

#3 CARBIDE - MINING MATERIAL

KEY



CARBIDE
MINING MATERIAL



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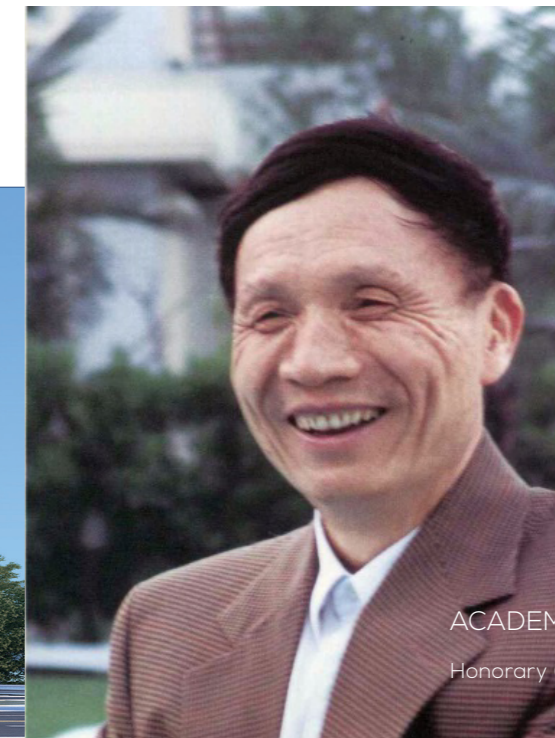


Our Company

Hunan Boyun Dongfang Powder Metallurgy Co., Ltd. was founded in 1994 by the Institute of powder metallurgy of Central South University of Technology (now the research center of powder metallurgy engineering of Central South University) and Hunan Yinzhou Co., Ltd. (now the wholly-owned member company of China Dongfang asset management company, Bangxin Asset Management Co., Ltd.), now it is the holding subsidiary of Hunan Boyun New Material Co., Ltd. (Stock Code: 002297), with a registered capital of 60 million yuan. The company is a national high-tech enterprise with Academician Huang Boyun, the top material scientist in China, as the chief scientist and honorary chairman of the board, integrating domestic and foreign talents and technological advantages, integrating production, learning, research and application, engaged in the research, development, production and sales of high-performance cemented carbide. The member of China Tungsten Industry Association, China mold industry association, China machinery industry metal cutting tool technology association.

Chief Scientist

Academician of Chinese Academy of Engineering
 Winner (1st) of China National Technological Invention Award (2005)
 Former president of Central South University
 Member of Twelfth National People's Congress Standing Committee
 Vice-Chairman, Chinese Association for Science



ACADEMICIAN HUANG BOYUN
 Honorary Chairman, Chief Scientist



With strong support from Central South University, State Key Laboratory of Powder Metallurgy, National Engineering Research Center of Powder Metallurgy, Quality Supervision and Inspection Center of Powder Metallurgy Products of Chinese Nonferrous Material Industry, the Company has played leading role in three projects of "National High Technology Research and Development Program (863 plan)".

COMPANY INTRODUCTION

Specialty One: Owned complete discipline system on non-ferrous materials while established top classes of non-ferrous metallurgy in the world.

Specialty Two: Conducted over 60 years of high education and R&D in rail transit system and made vital contributions to major projects including Qinghai-Tibet railway, high-speed railway, urban rail and helped to increase speed of all Chinese trains (six times).

1 GEOLOGY



4 METALLURGY



2 MINING



5 MATERIAL



3 ORE DRESSING



6 MECHANICAL



FEATURE SUBJECTS OF CENTRAL SOUTH UNIVERSITY



The University participated in the "Qinghai-Tibet Railway Project". The series of railway aerodynamics are widely used in the speeding of western railways and the construction of high-speed railways.

INSTITUTE OF POWDER METALLURGY

Among 31 colleges of CSU, the Institute of Powder Metallurgy is a comprehensive base of high education, R&D and industrialization of new materials in China.

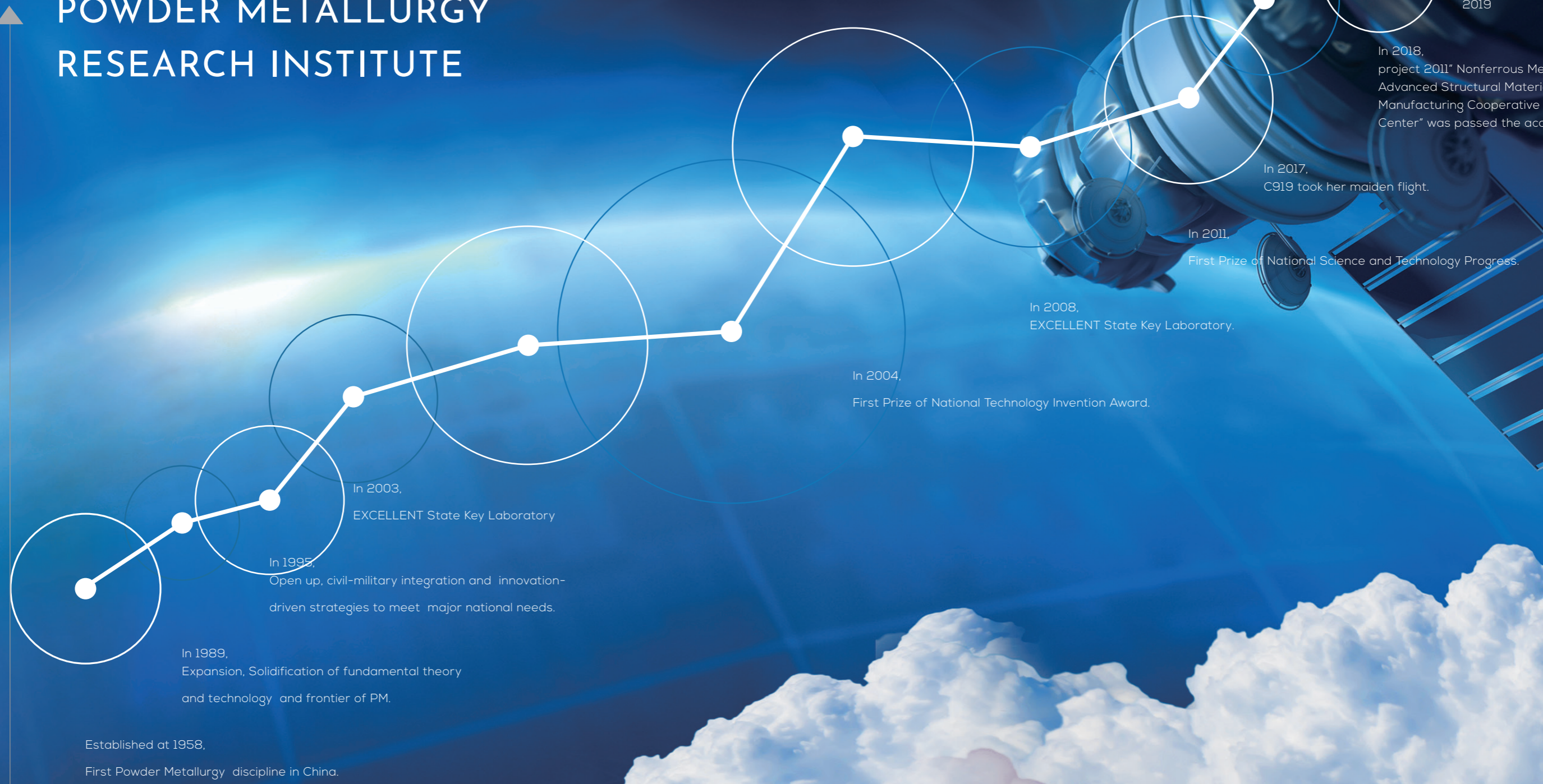
P / M Research Institute has established four national level P / M material and technology research and development bases:

State Key Laboratory of Powder Metallurgy

Supervision and Testing Center of Products of Powder Metallurgy of Chinese Nonferrous Metals Industry

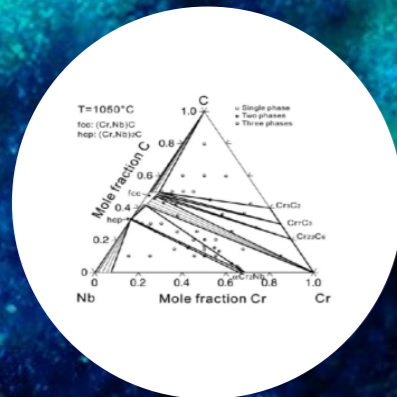
National Engineering Research Center of Powder Metallurgy

GLORIOUS HISTORY OF POWDER METALLURGY RESEARCH INSTITUTE



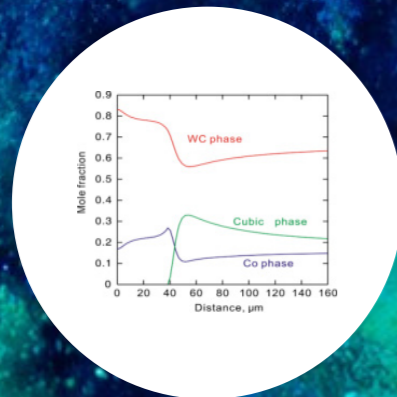
INSTITUTE OF POWDER METALLURGY

Basic research on Application of special PM materials



Thermodynamics database

$$V_{Co} = \frac{u_{Co}^S \cdot V_{Co}^m}{(1 - u_{Co}^S) \cdot V_{WC}^m + u_{Co}^S \cdot V_{Co}^m}$$

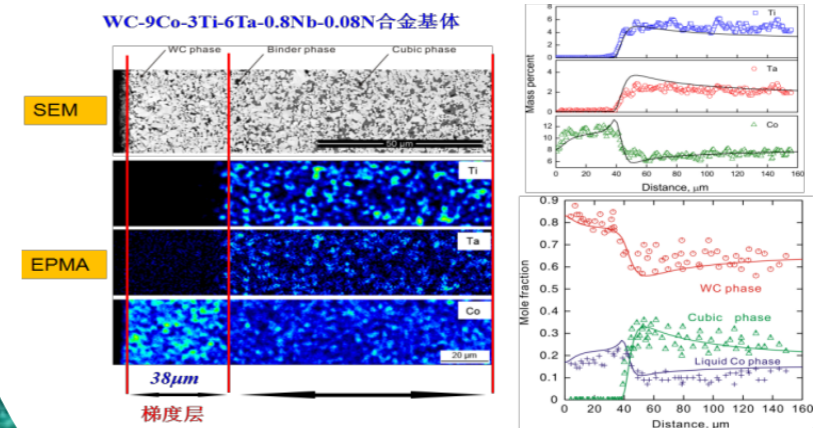


Dynamics database

The Institute of powder metallurgy has built the most complete database of thermodynamics and dynamics of multi-component cemented carbide in the world, which can accurately predict the distribution of phases and elements in the gradient layer of cemented carbide. Based on this database, a series of new gradient cemented carbide have been developed by integrated calculation. Propose the Symplectic Du formula to achieve efficient prediction of liquid phase diffusion coefficient 16-component cemented carbide thermodynamic and dynamics database. Using the database, quantitative description of Phase and Element Distribution in Cemented Carbide Gradient.

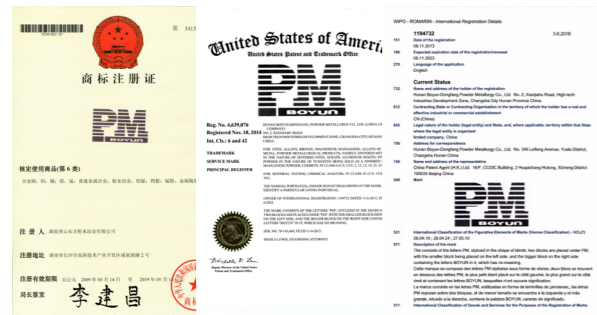
Gradient cemented carbide composition

Comparison of predictions and experimental results



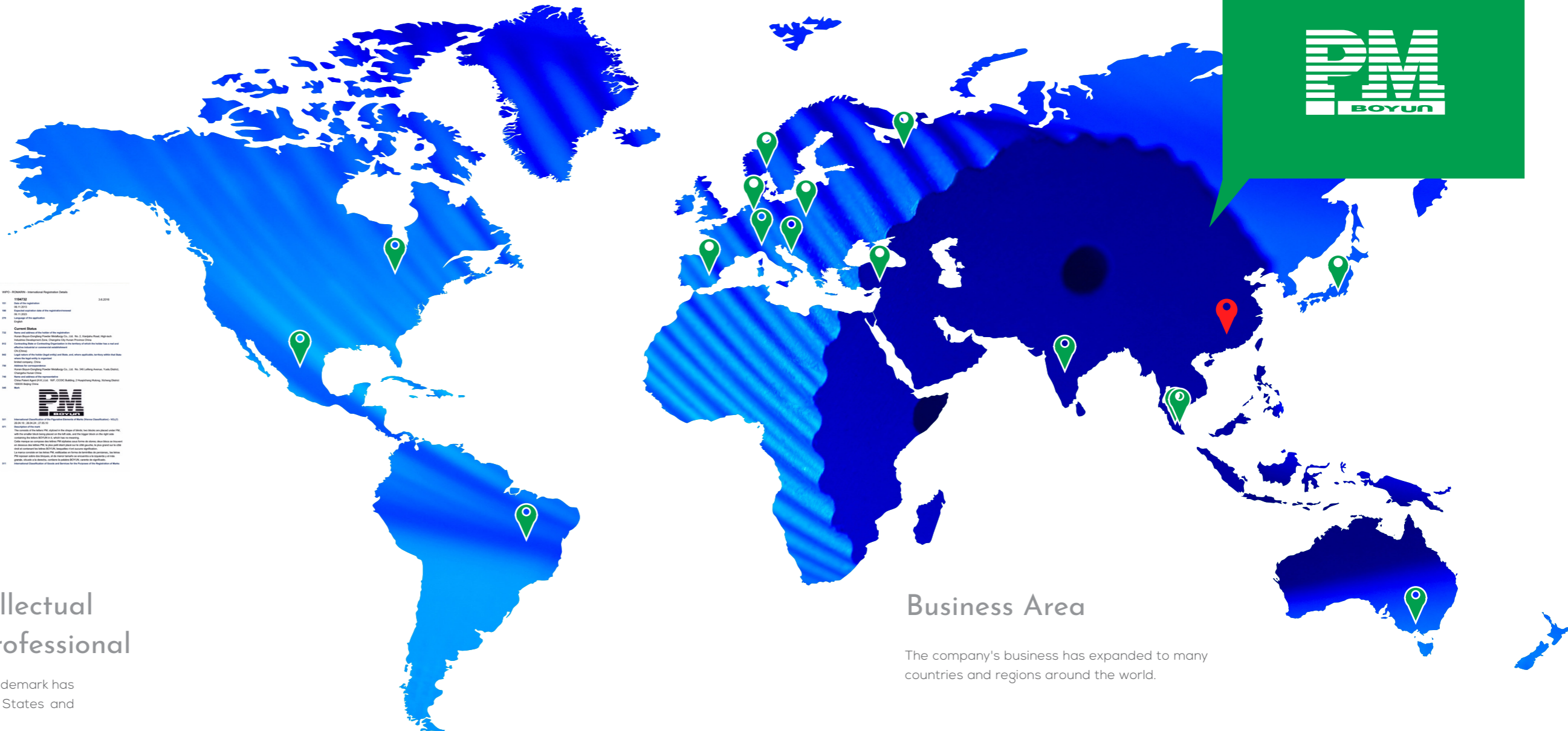
Structure Characterization and Quantitative Description of Element Distribution of Gradient Cemented Carbide

COMPANY BRAND AND MARKET



Protection of Intellectual Property Rights Professional

Besides registered in China, "PM" trademark has also been registered in the United States and the European Union.



