

# GUHRING

**NEW**



SpyroTec Chamfer Mills

- ▶ EW 100 G Deburring fork
- ▶ EWR 500 Deburring reamer
- ▶ SpyroTec chamfer mill
- ▶ Straight flute chamfer mill
- ▶ Front/back deburring mill
- ▶ Ball nose deburring mill



## Deburring tools



GUHRING – YOUR WORLDWIDE PARTNER

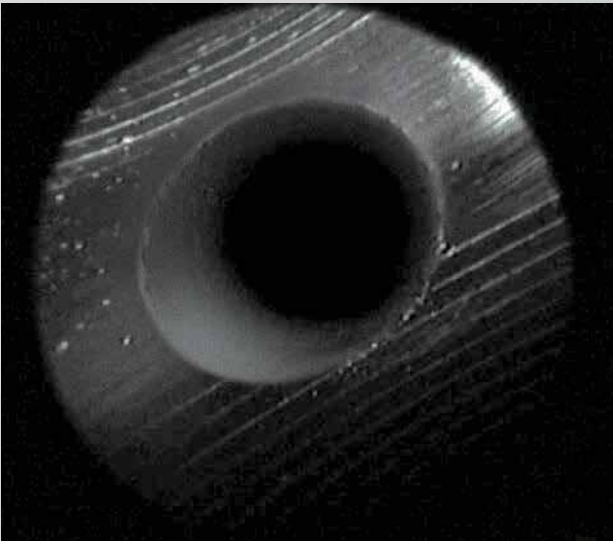


# Deburring tools

Internal and external deburring operations – quick, clean and fully automated



**Exit**  
of hole drilled in component prior to ...



...and following machining with deburring tool.

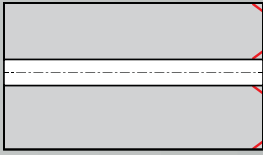
Guhring provides a comprehensive standard range of deburring tools, including the world's first solid carbide deburring tools. These tools allow for the automated deburring of hole entry, hole exit, and cross-hole exit, all while the part remains in your machine. Instead of implementing time-consuming and inefficient off-line manual deburring processes, you can reduce your production time by automating your deburring operations on your machine tool.

From a quality standpoint, the requirement for the deburring of intersecting cross-holes is becoming increasingly critical. For example, on oil galleries in modern high-performance engines, the optimal flow rate is dependent on seamless deburring of the exit. Precision deburring and chamfering is also required in crankshafts, valve blocks, steering arms, axle housings, drivetrain components, injector nozzles, and brake cylinders.

Although deburring the entry of cross-drilled holes rarely causes a problem, deburring the exit typically involves a more complicated operation which is usually performed manually off-line, resulting in a time-consuming and cost-prohibitive process. Guhring's latest innovation, the EWR 500 deburring reamer, is well-suited for these applications.

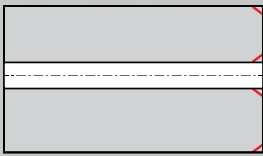
With multiple deburring tool options at your disposal, Guhring helps you achieve your complex deburring needs through automated processes. This results in considerable cost-savings and productivity gains, and more importantly, improved part quality and process reliability. In addition to our standard program, Guhring offers custom-made deburring tools manufactured specifically to meet your application requirements.

## SpyroTec spiral fluted chamfer mill



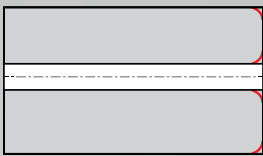
p. 6

## Straight flute chamfer mill



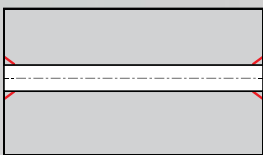
p. 10

## Corner rounding milling cutters



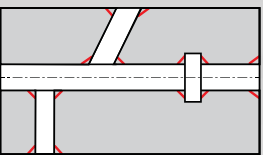
p. 15

## Front/back deburring mill



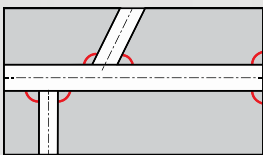
p. 16

## EW 100 G Deburring fork



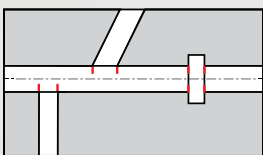
p. 18

## Ball-nose deburring mill



p. 21

## EWR 500 Deburring reamer



p. 22

# SpyroTec

# GUHRING

**THE INNOVATIVE, HELICAL HSS  
AND HSCO COUNTERSINK**

**NEW**  
SpyroTec 60°



CONVEX CUTTING EDGES

// Three different convex cutting edges in combination with three unequal helix angles enable extremely stable and low-vibration cutting processes without any chatter marks.



TiAlN COATING

// The titanium aluminum nitride coating provides high hardness and excellent thermal protection.



CUTTING MATERIAL

// The high-speed steel cobalt substrate holds up well in high temperature applications, providing long tool life in a wide variety of materials.

	Material group	Examples
<b>P</b>	Common structural steels	A283, A516, Gr50, 30, 35, 42, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90, 100, 110, 135, 140, 145, 150, 160
	Free-cutting steels	1151, 1215, L10, 10L10, 10L15, 10L17, 10L20, 10L23, 10L25, 10L30, 10L35, 10L40, 10L42, 10L45, 10L49, 10L50, 10L55, 11L15, 11L16, 11L17, 11L37, 11L38, 11L39, 11L41, 11L44, 11L46, 12L11, 12L12, 12L13, 12L14, 12L15, 41L25, 41L30, 41L35, 41L40, 41L42, 41L47, 41L50 51L15, 51L17, 51L20, 86L20, 86L40
	Unalloyed heat-treatable steels	1005, 1006, 1008, 1009, 1010, 1011, 1012, 1013, 1015, 1016, 1017, 1018, 1019, 1020, 1021, 1022, 1023, 1025, 1026, 1029, 1030, 1033, 1035, 1037, 1038, 1039, 1040, 1042, 1043, 1044, 1045, 1046, 1049, 1050, 1053, 1055, 1059, 1060, 1064, 1065, 1069, 1070, 1071, 1074, 1075, 1078, 1080, 1084, 1085, 1086, 1090, 1095
	Alloyed heat-treatable steels	1330, 1335, 1340, 1345, 2340, 3140, 3145, 3150, 3230, 3240, 3335, 3340, 3435, 3450, 4032, 4037, 4063, 4130, 4135, 4137, 4140, 4142, 4145, 4147, 4150, 4161, 4337, 4340, 4640, 5045, 5046, 5060, 5130, 5132, 5135, 5140, 5145, 5157, 5150, 5155, 5160, 6130, 6135, 6140, 6145, 6150, 7140, 6145, 6150, 7140, 8630, 8632, 8635, 8637, 8640, 8642, 8645, 8650, 8650, 8660, 8735, 8740, 8742, 9250, 9254, 9255, 9260, 9262, 9840, 9850
	Unalloyed case hardened steels	1005, 1006, 1008, 1009, 1010, 1011, 1012, 1013, 1015, 1016, 1017, 1018, 1019, 1020, 1021, 1022, 1023, 1025, 1026, 1029, 1030, 1033, 1035, 1037, 1038, 1039, 1040, 1042, 1043, 1044, 1045, 1046, 1049, 1050, 1053, 1055, 1059, 1060, 1064, 1065, 1069, 1070, 1071, 1074, 1075, 1078, 1080, 1084, 1085, 1086, 1090, 1095
	Alloyed case hardened steels	2317, 2512, 2515, 2517, 3115, 3120, 3215, 3220, 3312, 3316, 3325, 4012, 4023, 4024, 4027, 4028, 4118, 4119, 4125, 4317, 4320, 4419, 4422, 4427, 4608, 4615, 4617, 4620, 4621, 4626, 4718, 4720, 4815, 4817, 4820, 5015, 5115, 5117, 5120, 6115, 6118, 6120, 6125, 8115, 8615, 8617, 8620, 8622, 8625, 8627, 8720, 8822, 9310, 9315, 9317
	Nitriding steels	1132, 1137, 1138, 1139, 1140, 1141, 1144, 1145, 1146, 1151
	Tool steels	A2, A3, A4, A5, A6, A8, A9, A10, O1, O2, O6, O7, A7, D2, D3, D4, D5, D7, H10, H11, H12, H13, H14, H19, H20, H21, H22, H23, H24, H25, H26, H41, H42, H43, L1, L3, W1, W2, W5
	High speed steels	M1, M2, M3-1, M3-2, M4, M6, M7, M10, M30, M33, M34, M36, M41, M42, M43, M44, M46, M47, T1, T2, T4, T5, T6, T8, T15
	Spring steels	5150, 5155, 6145, 6150, 9255
<b>H</b>	Hardened steels >48-60 Rc	Heat Treated Steels
<b>M</b>	Stainless steels, sulphured	203 Ez, 303 Se, 303 Ma, 303 Pb, 303 PlusX, 430F Se, 416 Se, 416 PlusX, 420F, 420F Se, 440F, 440F Se
	austenitic	201, 202, 301, 302B, 303, 304, 304L, 305, 308, 309, 309S, 310, 310S, 314, 316, 316L, 317, 321, 330, 347, 348, 384, 385, Nitronic 32, Nitronic 33, Nitronic 40, Nitronic 50, Nitronic 60, 17-7PH
	martensitic	403, 405, 410, 414, 416, 420, 422, 430, 431, 440A, 440B, 440C, 446, 501, 502, 630, Greek Ascoloy
<b>K</b>	Cast iron	A48-20 B, A48-30 B, A48-40 B, A48-50B, A159G1800, A159G2500, A159G3000, A159G3500, A159G4000
	Spheroidal graphite iron and malleable cast iron	60-10-18, 60-40-18, 65-45-12, 80-55-06, 100-70-03, 120-90-02, 32510, 35018, 40010, 50005, 60004, 70003, 80002, 90001, A220-70003, A220-8002, A536
	Chilled cast iron	
<b>S</b>	Special alloys	Inconel, Hastelloy, Monel, Nimonic, MAR-M246, DS-Ni, Waspalloy, Rene41
	Ti and Ti-alloys	Ti6AL4V, 5390A, TiCu2
<b>N</b>	Aluminium and Al-alloys	EC 1060, 1100, 1145, 1175, 1235, 2011, 2014, 2017, 2018, 2021, 2024, 2025, 2117, 2218, 2219, 2618, 3003, 3004, 3005, 4032, 4032-T6, 5005, 5050, 5052, 5056, 5083, 5086, 5154, 5252, 5254, 5454, 5456, 5457, 5652, 5657, 6053, 6061, 6061-T6, 6063, 6066, 6070, 6101, 6151, 6253, 6262, 6463, 6951, 7001, 7004, 7005, 7039, 7049, 7050, 7075, 7075-T6, 7079, 7175, 7178
	Al wrought alloys	1100-0, 3003-H18, 5056-0, 2024-T4, 4043-H18
	Al cast alloys	295-T6, 319-F, 356-T6, 380-F, 384-F, 390-F, 443-F, 413-F, 518-F, 713-TS, 850-TS
	Magnesium alloys	AZ31B, AZ63A, AZ80A, AZ91C, EZ33A, HK31A, QE22A, ZK60A
	Copper, low-alloyed	C10100, C27000, C71500, C52400, C77000, C17200, C71500, C95500, C86500
	Brass, short-chipping	CUZn10, CUZn20

