

***SELECT*MILL**

GUHRING

UNIVERSAL MILLING CUTTER PROGRAM

Unique in
PRICE AND EFFICIENCY

NEW!

INTERACTIVE PDF

Click on the underlined text



SELECTMILL

With the **SELECTMILL PROGRAM** Guhring introduces a complete range of universal milling cutters for optimal performance at competitive prices



Outstanding in
PRICE AND EFFICIENCY



Unique in ***PRICE AND EFFICIENCY***

SELECTMILL cutting geometries are optimized to achieve high metal removal rates and long tool life in universal applications. In addition, nearly all the end mills in the **SELECTMILL PROGRAM** have Guhring's proven FIREX® coating for extended tool life.

Guhring developed geometries
for maximum performance

Precision ground on
specially developed machinery

The best fine grain carbide
substrate, produced by Guhring

A complete all-round PROGRAM
suitable for most material types

SELECTMILL

by **GUHRING**

P M K N S H	Tool illustration	No. Flutes	Feed	Shank form	Length	Tool material	Surface	d1/fract. in.	Series no.	Page
• • • • ○						VHM	F	1/8 - 1"	19959	5
• • • • •						VHM	F	1/4 - 1"	19960	6
• • • • •						VHM	○	1/8 - 1"	19958	7
• • • ○ •						VHM	F	1/16 - 1"	19952	8
• • • ○ •						VHM	F	1/8 - 1"	19953	9
• • • ○ •						VHM	F	1/16 - 1"	19954	10
• • • ○ •						VHM	F	1/8 - 1"	19955	11
• • • • ○						VHM	F	1/16 - 1"	19956	12
• • • • ○						VHM	F	1/8 - 1"	19957	13

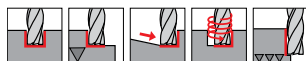
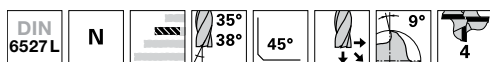
ISO material codes

P	Steel, high-alloyed steel
M	Stainless steel Stainless
K	Grey cast iron, spher, graphite/mall. cast iron
N	Aluminum and other non-ferrous metals
S	Special, super and titanium alloys
H	Hardened steel and chilled cast iron

On the following pages you will find recommendations regarding suitability for the application groups and details of max. tensile strength and hardness:

- optimal suitability
- limited suitability

4-flute HPC end mills



P	•
M	•
K	•
N	•
S	•
H	○

Cutting data page 16

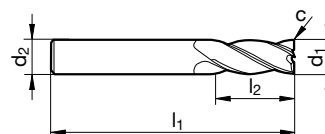
- high-performance with variable helix angle
- center cutting

Tool material **Solid carbide**

Surface **F**

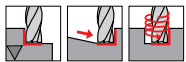
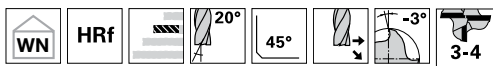
Type **N**

Shank form **cyl.**



Series no. 19959							EDP Number
d1 e8	d2 h6	l1	l2	c	No. of	Code no.	
inch	inch	inch	inch	in x 45°	flutes		
1/8	1/8	1 1/2	3/8	0.005	4	3.170	9199590031700
3/16	3/16	2	5/8	0.005	4	4.760	9199590047600
1/4	1/4	2 1/2	3/4	0.005	4	6.350	9199590063500
5/16	5/16	2 1/2	13/16	0.005	4	7.940	9199590079400
3/8	3/8	2 1/2	1	0.005	4	9.520	9199590095200
7/16	7/16	2 3/4	1	0.01	4	11.110	9199590111100
1/2	1/2	3	1	0.01	4	12.700	9199590127000
5/8	5/8	3 1/2	1 1/4	0.01	4	15.870	9199590158700
3/4	3/4	4	1 1/2	0.01	4	19.050	9199590190500
1	1	4	1 1/2	0.01	4	25.400	9199590254000

Fine tooth roughing end mills



P	•
M	
K	•
N	
S	
H	•

Cutting data page 1Z

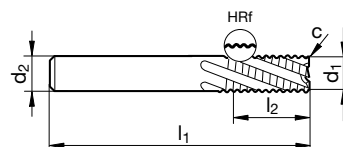
• center cutting

Tool material **Solid carbide**

Surface **F**

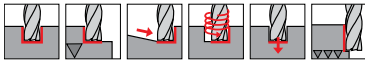
Type **HRf**

Shank form **cyl.**



Series no.							19960
d1 e8	d2 h6	l1	l2	c	No. of	Code no.	EDP Number
inch	inch	inch	inch	in x 45°	flutes		
1/4	1/4	2 1/2	3/4	0.005	3	6.350	9199600063500
5/16	5/16	2 1/2	13/16	0.005	3	7.940	9199600079400
3/8	3/8	2 1/2	1	0.005	4	9.520	9199600095200
7/16	7/16	2 3/4	1	0.01	4	11.110	9199600111100
1/2	1/2	3	1	0.01	4	12.700	9199600127000
5/8	5/8	3 1/2	1 1/4	0.01	4	15.870	9199600158700
3/4	3/4	4	1 1/2	0.01	4	19.050	9199600190500
1	1	4	1 1/2	0.01	4	25.400	9199600254000

3-flute aluminum end mill, standard length



P	
M	
K	
N	•
S	
H	

Cutting data page 18

- high-performance slot drill with a quick helix for an especially smooth cutting operation
- center cutting
- with special drill face

Tool material

Solid carbide

Surface

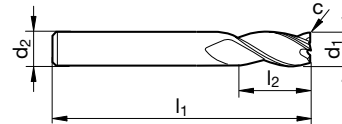


Type

W

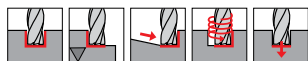
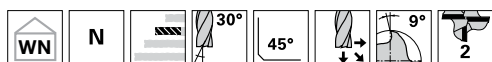
Shank form

cyl.



