



# ZCC America

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2024 VERSION

## CARBIDE RODS FOR PCB TOOLS



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# ABOUT ZCC



Zhuzhou Cemented Carbide Group Corporation Ltd. ZCC was one of the 156 major projects that China built in 1954 in its "First Five-Year Plan" , and was known as "the cradle of China's cemented carbide industry" . It is China's largest enterprise specialized in the production,scientific research, sales and export of cemented carbide.

ZCC's main products fall into 6 major categories: metal cutting tools, mining and oil drilling tools, hard materials, tungsten and molybdenum products, tantalum and niobium products, rare metals powder.

They are widely used in industries of metallurgy, machinery, geology, coal, oil and gas, petrochemical, electronics, textile and national defense, etc.

ZCC has established Sales Branches in Germany, USA, India and other countries, and its "Diamond Brand" and "ZCC" trademark has been registered in more than 60 countries and regions, such as Britain, Denmark, South Korea, Australia, Canada, and the products are sold to more than 70 countries and regions in the world.

## 1954

**FOUNDATION**

One of the 156 major projects that China constructed in 1954 in its "First Five-Year Plan"

## 1958

**THE FIRST ROD**

China's 1st piece of ROD was born in ZCC

## 2001

**THE FITST ROD WITH COOLANT HOLES**

China's 1st piece of ROD with coolant holes was born in ZCC

## 2009

**RODS & BARS DIVISION BUILT**

Isolated division for rods only in order to avoid cross contamination

## 2018

**NEW DRILL BLANKS**

New production line and have sold one million pieces

## 2021

**NEWLY BUILT PLANT OF RODS AND BARS DIVISION**

The World's leading manufacturing center for rods and bars

# PRODUCTION CAPACITY

At present, ZCC has 5 professional product divisions, 1 manufacturing plants, 3 research and development centers, 1 analysis and testing center, 5 holding subsidiaries, with all kinds of production and testing equipments. It has the production capacity of the entire cemented carbide system from raw materials powder production, to the finished carbide products production, and then to post production processing, and it is capable of producing and processing various types and shapes of cemented carbide. The annual output of cemented carbide products ranks the first in China.

