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**ZGCC**

# PRECISION CARBIDE PARTS



**CMT ZIGONG CEMENTED CARBIDE CORP., LTD**



APPLICATION  
SCENARIO



**CMT ZIGONG CEMENTED CARBIDE CORP., LTD**





# QUALITY ACCOMPLISHES THE FUTURE



ISO 9001: 2015  
ISO 14001: 2015  
ISO 45001: 2018



CNAS C001-Q

## ZIGONG CEMENTED CARBIDE CORP., LTD.

- ZGCC is a core member of China Minmetals, a Fortune Global 500 company.
- ZGCC has been a leading manufacturer and service provider of tungsten carbide parts worldwide since its establishment in 1965.
- ZGCC is certified to API SPEC Q1 and ISO standards and operates a nationally certified inspection center.



## Our Advantages

- In addition to dozens of mature grades available for selection, our R&D team can develop custom materials tailored to diverse applications.
- Our state-of-the-art production equipment, testing instruments, and meticulously controlled processes ensure consistent, traceable, and reliable quality.
- With over 30 years of commitment to the oil & gas industry, we understand the challenges our parts face in harsh environments.
- We maintain extensive inventories and a dedicated sales team in the US to ensure rapid delivery and responsive service.

## Contents

02

Applications of Precision Carbide Parts

04

Carbide Bushings & Sleeves for Electrical Submersible Pump

19

Corrosion-Resistant Cemented Carbide Bushings

30

API Valve Balls & Seats

36

Non-standard Precision Carbide Parts

03

The physical and mechanical properties of the commonly used grades

12

Cemented Carbide Sealing Rings

21

Cemented Carbide Nozzles and Sleeves

32

Wear-resistant Carbide Parts for Decanter Centrifuges



## Applications of Precision Carbide Parts



Precision carbide parts are meticulously machined from cemented carbide with high dimensional accuracy and precise surface roughness, showcasing exceptional mechanical properties including unparalleled resistance to wear, abrasion, and corrosion.

Our semifinished cemented carbide products undergo shaping and tolerance adjustments through diamond wheel grinding and electrical discharge machining. These parts are designed to replace metal components in harsh operational environments, thereby enhancing efficiency and extending their service life.

The products we manufacture encompass a wide range, such as:

- Carbide Bushings & Sleeves for Electrical Submersible Pumps
- Carbide Nozzles & Compacts
- API Valve Balls & Seats
- Balls & Seats for Gas Lift Applications
- Carbide Parts for Logging While Drilling (LWD) & Measurement While Drilling (MWD)
- Mechanical Carbide Sealing Rings & Bushings for Water Pumps
- Carbide Parts for Decanter Centrifuges

For information on additional products, please reach out to our sales representatives.

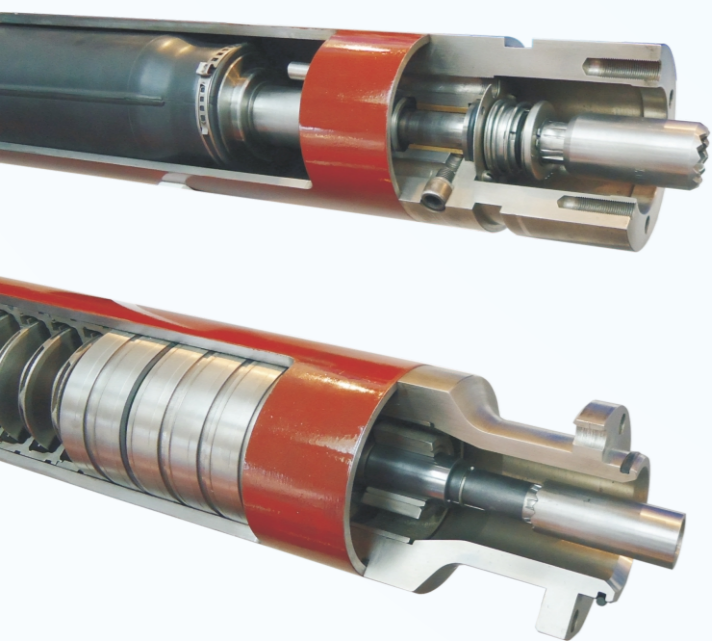


## The physical and mechanical properties of the commonly used grades.

Grade	Physical & Mechanical Properties					Material features and recommended applications
	Hardness (HRA)	TRS (N/mm <sup>2</sup> )	Coefficient of Thermal Expansion ( $\times 10^{-6}/^{\circ}\text{C}$ )	Abrasion Loss (cm <sup>3</sup> /100000r)	Impact Toughness (N·m/cm <sup>2</sup> )	
YG5	93.1	2500	5.0	0.06	4.7	Outstanding wear and abrasion resistance, with excellent overall properties, ideal for manufacturing non-standard structural components in severe wear and abrasive conditions with minimal impact.
YG15	87.5	3300	5.5		5.5	Exceptional combined impact and wear resistance, suitable for manufacturing non-standard structural parts and mechanical components under heavy stress.
YG9C	88	3000	5.3	2.2	6.5	Strong wear resistance and high strength, suitable for manufacturing nozzles and sleeves for PDC drill bits and roller cone bits.
YG11C	87.3	3100	5.4	2.8	6.8	Superior combined impact and wear resistance, suitable for manufacturing high-pressure nozzles in the petroleum, chemical, and mechanical industries.
YG20C	83.5	2600	6.1		8.5	Perfect combination of impact toughness and wear resistance, ideal for manufacturing non-standard parts and mechanical components under significant stress.
ZL10	89.5	2000	—	1.8	5.5	Excellent wear, corrosion, and thermal shock resistance. Non-magnetic, lightweight, with high pumping efficiency, suitable for manufacturing valve balls and seats for rod pumps.
ZK30 (YG8)	90.2	3000	5.1	1.4	3.2	Good combined impact and wear resistance, suitable for manufacturing non-standard structures and mechanical components under normal pressure conditions.
ZK35.5	87.3	2900	5.3	4.0	5.2	Excellent corrosion resistance and high strength, suitable for producing sealing rings under impact conditions.
ZN106G	91.5	2500	5.0	1.6	4.8	Supreme combined wear and corrosion resistance, suitable for manufacturing corrosion-resistant parts for submersible oil pumps and acid-proof pumps.
ZN109G	90.5	2800	5.4	1.9	5.4	Outstanding combined wear, corrosion, and impact resistance, suitable for manufacturing corrosion-resistant parts for drinking water pumps.
ZN211G	88.6	3000	5.2	3.2	5.1	Perfect combination of wear, corrosion, and impact resistance, ideal for manufacturing corrosion-resistant parts for submersible oil pumps.
ZK10UF-1	92	2900	5.0	0.9	3.9	Excellent wear and abrasion resistance, with excellent overall properties, suitable for manufacturing valve and pump parts.
ZK30UF	91.7	3100	5.4	0.6	7.6	Excellent wear and abrasion resistance, improved brazing performance, and excellent overall properties, suitable for manufacturing valve and pump parts.



## Carbide Bushings & Sleeves for Electrical Submersible Pump



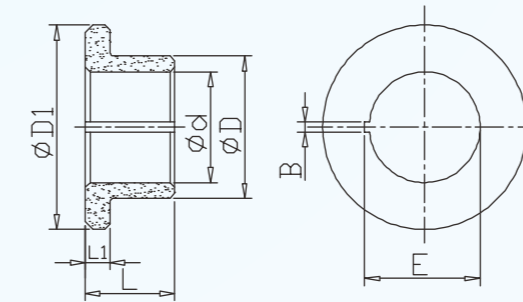
### Applications:

The Electrical Submersible Pump, typically called an ESP, is an efficient and reliable artificial-lift method for lifting moderate to high volumes of fluids from wellbores. We manufacture both straight-wall and flanged carbide bushings and sleeves, with or without oil grooves, keyways, and flanges. We can also tailor-make the parts per customer's drawings and specifications for different applications.

Carbide bushings and sleeves are mainly used for shaft's rotation support, centering, thrust, and sealing in centrifugal pumps, protectors, motors, and separators of ESP, such as sliding bearing sleeves, motor shaft sleeves, centralizing bearing sleeves, thrust bearing sleeves and sealing sleeves.

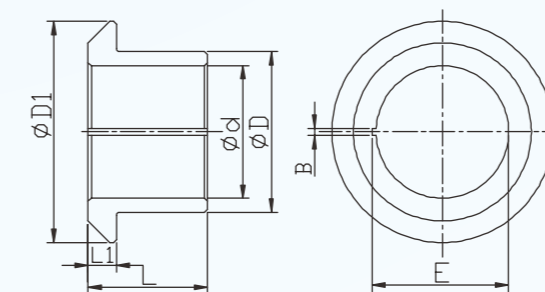
They are used in harsh working conditions such as high-speed rotation, erosion, and corrosive gases.

## Dimensions



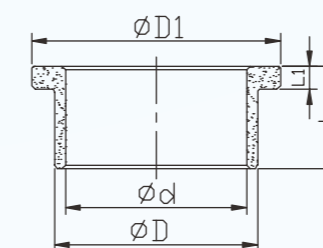
Convex-stage axle sleeve with keyway(PC type)

Main dimensions(mm)						
$\Phi D$	$\Phi D1$	$\Phi d$	L	L1	B	E
20~40	24~63	15~36	11~42	2~7	1.6~3.2	18~31



Convex-stage axle sleeve with keyway(PC type)

Main dimensions(mm)						
$\Phi D$	$\Phi D1$	$\Phi d$	L	L1	B	E
20~36	24~50	14~30	12~27	2.5~6.5	1.6	31



Convex-stage axle sleeve(PT type)

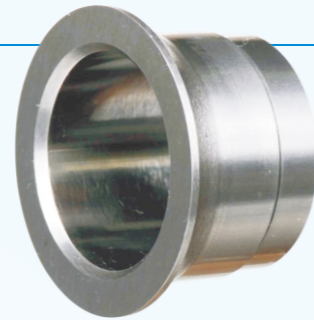
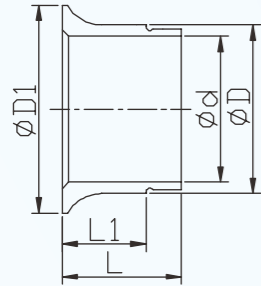
Main dimensions(mm)				
$\Phi D$	$\Phi D1$	$\Phi d$	L	L1
41~51	50~55	36~45	5~21	2~5





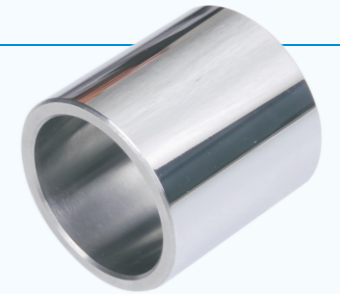
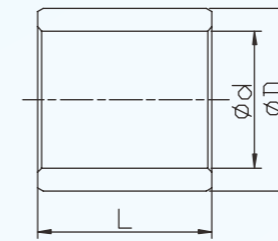
Carbide Bushings & Sleeves  
for Electrical Submersible Pump

