



HARTNER

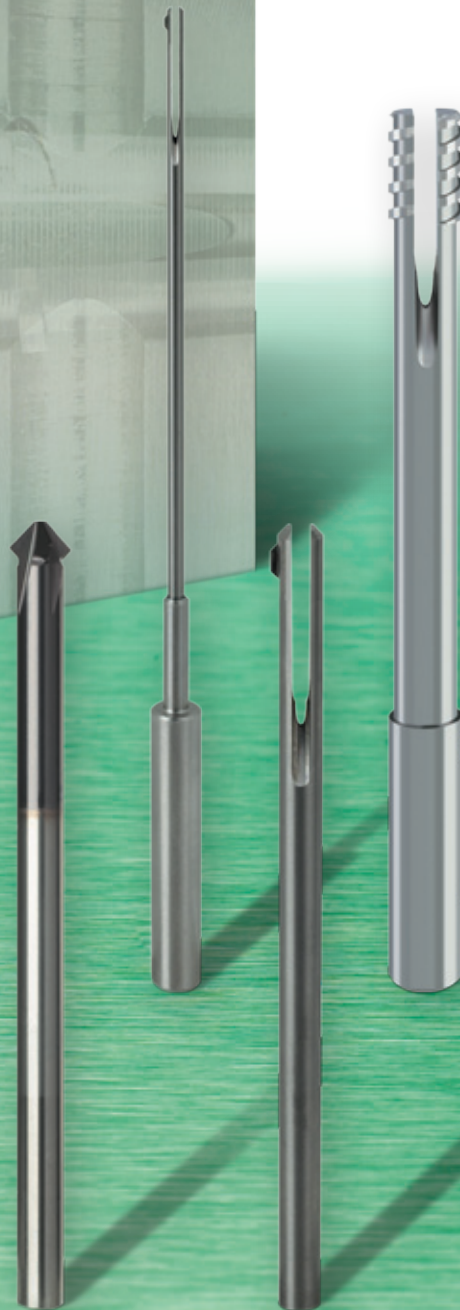
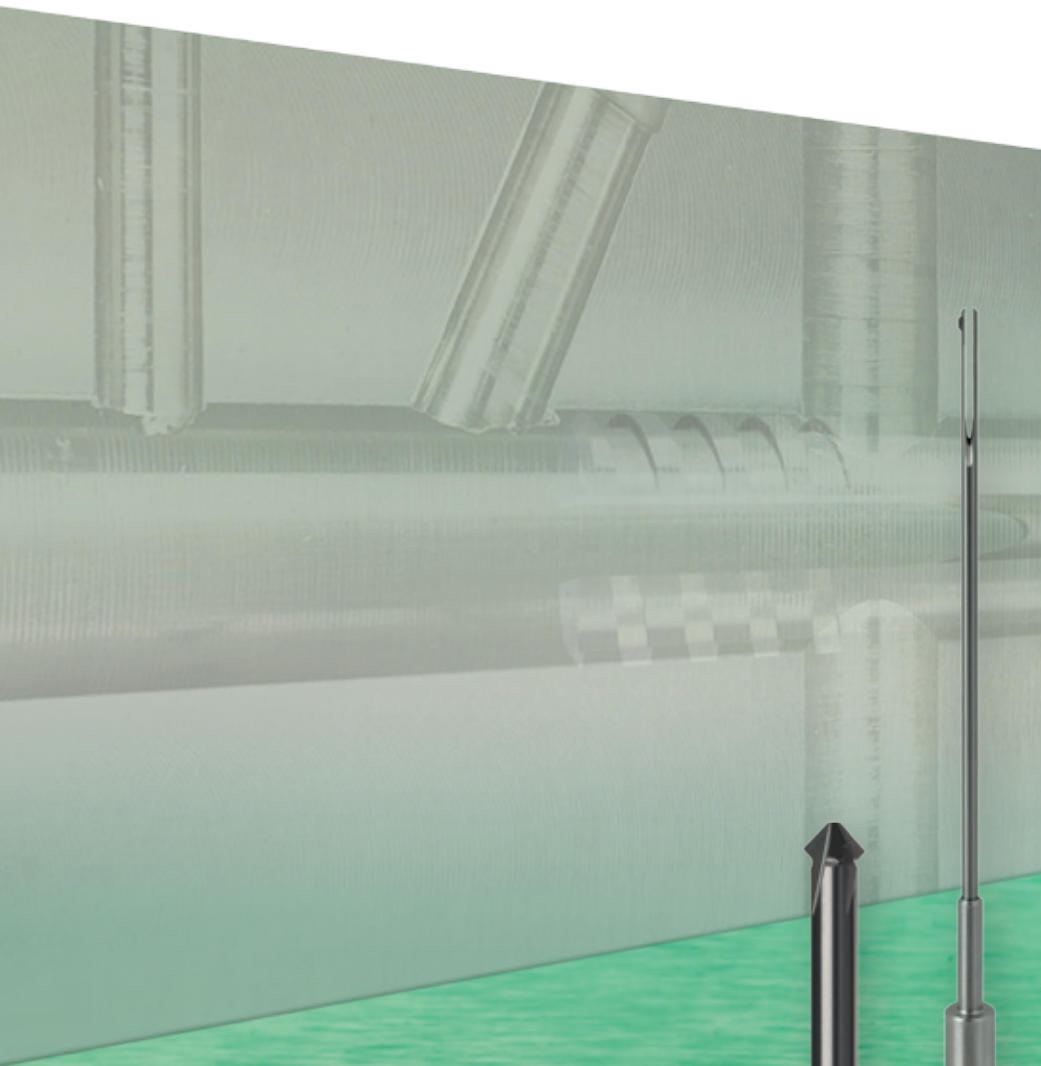
Precision Cutting Tools

