Cemented Carbide Rods Technical Data

General Descriptions:

Our mill partner for carbide has a newly built plant with high quality production facilities.The R&D and manufacturing center use the latest technology.The commitment to quality in each step of the production process results in extremely high quality carbide rods.

We provide the following cemented carbide products in metric or inches.

- Solid long rods.
- Ground rods with chamfered ends.
- Rods with two helical coolant holes (30º).
- Rods with central coolant holes.
- Rods with two straight coolant holes.

- Cemented Tungsten carbide is basically tungsten carbide grains cemented together by cobalt.
  - Cobalt is the binder.
- The size of the tungsten carbide grains and the amount of cobalt are the two factors that affect the characteristics.
- As the cobalt content increases the hardness decreases, impact resistance increases, and wear resistance decreases.
  - Parts with less cobalt break easier.
- As the tungsten carbide grains gets larger the hardness decreases, impact resistance increases and wear resistance descreases.
  -Parts with smaller tungsten carbide grains break easier.

SB Specialty Metals LLC

*Your **First Choice** for Specialty Metals*

Grades available

Grade	ISO Grade	Grain Size (μ)	Cobalt Content (wt.%)	Hardness HRA	Hardness HV30	Density (g/m^3)	TRS (psi, min)
SBC-6.4	K05-K10	0.4	6.0	94.0	2050	14.4	551,000
SBC-61	K15	1.0	6.0	92.5	1740	14.9	377,000
SBC-85.4	K10-K20	0.4	8.5	93.5	1940	14.5	551,000
SBC-9.2	K05-K10	0.2	9.0	94.0	2050	14.4	580,000
SBC-10.6	K20-K40	0.6	10.0	92.3	1700	14.4	609,000
SBC-10.7	K20-K40	0.7	10.0	91.9	1630	14.4	580,000
SBC-12.4	K20-K40	0.4	12.0	92.6	1750	14.1	609,000

Solid Rod - Selection guide

Work piece	Type of cutting Tool		SBC-9.2	SBC-6.4	SBC-85.4	SBC-12.4	SBC-10.6	SBC-10.7	SBC-61
Steel	End Mill	Roughing					x	+	
		Finishing				+	x	x	
	Drill						x	+	
Stainless Steel	End Mill	Roughing					x	+	
		Finishing	x			x	+		
	Drill						x	+	
Castiron	End Mill	Roughing						+	
		Finishing					+	x	*
	Drill						x	+	
Nonferrous material	End Mill	Roughing					x	+	
		Finishing	x			+	x	x	*
	Drill							+	
Heat Resistant Material	End Mill	Roughing			x			+	
		Finishing				+		x	
	Drill						x	+	
Hardened Material	End Mill	Roughing	x		+	x			
		Finishing	+	x	x				
	Drill				x		x	+	
Others	Graphite								*
	CFRP		x	x	x				*
	PCB		x	+	x				

First Choice	+
Second Choice	x
Coating	*

Solid Cemented Carbide rods - sizes available

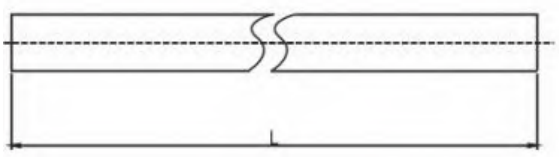
SBC-10.6, SBC-10.7, SBC-12.4 (metric)			
Dia (mm)	L (mm)	Dia (mm)	L (mm)
2	310/330	22	310/330
3	310/330	23	310/330
4	310/330	24	310/330
5	310/330	25	310/330
6	310/330	26	310/330
7	310/330	27	310/330
8	310/330	28	310/330
9	310/330	29	310/330
10	310/330	30	310/330
11	310/330	31	310/330
12	310/330	32	310/330
13	310/330	33	310/330
14	310/330	34	310/330
15	310/330	35	310/330
16	310/330	36	310/330
17	310/330	37	310/330
18	310/330	38	310/330
19	310/330	39	310/330
20	310/330	40	310/330
21	310/330		

SBC-10.6, SBC-10.7, SBC-12.4 (English)			
Dia (in.)	L (in.)	Dia. (in.)	L (in.)
0.1250	13 1/8	0.4063	12 1/8
0.1406	13 1/8	0.4219	12 1/8
0.1563	13 1/8	0.4375	12 1/8
0.1719	13 1/8	0.4531	12 1/8
0.1875	13 1/8	0.4688	12 1/8
0.2031	13 1/8	0.4844	12 1/8
0.2188	13 1/8	0.5000	12 1/8
0.2344	13 1/8	0.5313	12 1/8
0.2500	13 1/8	0.5625	12 1/8
0.2813	12 1/8	0.6250	12 1/8
0.2969	12 1/8	0.6875	12 1/8
0.3125	12 1/8	0.7500	12 1/8
0.3281	12 1/8	0.8125	12 1/8
0.3438	12 1/8	0.8750	12 1/8
0.3594	12 1/8	0.9375	12 1/8
0.3750	12 1/8	1.0000	12 1/8
0.3906	12 1/8		

