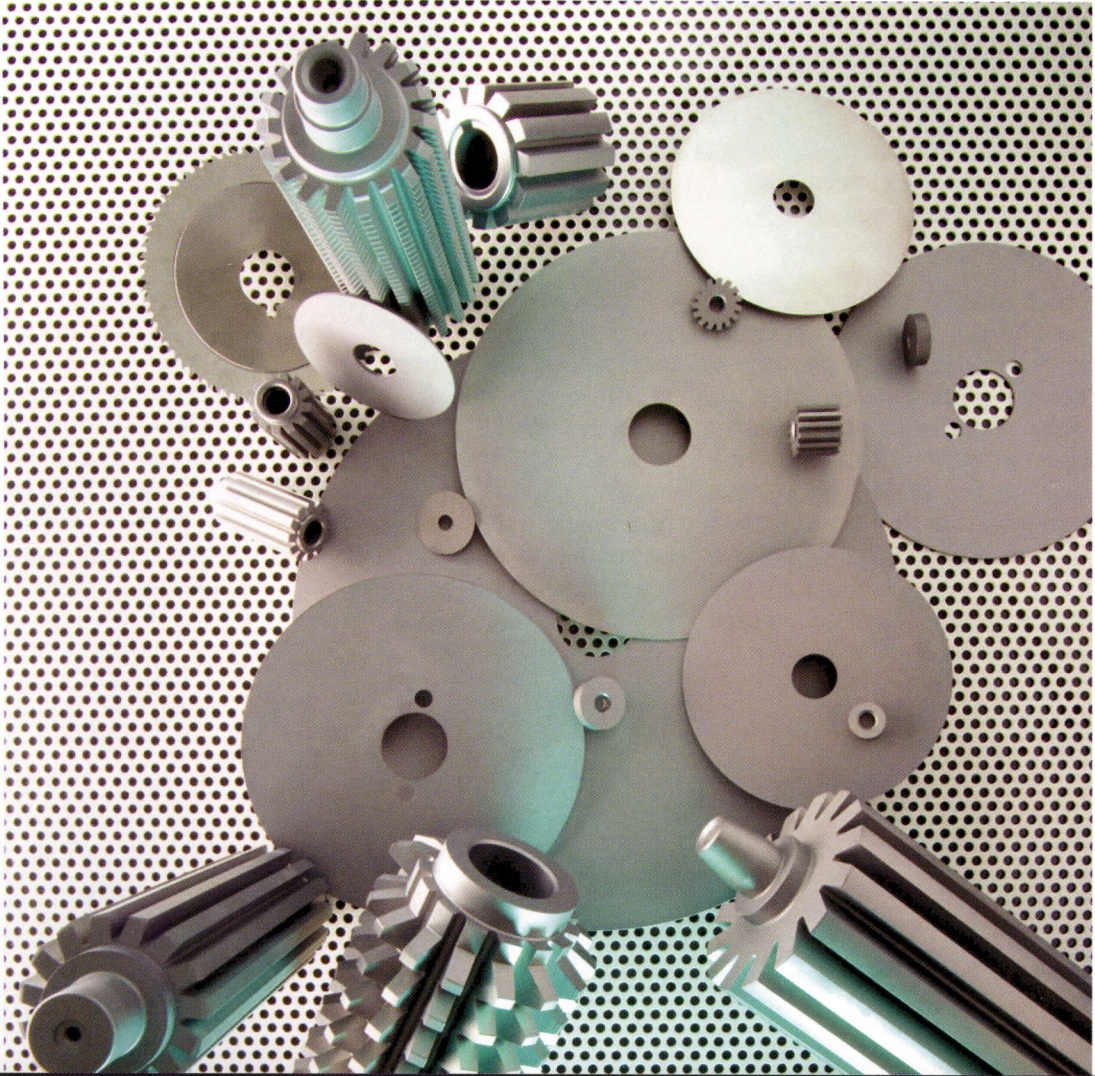


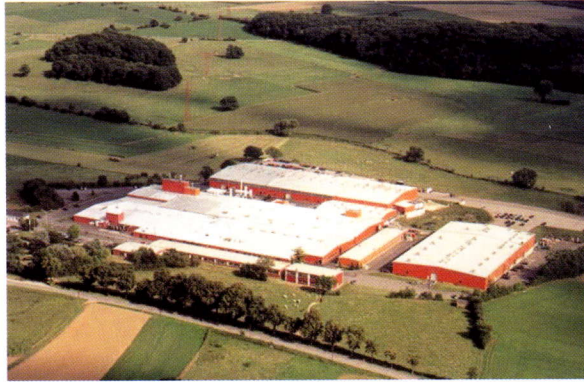
hard material matters



Carbide blanks for hobs, slitting and circular shear knives



CERATIZIT – the parent companies



Headquarters and main site
Mamer / Luxembourg

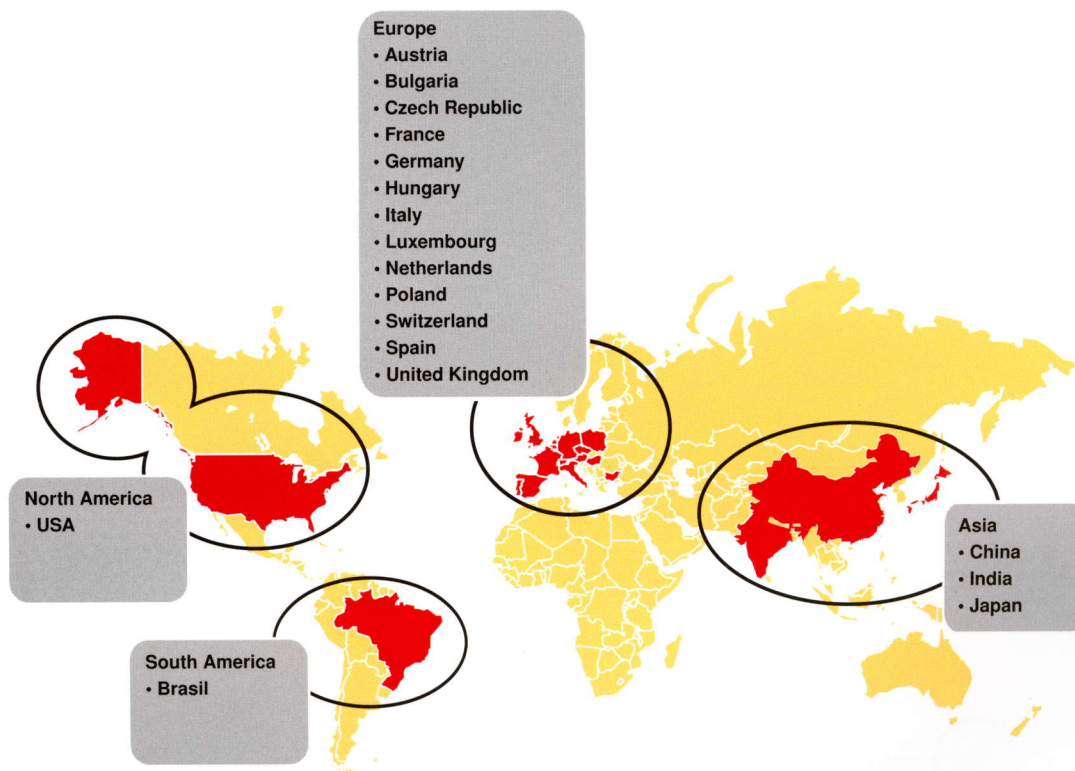


Main site Reutte / Austria

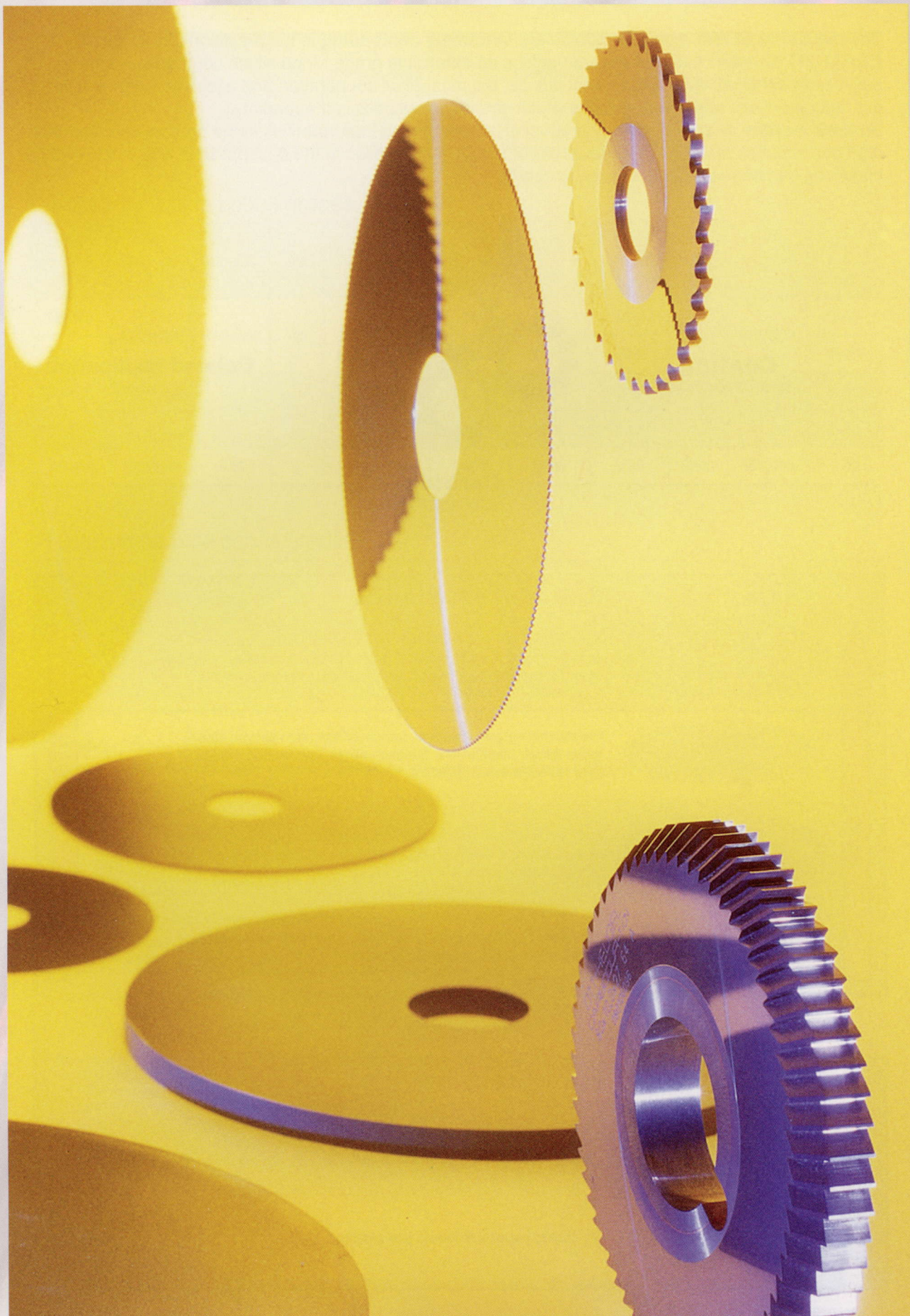
Hard material matters – it is the core of our business. Through in-depth knowledge and highly flexible production facilities we strive to provide our business partners with direct competitive advantages in the field of hard materials for tooling solutions and wear parts. Our dedication to hard material matters creates intelligent solutions for tomorrow and time to come.

Production plants in the three main economic areas and a worldwide sales network of subsidiaries and distribution partners ensure a quick response to customer needs. In-house training courses and seminars guarantee that both business partners and employees share the latest information on our product range.

We promote intensive dialogue with our customers and strive for long-term business relations on a partnership basis. The CERATIZIT corporate value 'The focus and point of view of our business partners matters' is a guiding principle for all CERATIZIT employees worldwide.