Solid carbide de-burring tools

for entry and exit

New: Front/back
de-burrer TS 100 VR

2010





A first for internal de-burring: Carbide tools

Hartner's carbide tools for entry and exit de-burring operations are setting the benchmark for automatic de-burring. This, however, does not involve machining in the fullest sense of the word - as with, for example, conventional drills, milling cutters, taps, reamers and countersinks. Instead, the de-burring tool very carefully shaves off the burr and can also, if required, create a chamfer.

For the quality of a workpiece – especially with intersecting and cross holes – then de-bur-ring of the back of hole 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 de-burring of the back of the hole. Highly accurate de-burring 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 de-burring of the entry to the hole hardly causes a problem, the de-burring of through holes in many cases involves an extensive operation that is often carried out manually and is time and cost intensive.

With the newly developed and patented carbide tools for exit de-burring, Hartner is providing the possibility to automate and rationalise this production step applying high performance tools.

There is a choice of three solutions:

1. De-burring fork TS 100 EG - standard tool
2. Front/back de-burrer TS 100 VR as standard tool
3. De-burring spiral TS 100 ES - semi-standard tool

This not only means a considerable cost and time saving for the production, but also, more importantly, improved quality and process reliability.



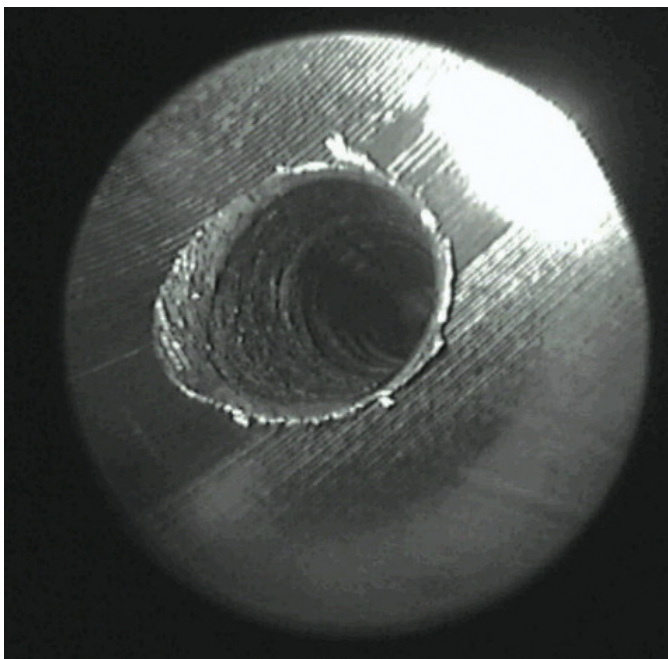
Solid carbide de-burring fork TS 100 EG



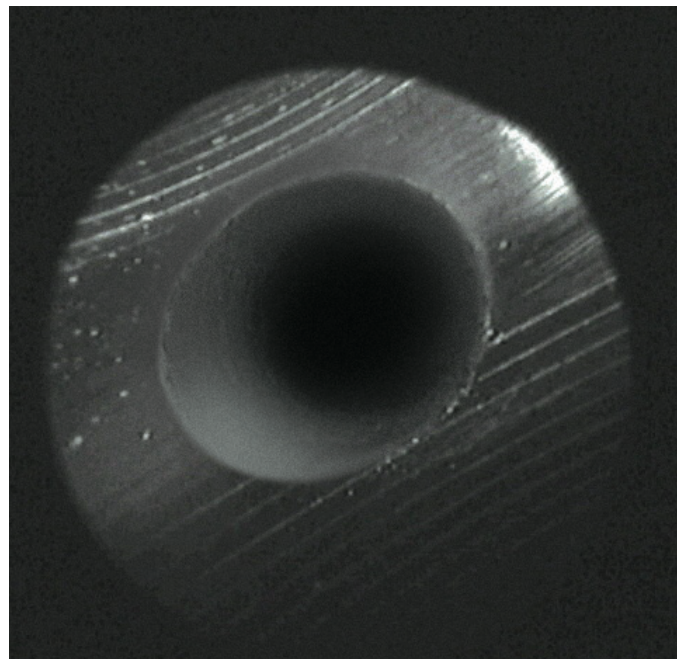
Front/back de-burrer TS 100 VR



Solid carbide de-burring spiral TS 100 ES



Exit of through hole prior to ...



...and following machining with de-burring fork.

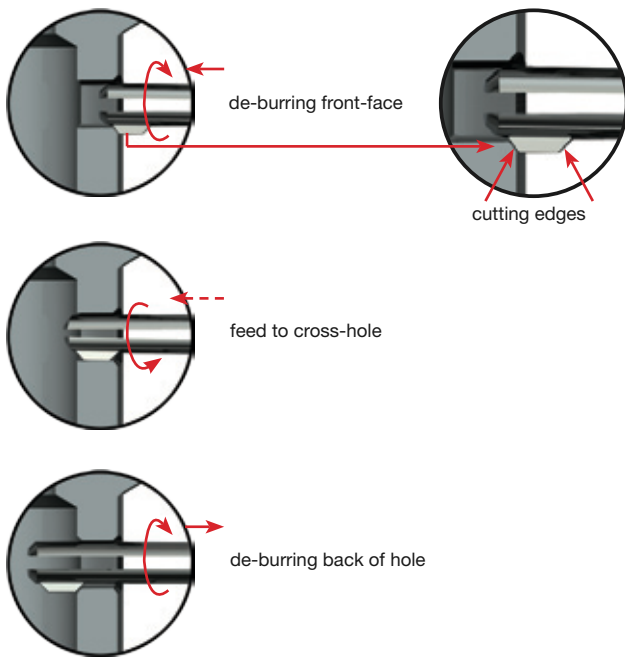


De-burring fork TS 100 EG

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 de-burring fork in holes with large tolerances. Reducing set-up time and cost!
- increased production. De-burring fork TS 100 EG de-burrs automatically with one set-up and short cycle times. Expensive and extensive manual operations are no longer required.

Operation



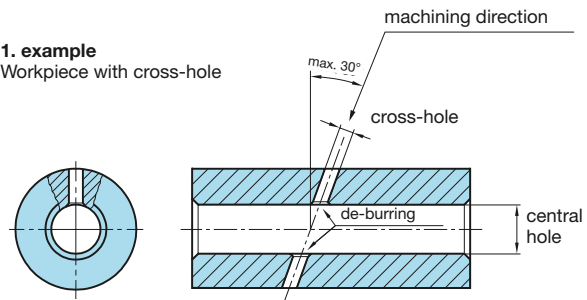
Step by step:

The automatically internal and external de-burring with de-burring fork TS 100 EG is an easy and cost saving alternative to common, extensive manual operations. Just one tool is required for all machining steps.

