom. Ø 3	6	8	10	12	16	20	25
P Steel	≤ 850 N/mm²	2xd	0.2xd	160	0.015	0.025	0.035	0.045	0.05	0.065	0.08	0.12
	850 - 1400 N/mm²	2xd	0.15xd	130	0.015	0.025	0.035	0.045	0.05	0.065	0.08	0.12
K Cast mat.	≥ 240 HB 30	2xd	0.25xd	140	0.015	0.025	0.035	0.045	0.05	0.065	0.08	0.12

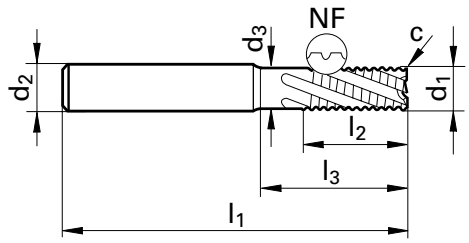
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life.
** for slotting the cutting speed and feed rate should be reduced by 50 %.

High-performance roughing end mills RS 100 U

centre cutting



Tool material	Solid carbide	
Surface finish	FIRE	FIRE
Discount group	106	106
Guhring no.	**3887**	**3888**



Code no.	d1 h10	d2 h6	d3	l1	l2	l3	c	Z	Availability	
	mm	mm	mm	mm	mm	mm	mm x 45°			
6.000	6.000	6.000	5.700	57.00	13.00	20.00	0.30	4	●	●
8.000	8.000	8.000	7.700	63.00	19.00	26.00	0.30	4	●	●
10.000	10.000	10.000	9.500	72.00	22.00	30.00	0.30	4	●	●
12.000	12.000	12.000	11.500	83.00	26.00	36.00	0.50	4	●	●
14.000	14.000	14.000	13.500	83.00	26.00	36.00	0.50	4	●	●
16.000	16.000	16.000	15.500	92.00	32.00	42.00	0.50	4	●	●
18.000	18.000	18.000	17.500	92.00	32.00	42.00	0.50	4	●	●
20.000	20.000	20.000	19.500	104.00	38.00	52.00	0.50	4	●	●
25.000	25.000	25.000	24.000	121.00	45.00	63.00	0.60	5	●	●

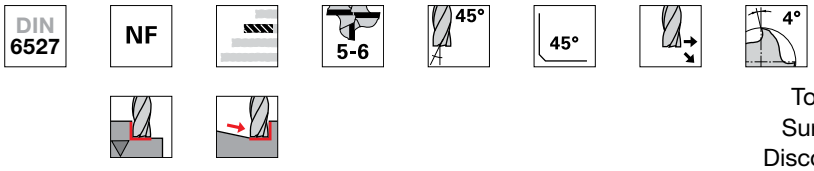
Cutting values: HPC-roughing* (detailed cutting values see p. 273)

ISO Code	Hardness	Feed depth a_p	Feed width a_e	Cutting speed** v_c	fz (mm/z) with nom. Ø 6	8	10	12	16	20	25
P Steel	≤ 850 N/mm²	2xd	0.5xd	160	0.024	0.032	0.04	0.048	0.056	0.072	0.104
	850 - 1400 N/mm²	2xd	0.4xd	130	0.016	0.032	0.041	0.054	0.063	0.081	0.09
M Stainless steel	≤ 750 N/mm²	2xd	0.25xd	115	0.024	0.032	0.04	0.048	0.056	0.072	0.104
	≥ 750 N/mm²	2xd	0.2xd	80	0.014	0.022	0.027	0.036	0.045	0.054	0.063
K Cast mat.	≥ 240 HB 30	2xd	0.4xd	150	0.024	0.032	0.04	0.048	0.056	0.072	0.104
N Aluminium	≤ 7% Si	2xd	0.3xd	250	0.027	0.036	0.045	0.054	0.063	0.081	0.12

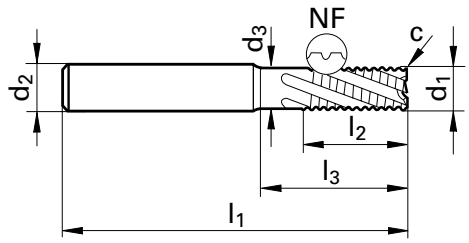
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life.
** for slotting the cutting speed and feed rate should be reduced by 40 %.

High-performance roughing end mills RS 100 F

centre cutting



Tool material	Solid carbide	
Surface finish	FIRE	FIRE
Discount group	106	106
Guhring no.	**3889**	**3890**



Code no.	d1 h10	d2 h6	d3	l1	l2	l3	c	Z	Availability	
	mm	mm	mm	mm	mm	mm	mm x 45°			
6.000	6.000	6.000	5.700	57.00	13.00	20.00	0.30	5	●	●
8.000	8.000	8.000	7.700	63.00	19.00	26.00	0.30	5	●	●
10.000	10.000	10.000	9.500	72.00	22.00	30.00	0.30	5	●	●
12.000	12.000	12.000	11.500	83.00	26.00	36.00	0.50	5	●	●
14.000	14.000	14.000	13.500	83.00	26.00	36.00	0.50	5	●	●
16.000	16.000	16.000	15.500	92.00	32.00	42.00	0.50	6	●	●
18.000	18.000	18.000	17.500	92.00	32.00	42.00	0.50	6	●	●
20.000	20.000	20.000	19.500	104.00	38.00	52.00	0.50	6	●	●
25.000	25.000	25.000	24.000	121.00	45.00	63.00	0.60	6	●	●

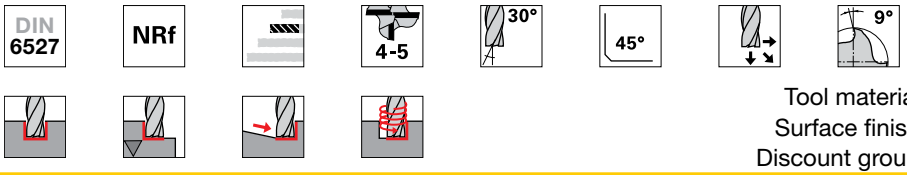
Cutting values: HPC-roughing* (detailed cutting values see p. 273)

ISO Code	Hardness	Feed depth a_p	Feed width a_e	Cutting speed** v_c	fz (mm/z) with nom. Ø 6	8	10	12	16	20	25
P Steel	≤ 850 N/mm²	2xd	0.5xd	160	0.024	0.032	0.04	0.048	0.056	0.072	0.104
	850 - 1400 N/mm²	2xd	0.4xd	130	0.016	0.032	0.041	0.054	0.063	0.081	0.09
M Stainless steel	≤ 750 N/mm²	2xd	0.25xd	115	0.024	0.032	0.04	0.048	0.056	0.072	0.104
	≥ 750 N/mm²	2xd	0.2xd	80	0.014	0.022	0.027	0.036	0.045	0.054	0.063
K Cast mat.	≥ 240 HB 30	2xd	0.4xd	150	0.024	0.032	0.04	0.048	0.056	0.072	0.104
N Aluminium	≤ 7% Si	2xd	0.3xd	250	0.027	0.036	0.045	0.054	0.063	0.081	0.12

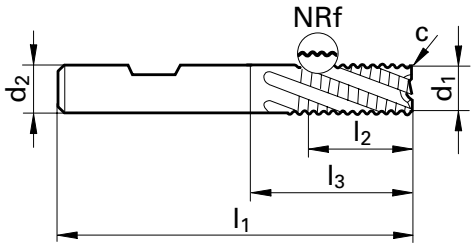
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life.
** for slotting the cutting speed and feed rate should be reduced by 40 %.

Roughing end mills GS 100 U (fine teeth)

centre cutting



Tool material	Solid carbide	
Surface finish	bright	FIRE
Discount group	117	117
Guhring no.	**3204**	**3723**



Code no.	d1 h10	d2 h6	l1	l2	l3	c	Z	Availability	
	mm	mm	mm	mm	mm	mm x 45°			
6.000	6.000	6.000	57.00	13.00	21.00	0.30	4	●	●
8.000	8.000	8.000	63.00	19.00	27.00	0.30	4	●	●
10.000	10.000	10.000	72.00	22.00	32.00	0.30	4	●	●
12.000	12.000	12.000	83.00	26.00	38.00	0.50	4	●	●
14.000	14.000	14.000	83.00	26.00	38.00	0.50	4	●	●
14.001	14.000	16.000	92.00	32.00	43.00	0.50	4	●	●
16.000	16.000	16.000	92.00	32.00	44.00	0.50	4	●	●
18.000	18.000	18.000	92.00	32.00	44.00	0.50	4	●	●
18.001	18.000	20.000	104.00	38.00	53.00	0.50	4	●	●
20.000	20.000	20.000	104.00	38.00	54.00	0.50	4	●	●
25.000	25.000	25.000	121.00	45.00	65.00	0.60	5	●	●

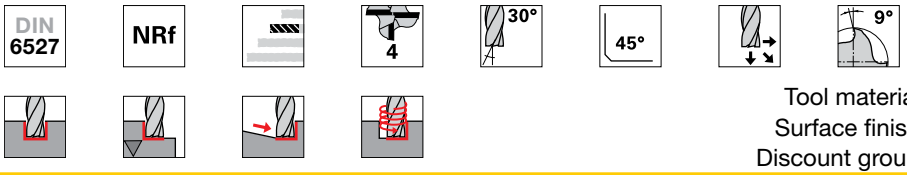
Cutting values: HPC-roughing* (detailed cutting values see p. 272)

ISO Code	Hardness	Feed depth a_p	Feed width a_e	Cutting speed** v_c	fz (mm/z) with nom. Ø 6	8	10	12	16	20	25
P Steel	≤ 850 N/mm²	2xd	0.5xd	160	0.02	0.028	0.036	0.04	0.052	0.064	0.096
	850 - 1400 N/mm²	2xd	0.4xd	130	0.016	0.024	0.028	0.032	0.044	0.052	0.064
M Stainless steel	≤ 750 N/mm²	2xd	0.25xd	115	0.02	0.028	0.036	0.04	0.052	0.064	0.096
	≥ 750 N/mm²	2xd	0.2xd	80	0.011	0.018	0.021	0.025	0.032	0.042	0.049
K Cast mat.	≥ 240 HB 30	2xd	0.4xd	150	0.021	0.028	0.035	0.042	0.049	0.063	0.091
N Aluminium	≤ 7% Si	2xd	0.3xd	250	0.024	0.032	0.04	0.048	0.056	0.072	0.104

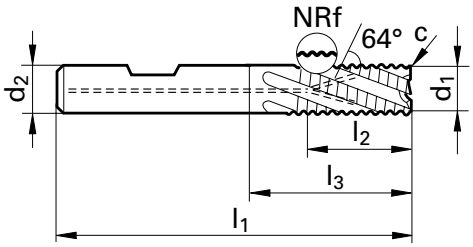
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life.
** for slotting the cutting speed and feed rate should be reduced by 40 %.
All recommendations are valid for coated tools. For bright milling cutters please v_c -40 % and f_z -25 %!

Roughing end mills GS 100 U (fine teeth)

centre cutting



Tool material	**Solid carbide**
Surface finish	FIRE
Discount group	106
Guhring no.	**3365**



Code no.	d1 h10	d2 h6	l1	l2	l3	c	Z	Availability
	mm	mm	mm	mm	mm	mm x 45°		
6.000	6.000	6.000	57.00	13.00	21.00	0.30	4	●
8.000	8.000	8.000	63.00	19.00	27.00	0.30	4	●
10.000	10.000	10.000	72.00	22.00	32.00	0.30	4	●
12.000	12.000	12.000	83.00	26.00	38.00	0.50	4	●
16.000	16.000	16.000	92.00	32.00	44.00	0.50	4	●
20.000	20.000	20.000	104.00	38.00	54.00	0.50	4	●

Cutting values: HPC-roughing* (detailed cutting values see p. 272)

ISO Code	Hardness	Feed depth a_p	Feed width a_e	Cutting speed** v_c	fz (mm/z) with nom. Ø 6	8	10	12	16	20	25
P Steel	≤ 850 N/mm²	2xd	0.5xd	160	0.02	0.028	0.036	0.04	0.052	0.064	0.096
	850 - 1400 N/mm²	2xd	0.4xd	130	0.016	0.024	0.028	0.032	0.044	0.052	0.064
M Stainless steel	≤ 750 N/mm²	2xd	0.25xd	115	0.02	0.028	0.036	0.04	0.052	0.064	0.096
	≥ 750 N/mm²	2xd	0.2xd	80	0.011	0.018	0.021	0.025	0.032	0.042	0.049
K Cast mat.	≥ 240 HB 30	2xd	0.4xd	150	0.021	0.028	0.035	0.042	0.049	0.063	0.091
N Aluminium	≤ 7% Si	2xd	0.3xd	250	0.024	0.032	0.04	0.048	0.056	0.072	0.104

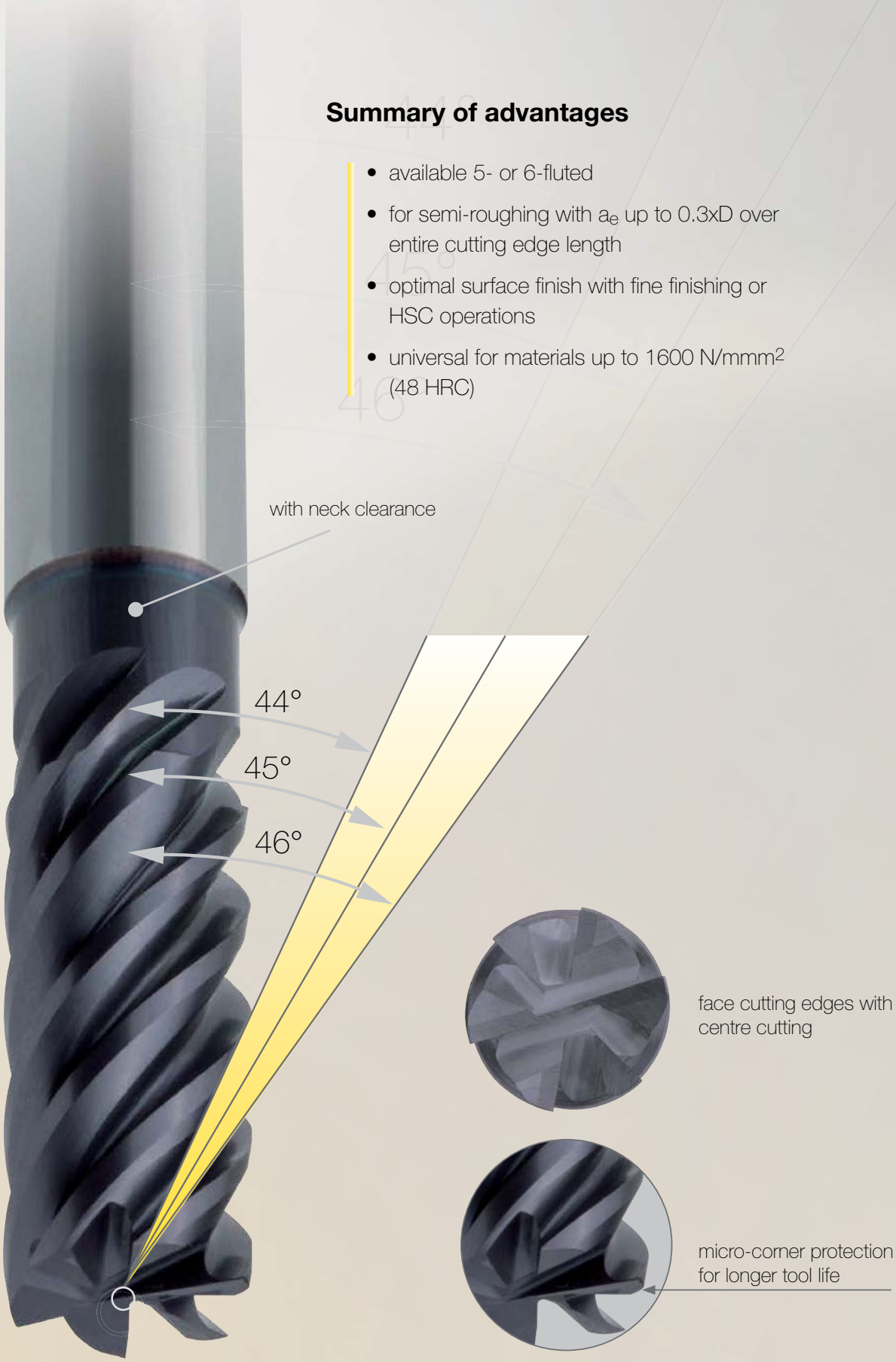
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life.
** for slotting the cutting speed and feed rate should be reduced by 40 %.

RF 100 SF - High-performance finishing end mills

for materials up to 1600 N/mm^2 (48 HRC)

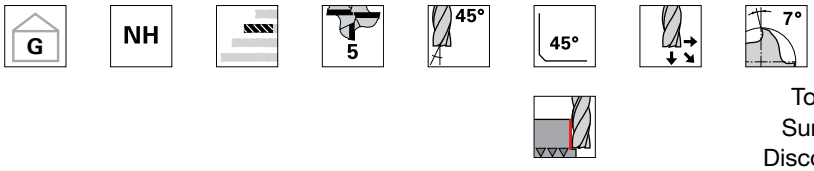
Summary of advantages

- available 5- or 6-fluted
- for semi-roughing with a_e up to 0.3xD over entire cutting edge length
- optimal surface finish with fine finishing or HSC operations
- universal for materials up to 1600 N/mm^2 (48 HRC)

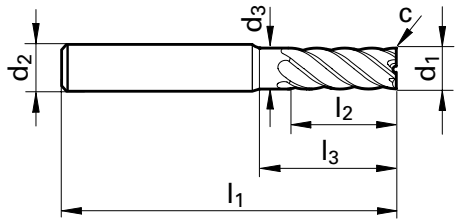


Ratio end mills Superfinish RF 100 SF

centre cutting



	Solid carbide	
Tool material	FIRE	FIRE
Surface finish	106	106
Discount group	**6709**	**6710**
Guhring no.		



Code no.	d1 h10	d2 h6	d3	l1	l2	l3	c	Z	Availability	
	mm	mm	mm	mm	mm	mm	mm x 45°			
4.000	4.000	6.000	3.800	57.00	11.00	18.00	0.05	5	●	●
5.000	5.000	6.000	4.800	57.00	13.00	18.00	0.05	5	●	●
6.000	6.000	6.000	5.700	57.00	13.00	20.00	0.05	5	●	●
8.000	8.000	8.000	7.700	63.00	19.00	26.00	0.10	5	●	●
10.000	10.000	10.000	9.500	72.00	22.00	30.00	0.10	5	●	●
12.000	12.000	12.000	11.500	83.00	26.00	36.00	0.10	5	●	●
16.000	16.000	16.000	15.500	92.00	32.00	42.00	0.15	5	●	●
20.000	20.000	20.000	19.500	104.00	38.00	52.00	0.15	5	●	●
25.000	25.000	25.000	24.000	121.00	45.00	63.00	0.20	5	●	●

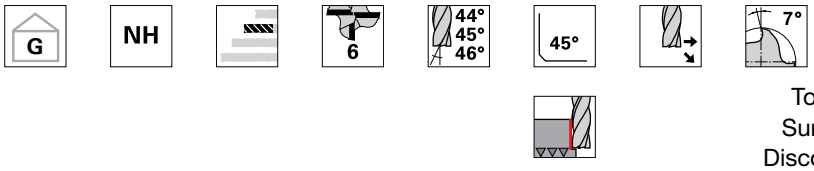
Cutting values: Finishing* and HPC-roughing** (detailed cutting values see p. 269)**

ISO Code	Hardness	Feed depth* a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 3	6	8	10	12	16	20	25
P Steel	≤ 850 N/mm²	2xd	0.3xd	280	0.016	0.03	0.04	0.055	0.065	0.08	0.095	0.14
	850 - 1400 N/mm²	2xd	0.2xd	220	0.015	0.025	0.035	0.045	0.05	0.065	0.08	0.12
M Stainless steel	≤ 750 N/mm²	2xd	0.2xd	180	0.015	0.025	0.035	0.045	0.05	0.065	0.08	0.12
	≥ 750 N/mm²	2xd	0.2xd	120	0.015	0.025	0.035	0.045	0.05	0.065	0.08	0.12
K Cast mat.	≥ 240 HB 30	2xd	0.2xd	200	0.018	0.035	0.045	0.05	0.065	0.08	0.12	0.15
N Aluminium	≤ 7% Si	2xd	0.2xd	1000	0.018	0.035	0.045	0.05	0.065	0.08	0.12	0.15

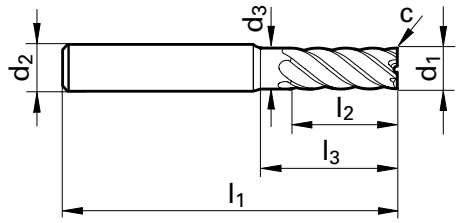
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life.
** for trochoidal milling and imachining with a_e 0.1-0.2xd the cutting speed and feed rate can be increased by 50 %.
*** for finishing with a_e 0.01xD the feed rate must be reduced by 25 % to achieve optimal surfaces.

Ratio end mills Superfinish RF 100 SF

centre cutting



	HA	HB
Tool material	Solid carbide	
Surface finish	FIRE	FIRE
Discount group	106	106
Guhring no.	**3631**	**3632**



Code no.	d1 h10	d2 h6	d3	l1	l2	l3	c	Z	Availability	
	mm	mm	mm	mm	mm	mm	mm x 45°			
8.000	8.000	8.000	7.700	63.00	19.00	26.00	0.10	6	●	●
10.000	10.000	10.000	9.500	72.00	22.00	30.00	0.10	6	●	●
12.000	12.000	12.000	11.500	83.00	26.00	36.00	0.10	6	●	●
16.000	16.000	16.000	15.500	92.00	32.00	42.00	0.15	6	●	●
20.000	20.000	20.000	19.500	104.00	38.00	52.00	0.15	6	●	●
25.000	25.000	25.000	24.000	121.00	45.00	63.00	0.20	6	●	●

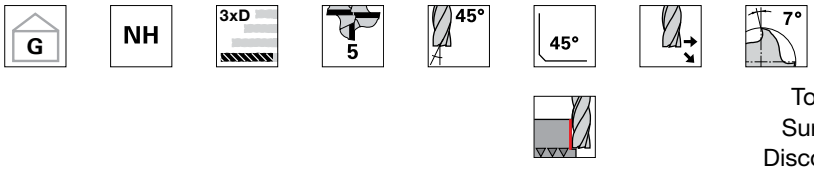
Cutting values: Finishing* and HPC-roughing** (detailed cutting values see p. 269)**

ISO Code	Hardness	Feed depth* a_p	Feed width ** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 3	6	8	10	12	16	20	25
P Steel	≤ 850 N/mm²	2xd	0.3xd	280	0.016	0.03	0.04	0.055	0.065	0.08	0.095	0.14
	850 - 1400 N/mm²	2xd	0.2xd	220	0.015	0.025	0.035	0.045	0.05	0.065	0.08	0.12
M Stainless steel	≤ 750 N/mm²	2xd	0.2xd	180	0.015	0.025	0.035	0.045	0.05	0.065	0.08	0.12
	≥ 750 N/mm²	2xd	0.2xd	120	0.015	0.025	0.035	0.045	0.05	0.065	0.08	0.12
K Cast mat.	≥ 240 HB 30	2xd	0.2xd	200	0.018	0.035	0.045	0.05	0.065	0.08	0.12	0.15
N Aluminium	≤ 7% Si	2xd	0.2xd	1000	0.018	0.035	0.045	0.05	0.065	0.08	0.12	0.15

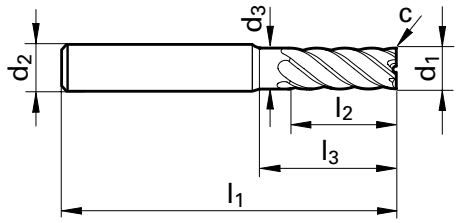
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life.
** for trochoidal milling and imachining with a_e 0.1-0.2xd the cutting speed and feed rate can be increased by 50 %.
*** for finishing with a_e 0.01xD the feed rate must be reduced by 25 % to achieve optimal surfaces.

Ratio end mills Superfinish RF 100 SF

centre cutting



	HA	HB
Tool material	Solid carbide	
Surface finish	FIRE	FIRE
Discount group	106	106
Guhring no.	**3897**	**3898**



Code no.	d1 h10	d2 h6	d3	l1	l2	l3	c	Z	Availability	
	mm	mm	mm	mm	mm	mm	mm x 45°			
4.000	4.000	6.000	3.800	65.00	12.00	26.00	0.05	5	●	●
5.000	5.000	6.000	4.800	65.00	15.00	26.00	0.05	5	●	●
6.000	6.000	6.000	5.700	65.00	18.00	28.00	0.05	5	●	●
8.000	8.000	8.000	7.700	75.00	24.00	38.00	0.10	5	●	●
10.000	10.000	10.000	9.500	80.00	30.00	38.00	0.10	5	●	●
12.000	12.000	12.000	11.500	93.00	36.00	46.00	0.10	5	●	●
16.000	16.000	16.000	15.500	108.00	48.00	58.00	0.15	5	●	●
20.000	20.000	20.000	19.500	126.00	60.00	74.00	0.15	5	●	●

Cutting values: Finishing* and HPC-roughing** (detailed cutting values see p. 269)**

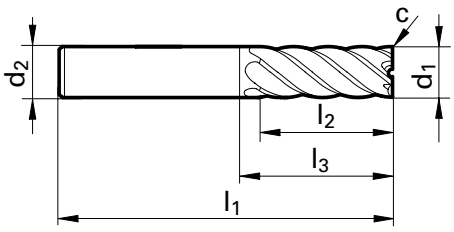
ISO Code	Hardness	Feed depth* a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 3	6	8	10	12	16	20	25
P Steel	≤ 850 N/mm²	2xd	0.3xd	280	0.016	0.03	0.04	0.055	0.065	0.08	0.095	0.14
	850 - 1400 N/mm²	2xd	0.2xd	220	0.015	0.025	0.035	0.045	0.05	0.065	0.08	0.12
M Stainless steel	≤ 750 N/mm²	2xd	0.2xd	180	0.015	0.025	0.035	0.045	0.05	0.065	0.08	0.12
	≥ 750 N/mm²	2xd	0.2xd	120	0.015	0.025	0.035	0.045	0.05	0.065	0.08	0.12
K Cast mat.	≥ 240 HB 30	2xd	0.2xd	200	0.018	0.035	0.045	0.05	0.065	0.08	0.12	0.15
N Aluminium	≤ 7% Si	2xd	0.2xd	1000	0.018	0.035	0.045	0.05	0.065	0.08	0.12	0.15

* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life.
** for trochoidal milling and imachining with a_e 0.1-0.2xd the cutting speed and feed rate can be increased by 50 %.
*** for finishing with a_e 0.01xD the feed rate must be reduced by 25 % to achieve optimal surfaces.

Multi-tooth end mills GH 100 U

centre cutting

Tool material	Solid carbide	
Surface finish	bright	FIRE
Discount group	106	106
Guhring no.	**3311**	**3689**



Code no.	d1 h10	d2 h6	l1	l2	l3	c	Z	Availability	
	mm	mm	mm	mm	mm	mm x 45°			
3.000	3.000	6.000	57.00	8.00	11.40	0.05	6	●	●
4.000	4.000	6.000	57.00	11.00	15.90	0.05	6	●	●
5.000	5.000	6.000	57.00	13.00	17.90	0.05	6	●	●
6.000	6.000	6.000	57.00	13.00	21.00	0.05	6	●	●
8.000	8.000	8.000	63.00	19.00	27.00	0.10	6	●	●
10.000	10.000	10.000	72.00	22.00	32.00	0.10	6	●	●
12.000	12.000	12.000	83.00	26.00	38.00	0.10	6	●	●
14.000	14.000	14.000	83.00	26.00	38.00	0.15	6	●	●
14.001	14.000	16.000	92.00	32.00	44.00	0.15	6	●	●
16.000	16.000	16.000	92.00	32.00	44.00	0.15	6	●	●
18.000	18.000	18.000	92.00	32.00	44.00	0.15	8	●	●
18.001	18.000	20.000	104.00	38.00	54.00	0.15	8	●	●
20.000	20.000	20.000	104.00	38.00	54.00	0.15	8	●	●
25.000	25.000	25.000	121.00	45.00	65.00	0.20	10	●	●

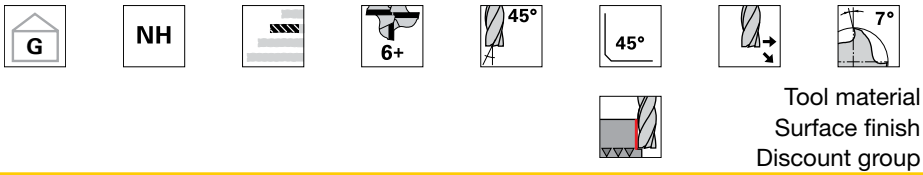
Cutting values: Finishing* and HPC-roughing** (detailed cutting values see p. 269)**

ISO Code	Hardness	Feed depth* a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 3	6	8	10	12	16	20	25
P Steel	≤ 850 N/mm²	2xd	0.2xd	280	0.014	0.027	0.036	0.05	0.059	0.072	0.086	0.12
	850 - 1400 N/mm²	2xd	0.15xd	180	0.012	0.024	0.032	0.04	0.048	0.056	0.072	0.104
M Stainless steel	≤ 750 N/mm²	2xd	0.15xd	150	0.014	0.027	0.036	0.045	0.054	0.063	0.081	0.11
	≥ 750 N/mm²	2xd	0.1xd	100	0.014	0.027	0.036	0.045	0.054	0.063	0.081	0.11
K Cast mat.	≥ 240 HB 30	2xd	0.2xd	160	0.016	0.03	0.04	0.055	0.065	0.08	0.095	0.14
N Aluminium	≤ 7% Si	2xd	0.15xd	280	0.018	0.035	0.045	0.05	0.065	0.08	0.12	0.15

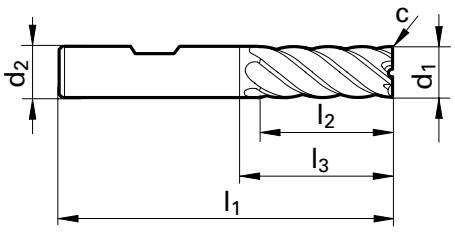
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life.
** for trochoidal milling and imachining with a_e 0.1-0.2xd the cutting speed and feed rate can be increased by 50 %.
*** for finishing with a_e 0.01xD the feed rate must be reduced by 25 % to achieve optimal surfaces.

Multi-tooth end mills GH 100 U

centre cutting



Tool material	**Solid carbide**
Surface finish	FIRE
Discount group	106
Guhring no.	**3047**



Code no.	d1 h10	d2 h6	l1	l2	l3	c	Z	Availability
	mm	mm	mm	mm	mm	mm x 45°		
6.000	6.000	6.000	57.00	13.00	21.00	0.05	6	●
8.000	8.000	8.000	63.00	19.00	27.00	0.10	6	●
10.000	10.000	10.000	72.00	22.00	32.00	0.10	6	●
12.000	12.000	12.000	83.00	26.00	38.00	0.10	6	●
14.000	14.000	14.000	83.00	26.00	38.00	0.15	6	●
16.000	16.000	16.000	92.00	32.00	44.00	0.15	6	●
18.000	18.000	18.000	92.00	32.00	44.00	0.15	8	●
20.000	20.000	20.000	104.00	38.00	54.00	0.15	8	●
25.000	25.000	25.000	121.00	45.00	65.00	0.20	10	●

Cutting values: Finishing* and HPC-roughing** (detailed cutting values see p. 271)**

ISO Code	Hardness	Feed depth* a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 3	6	8	10	12	16	20	25
P Steel	≤ 850 N/mm²	2xd	0.2xd	280	0.014	0.027	0.036	0.05	0.059	0.072	0.086	0.12
	850 - 1400 N/mm²	2xd	0.15xd	180	0.012	0.024	0.032	0.04	0.048	0.056	0.072	0.104
M Stainless steel	≤ 750 N/mm²	2xd	0.15xd	150	0.014	0.027	0.036	0.045	0.054	0.063	0.081	0.11
	≥ 750 N/mm²	2xd	0.1xd	100	0.014	0.027	0.036	0.045	0.054	0.063	0.081	0.11
K Cast mat.	≥ 240 HB 30	2xd	0.2xd	160	0.016	0.03	0.04	0.055	0.065	0.08	0.095	0.14
N Aluminium	≤ 7% Si	2xd	0.15xd	280	0.018	0.035	0.045	0.05	0.065	0.08	0.12	0.15

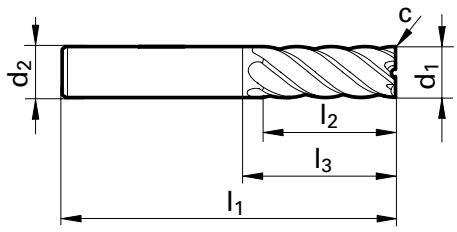
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life.
** for trochoidal milling and imachining with a_e 0.1-0.2xd the cutting speed and feed rate can be increased by 50 %.
*** for finishing with a_e 0.01xD the feed rate must be reduced by 25 % to achieve optimal surfaces.

Multi-tooth end mills GH 100 U

centre cutting



	Solid carbide	
Tool material		
Surface finish	bright	FIRE
Discount group	106	106
Guhring no.	**3312**	**3691**



Code no.	d1 h10	d2 h6	l1	l2	l3	c	Z	Availability	
	mm	mm	mm	mm	mm	mm x 45°			
6.000	6.000	6.000	75.00	30.00	39.00	0.05	6	●	●
8.000	8.000	8.000	100.00	40.00	64.00	0.10	6	●	●
10.000	10.000	10.000	100.00	40.00	60.00	0.10	6	●	●
12.000	12.000	12.000	150.00	45.00	105.00	0.10	6	●	●
16.000	16.000	16.000	150.00	65.00	102.00	0.15	6	●	●
20.000	20.000	20.000	150.00	65.00	100.00	0.15	8	●	●
25.000	25.000	25.000	150.00	75.00	94.00	0.20	10	●	●

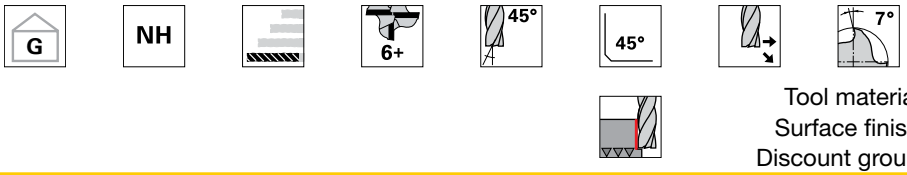
Cutting values: Finishing* and HPC-roughing** (detailed cutting values see p. 271)**

ISO Code	Hardness	Feed depth* a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 3	6	8	10	12	16	20	25
P Steel	≤ 850 N/mm²	2xd	0.2xd	280	0.014	0.027	0.036	0.05	0.059	0.072	0.086	0.12
	850 - 1400 N/mm²	2xd	0.15xd	180	0.012	0.024	0.032	0.04	0.048	0.056	0.072	0.104
M Stainless steel	≤ 750 N/mm²	2xd	0.15xd	150	0.014	0.027	0.036	0.045	0.054	0.063	0.081	0.11
	≥ 750 N/mm²	2xd	0.1xd	100	0.014	0.027	0.036	0.045	0.054	0.063	0.081	0.11
K Cast mat.	≥ 240 HB 30	2xd	0.2xd	160	0.016	0.03	0.04	0.055	0.065	0.08	0.095	0.14
N Aluminium	≤ 7% Si	2xd	0.15xd	280	0.018	0.035	0.045	0.05	0.065	0.08	0.12	0.15

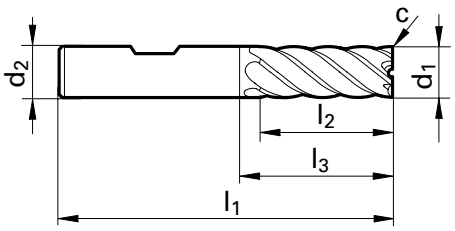
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life.
** for trochoidal milling and imachining with a_e 0.1-0.2xd the cutting speed and feed rate can be increased by 50 %.
*** for finishing with a_e 0.01xD the feed rate must be reduced by 25 % to achieve optimal surfaces.

Multi-tooth end mills GH 100 U

centre cutting



Tool material	Solid carbide	
Surface finish	bright	FIRE
Discount group	106	106
Guhring no.	**3313**	**3693**



Code no.	d1 h10	d2 h6	l1	l2	l3	c	Z	Availability	
	mm	mm	mm	mm	mm	mm x 45°			
6.000	6.000	6.000	75.00	30.00	39.00	0.05	6	●	●
8.000	8.000	8.000	100.00	40.00	64.00	0.10	6	●	●
10.000	10.000	10.000	100.00	40.00	60.00	0.10	6	●	●
12.000	12.000	12.000	150.00	45.00	105.00	0.10	6	●	●
16.000	16.000	16.000	150.00	65.00	102.00	0.15	6	●	●
20.000	20.000	20.000	150.00	65.00	100.00	0.15	8	●	●
25.000	25.000	25.000	150.00	75.00	94.00	0.20	10	●	●

Cutting values: Finishing* and HPC-roughing** (detailed cutting values see p. 271)**

ISO Code	Hardness	Feed depth* a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 3	6	8	10	12	16	20	25
P Steel	≤ 850 N/mm²	2xd	0.2xd	280	0.014	0.027	0.036	0.05	0.059	0.072	0.086	0.12
	850 - 1400 N/mm²	2xd	0.15xd	180	0.012	0.024	0.032	0.04	0.048	0.056	0.072	0.104
M Stainless steel	≤ 750 N/mm²	2xd	0.15xd	150	0.014	0.027	0.036	0.045	0.054	0.063	0.081	0.11
	≥ 750 N/mm²	2xd	0.1xd	100	0.014	0.027	0.036	0.045	0.054	0.063	0.081	0.11
K Cast mat.	≥ 240 HB 30	2xd	0.2xd	160	0.016	0.03	0.04	0.055	0.065	0.08	0.095	0.14
N Aluminium	≤ 7% Si	2xd	0.15xd	280	0.018	0.035	0.045	0.05	0.065	0.08	0.12	0.15

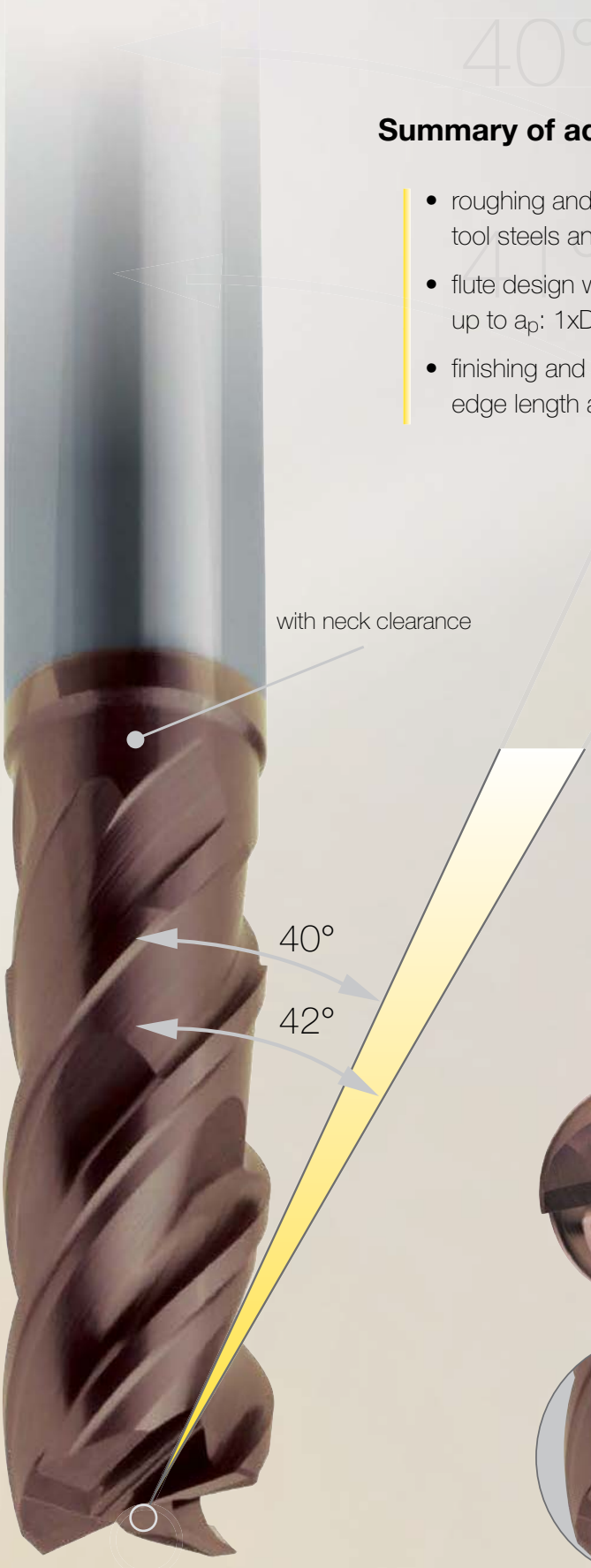
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life.
** for trochoidal milling and imachining with a_e 0.1-0.2xd the cutting speed and feed rate can be increased by 50 %.
*** for finishing with a_e 0.01xD the feed rate must be reduced by 25 % to achieve optimal surfaces.

RF 100 H - High performance end mills

for hardened steels also above 63 HRC

Summary of advantages

- roughing and finishing of hardened steels, tool steels and chilled cast iron
- flute design with reinforced core for roughing up to a_p: 1xD (from 32 to 54 HRC)
- finishing and HPC milling over entire cutting edge length also above 63 HRC



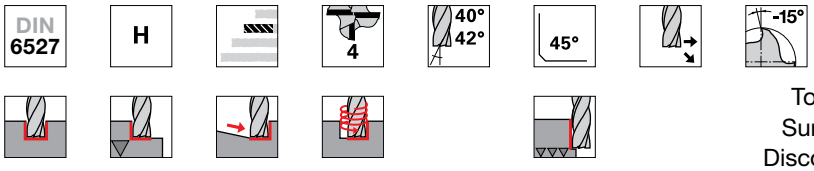
Longer tool life thanks to improved SIGNUM coating

face cutting edges with centre cutting

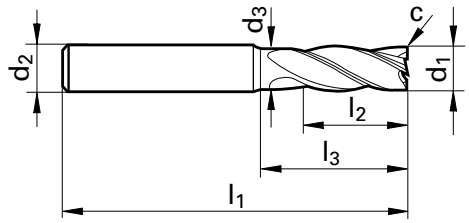
micro-corner protection for longer tool life

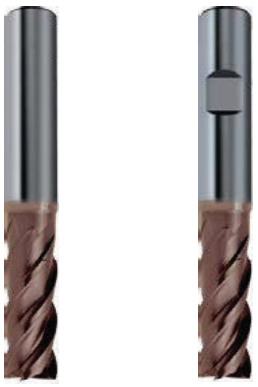
Ratio end mills RF 100 H

centre cutting



	HA	HB
Tool material	Solid carbide	
Surface finish	Signum	Signum
Discount group	106	106
Guhring no.	**3895**	**3896**





Code no.	d1 h10	d2 h6	d3	l1	l2	l3	c	Z	Availability	
	mm	mm	mm	mm	mm	mm	mm x 45°			
6.000	6.000	6.000	5.700	57.00	13.00	20.00	0.15	4	●	●
8.000	8.000	8.000	7.700	63.00	19.00	26.00	0.15	4	●	●
10.000	10.000	10.000	9.500	72.00	22.00	30.00	0.20	4	●	●
12.000	12.000	12.000	11.500	83.00	26.00	36.00	0.20	4	●	●
16.000	16.000	16.000	15.500	92.00	32.00	42.00	0.35	4	●	●
20.000	20.000	20.000	19.500	104.00	38.00	52.00	0.45	4	●	●

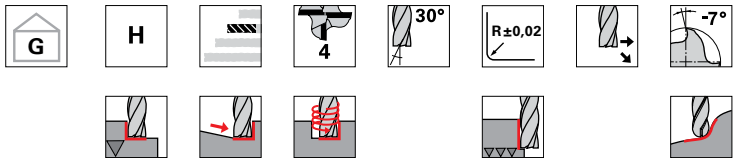
Cutting values: HPC-roughing* and hard finishing (detailed cutting values see p. 269)

ISO Code	Hardness	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 3	6	8	10	12	16	20
P Steel	≤ 850 N/mm²	-	-	-	-	-	-	-	-	-	-
	850 - 1400 N/mm²	1xd	-	140	0.02	0.04	0.05	0.065	0.08	0.095	0.11
K Cast mat.	≥ 240 HB 30	1xd	0.5xd	130	0.014	0.027	0.036	0.05	0.059	0.072	0.086
H Hardened steel	≤ 54 HRC	1xD	0.15xD	110	0.015	0.03	0.04	0.05	0.06	0.07	0.09
	≤ 63 HRC	2xD	0.03xD	80	0.01	0.015	0.025	0.035	0.042	0.05	0.08

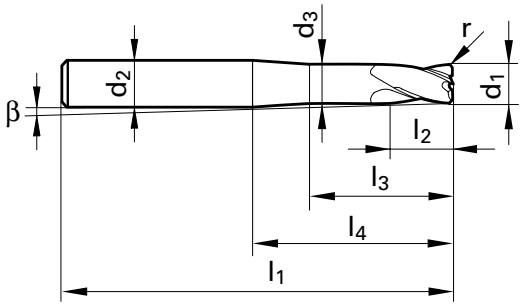
* air cooling is recommended for optimal chip evacuation and tool life.
** for slotting (up to 54 HRC) the cutting speed and feed rate should be reduced by 30 %.

Hard profile cutters with Torus grind GF 300 T

centre cutting



Tool material	**Solid carbide**
Surface finish	Signum
Discount group	106
Guhring no.	**3361**



Code no.	d1 h8	d2 h6	d3	l1	l2	l3	l4	r	β	Z	Availability
	mm	mm	mm	mm	mm	mm	mm	mm	°		
3.000	3.000	6.000	2.700	57.00	5.00	9.40	21.00	0.50	4.20	4	●
4.000	4.000	6.000	3.700	57.00	6.00	13.40	21.00	0.50	2.80	4	●
5.000	5.000	6.000	4.700	57.00	8.00	15.90	21.00	0.50	1.40	4	●
6.000	6.000	6.000	5.700	57.00	9.00	20.00	21.00	1.00	-	4	●
8.000	8.000	8.000	7.700	63.00	12.00	26.00	27.00	1.00	-	4	●
10.000	10.000	10.000	9.500	72.00	15.00	30.00	32.00	1.50	-	4	●
12.000	12.000	12.000	11.500	83.00	18.00	36.00	38.00	1.50	-	4	●
16.000	16.000	16.000	15.500	92.00	24.00	42.00	44.00	2.00	-	4	●

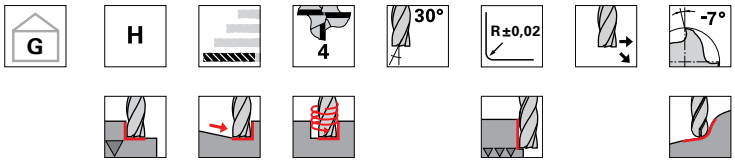
Cutting values: HPC-roughing* and HSC-copy milling* (detailed cutting values see p. 275)

ISO Code	Hardness	Feed depth* a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 2	3	4	6	8	10	12	16
P Steel	≤ 850 N/mm²	-	-	-	-	-	-	-	-	-	-	-
	850 - 1400 N/mm²	0.2xd	0.5xd	200	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
K Cast mat.	≥ 240 HB 30	0.2xd	0.5xd	200	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
H Hardened steel	≤ 54 HRC	0.1xd	0.5xd	140	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.1
	≤ 63 HRC	0.05xd	0.3xd	80	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.1

* dry machining with air cooling is recommended for optimal chip evacuation and tool life.
** for HSC-copy milling and imachining with a_e = 0.1xd the cutting speed v_c can be increased by 50 %.

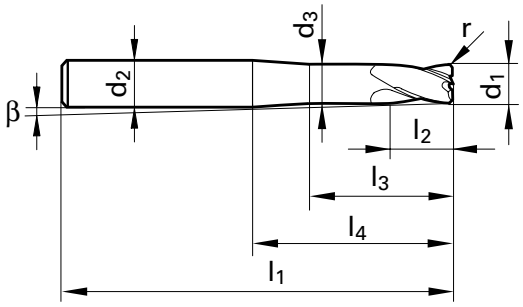
Hard profile cutters with Torus grind GF 300 T

centre cutting



Tool material	**Solid carbide**
Surface finish	Signum
Discount group	106
Guhring no.	**3362**

HA



Code no.	d1 h8	d2 h6	d3	l1	l2	l3	l4	r	β	Z	Availability
	mm	mm	mm	mm	mm	mm	mm	mm	°		
6.000	6.000	6.000	5.700	75.00	9.00	38.00	39.00	1.00		4	●
8.000	8.000	8.000	7.700	100.00	12.00	63.00	64.00	1.00		4	●
10.000	10.000	10.000	9.500	100.00	15.00	58.00	60.00	1.50		4	●
12.000	12.000	12.000	11.500	150.00	18.00	103.00	105.00	1.50		4	●
16.000	16.000	16.000	15.500	150.00	24.00	100.00	102.00	2.00		4	●

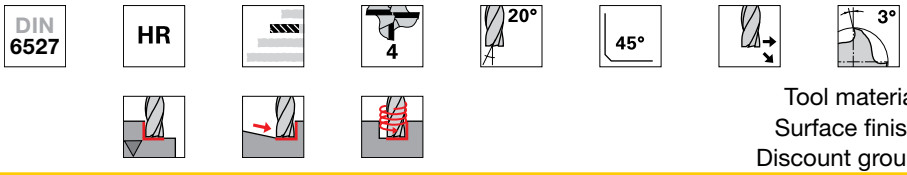
Cutting values: HPC-roughing* and HSC-copy milling (detailed cutting values see p. 275)

ISO Code	Hardness	Feed depth* a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 2	3	4	6	8	10	12	16
P Steel	≤ 850 N/mm²	-	-	-	-	-	-	-	-	-	-	-
	850 - 1400 N/mm²	0.2xd	0.5xd	200	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
K Cast mat.	≥ 240 HB 30	0.2xd	0.5xd	200	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
H Hardened steel	≤ 54 HRC	0.1xd	0.5xd	140	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.1
	≤ 63 HRC	0.05xd	0.3xd	80	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.1

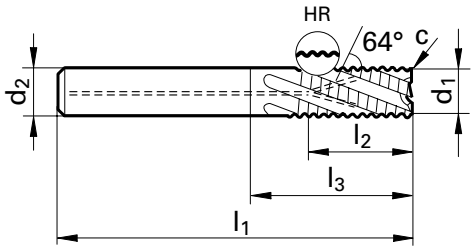
* dry machining with air cooling is recommended for optimal chip evacuation and tool life.
** for HSC-copy milling and imachining with a_e = 0.1xd the cutting speed vc can be increased by 50 %.

Hard roughing end mills GS 100 H (fine teeth)

centre cutting



	Solid carbide	
Tool material	Signum	Signum
Surface finish		
Discount group	106	106
Guhring no.	**6704**	**6705**



Code no.	d1 h10	d2 h6	l1	l2	l3	c	Z	Availability	
	mm	mm	mm	mm	mm	mm x 45°			
6.000	6.000	6.000	57.00	13.00	21.00	0.30	4	●	●
8.000	8.000	8.000	63.00	19.00	27.00	0.30	4	●	●
10.000	10.000	10.000	72.00	22.00	32.00	0.30	4	●	●
12.000	12.000	12.000	83.00	26.00	38.00	0.50	4	●	●
16.000	16.000	16.000	92.00	32.00	44.00	0.50	4	●	●
20.000	20.000	20.000	104.00	38.00	54.00	0.50	4	●	●
25.000	25.000	25.000	121.00	45.00	65.00	0.60	4	●	●

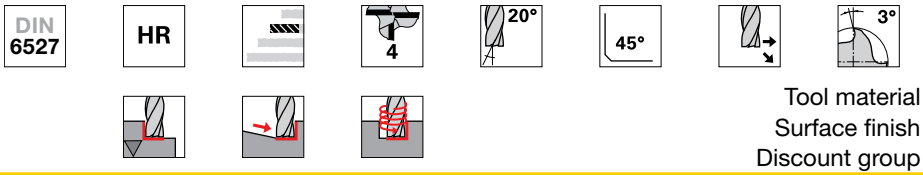
Cutting values: HPC-roughing* (detailed cutting values see p. 272)

ISO Code	Hardness	Feed depth* a_p	Feed width** a_e	Cutting speed v_c	6	8	10	12	16	20	25
P Steel	≤ 850 N/mm²	-	-	-	-	-	-	-	-	-	-
	850 - 1400 N/mm²	1.5xd	0.4xd	130	0.016	0.032	0.041	0.054	0.063	0.081	0.09
K Cast mat.	≥ 240 HB 30	2xd	0.5xd	130	0.016	0.032	0.041	0.054	0.063	0.081	0.09
H Hardened steel	≤ 54 HRC	1.5xd	0.25xd	90	0.014	0.022	0.027	0.036	0.045	0.054	0.063
	≤ 63 HRC	-	-	-	-	-	-	-	-	-	-

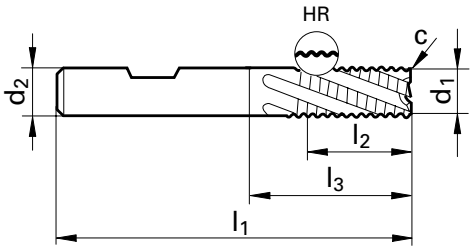
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life.
** for slotting the cutting speed and feed rate should be reduced by 30 %.

Hard roughing end mills GS 100 H (fine teeth)

centre cutting



	HB
Tool material	Solid carbide
Surface finish	Signum
Discount group	117
Guhring no.	3682



Code no.	d1 h10	d2 h6	l1	l2	l3	c	Z	Availability
	mm	mm	mm	mm	mm	mm x 45°		
6.000	6.000	6.000	57.00	13.00	21.00	0.30	4	●
8.000	8.000	8.000	63.00	19.00	27.00	0.30	4	●
10.000	10.000	10.000	72.00	22.00	32.00	0.30	4	●
12.000	12.000	12.000	83.00	26.00	38.00	0.50	4	●
16.000	16.000	16.000	92.00	32.00	44.00	0.50	4	●
20.000	20.000	20.000	104.00	38.00	54.00	0.50	4	●

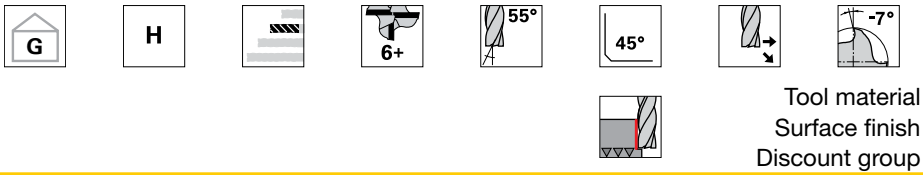
Cutting values: HPC-roughing* (detailed cutting values see p. 272)

ISO Code	Hardness	Feed depth* a_p	Feed width** a_e	Cutting speed v_c	6	8	10	12	16	20	25
P Steel	≤ 850 N/mm²	-	-	-	-	-	-	-	-	-	-
	850 - 1400 N/mm²	1.5xd	0.4xd	130	0.016	0.032	0.041	0.054	0.063	0.081	0.09
K Cast mat.	≥ 240 HB 30	2xd	0.5xd	130	0.016	0.032	0.041	0.054	0.063	0.081	0.09
H Hardened steel	≤ 54 HRC	1.5xd	0.25xd	90	0.014	0.022	0.027	0.036	0.045	0.054	0.063
	≤ 63 HRC	-	-	-	-	-	-	-	-	-	-

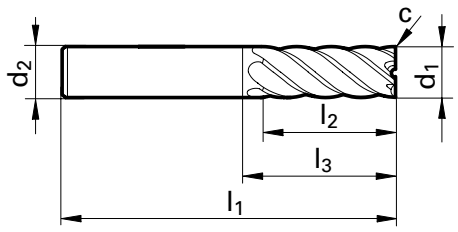
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life.
** for slotting the cutting speed and feed rate should be reduced by 30 %.

Hard multi-tooth end mills GH 100 H

centre cutting



Tool material	**Solid carbide**
Surface finish	Signum
Discount group	106
Guhring no.	**3715**



Code no.	d1 h10	d2 h6	l1	l2	l3	c	Z	Availability
	mm	mm	mm	mm	mm	mm x 45°		
3.000	3.000	6.000	57.00	8.00	11.40	0.05	6	●
4.000	4.000	6.000	57.00	11.00	15.90	0.05	6	●
5.000	5.000	6.000	57.00	13.00	17.90	0.05	6	●
6.000	6.000	6.000	57.00	13.00	21.00	0.05	6	●
8.000	8.000	8.000	63.00	19.00	27.00	0.10	6	●
10.000	10.000	10.000	72.00	22.00	32.00	0.10	6	●
12.000	12.000	12.000	83.00	26.00	38.00	0.10	6	●
14.000	14.000	14.000	83.00	26.00	38.00	0.15	6	●
14.001	14.000	16.000	92.00	32.00	43.00	0.15	6	●
16.000	16.000	16.000	92.00	32.00	44.00	0.15	6	●
18.000	18.000	18.000	92.00	32.00	44.00	0.15	8	●
18.001	18.000	20.000	104.00	38.00	53.00	0.15	8	●
20.000	20.000	20.000	104.00	38.00	54.00	0.15	8	●

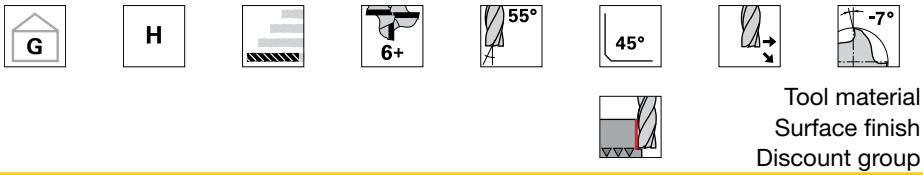
Cutting values: Finishing* and HPC-roughing** (detailed cutting values see p. 271)**

ISO Code	Hardness	Feed depth* a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 3	6	8	10	12	16	20	25
P Steel	≤ 850 N/mm²	-	-	-	-	-	-	-	-	-	-	-
	850 - 1400 N/mm²	2xd	0.05xd	180	0.012	0.024	0.032	0.04	0.048	0.056	0.072	0.104
K Cast mat.	≥ 240 HB 30	2xd	0.05xd	160	0.016	0.03	0.04	0.055	0.065	0.08	0.095	0.14
H Hardened steel	≤ 54 HRC	1.5xd	0.05xd	120	0.012	0.024	0.032	0.04	0.048	0.056	0.072	0.104
	≤ 63 HRC	1.5xd	0.02xd	90	0.01	0.015	0.025	0.035	0.042	0.05	0.08	0.09

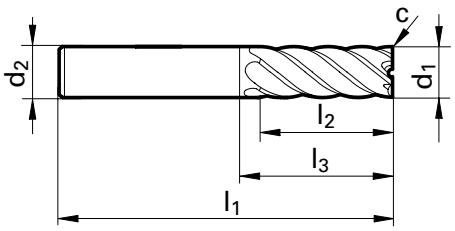
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life, for hard machining air cooling is recommended.
** for trochoidal milling and imachining with a_e 0.1-0.2xd the cutting speed and feed rate can be increased by 50 %.
*** for finishing with ae 0.01xD the feed rate must be reduced by 25 % to achieve optimal surfaces.

Hard multi-tooth end mills GH 100 H

centre cutting



Tool material	**Solid carbide**
Surface finish	Signum
Discount group	106
Guhring no.	**3716**



Code no.	d1 h10	d2 h6	l1	l2	l3	c	Z	Availability
	mm	mm	mm	mm	mm	mm x 45°		
6.000	6.000	6.000	75.00	30.00	39.00	0.05	6	●
8.000	8.000	8.000	100.00	40.00	64.00	0.10	6	●
10.000	10.000	10.000	100.00	40.00	60.00	0.10	6	●
12.000	12.000	12.000	150.00	45.00	105.00	0.10	6	●
16.000	16.000	16.000	150.00	65.00	102.00	0.15	6	●
20.000	20.000	20.000	150.00	65.00	100.00	0.15	8	●

Cutting values: Finishing* and HPC-roughing** (detailed cutting values see p. 271)**

ISO Code	Hardness	Feed depth* a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 3	6	8	10	12	16	20	25
P Steel	≤ 850 N/mm²	-	-	-	-	-	-	-	-	-	-	-
	850 - 1400 N/mm²	2xd	0.05xd	180	0.012	0.024	0.032	0.04	0.048	0.056	0.072	0.104
K Cast mat.	≥ 240 HB 30	2xd	0.05xd	160	0.016	0.03	0.04	0.055	0.065	0.08	0.095	0.14
H Hardened steel	≤ 54 HRC	1.5xd	0.05xd	120	0.012	0.024	0.032	0.04	0.048	0.056	0.072	0.104
	≤ 63 HRC	1.5xd	0.02xd	90	0.01	0.015	0.025	0.035	0.042	0.05	0.08	0.09

* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life, for hard machining air cooling is recommended.
** for trochoidal milling and imachining with a_e 0.1-0.2xd the cutting speed and feed rate can be increased by 50 %.
*** for finishing with ae 0.01xD the feed rate must be reduced by 25 % to achieve optimal surfaces.

Guhring GM 300 GÜHROJET

Tool holders with peripheral cooling

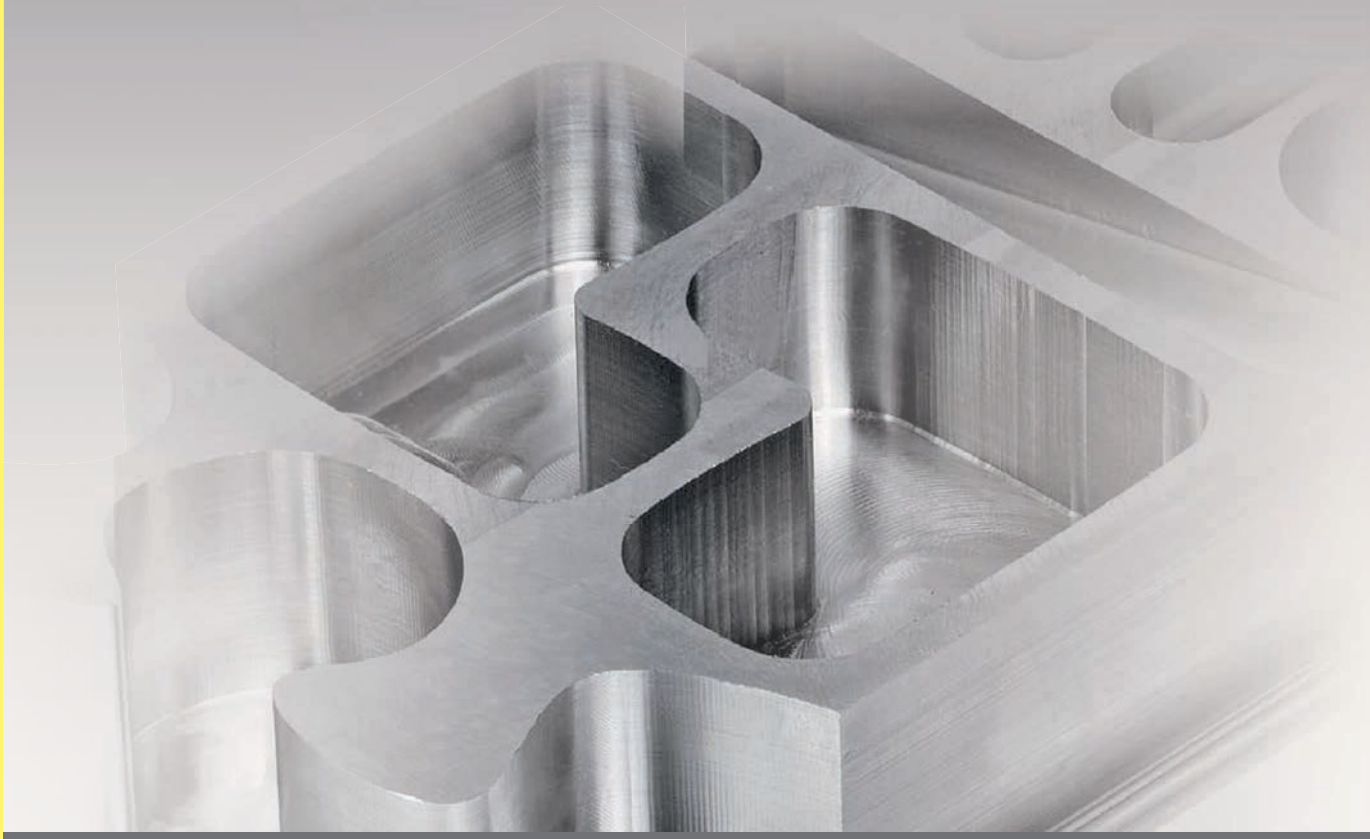
Summary of advantages

- high process reliability thanks to good chip evacuation
- improved cooling lubrication for tools without internal cooling
- GühroJet peripheral cooling for perfect chip evacuation during milling operations
- short and rigid straight shank holders “Weldon“ for HPC roughing operations
- HSC milling with precisely concentric shrink fit chucks

Further tool holders can be found in our GM 300 catalogue.

STAINLESS

SPECIAL ALLOYS



APPLICATION EXAMPLE

HPC roughing

Wet machining in X2CrNiMo 17 13 2 (1.4404)

RF100 VA 12 mm; Guhring no.: 3800 12.0

a_e = 24 mm / a_p = 1.2 mm
v_c = 120 m/min
f_z = 0.1 mm

v_f = 1280 mm/min

Metal removal rate Q = 36.6 cm^3/min

Slot milling

Wet machining in X5CrNi 18 10 (1.4301)

RF100 VA 16 mm; Guhring no.: 3805 16.0

a_e = 16 mm / a_p = 16 mm
v_c = 85 m/min
f_z = 0.06 mm

v_f = 405 mm/min

Metal removal rate Q = 103 cm^3/min

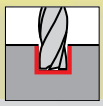
STAINLESS

Solid carbide HPC
high-performance milling cutter
For stainless steel and
difficult-to-machine alloys

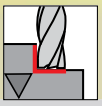
S

M

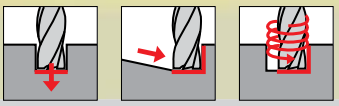
Stainless steel and difficult-to-mach



SLOTTING



ROUGHING



PLUNGING

NO.1 MTC M S

HPC M

up to approx. Ø 8.00 mm

MTC M

HPC M S

NO.1 HPC M

imachining a_e up to 0.3xD

HPC M S

imachining a_e up to 0.2xD

MTC M

HPC M S

NO.1 HPC M S

ramping up to 10°
helix up to a_p 0.2xD

HPC M

HPC M S

HPC M

HPC M S

HPC M

HSS-E-PM-
roughing end mills
GS 80 see page 231

MTC M

with GuhroJet up to a_p 2xD

MTC M

HPC M S

a_e up to 0.15xD

MTC M

HPC — HIGH-PERFORMANCE CUTTING
for max. metal removal rates / time;
rigid conditions, high performance,
good cooling, quick de-clamping

HSC — HIGH SPEED CUTTING
with high speeds / high feed rate
low performance, low feed rate

MTC — MILL TURN CENTER driven tools
non-rigid conditions, low drive power
medium to long de-clamping, moderate cooling

ine alloys

M S QUICK FINDER

FINISHING

COPYING

RF 100 U Z=3

i.e.: no. 3891 from p. 65

HSC M

More copying milling cutters from page 137

RF 100 VA / RF 100 Diver

i.e.: no. 6737 from p. 74

HSC M7C M S

RF 100 VA IK / RF 100 F IK

i.e.: no. 6700 from p. 69

HSC M7C M S

HSC M S

RF 100 Ti

i.e.: no. 3498 from p. 78

HSC M7C M S

NO.1 HPC HSC M S

RF 100 VA

i.e.: no. 6707 from p. 71

RF 100 VA / RS 100 U

i.e.: no. 3696 from p. 72

NO.1 HSC M S

RF 100 SF

i.e.: no. 3631 from p. 85

M STAINLESS STEEL & DIFFICULT-TO-MACHINE ALLOYS

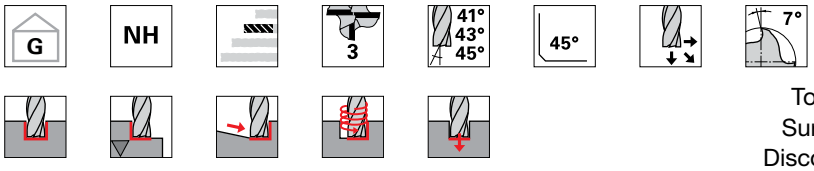
S TITAN & special alloys

NO.1 IDEAL TOOL

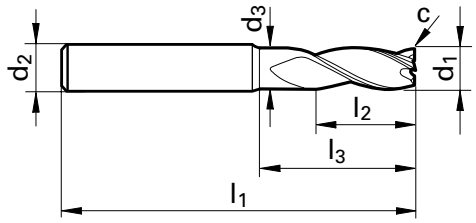
EXPLANATIONS for the Quickfinder see p. 6-7

Standard Ratio end mills RF 100 U (3-fluted)

centre cutting



Tool material	Solid carbide	
Surface finish	FIRE	FIRE
Discount group	106	106
Guhring no.	**3893**	**3894**



Code no.	d1 e8	d2 h6	d3	l1	l2	l3	c	Z	Availability	
	mm	mm	mm	mm	mm	mm	mm x 45°			
3.000	3.000	6.000	2.800	57.00	4.00	15.00	0.03	3	●	●
4.000	4.000	6.000	3.800	57.00	5.00	18.00	0.06	3	●	●
5.000	5.000	6.000	4.800	57.00	6.00	18.00	0.08	3	●	●
6.000	6.000	6.000	5.700	57.00	7.00	20.00	0.09	3	●	●
8.000	8.000	8.000	7.700	63.00	9.00	26.00	0.12	3	●	●
10.000	10.000	10.000	9.500	72.00	11.00	30.00	0.15	3	●	●
12.000	12.000	12.000	11.500	83.00	12.00	36.00	0.18	3	●	●
16.000	16.000	16.000	15.500	92.00	16.00	42.00	0.19	3	●	●

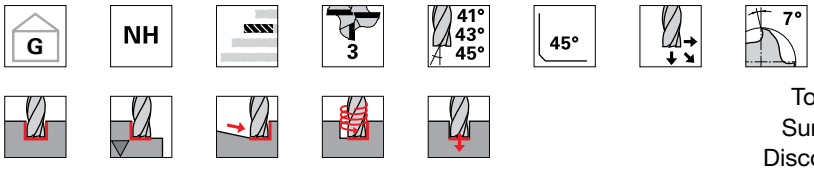
Cutting values: Slotting* (detailed cutting values see p. 269)

ISO Code	Hardness	Feed depth a_p	Feed width a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 3	6	8	10	12	16	20
P Steel	≤ 850 N/mm²	1xd	1xd	180	0.018	0.035	0.045	0.06	0.07	0.09	0.1
	850 - 1400 N/mm²	1xd	1xd	160	0.018	0.035	0.045	0.06	0.07	0.09	0.1
M Stainless steel	≤ 750 N/mm²	1xd	1xd	120	0.015	0.03	0.04	0.05	0.06	0.07	0.09
	≥ 750 N/mm²	1xd	1xd	80	0.015	0.025	0.035	0.045	0.05	0.065	0.08
K Cast mat.	≥ 240 HB 30	1xd	1xd	140	0.02	0.04	0.05	0.065	0.08	0.095	0.11
S Ti sp.alloys	≤ 1300 N/mm²	0.6xd	1xd	60	0.01	0.02	0.03	0.04	0.04	0.054	0.063

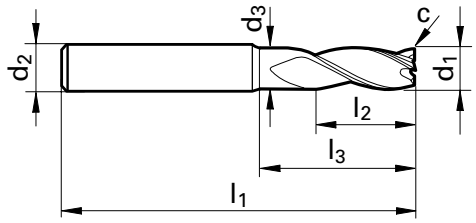
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life

Standard Ratio end mills RF 100 U (3-fluted)

centre cutting



	Solid carbide	
Tool material	FIRE	FIRE
Surface finish		
Discount group	106	106
Guhring no.	**3891**	**3892**



Code no.	d1 e8	d2 h6	d3	l1	l2	l3	c	Z	Availability	
	mm	mm	mm	mm	mm	mm	mm x 45°			
3.000	3.000	6.000	2.800	57.00	8.00	15.00	0.03	3	●	●
3.500	3.500	6.000	3.300	57.00	10.00	15.00	0.05	3	●	●
3.700	3.700	6.000	3.500	57.00	11.00	15.00	0.06	3	●	●
4.000	4.000	6.000	3.800	57.00	11.00	18.00	0.06	3	●	●
4.500	4.500	6.000	4.300	57.00	11.00	18.00	0.07	3	●	●
4.700	4.700	6.000	4.500	57.00	13.00	18.00	0.07	3	●	●
5.000	5.000	6.000	4.800	57.00	13.00	18.00	0.08	3	●	●
5.500	5.500	6.000	5.300	57.00	13.00	19.40	0.08	3	●	●
5.700	5.700	6.000	5.500	57.00	13.00	20.40	0.09	3	●	●
6.000	6.000	6.000	5.700	57.00	13.00	20.00	0.09	3	●	●
6.500	6.500	8.000	6.200	63.00	16.00	24.40	0.10	3	●	●
7.000	7.000	8.000	6.700	63.00	16.00	24.90	0.11	3	●	●
7.500	7.500	8.000	7.200	63.00	19.00	25.30	0.11	3	●	●
8.000	8.000	8.000	7.700	63.00	19.00	26.00	0.12	3	●	●
8.500	8.500	10.000	8.200	72.00	19.00	29.40	0.13	3	●	●
9.000	9.000	10.000	8.700	72.00	19.00	29.90	0.14	3	●	●
9.500	9.500	10.000	9.200	72.00	22.00	30.30	0.14	3	●	●
10.000	10.000	10.000	9.500	72.00	22.00	30.00	0.15	3	●	●
12.000	12.000	12.000	11.500	83.00	26.00	36.00	0.18	3	●	●
16.000	16.000	16.000	15.500	92.00	32.00	42.00	0.19	3	●	●
20.000	20.000	20.000	19.500	104.00	38.00	52.00	0.24	3	●	●

Cutting values: Slotting* (detailed cutting values see p. 269)

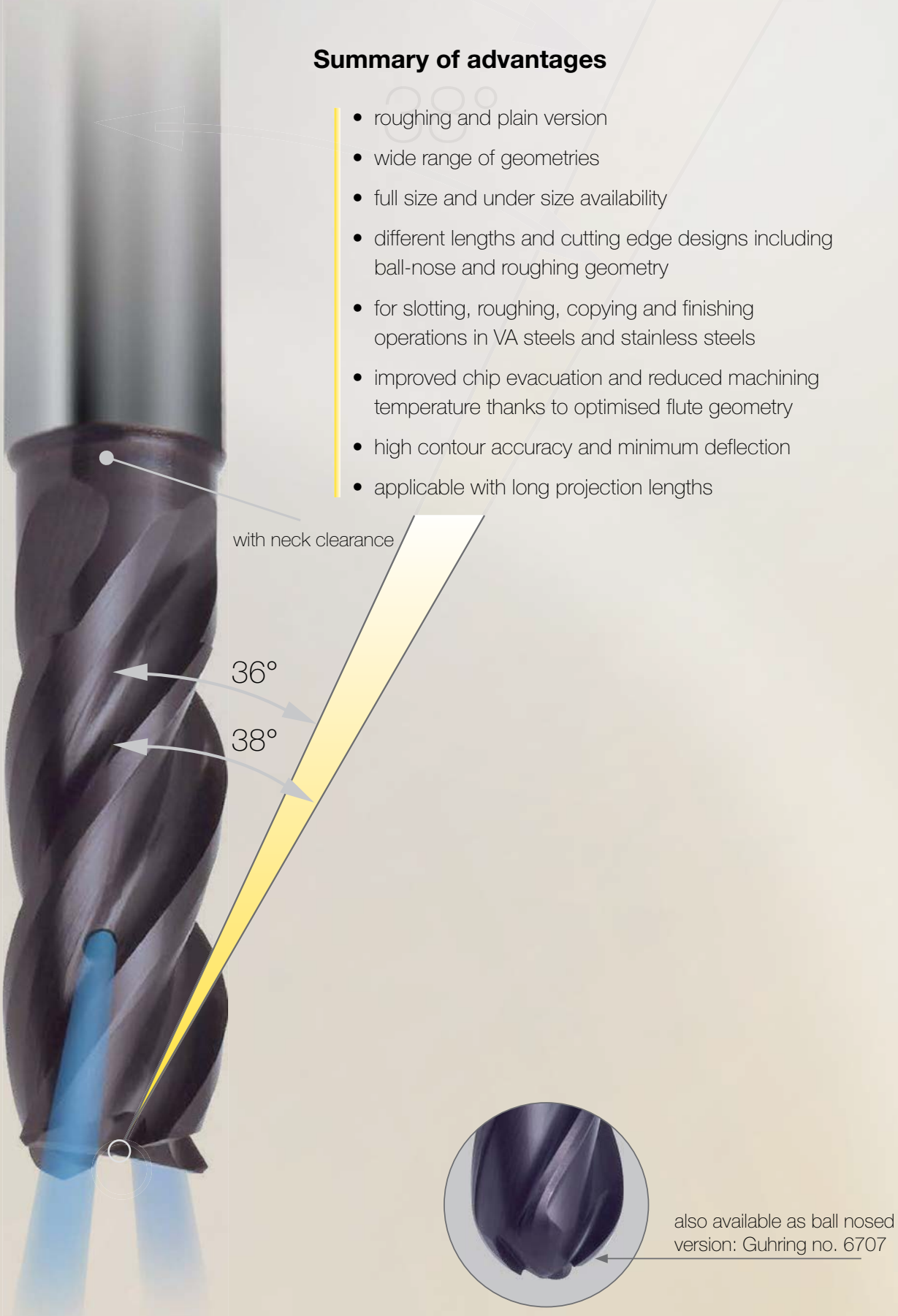
ISO Code	Hardness	Feed depth a_p	Feed width a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 3	6	8	10	12	16	20
P Steel	≤ 850 N/mm²	1xd	1xd	180	0.018	0.035	0.045	0.06	0.07	0.09	0.1
	850 - 1400 N/mm²	1xd	1xd	160	0.018	0.035	0.045	0.06	0.07	0.09	0.1
M Stainless steel	≤ 750 N/mm²	1xd	1xd	120	0.015	0.03	0.04	0.05	0.06	0.07	0.09
	≥ 750 N/mm²	1xd	1xd	80	0.015	0.025	0.035	0.045	0.05	0.065	0.08
K Cast mat.	≥ 240 HB 30	1xd	1xd	140	0.02	0.04	0.05	0.065	0.08	0.095	0.11
S Ti sp.alloys	≤ 1300 N/mm²	0.6xd	1xd	60	0.01	0.02	0.03	0.04	0.04	0.054	0.063

* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life

RF 100 VA - High-performance end mills
for stainless steel

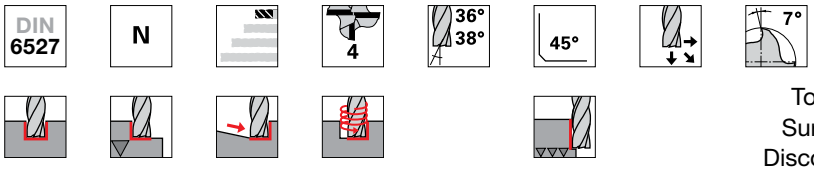
Summary of advantages

- roughing and plain version
- wide range of geometries
- full size and under size availability
- different lengths and cutting edge designs including ball-nose and roughing geometry
- for slotting, roughing, copying and finishing operations in VA steels and stainless steels
- improved chip evacuation and reduced machining temperature thanks to optimised flute geometry
- high contour accuracy and minimum deflection
- applicable with long projection lengths

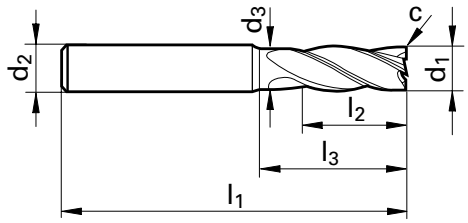


Ratio end mills RF 100 VA

centre cutting



	HA	HB
Tool material	Solid carbide	
Surface finish	TiAlN-nanoA	TiAlN-nanoA
Discount group	106	106
Guhring no.	**3804**	**3805**



Code no.	d1 h10	d2 h6	d3	l1	l2	l3	c	Z	Availability	
	mm	mm	mm	mm	mm	mm	mm x 45°			
4.000	4.000	6.000	3.800	54.00	8.00	15.00	0.15	4	●	●
5.000	5.000	6.000	4.800	54.00	9.00	15.00	0.15	4	●	●
6.000	6.000	6.000	5.700	54.00	10.00	17.00	0.20	4	●	●
8.000	8.000	8.000	7.700	58.00	12.00	21.00	0.25	4	●	●
10.000	10.000	10.000	9.500	66.00	14.00	24.00	0.30	4	●	●
12.000	12.000	12.000	11.500	73.00	16.00	26.00	0.35	4	●	●
16.000	16.000	16.000	15.500	82.00	22.00	32.00	0.50	4	●	●
20.000	20.000	20.000	19.500	92.00	26.00	40.00	0.60	4	●	●

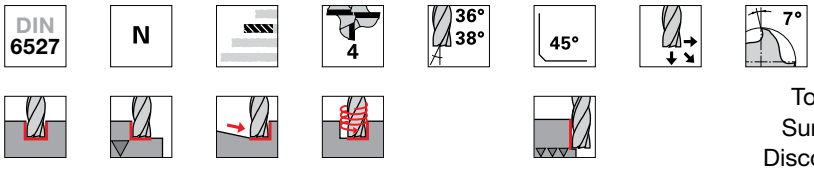
Cutting values: HPC-roughing* (detailed cutting values see p. 269)

ISO Code	Hardness	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 3	6	8	10	12	16	20	25
P Steel	≤ 850 N/mm²	2xd	0.3xd	200	0.02	0.04	0.055	0.07	0.085	0.1	0.12	0.17
M Stainless steel	≤ 750 N/mm²	2xd	0.3xd	140	0.018	0.035	0.045	0.06	0.07	0.09	0.1	0.15
	≥ 750 N/mm²	2xd	0.3xd	120	0.016	0.03	0.04	0.055	0.065	0.08	0.095	0.14
S Ti sp.alloys	≤ 1300 N/mm²	2xd	0.2xd	130	0.02	0.03	0.04	0.06	0.07	0.08	0.09	0.12

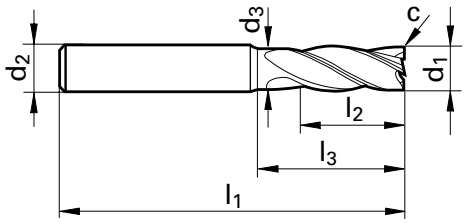
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life
** for trochoidal milling and imachining with a_e 0.1-0.2xd the cutting speed and feed rate can be increased by 50 %

Ratio end mills RF 100 VA

centre cutting



	HA	HB
Tool material	Solid carbide	
Surface finish	TiAlN-nanoA	TiAlN-nanoA
Discount group	106	106
Guhring no.	**3800**	**3803**



Code no.	d1 h10	d2 h6	d3	l1	l2	l3	c	Z	Availability	
	mm	mm	mm	mm	mm	mm	mm x 45°			
3.000	3.000	6.000	2.800	57.00	8.00	15.00	0.10	4	●	●
3.500	3.500	6.000	3.300	57.00	10.00	15.00	0.10	4	●	●
4.000	4.000	6.000	3.800	57.00	11.00	18.00	0.15	4	●	●
4.500	4.500	6.000	4.300	57.00	11.00	18.00	0.15	4	●	●
5.000	5.000	6.000	4.800	57.00	13.00	18.00	0.15	4	●	●
5.500	5.500	6.000	5.300	57.00	13.00	20.40	0.20	4	●	●
6.000	6.000	6.000	5.700	57.00	13.00	20.00	0.20	4	●	●
6.500	6.500	8.000	6.200	63.00	16.00	24.40	0.25	4	●	●
7.000	7.000	8.000	6.700	63.00	16.00	24.90	0.25	4	●	●
7.500	7.500	8.000	7.200	63.00	19.00	25.30	0.25	4	●	●
8.000	8.000	8.000	7.700	63.00	19.00	26.00	0.25	4	●	●
8.500	8.500	10.000	8.200	72.00	19.00	29.40	0.30	4	●	●
9.000	9.000	10.000	8.700	72.00	19.00	29.90	0.30	4	●	●
9.500	9.500	10.000	9.200	72.00	22.00	30.30	0.30	4	●	●
10.000	10.000	10.000	9.500	72.00	22.00	30.00	0.30	4	●	●
11.000	11.000	12.000	10.500	83.00	26.00	34.70	0.35	4	●	●
12.000	12.000	12.000	11.500	83.00	26.00	36.00	0.35	4	●	●
14.000	14.000	14.000	13.500	83.00	26.00	36.00	0.40	4	●	●
16.000	16.000	16.000	15.500	92.00	32.00	42.00	0.50	4	●	●
18.000	18.000	18.000	17.500	92.00	32.00	42.00	0.60	4	●	●
20.000	20.000	20.000	19.500	104.00	38.00	52.00	0.60	4	●	●
25.000	25.000	25.000	24.000	121.00	45.00	63.00	0.75	4	●	●

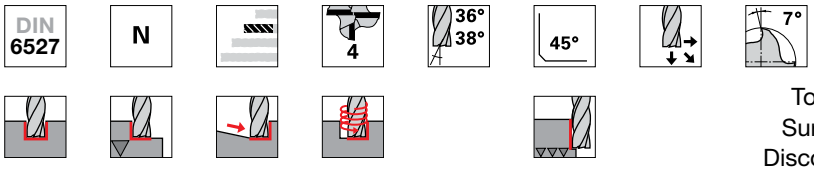
Cutting values: HPC-roughing* (detailed cutting values see p. 269)

ISO Code	Hardness	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 3	6	8	10	12	16	20	25
P Steel	≤ 850 N/mm²	2xd	0.3xd	200	0.02	0.04	0.055	0.07	0.085	0.1	0.12	0.17
M Stainless steel	≤ 750 N/mm²	2xd	0.3xd	140	0.018	0.035	0.045	0.06	0.07	0.09	0.1	0.15
	≥ 750 N/mm²	2xd	0.3xd	120	0.016	0.03	0.04	0.055	0.065	0.08	0.095	0.14
S Ti sp.alloys	≤ 1300 N/mm²	2xd	0.2xd	130	0.02	0.03	0.04	0.06	0.07	0.08	0.09	0.12

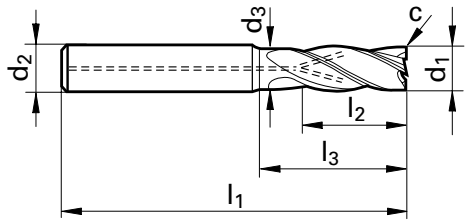
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life
** for trochoidal milling and imachining with a_e 0.1-0.2xd the cutting speed and feed rate can be increased by 50 %

Ratio end mills RF 100 VA

centre cutting



	HA	HB
Tool material	Solid carbide	
Surface finish	TiAlN-nanoA	TiAlN-nanoA
Discount group	106	106
Guhring no.	**6700**	**6701**



Code no.	d1 h10	d2 h6	d3	l1	l2	l3	c	Z	Availability	
	mm	mm	mm	mm	mm	mm	mm x 45°			
6.000	6.000	6.000	5.700	57.00	13.00	20.00	0.20	4	●	●
8.000	8.000	8.000	7.700	63.00	19.00	26.00	0.25	4	●	●
10.000	10.000	10.000	9.500	72.00	22.00	30.00	0.30	4	●	●
12.000	12.000	12.000	11.500	83.00	26.00	36.00	0.35	4	●	●
16.000	16.000	16.000	15.500	92.00	32.00	42.00	0.50	4	●	●
20.000	20.000	20.000	19.500	104.00	38.00	52.00	0.60	4	●	●
25.000	25.000	25.000	24.000	121.00	45.00	63.00	0.75	4	●	●

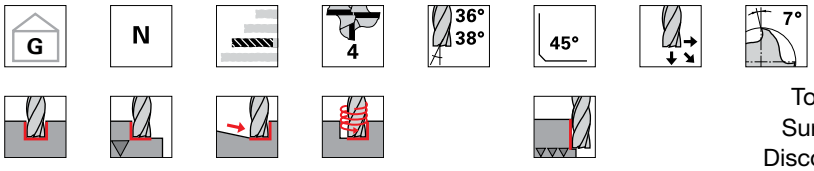
Cutting values: HPC-roughing* (detailed cutting values see p. 269)

ISO Code	Hardness	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 3	6	8	10	12	16	20	25
P Steel	≤ 850 N/mm²	2xd	0.3xd	200	0.02	0.04	0.055	0.07	0.085	0.1	0.12	0.17
M Stainless steel	≤ 750 N/mm²	2xd	0.3xd	140	0.018	0.035	0.045	0.06	0.07	0.09	0.1	0.15
	≥ 750 N/mm²	2xd	0.3xd	120	0.016	0.03	0.04	0.055	0.065	0.08	0.095	0.14
S Ti sp.alloys	≤ 1300 N/mm²	2xd	0.2xd	130	0.02	0.03	0.04	0.06	0.07	0.08	0.09	0.12

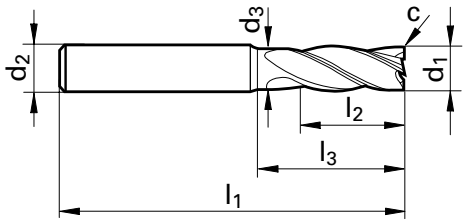
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life
** for trochoidal milling and imachining with a_e 0.1-0.2xd the cutting speed and feed rate can be increased by 50 %

Ratio end mills RF 100 VA

centre cutting



	HA	HB
Tool material	Solid carbide	
Surface finish	TiAlN-nanoA	TiAlN-nanoA
Discount group	106	106
Guhring no.	**3806**	**3807**



Code no.	d1 h10	d2 h6	d3	l1	l2	l3	c	Z	Availability	
	mm	mm	mm	mm	mm	mm	mm x 45°			
6.000	6.000	6.000	5.700	65.00	10.00	28.00	0.20	4	●	●
8.000	8.000	8.000	7.700	75.00	12.00	38.00	0.25	4	●	●
10.000	10.000	10.000	9.500	80.00	14.00	38.00	0.30	4	●	●
12.000	12.000	12.000	11.500	93.00	16.00	46.00	0.35	4	●	●
16.000	16.000	16.000	15.500	108.00	22.00	58.00	0.50	4	●	●
20.000	20.000	20.000	19.500	126.00	26.00	74.00	0.60	4	●	●

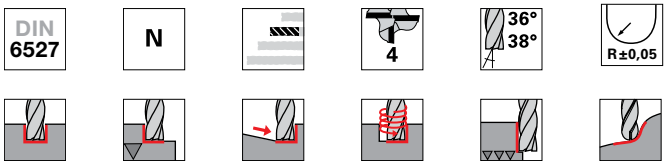
Cutting values: HPC-roughing* (detailed cutting values see p. 269)

ISO Code	Hardness	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 3	6	8	10	12	16	20	25
P Steel	≤ 850 N/mm²	2xd	0.3xd	200	0.02	0.04	0.055	0.07	0.085	0.1	0.12	0.17
M Stainless steel	≤ 750 N/mm²	2xd	0.3xd	140	0.018	0.035	0.045	0.06	0.07	0.09	0.1	0.15
	≥ 750 N/mm²	2xd	0.3xd	120	0.016	0.03	0.04	0.055	0.065	0.08	0.095	0.14
S Ti sp.alloys	≤ 1300 N/mm²	2xd	0.2xd	130	0.02	0.03	0.04	0.06	0.07	0.08	0.09	0.12

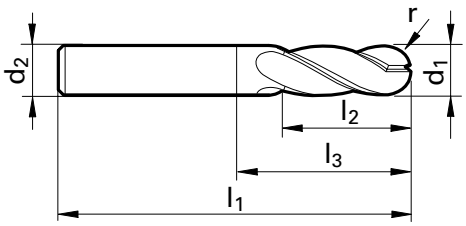
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life
** for trochoidal milling and imachining with a_e 0.1-0.2xd the cutting speed and feed rate can be increased by 50 %

Ratio end mills RF 100 VA

centre cutting



	Solid carbide	
Tool material	TiAlN-nanoA	TiAlN-nanoA
Surface finish	106	106
Discount group	**6707**	**6708**
Guhring no.		



