



VEHICLES



AEROSPACE



GEARS & BEARINGS



ENGINEERING



WIND ENERGY



SPK CERMETS

Turning, Grooving and Milling

CeramTec
THE CERAMIC EXPERTS

DISCOVER A MULTITUDE OF SOLUTIONS



AUTOMOTIVE INDUSTRY

For over 50 years, precision tools from CeramTec have been an integral part of highly productive machining solutions for components from the automotive industry. With our tool solutions, the implementation of concrete cost savings and increased productivity is always top priority. Component examples: Brake discs, gear components, fly wheels, clutch plates, brake components, drive shafts, hydraulic elements, engine/motor components.



MACHINERY AND PLANT ENGINEERING

Manufacturing complex components made of different materials with extreme precision and optimal surface quality in an economic way – that is the basic structure of requirements for which we work together with our customers to create innovative, costefficient machining solutions. Component examples: gearbox housings, flanges, guides, shafts, rollers.



WIND ENERGY

In the field of wind energy, special machining solutions are often required because the components involved are frequently very large. Strict tolerance requirements and a high level of surface quality place exceptional demands on the cutting materials and tool holders. By observing and analysing the determining factors for machining, we are able to provide our customers with extremely efficient and cost-effective machining solutions. Component examples: Rotor flanges, rotor blade connections, planetary gear holders, gearbox housings, gear components.

AEROSPACE

The aerospace industry places extremely high demands on machining. In this field, machining capacity and process safety are the decisive parameters, and our CSA cutting materials together with our Monsoon Tool Technology tools are the optimal solution. Component examples: Jet engine components such as blisks.



GEAR TECHNOLOGY, DRIVE TECHNOLOGY AND BEARING INDUSTRY

Surface quality, tolerances and the tool life of the cutting materials are the quality standards for hard machining. Our unique range of cutting materials made of PCBN and ceramics, together with our perfectly matched tools, set the bar in this industry. In practice, this results in highly efficient and cost-effective machining. Component examples: Gear wheels, shafts, large gearbox components, bearing rings and rolling elements.

■ VEHICLE MANUFACTURING INDUSTRY

MOTOR INDUSTRY

The high-performance materials that are used in this industry require cutting materials that ensure an extremely high level of process reliability and a consistently high quality level. Our cutting materials and tools are the perfect solution.

Component examples: Connecting rods, pulley wheels, cylinder heads, cylinder liners.

TRANSPORT

When machining components for the transport industry, special solutions are often required in order for the machining process to remain economic and efficient. Our tools and cutting materials make these kinds of solutions possible.

Component examples: Wheel rims, shafts, bearings.

AGRICULTURAL AND CONSTRUCTION MACHINERY

We offer highly efficient bearing solutions for components for agricultural and construction machinery. Our range of solutions are currently used for machining of soft steel as well as processing cast iron and hardened parts. Component examples: Brake components, drive shafts, hydraulic elements, motor components.

AUTOMOTIVE

For over 50 years, precision tools from CeramTec have been an integral part of highly productive machining solutions for components from the automotive industry:

Component examples: Brake discs, brake drums, fly wheels, connecting rods, gear components, engine blocks.



Motor industry



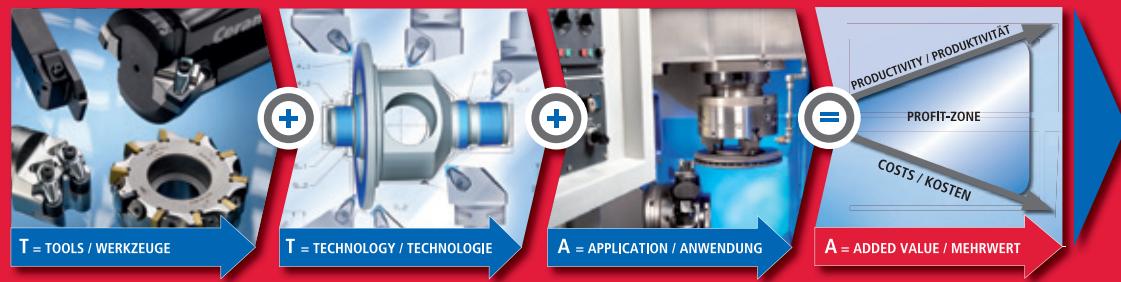
Transport

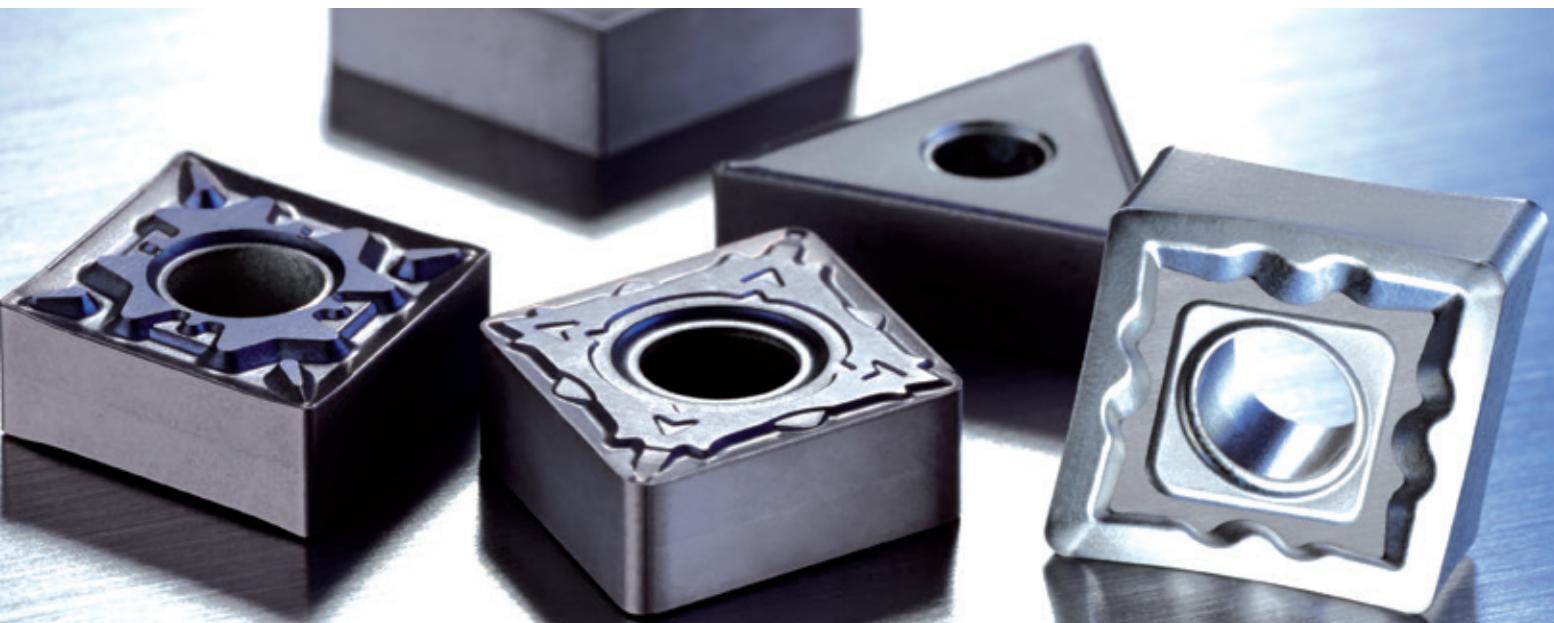


Agricultural and construction machinery

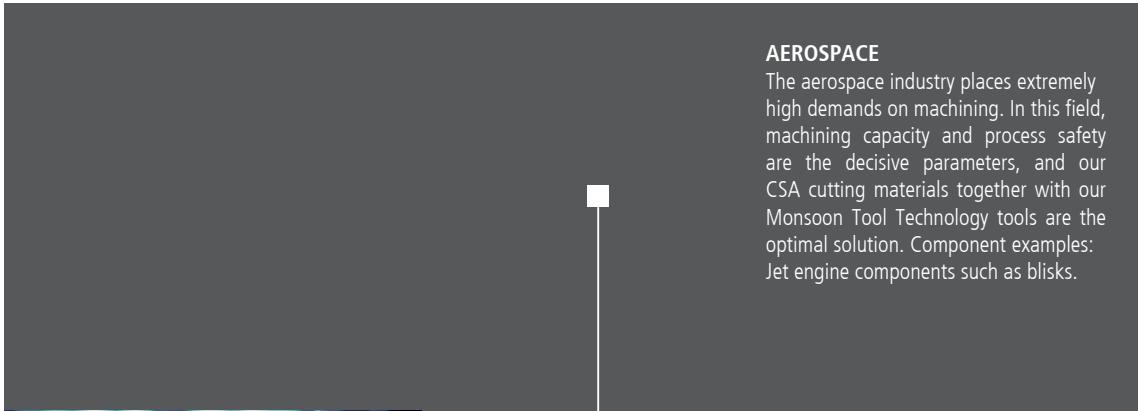


Automotive





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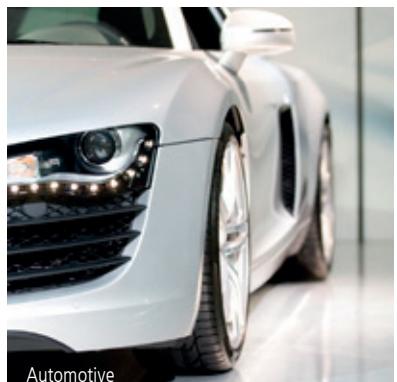
Motor industry



Transport

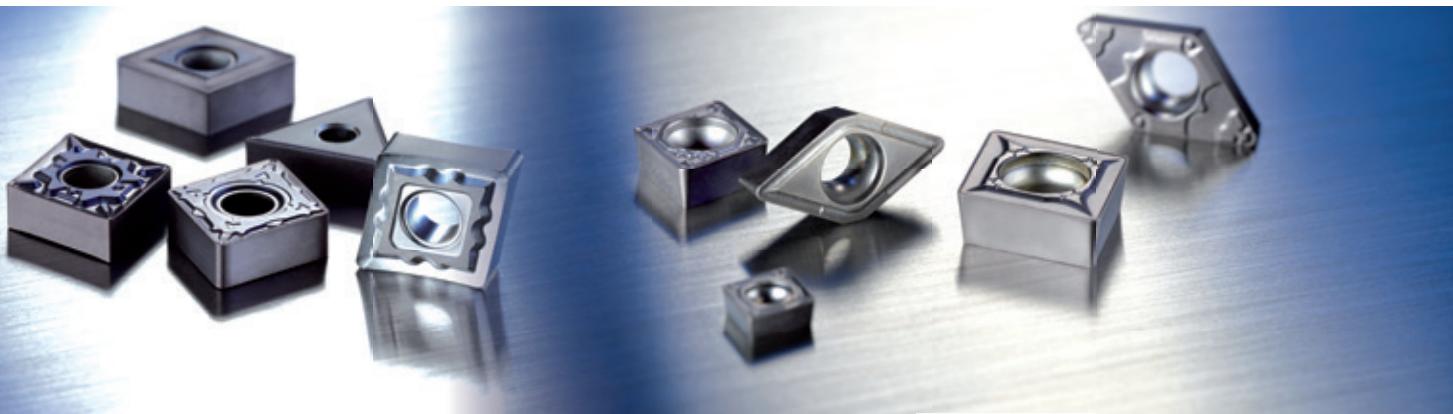


Agricultural and construction machinery



Automotive

SPK Cermet grades

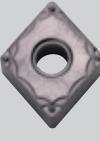
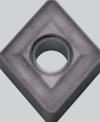


