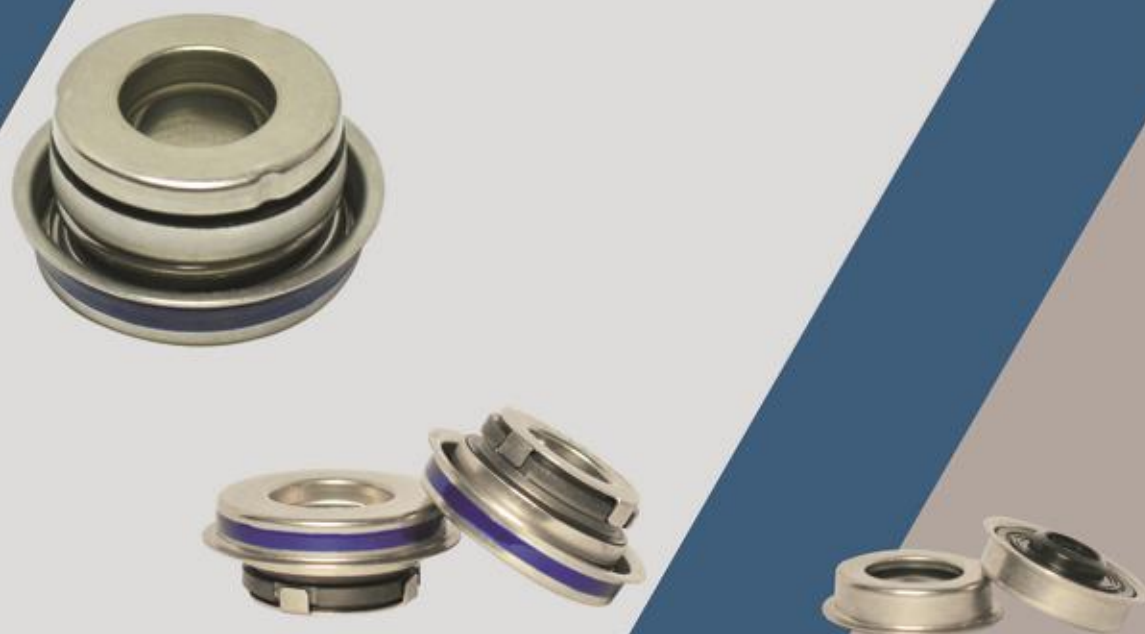


**WEICHAI**  
潍柴



# 湘火炬水封 TORCH SEALS

做中国水泵水封的领跑者  
TO BE THE LEADING MANUFACTURER IN DOMESTIC INDUSTRY



# 应用领域 Application Fields



乘用车水泵  
Passenger Car Water Pump



商用车水泵  
Commercial Vehicle Water Pump



船用柴油机水泵  
Marine Diesel Engine Water Pump



## 企业简介 Company Profile

株洲湘火炬火花塞有限责任公司，是潍柴动力下属全资子公司，成立于1961年，系国内最大火花塞及点火系统制造厂家。株洲湘火炬火花塞有限责任公司汽车密封分公司（以下简称“汽车密封分公司”）为其下设分公司。

汽车密封分公司主营汽车水泵水封产品，兼营特种陶瓷产品（氧化铝制品，碳化硅制品，空调压缩机接线端子）。其中汽车水泵水封规模为全国第一，现具备年产2000万套的生产能力；国内主机配套率最高，具有行业一流水准。

公司通过了ISO9001和IATF16949质量体系认证，具有强有力的质量保证能力。

Founded in 1961, Torch Spark Plug Co., Ltd. is the biggest Spark Plug & Ignition system manufacturer throughout China, which is a wholly-owned subsidiary of WEICHAI POWER GROUP. Torch Spark Plug Co., Ltd. Automobile Seals Branch (hereinafter referred to "Automobile Seals Branch") is a branch company of Torch Spark Plug Co., Ltd.