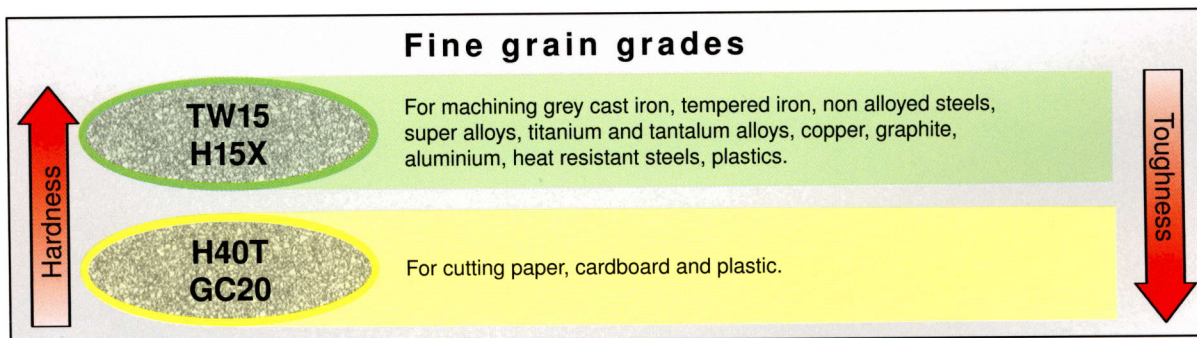
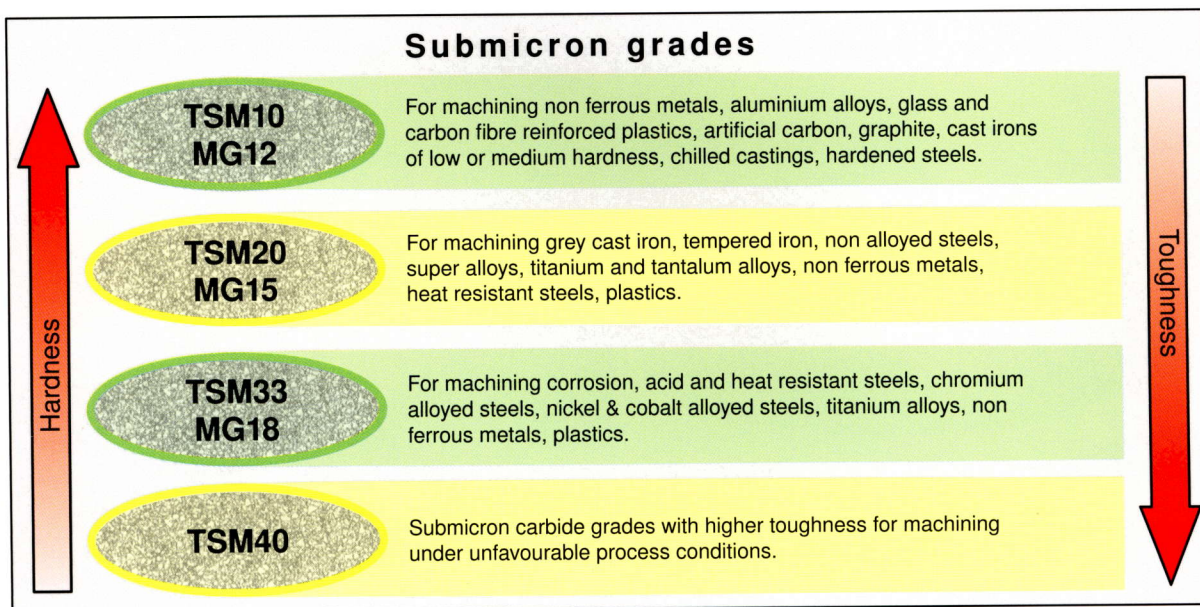
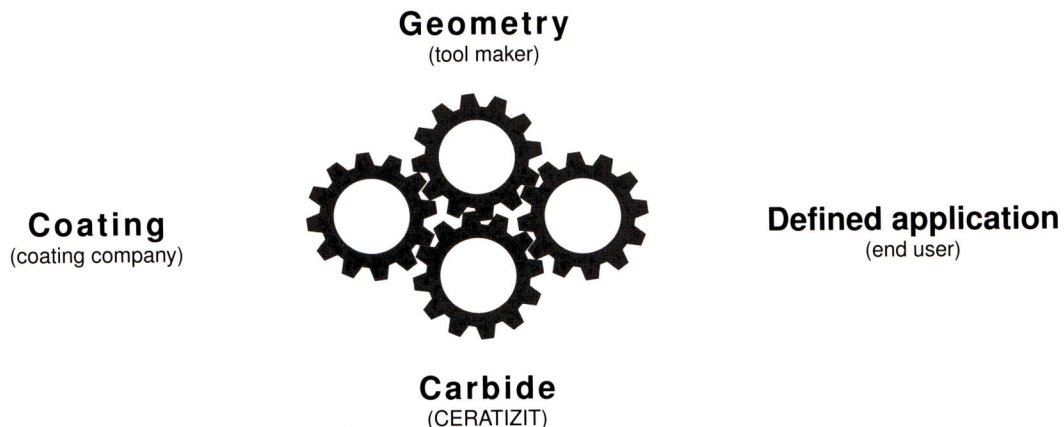


Direct sales and distribution partners



Recommended grades / applications for slitting knife blanks

The requirements with regard to carbide are **extremely demanding** in the precision tool industry. CERATIZIT's answer to these requirements is an **extensive** grade range which contributes to the success of our customers. Competent advice, but most of all cooperation and a joint procedure with our customers are **additional factors** which determine success in the market. Both the material and the company producing it represent an important link in the production chain of a high performance tool. The material however can only be applied in the best possible way when every cogwheel can be relied on to engage properly.



Grades for slitting knife blanks

Composition and properties

Former grade	New grade	ISO code	Code USA	Binder (%)	Density g/cm ³	Hardness			Transverse rupture strength		K _{IC} [*] MPa·m ^{1/2}
						HV10	HV30	HRA	MPa	P.S.I.	

Tungsten carbide cobalt grades *submicron*

TSM10	CTS12D	K05-K10	C3	6	14.90	1880	1850	93.5	3500	508,000	8,20
MG12					14.80	1820	1790	93.0			8,20
TSM20	CTS15D	K10-K30	C3	7,5	14.75	1750	1720	92.6	3600	522,000	8,60
MG15					14.70	1770	1740	92.7			8,60
TSM33	CTS20D	K20-K40	C2	10	14.50	1610	1590	91.9	3700	537,000	9,40
MG18	CTS20L				14.45	1680	1660	92.3			9,40
TSM40	CTS24D	K40	-	12	14.30	1480	1460	90.9	3800	551,000	9,90

Tungsten carbide cobalt grades *fine*

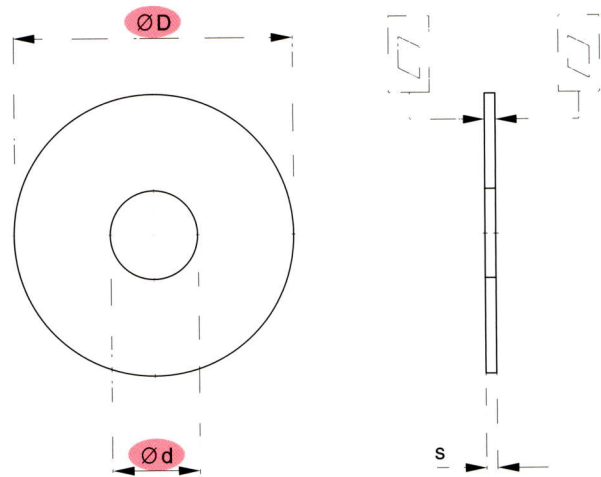
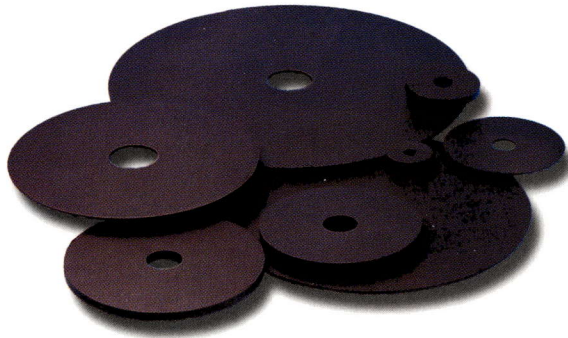
TW15	CTF12F	K10-K20	C3	7	14.80	1730	1700	92.5	2500	365,000	8,70
H15X				6	14.90	1730	1700	92.5			9,00
H40T	CTF24E	K40	-	12	14.32	1350	1340	89.9	3000	435,000	12,00
GC20					14.30	1330	1320	89.7			12,00

Comments:

- The data in this table are typical material parameters. We reserve the right to modify the data due to technical progress or due to further development within our company.
- K_{IC}^{*}: The measured critical tension intensity factors (K_{IC}) depend to a high degree on the sample geometry and sample preparation. A direct comparison with parameters which have been determined by means of a different method is therefore not admissible.

