TAIHE

PETROCHEMICAL

低温阀门系列

Cryogenic Valve Series

湖北泰和石化设备有限公司

HUBEI TAIHE PETROCHEMICAL EQUIPMENT CO., LTD.

COMPANY PROFILE
公司简介

湖北泰和石化设备有限公司位于屈原故里、三峡大坝所在地湖北秭归，是一家专业研发、设计、生产、销售、服于一体的现代化阀门、管件制造，提供流体控制、工业过程解决方案及流体技术咨询的高新技术企业。公司成立于2007年8月，占地126650M²，一期已建成，注册资金18000万元，公司拥有员工两百多人，大中专以上的学历占92%，2013年公司被认定为国家高新技术企业，技术水平和综合实力处于国内同行业领先地位。

公司拥有精良的加工设备，拥有阀门生产线八条，管件生产线三条，年产值过五亿元。检测设备齐全，拥有理化检验、无损探伤、光谱、洛氏硬度、深冷处理和深冷检测设备、流量特性测试设备等国际先进一体的检测设备，取得了国家TS认证、ISO9001:2008质量管理体系、ISO14001环境体系认证、OHSAS18001安全管理体系认证，美国API6A/6D认证、美国船级社ABS认证、CE免检认证、德国SIL3认证,形成了完善的产品质量保证体系。公司的产品不仅畅销全国各地，而且出口美国、英国、法国、巴西、印度、泰国、香港等国际和地区。其次公司与兰州理工大学、长江大学建立了产学研合作，成立了“湖北省校企共建LNG深冷流体控制阀研发中心”、“流体控制材料分析联合实验室”、“多功能阀门流动特性测试联合实验室”。截至目前公司拥有16项自主知识产权，其中4项发明专利和40多项实用新型专利，消化吸收了英国德国优秀超低温流体控制工程技术，掌握了高端装备制造的核心技术。

泰和人真诚欢迎国内外各界朋友的惠顾、垂询，并以一颗赤诚之心愿与您们共谋发展、共创美好未来！

www.hblsth.com

湖北泰和石化设备有限公司

HUBEI TAIHE PETROCHEMICAL EQUIPMENT CO.,LTD.

Hubei Taihe Petrochemical Equipment Co., Ltd, located in Zigui, Hubei - the hometown of Quyuan (an ancient great poet) and the location of the Three Gorges Dam, is a high-tech corporation, which develops, designs, manufactures, sells and services for valves and fittings, as well as offering the solutions for the flow control, industrial process and the flow technical consultation. Founded in August 2007, our company now covers an area of 126,650 M², the first phase of which has been built, and with registered capital of 180 million. There are more than 200 workers, 92% of them are Junior college or above. We are awarded as National High-tech enterprise in 2013, and our technological level and comprehensive strength are setting the pace in domestic valves industry.

Our company is endowed with sophisticated equipments, eight production lines and three pipe fitting lines, and over 500 million RMB annual We have complete international advance inspection equipments and chemical inspection, nondestructive test, spectrum, rockwell hardness test, cryogenic treatment and test, flow characteristic, etc. Meanwhile, we also have received certification of TS, ISO9001：2008 quality management system, ISO14001 environmental system, OHSAS18001 safety management system, API6A/6D, ABS, CE and SIL3, which contributes to an excellent quality guarantee system. Our products are not only sold in domestic markets, but also exported to worldwide countries and regions, such as USA, United Kingdom, France, Brazil, India and Hong Kong, etc.

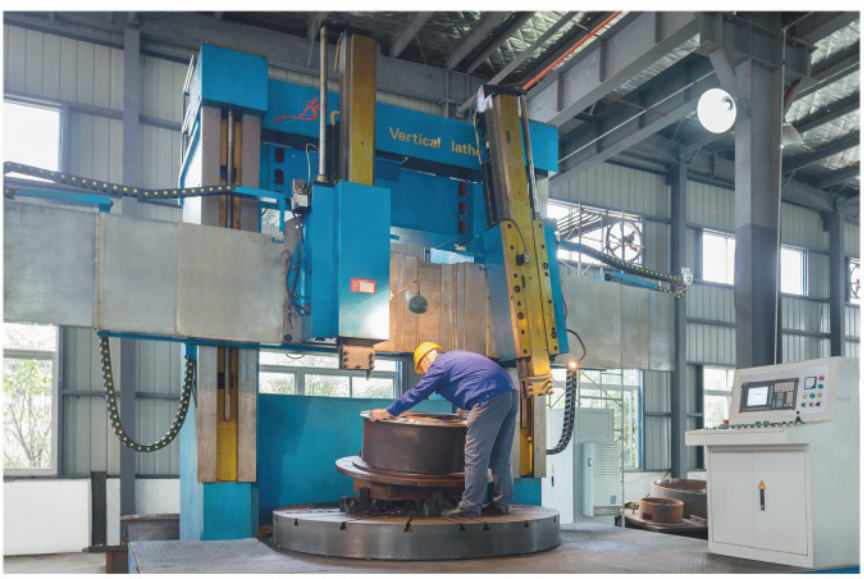
Meanwhile, we build up University-Industry cooperation with Lanzhou University of Technology and Changjiang University, and set up a series of R&D centers, such as LNG cryogenic fluid control valve R&D center, flow control material analysis laboratory, as well as multifunctional valve flow specification test laboratory. Until now, we have 16 independent intellectual properties, including 4 invention patents and more than 40 utility models patents. We are absorbing the advanced flow control technology from United Kingdom and German, and obtaining the key technology of High-end Equipment Manufacturing.

Your inquiries and visits are sincerely welcomed, and we are also cordially willing to make a mutual development, and expecting to create a better future with you!

PRODUCTION EQUIPMENT
生产装备

公司追求生产的准确性、精化性。
不断完善自己的精益生产方式，
包括每一个零部件，
都严格按标准精心打造，
确保产品的高品质。

We pursuit correct and accuracy production, and improve our refine manufacturing mode. Every part we made is strictly according to the standard, to ensure products quality.



QUALITY SITE
品质现场

强劲的研发能力，
使得企业在阀门产品种类上具有相对优势的，
公司的库存能力为人瞩目，
这一优势，
遥遥领先于同行，成为供应链的核心优势。

With strong R&D capability,
we have a comparative advantage in
valve product categories, which makes
our store capability stands in a high stage.
This advantage set up the pace in valve industry,
and is a core advantage in supplying Chain.

TESTING CENTER
检测中心

为提供高品质产品，公司配置了先进的检测设备以及完善的检测手段，建立了一支严格要求的品质管理队伍，实现了从原材料检测，生产过程检测，产品及应用全过程的质量控制。

To ensure high quality of our products, our company has advanced testing facilities and perfect testing methods. We have a strict quality control team, which can control entire process for raw materials , production process, products and application .

力学性能测试
Mechanical property test

缺口投影仪
Gap projector

超低温冲击试验机
Ultra low temperature Impact testing machine

光谱仪
Spectrograph

磁粉探伤
Magnetic powder flaw detection

超声波检测
Ultrasonic testing

低温检验
Low temperature test

低温实验箱
Low temperature experiment box

APPLICATION AREAS
应用领域

泰和都严格按标准精心打造，严谨的检测体系。
保障每一个阀门高品质。高标准要求。
服务于我们客户。为您带来更大回报价值。

TAIHE has the rigorous testing system in accordance with the strictest standard to provide high quality and high standard requirement of service, making higher respect value of reward.

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TAIHE PETROCHEMICAL

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概述
OVERVIEW

泰和石化 TAIHE PETROCHEMICAL

适用范围 Scope of Application

阀门 Valve		材料 Material		阀门尺寸 Valve Size(in/mm)																								
类型 Type	磅级 Class	阀体 Body	内件 Trim	½"	¾"	1"	1½"	2"	2½"	3"	4"	6"	8"	10"	12"	14"	16"	18"	20"	24"	26"	30"	32"	36"	42"	48"	50"
				15	20	25	32	50	65	80	100	150	200	250	300	350	400	450	500	600	650	750	800	900	1000	1150	1200
闸阀 Gate	150	LCB LCC CF8 CF8M CF3 CF3M	PCTFE Seating STL 6 STL 12	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√		
	300			√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√		
	600			√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√		
	900				√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√							
	1500					√	√	√	√	√	√	√	√	√	√	√	√	√	√	√							
	2500							√	√	√	√	√	√	√	√	√	√	√	√	√							
截止阀 Globe	150			√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√							
	300			√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√							
	600			√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√							
	900				√	√	√	√	√	√	√	√	√	√	√	√	√	√	√								
	1500					√	√	√	√	√	√	√	√	√	√	√	√	√	√								
	2500							√	√	√	√	√	√	√	√	√	√	√	√								
止回阀 Check	150			√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√				
	300			√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√				
	600					√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√				
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	1500							√	√	√	√	√	√	√	√	√	√	√	√								
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球阀 Ball	150			√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√				
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	600			√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√							
蝶阀 Butterfly	150							√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	300									√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	600										√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√

阀体可选材料 Optional Body Materials

ASTM SPEC	Type	TEMP. °F (°C)
A 352 LCC	LCC	-50°F (-46°C)
A 351 CF3M	316L	-425°F (-254°C)
A 351 CF8C	347	-425°F (-254°C)