Cermets are ideal for all types of machining that require a high level of surface quality and dimensional accuracy long with limited tolerances. They achieve extremely long tool life for small and medium chip thickness and uniform depths of cut. They are ideal for fine finishing and finishing of steel,

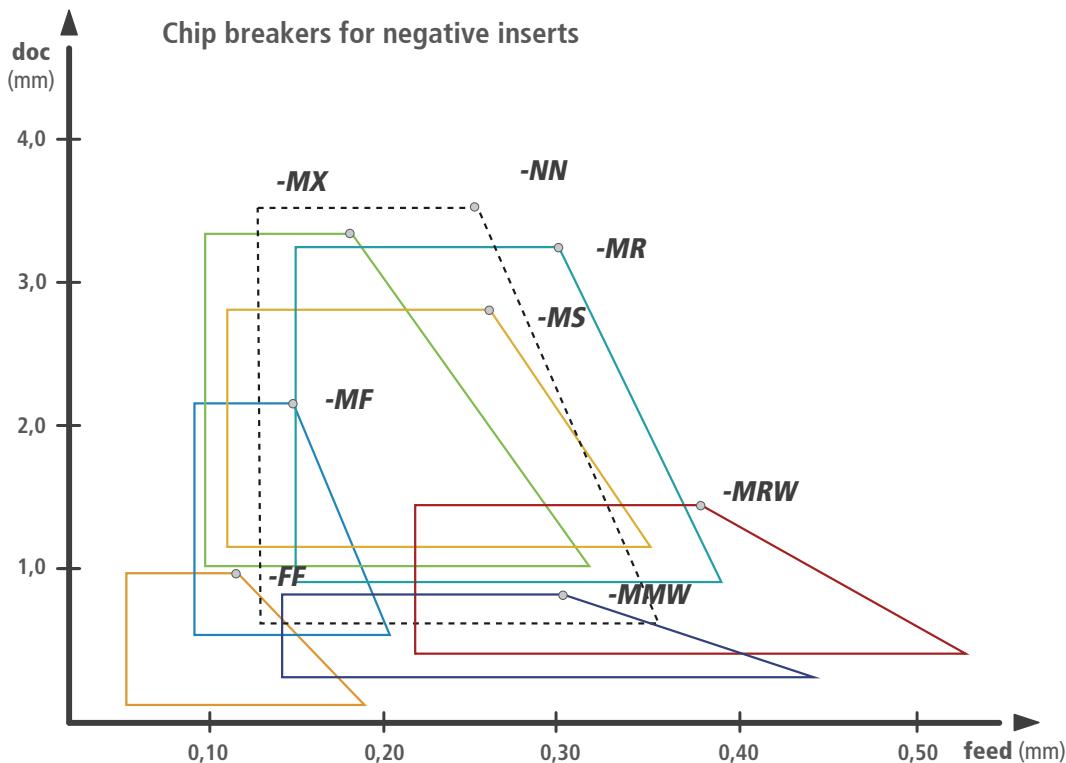
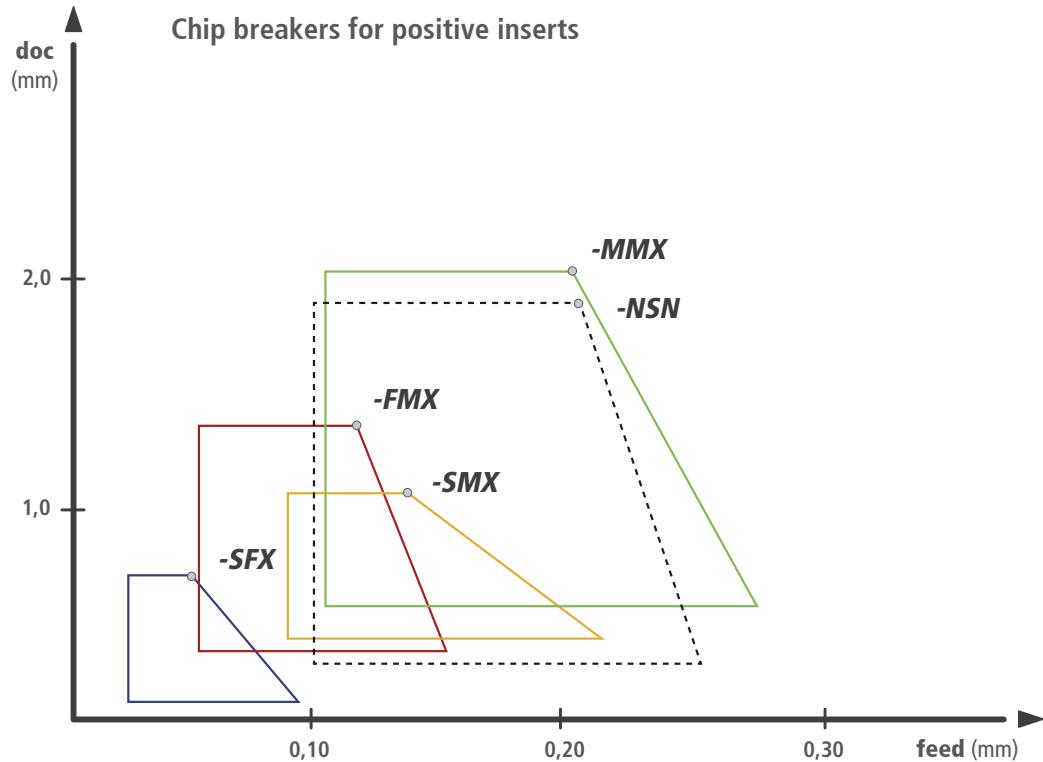
sintered metal and ductile cast iron. They are used for turning, grooving and milling. The specially adapted chip breakers result in reliable chip breaking.

GRADE	DESCRIPTION
TS1120	The uncoated SPK grade is primarily used for fine machining of steel (Group P05-P10).
TS1215	This coated SPK cermet cutting material is extremely wear- and heat-resistant. These characteristics make it a universal cutting material that is primarily suitable for medium and fine machining of steel, GJL (GG) and GJS (GGG) as well as fine machining of stainless steel. (Group P15-P20).
TS1230	A coated SPK grade for medium machining of steel. The coating has proven itself to be durable and wear-resistant in use. (Group P15-P20).
TS1415	This SPK grade's coating was developed primarily for medium machining and fine machining of GJL (GG) and GJS (GGG) materials; however it is also suitable for fine machining of stainless steel. (Group K10-K20).
TS1115	Uncoated grade, particularly suited for superfinishing of steel (Group P05). Extremely high surface quality will be achieved.

SPK Cermet chip breaker geometries

Insert	Chip breakers geometries for negative inserts	Insert	Chip breakers geometries for positive inserts
	<p>- FF A very sharp and soft cutting chip breaker geometry. It controls chips extremely safely, even with small cutting depths and low feed rates.</p>		<p>- SFX A chip breaker geometry for superfinishing. It features safe chip control even at very low feed rates and small depths of cut, well below 0.10 mm. Furthermore, it is ideal for finishing operations in boring.</p>
	<p>- MF This chip breaker geometry is particularly suited for medium milling and finishing of ductile workpiece materials. Its strengths become particularly apparent when machining narrow components.</p>		<p>- FMX The chip breaker geometry for general fine machining applications. It is extremely stable thanks to the soft-cutting design of its cutting edge.</p>
	<p>- MS The MS chip breaker geometry features a very sharp corner design with a positive, concave edge. It is primarily used for medium milling and finishing of corrosion-resistant steel.</p>		<p>- SMX The SMX features a chip formation that is often required for medium machining of steel and cast iron materials. It features an open chip breaker which also significantly reduces the cutting forces.</p>
	<p>- MX This chip breaker geometry has a large chip control range and can therefore be used for a wide variety of applications. Combined with the TS1215 grade it is the ideal geometry for steel machining.</p>		<p>- MMX This chip breaker geometry features a standard for a broad range of applications within the range of positive inserts in combination with the grade TS1215.</p>
	<p>- MR A chip breaker geometry for applications ranging from medium to rough machining. Stable cutting edge, yet soft-cutting.</p>		<p>- NSN This insert features a stable geometry that minimizes cutting forces and is resistant to chip impact. It is frequently used for machining cast iron materials.</p>
	<p>- NN This geometry features a highly stable cutting edge and is ideal suited for roughing of cast iron materials.</p>		
	<p>- MMW These inserts feature a chip breaker geometry for extremely fine machining, but also a precisely designed Wiper cutting edge (ZZ) to produce a high level of surface quality at high feed rates.</p>		
	<p>- MRW Inserts with this geometry are equipped with a chip formation for medium machining as well as a precisely designed Wiper cutting edge (ZZ). This chip breaker geometry allows high feed rates and a high level of surface quality.</p>		

Areas of application



Cutting data recommendations for grey cast iron (GJL)

MATERIAL NO.	HARDNESS (HB)	D	EU	F	GB	S	E	I	USA	J
		DIN	EN	AFNOR	B.S.	SS	UNE	UNI	AISI/SAE	JIS
0.6015	190	GJL-150	GJL-150	Ft 15 D	Grade 150	0115-00	FG 15	G 15	No 25 B	FC 150
0.6020	210	GJL-200	GJL-200	Ft 20 D	Grade 220	0120-00	FG 20	G 20	No 30 B	FC 200
0.6025	240	GJL-250	GJL-250	Ft 25 D	Grade 260	0125-00	FG 25	G 25	No 35 B	FC 250
0.6030	260	GJL-300	GJL-300	Ft 30 D	Grade 300	0130-00	FG 30	G 30	No 45 B	FC 300
0.6035	280	GJL-350	GJL-350	Ft 35 D	Grade 350	0135-00	FG 35	G 35	No 50 B	FC 350