# SpyroTec

**THE SPIRAL-FLUTED 90° CHAMFERING MILLING CUTTER,  
5 CUTTING EDGES**

**Flutes extend to the face**  
to allow for use of the entire  
cutting edge.

**5 different helix angles**  
(20°-24°) and **variable**  
**spaced flutes** reduce  
vibrations.

**Spiral cutting edge**  
**geometry and positive rake**  
**angle** ensures smooth cutting  
action and optimal surface  
finish in large chamfers.

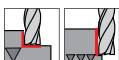
**Fine grain carbide**  
**and TiAlN coating** for  
long tool life.



90° Chamfer mill, spiral-flute

Series

6876



Tool material

Solid Carbide

Coating

nano-A™

Type

N

Shank



Internal cooling



Material		Suitability
<b>P</b>	Steel	●
<b>M</b>	Stainless steel	●
<b>K</b>	Cast iron	○
<b>N</b>	Aluminum	●
<b>S</b>	Ni / Ti alloys	●
<b>H</b>	Hardened steel	
●=Optimal ○=Secondary		

- face cutting
- without center cutting

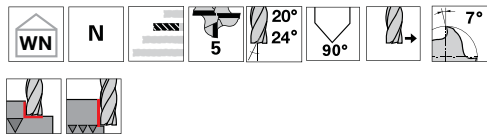


d1 js9	d2 h6	d3	l1	l2	Z	Code no.	EDP Number
fract	inch	inch	fract	fract	no. flutes		
1/4	0.2500	0.063	2 1/2	3/32	5	6.350	9068760063500
5/16	0.3125	0.078	2 1/2	7/64	5	7.940	9068760079400
3/8	0.3750	0.094	2 1/2	9/64	5	9.520	9068760095200
1/2	0.5000	0.125	3 1/2	3/16	5	12.700	9068760127000
5/8	0.6250	0.156	3 1/2	15/64	5	15.870	9068760158700
3/4	0.7500	0.188	4	9/32	5	19.050	9068760190500

Speeds & Feeds - Chamfering milling cutters

ISO	Hardness	SFM	Feed Rate IPT per Ø							SFM	Feed Rate IPT per Ø						
			1/8	1/4	5/16	3/8	1/2	5/8	3/4		1/8	1/4	5/16	3/8	1/2	5/8	3/4
<b>P</b>	Up to 25 HRC	<b>630</b>	0.0007	0.0014	0.0019	0.0024	0.0031	0.0039	0.0051	<b>820</b>	0.0010	0.0023	0.0031	0.0040	0.0051	0.0067	0.0083
	Over 25 HRC	<b>460</b>	0.0006	0.0012	0.0016	0.0024	0.0028	0.0035	0.0047		<b>590</b>	0.0010	0.0020	0.0028	0.0039	0.0047	0.0063
<b>M</b>	Up to 20 HRC	<b>390</b>	0.0005	0.0010	0.0013	0.0018	0.0020	0.0028	0.0035	<b>525</b>	0.0008	0.0017	0.0022	0.0031	0.0035	0.0047	0.0059
	20-30 HRC	<b>260</b>	0.0004	0.0007	0.0010	0.0014	0.0016	0.0024	0.0028		<b>325</b>	0.0006	0.0013	0.0017	0.0024	0.0028	0.0039
<b>K</b>	< 240 HB	<b>560</b>	0.0006	0.0012	0.0016	0.0024	0.0028	0.0035	0.0047	<b>755</b>	0.0010	0.0020	0.0028	0.0039	0.0047	0.0063	0.0079
<b>N</b>	< 7% Si	<b>820</b>	0.0009	0.0019	0.0024	0.0031	0.0039	0.0051	0.0067	<b>1080</b>	0.0015	0.0031	0.0041	0.0055	0.0067	0.0087	0.0110
<b>S</b>	Ti alloys ≤ 42 HRC	<b>260</b>	0.0003	0.0007	0.0009	0.0012	0.0016	0.0020	0.0023	<b>325</b>	0.0005	0.0011	0.0014	0.0018	0.0024	0.0030	0.0035
	Hi Temp ≤ 42 HRC	<b>130</b>	0.0004	0.0006	0.0008	0.0009	0.0013	0.0016	0.0019		<b>190</b>	0.0006	0.0009	0.0012	0.0014	0.0020	0.0024
<b>H</b>	Up to 55 HRC	<b>160</b>	0.0005	0.0010	0.0013	0.0020	0.0020	0.0027	0.0035	<b>230</b>	0.0008	0.0016	0.0022	0.0031	0.0035	0.0047	0.0059
	55 - 63 HRC	<b>130</b>	0.0004	0.0008	0.0010	0.0015	0.0016	0.0023	0.0027		<b>200</b>	0.0007	0.0013	0.0017	0.0023	0.0027	0.0039

90° Chamfer mill, spiral-flute Series **6992** **6993**



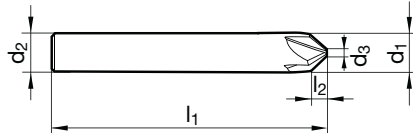
Tool material  
Coating  
Type  
Shank  
Internal cooling

Solid Carbide		Solid Carbide	
nano-A™		nano-A™	
N		N	

Material	Suitability
<b>P</b> Steel	●
<b>M</b> Stainless steel	●
<b>K</b> Cast iron	○
<b>N</b> Aluminum	●
<b>S</b> Ni / Ti alloys	●
<b>H</b> Hardened steel	

