

ZCC



中国驰名商标
CHINA'S RENOWNED BRAND

Carbide Rods & Bars

Karbid Rund- und Flachstäbe



ZCC Europe GmbH
Zhuzhou Cemented Carbide Group Corp. Ltd.

Introduction of Das Unternehmen



Zhuzhou Cemented Carbide Group Corp. Ltd. (ZCC) has been a leading manufacturer of cemented carbide products in China since built in 1954. It produces about 4,500 tons of cemented carbides, more than 10,000 tons of APT, tungsten powder, tungsten carbide powder, ready to press powder, and 700tons of Cobalt powder annually. Meanwhile, ZCC also owns separate plants to produce Molybdenum, Tantalum and Niobium products.

ZCC has different business sectors which are for Hard Material, Cutting inserts and tools, Tungsten & Molybdenum, Cobalt, Tantalum & Niobium products.

The hard material sector is the biggest one in ZCC. Its annual production capability is around 500tons of carbide rolls and anvils, 800tons of carbide rods, 500tons of mining and road milling buttons, 400tons of carbide molds and dies, a few hundred tons for special products and wear parts.

Carbide rods and bars including solid carbide rods and bars, carbide rods with hole(s), PCB rods are one of the key products of ZCC. ZCC produces carbide rods and bars by the method of extrusion, mould/isostatic pressing and HIP sintering. Strictly controlled and selected micron, sub-micron, ultra-micron tungsten carbide powder, advanced manufacturing facilities and stringent quality management system guarantee ZCC's carbide rods with a stable and world's first class quality.

The "Diamond Brand" trademark was named as "China's Renowned Trademark" in 1999, and "Diamond Brand" cemented carbide was awarded as "China's Famous Brand" in 2004.

There are totally 7000 employees in ZCC and turnover in 2008 was over USD 700 million.

In 2002, ZCC established a subsidiary, ZCC Europe GmbH in Germany, which is responsible for the sales and marketing in Europe. ZCC Europe GmbH is located at Heinrich Strasse 169A, Duesseldorf. It supplies various cemented carbide (hard metal) products, such as indexable inserts, endmills, rolls, drills, button bits, solid carbide rods, seal rings, bushings, drawing dies and other wear parts. Besides, it also supplies Tungsten (W), Molybdenum (Mo), Tantalum (Ta), Niobium (Nb), Cobalt (Co) products from intermediate to finished products.

Die Zhuzhou Cemented Carbide Gruppe Corp. Ltd. (ZCC) gehört seit ihrer Gründung im Jahr 1954 zu den führenden Herstellern von Hartmetall Produkten in China. Jährlich werden ca. 4.500t Hartmetalle, über 10.000t APT, Wolfram Pulver, Wolfram Karbid Pulver, RTP Pulver und 700t Kobalt Pulver produziert. Mittlerweile verfügt ZCC auch über mehrere Fertigungsanlagen zur Herstellung von Molybdän, Tantal und Niob.

ZCC ist in verschiedene Geschäftsbereiche unterteilt; Hartstoffe, Wendeschneidplatten und andere Schneidwerkzeuge, Wolfram und Molybdän, Kobalt Produkte, Tantal und Niob. Der größte dieser Bereiche der ZCC Group ist die Abteilung für Hartstoffe. Die jährliche Produktionskapazität beläuft sich für Karbidwalzen und Ambosse auf 500t, Karbidstäbe 800t, Fräsköpfe für den Berg- und Straßenbau 500t, Karbidscheiben 400t und auf einige hundert Tonnen für Spezialanfertigungen und Verschleißteile.

Karbidstäbe, wie z.B. Vollhartmetall Flach- und Rundstäbe, Stäbe mit Kühlkanälen oder auch PCB Stäbe sind das eigentliche Kerngeschäft. ZCC produziert HM Stäbe nach dem Extrusionsverfahren, Formpressen, kaltisostatisches Pressen und HIP Sinterung. Streng kontrolliertes Wolframkarbidpulver (superfein, ultra fein und fein), hochwertige Produktionsanlagen sowie ein striktes Qualitätsmanagement garantieren einen weltweit erstklassigen und gleichbleibend hohen Qualitätsstandard der ZCC Stäbe.

Die Marke „Diamond Brand“ wurde 1999 zu Chinas renommiertester Handelsmarke ernannt und „Diamond Brand“ Hartmetall wurde 2004 als Chinas erstklassige Marke ausgezeichnet.

Heute beschäftigt ZCC 7000 Mitarbeiter und der Umsatz im Jahr 2008 lag bei über 700 Millionen USD.

Als deutsche Niederlassung der ZCC Group übernimmt seit 2002 die ZCC Europe GmbH in Düsseldorf das europaweite Marketing und den Vertrieb von diversen Hartmetallprodukten, zu denen u.a. Bohrer und Bohrköpfe, Hartmetallstäbe, Walzringe, Dichtungsringe, Buchsen und Plättchen sowie Spezialanfertigungen und andere Verschleißteile zählen. Aber auch Wolfram, Molybdän, Niob, Tantal und Kobalt werden als Zwischen- oder Endprodukte vertrieben.



Carbide Rods & Bars
Karbid Rund- und Flachstäbe



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Hartmetall-Rundstäbe mit 2 verdrehten Kühlkanälen 30°geschliffen Tol. h5 Länge 330 oder 310mm
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Hartmetall-Rundstäbe mit 3 verdrehten Kühlkanälen 30°geschliffen Tol. h5 Länge 330 oder 310mm
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Hartmetall-Rundstäbe mit 2 verdrehten Kühlkanälen 40°geschliffen Tol. h5 Länge 330 oder 310mm
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Hartmetall-Quadratstäbe geschliffen Tol. h6 mit Länge 100mm

Grades and Properties of Carbide Rods Sorten und Eigenschaften der Hartmetallstäbe

Grade	ISO code	Grain size µm	Co %	Density g/cm ³	Hardness		TRS N/mm ²
					HV30	HRA	
YU06A	K05-K10	0.4	6	14.75	2100	94.7	3800
YF06	K05-K10	0.5	6	14.90	1850	93.1	3800
YH6F	K05-K10	0.5	6	14.80	1900	93.5	4000
YL10A	K10-K20	0.8	8	14.65	1780	92.8	4200
YU09E	K10-K30	0.4	9	14.40	1930	93.8	4500
YL10.2	K20-K30	0.8	10	14.42	1600	91.5	4000
XF30	K30-K40	0.6	12	14.10	1700	92.3	4000
XL40	P30-P40	2.0-3.0	11	13.0	1400	89.9	2200

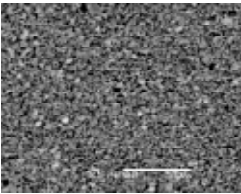
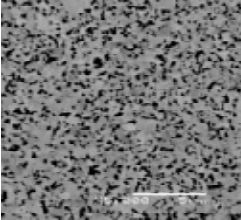
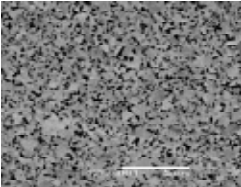
Note: 1. Test specimen is sample C, ground cylindrical Diameter 3.25 mm x 38 mm long.

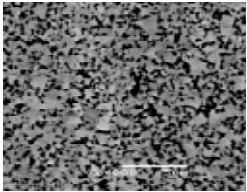
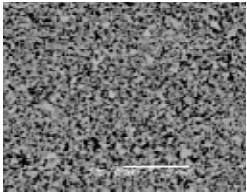
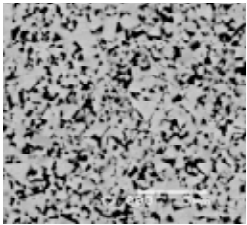
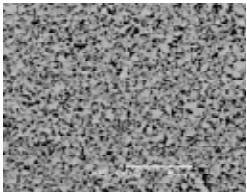
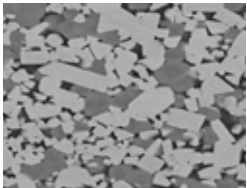
2. All the data above are typical.

Hinweis: 1. Das Prüfmuster ist Beispiel C, geschliffen zylinderförmiger Durchmesser 3.25 mm x 38 mm

2. Alle oben gemachten Angaben sind typisch

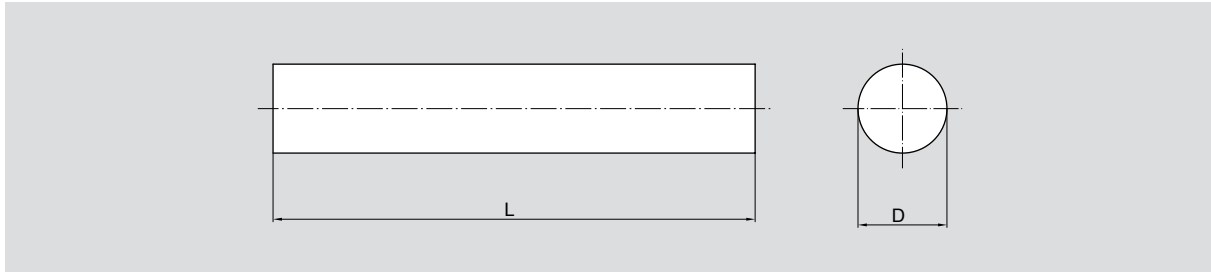
Recommended applications for the grades Empfohlene Applikationen für die Sorten

Grade Sorte	Microstructure Mikrostruktur	Recommended applications Empfohlene Applikationen
YU06A		For machining glass fiber, wood, plastic, aluminum-magnesium alloys. Also recommended for PCB routers with Diameter more than 0.6 mm. Für die Bearbeitung von Glasfaser, Holz, Kunststoff, Aluminium-Magnesiumlegierungen. Auch empfohlen für PCB Router mit einem Durchmesser von mehr als 0.6mm.
YF06		High speed milling/drilling of cast iron. Drilling, milling and routing of GRP composite and ceramic filled resin materials Machining paper, wood, resin laminates, non-ferrous and light alloys. For PCB drills with rather bigger Diameter, i.e. Φ 3.2-6.3 mm Geeignet für die Bearbeitung von Alu-Magnesiumlegierungen, Kunststoffen sowie Komplexwerkstoff Kohlenfaden, Eisenlegierungen usw. Für die Herstellung von Bohrern mit grossem Durchmesser, Minibohrern, Minifräsen und Reibahlen aus Hartmetall.
YH6F		Made from composite powder prepared by Nano technology, It's carbide with evener grain, higher strength, hardness and toughness. Specially designed for PCB microdrills with Diameter 0.3-0.5 mm Entwicklungsprodukt aus Komplexpulver nach Nano-Technologie. Es hat eine gleichmässige Körngrösse, eine sehr hohe Festigkeit, Härte und Zähigkeit usw. Besonders geeignet für die Herstellung von ϕ 0.30-0.50 mm PCB Minibohrern.