Business Area

The company's business has expanded to many countries and regions around the world.

CEMENTED CARBIDE

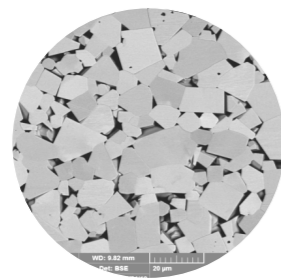
Cemented carbide is a kind of composite material which is made of refractory metal hard compounds (WC, TiC, etc.) and bonding metals (CO, Ni, Fe, etc.) by powder metallurgy. Cemented carbide have high hardness, high wear resistance, high strength, high modulus of elasticity, low coefficient of thermal expansion, high red hardness and stable chemical properties.

Classification of Grain Size of Cemented Carbide (ISO4499-2-2008)

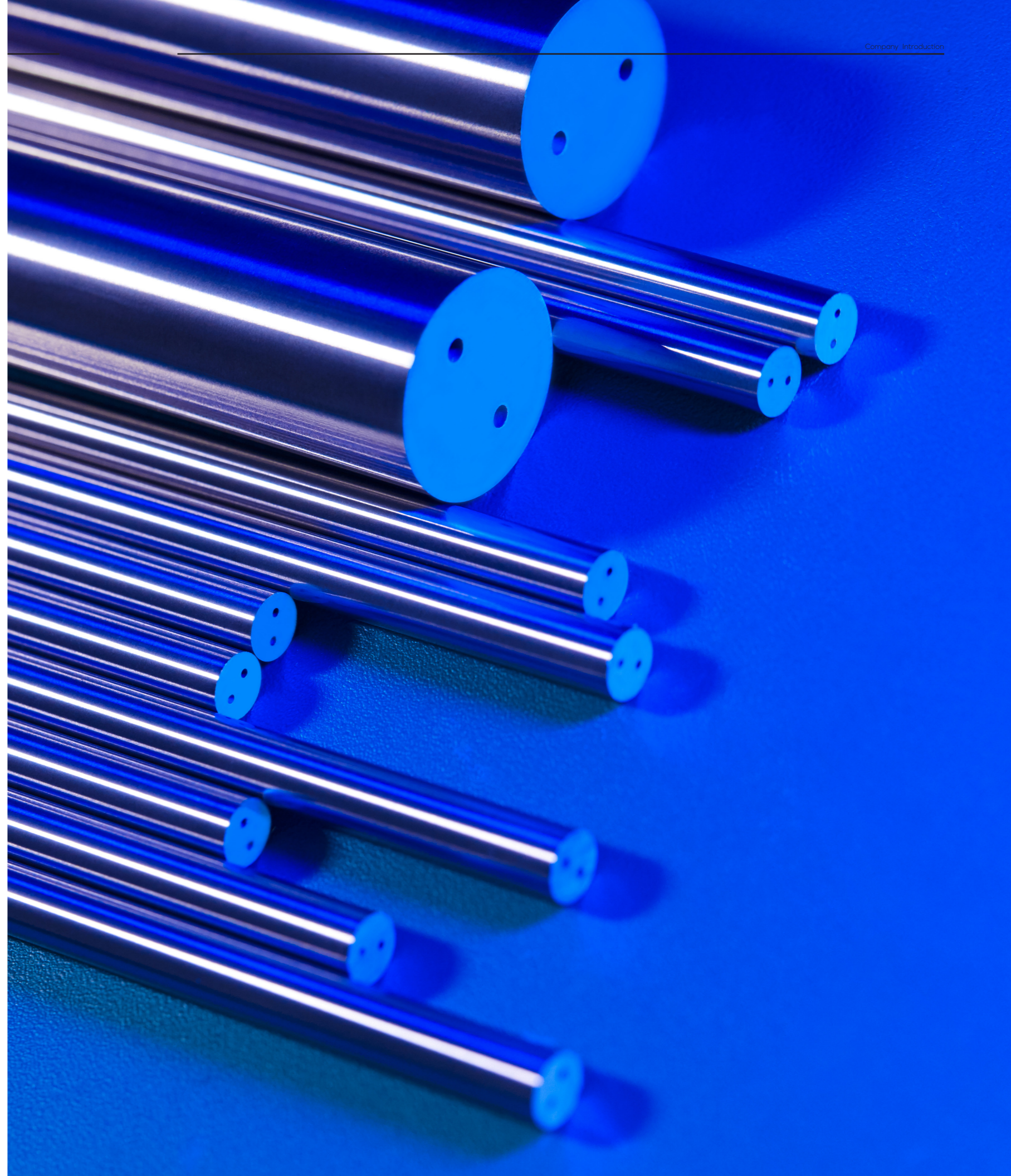
| Category | Grain size of WC(μm) |
|--------------|-----------------------------------|
| Nano | <0.2 |
| Ultrafine | 0.2~0.5 |
| Submicron | 0.5~0.8 |
| Fine | 0.8~1.3 |
| Medium | 1.3~2.5 |
| Coarse | 2.5~6.0 |
| Extra coarse | >6.0 |

Nano cemented carbide which means the WC grain size is less than 0.2 μm cemented carbide, nano cemented carbide has higher hardness and strength than normal cemented carbide, at the same time ,effectively solves the problem of ultra-high speed cutting of hard to machine materials such as superalloy, titanium alloy, composite material, hardened steel, etc., greatly improves the machining efficiency, and is the preferred tools material in the aerospace field and high-end equipment manufacturing industry.

Extra coarse-grained cemented carbide is a kind of cemented carbide with WC grain size larger than 6 μm , compared with coarse grained cemented carbide, it has better toughness, thermal fatigue resistance and higher wear resistance. It is widely used in shield, mining, stamping die, cold heading die, roll and other industries under extreme working conditions, and the product reliability is greatly improved.



SEM micrograph of extra coarse grained cemented carbide (2000X)



TECHNICAL ADVANTAGES

R & D Team

Academician Huang Boyun is the chief scientist, relying on the Central South University, and in combination with the premium customer WOLF group in Germany, the largest shield equipment

manufacturer in China, China railway construction heavy industry group, and the first industrial Internet in China Brand Foxconn industrial Internet Co., Ltd. consists of a strong interdisciplinary R & D team.



TECHNICAL ADVANTAGES

Ultrafine / Nano Cemented Carbide

Since 2002, Bayun-Dongfang has been cooperating with Central South University to continuously carry out the research and development and preparation of ultra-fine / nano cemented carbide with the support of the

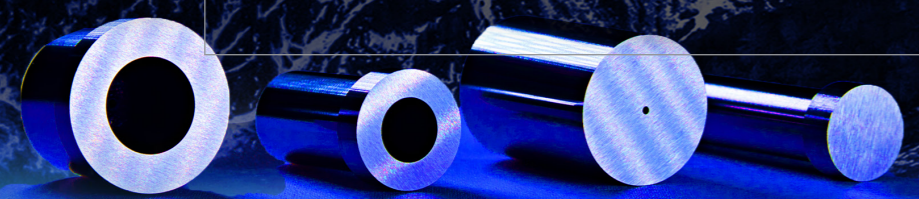
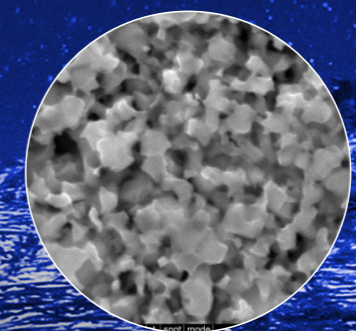
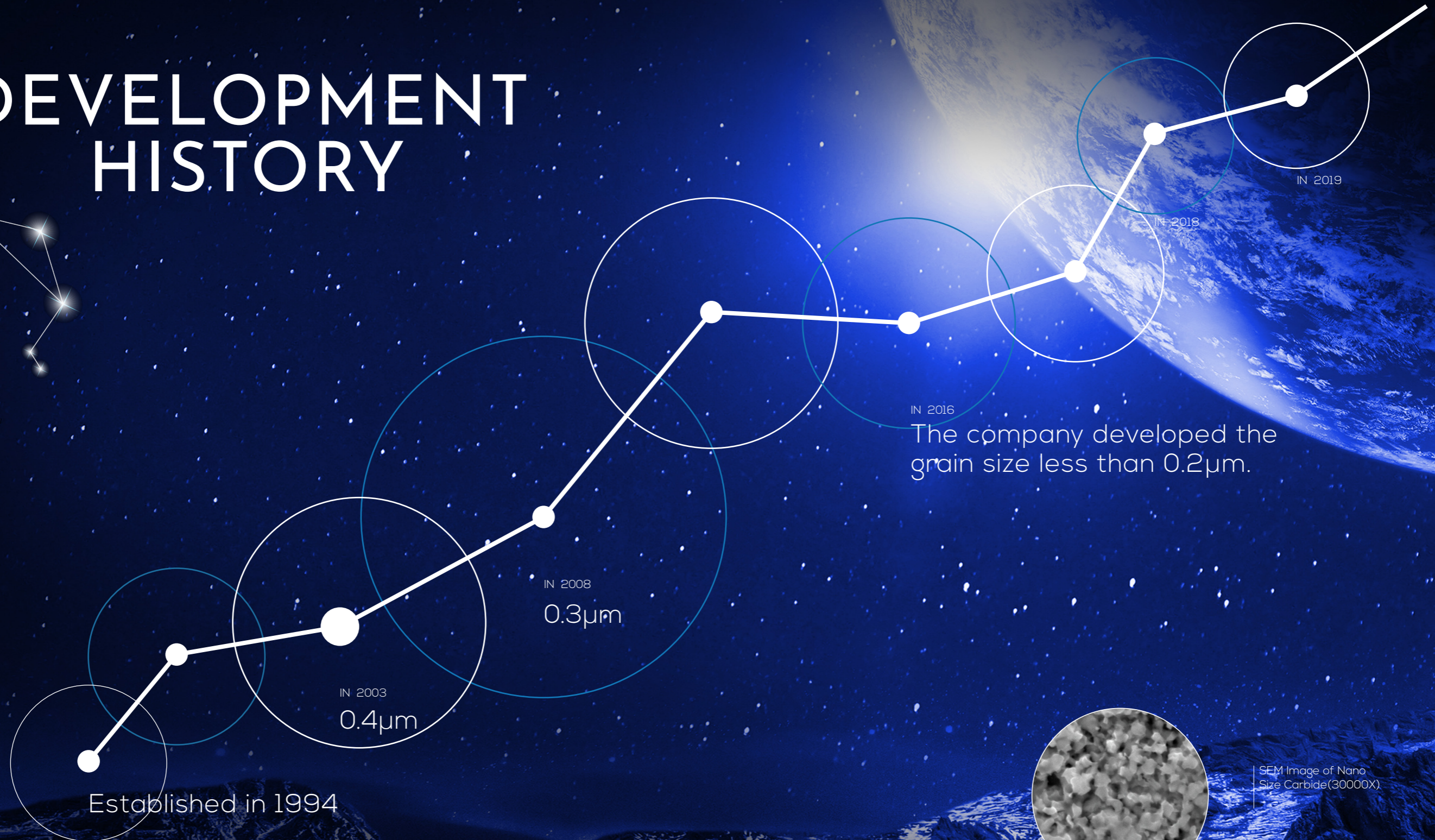
National Innovation Fund for small and medium-sized science and technology enterprises and the national high-tech research and development plan (863 Program).

Extra Coarse-Grained Cemented Carbide

The company developed the extra coarse-grained cemented carbide with WC grain size greater than $8\ \mu\text{m}$ has better toughness, better thermal fatigue resistance and higher wear resistance than the traditional extra coarse-grained cemented carbide. It is widely used in shield, mining, stamping die, cold upsetting die, roll and other industries under extreme working conditions, and the product reliability is greatly improved.

Have independent intellectual property rights and advanced self-activation high temperature reduction high temperature carbonization extra coarse-grained tungsten carbide powder preparation technology.

DEVELOPMENT HISTORY



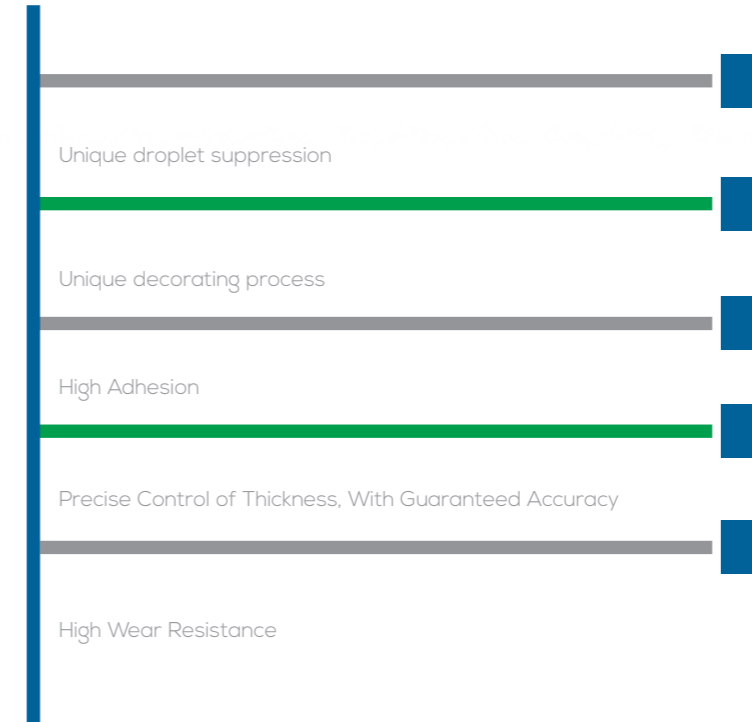
Ultrafine / Nano Cemented Carbide development history



TECHNICAL ADVANTAGES

Coating

Coating technology reaches the international leading level



We are the strategic partner of eifeler and wolf in China

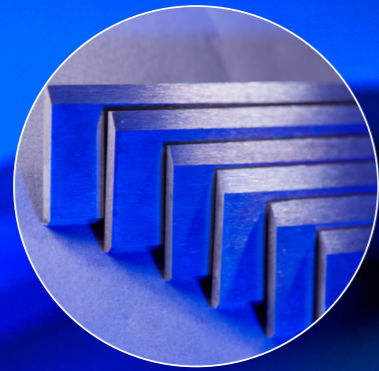
We are eifeler's demonstration plant in China

Our coating products have the same performance level as Germany

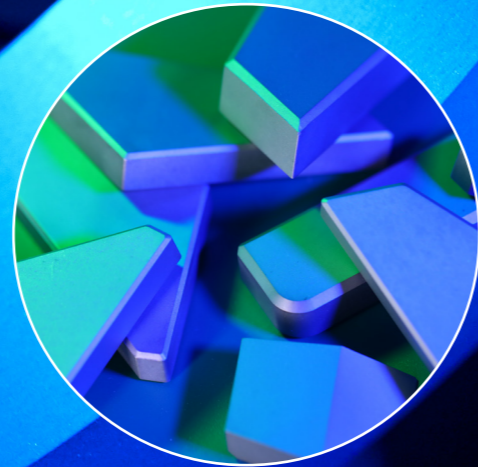


MAIN BUSINESS

The main business is the R & D, producing and sales of high-performance cemented carbide products. The main products are high-performance ultra-fine / nano cemented carbide rods, high-performance cemented carbide mold materials, high-performance extra coarse grain size cemented carbide in engineering and mining, refined and deep processed cemented carbide products (parts / components), etc. Our products are widely used in aerospace, automobile, metallurgy, engineering & mining, microelectronics and other industrial fields, and have been well known by our customers.