●=Optimal ○=Secondary

- face cutting
- without center cutting



d1 js9	d2 h6	d3	l1	l2	Z	Code no.	EDP Number	EDP Number
mm	mm	mm	mm	m	no. flutes			
6.000	6.000	1.500	57.000	2.250	5	6.000	9069920060000	9069930060000
8.000	8.000	2.000	63.000	3.000	5	8.000	9069920080000	9069930080000
10.000	10.000	2.500	72.000	3.750	5	10.000	9069920100000	9069930100000
12.000	12.000	3.000	83.000	4.500	5	12.000	9069920120000	9069930120000
16.000	16.000	4.000	92.000	6.000	5	16.000	9069920160000	9069930160000
20.000	20.000	5.000	104.000	7.500	5	20.000	9069920200000	9069930200000

Speeds & Feeds - Chamfering milling cutters

ISO	Hardness
<b>P</b>	Up to 25 HRC Over 25 HRC
<b>M</b>	Up to 20 HRC 20-30 HRC
<b>K</b>	< 240 HB
<b>N</b>	< 7% Si
<b>S</b>	Ti alloys ≤ 42 HRC Hi Temp ≤ 42 HRC
<b>H</b>	Up to 55 HRC 55 - 63 HRC

SFM	Feed Rate IPT per Ø							
	3	6	8	10	12	16	20	
	<b>Chamfering</b> ap/ae max = 0.25 x D							
<b>630</b>	0.0007	0.0014	0.0019	0.0024	0.0031	0.0039	0.0051	
<b>460</b>	0.0006	0.0012	0.0016	0.0024	0.0028	0.0035	0.0047	
<b>390</b>	0.0005	0.0010	0.0013	0.0018	0.0020	0.0028	0.0035	
<b>260</b>	0.0004	0.0007	0.0010	0.0014	0.0016	0.0024	0.0028	
<b>560</b>	0.0006	0.0012	0.0016	0.0024	0.0028	0.0035	0.0047	
<b>820</b>	0.0009	0.0019	0.0024	0.0031	0.0039	0.0051	0.0067	
<b>260</b>	0.0003	0.0007	0.0009	0.0012	0.0016	0.0020	0.0023	
<b>130</b>	0.0004	0.0006	0.0008	0.0009	0.0013	0.0016	0.0019	
<b>160</b>	0.0005	0.0010	0.0013	0.0020	0.0020	0.0027	0.0035	
<b>130</b>	0.0004	0.0008	0.0010	0.0015	0.0016	0.0023	0.0027	

SFM	Feed Rate IPT per Ø							
	3	6	8	10	12	16	20	
	<b>Deburring</b> ap/ae max = 0.05 x D							
<b>820</b>	0.0010	0.0023	0.0031	0.0040	0.0051	0.0067	0.0083	
<b>590</b>	0.0010	0.0020	0.0028	0.0039	0.0047	0.0063	0.0079	
<b>525</b>	0.0008	0.0017	0.0022	0.0031	0.0035	0.0047	0.0059	
<b>325</b>	0.0006	0.0013	0.0017	0.0024	0.0028	0.0039	0.0047	
<b>755</b>	0.0010	0.0020	0.0028	0.0039	0.0047	0.0063	0.0079	
<b>1080</b>	0.0015	0.0031	0.0041	0.0055	0.0067	0.0087	0.0110	
<b>325</b>	0.0005	0.0011	0.0014	0.0018	0.0024	0.0030	0.0035	
<b>190</b>	0.0006	0.0009	0.0012	0.0014	0.0020	0.0024	0.0029	
<b>230</b>	0.0008	0.0016	0.0022	0.0031	0.0035	0.0047	0.0059	
<b>200</b>	0.0007	0.0013	0.0017	0.0023	0.0027	0.0039	0.0047	



# RT 100 **XF**

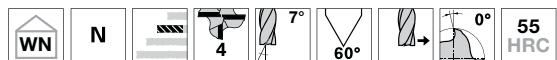
NEW.  
**EXTREME.**  
**POWERFUL.**

**EXCEPTIONAL** METAL REMOVAL RATE  
**POWERFUL** MACHINING

- Optimized operating parameters deliver **exceptional feed rates** and **metal removal rates**
- Internally developed exclusive finishing processes **maximize performance**
- **Reduced cycle times** for difficult-to-machine materials and special applications in high production



60° Chamfer mill, straight flute Series no. **6711** **6712**



Material		Suitability
<b>P</b>	Steel	●
<b>M</b>	Stainless steel	●
<b>K</b>	Cast iron	●
<b>N</b>	Aluminum	●
<b>S</b>	Ni / Ti alloys	●
<b>H</b>	Hardened steel	○

●=Optimal ○=Secondary

Tool material	Solid carbide	
Coating	TiAlN	TiAlN
Type	N	N
Shank form	HA	HB



d1 js9	d2 h6	l1	l2	Z	Code no.
mm	mm	mm	mm	no. flutes	
4.000	4.000	50.000	3.500	4	4.000
6.000	6.000	57.000	5.200	4	6.000
8.000	8.000	63.000	7.000	4	8.000
10.000	10.000	72.000	8.700	4	10.000
12.000	12.000	83.000	10.400	4	12.000

EDP Number	
9067110040000	
9067110060000	9067120060000
9067110080000	9067120080000
9067110100000	9067120100000
9067110120000	9067120120000

Speeds & Feeds - Chamfering milling cutters

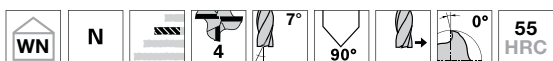
ISO	Hardness
<b>P</b>	Up to 25 HRC Over 25 HRC
<b>M</b>	Up to 20 HRC 20-30 HRC
<b>K</b>	< 240 HB
<b>N</b>	< 7% Si
<b>S</b>	Ti alloys ≤ 42 HRC Hi Temp ≤ 42 HRC
<b>H</b>	Up to 55 HRC 55 - 63 HRC

SFM	Feed Rate IPT per Ø						
	3	6	8	10	12	16	20
<b>Chamfering</b> ap/ae max = 0.25 x D							
<b>630</b>	0.0007	0.0014	0.0019	0.0024	0.0031	0.0039	0.0051
<b>460</b>	0.0006	0.0012	0.0016	0.0024	0.0028	0.0035	0.0047
<b>390</b>	0.0005	0.0010	0.0013	0.0018	0.0020	0.0028	0.0035
<b>260</b>	0.0004	0.0007	0.0010	0.0014	0.0016	0.0024	0.0028
<b>560</b>	0.0006	0.0012	0.0016	0.0024	0.0028	0.0035	0.0047
<b>820</b>	0.0009	0.0019	0.0024	0.0031	0.0039	0.0051	0.0067
<b>260</b>	0.0003	0.0007	0.0009	0.0012	0.0016	0.0020	0.0023
<b>130</b>	0.0004	0.0006	0.0008	0.0009	0.0013	0.0016	0.0019
<b>160</b>	0.0005	0.0010	0.0013	0.0020	0.0020	0.0027	0.0035
<b>130</b>	0.0004	0.0008	0.0010	0.0015	0.0016	0.0023	0.0027

SFM	Feed Rate IPT per Ø						
	3	6	8	10	12	16	20
<b>Deburring</b> ap/ae max = 0.05 x D							
<b>820</b>	0.0010	0.0023	0.0031	0.0040	0.0051	0.0067	0.0083
<b>590</b>	0.0010	0.0020	0.0028	0.0039	0.0047	0.0063	0.0079
<b>525</b>	0.0008	0.0017	0.0022	0.0031	0.0035	0.0047	0.0059
<b>325</b>	0.0006	0.0013	0.0017	0.0024	0.0028	0.0039	0.0047
<b>755</b>	0.0010	0.0020	0.0028	0.0039	0.0047	0.0063	0.0079
<b>1080</b>	0.0015	0.0031	0.0041	0.0055	0.0067	0.0087	0.0110
<b>325</b>	0.0005	0.0011	0.0014	0.0018	0.0024	0.0030	0.0035
<b>190</b>	0.0006	0.0009	0.0012	0.0014	0.0020	0.0024	0.0029
<b>230</b>	0.0008	0.0016	0.0022	0.0031	0.0035	0.0047	0.0059
<b>200</b>	0.0007	0.0013	0.0017	0.0023	0.0027	0.0039	0.0047

90° Chamfer mill, straight flute

Series no. **6713** **3396**



Tool material	Solid carbide	
Coating	TiAlN	TiAlN
Type	N	N
Shank form	HA	HB

Material		Suitability
<b>P</b>	Steel	●
<b>M</b>	Stainless steel	●
<b>K</b>	Cast iron	●
<b>N</b>	Aluminum	●
<b>S</b>	Ni / Ti alloys	●
<b>H</b>	Hardened steel	○

