HARTNER

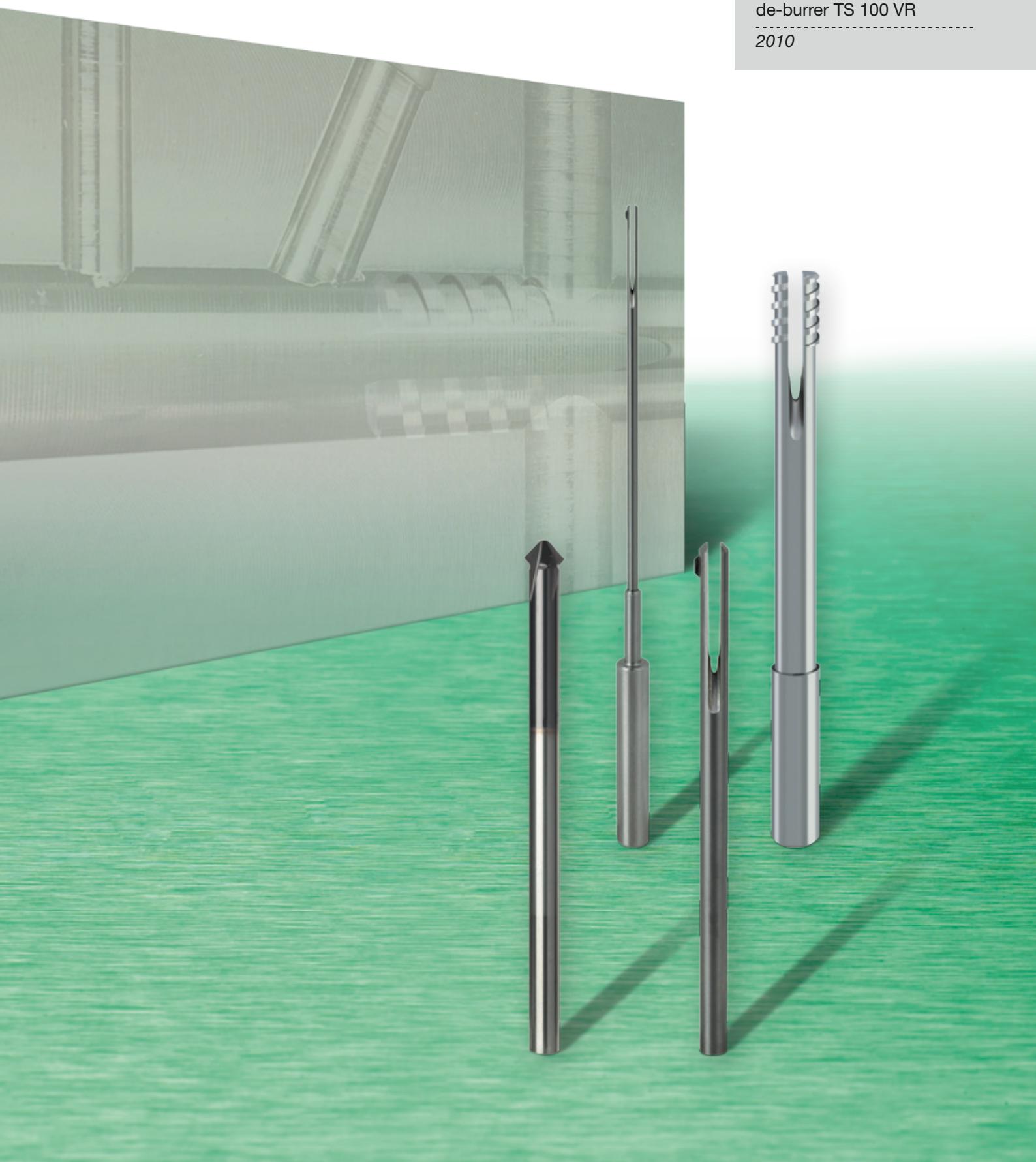
Precision Cutting Tools

Solid carbide de-burring tools

for entry and exit

New: Front/back
de-burrer TS 100 VR

2010



HARTNER

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.