Code no.	d1 h10	d2 h6	l1	l2	l3	r	Z	Availability	
	mm	mm	mm	mm	mm	mm			
4.000	4.000	6.000	57.00	11.00	18.00	2.00	4	●	●
5.000	5.000	6.000	57.00	13.00	18.00	2.50	4	●	●
6.000	6.000	6.000	57.00	13.00	20.00	3.00	4	●	●
8.000	8.000	8.000	63.00	19.00	26.00	4.00	4	●	●
10.000	10.000	10.000	72.00	22.00	30.00	5.00	4	●	●
12.000	12.000	12.000	83.00	26.00	36.00	6.00	4	●	●
16.000	16.000	16.000	92.00	32.00	42.00	8.00	4	●	●
20.000	20.000	20.000	104.00	38.00	52.00	10.00	4	●	●
25.000	25.000	25.000	121.00	45.00	63.00	12.50	4	●	●

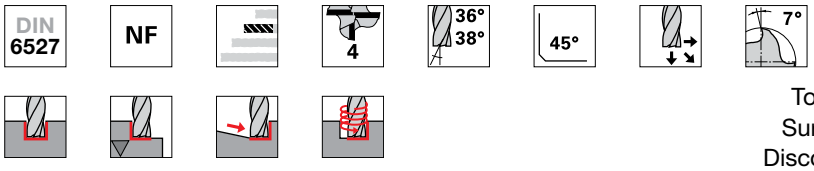
Cutting values: HPC-roughing* (detailed cutting values see p. 269)

ISO Code	Hardness	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 3	6	8	10	12	16	20	25
P Steel	≤ 850 N/mm²	1xd	0.3xd	200	0.02	0.04	0.055	0.07	0.085	0.1	0.12	0.17
M Stainless steel	≤ 750 N/mm²	1xd	0.3xd	140	0.018	0.035	0.045	0.06	0.07	0.09	0.1	0.15
	≥ 750 N/mm²	1xd	0.3xd	120	0.016	0.03	0.04	0.055	0.065	0.08	0.095	0.014
N Aluminium	≤ 7% Si	1xd	0.3xd	600	0.018	0.035	0.045	0.06	0.07	0.09	0.1	0.15
S Ti sp.alloys	≤ 1300 N/mm²	1xd	0.2xd	130	0.02	0.03	0.04	0.06	0.07	0.08	0.09	0.12

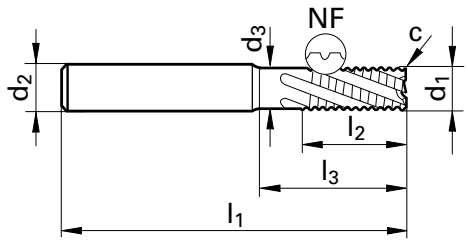
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life
** for trochoidal milling and imachining with a_e 0.1-0.2xd the cutting speed and feed rate can be increased by 50 %

Ratio end mills RF 100 VA

centre cutting



	HA	HB
Tool material	Solid carbide	
Surface finish	TiAlN-nanoA	TiAlN-nanoA
Discount group	106	106
Guhring no.	**3696**	**3718**



Code no.	d1 h10	d2 h6	d3	l1	l2	l3	c	Z	Availability	
	mm	mm	mm	mm	mm	mm	mm x 45°			
5.000	5.000	6.000	4.800	57.00	13.00	18.00	0.20	4	●	●
6.000	6.000	6.000	5.700	57.00	13.00	20.00	0.30	4	●	●
7.000	7.000	8.000	6.700	63.00	16.00	24.90	0.30	4	●	●
8.000	8.000	8.000	7.700	63.00	19.00	26.00	0.30	4	●	●
9.000	9.000	10.000	8.700	72.00	19.00	29.90	0.30	4	●	●
10.000	10.000	10.000	9.500	72.00	22.00	30.00	0.30	4	●	●
12.000	12.000	12.000	11.500	83.00	26.00	36.00	0.50	4	●	●
14.000	14.000	14.000	13.500	83.00	26.00	36.00	0.50	4	●	●
16.000	16.000	16.000	15.500	92.00	32.00	42.00	0.50	4	●	●
18.000	18.000	20.000	17.500	92.00	32.00	42.00	0.50	4	●	●
20.000	20.000	20.000	19.500	104.00	38.00	52.00	0.50	4	●	●
25.000	25.000	25.000	24.000	121.00	45.00	63.00	0.60	4	●	●

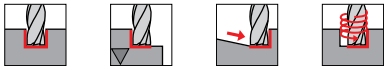
Cutting values: HPC-roughing* (detailed cutting values see p. 270)

ISO Code	Hardness	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 3	6	8	10	12	16	20	25
P Steel	≤ 850 N/mm²	1.5xd	0.5xd	180	0.018	0.025	0.035	0.045	0.05	0.065	0.08	0.12
M Stainless steel	≤ 750 N/mm²	1.5xd	0.5xd	120	0.015	0.025	0.035	0.045	0.05	0.065	0.08	0.12
	≥ 750 N/mm²	1.5xd	0.4xd	100	0.012	0.015	0.025	0.035	0.045	0.05	0.065	0.08

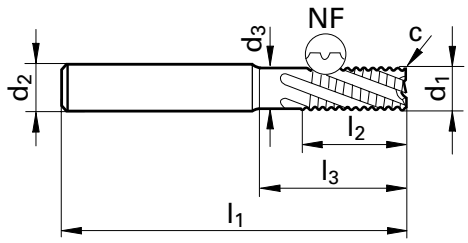
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life
** for slotting the cutting speed and feed rate should be reduced by 30 %

Ratio end mills RF 100 VA

centre cutting



	HA	HB
Tool material	Solid carbide	
Surface finish	TiAlN-nanoA	TiAlN-nanoA
Discount group	106	106
Guhring no.	**3733**	**3885**



Code no.	d1 h10	d2 h6	d3	l1	l2	l3	c	Z	Availability	
	mm	mm	mm	mm	mm	mm	mm x 45°			
6.000	6.000	6.000	5.700	65.00	10.00	28.00	0.30	4	●	●
8.000	8.000	8.000	7.700	75.00	12.00	38.00	0.30	4	●	●
10.000	10.000	10.000	9.500	80.00	14.00	38.00	0.30	4	●	●
12.000	12.000	12.000	11.500	93.00	16.00	46.00	0.50	4	●	●
16.000	16.000	16.000	15.500	108.00	22.00	58.00	0.50	4	●	●
20.000	20.000	20.000	19.500	126.00	26.00	74.00	0.50	4	●	●

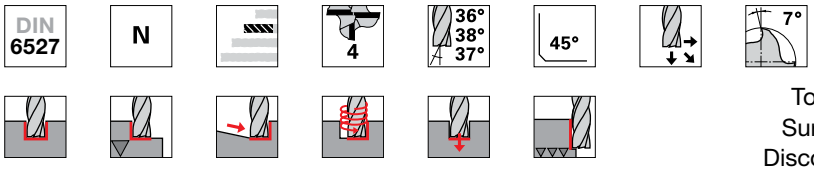
Cutting values: HPC-roughing* (detailed cutting values see p. 270)

ISO Code	Hardness	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 3	6	8	10	12	16	20	25
P Steel	≤ 850 N/mm²	1.5xd	0.5xd	180	0.018	0.025	0.035	0.045	0.05	0.065	0.08	0.12
M Stainless steel	≤ 750 N/mm²	1.5xd	0.5xd	120	0.015	0.025	0.035	0.045	0.05	0.065	0.08	0.12
	≥ 750 N/mm²	1.5xd	0.4xd	100	0.012	0.015	0.025	0.035	0.045	0.05	0.065	0.08

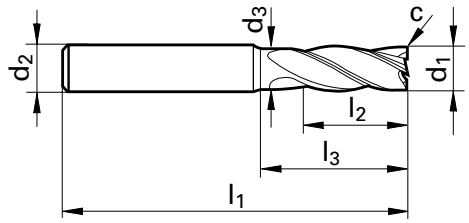
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life
** for slotting the cutting speed and feed rate should be reduced by 30 %

Ratio end mills RF 100 DIVER

centre cutting



	HA	HB
Tool material	Solid carbide	
Surface finish	Signum	Signum
Discount group	106	106
Guhring no.	**6737**	**6736**



Code no.	d1 h10	d2 h6	d3	l1	l2	l3	c	Z	Availability	
	mm	mm	mm	mm	mm	mm	mm x 45°			
5.700	5.700	6.000	5.500	57.00	13.00	20.40	0.06	4	●	●
7.700	7.700	8.000	7.400	63.00	19.00	26.50	0.08	4	●	●
9.700	9.700	10.000	9.400	72.00	22.00	31.50	0.10	4	●	●
11.700	11.700	12.000	11.200	83.00	26.00	37.30	0.12	4	●	●
13.700	13.700	14.000	13.200	83.00	26.00	37.30	0.14	4	●	●
15.600	15.600	16.000	15.100	92.00	32.00	43.20	0.16	4	●	●
19.500	19.500	20.000	19.000	104.00	38.00	53.10	0.20	4	●	●

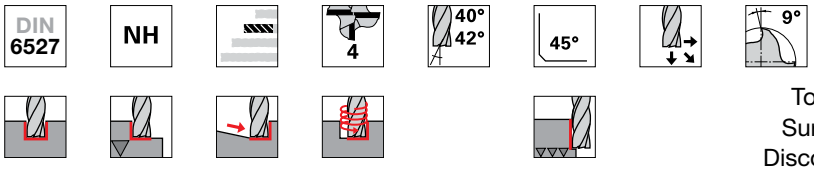
Cutting values: Ramping, slotting and HPC-milling (detailed cutting values see p. 268)**

ISO Code	Hardness	Feed depth a_p	Ramping max. angle	Cutting speed v_c	fz (mm/z) with nom. Ø 5,7	7,7	9,7	11,7	15,6	19,5
P Steel	≤ 850 N/mm²	1xd	45°	270	0.025	0.035	0.05	0.06	0.08	0.1
	850 - 1400 N/mm²	1xd	30°	240	0.025	0.03	0.045	0.05	0.07	0.085
M Stainless steel	≤ 750 N/mm²	1xd	10°	120	0.02	0.03	0.045	0.06	0.065	0.075
	≥ 750 N/mm²	1xd	5°	80	0.02	0.03	0.04	0.045	0.06	0.07
K Cast mat.	≥ 240 HB 30	1xd	45°	180	0.025	0.035	0.05	0.06	0.08	0.1
N Aluminium	≤ 7% Si	1xd	30°	420	0.03	0.04	0.065	0.08	0.095	0.11
S Ti sp.alloys	≤ 1300 N/mm²	0.6xd	10°	60	0.02	0.03	0.04	0.045	0.06	0.07

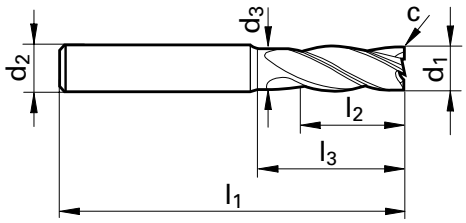
** for trochoidal milling and imachining with a_p 2xd and a_e 0.15 xd the cutting speed and feed rate can be increased by 50 %

Ratio end mills RF 100 F

centre cutting



	HA	HB
Tool material	Solid carbide	
Surface finish	FIRE	FIRE
Discount group	106	106
Guhring no.	**3629**	**3630**



Code no.	d1 h10	d2 h6	d3	l1	l2	l3	c	Z	Availability	
	mm	mm	mm	mm	mm	mm	mm x 45°			
4.000	4.000	6.000	3.800	57.00	11.00	18.00	0.10	4	●	●
5.000	5.000	6.000	4.800	57.00	13.00	18.00	0.10	4	●	●
6.000	6.000	6.000	5.700	57.00	13.00	20.00	0.15	4	●	●
8.000	8.000	8.000	7.700	63.00	19.00	26.00	0.15	4	●	●
10.000	10.000	10.000	9.500	72.00	22.00	30.00	0.20	4	●	●
12.000	12.000	12.000	11.500	83.00	26.00	36.00	0.20	4	●	●
16.000	16.000	16.000	15.500	92.00	32.00	42.00	0.35	4	●	●
20.000	20.000	20.000	19.500	104.00	38.00	52.00	0.45	4	●	●

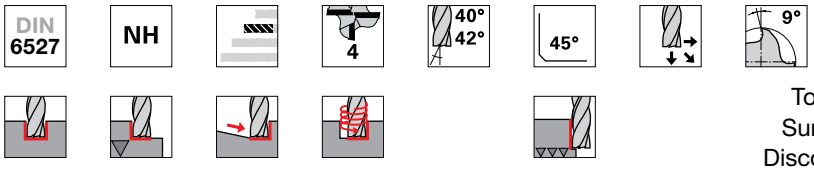
Cutting values: HPC-roughing* (detailed cutting values see p. 269)

ISO Code	Hardness	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 3	6	8	10	12	16	20	25
P Steel	≤ 850 N/mm²	2xd	0.3xd	200	0.02	0.04	0.055	0.07	0.085	0.1	0.12	0.17
	850 - 1400 N/mm²	2xd	0.3xd	180	0.02	0.04	0.055	0.07	0.085	0.1	0.12	0.17
M Stainless steel	≤ 750 N/mm²	2xd	0.3xd	140	0.018	0.035	0.045	0.06	0.07	0.09	0.1	0.15
	≥ 750 N/mm²	2xd	0.3xd	120	0.016	0.03	0.04	0.055	0.065	0.08	0.095	0.014
S Ti sp.alloys	≤ 1300 N/mm²	2xd	0.2xd	130	0.02	0.03	0.04	0.06	0.07	0.08	0.09	0.12

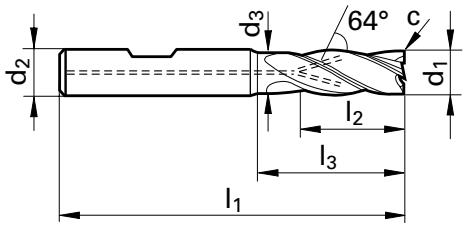
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life
** for trochoidal milling and imachining with a_e 0.1-0.2xd the cutting speed and feed rate can be increased by 50 %

Ratio end mills RF 100 F

centre cutting



	HB
Tool material	Solid carbide
Surface finish	FIRE
Discount group	106
Guhring no.	3366



Code no.	d1 h10	d2 h6	d3	l1	l2	l3	c	Z	Availability
	mm	mm	mm	mm	mm	mm	mm x 45°		
6.000	6.000	6.000	5.700	57.00	13.00	20.00	0.15	4	●
8.000	8.000	8.000	7.700	63.00	19.00	26.00	0.15	4	●
10.000	10.000	10.000	9.500	72.00	22.00	30.00	0.20	4	●
12.000	12.000	12.000	11.500	83.00	26.00	36.00	0.20	4	●
16.000	16.000	16.000	15.500	92.00	32.00	42.00	0.35	4	●
20.000	20.000	20.000	19.500	104.00	38.00	52.00	0.45	4	●

Cutting values: HPC-roughing* (detailed cutting values see p. 269)

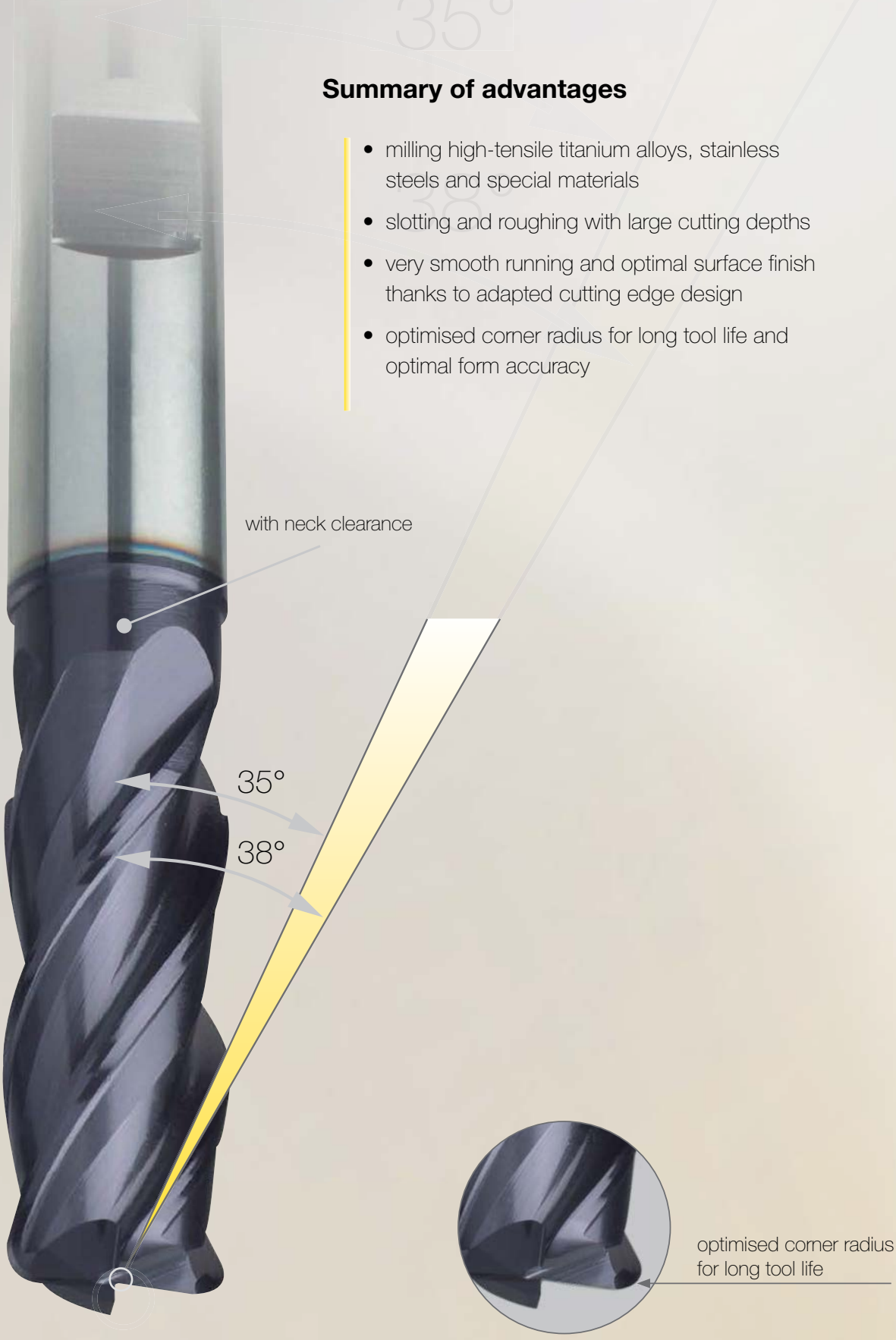
ISO Code	Hardness	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 3	6	8	10	12	16	20	25
P Steel	≤ 850 N/mm²	2xd	0.3xd	200	0.02	0.04	0.055	0.07	0.085	0.1	0.12	0.17
	850 - 1400 N/mm²	2xd	0.3xd	180	0.02	0.04	0.055	0.07	0.085	0.1	0.12	0.17
M Stainless steel	≤ 750 N/mm²	2xd	0.3xd	140	0.018	0.035	0.045	0.06	0.07	0.09	0.1	0.15
	≥ 750 N/mm²	2xd	0.3xd	120	0.016	0.03	0.04	0.055	0.065	0.08	0.095	0.014
S Ti sp.alloys	≤ 1300 N/mm²	2xd	0.2xd	130	0.02	0.03	0.04	0.06	0.07	0.08	0.09	0.12

* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life
** for trochoidal milling and imachining with a_e 0.1-0.2xd the cutting speed and feed rate can be increased by 50 %

RF 100 Ti - High-performance end mills
for special and titanium alloys

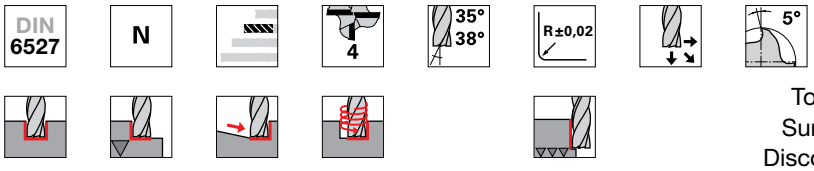
Summary of advantages

- milling high-tensile titanium alloys, stainless steels and special materials
- slotting and roughing with large cutting depths
- very smooth running and optimal surface finish thanks to adapted cutting edge design
- optimised corner radius for long tool life and optimal form accuracy

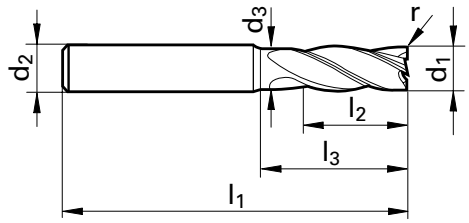


Ratio end mills RF 100 Ti

centre cutting



	HA	HB
Tool material	Solid carbide	
Surface finish	TiAlN-SuperA	TiAlN-SuperA
Discount group	106	106
Guhring no.	**3498**	**3499**



Code no.	d1 h10	d2 h6	d3	l1	l2	l3	r	Z	Availability	
	mm	mm	mm	mm	mm	mm	mm			
6.005	6.000	6.000	5.700	57.00	13.00	20.00	0.50	4	●	●
6.008	6.000	6.000	5.700	57.00	13.00	20.00	0.80	4	●	●
6.010	6.000	6.000	5.700	57.00	13.00	20.00	1.00	4	●	●
6.015	6.000	6.000	5.700	57.00	13.00	20.00	1.50	4	●	●
6.020	6.000	6.000	5.700	57.00	13.00	20.00	2.00	4	●	●
8.005	8.000	8.000	7.700	63.00	19.00	26.00	0.50	4	●	●
8.008	8.000	8.000	7.700	63.00	19.00	26.00	0.80	4	●	●
8.010	8.000	8.000	7.700	63.00	19.00	26.00	1.00	4	●	●
8.015	8.000	8.000	7.700	63.00	19.00	26.00	1.50	4	●	●
8.020	8.000	8.000	7.700	63.00	19.00	26.00	2.00	4	●	●
10.005	10.000	10.000	9.500	72.00	22.00	30.00	0.50	4	●	●
10.008	10.000	10.000	9.500	72.00	22.00	30.00	0.80	4	●	●
10.010	10.000	10.000	9.500	72.00	22.00	30.00	1.00	4	●	●
10.015	10.000	10.000	9.500	72.00	22.00	30.00	1.50	4	●	●
10.020	10.000	10.000	9.500	72.00	22.00	30.00	2.00	4	●	●
12.005	12.000	12.000	11.500	83.00	26.00	36.00	0.50	4	●	●
12.008	12.000	12.000	11.500	83.00	26.00	36.00	0.80	4	●	●
12.010	12.000	12.000	11.500	83.00	26.00	36.00	1.00	4	●	●
12.015	12.000	12.000	11.500	83.00	26.00	36.00	1.50	4	●	●
12.020	12.000	12.000	11.500	83.00	26.00	36.00	2.00	4	●	●
12.025	12.000	12.000	11.500	83.00	26.00	36.00	2.50	4	●	●
12.030	12.000	12.000	11.500	83.00	26.00	36.00	3.00	4	●	●
12.031	12.000	12.000	11.500	83.00	26.00	36.00	3.175	4	●	●
12.040	12.000	12.000	11.500	83.00	26.00	36.00	4.00	4	●	●

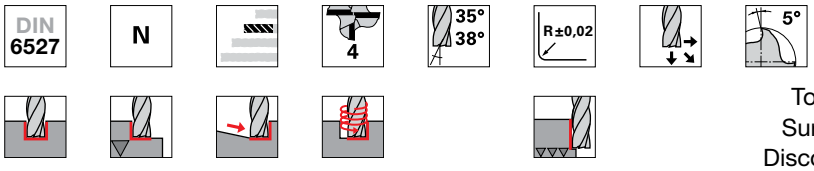
Cutting values: HPC-roughing* (detailed cutting values see p. 269)

ISO Code	Hardness	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 3	6	8	10	12	16	20	25
P Steel	≤ 850 N/mm²	-	-	-	-	-	-	-	-	-	-	-
	850 - 1400 N/mm²	1xd	0.6xd	160	0.015	0.03	0.04	0.05	0.06	0.07	0.09	0.14
M Stainless steel	≤ 750 N/mm²	1xd	0.6xd	120	0.015	0.03	0.04	0.05	0.06	0.07	0.09	0.14
	≥ 750 N/mm²	1xd	0.4xd	80	0.01	0.015	0.025	0.035	0.042	0.05	0.08	0.12
S Titan sp. alloys	≤ 1300 N/mm²	1xd	0.6xd	90	0.015	0.03	0.04	0.05	0.06	0.07	0.09	0.14
	≥ 1300 N/mm²	0.8xd	0.4xd	35	0.01	0.015	0.025	0.035	0.042	0.05	0.08	0.12

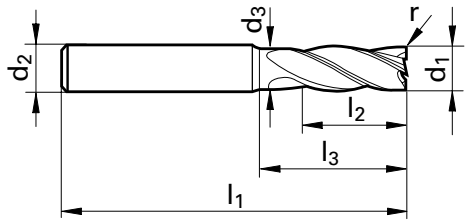
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life
** for slotting the cutting speed and feed rate should be reduced by 30 %

Ratio end mills RF 100 Ti

centre cutting



	HA	HB
Tool material	Solid carbide	
Surface finish	TiAlN-SuperA	TiAlN-SuperA
Discount group	106	106
Guhring no.	**3498**	**3499**



Code no.	d1 h10	d2 h6	d3	l1	l2	l3	r	Z	Availability	
	mm	mm	mm	mm	mm	mm	mm			
16.005	16.000	16.000	15.500	92.00	32.00	42.00	0.50	4	●	●
16.008	16.000	16.000	15.500	92.00	32.00	42.00	0.80	4	●	●
16.010	16.000	16.000	15.500	92.00	32.00	42.00	1.00	4	●	●
16.015	16.000	16.000	15.500	92.00	32.00	42.00	1.50	4	●	●
16.020	16.000	16.000	15.500	92.00	32.00	42.00	2.00	4	●	●
16.025	16.000	16.000	15.500	92.00	32.00	42.00	2.50	4	●	●
16.030	16.000	16.000	15.500	92.00	32.00	42.00	3.00	4	●	●
16.031	16.000	16.000	15.500	92.00	32.00	42.00	3.175	4	●	●
16.040	16.000	16.000	15.500	92.00	32.00	42.00	4.00	4	●	●
20.005	20.000	20.000	19.500	104.00	38.00	52.00	0.50	4	●	●
20.010	20.000	20.000	19.500	104.00	38.00	52.00	1.00	4	●	●
20.015	20.000	20.000	19.500	104.00	38.00	52.00	1.50	4	●	●
20.020	20.000	20.000	19.500	104.00	38.00	52.00	2.00	4	●	●
20.025	20.000	20.000	19.500	104.00	38.00	52.00	2.50	4	●	●
20.030	20.000	20.000	19.500	104.00	38.00	52.00	3.00	4	●	●
20.031	20.000	20.000	19.500	104.00	38.00	52.00	3.175	4	●	●
20.040	20.000	20.000	19.500	104.00	38.00	52.00	4.00	4	●	●
25.015	25.000	25.000	24.000	121.00	45.00	63.00	1.50	4	●	●
25.020	25.000	25.000	24.000	121.00	45.00	63.00	2.00	4	●	●
25.025	25.000	25.000	24.000	121.00	45.00	63.00	2.50	4	●	●
25.030	25.000	25.000	24.000	121.00	45.00	63.00	3.00	4	●	●
25.031	25.000	25.000	24.000	121.00	45.00	63.00	3.175	4	●	●
25.040	25.000	25.000	24.000	121.00	45.00	63.00	4.00	4	●	●
25.050	25.000	25.000	24.000	121.00	45.00	63.00	5.00	4	●	●

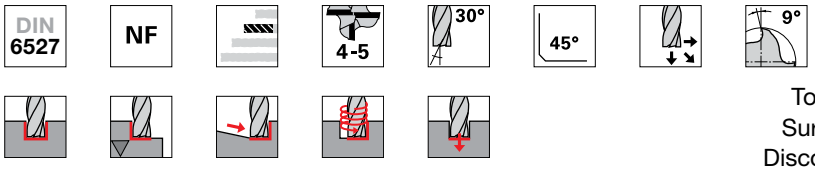
Cutting values: HPC-roughing* (detailed cutting values see p. 269)

ISO Code	Hardness	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 3	6	8	10	12	16	20	25
P Steel	≤ 850 N/mm²	-	-	-	-	-	-	-	-	-	-	-
	850 - 1400 N/mm²	1xd	0.6xd	160	0.015	0.03	0.04	0.05	0.06	0.07	0.09	0.14
M Stainless steel	≤ 750 N/mm²	1xd	0.6xd	120	0.015	0.03	0.04	0.05	0.06	0.07	0.09	0.14
	≥ 750 N/mm²	1xd	0.4xd	80	0.01	0.015	0.025	0.035	0.042	0.05	0.08	0.12
S Titan sp. alloys	≤ 1300 N/mm²	1xd	0.6xd	90	0.015	0.03	0.04	0.05	0.06	0.07	0.09	0.14
	≥ 1300 N/mm²	0.8xd	0.4xd	35	0.01	0.015	0.025	0.035	0.042	0.05	0.08	0.12

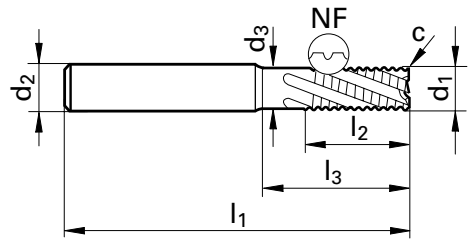
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life
** for slotting the cutting speed and feed rate should be reduced by 30 %

High-performance roughing end mills RS 100 U

centre cutting



	HA	HB
Tool material	Solid carbide	
Surface finish	FIRE	FIRE
Discount group	106	106
Guhring no.	**3887**	**3888**



Code no.	d1 h10	d2 h6	d3	l1	l2	l3	c	Z	Availability	
	mm	mm	mm	mm	mm	mm	mm x 45°			
6.000	6.000	6.000	5.700	57.00	13.00	20.00	0.30	4	●	●
8.000	8.000	8.000	7.700	63.00	19.00	26.00	0.30	4	●	●
10.000	10.000	10.000	9.500	72.00	22.00	30.00	0.30	4	●	●
12.000	12.000	12.000	11.500	83.00	26.00	36.00	0.50	4	●	●
14.000	14.000	14.000	13.500	83.00	26.00	36.00	0.50	4	●	●
16.000	16.000	16.000	15.500	92.00	32.00	42.00	0.50	4	●	●
18.000	18.000	18.000	17.500	92.00	32.00	42.00	0.50	4	●	●
20.000	20.000	20.000	19.500	104.00	38.00	52.00	0.50	4	●	●
25.000	25.000	25.000	24.000	121.00	45.00	63.00	0.60	5	●	●

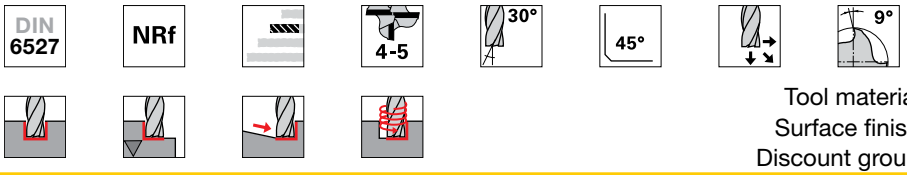
Cutting values: HPC-roughing * (detailed cutting values see p. 273)

ISO Code	Hardness	Feed depth a_p	Feed width a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 6	8	10	12	16	20	25
P Steel	≤ 850 N/mm²	2xd	0.5xd	160	0.024	0.032	0.04	0.048	0.056	0.072	0.104
	850 - 1400 N/mm²	2xd	0.4xd	130	0.016	0.032	0.041	0.054	0.063	0.081	0.09
M Stainless steel	≤ 750 N/mm²	2xd	0.25xd	115	0.024	0.032	0.04	0.048	0.056	0.072	0.104
	≥ 750 N/mm²	2xd	0.2xd	80	0.014	0.022	0.027	0.036	0.045	0.054	0.063
K Cast mat.	≥ 240 HB 30	2xd	0.4xd	150	0.024	0.032	0.04	0.048	0.056	0.072	0.104
N Aluminium	≤ 7% Si	2xd	0.3xd	250	0.027	0.036	0.045	0.054	0.063	0.081	0.12

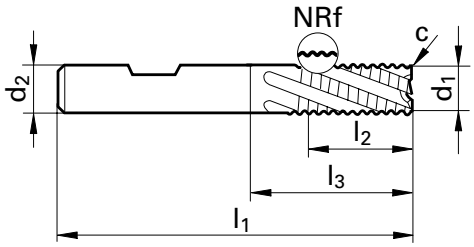
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life
** for slotting the cutting speed and feed rate should be reduced by 40 %

Roughing end mills GS 100 U (fine teeth)

centre cutting



Tool material	Solid carbide	
Surface finish	bright	FIRE
Discount group	117	117
Guhring no.	**3204**	**3723**



Code no.	d1 h10	d2 h6	l1	l2	l3	c	Z	Availability	
	mm	mm	mm	mm	mm	mm x 45°			
6.000	6.000	6.000	57.00	13.00	21.00	0.30	4	●	●
8.000	8.000	8.000	63.00	19.00	27.00	0.30	4	●	●
10.000	10.000	10.000	72.00	22.00	32.00	0.30	4	●	●
12.000	12.000	12.000	83.00	26.00	38.00	0.50	4	●	●
14.000	14.000	14.000	83.00	26.00	38.00	0.50	4	●	●
14.001	14.000	16.000	92.00	32.00	43.00	0.50	4	●	●
16.000	16.000	16.000	92.00	32.00	44.00	0.50	4	●	●
18.000	18.000	18.000	92.00	32.00	44.00	0.50	4	●	●
18.001	18.000	20.000	104.00	38.00	53.00	0.50	4	●	●
20.000	20.000	20.000	104.00	38.00	54.00	0.50	4	●	●
25.000	25.000	25.000	121.00	45.00	65.00	0.60	5	●	●

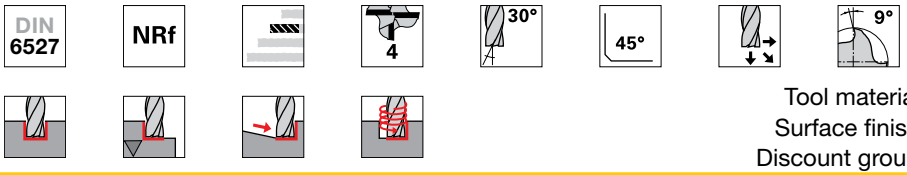
Cutting values: HPC-roughing * (detailed cutting values see p. 272)

ISO Code	Hardness	Feed depth a_p	Feed width a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 6	8	10	12	16	20	25
P Steel	≤ 850 N/mm²	2xd	0.5xd	160	0.02	0.028	0.036	0.04	0.052	0.064	0.096
	850 - 1400 N/mm²	2xd	0.4xd	130	0.016	0.024	0.028	0.032	0.044	0.052	0.064
M Stainless steel	≤ 750 N/mm²	2xd	0.25xd	115	0.02	0.028	0.036	0.04	0.052	0.064	0.096
	≥ 750 N/mm²	2xd	0.2xd	80	0.011	0.018	0.021	0.025	0.032	0.042	0.049
K Cast mat.	≥ 240 HB 30	2xd	0.4xd	150	0.021	0.028	0.035	0.042	0.049	0.063	0.091
N Aluminium	≤ 7% Si	2xd	0.3xd	250	0.024	0.032	0.04	0.048	0.056	0.072	0.104

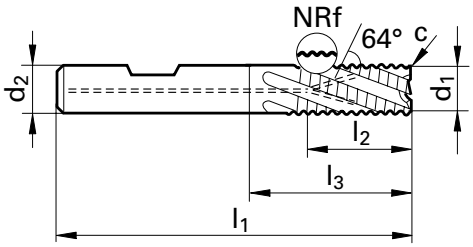
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life
** for slotting the cutting speed and feed rate should be reduced by 40 %
All recommendations are valid for coated tools. For bright milling cutters please v_c -40% and f_z -25% !

Roughing end mills GS 100 U (fine teeth)

centre cutting



Tool material	**Solid carbide**
Surface finish	FIRE
Discount group	106
Guhring no.	**3365**



Code no.	d1 h10	d2 h6	l1	l2	l3	c	Z	Availability
	mm	mm	mm	mm	mm	mm x 45°		
6.000	6.000	6.000	57.00	13.00	21.00	0.30	4	●
8.000	8.000	8.000	63.00	19.00	27.00	0.30	4	●
10.000	10.000	10.000	72.00	22.00	32.00	0.30	4	●
12.000	12.000	12.000	83.00	26.00	38.00	0.50	4	●
16.000	16.000	16.000	92.00	32.00	44.00	0.50	4	●
20.000	20.000	20.000	104.00	38.00	54.00	0.50	4	●

Cutting values: HPC-roughing * (detailed cutting values see p. 272)

ISO Code	Hardness	Feed depth a_p	Feed width a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 6	8	10	12	16	20	25
P Steel	≤ 850 N/mm²	2xd	0.5xd	160	0.02	0.028	0.036	0.04	0.052	0.064	0.096
	850 - 1400 N/mm²	2xd	0.4xd	130	0.016	0.024	0.028	0.032	0.044	0.052	0.064
M Stainless steel	≤ 750 N/mm²	2xd	0.25xd	115	0.02	0.028	0.036	0.04	0.052	0.064	0.096
	≥ 750 N/mm²	2xd	0.2xd	80	0.011	0.018	0.021	0.025	0.032	0.042	0.049
K Cast mat.	≥ 240 HB 30	2xd	0.4xd	150	0.021	0.028	0.035	0.042	0.049	0.063	0.091
N Aluminium	≤ 7% Si	2xd	0.3xd	250	0.024	0.032	0.04	0.048	0.056	0.072	0.104

* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life
** for slotting the cutting speed and feed rate should be reduced by 40 %

RF 100 SF – high-performance semi-roughing end mills
for materials up to 1600 N/mm^2 (48 HRC)

Summary of advantages

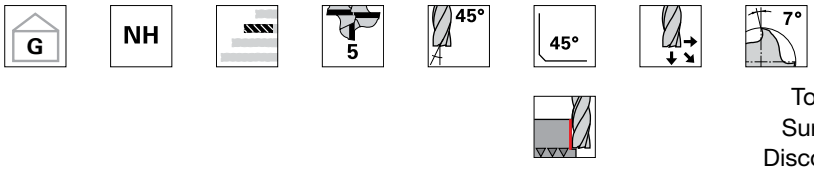
- available 5- or 6-fluted
- for semi-roughing with ae up to 0.3xD over entire cutting edge length
- optimal surface finish with fine finishing or HSC operations
- universal for materials up to 1600 N/mmm^2 (48 HRC)

Face cutting geometry with reinforced cutting edges and increased chip spaces for drilling and ramping operations

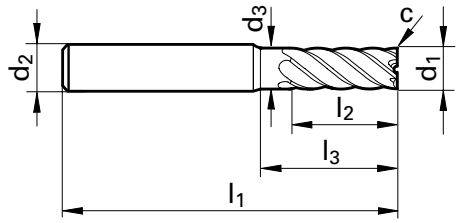
With micro-corner protection for longer tool life

Ratio end mills Superfinish RF 100 SF

centre cutting



	HA	HB
Tool material	Solid carbide	
Surface finish	FIRE	FIRE
Discount group	106	106
Guhring no.	**6709**	**6710**



Code no.	d1 h10	d2 h6	d3	l1	l2	l3	c	Z	Availability	
	mm	mm	mm	mm	mm	mm	mm x 45°			
4.000	4.000	6.000	3.800	57.00	11.00	18.00	0.05	5	●	●
5.000	5.000	6.000	4.800	57.00	13.00	18.00	0.05	5	●	●
6.000	6.000	6.000	5.700	57.00	13.00	20.00	0.05	5	●	●
8.000	8.000	8.000	7.700	63.00	19.00	26.00	0.10	5	●	●
10.000	10.000	10.000	9.500	72.00	22.00	30.00	0.10	5	●	●
12.000	12.000	12.000	11.500	83.00	26.00	36.00	0.10	5	●	●
16.000	16.000	16.000	15.500	92.00	32.00	42.00	0.15	5	●	●
20.000	20.000	20.000	19.500	104.00	38.00	52.00	0.15	5	●	●
25.000	25.000	25.000	24.000	121.00	45.00	63.00	0.20	5	●	●

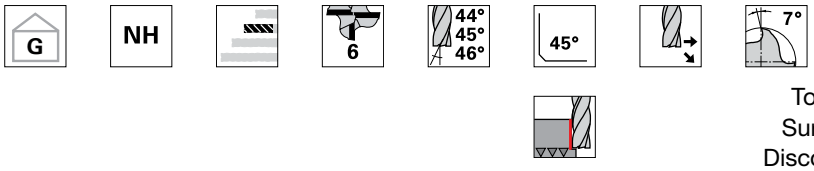
Cutting values: Finishing* and HPC-roughing ** (detailed cutting values see p. 269)**

ISO Code	Hardness	Feed depth* a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 3	6	8	10	12	16	20	25
P Steel	≤ 850 N/mm²	2xd	0.3xd	280	0.016	0.03	0.04	0.055	0.065	0.08	0.095	0.14
	850 - 1400 N/mm²	2xd	0.2xd	220	0.015	0.025	0.035	0.045	0.05	0.065	0.08	0.12
M Stainless steel	≤ 750 N/mm²	2xd	0.2xd	180	0.015	0.025	0.035	0.045	0.05	0.065	0.08	0.12
	≥ 750 N/mm²	2xd	0.2xd	120	0.015	0.025	0.035	0.045	0.05	0.065	0.08	0.12
K Cast mat.	≥ 240 HB 30	2xd	0.2xd	200	0.018	0.035	0.045	0.05	0.065	0.08	0.12	0.15
N Aluminium	≤ 7% Si	2xd	0.2xd	1000	0.018	0.035	0.045	0.05	0.065	0.08	0.12	0.15
S Ti sp.alloys	up to 1300 N/mm²	2xd	0.15xd	130	0.01	0.03	0.04	0.05	0.05	0.063	0.081	0.11

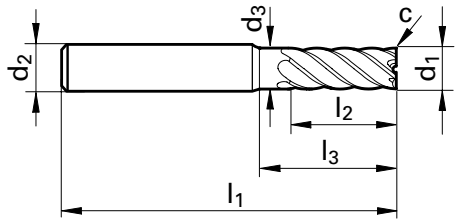
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life
** for trochoidal milling and imachining with a_e 0.1-0.2xd the cutting speed and feed rate can be increased by 50 %
*** for finishing with a_e 0.01xD the feed rate must be reduced by 25% to achieve optimal surfaces

Ratio end mills Superfinish RF 100 SF

centre cutting



	HA	HB
Tool material	Solid carbide	
Surface finish	FIRE	FIRE
Discount group	106	106
Guhring no.	**3631**	**3632**



Code no.	d1 h10	d2 h6	d3	l1	l2	l3	c	Z	Availability	
	mm	mm	mm	mm	mm	mm	mm x 45°			
8.000	8.000	8.000	7.700	63.00	19.00	26.00	0.10	6	●	●
10.000	10.000	10.000	9.500	72.00	22.00	30.00	0.10	6	●	●
12.000	12.000	12.000	11.500	83.00	26.00	36.00	0.10	6	●	●
16.000	16.000	16.000	15.500	92.00	32.00	42.00	0.15	6	●	●
20.000	20.000	20.000	19.500	104.00	38.00	52.00	0.15	6	●	●
25.000	25.000	25.000	24.000	121.00	45.00	63.00	0.20	6	●	●

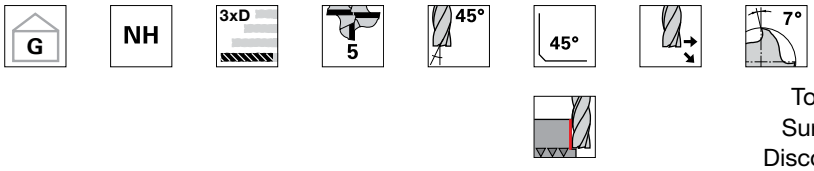
Cutting values: Finishing* and HPC-roughing ** (detailed cutting values see p. 269)**

ISO Code	Hardness	Feed depth* a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 3	6	8	10	12	16	20	25
P Steel	≤ 850 N/mm²	2xd	0.3xd	280	0.016	0.03	0.04	0.055	0.065	0.08	0.095	0.14
	850 - 1400 N/mm²	2xd	0.2xd	220	0.015	0.025	0.035	0.045	0.05	0.065	0.08	0.12
M Stainless steel	≤ 750 N/mm²	2xd	0.2xd	180	0.015	0.025	0.035	0.045	0.05	0.065	0.08	0.12
	≥ 750 N/mm²	2xd	0.2xd	120	0.015	0.025	0.035	0.045	0.05	0.065	0.08	0.12
K Cast mat.	≥ 240 HB 30	2xd	0.2xd	200	0.018	0.035	0.045	0.05	0.065	0.08	0.12	0.15
N Aluminium	≤ 7% Si	2xd	0.2xd	1000	0.018	0.035	0.045	0.05	0.065	0.08	0.12	0.15
S Ti sp.alloys	up to 1300 N/mm²	2xd	0.15xd	130	0.01	0.03	0.04	0.05	0.05	0.063	0.081	0.11

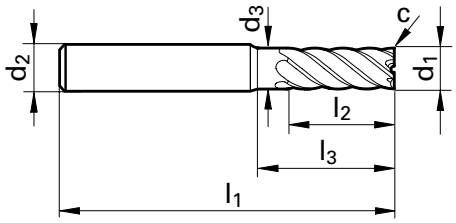
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life
** for trochoidal milling and imachining with a_e 0.1-0.2xd the cutting speed and feed rate can be increased by 50 %
*** for finishing with a_e 0.01xD the feed rate must be reduced by 25% to achieve optimal surfaces

Ratio end mills Superfinish RF 100 SF

centre cutting



	HA	HB
Tool material	Solid carbide	
Surface finish	FIRE	FIRE
Discount group	106	106
Guhring no.	**3897**	**3898**



Code no.	d1 h10	d2 h6	d3	l1	l2	l3	c	Z	Availability	
	mm	mm	mm	mm	mm	mm	mm x 45°			
4.000	4.000	6.000	3.800	65.00	12.00	26.00	0.05	5	●	●
5.000	5.000	6.000	4.800	65.00	15.00	26.00	0.05	5	●	●
6.000	6.000	6.000	5.700	65.00	18.00	28.00	0.05	5	●	●
8.000	8.000	8.000	7.700	75.00	24.00	38.00	0.10	5	●	●
10.000	10.000	10.000	9.500	80.00	30.00	38.00	0.10	5	●	●
12.000	12.000	12.000	11.500	93.00	36.00	46.00	0.10	5	●	●
16.000	16.000	16.000	15.500	108.00	48.00	58.00	0.15	5	●	●
20.000	20.000	20.000	19.500	126.00	60.00	74.00	0.15	5	●	●

Cutting values: Finishing* and HPC-roughing ** (detailed cutting values see p. 269)**

ISO Code	Hardness	Feed depth* a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 3	6	8	10	12	16	20	25
P Steel	≤ 850 N/mm²	2xd	0.3xd	280	0.016	0.03	0.04	0.055	0.065	0.08	0.095	0.14
	850 - 1400 N/mm²	2xd	0.2xd	220	0.015	0.025	0.035	0.045	0.05	0.065	0.08	0.12
M Stainless steel	≤ 750 N/mm²	2xd	0.2xd	180	0.015	0.025	0.035	0.045	0.05	0.065	0.08	0.12
	≥ 750 N/mm²	2xd	0.2xd	120	0.015	0.025	0.035	0.045	0.05	0.065	0.08	0.12
K Cast mat.	≥ 240 HB 30	2xd	0.2xd	200	0.018	0.035	0.045	0.05	0.065	0.08	0.12	0.15
N Aluminium	≤ 7% Si	2xd	0.2xd	1000	0.018	0.035	0.045	0.05	0.065	0.08	0.12	0.15
S Ti sp.alloys	up to 1300 N/mm²	2xd	0.15xd	130	0.01	0.03	0.04	0.05	0.05	0.063	0.081	0.11

* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life
** for trochoidal milling and imachining with a_e 0.1-0.2xd the cutting speed and feed rate can be increased by 50 %
*** for finishing with a_e 0.01xD the feed rate must be reduced by 25% to achieve optimal surfaces

Guhring GM 300 – HPC power clamp chucks

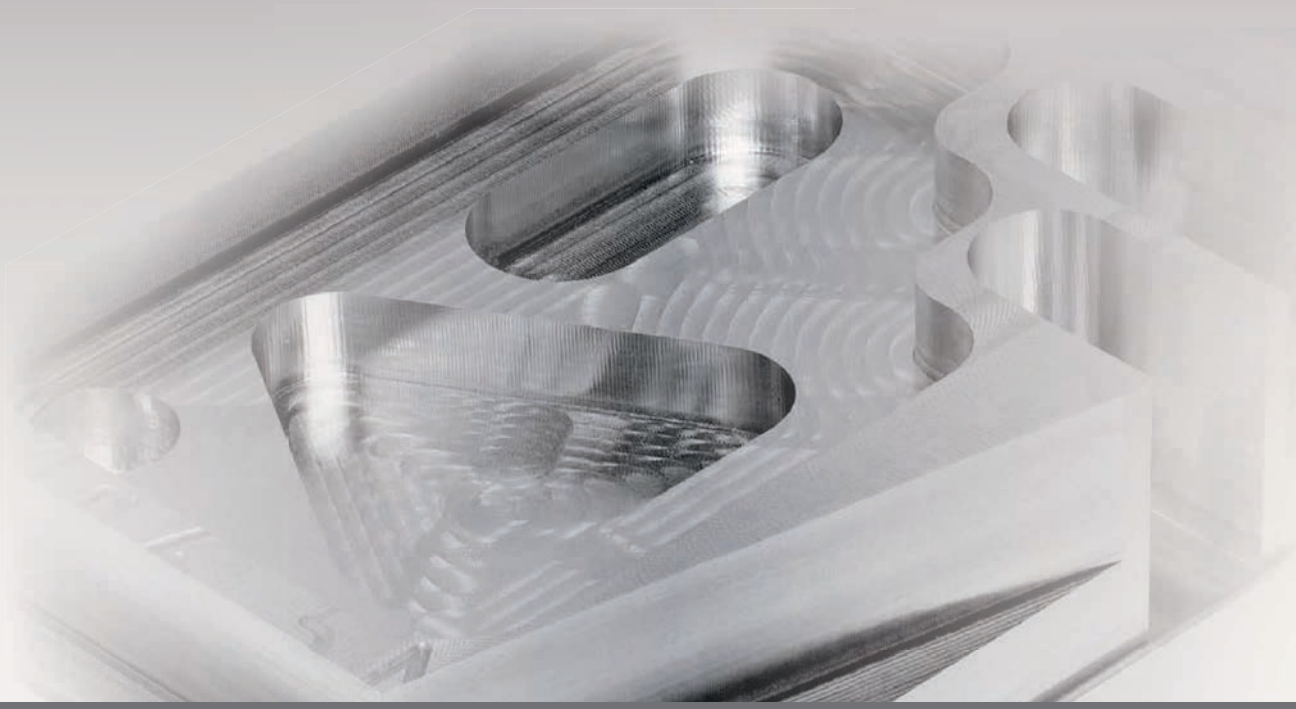
Well clamped is well milled!

Summary of advantages

- extreme clamping force thanks to mechanical clamping transmission
- ideal combination with HPC end mills and thread milling cutters
- for immense speeds with HPC and HSC milling
- maximum rigidity

GÜHROJET

ALUMINIUM,
NON –FERROUS METALS & PLASTICS



APPLICATION EXAMPLE

RF 100 A, Ø 20.0 mm

Slot milling in AlMg4.5Mn
a_e = 20 mm / a_p = 11 mm
v_c = 753 m/min
f_z = 0.11 mm

v_f = 7000 mm/min

Metal removal rate Q = 1540 cm^3/min

RF 100 A, Ø 16.0 mm

Slot milling in AlMgSi1
a_e = 16 mm / a_p = 16 mm
v_c = 666 m/min
f_z = 0.094 mm

v_f = 3740 mm/min

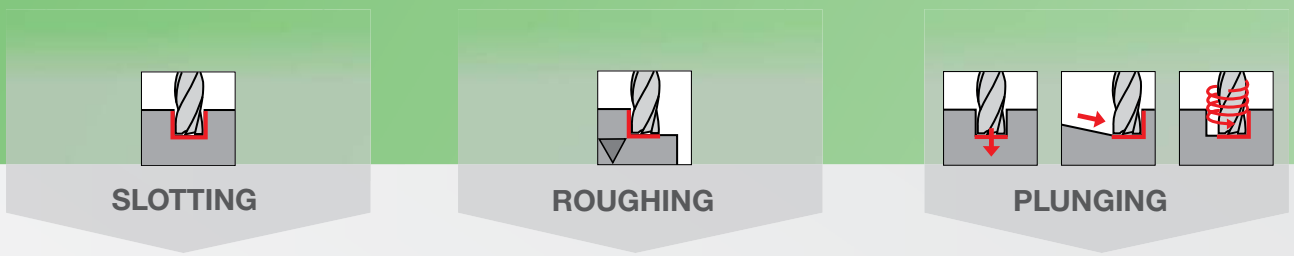
Metal removal rate Q = 957 cm^3/min

ALUMINIUM

Solid carbide HPC high-performance end mills
for Aluminium, non-ferrous metals and plastics

N

Aluminium, non-ferrous metals and pl

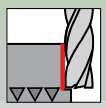


HPC HIGH-PERFORMANCE CUTTING
for max. metal removal rates / time; rigid conditions, high performance, good cooling, quick de-clamping

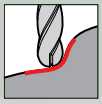
HSC HIGH SPEED CUTTING
with high speeds / high feed rate low performance, low feed rate

M7C MILL TURN CENTER driven tools
non-rigid conditions, low drive power medium to long de-clamping, moderate cooling

QUICK FINDER



FINISHING



COPYING

HSC N

RF100 A Z=3

i.e.: no. 3472 from p. 93

HSC N

NO.1 HSC N

RF100 A Z=3 ER

i.e.: no. 3599 from p. 94

NO.1 HSC N

RF100 A Z=3 3xD 4xD 5xD

i.e.: no. 6730 from p. 97

HSC N

RF100 A Z=4

i.e.: no. 3202 from p. 100

More copying milling cutters from page 137

RF100 A WF

i.e.: no. 3468 from p. 101

Alu slot drills Z=2

i.e.: no. 3310 from p. 104

HSC N

RF100 SF Z=5 / Z=6

i.e.: no. 3631 from p. 109

N ALUMINIUM, non-ferrous metals & plastics

NO.1 IDEAL TOOL

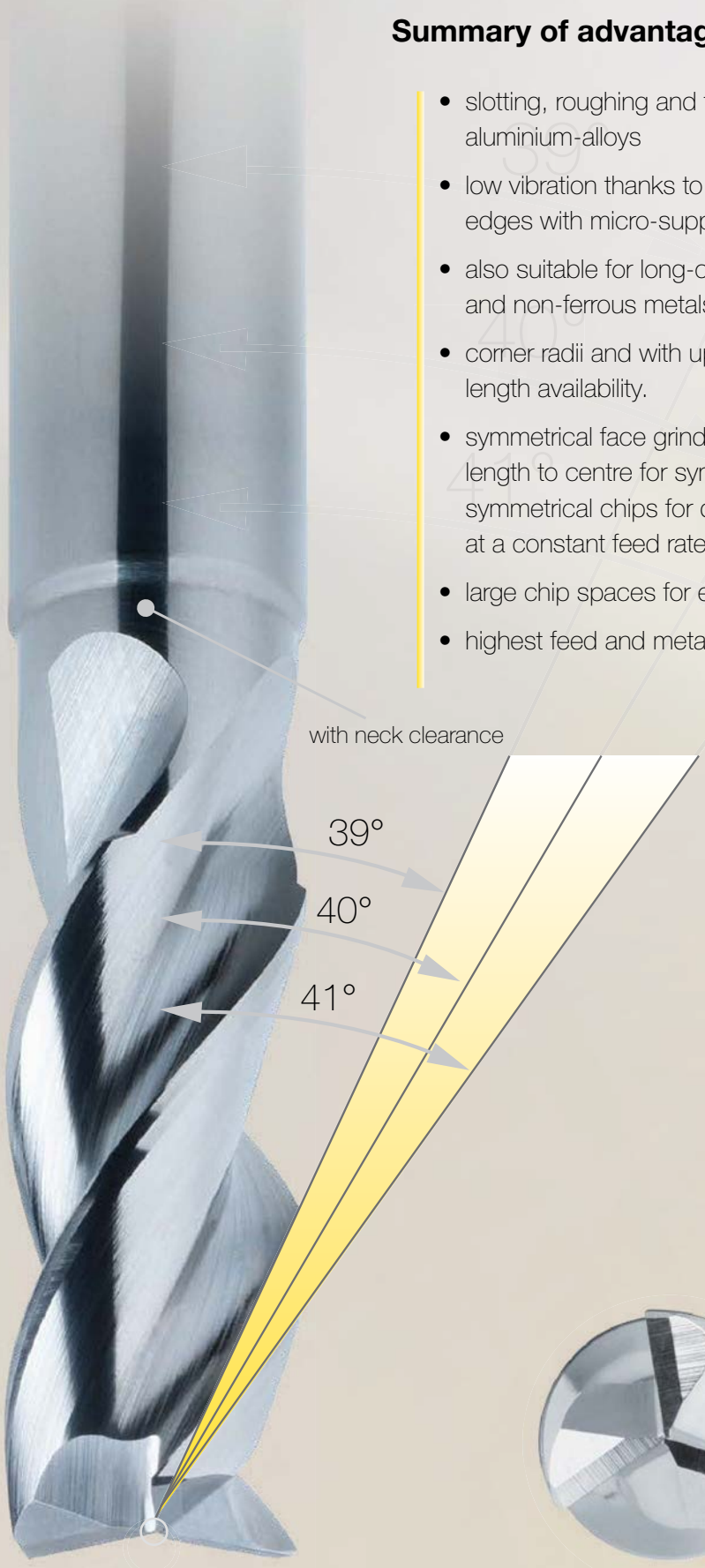
EXPLANATIONS for the Quickfinder see p. 6-7

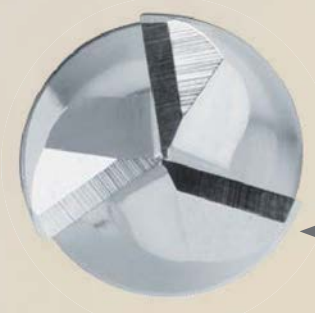
RF 100 A – high-performance end mills

for aluminium and aluminium alloys

Summary of advantages

- slotting, roughing and finishing in aluminium and aluminium-alloys
- low vibration thanks to nano-polished cutting edges with micro-support chamfers
- also suitable for long-chipping materials, plastics and non-ferrous metals
- corner radii and with up to 5xD cutting edge length availability.
- symmetrical face grind with cutting edge length to centre for symmetrical loading and symmetrical chips for drilling, recessing, ramping at a constant feed rate
- large chip spaces for excellent chip evacuation
- highest feed and metal removal rates

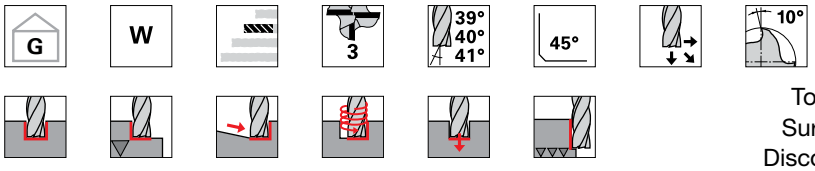




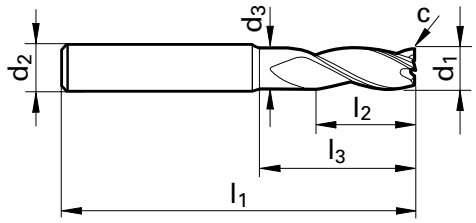
Face cutting geometry with reinforced cutting edges and increased chip spaces for drilling and ramping operations

Ratio end mills Alu RF 100 A

centre cutting



	HA	HB
Tool material	Solid carbide	
Surface finish	bright	bright
Discount group	106	106
Guhring no.	**3472**	**6702**



Code no.	d1 e8	d2 h6	d3	l1	l2	l3	c	Z	Availability	
	mm	mm	mm	mm	mm	mm	mm x 45°			
3.000	3.000	6.000	2.800	57.00	8.00	15.00	0.03	3	●	●
4.000	4.000	6.000	3.800	57.00	11.00	18.00	0.04	3	●	●
5.000	5.000	6.000	4.800	57.00	13.00	18.00	0.05	3	●	●
6.000	6.000	6.000	5.700	57.00	13.00	20.00	0.06	3	●	●
8.000	8.000	8.000	7.700	63.00	19.00	26.00	0.08	3	●	●
10.000	10.000	10.000	9.500	72.00	22.00	30.00	0.10	3	●	●
12.000	12.000	12.000	11.500	83.00	26.00	36.00	0.12	3	●	●
16.000	16.000	16.000	15.500	92.00	32.00	42.00	0.16	3	●	●
20.000	20.000	20.000	19.500	104.00	38.00	52.00	0.20	3	●	●

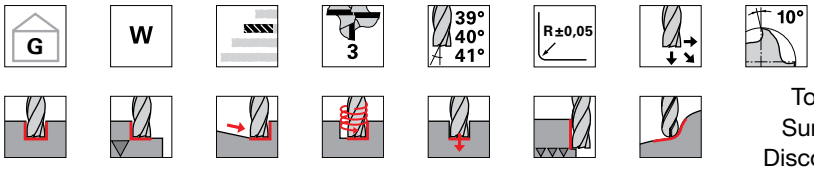
Cutting values: Slotting and HPC-roughing* (detailed cutting values see p. 269)

ISO Code	Hardness***	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 3	6	8	10	12	16	20	25
N Aluminium	≤ 3% Si	1xd	1xd	600	0.045	0.05	0.065	0.08	0.12	0.15	0.18	0.25
	≤ 7% Si	1xd	1xd	280	0.03	0.045	0.05	0.065	0.08	0.12	0.15	0.18

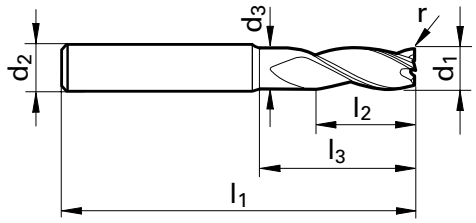
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life
** for trochoidal milling and imachining with a_p 2xd and a_e 0.15xd the cutting speed and feed rate can be increased by 50 %
*** as an option we can provide our Carbo-coating as a special tool for soft and sticky aluminium alloys and plastics

Ratio end mills Alu RF 100 A

centre cutting



	HA	HB
Tool material	Solid carbide	
Surface finish	bright	bright
Discount group	106	106
Guhring no.	**3599**	**6729**



Code no.	d1 e8	d2 h6	d3	l1	l2	l3	r	Z	Availability	
	mm	mm	mm	mm	mm	mm	mm			
6.005	6.000	6.000	5.700	57.00	13.00	20.00	0.50	3	●	●
6.010	6.000	6.000	5.700	57.00	13.00	20.00	1.00	3	●	●
8.005	8.000	8.000	7.700	63.00	19.00	26.00	0.50	3	●	●
8.010	8.000	8.000	7.700	63.00	19.00	26.00	1.00	3	●	●
10.005	10.000	10.000	9.500	72.00	22.00	30.00	0.50	3	●	●
10.010	10.000	10.000	9.500	72.00	22.00	30.00	1.00	3	●	●
10.015	10.000	10.000	9.500	72.00	22.00	30.00	1.50	3	●	●
12.005	12.000	12.000	11.500	83.00	26.00	36.00	0.50	3	●	●
12.010	12.000	12.000	11.500	83.00	26.00	36.00	1.00	3	●	●
12.015	12.000	12.000	11.500	83.00	26.00	36.00	1.50	3	●	●
12.020	12.000	12.000	11.500	83.00	26.00	36.00	2.00	3	●	●
12.025	12.000	12.000	11.500	83.00	26.00	36.00	2.50	3	●	●
12.030	12.000	12.000	11.500	83.00	26.00	36.00	3.00	3	●	●
12.040	12.000	12.000	11.500	83.00	26.00	36.00	4.00	3	●	●
16.010	16.000	16.000	15.500	92.00	32.00	42.00	1.00	3	●	●
16.020	16.000	16.000	15.500	92.00	32.00	42.00	2.00	3	●	●
16.025	16.000	16.000	15.500	92.00	32.00	42.00	2.50	3	●	●
16.030	16.000	16.000	15.500	92.00	32.00	42.00	3.00	3	●	●
16.040	16.000	16.000	15.500	92.00	32.00	42.00	4.00	3	●	●
20.010	20.000	20.000	19.500	104.00	38.00	52.00	1.00	3	●	●
20.020	20.000	20.000	19.500	104.00	38.00	52.00	2.00	3	●	●
20.025	20.000	20.000	19.500	104.00	38.00	52.00	2.50	3	●	●
20.030	20.000	20.000	19.500	104.00	38.00	52.00	3.00	3	●	●
20.040	20.000	20.000	19.500	104.00	38.00	52.00	4.00	3	●	●

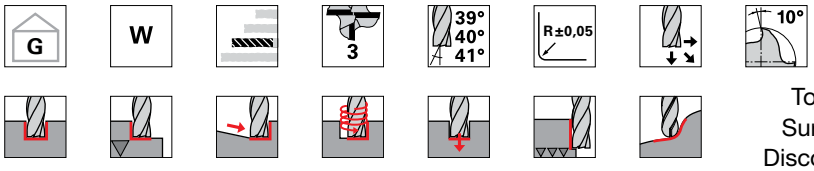
Cutting values: Slotting and HPC-roughing* (detailed cutting values see p. 269)

ISO Code	Hardness***	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 3	6	8	10	12	16	20	25
N Aluminium	≤ 3% Si	1xd	1xd	600	0.045	0.05	0.065	0.08	0.12	0.15	0.18	0.25
	≤ 7% Si	1xd	1xd	280	0.03	0.045	0.05	0.065	0.08	0.12	0.15	0.18

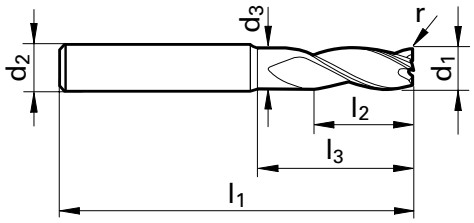
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life
** for trochoidal milling and imachining with a_p 2xd and a_e 0.15xd the cutting speed and feed rate can be increased by 50 %
*** as an option we can provide our Carbo-coating as a special tool for soft and sticky aluminium alloys and plastics

Ratio end mills Alu RF 100 A

centre cutting



	HA	HB
Tool material	Solid carbide	
Surface finish	bright	bright
Discount group	106	106
Guhring no.	**3599**	**6729**



Code no.	d1 e8	d2 h6	d3	l1	l2	l3	r	Z	Availability	
	mm	mm	mm	mm	mm	mm	mm			
25.020	25.000	25.000	24.000	121.00	45.00	63.00	2.00	3	●	●
25.030	25.000	25.000	24.000	121.00	45.00	63.00	3.00	3	●	●
25.040	25.000	25.000	24.000	121.00	45.00	63.00	4.00	3	●	●

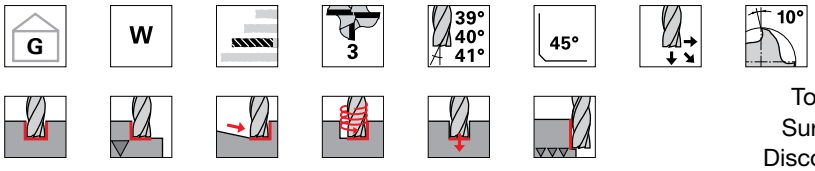
Cutting values: Slotting and HPC-roughing* (detailed cutting values see p. 269)

ISO Code	Hardness***	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 3	6	8	10	12	16	20	25
N Aluminium	≤ 3% Si	1xd	1xd	600	0.045	0.05	0.065	0.08	0.12	0.15	0.18	0.25
	≤ 7% Si	1xd	1xd	280	0.03	0.045	0.05	0.065	0.08	0.12	0.15	0.18

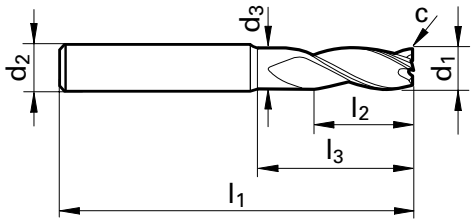
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life
** for trochoidal milling and imachining with a_p 2xd and a_e 0.15xd the cutting speed and feed rate can be increased by 50 %
*** as an option we can provide our Carbo-coating as a special tool for soft and sticky aluminium alloys and plastics

Ratio end mills Alu RF 100 A

centre cutting



	HA	HB
Tool material	Solid carbide	
Surface finish	bright	bright
Discount group	106	106
Guhring no.	**3473**	**6703**



Code no.	d1 e8	d2 h6	d3	l1	l2	l3	c	Z	Availability	
	mm	mm	mm	mm	mm	mm	mm x 45°			
6.000	6.000	6.000	5.700	65.00	13.00	28.00	0.06	3	●	●
8.000	8.000	8.000	7.700	75.00	19.00	38.00	0.08	3	●	●
10.000	10.000	10.000	9.500	80.00	22.00	38.00	0.10	3	●	●
12.000	12.000	12.000	11.500	93.00	26.00	46.00	0.12	3	●	●
16.000	16.000	16.000	15.500	108.00	32.00	58.00	0.16	3	●	●
20.000	20.000	20.000	19.500	126.00	38.00	74.00	0.20	3	●	●

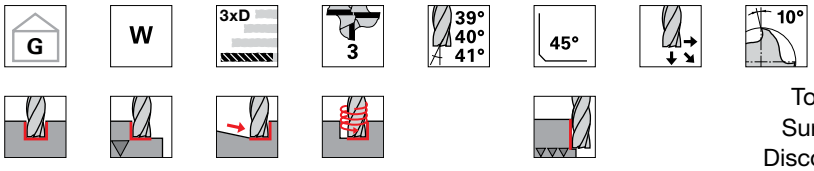
Cutting values: Slotting and HPC-roughing* (detailed cutting values see p. 269)

ISO Code	Hardness***	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 3	6	8	10	12	16	20	25
N Aluminium	≤ 3% Si	1xd	1xd	600	0.045	0.05	0.065	0.08	0.12	0.15	0.18	0.25
	≤ 7% Si	1xd	1xd	280	0.03	0.045	0.05	0.065	0.08	0.12	0.15	0.18

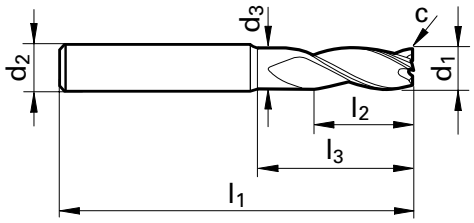
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life
** for trochoidal milling and imachining with a_p 2xd and a_e 0.15xd the cutting speed and feed rate can be increased by 50 %
*** as an option we can provide our Carbo-coating as a special tool for soft and sticky aluminium alloys and plastics

Ratio end mills Alu RF 100 A

centre cutting



	HA	HB
Tool material	Solid carbide	
Surface finish	bright	bright
Discount group	106	106
Guhring no.	**6730**	**6731**



Code no.	d1 e8	d2 h6	d3	l1	l2	l3	c	Z	Availability	
	mm	mm	mm	mm	mm	mm	mm x 45°			
5.000	5.000	6.000	4.800	57.00	15.00	19.40	0.05	3	●	●
6.000	6.000	6.000	5.700	65.00	18.00	28.00	0.06	3	●	●
8.000	8.000	8.000	7.700	75.00	24.00	38.00	0.08	3	●	●
10.000	10.000	10.000	9.500	80.00	30.00	38.00	0.10	3	●	●
12.000	12.000	12.000	11.500	93.00	36.00	46.00	0.12	3	●	●
16.000	16.000	16.000	15.500	108.00	48.00	58.00	0.16	3	●	●
20.000	20.000	20.000	19.500	126.00	60.00	74.00	0.20	3	●	●

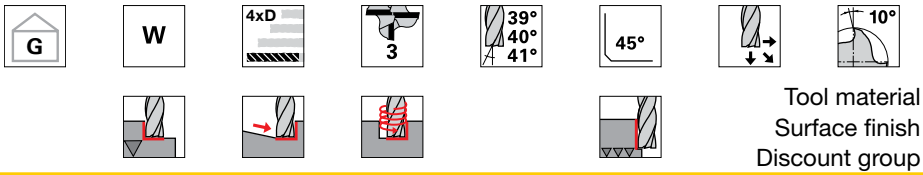
Cutting values: HPC-roughing* (detailed cutting values see p. 269)

ISO Code	Hardness***	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 3	6	8	10	12	16	20	25
N Aluminium	≤ 3% Si	3xd	0.25xd	600	0.03	0.045	0.05	0.065	0.08	0.12	0.15	0.20
	≤ 7% Si	3xd	0.2xd	280	0.025	0.03	0.045	0.05	0.065	0.08	0.12	0.18

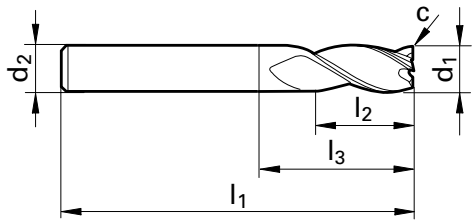
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life
** for trochoidal milling and imachining with a_p >2xd and a_e 0.15xd the cutting speed and feed rate can be increased by 50 %
*** as an option we can provide our Carbo-coating as a special tool for soft and sticky aluminium alloys and plastics

Ratio end mills Alu RF 100 A

centre cutting



	HA	HB
Tool material	Solid carbide	
Surface finish	bright	bright
Discount group	106	106
Guhring no.	**6732**	**6733**



Code no.	d1 e8	d2 h6	l1	l2	l3	c	Z	Availability	
	mm	mm	mm	mm	mm	mm x 45°			
6.000	6.000	6.000	65.00	24.00	29.00	0.06	3	●	●
8.000	8.000	8.000	75.00	32.00	39.00	0.08	3	●	●
10.000	10.000	10.000	100.00	40.00	60.00	0.10	3	●	●
12.000	12.000	12.000	100.00	48.00	55.00	0.12	3	●	●
16.000	16.000	16.000	125.00	64.00	77.00	0.16	3	●	●
20.000	20.000	20.000	150.00	80.00	100.00	0.20	3	●	●

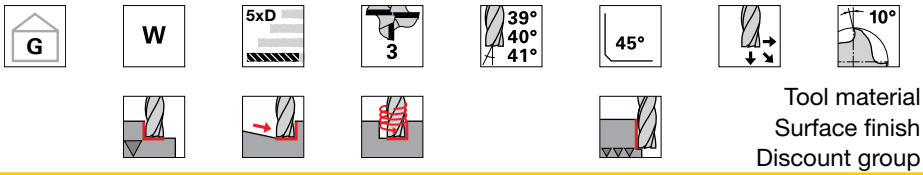
Cutting values: HPC-roughing* (detailed cutting values see p. 269)

ISO Code	Hardness***	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 3	6	8	10	12	16	20	25
N Aluminium	≤ 3% Si	3xd	0.25xd	600	0.03	0.045	0.05	0.065	0.08	0.12	0.15	0.18
	≤ 7% Si	3xd	0.2xd	280	0.025	0.03	0.045	0.05	0.065	0.08	0.12	0.15

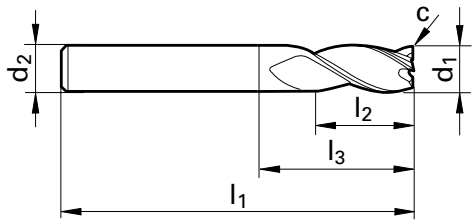
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life
** for trochoidal milling and imachining with a_p >2xd and a_e 0.15xd the cutting speed and feed rate can be increased by 50 %
*** as an option we can provide our Carbo-coating as a special tool for soft and sticky aluminium alloys and plastics

Ratio end mills Alu RF 100 A

centre cutting



	HA	HB
Tool material	Solid carbide	
Surface finish	bright	bright
Discount group	106	106
Guhring no.	**6734**	**6735**



Code no.	d1 e8	d2 h6	l1	l2	l3	c	Z	Availability	
	mm	mm	mm	mm	mm	mm x 45°			
6.000	6.000	6.000	75.00	30.00	39.00	0.06	3	●	●
8.000	8.000	8.000	86.00	40.00	50.00	0.08	3	●	●
10.000	10.000	10.000	100.00	50.00	60.00	0.10	3	●	●
12.000	12.000	12.000	120.00	60.00	75.00	0.12	3	●	●
16.000	16.000	16.000	150.00	80.00	102.00	0.16	3	●	●
20.000	20.000	20.000	175.00	100.00	125.00	0.20	3	●	●

Cutting values: HPC-roughing* (detailed cutting values see p. 269)

ISO Code	Hardness***	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 3	6	8	10	12	16	20	25
N Aluminium	≤ 3% Si	3xd	0.25xd	600	0.03	0.045	0.05	0.065	0.08	0.12	0.15	0.18
	≤ 7% Si	3xd	0.2xd	280	0.025	0.03	0.045	0.05	0.065	0.08	0.12	0.15

* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life
** for trochoidal milling and imachining with a_p >2xd and a_e 0.15xd the cutting speed and feed rate can be increased by 50 %
*** as an option we can provide our Carbo-coating as a special tool for soft and sticky aluminium alloys and plastics

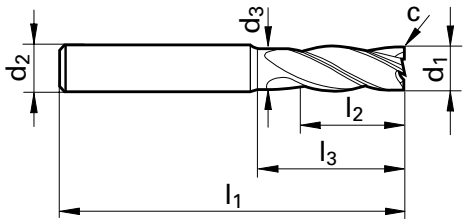
Ratio end mills Alu RF 100 A

centre cutting

DIN 6527 | W | 4 | 40° 42° | 45° | 9°

HA | HB

	HA	HB
Tool material	Solid carbide	
Surface finish	bright	bright
Discount group	106	106
Guhring no.	**3202**	**3319**



Code no.	d1 h10	d2 h6	d3	l1	l2	l3	c	Z	Availability	
	mm	mm	mm	mm	mm	mm	mm x 45°			
4.000	4.000	6.000	3.800	57.00	11.00	18.00	0.10	4	●	●
5.000	5.000	6.000	4.800	57.00	13.00	18.00	0.10	4	●	●
6.000	6.000	6.000	5.700	57.00	13.00	20.00	0.15	4	●	●
8.000	8.000	8.000	7.700	63.00	19.00	26.00	0.15	4	●	●
10.000	10.000	10.000	9.500	72.00	22.00	30.00	0.20	4	●	●
12.000	12.000	12.000	11.500	83.00	26.00	36.00	0.20	4	●	●
16.000	16.000	16.000	15.500	92.00	32.00	42.00	0.35	4	●	●
20.000	20.000	20.000	19.500	104.00	38.00	52.00	0.45	4	●	●

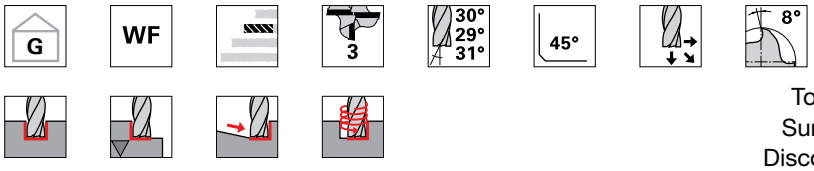
Cutting values: HPC-milling and HSC-finishing* (detailed cutting values see p. 269)

ISO Code	Hardness***	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 3	6	8	10	12	16	20	25
N Aluminium	≤ 3% Si	2xd	0.25xd	1000	0.025	0.03	0.045	0.05	0.065	0.08	0.12	0.15
	≤ 7% Si	2xd	0.2xd	400	0.025	0.03	0.045	0.05	0.065	0.08	0.12	0.15

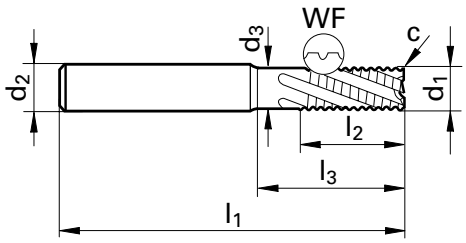
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life
** for trochoidal milling and imachining with a_p 2xd and a_e 0.15xd the cutting speed and feed rate can be increased by 50 %
*** as an option we can provide our Carbo-coating as a special tool for soft and sticky aluminium alloys and plastics

Ratio end mills Alu RF 100 A

centre cutting



	HA	HB
Tool material	Solid carbide	
Surface finish	bright	bright
Discount group	106	106
Guhring no.	**3468**	**3469**



Code no.	d1 h10	d2 h6	d3	l1	l2	l3	c	Z	Availability	
	mm	mm	mm	mm	mm	mm	mm x 45°			
6.000	6.000	6.000	5.700	57.00	13.00	20.00	0.30	3	●	●
8.000	8.000	8.000	7.700	63.00	19.00	26.00	0.30	3	●	●
10.000	10.000	10.000	9.500	72.00	22.00	30.00	0.30	3	●	●
12.000	12.000	12.000	11.500	83.00	26.00	36.00	0.50	3	●	●
16.000	16.000	16.000	15.500	92.00	32.00	42.00	0.50	3	●	●
20.000	20.000	20.000	19.500	104.00	38.00	52.00	0.50	3	●	●
25.000	25.000	25.000	24.000	121.00	45.00	63.00	0.60	3	●	●

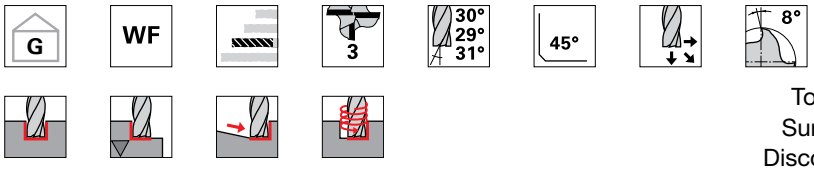
Cutting values: Slotting and HPC-roughing* (detailed cutting values see p. 270)

ISO Code	Hardness	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 3	6	8	10	12	16	20	25
N Aluminium	≤ 3% Si	1xd	1xd	600	0.018	0.035	0.045	0.06	0.07	0.09	0.1	0.15
	≤ 7% Si	1xd	1xd	280	0.015	0.03	0.04	0.05	0.06	0.07	0.09	0.13

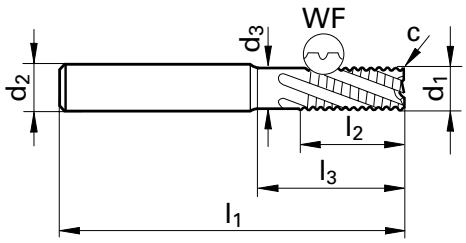
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life
** for slotting the cutting speed and feed rate should be reduced by 30 %

Ratio end mills Alu RF 100 A

centre cutting



	HA	HB
Tool material	Solid carbide	
Surface finish	bright	bright
Discount group	106	106
Guhring no.	**3470**	**3471**



Code no.	d1 h10	d2 h6	d3	l1	l2	l3	c	Z	Availability	
	mm	mm	mm	mm	mm	mm	mm x 45°			
6.000	6.000	6.000	5.700	65.00	13.00	28.00	0.30	3	●	●
8.000	8.000	8.000	7.700	75.00	19.00	38.00	0.30	3	●	●
10.000	10.000	10.000	9.500	80.00	22.00	38.00	0.30	3	●	●
12.000	12.000	12.000	11.500	93.00	26.00	46.00	0.50	3	●	●
16.000	16.000	16.000	15.500	108.00	32.00	58.00	0.50	3	●	●
20.000	20.000	20.000	19.500	126.00	38.00	74.00	0.50	3	●	●

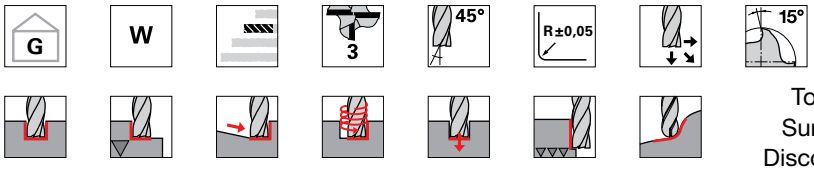
Cutting values: Slotting and HPC-roughing* (detailed cutting values see p. 270)

ISO Code	Hardness	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 3	6	8	10	12	16	20	25
N Aluminium	≤ 3% Si	1xd	1xd	600	0.018	0.035	0.045	0.06	0.07	0.09	0.1	0.15
	≤ 7% Si	1xd	1xd	280	0.015	0.03	0.04	0.05	0.06	0.07	0.09	0.13

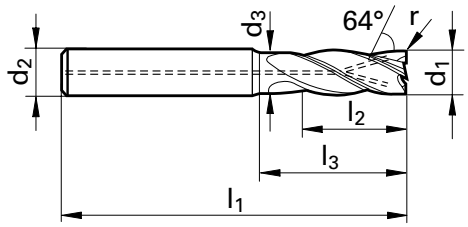
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life
** for slotting the cutting speed and feed rate should be reduced by 30 %

Slot drills GA 200 A (3-fluted)

centre cutting



Tool material	**Solid carbide**
Surface finish	bright
Discount group	106
Guhring no.	**3367**



Code no.	d1 h10	d2 h6	d3	l1	l2	l3	r	Z	Availability
	mm	mm	mm	mm	mm	mm	mm		
6.000	6.000	6.000	5.700	57.00	10.00	20.00	1.00	3	●
8.000	8.000	8.000	7.700	63.00	16.00	26.00	1.00	3	●
10.000	10.000	10.000	9.500	72.00	19.00	30.00	1.50	3	●
12.000	12.000	12.000	11.500	83.00	22.00	36.00	1.50	3	●
12.020	12.000	12.000	11.500	83.00	22.00	36.00	2.00	3	●
12.025	12.000	12.000	11.500	83.00	22.00	36.00	2.50	3	●
12.040	12.000	12.000	11.500	83.00	22.00	36.00	4.00	3	●
16.000	16.000	16.000	15.500	92.00	26.00	42.00	2.00	3	●
16.025	16.000	16.000	15.500	92.00	26.00	42.00	2.50	3	●
16.030	16.000	16.000	15.500	92.00	26.00	42.00	3.00	3	●
16.040	16.000	16.000	15.500	92.00	26.00	42.00	4.00	3	●
20.000	20.000	20.000	19.500	104.00	32.00	52.00	2.50	3	●
20.020	20.000	20.000	19.500	104.00	32.00	52.00	2.00	3	●
20.030	20.000	20.000	19.500	104.00	32.00	52.00	3.00	3	●
20.040	20.000	20.000	19.500	104.00	32.00	52.00	4.00	3	●
25.020	25.000	25.000	24.500	121.00	38.00	63.00	2.00	3	●
25.030	25.000	25.000	24.500	121.00	38.00	63.00	3.00	3	●
25.040	25.000	25.000	24.500	121.00	38.00	63.00	4.00	3	●

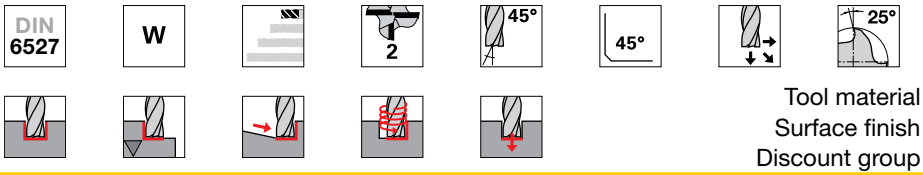
Cutting values: Slotting and HPC-roughing* (detailed cutting values see p. 271)

ISO Code	Hardness***	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 3	6	8	10	12	16	20
N Aluminium	≤ 3% Si	1xd	1xd	600	0.03	0.045	0.05	0.065	0.08	0.12	0.14
	≤ 7% Si	1xd	1xd	280	0.025	0.03	0.045	0.05	0.065	0.08	0.12

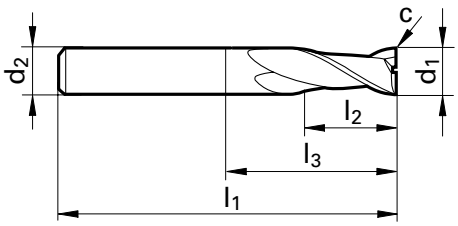
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life
** for trochoidal milling and imachining with a_p 2xd and a_e 0.15xd the cutting speed and feed rate can be increased by 50 %
*** as an option we can provide our Carbo-coating as a special tool for soft and sticky aluminium alloys and plastics

Al slot drills (2-fluted)

centre cutting



	HA	HB
Tool material	Solid carbide	
Surface finish	bright	bright
Discount group	117	117
Guhring no.	**3310**	**3126**



Code no.	d1 e8	d2 h6	l1	l2	l3	c	Z	Availability	
	mm	mm	mm	mm	mm	mm x 45°			
3.000	3.000	6.000	50.00	4.00	7.90	0.03	2	●	●
4.000	4.000	6.000	54.00	5.00	8.90	0.03	2	●	●
5.000	5.000	6.000	54.00	6.00	11.40	0.03	2	●	●
6.000	6.000	6.000	54.00	7.00	18.00	0.03	2	●	●
8.000	8.000	8.000	58.00	9.00	22.00	0.05	2	●	●
10.000	10.000	10.000	66.00	11.00	26.00	0.05	2	●	●
12.000	12.000	12.000	73.00	12.00	28.00	0.10	2	●	●
14.000	14.000	14.000	75.00	14.00	30.00	0.10	2	●	●
16.000	16.000	16.000	82.00	16.00	34.00	0.10	2	●	●
18.000	18.000	18.000	84.00	18.00	36.00	0.10	2	●	●
20.000	20.000	20.000	92.00	20.00	42.00	0.10	2	●	●

Cutting values: Slotting and HPC-roughing* (detailed cutting values see p. 277)

ISO Code	Hardness***	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 3	6	8	10	12	16	20
N Aluminium	≤ 3% Si	1xd	1xd	600	0.03	0.045	0.05	0.065	0.08	0.12	0.14
	≤ 7% Si	1xd	1xd	280	0.025	0.03	0.045	0.05	0.065	0.08	0.12

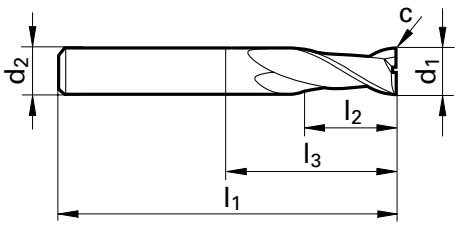
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life
** for trochoidal milling and imachining with a_p 2xd and a_e 0.15xd the cutting speed and feed rate can be increased by 50 %
*** as an option we can provide our Carbo-coating as a special tool for soft and sticky aluminium alloys and plastics

Al slot drills (2-fluted)

centre cutting

DIN 6527 | W | 2 | 45° | 45° | 25° | HA | HB

Tool material	Solid carbide	
Surface finish	bright	bright
Discount group	117	117
Guhring no.	**3309**	**3059**



Code no.	d1 e8	d2 h6	l1	l2	l3	c	Z	Availability	
	mm	mm	mm	mm	mm	mm x 45°			
3.000	3.000	6.000	57.00	7.00	10.90	0.03	2	●	●
4.000	4.000	6.000	57.00	8.00	11.90	0.03	2	●	●
5.000	5.000	6.000	57.00	10.00	15.40	0.03	2	●	●
6.000	6.000	6.000	57.00	10.00	21.00	0.03	2	●	●
8.000	8.000	8.000	63.00	16.00	27.00	0.05	2	●	●
10.000	10.000	10.000	72.00	19.00	32.00	0.05	2	●	●
12.000	12.000	12.000	83.00	22.00	38.00	0.10	2	●	●
14.000	14.000	14.000	83.00	22.00	38.00	0.10	2	●	●
14.001	14.000	16.000	92.00	26.00	44.00	0.10	2	●	
16.000	16.000	16.000	92.00	26.00	44.00	0.10	2	●	●
18.000	18.000	18.000	92.00	26.00	44.00	0.10	2	●	●
18.001	18.000	20.000	104.00	32.00	54.00	0.10	2	●	
20.000	20.000	20.000	104.00	32.00	54.00	0.10	2	●	●

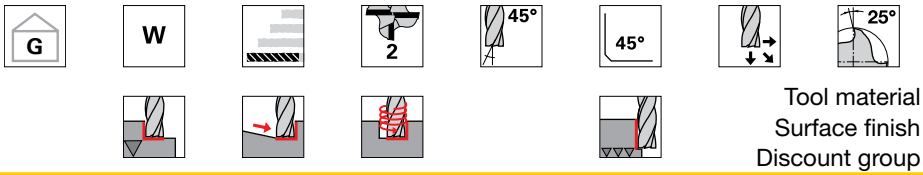
Cutting values: Slotting and HPC-roughing* (detailed cutting values see p. 277)

ISO Code	Hardness***	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 3	6	8	10	12	16	20
N Aluminium	≤ 3% Si	1xd	1xd	600	0.03	0.045	0.05	0.065	0.08	0.12	0.14
	≤ 7% Si	1xd	1xd	280	0.025	0.03	0.045	0.05	0.065	0.08	0.12

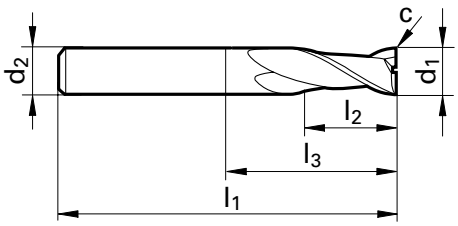
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life
** for trochoidal milling and imachining with a_p 2xd and a_e 0.15xd the cutting speed and feed rate can be increased by 50 %
*** as an option we can provide our Carbo-coating as a special tool for soft and sticky aluminium alloys and plastics

XL Al slot drills (2-fluted)

centre cutting



Tool material	**Solid carbide**
Surface finish	bright
Discount group	117
Guhring no.	**3358**



Code no.	d1 h10	d2 h6	l1	l2	l3	c	Z	Availability
	mm	mm	mm	mm	mm	mm x 45°		
5.000	5.000	5.000	75.00	30.00	47.00	0.03	2	●
6.000	6.000	6.000	75.00	30.00	39.00	0.03	2	●
8.000	8.000	8.000	100.00	40.00	64.00	0.05	2	●
10.000	10.000	10.000	100.00	40.00	60.00	0.05	2	●
12.000	12.000	12.000	150.00	45.00	105.00	0.10	2	●
16.000	16.000	16.000	150.00	65.00	102.00	0.10	2	●

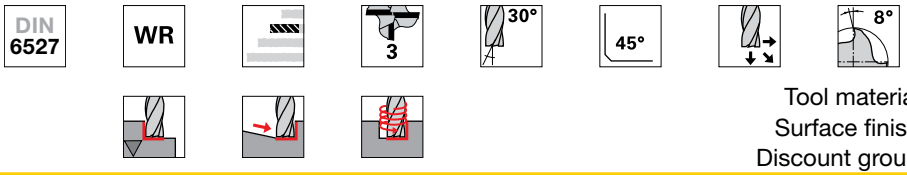
Cutting values: HPC-roughing* (detailed cutting values see p. 277)