Automobile Seals Branch mainly produces car water pump mechanical seals and special ceramics (Alumina products, Silicon Carbide products, air conditioning compressor terminals). Automobile Seals Branch is the largest car water pump mechanical seals manufacturer with the annual production capacity of 20 million sets throughout China. Occupying the highest O.E. matching rate in China, it has a leading level in industry.

Having passed ISO9001 and IATF16949, Automobile Seals Branch is consistently improving based on its powerful quality assurance capacity.



# 质量认证体系 Quality Certification Systems



IATF 16949



ISO 14001



ISO 9001



## 营销 Marketing

公司始终遵循“客户满意是我们的宗旨”的营销思路，以诚信务实的态度为国内外客户提供最优质的产品和服务。

国内主机配套占有率超过40%，主要配套厂家：一汽、二汽、潍柴、玉柴、云内、北汽、全柴、上柴、吉利、奇瑞、长安、扬柴、大柴、中联、宇通等，并出口欧洲，北美，南美，日韩，东南亚地区。

Consistently complies the marketing thinking which is described as Client' s Satisfaction Is Our Ultimate Goal, Torch offers domestic & foreign clients with the greatest products and services.

Occupying domestic O.E. matching rate over 40%, we have matched with FAW, DONGFENG, WEICHAI, YUCHAI, YUNNEI, BAIC, QUANCHAI, SHANGCHAI, GEELY, CHERY, CHANGAN, YANGCHAI, DACHAI, ZOOMLION, YUTONG and other major O.E. clients. In addition, we have been exporting to Europe, North America, South America, South Korea, Japan, Southeast Asia and other areas.





# 生产&检测设备 Manufacturing & Inspection Equipment



隧道窑  
Tunnel Kiln



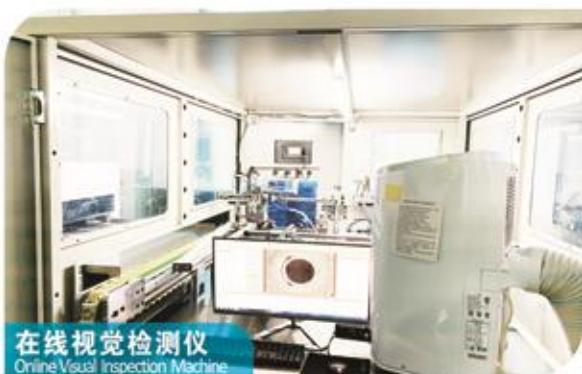
高温真空炉  
High Temperature Vacuum Furnace



过盈装配线  
Interference FR Structure Assembly Line



粘胶装配线  
Adhesive Structure Assembly Line



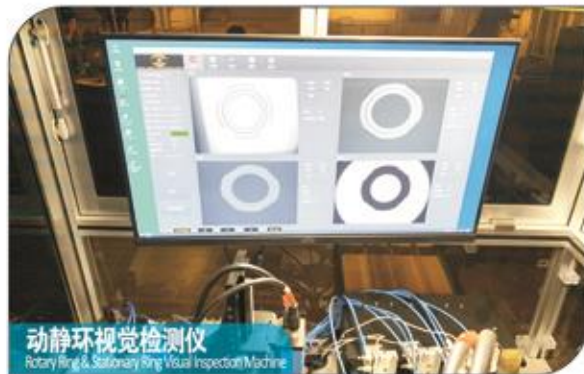
在线视觉检测仪  
Online Visual Inspection Machine



