

Precision Tools

Catalogue 2024



Solid carbide tools for metal cutting

WUNSCHMANN
PRÄZISIONSWERKZEUGE

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Persuasive precision and performance

Precision tools for metal cutting have been our business for over 45 years. Our top goal was and is the production of standard and custom tools which stand out from the rest through their high performance capability and exceptional cost-to-benefit ratio.

To be able to produce competitively, our customers need cutting tools which offer the longest possible service life in metalworking while providing the highest possible precision. Depending on the cutting task, this may be a standard tool, a modified serial production tool or a 100% custom tool.

Our product range covers a constantly growing, extensive line-up of high-performance solid carbide metal cutters and drills for a wide variety of different tasks and materials.



*Controlled quality:
SC-HRC cutter*

*Always focussing on customer benefit:
Owner Stephan Wunschmann*

We produce cutting tools, drills, multi-stage and contour tools on high-tech grinding centres of the latest generation. We also offer our renowned sharpening service on the same machines.

Special tools

Customer-specific custom metal cutting tools have been one of our specialties for many years. And our customers know it. At lot size 1 and up we develop and produce tools which leave competing products from big-name manufacturers far behind in tests. That's what drives us on!

This 2024 catalogue contains our current standard range with a great many new products.

If you have any special metal cutting tasks, I would be delighted if you would call or write me an e-mail.

Yours,

S. Wunschmann

Stephan Wunschmann

stephan@wunschmann.de
Phone +49 (0) 7457 8059

WUNSCHMANN
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Tailor-made quality tools

Custom SC cutting tools or drills for specific cutting tasks can really pay off. This has been our experience in numerous customer projects.

We develop and produce modified standard tools and 100% custom precision tools. In doing so, we place great value on close and trusting cooperation with the user.



*Tailor-made precision:
Special tools from Wunschmann*



*High-precision special tools
for special machining tasks*

Based on the workpiece drawing, we will develop the required tool with exactly the right geometry and coating. We work with the latest CAD programs and are happy to provide 3D tool simulations.

The grinding and measurement work is done on state-of-the-art CNC machines. All Wunschmann tools undergo strict quality control before shipping – with measurement report upon request. Follow-up orders or sharpening work is made simple thanks to item numbers, even for custom tools.

Choose, order and cut: the sure way to the right tool

Order Wunschmann tools with ease

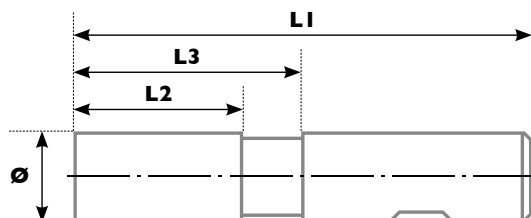
You will find all important information on the tool in the product descriptions in this catalogue: fields of application, coating, geometry, dimensions and item number.

The quoted cutting specifications are approximate values. The actual cutting speeds and feed rates depend on the working conditions at hand.

You can place your order by telephone, e-mail or fax. Simply name us the type, item number and desired number of tools.

Cutter dimensions

L1: Total length L2: Cutting length L3: Neck length



*Wunschmann customers appreciate
Accuracy in all areas*

Here is how you can reach us:

Phone: +49 (0) 7457 8059

Fax: +49 (0) 7457 4697

E-mail: info@wunschmann.de

E-mail for custom tools:

stephan@wunschmann.de

You will also find up-to-date information on our homepage and on our Facebook page.

Material groups as per ISO standard

P

Unalloyed and high-alloyed steels, including steel casting

M

Rust-free steels (ferritic, martensitic, austenitic, austenitic-ferritic)

K

Cast iron (grey iron GCI, malleable cast iron MCI, spheroidal graphite cast iron NCI, vermicular cast iron CGI, bainitic cast iron ADI)

N

Non-ferrous metals (such as aluminium, copper, brass)

S

Heat-resistant super-alloys (HRSA)

H

Steels with a hardness of 45–68 HRC, chilled casting 400–600 HB

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SC finishing cutter type 112

for universal use

- ▲ durable cutting edges
- ▲ good chip removal
- ▲ K 40 ultrafine grade
- ▲ right-hand cutting
- ▲ Weldon shank
- ▲ torus cutter upon request



Material	Steel < 500N	Steel < 900N	Steel < 1100N	Cast iron
$V_c = \text{m/min}$	105	100	70	90
$a_p = 1 \times D$	$a_e = 0.3 \times D$			

P	K	N
Z-3 over centre	DIN 6528	Shaft 6535 HB
Corner chamfer	30° spiral	TiAlN

Ø mm	Cutting length mm (L2)	Overall length mm (L1)	Item no.	Price €	FPT full slot	FPT lateral
3*	8	57	11203W	15.19	0.010	0.011
4*	13	57	11204W	15.03	0.020	0.023
5*	13	57	11205W	15.03	0.020	0.023
6	13	57	11206W	14.66	0.030	0.033
8	21	63	11208W	20.22	0.040	0.045
10	22	72	11210W	27.28	0.050	0.060
12	26	83	11212W	36.82	0.060	0.080
14	26	83	11214W	48.29	0.060	0.080
16	32	92	11216W	59.78	0.080	0.100
18	32	92	11218W	92.37	0.080	0.100
20	38	104	11220W	95.30	0.100	0.120

Other dimensions and special lengths upon request.

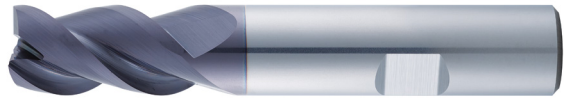
Prices not including statutory VAT.

* Shaft Ø 6.0

SC finishing cutter type 115

for universal use

- ▲ good chip removal
- ▲ durable cutting edges
- ▲ K 40 ultrafine grade
- ▲ right-hand cutting
- ▲ Weldon shank
- ▲ torus cutter upon request



Material	Steel < 500N	Steel < 900N	Steel < 1100N	Cast iron
$V_c = \text{m/min}$	105	100	70	90
$a_p = 1 \times D$	$a_e = 0.3 \times D$			

P	K	N
Z-3 over centre	DIN 6528	Shaft 6535 HB
Corner chamfer	45° spiral	TiAlN

Ø mm	Cutting length mm (L2)	Overall length mm (L1)	Item no.	Price €	FPT full slot	FPT lateral
6	13	57	11506W	14.66	0.030	0.033
8	21	63	11508W	20.22	0.040	0.045
10	22	72	11510W	27.28	0.050	0.060
12	26	83	11512W	36.82	0.060	0.080
14	26	83	11514W	48.29	0.060	0.080
16	32	92	11516W	59.78	0.080	0.100
18	32	92	11518W	92.37	0.080	0.100
20	38	104	11520W	95.30	0.100	0.120

Other dimensions and special lengths upon request.

Prices not including statutory VAT.

SC finishing cutter type I22

for universal use

- ▲ high accuracy of fit
- ▲ good surface quality
- ▲ K 40 ultrafine grade
- ▲ right-hand cutting
- ▲ Weldon shank
- ▲ torus cutter upon request



Material	Steel < 500N	Steel < 900N	Steel < 1100N	Cast iron
$V_c = \text{m/min}$	110	100	70	90
$a_p = 1 \times D$	$a_e = 0.4 \times D$			

P	K	N
Z-4 over centre	DIN 6527	Shaft 6535 HB
Corner chamfer	30° spiral	TiAlN

Ø mm	Cutting length mm (L2)	Overall length mm (L1)	Item no.	Price €	FPT full slot	FPT lateral
4*	13	57	I2204W	18.44	0.020	0.023
5*	13	57	I2205W	18.44	0.020	0.023
6	16	57	I2206W	17.35	0.030	0.033
8	22	63	I2208W	23.83	0.040	0.045
10	25	72	I2210W	27.38	0.050	0.060
12	28	83	I2212W	37.63	0.060	0.080
14	28	83	I2214W	47.44	0.060	0.080
16	32	92	I2216W	70.34	0.080	0.100
18	32	92	I2218W	79.98	0.080	0.100
20	38	104	I2220W	116.56	0.100	0.120

Other dimensions and special lengths upon request.