Application examples

1. example

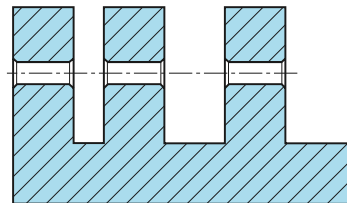
Workpiece with cross-hole



Please note when machining workpieces with cross-holes:
 – the diameter of the cross-hole must be maximal 35% of the central hole
 – the diameter of the cross-hole must be 40% larger than the cutting length l_6

2. example

Workpiece with multi-interrupted cut



Universal application:

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

\varnothing range (mm)	v_c m/min	f_u (mm)
$< \varnothing 4$	8 - 10	0.1 - 0.2
$\varnothing 4 - < \varnothing 6$	10 - 14	0.1 - 0.2
$6 - \varnothing 8$	14 - 20	0.1 - 0.2

Important:

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

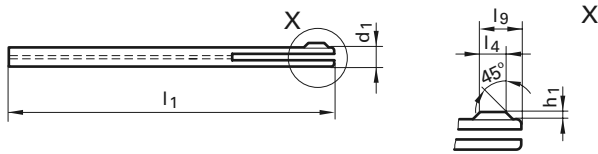


De-burring fork TS 100 EG - standard range

- with a straight shank for clamping in collet holders
- special dimensions and coated tools on request

Order no.
Tool material
Standard
Carbide grade
Surface
Type
Discount group

84100
Solid carbide
Hartner std.
K
○
TS 100 EG
120



nom. Ø	d1	for Ø range	l1	l4	l9	h1	Availability
mm	mm	mm	mm	mm	mm	mm	
2,000	1,900	1,91 - 2,15	80,00	1,00	2,05	0,35	●
2,250	2,100	2,16 - 2,40	80,00	1,50	2,60	0,40	●
2,500	2,400	2,41 - 2,70	80,00	1,50	2,90	0,40	●
2,750	2,600	2,71 - 2,90	90,00	1,50	2,95	0,45	●
3,000	2,900	2,91 - 3,25	90,00	2,00	3,65	0,45	●
3,500	3,200	3,26 - 3,60	90,00	2,00	3,80	0,60	●
4,000	3,600	3,61 - 4,25	90,00	2,00	4,10	0,70	●
4,500	4,200	4,26 - 4,75	90,00	2,50	4,60	0,70	●
5,000	4,700	4,76 - 5,30	100,00	2,50	4,85	0,75	●
5,500	5,200	5,31 - 5,80	100,00	2,50	4,85	0,75	●
6,000	5,600	5,81 - 6,20	110,00	3,00	5,80	0,80	●
6,500	6,000	6,21 - 6,70	110,00	3,00	5,90	0,90	●
7,000	6,500	6,71 - 7,10	110,00	3,00	5,85	0,85	●
7,500	6,900	7,11 - 7,60	110,00	3,50	6,95	0,95	●
8,000	7,300	7,61 - 8,05	110,00	3,50	7,00	1,00	●

○ bright

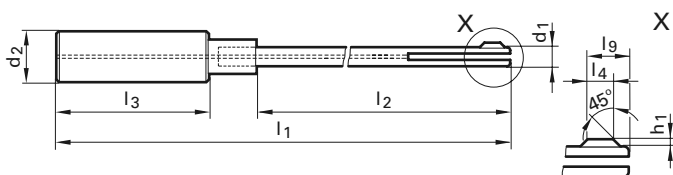


De-burring fork TS 100 EG - standard range

- with re-inforced plain shank to DIN 6535 HA for clamping in hydraulic chucks and shrink fit chucks
- special dimensions and coated tools on request

