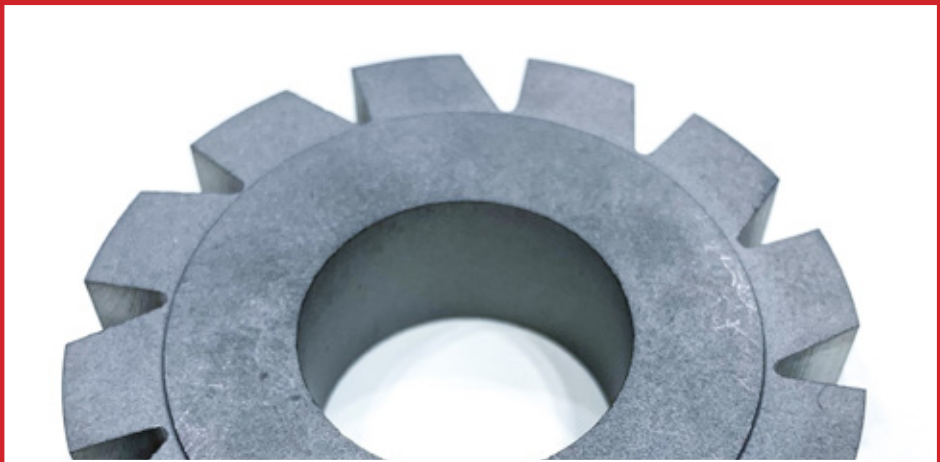
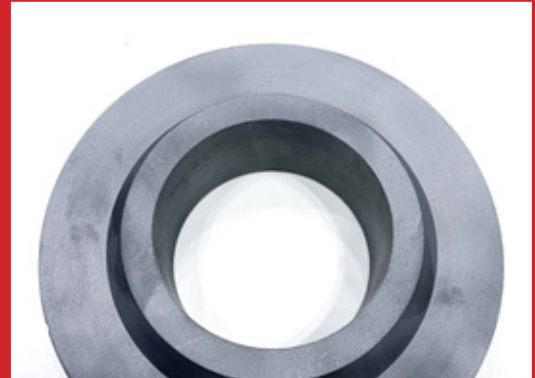


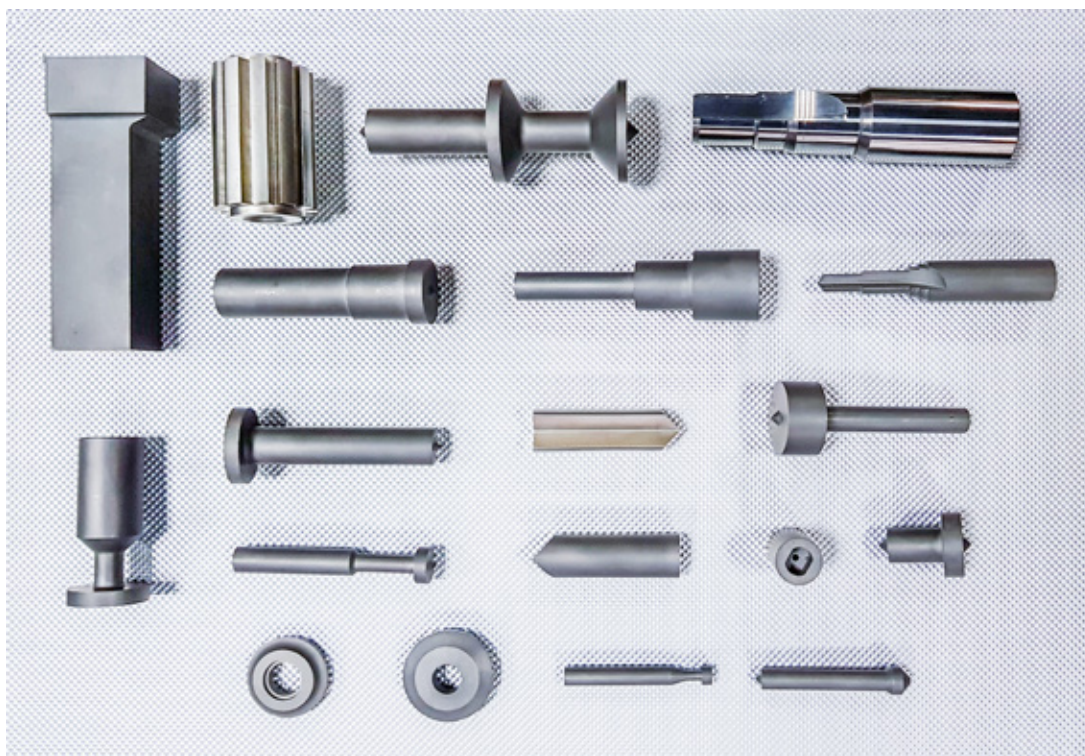


SINTERED TUNGSTEN CARBIDE

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Carbide products

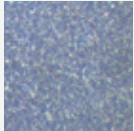
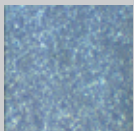
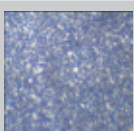
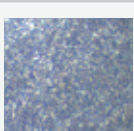
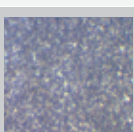
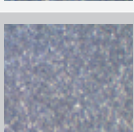
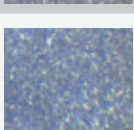
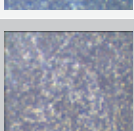


TIZ Implements offers carbide rods made from different kinds of materials in sizes from Ø2 mm to Ø40 mm and length to 400 mm. There are two types of rods available: polished and unpolished. To guarantee the quality of products, strength of every rod is tested. In addition, TRS (Tensile Rupture Strenght) measurement is done on randomly chosen unpolished details.

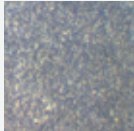
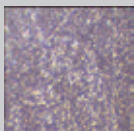
Carbide parts are used in a wide variety of fields including machine parts and industrial devices. Accessible semi-finished sinter parts allow toolmakers to fabricate carbide items at competitive prices.

TIZ Implements' advanced machine park allows manufacturing products with a complex geometry with minimal surpluses for finishing machining. Depending on a complexity of a product, technology of a semi-finished product production is optimised.

Grade table

Grade	Co%	Grain size[μm]	Density [g/cm ³]	Hardness [HRA]	TRS	Application	Micro structure
TCU90	9.0	0.2	14,35	94.1	5200	Material for cutting tools machining quenched materials (HRC65 -70), hardwood and high polishing cutters. Finish machining 316L stainless steel.	
TCF06	6.0	0.6	14,80	93.1	4000	Material for machining Al-Mg alloy, non ferrus metal, glass fiber, carbon fiber, composite material, graphite, denture and ceramic.	
TCS06	5.0	0.9	14,82	92.3	3200	Material for machining graphite, silumin and carbon fiber composite material. Excellent coating adhesion.	
TCU06	6.0	0.4	14,08	94.3	4600	Material for PCB micro-drill and end mili machining super high hardness Material.	
TCU08	8.0	0.4	14,52	93.5	4800	Material for PCB micro-drili, mini miliing cutter.	
TCU08S	8.0	0.3	14,50	93.6	5000	Material for Micro PCB drill, cutting tools finish machining quenched material (HRC60-65), 316L stainless steel, high polishing metal sheet and silicon steel sheet of motor.	
TCU40	10.0	0.8	14,40	91.7	4600	Material for common drili bit, end mili and punching die.	
TCU40F	10.0	0.6	14,45	92.3	4600	Material for cutting tools machining common drili bit, end mili, titanium alioy, stainless steel and gray cast iron.	
TCU40S	10.0	0.5	14,50	92.5	4800	Material for cutting tools machining 316L stainless steel, best Material for common circular cutter.	
TCU44	12.0	0.4	14,10	92.6	4800	Material for cutting tools machining titaniumalloy, heat resistant alioy, stainless steel, quenched steel(HRC55and above), gray cast iron.	

