



RUIAO CARBIDE



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Tungsten Carbide Rods

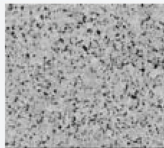
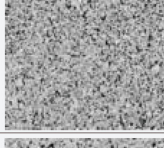
How to produce tungsten carbide rods

1. Wet Milling: To have the WC&Co mixture even distribution and combination and ensure uniform grain size, Tungsten carbide powder mixed with cobalt powder and other additive milling in alcohol.
2. Blending pressing binder and drying: The mostly used pressing binder in the manufacture of cemented carbide, such as rubber, paraffin wax, PEG, SBS and so on. The WC&Co mixture material will dried in the process before press.
3. Pressing to rods: There are two way to press with different advantages. Extrusion way, best way to press long length rods from 300-330mm. Automatic press, best way to press short rods (45-100mm length)
4. Drying shaped rods: Firstly, it should be naturally dried. Second, drying in oven.
5. Sintering: Sintered under 6Mpa pressuer and 1400°C+.
6. Anlysis: Inspection with hardness, TRS, Metallographic, Coercive force, density etc.

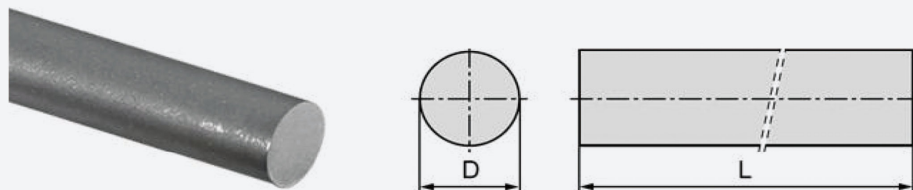
Ruiao Grade Introudction

Grade	Density g/cm ³	Hardness (HRA)	T.R.S (Mpa)	Grain Size(μm)	Composition(%)	Equal to ISO
RA06	14.8	≥94	≥3500	0.4	6% CO 93.5% WC	K05/K10
RA08	14.5	≥93	≥3500	0.4	8.5% CO 91% WC	K10/K20
RA09	14.44	≥93	≥4100	0.3	9% CO 90.5% WC	K10/K20
RA10	14.5	≥91.8	≥4000	0.5-0.6	10% CO 89.5% WC	K20/K30
RA11	14.5	≥91.8	≥3500	0.8	10% CO 89.5% WC	K20/K30
RA12	14.2	≥92.8	≥4000	0.5	12% CO 87.5% WC	K20/K30



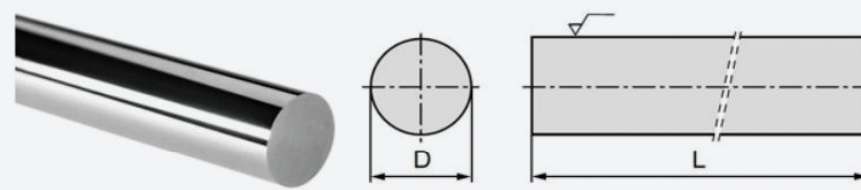
Grade	Metallographs	Recommended applications
RA06		It is suitable for cutting nonferrous metals, high-silicon aluminum alloy, carbon fabric composites and graphite products (diamond coating). 适用于有色金属、高硅铝合金、碳纤维复合材料、石墨制品(金刚石涂层)的切削加工。
RA08		For end mills with high wear resistant, engraving tool. For cutting PCB and Plastic plate. 用于高耐磨性立铣刀、雕刻刀具。用于切割PCB和塑料板。
RA09		It is suitable for cutting high wear-resistant materials such as hardened steel, graphite, aluminum alloy and composite materials. 适用于切削淬火钢、石墨、铝合金、复合材料等高耐磨材料。
RA10		Classic grade for more than 30 years, several thousands of tons sales It is suitable for cutting for general steel with HRC < 55, stainless steel, Grey Cast Iron and heat resistant alloy. 经典牌号30多年, 销量数千吨, 适用于HRC < 55的普通钢、不锈钢、灰铸铁及耐热合金的切削加工。
RA11		It has excellent impact resistance and strong versatility, and is suitable for rough and fine finishing process of general metal materials as well as steel, cast iron, aluminum alloy and other materials below 50HRC. 具有优异的抗冲击性和较强的通用性, 适用于一般金属材料的粗精加工, 也适用于钢、铸铁、铝合金等50HRC以下材料的粗精加工。
RA12		Ultra-fine Grain size. With quite good wear resistance. Good for making high speed tooling routers, carbide end mills, drills, reamers which under HRC55. For Titanium alloy, high hardness aluminum alloy, heat-treated steel, heat-treated alloy, stainless steel, glass fiber reinforced plastic, etc. 超细晶粒尺寸。具有相当好的耐磨性。适用于制造HRC55标准的高速刀具铣刀、硬质合金立铣刀、钻头、铰刀。适用于钛合金、高硬度铝合金、热处理钢、热处理合金、不锈钢、玻璃钢等。