●=Optimal ○=Secondary



d1 js9	d2 h6	l1	l2	Z	Code no.
mm	mm	mm	mm	no. flutes	
4.000	4.000	50.000	2.000	4	4.000
6.000	6.000	57.000	3.000	4	6.000
8.000	8.000	63.000	4.000	4	8.000
10.000	10.000	72.000	5.000	4	10.000
12.000	12.000	83.000	6.000	4	12.000

EDP Number	
<b>9067130040000</b>	
<b>9067130060000</b>	<b>9033960060000</b>
<b>9067130080000</b>	<b>9033960080000</b>
<b>9067130100000</b>	<b>9033960100000</b>
<b>9067130120000</b>	<b>9033960120000</b>

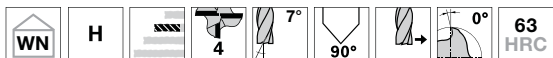
Speeds & Feeds - Chamfering milling cutters

ISO	Hardness
<b>P</b>	Up to 25 HRC Over 25 HRC
<b>M</b>	Up to 20 HRC 20-30 HRC
<b>K</b>	< 240 HB
<b>N</b>	< 7% Si
<b>S</b>	Ti alloys ≤ 42 HRC Hi Temp ≤ 42 HRC
<b>H</b>	Up to 55 HRC 55 - 63 HRC

SFM	Feed Rate IPT per Ø						
	3	6	8	10	12	16	20
	 Chamfering <span style="margin-left: 20px;">ap/ae max = 0.25 x D</span>						
<b>630</b>	0.0007	0.0014	0.0019	0.0024	0.0031	0.0039	0.0051
<b>460</b>	0.0006	0.0012	0.0016	0.0024	0.0028	0.0035	0.0047
<b>390</b>	0.0005	0.0010	0.0013	0.0018	0.0020	0.0028	0.0035
<b>260</b>	0.0004	0.0007	0.0010	0.0014	0.0016	0.0024	0.0028
<b>560</b>	0.0006	0.0012	0.0016	0.0024	0.0028	0.0035	0.0047
<b>820</b>	0.0009	0.0019	0.0024	0.0031	0.0039	0.0051	0.0067
<b>260</b>	0.0003	0.0007	0.0009	0.0012	0.0016	0.0020	0.0023
<b>130</b>	0.0004	0.0006	0.0008	0.0009	0.0013	0.0016	0.0019
<b>160</b>	0.0005	0.0010	0.0013	0.0020	0.0020	0.0027	0.0035
<b>130</b>	0.0004	0.0008	0.0010	0.0015	0.0016	0.0023	0.0027

SFM	Feed Rate IPT per Ø						
	3	6	8	10	12	16	20
	 Deburring <span style="margin-left: 20px;">ap/ae max = 0.05 x D</span>						
<b>820</b>	0.0010	0.0023	0.0031	0.0040	0.0051	0.0067	0.0083
<b>590</b>	0.0010	0.0020	0.0028	0.0039	0.0047	0.0063	0.0079
<b>525</b>	0.0008	0.0017	0.0022	0.0031	0.0035	0.0047	0.0059
<b>325</b>	0.0006	0.0013	0.0017	0.0024	0.0028	0.0039	0.0047
<b>755</b>	0.0010	0.0020	0.0028	0.0039	0.0047	0.0063	0.0079
<b>1080</b>	0.0015	0.0031	0.0041	0.0055	0.0067	0.0087	0.0110
<b>325</b>	0.0005	0.0011	0.0014	0.0018	0.0024	0.0030	0.0035
<b>190</b>	0.0006	0.0009	0.0012	0.0014	0.0020	0.0024	0.0029
<b>230</b>	0.0008	0.0016	0.0022	0.0031	0.0035	0.0047	0.0059
<b>200</b>	0.0007	0.0013	0.0017	0.0023	0.0027	0.0039	0.0047

90° Chamfer mill, straight flute - nano-Si coated



Material	Suitability
<b>P</b> Steel	●
<b>M</b> Stainless steel	●
<b>K</b> Cast iron	●
<b>N</b> Aluminum	
<b>S</b> Ni / Ti alloys	●
<b>H</b> Hardened steel	●

●=Optimal ○=Secondary

Series no.	6784	6785
Tool material	Solid carbide	
Coating	nano-Si	nano-Si
Type	H	H
Shank form	HA	HB



d1 js9	d2 h6	l1	l2	Z	Code no.
mm	mm	mm	mm	no. flutes	
4.000	4.000	50.000	2.000	4	4.000
6.000	6.000	57.000	3.000	4	6.000
8.000	8.000	63.000	4.000	4	8.000
10.000	10.000	72.000	5.000	4	10.000
12.000	12.000	83.000	6.000	4	12.000

EDP Number	
9067840040000	
9067840060000	9067850060000
9067840080000	9067850080000
9067840100000	9067850100000
9067840120000	9067850120000

Speeds & Feeds - Chamfering milling cutters

ISO	Hardness
<b>P</b>	Up to 25 HRC Over 25 HRC
<b>M</b>	Up to 20 HRC 20-30 HRC
<b>K</b>	< 240 HB
<b>N</b>	< 7% Si
<b>S</b>	Ti alloys ≤ 42 HRC Hi Temp ≤ 42 HRC
<b>H</b>	Up to 55 HRC 55 - 63 HRC

SFM	Feed Rate IPT per Ø						
	3	6	8	10	12	16	20
	<b>Chamfering</b> ap/ae max = 0.25 x D						
<b>630</b>	0.0007	0.0014	0.0019	0.0024	0.0031	0.0039	0.0051
<b>460</b>	0.0006	0.0012	0.0016	0.0024	0.0028	0.0035	0.0047
<b>390</b>	0.0005	0.0010	0.0013	0.0018	0.0020	0.0028	0.0035
<b>260</b>	0.0004	0.0007	0.0010	0.0014	0.0016	0.0024	0.0028
<b>560</b>	0.0006	0.0012	0.0016	0.0024	0.0028	0.0035	0.0047
<b>820</b>	0.0009	0.0019	0.0024	0.0031	0.0039	0.0051	0.0067
<b>260</b>	0.0003	0.0007	0.0009	0.0012	0.0016	0.0020	0.0023
<b>130</b>	0.0004	0.0006	0.0008	0.0009	0.0013	0.0016	0.0019
<b>160</b>	0.0005	0.0010	0.0013	0.0020	0.0020	0.0027	0.0035
<b>130</b>	0.0004	0.0008	0.0010	0.0015	0.0016	0.0023	0.0027

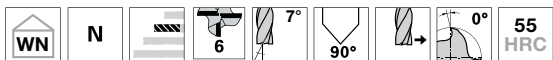
SFM	Feed Rate IPT per Ø						
	3	6	8	10	12	16	20
	<b>Deburring</b> ap/ae max = 0.05 x D						
<b>820</b>	0.0010	0.0023	0.0031	0.0040	0.0051	0.0067	0.0083
<b>590</b>	0.0010	0.0020	0.0028	0.0039	0.0047	0.0063	0.0079
<b>525</b>	0.0008	0.0017	0.0022	0.0031	0.0035	0.0047	0.0059
<b>325</b>	0.0006	0.0013	0.0017	0.0024	0.0028	0.0039	0.0047
<b>755</b>	0.0010	0.0020	0.0028	0.0039	0.0047	0.0063	0.0079
<b>1080</b>	0.0015	0.0031	0.0041	0.0055	0.0067	0.0087	0.0110
<b>325</b>	0.0005	0.0011	0.0014	0.0018	0.0024	0.0030	0.0035
<b>190</b>	0.0006	0.0009	0.0012	0.0014	0.0020	0.0024	0.0029
<b>230</b>	0.0008	0.0016	0.0022	0.0031	0.0035	0.0047	0.0059
<b>200</b>	0.0007	0.0013	0.0017	0.0023	0.0027	0.0039	0.0047

90° Chamfer mill, straight flute - 6 flutes

Series no.