Prices not including statutory VAT.

* Shaft Ø 6.0

SC finishing cutter type I62

for finishing cutting during peripheral
and contour milling

- ▲ high accuracy to size
- ▲ excellent surface quality
- ▲ K 40 ultrafine grade
- ▲ right-hand cutting
- ▲ Weldon shank
- ▲ torus cutter upon request



Material	Steel < 500N	Steel < 900N	Steel < 1100N	Cast iron
$V_c = \text{m/min}$	150	120	85	120
$a_e = 0.07 \times D$				

P	K	
Z-6 over centre	DIN 6527	Shaft 6535 HB
Corner chamfer	45° spiral	TiAlN

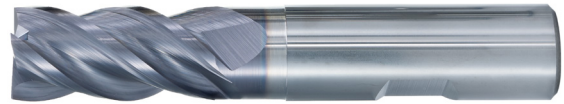
Ø mm	Cutting length mm (L2)	Overall length mm (L1)	Item no.	Price €	FPT lateral
6	13	57	I6206W	19.35	0.040
8	19	63	I6208W	26.76	0.045
10	22	72	I6210W	35.38	0.050
12	26	83	I6212W	46.80	0.050
16	32	92	I6216W	70.34	0.060
20	38	104	I6220W	102.29	0.080

Other dimensions and special lengths upon request. Prices not including statutory VAT.

SC-HPC cutter, uneven cutting pitch type 180

for roughing and finishing

- ▲ up to $1.5 \times D$ in solid material
- ▲ high-performance and quiet running
- ▲ best surface quality and accuracy to size
- ▲ K 40 ultrafine grade
- ▲ Weldon shank



Material	Steel < 500N	Steel < 900N	Steel < 1100N	Cast iron
$V_c = \text{m/min}$	150	110	80	90
$a_p = 1.5 \times D$	$a_e = 0.5 \times D$			

P	K		
Z-4 over centre	DIN 6527	Shaft 6535 HB	Corner chamfer
35°/38° spiral	TiAlN	Neck	

Ø mm	Cutting length mm (L2)	Overall length mm (L1)	Neck length mm	Item no.	Price €	FPT full slot	FPT lateral
3*	8	57	13	18003W	22.66	0.010	0.015
4*	11	57	16	18004W	22.66	0.010	0.020
5*	13	57	18	18005W	22.45	0.020	0.030
6	13	57	18	18006W	22.45	0.025	0.035
8	22	63	27	18008W	29.36	0.030	0.040
10	25	72	30	18010W	36.62	0.045	0.050
12	26	83	36	18012W	46.36	0.050	0.055
14	30	83	36	18014W	67.29	0.050	0.070
16	35	92	42	18016W	80.96	0.050	0.070
18	35	92	42	18018W	106.44	0.070	0.085
20	38	104	52	18020W	120.10	0.070	0.085

Other dimensions and special lengths upon request.

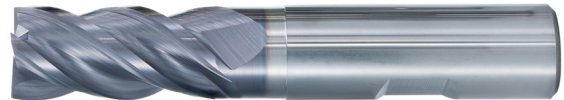
Prices not including statutory VAT.

* Shaft Ø 6.0

SC-HPC cutter with corner radius type 180WR

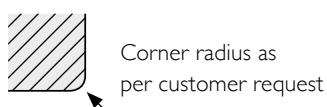
for roughing and finishing

- ▲ up to $1.5 \times D$ in solid material
- ▲ high-performance and quiet running
- ▲ best surface quality and accuracy to size
- ▲ K 40 ultrafine grade
- ▲ Weldon shank



Material	Steel < 500N	Steel < 900N	Steel < 1100N	Cast iron
$V_c = \text{m/min}$	150	110	80	90
$a_p = 1.5 \times D$	$a_e = 0.5 \times D$			

P	K		
Z-4 over centre	DIN 6527	Shaft 6535 HB	Corner radius
35°/38° spiral	TiAlN		



Ø mm	Cutting length mm (L2)	Overall length mm (L1)	Neck length mm	Item no.	Price €	FPT full slot	FPT lateral
3*	8	57	13	18003WR	30.77	0.010	0.015
4*	11	57	16	18004WR	30.77	0.010	0.020
5*	13	57	18	18005WR	30.99	0.020	0.030
6	13	57	18	18006WR	30.99	0.025	0.035
8	22	63	27	18008WR	37.97	0.030	0.040
10	25	72	30	18010WR	45.29	0.045	0.050
12	26	83	36	18012WR	55.14	0.050	0.055
14	30	83	36	18014WR	76.45	0.050	0.070
16	35	92	42	18016WR	95.06	0.050	0.070
18	35	92	42	18018WR	120.91	0.070	0.085
20	38	104	52	18020WR	134.57	0.070	0.085

Other dimensions and special lengths upon request.

Prices not including statutory VAT.

* Shaft Ø 6.0

SC-HPC cutter, short version type I80WK

for roughing and finishing

- ▲ up to $1.0 \times D$ in solid material
- ▲ quiet running
- ▲ best surface quality and accuracy to size
- ▲ K 40 ultrafine grade
- ▲ Weldon shank
- ▲ torus cutter upon request



Material	Steel < 500N	Steel < 900N	Steel < 1100N	Cast iron
$V_c = \text{m/min}$	160	120	100	100
$a_p = 1.0 \times D$	$a_e = 0.5 \times D$			

P	K		
Z-4 over centre	DIN 6527	Shaft 6535 HB	Corner chamfer
35°/38° spiral	TiAlN		

Ø mm	Cutting length mm (L2)	Overall length mm (L1)	Item no.	Price €	FPT full slot	FPT lateral
6	10	54	I8006WK	21.65	0.040	0.050
8	12	58	I8008WK	25.98	0.050	0.060
10	14	66	I8010WK	33.36	0.060	0.080
12	16	73	I8012WK	45.18	0.070	0.090
16	22	82	I8016WK	73.88	0.080	0.100
20	26	92	I8020WK	106.96	0.100	0.130

Other dimensions and special lengths upon request.

Prices not including statutory VAT.



Wunschmann GmbH · Phone +49 (0) 7457 8059 · Fax +49 (0) 7457 4697 · info@wunschmann.de · www.wunschmann.de

SC-HPC cutter, long with long blade type I81

for roughing and finishing

- ▲ up to $0.7 \times D$ in solid material
- ▲ very smooth running
- ▲ very good surface quality and accuracy to size
- ▲ Weldon shank
- ▲ torus cutter upon request



Material	Steel < 500N	Steel < 900N	Steel < 1100N	Cast iron
$V_c = \text{m/min}$	100	75	55	60
$a_e = 0.25 \times D$				

P	K		
Z-4 over centre	DIN 6527	Shaft 6535 HB	Neck
Corner chamfer	35°/38° spiral	TiAIN	

Ø mm	Cutting length mm (L2)	Overall length mm (L1)	Neck length mm (L3)	Item no.	Price €	FPT full slot	FPT lateral
6	18	63	24	18106W	28.49	0.040	0.020
8	24	68	30	18108W	35.12	0.050	0.020
10	30	90	38	18110W	48.89	0.060	0.025
12	36	93	46	18112W	64.94	0.070	0.030
16	48	108	58	18116W	94.78	0.080	0.035
20	60	126	74	18120W	145.24	0.100	0.050

Other dimensions and special lengths, upon request.

Prices not including statutory VAT.