Unground Solid Carbide Rods



Diameter	Tolerance in unground	Total length	Tolerance in length
D 2 mm	+0.15mm, +0.3mm	330mm	+0, +4mm
D 3 mm	+0.30mm, +0.5mm	330mm	+0, +4mm
D 4 mm	+0.30mm, +0.5mm	330mm	+0, +4mm
D 5 mm	+0.30mm, +0.5mm	330mm	+0, +4mm
D 6 mm	+0.30mm, +0.6mm	330mm	+0, +4mm
D 7 mm	+0.30mm, +0.6mm	330mm	+0, +4mm
D 8 mm	+0.30mm, +0.6mm	330mm	+0, +4mm
D 9 mm	+0.30mm, +0.6mm	330mm	+0, +4mm
D 10 mm	+0.30mm, +0.6mm	330mm	+0, +4mm
D 11 mm	+0.30mm, +0.6mm	330mm	+0, +4mm
D 12 mm	+0.30mm, +0.7mm	330mm	+0, +4mm
D 13 mm	+0.30mm, +0.7mm	330mm	+0, +4mm
D 14 mm	+0.30mm, +0.7mm	330mm	+0, +4mm
D 15 mm	+0.30mm, +0.7mm	330mm	+0, +4mm
D 16 mm	+0.30mm, +0.8mm	330mm	+0, +4mm
D 17 mm	+0.30mm, +0.8mm	330mm	+0, +4mm
D 18 mm	+0.30mm, +0.8mm	330mm	+0, +4mm
D 19 mm	+0.30mm, +0.8mm	330mm	+0, +4mm
D 20 mm	+0.30mm, +0.8mm	330mm	+0, +4mm
D 21 mm	+0.30mm, +0.8mm	330mm	+0, +4mm
D 22 mm	+0.30mm, +0.8mm	330mm	+0, +4mm
D 23 mm	+0.30mm, +0.8mm	330mm	+0, +4mm
D 24 mm	+0.30mm, +0.8mm	330mm	+0, +4mm
D 25 mm	+0.30mm, +0.8mm	330mm	+0, +4mm
D 26 mm	+0.5mm, +1.0mm	330mm	+0, +4mm
D 27 mm	+0.5mm, +1.0mm	330mm	+0, +4mm
D 28 mm	+0.5mm, +1.0mm	330mm	+0, +4mm
D 29mm	+0.5mm, +1.0mm	330mm	+0, +4mm
D 30mm	+0.5mm, +1.0mm	330mm	+0, +4mm
D 31mm- D 50mm	+1.0mm, +2.0mm	330mm	+0, +4mm

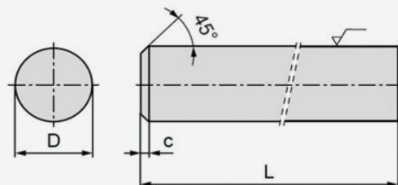
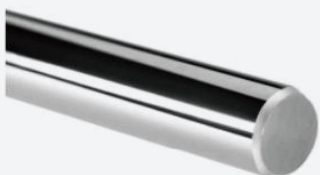
Ground Solid Carbide Rods