Grade Sorte	Microstructure Mikrostruktur	Recommended applications Empfohlene Applikationen
YL10A		<p>A standard carbide grade for rotational solid-carbide tools in machining gray cast iron, chilled cast iron, hardened steel, heat-treatable aluminum alloys, plastics containing fillers, etc.</p> <p>Eine Standard Karbid-Sorte für Vollhartmetall Spiralwerkzeuge für die Bearbeitung von Grauguss, Hartguss, gehärtetem Stahl, vergütbaren Aluminiumlegierungen, Kunststoffen, usw.</p>
YU09E		<p>With high wear resistance, considerable toughness and high cutting-edge stability for machining stainless steel and hardened steels etc. For micro drilling of PCB, Diameter down to 0.1 mm.</p> <p>Eine hohe Verschleißfestigkeit, beachtliche Zähigkeit und Schnittkantenstabilität für die Bearbeitung von rostfreiem und gehärtetem Stahl, etc. Geeignet für das Minibohren von PCB, Durchmesser bis zu 0.1 mm.</p>
YL10.2		<p>For rotary tools such End mills, Drills, Routers and Burs. For the machining of cast iron, steels; stainless and heat resistant steel; nickel based and titanium aerospace alloys etc. With Low cutting speed, high feed rate, even interrupted cutting.</p> <p>Geeignet für die Bearbeitung von normalem Stahl, Gusseisen, rostfreiem Stahl, wärmebeständigem Stahl, Nickel- und Titanlegierungen usw. Es wird als Werkstoff für allgemeine Werkzeuge wie Spiralbohrer, Schaftfräser, Gewindebohrer und Handbohrer usw. empfohlen.</p>
XF30		<p>With extremely high toughness while maintaining substantial hardness at the same time. Optimal for milling and tapping for titanium alloys, high-temperature alloys, cast iron, stainless and hardened steels, glass-fiber reinforced plastics, and composite materials etc.</p> <p>Eine extrem hohe Zähigkeit bei gleichzeitiger Aufrechterhaltung einer beachtlichen Härte. Optimal für das fräsen und bohren von Titanlegierungen, hochwarmfesten Legierungen, Gusseisen und gehärtetem Stahl, Glasfaser, verstärktem Kunststoff und Verbundstoffen, etc.</p>
XL40		<p>For the rough machining of austenitic stainless steels.</p> <p>Für das Vorbearbeiten von austenitischem rostfreiem Stahl.</p>

**Carbide rod blanks
with length 330(310)mm**

**Hartmetall-Rundstäbe roh
mit Länge 330 oder 310mm**



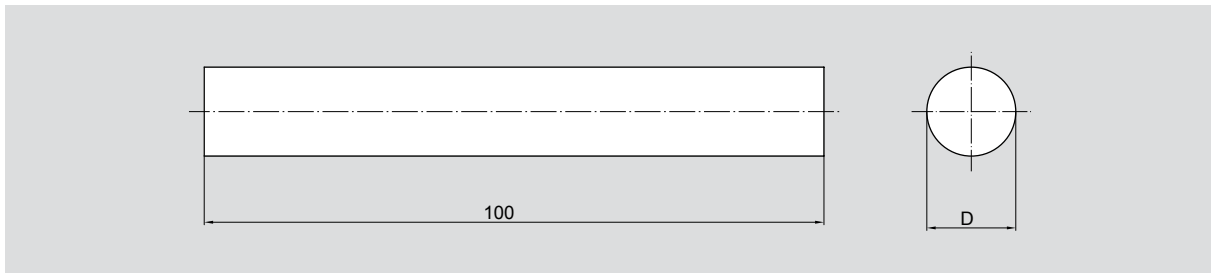
Type specification: B ØD×L

Typ-Spezifikation: B ØD×L

Diameter Durchmesser D(mm)	Tolerance D Toleranzen D	Tolerance L Toleranzen L	Diameter Durchmesser D(mm)	Tolerance D Toleranzen D	Tolerance L Toleranzen L
0.5	+0.20/+0.45	-0/+5.0	14.0	+0.20/+0.60	-0/+5.0
1.0	+0.20/+0.45	-0/+5.0	14.5	+0.20/+0.60	-0/+5.0
1.2	+0.20/+0.45	-0/+5.0	15.0	+0.20/+0.60	-0/+5.0
1.6	+0.20/+0.45	-0/+5.0	15.5	+0.20/+0.60	-0/+5.0
1.8	+0.20/+0.45	-0/+5.0	16.0	+0.20/+0.60	-0/+5.0
2.3	+0.20/+0.45	-0/+5.0	16.5	+0.20/+0.60	-0/+5.0
2.5	+0.20/+0.45	-0/+5.0	17.0	+0.20/+0.60	-0/+5.0
3.0	+0.20/+0.45	-0/+5.0	17.5	+0.20/+0.60	-0/+5.0
3.5	+0.20/+0.45	-0/+5.0	18.0	+0.20/+0.60	-0/+5.0
4.0	+0.20/+0.45	-0/+5.0	18.5	+0.20/+0.60	-0/+5.0
4.5	+0.20/+0.45	-0/+5.0	19.0	+0.20/+0.60	-0/+5.0
5.0	+0.20/+0.45	-0/+5.0	19.5	+0.20/+0.60	-0/+5.0
5.5	+0.20/+0.45	-0/+5.0	20.0	+0.20/+0.60	-0/+5.0
6.0	+0.20/+0.45	-0/+5.0	21.0	+0.20/+0.80	-0/+5.0
6.5	+0.20/+0.45	-0/+5.0	22.0	+0.20/+0.80	-0/+5.0
7.0	+0.20/+0.45	-0/+5.0	23.0	+0.20/+0.80	-0/+5.0
7.5	+0.20/+0.45	-0/+5.0	24.0	+0.20/+0.80	-0/+5.0
8.0	+0.20/+0.45	-0/+5.0	25.0	+0.20/+0.80	-0/+5.0
8.5	+0.20/+0.45	-0/+5.0	26.0	+0.20/+0.80	-0/+5.0
9.0	+0.20/+0.45	-0/+5.0	27.0	+0.20/+0.80	-0/+5.0
9.5	+0.20/+0.45	-0/+5.0	28.0	+0.20/+0.80	-0/+5.0
10.0	+0.20/+0.45	-0/+5.0	29.0	+0.20/+0.80	-0/+5.0
10.5	+0.20/+0.45	-0/+5.0	30.0	+0.20/+0.80	-0/+5.0
11.0	+0.20/+0.45	-0/+5.0	31.0	+0.20/+0.80	-0/+5.0
11.5	+0.20/+0.45	-0/+5.0	32.0	+0.20/+0.80	-0/+5.0
12.0	+0.20/+0.45	-0/+5.0	33.0	+0.20/+0.80	-0/+5.0
12.5	+0.20/+0.60	-0/+5.0	34.0	+0.20/+0.80	-0/+5.0
13.0	+0.20/+0.60	-0/+5.0	35.0	+0.20/+0.80	-0/+5.0
13.5	+0.20/+0.60	-0/+5.0			

**Carbide rod blanks with
length 100mm**

**Hartmetall-Rundstäbe roh
mit Länge 100mm**



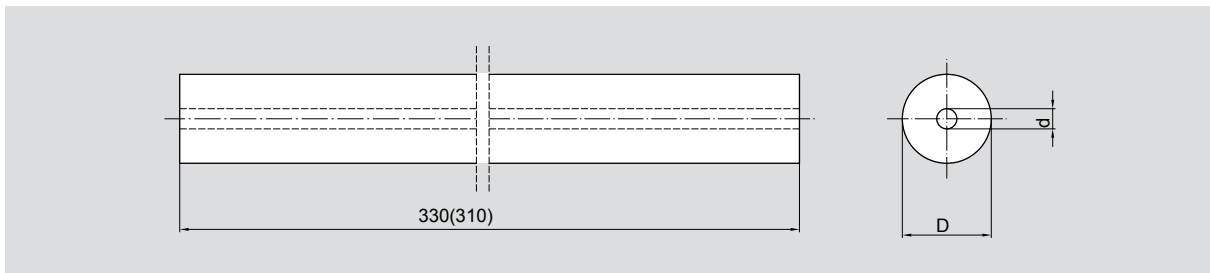
Type specification: B ØD×L

Typ-Spezifikation: B ØD×L

Diameter Durchmesser D(mm)	Tolerance D Toleranzen D	Tolerance L Toleranzen L	Diameter Durchmesser D(mm)	Tolerance D Toleranzen D	Tolerance L Toleranzen L
1.0	+0.20/+0.45	-0/+5.0	14.0	+0.20/+0.60	-0/+5.0
1.5	+0.20/+0.45	-0/+5.0	15.0	+0.20/+0.60	-0/+5.0
2.0	+0.20/+0.45	-0/+5.0	16.0	+0.20/+0.60	-0/+5.0
2.5	+0.20/+0.45	-0/+5.0	17.0	+0.20/+0.60	-0/+5.0
3.0	+0.20/+0.45	-0/+5.0	18.0	+0.20/+0.60	-0/+5.0
3.5	+0.20/+0.45	-0/+5.0	19.0	+0.20/+0.60	-0/+5.0
4.0	+0.20/+0.45	-0/+5.0	20.0	+0.20/+0.60	-0/+5.0
4.5	+0.20/+0.45	-0/+5.0	21.0	+0.20/+0.80	-0/+5.0
5.0	+0.20/+0.45	-0/+5.0	22.0	+0.20/+0.80	-0/+5.0
5.5	+0.20/+0.45	-0/+5.0	23.0	+0.20/+0.80	-0/+5.0
6.0	+0.20/+0.45	-0/+5.0	24.0	+0.20/+0.80	-0/+5.0
6.5	+0.20/+0.45	-0/+5.0	25.0	+0.20/+0.80	-0/+5.0
7.0	+0.20/+0.45	-0/+5.0	26.0	+0.20/+0.80	-0/+5.0
7.5	+0.20/+0.45	-0/+5.0	28.0	+0.20/+0.80	-0/+5.0
8.0	+0.20/+0.45	-0/+5.0	30.0	+0.20/+0.80	-0/+5.0
8.5	+0.20/+0.45	-0/+5.0	32.0	+0.20/+0.80	-0/+5.0
9.0	+0.20/+0.45	-0/+5.0	33.0	+0.20/+0.80	-0/+5.0
9.5	+0.20/+0.45	-0/+5.0	34.0	+0.20/+0.80	-0/+5.0
10.0	+0.20/+0.45	-0/+5.0	35.0	+0.20/+0.80	-0/+5.0
10.5	+0.20/+0.45	-0/+5.0	36.0	+0.20/+0.80	-0/+5.0
11.0	+0.20/+0.45	-0/+5.0	38.0	+0.20/+0.80	-0/+5.0
12.0	+0.20/+0.45	-0/+5.0	40.0	+0.20/+0.80	-0/+5.0
13.0	+0.20/+0.60	-0/+5.0			

