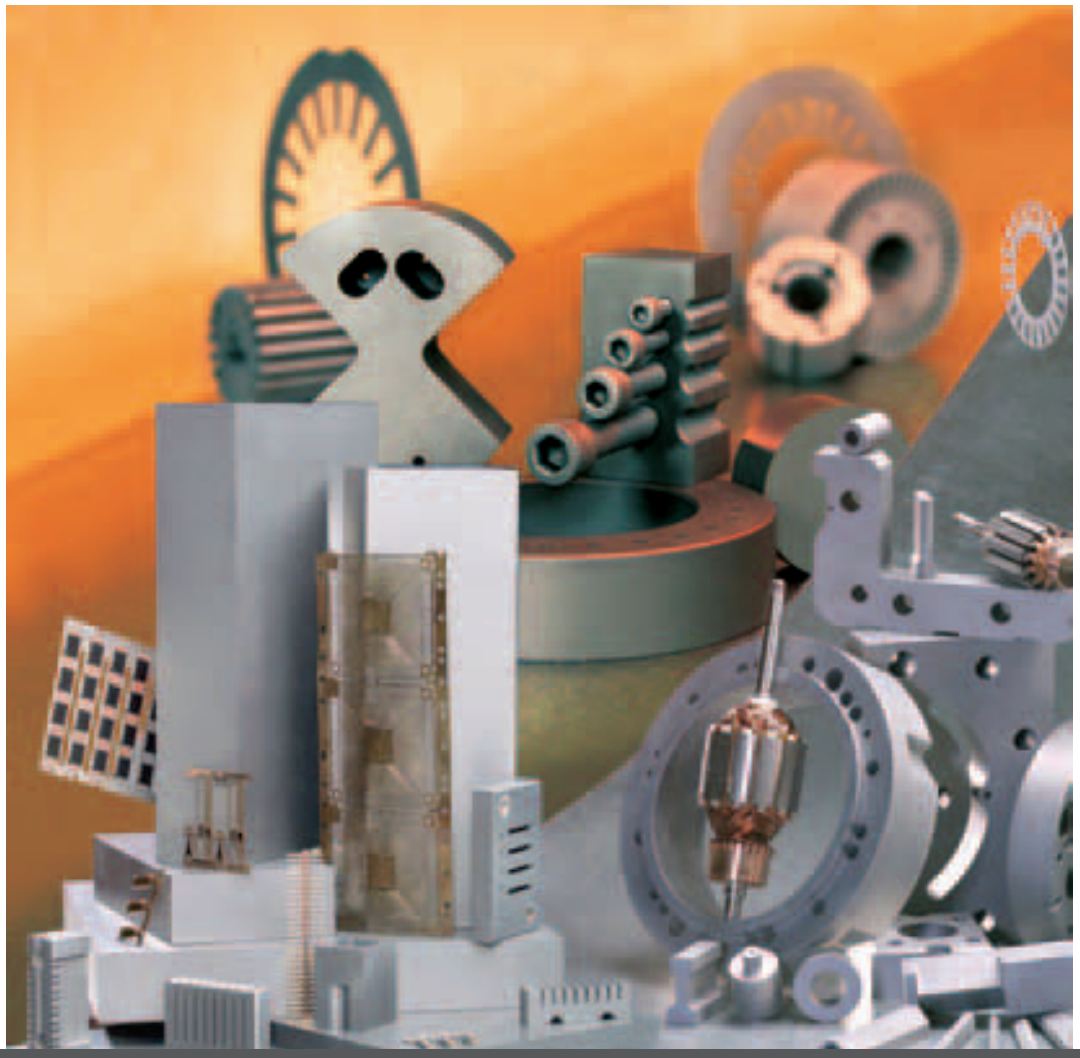
hard material matters

CERATIZIT

hard material matters

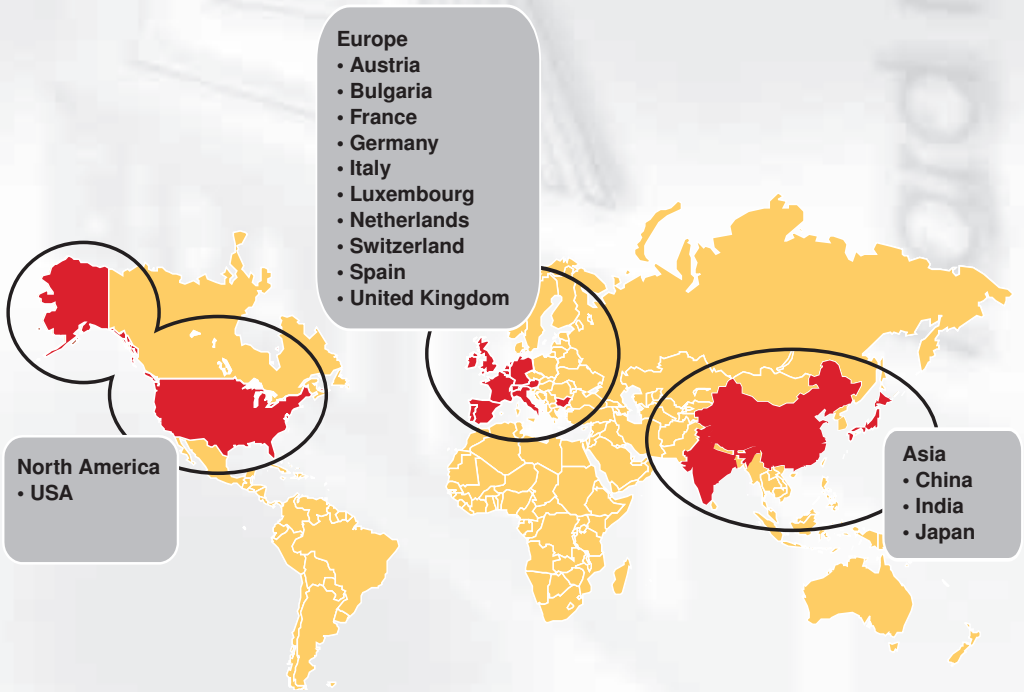


Hard metal for the tool and die industry

CERATIZIT - the parent companies

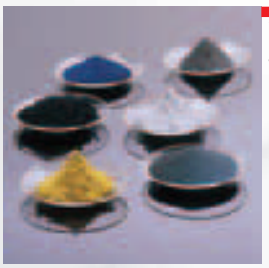
Headquarters and parent company in **MAMER** / Luxembourg

Parent company in **REUTTE** / Austria



Direct sales and distribution partners

Competence and know-how



We rely on more than 80 years of know-how in the field of powder metallurgy.
Our new powder preparation department absolutely guarantees availability combined with consistent quality.

Our facilities and production methods represent state-of-the-art technology because only modern and innovative production procedures offer the possibility to fulfil complex tasks economically.

Engineering know-how and competent on site application advice, as well as intensive cooperation with our customers make the difference.
Make use of our professional service.

We promote intensive dialogue with our business partners and organize technical seminars - either on site at our customers' or at our company.