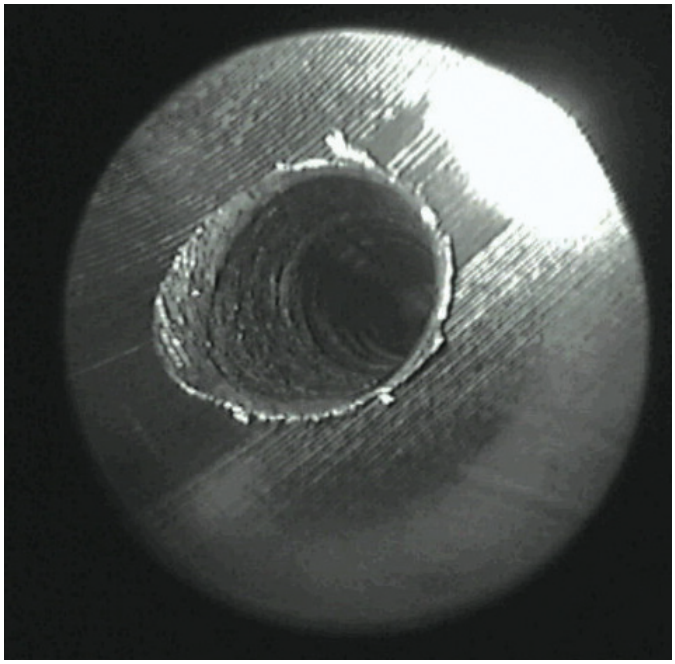
There is a choice of three solutions:
1. De-burring fork TS 100 EG - standard tool
2. Front/back de-burrer TS 100 VR as standard tool
3. De-burring spiral TS 100 ES - semi-standard tool

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

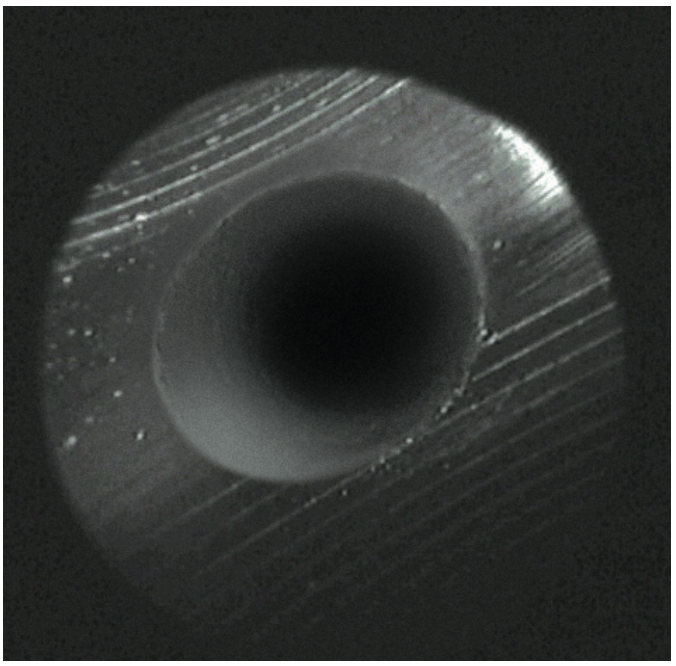
Solid carbide de-burring fork TS 100 EG

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.

