



**KSK**

昆山健博密封件科技有限公司  
Kunshan Kenbo Seal Technology Co., Ltd.



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Kunshan Kenbo Seal Technology Co., Ltd.

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## COMPANY PROFILE

### 公司简介

昆山健博密封件科技有限公司是成立于 1985 年的香港健大企业旗下子公司，昆山健博是专业从事橡胶密封件产品的研究、开发、生产的专业厂商，公司占地面积 35000 平米，总投资额 1500 万美元，公司具有较强的机械加工和模压生产能力，其产品广泛用于汽车、减速机、工程机械、农林机械、洗衣机、空调等行业。

“精益求精、顾客满意”是健博的质量方针，也是员工对自身素质完美的追求。广大员工确立了“健博的机遇，来自用户的满意”这一价值观念，以不断发现和满足国内外用户的需求来拓展市场，发展企业。本着“让我们的合作更紧密”的企业精神，健博通过强化内部各部门员工的合作，外部同用户以及供应商的合作，寻求共同发展，创建世界一流的密封件制造厂商。



## COMPANY PROFILE

Kunshan Kenbo Seal Technology Co., Ltd. is a subsidiary company of Hong Kong Jianda enterprise founded in 1985. Kenbo Jianbo is a professional manufacturer engaged in the research, development and production of rubber seal products. The company covers an area of 35,000 square meters, with a total investment of US \$15 million, the company has strong machining and molding capacity. Its products are widely used in automobile, reducer, construction machinery, agricultural and forestry machinery, washing machines, air conditioning and other industries.

"excelsior, customer satisfaction" is the quality policy of Jianbo, but also the pursuit of their own quality. The staff has established the value of "the opportunity of Jianbo, the satisfaction of users", in order to find and meet the needs of users at home and abroad to expand the market and develop enterprises. In the spirit of "let's cooperate more closely", we seek common development and create a world-class seal manufacturer by strengthening the cooperation of internal staff, external customers and suppliers.



健博密封件

昆山健博密封件科技有限公司  
KUNSHAN KENBO SEAL TECHNOLOGY CO.,LTD.

诚信经营/品质保证/经验丰富

HONEST MANAGEMENT  
QUALITY ASSURANCE  
RICH EXPERIENCE

以人为本/持续改善/环保理念，  
是我们的宗旨。

People oriented/Continuous improve-  
ment/Environmental protection concept,  
It's our mission statement.

## PRODUCTION EQUIPMENT 生产设备

创新的研发需要有好的设备来生产，我们具有专业的模具设计、生产能力，不断对设备进行技术维护及改良，应客户需求购置大型油封生产设备，引进自动仓储设备等。

技术不断创新、产能不断扩充，设备的更新及引进是我们每个阶段的重要目标。用先进及优质的设备来满足客户所有的需求。生产自动化将有效的降低生产成本。

健博采用领先技术，专注于每个细节，包括产品质量信息收集、规整和处理，一流的人才资源，先进的生产设备，奠定了我们坚实而牢固的质量基础；一丝不苟的敬业精神，熟练而专业的生产技能，成为我们缔造完美的保证。



aproduce, we have the professional mold She Ji, production capacity, Constantly on the equipment technical maintenance and improvement, for customer needs acquisition of large-scale production equipment, oil seals, introduction of automated storage devices, etc..

Technological innovation, expanding production capacity, equipment updates and the introduction of our important goals for each stage. With advanced and high-quality equipment to meet all customer needs. Automation will effectively reduce production costs.

KENBO with leading technology, focus on every detail, including product quality information gathering, and processing of regular first-class human resources, advanced production equipment, has laid a solid and strong quality of our foundation; meticulous professionalism, skilled and professional production skills, as we create the perfect guarantee.



## R&D TEAM 研发团队

我们拥有强大的研发团队，除了自行设计开发及材质研究，我们更采用主动追踪的经营态度，以客户所需产品为开发对象，了解产品特性及品质机能，使产品开发的成功率大为提升，从而提升客户满意度。

我们拥有多项产品专利，精良的研发团队，研发成果卓越，技术领先，产品线齐全。

材料研发拥有设备齐全的材料配方研究实验室 - 从配方研究开发、橡胶混炼、性能测试至品质检验一贯作业系统。未硫化胶料加工特性量测、材质硬度、机械强度量测、材料老化、耐油、耐燃料油、耐高低温、压缩变形回复性、弹性实验等。

We have strong R & D team, in addition to design development and materials research, we take a proactive approach to track the business, customer product requirements for the development of the object, to understand product characteristics and quality function, the product development success rate from thus enhancing customer satisfaction.

We have a number of product patents, sophisticated R & D team of R & D achievements of excellence, technology leadership, product line complete.

Materials research materials have well-equipped research laboratories recipe - from the formulation research and development, rubber mixing, consistent performance test to test the quality of the operating system. Unvulcanized rubber processing characteristics measurement, material hardness, mechanical strength measurements, material aging, oil resistance, fuel oil, low temperature, deformation reply, flexibility experiments.



# PRODUCTION EQUIPMENT

## 检测设备



昆山健博密封件科技有限公司为了更好的提供优质服务及油封配套工作，先后投入材料验证实验中心、油封模具设计及制造中心、各种环境的成品耐久实验室，确保每颗产品由开发设计到产品制造，各个环节得到充分验证，强大的实验能力及优秀的产品制造过程管控能力，确保了每颗产品完好无缺，让广大客户使用产品安心、更放心。

In order to provide high quality service and oil seal supporting work, Kunshan Jianbo Seal Technology Co., Ltd. has invested in the material verification laboratory, oil seal mold design and manufacturing center, and finished product durability laboratory in various environments, to ensure that each product from the development and design to product manufacturing, each link has been fully verified, strong experimental ability and excellent product manufacturing process management and control ability, to ensure that each product intact, let the general customers use the product to be at ease, more at ease.





密封元件运用范围极为广泛，从民生、衣食住行至航天科技均需利用各式密封件来辅助整体机构之防油、防水、防气等功能。油封是密封元件的动态密封件，我们制造运用于高转速的赛车引擎、航天设备及各类机械产品设备的密封元件。

Seals used extremely broad, from the people's livelihood, basic necessities to all kinds of space science and technology required to use seals to aid the overall organization of the anti-oil, water, anti-air capabilities. Seals oil seal is dynamic seals, we used high-speed car manufacturing engine, aerospace equipment and all kinds of machinery equipment, sealing elements.

# ARTICLE 1: INTRODUCTION OF OIL SEAL

## 第一篇 油封介绍

### 1、油封定义

油封是一般密封件的习惯称谓，顾名思义：油封是用来封油（油是传动系统中最常见的液体物质，也泛指一般的液体物质）的机械元件。机械的摩擦部分由于在机械运转时有油进入，为防止这些油从机械的间隙中泄漏而使用油封，并且除了油以外还需要防止水与化学药液的泄漏以及尘埃及土砂从外部侵入，这时候也要用到油封。

### 1. Definition of oil seal

As the name implies, oil seal is used to seal oil (oil is the most common liquid material in the transmission system, also generally refers to the general liquid material) mechanical components. The friction part of a machine is filled with oil while the machine is in operation. An oil seal is used to prevent the oil from leaking out of the clearance of the machine, and in addition to the oil also need to prevent the leakage of water and chemicals and dust and sand from outside invasion, this time also need to use oil seal.

### 2、油封分类

油封的各种不同型式，请参见：KSK油封常用型式。

### 2. Oil Seal classification

Various types of oil seals, please see: KSK commonly used type of oil seals.



### 3、油封材料

油封的常用材料有：丁腈橡胶，氟橡胶，氢化丁腈橡胶，硅橡胶，丙烯酸酯橡胶，聚氨酯，聚四氟乙烯等。选择油封的材料时，必须考虑材料对工作介质的相容性、对工作温度范围的适应性和唇缘对旋转轴高速旋转时的跟随能力。一般油封工作时其唇缘的温度高于工作介质温度 20~50°C，在选择油封材料时应予注意。详情请参照：橡胶种类及特性。油封的工作范围与油封使用的材料有关：材料为丁腈橡胶 (NBR) 时为 -25~120°C，丙烯酸酯橡胶 (ACM) -35~150°C，氟橡胶 (FKM) -25~250°C，氢化丁腈橡胶 (HNBR) -55~150°C。

### 3. Material of oil seal

Common material of oil seal is as following: NBR, FKM, HNBR, silicon rubber, ACM, polyurethane, PTFE etc. Customers shall consider material compatibility for working medium, adaptability of working temperature scope and following ability when lip edge revolve axis at high speed. Working medium temperature is between 20 C and 50 C for general oil seal working, customers shall be very careful when they choose material of oil seal. Please refer to following for detail: Type and character of oil seal. Working scope of oil seal has close relation to used material of oil seal: Temperature is between -25 C and 120 C for NBR, Temperature is between -35 C and 150 C for ACM, Temperature is between -25 C and 250C for FKM, Temperature is between -55 C and 150 C for HNBR.

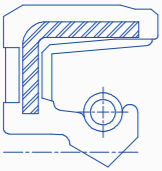
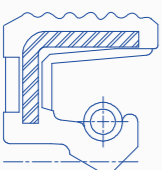
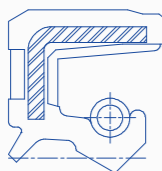
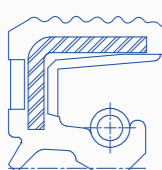
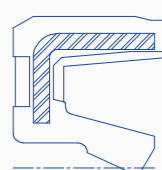
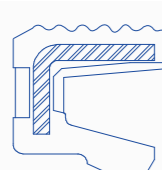
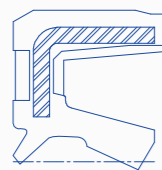
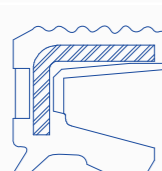
### 4、油封功能用途

动力系统油封、新能源行业油封、农林机械油封、传动机械油封、水电系统油封、家电系统油封、减震系统油封等。

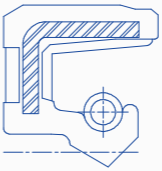
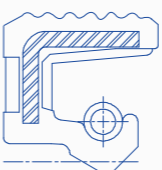

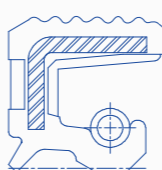
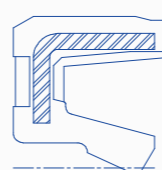
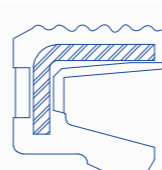
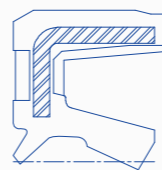
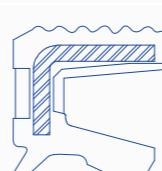
### 4. Function and application of oil seal

power system oil seal, new energy industry oil seal, agriculture and forestry machinery oil seal, transmission machinery oil seal, water and electricity system oil seal, home appliance system oil seal, shock absorption system oil seal, etc.

# KSK油封常用型式及特征用途

型式	结构简图	代码	主要特征用途	
			唇部特征用途	外围特征用途
标准单唇型		SC	单唇，一个弹簧；通常使用在密封压力低于0.03Mpa的密封环境，不适用在有任何灰尘或高污染的环境中。	外围橡胶设计，确保外径之密封性；适用于各种材质之装配孔，如软质合金或塑料，钢或铸铁等材质。
		SG		外围橡胶沟槽设计，装配容易；特别适合高热膨胀材质装配孔于高温环境时使用。
标准双唇型		TC	双唇，一个弹簧；通常使用在密封压力低于0.03Mpa的有灰尘的密封环境，增加额外的防尘唇部提供对主唇的保护。	外围橡胶设计，确保外径之密封性；适用于各种材质之装配孔，如软质合金或塑料，钢或铸铁等材质。
		TG		外围橡胶沟槽设计，装配容易；特别适合高热膨胀材质装配孔于高温环境时使用。
无弹簧单唇型		VC	单唇，没有弹簧；通常使用在无压力，无污染的密封环境，特别适用密封油脂。	外围橡胶设计，确保外径之密封性；适用于各种材质之装配孔，如软质合金或塑料，钢或铸铁等材质。
		VG		外围橡胶沟槽设计，装配容易；特别适合高热膨胀材质装配孔于高温环境时使用。
无弹簧双唇型		KC	双唇，没有弹簧；通常使用在无压力，有灰尘的密封环境，增加额外的防尘唇部提供对主唇的保护。	外围橡胶设计，确保外径之密封性；适用于各种材质之装配孔，如软质合金或塑料，钢或铸铁等材质。
		KG		外围橡胶沟槽设计，装配容易；特别适合高热膨胀材质装配孔于高温环境时使用。

# KSK COMMON TYPE AND CHARACTERISTIC USE OF OIL SEAL

Type	Structure diagram	Code	Main Characteristic Uses	
			Use of lip features	Peripheral Character Purpose
Standard single lip		SC	A single lip, belt Spring; usually used in a sealed environment with a sealing pressure of less than 0.03 Mpa, not suitable in an environment with any dust or high pollution.	Peripheral rubber design to ensure external diameter sealing; suitable for all kinds of material assembly holes, such as soft alloy or plastic, steel or cast iron and other materials.
		SG		Peripheral rubber groove design, easy assembly; especially suitable for high thermal expansion material assembly hole in high temperature environment. Peripheral rubber design to ensure the sealing of the outer diameter;
Standard Double Lips		TC	Double lips, a spring; usually used in a dusty sealing environment with a sealing pressure below 0.03 Mpa, adding additional dust-proof lips to provide protection to the main lip.	Peripheral rubber design to ensure the sealing of the outer diameter; suitable for various materials such as soft alloy or plastic, steel or cast iron and other materials.
		TG		Peripheral rubber groove design, easy assembly; especially suitable for high thermal expansion material assembly hole in high temperature environment.
Single lip without spring		VC	Single lip, no spring; usually used in pressure-free, pollution-free sealing environment, especially for sealing grease.	Peripheral rubber groove design, easy assembly; especially suitable for high thermal expansion material assembly hole in high temperature environment.
		VG		External rubber groove design, easy assembly; especially suitable for high thermal expansion material assembly L used in high temperature environment.
Double lip without spring		KC	Lips, no springs; usually used in pressure-free, dusty sealing environments, adding additional dust-proof lips to provide protection to the main lip.	Peripheral rubber design to ensure the sealing of the outer diameter; suitable for various materials such as soft alloy or plastic, steel or cast iron and other materials.
		KG		Peripheral rubber groove design, easy assembly; especially suitable for high thermal expansion material assembly hole in high temperature environment.




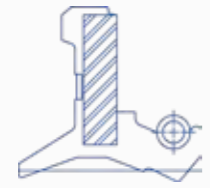


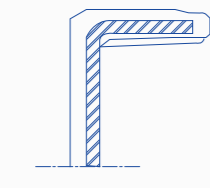
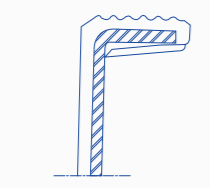
型式	结构简图	代码	主要特征用途	
			唇部特征用途	外围特征用途
外骨架单唇型		SB	单唇，一个弹簧；通常使用在密封压力低于0.03Mpa的密封环境，不适用在有任何灰尘或高污染的环境中。	外围铁壳设计，具有较佳的稳固及精确的装配特性；适用于钢或铸铁材质之装配孔。
外骨架双唇型		TB	双唇，一个弹簧；通常使用在密封压力低于0.03Mpa的有灰尘的密封环境，增加额外的防尘唇部提供对主唇的保护。	外围铁壳设计，具有较佳的稳固及精确的装配特性；适用于钢或铸铁材质之装配孔。
无弹簧外骨架单唇型		VB	单唇，没有弹簧；通常使用在无压力，无污染的密封环境，特别适用密封油脂。	外围铁壳设计，具有较佳的稳固及精确的装配特性；适用于钢或铸铁材质之装配孔。
无弹簧外骨架双唇型		KB	双唇，没有弹簧；通常使用在无压力，有灰尘的密封环境，增加额外的防尘唇部提供对主唇的保护。	外围铁壳设计，具有较佳的稳固及精确的装配特性；适用于钢或铸铁材质之装配孔。
组合式单唇型		SA	单唇，一个弹簧；通常使用在密封压力低于 0.03Mpa 的密封环境，不适用在有任何灰尘或高污染的环境中。	外围铁壳设计，内部组合一内铁壳用以加强油封之刚性；适用于较大尺寸之油封或须由背面装配者。
组合式双唇型		TA	双唇，一个弹簧；通常使用在密封压力低于0.03Mpa的有灰尘的密封环境，增加额外的防尘唇部提供对主唇的保护。	外围铁壳设计，内部组合一内铁壳用以加强油封之刚性；适用于较大尺寸之油封或须由背面装配者。
低扭力单唇型		SCV	单唇，一个弹簧；通常使用在密封压力低于0.03Mpa及低扭力的密封环境，不适用在有任何灰尘或高污染的环境中。	外围橡胶设计；确保外径之密封性；适用于各种材质之装配孔，如软质合金或塑料，钢或铸铁等材质。
		SGV		外围橡胶沟槽设计，装配容易；特别适合高热膨胀材质装配孔于高温环境时使用。




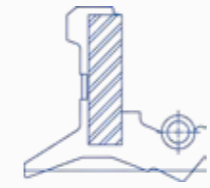


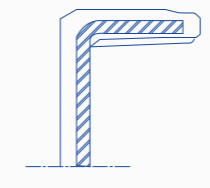
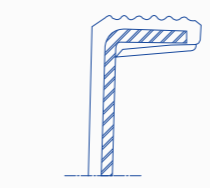
Type	Structure diagram	Code	Main Characteristic Uses	
			Use of lip features	Peripheral Character Purpose
Single lip outer skeleton		SB	A single lip, a spring; usually used in a sealed environment with a sealing pressure of less than 0.03 Mpa, not suitable in an environment with any dust or high pollution.	External iron shell design, with better stable and accurate assembly characteristics; suitable for steel or cast iron material assembly hole.
Lips with outer skeleton		TB	Double lips, a spring; usually used in a dusty sealing environment with a sealing pressure below 0.03 Mpa, adding additional dust-proof lips to provide protection to the main lip.	External iron shell design, with better stable and accurate assembly characteristics; suitable for steel or cast iron material assembly hole.
Outside frame without spring Single lip		VB	Single lip, no spring; usually used in pressure-free, pollution-free sealing environment, especially for sealing grease.	External iron shell design, with better stable and accurate assembly characteristics; suitable for steel or cast iron material assembly hole.
Outside frame without spring Double lip		KB	Lips, no springs; usually used in pressure-free, dusty sealing environments, adding additional dust-proof lips to provide protection to the main lip.	External iron shell design, with better stable and accurate assembly characteristics; suitable for steel or cast iron material assembly hole.
Combined single lip		SA	A single lip, a spring; usually used in a sealed environment with a sealing pressure of less than 0.03 Mpa, not suitable in an environment with any dust or high pollution.	External iron shell design, internal combination of an internal iron shell to strengthen the rigidity of oil seals; suitable for larger size oil seals or to be assembled by the back.
Combined lips		TA	Double lips, a spring; usually used in a dusty sealing environment with a sealing pressure below 0.03 Mpa, adding additional dust-proof lips to provide protection to the main lip.	External iron shell design, internal combination of an internal iron shell to strengthen the rigidity of oil seals; suitable for larger size oil seals or to be assembled by the back.
Low torque single lip		SCV	A single lip, a spring; usually used in a sealed environment with a sealing pressure of less than 0.03 Mpa and low torsion, not suitable for any dust or high pollution.	Peripheral rubber design; ensure the sealing of outer diameter; suitable for various materials such as soft alloy or plastic, steel or cast iron and other materials.
		SGV		Peripheral rubber groove design, easy assembly; especially suitable for high thermal expansion material assembly hole in high temperature environment.



型式	结构简图	代码	主要特征用途	
			唇部特征用途	外围特征用途
低扭力双唇型		TCV	双唇，一个弹簧；通常使用在密封压力低于0.03Mpa的有灰尘及低扭力的密封环境，增加额外的防尘唇部提供对主唇的保护。	外围橡胶设计，确保外径之密封性；适用于各种材质之装配孔，如软质合金或塑料，钢或铸铁等材质。
		TGV		外围橡胶沟槽设计，装配容易；特别适合高热膨胀材质装配孔于高温环境时使用。
双主唇型		DC	双主唇正反两面都装有弹簧的特殊设计；适用于需要隔离两种密封液体的环境中。	外围橡胶设计，确保外径之密封性，适用于各种材质之装配孔，如软质合金或塑料，钢或铸铁等材质。
		DG		外围橡胶沟槽设计，装配容易；特别适合高热膨胀材质装配孔于高温环境时使用。
		DB		外围铁壳设计，具有较佳的稳固及精确的装配特性；适用于钢或铸铁材质之装配孔。
耐压型		TCN	唇部的受压面积小，同时保持刚性的耐压油封；可使用在不同的中压场合。	外围橡胶设计，确保外径之密封性，适用于各种材质之装配孔，如软质合金或塑料，钢或铸铁等材质。
		TCNY		
		TCNG1		

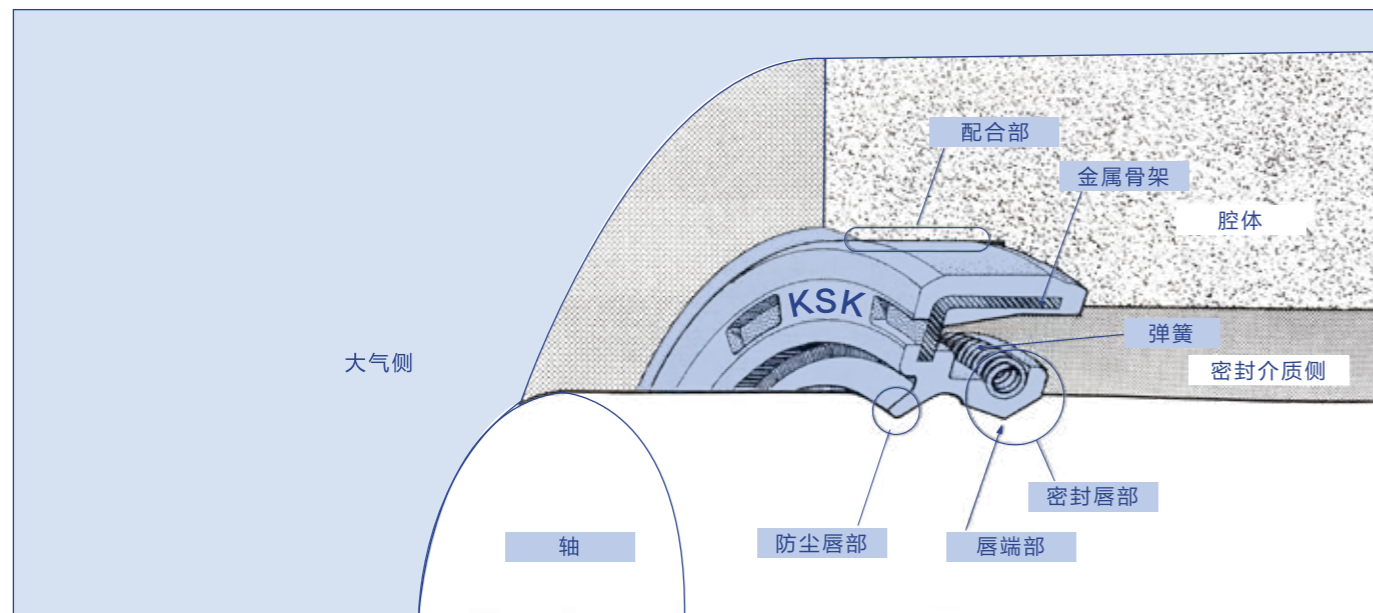
Type	Structure diagram	Code	Main Characteristic Uses	
			Use of lip features	Peripheral Character Purpose
Low torque double lip		TCV	Double lips, a spring; usually used in a dusty and low-torque sealing environment with a sealing pressure of less than 0.03 Mpa, adding additional dust-proof lips to provide protection to the main lip.	Peripheral rubber design to ensure the sealing of the outer diameter; suitable for various materials such as soft alloy or plastic, steel or cast iron and other materials.
		TGV		Peripheral rubber groove design, easy assembly; especially suitable for high thermal expansion material assembly hole in high temperature environment.
Double main lip		DC	Special design with spring on both sides of both main lips; suitable for isolation of two sealed liquids.	Peripheral rubber design; ensure the sealing of outer diameter, suitable for all kinds of material assembly holes, such as soft alloy or plastic, steel or cast iron and other materials.
		DG		Peripheral rubber groove design, easy assembly; especially suitable for high thermal expansion material assembly hole in high temperature environment.
		DB		External iron shell design, with better stable and accurate assembly characteristics; suitable for steel or cast iron material assembly hole.
Pressure Type		TCN	The pressure area of the lip is small and the pressure oil seal is rigid. It can be used in different medium pressure situations.	Peripheral rubber design; ensure the sealing of outer diameter, suitable for all kinds of material assembly holes, such as soft alloy or plastic, steel or cast iron and other materials.
		TCNY		
		TCNG1		

型式	结构简图	代码	主要特征用途	
			唇部特征用途	外围特征用途
耐压型		TCNG	短唇长的特殊设计能更好的抵抗内部压力；特殊的材质和结构设计可应用在不同的高压场合。	外围橡胶设计，确保外径之密封性，适用于各种材质之装配孔，如软质合金或塑料，钢或铸铁等材质。
铁氟龙型		TC-PL	唇部为橡胶接着 PTFE 材质，具有极优的耐化学性、耐高低温性及低摩擦系数；应用于极高转速、耐干转之使用环境。	外围橡胶设计，确保外径之密封性，适用于各种材质之装配孔，如软质合金或塑料，钢或铸铁等材质。
减震器型		TC4	副唇半圆设计减少摩擦防止唇部变形，适用于减震器往复运动。	外围橡胶设计，确保外径之密封性，适用于各种材质之装配孔，如软质合金或塑料，钢或铸铁等材质。
		TC4S		
双油封组合型		TCA3	密封油侧处设有阻挡异物的唇部位，阻挡主唇部位与内部异物的正面摩擦；适用于减速机内部有异物的密封。	外围橡胶设计，确保外径之密封性，适用于各种材质之装配孔，如软质合金或塑料，钢或铸铁等材质。
轴面型		RE1	橡胶 V 型环上增加骨架设计来加大刚性和提高抵抗尘土的能力；轴面油封安装在轴上，随着轴旋转，密封在与轴向垂直的平面上。	-
端盖型		EC	-	外围橡胶设计；应用于外径密封之密封盖设计，确保外径之密封性，适用于各种材质之装配孔，如软质合金或塑料，钢或铸铁等材质。
		EG	-	外围橡胶沟槽设计，装配容易；应用于外径密封之密封盖设计，特别适合高热膨胀材质装配孔于高温环境时使用。

Type	Structure diagram	Code	Main Characteristic Uses	
			Use of lip features	Peripheral Character Purpose
Pressure Type		TCNG	The special design of short lip length can better resist internal pressure; special material and structure design can be used in different high pressure situations.	Peripheral rubber design; ensure the sealing of outer diameter, suitable for all kinds of material assembly holes, such as soft alloy or plastic, steel or cast iron and other materials.
Teflon		TC-PL	Lip is rubber followed by PTFE material, with excellent chemical resistance, high and low temperature resistance and low friction coefficient; used in extremely high speed, dry rotation environment.	Peripheral rubber design; ensure the sealing of outer diameter, suitable for all kinds of material assembly holes, such as soft alloy or plastic, steel or cast iron and other materials.
Shock absorber Type		TC4	Secondary lip semicircle design reduces friction to prevent lip deformation, suitable for shock absorber reciprocating motion.	Peripheral rubber design; ensure the sealing of outer diameter, suitable for all kinds of material assembly holes, such as soft alloy or plastic, steel or cast iron and other materials.
		TC4S		
Double oil seal combination		TCA3	The sealing oil side is provided with a lip position to block the foreign body, which prevents the front friction between the main lip and the internal foreign body, and is suitable for sealing the internal foreign body such as the reducer.	Peripheral rubber design; ensure the sealing of outer diameter, suitable for all kinds of material assembly holes, such as soft alloy or plastic, steel or cast iron and other materials.
Shaft Type		RE1	A skeleton design is added to the rubber V ring to increase rigidity and improve dust resistance; the shaft oil seal is mounted on the shaft and sealed on a plane perpendicular to the axis as the shaft rotates.	-
Cap Type		EC	-	Peripheral rubber design; used in the design of sealing cover of outer diameter seal to ensure the sealing of outer diameter, suitable for assembly holes of various materials, such as soft alloy or plastic, steel or cast iron.
		EG	-	Peripheral rubber groove design, easy assembly; used in outer diameter seal sealing seal cover design, especially suitable for high thermal expansion material assembly hole in high temperature environment.