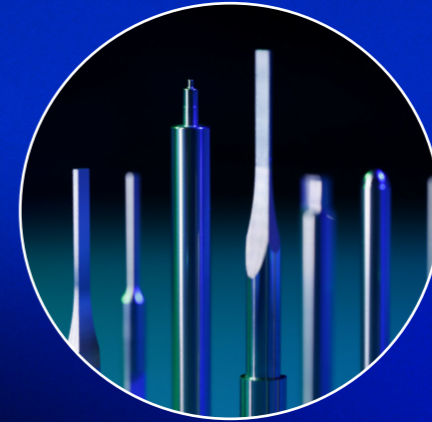
Special Tools



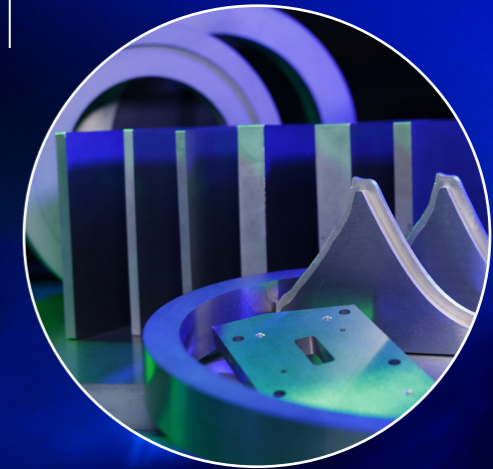
Shield Cutter



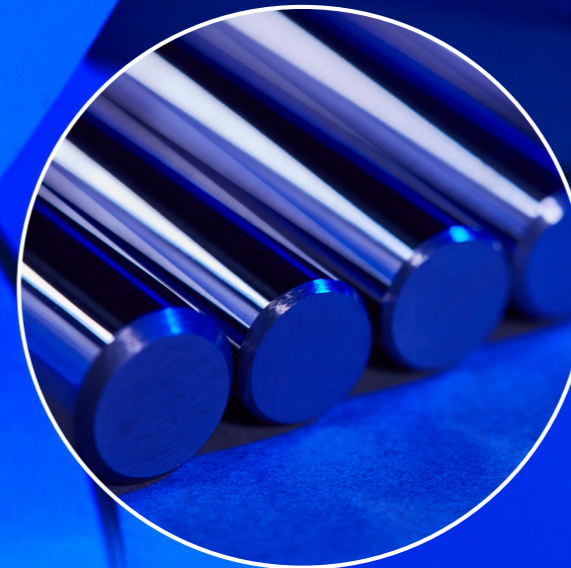
Coating



Finished Products



Molds



Rods

Grade Introduction of Mineral

| Grade Introduction of Mineral | | | | | | | | | |
|-------------------------------|----|------------------|----------|------------------|------------------------------|--------------------------|------------------------|----------------------------------------------------------|-----------------------------------------------------------------------------------|
| Grade | Co | Grain Size of WC | Hardness | | Density g/cm ³ | Flexural Strength MPa | Elastic Modulus GPa | Coefficient of Thermal Expansion 10 ⁻⁶ /°C | Application |
| | | | HRA | HV ₃₀ | | | | | |
| G206 | 6 | Medium | 90.8 | 1500 | 14.9 | 3200 | 530 | 4.9 | Suitable for DTH drilling with high wind pressure |
| G506 | 6 | Coarse | 88.0 | 1200 | 14.9 | 2500 | 530 | 4.9 | Suitable for gear shaper cutting of concrete and asphalt road |
| G208 | 8 | Medium | 89.1 | 1300 | 14.7 | 2750 | 510 | 5.1 | Suitable for DTH drilling with medium and low wind pressure, and rock breaking |
| G308 | 8 | Medium | 88.8 | 1270 | 14.7 | 2750 | 510 | 5.1 | Suitable for tri-cone drill bit in milling, and tri-cone drill bit in engineering |
| G211 | 11 | Medium | 88.0 | 1200 | 14.4 | 2800 | 478 | 5.6 | Suitable for tri-cone drill bit in milling, and tri-cone drill bit in engineering |
| G215 | 15 | Medium | 86.8 | 1100 | 14.0 | 2800 | 430 | 6.3 | Suitable for oilfield composite sheet |
| G510 | 10 | Coarse | 86.2 | 1040 | 14.5 | 2700 | 490 | 5.4 | Suitable for rotary drilling cutter, and coal cutters |
| G512 | 12 | Coarse | 86.0 | 1030 | 14.3 | 2900 | 470 | 5.7 | Suitable for tunnel boring machine of scraper, cutter and wear plate |
| G513 | 13 | Coarse | 85.6 | 1000 | 14.2 | 2900 | 460 | 5.8 | Suitable for tunnel boring machine of scraper, cutter and wear plate |
| G515 | 15 | Coarse | 84.8 | 940 | 14.0 | 2800 | 430 | 6.3 | Carbide for TBM or shield machine rollers |
| G707 | 7 | Extra Coarse | 86.3 | 1050 | 14.8 | 2200 | 520 | 5.0 | Suitable for hard rock in engineering, and DTH drilling cutter |
| G806 | 6 | Extra Coarse | 86.2 | 1040 | 14.9 | 2100 | 530 | 4.9 | Suitable for high rock of rotary drilling cutter |

Main Products

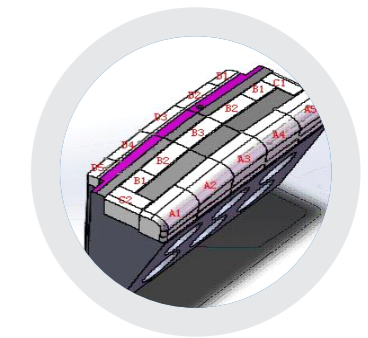
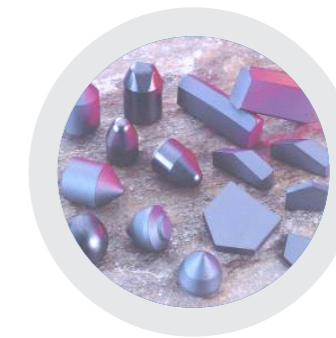
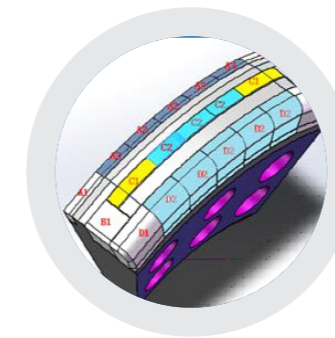
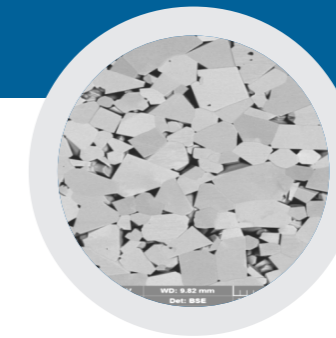
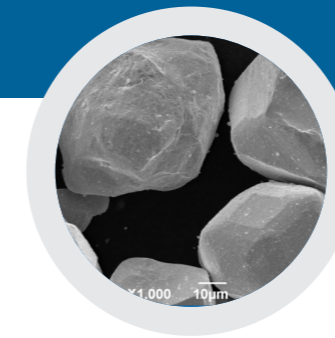
TBM (tunnel-boring machines) cutter, shield cutter, hobbing cutter

Technical Features

Technical features: high-performance carbides with ultra-coarse grain
High-performance carbide bit with Extra-Coarse of WC grain size more than 8μm by the first domestic enterprise, which improved to high performance carbide's toughness and wear resistance

Characteristic

- 1 Self-made WC Powder with complete crystallization
- 2 10MPa pressure furnace
- 3 Strict quality control system
- 4 Self Developed Ultra-Coarse Grain Technology
- 5 Strong Research Ability of Central South University
- 6 40Years Experience of Carbide Making



RULES FOR DESIGNATIONS OF THE TYPES AND GRADE OF BUTTONS

ZQ 14 × 20 A K P / M
1 2 3 4 5 6 7

1、 The shape of the button

ZQ:Spherical ZZ:Cone ZD:Parabolic
ZP:Flat ZB:Eccentric wedge ZX:Wedge
ZS:Spoon ZJ:Auger tip

2、 The diameter of button in mm .Only 2 integers are taken ,if the diameter is only one integer ,then it is preceded by zero

3、 The high of button in mm .Only 2 integers are taken ,if the height is only one integer ,then it is preceded by zero

4、 Special button top and it is omitted if there is standard head.

5、 It indicates air pocket structure at bottom ,it is omitted if there is no air pocket .

6、 It indicates the button is flat and there is only one chamfer,if absence,expressed as double-chamfered buttons.

7、 The diameter in the state of accurate grinding

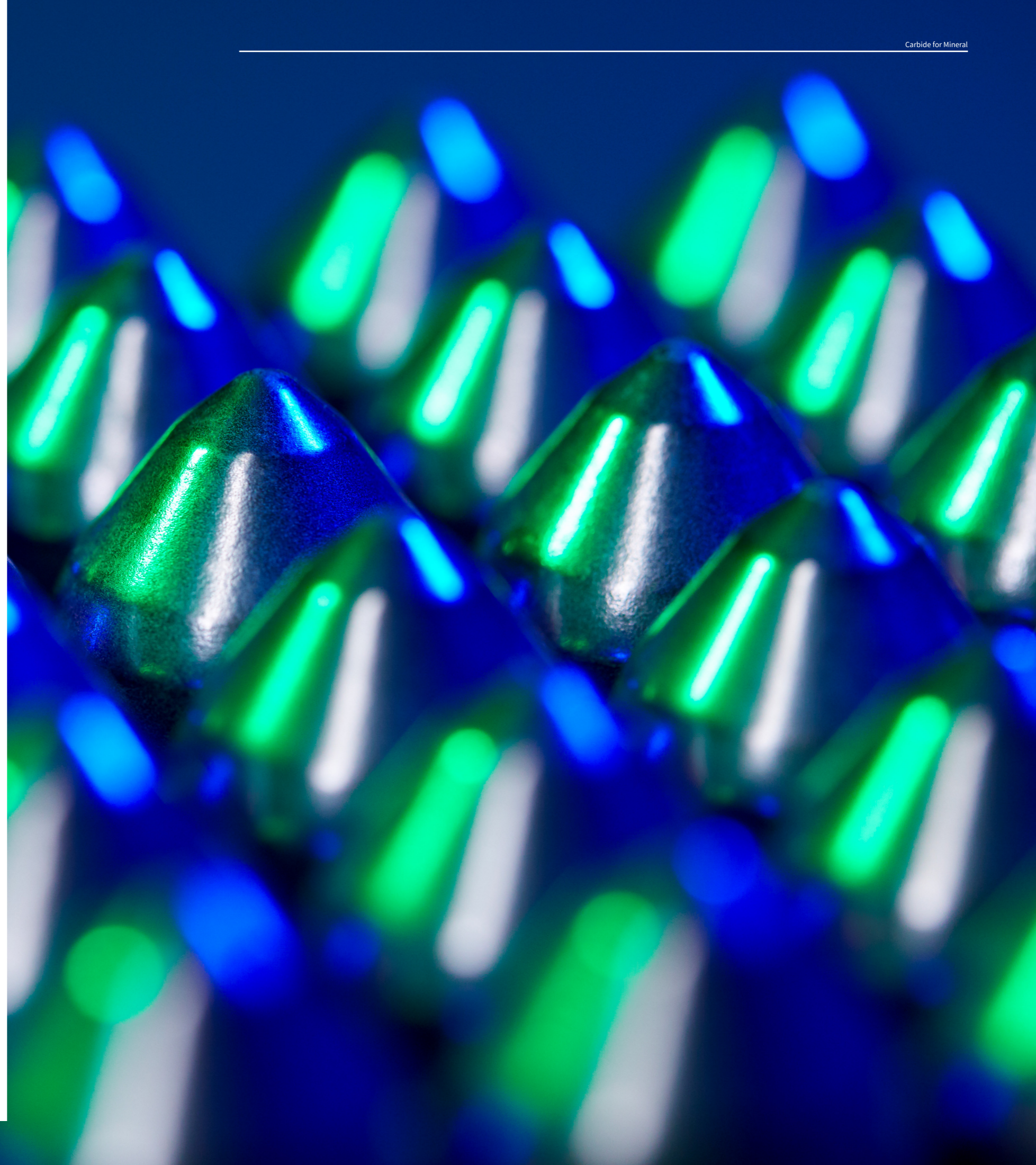
Standard tolerance of D&H

| Diameter | | Height | |
|--------------|-----------|--------------|-----------|
| Nominal size | Tolerance | Nominal size | Tolerance |
| ≤ 10 | ± 0.15 | ≤ 11 | ± 0.15 |
| ≤ 10 | ± 0.15 | 11-18 | ± 0.20 |
| > 11 | ± 0.20 | 18-25 | ± 0.20 |
| > 11 | ± 0.20 | > 25 | ± 0.25 |

G--Cemented carbide for mining

XXX--The main parameter of grade with the grain size of

Carbide and the content of cobalt

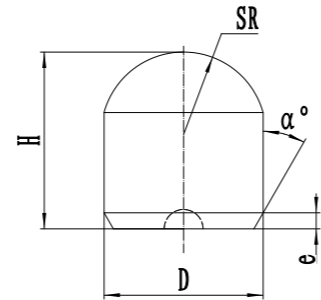


OUR PRODUCT

C A R B I D E

ALL TYPES AND SPECIFICATIONS OF
CEMENTED CARBIDE PRODUCTS

Spherical buttons for tri-cone drill bits

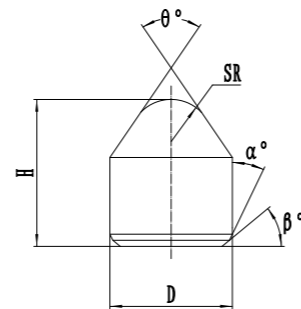


Unit:mm

Spherical buttons for tri-cone drill bits

| Type | Dimension | | | | |
|---------------|-----------|------|-----|----------------|-----|
| | D | H | SR | α° | e |
| ZQ11.5*12.5KP | 11.25 | 12.5 | 6.0 | 18 | 2.0 |
| ZQ13*13.5KP | 13.25 | 13.5 | 6.7 | 18 | 2.5 |
| ZQ14*14.5KP | 14.5 | 14.5 | 7.2 | 18 | 2.5 |

