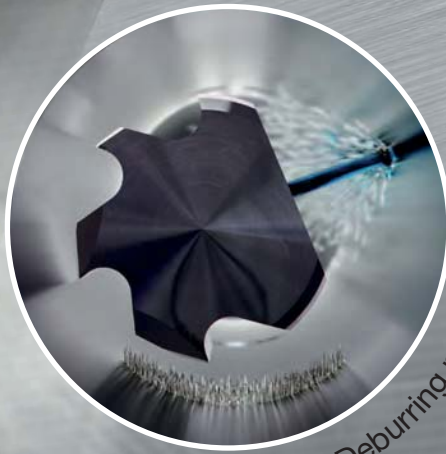


GUHRING

- ▶ EW 100 G Deburring fork
- ▶ EWR 500 Deburring reamer
- ▶ EW 100 S Deburring spiral
- ▶ Chamfering milling cutter
- ▶ Front/back deburrer
- ▶ Ball nose deburrer



• NEW • Deburring reamer EWR 500

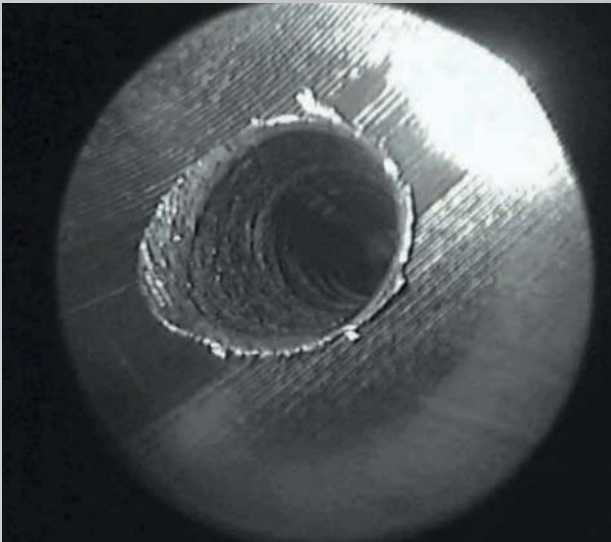


Deburring tools

GUHRING – YOUR WORLD-WIDE PARTNER

Deburring tools

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



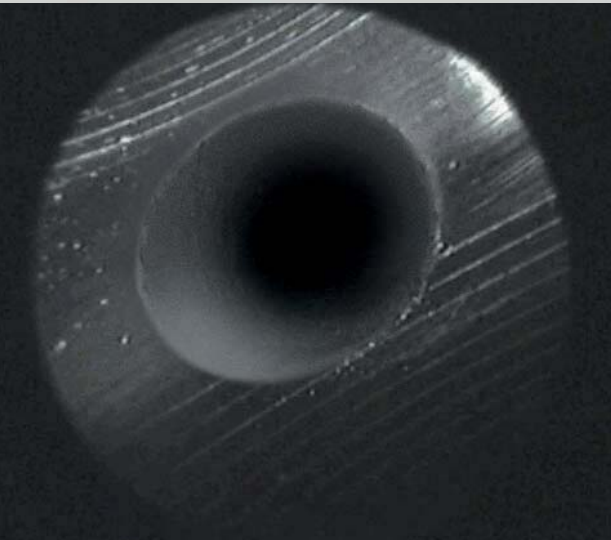
Exit
of hole drilled in component prior to ...

Guhring provides a comprehensive standard range of de-burring tools for mechanical finishing hole entry, hole exit and cross hole exit – including the world's first solid carbide tools for mechanical de-burring of hole entry and exit. Instead of time consuming and costly manual work the machining time is reduced with mechanical de-burring in a fully automated operating process.

For the quality of the workpiece – especially with intersecting and cross holes – in particular exit deburring is gaining more and more importance. This applies to, for example, oil galleries in modern high performance engines, where an optimal flow rate is dependent on perfect exit deburring. Highly accurate deburring and producing a chamfer is also increasingly required in crankshafts, valve blocks, steering arms, rotational housings, drive elements, injector nozzles and brake cylinders.

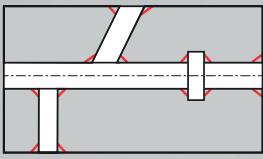
Whilst the deburring of the entry of the hole hardly causes a problem, exit deburring of drilled holes in many cases involves an extensive operation that is often carried out manually and is time and cost intensive. Here the latest development, the de-burring reamer EWR 500, finds its application.

With a multitude of de-burring tools Guhring now offers different possibilities to mechanically resolve the complex requirements. This not only means a considerable cost and time saving for the production, but also, more importantly, improved quality and process reliability. Moreover Guhring offers a deburring milling cutter for external deburring to customer's specific application tasks.



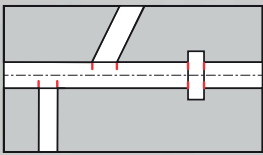
...and following machining with deburring lance.