PTFE弹簧圈工作原理

WORKING PRINCIPLE OF PTFE SPRING RING

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工作原理

- PTFE弹簧圈是一个带有聚四氟乙烯（或其他聚合材料）夹套的压力辅助密封装置，其中特别装备了一个耐腐蚀的金属致动弹簧。
- 当PTFE弹簧密封圈装在密封沟槽内，弹簧受压，促使夹套唇边紧贴密封沟槽，由此形成密封。
- 弹簧给密封夹套提供永久弹力，并弥补材料磨损及配合零件的偏移或偏心，系统压力也会辅助密封夹套致动，通过弹簧弹力和系统压力，无论在高压或低压下，都可实现有效密封。
- PTFE弹簧圈密封夹套是由聚四氟乙烯、填充聚四氟乙烯或其它高功能聚合物材料精密车削制成。带有聚四氟乙烯夹套的PTFE弹簧密封圈适用于从低温到340°C的温度范围。
- PTFE弹簧密封圈有多种致动弹簧可供选择，每种弹簧各有不同的特性去满足不同密封工况的要求。弹簧负荷可以达到动态应用时的极端苛刻的低摩擦要求和低温密封通常需要的是高负荷要求等。弹簧由耐腐蚀金属制 成，如300系列不锈钢和Elgiloy®, Hastelloy®和Inconel®等。
- PTFE弹簧密封圈安装在密封沟槽后的几何形状，可避免O型圈通常出现的扭转或螺旋失误，PTFE弹簧密封圈 (带有金属弹簧）有无限保存期，不存在橡胶密封圈通常会老化的问题。

Working Principle

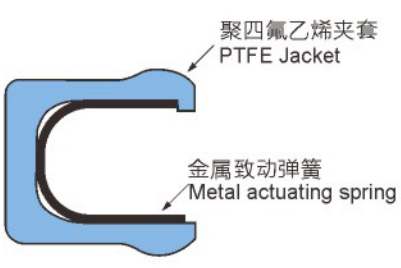
- The PTFE coil is a pressure-assisted sealing device with a polytetrafluoroethylene (PTFE) (or other polymeric material) jacket, which is specially equipped with a corrosion-resistant .
- When the PTFE spring seal is installed in the seal groove, the spring is compressed to urge the jacket lip against the seal groove, thereby forming a seal.
- Spring for sealing jacket provides permanent elasticity, and compensate for the wear of materials and materials with offset or eccentric, the system pressure will be the auxiliary sealing jacket is actuated by spring force and system pressure, whether in high or low pressure, can achieve effective sealing.
- PTFE spring ring jacket is made of PTFE, PTFE or other high functional polymer material precision turning, PTFE coil with PTFE jacketed sealing ring for the temperature range from low temperature to 340°C.
- PTFE spring ring has a variety of actuating springs to choose from, each spring has different characteristics to meet the requirements of different sealing conditions. Spring load can be reached when the dynamic application of the extremely demanding low friction requirements and low temperature seal is usually required for high load requirements, etc.. Springs are made of corrosion-resistant metal, such as 300 series stainless steel and Elgyloi ®, Hastelloy® and Inconel®, etc.
- PTFE spring ring sealing ring is arranged in the sealing groove after geometry, can avoid the O ring usually twist or spiral failure, PTFE spring ring (with metal spring) has unlimited storage period, there is no rubber sealing ring is usually the problem of aging.

静密封和动密封

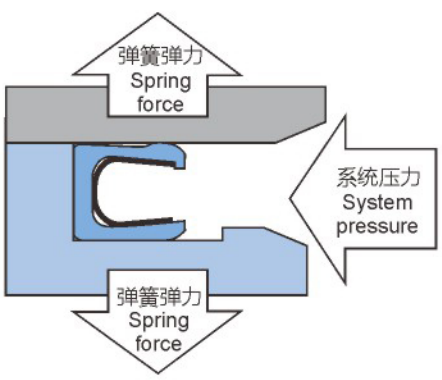
- 密封应用的两个基本类型是静密封和动密封。在静密封时，在密封圈和配合零件之间基本上没有相对运动，比如夹在上螺栓的法兰间的密封圈。
- 在动密封时，两个密封表面有相对的运动，典型实例如在液压缸里轴和活塞的密封。
- 动密封有两种运动形式：往复运动(直线运动)和转动(包括摆动)。
- 有时静密封和动密封会结合使用。密封圈在配合零件中的方位也需加以考虑，密封圈被径向压缩的被称为径向密封，例子还是活塞杆和活塞。压缩方向与轴向平行的密封圈叫做内、外压法兰密封，典型的例子是法兰垫圈。

Static Seal And Dynamic Seal

- The two basic types of sealing applications are static and dynamic seals. There is substantially no relative movement between the seal and the mating component, such as the seal between the flange of the bolt on the sealing ring.
- In the dynamic seal, the two sealing surfaces have relative movement, typical examples are in the hydraulic cylinder in the shaft and the piston seal.
- Dynamic seal has two forms of movement, reciprocating motion (linear motion) and rotation (including swing).
- Sometimes, static and dynamic seals are used in combination. The orientation of the seal in the mating part also needs to be taken into account. Radial sealing of the sealing ring is called radial sealing. Examples are piston rods and pistons. Compression direction and axial parallel to the ring is called internal and external pressure flange seal, a typical example is the flange gasket.



PTFE密封圈组件
PTFE sealing ring components



PTFE密封圈工作状态
PTFE sealing ring working condition

轴向密封及活塞密封的功能和运动
AXIAL SEAL AND PISTON SEAL FUNCTION AND MOVEMENT

泰和石化 TAIHE PETROCHEMICAL

静态应用的轴向密封

- 虽然大多数PTFE弹簧圈设计可以被用做静态轴向密封圈，但我们更多推荐使用H型系列，在大多数静密封情况下，H型系列从中到高的弹簧负荷能提供良好的密封性能。

Axial seals for static applications

- While most PTFE coil designs can be used as static axial seals, we recommend the use of the H-Series, which provides good sealing performance from the medium to high spring load in most static seals.

往复运动的轴向密封圈

- 往复运动的轴向密封圈是PTFE弹簧圈最通常的应用，就轴和活塞密封及类似应用，在低压到中压情形，一般推荐V型系列，该系列密封圈都是低负荷高扰度弹簧，可以提供低摩擦密封，延长磨损寿命并且可补偿配合零件较小的偏移或偏心现象。
- C型系列设计独特，它采用圆形金属丝弹簧，可以较宽的偏转范围内产生几乎恒定的弹簧负荷，这种密封类型能允许配合零件尺寸（公差）的变化，并且/或者在允许较大的密封磨损情况下仍能提供有效的密封负荷。它也可以绕成非常小的线圈直径，这特别适合小型密封圈和需要低摩擦的密封圈。
- 为了在低速下更好的密封，推荐使用H型系列。较高的弹簧负荷会在增加密封摩擦的同时，提供良好的密封。
- 除特别适合中压到高压的密封，H型系列也是优异的轴密封圈。

Axial sealing ring for reciprocating motion

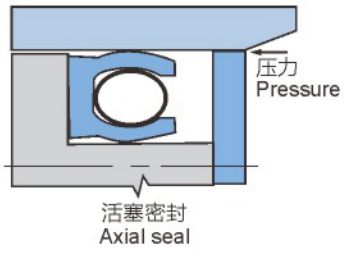
- Reciprocating axial seals are the most common applications for PTFE coils. For low-pressure to medium-pressure applications, the V-Series is recommended for shaft and piston seals and similar applications. These seals are low-load, high-impact springs , A low-friction seal can be provided to extend wear life and compensate for minor offset or eccentricity of the mating part.
- The C-Series is uniquely designed using a round wire spring that produces a nearly constant spring load over a wide deflection range that allows for variations in part size (tolerances) and / or in the case of larger Of the seal wear conditions can still provide effective sealing load. It can also be wound into a very small coil diameter, which is particularly suitable for small seals and the need for low-friction seals.
- In addition to being particularly suitable for medium to high pressure seals, the H-Series is an excellent shaft seal.

旋转运动的轴向密封圈及活塞密封

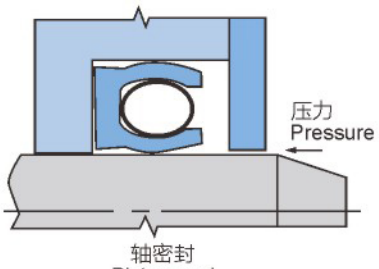
- 所有的PTFE弹簧密封圈设计都可以用在低压情况下慢速到中速的旋转或摆动运动中。
- 在旋转轴应用中，更适合使用法兰边设计。法兰边夹在配合零件里以防止密封圈随着轴一起转动。由于热力和其他影响，这种情况有时会发生在标准设计的密封件上，法兰边能增强配合零件的保持力。
- 带法兰边的V型弹簧和带法兰边的C型或H型推荐使用于多数旋转/摆动应用中。
- 这种轻微的弹簧负荷会将压力在I.5MPa以下，表面速度在1-1.5m/s以内的摩擦减到最低。如果在较高压力下，为了延长耐磨寿命，需要减小表面速度，富于弹性的V型弹簧及C型弹簧允许小的轴跳动或偏移。
- 在较高压力下，对0.5m/s以下的慢速和间歇旋转/摆动运动，推荐使用带法兰边的H型弹簧、V型弹簧极富回弹力，可容许超过通常水平的轴跳动及偏移。
- 如果需要应用在摩擦非常低、高压或高表面速度环境中，我们建议您联系TAIHE。

Rotating axial seal and piston seal

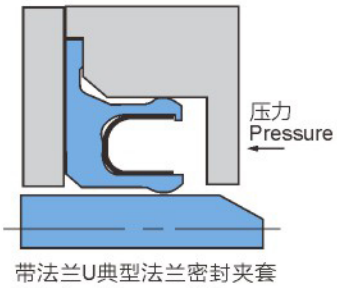
- All PTFE axial seal designs can be used for low to medium speed rotation or swing motion at low pressure.
- In rotary shaft applications, flange edge designs are more appropriate. The flange is clamped in the mating part to prevent the sealing ring from rotating together with the shaft. Due to heat and other influences, this can sometimes occur on standard-designed seals, which enhance the retention of the mating part.
- V-shaped spring with flange edge and flange type C or H or recommended for most swivel / swing applications.
- This slight spring load minimizes friction at pressures below 1.5 MPa and surface speeds below 1-1.5 m / s. If at higher pressures, in order to extend the wear life, the need to reduce the surface speed, elastic V-shaped spring and C-type spring allows small shaft runout or offset.
- At high pressures, H-springs with flange edges are recommended for slow and intermittent swivel / swing motions below 0.5 m / s. V-springs are extremely resilient to allow more than normal horizontal shaft runout and Offset.
- The results need to be applied in a very low friction, high pressure or high surface speed environment, please contact us.