Conical buttons for medium and low pressure DTH drilling

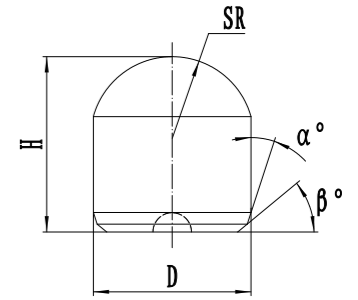


Unit:mm

Conical buttons for medium and low pressure DTH drilling

| Type | Dimension | | | | | |
|----------|-----------|----|-----|----------------|----------------|---------------|
| | D | H | SR | θ° | α° | β° |
| SZ12×18A | 12.35 | 18 | 4.8 | 55 | 20 | 28.0 |
| SZ12*18B | 12.35 | 18 | 4.0 | 55 | 20 | 27.0 |
| SZ12*18 | 12.35 | 18 | 4.5 | 53/55 | 20 | 20.0 |
| SZ13*18 | 13.35 | 18 | 4.5 | 53/55 | 20 | 20.0 |
| SZ13*19A | 13.35 | 19 | 4.5 | 55 | 20 | 28.0 |
| SZ13*19B | 13.35 | 19 | 5.0 | 55 | 20 | 27.0 |
| SZ14*19 | 14.35 | 19 | 5.0 | 53/55 | 20 | 20.0 |
| SZ14*22A | 14.35 | 22 | 5.0 | 55 | 20 | 14.5 |

Spherical buttons for high pressure DTH drilling

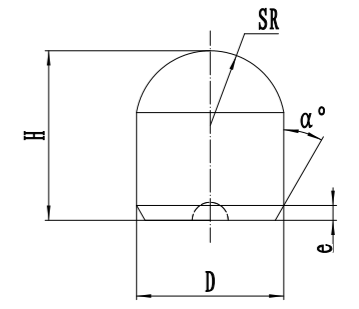


Unit:mm

Spherical buttons for high pressure DTH drilling

| Type | Dimension | | | | |
|-------------|-----------|----|-----|----------------|---------------|
| | D | H | SR | α° | β° |
| ZQ14*20K(P) | 14.2 | 20 | 7.2 | 18 | 27 |
| ZQ16*22K(P) | 16.25 | 22 | 9 | 18 | 27 |
| ZQ18*25K | 18.35 | 25 | 9.2 | 18 | 30 |

Spherical buttons for shield machine hob

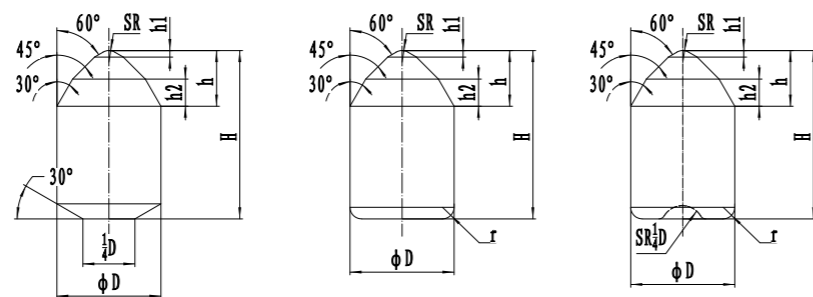
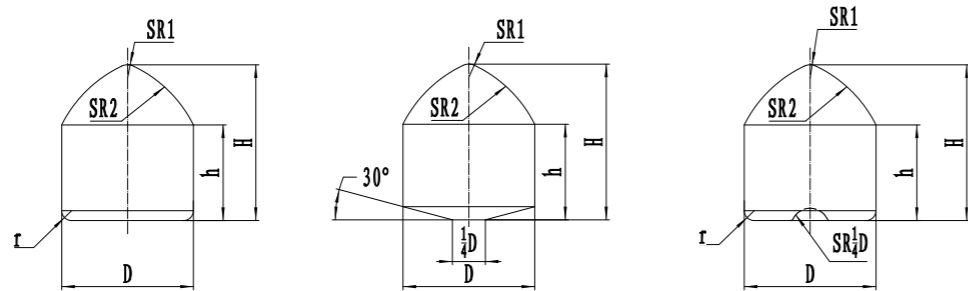
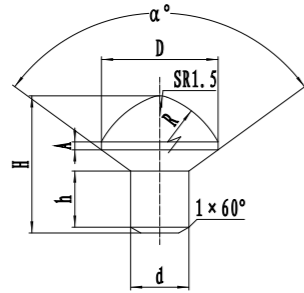


Unit:mm

Spherical buttons for shield machine hob

| Type | Dimension | | | | |
|-----------|-----------|----|----|----------------|---------------|
| | D | H | SR | α° | β° |
| ZQ16*23KP | 16.25 | 23 | 9 | 18 | 1.8 |
| ZQ16*21KP | 16.25 | 21 | 9 | 18 | 1.8 |

Cemented carbide for coal-mining and iron ore crusher



Unit:mm

Mushroom buttons

| Type | Dimension | | | | | | | | | |
|-------------|-----------|-----------|------|-----------|------|------------------|------|----|-----|----------------|
| | D | | H | | d | | h | R | A | α° |
| | Dim. | Tol. | Dim. | Tol. | Dim. | Tol. | | | | |
| $\Phi 2021$ | 20 | ± 0.2 | 21 | ± 0.2 | 12 | -0.1 -0.3 | 8.0 | 35 | 2.0 | 120 |
| $\Phi 2427$ | 24 | ± 0.2 | 27 | ± 0.2 | 14 | -0.1 -0.3 | 10.0 | 45 | 3.0 | 120 |
| $\Phi 1822$ | 18 | ± 0.2 | 22 | ± 0.2 | 10 | -0.1 -0.3 | 8.0 | 30 | 1.5 | 90 |
| $\Phi 2025$ | 20 | ± 0.2 | 25 | ± 0.2 | 12 | -0.1 -0.3 | 10.0 | 35 | 1.5 | 90 |
| $\Phi 2027$ | 20 | ± 0.2 | 27 | ± 0.2 | 12 | -0.1 -0.3 | 10.5 | 35 | 4.0 | 90 |
| $\Phi 2228$ | 22 | ± 0.2 | 28 | ± 0.2 | 14 | -0.1 -0.3 | 12.0 | 40 | 1.5 | 90 |

Unit:mm

J type buttons

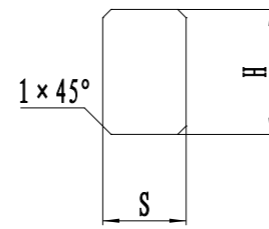
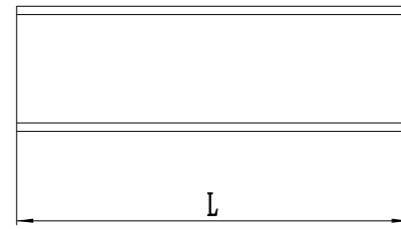
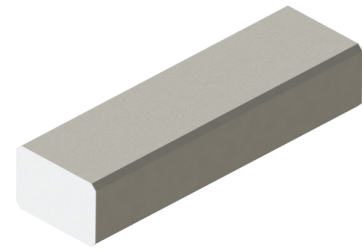
| Type | Dimension | | | | | |
|--------------|-----------|----|------|-----|-----|-----|
| | D | H | h | SR1 | SR2 | r |
| ZJ25×38/P/KP | 25 | 38 | 25 | 2 | 50 | 3 |
| ZJ25×34/P/KP | 25 | 34 | 21 | 2 | 50 | 3 |
| ZJ24×30/P/KP | 24 | 30 | 18 | 2 | 48 | 3 |
| ZJ22×32/P/KP | 22 | 32 | 21 | 2 | 44 | 2.5 |
| ZJ19×26/P/KP | 19 | 26 | 16.5 | 2 | 38 | 2.5 |
| ZJ17×23/P/KP | 17 | 23 | 14.5 | 2 | 34 | 2 |
| ZJ16×25/P/KP | 16 | 25 | 17 | 2 | 32 | 2 |

Unit:mm

JN type buttons

| Type | Dimension | | | | | | |
|--------------|-----------|----|----|-----|------|-----|-----|
| | D | H | SR | r | h | h1 | h2 |
| JN21×35/P/KP | 21 | 35 | 2 | 2.5 | 10.5 | 2 | 4.7 |
| JN18×30/P/KP | 18 | 30 | 2 | 2 | 10 | 1.4 | 5 |
| JN18×28/P/KP | 18 | 28 | 2 | 2 | 10 | 1.4 | 5 |
| JN16×28/P/KP | 16 | 28 | 2 | 2 | 8 | 1.7 | 3.3 |
| JN14×26/P/KP | 14 | 26 | 2 | 2 | 7 | 1.2 | 3.8 |

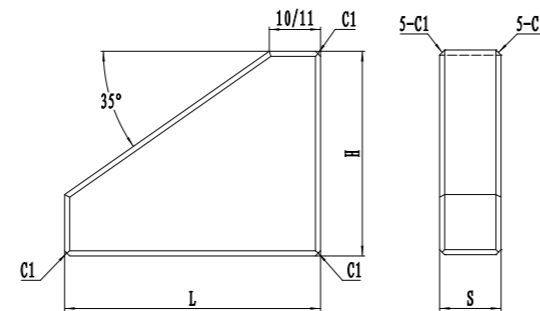
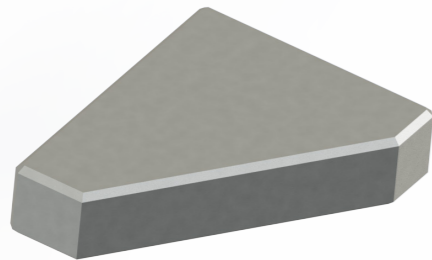
Cemented carbide for Engineering and shield machine



Unit:mm

Strip buttons for crusher

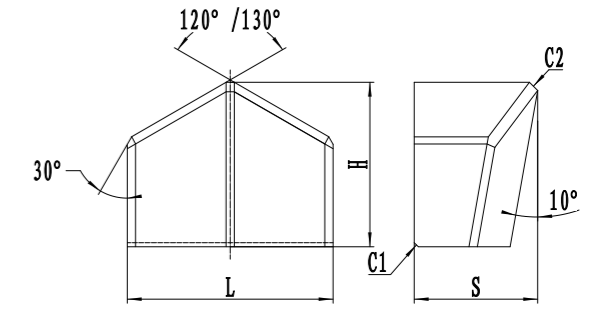
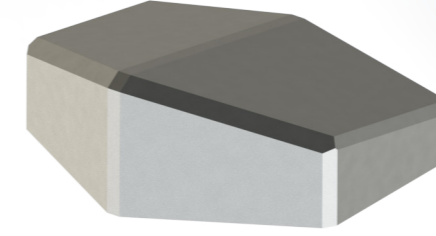
| Type | Dimension | | | | | |
|------------|-----------|-------|------|-------|------|------------|
| | L | | H | | S | |
| | Dim. | Tol. | Dim. | Tol. | Dim. | Tol. |
| 47×15×10 | 47 | ±0.3 | 15 | ±0.2 | 10 | 0 -0.3 |
| 52×23×12 | 52 | ±0.1 | 23 | ±0.3 | 12 | 0 -0.3 |
| 52.5×23×12 | 52.5 | ±0.3 | 23 | ±0.3 | 12 | 0 -0.3 |
| 55×23×12 | 55 | ±0.3 | 23 | ±0.3 | 12 | 0 -0.3 |
| 190×20×12 | 190 | ±0.6 | 20 | ±0.3 | 12 | 0 -0.3 |
| 194×20×12 | 194 | ±0.6 | 20 | ±0.3 | 12 | 0 -0.3 |
| 210×20×10 | 210 | ±0.7 | 20 | ±0.3 | 10 | 0 -0.3 |
| 190×23×13 | 190 | ±0.6 | 23 | ±0.3 | 13 | 0 -0.3 |
| 189×23×13 | 189 | ±0.6 | 23 | ±0.3 | 13 | 0 -0.3 |
| 52.5×20×10 | 52.5 | ±0.05 | 20 | -0.05 | 10 | 0 -0.05 |
| 105×20×10 | 105 | ±0.05 | 20 | -0.05 | 10 | 0 -0.05 |



Unit:mm

Shell buttons for shield tunneling machine

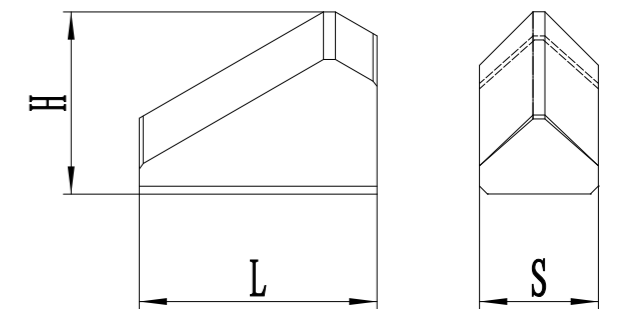
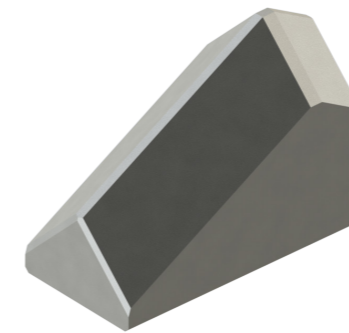
| Type | Dimension | | | | | |
|----------|-----------|-------|------|-------|------|-------|
| | L | | H | | S | |
| | Dim. | Tol. | Dim. | Tol. | Dim. | Tol. |
| 62×50×12 | 62 | ±0.50 | 50 | ±0.30 | 12 | ±0.05 |
| 52×40×12 | 52 | ±0.40 | 40 | ±0.25 | 12 | ±0.05 |
| 45×35×12 | 45 | ±0.40 | 35 | ±0.25 | 12 | ±0.05 |
| 40×40×12 | 40 | ±0.35 | 40 | ±0.25 | 12 | ±0.05 |
| 40×25×12 | 40 | ±0.35 | 25 | ±0.20 | 12 | ±0.05 |
| 30×31×10 | 30 | ±0.30 | 31 | ±0.30 | 10 | ±0.05 |



Unit:mm

Cemented carbide for milling cutters

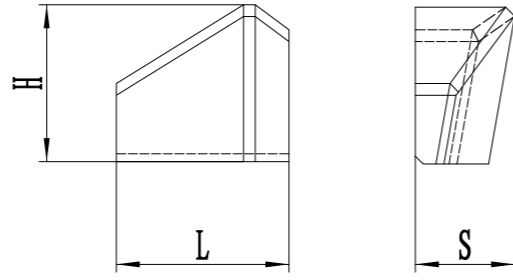
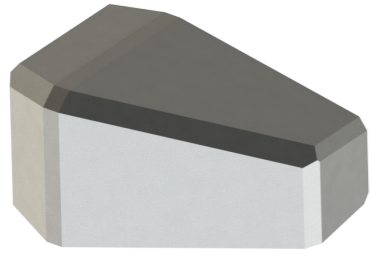
| Type | Dimension | | | | | |
|----------|-----------|--------|------|-------|------|------|
| | L | | H | | S | |
| | Dim. | Tol. | Dim. | Tol. | Dim. | Tol. |
| 60×45×30 | 60 | ±0.50 | 45 | ±0.40 | 30 | ±0.3 |
| 50×40×30 | 50 | ±0.40 | 40 | ±0.25 | 30 | ±0.3 |
| 40×35×25 | 40 | ±0.40 | 35 | ±0.25 | 25 | ±0.3 |
| 38×30×20 | 38 | ±0.350 | 30 | ±0.25 | 20 | ±0.3 |
| 50×35×25 | 50 | ±0.40 | 35 | ±0.30 | 25 | ±0.3 |
| 22×20×13 | 22 | ±0.20 | 20 | ±0.20 | 13 | ±0.3 |



