

GREWIN- SOLID CARBIDE ROD



Zhuzhou Grewin Tungsten Carbide Tools Co., Ltd

GREWIN -Committed to Cost-Effective Solid Carbide Cutting Tools

格威-致力于高性价比钨钢刀具及材料

GREWIN- PRODUCTION PROCESS OF SOLID CARBIDE ROD



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GREWIN- PRODUCTION EQUIPEMNT OF SOLID CARBIDE ROD



可倾式球磨机
Ball milling



喷雾塔
Spray dry



全自动压力机
Autopress



干式等静压机
Dry isostatic pressing



冷等静压机
Cold isostatic pressing



多气氛压力烧结炉
S-HIP furnace

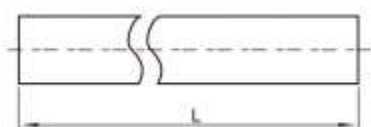
GREWIN-GRADE INTRODUCTION



GREWIN Grade	ISO Grade	Grain Size	Cobalt Content	Hardness (HRA)	Density (g/cm ³)	T.R.S (N/mm ²)	Application
GW10	K20-K30	0.8	10%	91.8	14.4	3800	For end mills and solid drill. Cutting for general steel with HRC < 48, stainless steel, Grey Cast Iron and heat resistant alloy
GW11	K20-K30	0.6	10%	92.5	14.4	3800	For end mills and solid drill. Cutting for general steel with HRC < 55, stainless steel, Grey Cast Iron and heat resistant alloy
GW12	K20-K30	0.4	12%	92.5	14.2	4000	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.
GW13	K10-K20	0.4	8.5%	93.5	14.5	3500	For end mills with high wear resistant, engraving tool. For cutting PCB and Plastic plate.
GW14	K05-K10	0.4	6%	94	14.8	3500	For end mills with high wear resistant, engraving tool. For cutting PCB and composite materials
GW15	K01-K05	0.3	12%	93	14.2	3500	For end mills and drills in tempered steel, stainless steel, heat resistant alloy, titanium alloy, Nickle alloy, composite materials, and CFRP

GREWIN CARBIDE

SOLID CARBIDE ROD IN METRI SIZE

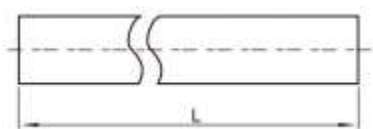


毛坯 Unground



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

SOLID CARBIDE ROD IN METRI SIZE

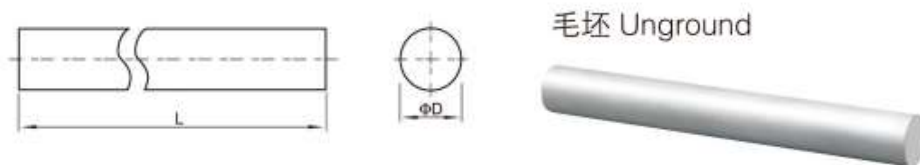


精磨 Ground



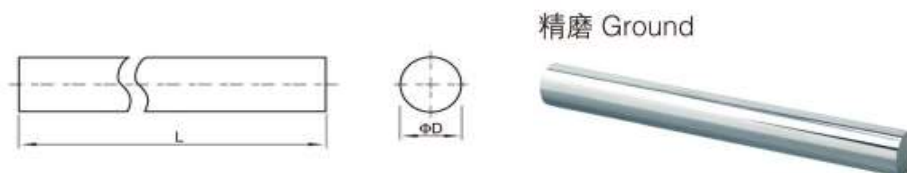
Diameter	Tolerance in ground	Total length	Tolerance in length
D 2 mm	h5/h6	330mm	+0, +5mm
D 3 mm		330mm	+0, +5mm
D 4 mm		330mm	+0, +5mm
D 5 mm		330mm	+0, +5mm
D 6 mm		330mm	+0, +5mm
D 7 mm		330mm	+0, +5mm
D 8 mm		330mm	+0, +5mm
D 9 mm		330mm	+0, +5mm
D 10 mm		330mm	+0, +5mm
D 11 mm		330mm	+0, +5mm
D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