活塞密封
Axial seal



轴密封
Piston seal



带法兰U典型法兰密封夹套
U typical flange with flange

配合零件，表面粗糙度和硬度
MATING PARTSSURFACE ROUGHNESS AND HARDNESS

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动态配合零件表面

- 配合零件表面的粗糙度会大大影响PTFE弹簧密封圈夹套材料与其的相对磨损，啮合面太粗糙会产生泄漏通道，并且磨损密封圈。
- 由PTFE弹簧圈转移来的并覆盖在配合动态表面的PTFE薄膜会延长密封圈寿命，相对粗糙的动态表面会很快磨损密封夹套材料，极度光滑的表面会导致PTFE材料转移不充分而形成薄膜，下图解释了表面粗糙度对密封圈磨损的影响。

Dynamic matching parts surface

- Matching parts surface roughness can affect the relative wear between PTFE spring seal ring bushing material and the matching parts, over rough meshing face will cause leakage, and will wear the seal ring.
- The PTFE film, transferred by PTFE and covers the matching dynamic surface can extend service life of the seal ring. Relative rough dynamic surface wears seal ring bushing material quickly, while extremely smooth surface will lead to PTFE material turn into a film for its insufficient transference. Following charts explain how the surface roughness wears the seal ring.

静态配合零件表面

- 在大多数静态密封应用中，良好的整体密封性能可以通过光滑的密封表面实现，多数静态密封应用中,PTFE弹簧圈的推荐最佳表面粗糙度是0.8Ra以上，静态表面和密封圈表面必须同心"放置"。

Static matching parts surface

- In most static sealing application, good sealing performance can realize through smooth sealing surface, and the best recommended surface roughness of PTFE spring ring is above 0.8 Ra, and static surface and seal ring surface should be placed concentric.

动态配合零件密封表面硬度

- 一般来说，密封表面的硬度越高，整体的密封性能就越好，良好的硬度可以减少磨损并增加密封寿命，慢速到中速往复运动中，推荐使用40RockwellC (或以上硬度）。
- 理想硬度是60到70 40RockwellC,推荐用于中速直线或旋转运动，在阳极化处理后的坚硬表面须做抛光处理。

Dynamic matching parts sealing surface hardness

- Generally, higher sealing surface hardness can make the integral sealing performance better, and good hardness can reduce abrasion and extend sealing life, and it is recommended to use 40 Rockwell C （or above hardness value） in the circle service from low speed to intermediate speed.
- Perfect hardness values are from 60 to 70 40Rockwell C, recommended to be used in intermediate speed in strait line or spiral movements, and the hard surface should be polished after anodization.

密封沟槽设计

- 早期设计是，对合适密封沟槽的考虑可减少不必要的安装问题。
- 在安装密封圈到密封沟槽期间，无论是活塞或轴应用，可分离式密封沟槽的使用会减少伸展或压缩PTFE弹簧密封圈，可分离式密封沟槽也可以减少特别安装工具的需要。
- 在安装进非分离式密封沟槽时，为了将密封圈伸长或扭曲量减到最小，可减小密封沟槽承压面，只提供部分轴肩以保持密封圈。
- 如果只能通过伸展将密封圈装入闭式密封凹槽，应避免通过锐角、螺纹、键槽安装密封圈，出现这些情况时，可使用保护性工具。

Seal groove design

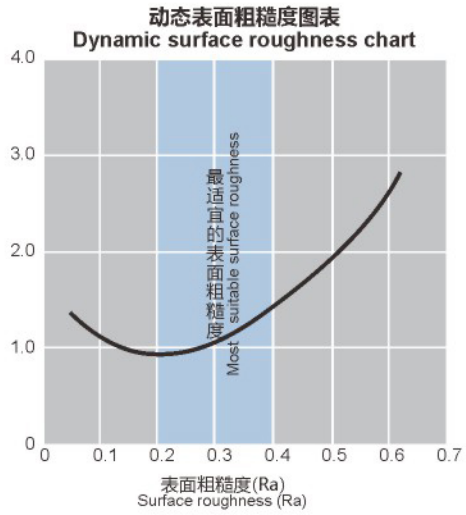
- Early design is considering a suitable sealing groove that can reduce unnecessary installation issues.
- During the period of installing seal ring and seal groove, no matter the application of piston or roller, to use separating seal groove can reduce the extension or contraction of PTFE spring seal ring, and separating seal groove can also reduce special installation tools.
- When installing into a union seal groove, in order to minimize seal ring extension and twist, we can narrow seal groove pressure-bearing surface with only providing partial shaft shoulder, so that to retain the seal ring.
- If it can only install seal ring into closed type seal groove by extension, please consult TAIHE. Avoid to install seal ring through acute angle, screw and key slot, once that happened, protective tools should be used.

配合零件表面粗糙度推荐值
Recommended value of matching parts surface roughness

密封介质 Sealing medium	表面粗糙度 Surface roughness	
	动态表面 Dynamic surface	静态表面 Static surface
低温 Low temperature 氦气 Helium 氢气 Hydrogen 氟利昂 Freon	0.1到0.2Ra 0.1 to 0.2Ra	0.1到0.2Ra(0.1 to 0.2Ra) 0.15到0.3Ra 0.15 to 0.3Ra
空气 Air 氨气 Ammonia gas 氩气 Argon 天然气 Natural gas 燃油 Fuel	0.15到0.3Ra 0.15 to 0.3Ra	0.15到0.8Ra 0.15 to 0.8Ra
水 Water 液压油 Hydraulic oil 原油 Crude oil 密封剂 Sealant	0.2到0.4Ra 0.2 to 0.4Ra	0.4到0.8Ra 0.4 to 0.8Ra

关于密封沟槽的合适表面粗糙度以及推荐介质,请咨询TAIHE。
Contact TAIHE for more about sealing groove surface roughness and recommended medium.

动态表面粗糙度图表
Dynamic surface roughness chart



PTFE弹簧圈支撑环
PTFE SPRING SUPPORT RING

泰和石化 TAIHE PETROCHEMICAL

支撑环

○ 用于密封高温和/或高压液体或气体情况下，在高压和高速往复运动条件下，也需要小心注意，建议您联系我们以获得更多帮助。

Support Ring

● Used in sealing high temperature and/or high pressure liquid or gas conditions, in condition of high temperature and high speed reciprocating motion should notice we suggest you contact us for more assistance.

直角支撑环(图形1)

○ 在低压和低于250°C温度下的大多数情况下，直角支撑环会保护密封圈不被咬合，这些支撑环是根据径向槽的宽度精确制造而成，支撑环材料应当比密封圈材料有更高的抗咬合能力。

Right Angle Support Ring (chart 1)

● In most low pressure and temperature below 250°C circumstances, right angle support ring would protect seal ring from being seized. These support rings will be accurately manufactured according to the radial slot width, and the support rings materials should have higher anti-seizure property.

三角形支撑环(图形2)

○ 在某些情况下，高温先于高压时，推荐使用三角形支撑环。

Triangle Support Ring (chart 2)

● In some conditions, when high temperature precedes high pressure, triangle support ring is recommended.

双三角支撑环(图形3)

○ 在极度高压和高温条件下，建议使用一组双三角支撑环，将支撑环的90°角面向咬合间隙安装非常重要，当系统压力导致径向沟槽尺寸改变出现时，通常使用这种类型的支撑环。

Dual Triangles Support Ring (chart 3)

● In extremely high pressure circumstances, using a set of dual triangles support rings is suggested. It is very important to install support ring by facing the 90°angle to the seizing gap. This kind of support rings are normally used when the system pressure leads to the change of radial slot size.

L型支撑环(图形4)

○ L型支撑环用于防止极度高压和高温同时出现时的咬合状况，它能够在高达+300°C和极端压力，比如20MPa和非常大的咬合间隙下，保护PTFE密封圈。

L-type Support Ring (chart 4)

● L-type support ring used in the seizing conditions that to prevent extremely high pressure and high temperature appear at the same time. It can reach up to +300°C and extremely pressure, for example, at 20MPa and large seizing gap circumstance, they can protect seal ring.

咬合由以下因素决定

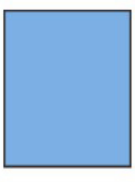
a)咬合间隙的大小　　b)温度
c)系统压力　　d)表面温度（往复运动）

○ 在压力下，PTFE可以流进咬合间隙里，动态往复运动增加咬合，在动态情况下，如果压力、温度和咬合一定，咬合会在摩擦与压力相等的情况下停止，然而，循环情况可以导致咬合持续，导致密封圈的过早破坏。

Seizure Is Decided By Following Factors

a) The range of seizure gap　　b) temperature
c) System pressure
d) surface temperature (reciprocating motion)

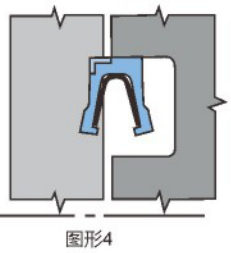
● Under pressure, PTFE can flow into seizure gap, dynamic reciprocating motion pushes the seizure, and under dynamic condition, if pressure, temperature and seizure are in certain range, seizing will stop in equal friction and pressure, while circle conditions would lead to retaining seizure, result in seal ring damages earlier.