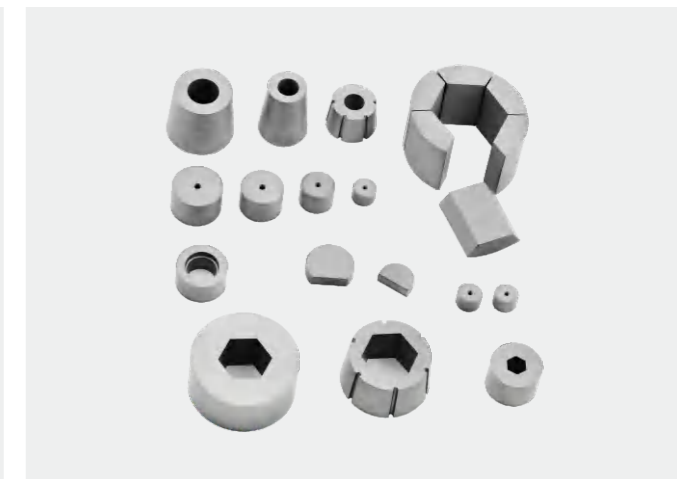
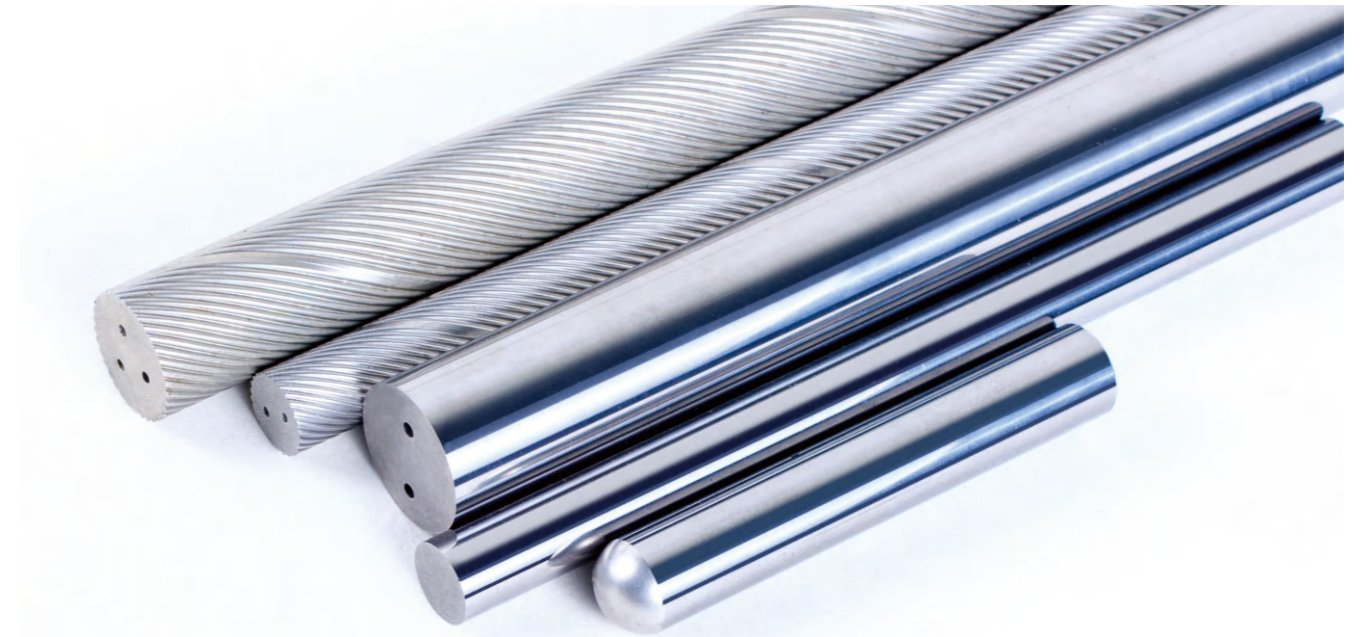
5 PROFESSIONAL PRODUCT DIVISIONS

1 MANUFACTURING PLANTS

3 RESEARCH AND DEVELOPMENT CENTERS

1 ANALYSIS AND TESTING CENTER

5 HOLDING SUBSIDIARIES



# R&D



ZCC adheres to the strategy of "revitalizing enterprise through science and education" and constantly improves its independent innovation ability.

Its hard material R&D center, cutting tool R&D center and micro bit R&D center is of the highest level in China. Since the "11th Five-Year Plan", ZCC has invested nearly 100 million yuan in scientific research every year, and has undertaken more than 20 major scientific and technological projects including national "863" and "973" projects, national innovation capacity construction projects, and national science and technology support projects. With a number of scientific research achievements reaching the international advanced level, ZCC has won more than 40 honors and awards at the provincial level and above. It has nearly 10 national strategic innovative products and key new product projects.

More than 830 authorized patents have been granted, and over 180 national and industrial standards have been established and revised.



ZCC is the presidium unit of China Tungsten Industry Association and the chairman unit of cemented carbide branch. It is the organizer and administrator of the national academic journal **CEMENTED CARBIDE** with great influence and authority in the field of cemented carbide and super hard materials in China, leading the development of cemented carbide industry in China.

ZCC has State Key Laboratory for Cemented Carbide, Nationally Recognized Enterprise Technology Center, Industrial Product Quality Control and Technical Evaluation Laboratory, and Cemented Carbide Quality Inspection Station of China Non-ferrous Metals Industry. It was identified as the national technology innovation demonstration enterprise and the national intellectual property advantage enterprise with the first post-doctoral research station in Hunan province.

# QUALITY ASSURANCE

ZCC always adheres to the quality policy of "Emphasizing Technology, Strict Management, Quality First, and Diamond Brand Products Fully Satisfying Customers' Needs". It has passed the certification in quality, occupational health and safety and environment management. ZCC always adheres to the idea of "Everything for Customer Service", closely focusing on customer needs, constantly expanding technical service efforts, and striving to improve the market service support capabilities.