Our quality management systems meet the highest standards.
We regularly organize audits.
This is documented by the ISO9001:2000 certificate.

Carbide grades
for the tool and die industry

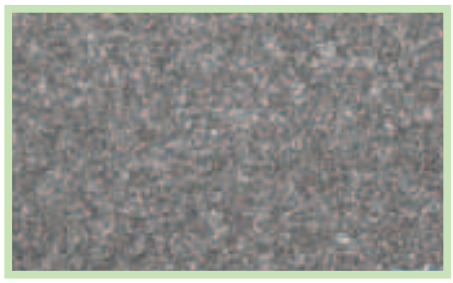
Composition and properties

Grade	Code ISO	Code USA	Binder	Hardness			Transverse Rupture Strength		K_{IC} SEVNB
			(%)	HV10	HV30	HRA	MPa	P.S.I.	MPa*m$^{1/2}$
CORROSION RESISTANT FINE / MEDIUM GRADES									
CF-H25S	K20-K30		8.5	1640	1620	92.1	2600	377.000	10.1
CF-H40S	K40	C11/C12	12.0	1400	1380	90.3	3000	435.000	12.0
MICRO-GRAIN GRADES									
TSF44	K10-K30	C3	12.0	1760	1730	92.7	4600	667.000	7.5
SMG24				1720	1690	92.5			
SMG44	-	-	22.0	1300	1290	89.4	4000	580.000	9.1
SUBMICRON GRADES									
TSM20	K10-K30	C3	7.5	1750	1720	92.6	3600	522.000	8.6
TSM30	K20-K40	C2	10.0	1570	1550	91.6	3700	537.000	9.4
TSM33				1610	1590	91.9			
MG18				1680	1660	92.3			
TSM40	>K40	C1/C10	12.0	1480	1460	90.9	4000	580.000	9.9
MG24				1510	1490	91.2			
MG30	>K40		15.0	1360	1350	90.0	3800	551.000	11.9
FINE / MEDIUM GRADES									
H20S	K20	C2	6.0	1630	1610	92.0	2200	319.000	9.9
H30S	K30	C1	9.0	1490	1470	91.0	2800	406.000	10.9
H40S	K40	C11/C12	12.0	1350	1340	89.9	3000	435.000	12.0
GC20				1330	1320	89.7			
H50S	>K40	C13	15.0	1230	1220	88.6	3100	450.000	13.1
GC30				1250	1240	88.8			
COARSE GRADES									
B30S			9.0	1170	1160	88.0	3000	435.000	15.6
B40S			12.0	1080	1070	87.1	3075	446.000	16.3
NON-MAGNETIC GRADES									
K16NM			8.0	1300	1290	89.4	2400	348.000	10.8
SILICON NITRIDE									
SNC1	CN-K20		9.0	1550	1530	91.5	1100	160.000	6.5

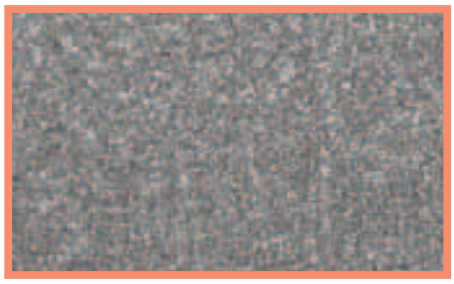
Comments:

1. 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.
2. 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.

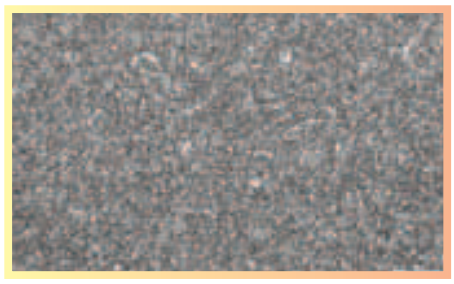
The basis for optimum quality



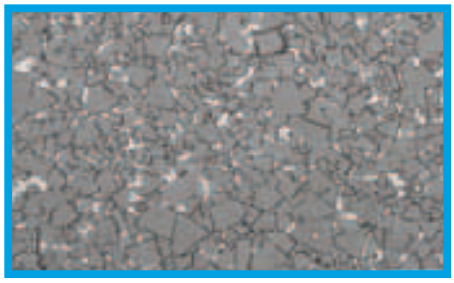
Micro-grain



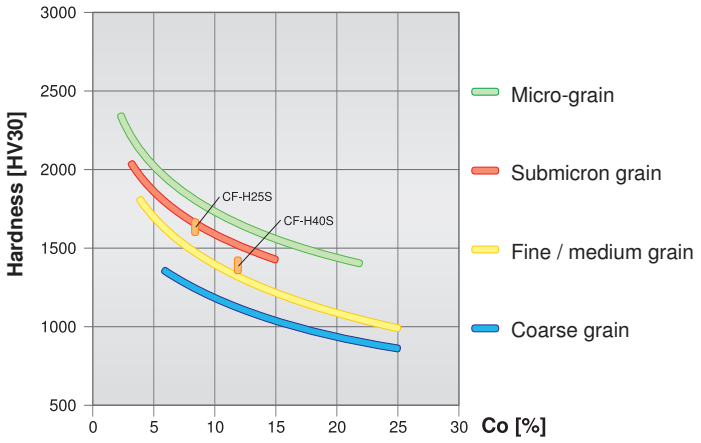
Submicron grain

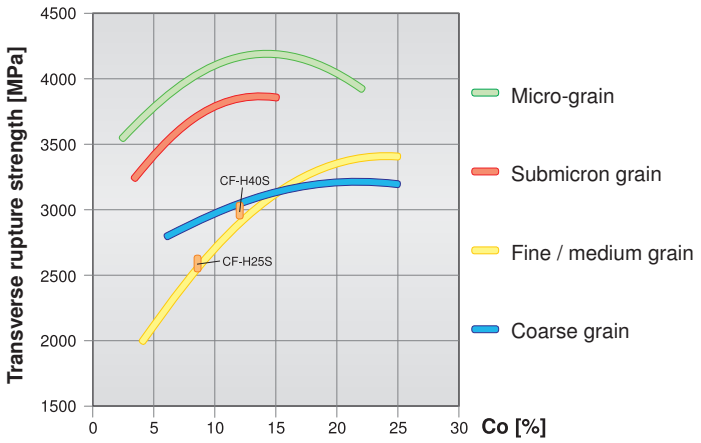


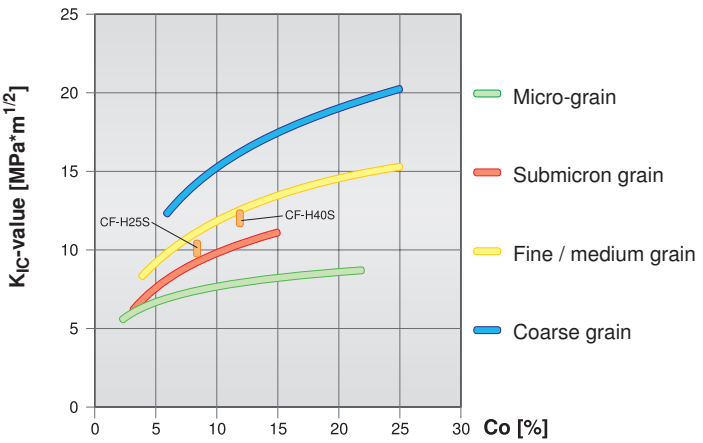
Fine / medium grain



Coarse grain







Demands on carbide as a material applied in the tool and die industry are enormous. We keep pace with our customers' requirements and we are often even a step ahead of them.
The extensive grade range from CERATIZIT demonstrates the technological edge which combined with years of experience in the sector of powder metallurgy guarantees maximum quality as well as consistency with regard to metallurgy.