Unit:mm

Cemented carbide for milling cutters

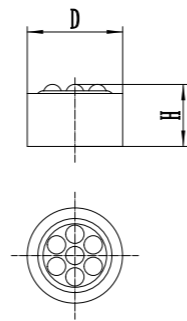
| Type | Dimension | | | | | |
|----------|-----------|-------|------|------|------|------|
| | L | | H | | S | |
| | Dim. | Tol. | Dim. | Tol. | Dim. | Tol. |
| 45×39×25 | 45 | ±0.50 | 39 | ±0.4 | 25 | -0.3 |
| 45×39×23 | 45 | ±0.40 | 39 | ±0.4 | 23 | -0.3 |
| 37×37×19 | 37 | ±0.40 | 37 | ±0.4 | 19 | -0.3 |
| 31×23×15 | 31 | ±0.25 | 23 | ±0.2 | 15 | -0.3 |
| 20×20×15 | 20 | ±0.20 | 20 | ±0.2 | 15 | -0.3 |



Unit:mm

Cemented carbide for milling cutters

| Type | Dimension | | | | | |
|----------|-----------|-------|------|------|------|------|
| | L | | H | | S | |
| | Dim. | Tol. | Dim. | Tol. | Dim. | Tol. |
| 40×35×25 | 40 | ±0.50 | 35 | ±0.4 | 25 | ±0.2 |
| 39×33×25 | 39 | ±0.40 | 33 | ±0.4 | 25 | ±0.2 |
| 45×35×23 | 45 | ±0.40 | 35 | ±0.4 | 23 | ±0.2 |
| 22×20×13 | 22 | ±0.25 | 20 | ±0.2 | 13 | ±0.2 |
| 20×20×15 | 20 | ±0.20 | 20 | ±0.2 | 15 | ±0.2 |



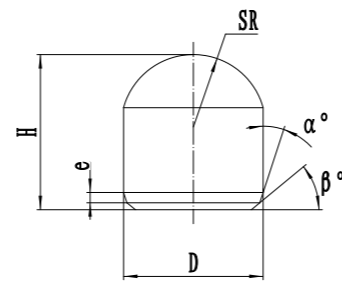
Unit:mm

Cemented carbide for diamond composite matrix

| Type | Dimension | | | |
|--------------|-----------|------|------|------|
| | D | | H | |
| | Dim. | Tol. | Dim. | Tol. |
| 21.5×16.0 | 21.5 | +0.4 | 16 | ±0.2 |
| 21.5×13.5 | 21.5 | +0.4 | 13.5 | ±0.2 |
| 21.5×13.0 | 21.5 | +0.4 | 13 | ±0.2 |
| 21.5×15.5(平) | 21.5 | +0.4 | 15.5 | ±0.2 |
| 21.5×7.2(平) | 21.5 | +0.4 | 7.2 | ±0.2 |
| 18×9.5(平) | 18 | +0.3 | 9.5 | ±0.2 |
| 18×7.2(平) | 18 | +0.3 | 7.2 | ±0.2 |
| 15×13.5 | 15 | +0.3 | 13.5 | ±0.2 |
| 15×9.5 | 15 | +0.3 | 9.5 | ±0.2 |
| 15×8 | 15 | +0.3 | 8 | ±0.2 |



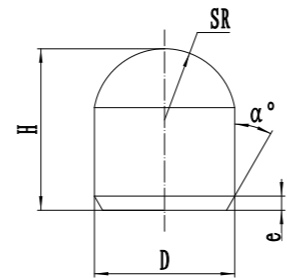
Cemented carbide for mining



Unit:mm

Spherical buttons

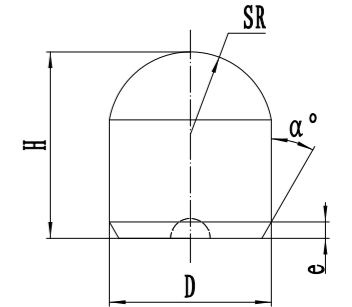
| Type | Dimension | | | | | |
|----------|-----------|----|------|----------------|---------------|-----|
| | D | H | SR | α° | β° | e |
| ZQ12×18 | 12.25 | 18 | 6.2 | 18 | 26.5 | 1.5 |
| ZQ13×19 | 13.30 | 19 | 6.6 | 18 | 26.5 | 1.5 |
| ZQ14×20 | 14.30 | 20 | 7.2 | 18 | 27.0 | 1.8 |
| ZQ14×22 | 14.30 | 22 | 7.2 | 18 | 27.0 | 1.8 |
| ZQ16×25 | 16.35 | 25 | 8.2 | 18 | 27.0 | 2.0 |
| ZQ16×21K | 16.35 | 21 | 9.0 | 18 | 30.0 | 2.0 |
| ZQ19×30K | 19.30 | 30 | 9.8 | 20 | 30.0 | 2.5 |
| ZQ21×32K | 21.70 | 32 | 10.9 | 20 | 30.0 | 2.5 |



Unit:mm

Spherical buttons

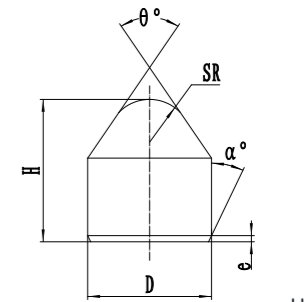
| Type | Dimension | | | | | |
|----------|-----------|----|-----|----------------|---------------|-----|
| | D | H | SR | α° | β° | e |
| ZQ08×10P | 8.15 | 10 | 4.4 | 18 | | 1 |
| ZQ08×12P | 8.15 | 12 | 4.4 | 18 | | 1 |
| ZQ09×14P | 9.15 | 14 | 4.7 | 18 | | 1 |
| ZQ9.5×14 | 9.65 | 14 | 5.1 | 18 | | 2 |
| ZQ10×15P | 10.25 | 15 | 5.2 | 18 | | 1.2 |
| ZQ11×15P | 11.25 | 16 | 6 | 18 | | 1.5 |
| ZQ12×16P | 12.25 | 16 | 6.6 | 18 | | 1.5 |
| ZQ12×17P | 12.25 | 17 | 6.6 | 18 | | 1.5 |
| ZQ12×19P | 12.25 | 19 | 7 | 18 | | 1.5 |
| ZQ13×18P | 13.25 | 18 | 7 | 18 | | 1.8 |
| ZQ14×19P | 14.25 | 19 | 7.7 | 18 | | 1.8 |
| ZQ19×30P | 19.25 | 30 | 10 | 18 | | 3.5 |



Unit:mm

Spherical buttons

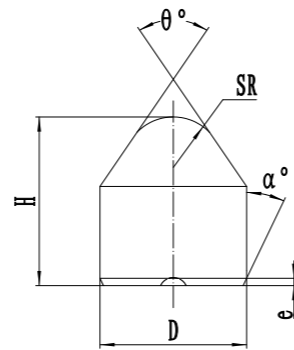
| Type | Dimension | | | | | |
|-------------|-----------|----|------|----------------|---------------|-----|
| | D | H | SR | α° | β° | e |
| ZQ11×15KP | 11.25 | 15 | 6 | 18 | | 2 |
| ZQ12×17KP | 12.25 | 17 | 6.6 | 18 | | 1.8 |
| ZQ13×19KP | 13.25 | 19 | 7 | 18 | | 1.8 |
| ZQ14×20KP | 14.25 | 20 | 7.5 | 18 | | 1.8 |
| ZQ16×22KP | 16.25 | 22 | 9 | 18 | | 1.8 |
| ZQ16×23KP | 16.25 | 23 | 9 | 18 | | 1.8 |
| ZQ16.5×23KP | 16.75 | 23 | 9 | 18 | | 2 |
| ZQ16.5×25KP | 16.75 | 25 | 9 | 18 | | 2 |
| ZQ18×24KP | 18.35 | 24 | 9.2 | 18 | | 2 |
| ZQ20×30KP | 20.25 | 30 | 10.7 | 18 | | 2.5 |



Unit:mm

Conical buttons

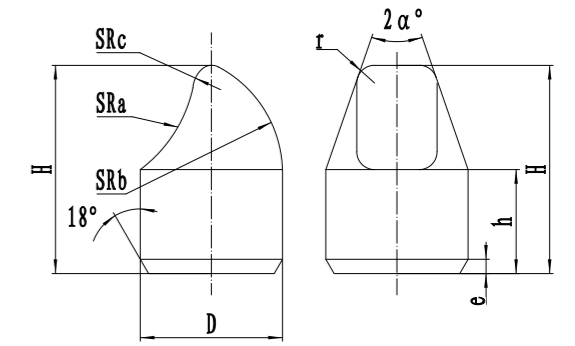
| Type | Dimension | | | | | |
|----------|-----------|----|-----|----------------|---------------|-----|
| | D | H | SR | α° | β° | e |
| ZZ07×10P | 7.15 | 10 | 3.5 | 18 | 70 | 1.0 |
| ZZ08×10P | 8.15 | 10 | 3.5 | 18 | 70 | 1.5 |
| ZZ08×12P | 8.15 | 12 | 3.5 | 18 | 70 | 1.5 |
| ZZ08×12P | 7.80 | 12 | 3.5 | 18 | 70 | 1.5 |
| ZZ09×13P | 9.15 | 13 | 3.8 | 18 | 70 | 1.5 |
| ZZ09×14P | 9.15 | 14 | 3.8 | 18 | 70 | 1.5 |
| ZZ10×14P | 10.15 | 14 | 4.2 | 18 | 70 | 1.5 |
| ZZ10×15P | 10.15 | 15 | 4.2 | 18 | 70 | 1.5 |
| ZZ11×15P | 11.25 | 15 | 4.5 | 18 | 70 | 1.8 |
| ZZ12×17P | 12.25 | 17 | 4.5 | 18 | 65 | 1.8 |



Unit:mm

Conical buttons

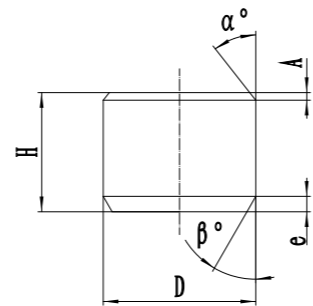
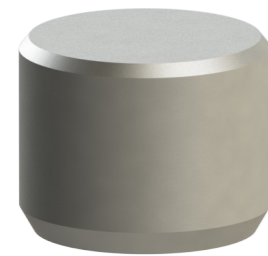
| Type | Dimension | | | | | |
|-------------|-----------|------|-----|----------------|---------------|-----|
| | D | H | SR | α° | β° | e |
| ZZ10×14KP | 10.15 | 14 | 4.2 | 45 | 70 | 1.5 |
| ZZ11×15KP | 11.2 | 15 | 4.5 | 45 | 70 | 1.8 |
| ZZ12×16KP | 12.2 | 16 | 4.8 | 45 | 70 | 1.8 |
| ZZ12×17KP | 12.2 | 17 | 4.8 | 45 | 70 | 1.8 |
| ZZ13×19KP | 13.2 | 19 | 4.8 | 45 | 65 | 1.8 |
| ZZ14×20KP | 14.25 | 20 | 5 | 45 | 65 | 2 |
| ZZ14×22KP | 14.25 | 22 | 5 | 45 | 65 | 2 |
| ZZ16×25KP | 16.3 | 25 | 5.5 | 45 | 65 | 2 |
| ZZ19×24.5KP | 19.35 | 24.5 | 7 | 45 | 55 | 2 |
| ZZ19×26KP | 19.35 | 26 | 7 | 45 | 42 | 2 |



Unit:mm

Spoon buttons

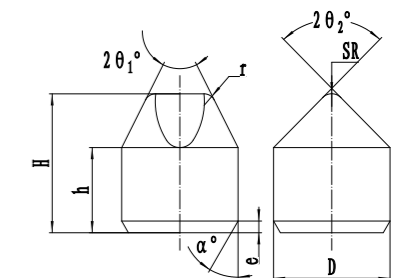
| Type | Dimension | | | | | | | | |
|----------|-----------|----|----|-----|-----|-----|-----|----------------|-----|
| | D | H | h | SRa | SRb | SRc | r | α° | e |
| ZS14×18P | 14.25 | 18 | 10 | 12 | 20 | 2.5 | 2.5 | 18 | 2 |
| ZS14×21P | 14.25 | 21 | 12 | 12 | 20 | 2.5 | 2.5 | 18 | 1.5 |
| ZS16×21P | 16.3 | 21 | 10 | 15 | 23 | 2.5 | 2.5 | 18 | 2 |
| ZS16×23P | 16.3 | 23 | 12 | 15 | 23 | 2.5 | 2.5 | 18 | 2 |
| ZS16×26P | 16.3 | 26 | 14 | 20 | 28 | 2.5 | 2.5 | 18 | 2 |
| ZS17×24P | 17.3 | 24 | 13 | 16 | 25 | 3 | 3 | 20 | 2 |
| ZS19×30P | 19.4 | 30 | 17 | 16 | 25 | 3 | 3 | 15 | 2 |
| ZS22×40P | 22.4 | 40 | 21 | 20 | 30 | 3 | 3 | 13 | 2 |
| ZS25×45P | 25.4 | 45 | 23 | 30 | 35 | 3.5 | 3.5 | 13 | 2 |



Unit:mm

Flatto buttons

| Type | Dimension | | | | | |
|-----------|-----------|----|-----|----------------|-----|---------------|
| | D | H | A | α° | e | β° |
| ZP08×07P | 8.15 | 7 | 1.0 | 45 | 1.5 | 18 |
| ZP10×08P | 10.15 | 8 | 1.2 | 45 | 1.5 | 18 |
| ZP10×10P | 10.15 | 10 | 1.2 | 45 | 1.5 | 18 |
| ZP11×09P | 11.20 | 9 | 1.2 | 45 | 1.8 | 18 |
| ZP16×15P | 16.4 | 15 | - | - | 1.8 | 45 |
| ZP19×17P | 19.4 | 17 | - | - | 2 | 45 |
| ZP14×14KP | 14.35 | 14 | 1.5 | 45 | 1.8 | 18 |
| ZP14×16KP | 14.35 | 16 | 1.5 | 45 | 1.8 | 18 |
| ZP16×22KP | 16.30 | 22 | 7.5 | 35 | 1.8 | 18 |
| ZP16×27KP | 18.30 | 27 | 10 | 35 | 1.8 | 18 |



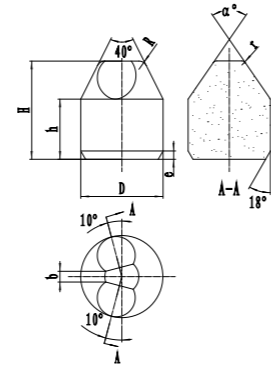
Unit:mm

Wedge buttons

ZX type

| Type | Dimension | | | | | | | | |
|----------|-----------|----|------|-----|-----|-----|------------------|------------------|----------------|
| | D | H | h | SR | e | r | θ_1° | θ_2° | α° |
| ZX14×21P | 14.2 | 21 | 11.5 | 4 | 1.5 | 1.5 | 18 | 30 | 18 |
| ZX15×22P | 15.2 | 22 | 13 | 4.5 | 1.5 | 2 | 18 | 30 | 18 |
| ZX16×23P | 16.2 | 23 | 14.5 | 6 | 2 | 2 | 18 | 32 | 18 |
| ZX16×24P | 16.2 | 24 | 14 | 5 | 2 | 2 | 18 | 30 | 18 |
| ZX18×25P | 18.3 | 25 | 17 | 7.5 | 2 | 2 | 18 | 32 | 18 |
| ZX18×26P | 18.3 | 26 | 15 | 6 | 2 | 2 | 18 | 30 | 18 |
| ZX19×29P | 19.4 | 29 | 17 | 4 | 2 | 3 | 15 | 30 | 18 |