**Carbide rod blanks
with central coolant hole
length 330(310)mm**

**Hartmetall-Rundstäbe
mit zentralem Kühlkanälen
roh Länge 330 oder 310mm**



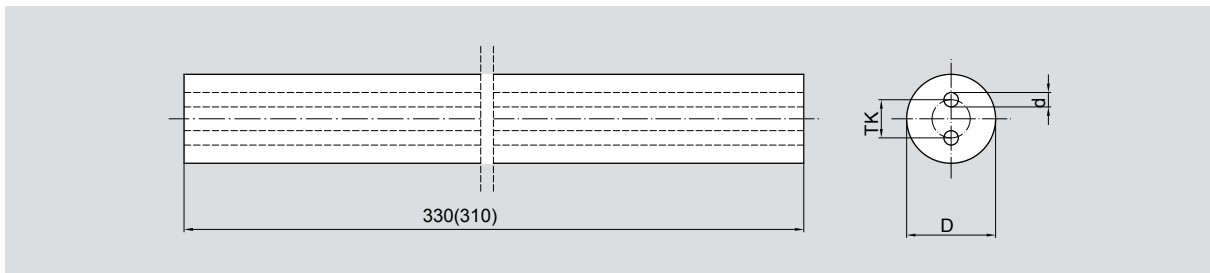
Type specification: B ØD×Ød×L

Typ-Spezifikation: B ØD×Ød×L

Diameter Durchmesser D(mm)	Hole Bohrung d(mm)	Diameter Durchmesser D(mm)	Hole Bohrung d(mm)
4.5	0.6	15.0	4.0
6.0	1.0	15.0	6.0
6.0	1.8	16.0	2.0
8.0	1.0	16.0	2.5
8.0	1.3	16.0	3.0
8.0	2.0	16.0	4.0
8.0	2.5	18.0	1.5
9.0	1.5	18.0	2.0
10.0	1.0	18.0	3.0
10.0	1.5	20.0	1.5
10.0	2.0	20.0	2.0
10.0	3.0	20.0	2.5
12.0	1.0	20.0	3.0
12.0	1.5	20.0	3.5
12.0	2.0	20.0	4.0
12.0	2.5	22.0	3.0
12.0	3.0	24.0	4.0
12.0	4.0	25.0	2.0
12.0	5.0	25.0	3.0
13.0	2.0	25.0	4.0
13.0	3.0	26.0	3.0
14.0	1.5	26.0	4.0
14.0	2.0	28.0	4.0
14.0	2.5	30.0	5.0
14.0	3.0	32.0	5.0
15.0	3.0		

**Carbide rod blanks
with 2 parallel coolant holes
length 330(310)mm**

**Hartmetall-Rundstäbe
mit 2 parallelen Kühlkanälen roh
Länge 330 oder 310mm**



Type specification: B ØD×2Ød×TK×L

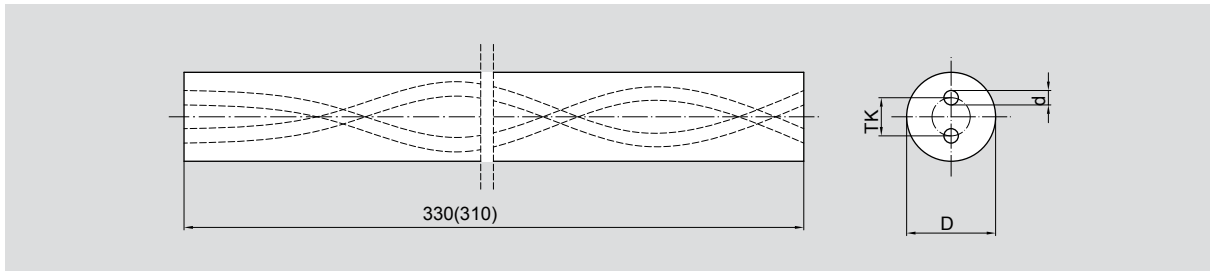
Typ-Spezifikation: B ØD×2Ød×TK×L

Diameter Durchmesser D(mm)	Pitch circle Teilkreis TK(mm)	Hole Bohrung d(mm)
4.0	1.8	0.80
5.0	2.0	0.80
6.0	1.5	0.80
6.0	3.0	1.00
7.0	3.5	1.00
8.0	1.5	0.80
8.0	2.0	0.80
8.0	4.0	1.00
9.0	2.6	1.00
9.0	4.0	1.40
10.0	2.6	1.00
10.0	5.0	1.40
11.0	3.5	1.20
11.0	5.0	1.40
12.0	3.5	1.20
12.0	6.0	1.75
13.0	3.5	1.20
13.0	6.0	1.75
14.0	5.0	1.50
14.0	7.0	1.75
15.0	5.0	1.50
15.0	7.0	2.00
16.0	5.0	1.50
16.0	8.0	2.00

Diameter Durchmesser D(mm)	Pitch circle Teilkreis TK(mm)	Hole Bohrung d(mm)
17.0	6.2	2.00
17.0	8.0	2.00
18.0	6.2	2.0
18.0	9.0	2.0
19.0	6.2	2.0
19.0	9.0	2.0
20.0	6.2	2.0
20.0	10.0	2.5
21.0	6.2	2.0
21.0	10.0	2.5
22.0	6.2	2.0
22.0	11.0	2.5
23.0	7.5	2.0
23.0	11.0	2.5
24.0	7.5	2.0
25.0	12.0	3.0
25.0	7.5	2.0
25.0	12.0	3.0
26.0	13.0	3.0
28.0	14.0	3.0
30.0	14.0	3.0
32.0	14.0	3.0
34.0	14.0	3.0

**Carbide rod blanks
with 2 twisted coolant holes 30°
length 330(310)mm**

**Hartmetall-Rundstäbe
mit 2 verdrehten Kühlkanälen 30°roh
Länge 330 oder 310mm**



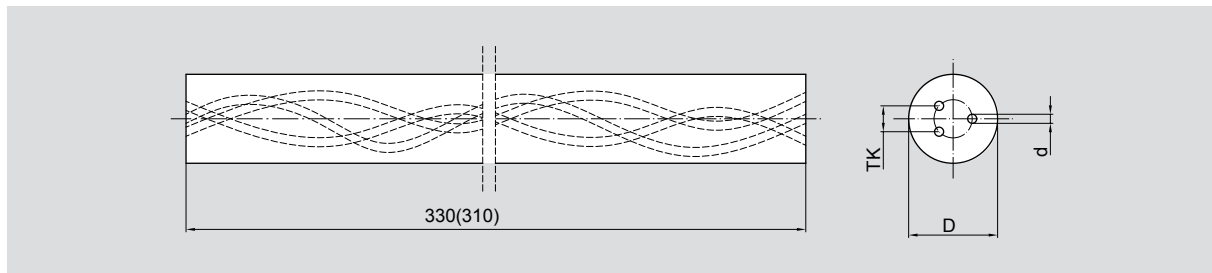
Type specification: B ØD×2Ød×TK×L×30°

Typ-Spezifikation: B ØD×2Ød×TK×L×30°

Diameter Durchmesser D(mm)	Pitch circle Teilkreis TK(mm)	Hole Bohrung d(mm)	Pitch Steigung (mm)	Diameter Durchmesser D(mm)	Pitch circle Teilkreis TK(mm)	Hole Bohrung d(mm)	Pitch Steigung (mm)
4.5	2.40	0.70	24.49	16.0	8.30	1.75	87.06
5.0	2.60	0.70	27.21	16.5	8.60	1.75	89.78
5.5	2.60	0.70	29.93	17.0	8.90	1.75	92.50
6.0	2.60	0.70	32.65	17.5	9.20	1.75	95.22
6.5	3.50	1.00	35.37	18.0	9,55	2.0	97.95
7.0	3.70	1.00	38.09	18.5	9,75	2.0	100.67
7.5	4.00	1.00	40.81	19.0	10,10	2.0	103.39
8.0	4.00	1.00	43.53	20.0	10,40	2.0	108.83
8.5	4.50	1.00	46.25	21.0	11,15	2.0	114.27
9.0	4.80	1.40	48.97	22.0	11,60	2.0	119.71
9.5	4.80	1.40	51.69	23.0	12,20	2.0	125.15
10.0	4.80	1.40	54.41	24.0	12,80	2.0	130.59
11.0	5.30	1.40	59.86	25.0	13,30	2.0	136.03
11.5	5.80	1.40	62.58	26.0	13,80	2.0	141.48
12.0	6.25	1.40	65.30	27.0	14,30	2.5	146.92
12.5	6.25	1.75	68.02	28.0	14,80	2.5	152.36
13.0	6.50	1.75	70.74	29.0	15,40	2.5	157.80
13.5	6.80	1.75	73.46	30.0	16,00	2.5	163.24
14.0	7.10	1.75	76.18	31.0	16,60	2.5	168.68
14.5	7.40	1.75	78.90	32.0	17,20	3.0	174.12
15.0	7.70	1.75	81.62	33.0	17,80	3.0	179.57
15.5	8.00	1.75	84.34	34.0	18,00	3.0	185.01

**Carbide rod blanks
with 3 twisted coolant holes 30°
length 330(310)mm**

**Hartmetall-Rundstäbe
mit 3 verdrehten Kühlkanälen 30°roh
Länge 330 oder 310mm**



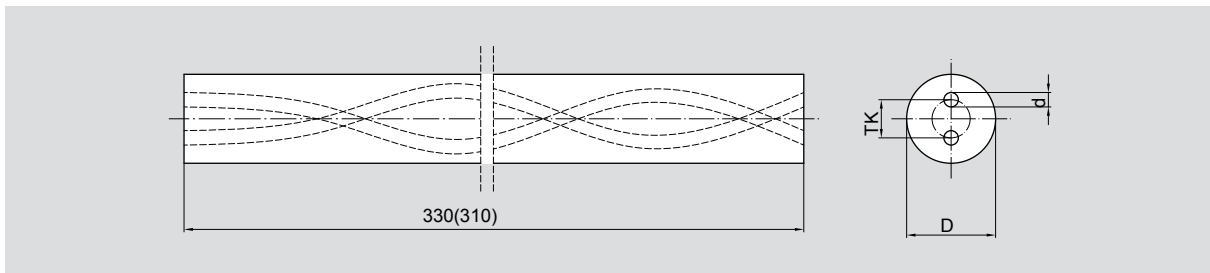
Type specification: B ØD×3Ød×TK×L×30°

Typ-Spezifikation: B ØD×3Ød×TK×L×30°

Diameter Durchmesser D(mm)	Pitch circle Teilkreis TK(mm)	Hole Bohrung d(mm)	Pitch Steigung (mm)	Diameter Durchmesser D(mm)	Pitch circle Teilkreis TK(mm)	Hole Bohrung d(mm)	Pitch Steigung (mm)
6.0	2.9	0.50	32.65	16.5	8.3	1.60	89.78
6.5	2.9	0.50	35.37	17.0	8.6	1.60	92.50
7.0	4.0	0.65	38.09	17.5	8.6	1.60	95.22
7.5	4.0	0.70	40.81	18.0	9.5	1.70	97.95
8.0	4.0	0.70	43.53	18.5	9.5	1.70	100.67
8.5	4.0	0.70	46.25	19.0	10.2	1.7	103.39
9.0	5.1	0.85	48.97	20.0	10.2	1.9	108.83
9.5	5.1	0.85	51.69	21.0	11.1	2.0	114.27
10.0	5.1	0.85	54.41	22.0	11.5	2.0	119.71
10.5	5.1	0.85	57.13	23.0	11.8	2.0	125.15
11.0	5.7	1.10	59.86	24.0	12.1	2.0	130.59
11.5	6.1	1.10	62.58	25.0	12.5	2.0	136.03
12.0	6.3	1.10	65.30	26.0	13.1	2.0	141.48
12.5	6.3	1.10	68.02	27.0	13.6	2.5	146.92
13.0	6.8	1.20	70.74	28.0	14.1	2.5	152.36
13.5	7.0	1.20	73.46	29.0	14.6	2.5	157.80
14.0	7.3	1.40	76.18	30.0	15.1	2.5	163.24
14.5	7.6	1.40	78.90	31.0	15.6	3.0	168.68
15.0	7.8	1.40	81.62	32.0	16.1	3.0	174.12
15.5	7.8	1.40	84.34	33.0	16.6	3.0	179.57
16.0	8.3	1.60	87.06				