SPK-Cermet

HARDNESS (HB)	CUTTING SPEED v_c (m/min)		DEPTH OF CUT a_p (mm)	FEED RATE f (mm)	
	RECOMMENDED VALUE	TOTAL RANGE		RECOMMENDED VALUE	TOTAL RANGE
6,3/ Finishing					
140 - 210	400	100 - 500	0,2 - 1,5	0,25	0,1 - 0,4
220 - 240	350	100 - 450	0,2 - 1,5	0,25	0,1 - 0,4
250 - 280	300	100 - 400	0,2 - 1,5	0,25	0,1 - 0,4
0,8/ Fine finishing					
140 - 210	450	100 - 550	0,2 - 1,0	0,12	0,1 - 0,4
220 - 240	400	100 - 500	0,2 - 1,0	0,12	0,1 - 0,4
250 - 280	350	100 - 400	0,2 - 1,0	0,12	0,1 - 0,4

Cutting data recommendations for ductile cast iron (GJS)

MATERIAL NO.	Rm (N/mm ²)	D	EU	F	GB	S	E	I	USA	J
		DIN	EN	AFNOR	B.S.	SS	UNE	UNI	AISI/SAE	JIS
0.7040	400	GJS-400-15	GJS-400-15	FGS 400-12	SGN 420/12	0717-02	FGE 38-17	GS 370-17	60-40-18	FCD 400
0.7050	500	GJS-500-7	GJS-500-7	FGS 500-7	SGN 500/7	0727-02	FGE 50-7	GS 500-7	65-45-12	FCD 500
0.7060	600	GJS-600-3	GJS-600-3	FGS 600-3	SGN 600/3	0732-03	FGE 60-2	GS 600-2	80-55-06	FCD 600
0.7070	700	GJS-700-2	GJS-700-2	FGS 700-2	SGN 700/2	0737-01	FGE 70-2	GS 700-2	100-70-03	FCD 700

SPK-Cermet

TENSILE STRENGTH Rm (N/mm ²)	CUTTING SPEED v _c (m/min)		DEPTH OF CUT a _p (mm)	FEED RATE f (mm)	
	RECOMMENDED VALUE	TOTAL RANGE		RECOMMENDED VALUE	TOTAL RANGE
^{12,5}  Semi-roughing					
400 - 700	300	100 - 400	0,80 - 2,0	0,30	0,12 - 0,40
^{6,3}  Finishing					
400 - 700	450	100 - 500	0,50 - 1,2	0,15	0,10 - 0,40
^{0,8}  Fine finishing					
400 - 700	400	100 - 500	0,25 - 0,5	0,10	0,10 - 0,32

Cutting data recommendations for sintered metal

SPK-Cermet

HARDNESS (HB)	CUTTING SPEED v_c (m/min)		DEPTH OF CUT a_p (mm)	FEED RATE f (mm)	
	RECOMMENDED VALUE	TOTAL RANGE		RECOMMENDED VALUE	TOTAL RANGE
0.8 / Fine finishing					
100 - 800	250	100 - 300	0,1 - 0,5	0,1	0,05 - 0,30

Cutting data recommendations for heat treatable steel and case hardened steel

STOFF-NR.	Rm (N/mm ²)	D	EU	F	GB	S	E	I	USA	J
		DIN	EN	AFNOR	B.S.	SS	UNE	UNI	AISI/SAE	JIS
1.0503	620 - 760	C 45		CC 45	080 M 46	1650	F.114	C45	1045	
1.5732	830 - 1080	14 NiCr 10		14 NC 11			15 NiCr 11	16 NiCr 11	3415	SNC 415 (H)
1.5920	1080 - 1320	18 CrNi 8		20 NC 6						
1.6511	780 - 930	36 CrNiMo 4		40 NCD 3	816 M 40		35 NiCrMo 4	38 NiCrMo 4	9840	
1.6587	980 - 1270	17 CrNiMo 6		18 NCD 6	820 A 16		35 NiCrMo 13			
1.7147	780 - 1080	20 MnCr 5		20 MC 5		2523			5120	
1.7220	740 - 880	34 CrMo 4		35 CD 4	708 A 37	2234	34 CrMo 4	35 CrMo 4	4137; 4135	SCM 432; SCCRM 3
1.7225	780 - 930	42 CrMo 4		42 CD 4	708 M 40	2244	42 CrMo 4	42 CrMo 4	4140	SCM 440 (H)

SPK-Cermet

TENSILE STRENGTH Rm (N/mm ²)	CUTTING SPEED v _c (m/min)		DEPTH OF CUT a _p (mm)	FEED RATE f (mm)	
	RECOMMENDED VALUE	TOTAL RANGE		RECOMMENDED VALUE	TOTAL RANGE
^{12,5} ▽ Semi-roughing					
600 - 900	300	100 - 400	0,50 - 2,0	0,25	0,10 - 0,40
900 - 1400	200	100 - 250	0,50 - 1,8	0,25	0,10 - 0,40
^{6,3} ▽ Finishing					
600 - 900	350	100 - 500	0,25 - 1,5	0,20	0,10 - 0,40
900 - 1400	300	150 - 400	0,30 - 1,5	0,25	0,10 - 0,40
^{0,8} ▽ Fine finishing					
600 - 900	400	100 - 500	0,10 - 0,5	0,12	0,05 - 0,30
900 - 1400	300	100 - 400	0,10 - 0,5	0,12	0,08 - 0,30

Cutting data recommendations for constructional and free cutting steels

STOFF-NR.	Rm (N/mm ²)	DIN	EU	F	GB	S	E	I	USA	J
		DIN	EN	AFNOR	B.S.	SS	UNE	UNI	AISI/SAE	JIS
1.0037	340 - 470	St 37-2	S 235 JR							
1.0044	410 - 540	St 44-2	S 275 JR							
1.0050	470 - 610	St 50-2	E 295							
1.0060	570 - 710	St 60-2	E 335							
1.0116		St 37-3	S 235 J2G3	E 24-U	4360-40 B	1312		Fe 37-3	A573-81 65	
1.0144		St 44-3	S 275 J2G3	E 28-3	4360-43 C	1412			A573-81	
1.0570		St 52-3	S 355 J2G3	E 36-3	4360-50 B	2132		Fe 52 BFN/ Fe 52 CFN		SM 490 A,B,C
1.0715	410 - 660	9 SMn 28		S 250	230 M 07	1912	11 SMn 28	CF 9 SMn 28	1213	SUM 22
1.0722	390 - 640	10 SPb 20		10 PbF 2			10 SPb 20	CF 10 SPb 20		
1.0727	610 - 800	45 S 20		45 MF 4	1973	212 M 44		1151		

SPK-Cermec

TENSILE STRENGTH Rm (N/mm ²)	CUTTING SPEED v _c (m/min)		DEPTH OF CUT a _p (mm)	FEED RATE f (mm)	
	RECOMMENDED VALUE	TOTAL RANGE		RECOMMENDED VALUE	TOTAL RANGE
^{12,5} / Semi-roughing					
600 - 900	300	100 - 400	0,80 - 2,0	0,30	0,12 - 0,40
900 - 1400	200	100 - 250	0,50 - 1,8	0,25	0,10 - 0,40
^{6,3} / Finishing					
600 - 900	350	200 - 500	0,25 - 1,5	0,25	0,10 - 0,40
900 - 1400	250	100 - 400	0,25 - 1,5	0,20	0,10 - 0,40
^{0,8} / Fine finishing					
600 - 900	400	100 - 500	0,10 - 0,5	0,10	0,05 - 0,30
900 - 1400	300	100 - 400	0,10 - 0,5	0,12	0,08 - 0,30

Cutting data recommendations for stainless steel / stainless steel castings

MATERIAL NO.	Rm (N/mm ²)	DIN	AFNOR	GB	S	E	I	USA	J
1.4000	450 - 650	X 6 Cr 13	Z 6 C 13	403 S 17	2301	F.3110	X 6 Cr 13	403	SUS 403
1.4008	590 - 780	G-X 8 CrNi 13							
1.4027	740 - 930	G-X 20 Cr 14	Z 20 C 13 M	420 C 29					SCS 2
1.4104	700 - 860	X 12 CrMoS 17	Z 10 CF 17	441 S 29	2383	F.3117	X 10 CrS 17	430 F	SUS 430 F
1.4113	450 - 650	X 6 CrMo 17 1	Z 8 CD 17.01	434 S 17	2325		X 8 CrMo 17	434	SUS 434
1.4301	500 - 700	X 5 CrNi 18 10	Z 6 CN 18.09	304 S 15	2332	F.3551	X 5 CrNi 18 10	304	SUS 304
1.4401	500 - 700	X 5 CrNiMo 17 12 2	Z 6 CND 17.11	316 S 16	2347	F.3543	X 5 CrNiMo 17 2 2	316	SUS 316
1.4550	500 - 750	X 6 CrNiNb 18 10	Z 6 CNNb 18.10	347 S 17	2338	F.3552	X 6 CrNiNb 18 11	347	SUS 347
1.4571	500 - 750	X 6 CrNiMoTi 17 12 2	Z 6 CNDT 17.12	320 S 17	2350	F.3535	X 6 CrNiMo-Ti 17 12 2	316 Ti	

SPK-Cermet

TENSILE STRENGTH Rm (N/mm ²)	CUTTING SPEED v _c (m/min)		DEPTH OF CUT a _p (mm)	FEED RATE f (mm)	
	RECOMMENDED VALUE	TOTAL RANGE		RECOMMENDED VALUE	TOTAL RANGE
12,5 Rough finishing					
400 - 700	350	100 - 450	0,50 - 1,8	0,25	0,10 - 0,40
700 - 1000	350	100 - 500	0,50 - 1,8	0,30	0,12 - 0,40
6,3 Finishing					
400 - 700	400	100 - 500	0,25 - 1,2	0,20	0,10 - 0,40
700 - 1000	350	100 - 450	0,25 - 1,2	0,20	0,10 - 0,40
0,8 Fine finishing					
400 - 700	450	100 - 550	0,10 - 0,5	0,10	0,05 - 0,30
700 - 1000	400	100 - 500	0,10 - 0,5	0,12	0,08 - 0,30

Cermet inserts for turning



Designation system for inserts in accordance with ISO 1832 - Cermet

V	35°		N	0°	Inscribed circle		O	135°	RC, RN S	d mm	RB (Type MO)
D	55°		A	3°		T	60°			6,0	06
E	75°		B	5°		C	80°			7,0	07
C	80°		C	7°		E	75°			8,0	08
M	86°		P	11°		D	55°			9,0	09
K	55°		E	20°		V	35°			10,0	10
B	82°		F	25°		W	80°			12,0	12
A	85°		G	30°		O	Clearance angle which requires special data.			16,0	16
R			O			H	120°			20,0	20
S	90°					P	108°			25,0	25
T	60°					Q	135°				
W	80°					U	60°				
L						F	80°				
P	108°					A	75°				
H	120°					M	55°				
O	135°					G	35°				