Order no.
Tool material
Standard
Carbide grade
Surface
Type
Discount group

84101
Solid carbide
Hartner std.
K
○
TS 100 EG
120



nom. Ø	d1	for Ø range	d2	l1	l2	l3	l4	l9	h1	Availability
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	
2,000	1,900	1,91 - 2,15	6,000	120,00	69,00	36,00	1,00	2,05	0,35	●
2,250	2,100	2,16 - 2,40	6,000	120,00	69,00	36,00	1,50	2,60	0,40	●
2,500	2,400	2,41 - 2,70	6,000	120,00	69,00	36,00	1,50	2,90	0,40	●
2,750	2,600	2,71 - 2,90	6,000	130,00	79,00	36,00	1,50	2,95	0,45	●
3,000	2,900	2,91 - 3,25	6,000	130,00	79,00	36,00	2,00	3,65	0,45	●
3,500	3,200	3,26 - 3,60	10,000	135,00	80,00	40,00	2,00	3,80	0,60	●
4,000	3,600	3,61 - 4,25	10,000	135,00	80,00	40,00	2,00	4,10	0,70	●
4,500	4,200	4,26 - 4,75	10,000	135,00	80,00	40,00	2,50	4,60	0,70	●
5,000	4,700	4,76 - 5,30	10,000	145,00	80,00	40,00	2,50	4,85	0,75	●
5,500	5,200	5,31 - 5,80	10,000	145,00	90,00	40,00	2,50	4,85	0,75	●
6,000	5,600	5,81 - 6,20	10,000	155,00	90,00	40,00	3,00	5,80	0,80	●
6,500	6,000	6,21 - 6,70	16,000	165,00	102,00	48,00	3,00	5,90	0,90	●
7,000	6,500	6,71 - 7,10	16,000	165,00	102,00	48,00	3,00	5,85	0,85	●
7,500	6,900	7,11 - 7,60	16,000	165,00	102,00	48,00	3,50	6,95	0,95	●
8,000	7,300	7,61 - 8,05	16,000	165,00	102,00	48,00	3,50	7,00	1,00	●

○ bright



Solid carbide de-burring spiral TS 100 ES - semistandard range

For exit de-burring through the central hole, Hartner has developed the solid carbide de-burring spiral TS 100 ES. 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 de-burring spiral TS 100 ES is based on the pre-tension of the grooved cutting portion. In the area of the cutting portion, the de-burring 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 de-burred 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 de-burring spiral TS 100 ES was a carbide as tool material that possesses an accordingly low rigidity and permits the necessary deformation in the cutting edge area. Thanks to Hartner's carbide expertise in development and production, then a carbide with such special attributes is available.