**Carbide rod blanks
with 2 twisted coolant holes 40°
length 330(310)mm**

**Hartmetall-Rundstäbe
mit 2 verdrehten Kühlkanälen 40°roh
Länge 330 oder 310mm**



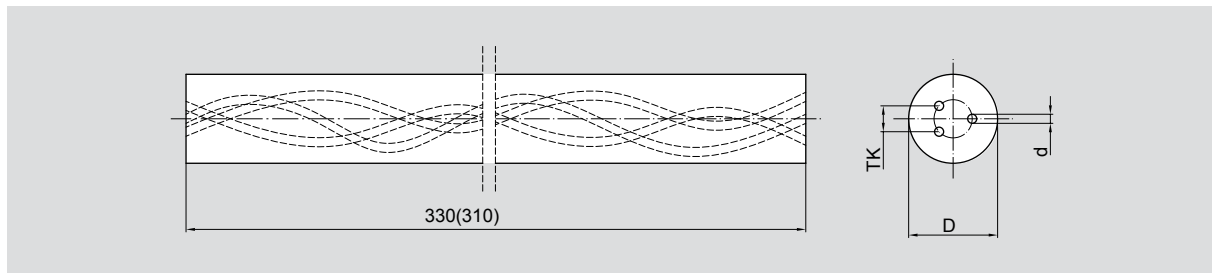
Type specification: B $\varnothing D \times 2\varnothing d \times TK \times L \times 40^\circ$

Typ-Spezifikation: B $\varnothing D \times 2\varnothing d \times TK \times L \times 40^\circ$

Diameter Durchmesser D(mm)	Pitch circle Teilkreis TK(mm)	Hole Bohrung d(mm)	Pitch Steigung (mm)	Diameter Durchmesser D(mm)	Pitch circle Teilkreis TK(mm)	Hole Bohrung d(mm)	Pitch Steigung (mm)
6.0	2.20	0.50	22.46	15.0	5.10	1.10	56.16
6.5	2.30	0.50	24.34	15.5	5.30	1.10	58.03
7.0	2.40	0.65	26.21	16.0	5.50	1.20	59.90
7.5	2.50	0.65	28.08	16.5	5.75	1.20	61.78
8.0	2.70	0.65	29.95	17.0	5.90	1.20	63.65
8.5	2.90	0.65	31.82	17.5	6.10	1.30	65.52
9.0	3.20	0.75	33.70	18.0	6.30	1.40	67.39
9.5	3.50	0.75	35.57	18.5	6.50	1.40	69.26
10.0	3.50	0.80	37.44	19.0	6.7	1.40	71.14
10.5	3.50	0.80	39.31	20.0	7.1	1.50	74.88
11.0	3.70	0.80	41.18	21.0	7.4	1.50	78.62
11.5	4.00	0.85	43.06	22.0	7.7	1.70	82.37
12.0	4.20	0.90	44.93	24.0	8.0	1.75	89.86
12.5	4.35	0.90	46.80	25.0	8.1	1.75	93.60
13.0	4.40	0.90	48.67	26.0	8.2	1.75	97.34
13.5	4.50	1.00	50.54	28.0	9.0	2.00	104.83
14.0	4.70	1.00	52.42	30.0	10.0	2.00	112.32
14.5	4.90	1.10	54.29	32.0	11.0	2.00	119.81

**Carbide rod blanks
with 3 twisted coolant holes 40°
length 330(310)mm**

**Hartmetall-Rundstäbe
mit 3 verdrehten Kühlkanälen 40°roh
Länge 330 oder 310mm**



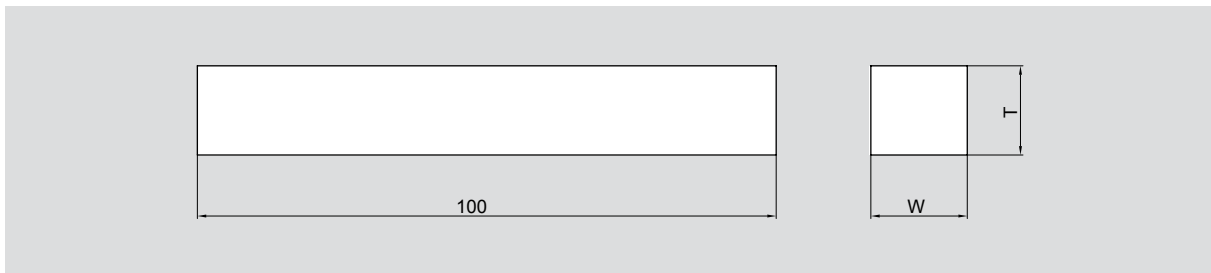
Type specification: B $\text{Ø}D \times 3\text{Ø}d \times \text{TK} \times L \times 40^\circ$

Typ-Spezifikation: B $\text{Ø}D \times 3\text{Ø}d \times \text{TK} \times L \times 40^\circ$

Diameter Durchmesser D(mm)	Pitch circle Teilkreis TK(mm)	Hole Bohrung d(mm)	Pitch Steigung (mm)	Diameter Durchmesser D(mm)	Pitch circle Teilkreis TK(mm)	Hole Bohrung d(mm)	Pitch Steigung (mm)
6.0	2.20	0.50	22.46	15.0	5.10	1.10	56.16
6.5	2.30	0.50	24.34	15.5	5.30	1.10	58.03
7.0	2.40	0.65	26.21	16.0	5.50	1.20	59.90
7.5	2.50	0.65	28.08	16.5	5.75	1.20	61.78
8.0	2.70	0.65	29.95	17.0	5.90	1.20	63.65
8.5	2.90	0.65	31.82	17.5	6.10	1.30	65.52
9.0	3.20	0.75	33.70	18.0	6.30	1.40	67.39
9.5	3.50	0.75	35.57	18.5	6.50	1.40	69.26
10.0	3.50	0.80	37.44	19.0	6.7	1.40	71.14
10.5	3.50	0.80	39.31	20.0	7.1	1.50	74.88
11.0	3.70	0.80	41.18	21.0	7.4	1.50	78.62
11.5	4.00	0.85	43.06	22.0	7.7	1.70	82.37
12.0	4.20	0.90	44.93	24.0	8.0	1.75	89.86
12.5	4.35	0.90	46.80	25.0	8.1	1.75	93.60
13.0	4.40	0.90	48.67	26.0	8.2	1.75	97.34
13.5	4.50	1.00	50.54	28.0	9.0	2.00	104.83
14.0	4.70	1.00	52.42	30.0	10.0	2.00	112.32
14.5	4.90	1.10	54.29	32.0	11.0	2.00	119.81

**Carbide square bar blanks
length 100mm**

**Hartmetall-Quadratstäbe roh
mit Länge 100mm**



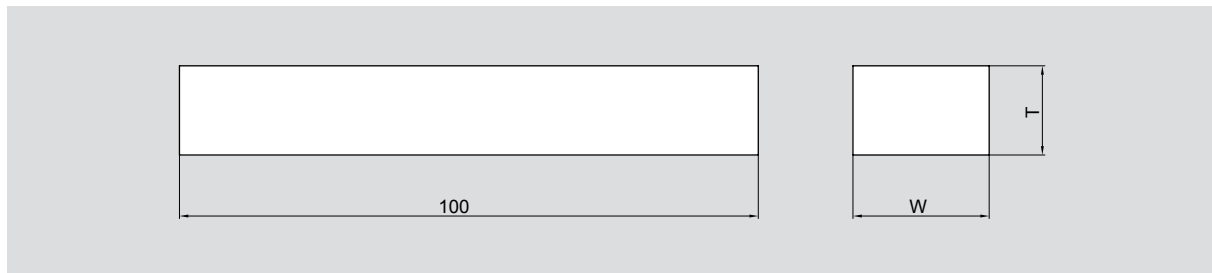
Type specification: T×W×L

Typ-Spezifikation: T×W×L

Dimensions Abmessung T×W(mm)
2.2 x 2.2
3.2 x 3.2
3.7 x 3.7
4.2 x 4.2
5.2 x 5.2
6.2 x 6.2
7.2 x 7.2
8.2 x 8.2
9.2 x 9.2
10.2 x 10.2
12.2 x 12.2