# THE RODS FACTORY



## Rods & Bars Branch

Rods & Bars Branch is a specialized production unit of cemented carbide rods and bars authorized by ZCC on Nov 12th, 2010. It is a base of ultra-fine cemented carbide that brings together R&D, production, and sales. It has world top technologies regarding cemented carbide and ultra-fine cemented carbide including TAP molding, isostatic pressing and extrusion molding, pressure sintering, etc., as well as high precision extrusion "near net shaping" technique, and complex helical groove shape preforming technique.

Rods and Bars Branch has relatively complete product variety and is able to produce cemented carbide products of nanocrystalline, ultra-fine, submicron crystalline, fine crystalline, etc. Rods and Bars Branch is a stable supplier of PCB rods, solid tool bars, rods with coolant holes, flat bars, among other mainstream products of the industry, and can meet market demand of multiple fields including electronic information, automobile, aerospace, molds, etc. It has been awarded "Science and Technology Prize of China Nonferrous Industry", "National Scientific and Technological Advancement Prize" among other national and provincial awards.

Currently, with 300 professional employees and three specialized workshops, ZCC's rod & bar division is producing about 2000 tons of rods annually and more than one-third are exported to worldwide-famous cutting tool manufacturers.

## New factory founded in Jan. 2021

3000 tons per year capacity (designed)

Semi-automatic production

Stable quality

Automatic storage / pickup warehouse

## 2021 Improvement Data

Production capacity increased 22%

Labor reduced 10%

Customer complaint reduced 30%

WIP reduced 25%

Productivity improved 35%





# GRADE OVERVIEW

## For Router

Grade	ISO Grade	Cobalt content	Grain size	Density	Hardness		Fracture toughness	TRS
		wt.%	μm	g/cm3	HV30	HRA	MPa.m1/2	N/mm2
XN208	K05-K10	8.0	0.2	14.50	2180	94.8	8.3	4500
YU06A	K05-K10	6.0	0.4	14.72	2100	94.4	8.5	4000
YU06R	K05-K10	6.0	0.4	14.70	2000	94.3	8.2	3800
YU05A	K05-K10	5.0	0.5	14.90	1950	94.2	7.5	3800

## For Micro Drill

Grade	ISO Grade	Cobalt content	Grain size	Density	Hardness		Fracture toughness	TRS
		wt.%	μm	g/cm3	HV30	HRA	MPa.m1/2	N/mm2
XN25S	K05-K10	9.0	0.2	14.42	2050	94.3	9.2	4500
XN209	K05-K10	9.0	0.2	14.40	2050	94.3	8.0	4200
XN20A	K05-K10	8.0	0.2	14.50	2020	94.2	9.8	4000
YU06A	K05-K10	6.0	0.4	14.70	2100	94.3	8.5	4000
XF15S	K10-K20	6.0	0.6	14.85	1880	93.5	9.2	3800