UNGROUND SOLID CARBIDE ROD IN INCH SIZE



Diameter	Tolerance in unground	Total length	Tolerance in length
D 1/8"	+0.012, +0.02"	3-1/8"	+1/8, +3/8"
D 3/8"	+0.012, +0.02"	13-1/8"	+1/8, +3/8"
D 5/32"	+0.012, +0.02"	13-1/8"	+1/8, +3/8"
D 11/64"	+0.012, +0.02"	13-1/8"	+1/8, +3/8"
D 3/16"	+0.012, +0.02"	13-1/8"	+1/8, +3/8"
D 13/64"	+0.012, +0.02"	13-1/8"	+1/8, +3/8"
D 7/32"	+0.012, +0.02"	13-1/8"	+1/8, +3/8"
D 15/64"	+0.012, +0.02"	13-1/8"	+1/8, +3/8"
D 1/4"	+0.012, +0.024"	13-1/8"	+1/8, +3/8"
D 9/32"	+0.012, +0.024"	12-1/8"	+1/8, +3/8"
D 19/64"	0.012, +0.024"	12-1/8"	+1/8, +3/8"
D 5/16"	0.012, +0.024"	12-1/8"	+1/8, +3/8"
D 21/64"	0.012, +0.024"	12-1/8"	+1/8, +3/8"
D 11/32"	0.012, +0.024"	12-1/8"	+1/8, +3/8"
D 23/64"	0.012, +0.024"	12-1/8"	+1/8, +3/8"
D 3/8"	0.012, +0.024"	12-1/8"	+1/8, +3/8"
D 25/64"	0.012, +0.024"	12-1/8"	+1/8, +3/8"
D 13/32"	0.012, +0.024"	12-1/8"	+1/8, +3/8"
D 27/64"	0.012, +0.024"	12-1/8"	+1/8, +3/8"
D 7/16"	0.012, +0.024"	12-1/8"	+1/8, +3/8"
D 29/64"	0.012, +0.024"	12-1/8"	+1/8, +3/8"
D 15/32"	0.012, +0.024"	12-1/8"	+1/8, +3/8"
D 31/64"	0.012, +0.028"	12-1/8"	+1/8, +3/8"
D 1/2"	0.012, +0.028"	12-1/8"	+1/8, +3/8"
D 17/32"	0.012, +0.028"	12-1/8"	+1/8, +3/8"
D 9/16"	0.012, +0.028"	12-1/8"	+1/8, +3/8"
D 5/8"	0.012, +0.032"	12-1/8"	+1/8, +3/8"
D 11/16"	0.012, +0.032"	12-1/8"	+1/8, +3/8"
D 3/4"	0.012, +0.032"	12-1/8"	+1/8, +3/8"
D 13/16"	0.012, +0.032"	12-1/8"	+1/8, +3/8"
D 7/8"	0.012, +0.032"	12-1/8"	+1/8, +3/8"
D 15/16"	0.012, +0.032"	12-1/8"	+1/8, +3/8"
1"	0.012, +0.032"	12-1/8"	+1/8, +3/8"

GROUND SOLID CARBIDE ROD IN INCH SIZE



Diameter	Tolerance in unground	Total length	Tolerance in length
D 1/8"	h5/h6	3-1/8"	+1/8, +3/8"
D 3/8"		13-1/8"	+1/8, +3/8"
D 5/32"		13-1/8"	+1/8, +3/8"
D 11/64"		13-1/8"	+1/8, +3/8"
D 3/16"		13-1/8"	+1/8, +3/8"
D 13/64"		13-1/8"	+1/8, +3/8"
D 7/32"		13-1/8"	+1/8, +3/8"
D 15/64"		13-1/8"	+1/8, +3/8"
D 1/4"		13-1/8"	+1/8, +3/8"
D 9/32"		12-1/8"	+1/8, +3/8"
D 19/64"		12-1/8"	+1/8, +3/8"
D 5/16"		12-1/8"	+1/8, +3/8"
D 21/64"		12-1/8"	+1/8, +3/8"
D 11/32"		12-1/8"	+1/8, +3/8"
D 23/64"		12-1/8"	+1/8, +3/8"
D 3/8"		12-1/8"	+1/8, +3/8"
D 25/64"		12-1/8"	+1/8, +3/8"
D 13/32"		12-1/8"	+1/8, +3/8"
D 27/64"		12-1/8"	+1/8, +3/8"
D 7/16"		12-1/8"	+1/8, +3/8"
D 29/64"		12-1/8"	+1/8, +3/8"
D 15/32"		12-1/8"	+1/8, +3/8"
D 31/64"		12-1/8"	+1/8, +3/8"
D 1/2"		12-1/8"	+1/8, +3/8"
D 17/32"		12-1/8"	+1/8, +3/8"
D 9/16"		12-1/8"	+1/8, +3/8"
D 5/8"		12-1/8"	+1/8, +3/8"
D 11/16"		12-1/8"	+1/8, +3/8"
D 3/4"		12-1/8"	+1/8, +3/8"
D 13/16"		12-1/8"	+1/8, +3/8"
D 7/8"		12-1/8"	+1/8, +3/8"
D 15/16"		12-1/8"	+1/8, +3/8"
1"		12-1/8"	+1/8, +3/8"