**Carbide flat bar blanks
with machining allowance
length 100mm**

**Hartmetall-Flachstäbe roh
mit Schleifaufmaß
Länge 100mm**



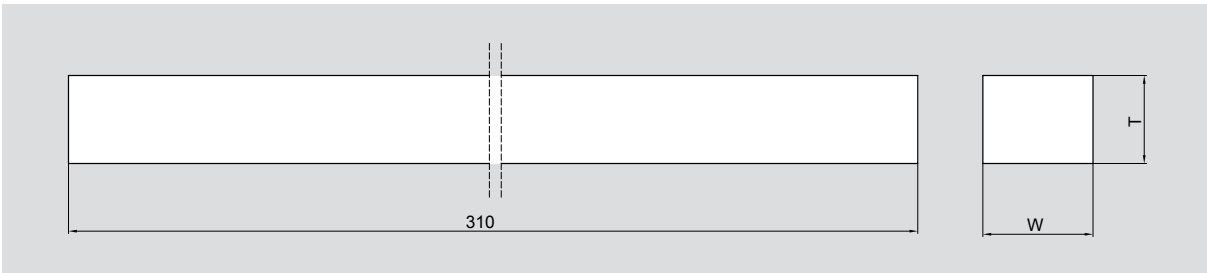
Type specification: T×W×L

Typ-Spezifikation: T×W×L

Dimensions Abmessung T×W(mm)	Dimensions Abmessung T×W(mm)	Dimensions Abmessung T×W(mm)	Dimensions Abmessung T×W(mm)	Dimensions Abmessung T×W(mm)
1.2 x 2.2	2.2 x 8.2	3.2 x 11.2	4.2 x 11.2	6.2 x 12.2
1.2 x 3.2	2.2 x 9.2	3.2 x 12.2	4.2 x 12.2	6.2 x 15.3
1.2 x 4.2	2.2 x 10.2	3.2 x 13.3	4.2 x 13.3	6.2 x 20.3
1.2 x 5.2	2.2 x 11.2	3.2 x 15.3	4.2 x 15.3	6.2 x 25.3
1.2 x 6.2	2.2 x 12.2	3.2 x 16.3	4.2 x 16.3	7.2 x 8.2
1.2 x 7.2	2.2 x 15.3	3.2 x 18.3	4.2 x 18.3	7.2 x 9.2
1.2 x 8.2	2.2 x 16.3	3.2 x 19.3	4.2 x 20.3	7.2 x 10.2
1.2 x 9.2	2.2 x 18.3	3.2 x 20.3	4.2 x 25.3	7.2 x 11.2
1.2 x 10.2	2.2 x 20.3	3.2 x 25.3	5.2 x 6.2	7.2 x 12.2
1.2 x 11.2	2.2 x 25.3	3.2 x 30.3	5.2 x 7.2	7.2 x 15.3
1.2 x 12.2	2.7 x 5.2	3.7 x 5.2	5.2 x 8.2	8.2 x 9.2
1.7 x 2.2	2.7 x 6.2	3.7 x 6.2	5.2 x 9.2	8.2 x 10.2
1.7 x 3.2	2.7 x 7.2	3.7 x 7.2	5.2 x 10.2	8.2 x 11.2
1.7 x 4.2	2.7 x 8.2	3.7 x 8.2	5.2 x 11.2	8.2 x 12.2
1.7 x 5.2	2.7 x 9.2	3.7 x 9.2	5.2 x 12.2	8.2 x 14.3
1.7 x 6.2	2.7 x 10.2	3.7 x 10.2	5.2 x 13.3	8.2 x 15.3
1.7 x 8.2	2.7 x 12.2	3.7 x 12.2	5.2 x 15.2	8.2 x 20.3
1.7 x 10.2	2.7 x 14.3	3.7 x 13.3	5.2 x 16.3	9.2 x 10.2
1.7 x 12.2	2.7 x 15.3	3.7 x 15.3	5.2 x 18.3	9.2 x 11.2
1.7 x 13.3	3.2 x 4.2	3.7 x 20.3	5.2 x 20.3	9.2 x 12.2
2.2 x 3.2	3.2 x 5.2	4.2 x 5.2	5.2 x 25.3	10.2 x 11.2
2.2 x 4.2	3.2 x 6.2	4.2 x 6.2	6.2 x 7.3	10.2 x 12.2
2.2 x 5.2	3.2 x 7.2	4.2 x 7.2	6.2 x 8.2	11.2 x 12.2
2.2 x 6.2	3.2 x 8.2	4.2 x 8.2	6.2 x 9.2	
2.2 x 6.5	3.2 x 9.2	4.2 x 9.2	6.2 x 10.2	
2.2 x 7.2	3.2 x 10.2	4.2 x 10.2	6.2 x 11.2	

**Carbide flat bar blanks
with machining allowance
length 310mm**

**Hartmetall-Flachstäbe roh
mit Schleifaufmaß
Länge 310mm**



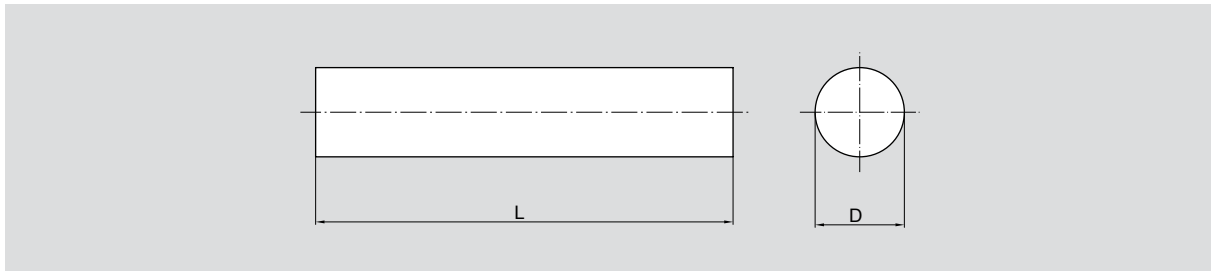
Type specification: T×W×L

Typ-Spezifikation: T×W×L

Dimensions Abmessung T×W(mm)	Dimensions Abmessung T×W(mm)	Dimensions Abmessung T×W(mm)	Dimensions Abmessung T×W(mm)
2.2 x 2.2	1.7 x 4.2	2.7 x 10.2	4.2 x 5.2
3.2 x 3.2	1.7 x 5.2	2.7 x 12.2	4.2 x 6.2
4.2 x 4.2	1.7 x 6.2	3.2 x 4.2	4.2 x 7.2
5.2 x 5.2	1.7 x 8.2	3.2 x 5.2	4.2 x 8.2
6.2 x 6.2	1.7 x 10.2	3.2 x 6.2	4.2 x 9.2
8.2 x 8.2	1.7 x 12.2	3.2 x 7.2	4.2 x 10.3
10.2 x 10.2	2.2 x 3.2	3.2 x 8.2	4.2 x 12.3
12.2 x 12.2	2.2 x 4.2	3.2 x 9.2	4.2 x 15.3
1.2 x 2.2	2.2 x 5.2	3.2 x 10.3	4.2 x 20.3
1.2 x 3.2	2.2 x 6.2	3.2 x 12.3	4.2 x 25.3
1.2 x 4.2	2.2 x 7.2	3.2 x 15.3	4.2 x 28.3
1.2 x 5.2	2.2 x 8.2	3.2 x 20.3	5.2 x 6.2
1.2 x 6.2	2.2 x 9.2	3.2 x 25.3	5.2 x 7.2
1.2 x 7.2	2.2 x 10.2	3.7 x 5.2	5.2 x 8.2
1.2 x 8.2	2.2 x 11.2	3.7 x 6.2	5.2 x 9.2
1.2 x 9.2	2.2 x 12.2	3.7 x 7.2	5.2 x 10.2
1.2 x 10.2	2.7 x 5.2	3.7 x 8.2	6.2 x 10.2
1.2 x 11.2	2.7 x 6.2	3.7 x 9.2	6.2 x 12.2
1.2 x 12.2	2.7 x 7.2	3.7 x 10.3	6.2 x 25.3
1.7 x 2.2	2.7 x 8.2	3.7 x 12.3	
1.7 x 3.2	2.7 x 9.2	3.7 x 13.3	

**Carbide rods
for PCB tools**

**Hartmetall-stäbe roh
für PCB Werkzeuge**



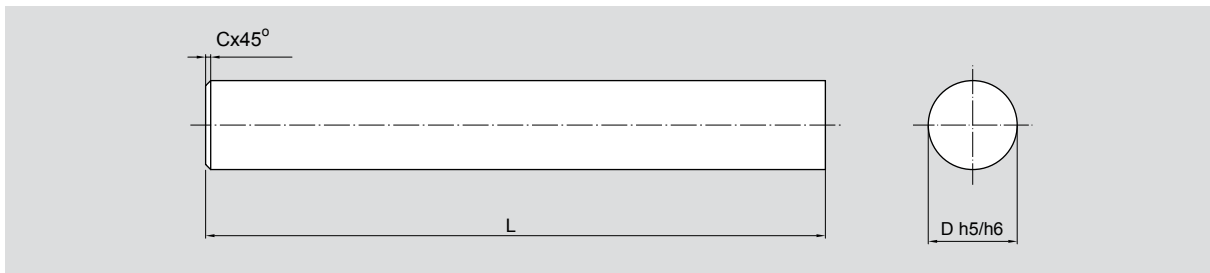
Type specification: PCB ØD×L

Typ-Spezifikation: PCB ØD×L

Diameter Durchmesser D(mm)	Tolerance D Toleranzen D	Length Länge L(mm)	Tolerance L Toleranzen L
3.25	-0/+0.05	38.5	-0.20/+0.20
3.5	-0/+0.05	38.5	-0.20/+0.20
4.0	-0/+0.05	38.5	-0.20/+0.20
4.5	-0/+0.05	38.5	-0.20/+0.20
5.0	-0/+0.05	38.5	-0.20/+0.20
5.5	-0/+0.05	38.5	-0.20/+0.20
6.0	-0/+0.05	38.5	-0.20/+0.20
6.5	-0/+0.05	38.5	-0.20/+0.20
3.25	-0/+0.05	38.7	-0.20/+0.30
3.5	+0.20/+0.50	12.8	-0.10/+0.10
4.0	+0.20/+0.50	12.8	-0.10/+0.10
4.5	+0.20/+0.50	12.8	-0.10/+0.10
5.0	+0.20/+0.40	12.8	-0.10/+0.10
5.5	+0.20/+0.40	12.8	-0.10/+0.10
6.0	+0.20/+0.40	12.8	-0.10/+0.10
6.5	+0.20/+0.40	12.8	-0.10/+0.10
6.85	+0.20/+0.40	12.8	-0.10/+0.10

**Carbide rods
ground to tol.h5/h6
one end chamfered 45°**

**Hartmetall-Rundstäbe
geschliffen Tol. h5/h6
einseitig gefasst 45°**



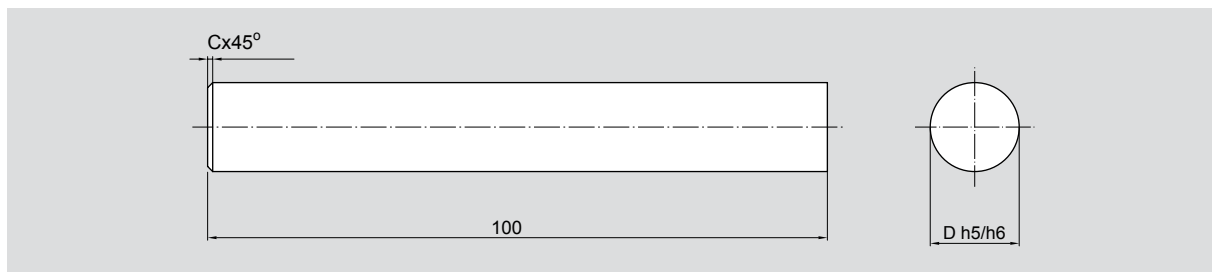
Type specification: $\varnothing D h6 \times L \times C45$

Typ-Spezifikation: $\varnothing D h6 \times L \times C45$

Diameter Durchmesser D(mm)	Length Länge L(mm)	Tolerance L Toleranz L (mm)	Chamfer Fase C(mm)	Diameter Durchmesser D(mm)	Length Länge L(mm)	Tolerance L Toleranz L (mm)	Chamfer Fase C(mm)
2.00	32.0	+0.7	0.3	10.00	70.0	+0.9	0.8
3.00	32.0	+0.7	0.3	10.00	73.0	+0.9	0.8
3.00	39.0	+0.7	0.3	11.00	70.0	+0.9	0.8
4.00	38.0	+0.8	0.4	11.00	72.0	+0.9	0.8
4.00	40.0	+0.8	0.4	12.00	70.0	+0.9	0.8
4.00	51.0	+0.8	0.4	12.00	73.0	+0.9	0.8
5.00	38.0	+0.8	0.4	12.00	84.0	+0.9	0.8
5.00	51.0	+0.8	0.4	12.00	100.0	+0.9	0.8
5.00	57.0	+0.8	0.4	13.00	75.0	+1.0	0.8
6.00	39.0	+0.8	0.4	14.00	75.0	+1.0	0.8
6.00	45.0	+0.8	0.4	14.00	84.0	+1.0	0.8
6.00	51.0	+0.9	0.4	15.00	75.0	+1.0	0.8
6.00	55.0	+0.9	0.4	16.00	75.0	+1.0	0.8
6.00	58.0	+0.9	0.4	16.00	82.0	+1.0	0.8
7.00	60.0	+0.9	0.6	16.00	93.0	+1.0	0.8
8.00	58.0	+0.9	0.6	18.00	84.0	+1.0	1.0
8.00	60.0	+0.9	0.6	18.00	93.0	+1.0	1.0
8.00	64.0	+0.9	0.6	18.00	100.0	+1.0	1.0
9.00	60.0	+0.9	0.6	20.00	92.0	+1.0	1.0
9.00	63.0	+0.9	0.6	20.00	100.0	+1.0	1.0
10.00	66.0	+0.9	0.6	20.00	105.0	+1.0	1.0