Series no.							19958
d1 e8	d2 h6	l1	l2	c	No. of	Code no.	EDP Number
inch	inch	inch	inch	in x 45°	flutes		
1/8	1/8	1 1/2	3/8	0.005	3	3.170	9199580031700
3/16	3/16	2	5/8	0.005	3	4.760	9199580047600
1/4	1/4	2 1/2	3/4	0.005	3	6.350	9199580063500
5/16	5/16	2 1/2	13/16	0.005	3	7.940	9199580079400
3/8	3/8	2 1/2	1	0.005	3	9.520	9199580095200
7/16	7/16	2 3/4	1	0.01	3	11.00	9199580111100
1/2	1/2	3	1	0.01	3	12.700	9199580127000
5/8	5/8	3 1/2	1 1/4	0.01	3	15.870	9199580158700
3/4	3/4	4	1 1/2	0.01	3	19.050	9199580190500
1	1	4	1 1/2	0.01	3	25.400	9199580254000

General purpose 2-flute end mills, standard length



P	•	Cutting data page 19
M	•	
K	•	
N	○	
S	•	
H		• center cutting • with special drill face

Tool material

Solid carbide

Surface

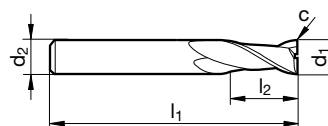
F

Type

N

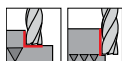
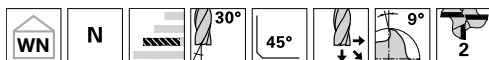
Shank form

cyl.



Series no.							19952
d1 e8	d2 h6	l1	l2	c	No. of	Code no.	EDP Number
inch	inch	inch	inch	in x 45°	flutes		
1/16	1/8	1 1/2	3/16	0.002	2	1.590	9199520015900
1/8	1/8	1 1/2	3/8	0.005	2	3.170	9199520031700
3/16	3/16	2	5/8	0.005	2	4.760	9199520047600
1/4	1/4	2 1/2	3/4	0.005	2	6.350	9199520063500
5/16	5/16	2 1/2	13/16	0.005	2	7.940	9199520079400
3/8	3/8	2 1/2	1	0.005	2	9.520	9199520095200
7/16	7/16	2 3/4	1	0.01	2	11.110	9199520111100
1/2	1/2	3	1	0.01	2	12.700	9199520127000
5/8	5/8	3 1/2	1 1/4	0.01	2	15.870	9199520158700
3/4	3/4	4	1 1/2	0.01	2	19.050	9199520190500
1	1	4	1 1/2	0.01	2	25.400	9199520254000

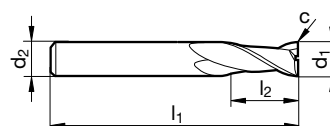
General purpose 2-flute end mills, long length



P	•
M	•
K	•
N	○
S	•
H	

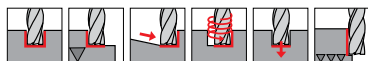
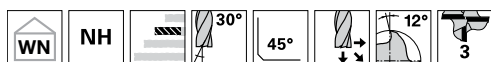
Cutting data page 19

- center cutting
- with special drill face

Tool material **Solid carbide**Surface **F**Type **N**Shank form **cyl.**

Series no. 19953							EDP Number
d1 e8	d2 h6	l1	l2	c	No. of	Code no.	
inch	inch	inch	inch	in x 45°	flutes		
1/8	1/8	2 1/4	3/4	0.005	2	3.170	9199530031700
3/16	3/16	2 1/2	3/4	0.005	2	4.760	9199530047600
1/4	1/4	3	1 1/8	0.005	2	6.350	9199530063500
5/16	5/16	3	1 1/8	0.005	2	7.940	9199530079400
3/8	3/8	3	1 1/8	0.005	2	9.520	9199530095200
7/16	7/16	4	2	0.010	2	11.110	9199530111100
1/2	1/2	4	2	0.010	2	12.700	9199530127000
5/8	5/8	5	2 1/4	0.010	2	15.870	9199530158700
3/4	3/4	5	2 1/4	0.010	2	19.050	9199530190500
1	1	5	2 1/4	0.010	2	25.400	9199530254000