Product standards (metric)				
Unground Dia. (mm)		Ground Dia. (mm)		L(mm)
Range	Tol. (mm)	Range	Tol.	Tol.
2 to ≤ 3	+0.15, +0.30	2 to 40	H5/H6	0,+5
3.01 to ≤ 6	+0.30,+0.50			
6.01 to ≤ 12	+0.30,+0.60			
12.01 to ≤16	+0.30,+0.70			
16.01 to ≤42	+0.30,+0.80			

Product standards (English)				
Unground Dia. (in.)		Ground Dia. (in.)		L(in.)
Range	Tol. (in.)	Range	Tol	Tol
1/8 to ≤ 1/4	+.012,+.020	1/8 to ≤1	H5/H6	+1/8,+3/8
1/4 to ≤ 31/64	+.012,+.024			
31/64 to≤ 5/8	+.012,+.028			
5/8 to ≤ 1	+.012,+.032			

Unground rod drawing and photo



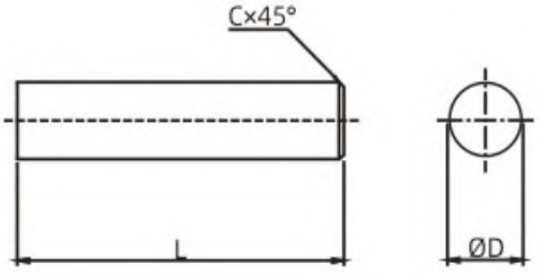
Ground Rods with Chamfer - Available Sizes

SBC-10.6, SBC-10.7, SBC-12.4							
OD (mm)	L (mm)	Chamfer (mm)	Chamfer angle	OD (mm)	L (mm)	Chamfer (mm)	Chamfer angle
3	40	0.4	45°	8	80	0.6	45°
3	50	0.4	45°	8	90	0.6	45°
3	70	0.4	45°	8	100	0.6	45°
3	100	0.4	45°	8	150	0.6	45°
3	150	0.4	45°	10	70	0.6	45°
4	40	0.4	45°	10	75	0.6	45°
4	50	0.4	45°	10	90	0.6	45°
4	75	0.4	45°	10	100	0.6	45°
4	100	0.4	45°	10	125	0.6	45°
4	150	0.4	45°	11	110	0.8	45°
5	50	0.4	45°	12	75	0.8	45°
5	55	0.5	45°	12	90	0.8	45°
5	60	0.5	45°	12	100	0.8	45°
5	70	0.5	45°	12	120	0.8	45°
5	80	0.5	45°	14	75	0.8	45°
5	100	0.5	45°	14	110	0.8	45°
5	150	0.5	45°	14	125	0.8	45°
6	50	0.5	45°	16	100	0.8	45°
6	60	0.5	45°	16	125	0.8	45°
6	75	0.5	45°	18	100	0.8	45°
6	100	0.5	45°	18	150	0.8	45°
6	150	0.5	45°	20	100	1.0	45°
7	55	0.6	45°	20	120	1.0	45°
7	60	0.6	45°	20	150	1.0	45°
8	60	0.6	45°	25	100	1.0	45°
8	75	0.6	45°	25	150	1.0	45°

SBC-10.6, SBC-10.7, SBC-12-4			
		Chamfer Size	
OD (in.)	Tol.-0,+1/16	C	Tol
1/8	1 1/2	0.015	±0.004
1/8	2	0.015	±0.004
1/8	2 1/2	0.015	±0.004
1/8	3	0.015	±0.004
3/16	2	0.015	±0.004
3/16	3	0.015	±0.004
1/4	2	0.015	±0.004
1/4	2 1/2	0.015	±0.004
1/4	3	0.015	±0.004
1/4	4	0.015	±0.004
5/16	2 1/2	0.015	±0.004
3/8	2 1/2	0.015	±0.004
3/8	3	0.015	±0.004
1/2	2 1/2	0.031	±0.008
1/2	3	0.031	±0.008
1/2	4	0.031	±0.008
5/8	3 1/2	0.031	±0.008
3/4	4	0.031	±0.008
3/4	5	0.031	±0.008
1	4	0.031	±0.008