Carbide Bushings & Sleeves  
for Electrical Submersible Pump



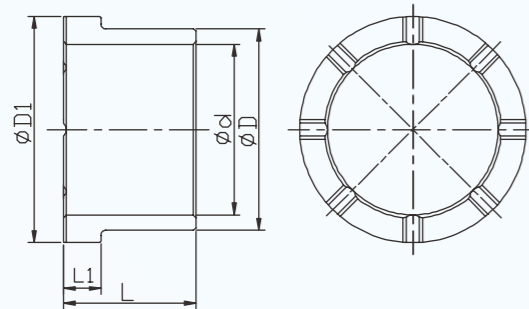
Convex-stage arc axle sleeve(PT type)

Main dimensions(mm)				
ΦD	ΦD1	Φd	L	L1
25~34	28~41	20~29	16~24	13~17



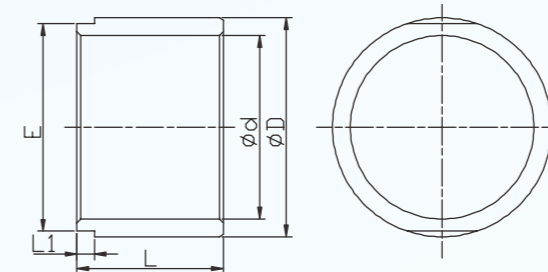
Straight tube axle sleeve(PY type)

Main dimensions(mm)		
ΦD	Φd	L
24~122	15~114	5~65



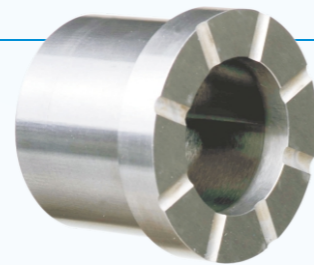
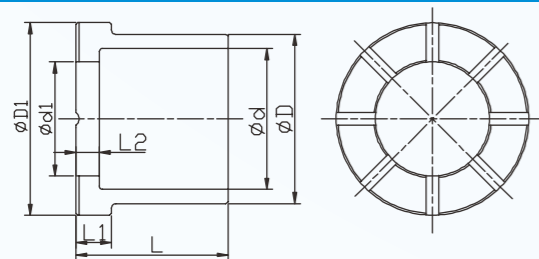
Convex-stage axle sleeve with oil groove(PX type)

Main dimensions(mm)				
ΦD	ΦD1	Φd	L	L1
46~57	52~64	38~48	26~38	6~10



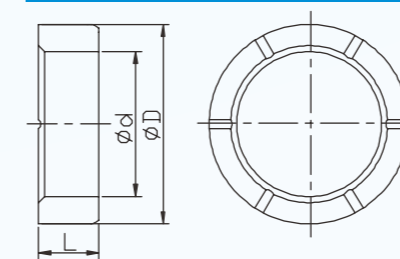
Straight tube axle sleeve(PY type)

Main dimensions(mm)				
ΦD	Φd	L	L1	E
57~70	48~58	38~58	4~8	54~67



Convex-stage axle sleeve with oil groove(PX type)

Main dimensions(mm)						
ΦD	ΦD1	Φd	Φd1	L	L1	L2
45~51	52~57	38~43	26~32	36~42	9.5	6.5



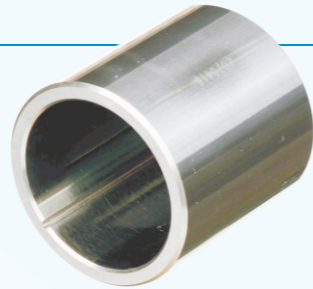
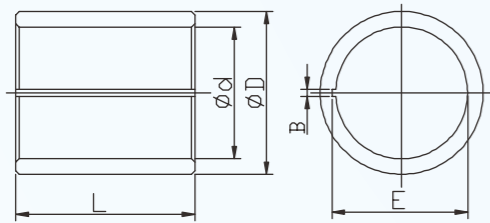
Straight tube axle sleeve with oil groove(PX type)

Main dimensions(mm)			
ΦD	Φd	L	R
24~41	15~29	8~15	2.5



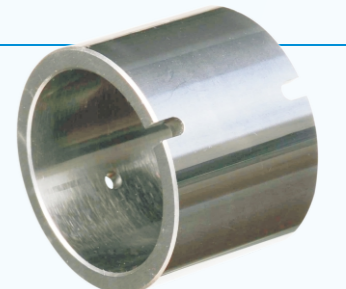
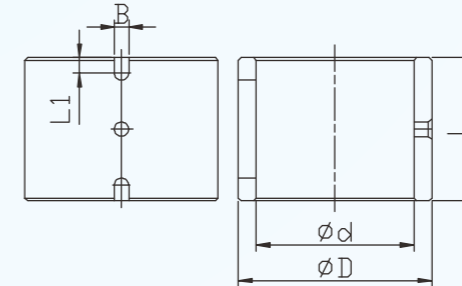
Carbide Bushings & Sleeves  
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Carbide Bushings & Sleeves  
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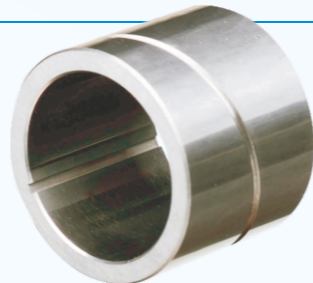
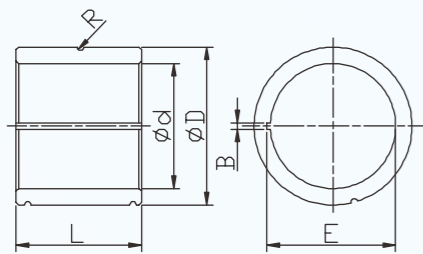
Straight tube axle sleeve with keyway(PD type)

Main dimensions(mm)				
$\Phi D$	$\Phi d$	L	B	E
22~76	15~48	5~76	1.6~3.2	16~49



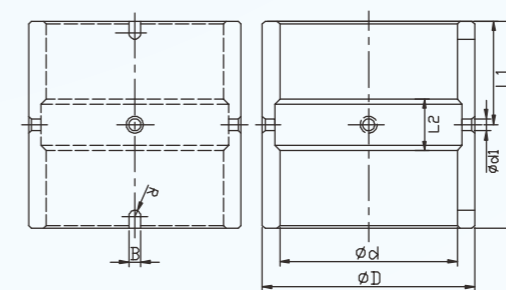
Axle sleeve with aligning groove and oil hole(PX type)

Main dimensions(mm)				
$\Phi D$	$\Phi d$	L	L1	B
43	35	35	3.5	3.2



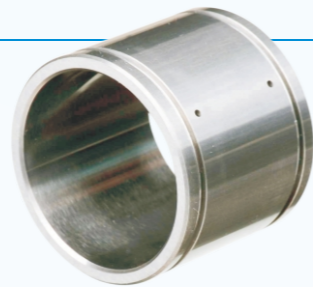
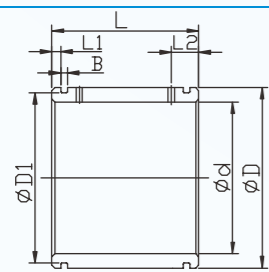
Straight tube axle sleeve with keyway and spiral groove(PD type)

Main dimensions(mm)					
$\Phi D$	$\Phi d$	L	B	E	R
38~48	30~35	25~30	1.6~3.2	31~36	0.5~1



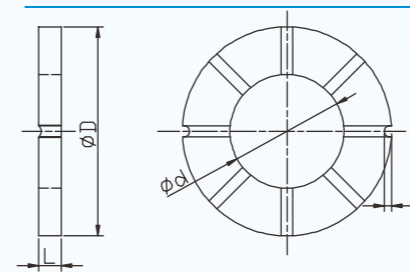
Axle sleeve with aligning groove and oil hole(PX type)

Main dimensions(mm)						
$\Phi D$	$\Phi d$	$\Phi d1$	L	L1	L2	B
57	48	3	56	28	11	3.2



Axle sleeve with round groove and oil hole(PX type)

Main dimensions(mm)					
$\Phi D$	$\Phi D1$	$\Phi d$	L	L1	B
38~70	36~68	30~58	31~49	2~4	1.5~2.5



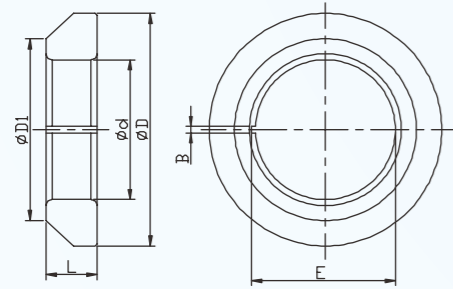
Anti-thrust axle sleeve with oil groove(PX type)

Main dimensions(mm)			
$\Phi D$	$\Phi d$	L	S
59~85	22~32	6~12	2~3.5



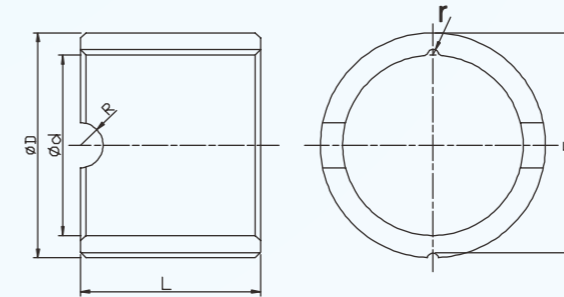
Carbide Bushings & Sleeves  
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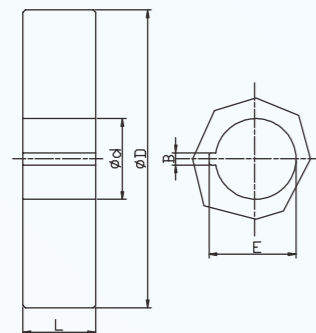
Anti-thrust axle sleeve with keyway(PD type)

Main dimensions(mm)					
ΦD	ΦD1	Φd	L	B	E
52~65	39~52	30~38	13	1.6~3.2	31~40



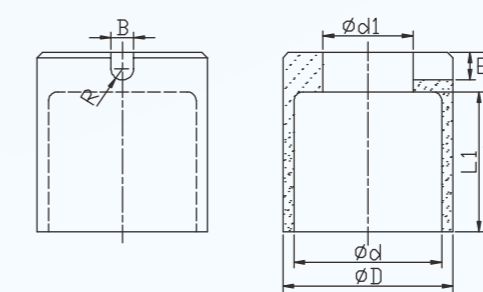
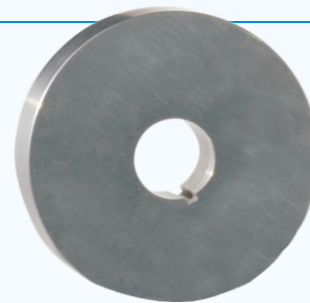
Nonstandard axle sleeve(PX type)

Main dimensions(mm)					
ΦD	Φd	L	E	R	r
32	26	25	31	3.2	0.8



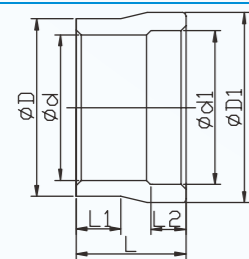
Anti-thrust axle sleeve with keyway(PX type)

Main dimensions(mm)				
ΦD	Φd	L	B	E
117	32	29	5	34



Nonstandard axle sleeve(PX type)

Main dimensions(mm)						
ΦD	Φd	Φd1	L	L1	B	E
48	42	25	51	40	6.4	8



Nonstandard axle sleeve(PX type)

Main dimensions(mm)						
ΦD	ΦD1	Φd	Φd1	L	L1	L2
26	25	20	21	15	6	6



### Technical Parameters

unit: mm

Accuracy of dimensions	Cylindricity	Flatness	Parallelism	Perpendicularity	Coaxiality	Position deviation	Total runout	Surface roughness Ra(μm)
≤0.02	≤0.005	≤0.005	≤0.01	≤0.02	≤0.02	≤0.05	≤0.02	1.6~0.1

### Capability and Capacity

Carbide bushings and sleeves are crafted from sub-fine tungsten carbide cobalt or tungsten carbide nickel, renowned for exceptional resistance to wear, corrosion, and abrasion. These components typically offer a service life exceeding 20,000 hours across a wide range of operational environments.