Classification of tungsten carbide grain size	
Tungsten carbide grain size [µm]	Classification
< 0,2	nano
0,2 - 0,5	ultrafine
0,5 - 0,8	submicron
0,8 - 1,3	fine
1,3 - 2,5	medium
2,5 - 6,0	coarse
> 6,0	extra-coarse

Standard dimensions / blank sizes



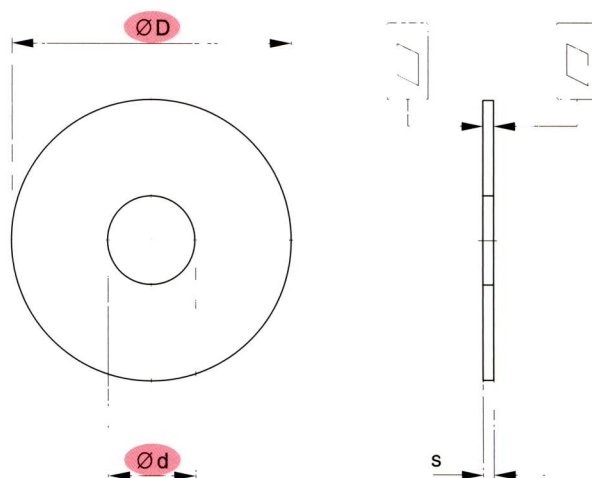
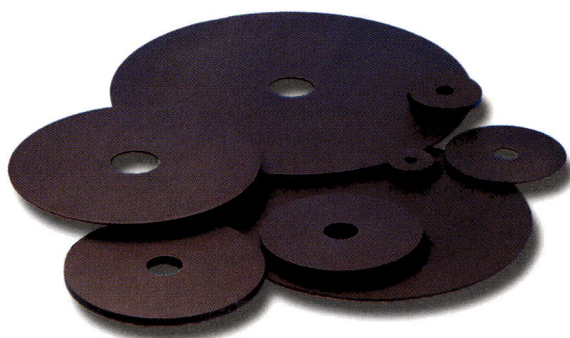
Type, description		Dimensions in mm						
		Ø D	Tol.	Ø d	Tol.	s	Tol.	
	CB 00375-00125-...	10,0	+0,20	2,9	-0,15	0,5-10,3	+0,15	0,1
KSR 0104-0048-0..		10,4	+0,20	4,8	-0,15	0,5-10,3	+0,15	0,1
KSR 0124-0048-0..		12,4	+0,20	4,8	-0,15	0,5-10,3	+0,15	0,1
KSR 0153-0048-0..		15,3	+0,25	4,8	-0,15	0,5-10,3	+0,15	0,1
	CB 00625-00125-...	16,4	+0,25	2,9	-0,15	0,5-10,3	+0,15	0,1
KSR 0205-0048-0..		20,5	+0,30	4,8	-0,15	0,5-10,3	+0,15	0,1
KSR 0253-0078-0..		25,3	+0,35	7,3	-0,25	0,5-10,3	+0,15	0,1
KSR 0305-0077-0..		30,5	+0,40	7,7	-0,25	0,5-10,3	+0,15	0,1
KSR 0325-0077-0..		32,5	+0,45	7,7	-0,25	0,5-10,3	+0,15	0,1
	CB 01500-00375-...	38,6	+0,45	9,2	-0,25	0,5-10,3	+0,15	0,1
	CB 01500-00500-...	38,6	+0,45	12,4	-0,30	0,5-10,3	+0,15	0,1
KSR 0405-0077-0..		40,5	+0,45	7,7	-0,25	0,5-10,3	+0,15	0,1
KSR 0405-0097-0..		40,5	+0,45	9,7	-0,25	0,5-10,3	+0,15	0,1
	CB 01750-00375-...	45,0	+0,50	9,2	-0,25	0,5-10,3	+0,15	0,1
KSR 0505-0097-0..		50,5	+0,55	9,7	-0,25	0,5-10,3	+0,15	0,1
KSR 0505-0127-0..		50,5	+0,55	12,7	-0,25	0,5-10,3	+0,15	0,1
	CB 02000-00500-...	51,3	+0,55	12,4	-0,25	0,5-10,3	+0,15	0,1
	CB 02375-00375-...	60,8	+0,70	9,2	-0,25	0,5-10,3	+0,15	0,1
KSR 0635-0097-0..		63,5	+0,75	9,7	-0,30	0,5-10,3	+0,15	0,1
KSR 0635-0127-0..		63,5	+0,75	12,7	-0,30	0,5-10,3	+0,15	0,1
KSR 0635-0157-0..		63,5	+0,75	15,7	-0,30	0,5-10,3	+0,15	0,1
KSR 0635-0217-0..		63,5	+0,75	21,7	-0,30	0,5-10,3	+0,15	0,1
	CB 02750-00375-...	70,4	+0,75	9,2	-0,25	0,5-10,3	+0,15	0,1
KSR 0705-0157-0..		70,5	+0,75	15,7	-0,30	0,5-10,3	+0,15	0,1
KSR 0705-0217-0..		70,5	+0,75	21,7	-0,30	0,5-10,3	+0,15	0,1
KSR 0755-0157-0..		75,5	+0,85	15,7	-0,30	0,5-10,3	+0,15	0,1
KSR 0755-0217-0..		75,5	+0,85	21,7	-0,30	0,5-10,3	+0,15	0,1
	CB 03000-01000-...	76,7	+0,85	25,1	-0,30	0,5-10,3	+0,15	0,1


Grinding allowance: 's': +0.3 mm

The above mentioned dimensions are normally available ex stock in tungsten carbide grade TW15. Other dimensions and tungsten carbide grades (see grade overview on page 5) are available upon request.

Upon request, all dimensions are available with groove and/or hole according to customer drawing (see page 9).