Grades table

Grade	Co%	Grain size[μm]	Density [g/cm ³]	Hardness [HRA]	TRS	Application	Micro structure
TCU25	12.0	0.6	14,05	92.3	4200	Material for cutting tools machining heat treated steel(Hardness HRC45 and above), cast iron, stainlesssteel.	
TCU45	13.0	0.3	13,95	92.7	4800	Material for cutting tools machining titanium, heat resistant alloy, stainless steel, quenched steel (HRC55 and above).	
TCU34	10.0	0.8	14,40	91.5	3600	Economy grade. Material for cutting tools machining common drill bit, end mili, titanium alloy, stainless steel and gray cast iron.	
TCU03	3	0.3	15.23	94.6	2560	Nano grain size grade with super high hardness, toughness and certain corrosion resistance. Good general use character, can be applied to tools with large ratio of length diameters	
TCU05	5	0.3	15.01	94.3	3200	Nano grain size grade, suitable for cutting high/medium density plate, plywood, soft wood, chipboard etc.	

Wood processing recommendation table

Machined material	TCU03	TCU05	TCU90	TCU40F
Chipboard	■■■■■	■■■■■□	■■■■■□	■■■■■□
Density plate	■■■■■	■■■■■□	■■■■■□	■■■■■□
MDF Board		■■■■■□	■■■■■□	■■■■■□
Solid wood		■■■■□□	■■■■■	■■■■■□
Soft wood		■■■■■□		



High performance Grades

For High Hardened Steels - TCU90

Material for cutting tools machining:

- quenched materials (HRC65 -70),
- hardwood and high polishing cutters.
- finish machining
- 316L stainless steel.

Nanograde

grain size:

0,2 μ m

High hardness
and highest

TRS 5200
coefficient



**Dedicated for
hardened materials**

TCU08S

For non-ferrous
metals

Material for cutting tools
machining:

- finish machining
- quenched material (HRC60-65),
- 316L stainless steel,
- high polishing metal sheet and
silicon steel sheet of motor.



TCU45

For difficult to cut
materials

Material for cutting tools machining:

- Inconel and other heat resistant alloys
- quenched steel (HRC55 and above)
- titanium alloy,
- stainless steel.



**Our best material for
HRSA materials.**

Main Grades

General high strength grade - **TCU44**

Material for cutting tools machining:

- gray cast iron,
- titanium alloy,
- heat resistant alloy,
- stainless steel,
- quenched steel (HRC55 and above),

Suitable material for grey cast iron



Economy high strength grade - **TCU40F**



Material for cutting tools machining:

- gray cast iron,
- common drill bit and endmills,
- titanium alloy,
- stainless steel.



Grain size	Classification
< 0,2	nano
0,2 - 0,5	ultrafine
0,5 - 0,8	sub-micron
0,8 - 1,3	fine
1,3 - 2,5	medium
2,5 - 6,0	coarse
> 6,0	extra-coarse

New high performance grades

TCF06

For composite material,
Al-Mg alloy, graphite,
denture and ceramic.



TCS06

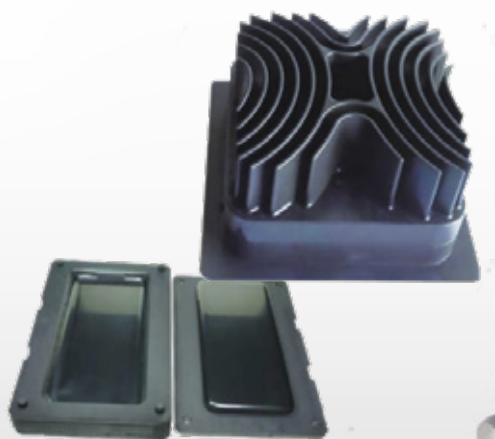
For graphite, silumin and
carbon fiber composite
material.



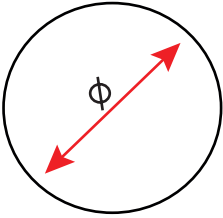
Excellent coating adhesion

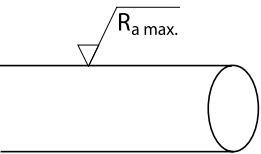
Material solution for CVD diamond coated tool

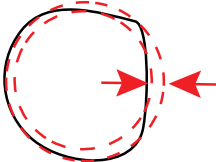
- Graphite mould, electrode machining
- Carbon fiber composite material machining
- For machining difficult materials like silumin
- For denture, ceramic machining

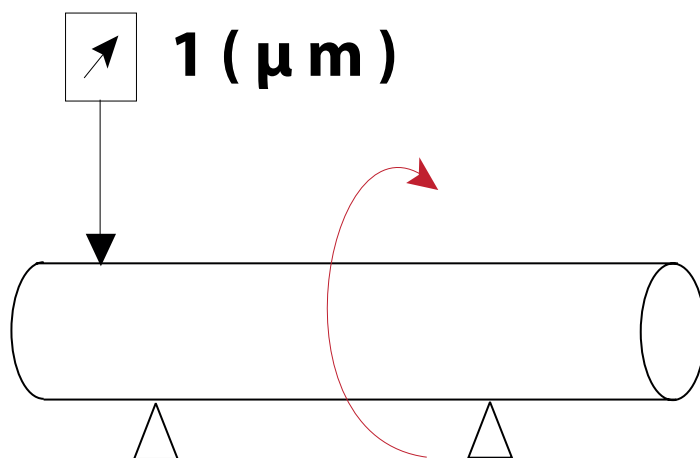


Tolerances

	Outside diameter (mm)	Tolerance (mm) (h5)
	2.0-3.0	-0.004
	3.1-6.0	-0.005
	6.1-18.0	-0.008
	18.1-30.0	-0.009

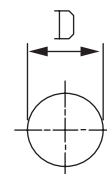
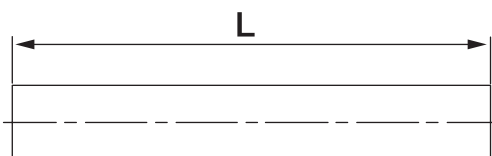
	Surface finishing
	Ra max (μm)
	0,05

	Outside diameter (mm)	Roundness tolerance (mm)
	2.0-3.0	-0.001
	3.1-6.0	-0.001
	6.1-10.0	-0.001
	10.1-18.0	-0.002
	18.1-22.0	-0.003
	22.1-30.0	-0.004