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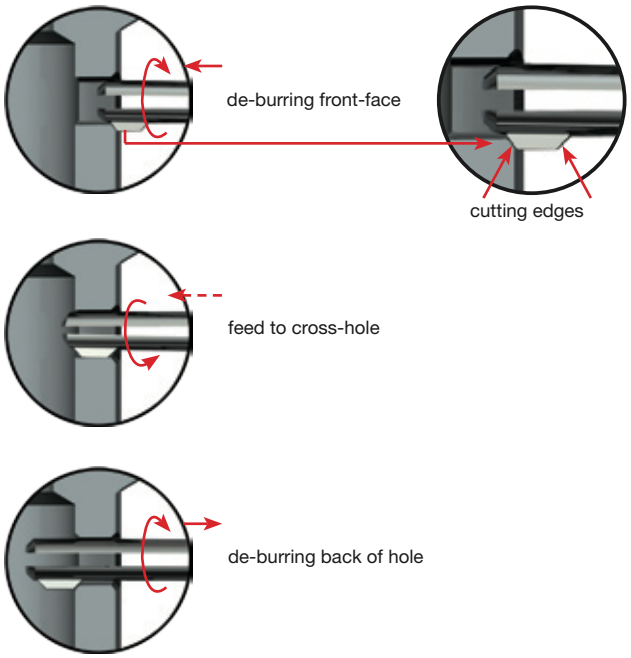
De-burring fork TS 100 EG

Advantages:

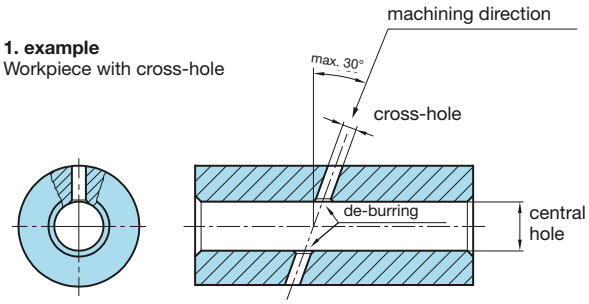
- cost saving. The standard tool offers outstanding price advantages in comparison with special tooling.
- universal tooling for milling, turning and robotic applications. The range of 0.25 mm enables the application of our de-burring fork in holes with large tolerances. Reducing set-up time and cost!
- 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



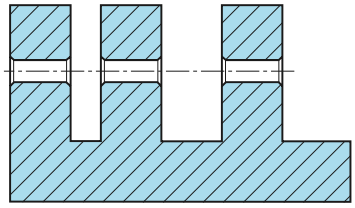
Application examples

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



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.

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.

∅ range (mm)	v_c m/min	fu (mm)
< ∅ 4	8 - 10	0.1 - 0.2
∅ 4 - < ∅ 6	10 - 14	0.1 - 0.2
6 - ∅ 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.

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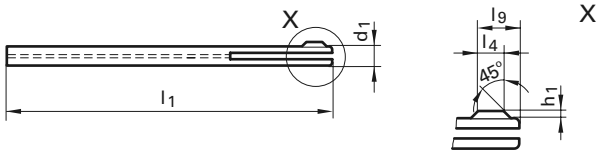
De-burring fork TS 100 EG - standard range

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

Order no.	84100
Tool material	Solid carbide
Standard	Hartner std.
Carbide grade	K
Surface	◯
Type	TS 100 EG
Discount group	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	●

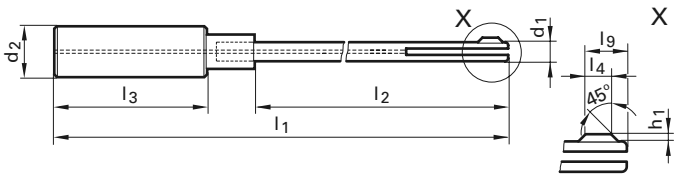
◯ bright

HARTNER

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.	**84101**
Tool material	**Solid carbide**
Standard	**Hartner std.**
Carbide grade	**K**
Surface	◯
Type	**TS 100 EG**
Discount group	**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	●

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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.