ISO Code	Hardness***	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 3	6	8	10	12	16	20
N Aluminium	≤ 3% Si	3xd	0.1xd	400	0.03	0.045	0.05	0.065	0.08	0.12	0.15
	≤ 7% Si	3xd	0.1xd	200	0.025	0.03	0.045	0.05	0.065	0.08	0.12

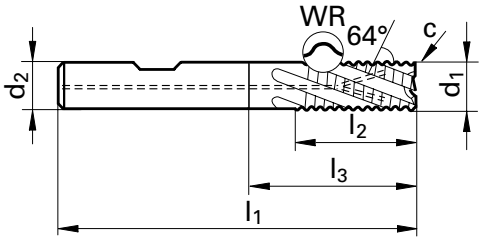
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life
** for trochoidal milling and imachining with a_p 2xd and a_e 0.15xd the cutting speed and feed rate can be increased by 50 %
*** as an option we can provide our Carbo-coating as a special tool for soft and sticky aluminium alloys and plastics

Roughing end mills GS 100 A (coarse teeth)

centre cutting



Tool material	Solid carbide	
Surface finish	bright	bright
Discount group	106	117
Guhring no.	**3364**	**3127**



Code no.	d1 h10	d2 h6	l1	l2	l3	c	Z	Availability	
	mm	mm	mm	mm	mm	mm x 45°			
6.000	6.000	6.000	57.00	10.00	21.00	0.30	3	●	●
8.000	8.000	8.000	63.00	16.00	27.00	0.30	3	●	●
10.000	10.000	10.000	72.00	19.00	32.00	0.30	3	●	●
12.000	12.000	12.000	83.00	22.00	38.00	0.50	3	●	●
14.000	14.000	14.000	83.00	22.00	38.00	0.50	3		●
16.000	16.000	16.000	92.00	26.00	44.00	0.50	3	●	●
18.000	18.000	18.000	92.00	26.00	44.00	0.50	3		●
20.000	20.000	20.000	104.00	32.00	54.00	0.50	3	●	●
25.000	25.000	25.000	121.00	45.00	65.00	0.60	3		●

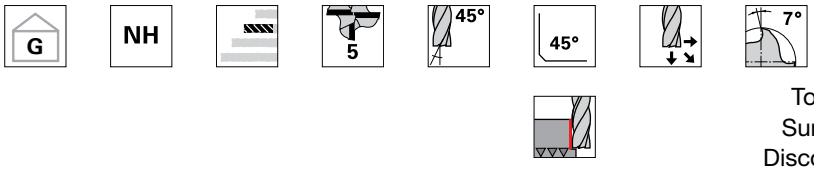
Cutting values: Slotting and HPC-roughing* **(detailed cutting values see p. 272)**

ISO Code	Hardness***	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 3	6	8	10	12	16	20	25
N Aluminium	≤ 3% Si	1xd	1xd	600	0.018	0.035	0.045	0.06	0.07	0.09	0.1	0.15
	≤ 7% Si	1xd	1xd	280	0.015	0.03	0.04	0.05	0.06	0.07	0.09	0.13

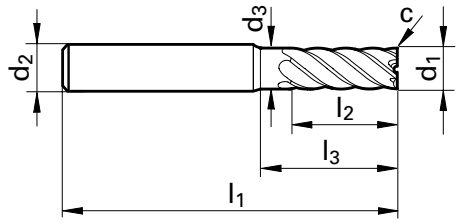
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life
** for trochoidal milling and imachining with a_p 2xd and a_e 0.15xd the cutting speed and feed rate can be increased by 50 %
*** as an option we can provide our Carbo-coating as a special tool for soft and sticky aluminium alloys and plastics

Ratio end mills Superfinish RF 100 SF

centre cutting



	HA	HB
Tool material	Solid carbide	
Surface finish	FIRE	FIRE
Discount group	106	106
Guhring no.	**6709**	**6710**



Code no.	d1 h10	d2 h6	d3	l1	l2	l3	c	Z	Availability	
	mm	mm	mm	mm	mm	mm	mm x 45°			
4.000	4.000	6.000	3.800	57.00	11.00	18.00	0.05	5	●	●
5.000	5.000	6.000	4.800	57.00	13.00	18.00	0.05	5	●	●
6.000	6.000	6.000	5.700	57.00	13.00	20.00	0.05	5	●	●
8.000	8.000	8.000	7.700	63.00	19.00	26.00	0.10	5	●	●
10.000	10.000	10.000	9.500	72.00	22.00	30.00	0.10	5	●	●
12.000	12.000	12.000	11.500	83.00	26.00	36.00	0.10	5	●	●
16.000	16.000	16.000	15.500	92.00	32.00	42.00	0.15	5	●	●
20.000	20.000	20.000	19.500	104.00	38.00	52.00	0.15	5	●	●
25.000	25.000	25.000	24.000	121.00	45.00	63.00	0.20	5	●	●

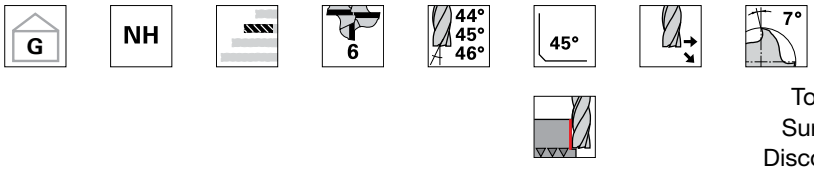
Cutting values: Finishing* and HPC-roughing** (detailed cutting values see p. 269)**

ISO Code	Hardness	Feed depth* a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 3	6	8	10	12	16	20	25
P Steel	≤ 850 N/mm²	2xd	0.3xd	280	0.016	0.03	0.04	0.055	0.065	0.08	0.095	0.14
	850 - 1400 N/mm²	2xd	0.2xd	220	0.015	0.025	0.035	0.045	0.05	0.065	0.08	0.12
M Stainless steel	≤ 750 N/mm²	2xd	0.2xd	180	0.015	0.025	0.035	0.045	0.05	0.065	0.08	0.12
	≥ 750 N/mm²	2xd	0.2xd	120	0.015	0.025	0.035	0.045	0.05	0.065	0.08	0.12
K Cast mat.	≥ 240 HB 30	2xd	0.2xd	200	0.018	0.035	0.045	0.05	0.065	0.08	0.12	0.15
N Aluminium	≤ 7% Si	2xd	0.2xd	1000	0.018	0.035	0.045	0.05	0.065	0.08	0.12	0.15

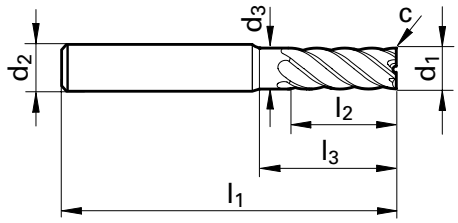
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life
** for trochoidal milling and imachining with a_e 0.1-0.2xd the cutting speed and feed rate can be increased by 50 %
*** for finishing with a_e 0.01xd the feed rate must be reduced by 25% to achieve optimal surfaces

Ratio end mills Superfinish RF 100 SF

centre cutting



	HA	HB
Tool material	Solid carbide	
Surface finish	FIRE	FIRE
Discount group	106	106
Guhring no.	**3631**	**3632**



Code no.	d1 h10	d2 h6	d3	l1	l2	l3	c	Z	Availability	
	mm	mm	mm	mm	mm	mm	mm x 45°			
8.000	8.000	8.000	7.700	63.00	19.00	26.00	0.10	6	●	●
10.000	10.000	10.000	9.500	72.00	22.00	30.00	0.10	6	●	●
12.000	12.000	12.000	11.500	83.00	26.00	36.00	0.10	6	●	●
16.000	16.000	16.000	15.500	92.00	32.00	42.00	0.15	6	●	●
20.000	20.000	20.000	19.500	104.00	38.00	52.00	0.15	6	●	●
25.000	25.000	25.000	24.000	121.00	45.00	63.00	0.20	6	●	●

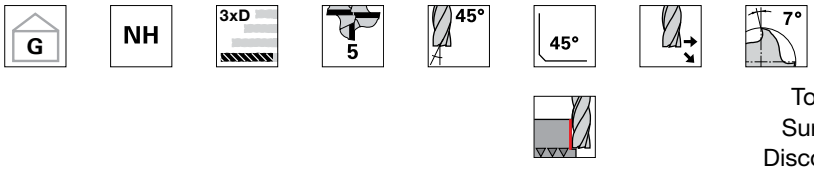
Cutting values: Finishing* and HPC-roughing** (detailed cutting values see p. 269)**

ISO Code	Hardness	Feed depth* a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 3	6	8	10	12	16	20	25
P Steel	≤ 850 N/mm²	2xd	0.3xd	280	0.016	0.03	0.04	0.055	0.065	0.08	0.095	0.14
	850 - 1400 N/mm²	2xd	0.2xd	220	0.015	0.025	0.035	0.045	0.05	0.065	0.08	0.12
M Stainless steel	≤ 750 N/mm²	2xd	0.2xd	180	0.015	0.025	0.035	0.045	0.05	0.065	0.08	0.12
	≥ 750 N/mm²	2xd	0.2xd	120	0.015	0.025	0.035	0.045	0.05	0.065	0.08	0.12
K Cast mat.	≥ 240 HB 30	2xd	0.2xd	200	0.018	0.035	0.045	0.05	0.065	0.08	0.12	0.15
N Aluminium	≤ 7% Si	2xd	0.2xd	1000	0.018	0.035	0.045	0.05	0.065	0.08	0.12	0.15

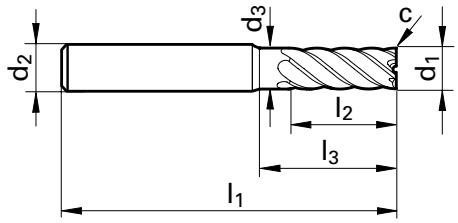
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life
** for trochoidal milling and imachining with a_e 0.1-0.2xd the cutting speed and feed rate can be increased by 50 %
*** for finishing with a_e 0.01xd the feed rate must be reduced by 25% to achieve optimal surfaces

Ratio end mills Superfinish RF 100 SF

centre cutting



	HA	HB
Tool material	Solid carbide	
Surface finish	FIRE	FIRE
Discount group	106	106
Guhring no.	**3897**	**3898**



Code no.	d1 h10	d2 h6	d3	l1	l2	l3	c	Z	Availability	
	mm	mm	mm	mm	mm	mm	mm x 45°			
4.000	4.000	6.000	3.800	65.00	12.00	26.00	0.05	5	●	●
5.000	5.000	6.000	4.800	65.00	15.00	26.00	0.05	5	●	●
6.000	6.000	6.000	5.700	65.00	18.00	28.00	0.05	5	●	●
8.000	8.000	8.000	7.700	75.00	24.00	38.00	0.10	5	●	●
10.000	10.000	10.000	9.500	80.00	30.00	38.00	0.10	5	●	●
12.000	12.000	12.000	11.500	93.00	36.00	46.00	0.10	5	●	●
16.000	16.000	16.000	15.500	108.00	48.00	58.00	0.15	5	●	●
20.000	20.000	20.000	19.500	126.00	60.00	74.00	0.15	5	●	●

Cutting values: Finishing* and HPC-roughing** (detailed cutting values see p. 269)**

ISO Code	Hardness	Feed depth* a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 3	6	8	10	12	16	20	25
P Steel	≤ 850 N/mm²	2xd	0.3xd	280	0.016	0.03	0.04	0.055	0.065	0.08	0.095	0.14
	850 - 1400 N/mm²	2xd	0.2xd	220	0.015	0.025	0.035	0.045	0.05	0.065	0.08	0.12
M Stainless steel	≤ 750 N/mm²	2xd	0.2xd	180	0.015	0.025	0.035	0.045	0.05	0.065	0.08	0.12
	≥ 750 N/mm²	2xd	0.2xd	120	0.015	0.025	0.035	0.045	0.05	0.065	0.08	0.12
K Cast mat.	≥ 240 HB 30	2xd	0.2xd	200	0.018	0.035	0.045	0.05	0.065	0.08	0.12	0.15
N Aluminium	≤ 7% Si	2xd	0.2xd	1000	0.018	0.035	0.045	0.05	0.065	0.08	0.12	0.15

* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life
** for trochoidal milling and imachining with a_e 0.1-0.2xd the cutting speed and feed rate can be increased by 50 %
*** for finishing with a_e 0.01xd the feed rate must be reduced by 25% to achieve optimal surfaces

Guhring GM 300 shrink fit technology

A secure connection: GSS shrink fit systems and shrink fit chucks

GSS 2000

Summary of advantages

- high-performance coil, therefore short change times
- automatic mode possible: GSS 2000 selects the correct heating programme automatically
- error recognition if incorrect holder/ programme selection

GÜHROJET

PCD

ADVANTAGES AT A GLANCE

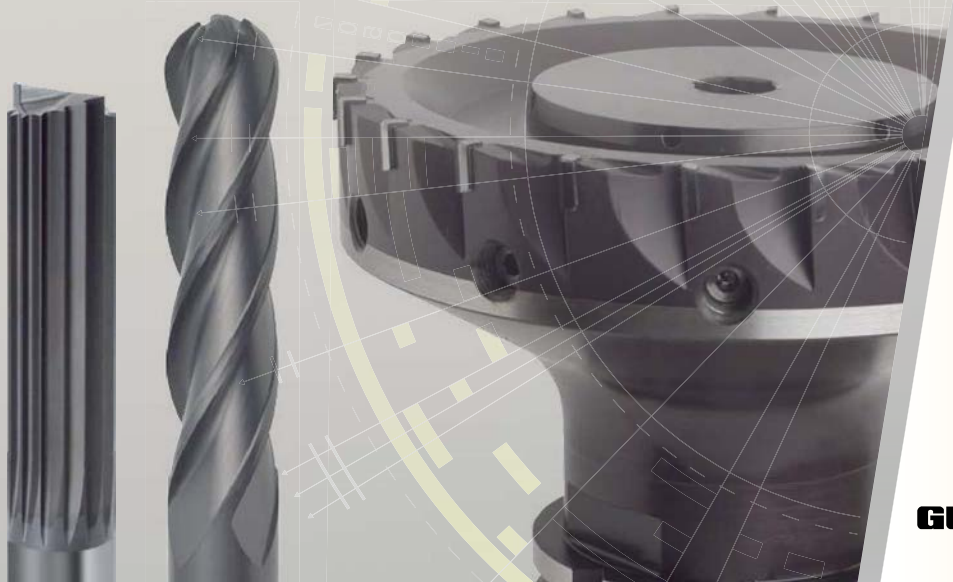
- modular design with cutting ring and ingenious clamping chuck
- axially and radially adjustable for accurate concentricity
- PCD cutting edges can be re-ground 10 times
- chip guide elements and radial coolant exit

Guhring TV
or scan in code and watch video!

DIAMOND/PCD MILLING CUTTERS

Maximum efficiency
for complex machining tasks

GÜHRING



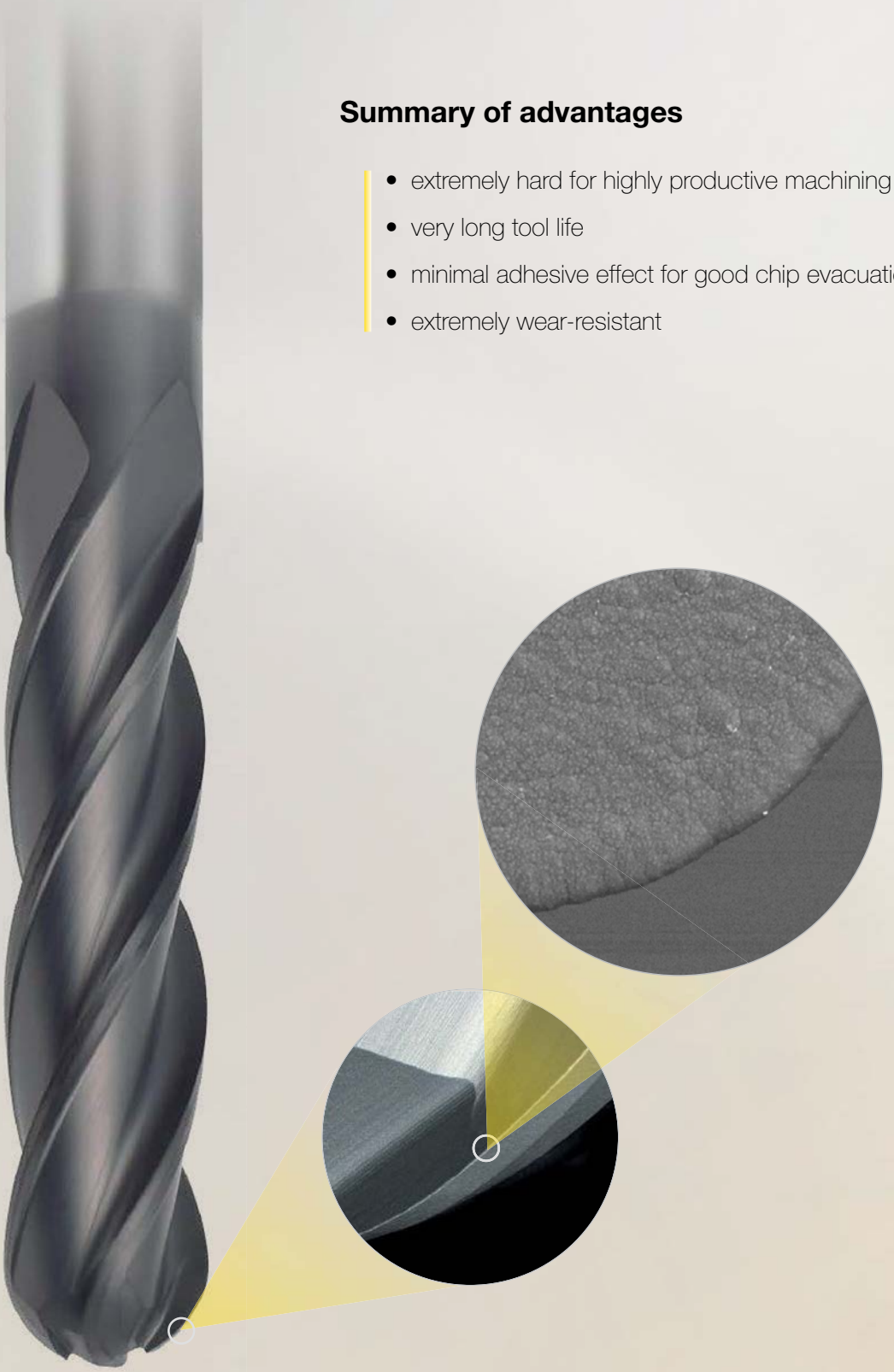
Diamond/PCD milling cutters

Helix	Z	Length	Feed	Shank design	Tool	Tool material	Surface finish	Guhring no.	Discount group	Page
XL slot drills (3-fluted) centre cutting										
30°	3			HA		Solid carbide	Cristall	**6721**	106	117
Slot drills with corner radius (2-fluted) centre cutting										
30°	2			HA		Solid carbide	Cristall	**6722**	106	118
End mills with corner radius (4-fluted) centre cutting										
30°	4			HA		Solid carbide	Cristall	**6723**	106	119
Ball nose slot drills (2-fluted) centre cutting										
30°	2			HA		Solid carbide	Cristall	**6724**	106	120
Ball nose end mills (4-fluted) centre cutting										
30°	4			HA		Solid carbide	Cristall	**6725**	106	121

Helix	Z	Length	Feed	Shank design	Material	Coating	Guhring no.	Ø range	Page
Kevlar end mills CR 100									
0°	6+			HA		Solid carbide	Cristall	**6720**	106	123
0°	6+			HA		Solid carbide	Cristall	**6717**	106	124
0°	6+			HA		Solid carbide	Cristall	**6719**	106	125
Kevlar end mills with internal cooling CR 100 Air									
0°	6+			HA		Solid carbide	Cristall	**6718**	106	126
PCD slot drills (2-fluted) centre cutting									
2-4°	2			HA		PCD	bright	**5492**	110	128
2-4°	2			~HA		PCD	bright	**5493**	110	129
PCD slot drills (3-fluted) centre cutting									
	3			HA		PCD	bright	**5495**	110	130
	3			~HA		PCD	bright	**5496**	110	131
HSC face milling cutters									
	6+					PCD	bright	**3016**	110	133

Cristall - diamond coat

for the machining of graphite, CFK, AlSi-alloys and ceramic

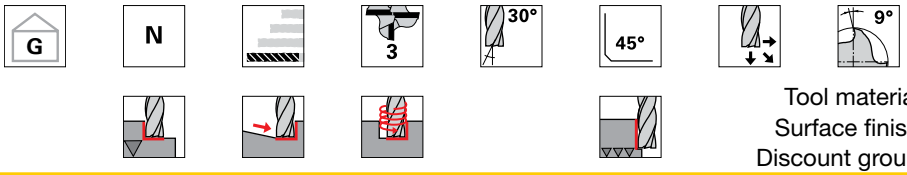


Summary of advantages

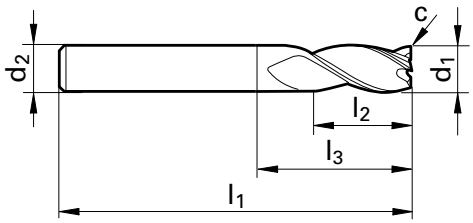
- extremely hard for highly productive machining operations
- very long tool life
- minimal adhesive effect for good chip evacuation
- extremely wear-resistant

XL slot drills (3-fluted)

centre cutting



Tool material	**Solid carbide**
Surface finish	Cristall
Discount group	106
Guhring no.	**6721**



Code no.	d1 h10	d2 h6	l1	l2	l3	c	Z	Availability
	mm	mm	mm	mm	mm	mm x 45°		
3.000	3.000	3.000	75.00	20.00	47.00	0.05	3	●
4.000	4.000	4.000	75.00	25.00	47.00	0.05	3	●
5.000	5.000	5.000	75.00	30.00	47.00	0.05	3	●
6.000	6.000	6.000	75.00	30.00	39.00	0.05	3	●
8.000	8.000	8.000	100.00	40.00	64.00	0.10	3	●
10.000	10.000	10.000	100.00	40.00	60.00	0.10	3	●
12.000	12.000	12.000	150.00	45.00	105.00	0.10	3	●
16.000	16.000	16.000	150.00	65.00	102.00	0.15	3	●

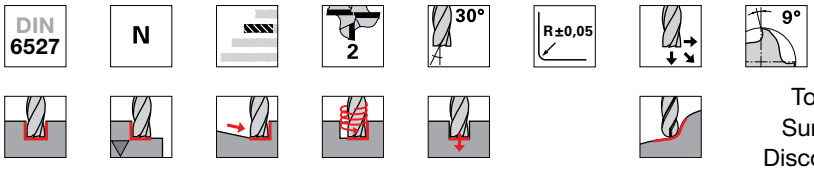
Cutting values: Slotting*, HPC-roughing and copy milling (detailed cutting values see p. 276)

Type	Characteristic	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 4	6	8	10	12	16	20
N Aluminium	up to 7% Si	-	-	-	-	-	-	-	-	-	-
	up to 17% Si	0.5xd	1xd	220	0.02	0.03	0.04	0.05	0.06	0.07	0.09
Graphite	up to 8 µm grain size	1.5xd	1xd	350	0.04	0.06	0.08	0.1	0.12	0.15	0.18
Kevlar	over 50 % fibre content	1xd	1xd	200	0.015	0.03	0.04	0.05	0.06	0.08	0.09

* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life, for graphite and Kevlar-machining air cooling
** at lower feed width the cutting speed v_c and feed rate f_z can be increased by 30 %

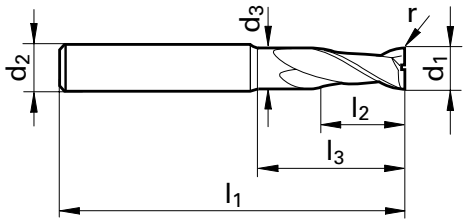
Slot drills with corner radius (2-fluted)

centre cutting



Tool material	**Solid carbide**
Surface finish	Cristall
Discount group	106
Guhring no.	**6722**

HA



Code no.	d1 h10	d2 h6	d3	l1	l2	l3	r	Z	Availability
	mm	mm	mm	mm	mm	mm	mm		
6.005	6.000	6.000	5.700	57.00	10.00	20.00	0.50	2	●
6.010	6.000	6.000	5.700	57.00	10.00	20.00	1.00	2	●
8.005	8.000	8.000	7.700	63.00	16.00	26.00	0.50	2	●
8.010	8.000	8.000	7.700	63.00	16.00	26.00	1.00	2	●
10.005	10.000	10.000	9.500	72.00	19.00	30.00	0.50	2	●
10.010	10.000	10.000	9.500	72.00	19.00	30.00	1.00	2	●
12.005	12.000	12.000	11.500	83.00	22.00	36.00	0.50	2	●
12.010	12.000	12.000	11.500	83.00	22.00	36.00	1.00	2	●

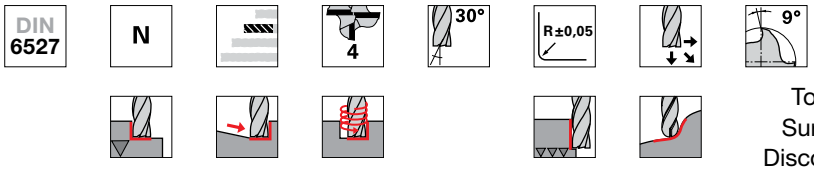
Cutting values: Slotting*, HPC-roughing and copy milling **(detailed cutting values see p. 276)**

Type	Characteristic	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 4	6	8	10	12	16	20
N Aluminium	up to 7% Si	-	-	-	-	-	-	-	-	-	-
	up to 17% Si	0.5xd	1xd	220	0.02	0.03	0.04	0.05	0.06	0.07	0.09
Graphite	up to 8 µm grain size	1.5xd	1xd	350	0.04	0.06	0.08	0.1	0.12	0.15	0.18
Kevlar	over 50 % fibre content	1xd	1xd	200	0.015	0.03	0.04	0.05	0.06	0.08	0.09

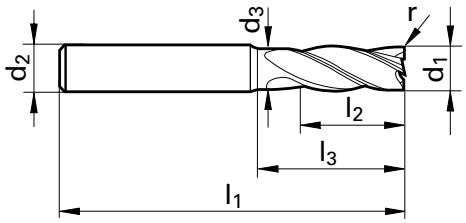
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life, for graphite and Kevlar-machining air cooling
** at lower feed width the cutting speed vc and feed rate fz can be increased by 30 %

End mills with corner radius (4-fluted)

centre cutting



Tool material	**Solid carbide**
Surface finish	Cristall
Discount group	106
Guhring no.	**6723**



Code no.	d1 h10	d2 h6	d3	l1	l2	l3	r	Z	Availability
	mm	mm	mm	mm	mm	mm	mm		
6.005	6.000	6.000	5.700	57.00	13.00	20.00	0.50	4	●
6.010	6.000	6.000	5.700	57.00	13.00	20.00	1.00	4	●
8.005	8.000	8.000	7.700	63.00	19.00	26.00	0.50	4	●
8.010	8.000	8.000	7.700	63.00	19.00	26.00	1.00	4	●
10.005	10.000	10.000	9.500	72.00	22.00	30.00	0.50	4	●
10.010	10.000	10.000	9.500	72.00	22.00	30.00	1.00	4	●
12.005	12.000	12.000	11.500	83.00	26.00	36.00	0.50	4	●
12.010	12.000	12.000	11.500	83.00	26.00	36.00	1.00	4	●

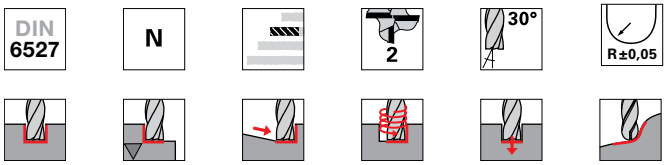
Cutting values: Slotting*, HPC-roughing and copy milling (detailed cutting values see p. 276)

Type	Characteristic	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 4	6	8	10	12	16	20
N Aluminium	up to 7% Si	-	-	-	-	-	-	-	-	-	-
	up to 17% Si	0.5xd	1xd	220	0.02	0.03	0.04	0.05	0.06	0.07	0.09
Graphite	up to 8 µm grain size	1.5xd	1xd	350	0.04	0.06	0.08	0.1	0.12	0.15	0.18
Kevlar	over 50 % fibre content	1xd	1xd	200	0.015	0.03	0.04	0.05	0.06	0.08	0.09

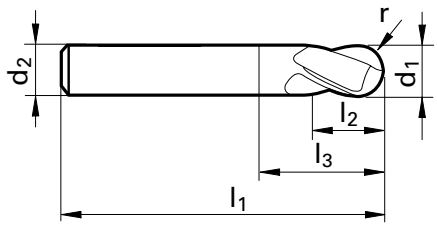
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life, for graphite and Kevlar-machining air cooling
** at lower feed width the cutting speed vc and feed rate fz can be increased by 30 %

Ball nose slot drills (2-fluted)

centre cutting



Tool material	**Solid carbide**
Surface finish	Cristall
Discount group	106
Guhring no.	**6724**



Code no.	d1 h10	d2 h6	l1	l2	l3	r	Z	Availability
	mm	mm	mm	mm	mm	mm		
3.000	3.000	6.000	57.00	7.00	11.90	1.50	2	●
4.000	4.000	6.000	57.00	8.00	13.40	2.00	2	●
5.000	5.000	6.000	57.00	10.00	16.90	2.50	2	●
6.000	6.000	6.000	57.00	10.00	21.00	3.00	2	●
8.000	8.000	8.000	63.00	16.00	27.00	4.00	2	●
10.000	10.000	10.000	72.00	19.00	32.00	5.00	2	●
12.000	12.000	12.000	83.00	22.00	38.00	6.00	2	●

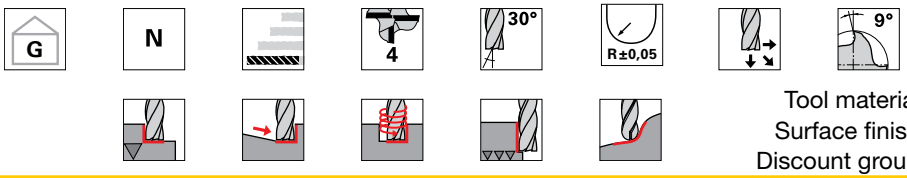
Cutting values: Slotting*, HPC-roughing and copy milling (detailed cutting values see p. 278)

Type	Characteristic	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 4	6	8	10	12	16	20
N Aluminium	up to 7% Si	-	-	-	-	-	-	-	-	-	-
	up to 17% Si	0.5xd	1xd	220	0.02	0.03	0.04	0.05	0.06	0.07	0.09
Graphite	up to 8 µm grain size	1.5xd	1xd	350	0.04	0.06	0.08	0.1	0.12	0.15	0.18
Kevlar	over 50 % fibre content	1xd	1xd	200	0.015	0.03	0.04	0.05	0.06	0.08	0.09

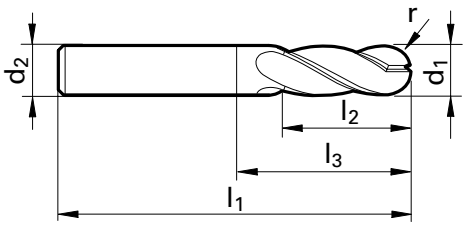
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life, for graphite and Kevlar-machining air cooling
** at lower feed width the cutting speed vc and feed rate fz can be increased by 30 %

Ball nose end mills (4-fluted)

centre cutting



Tool material	**Solid carbide**
Surface finish	Cristall
Discount group	106
Guhring no.	**6725**



Code no.	d1 h10	d2 h6	l1	l2	l3	r	Z	Availability
	mm	mm	mm	mm	mm	mm		
3.000	3.000	3.000	75.00	20.00	47.00	1.50	4	●
4.000	4.000	4.000	75.00	25.00	47.00	2.00	4	●
5.000	5.000	5.000	75.00	30.00	47.00	2.50	4	●
6.000	6.000	6.000	75.00	30.00	39.00	3.00	4	●
8.000	8.000	8.000	100.00	40.00	64.00	4.00	4	●
10.000	10.000	10.000	100.00	40.00	60.00	5.00	4	●
12.000	12.000	12.000	150.00	45.00	105.00	6.00	4	●

Cutting values: Slotting*, HPC-roughing and copy milling (detailed cutting values see p. 278)

Type	Characteristic	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 4	6	8	10	12	16	20
N Aluminium	up to 7% Si	-	-	-	-	-	-	-	-	-	-
	up to 17% Si	0.5xd	1xd	220	0.02	0.03	0.04	0.05	0.06	0.07	0.09
Graphite	up to 8 µm grain size	1.5xd	1xd	350	0.04	0.06	0.08	0.1	0.12	0.15	0.18
Kevlar	over 50 % fibre content	1xd	1xd	200	0.015	0.03	0.04	0.05	0.06	0.08	0.09

* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life, for graphite and Kevlar-machining air cooling
** at lower feed width the cutting speed vc and feed rate fz can be increased by 30 %

CR 100 – Kevlar end mills
for CFC and similar compounds

Summary of advantages

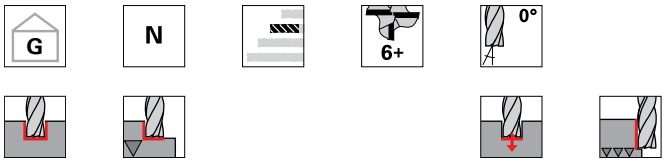
- delamination-free milling
- without face teeth for slotting and trimming
- centre cutting for slotting, trimming and oblique plunging
- with drill point specially for plunging and subsequent milling operation
- CR 100 Air without end teeth: Special, rearward air cooling exits ensure an optical removal of CFC dust

Typical delamination on a milled CFC workpiece edge

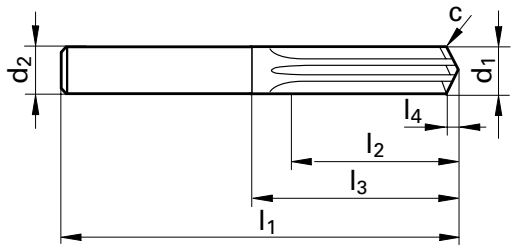
Milled CFC workpiece edge without delamination machined with a Guhring CR 100 end mill

Kevlar end mills CR 100

centre cutting



Tool material	**Solid carbide**
Surface finish	Cristall
Discount group	106
Guhring no.	**6720**



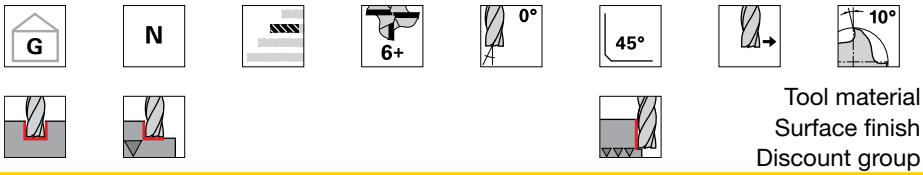
Code no.	d1 e10	d2 h6	l1	l2	l3	l4	Z	Availability
	mm	mm	mm	mm	mm	mm		
4.000	4.000	4.000	55.00	12.00	27.00	1.30	6	●
6.000	6.000	6.000	65.00	18.00	29.00	1.90	8	●
8.000	8.000	8.000	75.00	24.00	39.00	2.50	10	●
10.000	10.000	10.000	80.00	30.00	40.00	3.10	12	●
12.000	12.000	12.000	93.00	36.00	48.00	3.70	14	●
16.000	16.000	16.000	108.00	48.00	60.00	4.90	14	●

Cutting values: Slotting* and drilling* (detailed cutting values see p. 276)**

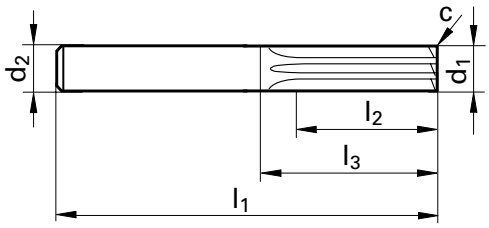
Type	Fibre content**	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 4	6	8	10	12	16	20
Kevlar	above 50 %	1xd	1xd	125	0.07	0.1	0.12	0.15	0.18	0.2	0.25

* air cooling is recommended for optimal chip evacuation and tool life
** with lower fibre content the cutting speed v_c and feed rate f_z can be increased by 20 %
*** up to a drilling depth of 1xd; with deeper holes woodpecking following every 0.5xd.

Kevlar end mills CR 100



Tool material	**Solid carbide**
Surface finish	Cristall
Discount group	106
Guhring no.	**6717**



Code no.	d1 e10	d2 h6	l1	l2	l3	c	Z	Availability
	mm	mm	mm	mm	mm	mm x 45°		
4.000	4.000	6.000	57.00	10.00	19.40	0.10	6	●
6.000	6.000	6.000	65.00	15.00	29.00	0.15	8	●
8.000	8.000	8.000	75.00	20.00	39.00	0.15	10	●
10.000	10.000	10.000	80.00	25.00	40.00	0.15	12	●
12.000	12.000	12.000	93.00	32.00	48.00	0.15	14	●
16.000	16.000	16.000	108.00	34.00	60.00	0.15	14	●

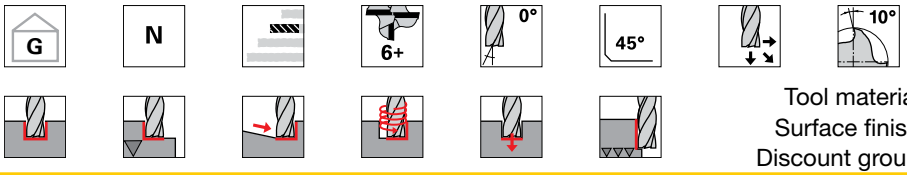
Cutting values: Slotting*, HPC-roughing and trimming **(detailed cutting values see p. 276)**

Type	Fibre content**	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 4	6	8	10	12	16	20
Kevlar	above 50 %	1xd	1xd	140	0.015	0.03	0.04	0.05	0.06	0.08	0.09
		1.5xd	0.5xd	200	0.02	0.035	0.05	0.06	0.07	0.09	0.1

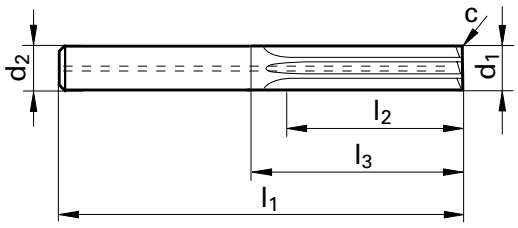
* air cooling is recommended for optimal chip evacuation and tool life
** with lower fibre content the cutting speed v_c and feed rate f_z can be increased by 20 %

Kevlar end mills CR 100

centre cutting



	HA
Tool material	Solid carbide
Surface finish	Cristall
Discount group	106
Guhring no.	6719



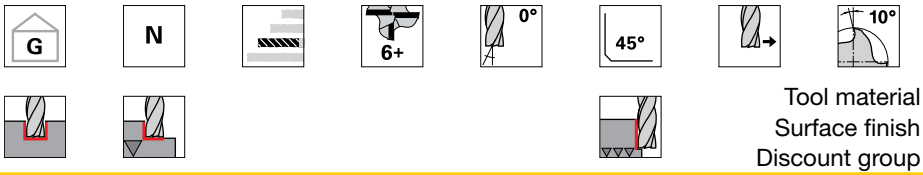
Code no.	d1 e10	d2 h6	l1	l2	l3	c	Z	Availability
	mm	mm	mm	mm	mm	mm x 45°		
4.000	4.000	6.000	57.00	10.00	19.40	0.10	6	●
6.000	6.000	6.000	65.00	15.00	29.00	0.15	8	●
8.000	8.000	8.000	75.00	20.00	39.00	0.15	10	●
10.000	10.000	10.000	80.00	25.00	40.00	0.15	12	●
12.000	12.000	12.000	93.00	32.00	48.00	0.15	14	●
16.000	16.000	16.000	108.00	34.00	60.00	0.15	14	●

Cutting values: Slotting*, HPC-roughing and trimming **(detailed cutting values see p. 276)**

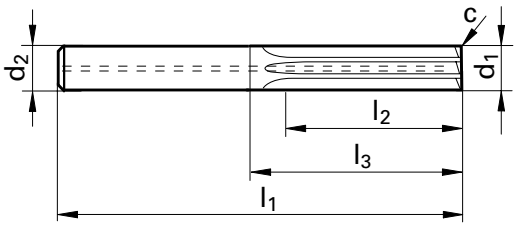
Type	Fibre content**	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 4	6	8	10	12	16	20
Kevlar	above 50 %	1xd	1xd	140	0.015	0.03	0.04	0.05	0.06	0.08	0.09
		1.5xd	0.5xd	200	0.02	0.035	0.05	0.06	0.07	0.09	0.1

* air cooling is recommended for optimal chip evacuation and tool life
** with lower fibre content the cutting speed v_c and feed rate f_z can be increased by 20 %

Kevlar end mills with internal cooling CR 100 Air



Tool material	**Solid carbide**
Surface finish	Cristall
Discount group	106
Guhring no.	**6718**



Code no.	d1 e10	d2 h6	l1	l2	l3	c	Z	Availability
	mm	mm	mm	mm	mm	mm x 45°		
6.000	6.000	6.000	70.00	24.00	34.00	0.15	8	●
8.000	8.000	8.000	80.00	32.00	44.00	0.15	10	●
10.000	10.000	10.000	90.00	40.00	50.00	0.15	12	●
12.000	12.000	12.000	110.00	48.00	65.00	0.15	14	●
16.000	16.000	16.000	130.00	64.00	82.00	0.15	14	●

Cutting values: Slotting*, HPC-roughing and trimming **(detailed cutting values see p. 276)**

Type	Fibre content**	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 4	6	8	10	12	16	20
Kevlar	above 50 %	1xd	1xd	140	0.015	0.03	0.04	0.05	0.06	0.08	0.09
		1.5xd	0.5xd	200	0.02	0.035	0.05	0.06	0.07	0.09	0.1

* air cooling is recommended for optimal chip evacuation and tool life
** with lower fibre content the cutting speed v_c and feed rate f_z can be increased by 20 %

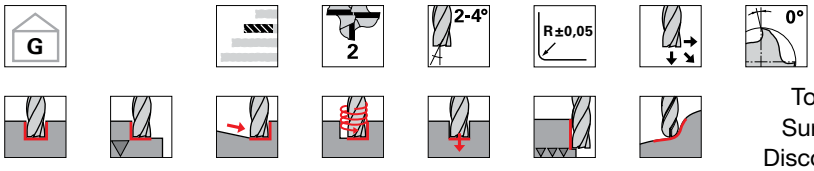
Special solutions for special requirements

Summary of advantages

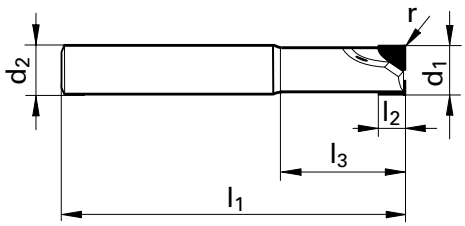
- individual solutions for the highly accurate and productive machining of small to large diameters
- special requirements necessitate special solutions, therefore, tools are manufactured taking the customer requirements into consideration
- PCD/CBN special tools enable maximum machine capacity utilisation, increasing the production capacity, tight tolerances, optimal surface qualities, maximum cutting speeds and essential process reliability
- it is also possible to reduce the set-up times for mass production components due to the longer tool life

PCD slot drills (2-fluted)

centre cutting



	HA
Tool material	PCD
Surface finish	bright
Discount group	110
Guhring no.	5492



Code no.	d1	tol. d1	d2 h6	l1	l2	l3	r	Z	Availability
	mm	mm	mm	mm	mm	mm	mm		
4.000	4.000	± 0,02	6.000	51.00	6.00	6.40	0.10	2	●
5.000	5.000	± 0,02	6.000	51.00	8.00	8.40	0.10	2	●
6.000	6.000	± 0,02	6.000	57.00	8.00	21.00	0.10	2	●
8.000	8.000	± 0,02	8.000	63.00	8.00	27.00	0.10	2	●
8.001	8.000	± 0,02	8.000	63.00	12.00	27.00	0.10	2	●
10.000	10.000	± 0,02	10.000	72.00	8.00	32.00	0.10	2	●
10.001	10.000	± 0,02	10.000	72.00	16.00	32.00	0.10	2	●
12.000	12.000	± 0,02	12.000	83.00	8.00	38.00	0.10	2	●
12.001	12.000	± 0,02	12.000	83.00	16.00	38.00	0.10	2	●
14.000	14.000	± 0,02	14.000	83.00	8.00	38.00	0.10	2	●
14.001	14.000	± 0,02	14.000	83.00	16.00	38.00	0.10	2	●
16.000	16.000	± 0,02	16.000	100.00	12.00	52.00	0.10	2	●
16.001	16.000	± 0,02	16.000	100.00	20.00	52.00	0.10	2	●
18.000	18.000	± 0,02	18.000	100.00	12.00	52.00	0.10	2	●
18.001	18.000	± 0,02	18.000	100.00	20.00	52.00	0.10	2	●
20.000	20.000	± 0,02	20.000	100.00	12.00	50.00	0.10	2	●
20.001	20.000	± 0,02	20.000	100.00	20.00	50.00	0.10	2	●

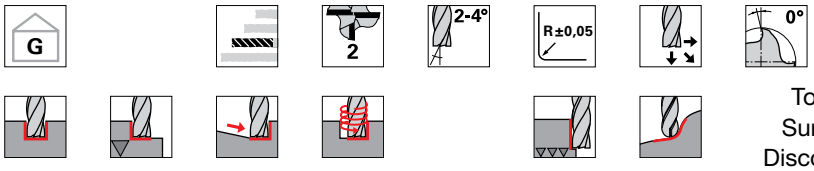
Cutting values: Slotting*, HPC-roughing and trimming (detailed cutting values see p. 276)

Type	Characteristic	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 4	6	8	10	12	16	20	25
N Aluminium	up to 7% Si	0.5xd	1xd	600	0.025	0.035	0.045	0.06	0.07	0.09	0.1	0.1
	up to 17% Si	0.5xd	1xd	260	0.02	0.03	0.04	0.05	0.06	0.07	0.09	0.09
Graphite	up to 8 µm grain size	1.5xd	1xd	450	0.04	0.06	0.08	0.1	0.12	0.15	0.18	0.18
Kevlar	above 50 % fibre content	1xd	1xd	300	0.015	0.03	0.04	0.05	0.06	0.08	0.09	0.09

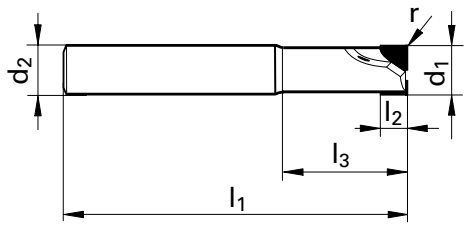
* int. cooling with soluble oil is recommended for optimal chip evacuation and tool life, for graphite and Kevlar-machining air cooling
** at lower feed width the cutting speed v_c and feed rate f_z can be increased by 30 %

PCD slot drills (2-fluted)

centre cutting



Tool material	PCD
Surface finish	bright
Discount group	110
Guhring no.	5493



Code no.	d1	tol. d1	d2 h6	l1	l2	l3	r	Z	Availability
	mm	mm	mm	mm	mm	mm	mm		
4.000	4.000	± 0,02	6.000	70.00	6.00	6.40	0.10	2	●
5.000	5.000	± 0,02	6.000	70.00	8.00	8.40	0.10	2	●
6.000	6.000	± 0,02	6.000	75.00	8.00	21.00	0.10	2	●
8.000	8.000	± 0,02	8.000	100.00	8.00	27.00	0.10	2	●
8.001	8.000	± 0,02	8.000	100.00	12.00	27.00	0.10	2	●
10.000	10.000	± 0,02	10.000	100.00	8.00	32.00	0.10	2	●
10.001	10.000	± 0,02	10.000	100.00	16.00	32.00	0.10	2	●
12.000	12.000	± 0,02	12.000	100.00	8.00	38.00	0.10	2	●
12.001	12.000	± 0,02	12.000	100.00	16.00	38.00	0.10	2	●
14.000	14.000	± 0,02	14.000	100.00	8.00	38.00	0.10	2	●
14.001	14.000	± 0,02	14.000	100.00	16.00	38.00	0.10	2	●
16.000	16.000	± 0,02	16.000	150.00	12.00	52.00	0.10	2	●
16.001	16.000	± 0,02	16.000	150.00	20.00	52.00	0.10	2	●
18.000	18.000	± 0,02	18.000	125.00	12.00	52.00	0.10	2	●
18.001	18.000	± 0,02	18.000	125.00	20.00	52.00	0.10	2	●
18.002	18.000	± 0,02	18.000	150.00	20.00	52.00	0.10	2	●
18.003	18.000	± 0,02	18.000	150.00	12.00	52.00	0.10	2	●
20.000	20.000	± 0,02	20.000	150.00	12.00	50.00	0.10	2	●
20.001	20.000	± 0,02	20.000	150.00	20.00	50.00	0.10	2	●

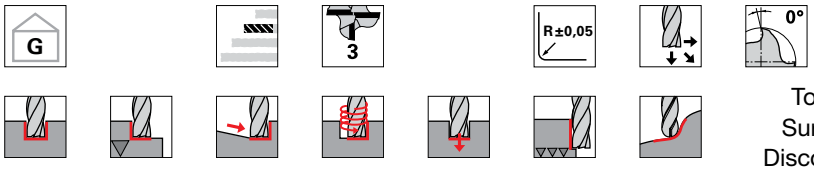
Cutting values: Slotting*, HPC-roughing and trimming (detailed cutting values see p. 276)

Type	Characteristic	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 4	6	8	10	12	16	20	25
N Aluminium	up to 7% Si	0.5xd	1xd	600	0.025	0.035	0.045	0.06	0.07	0.09	0.1	0.1
	up to 17% Si	0.5xd	1xd	260	0.02	0.03	0.04	0.05	0.06	0.07	0.09	0.09
Graphite	up to 8 µm grain size	1.5xd	1xd	450	0.04	0.06	0.08	0.1	0.12	0.15	0.18	0.18
Kevlar	above 50 % fibre content	1xd	1xd	300	0.015	0.03	0.04	0.05	0.06	0.08	0.09	0.09

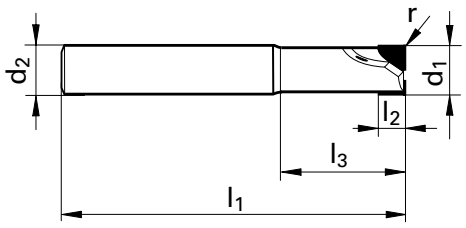
* int. cooling with soluble oil is recommended for optimal chip evacuation and tool life, for graphite and Kevlar-machining air cooling
** at lower feed width the cutting speed v_c and feed rate f_z can be increased by 30 %

PCD slot drills (3-fluted)

centre cutting



Tool material	PCD
Surface finish	bright
Discount group	110
Guhring no.	5495



Code no.	d1	tol. d1	d2 h6	l1	l2	l3	r	Z	Availability
	mm	mm	mm	mm	mm	mm	mm		
14.000	14.000	± 0,02	14.000	83.00	8.00	38.00	0.10	3	●
14.001	14.000	± 0,02	14.000	83.00	16.00	38.00	0.10	3	●
16.000	16.000	± 0,02	16.000	100.00	12.00	52.00	0.10	3	●
16.001	16.000	± 0,02	16.000	100.00	20.00	52.00	0.10	3	●
18.000	18.000	± 0,02	18.000	100.00	12.00	52.00	0.10	3	●
18.001	18.000	± 0,02	18.000	100.00	20.00	52.00	0.10	3	●
20.000	20.000	± 0,02	20.000	100.00	12.00	50.00	0.10	3	●
20.001	20.000	± 0,02	20.000	100.00	20.00	50.00	0.10	3	●

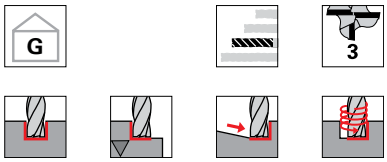
Cutting values: Slotting*, HPC-roughing and trimming (detailed cutting values see p. 276)

Type	Characteristic	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 4	6	8	10	12	16	20	25
N Aluminium	up to 7% Si	0.5xd	1xd	600	0.025	0.035	0.045	0.06	0.07	0.09	0.1	0.1
	up to 17% Si	0.5xd	1xd	260	0.02	0.03	0.04	0.05	0.06	0.07	0.09	0.09
Graphite	up to 8 µm grain size	1.5xd	1xd	450	0.04	0.06	0.08	0.1	0.12	0.15	0.18	0.18
Kevlar	above 50 % fibre content	1xd	1xd	300	0.015	0.03	0.04	0.05	0.06	0.08	0.09	0.09

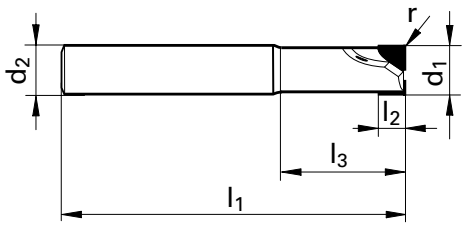
* int. cooling with soluble oil is recommended for optimal chip evacuation and tool life, for graphite and Kevlar-machining air cooling
** at lower feed width the cutting speed v_c and feed rate f_z can be increased by 30 %

PCD slot drills (3-fluted)

centre cutting



Tool material	PCD
Surface finish	bright
Discount group	110
Guhring no.	5496



Code no.	d1	tol. d1	d2 h6	l1	l2	l3	r	Z	Availability
	mm	mm	mm	mm	mm	mm	mm		
14.000	14.000	± 0,02	14.000	100.00	8.00	38.00	0.10	3	●
14.001	14.000	± 0,02	14.000	100.00	16.00	38.00	0.10	3	●
16.000	16.000	± 0,02	16.000	150.00	12.00	52.00	0.10	3	●
16.001	16.000	± 0,02	16.000	150.00	20.00	52.00	0.10	3	●
18.000	18.000	± 0,02	18.000	150.00	12.00	52.00	0.10	3	●
18.001	18.000	± 0,02	18.000	150.00	20.00	52.00	0.10	3	●
20.000	20.000	± 0,02	20.000	150.00	12.00	50.00	0.10	3	●
20.001	20.000	± 0,02	20.000	150.00	20.00	50.00	0.10	3	●

Cutting values: Slotting*, HPC-roughing and trimming (detailed cutting values see p. 276)

Type	Characteristic	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø							
					4	6	8	10	12	16	20	25
N Aluminium	up to 7% Si	0.5xd	1xd	600	0.025	0.035	0.045	0.06	0.07	0.09	0.1	0.1
	up to 17% Si	0.5xd	1xd	260	0.02	0.03	0.04	0.05	0.06	0.07	0.09	0.09
Graphite	up to 8 µm grain size	1.5xd	1xd	450	0.04	0.06	0.08	0.1	0.12	0.15	0.18	0.18
Kevlar	above 50 % fibre content	1xd	1xd	300	0.015	0.03	0.04	0.05	0.06	0.08	0.09	0.09

* int. cooling with soluble oil is recommended for optimal chip evacuation and tool life, for graphite and Kevlar-machining air cooling
** at lower feed width the cutting speed v_c and feed rate f_z can be increased by 30 %

PCD HSC face milling heads
PF 1000 G

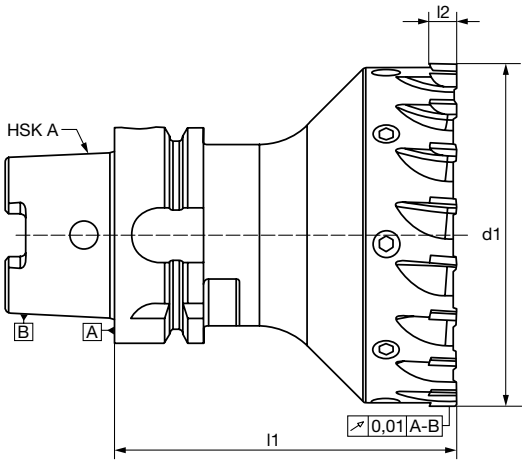
Summary of advantages

- maximum feed rates thanks to large number of teeth, i.e. Z=21 with Ø 125 mm
- available in standard range from Ø 32 mm to 150 mm
- cutting edge length 8 mm for the machining of shoulders and heels
- extremely robust tool
- maximum speeds possible, i.e. with Ø 100 mm n= 26,875 rev./min
- cutting depths to 2 mm with full cut possible
- HSK 63 holder; further interfaces available on request
- monoblock, solid insert seat, therefore, no adjustment of PCD cutting edges necessary
- integrated balancing screws for fine balancing with a thread lock
- radial coolant duct exits

HSC face milling cutters

G

Tool material	**PCD**
Surface finish	bright
Discount group	110
Guhring no.	**3016**



Code no.	d1 ±0.05	HSK-A	l1	l2	Z	Availability
	mm		mm	mm		
32.000	32.000	63	100.00	8.00	8	●
40.000	40.000	63	100.00	8.00	10	●
50.000	50.000	63	100.00	8.00	12	●
63.000	63.000	63	100.00	8.00	14	●
80.000	80.000	63	100.00	8.00	16	●
100.000	100.000	63	100.00	8.00	18	●
125.000	125.000	63	100.00	8.00	22	●

Cutting values: face milling*, HPC-roughing * (detailed cutting values see p. 276)**

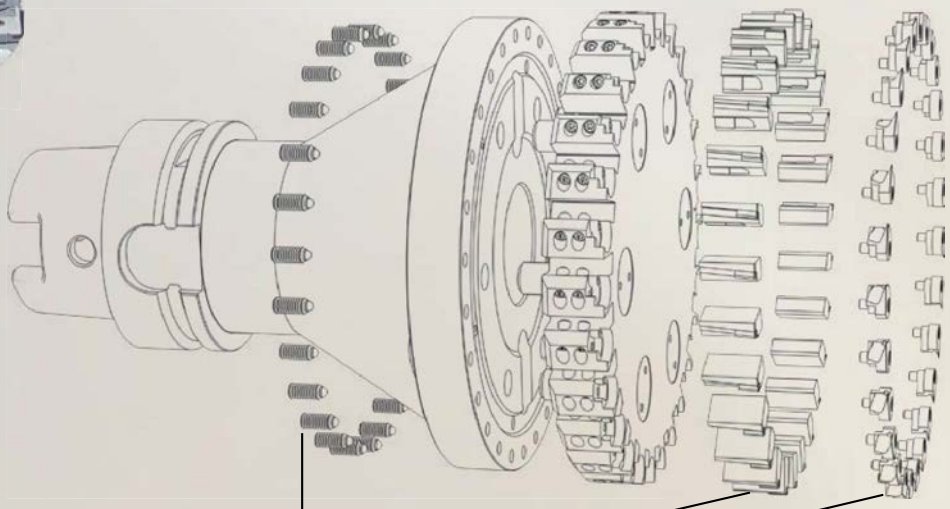
Type	Characteristic	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø							
					20	32	40	50	63	80	100	125
N Aluminium	up to 7% Si	0.3 - 3 mm	0.8xd	1600	0.1	0.11	0.12	0.15	0.15	0.15	0.15	0.15
	up to 17% Si	0.3 - 3 mm	0.8xd	500	0.06	0.08	0.09	0.1	0.1	0.1	0.1	0.1
Graphite	up to 8 µm grain size	1 - 6 mm	0.8xd	1000	0.18	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Kevlar	above 50 % fibre content	0.5 - 4 mm	0.8xd	400	0.09	0.1	0.11	0.12	0.12	0.12	0.12	0.12

* int. cooling with soluble oil is recommended for optimal chip evacuation and tool life. for graphite and Kevlar-machining air cooling
** at lower feed width the cutting speed v_c and feed rate f_z can be increased by 30 %

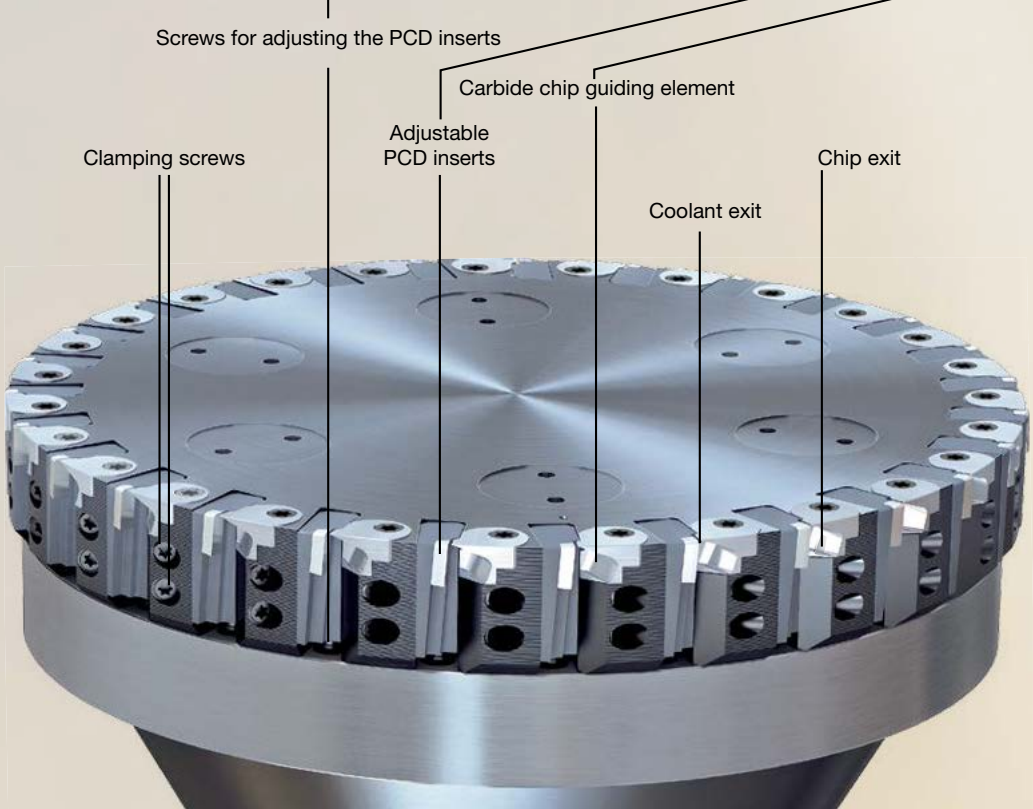
Hollfelder-Guhring
HPC-face mills

Advantages of applying these tools:

- extremely high number of cutting edges
  (i.e. dia. 63 => Z=12 / dia. 125 => Z=27)
- axial run-out of inserts µm-accurately adjustable
- PCD inserts and carbide chip guide elements exchangeable
- PCD inserts can be re-ground up to 10 times
- Extremely high feed rates
  (up to 60,000 mm/min)



Guhring TV
QR Code
Scan and watch video!

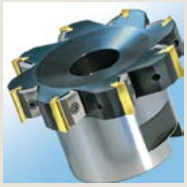


Hollfelder-Guhring
End mills programme

Programme overview:

HPC end mills Guhring no. 20004
Standard programme with maximum or reduced number of teeth
for cutting depth up to max. 2 mm
with HSK 63-A / HSK 100-A

End milling cutters Guhring no. 20000
axial µm-accurate adjustable
light and medium machining
for nominal diameter 16 - 40 mm



Face milling cutters shell milling cutter Guhring no. 20001
axial µm-accurate adjustable
light and medium machining
with maximum or reduced number of teeth, nominal diameter 40 - 160 mm

Face milling cutters monobloc Guhring no. 20002
axial µm-accurate adjustable
light and medium machining
with HSK 32 - 100 forme A

Disc milling cutters Guhring no. 20003
axial µm-accurate adjustable
Series 3108- and 6120-
for nominal diameter 80 - 200 mm

For more information, see the main catalog of Hollfelder-Guhring

Visit us
on the Internet at
http://www.hollfelder-guehring.de/!

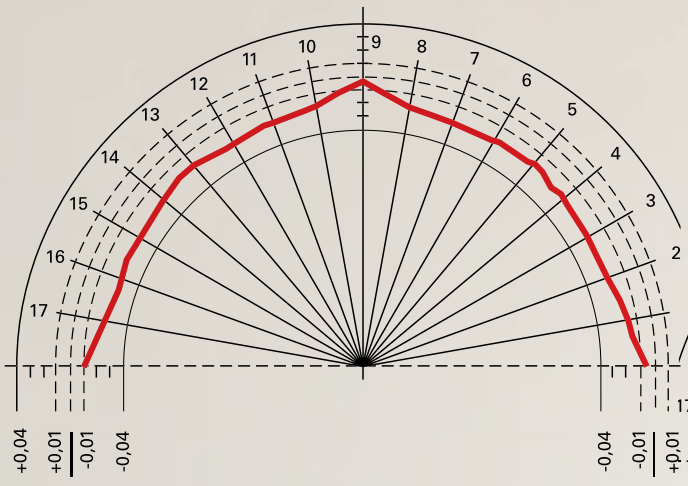
HSC

ADVANTAGES AT A GLANCE

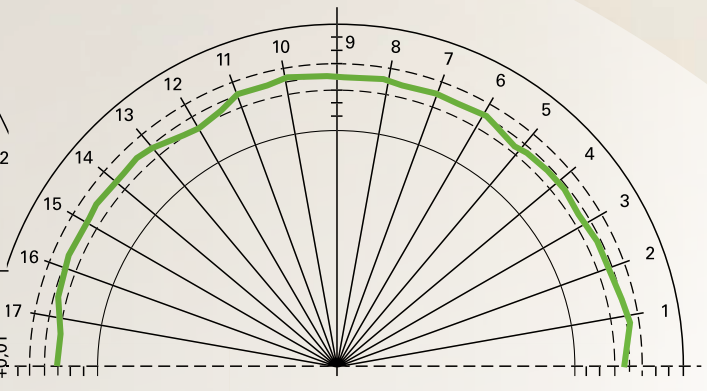
- absolutely precise diameter tolerances
- close radius tolerances
- radius point grind with constant helix correction
- cylinder and radius areas ground in one-pass process
- grinding procedure for highest surface qualities

Seamless radius area

Optimal wear-protection



Radius accuracy of competitor milling cutter (+/- 0.06 mm)



GF 500 radius in tolerance area +/- 0.01 mm

HSC RADIUS MILLING CUTTERS

GF 500 copy milling cutters
for maximum accuracy
in tool and mould making

Solid carbide HSC radius milling cutters

Helix	Z	Length	Feed	Shank design	Tool illustration	Tool material	Surface finish	Guhring no.	Dis-count group	Page
Slot drills with corner radius (2-fluted) centre cutting										
30°	2			HA		Solid carbide	bright	**3106**	117	143
30°	2			HA		Solid carbide	FIRE	**3561**	117	143
End mills with corner radius (4-fluted) centre cutting										
30°	4			HA		Solid carbide	bright	**3111**	117	144
30°	4			HA		Solid carbide	FIRE	**3562**	117	144
Hard multi-tooth end mills corner radius GH 100 H centre cutting										
55°	6			HA		Solid carbide	Signum	**3363**	106	145
Multi-tooth end mills with corner radius GH 100 U centre cutting										
45°	6+			HA		Solid carbide	FIRE	**3563**	106	146
Hard profile cutters with Torus grind GF 300 T centre cutting										
30°	4			HA		Solid carbide	Signum	**3361**	106	147
30°	4			HA		Solid carbide	Signum	**3362**	106	148
HSC-profile cutters with Torus form GF 500 T centre cutting										
30°	2			HA		Solid carbide	Signum	**3863**	106	149
30°	2			HA		Solid carbide	Signum	**3856**	106	150
30°	2			HA		Solid carbide	Signum	**3865**	106	151
30°	2			HA		Solid carbide	Signum	**3859**	106	152

Solid carbide HSC radius milling cutters

Helix	Z	Length	Feed	Shank design	Tool illustration	Tool material	Surface finish	Guhring no.	Dis-count group	Page
HSC-profile cutters with Torus form GF 500 T centre cutting										
30°	2			HA		Solid carbide	Signum	**3860**	106	153
Ball nose slot drills (2-fluted) centre cutting										
30°	2			HA		Solid carbide	FIRE	**3679**	117	154
30°	2			HB		Solid carbide	FIRE	**3049**	117	154
30°	2			HB		Solid carbide	bright	**3024**	117	155
30°	2			HA		Solid carbide	bright	**3308**	117	156
Ball nose end mills (4-fluted) centre cutting										
30°	4			HA		Solid carbide	bright	**3306**	117	157
30°	4			HA		Solid carbide	FIRE	**3727**	117	157
30°	4			HB		Solid carbide	bright	**3026**	117	158
30°	4			HB		Solid carbide	FIRE	**3050**	117	158
XL ball nose slot drills (2-fluted) centre cutting										
30°	2			HA		Solid carbide	bright	**3014**	117	159
30°	2			HA		Solid carbide	FIRE	**3030**	117	159
XL ball nose end mills (4-fluted) centre cutting										
30°	4			HA		Solid carbide	bright	**3015**	117	160
30°	4			HA		Solid carbide	FIRE	**3043**	117	160

Solid carbide HSC radius milling cutters

Helix	Z	Length	Feed	Shank design	Tool illustration	Tool material	Surface finish	Guhring no.	Dis-count group	Page
Ball nose profile cutters GF 200 B centre cutting										
30°	4			HA		Solid carbide	FIRE	**3045**	106	161
	2			HA		Solid carbide	FIRE	**3044**	106	162
Ball nose hard profile cutters GF 300 B centre cutting										
30°	2			HA		Solid carbide	Signum	**3359**	106	163
30°	2			HA		Solid carbide	Signum	**3360**	106	164
HSC-ball nose profile cutters GF 500 B centre cutting										
30°	2			HA		Solid carbide	Signum	**3854**	106	165
30°	2			HA		Solid carbide	Signum	**3866**	106	166
30°	2			HA		Solid carbide	Signum	**3848**	106	167
30°	2			HA		Solid carbide	Signum	**3855**	106	168
30°	2			HA		Solid carbide	Signum	**3849**	106	169
30°	2			HA		Solid carbide	Signum	**3853**	106	170

Solid carbide HSC radius milling cutters

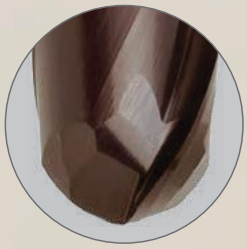
Helix	Z	Length	Feed	Shank design	Tool illustration	Tool material	Surface finish	Guhring no.	Discount group	Page
Die sinking cutter holder GF 200 WP										
	2			HA			nickel-plated	**1941**	140	171
	2			HA			nickel-plated	**1942**	140	172
Indexable inserts round										
	2					Cermet	bright	**1947**	141	173
	2					Solid carbide	FIRE	**2520**	141	173
Clamping screws for diesinking cutter holders										
								**1691**	140	173
Torx screwdriver										
								**1612**	140	174

Guhring mould and die cutters
Hard shell protection of core

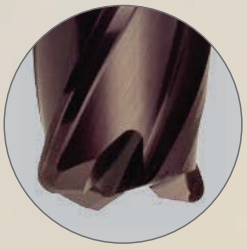
Summary of advantages

- The GF500 for machining tempered steel, stainless steel, high tensile aluminium and Titanium
- GF300 for machining hardened steel and chilled cast iron wear parts
- Now with ultra-hard Signum Coating: 5500HV
- Finely homogenised surfaces by cutting edges
- Long life through improved coating: SIGNUM

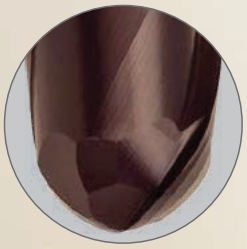
Torus cutter GF500 T roughing, finishing & copy milling up to 54 HRC i.e.: Guhring no. 3863



Radius cutter GF 500 B copy milling up to 54 HRC i.e.: Guhring no. 3866



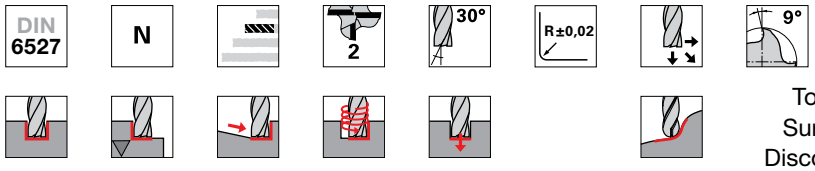
Torus cutter GF 300 T roughing, finishing & copy milling from 40-63 HRC i.e.: Guhring no. 3361



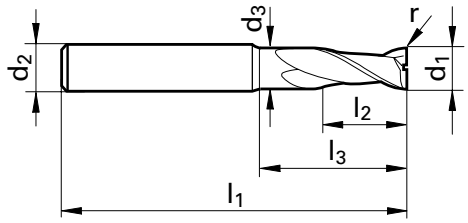
Radius cutter GF 300B copy milling from 50-63 HRC i.e.: Guhring no. 3359

Slot drills with corner radius (2-fluted)

centre cutting



	HA	HA
Tool material	Solid carbide	
Surface finish	bright	FIRE
Discount group	117	117
Guhring no.	**3106**	**3561**



Code no.	d1 h10	d2 h6	d3	l1	l2	l3	r	Z	Availability	
	mm	mm	mm	mm	mm	mm	mm			
6.005	6.000	6.000	5.700	57.00	10.00	20.00	0.50	2	●	●
6.010	6.000	6.000	5.700	57.00	10.00	20.00	1.00	2	●	●
8.005	8.000	8.000	7.700	63.00	16.00	26.00	0.50	2	●	●
8.010	8.000	8.000	7.700	63.00	16.00	26.00	1.00	2	●	●
8.015	8.000	8.000	7.700	63.00	16.00	26.00	1.50	2	●	●
8.020	8.000	8.000	7.700	63.00	16.00	26.00	2.00	2	●	●
10.005	10.000	10.000	9.500	72.00	19.00	30.00	0.50	2	●	●
10.010	10.000	10.000	9.500	72.00	19.00	30.00	1.00	2	●	●
10.015	10.000	10.000	9.500	72.00	19.00	30.00	1.50	2	●	●
10.020	10.000	10.000	9.500	72.00	19.00	30.00	2.00	2	●	●
12.005	12.000	12.000	11.500	83.00	22.00	36.00	0.50	2	●	●
12.010	12.000	12.000	11.500	83.00	22.00	36.00	1.00	2	●	●
12.015	12.000	12.000	11.500	83.00	22.00	36.00	1.50	2	●	●
12.020	12.000	12.000	11.500	83.00	22.00	36.00	2.00	2	●	●
16.010	16.000	16.000	15.500	92.00	26.00	42.00	1.00	2	●	●
16.015	16.000	16.000	15.500	92.00	26.00	42.00	1.50	2	●	●
16.020	16.000	16.000	15.500	92.00	26.00	42.00	2.00	2	●	●
20.010	20.000	20.000	19.500	104.00	32.00	52.00	1.00	2	●	●
20.015	20.000	20.000	19.500	104.00	32.00	52.00	1.50	2	●	●
20.020	20.000	20.000	19.500	104.00	32.00	52.00	2.00	2	●	●

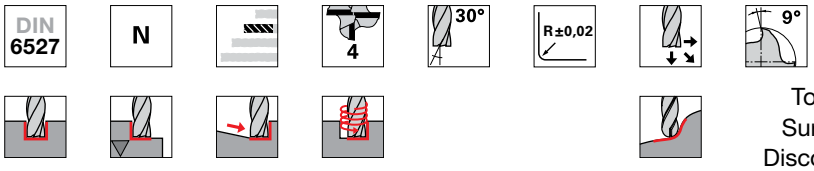
Cutting values: Slotting* and roughing (detailed cutting values see p. 276)

ISO Code	Hardness	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 2	4	6	8	10	12	16	20
P Steel	≤ 850 N/mm²	0.5xd	1xd	125	0.013	0.018	0.025	0.032	0.042	0.049	0.063	0.07
	850 - 1400 N/mm²	0.5xd	1xd	95	0.01	0.015	0.02	0.024	0.033	0.039	0.048	0.057
M Stainless steel	≤ 750 N/mm²	0.5xd	1xd	85	0.01	0.015	0.02	0.024	0.033	0.039	0.048	0.057
	≥ 750 N/mm²	0.5xd	1xd	50	0.007	0.01	0.015	0.018	0.027	0.03	0.039	0.048
K Cast mat.	≥ 240 HB 30	0.5xd	1xd	100	0.01	0.015	0.02	0.024	0.033	0.039	0.048	0.057
N Aluminium	≤ 7% Si	1xd	1xd	160	0.013	0.018	0.025	0.032	0.042	0.049	0.063	0.07

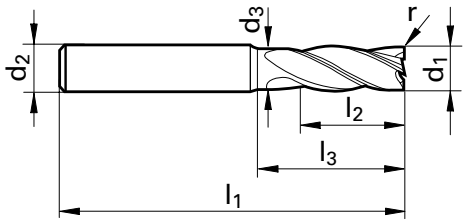
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life
** for finishing with a_e = 0.02xd the cutting speed v_c can be incressed by 50 %
All recommendations are valid for coated tools. For bright milling cutters please v_c -40% and f_z -25% !

End mills with corner radius (4-fluted)

centre cutting



	HA	HA
Tool material	Solid carbide	
Surface finish	bright	FIRE
Discount group	117	117
Guhring no.	**3111**	**3562**



Code no.	d1 h10	d2 h6	d3	l1	l2	l3	r	Z	Availability	
	mm	mm	mm	mm	mm	mm	mm			
6.005	6.000	6.000	5.700	57.00	13.00	20.00	0.50	4	●	●
6.010	6.000	6.000	5.700	57.00	13.00	20.00	1.00	4	●	●
8.005	8.000	8.000	7.700	63.00	19.00	26.00	0.50	4	●	●
8.010	8.000	8.000	7.700	63.00	19.00	26.00	1.00	4	●	●
8.015	8.000	8.000	7.700	63.00	19.00	26.00	1.50	4	●	●
8.020	8.000	8.000	7.700	63.00	19.00	26.00	2.00	4	●	●
10.005	10.000	10.000	9.500	72.00	22.00	30.00	0.50	4	●	●
10.008	10.000	10.000	9.500	72.00	22.00	30.00	0.80	4	●	●
10.010	10.000	10.000	9.500	72.00	22.00	30.00	1.00	4	●	●
10.015	10.000	10.000	9.500	72.00	22.00	30.00	1.50	4	●	●
10.020	10.000	10.000	9.500	72.00	22.00	30.00	2.00	4	●	●
12.005	12.000	12.000	11.500	83.00	26.00	36.00	0.50	4	●	●
12.008	12.000	12.000	11.500	83.00	26.00	36.00	0.80	4	●	●
12.010	12.000	12.000	11.500	83.00	26.00	36.00	1.00	4	●	●
12.015	12.000	12.000	11.500	83.00	26.00	36.00	1.50	4	●	●
12.020	12.000	12.000	11.500	83.00	26.00	36.00	2.00	4	●	●
16.010	16.000	16.000	15.500	92.00	32.00	42.00	1.00	4	●	●
16.015	16.000	16.000	15.500	92.00	32.00	42.00	1.50	4	●	●
16.020	16.000	16.000	15.500	92.00	32.00	42.00	2.00	4	●	●
20.010	20.000	20.000	19.500	104.00	38.00	52.00	1.00	4	●	●
20.015	20.000	20.000	19.500	104.00	38.00	52.00	1.50	4	●	●
20.020	20.000	20.000	19.500	104.00	38.00	52.00	2.00	4	●	●

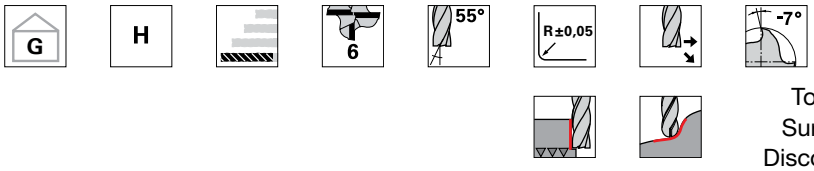
Cutting values: Roughing* and finishing (detailed cutting values see p. 276)

ISO Code	Hardness	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 2	4	6	8	10	12	16	20
P Steel	≤ 850 N/mm²	1.5xd	0.5xd	125	0.013	0.018	0.025	0.032	0.042	0.049	0.063	0.07
	850 - 1400 N/mm²	1.5xd	0.5xd	95	0.01	0.015	0.02	0.024	0.033	0.039	0.048	0.057
M Stainless steel	≤ 750 N/mm²	1.5xd	0.5xd	85	0.01	0.015	0.02	0.024	0.033	0.039	0.048	0.057
	≥ 750 N/mm²	1.5xd	0.2xd	50	0.007	0.01	0.015	0.018	0.027	0.03	0.039	0.048
K Cast mat.	≥ 240 HB 30	1.5xd	0.5xd	100	0.01	0.015	0.02	0.024	0.033	0.039	0.048	0.057
N Aluminium	≤ 7% Si	1.5xd	0.3xd	160	0.013	0.018	0.025	0.032	0.042	0.049	0.063	0.07

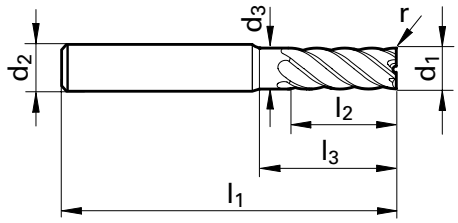
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life
** for finishing with a_e = 0.02xd the cutting speed v_c can be incressed by 50 %
All recommendations are valid for coated tools. For bright milling cutters please v_c -40% and f_z -25%!