Product Standards		
Ground Dia. (in.)		Angle of Chamfer
Range	Tol.	Tol.
0.125 to ≤ 1	h5/h6	45°± 3°

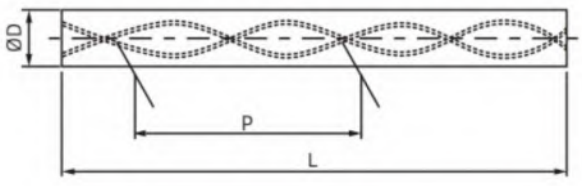
Product standards				
Ground Dia. (mm)		Chamfer	Angle of Chamfer	L(mm)
Range	Tol. (mm)	Range	Tol.	Tol.
3 to ≤ 25	h5/h6	±0.1	45°± 3°	0,+1.0

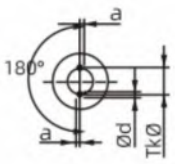


Rods with two Helical Coolant Holes (30 degrees)

SBC-10.6 and SBC-10.7						
ØD (mm)	Length (L) (Tol.-0,+5)	Ød	Bolt Circle TKØ	Pitch (±0.5°)		Deviation (a)
				P	Tol.	
14	330	1.75	7.10	76.18	-1.51,+1.56	0.40
14	330	1.90	6.70	76.18	-1.51,+1.56	0.40
15	330	1.75	7.70	81.62	-1.62,+1.67	0.40
16	330	1.75	8.30	87.06	-1.73,+1.78	0.40
16	330	2.10	8.00	87.07	-1.73,+1.78	0.45
16	330	2.50	8.80	87.06	-1.73,+1.78	0.45
17	330	1.75	8.90	92.50	-1.84,+1.89	0.45
18	330	2.00	9.55	97.95	-1.94, +2.00	0.50
18	330	2.80	9.90	97.95	-1.95,+2.00	0.50
19	330	2.00	10.10	103.39	-2.05,+2.12	0.50
20	330	2.00	10.40	108.83	-2.16,+2.23	0.50
20	330	2.50	10.00	108.83	-2.16,+2.23	0.50
21	330	2.00	11.15	114.27	-2.27,+2.34	0.50
22	330	2.00	11.60	119.71	-2.38,+2.45	0.50
23	330	2.00	12.20	125.15	-2.48,+2.56	0.50
24	330	2.00	12.80	130.59	-2.59,+2.67	0.50
25	330	2.00	13.30	136.03	-2.70,+2.78	0.50

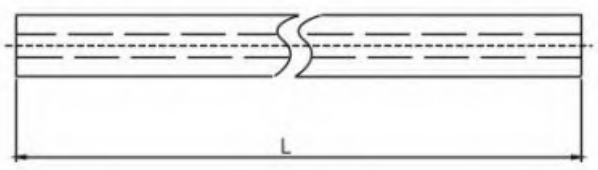
Product Standards							
Unground ØD (mm)		**Ground ØD (mm)**		**Ød (mm)**		**TKØ (mm)**	
Range	Tol.	Range	Tol.	range	Tol.	Range	Tol.
6 to ≤24	+0.70,+1.10	3 to ≤25	h5/h6	0.40 to ≤ 0.90	±0.10	TKØ ≤ 4.00	+0,-0.40
25	+0.08,+1.20			0.90 to ≤ 1.70	±0.15	4.01 to ≤ 5.00	+0,-0.60
				ØD=1.75	±0.20	5.01 to ≤ 10.10	+0,-0.80
				ØD=2.00	±0.25	10.01 to ≤ 13.30	+0,-1.00