EW 100 G Deburring fork



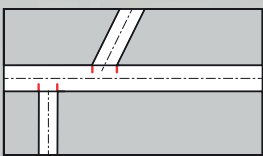
p. 4

EWR 500 Deburring reamer



p. 8

EW 100 S Deburring spiral



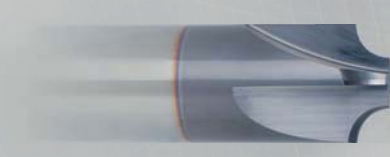
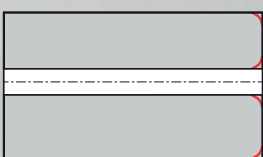
p. 10

Chamfering milling cutter



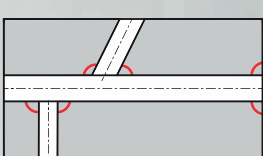
p. 12

Quadrant milling cutters



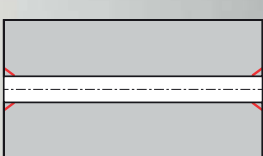
p. 17

Ball nose deburrer



p. 7

Front/back deburrer



p. 18

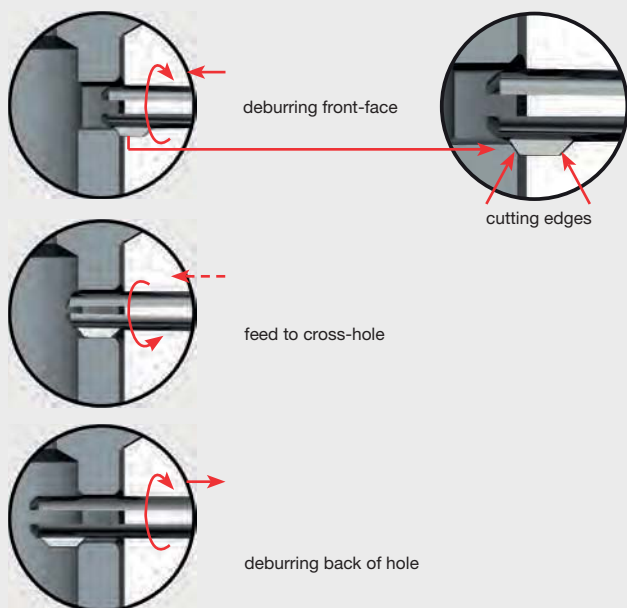
EW 100 G Deburring fork



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.

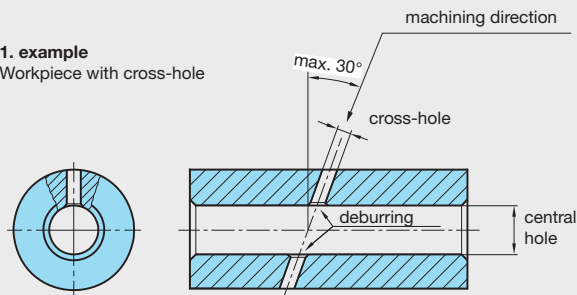
Operation



Application examples

1. example

Workpiece with cross-hole

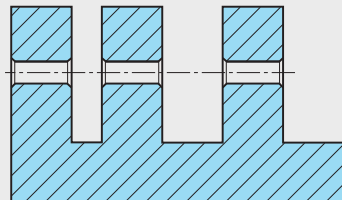


Please note when machining workpieces with cross-holes:

- the diameter of the cross-hole must be maximal 35% of the central hole
- the diameter of the cross-hole must be 40% larger than the cutting length l_4

2. example

Workpiece with multi-interrupted cut



Step by step:

The automatically internal and external deburring with deburring fork EW 100 G is an easy and cost saving alternative to common, extensive manual operations. Just one tool is required for all machining steps.

Universal application:

The new ex-stock deburring fork machines workpieces with one cross-hole as well as workpieces with multi-interrupted cut and produces high quality deburred faces and ends of the hole.

EW 100 G



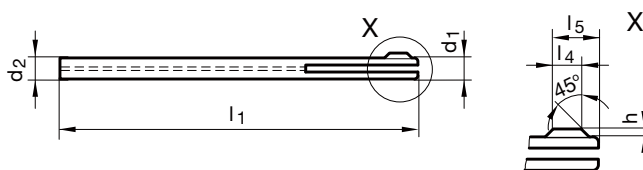
Deburring forks



Tool material	Solid carbide
Surface	○
Shank form	cyl.
Cutting direction	Ⓜ

P	●
M	●
K	●
N	○
S	○
H	○

with internal coolant supply ● for holding in collet chucks



Article no. **4100**

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

ISO	Hardness	vc	fu (mm/U) / Ø						
			3	6	8	10	12	16	20
P	≤ 850 N/mm ²	15	0,15	0,15	0,20	0,20	0,20	0,20	0,20
	≥ 850 N/mm ²	10	0,10	0,10	0,15	0,15	0,15	0,15	0,15
M	≤ 750 N/mm ²	12	0,10	0,10	0,15	0,15	0,15	0,15	0,15
	≥ 750 N/mm ²	8	0,10	0,10	0,15	0,15	0,15	0,15	0,15
K	≤ 350 HB	20	0,15	0,15	0,20	0,20	0,20	0,20	0,20
N	≤ 3% Si	30	0,20	0,20	0,25	0,25	0,25	0,25	0,25
	> 3% Si	30	0,20	0,20	0,25	0,25	0,25	0,25	0,25