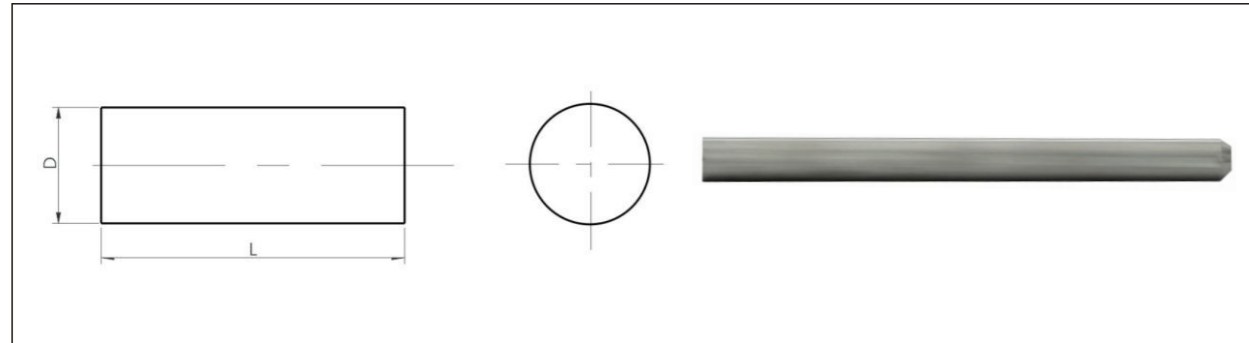
# APPLICATION

Grade	Application
XN208	Nano material with good performance. Suitable for processing high-end difficult-to-process materials such as high TG sheets and high-density/hardness sheets.
YU06A	Ultrafine material with good comprehensiveness and versatility. Suitable for making full process milling cutter.
YU06R	For processing common sheets. Suitable for making milling cutters above 0.8mm.
YU05A	For processing common sheets. Suitable for making milling cutters above 1.0mm.

Grade	Application
XN25S	Nano material, suitable for making drill bits with diameter of 0.1-0.3mm.
XN209	Nano material, suitable for making drill bits with diameter of 0.3-0.5mm.
XN20A	Nano material, suitable for making drill bits with diameter of 0.1-0.4mm.
YU06A	Ultrafine material, suitable for making drill bits with diameter above 0.5mm.
XF15S	Submicron material with high hardness and toughness, suitable for making drill bits with diameter above 0.25mm.

# RODS FOR PCB MICRO MILLING CUTTERS

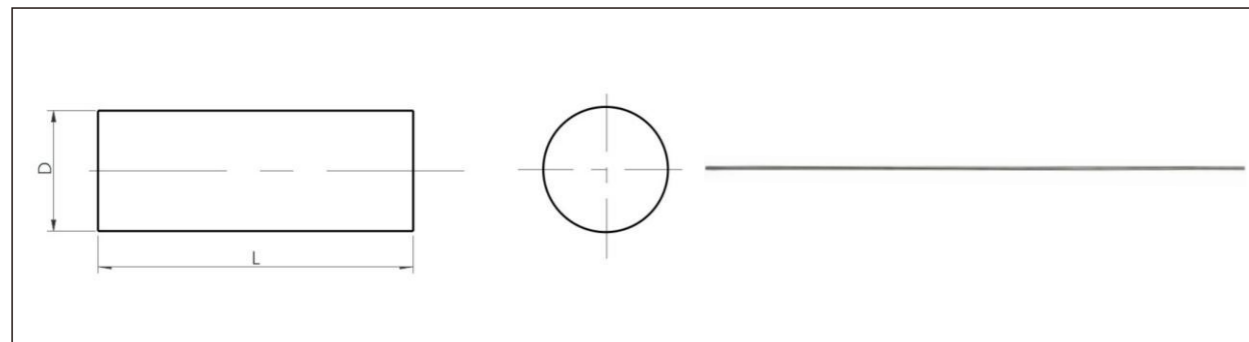
## PCB FOR ROUTER



Diameter		Length	
D	Tol.	L	Tol.
3.21	0/+0.02	38.5	-0.10/+0.20
3.21	0/+0.02	38.7	-0.20/+0.30