Hard multi-tooth end mills corner radius GH 100 H

centre cutting



Tool material	**Solid carbide**
Surface finish	Signum
Discount group	106
Guhring no.	**3363**



Code no.	d1 h10	d2 h6	d3	l1	l2	l3	r	Z	Availability
	mm	mm	mm	mm	mm	mm	mm		
6.000	6.000	6.000	5.700	75.00	13.00	38.00	0.50	6	●
8.000	8.000	8.000	7.700	100.00	19.00	63.00	0.50	6	●
10.000	10.000	10.000	9.500	100.00	22.00	58.00	0.50	6	●
12.000	12.000	12.000	11.500	150.00	26.00	103.00	1.00	6	●
16.000	16.000	16.000	15.500	150.00	32.00	100.00	1.00	6	●

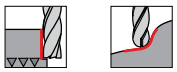
Cutting values: Finishing* and HPC-roughing** (detailed cutting values see p. 271)**

ISO Code	Hardness	Feed depth* a_p	Feed width.** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 3	6	8	10	12	16	20	25
P Steel	≤ 850 N/mm²	-	-	-	-	-	-	-	-	-	-	-
	850 - 1400 N/mm²	2xd	0.05xd	180	0.012	0.024	0.032	0.04	0.048	0.056	0.072	0.104
K Cast mat.	≥ 240 HB 30	2xd	0.05xd	160	0.016	0.03	0.04	0.055	0.065	0.08	0.095	0.14
H Hardened steel	≤ 54 HRC	1.5xd	0.05xd	120	0.012	0.024	0.032	0.04	0.048	0.056	0.072	0.104
	≤ 63 HRC	1.5xd	0.02xd	90	0.01	0.015	0.025	0.035	0.042	0.05	0.08	0.09

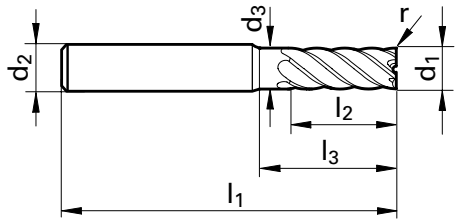
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life, for hard machining air cooling is recommended
** for trochoidal milling and imachining with a_e 0.02-0.1xd the cutting speed v_c and feed rate can be increased by 50 %
*** for finishing with a_e 0.01xD the feed rate must be reduced to achieve optimal surfaces

Multi-tooth end mills with corner radius GH 100 U

centre cutting



Tool material	**Solid carbide**
Surface finish	FIRE
Discount group	106
Guhring no.	**3563**



Code no.	d1 h10	d2 h6	d3	l1	l2	l3	r	Z	Availability
	mm	mm	mm	mm	mm	mm	mm		
6.005	6.000	6.000	5.700	57.00	13.00	20.00	0.50	6	●
6.010	6.000	6.000	5.700	57.00	13.00	20.00	1.00	6	●
8.005	8.000	8.000	7.700	63.00	19.00	26.00	0.50	6	●
8.010	8.000	8.000	7.700	63.00	19.00	26.00	1.00	6	●
8.015	8.000	8.000	7.700	63.00	19.00	26.00	1.50	6	●
8.020	8.000	8.000	7.700	63.00	19.00	26.00	2.00	6	●
10.005	10.000	10.000	9.500	72.00	22.00	30.00	0.50	6	●
10.010	10.000	10.000	9.500	72.00	22.00	30.00	1.00	6	●
10.015	10.000	10.000	9.500	72.00	22.00	30.00	1.50	6	●
10.020	10.000	10.000	9.500	72.00	22.00	30.00	2.00	6	●
12.005	12.000	12.000	11.500	83.00	26.00	36.00	0.50	6	●
12.010	12.000	12.000	11.500	83.00	26.00	36.00	1.00	6	●
12.015	12.000	12.000	11.500	83.00	26.00	36.00	1.50	6	●
12.020	12.000	12.000	11.500	83.00	26.00	36.00	2.00	6	●
16.005	16.000	16.000	15.500	92.00	32.00	42.00	0.50	6	●
16.010	16.000	16.000	15.500	92.00	32.00	42.00	1.00	6	●
16.015	16.000	16.000	15.500	92.00	32.00	42.00	1.50	6	●
16.020	16.000	16.000	15.500	92.00	32.00	42.00	2.00	6	●
20.005	20.000	20.000	19.500	104.00	38.00	52.00	0.50	8	●
20.010	20.000	20.000	19.500	104.00	38.00	52.00	1.00	8	●
20.015	20.000	20.000	19.500	104.00	38.00	52.00	1.50	8	●
20.020	20.000	20.000	19.500	104.00	38.00	52.00	2.00	8	●

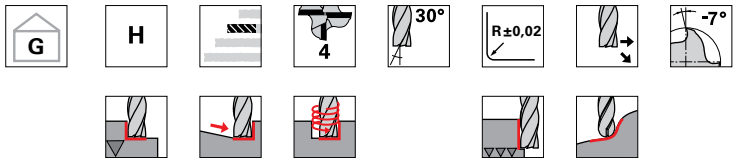
Cutting values: Finishing* and HPC-roughing** (detailed cutting values see p. 271)**

ISO Code	Hardness	Feed depth* a_p	Feed width.** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 3	6	8	10	12	16	20	25
P Steel	≤ 850 N/mm²	2xd	0.2xd	280	0.014	0.027	0.036	0.05	0.059	0.072	0.086	0.12
	850 - 1400 N/mm²	2xd	0.15xd	180	0.012	0.024	0.032	0.04	0.048	0.056	0.072	0.104
M Stainless steel	≤ 750 N/mm²	2xd	0.15xd	150	0.014	0.027	0.036	0.045	0.054	0.063	0.081	0.11
	≥ 750 N/mm²	2xd	0.1xd	100	0.014	0.027	0.036	0.045	0.054	0.063	0.081	0.11
K Cast mat.	≥ 240 HB 30	2xd	0.2xd	160	0.016	0.03	0.04	0.055	0.065	0.08	0.095	0.14
N Aluminium	≤ 7% Si	2xd	0.15xd	280	0.018	0.035	0.045	0.05	0.065	0.08	0.12	0.15

* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life
** for trochoidal milling and imachining with a_e 0.1-0.2xd the cutting speed v_c and feed rate can be increased by 50 %
*** for finishing with a_e 0.01xD the feed rate must be reduced to achieve optimal surfaces

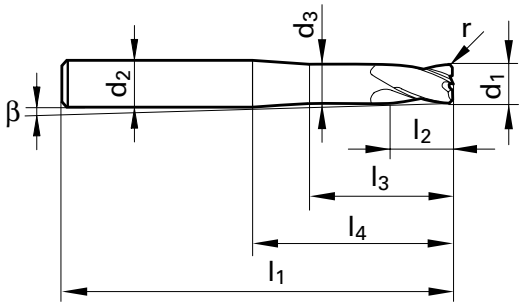
Hard profile cutters with Torus grind GF 300 T

centre cutting



Tool material	**Solid carbide**
Surface finish	Signum
Discount group	106
Guhring no.	**3361**

HA



Code no.	d1 h8	d2 h6	d3	l1	l2	l3	l4	r	β	Z	Availability
	mm	mm	mm	mm	mm	mm	mm	mm	°		
3.000	3.000	6.000	2.700	57.00	5.00	10.00	21.00	0.50	4.20	4	●
4.000	4.000	6.000	3.700	57.00	6.00	13.40	21.00	0.50	2.80	4	●
5.000	5.000	6.000	4.700	57.00	8.00	15.90	21.00	0.50	1.40	4	●
6.000	6.000	6.000	5.700	57.00	9.00	20.00	21.00	1.00	-	4	●
8.000	8.000	8.000	7.700	63.00	12.00	26.00	27.00	1.00	-	4	●
10.000	10.000	10.000	9.500	72.00	15.00	30.00	32.00	1.50	-	4	●
12.000	12.000	12.000	11.500	83.00	18.00	36.00	38.00	1.50	-	4	●
16.000	16.000	16.000	15.500	92.00	24.00	42.00	44.00	2.00	-	4	●

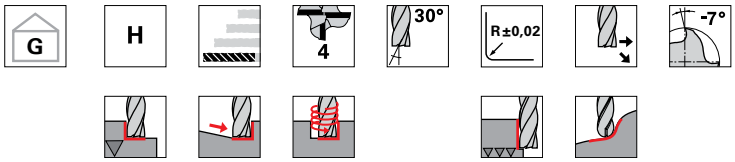
Cutting values: HPC-roughing and HSC copy milling* (detailed cutting values see p. 275)

ISO Code	Hardness	Feed depth* a_p	Feed width.** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 2	3	4	6	8	10	12	16
P Steel	≤ 850 N/mm²	-	-	-	-	-	-	-	-	-	-	-
	850 - 1400 N/mm²	0.2xd	0.5xd	200	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
K Cast mat.	≥ 240 HB 30	0.2xd	0.5xd	200	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
H Hardened steel	≤ 54 HRC	0.1xd	0.5xd	140	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.1
	≤ 63 HRC	0.05xd	0.3xd	80	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.1

*dry machining with air cooling is recommended for optimal chip evacuation and tool life
** for HSC copy milling and imachining with a_e = 0.1xd the cutting speed v_c can be increased by 50 %

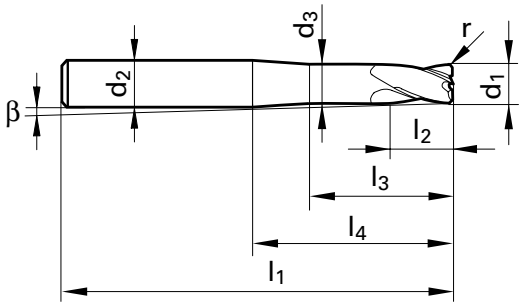
Hard profile cutters with Torus grind GF 300 T

centre cutting



Tool material	**Solid carbide**
Surface finish	Signum
Discount group	106
Guhring no.	**3362**

HA



Code no.	d1 h8	d2 h6	d3	l1	l2	l3	l4	r	β	Z	Availability
	mm	mm	mm	mm	mm	mm	mm	mm	°		
6.000	6.000	6.000	5.700	75.00	9.00	38.00	39.00	1.00	-	4	●
8.000	8.000	8.000	7.700	100.00	12.00	63.00	64.00	1.00	-	4	●
10.000	10.000	10.000	9.500	100.00	15.00	58.00	60.00	1.50	-	4	●
12.000	12.000	12.000	11.500	150.00	18.00	103.00	105.00	1.50	-	4	●
16.000	16.000	16.000	15.500	150.00	24.00	100.00	102.00	2.00	-	4	●

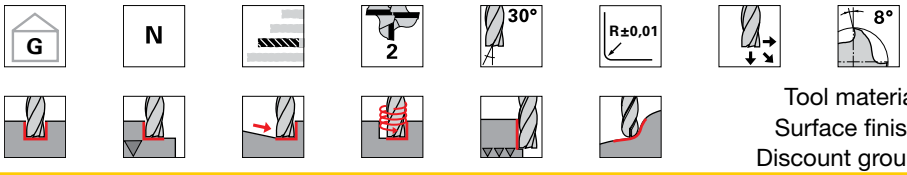
Cutting values: HPC-roughing and HSC copy milling* (detailed cutting values see p. 275)

ISO Code	Hardness	Feed depth* a_p	Feed width.** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 2	3	4	6	8	10	12	16
P Steel	≤ 850 N/mm²	-	-	-	-	-	-	-	-	-	-	-
	850 - 1400 N/mm²	0.2xd	0.5xd	200	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
K Cast mat.	≥ 240 HB 30	0.2xd	0.5xd	200	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
H Hardened steel	≤ 54 HRC	0.1xd	0.5xd	140	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.1
	≤ 63 HRC	0.05xd	0.3xd	80	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.1

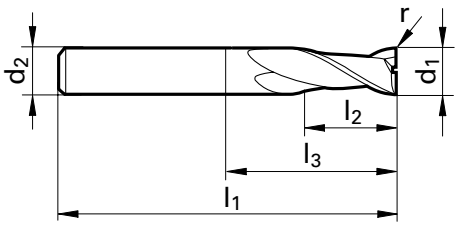
* dry machining with air cooling is recommended for optimal chip evacuation and tool life
** for HSC copy milling and imachining with a_e = 0.1xd the cutting speed v_c can be increased by 50 %

HSC-profile cutters with Torus form GF 500 T

centre cutting



Tool material	**Solid carbide**
Surface finish	Signum
Discount group	106
Guhring no.	**3863**



Code no.	d1 e8	d2 h6	l1	l2	l3	r	Z	Availability
	mm	mm	mm	mm	mm	mm		
4.000	4.000	4.000	80.00	8.00	52.00	0.50	2	●
6.000	6.000	6.000	100.00	12.00	64.00	1.00	2	●
8.000	8.000	8.000	100.00	16.00	64.00	1.00	2	●
10.000	10.000	10.000	100.00	20.00	60.00	1.00	2	●
12.000	12.000	12.000	120.00	24.00	75.00	1.50	2	●

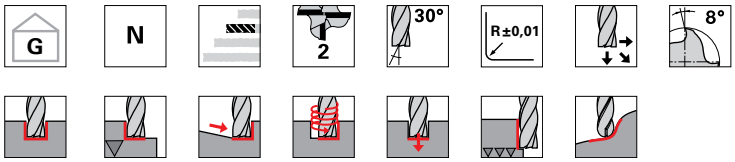
Cutting values: HPC-roughing and HSC copy milling* (detailed cutting values see p. 275)

ISO Code	Hardness	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 2	3	4	6	8	10	12	16
P Steel	≤ 850 N/mm²	0.2xd	0.5xd	200	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
	850 - 1400 N/mm²	0.15xd	0.4xd	180	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
M Stainless steel	≤ 750 N/mm²	0.15xd	0.4xd	140	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
	≥ 750 N/mm²	0.15xd	0.4xd	100	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.1
N Aluminium	≤ 7% Si	0.15xd	0.4xd	280	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
S Ti sp.alloys	≤ 1300 N/mm²	0.1xd	0.4xd	90	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.15
H Hard. steel	up to 54 HRC	0.05xd	0.3xd	140	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.1

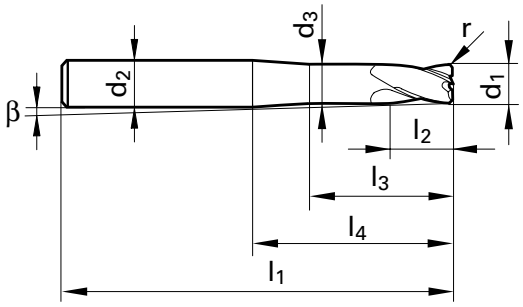
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life, for hard machining air cooling is recommended
** for HSC copy milling and imachining with a_e = 0.1xd the cutting speed v_c can be increased by 50 %

HSC-profile cutters with Torus form GF 500 T

centre cutting



Tool material	**Solid carbide**
Surface finish	Signum
Discount group	106
Guhring no.	**3856**



Code no.	d1 h8	d2 h6	d3	l1	l2	l3	l4	r	β	Z	Availability
	mm	mm	mm	mm	mm	mm	mm	mm	°		
2.000	2.000	6.000	1.800	57.00	3.00	8.00	20.00	0.50	5.90	2	●
3.000	3.000	6.000	2.800	57.00	3.50	9.00	20.00	0.50	4.40	2	●
4.000	4.000	6.000	3.800	57.00	4.00	9.40	20.00	1.00	3.10	2	●
6.000	6.000	6.000	5.600	57.00	6.00	19.00	20.00	2.00	-	2	●
8.000	8.000	8.000	7.600	63.00	7.00	25.00	26.00	2.00	-	2	●
10.000	10.000	10.000	9.600	72.00	8.00	28.00	30.00	3.00	-	2	●
12.000	12.000	12.000	11.500	83.00	10.00	33.00	35.00	4.00	-	2	●

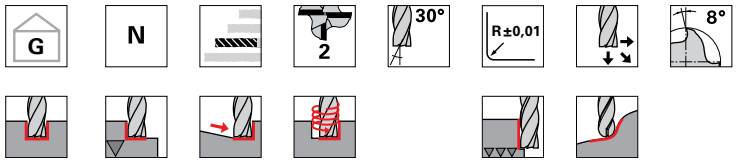
Cutting values: HPC-roughing and HSC copy milling* (detailed cutting values see p. 275)

ISO Code	Hardness	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 2	3	4	6	8	10	12	16
P Steel	≤ 850 N/mm²	0.2xd	0.5xd	200	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
	850 - 1400 N/mm²	0.15xd	0.4xd	180	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
M Stainless steel	≤ 750 N/mm²	0.15xd	0.4xd	140	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
	≥ 750 N/mm²	0.15xd	0.4xd	100	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.1
N Aluminium	≤ 7% Si	0.15xd	0.4xd	280	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
S Ti sp.alloys	≤ 1300 N/mm²	0.1xd	0.4xd	90	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.15
H Hard. steel	up to 54 HRC	0.05xd	0.3xd	140	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.1

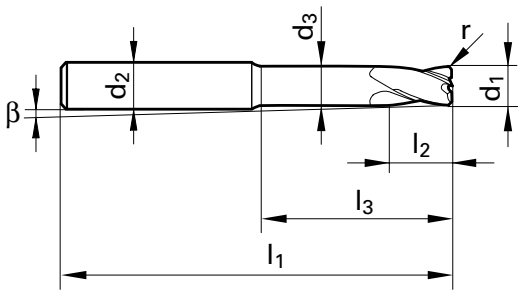
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life, for hard machining air cooling is recommended
** for HSC copy milling and imachining with a_e = 0.1xd the cutting speed v_c can be increased by 50 %

HSC-profile cutters with Torus form GF 500 T

centre cutting



Tool material	**Solid carbide**
Surface finish	Signum
Discount group	106
Guhring no.	**3865**



Code no.	d1 h8	d2 h6	d3	l1	l2	l3	l4	r	β	Z	Availability
	mm	mm	mm	mm	mm	mm	mm	mm	°		
6.000	6.000	6.000	5.600	80.00	6.00	39.00	40.00	2.00	-	2	●
8.000	8.000	8.000	7.600	100.00	7.00	59.00	60.00	2.00	-	2	●
10.000	10.000	10.000	9.600	120.00	8.00	73.00	75.00	3.00	-	2	●
12.000	12.000	12.000	11.500	120.00	10.00	68.00	70.00	4.00	-	2	●

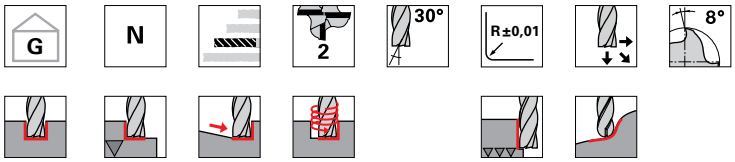
Cutting values: HPC-roughing and HSC copy milling* (detailed cutting values see p. 275)

ISO Code	Hardness	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 2	3	4	6	8	10	12	16
P Steel	≤ 850 N/mm²	0.2xd	0.5xd	200	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
	850 - 1400 N/mm²	0.15xd	0.4xd	180	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
M Stainless steel	≤ 750 N/mm²	0.15xd	0.4xd	140	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
	≥ 750 N/mm²	0.15xd	0.4xd	100	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.1
N Aluminium	≤ 7% Si	0.15xd	0.4xd	280	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
S Ti sp.alloys	≤ 1300 N/mm²	0.1xd	0.4xd	90	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.15
H Hard. steel	up to 54 HRC	0.05xd	0.3xd	140	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.1

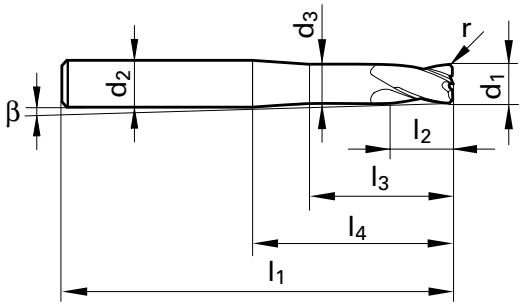
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life, for hard machining air cooling is recommended
** for HSC copy milling and imachining with a_e = 0.1xd the cutting speed v_c can be increased by 50 %

HSC-profile cutters with Torus form GF 500 T

centre cutting



Tool material	**Solid carbide**
Surface finish	Signum
Discount group	106
Guhring no.	**3859**



Code no.	d1 h8	d2 h6	d3	l1	l2	l3	l4	r	β	Z	Availability
	mm	mm	mm	mm	mm	mm	mm	mm	°		
2.000	2.000	6.000	1.800	80.00	3.00	8.00	40.00	0.50	2.90	2	●
3.000	3.000	6.000	2.800	80.00	3.50	12.00	40.00	0.50	2.20	2	●
4.000	4.000	6.000	3.800	80.00	4.00	20.00	40.00	1.00	1.50	2	●
6.000	6.000	8.000	5.600	100.00	6.00	59.00	60.00	2.00	1.00	2	●
8.000	8.000	10.000	7.600	120.00	7.00	74.00	75.00	2.00	0.80	2	●
10.000	10.000	12.000	9.600	120.00	8.00	68.00	70.00	3.00	0.90	2	●
12.000	12.000	16.000	11.500	150.00	10.00	95.80	100.00	4.00	1.20	2	●

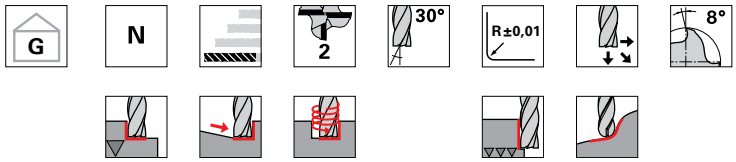
Cutting values: HPC-roughing and HSC copy milling* (detailed cutting values see p. 275)

ISO Code	Hardness	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 2	3	4	6	8	10	12	16
P Steel	≤ 850 N/mm²	0.2xd	0.5xd	200	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
	850 - 1400 N/mm²	0.15xd	0.4xd	180	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
M Stainless steel	≤ 750 N/mm²	0.15xd	0.4xd	140	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
	≥ 750 N/mm²	0.15xd	0.4xd	100	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.1
N Aluminium	≤ 7% Si	0.15xd	0.4xd	280	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
S Ti sp.alloys	≤ 1300 N/mm²	0.1xd	0.4xd	90	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.15
H Hard. steel	up to 54 HRC	0.05xd	0.3xd	140	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.1

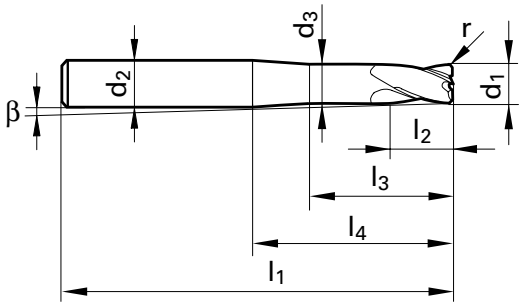
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life, for hard machining air cooling is recommended
** for HSC copy milling and imachining with a_e = 0.1xd the cutting speed v_c can be increased by 50 %

HSC-profile cutters with Torus form GF 500 T

centre cutting



Tool material	**Solid carbide**
Surface finish	Signum
Discount group	106
Guhring no.	**3860**



Code no.	d1 h8	d2 h6	d3	l1	l2	l3	l4	r	β	Z	Availability
	mm	mm	mm	mm	mm	mm	mm	mm	°		
2.000	2.000	6.000	1.800	80.00	3.00	8.00	40.00	0.50	2.90	2	●
3.000	3.000	6.000	2.800	80.00	3.50	12.00	40.00	0.50	2.20	2	●
4.000	4.000	6.000	3.800	100.00	4.00	20.00	60.00	0.50	1.00	2	●
6.000	6.000	8.000	5.600	120.00	6.00	79.00	80.00	1.00	0.80	2	●
8.000	8.000	10.000	7.600	150.00	7.00	104.00	105.00	1.00	0.60	2	●

Cutting values: HPC-roughing and HSC copy milling* (detailed cutting values see p. 275)

ISO Code	Hardness	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 2	3	4	6	8	10	12	16
P Steel	≤ 850 N/mm²	0.2xd	0.5xd	200	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
	850 - 1400 N/mm²	0.15xd	0.4xd	180	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
M Stainless steel	≤ 750 N/mm²	0.15xd	0.4xd	140	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
	≥ 750 N/mm²	0.15xd	0.4xd	100	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.1
N Aluminium	≤ 7% Si	0.15xd	0.4xd	280	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
S Ti sp.alloys	≤ 1300 N/mm²	0.1xd	0.4xd	90	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.15
H Hard. steel	up to 54 HRC	0.05xd	0.3xd	140	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.1

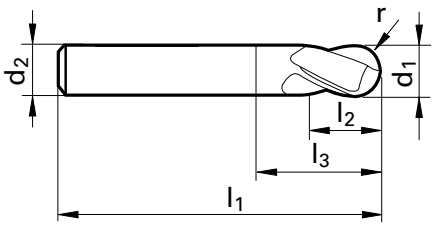
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life, for hard machining air cooling is recommended
** for HSC copy milling and imachining with a_e = 0.1xd the cutting speed v_c can be increased by 50 %

Ball nose slot drills (2-fluted)

centre cutting

DIN 6527 | N | 2 | 30° | R±0,05 | 9°

	HA	HB
Tool material	Solid carbide	
Surface finish	FIRE	FIRE
Discount group	117	117
Guhring no.	**3679**	**3049**



Code no.	d1 h10	d2 h6	l1	l2	l3	r	Z	Availability	
	mm	mm	mm	mm	mm	mm			
0.500	0.500	3.000	38.00	1.00	2.10	0.25	2	●	
0.800	0.800	3.000	38.00	1.00	2.10	0.40	2	●	
1.000	1.000	3.000	38.00	2.00	3.90	0.50	2	●	
1.500	1.500	3.000	38.00	3.00	6.40	0.75	2	●	
2.000	2.000	6.000	57.00	6.00	9.40	1.00	2	●	
3.000	3.000	6.000	57.00	7.00	11.90	1.50	2	●	●
4.000	4.000	6.000	57.00	8.00	13.40	2.00	2	●	●
5.000	5.000	6.000	57.00	10.00	16.90	2.50	2	●	●
6.000	6.000	6.000	57.00	10.00	21.00	3.00	2	●	●
8.000	8.000	8.000	63.00	16.00	27.00	4.00	2	●	●
10.000	10.000	10.000	72.00	19.00	32.00	5.00	2	●	●
12.000	12.000	12.000	83.00	22.00	38.00	6.00	2	●	●
14.000	14.000	14.000	83.00	22.00	38.00	7.00	2	●	●
14.001	14.000	16.000	92.00	26.00	43.00	7.00	2	●	
16.000	16.000	16.000	92.00	26.00	44.00	8.00	2	●	●
18.000	18.000	18.000	92.00	26.00	44.00	9.00	2	●	●
18.001	18.000	20.000	104.00	32.00	53.00	9.00	2	●	
20.000	20.000	20.000	104.00	32.00	54.00	10.00	2	●	●

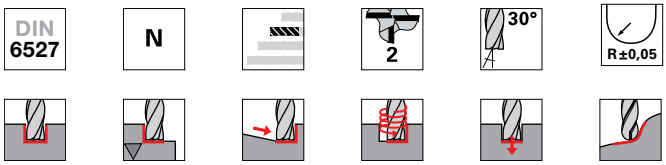
Cutting values: Roughing and copy milling* (detailed cutting values see p. 278)

ISO Code	Hardness	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 2	3	4	6	8	10	12	16
P Steel	≤ 850 N/mm²	0.5xd	0.4xd	175	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
	850 - 1400 N/mm²	0.5xd	0.3xd	140	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
M Stainless steel	≤ 750 N/mm²	1xd	0.1xd	126	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
	≥ 750 N/mm²	1xd	0.1xd	56	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.1
N Aluminium	≤ 7% Si	1xd	0.3xd	196	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
S Ti sp.alloys	≤ 1300 N/mm²	1xd	0.1xd	56	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.1
H Hard. steel	up to 54 HRC	0.05xd	0.05xd	70	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.1

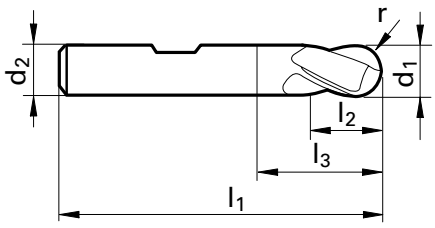
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life, for hard machining air cooling is recommended
** for HSC-finishing with a_e = 0.02xd the cutting speed v_c can be increased by 50 %

Ball nose slot drills (2-fluted)

centre cutting



Tool material	**Solid carbide**
Surface finish	bright
Discount group	117
Guhring no.	**3024**



Code no.	d1 h10	d2 h6	l1	l2	l3	r	Z	Availability
	mm	mm	mm	mm	mm	mm		
3.000	3.000	6.000	57.00	7.00	11.90	1.50	2	●
4.000	4.000	6.000	57.00	8.00	13.40	2.00	2	●
5.000	5.000	6.000	57.00	10.00	16.90	2.50	2	●
6.000	6.000	6.000	57.00	10.00	21.00	3.00	2	●
8.000	8.000	8.000	63.00	16.00	27.00	4.00	2	●
10.000	10.000	10.000	72.00	19.00	32.00	5.00	2	●
12.000	12.000	12.000	83.00	22.00	38.00	6.00	2	●
14.000	14.000	14.000	83.00	22.00	38.00	7.00	2	●
16.000	16.000	16.000	92.00	26.00	44.00	8.00	2	●
18.000	18.000	18.000	92.00	26.00	44.00	9.00	2	●
20.000	20.000	20.000	104.00	32.00	54.00	10.00	2	●

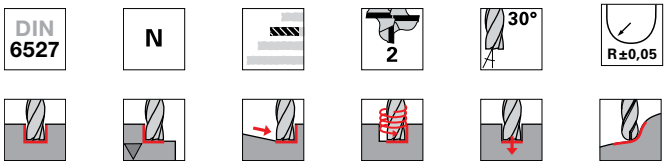
Cutting values: Roughing and copy milling* (detailed cutting values see p. 278)

ISO Code	Hardness	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 2	3	4	6	8	10	12	16
P Steel	≤ 850 N/mm²	0.5xd	0.4xd	175	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
	850 - 1400 N/mm²	0.5xd	0.3xd	140	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
M Stainless steel	≤ 750 N/mm²	1xd	0.1xd	126	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
	≥ 750 N/mm²	1xd	0.1xd	56	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.1
N Aluminium	≤ 7% Si	1xd	0.3xd	196	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
S Ti sp.alloys	≤ 1300 N/mm²	1xd	0.1xd	56	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.1
H Hard. steel	up to 54 HRC	0.05xd	0.05xd	70	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.1

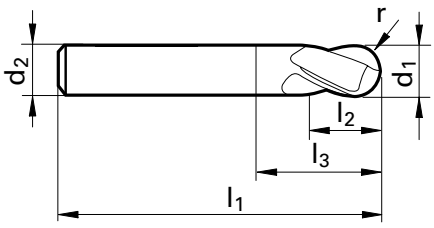
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life, for hard machining air cooling is recommended
** for HSC-finishing with a_e = 0.02xd the cutting speed v_c can be increased by 50 %
All recommendations are valid for coated tools. For bright milling cutters please v_c -40% and f_z -25% !

Ball nose slot drills (2-fluted)

centre cutting



Tool material	**Solid carbide**
Surface finish	bright
Discount group	117
Guhring no.	**3308**



Code no.	d1 h10	d2 h6	l1	l2	l3	r	Z	Availability
	mm	mm	mm	mm	mm	mm		
0.500	0.500	3.000	38.00	1.00	2.10	0.25	2	●
0.800	0.800	3.000	38.00	1.00	2.10	0.40	2	●
1.000	1.000	3.000	38.00	2.00	3.90	0.50	2	●
1.500	1.500	3.000	38.00	3.00	6.40	0.75	2	●
2.000	2.000	6.000	57.00	6.00	9.40	1.00	2	●
3.000	3.000	6.000	57.00	7.00	11.90	1.50	2	●
4.000	4.000	6.000	57.00	8.00	13.40	2.00	2	●
5.000	5.000	6.000	57.00	10.00	16.90	2.50	2	●
6.000	6.000	6.000	57.00	10.00	21.00	3.00	2	●
8.000	8.000	8.000	63.00	16.00	27.00	4.00	2	●
10.000	10.000	10.000	72.00	19.00	32.00	5.00	2	●
12.000	12.000	12.000	83.00	22.00	38.00	6.00	2	●
14.000	14.000	14.000	83.00	22.00	38.00	7.00	2	●
14.001	14.000	16.000	92.00	26.00	43.00	7.00	2	●
16.000	16.000	16.000	92.00	26.00	44.00	8.00	2	●
18.000	18.000	18.000	92.00	26.00	44.00	9.00	2	●
18.001	18.000	20.000	104.00	32.00	53.00	9.00	2	●
20.000	20.000	20.000	104.00	32.00	54.00	10.00	2	●

Cutting values: Roughing and copy milling* (detailed cutting values see p. 278)

ISO Code	Hardness	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 2	3	4	6	8	10	12	16
P Steel	≤ 850 N/mm²	0.5xd	0.4xd	175	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
	850 - 1400 N/mm²	0.5xd	0.3xd	140	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
M Stainless steel	≤ 750 N/mm²	1xd	0.1xd	126	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
	≥ 750 N/mm²	1xd	0.1xd	56	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.1
N Aluminium	≤ 7% Si	1xd	0.3xd	196	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
S Ti sp.alloys	≤ 1300 N/mm²	1xd	0.1xd	56	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.1
H Hard. steel	up to 54 HRC	0.05xd	0.05xd	70	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.1

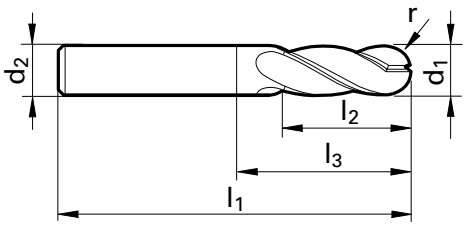
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life, for hard machining air cooling is recommended
** for HSC-finishing with a_e = 0.02xd the cutting speed v_c can be increased by 50 %
All recommendations are valid for coated tools. For bright milling cutters please v_c -40% and f_z -25% !

Ball nose end mills (4-fluted)

centre cutting

DIN 6528 | N | 4 | 30° | R±0,05 | 9°

	HA	HA
Tool material	Solid carbide	
Surface finish	bright	FIRE
Discount group	117	117
Guhring no.	**3306**	**3727**



Code no.	d1 h10	d2 h6	l1	l2	l3	r	Z	Availability	
	mm	mm	mm	mm	mm	mm			
4.000	4.000	4.000	50.00	11.00	22.00	2.00	4	●	●
5.000	5.000	5.000	50.00	13.00	22.00	2.50	4	●	●
6.000	6.000	6.000	57.00	13.00	21.00	3.00	4	●	●
8.000	8.000	8.000	63.00	19.00	27.00	4.00	4	●	●
10.000	10.000	10.000	72.00	22.00	32.00	5.00	4	●	●
12.000	12.000	12.000	83.00	26.00	38.00	6.00	4	●	●
14.000	14.000	14.000	83.00	26.00	38.00	7.00	4	●	●
14.001	14.000	16.000	92.00	32.00	36.00	7.00	4	●	●
16.000	16.000	16.000	92.00	32.00	44.00	8.00	4	●	●
18.000	18.000	18.000	92.00	32.00	44.00	9.00	4	●	●
18.001	18.000	20.000	104.00	38.00	54.00	9.00	4	●	●
20.000	20.000	20.000	104.00	38.00	54.00	10.00	4	●	●

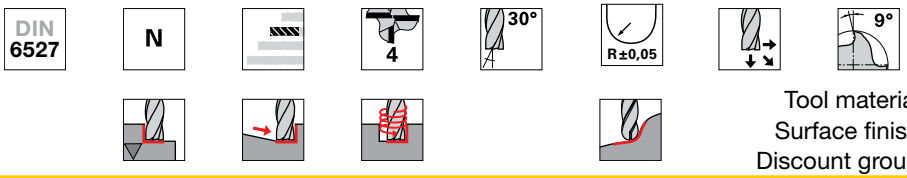
Cutting values: Roughing and copy milling* (detailed cutting values see p. 278)

ISO Code	Hardness	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 2	3	4	6	8	10	12	16
P Steel	≤ 850 N/mm²	0.5xd	0.4xd	175	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
	850 - 1400 N/mm²	0.5xd	0.3xd	140	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
M Stainless steel	≤ 750 N/mm²	1xd	0.1xd	126	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
	≥ 750 N/mm²	1xd	0.1xd	56	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.1
N Aluminium	≤ 7% Si	1xd	0.3xd	196	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
S Ti sp.alloys	≤ 1300 N/mm²	1xd	0.1xd	56	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.1
H Hard. steel	up to 54 HRC	0.05xd	0.05xd	70	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.1

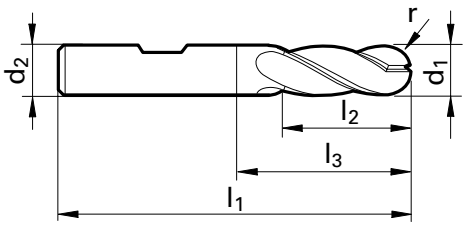
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life, for hard machining air cooling is recommended
** for HSC-finishing with a_e = 0.02xd the cutting speed v_c can be increased by 50 %
All recommendations are valid for coated tools. For bright milling cutters please v_c -40% and f_z -25% !

Ball nose end mills (4-fluted)

centre cutting



	HB	HB
Tool material	Solid carbide	
Surface finish	bright	FIRE
Discount group	117	117
Guhring no.	**3026**	**3050**



Code no.	d1 h10	d2 h6	l1	l2	l3	r	Z	Availability	
	mm	mm	mm	mm	mm	mm			
3.000	3.000	6.000	57.00	8.00	12.90	1.50	4	●	●
4.000	4.000	6.000	57.00	11.00	16.90	2.00	4	●	●
5.000	5.000	6.000	57.00	13.00	19.90	2.50	4	●	●
6.000	6.000	6.000	57.00	13.00	21.00	3.00	4	●	●
8.000	8.000	8.000	63.00	19.00	27.00	4.00	4	●	●
10.000	10.000	10.000	72.00	22.00	32.00	5.00	4	●	●
12.000	12.000	12.000	83.00	26.00	38.00	6.00	4	●	●
14.000	14.000	14.000	83.00	26.00	38.00	7.00	4	●	●
16.000	16.000	16.000	92.00	32.00	44.00	8.00	4	●	●
18.000	18.000	18.000	92.00	32.00	44.00	9.00	4	●	●
20.000	20.000	20.000	104.00	38.00	54.00	10.00	4	●	●

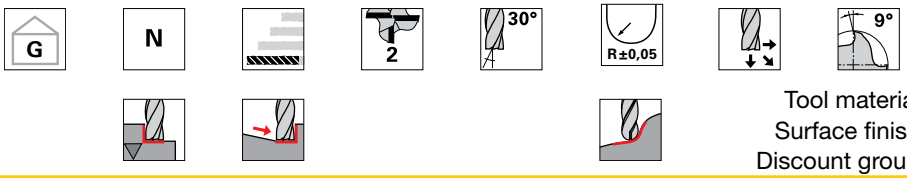
Cutting values: Roughing and copy milling* (detailed cutting values see p. 278)

ISO Code	Hardness	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 2	3	4	6	8	10	12	16
P Steel	≤ 850 N/mm²	0.5xd	0.4xd	175	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
	850 - 1400 N/mm²	0.5xd	0.3xd	140	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
M Stainless steel	≤ 750 N/mm²	1xd	0.1xd	126	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
	≥ 750 N/mm²	1xd	0.1xd	56	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.1
N Aluminium	≤ 7% Si	1xd	0.3xd	196	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
S Ti sp.alloys	≤ 1300 N/mm²	1xd	0.1xd	56	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.1
H Hard. steel	up to 54 HRC	0.05xd	0.05xd	70	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.1

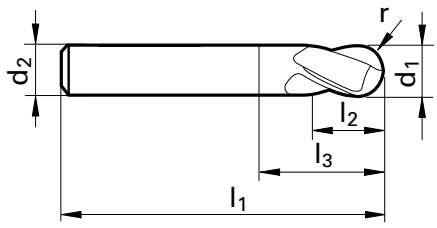
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life, for hard machining air cooling is recommended
** for HSC-finishing with a_e = 0.02xd the cutting speed v_c can be increased by 50 %
All recommendations are valid for coated tools. For bright milling cutters please v_c -40% and f_z -25% !

XL ball nose slot drills (2-fluted)

centre cutting



	HA	HA
Tool material	Solid carbide	
Surface finish	bright	FIRE
Discount group	117	117
Guhring no.	**3014**	**3030**



Code no.	d1 h10	d2 h6	l1	l2	l3	r	Z	Availability	
	mm	mm	mm	mm	mm	mm			
3.000	3.000	3.000	75.00	20.00	47.00	1.50	2	●	●
4.000	4.000	4.000	75.00	25.00	47.00	2.00	2	●	●
5.000	5.000	5.000	75.00	30.00	47.00	2.50	2	●	●
6.000	6.000	6.000	75.00	30.00	39.00	3.00	2	●	●
8.000	8.000	8.000	100.00	40.00	64.00	4.00	2	●	●
10.000	10.000	10.000	100.00	40.00	60.00	5.00	2	●	●
12.000	12.000	12.000	150.00	45.00	105.00	6.00	2	●	●

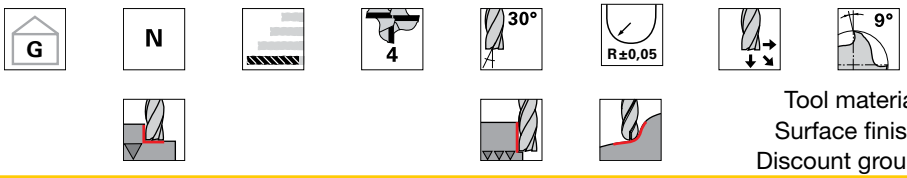
Cutting values: Roughing and copy milling* (detailed cutting values see p. 278)

ISO Code	Hardness	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 2	3	4	6	8	10	12	16
P Steel	≤ 850 N/mm²	0.5xd	0.4xd	175	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
	850 - 1400 N/mm²	0.5xd	0.3xd	140	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
M Stainless steel	≤ 750 N/mm²	1xd	0.1xd	126	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
	≥ 750 N/mm²	1xd	0.1xd	56	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.1
N Aluminium	≤ 7% Si	1xd	0.3xd	196	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
S Ti sp.alloys	≤ 1300 N/mm²	1xd	0.1xd	56	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.1
H Hard. steel	up to 54 HRC	0.05xd	0.05xd	70	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.1

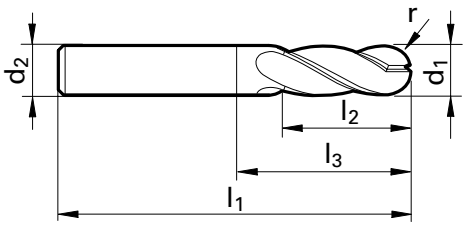
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life, for hard machining air cooling is recommended
** for HSC-finishing with a_e = 0.02xd the cutting speed v_c can be increased by 50 %
All recommendations are valid for coated tools. For bright milling cutters please v_c -40% and f_z -25% !

XL ball nose end mills (4-fluted)

centre cutting



	HA	HA
Tool material	Solid carbide	
Surface finish	bright	FIRE
Discount group	117	117
Guhring no.	**3015**	**3043**



Code no.	d1 h10	d2 h6	l1	l2	l3	r	Z	Availability	
	mm	mm	mm	mm	mm	mm			
3.000	3.000	3.000	75.00	20.00	47.00	1.50	4	●	●
4.000	4.000	4.000	75.00	25.00	47.00	2.00	4	●	●
5.000	5.000	5.000	75.00	30.00	47.00	2.50	4	●	●
6.000	6.000	6.000	75.00	30.00	39.00	3.00	4	●	●
8.000	8.000	8.000	100.00	40.00	64.00	4.00	4	●	●
10.000	10.000	10.000	100.00	40.00	60.00	5.00	4	●	●
12.000	12.000	12.000	150.00	45.00	105.00	6.00	4	●	●

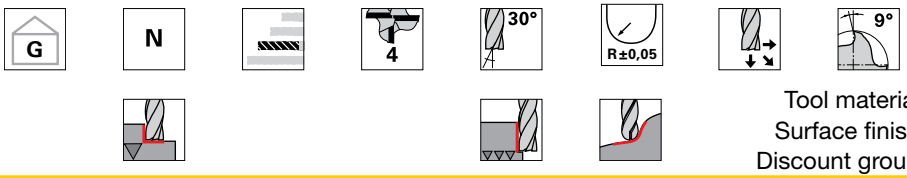
Cutting values: Roughing and copy milling* (detailed cutting values see p. 278)

ISO Code	Hardness	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 2	3	4	6	8	10	12	16
P Steel	≤ 850 N/mm²	0.5xd	0.4xd	175	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
	850 - 1400 N/mm²	0.5xd	0.3xd	140	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
M Stainless steel	≤ 750 N/mm²	1xd	0.1xd	126	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
	≥ 750 N/mm²	1xd	0.1xd	56	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.1
N Aluminium	≤ 7% Si	1xd	0.3xd	196	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
S Ti sp.alloys	≤ 1300 N/mm²	1xd	0.1xd	56	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.1
H Hard. steel	up to 54 HRC	0.05xd	0.05xd	70	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.1

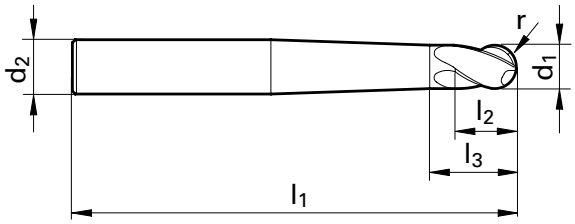
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life, for hard machining air cooling is recommended
** for HSC-finishing with a_e = 0.02xd the cutting speed v_c can be increased by 50 %
All recommendations are valid for coated tools. For bright milling cutters please v_c -40% and f_z -25% !

Ball nose profile cutters GF 200 B

centre cutting



Tool material	**Solid carbide**
Surface finish	FIRE
Discount group	106
Guhring no.	**3045**



Code no.	d1 h10	d2 h6	l1	l2	l3	r	Z	Availability
	mm	mm	mm	mm	mm	mm		
3.000	3.000	6.000	75.00	4.00	6.50	1.50	2	●
4.000	4.000	6.000	75.00	5.00	7.50	2.00	2	●
5.000	5.000	6.000	75.00	6.00	8.50	2.50	2	●
6.000	6.000	8.000	75.00	8.00	10.50	3.00	2	●
8.000	8.000	10.000	100.00	12.00	14.50	4.00	2	●
10.000	10.000	12.000	100.00	15.00	17.50	5.00	2	●

Cutting values: HSC copy milling* (detailed cutting values see p. 274)

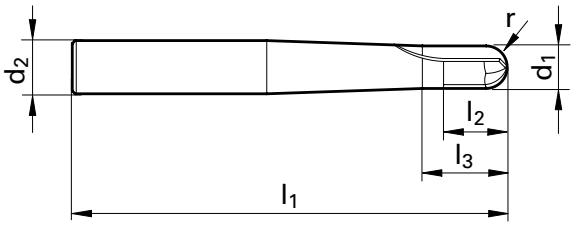
ISO Code	Hardness	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 2	3	4	6	8	10	12	16
P Steel	≤ 850 N/mm²	0.1xd	0.1xd	200	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
	850 - 1400 N/mm²	0.1xd	0.1xd	180	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
M Stainless steel	≤ 750 N/mm²	0.1xd	0.1xd	140	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
	≥ 750 N/mm²	0.05xd	0.1xd	100	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.1
N Aluminium	≤ 7% Si	0.15xd	0.1xd	280	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
S Ti sp.alloys	≤ 1300 N/mm²	0.05xd	0.1xd	90	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.1
H Hard. steel	up to 54 HRC	0.05xd	0.05xd	140	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.1

* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life, for hard machining air cooling is recommended
** for HSC-finishing with a_e = 0.02xd the cutting speed v_c can be increased by 50 %

Ball nose profile cutters GF 200 B

centre cutting

Tool material	Solid carbide
Surface finish	FIRE
Discount group	106
Guhring no.	3044



Code no.	d1 h10	d2 h6	l1	l2	l3	r	Z	Availability
	mm	mm	mm	mm	mm	mm		
3.000	3.000	6.000	75.00	4.00	6.50	1.50	2	●
4.000	4.000	6.000	75.00	5.00	7.50	2.00	2	●
5.000	5.000	6.000	75.00	6.00	8.50	2.50	2	●
6.000	6.000	8.000	75.00	8.00	10.50	3.00	2	●
8.000	8.000	10.000	100.00	12.00	14.50	4.00	2	●
10.000	10.000	12.000	100.00	15.00	17.50	5.00	2	●

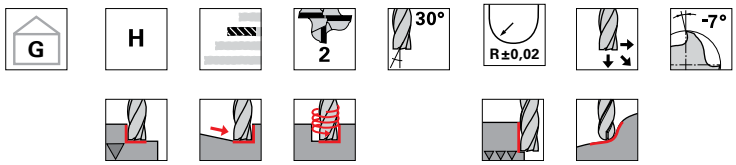
Cutting values: HSC copy milling* (detailed cutting values see p. 274)

ISO Code	Hardness	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 2	3	4	6	8	10	12	16
P Steel	≤ 850 N/mm²	0.1xd	0.1xd	200	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
	850 - 1400 N/mm²	0.1xd	0.1xd	180	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
M Stainless steel	≤ 750 N/mm²	0.1xd	0.1xd	140	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
	≥ 750 N/mm²	0.05xd	0.1xd	100	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.1
N Aluminium	≤ 7% Si	0.15xd	0.1xd	280	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
S Ti sp.alloys	≤ 1300 N/mm²	0.05xd	0.1xd	90	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.1
H Hard. steel	up to 54 HRC	0.05xd	0.05xd	140	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.1

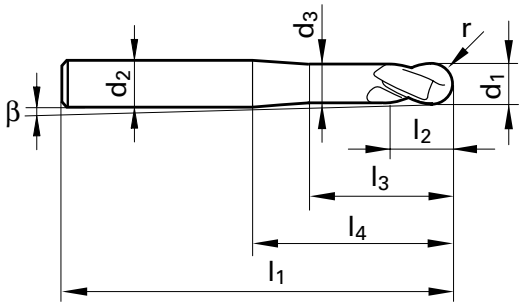
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life, for hard machining air cooling is recommended
** for HSC-finishing with a_e = 0.02xd the cutting speed v_c can be increased by 50 %

Ball nose hard profile cutters GF 300 B

centre cutting



	HA
Tool material	Solid carbide
Surface finish	Signum
Discount group	106
Guhring no.	3359



Code no.	d1 h8	d2 h6	d3	l1	l2	l3	l4	r	β	Z	Availability
	mm	mm	mm	mm	mm	mm	mm	mm	°		
0.500	0.500	3.000	0.400	38.00	0.75	2.60	10.00	0.25	7.40	2	●
0.800	0.800	3.000	0.700	38.00	1.20	3.50	10.00	0.40	6.60	2	●
1.000	1.000	3.000	0.900	38.00	1.50	4.00	10.00	0.50	6.10	2	●
1.500	1.500	3.000	1.400	38.00	2.25	5.50	10.00	0.75	4.70	2	●
2.000	2.000	6.000	1.900	57.00	3.00	9.40	21.00	1.00	5.80	2	●
3.000	3.000	6.000	2.700	57.00	5.00	11.60	21.00	1.50	4.40	2	●
4.000	4.000	6.000	3.700	57.00	6.00	14.50	21.00	2.00	3.10	2	●
5.000	5.000	6.000	4.700	57.00	8.00	17.30	21.00	2.50	1.60	2	●
6.000	6.000	6.000	5.700	57.00	9.00	20.00	21.00	3.00	-	2	●
8.000	8.000	8.000	7.700	63.00	12.00	26.00	27.00	4.00	-	2	●
10.000	10.000	10.000	9.500	72.00	15.00	30.00	32.00	5.00	-	2	●
12.000	12.000	12.000	11.500	83.00	18.00	36.00	38.00	6.00	-	2	●
16.000	16.000	16.000	15.500	92.00	24.00	42.00	44.00	8.00	-	2	●

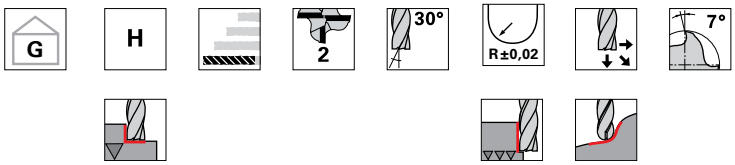
Cutting values: HSC copy milling* (detailed cutting values see p. 274)

ISO Code	Hardness	Feed depth a_p	Schnittbr.** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 2	3	4	6	8	10	12	16
P Steel	≤ 850 N/mm²	-	-	-	-	-	-	-	-	-	-	-
	850 - 1400 N/mm²	0.1xd	0.1xd	200	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
K Cast mat.	≥ 240 HB 30	0.1xd	0.1xd	200	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
H Hardened steel	≤ 54 HRC	0.05xd	0.1xd	140	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.1
	≤ 63 HRC	0.02xd	0.1xd	80	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.1

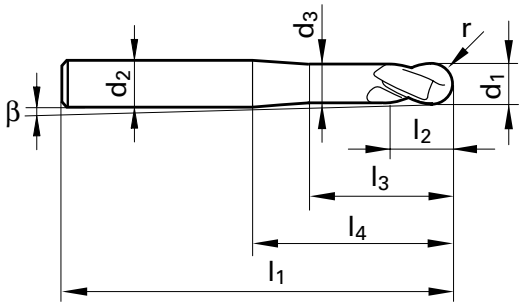
* dry machining with air cooling is recommended for optimal chip evacuation and tool life
** for HSC-finishing with a_e = 0.2xd the cutting speed v_c can be increased by 50 %

Ball nose hard profile cutters GF 300 B

centre cutting



	HA
Tool material	Solid carbide
Surface finish	Signum
Discount group	106
Guhring no.	3360



Code no.	d1 h8	d2 h6	d3	l1	l2	l3	l4	r	β	Z	Availability
	mm	mm	mm	mm	mm	mm	mm	mm	°		
3.000	3.000	6.000	2.700	75.00	5.00	20.00	39.00	1.50	2.30	2	●
4.000	4.000	6.000	3.700	75.00	6.00	20.00	39.00	2.00	1.60	2	●
5.000	5.000	6.000	4.700	75.00	8.00	20.00	39.00	2.50	0.80	2	●
6.000	6.000	6.000	5.700	75.00	9.00	38.00	39.00	3.00	-	2	●
8.000	8.000	8.000	7.700	100.00	12.00	63.00	64.00	4.00	-	2	●
10.000	10.000	10.000	9.500	100.00	15.00	58.00	60.00	5.00	-	2	●
12.000	12.000	12.000	11.500	150.00	18.00	103.00	105.00	6.00	-	2	●
16.000	16.000	16.000	15.500	150.00	24.00	100.00	102.00	8.00	-	2	●

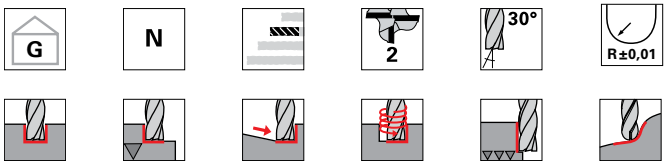
Cutting values: HSC copy milling* (detailed cutting values see p. 274)

ISO Code	Hardness	Feed depth a_p	Schnittbr.** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 2	3	4	6	8	10	12	16
P Steel	≤ 850 N/mm²	-	-	-	-	-	-	-	-	-	-	-
	850 - 1400 N/mm²	0.1xd	0.1xd	200	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
K Cast mat.	≥ 240 HB 30	0.1xd	0.1xd	200	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
H Hardened steel	≤ 54 HRC	0.05xd	0.1xd	140	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.1
	≤ 63 HRC	0.02xd	0.1xd	80	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.1

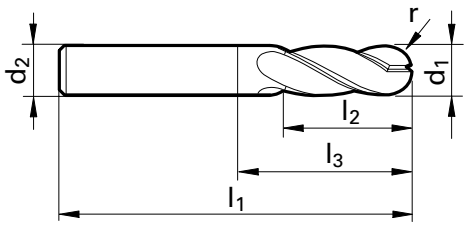
* dry machining with air cooling is recommended for optimal chip evacuation and tool life
** for HSC-finishing with a_e = 0.2xd the cutting speed v_c can be increased by 50 %

HSC-ball nose profile cutters GF 500 B

centre cutting



Tool material	**Solid carbide**
Surface finish	Signum
Discount group	106
Guhring no.	**3854**



Code no.	d1 h8	d2 h6	l1	l2	l3	r	Z	Availability
	mm	mm	mm	mm	mm	mm		
6.000	6.000	6.000	57.00	12.00	21.00	3.00	2	●
8.000	8.000	8.000	63.00	16.00	27.00	4.00	2	●
10.000	10.000	10.000	72.00	20.00	32.00	5.00	2	●
12.000	12.000	12.000	83.00	24.00	38.00	6.00	2	●

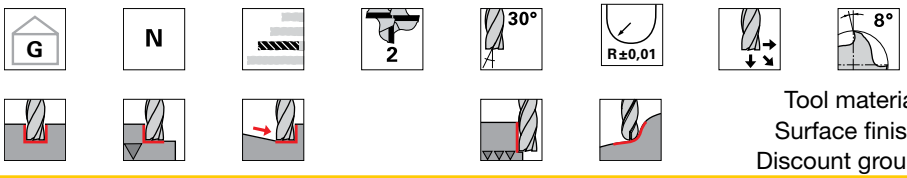
Cutting values: HSC copy milling* (detailed cutting values see p. 274)

ISO Code	Hardness	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 2	3	4	6	8	10	12	16
P Steel	≤ 850 N/mm²	0.1xd	0.1xd	200	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
	850 - 1400 N/mm²	0.1xd	0.1xd	180	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
M Stainless steel	≤ 750 N/mm²	0.1xd	0.1xd	140	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
	≥ 750 N/mm²	0.05xd	0.1xd	100	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.1
N Aluminium	≤ 7% Si	0.15xd	0.1xd	280	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
S Ti sp.alloys	≤ 1300 N/mm²	0.05xd	0.1xd	90	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.1
H Hard. steel	up to 54 HRC	0.05xd	0.05xd	140	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.1

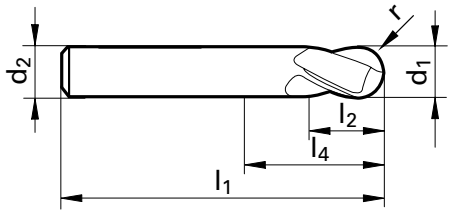
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life, for hard machining air cooling is recommended
** for HSC-finishing with a_e = 0.02xd the cutting speed v_c can be increased by 50 %

HSC-ball nose profile cutters GF 500 B

centre cutting



Tool material	**Solid carbide**
Surface finish	Signum
Discount group	106
Guhring no.	**3866**



Code no.	d1 h8	d2 h6	l1	l2	l3	r	Z	Availability
	mm	mm	mm	mm	mm	mm		
4.000	4.000	4.000	80.00	8.00	52.00	2.00	2	●
6.000	6.000	6.000	100.00	12.00	64.00	3.00	2	●
8.000	8.000	8.000	100.00	16.00	64.00	4.00	2	●
10.000	10.000	10.000	100.00	20.00	60.00	5.00	2	●
12.000	12.000	12.000	120.00	24.00	75.00	6.00	2	●

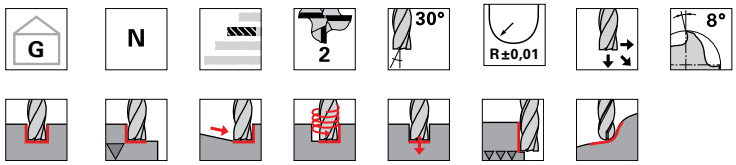
Cutting values: HSC copy milling* (detailed cutting values see p. 274)

ISO Code	Hardness	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 2	3	4	6	8	10	12	16
P Steel	≤ 850 N/mm²	0.1xd	0.1xd	200	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
	850 - 1400 N/mm²	0.1xd	0.1xd	180	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
M Stainless steel	≤ 750 N/mm²	0.1xd	0.1xd	140	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
	≥ 750 N/mm²	0.05xd	0.1xd	100	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.1
N Aluminium	≤ 7% Si	0.15xd	0.1xd	280	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
S Ti sp.alloys	≤ 1300 N/mm²	0.05xd	0.1xd	90	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.1
H Hard. steel	up to 54 HRC	0.05xd	0.05xd	140	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.1

* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life, for hard machining air cooling is recommended
** for HSC-finishing with a_e = 0.02xd the cutting speed v_c can be increased by 50 %

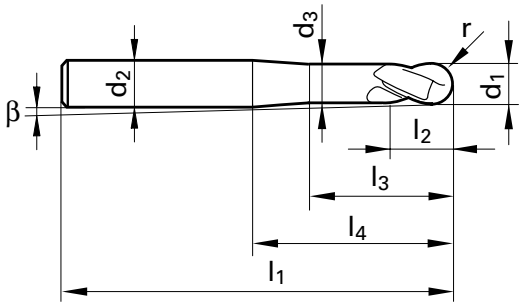
HSC-ball nose profile cutters GF 500 B

centre cutting



HA

Tool material	**Solid carbide**
Surface finish	Signum
Discount group	106
Guhring no.	**3848**



Code no.	d1 h8	d2 h6	d3	l1	l2	l3	l4	r	β	Z	Availability
	mm	mm	mm	mm	mm	mm	mm	mm	°		
2.000	2.000	6.000	1.800	57.00	3.00	6.20	20.00	1.00	6.10	2	●
3.000	3.000	6.000	2.800	57.00	3.50	8.40	20.00	1.50	4.70	2	●
4.000	4.000	6.000	3.800	57.00	4.00	9.40	20.00	2.00	3.20	2	●
6.000	6.000	6.000	5.600	57.00	6.00	19.00	20.00	3.00	-	2	●
8.000	8.000	8.000	7.600	63.00	7.00	25.00	26.00	4.00	-	2	●
10.000	10.000	10.000	9.600	72.00	8.00	28.00	30.00	5.00	-	2	●
12.000	12.000	12.000	11.500	83.00	10.00	33.00	35.00	6.00	-	2	●

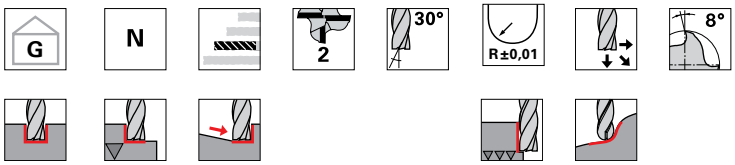
Cutting values: HSC copy milling* (detailed cutting values see p. 274)

ISO Code	Hardness	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 2	3	4	6	8	10	12	16
P Steel	≤ 850 N/mm²	0.1xd	0.1xd	200	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
	850 - 1400 N/mm²	0.1xd	0.1xd	180	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
M Stainless steel	≤ 750 N/mm²	0.1xd	0.1xd	140	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
	≥ 750 N/mm²	0.05xd	0.1xd	100	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.1
N Aluminium	≤ 7% Si	0.15xd	0.1xd	280	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
S Ti sp.alloys	≤ 1300 N/mm²	0.05xd	0.1xd	90	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.1
H Hard. steel	up to 54 HRC	0.05xd	0.05xd	140	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.1

* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life, for hard machining air cooling is recommended
** for HSC-finishing with a_e = 0.02xd the cutting speed v_c can be increased by 50 %

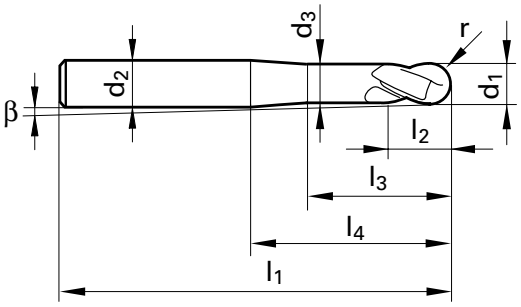
HSC-ball nose profile cutters GF 500 B

centre cutting



Tool material	**Solid carbide**
Surface finish	Signum
Discount group	106
Guhring no.	**3855**

HA



Code no.	d1 h8	d2 h6	d3	l1	l2	l3	l4	r	β	Z	Availability
	mm	mm	mm	mm	mm	mm	mm	mm	°		
6.000	6.000	6.000	5.600	80.00	6.00	39.00	40.00	3.00	-	2	●
8.000	8.000	8.000	7.600	100.00	7.00	59.00	60.00	4.00	-	2	●
10.000	10.000	10.000	9.600	120.00	8.00	73.00	75.00	5.00	-	2	●
12.000	12.000	12.000	11.500	120.00	10.00	68.00	70.00	6.00	-	2	●

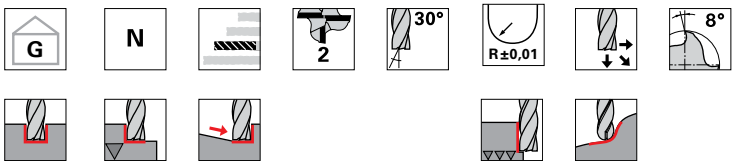
Cutting values: HSC copy milling* (detailed cutting values see p. 274)

ISO Code	Hardness	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 2	3	4	6	8	10	12	16
P Steel	≤ 850 N/mm²	0.1xd	0.1xd	200	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
	850 - 1400 N/mm²	0.1xd	0.1xd	180	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
M Stainless steel	≤ 750 N/mm²	0.1xd	0.1xd	140	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
	≥ 750 N/mm²	0.05xd	0.1xd	100	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.1
N Aluminium	≤ 7% Si	0.15xd	0.1xd	280	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
S Ti sp.alloys	≤ 1300 N/mm²	0.05xd	0.1xd	90	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.1
H Hard. steel	up to 54 HRC	0.05xd	0.05xd	140	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.1

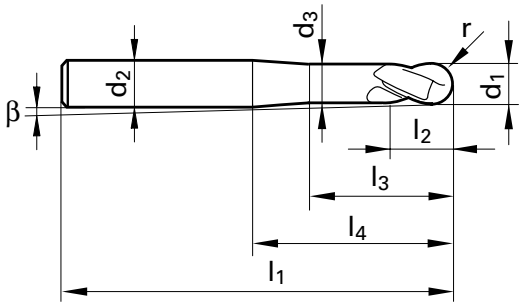
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life, for hard machining air cooling is recommended
** for HSC-finishing with a_e = 0.02xd the cutting speed v_c can be increased by 50 %

HSC-ball nose profile cutters GF 500 B

centre cutting



	HA
Tool material	Solid carbide
Surface finish	Signum
Discount group	106
Guhring no.	3849



Code no.	d1 h8	d2 h6	d3	l1	l2	l3	l4	r	β	Z	Availability
	mm	mm	mm	mm	mm	mm	mm	mm	°		
2.000	2.000	6.000	1.800	80.00	3.00	8.00	40.00	1.00	3.00	2	●
3.000	3.000	6.000	2.800	80.00	3.50	12.00	40.00	1.50	2.30	2	●
4.000	4.000	6.000	3.800	80.00	4.00	20.00	40.00	2.00	1.60	2	●
5.000	5.000	6.000	4.700	80.00	5.00	25.00	40.00	2.50	0.80	2	●
6.000	6.000	8.000	5.600	100.00	6.00	25.00	60.00	3.00	1.10	2	●
8.000	8.000	10.000	7.600	120.00	7.00	30.00	75.00	4.00	0.90	2	●
10.000	10.000	12.000	9.600	120.00	8.00	30.00	70.00	5.00	0.90	2	●
12.000	12.000	16.000	11.500	150.00	10.00	35.00	100.00	6.00	1.30	2	●

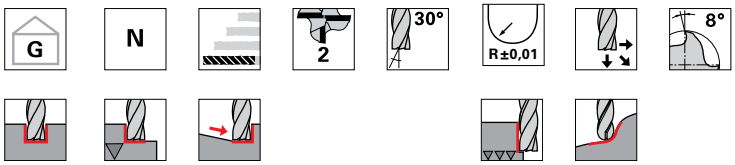
Cutting values: HSC copy milling* (detailed cutting values see p. 274)

ISO Code	Hardness	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 2	3	4	6	8	10	12	16
P Steel	≤ 850 N/mm²	0.1xd	0.1xd	200	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
	850 - 1400 N/mm²	0.1xd	0.1xd	180	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
M Stainless steel	≤ 750 N/mm²	0.1xd	0.1xd	140	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
	≥ 750 N/mm²	0.05xd	0.1xd	100	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.1
N Aluminium	≤ 7% Si	0.15xd	0.1xd	280	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
S Ti sp.alloys	≤ 1300 N/mm²	0.05xd	0.1xd	90	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.1
H Hard. steel	up to 54 HRC	0.05xd	0.05xd	140	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.1

* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life, for hard machining air cooling is recommended
** for HSC-finishing with a_e = 0.02xd the cutting speed v_c can be increased by 50 %

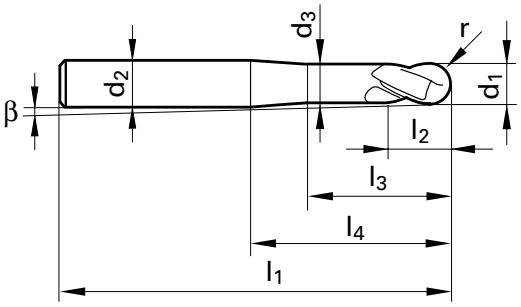
HSC-ball nose profile cutters GF 500 B

centre cutting



Tool material	**Solid carbide**
Surface finish	Signum
Discount group	106
Guhring no.	**3853**

HA



Code no.	d1 h8	d2 h6	d3	l1	l2	l3	l4	r	β	Z	Availability
	mm	mm	mm	mm	mm	mm	mm	mm	°		
2.000	2.000	6.000	1.800	80.00	3.00	8.00	40.00	1.00	3.00	2	●
3.000	3.000	6.000	2.800	80.00	3.50	12.00	40.00	1.50	2.30	2	●
4.000	4.000	6.000	3.800	100.00	4.00	20.00	60.00	2.00	1.00	2	●
6.000	6.000	8.000	5.600	120.00	6.00	25.00	80.00	3.00	0.80	2	●
8.000	8.000	10.000	7.600	150.00	7.00	20.00	105.00	4.00	0.60	2	●

Cutting values: HSC copy milling* (detailed cutting values see p. 274)

ISO Code	Hardness	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 2	3	4	6	8	10	12	16
P Steel	≤ 850 N/mm²	0.1xd	0.1xd	200	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
	850 - 1400 N/mm²	0.1xd	0.1xd	180	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
M Stainless steel	≤ 750 N/mm²	0.1xd	0.1xd	140	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
	≥ 750 N/mm²	0.05xd	0.1xd	100	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.1
N Aluminium	≤ 7% Si	0.15xd	0.1xd	280	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
S Ti sp.alloys	≤ 1300 N/mm²	0.05xd	0.1xd	90	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.1
H Hard. steel	up to 54 HRC	0.05xd	0.05xd	140	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.1

* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life, for hard machining air cooling is recommended
** for HSC-finishing with a_e = 0.02xd the cutting speed v_c can be increased by 50 %

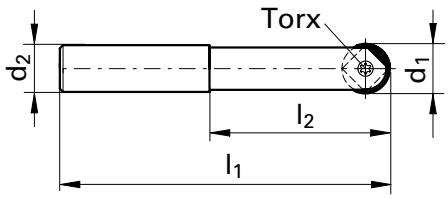
Die sinking cutter holder GF 200 WP

G

HA

Tool material	
Surface finish	nickel-plated
Discount group	140
Guhring no.	**1941**

Indexable inserts no. 1947 or 2520 order separately



Code no.	d1 ±0.015	d2 h6	l1	l2	Torx	Availability
	mm	mm	mm	mm		
10.000	10.000	10.000	95.20	45.00	T8	●
12.000	12.000	12.000	110.20	50.00	T15	●
16.000	16.000	16.000	125.00	65.00	T20	●
20.000	20.000	20.000	140.00	75.00	T20	●
25.000	25.000	25.000	165.00	90.00	T30	●
32.000	32.000	32.000	185.00	105.00	T30	●

Cutting values: HSC copy milling* (detailed cutting values see p. 274)

ISO Code	Hardness	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 8	10	12	16	20	25	32
P Steel	≤ 850 N/mm²	0.04xd	0.05xd	200	0.07	0.1	0.12	0.15	0.15	0.18	0.22
	850 - 1400 N/mm²	0.03xd	0.05xd	180	0.07	0.1	0.12	0.15	0.15	0.17	0.2
M Stainless steel	≤ 750 N/mm²	0.03xd	0.05xd	140	0.07	0.1	0.12	0.15	0.15	0.17	0.2
	≥ 750 N/mm²	0.02xd	0.05xd	100	0.05	0.00	0.08	0.1	0.1	0.12	0.15
N Aluminium	≤ 7% Si	0.06xd	0.05xd	280	0.07	0.1	0.12	0.15	0.15	0.2	0.25
S Ti sp.alloys	≤ 1300 N/mm²	0.02xd	0.05xd	90	0.05	0.07	0.08	0.1	0.1	0.12	0.15
H Hard. steel	up to 54 HRC	0.03xd	0.05xd	140	0.05	0.07	0.08	0.1	0.1	0.12	0.15

* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life, for hard machining air cooling is recommended
** for HSC-finishing with a_e = 0.02xd the cutting speed v_c can be increased by 50 %

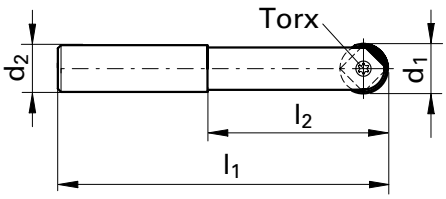
Die sinking cutter holder GF 200 WP

G

HA

Tool material	
Surface finish	nickel-plated
Discount group	140
Guhring no.	**1942**

Indexable inserts no. 1947 or 2520 order separately



Code no.	d1 ±0.015	d2 h6	l1	l2	Torx	Availability
	mm	mm	mm	mm		
10.000	10.000	12.000	150.20	35.00	T8	●
12.000	12.000	16.000	160.20	60.00	T15	●
16.000	16.000	20.000	174.50	70.00	T20	●
20.000	20.000	25.000	189.50	80.00	T20	●
25.000	25.000	32.000	210.00	100.00	T30	●
32.000	32.000	40.000	240.00	125.00	T30	●

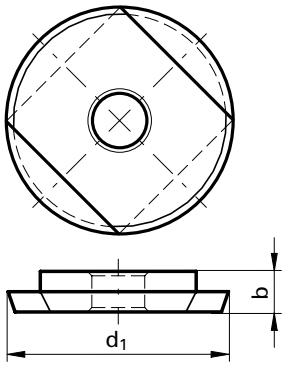
Cutting values: HSC copy milling* (detailed cutting values see p. 274)

ISO Code	Hardness	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 8	10	12	16	20	25	32
P Steel	≤ 850 N/mm²	0.04xd	0.05xd	200	0.07	0.1	0.12	0.15	0.15	0.18	0.22
	850 - 1400 N/mm²	0.03xd	0.05xd	180	0.07	0.1	0.12	0.15	0.15	0.17	0.2
M Stainless steel	≤ 750 N/mm²	0.03xd	0.05xd	140	0.07	0.1	0.12	0.15	0.15	0.17	0.2
	≥ 750 N/mm²	0.02xd	0.05xd	100	0.05	0.00	0.08	0.1	0.1	0.12	0.15
N Aluminium	≤ 7% Si	0.06xd	0.05xd	280	0.07	0.1	0.12	0.15	0.15	0.2	0.25
S Ti sp.alloys	≤ 1300 N/mm²	0.02xd	0.05xd	90	0.05	0.07	0.08	0.1	0.1	0.12	0.15
H Hard. steel	up to 54 HRC	0.03xd	0.05xd	140	0.05	0.07	0.08	0.1	0.1	0.12	0.15

* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life, for hard machining air cooling is recommended
** for HSC-finishing with a_e = 0.02xd the cutting speed v_c can be increased by 50 %

Indexable inserts round

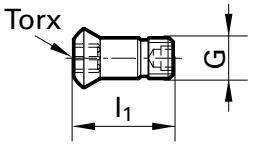
	Cermet	Sol. carb.
Tool material		
Surface finish	bright	FIRE
Discount group	141	141
Guhring no.	**1947**	**2520**



Code no.	d1 ±0.015 mm	b mm	Availability	
10.000	10.000	2.500	●	●
12.000	12.000	2.500	●	●
16.000	16.000	3.200	●	●
20.000	20.000	4.000	●	●
25.000	25.000	4.600	●	●
32.000	32.000	5.000	●	●

Clamping screws f. diesinking cutter holders

Tool material	
Surface finish	
Discount group	140
Guhring no.	**1691**



Code no.	G	l1 mm	Torx	Availability
3.000	M 3	8.50	T8	●
4.000	M 4 x 0.5	10.20	T15	●
5.000	M 5 x 0.5	12.80	T20	●
5.001	M 5 x 0.5	15.40	T20	●
6.000	M 6 x 0.75	20.40	T30	●
8.000	M 8 x 0.75	24.80	T30	●

Cutting values: HSC copy milling* (detailed cutting values see p. 274)

ISO Code	Hardness	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 8	10	12	16	20	25	32
P Steel	≤ 850 N/mm²	0.04xd	0.05xd	200	0.07	0.1	0.12	0.15	0.15	0.18	0.22
	850 - 1400 N/mm²	0.03xd	0.05xd	180	0.07	0.1	0.12	0.15	0.15	0.17	0.2
M Stainless steel	≤ 750 N/mm²	0.03xd	0.05xd	140	0.07	0.1	0.12	0.15	0.15	0.17	0.2
	≥ 750 N/mm²	0.02xd	0.05xd	100	0.05	0.00	0.08	0.1	0.1	0.12	0.15
N Aluminium	≤ 7% Si	0.06xd	0.05xd	280	0.07	0.1	0.12	0.15	0.15	0.2	0.25
S Ti sp.alloys	≤ 1300 N/mm²	0.02xd	0.05xd	90	0.05	0.07	0.08	0.1	0.1	0.12	0.15
H Hard. steel	up to 54 HRC	0.03xd	0.05xd	140	0.05	0.07	0.08	0.1	0.1	0.12	0.15

* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life, for hard machining air cooling is recommended
** for HSC-finishing with a_e = 0.02xd the cutting speed v_c can be increased by 50 %

Torx screwdriver

G

Tool material	
Surface finish	
Discount group	140
Guhring no.	**1612**

Code no.	Torx	Availability
5.001	T5	●
6.000	T6	●
7.000	T7	●
7.001	T7	●
8.000	T8	●
8.001	T8	●
9.001	T9	●
10.000	T10	●
10.001	T10	●
15.000	T15	●
15.001	T15	●
20.001	T20	●
25.000	T25	●
25.001	T25	●
30.001	T30	●

SOLID CARBIDE UNIVERSAL MILLING CUTTERS

Solid Carbide
Universal Milling Cutters

Solid carbide universal milling cutters

Helix	Z	Length	Feed	Shank design	Tool illustration	Tool material	Surface finish	Guhring no.	Discount group	Page
Chamfering milling cutters										
0°	4			HA		Solid carbide	TiAlN	**6711**	117	180
0°	4			HB		Solid carbide	TiAlN	**6712**	117	180
0°	4			HA		Solid carbide	TiAlN	**6713**	117	181
0°	4			HB		Solid carbide	TiAlN	**3396**	117	181
0°	4			HA		Solid carbide	TiAlN	**6714**	117	182
0°	4			HB		Solid carbide	TiAlN	**6715**	117	182
Front/back de-burrer										
0°	4			~HA		Solid carbide	TiAlN-nanoA	**495**	120	183
Slot drills (2-fluted) centre cutting										
30°	2			HA		Solid carbide	bright	**3194**	117	184
30°	2			HA		Solid carbide	FIRE	**3633**	117	184
30°	2			HB		Solid carbide	bright	**3294**	117	185
30°	2			HB		Solid carbide	FIRE	**3634**	117	185
30°	2			HA		Solid carbide	bright	**3195**	117	186
30°	2			HA		Solid carbide	FIRE	**3635**	117	186
30°	2			HB		Solid carbide	bright	**3295**	117	188
30°	2			HB		Solid carbide	FIRE	**3154**	117	188

Helix	Z	Length	Feed	Shank design	Tool illustration	Tool material	Surface finish	Guhring no.	Discount group	Page
Slot drills (2-fluted) centre cutting										
30°	2			HA		Solid carbide	bright	**3212**	117	190
30°	2			HA		Solid carbide	FIRE	**3709**	117	190
30°	2			HA		Solid carbide	bright	**3303**	117	192
30°	2			HA		Solid carbide	FIRE	**3676**	117	192
XL slot drills (2-fluted) centre cutting										
30°	2			HA		Solid carbide	bright	**3011**	117	194
30°	2			HA		Solid carbide	FIRE	**3021**	117	194
Al slot drills (2-fluted) centre cutting										
45°	2			HA		Solid carbide	bright	**3310**	117	195
45°	2			HB		Solid carbide	bright	**3126**	117	195
45°	2			HA		Solid carbide	bright	**3309**	117	196
45°	2			HB		Solid carbide	bright	**3059**	117	196
XL Al slot drills (2-fluted) centre cutting										
45°	2			HA		Solid carbide	bright	**3358**	117	197
Slot drills (3-fluted) centre cutting										
30°	3			HA		Solid carbide	bright	**3555**	117	198
30°	3			HA		Solid carbide	FIRE	**3558**	117	198

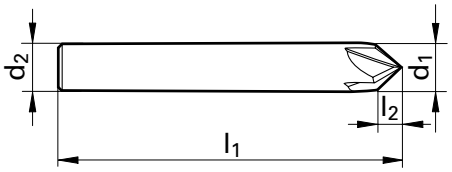
Solid carbide universal milling cutters

Helix	Z	Length	Feed	Shank design	Tool illustration	Tool material	Surface finish	Guhring no.	Discount group	Page
Slot drills (3-fluted) centre cutting										
30°	3			HB		Solid carbide	bright	**3296**	117	199
30°	3			HB		Solid carbide	FIRE	**3719**	117	199
30°	3			HA		Solid carbide	bright	**3559**	117	200
30°	3			HA		Solid carbide	FIRE	**3560**	117	200
30°	3			HB		Solid carbide	bright	**3297**	117	201
30°	3			HB		Solid carbide	FIRE	**3720**	117	201
30°	3			HA		Solid carbide	bright	**3307**	117	202
30°	3			HA		Solid carbide	FIRE	**3677**	117	202
30°	3			HA		Solid carbide	bright	**3220**	117	204
30°	3			HA		Solid carbide	FIRE	**3711**	117	204
XL slot drills (3-fluted) centre cutting										
30°	3			HA		Solid carbide	bright	**3314**	117	206
30°	3			HA		Solid carbide	FIRE	**3680**	117	206
Mini slot drills (3-fluted) centre cutting										
30°	3					Solid carbide	FIRE	**3684**	117	207
45°	3					Solid carbide	FIRE	**3686**	106	209

Helix	Z	Length	Feed	Shank design	Tool illustration	Tool material	Surface finish	Guhring no.	Discount group	Page
End mills (4-fluted) centre cutting										
30°	4			HA		Solid carbide	bright	**3198**	117	210
30°	4			HA		Solid carbide	FIRE	**3637**	117	210
30°	4			HB		Solid carbide	bright	**3298**	117	211
30°	4			HB		Solid carbide	FIRE	**3721**	117	211
30°	4			HA		Solid carbide	bright	**3197**	117	212
30°	4			HA		Solid carbide	FIRE	**3649**	117	212
30°	4			HB		Solid carbide	bright	**3299**	117	213
30°	4			HB		Solid carbide	FIRE	**3722**	117	213
30°	4			HA		Solid carbide	bright	**3304**	117	214
30°	4			HA		Solid carbide	FIRE	**3678**	117	214
30°	4			HA		Solid carbide	bright	**3257**	117	215
30°	4			HA		Solid carbide	FIRE	**3713**	117	215
XL end mills (4-fluted) centre cutting										
30°	4			HA		Solid carbide	bright	**3012**	117	216
30°	4			HA		Solid carbide	FIRE	**3023**	117	216
Pilot milling cutters centre cutting										
30°	4			HA		Solid carbide	TiAlN-SuperA	**6716**	106	218

Chamfering milling cutters

	HA	HB
Tool material	Solid carbide	Solid carbide
Surface finish	TiAlN	TiAlN
Discount group	117	117
Guhring no.	**6711**	**6712**



Code no.	d1 js9	d2 h6	l1	l2	Z	Availability	
	mm	mm	mm	mm			
4.000	4.000	4.000	50.00	3.50	4	●	
6.000	6.000	6.000	57.00	5.20	4	●	●
8.000	8.000	8.000	63.00	7.00	4	●	●
10.000	10.000	10.000	72.00	8.70	4	●	●
12.000	12.000	12.000	83.00	10.40	4	●	●

Cutting values: Chamfering and de-burring **(detailed cutting values see p. 276)**

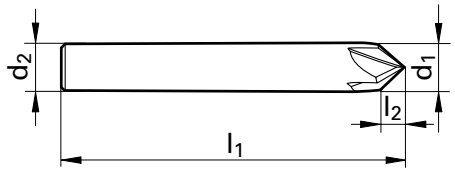
ISO Code	Hardness	Cutting speed v_c	fz (mm/z) with nom. Ø 3	6	8	10	12	16	20
P Steel	≤ 850 N/mm²	130	0.01	0.012	0.015	0.025	0.032	0.042	0.049
	850 - 1400 N/mm²	90	0.008	0.01	0.012	0.015	0.025	0.032	0.042
M Stainless steel	≤ 750 N/mm²	80	0.008	0.01	0.012	0.015	0.025	0.032	0.042
	≥ 750 N/mm²	50	0.008	0.01	0.012	0.015	0.025	0.032	0.042
K Cast mat.	≥ 240 HB 30	100	0.01	0.012	0.015	0.025	0.032	0.042	0.049
N Aluminium	≤ 7% Si	150	0.013	0.018	0.025	0.032	0.042	0.049	0.063

* Cutting speed based on the effective cutting diameter!

** For chamfering with a_p = 0.3 mm the cutting speed and feed rate can be increased by 50 %

Chamfering milling cutters

	HA	HB
Tool material	Solid carbide	Solid carbide
Surface finish	TiAlN	TiAlN
Discount group	117	117
Guhring no.	6713	3396



Code no.	d1 js9	d2 h6	l1	l2	Z	Availability	
	mm	mm	mm	mm			
4.000	4.000	4.000	50.00	2.00	4	●	
6.000	6.000	6.000	57.00	3.00	4	●	●
8.000	8.000	8.000	63.00	4.00	4	●	●
10.000	10.000	10.000	72.00	5.00	4	●	●
12.000	12.000	12.000	83.00	6.00	4	●	●

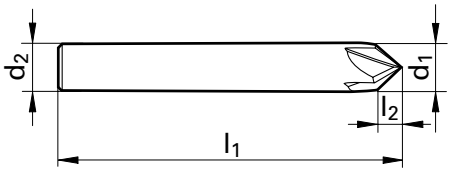
Cutting values: Chamfering and de-burring (detailed cutting values see p. 276)

ISO Code	Hardness	Cutting speed v_c	fz (mm/z) with nom. Ø 3	6	8	10	12	16	20
P Steel	≤ 850 N/mm²	130	0.01	0.012	0.015	0.025	0.032	0.042	0.049
	850 - 1400 N/mm²	90	0.008	0.01	0.012	0.015	0.025	0.032	0.042
M Stainless steel	≤ 750 N/mm²	80	0.008	0.01	0.012	0.015	0.025	0.032	0.042
	≥ 750 N/mm²	50	0.008	0.01	0.012	0.015	0.025	0.032	0.042
K Cast mat.	≥ 240 HB 30	100	0.01	0.012	0.015	0.025	0.032	0.042	0.049
N Aluminium	≤ 7% Si	150	0.013	0.018	0.025	0.032	0.042	0.049	0.063

* Cutting speed based on the effective cutting diameter!
** For chamfering with a_p = 0.3 mm the cutting speed and feed rate can be increased by 50 %

Chamfering milling cutters

	HA	HB
Tool material	Solid carbide	Solid carbide
Surface finish	TiAlN	TiAlN
Discount group	117	117
Guhring no.	**6714**	**6715**



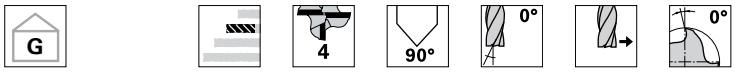
Code no.	d1 js9	d2 h6	l1	l2	Z	Availability	
	mm	mm	mm	mm			
4.000	4.000	4.000	50.00	1.20	4	●	
6.000	6.000	6.000	57.00	1.80	4	●	●
8.000	8.000	8.000	63.00	2.40	4	●	●
10.000	10.000	10.000	72.00	2.90	4	●	●
12.000	12.000	12.000	83.00	3.50	4	●	●

Cutting values: Chamfering and de-burring (detailed cutting values see p. 276)

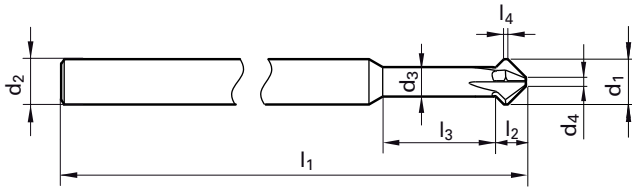
ISO Code	Hardness	Cutting speed v_c	fz (mm/z) with nom. Ø 3	6	8	10	12	16	20
P Steel	≤ 850 N/mm²	130	0.01	0.012	0.015	0.025	0.032	0.042	0.049
	850 - 1400 N/mm²	90	0.008	0.01	0.012	0.015	0.025	0.032	0.042
M Stainless steel	≤ 750 N/mm²	80	0.008	0.01	0.012	0.015	0.025	0.032	0.042
	≥ 750 N/mm²	50	0.008	0.01	0.012	0.015	0.025	0.032	0.042
K Cast mat.	≥ 240 HB 30	100	0.01	0.012	0.015	0.025	0.032	0.042	0.049
N Aluminium	≤ 7% Si	150	0.013	0.018	0.025	0.032	0.042	0.049	0.063

* Cutting speed based on the effective cutting diameter!
** For chamfering with a_p = 0.3 mm the cutting speed and feed rate can be increased by 50 %

Front/back de-burrer



Tool material	**Solid carbide**
Surface finish	TiAlN-nanoA
Discount group	120
Guhring no.	**495**



Code no.	d1	d2 h6	d3	d4	l1	l2	l3	l4	Z	Availability
	mm	mm	mm	mm	mm	mm	mm	mm		
3.000	3.000	4.000	2.200	0.600	75.00	2.10	10.00	0.50	4	●
4.000	4.000	4.000	2.900	0.800	75.00	2.70	13.00	0.50	4	●
5.000	5.000	5.000	3.900	1.000	75.00	3.00	15.00	0.50	4	●
6.000	6.000	6.000	3.900	1.200	100.00	3.50	15.00	0.50	4	●
8.000	8.000	6.000	6.000	1.600	100.00	4.70		0.50	4	●
10.000	10.000	6.000	6.000	2.000	100.00	6.50		0.50	4	●
12.000	12.000	6.000	6.000	2.400	100.00	8.30		0.50	4	●

Cutting values: Chamfering and de-burring **(detailed cutting values see p. 276)**

ISO Code	Hardness	Cutting speed v_c	fz (mm/z) with nom. Ø 3	6	8	10	12	16	20
P Steel	≤ 850 N/mm²	130	0.01	0.012	0.015	0.025	0.032	0.042	0.049
	850 - 1400 N/mm²	90	0.008	0.01	0.012	0.015	0.025	0.032	0.042
M Stainless steel	≤ 750 N/mm²	80	0.008	0.01	0.012	0.015	0.025	0.032	0.042
	≥ 750 N/mm²	50	0.008	0.01	0.012	0.015	0.025	0.032	0.042
K Cast mat.	≥ 240 HB 30	100	0.01	0.012	0.015	0.025	0.032	0.042	0.049
N Aluminium	≤ 7% Si	150	0.013	0.018	0.025	0.032	0.042	0.049	0.063

* Cutting speed based on the effective cutting diameter!

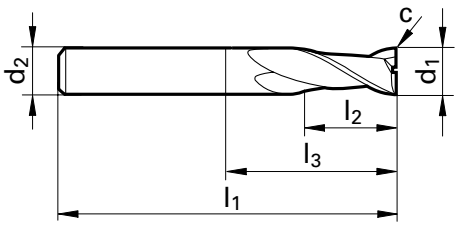
** For chamfering with a_p = 0.3 mm the cutting speed and feed rate can be increased by 50 %

Slot drills (2-fluted)

centre cutting

DIN 6527 | N | 2 | 30° | 45° | 9°

	HA	HA
Tool material	Solid carbide	
Surface finish	bright	FIRE
Discount group	117	117
Guhring no.	**3194**	**3633**



Code no.	d1 h10	d2 h6	l1	l2	l3	c	Z	Availability	
	mm	mm	mm	mm	mm	mm x 45°			
2.000	2.000	6.000	50.00	3.00	6.40	0.03	2	●	●
2.500	2.500	6.000	50.00	3.00	6.40	0.05	2	●	●
3.000	3.000	6.000	50.00	4.00	8.90	0.05	2	●	●
4.000	4.000	6.000	54.00	5.00	10.40	0.05	2	●	●
5.000	5.000	6.000	54.00	6.00	12.90	0.05	2	●	●
6.000	6.000	6.000	54.00	7.00	18.00	0.05	2	●	●
6.500	6.500	8.000	58.00	8.00	17.40	0.10	2	●	●
8.000	8.000	8.000	58.00	9.00	22.00	0.10	2	●	●
10.000	10.000	10.000	66.00	11.00	26.00	0.10	2	●	●
12.000	12.000	12.000	73.00	12.00	28.00	0.10	2	●	●
14.000	14.000	14.000	75.00	14.00	30.00	0.15	2	●	●
16.000	16.000	16.000	82.00	16.00	34.00	0.15	2	●	●
18.000	18.000	18.000	84.00	18.00	36.00	0.15	2	●	●
20.000	20.000	20.000	92.00	20.00	42.00	0.15	2	●	●

Cutting values: Slotting* and roughing (detailed cutting values see p. 276)

ISO Code	Hardness	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 2	4	6	8	10	12	16	20
P Steel	≤ 850 N/mm²	0.5xd	1xd	125	0.013	0.018	0.025	0.032	0.042	0.049	0.063	0.07
	850 - 1400 N/mm²	0.5xd	1xd	95	0.01	0.015	0.02	0.024	0.033	0.039	0.048	0.057
M Stainless steel	≤ 750 N/mm²	0.5xd	1xd	85	0.01	0.015	0.02	0.024	0.033	0.039	0.048	0.057
	≥ 750 N/mm²	0.5xd	1xd	50	0.007	0.01	0.015	0.018	0.027	0.03	0.039	0.048
K Cast mat.	≥ 240 HB 30	0.5xd	1xd	100	0.01	0.015	0.02	0.024	0.033	0.039	0.048	0.057
N Aluminium	≤ 7% Si	1xd	1xd	160	0.013	0.018	0.025	0.032	0.042	0.049	0.063	0.07

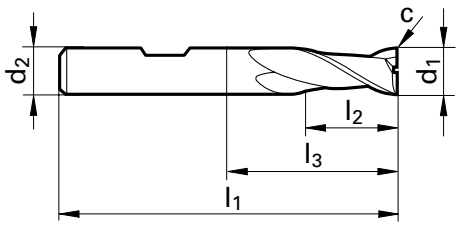
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life
** for slotting with a_e = 0.02xd the cutting speed v_c can be increased by 50 %
All recommendations are valid for coated tools. For bright milling cutters please v_c -40 % and f_z -25 %!

Slot drills (2-fluted)

centre cutting

DIN 6527 | N | 2 | 30° | 45° | 9° | HB | HB

	Solid carbide	
Tool material		
Surface finish	bright	FIRE
Discount group	117	117
Guhring no.	**3294**	**3634**



Code no.	d1 h10	d2 h6	l1	l2	l3	c	Z	Availability	
	mm	mm	mm	mm	mm	mm x 45°			
2.000	2.000	6.000	50.00	3.00	6.40	0.03	2	●	●
2.500	2.500	6.000	50.00	3.00	6.40	0.05	2	●	●
3.000	3.000	6.000	50.00	4.00	8.90	0.05	2	●	●
4.000	4.000	6.000	54.00	5.00	10.40	0.05	2	●	●
5.000	5.000	6.000	54.00	6.00	12.90	0.05	2	●	●
6.000	6.000	6.000	54.00	7.00	18.00	0.05	2	●	●
6.500	6.500	8.000	58.00	8.00	17.40	0.10	2	●	●
8.000	8.000	8.000	58.00	9.00	22.00	0.10	2	●	●
10.000	10.000	10.000	66.00	11.00	26.00	0.10	2	●	●
12.000	12.000	12.000	73.00	12.00	28.00	0.10	2	●	●
14.000	14.000	14.000	75.00	14.00	30.00	0.15	2	●	●
16.000	16.000	16.000	82.00	16.00	34.00	0.15	2	●	●
18.000	18.000	18.000	84.00	18.00	36.00	0.15	2	●	●
20.000	20.000	20.000	92.00	20.00	42.00	0.15	2	●	●

Cutting values: Slotting* and roughing (detailed cutting values see p. 276)

ISO Code	Hardness	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 2	4	6	8	10	12	16	20
P Steel	≤ 850 N/mm²	0.5xd	1xd	125	0.013	0.018	0.025	0.032	0.042	0.049	0.063	0.07
	850 - 1400 N/mm²	0.5xd	1xd	95	0.01	0.015	0.02	0.024	0.033	0.039	0.048	0.057
M Stainless steel	≤ 750 N/mm²	0.5xd	1xd	85	0.01	0.015	0.02	0.024	0.033	0.039	0.048	0.057
	≥ 750 N/mm²	0.5xd	1xd	50	0.007	0.01	0.015	0.018	0.027	0.03	0.039	0.048
K Cast mat.	≥ 240 HB 30	0.5xd	1xd	100	0.01	0.015	0.02	0.024	0.033	0.039	0.048	0.057
N Aluminium	≤ 7% Si	1xd	1xd	160	0.013	0.018	0.025	0.032	0.042	0.049	0.063	0.07

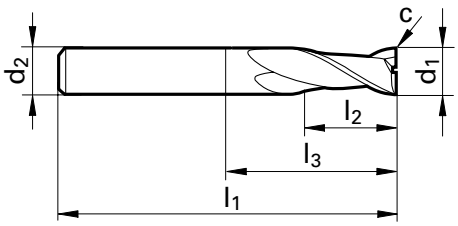
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life
** for slotting with a_e = 0.02xd the cutting speed v_c can be increased by 50 %
All recommendations are valid for coated tools. For bright milling cutters please v_c -40 % and f_z -25 %!

Slot drills (2-fluted)

centre cutting

DIN 6527 | N | 2 | 30° | 45° | 9° | HA | HA

	Solid carbide	
Tool material		
Surface finish	bright	FIRE
Discount group	117	117
Guhring no.	**3195**	**3635**



Code no.	d1 h10	d2 h6	l1	l2	l3	c	Z	Availability	
	mm	mm	mm	mm	mm	mm x 45°			
1.000	1.000	3.000	38.00	2.00	3.90	0.03	2	●	●
1.500	1.500	3.000	38.00	3.00	6.40	0.03	2	●	●
2.000	2.000	6.000	57.00	6.00	9.40	0.03	2	●	●
2.500	2.500	6.000	57.00	7.00	10.40	0.05	2	●	●
2.800	2.800	6.000	57.00	7.00	11.90	0.05	2	●	●
3.000	3.000	6.000	57.00	7.00	11.90	0.05	2	●	●
3.500	3.500	6.000	57.00	7.00	12.40	0.05	2	●	●
3.800	3.800	6.000	57.00	8.00	13.40	0.05	2	●	●
4.000	4.000	6.000	57.00	8.00	13.40	0.05	2	●	●
4.500	4.500	6.000	57.00	8.00	14.90	0.05	2	●	●
4.800	4.800	6.000	57.00	10.00	16.90	0.05	2	●	●
5.000	5.000	6.000	57.00	10.00	16.90	0.05	2	●	●
5.500	5.500	6.000	57.00	10.00	17.40	0.05	2	●	●
5.750	5.750	6.000	57.00	10.00	18.40	0.05	2	●	●
6.000	6.000	6.000	57.00	10.00	21.00	0.05	2	●	●
6.750	6.750	8.000	63.00	13.00	22.40	0.10	2	●	●
7.000	7.000	8.000	63.00	13.00	22.40	0.10	2	●	●
7.500	7.500	8.000	63.00	16.00	25.40	0.10	2	●	●
7.750	7.750	8.000	63.00	16.00	25.40	0.10	2	●	●
8.000	8.000	8.000	63.00	16.00	27.00	0.10	2	●	●
8.700	8.700	10.000	72.00	16.00	27.40	0.10	2	●	●
9.000	9.000	10.000	72.00	16.00	27.40	0.10	2	●	●
9.700	9.700	10.000	72.00	19.00	30.40	0.10	2	●	●
10.000	10.000	10.000	72.00	19.00	32.00	0.10	2	●	●

Cutting values: Slotting* and roughing (detailed cutting values see p. 276)

ISO Code	Hardness	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 2	4	6	8	10	12	16	20
P Steel	≤ 850 N/mm²	0.5xd	1xd	125	0.013	0.018	0.025	0.032	0.042	0.049	0.063	0.07
	850 - 1400 N/mm²	0.5xd	1xd	95	0.01	0.015	0.02	0.024	0.033	0.039	0.048	0.057
M Stainless steel	≤ 750 N/mm²	0.5xd	1xd	85	0.01	0.015	0.02	0.024	0.033	0.039	0.048	0.057
	≥ 750 N/mm²	0.5xd	1xd	50	0.007	0.01	0.015	0.018	0.027	0.03	0.039	0.048
K Cast mat.	≥ 240 HB 30	0.5xd	1xd	100	0.01	0.015	0.02	0.024	0.033	0.039	0.048	0.057
N Aluminium	≤ 7% Si	1xd	1xd	160	0.013	0.018	0.025	0.032	0.042	0.049	0.063	0.07

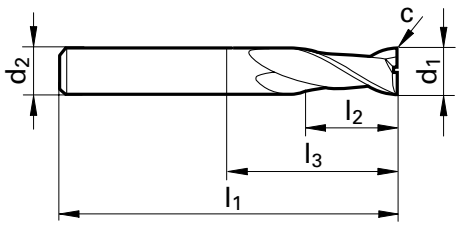
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life
** for slotting with a_e = 0.02xd the cutting speed v_c can be increased by 50 %
All recommendations are valid for coated tools. For bright milling cutters please v_c -40 % and f_z -25 %!

Slot drills (2-fluted)

centre cutting

DIN 6527 | N | 2 | 30° | 45° | 9° | HA | HA

	Solid carbide	
Tool material		
Surface finish	bright	FIRE
Discount group	117	117
Guhring no.	**3195**	**3635**



Code no.	d1 h10	d2 h6	l1	l2	l3	c	Z	Availability	
	mm	mm	mm	mm	mm	mm x 45°			
11.700	11.700	12.000	83.00	22.00	38.00	0.10	2	●	●
12.000	12.000	12.000	83.00	22.00	38.00	0.10	2	●	●
13.700	13.700	14.000	83.00	22.00	38.00	0.15	2	●	●
14.000	14.000	14.000	83.00	22.00	38.00	0.15	2	●	●
14.001	14.000	16.000	92.00	26.00	44.00	0.15	2	●	●
15.700	15.700	16.000	92.00	26.00	44.00	0.15	2	●	●
16.000	16.000	16.000	92.00	26.00	44.00	0.15	2	●	●
18.000	18.000	18.000	92.00	26.00	44.00	0.15	2	●	●
18.001	18.000	20.000	104.00	32.00	54.00	0.15	2	●	●
20.000	20.000	20.000	104.00	32.00	54.00	0.15	2	●	●

Cutting values: Slotting* and roughing (detailed cutting values see p. 276)

ISO Code	Hardness	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 2	4	6	8	10	12	16	20
P Steel	≤ 850 N/mm²	0.5xd	1xd	125	0.013	0.018	0.025	0.032	0.042	0.049	0.063	0.07
	850 - 1400 N/mm²	0.5xd	1xd	95	0.01	0.015	0.02	0.024	0.033	0.039	0.048	0.057
M Stainless steel	≤ 750 N/mm²	0.5xd	1xd	85	0.01	0.015	0.02	0.024	0.033	0.039	0.048	0.057
	≥ 750 N/mm²	0.5xd	1xd	50	0.007	0.01	0.015	0.018	0.027	0.03	0.039	0.048
K Cast mat.	≥ 240 HB 30	0.5xd	1xd	100	0.01	0.015	0.02	0.024	0.033	0.039	0.048	0.057
N Aluminium	≤ 7% Si	1xd	1xd	160	0.013	0.018	0.025	0.032	0.042	0.049	0.063	0.07

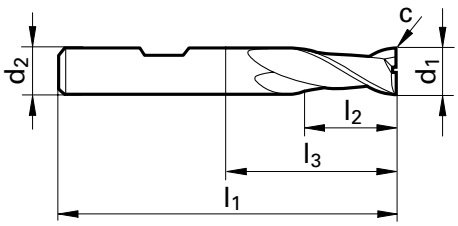
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life
** for slotting with a_e = 0.02xd the cutting speed v_c can be increased by 50 %
All recommendations are valid for coated tools. For bright milling cutters please v_c -40 % and f_z -25 %!