**Carbide rods
ground to tol.h5/h6
one end chamfered 45°
length 100mm**

**Hartmetall-Rundstäbe
geschliffen Tol. h5/h6
einseitig gefasst 45°
mit Länge 100mm**

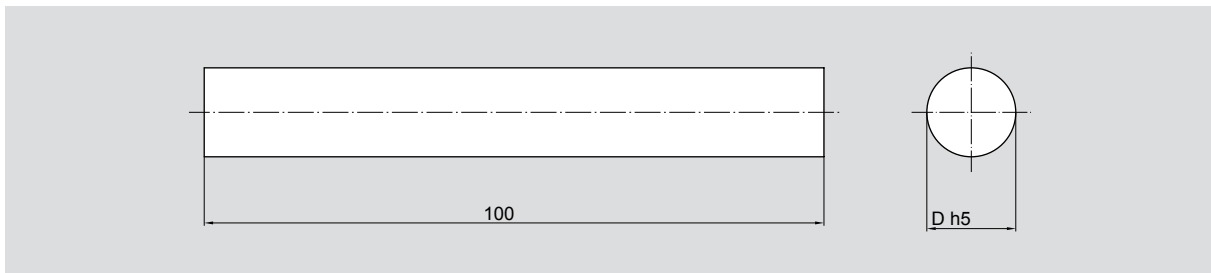


Type specification: $\varnothing D h6 \times L \times C45$ Typ-Spezifikation: $\varnothing D h6 \times L \times C45$

Diameter Durchmesser D(mm)	Chamfer Fase C(mm)	Diameter Durchmesser D(mm)	Chamfer Fase C(mm)
1.00	0.3	13.00	0.7
1.50	0.3	14.00	0.7
2.00	0.3	15.00	0.7
2.50	0.3	16.00	0.7
3.00	0.3	18.00	1.0
3.50	0.3	19.00	1.0
4.00	0.3	20.00	1.0
4.50	0.3	21.00	1.0
5.00	0.3	22.00	1.0
5.50	0.3	23.00	1.0
6.00	0.5	24.00	1.0
6.50	0.5	25.00	1.5
7.00	0.5	26.00	1.5
7.50	0.5	28.00	1.5
8.00	0.5	30.00	1.5
8.50	0.5	32.00	1.5
9.00	0.5	33.00	1.5
9.50	0.5	34.00	1.5
10.00	0.5	35.00	1.5
10.50	0.5	36.00	1.5
11.00	0.5	38.00	1.5
11.50	0.5	40.00	1.5
12.00	0.7		

**Carbide rods
ground to tol.h5
length 100mm**

**Hartmetall-Rundstäbe
geschliffen Tol. h5
Länge 100mm**



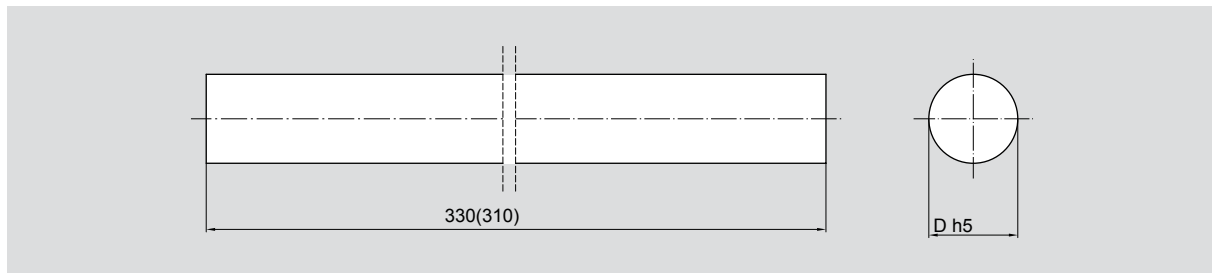
Type specification: $\varnothing D \ h5 \times L$

Typ-Spezifikation: $\varnothing D \ h5 \times L$

Diameter Durchmesser D(mm)	Diameter Durchmesser D(mm)
1.00	13.00
1.50	14.00
2.00	15.00
2.50	16.00
3.00	18.00
3.50	19.00
4.00	20.00
4.50	21.00
5.00	22.00
5.50	23.00
6.00	24.00
6.50	25.00
7.00	26.00
7.50	28.00
8.00	30.00
8.50	32.00
9.00	33.00
9.50	34.00
10.00	35.00
10.50	36.00
11.00	38.00
11.50	40.00
12.00	

**Carbide rods
ground to tol.h5
length 330(310)mm**

**Hartmetall-Rundstäbe
geschliffen Tol. h5
Länge 330 oder 310mm**



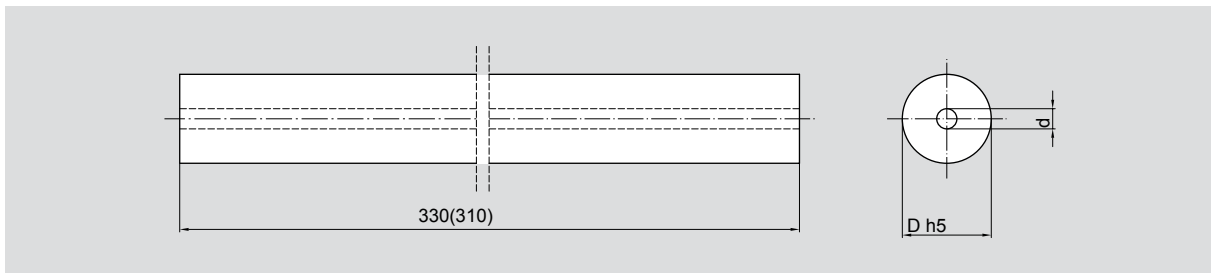
Type specification: $\varnothing D \ h5 \times L$

Typ-Spezifikation: $\varnothing D \ h5 \times L$

Diameter Durchmesser D(mm)	Diameter Durchmesser D(mm)
1.00	13.00
1.50	14.00
2.00	15.00
2.50	16.00
3.00	17.00
3.50	18.00
4.00	19.00
4.50	20.00
5.00	21.00
5.50	22.00
6.00	23.00
6.50	24.00
7.00	25.00
7.50	26.00
8.00	28.00
8.50	30.00
9.00	32.00
9.50	33.00
10.00	34.00
10.50	35.00
11.00	36.00
11.50	38.00
12.00	40.00
12.50	

**Carbide rods
with central coolant hole
ground to tol.h5
length 330(310)mm**

**Hartmetall-Rundstäbe
mit zentralem Kühlkanälen
geschliffen Tol. h5
Länge 330 oder 310mm**



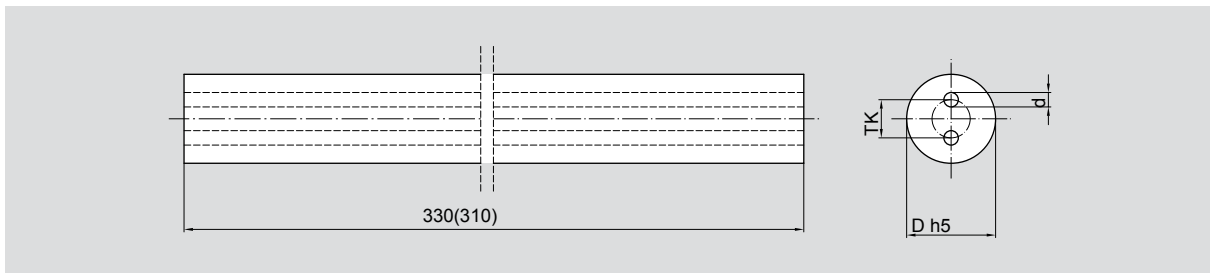
Type specification: $\varnothing D \text{ h}5 \times \varnothing d \times L$

Typ-Spezifikation: $\varnothing D \text{ h}5 \times \varnothing d \times L$

Diameter Durchmesser D(mm)	Hole Bohrung d(mm)	Diameter Durchmesser D(mm)	Hole Bohrung d(mm)
4.50	0.6	15.00	4.0
6.00	1.0	15.00	6.0
6.00	1.8	16.00	2.0
8.00	1.0	16.00	2.5
8.00	1.3	16.00	3.0
8.00	2.0	16.00	4.0
8.00	2.5	18.00	1.5
9.00	1.5	18.00	2.0
10.00	1.0	18.00	3.0
10.00	1.5	20.00	1.5
10.00	2.0	20.00	2.0
10.00	3.0	20.00	2.5
12.00	1.0	20.00	3.0
12.00	1.5	20.00	3.5
12.00	2.0	20.00	4.0
12.00	2.5	22.00	3.0
12.00	3.0	24.00	4.0
12.00	4.0	25.00	2.0
12.00	5.0	25.00	3.0
13.00	2.0	25.00	4.0
13.00	3.0	26.00	3.0
14.00	1.5	26.00	4.0
14.00	2.0	28.00	4.0
14.00	2.5	30.00	5.0
14.00	3.0	32.00	5.0
15.00	3.0		

**Carbide rods
with 2 parallel coolant holes
ground to tol.h5
length 330(310)mm**

**Hartmetall-Rundstäbe
mit 2 parallelen Kühlkanälen
geschliffen Tol. h5
Länge 330 oder 310mm**



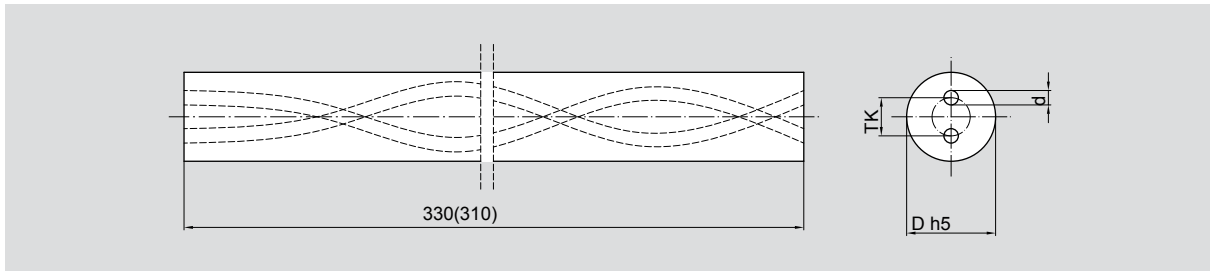
Type specification: $\varnothing D \ h5 \times 2\varnothing d \times TK \times L$