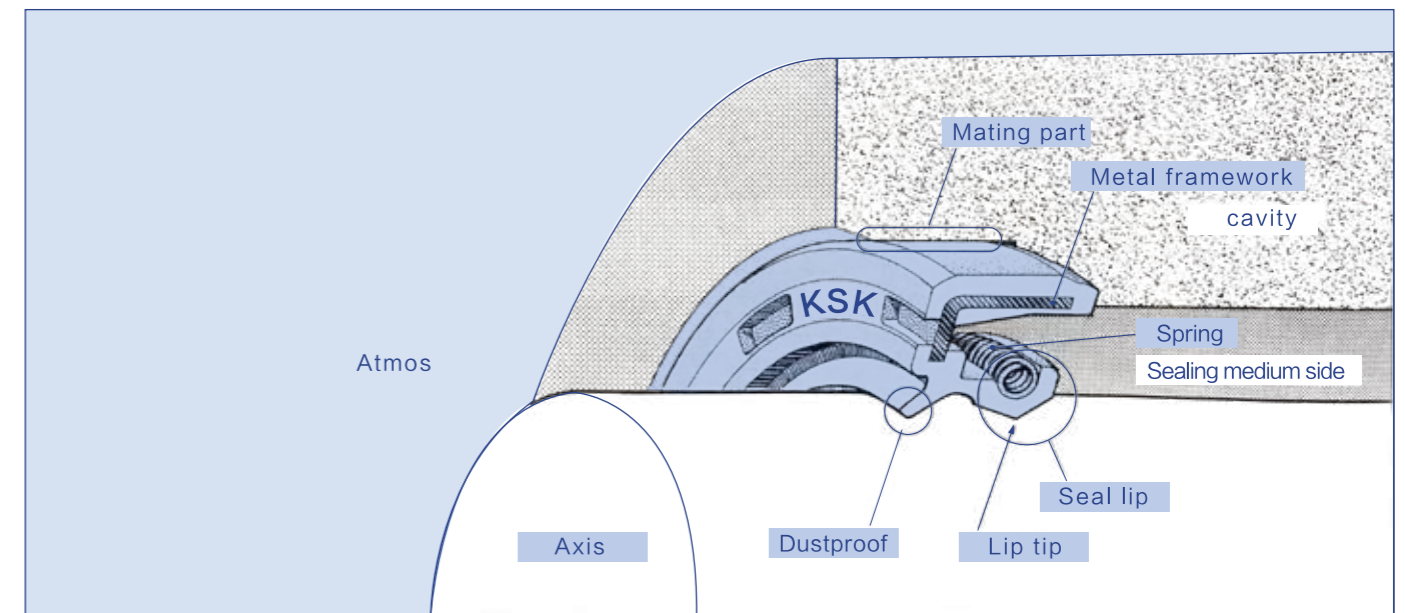
由于版面有限，还有很多型式，用于不同工况下的密封件未能全部列出，如有需求，建议和KSK公司联系。

## 油封各部位的作用



名称		各部位的作用
①	唇端部 (滑动面)	唇端部是斜楔形状, 在端部按压轴表面, 起密封流体的作用。
②	唇部 密封唇部	密封唇是柔性弹性体, 设计上确保其在机械的振动及密封流体的压力变动的影响下仍可保持稳定的密封作用, 并起保持与唇端部的轴表面的接触状态稳定的作用。另外, 弹簧可提高密封唇部对轴的压紧力, 起防止尘埃侵入的作用。
③	防尘唇部	防尘唇是没有与弹簧连接的副唇, 起防止尘埃侵入的作用。
④	配合部	配合部在将油封固定于腔体孔的同时, 起防止流体从油封外周面与腔体内面的接触面之间泄漏及侵入的作用。另外, 金属骨架起将油封固定于腔体上, 保持配合力的作用。

## Function of various parts of oil seal



Name of name		Role of various parts
①	Lip tip (sliding surface)	The lip end is wedge-shaped, pressing the shaft surface at the end to seal the fluid.
②	Lips Seal lip	The sealing lip is a flexible elastomer, which is designed to ensure that it can still maintain a stable sealing effect under the influence of mechanical vibration and pressure change of sealing fluid, and to maintain the stable contact state with the shaft surface of the lip end. In addition, the spring can improve the sealing lip pressure on the shaft, play a role in preventing dust intrusion.
③	Dustproof lips	Dustproof lips are auxiliary lips without spring connection, which prevent dust from invading.
④	Cooperation Department	The mating part not only fixes the oil seal on the hole of the cavity, but also prevents the leakage and invasion of the fluid from the contact surface between the outer surface of the oil seal and the inner surface of the cavity. In addition, the metal frame from the oil seal fixed on the cavity, to maintain the role of the combining force.

# CHAPTER 2 SEALING PRINCIPLE OF OIL SEAL

## 第二篇 油封的密封原理

油封的密封状态，一是油封外径和腔体之间为静态密封，同时保证油封外径在腔体之间的可靠定位；二是油封密封唇和轴之间的密封状态，当轴旋转时为动态密封，当轴静止时为静态密封。

外径静态密封是由油封外径与箱体接触面积产生干涉而达到密封效能。

油封动态密封是密封唇与轴直接接触，在油侧和空气侧间形成一层油膜，阻止油的泄漏；旋转轴唇型密封产生密封的边界润滑理论，主要是旋转轴唇型油封装配使用时，唇尖受径向力的作用与轴接触，会产生轻微的变形；密封唇部若出现较厚油膜，则会产生轴向流动而泄漏；因此，要达到理想的密封，在密封的唇和轴之间必须有一层薄而稳定的油膜，其兼具密封及润滑作用。

### 润滑特性

油封装入机械装置后，在静止时及轴运转时主要起到密封流体的作用。另外，唇部的摩擦力小、磨损少是其重要特征之一。

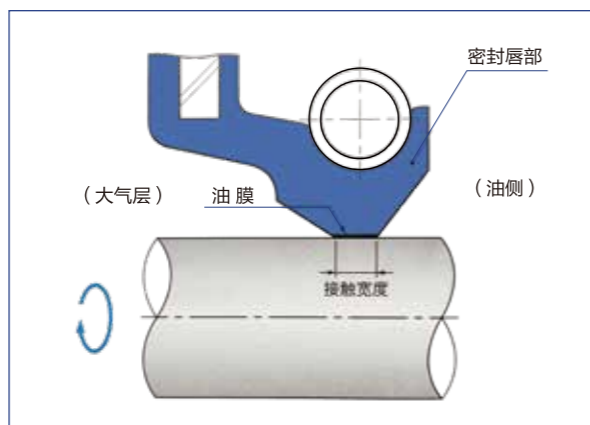
对油封寿命有影响的唇口滑动面的润滑特性又如何呢？

这里,我们通过宏观现象对润滑特性进行说明。

为了掌握油封的润滑状态，评价其摩擦特性是很重要的。

为此，我们在〈图·1.〉这样的状态下将油封安装在试验机上，使轴在各种条件下旋转，对其摩擦力进行了测量。

油封装上的状态  
〈图·1.〉



The sealing state of the oil seal is, first, the external diameter of the oil seal is sealed statically between the oil seal and the cavity, while ensuring the reliable positioning of the external diameter of the oil seal between the cavity; Second, the sealing state between the oil seal lip and the shaft, when the shaft rotates, is sealed dynamically, static seal when shaft is stationary. The external diameter static seal is caused by the interference between the external diameter of the oil seal and the contact area of the oil seal box. The dynamic seal of oil seal is that the seal lip is in direct contact with the shaft, forming a layer of oil film between the oil side and the air side to prevent oil leakage; When the lip tip is in contact with the shaft under the action of the radial force, it will slightly deform. If there is a thicker oil film on the sealing lip, it will cause axial flow and leak. Therefore, to achieve an ideal seal, there must be a thin and stable oil film between the sealing lip and the shaft, which has both sealing and lubricating functions.

### Lubrication characteristics

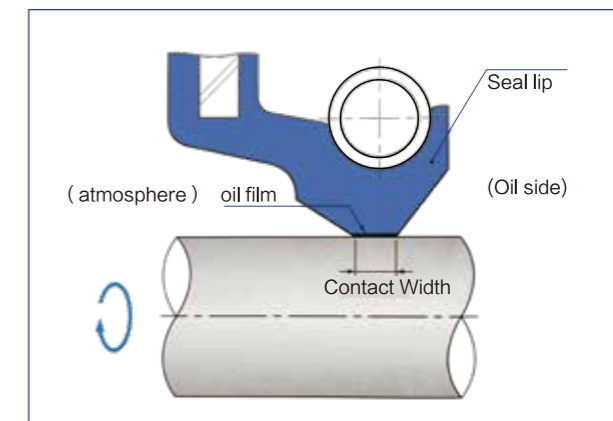
When the oil seal is loaded into the mechanical device, it mainly starts at rest and when the shaft is running The action of sealing fluid. In addition, the lip friction is small, less wear is one of its important characteristics.

What are the lubrication characteristics of the lip sliding surface that affect the oil seal life? Here, we explain the lubrication characteristics through macroscopic phenomena.

In order to master the lubricating state of oil seal, it is very important to evaluate its friction characteristics.

Therefore, we install the oil seal on the testing machine under the condition of "Fig .1.", so that the shaft rotates under various conditions and the friction force is carried out Measurement.

Status on oil seal  
〈Photo 1〉



# ARTLCLE 3: MATERIAL OF OIL SEAL

## 第三篇 油封材质



### 1、橡胶 Rubber

(1) 橡胶材料通用代号与中、英文名称

(1) Universal code of rubber material, Chinese and English name

通用代号 General code	中文名称 Chinese name	英文名称 English code	通用俗称 Universal common name
SBR	苯乙烯-丁二稀橡胶	Styrene butadiene rubber	丁苯橡胶
CR	氯丁二稀橡胶	Chloroprene rubber	氯丁橡胶
EPDM	乙烯丙烯橡胶	Ethylene propylene rubber	乙丙胶
FVMQ	氟化硅氧橡胶	Fluorinated silicone rubber	氟化硅橡胶
CSM	氯磺化聚乙烯橡胶	Chlorosulfonated polyethylene	海波龙
HNBR	氢化丁腈橡胶	Hydrogenated NBR rubber	—
AEM	乙烯/丙烯酸橡胶	Ethylene/Acrylic rubber	VAMAC
NBR	丙烯腈-丁二烯橡胶	Acrylonitrile butadiene rubber	丁腈橡胶、耐油橡胶
ACM	丙烯酸酯橡胶	Polyacrylate rubber	压克力橡胶、CII
NR	天然橡胶	Natural rubber	—
VMQ	硅氧橡胶	Silicone rubber	—
PTFE	聚四氟乙烯	polytetrafluoroethylene	铁氟龙
PU	氨基甲酸酯橡胶	Urethane rubber	聚氨酯橡胶
FKM	氟素橡胶	Fluorocarbon rubber	氟橡胶、VITON
XNBR	羧化丁腈橡胶	Carboxylated NBR	—



## (2) 常用橡胶种类的特性

项目 种类	适用温度		特性说明	
	高温	低温		
NBR				由于其价格便宜，耐油性及耐磨耗性佳，因此是油封材料使用最多的耐油胶，特别是对矿物油系的抵抗性最佳，忌用于酮类或酯类的极性溶剂中。
	120	-55	低含腈	耐低温性增加，弹性增加，塑化剂互适性增加，用于低温比耐油性更为重要的部位。
	120	-40	中含腈	其性质介于低、高丙烯腈聚合物之间；用于芳香类化合物含量较低或可以承受橡胶膨胀较大之处。
	120	-25	高含腈	耐油性、耐燃性、抗拉强度、硬度都增加，抗磨损有所改善，不透性增加；常用于极需耐油之处及其它需要抵抗芳香类燃料、油类与溶剂的用途。
HNBR				HNBR 是逐渐将 NBR 予以氢化而成，因此其具备了耐高温、耐油、耐寒、耐压缩不变形等特征，其机械性质、强度及耐磨耗均有优异的表现。
	120	-55	硫磺系统	经氢化 NBR 后改善物性，可提供比 NBR 更佳耐热、耐油性。
	150	-40	过氧系统	HNBR 适用的温度较广约为 -40 ~ 150°C 且提供更佳的抗氧化作用及不影响制品色泽特性。
ACM	150	-35		广泛用于油封膜片，汽车零件的散热管、油冷却管，与脂肪类碳水化合物有良好抵抗性、耐候性、耐油性及耐臭氧性优，但不耐水、酸、碱等流体；其结构主要是以不饱和官能基作为主链，支链是由 ethyl acrylate(EA)、butyl acrylate(BA) 与 methoxy ethyl acrylate(MEA) 所组成。当 BA 所占越多则耐寒性越好，若 MEA 所占越多则耐油性越优异。
VMQ	225	-55		温度范围广，无双键，耐臭氧性佳，无臭无味。但机械性质差，且耐药品性不佳，价格较贵。
FKM				耐化学药品性特优，及价格较高是两大特质，除了酮类及酯类外，可耐大部分的油及溶剂。
	250	-25	二聚物	偏氟乙烯与六氟丙烯共聚物。
	250	-20	三聚物	偏氟乙烯与六氟丙烯及四氟乙烯共聚物，较二聚物有更好的耐溶剂性。
EPDM	150	-55		对极性溶剂(醇、酮、乙二醇)、盐酸等无机药品很安定，是所有橡胶中比重最小，故可进行高填充。
SBR	100	-40		可与天然胶及合成胶混合使用，耐油性优于天然胶，机械性质很差且加硫慢，弹性低，动性发热大。
PTFE	250	-50		除了弹性较橡胶差外，几乎所有物理性能均优于橡胶，且低摩擦系数的特性常应用于油封的唇部。
CR	100	-40		耐油性仅次于 NBR，无自燃性，耐候，耐臭氧性优，长期暴露室外也不易老化，原胶储存安定性差。

## (2) Type character of common rubber

Project Type	Applicable temperature		Characteristic description	
	High temperature	Low temperature		
NBR				Its price is cheap, oil resistance and abrasion performance is best, thus, oil resistant adhesive and abrasion performance is well, thus, oil resistant adhesive is frequently used for oil seal material, it has best resistance for mineral oil, it is not allowed for ketones and lipid polar solvent.
	120	-55		Low temperature tolerance increases, elasticity increases, plasticizer compatibility increases, it is used important part for low temperature than oil resistivity.
	120	-40	Low nitrile	Its nature is between low and high acrylic polymers; low content aromatic compounds or it can bear large rubber expansion.
	120	-25	Medium nitrile	Oil resistance, flame resistance, tensile strength and hardness is improved, Air permeability increases.
HNBR				Gradually hydriding NBR for becoming HNBR, thus, it has high temperature resistance, oil resistance, cold-resistant, compression resistance, non-deformation feature, it has excellent mechanical nature, strength and abrasion resistance.
	120	-55		Better heat resistance and oil resistance could be provided after improvement of NBR hydriding.
	150	-40	Peroxide system	Applicable temperature of HNBR is about between -40 and 150 C, better antioxygenation is provided. It does not affect color of products.
ACM	150	-35		It is widely used into oil seal film, cooling tube of vehicle spare parts, oil cooling tube. Have good resistance, fat and carbohydrate weathering resistance, oil resistance and excellent resistance to ozone, but not water, acid and alkali fluid; its structure is mainly based on the unsaturated functional groups as the main chain, branched chain is composed of ethyl acrylate(EA) and butyl acrylate(BA) and methoxy ethyl acrylate(MEA), when the BA for the more cold resistance is better, if the MEA for the more resistant oily more excellent.
VMQ	225	-55		Temperature scope is wide and no double bonds, it has good resistance to ozone, no odor, price is expensive.
FKM				It has good resistance chemical drug and price is high, except ketones and lipids, it can resist against majority oil and solvent.
	250	-25	Dimer	it is co-polymer of partial fluorine ethylene and six fluorine ethylene .
	250	-20	Trimers	it is co-polymer of partial fluorine ethylene, six fluorine ethylene and four fluorine ethylene .
EPDM	150	-55		It is stable when encounter polar solvent(Alcohol, ketone), muriatic acid and other inorganic drugs, it has minimum proportion among rubbers.
SBR	100	-40		It can be used with natural rubber and synthetic rubber, its oil resistance is better than natural rubber, mechanical property is poor with low elasticity.
PTFE	250	-50		Its elasticity is more poor than rubber, almost physical property is better than rubber, it is used for lip of oil seal according to low coefficient of friction.
CR	100	-40		Oil resistance is next only to NBR, no naturality, it is weather-resistant and ozone resistance, it is very hard to aging in exposed environment.

### ( 3 ) 橡胶材质燃烧特性

材质	NBR	ACM	SIL	FKM
燃烧时烟的情形	黑烟	无烟	白烟	无烟
味道	恶臭	微香	微臭	微臭
火移开后橡胶燃烧的情形	大火继续燃烧	继续燃烧	小火继续燃烧	火熄灭
火熄灭时的情形	白烟	白烟	白烟	白烟
高温未完全燃烧的情形	粉末	粉末	粉末	粉末
灰烬的情形	黑色粉末	黑色粉末	白色粉末	灰色粉末

### (3)Combustion characteristic of rubber

Material	NBR	ACM	SIL	FKM
Gas condition during burn	Black smoke	No smoke	White smoke	No smoke
Flavour	Smelling	micro incense	slight odor	slight odor
Rubber burn when fire leave	Keep big fire burning	Keep big fire burning	Keep big fire burning	Fire go out
Condition when fire extinct	White smoke	White smoke	White smoke	White smoke
Imperfect combustion at high temperature	Powder	Powder	Powder	Powder
Ash condition	Black powder	Black powder	White powder	Grey powder

### ( 4 ) 橡胶在不同环境中的耐性

橡胶材质	NBR(丁腈)	ACM(丙烯酸酯)	VMQ(硅橡胶)	FKM(氟橡胶)
抗撕裂性	良	一般与差之间	一般与差之间	良与一般之间
耐磨耗	优	一般	一般与差之间	良
压缩比	优与良之间	良	优与一般之间	优与良之间
回弹性23℃	良	一般	优与差之间	一般
耐燃性	差	差	优与一般之间	优
耐候性	差	优	优	优优
耐水性	优	差	优与良之间	优
耐蒸气性	良与一般之间	极差	良与一般之间	良
抗臭氧性	一般与差之间	优	优	优
抗氧化性	良	良	优	优
耐酸性(稀释)	良	一般与差之间	良	优
耐酸性(浓缩)	良	一般与差之间	一般	优
耐碱性(稀释)	良	一般与差之间	优	优
耐碱性(浓缩)	良	一般与差之间	优	极差
合成润滑剂	优与良之间	差	极差	优
低纯度润滑油	优	优	良	优
高纯度润滑油	优	优	一般	优
动、植物油	良	良	优	优
抗气体渗透率	优与良之间	良	差	优
抗导电性	一般与差之间	一般	优与良之间	良
与金属的附着力	优与良之间	良	良	一般

### (4)Rubber weather resistant under different environment

Rubber material	NBR(丁腈)	ACM(丙烯酸酯)	VMQ(硅橡胶)	FKM(氟橡胶)
Resistant tearing	Good	Between average and poor	Between average and poor	Between average and good
Abrasion resistance	Excellent	Average	Between average and poor	Good
Compression ratio	Between excellent and good	Good	Between excellent and average	Between excellent and good
Elastic resilience 23 C	Good	Average	Between excellent and poor	Average
Flame resistance	Poor	Poor	Between excellent and average	Excellent
Weather resistant	Poor	Excellent	Excellent	Excellent
Resistance to water	Excellent	Poor	Between excellent and good	Excellent
Steam resistance	Between good and average	Very poor	Between good and average	Good
Ozone resistance	Between average and poor	Excellent	Excellent	Excellent
Resistance to oxidation	Good	Good	Excellent	Excellent
Acid-proof(dilution)	Good	Between average and poor	Good	Excellent
Acid-proof(concentration)	Good	Between average and poor	Average	Excellent
Resistance to alkali(dilution)	Good	Between average and poor	Excellent	Excellent
Resistance to alkali(concentration)	Good	Between average and poor	Excellent	Very Poor
Synthetic lubricant	Between excellent and good	Poor	Very Poor	Excellent
Low purity lubricating oil	Excellent	Excellent	Good	Excellent
High purity lubricating oil	Excellent	Excellent	Average	Excellent
Animal and plant oil	Good	Good	Excellent	Excellent
Anti-gas permeability	Between excellent and good	Good	Poor	Excellent
Resistance to electrical conductivity	Between average and poor	Average	Between excellent and good	Good
Adhesion to metal	Between excellent and good	Good	Good	Average

### ( 5 ) 橡胶对各种化学药液的安定性

	流体	NBR(丁腈)	HNBR	ACM(丙烯酸酯)	VMQ(硅橡胶)	FKM(氟橡胶)
	水蒸气 ( 150℃ )	▲	●	▲	▲	◆
有机酸	醋酸	●	●	▲	★	●
无机酸	盐酸 ( 25℃ )	●	●	▲	★	●
	磷酸 ( 20℃ )	●	★	-	●	★
	硝酸 ( 25℃ )	▲	●	▲	●	◆
碱类	氢氧化钠 ( 30% )	●	★	-	●	●
	氨水 ( 28% )	★	★	▲	★	●
盐类	氯化钠 ( 30% )	★	★	-	★	★
	碳酸钠 ( 10% )	★	★	-	★	●
氧化剂	过氧化氢 ( 3% )	◆	●	-	★	★
	次氯酸钠 ( 5% )	▲	●	▲	●	★
脂肪族碳水化合物	异辛烷	★	★	★	▲	★
芳香族碳水化合物	甲苯	◆	◆	▲	◆	★
氯化碳水化合物	三氯乙烯	◆	◆	-	▲	★
醇类	甲醇	★	★	▲	★	▲
	乙醇	★	★	▲	★	★
醚类	乙醚	◆	◆	▲	▲	▲
酯类	乙酸乙酯	▲	▲	-	▲	◆
酮	甲基乙基甲酮	▲	▲	▲	▲	▲
醛类	糠醛	◆	●	▲	▲	▲
胺类	三乙醇胺	◆	★	▲	▲	▲
	二硫化碳	◆	◆	-	-	★