Standard dimensions / blank sizes



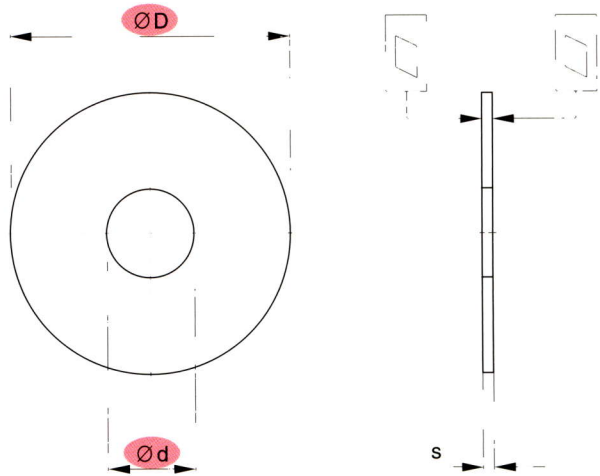
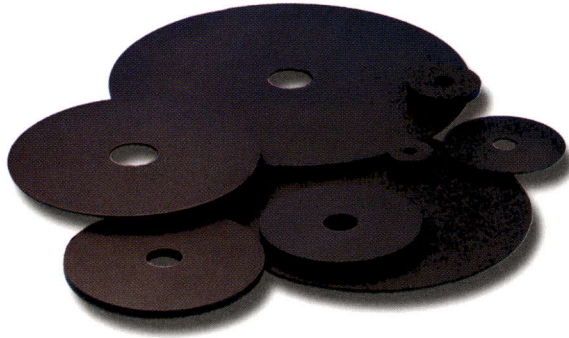
Type, description		Dimensions in mm						
		Ø D	Tol.	Ø d	Tol.	s	Tol.	
KSR 0805-0157-0..		80,5	+0,85	15,7	-0,30	0,5-10,3	+0,15	0,1
KSR 0805-0217-0..		80,5	+0,85	21,7	-0,30	0,5-10,3	+0,15	0,1
KSR 0865-0217-0..		86,5	+1,00	21,7	-0,30	0,5-10,3	+0,15	0,1
KSR 0905-0217-0..		90,5	+1,00	21,7	-0,30	0,8-10,3	+0,15	0,1
KSR 1005-0217-0..		100,5	+1,10	21,7	-0,30	0,8-10,3	+0,15	0,1
KSR 1005-0397-0..		100,5	+1,10	39,7	-0,45	0,8-10,3	+0,15	0,1
	CB 04000-00500-...	102,1	+1,10	12,4	-0,25	0,8-10,3	+0,15	0,1
	CB 04000-01000-...	102,1	+1,10	25,1	-0,40	0,8-10,3	+0,15	0,1
KSR 1255-0217-0..		125,5	+1,40	21,7	-0,30	0,8-10,3	+0,20	0,15
	CB 05000-01000-...	127,5	+1,90	25,1	-0,60	0,8-10,3	+0,20	0,15
KSR 1505-0217-0..		150,5	+2,20	21,7	-0,60	1,0-10,3	+0,20	0,15
KSR 1505-0317-0..		150,5	+2,20	31,7	-0,60	1,0-10,3	+0,20	0,15
KSR 1605-0217-0..		160,5	+2,20	21,7	-0,60	1,0-10,3	+0,20	0,15
KSR 1605-0317-0..		160,5	+2,20	31,7	-0,60	1,0-10,3	+0,20	0,15
KSR 1805-0217-0..		180,5	+2,50	21,7	-0,60	1,0-10,3	+0,20	0,15
KSR 1805-0317-0..		180,5	+2,50	31,7	-0,60	1,0-10,3	+0,20	0,15
KSR 2005-0217-0..		200,5	+2,80	21,7	-0,60	1,0-10,3	+0,20	0,15
KSR 2005-0317-0..		200,5	+2,80	31,7	-0,60	1,0-10,3	+0,20	0,15
KSR 2105-0317-0..		210,5	+3,00	31,7	-0,70	1,0-10,3	+0,20	0,2
KSR 2255-0317-0..		225,5	+3,00	31,7	-0,70	1,0-10,3	+0,20	0,2
KSR 2505-0317-0..		250,5	+3,50	31,7	-0,60	1,0-10,3	+0,20	0,2
KSR 2505-0397-0..		250,5	+3,50	39,7	-0,70	1,0-10,3	+0,20	0,2
KSR 2755-0317-0..		275,5	+3,50	31,7	-0,70	1,3-10,3	+0,30	0,2
KSR 3005-0317-0..		300,5	+4,00	31,7	-0,70	1,3-10,3	+0,30	0,2
KSR 3155-0317-0..		315,5	+4,00	31,7	-0,70	1,5-10,3	+0,30	0,2
KSR 3505-0317-0..		350,5	+4,00	31,7	-0,70	1,5-10,3	+0,30	0,2

Grinding allowance: 's': +0.3 mm

The above mentioned dimensions are normally available ex stock in tungsten carbide grade TW15. Other dimensions and tungsten carbide grades (see grade overview on page 5) are available upon request.

Upon request, all dimensions are available with groove and/or hole according to customer drawing (see page 9).

Inch dimensions / finished sizes + blank sizes



Type, description	Inch dimensions									
	Ø D			Tol.	Ø d			Tol.	s	
	FS	BS	FS		BS	FS	BS		Tol.	
CB 00375-00125-...	3/8"	0,375	0,395	+0,008	1/8"	0,125	0,113	+0,005	0,019-0,405	+0,005
CB 00625-00125-...	5/8"	0,625	0,645	+0,010	1/8"	0,125	0,113	+0,005	0,019-0,405	+0,005
CB 01000-00375-...	1"	1,000	1,020	+0,011	3/8"	0,375	0,363	-0,009	0,019-0,405	+0,005
CB 01500-00375-...	1 1/2"	1,500	1,520	+0,018	3/8"	0,375	0,363	-0,009	0,019-0,405	+0,005
CB 01500-00500-...	1 1/2"	1,500	1,520	+0,018	1/2"	0,500	0,488	-0,009	0,019-0,405	+0,005
CB 01750-00375-...	1 3/4"	1,750	1,770	+0,020	3/8"	0,375	0,363	-0,009	0,019-0,405	+0,005
CB 02000-00500-...	2"	2,000	2,020	+0,024	1/2"	0,500	0,488	-0,009	0,019-0,405	+0,005
CB 02250-00625-...	2 1/4"	2,250	2,270	+0,024	5/8"	0,625	0,613	-0,009	0,019-0,405	+0,005
CB 02375-00375-...	2 3/8"	2,375	2,395	+0,028	3/8"	0,375	0,363	-0,009	0,019-0,405	+0,005
CB 02750-00375-...	2 3/4"	2,750	2,770	+0,030	3/8"	0,375	0,363	-0,009	0,019-0,405	+0,005
CB 02750-00625-...	2 3/4"	2,750	2,770	+0,030	5/8"	0,625	0,613	-0,009	0,019-0,405	+0,005
CB 02750-01000-...	2 3/4"	2,750	2,770	+0,030	1"	1,000	0,988	-0,013	0,019-0,405	+0,005
CB 03000-01000-...	3"	3,000	3,020	+0,030	1"	1,000	0,988	-0,009	0,019-0,405	+0,005
CB 04000-00500-...	4"	4,000	4,020	+0,043	1/2"	0,500	0,488	-0,009	0,031-0,405	+0,005
CB 04000-01000-...	4"	4,000	4,020	+0,043	1"	1,000	0,988	-0,013	0,031-0,405	+0,005
CB 05000-01000-...	5"	5,000	5,020	+0,074	1"	1,000	0,988	-0,023	0,031-0,405	+0,005

FS = finished size, ground
BS = blank size

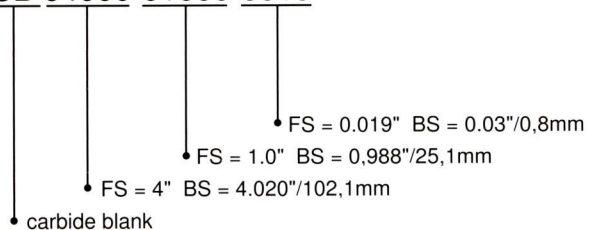


Planity:

CB 00375-00125- ... up to CB 04000-01000-... = 0,1
CB 05000-01000-... = 0,15

Explanation of ordering description:

CB 04000-01000-0019



Grinding allowance: OD generally +0.020 inch
ID generally -0.012 inch
thickness +0.011 inch

The above mentioned dimensions are normally available ex stock in tungsten carbide grade TW15. Other dimensions and tungsten carbide grades (see grade overview on page 5) are available upon request.

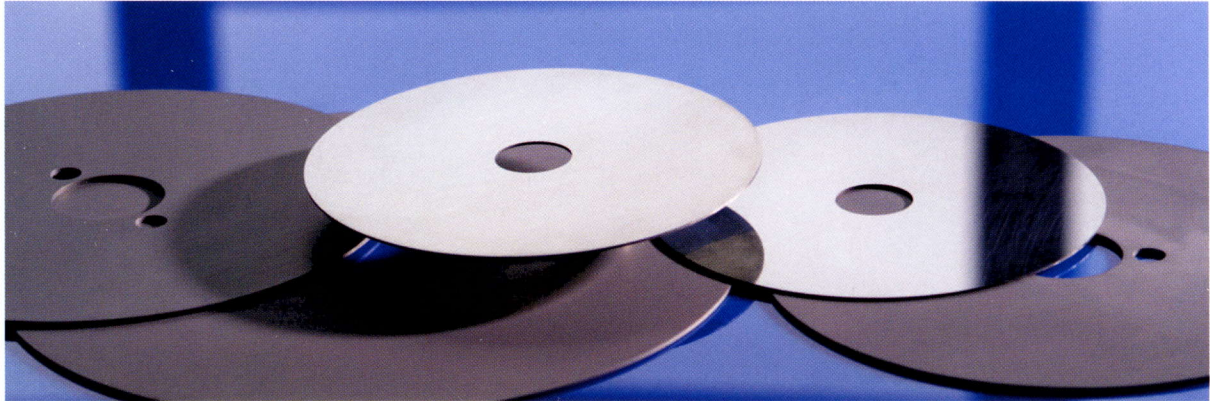
Upon request, all dimensions are available with groove and/or hole according to customer drawing (see page 9).