6786

6787



Tool material

Solid carbide

Coating

TiAlN

TiAlN

Type

N

N

Shank form

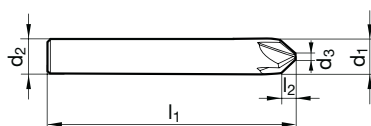
HA

HB

Material		Suitability
<b>P</b>	Steel	●
<b>M</b>	Stainless steel	●
<b>K</b>	Cast iron	●
<b>N</b>	Aluminum	●
<b>S</b>	Ni / Ti alloys	○
<b>H</b>	Hardened steel	○

●=Optimal ○=Secondary

- face cutting
- without center cutting



d1 js9	d2 h6	d3	l1	l2	Z	Code
mm	mm	mm	mm	mm	no. flutes	no.
6.000	6.000	1.500	57.00	2.25	6	6.000
8.000	8.000	2.000	63.00	3.00	6	8.000
10.000	10.000	3.000	72.00	3.50	6	10.000
12.000	12.000	3.000	83.00	4.50	6	12.000
16.000	16.000	4.000	92.00	6.00	6	16.000
20.000	20.000	6.000	92.00	7.00	6	20.000

EDP Number	
9067860060000	9067870060000
9067860080000	9067870080000
9067860100000	9067870100000
9067860120000	9067870120000
9067860160000	9067870160000
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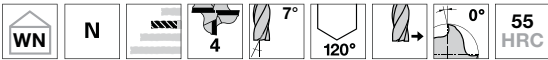
Speeds & Feeds - Chamfering milling cutters

ISO	Hardness
<b>P</b>	Up to 25 HRC Over 25 HRC
<b>M</b>	Up to 20 HRC 20-30 HRC
<b>K</b>	< 240 HB
<b>N</b>	< 7% Si
<b>S</b>	Ti alloys ≤ 42 HRC Hi Temp ≤ 42 HRC
<b>H</b>	Up to 55 HRC 55 - 63 HRC

SFM	Feed Rate IPT per Ø						
	3	6	8	10	12	16	20
	<b>Chamfering</b> ap/ae max = 0.25 x D						
<b>630</b>	0.0007	0.0014	0.0019	0.0024	0.0031	0.0039	0.0051
<b>460</b>	0.0006	0.0012	0.0016	0.0024	0.0028	0.0035	0.0047
<b>390</b>	0.0005	0.0010	0.0013	0.0018	0.0020	0.0028	0.0035
<b>260</b>	0.0004	0.0007	0.0010	0.0014	0.0016	0.0024	0.0028
<b>560</b>	0.0006	0.0012	0.0016	0.0024	0.0028	0.0035	0.0047
<b>820</b>	0.0009	0.0019	0.0024	0.0031	0.0039	0.0051	0.0067
<b>260</b>	0.0003	0.0007	0.0009	0.0012	0.0016	0.0020	0.0023
<b>130</b>	0.0004	0.0006	0.0008	0.0009	0.0013	0.0016	0.0019
<b>160</b>	0.0005	0.0010	0.0013	0.0020	0.0020	0.0027	0.0035
<b>130</b>	0.0004	0.0008	0.0010	0.0015	0.0016	0.0023	0.0027

SFM	Feed Rate IPT per Ø						
	3	6	8	10	12	16	20
	<b>Deburring</b> ap/ae max = 0.05 x D						
<b>820</b>	0.0010	0.0023	0.0031	0.0040	0.0051	0.0067	0.0083
<b>590</b>	0.0010	0.0020	0.0028	0.0039	0.0047	0.0063	0.0079
<b>525</b>	0.0008	0.0017	0.0022	0.0031	0.0035	0.0047	0.0059
<b>325</b>	0.0006	0.0013	0.0017	0.0024	0.0028	0.0039	0.0047
<b>755</b>	0.0010	0.0020	0.0028	0.0039	0.0047	0.0063	0.0079
<b>1080</b>	0.0015	0.0031	0.0041	0.0055	0.0067	0.0087	0.0110
<b>325</b>	0.0005	0.0011	0.0014	0.0018	0.0024	0.0030	0.0035
<b>190</b>	0.0006	0.0009	0.0012	0.0014	0.0020	0.0024	0.0029
<b>230</b>	0.0008	0.0016	0.0022	0.0031	0.0035	0.0047	0.0059
<b>200</b>	0.0007	0.0013	0.0017	0.0023	0.0027	0.0039	0.0047

120° Chamfer mill, straight flute

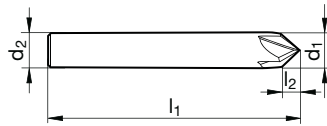


Series no. **6714** **6715**

Tool material	<b>Solid carbide</b>	
Coating	TiAlN	TiAlN
Type	N	N
Shank form	HA	HB

Material		Suitability
<b>P</b>	Steel	●
<b>M</b>	Stainless steel	●
<b>K</b>	Cast iron	●
<b>N</b>	Aluminum	●
<b>S</b>	Ni / Ti alloys	●
<b>H</b>	Hardened steel	○

●=Optimal ○=Secondary



d1 js9	d2 h6	l1	l2	Z	Code no.
mm	mm	mm	mm	no. flutes	
4.000	4.000	50.000	1.200	4	4.000
6.000	6.000	57.000	1.800	4	6.000
8.000	8.000	63.000	2.400	4	8.000
10.000	10.000	72.000	2.900	4	10.000
12.000	12.000	83.000	3.500	4	12.000

EDP Number	
<b>9067140040000</b>	
<b>9067140060000</b>	<b>9067150060000</b>
<b>9067140080000</b>	<b>9067150080000</b>
<b>9067140100000</b>	<b>9067150100000</b>
<b>9067140120000</b>	<b>9067150120000</b>

Speeds & Feeds - Chamfering milling cutters

ISO	Hardness
<b>P</b>	Up to 25 HRC Over 25 HRC
<b>M</b>	Up to 20 HRC 20-30 HRC
<b>K</b>	< 240 HB
<b>N</b>	< 7% Si
<b>S</b>	Ti alloys ≤ 42 HRC Hi Temp ≤ 42 HRC
<b>H</b>	Up to 55 HRC 55 - 63 HRC

SFM	Feed Rate IPT per Ø							
	3	6	8	10	12	16	20	
	<b>Chamfering</b> ap/ae max = 0.25 x D							
<b>630</b>	0.0007	0.0014	0.0019	0.0024	0.0031	0.0039	0.0051	
<b>460</b>	0.0006	0.0012	0.0016	0.0024	0.0028	0.0035	0.0047	
<b>390</b>	0.0005	0.0010	0.0013	0.0018	0.0020	0.0028	0.0035	
<b>260</b>	0.0004	0.0007	0.0010	0.0014	0.0016	0.0024	0.0028	
<b>560</b>	0.0006	0.0012	0.0016	0.0024	0.0028	0.0035	0.0047	
<b>820</b>	0.0009	0.0019	0.0024	0.0031	0.0039	0.0051	0.0067	
<b>260</b>	0.0003	0.0007	0.0009	0.0012	0.0016	0.0020	0.0023	
<b>130</b>	0.0004	0.0006	0.0008	0.0009	0.0013	0.0016	0.0019	
<b>160</b>	0.0005	0.0010	0.0013	0.0020	0.0020	0.0027	0.0035	
<b>130</b>	0.0004	0.0008	0.0010	0.0015	0.0016	0.0023	0.0027	

SFM	Feed Rate IPT per Ø							
	3	6	8	10	12	16	20	
	<b>Deburring</b> ap/ae max = 0.05 x D							
<b>820</b>	0.0010	0.0023	0.0031	0.0040	0.0051	0.0067	0.0083	
<b>590</b>	0.0010	0.0020	0.0028	0.0039	0.0047	0.0063	0.0079	
<b>525</b>	0.0008	0.0017	0.0022	0.0031	0.0035	0.0047	0.0059	
<b>325</b>	0.0006	0.0013	0.0017	0.0024	0.0028	0.0039	0.0047	
<b>755</b>	0.0010	0.0020	0.0028	0.0039	0.0047	0.0063	0.0079	
<b>1080</b>	0.0015	0.0031	0.0041	0.0055	0.0067	0.0087	0.0110	
<b>325</b>	0.0005	0.0011	0.0014	0.0018	0.0024	0.0030	0.0035	
<b>190</b>	0.0006	0.0009	0.0012	0.0014	0.0020	0.0024	0.0029	
<b>230</b>	0.0008	0.0016	0.0022	0.0031	0.0035	0.0047	0.0059	
<b>200</b>	0.0007	0.0013	0.0017	0.0023	0.0027	0.0039	0.0047	

Corner rounding milling cutters

Series no. **6788**

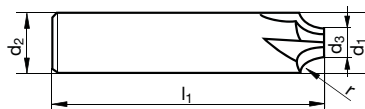


Tool material	<b>Solid carbide</b>
Coating	FIREX
Type	N
Shank form	HA

Material		Suitability
<b>P</b>	Steel	●
<b>M</b>	Stainless steel	●
<b>K</b>	Cast iron	●
<b>N</b>	Aluminum	●
<b>S</b>	Ni / Ti alloys	○
<b>H</b>	Hardened steel	●