GROUND SOLID ROD WITH CHAMFER-Metric size-GROUND in h5/h6



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	50 mm	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°

GROUND SOLID ROD WITH CHAMFER-Metric size-GROUND in h5/h6



Diameter	Total length (+0, +1mm)	Chamfer size(+/-0.1mm)	Angle of chamfer (+/-3°)
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°
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°

GROUND SOLID ROD WITH CHAMFER-Metric size-GROUND in h5/h6

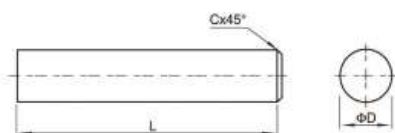


Diameter	Total length	Chamfer size		Angle of chamfer (+/-3°)
		C	Tolerance	
D 1/8"	1/1-2"	0.015"	+/-0.004"	45°
D 1/8"	2"	0.015"	+/-0.004"	45°
D 1/8"	2-1/2"	0.015"	+/-0.004"	45°
D 1/8"	3"	0.015"	+/-0.004"	45°
D 3/16"	2"	0.015"	+/-0.004"	45°
D 3/16"	3"	0.015"	+/-0.004"	45°
D 1/4"	2"	0.015"	+/-0.004"	45°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

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GROUND SOLID ROD WITH CHAMFER-DIN h5/h6



Diameter	Total length (0,+1mm)	Chamfer size (+/-0.1mm)	Angle of chamfer (+/-3°)
D 3 mm	38 mm	0.4 mm	45°
D 3.5 mm	50 mm	0.4 mm	45°
D 4 mm	50 mm	0.4 mm	45°
D 4.5 mm	50 mm	0.5 mm	45°
D 5 mm	50 mm	0.5 mm	45°
D 5.5 mm	57 mm	0.5 mm	45°
D 6 mm	50 mm	0.5 mm	45°
D 6 mm	57 mm	0.5 mm	45°
D 6 mm	54 mm	0.5 mm	45°
D 6.5 mm	60 mm	0.6 mm	45°
D 7 mm	60 mm	0.6 mm	45°
D 7.5 mm	63 mm	0.6 mm	45°
D 8 mm	58 mm	0.6 mm	45°
D 8 mm	63 mm	0.6 mm	45°
D 8.5 mm	67 mm	0.6 mm	45°
D 9 mm	67 mm	0.6 mm	45°
D 9.5 mm	72 mm	0.6 mm	45°
D 10 mm	66 mm	0.6 mm	45°
D 10 mm	72 mm	0.6 mm	45°
D 11 mm	83 mm	0.8 mm	45°
D 12 mm	73 mm	0.8 mm	45°
D 12 mm	83 mm	0.8 mm	45°
D 13 mm	83 mm	0.8 mm	45°
D 14 mm	75 mm	0.8 mm	45°
D 14 mm	83 mm	0.8 mm	45°
D 15 mm	92 mm	0.8 mm	45°
D 16 mm	82 mm	0.8 mm	45°
D 16 mm	92 mm	0.8 mm	45°
D 18 mm	84 mm	0.8 mm	45°
D 18 mm	92 mm	0.8 mm	45°
D 20 mm	92 mm	1.0 mm	45°
D 20 mm	104 mm	1.0 mm	45°