Additional CERATIZIT services

New!

Preground disks Surface ground and hole ground!

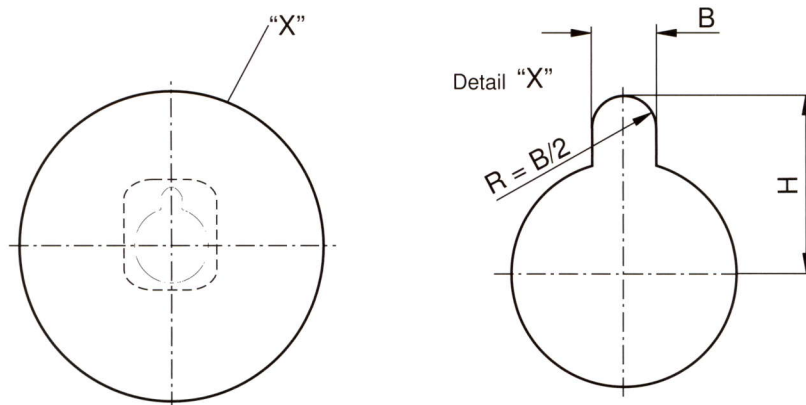
Upon request, CERATIZIT additionally offers customer service in supplying ground disks. In this manner CERATIZIT provides further customer benefit.



Range of outer diameters	50 mm - 400 mm	
Max. thickness	1/4 of the outer diameter	
Min. thickness	depends on the outer diameter	
Thickness tolerance	± 0,005 mm	
Surface	≤ R _a 0,4 (no mirror finish)	
Minimum quantity	< Ø 100 mm 4 pieces	≥ Ø 100 mm 3 pieces

Prices and delivery time upon request.

Upon request, blanks for slitting knives including preformed groove (CERATIZIT factory standard)

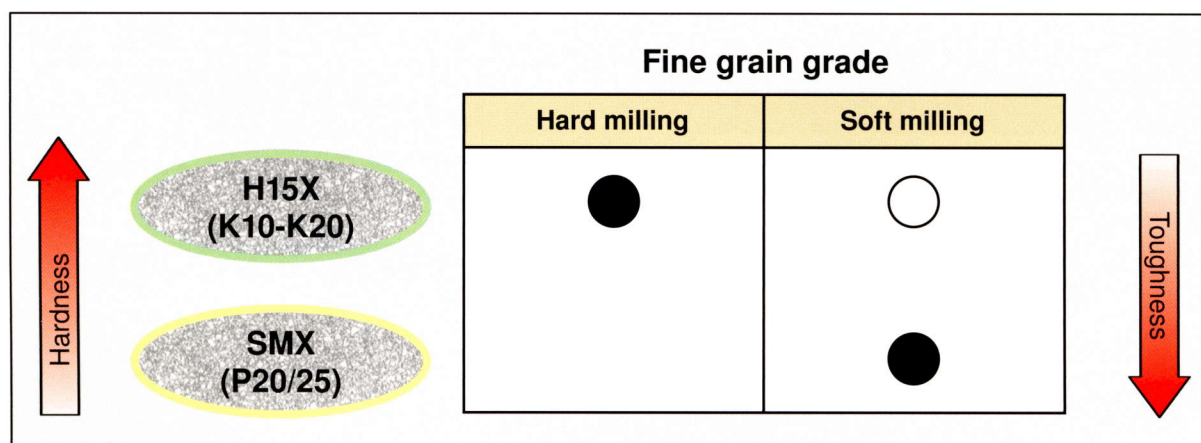
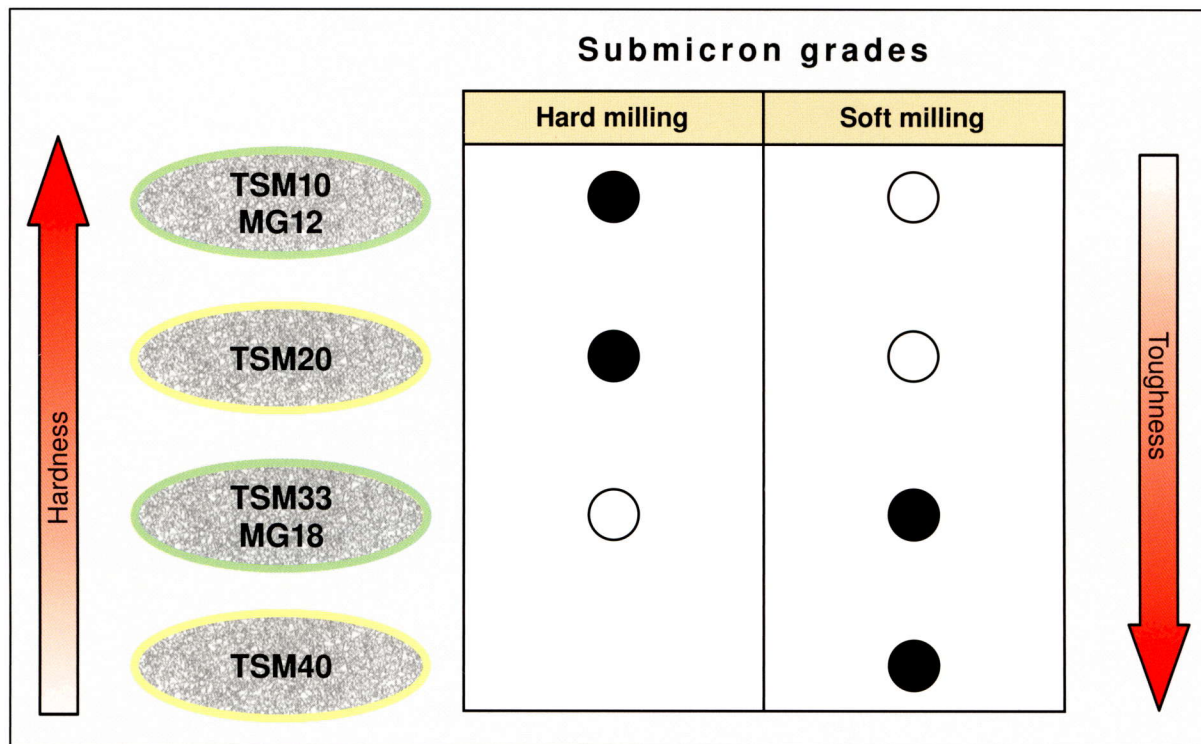


Ø d	H	B
10	8,25 ± 0,15	3,1 ± 0,2
13	9,85 ± 0,15	3,1 ± 0,2
16	12,00 ± 0,2	4,1 ± 0,2
22	16,30 ± 0,2	6,1 ± 0,2
32	23,10 ± 0,25	8,1 ± 0,2

Other versions upon request!