General purpose 3-flute end mills, standard length



P	•
M	•
K	•
N	○
S	•
H	

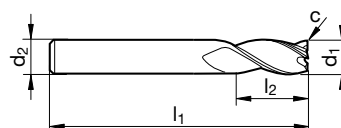
Cutting data page 19

- center cutting
- with special drill face

Tool material **Solid carbide**

Surface **F**

Type **N**

Shank form **cyl.**


Series no.						19954
d1 e8	d2 h6	l1	l2	c	No. of	Code no.
inch	inch	inch	inch	in x 45°	flutes	EDP Number
1/16	1/8	1 1/2	3/16	0.002	3	1.590
1/8	1/8	1 1/2	3/8	0.005	3	3.170
3/16	3/16	2	5/8	0.005	3	4.760
1/4	1/4	2 1/2	3/4	0.005	3	6.350
5/16	5/16	2 1/2	13/16	0.005	3	7.940
3/8	3/8	2 1/2	1	0.005	3	9.520
7/16	7/16	2 3/4	1	0.010	3	11.110
1/2	1/2	3	1	0.010	3	12.700
5/8	5/8	3 1/2	1 1/4	0.010	3	15.870
3/4	3/4	4	1 1/2	0.010	3	19.050
1	1	4	1 1/2	0.010	3	25.400

9199540015900

9199540031700

9199540047600

9199540063500

9199540079400

9199540095200

9199540111100

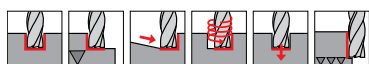
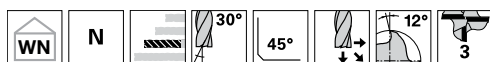
9199540127000

9199540158700

9199540190500

9199540254000

General purpose 3-flute end mills, long length



P	•
M	•
K	•
N	○
S	•
H	

Cutting data page 19

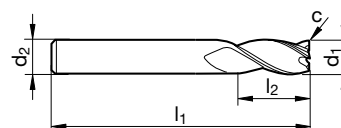
- center cutting
- with special drill face

Tool material **Solid carbide**

Surface **F**

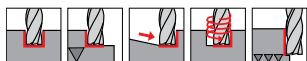
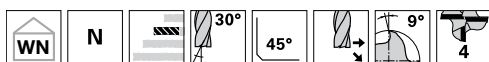
Type **N**

Shank form **cyl.**



Series no. 19955							EDP Number
d1 e8	d2 h6	l1	l2	c	No. of flutes	Code no.	
inch	inch	inch	inch	in x 45°			
1/8	1/8	2 1/4	3/4	0.005	3	3.170	9199550031700
3/16	3/16	2 1/2	3/4	0.005	3	4.760	9199550047600
1/4	1/4	3	1 1/8	0.005	3	6.350	9199550063500
5/16	5/16	3	1 1/8	0.005	3	7.940	9199550079400
3/8	3/8	3	1 1/8	0.005	3	9.520	9199550095200
7/16	7/16	4	2	0.010	3	11.110	9199550111100
1/2	1/2	4	2	0.010	3	12.700	9199550127000
5/8	5/8	5	2 1/4	0.010	3	15.870	9199550158700
3/4	3/4	5	2 1/4	0.010	3	19.050	9199550190500
1	1	5	2 1/4	0.010	3	25.400	9199550254000

General purpose 4-flute end mills, standard length



P	•
M	•
K	•
N	•
S	•
H	○

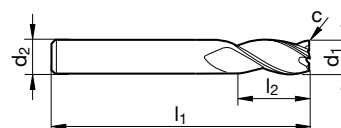
Cutting data page 19

- center cutting
- with special drill face

Tool material **Solid carbide**

Surface **F**

Type **N**

Shank form **cyl.**


Series no.						19956
d1 e8	d2 h6	l1	l2	c	No. of	Code no.
inch	inch	inch	inch	in x 45°	flutes	EDP Number
1/16	1/8	1 1/2	3/16	0.002	4	1.590
1/8	1/8	1 1/2	3/8	0.005	4	3.170
3/16	3/16	2	5/8	0.005	4	4.760
1/4	1/4	2 1/2	3/4	0.005	4	6.350
5/16	5/16	2 1/2	13/16	0.005	4	7.940
3/8	3/8	2 1/2	1	0.005	4	9.520
7/16	7/16	2 3/4	1	0.010	4	11.110
1/2	1/2	3	1	0.010	4	12.700
5/8	5/8	3 1/2	1 1/4	0.010	4	15.870
3/4	3/4	4	1 1/2	0.010	4	19.050
1	1	4	1 1/2	0.010	4	25.400

9199560015900

9199560031700

9199560047600

9199560063500

9199560079400

9199560095200

9199560111100

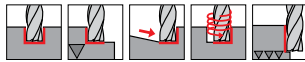
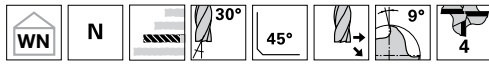
9199560127000

9199560158700

9199560190500

9199560254000

General purpose 4-flute end mills, long length

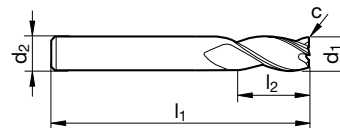


P	•
M	•
K	•
N	•
S	•
H	○

Cutting data page 19

- center cutting
- with special drill face

Tool material	Solid carbide
Surface	F
Type	N
Shank form	cyl.