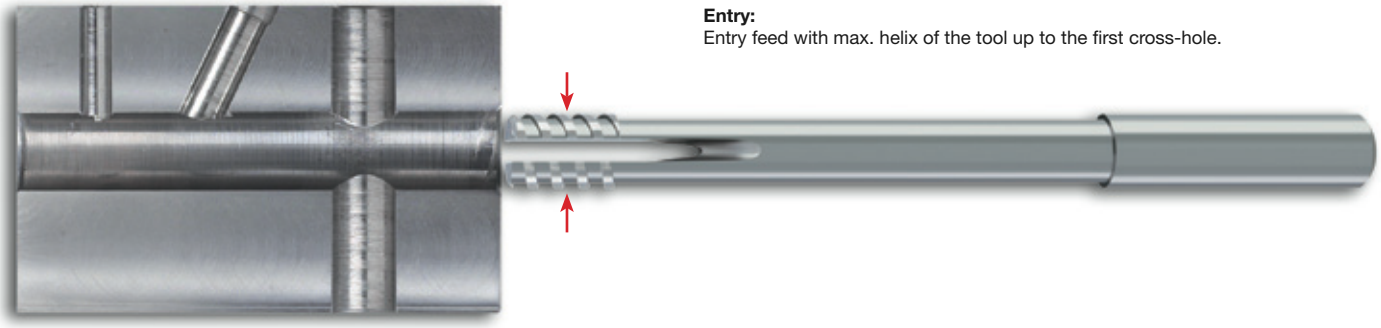
Pre-requisite for the development of the de-burring spiral TS 100 ES was a carbide as tool material that possesses an accordingly low rigidity and permits the necessary deformation in the cutting edge area. Thanks to Hartner‘s carbide expertise in development and production, then a carbide with such special attributes is available.

Cutting parameters de-burring spiral

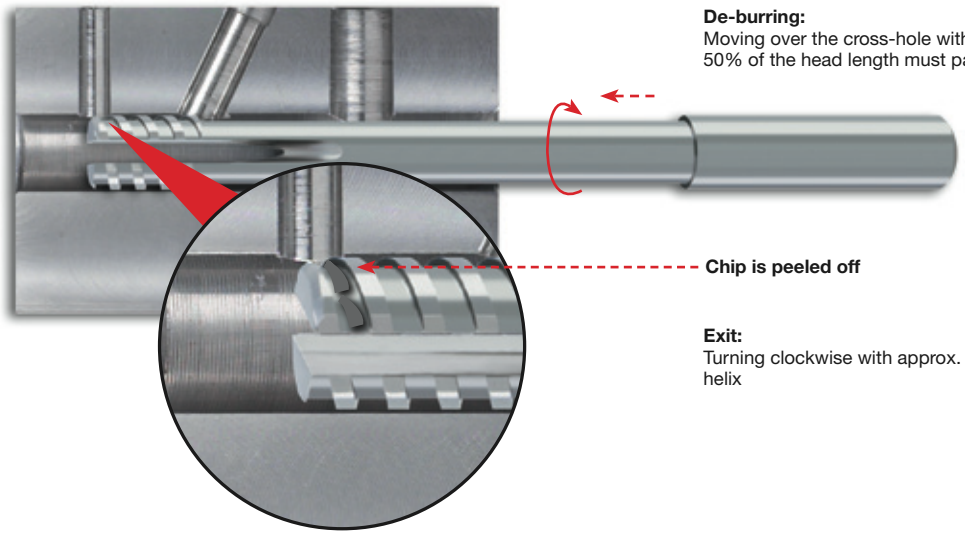
∅ range (mm)	v_c m/min	fu (mm)
< ∅ 8	15 - 25	0.2 - 0.3
≥ ∅ 8	15 - 25	0.4 - 0.8

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.