mm

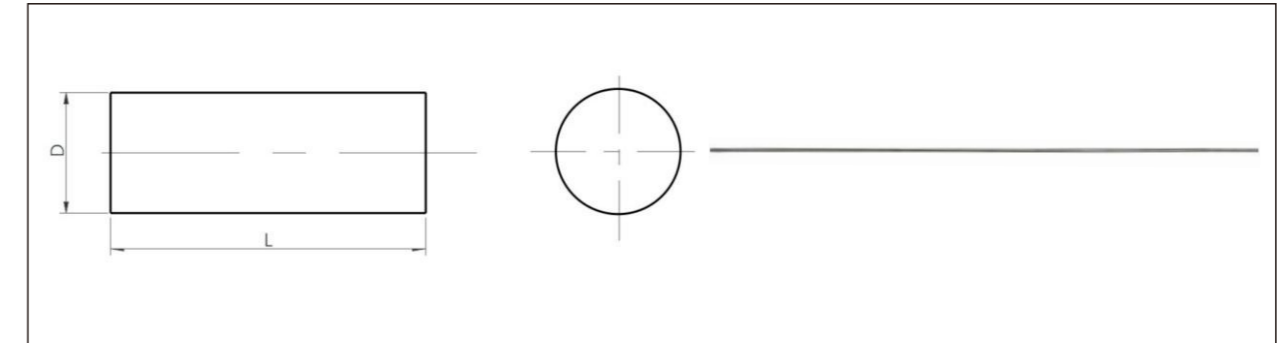
## PCB FOR MICRO DRILL



Diameter		Length	
D	Tol.	L	Tol.
0.8	0/+0.05	320/330	0/+10
1.15	0/+0.05	320/330	0/+10
1.35	0/+0.05	320/330	0/+10
1.5	0/+0.05	320/330	0/+10
1.8	0/+0.05	320/330	0/+10
2.0	0/+0.05	320/330	0/+10
2.25	0/+0.05	320/330	0/+10
2.5	0/+0.05	320/330	0/+10

mm

# RODS FOR PCB STEP DRILLS

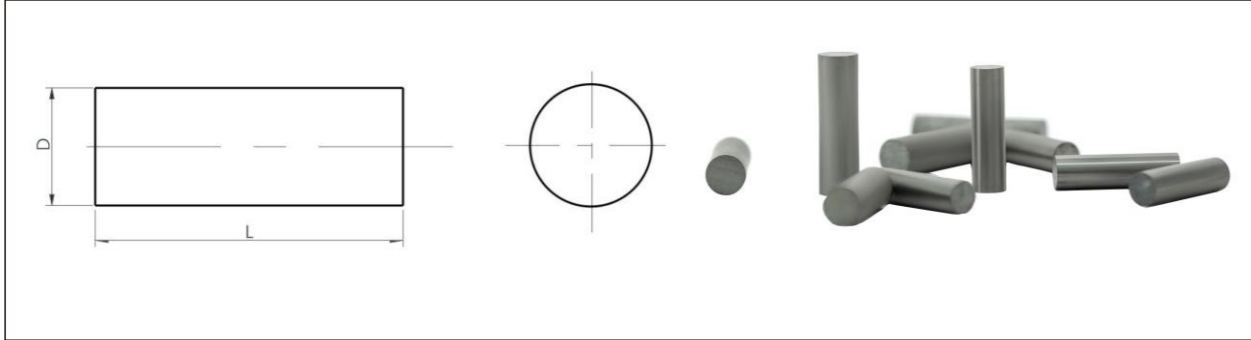


Diameter		Length	
D	Tol.	L	Tol.
3.5	+0.05/+0.25	38.5	±0.20
4.0	+0.05/+0.25	38.5	±0.20
4.5	+0.05/+0.25	38.5	±0.20
5.0	+0.05/+0.25	38.5	±0.20
5.5	+0.05/+0.25	38.5	±0.20
6.0	+0.05/+0.25	38.5	±0.20
6.5	+0.05/+0.25	38.5	±0.20

mm

More types are available on request

# SHORT RODS FOR PCB WELDING



Diameter		Length	
D	Tol.	L	Tol.
3.5	-0.05/+0.05	12.2	0~0.4
3.75	-0.05/+0.05	12.2	0~0.4
4.0	-0.05/+0.05	12.2	0~0.4
4.25	-0.05/+0.05	12.2	0~0.4
4.5	-0.05/+0.05	12.2	0~0.4
4.75	-0.05/+0.05	12.2	0~0.4
5.0	-0.05/+0.05	12.2	0~0.4
5.25	-0.05/+0.05	12.2	0~0.4
5.5	-0.05/+0.05	12.2	0~0.4
5.75	-0.05/+0.05	12.2	0~0.4
6.0	-0.05/+0.05	12.2	0~0.4

mm



# APPENDIX

## MECHANICAL & PHYSICAL PROPERTIES OF CEMENTED CARBIDE

### 1. Hardness (ISO 3738 and ISO 3878)

The hardness of a material is its quality to withstand localized deformation. Rockwell hardness (unit: HRA) and Vickers hardness (unit: HV) tests are normally applied to cemented carbide. Due to different methods of measurement, the conversion of values from the above two tests should be based on the reference table of the tested materials.