Insert shape

Normal clearance angle

Insert size and cutting edge length

C

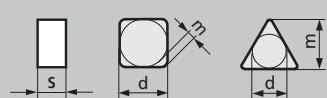
N

M

G

12

Tolerances



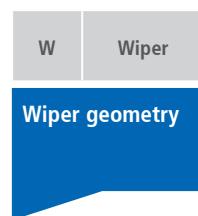
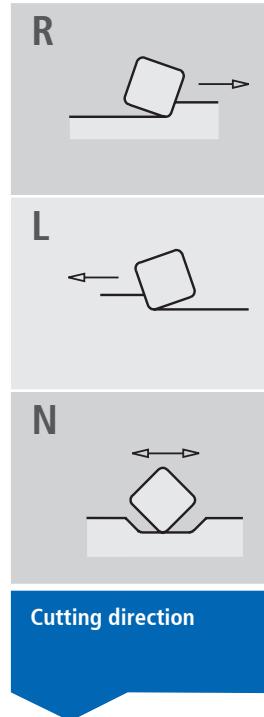
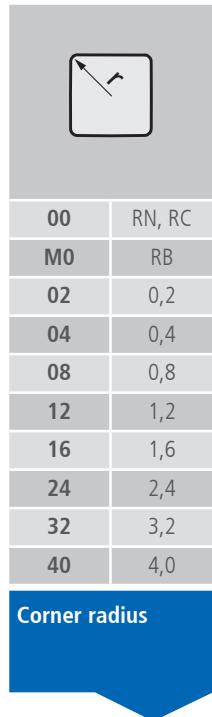
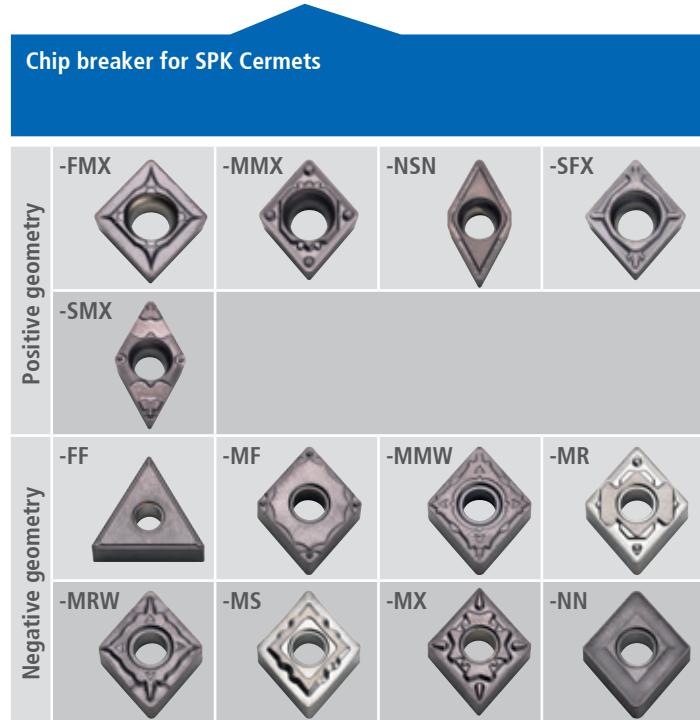
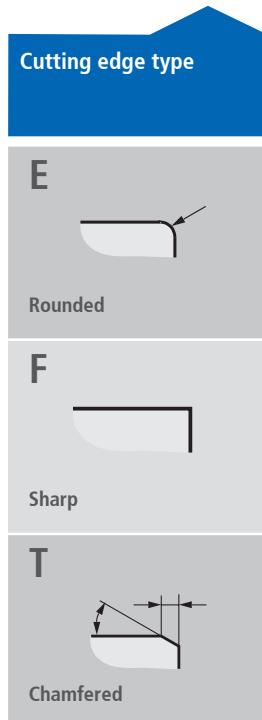
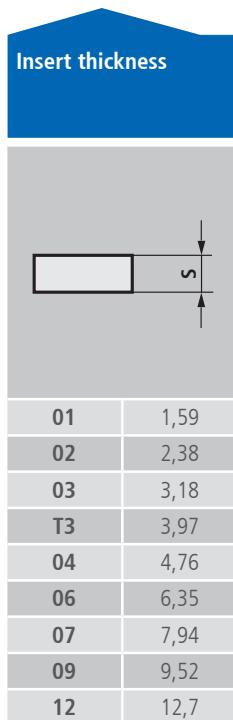
* Varies depending insert form and size

d mm	In-scribed circle	Tolerance class			
		J, K, L, M	U	M, N	U
		d = ± mm		m = ± mm	
A	0,025	0,025	0,005		
C	0,025	0,025	0,013		
E	0,025	0,025	0,025		
F	0,025	0,013	0,005	3,97	
G	0,130	0,025	0,025	5,56	
H	0,025	0,013	0,013	6,35	
J	0,025	0,05-0,13*	0,005	9,52	
K	0,025	0,05-0,13*	0,013	12,70	0,08
L	0,025	0,05-0,13*	0,025	15,88	0,1
M	0,130	0,05-0,13*	0,08-0,18*	19,05	0,18
U	0,130	0,08-0,25*	0,13-0,38*	25,40	0,13

Insert type

N		T	
R		Q	
F		U	
A		B	
M		H	
G		C	
W		J	

X Special design

**04****08****E****N****- MRW**

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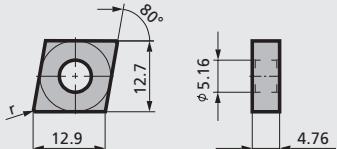
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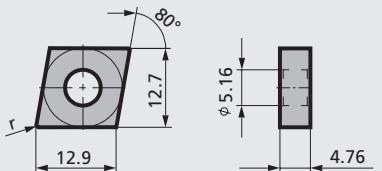
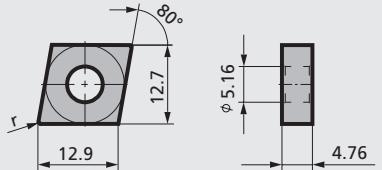
Cermet inserts for turning

INSERT	ISO	GRADE	SPK REF. NO.
CCMT 06 02 ..	CCMT 06 02 02 - MMT	TS 1215	50.59.522.40.1
		TS 1115	50.59.522.40.6
CCMT 06 02 02 - SMX	TS 1215	50.59.523.40.1	
	TS 1415	50.59.523.40.3	
	TS 1115	50.59.523.40.6	
CCMT 06 02 04 - MMX	TS 1120	50.59.507.40.0	
	TS 1215	50.59.507.40.1	
	TS 1230	50.59.507.40.2	
CCMT 06 02 04 - SFX	TS 1215	50.59.508.40.1	
	TS 1230	50.59.508.40.2	
	TS 1115	50.59.508.40.6	
CCMT 06 02 04 - SMX	TS 1120	50.59.500.40.0	
	TS 1215	50.59.500.40.1	
	TS 1230	50.59.500.40.2	
CCMT 09 T3 ..	CCMT 09 T3 04 - MMX	TS 1120	50.59.505.40.0
		TS 1215	50.59.505.40.1
		TS 1230	50.59.505.40.2
CCMT 09 T3 08 - MMX	TS 1120	50.59.506.40.0	
	TS 1215	50.59.506.40.1	
	TS 1230	50.59.506.40.2	
CCMT 12 04 ..	CCMT 12 04 04 - SMX	TS 1120	50.59.502.40.0
		TS 1215	50.59.502.40.1
		TS 1230	50.59.502.40.2
CCMT 12 04 08 - SMX	TS 1120	50.59.503.40.0	
	TS 1215	50.59.503.40.1	
	TS 1230	50.59.503.40.2	
CCMT 12 04 12 - SMX	TS 1120	50.59.504.40.0	
	TS 1215	50.59.504.40.1	
	TS 1230	50.59.504.40.2	

Cermet inserts for turning

INSERT	ISO	GRADE	SPK REF. NO.
CNMG 12 04 ..			
	CNMG 12 04 04 - FX	TS 1120	50.53.521.40.0
		TS 1215	50.53.521.40.1
		TS 1230	50.53.521.40.2
	CNMG 12 04 04 - MF	TS 1120	50.53.519.40.0
		TS 1215	50.53.519.40.1
		TS 1230	50.53.519.40.2
	CNMG 12 04 04 - MMW	TS 1120	50.53.502.40.0
		TS 1215	50.53.502.40.1
		TS 1230	50.53.502.40.2
	CNMG 12 04 04 - MR	TS 1120	50.53.512.40.0
		TS 1215	50.53.512.40.1
		TS 1230	50.53.512.40.2
	CNMG 12 04 04 - MRW	TS 1120	50.53.503.40.0
		TS 1215	50.53.503.40.1
		TS 1230	50.53.503.40.2
	CNMG 12 04 04 - MX	TS 1120	50.53.506.40.0
		TS 1215	50.53.506.40.1
		TS 1230	50.53.506.40.2
	CNMG 12 04 04 - NN	TS 1215	50.53.539.40.1
		TS 1230	50.53.539.40.2
		TS 1415	50.53.539.40.3
	CNMG 12 04 08 - MF	TS 1120	50.53.520.40.0
		TS 1215	50.53.520.40.1
		TS 1230	50.53.520.40.2
	CNMG 12 04 08 - MMW	TS 1120	50.53.500.40.0
		TS 1215	50.53.500.40.1
		TS 1230	50.53.500.40.2
	CNMG 12 04 08 - MR	TS 1120	50.53.513.40.0
		TS 1215	50.53.513.40.1
		TS 1230	50.53.513.40.2
	CNMG 12 04 08 - MRW	TS 1120	50.53.504.40.0
		TS 1215	50.53.504.40.1
		TS 1230	50.53.504.40.2
	CNMG 12 04 08 - MX	TS 1120	50.53.507.40.0
		TS 1215	50.53.507.40.1
		TS 1230	50.53.507.40.2

Cermet inserts for turning

INSERT	ISO	GRADE	SPK REF. NO.
CNMG 12 04 ..			
	CNMG 12 04 08 - NN	TS 1215	50.53.516.40.1
		TS 1230	50.53.516.40.2
		TS 1415	50.53.516.40.3
	CNMG 12 04 12 - FX	TS 1120	50.53.509.40.0
		TS 1215	50.53.509.40.1
		TS 1230	50.53.509.40.2
	CNMG 12 04 12 - MR	TS 1120	50.53.514.40.0
		TS 1215	50.53.514.40.1
		TS 1230	50.53.514.40.2
	CNMG 12 04 12 - MRW	TS 1120	50.53.505.40.0
		TS 1215	50.53.505.40.1
		TS 1230	50.53.505.40.2
	CNMG 12 04 12 - MX	TS 1120	50.53.508.40.0
		TS 1215	50.53.508.40.1
		TS 1230	50.53.508.40.2
	CNMG 12 04 12 - NN	TS 1215	50.53.517.40.1
		TS 1230	50.53.517.40.2
		TS 1415	50.53.517.40.3
	CNMG 12 04 16 - MR	TS 1120	50.53.515.40.0
		TS 1215	50.53.515.40.1
		TS 1230	50.53.515.40.2
	CNMG 12 04 16 - NN	TS 1215	50.53.518.40.1
		TS 1230	50.53.518.40.2
		TS 1415	50.53.518.40.3
CNMP 12 04 ..			
	CNMP 12 04 04 - MS	TS 1120	50.53.510.40.0
		TS 1215	50.53.510.40.1
		TS 1230	50.53.510.40.2
	CNMP 12 04 08 - MS	TS 1120	50.53.511.40.0
		TS 1215	50.53.511.40.1
		TS 1230	50.53.511.40.2