SC-HPC cutter, long, stepped shaft type I82

with extra-longneck for roughing and finishing

- ▲ high-performance and quiet running
- ▲ best surface quality and accuracy to size
- ▲ Weldon shank
- ▲ torus cutter upon request



Material	Steel < 500N	Steel < 900N	Steel < 1100N	Cast iron
$V_c = \text{m/min}$	100	75	55	60
$a_e = 0,1 \times D$				

P	K		
Z-4 over centre	DIN 6527	Shaft 6535 HB	Corner chamfer
35°/38° spiral	TiAIN	Neck	

Ø mm	Cutting length mm (L2)	Overall length mm (L1)	Neck length mm (L3)	Item no.	Price €	FPT lateral
6	13	80	40	18206W	32.20	0.020
8	22	100	60	18208W	39.59	0.020
10	25	100	60	18210W	52.74	0.025
12	25	120	75	18212W	67.63	0.030
16	35	150	100	18216W	120.66	0.035
20	40	150	100	18220W	172.66	0.050

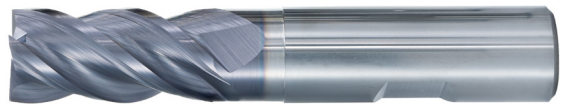
Other dimensions and special lengths upon request.

Prices not including statutory VAT.

SC-HPC-V cutter up to 2 × D type I86

for roughing and finishing at
maximum feed rates

- ▲ excellent surface quality
and accuracy to size
- ▲ smooth running
- ▲ gets the most out of the machine
- ▲ Weldon shank



Material	Steel < 500N	Steel < 900N	Steel < 1100N	Cast iron < 240HB	Cast iron < 300HB
$V_c = \text{m/min}$	180	120	100	120	100
$a_p = 2 \times D$	$a_e = 0.5 \times D$				

P	K		
Z-4 over centre	DIN 6527	Shaft 6535 HB	Corner chamfer
35°/38° spiral	TiAlN polished	Neck	

Ø mm	Cutting length mm (L2)	Overall length mm (L1)	Neck length mm (L3)	Item no.	Price €	FPT full slot	FPT lateral
3*	8	57	13	18603W	27.01	0.015	0.035
4*	11	57	16	18604W	25.83	0.018	0.035
5*	13	57	18	18605W	25.83	0.025	0.045
6	13	57	18	18606W	25.83	0.035	0.050
8	22	63	27	18608W	33.77	0.040	0.055
10	25	72	30	18610W	42.14	0.050	0.075
12	26	83	36	18612W	53.33	0.055	0.080
14	30	83	36	18614W	68.81	0.055	0.080
16	35	92	42	18616W	93.13	0.080	0.100
18	35	92	42	18618W	106.50	0.080	0.100
20	40	104	52	18620W	138.14	0.100	0.130

Other dimensions and special lengths upon request.

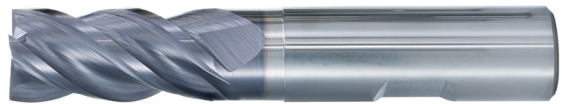
Prices not including statutory VAT.

* Shaft Ø 6.0

SC-HPC-V cutter with corner radius up to 2 × D type I86WR

for roughing and finishing at
maximum feed rates

- ▲ excellent surface quality
and accuracy to size
- ▲ smooth running
- ▲ gets the most out of the machine
- ▲ Weldon shank



Material	Steel < 500N	Steel < 900N	Steel < 1100N	Cast iron < 240HB	Cast iron < 300HB
$V_c = \text{m/min}$	180	120	100	120	100
$a_p = 2 \times D$	$a_e = 0.5 \times D$				

P	K		
Z-4 over centre	DIN 6527	Shaft 6535 HB	Corner radius
35°/38° spiral	TiAlN polished	Neck	

Ø mm	Cutting length mm (L2)	Overall length mm (L1)	Neck length mm (L3)	Item no.	Price €	FPT full slot	FPT lateral
3*	8	57	13	18603WR	33.18	0.015	0.035
4*	11	57	16	18604WR	33.18	0.018	0.035
5*	13	57	18	18605WR	33.18	0.025	0.045
6	13	57	18	18606WR	33.18	0.035	0.050
8	22	63	27	18608WR	41.34	0.040	0.055
10	25	72	30	18610WR	51.85	0.050	0.075
12	26	83	36	18612WR	62.16	0.055	0.080
14	30	83	36	18614WR	78.59	0.055	0.080
16	35	92	42	18616WR	107.32	0.080	0.100
18	35	92	42	18618WR	120.85	0.080	0.100
20	40	104	52	18620WR	152.82	0.100	0.130

Other dimensions and special lengths upon request.

Prices not including statutory VAT.

* Shaft Ø 6.0

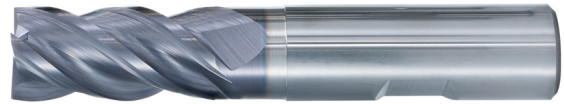


Corner radius as
per customer request

SC-HPC-Vplus cutter up to 2 × D type 187

for roughing, semi-finishing, finishing

- ▲ special edge preparation
- ▲ superlative feed rates
- ▲ high metal removal rate
- ▲ smooth running and high toughness
- ▲ high process reliability
- ▲ for medium and large series
- ▲ Weldon shank
- ▲ torus cutter upon request



Material	Steel < 500N	Steel < 900N	Steel < 1100N	Cast iron < 240HB	Cast iron < 300HB
$V_c = \text{m/min}$	180	120	100	120	100
$a_p = 2 \times D$	$a_e = 0.5 \times D$				

P	K		
Z-4	DIN 6527	Shaft 6535 HB	Corner chamfer 45°
35°/38° spiral	Neck	HE-X	

Ø mm	Cutting length mm (L2)	Overall length mm (L1)	Neck length mm (L3)	Item no.	Price €	FPT full slot	FPT lateral
3*	8	57	13	18703W	29.06	0.015	0.035
4*	11	57	16	18704W	29.06	0.018	0.035
5*	13	57	18	18705W	29.06	0.025	0.045
6	13	57	18	18706W	29.06	0.035	0.050
8	22	63	27	18708W	39.86	0.040	0.055
10	25	72	30	18710W	56.72	0.050	0.075
12	26	83	36	18712W	65.16	0.055	0.080
14	30	83	36	18714W	76.94	0.055	0.080
16	35	92	42	18716W	90.82	0.080	0.100
18	35	92	42	18718W	107.94	0.080	0.100
20	40	104	52	18720W	143.92	0.100	0.130

Other dimensions and special lengths upon request.

Prices not including statutory VAT.

* Shaft Ø 6.0

SC-HPC cutter VA type 188

Ideal all-rounder for roughing, semi-finishing and finishing

- ▲ impressively smooth running
- ▲ superlative feed rates
- ▲ very good surface quality
- ▲ up to 1.5 × D in solid material
- ▲ Weldon shank
- ▲ torus cutter upon request



Material	Steel < 500N	Steel < 900N	Steel < 1100N	Stainless < 900N	Stainless > 900N
$V_c = \text{m/min}$	230	170	140	75	60
$a_p = 1.5 \times D$	$a_e = 0.4 \times D$				

P	K	M	
Z-4 over centre	DIN 6527	Shaft 6535 HB	Corner chamfer
35°/38° spiral	HE-X	Neck	

Ø mm	Cutting length mm (L2)	Overall length mm (L1)	Neck length mm (L3)	Item no.	Price €	FPT full slot	FPT lateral
3*	8	57	12	18803W	27.51	0.015	0.025
4*	11	57	16	18804W	27.51	0.018	0.025
5*	13	57	18	18805W	27.51	0.025	0.045
6	13	57	21	18806W	29.83	0.035	0.045
8	19	63	27	18808W	32.63	0.035	0.045
10	22	72	32	18810W	42.14	0.045	0.065
12	26	83	38	18812W	50.38	0.050	0.070
14	26	83	42	18814W	67.13	0.050	0.070
16	32	92	44	18816W	93.15	0.080	0.100
18	32	92	50	18818W	104.03	0.080	0.100
20	38	104	54	18820W	138.19	0.100	1.130

Other dimensions and special lengths upon request.