旋转环组装机  
Rotary Ring Assembly Machine



数显气密检测仪  
Digital Air Tightness Detector



动静环视觉检测仪  
Rotary Ring & Stationary Ring Visual Inspection Machine

# 试验设备 Test Facilities



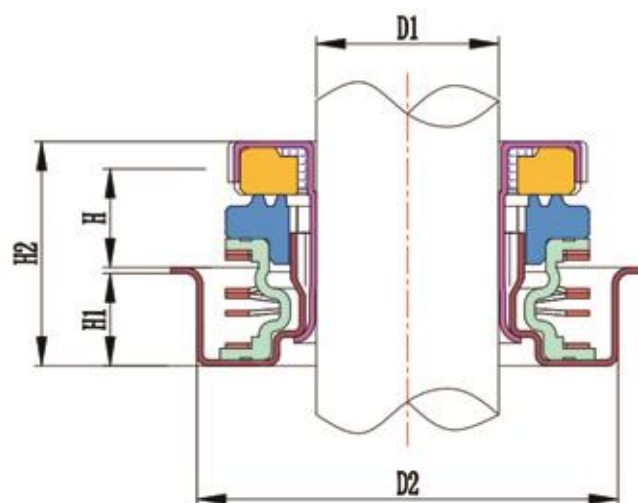


# 汽车水泵水封

## Car Water Pump Mechanical Seals

### 波形弹簧粘胶结构

#### Wave Spring Adhesive Structure



| 产品型号<br>Part Number | 轴径 (D1)<br>Shaft Diameter | 底座外径 (D2)<br>Seat O.D. | 压装高度 (H)<br>Working Height | 底座高度 (H1)<br>Seat Height | 自由高度 (H2)<br>Free Height |
|---------------------|---------------------------|------------------------|----------------------------|--------------------------|--------------------------|
| C12A21              | 12                        | 30                     | 7.6                        | 7.6                      | 17.5                     |
| C12D20              | 12                        | 30                     | 9.1                        | 6.3                      | 17                       |
| C12N20              | 12                        | 30                     | 7.6                        | 7.6                      | 17                       |
| C12U20              | 12                        | 30                     | 7.49                       | 7.05                     | 16                       |
| C12V20              | 12.7                      | 30                     | 8.8                        | 7.05                     | 17.5                     |
| C16E20              | 15.918                    | 36.5                   | 9.1                        | 8                        | 19.5                     |
| C16E21              | 15.918                    | 36.5                   | 9.1                        | 8                        | 19.5                     |
| C16F20              | 15.918                    | 36.45                  | 9.1                        | 8                        | 19.5                     |
| C16G20              | 15.918                    | 38.1                   | 9                          | 8                        | 19.5                     |
| C16G21              | 15.918                    | 38.1                   | 9                          | 8                        | 19.5                     |
| C16I20              | 15.918                    | 34.2                   | 10.1                       | 7                        | 19.5                     |
| C16I21              | 15.918                    | 34.2                   | 10.1                       | 7                        | 19.5                     |
| C16L20              | 15.918                    | 39.5                   | 9.1                        | 8.64                     | 19.5                     |
| C16R20              | 15.918                    | 36.6                   | 9.1                        | 8.5                      | 19.5                     |
| C16S21              | 15.918                    | 36.5                   | 8.1                        | 8                        | 19.5                     |
| C17D21              | 17                        | 35                     | 10.1                       | 8                        | 20.5                     |
| C17S21              | 17                        | 36.5                   | 10.1                       | 8                        | 20.5                     |

#### 技术特点

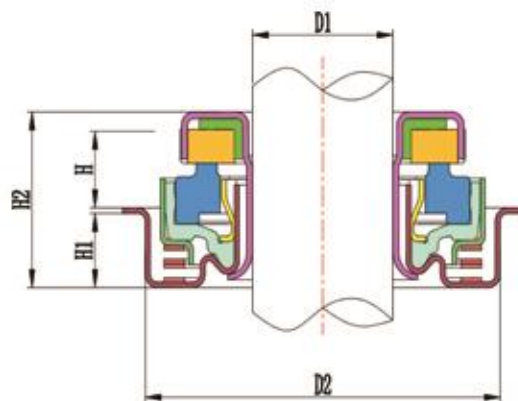
1. 采用波形弹簧，密封面受力更均匀合理，水封的追随性大幅度提高。
2. 工作高度较低，能有效改善水封的工作环境。
3. 粘胶结构。

#### Technical Features

1. By adopting wave spring, the forces on seal faces are more uniform and reasonable, which improved the follow performance of seals significantly.
2. Lower working height designed to improve the working environment of seals.
3. Adhesive structure.