★:优秀 ●: 除特别指定外, 具有抗性 ◆: 除特别指定外, 不具抗性 ▲: 不具抗性

### ( 6 ) 橡胶材料对各式油品的适用范围

油品	连续性测试 温度范围	周期性测试 温度范围	汽车发动机 用油	齿轮轴 用油	自动变速器 用油	一般液 压油	矿物性 润滑油	砂性 润滑油	柴油发动 机用油	发动机用 汽油(标准)	发动机用 汽油(特级)
温度适用范围 (℃)			150-(-40)	150-(-40)	160-(-50)	100-(-30)	100-(-30)	250-(-50)			
NBR	100-(-30)	120-(-30)	100	90	100	100	100	100	*	*	*
ACM	130-(-10)	150-(-10)	130	110	120	100	100	130	*	*	*
FKM	200-(-20)	250-(-20)	150	150	160	100	100	200	150	150	150
VMQ	200-(-55)	225-(-55)	130	*	*	*	100	*	NS	NS	NS
HNBR	130-(-30)	150-(-30)	130	110	130	100	100	130	*	*	*

(NS:弹性体对此种油品的温度变化范围很大 \* : 此弹性体不适用此种油品 温度单位℃)

### (5)Stability of rubber for all kinds of chemical liquids

	Fluid	NBR(丁腈)	HNBR	ACM(丙烯酸酯)	VMQ(硅橡胶)	FKM(氟橡胶)
	Vapor(150°C)	▲	●	▲	▲	◆
Rubber material	Acetic acid	●	●	▲	★	●
Inorganic acid	Muriatic acid(25°C)	●	●	▲	★	●
	Phosphoric acid(25°C)	●	★	-	●	★
	Nitric acid(25°C)	▲	●	▲	●	◆
Alkalines	Sodium hydrate(30%)	●	★	-	●	●
	Ammonia(28%)	★	★	▲	★	●
Salts	Common salt(30%)	★	★	-	★	★
	Soda(10%)	★	★	-	★	●
Oxidant	Hydrogen peroxide(3%)	◆	●	-	★	★
	(Chlorox5%)	▲	●	▲	●	★
Aliphatic carbohydrates	Isooctane	★	★	★	▲	★
Aromatic carbohydrate	Toluene	◆	◆	▲	◆	★
Chlorinated carbohydrate	Chlorylene	◆	◆	-	▲	★
Alcohol	Methanol	★	★	▲	★	▲
	Ethanol	★	★	▲	★	★
Ether	Aether	◆	◆	▲	▲	▲
Ester	Acetic ether	▲	▲	-	▲	◆
Ketone	Methyl ethyl ketone	▲	▲	▲	▲	▲
Aldehyde	Furfural	◆	●	▲	▲	▲
Amine	Triethanolamine	◆	★	▲	▲	▲
	Carbon disulphide	◆	◆	-	-	★

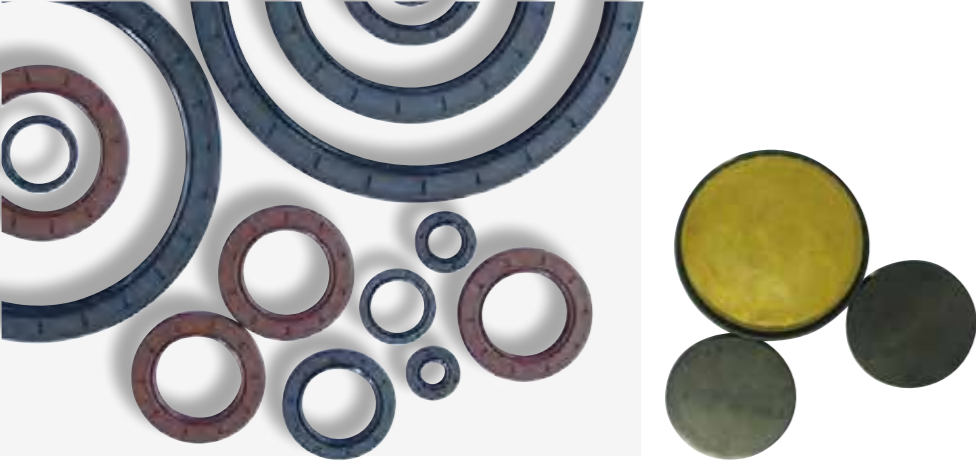
★ : Excellent; ● : Except for special designation, it has resistance. ◆ : Except for special designation, it has not resistance; ▲ : No resistance;

### (6)Applicable scope of rubber material for all oils

Oil	Continuous test temperature range	Cycle test temperature rang	Oil of automotive engine	Oil of gear shaft	Oil of automatic transmission	General hydraulic oil	Mineral lubricating oil	Silicone oil	Oil of diesel engine	Gasoline for engine (standard)	Gasoline for engine (special grade)
Temperature range(℃)			150-(-40)	150-(-40)	160-(-50)	100-(-30)	100-(-30)	250-(-50)			
NBR	100-(-30)	120-(-30)	100	90	100	100	100	100	*	*	*
ACM	130-(-10)	150-(-10)	130	110	120	100	100	130	*	*	*
FKM	200-(-20)	250-(-20)	150	150	160	100	100	200	150	150	150
VMQ	200-(-55)	225-(-55)	130	*	*	*	100	*	NS	NS	NS
HNBR	130-(-30)	150-(-30)	130	110	130	100	100	130	*	*	*

NS: The elastic body is very large in the temperature range of these oils, \* : which is not suitable for this kind of oil. Temperature range(℃)





### (7) 橡胶对各种油品与溶剂的安定性

### (7) Stability of rubber for all kinds of oils and solvent

油、溶剂	橡胶种类	NBR(丁腈)	HNBR	ACM(丙烯酸酯)	VMQ(硅橡胶)	FKM(氟橡胶)
引擎油	SAE#30	★	★	★	★	★
	SAE#10W_30	★	★	★	●	★
齿轮油	车辆用	★	★	★	◆	●
	工业用2种9(极性)合成淀	★	★	▲	◆	●
流体式自动变速装置油、自动控制流体		★	★	★	▲	●
刹车油	DOT3(乙二醇系)	◆	▲	▲	●	▲
	DOT5(乙二醇系)	◆	▲	▲	●	▲
	DOT5(矽系)	★	★	★	▲	★
滑轮油2种		●	●	★	◆	★
机械油(2号轴润滑油)		●	●	●	▲	★
油压工作油(矿油系)		★	★	★	◆	★
燃烧性	磷酸酯系	▲	▲	▲	★	◆
工作油	水+乙二醇系	●	●	▲	◆	◆
润滑脂	切削油	★	★	◆	★	★
	矿油系	★	★	★	★	★
	矽系	★	★	★	▲	★
冷煤	氟系	★	★	★	★	▲
	R12+石蜡系	●	★	▲	▲	▲
	R134a+乙二醇系	▲	●	▲	▲	▲
汽油		▲	●	▲	▲	★
轻油、煤油		▲	●	▲	▲	★
重油		●	★	◆	▲	★
不冻液(乙烯乙二醇系)		●	●	▲	◆	▲
温水		●	★	▲	●	●
海水		●	★	▲	▲	●
水蒸气		▲	●	▲	▲	◆
盐酸10%液		●	●	●	●	●
硫酸30%液		◆	◆	◆	▲	◆
硝酸10液		▲	●	▲	▲	◆
氢氧化钠40%液		●	★	▲	▲	▲
苯		▲	▲	▲	▲	▲
酒精		●	●	▲	●	●
丁酮		▲	▲	▲	◆	▲

Oil And solvent	Types of rubber	NBR(丁腈)	HNBR	ACM(丙烯酸酯)	VMQ(硅橡胶)	FKM(氟橡胶)
Engine oil	SAE#30	★	★	★	★	★
	SAE#10W_30	★	★	★	●	★
Gear oil	Vehicle usage	★	★	★	◆	●
	Two industrial synthetic starch	★	★	▲	◆	●
Fluid automatic transmission shaft		★	★	★	▲	●
Brake Oil	DOT3	◆	▲	▲	●	▲
	DOT5	◆	▲	▲	●	▲
	DOT5	★	★	★	▲	★
Two kinds of lubricating oil		●	●	★	◆	★
Mechanical oil(No.2 axis lubricating oil)		●	●	●	▲	★
Hydraulic oil(Mineral oil)		★	★	★	◆	★
Combustibility	Phosphate	▲	▲	▲	★	◆
Working oil	Water+glycol	●	●	▲	◆	◆
Cutting oil		★	★	◆	★	★
Lubricating grease	Mineral oil	★	★	★	★	★
	Silicon	★	★	★	▲	★
	Fluorine	★	★	★	★	▲
Refrigerant	R12+olefin	●	★	▲	▲	▲
	R134a+glycol	▲	●	▲	▲	▲
Gasoline		▲	●	▲	▲	★
Light oil and kerosene		▲	●	▲	▲	★
Heavy oil		●	★	◆	▲	★
Antifreeze solution(ethylene glycol)		●	●	▲	◆	▲
Hot water		●	★	▲	●	●
Sea water		●	★	▲	▲	●
Vapor		▲	●	▲	▲	◆
10% muriatic acid liquid		●	●	●	●	●
30% sulphuric acid liquid		◆	◆	◆	▲	◆
10% nitric acid liquid		▲	●	▲	▲	◆
40% sodium hydrate		●	★	▲	▲	▲
Benzol		▲	▲	▲	▲	▲
Alcohol		●	●	▲	●	●
Butanone		▲	▲	▲	◆	▲

★:优秀 ●: 除特别指定外, 具有抗性 ◆: 除特别指定外, 不具抗性 ▲: 不具抗性

★: Excellent; ●: Except for special designation, it has resistance. ◆: Except for special designation, it has not resistance; ▲: No resistance;

## 2、铁壳 Metallic casing

铁壳称之为油封的骨架，起支撑油封强度的作用，且可使油封正确完全嵌入于箱体孔内。

Metallic casing is frame of oil seal, it can support strength of oil seal, thus, oil seal can completely insert into box hole.

## 3、弹簧 Spring

弹簧的作用是使油封唇部提供一定收紧力及延长油封寿命，并依据轴的转速及轴的偏心选用适当弹簧力。

Role of spring is to provide certain tightening force and prolong life of oil seal, besides, spring force shall be used in accordance with speed of axis and eccentric action of axis.

## 4、弹簧及铁壳的材质种类及适用环境选择

Selection of material types and applicable environment for spring and metallic casing.

密封对象	弹簧			铁壳		
	标准材料	专用材料		标准材料	专用材料	
	碳钢	不锈钢		碳钢	不锈钢	
	SAE1070 SAE1080	SAE30304	SAE30316	SAE1008	SAE30304	SAE30316
润滑油、润滑脂	●	●	●	●	●	●
水	▲	●	●	▲	●	●
水蒸气	▲	●	●	▲	●	●
海水	▲	★	●	▲	★	●
酸	▲	★	●	▲	★	●
碱(ALKALI)	▲	●	●	▲	●	●

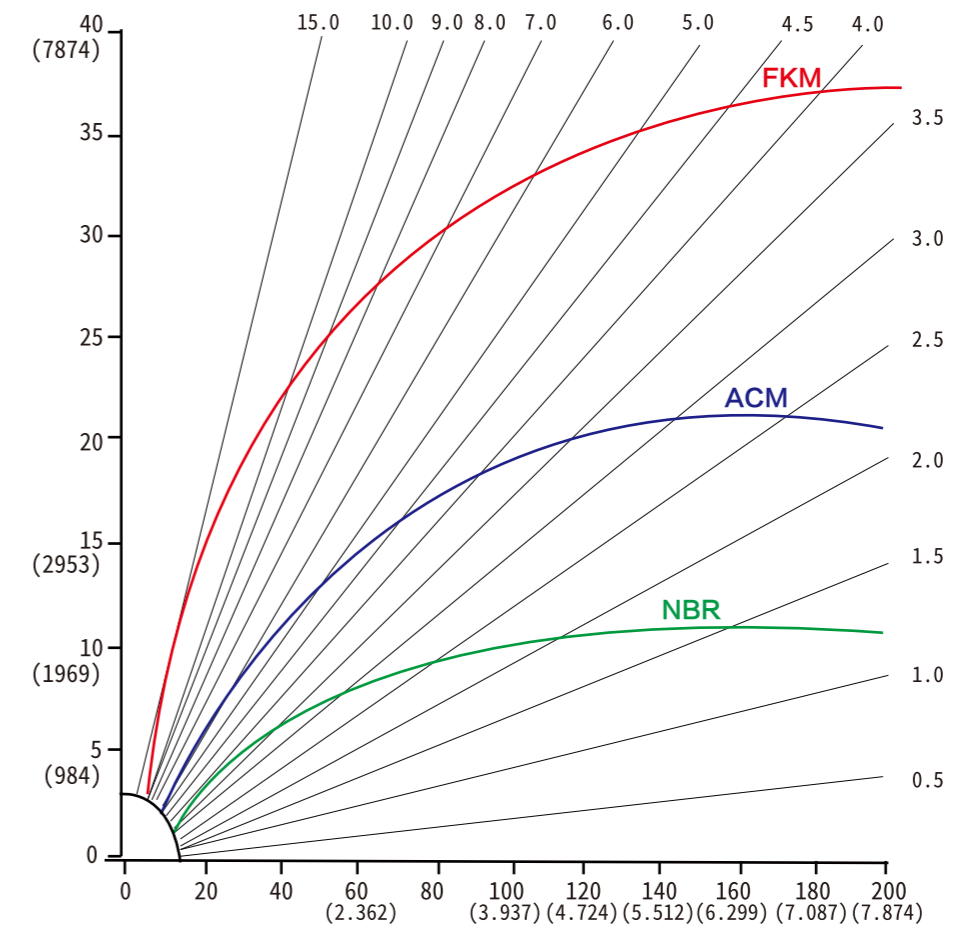
★:优秀 ●: 除特别指定外, 具有抗性 ◆: 除特别指定外, 不具抗性 ▲: 不具抗性

Sealing object	Spring			Metallic casing		
	Standard material	Special material		Standard material	Special material	
	Carbon steel	Stainless steel		Carbon steel	Stainless steel	
	SAE1070 SAE1080	SAE30304	SAE30316	SAE1008	SAE30304	SAE30316
Lubricating oil and grease	●	●	●	●	●	●
Water	▲	●	●	▲	●	●
Vapor	▲	●	●	▲	●	●
Sea water	▲	★	●	▲	★	●
Acid	▲	★	●	▲	★	●
Alkali	▲	●	●	▲	●	●

★ : Excellent; ● : Except for special designation, it has resistance. ◆ : Except for special designation, it has not resistance; ▲ : No resistance;

## 径向轴密封件 radial shaft seal

Linear velocity [m/s (ft/min)]



轴径 [毫米 (英寸)]  
Shaft diameter [mm (inch)]

来源: DIN 3760标准  
Source: DIN 3760

# 第四篇 油封的安装环境

## 1、轴的要求

为了提供您最好的旋转轴油封，我们必须要考虑轴所使用的材质、粗糙度、硬度、导角、公差和偏心。

### (1) 轴的材质

油封能在碳钢或不锈钢材质的轴上作最好的运动，应特别考虑使用热处理或氮化。在低速度时对水的密封，不锈钢的材质更适合。

### (2) 轴的表面粗糙度

轴的表面粗糙度是影响油封寿命的因素之一，故要求表面粗糙度为  $Ra 0.2 \sim 0.8\mu m$  且在接触表面的区域范围内，不允许有任何的沟痕。

### (3) 轴的表面硬度

轴的表面硬度对油封的使用寿命也起到关键性的作用，一般不得小于 HRC45；若圆周速度超过  $4 m / s$  时，轴的表面硬度不得小于 HRC55。

### (4) 轴的倒角

轴的倒角能引导油封唇部进入适当位置，建议角度使用 15 到 30 度，倒角部分不允许有任何毛刺。

### (5) 轴径公差

对于轴径的公差范围，参考下表：



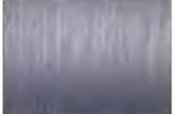

轴公差(英制)		轴公差(公制)	
轴径	公差	轴径	公差
4.000以下	+/-0.003	3.00以下	0/-0.006
4.001-6.000	+/-0.004	3.01-6.00	0/-0.075
6.001-10.000	+/-0.005	6.01-40.00	0/-0.090
10.001以上	+/-0.006	10.01-18.00	0/-0.110
		18.01-30.00	0/-0.130
		30.01-50.00	0/-0.160
		50.01-80.00	0/-0.190
		80.01-120.00	0/-0.220
		120.01-180.00	0/-0.250
		180.01-250.00	0/-0.290
		250.01-315.00	0/-0.320
		315.01-400.00	0/-0.360
		400.01-500.00	0/-0.400

### (6) 轴的偏心

轴有两种偏心型式会影响油封的性能，一种是静态偏心（轴到孔的偏心量），一种是动态偏心（轴的跳动）。

### (7) 轴的表面加工方式

由图示分辨合适与不合适加工后轴表面之纹路

 车刀面车削	合适之加工方式 加工纹路垂直于轴线。	 车削后面贴砂,纸横向研磨	不合适之加工方式, 加工纹路与轴线成一 倾斜角度, 易导致单一特定轴 旋转方向漏油。
 车削后抛光	不合适之加工方式, 加工纹路于轴线成一 倾斜角度, 易导致单一特定轴 旋转方向漏油。	 车削后垂直研磨	合适之加工方式 加工纹路垂直于轴线。

## 2、孔的要求

为了油封运转的合适性，需考虑到油封装配孔的要求。主要考虑孔所使用的材质、粗糙度、倒角和公差。

### (1) 孔的材质

装配孔为铸铁和钢铁的材质时，可提供给油封外径为橡胶或金属的油封一个好的密封表面，对于铝合金材质的装配孔，使用有橡胶外径的油封有较佳的密封能力。

### (2) 孔的粗糙度

使用铁壳外径油封的孔径表面的粗糙度为  $(0.4\sim 3.2)\mu m Ra$  或如果是使用橡胶外径油封的孔径表面粗糙度则为  $(1.6\sim 3.2)\mu m Ra$ 。

### (3) 孔的倒角

孔的倒角能使油封容易安装，建议角度为 15 ~ 30度。

### (4) 孔径公差

关于孔径公差范围，参考下表：

孔公差(英制)		孔公差(公制)	
孔径	公差	孔径	公差
3.000以下	+/-0.001	10.000以下	+0.022/0
3.001-7.000	+/-0.0015	10.01-18.00	+0.027/0
7.001-12.000	+/-0.002	18.01-30.00	+0.033/0
12.001-20.000	+/-0.003	30.01-50.00	+0.039/0
20.001-40.000	+/-0.004	50.01-80.00	+0.046/0
40.001-60.000	+/-0.006	80.01-120.00	+0.054/0
		120.01-180.00	+0.063/0
		180.01-250.00	+0.072/0
		250.01-315.00	+0.081/0
		315.01-400.00	+0.089/0
		400.01-500.00	+0.097/0

# Article 4: Installation environment of oil seal

## 1.Requirements for axis

In order to provide best oil seal of rotary axis, we shall consider axis material, roughness, hardness, chamfer, tolerance and eccentricity.

### (1)Material of axis

Oil seal can conduct best motion on the carbon steel and stainless steel, heat treatment and nitrogen treatment. It is more suitable for water proof and material of stainless steel with low speed.

### (2)Surface roughness

Surface roughness of axis is one of factor for affecting life of oil seal, surface roughness shall be between  $Ra0.2-0.8\mu m$ . There shall be no any groove mark within area of contact surface.

### (3)Surface hardness of axis

Surface hardness of axis plays an key role in usage life of oil seal, it shall be not less than HRC45; Surface hardness of axis shall be not less than HRC55 if peripheral speed is more than 4m/s.

### (4)Chamfer of axis

Chamfer of axis can guide lip of oil seal enter right place, it is recommended that angle is between  $15^\circ$  and  $30^\circ$ , chamfer shall be no any burr.

### (5)Axial tolerance

Axial tolerance scope refer to below form:





Axis Tolerance(British System)		Axis Tolerance(Metric System)	
Axis diameter	Tolerance	Axis diameter	Tolerance
Less than 4.000	+/-0.003	Less than 3.00	0/-0.006
4.001-6.000	+/-0.004	3.01-6.00	0/-0.075
6.001-10.000	+/-0.005	6.01-40.00	0/-0.090
greater than 10.001	+/-0.006	10.01-18.00	0/-0.110
		18.01-30.00	0/-0.130
		30.01-50.00	0/-0.160
		50.01-80.00	0/-0.190
		80.01-120.00	0/-0.220
		120.01-180.00	0/-0.250
		180.01-250.00	0/-0.290
		250.01-315.00	0/-0.320
		315.01-400.00	0/-0.360
		400.01-500.00	0/-0.400

## (6)Axial eccentricity

Two kinds of axis eccentricity can affect performance of oil seal, the first is static eccentricity(eccentricity between axis and hole), the other is dynamic eccentricity(axis beating);

## (7)Surface processing form of axis

Figure to distinguish the suitable and unsuitable surface texture of the rear axle

 Face turning	The suitable processing way, the processing line is perpendicular to the axis.	 The back of the turning is sanded and the paper is ground laterally	Improper processing method, processing grain and axis into a tilt angle, easy to cause a single specific axis rotation direction oil leakage.
 After turning polishing	Improper processing method, processing grain and axis into a tilt angle, easy to cause a single specific axis rotation direction oil leakage.	 Vertical grinding after turning	The suitable processing way, the processing line is perpendicular to the axis.

## 2.Requirements for hole

We shall consider assembly hole requirements of oil seal, thus, we could meet for suitability of oil seal running. Mainly we shall consider hole material, roughness, chamfer and tolerance.

### (1)Material of hole

Assembly hole is material of cast iron and steel, it can be provided for oil seal if outer diameter of oil seal is a good sealing surface of rubber or metal, as for assembly hole of aluminum alloy, The oil seal with rubber outer diameter has better sealing ability.