Prices not including statutory VAT.

* Shaft Ø 6.0

SC-HPC-RH cutter, ramp type 189

- ▲ continuously linear diagonal immersion (ramp) up to 42°
- ▲ deep slots, new face geometry
- ▲ Weldon shank
- ▲ torus cutter upon request



P	K	M
Z-4 over centre	DIN 6527	Shaft 6535 HB
35°/38° Spiral	HE-X	Neck
		Corner chamfer

Ø mm	Cutting length mm (L2)	Overall length mm (L1)	Neck length mm (L3)	Item no.	Price €
6	13	57	21	18906W	26.06
8	19	63	27	18908W	33.45
10	22	72	32	18910W	43.70
12	26	83	38	18912W	57.43
16	32	92	44	18916W	90.12
20	38	104	54	18920W	137.83

Other dimensions and special lengths
upon request.

Prices not including statutory VAT.

In use by customers:
1.2085; 1.2343; 1.2379; 1.2510

HELIX values:

Material	V _c	Ø	FPT	a _p	a _e	Helix angle
Steel 750– 1000N	160	6	0.040	9.0	2.4	20°
	160	8	0.050	12.0	3.2	20°
	160	10	0.065	15.0	4.0	20°
	160	12	0.075	18.0	4.8	20°
	160	16	0.085	24.0	6.4	20°
	160	20	0.100	30.0	8.0	20°
Steel 1000– 1400N	120	6	0.040	9.0	2.4	17.5°
	120	8	0.050	12.0	3.2	17.5°
	120	10	0.065	15.0	4.0	17.5°
	120	12	0.075	18.0	4.8	17.5°
	120	16	0.085	24.0	6.4	17.5°
	120	20	0.100	30.0	8.0	17.5°
Tool Steel 50– 54HRC	65	6	0.025	9.0	2.4	15°
	65	8	0.030	12.0	3.2	15°
	65	10	0.035	15.0	4.0	15°
	65	12	0.045	18.0	4.8	15°
	65	16	0.055	24.0	6.4	15°
	65	20	0.070	30.0	8.0	15°

Ramp values:

Material	V _c	Ø	FPT	a _p	a _e	Ramp angle
Steel 750– 1000N	160	6	0.040	7.5	6.0	32°
	160	8	0.050	10.0	8.0	32°
	160	10	0.065	12.5	10.0	32°
	160	12	0.075	15.0	12.0	32°
	160	16	0.085	20.0	16.0	32°
	160	20	0.100	25.0	18.0	32°
Steel 1000– 1400N	160	6	0.040	7.5	6.0	28°
	160	8	0.050	10.0	8.0	28°
	160	10	0.065	12.5	10.0	28°
	160	12	0.075	15.0	12.0	28°
	160	16	0.085	20.0	16.0	28°
	160	20	0.100	25.0	20.0	28°
Tool Steel 50– 54HRC	160	6	0.040	7.5	6.0	24°
	160	8	0.050	10.0	8.0	24°
	160	10	0.065	12.5	10.0	24°
	160	12	0.075	15.0	12.0	24°
	160	16	0.085	20.0	16.0	24°
	160	20	0.100	25.0	20.0	24°

SC-HPC trochoidal cutter type I85

Process-reliable cutting with high cutting performance

- ▲ high metal removal rate
- ▲ great cutting depths
- ▲ low tool wear
- ▲ Weldon shank



Material	Steel < 500N	Steel < 900N	Steel < 1100N	Stainless < 1500N	Stainless < 900N	Stainless > 900N
V _c = m/min	350	320	250	170	240	180

P	K	M
Z-5	HE-X	Chip breaker flutes
Neck	Shaft HB	Corner chamfer

Uneven cutting pitch

Ø mm	Cutting length mm (L2)	Overall length mm (L1)	Neck length mm (L3)	Item no.	Price €
6	18	62	25	18506W	41.72
8	24	68	30	18508W	53.16
10	22	72	30	18510WL-20	60.09
10	32	80	38	18510W	67.37
10	42	90	-	18510WL-40	80.22
10*	52	100	-	18510WL-50	90.24
12	22	83	30	18512WL-20	76.42
12	32	90	38	18512WL-30	83.98
12	42	100	-	18512WL-40	94.74
12*	52	120	-	18512WL-50	109.20
16	32	92	42	18516WL-30	101.11
16	42	100	50	18516WL-40	117.47
16	50	108	55	18516W	135.59
20	42	104	50	18520WL-40	159.70
20	62	125	70	18520W	185.99
20	70	135	82	18520WL-70	207.42

* Second Weldon face for short chucks.

Prices not including statutory VAT.

Additional dimensions and corner radii upon request.



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SC-HPC trochoidal cutter, corner radius type 175

High-performance cutter for cutting super-alloys

- ▲ excellent cutting rates in different materials
- ▲ high metal removal rate
- ▲ Weldon shank

P	K	M	S
Z-5 over centre	Chip breaker flute	Shaft HB	Corner radius
Uneven cutting pitch	HE-S	Neck	



Material	Stainless	Heat-resistant alloys	Titanium alloys
V _c = m/min	130–190	50–80	80–130

Ø mm	Cutting length mm (L2)	Overall length mm (L1)	Neck length mm (L3)	Radius mm	Item no.	Price €
6	18	62	25	0.25	17506W	69.41
8	24	68	30	0.25	17508W	77.50
10	22	72	30	0.5	17510WL-20	79.09
10	32	80	38	0.5	17510WL-30	86.38
10	42	90	-	0.5	17510WL-40	93.46
10*	52	100	-	0.5	17510WL-50	102.52
12	22	83	30	0.5	17512WL-20	86.40
12	32	90	38	0.5	17512WL-30	100.30
12	42	100	-	0.5	17512WL-40	119.90
12*	52	120	-	0.5	17512WL-50	124.47
16	32	92	42	0.5	17516WL-30	127.63
16	42	100	50	0.5	17516WL-40	141.19
16	50	108	55	0.5	17516WL-50	146.56
20	42	104	50	0.5	17520WL-40	171.12
20	62	125	70	0.5	17520WL-60	200.58
20	70	135	82	0.5	17520WL-70	214.51

* Second Weldon face for short chucks.

Additional dimensions and corner radii upon request.

Prices not including statutory VAT.



SC-HPC aluminium cutter type I83

for roughing and finishing

- ▲ smooth running
- ▲ polished chip spaces
- ▲ specifically suitable for fluting
- ▲ Weldon shank
- ▲ torus cutter upon request



Material	Aluminium, long cutting	Aluminium, short cutting	Aluminium cast Si < 8%	Plastics	CuZn
$V_c = \text{m/min}$	420	400	300	400	100
$ap = 1,5 \times D$	$ae = 0,4 \times D$				

N		
Z-3 over centre	DIN 6527	Shaft 6535 HB
Corner chamfer	Neck	

Ø mm	Cutting length mm (L2)	Overall length mm (L1)	Neck length mm (L3)	Item no.	Price €	FPT full slot	FPT lateral
3*	8	57	13	18303W	35.75	0.015	0.020
4*	11	57	16	18304W	35.75	0.015	0.020
5*	13	57	18	18305W	35.75	0.020	0.025
6	13	57	18	18306W	35.75	0.025	0.030
8	22	63	27	18308W	47.71	0.030	0.040
10	22	72	30	18310W	60.24	0.040	0.050
12	26	83	36	18312W	72.23	0.050	0.070
16	35	92	42	18316W	84.16	0.065	0.090
20	40	104	52	18320W	117.73	0.085	0.120

Other dimensions and special lengths upon request.