Diameter	Tolerance in ground	Total length	Tolerance in length
D 2 mm	h5/h6	330mm	+0, +4mm
D 3 mm		330mm	+0, +4mm
D 4 mm		330mm	+0, +4mm
D 5 mm		330mm	+0, +4mm
D 6 mm		330mm	+0, +4mm
D 7 mm		330mm	+0, +4mm
D 8 mm		330mm	+0, +4mm
D 9 mm		330mm	+0, +4mm
D 10 mm		330mm	+0, +4mm
D 11 mm		330mm	+0, +4mm
D 12 mm		330mm	+0, +4mm
D 13 mm		330mm	+0, +4mm
D 14 mm		330mm	+0, +4mm
D 15 mm		330mm	+0, +4mm
D 16 mm		330mm	+0, +4mm
D 17 mm		330mm	+0, +4mm
D 18 mm		330mm	+0, +4mm
D 19 mm		330mm	+0, +4mm
D 20 mm		330mm	+0, +4mm
D 21 mm		330mm	+0, +4mm
D 22 mm		330mm	+0, +4mm
D 23 mm		330mm	+0, +4mm
D 24 mm		330mm	+0, +4mm
D 25 mm		330mm	+0, +4mm
D 26mm		330mm	+0, +4mm
D 27mm		330mm	+0, +4mm
D 28mm		330mm	+0, +4mm
D 29mm		330mm	+0, +4mm
D 30mm		330mm	+0, +4mm
D 31- D 50mm		330mm	+0, +4mm



Ground Carbide Rods with 1-end chamfer



Standard Metric Size

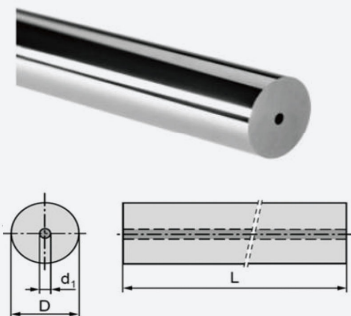
Diameter	Total length (+0, +1mm)	Chamfer size(±0.1mm)	Angle of chamfer (±3°)
D 3mm	40 mm	0.4 mm	45°
D 3 mm	50 mm	0.4 mm	45°
D 3 mm	70 mm	0.4 mm	45°
D 3 mm	100 mm	0.4 mm	45°
D 3mm	150 mm	0.4 mm	45°
D 4 mm	40 mm	0.4 mm	45°
D 4 mm	50mm	0.4 mm	45°
D 4 mm	75 mm	0.4 mm	45°
D 4 mm	100 mm	0.4 mm	45°
D 4 mm	150 mm	0.4 mm	45°
D 5 mm	50 mm	0.5 mm	45°
D 5 mm	55 mm	0.5 mm	45°
D 5 mm	60 mm	0.5 mm	45°
D 5 mm	70 mm	0.5 mm	45°
D 5 mm	80 mm	0.5 mm	45°
D 5 mm	100 mm	0.5 mm	45°
D 5 mm	150 mm	0.5 mm	45°
D 6 mm	50 mm	0.5 mm	45°
D 6 mm	60 mm	0.5 mm	45°
D 6 mm	75 mm	0.5 mm	45°
D 6 mm	100 mm	0.5 mm	45°
D 6 mm	150 mm	0.5 mm	45°
D 7 mm	55 mm	0.6 mm	45°
D 7 mm	60 mm	0.6 mm	45°
D 8 mm	60 mm	0.6 mm	45°
D 8 mm	75 mm	0.6 mm	45°
D 8 mm	80 mm	0.6 mm	45°
D 8 mm	90 mm	0.6 mm	45°
D 8 mm	100 mm	0.6 mm	45°
D 8 mm	150 mm	0.6 mm	45°
D 10 mm	70 mm	0.6 mm	45°
D 10 mm	75 mm	0.6 mm	45°
D 10 mm	90 mm	0.6 mm	45°