1 micron run-out
at 100mm length
guaranteed

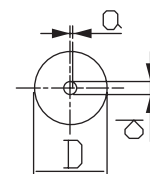
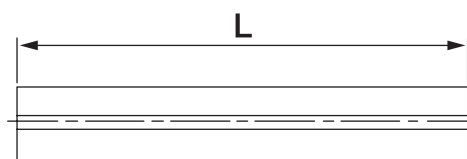
Solid carbide rod



Diameter [mm]	D tol. [mm]	Length [mm]	L tol. [mm]
2	+0.30/+0.15	330	1.5
2.5	+0.30/+0.15	330	1.5
3	+0.40/+0.20	330	1.5
3.5	+0.40/+0.20	330	1.5
4	+0.40/+0.20	330	1.5
4.5	+0.40/+0.20	330	1.5
5	+0.40/+0.20	330	1.5
5.5	+0.40/+0.20	330	1.5
6	+0.40/+0.20	330	1.5
6.5	+0.50/+0.30	330	1.5
7	+0.50/+0.30	330	1.5
7.5	+0.50/+0.30	330	1.5
8	+0.50/+0.30	330	1.5
8.5	+0.50/+0.30	330	1.5
9	+0.60/+0.30	330	1.5
9.5	+0.60/+0.30	330	1.5
10	+0.60/+0.30	330	1.5
10.5	+0.60/+0.30	330	1.5
11	+0.60/+0.30	330	1.5
11.5	+0.60/+0.30	330	1.5
12	+0.60/+0.30	330	1.5
12.5	+0.60/+0.30	330	1.5
13	+0.60/+0.30	330	1.5
13.5	+0.60/+0.30	330	1.5
14	+0.70/+0.30	330	1.5
14.5	+0.70/+0.30	330	1.5
15	+0.70/+0.30	330	1.5
15.5	+0.70/+0.30	330	1.5
16	+0.70/+0.30	330	1.5

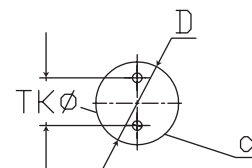
Diameter [mm]	D tol. [mm]	Length [mm]	L tol. [mm]
16.5	+0.8/+0.3	330	1.5
17	+0.8/+0.3	330	1.5
17.5	+0.8/+0.3	330	1.5
18	+0.8/+0.3	330	1.5
18.5	+0.8/+0.3	330	1.5
19	+0.8/+0.3	330	1.5
19.5	+0.8/+0.3	330	1.5
20	+0.8/+0.3	330	1.5
20.5	+0.8/+0.3	330	1.5
21	+0.8/+0.3	330	1.5
21.5	+0.8/+0.3	330	1.5
22	+0.8/+0.3	330	1.5
22.5	+0.8/+0.3	330	1.5
23	+0.8/+0.3	330	1.5
23.5	+0.8/+0.3	330	1.5
24	+0.8/+0.3	330	1.5
24.5	+0.8/+0.3	330	1.5
25	+0.8/+0.3	330	1.5
25.5	+0.8/+0.3	330	1.5
26	+0.8/+0.3	330	1.5
26.5	+0.8/+0.3	330	1.5
27	+0.8/+0.3	330	1.5
27.5	+0.8/+0.3	330	1.5
28	+0.8/+0.3	330	1.5
28.5	+0.8/+0.3	330	1.5
29	+0.8/+0.3	330	1.5
29.5	+0.8/+0.3	330	1.5
30	+0.8/+0.3	330	1.5
30.5	+0.8/+0.3	330	1.5

Carbide rod with one straight hole



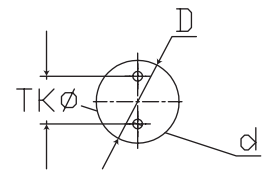
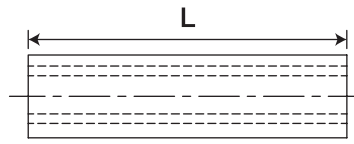
Diameter [mm]	D tol. [mm]	Inner Hole d[mm]	d tol. [mm]	Hole center diviation	Length [mm]	L tol. [mm]
3.0	+0.40/+0.20	0.5	±0.10	0.10	330	+1.5
4.0	+0.40/+0.20	0.8	±0.10	0.10	330	+1.5
5.0	+0.40/+0.20	0.8	±0.10	0.13	330	+1.5
6.0	+0.40/+0.20	1.0	±0.15	0.15	330	+1.5
7.0	+0.60/+0.30	1.0	±0.15	0.15	330	+1.5
8.0	+0.60/+0.30	1.0	±0.15	0.15	330	+1.5
9.0	+0.60/+0.30	1.4	±0.15	0.20	330	+1.5
10.0	+0.60/+0.30	1.4	±0.15	0.20	330	+1.5
11.0	+0.60/+0.30	1.4	±0.15	0.28	330	+1.5
12.0	+0.60/+0.30	1.8	±0.15	0.30	330	+1.5
13.0	+0.70/+0.30	1.8	±0.15	0.34	330	+1.5
14.0	+0.70/+0.30	1.8	±0.15	0.37	330	+1.5
15.0	+0.70/+0.30	2.0	±0.20	0.40	330	+1.5
16.0	+0.70/+0.30	2.0	±0.20	0.40	330	+1.5
17.0	+0.80/+0.30	2.0	±0.20	0.47	330	+1.5
18.0	+0.80/+0.30	2.0	±0.20	0.50	330	+1.5
19.0	+0.80/+0.30	2.0	±0.20	0.50	330	+1.5
20.0	+0.80/+0.30	2.5	±0.25	0.50	330	+1.5
21.0	+0.80/+0.30	2.5	±0.25	0.50	330	+1.5
22.0	+0.80/+0.30	2.5	±0.25	0.50	330	+1.5
23.0	+0.80/+0.30	3.0	±0.25	0.50	330	+1.5
24.0	+0.80/+0.30	3.0	±0.25	0.50	330	+1.5
25.0	+0.80/+0.30	3.0	±0.25	0.50	330	+1.5
26.0	+0.80/+0.30	3.0	±0.25	0.50	330	+1.5
27.0	+0.80/+0.30	3.0	±0.25	0.50	330	+1.5
28.0	+0.80/+0.30	3.0	±0.25	0.50	330	+1.5
29.0	+0.80/+0.30	3.0	±0.25	0.50	330	+1.5
30.0	+0.80/+0.30	3.0	±0.25	0.50	330	+1.5