GROUND SOLID ROD WITH CHAMFER-DIN h5/h6



For making solid drill

Diameter	Total length (0, +1mm)	Chamfer size (+/-0.1mm)	Angle of chamfer (+/-3°)
D 3 mm	47 mm	0.4 mm	45°
D 4 mm	56 mm	0.4 mm	45°
D 5 mm	63 mm	0.5 mm	45°
D 6 mm	63 mm	0.5 mm	45°
D 6 mm	67 mm	0.5 mm	45°
D 6 mm	75 mm	0.5 mm	45°
D 6 mm	83 mm	0.5 mm	45°
D 7 mm	75 mm	0.5 mm	45°
D 8 mm	80 mm	0.6 mm	45°
D 8 mm	92 mm	0.6 mm	45°
D 9 mm	85 mm	0.6 mm	45°
D 10 mm	90 mm	0.6 mm	45°
D 10 mm	104 mm	0.6 mm	45°
D 11 mm	96 mm	0.6 mm	45°
D 12 mm	103 mm	0.8 mm	45°
D 12 mm	119 mm	0.8 mm	45°
D 13 mm	103 mm	0.8 mm	45°
D 14 mm	108 mm	0.8 mm	45°
D 14 mm	125 mm	0.8 mm	45°
D 15 mm	112 mm	0.8 mm	45°
D 16 mm	116 mm	0.8 mm	45°
D 16 mm	134 mm	0.8 mm	45°
D 17 mm	120 mm	0.8 mm	45°
D 18 mm	124 mm	0.8 mm	45°
D 18 mm	144 mm	0.8 mm	45°
D 19 mm	128 mm	1.0 mm	45°
D 20 mm	132 mm	1.0 mm	45°
D 20 mm	154 mm	1.0 mm	45°

UNGROUND SOLID ROD WITH 1 STRAIGHT CENTRAL COOLANT HOLE



Diameter	Total length (0, +5mm)	Hole size	Tolerance of hole size	a
D 3 mm	330 mm	0.3	+/-0.1mm	0.1
D 4 mm	330 mm	0.6	+/-0.1mm	0.1
D 6 mm	330 mm	1.0	+/-0.15mm	0.15
D 8 mm	330 mm	1.3	+/-0.15mm	0.15
D 10 mm	330 mm	2.0	+/-0.2mm	0.2
D 12 mm	330 mm	2.0	+/-0.2mm	0.3
D 14 mm	330 mm	2.0	+/-0.2mm	0.37
D 16 mm	330 mm	2.0	+/-0.2mm	0.4
D 18 mm	330 mm	3.0	+/-0.25mm	0.5
D 20 mm	330 mm	3.0	+/-0.25mm	0.5
D 22 mm	330 mm	3.0	+/-0.25mm	0.5
D 24 mm	330 mm	4.0	+/-0.30mm	0.5
D 26 mm	330 mm	4.0	+/-0.30mm	0.5
D 28 mm	330 mm	4.0	+/-0.30mm	0.5
D 30 mm	330 mm	5.0	+/-0.35mm	0.5