●=Optimal ○=Secondary

• without center cutting



d1	r	d2	d3	l1	Z	Code
mm	mm	mm	mm	mm	no. flutes	no.
6.000	0.50	6.000	5.000	50.00	4	6.005
6.000	1.00	6.000	4.000	50.00	4	6.010
8.000	1.50	8.000	5.000	58.00	4	8.015
10.000	2.00	10.000	6.000	66.00	4	10.020
10.000	2.50	10.000	5.000	66.00	4	10.025
12.000	3.00	12.000	6.000	73.00	4	12.030
14.000	3.50	14.000	7.000	75.00	4	14.035
14.000	4.00	14.000	6.000	75.00	4	14.040
16.000	4.50	16.000	7.000	76.00	4	16.045
16.000	5.00	16.000	6.000	76.00	4	16.050
20.000	5.50	20.000	9.000	92.00	4	20.055
20.000	6.00	20.000	8.000	92.00	4	20.060

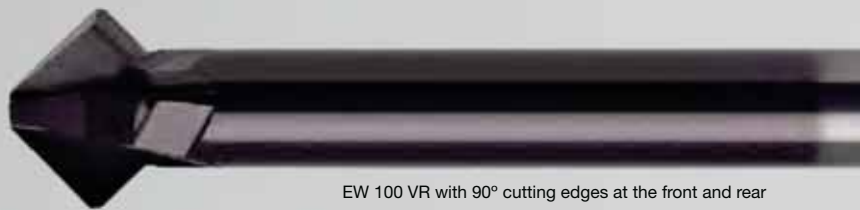
EDP Number
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9067880060100
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Speeds & Feeds - Corner rounding milling cutters

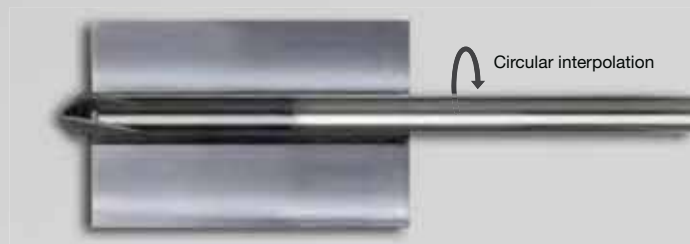
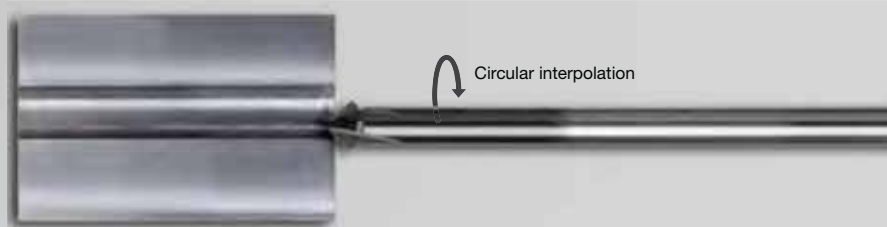
ISO	Hardness	SFM	Feed Rate IPT per Ø						
			3	6	8	10	12	16	20
<b>P</b>	Up to 25 HRC	<b>460</b>	0.0006	0.0011	0.0014	0.0019	0.0023	0.0031	0.0039
	Over 25 HRC	<b>360</b>	0.0005	0.0009	0.0013	0.0018	0.0020	0.0028	0.0035
<b>M</b>	Up to 20 HRC	<b>330</b>	0.0004	0.0007	0.0010	0.0014	0.0016	0.0024	0.0028
	20-30 HRC	<b>230</b>	0.0003	0.0006	0.0008	0.0011	0.0012	0.0020	0.0024
<b>K</b>	< 240 HB	<b>425</b>	0.0005	0.0010	0.0013	0.0018	0.0020	0.0028	0.0035
<b>N</b>	< 7% Si	<b>620</b>	0.0007	0.0014	0.0019	0.0025	0.0031	0.0039	0.0051
<b>S</b>	Ti alloys ≤ 42 HRC	<b>230</b>	0.0003	0.0006	0.0008	0.0011	0.0012	0.0020	0.0024
	Hi Temp ≤ 42 HRC	<b>115</b>	0.0003	0.0006	0.0008	0.0010	0.0011	0.0018	0.0020
<b>H</b>	Up to 55 HRC	<b>130</b>	0.0004	0.0005	0.0010	0.0012	0.0013	0.0020	0.0025
	55 - 63 HRC	<b>115</b>	0.0003	0.0006	0.0008	0.0010	0.0011	0.0018	0.0020

# EW 100 VR Front/back deburring mill

Guhring's standard solid carbide EW 100 VR front/back deburring mill with TiAlN coating can be utilized for both deburring and chamfering the entry and exit of a hole with a 90° angle. The EW 100 VR is a milling cutter with cutting edges on the front and back face. To deburr or chamfer a part the tool performs a circular interpolation along the edge or contour of the hole or part profile.



EW 100 VR with 90° cutting edges at the front and rear

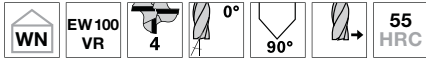


# EW 100 VR



Front/back deburring mill 90°

Series no. 495

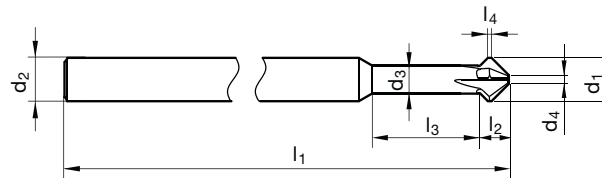


Tool material	<b>Solid carbide</b>
Coating	nano-A
Type	EW 100 VR
Shank form	HA

Material		Suitability
<b>P</b>	Steel	●
<b>M</b>	Stainless steel	●
<b>K</b>	Cast iron	●
<b>N</b>	Aluminum	○
<b>S</b>	Ni / Ti alloys	●
<b>H</b>	Hardened steel	●

●=Optimal ○=Secondary

- neck clearance < Ø 6.0 mm
- without center cutting



d1	d2 h6	d3	d4	l1	l4	l3	l2	Z	Code no.	EDP Number
mm	mm	mm	mm	mm	mm	mm	mm	no. flutes		
3.000	4.000	2.200	0.600	75.00	0.50	9.30	2.10	4	3.000	9004950030000
4.000	4.000	2.900	0.800	75.00	0.50	12.30	2.70	4	4.000	9004950040000
5.000	5.000	3.900	1.000	75.00	0.50	15.00	3.00	4	5.000	9004950050000
6.000	6.000	3.900	1.200	100.00	0.50	14.30	3.50	4	6.000	9004950060000
8.000	6.000	6.000	1.600	100.00	0.50		4.70	4	8.000	9004950080000
10.000	6.000	6.000	2.000	100.00	0.50		6.50	4	10.000	9004950100000
12.000	6.000	6.000	2.400	100.00	0.50		8.30	4	12.000	9004950120000

Speeds & Feeds - Front/back deburrer

ISO	Hardness	SFM	Feed Rate IPT per Ø						
			3	6	8	10	12	16	20
<b>P</b>	≤ 25 HRC	<b>590</b>	0.0031	0.0047	0.0079	0.0079	0.0098	0.0098	0.0098
	> 25 HRC	<b>490</b>	0.0024	0.0039	0.0059	0.0059	0.0079	0.0079	0.0079
<b>M</b>	≤ 20 HRC	<b>330</b>	0.0024	0.0039	0.0059	0.0059	0.0079	0.0079	0.0079
	> 20 HRC	<b>260</b>	0.0020	0.0031	0.0047	0.0047	0.0059	0.0059	0.0059
<b>K</b>	≤ 350 HB	<b>395</b>	0.0031	0.0047	0.0079	0.0079	0.0098	0.0098	0.0098
<b>N</b>	≤ 3% Si	<b>655</b>	0.0039	0.0059	0.0098	0.0098	0.0118	0.0118	0.0118
	> 3% Si	<b>490</b>	0.0031	0.0047	0.0079	0.0079	0.0098	0.0098	0.0098
<b>S</b>	≤ 25 HRC	<b>195</b>	0.0020	0.0031	0.0047	0.0047	0.0059	0.0059	0.0059
	≤ 44 HRC	<b>130</b>	0.0016	0.0024	0.0039	0.0039	0.0047	0.0047	0.0047
<b>H</b>	< 55 HRC	<b>330</b>	0.0024	0.0039	0.0059	0.0059	0.0079	0.0079	0.0079
	≤ 63 HRC	<b>130</b>	0.0016	0.0020	0.0024	0.0024	0.0031	0.0031	0.0031