Carbide rod with two straight holes



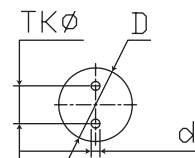
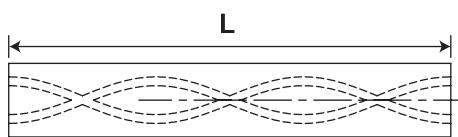
Diameter [mm]	D tol. [mm]	Inner Hole d [mm]	d Tol. [mm]	Distance be- tween holes TK [mm]	TK tol. [mm]	Hole cen- ter devia- tion	Length [mm]	L tol. [mm]
4.0	+0.40/ +0.20	0.8	±0.10	1.8	+ 0/-0.15	0.10	330/310	+1.5
5.0	+0.40/+0.20	0.8	±0.10	2.0	+ 0/-0.15	0.13	330/310	+1.5
6.0	+0.40/+0.20	1.0	±0.15	3.0	+ 0/-0.20	0.15	330/310	+1.5
7.0	+0.60/+0.30	1.0	±0.15	3.5	+ 0/-0.20	0.15	330/310	+1.5
8.0	+0.60/+0.30	1.0	±0.15	4.0	+ 0/-0.30	0.15	330/310	+1.5
9.0	+0.60/+0.30	1.4	±0.15	4.0	+ 0/-0.30	0.20	330/310	+1.5
10.0	+0.60/+0.30	1.4	±0.15	5.0	+ 0/-0.30	0.20	330/310	+1.5
11.0	+0.60/+0.30	1.4	±0.15	5.0	+ 0/-0.30	0.28	330/310	+1.5
12.0	+0.60/+0.30	1.8	±0.15	6.0	+ 0/-0.30	0.30	330/310	+1.5
13.0	+0.70/+0.30	1.8	±0.15	6.0	+ 0/-0.30	0.34	330/310	+1.5
14.0	+0.70/+0.30	1.8	±0.15	7.0	+ 0/-0.30	0.37	330/310	+1.5
15.0	+0.70/+0.30	2.0	±0.20	7.0	+ 0/-0.30	0.40	330/310	+1.5
16.0	+0.70/+0.30	2.0	±0.20	8.0	+ 0/-0.30	0.40	330/310	+1.5
17.0	+0.80/+0.30	2.0	±0.20	8.0	+ 0/-0.30	0.47	330/310	+1.5
18.0	+0.80/+0.30	2.0	±0.20	9.0	+ 0/-0.30	0.50	330/310	+1.5
19.0	+0.80/+0.30	2.0	±0.20	9.0	+ 0/-0.30	0.50	330/310	+1.5
20.0	+0.80/+0.30	2.5	±0.25	10.0	+ 0/-0.40	0.50	330/310	+1.5
21.0	+0.80/+0.30	2.5	±0.25	10.0	+ 0/-0.40	0.50	330/310	+1.5
22.0	+0.80/+0.30	2.5	±0.25	11.0	+ 0/-0.40	0.50	330/310	+1.5
23.0	+0.80/+0.30	2.5	±0.25	11.0	+ 0/-0.40	0.50	330/310	+1.5
24.0	+0.80/+0.30	3.0	±0.25	12.0	+ 0/-0.50	0.50	330/310	+1.5
25.0	+0.80/+0.30	3.0	±0.25	12.0	+ 0/-0.50	0.50	330/310	+1.5
26.0	+0.80/+0.30	3.0	±0.25	13.0	+ 0/-0.50	0.50	330/310	+1.5

Carbide rod with two straight holes



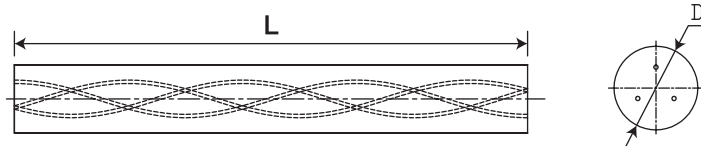
Diameter [mm]	D tol. [mm]	Inner Hole d [mm]	d tol. [mm]	Distance be- tween holes TK [mm]	TK tol. [mm]	Hole cen- ter devia- tion	Length [mm]	L tol. [mm]
6.0	+0.40/+0.20	0.8	±0.10	1.5	+ 0/-0.20	0.15	330	+1.5
7.0	+0.60/+0.30	0.8	±0.10	1.5	+ 0/-0.20	0.15	330	+1.5
8.0	+0.60/+0.30	1.0	±0.15	1.5	+ 0/-0.30	0.15	330	+1.5
9.0	+0.60/+0.30	1.0	±0.15	2.6	+ 0/-0.30	0.20	330	+1.5
10.0	+0.60/+0.30	1.0	±0.15	2.6	+ 0/-0.30	0.20	330	+1.5
11.0	+0.60/+0.30	1.2	±0.15	3.6	+ 0/-0.30	0.28	330	+1.5
12.0	+0.60/+0.30	1.2	±0.15	3.6	+ 0/-0.30	0.30	330	+1.5
13.0	+0.70/+0.30	1.2	±0.15	3.6	+ 0/-0.30	0.34	330	+1.5
14.0	+0.70/+0.30	1.5	±0.15	5.0	+ 0/-0.30	0.37	330	+1.5
15.0	+0.70/+0.30	1.5	±0.15	5.0	+ 0/-0.30	0.40	330	+1.5
16.0	+0.70/+0.30	1.5	±0.15	5.0	+ 0/-0.30	0.40	330	+1.5
17.0	+0.80/+0.30	2.0	±0.20	6.2	+ 0/-0.30	0.47	330	+1.5
18.0	+0.80/+0.30	2.0	±0.20	6.2	+ 0/-0.30	0.50	330	+1.5
19.0	+0.80/+0.30	2.0	±0.20	6.2	+ 0/-0.30	0.50	330	+1.5
20.0	+0.80/+0.30	2.0	±0.20	6.2	+ 0/-0.40	0.50	330	+1.5
21.0	+0.80/+0.30	2.0	±0.20	6.2	+ 0/-0.40	0.50	330	+1.5
22.0	+0.80/+0.30	2.0	±0.20	6.2	+ 0/-0.40	0.50	330	+1.5
23.0	+0.80/+0.30	2.0	±0.20	7.5	+ 0/-0.40	0.50	330	+1.5
24.0	+0.80/+0.30	2.0	±0.20	7.5	+ 0/-0.50	0.50	330	+1.5
25.0	+0.80/+0.30	2.0	±0.20	7.5	+ 0/-0.50	0.50	330	+1.5
26.0	+0.80/+0.30	2.0	±0.20	7.5	+ 0/-0.50	0.50	330	+1.5

Carbide rod with two helix holes (30°)