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UNGROUND SOLID ROD WITH 2 STRAIGHT COOLANT HOLES



Diameter X Length	Inner hole	Tolerance	TK	Tolerance	a
D4X330 mm	d 0.8 mm	+/-0.1mm	1.72 mm	+/-0.08 mm	0.10 mm
D5X330 mm	d 0.8 mm	+/-0.1mm	1.92 mm	+/-0.08 mm	0.13 mm
D6X330 mm	d 1.0 mm	+/-0.1mm	2.9 mm	+/-0.1 mm	0.15 mm
D7X330 mm	d 1.0 mm	+/-0.15mm	3.4 mm	+/-0.1 mm	0.15 mm
D8X330 mm	d 1.0 mm	+/-0.15mm	3.85 mm	+/-0.15 mm	0.15 mm
D9X330 mm	d 1.4 mm	+/-0.15mm	3.85 mm	+/-0.15 mm	0.2 mm
D10X330 mm	d 1.4 mm	+/-0.15mm	4.85 mm	+/-0.15 mm	0.2 mm
D11X330 mm	d 1.4 mm	+/-0.15mm	4.85 mm	+/-0.15 mm	0.28 mm
D12X330 mm	d 1.75 mm	+/-0.15mm	5.85 mm	+/-0.15 mm	0.3 mm
D13X330 mm	d 1.75 mm	+/-0.15mm	5.85 mm	+/-0.15 mm	0.34 mm
D14X330 mm	d 1.75 mm	+/-0.15mm	6.85 mm	+/-0.15 mm	0.37 mm
D15X330 mm	d 2.0 mm	+/-0.20mm	6.85 mm	+/-0.15 mm	0.4 mm
D16X330 mm	d 2.0 mm	+/-0.20mm	7.85 mm	+/-0.15 mm	0.4 mm
D17X330 mm	d 2.0 mm	+/-0.20mm	7.85 mm	+/-0.15 mm	0.47 mm
D18X330 mm	d 2.0 mm	+/-0.20mm	8.85 mm	+/-0.15 mm	0.5 mm
D19X330 mm	d 2.0 mm	+/-0.20mm	8.85 mm	+/-0.15 mm	0.5 mm
D20X330 mm	d 2.5 mm	+/-0.25mm	9.8 mm	+/-0.20 mm	0.5 mm
D21X330 mm	d 2.5 mm	+/-0.25mm	9.8 mm	+/-0.20 mm	0.5 mm
D22X330 mm	d 2.5 mm	+/-0.25mm	10.8 mm	+/-0.20 mm	0.5 mm
D23X330 mm	d 2.5 mm	+/-0.25mm	10.8 mm	+/-0.20 mm	0.5 mm
D24X330 mm	d 3.0 mm	+/-0.25mm	11.75 mm	+/-0.20 mm	0.5 mm
D25X330 mm	d 3.0 mm	+/-0.25mm	11.75 mm	+/-0.20 mm	0.5 mm
D26X330 mm	d 3.0 mm	+/-0.25mm	12.75 mm	+/-0.20 mm	0.5 mm

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UNGROUND SOLID ROD WITH 2 STRAIGHT COOLANT HOLES -NEAR HOLE

NEAR HOLE

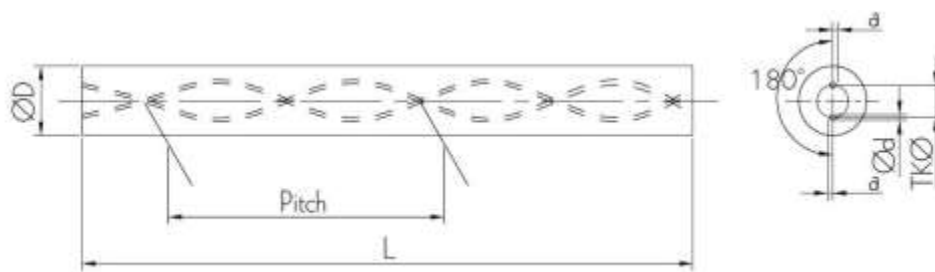


NEAR HOLE

Diameter X Length	Inner hole	Tolerance	TK	Tolerance	a
D7 X330 mm	d 0.8 mm	+/-0.1	1.4	+/-0.1	0.15
D8 X330 mm	d 0.8 mm	+/-0.1	1.4	+/-0.1	0.15
D8 X330 mm	d 0.8 mm	+/-0.1	1.85	+/-0.1	0.15
D8 X330 mm	d 1.0 mm	+/-0.1	2.45	+/-0.15	0.15
D9 X330 mm	d 1.0 mm	+/-0.1	2.45	+/-0.15	0.2
D10 X330 mm	d 1.0 mm	+/-0.1	2.45	+/-0.15	0.2
D11 X330 mm	d 1.2 mm	+/-0.15	3.35	+/-0.15	0.28
D12 X330 mm	d 1.2 mm	+/-0.15	3.35	+/-0.15	0.3
D13 X330 mm	d 1.2 mm	+/-0.15	3.35	+/-0.15	0.34
D14 X330 mm	d 1.5 mm	+/-0.15	4.85	+/-0.15	0.37
D15 X330 mm	d 1.5 mm	+/-0.15	4.85	+/-0.15	0.4
D16 X330 mm	d 1.5 mm	+/-0.15	4.85	+/-0.15	0.4
D17 X330 mm	d 2.0 mm	+/-0.20	6	+/-0.2	0.47
D18 X330 mm	d 2.0 mm	+/-0.20	6	+/-0.15	0.5
D19 X330 mm	d 2.0 mm	+/-0.20	6	+/-0.15	0.5
D20 X330 mm	d 2.0 mm	+/-0.20	6	+/-0.2	0.5
D21 X330 mm	d 2.0 mm	+/-0.20	6	+/-0.2	0.5
D22 X330 mm	d 2.0 mm	+/-0.20	6	+/-0.2	0.5
D23 X330 mm	d 2.0 mm	+/-0.20	7.3	+/-0.2	0.5
D24 X330 mm	d 2.0 mm	+/-0.20	7.3	+/-0.2	0.5
D25 X330 mm	d 2.0 mm	+/-0.20	7.3	+/-0.2	0.5
D26 X330 mm	d 2.0 mm	+/-0.20	7.3	+/-0.25	0.5