Cermet inserts for turning

INSERT	ISO	GRADE	SPK REF. NO.
DCMT 07 02 ..	DCMT 07 02 04 - SMX	TS 1115 TS 1215 TS 1415	31.50.59.524.40.6 31.50.59.524.40.1 31.50.59.524.40.3
DCMT 11 T3 ..	DCMT 11 T3 04 - FMX	TS 1120 TS 1215 TS 1230	31.50.59.509.40.0 31.50.59.509.40.1 31.50.59.509.40.2
	DCMT 11 T3 04 - MMX	TS 1120 TS 1215 TS 1230	31.50.59.513.40.0 31.50.59.513.40.1 31.50.59.513.40.2
	DCMT 11 T3 04 - SMX	TS 1120 TS 1215 TS 1230	31.50.59.511.40.0 31.50.59.511.40.1 31.50.59.511.40.2
	DCMT 11 T3 08 - FMX	TS 1120 TS 1215 TS 1230	31.50.59.510.40.0 31.50.59.510.40.1 31.50.59.510.40.2
	DCMT 11 T3 08 - MMX	TS 1120 TS 1215 TS 1230	31.50.59.514.40.0 31.50.59.514.40.1 31.50.59.514.40.2
	DCMT 11 T3 08 - NSN	TS 1215 TS 1230 TS 1415	31.50.59.515.40.1 31.50.59.515.40.2 31.50.59.515.40.3
	DCMT 11 T3 08 - SMX	TS 1120 TS 1215 TS 1230	31.50.59.512.40.0 31.50.59.512.40.1 31.50.59.512.40.2
DNMG 15 06 ..	DNMG 15 06 04 - MF	TS 1120 TS 1215 TS 1230	31.50.53.522.40.0 31.50.53.522.40.1 31.50.53.522.40.2
	DNMG 15 06 04 - MX	TS 1120 TS 1215 TS 1230	31.50.53.524.40.0 31.50.53.524.40.1 31.50.53.524.40.2
	DNMG 15 06 08 - MF	TS 1120 TS 1215 TS 1230	31.50.53.523.40.0 31.50.53.523.40.1 31.50.53.523.40.2

Cermet inserts for turning

INSERT	ISO	GRADE	SPK REF. NO.
DNMG 15 06 ..	DNMG 15 06 08 - MR	TS 1120	50.53.528.40.0
		TS 1215	50.53.528.40.1
		TS 1230	50.53.528.40.2
	DNMG 15 06 08 - MX	TS 1120	50.53.525.40.0
		TS 1215	50.53.525.40.1
		TS 1230	50.53.525.40.2
	DNMG 15 06 08 - NN	TS 1215	50.53.530.40.1
		TS 1230	50.53.530.40.2
		TS 1415	50.53.530.40.3
	DNMG 15 06 12 - MR	TS 1120	50.53.529.40.0
		TS 1215	50.53.529.40.1
		TS 1230	50.53.529.40.2
	DNMG 15 06 12 - MX	TS 1120	50.53.501.40.0
		TS 1215	50.53.501.40.1
		TS 1230	50.53.501.40.2
	DNMG 15 06 12 - NN	TS 1215	50.53.531.40.1
		TS 1230	50.53.531.40.2
		TS 1415	50.53.531.40.3
DNMP 15 06 ..	DNMP 15 06 04 - MS	TS 1120	50.53.526.40.0
		TS 1215	50.53.526.40.1
		TS 1230	50.53.526.40.2
	DNMP 15 06 08 - MS	TS 1120	50.53.527.40.0
		TS 1215	50.53.527.40.1
		TS 1230	50.53.527.40.2
SCMT 09 T3 ..	SCMT 09 T3 04 - MMX	TS 1120	50.19.500.40.0
		TS 1215	50.19.500.40.1
		TS 1230	50.19.500.40.2
	SCMT 09 T3 04 - SFX	TS 1215	50.19.502.40.1
		TS 1230	50.19.502.40.2
		TS 1115	50.19.502.40.6
	SCMT 09 T3 08 - MMX	TS 1120	50.19.501.40.0
		TS 1215	50.19.501.40.1
		TS 1230	50.19.501.40.2
	SCMT 09 T3 08 - SFX	TS 1115	50.19.503.40.6
		TS 1215	50.19.503.40.1
		TS 1230	50.19.503.40.2

Cermet inserts for turning

INSERT	ISO	GRADE	SPK REF. NO.
SNMG 12 04 ..	SNMG 12 04 08 - MR SNMG 12 04 08 - MX SNMG 12 04 08 - NN SNMG 12 04 12 - NN SNMG 12 04 16 - NN	TS 1120 TS 1215 TS 1230 TS 1120 TS 1215 TS 1230 TS 1415 TS 1415 TS 1415	50.13.503.40.0 50.13.503.40.1 50.13.503.40.2 50.13.500.40.0 50.13.500.40.1 50.13.500.40.2 50.53.506.40.3 50.53.507.40.3 50.53.508.40.3
TCMT 16 T3 ..	TCMT 16 T3 04 - MMX TCMT 16 T3 08 - MMX TCMT 16 T3 12 - MMX	TS 1120 TS 1215 TS 1230 TS 1120 TS 1215 TS 1230 TS 1120 TS 1215 TS 1230	50.39.500.40.0 50.39.500.40.1 50.39.500.40.2 50.39.501.40.0 50.39.501.40.1 50.39.501.40.2 50.39.502.40.0 50.39.502.40.1 50.39.502.40.2
TNMG 16 04 ..	TNMG 16 04 04 - FF TNMG 16 04 04 - MF TNMG 16 04 04 - MX TNMG 16 04 08 - FF TNMG 16 04 08 - FX	TS 1120 TS 1215 TS 1230 TS 1120 TS 1215 TS 1230 TS 1120 TS 1215 TS 1230 TS 1120 TS 1215 TS 1230 TS 1120 TS 1215 TS 1230	50.33.500.40.0 50.33.500.40.1 50.33.500.40.2 50.33.502.40.0 50.33.502.40.1 50.33.502.40.2 50.33.504.40.0 50.33.504.40.1 50.33.504.40.2 50.33.501.40.0 50.33.501.40.1 50.33.501.40.2 50.33.511.40.0 50.33.511.40.1 50.33.511.40.2

Cermet inserts for turning

INSERT	ISO	GRADE	SPK REF. NO.
TNMG 16 04 ..	TNMG 16 04 08 - MF TNMG 16 04 08 - MR TNMG 16 04 08 - MX TNMG 16 04 08 - NN	TS 1120 TS 1215 TS 1230 TS 1120 TS 1215 TS 1230 TS 1120 TS 1215 TS 1230 TS 1215 TS 1230 TS 1415	50.33.503.40.0 50.33.503.40.1 50.33.503.40.2 50.33.509.40.0 50.33.509.40.1 50.33.509.40.2 50.33.505.40.0 50.33.505.40.1 50.33.505.40.2 50.33.512.40.1 50.33.512.40.2 50.33.512.40.3
TNMP 16 04 ..	TNMP 16 04 04 - MS TNMP 16 04 08 - MS	TS 1120 TS 1215 TS 1230 TS 1120 TS 1215 TS 1230	50.33.507.40.0 50.33.507.40.1 50.33.507.40.2 50.33.508.40.0 50.33.508.40.1 50.33.508.40.2

Cermet inserts for turning

INSERT	ISO	GRADE	SPK REF. NO.
VBMT 16 04 ..	VBMT 16 04 04 - FMX VBMT 16 04 04 - MMX VBMT 16 04 08 - FMX VBMT 16 04 08 - MMX VBMT 16 04 12 - MMX	TS 1120 TS 1215 TS 1230 TS 1120 TS 1215 TS 1230 TS 1120 TS 1215 TS 1230 TS 1120 TS 1215 TS 1230	50.59.516.40.0 50.59.516.40.1 50.59.516.40.2 50.59.501.40.0 50.59.501.40.1 50.59.501.40.2 50.59.517.40.0 50.59.517.40.1 50.59.517.40.2 50.59.518.40.0 50.59.518.40.1 50.59.518.40.2 50.59.519.40.0 50.59.519.40.1 50.59.519.40.2
VCMT 16 04 ..	VCMT 16 04 04 - MMX VCMT 16 04 08 - MMX	TS 1120 TS 1215 TS 1230 TS 1120 TS 1215 TS 1230	50.59.520.40.0 50.59.520.40.1 50.59.520.40.2 50.59.521.40.0 50.59.521.40.1 50.59.521.40.2
VNMG 16 04 ..	VNMG 16 04 04 - MF VNMG 16 04 04 - MX VNMG 16 04 04 - NN VNMG 16 04 08 - MF	TS 1120 TS 1215 TS 1230 TS 1120 TS 1215 TS 1230 TS 1215 TS 1230 TS 1415 TS 1120 TS 1215 TS 1230	50.53.532.40.0 50.53.532.40.1 50.53.532.40.2 50.53.534.40.0 50.53.534.40.1 50.53.534.40.2 50.53.537.40.1 50.53.537.40.2 50.53.537.40.3 50.53.533.40.0 50.53.533.40.1 50.53.533.40.2