Diameter [mm]	D tol. [mm]	Distance be- tween holes TK [mm]	TK tol. [mm]	Inner Hole d [mm]	d tol. [mm]	Pitch [mm]
3.0	+0.5/+0.9	1.60	+/-0.15	0.40	+/-0.1	16.32
4.0	+0.6/+0.9	2.10	+/-0.15	0.60	+/-0.15	21.77
5.0	+0.6/+0.9	2.40	+/-0.20	0.70	+/-0.15	27.21
6.0	+0.7/+1.3	1.60	+/-0.15	0.40	+/-0.15	32.65
6.0	+0.7/+1.3	1.80	+/-0.15	0.50	+/-0.15	32.65
6.0	+0.7/+1.3	2.10	+/-0.15	0.60	+/-0.15	32.65
6.0	+0.7/+1.3	2.25	+/-0.15	0.70	+/-0.15	32.65
6.0	+0.7/+1.3	2.40	+/-0.15	0.70	+/-0.15	32.65
7.0	+0.7/+1.3	3.50	+/-0.15	1.00	+/-0.15	36.46
7.0	+0.7/+1.3	3.50	+/-0.15	1.00	+/-0.15	38.09
8.0	+0.7/+1.3	2.80	+/-0.15	0.60	+/-0.15	43.53
8.0	+0.7/+1.3	3.80	+/-0.15	1.00	+/-0.15	43.53
9.0	+0.7/+1.3	4.50	+/-0.15	1.40	+/-0.15	47.34
9.0	+0.7/+1.3	4.50	+/-0.15	1.40	+/-0.15	48.97
10.0	+0.7/+1.3	4.50	+/-0.15	1.40	+/-0.15	54.41
11.0	+0.7/+1.3	4.90	+/-0.15	1.40	+/-0.15	58.22
11.0	+0.7/+1.3	4.90	+/-0.15	1.40	+/-0.15	59.86
12.0	+0.6/+1.4	5.85	+/-0.15	1.40	+/-0.15	65.3
13.0	+0.6/+1.4	6.10	+/-0.15	1.4/1.75/2	+/-0.20	69.11
13.0	+0.6/+1.4	6.10	+/-0.15	1.4/1.75/2	+/-0.20	70.74
14.0	+0.7/+1.5	6.70	+/-0.15	1.4/1.75/2	+/-0.20	76.18
15.0	+0.7/+1.5	7.30	+/-0.15	1.4/1.75/2	+/-0.20	79.45
16.0	+0.6/+1.6	7.90	+/-0.15	1.4/1.75/2	+/-0.20	87.06
18.0	+0.7/+1.7	9.15	+/-0.15	1.4/1.75/2/2.5	+/-0.25	97.95
20.0	+0.7/+1.7	9.90	+/-0.15	1.4/1.75/2/2.5	+/-0.25	108.83
25.0	+0.7/+1.7	12.80	+/-0.15	1.4/1.75/2/2.5	+/-0.25	136.03

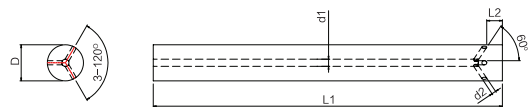
Carbide rod with three helix holes (30°)



Diameter [mm]	D tol. [mm]	Distance be- tween holes TK [mm]	TK tol. [mm]	Inner Hole d[mm]	d tol. [mm]	Pitch [mm]	Pitch - tol. [mm]	Pitch + tol. [mm]
6	+1.0/+0.6	2.75	-0.4	0.7	±0.10	32.7	-0.7	0.62
8	+1.4/+0.7	3	-0.4	1	±0.15	43.53	-0.86	0.89
10	+1.4/+0.7	5	-0.6	1.4	±0.15	54.41	-1.08	1.12
12	+1.4/+0.7	6	-0.6	1.4	±0.15	65.3	-1.3	1.33
14	+1.5/+0.7	7	-0.8	1.75	±0.20	76.18	-1.51	1.56
16	+1.6/+0.7	8	-0.8	1.75	±0.20	87.06	-1.73	1.78
18	+1.7/+0.7	9.55	-0.8	2	±0.25	97.95	-1.95	2.00
20	+1.7/+0.7	10	-1	2	±0.25	108.83	-2.16	2.22

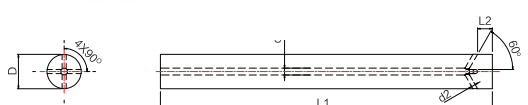
Carbide rod with Y shaped holes

3Y



D	L1	d1	d2	L2
6	58	1.2	0.7	3
8	64	1.6	0.9	4
10	74	2.0	1.2	5
12	84	2.2	1.3	6
14	84	2.4	1.4	7
16	93	2.6	1.5	8
18	93	2.8	1.6	9
20	105	3.0	1.7	10

4Y

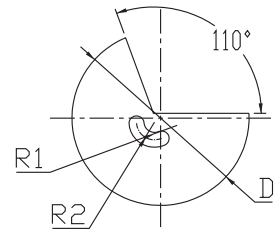
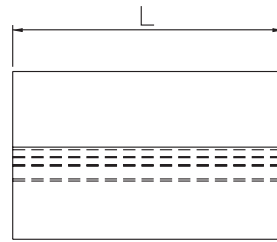


D	L1	d1	d2	L2
6	58	1.2	0.6	3
8	64	1.6	0.8	4
10	74	2.0	1.0	5
12	84	2.2	1.1	6
14	84	2.4	1.2	7
16	93	2.6	1.3	8
18	93	2.8	1.4	9
20	105	3.0	1.5	10

Technical information for rod grinding

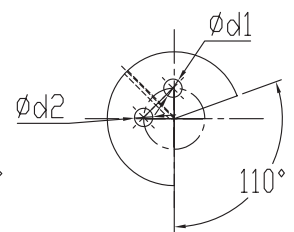
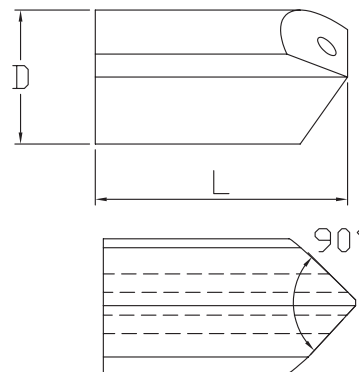
Diameter	h 4	h 5	h 6	h 7
0 < $\varnothing$ < 3 mm	0.003 mm	0.004 mm	0.006 mm	0.010 mm
0 < $\varnothing$ < 0.1181 in	0.00012 in	0.00015 in	0.00024 in	0.00039 in
3 < $\varnothing$ < 6 mm	0.004 mm	0.005 mm	0.008 mm	0.012 mm
0.11812 < $\varnothing$ < 0.23622 in	0.00016 in	0.00020 in	0.00024 in	0.00047 in
6 < $\varnothing$ < 10.0 mm	0.004 mm	0.006 mm	0.009 mm	0.015 mm
0.23623 < $\varnothing$ < 0.3937 in	0.00016 in	0.00024 in	0.00035 in	0.00059 in
10 < $\varnothing$ < 18.0 mm	0.005 mm	0.008 mm	0.011 mm	0.018 mm
0.39371 < $\varnothing$ < 0.70866 in	0.00020 in	0.0003 in	0.00043 in	0.00071 in
18 < $\varnothing$ < 30.0 mm	0.006 mm	0.009 mm	0.013 mm	0.021 mm
0.90867 < $\varnothing$ < 1.18110 in	0.00024 in	0.00035 in	0.0005 in	0.00083 in
30 < $\varnothing$ < 50 mm	0.007 mm	0.011 mm	0.016 mm	0.025 mm
1.8111 < $\varnothing$ < 1.96850 in	0.00028 in	0.00043 in	0.00063 in	0.00098 in