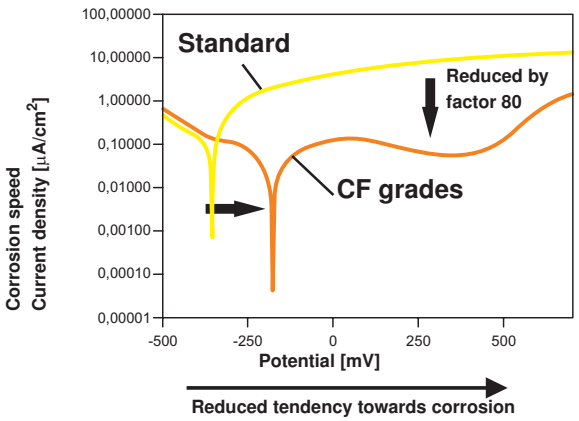
Our competitive edge is the prerequisite for your success.

The new way – corrosion resistant carbide

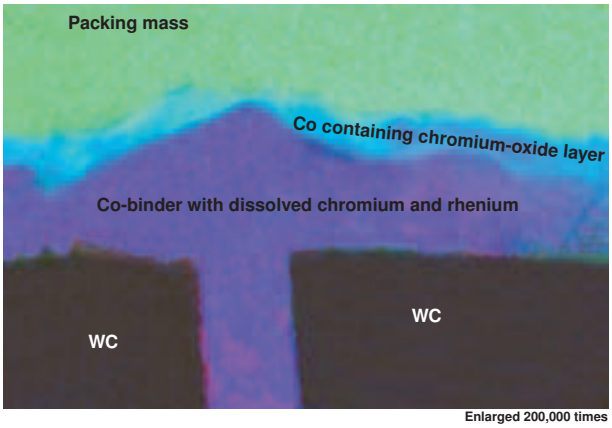
For many years corrosion has been a serious topic in the tool and die industry. Due to this fact erosion times of carbides used to be limited and there was continuous demand for the development of a corrosion resistant carbide.

Typical appearance of corroded surfaces

CERATIZIT has fulfilled these requirements and proudly presents the patented corrosion resistant carbide grades CF-H40S/HIP and CF-H25S/HIP as standard grades in their product range.
For these grades we have succeeded in reducing the speed of corrosion and the tendency towards corrosion by the factor 80 which means a real revolution for the tool and die industry. In this way considerably longer processing times are possible with maximum process safety at the same time. Is there anything better you could wish for?



Measured current density potential curves

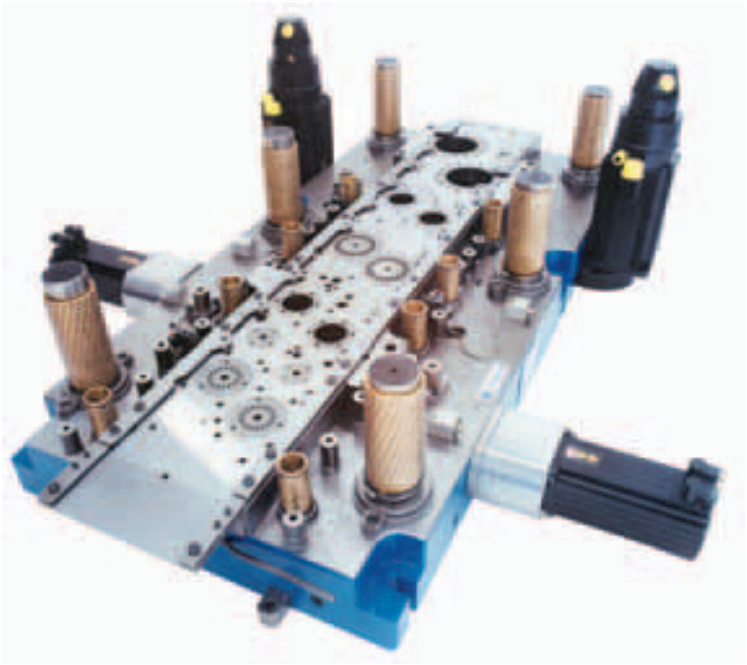


TEM picture of the protection layer of a carbide grade containing Cr and Re

You will find more detailed information in our technical article 'Hard metal in the tool-making industry is a question of confidence - The new performance dimension when W-EDM-machining tungsten carbide‘ - edition 4.

Optimum materials achieve optimum results

Carbide grades which are optimally adapted to the many and diverse applications in the field of the tool and die industry represent the basis for your success. Competent advice and joint procedure are our 'secrets' for your success in the market. The demands and requirements you make are challenge, motivation and incentive for us.



Application fields of carbides

Corrosion resistant fine / medium grades

CF grades exhibit excellent corrosion resistance combined with the mechanical and physical properties required in the tool and die industry.

CF-H25S: For difficult abrasive materials and wherever there is a tendency for galling
Good edge stability despite high hardness

CF-H40S: Ideal compromise between wear resistance and fracture toughness
Ideal grade for universal application

Micro-grain grades

Thanks to their high transverse rupture strength these grades are particularly suitable for stamping thin sheet metal and foils with extremely thin-walled punches.

Submicron grades

For difficult abrasive materials and wherever there is a tendency for galling
Excellent wear resistance

Fine / medium grades

The standard grades for blanking and stamping tools.
Ideal compromise between wear resistance and fracture toughness with very good edge stability

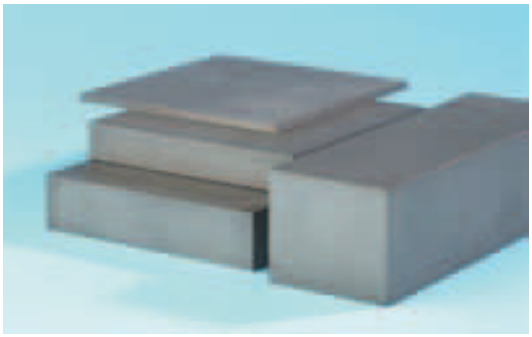
Coarse grades

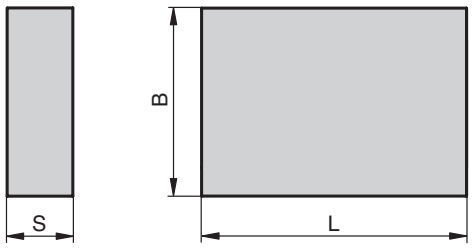
Very high toughness with sufficient hardness for stamping or bending operations
Particularly suitable for deformation operations

You will find more detailed information about our materials and their applications in our technical article series 'Hard metal in the tool-making industry is a question of confidence' which you can order at any time.