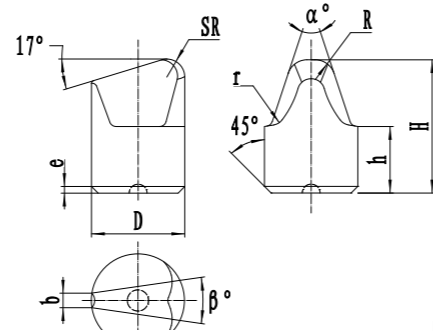
Wedge buttons



Unit:mm

ZB type

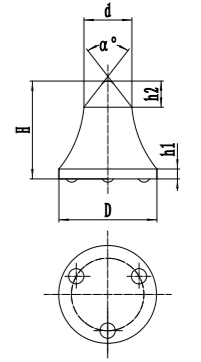
| Type | Dimension | | | | | | | |
|-------------|-----------|------|------|-----|-----|-----|----------------|-----|
| | D | H | h | R | r | e | α° | b |
| ZB14×17AP | 14.25 | 17 | 12 | 3 | 2.5 | 1.5 | 90 | 3 |
| ZB14×18AP | 14.25 | 18 | 12 | 3 | 2.5 | 1.5 | 80 | 4 |
| ZB14×19AP | 14.25 | 19 | 12 | 3 | 2.5 | 1.5 | 75 | 4 |
| ZB15×19.8AP | 15.3 | 19.8 | 11.8 | 2 | 2.5 | 1.5 | 66 | 3.5 |
| ZB16×21AP | 16.3 | 21 | 14 | 3 | 3 | 1.5 | 70 | 4.5 |
| ZB19×24AP | 19.4 | 24 | 15 | 3.5 | 3 | 1.5 | 70 | 4.5 |
| ZB22×30AP | 22.4 | 30 | 17 | 3.5 | 3 | 1.5 | 60 | 5 |



Unit:mm

ZB type

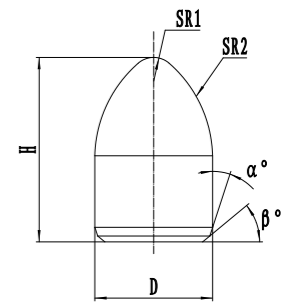
| Type | Dimension | | | | | | | | | |
|----------|-----------|----|------|-----|-----|---|-----|----------------|---------------|-----|
| | D | H | h | R | SR | r | e | α° | β° | b |
| ZB09×14P | 9 | 14 | 9.5 | 3.8 | 5.5 | 2 | 1.5 | 65 | 20 | 2 |
| ZB09×14P | 9 | 14 | 9.0 | 3.8 | 5.5 | 2 | 1.5 | 55 | 30 | 2 |
| ZB12×17P | 12 | 17 | 11 | 4.5 | 7.5 | 2 | 1.5 | 65 | 20 | 3 |
| ZB14×20P | 14 | 20 | 12.5 | 5 | 8.5 | 2 | 2.0 | 65 | 20 | 3.5 |
| ZB14×20P | 14 | 20 | 12 | 5 | 8.5 | 2 | 2.0 | 55 | 30 | 3.5 |



Unit:mm

Parabolic buttons

| Type | Dimension | | | | | |
|----------|-----------|---|-------|------|-----|----------------|
| | D | d | H | h1 | h2 | α° |
| 3T10416T | 16.07 | 8 | 15.08 | 3 | 1.8 | 92 |
| 3T10427T | 18.75 | 8 | 17.78 | 3.75 | 1.5 | 83 |
| 3T10434T | 17.86 | 8 | 17.13 | 3.84 | 1.6 | 82 |

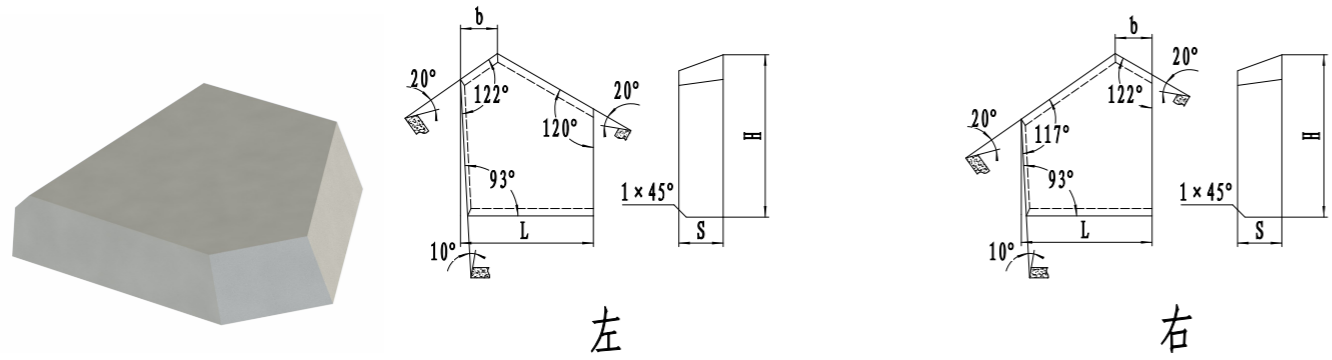


Unit:mm

Parabolic buttons

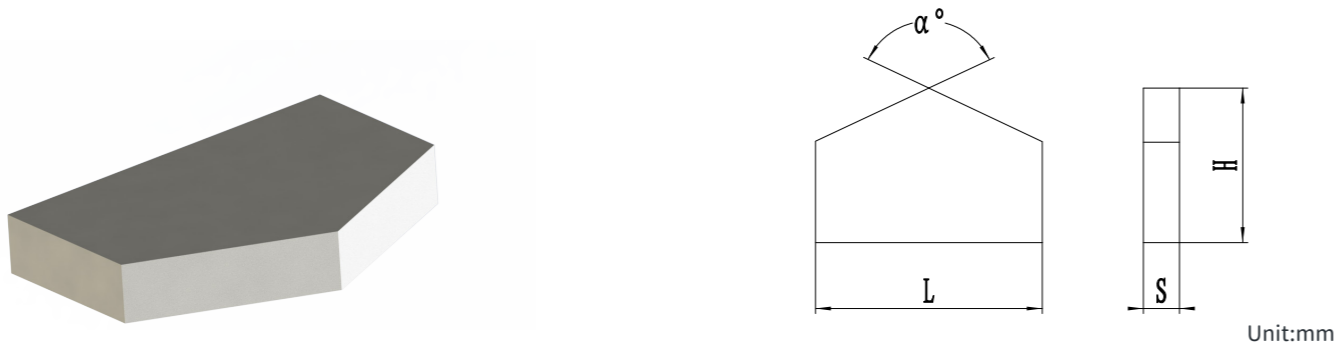
| Type | Dimension | | | | | |
|-------------|-----------|------|-----|------|----------------|---------------|
| | D | H | SR1 | SR2 | α° | β° |
| ZD09×14.5 | 9.2 | 14.5 | 2 | 12 | 20 | 27 |
| ZD10×15 | 10.2 | 15 | 2 | 13 | 20 | 27 |
| ZD12×18 | 12.35 | 18 | 3 | 16 | 20 | 27 |
| ZD12×22 | 12.35 | 22 | 3 | 16 | 20 | 27 |
| ZD12×23A | 12.35 | 22.6 | 4.6 | 13.3 | 25 | 25 |
| ZD12×23B | 12.35 | 23 | 3 | 12 | 25 | 25 |
| ZD13×19 | 13.35 | 19 | 3 | 18 | 20 | 27 |
| ZD14×22 | 14.35 | 22 | 3.5 | 20 | 20 | 27 |
| ZD14×27A | 14.35 | 26.7 | 5.3 | 15.4 | 25 | 25 |
| ZD16×24.3KP | 16.35 | 24.3 | 5 | 36 | 20 | - |
| ZD16×26.3KP | 16.35 | 26.3 | 5 | 36 | 20 | - |
| ZD19×29KP | 19.3 | 29 | 5 | 95 | 20 | - |

Cemented carbide for coal-mining tools



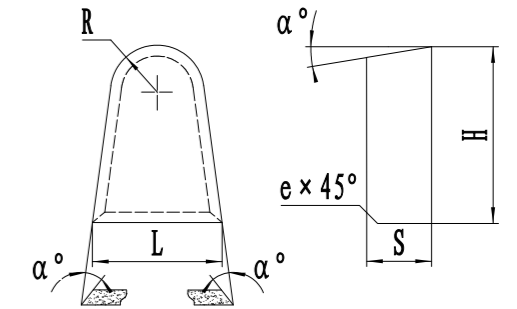
Unit:mm

| M10 type | | | | | | | | |
|----------|-----------|------|------|------|------|------|------|------|
| Type | Dimension | | | | | | | |
| | L | | H | | S | | b | |
| | Dim. | Tol. | Dim. | Tol. | Dim. | Tol. | Dim. | Tol. |
| M1011R | 11 | ±0.3 | 12 | ±0.3 | 2.5 | ±0.2 | 4 | ±0.3 |
| M1011L | 11 | ±0.3 | 12 | ±0.3 | 2.5 | ±0.2 | 4 | ±0.3 |
| M1014R | 14 | ±0.3 | 19 | ±0.4 | 3.8 | ±0.2 | 4 | ±0.3 |
| M1014L | 14 | ±0.3 | 19 | ±0.4 | 3.8 | ±0.2 | 4 | ±0.3 |
| M1015R | 15 | ±0.4 | 22 | ±0.4 | 3 | ±0.3 | 5 | ±0.3 |
| M1015L | 15 | ±0.4 | 22 | ±0.4 | 3 | ±0.3 | 5 | ±0.3 |
| M1018R | 18 | ±0.4 | 22 | ±0.4 | 6 | ±0.3 | 5 | ±0.3 |
| M1018L | 18 | ±0.4 | 22 | ±0.4 | 6 | ±0.3 | 5 | ±0.3 |



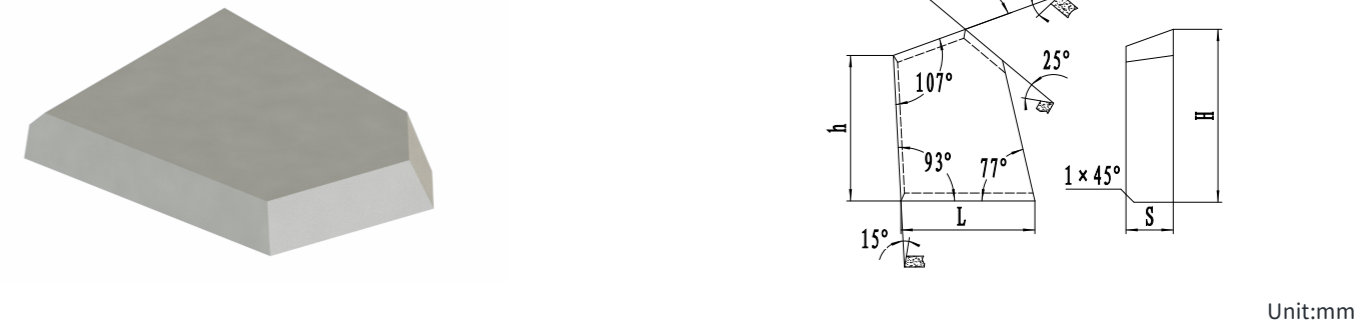
Unit:mm

| M13 type | | | | | | | |
|----------|-----------|------|------|------|------|------|-----|
| Type | Dimension | | | | | | |
| | L | | H | | S | | α° |
| | Dim. | Tol. | Dim. | Tol. | Dim. | Tol. | |
| M1306 | 6 | ±0.2 | 5 | ±0.2 | 1.4 | ±0.2 | 130 |
| M1311 | 11 | ±0.4 | 9 | ±0.3 | 2 | ±0.2 | 130 |
| M1313 | 13 | ±0.4 | 10 | ±0.4 | 2.5 | ±0.3 | 130 |
| M1315 | 15 | ±0.4 | 10 | ±0.4 | 2.5 | ±0.3 | 130 |
| M1317 | 17 | ±0.4 | 13 | ±0.4 | 3 | ±0.3 | 130 |
| M1319 | 19 | ±0.4 | 13 | ±0.4 | 3 | ±0.3 | 130 |
| M1322 | 22 | ±0.5 | 15 | ±0.4 | 3.5 | ±0.3 | 130 |
| M1326 | 26 | ±0.5 | 18 | ±0.4 | 4.5 | ±0.3 | 130 |
| M1333 | 33 | ±0.5 | 22 | ±0.4 | 3 | ±0.3 | 130 |
| M1345 | 45 | ±0.6 | 27 | ±0.4 | 9 | ±0.3 | 130 |



Unit:mm

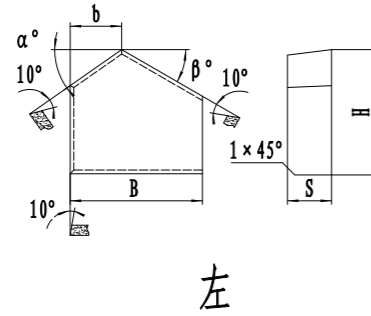
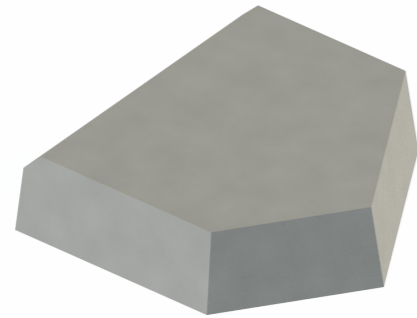
| M12 type | | | | | | | | | |
|----------|-----------|------|------|------|------|------|---|----|-----|
| Type | Dimension | | | | | | | | |
| | L | | H | | S | | R | α° | e |
| | Dim. | Tol. | Dim. | Tol. | Dim. | Tol. | | | |
| M1216 | 16 | ±0.4 | 22 | ±0.4 | 7 | ±0.3 | 6 | 15 | 1.0 |
| M1220 | 20 | ±0.4 | 27 | ±0.4 | 8 | ±0.3 | 7 | 15 | 1.0 |
| M1222 | 22 | ±0.4 | 22 | ±0.4 | 7.5 | ±0.3 | 9 | 10 | 1.5 |
| M1230 | 30 | ±0.4 | 35 | ±0.4 | 12 | ±0.3 | 8 | 8 | 1.0 |



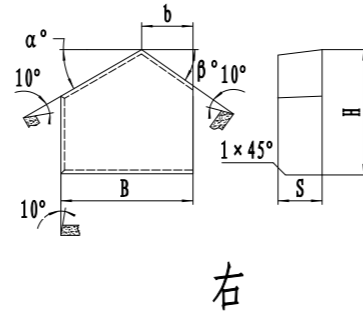
Unit:mm

| M11 type | | | | | | | | |
|----------|-----------|------|------|------|------|------|------|------|
| Type | Dimension | | | | | | | |
| | L | | H | | h | | S | |
| | Dim. | Tol. | Dim. | Tol. | Dim. | Tol. | Dim. | Tol. |
| M1112 | 12 | ±0.3 | 18 | ±0.4 | 15.8 | ±0.4 | 3 | ±0.3 |
| M1113 | 13.4 | ±0.3 | 26 | ±0.4 | 23.8 | ±0.4 | 3 | ±0.3 |