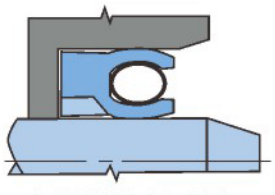
图形1

图形2

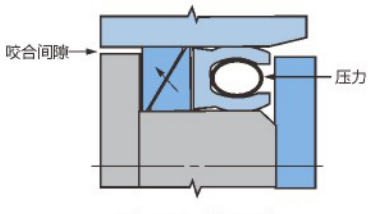
图形3



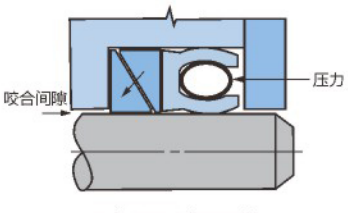
图形4



高弹性模数抗咬合/磨损坏



带有分列式背压环的
活塞密封安装



带有分列式背压环的
轴密封安装

Lip-seal®结构选型
LIP-SEAL STRUCTURE

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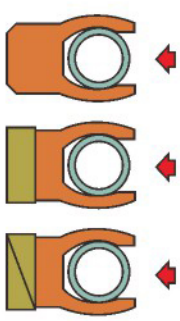
H-基本型

- H型Lip-seal®内置了螺旋片簧
- 螺旋片簧提供了一种中到高的弹簧负荷，用以满足静态和中等速度的密封，尤其是对密封泄漏率极为低的工况要求下，比如低温气体密封。
- 螺旋片簧具有优异的抗疲劳性能，并且能够提供多种线径的弹簧，用来满足各种不同标准的截面高度，比如常用的O-ring沟槽截面高度
- 圆弧形唇口能够避免唇口在运动中产生翻边
- 基本型的Lip-seal®能承受25MPa压力

Basic type H

- Lip-seal type H inserts helical spring.
- Helical springs provide the load from low to high, to meet static and middle speed seal requirement, especially under the circumstance which seal leakage rate is extremely low, such as cryogenic gas seal.
- Helical springs have excellent anti-fatigue, provide a variety of springs, to meet different standard of surface length, such as O-ring's.
- Circular lips avoid rollover during operating.
- Basic lip-seal can bear pressure of 25Mpa.

H-高压型

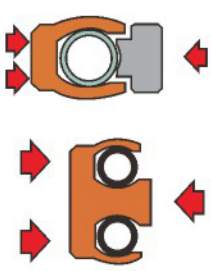


- 高压型加长了尾端或在尾部增加支撑环
- 承受比基本型更高的压力
- 径向槽的间隙E较大时，增加的支撑环提高了密封件的抗咬合能力
- 支撑环防止夹套材料在高温下变软而挤出
- 高压型的Lip-seal®能承受55MPa压力

High pressure type H

- High pressure type lengthens the end or adds back-up ring.
- High pressure type can bear more pressure than basic one.
- Added back-up ring improves anti-seizure ability of sealing when the gap of radial slot becomes larger.
- Back-up ring prevents jacket materials turning soft under high temperature.
- High pressure lip-seal can bear pressure of 55Mpa.

H-背压型

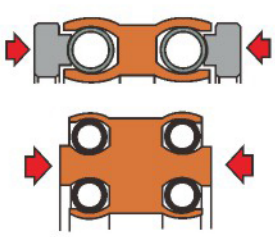


- 背压型在前端增加了 T型挡圈或车削成上下双弹簧的结构
- 背压型主要防止反向压力冲击密封件而损坏密封唇口
- T型挡圈的结构能承受25MPa的反向压力
- 双弹簧的结构能承受55MPa的反向压力
- 背压型只承受反向压力，并非是对反向压力进行密封

Back pressure type H

- Back pressure type adds T rings or turning double springs in front.
- Back pressure type prevents damaging seal lip from reversed pressure striking sealing.
- T-ring can bear reversed pressure of 25Mpa.
- Double spring structure can bear reversed pressure of 55Mpa.
- Back pressure type can only bear reversed pressure, instead of seal it.

H-双向密封



- 双向密封结构是两个背压型结构相向安装或车削成一体
- 双向密封结构对两端压力进行密封
- T型挡圈双向密封结构承受25MPa压力
- 上下弹簧双向密封结构承受55MPa的压力

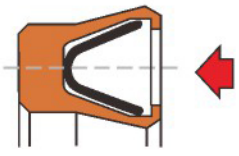
Double seal H

- Double seal structure has two back pressure types installing or turning to one.
- Double seal structure seals pressure form double sides.
- T-ring double seal structure can bear pressure of 25Mpa.
- Double springs seal structure can bear pressure of 25Mpa.

Lip-seal®结构选型
LIP-SEAL STRUCTURE

泰和石化 TAIHE PETROCHEMICAL

V-基本型

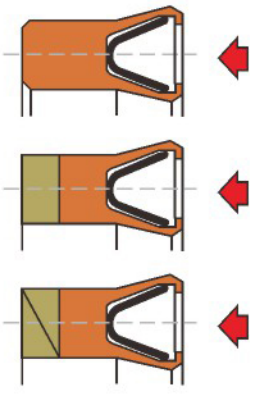


- V型Lip-seal®内置了V型片簧
- V型片簧具有最大的弹簧挠度，也是最有回弹力的弹簧 ，可以多重排列叠加，因此能提供从轻型负载到重型负载之间的弹力，多重弹簧叠加更提高了密封的可靠性
- V型Lip-seal®可设计成厚唇口，最大限度的延长密封件的使用寿命。
- 型腔内可填充硅胶，应用在食品和制药行业
- 基本型的Lip-seal®能承受25MPa压力

Basic type V

- Lip-seal type V inserts helical spring.
- V-spring has the highest spring camber and resilient force, which can be multiple arrangement, and makes seal more reliable. Therefore, it can provide the elasticity form light load to high load.
- V lip-seal can be designed thick lip, which can maximum service time of sealing.
- Packing silicon make it applies to food and pharmaceutical industry.
- Basic lip-seal can bear pressure of 25Mpa.

V-高压型

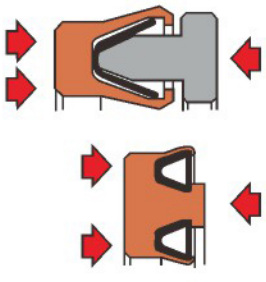


- 高压型加长了尾端或在尾部增加支撑环
- 承受比基本型更高的压力
- 径向槽的间隙E较大时，增加的支撑环提高了密封件的抗咬合能力
- 支撑环防止夹套材料在高温下变软而挤出
- 高压型的Lip-seal®能承受55MPa压力

High pressure type V

- High pressure type lengthens the end or adds back-up ring.
- High pressure type can bear more pressure than basic one.
- Added back-up ring improves anti-seizure ability of sealing when the gap of radial slot becomes larger.
- Back-up ring prevents jacket materials turning soft under high temperature.
- High pressure lip-seal can bear pressure of 55Mpa.

V-背压型

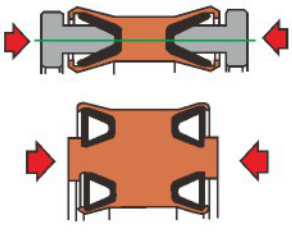


- 背压型在前端增加了T型挡圈或车削成上下双弹簧的结构
- 背压型主要防止反向压力冲击密封件而损坏密封唇口
- 反向压力达到0.6MPa就会从唇口密封面处泄漏到另一端 (假设正向压力为0)

Back pressure type V

- Back pressure type adds T rings or turning double springs in front.
- Back pressure type prevents damaging seal lip from reversed pressure striking sealing.
- Leakage flows from lip sealing to the other side when reversed pressure reaches 0.6Mpa.

V-双向密封



- 双向密封结构是两个背压型结构相向安装或加工成一体
- 双向密封结构对两端压力进行密封
- T型挡圈双向密封结构承受25MPa压力
- 上下弹簧双向密封结构承受55M#A的压力

Double seal V

- Double seal structure has two back pressure types installing or turning to one.
- Double seal structure seals pressure form double sides.
- T-ring double seal structure can bear pressure of 25Mpa.
- Double springs seal structure can bear pressure of 25Mpa.

Lip-seal®结构选型
LIP-SEAL STRUCTURE

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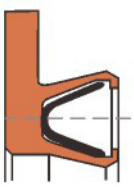
V-双向密封



- 主要用于密封旋转轴，是泵、马达和旋转执行器的最佳选择
- 外法兰端固定，限制密封件随着轴一起旋转，防止产生大量的热量

Rotation axis seal V

- Rotation axis seal is the optimal choice of pumps , motors and rotation actuators.
- To prevent plenty of heat, we fix external flange, limit sealing rotating with axis.

C型

- C型Lip-seal®内置了倾斜线簧
- 倾斜线簧提供轻的负载力，可以在大范围偏差内维持有效密封
- 倾斜线簧可以缠绕到很小的直径，是小横截面和小直径密封的最佳选择
- C型Lip-seal®可完成闭合沟槽的装配而不会损坏密封件
- C型Lip-seal®最大可承受71MPa的系统压力，密封直径从2mm到1.5米

C Type

- Lip-seal type C inserts gradient spring.
- Gradient spring provides light load which can remain seal under large-scale deviation.
- Gradient spring can twist to very small diameter, which is the optimal option of small cross section and small diameter seal.
- Lip-seal type C can install shut-off groove without damaging sealing.
- Lip-seal type C can bear pressure of 72Mpa, sealing diameter range from 2mm to 1.5m.