## Cemented Carbide Sealing Rings



### Applications:

The cemented carbide sealing ring is designed for mechanical seals, comprising kinetic and static sealing rings, along with a spring, rubber seal ring, and steel jacket. It is primarily utilized in demanding applications such as wastewater pumps, mine water discharge pumps, centrifugal pumps, centrifuges, slag slurry pumps, and slurry pumps, where conditions involve high-speed rotation, sand abrasion, and corrosion.

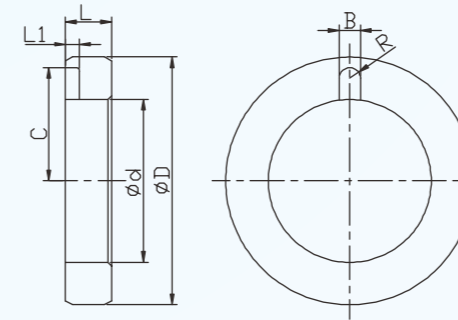
These sealing rings are installed on both the pump body and rotating axle, creating a liquid or gas seal through the interface of the kinetic and static rings.

### Main products include:

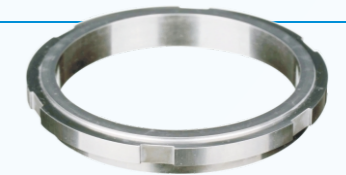
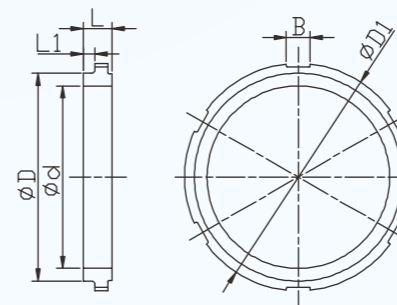
Kinetic and static ring types with anti-rotation grooves, rubber seal rings, toothed designs, and options for balanced and unbalanced configurations. We offer a wide range of sizes and product types, and can also provide recommendations, design services, and custom production based on customer drawings and specifications.



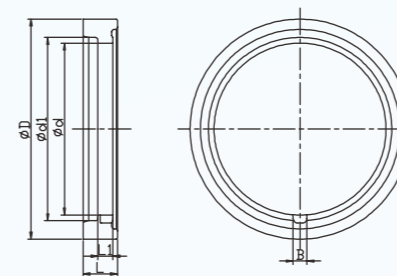
## Dimensions



Main dimensions(mm)					
$\phi D$	$\phi d$	L	L1	B	
35	23	7	2	3	



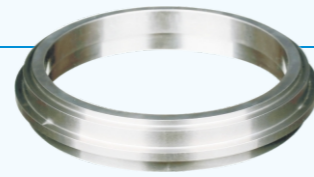
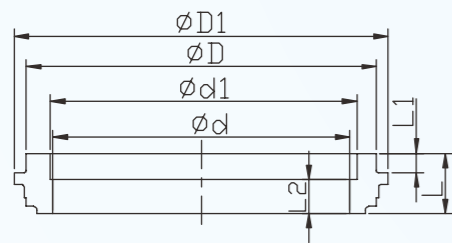
Main dimensions(mm)					
$\phi D$	$\phi D1$	$\phi d$	L	L1	B
105	115	92	15	6	12



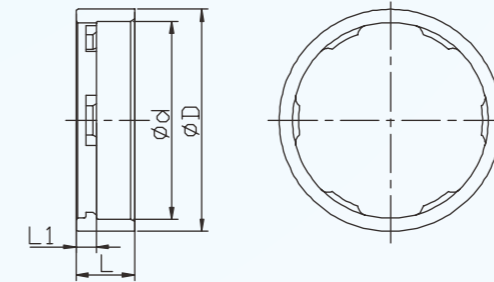
Main dimensions(mm)					
$\phi D$	$\phi d$	$\phi d1$	L	L1	B
96	75	80	15	7	6

Cemented Carbide Sealing Rings

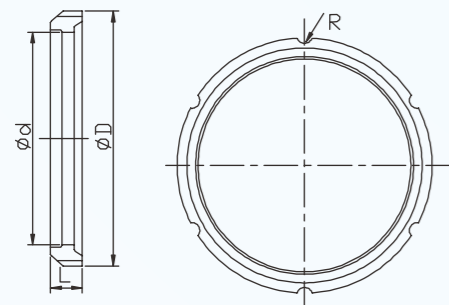
Cemented Carbide Sealing Rings



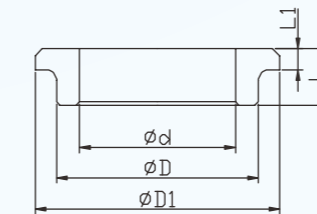
Main dimensions(mm)						
$\Phi D$	$\Phi D1$	$\Phi d$	$\Phi d1$	L	L1	L2
145~175	155~185	123~159	127~163	22~25	8~10	12~15



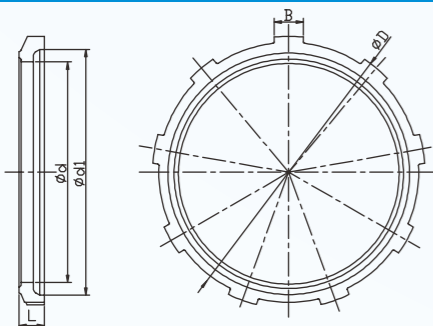
Main dimensions(mm)			
$\Phi D$	$\Phi d$	L	L1
55	49	15	5



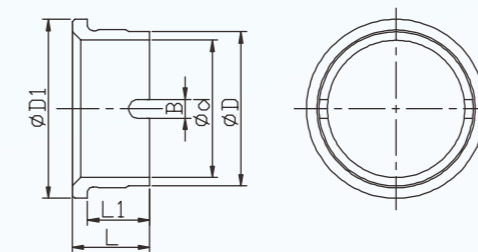
Main dimensions(mm)				
$\Phi D$	$\Phi d$	R	L	
144	120	5	18	



Main dimensions(mm)				
$\Phi D$	$\Phi D1$	$\Phi d$	L	L1
29	35	20	8	3



Main dimensions(mm)				
$\Phi D$	$\Phi d$	$\Phi D1$	L	B
111	90	100	11	12

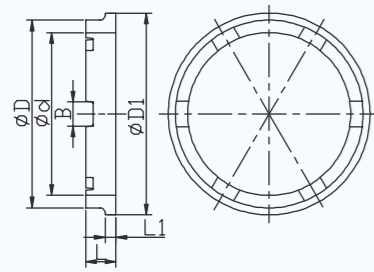


Main dimensions(mm)					
$\Phi D$	$\Phi D1$	$\Phi d$	L	L1	B
41	48	36	21	17	5

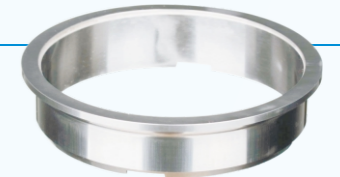
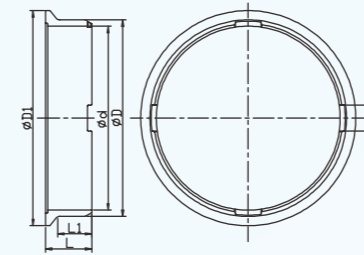


Cemented Carbide Sealing Rings

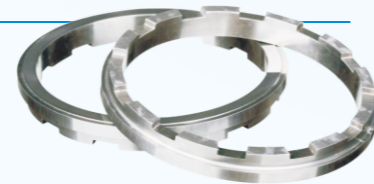
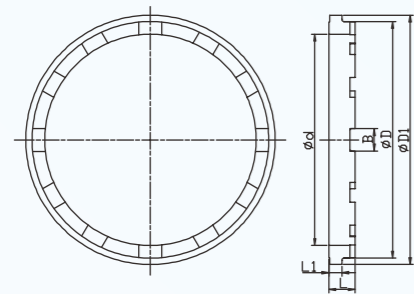
Cemented Carbide Sealing Rings



Main dimensions(mm)					
$\Phi D$	$\Phi D1$	$\Phi d$	L	L1	B
41~53	46~57	36~46	7~9	3	5~7



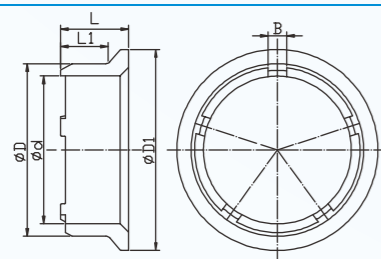
Main dimensions(mm)					
$\Phi D$	$\Phi D1$	$\Phi d$	L	L1	B
90~92	97~100	82~86	22~30	16~19	12



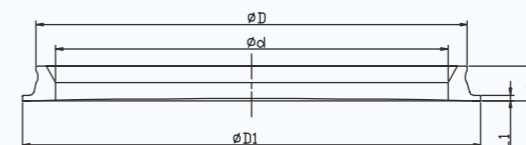
Main dimensions(mm)					
$\Phi D$	$\Phi D1$	$\Phi d$	L	L1	B
68~103	73~109	61~92	10~12	4~6	8~10



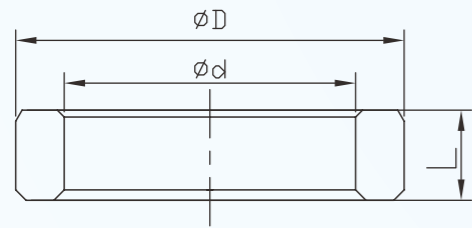
Main dimensions(mm)				
$\Phi D$	$\Phi d$	$\Phi d1$	L	L1
65	55	60	5.6	0.8



Main dimensions(mm)					
$\Phi D$	$\Phi D1$	$\Phi d$	L	L1	B
28~34	34~39	23~29	14	9	7



Main dimensions(mm)				
$\Phi D$	$\Phi D1$	$\Phi d$	L	L1
61	65	55	5	0.8



Main dimensions(mm)		
φD	φd	L
28~150	20~120	6~15

### Technical Parameters

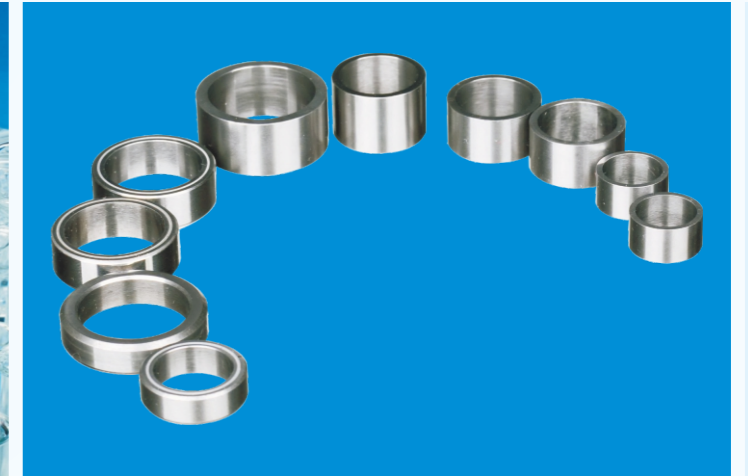
unit: mm

Flatness	Surface roughness Ra	Surface roughness Rz	Shape of seal face
≤0.6	0.03~0.06	0.5	Plane concave/convex sphere

### Capability and Capacity

The precision sealing rings are crafted from high-quality materials using advanced processes incorporating several proprietary technologies. They feature intricate designs, exceptional accuracy, stable mechanical properties, and significantly enhanced resistance to wear and corrosion. These sealing rings boast a service life exceeding twenty thousand hours in most operational conditions.