### (2)Roughness of hole

Roughness of hole diameter surface is  $(0.4\sim 3.2)\mu m Ra$  when iron outer diameter oil seal is used, or roughness of hole diameter surface is  $(1.6\sim 3.2)\mu m Ra$  when rubber outer diameter oil seal is used

### (3)Chamfer of hole

Chamfer of hole make installation of oil seal easily, recommended angle is between  $15^\circ$  and  $30^\circ$

### (4)Tolerance of hole diameter

Please refer to below figure for tolerance scope of hole diameter:

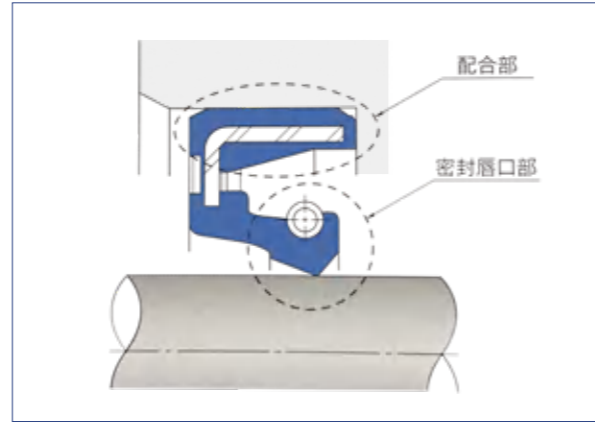
Hole Tolerance(British System)		Axis Tolerance(Metric System)	
Hole diameter	Tolerance	Hole diameter	Tolerance
Less than 3.000	+/-0.001	Less than 10.000	+0.022/0
3.001-7.000	+/-0.0015	10.01-18.00	+0.027/0
7.001-12.000	+/-0.002	18.01-30.00	+0.033/0
12.001-20.000	+/-0.003	30.01-50.00	+0.039/0
20.001-40.000	+/-0.004	50.01-80.00	+0.046/0
40.001-60.000	+/-0.006	80.01-120.00	+0.054/0
		120.01-180.00	+0.063/0
		180.01-250.00	+0.072/0
		250.01-315.00	+0.081/0
		315.01-400.00	+0.089/0
		400.01-500.00	+0.097/0

# 第五篇 油封失效分析

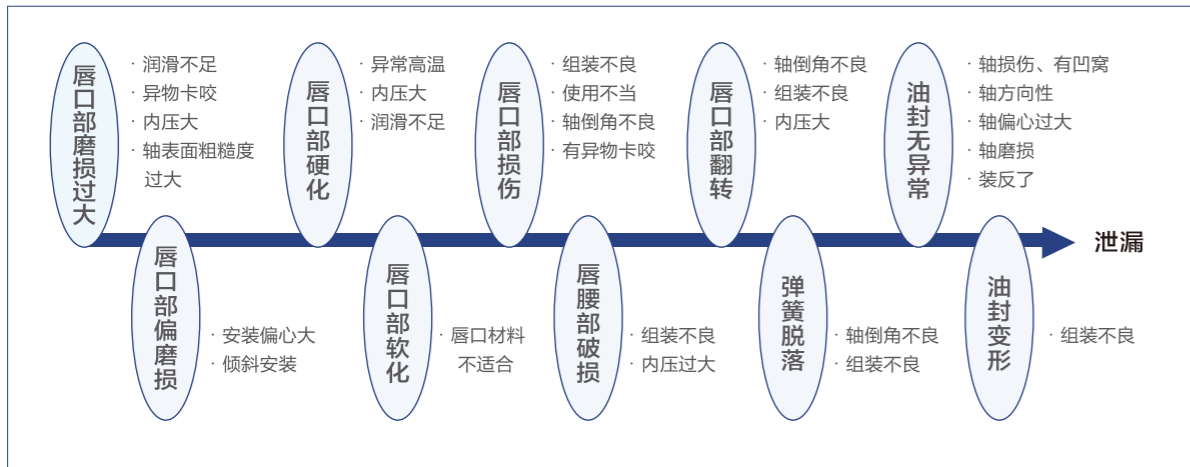
## 1、常见失效原因分析

由油封泄漏如〈图-1.〉所示，可分为由密封唇口部泄漏和由配合部泄漏两类。其各自的代表性泄漏原因见主要原因图〈图-2.〉、〈图-3.〉。

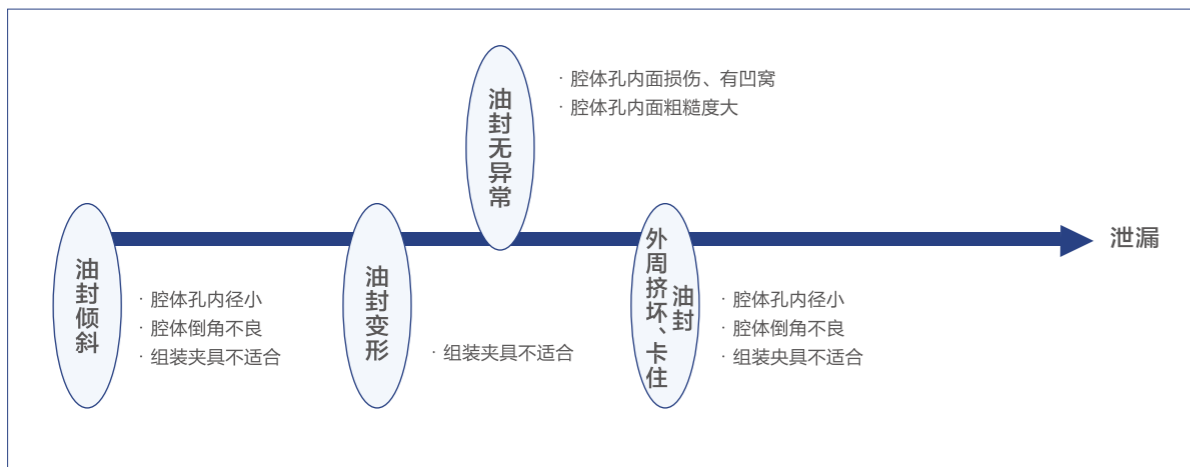
(图一) 油封泄漏的发生部位



〈图-2.〉由唇口部泄漏的主要原因图



〈图-3.〉由配合部泄漏的主要原因图

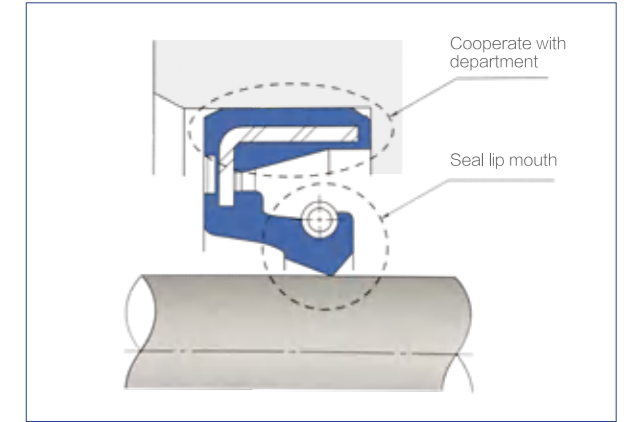


# The fifth part is the failure analysis of oil seal

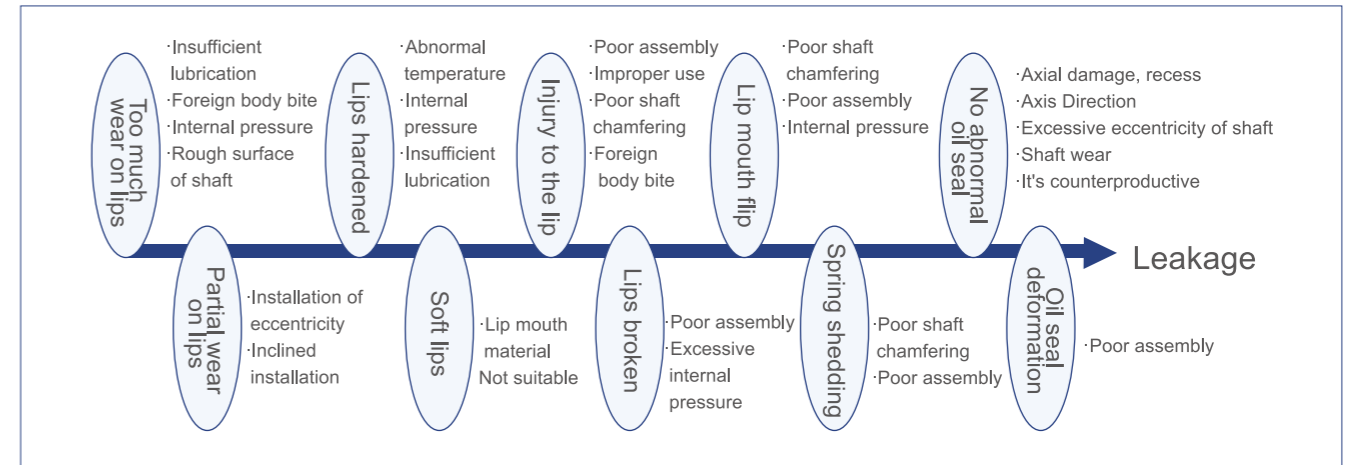
## 1.Common failure cause analysis

As shown in FIG. 1. >, leakage from oil seal can be divided into two types: leakage from seal lip and leakage from mating part. Their respective representative leakage causes are shown in the main cause figure < FIG. 2. > and < FIG. 3. >.

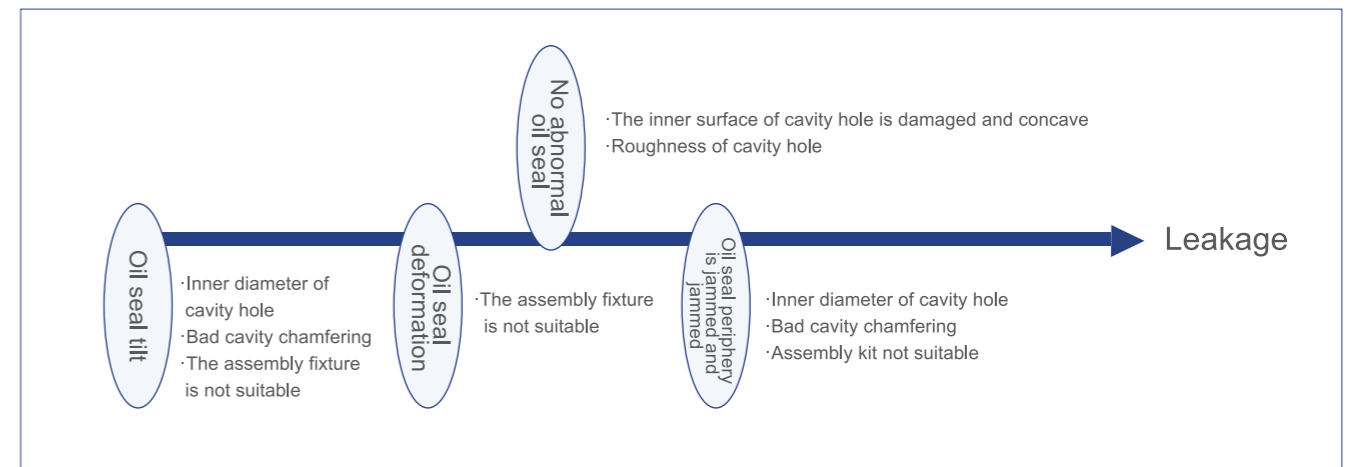
(FIG. 1) The location of oil seal leakage




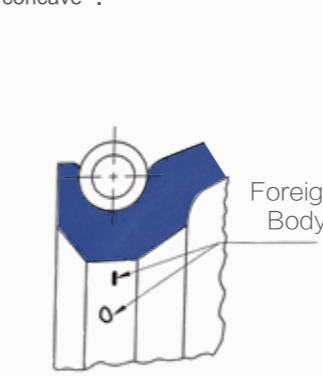
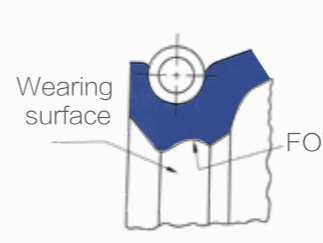
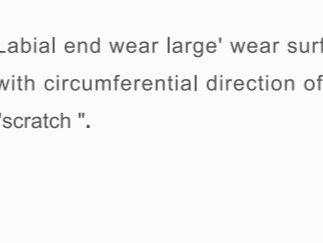
< Figure 2.> Main causes of lip leakage

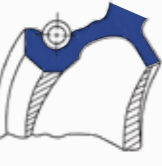
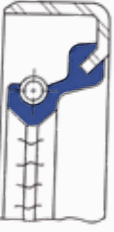


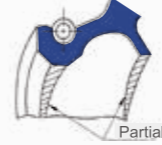


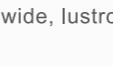
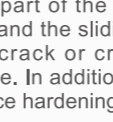
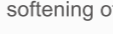
< Fig .3.> Main causes of leakage by mating department





主要原因	故障模式	原因	对策
唇口部磨损过大	润滑不足 唇端部磨损大、磨损面失去光泽。 	<ul style="list-style-type: none"> <li>由于所使用的润滑油在指定量以下,油回不到唇口部,因而在干燥状态下滑动,产生异常磨损。</li> <li>油封附近的结构差,油回不到唇口部。(例)</li> <li>密封唇口部前有甩油环。</li> <li>密封唇口部前有大的排油槽。</li> <li>由于飞沫润滑,在启动后几分钟内油完全回不来。</li> </ul>	<ul style="list-style-type: none"> <li>补充润滑油达到指定量再运转。</li> <li>作为应急处理,可改用双唇口型密封,在两唇口间使用润滑脂进行涂抹。</li> <li>作为永久性对策,可变更油封附近的结构,使油能够回到唇口部。</li> </ul>
	有异物卡咬 唇端部磨损大、有“条纹”或“凹处”。 	<ul style="list-style-type: none"> <li>使用的轴与油封上附着有切屑,切屑粉卡在唇口部。</li> <li>在附着有灰尘的轴上仍照样使用了油封,灰尘卡在唇口部。</li> <li>在唇口部与轴上附着有液态密封胶而仍照样使用,液态密封胶卡在唇口部。</li> <li>油漆机器时在唇口部与轴上附着有涂料而仍照样使用,涂料卡在唇口部。</li> </ul>	<ul style="list-style-type: none"> <li>装配时避免使油封与轴沾染上灰尘和砂土等。</li> <li>使用润滑油清洗机器。</li> </ul>
	内压大 唇端部磨损大、有“凹处”。 	<ul style="list-style-type: none"> <li>油封部的压力超过了设计值。</li> </ul>	<ul style="list-style-type: none"> <li>改用耐压油封。</li> <li>设置通气孔,做成不带压力的结构。</li> </ul>
	唇端部磨损大'磨损面上带有圆周方向的“划痕”。	<ul style="list-style-type: none"> <li>使用的轴表面粗糙度比指定的Ra0.2~0.8 μm要粗,因而产生了异常摩擦。</li> </ul>	<ul style="list-style-type: none"> <li>用金刚砂纸(约#240)修正轴的表面粗糙度至Ra0.2~0.8 μm。绝对不能使金刚砂纸在轴方向移动。</li> <li>更换为指定粗糙度的轴。</li> </ul>

Main causes	Fault mode	Reasons	Countermeasures
Too much wear on lip	Insufficient The end of the lip is worn and the wear surface loses its luster. 	<ul style="list-style-type: none"> <li>Because the lubricating oil used is below the specified amount, the oil can not return to the lip, so it slips in the dry state, resulting in abnormal wear.</li> <li>The structure near the oil seal is poor and the oil can not return to the lip. (example)</li> <li>There is an oil ring in front of the seal lip.</li> <li>There is a large drain tank in front of the sealing lip.</li> <li>Due to droplet lubrication, the oil can not return completely within a few minutes after starting.</li> </ul>	<ul style="list-style-type: none"> <li>Replenish lubricating oil to a specified amount and then run.</li> <li>As an emergency treatment, you can use double lip seal, apply grease between the two lips.</li> <li>As a permanent countermeasure, the structure near the oil seal can be changed so that the oil can return to the lip.</li> </ul>
	Foreign body Lips end wear large, with "stripes" or "concave". 	<ul style="list-style-type: none"> <li>The shaft used is attached to the oil seal with chips, which are stuck in the lip.</li> <li>The oil seal is still used on the dusty shaft, and the dust is stuck in the lip.</li> <li>Liquid sealant is attached to the lip and shaft, and the liquid sealant is stuck in the lip.</li> <li>Attach lip and shaft to paint machine Paint and still use, paint card At the mouth of the lip.</li> </ul>	<ul style="list-style-type: none"> <li>Avoid contamination of oil seals and shafts with dust and sand during assembly.</li> <li>Use lubricating oil to clean the machine.</li> </ul>
	Internal pressure Lips end wear large, have "concave". 	<ul style="list-style-type: none"> <li>The pressure of the oil seal exceeds the design value.</li> </ul>	<ul style="list-style-type: none"> <li>Use a pressure oil seal.</li> <li>Set the vent to make a structure without pressure.</li> </ul>
	Labial end wear large' wear surface with circumferential direction of the "scratch". 	<ul style="list-style-type: none"> <li>he surface roughness of the shaft used is thicker than the specified Ra0.2~0.8μm. Therefore, abnormal friction is produced.</li> </ul>	<ul style="list-style-type: none"> <li>Correct the surface roughness of the shaft to Ra0.2~0.8μm with Emery Paper (about #240). absolutely can not make emery paper move in axis direction.</li> <li>Replace the shaft with the specified roughness.</li> </ul>

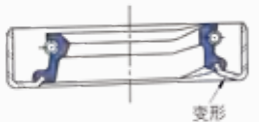
主要原因	故障模式	原因	对策
唇口部不均匀磨损	安装偏心大 	唇口滑动宽度在圆周上不均匀，最小宽度与最大宽度的位置大致对称。 ● 在轴与腔体中心错位的状态下安装并运转。 ● 在轴朝一个方向挠曲的状态下运转。	● 提高轴与腔体的同心度精度。 ● 提高针对轴"挠曲"的强度。
	倾斜安装 	唇口滑动宽度在圆周上不均匀，最小宽度与最大宽度的位置大致对称。且密封唇口部与防尘唇口部的滑动宽度的大小关系相反。 ● 腔体内径尺寸明明比指定尺寸要小，却勉强将油封打进去，导致油封被倾斜安装。 ● 腔体未进行倒角加工或不当地勉强将油封打进去，导致油封被倾斜安装。 ● 由于组装夹具倾斜而安装得倾斜。	● 使用指定尺寸的腔体。 ● 对腔体进行倒角加工或做成适当尺寸。 ● 改进组装夹具。
唇口部硬化	异常高温 	唇口滑动部光滑、有光泽，整个唇口硬化，发生了龟裂。 ● 密封唇口部附近的油温由于某种原因而上升，超过了橡胶的耐热极限。 ● 因为条件差异等因素油温比设计时预想的温度更高，超过了耐热极限。	● 查出原因后，防止温度上升。 ● 改用耐热性良好的唇口材料的油封。(例)丁腈橡胶-丙烯酸酯橡胶(NBR)(ACM) 丙烯酸酯橡胶-氟橡胶(ACM)(FKM) (变更唇口材料时，注意与耐油性的关系。)
	内压大	唇口滑动宽度广、有光泽，唇口发生了龟裂。 ● 超过油封的耐压限度	● 改用耐压油封。 ● 设置通气孔，做成不带压力的结构。
	润滑不足	唇口滑动部光滑、有光泽，唇口滑动面发生了龟裂或用手指按时会发生龟裂。另外，只在滑动面上硬化的情况较多。 ● 由于所使用的润滑油在指定量以外，到唇口部的油少，润滑不足。 ● 由于是飞沫润滑，到唇口部的油少，润滑不足。	● 加入润滑油达到指定量再运转。 ● 作为应急处理，可改用防尘型密封，在唇口间涂抹润滑脂。 ● 作为永久性对策，可变更油封附近的结构，使油能够充分覆盖唇口部。
唇口部软化	唇口材料不合适 	唇口部溶胀、软化。 ● 针对所用润滑油，选错了唇口材料，因此唇口部发生了溶胀。 ● 用洗油或汽油浸渍了油封，或在清洗后液体未擦拭干净的状态下放置，因而发生了溶胀。	● 针对所用润滑油，改用唇口材料不溶胀的油封。 ● 改用不会使唇口材料发生溶胀的油。 ● 不清洗油封。

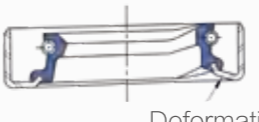
Main causes	Fault mode	Reasons	Countermeasures
Uneven wear on lips	Installation of eccentricity 	The sliding width of the lip is uneven on the circumference, and the position of the minimum width and the maximum width is approximately symmetrical. ● Install and operate in the state of misalignment between the shaft and the center of the cavity. ● Run in a state where the axis flexes in one direction.	● Improve the concentricity accuracy of shaft and cavity. ● Improve the strength of the "flexure" for the axis.
	Inclined installation 	The sliding width of the lip is uneven on the circumference, and the position of the minimum width and the maximum width is approximately symmetrical. The relationship between the sliding width of the sealing lip and the dustproof lip is opposite. ● The inner diameter of the cavity is smaller than the specified size, but the oil seal is forced into it, resulting in the oil seal being tilted. ● The cavity is not chamfering or improperly forced to insert the oil seal, resulting in the oil seal being tilted. ● Inclined installation due to tilt of assembly fixture.	● Use a cavity of the specified size. ● Chamfer the cavity or make the appropriate size. ● Improve assembly fixture.
Lips hardened	Abnormal temperature 	The sliding part of the lip is smooth and glossy, and the whole lip is hardened and cracked. ● The oil temperature near the seal lip increases for some reason, exceeding the heat resistance limit of rubber. ● Because of the difference of conditions and other factors, the oil temperature is higher than the expected temperature in the design, which exceeds the heat resistance limit.	● After finding out the cause, prevent the temperature from rising. ● Use oil seal with good heat resistance lip material. butyl rubber - acrylate rubber (NBR)(ACM) acrylate rubber - fluorine rubber (ACM)(FKM) Pay attention to the relationship with oil resistance when changing lip material.)
	Internal pressure 	Lips gliding wide, lustrous, lips have cracked. ● Over pressure limit of oil seal	● Use a pressure oil seal. ● Set the vent to make a structure without pressure.
	Insufficient lubrication 	The sliding part of the lip is smooth and glossy, and the sliding surface of the lip will crack or crack with the finger on time. In addition, only on the sliding surface hardening more. ● Because of droplet lubrication, less oil to the lip, insufficient lubrication.	● Add lubricating oil to the specified amount and then run. ● As an emergency treatment, you can use dust-proof dense Yin, apply grease between lips. ● As a permanent countermeasure, the structure near the oil seal can be changed so that the oil can fully cover the lip.
Soft lips	Lips not suitable 	Swelling and softening of lip. ● For the use of lubricating oil, the wrong lip material, so the lip swelling. ● The oil seal is impregnated with washing oil or gasoline, or placed in a state where the liquid is not cleaned after cleaning, thus swelling occurs.	● For the use of lubricating oil, use lip material not swelling oil seal. ● Use oil that does not cause swelling of lip material. ● Do not clean the oil seal.

主要原因	故障模式	原因	对策	
唇口部损伤	组装不良	●油封通过键槽与花键上时，与锐角边接触带来损伤。	●给键槽与花键装上罩子等以免"损伤"。	
		●在轴的倒角部带有“毛边”或“飞边”的状态下安装了油封而带来了损伤。	●去除“毛边”、“飞边”。	
	使用不当	●在搬运与保管油封时，锐利的金属零件与唇口部接触，使唇端部一受到"损伤"。	●改善搬运、保管方法。	
		●戴上带有切屑粉的手套操作了油封，使唇端部受到了“损伤”。	●不接触唇端部。	
轴倒角不良	唇端部带有肉眼可见“损伤”。	●因轴端倒角尺寸及角度不正确而使唇口部卡在轴端，带来了"损伤"。	●正确进行轴的倒角加工。	
有异物卡咬	●唇端部附着有异物。 ●唇口滑动部有“凹坑”。	●因使用了附着切屑粉的轴而使切屑粉在唇端部卡咬。	●清洗机器。	
		●因使用了附着金属粉的轴而使金属粉在唇端部卡咬。		
唇口部翻转	轴倒角不良	在将油封插入轴的方向上有一部分唇口部朝反方向翻转。	●因轴端倒角尺寸及角度不正确而使唇口部卡在轴端，唐口部发生了翻转。	●确保轴的倒角尺寸及角度正确，组装时在倒角部涂抹润滑脂。
	组装不良		●因轴与腔体不同心，装配粗糙而使唇口部发生了翻转。	●使轴与腔体孔同心，注意装配。此时，也要在轴端涂抹润滑脂。
	内压过大	唇部圆周上有一部分或全部向外部翻转。 	●因在运转中产生了异常高压，而在唇口部有异常的力作用，使唇口部发生了翻转。	●改良为不带压力的结构。 ●使用耐压油封。
唇口腰部破	组装不良	唇口腰部有龟裂	●组装时压坏了唇口部而使腰部产生了龟裂。	●使轴与腔体孔同心，注意装配。
			●在装配后进行耐压试验（气密性试验等）时，压力过大，油封腰部产生了龟裂。	●检验时不要采用超过油封耐压规格的压力试验。
	内压过大		●在运转过程中产生了比设计时预想的压力高的压力，油封腰部产生了龟裂。	●改用耐压油封。 ●改为不会产生过大压力的结构。


Main causes	Fault mode	Reasons	Countermeasures
Injury to the lip	Poor assembly	● When the oil seal passes through the keyway and the spline, contact with the sharp edge brings damage.	● Fit the keyway and spline with a mask to avoid "damage".
	Improper use	● The oil seal is installed in the chamfering part of the shaft with "edge" or "flange" to cause damage.	● remove "wool edge," fly edge".
		● When the oil seal passes through the keyway and the spline, contact with the sharp edge brings damage.	● Improve handling and storage methods.
	Poor shaft chamfering	● Wearing gloves with chip powder to operate the oil seal, so that the lip end was "damaged".	● Do not touch the end of the lip
Foreign body bite	Lip tip with naked eye visible "damage".	● Because the chamfer size and angle of the shaft end are incorrect, the lip is stuck at the shaft end, which brings "damage".	● Correct chamfering of shaft.
		● The chip powder is bitten at the end of the lip because of the use of a shaft attached to the chip powder. ● The metal powder is bitten at the end of the lip by using a shaft attached to the metal powder. ● There is a foreign body bite at the end of the lip due to the use of long-term shaft and oil seals placed in dusty places.	● Cleaning machine.
Lip-mouth flip	Poor shaft chamfering	● Because the chamfering size and angle of the shaft end are incorrect, the lip is stuck at the shaft end, and the Tang mouth is flipped.	● Make sure the chamfering size and angle of the shaft are correct and apply grease to the chamfering part during assembly.
	Poor assembly	In the direction of inserting the oil seal into the shaft, a part of the lip is flipped in the opposite direction.	● Because the shaft and cavity are different, the assembly is rough and the lip is flipped.
	Excessive internal pressure	Part or all of the circumference of the lip flips outward. 	● Because of the abnormal high pressure in operation, and the abnormal force in the lip mouth, the lip mouth has flipped.
Broken lip, broken waist	Lips and loins 	● The assembly crushed the lip and cracked the waist.	● Make the shaft concentric with the cavity hole, pay attention to assembly.
		● When the pressure test (air tightness test, etc.) is carried out after assembly, the pressure is too large and the oil seal waist cracks.	● Do not use pressure test exceeding the pressure specification of oil seal during inspection.
Excessive internal pressure	● During the operation, the pressure is higher than expected, and the oil seal waist cracks.	● Use a pressure oil seal. ● Instead of creating too much pressure.	