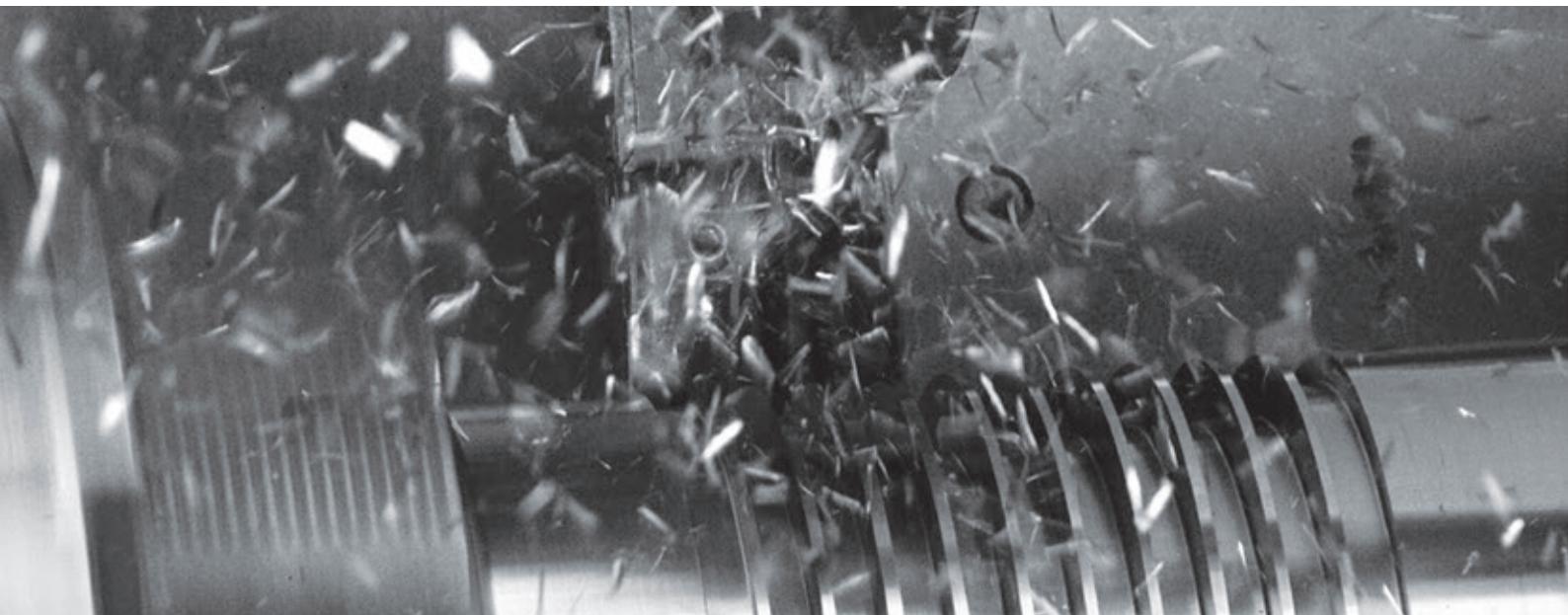
Cermet inserts for turning

INSERT	ISO	GRADE	SPK REF. NO.
VNMG 16 04 ..	VNMG 16 04 08 - MX VNMG 16 04 08 - NN VNMG 16 04 12 - MX	TS 1120 TS 1215 TS 1230 TS 1215 TS 1230 TS 1415 TS 1120 TS 1215 TS 1230	50.53.535.40.0 50.53.535.40.1 50.53.535.40.1 50.53.538.40.1 50.53.538.40.2 50.53.538.40.3 50.53.536.40.0 50.53.536.40.1 50.53.536.40.2
WNMG 08 04 ..	WNMG 08 04 04 - MF WNMG 08 04 04 - MMW WNMG 08 04 04 - MRW WNMG 08 04 04 - MX WNMG 08 04 08 - MF WNMG 08 04 08 - MMW WNMG 08 04 08 - MR WNMG 08 04 08 - MRW WNMG 08 04 08 - MX	TS 1120 TS 1215 TS 1230 TS 1120 TS 1215 TS 1230	50.63.505.40.0 50.63.505.40.1 50.63.505.40.2 50.63.501.40.0 50.63.501.40.1 50.63.501.40.2 50.63.503.40.0 50.63.503.40.1 50.63.503.40.2 50.63.507.40.0 50.63.507.40.1 50.63.507.40.2 50.63.506.40.0 50.63.506.40.1 50.63.506.40.2 50.63.502.40.0 50.63.502.40.1 50.63.502.40.2 50.63.512.40.0 50.63.512.40.1 50.63.512.40.2 50.63.500.40.0 50.63.500.40.1 50.63.500.40.2 50.63.508.40.0 50.63.508.40.1 50.63.508.40.2

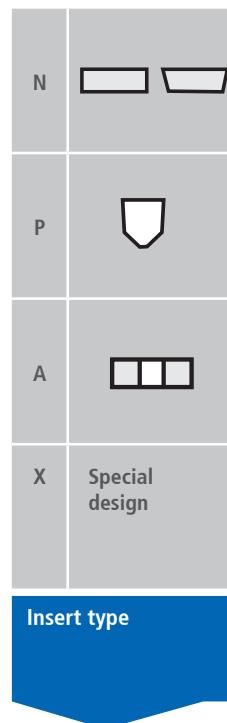
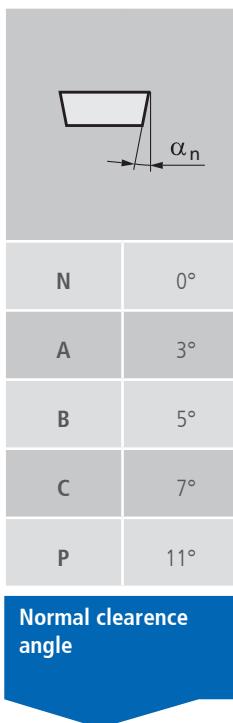
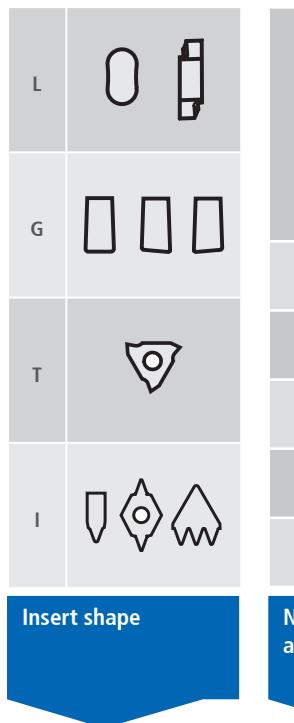
Cermet inserts for turning

INSERT	ISO	GRADE	SPK REF. NO.
WNMG 08 04 ..	WNMG 08 04 08 - NN	TS 1215	50.63.514.40.1
		TS 1230	50.63.514.40.2
		TS 1415	50.63.514.40.1
	WNMG 08 04 12 - MR	TS 1120	50.63.513.40.0
		TS 1215	50.63.513.40.1
		TS 1230	50.63.513.40.2
	WNMG 08 04 12 - MRW	TS 1120	50.63.504.40.0
		TS 1215	50.63.504.40.1
		TS 1230	50.63.504.40.2
	WNMG 08 04 12 - MX	TS 1120	50.63.509.40.0
		TS 1215	50.63.509.40.1
		TS 1230	50.63.509.40.2
	WNMG 08 04 12 - NN	TS 1215	50.63.515.40.1
		TS 1230	50.63.515.40.2
		TS 1415	50.63.515.40.3
WNMP 08 04 ..	WNMP 08 04 04 - MS	TS 1120	50.63.510.40.0
		TS 1215	50.63.510.40.1
		TS 1230	50.63.510.40.2
	WNMP 08 04 08 - MS	TS 1120	50.63.511.40.0
		TS 1215	50.63.511.40.1
		TS 1230	50.63.511.40.2

Cermet inserts for grooving



Designation system for inserts for grooving - Cermet



T **P** **G** **X** **16**

Tolerances

* Varies depending insert form and size

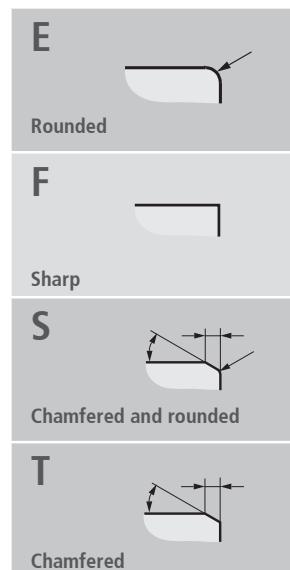
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	J, K, L, M	U	M, N	U
d mm	d = ± mm		m = ± mm	
A	0,025	0,025	0,005	
C	0,025	0,025	0,013	
E	0,025	0,025	0,025	
F	0,025	0,013	0,005	3,97
G	0,130	0,025	0,025	5,56
H	0,025	0,013	0,013	6,35
J	0,025	0,05-0,13*	0,005	9,52
K	0,025	0,05-0,13*	0,013	12,70
L	0,025	0,05-0,13*	0,025	15,88
M	0,130	0,05-0,13*	0,08-0,18*	19,05
U	0,130	0,08-0,25*	0,13-0,38*	25,40

Insert size

08	8 mm
12	12 mm
15	15 mm
09	9,52 mm
12	12,70 mm
15	15,88 mm
16	9,52 mm

110	1,1 mm
130	1,3 mm
160	1,6 mm
185	1,85 mm
...
415	4,15 mm
040	4,0 mm
050	5,0 mm
...
250	25,0 mm

Groove width



Cutting edge

K	Type of profile
4	No. of cutting edges

Poly-V-Profil DIN 7867

03

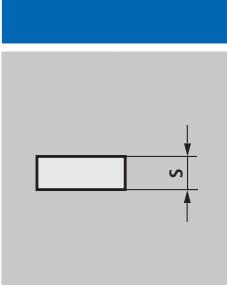
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F

R

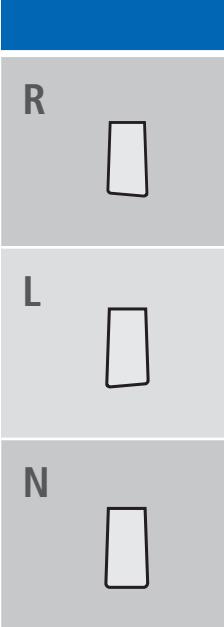
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Insert thickness

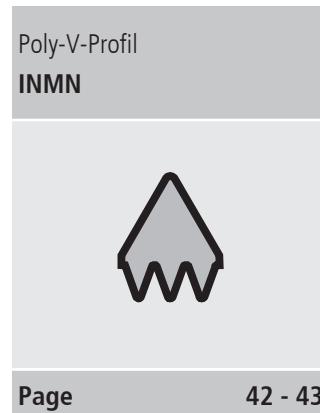
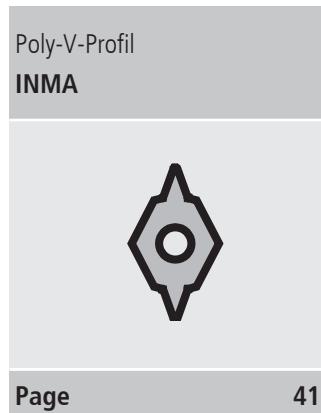
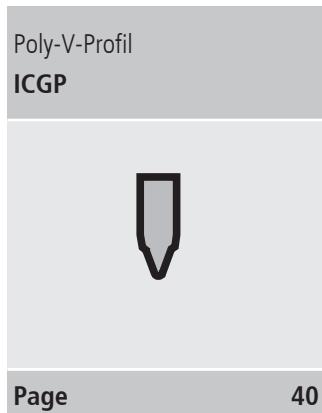
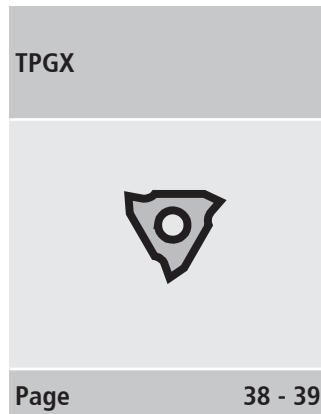
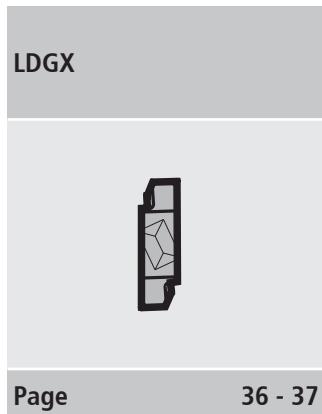