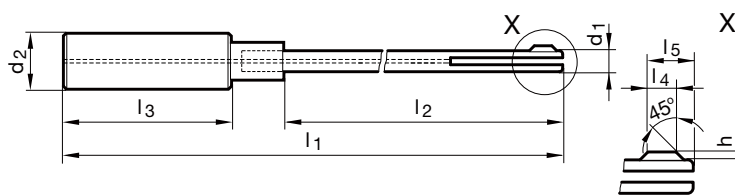
Deburring forks



P	•
M	•
K	•
N	○
S	○
H	○

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

Tool material	Solid carbide
Surface	○
Shank form	HA
Cutting direction	Ⓜ



Article no. 4101

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

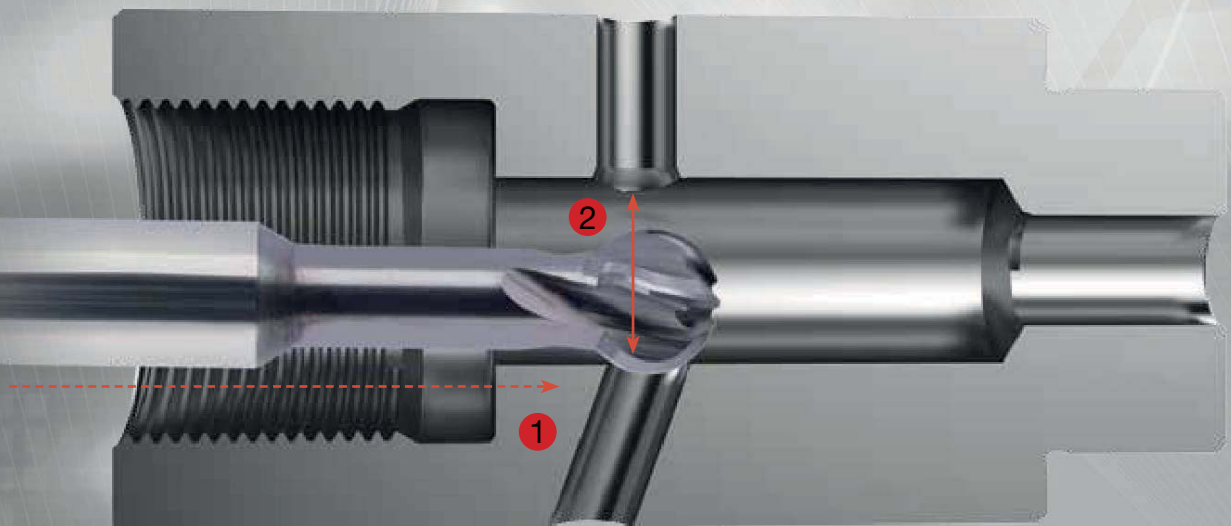
ISO	Hardness	vc	fu (mm/U) / Ø						
			3	6	8	10	12	16	20
P	≤ 850 N/mm ²	15	0,15	0,15	0,20	0,20	0,20	0,20	0,20
	≥ 850 N/mm ²	10	0,10	0,10	0,15	0,15	0,15	0,15	0,15
M	≤ 750 N/mm ²	12	0,10	0,10	0,15	0,15	0,15	0,15	0,15
	≥ 750 N/mm ²	8	0,10	0,10	0,15	0,15	0,15	0,15	0,15
K	≤ 350 HB	20	0,15	0,15	0,20	0,20	0,20	0,20	0,20
N	≤ 3% Si	30	0,20	0,20	0,25	0,25	0,25	0,25	0,25
	> 3% Si	30	0,20	0,20	0,25	0,25	0,25	0,25	0,25



Ball nose de-burring milling cutter

Cross holes and recessed edges with even three-dimensional edge contours can be processed reliably de-burred or chamfered with a ball nose de-burring milling cutter. The universal machining of all materials and geometries is possible with two- to four-flute designed special tools depending on the application task. Ball nose de-burring milling cutters are available as special tools in dimensions adapted to the de-burring situation.

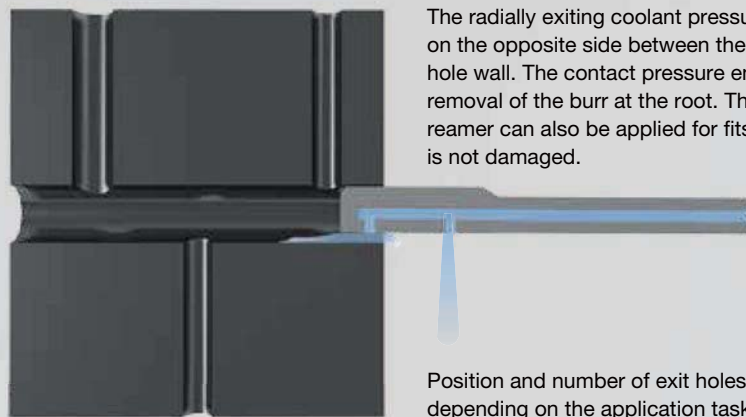
1. axial entry in main hole
2. radial de-burring/chamfering cross hole



EWR 500 de-burring reamer

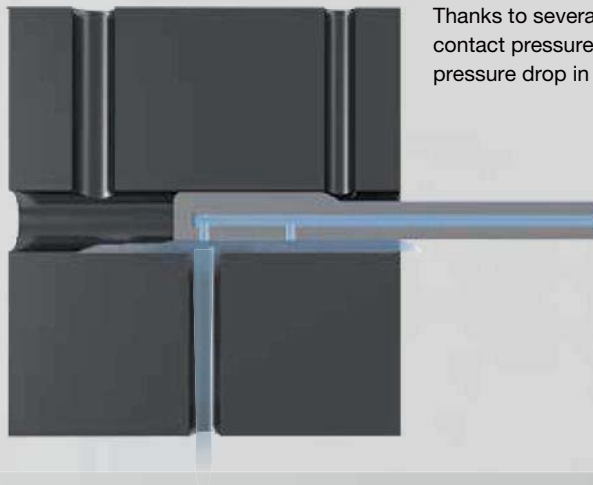
De-burr cross holes with EWR 500

When de-burring with conventional reamers the burr between tool and hole wall is only folded over. The machining process suffers. In contrast to conventional reamers with the new de-burring reamer EWR 500 the burr is process reliably cut.