Waist hole gun drill



$\varnothing D$ (mm)	D tol. [mm]	R1 [mm]	R1 tol. [mm]	R2 [mm]	R2 tol. [mm]	Length [mm]	L tol. [mm]
6.9	-0.1/+0.4	1.7	-0.15/+0.15	1.2	-0.20/+0.20	32	0/+3.0
4.5	-0.1/+0.4	1.1	-0.15/+0.15	0.7	-0.20/+0.20	32	0/+3.0
5.5	-0.1/+0.4	1.3	-0.15/+0.15	0.8	-0.20/+0.20	32	0/+3.0
6.3	-0.1/+0.4	1.6	-0.15/+0.15	0.9	-0.20/+0.20	32	0/+3.0
7.6	-0.1/+0.4	1.7	-0.15/+0.15	1.2	-0.20/+0.20	34	0/+3.0
8	-0.1/+0.4	1.8	-0.15/+0.15	1.3	-0.20/+0.20	34	0/+3.0
8.6	-0.1/+0.4	1.9	-0.15/+0.15	1.3	-0.20/+0.20	36	0/+3.0
9	-0.1/+0.4	2	-0.15/+0.15	1.4	-0.20/+0.20	36	0/+3.0
9.7	-0.1/+0.4	2.2	-0.15/+0.15	1.4	-0.20/+0.20	36	0/+3.0

Two holes gun drill



$\varnothing D$ (mm)	D tol. [mm]	R1 [mm]	R1 tol. [mm]	R2 [mm]	R2 tol. [mm]	Length [mm]	L tol. [mm]
10.5	-0.10/+0.45	1.9	-0.20/+0.20	2.3	-0.20/+0.20	36	0/+3.0
15.0	-0.10/+0.45	2.4	-0.20/+0.20	3.3	-0.20/+0.20	42	0/+3.0
20.0	-0.10/+0.45	3.5	-0.20/+0.20	4.2	-0.20/+0.20	55	0/+3.0
30.0	-0.10/+0.45	5.0	-0.20/+0.20	6.0	-0.20/+0.20	65	0/+3.0
35.0	-0.10/+0.45	5.5	-0.20/+0.20	6.5	-0.20/+0.20	65	0/+3.0

Carbide strip

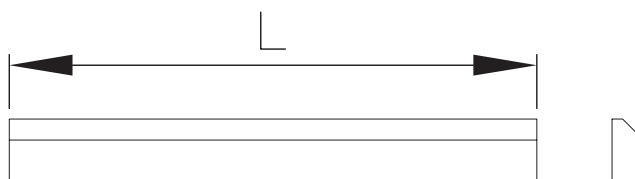


Size	Thickness [mm]	Thickness tol. [mm]	Width [mm]	Width tol. [mm]	Length [mm]
2x3	2	+ 0 .3/ + 0. 1	3	+ 0.4 / + 0.2	310
2x4	2	+ 0 .3 / + 0 .1	4	+ 0.4 / + 0 .2	310
2x5	2	+ 0 .3 / + 0. 1	5	+ 0.4 / + 0.2	310
2x6	2	+ 0 .3 / + 0. 1	6	+ 0.4 / + 0.2	310
2x8	2	+ 0.3/ + 0.1	8	+ 0.4/ + 0.2	310
2x10	2	+ 0.3/ + 0.1	10	+ 0.4/ + 0.2	310
2x12	2	+ 0.3/ + 0.1	12	+ 0.4/ + 0.2	310
2x14	2	+ 0.3/ + 0.1	14	+ 0.4/ + 0.2	310
2x15	2	+ 0.3/ + 0.1	15	+ 0.4/ + 0.2	310
2x16	2	+ 0.3/ + 0.1	16	+ 0.4/ + 0.2	310
2x18	2	+ 0.3/ + 0.1	18	+ 0.4/ + 0.2	310
2x19	2	+ 0.3/ + 0.1	19	+ 0.4/ + 0.2	310
3x3	3	+ 0.3/ + 0.1	3	+ 0.4/ + 0.2	310
3x4	3	+ 0.3/ + 0.1	4	+ 0.4/ + 0.2	310
3x5	3	+ 0.3/ + 0.1	5	+ 0.4/ + 0.2	310
3x6	3	+ 0.3/ + 0.1	6	+ 0.4/ + 0.2	310
3x8	3	+ 0.3/ + 0.1	8	+ 0.4/ + 0.2	310
3x9	3	+ 0.3/ + 0.1	9	+ 0.6/ + 0.2	310
3x10	3	+ 0.3/ + 0.1	10	+ 0.6/ + 0.2	310
3x11	3	+ 0.3/ + 0.1	11	+ 0.6/ + 0.2	310
3x12	3	+ 0.3/ + 0.1	12	+ 0.6/ + 0.2	310
3x13	3	+ 0.3/ + 0.1	13	+ 0.6/ + 0.2	310
3x15	3	+ 0.3/ + 0.1	15	+ 0.6/ + 0.2	310
3 x16	3	+ 0.3/ + 0.1	16	+ 0.6/ + 0.2	310
3 x18	3	+ 0.3/ + 0.1	18	+ 0.6/ + 0.2	310



Size	Thickness [mm]	Thickness tol. [mm]	Width [mm]	Width tol. [mm]	Length [mm]
3x20	3	+ 0.3/ + 0.1	20	+ 0.6/ + 0.2	310
3x22	3	+ 0.3/ + 0.1	22	+ 0.6/ + 0.2	310
3x25	3	+ 0.3/ + 0.1	25	+ 0.6/ + 0.2	310
3x28	3	+ 0.3/ + 0.1	28	+ 1.0/ + 0.2	310
3x31	3	+ 0.3/ + 0.1	31	+ 1.0/ + 0.2	310
4x5	4	+ 0.3/ + 0.1	5	+ 1.0/ + 0.2	310
4 x6	4	+ 0.3/ + 0.1	6	+ 0.6/ + 0.2	310
4x8	4	+ 0.3/ + 0.1	8	+ 0.6/ + 0.2	310
4x10	4	+ 0.3/ + 0.1	10	+ 0.6/ + 0.2	310
4x12	4	+ 0.3/ + 0.1	12	+ 0.6/ + 0.2	310
4x13	4	+ 0.3/ + 0.1	13	+ 0.6/ + 0.2	310
4x15	4	+ 0.3/ + 0.1	15	+ 0.6/ + 0.2	310
4x16	4	+ 0.3/ + 0.1	16	+ 0.6/ + 0.2	310
4x18	4	+ 0.3/ + 0.1	18	+ 0.6/ + 0.2	310
4x20	4	+ 0.3/ + 0.1	20	+ 0.6/ + 0.2	310
4x22	4	+ 0.3/ + 0.1	22	+ 1.0/ + 0.2	310
4x25	4	+ 0.3/ + 0.1	25	+ 1.0/ + 0.2	310
4x31	4	+ 0.3/ + 0.1	31	+ 1.0/ + 0.2	310