Prices not including statutory VAT.

* Shaft Ø 6.0

SC-HPC aluminium cutter type I84

with double flute for better chip removal

- ▲ polished chip spaces
- ▲ special face geometry for immersion
- ▲ Weldon shank



Material	Aluminium, long cutting	Aluminium, short cutting	Aluminium cast Si < 8%	Plastics	CuZn
$V_c = \text{m/min}$	500	400	300	400	170
$ap = 1,5 \times D$	$ae = 0,4 \times D$				

N			
Z-3 over centre	DIN 6527	Shaft 6535 HB	Corner chamfer
35°/38° spiral	ZRN	Neck	

Ø mm	Cutting length mm (L2)	Overall length mm (L1)	Neck length mm (L3)	Item no.	Price €	FPT Full slot	FPT lateral
3*	8	57	13	18403W	37.64	0.015	0.020
4*	11	57	16	18404W	37.64	0.015	0.020
5*	13	57	18	18405W	37.64	0.020	0.025
6	13	57	18	18406W	37.64	0.025	0.030
8	22	63	27	18408W	45.71	0.030	0.040
10	22	72	30	18410W	54.95	0.040	0.050
12	26	83	36	18412W	68.21	0.050	0.070
16	35	92	42	18416W	99.68	0.065	0.090
20	40	104	52	18420W	142.04	0.085	0.120

Other dimensions and special lengths upon request.

Prices not including statutory VAT.

* Shaft Ø 6.0

SC-HPC aluminium cutter with corner radius type I84WR

- ▲ roughing, finishing, fluting
- ▲ with double flute
- ▲ polished chip spaces
- ▲ smooth running
- ▲ Weldon shank



Material	Aluminium, long cutting	Aluminium, short cutting	Aluminium cast Si < 8%	Plastics	CuZn
$V_c = \text{m/min}$	500	400	240	400	170
$a_p = 1.5 \times D$	$a_e = 0.4 \times D$				

N			
Z-3 over centre	DIN 6527	Shaft 6535 HB	Corner radius
35°/38° spiral	ZRN	Neck	



Corner radius as
per customer request

Ø mm	Cutting length mm (L2)	Overall length mm (L1)	Neck length mm (L3)	Item no.	Price €	FPT full slot	FPT lateral
5*	13	57	18	I8405WR	45.00	0.020	0.025
6	13	57	18	I8406WR	45.00	0.025	0.030
8	22	63	27	I8408WR	53.29	0.030	0.040
10	22	72	30	I8410WR	64.68	0.040	0.050
12	26	83	36	I8412WR	77.92	0.050	0.070
16	35	92	42	I8416WR	113.89	0.065	0.090
20	40	104	52	I8420WR	155.09	0.085	0.120

Other dimensions and special lengths upon request.

* Shaft Ø 6.0

Prices not including statutory VAT.

HPC aluminium cutter with long, offset shaft type I84WL

Roughing and finishing of aluminium
and non-ferrous alloys

- ▲ with double flute
- ▲ polished chip spaces
- ▲ reinforced core
- ▲ extra-long neck
- ▲ Weldon shank
- ▲ torus cutter upon request



Material	Aluminium, long cutting	Aluminium, short cutting	Aluminium cast Si < 8%	Plastics	CuZn
$V_c = \text{m/min}$	240	220	120	240	120
$a_p = 1.5 \times D$	$a_e = 0.3 \times D$				

N			
Z-3 over centre	DIN 6527	Shaft 6535 HB	
35°/38° spiral	ZRN	Neck	

Ø mm	Cutting length mm (L2)	Overall length mm (L1)	Neck length mm (L3)	Item no.	Price €	FPT Full slot	FPT lateral
6	13	80	42	I8406WL	53.42	0.025	0.030
8	21	100	62	I8408WL	76.20	0.030	0.040
10	22	100	58	I8410WL	86.99	0.040	0.050
12	26	120	73	I8412WL	110.35	0.050	0.070
16	36	150	100	I8416WL	174.62	0.065	0.090
20	41	150	100	I8420WL	230.11	0.085	0.120

Other dimensions and special lengths upon request.

Prices not including statutory VAT.

SC-HPC roughing cutter type I90

- ▲ durable cutting edges
- ▲ good chip removal
- ▲ for cutting with high material removal
- ▲ Weldon shank



Material	Steel < 500N	Steel < 900N	Steel < 1100N	Cast iron
$V_c = \text{m/min}$	100	80	45	95
$a_p = 1 \times D$	$a_e = 0.4 \times D$			

P	K	
Z-4 over centre	DIN 6527	Shaft 6535 HB
Corner chamfer	30° spiral	TiAlN

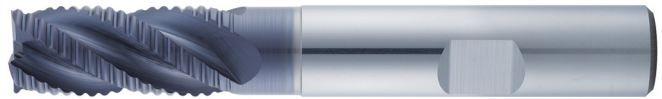
Ø mm	Cutting length mm (L2)	Overall length mm (L1)	Number of teeth	Item no.	Price €	FPT Full slot	FPT lateral
6	13	57	4	19006W	30.57	0.025	0.030
8	22	63	4	19008W	37.14	0.035	0.450
10	22	72	4	19010W	53.03	0.050	0.060
12	26	83	4	19012W	81.60	0.055	0.065
16	32	92	4	19016W	106.20	0.700	0.080
20	38	104	4	19020W	141.58	0.090	0.120

Other dimensions, special lengths, torus cutters upon request.

Prices not including statutory VAT.

SC-HPC roughing cutter VA type I98

- specifically for roughing VA materials
- ▲ smooth running and high feed rates
 - ▲ very good surface quality
 - ▲ up to $1 \times D$ in solid material
 - ▲ Weldon shank



Material	Steel < 500N	Steel < 900N	Steel < 1100N	Stainless < 900N	Stainless > 900N
$V_c = \text{m/min}$	200	160	140	65	55
$a_p = 1 \times D$	$a_e = 0.5 \times D$				

P	K	M	
Z-4 over centre	DIN 6527	Shaft 6535 HB	Corner chamfer
35°/38° spiral	HE-X	Neck	

Ø mm	Cutting length mm (L2)	Overall length mm (L1)	Neck length mm (L3)	Item no.	Price €	FPT Full slot	FPT lateral
6	13	57	21	19806W	34.67	0.025	0.030
8	19	63	27	19808W	42.84	0.040	0.050
10	22	72	32	19810W	52.71	0.050	0.060
12	26	83	38	19812W	67.03	0.060	0.070
16	32	92	44	19816W	105.68	0.080	0.090
20	38	104	54	19820W	150.31	0.090	0.120

Other dimensions, special lengths, torus cutters upon request.

Prices not including statutory VAT.

SC aluminium roughing cutter, non-ferrous metals type 194

- ▲ durable roughing cutter
- ▲ coarse cord-roughing toothing
- ▲ special edge for cutting non-ferrous metals
- ▲ Weldon shank



Material	Aluminium, long cutting	Aluminium, short cutting	Aluminium cast Si < 8 %	Plastics
$V_C = \text{m/min}$	250	230	160	250

N		
Z-3 over centre	DIN 6527	Shaft 6535 HB
Corner chamfer	35°/38° spiral	Neck

Ø mm	Cutting length mm (L2)	Overall length mm (L1)	Neck length mm (L3)	Item no.	Price €	FPT full slot	FPT lateral
6	13	57	21	19406W	30.67	0.060	0.080
8	16	63	27	19408W	37.26	0.060	0.080
10	22	72	32	19410W	48.54	0.070	0.090
12	26	83	38	19412W	68.45	0.070	0.090
16	32	92	44	19416W	102.41	0.090	0.110
20	38	104	54	19420W	154.73	0.120	0.140

Other dimensions, special lengths, torus cutters upon request.