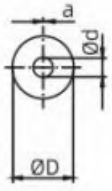




Rods with One Central Coolant Hole

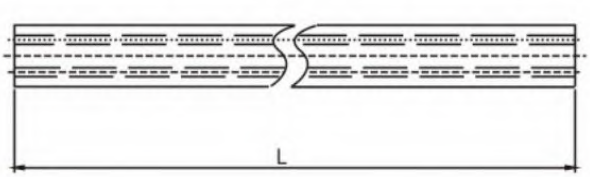
SBC10.6, SBC-10.7 and SBC-12.4					
Diameter			Length (L)	Hole Dia.	
ØD	Unground Tol.	Ground Tol.	(Tol.-0,+5)	Ød	Tol.
3	+0.30,+0.50	h5/h6	330	0.50	±0.10
4	+0.30,+0.50	h5/h6	330	0.80	±0.10
5	+0.30,+0.50	h5/h6	330	0.80	±0.10
6	+0.30,+0.50	h5/h6	330	1.00	±0.15
7	+0.30,+0.60	h5/h6	330	1.00	±0.15
8	+0.30,+0.60	h5/h6	330	1.00	±0.15
9	+0.30,+0.60	h5/h6	330	1.40	±0.15
10	+0.30,+0.60	h5/h6	330	1.40	±0.15
11	+0.30,+0.60	h5/h6	330	1.40	±0.15
12	+0.30,+0.60	h5/h6	330	1.75	±0.15
13	+0.30,+0.70	h5/h6	330	1.75	±0.15
14	+0.30,+0.70	h5/h6	330	1.75	±0.15
15	+0.30,+0.70	h5/h6	330	2.00	±0.20
16	+0.30,+0.70	h5/h6	330	2.00	±0.20
17	+0.30,+0.80	h5/h6	330	2.00	±0.20
18	+0.30,+0.80	h5/h6	330	2.00	±0.20
19	+0.30,+0.80	h5/h6	330	2.00	±0.20
20	+0.30,+0.80	h5/h6	330	2.50	±0.25
21	+0.30,+0.80	h5/h6	330	2.50	±0.25
22	+0.30,+0.80	h5/h6	330	2.50	±0.25
23	+0.30,+0.80	h5/h6	330	2.50	±0.25
24	+0.30,+0.80	h5/h6	330	3.00	±0.25
25	+0.30,+0.80	h5/h6	330	3.00	±0.25
26	+0.30,+0.80	h5/h6	330	3.00	±0.25
27	+0.30,+0.80	h5/h6	330	3.00	±0.25
28	+0.30,+0.80	h5/h6	330	3.00	±0.25
29	+0.30,+0.80	h5/h6	330	3.00	±0.25
30	+0.30,+0.80	h5/h6	330	3.00	±0.25

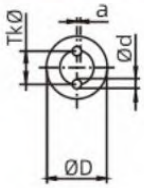




Rods with Two Straight Coolant Holes - Page 1

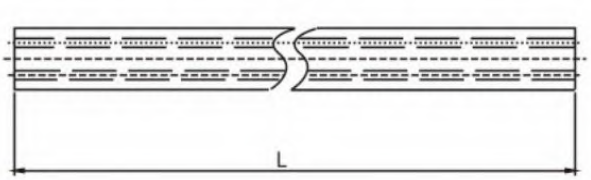
SBC-10.6, SBC-10.7 and SBC-12.4							
Diameter			Length (L)	Hole Diameter		Bolt Circle	
ØD	Unground Tol.	Ground Tol.	(Tol.-0,+5)	Ød	Tol.	TKØ	Tol.
4	+0.30,+0.50	h5/h6	330	0.80	±0.10	1.80	+0,-0.15
5	+0.30,+0.50	h5/h6	330	0.80	±0.10	2.00	+0,-0.15
6	+0.30,+0.50	h5/h6	330	1.00	±0.15	3.00	+0,-0.20
7	+0.30,+0.60	h5/h6	330	1.00	±0.15	3.50	+0,-0.20
8	+0.30,+0.60	h5/h6	330	1.00	±0.15	4.00	+0,-0.30
9	+0.30,+0.60	h5/h6	330	1.40	±0.15	4.00	+0,-0.30
10	+0.30,+0.60	h5/h6	330	1.40	±0.15	5.00	+0,-0.30
11	+0.30,+0.60	h5/h6	330	1.40	±0.15	5.00	+0,-0.30
12	+0.30,+0.60	h5/h6	330	1.75	±0.15	6.00	+0,-0.30
13	+0.30,+0.70	h5/h6	330	1.75	±0.15	6.00	+0,-0.30
14	+0.30,+0.70	h5/h6	330	1.75	±0.15	7.00	+0,-0.30
15	+0.30,+0.70	h5/h6	330	2.00	±0.20	7.00	+0,-0.30
16	+0.30,+0.70	h5/h6	330	2.00	±0.20	8.00	+0,-0.30
17	+0.30,+0.80	h5/h6	330	2.00	±0.20	8.00	+0,-0.30
18	+0.30,+0.80	h5/h6	330	2.00	±0.20	9.00	+0,-0.30
19	+0.30,+0.80	h5/h6	330	2.00	±0.20	9.00	+0,-0.30
20	+0.30,+0.80	h5/h6	330	2.50	±0.25	10.00	+0,-0.40
21	+0.30,+0.80	h5/h6	330	2.50	±0.25	10.00	+0,-0.40
22	+0.30,+0.80	h5/h6	330	2.50	±0.25	11.00	+0,-0.40
23	+0.30,+0.80	h5/h6	330	2.50	±0.25	11.00	+0,-0.40
24	+0.30,+0.80	h5/h6	330	3.00	±0.25	12.00	+0,-0.50
25	+0.30,+0.80	h5/h6	330	3.00	±0.25	12.00	+0,-0.50
26	+0.30,+0.80	h5/h6	330	3.00	±0.25	13.00	+0,-0.50