## 波形弹簧过盈配合结构 Wave Spring Interference Fit Structure



| 产品型号<br>Part Number | 轴径 (D1)<br>Shaft Diameter | 底座外径 (D2)<br>Seat O.D. | 压装高度 (H)<br>Working Height | 底座高度 (H1)<br>Seat Height | 自由高度 (H2)<br>Free Height |
|---------------------|---------------------------|------------------------|----------------------------|--------------------------|--------------------------|
| C12B10              | 12                        | 30                     | 7.1                        | 5.5                      | 13.8                     |
| C12B12              | 12                        | 30                     | 7.1                        | 5.5                      | 13.8                     |
| C12B15              | 12                        | 30                     | 7.1                        | 5.5                      | 13.8                     |
| C12C10              | 11.92                     | 30                     | 7.1                        | 5.5                      | 13.8                     |
| E12A12              | 11.92                     | 30                     | 7.1                        | 5.5                      | 13.8                     |
| C16A10              | 15.918                    | 36.5                   | 8.1                        | 7                        | 16.9                     |
| C16A12              | 15.918                    | 36.63                  | 8.1                        | 7                        | 16.9                     |
| C16B10              | 15.918                    | 34.2                   | 8.1                        | 7                        | 16.9                     |
| C16B12              | 15.918                    | 34.2                   | 8.1                        | 7                        | 16.9                     |
| C16E12              | 15.918                    | 36.63                  | 7.1                        | 7                        | 15.9                     |
| C16G10              | 15.918                    | 38.1                   | 8.1                        | 7                        | 16.9                     |
| C16G12              | 15.918                    | 38.1                   | 8.1                        | 7                        | 16.9                     |
| C17A10              | 17                        | 35                     | 8.1                        | 7                        | 16.9                     |
| C17A12              | 17                        | 35                     | 8.1                        | 7                        | 16.9                     |

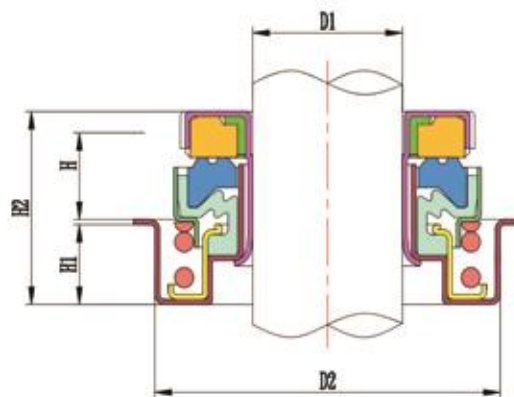
### 技术特点

1. 采用波形弹簧, 密封面受力更均匀合理, 水封的追随性大幅度提高。
2. 工作高度较低, 能有效改善水封工作环境。
3. 全过盈配合结构, 全自动化生产。
4. 模块化设计, 工作高度, 静侧安装长度统一便于顾客管理。

### Technical Features

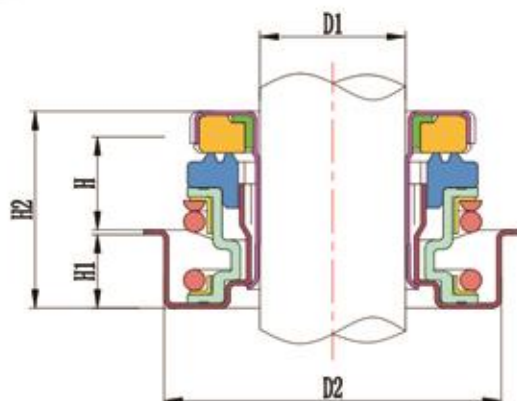
1. By adopting wave spring, the forces on seal faces are more uniform and reasonable, which improved the follow performance of seals significantly.
2. Lower working height designed to improve the working environment of seals.
3. Full interference fit structure, manufactured by full-automatic lines.
4. Modular design, unified in working height.