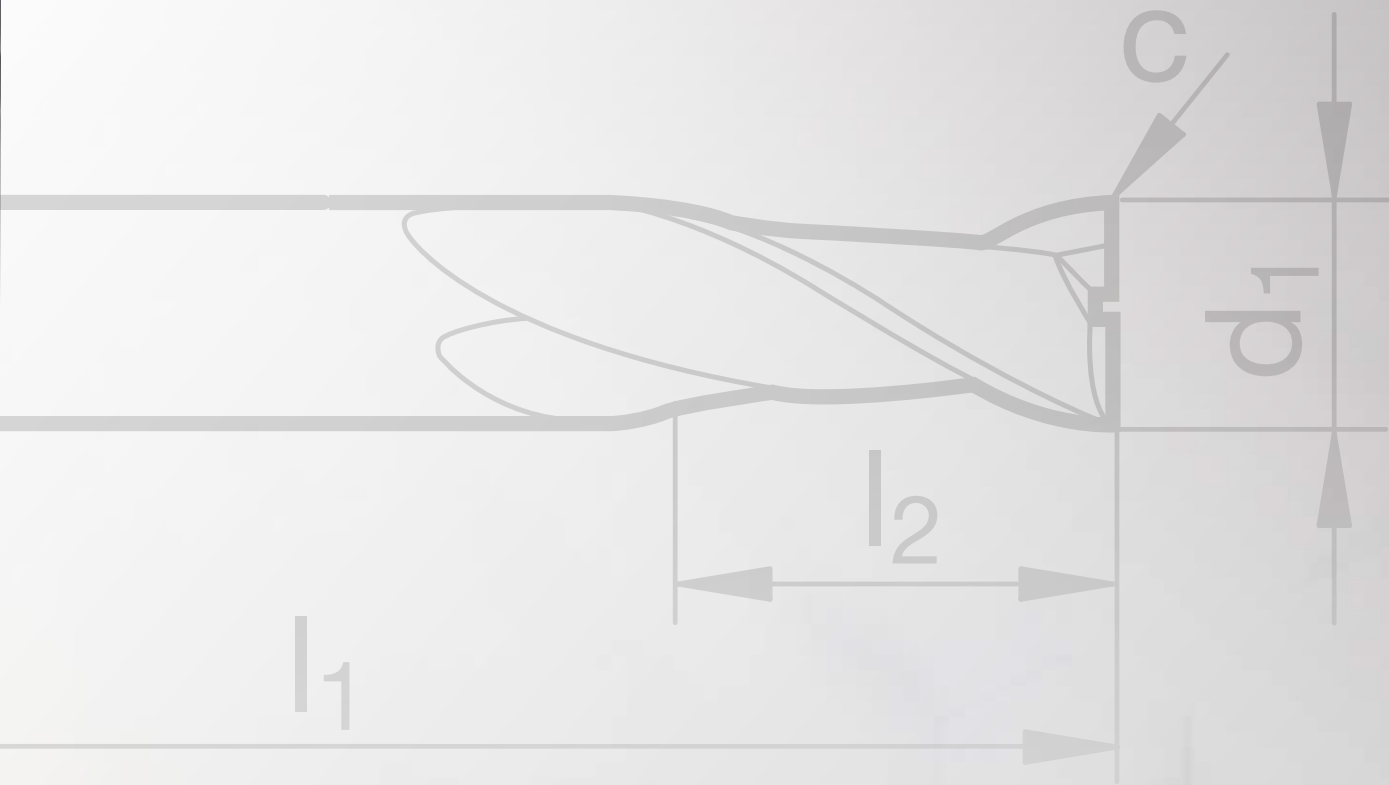
Series no. 19957							EDP Number
d1 e8	d2 h6	l1	l2	c	No. of	Code no.	
inch	inch	inch	inch	in x 45°	flutes		
1/8	1/8	2 1/4	3/4	0.005	4	3.170	9199570031700
3/16	3/16	2 1/2	3/4	0.005	4	4.760	9199570047600
1/4	1/4	3	1 1/8	0.005	4	6.350	9199570063500
5/16	5/16	3	1 1/8	0.005	4	7.940	9199570079400
3/8	3/8	3	1 1/8	0.005	4	9.520	9199570095200
7/16	7/16	4	2	0.010	4	11.110	9199570111100
1/2	1/2	4	2	0.010	4	12.700	9199570127000
5/8	5/8	5	2 1/4	0.010	4	15.870	9199570158700
3/4	3/4	5	2 1/4	0.010	4	19.050	9199570190500
1	1	5	2 1/4	0.010	4	25.400	9199570254000

The background image shows a close-up of a lathe machine. A large, polished metal workpiece is being turned, with a grooving tool (a small, pointed tool) cutting a groove into its end. The tool is mounted on a dark, industrial-looking carriage. The Gühring logo is in the top left corner.

GUHRING

GROOVING SYSTEMS

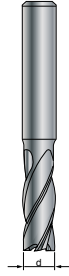
Highest quality and flexibility
thanks to a vast product offering.
All from one supplier.