## Corrosion-Resistant Cemented Carbide Bushings



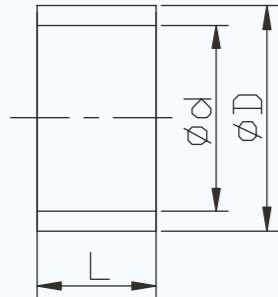
### Applications:

The corrosion-resistant cemented carbide bushings are primarily designed for axial sealing and rotational support in drinking water pumps.

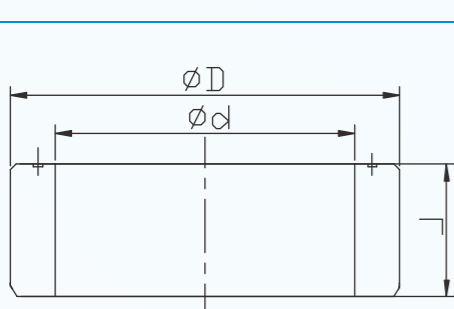




## Dimensions



Main dimensions(mm)		
ΦD	Φd	L
14~27	10~16	7~13



Main dimensions(mm)		
ΦD	Φd	L
20~35	14~27	6~12

## Technical Parameters

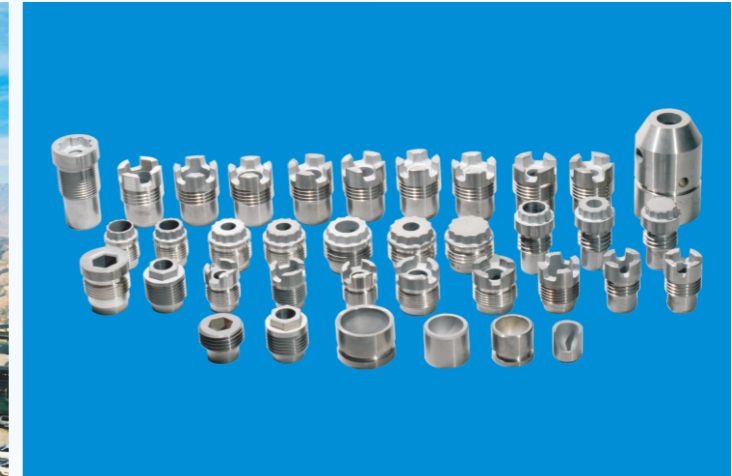
unit: mm

Accuracy of dimensions	Cylindricity	Parallelism	Perpendicularity	Coaxiality	Total runout	Surface roughness Ra(μm)
≤0.025	≤0.01	≤0.01	≤0.025	≤0.025	≤0.025	1.6~0.1

## Capability and Capacity

The products boast outstanding corrosion resistance and environmental protection attributes. The material is patented by the China National Patent Bureau and certified by ROHS (China Quality Test Center) and WARS (Water Service Center of United Kingdom BS 69200:2000). We are currently the approved primary supplier for ITT Company (Italy).

## Cemented Carbide Nozzles and Sleeves



### Applications:

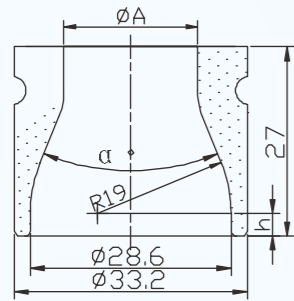
Cemented carbide nozzles are primarily employed in PDC drill bits and roller cone bits. These nozzles facilitate the flushing, cooling, and lubrication of the drill bits, aid in rock fragmentation, and effectively remove cuttings at the wellbore bottom during the drilling operations.

### Main products include:

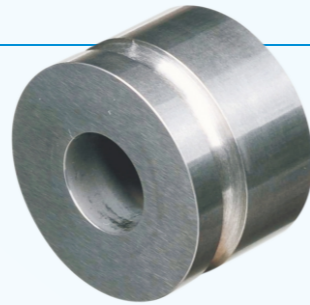
- Solid carbide nozzles
  - Threaded nozzles for PDC drill bits - Cross-groove wrench series
  - Threaded nozzles for PDC drill bits - Plum blossom teeth wrench series
  - Threaded nozzles for PDC drill bits - Internal hexagonal wrench series
  - Composite carbide nozzles
  - Threaded composite nozzles for PDC drill bits - Y-type (three grooves) wrench series
  - Threaded composite nozzles for PDC drill bits - Cross-groove wrench series
  - Threaded composite nozzles for PDC drill bits - Plum blossom teeth wrench series
  - Threaded composite nozzles for PDC drill bits - Outer hexagonal wrench series
- Our product range features diverse sizes and types. We offer services to recommend, design, develop, manufacture, and deliver products tailored to customer drawings and specifications.



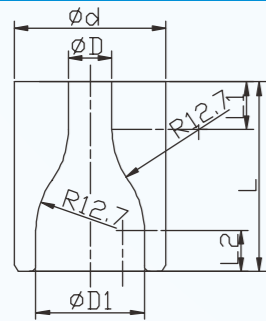
## Dimensions



Roller cone bit nozzle



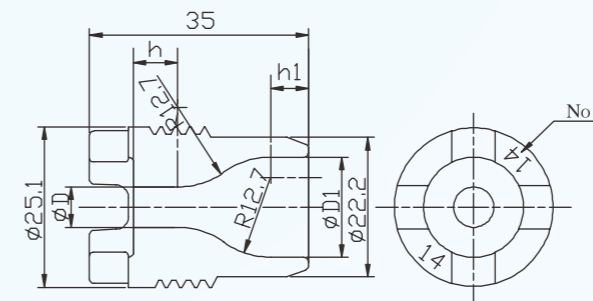
Type	No.	Main dimensions(mm)		
		$\Phi A$	h	$\alpha^\circ$
PZ-0101-20	20	15.9	1.6	58
PZ-0101-24	24	19.1	3.2	44
PZ-0101-26	26	20.6	3.2	44



Roller cone bit nozzle



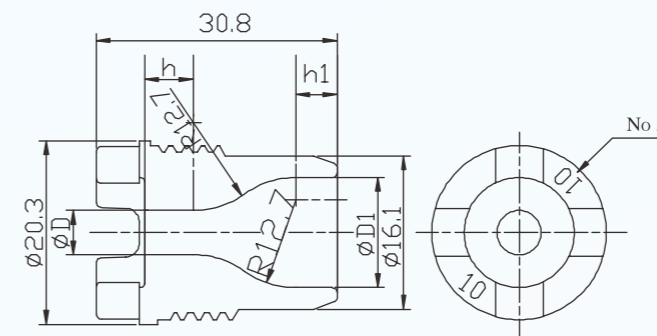
Type	No.	Main dimensions(mm)						
		$\Phi D$	$\Phi D1$	$\Phi d$	L	L1	L2	
PZ-FG10	10	7.9	9	16	20	6.4	3.2	
PZ-FG11	11	8.7	9	16	20	6.4	3.2	
PZ-FG12	12	9.5	9.5	16	20	-	-	
PZ-FG13	13	10.3	10.3	16	20	-	-	
PZ-FG14	14	11.1	15.9	20.4	22.2	6.8	4.7	
PZ-FG15	15	11.9	15.9	20.4	22.2	6.8	4.7	
PZ-FG16	16	12.7	15.9	20.4	22.2	6.8	4.7	
PZ-FG18	18	14.3	15.9	20.4	22.2	6.8	4.7	
PZ-FE14	14	11.1	16	21	22.6	-	3.4	
PZ-FE16	16	12.7	16	21	22.6	-	3.4	
PZ-FE18	18	14.3	16	21	22.6	-	3.4	
PZ-FE20	20	15.9	16	21	22.6	-	3.4	
PZ-FH14	14	11.1	28.6	32.9	27	7.1	-	
PZ-FH16	16	12.7	28.6	32.9	27	7.1	-	
PZ-FH18	18	14.3	28.6	32.9	27	7.1	-	
PZ-FH19	19	15.1	28.6	32.9	27	7.1	-	
PZ-FH20	20	15.9	28.6	32.9	27	7.1	-	
PZ-FH21	21	16.7	28.6	32.9	27	7.1	-	
PZ-FH22	22	17.5	28.6	32.9	27	7.1	-	



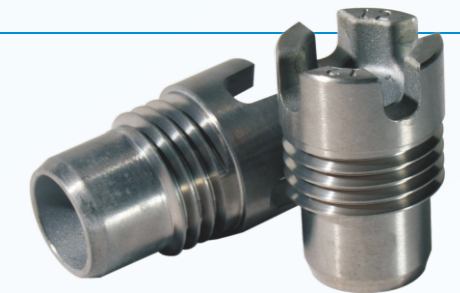
Threaded nozzles for PDC drill bits - Cross-groove wrench series



Type	No.	Main dimensions(mm)			Thread specification
		$\Phi D$	$\Phi D1$	h	
P7-12326-M	08	6.4	15.9	6.0	1.0-12UNF-2A
PZ-12327-M	09	7.1	15.9	6.4	
PZ-12328-M	10	7.9	15.9	7.1	
PZ-12329-M	11	8.7	15.9	7.7	
PZ-12330-M	12	9.5	15.9	8.4	
PZ-12331-M	13	10.3	15.9	9.1	
P7-12332-M	14	11.1	15.9	10.0	
PZ-12333-M	15	11.9	15.9	10.9	
PZ-12334-M	16	12.7	15.9	11.9	
PZ-12335-M	18	14.3	15.9	14.4	
P7-12336-M	20	15.9	15.9	-	
PZ-12337-M	22	17.5	17.5	-	