Cemented carbide for coal-mining tools



左

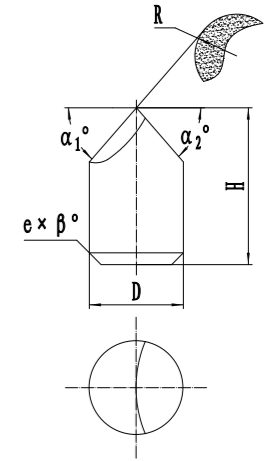


右

Unit:mm

M14 type

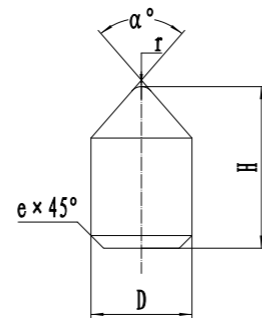
| Type | Dimension | | | | | | | | |
|--------|-----------|------|------|------|------|------|----|----|----|
| | b | | H | | S | | b | α° | β° |
| | Dim. | Tol. | Dim. | Tol. | Dim. | Tol. | | | |
| M1427R | 27.5 | ±0.4 | 22 | ±0.4 | 4.5 | ±0.3 | 10 | 35 | 30 |
| M1427L | 27.5 | ±0.4 | 22 | ±0.4 | 4.5 | ±0.3 | 10 | 35 | 30 |
| M1445R | 45 | ±0.5 | 21 | ±0.4 | 9 | ±0.3 | 15 | 31 | 17 |
| M1445L | 45 | ±0.5 | 21 | ±0.4 | 9 | ±0.3 | 15 | 31 | 17 |



Unit:mm

M21 type

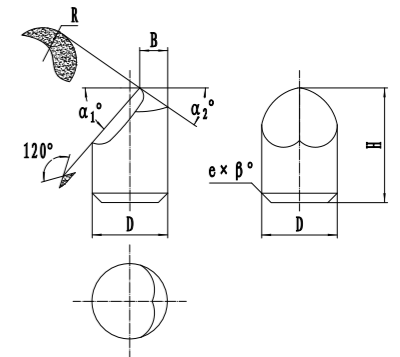
| Type | Dimension | | | | | | | | | |
|--------|-----------|------|------|------|------|-------|-----|-----|-----|----|
| | D | | H | | R | | α1° | α2° | e | β° |
| | Dim. | Tol. | Dim. | Tol. | Dim. | Tol. | | | | |
| M2110A | 10 | ±0.2 | 18 | ±0.4 | 8 | ±0.3 | 53 | 53 | 1 | 30 |
| M2110B | 10 | ±0.2 | 20 | ±0.4 | 5.5 | ±0.3 | 50 | 58 | 1 | 45 |
| M2112A | 12 | ±0.3 | 20 | ±0.4 | 6.5 | ±0.3 | 32 | 40 | 1 | 45 |
| M2112B | 12.5 | ±0.4 | 25 | ±0.4 | 10 | ±0.35 | 46 | 46 | 1 | 30 |
| M2115 | 15 | ±0.4 | 25 | ±0.4 | 11 | ±0.35 | 45 | 45 | 2.5 | 30 |
| M2118 | 18 | ±0.4 | 20 | ±0.4 | 14.4 | ±0.4 | 37 | 37 | 1.5 | 45 |



Unit:mm

M20 type

| Type | Dimension | | | | | | |
|--------|-----------|------|------|------|-----|----|-----|
| | D | | H | | r | α° | e |
| | Dim. | Tol. | Dim. | Tol. | | | |
| M2009 | 9 | ±0.2 | 16 | ±0.4 | 1 | 90 | 1 |
| M2012A | 12 | ±0.2 | 18 | ±0.4 | 1.5 | 82 | 1 |
| M2012B | 12 | ±0.2 | 20 | ±0.4 | 1.5 | 82 | 1.5 |
| M2018 | 18 | ±0.3 | 32 | ±0.4 | 1.5 | 82 | 2 |

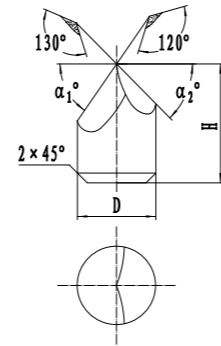


Unit:mm

M22 type

| Type | Dimension | | | | | | | | | | |
|--------|-----------|------|------|------|------|-------|-----|-----|---|---|----|
| | D | | H | | R | | α1° | α2° | B | e | β° |
| | Dim. | Tol. | Dim. | Tol. | Dim. | Tol. | | | | | |
| M2210A | 10 | ±0.2 | 18 | ±0.4 | 8 | ±0.3 | 33 | 48 | - | 1 | 45 |
| M2210B | 10 | ±0.2 | 20 | ±0.4 | 8 | ±0.3 | 33 | 48 | - | 1 | 45 |
| M2212A | 12 | ±0.3 | 22 | ±0.4 | 9 | ±0.3 | 50 | 50 | 4 | 1 | 30 |
| M2212B | 12.5 | ±0.4 | 25 | ±0.4 | 9 | ±0.35 | 55 | 45 | 4 | 1 | 30 |
| M2214 | 14 | ±0.4 | 22 | ±0.4 | 10 | ±0.35 | 49 | 55 | - | 2 | 45 |
| M2216 | 16 | ±0.4 | 28 | ±0.4 | 8 | ±0.3 | 50 | 50 | 5 | 2 | 30 |
| M2218 | 18 | ±0.4 | 21.5 | ±0.4 | 11 | ±0.35 | 52 | 52 | - | 2 | 30 |

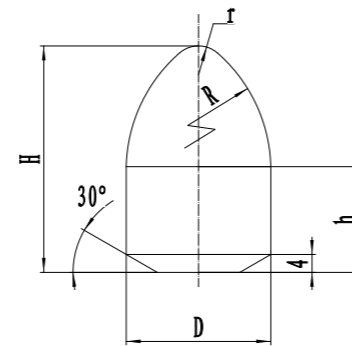
Cemented carbide for coal-mining tools



Unit:mm

M23 type

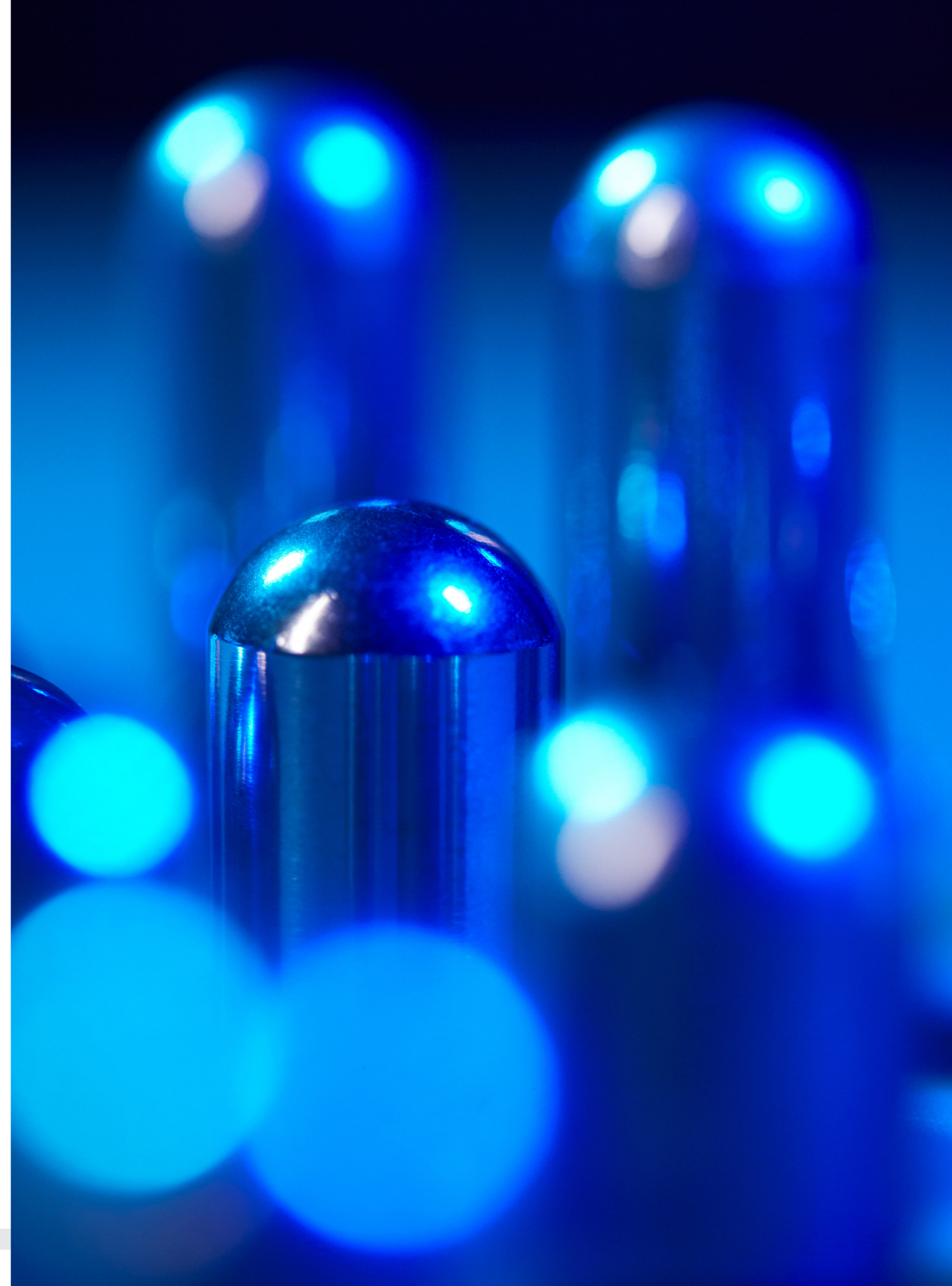
| Type | Dimension | | | | | |
|--------|-----------|------|------|------|-----|-----|
| | D | | H | | α1° | α2° |
| | Dim. | Tol. | Dim. | Tol. | | |
| M2312A | 12 | ±0.2 | 22 | ±0.4 | 56 | 48 |
| M2312B | 12.5 | ±0.2 | 25 | ±0.4 | 56 | 48 |
| M2314A | 14 | ±0.2 | 22 | ±0.4 | 56 | 48 |
| M2314B | 14 | ±0.3 | 25 | ±0.4 | 56 | 48 |



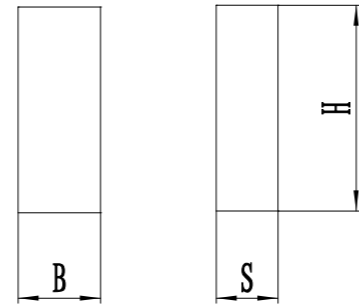
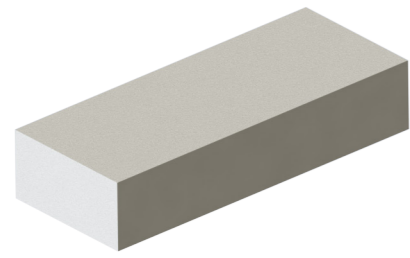
Unit:mm

M24 type

| Type | Dimension | | | | | | |
|--------|-----------|------|------|------|----|----|------|
| | D | | H | | h | R | r |
| | Dim. | Tol. | Dim. | Tol. | | | |
| M2417A | 17 | ±0.4 | 26.5 | ±0.4 | 12 | 26 | 1.75 |
| M2417B | 17 | ±0.4 | 26.5 | ±0.4 | 15 | 26 | 1.75 |

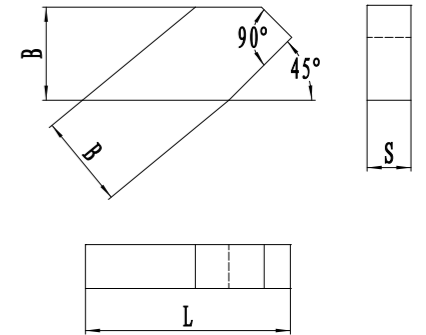
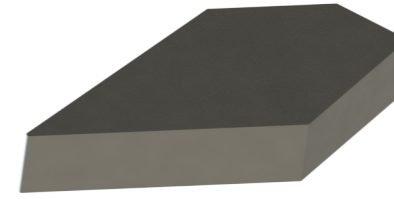


Cemented carbide for geological exploration drilling tools



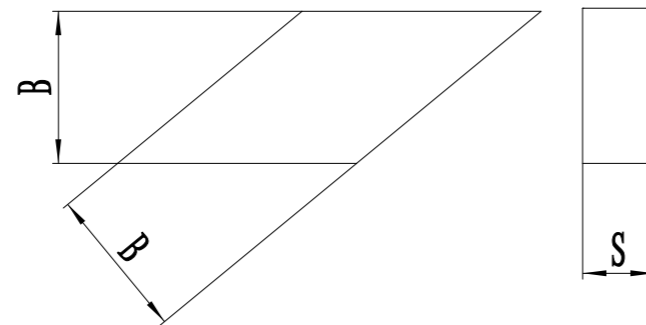
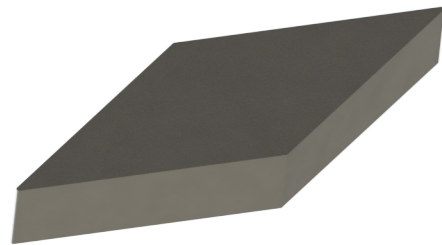
Unit:mm

| T1 type | | | | | | |
|---------|-----------|-----------|------|------------|------|------------------|
| Type | Dimension | | | | | |
| | H | | B | | S | $\alpha 2^\circ$ |
| | Dim. | Tol. | Dim. | Tol. | Dim. | Tol. |
| T1003 | 15 | ± 0.4 | 3 | ± 0.30 | 1.5 | ± 0.2 |
| T1006 | 20 | ± 0.5 | 6 | ± 0.35 | 4 | ± 0.3 |
| T1008 | 20 | ± 0.5 | 8 | ± 0.35 | 6 | ± 0.3 |



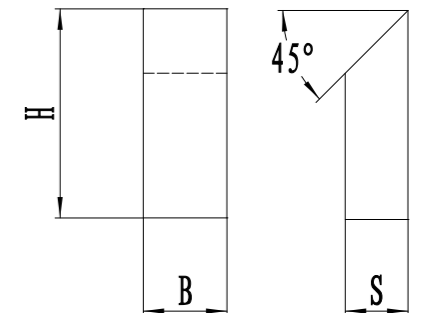
Unit:mm

| T12 type | | | | | | |
|----------|-----------|------------|------|-----------|------|-----------|
| Type | Dimension | | | | | |
| | B | | L | | S | |
| | Dim. | Tol. | Dim. | Tol. | Dim. | Tol. |
| T1208 | 8.5 | ± 0.35 | 17.5 | ± 0.5 | 3 | ± 0.2 |
| T1212 | 12 | ± 0.5 | 24 | ± 0.6 | 4 | ± 0.3 |