Slot drills (2-fluted)

centre cutting

DIN 6527 | N | 2 | 30° | 45° | 9° | HB | HB

	Solid carbide	
Tool material		
Surface finish	bright	FIRE
Discount group	117	117
Guhring no.	**3295**	**3154**



Code no.	d1 h10	d2 h6	l1	l2	l3	c	Z	Availability	
	mm	mm	mm	mm	mm	mm x 45°			
2.000	2.000	6.000	57.00	6.00	9.40	0.03	2	●	●
2.500	2.500	6.000	57.00	7.00	10.40	0.05	2	●	●
2.800	2.800	6.000	57.00	7.00	11.90	0.05	2	●	●
3.000	3.000	6.000	57.00	7.00	11.90	0.05	2	●	●
3.500	3.500	6.000	57.00	7.00	12.40	0.05	2	●	●
3.800	3.800	6.000	57.00	8.00	13.40	0.05	2	●	●
4.000	4.000	6.000	57.00	8.00	13.40	0.05	2	●	●
4.500	4.500	6.000	57.00	8.00	14.90	0.05	2	●	●
4.800	4.800	6.000	57.00	10.00	16.90	0.05	2	●	●
5.000	5.000	6.000	57.00	10.00	16.90	0.05	2	●	●
5.500	5.500	6.000	57.00	10.00	17.40	0.05	2	●	●
5.750	5.750	6.000	57.00	10.00	18.40	0.05	2	●	●
6.000	6.000	6.000	57.00	10.00	21.00	0.05	2	●	●
6.750	6.750	8.000	63.00	13.00	22.40	0.10	2	●	●
7.000	7.000	8.000	63.00	13.00	22.40	0.10	2	●	●
7.500	7.500	8.000	63.00	16.00	25.40	0.10	2	●	●
7.750	7.750	8.000	63.00	16.00	25.40	0.10	2	●	●
8.000	8.000	8.000	63.00	16.00	27.00	0.10	2	●	●
8.700	8.700	10.000	72.00	16.00	27.40	0.10	2	●	●
9.000	9.000	10.000	72.00	16.00	27.40	0.10	2	●	●
9.700	9.700	10.000	72.00	19.00	30.40	0.10	2	●	●
10.000	10.000	10.000	72.00	19.00	32.00	0.10	2	●	●
11.700	11.700	12.000	83.00	22.00	38.00	0.10	2	●	●
12.000	12.000	12.000	83.00	22.00	38.00	0.10	2	●	●

Cutting values: Slotting* and roughing (detailed cutting values see p. 276)

ISO Code	Hardness	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 2	4	6	8	10	12	16	20
P Steel	≤ 850 N/mm²	0.5xd	1xd	125	0.013	0.018	0.025	0.032	0.042	0.049	0.063	0.07
	850 - 1400 N/mm²	0.5xd	1xd	95	0.01	0.015	0.02	0.024	0.033	0.039	0.048	0.057
M Stainless steel	≤ 750 N/mm²	0.5xd	1xd	85	0.01	0.015	0.02	0.024	0.033	0.039	0.048	0.057
	≥ 750 N/mm²	0.5xd	1xd	50	0.007	0.01	0.015	0.018	0.027	0.03	0.039	0.048
K Cast mat.	≥ 240 HB 30	0.5xd	1xd	100	0.01	0.015	0.02	0.024	0.033	0.039	0.048	0.057
N Aluminium	≤ 7% Si	1xd	1xd	160	0.013	0.018	0.025	0.032	0.042	0.049	0.063	0.07

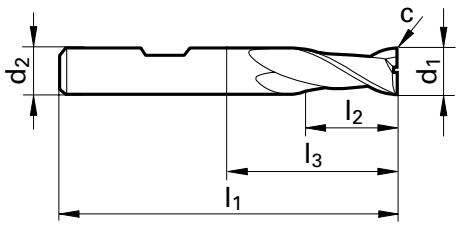
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life
** for slotting with a_e = 0.02xd the cutting speed v_c can be increased by 50 %
All recommendations are valid for coated tools. For bright milling cutters please v_c -40 % and f_z -25 %!

Slot drills (2-fluted)

centre cutting

DIN 6527 | N | 2 | 30° | 45° | 9° | HB | HB

	Solid carbide	
Tool material		
Surface finish	bright	FIRE
Discount group	117	117
Guhring no.	**3295**	**3154**



Code no.	d1 h10	d2 h6	l1	l2	l3	c	Z	Availability	
	mm	mm	mm	mm	mm	mm x 45°			
13.700	13.700	14.000	83.00	22.00	38.00	0.15	2	●	●
14.000	14.000	14.000	83.00	22.00	38.00	0.15	2	●	●
15.700	15.700	16.000	92.00	26.00	44.00	0.15	2	●	●
16.000	16.000	16.000	92.00	26.00	44.00	0.15	2	●	●
18.000	18.000	18.000	92.00	26.00	44.00	0.15	2	●	●
20.000	20.000	20.000	104.00	32.00	54.00	0.15	2	●	●

Cutting values: Slotting* and roughing (detailed cutting values see p. 276)

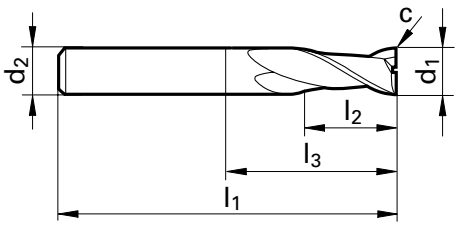
ISO Code	Hardness	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 2	4	6	8	10	12	16	20
P Steel	≤ 850 N/mm²	0.5xd	1xd	125	0.013	0.018	0.025	0.032	0.042	0.049	0.063	0.07
	850 - 1400 N/mm²	0.5xd	1xd	95	0.01	0.015	0.02	0.024	0.033	0.039	0.048	0.057
M Stainless steel	≤ 750 N/mm²	0.5xd	1xd	85	0.01	0.015	0.02	0.024	0.033	0.039	0.048	0.057
	≥ 750 N/mm²	0.5xd	1xd	50	0.007	0.01	0.015	0.018	0.027	0.03	0.039	0.048
K Cast mat.	≥ 240 HB 30	0.5xd	1xd	100	0.01	0.015	0.02	0.024	0.033	0.039	0.048	0.057
N Aluminium	≤ 7% Si	1xd	1xd	160	0.013	0.018	0.025	0.032	0.042	0.049	0.063	0.07

* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life
** for slotting with a_e = 0.02xd the cutting speed v_c can be increased by 50 %
All recommendations are valid for coated tools. For bright milling cutters please v_c -40 % and f_z -25 %!

Slot drills (2-fluted)

centre cutting

G	N		2	30°	45°		9°	HA	HA
Tool material								Solid carbide	
Surface finish								bright	FIRE
Discount group								117	117
Guhring no.								**3212**	**3709**



Code no.	d1 h10	d2 h6	l1	l2	l3	c	Z	Availability	
	mm	mm	mm	mm	mm	mm x 45°			
2.000	2.000	2.000	32.00	8.00	16.00	0.03	2	●	●
2.500	2.500	2.500	32.00	8.00	16.00	0.05	2	●	●
3.000	3.000	3.000	32.00	12.00	21.00	0.05	2	●	●
3.500	3.500	3.500	32.00	12.00	22.00	0.05	2	●	●
4.000	4.000	4.000	40.00	12.00	22.00	0.05	2	●	●
4.500	4.500	4.500	50.00	14.00	25.00	0.05	2	●	●
5.000	5.000	5.000	50.00	14.00	25.00	0.05	2	●	●
5.500	5.500	5.500	50.00	16.00	27.00	0.05	2	●	●
6.000	6.000	6.000	50.00	16.00	28.00	0.05	2	●	●
6.500	6.500	6.500	60.00	16.00	29.00	0.10	2	●	●
7.000	7.000	7.000	60.00	20.00	33.00	0.10	2	●	●
7.500	7.500	7.500	60.00	20.00	33.00	0.10	2	●	●
8.000	8.000	8.000	60.00	20.00	33.00	0.10	2	●	●
8.500	8.500	8.500	60.00	20.00	35.00	0.10	2	●	●
9.000	9.000	9.000	60.00	20.00	35.00	0.10	2	●	●
9.500	9.500	9.500	70.00	22.00	37.00	0.10	2	●	●
10.000	10.000	10.000	70.00	22.00	37.00	0.10	2	●	●
11.000	11.000	11.000	70.00	22.00	39.00	0.10	2	●	●
12.000	12.000	12.000	70.00	22.00	40.00	0.10	2	●	●
13.000	13.000	13.000	75.00	25.00	44.00	0.15	2	●	●
14.000	14.000	14.000	75.00	25.00	44.00	0.15	2	●	●
15.000	15.000	15.000	75.00	25.00	46.00	0.15	2	●	●
16.000	16.000	16.000	75.00	25.00	46.00	0.15	2	●	●
18.000	18.000	18.000	100.00	35.00	57.00	0.15	2	●	●

Cutting values: Slotting* and roughing (detailed cutting values see p. 276)

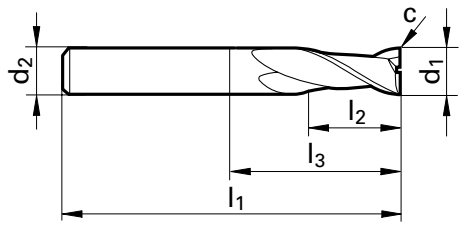
ISO Code	Hardness	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 2	4	6	8	10	12	16	20
P Steel	≤ 850 N/mm²	0.5xd	1xd	125	0.013	0.018	0.025	0.032	0.042	0.049	0.063	0.07
	850 - 1400 N/mm²	0.5xd	1xd	95	0.01	0.015	0.02	0.024	0.033	0.039	0.048	0.057
M Stainless steel	≤ 750 N/mm²	0.5xd	1xd	85	0.01	0.015	0.02	0.024	0.033	0.039	0.048	0.057
	≥ 750 N/mm²	0.5xd	1xd	50	0.007	0.01	0.015	0.018	0.027	0.03	0.039	0.048
K Cast mat.	≥ 240 HB 30	0.5xd	1xd	100	0.01	0.015	0.02	0.024	0.033	0.039	0.048	0.057
N Aluminium	≤ 7% Si	1xd	1xd	160	0.013	0.018	0.025	0.032	0.042	0.049	0.063	0.07

* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life
** for slotting with a_e = 0.02xd the cutting speed v_c can be increased by 50 %
All recommendations are valid for coated tools. For bright milling cutters please v_c -40 % and f_z -25 %!

Slot drills (2-fluted)

centre cutting

G	N		2	30°	45°		9°	HA	HA
Tool material								Solid carbide	
Surface finish								bright	FIRE
Discount group								117	117
Guhring no.								**3212**	**3709**



Code no.	d1 h10	d2 h6	l1	l2	l3	c	Z	Availability	
	mm	mm	mm	mm	mm	mm x 45°			
20.000	20.000	20.000	100.00	35.00	59.00	0.15	2	●	●

RF 100 U -
High performance end mills
for materials up to 1600 N/mm² (48 HRC)

Summary of advantages

- available 3-fluted for extreme feed rates
- large selection
- new end geometry with three faceted centre cutting edges
- large chip space

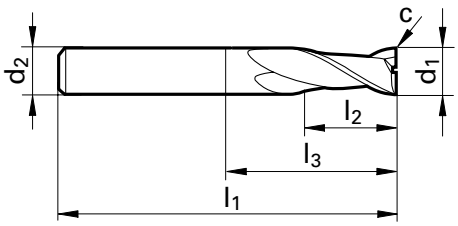
Programme from page 15.

Slot drills (2-fluted)

centre cutting

DIN 6528 | N | 2 | 30° | 45° | 9° | HA | HA

	Solid carbide	
Tool material		
Surface finish	bright	FIRE
Discount group	117	117
Guhring no.	**3303**	**3676**



Code no.	d1 h10	d2 h6	l1	l2	l3	c	Z	Availability	
	mm	mm	mm	mm	mm	mm x 45°			
2.000	2.000	2.000	32.00	5.00	7.50	0.03	2	●	●
2.500	2.500	2.500	32.00	6.00	8.50	0.05	2	●	●
3.000	3.000	3.000	38.00	7.00	11.00	0.05	2	●	●
3.500	3.500	3.500	50.00	7.00	22.00	0.05	2	●	●
4.000	4.000	4.000	50.00	8.00	22.00	0.05	2	●	●
4.500	4.500	4.500	50.00	8.00	22.00	0.05	2	●	●
5.000	5.000	5.000	50.00	10.00	22.00	0.05	2	●	●
5.500	5.500	5.500	57.00	10.00	21.00	0.05	2	●	●
6.000	6.000	6.000	57.00	10.00	21.00	0.05	2	●	●
6.500	6.500	6.500	60.00	13.00	24.00	0.10	2	●	●
7.000	7.000	7.000	60.00	13.00	24.00	0.10	2	●	●
7.500	7.500	7.500	63.00	16.00	27.00	0.10	2	●	●
8.000	8.000	8.000	63.00	16.00	27.00	0.10	2	●	●
8.500	8.500	8.500	67.00	16.00	27.00	0.10	2	●	●
9.000	9.000	9.000	67.00	16.00	27.00	0.10	2	●	●
9.500	9.500	9.500	72.00	19.00	32.00	0.10	2	●	●
10.000	10.000	10.000	72.00	19.00	32.00	0.10	2	●	●
11.000	11.000	11.000	83.00	22.00	38.00	0.10	2	●	●
12.000	12.000	12.000	83.00	22.00	38.00	0.10	2	●	●
13.000	13.000	13.000	83.00	22.00	38.00	0.15	2	●	●
14.000	14.000	14.000	83.00	22.00	38.00	0.15	2	●	●
15.000	15.000	15.000	92.00	26.00	44.00	0.15	2	●	●
16.000	16.000	16.000	92.00	26.00	44.00	0.15	2	●	●
18.000	18.000	18.000	92.00	26.00	44.00	0.15	2	●	●

Cutting values: Slotting* and roughing (detailed cutting values see p. 276)

ISO Code	Hardness	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 2	4	6	8	10	12	16	20
P Steel	≤ 850 N/mm²	0.5xd	1xd	125	0.013	0.018	0.025	0.032	0.042	0.049	0.063	0.07
	850 - 1400 N/mm²	0.5xd	1xd	95	0.01	0.015	0.02	0.024	0.033	0.039	0.048	0.057
M Stainless steel	≤ 750 N/mm²	0.5xd	1xd	85	0.01	0.015	0.02	0.024	0.033	0.039	0.048	0.057
	≥ 750 N/mm²	0.5xd	1xd	50	0.007	0.01	0.015	0.018	0.027	0.03	0.039	0.048
K Cast mat.	≥ 240 HB 30	0.5xd	1xd	100	0.01	0.015	0.02	0.024	0.033	0.039	0.048	0.057
N Aluminium	≤ 7% Si	1xd	1xd	160	0.013	0.018	0.025	0.032	0.042	0.049	0.063	0.07

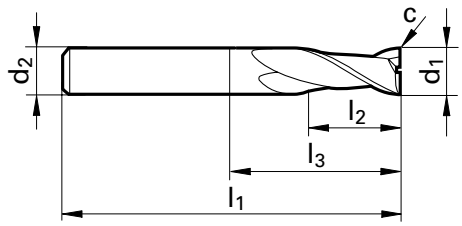
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life
** for slotting with a_e = 0.02xd the cutting speed v_c can be increased by 50 %
All recommendations are valid for coated tools. For bright milling cutters please v_c -40 % and f_z -25 %!

Slot drills (2-fluted)

centre cutting

DIN 6528 | N | 2 | 30° | 45° | 9° | HA | HA

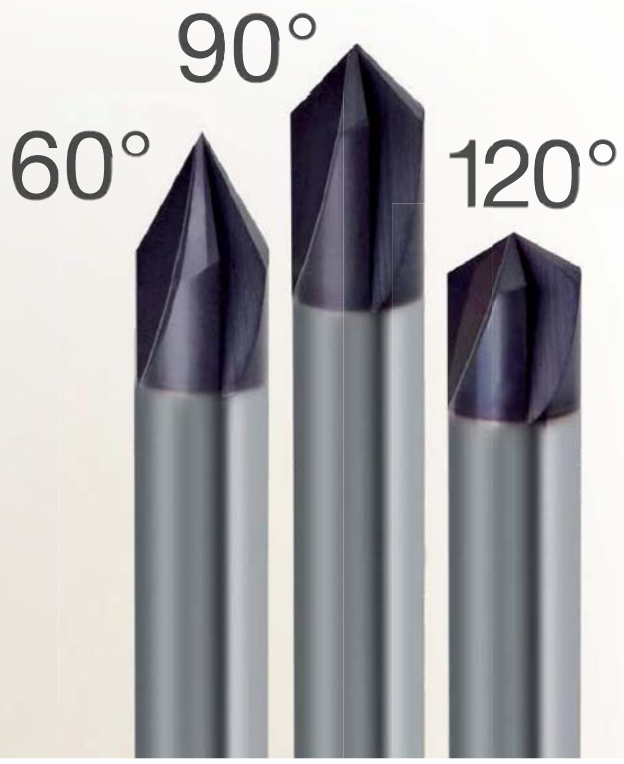
Tool material	Solid carbide	
Surface finish	bright	FIRE
Discount group	117	117
Guhring no.	**3303**	**3676**



Code no.	d1 h10	d2 h6	l1	l2	l3	c	Z	Availability	
	mm	mm	mm	mm	mm	mm x 45°			
20.000	20.000	20.000	104.00	32.00	54.00	0.15	2	●	●

Chamfering milling cutters

with radial relief geometry for chamfering, de-burring and contour operations



Summary of advantages

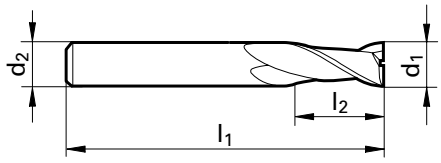
- radially relief ground
- universal application for all materials
- wear-resistant TiAlN-coating

Programme from page 180.

XL slot drills (2-fluted)

centre cutting

Tool material	Solid carbide	
Surface finish	bright	FIRE
Discount group	117	117
Guhring no.	**3011**	**3021**



Code no.	d1 h10	d2 h6	l1	l2	l3	c	Z	Availability	
	mm	mm	mm	mm	mm	mm x 45°			
3.000	3.000	3.000	75.00	20.00	47.00	0.05	2	●	●
4.000	4.000	4.000	75.00	25.00	47.00	0.05	2	●	●
5.000	5.000	5.000	75.00	30.00	47.00	0.05	2	●	●
6.000	6.000	6.000	75.00	30.00	39.00	0.05	2	●	●
8.000	8.000	8.000	100.00	40.00	64.00	0.10	2	●	●
10.000	10.000	10.000	100.00	40.00	60.00	0.10	2	●	●
12.000	12.000	12.000	150.00	45.00	105.00	0.10	2	●	●
14.000	14.000	14.000	150.00	45.00	105.00	0.15	2	●	●
14.001	14.000	16.000	150.00	65.00	102.00	0.15	2	●	●
16.000	16.000	16.000	150.00	65.00	102.00	0.15	2	●	●
18.000	18.000	18.000	150.00	65.00	102.00	0.15	2	●	●
18.001	18.000	20.000	150.00	65.00	100.00	0.15	2	●	●
20.000	20.000	20.000	150.00	65.00	100.00	0.15	2	●	●

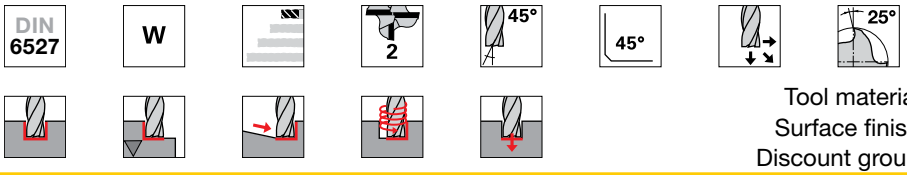
Cutting values: Slotting* and roughing (detailed cutting values see p. 276)

ISO Code	Hardness	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 2	4	6	8	10	12	16	20
P Steel	≤ 850 N/mm²	0.5xd	1xd	125	0.013	0.018	0.025	0.032	0.042	0.049	0.063	0.07
	850 - 1400 N/mm²	0.5xd	1xd	95	0.01	0.015	0.02	0.024	0.033	0.039	0.048	0.057
M Stainless steel	≤ 750 N/mm²	0.5xd	1xd	85	0.01	0.015	0.02	0.024	0.033	0.039	0.048	0.057
	≥ 750 N/mm²	0.5xd	1xd	50	0.007	0.01	0.015	0.018	0.027	0.03	0.039	0.048
K Cast mat.	≥ 240 HB 30	0.5xd	1xd	100	0.01	0.015	0.02	0.024	0.033	0.039	0.048	0.057
N Aluminium	≤ 7% Si	1xd	1xd	160	0.013	0.018	0.025	0.032	0.042	0.049	0.063	0.07

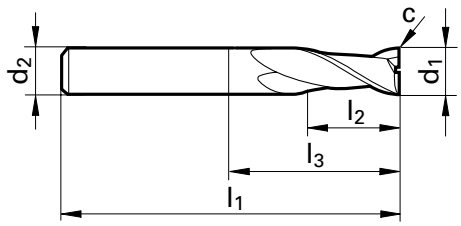
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life
** for slotting with a_e = 0.02xd the cutting speed v_c can be increased by 50 %
All recommendations are valid for coated tools. For bright milling cutters please v_c -40 % and f_z -25 %!

Al slot drills (2-fluted)

centre cutting



Tool material	Solid carbide	
Surface finish	bright	bright
Discount group	117	117
Guhring no.	**3310**	**3126**



Code no.	d1 e8	d2 h6	l1	l2	l3	c	Z	Availability	
	mm	mm	mm	mm	mm	mm x 45°			
3.000	3.000	6.000	50.00	4.00	7.90	0.03	2	●	●
4.000	4.000	6.000	54.00	5.00	8.90	0.03	2	●	●
5.000	5.000	6.000	54.00	6.00	11.40	0.03	2	●	●
6.000	6.000	6.000	54.00	7.00	18.00	0.03	2	●	●
8.000	8.000	8.000	58.00	9.00	22.00	0.05	2	●	●
10.000	10.000	10.000	66.00	11.00	26.00	0.05	2	●	●
12.000	12.000	12.000	73.00	12.00	28.00	0.10	2	●	●
14.000	14.000	14.000	75.00	14.00	30.00	0.10	2	●	●
16.000	16.000	16.000	82.00	16.00	34.00	0.10	2	●	●
18.000	18.000	18.000	84.00	18.00	36.00	0.10	2	●	●
20.000	20.000	20.000	92.00	20.00	42.00	0.10	2	●	●

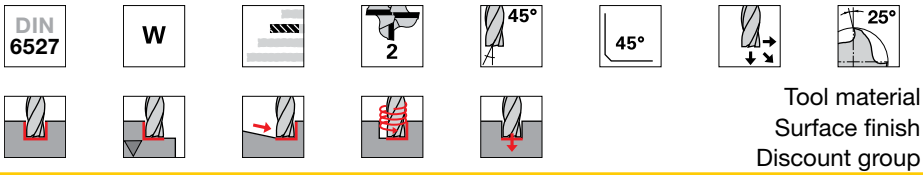
Cutting values: Slotting and HPC-Roughing* (detailed cutting values see p. 277)

ISO Code	Hardness***	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 3	6	8	10	12	16	20
N Aluminium	≤ 3% Si	1xd	1xd	600	0.03	0.045	0.05	0.065	0.08	0.12	0.14
	≤ 7% Si	1xd	1xd	280	0.025	0.03	0.045	0.05	0.065	0.08	0.12

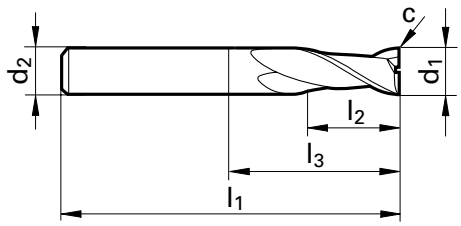
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life
** for trochoidal milling and imachining with a_p 2xd and a_e 0.15xd the cutting speed and feed rate can be increased by 50 %
*** as an option we can provide our Carbo-coating as a special tool for soft and sticky aluminium alloys and plastics

Al slot drills (2-fluted)

centre cutting



	Solid carbide	
Tool material		
Surface finish	bright	bright
Discount group	117	117
Guhring no.	**3309**	**3059**



Code no.	d1 e8	d2 h6	l1	l2	l3	c	Z	Availability	
	mm	mm	mm	mm	mm	mm x 45°			
3.000	3.000	6.000	57.00	7.00	10.90	0.03	2	●	●
4.000	4.000	6.000	57.00	8.00	11.90	0.03	2	●	●
5.000	5.000	6.000	57.00	10.00	15.40	0.03	2	●	●
6.000	6.000	6.000	57.00	10.00	21.00	0.03	2	●	●
8.000	8.000	8.000	63.00	16.00	27.00	0.05	2	●	●
10.000	10.000	10.000	72.00	19.00	32.00	0.05	2	●	●
12.000	12.000	12.000	83.00	22.00	38.00	0.10	2	●	●
14.000	14.000	14.000	83.00	22.00	38.00	0.10	2	●	●
14.001	14.000	16.000	92.00	26.00	44.00	0.10	2	●	
16.000	16.000	16.000	92.00	26.00	44.00	0.10	2	●	●
18.000	18.000	18.000	92.00	26.00	44.00	0.10	2	●	●
18.001	18.000	20.000	104.00	32.00	54.00	0.10	2	●	
20.000	20.000	20.000	104.00	32.00	54.00	0.10	2	●	●

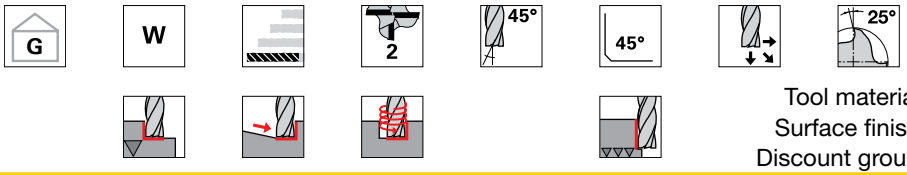
Cutting values: Slotting and HPC-Roughing* (detailed cutting values see p. 277)

ISO Code	Hardness***	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 3	6	8	10	12	16	20
N Aluminium	≤ 3% Si	1xd	1xd	600	0.03	0.045	0.05	0.065	0.08	0.12	0.14
	≤ 7% Si	1xd	1xd	280	0.025	0.03	0.045	0.05	0.065	0.08	0.12

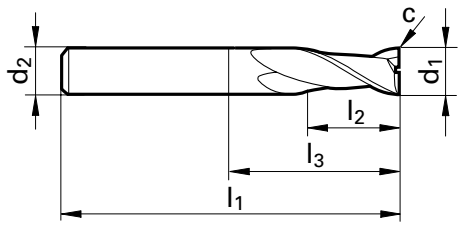
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life
** for trochoidal milling and imachining with ap 2xd and ae 0.15xd the cutting speed and feed rate can be increased by 50 %
*** as an option we can provide our Carbo-coating as a special tool for soft and sticky aluminium alloys and plastics

XL Al slot drills (2-fluted)

centre cutting



Tool material	**Solid carbide**
Surface finish	bright
Discount group	117
Guhring no.	**3358**



Code no.	d1 h10	d2 h6	l1	l2	l3	c	Z	Availability
	mm	mm	mm	mm	mm	mm x 45°		
5.000	5.000	5.000	75.00	30.00	47.00	0.03	2	●
6.000	6.000	6.000	75.00	30.00	39.00	0.03	2	●
8.000	8.000	8.000	100.00	40.00	64.00	0.05	2	●
10.000	10.000	10.000	100.00	40.00	60.00	0.05	2	●
12.000	12.000	12.000	150.00	45.00	105.00	0.10	2	●
16.000	16.000	16.000	150.00	65.00	102.00	0.10	2	●

Cutting values: HPC-Roughing* (detailed cutting values see p. 277)

ISO Code	Hardness***	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 3	6	8	10	12	16	20
N Aluminium	≤ 3% Si	3xd	0.1xd	400	0.03	0.045	0.05	0.065	0.08	0.12	0.15
	≤ 7% Si	3xd	0.1xd	200	0.025	0.03	0.045	0.05	0.065	0.08	0.12

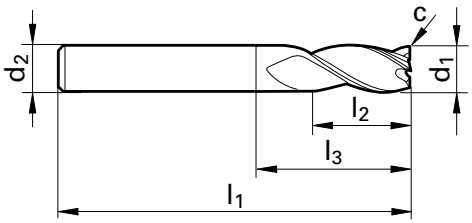
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life
** for trochoidal milling and imachining with ap 2xd and ae 0.15xd the cutting speed and feed rate can be increased by 50 %
*** as an option we can provide our Carbo-coating as a special tool for soft and sticky aluminium alloys and plastics

Slot drills (3-fluted)

centre cutting

DIN 6527 | N | 3 | 30° | 45° | 9°

	HA	HA
Tool material	Solid carbide	
Surface finish	bright	FIRE
Discount group	117	117
Guhring no.	**3555**	**3558**



Code no.	d1 h10	d2 h6	l1	l2	l3	c	Z	Availability	
	mm	mm	mm	mm	mm	mm x 45°			
2.000	2.000	6.000	50.00	3.00	7.40	0.03	3	●	●
2.500	2.500	6.000	50.00	3.00	7.40	0.05	3	●	●
3.000	3.000	6.000	50.00	4.00	8.40	0.05	3	●	●
3.500	3.500	6.000	50.00	4.00	8.40	0.05	3	●	●
4.000	4.000	6.000	54.00	5.00	10.40	0.05	3	●	●
5.000	5.000	6.000	54.00	6.00	12.40	0.05	3	●	●
5.500	5.500	6.000	54.00	7.00	14.90	0.05	3	●	●
6.000	6.000	6.000	54.00	7.00	18.00	0.05	3	●	●
7.000	7.000	8.000	58.00	8.00	16.90	0.10	3	●	●
8.000	8.000	8.000	58.00	9.00	22.00	0.10	3	●	●
8.500	8.500	10.000	66.00	10.00	20.90	0.10	3	●	●
9.000	9.000	10.000	66.00	10.00	20.90	0.10	3	●	●
10.000	10.000	10.000	66.00	11.00	26.00	0.10	3	●	●
12.000	12.000	12.000	73.00	12.00	28.00	0.10	3	●	●
14.000	14.000	14.000	75.00	14.00	30.00	0.15	3	●	●
16.000	16.000	16.000	82.00	16.00	34.00	0.15	3	●	●
18.000	18.000	18.000	84.00	18.00	36.00	0.15	3	●	●
20.000	20.000	20.000	92.00	20.00	42.00	0.15	3	●	●

Cutting values: Slotting* and roughing (detailed cutting values see p. 276)

ISO Code	Hardness	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 2	4	6	8	10	12	16	20
P Steel	≤ 850 N/mm²	0,5xd	1xd	125	0.013	0.018	0.025	0.032	0.042	0.049	0.063	0.07
	850 - 1400 N/mm²	0,5xd	1xd	95	0.01	0.015	0.02	0.024	0.033	0.039	0.048	0.057
M Stainless steel	≤ 750 N/mm²	0,5xd	1xd	85	0.01	0.015	0.02	0.024	0.033	0.039	0.048	0.057
	≥ 750 N/mm²	0,5xd	1xd	50	0.007	0.01	0.015	0.018	0.027	0.03	0.039	0.048
K Cast mat.	≥ 240 HB 30	0,5xd	1xd	100	0.01	0.015	0.02	0.024	0.033	0.039	0.048	0.057
N Aluminium	≤ 7% Si	1xd	1xd	160	0.013	0.018	0.025	0.032	0.042	0.049	0.063	0.07

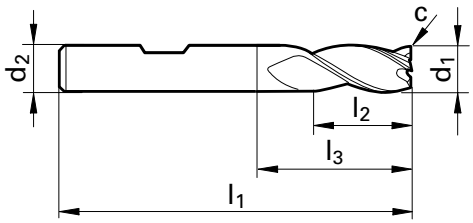
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life
** for slotting with a_e = 0.02xd the cutting speed v_c can be increased by 50 %
All recommendations are valid for coated tools. For bright milling cutters please v_c -40 % and f_z -25 %!

Slot drills (3-fluted)

centre cutting

DIN 6527 | N | 3 | 30° | 45° | 9° | HB | HB

	Solid carbide	
Tool material		
Surface finish	bright	FIRE
Discount group	117	117
Guhring no.	**3296**	**3719**



Code no.	d1 h10	d2 h6	l1	l2	l3	c	Z	Availability	
	mm	mm	mm	mm	mm	mm x 45°			
2.000	2.000	6.000	50.00	3.00	7.40	0.03	3	●	●
2.500	2.500	6.000	50.00	3.00	7.40	0.05	3	●	●
3.000	3.000	6.000	50.00	4.00	8.40	0.05	3	●	●
3.500	3.500	6.000	50.00	4.00	8.40	0.05	3	●	●
4.000	4.000	6.000	54.00	5.00	10.40	0.05	3	●	●
5.000	5.000	6.000	54.00	6.00	12.40	0.05	3	●	●
5.500	5.500	6.000	54.00	7.00	14.90	0.05	3	●	●
6.000	6.000	6.000	54.00	7.00	18.00	0.05	3	●	●
7.000	7.000	8.000	58.00	8.00	16.90	0.10	3	●	●
8.000	8.000	8.000	58.00	9.00	22.00	0.10	3	●	●
8.500	8.500	10.000	66.00	10.00	20.90	0.10	3	●	●
9.000	9.000	10.000	66.00	10.00	20.90	0.10	3	●	●
10.000	10.000	10.000	66.00	11.00	26.00	0.10	3	●	●
12.000	12.000	12.000	73.00	12.00	28.00	0.10	3	●	●
14.000	14.000	14.000	75.00	14.00	30.00	0.15	3	●	●
16.000	16.000	16.000	82.00	16.00	34.00	0.15	3	●	●
18.000	18.000	18.000	84.00	18.00	36.00	0.15	3	●	●
20.000	20.000	20.000	92.00	20.00	42.00	0.15	3	●	●

Cutting values: Slotting* and roughing (detailed cutting values see p. 276)

ISO Code	Hardness	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 2	4	6	8	10	12	16	20
P Steel	≤ 850 N/mm²	0.5xd	1xd	125	0.013	0.018	0.025	0.032	0.042	0.049	0.063	0.07
	850 - 1400 N/mm²	0.5xd	1xd	95	0.01	0.015	0.02	0.024	0.033	0.039	0.048	0.057
M Stainless steel	≤ 750 N/mm²	0.5xd	1xd	85	0.01	0.015	0.02	0.024	0.033	0.039	0.048	0.057
	≥ 750 N/mm²	0.5xd	1xd	50	0.007	0.01	0.015	0.018	0.027	0.03	0.039	0.048
K Cast mat.	≥ 240 HB 30	0.5xd	1xd	100	0.01	0.015	0.02	0.024	0.033	0.039	0.048	0.057
N Aluminium	≤ 7% Si	1xd	1xd	160	0.013	0.018	0.025	0.032	0.042	0.049	0.063	0.07

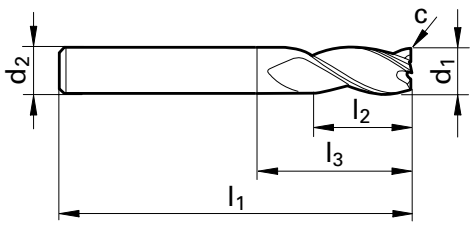
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life
** for slotting with a_e = 0.02xd the cutting speed v_c can be increased by 50 %
All recommendations are valid for coated tools. For bright milling cutters please v_c -40 % and f_z -25 %!

Slot drills (3-fluted)

centre cutting

DIN 6527 | N | 3 | 30° | 45° | 9° | HA | HA

	Solid carbide	
Tool material		
Surface finish	bright	FIRE
Discount group	117	117
Guhring no.	**3559**	**3560**



Code no.	d1 h10	d2 h6	l1	l2	l3	c	Z	Availability	
	mm	mm	mm	mm	mm	mm x 45°			
2.000	2.000	6.000	57.00	6.00	10.40	0.03	3	●	●
2.500	2.500	6.000	57.00	7.00	11.40	0.05	3	●	●
3.000	3.000	6.000	57.00	7.00	11.40	0.05	3	●	●
3.500	3.500	6.000	57.00	7.00	11.40	0.05	3	●	●
4.000	4.000	6.000	57.00	8.00	13.90	0.05	3	●	●
4.500	4.500	6.000	57.00	8.00	13.90	0.05	3	●	●
5.000	5.000	6.000	57.00	10.00	16.90	0.05	3	●	●
6.000	6.000	6.000	57.00	10.00	21.00	0.05	3	●	●
7.000	7.000	8.000	63.00	13.00	21.90	0.10	3	●	●
8.000	8.000	8.000	63.00	16.00	27.00	0.10	3	●	●
8.500	8.500	10.000	72.00	16.00	27.40	0.10	3	●	●
9.000	9.000	10.000	72.00	16.00	27.40	0.10	3	●	●
10.000	10.000	10.000	72.00	19.00	32.00	0.10	3	●	●
12.000	12.000	12.000	83.00	22.00	38.00	0.10	3	●	●
14.000	14.000	14.000	83.00	22.00	38.00	0.15	3	●	●
14.001	14.000	16.000	92.00	26.00	37.40	0.15	3	●	●
16.000	16.000	16.000	92.00	26.00	44.00	0.15	3	●	●
18.000	18.000	18.000	92.00	26.00	44.00	0.15	3	●	●
18.001	18.000	20.000	104.00	32.00	54.00	0.15	3	●	●
20.000	20.000	20.000	104.00	32.00	54.00	0.15	3	●	●

Cutting values: Slotting* and roughing (detailed cutting values see p. 276)

ISO Code	Hardness	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 2	4	6	8	10	12	16	20
P Steel	≤ 850 N/mm²	0.5xd	1xd	125	0.013	0.018	0.025	0.032	0.042	0.049	0.063	0.07
	850 - 1400 N/mm²	0.5xd	1xd	95	0.01	0.015	0.02	0.024	0.033	0.039	0.048	0.057
M Stainless steel	≤ 750 N/mm²	0.5xd	1xd	85	0.01	0.015	0.02	0.024	0.033	0.039	0.048	0.057
	≥ 750 N/mm²	0.5xd	1xd	50	0.007	0.01	0.015	0.018	0.027	0.03	0.039	0.048
K Cast mat.	≥ 240 HB 30	0.5xd	1xd	100	0.01	0.015	0.02	0.024	0.033	0.039	0.048	0.057
N Aluminium	≤ 7% Si	1xd	1xd	160	0.013	0.018	0.025	0.032	0.042	0.049	0.063	0.07

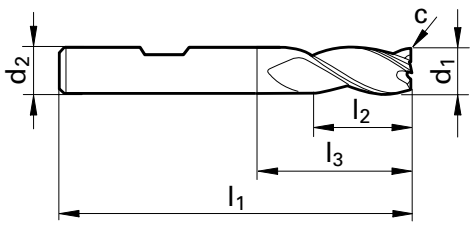
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life
** for slotting with a_e = 0.02xd the cutting speed v_c can be increased by 50 %
All recommendations are valid for coated tools. For bright milling cutters please v_c -40 % and f_z -25 %!

Slot drills (3-fluted)

centre cutting

DIN 6527 | N | 3 | 30° | 45° | 9° | HB | HB

	Solid carbide	
Tool material		
Surface finish	bright	FIRE
Discount group	117	117
Guhring no.	**3297**	**3720**



Code no.	d1 h10	d2 h6	l1	l2	l3	c	Z	Availability	
	mm	mm	mm	mm	mm	mm x 45°			
2.000	2.000	6.000	57.00	6.00	10.40	0.03	3	●	●
2.500	2.500	6.000	57.00	7.00	11.40	0.05	3	●	●
3.000	3.000	6.000	57.00	7.00	11.40	0.05	3	●	●
3.500	3.500	6.000	57.00	7.00	11.40	0.05	3	●	●
4.000	4.000	6.000	57.00	8.00	13.90	0.05	3	●	●
4.500	4.500	6.000	57.00	8.00	13.90	0.05	3	●	●
5.000	5.000	6.000	57.00	10.00	16.90	0.05	3	●	●
6.000	6.000	6.000	57.00	10.00	21.00	0.05	3	●	●
7.000	7.000	8.000	63.00	13.00	21.90	0.10	3	●	●
8.000	8.000	8.000	63.00	16.00	27.00	0.10	3	●	●
8.500	8.500	10.000	72.00	16.00	27.40	0.10	3	●	●
9.000	9.000	10.000	72.00	16.00	27.40	0.10	3	●	●
10.000	10.000	10.000	72.00	19.00	32.00	0.10	3	●	●
12.000	12.000	12.000	83.00	22.00	38.00	0.10	3	●	●
14.000	14.000	14.000	83.00	22.00	38.00	0.15	3	●	●
16.000	16.000	16.000	92.00	26.00	44.00	0.15	3	●	●
18.000	18.000	18.000	92.00	26.00	44.00	0.15	3	●	●
20.000	20.000	20.000	104.00	32.00	54.00	0.15	3	●	●

Cutting values: Slotting* and roughing (detailed cutting values see p. 276)

ISO Code	Hardness	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 2	4	6	8	10	12	16	20
P Steel	≤ 850 N/mm²	0.5xd	1xd	125	0.013	0.018	0.025	0.032	0.042	0.049	0.063	0.07
	850 - 1400 N/mm²	0.5xd	1xd	95	0.01	0.015	0.02	0.024	0.033	0.039	0.048	0.057
M Stainless steel	≤ 750 N/mm²	0.5xd	1xd	85	0.01	0.015	0.02	0.024	0.033	0.039	0.048	0.057
	≥ 750 N/mm²	0.5xd	1xd	50	0.007	0.01	0.015	0.018	0.027	0.03	0.039	0.048
K Cast mat.	≥ 240 HB 30	0.5xd	1xd	100	0.01	0.015	0.02	0.024	0.033	0.039	0.048	0.057
N Aluminium	≤ 7% Si	1xd	1xd	160	0.013	0.018	0.025	0.032	0.042	0.049	0.063	0.07

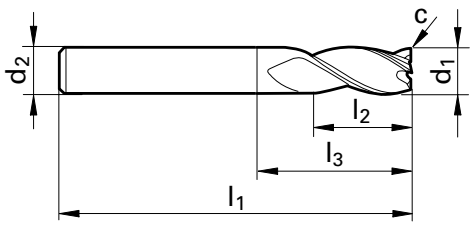
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life
** for slotting with a_e = 0.02xd the cutting speed v_c can be increased by 50 %
All recommendations are valid for coated tools. For bright milling cutters please v_c -40 % and f_z -25 %!

Slot drills (3-fluted)

centre cutting

DIN 6528 | N | 3 | 30° | 45° | 9° | HA | HA

	Solid carbide	
Tool material		
Surface finish	bright	FIRE
Discount group	117	117
Guhring no.	**3307**	**3677**



Code no.	d1 h10	d2 h6	l1	l2	l3	c	Z	Availability	
	mm	mm	mm	mm	mm	mm x 45°			
2.000	2.000	2.000	32.00	5.00	9.00	0.03	3	●	●
2.500	2.500	2.500	32.00	6.00	10.00	0.05	3	●	●
3.000	3.000	3.000	38.00	7.00	10.00	0.05	3	●	●
3.500	3.500	3.500	50.00	7.00	22.00	0.05	3	●	●
4.000	4.000	4.000	50.00	8.00	22.00	0.05	3	●	●
4.500	4.500	4.500	50.00	8.00	22.00	0.05	3	●	●
5.000	5.000	5.000	50.00	10.00	22.00	0.05	3	●	●
5.500	5.500	5.500	57.00	10.00	21.00	0.05	3	●	●
6.000	6.000	6.000	57.00	10.00	21.00	0.05	3	●	●
6.500	6.500	6.500	60.00	13.00	24.00	0.10	3	●	●
7.000	7.000	7.000	60.00	13.00	24.00	0.10	3	●	●
7.500	7.500	7.500	63.00	16.00	27.00	0.10	3	●	●
8.000	8.000	8.000	63.00	16.00	27.00	0.10	3	●	●
8.500	8.500	8.500	67.00	16.00	27.00	0.10	3	●	●
9.000	9.000	9.000	67.00	16.00	27.00	0.10	3	●	●
9.500	9.500	9.500	72.00	19.00	32.00	0.10	3	●	●
10.000	10.000	10.000	72.00	19.00	32.00	0.10	3	●	●
11.000	11.000	11.000	83.00	22.00	38.00	0.10	3	●	●
12.000	12.000	12.000	83.00	22.00	38.00	0.10	3	●	●
13.000	13.000	13.000	83.00	22.00	38.00	0.15	3	●	●
14.000	14.000	14.000	83.00	22.00	38.00	0.15	3	●	●
15.000	15.000	15.000	92.00	26.00	44.00	0.15	3	●	●
16.000	16.000	16.000	92.00	26.00	44.00	0.15	3	●	●
18.000	18.000	18.000	92.00	26.00	44.00	0.15	3	●	●

Cutting values: Slotting* and roughing (detailed cutting values see p. 276)

ISO Code	Hardness	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 2	4	6	8	10	12	16	20
P Steel	≤ 850 N/mm²	0.5xd	1xd	125	0.013	0.018	0.025	0.032	0.042	0.049	0.063	0.07
	850 - 1400 N/mm²	0.5xd	1xd	95	0.01	0.015	0.02	0.024	0.033	0.039	0.048	0.057
M Stainless steel	≤ 750 N/mm²	0.5xd	1xd	85	0.01	0.015	0.02	0.024	0.033	0.039	0.048	0.057
	≥ 750 N/mm²	0.5xd	1xd	50	0.007	0.01	0.015	0.018	0.027	0.03	0.039	0.048
K Cast mat.	≥ 240 HB 30	0.5xd	1xd	100	0.01	0.015	0.02	0.024	0.033	0.039	0.048	0.057
N Aluminium	≤ 7% Si	1xd	1xd	160	0.013	0.018	0.025	0.032	0.042	0.049	0.063	0.07

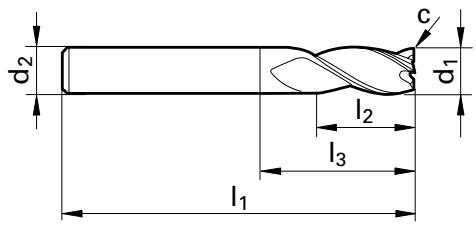
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life
** for slotting with a_e = 0.02xd the cutting speed v_c can be increased by 50 %
All recommendations are valid for coated tools. For bright milling cutters please v_c -40 % and f_z -25 %!

Slot drills (3-fluted)

centre cutting

DIN 6528 | N | 3 | 30° | 45° | 9° | HA | HA

	Solid carbide	
Tool material		
Surface finish	bright	FIRE
Discount group	117	117
Guhring no.	**3307**	**3677**



Code no.	d1 h10	d2 h6	l1	l2	l3	c	Z	Availability	
	mm	mm	mm	mm	mm	mm x 45°			
20.000	20.000	20.000	104.00	32.00	54.00	0.15	3	●	●

RF 100 U - High performance end mills

for materials up to 1600 N/mm² (48 HRC)

Summary of advantages

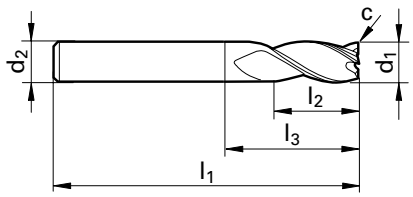
- slotting, roughing, finishing
- short machining times thanks to maximum metal removal rate
- unequal helix 35/38° for low vibration running
- feed rates to ap 3XD with HPC applications

Programme from page 27.

Slot drills (3-fluted)

centre cutting

Tool material	Solid carbide	
Surface finish	bright	FIRE
Discount group	117	117
Guhring no.	**3220**	**3711**



Code no.	d1 e8/h11	d2 h6	l1	l2	l3	c	Z	Availability	
	mm	mm	mm	mm	mm	mm x 45°			
2.000	2.000	2.000	32.00	8.00	17.00	0.03	3	●	●
2.500	2.500	2.500	32.00	8.00	17.00	0.05	3	●	●
3.000	3.000	3.000	32.00	12.00	21.00	0.05	3	●	●
3.500	3.500	3.500	32.00	12.00	21.00	0.05	3	●	
4.000	4.000	4.000	40.00	12.00	21.00	0.05	3	●	●
4.500	4.500	4.500	50.00	14.00	24.00	0.05	3	●	●
5.000	5.000	5.000	50.00	14.00	24.00	0.05	3	●	●
5.500	5.500	5.500	50.00	16.00	27.00	0.05	3	●	●
6.000	6.000	6.000	50.00	16.00	27.00	0.05	3	●	●
6.500	6.500	6.500	60.00	16.00	28.00	0.10	3	●	●
7.000	7.000	7.000	60.00	20.00	32.00	0.10	3	●	●
7.500	7.500	7.500	60.00	20.00	33.00	0.10	3	●	●
8.000	8.000	8.000	60.00	20.00	33.00	0.10	3	●	●
8.500	8.500	8.500	60.00	20.00	34.00	0.10	3	●	●
9.000	9.000	9.000	60.00	20.00	34.00	0.10	3	●	●
9.500	9.500	9.500	70.00	22.00	37.00	0.10	3	●	●
10.000	10.000	10.000	70.00	22.00	37.00	0.10	3	●	●
11.000	11.000	11.000	70.00	22.00	38.00	0.10	3	●	●
12.000	12.000	12.000	70.00	22.00	39.00	0.10	3	●	●
13.000	13.000	13.000	75.00	25.00	42.00	0.15	3	●	●
14.000	14.000	14.000	75.00	25.00	43.00	0.15	3	●	●
15.000	15.000	15.000	75.00	25.00	44.00	0.15	3	●	●
16.000	16.000	16.000	75.00	25.00	45.00	0.15	3	●	●
18.000	18.000	18.000	100.00	35.00	56.00	0.15	3	●	●

Cutting values: Slotting* and roughing (detailed cutting values see p. 276)

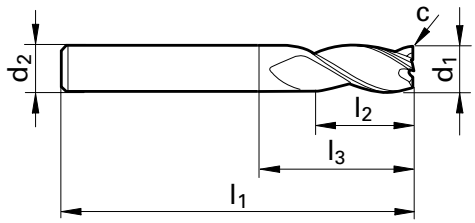
ISO Code	Hardness	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 2	4	6	8	10	12	16	20
P Steel	≤ 850 N/mm²	0.5xd	1xd	125	0.013	0.018	0.025	0.032	0.042	0.049	0.063	0.07
	850 - 1400 N/mm²	0.5xd	1xd	95	0.01	0.015	0.02	0.024	0.033	0.039	0.048	0.057
M Stainless steel	≤ 750 N/mm²	0.5xd	1xd	85	0.01	0.015	0.02	0.024	0.033	0.039	0.048	0.057
	≥ 750 N/mm²	0.5xd	1xd	50	0.007	0.01	0.015	0.018	0.027	0.03	0.039	0.048
K Cast mat.	≥ 240 HB 30	0.5xd	1xd	100	0.01	0.015	0.02	0.024	0.033	0.039	0.048	0.057
N Aluminium	≤ 7% Si	1xd	1xd	160	0.013	0.018	0.025	0.032	0.042	0.049	0.063	0.07

* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life
** for slotting with a_e = 0.02xd the cutting speed v_c can be increased by 50 %
All recommendations are valid for coated tools. For bright milling cutters please v_c -40 % and f_z -25 %!

Slot drills (3-fluted)

centre cutting

Tool material	Solid carbide	
Surface finish	bright	FIRE
Discount group	117	117
Guhring no.	**3220**	**3711**



Code no.	d1 e8/h11	d2 h6	l1	l2	l3	c	Z	Availability	
	mm	mm	mm	mm	mm	mm x 45°			
20.000	20.000	20.000	100.00	35.00	59.00	0.15	3	●	●

Mini Slot Drills - 3-fluted

from Ø 0.3mm Guhring no. 3684 30° helix
from Ø 1 mm Guhring no. 3686 45° helix

Summary of advantages

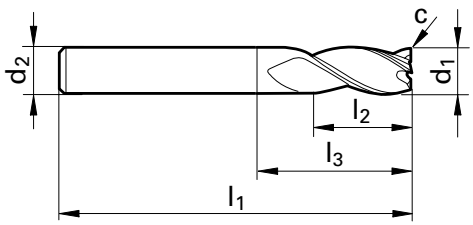
- Ideally suited for small slotting in steel, stainless steel, aluminium and plastics
- Also suitable for mill-turn centres: MTC

Programme from page 208.

XL slot drills (3-fluted)

centre cutting

G	N		3	30°	45°		9°	HA	HA
Tool material								Solid carbide	
Surface finish								bright	FIRE
Discount group								117	117
Guhring no.								**3314**	**3680**



Code no.	d1 h10	d2 h6	l1	l2	l3	c	Z	Availability	
	mm	mm	mm	mm	mm	mm x 45°			
3.000	3.000	3.000	75.00	20.00	47.00	0.05	3	●	●
4.000	4.000	4.000	75.00	25.00	47.00	0.05	3	●	●
5.000	5.000	5.000	75.00	30.00	47.00	0.05	3	●	●
6.000	6.000	6.000	75.00	30.00	39.00	0.05	3	●	●
8.000	8.000	8.000	100.00	40.00	64.00	0.10	3	●	●
10.000	10.000	10.000	100.00	40.00	60.00	0.10	3	●	●
12.000	12.000	12.000	150.00	45.00	105.00	0.10	3	●	●
16.000	16.000	16.000	150.00	65.00	102.00	0.15	3	●	●
20.000	20.000	20.000	150.00	65.00	100.00	0.15	3	●	●

Cutting values: Slotting* and roughing (detailed cutting values see p. 276)

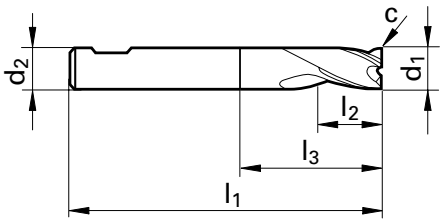
ISO Code	Hardness	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 2	4	6	8	10	12	16	20
P Steel	≤ 850 N/mm²	0.5xd	1xd	125	0.013	0.018	0.025	0.032	0.042	0.049	0.063	0.07
	850 - 1400 N/mm²	0.5xd	1xd	95	0.01	0.015	0.02	0.024	0.033	0.039	0.048	0.057
M Stainless steel	≤ 750 N/mm²	0.5xd	1xd	85	0.01	0.015	0.02	0.024	0.033	0.039	0.048	0.057
	≥ 750 N/mm²	0.5xd	1xd	50	0.007	0.01	0.015	0.018	0.027	0.03	0.039	0.048
K Cast mat.	≥ 240 HB 30	0.5xd	1xd	100	0.01	0.015	0.02	0.024	0.033	0.039	0.048	0.057
N Aluminium	≤ 7% Si	1xd	1xd	160	0.013	0.018	0.025	0.032	0.042	0.049	0.063	0.07

* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life
** for slotting with a_e = 0.02xd the cutting speed v_c can be increased by 50 %
All recommendations are valid for coated tools. For bright milling cutters please v_c -40 % and f_z -25 %!

Mini slot drills (3-fluted)

centre cutting

Tool material	**Solid carbide**
Surface finish	FIRE
Discount group	117
Guhring no.	**3684**



Code no.	d1 e8	d2 h6	l1	l2	l3	c	Z	Availability
	mm	mm	mm	mm	mm	mm x 45°		
0.300	0.300	3.000	38.00	1.00	3.40		3	●
0.400	0.400	3.000	38.00	1.00	3.40		3	●
0.500	0.500	3.000	38.00	1.50	3.40	0.03	3	●
0.600	0.600	3.000	38.00	1.50	3.40	0.03	3	●
0.800	0.800	3.000	38.00	2.00	3.90	0.03	3	●
1.000	1.000	3.000	38.00	2.00	3.90	0.03	3	●
1.200	1.200	3.000	38.00	2.00	3.90	0.03	3	●
1.500	1.500	3.000	38.00	2.00	3.90	0.03	3	●
1.800	1.800	3.000	38.00	2.00	3.90	0.03	3	●
2.000	2.000	6.000	38.00	4.00	7.40	0.03	3	●
2.500	2.500	6.000	38.00	5.00	8.40	0.05	3	●
3.000	3.000	6.000	38.00	5.00	8.40	0.05	3	●
3.500	3.500	6.000	38.00	6.00	9.40	0.05	3	●
4.000	4.000	6.000	38.00	7.00	10.40	0.05	3	●
4.500	4.500	6.000	38.00	8.00	12.40	0.05	3	●
5.000	5.000	6.000	38.00	8.00	12.40	0.05	3	●
5.500	5.500	6.000	38.00	8.00	12.40	0.05	3	●
5.750	5.750	6.000	38.00	8.00	12.40	0.05	3	●
6.000	6.000	6.000	38.00	8.00	14.00	0.05	3	●
6.750	6.750	8.000	42.00	10.00	15.40	0.10	3	●
7.000	7.000	8.000	42.00	10.00	16.40	0.10	3	●
7.750	7.750	8.000	42.00	10.00	16.40	0.10	3	●
8.000	8.000	8.000	43.00	11.00	19.00	0.10	3	●
8.700	8.700	10.000	48.00	11.00	17.40	0.10	3	●

Cutting values: Slotting* and roughing (detailed cutting values see p. 276)

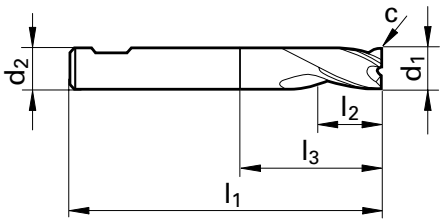
ISO Code	Hardness	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 2	4	6	8	10	12	16	20
P Steel	≤ 850 N/mm²	0.5xd	1xd	125	0.013	0.018	0.025	0.032	0.042	0.049	0.063	0.07
	850 - 1400 N/mm²	0.5xd	1xd	95	0.01	0.015	0.02	0.024	0.033	0.039	0.048	0.057
M Stainless steel	≤ 750 N/mm²	0.5xd	1xd	85	0.01	0.015	0.02	0.024	0.033	0.039	0.048	0.057
	≥ 750 N/mm²	0.5xd	1xd	50	0.007	0.01	0.015	0.018	0.027	0.03	0.039	0.048
K Cast mat.	≥ 240 HB 30	0.5xd	1xd	100	0.01	0.015	0.02	0.024	0.033	0.039	0.048	0.057
N Aluminium	≤ 7% Si	1xd	1xd	160	0.013	0.018	0.025	0.032	0.042	0.049	0.063	0.07

* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life
** for slotting with a_e = 0.02xd the cutting speed v_c can be increased by 50 %

Mini slot drills (3-fluted)

centre cutting

Tool material	**Solid carbide**
Surface finish	FIRE
Discount group	117
Guhring no.	**3684**



Code no.	d1 e8	d2 h6	l1	l2	l3	c	Z	Availability
	mm	mm	mm	mm	mm	mm x 45°		
9.000	9.000	10.000	48.00	11.00	17.40	0.10	3	●
9.700	9.700	10.000	48.00	11.00	17.40	0.10	3	●
10.000	10.000	10.000	50.00	13.00	23.00	0.10	3	●
12.000	12.000	12.000	55.00	15.00	25.00	0.10	3	●
14.000	14.000	14.000	58.00	15.00	28.00	0.15	3	●
16.000	16.000	16.000	62.00	18.00	29.00	0.15	3	●
18.000	18.000	18.000	70.00	20.00	37.00	0.15	3	●
20.000	20.000	20.000	75.00	22.00	41.00	0.15	3	●

Cutting values: Slotting* and roughing (detailed cutting values see p. 276)

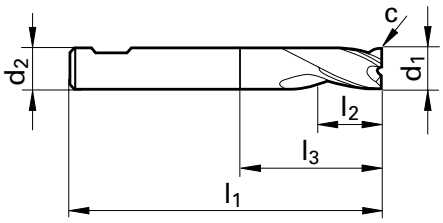
ISO Code	Hardness	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 2	4	6	8	10	12	16	20
P Steel	≤ 850 N/mm²	0.5xd	1xd	125	0.013	0.018	0.025	0.032	0.042	0.049	0.063	0.07
	850 - 1400 N/mm²	0.5xd	1xd	95	0.01	0.015	0.02	0.024	0.033	0.039	0.048	0.057
M Stainless steel	≤ 750 N/mm²	0.5xd	1xd	85	0.01	0.015	0.02	0.024	0.033	0.039	0.048	0.057
	≥ 750 N/mm²	0.5xd	1xd	50	0.007	0.01	0.015	0.018	0.027	0.03	0.039	0.048
K Cast mat.	≥ 240 HB 30	0.5xd	1xd	100	0.01	0.015	0.02	0.024	0.033	0.039	0.048	0.057
N Aluminium	≤ 7% Si	1xd	1xd	160	0.013	0.018	0.025	0.032	0.042	0.049	0.063	0.07

* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life
** for slotting with a_e = 0.02xd the cutting speed v_c can be increased by 50 %

Mini slot drills (3-fluted)

centre cutting

Tool material	**Solid carbide**
Surface finish	FIRE
Discount group	106
Guhring no.	**3686**



Code no.	d1 e8	d2 h6	l1	l2	l3	c	Z	Availability
	mm	mm	mm	mm	mm	mm x 45°		
1.000	1.000	3.000	38.00	2.00	3.90	0.03	3	●
1.200	1.200	3.000	38.00	2.00	3.90	0.03	3	●
1.500	1.500	3.000	38.00	3.00	5.90	0.03	3	●
1.800	1.800	3.000	38.00	3.00	5.90	0.03	3	●
2.000	2.000	6.000	45.00	4.00	6.90	0.03	3	●
2.500	2.500	6.000	45.00	5.00	7.90	0.05	3	●
3.000	3.000	6.000	45.00	6.00	9.90	0.05	3	●
3.500	3.500	6.000	45.00	6.00	9.90	0.05	3	●
4.000	4.000	6.000	45.00	7.00	10.90	0.05	3	●
4.500	4.500	6.000	45.00	8.00	13.40	0.05	3	●
5.000	5.000	6.000	45.00	8.00	13.40	0.05	3	●
5.500	5.500	6.000	45.00	8.00	14.40	0.05	3	●
5.750	5.750	6.000	45.00	10.00	3.80	0.05	3	●
6.000	6.000	6.000	45.00	10.00	15.00	0.05	3	●
6.750	6.750	8.000	55.00	10.00	18.40	0.10	3	●
7.000	7.000	8.000	55.00	12.00	12.00	0.10	3	●
7.750	7.750	8.000	55.00	12.00	12.00	0.10	3	●
8.000	8.000	8.000	55.00	13.00	19.00	0.10	3	●
8.700	8.700	10.000	55.00	14.00	23.40	0.10	3	●
9.000	9.000	10.000	55.00	14.00	23.40	0.10	3	●
9.700	9.700	10.000	55.00	16.00	16.30	0.10	3	●
10.000	10.000	10.000	55.00	16.00	25.00	0.10	3	●

Cutting values: Slotting* and roughing **(detailed cutting values see p. 276)**

ISO Code	Hardness	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 2	4	6	8	10	12	16	20
P Steel	≤ 850 N/mm²	0.5xd	1xd	125	0.013	0.018	0.025	0.032	0.042	0.049	0.063	0.07
	850 - 1400 N/mm²	0.5xd	1xd	95	0.01	0.015	0.02	0.024	0.033	0.039	0.048	0.057
M Stainless steel	≤ 750 N/mm²	0.5xd	1xd	85	0.01	0.015	0.02	0.024	0.033	0.039	0.048	0.057
	≥ 750 N/mm²	0.5xd	1xd	50	0.007	0.01	0.015	0.018	0.027	0.03	0.039	0.048
K Cast mat.	≥ 240 HB 30	0.5xd	1xd	100	0.01	0.015	0.02	0.024	0.033	0.039	0.048	0.057
N Aluminium	≤ 7% Si	1xd	1xd	160	0.013	0.018	0.025	0.032	0.042	0.049	0.063	0.07

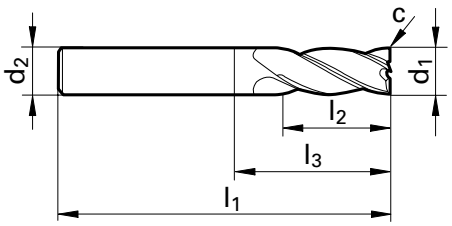
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life
** for slotting with a_e = 0.02xd the cutting speed v_c can be increased by 50 %

End mills (4-fluted)

centre cutting

DIN 6527 | N | 4 | 30° | 45° | 9° | HA | HA

Tool material	Solid carbide	
Surface finish	bright	FIRE
Discount group	117	117
Guhring no.	**3198**	**3637**



Code no.	d1 h10	d2 h6	l1	l2	l3	c	Z	Availability	
	mm	mm	mm	mm	mm	mm x 45°			
2.000	2.000	6.000	50.00	4.00	8.40	0.03	4	●	●
3.000	3.000	6.000	50.00	5.00	9.40	0.05	4	●	●
4.000	4.000	6.000	54.00	8.00	13.40	0.05	4	●	●
5.000	5.000	6.000	54.00	9.00	15.90	0.05	4	●	●
6.000	6.000	6.000	54.00	10.00	18.00	0.05	4	●	●
8.000	8.000	8.000	58.00	12.00	22.00	0.10	4	●	●
10.000	10.000	10.000	66.00	14.00	26.00	0.10	4	●	●
12.000	12.000	12.000	73.00	16.00	28.00	0.10	4	●	●
14.000	14.000	14.000	75.00	18.00	30.00	0.15	4	●	●
16.000	16.000	16.000	82.00	22.00	34.00	0.15	4	●	●
18.000	18.000	18.000	84.00	24.00	36.00	0.15	4	●	●
20.000	20.000	20.000	92.00	26.00	42.00	0.15	4	●	●

Cutting values: Slotting* and roughing (detailed cutting values see p. 276)

ISO Code	Hardness	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 2	4	6	8	10	12	16	20
P Steel	≤ 850 N/mm²	1.5xd	0.5xd	125	0.013	0.018	0.025	0.032	0.042	0.049	0.063	0.07
	850 - 1400 N/mm²	1.5xd	0.5xd	95	0.01	0.015	0.02	0.024	0.033	0.039	0.048	0.057
M Stainless steel	≤ 750 N/mm²	1.5xd	0.5xd	85	0.01	0.015	0.02	0.024	0.033	0.039	0.048	0.057
	≥ 750 N/mm²	1.5xd	0.2xd	50	0.007	0.01	0.015	0.018	0.027	0.03	0.039	0.048
K Cast mat.	≥ 240 HB 30	1.5xd	0.5xd	100	0.01	0.015	0.02	0.024	0.033	0.039	0.048	0.057
N Aluminium	≤ 7% Si	1.5xd	0.3xd	160	0.013	0.018	0.025	0.032	0.042	0.049	0.063	0.07

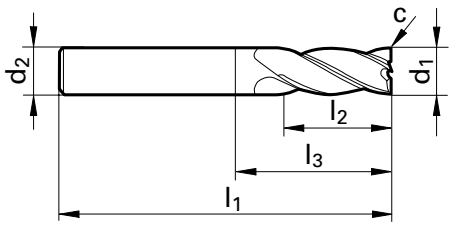
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life
** for slotting with a_e = 0.02xd the cutting speed v_c can be increased by 50 %
All recommendations are valid for coated tools. For bright milling cutters please v_c -40 % and f_z -25 %!

End mills (4-fluted)

centre cutting

DIN 6527 | N | 4 | 30° | 45° | 9° | HB | HB

Tool material	Solid carbide	
Surface finish	bright	FIRE
Discount group	117	117
Guhring no.	**3298**	**3721**



Code no.	d1 h10	d2 h6	l1	l2	l3	c	Z	Availability	
	mm	mm	mm	mm	mm	mm x 45°			
2.000	2.000	6.000	50.00	4.00	8.40	0.03	4	●	●
3.000	3.000	6.000	50.00	5.00	9.40	0.05	4	●	●
4.000	4.000	6.000	54.00	8.00	13.40	0.05	4	●	●
5.000	5.000	6.000	54.00	9.00	15.90	0.05	4	●	●
6.000	6.000	6.000	54.00	10.00	18.00	0.05	4	●	●
8.000	8.000	8.000	58.00	12.00	22.00	0.10	4	●	●
10.000	10.000	10.000	66.00	14.00	26.00	0.10	4	●	●
12.000	12.000	12.000	73.00	16.00	28.00	0.10	4	●	●
14.000	14.000	14.000	75.00	18.00	30.00	0.15	4	●	●
16.000	16.000	16.000	82.00	22.00	34.00	0.15	4	●	●
18.000	18.000	18.000	84.00	24.00	36.00	0.15	4	●	●
20.000	20.000	20.000	92.00	26.00	42.00	0.15	4	●	●

Cutting values: Slotting* and roughing (detailed cutting values see p. 276)

ISO Code	Hardness	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 2	4	6	8	10	12	16	20
P Steel	≤ 850 N/mm²	1.5xd	0.5xd	125	0.013	0.018	0.025	0.032	0.042	0.049	0.063	0.07
	850 - 1400 N/mm²	1.5xd	0.5xd	95	0.01	0.015	0.02	0.024	0.033	0.039	0.048	0.057
M Stainless steel	≤ 750 N/mm²	1.5xd	0.5xd	85	0.01	0.015	0.02	0.024	0.033	0.039	0.048	0.057
	≥ 750 N/mm²	1.5xd	0.2xd	50	0.007	0.01	0.015	0.018	0.027	0.03	0.039	0.048
K Cast mat.	≥ 240 HB 30	1.5xd	0.5xd	100	0.01	0.015	0.02	0.024	0.033	0.039	0.048	0.057
N Aluminium	≤ 7% Si	1.5xd	0.3xd	160	0.013	0.018	0.025	0.032	0.042	0.049	0.063	0.07

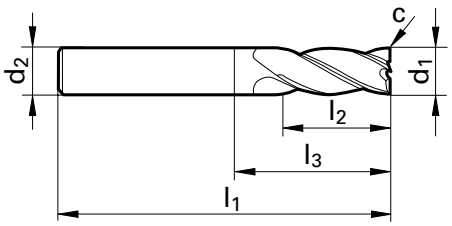
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life
** for slotting with a_e = 0.02xd the cutting speed v_c can be increased by 50 %
All recommendations are valid for coated tools. For bright milling cutters please v_c -40 % and f_z -25 %!

End mills (4-fluted)

centre cutting

DIN 6527 | N | 4 | 30° | 45° | 9° | HA | HA

Tool material	Solid carbide	
Surface finish	bright	FIRE
Discount group	117	117
Guhring no.	**3197**	**3649**



Code no.	d1 h10	d2 h6	l1	l2	l3	c	Z	Availability	
	mm	mm	mm	mm	mm	mm x 45°			
2.000	2.000	6.000	57.00	7.00	11.40	0.03	4	●	●
3.000	3.000	6.000	57.00	8.00	12.90	0.05	4	●	●
3.500	3.500	6.000	57.00	10.00	15.90	0.05	4	●	●
4.000	4.000	6.000	57.00	11.00	16.90	0.05	4	●	●
4.500	4.500	6.000	57.00	11.00	16.90	0.05	4	●	●
5.000	5.000	6.000	57.00	13.00	19.90	0.05	4	●	●
6.000	6.000	6.000	57.00	13.00	21.00	0.05	4	●	●
7.000	7.000	8.000	63.00	16.00	23.90	0.10	4	●	●
8.000	8.000	8.000	63.00	19.00	27.00	0.10	4	●	●
9.000	9.000	10.000	72.00	19.00	28.40	0.10	4	●	●
10.000	10.000	10.000	72.00	22.00	32.00	0.10	4	●	●
12.000	12.000	12.000	83.00	26.00	38.00	0.10	4	●	●
14.000	14.000	14.000	83.00	26.00	38.00	0.15	4	●	●
14.001	14.000	16.000	92.00	32.00	43.00	0.15	4	●	●
16.000	16.000	16.000	92.00	32.00	44.00	0.15	4	●	●
18.000	18.000	18.000	92.00	32.00	44.00	0.15	4	●	●
18.001	18.000	20.000	104.00	38.00	53.00	0.15	4	●	●
20.000	20.000	20.000	104.00	38.00	54.00	0.15	4	●	●

Cutting values: Slotting* and roughing (detailed cutting values see p. 276)

ISO Code	Hardness	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 2	4	6	8	10	12	16	20
P Steel	≤ 850 N/mm²	1.5xd	0.5xd	125	0.013	0.018	0.025	0.032	0.042	0.049	0.063	0.07
	850 - 1400 N/mm²	1.5xd	0.5xd	95	0.01	0.015	0.02	0.024	0.033	0.039	0.048	0.057
M Stainless steel	≤ 750 N/mm²	1.5xd	0.5xd	85	0.01	0.015	0.02	0.024	0.033	0.039	0.048	0.057
	≥ 750 N/mm²	1.5xd	0.2xd	50	0.007	0.01	0.015	0.018	0.027	0.03	0.039	0.048
K Cast mat.	≥ 240 HB 30	1.5xd	0.5xd	100	0.01	0.015	0.02	0.024	0.033	0.039	0.048	0.057
N Aluminium	≤ 7% Si	1.5xd	0.3xd	160	0.013	0.018	0.025	0.032	0.042	0.049	0.063	0.07

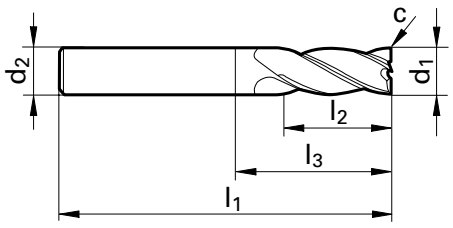
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life
** for slotting with a_e = 0.02xd the cutting speed v_c can be increased by 50 %
All recommendations are valid for coated tools. For bright milling cutters please v_c -40 % and f_z -25 %!

End mills (4-fluted)

centre cutting

DIN 6527 | N | 4 | 30° | 45° | 9° | HB | HB

	Solid carbide	
Tool material		
Surface finish	bright	FIRE
Discount group	117	117
Guhring no.	**3299**	**3722**



Code no.	d1 h10	d2 h6	l1	l2	l3	c	Z	Availability	
	mm	mm	mm	mm	mm	mm x 45°			
2.000	2.000	6.000	57.00	7.00	11.40	0.03	4	●	●
3.000	3.000	6.000	57.00	8.00	12.90	0.05	4	●	●
3.500	3.500	6.000	57.00	10.00	15.90	0.05	4	●	●
4.000	4.000	6.000	57.00	11.00	16.90	0.05	4	●	●
4.500	4.500	6.000	57.00	11.00	16.90	0.05	4	●	●
5.000	5.000	6.000	57.00	13.00	19.90	0.05	4	●	●
6.000	6.000	6.000	57.00	13.00	21.00	0.05	4	●	●
7.000	7.000	8.000	63.00	16.00	23.90	0.10	4	●	●
8.000	8.000	8.000	63.00	19.00	27.00	0.10	4	●	●
9.000	9.000	10.000	72.00	19.00	28.40	0.10	4	●	●
10.000	10.000	10.000	72.00	22.00	32.00	0.10	4	●	●
12.000	12.000	12.000	83.00	26.00	38.00	0.10	4	●	●
14.000	14.000	14.000	83.00	26.00	38.00	0.15	4	●	●
16.000	16.000	16.000	92.00	32.00	44.00	0.15	4	●	●
18.000	18.000	18.000	92.00	32.00	44.00	0.15	4	●	●
20.000	20.000	20.000	104.00	38.00	54.00	0.15	4	●	●

Cutting values: Slotting* and roughing (detailed cutting values see p. 276)

ISO Code	Hardness	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 2	4	6	8	10	12	16	20
P Steel	≤ 850 N/mm²	1.5xd	0.5xd	125	0.013	0.018	0.025	0.032	0.042	0.049	0.063	0.07
	850 - 1400 N/mm²	1.5xd	0.5xd	95	0.01	0.015	0.02	0.024	0.033	0.039	0.048	0.057
M Stainless steel	≤ 750 N/mm²	1.5xd	0.5xd	85	0.01	0.015	0.02	0.024	0.033	0.039	0.048	0.057
	≥ 750 N/mm²	1.5xd	0.2xd	50	0.007	0.01	0.015	0.018	0.027	0.03	0.039	0.048
K Cast mat.	≥ 240 HB 30	1.5xd	0.5xd	100	0.01	0.015	0.02	0.024	0.033	0.039	0.048	0.057
N Aluminium	≤ 7% Si	1.5xd	0.3xd	160	0.013	0.018	0.025	0.032	0.042	0.049	0.063	0.07

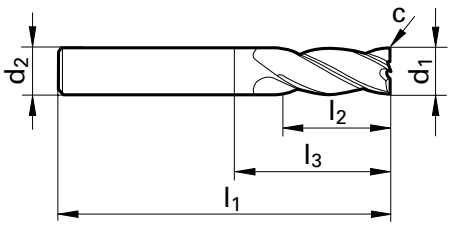
* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life
** for slotting with a_e = 0.02xd the cutting speed v_c can be increased by 50 %
All recommendations are valid for coated tools. For bright milling cutters please v_c -40 % and f_z -25 %!

End mills (4-fluted)

centre cutting

DIN 6528 | N | 4 | 30° | 45° | 9° | HA | HA

Tool material	Solid carbide	
Surface finish	bright	FIRE
Discount group	117	117
Guhring no.	**3304**	**3678**



Code no.	d1 h10	d2 h6	l1	l2	l3	c	Z	Availability	
	mm	mm	mm	mm	mm	mm x 45°			
2.000	2.000	2.000	32.00	5.00	10.00	0.03	4	●	●
2.500	2.500	2.500	32.00	6.00	11.00	0.05	4	●	●
3.000	3.000	3.000	38.00	7.00	11.00	0.05	4	●	●
3.500	3.500	3.500	50.00	8.00	14.00	0.05	4	●	●
4.000	4.000	4.000	50.00	11.00	22.00	0.05	4	●	●
4.500	4.500	4.500	50.00	11.00	22.00	0.05	4	●	●
5.000	5.000	5.000	50.00	13.00	22.00	0.05	4	●	●
6.000	6.000	6.000	57.00	13.00	21.00	0.05	4	●	●
7.000	7.000	7.000	60.00	16.00	24.00	0.10	4	●	●
7.500	7.500	7.500	63.00	19.00	27.00	0.10	4	●	●
8.000	8.000	8.000	63.00	19.00	27.00	0.10	4	●	●
9.000	9.000	9.000	67.00	19.00	27.00	0.10	4	●	●
10.000	10.000	10.000	72.00	22.00	32.00	0.10	4	●	●
11.000	11.000	11.000	83.00	26.00	38.00	0.10	4	●	●
12.000	12.000	12.000	83.00	26.00	38.00	0.10	4	●	●
13.000	13.000	13.000	83.00	26.00	38.00	0.15	4	●	●
14.000	14.000	14.000	83.00	26.00	38.00	0.15	4	●	●
15.000	15.000	15.000	92.00	32.00	44.00	0.15	4	●	
16.000	16.000	16.000	92.00	32.00	44.00	0.15	4	●	●
18.000	18.000	18.000	92.00	32.00	44.00	0.15	4	●	●
20.000	20.000	20.000	104.00	38.00	54.00	0.15	4	●	●

Cutting values: Slotting* and roughing (detailed cutting values see p. 276)

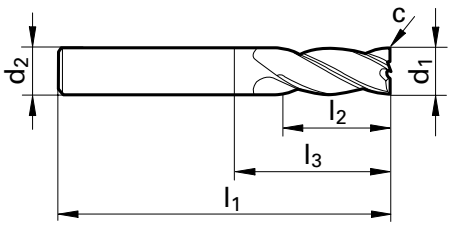
ISO Code	Hardness	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 2	4	6	8	10	12	16	20
P Steel	≤ 850 N/mm²	1.5xd	0.5xd	125	0.013	0.018	0.025	0.032	0.042	0.049	0.063	0.07
	850 - 1400 N/mm²	1.5xd	0.5xd	95	0.01	0.015	0.02	0.024	0.033	0.039	0.048	0.057
M Stainless steel	≤ 750 N/mm²	1.5xd	0.5xd	85	0.01	0.015	0.02	0.024	0.033	0.039	0.048	0.057
	≥ 750 N/mm²	1.5xd	0.2xd	50	0.007	0.01	0.015	0.018	0.027	0.03	0.039	0.048
K Cast mat.	≥ 240 HB 30	1.5xd	0.5xd	100	0.01	0.015	0.02	0.024	0.033	0.039	0.048	0.057
N Aluminium	≤ 7% Si	1.5xd	0.3xd	160	0.013	0.018	0.025	0.032	0.042	0.049	0.063	0.07

* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life
** for slotting with a_e = 0.02xd the cutting speed v_c can be increased by 50 %
All recommendations are valid for coated tools. For bright milling cutters please v_c -40 % and f_z -25 %!

End mills (4-fluted)

centre cutting

Tool material	Solid carbide	
Surface finish	bright	FIRE
Discount group	117	117
Guhring no.	**3257**	**3713**



Code no.	d1 h11	d2 h6	l1	l2	l3	c	Z	Availability	
	mm	mm	mm	mm	mm	mm x 45°			
4.500	4.500	4.500	50.00	14.00	23.00	0.05	4	●	●
5.000	5.000	5.000	50.00	14.00	23.00	0.05	4	●	●
5.500	5.500	5.500	50.00	16.00	26.00	0.05	4	●	
6.000	6.000	6.000	50.00	16.00	26.00	0.05	4	●	●
6.500	6.500	6.500	60.00	16.00	26.00	0.10	4	●	
7.000	7.000	7.000	60.00	20.00	30.00	0.10	4	●	●
7.500	7.500	7.500	60.00	20.00	31.00	0.10	4	●	●
8.000	8.000	8.000	60.00	20.00	31.00	0.10	4	●	●
8.500	8.500	8.500	60.00	20.00	32.00	0.10	4	●	
9.000	9.000	9.000	60.00	20.00	32.00	0.10	4	●	●
9.500	9.500	9.500	70.00	22.00	35.00	0.10	4	●	
10.000	10.000	10.000	70.00	22.00	35.00	0.10	4	●	●
11.000	11.000	11.000	70.00	22.00	35.00	0.10	4	●	●
12.000	12.000	12.000	70.00	22.00	36.00	0.10	4	●	●
13.000	13.000	13.000	75.00	25.00	39.00	0.15	4	●	●
14.000	14.000	14.000	75.00	25.00	40.00	0.15	4	●	●
15.000	15.000	15.000	75.00	25.00	41.00	0.15	4	●	
16.000	16.000	16.000	75.00	25.00	42.00	0.15	4	●	●
18.000	18.000	18.000	100.00	35.00	53.00	0.15	4	●	●
20.000	20.000	20.000	100.00	35.00	54.00	0.15	4	●	●

Cutting values: Slotting* and roughing (detailed cutting values see p. 276)

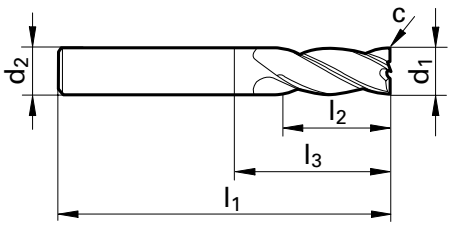
ISO Code	Hardness	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 2	4	6	8	10	12	16	20
P Steel	≤ 850 N/mm²	1.5xd	0.5xd	125	0.013	0.018	0.025	0.032	0.042	0.049	0.063	0.07
	850 - 1400 N/mm²	1.5xd	0.5xd	95	0.01	0.015	0.02	0.024	0.033	0.039	0.048	0.057
M Stainless steel	≤ 750 N/mm²	1.5xd	0.5xd	85	0.01	0.015	0.02	0.024	0.033	0.039	0.048	0.057
	≥ 750 N/mm²	1.5xd	0.2xd	50	0.007	0.01	0.015	0.018	0.027	0.03	0.039	0.048
K Cast mat.	≥ 240 HB 30	1.5xd	0.5xd	100	0.01	0.015	0.02	0.024	0.033	0.039	0.048	0.057
N Aluminium	≤ 7% Si	1.5xd	0.3xd	160	0.013	0.018	0.025	0.032	0.042	0.049	0.063	0.07

* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life
** for slotting with a_e = 0.02xd the cutting speed v_c can be increased by 50 %
All recommendations are valid for coated tools. For bright milling cutters please v_c -40 % and f_z -25 %!

XL end mills (4-fluted)

centre cutting

Tool material	Solid carbide	
Surface finish	bright	FIRE
Discount group	117	117
Guhring no.	**3012**	**3023**



Code no.	d1 h10	d2 h6	l1	l2	l3	c	Z	Availability	
	mm	mm	mm	mm	mm	mm x 45°			
3.000	3.000	3.000	75.00	20.00	47.00	0.05	4	●	●
4.000	4.000	4.000	75.00	25.00	47.00	0.05	4	●	●
5.000	5.000	5.000	75.00	30.00	47.00	0.05	4	●	●
6.000	6.000	6.000	75.00	30.00	39.00	0.05	4	●	●
8.000	8.000	8.000	100.00	40.00	64.00	0.10	4	●	●
10.000	10.000	10.000	100.00	40.00	60.00	0.10	4	●	●
12.000	12.000	12.000	150.00	45.00	105.00	0.10	4	●	●
14.000	14.000	14.000	150.00	45.00	105.00	0.15	4	●	●
14.001	14.000	16.000	150.00	65.00	101.00	0.15	4	●	●
16.000	16.000	16.000	150.00	65.00	102.00	0.15	4	●	●
18.000	18.000	18.000	150.00	65.00	102.00	0.15	4	●	●
18.001	18.000	20.000	150.00	65.00	99.00	0.15	4	●	●
20.000	20.000	20.000	150.00	65.00	100.00	0.15	4	●	●

Cutting values: Slotting* and roughing (detailed cutting values see p. 276)

ISO Code	Hardness	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 2	4	6	8	10	12	16	20
P Steel	≤ 850 N/mm²	1.5xd	0.5xd	125	0.013	0.018	0.025	0.032	0.042	0.049	0.063	0.07
	850 - 1400 N/mm²	1.5xd	0.5xd	95	0.01	0.015	0.02	0.024	0.033	0.039	0.048	0.057
M Stainless steel	≤ 750 N/mm²	1.5xd	0.5xd	85	0.01	0.015	0.02	0.024	0.033	0.039	0.048	0.057
	≥ 750 N/mm²	1.5xd	0.2xd	50	0.007	0.01	0.015	0.018	0.027	0.03	0.039	0.048
K Cast mat.	≥ 240 HB 30	1.5xd	0.5xd	100	0.01	0.015	0.02	0.024	0.033	0.039	0.048	0.057
N Aluminium	≤ 7% Si	1.5xd	0.3xd	160	0.013	0.018	0.025	0.032	0.042	0.049	0.063	0.07

* peripheral cooling „Guhrojet“ is recommended for optimal chip evacuation and tool life
** for slotting with a_e = 0.02xd the cutting speed v_c can be increased by 50 %
All recommendations are valid for coated tools. For bright milling cutters please v_c -40 % and f_z -25 %!

Pilot Cutter

Piloting, drilling, finishing - with only one tool

with reinforced shank

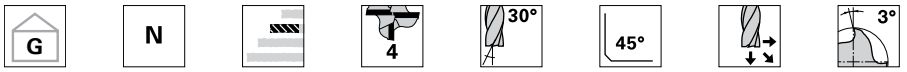
Summary of advantages

- Piloting, drilling and finishing with only one tool
- Piloting and finishing particularly on inclined surfaces
- For widening holes
- Ramping up to a 45° plunging angle
- Drilling on curved surfaces and off-centre

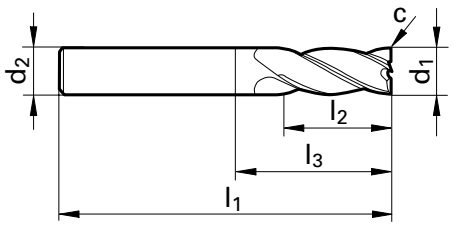
Detailed pilot geometry with reinforced flutes and greater chip space for drilling and ramping operations

Pilot end mill

centre cutting



Tool material	**Solid carbide**
Surface finish	TiAlN-SuperA
Discount group	106
Guhring no.	**6716**



Code no.	d1 m8	d2 h6	l1	l2	l3	c	Z	Availability
	mm	mm	mm	mm	mm	mm x 45°		
1.400	1.400	3.000	38.00	3.00	5.90	0.01	4	●
1.500	1.500	3.000	38.00	4.00	6.90	0.02	4	●
1.800	1.800	3.000	38.00	6.00	8.90	0.02	4	●
2.000	2.000	3.000	38.00	6.50	9.40	0.02	4	●
2.100	2.100	3.000	38.00	6.50	9.90	0.02	4	●
2.300	2.300	3.000	38.00	6.50	9.90	0.02	4	●
2.500	2.500	3.000	38.00	6.50	9.90	0.03	4	●
2.800	2.800	3.000	38.00	6.50	10.00	0.03	4	●
3.000	3.000	6.000	57.00	8.00	12.40	0.03	4	●
3.500	3.500	6.000	57.00	10.00	14.90	0.04	4	●
4.000	4.000	6.000	57.00	11.00	15.90	0.04	4	●
4.500	4.500	6.000	57.00	11.00	17.40	0.05	4	●
5.000	5.000	6.000	57.00	13.00	19.40	0.05	4	●
5.500	5.500	6.000	57.00	13.00	20.40	0.06	4	●
6.000	6.000	8.000	63.00	13.00	20.40	0.06	4	●
6.500	6.500	8.000	63.00	13.00	20.90	0.07	4	●
7.000	7.000	8.000	63.00	16.00	23.90	0.07	4	●
7.500	7.500	8.000	63.00	16.00	23.90	0.08	4	●
8.000	8.000	10.000	72.00	19.00	26.90	0.08	4	●
8.500	8.500	10.000	72.00	19.00	28.40	0.09	4	●
9.000	9.000	10.000	72.00	19.00	28.40	0.09	4	●
10.000	10.000	12.000	83.00	22.00	31.40	0.10	4	●
11.000	11.000	12.000	83.00	26.00	36.40	0.11	4	●
12.000	12.000	14.000	83.00	26.00	37.40	0.12	4	●

Cutting values: Slotting* and roughing **(detailed cutting values see p. 276)**

ISO Code	Hardness	Drilling depth* (a_p max.)	Cutting speed (v_c)	fz (mm/min) 1	2	4	6	8	10	12
P Steel	up to 850 N/mm²	1.5xd	100	0.010	0.015	0.025	0.030	0.045	0.060	0.075
	850 - 1200 N/mm²	1.5xd	85	0.008	0.010	0.020	0.025	0.035	0.050	0.060
	850 - 1400 N/mm²	1.0xd	70	0.006	0.008	0.015	0.020	0.030	0.045	0.050
M Stainl.steel	up to 750 N/mm²	1.0xd	50	0.005	0.006	0.012	0.015	0.020	0.030	0.040
K Cast mat.	up to 240 HB 30	1.5xd	100	0.010	0.015	0.025	0.030	0.045	0.060	0.075
	over 240 HB 30	1.5xd	85	0.008	0.010	0.020	0.025	0.035	0.050	0.060
N Aluminium	up to 3% Si	1.0xd	140	0.010	0.015	0.025	0.030	0.045	0.060	0.075

* peripheral cooling “Gühjet” recommended from drilling depth 0.5xd

HIGH PERFORMANCE MILLING CUTTERS HSS-E-PM
UNIVERSAL MILLING CUTTERS M42

High Performance
Milling Cutters HSS-E-PM
Universal Milling Cutters M42

High performance milling cutters HSS-E-PM

Helix	Z	Length	Feed	Shank design	Tool illustration	Tool material	Surface finish	Guhring no.	Dis-count group	Page
Ratio end mills RF 40 centre cutting										
35° 38°	4-6			B		HSS-E-PM	bright	**3429**	112	226
35° 38°	4			B		HSS-E-PM	FIRE	**3705**	112	226
30° 32°	4-6			B		HSS-E-PM	bright	**3432**	112	227
30° 32°	4-6			B		HSS-E-PM	FIRE	**3706**	112	227
Roughing end mills GS 40 (fine teeth) centre cutting										
30°	3			B		HSS-E-PM	bright	**3322**	112	228
30°	3			B		HSS-E-PM	FIRE	**3668**	112	228
30°	4-6			B		HSS-E-PM	bright	**3340**	112	229
30°	4-6			B		HSS-E-PM	FIRE	**3660**	112	229
Roughing end mills GS 80 (fine teeth) centre cutting										
45°	3-6			B		HSS-E-PM	FIRE	**6756**	112	231

Universal milling cutters M42

Helix	Z	Length	Feed	Shank design	Tool illustration	Tool material	Surface finish	Guhring no.	Dis-count group	Page
Slot drills (2-fluted) centre cutting										
30°	2			B		M42	bright	**3451**	112	232
30°	2			B		M42	FIRE	**3663**	112	232
30°	2			B		M42	bright	**3452**	112	233
30°	2			B		M42	FIRE	**3694**	112	233
30°	2			B		M42	bright	**3453**	112	234
30°	2			B		M42	FIRE	**3695**	112	234
Ball nose slot drills (2-fluted) centre cutting										
30°	2			B		M42	bright	**3466**	112	235
30°	2			B		M42	FIRE	**3703**	112	235
30°	2			B		M42	bright	**3467**	112	236
30°	2			B		M42	FIRE	**3704**	112	236
Mini slot drills (3-fluted) centre cutting										
30°	3			B		M42	bright	**3142**	112	237
30°	3			B		M42	FIRE	**3144**	112	237
30°	3			B		M42	bright	**3143**	112	238
30°	3			B		M42	FIRE	**3145**	112	238

Universal milling cutters M42

Helix	Z	Length	Feed	Shank design	Tool illustration	Tool material	Surface finish	Guhring no.	Dis-count group	Page
Slot drills (3-fluted) centre cutting										
30°	3			B		M42	bright	**3458**	112	239
30°	3			B		M42	FIRE	**3651**	112	239
30°	3			B		M42	bright	**3459**	112	240
30°	3			B		M42	FIRE	**3664**	112	240
30°	3			B		M42	bright	**3460**	112	241
30°	3			B		M42	FIRE	**3836**	112	241
End mills centre cutting										
30°	4-6			B		M42	bright	**3428**	112	242
30°	4-6			B		M42	FIRE	**3670**	112	242
30°	4-6			B		M42	bright	**3431**	112	243
30°	4-6			B		M42	FIRE	**3692**	112	243
30°	4			B		M42	bright	**3433**	112	244
Roughing end mills centre cutting										
30°	4-6			B		M42	bright	**3346**	112	245
30°	4-6			B		M42	FIRE	**3690**	112	245
30°	4-6			B		M42	bright	**3347**	112	246
30°	4-6			B		M42	FIRE	**3650**	112	246

Universal milling cutters M42

Helix	Z	Length	Feed	Shank design	Tool illustration	Tool material	Surface finish	Guhring no.	Dis-count group	Page
Roughing/finishing end mills centre cutting										
30°	4-6			B		M42	bright	**3343**	112	247
30°	4-6			B		M42	FIRE	**3669**	112	247
30°	4-6			B		M42	bright	**3342**	112	248
30°	4-6			B		M42	FIRE	**3698**	112	248
Morse taper end mills										
30°	4-8			MK		HSCO	bright	**3118**	112	249
30°	4-8			MK		HSCO	bright	**3117**	112	249
30°	4-8			MK		HSCO	bright	**3440**	112	250
30°	4-8			MK		HSCO	bright	**3121**	112	251
30°	4-8			MK		HSCO	bright	**3120**	112	252
End mills with international taper										
30°	6+			SK		HSCO	bright	**3130**	112	253
30°	4-8			SK		HSCO	bright	**3131**	112	254
30°	4-8			SK		HSCO	bright	**3134**	112	255
30°	6+			SK		HSCO	bright	**3133**	112	256
Side and face cutters										
						HSCO	bright	**3530**	112	257

Universal milling cutters M42

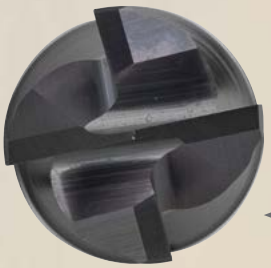
Helix	Z	Length	Feed	Shank design	Tool illustration	Tool material	Surface finish	Guhring no.	Dis-count group	Page
Shell end mills										
30°	6+					M42	bright	**3504**	112	258
30°	6+					M42	TiCN	**3654**	112	258
30°	6+					M42	bright	**3185**	112	259
30°	6+					M42	TiCN	**3749**	112	259
30°	6+					M42	bright	**3187**	112	260
T-slot end mills										
	6+			B		HSCO	bright	**3570**	112	261
Woodruff cutters										
	6+			B		HSCO	bright	**3580**	112	262
	6+			B		HSCO	bright	**3579**	112	263
Dovetail cutters										
	6+			B		HSCO	bright	**3572**	112	264
	6+			B		HSCO	bright	**3576**	112	264
	6+			B		HSCO	bright	**3574**	112	265
	6+			B		HSCO	bright	**3577**	112	265
Corner rounding cutters										
	4-6					M42	bright	**3176**	112	266

RF40 – High Performance PM roughing end mills

for difficult applications in steel and high-strength steels

Summary of advantages

- with unequal helix 35/38° for low vibration running
- for slotting, roughing and finishing in steel, stainless steel, cast material and high strength materials
- highest removal rates and short production times in HPC applications to 2XD
- for extreme feed rates thanks to smooth cutting operation
- low power consumption allows for use in unstable applications and on weaker machines
- available in two different lengths
- high temperature-resistant HSS E PM tool material with Fire-coating



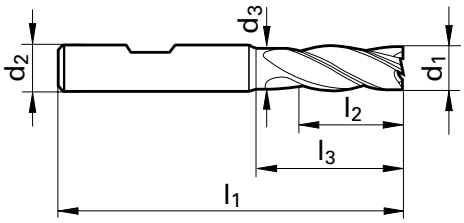
End geometry with
centre cutting
for plunging

Ratio end mills RF 40

centre cutting

DIN 844 | N | 4-6 | 35° 38° | 11° | B | B

	HSS-E-PM	
Tool material		
Surface finish	bright	FIRE
Discount group	112	112
Guhring no.	**3429**	**3705**



Code no.	d1 js12	d2	d3	l1	l2	l3	Z	Availability	
	mm	mm	mm	mm	mm	mm			
8.000	8.000	10.000	7.700	69.00	19.00	21.50	4	●	●
10.000	10.000	10.000	9.500	72.00	22.00	30.00	4	●	●
12.000	12.000	12.000	11.500	83.00	26.00	36.00	4	●	●
14.000	14.000	12.000	12.000	83.00	26.00	38.00	4	●	●
16.000	16.000	16.000	15.500	92.00	32.00	42.00	4	●	●
18.000	18.000	16.000	16.000	92.00	32.00	44.00	4	●	●
20.000	20.000	20.000	19.000	104.00	38.00	52.00	4	●	●
25.000	25.000	25.000	24.000	121.00	45.00	63.00	4	●	
30.000	30.000	25.000	25.000	121.00	45.00	65.00	6	●	

Cutting values: Slotting* and roughing (detailed cutting values see p. 279)**

ISO Code	Hardness	Feed depth* a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 6	8	10	12	16	20
P Steel	≤ 850 N/mm²	1xd	1xd	60	0.024	0.032	0.044	0.052	0.064	0.076
	850 - 1400 N/mm²	1xd	1xd	50	0.024	0.032	0.044	0.052	0.064	0.076
M Stainless steel	≤ 750 N/mm²	1xd	1xd	45	0.014	0.027	0.036	0.05	0.059	0.063
	≥ 750 N/mm²	1xd	1xd	35	0.014	0.027	0.036	0.05	0.059	0.063
K Cast mat.	≥ 240 HB 30	1xd	1xd	50	0.027	0.036	0.05	0.059	0.072	0.086
N Aluminium	≤ 7% Si	1xd	1xd	130	0.027	0.036	0.05	0.059	0.072	0.086

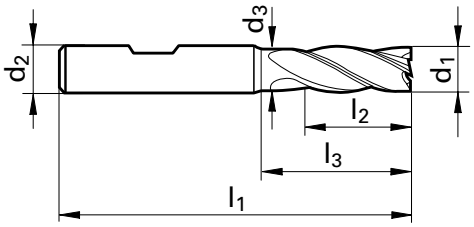
* good cooling is recommended for optimal chip evacuation and tool life
** when lateral milling and finishing with ae = 0.05-0.1xd the cutting speed vc and feed rate can be increased by 30%
All recommendations are valid for coated tools. For bright milling cutters please v_c -40 % and f_z -25%!