Carbide blocks for wire erosion

as sintered with grinding allowance on all dimensions and positive sintering tolerances





PG 50

[mm]			Grade		
L	B	S	CF-H40S/ HIP	H40S/ HIP	GC20/ HIP
100	20	20	●	▲	
100	25	25	●	▲	
100	72	4	●	▲	
100	72	5	●	▲	
100	72	6	●	▲	
100	72	8	●	▲	
100	72	10	●	▲	
100	72	12	●	▲	
100	72	62	●	▲	
100	82,5	76,5	●	▲	
100	100	3	●	▲	
100	100	4	●	▲	
100	100	5	●	▲	
100	100	6	●	▲	
100	100	7	●	▲	
100	100	8	●	▲	
100	100	9	●	▲	
100	100	10	●	▲	
100	100	11		▲	
100	100	12	●	▲	
100	100	15	●	▲	
100	100	16	●	▲	
100	100	18	●	▲	
100	100	20	●	▲	
100	100	22	●	▲	
100	100	25	●	▲	
100	100	30	●	▲	
100	100	50	●	▲	
100	100	60	●	▲	
100	100	70	●	▲	
150	50	42	●	▲	
150	70	50	●	▲	
150	72	21	●	▲	
150	72	26	●	▲	
150	72	31	●	▲	
150	72	50			▲
150	72	52	●	▲	
150	72	62	●	▲	

[mm]			Grade		
L	B	S	CF-H40S/ HIP	H40S/ HIP	GC20/ HIP
150	80	45	●	▲	▲
150	80	65	●	▲	▲
150	85	20		▲	
150	90	76,5	●	▲	
150	100	8	●	▲	
150	100	12	●	▲	
150	100	15			▲
150	100	16	●	▲	
150	100	20	●	▲	▲
150	100	22	●	▲	▲
150	100	25	●		▲
150	100	28			▲
150	100	30	●	▲	▲
150	100	32	●	▲	
150	100	35	●	▲	
150	100	40			▲
150	100	45			▲
150	100	55	●		
150	100	66	●		
150	100	76,5		▲	
150	120	40			▲
150	150	22	●	▲	▲
150	150	30	●	▲	▲
190	72	10			▲
190	72	15			▲
190	72	20			▲
190	72	25			▲
190	72	30			▲
190	72	60			▲
200	72	10	●		
200	72	15	●		
200	72	20	●		
200	72	25	●		
200	72	30	●		
200	72	60	●		
250	150	20	●	▲	
250	150	26	●	▲	
250	150	32	●	▲	

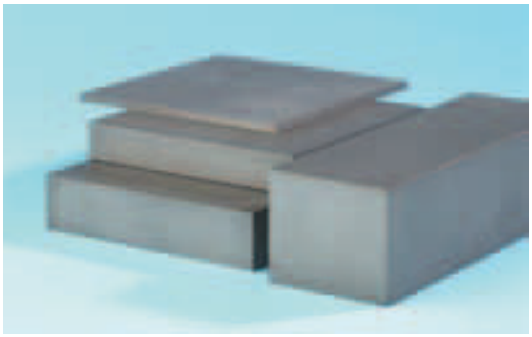
● = stock item
▲ = limited stock or upon request

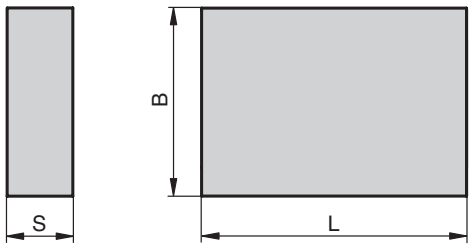
Other grades and dimensions upon request

CERATIZIT
hard material models

Carbide blocks for wire erosion

as sintered with grinding allowance on all dimensions and positive sintering tolerances



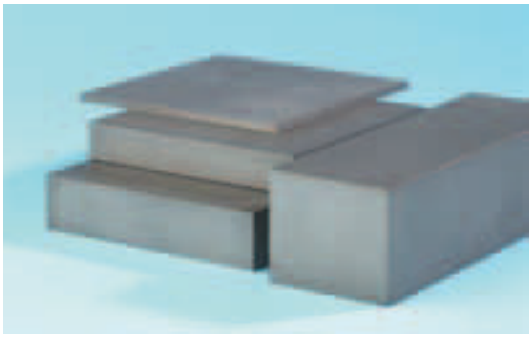


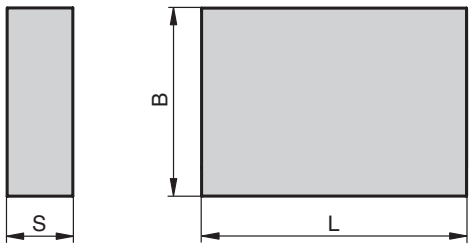
PG 50

[mm]			Grade				
L	B	S	CF-H25S/ HIP	TSM30/ HIP	MG18/ HIP	MG24/ HIP	MG30/ HIP
100	100	1			▲		
100	100	1,5			▲		
100	100	2			▲		
100	100	2,5			▲		
100	100	3	●	▲	▲		
100	100	3,5			▲		
100	100	4	●	▲	▲		▲
100	100	4,5			▲		
100	100	5	●	▲	▲		▲
100	100	6	●	▲	▲		
100	100	7	●	▲	▲		▲
100	100	8	●	▲			▲
100	100	9	●	▲	▲		
100	100	10	●	▲			▲
100	100	11	●	▲			
100	100	12	●	▲			
100	100	13			▲		▲
100	100	15	●	▲			
100	100	16			▲		▲
100	100	18	●	▲			
100	100	20	●	▲			
100	100	25	●	▲			▲
100	100	30	●				
100	100	35	●				
120	72	62	●	▲			
150	70	42	●	▲			
150	70	50	●	▲			
150	72	20	●	▲			
150	72	52	●	▲		▲	▲
150	72	62					▲
150	75	3	●	▲			
150	75	4	●	▲			
150	75	5	●	▲			
150	75	6	●	▲			
150	75	8	●	▲			
150	75	10	●	▲			
150	75	12	●	▲			
150	75	16	●	▲			
150	75	20	●	▲			

Carbide blocks for wire erosion

as sintered with grinding allowance on all dimensions and positive sintering tolerances