Diameter	Total length (+0, +1mm)	Chamfer size(±0.1mm)	Angle of chamfer (±3°)
D 10 mm	100 mm	0.6 mm	45°
D 10 mm	125 mm	0.6 mm	45°
D 11 mm	110 mm	0.8 mm	45°
D 12 mm	75 mm	0.8 mm	45°
D 12 mm	90 mm	0.8 mm	45°
D 12 mm	100 mm	0.8 mm	45°
D 12 mm	120 mm	0.8 mm	45°
D 14 mm	75 mm	0.8 mm	45°
D 14 mm	110 mm	0.8 mm	45°
D 14 mm	125 mm	0.8 mm	45°
D 16 mm	100 mm	0.8 mm	45°
D 16 mm	125 mm	0.8 mm	45°
D 18 mm	100 mm	0.8 mm	45°
D 18 mm	150 mm	0.8 mm	45°
D 20 mm	100 mm	1.0 mm	45°
D 20 mm	120 mm	1.0 mm	45°
D 20 mm	150 mm	1.0 mm	45°
D 25 mm	100 mm	1.0 mm	45°
D 25 mm	150 mm	1.0 mm	45°

Standard Inch Size

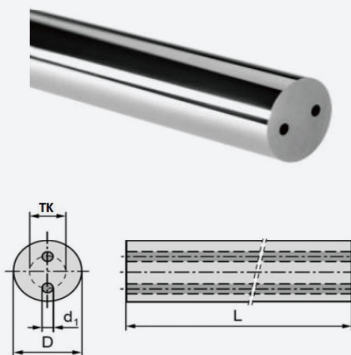
Diameter	Total length	Chamfer size		Angle of chamfer (±3°)
		C	Tolerance	
1/8"	1/1-2"	0.015"	±-0.004"	45°
1/8"	2"	0.015"	±-0.004"	45°
1/8"	2-1/2"	0.015"	±-0.004"	45°
1/8"	3"	0.015"	±-0.004"	45°
3/16"	2"	0.015"	±-0.004"	45°
3/16"	3"	0.015"	±-0.004"	45°
1/4"	2"	0.015"	±-0.004"	45°
1/4"	2/1-2"	0.015"	±-0.004"	45°
1/4"	3"	0.015"	±-0.004"	45°
1/4"	4"	0.015"	±-0.004"	45°
5/16"	2-1/2"	0.015"	±-0.004"	45°
3/8"	2-1/2"	0.015"	±-0.004"	45°
3/8"	3"	0.015"	±-0.004"	45°
1/2"	2-1/2"	0.015"	±-0.004"	45°
1/2"	3"	0.015"	±-0.004"	45°
1/2"	4"	0.015"	±-0.004"	45°
5/8"	3-1/2"	0.015"	±-0.004"	45°
3/4"	4"	0.015"	±-0.004"	45°
3/4"	5"	0.015"	±-0.004"	45°
1"	4"	0.015"	±-0.004"	45°

Carbide Rod with 1 straight central coolant hole



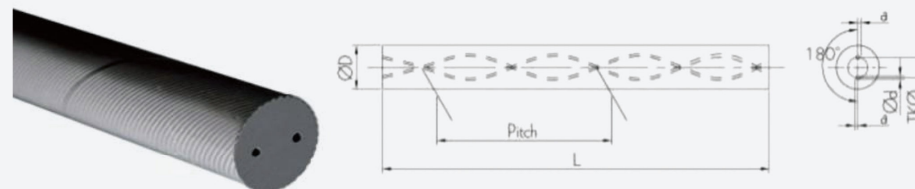
D mm	d mm	Aperture tolerance	L mm	a mm
3	0.3	±0.10	330	0.1
3	0.5	±0.10	330	0.1
4	0.8	±0.10	330	0.1
6	1	±0.15	330	0.15
8	1	±0.15	330	0.15
10	1.4	±0.15	330	0.2
12	1.75	±0.15	330	0.3
16	2	±0.20	330	0.4
18	2.5	±0.20	330	0.5
20	2.5	±0.20	330	0.5
22	3	±0.20	330	0.5
24	3	±0.25	330	0.5
25	3	±0.25	330	0.5
26	3	±0.25	330	0.5
28	3	±0.25	330	0.5
30	3	±0.25	330	0.5
32	3	±0.25	330	0.5