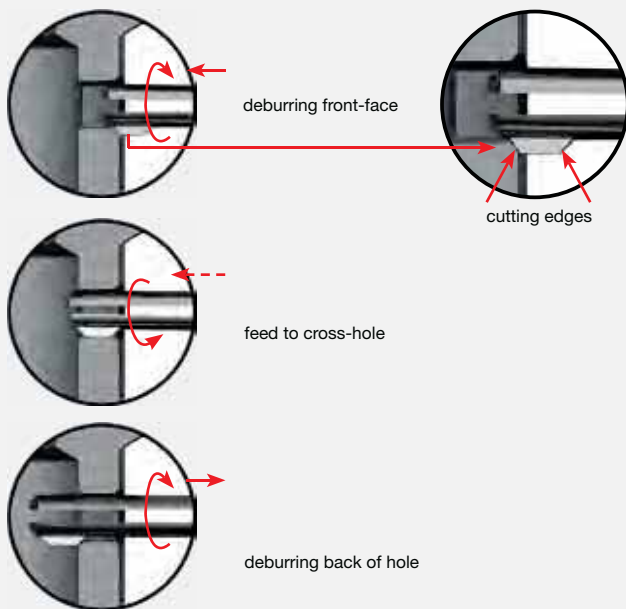
# EW 100 G Deburring fork



## Advantages

- ▶ cost saving. The standard tool offers outstanding price advantages in comparison with special tooling.
- ▶ universal tooling for milling, turning and robotic applications.  
The range of 0.25 mm enables the application of our deburring fork in holes with large tolerances.  
Reducing set-up time and cost!
- ▶ increased production. Deburring fork EW 100 G deburrs automatically with one set-up and short cycle times.  
Expensive and extensive manual operations are no longer required.

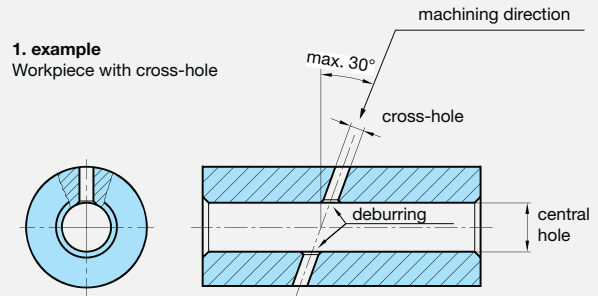
## Operation



### Step by step:

The automated internal and external deburring with deburring fork EW 100 G is a simple and economic alternative to common, extensive manual operations. Just one tool is required for all machining steps.

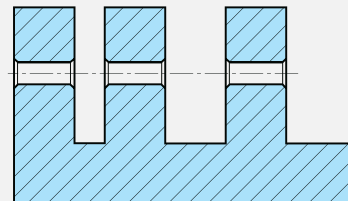
## Application examples



**1. example**  
Workpiece with cross-hole

Please note when machining workpieces with cross-holes:  
- the diameter of the cross-hole must be no more than 35% of the central hole diameter  
- the diameter of the cross-hole must be 40% larger than the cutting length  $l_c$

**2. example**  
Workpiece with multiple interrupted cut zones



### Universal application:

The new stock standard deburring fork is capable of machining workpieces with cross-holes as well as workpieces with multiple interrupted cuts. It cleanly removes the burrs from both entries and exits of holes.

Deburring fork with straight shank

Series no. **4100**



Tool material **Solid carbide**

Coating Uncoated

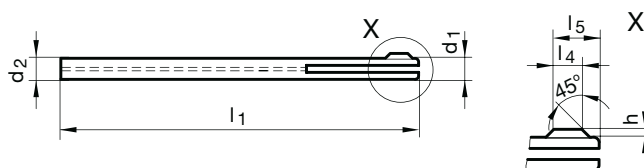
Shank form cyl.

Cutting direction

Material		Suitability
<b>P</b>	Steel	●
<b>M</b>	Stainless steel	●
<b>K</b>	Cast iron	●
<b>N</b>	Aluminum	○
<b>S</b>	Ni / Ti alloys	○
<b>H</b>	Hardened steel	○

●=Optimal ○=Secondary

- with internal coolant supply
- for holding in collet chucks



Ø-range	d1	d2	l1	l4	l5	h	Code no.	EDP Number
	mm	mm	mm	mm	mm	mm		
1.91 -2.15	1.900	1.900	80.000	1.000	2.050	0.350	2.000	9041000020000
2.16 -2.40	2.100	2.100	80.000	1.500	2.600	0.400	2.250	9041000022500
2.41 -2.70	2.400	2.400	80.000	1.500	2.900	0.400	2.500	9041000025000
2.71 -2.90	2.600	2.600	90.000	1.500	2.950	0.450	2.750	9041000027500
2.91 -3.25	2.900	2.900	90.000	2.000	3.650	0.450	3.000	9041000030000
3.26 -3.60	3.200	3.200	90.000	2.000	3.800	0.600	3.500	9041000035000
3.61 -4.25	3.600	3.600	90.000	2.000	4.100	0.700	4.000	9041000040000
4.26 -4.75	4.200	4.200	90.000	2.500	4.600	0.700	4.500	9041000045000
4.76 -5.30	4.700	4.700	100.000	2.500	4.850	0.750	5.000	9041000050000
5.31 -5.80	5.200	5.200	100.000	2.500	4.850	0.750	5.500	9041000055000
5.81 -6.20	5.600	5.600	110.000	3.000	5.800	0.800	6.000	9041000060000
6.21 -6.70	6.000	6.000	110.000	3.000	5.900	0.900	6.500	9041000065000
6.71 -7.10	6.500	6.500	110.000	3.000	5.850	0.850	7.000	9041000070000
7.11 -7.60	6.900	6.900	110.000	3.500	6.950	0.950	7.500	9041000075000
7.61 -8.05	7.300	7.300	110.000	3.500	7.000	1.000	8.000	9041000080000

Speeds & Feeds - Deburring forks

ISO	Hardness	SFM	Feed Rate IPR per Ø						
			3	6	8	10	12	16	20
<b>P</b>	≤ 25 HRC	<b>50</b>	0.0059	0.0059	0.0079	0.0079	0.0079	0.0079	0.0079
	> 25 HRC	<b>35</b>	0.0039	0.0039	0.0059	0.0059	0.0059	0.0059	0.0059
<b>M</b>	≤ 20 HRC	<b>40</b>	0.0039	0.0039	0.0059	0.0059	0.0059	0.0059	0.0059
	> 20 HRC	<b>25</b>	0.0039	0.0039	0.0059	0.0059	0.0059	0.0059	0.0059
<b>K</b>	≤ 350 HB	<b>65</b>	0.0059	0.0059	0.0079	0.0079	0.0079	0.0079	0.0079
<b>N</b>	≤ 3% Si	<b>100</b>	0.0079	0.0079	0.0098	0.0098	0.0098	0.0098	0.0098
	> 3% Si	<b>100</b>	0.0079	0.0079	0.0098	0.0098	0.0098	0.0098	0.0098

Deburring fork with reinforced shank Series no. **4101**

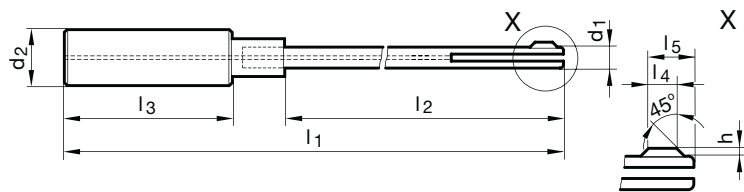


Material		Suitability
<b>P</b>	Steel	●
<b>M</b>	Stainless steel	●
<b>K</b>	Cast iron	●
<b>N</b>	Aluminum	○
<b>S</b>	Ni / Ti alloys	○
<b>H</b>	Hardened steel	○

●=Optimal ○=Secondary

for clamping in hydraulic & shrink fit chucks  
 • with shank to DIN 6535  
 • with internal coolant supply

Tool material	<b>Solid carbide</b>
Coating	Uncoated
Shank form	HA
Cutting direction	