PG 50

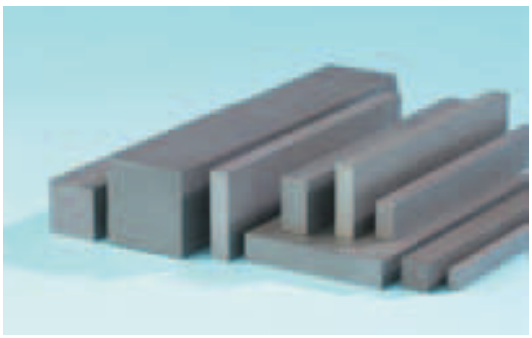
[mm]			Grade				
L	B	S	CF-H25S/ HIP	TSM30/ HIP	MG18/ HIP	MG24/ HIP	MG30/ HIP
150	75	22	●	▲			
150	75	24	●	▲			
150	75	28	●	▲			
150	80	20					▲
150	80	25					▲
150	80	30					▲
150	80	40					▲
150	80	65					▲
150	100	15					▲
150	100	20					▲
150	100	25					▲
150	100	28					▲
150	100	30					▲
150	100	40					▲
190	56	5				▲	
190	56	6				▲	
190	56	8				▲	
190	56	10				▲	
190	56	30				▲	
190	72	2				▲	▲
190	72	3				▲	▲
190	72	4				▲	▲
190	72	5				▲	▲
190	72	6				▲	▲
190	72	7				▲	▲
190	72	8			▲	▲	▲
190	72	9					▲
190	72	10			▲	▲	▲
190	72	12				▲	▲
190	72	15			▲	▲	▲
190	72	16				▲	▲
190	72	18				▲	▲
190	72	20			▲	▲	▲
190	72	22				▲	▲
190	72	25			▲	▲	▲
190	72	28				▲	▲
190	72	30				▲	▲
190	72	40			▲	▲	

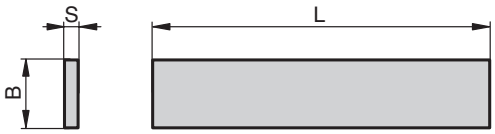
● = stock item
▲ = limited stock or upon request

Other grades and dimensions upon request

Carbide blocks for wire erosion

as sintered with grinding allowance on all dimensions and positive sintering tolerances



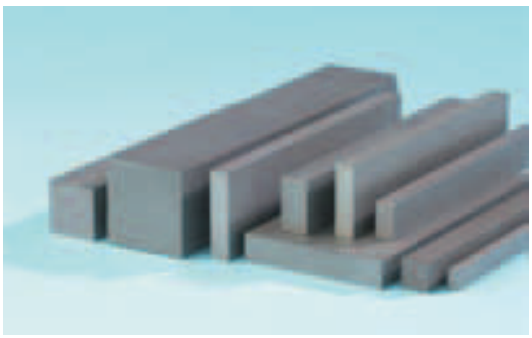


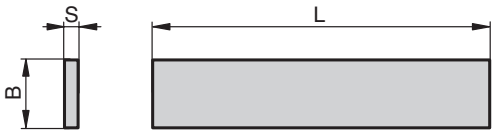
PG C1

Type, description	[mm] B	[mm] S	Grade H40S/HIP L = 80 mm	Grade TSM30/HIP L = 75 mm	Grade MG30/HIP L = 72 mm
CTSS 2,5 x 2,5 x L	2,5	2,5	●	●	▲
CTSS 4,5 x 2,5 x L	4,5	2,5	●	●	▲
CTSS 5,5 x 2,5 x L	5,5	2,5	●	●	
CTSS 6,5 x 2,5 x L	6,5	2,5	●	●	▲
CTSS 8,5 x 2,5 x L	8,5	2,5	●	●	▲
CTSS 10,5 x 2,5 x L	10,5	2,5	●	●	▲
CTSS 12,5 x 2,5 x L	12,5	2,5	●	●	
CTSS 14,5 x 2,5 x L	14,5	2,5	●	●	
CTSS 16,5 x 2,5 x L	16,5	2,5	●	●	
CTSS 3,5 x 3,5 x L	3,5	3,5	●	●	
CTSS 4,5 x 3,5 x L	4,5	3,5			▲
CTSS 5,5 x 3,5 x L	5,5	3,5	●	●	▲
CTSS 6,5 x 3,5 x L	6,5	3,5	●	●	▲
CTSS 7,5 x 3,5 x L	7,5	3,5			▲
CTSS 8,5 x 3,5 x L	8,5	3,5	●	●	▲
CTSS 10,5 x 3,5 x L	10,5	3,5	●	●	▲
CTSS 12,5 x 3,5 x L	12,5	3,5	●	●	▲
CTSS 14,5 x 3,5 x L	14,5	3,5	●	●	▲
CTSS 18,5 x 3,5 x L	18,5	3,5	●	●	
CTSS 20,5 x 3,5 x L	20,5	3,5	●	●	
CTSS 4,5 x 4,5 x L	4,5	4,5	●	●	▲
CTSS 5,5 x 4,5 x L	5,5	4,5			▲
CTSS 6,5 x 4,5 x L	6,5	4,5	●	●	▲
CTSS 7,5 x 4,5 x L	7,5	4,5			▲
CTSS 8,5 x 4,5 x L	8,5	4,5	●	●	▲
CTSS 10,5 x 4,5 x L	10,5	4,5	●	●	▲
CTSS 12,5 x 4,5 x L	12,5	4,5	●	●	▲
CTSS 14,5 x 4,5 x L	14,5	4,5			▲
CTSS 16,5 x 4,5 x L	16,5	4,5	●	●	
CTSS 20,5 x 4,5 x L	20,5	4,5	●	●	
CTSS 25,5 x 4,5 x L	25,5	4,5	●	●	
CTSS 35,5 x 4,5 x L	35,5	4,5		●	
CTSS 5,5 x 5,5 x L	5,5	5,5	●	●	▲
CTSS 7,5 x 5,5 x L	7,5	5,5			▲
CTSS 8,5 x 5,5 x L	8,5	5,5	●	●	▲