Prices not including statutory VAT.



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SC-HRC cutter type 170

for hard machining

- ▲ special coating: HE-S
- ▲ K 44 ultrafine grade
- ▲ negative cutting angle
- ▲ suitable for dry cutting
- ▲ Weldon shank



Material	Steel < 1500N	Steel < HRC56	Steel > HRC56
$V_c = \text{m/min}$	110	80	55
$a_p = 1.5 \times D$	$a_e = 0.03 \times D$		

H		
Z-4 Z-8	DIN 6527	Shaft 6535 HA
Corner chamfer	55° spiral	HE-S

Ø mm	Cutting length mm (L2)	Overall length mm (L1)	Number of teeth	Item no.	Price €	f_z lateral
3*	13	58	4	17003	34.44	0.018
4*	13	58	4	17004	34.44	0.018
5*	13	58	4	17005	34.44	0.020
6	18	58	6	17006	34.44	0.020
8	24	63	6	17008	38.33	0.025
10	25	72	6	17010	56.09	0.030
12	30	83	6	17012	65.32	0.035
16	32	92	6	17016	135.81	0.045
20	38	104	8	17020	239.87	0.050

Other dimensions and special lengths upon request.

Prices not including statutory VAT.

* Shaft Ø 6.0

SC-HRC cutter with corner radius type 170R

- ▲ special coating: HE-S
- ▲ K 44 ultrafine grade
- ▲ negative cutting angle
- ▲ suitable for dry cutting



Material	Steel < 1500N	Steel < HRC56	Steel > HRC56
$V_c = \text{m/min}$	110	80	55
$a_p = 1.5 \times D$	$a_e = 0.03 \times D$		

H		
Z-4 Z-8	DIN 6527	Shaft 6535 HA
Corner radius	55° spiral	HE-S



Corner radius as
per customer request

Ø mm	Cutting length mm (L2)	Overall length mm (L1)	Number of teeth	Item no.	Price €	FPT lateral
4*	13	58	4	17004R	43.10	0.018
5*	13	58	4	17005R	43.10	0.020
6	18	58	6	17006R	43.10	0.020
8	24	63	6	17008R	47.01	0.025
10	25	72	6	17010R	64.96	0.030
12	30	83	6	17012R	74.27	0.035
16	32	92	6	17016R	150.47	0.045
20	38	104	8	17020R	258.82	0.050

Other dimensions and special lengths upon request.

Prices not including statutory VAT.

* Shaft Ø 6.0

SC full radius cutter HRC type I34

for hard machining

- ▲ special geometry
- ▲ special carbide
- ▲ special coating
- ▲ centre cut



Material	Steel < 1500N	Steel < HRC56	Steel > HRC56
$V_c = \text{m/min}$	200	170–190	110–150
$a_p = 0.1 \times D$	$a_e = 0.1–0.2 \times D$		

H		
	Z-2 centre- cutting	Shaft 6535 HA
	Spiral 30°	HE-S

Ø mm	Cutting length mm (L2)	Overall length mm (L1)	Item no.	Price €	FPT lateral
3*	5	70	I3403neg	37.89	0.040
4*	8	70	I3404neg	35.57	0.054
5*	9	80	I3405neg	36.24	0.068
6	10	90	I3406neg	37.26	0.080
8	12	100	I3408neg	51.03	0.108
10	15	100	I3410neg	67.64	0.130
12	18	110	I3412neg	84.93	0.151

Other dimensions and special lengths upon request. Prices not including statutory VAT.

* Shaft Ø 6.0

SC full radius cutter HRC type I51

for hard machining

- ▲ special geometry
- ▲ special carbide
- ▲ special coating
- ▲ centre cut



Material	Steel < 1500N	Steel < HRC56	Steel > HRC56
$V_c = \text{m/min}$	190	170	110–150
$a_p = 0.05 \times D$	$a_e = 0.2 \times D$		

H		
	Z-4 centre-cutting	Shaft 6535 HA
	Spiral 30°	HE-S

Ø mm	Cutting length mm (L2)	Overall length mm (L1)	Item no.	Price €	FPT lateral
3*	5	54	I5103	49.04	0.019
4*	8	54	I5104	49.04	0.019
5*	9	54	I5105	43.49	0.040
6	10	54	I5106	43.49	0.045
8	12	58	I5108	50.68	0.060
10	14	66	I5110	67.38	0.070
12	16	73	I5112	87.09	0.080
16	22	82	I5116	141.14	0.090
20	26	92	I5120	193.97	0.100

Other dimensions and special lengths upon request. Prices not including statutory VAT.

* Shaft Ø 6.0

SC full radius cutter type 135

- ▲ centre-cutting
- ▲ Weldon shank upon request
- ▲ suitable for copy milling



P	K
Z-2 centre-cutting	Shaft 6535 HA
Spiral 30°	TiAlN
	DIN 6527

Material	Steel < 500N	Steel < 900N	Steel < 1100N	Cast iron	Stainless < 900N	Stainless > 900N
$V_c = \text{m/min}$	250	240	200	280	70	65
$a_p = 0.03 \times D$	$a_e = 0.05$ $\times D$					

Ø mm	Cutting length mm (L2)	Overall length mm (L1)	Neck length mm (L3)	Radius mm	Item no.	Price €	FPT Radius
3*	5	50	15	1.5	13503	33.52	0.060
4*	8	57	18	2	13504	33.74	0.060
5*	9	57	19	2.5	13505	33.74	0.070
6	10	57	20	3	13506	34.84	0.080
8	12	63	27	4	13508	43.26	0.100
10	14	72	32	5	13510	52.98	0.130
12	16	83	38	6	13512	64.85	0.160
14	18	83	38	7	13514	77.42	0.160
16	22	92	44	8	13516	97.88	0.200
18	24	92	44	9	13518	113.26	0.200
20	26	104	50	10	13520	138.60	0.220

Other dimensions and special lengths upon request.
* Shaft Ø 6.0

Prices not including statutory VAT.

SC full radius cutter type 150

- ▲ two teeth centre-cutting
- ▲ Weldon shank upon request
- ▲ suitable for copy milling



P	K
Z-4 centre-cutting	Shaft 6535 HA
Spiral 30°	TiAlN
	DIN 6527

Material	Steel < 500N	Steel < 900N	Steel < 1100N	Cast iron	Stainless < 900N	Stainless > 900N
$V_c = \text{m/min}$	250	240	200	280	70	65
$a_p = 0.03 \times D$	$a_e = 0.05$ $\times D$					

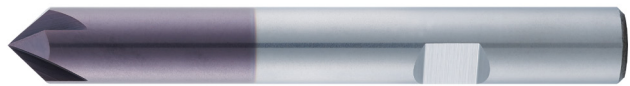
Ø mm	Cutting length mm (L2)	Overall length mm (L1)	Neck length mm (L3)	Radius mm	Item no.	Price €	FPT Radius
3*	5	50	15	1.5	15003	37.92	0.060
4*	8	57	18	2	15004	38.14	0.060
5*	9	57	19	2.5	15005	38.14	0.070
6	10	57	20	3	15006	38.69	0.080
8	12	63	27	4	15008	44.91	0.100
10	14	72	32	5	15010	55.18	0.130
12	16	83	38	6	15012	66.50	0.160
14	18	83	38	7	15014	78.52	0.160
16	22	92	44	8	15016	96.78	0.200
18	24	92	44	9	15018	113.26	0.200
20	26	104	50	10	15020	139.70	0.220

Other dimensions and special lengths upon request.
* Shaft Ø 6.0

Prices not including statutory VAT.