## 螺旋弹簧过盈配合结构 Coil Spring Interference Fit Structure



| 产品型号<br>Part Number | 轴径 (D1)<br>Shaft Diameter | 底座外径 (D2)<br>Seat O.D. | 压装高度 (H)<br>Working Height | 底座高度 (H1)<br>Seat Height | 自由高度 (H2)<br>Free Height |
|---------------------|---------------------------|------------------------|----------------------------|--------------------------|--------------------------|
| C16A (康明斯Cummins)   | 15.918                    | 36.46                  | 10.9                       | 9.5                      | 20.8                     |
| C16A31              | 15.918                    | 36.5                   | 10.8                       | 8                        | 21                       |
| C20A                | 20                        | 52                     | 16.5                       | 10                       | 29.5                     |
| C20B                | 20                        | 42                     | 16.5                       | 10                       | 29.5                     |
| C25A                | 25.15 / 25.40             | 50.89                  | 10.7                       | 12.6                     | 25                       |
| C25B                | 25                        | 41                     | 22.66                      | 8.8                      | 33                       |

## 螺旋弹簧粘胶结构 Coil Spring Adhesive Structure



| 产品型号<br>Part Number | 轴径 (D1)<br>Shaft Diameter | 底座外径 (D2)<br>Seat O.D. | 压装高度 (H)<br>Working Height | 底座高度 (H1)<br>Seat Height | 自由高度 (H2)<br>Free Height |
|---------------------|---------------------------|------------------------|----------------------------|--------------------------|--------------------------|
| C12A                | 12                        | 30                     | 9.3                        | 8                        | 19.5                     |
| C12D                | 12                        | 30                     | 9.1                        | 6.3                      | 17.5                     |
| C12E                | 12                        | 38.1                   | 8.8                        | 8                        | 19.5                     |
| C12F                | 12.7                      | 28.5                   | 9.2                        | 6.3                      | 17                       |
| C12H                | 12.04                     | 30                     | 9.3                        | 7.6                      | 19.5                     |
| C12M                | 12                        | 28.5                   | 8                          | 8                        | 17.5                     |
| C12N                | 12                        | 30                     | 7.94                       | 7.6                      | 17.5                     |
| C12N01              | 12                        | 30                     | 7.1                        | 8                        | 17                       |
| C12P                | 12                        | 39.59                  | 6.37                       | 9.86                     | 17.5                     |
| C12R                | 11.8                      | 38.1                   | 8.8                        | 8                        | 19.5                     |
| C12S                | 12                        | 30                     | 9.3                        | 8                        | 19.5                     |
| C12X                | 12                        | 30                     | 8.34                       | 7.6                      | 17.5                     |
| C13A                | 13                        | 30                     | 9.3                        | 8                        | 19.5                     |
| C13E                | 13                        | 36.6                   | 9.3                        | 8                        | 19.5                     |
| C13M                | 13                        | 28.7                   | 9.3                        | 8                        | 19.5                     |
| C15A                | 15                        | 30                     | 10.6                       | 8                        | 21                       |
| C15B                | 15                        | 36.5                   | 11.84                      | 8                        | 22                       |
| C15C                | 15                        | 36                     | 10.9                       | 9.45                     | 22                       |
| C16B                | 15.918                    | 34.2                   | 11.84                      | 5.64                     | 19.5                     |
| C16D                | 15.918                    | 34.2                   | 11.84                      | 8                        | 22                       |
| C16E                | 15.918                    | 36.5                   | 10.84                      | 8                        | 21                       |
| C16F                | 15.918                    | 36.45                  | 10.8                       | 8                        | 21                       |
| C16G                | 15.918                    | 38.1                   | 10.8                       | 8                        | 21                       |
| C16T                | 15.918                    | 36.5                   | 11.84                      | 8                        | 22                       |
| C16H                | 15.918                    | 34.24                  | 11.1                       | 6.3                      | 19.5                     |
| C16I                | 15.918                    | 34.2                   | 11.84                      | 7                        | 21                       |
| C16K                | 15.918                    | 39                     | 10.8                       | 8                        | 21.5                     |
| C16L                | 15.918                    | 39.5                   | 10.8                       | 8.64                     | 22                       |
| C16M                | 16                        | 36.5                   | 10.84                      | 8                        | 21                       |
| C16N                | 15.918                    | 40.08                  | 10.84                      | 8                        | 21                       |
| C16E01              | 15.918                    | 36.5                   | 10.8                       | 8                        | 21.5                     |
| C16Q                | 15.918                    | 34.2                   | 11.84                      | 5.64                     | 19.5                     |
| C16R                | 15.918                    | 36.5                   | 10.8                       | 8.5                      | 21                       |
| C16S                | 15.918                    | 38.6                   | 10.8                       | 8                        | 21                       |
| C16P                | 15.918                    | 55                     | 11.43                      | 8.5                      | 22                       |
| C16X                | 15.918                    | 23.7                   | 18                         | 7                        | -                        |
| C16Z                | 15.918                    | 47.6                   | 10.8                       | 8                        | 21                       |
| C17A                | 17                        | 35                     | 13                         | 8                        | 23                       |
| C17B                | 17                        | 35                     | 13                         | 9.5                      | 25                       |
| C17D                | 17                        | 35                     | 13.5                       | 8                        | 24                       |
| C19B                | 19                        | 40.08                  | 10.46                      | 9.53                     | 22.5                     |
| C19D01              | 19                        | 40.1                   | 12                         | 9.8                      | 24                       |
| C20D                | 20                        | 52                     | 13                         | 10.6                     | 26                       |