The radially exiting coolant pressure closes the gap on the opposite side between the reamer and the hole wall. The contact pressure enables a clean removal of the burr at the root. The de-burring reamer can also be applied for fits, as the hole wall is not damaged.

Position and number of exit holes are adapted depending on the application task.



Thanks to several coolant exit holes a permanent contact pressure is ensured. This prevents a pressure drop in the cross hole area.

EWR 500

- » the surface finish quality of the reamed hole is retained
- » **short process times** as rapid movement is possible outside the cross hole
- » **flexible diameter range**

Functional area

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



Deburring reamers


 Tool material **Solid carbide**

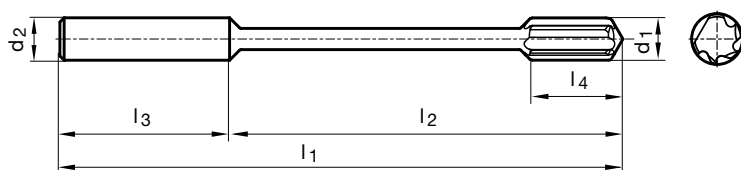
 Surface **a**

Shank form DIN 6535-HA

 Cutting direction **(R)**

P	•
M	•
K	•
N	○
S	•
H	○

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


 Article no. **4103**

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

ISO	Hardness	vc	fu (mm/U) / Ø						
			3	6	8	10	12	16	20
P	≤ 850 N/mm ²	150	0,03	0,03	0,05	0,05	0,05	0,05	0,05
	≥ 850 N/mm ²	120	0,03	0,03	0,03	0,03	0,03	0,03	0,03
M	≤ 750 N/mm ²	120	0,03	0,03	0,05	0,05	0,05	0,05	0,05
	≥ 750 N/mm ²	100	0,03	0,03	0,03	0,03	0,03	0,03	0,03
K	≤ 350 HB	150	0,05	0,05	0,05	0,05	0,05	0,05	0,05
N*	≤ 3% Si	150	0,03	0,03	0,03	0,03	0,03	0,03	0,03
	> 3% Si	150	0,05	0,05	0,05	0,05	0,05	0,05	0,05
S		100	0,03	0,03	0,03	0,03	0,03	0,03	0,03

* We recommend our Carbo-coating for the machining of aluminium.

EW 100 S Deburring spiral

For internal deburring of cross-holes through the central hole, Guhring has developed the solid carbide deburring spiral EW 100 S. The slotted tool is available as a semi-standard tool with immediate effect, i. e. inside the diameter ranges specified in the adjacent table tools can be supplied in one-hundredth increments with the respective shank and length dimensions as well as number of cutting edges with short delivery times and at favourable prices. In addition, at any time other customer specific solutions as special tools, for example, with further reach or other shank diameters.

The principle of function of the deburring spiral EW 100 S is based on the pre-tension of the grooved cutting portion. In the area of the cutting portion, the deburring spiral has a fractionally larger diameter than the bore to be machined. Through the run-on, the grooved cutting portion is pressed together on entry into the hole to be machined and thereby pre-tensioned. The pre-tension ensures that inside the bore and especially in the area of the cross-hole to be deburred there is a perfect fit of the cutting spiral at the wall of the bore or the edges of the cross-hole respectively. The burr in the cross-hole is subsequently accurately and cleanly peeled off at the root. Thereby very small chips are created that can be evacuated problem-free from the hole.