Square and rectangular rods for punches

as sintered with positive sintering tolerances





PG C1

Type, description	[mm] B	[mm] S	Grade H40S/HIP L = 80 mm	Grade TSM30/HIP L = 75 mm	Grade MG30/HIP L = 72 mm
CTSS 10,5 x 5,5 x L	10,5	5,5	●	●	▲
CTSS 12,5 x 5,5 x L	12,5	5,5	●	●	▲
CTSS 16,5 x 5,5 x L	16,5	5,5	●	●	
CTSS 20,5 x 5,5 x L	20,5	5,5	●	●	
CTSS 30,5 x 5,5 x L	30,5	5,5	●	●	
CTSS 35,5 x 5,5 x L	35,5	5,5		●	
CTSS 6,5 x 6,5 x L	6,5	6,5	●	●	▲
CTSS 7,5 x 6,5 x L	7,5	5,5			▲
CTSS 8,5 x 6,5 x L	8,5	6,5	●	●	▲
CTSS 9,5 x 6,5 x L	9,5	6,5			▲
CTSS 10,5 x 6,5 x L	10,5	6,5	●	●	▲
CTSS 12,5 x 6,5 x L	12,5	6,5	●	●	▲
CTSS 14,5 x 6,5 x L	14,5	6,5			▲
CTSS 16,5 x 6,5 x L	16,5	6,5	●	●	▲
CTSS 20,5 x 6,5 x L	20,5	6,5	●	●	
CTSS 25,5 x 6,5 x L	25,5	6,5	●	●	
CTSS 30,5 x 6,5 x L	30,5	6,5	●	●	
CTSS 35,5 x 6,5 x L	35,5	6,5		●	
CTSS 7,5 x 7,5 x L	7,5	7,5	●	●	▲
CTSS 10,5 x 7,5 x L	10,5	7,5	●	●	
CTSS 15,5 x 7,5 x L	15,5	7,5	●	●	
CTSS 18,5 x 7,5 x L	18,5	7,5	●	●	
CTSS 20,5 x 7,5 x L	20,5	7,5	●	●	
CTSS 8,5 x 8,5 x L	8,5	8,5	●	●	▲
CTSS 9,5 x 8,5 x L	9,5	8,5			▲
CTSS 10,5 x 8,5 x L	10,5	8,5	●	●	▲
CTSS 12,5 x 8,5 x L	12,5	8,5	●	●	▲
CTSS 14,5 x 8,5 x L	14,5	8,5			▲
CTSS 16,5 x 8,5 x L	16,5	8,5	●	●	▲
CTSS 18,5 x 8,5 x L	18,5	8,5			▲
CTSS 20,5 x 8,5 x L	20,5	8,5	●	●	
CTSS 25,5 x 8,5 x L	25,5	8,5	●	●	
CTSS 30,5 x 8,5 x L	30,5	8,5	●	●	
CTSS 35,5 x 8,5 x L	35,5	8,5		●	

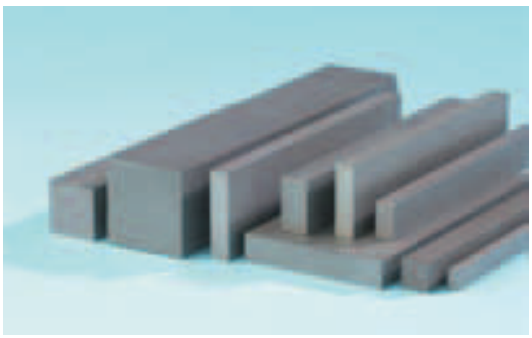
● = stock item
▲ = limited stock or upon request

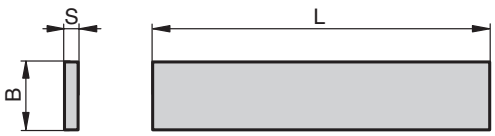
Other grades and dimensions upon request

CERATIZIT

Square and rectangular rods for punches

as sintered with positive sintering tolerances





PG C1

Type, description	[mm] B	[mm] S	Grade H40S/HIP L = 80 mm	Grade TSM30/HIP L = 75 mm	Grade MG30/HIP L = 72 mm
CTSS 9,5 x 9,5 x L	9,5	9,5			▲
CTSS 10,5 x 9,5 x L	10,5	9,5			▲
CTSS 12,5 x 9,5 x L	12,5	9,5			▲
CTSS 14,5 x 9,5 x L	14,5	9,5			▲
CTSS 16,5 x 9,5 x L	16,5	9,5			▲
CTSS 18,5 x 9,5 x L	18,5	9,5			▲
CTSS 20,5 x 9,5 x L	20,5	9,5			▲
CTSS 10,5 x 10,5 x L	10,5	10,5	●	●	▲
CTSS 12,5 x 10,5 x L	12,5	10,5	●	●	▲
CTSS 14,5 x 10,5 x L	14,5	10,5			▲
CTSS 15,5 x 10,5 x L	15,5	10,5	●	●	
CTSS 16,5 x 10,5 x L	16,5	10,5			▲
CTSS 18,5 x 10,5 x L	18,5	10,5			▲
CTSS 20,5 x 10,5 x L	20,5	10,5	●	●	▲
CTSS 25,5 x 10,5 x L	25,5	10,5	●	●	
CTSS 30,5 x 10,5 x L	30,5	10,5	●	●	
CTSS 12,5 x 12,5 x L	12,5	12,5	●	●	▲
CTSS 14,5 x 12,5 x L	14,5	12,5			▲
CTSS 15,5 x 12,5 x L	15,5	12,5	●	●	
CTSS 16,5 x 12,5 x L	16,5	12,5			▲
CTSS 18,5 x 12,5 x L	18,5	12,5			▲
CTSS 20,5 x 12,5 x L	20,5	12,5	●	●	▲
CTSS 22,5 x 12,5 x L	22,5	12,5			▲
CTSS 25,5 x 12,5 x L	25,5	12,5	●	●	
CTSS 14,5 x 14,5 x L	14,5	14,5	●		▲
CTSS 16,5 x 14,5 x L	16,5	14,5			▲
CTSS 18,5 x 14,5 x L	18,5	14,5			▲
CTSS 20,5 x 14,5 x L	20,5	14,5	●	●	▲
CTSS 22,5 x 14,5 x L	22,5	14,5			▲
CTSS 24,5 x 14,5 x L	24,5	14,5			▲
CTSS 25,5 x 14,5 x L	25,5	14,5	●	●	
CTSS 26,5 x 14,5 x L	26,5	14,5	●	●	
CTSS 16,5 x 16,5 x L	16,5	16,5	●		
CTSS 18,5 x 18,5 x L	18,5	18,5	●		
CTSS 20,5 x 20,5 x L	20,5	20,5	●		