Carbide strip with chamfer

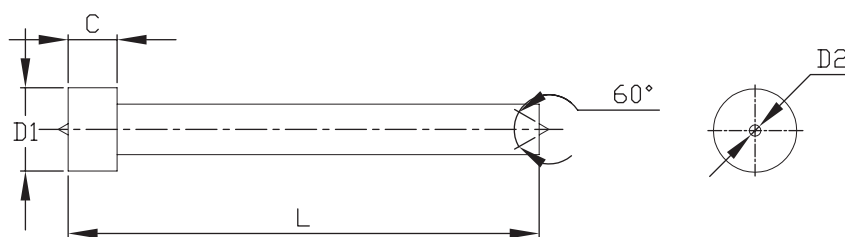


Size	Thickness [mm]	Thickness tol. [mm]	Width [mm]	Width tol. [mm]	Length [mm]
3 x6-55°	3	+0.3/+0.1	6	+0.4/+0.2	310
3x8-55°	3	+0.3/+0.1	8	+0.4/+0.3	310
3 x9-55 °	3	+0.3/+0.1	9	+0.4/+0.4	310
3x10-55°	3	+0.3/+0.1	10	+0.4/+0.5	310
3x 12-55°	3	+0.3/+0.1	12	+0.4/+0.6	310
3 x30-45°	3	+0.6/+0.4	30	+1.2/+0.6	310
4x10-55°	4	+0.3/+0.1	10	+0.4/+0.2	310

PREFORMS



Preforms



$\varnothing D$ (mm)	L (mm)	C (mm)	$\varnothing D2$ (mm)
17	104	4	10.3
17	106	6	10.3
17	108	8	10.3
17	110	10	10.3
21	104	4	10.3
21	106	6	10.3
21	108	8	10.3
21	110	10	10.3
27	104	4	12.3
27	106	6	12.3
27	108	8	12.3
27	110	10	12.3
33	104	4	16.3
33	106	6	16.3
33	108	8	16.3
33	110	10	16.3
33	154	4	16.3
33	156	6	16.3
33	158	8	16.3
33	160	10	16.3

$\varnothing D$ (mm)	L (mm)	C (mm)	$\varnothing D2$ (mm)
37	104	4	16.3
37	106	6	16.3
37	108	8	16.3
37	110	10	16.3
37	154	4	16.3
37	156	6	16.3
37	158	8	16.3
37	160	10	16.3
41.3	104	4	16.3
41.3	106	6	16.3
41.3	108	8	16.3
41.3	110	10	16.3
41.3	154	4	16.3
41.3	156	6	16.3
41.3	158	8	16.3
41.3	160	10	16.3

Size range: Dia: 15-42mm
Length range: 100-160mm
Other customized size

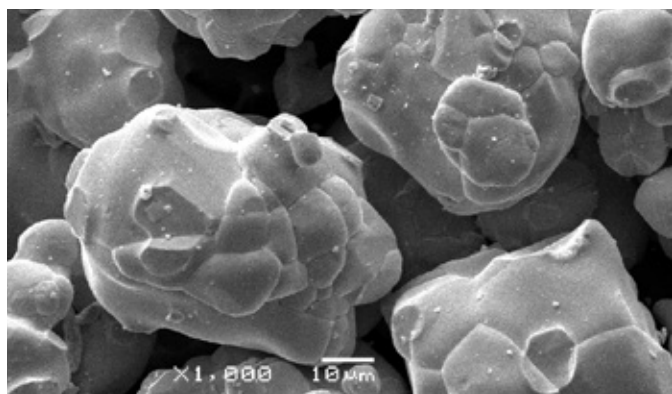
Tolerance:
D: ± 0.2 mm
d: ± 0.3 mm
Length: $+1.0/+2.0$ mm
C: $+0.2/+0.4$ mm

Heading die core

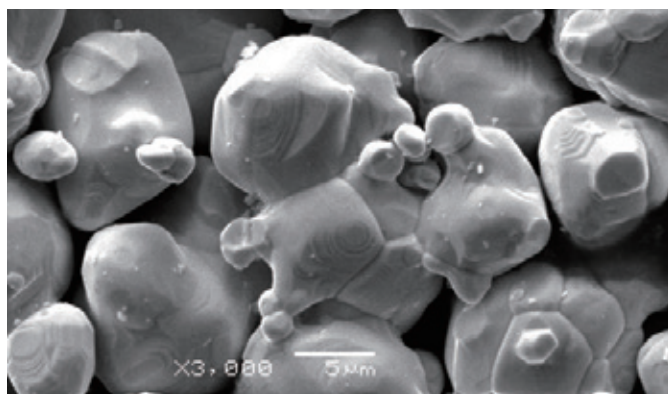
Grade	Density [g/cm ³]	Hardness [HRA]	Grain Size [μm]	TRS	Impact force	WApplication
RCKG5	14.31	88.2	2.0-3.0	3400	0.70	Drawing die, rod die
RCKG6	14.12	87.2	2.0-3.0	3200	0.76	
RCEA65	13.73	85.0	2.0-6.0	3000	0.80	Small diameter screw die, lock core die
RCEA90	13.22	82.8	2.0-6.0	2700	0.90	Big head screw die
RCVA70	13.95	84.6	3.0-6.0	2600	0.78	Impact resistant forging die
RCVA80	13.58	84.0	3.0-6.0	2740	0.85	
RCVA90	13.39	82.5	3.0-6.0	2350	0.90	
RCVA95	13.10	81.5	6.0-9.0	2150	0.96	
RCST1	13.40	84.5	2.0-6.0	2640	0.81	Stainless steel screw die
RCST6	13.70	85.8	3.0-6.0	2740	0.78	
RCST7	13.40	85.0	2.0-6.0	2640	0.80	
RCST8	13.30	84.0	2.0-6.0	2640	0.90	
RCHA60	13.95	84.5	2.0-3.0	2640	0.76	Hot forging die
RCHA70	13.58	83.0	6.0-9.0	2350	0.82	
GCH10	12.90	80.5	6.0-9.0	2140	0.97	Stainless steel screw die, impact resistant forging die
GCH15	13.60	86.5	2.0-3.0	2580	0.82	
GCH20	13.40	85.0	2.0-6.0	2780	0.87	
GCH30	13.50	84.0	3.0-9.0	2380	0.88	
GCH35	13.20	83.8	2.0-6.0	2550	0.92	
GCH40	13.30	83.0	2.0-6.0	2160	0.95	

New GCH grades series

super high wear resistant and super high toughness



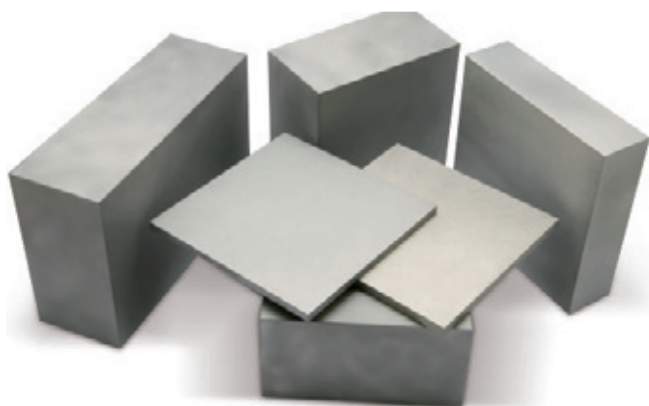
Traditional polycrystalline WC structure