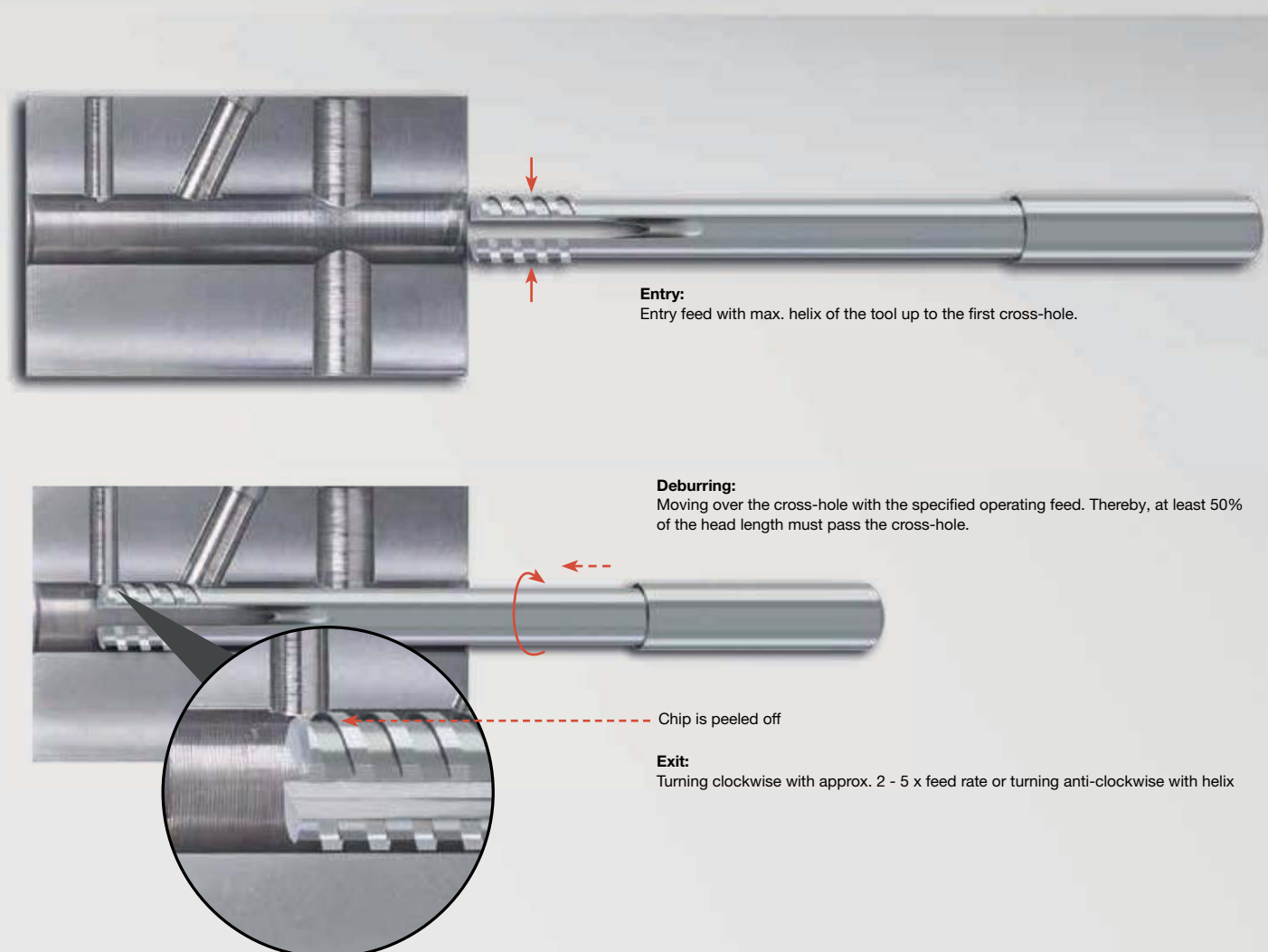
Pre-requisite for the development of the deburring spiral EW 100 S was a carbide as tool material that possesses an accordingly low rigidity and permits the necessary deformation in the cutting edge area. Thanks to Guhring's carbide expertise in development and production, then a carbide with such special attributes is available.

Cutting parameters deburring spiral

Ø range (mm)	v _c m/min	f _u (mm)
< Ø 8	15–25	0.2–0.3
< Ø 4–< Ø 6	15–25	0.4–0.8

Important:

Please note, that the cutting parameters are recommendations. They can be adapted to higher and lower cutting





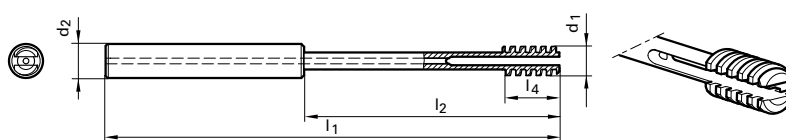
EW 100 S Deburring spiral



- P** ● with shank to DIN 6535 HA or extra length shank for extremely deep holes
- M** ●
- K** ●
- N** ○
- S** ○
- H** ○

Tool material	Solid carbide
Surface	○
Type	EW 100 S
Discount group	120

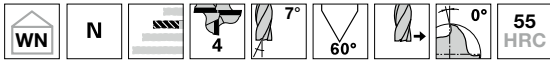
| semistandard |



Article no. **Special tool**

Dimensions d1 from ... to 1/100 increments	l4	long version		short version		Shank d2 h6	Availability
		l1	l2	l1	l2		
mm	mm	mm	mm	mm	mm	mm	
3.00 - 4.10	12	68.00	40			4.00	on request
4.11 - 6.10	12	76.00	40			6.00	on request
6.11 - 8.10	16	101.00	65	76.00	40	8.00	on request
8.11 - 10.10	19	101.00	61	76.00	36	10.00	on request
10.11 - 12.10	19	130.00	85	80.00	35	12.00	on request
12.11 - 14.10	22	130.00	85	80.00	35	14.00	on request
14.11 - 16.10	22	150.00	102	90.00	42	16.00	on request

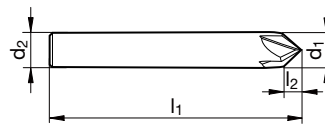
Chamfering milling cutters



Tool material **Solid carbide**

Surface	A	A
Type	N	N
Shank form	HA	HB

P	•
M	•
K	•
N	•
S	•
H	○



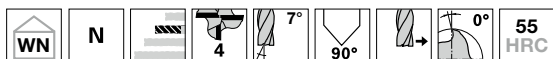
Article no. **6711** **6712**

d1 js9	d2 h6	l1	l2	Z	Code no.
mm	mm	mm	mm		
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