Typ-Spezifikation: $\varnothing D \ h5 \times 2\varnothing d \times TK \times L$

Diameter Durchmesser D(mm)	Pitch circle Teilkreis TK(mm)	Hole Bohrung d(mm)	Diameter Durchmesser D(mm)	Pitch circle Teilkreis TK(mm)	Hole Bohrung d(mm)
4.00	1.8	0.80	17.00	6.2	2.0
5.00	2.0	0.80	17.00	8.0	2.0
6.00	1.5	0.80	18.00	6.2	2.0
6.00	3.0	1.00	18.00	9.0	2.0
7.00	3.5	1.00	19.00	6.2	2.0
8.00	1.5	0.80	19.00	9.0	2.0
8.00	2.0	0.80	20.00	6.2	2.0
8.00	4.0	1.00	20.00	10.0	2.5
9.00	2.6	1.00	21.00	6.2	2.0
9.00	4.0	1.40	21.00	10.0	2.5
10.00	2.6	1.00	22.00	6.2	2.0
10.00	5.0	1.40	22.00	11.0	2.5
11.00	3.5	1.20	23.00	7.5	2.0
11.00	5.0	1.40	23.00	11.0	2.5
12.00	3.5	1.20	24.00	7.5	2.0
12.00	6.0	1.75	24.00	12.0	3.0
13.00	3.5	1.20	25.00	7.5	2.0
13.00	6.0	1.75	25.00	12.0	3.0
14.00	5.0	1.50	26.00	13.0	3.0
14.00	7.0	1.75	28.00	14.0	3.0
15.00	5.0	1.50	30.00	14.0	3.0
15.00	7.0	2.00	32.00	14.0	3.0
16.00	5.0	1.50	34.00	14.0	3.0
16.00	8.0	2.00			

**Carbide rods
with 2 twisted coolant holes 30°
ground to tol.h5
length 330(310)mm**

**Hartmetall-Rundstäbe
mit 2 verdrehten Kühlkanälen 30°
geschliffen Tol. h5
Länge 330 oder 310mm**



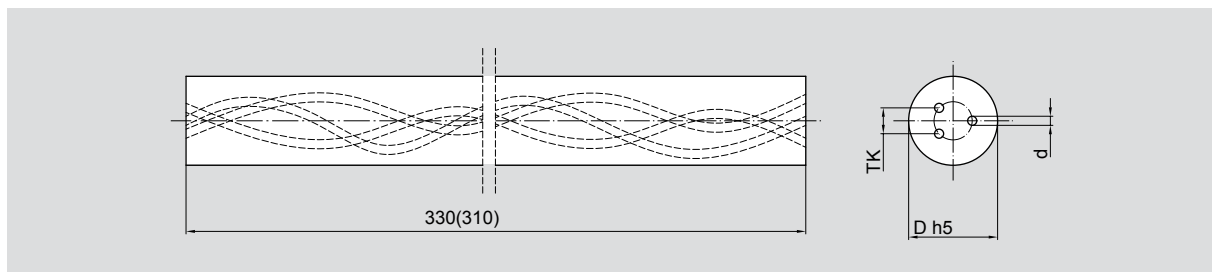
Type specification: $\varnothing D \text{ h}5 \times 2\varnothing d \times TK \times L \times 30^\circ$

Typ-Spezifikation: $\varnothing D \text{ h}5 \times 2\varnothing d \times TK \times L \times 30^\circ$

Diameter Durchmesser D(mm)	Pitch circle Teilkreis TK(mm)	Hole Bohrung d(mm)	Pitch Steigung (mm)
4.00	2.20	0.60	21.77
5.00	2.60	0.70	27.21
6.00	2.60	0.70	32.65
7.00	3.70	1.00	38.09
8.00	4.00	1.00	43.53
9.00	4.80	1.40	48.97
10.00	4.80	1.40	54.41
11.00	5.30	1.40	59.86
12.00	6.25	1.40	65.30
13.00	6.50	1.75	70.74
14.00	7.10	1.75	76.18
15.00	7.70	1.75	81.62
16.00	8.30	1.75	87.06
17.00	8.90	1.75	92.50
18.00	9.55	2.00	97.95
19.00	10.10	2.00	103.39
20.00	10.40	2.00	108.83
21.00	11.15	2.00	114.27
22.00	11.60	2.00	119.71
24.00	12.80	2.00	130.59
25.00	13.30	2.00	136.03
26.00	13.80	2.00	141.48
28.00	14.80	2.50	152.36
30.00	16.00	2.50	163.24
32.00	17.20	3.00	174.12
34.00	18.00	3.00	185.01

**Carbide rods
with 3 twisted coolant holes 30°
ground to tol.h5
length 330(310)mm**

**Hartmetall-Rundstäbe
mit 3 verdrehten Kühlkanälen 30°
geschliffen Tol. h5
Länge 330 oder 310mm**



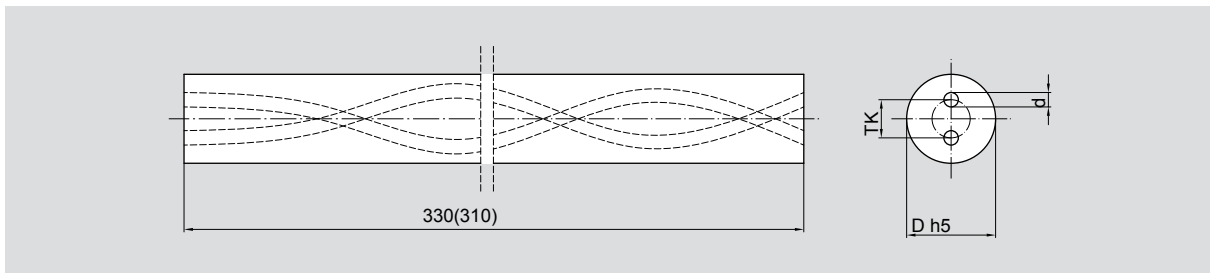
Type specification: $\varnothing D \ h5 \times 3\varnothing d \times TK \times L \times 30^\circ$

Typ-Spezifikation: $\varnothing D \ h5 \times 3\varnothing d \times TK \times L \times 30^\circ$

Diameter Durchmesser D(mm)	Pitch circle Teilkreis TK(mm)	Hole Bohrung d(mm)	Pitch Steigung (mm)
6.00	2.9	0.50	32.65
7.00	4.0	0.65	38.09
8.00	4.0	0.70	43.53
9.00	5.1	0.85	48.97
10.00	5.1	0.85	54.41
11.00	5.7	1.10	59.86
12.00	6.3	1.10	65.30
13.00	6.8	1.20	70.74
14.00	7.3	1.40	76.18
15.00	7.8	1.40	81.62
16.00	8.3	1.60	87.06
17.00	8.6	1.60	92.50
18.00	9.5	1.70	97.95
19.00	10.2	1.70	103.39
20.00	10.2	1.90	108.83
21.00	11.1	2.00	114.27
22.00	11.5	2.00	119.71
24.00	12.1	2.00	130.59
25.00	12.5	2.00	136.03
26.00	13.1	2.00	141.48
28.00	14.1	2.50	152.36
30.00	15.1	2.50	163.24
32.00	16.1	3.00	174.12
33.00	16.6	3.00	179.57

**Carbide rods
with 2 twisted coolant holes 40°
ground to tol.h5
length 330(310)mm**

**Hartmetall-Rundstäbe
mit 2 verdrehten Kühlkanälen 40°
geschliffen Tol. h5
Länge 330 oder 310mm**



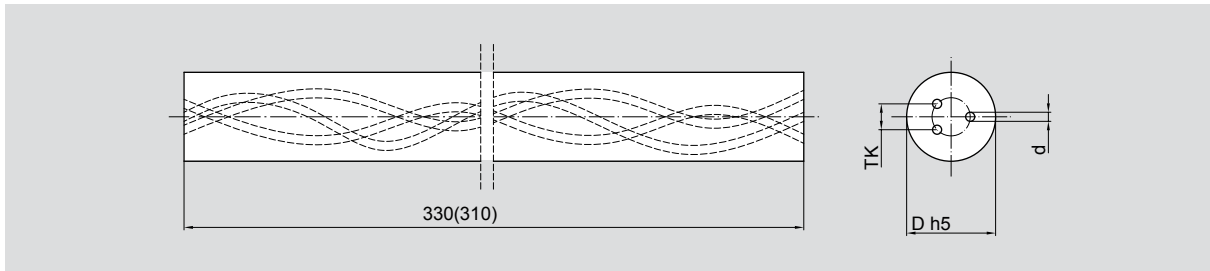
Type specification: $\varnothing D \text{ h}5 \times 2\varnothing d \times TK \times L \times 40^\circ$

Typ-Spezifikation: $\varnothing D \text{ h}5 \times 2\varnothing d \times TK \times L \times 40^\circ$

Diameter Durchmesser D(mm)	Pitch circle Teilkreis TK(mm)	Hole Bohrung d(mm)	Pitch Steigung (mm)
6.00	2.2	0.50	22.46
7.00	2.4	0.65	26.21
8.00	2.7	0.65	29.95
9.00	3.2	0.75	33.70
10.00	3.5	0.80	37.44
11.00	3.7	0.80	41.18
12.00	4.2	0.90	44.93
13.00	4.4	0.90	48.67
14.00	4.7	1.00	52.42
15.00	5.1	1.10	56.16
16.00	5.5	1.20	59.90
17.00	5.9	1.20	63.65
18.00	6.3	1.40	67.39
19.00	6.7	1.40	71.14
20.00	7.1	1.50	74.88
21.00	7.4	1.50	78.62
22.00	7.7	1.70	82.37
24.00	8.0	1.75	89.86
25.00	8.1	1.75	93.60
26.00	8.2	1.75	97.34
28.00	9.0	2.00	104.83
30.00	10.0	2.00	112.32
32.00	11.0	2.00	119.81

**Carbide rods
with 3 twisted coolant holes 40°
ground to tol.h5
length 330(310)mm**

**Hartmetall-Rundstäbe
mit 3 verdrehten Kühlkanälen 40°
geschliffen Tol. h5
Länge 330 oder 310mm**



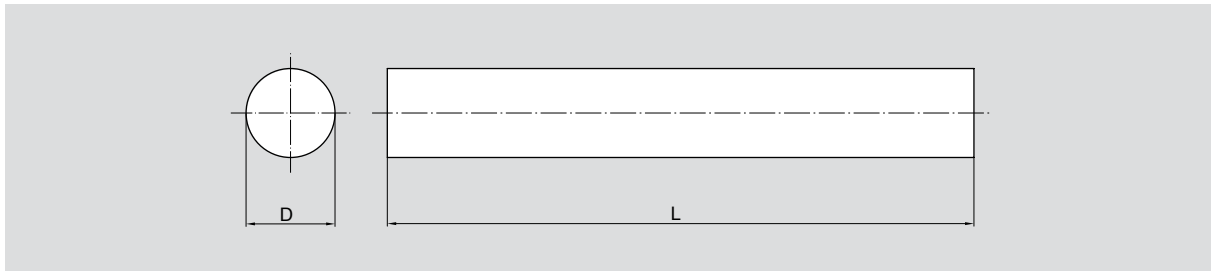
Type specification: $\text{ØD h5} \times 3\text{Ød} \times \text{TK} \times \text{L} \times 40^\circ$