## 材质配置选择 The selection of material configuration

| 零部件名称 ComponentName                                  | 材料选择 MaterialOptions   |
|--|--|
| 传动座 Retainer<br>波纹管座 Bellows Seat<br>弹簧座 SpringSeats | SUS304, SUS316, SUS430, 1Cr18Ni9, 0Cr18Ni9   |
| 静止环 StationaryRing                                   | 热压树脂石墨 Hot Pressed Resin Carbon<br>烧结浸渍石墨 Sintered Impregnated Carbon<br>硬碳石墨 Hard Carbon<br>碳化硅复合材料 Silicon Carbide Composite |
| 旋转环 RotaryRing                                       | 氧化铝陶瓷 Alumina Ceramics<br>碳化硅 Silicon Carbide<br>碳化硅复合材料 Silicon Carbide Composite   |
| 弹簧 Spring  | SUS304, SUS316, 1Cr18Ni9, 0Cr18Ni9<br>C组碳素钢丝 Carbon Steel Wire (Group C)   |
| 辅助密封圈 CupRing<br>波纹管 Bellows                         | 丁腈橡胶 NBR<br>氢化丁腈橡胶 HNBR  |

| 橡胶材料<br>RubberMaterial | 温度<br>Temperature |
|------------------------|-------------------|
| 丁腈橡胶 NBR               | -35°C ~ 110°C     |
| 氢化丁腈橡胶 HNBR            | -50°C ~ 150°C     |

| 防冻液类型<br>CoolantType  | 转速<br>RotatingSpeed | 静止环材料<br>StationaryRing Material                             | 旋转环材料<br>RotaryRing Material                        |
|---|---------------------|--|---|
| 有机酸系<br>Organic Acid Series<br>磷酸系<br>Phosphoric Acid Series<br>半有机酸系<br>Half-Organic Acid Series | Max 6000rpm (φ12)   | 热压树脂石墨<br>Hot Pressed Resin Carbon                           | 氧化铝陶瓷<br>Alumina Ceramics                           |
|   | Max 8000rpm (φ12)   | 烧结浸渍石墨<br>Sintered Impregnated Carbon<br>硬碳石墨<br>Hard Carbon | 氧化铝陶瓷<br>Alumina Ceramics<br>碳化硅<br>Silicon Carbide |
|   | Max 12000rpm (φ12)  | 烧结浸渍石墨<br>Sintered Impregnated Carbon<br>硬碳石墨<br>Hard Carbon | 碳化硅<br>Silicon Carbide                              |
| 硅酸系<br>Silicic Acid Series  | Max 8000rpm (φ12)   | 碳化硅复合材料<br>Silicon Carbide Composite                         | 碳化硅复合材料<br>Silicon Carbide Composite                |