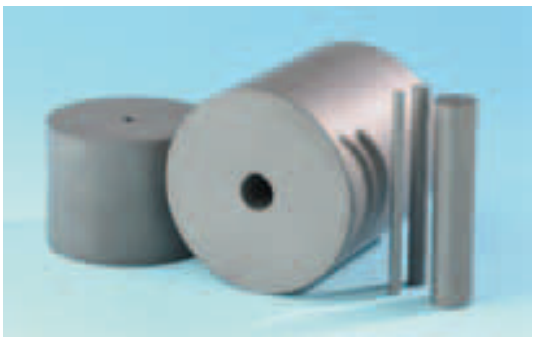
● = stock item

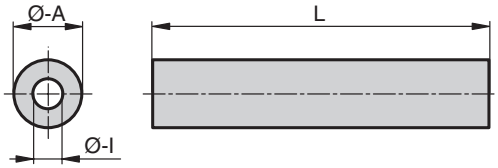
▲ = limited stock or upon request

Other grades and dimensions upon request

Die bushes and powder compacting dies

as sintered with positive sintering tolerances





PG C3 / PG G2

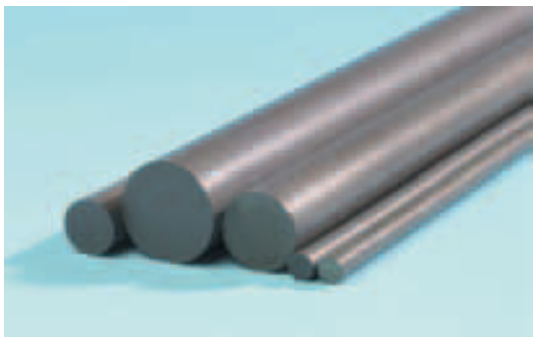
Type, description	[mm] Ø-A	Ø-I	L	Grade H40S/HIP
CTSB-0601-110	6	1	110	●
CTSB-0801-110	8	1	110	●
CTSB-1001-110	10	1	110	●
CTSB-1202-110	12	2	110	●
CTSB-1402-110	14	2	110	●
CTSB-1602-110	16	2	110	●
CTSB-1802-110	18	2	110	●
CTSB-2002-110	20	2	110	●
CTSB-2202-110	22	2	110	●
PPWM-025003125	25	3	125	●
PPWM-030003125	30	3	125	●
PPWM-035003125	35	3	125	●
PPWM-040008120	40	8	120	●
PPWM-050008120	50	8	120	●
PPWM-060008120	60	8	120	●
PPWM-070008120	70	8	120	●
PPWM-075010050	75	10	50	●
PPWM-075010070	75	10	70	●
PPWM-080010058	80	10	58	●
PPWM-080010120	80	10	120	●
PPWM-080020120	80	20	120	●
PPWM-090010058	90	10	58	●
PPWM-090010120	90	10	120	●
PPWM-095010050	95	10	50	●
PPWM-095010070	95	10	70	●
PPWM-100020060	100	20	60	●
PPWM-100020120	100	20	120	●
PPWM-110020060	110	20	60	●
PPWM-110020120	110	20	120	●
PPWM-120040060	120	40	60	●
PPWM-120040120	120	40	120	●
PPWM-130040060	130	40	60	●
PPWM-130040120	130	40	120	●
PPWM-150060120	150	60	120	●
PPWM-180100050	180	100	50	●

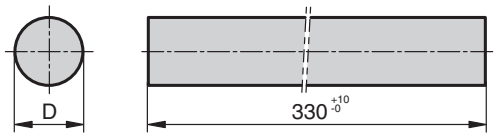
● = stock item

Other grades and dimensions upon request

Sintered rods

Length: 330 mm





PG 04 / PG 88

Type, description	[mm] D	Tol.	Grade H40S	TSM20	TSM33
RR 0115-330	1,15		●		●
RR 0165-330	1,65	-0/+0,15	●		●
RR 0180-330	1,80		●		●
RR 0220-330	2,20	-0/+0,20	●	●	●
RR 0270-330	2,70		●		●
RR 0325-330	3,25	-0/+0,10	●	●	●
RR 0370-330	3,70		●		●
RR 0420-330	4,20	-0/+0,20	●	●	●
RR 0470-330	4,70		●		●
RR 0520-330	5,20		●		●
RR 0570-330	5,70	-0/+0,25	●		●
RR 0620-330	6,20		●	●	●
RR 0670-330	6,70		●		●
RR 0720-330	7,20		●		●
RR 0770-330	7,70		●		●
RR 0820-330	8,20		●	●	●
RR 0870-330	8,70		●		●
RR 0920-330	9,20		●		●
RR 0970-330	9,70				●
RR 1020-330	10,20		●	●	●
RR 1070-330	10,70	-0/+0,30	●		●
RR 1120-330	11,20		●		●
RR 1170-330	11,70		●		●
RR 1220-330	12,20		●	●	●
RR 1270-330	12,70		●		●
RR 1320-330	13,20		●		●
RR 1420-330	14,20		●	●	●
RR 1470-330	14,70		●		●
RR 1520-330	15,20		●		●

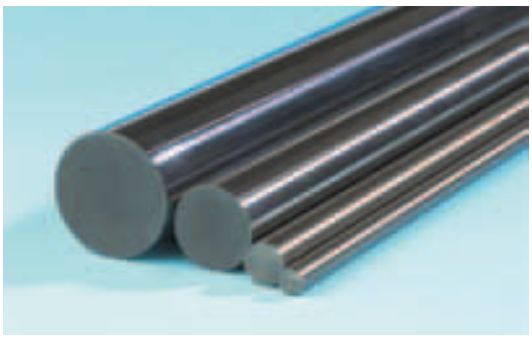
Type, description	[mm] D	Tol.	Grade H40S	TSM20	TSM33
RR 1620-330	16,20		●	●	●
RR 1720-330	17,20		●		●
RR 1820-330	18,20	-0/+0,45	●	●	●
RR 1920-330	19,20		●		●
RR 2020-330	20,20		●	●	●
RR 2120-330	21,20		●		●
RR 2220-330	22,20	-0/+0,55	●		●
RR 2320-330	23,20				●
RR 2420-330	24,20		●		●
RR 2520-330	25,20		●	●	●
RR 2620-330	26,20				●
RR 2820-330	28,20	-0/+0,65	●		●
RR 3020-330	30,20		●		●
RR 3220-330	32,20				●

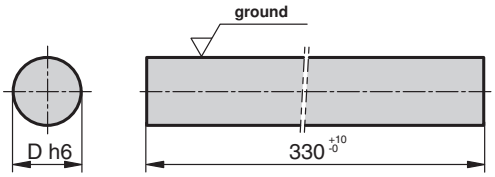
● = stock item

Other grades and dimensions upon request

Ground rods h6

Length: 330 mm





PG 0E / PG 30

Type, description	[mm] D	[mm] Tol.	Grade H40S	Grade TSM33
RG 0100-330	1,00		▲	●
RG 0150-330	1,50		▲	▲
RG 0200-330	2,00	+0/-0,006	▲	●
RG 0250-330	2,50		▲	▲
RG 0300-330	3,00		▲	●
RG 0350-330	3,50		▲	▲
RG 0400-330	4,00		▲	●
RG 0450-330	4,50	+0/-0,008	▲	▲
RG 0500-330	5,00		▲	●
RG 0550-330	5,50		▲	▲
RG 0600-330	6,00		▲	●
RG 0650-330	6,50		▲	▲
RG 0700-330	7,00		▲	▲
RG 0750-330	7,50		▲	▲
RG 0800-330	8,00	+0/-0,009	▲	●
RG 0850-330	8,50		▲	▲
RG 0900-330	9,00		▲	▲
RG 0950-330	9,50			▲
RG 1000-330	10,00		▲	●

Type, description	[mm] D	[mm] Tol.	Grade H40S	Grade TSM33
RG 1050-330	10,50		▲	▲
RG 1100-330	11,00		▲	▲
RG 1150-330	11,50		▲	▲
RG 1200-330	12,00		▲	●
RG 1250-330	12,50		▲	▲
RG 1300-330	13,00		▲	▲
RG 1350-330	13,50	+0/-0,011	▲	▲
RG 1400-330	14,00		▲	●
RG 1450-330	14,50		▲	▲
RG 1500-330	15,00			●
RG 1550-330	15,50			▲
RG 1600-330	16,00		▲	●
RG 1800-330	18,00		▲	●
RG 2000-330	20,00		▲	●
RG 2200-330	22,00		▲	●
RG 2400-330	24,00	+0/-0,013	▲	●
RG 2500-330	25,00			●
RG 2800-330	28,00			●
RG 3000-330	30,00			●
RG 3200-330	32,00	+0/-0,016		●