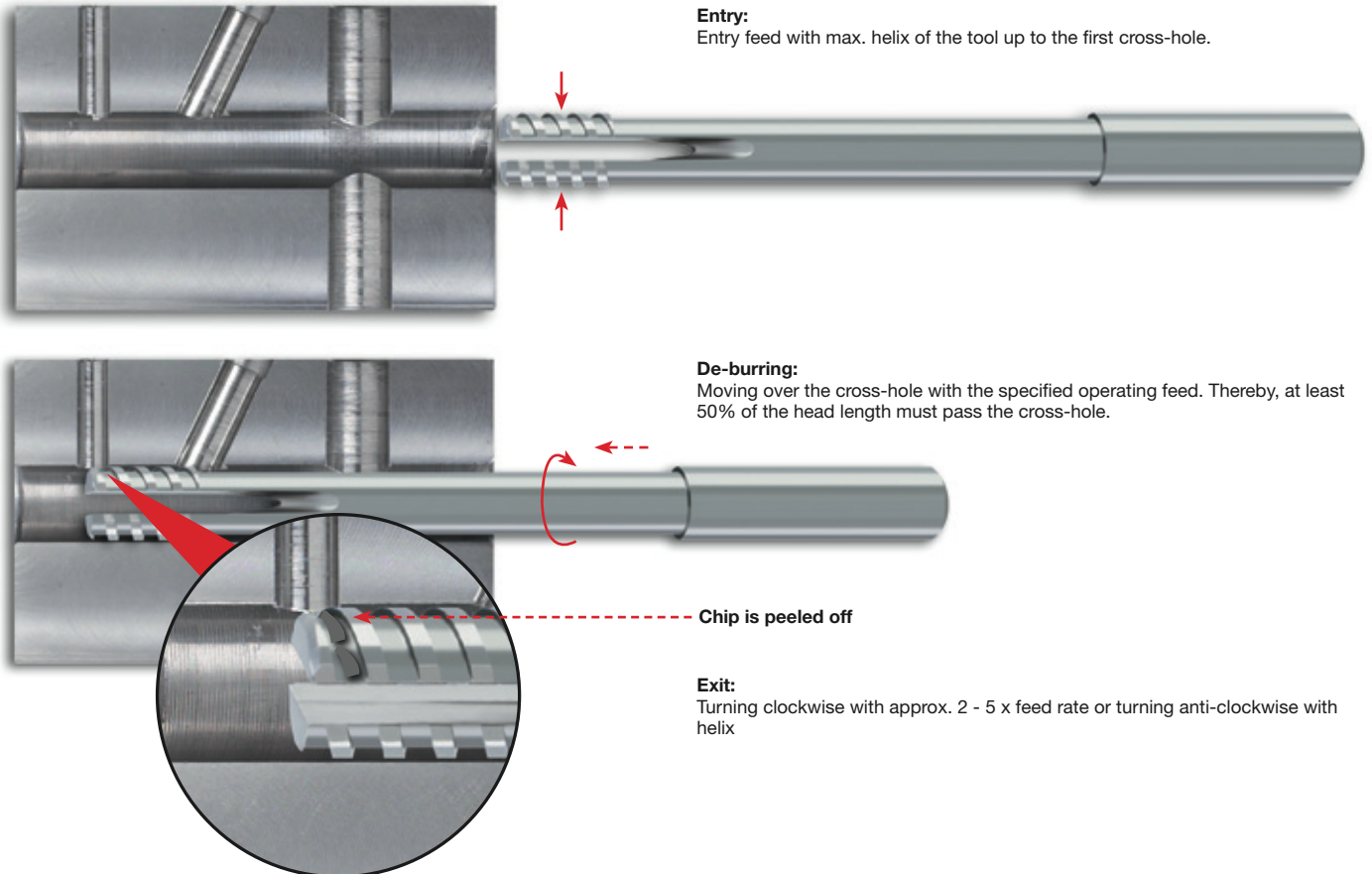
Cutting parameters de-burring spiral

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

Important:

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

Principle of function



Entry:

Entry feed with max. helix of the tool up to the first cross-hole.

De-burring:

Moving over the cross-hole with the specified operating feed. Thereby, at least 50% of the head length must pass the cross-hole.

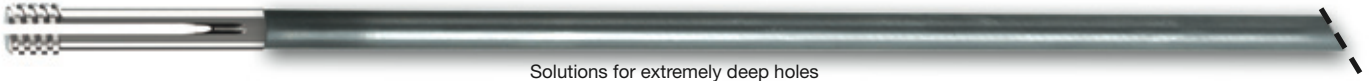
Chip is peeled off

Exit:

Turning clockwise with approx. 2 - 5 x feed rate or turning anti-clockwise with helix



Solid carbide de-burring spiral TS 100 ES - semistandard range