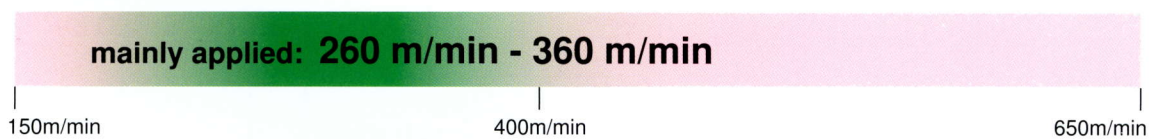


Recommended grades / applications for hob blanks

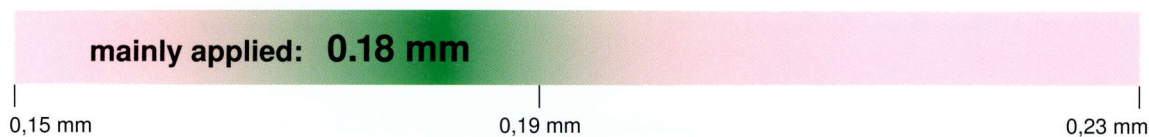


Machining conditions for solid carbide hobs

Cutting speed V_c



Max. head chip thickness h_{cu} (according to the Hofmeister theory)



Grades for hob blanks

Composition and properties

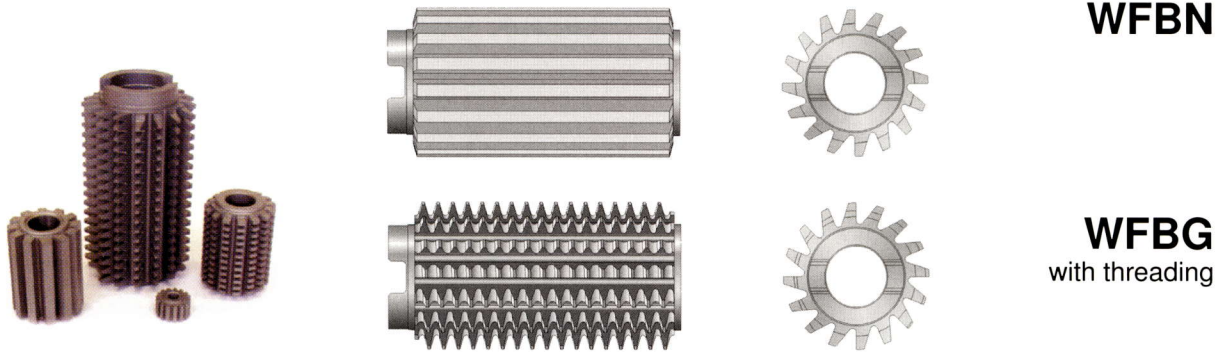
Former grade	New grade	Code ISO	Code USA	Binder	Density	Hardness			Transverse rupture strength		K _{IC} *
				(%)	g/cm ³	HV10	HV30	HRA	MPa	P.S.I.	
Tungsten carbide cobalt grades <i>submicron</i>											
TSM10	CTS12D	K05-K10	C3	6,0	14,90	1880	1850	93,5	3500	508.000	8,20
MG12					14,80	1820	1790	93,0			8,20
TSM20	CTS15D	K10-K30	C3	7,5	14,75	1750	1720	92,6	3600	522.500	8,60
TSM33	CTS20D	K20-K40	C2	10,0	14,50	1610	1590	91,9	3700	537.000	9,40
MG18	CTS20L				14,45	1680	1660	92,3			9,40
TSM40	CTS24D	K40	-	12,0	14,30	1480	1460	90,9	3800	551.000	9,90
Tungsten carbide cobalt grades <i>fine</i>											
H15X	CTF12F	K10-K20	C3	6,0	14,90	1730	1700	92,5	2500	365.000	9,00
Tungsten carbide, TiC, TaC cobalt grades <i>fine</i>											
SMX	CTF21Q	P20/25	C6	10,5	12,65	1550	1530	91,5	2200	319.000	10,0

* **Note:** the measured critical tension intensity factors (K_{IC}) depend to a high degree on the sample geometry and sample preparation. A direct comparison with parameters which have been determined by means of a different method is therefore not admissible.

Classification of tungsten carbide grain size	
Tungsten carbide grain size [μm]	Classification
< 0,2	nano
0,2 - 0,5	ultrafine
0,5 - 0,8	submicron
0,8 - 1,3	fine
1,3 - 2,5	medium
2,5 - 6,0	coarse
> 6,0	extra-coarse

Types of hobs

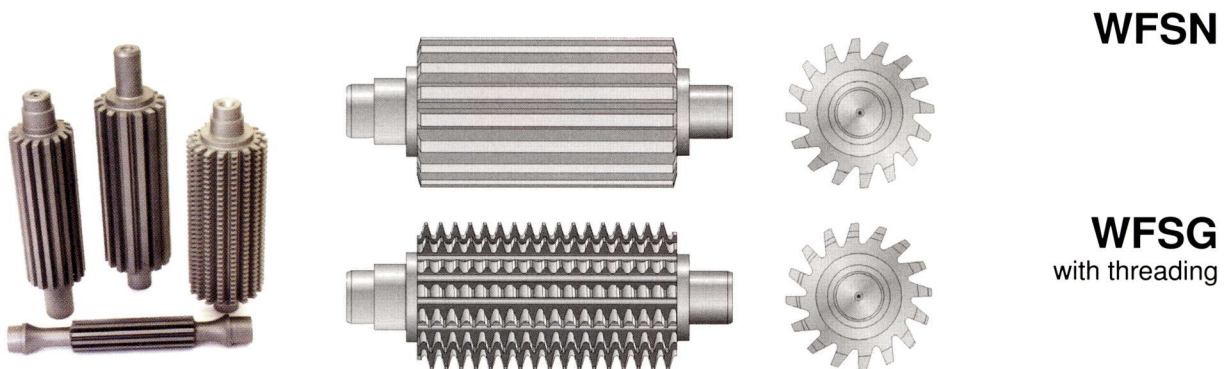
Hobs with gashes or thread



WFBN

WFBG
with threading

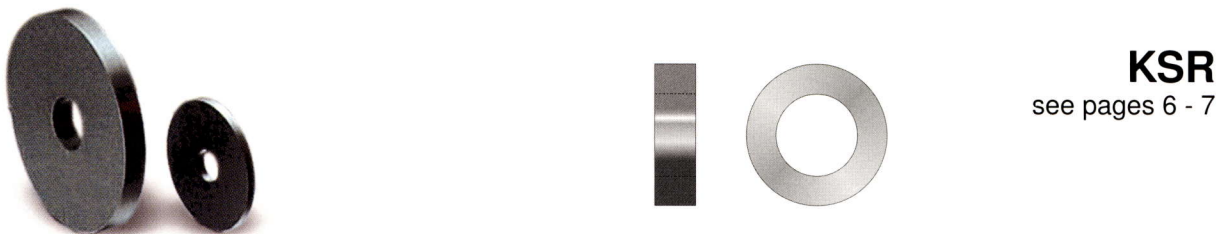
Shank-type hobs with gashes or thread



WFSN

WFSG
with threading

Disks



KSR
see pages 6 - 7

Type:
shank-type hobs
WFSG 065-203/150-16 TSM33
 shank-type hob with gashes and threading
 diameter 65 (mm)
 total length (mm)
 cutting length (mm)
 number of gashes
 T.C. grade

Type:
hobs with bore
WFBN 081-150/133-16 TSM40
 hob with bore, gashes, neutral, without threading
 diameter 81 (mm)
 total length (mm)
 cutting length (mm)
 number of gashes
 T.C. grade

All common blanks for hobs are manufactured according to your specifications.