Threaded nozzles for PDC drill bits - Cross-groove wrench series

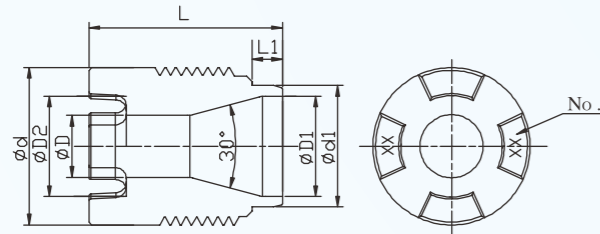


Type	No.	Main dimensions(mm)			Thread specification
		$\Phi D$	$\Phi D1$	h	
PZ-12342-M	08	6.4	12.7	5.1	M20x2-6h 3/4-12UN-2A
PZ-12343-M	09	7.1	12.7	5.8	
PZ-12344-M	10	7.9	12.7	6.6	
P7-12345-M	11	8.7	12.7	7.5	
PZ-12346-M	12	9.5	12.7	8.5	
P7-12347-M	13	10.3	12.7	9.7	
P7-12348-M	14	11.1	12.7	11.1	
P7-12349-M	15	11.9	12.7	-	
P7-12350-M	16	12.7	12.7	-	



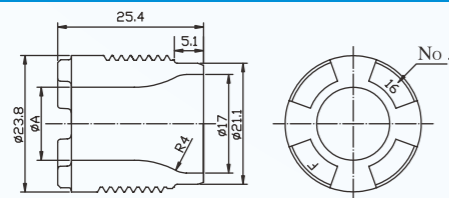
Cemented Carbide  
Nozzles and Sleeves

Cemented Carbide  
Nozzles and Sleeves



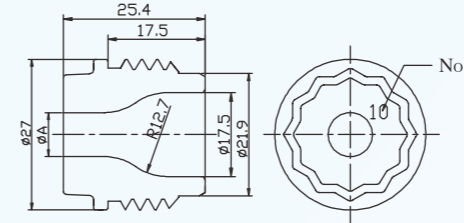
Threaded nozzles for PDC drill bits - Cross-groove wrench series

Type	No.	Main dimensions(mm)						Thread specification
		ΦD	ΦD1	Φd	Φd1	L	L1	
PZ-1104-09	09	7.1	17.5	25.4	20.4	30.8	3.9	1-14UNS-2A
PZ-1104-10	10	7.9	17.5	25.4	20.4	30.8	3.9	
PZ-1104-11	11	8.7	17.5	25.4	20.4	30.8	3.9	
PZ-1104-12	12	9.5	17.5	25.4	20.4	30.8	3.9	
PZ-1104-13	13	10.3	17.5	25.4	20.4	30.8	3.9	
PZ-1104-14	14	11.1	17.5	25.4	20.4	30.8	3.9	
PZ-1104-15	15	11.9	17.5	25.4	20.4	30.8	3.9	
PZ-1104-16	16	12.7	17.5	25.4	20.4	30.8	3.9	
PZ-1104-17	17	13.5	17.5	25.4	20.4	30.8	3.9	
PZ-1104-18	18	14.3	17.5	25.4	20.4	30.8	3.9	
PZ-1104-19	19	15.1	17.5	25.4	20.4	30.8	3.9	
PZ-1104-20	20	15.9	17.5	25.4	20.4	30.8	3.9	
PZ-1104-21	21	16.7	17.5	25.4	20.4	30.8	3.9	
PZ-1104-22	22	17.5	17.5	25.4	20.4	30.8	3.9	
PZ-1103-09	09	7.1	14.3	22.4	17.1	27.5	3.9	7/8-14UNS-2A
PZ-1103-10	10	7.9	14.3	22.4	17.1	27.5	3.9	
PZ-1103-11	11	8.7	14.3	22.4	17.1	27.5	3.9	
PZ-1103-12	12	9.5	14.3	22.4	17.1	27.5	3.9	
PZ-1103-13	13	10.3	14.3	22.4	17.1	27.5	3.9	
PZ-1103-14	14	11.1	14.3	22.4	17.1	27.5	3.9	
PZ-1103-15	15	11.9	14.3	22.4	17.1	27.5	3.9	
PZ-1103-16	16	12.7	14.3	22.4	17.1	27.5	3.9	
PZ-1103-17	17	13.5	14.3	22.4	17.1	27.5	3.9	
PZ-1103-18	18	14.3	14.3	22.4	17.1	27.5	3.9	



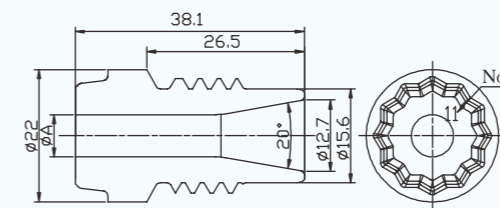
Threaded nozzles for PDC drill bits - Cross-groove wrench series

Type	No.	ΦA	Thread specification
PZ-13307-M	16	12.7	15/16-16UN-2A
PZ-13308-M	18	14.3	
PZ-13309-M	20	15.8	
PZ-13310-M	22	17.5	



Threaded nozzles for PDC drill bits - Plum blossom teeth wrench series

Type	No.	ΦA	Thread specification
PZ-M12-07	07	5.6	1-1/16-12UN-2A
PZ-M12-08	08	6.4	
PZ-M12-09	09	7.1	
PZ-M12-10	10	7.9	
PZ-M12-11	11	8.7	
PZ-M12-12	12	9.5	
PZ-M12-13	13	10.3	
PZ-M12-14	14	11.1	
PZ-M12-15	15	11.9	
PZ-11523-M	16	12.7	
PZ-12505-M	17	13.5	
PZ-11524-M	18	14.3	
P7-12506-M	19	15.1	
PZ-11525-N	20	15.9	
PZ-12507-M	21	16.7	
PZ-11526-M	22	17.5	

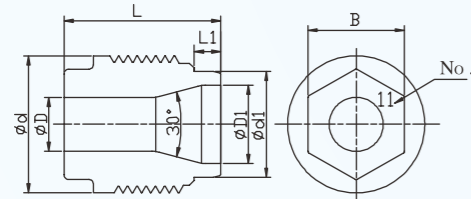


Threaded nozzles for PDC drill bits - Plum blossom teeth wrench series

Type	No.	ΦA	Thread specification
PZ-09501-M	00	0	3/4-10UNC-3A
PZ-07501-M	06	4.8	
PZ-07502-M	08	6.4	
PZ-07503-M	09	7.1	
PZ-07504-M	10	7.9	
PZ-07505-M	11	8.7	
PZ-07506-M	12	9.5	
PZ-07507-M	13	10.3	
PZ-07508-M	14	11.1	
PZ-07509-M	15	11.9	
PZ-07510-M	16	12.7	

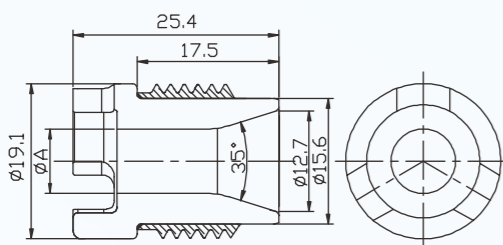
Cemented Carbide  
Nozzles and Sleeves

Cemented Carbide  
Nozzles and Sleeves



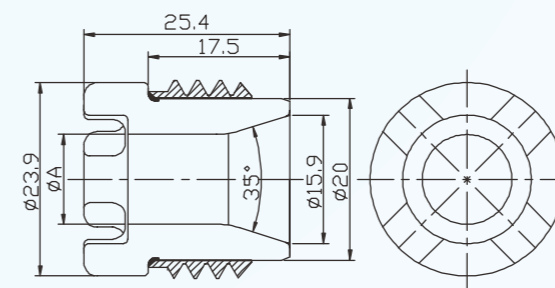
Threaded nozzles for PDC drill bits - Outer hexagonal wrench series

Type	No.	Main dimensions(mm)							Thread specification
		φD	φD1	φd	φd1	L	L1	B	
PZ-55-07	07	5.6	12.7	22.2	17.15	25.4	4.3	15.6	7/8-14UNF-2A
PZ-55-08	08	6.4	12.7	22.2	17.15	25.4	4.3	15.6	
PZ-55-09	09	7.1	12.7	22.2	17.15	25.4	4.3	15.6	
PZ-55-10	10	7.9	12.7	22.2	17.15	25.4	4.3	15.6	
PZ-08501-M	11	8.7	12.7	22.2	17.15	25.4	4.3	15.6	
PZ-08502-M	12	9.5	12.7	22.2	17.15	25.4	4.3	15.6	
PZ-08503-M	13	10.3	12.7	22.2	17.15	25.4	4.3	15.6	
PZ-55-14	14	11.1	12.7	22.2	17.15	25.4	4.3	15.6	
PZ-55-15	15	11.9	12.7	22.2	17.15	25.4	4.3	15.6	
PZ-55-16	16	12.7	12.7	22.2	17.15	25.4	4.3	15.6	
PZ-65-07	07	5.6	15.9	25.4	20.4	28.6	4.8	18.7	1-14UNF-2A
PZ-65-08	08	6.4	15.9	25.4	20.4	28.6	4.8	18.7	
PZ-65-09	09	7.1	15.9	25.4	20.4	28.6	4.8	18.7	
PZ-65-10	10	7.9	15.9	25.4	20.4	28.6	4.8	18.7	
PZ-65-11	11	8.7	15.9	25.4	20.4	28.6	4.8	18.7	
PZ-65-12	12	9.5	15.9	25.4	20.4	28.6	4.8	18.7	
PZ-65-13	13	10.3	15.9	25.4	20.4	28.6	4.8	18.7	
PZ-65-14	14	11.1	15.9	25.4	20.4	28.6	4.8	18.7	
PZ-65-15	15	11.9	15.9	25.4	20.4	28.6	4.8	18.7	
PZ-65-16	16	12.7	15.9	25.4	20.4	28.6	4.8	18.7	
PZ-65-17	17	13.5	15.9	25.4	20.4	28.6	4.8	18.7	
PZ-65-18	18	14.3	15.9	25.4	20.4	28.6	4.8	18.7	
PZ-65-19	19	15.1	15.9	25.4	20.4	28.6	4.8	18.7	
PZ-65-20	20	15.9	15.9	25.4	20.4	28.6	4.8	18.7	



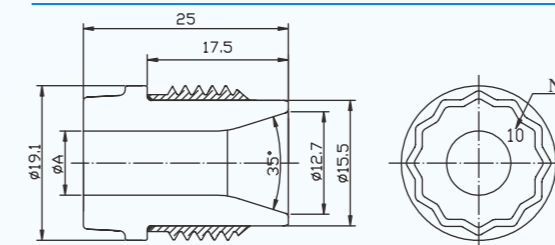
Threaded composite nozzles for PDC drill bits - Y-type (three grooves) wrench series

Type	No.	φA	Thread specification
PZ-11503-M	08	6.4	3/4-16UNF-2A
PZ-11504-M	09	7.1	
PZ-10514-M	10	7.9	
PZ-10515-M	11	8.7	
PZ-10516-M	12	9.5	
PZ-10517-M	13	10.3	
PZ-10512-M	14	11.1	
PZ-11505-M	15	11.9	
PZ-10513-M	16	12.7	