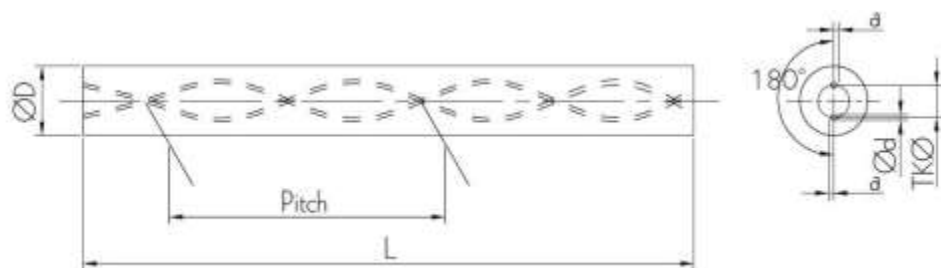
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UNGROUND SOLID ROD WITH 2 HELIX HOLES – 30°


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°

UNGROUND SOLID ROD WITH T 2 HELIX HOLES – 40°

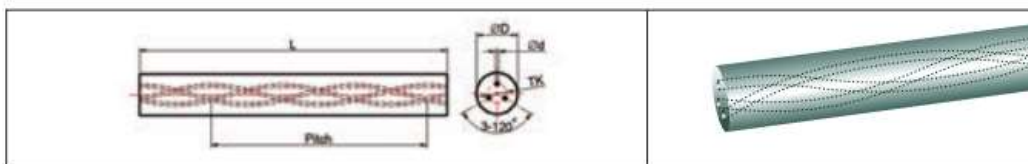


Diameter X Length	Inner hole	Tolerance	TK	Tolerance	Pitch (+/-1°)
D6X330 mm	d 0.7 mm	+/-0.1 mm	1.9 mm	+/-0.1 mm	22.46°
D8x330 mm	d 0.65 mm	+/-0.1 mm	2.4 mm	+/-0.2 mm	29.95°
D10 X330 mm	d 0.80 mm	+/-0.1 mm	3.1 mm	+/-0.2 mm	37.44°
D12 X330 mm	d 0.9 mm	+/-0.1 mm	3.8 mm	+/-0.2 mm	44.93°
D14 X330 mm	d 1.0 mm	+/-0.15 mm	4.3 mm	+/-0.3 mm	52.42°
D16 X330mm	d 1.2 mm	+/-0.15 mm	5.1 mm	+/-0.4 mm	59.90°
D18 X330mm	d 1.4 mm	+/-0.15 mm	5.9 mm	+/-0.4 mm	67.39°
D20 X330mm	d 1.5 mm	+/-0.15 mm	6.6 mm	+/-0.4 mm	74.88°
D22 X330mm	d 1.7 mm	+/-0.20 mm	7.2 mm	+/-0.4 mm	82.35°
D25 X330mm	d 1.75 mm	+/-0.20 mm	7.6 mm	+/-0.4 mm	93.58°

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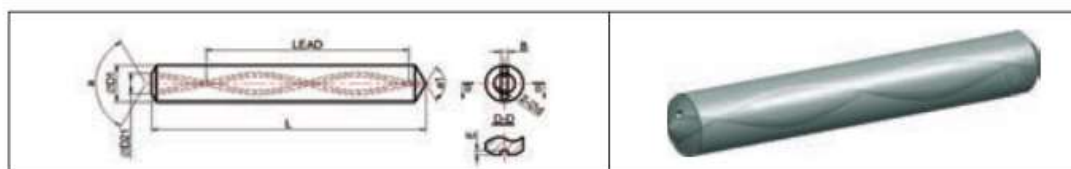
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UNGROUND SOLID ROD WITH 3 HELIX HOLES – 30°