SC deburrer 60°/ 90°, tiny chamfers type 24

- ▲ chamfering and deburring
- ▲ configured for the smallest chamfers
- ▲ for various materials
- ▲ Weldon shank



P	M	K	N
Z-4	DIN 6527	Shaft 6535 HB	TiAlN

Material	Steel < 500N	Steel < 900N	Steel < 1100N	Stainless < 900N	Stainless > 900N	Cast iron	Aluminium, plastics
V _c = m/min	120	100	65	60	50	80	250

Ø mm	Overall length mm (L1)	Number of teeth	Item no. 60°	Price €	Item no. 90°	Price €	FPT lateral
4*	50	4	24004	14.04	24104	14.04	0.02
6	57	4	24006	16.42	24106	16.42	0.03
8	63	4	24008	21.64	24108	21.68	0.04
10	66	4	24010	29.52	24110	29.52	0.05
12	73	4	24012	39.64	24112	39.64	0.06

Other dimensions and special lengths upon request.

Prices not including statutory VAT.

* without Weldon shank

SC-NC centre bit 90°/120° type 28

- ▲ precise centring and chamfering
- ▲ special centre polish all the way to the tip
- ▲ for various materials



P	M	K	N
DIN 6527	Shaft 6535 HA	TiAlN	

Material	Steel < 500N	Steel < 900N	Steel < 1100N	Stainless < 900N	Stainless > 900N	Cast iron	Aluminium, plastics
V _c = m/min	70	60	50	40	30	80	220

SC-NC centre bit 90°

Ø mm	Overall length mm (L1)	Cutting length mm (L2)	Item no.	Price €	Item no. TiAlN	Price €	Feed per revolution mm
3	39	8	28003/90	11.84	28103/90	13.78	0.12
4	50	10	28004/90	11.84	28104/90	13.78	0.12
6	57	13	28006/90	16.83	28106/90	18.83	0.15
8	63	23	28008/90	27.27	28108/90	29.26	0.15
10	66	24	28010/90	39.09	28110/90	42.45	0.15
12	73	24	28012/90	54.49	28112/90	57.84	0.15

Other dimensions and special lengths upon request.

Prices not including statutory VAT.

SC-NC centre bit 120°

Ø mm	Overall length mm (L1)	Cutting length mm (L2)	Item no.	Price €	Item no. TiAlN	Price €	Feed per revolution mm
3	39	8	28003/120	11.84	28103/120	13.78	0.12
4	50	10	28004/120	11.84	28104/120	13.78	0.12
6	57	13	28006/120	16.83	28106/120	18.83	0.15
8	63	23	28008/120	27.27	28108/120	29.26	0.15
10	66	24	28010/120	39.09	28110/120	42.45	0.15
12	73	24	28012/120	54.49	28112/120	57.84	0.15

Other dimensions and special lengths upon request.

Prices not including statutory VAT.

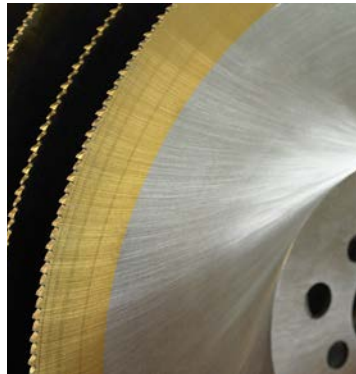
Sharpening reduces tool costs

Sharpening and recoating significantly reduce cutting tool costs. For instance, sharpening and recoating a carbide shaft cutter three times reduces the tool costs by up to 50 percent – without compromising on performance or dimensional accuracy.

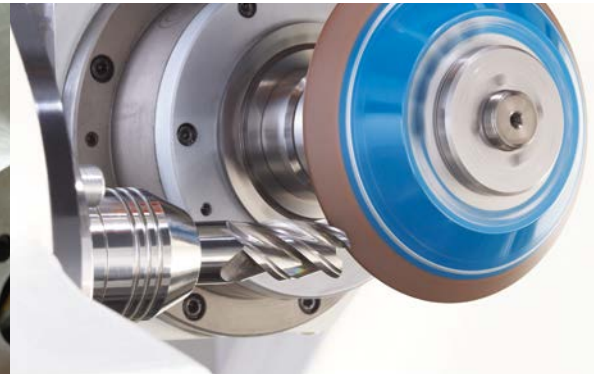
We have been grinding precision tools since 1976 and know what it takes to sharpen tools. We grind all tools on modern 5-axis grinding centres and have access to a large database with tool data and geometries from numerous manufacturers.

We also offer all conventional types of coating for the recoating. We will create a detailed measurement report for each tool upon request.

*Convenient and secure:
the Wunschmann box*



*Resharpened:
HSS metal circular saw blades*



*Sharpening reduces
tool costs*

Many companies large and small have us sharpen and recoat their tools on a regular basis.

We sharpen:

- ▲ SC and HSS cutters
- ▲ SCC and HSS drill tools
- ▲ SC DIN saw blades
(ø 20 to 250 mm, tooth shapes A and BW)
- ▲ HSS saw blades
(ø 30 to 910 mm)
- ▲ Saw blades with special tooth shapes and chip breaker slots

It is as simple as this:

You pack all of the tools to be sharpened in the Wunschmann box; our sales force (in Baden-Württemberg only) or the package service will pick up the box from you. We will sharpen your tools within the agreed time and deliver them carriage paid. Thanks to our modern fleet of machines, we can sharpen individual tools as well as large numbers of parts at short notice – in proven Wunschmann quality.

Laser inscription: precise and reliable

With our laser marking system we can inscribe and mark according to your requirements: precision tools, components, products or promotional gifts. A laser inscription is easily legible, precise, permanent, forgery-proof and non-destructive. Please contact us; we will be glad to make you an offer or inscribe a prototype.



*Permanently inscribed
tools and parts*



*Easily legible
and forgery-proof*

Inscriptions:

Text, logo, ID number, bar code, QR code, type designation, scales, industrial markings, consecutive numbering, etc.

Materials:

Metals (steel, carbide, stainless steel, titanium, nickel, chrome, copper etc.), plastic, laser foil (others materials upon request)

File formats:

*.jpg, *.pdf, *.cdr, *.dxf, *.dwg, *.igs (other formats upon request)

Part size:

max. 480 × 478 × 290 mm

Laser technology

EF technology or Yb-fibre for contact-free two-dimensional marking

Marking area:

max. 100 × 100 mm

*Forgery-proof
and non-destructive*



Sales, delivery and payment conditions

General

- ▲ All prices are non-binding recommended prices and do not include surcharges for alloys or value-added tax.
- ▲ All previous catalogues and brochures will cease to be valid after the appearance of this price catalogue.
- ▲ Printing errors of any kind, including errors relating to technical data or prices, will constitute no reason for claims.
- ▲ We reserve the right to make changes to dimensions or prices due to further developments or changes to standards.
- ▲ All cutting performance specifications are approximate values. Actual cutting speeds and feed rates depend on the working conditions at hand.
- ▲ The General Terms and Conditions (GTCs) apply exclusively in relation to companies and legal entities under public law.
- ▲ The customer is deemed to have accepted the GTCs at the latest upon receiving the goods. The GTCs are also deemed to have been agreed upon for all future deliveries and services to the customer.
- ▲ All deliveries and services will be governed by these conditions as well as any separate contractual agreements. Acceptance of an order will not imply acceptance of the ordering party's purchasing conditions as part of the agreement, unless the supplier has agreed to this separately in writing.
- ▲ The supplier reserves ownership rights and intellectual property rights to samples, images, drawings, etc., including those in electronic form. These may not be made accessible to third parties. The ordering party is not permitted to make copies of any documents.
- ▲ Price lists which are handed over or sent by the supplier constitute the submission of an offer. All offers are non-binding concerning prices and delivery options, and are subject to prior sale.
- ▲ Standard tools conform to our catalogue specifications, which, however, are subject to change due to technological progress. Changes due to such progress will not entitle the ordering party to file a complaint.
- ▲ Verbal side agreements do not exist. Amendments must be made in writing to be valid.