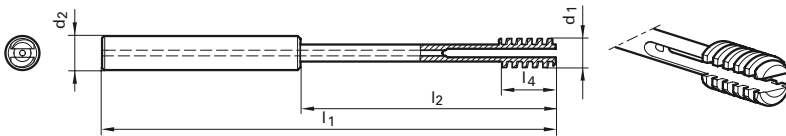


Solutions for extremely deep holes

- Re-inforced shank to DIN 6535
HA or extra length shank for extremely deep holes
- special dimensions and coated tools on request
- request form page 10

Order no.
Tool material
Standard
Carbide grade
Surface
Type
Discount group

Semistandard
Solid carbide
Hartner std.
K
○
TS 100 ES
120



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

○ bright

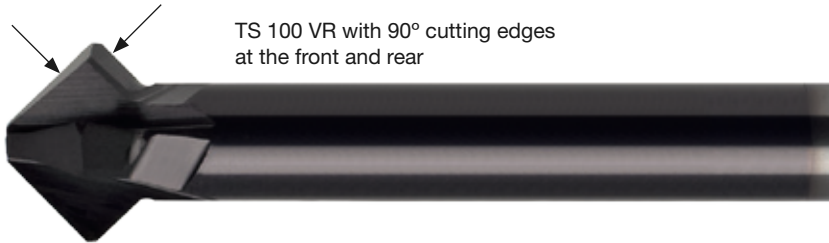


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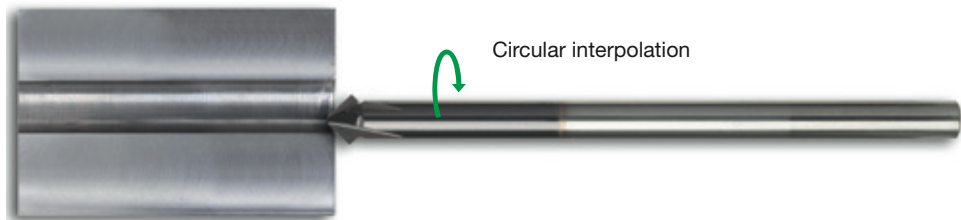
Front/back de-burrer TS 100 VR