Ratio end mills RF 40

centre cutting

DIN 844 | N | 4-6 | 30° 32° | 11° | B | B

	HSS-E-PM	
Tool material		
Surface finish	bright	FIRE
Discount group	112	112
Guhring no.	**3432**	**3706**



Code no.	d1 js12	d2	d3	l1	l2	l3	Z	Availability	
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16.000	16.000	16.000	15.500	123.00	63.00	73.00	4	●	●
18.000	18.000	16.000	16.000	123.00	63.00	75.00	4	●	●
20.000	20.000	20.000	19.000	141.00	75.00	89.00	4	●	●
25.000	25.000	25.000	24.000	166.00	90.00	108.00	4	●	●
30.000	30.000	25.000	25.000	166.00	90.00	110.00	6	●	●

Cutting values: Roughing and finishing (detailed cutting values see p. 279)**

ISO Code	Hardness	Feed depth* a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 3	6	8	10	12	16	20	25
P Steel	≤ 850 N/mm²	3xd	0.2xd	65	0.014	0.027	0.036	0.05	0.059	0.072	0.086	0.12
	850 - 1400 N/mm²	3xd	0.15xd	55	0.012	0.024	0.032	0.04	0.048	0.056	0.072	0.1
M Stainless steel	≤ 750 N/mm²	3xd	0.15xd	50	0.012	0.024	0.032	0.04	0.048	0.056	0.072	0.1
	≥ 750 N/mm²	3xd	0.1xd	40	0.012	0.024	0.032	0.04	0.048	0.056	0.072	0.1
K Cast mat.	≥ 240 HB 30	3xd	0.2xd	55	0.016	0.03	0.04	0.055	0.065	0.08	0.095	0.14
N Aluminium	≤ 7% Si	3xd	0.15xd	150	0.018	0.035	0.045	0.05	0.065	0.08	0.12	0.15

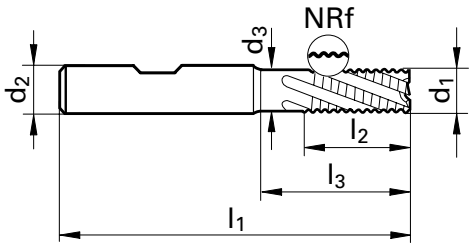
* good cooling is recommended for optimal chip evacuation and tool life
** when lateral milling and finishing with ae = 0.05-0.1xd the cutting speed vc and feed rate can be increased by 30%
All recommendations are valid for coated tools. For bright milling cutters please v_c -40 % and f_z -25%!

Roughing end mills GS 40 (fine teeth)

centre cutting

DIN 844 | NRf | 3 | 30° | 11° | B | B

Tool material	HSS-E-PM	
Surface finish	bright	FIRE
Discount group	112	112
Guhring no.	**3322**	**3668**



Code no.	d1 js12	d2	d3	l1	l2	l3	Z	Availability	
	mm	mm	mm	mm	mm	mm			
6.000	6.000	6.000	5.700	57.00	13.00	20.00	3	●	●
8.000	8.000	10.000	7.700	69.00	19.00	21.50	3	●	●
10.000	10.000	10.000	9.500	72.00	22.00	30.00	3	●	●
12.000	12.000	12.000	11.500	83.00	26.00	36.00	3	●	●
14.000	14.000	12.000	12.000	83.00	26.00	38.00	3	●	●
16.000	16.000	16.000	15.500	92.00	32.00	42.00	3	●	●
18.000	18.000	16.000	16.000	92.00	32.00	44.00	3	●	●
20.000	20.000	20.000	19.000	104.00	38.00	52.00	3	●	●

Cutting values: Roughing* (detailed cutting values see p. 279)

ISO Code	Hardness	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 3	6	8	10	12	16	20	25
P Steel	≤ 850 N/mm²	2xd	0.5xd	65	0.014	0.024	0.032	0.04	0.048	0.056	0.072	0.104
	850 - 1400 N/mm²	2xd	0.4xd	55	0.012	0.016	0.032	0.041	0.054	0.063	0.081	0.09
M Stainless steel	≤ 750 N/mm²	2xd	0.4xd	50	0.012	0.024	0.032	0.04	0.048	0.056	0.072	0.104
	≥ 750 N/mm²	2xd	0.25xd	40	0.012	0.014	0.022	0.027	0.036	0.045	0.054	0.063
K Cast mat.	≥ 240 HB 30	2xd	0.4xd	55	0.016	0.024	0.032	0.04	0.048	0.056	0.072	0.104
N Aluminium	≤ 7% Si	2xd	0.4xd	150	0.018	0.027	0.036	0.045	0.054	0.063	0.081	0.12

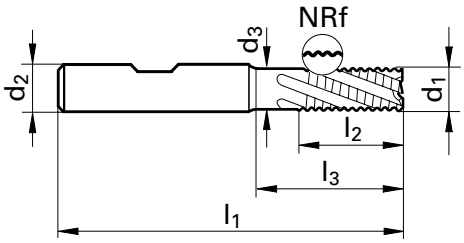
* good cooling is recommended for optimal chip evacuation and tool life
** for slotting the cutting speed and feed rate should be reduced by 40 %
All recommendations are valid for coated tools. For bright milling cutters please v_c -40 % and f_z -25%!

Roughing end mills GS 40 (fine teeth)

centre cutting

DIN 844 | NRf | 4-6 | 30° | 11° | B | B

Tool material	HSS-E-PM	
Surface finish	bright	FIRE
Discount group	112	112
Guhring no.	**3340**	**3660**



Code no.	d1 js12	d2	d3	l1	l2	l3	Z	Availability	
	mm	mm	mm	mm	mm	mm			
6.000	6.000	6.000	5.700	57.00	13.00	20.00	4	●	●
7.000	7.000	10.000	6.700	66.00	16.00	17.90	4	●	●
8.000	8.000	10.000	7.700	69.00	19.00	21.50	4	●	●
9.000	9.000	10.000	8.700	69.00	19.00	24.30	4	●	●
10.000	10.000	10.000	9.500	72.00	22.00	30.00	4	●	●
11.000	11.000	12.000	10.500	79.00	22.00	30.70	4	●	●
12.000	12.000	12.000	11.500	83.00	26.00	36.00	4	●	●
13.000	13.000	12.000	12.000	83.00	26.00	38.00	4	●	●
14.000	14.000	12.000	12.000	83.00	26.00	38.00	4	●	●
15.000	15.000	12.000	12.000	83.00	26.00	38.00	4	●	●
16.000	16.000	16.000	15.500	92.00	32.00	42.00	4	●	●
18.000	18.000	16.000	16.000	92.00	32.00	44.00	4	●	●
20.000	20.000	20.000	19.000	104.00	38.00	52.00	4	●	●
25.000	25.000	25.000	24.000	121.00	45.00	63.00	5	●	●
28.000	28.000	25.000	25.000	121.00	45.00	65.00	5	●	●
30.000	30.000	25.000	25.000	121.00	45.00	65.00	5	●	●
32.000	32.000	32.000	31.000	133.00	53.00	71.00	6	●	●

Cutting values: Roughing* (detailed cutting values see p. 279)

ISO Code	Hardness	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 3	6	8	10	12	16	20	25
P Steel	≤ 850 N/mm²	2xd	0.5xd	65	0.014	0.024	0.032	0.04	0.048	0.056	0.072	0.104
	850 - 1400 N/mm²	2xd	0.4xd	55	0.012	0.016	0.032	0.041	0.054	0.063	0.081	0.09
M Stainless steel	≤ 750 N/mm²	2xd	0.4xd	50	0.012	0.024	0.032	0.04	0.048	0.056	0.072	0.104
	≥ 750 N/mm²	2xd	0.25xd	40	0.012	0.014	0.022	0.027	0.036	0.045	0.054	0.063
K Cast mat.	≥ 240 HB 30	2xd	0.4xd	55	0.016	0.024	0.032	0.04	0.048	0.056	0.072	0.104
N Aluminium	≤ 7% Si	2xd	0.4xd	150	0.018	0.027	0.036	0.045	0.054	0.063	0.081	0.12

* good cooling is recommended for optimal chip evacuation and tool life
** for slotting the cutting speed and feed rate should be reduced by 40 %
All recommendations are valid for coated tools. For bright milling cutters please v_c -40 % and f_z -25%!

GS 80 - High performance PM roughing end mills

for difficult applications in steel and high strength steels

Summary of advantages

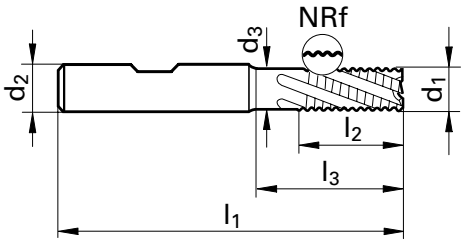
- particularly smooth cutting thanks to 45° helix
- increased number of teeth for extra performance
- low thrust pressure allows use in unstable conditions
- high temperature-resistant HSS-E-PM tool material with Fire-coating
- particularly well suited for difficult materials

Roughing end mills GS 80 (fine teeth)

centre cutting

DIN 844 | NRf | 3-6 | 45° | 11° | B

Tool material	HSS-E-PM
Surface finish	FIRE
Discount group	112
Guhring no.	6756



Code no.	d1 js12	d2	d3	l1	l2	l3	Z	Availability
	mm	mm	mm	mm	mm	mm		
4.000	4.000	6.000	3.700	57.00	11.00	15.00	3	●
5.000	5.000	6.000	4.700	57.00	13.00	18.00	4	●
6.000	6.000	6.000	5.700	57.00	13.00	20.00	4	●
7.000	7.000	10.000	6.700	66.00	16.00	22.10	4	●
8.000	8.000	10.000	7.700	69.00	19.00	26.00	4	●
9.000	9.000	10.000	8.700	69.00	19.00	26.90	4	●
10.000	10.000	10.000	9.500	72.00	22.00	30.00	4	●
12.000	12.000	12.000	11.500	83.00	26.00	36.00	4	●
14.000	14.000	12.000	12.000	83.00	26.00	38.00	5	●
16.000	16.000	16.000	15.500	92.00	32.00	42.00	5	●
18.000	18.000	16.000	16.000	92.00	32.00	44.00	6	●
20.000	20.000	20.000	19.000	104.00	38.00	52.00	6	●
25.000	25.000	25.000	24.000	121.00	45.00	63.00	6	●

Cutting values: Roughing* (detailed cutting values see p. 279)

ISO Code	Hardness	Feed depth a_p	Feed width** a_e	Cutting speed v_c	fz (mm/z) with nom. Ø 3	6	8	10	12	16	20	25
P Steel	≤ 850 N/mm²	2xd	0.5xd	65	0.014	0.024	0.032	0.04	0.048	0.056	0.072	0.104
	850 - 1400 N/mm²	2xd	0.4xd	55	0.012	0.016	0.032	0.041	0.054	0.063	0.081	0.09
M Stainless steel	≤ 750 N/mm²	2xd	0.4xd	50	0.012	0.024	0.032	0.04	0.048	0.056	0.072	0.104
	≥ 750 N/mm²	2xd	0.25xd	40	0.012	0.014	0.022	0.027	0.036	0.045	0.054	0.063
K Cast mat.	≥ 240 HB 30	2xd	0.4xd	55	0.016	0.024	0.032	0.04	0.048	0.056	0.072	0.104
N Aluminium	≤ 7% Si	2xd	0.4xd	150	0.018	0.027	0.036	0.045	0.054	0.063	0.081	0.12

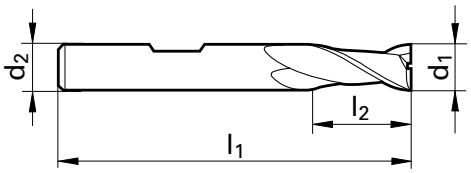
* good cooling is recommended for optimal chip evacuation and tool life
** for slotting the cutting speed and feed rate should be reduced by 40 %

Slot drills (2-fluted)

centre cutting

DIN 327 | N | 2 | 30° | 11°

	B	B
Tool material	M42	
Surface finish	bright	FIRE
Discount group	112	112
Guhring no.	**3451**	**3663**



Code no.	d1	d1	d2	l1	l2	Z	Availability	
	mm	tolerance	mm	mm	mm			
1.000	1.000	h10	6.000	47.00	2.00	2	●	●
1.500	1.500	h10	6.000	47.00	3.00	2	●	●
2.000	2.000	e8	6.000	48.00	4.00	2	●	●
2.500	2.500	e8	6.000	49.00	5.00	2	●	●
3.000	3.000	e8	6.000	49.00	5.00	2	●	●
3.500	3.500	h10	6.000	50.00	6.00	2	●	●
4.000	4.000	e8	6.000	51.00	7.00	2	●	●
4.500	4.500	h10	6.000	51.00	7.00	2	●	●
5.000	5.000	e8	6.000	52.00	8.00	2	●	●
5.500	5.500	h10	6.000	52.00	8.00	2	●	●
6.000	6.000	e8	6.000	52.00	8.00	2	●	●
6.500	6.500	h10	10.000	60.00	10.00	2	●	●
7.000	7.000	e8	10.000	60.00	10.00	2	●	●
7.500	7.500	h10	10.000	60.00	10.00	2	●	●
8.000	8.000	e8	10.000	61.00	11.00	2	●	●
8.500	8.500	h10	10.000	61.00	11.00	2	●	●
9.000	9.000	h10	10.000	61.00	11.00	2	●	●
9.500	9.500	h10	10.000	61.00	11.00	2	●	●
10.000	10.000	e8	10.000	63.00	13.00	2	●	●
10.500	10.500	h10	12.000	70.00	13.00	2	●	●
11.000	11.000	h10	12.000	70.00	13.00	2	●	●
11.500	11.500	h10	12.000	70.00	13.00	2	●	●
12.000	12.000	e8	12.000	73.00	16.00	2	●	●
13.000	13.000	h10	12.000	73.00	16.00	2	●	●
14.000	14.000	e8	12.000	73.00	16.00	2	●	●
15.000	15.000	h10	12.000	73.00	16.00	2	●	●
16.000	16.000	e8	16.000	79.00	19.00	2	●	●
17.000	17.000	h10	16.000	79.00	19.00	2	●	●
18.000	18.000	e8	16.000	79.00	19.00	2	●	●
19.000	19.000	h10	16.000	79.00	19.00	2	●	●
20.000	20.000	e8	20.000	88.00	22.00	2	●	●
22.000	22.000	e8	20.000	88.00	22.00	2	●	●
24.000	24.000	e8	25.000	102.00	26.00	2	●	●
25.000	25.000	e8	25.000	102.00	26.00	2	●	●

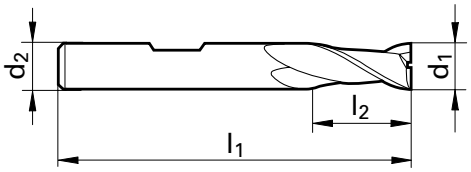
Navigator cutting data see page 280.

Slot drills (2-fluted)

centre cutting

DIN 844 | N | 2 | 30° | 11° | B | B

Tool material	M42	
Surface finish	bright	FIRE
Discount group	112	112
Guhring no.	**3452**	**3694**



Code no.	d1	d1	d2	l1	l2	Z	Availability	
	mm	tolerance	mm	mm	mm			
3.000	3.000	e8	6.000	52.00	8.00	2	●	●
3.500	3.500	h10	6.000	54.00	10.00	2	●	●
4.000	4.000	e8	6.000	55.00	11.00	2	●	●
4.500	4.500	h10	6.000	55.00	11.00	2	●	●
5.000	5.000	e8	6.000	57.00	13.00	2	●	●
5.500	5.500	h10	6.000	57.00	13.00	2	●	●
6.000	6.000	e8	6.000	57.00	13.00	2	●	●
7.000	7.000	e8	10.000	66.00	16.00	2	●	●
8.000	8.000	e8	10.000	69.00	19.00	2	●	●
10.000	10.000	e8	10.000	72.00	22.00	2	●	●
11.000	11.000	h10	12.000	79.00	22.00	2	●	●
12.000	12.000	e8	12.000	83.00	26.00	2	●	●
13.000	13.000	h10	12.000	83.00	26.00	2	●	●
14.000	14.000	e8	12.000	83.00	26.00	2	●	●
15.000	15.000	h10	12.000	83.00	26.00	2	●	●
16.000	16.000	e8	16.000	92.00	32.00	2	●	●
18.000	18.000	e8	16.000	92.00	32.00	2	●	●
20.000	20.000	e8	20.000	104.00	38.00	2	●	●

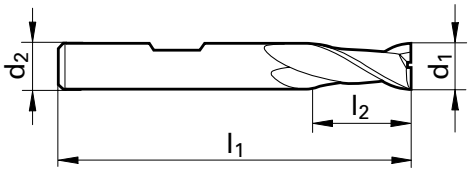
Navigator cutting data see page 280.

Slot drills (2-fluted)

centre cutting

DIN 844 | N | 2 | 30° | 11° | B | B

Tool material	M42	
Surface finish	bright	FIRE
Discount group	112	112
Guhring no.	**3453**	**3695**



Code no.	d1	d1	d2	l1	l2	Z	Availability	
	mm	tolerance	mm	mm	mm			
3.000	3.000	h10	6.000	56.00	12.00	2	●	●
4.000	4.000	h10	6.000	63.00	19.00	2	●	●
5.000	5.000	h10	6.000	68.00	24.00	2	●	●
6.000	6.000	h10	6.000	68.00	24.00	2	●	●
8.000	8.000	h10	10.000	88.00	38.00	2	●	●
10.000	10.000	h10	10.000	95.00	45.00	2	●	●
12.000	12.000	h10	12.000	110.00	53.00	2	●	●
14.000	14.000	h10	12.000	110.00	53.00	2	●	●
16.000	16.000	h10	16.000	123.00	63.00	2	●	●
18.000	18.000	h10	16.000	123.00	63.00	2	●	●
20.000	20.000	h10	20.000	141.00	75.00	2	●	●

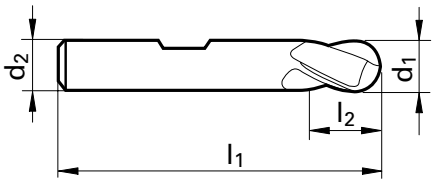
Navigator cutting data see page 280.

Ball nose slot drills (2-fluted)

centre cutting

DIN 327 | N | 2 | 30° | R±0,05 | 11°

	B	B
Tool material	M42	
Surface finish	bright	FIRE
Discount group	112	112
Guhring no.	**3466**	**3703**



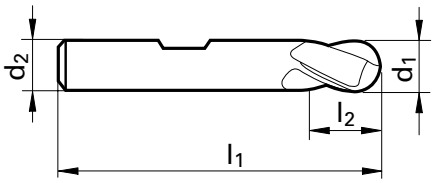
Code no.	d1	d1	d2	l1	l2	Z	Availability	
	mm	tolerance	mm	mm	mm			
2.000	2.000	e8	6.000	48.00	4.00	2	●	●
3.000	3.000	e8	6.000	49.00	5.00	2	●	●
4.000	4.000	e8	6.000	51.00	7.00	2	●	●
5.000	5.000	e8	6.000	52.00	8.00	2	●	●
6.000	6.000	e8	6.000	52.00	8.00	2	●	●
7.000	7.000	e8	10.000	60.00	10.00	2	●	●
8.000	8.000	e8	10.000	61.00	11.00	2	●	●
9.000	9.000	h10	10.000	61.00	11.00	2	●	●
10.000	10.000	e8	10.000	63.00	13.00	2	●	●
11.000	11.000	h10	12.000	70.00	13.00	2		●
12.000	12.000	e8	12.000	73.00	16.00	2	●	●
13.000	13.000	h10	12.000	73.00	16.00	2	●	●
14.000	14.000	e8	12.000	73.00	16.00	2	●	●
15.000	15.000	h10	12.000	73.00	16.00	2	●	●
16.000	16.000	e8	16.000	79.00	19.00	2	●	●
17.000	17.000	h10	16.000	79.00	19.00	2	●	●
18.000	18.000	e8	16.000	79.00	19.00	2	●	●
19.000	19.000	h10	16.000	79.00	19.00	2	●	●
20.000	20.000	e8	20.000	88.00	22.00	2	●	●
22.000	22.000	e8	20.000	88.00	22.00	2	●	●
24.000	24.000	e8	25.000	102.00	26.00	2	●	●
25.000	25.000	e8	25.000	102.00	26.00	2	●	
26.000	26.000	h10	25.000	102.00	26.00	2	●	
28.000	28.000	e8	25.000	102.00	26.00	2	●	
30.000	30.000	h10	25.000	102.00	26.00	2		●

Navigator cutting data see page 280.

Ball nose slot drills (2-fluted)

centre cutting

Tool material	M42	
Surface finish	bright	FIRE
Discount group	112	112
Guhring no.	**3467**	**3704**



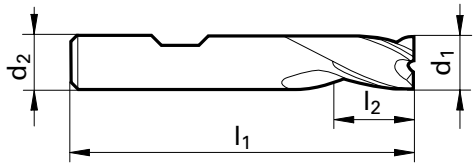
Code no.	d1	d1	d2	l1	l2	Z	Availability	
	mm	tolerance	mm	mm	mm			
3.000	3.000	h10	6.000	56.00	8.00	2	●	●
4.000	4.000	h10	6.000	63.00	11.00	2	●	●
5.000	5.000	h10	6.000	68.00	13.00	2	●	●
6.000	6.000	h10	6.000	68.00	13.00	2	●	●
7.000	7.000	h10	10.000	80.00	16.00	2	●	●
8.000	8.000	h10	10.000	88.00	19.00	2	●	●
10.000	10.000	h10	10.000	95.00	22.00	2	●	●
12.000	12.000	h10	12.000	110.00	26.00	2	●	●
14.000	14.000	h10	12.000	110.00	26.00	2	●	●
15.000	15.000	h10	12.000	110.00	26.00	2	●	●
16.000	16.000	h10	16.000	123.00	32.00	2	●	●
18.000	18.000	h10	16.000	123.00	32.00	2	●	●
20.000	20.000	h10	20.000	141.00	38.00	2	●	●
24.000	24.000	h10	25.000	166.00	45.00	2	●	
25.000	25.000	h10	25.000	166.00	45.00	2	●	
30.000	30.000	h10	25.000	166.00	45.00	2	●	

Navigator cutting data see page 280.

Mini slot drills (3-fluted)

centre cutting

Tool material	M42	M42
Surface finish	bright	FIRE
Discount group	112	112
Guhring no.	**3142**	**3144**



Code no.	d1 e8	d2	l1	l2	Z	Availability	
	mm	mm	mm	mm			
3.000	3.000	6.000	36.00	5.00	3	●	●
4.000	4.000	6.000	38.00	7.00	3	●	●
5.000	5.000	6.000	39.00	8.00	3	●	●
6.000	6.000	6.000	39.00	8.00	3	●	●
8.000	8.000	8.000	43.00	11.00	3	●	●
10.000	10.000	10.000	50.00	13.00	3	●	●

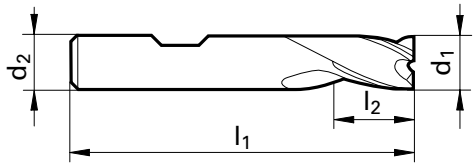
Navigator cutting data see page 280.

Mini slot drills (3-fluted)

centre cutting



Tool material	**M42**	**M42**
Surface finish	bright	FIRE
Discount group	112	112
Guhring no.	**3143**	**3145**




Code no.	d1 e8	d2	l1	l2	Z	Availability	
	mm	mm	mm	mm			
3.000	3.000	6.000	39.00	8.00	3	●	●
4.000	4.000	6.000	42.00	11.00	3	●	●
5.000	5.000	6.000	44.00	13.00	3	●	●
6.000	6.000	6.000	44.00	13.00	3	●	●
8.000	8.000	8.000	51.00	19.00	3	●	●
10.000	10.000	10.000	59.00	22.00	3	●	●

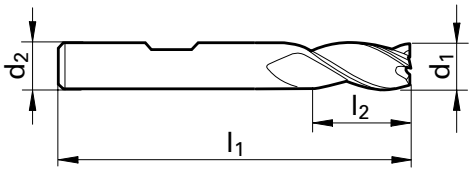
Navigator cutting data see page 280.

Slot drills (3-fluted)

centre cutting

DIN 327 | N | 3 | 30° | 11° | B | B

	M42	
Tool material		
Surface finish	bright	FIRE
Discount group	112	112
Guhring no.	**3458**	**3651**



Code no.	d1	d1	d2	l1	l2	Z	Availability	
	mm	tolerance	mm	mm	mm			
2.800	2.800	h10	6.000	49.00	5.00	3	●	●
3.000	3.000	e8	6.000	49.00	5.00	3	●	●
3.800	3.800	h10	6.000	51.00	7.00	3	●	●
4.000	4.000	e8	6.000	51.00	7.00	3	●	●
4.800	4.800	h10	6.000	52.00	8.00	3	●	●
5.000	5.000	e8	6.000	52.00	8.00	3	●	●
5.750	5.750	h10	6.000	52.00	8.00	3	●	●
6.000	6.000	e8	6.000	52.00	8.00	3	●	●
6.750	6.750	h10	10.000	60.00	10.00	3	●	●
7.000	7.000	e8	10.000	60.00	10.00	3	●	●
7.750	7.750	h10	10.000	61.00	11.00	3	●	●
8.000	8.000	e8	10.000	61.00	11.00	3	●	●
9.700	9.700	h10	10.000	63.00	13.00	3	●	●
10.000	10.000	e8	10.000	63.00	13.00	3	●	●
11.700	11.700	h10	12.000	70.00	13.00	3	●	●
12.000	12.000	e8	12.000	73.00	16.00	3	●	●
13.700	13.700	h10	12.000	73.00	16.00	3	●	●
14.000	14.000	e8	12.000	73.00	16.00	3	●	●
15.700	15.700	h10	16.000	79.00	19.00	3	●	●
16.000	16.000	e8	16.000	79.00	19.00	3	●	●
18.000	18.000	e8	16.000	79.00	19.00	3	●	●
20.000	20.000	e8	20.000	88.00	22.00	3	●	●
22.000	22.000	e8	20.000	88.00	22.00	3	●	●
25.000	25.000	e8	25.000	102.00	26.00	3	●	●
30.000	30.000	h10	25.000	102.00	26.00	3	●	●

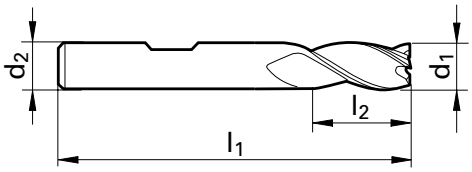
Navigator cutting data see page 280.

Slot drills (3-fluted)

centre cutting

DIN 844 | N | 3 | 30° | 11° | B | B

Tool material	M42	
Surface finish	bright	FIRE
Discount group	112	112
Guhring no.	**3459**	**3664**



Code no.	d1	d1	d2	l1	l2	Z	Availability	
	mm	tolerance	mm	mm	mm			
2.800	2.800	h10	6.000	52.00	8.00	3	●	●
3.000	3.000	e8	6.000	52.00	8.00	3	●	●
3.800	3.800	h10	6.000	55.00	11.00	3	●	●
4.000	4.000	e8	6.000	55.00	11.00	3	●	●
4.800	4.800	h10	6.000	57.00	13.00	3	●	●
5.000	5.000	e8	6.000	57.00	13.00	3	●	●
5.750	5.750	h10	6.000	57.00	13.00	3	●	●
6.000	6.000	e8	6.000	57.00	13.00	3	●	●
6.750	6.750	h10	10.000	66.00	16.00	3	●	●
7.000	7.000	e8	10.000	66.00	16.00	3	●	●
7.750	7.750	h10	10.000	69.00	19.00	3	●	●
8.000	8.000	e8	10.000	69.00	19.00	3	●	●
9.000	9.000	h10	10.000	69.00	19.00	3	●	●
9.700	9.700	h10	10.000	72.00	22.00	3	●	●
10.000	10.000	e8	10.000	72.00	22.00	3	●	●
11.000	11.000	h10	12.000	79.00	22.00	3	●	●
11.700	11.700	h10	12.000	79.00	22.00	3	●	●
12.000	12.000	e8	12.000	83.00	26.00	3	●	●
13.700	13.700	h10	12.000	83.00	26.00	3	●	●
14.000	14.000	e8	12.000	83.00	26.00	3	●	●
15.000	15.000	h10	12.000	83.00	26.00	3	●	●
15.700	15.700	h10	16.000	92.00	32.00	3	●	●
16.000	16.000	e8	16.000	92.00	32.00	3	●	●
18.000	18.000	e8	16.000	92.00	32.00	3	●	●
20.000	20.000	e8	20.000	104.00	38.00	3	●	●

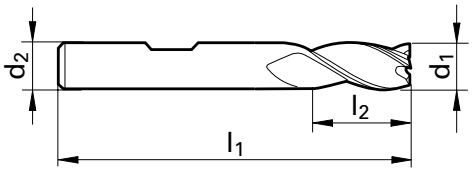
Navigator cutting data see page 280.

Slot drills (3-fluted)

centre cutting

DIN 844 | N | 3 | 30° | 11° | B | B

Tool material	M42	
Surface finish	bright	FIRE
Discount group	112	112
Guhring no.	**3460**	**3836**



Code no.	d1	d1	d2	l1	l2	Z	Availability	
	mm	tolerance	mm	mm	mm			
3.000	3.000	h10	6.000	56.00	12.00	3	●	●
4.000	4.000	h10	6.000	63.00	19.00	3	●	●
5.000	5.000	h10	6.000	68.00	24.00	3	●	●
6.000	6.000	h10	6.000	68.00	24.00	3	●	●
8.000	8.000	h10	10.000	88.00	38.00	3	●	●
10.000	10.000	h10	10.000	95.00	45.00	3	●	●
12.000	12.000	h10	12.000	110.00	53.00	3	●	●
14.000	14.000	h10	12.000	110.00	53.00	3	●	●
16.000	16.000	h10	16.000	123.00	63.00	3	●	●
18.000	18.000	h10	16.000	123.00	63.00	3	●	●
20.000	20.000	h10	20.000	141.00	75.00	3	●	●

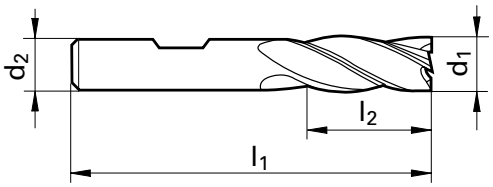
Navigator cutting data see page 280.

End mills

centre cutting

DIN 844 | N | 4-6 | 30° | 11°

	B	B
Tool material	M42	M42
Surface finish	bright	FIRE
Discount group	112	112
Guhring no.	3428	3670



Code no.	d1 js12	d2	l1	l2	Z	Availability	
	mm	mm	mm	mm			
2.000	2.000	6.000	51.00	7.00	4	●	●
2.500	2.500	6.000	52.00	8.00	4	●	●
3.000	3.000	6.000	52.00	8.00	4	●	●
3.500	3.500	6.000	54.00	10.00	4	●	●
4.000	4.000	6.000	55.00	11.00	4	●	●
4.500	4.500	6.000	55.00	11.00	4	●	●
5.000	5.000	6.000	57.00	13.00	4	●	●
5.500	5.500	6.000	57.00	13.00	4	●	●
6.000	6.000	6.000	57.00	13.00	4	●	●
6.500	6.500	10.000	66.00	16.00	4	●	●
7.000	7.000	10.000	66.00	16.00	4	●	●
7.500	7.500	10.000	66.00	16.00	4	●	●
8.000	8.000	10.000	69.00	19.00	4	●	●
8.500	8.500	10.000	69.00	19.00	4	●	●
9.000	9.000	10.000	69.00	19.00	4	●	●
9.500	9.500	10.000	69.00	19.00	4	●	●
10.000	10.000	10.000	72.00	22.00	4	●	●
11.000	11.000	12.000	79.00	22.00	4	●	●
12.000	12.000	12.000	83.00	26.00	4	●	●
13.000	13.000	12.000	83.00	26.00	4	●	●
14.000	14.000	12.000	83.00	26.00	4	●	●
15.000	15.000	12.000	83.00	26.00	4	●	●
16.000	16.000	16.000	92.00	32.00	4	●	●
18.000	18.000	16.000	92.00	32.00	4	●	●
20.000	20.000	20.000	104.00	38.00	4	●	●
22.000	22.000	20.000	104.00	38.00	6	●	●
24.000	24.000	25.000	121.00	45.00	6	●	●
25.000	25.000	25.000	121.00	45.00	6	●	●
26.000	26.000	25.000	121.00	45.00	6	●	●
28.000	28.000	25.000	121.00	45.00	6	●	●
30.000	30.000	25.000	121.00	45.00	6	●	●
32.000	32.000	32.000	133.00	53.00	6	●	●

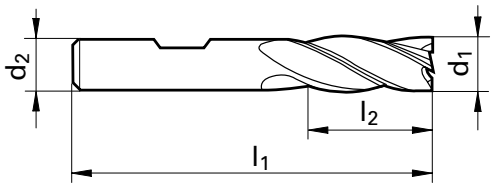
Navigator cutting data see page 280.

End mills

centre cutting

DIN 844 | N | 4-6 | 30° | 11° | B | B

Tool material	M42	M42
Surface finish	bright	FIRE
Discount group	112	112
Guhring no.	3431	3692



Code no.	d1 js12	d2	l1	l2	Z	Availability	
	mm	mm	mm	mm			
3.000	3.000	6.000	56.00	12.00	4	●	●
4.000	4.000	6.000	63.00	19.00	4	●	●
5.000	5.000	6.000	68.00	24.00	4	●	●
6.000	6.000	6.000	68.00	24.00	4	●	●
7.000	7.000	10.000	80.00	30.00	4	●	●
8.000	8.000	10.000	88.00	38.00	4	●	●
9.000	9.000	10.000	88.00	38.00	4	●	●
10.000	10.000	10.000	95.00	45.00	4	●	●
11.000	11.000	12.000	102.00	45.00	4	●	●
12.000	12.000	12.000	110.00	53.00	4	●	●
14.000	14.000	12.000	110.00	53.00	4	●	●
15.000	15.000	12.000	110.00	53.00	4	●	●
16.000	16.000	16.000	123.00	63.00	4	●	●
18.000	18.000	16.000	123.00	63.00	4	●	●
20.000	20.000	20.000	141.00	75.00	4	●	●
25.000	25.000	25.000	166.00	90.00	6	●	●
28.000	28.000	25.000	166.00	90.00	6	●	●
30.000	30.000	25.000	166.00	90.00	6	●	●
32.000	32.000	32.000	186.00	106.00	6	●	●
40.000	40.000	40.000	217.00	125.00	6	●	

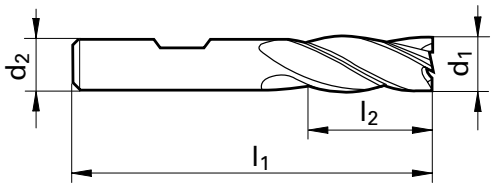
Navigator cutting data see page 280.

End mills

centre cutting



Tool material	**M42**
Surface finish	bright
Discount group	112
Guhring no.	**3433**



Code no.	d1 js12	d2	l1	l2	Z	Availability
	mm	mm	mm	mm		
6.000	6.000	6.000	79.00	40.00	4	●
8.000	8.000	10.000	105.00	56.00	4	●
10.000	10.000	10.000	112.00	63.00	4	●
12.000	12.000	12.000	125.00	71.00	4	●
14.000	14.000	12.000	125.00	71.00	4	●
16.000	16.000	16.000	141.00	80.00	4	●
18.000	18.000	16.000	141.00	80.00	4	●
20.000	20.000	20.000	163.00	100.00	4	●

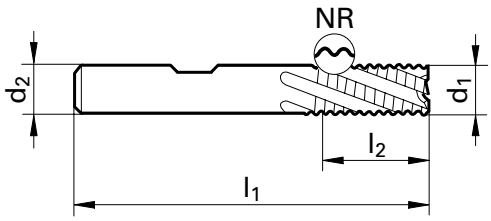
Navigator cutting data see page 280.

Roughing end mills

centre cutting

DIN 844 | NR | 4-6 | 30° | 11° | B | B

Tool material	M42	M42
Surface finish	bright	FIRE
Discount group	112	112
Guhring no.	3346	3690



Code no.	d1 js12	d2	l1	l2	Z	Availability	
	mm	mm	mm	mm			
6.000	6.000	6.000	57.00	13.00	4	●	●
7.000	7.000	10.000	66.00	16.00	4	●	●
8.000	8.000	10.000	69.00	19.00	4	●	●
9.000	9.000	10.000	69.00	19.00	4	●	●
10.000	10.000	10.000	72.00	22.00	4	●	●
11.000	11.000	12.000	79.00	22.00	4	●	●
12.000	12.000	12.000	83.00	26.00	4	●	●
14.000	14.000	12.000	83.00	26.00	4	●	●
15.000	15.000	12.000	83.00	26.00	4	●	●
16.000	16.000	16.000	92.00	32.00	4	●	●
18.000	18.000	16.000	92.00	32.00	4	●	●
20.000	20.000	20.000	104.00	38.00	4	●	●
22.000	22.000	20.000	104.00	38.00	4	●	●
24.000	24.000	25.000	121.00	45.00	4	●	●
25.000	25.000	25.000	121.00	45.00	4	●	●
26.000	26.000	25.000	121.00	45.00	4	●	●
28.000	28.000	25.000	121.00	45.00	4	●	●
30.000	30.000	25.000	121.00	45.00	4	●	●
32.000	32.000	32.000	133.00	53.00	4	●	●
36.000	36.000	32.000	133.00	53.00	6	●	●
40.000	40.000	40.000	155.00	63.00	6	●	●

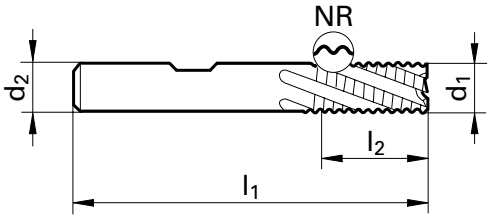
Navigator cutting data see page 280.

Roughing end mills

centre cutting

DIN 844 | NR | 4-6 | 30° | 11°

	B	B
Tool material	M42	M42
Surface finish	bright	FIRE
Discount group	112	112
Guhring no.	3347	3650



Code no.	d1 js12	d2	l1	l2	Z	Availability	
	mm	mm	mm	mm			
6.000	6.000	6.000	68.00	24.00	4	●	●
7.000	7.000	10.000	80.00	30.00	4	●	●
8.000	8.000	10.000	88.00	38.00	4	●	●
9.000	9.000	10.000	88.00	38.00	4	●	●
10.000	10.000	10.000	95.00	45.00	4	●	●
12.000	12.000	12.000	110.00	53.00	4	●	●
14.000	14.000	12.000	110.00	53.00	4	●	●
16.000	16.000	16.000	123.00	63.00	4	●	●
18.000	18.000	16.000	123.00	63.00	4	●	●
20.000	20.000	20.000	141.00	75.00	4	●	●
22.000	22.000	20.000	141.00	75.00	4	●	●
25.000	25.000	25.000	166.00	90.00	4	●	●
28.000	28.000	25.000	166.00	90.00	4	●	●
32.000	32.000	32.000	186.00	106.00	4	●	●
36.000	36.000	32.000	186.00	106.00	6	●	●

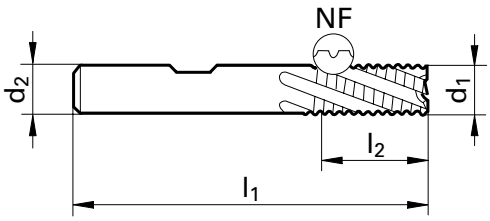
Navigator cutting data see page 280.

Roughing/finishing end mills

centre cutting

DIN 844 | NF | 4-6 | 30° | 11° | B | B

Tool material	M42	M42
Surface finish	bright	FIRE
Discount group	112	112
Guhring no.	3343	3669



Code no.	d1 js12	d2	l1	l2	Z	Availability	
	mm	mm	mm	mm			
6.000	6.000	6.000	57.00	13.00	4	●	●
7.000	7.000	10.000	66.00	16.00	4	●	●
8.000	8.000	10.000	69.00	19.00	4	●	●
9.000	9.000	10.000	69.00	19.00	4	●	●
10.000	10.000	10.000	72.00	22.00	4	●	●
11.000	11.000	12.000	79.00	22.00	4	●	●
12.000	12.000	12.000	83.00	26.00	4	●	●
14.000	14.000	12.000	83.00	26.00	4	●	●
15.000	15.000	12.000	83.00	26.00	4	●	●
16.000	16.000	16.000	92.00	32.00	4	●	●
18.000	18.000	16.000	92.00	32.00	4	●	●
20.000	20.000	20.000	104.00	38.00	4	●	●
22.000	22.000	20.000	104.00	38.00	4	●	●
24.000	24.000	25.000	121.00	45.00	4	●	●
25.000	25.000	25.000	121.00	45.00	4	●	●
26.000	26.000	25.000	121.00	45.00	4	●	●
28.000	28.000	25.000	121.00	45.00	4	●	●
30.000	30.000	25.000	121.00	45.00	4	●	●
32.000	32.000	32.000	133.00	53.00	4	●	●
36.000	36.000	32.000	133.00	53.00	6	●	
40.000	40.000	40.000	155.00	63.00	6	●	●

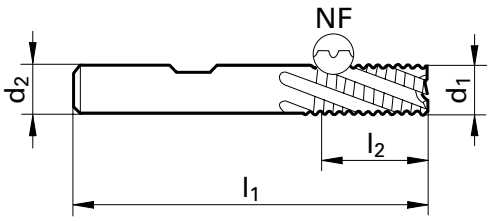
Navigator cutting data see page 280.

Roughing/finishing end mills

centre cutting

DIN 844 | NF | 4-6 | 30° | 11°

	B	B
Tool material	M42	M42
Surface finish	bright	FIRE
Discount group	112	112
Guhring no.	3342	3698



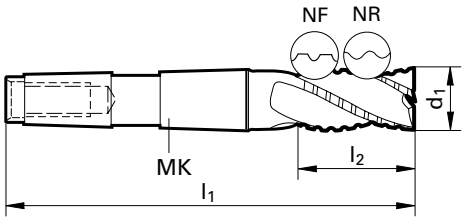
Code no.	d1 js12	d2	l1	l2	Z	Availability	
	mm	mm	mm	mm			
6.000	6.000	6.000	68.00	24.00	4	●	●
8.000	8.000	10.000	88.00	38.00	4	●	●
10.000	10.000	10.000	95.00	45.00	4	●	●
12.000	12.000	12.000	110.00	53.00	4	●	●
14.000	14.000	12.000	110.00	53.00	4	●	●
16.000	16.000	16.000	123.00	63.00	4	●	●
18.000	18.000	16.000	123.00	63.00	4	●	●
20.000	20.000	20.000	141.00	75.00	4	●	●
22.000	22.000	20.000	141.00	75.00	4	●	●
25.000	25.000	25.000	166.00	90.00	4	●	●
28.000	28.000	25.000	166.00	90.00	4	●	●
32.000	32.000	32.000	186.00	106.00	4	●	●
36.000	36.000	32.000	186.00	106.00	6	●	

Navigator cutting data see page 280.

Morse taper end mills

DIN 845 | 4-8 | 30° | 11° | NF MK | NR MK

Tool material	HSCO	
Surface finish	bright	bright
Discount group	112	112
Guhring no.	**3118**	**3117**



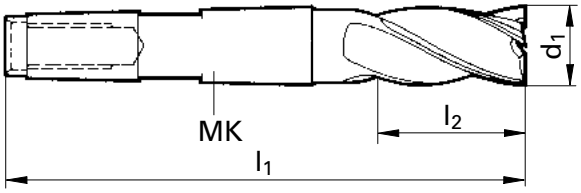
Code no.	d1 js12	MK	Form	l1	l2	Z	Availability	
	mm			mm	mm			
10.000	10.000	1	B	92.00	22.00	4	●	●
12.000	12.000	1	B	96.00	26.00	4	●	
14.000	14.000	2	B	111.00	26.00	4	●	●
16.000	16.000	2	B	117.00	32.00	4	●	●
18.000	18.000	2	B	117.00	32.00	4	●	●
20.000	20.000	2	B	123.00	38.00	4	●	●
24.000	24.000	3	B	147.00	45.00	4	●	
25.000	25.000	3	B	147.00	45.00	4	●	●
26.000	26.000	3	B	147.00	45.00	4	●	●
28.000	28.000	3	B	147.00	45.00	5		●
30.000	30.000	3	B	147.00	45.00	5	●	●
32.000	32.000	4	C	201.00	53.00	6		●
35.000	35.000	4	C	201.00	53.00	6	●	
36.000	36.000	4	C	201.00	53.00	6	●	
40.000	40.000	4	C	211.00	63.00	6		●
50.000	50.000	5	C	261.00	75.00	8	●	●

Navigator cutting data see page 280.

Morse taper end mills

DIN 845 | N | 4-8 | 30° | 11° | MK

Tool material	HSCO
Surface finish	bright
Discount group	112
Guhring no.	3440



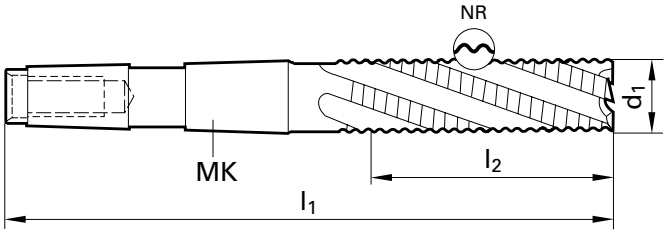
Code no.	d1 js12 mm	MK	Form	l1 mm	l2 mm	Z	Availability
14.000	14.000	2	B	111.00	26.00	4	●
16.000	16.000	2	B	117.00	32.00	4	●
18.000	18.000	2	B	117.00	32.00	4	●
19.000	19.000	2	B	117.00	32.00	4	●
20.000	20.000	2	B	123.00	38.00	4	●
22.000	22.000	2	B	123.00	38.00	6	●
25.000	25.000	3	B	147.00	45.00	4	●
26.000	26.000	3	B	147.00	45.00	4	●
28.000	28.000	3	B	147.00	45.00	5	●
30.000	30.000	3	B	147.00	45.00	5	●
32.000	32.000	4	C	201.00	53.00	6	●
36.000	36.000	4	C	201.00	53.00	6	●
40.000	40.000	4	C	211.00	63.00	6	●
45.000	45.000	4	C	211.00	63.00	8	●

Navigator cutting data see page 280.

Morse taper end mills

DIN 845 | NR | 4-8 | 30° | 11° | MK

Tool material	HSCO
Surface finish	bright
Discount group	112
Guhring no.	3121



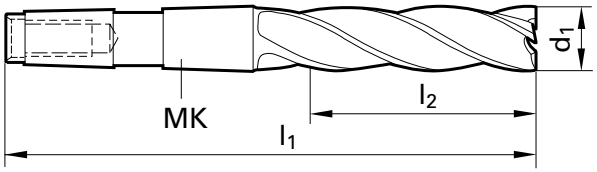
Code no.	d1 js12	MK	Form	l1	l2	Z	Availability
	mm			mm	mm		
16.000	16.000	2	B	148.00	63.00	4	●
18.000	18.000	2	B	148.00	63.00	4	●
20.000	20.000	2	B	160.00	75.00	4	●
25.000	25.000	3	B	192.00	90.00	6	●
28.000	28.000	3	B	192.00	90.00	6	●
30.000	30.000	3	B	192.00	90.00	5	●
32.000	32.000	4	C	254.00	106.00	6	●
36.000	36.000	4	C	254.00	106.00	6	●
40.000	40.000	4	C	273.00	125.00	6	●
50.000	50.000	5	C	336.00	150.00	8	●

Navigator cutting data see page 280.

Morse taper end mills

DIN 845 | N | 4-8 | 30° | 11° | MK

Tool material	HSCO
Surface finish	bright
Discount group	112
Guhring no.	3120



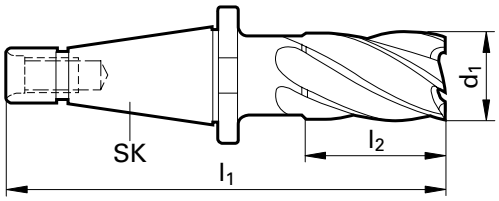
Code no.	d1 js12	MK	Form	l1	l2	Z	Availability
	mm			mm	mm		
16.000	16.000	2	B	148.00	63.00	4	●
16.001	16.000	3	B	165.00	63.00	4	●
18.000	18.000	2	B	148.00	63.00	4	●
18.001	18.000	3	B	165.00	63.00	4	●
20.000	20.000	2	B	160.00	75.00	4	●
25.000	25.000	3	B	192.00	90.00	6	●
28.000	28.000	3	B	192.00	90.00	6	●
28.001	28.000	4	C	265.00	112.00	6	●
32.000	32.000	4	C	254.00	106.00	6	●
36.000	36.000	4	C	254.00	106.00	6	●
40.000	40.000	4	C	273.00	125.00	6	●
40.002	40.000	5	C	317.00	125.00	6	●
50.000	50.000	5	C	336.00	150.00	8	●
50.001	50.000	5	C	298.00	112.00	8	●
56.000	56.000	5	C	336.00	150.00	8	●
63.000	63.000	5	C	366.00	180.00	8	●
63.002	63.000	5	C	411.00	225.00	8	●

Navigator cutting data see page 280.

End mills with international taper

DIN 2328 | N | 6+ | 30° | 11° | SK

Tool material	HSCO
Surface finish	bright
Discount group	112
Guhring no.	3130



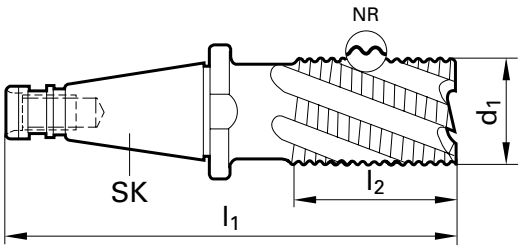
Code no.	d1 js12	SK	Form	l1	l2	Z	Availability
	mm			mm	mm		
32.000	32.000	40	A	188.00	53.00	6	●
36.000	36.000	40	A	188.00	53.00	6	●
40.000	40.000	40	A	198.00	63.00	6	●
40.001	40.000	40	A	198.00	63.00	8	●
45.000	45.000	40	A	198.00	63.00	8	●
45.001	45.000	50	A	240.00	63.00	8	●
50.000	50.000	40	A	210.00	75.00	8	●
50.001	50.000	50	A	252.00	75.00	8	●
56.000	56.000	40	A	210.00	75.00	8	●
56.001	56.000	50	A	252.00	75.00	8	●
63.000	63.000	50	A	267.00	90.00	8	●
80.000	80.000	50	A	283.00	106.00	10	●

Navigator cutting data see page 280.

End mills with international taper

DIN 2328 | NR | 4-8 | 30° | 11° | SK

Tool material	HSCO
Surface finish	bright
Discount group	112
Guhring no.	3131



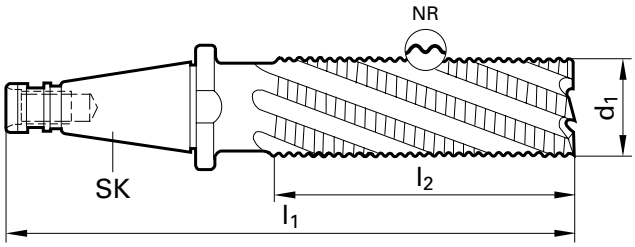
Code no.	d1 js12	SK	Form	l1	l2	Z	Availability
	mm			mm	mm		
32.000	32.000	40	A	188.00	53.00	4	●
36.000	36.000	40	A	188.00	53.00	6	●
40.000	40.000	40	A	198.00	63.00	6	●
40.001	40.000	50	A	240.00	63.00	6	●
45.001	45.000	50	A	240.00	63.00	6	●
50.000	50.000	40	A	210.00	75.00	6	●
50.001	50.000	50	A	252.00	75.00	6	●
56.000	56.000	40	A	210.00	75.00	8	●
56.001	56.000	50	A	252.00	75.00	8	●
63.000	63.000	50	A	267.00	90.00	8	●
80.000	80.000	50	A	283.00	106.00	8	●

Navigator cutting data see page 280.

End mills with international taper

DIN 2328 | NR | 4-8 | 30° | 11° | SK

Tool material	HSCO
Surface finish	bright
Discount group	112
Guhring no.	3134



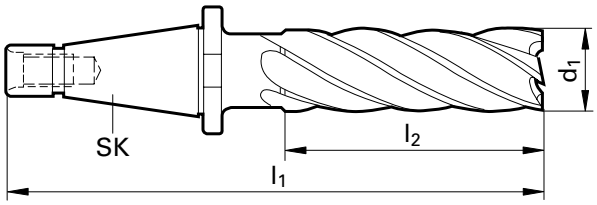
Code no.	d1 js12	SK	Form	l1	l2	Z	Availability
	mm			mm	mm		
32.000	32.000	40	A	241.00	106.00	4	●
32.001	32.000	40	A	215.00	80.00	4	●
36.000	36.000	40	A	241.00	106.00	6	●
40.000	40.000	40	A	260.00	125.00	6	●
40.003	40.000	50	A	277.00	100.00	6	●
45.001	45.000	40	A	260.00	100.00	6	●
45.004	45.000	50	A	260.00	100.00	6	●
50.000	50.000	40	A	285.00	150.00	6	●
50.002	50.000	50	A	327.00	150.00	6	●
50.003	50.000	50	A	289.00	112.00	6	●
56.001	56.000	40	A	285.00	112.00	8	●
63.001	63.000	50	A	317.00	140.00	8	●
80.001	80.000	50	A	337.00	160.00	8	●

Navigator cutting data see page 280.

End mills with international taper

DIN 2328 | N | 6+ | 30° | 11° | SK

Tool material	HSCO
Surface finish	bright
Discount group	112
Guhring no.	3133



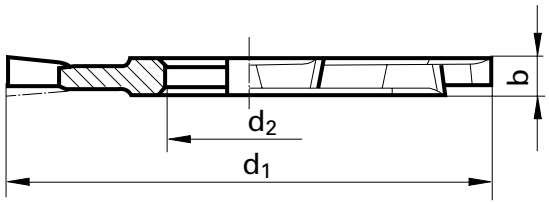
Code no.	d1 js12	SK	Form	l1	l2	Z	Availability
	mm			mm	mm		
32.000	32.000	40	A	241.00	106.00	6	●
36.000	36.000	40	A	241.00	106.00	6	●
36.001	36.000	40	A	215.00	80.00	6	●
40.000	40.000	40	A	260.00	125.00	6	●
45.000	45.000	40	A	260.00	125.00	8	●
45.002	45.000	50	A	302.00	125.00	8	●
45.003	45.000	50	A	277.00	100.00	8	●
45.004	45.000	50	A	337.00	160.00	8	●
50.001	50.000	40	A	247.00	112.00	8	●
56.002	56.000	50	A	327.00	150.00	8	●
80.000	80.000	50	A	389.00	212.00	10	●
80.003	80.000	50	A	477.00	300.00	10	●

Navigator cutting data see page 280.

DIN 885

N

Tool material	HSCO
Surface finish	bright
Discount group	112
Guhring no.	3530



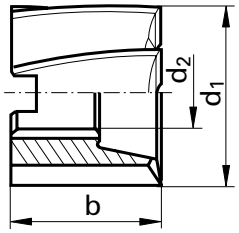
Code no.	d1 k14	d2	b	Z	Availability
	mm	mm	mm		
50.000	50.000	16.000	4.00	10	●
50.002	50.000	16.000	6.00	10	●
50.003	50.000	16.000	8.00	10	●
63.000	63.000	22.000	5.00	12	●
63.001	63.000	22.000	6.00	12	●
63.002	63.000	22.000	8.00	12	●
63.003	63.000	22.000	10.00	12	●
63.004	63.000	22.000	12.00	12	●
80.000	80.000	27.000	5.00	14	●
80.001	80.000	27.000	6.00	14	●
80.002	80.000	27.000	8.00	14	●
80.003	80.000	27.000	10.00	14	●
80.004	80.000	27.000	12.00	14	●
80.006	80.000	27.000	16.00	14	●
100.000	100.000	32.000	6.00	16	●
100.001	100.000	32.000	8.00	16	●
100.002	100.000	32.000	10.00	16	●
100.003	100.000	32.000	12.00	16	●
100.004	100.000	32.000	14.00	16	●
100.005	100.000	32.000	16.00	16	●
100.006	100.000	32.000	18.00	16	●
100.007	100.000	32.000	20.00	16	●
125.000	125.000	32.000	6.00	16	●
125.001	125.000	32.000	8.00	16	●
125.002	125.000	32.000	10.00	16	●
125.004	125.000	32.000	14.00	16	●
125.005	125.000	32.000	16.00	16	●
125.006	125.000	32.000	18.00	16	●
125.007	125.000	32.000	20.00	16	●
160.000	160.000	40.000	8.00	18	●
160.001	160.000	40.000	10.00	18	●
160.002	160.000	40.000	12.00	18	●
160.003	160.000	40.000	14.00	18	●
160.005	160.000	40.000	18.00	18	●
160.006	160.000	40.000	20.00	18	●
200.001	200.000	40.000	12.00	22	●
200.002	200.000	40.000	14.00	22	●
200.004	200.000	40.000	18.00	22	●
200.005	200.000	40.000	20.00	22	●

Navigator cutting data see page 280.

Shell end mills

DIN 1880 | N | 6+ | 30° | 11°

	M42	
Tool material		
Surface finish	bright	TiCN
Discount group	112	112
Guhring no.	**3504**	**3654**



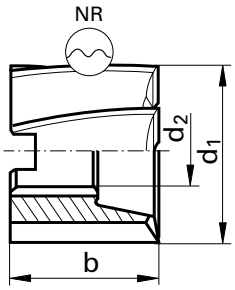
Code no.	d1 k12	d2	b	Z	Availability	
	mm	mm	mm			
40.000	40.000	16.000	32.00	8	●	●
50.000	50.000	22.000	36.00	8	●	●
63.000	63.000	27.000	40.00	8	●	●
80.000	80.000	27.000	45.00	10	●	●
100.000	100.000	32.000	50.00	10		●
125.000	125.000	40.000	56.00	12	●	

Navigator cutting data see page 280.

Shell end mills

DIN 1880 | NR | 6+ | 30° | 11°

	M42	
Tool material		
Surface finish	bright	TiCN
Discount group	112	112
Guhring no.	**3185**	**3749**



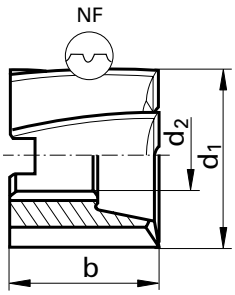
Code no.	d1 k12	d2	b	Z	Availability	
	mm	mm	mm			
40.000	40.000	16.000	32.00	6	●	●
50.000	50.000	22.000	36.00	8	●	●
63.000	63.000	27.000	40.00	8	●	●
80.000	80.000	27.000	45.00	10	●	●
100.000	100.000	32.000	50.00	10	●	●
125.000	125.000	40.000	56.00	12	●	

Navigator cutting data see page 280.

Shell end mills

DIN 1880 | NF | 6+ | 30° | 11°

Tool material	M42
Surface finish	bright
Discount group	112
Guhring no.	3187



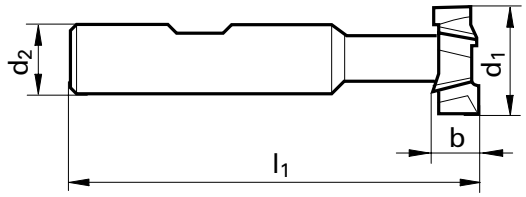
Code no.	d1 k12	d2	b	Z	Availability
	mm	mm	mm		
40.000	40.000	16.000	32.00	6	●
50.000	50.000	22.000	36.00	8	●
63.000	63.000	27.000	40.00	8	●
80.000	80.000	27.000	45.00	10	●
100.000	100.000	32.000	50.00	10	●
125.000	125.000	40.000	56.00	12	●

Navigator cutting data see page 280.

T-slot end mills

DIN 851 | N | 6+ | 10° | B

Tool material	HSCO
Surface finish	bright
Discount group	112
Guhring no.	3570



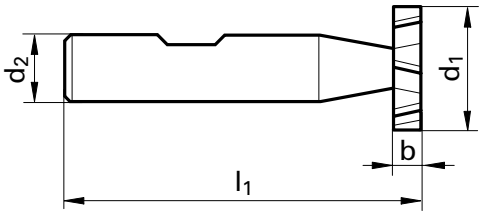
Code no.	for keyseats	d1 d11 mm	d2 mm	l1 mm	b mm	Z	Availability
12.500	6	12.500	10.000	57.00	6.00	6	●
16.000	8	16.000	10.000	62.00	8.00	6	●
18.000	10	18.000	12.000	70.00	8.00	6	●
19.000	10	19.000	12.000	71.00	9.00	6	●
21.000	12	21.000	12.000	74.00	9.00	8	●
22.000	12	22.000	12.000	75.00	10.00	8	●
25.000	14	25.000	16.000	82.00	11.00	8	●
28.000	16	28.000	16.000	85.00	12.00	8	●
32.000	18	32.000	16.000	90.00	14.00	8	●

Navigator cutting data see page 280.

Woodruff cutters

DIN 850 | N | 6+ | 6° | B

Tool material	HSCO
Surface finish	bright
Discount group	112
Guhring no.	3580



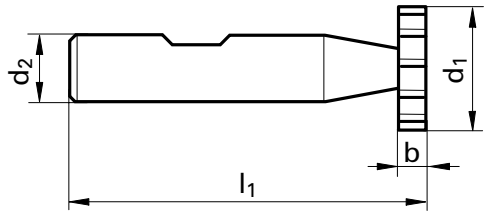
Code no.	for keyseats	d1 h12 mm	d2 mm	l1 mm	b mm	Z	Availability
4.500	1,0x 1,4	4.500	6.000	50.00	1.00	6	●
7.500	1,5x 2,6	7.500	6.000	50.00	1.50	6	●
7.501	2,0x 2,6	7.500	6.000	50.00	2.00	6	●
10.500	2,0x 3,7	10.500	6.000	50.00	2.00	6	●
10.501	2,5x 3,7	10.500	6.000	50.00	2.50	6	●
10.502	3,0x 3,7	10.500	6.000	50.00	3.00	6	●
13.500	3,0x 5,0	13.500	10.000	56.00	3.00	8	●
13.501	4,0x 5,0	13.500	10.000	56.00	4.00	8	●
16.500	3,0x 6,5	16.500	10.000	56.00	3.00	8	●
16.501	4,0x 6,5	16.500	10.000	56.00	4.00	8	●
16.502	5,0x 6,5	16.500	10.000	56.00	5.00	8	●
19.500	4,0x 7,5	19.500	10.000	63.00	4.00	8	●
19.501	5,0x 7,5	19.500	10.000	63.00	5.00	8	●
19.502	6,0x 7,5	19.500	10.000	63.00	6.00	8	●
22.500	5,0x 9,0	22.500	10.000	63.00	5.00	10	●
22.501	6,0x 9,0	22.500	10.000	63.00	6.00	10	●
22.502	8,0x 9,0	22.500	10.000	63.00	8.00	10	●
25.500	6,0x10,0	25.500	10.000	63.00	6.00	10	●
28.500	6,0x11,0	28.500	10.000	63.00	6.00	10	●
28.501	8,0x11,0	28.500	10.000	63.00	8.00	10	●
28.502	10,0x11,0	28.500	12.000	71.00	10.00	10	●
32.500	8,0x13,0	32.500	12.000	71.00	8.00	10	●
32.501	10,0x13,0	32.500	12.000	71.00	10.00	10	●
45.500	10,0x16,0	45.500	12.000	71.00	10.00	12	●

Navigator cutting data see page 280.

Woodruff cutters

DIN 850 | H | 6+ | 6°

Tool material	HSCO
Surface finish	bright
Discount group	112
Guhring no.	3579



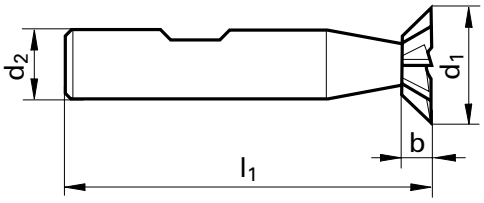
Code no.	for keyseats	d1 h12 mm	d2 mm	l1 mm	b mm	Z	Availability
4.500	1,0x 1,4	4.500	6.000	50.00	1.00	8	●
7.500	1,5x 2,6	7.500	6.000	50.00	1.50	8	●
7.501	2,0x 2,6	7.500	6.000	50.00	2.00	8	●
10.500	2,0x 3,7	10.500	6.000	50.00	2.00	10	●
10.501	2,5x 3,7	10.500	6.000	50.00	2.50	10	●
10.502	3,0x 3,7	10.500	6.000	50.00	3.00	10	●
13.500	3,0x 5,0	13.500	10.000	56.00	3.00	10	●
13.501	4,0x 5,0	13.500	10.000	56.00	4.00	10	●
16.500	3,0x 6,5	16.500	10.000	56.00	3.00	10	●
16.501	4,0x 6,5	16.500	10.000	56.00	4.00	10	●
16.502	5,0x 6,5	16.500	10.000	56.00	5.00	10	●
19.500	4,0x 7,5	19.500	10.000	63.00	4.00	12	●
19.501	5,0x 7,5	19.500	10.000	63.00	5.00	12	●
19.502	6,0x 7,5	19.500	10.000	63.00	6.00	12	●
22.500	5,0x 9,0	22.500	10.000	63.00	5.00	12	●
22.501	6,0x 9,0	22.500	10.000	63.00	6.00	12	●
22.502	8,0x 9,0	22.500	10.000	63.00	8.00	12	●
25.500	6,0x10,0	25.500	10.000	63.00	6.00	14	●
28.500	6,0x11,0	28.500	10.000	63.00	6.00	16	●
28.501	8,0x11,0	28.500	10.000	63.00	8.00	16	●
28.502	10,0x11,0	28.500	12.000	71.00	10.00	16	●
32.500	8,0x13,0	32.500	12.000	71.00	8.00	18	●
32.501	10,0x13,0	32.500	12.000	71.00	10.00	18	●
45.500	10,0x16,0	45.500	12.000	71.00	10.00	22	●

Navigator cutting data see page 280.

Dovetail cutters

DIN 1833 | H | 6+ | 0°

	B	B
Tool material	HSCO	HSCO
Surface finish	bright	bright
Discount group	112	112
Guhring no.	3572	3576



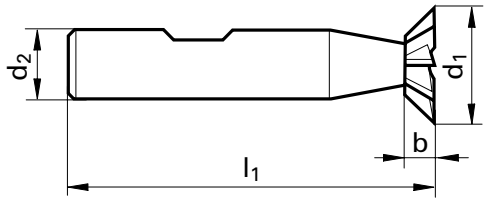
Code no.	d1 js16	d2	l1	l2	Z	Availability	
	mm	mm	mm	mm			
16.000	16.000	12.000	60.00	4.00	8	●	●
20.000	20.000	12.000	63.00	5.00	10	●	●
25.000	25.000	12.000	67.00	6.30	10	●	●
32.000	32.000	16.000	71.00	8.00	12	●	●

Navigator cutting data see page 280.

Dovetail cutters

DIN 1833 | H | 6+ | 0° | B | B

Tool material	HSCO	HSCO
Surface finish	bright	bright
Discount group	112	112
Guhring no.	**3574**	**3577**



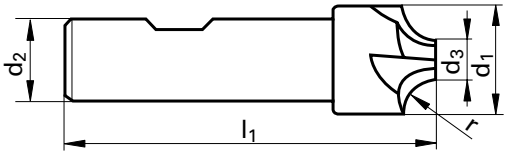
Code no.	d1 js16	d2	l1	l2	Z	Availability	
	mm	mm	mm	mm			
16.000	16.000	12.000	60.00	6.30	8	●	●
20.000	20.000	12.000	63.00	8.00	10	●	●
25.000	25.000	12.000	67.00	10.00	10	●	●
32.000	32.000	16.000	71.00	12.50	12	●	●

Navigator cutting data see page 280.

Corner rounding cutters

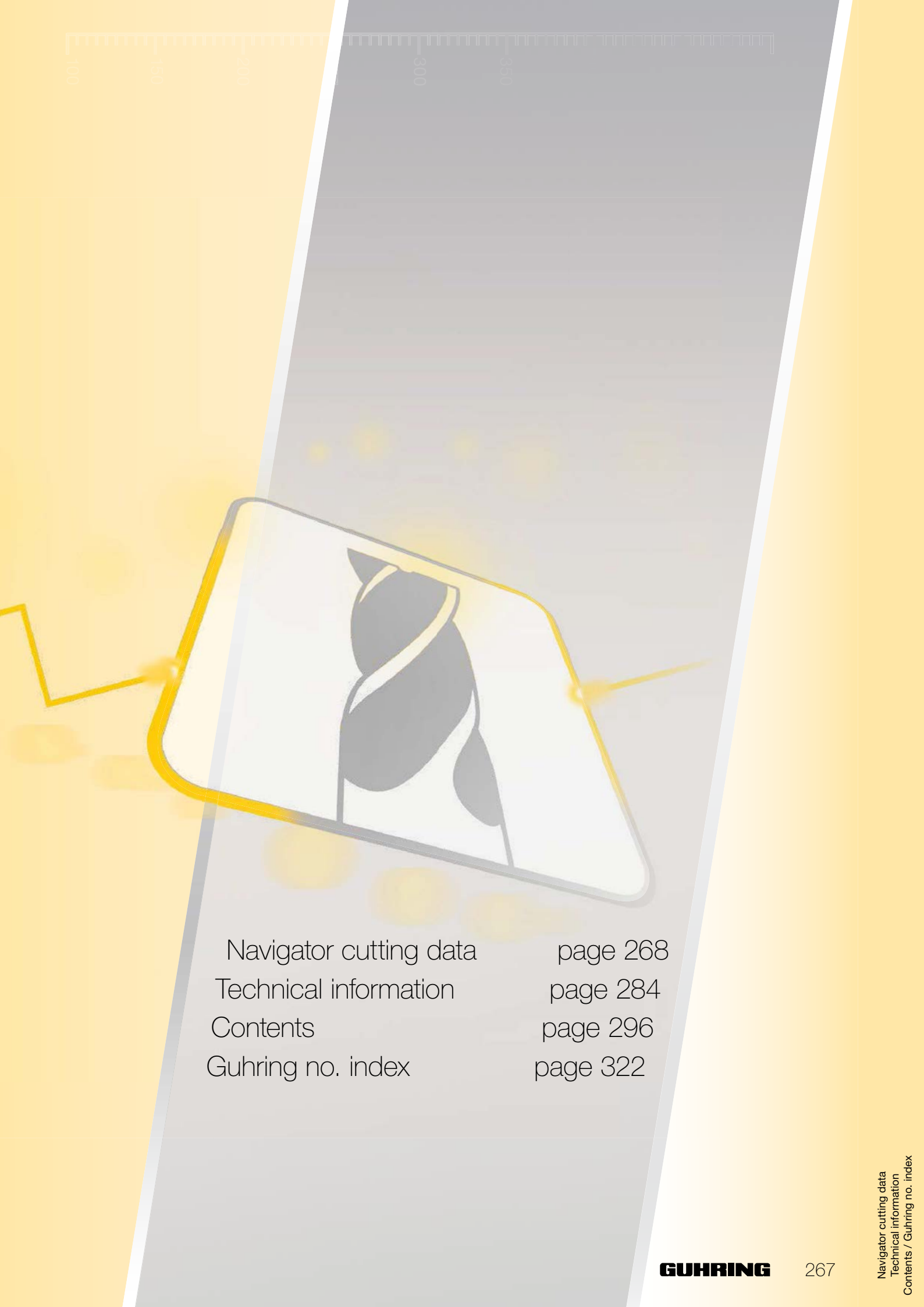
DIN 6518 | N | 4-6 | R±0,05 | 5°

Tool material	M42
Surface finish	bright
Discount group	112
Guhring no.	3176



Code no.	r	d1	d2	d3	l1	Z	Availability
	mm	mm	mm	mm	mm		
2.000	2.00	10.000	10.000	6.000	60.00	4	●
2.500	2.50	11.000	10.000	6.000	60.00	4	●
3.000	3.00	12.000	12.000	6.000	60.00	4	●
4.000	4.00	14.000	12.000	6.000	60.00	4	●
5.000	5.00	16.000	12.000	6.000	60.00	4	●
6.000	6.00	20.000	16.000	8.000	67.00	4	●
8.000	8.00	24.000	16.000	8.000	71.00	4	●
10.000	10.00	28.000	25.000	8.000	85.00	4	●
12.000	12.00	34.000	25.000	10.000	90.00	4	●
16.000	16.00	48.000	25.000	16.000	100.00	6	●
20.000	20.00	56.000	32.000	16.000	112.00	6	●

Navigator cutting data see page 280.



RF 100 Diver

RF100 diver

PLUNGING* AND RAMPING*

Material/ISO material		Hardness	Ramping depth* (a_p max.)	Ramping* max. angle in °	Cutting speed (v_c)	fz (mm/z) with nom. Ø					
						5.7	7.7	9.7	11.7	15.6	19.5
P	Struct./free-cutting steels, unall. heat-treat./case hard. steels	up to 850 N/mm²	1xd	45°	270	0.020	0.030	0.040	0.045	0.050	0.060
	Free-cutting steels, unalloyed case hard. steels, nitr. steels	850 - 1200 N/mm²	1xd	45°	240	0.015	0.020	0.035	0.040	0.045	0.050
	Alloyed heat-treatable, tool and high speed steels	850 - 1400 N/mm²	1xd	30°	200	0.010	0.015	0.025	0.030	0.035	0.040
M	Stainless steel - easy to machine / sulphured	up to 750 N/mm²	1xd	10°	60	0.010	0.015	0.025	0.030	0.035	0.040
	Stainless steel - moderately difficult to machine	over 750 - 950 N/mm²	0.5xd	5°	50	0.010	0.015	0.020	0.025	0.030	0.035
K	Cast iron, grey cast iron, spher. graphite/malleable cast iron	over 240 HB 30	1xd	45°	150	0.020	0.030	0.040	0.045	0.050	0.060
N	Aluminium, Al-wrought alloys, Al-alloys	up to 3% Si	1xd	30°	180	0.015	0.020	0.035	0.040	0.045	0.050
	Aluminium-cast alloys	over 3% Si	1xd	45°	140	0.020	0.030	0.040	0.045	0.050	0.060
S	Titanium, Titanium alloys	up to 1400 N/mm²	0.5xd	10°	45	0.010	0.015	0.020	0.025	0.030	0.035

* peripheral cooling „Guhrojet“ recommended for optimal chip evacuation and tool life

SLOTTING*

Material/ISO material		Hardness	Cutting depth* (a_p)	Cutting width (a_e)	Cutting speed (v_c)	fz (mm/z) with nom. Ø					
						5.7	7.7	9.7	11.7	15.6	19.5
P	Struct./free-cutting steels, unall. heat-treat./case hard. steels	up to 850 N/mm²	1xd	1xd	270	0.025	0.035	0.050	0.060	0.080	0.100
	Free-cutting steels, unalloyed case hard. steels, nitr. steels	850 - 1200 N/mm²	1xd	1xd	240	0.025	0.035	0.050	0.060	0.080	0.100
	Alloyed heat-treatable, tool and high speed steels	850 - 1400 N/mm²	1xd	1xd	200	0.025	0.030	0.045	0.050	0.070	0.085
M	Stainless steel - easy to machine / sulphured	up to 750 N/mm²	1xd	1xd	120	0.020	0.030	0.045	0.060	0.065	0.075
	Stainless steel - moderately difficult to machine	over 750 - 950 N/mm²	1xd	1xd	80	0.020	0.030	0.040	0.045	0.060	0.070
K	Cast iron, grey cast iron, spher. graphite/malleable cast iron	over 240 HB 30	1xd	1xd	160	0.025	0.035	0.050	0.060	0.080	0.100
N	Aluminium, Al-wrought alloys, Al-alloys	up to 3% Si	1xd	1xd	500	0.030	0.040	0.065	0.080	0.095	0.110
	Aluminium-cast alloys	over 3% Si	1xd	1xd	340	0.020	0.030	0.055	0.065	0.080	0.100
S	Titanium, Titanium alloys	up to 1400 N/mm²	1xd	1xd	60	0.020	0.030	0.040	0.045	0.060	0.070

* peripheral cooling „Guhrojet“ recommended for optimal chip evacuation and tool life

HPC-ROUGHING* AND HSC-FINISHING**

Material/ISO material		Hardness	Cutting depth* (a_p)	Cutting width*** (a_e)	Cutting speed (v_c)	fz (mm/z) with nom. Ø					
						5.7	7.7	9.7	11.7	15.6	19.5
P	Struct./free-cutting steels, unall. heat-treat./case hard. steels	up to 850 N/mm²	2xd	0.4xd	350	0.030	0.045	0.060	0.075	0.090	0.110
	Free-cutting steels, unalloyed case hard. steels, nitr. steels	850 - 1200 N/mm²	2xd	0.4xd	290	0.030	0.045	0.060	0.075	0.090	0.110
	Alloyed heat-treatable, tool and high speed steels	850 - 1400 N/mm²	2xd	0.3xd	240	0.025	0.030	0.055	0.070	0.085	0.100
M	Stainless steel - easy to machine / sulphured	up to 750 N/mm²	2xd	0.3xd	140	0.025	0.035	0.055	0.065	0.080	0.090
	Stainless steel - moderately difficult to machine	over 750 - 950 N/mm²	2xd	0.25xd	120	0.020	0.030	0.045	0.050	0.065	0.075
K	Cast iron, grey cast iron, spher. graphite/malleable cast iron	over 240 HB 30	2xd	0.4xd	180	0.030	0.045	0.060	0.075	0.090	0.110
N	Aluminium, Al-wrought alloys, Al-alloys	up to 3% Si	2xd	0.5xd	600	0.040	0.060	0.080	0.100	0.120	0.150
	Aluminium-cast alloys	over 3% Si	2xd	0.4xd	420	0.030	0.045	0.060	0.075	0.090	0.110
S	Titanium, Titanium alloys	up to 1400 N/mm²	2xd	0.4xd	120	0.020	0.030	0.045	0.050	0.065	0.075

* peripheral cooling „Guhrojet“ recommended for optimal chip evacuation and tool life
** for HSC machining the cutting speed can be increased by 50%, feed rate fz can be reduced depending on surface requirements.
*** for trochoidal milling and imachining with ae = 0.1-0.2xd the cutting speed vc and the feed rate can be increased by 50 %.

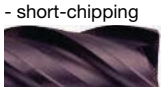
DRILLING*

Material/ISO material		Hardness	Drilling depth** (a_p max.)	Cutting speed (v_c)	fz (mm/z) with nom. Ø					
					5.7	7.7	9.7	11.7	15.6	19.5
P	Struct./free-cutting steels, unall. heat-treat./case hard. steels	up to 850 N/mm²	2xd	270	0.020	0.030	0.040	0.045	0.050	0.060
	Free-cutting steels, unalloyed case hard. steels, nitr. steels	850 - 1200 N/mm²	2xd	240	0.015	0.020	0.035	0.040	0.045	0.050
	Alloyed heat-treatable, tool and high speed steels	850 - 1400 N/mm²	1xd	200	0.010	0.015	0.025	0.030	0.035	0.040
K	Cast iron, grey cast iron, spher. graphite/malleable cast iron	over 240 HB 30	2xd	150	0.020	0.030	0.040	0.045	0.050	0.060
N	Aluminium, Al-wrought alloys, Al-alloys	up to 3% Si	1xd	180	0.015	0.020	0.035	0.040	0.045	0.050
	Aluminium-cast alloys	over 3% Si	1xd	140	0.020	0.030	0.040	0.045	0.050	0.060

* pecking recommended from drilling depth 1XD
* peripheral cooling „Guhrojet“ recommended for optimal chip evacuation and tool life

RF 100 U, F, VA, A, Ti, H for stable conditions

Stable conditions:
- good cooling
- sufficient performance
- short-chipping



Application	v_c factor	f_z factor	Feed width (ae)	Feed depth (ap)
Slotting	**1**	**1** (0.7 for a_p = 2xd)	1xd	0.5 up to 1xd
Roughing	**1**	**1** (0.7 for a_p = 2xd)	0.4 up to 0.9xd	0.5 up to 1xd
Finishing	**1**	**1**	0.01 up to 0.1xd	1 up to 2xd
HPC-roughing	**1.3**	**1.5**	0.15 up to 0.4xd	1 up to 2xd
HSC-roughing	**1.5**	**2**	0.05 up to 0.15xd	1 up to 2xd

Material	Hardness	recom-mended RF 100 type	Type of application	cut Vc	fz (mm/z) with nom. Ø							
					3	6	8	10	12	16	20	25
Structural + free-cutting steels, unalloyed heat-treatable + case hardened steels 1.0035 S185, 1.0486 P275N, 1.0345 P235GH, 1.0050, 1.0070, 1.8937 1.0718 11SMnPb30, 1.0736 11SMn37 1.0402 C22, 1.1178 C30E 1.0503 C45, 1.1191 C30E 1.0301 C10, 1.1121 C10E 1.1750 C75W, 1.2076 102Cr6, 1.2307 29CrMoV9	up to 850 N/mm²	F	Slotting	180	0.018	0.035	0.045	0.06	0.07	0.09	0.1	0.15
		F	Roughing	200	0.02	0.04	0.055	0.07	0.085	0.1	0.12	0.17
		SF	Finishing	280	0.016	0.03	0.04	0.055	0.065	0.08	0.095	0.14
Free-cutting steels, unalloyed case hardened steels, nitriding steels 1.0727 46 S20, 1.0728 60 S20, 1.0757 46SPb20 1.0601 C60, 1.1221 C60E 1.7043 38Cr4 1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5 1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	850-1,200 N/mm²	F	Slotting	160	0.018	0.035	0.045	0.06	0.07	0.09	0.1	0.15
		F	Roughing	180	0.02	0.04	0.055	0.07	0.085	0.1	0.12	0.17
		SF	Finishing	220	0.016	0.03	0.04	0.055	0.065	0.08	0.095	0.14
Alloyed heat-treatable, tool and high speed steels 1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2379 X155CrVMo12-1 1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3 Spring steel = 1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4	850-1,400 N/mm²	U	Slotting	135	0.016	0.03	0.04	0.055	0.065	0.08	0.095	0.14
		U	Roughing	160	0.02	0.04	0.05	0.065	0.08	0.095	0.11	0.16
		SF	Finishing	200	0.015	0.03	0.04	0.05	0.06	0.07	0.09	0.13
Hardened steel Tool steel, heat-treatable steel, spring steel, high-speed steel, case hardened steel, etc. Z.B.: 1.2344 X40CrMoV5-1; 1.2767 X45NiCrMo4; 1.2379 X155CrVMo12-1 ;1.2080 X210Cr12 1.3343 S 6-5-2	up to 54 HRC	U	Slotting	70	0.012	0.025	0.03	0.04	0.045	0.06	0.07	0.1
		U	Roughing	110	0.015	0.025	0.035	0.045	0.05	0.065	0.08	0.12
		SF	Finishing	150	0.015	0.03	0.04	0.05	0.06	0.07	0.09	0.13
	54-60 HRC		Slotting									
		H	Roughing									
		H	Finishing	110	0,01	0,015	0,025	0,035	0,042	0,05	0,08	0,09
Stainless steel 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X10CrNiS18-9 USA = 303, 410, 420F, 430, 430F	up to 750 N/mm²	VA	Slotting	120	0.015	0.03	0.04	0.05	0.06	0.07	0.09	0.13
		VA	Roughing	140	0.018	0.035	0.045	0.06	0.07	0.09	0.1	0.15
		SF	Finishing	180	0.016	0.03	0.04	0.055	0.065	0.08	0.095	0.14
Stainless steel 1.4301X5CrNi18-10, 1.4303 X5CrNi18-12 1.4310 XCrNi18-8 USA = 304, 304L, 420	750-850 N/mm²	VA	Slotting	80	0.015	0.025	0.035	0.045	0.05	0.065	0.08	0.12
		VA	Roughing	120	0.016	0.03	0.04	0.055	0.065	0.08	0.095	0.14
		SF	Finishing	140	0.015	0.03	0.04	0.05	0.06	0.07	0.09	0.13
Stainless steel 1.4438 X2CrNiMo18-15-4, 1.4404 X2CrNiMo17-12-2, 1.4571 X6CrNiTi18-10 USA = 310, 316, 316B, 316L, 317	above 850 N/mm²	VA/F	Slotting	70	0.012	0.025	0.03	0.04	0.045	0.06	0.07	0.1
		VA/F	Roughing	100	0.015	0.025	0.035	0.045	0.05	0.065	0.08	0.12
		SF	Finishing	120	0.015	0.025	0.035	0.045	0.05	0.065	0.08	0.12
Special alloys (nickel based "Ni") Nimonic, Inconel, Monel, Hastelloy	up to 1,300 N/mm²	Ti/U	Slotting	30	0,01	0.015	0.02	0.025	0.03	0.04	0.05	0.06
		Ti/U	Roughing	35	0.01	0.02	0.03	0.035	0.04	0.055	0.065	0.08
		SF	Finishing	45	0.015	0.025	0.035	0.045	0.05	0.065	0.08	0.12
Titanium alloys ("Ti") 3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7164 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5	up to 1,300 N/mm²	Ti/U	Slotting	60	0.015	0.025	0.035	0.045	0.05	0.065	0.08	0.12
		Ti/U	Roughing	90	0.016	0.03	0.04	0.055	0.065	0.08	0.095	0.14
		SF	Finishing	130	0.016	0.03	0.04	0.055	0.065	0.08	0.095	0.14
Cast iron, grey cast iron, spheroidal graphite and malleable cast iron 0.6010 EN-GL100 (GG10), 0.6020 EN-GJL-200 (GG20), 0.7050 EN-GJS-500-7 (GGG50), 0.8535 EN-GJMW-350-4 (GTW35)	up to 240 HB 30	F	Slotting	160	0.02	0.04	0.05	0.065	0.08	0.095	0.11	0.16
		F	Roughing	180	0.02	0.04	0.055	0.07	0.085	0.1	0.12	0.17
		SF	Finishing	220	0.018	0.035	0.045	0.06	0.07	0.09	0.1	0.15
Cast iron, grey cast iron, spheroidal graphite and malleable cast iron 0.6025 EN-GL250 (GG25), 0.6035 EN-GJL-350 (GG35), 0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)	above 240 HB 30	U	Slotting	140	0.016	0.03	0.04	0.055	0.065	0.08	0.095	0.14
		U	Roughing	160	0.02	0.04	0.05	0.065	0.08	0.095	0.11	0.16
		SF	Finishing	200	0.018	0.035	0.045	0.06	0.07	0.09	0.1	0.15
Aluminium, Al-wrought alloys, Al-alloys 3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1 3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	up to 3% Si	A	Slotting	500	0.02	0.04	0.05	0.065	0.08	0.095	0.11	0.16
		A	Roughing	600	0.02	0.04	0.055	0.07	0.085	0.1	0.12	0.17
		A	Finishing	1000	0.018	0.035	0.045	0.06	0.07	0.09	0.1	0.15
Aluminium-cast alloys 3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9 3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	above 3% Si	A	Slotting	230	0.016	0.03	0.04	0.055	0.065	0.08	0.095	0.14
		A	Roughing	280	0.02	0.04	0.05	0.065	0.08	0.095	0.11	0.16
		A	Finishing	350	0.018	0.035	0.045	0.06	0.07	0.09	0.1	0.15
Magnesium-alloys MgMn2, G-MgAl8Zn1, G-MgAl6Zn3	-	A	Slotting	180	0.016	0.03	0.04	0.055	0.065	0.08	0.095	0.14
		A	Roughing	220	0.02	0.04	0.05	0.065	0.08	0.095	0.11	0.16
		A	Finishing	280	0.018	0.035	0.045	0.06	0.07	0.09	0.1	0.15
Non-ferrous metals (copper, short- or long-chipping brass or bronze) 2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb 2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5 2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10	up to 850 N/mm²	A	Slotting	250	0.015	0.025	0.035	0.045	0.05	0.065	0.08	0.12
		A	Roughing	300	0.016	0.03	0.04	0.055	0.065	0.08	0.095	0.14
		SF	Finishing	400	0.016	0.03	0.04	0.055	0.065	0.08	0.095	0.14

All recommendations are valid for coated tools. For bright milling cutters please vc - 40% and fz -25%!