Order acceptance

- ▲ An agreement is established upon written confirmation of the order or upon the delivery of the goods. The ordering party assumes responsibility for the correctness of the documents (drawings, samples, etc.) it provides to the supplier. If the ordering party's drawings contain no unequivocal design-related tolerances, the supplier will manufacture according to its own experience and accepted industry standards.
- ▲ In the case of custom tools, the supplier reserves the right to under- or over-delivery by up to 10% of the quantities ordered.

Prices and payment

- ▲ Prices are subject to change without notice and are quoted in Euros ex works, not including the statutory value-added tax at the current rate and the costs for any packaging, transport and insurance.
- ▲ Payment is to be made strictly net within 8 days of the invoice date in the case of custom tools and within 8 days with 2% discount or strictly net within 30 days in the case of standard tools.
- ▲ In the case of a delay in payment, the supplier will charge interest on arrears at the level of the usual bank interest rates.
- ▲ We will be entitled to render outstanding deliveries or services exclusively in return for advance payment if, after concluding the agreement, we gain knowledge of circumstances which significantly reduce the customer's creditworthiness and could jeopardise the payment of open receivables from the contractual relationship in question.

Delivery date

- ▲ The delivery dates we specify are non-binding, unless otherwise explicitly agreed upon with the customer in writing.
- ▲ Compliance with the delivery time is subject to the correct and punctual availability of supplies and raw materials.
- ▲ Partial deliveries are permissible. In case of default, the ordering party may withdraw from the agreement after the lapse of a reasonable grace period if the goods have not been declared ready to ship by that time.
- ▲ The delivery deadline will be deemed met if the goods are declared ready to ship by that time.
- ▲ Delivery will be made by our sales force or a package service and will be carriage free within Europe at a goods value of € 100.00 and up.

Retention of title

- ▲ The ordering party is not released from conducting an incoming goods inspection, especially not if we were instructed to meet specific tolerances when the order was placed.
- ▲ If goods under retention of title are sold, the customer will assign the purchase price and any claim for work compensation to us at the amount of the invoice sum.
- ▲ If any third party should lay claim to goods under retention of title, in particular by way of attachment, the customer shall inform said parties of our title to the goods and notify us without delay, in order to enable us to assert our rights to retention of title.

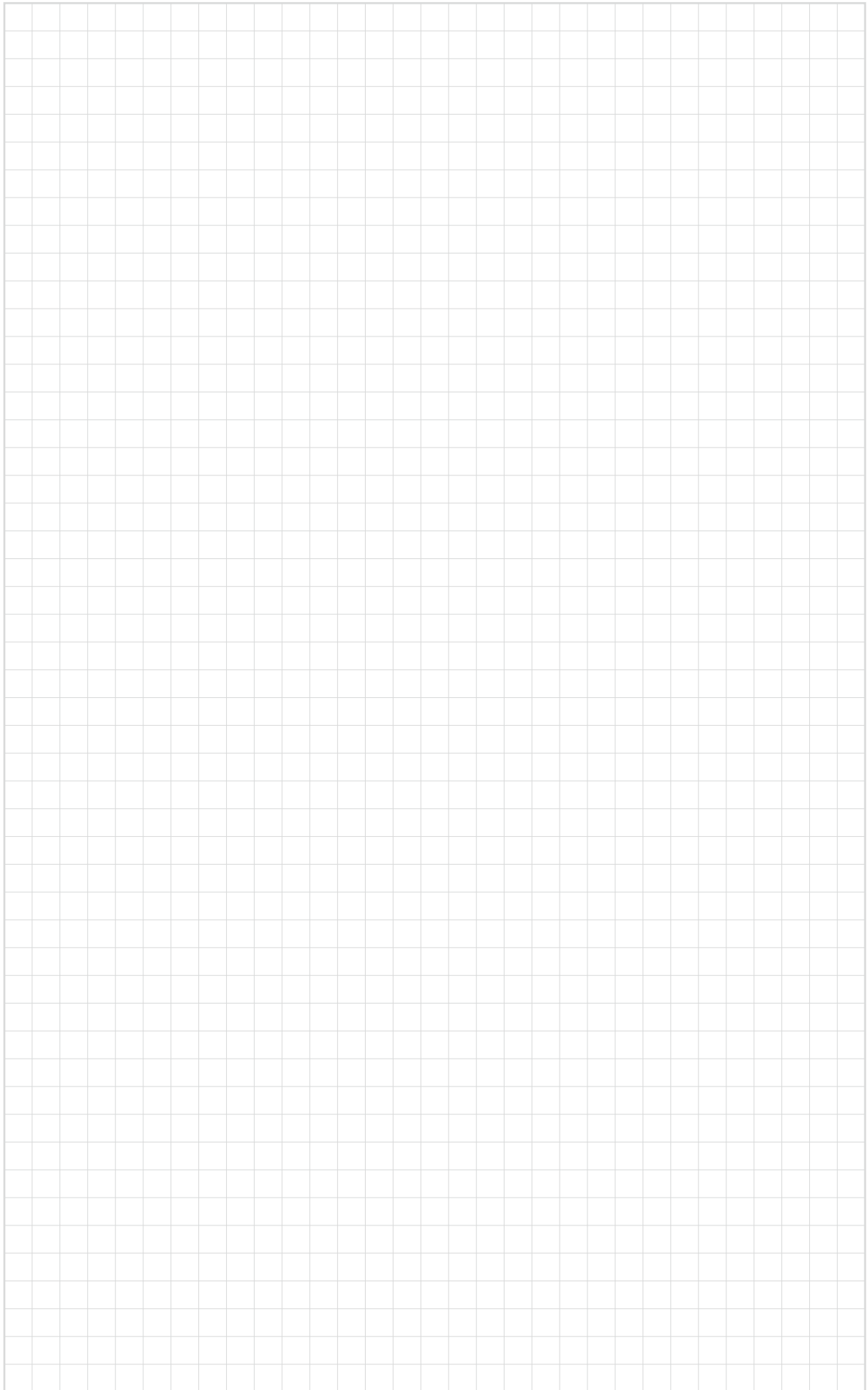
Claims for defects

- ▲ The ordering party is not released from conducting an incoming goods inspection, especially not if we were instructed to meet specific tolerances when the order was placed.
- ▲ Notices of defects are to be sent to us in writing within 5 business days. The goods subject to complaint must be provided to us for reworking starting at the date of the defect notice. Justified complaints which relate to defects or assured properties oblige us to perform rework free of charge. The ordering party may withdraw from the order after a second unsuccessful attempt at rework.
- ▲ The supplier assumes liability only up to the amount of its processing costs. Liability for further damages of any kind is excluded. This applies especially to indirect damages and consequential damages from defects.
- ▲ We will assume no liability for the behaviour of the material sent to us. Our entitlement to remuneration will remain unaffected.
- ▲ We will accept no responsibility for defects and damages resulting from unsuitable and improper use and failure to observe the instructions for use, non-observance of ambient conditions and conditions of use described, or improper maintenance. The customer is obliged to check our deliveries and services in terms of suitability for their intended use.

Applicable law

The sole legal venue for any disputes resulting directly or indirectly from the contractual relationship will be the domicile of our company. The same applies if the customer has no general legal venue in Germany or if its place of residence and/or habitual abode is not known at the time the complaint is filed. The registered office of our company is deemed the agreed place of performance for all services, deliveries and payments.

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Wunschmann GmbH · Germany

Etzwiesenstraße 39 · 72108 Rottenburg-Hailfingen · Germany

Phone +49 (0) 7457 8059 · Fax +49 (0) 7457 4697

info@wunschmann.de

www.wunschmann.de

WUNSCHMANN
PRÄZISIONSWERKZEUGE