A	$\leq 5,0$
02	2,38
03	3,18
T3	3,97
04	4,76
06	6,35
07	7,94
09	9,52
12	12,7

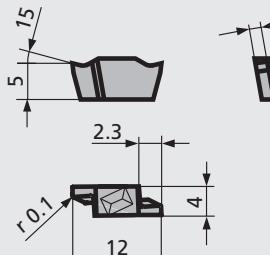
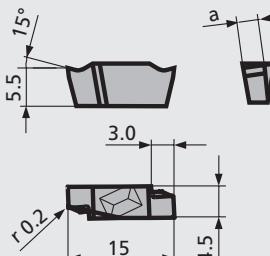
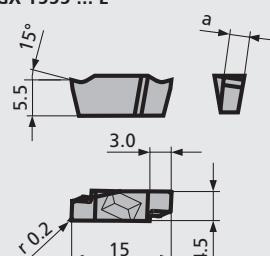
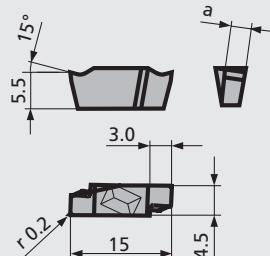
Hand of insert



Contents: Cermet inserts for grooving



Cermet inserts for grooving

SPK INSERT	TYPE	GRADE	SPK REF. NO.
LDGX 1250 ... L	LDGX 1250 110 L LDGX 1250 130 L LDGX 1250 160 L	SC 40 SC 40 SC 40	46.26.000.40.4 46.26.002.40.4 46.26.004.40.4
			
	a 1,1 1,3 1,6		
LDGX 1250 ... R	LDGX 1250 110 R LDGX 1250 130 R LDGX 1250 160 R	SC 40 SC 40 SC 40	46.26.001.40.4 46.26.003.40.4 46.26.005.40.4
			
	a 1,1 1,3 1,6		
LDGX 1555 ... L	LDGX 1555 185 L LDGX 1555 215 L LDGX 1555 265 L	SC 40 SC 40 SC 40	46.26.006.40.4 46.26.008.40.4 46.26.010.40.4
			
	a 1,85 2,15 2,65		
LDGX 1555 ... R	LDGX 1555 185 R LDGX 1555 215 R LDGX 1555 265 R	SC 40 SC 40 SC 40	46.26.026.40.4 46.26.009.40.4 46.26.011.40.4
			
	a 1,85 2,15 2,65		

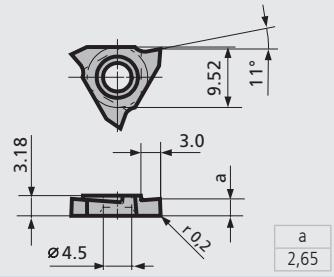
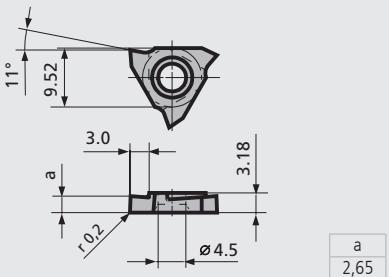
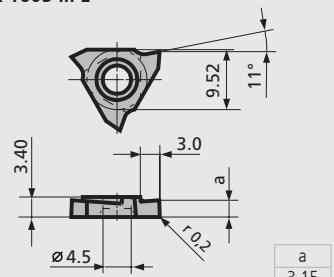
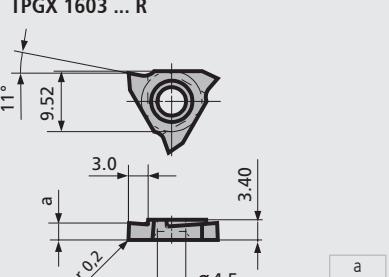
Cermet inserts for grooving

SPK INSERT	TYPE	GRADE	SPK REF. NO.
LDGX 2165 ... L	LDGX 2165 315 L	SC 40	46.26.012.40.4
LDGX 2165 ... R	LDGX 2165 315 R	SC 40	46.26.013.40.4
LDGX 2165 ... L	LDGX 2165 415 L	SC 40	46.26.021.40.4
LDGX 2165 ... R	LDGX 2165 415 R	SC 40	46.26.022.40.4

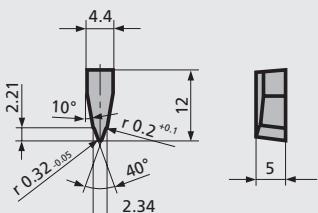
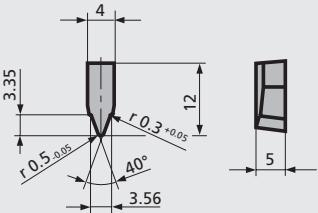
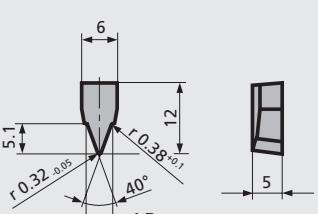
Cermet inserts for grooving

SPK INSERT	TYPE	GRADE	SPK REF. NO.
TPGX 1603 ... L	TPGX 1603 110 L TPGX 1603 130 L TPGX 1603 160 L TPGX 1603 185 L	SC 40 SC 40 SC 40 SC 40	46.32.529.40.4 46.32.530.40.4 46.32.531.40.4 46.32.532.40.4
TPGX 1603 ... R	TPGX 1603 110 R TPGX 1603 130 R TPGX 1603 160 R TPGX 1603 185 R	SC 40 SC 40 SC 40 SC 40	46.32.514.40.4 46.32.515.40.4 46.32.516.40.4 46.32.525.40.4
TPGX 1603 ... L	TPGX 1603 215 L	SC 40	46.32.533.40.4
TPGX 1603 ... R	TPGX 1603 215 R	SC 40	46.32.526.40.4

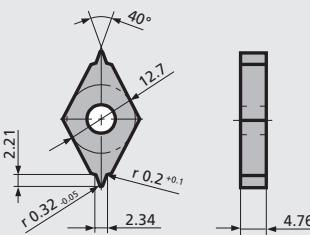
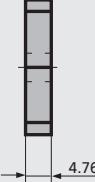
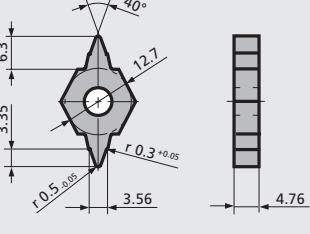
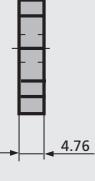
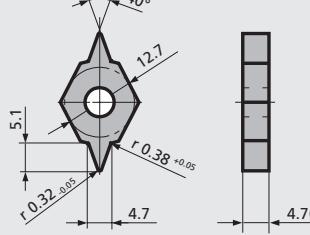
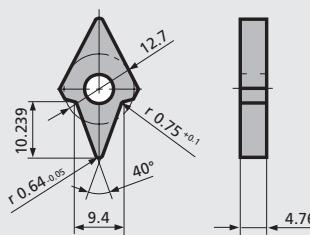
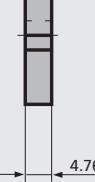
Cermet inserts for grooving

SPK INSERT	TYPE	GRADE	SPK REF. NO.
TPGX 1603 ... L	TPGX 1603 265 L	SC 40	46.32.534.40.4
			
TPGX 1603 ... R	TPGX 1603 265 R	SC 40	46.32.527.40.4
			
TPGX 1603 ... L	TPGX 1603 315 L	SC 40	46.32.535.40.4
			
TPGX 1603 ... R	TPGX 1603 315 R	SC 40	46.32.528.40.4
			

Cermet inserts for grooving

SPK INSERT	TYPE	GRADE	SPK REF. NO.
ICGP 12A 023 F - J1	ICGP 12 A 023 F - J1	SC 40	46.26.142.06.4
			
ICGP 12A 036 F - K1	ICGP 12 A 036 F - K1	SC 40	46.26.143.06.4
			
ICGP 12A 047 F - L1	ICGP 12 A 047 F - L1	SC 40	46.26.144.06.4
			

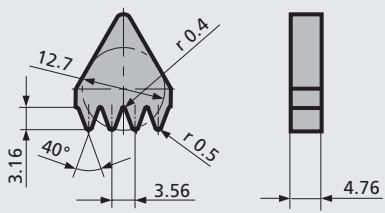
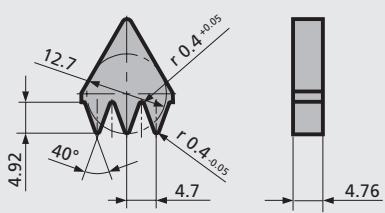
Cermet inserts for grooving

SPK INSERT	TYPE	GRADE	SPK REF. NO.
INMA 25 A 023 F - J1	INMA 25 A 023 F - J1	SC 40	46.70.009.06.4
	 		
INMA 25 A 036 F - K1	INMA 25 A 036 F - K1	SC 40	46.70.008.06.4
	 		
INMA 25 A 047 F - L1	INMA 25 A 047 F - L1	SC 40	46.70.007.06.4
	 		
INMA 25 A 094 F - M1	INMA 25 A 094 F - M1	SC 40	46.70.010.06.4
	 		

Cermet inserts for grooving

SPK INSERT	TYPE	GRADE	SPK REF. NO.
INMN 09 A 098 F - J4	INMN 09 A 098 F - J4	SC 40	46.70.004.40.4
INMN 09 A 111 F - K3	INMN 09 A 111 F - K3	SC 40 SC 7015	46.70.001.40.4 46.70.001.40.9
INMN 09 A 111 F - K3-04	INMN 09 A 111 F - K3-04	SC 40	46.70.034.06.4
INMN 12 A 147 F - K4	INMN 12 A 147 F - K4	SC 40 SC 7015	46.70.002.40.4 46.70.002.40.9

Cermet inserts for grooving

SPK INSERT	TYPE	GRADE	SPK REF. NO.
INMN 12 A 147 F - K4-04	IINMN 12 A 147 F - K4-04	SC 40	46.70.035.06.4
 INMN 12 A 147 F - L3	INMN 12 A 147 F - L3	SC 40	46.70.003.40.4
			

Cermet inserts for milling



Designation system for milling inserts according to ISO 1832 - Cermet

V	35°	
D	55°	
E	75°	
C	80°	
M	86°	
K	55°	
B	82°	
A	85°	
R		
S	90°	
T	60°	
W	80°	
L		
P	108°	
H	120°	
O	135°	

N	0°	
A	3°	
B	5°	
C	7°	
P	11°	
D	15°	
E	20°	
F	25°	
G	30°	
O		
Clearance angle with specific information.		