Hartner's solid carbide TS 100 VR front/back de-burrer with TiAlN-coating as a standard tool enables de-burring as well as chamfering of hole entry and exit with a 90° angle.

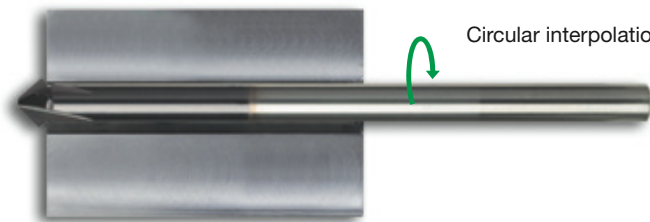
TS 100 VR possesses a milling head with a front and back cutting region. To de-burr or chamfer the tool performs a circular milling movement along the hole edge or contour.



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



Circular interpolation



Circular interpolation

Cutting parameters front/back de-burrer TS 100 VR

Material group	Tens. strength Hard- MPa (N/mm ²) ness	v _c (m/min)	Feed col. no.
Steels	< 850	120 - 200	71
	850-1200	100 - 180	71
	> 1200	80 - 140	71
Hardened steels	< 54 HRC	60 - 120	71
	54-60 HRC	40 - 80	71
Stainless/acid-resistant steels	< 850	80 - 120	71
Nickel-based alloys	< 1300	30 - 60	71
Ti-alloys	< 1300	50 - 100	71
Cast materials	< 240 HB30	120 - 180	72
	> 240 HB30	100 - 160	72
Al wrought alloys < 3% Si		150 - 250	72
Al cast alloys > 3% Si		100 - 200	72
Magnesium alloys		150 - 250	72
Non-ferrous alloys	< 850	30 - 200	72

Feed column no. (mm/rev.)

Ø	71	72
≤ 3.00	0.060	0.080
4.00	0.100	0.125
5.00	0.100	0.125
6.30	0.125	0.160
8.00	0.160	0.200
10.00	0.200	0.250
12.50	0.200	0.250

Important:

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

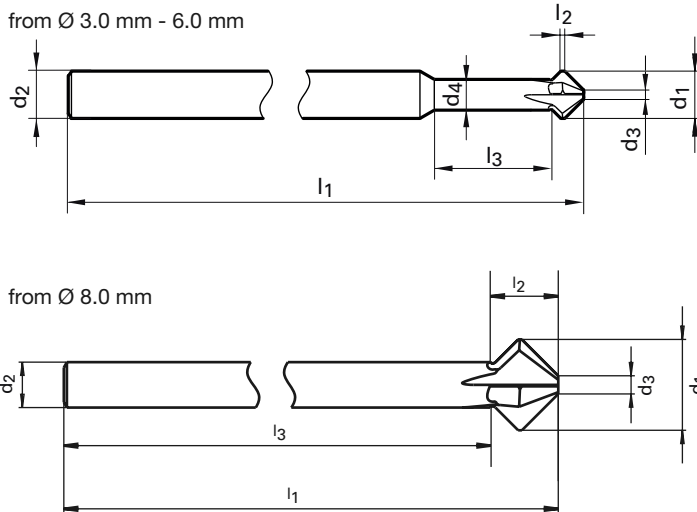


Front/back de-burrer TS 100 VR - standard range

• Re-inforced plain shank to DIN 6535 HA for clamping in hydraulic chucks and shrink fit chucks