Threaded composite nozzles for PDC drill bits - Cross-groove wrench series

Type	No.	φA	Thread specification
PZ-10501-M	00	0	15/16-16UN-2A
PZ-10502-M	07	5.6	
PZ-10503-M	08	6.4	
PZ-10504-M	09	7.1	
PZ-10505-M	10	7.9	
PZ-10506-M	11	8.7	
PZ-10507-M	12	9.5	
PZ-10508-M	13	10.3	
PZ-10509-M	14	11.1	
PZ-10510-M	15	11.9	
PZ-10511-M	16	12.7	
PZ-H4-17	17	13.5	
PZ-H4-18	18	14.3	
PZ-H4-19	19	15.1	
PZ-H4-20	20	15.9	



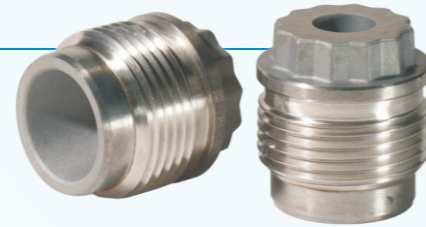
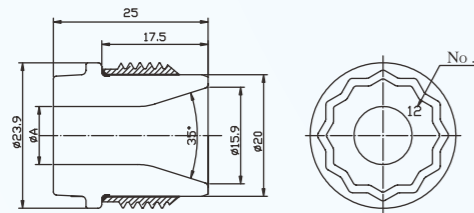
Threaded composite nozzles for PDC drill bits - Plum blossom teeth wrench series

Type	No.	φA	Thread specification
PZ-12512-M	00	0	3/4-16UNF-2A
PZ-12513-M	06	4.8	
PZ-12514-M	08	6.4	
PZ-12515-M	09	7.1	
PZ-12508-M	10	7.9	
PZ-12509-M	11	8.7	
PZ-12510-M	12	9.5	
PZ-12511-M	13	10.3	
PZ-11521-M	14	11.1	
PZ-12516-M	15	11.9	
PZ-11522-M	16	12.7	



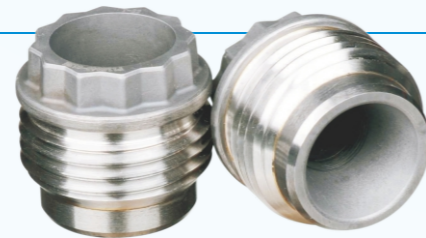
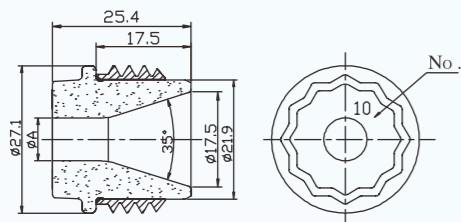
Cemented Carbide Nozzles and Sleeves

Cemented Carbide Nozzles and Sleeves



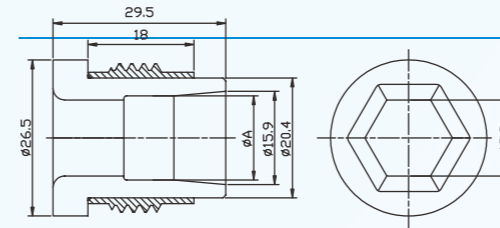
Threaded composite nozzles for PDC drill bits - Plum blossom teeth wrench series

Type	No.	ΦA	Thread specification
PZ-12517-M	00	0	15/16-16UN-2A
PZ-12518-M	07	5.6	
PZ-12519-M	08	6.4	
PZ-12520-M	09	7.1	
PZ-12521-M	10	7.9	
PZ-12522-M	11	8.7	
PZ-12523-M	12	9.5	
PZ-12524-M	13	10.3	
PZ-12501-M	14	11.1	
PZ-12525-M	15	11.9	
PZ-12502-M	16	12.7	
PZ-12526-M	17	13.5	
PZ-12503-M	18	14.3	
PZ-12527-M	19	15.1	
PZ-12504-M	20	15.9	



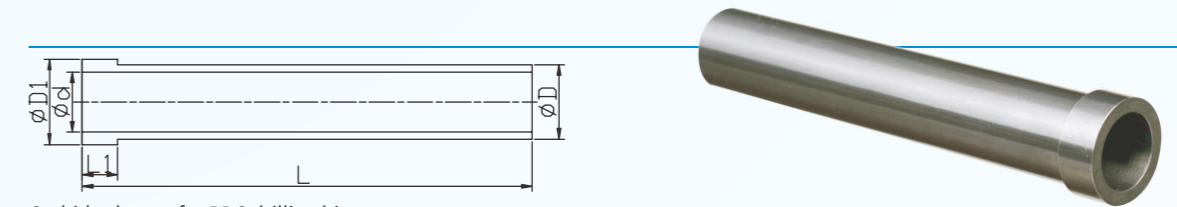
Threaded composite nozzles for PDC drill bits - Plum blossom teeth wrench series

Type	No.	ΦA	Thread specification
PZ-09502-M	00	0	1-1/16-12UN-2A
PZ-07511-M	07	5.6	
PZ-07512-M	08	6.4	
PZ-07513-M	09	7.1	
PZ-07514-M	10	7.9	
PZ-07515-M	11	8.7	
PZ-07516-M	12	9.5	
PZ-07517-M	13	10.3	
PZ-07518-M	14	11.1	
PZ-07519-M	15	11.9	
PZ-07520-M	16	12.7	
PZ-07521-M	17	13.5	
PZ-07522-M	18	14.3	
PZ-07523-M	19	15.1	
PZ-07524-M	20	15.9	
PZ-07525-M	21	16.7	
PZ-07526-M	22	17.5	



Threaded composite nozzles for PDC drill bits - Internal hexagonal wrench series wrench series

Type	No.	ΦA	Thread specification
PZ-13303-M	16	12.7	1-14UNS-2A
PZ-13304-M	18	14.3	
PZ-13305-M	20	15.9	
PZ-13306-M	22	17.5	



Carbide sleeves for PDC drilling bit

Type	Main dimensions(mm)				
	ΦD	ΦD1	Φd	L	L1
PG-018	15	17	10.3	49	4.1
PG-019	19	22	14.3	25	3.2
PG-020	19	22	14.3	38	3.2
PG-021	19	22	14.3	51	3.2
PG-022	19	22	14.3	57	3.2
PG-023	19	22	14.3	70	3.2
PG-024	21	22	17.5	31	2.9
PG-025	21	23.4	14.8	51	4.1
PG-026	21	23.4	14.8	63	4.1
PG-027	21	23.4	14.8	71	4.1
PG-11501-M	21	24.2	17.5	127	9.5
PG-11502-M	21	24.2	17.5	146	9.5
PG-13501-M	14.5	17	11.1	76	9.5
PG-14301-M	21	24.2	17.5	40	9.5
PG-14302-M	21	24.2	17.5	50	9.5
PG-14303-M	21	24.2	17.5	60	9.5
PG-14304-M	21	24.2	17.5	70	9.5
PG-14305-M	21	24.2	17.5	80	9.5
PG-14306-M	21	24.2	17.5	95	9.5

Technical Parameters

unit: mm

Accuracy of dimensions	Perpendicularity	Coaxiality	Position deviation	Circular runout	Surface roughness Ra(μm)	Thread accuracy
≤0.05	≤0.05	≤0.05	≤0.05	≤0.05	1.6~0.4	ASTM class 3, Metric class 6

Capability and Capacity

The nozzles and sleeves have high hardness, excellent wear resistance, high-pressure resistance, and combined erosion and impact resistance.

There are different types of carbide nozzles available to choose from, solid carbide nozzles and composite nozzles (brazed or shrink-fitted).

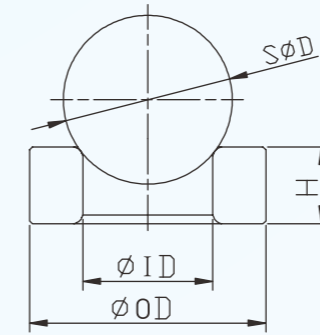
Various models are available and can be customized.

## API Valve Balls & Seats



### Applications:

The cemented carbide valve ball and seat are extensively utilized in stationary and moving unidirectional valves across various tube-type and rod-type oil suction pumps. They are valued for their high hardness, exceptional wear and corrosion resistance, as well as excellent resistance to compression and thermal shock. These properties contribute to high pumping efficiency and extended pump check cycles, particularly in the extraction of thick oil containing sand, gas, and wax from inclined wells.



API code Item	V12-106	V12-125	V12-150	V12-175	V12-200	V12-225	V12-250	V12-375
SΦD±0.025	15.88	19.05	23.83	28.58	31.75	34.93	42.88	57.15
H+0.51-0.25	12.70	12.70	12.70	12.70	12.70	12.70	12.70	19.05
OD0-0.13	20.14	23.32	29.67	35.26	37.54	43.69	51.05	78.30
ID±1.27	11.68	13.97	17.02	20.96	24.38	26.92	33.27	43.18

Note: The maximum allowable deviation for the roundness of SΦD is 0.003mm, and the maximum permissible surface roughness error is Ra 0.1μm.

### Technical Parameters

The valve ball and seat will be manufactured and inspected in accordance with API Specification II AX: 2015 and GB/T18607-2008 (China National Standard). They are dimensionally accurate within class IT6. Surface roughness ranges from Ra0.8 to Ra0.05μm, and the roundness of the valve ball reaches 0.002 μm.

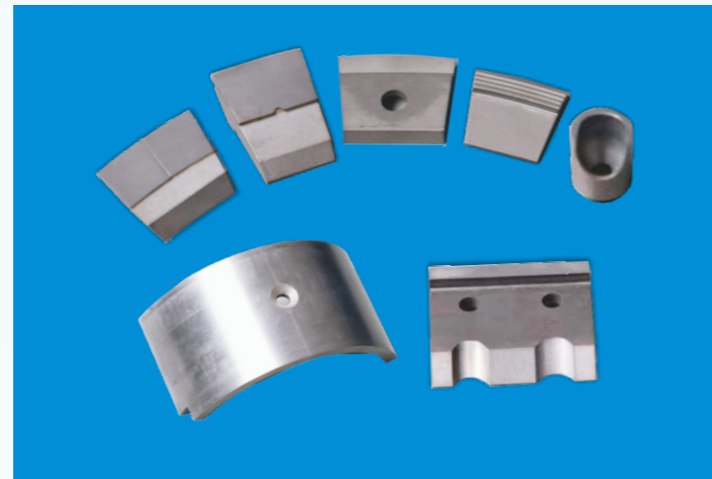
### Capability and Capacity

We provide API balls and seats in a variety of materials, including 440 stainless steel, cast cobalt alloys, powder metallurgy cobalt alloys, cobalt carbide, nickel carbide, and titanium carbide.

These materials exhibit exceptional properties such as excellent wear and corrosion resistance, as well as robust anti-compression and thermal shock capabilities. Our products not only achieve high accuracy but also demonstrate excellent sealing characteristics (no leakage for 5 seconds under a vacuum of 85 MPa). The production technology used reaches an advanced global standard.



## Wear-resistant Carbide Parts for Decanter Centrifuges



### Applications:

A decanter centrifuge continuously separates solid materials from liquids in the slurry and therefore plays a significant role in the wastewater treatment, chemical, oil, and food processing industries. The wear and corrosion are the main reasons for premature failure and shutdown. We provide standard and customized TC wear-resistant parts and components to prolong your centrifuges' service life and increase production efficiency, and reliability.