Inscribed circle					O 135°	T 60°	C 80°	E 75°	D 55°	V 35°	W 80°	Inscribed circle	d mm	RB (Type MO)
						06							6,0	06
						09							7,0	07
						11	06			07			8,0	08
		09				16	09			11	16	06	9,0	09
										12			10,0	10
		12	05	22	12	13	15	22	08				12,0	12
		15	06	27	16								16,0	16
		19		33									20,0	20
		25		44									25,0	25

Insert shape

Normal clearance angle on major cutting edge

Insert size and cutting edge length

S

N

C

N

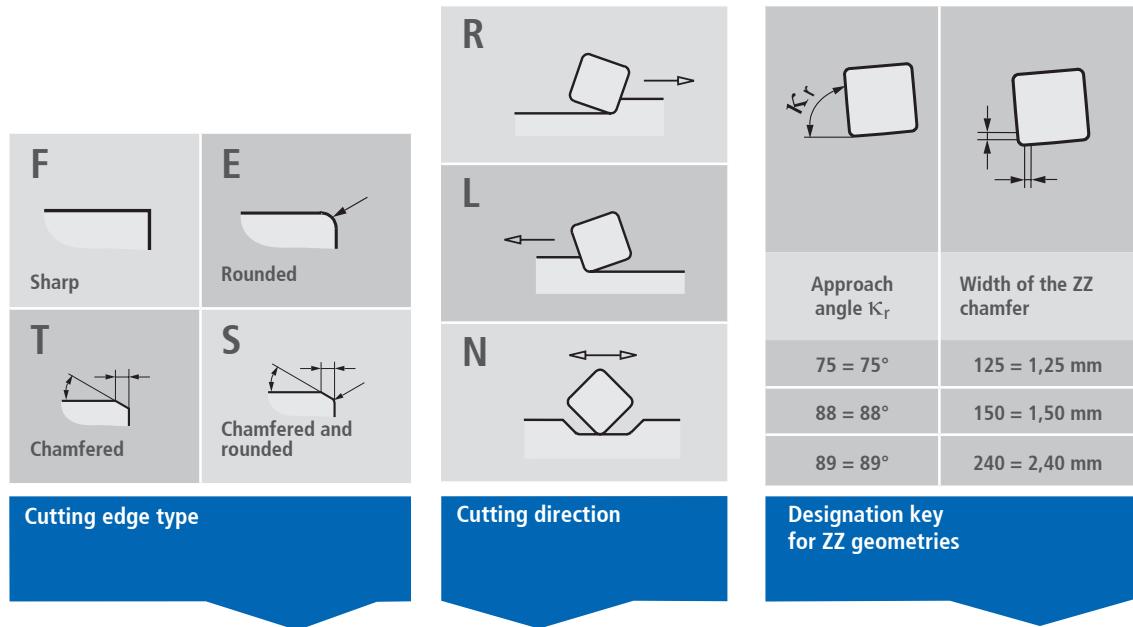
12

Tolerances

Insert type

			* Varies depending insert form and size					
S = ± mm	d = ± mm	m = ± mm	Inscribed circle d mm	Tolerance class			J, K, L, M	U
A 0,025	0,025	0,005	3,97				M, N	U
C 0,025	0,025	0,013					d = ± mm	m = ± mm
E 0,025	0,025	0,025	5,56	0,05	0,08	0,08		0,13
F 0,025	0,013	0,005	6,35					
G 0,130	0,025	0,025						
H 0,025	0,013	0,013						
J 0,025	0,05-0,13*	0,005	9,52					
K 0,025	0,05-0,13*	0,013	12,70	0,08	0,13	0,13		0,2
L 0,025	0,05-0,13*	0,025	15,88	0,1	0,18	0,15		0,27
M 0,130	0,05-0,13*	0,08-0,18*	19,05					
U 0,130	0,08-0,25*	0,13-0,38*	25,40	0,13	0,25	0,18		0,38

N	T
R	Q
F	U
A	B
M	H
G	C
W	J
X Special design	



04

ZN

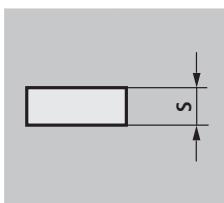
F

N

01020

- 89Z240

Insert thickness

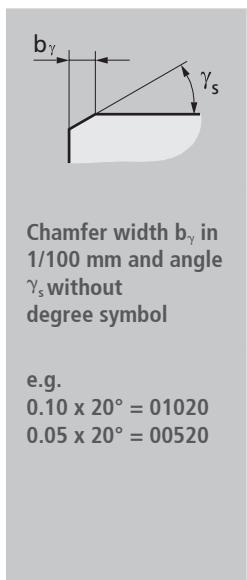


01	1,59
02	2,38
03	3,18
T3	3,97
04	4,76
05	5,56
06	6,35
07	7,94
09	9,52
12	12,70

Corner radius or parallel land / Clearance angle

Insert with corner radius		Insert with parallel land	
00	RN, RC	02	0,2
M0	RB	04	0,4
08	0,8	A	45°
12	1,2	D	60°
16	1,6	E	75°
24	2,4	F	85°
32	3,2	P	90°
40	4,0	Z	Special

Chamfer design



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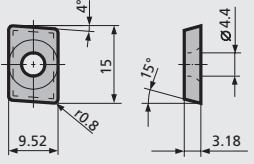
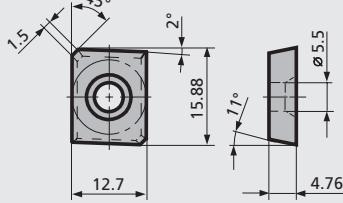
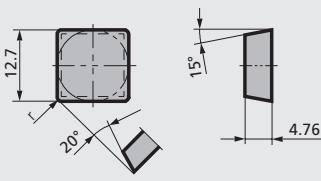
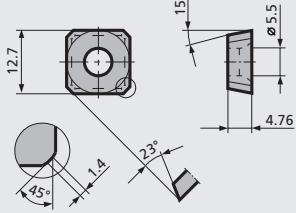
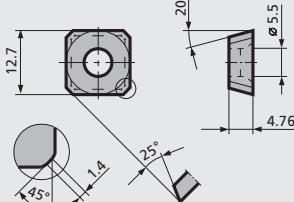
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SPEW, SPGB		Page 52 - 53
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SDCN, SEKN, SPKN		Page 50 + 51 + 53
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TPKN, TPMN		Page 53
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Cermet inserts for milling

INSERT	ISO	GRADE	SPK REF. NO.
NDCB 1503 PD TR	NDCB 15 03 PD TR	SC 60	46.57.000.40.6
			
NPCB 1504 AP TR	NPCB 15 04 AP TR	SC 60	46.57.002.01.6
			
SDCN 120408 E - 20	SDCN 12 04 08 E - 20	SC 7015	46.15.104.41.9
			
SDEW 1204 AZ T	SDEW 12 04 AZ T	SC 60 SC 7015	46.15.039.40.6 46.15.039.40.9
			
SEEB 1204 .. T	SEEB 12 04 AFT	SC 60 SC 7015	46.15.041.40.6 46.15.041.40.9
			

Cermet inserts for milling

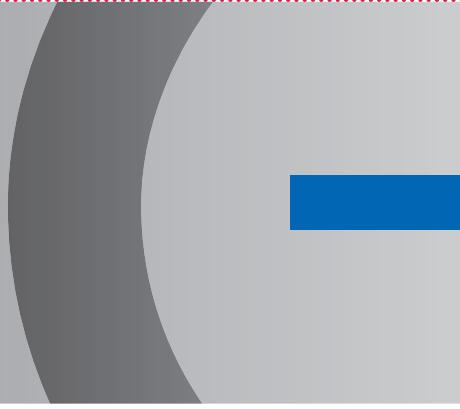
INSERT	ISO	GRADE	SPK REF. NO.
SEHW 1204 AF T 	SEHW 12 04 AF T	SC 60 SC 7015	46.15.087.01.6 46.15.087.01.9
SEKN 1203 AF TN 	SEKN 12 03 AF TN	SC 60 SC 7015	46.15.035.40.6 46.15.035.40.9
SEKN 1204 AF TN 	SEKN 12 04 AF TN	SC 60 SC 7015	46.15.068.01.6 46.15.068.01.9
SEKN 1504 AF TN 	SEKN 15 04 AF TN	SC 60 SC 7015	46.15.047.40.6 46.15.047.40.9
SNCN 1204 ZN F - 89Z240 	SNCN 12 04 ZN F - 89Z240	SC 7015	46.10.042.01.9

Cermet inserts for milling

INSERT	ISO	GRADE	SPK REF. NO.
SNGN 1204 .. T	SNGN 12 04 12 T	SC 60 SC 7015	46.10.001.40.6 46.10.001.40.9
SNGN 1204 12 F - 89Z240	SNGN 12 04 12 F - 89Z240	SC 60 SC 7015	46.10.037.01.6 46.10.037.01.9
SNGX 1204 .. T124	SNGX 12 04 12 T124	SC 7015	46.10.016.99.9
SPEW 1204 .. T	SPEW 12 04 08 T	SC 60 SC 7015	46.15.037.40.6 46.15.037.40.9
SPEW 1204 ED TR	SPEW 12 04 ED TR	SC 60 SC 7015	46.15.040.40.6 46.15.040.40.9

Cermet inserts for milling

INSERT	ISO	GRADE	SPK REF. NO.
SPGB 0903 .. T 123	SPGB 09 03 08 T123	SC 60 SC 7015	46.17.013.40.6 46.17.013.40.9
SPKN 1203 ED TR	SPKN 12 03 ED TR	SC 60 SC 7015	46.15.010.40.6 46.15.010.40.9
SPKN 1204 ED TR	SPKN 12 04 ED TR	SC 60 SC 7015	46.15.065.40.6 46.15.065.40.9
TPKN 1603 PD TR	TPKN 16 03 PD TR	SC 60 SC 7015	46.35.035.40.6 46.35.035.40.9
TPKN 2204 PD TR	TPKN 22 04 PD TR	SC 60 SC 7015	46.35.012.40.6 46.35.012.40.9



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