RF 100 U/HF, VA/NF, A/WF for unstable conditions

Unstable conditions:
- standard cooling
- average performance
- medium- to long-chipping

Application	v_c factor	f_z factor	Feed width (ae)	Feed depth (ap)
Slotting	**1**	**1** (0.7 for a_p = 2xd)	1xd	0.5 up to 1xd
Roughing	**1**	**1** (0.7 for a_p = 2xd)	0.4 up to 0.9xd	0.5 up to 1xd
Finishing	**1**	**1**	0.01 up to 0.1xd	1 up to 2xd
HPC-roughing	**1.3**	**1.5**	0.15 up to 0.4xd	1 up to 2xd
HSC-roughing	**1.5**	**2**	0.05 up to 0.15xd	1 up to 2xd

Material	Hardness	recom-mended RF 100 type	Type of application	cut Vc	fz (mm/z) with nom. Ø							
					3	6	8	10	12	16	20	25
Structural + free-cutting steels, unalloyed heat-treatable + case hardened steels 1.0035 S185, 1.0486 P275N, 1.0345 P235GH, 1.0050, 1.0070, 1.8937 1.0718 11SMnPb30, 1.0736 11SMn37 1.0402 C22, 1.1178 C30E 1.0503 C45, 1.1191 C30E 1.0301 C10, 1.1121 C10E 1.1750 C75W, 1.2076 102Cr6, 1.2307 29CrMoV9	up to 850 N/mm²	VA/NF	Slotting	180	0.012	0.025	0.03	0.04	0.045	0.06	0.07	0.1
		VA/NF	Roughing	200	0.015	0.025	0.035	0.045	0.05	0.065	0.08	0.12
			Finishing									
Free-cutting steels, unalloyed case hardened steels, nitriding steels 1.0727 46 S20, 1.0728 60 S20, 1.0757 46SPb20 1.0601 C60, 1.1221 C60E 1.7043 38Cr4 1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5 1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	850-1,200 N/mm²	VA/NF	Slotting	160	0.012	0.025	0.03	0.04	0.045	0.06	0.07	0.1
		VA/NF	Roughing	180	0.015	0.025	0.035	0.045	0.05	0.065	0.08	0.12
			Finishing									
Alloyed heat-treatable, tool and high speed steels 1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2379 X155CrVMo12-1 1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3 Spring steel = 1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4	850-1,400 N/mm²	U/HF	Slotting	135	0,01	0.015	0.025	0.03	0.035	0.045	0.06	0.07
		U/HF	Roughing	160	0.01	0.02	0.03	0.035	0.04	0.055	0.065	0.08
			Finishing									
Hardened steel Tool steel, heat-treatable steel, spring steel, high-speed steel, case hardened steel, etc. Z.B.: 1.2344 X40CrMoV5-1; 1.2767 X45NiCrMo4; 1.2379 X155CrVMo12-1 ;1.2080 X210Cr12 1.3343 S 6-5-2	up to 54 HRC	U/HF	Slotting	70	0,01	0.015	0.02	0.025	0.03	0.04	0.05	0.06
		U/HF	Roughing	110	0,012	0.015	0.025	0.03	0.035	0.045	0.06	0.07
			Finishing									
	54-60 HRC		Slotting									
			Roughing									
			Finishing									
Stainless steel 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X10CrNiS18-9 USA = 303, 410, 420F, 430, 430F	up to 750 N/mm²	VA/NF	Slotting	120	0.012	0.025	0.03	0.04	0.045	0.06	0.07	0.1
		VA/NF	Roughing	140	0.015	0.025	0.035	0.045	0.05	0.065	0.08	0.12
			Finishing									
Stainless steel 1.4301X5CrNi18-10, 1.4303 X5CrNi18-12 1.4310 XCrNi18-8 USA = 304, 304L, 420	750-850 N/mm²	VA/NF	Slotting	80	0,01	0.015	0.025	0.03	0.035	0.045	0.06	0.07
		VA/NF	Roughing	120	0,012	0.02	0.03	0.035	0.04	0.055	0.065	0.08
			Finishing									
Stainless steel 1.4438 X2CrNiMo18-15-4, 1.4404 X2CrNiMo17-12-2, 1.4571 X6CrNiTi18-10 USA = 310, 316, 316B, 316L, 317	above 850 N/mm²	VA/NF	Slotting	70	0,01	0.015	0.02	0.025	0.03	0.04	0.05	0.06
		VA/NF	Roughing	100	0,012	0.015	0.025	0.03	0.035	0.045	0.06	0.07
			Finishing									
Special alloys (nickel based "Ni") Nimonic, Inconel, Monel, Hastelloy	up to 1,300 N/mm²	U/HF	Slotting	30	0,008	0.01	0.015	0.02	0.025	0.035	0.04	0.05
		U/HF	Roughing	35	0,01	0.015	0.02	0.025	0.03	0.04	0.05	0.06
			Finishing									
Titanium alloys ("Ti") 3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7164 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5	up to 1,300 N/mm²	U/HF	Slotting	60	0,01	0.015	0.025	0.03	0.035	0.045	0.06	0.07
		U/HF	Roughing	90	0,012	0.02	0.03	0.035	0.04	0.055	0.065	0.08
			Finishing									
Cast iron, grey cast iron, spheroidal graphite and malleable cast iron 0.6010 EN-GL100 (GG10), 0.6020 EN-GJL-200 (GG20), 0.7050 EN-GJS-500-7 (GGG50), 0.8535 EN-GJMW-350-4 (GTW35)	up to 240 HB 30	VA/NF	Slotting	160	0.015	0.025	0.035	0.045	0.05	0.065	0.08	0.12
		VA/NF	Roughing	180	0.015	0.03	0.04	0.05	0.06	0.07	0.09	0.13
			Finishing									
Cast iron, grey cast iron, spheroidal graphite and malleable cast iron 0.6025 EN-GL250 (GG25), 0.6035 EN-GJL-350 (GG35), 0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)	above 240 HB 30	U/HF	Slotting	140	0.012	0.025	0.03	0.04	0.045	0.06	0.07	0.1
		U/HF	Roughing	160	0.015	0.025	0.035	0.045	0.05	0.065	0.08	0.12
			Finishing									
Aluminium, Al-wrought alloys, Al-alloys 3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1 3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	up to 3% Si	A/WF	Slotting	500	0.016	0.03	0.04	0.055	0.065	0.08	0.095	0.14
		A/WF	Roughing	600	0.018	0.035	0.045	0.06	0.07	0.09	0.1	0.15
			Finishing									
Aluminium-cast alloys 3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9 3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	above 3% Si	A/WF	Slotting	230	0.015	0.025	0.035	0.045	0.05	0.065	0.08	0.12
		A/WF	Roughing	280	0.015	0.03	0.04	0.05	0.06	0.07	0.09	0.13
			Finishing									
Magnesium-alloys MgMn2, G-MgAl8Zn1, G-MgAl6Zn3	-	A/WF	Slotting	180	0.012	0.025	0.03	0.04	0.045	0.06	0.07	0.1
		A/WF	Roughing	220	0.015	0.03	0.04	0.05	0.06	0.07	0.09	0.13
			Finishing									
Non-ferrous metals (copper, short- or long-chipping brass or bronze) 2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb 2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5 2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10	up to 850 N/mm²	VA/NF	Slotting	250	0.012	0.025	0.03	0.04	0.045	0.06	0.07	0.1
		VA/NF	Roughing	300	0.015	0.03	0.04	0.05	0.06	0.07	0.09	0.13
			Finishing									

All recommendations are valid for coated tools. For bright milling cutters please vc - 40% and fz -25%!

GH 100 U, GH 100 H and GA 200 A

Application	v_c factor	f_z factor	Feed width (ae)	Feed depth (ap)
Slotting	**1**	**1** (0.7 for a_p = 2xd)	1xd	0.5 up to 1xd
Roughing	**1**	**1** (0.7 for a_p = 2xd)	0.4 up to 0.9xd	0.5 up to 1xd
Finishing	**1**	**1**	0.01 up to 0.1xd	1 up to 2xd
HPC-roughing	**1.3**	**1.5**	0.15 up to 0.4xd	1 up to 2xd
HSC-roughing	**1.5**	**2**	0.05 up to 0.15xd	1 up to 2xd

Material	Hardness	recom-mended GH 100 type	Type of application	cut Vc	fz (mm/z) with nom. Ø							
					3	6	8	10	12	16	20	25
Structural + free-cutting steels, unalloyed heat-treatable + case hardened steels 1.0035 S185, 1.0486 P275N, 1.0345 P235GH, 1.0050, 1.0070, 1.8937 1.0718 11SMnPb30, 1.0736 11SMn37 1.0402 C22, 1.1178 C30E 1.0503 C45, 1.1191 C30E 1.0301 C10, 1.1121 C10E 1.1750 C75W, 1.2076 102Cr6, 1.2307 29CrMoV9	up to 850 N/mm²	U (3-Flt.)	Slotting	180	0.016	0.032	0.041	0.054	0.063	0.081	0.090	0.135
		U (3-Flt.)	Roughing	200	0.018	0.036	0.050	0.063	0.077	0.090	0.108	0.153
		U (6-/8-Flt.)	Finishing	280	0.014	0.027	0.036	0.050	0.059	0.072	0.086	0.126
Free-cutting steels, unalloyed case hardened steels, nitriding steels 1.0727 46 S20, 1.0728 60 S20, 1.0757 46SPb20 1.0601 C60, 1.1221 C60E 1.7043 38Cr4 1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5 1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	850-1,200 N/mm²	U (3-Flt.)	Slotting	160	0.016	0.032	0.041	0.054	0.063	0.081	0.090	0.135
		U (3-Flt.)	Roughing	180	0.018	0.036	0.050	0.063	0.077	0.090	0.108	0.153
		U (6-/8-Flt.)	Finishing	220	0.014	0.027	0.036	0.050	0.059	0.072	0.086	0.126
Alloyed heat-treatable, tool and high speed steels 1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2379 X155CrVMo12-1 1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3 Spring steel = 1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4	850-1,400 N/mm²	U (3-Flt.)	Slotting	120	0.013	0.024	0.032	0.044	0.052	0.064	0.076	0.112
		U (3-Flt.)	Roughing	150	0.016	0.032	0.040	0.052	0.064	0.076	0.088	0.128
		U (6-/8-Flt.)	Finishing	180	0.012	0.024	0.032	0.040	0.048	0.056	0.072	0.104
Hardened steel Tool steel, heat-treatable steel, spring steel, high-speed steel, case hardened steel, etc. Z.B.: 1.2344 X40CrMoV5-1; 1.2767 X45NiCrMo4; 1.2379 X155CrVMo12-1 ;1.2080 X210Cr12 1.3343 S 6-5-2	up to 54 HRC	U (3-Flt.)	Slotting	60	0.008	0.018	0.021	0.028	0.032	0.042	0.049	0.070
		H (6-/8-Flt.)*	Roughing	90	0.011	0.018	0.025	0.032	0.035	0.046	0.056	0.084
		H (6-/8-Flt.)	Finishing	120	0.011	0.021	0.028	0.035	0.042	0.049	0.063	0.091
	54-60 HRC		Slotting									
			Roughing									
		H (6-/8-Flt.)	Finishing	90	0.01	0.015	0.025	0.035	0.042	0.05	0.08	0.09
Stainless steel 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X10CrNiS18-9 USA = 303, 410, 420F, 430, 430F	up to 750 N/mm²	U (3-Flt.)	Slotting	100	0.014	0.027	0.036	0.045	0.054	0.063	0.081	0.117
		U (3-Flt.)	Roughing	115	0.016	0.032	0.041	0.054	0.063	0.081	0.090	0.135
		U (6-/8-Flt.)	Finishing	150	0.014	0.027	0.036	0.050	0.059	0.072	0.086	0.126
Stainless steel 1.4301X5CrNi18-10, 1.4303 X5CrNi18-12 1.4310 XCrNi18-8 USA = 304, 304L, 420	750-850 N/mm²	U (3-Flt.)	Slotting	60	0.014	0.023	0.032	0.041	0.045	0.059	0.072	0.108
		U (3-Flt.)	Roughing	100	0.014	0.027	0.036	0.050	0.059	0.072	0.086	0.126
		U (6-/8-Flt.)	Finishing	110	0.014	0.027	0.036	0.045	0.054	0.063	0.081	0.117
Stainless steel 1.4438 X2CrNiMo18-15-4, 1.4404 X2CrNiMo17-12-2, 1.4571 X6CrNiTi18-10 USA = 310, 316, 316B, 316L, 317	above 850 N/mm²	U (3-Flt.)	Slotting	60	0.011	0.023	0.027	0.036	0.041	0.054	0.063	0.090
		U (3-Flt.)	Roughing	80	0.014	0.023	0.032	0.041	0.045	0.059	0.072	0.108
		U (6-/8-Flt.)	Finishing	100	0.014	0.023	0.032	0.041	0.045	0.059	0.072	0.108
Special alloys (nickel based "Ni") Nimonic, Inconel, Monel, Hastelloy	up to 1,300 N/mm²	U (3-Flt.)	Slotting	25	0.009	0.014	0.018	0.023	0.027	0.036	0.045	0.054
		U (3-Flt.)	Roughing	30	0.009	0.018	0.027	0.032	0.036	0.050	0.059	0.072
		U (6-/8-Flt.)	Finishing	35	0.014	0.023	0.032	0.041	0.045	0.059	0.072	0.108
Titanium alloys ("Ti") 3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7164 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5	up to 1,300 N/mm²	U (3-Flt.)	Slotting	55	0.014	0.023	0.032	0.041	0.045	0.059	0.072	0.108
		U (3-Flt.)	Roughing	80	0.014	0.027	0.036	0.050	0.059	0.072	0.086	0.126
		U (6-/8-Flt.)	Finishing	120	0.014	0.027	0.036	0.050	0.059	0.072	0.086	0.126
Cast iron, grey cast iron, spheroidal graphite and malleable cast iron 0.6010 EN-GL100 (GG10), 0.6020 EN-GJL-200 (GG20), 0.7050 EN-GJS-500-7 (GGG50), 0.8535 EN-GJMW-350-4 (GTW35)	up to 240 HB 30	U (3-Flt.)	Slotting	130	0.018	0.036	0.045	0.059	0.072	0.086	0.099	0.144
		U (3-Flt.)	Roughing	150	0.018	0.036	0.050	0.063	0.077	0.090	0.108	0.153
		U (6-/8-Flt.)	Finishing	180	0.016	0.032	0.041	0.054	0.063	0.081	0.090	0.135
Cast iron, grey cast iron, spheroidal graphite and malleable cast iron 0.6025 EN-GL250 (GG25), 0.6035 EN-GJL-350 (GG35), 0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)	above 240 HB 30	U (3-Flt.)	Slotting	115	0.014	0.027	0.036	0.050	0.059	0.072	0.086	0.126
		U (3-Flt.)	Roughing	130	0.018	0.036	0.045	0.059	0.072	0.086	0.099	0.144
		U (6-/8-Flt.)	Finishing	160	0.016	0.032	0.041	0.054	0.063	0.081	0.090	0.135
Aluminium, Al-wrought alloys, Al-alloys 3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1 3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	up to 3% Si	A (3-Flt.)	Slotting	400	0.018	0.036	0.045	0.059	0.072	0.086	0.099	0.144
		A (3-Flt.)	Roughing	480	0.018	0.036	0.050	0.063	0.077	0.090	0.108	0.153
		A (3-Flt.)	Finishing	800	0.016	0.032	0.041	0.054	0.063	0.081	0.090	0.135
Aluminium-cast alloys 3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9 3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	above 3% Si	A (3-Flt.)	Slotting	180	0.014	0.027	0.036	0.050	0.059	0.072	0.086	0.126
		A (3-Flt.)	Roughing	220	0.018	0.036	0.045	0.059	0.072	0.086	0.099	0.144
		U (6-/8-Flt.)	Finishing	280	0.016	0.032	0.041	0.054	0.063	0.081	0.090	0.135
Magnesium-alloys MgMn2, G-MgAl8Zn1, G-MgAl6Zn3	-	A (3-Flt.)	Slotting	150	0.014	0.027	0.036	0.050	0.059	0.072	0.086	0.126
		A (3-Flt.)	Roughing	180	0.018	0.036	0.045	0.059	0.072	0.086	0.099	0.144
		A (3-Flt.)	Finishing	230	0.016	0.032	0.041	0.054	0.063	0.081	0.090	0.135
Non-ferrous metals (copper, short- or long-chipping brass or bronze) 2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb 2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5 2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10	up to 850 N/mm²	A (3-Flt.)	Slotting	200	0.014	0.023	0.032	0.041	0.045	0.059	0.072	0.108
		A (3-Flt.)	Roughing	240	0.014	0.027	0.036	0.050	0.059	0.072	0.086	0.126
		U (6-/8-Flt.)	Finishing	320	0.014	0.027	0.036	0.050	0.059	0.072	0.086	0.126

* trochoid milling strategy

All recommendations are valid for coated tools. For bright milling cutters please vc - 40% and fz -25%!

GS 100 A, U and H

Application	v_c factor	f_z factor	Feed width (ae)	Feed depth (ap)
Slotting	**1**	**1** (0.7 for a_p = 2xd)	1xd	0.5 up to 1xd
Roughing	**1**	**1** (0.7 for a_p = 2xd)	0.4 up to 0.9xd	0.5 up to 1xd
Finishing	**1**	**1**	0.01 up to 0.1xd	1 up to 2xd
HPC-roughing	**1.3**	**1.5**	0.15 up to 0.4xd	1 up to 2xd
HSC-roughing	**1.5**	**2**	0.05 up to 0.15xd	1 up to 2xd

Material	Hardness	recom-mended GS 100 type	Type of application	cut Vc	fz (mm/z) with nom. Ø							
					3	6	8	10	12	16	20	25
Structural + free-cutting steels, unalloyed heat-treatable + case hardened steels 1.0035 S185, 1.0486 P275N, 1.0345 P235GH, 1.0050, 1.0070, 1.8937 1.0718 11SMnPb30, 1.0736 11SMn37 1.0402 C22, 1.1178 C30E 1.0503 C45, 1.1191 C30E 1.0301 C10, 1.1121 C10E 1.1750 C75W, 1.2076 102Cr6, 1.2307 29CrMoV9	up to 850 N/mm²	U	Slotting	140	0.010	0.020	0.024	0.032	0.036	0.048	0.056	0.080
		U	Roughing	160	0.012	0.020	0.028	0.036	0.040	0.052	0.064	0.096
			Finishing									
Free-cutting steels, unalloyed case hardened steels, nitriding steels 1.0727 46 S20, 1.0728 60 S20, 1.0757 46SPb20 1.0601 C60, 1.1221 C60E 1.7043 38Cr4 1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5 1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	850-1,200 N/mm²	U	Slotting	130	0.010	0.020	0.024	0.032	0.036	0.048	0.056	0.080
		U	Roughing	150	0.012	0.020	0.028	0.036	0.040	0.052	0.064	0.096
			Finishing									
Alloyed heat-treatable, tool and high speed steels 1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2379 X155CrVMo12-1 1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3 Spring steel = 1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4	850-1,400 N/mm²	U	Slotting	110	0.008	0.012	0.020	0.024	0.028	0.036	0.048	0.056
		H	Roughing	130	0.008	0.016	0.024	0.028	0.032	0.044	0.052	0.064
			Finishing									
Hardened steel Tool steel, heat-treatable steel, spring steel, high-speed steel, case hardened steel, etc. Z.B.: 1.2344 X40CrMoV5-1; 1.2767 X45NiCrMo4; 1.2379 X155CrVMo12-1 ;1.2080 X210Cr12 1.3343 S 6-5-2	up to 54 HRC	H	Slotting	55	0.008	0.012	0.016	0.020	0.024	0.032	0.040	0.048
		H	Roughing	90	0.010	0.012	0.020	0.024	0.028	0.036	0.048	0.056
			Finishing									
	54-60 HRC		Slotting									
			Roughing									
			Finishing									
Stainless steel 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X10CrNiS18-9 USA = 303, 410, 420F, 430, 430F	up to 750 N/mm²	U	Slotting	100	0.010	0.020	0.024	0.032	0.036	0.048	0.056	0.080
		U	Roughing	115	0.012	0.020	0.028	0.036	0.040	0.052	0.064	0.096
			Finishing									
Stainless steel 1.4301X5CrNi18-10, 1.4303 X5CrNi18-12 1.4310 XCrNi18-8 USA = 304, 304L, 420	750-850 N/mm²	U	Slotting	65	0.007	0.011	0.018	0.021	0.025	0.032	0.042	0.049
		U	Roughing	100	0.008	0.014	0.021	0.025	0.028	0.039	0.046	0.056
			Finishing									
Stainless steel 1.4438 X2CrNiMo18-15-4, 1.4404 X2CrNiMo17-12-2, 1.4571 X6CrNiTi18-10 USA = 310, 316, 316B, 316L, 317	above 850 N/mm²	U	Slotting	55	0.007	0.011	0.014	0.018	0.021	0.028	0.035	0.042
		U	Roughing	80	0.008	0.011	0.018	0.021	0.025	0.032	0.042	0.049
			Finishing									
Special alloys (nickel based "Ni") Nimonic, Inconel, Monel, Hastelloy	up to 1,300 N/mm²	U	Slotting	25	0.006	0.007	0.011	0.014	0.018	0.025	0.028	0.035
		U	Roughing	30	0.007	0.011	0.014	0.018	0.021	0.028	0.035	0.042
			Finishing									
Titanium alloys ("Ti") 3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7164 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5	up to 1,300 N/mm²	U	Slotting	50	0.007	0.011	0.018	0.021	0.025	0.032	0.042	0.049
		U	Roughing	70	0.008	0.014	0.021	0.025	0.028	0.039	0.046	0.056
			Finishing									
Cast iron, grey cast iron, spheroidal graphite and malleable cast iron 0.6010 EN-GL100 (GG10), 0.6020 EN-GJL-200 (GG20), 0.7050 EN-GJS-500-7 (GGG50), 0.8535 EN-GJMW-350-4 (GTW35)	up to 240 HB 30	U	Slotting	130	0.011	0.018	0.025	0.032	0.035	0.046	0.056	0.084
		U	Roughing	140	0.011	0.021	0.028	0.035	0.042	0.049	0.063	0.091
			Finishing									
Cast iron, grey cast iron, spheroidal graphite and malleable cast iron 0.6025 EN-GL250 (GG25), 0.6035 EN-GJL-350 (GG35), 0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)	above 240 HB 30	H	Slotting	110	0.008	0.018	0.021	0.028	0.032	0.042	0.049	0.070
		H	Roughing	130	0.011	0.018	0.025	0.032	0.035	0.046	0.056	0.084
			Finishing									
Aluminium, Al-wrought alloys, Al-alloys 3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1 3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	up to 3% Si	A	Slotting	450	0.013	0.024	0.032	0.044	0.052	0.064	0.076	0.112
		A	Roughing	540	0.014	0.028	0.036	0.048	0.056	0.072	0.080	0.120
			Finishing									
Aluminium-cast alloys 3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9 3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	above 3% Si	A	Slotting	200	0.012	0.020	0.028	0.036	0.040	0.052	0.064	0.096
		A	Roughing	250	0.012	0.024	0.032	0.040	0.048	0.056	0.072	0.104
			Finishing									
Magnesium-alloys MgMn2, G-MgAl8Zn1, G-MgAl6Zn3	-	A	Slotting	160	0.010	0.020	0.024	0.032	0.036	0.048	0.056	0.080
		A	Roughing	200	0.012	0.024	0.032	0.040	0.048	0.056	0.072	0.104
			Finishing									
Non-ferrous metals (copper, short- or long-chipping brass or bronze) 2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb 2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5 2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10	up to 850 N/mm²	A	Slotting	225	0.010	0.020	0.024	0.032	0.036	0.048	0.056	0.080
		A	Roughing	270	0.012	0.024	0.032	0.040	0.048	0.056	0.072	0.104
			Finishing									

All recommendations are valid for coated tools. For bright milling cutters please vc - 40% and fz -25%!

RS 100 U and F

Application	v_c factor	f_z factor	Feed width (ae)	Feed depth (ap)
Slotting	**1**	**1** (0.7 for a_p = 2xd)	1xd	0.5 up to 1xd
Roughing	**1**	**1** (0.7 for a_p = 2xd)	0.4 up to 0.9xd	0.5 up to 1xd
Finishing	**1**	**1**	0.01 up to 0.1xd	1 up to 2xd
HPC-roughing	**1.3**	**1.5**	0.15 up to 0.4xd	1 up to 2xd
HSC-roughing	**1.5**	**2**	0.05 up to 0.15xd	1 up to 2xd

Material	Hardness	recom-mended RS 100 type	Type of application	cut Vc	fz (mm/z) with nom. Ø							
					3	6	8	10	12	16	20	25
Structural + free-cutting steels, unalloyed heat-treatable + case hardened steels 1.0035 S185, 1.0486 P275N, 1.0345 P235GH, 1.0050, 1.0070, 1.8937 1.0718 11SMnPb30, 1.0736 11SMn37 1.0402 C22, 1.1178 C30E 1.0503 C45, 1.1191 C30E 1.0301 C10, 1.1121 C10E 1.1750 C75W, 1.2076 102Cr6, 1.2307 29CrMoV9	up to 850 N/mm²	U	Slotting	140	0.011	0.023	0.027	0.036	0.041	0.054	0.063	0.090
		F	Roughing	160	0.014	0.023	0.032	0.041	0.045	0.059	0.072	0.108
			Finishing									
Free-cutting steels, unalloyed case hardened steels, nitriding steels 1.0727 46 S20, 1.0728 60 S20, 1.0757 46SPb20 1.0601 C60, 1.1221 C60E 1.7043 38Cr4 1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5 1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	850-1,200 N/mm²	U	Slotting	130	0.011	0.023	0.027	0.036	0.041	0.054	0.063	0.090
		F	Roughing	150	0.014	0.023	0.032	0.041	0.045	0.059	0.072	0.108
			Finishing									
Alloyed heat-treatable, tool and high speed steels 1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2379 X155CrVMo12-1 1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3 Spring steel = 1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4	850-1,400 N/mm²	U	Slotting	110	0.009	0.014	0.023	0.027	0.032	0.041	0.054	0.063
		F	Roughing	130	0.009	0.018	0.027	0.032	0.036	0.050	0.059	0.072
			Finishing									
Hardened steel Tool steel, heat-treatable steel, spring steel, high-speed steel, case hardened steel, etc. Z.B.: 1.2344 X40CrMoV5-1; 1.2767 X45NiCrMo4; 1.2379 X155CrVMo12-1 ;1.2080 X210Cr12 1.3343 S 6-5-2	up to 54 HRC	F*	Slotting	55	0.009	0.014	0.018	0.023	0.027	0.036	0.045	0.054
		F	Roughing	90	0.011	0.014	0.023	0.027	0.032	0.041	0.054	0.063
			Finishing									
	54-60 HRC		Slotting									
			Roughing									
			Finishing									
Stainless steel 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X10CrNiS18-9 USA = 303, 410, 420F, 430, 430F	up to 750 N/mm²	U	Slotting	100	0.011	0.023	0.027	0.036	0.041	0.054	0.063	0.090
		U	Roughing	115	0.014	0.023	0.032	0.041	0.045	0.059	0.072	0.108
			Finishing									
Stainless steel 1.4301X5CrNi18-10, 1.4303 X5CrNi18-12 1.4310 XCrNi18-8 USA = 304, 304L, 420	750-850 N/mm²	U	Slotting	65	0.009	0.014	0.023	0.027	0.032	0.041	0.054	0.063
		U	Roughing	100	0.011	0.018	0.027	0.032	0.036	0.050	0.059	0.072
			Finishing									
Stainless steel 1.4438 X2CrNiMo18-15-4, 1.4404 X2CrNiMo17-12-2, 1.4571 X6CrNiTi18-10 USA = 310, 316, 316B, 316L, 317	above 850 N/mm²	U	Slotting	55	0.009	0.014	0.018	0.023	0.027	0.036	0.045	0.054
		U	Roughing	80	0.011	0.014	0.023	0.027	0.032	0.041	0.054	0.063
			Finishing									
Special alloys (nickel based "Ni") Nimonic, Inconel, Monel, Hastelloy	up to 1,300 N/mm²	U	Slotting	25	0.007	0.009	0.014	0.018	0.023	0.032	0.036	0.045
		F	Roughing	30	0.009	0.014	0.018	0.023	0.027	0.036	0.045	0.054
			Finishing									
Titanium alloys ("Ti") 3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7164 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5	up to 1,300 N/mm²	U	Slotting	55	0.009	0.014	0.023	0.027	0.032	0.041	0.054	0.063
		F	Roughing	80	0.011	0.018	0.027	0.032	0.036	0.050	0.059	0.072
			Finishing									
Cast iron, grey cast iron, spheroidal graphite and malleable cast iron 0.6010 EN-GL100 (GG10), 0.6020 EN-GJL-200 (GG20), 0.7050 EN-GJS-500-7 (GGG50), 0.8535 EN-GJMW-350-4 (GTW35)	up to 240 HB 30	U	Slotting	150	0.014	0.023	0.032	0.041	0.045	0.059	0.072	0.108
		F	Roughing	160	0.014	0.027	0.036	0.045	0.054	0.063	0.081	0.117
			Finishing									
Cast iron, grey cast iron, spheroidal graphite and malleable cast iron 0.6025 EN-GL250 (GG25), 0.6035 EN-GJL-350 (GG35), 0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)	above 240 HB 30	U	Slotting	130	0.011	0.023	0.027	0.036	0.041	0.054	0.063	0.090
		F	Roughing	150	0.014	0.023	0.032	0.041	0.045	0.059	0.072	0.108
			Finishing									
Aluminium, Al-wrought alloys, Al-alloys 3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1 3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	up to 3% Si	U	Slotting	450	0.014	0.027	0.036	0.050	0.059	0.072	0.086	0.126
		U	Roughing	540	0.016	0.032	0.041	0.054	0.063	0.081	0.090	0.135
			Finishing									
Aluminium-cast alloys 3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9 3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	above 3% Si	U	Slotting	200	0.014	0.023	0.032	0.041	0.045	0.059	0.072	0.108
		U	Roughing	250	0.014	0.027	0.036	0.045	0.054	0.063	0.081	0.117
			Finishing									
Magnesium-alloys MgMn2, G-MgAl8Zn1, G-MgAl6Zn3	-	U	Slotting	160	0.011	0.023	0.027	0.036	0.041	0.054	0.063	0.090
		U	Roughing	200	0.014	0.027	0.036	0.045	0.054	0.063	0.081	0.117
			Finishing									
Non-ferrous metals (copper, short- or long-chipping brass or bronze) 2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb 2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5 2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10	up to 850 N/mm²	U	Slotting	225	0.011	0.023	0.027	0.036	0.041	0.054	0.063	0.090
		U	Roughing	270	0.014	0.027	0.036	0.045	0.054	0.063	0.081	0.117
			Finishing									

* trochoid milling strategy

All recommendations are valid for coated tools. For bright milling cutters please vc - 40% and fz -25%!

GF 500 B and GF 300 B (Ball Nose)

Tool length/reach up to 3xD Vc and fz 100%
Tool length/reach 3-5xD Vc and fz 80%
Tool length/reach > 5-10xD Vc and fz 60%

Application	Width/depth		Nom. diameter (mm) 2	3	4	6	8	10	12	16
Roughing	ae	(mm)	0.1	0.15	0.2	0.4	0.6	0.75	1	1.2
	ap	(mm)	0.15	0.15	0.3	0.5	0.75	1	1.5	1.5
Finishing	ae	(mm)	0.05	0.07	0.1	0.14	0.16	0.18	0.2	0.3
	ap	(mm)	0.05	0.05	0.07	0.1	0.15	0.2	0.25	0.3

Material	Hardness	recommended GF type	Type of application	cut Vc	fz (mm/z) with nom. Ø 2	3	4	6	8	10	12	16
Structural + free-cutting steels, unalloyed heat-treatable + case hardened steels 1.0035 S185, 1.0486 P275N, 1.0345 P235GH, 1.0050, 1.0070, 1.8937 1.0718 11SMnPb30, 1.0736 11SMn37 1.0402 C22, 1.1178 C30E 1.0503 C45, 1.1191 C30E 1.0301 C10, 1.1121 C10E 1.1750 C75W, 1.2076 102Cr6, 1.2307 29CrMoV9	up to 850 N/mm²	GF 500 B	Roughing	200	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
		GF 500 B	Finishing	300	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
Free-cutting steels, unalloyed case hardened steels, nitriding steels 1.0727 46 S20, 1.0728 60 S20, 1.0757 46SPb20 1.0601 C60, 1.1221 C60E 1.7043 38Cr4 1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5 1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	850-1,200 N/mm²	GF 500 B	Roughing	200	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
		GF 500 B	Finishing	300	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
Alloyed heat-treatable, tool and high speed steels 1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2379 X155CrVMo12-1 1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3 Spring steel = 1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4	850-1,400 N/mm²	GF 500 B	Roughing	180	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
		GF 500 B	Finishing	280	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
Hardened steel Tool steel, heat-treatable steel, spring steel, high-speed steel, case hardened steel, etc. Z.B.: 1.2344 X40CrMoV5-1; 1.2767 X45NiCrMo4; 1.2379 X155CrVMo12-1 ;1.2080 X210Cr12 1.3343 S 6-5-2	up to 54 HRC	GF 500 B	Roughing	140	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.1
		GF 500 B	Finishing	200	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
	54-60 HRC	GF 300 B	Roughing	80	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.1
		GF 300 B	Finishing	130	0.025	0.03	0.04	0.045	0.05	0.07	0.1	0.12
Stainless steel 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X10CrNiS18-9 USA = 303, 410, 420F, 430, 430F	up to 750 N/mm²	GF 500 B	Roughing	180	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
		GF 500 B	Finishing	280	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
Stainless steel 1.4301X5CrNi18-10, 1.4303 X5CrNi18-12 1.4310 XCrNi18-8 USA = 304, 304L, 420	750-850 N/mm²	GF 500 B	Roughing	120	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.1
		GF 500 B	Finishing	180	0.025	0.03	0.04	0.045	0.05	0.07	0.1	0.12
Stainless steel 1.4438 X2CrNiMo18-15-4, 1.4404 X2CrNiMo17-12-2, 1.4571 X6CrNiTi18-10 USA = 310, 316, 316B, 316L, 317	above 850 N/mm²	GF 500 B	Roughing	80	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.1
		GF 500 B	Finishing	130	0.025	0.03	0.04	0.045	0.05	0.07	0.1	0.12
Special alloys (nickel based "Ni") Nimonic, Inconel, Monel, Hastelloy	up to 1,300 N/mm²	GF 500 B	Roughing	40	0.01	0.02	0.03	0.035	0.04	0.05	0.07	0.08
		GF 500 B	Finishing	60	0.02	0.025	0.03	0.04	0.045	0.06	0.08	0.09
Titanium alloys ("Ti") 3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7164 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5	up to 1,300 N/mm²	GF 500 B	Roughing	90	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.1
		GF 500 B	Finishing	150	0.025	0.03	0.04	0.045	0.05	0.07	0.1	0.12
Cast iron, grey cast iron, spheroidal graphite and malleable cast iron 0.6010 EN-GL100 (GG10), 0.6020 EN-GJL-200 (GG20), 0.7050 EN-GJS-500-7 (GGG50), 0.8535 EN-GJMW-350-4 (GTW35)	up to 240 HB 30	GF 500 B	Roughing	200	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
		GF 500 B	Finishing	300	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
Cast iron, grey cast iron, spheroidal graphite and malleable cast iron 0.6025 EN-GL250 (GG25), 0.6035 EN-GJL-350 (GG35), 0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)	above 240 HB 30	GF 500 B	Roughing	150	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
		GF 500 B	Finishing	230	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
Aluminium, Al-wrought alloys, Al-alloys 3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1 3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	up to 3% Si											
Aluminium-cast alloys 3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9 3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	above 3% Si	GF 500 B	Roughing	280	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
		GF 500 B	Finishing	350	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
Magnesium-alloys MgMn2, G-MgAl8Zn1, G-MgAl6Zn3	-											
Non-ferrous metals (copper, short- or long-chipping brass or bronze) 2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb 2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5 2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10	up to 850 N/mm²	GF 500 B	Roughing	250	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
		GF 500 B	Finishing	400	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15

All recommendations are valid for coated tools. For bright milling cutters please vc - 40% and fz -25%!

GF 500 T and GF 300 T („Torus“ Nose / Corner Radius)

Tool length/reach up to 3xD Vc and fz 100%
Tool length/reach 3-5xD Vc and fz 80%
Tool length/reach > 5-10xD Vc and fz 60%

Application	Width/depth		Nom. diameter (mm) 2	3	4	6	8	10	12	16
Roughing	ae	(mm)	0.15	0.2	0.3	0.4	0.6	0.75	1	1.5
	ap	(mm)	1	1.5	2	3	4	5	6	8
Finishing	ae	(mm)	0.08	0.11	0.13	0.15	0.2	0.3	0.4	0.5
	ap	(mm)	0.2	0.3	0.4	0.7	1	1.5	2	3

Material	Hardness	recom-mended GF type	Type of application	cut Vc	fz (mm/z) 2	3	4	6	8	10	12	16
Structural + free-cutting steels, unalloyed heat-treatable + case hardened steels 1.0035 S185, 1.0486 P275N, 1.0345 P235GH, 1.0050, 1.0070, 1.8937 1.0718 11SMnPb30, 1.0736 11SMn37 1.0402 C22, 1.1178 C30E 1.0503 C45, 1.1191 C30E 1.0301 C10, 1.1121 C10E 1.1750 C75W, 1.2076 102Cr6, 1.2307 29CrMoV9	up to 850 N/mm²	GF 500 T	Roughing	200	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
		GF 500 T	Finishing	300	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
Free-cutting steels, unalloyed case hardened steels, nitriding steels 1.0727 46 S20, 1.0728 60 S20, 1.0757 46SPb20 1.0601 C60, 1.1221 C60E 1.7043 38Cr4 1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5 1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	850-1,200 N/mm²	GF 500 T	Roughing	200	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
		GF 500 T	Finishing	300	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
Alloyed heat-treatable, tool and high speed steels 1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2379 X155CrVMo12-1 1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3 Spring steel = 1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4	850-1,400 N/mm²	GF 300 T	Roughing	180	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
		GF 300 T	Finishing	280	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
Hardened steel Tool steel, heat-treatable steel, spring steel, high-speed steel, case hardened steel, etc. Z.B.: 1.2344 X40CrMoV5-1; 1.2767 X45NiCrMo4; 1.2379 X155CrVMo12-1 ;1.2080 X210Cr12 1.3343 S 6-5-2	up to 54 HRC	GF 300 T	Roughing	140	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.1
		GF 300 T	Finishing	200	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
	54-60 HRC	GF 300 T	Roughing	80	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.1
		GF 300 T	Finishing	130	0.025	0.03	0.04	0.045	0.05	0.07	0.1	0.12
Stainless steel 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X10CrNiS18-9 USA = 303, 410, 420F, 430, 430F	up to 750 N/mm²	GF 500 T	Roughing	180	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
		GF 500 T	Finishing	280	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
Stainless steel 1.4301X5CrNi18-10, 1.4303 X5CrNi18-12 1.4310 XCrNi18-8 USA = 304, 304L, 420	750-850 N/mm²	GF 500 T	Roughing	120	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.1
		GF 500 T	Finishing	180	0.025	0.03	0.04	0.045	0.05	0.07	0.1	0.12
Stainless steel 1.4438 X2CrNiMo18-15-4, 1.4404 X2CrNiMo17-12-2, 1.4571 X6CrNiTi18-10 USA = 310, 316, 316B, 316L, 317	above 850 N/mm²	GF 500 T	Roughing	80	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.1
		GF 500 T	Finishing	130	0.025	0.03	0.04	0.045	0.05	0.07	0.1	0.12
Special alloys (nickel based “Ni“) Nimonic, Inconel, Monel, Hastelloy	up to 1,300 N/mm²	GF 500 T	Roughing	40	0.01	0.02	0.03	0.035	0.04	0.05	0.07	0.08
		GF 500 T	Finishing	60	0.02	0.025	0.03	0.04	0.045	0.06	0.08	0.09
Titanium alloys (“Ti“) 3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7164 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5	up to 1,300 N/mm²	GF 500 T	Roughing	90	0.02	0.03	0.035	0.04	0.05	0.07	0.08	0.1
		GF 500 T	Finishing	150	0.025	0.03	0.04	0.045	0.05	0.07	0.1	0.12
Cast iron, grey cast iron, spheroidal graphite and malleable cast iron 0.6010 EN-GL100 (GG10), 0.6020 EN-GJL-200 (GG20), 0.7050 EN-GJS-500-7 (GGG50), 0.8535 EN-GJMW-350-4 (GTW35)	up to 240 HB 30	GF 500 T	Roughing	200	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
		GF 300 T	Finishing	300	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
Cast iron, grey cast iron, spheroidal graphite and malleable cast iron 0.6025 EN-GL250 (GG25), 0.6035 EN-GJL-350 (GG35), 0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)	above 240 HB 30	GF 300 T	Roughing	150	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
		GF 300 T	Finishing	230	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
Aluminium, Al-wrought alloys, Al-alloys 3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1 3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	up to 3% Si											
Aluminium-cast alloys 3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9 3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	above 3% Si	GF 500 T	Roughing	280	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
		GF 500 T	Finishing	350	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
Magnesium-alloys MgMn2, G-MgAl8Zn1, G-MgAl6Zn3	-											
Non-ferrous metals (copper, short- or long-chipping brass or bronze) 2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb 2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5 2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10	up to 850 N/mm²	GF 500 T	Roughing	250	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15
		GF 500 T	Finishing	400	0.03	0.04	0.045	0.05	0.07	0.1	0.12	0.15

All recommendations are valid for coated tools. For bright milling cutters please vc - 40% and fz -25%!

Universal end mills 2-/3-/4-fluted Type N

Application	v_c factor	f_z factor	Feed width (ae)	Feed depth (ap)
Slotting	1	1 (0.7 for a_p = 2xd)	1xd	0.5 up to 1xd
Roughing	1	1 (0.7 for a_p = 2xd)	0.4 up to 0.9xd	0.5 up to 1xd
Finishing	1	1	0.01 up to 0.1xd	1 up to 2xd
HPC-roughing	1.3	1.5	0.15 up to 0.4xd	1 up to 2xd
HSC-roughing	1.5	2	0.05 up to 0.15xd	1 up to 2xd

Material	Hardness	recom-mended type	Type of application	cut Vc	fz (mm/z)							
					3	6	8	10	12	16	20	25
Structural + free-cutting steels, unalloyed heat-treatable + case hardened steels 1.0035 S185, 1.0486 P275N, 1.0345 P235GH, 1.0050, 1.0070, 1.8937 1.0718 11SMnPb30, 1.0736 11SMn37 1.0402 C22, 1.1178 C30E 1.0503 C45, 1.1191 C30E 1.0301 C10, 1.1121 C10E 1.1750 C75W, 1.2076 102Cr6, 1.2307 29CrMoV9	up to 850 N/mm²	2-fluted	Slotting	125	0.013	0.025	0.032	0.042	0.049	0.063	0.070	0.105
		2- or 3-fluted	Roughing	140	0.014	0.028	0.039	0.049	0.060	0.070	0.084	0.119
		4-fluted	Finishing	190	0.011	0.021	0.028	0.039	0.046	0.056	0.067	0.098
Free-cutting steels, unalloyed case hardened steels, nitriding steels 1.0727 46 S20, 1.0728 60 S20, 1.0757 46SPb20 1.0601 C60, 1.1221 C60E 1.7043 38Cr4 1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5 1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	850-1,200 N/mm²	2-fluted	Slotting	110	0.013	0.025	0.032	0.042	0.049	0.063	0.070	0.105
		2- or 3-fluted	Roughing	130	0.014	0.028	0.039	0.049	0.060	0.070	0.084	0.119
		4-fluted	Finishing	150	0.011	0.021	0.028	0.039	0.046	0.056	0.067	0.098
Alloyed heat-treatable, tool and high speed steels 1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2379 X155CrVMo12-1 1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3 Spring steel = 1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4	850-1,400 N/mm²	2-fluted	Slotting	95	0.011	0.021	0.028	0.039	0.046	0.056	0.067	0.098
		2- or 3-fluted	Roughing	115	0.014	0.028	0.035	0.046	0.056	0.067	0.077	0.112
		4-fluted	Finishing	140	0.011	0.021	0.028	0.035	0.042	0.049	0.063	0.091
Hardened steel Tool steel, heat-treatable steel, spring steel, high-speed steel, case hardened steel, etc. Z.B.: 1.2344 X40CrMoV5-1; 1.2767 X45NiCrMo4; 1.2379 X155CrVMo12-1 ;1.2080 X210Cr12 1.3343 S 6-5-2	up to 54 HRC	2-fluted	Slotting	50	0.007	0.015	0.018	0.024	0.027	0.036	0.042	0.060
		2- or 3-fluted	Roughing	75	0.009	0.015	0.021	0.027	0.030	0.039	0.048	0.072
		4-fluted	Finishing	105	0.009	0.018	0.024	0.030	0.036	0.042	0.054	0.078
	54-60 HRC	2-fluted	Slotting									
		2- or 3-fluted	Roughing									
		4-fluted	Finishing									
Stainless steel 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X10CrNiS18-9 USA = 303, 410, 420F, 430, 430F	up to 750 N/mm²	2-fluted	Slotting	85	0.009	0.018	0.024	0.030	0.036	0.042	0.054	0.078
		2- or 3-fluted	Roughing	100	0.011	0.021	0.027	0.036	0.042	0.054	0.060	0.090
		4-fluted	Finishing	125	0.010	0.018	0.024	0.033	0.039	0.048	0.057	0.084
Stainless steel 1.4301X5CrNi18-10, 1.4303 X5CrNi18-12 1.4310 XCrNi18-8 USA = 304, 304L, 420	750-850 N/mm²	2-fluted	Slotting	55	0.009	0.015	0.021	0.027	0.030	0.039	0.048	0.072
		2- or 3-fluted	Roughing	85	0.010	0.018	0.024	0.033	0.039	0.048	0.057	0.084
		4-fluted	Finishing	100	0.009	0.018	0.024	0.030	0.036	0.042	0.054	0.078
Stainless steel 1.4438 X2CrNiMo18-15-4, 1.4404 X2CrNiMo17-12-2, 1.4571 X6CrNiTi18-10 USA = 310, 316, 316B, 316L, 317	above 850 N/mm²	2-fluted	Slotting	50	0.007	0.015	0.018	0.024	0.027	0.036	0.042	0.060
		2- or 3-fluted	Roughing	70	0.009	0.015	0.021	0.027	0.030	0.039	0.048	0.072
		4-fluted	Finishing	85	0.009	0.015	0.021	0.027	0.030	0.039	0.048	0.072
Special alloys (nickel based "Ni") Nimonic, Inconel, Monel, Hastelloy	up to 1,300 N/mm²	2-fluted	Slotting	20	0.006	0.009	0.012	0.015	0.018	0.024	0.030	0.036
		2- or 3-fluted	Roughing	25	0.006	0.012	0.018	0.021	0.024	0.033	0.039	0.048
		4-fluted	Finishing	30	0.009	0.015	0.021	0.027	0.030	0.039	0.048	0.072
Titanium alloys ("Ti") 3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7164 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5	up to 1,300 N/mm²	2-fluted	Slotting	40	0.009	0.015	0.021	0.027	0.030	0.039	0.048	0.072
		2- or 3-fluted	Roughing	60	0.010	0.018	0.024	0.033	0.039	0.048	0.057	0.084
		4-fluted	Finishing	90	0.010	0.018	0.024	0.033	0.039	0.048	0.057	0.084
Cast iron, grey cast iron, spheroidal graphite and malleable cast iron 0.6010 EN-GL100 (GG10), 0.6020 EN-GJL-200 (GG20), 0.7050 EN-GJS-500-7 (GGG50), 0.8535 EN-GJMW-350-4 (GTW35)	up to 240 HB 30	2-fluted	Slotting	115	0.012	0.024	0.030	0.039	0.048	0.057	0.066	0.096
		2- or 3-fluted	Roughing	125	0.012	0.024	0.033	0.042	0.051	0.060	0.072	0.102
		4-fluted	Finishing	155	0.011	0.021	0.027	0.036	0.042	0.054	0.060	0.090
Cast iron, grey cast iron, spheroidal graphite and malleable cast iron 0.6025 EN-GL250 (GG25), 0.6035 EN-GJL-350 (GG35), 0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)	above 240 HB 30	2-fluted	Slotting	100	0.010	0.018	0.024	0.033	0.039	0.048	0.057	0.084
		2- or 3-fluted	Roughing	115	0.012	0.024	0.030	0.039	0.048	0.057	0.066	0.096
		4-fluted	Finishing	140	0.011	0.021	0.027	0.036	0.042	0.054	0.060	0.090
Aluminium, Al-wrought alloys, Al-alloys 3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1 3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	up to 3% Si	2-fluted	Slotting	350	0.014	0.028	0.035	0.046	0.056	0.067	0.077	0.112
		2- or 3-fluted	Roughing	420	0.014	0.028	0.039	0.049	0.060	0.070	0.084	0.119
		4-fluted	Finishing	700	0.013	0.025	0.032	0.042	0.049	0.063	0.070	0.105
Aluminium-cast alloys 3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9 3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	above 3% Si	2-fluted	Slotting	160	0.011	0.021	0.028	0.039	0.046	0.056	0.067	0.098
		2- or 3-fluted	Roughing	200	0.014	0.028	0.035	0.046	0.056	0.067	0.077	0.112
		4-fluted	Finishing	245	0.013	0.025	0.032	0.042	0.049	0.063	0.070	0.105
Magnesium-alloys MgMn2, G-MgAl8Zn1, G-MgAl6Zn3	-	2-fluted	Slotting	125	0.011	0.021	0.028	0.039	0.046	0.056	0.067	0.098
		2- or 3-fluted	Roughing	150	0.014	0.028	0.035	0.046	0.056	0.067	0.077	0.112
		4-fluted	Finishing	200	0.013	0.025	0.032	0.042	0.049	0.063	0.070	0.105
Non-ferrous metals (copper, short- or long-chipping brass or bronze) 2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb 2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5 2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10	up to 850 N/mm²	2-fluted	Slotting	175	0.011	0.018	0.025	0.032	0.035	0.046	0.056	0.084
		2- or 3-fluted	Roughing	210	0.011	0.021	0.028	0.039	0.046	0.056	0.067	0.098
		4-fluted	Finishing	280	0.011	0.021	0.028	0.039	0.046	0.056	0.067	0.098

All recommendations are valid for coated tools. For bright milling cutters please vc - 40% and fz -25%!

Slot drills 2-fluted type W for Aluminium

Application	v_c factor	f_z factor	Feed width (ae)	Feed depth (ap)
Slotting	1	1 (0.7 for a_p = 2xd)	1xd	0.5 up to 1xd
Roughing	1	1 (0.7 for a_p = 2xd)	0.4 up to 0.9xd	0.5 up to 1xd
Finishing	1	1	0.01 up to 0.1xd	1 up to 2xd
HPC-roughing	1.3	1.5	0.15 up to 0.4xd	1 up to 2xd
HSC-roughing	1.5	2	0.05 up to 0.15xd	1 up to 2xd

Material	Hardness	recom-mended type	Type of application	cut Vc	fz (mm/z)							
					2	3	4	6	8	10	12	16
Structural + free-cutting steels, unalloyed heat-treatable + case hardened steels 1.0035 S185, 1.0486 P275N, 1.0345 P235GH, 1.0050, 1.0070, 1.8937 1.0718 11SMnPb30, 1.0736 11SMn37 1.0402 C22, 1.1178 C30E 1.0503 C45, 1.1191 C30E 1.0301 C10, 1.1121 C10E 1.1750 C75W, 1.2076 102Cr6, 1.2307 29CrMoV9	up to 850 N/mm²											
Free-cutting steels, unalloyed case hardened steels, nitriding steels 1.0727 46 S20, 1.0728 60 S20, 1.0757 46SPb20 1.0601 C60, 1.1221 C60E 1.7043 38Cr4 1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5 1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	850-1,200 N/mm²											
Alloyed heat-treatable, tool and high speed steels 1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2379 X155CrVMo12-1 1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3 Spring steel = 1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4	850-1,400 N/mm²											
Hardened steel Tool steel, heat-treatable steel, spring steel, high-speed steel, case hardened steel, etc. Z.B.: 1.2344 X40CrMoV5-1; 1.2767 X45NiCrMo4; 1.2379 X155CrVMo12-1 ;1.2080 X210Cr12 1.3343 S 6-5-2	up to 54 HRC											
	54-60 HRC											
Stainless steel 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X10CrNiS18-9 USA = 303, 410, 420F, 430, 430F	up to 750 N/mm²											
Stainless steel 1.4301X5CrNi18-10, 1.4303 X5CrNi18-12 1.4310 XCrNi18-8 USA = 304, 304L, 420	750-850 N/mm²											
Stainless steel 1.4438 X2CrNiMo18-15-4, 1.4404 X2CrNiMo17-12-2, 1.4571 X6CrNiTi18-10 USA = 310, 316, 316B, 316L, 317	above 850 N/mm²											
Special alloys (nickel based "Ni") Nimonic, Inconel, Monel, Hastelloy	up to 1,300 N/mm²											
Titanium alloys ("Ti") 3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7164 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5	up to 1,300 N/mm²											
Cast iron, grey cast iron, spheroidal graphite and malleable cast iron 0.6010 EN-GL100 (GG10), 0.6020 EN-GJL-200 (GG20), 0.7050 EN-GJS-500-7 (GGG50), 0.8535 EN-GJMW-350-4 (GTW35)	up to 240 HB 30											
Cast iron, grey cast iron, spheroidal graphite and malleable cast iron 0.6025 EN-GL250 (GG25), 0.6035 EN-GJL-350 (GG35), 0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)	above 240 HB 30											
Aluminium, Al-wrought alloys, Al-alloys 3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1 3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	up to 3% Si	2-fluted	Slotting	350	0.014	0.028	0.035	0.046	0.056	0.067	0.077	0.112
		2-fluted	Roughing	420	0.014	0.028	0.039	0.049	0.060	0.070	0.084	0.119
		2-fluted	Finishing	700	0.013	0.025	0.032	0.042	0.049	0.063	0.070	0.105
Aluminium-cast alloys 3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9 3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	above 3% Si	2-fluted	Slotting	160	0.011	0.021	0.028	0.039	0.046	0.056	0.067	0.098
		2-fluted	Roughing	200	0.014	0.028	0.035	0.046	0.056	0.067	0.077	0.112
		2-fluted	Finishing	245	0.013	0.025	0.032	0.042	0.049	0.063	0.070	0.105
Magnesium-alloys MgMn2, G-MgAl8Zn1, G-MgAl6Zn3	-	2-fluted	Slotting	125	0.011	0.021	0.028	0.039	0.046	0.056	0.067	0.098
		2-fluted	Roughing	150	0.014	0.028	0.035	0.046	0.056	0.067	0.077	0.112
		2-fluted	Finishing	200	0.013	0.025	0.032	0.042	0.049	0.063	0.070	0.105
Non-ferrous metals (copper, short- or long-chipping brass or bronze) 2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb 2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5 2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10	up to 850 N/mm²	2-fluted	Slotting	175	0.011	0.018	0.025	0.032	0.035	0.046	0.056	0.084
		2-fluted	Roughing	210	0.011	0.021	0.028	0.039	0.046	0.056	0.067	0.098
		2-fluted	Finishing	280	0.011	0.021	0.028	0.039	0.046	0.056	0.067	0.098

All recommendations are valid for coated tools. For bright milling cutters please vc - 40% and fz -25%!

Universal Slot drills and end mills with ball nose

Tool length/reach up to 3xD Vc and fz 100%
Tool length/reach 3-5xD Vc and fz 80%
Tool length/reach > 5-10xD Vc and fz 60%

Application	Width/depth		Nom. diameter (mm) 2	3	4	6	8	10	12	16
Roughing	ae	(mm)	0.1	0.15	0.2	0.4	0.6	0.75	1	1.2
	ap	(mm)	0.15	0.15	0.3	0.5	0.75	1	1.5	1.5
Finishing	ae	(mm)	0.05	0.07	0.1	0.14	0.16	0.18	0.2	0.3
	ap	(mm)	0.05	0.05	0.07	0.1	0.15	0.2	0.25	0.3

Material	Hardness	recom-mended type	Type of application	cut Vc	fz (mm/z) 3	6	8	10	12	16	20	25
Structural + free-cutting steels, unalloyed heat-treatable + case hardened steels 1.0035 S185, 1.0486 P275N, 1.0345 P235GH, 1.0050, 1.0070, 1.8937 1.0718 11SMnPb30, 1.0736 11SMn37 1.0402 C22, 1.1178 C30E 1.0503 C45, 1.1191 C30E 1.0301 C10, 1.1121 C10E 1.1750 C75W, 1.2076 102Cr6, 1.2307 29CrMoV9	up to 850 N/mm²	2-/4-fluted	Roughing	175	0.021	0.028	0.032	0.035	0.049	0.070	0.084	0.105
		2-/4-fluted	Finishing	350	0.021	0.028	0.032	0.035	0.049	0.070	0.084	0.105
Free-cutting steels, unalloyed case hardened steels, nitriding steels 1.0727 46 S20, 1.0728 60 S20, 1.0757 46SPb20 1.0601 C60, 1.1221 C60E 1.7043 38Cr4 1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5 1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	850-1,200 N/mm²	2-/4-fluted	Roughing	175	0.021	0.028	0.032	0.035	0.049	0.070	0.084	0.105
		2-/4-fluted	Finishing	245	0.021	0.028	0.032	0.035	0.049	0.070	0.084	0.105
Alloyed heat-treatable, tool and high speed steels 1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2379 X155CrVMo12-1 1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3 Spring steel = 1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4	850-1,400 N/mm²	2-/4-fluted	Roughing	140	0.021	0.028	0.032	0.035	0.049	0.070	0.084	0.105
		2-/4-fluted	Finishing	210	0.021	0.028	0.032	0.035	0.049	0.070	0.084	0.105
Hardened steel Tool steel, heat-treatable steel, spring steel, high-speed steel, case hardened steel, etc. Z.B.: 1.2344 X40CrMoV5-1; 1.2767 X45NiCrMo4; 1.2379 X155CrVMo12-1 ;1.2080 X210Cr12 1.3343 S 6-5-2	up to 54 HRC		Roughing									
			Finishing									
	54-60 HRC		Roughing									
			Finishing									
Stainless steel 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X10CrNiS18-9 USA = 303, 410, 420F, 430, 430F	up to 750 N/mm²	2-/4-fluted	Roughing	126	0.021	0.028	0.032	0.035	0.049	0.070	0.084	0.105
		2-/4-fluted	Finishing	196	0.021	0.028	0.032	0.035	0.049	0.070	0.084	0.105
Stainless steel 1.4301X5CrNi18-10, 1.4303 X5CrNi18-12 1.4310 XCrNi18-8 USA = 304, 304L, 420	750-850 N/mm²	2-/4-fluted	Roughing	91	0.014	0.021	0.025	0.028	0.035	0.049	0.056	0.070
		2-/4-fluted	Finishing	140	0.018	0.021	0.028	0.032	0.035	0.049	0.070	0.084
Stainless steel 1.4438 X2CrNiMo18-15-4, 1.4404 X2CrNiMo17-12-2, 1.4571 X6CrNiTi18-10 USA = 310, 316, 316B, 316L, 317	above 850 N/mm²	2-/4-fluted	Roughing	56	0.014	0.021	0.025	0.028	0.035	0.049	0.056	0.070
		2-/4-fluted	Finishing	91	0.018	0.021	0.028	0.032	0.035	0.049	0.070	0.084
Special alloys (nickel based "Ni") Nimonic, Inconel, Monel, Hastelloy	up to 1,300 N/mm²	2-/4-fluted	Roughing	28	0.007	0.014	0.021	0.025	0.028	0.035	0.049	0.056
		2-/4-fluted	Finishing	42	0.014	0.018	0.021	0.028	0.032	0.042	0.056	0.063
Titanium alloys ("Ti") 3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7164 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5	up to 1,300 N/mm²	2-/4-fluted	Roughing	56	0.014	0.021	0.025	0.028	0.035	0.049	0.056	0.070
		2-/4-fluted	Finishing	105	0.018	0.021	0.028	0.032	0.035	0.049	0.070	0.084
Cast iron, grey cast iron, spheroidal graphite and malleable cast iron 0.6010 EN-GL100 (GG10), 0.6020 EN-GJL-200 (GG20), 0.7050 EN-GJS-500-7 (GGG50), 0.8535 EN-GJMW-350-4 (GTW35)	up to 240 HB 30	2-/4-fluted	Roughing	140	0.021	0.028	0.032	0.035	0.049	0.070	0.084	0.105
		2-/4-fluted	Finishing	210	0.021	0.028	0.032	0.035	0.049	0.070	0.084	0.105
Cast iron, grey cast iron, spheroidal graphite and malleable cast iron 0.6025 EN-GL250 (GG25), 0.6035 EN-GJL-350 (GG35), 0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)	above 240 HB 30	2-/4-fluted	Roughing	105	0.021	0.028	0.032	0.035	0.049	0.070	0.084	0.105
		2-/4-fluted	Finishing	161	0.021	0.028	0.032	0.035	0.049	0.070	0.084	0.105
Aluminium, Al-wrought alloys, Al-alloys 3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1 3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	up to 3% Si											
Aluminium-cast alloys 3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9 3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	above 3% Si	2-/4-fluted	Roughing	196	0.021	0.028	0.032	0.035	0.049	0.070	0.084	0.105
		2-/4-fluted	Finishing	245	0.021	0.028	0.032	0.035	0.049	0.070	0.084	0.105
Magnesium-alloys MgMn2, G-MgAl8Zn1, G-MgAl6Zn3	-											
Non-ferrous metals (copper, short- or long-chipping brass or bronze) 2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb 2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5 2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10	up to 850 N/mm²	2-/4-fluted	Roughing	175	0.021	0.028	0.032	0.035	0.049	0.070	0.084	0.105
		2-/4-fluted	Finishing	280	0.021	0.028	0.032	0.035	0.049	0.070	0.084	0.105

All recommendations are valid for coated tools. For bright milling cutters please vc - 40% and fz -25%!

High performance milling cutters PM HSS-E

Application	v_c factor	f_z factor	Feed width (ae)	Feed depth (ap)
Slotting	**1**	**1** (0.7 for a_p = 2xd)	1xd	0.5 up to 1xd
Roughing	**1**	**1** (0.7 for a_p = 2xd)	0.4 up to 0.9xd	0.5 up to 1xd
Finishing	**1**	**1**	0.01 up to 0.1xd	1 up to 2xd
HPC-roughing	**1.3**	**1.5**	0.15 up to 0.4xd	1 up to 2xd
HSC-roughing	**1.5**	**2**	0.05 up to 0.15xd	1 up to 2xd

Material	Hardness	Type of application	cut Vc	fz (mm/z)							
				2	3	4	6	8	10	12	16
Structural + free-cutting steels, unalloyed heat-treatable + case hardened steels 1.0035 S185, 1.0486 P275N, 1.0345 P235GH, 1.0050, 1.0070, 1.8937 1.0718 11SMnPb30, 1.0736 11SMn37 1.0402 C22, 1.1178 C30E 1.0503 C45, 1.1191 C30E 1.0301 C10, 1.1121 C10E 1.1750 C75W, 1.2076 102Cr6, 1.2307 29CrMoV9	up to 850 N/mm²	Slotting	65	0,010	0,012	0,025	0,032	0,040	0,045	0,060	0,080
		Roughing	75	0,012	0,015	0,030	0,039	0,050	0,060	0,080	0,095
		Finishing	85	0,011	0,014	0,028	0,030	0,042	0,050	0,070	0,075
Free-cutting steels, unalloyed case hardened steels, nitriding steels 1.0727 46 S20, 1.0728 60 S20, 1.0757 46SPb20 1.0601 C60, 1.1221 C60E 1.7043 38Cr4 1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5 1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	850-1.200 N/mm²	Slotting	60	0,009	0,012	0,020	0,030	0,035	0,040	0,045	0,060
		Roughing	70	0,011	0,015	0,025	0,035	0,045	0,050	0,060	0,080
		Finishing	80	0,010	0,014	0,021	0,028	0,039	0,042	0,050	0,070
Alloyed heat-treatable, tool and high speed steels 1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2379 X155CrVMo12-1 1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3 Spring steel = 1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4	850-1.400 N/mm²	Slotting	55	0,008	0,010	0,015	0,025	0,032	0,040	0,045	0,060
		Roughing	60	0,010	0,012	0,020	0,030	0,039	0,050	0,060	0,080
		Finishing	70	0,009	0,011	0,015	0,028	0,030	0,042	0,050	0,070
Hardened steel Tool steel, heat-treatable steel, spring steel, high-speed steel, case hardened steel, etc. Z.B.: 1.2344 X40CrMoV5-1; 1.2767 X45NiCrMo4; 1.2379 X155CrVMo12-1 ;1.2080 X210Cr12 1.3343 S 6-5-2	up to 54 HRC	Slotting									
		Roughing	20	0,006	0,009	0,015	0,021	0,027	0,030	0,039	0,048
		Finishing	30	0,008	0,009	0,018	0,024	0,030	0,036	0,042	0,054
	54-60 HRC	Slotting									
		Roughing									
		Finishing									
Stainless steel 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X10CrNiS18-9 USA = 303, 410, 420F, 430, 430F	up to 750 N/mm²	Slotting	55	0,008	0,009	0,018	0,024	0,030	0,036	0,042	0,054
		Roughing	60	0,010	0,011	0,021	0,027	0,036	0,042	0,054	0,060
		Finishing	70	0,009	0,010	0,018	0,024	0,033	0,039	0,048	0,057
Stainless steel 1.4301X5CrNi18-10, 1.4303 X5CrNi18-12 1.4310 XCrNi18-8 USA = 304, 304L, 420	750-850 N/mm²	Slotting	40	0,007	0,009	0,015	0,021	0,027	0,030	0,039	0,048
		Roughing	50	0,009	0,010	0,018	0,024	0,033	0,039	0,048	0,057
		Finishing	60	0,008	0,009	0,018	0,024	0,030	0,036	0,042	0,054
Stainless steel 1.4438 X2CrNiMo18-15-4, 1.4404 X2CrNiMo17-12-2, 1.4571 X6CrNiTi18-10 USA = 310, 316, 316B, 316L, 317	over 850 N/mm²	Slotting	28	0,006	0,007	0,015	0,018	0,024	0,027	0,036	0,042
		Roughing	35	0,008	0,009	0,015	0,021	0,027	0,030	0,039	0,048
		Finishing	50	0,007	0,009	0,015	0,021	0,027	0,030	0,039	0,048
Special alloys (nickel based "Ni") Nimonic, Inconel, Monel, Hastelloy	up to 1.300 N/mm²	Slotting	16	0,006	0,009	0,012	0,015	0,018	0,024	0,030	0,036
		Roughing	18	0,006	0,012	0,018	0,021	0,024	0,033	0,039	0,048
		Finishing	22	0,009	0,015	0,021	0,027	0,030	0,039	0,048	0,072
Titanium alloys ("Ti") 3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7164 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5	up to 1.300 N/mm²	Slotting	25	0,009	0,015	0,021	0,027	0,030	0,039	0,048	0,072
		Roughing	35	0,010	0,018	0,024	0,033	0,039	0,048	0,057	0,084
		Finishing	60	0,010	0,018	0,024	0,033	0,039	0,048	0,057	0,084
Cast iron, grey cast iron, spheroidal graphite and malleable cast iron 0.6010 EN-GL100 (GG10), 0.6020 EN-GJL-200 (GG20), 0.7050 EN-GJS-500-7 (GGG50), 0.8535 EN-GJMW-350-4 (GTW35)	up to 240 HB 30	Slotting	50	0,009	0,012	0,024	0,030	0,039	0,048	0,057	0,066
		Roughing	60	0,011	0,012	0,024	0,033	0,042	0,051	0,060	0,072
		Finishing	70	0,010	0,011	0,021	0,027	0,036	0,042	0,054	0,060
Cast iron, grey cast iron, spheroidal graphite and malleable cast iron 0.6025 EN-GL250 (GG25), 0.6035 EN-GJL-350 (GG35), 0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)	over 240 HB 30	Slotting	40	0,009	0,010	0,018	0,024	0,033	0,039	0,048	0,057
		Roughing	50	0,010	0,012	0,024	0,030	0,039	0,048	0,057	0,066
		Finishing	60	0,010	0,011	0,021	0,027	0,036	0,042	0,054	0,060
Aluminium, Al-wrought alloys, Al-alloys 3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1 3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	up to 3% Si	Slotting	120	0,012	0,014	0,028	0,035	0,046	0,056	0,067	0,077
		Roughing	160	0,012	0,014	0,028	0,039	0,049	0,060	0,070	0,084
		Finishing	250	0,011	0,013	0,025	0,032	0,042	0,049	0,063	0,070
Aluminium-cast alloys 3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9 3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	over 3% Si	Slotting	80	0,011	0,021	0,028	0,039	0,046	0,056	0,067	0,098
		Roughing	120	0,014	0,028	0,035	0,046	0,056	0,067	0,077	0,112
		Finishing	140	0,013	0,025	0,032	0,042	0,049	0,063	0,070	0,105
Magnesium-alloys MgMn2, G-MgAl8Zn1, G-MgAl6Zn3	-	Slotting	75	0,011	0,021	0,028	0,039	0,046	0,056	0,067	0,098
		Roughing	110	0,014	0,028	0,035	0,046	0,056	0,067	0,077	0,112
		Finishing	140	0,013	0,025	0,032	0,042	0,049	0,063	0,070	0,105
Non-ferrous metals (copper, short- or long-chipping brass or bronze) 2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb 2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5 2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10	up to 850 N/mm²	Slotting	80	0,011	0,018	0,025	0,032	0,035	0,046	0,056	0,084
		Roughing	120	0,011	0,021	0,028	0,039	0,046	0,056	0,067	0,098
		Finishing	160	0,011	0,021	0,028	0,039	0,046	0,056	0,067	0,098

All recommendations are valid for coated tools. For bright milling cutters please vc - 40% and fz -25%!

Universal milling cutters M42

Application	v_c factor	f_z factor	Feed width (ae)	Feed depth (ap)
Slotting	**1**	**1** (0.7 for a_p = 2xd)	1xd	0.5 up to 1xd
Roughing	**1**	**1** (0.7 for a_p = 2xd)	0.4 up to 0.9xd	0.5 up to 1xd
Finishing	**1**	**1**	0.01 up to 0.1xd	1 up to 2xd
HPC-roughing	**1.3**	**1.5**	0.15 up to 0.4xd	1 up to 2xd
HSC-roughing	**1.5**	**2**	0.05 up to 0.15xd	1 up to 2xd

Material	Hardness	Type of application	cut Vc	fz (mm/z)							
				2	3	4	6	8	10	12	16
Structural + free-cutting steels, unalloyed heat-treatable + case hardened steels 1.0035 S185, 1.0486 P275N, 1.0345 P235GH, 1.0050, 1.0070, 1.8937 1.0718 11SMnPb30, 1.0736 11SMn37 1.0402 C22, 1.1178 C30E 1.0503 C45, 1.1191 C30E 1.0301 C10, 1.1121 C10E 1.1750 C75W, 1.2076 102Cr6, 1.2307 29CrMoV9	up to 850 N/mm²	Slotting	40	0.010	0.012	0.025	0.032	0.040	0.045	0.060	0.080
		Roughing	50	0.012	0.015	0.030	0.039	0.050	0.060	0.080	0.095
		Finishing	75	0.011	0.014	0.028	0.030	0.042	0.050	0.070	0.075
Free-cutting steels, unalloyed case hardened steels, nitriding steels 1.0727 46 S20, 1.0728 60 S20, 1.0757 46SPb20 1.0601 C60, 1.1221 C60E 1.7043 38Cr4 1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5 1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	850-1.200 N/mm²	Slotting	35	0.009	0.012	0.020	0.030	0.035	0.040	0.045	0.060
		Roughing	45	0.011	0.015	0.025	0.035	0.045	0.050	0.060	0.080
		Finishing	60	0.010	0.014	0.021	0.028	0.039	0.042	0.050	0.070
Alloyed heat-treatable, tool and high speed steels 1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2379 X155CrVMo12-1 1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3 Spring steel = 1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4	850-1.400 N/mm²	Slotting	25	0.008	0.010	0.015	0.025	0.032	0.040	0.045	0.060
		Roughing	35	0.010	0.012	0.020	0.030	0.039	0.050	0.060	0.080
		Finishing	50	0.009	0.011	0.015	0.028	0.030	0.042	0.050	0.070
Hardened steel Tool steel, heat-treatable steel, spring steel, high-speed steel, case hardened steel, etc. Z.B.: 1.2344 X40CrMoV5-1; 1.2767 X45NiCrMo4; 1.2379 X155CrVMo12-1 ;1.2080 X210Cr12 1.3343 S 6-5-2	up to 54 HRC	Slotting									
		Roughing									
		Finishing									
	54-60 HRC	Slotting									
		Roughing									
		Finishing									
Stainless steel 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X10CrNiS18-9 USA = 303, 410, 420F, 430, 430F	up to 750 N/mm²	Slotting	30	0.008	0.009	0.018	0.024	0.030	0.036	0.042	0.054
		Roughing	40	0.010	0.011	0.021	0.027	0.036	0.042	0.054	0.060
		Finishing	55	0.009	0.010	0.018	0.024	0.033	0.039	0.048	0.057
Stainless steel 1.4301X5CrNi18-10, 1.4303 X5CrNi18-12 1.4310 XCrNi18-8 USA = 304, 304L, 420	750-850 N/mm²	Slotting	25	0.007	0.009	0.015	0.021	0.027	0.030	0.039	0.048
		Roughing	35	0.009	0.010	0.018	0.024	0.033	0.039	0.048	0.057
		Finishing	50	0.008	0.009	0.018	0.024	0.030	0.036	0.042	0.054
Stainless steel 1.4438 X2CrNiMo18-15-4, 1.4404 X2CrNiMo17-12-2, 1.4571 X6CrNiTi18-10 USA = 310, 316, 316B, 316L, 317	over 850 N/mm²	Slotting	18	0.006	0.007	0.015	0.018	0.024	0.027	0.036	0.042
		Roughing	28	0.008	0.009	0.015	0.021	0.027	0.030	0.039	0.048
		Finishing	36	0.007	0.009	0.015	0.021	0.027	0.030	0.039	0.048
Special alloys (nickel based "Ni") Nimonic, Inconel, Monel, Hastelloy	up to 1.300 N/mm²	Slotting	8	0.006	0.009	0.012	0.015	0.018	0.024	0.030	0.036
		Roughing	10	0.006	0.012	0.018	0.021	0.024	0.033	0.039	0.048
		Finishing	15	0.009	0.015	0.021	0.027	0.030	0.039	0.048	0.072
Titanium alloys ("Ti") 3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7164 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5	up to 1.300 N/mm²	Slotting	18	0.009	0.015	0.021	0.027	0.030	0.039	0.048	0.072
		Roughing	25	0.010	0.018	0.024	0.033	0.039	0.048	0.057	0.084
		Finishing	45	0.010	0.018	0.024	0.033	0.039	0.048	0.057	0.084
Cast iron, grey cast iron, spheroidal graphite and malleable cast iron 0.6010 EN-GL100 (GG10), 0.6020 EN-GJL-200 (GG20), 0.7050 EN-GJS-500-7 (GGG50), 0.8535 EN-GJMW-350-4 (GTW35)	up to 240 HB 30	Slotting	40	0.009	0.012	0.024	0.030	0.039	0.048	0.057	0.066
		Roughing	50	0.011	0.012	0.024	0.033	0.042	0.051	0.060	0.072
		Finishing	60	0.010	0.011	0.021	0.027	0.036	0.042	0.054	0.060
Cast iron, grey cast iron, spheroidal graphite and malleable cast iron 0.6025 EN-GL250 (GG25), 0.6035 EN-GJL-350 (GG35), 0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)	over 240 HB 30	Slotting	30	0.009	0.010	0.018	0.024	0.033	0.039	0.048	0.057
		Roughing	40	0.010	0.012	0.024	0.030	0.039	0.048	0.057	0.066
		Finishing	50	0.010	0.011	0.021	0.027	0.036	0.042	0.054	0.060
Aluminium, Al-wrought alloys, Al-alloys 3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1 3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	up to 3% Si	Slotting	100	0.012	0.014	0.028	0.035	0.046	0.056	0.067	0.077
		Roughing	120	0.012	0.014	0.028	0.039	0.049	0.060	0.070	0.084
		Finishing	160	0.011	0.013	0.025	0.032	0.042	0.049	0.063	0.070
Aluminium-cast alloys 3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9 3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	over 3% Si	Slotting	70	0.011	0.021	0.028	0.039	0.046	0.056	0.067	0.098
		Roughing	90	0.014	0.028	0.035	0.046	0.056	0.067	0.077	0.112
		Finishing	130	0.013	0.025	0.032	0.042	0.049	0.063	0.070	0.105
Magnesium-alloys MgMn2, G-MgAl8Zn1, G-MgAl6Zn3	-	Slotting	65	0.011	0.021	0.028	0.039	0.046	0.056	0.067	0.098
		Roughing	90	0.014	0.028	0.035	0.046	0.056	0.067	0.077	0.112
		Finishing	110	0.013	0.025	0.032	0.042	0.049	0.063	0.070	0.105
Non-ferrous metals (copper, short- or long-chipping brass or bronze) 2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb 2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5 2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10	up to 850 N/mm²	Slotting	60	0.011	0.018	0.025	0.032	0.035	0.046	0.056	0.084
		Roughing	80	0.011	0.021	0.028	0.039	0.046	0.056	0.067	0.098
		Finishing	100	0.011	0.021	0.028	0.039	0.046	0.056	0.067	0.098

All recommendations are valid for coated tools. For bright milling cutters please vc - 40% and fz -25%!

Application recommendations RF 100

Application	Milling cutter type	Type	Helix angle	No. of teeth	Tool illustration	Material to ISO						Slot drilling	Roughing	Finishing	Copying	Page
						P	M	K	N	S	H					
MTC	RF 100 U	N	41/43/45°	3		<1400 N/mm²	all	> 200 HB30	> 5% Si	Ti & Ni		●	●	●		15
HPC	RF 100 U	N	35/38°	4		< 48 HRC	>1000 N/mm²	> 200 HB30		Ti & Ni		●	●	●		27
HPC	RF 100 U (corner radius)	N	35/38°	4		< 48 HRC	all	> 200 HB30				●	●	●	●	34
MTC	RF 100 U/HF	HF	30/32°	4		< 48 HRC	>1000 N/mm²	> 200 HB30				○	●			36
HPC	RF 100 Diver	N	36/38/37°	4		all	all	all	all	Ti & Ni		●	●	●	●	24
HPC	RF 100 F	NH	40/42°	4		<750 N/mm²	<850 N/mm²	< 200 HB30				●	●	●		25
HPC	RF 100 VA	N	36/38°	4		<850 N/mm²	all	< 200 HB30	> 5% Si	Ti & Ni		●	●	●		67
HPC/ HSC	RF 100 VA (ball-nosed)	N	36/38°	4		<850 N/mm²	all	< 200 HB30	> 5% Si	Ti & Ni		●	●	●	●	71
MTC	RF 100 VA/NF	NF	36/38°	4		<750 N/mm²	all					○	●			72
HPC	RF 100 A	W	40/42°	4					> 3% Si			○	●	●		100
HPC	RF 100 A	W	39/40/41°	3					all			●	●	●		93
MTC	RF 100 A/WF	WF	29/30/31°	3					all			○	●			101
HPC/ HSC	RF 100 H	NH	40/42°	4		> 48 HRC					< 62 HRC	●	●	●		52
HPC	RF 100 Ti (corner radius)	N	35/38°	4			<850 N/mm²			Ti & Ni		●	●	●	●	78
HPC/ HSC	RF 100 S/F	NH	45°	5		< 48 HRC	all	all	> 3% Si	Ti & Ni			●	●		44
HPC/ HSC	RF 100 S/F	NH	44/45/46°	6		< 48 HRC	all	all	> 3% Si	Ti & Ni			●	●		45

● = optimal suitability ○ = limited suitability

HPC = maximum metal removal rate; HSC = highest speed; MTC = instable conditions

Chapter Divisions for Material Classification

Within the program pages the optimum tool is offered based on the Material Classification

Application group	Material examples	Chapter
P	Steel, high-alloyed steel	Steel
M	Stainless steel	Stainless
K	Grey iron, spher.graph. iron and malleable cast iron	Steel
N	Aluminium and other non-ferrous metals	Aluminium and Diamond
S	Special-, super- and titanium- alloys	Stainless
H	Hardened steel and chilled cast iron	Steel and radius milling cutters

Application recommendations HPC High performance- & Corner Radius Milling Cutters

Application	Milling cutter type	Type	Helix angle	No. of teeth	Tool illustration	Material to ISO						Slot drilling	Roughing	Finishing	Copying	Page
						P	M	K	N	S	H					
MTC	GH 100 U	NH	45°	3		<1400 N/mm²	all	all	> 3% Si			●	●	○		17
HPC	GA 200 A (corner radius)	W	45°	3					all			●	●	●		103
MTC	RS 100 U	NF	30°	4-5		<1000 N/mm²	all	all	> 5% Si			○	●			39
MTC/ HPC	RS 100 F	NF	45°	5-6		< 48 HRC	<850 N/mm²	> 200 HB30	> 5% Si	Ti & Ni		○	●			40
MTC	GS 100 A	WR	30°	3					all			○	●			107
MTC	GS 100 U	NRf	30°	4-5		< 48 HRC	<850 N/mm²	< 200 HB30	> 5% Si			○	●			41
MTC	GS 100 H	HR	20°	4		>1200 N/mm²		< 300 HB30			< 52 HRC	○	●			55
HPC/ HSC	GH 100 U	NH	45°	6-10		< 48 HRC	all	all						●		47
HPC/ HSC	GH 100 U (corner radius)	NH	45°	6-8		< 48 HRC	all	all	> 3% Si	Ti & Ni				●	●	146
HPC/ HSC	GH 100 H	H	55°	6-8				< 300 HB30			< 62 HRC			●		57
HPC/ HSC	GH 100 H (corner radius)	H	55°	6				< 300 HB30			< 62 HRC			●		145
HPC	CR 100	N	0°	6-14					CFK	CFK		●	●	●		123
MTC	Pilot end mill	N	30°	4		all	all	all	> 5% Si			pilot mil-ling				218
HSC	GF 300 B	H	30°	2		> 48 HRC		< 300 HB30			< 62 HRC				●	163
HSC	GF 300 T	H	30°	4		> 48 HRC		< 300 HB30			< 62 HRC			●	●	147
HSC	GF 500 B	N	30°	2		> 850 N/mm²	all	< 200 HB30		Ti & Ni	< 54 HRC				●	165
HSC	GF 500 T	N	30°	2		> 850 N/mm²	all	< 200 HB30		Ti & Ni	< 54 HRC			●	●	149
HSC	End mills, PCD-tipped	-	0°	2-3					all	CFK	Graphite	●	●	●		128

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Application recommendations Solid Carbide Universal Milling Cutters

Application	Milling cutter type	Type	Helix angle	No. of teeth	Tool illustration	Material to ISO						Slot drilling	Roughing	Finishing	Copying	Page
						P	M	K	N	S	H					
Uni	Slot drills (Aluminium)	W	45°	2					< 3% Si			●	●	●		104
Uni	Slot drills	N	30°	2		< 1000 N/mm²		< 180 HB30				●	○			184
Uni	Slot drills (corner radius)	N	30°	2		< 48 HRC	<850 N/mm²	< 180 HB30	> 3% Si			●	○		●	143
Uni	Slot drills (ball-nosed)	N	30°	2		< 48 HRC	<850 N/mm²	< 180 HB30	> 3% Si						●	154
Uni	Slot drills	N	30°	3		< 1000 N/mm²		< 180 HB30				●	○	○		198
Uni	Slot drills (Mini-slot drills)	N	30°	3		<850 N/mm²	<850 N/mm²			< 850 N/mm²		●	○	○		207
Uni	Slot drills (Mini-slot drills)	NH	45°	3		< 850 N/mm²	all		> 3% Si			●	●	○		209
Uni	End Mills	N	30°	4		< 1000 N/mm²		< 180 HB30						●		210
Uni	End Mills (corner radius)	N	30°	4		< 48 HRC		< 180 HB30						●	●	144
Uni	End Mills (ball-nosed)	N	30°	4		< 48 HRC		< 180 HB30						●	●	157
Uni	Chamfering milling cutters 60°	N	0°	4		< 48 HRC	all	all	> 3% Si					●		180
Uni	Chamfering milling cutters 90°	N	0°	4		< 48 HRC	all	all	> 3% Si					●		181
Uni	Chamfering milling cutters 120°	N	0°	4		< 48 HRC	all	all	> 3% Si					●		182
Uni	Front and back de-burrer		0°	4		< 48 HRC	all	all	> 3% Si							183

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HPC and HSC - milling strategies with solid carbide milling cutters

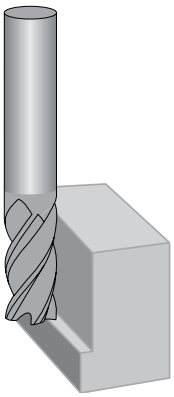
Objectives: Higher efficiency through greater metal removal rate

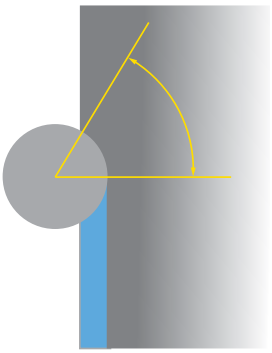
HPC = High Performance Cutting:
max. machining volume / time; stable conditions; short chip creation; high performance; good cooling

Milling with a tool contact angle of less than 70° and cutting depths of 2-3 x tool diameter

imachining, roughing, trochoid

- low cutting width (a_e): <0.4 x d
- high depth of cut (a_p): up to 2-3 x d
- very high tooth feed rate (f_z)
- very high cutting speed (v_c)





Tool Contact Angle

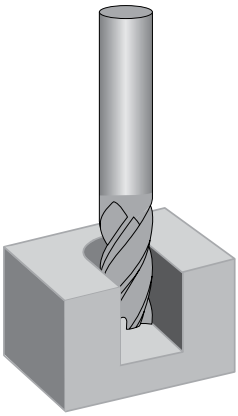
HPC Linear Milling
Milling internal and external contours with high axial depth (a_p) and low radial widths (a_e). Increasing the cutting parameters due to the tool contact angle.

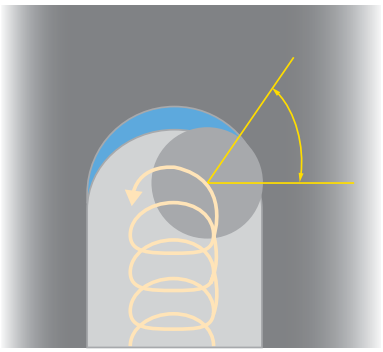
HSC = High Speed Cutting:
at higher cutting speed/ high feed; low power; low feed function

Milling with a tool contact angle of less than 37° and cutting depths up to 3x tool diameter

Semi roughing, finishing and fine-finishing

- minimum cutting width (a_e): 0.15 x d
- high depth of cut (a_p): up to 3 x d
- high tooth feed rate (f_z)
- maximum cutting speed (v_c)





Tool Contact Angle

HPC Milling – Trochoid /imachining
Machining of grooves or complex contours with long lengths (a_p) and small radial depths (a_e). Increasing the cutting parameters due to the limited angle of contact. Programming cycles or CAM-program.

Operating Principals

- reducing the contact time of tool and workpiece results in less stress and greater thermal efficiency on the cutting edge
- the reduction of the pressure angle between the tool and workpiece reduces the average chip thickness
- less force on the tool, workpiece and machine

Benefits

- extreme increase in cutting speed
- significant increase in the feed rate per tooth
- significant increase in the removal rate
- process-reliable for difficult-to-machine materials
- increase in tool life
- machinery is conserved

HPC and HSC milling strategies with solid carbide milling cutters

Benchmarks for increasing the cutting values

Application	Radial feed in% from	* f_z Factor	* v_c Factor	Contact Angle
slotting	100%	1	1	180°
HPC roughing	33%	1,3	1,5	70°
HPC roughing	25%	1,5	1,6	60°
HPC roughing	20%	1,6	1,7	53°
HPC roughing	15%	1,9	1,7	46°
HSC roughing	10%	2,3	1,8	37°
HSC roughing	5%	3,3	1,9	26°
HSC finishing	3%	1,1	2,0	20°
HSC finishing	2%	1,4	2,0	18°
HSC finishing	1%	2,0	2,1	11°
Fine finishing	<1%	1	2	target: min R_z

* Basis for the calculation with the vc and fz factors is provided within the Guhring Navigator section for „grooves“ in the appropriate material group.

Example: steel C45

Tools: Milling cutter Ø12 mm

Feed: Radial feed (a_e) 3 mm

% Calculation : a_e 3 mm = 25% of Ø 12 mm

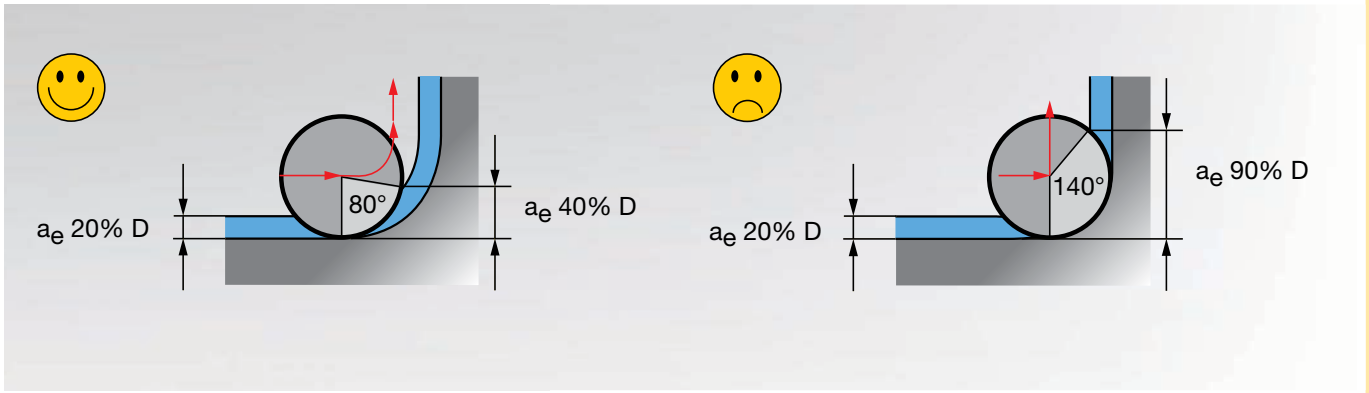
Standardwerte: v_c slotting = 180 m/min, f_z slotting = 0.07 mm

Umrechnung: v_c factor = 1.6 → v_c: 180 m/min x 1,6 = v_c 288 m/min
f_z factor = 1.5 → f_z: 0.07 mm x 1.5 = f_z 0.105

Increased Values: v_c 288 m/min / f_z 0.105 mm
S: 7640 min^{-1} / vf: 4580 mm/min
a_p: 24 mm a_e: 3 mm → Q: 330 cm^3/min

$$Q_{(cm3/min)} = a_p\ (mm) \times a_e\ (mm) \times V_f\ (m/min)$$

The increase in the corner contact angle overloads the milling cutters. Solution: the pocket radius must be much larger than the milling cutter radius to keep the contact angle less than 80° (max load).



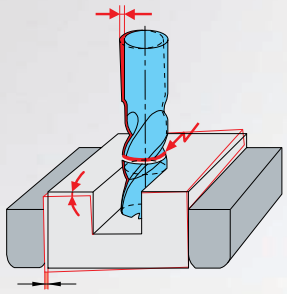
General notes

All the cutting rate recommendations specified in this catalogue are standard values valid exclusively for new tools or tools re-ground to Guhring specifications. Pre-requisites are stable machines, optimal cooling, optimal tool clamping and maximum concentricity of the tool and the machine spindle. Our recommended cutting rates must be reduced if the conditions deviate. The values may also be adjusted to influence surface quality, machining rate or tool life.