Unit:mm

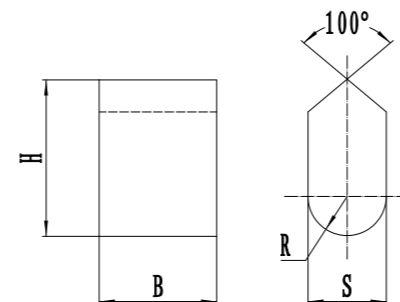
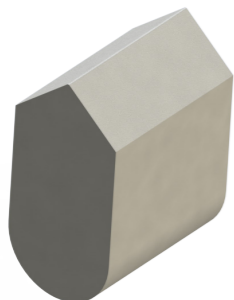
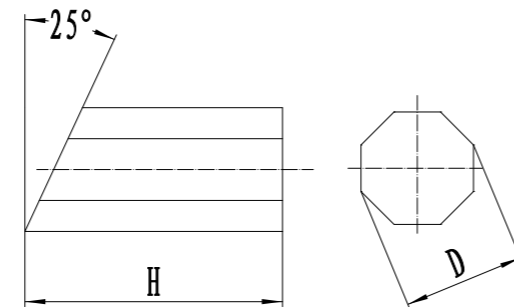
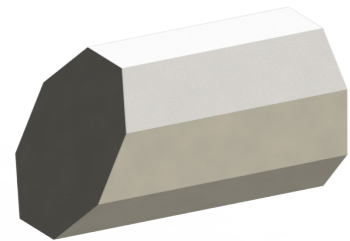
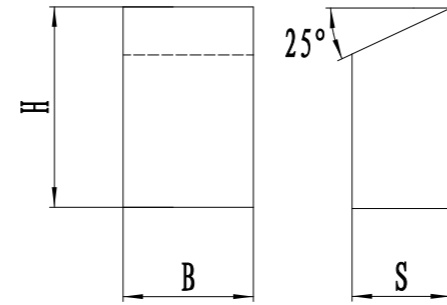
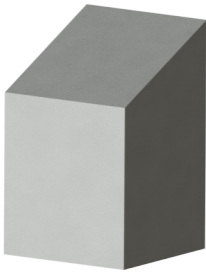
| T11 type | | | | | |
|----------|-----------|------------|------|------------|--|
| Type | Dimension | | | | |
| | B | | S | | |
| | Dim. | Tol. | Dim. | Tol. | |
| T1108 | 8.5 | ± 0.35 | 3 | ± 0.3 | |
| T1112 | 12 | ± 0.5 | 4 | ± 0.35 | |



Unit:mm

| T2 type | | | | | | |
|---------|-----------|------------|------|-----------|------|------------|
| Type | Dimension | | | | | |
| | B | | H | | S | |
| | Dim. | Tol. | Dim. | Tol. | Dim. | Tol. |
| T2004 | 4 | ± 0.30 | 15 | ± 0.5 | 3.6 | ± 0.30 |
| T2005 | 5 | ± 0.30 | 20 | ± 0.6 | 4 | ± 0.30 |
| T2006 | 6 | ± 0.35 | 20 | ± 0.6 | 6 | ± 0.35 |
| T2008 | 8 | ± 0.35 | 20 | ± 0.6 | 6 | ± 0.35 |
| T2010 | 10 | ± 0.35 | 20 | ± 0.6 | 8 | ± 0.35 |

Cemented carbide for geological exploration drilling tools



Unit:mm

T21 type

| Type | Dimension | | | | | |
|--------|-----------|-------|------|-------|------|-------|
| | B | | H | | S | |
| | Dim. | Tol. | Dim. | Tol. | Dim. | Tol. |
| T2105 | 5 | ±0.3 | 7 | ±0.35 | 3 | ±0.3 |
| T2105A | 5 | ±0.3 | 8 | ±0.35 | 5 | ±0.3 |
| T2105B | 5 | ±0.3 | 10 | ±0.35 | 5 | ±0.3 |
| T2105C | 5 | ±0.3 | 13 | ±0.5 | 5 | ±0.3 |
| T2107 | 7.5 | ±0.35 | 10 | ±0.35 | 3 | ±0.3 |
| T2107A | 7 | ±0.35 | 20 | ±0.6 | 7 | ±0.35 |
| T2108 | 8.5 | ±0.35 | 8 | ±0.35 | 3 | ±0.3 |
| T2110 | 10 | ±0.35 | 14 | ±0.5 | 4 | ±0.3 |
| T2114 | 14 | ±0.5 | 25 | ±0.6 | 12 | ±0.5 |

Unit:mm

T30 type

| Type | Dimension | | | |
|--------|-----------|-------|------|-------|
| | D | | H | |
| | Dim. | Tol. | Dim. | Tol. |
| T3005 | 5 | ±0.3 | 10 | ±0.35 |
| T3007 | 7 | ±0.35 | 10 | ±0.35 |
| T3007A | 7 | ±0.35 | 15 | ±0.6 |
| T3007B | 7 | ±0.35 | 20 | ±0.5 |
| T3010 | 10 | ±0.35 | 15 | ±0.5 |
| T3010B | 10 | ±0.35 | 16 | ±0.5 |
| T3010A | 10 | ±0.35 | 20 | ±0.6 |

Unit:mm

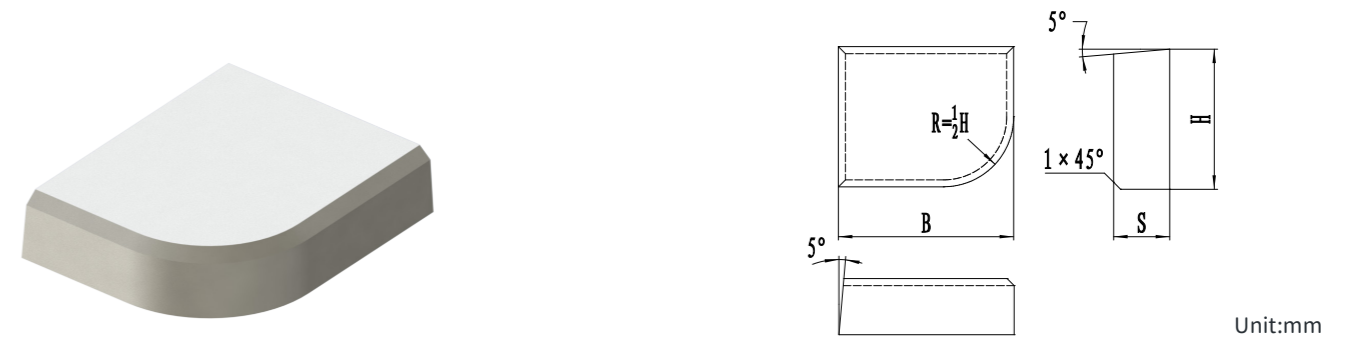
T40 type

| Type | Dimension | | | | | | |
|-------|-----------|-------|------|------|------|-------|---|
| | B | | H | | S | | R |
| | Dim. | Tol. | Dim. | Tol. | Dim. | Tol. | |
| T4010 | 10 | ±0.35 | 16 | ±0.5 | 8 | ±0.35 | 4 |
| T4012 | 12 | ±0.5 | 16 | ±0.5 | 8 | ±0.35 | 4 |
| T4014 | 14 | ±0.5 | 16 | ±0.5 | 8 | ±0.35 | 4 |
| T4015 | 15 | ±0.5 | 20 | ±0.5 | 10 | ±0.35 | 5 |

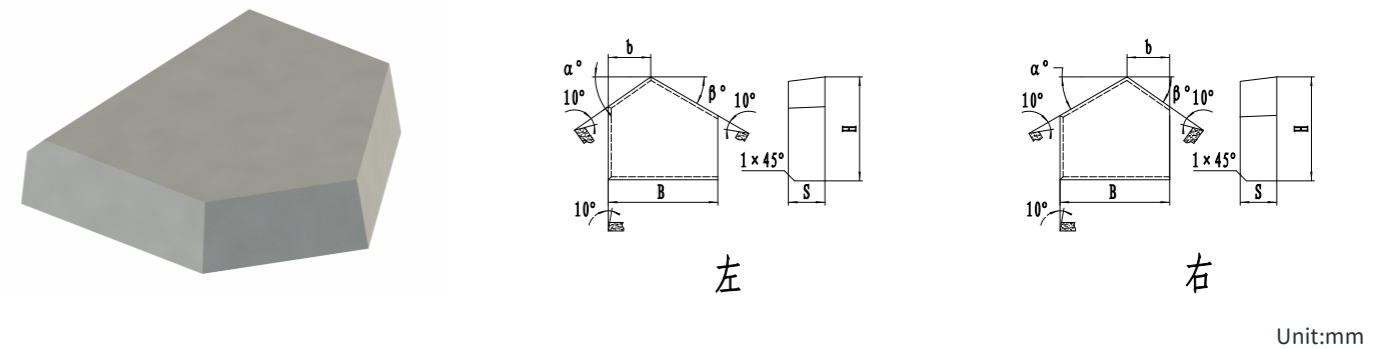
Cemented carbide for construction engineering tools



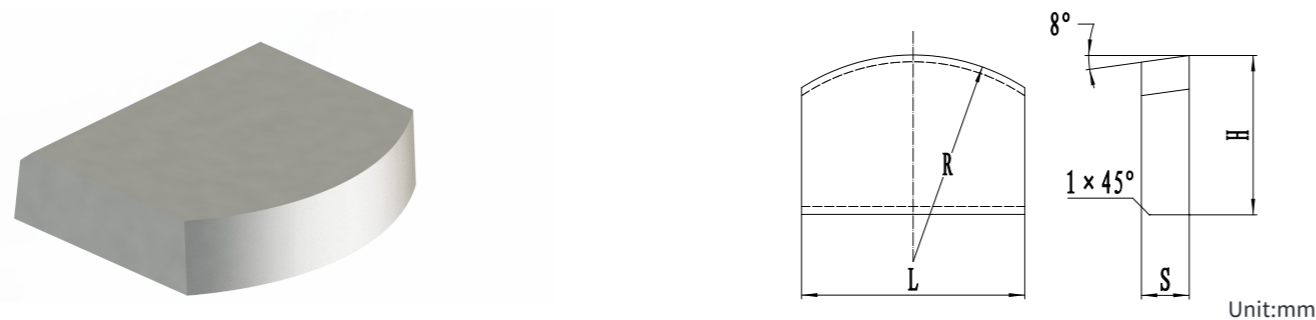
| J10 type | | | | | | |
|----------|-----------|-------|------|-------|------|------|
| Type | Dimension | | | | | |
| | B | | H | | S | |
| | Dim. | Tol. | Dim. | Tol. | Dim. | Tol. |
| J1006 | 6.5 | ±0.3 | 6 | ±0.3 | 1.9 | ±0.2 |
| J1008 | 8.5 | ±0.3 | 7.5 | ±0.3 | 2.4 | ±0.2 |
| J1010 | 10.5 | ±0.3 | 9 | ±0.35 | 2.5 | ±0.3 |
| J1012 | 12.5 | ±0.3 | 10 | ±0.35 | 2.5 | ±0.3 |
| J1014 | 14.5 | ±0.35 | 10 | ±0.35 | 2.5 | ±0.3 |
| J1016 | 16.5 | ±0.35 | 13 | ±0.35 | 3 | ±0.3 |
| J1018 | 18.5 | ±0.5 | 12 | ±0.35 | 3.5 | ±0.3 |
| J1020 | 20.5 | ±0.5 | 14 | ±0.35 | 3.5 | ±0.3 |
| J1022 | 22.5 | ±0.5 | 15 | ±0.35 | 4 | ±0.3 |
| J1024 | 24.5 | ±0.5 | 18 | ±0.5 | 4.5 | ±0.3 |
| J1026 | 26.5 | ±0.5 | 17 | ±0.5 | 4 | ±0.3 |
| J1028 | 28.5 | ±0.5 | 22 | ±0.5 | 4.5 | ±0.3 |
| J1030 | 30.5 | ±0.5 | 18.5 | ±0.5 | 4.8 | ±0.3 |



| J21 type | | | | | | |
|----------|-----------|-------|------|------|------|------|
| Type | Dimension | | | | | |
| | B | | H | | S | |
| | Dim. | Tol. | Dim. | Tol. | Dim. | Tol. |
| J2114 | 14 | ±0.3 | 16 | ±0.3 | 6 | ±0.3 |
| J2118 | 18 | ±0.3 | 16 | ±0.3 | 6 | ±0.3 |
| J2120 | 20 | ±0.35 | 12 | ±0.3 | 7 | ±0.3 |
| J2115 | 25 | ±0.35 | 16 | ±0.3 | 8 | ±0.3 |



| J20 type | | | | | | | | | |
|----------|-----------|-------|------|------|------|------|----|----|----|
| Type | Dimension | | | | | | | | |
| | B | | H | | S | | b | α° | β° |
| | Dim. | Tol. | Dim. | Tol. | Dim. | Tol. | | | |
| J2034R | 34 | ±0.35 | 22 | ±0.4 | 8 | ±0.3 | 14 | 22 | 20 |
| J2034L | 34 | ±0.35 | 22 | ±0.4 | 8 | ±0.3 | 14 | 22 | 20 |
| J2040R | 40 | ±0.5 | 21 | ±0.4 | 9 | ±0.3 | 15 | 20 | 20 |
| J2040L | 40 | ±0.5 | 21 | ±0.4 | 9 | ±0.3 | 15 | 20 | 20 |
| J2043R | 43 | ±0.5 | 22 | ±0.4 | 8 | ±0.3 | 18 | 20 | 20 |
| J2043L | 43 | ±0.5 | 22 | ±0.4 | 8 | ±0.3 | 18 | 20 | 20 |
| J2044R | 44 | ±0.5 | 25 | ±0.4 | 8 | ±0.3 | 18 | 20 | 20 |
| J2044L | 44 | ±0.5 | 25 | ±0.4 | 8 | ±0.3 | 18 | 20 | 20 |
| J2045R | 45 | ±0.5 | 27 | ±0.4 | 9 | ±0.3 | 15 | 20 | 20 |
| J2045L | 45 | ±0.5 | 27 | ±0.4 | 9 | ±0.3 | 15 | 20 | 20 |
| J2046R | 46 | ±0.5 | 30 | ±0.4 | 8 | ±0.3 | 18 | 20 | 20 |
| J2046L | 46 | ±0.5 | 30 | ±0.4 | 8 | ±0.3 | 18 | 20 | 20 |

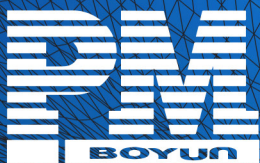


| J11 type | | | | | | | |
|----------|-----------|-------|------|------|------|------|----|
| Type | Dimension | | | | | | |
| | L | | H | | S | | R |
| | Dim. | Tol. | Dim. | Tol. | Dim. | Tol. | |
| J1118 | 18 | ±0.35 | 20 | ±0.5 | 6 | ±0.3 | 12 |
| J1122 | 22 | ±0.5 | 20 | ±0.5 | 6 | ±0.3 | 17 |
| J1128 | 28 | ±0.5 | 20 | ±0.5 | 6 | ±0.3 | 22 |
| J1133 | 33 | ±0.5 | 25 | ±0.5 | 6 | ±0.3 | 26 |

INTEGRITY COOPERATION INNOVATION

HUNANBOYUN-DONGFANG
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