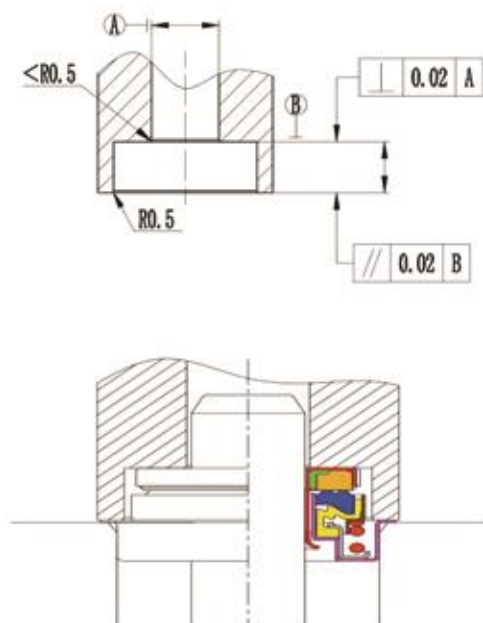
## 水封的装配 The Installation of Seals

### ■ 准备工作

1. 确认泵壳装配内孔和轴承的端角有倒角处理；
2. 确认装配水封的部位没有异物附着，飞边残留；
3. 以装配水封的泵体中心为基准，同轴度必须控制在0.05mm以下。

### ■ 装配工作

1. 以轴承的轴为基准，轴向跳动必须控制在0.1mm以下；
2. 水封的工作高度必须控制在基准工作高度 $\pm 0.13\text{mm}$ 的范围内。

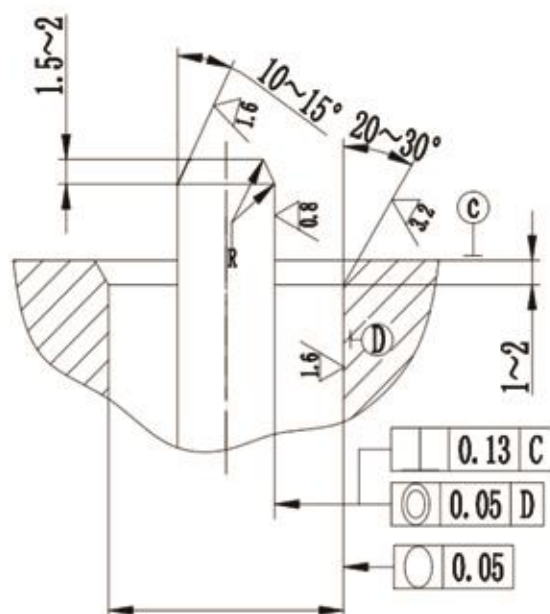


### ■ Preparations

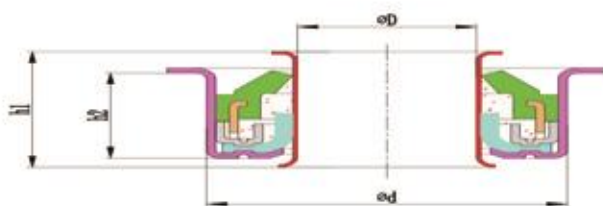
1. Confirm that the installation inner hole of pump and the terminal angle of bearing are chamfered.
2. Confirm that there is no foreign matter or residual flash adhering to the part where seal is assembled.
3. Based on the center of the pump body, the concentricity must be controlled below 0.05mm.