1. Workpiece clamping
Loss of tool life or tool breakage through unstable clamping

- improve workpiece clamping

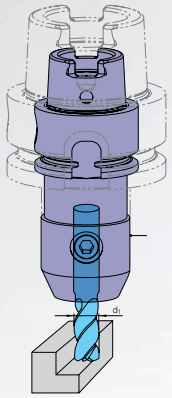
Alternative:
- reduce feed
- reduce cutting width or depth



2. Tool clamping
Loss of tool life or tool breakage through unstable, worn or too small/long/thin tool holder

- apply new or larger tool holder or holder with increased clamping force and increased concentricity

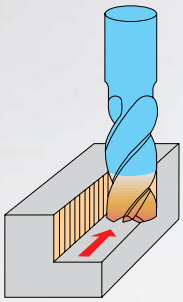
Alternative:
- reduce cutting rates
- reduce clamping length
- apply tool with smaller diameter
- check clamping screws for wear



3. Surface quality
Excessive peak-to-valley height Ra/Rz at the tool surface through excessive feed and feed rates or vibrations

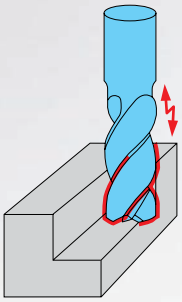
- improve workpiece clamping and tool clamping (see points 1 and 2)

Alternative:
- reduce feed and feed rate
- increase cutting speed



4. Vibrations
High tool wear, insufficient workpiece surface quality and insufficient dimensional accuracy through vibration

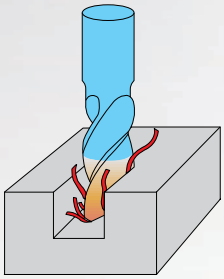
- improve workpiece and tool clamping (see points 1 and 2)
- increase tooth feed, because the chip centre thickness is too small
- modify speed
- modify milling strategy, i.e. select alternative cutting distribution
- change tool selection, i.e. reduce no. of teeth or spiral



5. Chip congestion/cooling
Significant reduction in tool life, crumbling on cutting lips, edge build-up or conglutination of flutes through insufficient chip evacuation

- select milling cutters with internal cooling

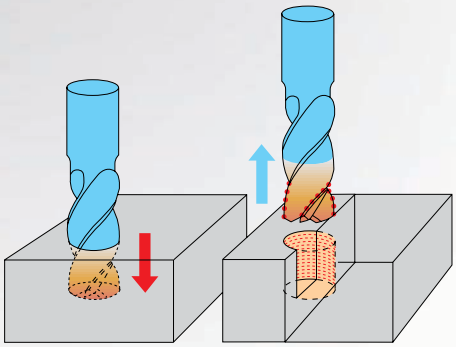
Alternative:
- peripheral cooling via GM 300 chuck
- increase volume flow
- adjust coolant flow
- apply compressed air cooling (according to tool and material)
- reduce feed rate
- modify cutting distribution



6. Pecking when drilling
Significant reduction in tool life as well as crumbling of cutting lips through insufficient chip evacuation and thermal stresses

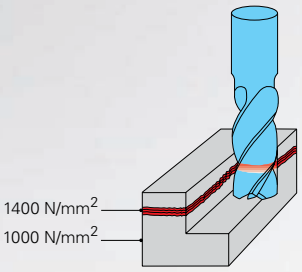
- select milling cutter with internal cooling
- with drilling depths > 0.5 x D pecking in stages

Alternative:
- peripheral cooling via GM 300 chuck
- increase volume flow
- adjust coolant flow
- reduce feed rate

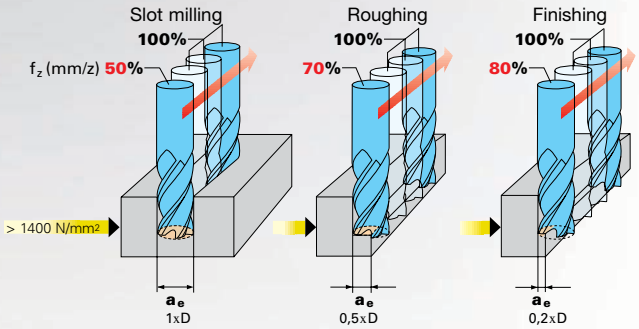


7. Thermal influence on materials
Through welding or torch cutting, the material characteristics at the parting line do not correspond with the specified material class

- reduce cutting rates
- select tool for materials with a higher tensile strength



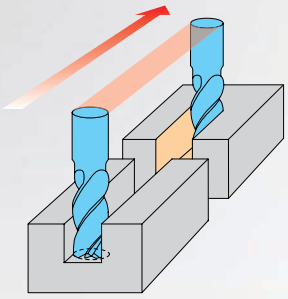
8. Entry in hardened materials
For entering materials over 1400 N/mm² (44HRC), reduce the feed rate vf (mm/min) in accordance with the illustration on the right



9. Loss in tool life with interrupted cutting

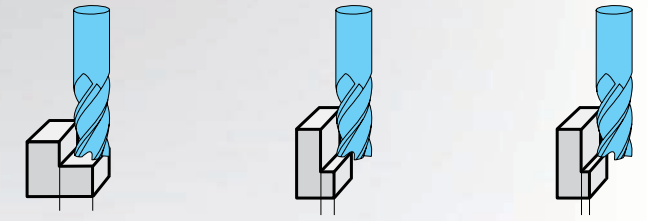
Significant loss in tool life through interrupted cutting (especially with milling angles of 90°)

- modify cutting distribution
- reduce feed rate for entry and exit
- reduce approach angle



10. Feed rate adjustment: Modifying the cutting width

- when modifying the cutting width a_e, the feed rate must be reduced in accordance with the illustration on the right
- cutting speed or revolutions remain unchanged
- double reduction applies when also modifying the cutting depth a_p!



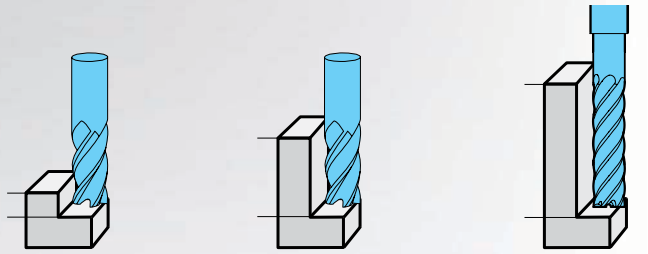
$a_e = 1 \times D$
$f_z = 25\ \%$

$a_e = 0{,}5 \times D$
$f_z = 50\ \%$

$a_e = 0{,}25 \times D$
$f_z = 100\ \%$

11. Feed rate adjustment: Modifying the cutting depth

- when modifying the cutting depth a_p, the feed rate must be reduced in accordance with the illustration on the right
- cutting speed or revolutions remain unchanged up to cutting depths of 3 x D, must only be adapted over 3 x D
- double reduction applies when also modifying the cutting width a_e!



$a_p = 1 \times D$
$f_z = 100\ \%$

$a_p = 2 \times D$
$f_z = 50\ \%$

$a_p = 3 \times D$
$f_z = 25\ \%$

12. Plunging strategies
for drilling:

- reduce feed rate v_f (mm/min.)
- additional pecking for drilling depths > 0.5 x D or transition to radial machining

Attention: Danger of breakage through abrupt load increase!

Oblique plunging up to 15° (preferred):

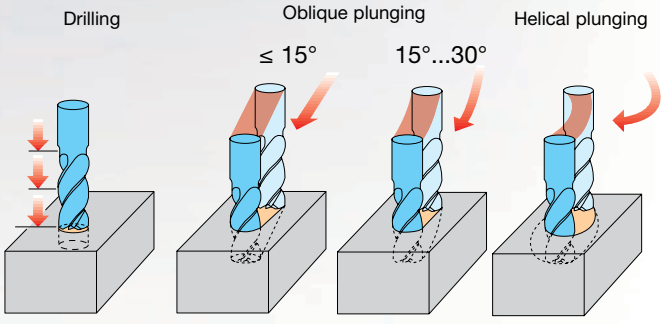
- reduction in feed rate v_f (mm/min.) not required

Oblique plunging between 15° and 30°:

- reduce feed rate v_f (mm/min.) in accordance with the illustration on the right

Helical plunging:

- for helical plunging on a milling cycle, we recommend a feed of 0.1 to 0.2 per cycle
- reduce feed rate v_f (mm/min.) in accordance with the illustration on the right
- select preferred hole diameter 1.8 x D



90°
f_z -70 %

≤ 15°
f_z = 100 %

15°...30°
f_z -30 %

f_z -15 %

13. HSC milling with ball nosed copy milling cutters

HSC = High Speed Cutting:

Milling operations with very low metal removal but with consideration of the effective tool diameter.

3D machining with ball or Torus milling.

- **low cutting width (a_e)**
- **low cutting depth (a_p)**
- **high feed rate per tooth (f_z)**
- **very high cutting speed (V_c)**

Function and Advantages

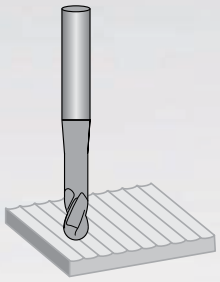
Calculation of the effective tool diameter

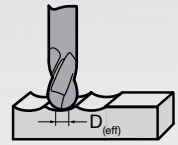
- adjusting speed to effective tool diameter
- Increasing the overall feed rate
- Improving the surface quality

Consideration of the pressure angle / width

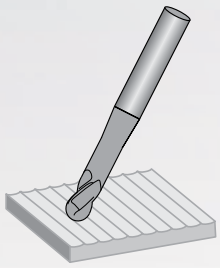
- adjusting the tooth feed to achieve the required surface quality

At cutting depths a_p <0.2xD the actual engaged effective diameter $D_{(eff)}$ must be used to calculate the speed. It is derived from the graphic below with the spindle not engaged. To increase the tool life, we recommend machining with a tilted spindle.



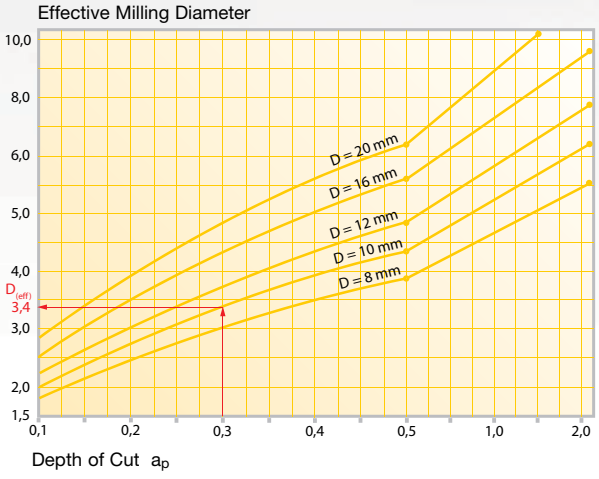


$$D_{(eff)} = 2 \cdot \sqrt{D \cdot a_p - a_p^2}$$



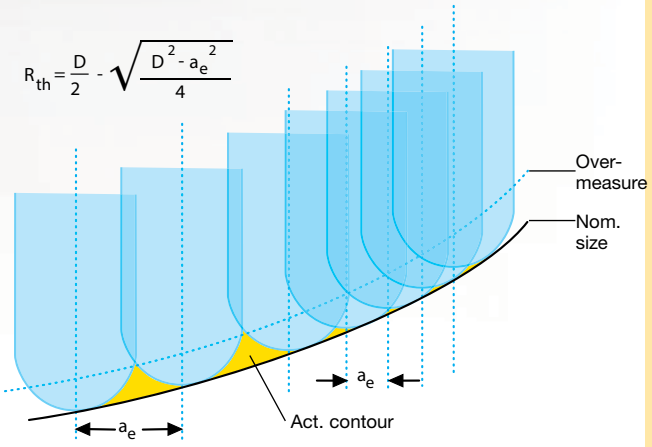
The ball-nosed milling cutter is perpendicular to the machining surface. In the centre of the tool is the cutting speed = 0 .
Tool life and surface quality are not optimal.

The ball-nosed milling cutter is oblique to the machining surface. The centre of the tool is not engaged.
Tool life and surface quality are improved.



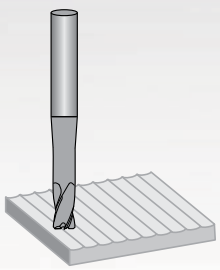
Example: For a full copy milling radius Ø 10 mm and a depth of cut a_p of 0.3 mm results in an effective diameter $D_{(eff)}$ = 3.4 mm
This $D_{(eff)}$ shall be used to calculate the cutting speed V_c

$$R_{th} = \frac{D}{2} - \sqrt{\frac{D^2 - a_e^2}{4}}$$



The reduction of the cutting width, ae. leads to an improvement of the surface quality of the workpiece (reduced peak-to-valley height).

14. HSC milling with corner radius - copy milling cutters / Torus milling

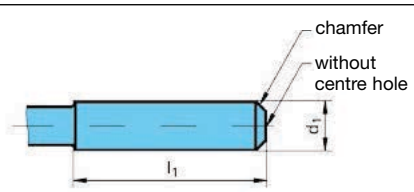


HSC milling & Torus milling

3D-machining with Torus milling cutters. Engagement of the tool predominantly on the corner radius. Improves the surface quality and the tool life. Of advantage when 3D-machining flat contour areas on 3-axis machines.

Carbide straight shanks DIN 6535 for twist drills and end mills (extract)

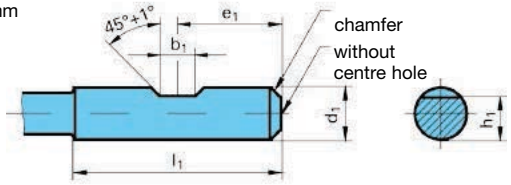
Form HA, plain
Dimensions in mm



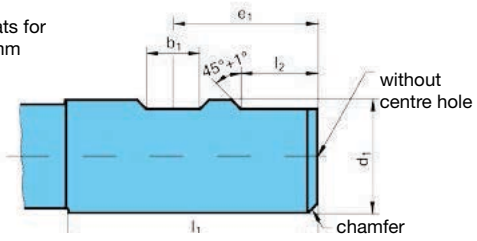
d_1 h6	l_1 +2 0	d_1 h6	l_1 +2 0	d_1 h6	l_1 +2 0
2	28	8	36	18	48
3	28	10	40	20	50
4	28	12	45	25	56
5	28	14	45	32	60
6	36	16	48		

Form HB, with drive flat
Dimensions in mm

with **one** drive flat for d_1 = 6 and 20 mm



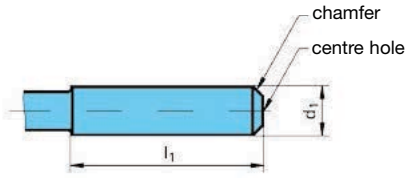
with **two** drive flats for d_1 = 25 and 32 mm



d_1 h6	b_1 +0.05 0	e_1 0 -1	h_1 h11	l_1 +2 0	l_2 +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	–
25	12	32	23	56	17
32	14	36	30	60	19

High speed steel straight shanks, DIN 1835-1 (extract)

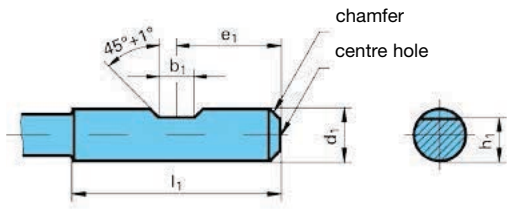
Form A, plain
Dimensions in mm



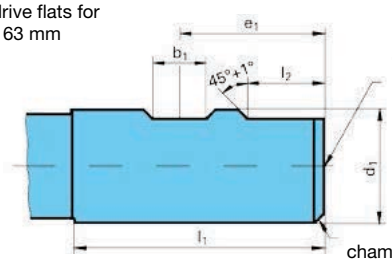
d_1 h8	l_1 +2 0	d_1 h8	l_1 +2 0	d_1 h8	l_1 +2 0
3	28	10	40	32	60
4	28	12	45	40	70
5	28	16	48	50	60
6	36	20	50	63	90
8	36	25	56		

Form B, with drive flat
Dimensions in mm

with one drive flat for d_1 = 6 ... 20 mm



with two drive flats for d_1 = 25 ... 63 mm



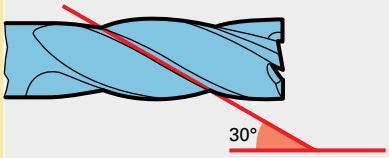
d_1 h6	b_1 +0.05 0	e_1 0 -1	h_1 h13	l_1 +2 0	l_2 +1 0	centre hole form R DIN 332 sect. 1
6	4.2	18	4.8	36	-	1.6x2.5
8	5.5	18	6.6	36	-	1.6x3.35
10	7	20	8.4	40	-	1.6x3.35
12	8	22.5	10.4	45	-	1.6x3.35
16	10	24	14.2	48	-	2.0x4.25
20	11	25	18.2	50	-	2.5x5.3
25	12	32	23	56	17	2.5x5.3
32	14	36	30	60	19	3.15x6.7
40	14	40	38	70	19	3.15x6.7
50	18	45	47.8	80	23	3.15x6.7
63	18	50	60.8	90	23	3.15x6.7

Comparsion of Hardness

Tens. strength (N/mm^2)	HRC	HB30	HV10
240		71	75
255		76	80
270		81	85
285		86	90
305		90	95
320		95	100
335		100	105
350		105	110
370		109	115
385		114	120
400		119	125
415		124	130
430		128	135
450		133	140
465		138	145
480		143	150
495		147	155
510		152	160
530		157	165
545		162	170
560		166	175
575		171	180
595		176	185
610		181	190
625		185	195
640		190	200
660		195	205
675		199	210
690		204	215
705		209	220
720		214	225
740		219	230
755		223	235
770		228	240
785		233	245
800	22	238	250
820	23	242	255
835	24	247	260
860	25	255	268
870	26	258	272
900	27	266	280
920	28	273	287
940	29	278	293
970	30	287	302
995	31	295	310
1020	32	301	317
1050	33	311	327
1080	34	319	336
1110	35	328	345
1140	36	337	355
1170	37	346	364

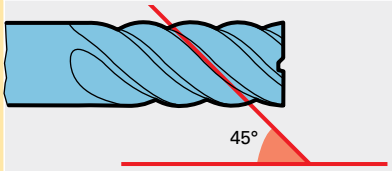
Tens. strength (N/mm^2)	HRC	HB30	HV10
1200	38	354	373
1230	39	363	382
1260	40	372	392
1300	41	383	403
1330	42	393	413
1360	43	402	423
1400	44	413	434
1440	45	424	446
1480	46	435	458
1530	47	449	473
1570	48	460	484
1620	49	472	497
1680	50	488	514
1730	51	501	527
1790	52	517	544
1845	53	532	560
1910	54	549	578
1980	55	567	596
2050	56	584	615
2140	57	607	639
2180	58	622	655
	59		675
	60		698
	61		720
	62		745
	63		773
	64		800
	65		829
	66		864
	67		900
	68		940

Milling cutter types and their primary fields of application



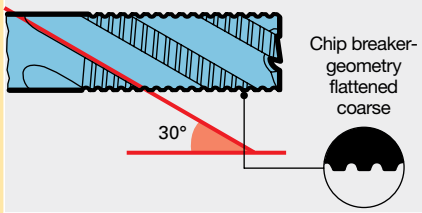
Type N

Quick spiral with 30° helical pitch, suitable for finish milling structural, case hardened and heat-treatable steels as well as short-chipping non-ferrous metals and materials up to
- 1200 N/mm² tensile strength applying high speed steel milling cutters
- 1600 N/mm² tensile strength applying solid carbide milling cutters



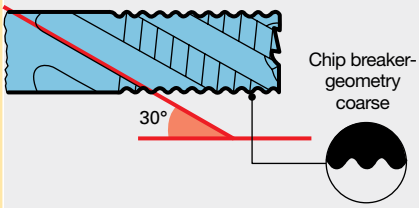
Type NH

Quick spiral with high 45° helical pitch, suitable for super fine finishing high-alloyed materials and grey cast iron up to appr.
- 1600 N/mm² tensile strength



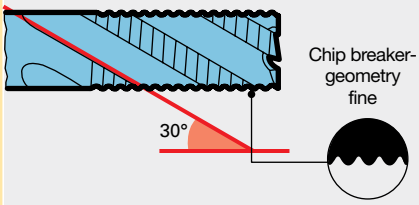
Type NF

Flat knuckle-type teeth/quick spiral, produces short chips and improved smoother surface quality in comparison to type NR or NRf. Suitable for milling standard materials up to appr.
- 1200 N/mm² tensile strength applying high speed steel milling cutters
- 1600 N/mm² tensile strength applying solid carbide milling cutters



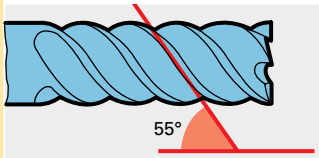
Type NR

Standard knuckle-type teeth, produces short chips and good chip evacuation. Suitable for milling standard materials up to appr.
- 1000 N/mm² tensile strength applying high speed steel milling cutters
- 1200 N/mm² tensile strength applying solid carbide milling cutters



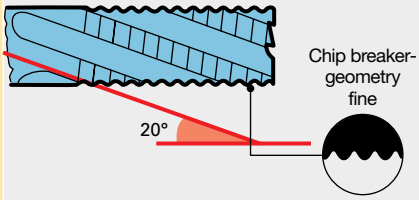
Type NRf

Fine knuckle-type teeth, produces short chips and good chip evacuation. Better feed rates possible than with type NR. Suitable for milling materials with a high tensile strength up to appr.
- 1400 N/mm² tensile strength applying high speed steel milling cutters
- 1600 N/mm² tensile strength applying solid carbide milling cutters



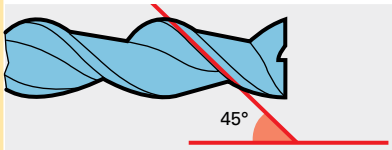
Type H

Quick spiral with high 55° helical pitch, suitable for super-fine finishing as well as HSC* machining of all hardened materials and chilled cast iron up to appr.
- 62 HRC hardness



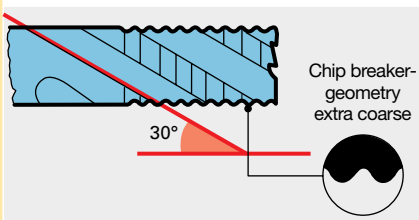
Type HR

Fine knuckle-type teeth, produces short chips with good chip evacuation. Suitable for milling hardened materials as well as grey and chilled cast iron with up to appr.
- 56 HRC hardness



Type W

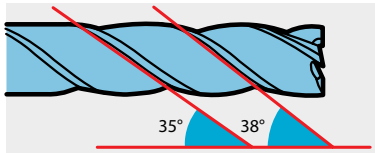
Quick spiral with 45° helical pitch, suitable for finish milling soft materials such as aluminium, Al-alloys and non-ferrous metals up to appr.
- 600 N/mm² tensile strength



Type WR

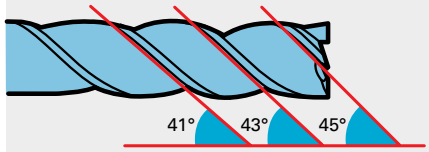
Coarse knuckle-type teeth, produces short chips with good chip evacuation. Suitable for milling aluminium, non-ferrous metals as well as soft steels up to appr.
- 600 N/mm² tensile strength.

Milling cutter types and their primary fields of application



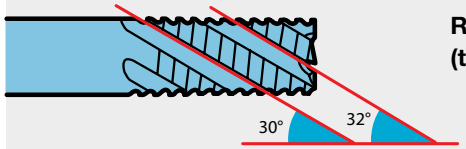
RF 100 U (type N)

35°/38° helix. Suitable for slotting, roughing and finishing steel, high-alloyed steel and hardened steel up to
• 1600 N/mm² tensile strength (48 HRC)



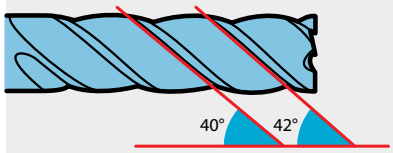
RF 100 U (type NH) 3-fluted

41°/43°/45° helix. Suitable for slotting, roughing and finishing steel, high-alloyed steel and stainless steel up to
• 1400 N/mm² tensile strength (44 HRC)
3-fluted suitable for extreme cutting depths



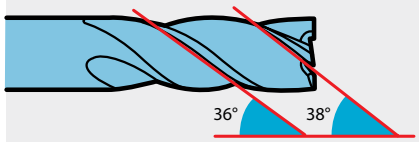
RF 100 U/HF (type HF)

30°/32° helix and roughing and finishing geometry. Suitable for slotting and roughing with large cutting widths and depths in steel, high-alloyed steel and hardened steel up to
• 1600 N/mm² tensile strength (48 HRC)



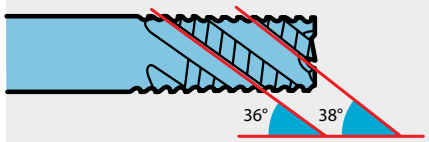
RF 100 F (type NH)

40°/42° helix. Suitable for slotting, roughing and finishing as well as HPC-milling/imachining tough steels as well as other long-chipping materials up to
• 850 N/mm² tensile strength (25 HRC)



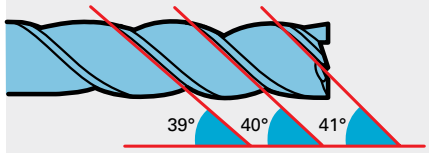
RF 100 VA (type N)

36°/38° helix. Suitable for slotting, roughing and finishing VA steels and stainless materials



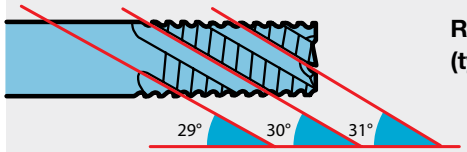
RF 100 VA/NF (type NF)

36°/38° helix and roughing and finishing geometry. Suitable for slotting and roughing VA steels and stainless materials



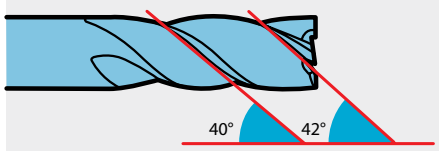
RF 100 A (type W)

39°/40°/41° helix. Suitable for slotting, roughing and finishing aluminium and Al-alloys as well as long-chipping materials and non-ferrous metals



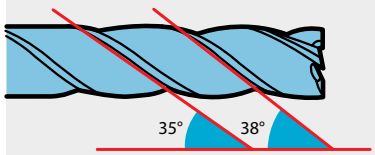
RF 100 A/WF (type WF)

29°/30°/31° helix and roughing and finishing geometry. Suitable for slotting and roughing aluminium and Al-alloys



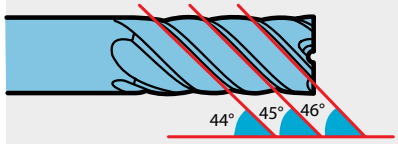
RF 100 H (type H)

40°/42° helix and progressive core diameter. Suitable for roughing up to 1xD in materials up to 54 HRC, for finishing over the entire cutting edge length in materials over 63 HRC. With HPC strategy suitable for roughing materials > 63 HRC.



RF 100 Ti (type N)

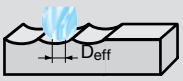
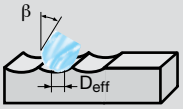
35°/38° helix with corner radius. Suitable for slotting and roughing of titanium alloys as well as difficult-to-cut alloys



RF 100 SF (type NH)

44°/45°/46° helix. Suitable for HSC super fine finishing for semi-roughing with feed widths up to max. 0.3xD and HPC roughing over the entire cutting edge length for standard steels, c ast iron, non-ferrous metals and high-alloyed materials

Formulae

Symbol	Description	metric	Formula
z	No. of teeth		
D	Milling cutter diameter	mm	
a_p	Depth of cut	mm	
a_e	Width of cut	mm	
l_f	Milling length	mm	
n	Revolution per min.	U/min	$n = \frac{v_c \cdot 1000}{\pi \cdot D}$
v_c	Cutting speed	m/min	$v_c = \frac{\pi \cdot D \cdot n}{1000}$
v_f	Feed per min.	mm	$v_f = n \cdot z \cdot f_z$
f_z	Feed per tooth	mm	$f_z = \frac{v_f}{n \cdot z}$
f/U	Feed per revolution	mm	$f/U = \frac{v_f}{n}$
f/U	Feed per revolution	mm	$f/U = f_z \cdot z$
Q	Chip volume	cm^3/min	$Q = \frac{a_p \cdot a_e \cdot v_f}{1000}$
T	Milling time	min	$T = \frac{l_f}{v_f}$
hm	Average chip thickness	mm	$hm = fz \cdot \sqrt{\frac{a_e}{D}}$
$D_{(eff)}$	Effective diameter 	mm	$D_{(eff)} = 2 \cdot \sqrt{D \cdot a_p - a_p^2}$
	Effective diameter with approach angle 	mm	$D_{(eff)} = D \cdot \sin\left[\beta + \arccos\left(\frac{D - 2a_p}{D}\right)\right]$
R_{th}	Peak-to-valley height	mm	$R_{th} = \frac{D}{2} = \sqrt{\frac{D^2 - a_e^2}{4}}$
Z_b	Optimal step over for torus milling	mm	$Z_b = \frac{D - 2 \times R}{2}$

Questionnaire special milling cutters

Customer number | New cust. | RFQ/P.O. Number

Company | Contact

Street | Postcode | Contact at Guhring

Telephone | Fax

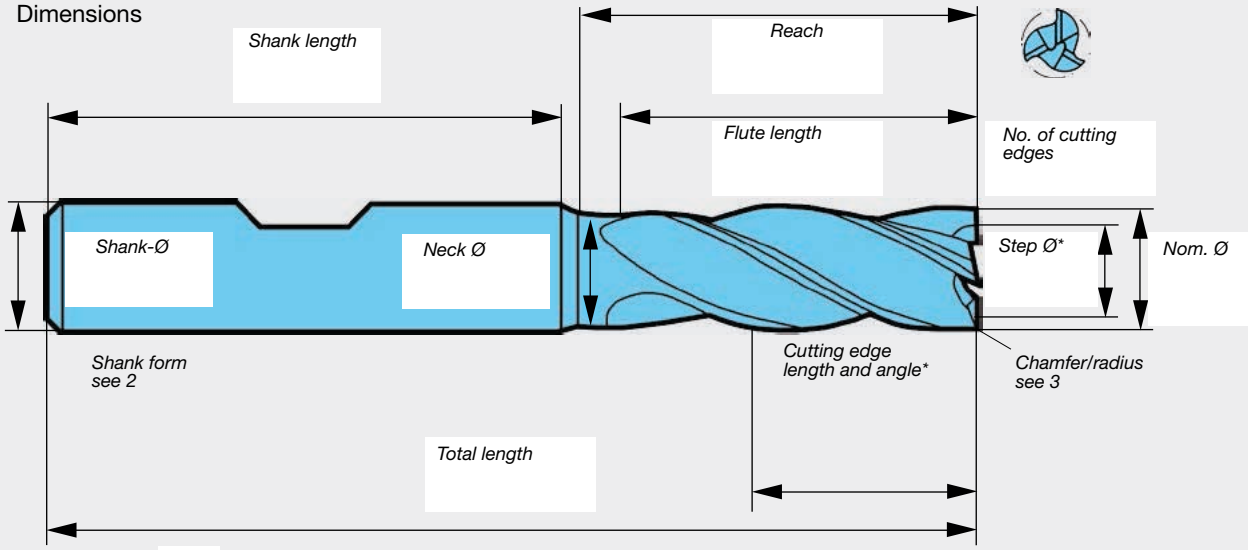
Date | Signature

❑ Enquiry ❑ Order

(Please enter the required parameters into the boxes)

Reference tool / basic tool (Art.-No.)

1 Dimensions

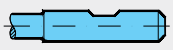


❑ with internal cooling

* only with step milling cutters

2 Shank form

❑ Plain shank 

❑ Flatted shank 

❑ Whistle Notch 

3 Chamfer/ radius

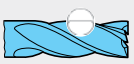
❑ Chamfer 

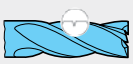
❑ Corner radius 

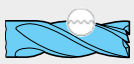
❑ Ball nose 

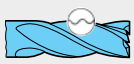
Size

4 Geometry

❑ Type N, W, H 

❑ Type NF 

❑ Type NRf, HR 

❑ Type WR 

5 Material Coating

❑ Solid carbide ❑ HSS M42 ❑ HSS-PM ❑ other: _____

❑ Bright ❑ SuperA-coated ❑ A-coated ❑ FIRE-coated

6 Operation

❑ Slotting 

❑ Roughing 

❑ Finishing 

❑ Tracing

Depth of cut: _____

Width of cut: _____

7 Application

Workpiece material:

Hardness:

8 Required quantity:

Solid carbide HPC high performance milling cutters

Standard Ratio end mills RF 100 U (3-fluted) centre cutting

Helix	Z	Length	Feed	Shank design	Tool illustration	Tool material	Surface finish	Guhring no.	Discount group	Page
41° 43° 45°	3			HA		Solid carbide	FIRE	3893	106	15
41° 43° 45°	3			HB		Solid carbide	FIRE	3894	106	15
41° 43° 45°	3			HA		Solid carbide	FIRE	3891	106	16
41° 43° 45°	3			HB		Solid carbide	FIRE	3892	106	16

Slot drills GH 100 U (3-fluted) centre cutting

Helix	Z	Length	Feed	Shank design	Tool illustration	Tool material	Surface finish	Guhring no.	Discount group	Page
45°	3			HA		Solid carbide	bright	3203	106	17
45°	3			HA		Solid carbide	FIRE	3741	106	17
45°	3			HA		Solid carbide	bright	3193	106	19
45°	3			HA		Solid carbide	FIRE	3540	106	19
45°	3			HB		Solid carbide	FIRE	3729	106	20
45°	3			HA		Solid carbide	bright	3196	106	21
45°	3			HA		Solid carbide	FIRE	3636	106	21
45°	3			HB		Solid carbide	FIRE	3730	106	22

Ratio end mills RF 100 DIVER centre cutting

Helix	Z	Length	Feed	Shank design	Tool illustration	Tool material	Surface finish	Guhring no.	Discount group	Page
36° 38° 37°	4			HA		Solid carbide	Signum	6737	106	24
36° 38° 37°	4			HB		Solid carbide	Signum	6736	106	24

Solid carbide HPC high performance milling cutters

Ratio end mills RF 100 F centre cutting

Helix	Z	Length	Feed	Shank design	Tool illustration	Tool material	Surface finish	Guhring no.	Discount group	Page
40° 42°	4			HA		Solid carbide	FIRE	3629	106	25
40° 42°	4			HB		Solid carbide	FIRE	3630	106	25
40° 42°	4			HB		Solid carbide	FIRE	3366	106	26

Standard Ratio end mills RF 100 U centre cutting

Helix	Z	Length	Feed	Shank design	Tool illustration	Tool material	Surface finish	Guhring no.	Discount group	Page
35° 38°	4			HA		Solid carbide	FIRE	6706	106	27
35° 38°	4			HB		Solid carbide	FIRE	3731	106	27
35° 38°	4			HB		Solid carbide	bright	3200	106	28
35° 38°	4			HA		Solid carbide	FIRE	3736	106	29
35° 38°	4			HB		Solid carbide	FIRE	3732	106	29
35° 38°	4			HA		Solid carbide	bright	3208	106	30
35° 38°	4			HB		Solid carbide	bright	3201	106	30
35° 38°	4			HA		Solid carbide	FIRE	3837	106	31
35° 38°	4			HB		Solid carbide	FIRE	3838	106	31
35° 38°	4	3xD		HA		Solid carbide	FIRE	3839	106	32
35° 38°	4	3xD		HB		Solid carbide	FIRE	3871	106	32
35° 38°	4			~HA		Solid carbide	bright	3209	106	33
35° 38°	4			~HA		Solid carbide	FIRE	3627	106	33

Solid carbide HPC high performance milling cutters

Standard Ratio end mills RF 100 U centre cutting

Helix	Z	Length	Feed	Shank design	Tool illustration	Tool material	Surface finish	Guhring no.	Discount group	Page
35° 38°	4			HA		Solid carbide	FIRE	3872	106	34
35° 38°	4			HB		Solid carbide	FIRE	3873	106	34
30° 32°	4			HA		Solid carbide	FIRE	3507	106	36
30° 32°	4			HB		Solid carbide	FIRE	3508	106	36
30° 32°	4	3xD		HA		Solid carbide	FIRE	3509	106	37
30° 32°	4	3xD		HB		Solid carbide	FIRE	3522	106	37
30° 32°	4			~HA		Solid carbide	FIRE	3598	106	38
30° 32°	4			~HB		Solid carbide	FIRE	3600	106	38

High-performance roughing end mills RS 100 U centre cutting

Helix	Z	Length	Feed	Shank design	Tool illustration	Tool material	Surface finish	Guhring no.	Discount group	Page
30°	4-5			HA		Solid carbide	FIRE	3887	106	39
30°	4-5			HB		Solid carbide	FIRE	3888	106	39

High-performance roughing end mills RS 100 F centre cutting

Helix	Z	Length	Feed	Shank design	Tool illustration	Tool material	Surface finish	Guhring no.	Discount group	Page
45°	5-6			HA		Solid carbide	FIRE	3889	106	40
45°	5-6			HB		Solid carbide	FIRE	3890	106	40

Roughing end mills GS 100 U (fine teeth) centre cutting

Helix	Z	Length	Feed	Shank design	Tool illustration	Tool material	Surface finish	Guhring no.	Discount group	Page
30°	4-5			HB		Solid carbide	bright	3204	117	41
30°	4-5			HB		Solid carbide	FIRE	3723	117	41

Solid carbide HPC high performance milling cutters

Helix	Z	Length	Feed	Shank design	Tool illustration	Tool material	Surface finish	Guhring no.	Dis-count group	Page
Roughing end mills GS 100 U (fine teeth) centre cutting										
30°	4			HB		Solid carbide	FIRE	**3365**	106	42
Ratio end mills Superfinish RF 100 SF centre cutting										
45°	5			HA		Solid carbide	FIRE	**6709**	106	44
45°	5			HB		Solid carbide	FIRE	**6710**	106	44
44° 45° 46°	6			HA		Solid carbide	FIRE	**3631**	106	45
44° 45° 46°	6			HB		Solid carbide	FIRE	**3632**	106	45
45°	5	3xD		HA		Solid carbide	FIRE	**3897**	106	46
45°	5	3xD		HB		Solid carbide	FIRE	**3898**	106	46
Multi-tooth end mills GH 100 U centre cutting										
45°	6+			HA		Solid carbide	bright	**3311**	106	47
45°	6+			HA		Solid carbide	FIRE	**3689**	106	47
45°	6+			HB		Solid carbide	FIRE	**3047**	106	48
45°	6+			HA		Solid carbide	bright	**3312**	106	49
45°	6+			HA		Solid carbide	FIRE	**3691**	106	49
45°	6+			HB		Solid carbide	bright	**3313**	106	50
45°	6+			HB		Solid carbide	FIRE	**3693**	106	50

Solid carbide HPC high performance milling cutters

Helix	Z	Length	Feed	Shank design	Tool illustration	Tool material	Surface finish	Guhring no.	Discount group	Page
Ratio end mills RF 100 H centre cutting										
40° 42°	4			HA		Solid carbide	Signum	**3895**	106	52
40° 42°	4			HB		Solid carbide	Signum	**3896**	106	52
Hard profile cutters with Torus grind GF 300 T centre cutting										
30°	4			HA		Solid carbide	Signum	**3361**	106	53
30°	4			HA		Solid carbide	Signum	**3362**	106	54
Hard roughing end mills GS 100 H (fine teeth) centre cutting										
20°	4			HA		Solid carbide	Signum	**6704**	106	55
20°	4			HB		Solid carbide	Signum	**6705**	106	55
20°	4			HB		Solid carbide	Signum	**3682**	117	56
Hard multi-tooth end mills GH 100 H centre cutting										
55°	6+			HA		Solid carbide	Signum	**3715**	106	57
55°	6+			HA		Solid carbide	Signum	**3716**	106	58

Helix	Z	Length	Feed	Shank design	Tool illustration	Tool material	Surface finish	Guhring no.	Discount group	Page
Standard Ratio end mills RF 100 U (3-fluted) centre cutting										
41° 43° 45°	3			HA		Solid carbide	FIRE	**3893**	106	64
41° 43° 45°	3			HB		Solid carbide	FIRE	**3894**	106	64
41° 43° 45°	3			HA		Solid carbide	FIRE	**3891**	106	65
41° 43° 45°	3			HB		Solid carbide	FIRE	**3892**	106	65
Ratio end mills RF 100 VA centre cutting										
36° 38°	4			HA		Solid carbide	TiAlN-nanoA	**3804**	106	67
36° 38°	4			HB		Solid carbide	TiAlN-nanoA	**3805**	106	67
36° 38°	4			HA		Solid carbide	TiAlN-nanoA	**3800**	106	68
36° 38°	4			HB		Solid carbide	TiAlN-nanoA	**3803**	106	68
36° 38°	4			HA		Solid carbide	TiAlN-nanoA	**6700**	106	69
36° 38°	4			HB		Solid carbide	TiAlN-nanoA	**6701**	106	69
36° 38°	4			HA		Solid carbide	TiAlN-nanoA	**3806**	106	70
36° 38°	4			HB		Solid carbide	TiAlN-nanoA	**3807**	106	70
36° 38°	4			HA		Solid carbide	TiAlN-nanoA	**6707**	106	71
36° 38°	4			HB		Solid carbide	TiAlN-nanoA	**6708**	106	71
36° 38°	4			HA		Solid carbide	TiAlN-nanoA	**3696**	106	72
36° 38°	4			HB		Solid carbide	TiAlN-nanoA	**3718**	106	72

Solid carbide HPC high performance milling cutters

Helix	Z	Length	Feed	Shank design	Tool illustration	Tool material	Surface finish	Guhring no.	Discount group	Page
Ratio end mills RF 100 VA centre cutting										
36° 38°	4			HA		Solid carbide	TiAlN-nanoA	**3733**	106	73
36° 38°	4			HB		Solid carbide	TiAlN-nanoA	**3885**	106	73
Ratio end mills RF 100 DIVER centre cutting										
36° 38° 37°	4			HA		Solid carbide	Signum	**6737**	106	74
36° 38° 37°	4			HB		Solid carbide	Signum	**6736**	106	74
Ratio end mills RF 100 F centre cutting										
40° 42°	4			HA		Solid carbide	FIRE	**3629**	106	75
40° 42°	4			HB		Solid carbide	FIRE	**3630**	106	75
40° 42°	4			HB		Solid carbide	FIRE	**3366**	106	76
Ratio end mills RF 100 Ti centre cutting										
35° 38°	4			HA		Solid carbide	TiAlN-SuperA	**3498**	106	78
35° 38°	4			HB		Solid carbide	TiAlN-SuperA	**3499**	106	78
High-performance roughing end mills RS 100 U centre cutting										
30°	4-5			HA		Solid carbide	FIRE	**3887**	106	80
30°	4-5			HB		Solid carbide	FIRE	**3888**	106	80
Roughing end mills GS 100 U (fine teeth) centre cutting										
30°	4-5			HB		Solid carbide	bright	**3204**	117	81

Helix	Z	Length	Feed	Shank design	Tool illustration	Tool material	Surface finish	Guhring no.	Dis-count group	Page
Roughing end mills GS 100 U (fine teeth) centre cutting										
30°	4-5			HB		Solid carbide	FIRE	**3723**	117	81
30°	4			HB		Solid carbide	FIRE	**3365**	106	82
Ratio end mills Superfinish RF 100 SF centre cutting										
45°	5			HA		Solid carbide	FIRE	**6709**	106	84
45°	5			HB		Solid carbide	FIRE	**6710**	106	84
44° 45° 46°	6			HA		Solid carbide	FIRE	**3631**	106	85
44° 45° 46°	6			HB		Solid carbide	FIRE	**3632**	106	85
45°	5	3xD		HA		Solid carbide	FIRE	**3897**	106	86
45°	5	3xD		HB		Solid carbide	FIRE	**3898**	106	86

Solid carbide HPC high performance milling cutters

Ratio end mills Alu RF 100 A centre cutting

Helix	Z	Length	Feed	Shank design	Tool illustration	Tool material	Surface finish	Guhring no.	Discount group	Page
39° 40° 41°	3			HA		Solid carbide	bright	**3472**	106	93
39° 40° 41°	3			HB		Solid carbide	bright	**6702**	106	93
39° 40° 41°	3			HA		Solid carbide	bright	**3599**	106	94
39° 40° 41°	3			HB		Solid carbide	bright	**6729**	106	94
39° 40° 41°	3			HA		Solid carbide	bright	**3473**	106	96
39° 40° 41°	3			HB		Solid carbide	bright	**6703**	106	96
39° 40° 41°	3	3xD		HA		Solid carbide	bright	**6730**	106	97
39° 40° 41°	3	3xD		HB		Solid carbide	bright	**6731**	106	97
39° 40° 41°	3	4xD		HA		Solid carbide	bright	**6732**	106	98
39° 40° 41°	3	4xD		HB		Solid carbide	bright	**6733**	106	98
39° 40° 41°	3	5xD		HA		Solid carbide	bright	**6734**	106	99
39° 40° 41°	3	5xD		HB		Solid carbide	bright	**6735**	106	99
40° 42°	4			HA		Solid carbide	bright	**3202**	106	100
40° 42°	4			HB		Solid carbide	bright	**3319**	106	100
30° 29° 31°	3			HA		Solid carbide	bright	**3468**	106	101
30° 29° 31°	3			HB		Solid carbide	bright	**3469**	106	101
30° 29° 31°	3			HA		Solid carbide	bright	**3470**	106	102

Helix	Z	Length	Feed	Shank design	Tool illustration	Tool material	Surface finish	Guhring no.	Dis-count group	Page
Ratio end mills Alu RF 100 A centre cutting										
30° 29° 31°	3			HB		Solid carbide	bright	**3471**	106	102
Slot drills GA 200 A (3-fluted) centre cutting										
45°	3			HA		Solid carbide	bright	**3367**	106	103
Al slot drills (2-fluted) centre cutting										
45°	2			HA		Solid carbide	bright	**3310**	117	104
45°	2			HB		Solid carbide	bright	**3126**	117	104
45°	2			HA		Solid carbide	bright	**3309**	117	105
45°	2			HB		Solid carbide	bright	**3059**	117	105
XL Al slot drills (2-fluted) centre cutting										
45°	2			HA		Solid carbide	bright	**3358**	117	106
Roughing end mills GS 100 A (coarse teeth) centre cutting										
30°	3			HB		Solid carbide	bright	**3364**	106	107
30°	3			HB		Solid carbide	bright	**3127**	117	107
Ratio end mills Superfinish RF 100 SF centre cutting										
45°	5			HA		Solid carbide	FIRE	**6709**	106	108
45°	5			HB		Solid carbide	FIRE	**6710**	106	108
44° 45° 46°	6			HA		Solid carbide	FIRE	**3631**	106	109

Solid carbide HPC high performance milling cutters

Helix	Z	Length	Feed	Shank design	Tool illustration	Tool material	Surface finish	Guhring no.	Dis-count group	Page
Ratio end mills Superfinish RF 100 SF centre cutting										
44° 45° 46°	6			HB		Solid carbide	FIRE	**3632**	106	109
45°	5	3xD		HA		Solid carbide	FIRE	**3897**	106	110
45°	5	3xD		HB		Solid carbide	FIRE	**3898**	106	110

Helix	Z	Length	Feed	Shank design	Tool illustration	Tool material	Surface finish	Guhring no.	Dis-count group	Page
XL slot drills (3-fluted) centre cutting										
30°	3			HA		Solid carbide	Cristall	**6721**	106	117
Slot drills with corner radius (2-fluted) centre cutting										
30°	2			HA		Solid carbide	Cristall	**6722**	106	118
End mills with corner radius (4-fluted) centre cutting										
30°	4			HA		Solid carbide	Cristall	**6723**	106	119
Ball nose slot drills (2-fluted) centre cutting										
30°	2			HA		Solid carbide	Cristall	**6724**	106	120
Ball nose end mills (4-fluted) centre cutting										
30°	4			HA		Solid carbide	Cristall	**6725**	106	121

Diamond/PCD milling cutters

Helix	Z	Length	Feed	Shank design	Tool illustration	Tool material	Surface finish	Guhring no.	Dis-count group	Page
Kevlar end mills CR 100										
0°	6+			HA		Solid carbide	Cristall	**6720**	106	123
0°	6+			HA		Solid carbide	Cristall	**6717**	106	124
0°	6+			HA		Solid carbide	Cristall	**6719**	106	125
Kevlar end mills with internal cooling CR 100 Air										
0°	6+			HA		Solid carbide	Cristall	**6718**	106	126
PCD slot drills (2-fluted) centre cutting										
2-4°	2			HA		PCD	bright	**5492**	110	128
2-4°	2			~HA		PCD	bright	**5493**	110	129
PCD slot drills (3-fluted) centre cutting										
	3			HA		PCD	bright	**5495**	110	130
	3			~HA		PCD	bright	**5496**	110	131
HSC face milling cutters										
	6+					PCD	bright	**3016**	110	133

Solid carbide HSC radius milling cutters

Helix	Z	Length	Feed	Shank design	Tool illustration	Tool material	Surface finish	Guhring no.	Dis-count group	Page
Slot drills with corner radius (2-fluted) centre cutting										
30°	2			HA		Solid carbide	bright	**3106**	117	143
30°	2			HA		Solid carbide	FIRE	**3561**	117	143
End mills with corner radius (4-fluted) centre cutting										
30°	4			HA		Solid carbide	bright	**3111**	117	144
30°	4			HA		Solid carbide	FIRE	**3562**	117	144
Hard multi-tooth end mills corner radius GH 100 H centre cutting										
55°	6			HA		Solid carbide	Signum	**3363**	106	145
Multi-tooth end mills with corner radius GH 100 U centre cutting										
45°	6+			HA		Solid carbide	FIRE	**3563**	106	146
Hard profile cutters with Torus grind GF 300 T centre cutting										
30°	4			HA		Solid carbide	Signum	**3361**	106	147
30°	4			HA		Solid carbide	Signum	**3362**	106	148
HSC-profile cutters with Torus form GF 500 T centre cutting										
30°	2			HA		Solid carbide	Signum	**3863**	106	149
30°	2			HA		Solid carbide	Signum	**3856**	106	150
30°	2			HA		Solid carbide	Signum	**3865**	106	151
30°	2			HA		Solid carbide	Signum	**3859**	106	152

Solid carbide HSC radius milling cutters

Helix	Z	Length	Feed	Shank design	Tool illustration	Tool material	Surface finish	Guhring no.	Dis-count group	Page
HSC-profile cutters with Torus form GF 500 T centre cutting										
30°	2			HA		Solid carbide	Signum	**3860**	106	153
Ball nose slot drills (2-fluted) centre cutting										
30°	2			HA		Solid carbide	FIRE	**3679**	117	154
30°	2			HB		Solid carbide	FIRE	**3049**	117	154
30°	2			HB		Solid carbide	bright	**3024**	117	155
30°	2			HA		Solid carbide	bright	**3308**	117	156
Ball nose end mills (4-fluted) centre cutting										
30°	4			HA		Solid carbide	bright	**3306**	117	157
30°	4			HA		Solid carbide	FIRE	**3727**	117	157
30°	4			HB		Solid carbide	bright	**3026**	117	158
30°	4			HB		Solid carbide	FIRE	**3050**	117	158
XL ball nose slot drills (2-fluted) centre cutting										
30°	2			HA		Solid carbide	bright	**3014**	117	159
30°	2			HA		Solid carbide	FIRE	**3030**	117	159
XL ball nose end mills (4-fluted) centre cutting										
30°	4			HA		Solid carbide	bright	**3015**	117	160
30°	4			HA		Solid carbide	FIRE	**3043**	117	160

Solid carbide HSC radius milling cutters

Helix	Z	Length	Feed	Shank design	Tool illustration	Tool material	Surface finish	Guhring no.	Dis-count group	Page
Ball nose profile cutters GF 200 B centre cutting										
30°	4			HA		Solid carbide	FIRE	**3045**	106	161
	2			HA		Solid carbide	FIRE	**3044**	106	162
Ball nose hard profile cutters GF 300 B centre cutting										
30°	2			HA		Solid carbide	Signum	**3359**	106	163
30°	2			HA		Solid carbide	Signum	**3360**	106	164
HSC-ball nose profile cutters GF 500 B centre cutting										
30°	2			HA		Solid carbide	Signum	**3854**	106	165
30°	2			HA		Solid carbide	Signum	**3866**	106	166
30°	2			HA		Solid carbide	Signum	**3848**	106	167
30°	2			HA		Solid carbide	Signum	**3855**	106	168
30°	2			HA		Solid carbide	Signum	**3849**	106	169
30°	2			HA		Solid carbide	Signum	**3853**	106	170

Solid carbide HSC radius milling cutters

Helix	Z	Length	Feed	Shank design	Tool illustration	Tool material	Surface finish	Guhring no.	Discount group	Page
Die sinking cutter holder GF 200 WP										
	2			HA			nickel-plated	**1941**	140	171
	2			HA			nickel-plated	**1942**	140	172
Indexable inserts round										
	2					Cermet	bright	**1947**	141	173
	2					Solid carbide	FIRE	**2520**	141	173
Clamping screws for diesinking cutter holders										
								**1691**	140	173
Torx screwdriver										
								**1612**	140	174

Chamfering milling cutters

Helix	Z	Length	Feed	Shank design	Tool illustration	Tool material	Surface finish	Guhring no.	Discount group	Page
0°	4			HA		Solid carbide	TiAlN	**6711**	117	180
0°	4			HB		Solid carbide	TiAlN	**6712**	117	180
0°	4			HA		Solid carbide	TiAlN	**6713**	117	181
0°	4			HB		Solid carbide	TiAlN	**3396**	117	181
0°	4			HA		Solid carbide	TiAlN	**6714**	117	182
0°	4			HB		Solid carbide	TiAlN	**6715**	117	182

Front/back de-burrer

Helix	Z	Length	Feed	Shank design	Tool illustration	Tool material	Surface finish	Guhring no.	Discount group	Page
0°	4			~HA		Solid carbide	TiAlN-nanoA	**495**	120	183

Slot drills (2-fluted) centre cutting

Helix	Z	Length	Feed	Shank design	Tool illustration	Tool material	Surface finish	Guhring no.	Discount group	Page
30°	2			HA		Solid carbide	bright	**3194**	117	184
30°	2			HA		Solid carbide	FIRE	**3633**	117	184
30°	2			HB		Solid carbide	bright	**3294**	117	185
30°	2			HB		Solid carbide	FIRE	**3634**	117	185
30°	2			HA		Solid carbide	bright	**3195**	117	186
30°	2			HA		Solid carbide	FIRE	**3635**	117	186
30°	2			HB		Solid carbide	bright	**3295**	117	188
30°	2			HB		Solid carbide	FIRE	**3154**	117	188

Solid carbide universal milling cutters

Helix	Z	Length	Feed	Shank design	Tool illustration	Tool material	Surface finish	Guhring no.	Dis-count group	Page
Slot drills (2-fluted) centre cutting										
30°	2			HA		Solid carbide	bright	**3212**	117	190
30°	2			HA		Solid carbide	FIRE	**3709**	117	190
30°	2			HA		Solid carbide	bright	**3303**	117	192
30°	2			HA		Solid carbide	FIRE	**3676**	117	192
XL slot drills (2-fluted) centre cutting										
30°	2			HA		Solid carbide	bright	**3011**	117	194
30°	2			HA		Solid carbide	FIRE	**3021**	117	194
Al slot drills (2-fluted) centre cutting										
45°	2			HA		Solid carbide	bright	**3310**	117	195
45°	2			HB		Solid carbide	bright	**3126**	117	195
45°	2			HA		Solid carbide	bright	**3309**	117	196
45°	2			HB		Solid carbide	bright	**3059**	117	196
XL Al slot drills (2-fluted) centre cutting										
45°	2			HA		Solid carbide	bright	**3358**	117	197
Slot drills (3-fluted) centre cutting										
30°	3			HA		Solid carbide	bright	**3555**	117	198
30°	3			HA		Solid carbide	FIRE	**3558**	117	198

Helix	Z	Length	Feed	Shank design	Tool illustration	Tool material	Surface finish	Guhring no.	Dis-count group	Page
Slot drills (3-fluted) centre cutting										
30°	3			HB		Solid carbide	bright	**3296**	117	199
30°	3			HB		Solid carbide	FIRE	**3719**	117	199
30°	3			HA		Solid carbide	bright	**3559**	117	200
30°	3			HA		Solid carbide	FIRE	**3560**	117	200
30°	3			HB		Solid carbide	bright	**3297**	117	201
30°	3			HB		Solid carbide	FIRE	**3720**	117	201
30°	3			HA		Solid carbide	bright	**3307**	117	202
30°	3			HA		Solid carbide	FIRE	**3677**	117	202
30°	3			HA		Solid carbide	bright	**3220**	117	204
30°	3			HA		Solid carbide	FIRE	**3711**	117	204
XL slot drills (3-fluted) centre cutting										
30°	3			HA		Solid carbide	bright	**3314**	117	206
30°	3			HA		Solid carbide	FIRE	**3680**	117	206
Mini slot drills (3-fluted) centre cutting										
30°	3					Solid carbide	FIRE	**3684**	117	207
45°	3					Solid carbide	FIRE	**3686**	106	209

Solid carbide universal milling cutters

Helix	Z	Length	Feed	Shank design	Tool illustration	Tool material	Surface finish	Guhring no.	Dis-count group	Page
End mills (4-fluted) centre cutting										
30°	4			HA		Solid carbide	bright	**3198**	117	210
30°	4			HA		Solid carbide	FIRE	**3637**	117	210
30°	4			HB		Solid carbide	bright	**3298**	117	211
30°	4			HB		Solid carbide	FIRE	**3721**	117	211
30°	4			HA		Solid carbide	bright	**3197**	117	212
30°	4			HA		Solid carbide	FIRE	**3649**	117	212
30°	4			HB		Solid carbide	bright	**3299**	117	213
30°	4			HB		Solid carbide	FIRE	**3722**	117	213
30°	4			HA		Solid carbide	bright	**3304**	117	214
30°	4			HA		Solid carbide	FIRE	**3678**	117	214
30°	4			HA		Solid carbide	bright	**3257**	117	215
30°	4			HA		Solid carbide	FIRE	**3713**	117	215
XL end mills (4-fluted) centre cutting										
30°	4			HA		Solid carbide	bright	**3012**	117	216
30°	4			HA		Solid carbide	FIRE	**3023**	117	216
Pilot end mill centre cutting										
30°	4			HA		Solid carbide	TiAlN-SuperA	**6716**	106	218

Helix	Z	Length	Feed	Shank design	Tool illustration	Tool material	Surface finish	Guhring no.	Dis-count group	Page
Ratio end mills RF 40 centre cutting										
35° 38°	4-6			B		HSS-E-PM	bright	**3429**	112	226
35° 38°	4			B		HSS-E-PM	FIRE	**3705**	112	226
30° 32°	4-6			B		HSS-E-PM	bright	**3432**	112	227
30° 32°	4-6			B		HSS-E-PM	FIRE	**3706**	112	227
Roughing end mills GS 40 (fine teeth) centre cutting										
30°	3			B		HSS-E-PM	bright	**3322**	112	228
30°	3			B		HSS-E-PM	FIRE	**3668**	112	228
30°	4-6			B		HSS-E-PM	bright	**3340**	112	229
30°	4-6			B		HSS-E-PM	FIRE	**3660**	112	229
Roughing end mills GS 80 (fine teeth) centre cutting										
45°	3-6			B		HSS-E-PM	FIRE	**6756**	112	231

Universal milling cutters M42

Helix	Z	Length	Feed	Shank design	Tool illustration	Tool material	Surface finish	Guhring no.	Dis-count group	Page
Slot drills (2-fluted) centre cutting										
30°	2			B		M42	bright	**3451**	112	232
30°	2			B		M42	FIRE	**3663**	112	232
30°	2			B		M42	bright	**3452**	112	233
30°	2			B		M42	FIRE	**3694**	112	233
30°	2			B		M42	bright	**3453**	112	234
30°	2			B		M42	FIRE	**3695**	112	234
Ball nose slot drills (2-fluted) centre cutting										
30°	2			B		M42	bright	**3466**	112	235
30°	2			B		M42	FIRE	**3703**	112	235
30°	2			B		M42	bright	**3467**	112	236
30°	2			B		M42	FIRE	**3704**	112	236
Mini slot drills (3-fluted) centre cutting										
30°	3			B		M42	bright	**3142**	112	237
30°	3			B		M42	FIRE	**3144**	112	237
30°	3			B		M42	bright	**3143**	112	238
30°	3			B		M42	FIRE	**3145**	112	238

Helix	Z	Length	Feed	Shank design	Tool illustration	Tool material	Surface finish	Guhring no.	Dis-count group	Page
Slot drills (3-fluted) centre cutting										
30°	3			B		M42	bright	3458	112	239
30°	3			B		M42	FIRE	3651	112	239
30°	3			B		M42	bright	3459	112	240
30°	3			B		M42	FIRE	3664	112	240
30°	3			B		M42	bright	3460	112	241
30°	3			B		M42	FIRE	3836	112	241
End mills centre cutting										
30°	4-6			B		M42	bright	3428	112	242
30°	4-6			B		M42	FIRE	3670	112	242
30°	4-6			B		M42	bright	3431	112	243
30°	4-6			B		M42	FIRE	3692	112	243
30°	4			B		M42	bright	3433	112	244
Roughing end mills centre cutting										
30°	4-6			B		M42	bright	3346	112	245
30°	4-6			B		M42	FIRE	3690	112	245
30°	4-6			B		M42	bright	3347	112	246
30°	4-6			B		M42	FIRE	3650	112	246

Universal milling cutters M42

Helix	Z	Length	Feed	Shank design	Tool illustration	Tool material	Surface finish	Guhring no.	Dis-count group	Page
Roughing/finishing end mills centre cutting										
30°	4-6			B		M42	bright	**3343**	112	247
30°	4-6			B		M42	FIRE	**3669**	112	247
30°	4-6			B		M42	bright	**3342**	112	248
30°	4-6			B		M42	FIRE	**3698**	112	248
Morse taper end mills										
30°	4-8			MK		HSCO	bright	**3118**	112	249
30°	4-8			MK		HSCO	bright	**3117**	112	249
30°	4-8			MK		HSCO	bright	**3440**	112	250
30°	4-8			MK		HSCO	bright	**3121**	112	251
30°	4-8			MK		HSCO	bright	**3120**	112	252
End mills with international taper										
30°	6+			SK		HSCO	bright	**3130**	112	253
30°	4-8			SK		HSCO	bright	**3131**	112	254
30°	4-8			SK		HSCO	bright	**3134**	112	255
30°	6+			SK		HSCO	bright	**3133**	112	256
Side and face cutters										
						HSCO	bright	**3530**	112	257

Universal milling cutters M42

Helix	Z	Length	Feed	Shank design	Tool illustration	Tool material	Surface finish	Guhring no.	Dis-count group	Page
Shell end mills										
30°	6+					M42	bright	**3504**	112	258
30°	6+					M42	TiCN	**3654**	112	258
30°	6+					M42	bright	**3185**	112	259
30°	6+					M42	TiCN	**3749**	112	259
30°	6+					M42	bright	**3187**	112	260
T-slot end mills										
	6+			B		HSCO	bright	**3570**	112	261
Woodruff cutters										
	6+			B		HSCO	bright	**3580**	112	262
	6+			B		HSCO	bright	**3579**	112	263
Dovetail cutters										
	6+			B		HSCO	bright	**3572**	112	264
	6+			B		HSCO	bright	**3576**	112	264
	6+			B		HSCO	bright	**3574**	112	265
	6+			B		HSCO	bright	**3577**	112	265
Corner rounding cutters										
	4-6					M42	bright	**3176**	112	266

Guhring no. index

Guhring no.	Page	Discount group	Standard	Description	Tool material	Type	Form
495	183	120	G.S.	Front/back de-burrer	Solid carbide	EW 100 VR	
1612	174	140	G.S.	Torx screwdriver			
1691	173	140	G.S.	Clamping screws for diesinking cutter holders			
1941	171	140	G.S.	Die sinking cutter holder GF 200 WP		GF 200	
1942	172	140	G.S.	Die sinking cutter holder GF 200 WP		GF 200	
1947	173	141	G.S.	Indexable inserts round	Cermet		
2520	173	141	G.S.	Indexable inserts round	Solid carbide		
3011	194	117	G.S.	XL slot drills (2-fluted)	Solid carbide	N	
3012	216	117	G.S.	XL end mills (4-fluted)	Solid carbide	N	
3014	159	117	G.S.	XL ball nose slot drills (2-fluted)	Solid carbide	N	
3015	160	117	G.S.	XL ball nose end mills (4-fluted)	Solid carbide	N	
3016	133	110	G.S.	HSC face milling cutters	PKD-bestückt	PF 1000 G	
3021	194	117	G.S.	XL slot drills (2-fluted)	Solid carbide	N	
3023	216	117	G.S.	XL end mills (4-fluted)	Solid carbide	N	
3024	155	117	6527L	Ball nose slot drills (2-fluted)	Solid carbide	N	
3026	158	117	6527L	Ball nose end mills (4-fluted)	Solid carbide	N	
3030	159	117	G.S.	XL ball nose slot drills (2-fluted)	Solid carbide	N	
3043	160	117	G.S.	XL ball nose end mills (4-fluted)	Solid carbide	N	
3044	162	106	G.S.	Ball nose profile cutters GF 200 B	Solid carbide	N	
3045	161	106	G.S.	Ball nose profile cutters GF 200 B	Solid carbide	N	
3047	48	106	G.S.	Multi-tooth end mills GH 100 U	Solid carbide	NH	
3049	154	117	6527L	Ball nose slot drills (2-fluted)	Solid carbide	N	
3050	158	117	6527L	Ball nose end mills (4-fluted)	Solid carbide	N	
3059	105/196	117	6527L	Al slot drills (2-fluted)	Solid carbide	W	
3106	143	117	6527L	Slot drills with corner radius (2-fluted)	Solid carbide	N	
3111	144	117	6527L	End mills with corner radius (4-fluted)	Solid carbide	N	
3117	249	112	845K	Morse taper end mills	HSCO	NR	
3118	249	112	845K	Morse taper end mills	HSCO	NF	
3120	252	112	845L	Morse taper end mills	HSCO	N	
3121	251	112	845L	Morse taper end mills	HSCO	NR	
3126	104/195	117	6527K	Al slot drills (2-fluted)	Solid carbide	W	
3127	107	117	6527L	Roughing end mills GS 100 A (coarse teeth)	Solid carbide	WR	
3130	253	112	2328K	End mills with international taper	HSCO	N	
3131	254	112	2328K	End mills with international taper	HSCO	NR	
3133	256	112	2328L	End mills with international taper	HSCO	N	
3134	255	112	2328L	End mills with international taper	HSCO	NR	
3142	237	112	G.S.	Mini slot drills (3-fluted)	M42	N	
3143	238	112	G.S.	Mini slot drills (3-fluted)	M42	N	
3144	237	112	G.S.	Mini slot drills (3-fluted)	M42	N	
3145	238	112	G.S.	Mini slot drills (3-fluted)	M42	N	
3154	188	117	6527L	Slot drills (2-fluted)	Solid carbide	N	
3176	266	112	6518	Corner rounding cutters	M42	N	B/D
3185	259	112	1880	Shell end mills	M42	NR	
3187	260	112	1880	Shell end mills	M42	NF	
3193	19	106	6527K	Slot drills GH 100 U (3-fluted)	Solid carbide	NH	
3194	184	117	6527K	Slot drills (2-fluted)	Solid carbide	N	
3195	186	117	6527L	Slot drills (2-fluted)	Solid carbide	N	
3196	21	106	6527L	Slot drills GH 100 U (3-fluted)	Solid carbide	NH	
3197	212	117	6527L	End mills (4-fluted)	Solid carbide	N	
3198	210	117	6527K	End mills (4-fluted)	Solid carbide	N	
3200	28	106	6527K	Standard Ratio end mills RF 100 U	Solid carbide	N	
3201	30	106	6527L	Standard Ratio end mills RF 100 U	Solid carbide	N	
3202	100	106	6527L	Ratio end mills Alu RF 100 A	Solid carbide	W	
3203	17	106	6528	Slot drills GH 100 U (3-fluted)	Solid carbide	NH	
3204	41/81	117	6527L	Roughing end mills GS 100 U (fine teeth)	Solid carbide	NRf	
3208	30	106	6527L	Standard Ratio end mills RF 100 U	Solid carbide	N	
3209	33	106	G.S.	Standard Ratio end mills RF 100 U	Solid carbide	N	
3212	190	117	G.S.	Slot drills (2-fluted)	Solid carbide	N	
3220	204	117	G.S.	Slot drills (3-fluted)	Solid carbide	N	
3257	215	117	G.S.	End mills (4-fluted)	Solid carbide	N	
3294	185	117	6527K	Slot drills (2-fluted)	Solid carbide	N	
3295	188	117	6527L	Slot drills (2-fluted)	Solid carbide	N	
3296	199	117	6527K	Slot drills (3-fluted)	Solid carbide	N	
3297	201	117	6527L	Slot drills (3-fluted)	Solid carbide	N	
3298	211	117	6527K	End mills (4-fluted)	Solid carbide	N	
3299	213	117	6527L	End mills (4-fluted)	Solid carbide	N	
3303	192	117	6528	Slot drills (2-fluted)	Solid carbide	N	
3304	214	117	6528	End mills (4-fluted)	Solid carbide	N	
3306	157	117	6528	Ball nose end mills (4-fluted)	Solid carbide	N	
3307	202	117	6528	Slot drills (3-fluted)	Solid carbide	N	
3308	156	117	6527L	Ball nose slot drills (2-fluted)	Solid carbide	N	
3309	105/196	117	6527L	Al slot drills (2-fluted)	Solid carbide	W	

Guhring no. index

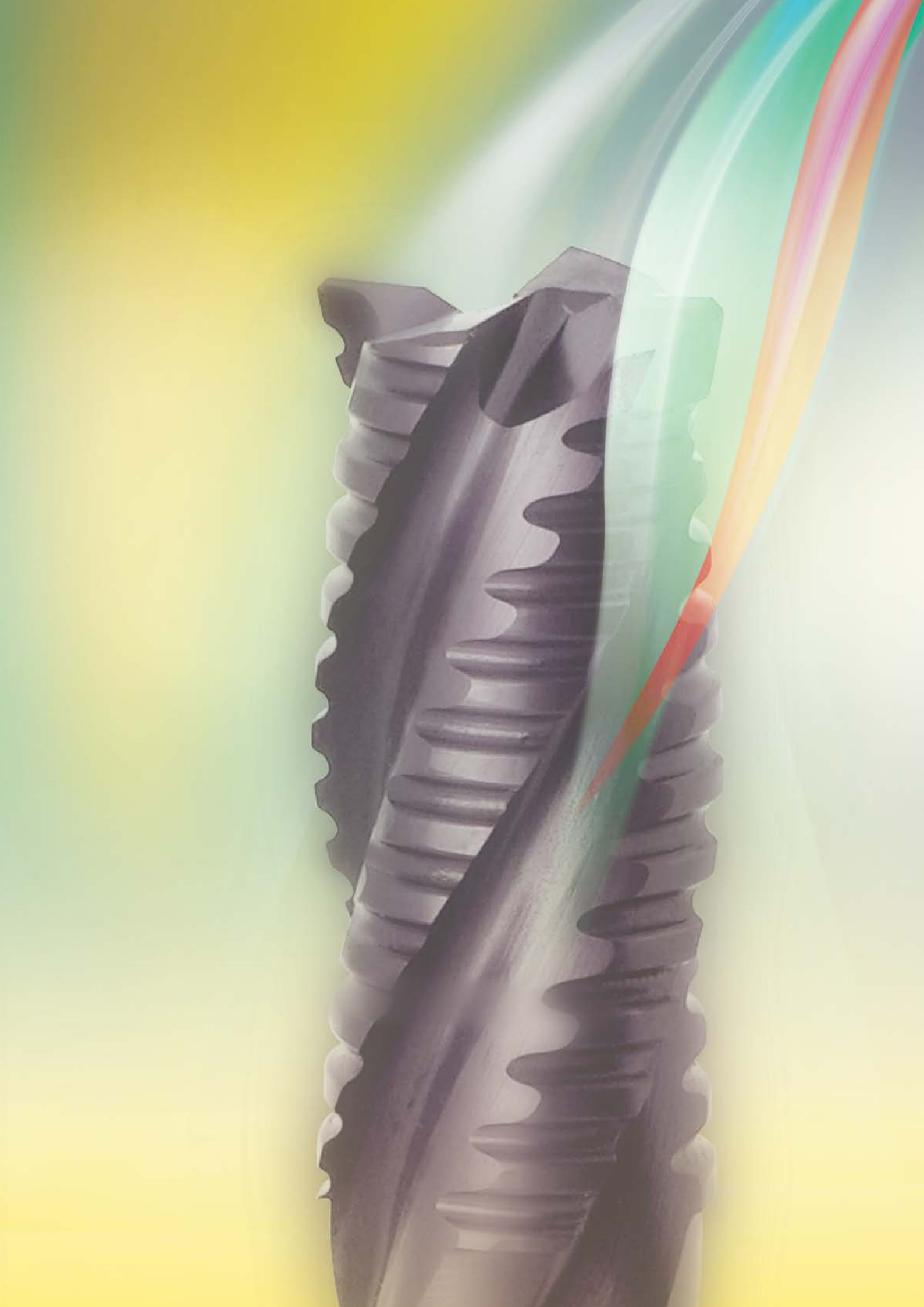
Guhring no.	Page	Discount group	Standard	Description	Tool material	Type	Form
3310	104/195	117	6527K	Al slot drills (2-fluted)	Solid carbide	W	
3311	47	106	G.S.	Multi-tooth end mills GH 100 U	Solid carbide	NH	
3312	49	106	G.S.	Multi-tooth end mills GH 100 U	Solid carbide	NH	
3313	50	106	G.S.	Multi-tooth end mills GH 100 U	Solid carbide	NH	
3314	206	117	G.S.	Slot drills XL (3-fluted)	Solid carbide	N	
3319	100	106	6527L	Ratio end mills Alu RF 100 A	Solid carbide	W	
3322	228	112	844K	Roughing end mills GS 40 (fine teeth)	HSS-E-PM	NRf	
3340	229	112	844K	Roughing end mills GS 40 (fine teeth)	HSS-E-PM	NRf	
3342	248	112	844L	Roughing/finishing end mills	M42	NF	
3343	247	112	844K	Roughing/finishing end mills	M42	NF	
3346	245	112	844K	Roughing end mills	M42	NR	
3347	246	112	844L	Roughing end mills	M42	NR	
3358	106/197	117	G.S.	Alu-XL slot drills (2-fluted)	Solid carbide	W	
3359	163	106	G.S.	Ball nose hard profile cutters GF 300 B	Solid carbide	H	
3360	164	106	G.S.	Ball nose hard profile cutters GF 300 B	Solid carbide	H	
3361	53/147	106	G.S.	Hard profile cutters with Torus grind GF 300 T	Solid carbide	H	
3362	54/148	106	G.S.	Hard profile cutters with Torus grind GF 300 T	Solid carbide	H	
3363	145	106	G.S.	Hard multi-tooth end mills corner radius GH 100 H	Solid carbide	H	
3364	107	106	6527L	Roughing end mills GS 100 A (coarse teeth)	Solid carbide	WR	
3365	42/82	106	6527L	Roughing end mills GS 100 U (fine teeth)	Solid carbide	NRf	
3366	26/76	106	6527L	Ratio end mills RF 100 F	Solid carbide	NH	
3367	103	106	G.S.	Slot drills GA 200 A (3-fluted)	Solid carbide	W	
3396	181	117	G.S.	Chamfering milling cutters	Solid carbide	N	
3428	242	112	844K	End mills	M42	N	
3429	226	112	844K	Ratio end mills RF 40	HSS-E-PM	N	
3431	243	112	844L	End mills	M42	N	
3432	227	112	844L	Ratio end mills RF 40	HSS-E-PM	N	
3433	244	112	G.S.	End mills	M42	N	
3440	250	112	845K	Morse taper end mills	HSCO	N	
3451	232	112	327	Slot drills (2-fluted)	M42	N	D
3452	233	112	844K	Slot drills (2-fluted)	M42	N	
3453	234	112	844L	Slot drills (2-fluted)	M42	N	
3458	239	112	327	Slot drills (3-fluted)	M42	N	D
3459	240	112	844K	Slot drills (3-fluted)	M42	N	
3460	241	112	844L	Slot drills (3-fluted)	M42	N	
3466	235	112	327	Ball nose slot drills (2-fluted)	M42	N	D
3467	236	112	G.S.	Ball nose slot drills (2-fluted)	M42	N	
3468	101	106	G.S.	Ratio end mills Alu RF 100 A	Solid carbide	WF	
3469	101	106	G.S.	Ratio end mills Alu RF 100 A	Solid carbide	WF	
3470	102	106	G.S.	Ratio end mills Alu RF 100 A	Solid carbide	WF	
3471	102	106	G.S.	Ratio end mills Alu RF 100 A	Solid carbide	WF	
3472	93	106	G.S.	Ratio end mills Alu RF 100 A	Solid carbide	W	
3473	96	106	G.S.	Ratio end mills Alu RF 100 A	Solid carbide	W	
3498	78	106	6527L	Ratio end mills RF 100 Ti	Solid carbide	N	
3499	78	106	6527L	Ratio end mills RF 100 Ti	Solid carbide	N	
3504	258	112	1880	Shell end mills	M42	N	
3507	36	106	6527L	Standard Ratio end mills RF 100 U	Solid carbide	HF	
3508	36	106	6527L	Standard Ratio end mills RF 100 U	Solid carbide	HF	
3509	37	106	G.S.	Standard Ratio end mills RF 100 U	Solid carbide	HF	
3522	37	106	G.S.	Standard Ratio end mills RF 100 U	Solid carbide	HF	
3530	257	112	885	Side and face cutters	HSCO	N	
3540	19	106	6527K	Slot drills GH 100 U (3-fluted)	Solid carbide	NH	
3555	198	117	6527K	Slot drills (3-fluted)	Solid carbide	N	
3558	198	117	6527K	Slot drills (3-fluted)	Solid carbide	N	
3559	200	117	6527L	Slot drills (3-fluted)	Solid carbide	N	
3560	200	117	6527L	Slot drills (3-fluted)	Solid carbide	N	
3561	143	117	6527L	Slot drills with corner radius (2-fluted)	Solid carbide	N	
3562	144	117	6527L	End mills with corner radius (4-fluted)	Solid carbide	N	
3563	146	106	G.S.	Multi-tooth end mills mit Eckenradius GH 100 U	Solid carbide	NH	
3570	261	112	851	T-slot end mills	HSCO	N	A/B
3572	264	112	1833	Dovetail cutters	HSCO	H	C
3574	265	112	1833	Dovetail cutters	HSCO	H	C
3576	264	112	1833	Dovetail cutters	HSCO	H	D
3577	265	112	1833	Dovetail cutters	HSCO	H	D
3579	263	112	850	Woodruff cutters	HSCO	H	C
3580	262	112	850	Woodruff cutters	HSCO	N	D
3598	38	106	G.S.	Standard Ratio end mills RF 100 U	Solid carbide	HF	
3599	94	106	G.S.	Ratio end mills Alu RF 100 A	Solid carbide	W	
3600	38	106	G.S.	Standard Ratio end mills RF 100 U	Solid carbide	HF	
3627	33	106	G.S.	Standard Ratio end mills RF 100 U	Solid carbide	N	
3629	25/75	106	6527L	Ratio end mills RF 100 F	Solid carbide	NH	
3630	25/75	106	6527L	Ratio end mills RF 100 F	Solid carbide	NH	

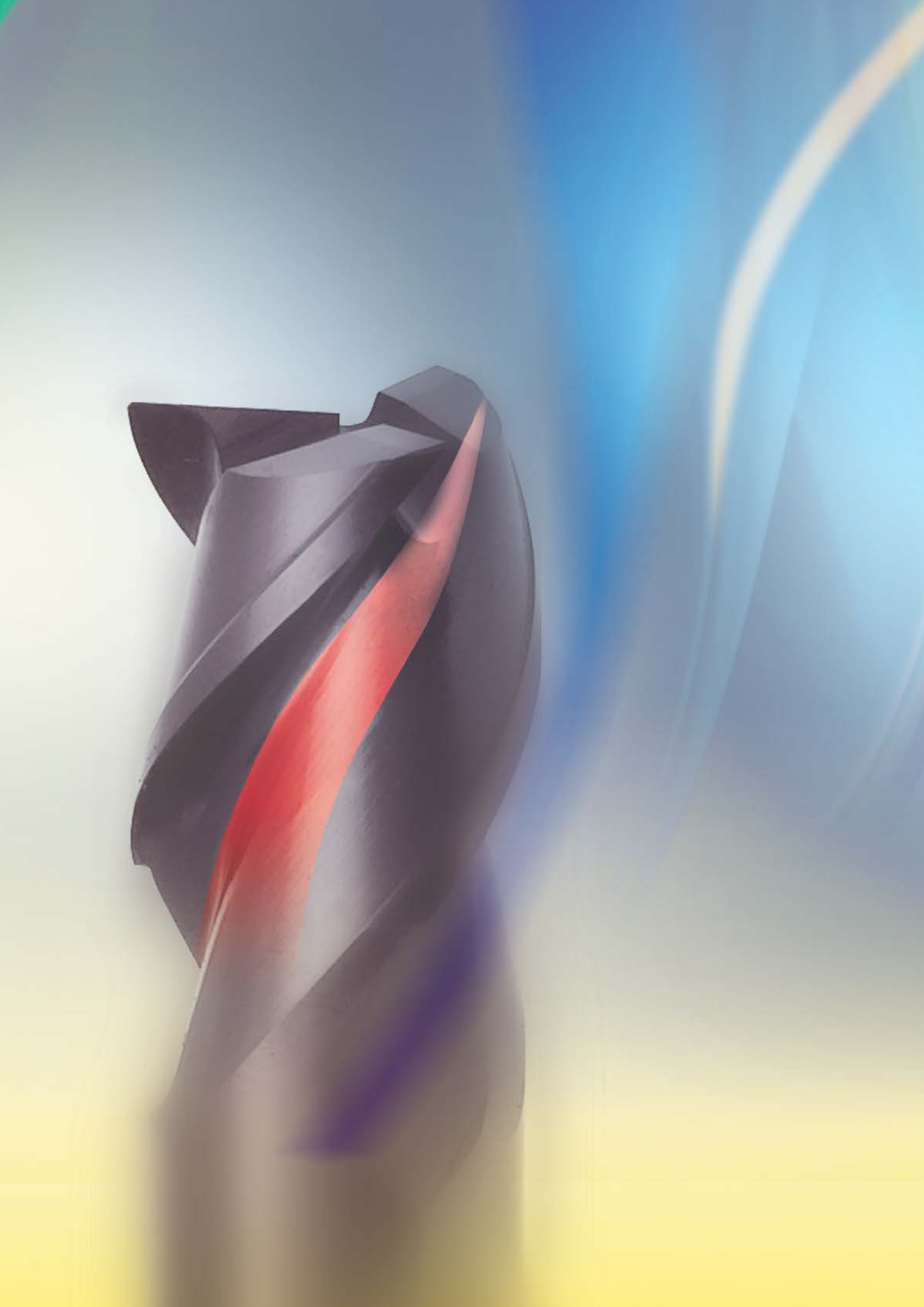
Guhring no. index

Guhring no.	Page	Discount group	Standard	Description	Tool material	Type	Form
3631	45/85/109	106	G.S.	Ratio end mills Superfinish RF 100 SF	Solid carbide	NH	
3632	45/85/109	106	G.S.	Ratio end mills Superfinish RF 100 SF	Solid carbide	NH	
3633	184	117	6527K	Slot drills (2-fluted)	Solid carbide	N	
3634	185	117	6527K	Slot drills (2-fluted)	Solid carbide	N	
3635	186	117	6527L	Slot drills (2-fluted)	Solid carbide	N	
3636	21	106	6527L	Slot drills GH 100 U (3-fluted)	Solid carbide	NH	
3637	210	117	6527K	End mills (4-fluted)	Solid carbide	N	
3649	212	117	6527L	End mills (4-fluted)	Solid carbide	N	
3650	246	112	844L	Roughing end mills	M42	NR	
3651	239	112	327	Slot drills (3-fluted)	M42	N	D
3654	258	112	1880	Shell end mills	M42	N	
3660	229	112	844K	Roughing end mills GS 40 (fine teeth)	HSS-E-PM	NRf	
3663	232	112	327	Slot drills (2-fluted)	M42	N	D
3664	240	112	844K	Slot drills (3-fluted)	M42	N	
3668	228	112	844K	Roughing end mills GS 40 (fine teeth)	HSS-E-PM	NRf	
3669	247	112	844K	Roughing/finishing end mills	M42	NF	
3670	242	112	844K	End mills	M42	N	
3676	192	117	6528	Slot drills (2-fluted)	Solid carbide	N	
3677	202	117	6528	Slot drills (3-fluted)	Solid carbide	N	
3678	214	117	6528	End mills (4-fluted)	Solid carbide	N	
3679	154	117	6527L	Ball nose slot drills (2-fluted)	Solid carbide	N	
3680	206	117	G.S.	Slot drills XL (3-fluted)	Solid carbide	N	
3682	56	117	6527L	Hard roughing end mills GS 100 H (fine teeth)	Solid carbide	HR	
3684	207	117	G.S.	Mini slot drills (3-fluted)	Solid carbide	N	
3686	209	106	G.S.	Mini slot drills (3-fluted)	Solid carbide	NH	
3689	47	106	G.S.	Multi-tooth end mills GH 100 U	Solid carbide	NH	
3690	245	112	844K	Roughing end mills	M42	NR	
3691	49	106	G.S.	Multi-tooth end mills GH 100 U	Solid carbide	NH	
3692	243	112	844L	End mills	M42	N	
3693	50	106	G.S.	Multi-tooth end mills GH 100 U	Solid carbide	NH	
3694	233	112	844K	Slot drills (2-fluted)	M42	N	
3695	234	112	844L	Slot drills (2-fluted)	M42	N	
3696	72	106	6527L	Ratio end mills RF 100 VA	Solid carbide	NF	
3698	248	112	844L	Roughing/finishing end mills	M42	NF	
3703	235	112	327	Ball nose slot drills (2-fluted)	M42	N	D
3704	236	112	G.S.	Ball nose slot drills (2-fluted)	M42	N	
3705	226	112	844K	Ratio end mills RF 40	HSS-E-PM	N	
3706	227	112	844L	Ratio end mills RF 40	HSS-E-PM	N	
3709	190	117	G.S.	Slot drills (2-fluted)	Solid carbide	N	
3711	204	117	G.S.	Slot drills (3-fluted)	Solid carbide	N	
3713	215	117	G.S.	End mills (4-fluted)	Solid carbide	N	
3715	57	106	G.S.	Hard multi-tooth end mills GH 100 H	Solid carbide	H	
3716	58	106	G.S.	Hard multi-tooth end mills GH 100 H	Solid carbide	H	
3718	72	106	6527L	Ratio end mills RF 100 VA	Solid carbide	NF	
3719	199	117	6527K	Slot drills (3-fluted)	Solid carbide	N	
3720	201	117	6527L	Slot drills (3-fluted)	Solid carbide	N	
3721	211	117	6527K	End mills (4-fluted)	Solid carbide	N	
3722	213	117	6527L	End mills (4-fluted)	Solid carbide	N	
3723	41/81	117	6527L	Roughing end mills GS 100 U (fine teeth)	Solid carbide	NRf	
3727	157	117	6528	Ball nose end mills (4-fluted)	Solid carbide	N	
3729	20	106	6527K	Slot drills GH 100 U (3-fluted)	Solid carbide	NH	
3730	22	106	6527L	Slot drills GH 100 U (3-fluted)	Solid carbide	NH	
3731	27	106	6527K	Standard Ratio end mills RF 100 U	Solid carbide	N	
3732	29	106	6527L	Standard Ratio end mills RF 100 U	Solid carbide	N	
3733	73	106	G.S.	Ratio end mills RF 100 VA	Solid carbide	NF	
3736	29	106	6527L	Standard Ratio end mills RF 100 U	Solid carbide	N	
3741	17	106	6528	Slot drills GH 100 U (3-fluted)	Solid carbide	NH	
3749	259	112	1880	Shell end mills	M42	NR	
3800	68	106	6527L	Ratio end mills RF 100 VA	Solid carbide	N	
3803	68	106	6527L	Ratio end mills RF 100 VA	Solid carbide	N	
3804	67	106	6527K	Ratio end mills RF 100 VA	Solid carbide	N	
3805	67	106	6527K	Ratio end mills RF 100 VA	Solid carbide	N	
3806	70	106	G.S.	Ratio end mills RF 100 VA	Solid carbide	N	
3807	70	106	G.S.	Ratio end mills RF 100 VA	Solid carbide	N	
3836	241	112	844L	Slot drills (3-fluted)	M42	N	
3837	31	106	G.S.	Standard Ratio end mills RF 100 U	Solid carbide	N	
3838	31	106	G.S.	Standard Ratio end mills RF 100 U	Solid carbide	N	
3839	32	106	G.S.	Standard Ratio end mills RF 100 U	Solid carbide	N	
3848	167	106	G.S.	HSC-ball nose profile cutters GF 500 B	Solid carbide	N	
3849	169	106	G.S.	HSC-ball nose profile cutters GF 500 B	Solid carbide	N	
3853	170	106	G.S.	HSC-ball nose profile cutters GF 500 B	Solid carbide	N	
3854	165	106	G.S.	HSC-ball nose profile cutters GF 500 B	Solid carbide	N	

Guhring no. index

Guhring no.	Page	Discount group	Standard	Description	Tool material	Type	Form
3855	168	106	G.S.	HSC-ball nose profile cutters GF 500 B	Solid carbide	N	
3856	150	106	G.S.	HSC-profile cutters with Torus form GF 500 T	Solid carbide	N	
3859	152	106	G.S.	HSC-profile cutters with Torus form GF 500 T	Solid carbide	N	
3860	153	106	G.S.	HSC-profile cutters with Torus form GF 500 T	Solid carbide	N	
3863	149	106	G.S.	HSC-profile cutters with Torus form GF 500 T	Solid carbide	N	
3865	151	106	G.S.	HSC-profile cutters with Torus form GF 500 T	Solid carbide	N	
3866	166	106	G.S.	HSC-ball nose profile cutters GF 500 B	Solid carbide	N	
3871	32	106	G.S.	Standard Ratio end mills RF 100 U	Solid carbide	N	
3872	34	106	6527L	Standard Ratio end mills RF 100 U	Solid carbide	N	
3873	34	106	6527L	Standard Ratio end mills RF 100 U	Solid carbide	N	
3885	73	106	G.S.	Ratio end mills RF 100 VA	Solid carbide	NF	
3887	39/80	106	6527L	High-performance roughing end mills RS 100 U	Solid carbide	NF	
3888	39/80	106	6527L	High-performance roughing end mills RS 100 U	Solid carbide	NF	
3889	40	106	6527L	High-performance roughing end mills RS 100 F	Solid carbide	NF	
3890	40	106	6527L	High-performance roughing end mills RS 100 F	Solid carbide	NF	
3891	16/65	106	G.S.	Standard Ratio end mills RF 100 U (3-fluted)	Solid carbide	NH	
3892	16/65	106	G.S.	Standard Ratio end mills RF 100 U (3-fluted)	Solid carbide	NH	
3893	15/64	106	G.S.	Standard Ratio end mills RF 100 U (3-fluted)	Solid carbide	NH	
3894	15/64	106	G.S.	Standard Ratio end mills RF 100 U (3-fluted)	Solid carbide	NH	
3895	52	106	6527L	Ratio end mills RF 100 H	Solid carbide	H	
3896	52	106	6527L	Ratio end mills RF 100 H	Solid carbide	H	
3897	46/86/110	106	G.S.	Ratio end mills Superfinish RF 100 SF	Solid carbide	NH	
3898	46/86/110	106	G.S.	Ratio end mills Superfinish RF 100 SF	Solid carbide	NH	
5492	128	110	G.S.	PKD-Slot drills (2-fluted)	PKD		
5493	129	110	G.S.	PKD-Slot drills (2-fluted)	PKD		
5495	130	110	G.S.	PKD-Slot drills (3-fluted)	PKD		
5496	131	110	G.S.	PKD-Slot drills (3-fluted)	PKD		
6700	69	106	6527L	Ratio end mills RF 100 VA	Solid carbide	N	
6701	69	106	6527L	Ratio end mills RF 100 VA	Solid carbide	N	
6702	93	106	G.S.	Ratio end mills Alu RF 100 A	Solid carbide	W	
6703	96	106	G.S.	Ratio end mills Alu RF 100 A	Solid carbide	W	
6704	55	106	6527L	Hard roughing end mills GS 100 H (fine teeth)	Solid carbide	HR	
6705	55	106	6527L	Hard roughing end mills GS 100 H (fine teeth)	Solid carbide	HR	
6706	27	106	6527K	Standard Ratio end mills RF 100 U	Solid carbide	N	
6707	71	106	6527L	Ratio end mills RF 100 VA	Solid carbide	N	
6708	71	106	6527L	Ratio end mills RF 100 VA	Solid carbide	N	
6709	44/84/108	106	G.S.	Ratio end mills Superfinish RF 100 SF	Solid carbide	NH	
6710	44/84/108	106	G.S.	Ratio end mills Superfinish RF 100 SF	Solid carbide	NH	
6711	180	117	G.S.	Chamfering milling cutters	Solid carbide	N	
6712	180	117	G.S.	Chamfering milling cutters	Solid carbide	N	
6713	181	117	G.S.	Chamfering milling cutters	Solid carbide	N	
6714	182	117	G.S.	Chamfering milling cutters	Solid carbide	N	
6715	182	117	G.S.	Chamfering milling cutters	Solid carbide	N	
6716	218	106	G.S.	Pilot end mills	Solid carbide	N	
6717	124	106	G.S.	Kevlar end mills CR 100	Solid carbide	N	
6718	126	106	G.S.	Kevlar end mills with internal cooling CR 100 Air	Solid carbide	N	
6719	125	106	G.S.	Kevlar end mills CR 100	Solid carbide	N	
6720	123	106	G.S.	Kevlar end mills CR 100	Solid carbide	N	
6721	117	106	G.S.	Slot drills XL (3-fluted)	Solid carbide	N	
6722	118	106	6527L	Slot drills with corner radius (2-fluted)	Solid carbide	N	
6723	119	106	6527L	End mills with corner radius (4-fluted)	Solid carbide	N	
6724	120	106	6527L	Ball nose slot drills (2-fluted)	Solid carbide	N	
6725	121	106	G.S.	Ball nose end mills (4-fluted)	Solid carbide	N	
6729	94	106	G.S.	Ratio end mills Alu RF 100 A	Solid carbide	W	
6730	97	106	G.S.	Ratio end mills Alu RF 100 A	Solid carbide	W	
6731	97	106	G.S.	Ratio end mills Alu RF 100 A	Solid carbide	W	
6732	98	106	G.S.	Ratio end mills Alu RF 100 A	Solid carbide	W	
6733	98	106	G.S.	Ratio end mills Alu RF 100 A	Solid carbide	W	
6734	99	106	G.S.	Ratio end mills Alu RF 100 A	Solid carbide	W	
6735	99	106	G.S.	Ratio end mills Alu RF 100 A	Solid carbide	W	
6736	24/74	106	6527L	Ratio end mills RF 100 DIVER	Solid carbide	N	
6737	24/74	106	6527L	Ratio end mills RF 100 DIVER	Solid carbide	N	
6756	231	112	844K	Roughing end mills GS 80 (fine teeth)	HSS-E-PM	NRf	





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