ISO	Hardness	vc	fz (mm/z) / Ø							vc	fz (mm/z) / Ø						
			3	6	8	10	12	16	20		3	6	8	10	12	16	20
P	≤ 850 N/mm ²	192	0,018	0,036	0,048	0,06	0,08	0,10	0,13	250	0,030	0,060	0,080	0,11	0,13	0,17	0,21
	≥ 850 N/mm ²	140	0,016	0,032	0,042	0,06	0,07	0,09	0,12		180	0,026	0,053	0,070	0,10	0,12	0,16
M	≤ 750 N/mm ²	120	0,013	0,025	0,034	0,05	0,05	0,07	0,09	160	0,021	0,042	0,056	0,08	0,09	0,12	0,15
	≥ 750 N/mm ²	80	0,009	0,019	0,025	0,04	0,04	0,06	0,07		100	0,016	0,032	0,042	0,06	0,07	0,10
K	≤ 240 HB	170	0,017	0,033	0,044	0,06	0,07	0,09	0,12	230	0,028	0,056	0,074	0,10	0,12	0,16	0,20
N	≥ 7% Si	250	0,023	0,047	0,062	0,08	0,10	0,13	0,17		330	0,039	0,078	0,104	0,14	0,17	0,22

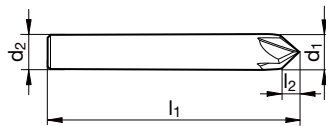


Chamfering milling cutters





Tool material	Solid carbide	
Surface	A	A
Type	N	N
Shank form	HA	HB

P	•
M	•
K	•
N	•
S	•
H	○



					Article no.	6713	3396
d1 js9	d2 h6	l1	l2	Z	Code no.		
mm	mm	mm	mm				
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		

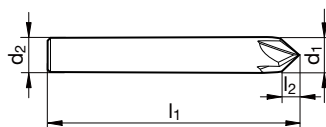
ISO	Hardness	vc	fz (mm/z) / Ø							vc	fz (mm/z) / Ø								
			3	6	8	10	12	16	20		3	6	8	10	12	16	20		
P	≤ 850 N/mm ²	192	0,018	0,036	0,048	0,06	0,08	0,10	0,13		ap/ae max = 0,25 x D	250	0,030	0,060	0,080	0,11	0,13	0,17	0,21
	≥ 850 N/mm ²	140	0,016	0,032	0,042	0,06	0,07	0,09	0,12			180	0,026	0,053	0,070	0,10	0,12	0,16	0,20
M	≤ 750 N/mm ²	120	0,013	0,025	0,034	0,05	0,05	0,07	0,09		ap/ae max = 0,05 x D	160	0,021	0,042	0,056	0,08	0,09	0,12	0,15
	≥ 750 N/mm ²	80	0,009	0,019	0,025	0,04	0,04	0,06	0,07			100	0,016	0,032	0,042	0,06	0,07	0,10	0,12
K	≤ 240 HB	170	0,017	0,033	0,044	0,06	0,07	0,09	0,12			230	0,028	0,056	0,074	0,10	0,12	0,16	0,20
N	≥ 7% Si	250	0,023	0,047	0,062	0,08	0,10	0,13	0,17			330	0,039	0,078	0,104	0,14	0,17	0,22	0,28

Chamfering milling cutters



P	•
M	•
K	•
N	•
S	•
H	•

Tool material	Solid carbide	
Surface	Y	Y
Type	H	H
Shank form	HA	HB
	NEW	NEW

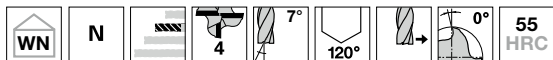


Article no.					6784	6785
d1 js9	d2 h6	l1	l2	Z	Code no.	
mm	mm	mm	mm			
4.000	4.000	50.000	2.000	4	4.000	
6.000	6.000	57.000	3.000	4	6.000	
8.000	8.000	63.000	4.000	4	8.000	
10.000	10.000	72.000	5.000	4	10.000	
12.000	12.000	83.000	6.000	4	12.000	

ISO	Hardness	vc	fz (mm/z) / Ø							vc	fz (mm/z) / Ø						
			3	6	8	10	12	16	20		3	6	8	10	12	16	20
P	≥ 850 N/mm ²	140	0,016	0,032	0,042	0,06	0,07	0,09	0,12	180	0,026	0,053	0,070	0,10	0,12	0,16	0,20
K	≥ 240 HB	150	0,014	0,028	0,037	0,05	0,06	0,08	0,10	190	0,023	0,047	0,062	0,08	0,10	0,13	0,17
H	≤ 55 HRC	50	0,010	0,020	0,026	0,04	0,04	0,06	0,07	70	0,017	0,033	0,044	0,06	0,07	0,10	0,12
	55 - 63 HRC	40	0,013	0,025	0,034	0,05	0,05	0,07	0,09	60	0,021	0,042	0,056	0,08	0,09	0,12	0,15



Chamfering milling cutters



Tool material	Solid carbide	
Surface	A	A
Type	N	N
Shank form	HA	HB

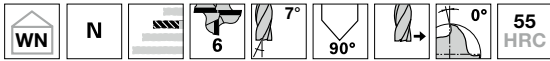
P	●
M	●
K	●
N	●
S	●
H	○



					Article no.	6714	6715
d1 js9	d2 h6	l1	l2	Z	Code no.		
mm	mm	mm	mm				
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		