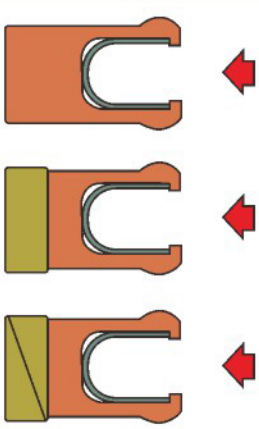
U-基本型

- U型Lip-seal®内置了U型片簧
- U型片簧具有轻的负载，并且是一种悬臂指状设计，这种设计允许密封沟槽有一定的跳动，运行在同轴度和更大的公差范围，摩擦大为减少
- 要求配合零件表面更加光滑，静态应用也要求更好的粗糙度
- 基本型的Lip-seal®能承受25MPa压力

Basic type U

- Lip-seal type U inserts gradient spring.
- U- spring provides light load and be designed to cantilever shape, which allows seal groove working under same axial gradient and larger tolerance range, reduces friction.
- It requires more smooth of the surface of spare parts and more roughness under static operation.
- Basic lip-seal can bear pressure of 25Mpa.

U-高压型



- 高压型加长了尾端或在尾部增加支撑环
- 承受比基本型更高的压力
- 径向槽的间隙E较大时，增加的支撑环提高了密封件的抗咬合能力
- 支撑环防止夹套材料在高温下变软而挤出
- 高压型的Lip-seal®能承受55MPa压力

High pressure type U

- High pressure type lengthens the end or adds back-up ring.
- High pressure type can bear more pressure than basic one.
- Added back-up ring improves anti-seizure ability of sealing when the gap of radial slot becomes larger.
- Back-up ring prevents jacket materials turning soft under high temperature.
- High pressure lip-seal can bear pressure of 55Mpa.

基体材料性能
BASE MATERIALS PROPERTY

泰和石化 TAIHE PETROCHEMICAL

物理化学性能如下表 Physical and chemical properties are as follows

PTFE	○ 广泛温度范围内的热稳定性 ○ 低摩擦系数，有自润滑性 ○ 无限的保质期 ○ 不受限于爆炸性减压工况 ○ 安全应用于真空环境 ○ 优秀的介电性能 ○ 优秀的耐化学腐蚀和水解性能 ○ 可提供食品级(FDA)的材料	● Heat stability under broad scope of temperature. ● Low friction and self-lubricity. ● No shelf life. ● No limited to explosive reduced temperature circumstance. ● Applying to vacuum environment safely. ● Excellent dielectric property. ● Excellent anti-corrosion and hydrolysis property. ● Providing FDA materials.
PEEK	○ 优秀的耐化学腐蚀和水解性能 ○ 绝佳的耐磨性能 ○ 广泛温度范围内的热温定性 ○ 可提供润滑等级的材料 ○ 更高温度下，还具有较高的机械强度、刚度和抗蠕变性能 ○ 卓越的抗高能辐射性能	● Excellent anti-corrosion and hydrolysis property. ● Great abrasion resistance ● Heat stability under broad scope of temperature. ● Providing lubricative materials. ● Possessing high mechanical strength, rigidity and anti-creep property. ● Excellent anti-radiation property.
PI	○ 耐超高温(350°C)及超低温(-272°C) ○ 耐等离子、放射线 ○ 真空中超低的放气量 ○ 无润滑情况下PV临界值高 ○ 高温下不会软化，承受高载荷 ○ 良好的机加工性能	● Bearing extra-high temperature(350°C)and extra-low temperature (-272°C) ● Anti-plasma and anti-radioactive ● Ultra-low gas outlet under vacuum circumstance ● High PV critical value under no lubricative environment ● Bearing high load and won't get soft under high temperature ● Great machining property
PBI	○ 耐超高温(400°C),是耐温等级最高的工程级别塑料 ○ 卓越的防辐射性能 ○ 极低的线性热膨胀系数 ○ 广泛的温度内，保持绝佳的机械强度、 ○ 刚度和抗蠕变性能 ○ 绝佳的耐磨性	● Bearing extra-high temperature(400°C),is the highest grade engineering plastic ● Excellent anti-radiation property. ● Ultra-low linear thermal expansion ● Possessing high mechanical strength，rigidity and anti-creep property. ● Great abrasion resistance
UHMW	○ 高韧性，即使温度低至-200°C以下 ○ 绝佳的耐磨性及自润滑性 ○ 极低的动摩擦系数 ○ 优秀的耐化学性能 ○ 极低的吸水性	● With high tenacity even if under -200°C ● Great abrasion resistance and self-lubricity. ● Low dynamic friction coefficient ● Great chemical resistance ● Low water-absorbing capacity
PCTFE	○ PCTFE在低温下的收缩率是所有工程塑料中最低的 ○ 低温下良好尺寸稳定性 ○ 优异的抗蠕变性能 ○ 较高的抗压强度和较低的负载变形 ○ 极低的吸水性和透气性	● PCFFE has the lowest Shrinkage Ratio among all engineering materials. ● Great size stability under low temperature. ● Excellent anti-creep property. ● High Compressive strength and low load deformation. ● Low water-absorbing capacity and air permeability.

填充材料性能
PACKING MATERIAL CAPACITY

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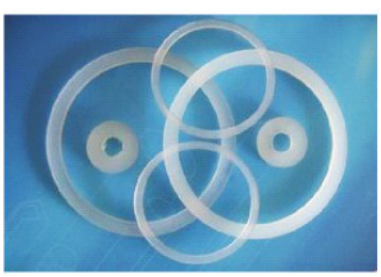
填料主要是添加到基体材料里面的添加剂，用于强化基体材料的物理化学性能，比如碳纤维、玻璃纤维及Graphite等。
Packing are additives that are added to the base material to enhance the physical and chemical properties of the base material, such as carbon fiber, glass fiber and Graphite etc.

碳纤维 Carbon fiber	增加耐磨性、刚度、机械强度以及抗蠕变性能 Increased wear resistance, stiffness, mechanical strength and creep resistance
玻璃纤维 Glass fiber	增加刚度和抗蠕变性能，提高尺寸稳定性，但是对金属的动态表面有一定的磨损 Increased stiffness, creep resistance, improve dimensional stability, but the metal surface with a certain dynamic wear and tear
石墨 Graphite	增加润滑性，降低摩擦系数，对力学性能影响不大 Increase the lubrication, reduce the coefficient of friction, have little effect on the mechanical properties.
二硫化钼 Molybdenum disulfide	减少使用期的磨损和降低摩擦系数 Reduce wear and friction coefficient
铜 Copper	非常耐磨且提高承压能力，缓冲吸能。但耐化学性能差 Very wear-resistant and improve the pressure bearing capacity, buffer energy absorption. But poor chemical resistance
PPS	降低磨损和擦伤，优秀的抵抗变形和挤出能力，大大降低了拉伸和伸长率。 Wear and abrasion resistance, excellent resistance to deformation and extrusion, greatly reduced the tensile and elongation

材料 Materials

- PCTFE
  基于PCTFE在低温下的性能，所以选其作为球阀的阀座等关键密封零部件的材料。
- Base on the performance under low temperature, PCTFE are chosen to be materials of ball valve seat and other key sealing parts.

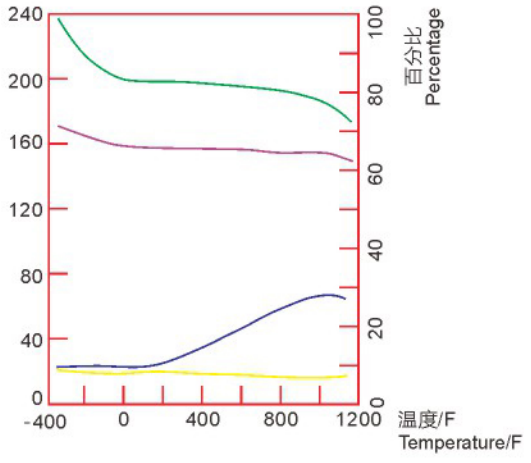


项目 Items	单位Unit	实验数值Test value		
		1#试样Sample	2#试样Sample	3#试样Sample
密度 Density	g/cm³	2.13	2.11	2.11
拉伸强度T ensile Strength	MPa	37	36.8	36.9
断裂伸长率 Elongation at Break	%	25	24	24
硬度 Hardness	SHARE D	89	87	87
压缩强度 Compression Strength/1% 25°C	MPa	118	115	115
载荷变形 Deformation under Load/25°C，14MPa，24h	%	0.2	0.2	0.2

弹簧材质选型
SPRING MATERIAL OPTION

泰和石化 TAIHE PETROCHEMICAL

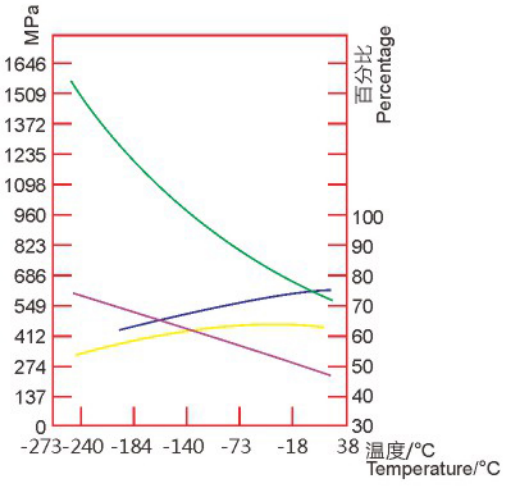
Inconel-718



○ Inconel-718在-253°C 到700°C 范围内有良 好的综合性能，700°C下有高的抗拉强度、疲劳强度、抗蠕变强度以及断裂强度。可生产中型到重型载荷的弹簧，在静密封及高压介质的动密封上应用。

● Inconel 1-718 has good comprehensive performance at the temperature range of -253°C~700°C, high compressive strength , fatigue strength, creep strength and breaking strength at 700°C. Inconel 1-718 can used to produce midsize and heave type load spring, and applicated in static seal and high pressure medium dynamic seal.