Order no.
Tool material
Standard
Carbide grade
Surface
Type
Discount group

80495
Solid carbide
Hartner std.
K
○
TS 100 VR
120



d1 h8	d2 h6	d3	d4 ± 0.2	l1	l2 ± 0.2	l3 ± 0.2	Availability
mm	mm	mm	mm	mm	mm	mm	
3.000	4.000	0.600	2.200	75.00	2.10	10.00	●
4.000	4.000	0.800	2.900	75.00	2.70	13.00	●
5.000	5.000	1.000	3.900	75.00	3.00	15.00	●
6.000	6.000	1.200	3.900	100.00	3.50	15.00	●
8.000	6.000	1.600	-	100.00	4.70	95.30	●
10.000	6.000	2.000	-	100.00	6.50	95.30	●
12.000	6.000	2.400	-	100.00	8.30	91.70	●

○ bright



Solid carbide de-burring spiral TS 100 ES semistandard

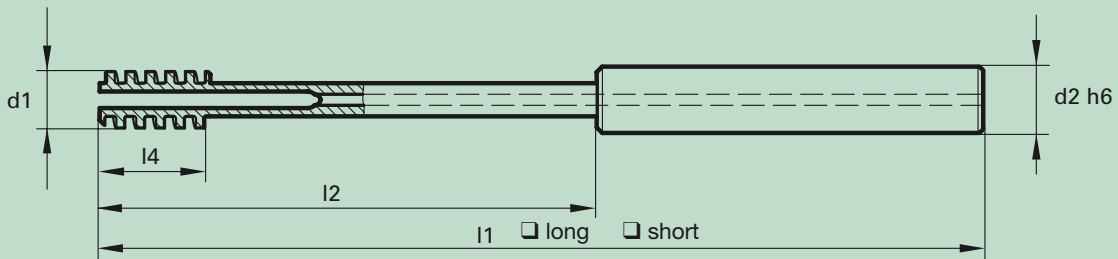
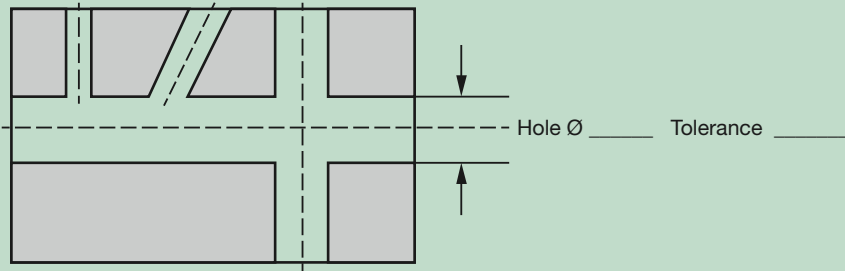
Fax Inquiry / Order
simply photo-copy, complete and fax...

Inquiry

Order

Repeat order, no. of initial order

Number required: _____ items



The production \varnothing $d1$ of the de-burring spiral is determined by the hole \varnothing of the component. Shank \varnothing and lengths are dependent on the production \varnothing and the table below.

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

Company: _____

Company stamp: _____

Telephone/fax: _____

Contact: _____

Signature: _____



Fax Inquiry / Order simply photo-copy, complete and fax...

Inquiry Order Repeat order, no. of initial order

TS 100 EG TS 100 VR TS 100 ES

Please recommend the optimal tool for the application as per description.

Drawing of lay-out

Machining: De-burring Entry Exit Cross-hole
Milling Entry, angle _____° Exit, angle _____°

Workpiece: Hole Ø: _____mm Hole depth: _____mm
Cross-hole: no yes, to _____mm

Material/designation: _____

Maschine type: Machining centre Turning centre others: _____

Shank: HA HE others: _____

Coolant: internal external
 Oil Soluble oil MQL

Pressure: _____bar Quantity: _____l/min

Company: _____

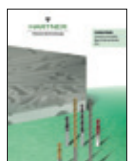
Company stamp:

Telephone/fax: _____

Contact: _____

Signature: _____

Our programme:



FU 500/FN500



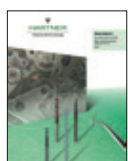
Gun Drills



INOX Drills



Standard Solid Carbide De-burring Tools



Micro Precision Drills



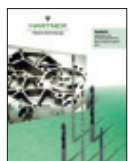
Multiplex



TS-Drills



Multiplex HPC



Highlights



Standard Range



Special Drills



TM Vending Machines

Hartner GmbH

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