主要原因		故障模式	原因	对策
弹簧脱落	轴倒角不良	“弹簧”有一部分或全部脱落。	● 因轴端倒角尺寸及角度不正确而使唇口部卡在轴端，“弹簧”脱落。	● 确保轴的倒角尺寸及角度正确，组装时在倒角部涂抹润滑脂。
	组装不良		● 因组装时轴与腔体孔不同心，装配粗糙而使“弹簧”脱落。	● 使轴与腔体孔同心，注意装配。此时，也要在轴端涂抹润滑脂。
油封变形	组装不良	油封变形，变形部位唇口的滑动宽度发生了变化。 	● 因油封组装夹具不正确而使油封发生了变形。	● 改进组装夹具。
油封无异常	有凹窝、轴损伤	—	● 在轴的滑动部有肉眼可见的“损伤”、凹窝。	● 在油封上垫一块垫片，使滑动位置挪动。 ● 对“损伤”处进行修正加工。
	轴的方向性	—	● 使用了车床加工后未处理表面的轴。 ● 用砂轮、金刚砂纸进行精加工时，挂上了进给。	● 仅在唇口滑动部，用金刚砂纸(#240)不挂上进给进行修正。 ● 改变加工方法(改用在轴方向不挂上进给进行精加工的方法。)
	轴偏心	—	● 因轴承异常而使轴的偏心比设计值更大。 ● 结构上轴的偏心大，却使用了通用油封。	● 更换轴承。 ● 更换成可承受较大偏心的特殊油封。
	轴磨损	—	● 安装了附着有灰尘、切屑粉的油封。 ● 润滑油变质、混入异物。 ● 异物从外部侵入，卡咬在了唇口滑动部。 ● 轴上使用了有色金属。	● 清洗机器，于装配时在油封上垫一块垫片，使滑动位置挪动。 ● 灰尘量轻微时，使用带防尘唇的油封或盖上防尘罩。 ● 使用适当的轴材料。
	装反了	—	● 组装时装错	● 使密封唇口部朝密封介质侧安装。

Main causes		Fault mode	Reasons	Countermeasures
Spring shedding	Oil seal deformation	The spring falls off in part or in whole.	● The lip is stuck at the shaft end because the chamfer size and angle are incorrect, and the spring falls off.	● Make sure the chamfering size and angle of the shaft are correct and apply grease to the chamfering part during assembly.
	Poor assembly		● Because the shaft and cavity hole are different, the assembly is rough and the spring falls off.	● Make the shaft concentric with the cavity hole, pay attention to assembly. At this point, also apply grease at the end of the shaft.
Oil seal deformation	Poor assembly	The sliding width of the lip of the deformed part has changed.  Deformation	● The oil seal is deformed because the oil seal assembly fixture is incorrect.	● Improve assembly fixture.
No abnormal oil seal	Axial damage, concave	—	● In the sliding part of the shaft there are visible "damage", recess.	● Pad a gasket on the oil seal to move the sliding position. ● Correct the damage.
	Directionality of the axis	—	● A shaft with an untreated surface machined by a lathe was used. ● When finishing with grinding wheel and emery paper, the feed was put up.	● Only in the lip sliding part, with Emery Paper (#240) do not hang feed correction. ● Change the processing method (to use in the direction of the shaft without hanging feed for finishing.)
	Axial eccentricity	—	● Because of the abnormal bearing, the eccentricity of the shaft is larger than the design value. ● The eccentricity of the upper shaft of the structure is large, but the general oil seal is used.	● Replace bearings. ● Replace with a special oil seal that can withstand large eccentricity.
	Shaft wear	—	● The oil seal with dust and chip powder is installed. ● Lubricating oil deterioration, mixed with foreign bodies. ● The foreign body invaded from the outside and bit in the sliding part of the lip. ● Nonferrous metals are used on the shaft.	● Cleaning machine, oil seal padded during assembly ● Block gasket to move the sliding position. When dust is slight, use oil seal with dust-proof lip or cover dust shield. ● Use appropriate shaft materials.
	It's counterprod	—	● Wrong assembly	● Install the sealing lip towards the sealing medium side.

主要原因	故障模式	原因	对策
油封倾斜安装	[拆卸油封前] ● 目测可知油封相对于腔体及轴来说是倾斜的。  [拆卸油封后] ● 油封配合部的接触不均匀	● 腔体孔尺寸明明比指定尺寸要小, 却勉强将油封打进去, 导致油封被倾斜安装。	● 使用指定的腔体孔内径尺寸。
		● 腔体未进行倒角加工或不当地勉强将油封打进去, 导致油封被倾斜安装。	● 对腔体进行倒角加工或做成适当尺寸。
		● 由于组装夹具倾斜而安装得倾斜。	● 改进组装夹具。
油封变形	● 配合痕迹局部中断。  	● 因油封组装夹具不正确而使油封发生了变形。	● 改进组装夹具。
		● 因装入了使用时产生了局部变形的油封, 而使配合部产生了“空隙”。	● 使用时, 请注意避免掉落或碰撞硬物。
油封配合部卡住、挤坏	[拆卸油封后] ● 油封配合部轴方向上有“损伤”或橡胶“挤坏”。	● 腔体孔内径尺寸明明比指定尺寸要小, 却勉强将油封打进去, 导致油封被倾斜安装, 配合部受到了“损伤”。	● 使用指定的腔体孔内径尺寸。
		● 腔体未进行倒角加工或不当地勉强将油封打进去, 导致油封的外周受到了“损伤”。	● 对腔体进行倒角加工或做成适当尺寸。
		● 因在油封组装夹具与腔体未达到平行度的状态下安装了油封, 而使油封配合部“挤坏”。	● 使组装用夹具与腔体的平行度达到要求。
油封无异常	——	● 安装了在腔体孔内面或油封配合部附着有切屑粉等异物的油封, 而使腔体孔内面受到了“损伤”。	● 在腔体孔内面的“损伤”、凹窝里薄薄地涂上一层液态密封胶。但注意不要使液态密封胶附着在油封的唇口部或轴上。
		● 因反复组装与卸下油封, 而使腔体孔内面受到了“损伤”。	● 卸下油封, 确认腔体孔倒角部有无“毛边”。若有, 则使用金刚砂纸去除, 并在腔体孔内面涂抹液态密封胶。
	——	● 腔体孔内面有大的凹窝。	● 在未去除腔体孔倒角部的“毛边”的情况下安装了油封, 而使腔体孔内面受到了“损伤”
	——	● 腔体孔内面粗糙度粗。	● 应急处理在腔体孔内面涂抹液态密封胶。 ● 永久性对策使腔体孔内面粗糙度适宜。

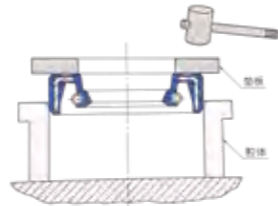
Main causes	Fault mode	Reasons	Countermeasures
Oil seal tilt mounting	● [Before removing the oil seal] Visual measurement shows that the oil seal is relative to the cavity and shaft It is inclined.  ● [After removing the oil seal] Uneven contact of oil seal fitting part	● The cavity hole size is obviously smaller than the specified size, but the oil seal is forced into it, resulting in the oil seal being tilted.	● Use the specified cavity hole inner diameter size.
		● Cavity not chamfered or improperly machined Barely put the oil seal in, resulting in the oil seal being tilted to install.	● Chamfer the cavity or make the appropriate size.
		● The installation is tilted due to the tilt of the assembly fixture.	● Improve assembly fixture.
Oil seal deformation	● Local interruption with trace.  	● The oil seal is deformed because the oil seal assembly fixture is incorrect.	● Improve assembly fixture.
		● The oil seal with local deformation is produced when it is loaded into use, and the fitting part produces "void".	● When using, be careful not to drop or collide with hard objects.
The oil seal fit is jammed and crushed	● [After removing the oil seal] There is "damage" in the shaft direction of oil seal fitting part ".or rubber "squeezed out ".	● The inner diameter of the cavity hole is obviously smaller than the specified size, but the oil seal is forced into it, which results in the oil seal being tilted and installed, and the matching part is "damaged".	● Use the specified cavity hole inner diameter size.
		● The cavity is not chamfering or improperly forced to seal the oil, resulting in the oil seal peripheral suffered "damage".	● Chamfer the cavity or make the appropriate size.
		● Because the oil seal is installed in the condition that the assembly fixture and the cavity are not parallel, the oil seal matching part is "squeezed out".	● Make the assembly fixture and cavity parallelism to meet the requirements.
No abnormal oil seal	——	● Installed inside cavity hole or oil seal fit An oil seal attached to a foreign body such as chip powder, The inner surface of the cavity hole is "damaged".	● Apply a thin layer of liquid sealant to the "damaged" and recesses of the cavity hole. But be careful not to attach liquid sealant to the lip or shaft of the oil seal.
		● Cavity caused by repeated assembly and removal of oil seals The inner surface of the body hole was "damaged".	● Remove the oil seal and confirm that the chamfering part of the cavity hole has "edge". If yes, use Emery Paper to remove and apply liquid sealant to the inner surface of the cavity hole.
	——	● The inner surface of the cavity hole has a large concave nest.	● Apply liquid density to the inner surface of cavity hole Sealant.
	——	● The oil seal is installed without removing the "edge" of the chamfering part of the cavity hole to make the cavity The inner surface of the hole was "damaged"	● The permanent countermeasure makes the inner surface roughness of cavity hole suitable.
	——	● The inner surface of the cavity hole is rough.	

# 安装方法

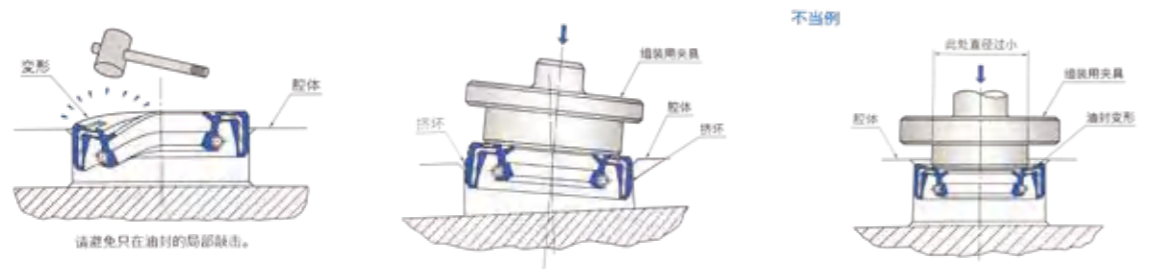
油封安装前,请确认油封唇部没有脏污并且不可让油封唇部变形或遭到破坏  
油封安装前可在油封唇部涂抹些许润滑脂(牛油)让油封唇部密封处先有些许润滑  
请小心地安装油封,并且确认清楚油封的密封面需朝向流体侧

## 油封安装

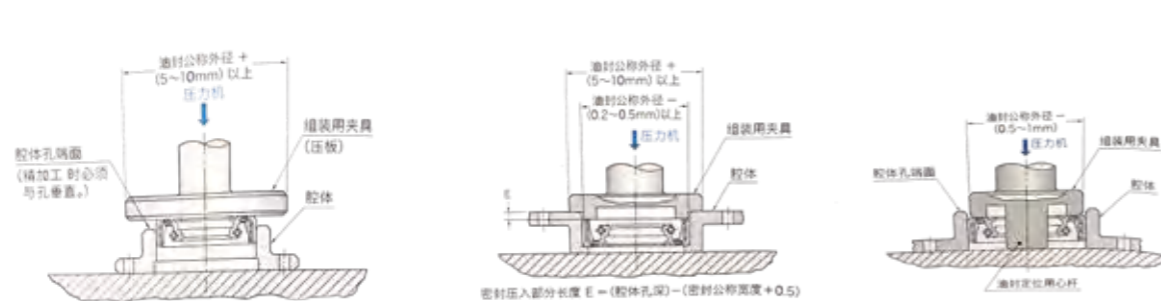
安装过程中需要使用安装治具以避免油封安装歪斜建议使用油压或机械设备安装油封至孔定位。



错误的安装会造成油封安装于孔时歪斜,甚至造成油封损坏而泄漏,请务必使用正确的安装工具以防止油封变形。



如果使用槌子或手压台安装油封,必须使用安装治具避免油封损坏使用槌子安装油封时,请务必均匀施力于整个油封面部。



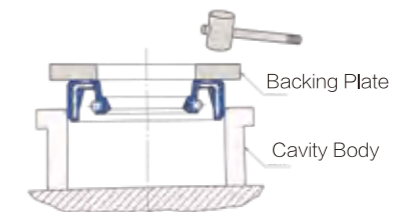
# Installation method

Before the oil seal is installed, please make sure the lip of the oil seal is not dirty and do not deform or destroy the lip of the oil seal

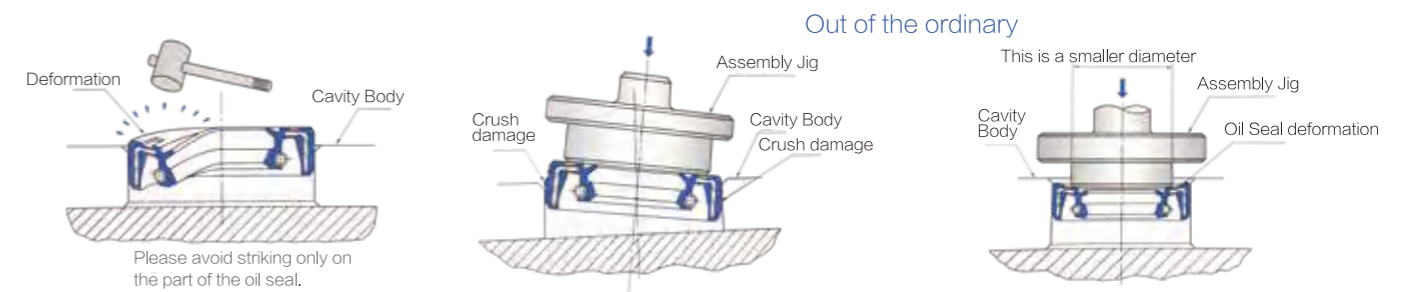
Apply a little grease (butter) to the lip of the oil seal before the oil seal is installed. Please install the oil seal carefully and make sure that the sealing surface of the oil seal is oriented towards the fluid side

## Oil seal installation

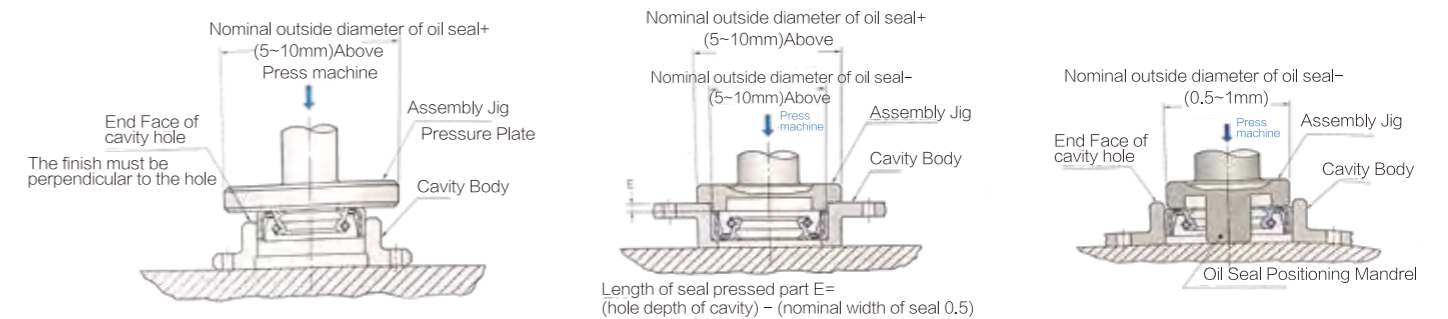
Installation fixture should be used during installation to avoid oil seal installation deviation. Oil pressure or mechanical equipment should be used to install oil seal to hole location.



The wrong installation will cause the oil seal installed in the hole when the skew, or even cause oil seal damage and leakage, please be sure to use the right installation tools to prevent oil seal deformation.



If using hammer or hand pressure table to install oil seal, must use installation fixture to avoid oil seal damage when using hammer to install oil seal, be sure to apply uniform force to the whole oil seal face.



项次 Item	型式 Form	规格 Specification
1	AJ1	25*52/60*10/18
2	AJ1	35*62/70*11/19
3	BOOT	4.5*20*42
4	BUSHING	7*8.2*7
5	BUSHING	9*10.2*8
6	BUSHING	10.4*25*31/36
7	BUSHING	14*22*10
8	BUSHING	15*20*16
9	BUSHING	16.4*35*54/60
10	BUSHING	20*30*13
11	COR	22*30*7
12	DB	80*105*20
13	DC	16*30*8
14	DC	17*28*6.5
15	DC	18*30*8/10
16	DC	20*40*8
17	DC	25*42*10
18	DC	32*52*12
19	DC	40*62*10
20	DC	80*105*20
21	DC4S	20*46.2*7/10.5
22	DCA Y	38*64*11/13.5
23	DCN	17*28*6.5
24	DCN	17*40*7
25	DCN	20*35*8
26	DCN	20*40*8
27	DCN	25*40*8
28	DCN	32*52*10
29	DCN	32*52*12
30	DCN	35*56*12
31	DCN	35*65*15
32	DCN	45*65*12
33	DCNY	15*26*7
34	DCNY	20*35*8
35	DCNY	25*40*10
36	DCNY	32*52*10
37	DCNY	32*52*12
38	DCNY	35*56*12
39	DCNG1	22*35*7
40	DCY	20*39*11
41	DG	90*125*13
42	DG	95*170*13
43	DG	118*150*12
44	DG	100*120*13
45	DGY	8*26*8/11
46	GASKET	109*1.3
47	GASKET	225.20*176.55*3
48	KB	37*51*8
49	KB	80*105*8

项次 Item	型式 Form	规格 Specification
50	KB	85*110*8
51	KBCJ	15*20/26*15.5
52	KBP	25*36.7/41.5*6/8.5
53	KBP	38*53/58*6.2/8.8
54	KBY	32*40.8/43.8*9/9.5
55	KC	6.35*21*10/12.3
56	KC	7*13*4
57	KC	8*17*3
58	KC	12*18*5
59	KC	15*42*3
60	KC	20*30*5
61	KC	22*35*7
62	KC	34*41*4
63	KC	40*54*7
64	KC	40*55*7
65	KC	45*65*5
66	KC	50*68*7
67	KC	150*180*14
68	KC4	20*35*7/11
69	KC4	25*40*8/11
70	KC4Y	6.5*17.2*8
71	KC4Y	7.6*17.2*8
72	KC4Y	8*17*8
73	KC6	45*65*8/10
74	KCJ	15.9*20*8/8.5
75	KCY	16.9*25*5/7
76	KCY	18*29*6/8.6
77	KCY	27*38*1.4/2
78	KG	8*14*4
79	KG	9*16*5
80	KG	20*35*4
81	KG	20*40*5
82	KG	25*40*7
83	KG	30*55*5
84	KG	40*54*7
85	KG	40*72*7
86	KG	50*100*10
87	KG	63*80*9
88	KG	80*100*8
89	KG	95*105*6
90	KG	100*125*10
91	KG2	4*13.5*5
92	KG4	12*20*4/5.8
93	KG4	32*42*7
94	KG4	36*47*7
95	KGY	8*16*5
96	KGY	9*16*5
97	KGY	9*17.5*4
98	KGY	9*18*5

项次 Item	型式 Form	规格 Specification
99	KGY	10*18*5
100	KXC	30*47*10
101	KXC2	40*62*10
102	KXC2	45*65*8
103	KXC2	45*72*10
104	L	25*28/29.8*3.8
105	L	30*33/35*3.7
106	L	50.75*69.9*2.5
107	OKC9	100*134*22/37
108	OKCY	60*125*15/32
109	O-RING	38.6*1.2
110	O-RING	106.8*9.3
111	O-RING	107.5*9.3
112	OVB1	51.4*109.4*11.95
113	OVB2	47*117.99*9.9
114	OVB2	49.8*118.1*10.28
115	OVBG	35.4*107.2/114.5*35.5/47.5
116	OVBG	38.9*111.97/126.5*36.5/47.5
117	OVBJ1	52.2*113.97/142.8*21.6
118	OVB Y	75.5*101*2.3/4.4
119	OVCY	95*110*48
120	OVCY	95*117*48
121	PA1L3	22*35*8
122	PA1L3	22*44*7
123	PA1L3	25*40*7
124	PA2L3	21.5*30*6
125	PA5	85*110*9.5/10
126	PA6	74.5*100*10
127	RE1	15*32*4/6
128	RE1	20*37*4/6
129	RE1	25*42*4/6
130	RE1	30*48*4.5/6.5
131	RE1	40*58*4.5/6.5
132	RE1	45*63*4.5/6.5
133	RE1	50*72*5.5/7.5
134	RE1	60*82*5.5/7.5
135	RE1	65*87*5.5/7.5
136	RE1	75*97*5.5/7.5
137	RE1	80*102*5.5/7.5
138	RE1	85*107*5.5/7.5
139	RE1	95*117*5.5/7.5
140	RE1	100*122*5.5/7.5
141	RING	15*22*3
142	RING	15.5*2.5
143	RING	18.4*2.5
144	RING	19.5*2.5
145	RING	20*2.5
146	RING	21.5*2.5
147	RING	22*2.5

项次 Item	型式 Form	规格 Specification
148	RING	22*29*3
149	RING	23.5*2.5
150	RING	25.5*2.5
151	RING	26*2.5
152	RING	26.8*2.5
153	RING	28*35*3
154	RING	28.5*2.5
155	RING	30.5*40*4
156	RING	32.5*2.5
157	RING	35*2.5
158	RING	45.5*5.5
159	RING	55*5.5
160	RING	99.5*113*24
161	SA	69.85*88.9*10.3
162	SB	15.84*27*6.35
163	SB	18*30*7
164	SBC	11*21*6
165	SBC	15.6*34.5*6
166	SBCJ	15.6*34.5/39*5.3/6.3
167	SC	0.312*0.750*0.250
168	SC	0.625*1.125*0.245
169	SC	6*16*5
170	SC	6*16*6
171	SC	8*14*4
172	SC	8*18*7
173	SC	8*22*4.5
174	SC	10*18*4
175	SC	10*19*4
176	SC	10*21*4
177	SC	10*22*6
178	SC	12*22*5
179	SC	12*24*4.5
180	SC	12*24*5
181	SC	12*37*7
182	SC	12*42*5
183	SC	13*24*5
184	SC	13*25*7
185	SC	14*25*5.5
186	SC	14.7*22*7
187	SC	14.7*26.7*7
188	SC	15*24*5
189	SC	15*25*5
190	SC	15*28*6.5
191	SC	15*30*7
192	SC	17*30*6
193	SC	17*32*7
194	SC	20*28*4.5
195	SC	20*30*9
196	SC	20*33*3

项次 Item	型式 Form	规格 Specification
197	SC	20*35*5
198	SC	20*35*7
199	SC	20*40*7
200	SC	22*31*5
201	SC	24*40*10
202	SC	25*40*7
203	SC	25*42*10
204	SC	25*47*5
205	SC	28*48*4
206	SC	28.58*38.08*5
207	SC	30*45*5
208	SC	30*47*7
209	SC	32*42*7
210	SC	32*45*7
211	SC	33*45*7
212	SC	34*46*8
213	SC	35*45*4
214	SC	38*50*7
215	SC	39*55.5*9
216	SC	40*56*7
217	SC	41*62*10
218	SC	46*60*7
219	SC	50*70*10
220	SC	85*110*15
221	SC	115*140*10
222	SCN	8*14*5
223	SCN	20*35*6
224	SCN	25*40*7
225	SCN	35*56*12
226	SCN	38*58*12
227	SCN	42*70*10
228	SCN	45*62*7
229	SCNG	27*37*5
230	SCNG	28*38*4
231	SCNG	28.56*42.1*5.5
232	SCNG	32*45*5.5
233	SCNG	32*45*6
234	SCNG	35*48*5.5
235	SCNG	35*52*6
236	SCNG	40*60*6
237	SCNG	45*55*7
238	SCNG	45*65*7
239	SCNG	55*70*8
240	SCNGW12	27*37*5
241	SCNGW12	28*38*4
242	SCNGW12	28.5*42*4.8
243	SCNGW12	32*45*5.5
244	SCNGW12	32*45*6
245	SCNGW12	35*48*4.8