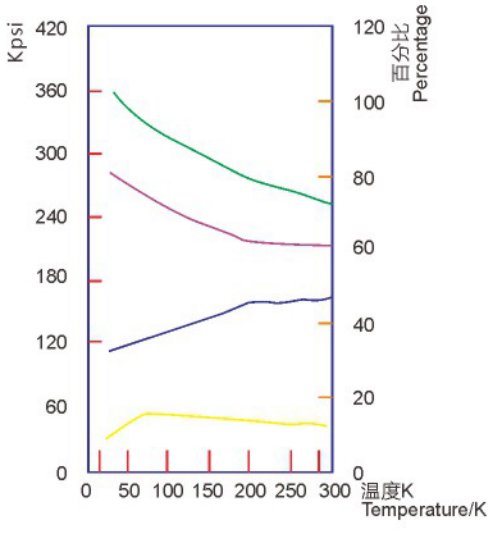
316L



○ 316L在-200°C到430°C有稳定的化学性能，优秀的拉伸率使其成为轻型载荷的弹簧，在低摩擦高速度Lip seal应用。

● 316L has steady chemical performance, and excellent stretch rate, both of which make it be a load spring, and used in low friction high speed Lip seal.

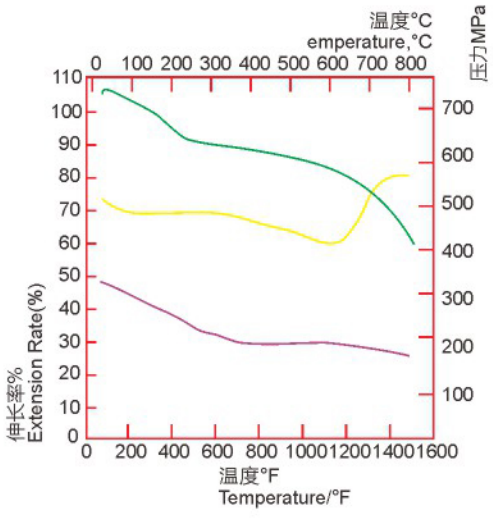
Elgiloy



○ Elgiloy拥有极高的强度、延展性以及机械性能良好的疲劳寿命，提供重型载荷的弹力。在超高压、带冲击载荷的场合以及低温环境应用。

● Elgiloy has extremly high strength, malleability and good mechanical property fatigue life, provide heavy type load elasticity. Elgiloy is used in ultrahigh pressure, with impact load circumstance and low temperature.

Hastelloy



○ Hastelloy-C276耐腐蚀性强，是少数几种耐氯化物和热浓硫酸的金属，主要用于强腐蚀性工况的Lipseal。

● Hastelloy-C276 has corrosion resistance, is a kind of few chloride resistance and heat concentrated sulfuric acid metal, major used in strong corrosion circumstance seal

抗拉强度 tensile strength　　屈服强度 Yield Strength　　断面收缩率 Rate of reduction in area　　伸长率 Elongation

夹套材料选型
JACKET MATERIAL SELECTION

基体材料 Basic material	填料 Packing	主要应用 Major application	使用温度 Application temperature	FDA	应用举例 Application sample
PTFE	未填充 Unfilled	良好的低温特性 优秀的气体或真空应用 Good cryogenics performanceand excellent gas and vacuum application	-180~200°C	√	Lip-seal 垫片 Lip-seal gasket
PTFE	碳纤维 Carbon Fiber	特别适用与水与水蒸气 强度高，耐磨性能好 Especially suitable for water and steamhigh strength and good wear resistant	-160~260°C	×	Lip-seal 阀座、挡圈 Lip-seal seat, check ring
PTFE	玻璃纤维 Glass Fiber	高强度用作支撑环 对金属表面会刮擦 High strength to used for support ringscraping metal surface	-160~260°C	×	挡圈 Check Ring
PTFE	铜 Copper	非常耐磨、耐压、耐温 导电。不能用为油封 Very wear-resisting, withstand voltage, high temperature resistant conductive. Can't used for oil seal.	-160~290°C	×	Lip-seal 导向环 Lip-seal guide ring
PTFE	石墨 Graphite	耐腐蚀耐磨、自润滑性 适用于水及蒸汽 Corrosion resistant and wear-resistant, and self-lubricity, applicable in water and steam	-160~230°C	×	阀座 活塞环 Seatpiston Ring
PEEK	未添加 No Adding	耐磨、高温下强度高 耐辐射 Wear-resistant, high strength in high temperature,radiation resistant	-56~260°C	√	Lip-seal 衬套 Lip-seal bushing
PEEK	玻璃纤维 Glass Fiber	比纯PEEK有更高的耐温性及抗蠕变强度 Higher thermal resistance than pure PEEK and high creep resistant	-56~310 °C	×	挡圈 支撑环 Check Ringsupport Ring
PEEK	碳纤维 Carbon Fiber	比纯PEEK更耐磨，更低的热膨胀率，散热快 More wear-resisting than pure PEEKLower expansion and fast heat rejection	-56~310°C	×	轴承 活塞环 Bearingpiston Ring

夹套材料选型
JACKET MATERIAL SELECTION

泰和石化 TAIHE PETROCHEMICAL

基体材料 Basic material	填料 Packing	主要应用 Major application	使用温度 Application temperature	FDA	应用举例 Application sample
PAI	未添加 No Adding	绝佳的抗压强度和伸长率，用于易磨损、有冲击场合，但吸水率高 Fine compressive strength And extension rate, applied In easy wearing and impact Circumstance high Hydroscopicity	-60~260°C	×	阀座 活塞环 Seatpiston ring
PAI	PTFE +石墨 PTFE +Graphite	摩擦系数比纯PAI低 耐磨极高场合 Lower wearing rate than Pure pai, and fine wear-Resistant circumstance	-60~260°C	×	无油轴承 活塞环 Oilless bearingpiston ring
PAI	玻璃纤维 Glass Fiber	更高抗蠕变强度，高温下长时间承受静负载 Higher creep resistant strength and keep bearing static load for a long time under high temperature	-60~270°C	×	挡圈 结构件 Check ringstructural component
PI	未添加 No Adding	高温下不会软化，可承受高载荷。超低温环境下尺寸极为稳定 Not soften in high temperature, can bear high load. Extremely steady dimension in cryogenic environment	-270~350 °C	×	阀座 活塞环 Seatpiston ring
PI	石墨 Graphite	高PV值下的耐磨性 低热膨胀系数 Wear-resistant in high PV value low expansion rate	-270~350°C	×	轴承 活塞环 Bearingpiston ring
PBI	未添加 No Adding	工程塑料中最高等级的耐温材料 The highest class of temperature resistance material in engineering plastic	15~400°C	×	Lip-seal 阀座 Lip-seal seat
PCTFE	未添加 No Adding	低温下最低的收缩率 极高的抗蠕变强度 Lowest shrinkage ratio in low temperature and extremely high creep resistant	-200~150°C	×	Lip-seal 阀座 Lip-seal seat
UHMW	未添加 No Adding	最耐磨的材料，耐磨性能是PTFE的四倍良好的低温应用 往复运动的最佳材料 The best wear-resistant material, four tiems than PTFEFine cryogenic applicationthe best material in reciprocating motion	-200~100°C	√	Lip-seal 阀座 垫片 Lip-sealseatgasket

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CRYOGENIC BUTTERFLY VALVE

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执行标准

- 设计标准
  符合API609, ASME B16.34, ASME Ⅷ, BS6364, DIN3840要求
- 连接标准
  符合ASME B16.10, ISO5752要求
- 微泄漏试验
  符合ISO15848, API622, SHELL SPE77-312, TA-LUFT要求
- 防火试验
  符合API607, BS6755, ISO/FDIS10497要求
- 强度和密封试验标准
  符合API598, BS6364, EN12266\ISO5208要求

Executive standard

- Design standards
  In accordance with API609, ASME B16.34, ASME VIII, BS6364 and DIN3840 requirements.
- Connection standards
  In accordance with ASME B16.10 and ISO5752 requirements.
- Microleak test
  In accordance with IOS15848, API622, SHELL SPE77-312 and TA-LUFT requirements.
- Fire-proof test
  In accordance with API607, BS6755 and ISO/FDIS10497 requirements.
- Strength and sealing test standards
  In accordance with API598, BS6364 and EN12266\ISO 5208 requirements.

材料选择

在选择低温条件下使用材料，考虑以下两个方面的要求：

- 承受持久或瞬间温差应力
- 承受压力和温度交变的各种载荷，无明显弹塑性变形
- 超低温条件下的韧性，以防止脆性断裂
- 超低温条件下材料要有足够的组织稳定性，以保证密封性
- 具备耐压、耐磨、耐蚀和可焊接性

Material selection

In the choice of low-temperature conditions, the use of materials, consider the following two requirements:

- Can withstand a lasting or instant temperature stress.
- Can withstand a variety of pressure and temperature alternating load, no significant elastic-plastic deformation
- Toughness under ultra-low temperature conditions to prevent brittle fracture.
- Ultra-low temperature conditions, the material should have sufficient tissue stability, in order to ensure sealing.
- With pressure resistance, wear resistance, corrosion resistance and weldability.

深冷处理

- 奥氏体不锈钢作为超低温阀门主要承压件的材料在常温下处于亚稳定状态，当温度降低到相变点Ms点以下时，部分奥氏体会变成体心立方晶格的马氏体，阀门密封结构会有一定的变形
- 低于阀门工作温度
- 深冷处理时间2~6h、2~4次，消除材料相变和塑性变形的影响，保证超低温阀门的密封性能。

Cryogenic treatment

- Austenitic stainless steel as the main pressure bearing parts of ultra-low temperature material at room temperature in the sub-stable state. When the temperature dropped to the point below the transformation point Ms, the part of the austenite will become a body-centered cubic lattice of martensite, the valve seal structure will have a certain deformation.
- Lower than valve operating temperature.
- Cryogenic treatment time 2~6h, 2~4 times, eliminating the material phase transformation and plastic deformation of the impact of ultra-low temperature valve to ensure sealing performance.