TECHNICAL

Feeds & Speeds for SELECT MILL HPC end mills

***Large cutting depths and/or less than ideal machining conditions will require a reduction in both Surface Feet Per Minute and Inches Per Revolution ***



Surface feet per minute - SFM				
DOC (ap)		WOC (ae)		
High Speed Milling		Rough		Slot
DOC 2xd		DOC 1xd		
WOC .05xd	WOC .1xd	WOC .25xd	WOC .4 to .9xd	WOC 1xd

$$RPM = \frac{SFM}{d_1} \times 3.82$$

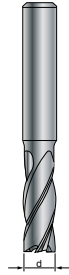
$$IPM = \text{No. of teeth} \times IPT \times RPM$$

For finishing use WOC (ae) .01 up to .1xd, use SFM from .25xd column, do not increase IPT from table values

Material	Hardness						1/8 3.17mm	1/4 6.35mm	5/16 7.94mm	3/8 9.52mm	1/2 12.70mm	5/8 15.87mm	3/4 19.05mm	1 25.40mm
		2.5	2.3	1.5	1	1	Multiply IPT x this factor based on WOC							
Structural + free-cutting steels, unalloyed heat-treatable + case hardened steels A283, 1151, 1215, L10, 10Lxx, 11Lxx, 12Lxx, 41Lxx, 51Lxx, 86Lxx, 86Lxx, 10xx	up to 28 HRc	1050	950	800	550	500	.0006	.0011	.0014	.0020	.0026	.0034	.0038	.0051
Free-cutting steels, unalloyed case hardened steels, nitriding steels 1151, 1215, L10, 10Lxx, 11Lxx, 12Lxx, 41Lxx, 51Lxx, 86Lxx, 86Lxx, 10xx, 11xx	28 to 38 HRc	945	855	720	495	450	.0005	.0010	.0013	.0018	.0024	.0030	.0035	.0048
Alloyed heat-treatable, tool and high speed steels 13xx, 2340, 31xx, 32xx, 33xx, 34xx, 40xx, 41xx, 43xx, 4640, 50xx, 51xx, 61xx, 71xx, 86xx, 87xx, 92xx, 98xx, 98xx, Ax, Ox, Dx, Hxx, Lx, Wx, Mx, Tx	28 to 44 HRc	735	665	560	385	350	.0005	.0009	.0012	.0016	.0021	.0026	.0032	.0044
Hardened Steels Carbon and Alloy Steels, Tool & Die Steels	Up to 54 HRc	420	380	320	220	200	.0004	.0008	.0009	.0013	.0017	.0020	.0026	.0034
	54 to 60 HRc	--	--	--	--	--	--	--	--	--	--	--	--	--
Stainless steel 303, 410, 420F, 430, 430F, 416	--	715	645	545	375	340	.0005	.0009	.0012	.0016	.0021	.0026	.0032	.0044
Stainless steel 304, 304L, 420, 17-4PH, 17-7PH, 15-5PH, 13-8PH	--	440	400	335	230	210	.0004	.0009	.0011	.0014	.0020	.0023	.0029	.0038
Stainless steel 310, 316, 316B, 316L, 317, Duplex	--	370	335	280	195	175	.0004	.0008	.0009	.0013	.0017	.0020	.0026	.0034
Titanium Alloys 6Al-4V, 5Al-2.5 Sn, 6Al-2Sn-4Zr-6Mo, 3Al-8V-6Cr4Mo-4Zr, 10V-2Fe-3Al, 13V-11Cr-3Al	up to 42 HRc	355	320	270	185	170	.0003	.0006	.0008	.0010	.0014	.0017	.0020	.0027
High-Temperature Alloys Inconel, Nimonic, Monel, Hastelloy, Waspalloy, A286, Rene 41, Udimet, Stellite	up to 42 HRc	180	160	135	95	85	.0003	.0005	.0007	.0008	.0011	.0013	.0016	.0020
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	945	855	720	495	450	.0006	.0012	.0015	.0020	.0028	.0033	.0042	.0054
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	810	730	615	425	385	.0005	.0011	.0014	.0018	.0024	.0030	.0035	.0048
Aluminum, Al-wrought alloys, Al-alloys 2024, 6061, 7075, 1050, 6351, 5005, 2017, 7075	up to 3% Si	--	--	--	--	--	--	--	--	--	--	--	--	--
Aluminium-cast alloys 3.2131 G-AISI5Cu1, 3.2153 G-AISI7Cu3, 3.2573 G-AISI9, 3.2581 G-AISI12, 3.2583 G-AISI12Cu, - G-AISI12CuNiMg	over 3% Si	--	--	--	--	--	--	--	--	--	--	--	--	--
Magnesium-alloys MgMn2, G-MgAl8Zn1, G-MgAl6Zn3	—	--	--	--	--	--	--	--	--	--	--	--	--	--
Non-ferrous metals (copper, short- or long-chipping brass or bronze)	up to 28 HRc	--	--	--	--	--	--	--	--	--	--	--	--	--

Feeds & Speeds for SELECT MILL Fine tooth roughing end mills

***Large cutting depths and/or less than ideal machining conditions will require a reduction in both Surface Feet Per Minute and Inches Per Revolution ***



$$RPM = \frac{SFM}{d_1} \times 3.82$$

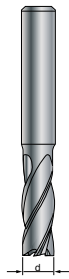
$$IPM = \text{No. of teeth} \times IPT \times RPM$$

For finishing use WOC (ae) .01 up to .1xd, use SFM from .25xd column, do not increase IPT from table values