Typ-Spezifikation: $\text{ØD h5} \times 3\text{Ød} \times \text{TK} \times \text{L} \times 40^\circ$

Diameter Durchmesser D(mm)	Pitch circle Teilkreis TK(mm)	Hole Bohrung d(mm)	Pitch Steigung (mm)
6.00	2.2	0.50	22.46
7.00	2.4	0.65	26.21
8.00	2.7	0.65	29.95
9.00	3.2	0.75	33.70
10.00	3.5	0.80	37.44
11.00	3.7	0.80	41.18
12.00	4.2	0.90	44.93
13.00	4.4	0.90	48.67
14.00	4.7	1.00	52.42
15.00	5.1	1.10	56.16
16.00	5.5	1.20	59.90
17.00	5.9	1.20	63.65
18.00	6.3	1.40	67.39
19.00	6.7	1.40	71.14
20.00	7.1	1.50	74.88
21.00	7.4	1.50	78.62
22.00	7.7	1.70	82.37
24.00	8.0	1.75	89.86
25.00	8.1	1.75	93.60
26.00	8.2	1.75	97.34
28.00	9.0	2.00	104.83
30.00	10.0	2.00	112.32
32.00	11.0	2.00	119.81

**Carbide rod blanks
as per inch standard**

**Hartmetall-Rundstäbe
gemäß Zoll Norm**



Type specification: B ØD×L

Typ-Spezifikation: BØD×L

Type Typ (D×L)	D(inch) D(Zoll)	L(inch) L(Zoll)	Type Typ (D×L)	D(inch) D(Zoll)	L(inch) L(Zoll)
1/8 x 1 1/2	0.129	1.505	3/8 x 2	0.379	2.005
1/8 x 2	0.129	2.005	3/8 x 2 1/2	0.379	2.505
1/8 x 3	0.129	3.005	3/8 x 3	0.379	3.005
3/16 x 1 1/2	0.191	1.505	3/8 x 3 1/2	0.379	3.505
3/16 x 2	0.191	2.005	7/16 x 2 1/2	0.441	2.505
3/16 x 2 1/2	0.191	2.505	7/16 x 2 3/4	0.441	2.755
3/16 x 3	0.191	3.005	1/2 x 2 1/2	0.504	2.505
1/4 x 1 1/2	0.254	1.505	1/2 x 3	0.504	3.005
1/4 x 2	0.254	2.005	1/2 x 4	0.504	4.005
1/4 x 2 1/2	0.254	2.505	9/16 x 3	0.566	3.005
1/4 x 3	0.254	3.005	9/16 x 3 1/2	0.566	3.505
1/4 x 3 1/2	0.254	3.505	5/8 x 3 1/2	0.629	3.505
1/4 x 4	0.254	4.005	3/4 x 4	0.754	4.005
5/16 x 2	0.316	2.005	7/8 x 4	0.879	4.005
5/16 x 2 1/2	0.316	2.505	1 x 4	1.004	4.005

Tolerances/Toleranzen

Diameters/Durchmesser:

Lengths/Längen:

All	-0/+0.004 in
0-2 in	-0/+0.030 in
2-2.5 in	-0/+0.040 in
2.5-3 in	-0/+0.050 in
>3 in	-0/+0.060 in

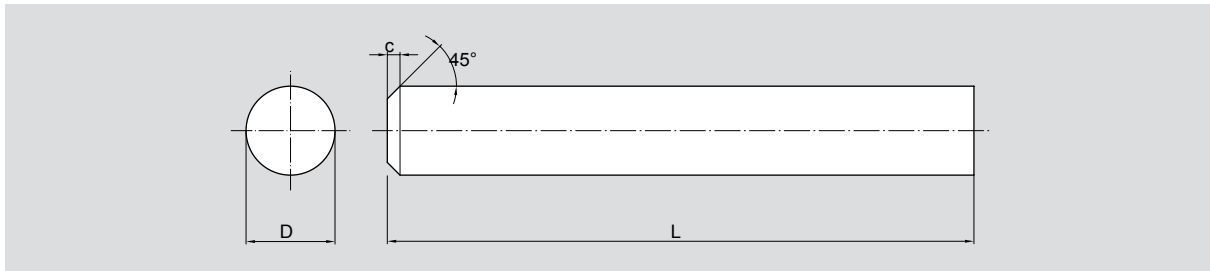
Specifications/Spezifikationen

Run-out (using Rotary 'V' fixture)/Auslauf (mit rotierender V-Vorrichtung)

All Diameters and lengths/Alle Durchmesser und Längen: 0.002 in

**Carbide rods
finished ground
with single chamfer 45°
as per inch standard**

**Hartmetall-Rundstäbe
geschliffen
ein Ende abgeschrägt 45°
gemäß Zoll Norm**



Type specification: PG ØD×L×C45

Typ-Spezifikation: PG ØD×LXC45

Type Typ (D×L)	D(inch) D(Zoll)	L(inch) L(Zoll)	C(inch) C(Zoll)	Type Typ (D×L)	D(inch) D(Zoll)	L(inch) L(Zoll)	C(inch) C(Zoll)
1/8 x 1 1/2	0.1250	1.505	0.010	3/8 x 2 1/2	0.3750	2.505	0.010
1/8 x 2	0.1250	2.005	0.010	3/8 x 3	0.3750	3.005	0.010
1/8 x 3	0.1250	3.005	0.010	3/8 x 3 1/2	0.3750	3.505	0.010
3/16 x 1 1/2	0.1875	1.505	0.010	7/16 x 2 1/2	0.4375	2.505	0.025
3/16 x 2 1/2	0.1875	2.505	0.010	7/16 x 2 3/4	0.4375	2.755	0.025
3/16 x 3	0.1875	3.005	0.010	1/2 x 2 1/2	0.5000	2.505	0.025
1/4 x 2	0.2500	2.005	0.010	1/2 x 3	0.5000	3.005	0.025
1/4 x 2 1/2	0.2500	2.505	0.010	1/2 x 4	0.5000	4.005	0.025
1/4 x 3	0.2500	3.005	0.010	9/16 x 3	0.5625	3.005	0.025
1/4 x 3 1/2	0.2500	3.505	0.010	9/16 x 3 1/2	0.5625	3.505	0.025
1/4 x 4	0.2500	4.005	0.010	5/8 x 3 1/2	0.6250	3.505	0.025
5/16 x 2	0.3125	2.005	0.010	3/4 x 4	0.7500	4.005	0.025
5/16 x 2 1/2	0.3125	2.505	0.010	7/8 x 4	0.8750	4.005	0.025
3/8 x 2	0.3750	2.005	0.010	1 x 4	1.0000	4.005	0.030

Tolerances/Toleranzen

Geometrical tolerance according to product drawing/Geometrische Toleranz gemäß Produktzeichnung.

Diameters/Durchmesser:	All	-0.0001 to -0.0004 in
Length/Längen:	0-2 in	-0/+0.030 in
	2-2.5 in	-0/+0.040 in
	2.5-3 in	-0/+0.050 in
	>3 in	-0/+0.060 in
Chamfer/Fase	C	-0/±1.5%
Surface finish/Oberflächenbeschaffenheit		10 RMS

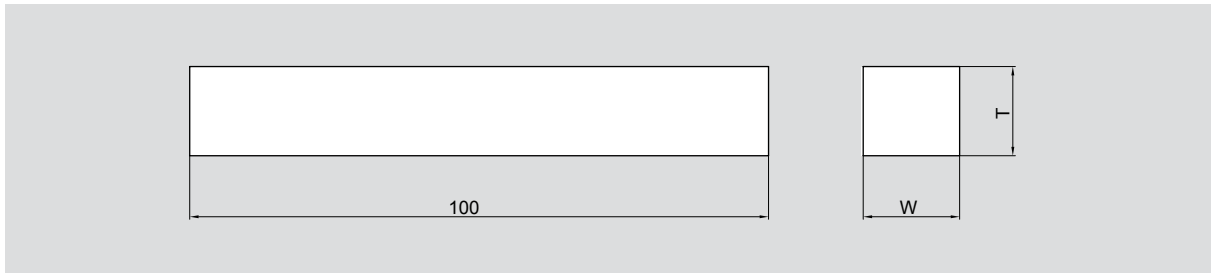


中国驰名商标
CHINA'S RENOWNED BRAND



**Carbide bars
ground to tol.h6
length 100mm**

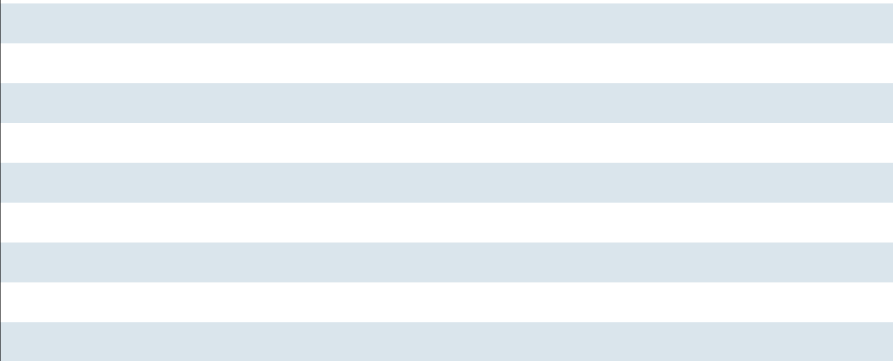
**Hartmetall-Quadratstäbe
geschliffen Tol. h6
Länge 100mm**

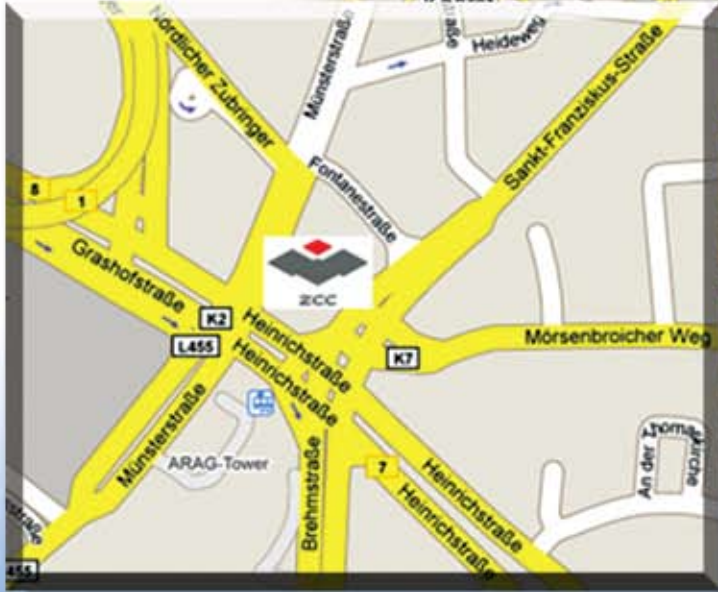


Type specification: Th6×Wh6×L

Typ-Spezifikation: Th6×Wh6×L

Dimensions Abmessung T×W(mm)
1.0 x 1.0
2.0 x 2.0
3.0 x 3.0
4.0 x 4.0
5.0 x 5.0
6.0 x 6.0
8.0 x 8.0
9.0 x 9.0
10.0 x 10.0
12.0 x 12.0





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