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

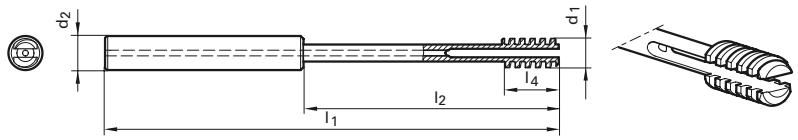
HARTNER

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.	**Semistandard**
Tool material	**Solid carbide**
Standard	**Hartner std.**
Carbide grade	**K**
Surface	◯
Type	**TS 100 ES**
Discount group	**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**

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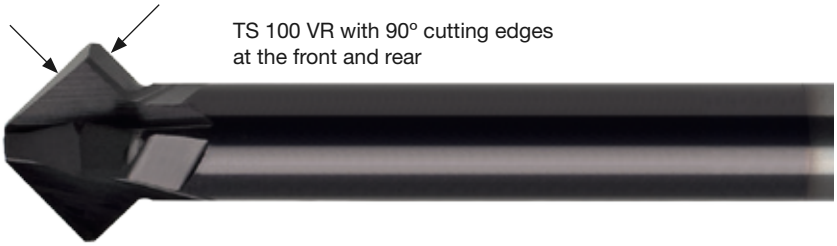
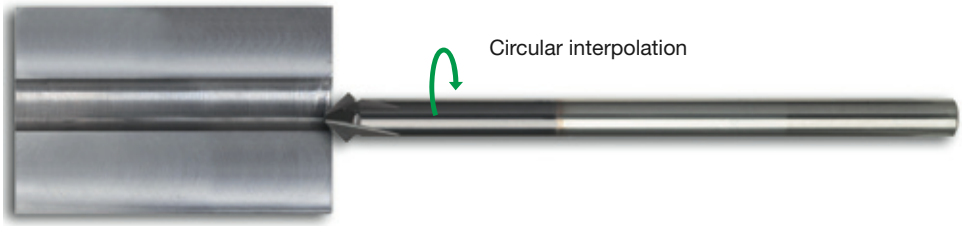
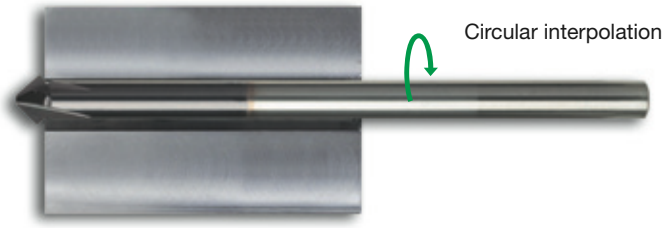
Front/back de-burrer TS 100 VR

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.







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.

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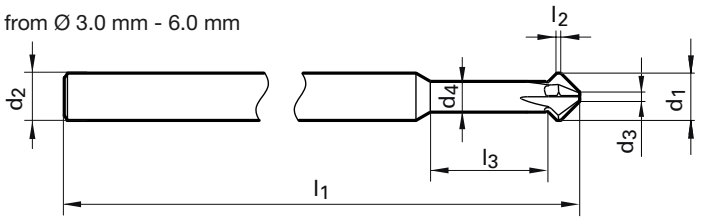
Front/back de-burrer TS 100 VR - standard range

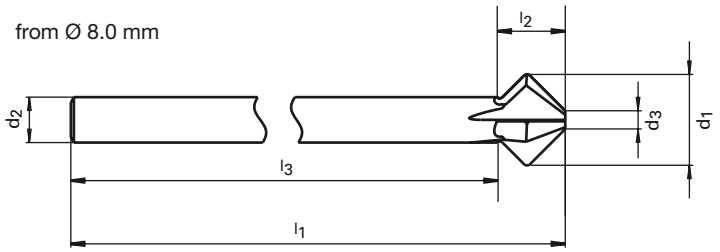
- **Re-inforced plain shank to DIN 6535 HA for clamping in hydraulic chucks and shrink fit chucks**