长颈阀盖结构

- 防止因填料函部分过冷出现填料以及阀盖上部的零件结霜或冷冻现象。
- 防止金属材料与非金属材料的低温收缩性的不一致导致阀门的操作扭矩增大和填料的磨损
- 阀盖颈部的长度尺寸根据BS 6364 或 MSS SP-134标准要求确定；根据试验或用户要求有限元分析的方法验证确定

Structure design

- To prevent packing and bonnet upper parts frost or freeze because of stuffing box sub-cooling.
- To prevent low-temperature contraction inconsistency of metal materials and non-metal materials lead to increasing valve operating torque and filler wear.
- The length of bonnet neck must match the standard requirements of BS 6364 or MSS SP-134; and confirmed by the method of test or user requirements finite element analysis .

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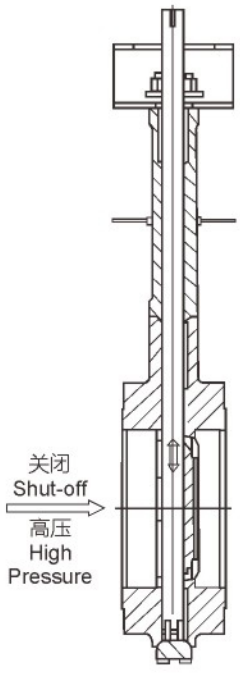
滴水盘结构



Trip Tray Structure

○ 设置滴水盘减缓阀体介质温度向阀体上端及填料部位传递，保证滴水盘上部阀盖及填料部位温度在零度以上

○ 滴水盘的直径超过中法兰直径，可以防止低温凝化的水蒸气滴落在中法兰及螺栓上引起冷量损失和腐蚀，影响在线维修。

- Trip tray can slow down temperature of valve medium transfer to valve upper and packing parts,make sure temperature of bonnet and packing parts below 0°C.
- Diameter of trip tray is longer than flange's, to avoid water vapours from cold environment dripping on the flange and screw,which will cause cool losing and corrosion, then we can't maintain online.

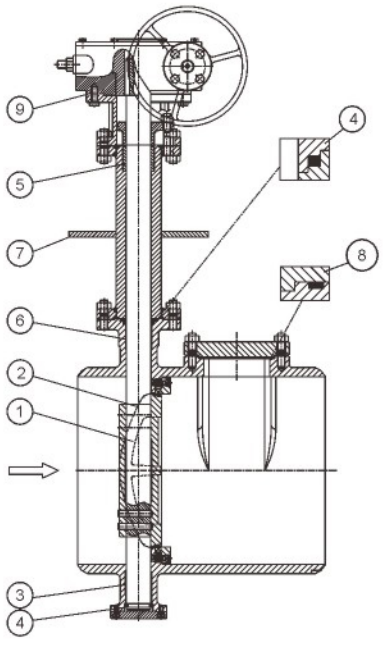
在线维修结构

Online Maintenance Structure

○ 在线快速拆卸和装配阀座和蝶板密封元件，实现在线维修

○ 密封组件的拆卸和重新装配不需要任何特殊工具

- Maintenance online: disassemble and assemble seats and butterfly plate seal parts online fast.
- We don't need any special tools to installation and disassemble.

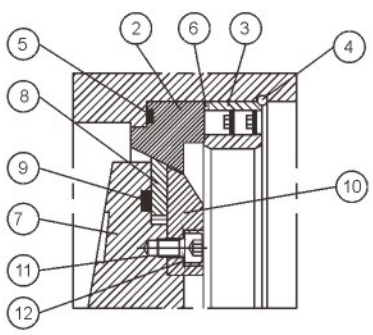


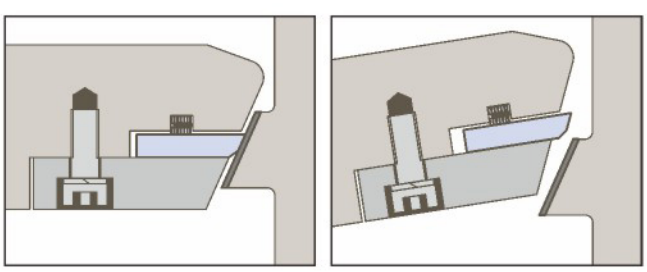
序号 NO.	名称 Item	材料 Materials
1	阀杆 stem	ASTM A479 XM-19(UNS S20910)
2	键 key	NITRONIC 50 HS
3	复合轴承 compost bearing	UNS S31600+PTFE
4	垫片 gasket	UNS S31600+PTFE
5	中法兰垫片 flange gasket	ANSI 316+ Graphite(高纯度柔性石墨) (High purity flexible graphite)
6	轴承 bearing	UNS S31600+PTFE
7	滴水盘 drip tray	UNS S31600
8	垫片 gasket	Graphite(高纯度柔性石墨) (High purity flexible graphite)
9	支架 bracket	碳钢 Carbon Stell

低温蝶阀
CRYOGENIC BUTTERFLY VALVE

密封结构设计

- 阀座依靠镶嵌在阀体槽内的压环和螺钉固定在阀体上
- 蝶板主要由蝶板本体、压板及密封件组合而成
- 密封副为金属对金属结构形式，表面堆焊STL6和STL12，硬度 HRC55~60
- 考虑低温引起密封面的变形，在计算密封预紧力时，增加30%左右的裕量





Sealing Structure Design

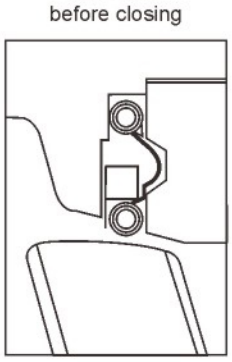
- Valve seats fix on bodies by press rings and screws which embedded in valve bodies.
- Butterfly plates consist of plates, press plates and seal parts.
- Sealing pair is metallic or metallic structure, butt welding STL6 and STL12 on surface, hardness is C55-60
- Seal surface will out of shape under cold environment, we add 30% to calculate seal pre-tightening force

序号 No.	名称 Item	材料 Materials
1	阀体 valve body	ASTM A351 CF3
2	阀座 valve seat	UNS S30400 hardended
3	密封圈法兰 seal flange	UNS S30400
4	固定阀座压板 Fixed seat press plate	UNS S30400
5	阀座 valve seat	Graphite(高纯度柔性石墨) (High purity flexible graphite)
6	阀座固定销f ixed pin	A4-70(UNS S31600)
7	蝶板 butterfly plate	ASTM A351 CF3 或者A182 F304L
8	金属密封圈 metallic seal ring	UNS S31600
9	密封垫片 seal gasket	Graphite(高纯度柔性石墨) (High purity flexible graphite)
10	密封圈固定法兰 seal fixed flange	UNS S30400
11	螺栓 screw	4-70(UNS S31600)
12	垫片 gasket	UNS S31600

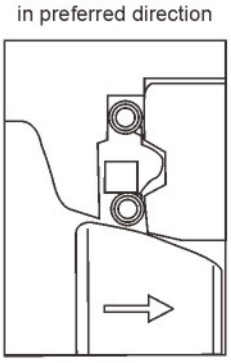
反向密封结构设计

Reversed Seal Structure

关闭之前
before closing

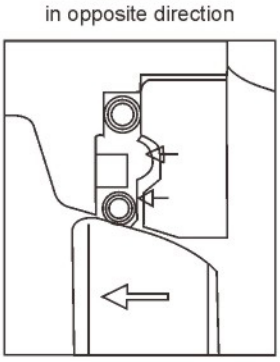


在正方向
in preferred direction



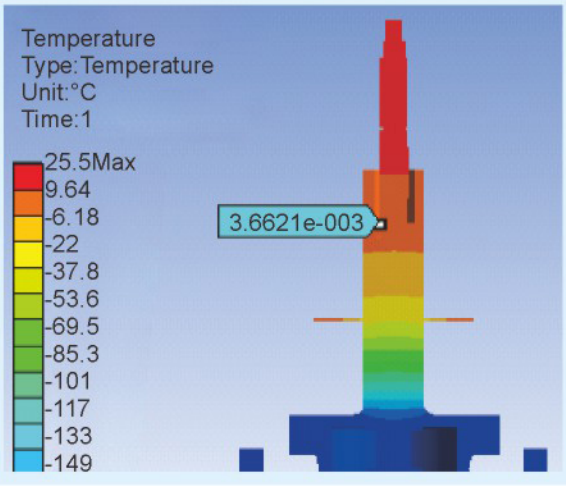
压缩的金属阀座
Compression of the metallic seat

在反方向
in opposite direction



阀座槽上的金属阀座和压力调整压缩
Compression of the metallic seat and pressure adjustment of the seat.