### 2. Toughness / Fracture toughness

Toughness refers to the capacity of a material to resist fracture or crack propagation. Its depends on the composition, microstructure and other intrinsic factors of the material, and characterizes the comprehensive performance of a material.

### 3. Transverse rupture strength (ISO 3327)

Transverse rupture strength (TRS) is the ability of a material to resist bending. This value can be calculated with the Three Pin Fixture, used with a Hydraulic Press, to exert heavy pressure on a test piece. TRS is the average value of several tests. This value can vary considerably depending on the geometry and the surface condition of the specimen and the experimental equipment. In particular, this result is closely to surface smoothness, residual surface stress, surface corrosion and internal defects. It must be mentioned that the TRS value alone cannot be used as a criterion for grade selection.

### 4. Density (ISO 3369)

Density is commonly used in the cemented carbide industry to determine the accuracy of a grade's composition. The density of carbide is determined according to ISO 3369 and varies strongly depending on the composition of the carbide grade. The density of tungsten carbide (WC) is 15.7 g/cm<sup>3</sup> and the density of cobalt (Co) is 8.9 g/cm<sup>3</sup>. Therefore, for the WC-Co grade, the density decreases as the cobalt content increases.

### 5. Others

#### Straightness

Straightness indicates the condition where actual straight elements of a part lies in a ideal straight line. Straightness tolerance is the maximum deflection allowed for an actual line to an ideal straight line.

#### Roudness

Roundness is defined as the closeness of a cross-section through that part to an ideal circler. Roundness tolerance is the maximum deflection allowed for an actual circle to an ideal circle in the same cross-s ection.

#### Concentricity

Concentricity indicates the condition of how well the measured circle center conforms the reference circle center. Concentricity tolerance is the maximum deflection allowed for the measured actual circle center to the reference circle center.

#### Circular run-out

Circular run-out indicates how well a circular cross-section of a part stands in a fixed position with respect to the datum axis. Circular run-out tolerance is the maximum allowable deflection in a circular feature when the part rotates about the true datum axis.



# SOCIAL RESPONSIBILITY

Bearing in mind the 30·60 goal and dual circulation development paradigm, ZCC explores new standards, technologies, new energy, green and digital technologies, and other fields and makes multiple sectors go intelligent, efficient, green, and low carbon to create a better life and contribute to China's high quality and sustainable development.

Zhuzhou Cemented Carbide Group Co., Ltd. has been once again recognized as an environmental credit and integrity enterprise in Hunan Province.

In accordance with people-orientated management philosophy, ZCC empowers the staff, provides quality service for customers and makes contributions to building a harmonious society. ZCC is dedicated to the development of staff, enterprise and society.

Aimed at becoming an environmental-friendly enterprise, ZCC implemented clean production and promoted environmental protection by eliminating its energy-intensive production lines and introducing new technologies, new processes and new energy resources. In May 2011, the natural gas boiler system went into operation, and the last two chimneys were removed.

# WORLDWIDE SALES NETWORK



Zhuzhou Cemented Carbide Works Imp. & Exp. Co.(ZCCC) is the international trade organization under ZCC group. ZCCC has five overseas branches in USA, Europe, India, Japan, South Korea and HongKong China. In order to shorten delivery and facilitate customers at closer range, large volume of standardized rods are stocked in Ann Arbor, USA and Dusseldorf, Germany, enabling prompt order response and deliveries of most popular rods within 48 hours to our customers in North America and European countries.

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## HongKong

Zhuzhou Cemented Carbide Group HongKong Co.,Ltd.