Ø-range	d1	d2 h6	l1	l2	l3	l4	l5	h	Code no.	EDP Number
	mm	mm	mm	mm	mm	mm	mm	mm		
1.91 -2.15	1.900	6.000	120.000	69.000	36.000	1.000	2.050	0.350	2.000	9041010020000
2.16 -2.40	2.100	6.000	120.000	69.000	36.000	1.500	2.600	0.400	2.250	9041010022500
2.41 -2.70	2.400	6.000	120.000	69.000	36.000	1.500	2.900	0.400	2.500	9041010025000
2.71 -2.90	2.600	6.000	130.000	79.000	36.000	1.500	2.950	0.450	2.750	9041010027500
2.91 -3.25	2.900	6.000	130.000	79.000	36.000	2.000	3.650	0.450	3.000	9041010030000
3.26 -3.60	3.200	10.000	135.000	80.000	40.000	2.000	3.800	0.600	3.500	9041010035000
3.61 -4.25	3.600	10.000	135.000	80.000	40.000	2.000	4.100	0.700	4.000	9041010040000
4.26 -4.75	4.200	10.000	135.000	80.000	40.000	2.500	4.600	0.700	4.500	9041010045000
4.76 -5.30	4.700	10.000	145.000	80.000	40.000	2.500	4.850	0.750	5.000	9041010050000
5.31 -5.80	5.200	10.000	145.000	90.000	40.000	2.500	4.850	0.750	5.500	9041010055000
5.81 -6.20	5.600	10.000	155.000	90.000	40.000	3.000	5.800	0.800	6.000	9041010060000
6.21 -6.70	6.000	16.000	165.000	102.000	48.000	3.000	5.900	0.900	6.500	9041010065000
6.71 -7.10	6.500	16.000	165.000	102.000	48.000	3.000	5.850	0.850	7.000	9041010070000
7.11 -7.60	6.900	16.000	165.000	102.000	48.000	3.500	6.950	0.950	7.500	9041010075000
7.61 -8.05	7.300	16.000	165.000	102.000	48.000	3.500	7.000	1.000	8.000	9041010080000

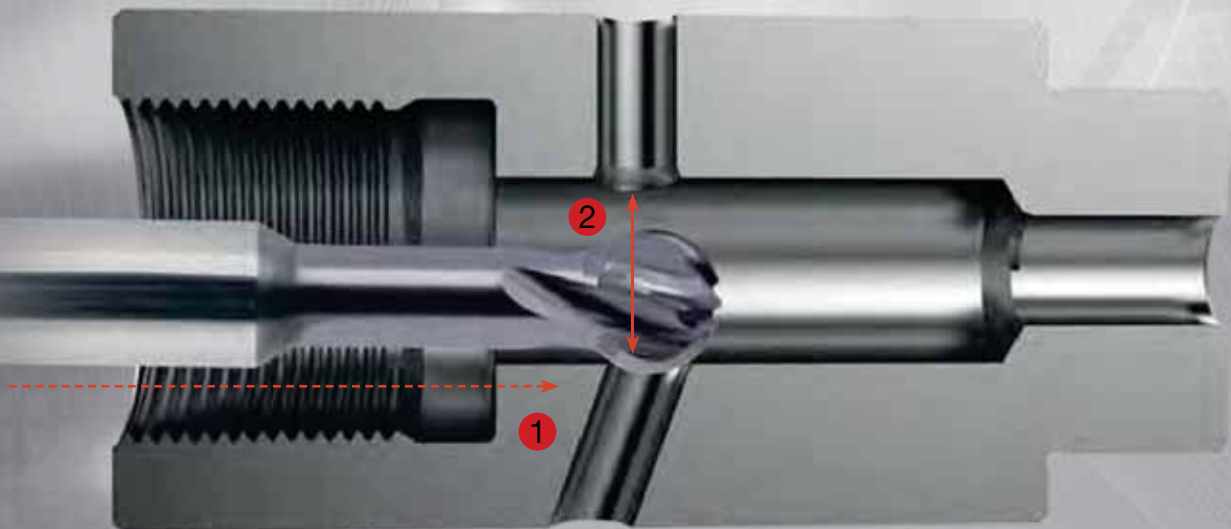
Speeds & Feeds - Deburring forks

ISO	Hardness	SFM	Feed Rate IPR per Ø						
			3	6	8	10	12	16	20
<b>P</b>	≤ 25 HRC	<b>50</b>	0.0059	0.0059	0.0079	0.0079	0.0079	0.0079	0.0079
	> 25 HRC	<b>35</b>	0.0039	0.0039	0.0059	0.0059	0.0059	0.0059	0.0059
<b>M</b>	≤ 20 HRC	<b>40</b>	0.0039	0.0039	0.0059	0.0059	0.0059	0.0059	0.0059
	> 20 HRC	<b>25</b>	0.0039	0.0039	0.0059	0.0059	0.0059	0.0059	0.0059
<b>K</b>	≤ 350 HB	<b>65</b>	0.0059	0.0059	0.0079	0.0079	0.0079	0.0079	0.0079
<b>N</b>	≤ 3% Si	<b>100</b>	0.0079	0.0079	0.0098	0.0098	0.0098	0.0098	0.0098
	> 3% Si	<b>100</b>	0.0079	0.0079	0.0098	0.0098	0.0098	0.0098	0.0098

# Ball-nose deburring mill

Cross-holes and recessed edges, even those consisting of three-dimensional edge contours, can be deburred or chamfered with process reliability using the ball-nose deburring mill. Available in 2-flute or 4-flute designs, these ball-nose deburring mills are custom-made, designed for specifically for each unique application.

1. axial entry in main hole
2. radial deburring/chamfering cross hole



# EWR 500 deburring reamer

## Deburr cross holes with EWR 500

When using conventional reamers to deburr cross-drilled holes, the burr is simply folded over back into the cross-hole. However, while using the EWR 500 deburring reamer, the burr is consistently cut and removed from the part.



The radially exiting coolant pressure closes the gap on the opposite side between the reamer and the wall of the hole. The contact pressure enables clean removal of the burr at the root. The deburring reamer can also be applied for smooth surface finish requirements, as the wall of the hole is not damaged.



The programmed path of the deburring reamer is adjusted based on the application to accommodate the location and quantity of exit holes.

Constant contact pressure is maintained against the sidewall of the hole due to multiple coolant ports. This prevents a reduction in contact pressure while the tool feeds past the cross-holes.

# EWR 500

- » the surface finish quality of the machined hole is retained
- » **short process times** as rapid feed rates are applied between cross-holes
- » **flexible diameter range**

## Functional diameter range of standard program

Ø d1 (mm)	Hole diameter	
	from Ø [mm]	up to Ø [mm]
2.97	2.99	3.04
3.97	3.99	4.04
4.97	4.99	5.04
5.97	5.99	6.04
7.97	7.99	8.04
9.97	9.99	10.04
11.97	11.99	12.04

EWR 500 Deburring reamers

Series no. **4103**



Tool material **Solid carbide**

Coating nano-A

Shank form DIN 6535-HA

Cutting direction

Material		Suitability
<b>P</b>	Steel	●
<b>M</b>	Stainless steel	●
<b>K</b>	Cast iron	●
<b>N</b>	Aluminum	○
<b>S</b>	Ni / Ti alloys	●
<b>H</b>	Hardened steel	○

●=Optimal ○=Secondary

deburring without damage to the bore surface  
 • short process times due to low feed rate  
 • minimum cooling pressure 15 bar (220psi)



d1	d2 h6	l1	l2	l3	l4	Code no.	EDP Number
mm	mm	mm	mm	mm	mm		
2.970	4.000	101.000	73.000	28.000	12.700	2.970	9041030029700
3.970	4.000	101.000	73.000	28.000	13.000	3.970	9041030039700
4.970	6.000	121.000	85.000	36.000	13.300	4.970	9041030049700
5.970	6.000	121.000	85.000	36.000	13.600	5.970	9041030059700
7.970	8.000	132.000	96.000	36.000	18.100	7.970	9041030079700
9.970	10.000	132.000	92.000	40.000	21.700	9.970	9041030099700
11.970	12.000	133.000	88.000	45.000	19.000	11.970	9041030119700

Speeds & Feeds - Deburring reamers

ISO	Hardness	SFM	Feed Rate IPR per Ø						
			3	6	8	10	12	16	20
<b>P</b>	≤ 25 HRC	<b>490</b>	0.0012	0.0012	0.0020	0.0020	0.0020	0.0020	0.0020
	> 25 HRC	<b>395</b>	0.0012	0.0012	0.0012	0.0012	0.0012	0.0012	0.0012
<b>M</b>	≤ 20 HRC	<b>395</b>	0.0012	0.0012	0.0020	0.0020	0.0020	0.0020	0.0020
	> 20 HRC	<b>330</b>	0.0012	0.0012	0.0012	0.0012	0.0012	0.0012	0.0012
<b>K</b>	≤ 350 HB	<b>490</b>	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020
<b>N</b>	≤ 3% Si	<b>490</b>	0.0012	0.0012	0.0012	0.0012	0.0012	0.0012	0.0012
	> 3% Si	<b>490</b>	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020
<b>S</b>		<b>330</b>	0.0012	0.0012	0.0012	0.0012	0.0012	0.0012	0.0012



Drilling

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Fluteless tapping

Milling

PCD

Reaming

Countersinking

Services

Modular systems

Special solutions

Grooving systems

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