			Feed Rate Inch per Tooth - IPT							
			d1 End Mill Diameter							
Material	Hardness	SFM	1/8 3.17mm	1/4 6.35mm	5/16 7.94mm	3/8 9.52mm	1/2 12.70mm	5/8 15.87mm	3/4 19.05mm	1 25.40mm
Structural + free-cutting steels, unalloyed heat-treatable + case hardened steels A283, 1151, 1215, L10, 10Lxx, 11Lxx, 12Lxx, 41Lxx, 51Lxx, 86Lxx, 86Lxx, 10xx	up to 28 HRc	--	--	--	--	--	--	--	--	--
Free-cutting steels, unalloyed case hardened steels, nitriding steels 1151, 1215, L10, 10Lxx, 11Lxx, 12Lxx, 41Lxx, 51Lxx, 86Lxx, 86Lxx, 10xx, 11xx	28 to 38 HRc	--	--	--	--	--	--	--	--	--
Alloyed heat-treatable, tool and high speed steels 13xx, 2340, 31xx, 32xx, 33xx, 34xx, 40xx, 41xx, 43xx, 4640, 50xx, 51xx, 61xx, 71xx, 86xx, 87xx, 92xx, 98xx, 98xx, Ax, Ox, Dx, Hxx, Lx, Wx, Mx, Tx	28 to 44 HRc	250	.0003	.0005	.0007	.0009	.0012	.0014	.0020	.0024
Hardened Steels Carbon and Alloy Steels, Tool & Die Steels	Up to 54 HRc	140	.0002	.0004	.0005	.0007	.0009	.0010	.0013	.0017
	54 to 60 HRc	70	.0001	.0003	.0005	.0006	.0008	.0009	.0011	.0014
Stainless steel 303, 410, 420F, 430, 430F, 416	--	--	--	--	--	--	--	--	--	--
Stainless steel 304, 304L, 420, 17-4PH, 17-7PH, 15-5PH, 13-8PH	--	--	--	--	--	--	--	--	--	--
Stainless steel 310, 316, 316B, 316L, 317, Duplex	--	--	--	--	--	--	--	--	--	--
Titanium Alloys 6Al-4V, 5Al-2.5 Sn, 6Al-2Sn-4Zr-6Mo, 3Al-8V-6Cr4Mo-4Zr, 10V-2Fe-3Al, 13V-11Cr-3Al	up to 42 HRc	--	--	--	--	--	--	--	--	--
High-Temperature Alloys Inconel, Nimonic, Monel, Hastelloy, Waspalloy, A286, Rene 41, Udimet, Stellite	up to 42 HRc	--	--	--	--	--	--	--	--	--
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	280	.0004	.0009	.0011	.0014	.0020	.0023	.0029	.0037
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	250	.0004	.0009	.0010	.0014	.0018	.0023	.0026	.0037
Aluminum, Al-wrought alloys, Al-alloys 2024, 6061, 7075, 1050, 6351, 5005, 2017, 7075	up to 3% Si	--	--	--	--	--	--	--	--	--
Aluminium-cast alloys 3.2131 G-AISI5Cu1, 3.2153 G-AISI7Cu3, 3.2573 G-AISI9, 3.2581 G-AISI12, 3.2583 G-AISI12Cu, - G-AISI12CuNiMg	over 3% Si	--	--	--	--	--	--	--	--	--
Magnesium-alloys MgMn2, G-MgAl8Zn1, G-MgAl6Zn3	--	--	--	--	--	--	--	--	--	--
Non-ferrous metals (copper, short- or long-chipping brass or bronze)	up to 28 HRc	--	--	--	--	--	--	--	--	--

Feeds & Speeds for SELECT MILL Aluminum end mills

***Large cutting depths and/or less than ideal machining conditions will require a reduction in both Surface Feet Per Minute and Inches Per Revolution ***



Surface feet per minute - SFM				
High Speed Milling			Rough	Slot
DOC 2xd			DOC 1xd	
WOC .05xd	WOC .1xd	WOC .25xd	WOC .4 to .9xd	WOC 1xd

$$RPM = \frac{SFM}{d_1} \times 3.82$$

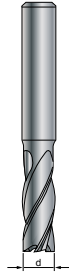
$$IPM = \text{No. of teeth} \times IPT \times RPM$$

For finishing use WOC (ae) .01 up to .1xd, use SFM from .25xd column, do not increase IPT from table values

Material	Hardness						Feed Rate Inch per Tooth - IPT							
							d1 End Mill Diameter							
							1/8 3.17mm	1/4 6.35mm	5/16 7.94mm	3/8 9.52mm	1/2 12.70mm	5/8 15.87mm	3/4 19.05mm	1 25.40mm
		2.5	2.3	1.5	1	1	Multiply IPT x this factor based on WOC							
Structural + free-cutting steels, unalloyed heat-treatable + case hardened steels	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hardened Steels	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Stainless steel	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Titanium Alloys	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cast iron, grey cast iron, spheroidal graphite and malleable cast iron	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aluminum, Al-wrought alloys, Al-alloys 2024, 6061, 7075, 1050, 6351, 5005, 2017, 7075	up to 3% Si	1755	1585	1335	920	835	.0005	.0011	.0014	.0018	.0024	.0030	.0035	.0048
Aluminium-cast alloys 3.2131 G-AISI5Cu1, 3.2153 G-AISI7Cu3, 3.2573 G-AISI9, 3.2581 G-AISI12, 3.2583 G-AISI12Cu, - G-AISI12CuNiMg	over 3% Si	1050	950	800	550	500	.0005	.0009	.0012	.0016	.0021	.0026	.0032	.0044
Magnesium-alloys MgMn2, G-MgAl8Zn1, G-MgAl6Zn3	—	885	810	680	470	425	.0004	.0009	.0011	.0014	.0020	.0023	.0029	.0037
Non-ferrous metals (copper, short- or long-chipping brass or bronze)	up to 28 HRc	1155	1045	880	605	550	.0005	.0009	.0012	.0016	.0021	.0026	.0032	.0044