项次 Item	型式 Form	规格 Specification
246	SCNGW12	35*48*5.5
247	SCNGW12	38*50*4.8
248	SCNGW12	38*50*6
249	SCNGW12	45*65*6
250	SCNGW12	45*65*7
251	SCNGW12	55*70*8
252	SCNGW12	55*80*7
253	SCNY	22*38*10
254	SCNY	28*50*7
255	SCNY	35*56*12
256	SCNY	38*58*12
257	SCNY	42*70*10
258	SC-PL	90*110*10
259	SCV	8*18*4
260	SCV	8*22*6
261	SCV	10*20*5
262	SCV	15*25*5
263	SCV	15*25*8
264	SCV	20*30*4.5
265	SCV	20*35*5
266	SCV	25*35*6
267	SCV	30*40*5
268	SCV	30*70*9
269	SCV	38*47*5
270	SCV	45*55*5
271	SCV	45*60*7
272	SCV	65*85*8
273	SCV	70*90*7
274	SCJ	17*28/34.6*3.4/4
275	SCY	8*22*6
276	SCY	20*36*4.5
277	SG	12*30*7
278	SG	16*24*4
279	SG	30*40*6
280	SG	32*55*5
281	SGR9	130*160*8
282	SGV	10*20*5
283	SGV	15*25*5
284	SGV	38*48.1*5.8
285	SGV	55*65*5
286	SGV-PL	35*50*8
287	SGV-PL	40*52*5
288	SGV-PL	45*60*6
289	SGV-PL	45*68*12
290	SGV-PL	55*78*12
291	SGV-PL	58*72*8
292	SGV-PL	60*80*8
293	SGV-PL	60*100*10
294	SGV-PL	65*90*10

项次 Item	型式 Form	规格 Specification
295	SGV-PL	70*95*10
296	SGV-PL	80*100*10
297	SGV-PL	85*110*10
298	SLEEVES	47*52*18
299	SQ	15.5*2.5*4
300	SQ	17.8*2.5*4
301	SQ	18.4*2.5*4
302	SQ	19.5*2.5*4
303	SQ	20*2.5*4
304	SQ	21.5*2.5*4
305	SQ	22*2.5*4
306	SQ	22*4*2.5
307	SQ	23.5*2.5*4
308	SQ	24.3*2.5*4
309	SQ	24.8*2.5*4
310	SQ	25.7*2.5*4
311	SQ	26*2.5*4
312	SQ	26*4*2.5
313	SQ	26.8*2.5*4
314	SQ	27.8*2.5*4
315	SQ	28.5*2.5*4
316	SQ	31.2*2.5*4
317	SQ	32.5*2.5*4
318	SQ	35*2.5*4
319	SQ-RING	5.5*9.6*1.72
320	SQ-RING	32*42*4
321	ST1	30*61/62*8/14.5
322	ST2	25*46/47*10/15
323	TB	24.61*42.88*7.95
324	TB	25*40*8
325	TB	25*40*12
326	TB	63.5*82.7*10
327	TB	69.9*90*12.7
328	TB	80*105*12
329	TB	100*120*13
330	TB	100*125*12
331	TB	190*225*16
332	TBCN	16*30*7
333	TBGNY	12*25*7
334	TC	4*12*6
335	TC	5*12*5
336	TC	5*15*5
337	TC	6*16*7
338	TC	6*19*7
339	TC	6.5*14.5*7
340	TC	7*13*4
341	TC	7*16*5
342	TC	7*16*7
343	TC	7*19*7

项次 Item	型式 Form	规格 Specification
344	TC	8*14*5
345	TC	8*15*4
346	TC	8*15*5
347	TC	8*17*7
348	TC	8*18*4
349	TC	8*18*5
350	TC	8*20*7
351	TC	8*22*6
352	TC	8*22*7
353	TC	9*16*7
354	TC	9*17*4
355	TC	9*17*5
356	TC	9*20*4.5
357	TC	9*20*7
358	TC	9*22*7
359	TC	9*24*7
360	TC	9.5*19*8
361	TC	10*16*4
362	TC	10*16*7
363	TC	10*17*4
364	TC	10*18*4
365	TC	10*18*5
366	TC	10*18*6
367	TC	10*18*7
368	TC	10*19*4
369	TC	10*19*7
370	TC	10*20*5
371	TC	10*20*7
372	TC	10*21*4
373	TC	10*21*5
374	TC	10*22*5
375	TC	10*22*7
376	TC	10*23*7
377	TC	10*24*7
378	TC	10*25*6
379	TC	10*25*7
380	TC	10*25*10
381	TC	10*26*7
382	TC	10*28*7
383	TC	10*30*7
384	TC	10*30*10
385	TC	11*17*4
386	TC	11*26*7
387	TC	11*28*7
388	TC	11.6*24*10
389	TC	11.9*18*4
390	TC	12*18*5
391	TC	12*19*5
392	TC	12*20*5

项次 Item	型式 Form	规格 Specification
393	TC	12*20*6
394	TC	12*21*4
395	TC	12*21*7
396	TC	12*22*5
397	TC	12*22*6
398	TC	12*22*7
399	TC	12*24*4.5
400	TC	12*24*7
401	TC	12*25*5
402	TC	12*25*7
403	TC	12*25*8
404	TC	12*25*10
405	TC	12*26*4
406	TC	12*26*7
407	TC	12*28*4
408	TC	12*28*7
409	TC	12*30*7
410	TC	12*30*10
411	TC	12*32*5.5
412	TC	12*32*7
413	TC	12*32*10
414	TC	12*35*7
415	TC	12*40*7
416	TC	13*20*7
417	TC	13*22*4
418	TC	13*22*5
419	TC	13*24*5
420	TC	13*25*7
421	TC	13*26*7
422	TC	13*30*7
423	TC	13*32*5
424	TC	13.5*24*6
425	TC	13.7*24*5
426	TC	14*20*5
427	TC	14*20*7
428	TC	14*21*7
429	TC	14*22*4
430	TC	14*22*5
431	TC	14*22*6
432	TC	14*22*7
433	TC	14*24*6
434	TC	14*24*7
435	TC	14*25*5
436	TC	14*25*7
437	TC	14*26*6
438	TC	14*26*7
439	TC	14*28*7
440	TC	14*28*10
441	TC	14*30*7

项次 Item	型式 Form	规格 Specification
442	TC	14*30*10
443	TC	14*32*7
444	TC	14*32*10
445	TC	14*35*7
446	TC	15*22*5
447	TC	15*22*7
448	TC	15*23*7
449	TC	15*24*4
450	TC	15*24*5
451	TC	15*24*7
452	TC	15*25*4
453	TC	15*25*5
454	TC	15*25*6
455	TC	15*25*7
456	TC	15*26*6
457	TC	15*26*7
458	TC	15*27*7
459	TC	15*28*4.5
460	TC	15*28*5
461	TC	15*28*7
462	TC	15*28*10
463	TC	15*30*5
464	TC	15*30*6
465	TC	15*30*7
466	TC	15*30*10
467	TC	15*32*4
468	TC	15*32*7
469	TC	15*32*9
470	TC	15*33*7
471	TC	15*35*4.5
472	TC	15*35*5
473	TC	15*35*7
474	TC	15*35*8
475	TC	15*35*10
476	TC	15*40*8
477	TC	15*42*7
478	TC	15*42*8
479	TC	15*42*10
480	TC	15.8*26.8*6.5
481	TC	16*22*7
482	TC	16*24*5
483	TC	16*24*6
484	TC	16*24*7
485	TC	16*25*4
486	TC	16*25*6
487	TC	16*25*7
488	TC	16*26*6
489	TC	16*26*7
490	TC	16*27*7

项次 Item	型式 Form	规格 Specification
491	TC	16*27*8
492	TC	16*28*6
493	TC	16*28*7
494	TC	16*30*5
495	TC	16*30*6
496	TC	16*30*7
497	TC	16*30*10
498	TC	16*32*5
499	TC	16*32*7
500	TC	16*32*8
501	TC	16*32*10
502	TC	16*35*7
503	TC	16*35*10
504	TC	16*37*7
505	TC	16*38*7
506	TC	16*40*8
507	TC	16*40*10
508	TC	17*24*4
509	TC	17*24*5
510	TC	17*24*7
511	TC	17*25*4
512	TC	17*25*6
513	TC	17*25*7
514	TC	17*26*5
515	TC	17*26*7
516	TC	17*27*6
517	TC	17*28*5
518	TC	17*28*6
519	TC	17*28*7
520	TC	17*29*5
521	TC	17*30*5
522	TC	17*30*6
523	TC	17*30*7
524	TC	17*30*8
525	TC	17*30*10
526	TC	17*32*6
527	TC	17*32*7
528	TC	17*32*8
529	TC	17*35*6
530	TC	17*35*7
531	TC	17*35*8
532	TC	17*35*10
533	TC	17*36*7
534	TC	17*40*5
535	TC	17*40*7
536	TC	17*40*8
537	TC	17*40*10
538	TC	17*42*7
539	TC	17*47*7

项次 Item	型式 Form	规格 Specification
540	TC	18*24*4
541	TC	18*25*7
542	TC	18*26*7
543	TC	18*28*6
544	TC	18*28*7
545	TC	18*28*10
546	TC	18*29*7
547	TC	18*30*4
548	TC	18*30*7
549	TC	18*30*8
550	TC	18*30*10
551	TC	18*32*7
552	TC	18*32*8
553	TC	18*35*7
554	TC	18*35*8
555	TC	18*35*10
556	TC	18*37*7
557	TC	18*38*7
558	TC	18*40*7
559	TC	18*40*10
560	TC	18*42*7
561	TC	19*26*4
562	TC	19*27*5
563	TC	19*28*4.5
564	TC	19*30*5
565	TC	19*30*7
566	TC	19*32*6
567	TC	19*32*7
568	TC	19*35*7
569	TC	19*35*10
570	TC	19*36*7
571	TC	19*40*7
572	TC	19.8*30*5
573	TC	20*26*4
574	TC	20*26*5
575	TC	20*28*4.5
576	TC	20*28*6
577	TC	20*28*7
578	TC	20*30*5
579	TC	20*30*6
580	TC	20*30*7
581	TC	20*30*8
582	TC	20*30*10
583	TC	20*31*6
584	TC	20*32*5
585	TC	20*32*6
586	TC	20*32*7
587	TC	20*32*8
588	TC	20*32*10

项次 Item	型式 Form	规格 Specification
589	TC	20*33*7
590	TC	20*34*7
591	TC	20*35*5
592	TC	20*35*6
593	TC	20*35*7
594	TC	20*35*8
595	TC	20*35*10
596	TC	20*36*4.5
597	TC	20*36*7
598	TC	20*37*7
599	TC	20*38*7
600	TC	20*38*8
601	TC	20*38*10
602	TC	20*40*5
603	TC	20*40*7
604	TC	20*40*8
605	TC	20*40*10
606	TC	20*42*5
607	TC	20*42*7
608	TC	20*42*8
609	TC	20*42*10
610	TC	20*45*7
611	TC	20*45*8
612	TC	20*47*5
613	TC	20*47*7
614	TC	20*47*8
615	TC	20*47*10
616	TC	20*48*7
617	TC	20*50*8
618	TC	20*50*10
619	TC	20*50*12
620	TC	20*52*7
621	TC	20*52*8
622	TC	20*52*10
623	TC	21*28*4
624	TC	21*30*5
625	TC	21*32*5
626	TC	21*40*7
627	TC	22*28*4
628	TC	22*30*5
629	TC	22*30*6
630	TC	22*30*7
631	TC	22*32*5
632	TC	22*32*7
633	TC	22*35*6
634	TC	22*35*7
635	TC	22*35*8
636	TC	22*35*10
637	TC	22*36*7

项次 Item	型式 Form	规格 Specification
638	TC	22*38*7
639	TC	22*38*8
640	TC	22*38*10
641	TC	22*40*7
642	TC	22*40*10
643	TC	22*42*6
644	TC	22*42*7
645	TC	22*42*10
646	TC	22*42*11
647	TC	22*44*7
648	TC	22*45*7
649	TC	22*45*10
650	TC	22*47*7
651	TC	22.6*35*8
652	TC	22.6*40*8
653	TC	23*34*7.5
654	TC	23*38*7
655	TC	23*40*8
656	TC	23*42*5
657	TC	23*42*7
658	TC	24*32*5
659	TC	24*35*7
660	TC	24*38*8
661	TC	24*40*7
662	TC	24*40*8
663	TC	24*40*10
664	TC	24*41*8
665	TC	24*42*7
666	TC	24*42*10
667	TC	24*43*7
668	TC	24*45*10
669	TC	24*46*10
670	TC	24*47*7
671	TC	24*47*10
672	TC	25*32*4
673	TC	25*32*7
674	TC	25*33*6
675	TC	25*33*8
676	TC	25*34*5
677	TC	25*34*7
678	TC	25*35*5
679	TC	25*35*6
680	TC	25*35*7
681	TC	25*35*8
682	TC	25*36*8
683	TC	25*37*6
684	TC	25*37*7
685	TC	25*38*5.9
686	TC	25*38*6

项次 Item	型式 Form	规格 Specification
687	TC	25*38*7
688	TC	25*38*8
689	TC	25*40*5
690	TC	25*40*7
691	TC	25*40*8
692	TC	25*40*10
693	TC	25*41.25*6
694	TC	25*42*5
695	TC	25*42*6
696	TC	25*42*7
697	TC	25*42*8
698	TC	25*42*10
699	TC	25*44*7
700	TC	25*45*7
701	TC	25*45*8
702	TC	25*45*10
703	TC	25*45*12
704	TC	25*47*5
705	TC	25*47*7
706	TC	25*47*8
707	TC	25*47*10
708	TC	25*48*7
709	TC	25*50*7
710	TC	25*50*8
711	TC	25*50*10
712	TC	25*52*7
713	TC	25*52*8
714	TC	25*52*10
715	TC	25*55*8
716	TC	25*55*10
717	TC	25*55*12
718	TC	25*60*10
719	TC	25*62*7
720	TC	25*62*9
721	TC	25*62*10
722	TC	25*62*12
723	TC	25*65*10
724	TC	25*80*10
725	TC	25.4*52*7
726	TC	25.5*50*8
727	TC	26*35*7
728	TC	26*36*7
729	TC	26*37*7
730	TC	26*38*5
731	TC	26*38*7
732	TC	26*40*10
733	TC	26*42*7
734	TC	26*47*6
735	TC	26*47*7

项次 Item	型式 Form	规格 Specification
736	TC	26*52*8
737	TC	27*35*7
738	TC	27*37*7
739	TC	27*38*6
740	TC	27*38*10
741	TC	27*40*6
742	TC	27*40*7
743	TC	27*40*8
744	TC	27*42*7
745	TC	27*47*7
746	TC	28*35*8
747	TC	28*35*9
748	TC	28*37*7
749	TC	28*38*7
750	TC	28*38*8
751	TC	28*40*6
752	TC	28*40*7
753	TC	28*40*9
754	TC	28*40*10
755	TC	28*42*7
756	TC	28*42*10
757	TC	28*43*7
758	TC	28*44*8
759	TC	28*45*8
760	TC	28*45*10
761	TC	28*47*7
762	TC	28*47*10
763	TC	28*48*7
764	TC	28*48*8
765	TC	28*48*11
766	TC	28*50*7
767	TC	28*52*7
768	TC	28*52*10
769	TC	28*56*7
770	TC	28*56*8
771	TC	28*59*7
772	TC	28*62*8
773	TC	29*38*7
774	TC	30*37*7
775	TC	30*38*5
776	TC	30*40*5
777	TC	30*40*6
778	TC	30*40*7
779	TC	30*40*8
780	TC	30*40*10
781	TC	30*41*7
782	TC	30*42*4.5
783	TC	30*42*6
784	TC	30*42*7

项次 Item	型式 Form	规格 Specification
785	TC	30*42*7.5
786	TC	30*42*8
787	TC	30*42*10
788	TC	30*44*7
789	TC	30*44*10
790	TC	30*45*5
791	TC	30*45*6
792	TC	30*45*7
793	TC	30*45*8
794	TC	30*45*10
795	TC	30*45*12
796	TC	30*46*8
797	TC	30*47*5
798	TC	30*47*7
799	TC	30*47*8
800	TC	30*47*10
801	TC	30*48*7
802	TC	30*48*8
803	TC	30*48*10
804	TC	30*48*12
805	TC	30*50*7
806	TC	30*50*8
807	TC	30*50*10
808	TC	30*50*12
809	TC	30*52*7
810	TC	30*52*8
811	TC	30*52*10
812	TC	30*52*12
813	TC	30*55*7
814	TC	30*55*8
815	TC	30*55*10
816	TC	30*55*12
817	TC	30*56*10
818	TC	30*56*12
819	TC	30*60*7
820	TC	30*60*8
821	TC	30*60*10
822	TC	30*60*12
823	TC	30*62*7
824	TC	30*62*8
825	TC	30*62*10
826	TC	30*62*12
827	TC	30*65*10
828	TC	30*65*12
829	TC	30*68*10
830	TC	30*70*12
831	TC	30*72*10
832	TC	30*72*12
833	TC	31*40*7

项次 Item	型式 Form	规格 Specification
834	TC	31*45*7
835	TC	32*40*7
836	TC	32*42*7
837	TC	32*42*8
838	TC	32*43*7
839	TC	32*44*7
840	TC	32*44*8/9.5
841	TC	32*44*10
842	TC	32*45*6
843	TC	32*45*7
844	TC	32*45*8
845	TC	32*45*10
846	TC	32*46*7
847	TC	32*47*7
848	TC	32*47*8
849	TC	32*47*10
850	TC	32*48*8
851	TC	32*50*7
852	TC	32*50*8
853	TC	32*50*10
854	TC	32*52*7
855	TC	32*52*8
856	TC	32*52*10
857	TC	32*52*11
858	TC	32*52*12
859	TC	32*54*8
860	TC	32*55*8
861	TC	32*55*10
862	TC	32*56*10
863	TC	32*58*10
864	TC	32*62*8
865	TC	33*45*6
866	TC	33.6*52.52*11.2
867	TC	34*48*7
868	TC	34*50*7
869	TC	34*52*5
870	TC	34*52*8
871	TC	35*42*8
872	TC	35*45*5
873	TC	35*45*6
874	TC	35*45*7
875	TC	35*45*8
876	TC	35*45*10
877	TC	35*46*7
878	TC	35*47*6
879	TC	35*47*7
880	TC	35*48*7
881	TC	35*48*8
882	TC	35*48*10

项次 Item	型式 Form	规格 Specification
883	TC	35*50*7
884	TC	35*50*8
885	TC	35*50*10
886	TC	35*50*12
887	TC	35*50.8*8
888	TC	35*51*6
889	TC	35*52*6
890	TC	35*52*7
891	TC	35*52*8
892	TC	35*52*10
893	TC	35*52*12
894	TC	35*53*7
895	TC	35*53*7.5
896	TC	35*53*9
897	TC	35*54*8
898	TC	35*54*10
899	TC	35*55*6
900	TC	35*55*7
901	TC	35*55*8
902	TC	35*55*10
903	TC	35*55*12
904	TC	35*56*10
905	TC	35*56*12
906	TC	35*56*8
907	TC	35*57*5
908	TC	35*58*8
909	TC	35*58*10
910	TC	35*58*12
911	TC	35*60*8
912	TC	35*60*10
913	TC	35*60*12
914	TC	35*62*7
915	TC	35*62*8
916	TC	35*62*10
917	TC	35*62*12
918	TC	35*65*7
919	TC	35*68*8
920	TC	35*65*10
921	TC	35*65*12
922	TC	35*70*10
923	TC	35*70*12
924	TC	35*72*7
925	TC	35*72*8
926	TC	35*72*10
927	TC	35*72*12
928	TC	35*75*8
929	TC	35*80*8
930	TC	35*80*10
931	TC	35*80*12

项次 Item	型式 Form	规格 Specification
932	TC	35*90*10
933	TC	35*90*12
934	TC	36*50*7
935	TC	36*62*7
936	TC	36*68*10
937	TC	37*62*7
938	TC	38*47*5
939	TC	38*48*7
940	TC	38*50*7
941	TC	38*50*8
942	TC	38*52*6
943	TC	38*52*7
944	TC	38*52*8
945	TC	38*54*8
946	TC	38*54*10
947	TC	38*55*7
948	TC	38*55*8
949	TC	38*55*10
950	TC	38*56*12
951	TC	38*58*8
952	TC	38*58*11
953	TC	38*58*12
954	TC	38*60*10
955	TC	38*60*12
956	TC	38*62*8
957	TC	38*62*12
958	TC	38*65*10
959	TC	38*72*12
960	TC	39*65*12
961	TC	40*50*5
962	TC	40*50*7
963	TC	40*50*8
964	TC	40*50*10
965	TC	40*52*7
966	TC	40*52*8
967	TC	40*52*10
968	TC	40*54*7
969	TC	40*55*6
970	TC	40*55*7
971	TC	40*55*8
972	TC	40*55*10
973	TC	40*55*12
974	TC	40*56*8
975	TC	40*58*7
976	TC	40*58*8
977	TC	40*58*10
978	TC	40*60*6
979	TC	40*60*7
980	TC	40*60*8



项次 Item	型式 Form	规格 Specification
981	TC	40*60*10
982	TC	40*60*12
983	TC	40*62*6
984	TC	40*62*7
985	TC	40*62*8
986	TC	40*62*9
987	TC	40*62*10
988	TC	40*62*11
989	TC	40*62*12
990	TC	40*65*8
991	TC	40*65*10
992	TC	40*65*12
993	TC	40*68*7
994	TC	40*68*8
995	TC	40*68*10
996	TC	40*70*10
997	TC	40*70*12
998	TC	40*72*7
999	TC	40*72*8
1000	TC	40*72*10
1001	TC	40*72*12
1002	TC	40*75*12
1003	TC	40*80*7
1004	TC	40*80*10
1005	TC	40*80*12
1006	TC	40*90*10
1007	TC	40*90*12
1008	TC	41*55*7
1009	TC	42*51*6.5
1010	TC	42*52*7
1011	TC	42*55*7
1012	TC	42*55*8
1013	TC	42*55*10
1014	TC	42*55*12
1015	TC	42*56*7
1016	TC	42*60*8
1017	TC	42*60*9
1018	TC	42*60*10
1019	TC	42*60*12
1020	TC	42*62*8
1021	TC	42*62*10
1022	TC	42*62*12
1023	TC	42*65*10
1024	TC	42*65*12
1025	TC	42*70*12
1026	TC	42*72*10
1027	TC	42*72*12
1028	TC	42*75*12
1029	TC	42*85*8

项次 Item	型式 Form	规格 Specification
1030	TC	44*62*8
1031	TC	44*92*10
1032	TC	45*100*10
1033	TC	45*100*12
1034	TC	45*55*7
1035	TC	45*56*8
1036	TC	45*58*6
1037	TC	45*58*7
1038	TC	45*58*8
1039	TC	45*60*7
1040	TC	45*60*8
1041	TC	45*60*10
1042	TC	45*60*12
1043	TC	45*62*7
1044	TC	45*62*8
1045	TC	45*62*9
1046	TC	45*62*10
1047	TC	45*62*12
1048	TC	45*65*7
1049	TC	45*65*8
1050	TC	45*65*10
1051	TC	45*65*12
1052	TC	45*68*8
1053	TC	45*68*10
1054	TC	45*68*12
1055	TC	45*70*8
1056	TC	45*70*10
1057	TC	45*70*12
1058	TC	45*72*7
1059	TC	45*72*8
1060	TC	45*72*10
1061	TC	45*72*12
1062	TC	45*75*8
1063	TC	45*75*10
1064	TC	45*75*12
1065	TC	45*80*8
1066	TC	45*80*10
1067	TC	45*80*12
1068	TC	45*85*8
1069	TC	45*85*10
1070	TC	45*85*12
1071	TC	45*90*10
1072	TC	47*70*10
1073	TC	47*90*10
1074	TC	48*60*8
1075	TC	48*62*7
1076	TC	48*62*8
1077	TC	48*62*10
1078	TC	48*65*9

项次 Item	型式 Form	规格 Specification
1079	TC	48*68*10
1080	TC	48*70*10
1081	TC	48*70*12
1082	TC	48*72*12
1083	TC	48*75*10
1084	TC	48*80*10
1085	TC	48*80*12
1086	TC	50*58*4
1087	TC	50*60*8
1088	TC	50*60*10
1089	TC	50*62*7
1090	TC	50*62*10
1091	TC	50*65*7
1092	TC	50*65*8
1093	TC	50*65*10
1094	TC	50*68*7
1095	TC	50*68*8
1096	TC	50*68*9
1097	TC	50*68*10
1098	TC	50*68*12
1099	TC	50*70*8
1100	TC	50*70*10
1101	TC	50*70*12
1102	TC	50*72*7
1103	TC	50*72*8
1104	TC	50*72*10
1105	TC	50*72*12
1106	TC	50*75*8
1107	TC	50*75*10
1108	TC	50*75*12
1109	TC	50*80*8
1110	TC	50*80*10
1111	TC	50*80*12
1112	TC	50*85*10
1113	TC	50*85*12
1114	TC	50*90*8
1115	TC	50*90*10
1116	TC	50*90*12
1117	TC	50*100*10
1118	TC	50*110*10
1119	TC	52*68*8
1120	TC	52*68*10
1121	TC	52*68*12
1122	TC	52*70*9
1123	TC	52*72*8
1124	TC	52*72*10
1125	TC	52*72*12
1126	TC	52*75*10
1127	TC	52*75*12