Carbide Rods with 2 straight coolant holes



D mm	L mm	TK		d1		a mm
		TKΦ	tolerance	d	tolerance	
6	330	3	-0.2,+0	0.8	±0.10	0.15
8	330	4	-0.3,+0	1	±0.15	0.15
10	330	5	-0.3,+0	1	±0.15	0.2
12	330	6	-0.3,+0	1.2	±0.15	0.3
16	330	8	-0.3,+0	1.5	±0.15	0.4
18	330	9	-0.3,+0	2	±0.20	0.5
20	330	10	-0.4,+0	2	±0.20	0.5
22	330	11	-0.4,+0	2	±0.20	0.5
24	330	12	-0.5,+0	2	±0.20	0.5
25	330	12	-0.5,+0	2	±0.20	0.5
26	330	13	-0.5,+0	2	±0.20	0.5
28	330	14	-0.2,+0	2	±0.20	0.5
30	330	15	-0.2,+0	2	±0.20	0.5
32	330	16	-0.2,+0	2	±0.20	0.5

Carbide rods with 2 helix holes -30°



Diameter X Length	Inner hole	Tolerance	TK	Tolerance	Pitch
					(±1°)
D3X330 mm	d 0.4 mm	±0.1 mm	1.6 mm	±0.1 mm	16.32°
D4X330 mm	d 0.6 mm	±0.1 mm	2.1 mm	±0.1 mm	21.77°
D5X330 mm	d 0.7 mm	±0.1 mm	2.4 mm	±0.2 mm	27.21°
D6X330 mm	d 0.7 mm	±0.1 mm	2.4 mm	±0.2 mm	32.65°
D7X330 mm	d 1.0 mm	±0.15 mm	3.5 mm	±0.2 mm	38.09°
D8X330 mm	d 1.0 mm	±0.15 mm	3.8 mm	±0.2 mm	43.53°
D9X330 mm	d 1.4 mm	±0.15 mm	4.5 mm	±0.3 mm	48.97°
D10X330 mm	d 1.4 mm	±0.15 mm	4.5 mm	±0.3 mm	54.41°
D11X330 mm	d 1.4 mm	±0.15 mm	4.9 mm	±0.4 mm	59.86°
D12X330 mm	d 1.4 mm	±0.15 mm	5.4 mm	±0.4 mm	65.30°
D13X330 mm	d 1.75 mm	±0.20 mm	6.1 mm	±0.4 mm	70.74°
D14X330 mm	d 1.75 mm	±0.20 mm	6.7 mm	±0.4 mm	76.18°
D15X330 mm	d 1.75 mm	±0.20 mm	7.3 mm	±0.4 mm	81.62°
D16X330 mm	d 1.75 mm	±0.20 mm	8.0 mm	±0.4 mm	87.06°
D17X330 mm	d 2.00 mm	±0.25 mm	8.0 mm	±0.4 mm	92.50°
D18X330 mm	d 2.00 mm	±0.25 mm	9.0 mm	±0.4 mm	97.95°
D19X330 mm	d 2.00 mm	±0.25 mm	9.0 mm	±0.4 mm	103.39°
D20X330 mm	d 2.00 mm	±0.25 mm	10.0 mm	±0.4 mm	108.83°
D21X330 mm	d 2.00 mm	±0.25 mm	10.0 mm	±0.5 mm	114.27°
D22X330 mm	d 2.00 mm	±0.30 mm	10.0 mm	±0.5 mm	119.71°
D23X330 mm	d 2.00 mm	±0.30 mm	10.0 mm	±0.5 mm	125.15°
D24X330 mm	d 2.00 mm	±0.30 mm	12.0 mm	±0.5 mm	130.59°
D25X330 mm	d 2.00 mm	±0.30 mm	12.0 mm	±0.5 mm	136.05°
D26X330 mm	d 2.00 mm	±0.30 mm	12.0 mm	±0.5 mm	141.48°



3XD GROUND SOLID CARBIDE HELIX ROD



Diameter X Length	Inner hole	Tolerance	TK	Tolerance	Pitch (±1°)
D6x63 mm	d 0.7 mm	±0.1 mm	1.9 mm	±0.15 mm	22.5°
D 6x67 mm	d 0.8 mm	±0.1 mm	2.7 mm	±0.2 mm	32.7°
D 8X80.5 mm	d 1.0 mm	±0.15 mm	3.4 mm	±0.2 mm	43.5°
D 10X90.5 mm	d 1.3 mm	±0.15 mm	4.8 mm	±0.3 mm	54.4°
D 12X104 mm	d 1.7 mm	±0.2 mm	6.3 mm	±0.4 mm	65.0°
D 14X109 mm	d 1.8 mm	±0.2 mm	6.7 mm	±0.4 mm	76.20°
D 16X117.5 mm	d 2.0 mm	±0.2 mm	8.0 mm	±0.4 mm	87.10°
D 18X125.5 mm	d 2.3 mm	±0.2 mm	9.0 mm	±0.45 mm	98.0°
D 20X134 mm	d 2.5 mm	±0.2 mm	10.0 mm	±0.5 mm	108.80°