Feeds & Speeds for SELECT MILL General purpose end mills

***Large cutting depths and/or less than ideal machining conditions will require a reduction in both Surface Feet Per Minute and Inches Per Revolution ***



$$RPM = \frac{SFM}{d_1} \times 3.82$$

$$IPM = \text{No. of teeth} \times IPT \times RPM$$

For finishing use WOC (ae) .01 up to .1xd, use SFM from .25xd column, do not increase IPT from table values

Material	Hardness	SFM
Structural + free-cutting steels, unalloyed heat-treatable + case hardened steels A283, 1151, 1215, L10, 10Lxx, 11Lxx, 12Lxx, 41Lxx, 51Lxx, 86Lxx, 86Lxx, 10xx	up to 28 HRc	340
Free-cutting steels, unalloyed case hardened steels, nitriding steels 1151, 1215, L10, 10Lxx, 11Lxx, 12Lxx, 41Lxx, 51Lxx, 86Lxx, 86Lxx, 10xx, 11xx	28 to 38 HRc	300
Alloyed heat-treatable, tool and high speed steels 13xx, 2340, 31xx, 32xx, 33xx, 34xx, 40xx, 41xx, 43xx, 4640, 50xx, 51xx, 61xx, 71xx, 86xx, 87xx, 92xx, 98xx, 98xx, Ax, Ox, Dx, Hxx, Lx, Wx, Mx, Tx	28 to 44 HRc	225
Hardened Steels Carbon and Alloy Steels, Tool & Die Steels	Up to 54 HRc	100
	54 to 60 HRc	--
Stainless steel 303, 410, 420F, 430, 430F, 416	--	220
Stainless steel 304, 304L, 420, 17-4PH, 17-7PH, 15-5PH, 13-8PH	--	150
Stainless steel 310, 316, 316B, 316L, 317, Duplex	--	130
Titanium Alloys 6Al-4V, 5Al-2.5 Sn, 6Al-2Sn-4Zr-6Mo, 3Al-8V-6Cr-4Mo-4Zr, 10V-2Fe-3Al, 13V-11Cr-3Al	up to 42 HRc	110
High-Temperature Alloys Inconel, Nimonic, Monel, Hastelloy, Waspalloy, A286, Rene 41, Udimet, Stellite	up to 42 HRc	70
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	310
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	265
Aluminum, Al-wrought alloys, Al-alloys 2024, 6061, 7075, 1050, 6351, 5005, 2017, 7075	up to 3% Si	835
Aluminium-cast alloys 3.2131 G-AISI5Cu1, 3.2153 G-AISI7Cu3, 3.2573 G-AISI9, 3.2581 G-AISI12, 3.2583 G-AISI12Cu, - G-AISI12CuNiMg	over 3% Si	500
Magnesium-alloys MgMn2, G-MgAl6Zn1, G-MgAl6Zn3	—	800
Non-ferrous metals (copper, short- or long-chipping brass or bronze)	up to 28 HRc	330

Feed Rate Inch per Tooth - IPT							
d1 End Mill Diameter							
1/8 3.17mm	1/4 6.35mm	5/16 7.94mm	3/8 9.52mm	1/2 12.70mm	5/8 15.87mm	3/4 19.05mm	1 25.40mm
.0004	.0009	.0011	.0014	.0018	.0023	.0026	.0038
.0004	.0009	.0011	.0014	.0018	.0023	.0026	.0038
.0004	.0008	.0009	.0013	.0017	.0020	.0026	.0034
.0003	.0004	.0006	.0008	.0010	.0014	.0016	.0020
--	--	--	--	--	--	--	--
.0003	.0006	.0008	.0009	.0013	.0017	.0020	.0027
.0003	.0005	.0006	.0009	.0011	.0014	.0016	.0024
.0002	.0004	.0006	.0008	.0010	.0014	.0016	.0020
.0002	.0003	.0004	.0006	.0008	.0010	.0013	.0017
.0002	.0003	.0004	.0006	.0008	.0010	.0013	.0017
.0004	.0008	.0010	.0013	.0017	.0020	.0026	.0034
.0003	.0007	.0009	.0010	.0014	.0017	.0022	.0027
.0007	.0013	.0017	.0020	.0028	.0033	.0042	.0054
.0006	.0011	.0014	.0018	.0024	.0030	.0035	.0048
.0006	.0011	.0014	.0018	.0024	.0030	.0035	.0048
.0004	.0009	.0011	.0014	.0020	.0023	.0029	.0041

Guhring's tool dispensing systems TM 326, TM 426 and TM 526 optimize your tool storage and your tool management. Gain increased security of your tool stock and increase the transparency of your tool management!