Diameter tolerance: according to DIN ISO 286/h6
Surface quality: R_a <0,05 µm polished-ground

● = stock item
▲ = limited stock or upon request

Other grades and dimensions upon request

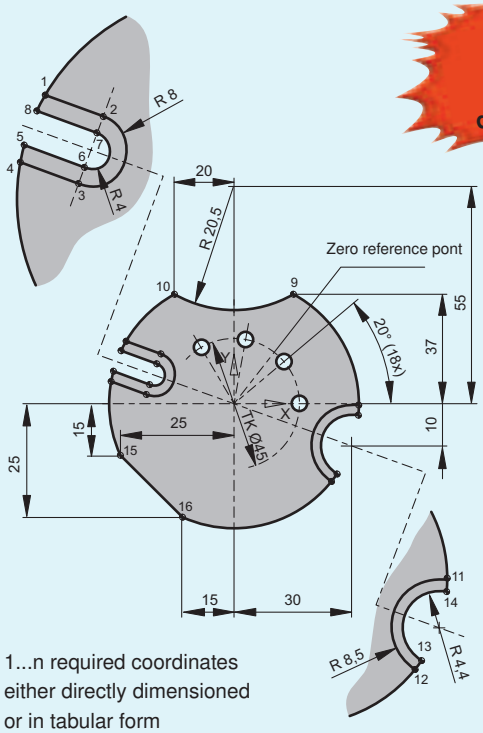
Advice concerning construction

The correct way to the correct size

For the tool and die industry we exclusively deliver sintered parts which are produced on our state-of-the-art machines by the CERATIZIT skilled workers. It is therefore necessary to speak the same 'language' with regard to the dimensions indicated in the drawings in order to manufacture products correctly (see illustrations below). In this context, it is a big advantage for you that you can illustrate the hole specifications etc. in a simplified way. The part will then be supplied in accordance with the appropriate tables.
The way of transmitting the drawing represents a significant factor with regard to the time taken to process an order and the quality that is achieved. This is why we are going to benefit to a larger degree from drawing transmission via e-mail. The file format should be .dwg or .dxf and large data amounts should be zipped.

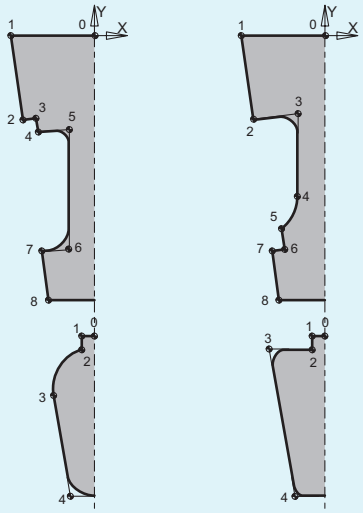
Round part with holes

Send your drawing via e-mail as .dwg or .dxf-file to drawing@ceratizit.com



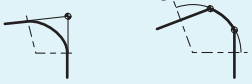
1...n required coordinates
either directly dimensioned
or in tabular form

Punches and segments



Detail coordinates for radii

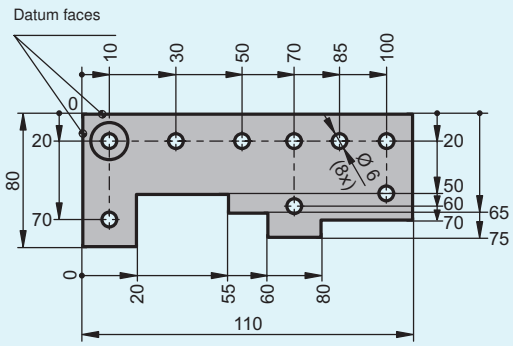
R = tangential R ≠ tangential



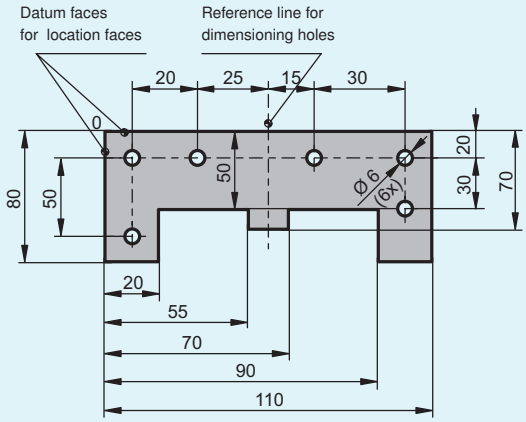
Theoretical point of intersection

1...n required coordinates
either directly dimensioned
or in tabular form

Blocks with holes



Absolute dimensions



Profile: absolute dimensions
Holes: incremental dimensions

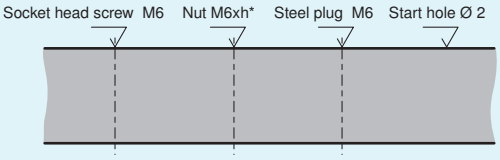
Advice concerning construction

Thread in sintered version

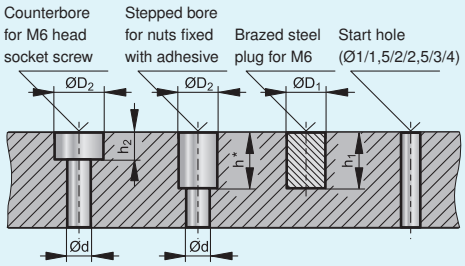
Thread	Max. length
M4	16
M5	20
M6	20
M8	30
M10	30

Holes in sintered blanking parts

Simplified illustration for use with your order drawing



Supplied as follows:

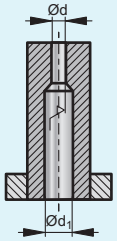


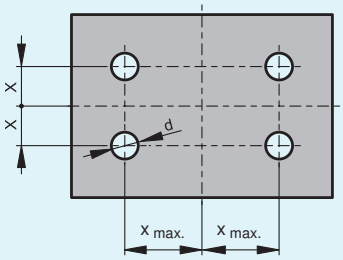
Thread	Steel plugs for threads Ø D_1	h_1	Bores for socket head screws Ø D_2	h_2	Ø d	h*
M 4	8	14	9,0	5,0	5,5	As required by customer
M 5	10	18	11,0	6,5	6,5	
M 6	10	21	12,5	7,5	8,0	
M 8	14	24	16,5	10,0	11,0	
M 10	16	28	20,0	12,0	13,5	

Stepped holes (Ø d_f)

with grinding allowance on Ø d!

Ø d_f	Ø d	Ø d_1
≤ 4	d_f - 1,0	6,5
> 4 ≤ 6	d_f - 1,0	8,0
> 6 ≤10	d_f - 1,5	12,0





Dowel holes

(Finished dimensions d_f = 4,0/5,0/6,0/7,0/8,0/10,0)

x max.	d
≤ 40	d_f - 0,5
> 40 ≤ 100	d_f - 1,0
>100	d_f - 1,5

Through holes

d	Increment
< 7,0	0,5
≥ 7,0	1,0

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