Single crystal spherical WC powder for GCH series

Grade	Density [g/cm ³]	Hardness [HRA]	TRS [N/mm ²]	Impact Strength [Kgf-m/cm ²]	Application
GCH11	14.70	89.5	3850	0.75	Heading die draw or extrude
GCH12	13.92	88.5	3700	0.80	
GCH14	13.72	87.5	3550	0.82	
GCH22	13.32	84.6	2740	0.87	Stainless steel screw die
GCH24	13.85	86.2	2860	0.84	
GCH25	13.46	85.0	2780	0.86	
GCH26	13.13	84.2	2680	0.90	Stainless steel screw die, impact resistant forging die
GCH28	13.05	83.6	2640	0.92	
GCH32	13.00	82.8	2550	0.95	Impact resistant forging die
GCH36	12.86	81.3	2350	0.98	
GCH39	12.80	80.2	2250	0.99	

Carbide plate



GRADE	Density [g/cm ³]	Hardness [HRA]	TRS [N/mm ²]	Impact Strength [Kgf-m/cm ²]
RCKG3	14.61	89.30	3450	0.52
RCKG4	14.31	89.30	3450	0.55
RCKG5	14.32	88.30	3450	0.58
RCKG6	14.12	87.20	3260	0.65
RCKG7	13.95	89.30	3680	0.70
TCF10	14.35	92.50	3680	0.25
TCF15	14.36	91.80	3890	0.30
TCF25	14.15	92.20	3880	0.35
TCF30	14.15	90.00	3530	0.38
TCF40	13.95	90.00	3680	0.40

Wear parts

Wire drawing / tube drawing die



GRADE	Density [g/cm ³]	Hardness [HRA]	TRS [N/mm ²]	Impact Strength [Kgf-m/cm ²]	Application
RCKG03	14.75	94.5	3660	0.20	For small wire drawing, specially good for steel, non-ferrous metal and alloy metal wire dia. less than 0.6mm.
RCKG1	15.00	92.0	3120	0.26	To draw steel, non-ferrous metal and alloy metal wire of which dia. 2 to 6mm.
RCKG2	14.90	90.5	3270	0.28	For Dia. 20mm rods or wire drawing, also for drawing tubes of which dia. smaller than 10mm.
RCKG3	14.61	89.3	3450	0.52	To draw steel, non-ferrous metal and alloy metal wire of which dia. less than 50mm, and dia. less than 35 tubes.
RCKG6	14.12	87.2	3260	0.65	To draw steel bars and copper pipes under very high stress conditions.

Wear parts

Circular blank



Outside Dia. ø [mm]	OD Tol. [mm]	Thickness [mm]	Thickness tol. [mm]	Inner Dia. ø [mm]	ID Tol. [mm]
10	+0.5 /+ 0.3	T	+0.5 / +0.3	4	-0.5/ -0.3
20	+0.5/+0 .7	T	+0 .5/ +0.7	5	-0.5/ -0.3
30	+0.7 /+ 0.9	T	+0.5/+ 0.7	8	-0.5/-0.3
40	+0.7/+0 .9	T	+0 .7/+0.9	10	-0.5/ -0.3
50	+0.9/+ 1.1	T	+0 .7/ +0.9	13	-0.7/-0.5
60	+0.9 /+1.1	T	+0.7/ +0.9	16	-0.7/- 0.5
70	+1.1/+ 1.3	T	+0 .7/ +0.9	25.4	-0.9/-0.7
80	+1.1/+1.3	T	+0.7/+0.9	22	-0.9/-0.7
90	+1 .1 /+1 .3	T	+0.7 /+0.9	22	-0.9/-0.7
100	+1.1/+1.3	T	+0.7/+0.9	25.4	-0.9/-0.7

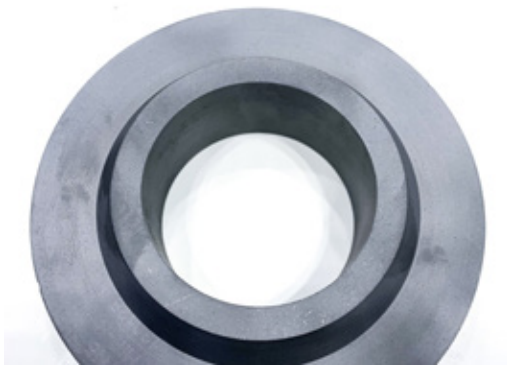
Wear parts



Gear hob blank



Nozzle



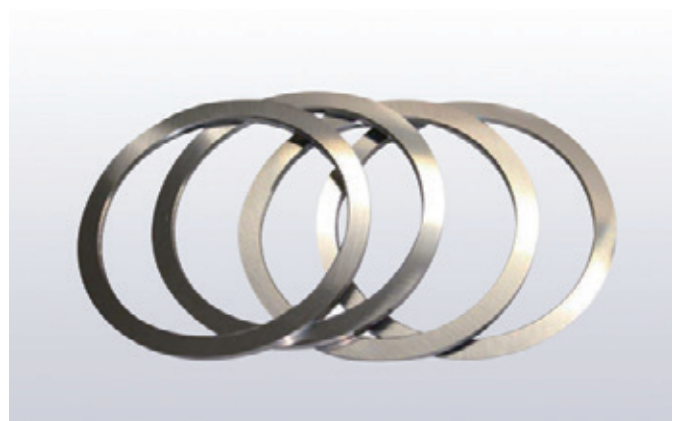
Roll



Bushings



Water jet cutter



Seal Rings

Important notice

1. Total run-out of spindle, tool holder with tools have a significant impact on tool life and performance.
2. Difference between 3 and 50-micron run-out results ten times difference in tool life.
3. If total run-out will be over 20 microns it doesn't matter what carbide grade you use.
4. World best class spindles run-out is 1-2 micron, tool holder -3 microns, cutting tool - 3 micron - total run-out is 7-8 micron. From previous, you can understand the influence of machine tool, tool holder and cutting tools on tool life and performance.
5. Most impact on cutting tools run out have the run-out of its blank. General cylindrical grinding offer h6 diameter tolerance and run-out of 6-8 micron for length up to 100 mm. Practice shows that tool manufacturer adjust run-out a first produced piece and next pieces are manufactured with initial set up. Adjust run-out for each piece increase costs. So practically it is not possible to compensate run-out within grounded geometry. How much will costs tool manufacturer to make blanks h4/h5 tolerance with run-out 1-2 microns? They can do it, if they will grind between centers of the blank. The solution is to buy grounded blanks h4/h5 tolerance with run-out 1-2 microns.
6. Blank cost is significant, but if you have delivery time which is much shorter, your stock inventory can be much less, your cutting tools live will be longer, you can ask for the higher price of cutting tools.
7. Material strength is also critical. Our material grades strength coefficients are up to 15% higher than from competitors. It means you can produce solid carbide cutting tools which can work on higher parameters.
8. Dedicated carbide grades for its application is essential for high-performance machining. We offer specialized grades for high hardness steel and cast iron group, difficult to cut material group like Inconel, titanium alloys, stainless steels, color metal and nonmetal materials group, dedicated grades for CVD diamond coating, specialized grades for PCB cutting tools.
9. Ordering cut to length and chamfered blanks reduce your cost.
10. Ordering solid carbide near to shape preform reduce your cost for special cutting tools manufacturing.
11. Customized coolant channels in blanks and preforms guarantee high performance and long tool life.



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