项次 Item	型式 Form	规格 Specification
1128	TC	52*80*10
1129	TC	52*85*9
1130	TC	52*85*10
1131	TC	52*100*10
1132	TC	54*82*10
1133	TC	55*65*8
1134	TC	55*65*10
1135	TC	55*70*7
1136	TC	55*70*8
1137	TC	55*70*9
1138	TC	55*70*10
1139	TC	55*70*12
1140	TC	55*72*8
1141	TC	55*72*9
1142	TC	55*72*10
1143	TC	55*72*12
1144	TC	55*75*8
1145	TC	55*75*10
1146	TC	55*75*12
1147	TC	55*78*12
1148	TC	55*80*8
1149	TC	55*80*10
1150	TC	55*80*12
1151	TC	55*82*12
1152	TC	55*85*8
1153	TC	55*85*10
1154	TC	55*85*12
1155	TC	55*90*8
1156	TC	55*90*10
1157	TC	55*90*12
1158	TC	56*72*9
1159	TC	57*85*8
1160	TC	58*72*5
1161	TC	58*72*9
1162	TC	58*75*9
1163	TC	58*80*8
1164	TC	58*80*12
1165	TC	58*80*13
1166	TC	55*100*10
1167	TC	55*120*12
1168	TC	60*130*12
1169	TC	60*70*8
1170	TC	60*72*8
1171	TC	60*72*10
1172	TC	60*75*7
1173	TC	60*75*8
1174	TC	60*75*9
1175	TC	60*75*10
1176	TC	60*80*7

项次 Item	型式 Form	规格 Specification
1177	TC	60*80*8
1178	TC	60*80*10
1179	TC	60*80*12
1180	TC	60*82*12
1181	TC	60*85*8
1182	TC	60*85*10
1183	TC	60*85*12
1184	TC	60*85*14
1185	TC	60*90*8
1186	TC	60*90*10
1187	TC	60*90*12
1188	TC	60*90*13
1189	TC	60*95*10
1190	TC	60*95*12
1191	TC	60*100*10
1192	TC	60*110*10
1193	TC	60*110*12
1194	TC	62*80*10
1195	TC	62*85*10
1196	TC	62*85*12
1197	TC	62*90*10
1198	TC	62*90*13
1199	TC	62*93*12
1200	TC	62*100*10
1201	TC	62*100*12
1202	TC	62*120*12
1203	TC	63*80*9
1204	TC	64*80*12
1205	TC	65*75*8
1206	TC	65*75*10
1207	TC	65*80*8
1208	TC	65*80*10
1209	TC	65*80*12
1210	TC	65*85*8
1211	TC	65*85*10
1212	TC	65*85*12
1213	TC	65*88*12
1214	TC	65*90*7
1215	TC	65*90*10
1216	TC	65*90*12
1217	TC	65*95*10
1218	TC	65*95*12
1219	TC	65*95*13
1220	TC	65*100*10
1221	TC	65*100*12
1222	TC	65*105*10
1223	TC	65*110*10
1224	TC	65*110*12
1225	TC	65*120*12

项次 Item	型式 Form	规格 Specification
1226	TC	65*120*13
1227	TC	65*120*15
1228	TC	65*130*12
1229	TC	65*140*12
1230	TC	68*85*10
1231	TC	68*86*8
1232	TC	68*90*10
1233	TC	68*90*12
1234	TC	69*78*5
1235	TC	70*80*10
1236	TC	70*80*8
1237	TC	70*85*10
1238	TC	70*85*8
1239	TC	70*88*12
1240	TC	70*90*10
1241	TC	70*90*12
1242	TC	70*90*7
1243	TC	70*90*8
1244	TC	70*92*12
1245	TC	70*95*10
1246	TC	70*95*12
1247	TC	70*95*13
1248	TC	70*100*8
1249	TC	70*100*10
1250	TC	70*100*12
1251	TC	70*105*12
1252	TC	70*110*10
1253	TC	70*110*12
1254	TC	70*115*13
1255	TC	70*120*10
1256	TC	70*125*10
1257	TC	70*125*12
1258	TC	70*130*12
1259	TC	70*150*12
1260	TC	72*90*10
1261	TC	72*95*12
1262	TC	72*100*10
1263	TC	72*110*12
1264	TC	72*120*12
1265	TC	72*140*12
1266	TC	75*90*8
1267	TC	75*90*10
1268	TC	75*90*12
1269	TC	75*95*10
1270	TC	75*95*12
1271	TC	75*95*13
1272	TC	75*100*7
1273	TC	75*100*8
1274	TC	75*100*10

项次 Item	型式 Form	规格 Specification
1275	TC	75*100*12
1276	TC	75*105*10
1277	TC	75*105*12
1278	TC	75*110*12
1279	TC	75*115*12
1280	TC	75*120*12
1281	TC	75*130*12
1282	TC	75*140*12
1283	TC	78*100*10
1284	TC	80*95*8
1285	TC	80*95*10
1286	TC	80*100*8
1287	TC	80*100*10
1288	TC	80*100*12
1289	TC	80*100*13
1290	TC	80*105*12
1291	TC	80*105*13
1292	TC	80*110*10
1293	TC	80*110*12
1294	TC	80*110*13
1295	TC	80*115*10
1296	TC	80*115*12
1297	TC	80*120*10
1298	TC	80*120*12
1299	TC	80*125*12
1300	TC	80*130*12
1301	TC	80*140*13
1302	TC	80*150*14
1303	TC	80*170*13
1304	TC	82*120*12
1305	TC	82*160*13
1306	TC	85*100*9
1307	TC	85*100*10
1308	TC	85*100*12
1309	TC	85*105*8
1310	TC	85*105*10
1311	TC	85*105*12
1312	TC	85*110*10
1313	TC	85*110*12
1314	TC	85*110*13
1315	TC	85*115*12
1316	TC	85*120*10
1317	TC	85*120*12
1318	TC	85*125*12
1319	TC	85*130*10
1320	TC	85*130*12
1321	TC	85*140*12
1322	TC	85*150*12
1323	TC	88.9*107.95*12.7

项次 Item	型式 Form	规格 Specification
1324	TC	90*105*6
1325	TC	90*105*10
1326	TC	90*105*12
1327	TC	90*110*10
1328	TC	90*110*12
1329	TC	90*115*10
1330	TC	90*115*12
1331	TC	90*120*10
1332	TC	90*120*12
1333	TC	90*125*12
1334	TC	90*130*12
1335	TC	90*140*10
1336	TC	90*140*12
1337	TC	90*160*12
1338	TC	90*160*13
1339	TC	94*125*12
1340	TC	95*110*10
1341	TC	95*110*12
1342	TC	95*110*13
1343	TC	95*115*10
1344	TC	95*115*12
1345	TC	95*115*13
1346	TC	95*120*10
1347	TC	95*120*12
1348	TC	95*120*13
1349	TC	95*125*12
1350	TC	95*130*12
1351	TC	95*135*12
1352	TC	95*140*13
1353	TC	95*145*10
1354	TC	95*145*13
1355	TC	95*150*12
1356	TC	95*160*15
1357	TC	95*170*12
1358	TC	95*170*13
1359	TC	100*115*10
1360	TC	100*120*10
1361	TC	100*120*12
1362	TC	100*120*13
1363	TC	100*125*10
1364	TC	100*125*12
1365	TC	100*125*13
1366	TC	100*130*12
1367	TC	100*135*12
1368	TC	100*135*14
1369	TC	100*140*12
1370	TC	100*150*13
1371	TC	100*180*12
1372	TC	100*200*12

项次 Item	型式 Form	规格 Specification
1373	TC	102*125*10
1374	TC	105*120*6
1375	TC	105*120*13
1376	TC	105*125*12
1377	TC	105*130*7.5
1378	TC	105*130*10
1379	TC	105*130*12
1380	TC	105*130*13
1381	TC	105*130*14
1382	TC	105*135*14
1383	TC	105*140*12
1384	TC	105*140*15
1385	TC	105*160*12
1386	TC	108*140*15
1387	TC	108*170*15
1388	TC	110*125*12
1389	TC	110*130*10
1390	TC	110*130*12
1391	TC	110*130*13
1392	TC	110*135*12
1393	TC	110*140*12
1394	TC	110*140*14
1395	TC	110*140*15
1396	TC	110*140*16
1397	TC	110*145*12
1398	TC	110*150*13
1399	TC	110*150*14
1400	TC	110*160*12
1401	TC	110*170*12
1402	TC	110*170*15
1403	TC	110*200*13
1404	TC	111*140*12
1405	TC	115*135*13
1406	TC	115*140*12
1407	TC	115*140*14
1408	TC	115*145*12
1409	TC	115*145*14
1410	TC	115*150*12
1411	TC	115*160*15
1412	TC	118*140*12
1413	TC	120*140*7.5
1414	TC	120*140*12
1415	TC	120*140*13
1416	TC	120*145*12
1417	TC	120*146*10
1418	TC	120*150*12
1419	TC	120*150*14
1420	TC	120*150*16
1421	TC	120*160*12

项次 Item	型式 Form	规格 Specification
1422	TC	120*160*13
1423	TC	120*160*15
1424	TC	120*170*16
1425	TC	120*180*12
1426	TC	120*180*15
1427	TC	120*215*13
1428	TC	125*150*12
1429	TC	125*150*14
1430	TC	125*150*15
1431	TC	125*150*16
1432	TC	125*155*14
1433	TC	125*160*12
1434	TC	125*160*15
1435	TC	130*150*10
1436	TC	130*150*12
1437	TC	130*150*13
1438	TC	130*155*10
1439	TC	130*160*12
1440	TC	130*160*13
1441	TC	130*160*14
1442	TC	130*160*15
1443	TC	130*170*12
1444	TC	130*170*13
1445	TC	130*180*12
1446	TC	130*200*12
1447	TC	130*230*14
1448	TC	135*153*9
1449	TC	135*160*12
1450	TC	135*160*15
1451	TC	135*165*14
1452	TC	135*165*15
1453	TC	135*170*12
1454	TC	135*170*15
1455	TC	135*175*15
1456	TC	135*180*15
1457	TC	135*210*12
1458	TC	140*154*7.5
1459	TC	140*160*10
1460	TC	140*160*12
1461	TC	140*160*14
1462	TC	140*165*13
1463	TC	140*170*12
1464	TC	140*170*14
1465	TC	140*170*15
1466	TC	140*170*16
1467	TC	140*175*13
1468	TC	140*175*15
1469	TC	140*180*12
1470	TC	140*180*15

项次 Item	型式 Form	规格 Specification
1471	TC	140*210*15
1472	TC	140*250*15
1473	TC	145*165*14
1474	TC	145*170*13
1475	TC	145*170*15
1476	TC	145*175*13
1477	TC	145*175*15
1478	TC	145*180*12
1479	TC	145*180*15
1480	TC	145*230*17
1481	TC	147*175*13
1482	TC	148*170*15
1483	TC	150*170*13
1484	TC	150*170*15
1485	TC	150*180*12
1486	TC	150*180*14
1487	TC	150*180*15
1488	TC	150*180*16
1489	TC	150*185*15
1490	TC	150*190*15
1491	TC	150*200*15
1492	TC	150*225*15
1493	TC	155*180*15
1494	TC	155*190*15
1495	TC	155*200*15
1496	TC	160*180*10
1497	TC	160*180*13
1498	TC	160*180*15
1499	TC	160*185*10
1500	TC	160*185*13
1501	TC	160*190*13
1502	TC	160*190*14
1503	TC	160*190*15
1504	TC	160*190*16
1505	TC	160*200*10
1506	TC	160*200*12
1507	TC	160*200*14
1508	TC	160*200*15
1509	TC	160*200*16
1510	TC	160*240*15
1511	TC	165*190*15
1512	TC	165*195*15
1513	TC	165*200*12
1514	TC	170*190*10
1515	TC	170*190*14
1516	TC	170*200*13
1517	TC	170*200*15
1518	TC	170*200*16
1519	TC	170*200*18

项次 Item	型式 Form	规格 Specification
1520	TC	170*210*15
1521	TC	175*200*15
1522	TC	175*210*15
1523	TC	175*220*15
1524	TC	180*195*8/9
1525	TC	180*200*15
1526	TC	180*210*15
1527	TC	180*215*15
1528	TC	180*220*15
1529	TC	180*220*16
1530	TC	180*240*15
1531	TC	190*210*10
1532	TC	190*210*15
1533	TC	190*220*15
1534	TC	190*225*15
1535	TC	190*225*16
1536	TC	190*230*16
1537	TC	190*240*15
1538	TC	190*240*18
1539	TC	190*250*18
1540	TC	192*220*13
1541	TC	200*220*15
1542	TC	200*230*15
1543	TC	200*235*15
1544	TC	200*240*15
1545	TC	200*240*18
1546	TC	200*240*20
1547	TC	200*250*15
1548	TC	205*235*18
1549	TC	210*240*15
1550	TC	210*250*15
1551	TC	215*240*16
1552	TC	215*250*16
1553	TC	220*250*15
1554	TC	220*260*14
1555	TC	220*260*15
1556	TC	220*260*18
1557	TC	220*280*16
1558	TC	230*260*15
1559	TC	230*270*15
1560	TC	240*260*15
1561	TC	240*270*15
1562	TC	240*275*15
1563	TC	240*280*16
1564	TC	240*280*18
1565	TC	240*300*18
1566	TC	250*280*15
1567	TC	250*280*16
1568	TC	250*290*15

项次 Item	型式 Form	规格 Specification
1569	TC	250*290*18
1570	TC	260*280*10
1571	TC	260*290*15
1572	TC	260*300*20
1573	TC	260*320*20
1574	TC	270*310*20
1575	TC	280*320*20
1576	TC	290*330*16
1577	TC	300*340*18
1578	TC	320*360*18
1579	TC	340*380*18
1580	TC	360*400*20
1581	TC	380*420*20
1582	TC	400*440*20
1583	TC	420*460*20
1584	TC2	20*35*10/12.5
1585	TC2	45.2*70*15
1586	TC2	48*65*9
1587	TC2	50.75*69.9*9/11
1588	TC29	42*58*8/14
1589	TC29	55*72*10/14
1590	TC29Y	25*45/66*14.5/17
1591	TC2-PL	90*115*13
1592	TC2W	41*64*10/12
1593	TC2Y	38*70*7/11.35
1594	TC4	18*28*7
1595	TC4	20*30*8
1596	TC4	25*33*8
1597	TC4	27*38*8
1598	TC4	28*37*8
1599	TC4	32*40*12
1600	TC4	35*80*12
1601	TC4	38*52*7/8.5
1602	TC4	40*52*7
1603	TC4	45*65*8
1604	TC4Y	35.4*51*12
1605	TC4A	30*50*8.5
1606	TC4S	12.4*32*3.3/11
1607	TC4S	12.5*32*3.3/8.5
1608	TC4S	15*39*4.2/11.5
1609	TC4S	20*37*3.9/9.8
1610	TC4S	20*41*4/11
1611	TC4SY	15*25.8*2/7
1612	TC4SY	16*28*2/6
1613	TC4SY	17*30*2/6
1614	TC4SY	18*30*2/6
1615	TC4SY	19*30*2/7
1616	TC4SY	25*36*2/6
1617	TC9	24*38*8/12

项次 Item	型式 Form	规格 Specification
1618	TC9	35*56*8/11.5
1619	TC9	35*61*9/13.5
1620	TC9	65*90*9/13.2
1621	TCA3	12*22*6/6.5
1622	TCA3	15*25*7/8
1623	TCA3	20*35*7/8
1624	TCA3	25*40*6.5/7.5
1625	TCA3	30*46*7/8
1626	TCA3	35*50*7/8
1627	TCA3	40*60*10/10.5
1628	TCA3	55*70*10/10.5
1629	TCA3	85*110*10/10.5
1630	TCJ	12*28*6
1631	TCJ	12*32*5.6
1632	TCJ	25*40/52*2.6/9
1633	TCJ	30*47/55*2.6/10.5
1634	TCJ	30*47/62*2.6/9
1635	TCJ	76.2*95.25/101*9/12
1636	TCL	38*55*8
1637	TCL9	18.9*30*5
1638	TCL9	19*28*5
1639	TCL9	20*30*5
1640	TCL9	30*55*7
1641	TCN	5*15*5
1642	TCN	12*22*5
1643	TCN	12*24*5
1644	TCN	12*24*7.5
1645	TCN	12*25*7
1646	TCN	15*30*7
1647	TCN	17*26*5
1648	TCN	17*35*7
1649	TCN	20*30*5
1650	TCN	20*35*7
1651	TCN	20*35*7/7.5
1652	TCN	20*40*8
1653	TCN	20*47*10
1654	TCN	22*31*5
1655	TCN	22*42*11
1656	TCN	25*42*8
1657	TCN	30*47*7
1658	TCN	32*52*11
1659	TCN	32*52*12
1660	TCN	35*52*7
1661	TCN	40*55*8
1662	TCN	45*70*8
1663	TCN	50*70*8
1664	TCN	55*90*7
1665	TCN	60*80*7
1666	TCN	65*85*12

项次 Item	型式 Form	规格 Specification
1667	TCN	70*90*7
1668	TCN	70*95*10
1669	TCN	80*100*7
1670	TCN	95*120*12
1671	TCN	110*140*13
1672	TCN1	10*22*8
1673	TCN1	17*30*7
1674	TCN1	18*30*7
1675	TCN1	19*30*7
1676	TCN1	20*35*7/7.5
1677	TCN11	20*35*7
1678	TCNG	8*16*7
1679	TCNG	18*30*6
1680	TCNG	19*30*6
1681	TCNG	20*35*8
1682	TCNG	24*38*8
1683	TCNG	25*38*8
1684	TCNG1	17*30*7
1685	TCNG1	19*30*7
1686	TCNG1	20*35*7
1687	TCNG1	22*35*7
1688	TCNG1	24*40*8
1689	TCNG1	25*38*8
1690	TCNG1	25*42*8
1691	TCNG1	26*42*8
1692	TCNG1	30*42*7
1693	TCNG1	32*52*11
1694	TCNG1	40*52*7
1695	TCNG1	45*65*10
1696	TCNL9	20*34*7
1697	TCNY	10*22*8/8.5
1698	TCNY	12*22*5/5.5
1699	TCNY	15*24*5/5.5
1700	TCNY	15*30*7/7.5
1701	TCNY	18*30*7/7.5
1702	TCNY	18*35*6.5
1703	TCNY	19*30*8/8.5
1704	TCNY	24*40*8/8.5
1705	TCNY	27*42*7/7.5
1706	TCNY	32*52*11/11.5
1707	TCNY	36*52*7/7.5
1708	TCNY	38*50*7/7.5
1709	TCNY	40*52*7/7.5
1710	TCNY	40*62*10/10.5
1711	TCNY	55*78*9/9.5
1712	TCNY	230*255*15/15.5
1713	TC-PL	16*32.2*6.5
1714	TCR9	25*35*7
1715	TCR9	35*65*9

项次 Item	型式 Form	规格 Specification
1716	TCR9	38*50*6
1717	TCR9	42*55*8
1718	TCR9	44.9*62*6
1719	TCR9	48*65*8
1720	TCV	10*18*4
1721	TCV	10*19*4
1722	TCV	12*20*4
1723	TCV	12*22*3
1724	TCV	12*22*4
1725	TCV	12*25*5
1726	TCV	12*28*4.5
1727	TCV	12*28*7
1728	TCV	12*32*7
1729	TCV	14*30*7
1730	TCV	15*25*5
1731	TCV	15*28*7
1732	TCV	15*35*7
1733	TCV	15*36*7
1734	TCV	16*24*7
1735	TCV	17*24*5
1736	TCV	17*28*7
1737	TCV	17*40*7
1738	TCV	20*30*4
1739	TCV	20*30*7
1740	TCV	20*32*6
1741	TCV	20*47*7
1742	TCV	24*45*7
1743	TCV	25*35*7
1744	TCV	25*40*8
1745	TCV	25*47*7
1746	TCV	25*52*8
1747	TCV	30*40*7
1748	TCV	30*47*7
1749	TCV	30*52*8
1750	TCV	30*55*5
1751	TCV	30*55*7
1752	TCV	30*60*10
1753	TCV	30*62*10
1754	TCV	33*50*6
1755	TCV	35*48*7
1756	TCV	35*52*8
1757	TCV	35*60*10
1758	TCV	35*72*10
1759	TCV	38*60*8
1760	TCV	40*49*5
1761	TCV	40*60*10
1762	TCV	40*62*8
1763	TCV	40*68*10
1764	TCV	40*72*7

项次 Item	型式 Form	规格 Specification
1765	TCV	45*65*8
1766	TCV	45*65*10
1767	TCV	50*68*10
1768	TCV	50*72*8
1769	TCV	50*72*10
1770	TCV	58*72*5
1771	TCV	60*85*10
1772	TCV	60*90*10
1773	TCV	65*85*10
1774	TCV	70*90*10
1775	TCV	90*120*12
1776	TCV	105*120*8
1777	TCV	135*153*9
1778	TCV	245*274*15
1779	TCV	350*400*13
1780	TCV2	26*47*8/10
1781	TCV2	40*55*8/10
1782	TCV2	45*65*8
1783	TCV2	45*68*7
1784	TCV2	50*90*8
1785	TCVW	72*85*8
1786	TCY	8*15*4
1787	TCY	8*19*5
1788	TCY	9*17*5
1789	TCY	10*20*5
1790	TCY	10*25*6
1791	TCY	12*22*5
1792	TCY	12*22*7
1793	TCY	12*25*7
1794	TCY	13.5*24*6
1795	TCY	15*25*6
1796	TCY	15*28*5
1797	TCY	20*31*6
1798	TCY	20*32*7
1799	TCY	24*40*7
1800	TCY	25*33*6
1801	TCY	25*35*7
1802	TCY	28*37*7
1803	TCY	30*41*7
1804	TCY	30*42*7.5
1805	TCY	30*45*10
1806	TCY	32*42*7
1807	TCY	32*45*7
1808	TCY	35*55*10
1809	TCY	45*55*7
1810	TCY	55*72*8
1811	TCY	90*120*12
1812	TG	2.000*2.626*0.313
1813	TG	6*14*6

项次 Item	型式 Form	规格 Specification
1814	TG	8*16*5
1815	TG	8*16*6
1816	TG	10*19*3.8
1817	TG	10*19*4
1818	TG	10*19*7
1819	TG	10*26*4
1820	TG	11*22*7
1821	TG	12*21*5
1822	TG	12*32*7
1823	TG	14*20*4
1824	TG	14*22*5/7
1825	TG	14*30*7
1826	TG	15*24*5
1827	TG	15*25*7
1828	TG	15*28*7
1829	TG	15*30*4
1830	TG	15*30*7
1831	TG	15*30*8
1832	TG	15*30*10
1833	TG	15*35*7
1834	TG	16*25.5*6
1835	TG	16*28*7
1836	TG	17*28*6
1837	TG	17*30*5
1838	TG	17*30*7
1839	TG	17*30*10
1840	TG	17*35*7
1841	TG	17*40*7
1842	TG	18*26*5
1843	TG	20*28*4
1844	TG	20*30*7
1845	TG	20*32*7
1846	TG	20*35*7
1847	TG	20*35*10
1848	TG	20*40*7
1849	TG	20*40*10
1850	TG	20*42*7
1851	TG	20*45*10
1852	TG	20*47*7
1853	TG	20*47*8
1854	TG	21*28.7*6
1855	TG	22*47*7
1856	TG	25*35*7
1857	TG	25*37*5
1858	TG	25*40*7
1859	TG	25*40*8
1860	TG	25*40*9
1861	TG	25*40*10
1862	TG	25*45*10

项次 Item	型式 Form	规格 Specification
1863	TG	25*47*7
1864	TG	25*50*10
1865	TG	25*52*7
1866	TG	25*52*10
1867	TG	25*85*10
1868	TG	25.4*38.1*7
1869	TG	25.4*47*7
1870	TG	25.4*50.8*8
1871	TG	27*40*10
1872	TG	28*45*8
1873	TG	28*47*7
1874	TG	28*47*10
1875	TG	28*50*10
1876	TG	28.5*62*8
1877	TG	28.5*62*9.5
1878	TG	30*40*7
1879	TG	30*42*8
1880	TG	30*45*8
1881	TG	30*47*7
1882	TG	30*50*8
1883	TG	30*50*10
1884	TG	30*52*10
1885	TG	30*55*5
1886	TG	30*55*10
1887	TG	30*62*7
1888	TG	30*62*10
1889	TG	31.75*42.85*6.35
1890	TG	31.75*44.5*7.92
1891	TG	31.75*50.8*8
1892	TG	31.75*60.3*8
1893	TG	31.75*62*6.35
1894	TG	31.75*62*9.5
1895	TG	32*48*8
1896	TG	32*52*7
1897	TG	33*52*10
1898	TG	33*55*10
1899	TG	34*58*9
1900	TG	34.9*50.8*8
1901	TG	34.9*54*10
1902	TG	34.9*60.3*9.5
1903	TG	34.9*60.3*12
1904	TG	34.9*62*9.5
1905	TG	34.9*65.1*9.5
1906	TG	34.9*85.1*10
1907	TG	34.93*69*8
1908	TG	35*47*7
1909	TG	35*50*8
1910	TG	35*50*10
1911	TG	35*52*7