Headquarters: CERATIZIT S.A.**Main site Luxembourg**

CERATIZIT Luxembourg Sarl
Route de Holzem, B.P. 51
L-8201 Mamer
Tel.: +352 312 085-1
Fax: +352 311 911
E-Mail: info@ceratizit.com

Main site Austria

CERATIZIT Austria Gesellschaft m.b.H.
A-6600 Reutte/Tyrol
Tel.: +43 (5672) 200-0
Fax: +43 (5672) 200-502
E-Mail: info.austria@ceratizit.com



www.ceratizit.com

Sales Companies**Austria**

CERATIZIT Austria Gesellschaft m.b.H.
A-6600 Reutte/Tyrol
Tel.: +43 (5672) 200-0
Fax: +43 (5672) 200-502
E-Mail: info.austria@ceratizit.com

Bulgaria

CERATIZIT Bulgaria AG
Boulevard Stoletov 157
BG-5301 Gabrovo
Tel: +359 (66) 803-811
Fax: +359 (66) 801 608
E-Mail: info.bulgaria@ceratizit.com

China

CERATIZIT China Ltd.
Room 1201-1204
Hollywood Centre
233 Hollywood Rd., Sheung Wan
Hong Kong
Tel.: +852 (2542)-1838
Fax: +852 (2854) 3777
E-Mail: info.china@ceratizit.com.hk

Czech Republic

CERATIZIT
Kancelar Ceska Republika
Pod Hradbami 2002/1
CZ-59401 Velke Mezirici
Tel.: +420 (566) 520-341
Fax: +420 (566) 521-340
E-Mail: info.cz@ceratizit.com

France

CERATIZIT France Sarl
Office Pontoise
20, Rue Lavoisier
F-95300 Pontoise
Tel.: +33 (1) 3433-3180
Fax: +33 (1) 3030-9339
E-Mail: info.france@ceratizit.com

CERATIZIT France Sarl

Office Lyon
Parc de L'Artilerie
5, Espace Henri Vallée
F-69007 Lyon
Tel.: +33 (4) 72 76 86 50
Fax: +33 (4) 72 76 86 51
E-Mail: info.lyon@ceratizit.com

Germany

CERATIZIT Deutschland GmbH
Office Langenfeld
Hans-Böckler-Straße 10
D-40764 Langenfeld
Tel.: +49 (2173) 97 25-0
Fax: +49 (2173) 97 25-25
E-Mail: info.deutschland@ceratizit.com

CERATIZIT Deutschland GmbH

Büro Dettingen
Karlstraße 80
D-72581 Dettingen
Tel.: +49 (7123) 9201-0
Fax: +49 (7123) 9201-210
E-Mail: info.dettingen@ceratizit.com

CERATIZIT Horb GmbH

Stadionstraße
D-72160 Horb
Tel.: +49 (7451) 522 0
Fax: +49 (7451) 522 288
E-Mail: info.horb@ceratizit.com

CERATIZIT Hitzacker GmbH

Am Räsenberg 3
D-29456 Hitzacker
Tel.: +49 (5862) 969 10-0
Fax: +49 (5862) 9696 10-70
E-Mail: info.hitzacker@ceratizit.com

CERATIZIT Logistik GmbH

Daimlerstraße 70
D-87437 Kempten
Tel.: +49 (831) 570 11-0
Fax: +49 (831) 570 11-3811
E-Mail: info.logistik@ceratizit.com

Great Britain

CERATIZIT UK Ltd.
Cliff Lane
Grappenhall
Warrington WA4 3JX
Tel.: +44 (1925) 261-161
Fax: +44 (1925) 267-933
E-Mail: info.uk@ceratizit.com

Hungary

CERATIZIT
Iroda Magyarorszag
Kórház u 6-12
HU-1033 Budapest
Tel.: +36 1 43709-30
Fax: +36 1 43709-31
E-Mail: info.hu@ceratizit.com

India

CERATIZIT India Pvt. Ltd.
58, Motilal Gupta Road
Barisha
IN-700 008 Kolkata
Tel.: +91 (33) 2494-5435
Fax: +91 (33) 2494-1472
Telex: 021 8142 ihm in
E-Mail: info.india@ceratizit.com

Italy

CERATIZIT Italia SpA
Piazza F. Martelli, 7
I-20162 Milano
Tel.: +39 (02) 6441-111
Fax: +39 (02) 6611-6040
E-Mail: info.italia@ceratizit.com

Japan

CERATIZIT Japan Ltd.
3-13-9, Mizuho
Shizuoka 421 - 0115
Tel.: +81 (54) 268 1060
Fax: +81 (54) 257 8181
E-Mail: info.japan@ceratizit.com

Luxembourg

CERATIZIT Luxembourg Sarl
Route de Holzem, B.P. 51
L-8201 Mamer
Tel.: +352 312 085-1
Fax: +352 311 911
E-Mail: info@ceratizit.com

Netherlands

CERATIZIT Nederland B.V.
Bergrand 224
NL-4707 AT Roosendaal
Tel.: +31 (165) 55 08 00
Fax: +31 (165) 55 61 76
E-Mail: info.nederland@ceratizit.com

Spain

CERATIZIT Ibérica SL
Office Pozuelo
Vía de las Dos Castillas, 9c
Portal 2, Bajo B
E-28224 Pozuelo (Madrid)
Tel.: +34 (91) 351-0609
Fax: +34 (91) 351-2813
E-Mail: info.iberica@ceratizit.com

CERATIZIT Ibérica SL

Office Bilbao
Avda. Mazarredo 41 1 Izqda.
E-48009 Bilbao
Tel.: +34 (944) 23 71 18
Fax: +34 (944) 23 97 18
E-Mail: info.bilbao@ceratizit.com

Poland

CERATIZIT
Biuro Polska
U. Lagiewnicka 33a
PL-30-417 Kraków
Tel.: +48 12 252 85-91
Fax: +48 12 252 85-93
E-Mail: info.pl@ceratizit.com

Switzerland

CERATIZIT Schweiz AG
Solithurnstrasse 68
CH-2504 Biel
Tel.: +41 (32) 344 93 93
Fax: +41 (32) 344 93 94
E-Mail: info.schweiz@ceratizit.com

USA

CERATIZIT USA Inc.
777 Old Clemson Road
Columbia
South Carolina 29229
Toll free: +1 (800) 334 1165
Tel.: +1 (803) 736 1900
Fax: +1 (803) 736 1902
E-Mail: info.usa@ceratizit.com

POLAND

SPINEX SPINKIEWICZ SPOLKA JAWNA
UL. KLIMONTOWSKA 19
04-672 WARSZAWA
Tel.: +48 22 512 50 00
Fax: +48 22 512 50 50
E-mail: biuro@spinex.com.pl
WWW.SPINEX.COM.PL