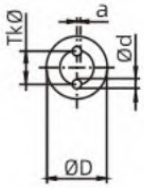




Rods with Two Straight Coolant Holes - Page 2

SBC-10.6, SBC-10.7 and SBC-12.4							
Diameter			Length (L)	Hole Diameter		Bolt Circle	
ØD	Unground Tol.	Ground Tol.	(Tol.0,-5)	Ød	Tol.	TKØ	Tol.
6	+0.30,+0.50	h5/h6	330	0.80	±0.10	1.50	+0,-0.20
7	+0.30,+0.60	h5/h6	330	0.80	±0.10	1.50	+0,-0.20
8	+0.30,+0.60	h5/h6	330	1.00	±0.15	1.50	+0,-0.30
9	+0.30,+0.60	h5/h6	330	1.00	±0.15	2.60	+0,-0.30
10	+0.30,+0.60	h5/h6	330	1.00	±0.15	2.60	+0,-0.30
11	+0.30,+0.60	h5/h6	330	1.20	±0.15	3.60	+0,-0.30
12	+0.30,+0.60	h5/h6	330	1.20	±0.15	3.60	+0,-0.30
13	+0.30,+0.70	h5/h6	330	1.20	±0.15	3.60	+0,-0.30
14	+0.30,+0.70	h5/h6	330	1.50	±0.15	5.00	+0,-0.30
15	+0.30,+0.70	h5/h6	330	1.50	±0.15	5.00	+0,-0.30
16	+0.30,+0.70	h5/h6	330	1.50	±0.15	5.00	+0,-0.30
17	+0.30,+0.80	h5/h6	330	2.00	±0.20	6.20	+0,-0.30
18	+0.30,+0.80	h5/h6	330	2.00	±0.20	6.20	+0,-0.30
19	+0.30,+0.80	h5/h6	330	2.00	±0.20	6.20	+0,-0.30
20	+0.30,+0.80	h5/h6	330	2.00	±0.20	6.20	+0,-0.40
21	+0.30,+0.80	h5/h6	330	2.00	±0.20	6.20	+0,-0.40
22	+0.30,+0.80	h5/h6	330	2.00	±0.20	6.20	+0,-0.40
23	+0.30,+0.80	h5/h6	330	2.00	±0.20	7.50	+0,-0.40
24	+0.30,+0.80	h5/h6	330	2.00	±0.20	7.50	+0,-0.50
25	+0.30,+0.80	h5/h6	330	2.00	±0.20	7.50	+0,-0.50
26	+0.30,+0.80	h5/h6	330	2.00	±0.20	7.50	+0,-0.50
25	+0.30,+0.80	h5/h6	330	3.00	±0.25	12.00	+0,-0.50
26	+0.30,+0.80	h5/h6	330	3.00	±0.25	13.00	+0,-0.50





Carbide rod tolerances

Tolerance of ground rod diameter				
Diameter	h4	h5	h6	h7
0-3.0mm	0.003mm	0.004mm	0.006mm	0.010mm
0-0.1181in.	0.00012in.	0.00015in.	0.00024in.	0.00039in.
3.001-6.0mm	0.004mm	0.005mm	0.008mm	0.012mm
0.1181-0.2362in.	0.00015in.	0.00020in.	0.00031in.	0.00047in.
6.001-10.0mm	0.004mm	0.006mm	0.008mm	0.015mm
0.2363-0.3937in.	0.00015in.	0.00024in.	0.00035in.	0.00059in.
10.001-18.0mm	0.005mm	0.008mm	0.011mm	0.018mm
0.3938-0.7087in.	0.00020in.	0.00031in.	0.00043in.	0.00071in.
18.001-30.0mm	0.006mm	0.009mm	0.013mm	0.021mm
0.7088-1.1811in.	0.00024in.	0.00035in.	0.00051in.	0.00083in.
30.001-50.0mm	0.007mm	0.011mm	0.016mm	0.025mm
1.1812-1.9685in.	0.00028in.	0.00043in.	0.00063in.	0.00098in.

Surface roughness of rods	
Type	Accuracy
Polished Rods	0.00-0.05μm
Ground Rods	0.00-0.10μm
Dull finished	0.10-0.2μm

Roundess tolerance	
Standard	0.002mm