### Main products include:

- Decanter Centrifuge Tiles
- Feed and Discharge Ports
- Scraper Bars and Plows
- Other Wear-resistant Parts

Grade	Density	Hardness	TRS	Abrasive abrasion	Impact toughness
	g/cm <sup>3</sup>	HRA	N/mm <sup>2</sup>	cm <sup>3</sup> /100000r	N·m/cm <sup>2</sup>
ZK10UF-H	14.88	93.3	2900	0.6	4.7
ZK30	14.75	90.2	3000	1.4	3.2
ZK30UF	14.43	91.7	3100	0.8	7.6
ZN106G	15.03	91.5	2500	1.6	4.8
ZN106G-1	14.9	92.9	2750	0.8	5.2
ZN109G	14.55	90.5	2800	1.9	5.4
ZN112G	14.25	89.5	2900	2.2	5.1

### Technical Parameters

The hardness of the carbide parts exceeds 93 HRA, and the bonding strength is over 160 MPa. The service life of the silver-soldered tiles can last a minimum of 8 months under the most critical working conditions.

### Capability and Capacity

We offer a range of tungsten carbide grades achieved by blending different grain sizes of tungsten carbide with various binders. This results in materials that excel in combined wear, corrosion, and fracture resistance, tailored for diverse applications.

### Decanter Centrifuge Tiles

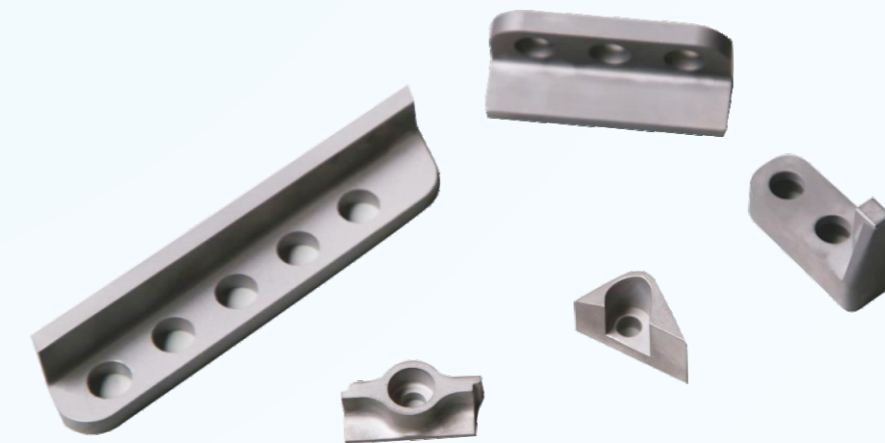
Both screwed and brazed carbide and steel assemblies are available



### Feed and Discharge Ports



### Scraper Bars and Plows



### Other Wear-resistant Parts



### Various Tungsten Carbide Grades to Choose From

We provide various tungsten carbide grades by mixing different grain sizes of tungsten carbide with different binders to create distinguished combined wear, corrosion, and fracture resistance materials for different applications.



## Non-standard Precision Carbide Parts

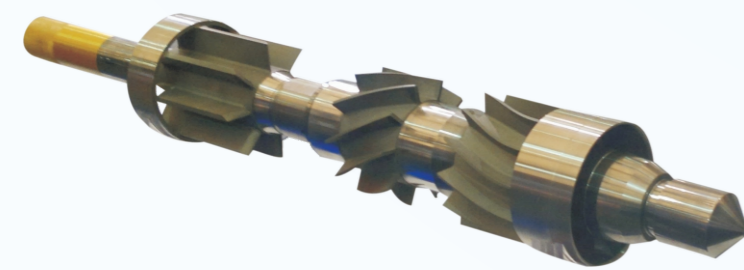


### Applications:

Non-standard precision carbide parts are primarily used in vertical drilling tools for oil and natural gas exploration, self-activated oscillating rotary impact drilling tools, and LWD & MWD instruments used during drilling operations. They are employed for diverting, flushing, sealing, and providing feedback on mud pressure pulse signals in drilling mud. These products are designed for harsh conditions including high-pressure, high-speed sand flushing, high temperature, fatigue resistance, and resistance to gas-liquid corrosion.

### Main products include:

- Upper valve assembly, lower valve, piston, liner, and nozzles for liquid flow control and automatic thrust devices in vertical drilling tools.
- Deflectors, impellers, impeller shafts, impeller housings, and water eyes for self-excited oscillating rotary impact drilling tools.
- Mushroom heads (main valve core), flow restrictors, flow restrictor chambers, valve stems, valve seats, nozzles, lift valves, nose caps, diverters, spacers, pulse hole valves, upper bearing sleeves, lower bearing sleeves, liners, and wear-resistant sleeves for MWD & LWD pulse generators.
- Nozzles, TC radial bearings, and wear-resistant sleeves for downhole tools.



## Wear parts for MWD and LWD instruments (I)



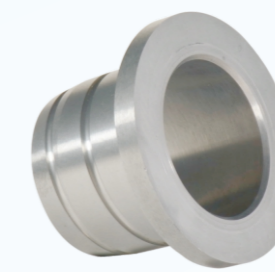
Spacer sleeve



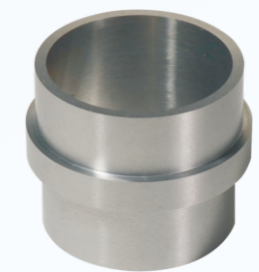
Bearing sleeve



Upper bearing sleeve



Lower bearing sleeve



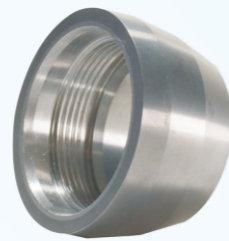
Upper wear sleeve

Non-standard Precision Carbide Parts

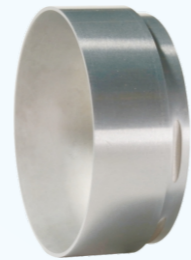
Non-standard Precision Carbide Parts



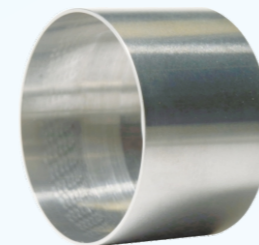
Flow separator



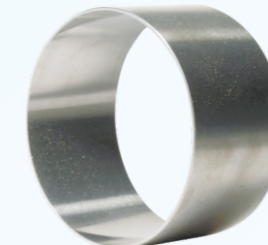
Nose cap



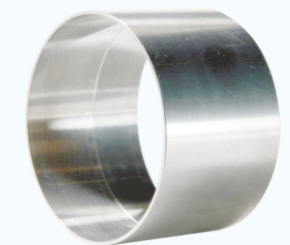
Bush raising valve



Wear sleeve I

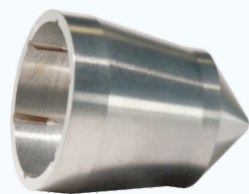


Wear sleeve II



Wear sleeve III

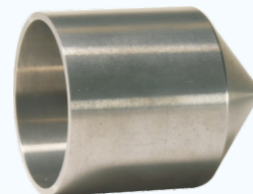
Lift valve (mushroom head)



Type 350



Type 650



Type 1200



Flow limitation ring 350

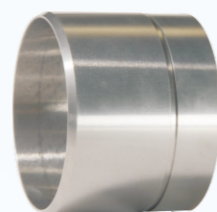


Flow limitation ring 650

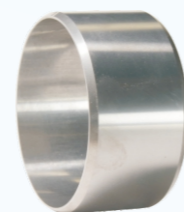
Wear parts for MWD and LWD instruments (II)



Wear sleeve No.3



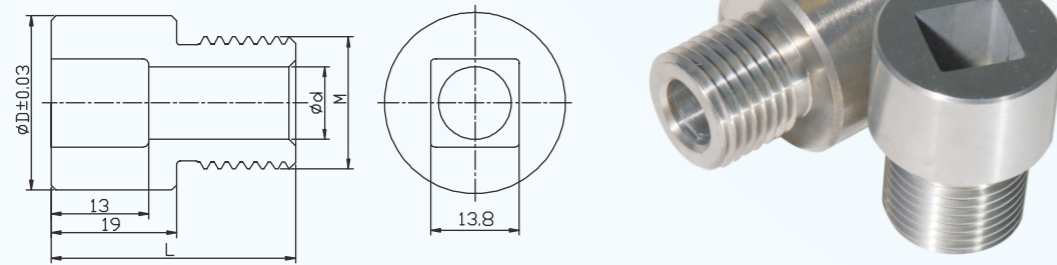
Wear sleeve No.1



Wear sleeve No.2~4

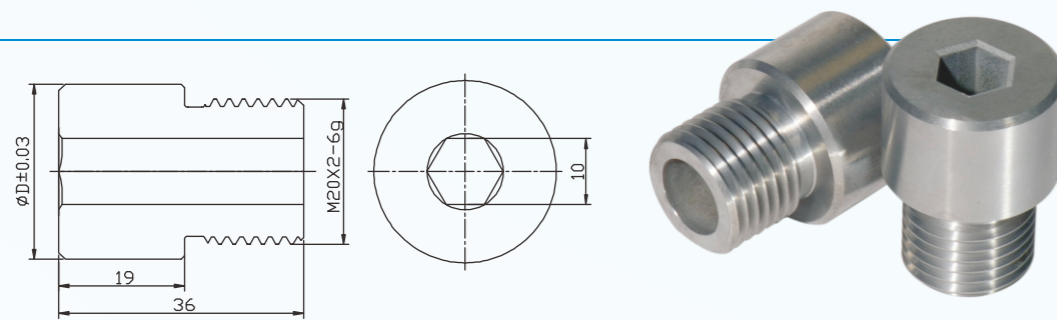






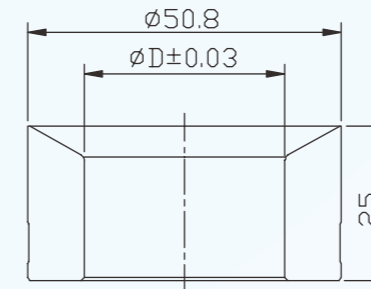
Main valve cores (hexagonal)

Type	No.	Main dimensions(mm)			
		$\Phi D$	$\Phi d$	L	M
FX-12395-M	1.04	26.4	13.2	36.8	7/8-14UNF-2A
FX-12396-M	1.086	27.6	13.2	36.8	
FX-12397-M	1.122	28.5	13.2	36.8	
FX-13321-M	1.2	30.5	13.2	36.8	
FX-13307-M	26.4	26.4	11	36	M20x2-6g
FX-13308-M	27.6	27.6	11	36	
FX-13309-M	28.5	28.5	11	36	
FX-13310-M	30.5	30.5	11	36	