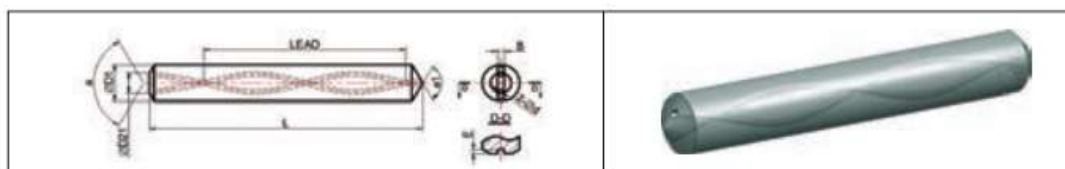
Diameter X Length	Inner hole	Tolerance	TK	Tolerance	Pitch (+/-1°)
D6X330 mm	0.5	+/-0.15	2.75	+/-0.2mm	32.65°
D8x330 mm	0.7	+/-0.15	3.85	+/-0.2mm	43.53°
D10 X330 mm	0.85	+/-0.20	4.95	+/-0.3mm	54.41°
D12 X330 mm	1.1	+/-0.20	6.05	+/-0.4mm	65.30°
D14 X330 mm	1.4	+/-0.20	7.05	+/-0.4mm	76.18°
D16 X330mm	1.6	+/-0.20	8.05	+/-0.4mm	87.06°
D18 X330mm	1.7	+/-0.25	9.25	+/-0.5mm	98.95°
D20 X330mm	1.9	+/-0.25	9.85	+/-0.5mm	108.83°

3XD GROUND SOLID CARBIDE HELIX ROD



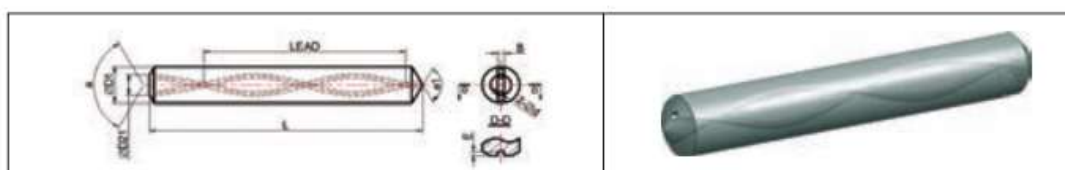
Diameter X Length	Inner hole	Tolerance	TK	Tolerance	Pitch (+/-1°)
D6x63 mm	d 0.7 mm	+/-0.1 mm	1.9 mm	+/-0.15 mm	22.5°
D 6x67 mm	d 0.8 mm	+/-0.1 mm	2.7 mm	+/-0.2 mm	32.7°
D 8X80.5 mm	d 1.0 mm	+/-0.15 mm	3.4 mm	+/-0.2 mm	43.5°
D 10X90.5 mm	d 1.3 mm	+/-0.15 mm	4.8 mm	+/-0.3 mm	54.4°
D 12X104 mm	d 1.7 mm	+/-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



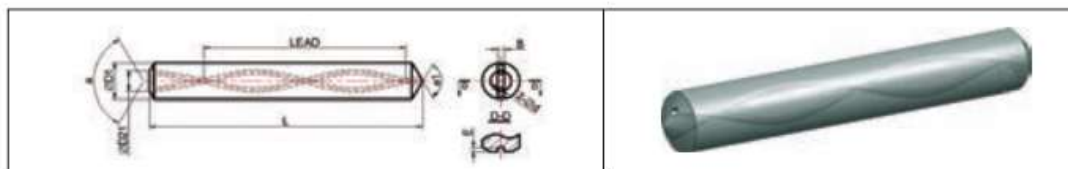
Diameter X Length	Inner hole	Tolerance	TK	Tolerance	Pitch (+/-1°)
D6x75 mm	d 0.7 mm	+/-0.1 mm	1.9 mm	+/-0.15	22.5°
D 6x83 mm	d 0.8 mm	+/-0.1 mm	2.7 mm	+/-0.2	32.7°
D 8x92.5 mm	d 1.0 mm	+/-0.15 mm	3.4 mm	+/-0.20	43.5°
D 10x104.5 mm	d 1.3 mm	+/-0.15 mm	4.8 mm	+/-0.30	54.4°
D 12x120 mm	d 1.7 mm	+/-0.20 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°