5XD GROUND SOLID CARBIDE HELIX ROD

Diameter X Length	Inner hole	Tolerance	TK	Tolerance	Pitch (±1°)
D6x75 mm	d 0.7 mm	0.1 mm	1.9 mm	±0.15	22.5°
D 6x83 mm	d 0.8 mm	±0.1 mm	2.7 mm	±0.2	32.7°
D 8x92.5 mm	d 1.0 mm	±0.15 mm	3.4 mm	±0.20	43.5°
D 10x104.5 mm	d 1.3 mm	±0.15 mm	4.8 mm	±0.30	54.4°
D 12x120 mm	d 1.7 mm	±0.20 mm	6.3 mm	±0.40	65°
D 14x126.5 mm	d 1.8 mm	±0.20 mm	6.7 mm	±0.40	76.2°
D 16x135.5 mm	d 2.0 mm	±0.20 mm	8.0 mm	±0.40	87.10°
D 18x145.5 mm	d 2.3 mm	±0.20 mm	9.0 mm	±0.45	98.0°
D 20x156 mm	d 2.5 mm	±0.20 mm	10.0 mm	±0.50	108.8°

8XD GROUND SOLID CARBIDE HELIX ROD

Diameter X Length	Inner hole	Tolerance	TK	Tolerance	Pitch (±1°)
D6X86 mm	d 0.7mm	±0.1mm	1.9 mm	±0.15 mm	22.5°
D6X98 mm	d 0.8 mm	±0.05 mm	2.7 mm	±0.2 mm	32.7°
D8X107.5 mm	d 1.0 mm	±0.05 mm	3.4 mm	±0.2 mm	43.5°
D8X117.5 mm	d 1.0 mm	±0.05 mm	3.4 mm	±0.2 mm	43.5°
D10X135.5 mm	d 1.3 mm	±0.05 mm	4.8 mm	±0.23 mm	54.4°
D12X157 mm	d 1.7 mm	±0.075 mm	6.3 mm	±0.23 mm	65°
D14X184.5 mm	d 1.8 mm	±0.075 mm	6.7 mm	±0.26 mm	76.2°
D16X206.5 mm	d 2.0 mm	±0.075 mm	8.0 mm	±0.40 mm	87.10°
D18X225.5 mm	d 2.3 mm	±0.075 mm	9.0 mm	±0.45 mm	98.0°
D20X247 mm	d 2.5 mm	±0.075 mm	10.0 mm	±0.50 mm	108.8°

12XD GROUND SOLID CARBIDE HELIX ROD

Diameter X Length	Inner hole	Tolerance	TK	Tolerance	Pitch (±1°)
D6X103.5mm	d 0.7mm	±0.1mm	1.9 mm	±0.15 mm	22.5°
D6X122.5mm	d 0.8 mm	±0.05 mm	2.7 mm	±0.2 mm	32.7°
D8X150mm	d 1.0 mm	±0.05 mm	3.4 mm	±0.2 mm	43.5°
D10X183mm	d 1.3 mm	±0.05 mm	4.8 mm	±0.23 mm	54.4°
D12X208mm	d 1.7 mm	±0.075 mm	6.3 mm	±0.23 mm	65°
D14X233mm	d 1.8 mm	±0.075 mm	6.7 mm	±0.26 mm	76.2°
D16X263mm	d 2.0 mm	±0.075 mm	8.0 mm	±0.40 mm	87.10°
D18X288mm	d 2.3 mm	±0.075 mm	9.0 mm	±0.45 mm	98.0°
D20X313.5mm	d 2.5 mm	±0.075 mm	10.0 mm	±0.50 mm	108.8°