Order no.	**80495**
Tool material	**Solid carbide**
Standard	**Hartner std.**
Carbide grade	**K**
Surface	◯
Type	**TS 100 VR**
Discount group	**120**

from Ø 3.0 mm - 6.0 mm



from Ø 8.0 mm



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	●

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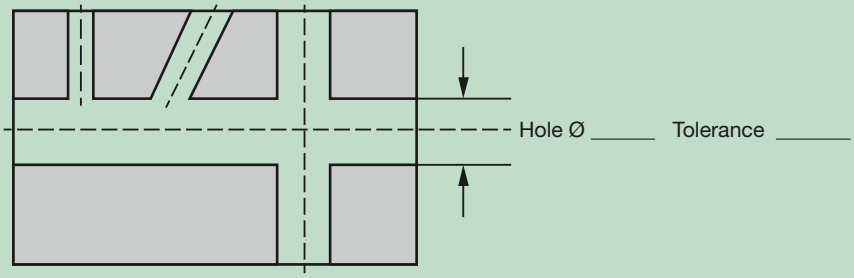
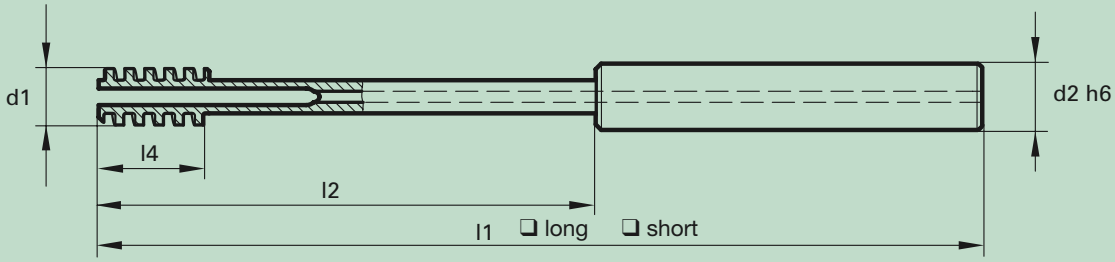
Solid carbide de-burring spiral TS 100 ES semistandard

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

❑ Inquiry ❑ Order ❑ Repeat order, no. of initial order

Number required: _____ **items**





The production Ø d1 of the de-burring spiral is determined by the hole Ø of the component.
Shank Ø and lengths are dependent on the production Ø 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

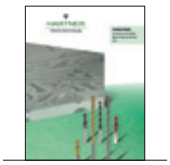
Machining:	De-burring	❑ Entry	❑ Exit	❑ Cross-hole
	Milling	❑ Entry, angle _____°	❑ Exit, angle _____°	
Workpiece:	Hole Ø: _____mm	Hole depth: _____mm		
	Cross-hole:	❑ no	❑ yes, to _____mm	
	Material/designation: _____			
Maschine type:	❑ Machining centre	❑ Turning centre	❑ others: _____	
Shank:	❑ HA	❑ HE	❑ others: _____	
Coolant:	❑ internal	❑ external		
	❑ Oil	❑ Soluble oil	❑ MQL	
	Pressure: _____bar	Quantity: _____l/min		

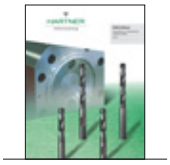
Company: _____ Company stamp:

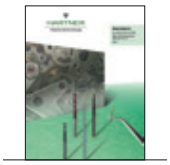
Telephone/fax: _____

Contact: _____ Signature: _____

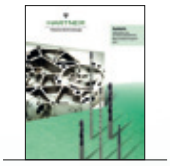
Our programme:

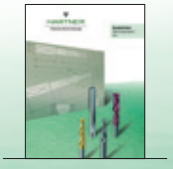

FU 500/FN500

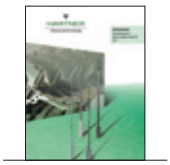

INOX Drills

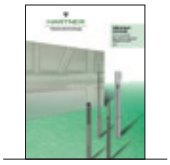

Micro Precision Drills

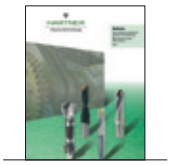

TS-Drills


Highlights

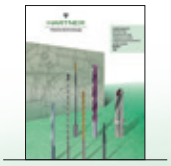

Special Drills


Gun Drills


Standard Solid Carbide De-burring Tools


Multiplex


Multiplex HPC


Standard Range


TM Vending Machines

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