ISO	Hardness	vc	fz (mm/z) / Ø							vc	fz (mm/z) / Ø									
			3	6	8	10	12	16	20		3	6	8	10	12	16	20			
P	≤ 850 N/mm ²	192	0,018	0,036	0,048	0,06	0,08	0,10	0,13	Chamfering		ap/ae max = 0,25 x D	250	0,030	0,060	0,080	0,11	0,13	0,17	0,21
	≥ 850 N/mm ²	140	0,016	0,032	0,042	0,06	0,07	0,09	0,12				180	0,026	0,053	0,070	0,10	0,12	0,16	0,20
M	≤ 750 N/mm ²	120	0,013	0,025	0,034	0,05	0,05	0,07	0,09	De-burring		ap/ae max = 0,05 x D	160	0,021	0,042	0,056	0,08	0,09	0,12	0,15
	≥ 750 N/mm ²	80	0,009	0,019	0,025	0,04	0,04	0,06	0,07				100	0,016	0,032	0,042	0,06	0,07	0,10	0,12
K	≤ 240 HB	170	0,017	0,033	0,044	0,06	0,07	0,09	0,12	230	0,028	0,056	0,074	0,10	0,12	0,16	0,20			
N	≥ 7% Si	250	0,023	0,047	0,062	0,08	0,10	0,13	0,17	330	0,039	0,078	0,104	0,14	0,17	0,22	0,28			

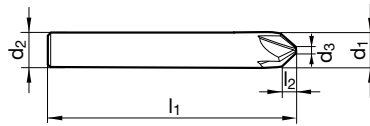
Chamfering milling cutters



Tool material	Solid carbide	
Surface	A	A
Type	N	N
Shank form	HA	HB

P	•
M	•
K	•
N	•
S	○
H	

- face cutting
- without centre cutting



Article no. **6786** **6787**

d1 js9	d2 h6	d3	l1	l2	Z	Code no.
mm	mm	mm	mm	mm		
6.000	6.000	1.500	57.000	2.250	6	6.000
8.000	8.000	2.000	63.000	3.000	6	8.000
10.000	10.000	3.000	72.000	3.500	6	10.000
12.000	12.000	3.000	83.000	4.500	6	12.000
16.000	16.000	4.000	92.000	6.000	6	16.000
20.000	20.000	6.000	92.000	7.000	6	20.000

ISO	Hardness	vc	fz (mm/z) / Ø							vc	fz (mm/z) / Ø						
			3	6	8	10	12	16	20		3	6	8	10	12	16	20
P	≤ 850 N/mm ²	192	0,018	0,036	0,048	0,06	0,08	0,10	0,13	250	0,030	0,060	0,080	0,11	0,13	0,17	0,21
	≥ 850 N/mm ²	140	0,016	0,032	0,042	0,06	0,07	0,09	0,12		180	0,026	0,053	0,070	0,10	0,12	0,16
M	≤ 750 N/mm ²	120	0,013	0,025	0,034	0,05	0,05	0,07	0,09	160	0,021	0,042	0,056	0,08	0,09	0,12	0,15
	≥ 750 N/mm ²	80	0,009	0,019	0,025	0,04	0,04	0,06	0,07		100	0,016	0,032	0,042	0,06	0,07	0,10
K	≤ 240 HB	170	0,017	0,033	0,044	0,06	0,07	0,09	0,12	230	0,028	0,056	0,074	0,10	0,12	0,16	0,20
N	≥ 7% Si	250	0,023	0,047	0,062	0,08	0,10	0,13	0,17		330	0,039	0,078	0,104	0,14	0,17	0,22



Quadrant milling cutters



Tool material	Solid carbide
Surface	F
Type	N
Shank form	HA

P	•
M	•
K	•
N	•
S	○
H	•

• without centre cutting



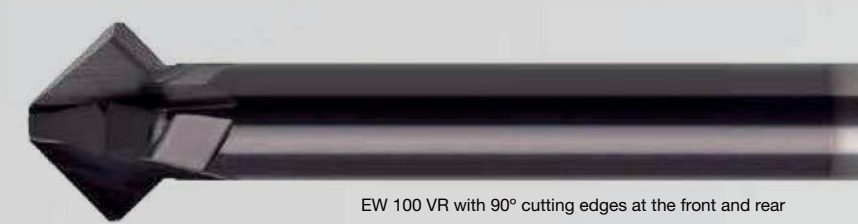
Article no. **6788**

d1	r	d2	d3	l1	Z	Code no.
mm	mm	mm	mm	mm		
6.00	0.50	6.00	5.0	50	4	6.005
6.00	1.00	6.00	4.0	50	4	6.010
8.00	1.50	8.00	5.0	58	4	8.015
10.00	2.00	10.00	6.0	66	4	10.020
10.00	2.50	10.00	5.0	66	4	10.025
12.00	3.00	12.00	6.0	73	4	12.030
14.00	3.50	14.00	7.0	75	4	14.035
14.00	4.00	14.00	6.0	75	4	14.040
16.00	4.50	16.00	7.0	76	4	16.045
16.00	5.00	16.00	6.0	76	4	16.050
20.00	5.50	20.00	9.0	92	4	20.055
20.00	6.00	20.00	8.0	92	4	20.060