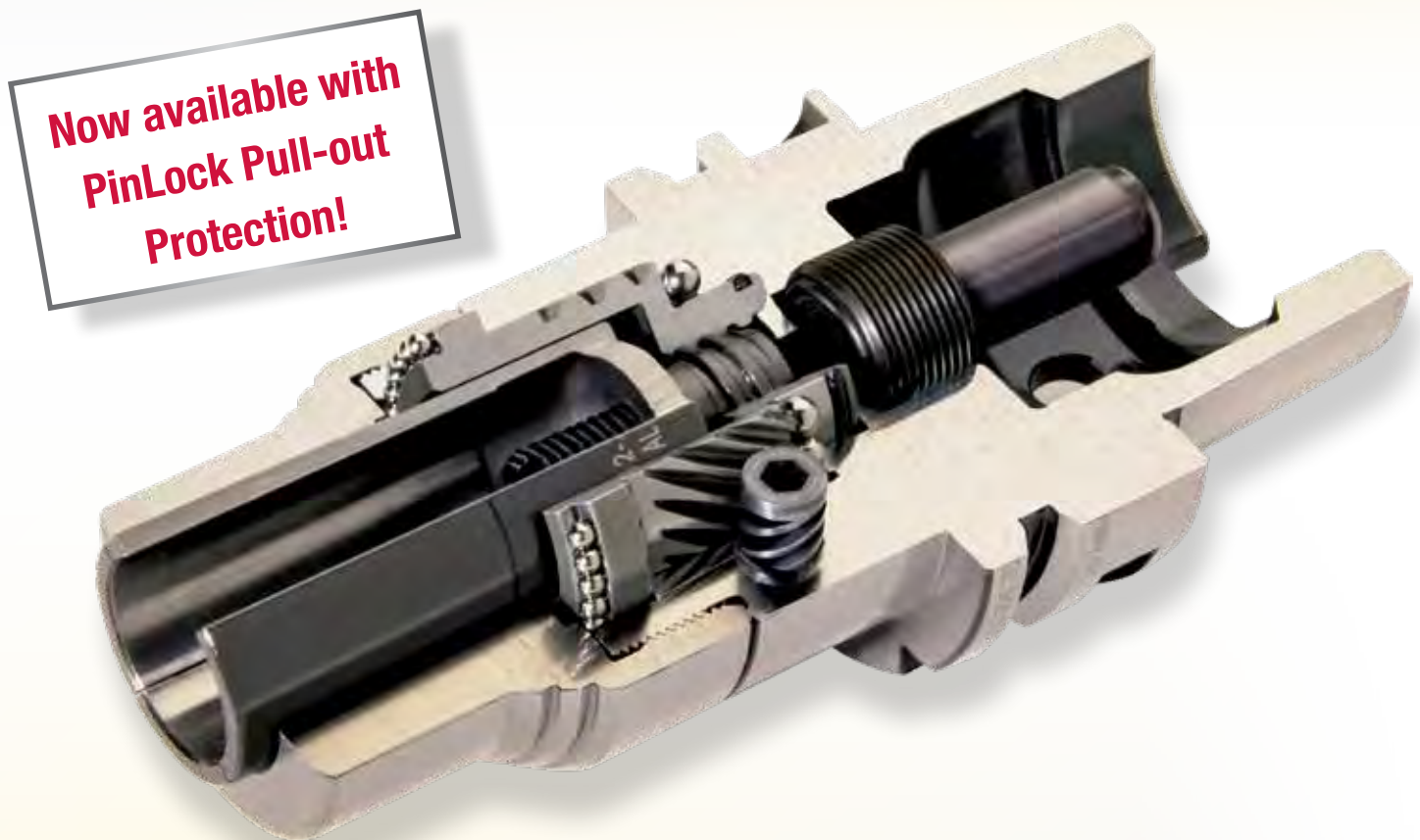


GUHRING

Recommended holders for Guhring end mills:

HPC PRECISION CLAMPING CHUCKS

Guhring's precision clamping chucks offer extremely high clamping forces while maintaining extremely tight concentricity tolerances, making it an ideal solution for milling operations, as well as drilling and reaming applications. It excels in both heavy-duty and high-speed machining applications. The special clamping sleeve is clamped via a worm gear, which transfers the optimal clamping force onto the tool shank. This creates clamping forces of > 200 Nm for 12 mm shank diameters and > 300 Nm for 16 mm shank diameters.



**Now available with
PinLock Pull-out
Protection!**

This system offers the following advantages:

- Increased cutting depths in comparison to conventional tool holders
- Increased radial engagement and subsequently higher material removal rate
- Maintenance-free technology
- Suitable for use with both round shanks and flatted shanks
- Concentricity 3 μm with 2,5 x D
- Balancing quality: G2.5 / 20.000 rev./min or U< 1.2gmm

ISO materials

P	Steel, high-alloyed steel
M	Stainless steel Stainless
K	Grey cast iron, sph. graphite/mall. cast iron
N	Aluminum and other non-ferrous metals
S	Special, super and titanium alloys
H	Hardened steel and chilled cast iron

Pictograms

Tool material	VHM Solid carbide finest grain (HM-UF)				
Shank form	HA HB to DIN 6535				
Standard	DIN 6527 L WN to DIN to Guhring standard				
Type	N W NH HRf				
Application	Slotting Roughing Ramping Helix Drilling Finishing Copying				
Length	short (DIN) long (DIN) medium extra length				
No. of cutting edges	2 3 4 6 3-4 3-5 no. of major cutting edges				
Helix angle	20° 30° 35° 45° 35° 38° Size of helix angle / no. of different helix angles				
Rake angle	-3° 7° 9° 12° 15° Rake angle of circumference cutting edges				
Cutting edge form	45° 90° R±0,05 Corner chamfer Radius with tolerance				
Feed	for lateral feed for lateral feed and oblique plunging for lateral feed, oblique plunging and drilling				



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