### ■ Installation

1. Based on the shaft of bearing, the axial run-out must be controlled below 0.1mm.
2. The working height of seals must be controlled within  $\pm 0.13\text{mm}$  of corresponding fiducial working height.



## 唇封 Lip Seal



|                |   |
|----------------|---|
| 简况 Profile     |   |
| 材质 Material    | 聚四氟乙烯 PTFE  |
| 应用 Application | 汽车水泵,一般密封应用 Coolant Pump, General Sealing Application |

| 性能<br>Properties                 | 单位<br>Unit | 数值<br>Value       |
|----------------------------------|------------|-------------------|
| 安装外径 Installation Outer Diameter | mm         | 30                |
| 安装轴径 Installation Shaft Diameter | mm         | 12                |
| 最大转速 Maximum Rotating Speed      | rpm        | 10000             |
| 最大压力 Maximum Pressure            | Bar        | 3                 |
| 最小压力 Minimum Pressure            | Bar        | 0.01              |
| 最高温度 Maximum Temperature         | °C         | 130               |
| 重量 Weight                        | g          | 13.3              |
| 轴套 Shaft Sleeve                  | -          | 预装配 Pre-assembled |
| 摩擦力 Friction                     | N.cm       | 3.2               |
| 泵孔配合长度 Applied Pump Hole Length  | mm         | 7.8               |

## 叶轮挡圈 EWP Washer



### 简况 Profile

|                |  |
|----------------|--|
| 材质 Material    | 碳化硅 / 氧化铝 Silicon Carbide / Alumina Ceramics |
| 应用 Application | 汽车电子水泵 Car Electric Water Pump               |

| 性能<br>Properties                   | 单位<br>Unit                 | 碳化硅数值<br>Value of Silicon Carbide | 氧化铝陶瓷数值<br>Value of Alumina Ceramics |
|------------------------------------|----------------------------|-----------------------------------|--------------------------------------|
| 最大转速 Maximum Rotating Speed        | rpm                        | 15000                             | 10000                                |
| 抗折强度 Flexural Strength             | Mpa                        | ≥200                              | ≥200                                 |
| 线膨胀系数 Linear Expansion Coefficient | $10^{-6}/^{\circ}\text{C}$ | 4.2                               | 6.5~7.5                              |
| 导热率 Thermal Conductivity           | W/m.K                      | 110                               | 20                                   |
| 密度 Density                         | $\text{g}/\text{cm}^3$     | ≥3.10                             | ≥3.70                                |
| 硬度 Hardness                        | HRA                        | ≥90                               | ≥85                                  |
| 使用寿命 Service Life                  | h                          | ≥20000                            | ≥15000                               |



## 石墨轴承 EWP Bushing



### 简况 Profile

|                |                                |
|----------------|--------------------------------|
| 材质 Material    | 碳石墨 / 硬碳 Carbon / Hard Carbon  |
| 应用 Application | 汽车电子水泵 Car Electric Water Pump |

| 性能<br>Properties                   | 单位<br>Unit                 | 碳石墨数值<br>Value of Carbon | 硬碳数值<br>Value of Hard Carbon |
|------------------------------------|----------------------------|--------------------------|------------------------------|
| 最大转速 Maximum Rotating Speed        | rpm                        | 10000                    | 10000                        |
| 抗折强度 Flexural Strength             | Mpa                        | 60                       | 70                           |
| 线膨胀系数 Linear Expansion Coefficient | $10^{-6}/^{\circ}\text{C}$ | 12                       | 5                            |
| 导热率 Thermal Conductivity           | W/m.K                      | 10                       | 15                           |
| 硬度 Hardness                        | HSD                        | 65                       | 80                           |
| 使用寿命 Service Life                  | h                          | $\geq 10000$             | $\geq 15000$                 |

# TORCH SEALS

TO BE THE LEADING MANUFACTURER IN DOMESTIC INDUSTRY

## Torch Middle East and Africa FZE

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