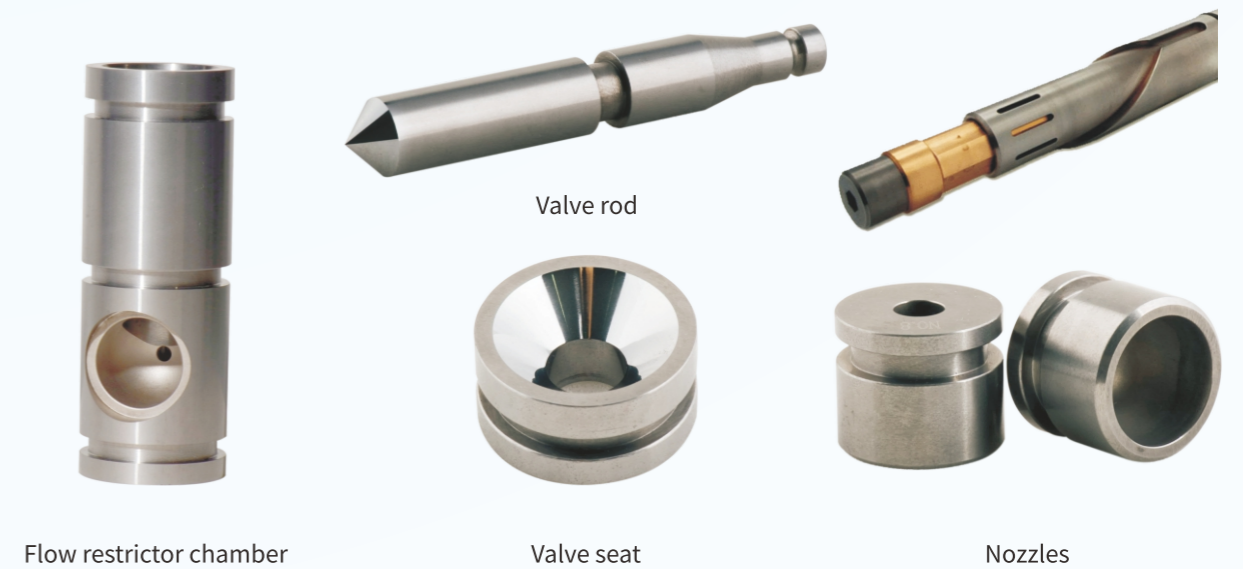
Main valve cores (hexagonal)

Type	No.	$\Phi D$
FX-13366-M	1.04	26.4
FX-13367-M	1.086	27.6
FX-13368-M	1.122	28.5
FX-13369-M	1.2	30.5



Flow restrictor rings

Type	No.	$\Phi D$
FX-12452-M	1.28	32.51
FX-12453-M	1.35	34.29
FX-12454-M	1.4	35.56
FX-12455-M	1.5	38.10
FX-12456-M	1.55	39.37
FX-12346-M	1.7	43.18
FX-12347-M	1.6	40.64
FX-13332-M	1.25	31.75
FX-13345-M	1.58	40.13
FX-13346-M	1.2	30.5



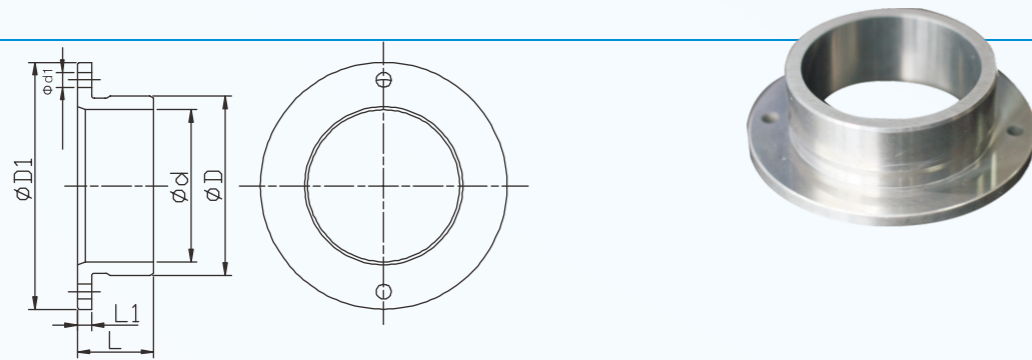
Flow restrictor chamber

Valve rod

Valve seat

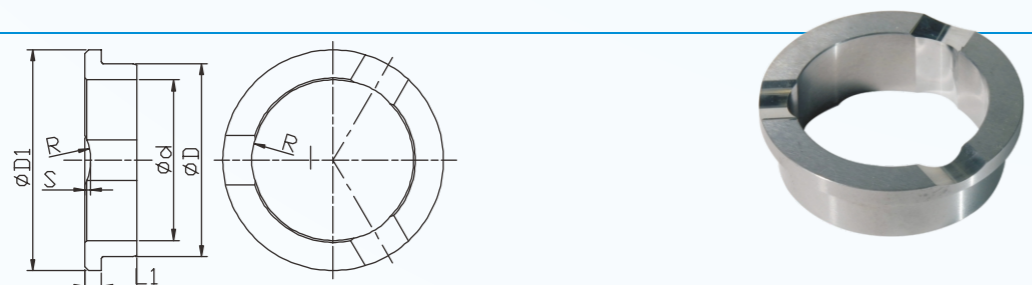
Nozzles

### Wear parts for MWD and LWD instrument(III)



TC axle sleeve 1

Type	Main dimensions(mm)					
	$\phi D$	$\phi D1$	$\phi d$	$\phi d1$	L	L1
FX-05508-M	44	60	37	4	19	4

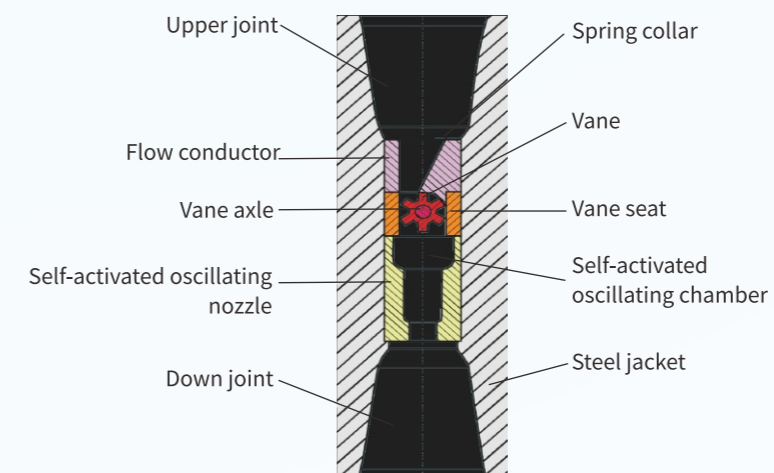
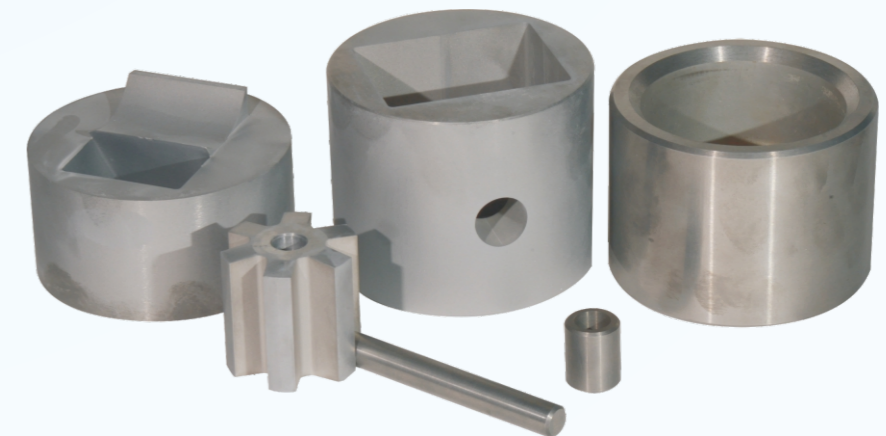


TC axle sleeve 2

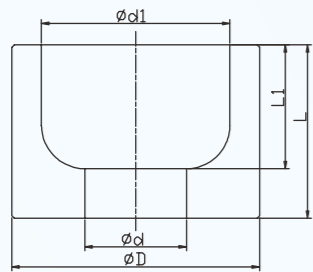
Type	Main dimensions(mm)					
	$\phi D$	$\phi D1$	$\phi d$	L	L1	R
FX-05509-M	52	60	44	14	5	16



### Wear parts for self-excited oscillating rotary impact drilling tools

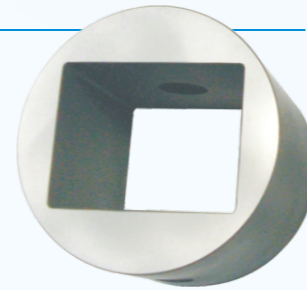
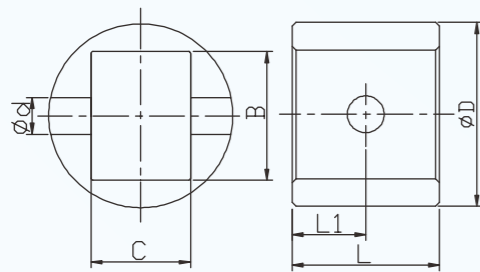






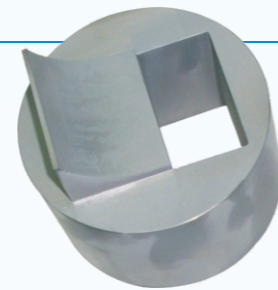
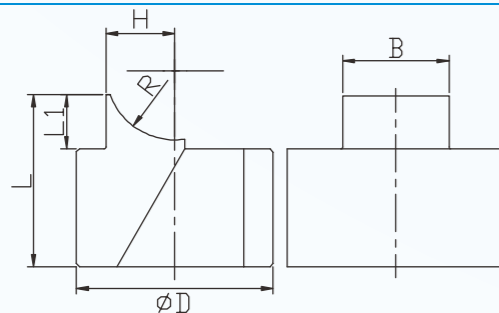
Nozzle(water hole)

Type	Main dimensions(mm)				
	ΦD	Φd	Φd1	L	L1
FX-10038-M	100	41	76	70	50



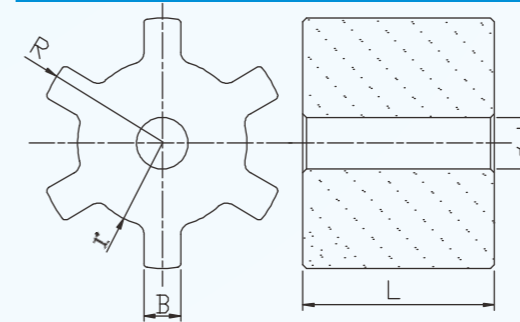
Vane box

Type	Main dimensions(mm)				
	ΦD	Φd	B	C	L
FX-10039-M	100	20	70	54	80



Flow conductor

Type	Main dimensions(mm)			
	ΦD	L	B	R
FX-10040-M	100	88	54	35



Vane

Type	Main dimensions(mm)				
	Φd	R	r	L	B
FX-10042-M	14	34	23	52	10

### Technical Parameters

unit: mm

Accuracy of dimensions	Cylindricity	Flatness	Parallelism	Perpendicularity	Coaxiality	Position deviation	Total runout	Surface roughness Ra(μm)
≤0.025	≤0.01	≤0.005	≤0.01	≤0.025	≤0.025	≤0.05	≤0.025	1.6~0.1

### Capability and Capacity

The products have good wear and corrosion resistance, complicated shapes and high accuracy. We can also design, produce and provide various kinds of non-standard products according to drawings and requirements of the customers.