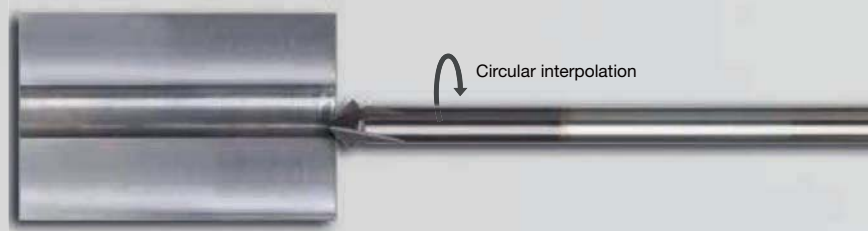
ISO	Hardness	vc	fz (mm/z) / Ø								vc	fz (mm/z) / Ø							
			3	6	8	10	12	16	20	3		6	8	10	12	16	20		
P	≤ 850 N/mm ²	140	0,014	0,028	0,037	0,048	0,06	0,08	0,10	240	0,013	0,026	0,035	0,046	0,06	0,07	0,09		
	≥ 850 N/mm ²	110	0,012	0,024	0,032	0,045	0,05	0,07	0,09	180	0,012	0,023	0,031	0,043	0,05	0,07	0,09		
M	≤ 750 N/mm ²	100	0,010	0,019	0,026	0,035	0,04	0,06	0,07	160	0,009	0,018	0,025	0,033	0,04	0,05	0,07		
	≥ 750 N/mm ²	70	0,008	0,015	0,020	0,029	0,03	0,05	0,06	100	0,006	0,013	0,017	0,024	0,03	0,04	0,05		
K	≤ 240 HB	130	0,013	0,026	0,034	0,045	0,05	0,07	0,09	220	0,012	0,024	0,033	0,043	0,05	0,07	0,09		
N	≥ 7% Si	190	0,018	0,036	0,048	0,064	0,08	0,10	0,13	320	0,017	0,034	0,046	0,062	0,07	0,10	0,12		

EW 100 VR Front/back deburrer

Gühring's solid carbide EW 100 VR front/back deburrer with TiAlN-coating as a standard tool enables deburring as well as chamfering of hole entry and exit with a 90° angle. EW 100 VR possesses a milling head with a front and back cutting region. To deburr or chamfer the tool performs a circular milling movement along the hole edge or contour.



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



Circular interpolation

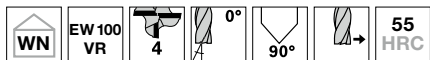


Circular interpolation

EW 100 VR



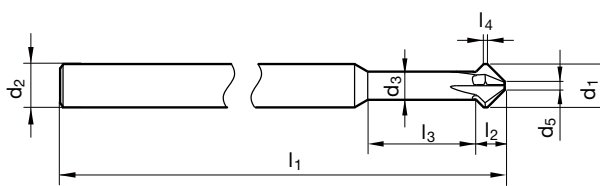
Front/back deburrer 90°



Tool material	Solid carbide
Surface	a
Type	EW 100 VR
Shank form	HA

P	•
M	•
K	•
N	○
S	•
H	•

- neck clearance < Ø 6.0 mm
- without centre cutting



Article no. **495**

d1	d2 h6	d3	d5	l1	l2	l3	l2	Z	Code no.
mm	mm	mm	mm	mm	mm	mm	mm		
3.00	4.00	2.20	0.6	75	2.1	9.3	5.0	4	3.000
4.00	4.00	2.90	0.8	75	2.7	12.3	6.0	4	4.000
5.00	5.00	3.90	1.0	75	3.0	15.0	7.0	4	5.000
6.00	6.00	3.90	1.2	100	3.9	14.3	8.0	4	6.000
8.00	6.00	6.00	1.6	100	4.7		12.0	4	8.000
10.00	6.00	6.00	2.0	100	6.5		12.0	4	10.000
12.00	6.00	6.00	2.4	100	8.3		13.0	4	12.000

ISO	Hardness	vc	fu (mm/U) / Ø						
			3	6	8	10	12	16	20
P	≤ 850 N/mm ²	180	0,08	0,12	0,20	0,20	0,25	0,25	0,25
	≥ 850 N/mm ²	150	0,06	0,10	0,15	0,15	0,20	0,20	0,20
M	≤ 750 N/mm ²	100	0,06	0,10	0,15	0,15	0,20	0,20	0,20
	≥ 750 N/mm ²	80	0,05	0,08	0,12	0,12	0,15	0,15	0,15
K	≤ 350 HB	120	0,08	0,12	0,20	0,20	0,25	0,25	0,25
N*	≤ 3% Si	200	0,10	0,15	0,25	0,25	0,30	0,30	0,30
	> 3% Si	150	0,08	0,12	0,20	0,20	0,25	0,25	0,25
S	≤ 850 N/mm ²	60	0,05	0,08	0,12	0,12	0,15	0,15	0,15
	≤ 1400 N/mm ²	40	0,04	0,06	0,10	0,10	0,12	0,12	0,12
H	< 55 HRC	100	0,06	0,10	0,15	0,15	0,20	0,20	0,20
	≤ 63 HRC	40	0,04	0,05	0,06	0,06	0,08	0,08	0,08

* We recommend our Carbo-coating for the machining of aluminium.



GUHRING

P.O. Box 100247 • 72423 Albstadt
Herderstrasse 50-54 • 72458 Albstadt

T +49 74 31 17-0
F +49 74 31 17-21279

info@guehring.de
www.guehring.de

No liability can be accepted for printing errors or technical changes of any kind.
Our Conditions of Sale and Terms of Payment apply. Available on request.