项次 Item	型式 Form	规格 Specification
1912	TG	35*52*8
1913	TG	35*52*10
1914	TG	35*52*12
1915	TG	35*55*7
1916	TG	35*55*10
1917	TG	35*60*10
1918	TG	35*60*12
1919	TG	35*62*7
1920	TG	35*62*8
1921	TG	35*62*10
1922	TG	35*65*10
1923	TG	35*72*10
1924	TG	35*72*12
1925	TG	38*52*8
1926	TG	38*54*7
1927	TG	38*62*9.5
1928	TG	38.1*50.8*8
1929	TG	38.1*60.3*9.5
1930	TG	38.1*65.1*9.5
1931	TG	38.1*69*9.5
1932	TG	38.1*76.2*12
1933	TG	39.7*54*9.5
1934	TG	40*46*3.8
1935	TG	40*55*8
1936	TG	40*55.1*8
1937	TG	40*56*7
1938	TG	40*60*7
1939	TG	40*60*8
1940	TG	40*60*10
1941	TG	40*62*7
1942	TG	40*62*8
1943	TG	40*62*9
1944	TG	40*62*10
1945	TG	40*62*12
1946	TG	40*65*12
1947	TG	40*66*8
1948	TG	40*68*10
1949	TG	40*70*10
1950	TG	40*72*10
1951	TG	40*80*8
1952	TG	40*80*10
1953	TG	40*90*10
1954	TG	41.3*65*10
1955	TG	41.3*73.4*10
1956	TG	42*60*8
1957	TG	42*60*9
1958	TG	42*62*8
1959	TG	42*65*12
1960	TG	42*68*13.5/20

项次 Item	型式 Form	规格 Specification
1961	TG	42*72*8
1962	TG	43*62*10
1963	TG	43*63*9
1964	TG	44.2*57.2*6
1965	TG	44.45*60.3*8
1966	TG	44.45*69*8
1967	TG	44.45*69.1*9.5
1968	TG	44.45*76*8
1969	TG	44.45*81.13*8
1970	TG	44.45*82.94*8
1971	TG	44.45*90*10
1972	TG	45*60*10
1973	TG	45*62*8
1974	TG	45*62*9
1975	TG	45*65*8
1976	TG	45*65*10
1977	TG	45*65*12
1978	TG	45*67*10
1979	TG	45*68*7
1980	TG	45*70*10
1981	TG	45*72*10
1982	TG	45*75*8
1983	TG	45*85*10
1984	TG	45*85*12
1985	TG	45*93.26*11
1986	TG	45*100*10
1987	TG	47*65*8
1988	TG	47*65*10
1989	TG	47*90*10
1990	TG	48*65*9
1991	TG	48*68*10
1992	TG	48*70*9
1993	TG	48*90*13
1994	TG	50*65*8
1995	TG	50*65*10
1996	TG	50*68*8
1997	TG	50*68*10
1998	TG	50*70*7
1999	TG	50*70*10
2000	TG	50*72*7
2001	TG	50*72*8
2002	TG	50*72*10
2003	TG	50*72*12
2004	TG	50*75*10
2005	TG	50*76*12
2006	TG	50*80*10
2007	TG	50*85*8
2008	TG	50*90*10
2009	TG	50*110*12

项次 Item	型式 Form	规格 Specification
2010	TG	50.8*65*8
2011	TG	50.8*66.5*7.92
2012	TG	50.8*81.13*11
2013	TG	50.8*86*10
2014	TG	50.8*101.6*11
2015	TG	51*76*9.5
2016	TG	52*72*10
2017	TG	52*100*10
2018	TG	52*100*12
2019	TG	54*73*11
2020	TG	55*68*8
2021	TG	55*72*7
2022	TG	55*72*8
2023	TG	55*72*9
2024	TG	55*75*10
2025	TG	55*80*10
2026	TG	55*80*12
2027	TG	55*85*12
2028	TG	55*90*10
2029	TG	55*90*12
2030	TG	55*100*8
2031	TG	55*100*10
2032	TG	58*90*10
2033	TG	60*80*10
2034	TG	60*85*10
2035	TG	60*85*12
2036	TG	60*90*10
2037	TG	60*90*12
2038	TG	60*95*12
2039	TG	60*100*12
2040	TG	60*110*12
2041	TG	60*120*12
2042	TG	60*125*12
2043	TG	62*90*10
2044	TG	62*90*12
2045	TG	62*120*12
2046	TG	63*80*8
2047	TG	65*85*10
2048	TG	65*90*8
2049	TG	65*90*10
2050	TG	65*90*12
2051	TG	65*95*12
2052	TG	65*100*10
2053	TG	65*100*12
2054	TG	65*120*12
2055	TG	65*140*12
2056	TG	65*140*15
2057	TG	70*88*12
2058	TG	70*90*10

项次 Item	型式 Form	规格 Specification
2059	TG	70*90*12
2060	TG	70*95*10
2061	TG	70*100*10
2062	TG	70*110*12
2063	TG	70*125*12
2064	TG	72*95*12
2065	TG	72*140*12
2066	TG	75*95*10
2067	TG	75*95*12
2068	TG	75*100*10
2069	TG	75*110*13
2070	TG	75*130*12
2071	TG	80*100*10
2072	TG	80*105*10
2073	TG	80*105*12
2074	TG	80*113*22
2075	TG	80*120*12
2076	TG	80*125*12
2077	TG	80*140*13
2078	TG	80*170*15
2079	TG	82*160*16
2080	TG	85*110*12
2081	TG	85*120*8
2082	TG	85*125*13
2083	TG	85*140*12
2084	TG	90*110*12
2085	TG	90*120*12
2086	TG	90*130*12
2087	TG	95*120*12
2088	TG	95*120*13
2089	TG	95*125*13
2090	TG	95*145*13
2091	TG	95*170*15
2092	TG	98.43*127*9.5
2093	TG	100*130*12
2094	TG	100*180*12
2095	TG	101.6*125*12
2096	TG	105*135*12
2097	TG	108*140*15
2098	TG	108*170*15
2099	TG	115*140*13
2100	TG	115*150*15
2101	TG	118*150*12
2102	TG	120*150*12
2103	TG	120*150*15
2104	TG	120*180*15
2105	TG	120*215*13
2106	TG	125*160*15
2107	TG	125*200*15

项次 Item	型式 Form	规格 Specification
2108	TG	130*160*15
2109	TG	135*150*10
2110	TG	135*155*12
2111	TG	135*170*12
2112	TG	140*170*15
2113	TG	145*190*17
2114	TG	145*230*17
2115	TG	150*180*15
2116	TG	155*180*15
2117	TG	180*210*15
2118	TG	180*215*15
2119	TG	200*230*15
2120	TG	204*232*12
2121	TG-10	25*35*7
2122	TG-10	30*47*7
2123	TG2	35*72.5*12/14.5
2124	TG2	40*80*10
2125	TG2	57.15*76.2*12/14.5
2126	TG29	180*195*8/11.5
2127	TG2-PL	40*62*7
2128	TG2-PL	85*115*10
2129	TG2-PL	100*120*12
2130	TG2-PL	220*250*14
2131	TG4	12*30*7
2132	TG4	13*22*5
2133	TG4	15*24*7
2134	TG4	15*25*5
2135	TG4	15*30*5
2136	TG4	15*30*7
2137	TG4	17*35*5
2138	TG4	17*35*7
2139	TG4	20*35*7
2140	TG4	20*40*4
2141	TG4	20*40*7
2142	TG4	20*40*10
2143	TG4	22*30*7
2144	TG4	25*35*7
2145	TG4	25*40*5
2146	TG4	25*40*7
2147	TG4	25*40*8
2148	TG4	25*45*7
2149	TG4	28*40*5
2150	TG4	28*45*8
2151	TG4	28*48*8
2152	TG4	30*40*7
2153	TG4	30*42*7
2154	TG4	30*45*8
2155	TG4	30*50*8
2156	TG4	30*55*7

项次 Item	型式 Form	规格 Specification
2157	TG4	32*48*8
2158	TG4	32*75*12
2159	TG4	35*48*8
2160	TG4	35*55*8
2161	TG4	35*56*8
2162	TG4	35*62*10
2163	TG4	38*52*7
2164	TG4	40*62*11
2165	TG4	40*72*10
2166	TG4	40*80*10
2167	TG4	42*60*9
2168	TG4	45*62*8
2169	TG4	45*62*9
2170	TG4	45*65*10
2171	TG4	48*65*9
2172	TG4	50*70*10
2173	TG4	50*80*10
2174	TG4	52*75*8
2175	TG4	52*75*12
2176	TG4	55*70*10
2177	TG4	55*72*12
2178	TG4	60*80*12
2179	TG4	65*80*10
2180	TG4	70*88*12
2181	TG4	70*90*12
2182	TG4	120*150*12
2183	TG4Y	17*35*7
2184	TG4A3	15*30*7
2185	TG4A3	20*35*7
2186	TG4A3	20*40*7
2187	TG4A3	25*40*7
2188	TG4A3	25*40*8
2189	TG4A3	30*45*8
2190	TG4A3	30*50*8
2191	TG4A3	35*55*10/11.5
2192	TG4A3	35*55*8
2193	TG4A3	35*62*7
2194	TG4A3	38*52*7
2195	TG4A3	45*65*10
2196	TG4A3	55*100*8
2197	TG4A3	60*110*13
2198	TG4A3	62*90*10
2199	TG4A3	62*120*12
2200	TG4A3	70*110*12
2201	TG4A3	85*140*15
2202	TGA3	36*62*7/7.5
2203	TGA3	45*62*10/10.5
2204	TGA3	45*65*12/12.5
2205	TGJ4Y	7.5*16.5*7/8

项次 Item	型式 Form	规格 Specification
2206	TGL9	40*62*8
2207	TGL9	110*130*12
2208	TGL9	110*140*12
2209	TGN	18*35*10
2210	TGNG1	26*37*7
2211	TGR9	80*105*10
2212	TGR9	88*140*13
2213	TGR9	130*160*12
2214	TGV	7*16*5
2215	TGV	12*28*6
2216	TGV	12*28*7
2217	TGV	15*28*7
2218	TGV	15*30*10
2219	TGV	17*30*7
2220	TGV	17*30*10
2221	TGV	17*32*8
2222	TGV	19*42*6
2223	TGV	20*26*5
2224	TGV	20*30*7
2225	TGV	20*35*7
2226	TGV	20*35*8
2227	TGV	20*35*10
2228	TGV	20*40*10
2229	TGV	22*35*7
2230	TGV	22*47*6
2231	TGV	25*35*5
2232	TGV	25*35*7
2233	TGV	25*40*10
2234	TGV	25*42*7
2235	TGV	25*45*10
2236	TGV	25*47*7
2237	TGV	27.2*35*5
2238	TGV	28*40*5
2239	TGV	30*38*4
2240	TGV	30*40*7
2241	TGV	30*45*6
2242	TGV	30*45*8
2243	TGV	30*45*10
2244	TGV	30*47*7
2245	TGV	30*47*8
2246	TGV	30*50*10
2247	TGV	30*55*8
2248	TGV	30*72*8
2249	TGV	31.5*45*8
2250	TGV	35*42*4
2251	TGV	35*45*7
2252	TGV	35*47*5
2253	TGV	35*47*7
2254	TGV	35*50*10

项次 Item	型式 Form	规格 Specification
2255	TGV	35*52*7
2256	TGV	35*52*8
2257	TGV	35*55*8
2258	TGV	35*60*10
2259	TGV	35*72*8
2260	TGV	35*80*10
2261	TGV	37.5*52*8
2262	TGV	40*52*7
2263	TGV	40*60*8
2264	TGV	40*60*10
2265	TGV	40*62*10
2266	TGV	40*62*8
2267	TGV	40*70*10
2268	TGV	44*90*8
2269	TGV	45*65*8
2270	TGV	45*65*10
2271	TGV	45*65*12
2272	TGV	45*70*10
2273	TGV	45*72*8
2274	TGV	48*62*8
2275	TGV	50*60*8
2276	TGV	50*64*10
2277	TGV	50*72*10
2278	TGV	50*75*8
2279	TGV	50*75*12
2280	TGV	50*80*10
2281	TGV	55*70*9
2282	TGV	55*72*8
2283	TGV	55*72*10
2284	TGV	55*80*12
2285	TGV	55*85*10
2286	TGV	55*120*10
2287	TGV	60*80*12
2288	TGV	60*85*10
2289	TGV	60*85*12
2290	TGV	60*90*10
2291	TGV	60*90*12
2292	TGV	60*95*8
2293	TGV	65*90*12
2294	TGV	65*95*12
2295	TGV	70*90*12
2296	TGV	70*100*12
2297	TGV	70*105*12
2298	TGV	70*110*10
2299	TGV	75*105*12
2300	TGV	75*115*10
2301	TGV	80*100*10
2302	TGV	80*110*12
2303	TGV	80*170*13

项次 Item	型式 Form	规格 Specification
2304	TGV	85*100*10
2305	TGV	85*105*12
2306	TGV	85*140*15
2307	TGV	95*130*12
2308	TGV	95*170*13
2309	TGV	105*130*14
2310	TGV	110*160*12
2311	TGV	120*180*12
2312	TGV	160*200*12
2313	TGVA3	25*35*7
2314	TGVA3	50*68*8
2315	TGV-PL	30*45*8
2316	TGV-PL	48*62*7
2317	TGW2	20*45*7
2318	TGW2	42*55*8
2319	TGY	16*30*7
2320	TGY	30*47*5
2321	TGY	31.75*50.8*8
2322	TLCNY	16*30*7/7.5
2323	TZ-H	325*355*16/20
2324	TZ-H	410*440*20/24
2325	TZN	32.7*50.8*7.8
2326	UIR	6*12.2*3.8
2327	UIRAY	15*22*5
2328	UNR	12*20*5
2329	UNRAY	21*28*6.2
2330	UNRY	28*35*6.5
2331	VA-012	10.5*16.5*5.5
2332	VA-050	45*55*9
2333	VB	12*16*3
2334	VB	101.6*114.3*6.35
2335	VB9	42*59.7*3.5/8.1
2336	VBGY	125*180/186.5*12/38
2337	VBGY	145*215/222*13.8/39
2338	VC	7*12.7*2.9
2339	VC	7*14*4
2340	VC	7.5*12.7*2.9
2341	VC	8*13*3.5
2342	VC	8*17*3
2343	VC	8*18*4
2344	VC	9*14*3
2345	VC	9*17.4*3.8
2346	VC	10*14*2.5
2347	VC	10*14*3
2348	VC	10*15*3.1
2349	VC	10*16*4
2350	VC	10*18*4
2351	VC	10*20*5
2352	VC	10*22*5

项次 Item	型式 Form	规格 Specification
2353	VC	12*16*5
2354	VC	12*18*3.5
2355	VC	12*19*3
2356	VC	12*21*4
2357	VC	12*22*4
2358	VC	12*22*6
2359	VC	12*24*4.5
2360	VC	12*24*7
2361	VC	12*25*4
2362	VC	12*25*7
2363	VC	13*25*4
2364	VC	14*21*3
2365	VC	15*24*4
2366	VC	15*26*7
2367	VC	15*30*6
2368	VC	15*30*7
2369	VC	15.5*26*3
2370	VC	17*26*4
2371	VC	17*30*7
2372	VC	20*30*5
2373	VC	20*30*7
2374	VC	20*35*7
2375	VC	25*40*5
2376	VC	25*40*7
2377	VC	30*40*7
2378	VC	30*42*6
2379	VC	30*45*7
2380	VC	30*46*7
2381	VC	30*47*7
2382	VC	30*52*7
2383	VC	32*52*5
2384	VC	38*50*4
2385	VC	40*56*8
2386	VC	40*62*7
2387	VC	45*55*7
2388	VC	60*90*7
2389	VC	65*73*5
2390	VC	75*100*7
2391	VC	90*110*7
2392	VCY	9*14*3
2393	VCY	15.5*32*1.5
2394	VCY	32.5*42*2
2395	VG	6*11*4
2396	VG	6*14*3
2397	VG	8*12*3
2398	VG	8*14*3
2399	VG	8*15.5*3
2400	VG	8*16*3.5
2401	VG	8*18*4

项次 Item	型式 Form	规格 Specification
2402	VG	10*18*3
2403	VG	10*19*4
2404	VG	12*16*3
2405	VG	12*21*3
2406	VG	12*22*5
2407	VG	12*28*5
2408	VG	13*28*5
2409	VG	15*21*3
2410	VG	15*22*5
2411	VG	15*24*5
2412	VG	15*25*5
2413	VG	15*28*5
2414	VG	16*24*3
2415	VG	17*28*7
2416	VG	17*30*7
2417	VG	20*28*4
2418	VG	28.56*35*4
2419	VG	35*42*4
2420	VG	37.5*65*6
2421	VG	38*52*6
2422	VG	45*52*4
2423	VGY	9*17.5*4
2424	VGY	12*18*3
2425	VGY	15*21*3
2426	VGY	20*26*4
2427	VGY	25*32*4
2428	VGY	28*35*4
2429	VGY	30*40*4
2430	VGY	40*50*4
2431	VM	68*83*4.7
2432	VMY	25.4*35.15/37.2*4
2433	VMY-H	10.5/25.5*32*8
2434	VMY-H	14/30*40.5*9.1
2435	VSC2	8*13.5*6.4/10.5
2436	VSC5	5*8.7*5.7/8.4
2437	VSC5	5.5*8.7*5.5/8.2
2438	VSC6	4.5*8.2*5.5/8
2439	VSCY	8*18/22*25.3
2440	WPM	25*35*7/10
2441	WPV	15*26*4
2442	WPV	16*22*4
2443	Y	31.8*35/39.1*4
2444	Y	117*133*6
2445	EBC	20*5
2446	EBC	25*5
2447	EBC	30*5
2448	EBC	35*6
2449	EBC	37*7
2450	EBC	40*7

项次 Item	型式 Form	规格 Specification
2451	EBC	42*7
2452	EBC	47*7
2453	EBC	52*7
2454	EBC	55*8
2455	EBC	62*8
2456	EBC	65*10
2457	EBC	68*8
2458	EBC	72*9
2459	EBC	75*7
2460	EBC	80*12
2461	EBC	85*10
2462	EBC	90*10
2463	EBC	100*12
2464	EBC	110*12
2465	EBC	120*12
2466	EBC	125*10
2467	EBC	130*12
2468	EBC	140*12
2469	EBC	145*12
2470	EBC	150*15
2471	EBC	155*12
2472	EBC	160*15
2473	EBC	180*12
2474	EBCY	32*62*7/13.5
2475	EC	8*4
2476	EC	10*4
2477	EC	12*4.5
2478	EC	15*4
2479	EC	16*5
2480	EC	18*4
2481	EC	19.5*4.2
2482	EC	20*7
2483	EC	21*5
2484	EC	22*4
2485	EC	22*7
2486	EC	24*3
2487	EC	24*5
2488	EC	24*7
2489	EC	25*7
2490	EC	26*6
2491	EC	26*6.5
2492	EC	26*9
2493	EC	27*5
2494	EC	28*5
2495	EC	28*7
2496	EC	30*5
2497	EC	30*7
2498	EC	30*8
2499	EC	32*6

项次 Item	型式 Form	规格 Specification
2500	EC	32*7
2501	EC	35*7
2502	EC	35*8
2503	EC	37*5
2504	EC	37*7
2505	EC	38*8
2506	EC	40*4.5
2507	EC	40*6
2508	EC	40*7
2509	EC	42*7
2510	EC	45*7
2511	EC	47*7
2512	EC	47*8
2513	EC	47*10
2514	EC	50*7
2515	EC	51*10
2516	EC	52*6.5
2517	EC	52*7
2518	EC	52*8
2519	EC	52*10
2520	EC	55*4
2521	EC	55*8
2522	EC	55*10
2523	EC	58*10
2524	EC	60*8
2525	EC	62*5
2526	EC	62*7
2527	EC	62*8
2528	EC	62*10
2529	EC	63.5*10
2530	EC	65*8
2531	EC	65*10
2532	EC	70*8
2533	EC	72*5.5
2534	EC	72*7
2535	EC	72*10
2536	EC	75*7
2537	EC	80*8
2538	EC	80*10
2539	EC	80*12
2540	EC	85*8
2541	EC	85*10
2542	EC	85*12
2543	EC	90*8
2544	EC	90*10
2545	EC	90*12
2546	EC	100*10
2547	EC	100*12
2548	EC	110*10



项次 Item	型式 Form	规格 Specification
2549	EC	110*12
2550	EC	115*8
2551	EC	120*10
2552	EC	120*12
2553	EC	125*12
2554	EC	130*8
2555	EC	130*15
2556	EC	140*12
2557	EC	140*15
2558	EC	145*15
2559	EC	150*10
2560	EC	150*12
2561	EC	150*15
2562	EC	160*15
2563	EC	170*15
2564	EC	180*12
2565	EC	180*15
2566	EC	190*15
2567	EC	215*14
2568	EC	215*18
2569	ECA1	22*30*6/12.5
2570	ECA1	72*10/12.85
2571	ECA1	85*10/12.85
2572	ECA1	90*10/12.85
2573	ECY	20*6
2574	ECY	24*6
2575	ECY	28*7
2576	ECY	30*6
2577	ECY	31/34*3.5/5.5
2578	ECY	32*6
2579	ECY	32*7
2580	ECY	40*6
2581	ECY	40*7
2582	ECY	47*6
2583	ECY	47*7
2584	ECY	51.3*90*10
2585	ECY	52*7
2586	ECY	52*8
2587	ECY	62*7
2588	ECY	62*8
2589	ECY	62*10
2590	ECY	72*7
2591	ECY	72*10
2592	ECY	85*10
2593	EG	22*5
2594	EG	22*6
2595	EG	24*7
2596	EG	28*7
2597	EG	30*8

项次 Item	型式 Form	规格 Specification
2598	EG	31.75*8
2599	EG	32*6
2600	EG	32*7
2601	EG	34*7
2602	EG	35*7
2603	EG	35*8
2604	EG	37*7
2605	EG	37*8
2606	EG	38*10
2607	EG	38.1*7
2608	EG	40*6
2609	EG	40*7
2610	EG	40*10
2611	EG	41.25*8
2612	EG	42*5
2613	EG	42*7
2614	EG	42*9
2615	EG	42*10
2616	EG	46*10
2617	EG	47*7
2618	EG	47*8
2619	EG	47*10
2620	EG	50*8
2621	EG	50*10
2622	EG	50.8*7
2623	EG	50.8*8
2624	EG	52*7
2625	EG	52*8
2626	EG	52*10
2627	EG	55*10
2628	EG	60*8
2629	EG	60.3*8
2630	EG	61.9*10
2631	EG	62*7
2632	EG	62*8
2633	EG	62*10
2634	EG	68*8
2635	EG	69*9.5
2636	EG	70*8
2637	EG	70*10
2638	EG	72*7
2639	EG	72*9
2640	EG	72*10
2641	EG	72*12
2642	EG	75*7
2643	EG	75*8
2644	EG	80*9
2645	EG	80*10
2646	EG	80*12

项次 Item	型式 Form	规格 Specification
2647	EG	81.13*11
2648	EG	85*10
2649	EG	90*10
2650	EG	90*12
2651	EG	95*10
2652	EG	100*10
2653	EG	100*12
2654	EG	105*10.5
2655	EG	110*12
2656	EG	120*10
2657	EG	120*12
2658	EG	125*10

项次 Item	型式 Form	规格 Specification
2659	EG	125*12
2660	EG	130*12
2661	EG	140*12
2662	EG	140*14
2663	EG	140*15
2664	EG	150*13
2665	EG	150*15
2666	EG	160*15
2667	EG	170*15
2668	EG	180*15
2669	EGY	36*82*6.5

由于版面所限规格未能列全，如有需要请致电KSK公司。

# HONORABLE MENTION

## 荣誉资质



**BUSINESS  
VISION**  
企业愿景



未来，是中国工业发展大有作为的重要战略机遇期，也是健博公司全面落实提升战略方针的关键时期。特别是新的生产基地的全面开工，将为公司的生产经营与实现可持续发展带来重大变化。

未来，公司产能不断扩充，产品结构不断丰富，质量发展向国际领先水平看齐，实施“精品名牌”工程，人力资源发展体现“高素质、高要求、高待遇”，增强人才的归宿感和成就感，充分满足公司新事业开拓的人才需求。

健博必将成为业内领先者。

In the future, it is important strategic period of Chinese industrial development, It is also kenbo for implementing and improving strategic principle. Especially new production base is under construction, it could bring major change for corporate production business and sustainable development.

In the future, Corporate capacity could constantly increase, products structure could be enriched, development quality could reach international level, we could implement famous brand project, development of human resources reflect high quality, high requirements and high treatment, this could strengthen sense of belonging and sense of achievement for talents, this could fully meet talents requirements of business development.

Kenbo could become leading company in this industry.

曾经的一切皆为历史，未来的一切全新超越...

Former everything becomes history,  
everything could surpass history in future...