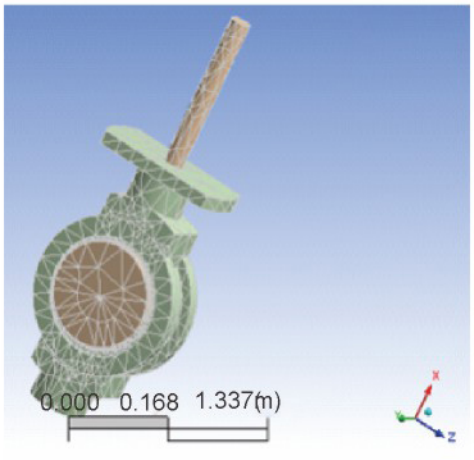
低温耦合蝶阀温度场Temperature field of low temperature coupled butterfly valve

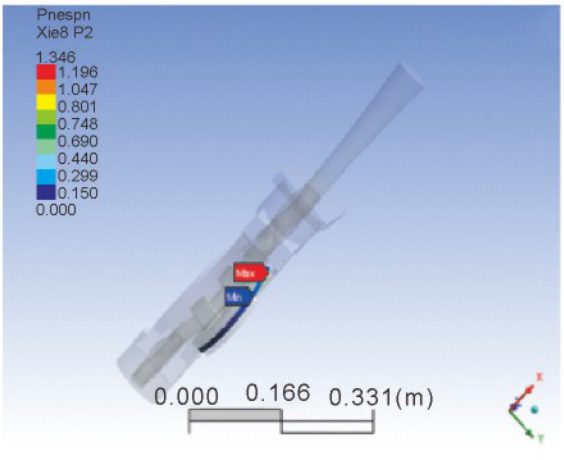


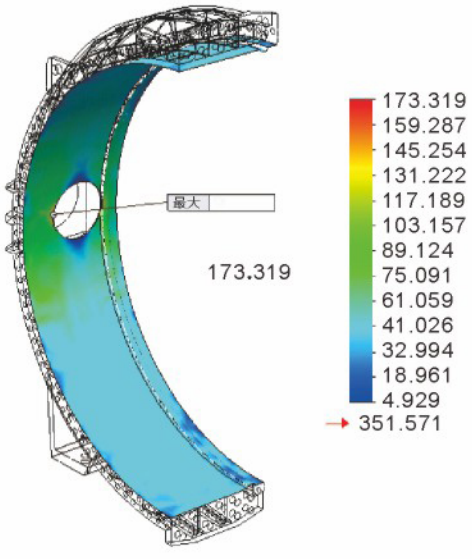
$$L_1=\frac{1ny}{\beta_1} \qquad \beta_1=\sqrt{\frac{2h_1}{\lambda r}}$$

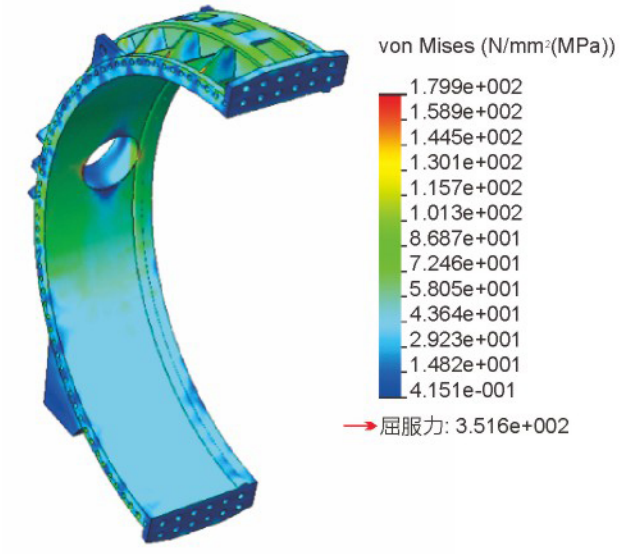
$$y=\frac{\frac{4\lambda^2\beta_1(t_f-t_0)}{(t_f-273)h_1r_1}+\sqrt{\left[\frac{4\lambda^2\beta_1(t_f-t_0)}{(t_f-273)h_1r_1}\right]^2-4\left[(\beta\lambda)^2-h_2^2\right]}}{2(\beta\lambda+h_2)}$$

低温耦合下阀门强度分析Strength analysis of valve under low temperature



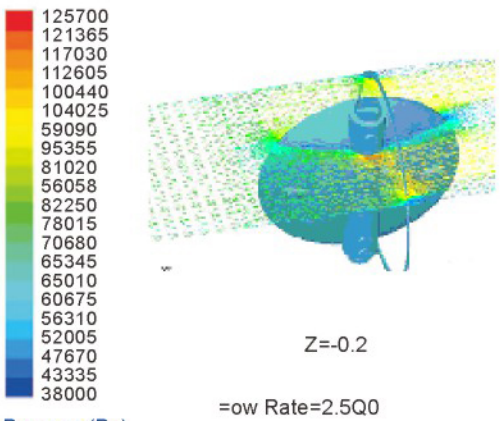


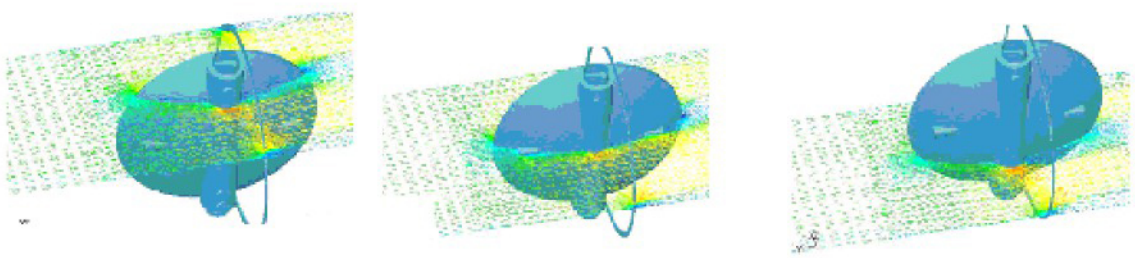




低温蝶阀
CRYOGENIC BUTTERFLY VALVE

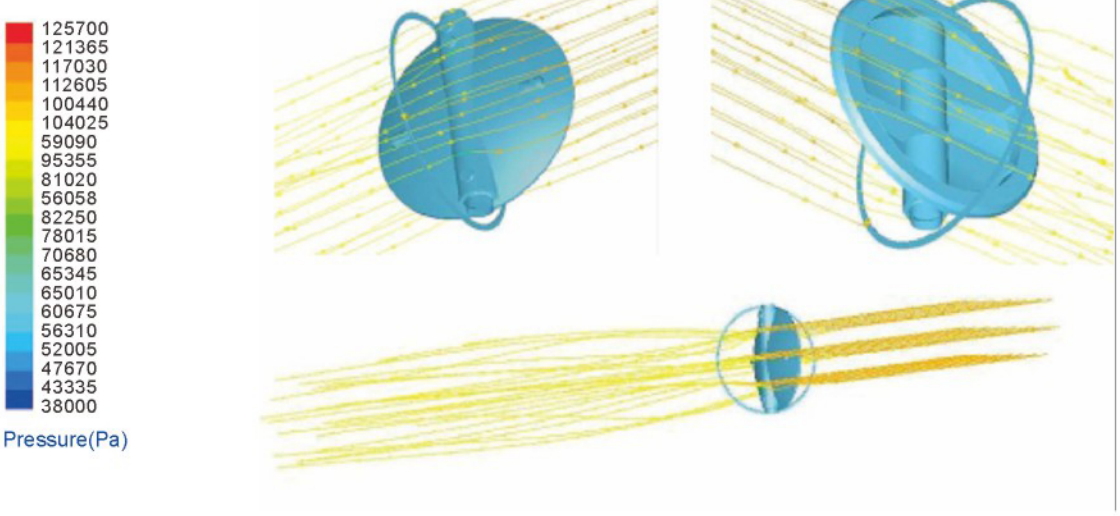
低温蝶阀流场 Flow field of low temperature butterfly valve

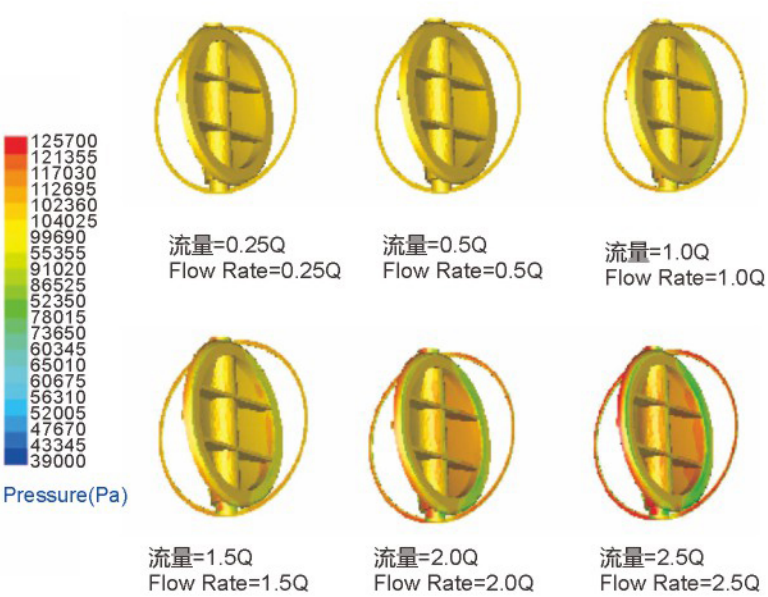




Z=-0.2　　Z=-0　　Z=0.2

=ow Rate=2.5Q0





流量=0.25Q
Flow Rate=0.25Q

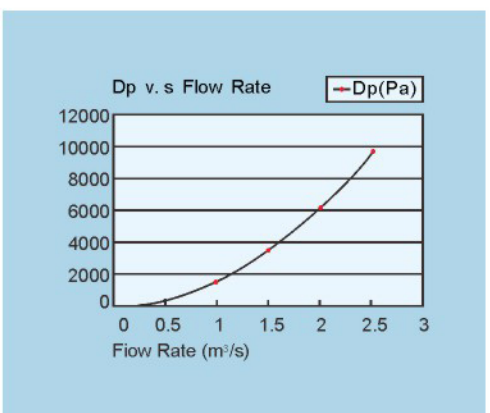
流量=0.5Q
Flow Rate=0.5Q

流量=1.0Q
Flow Rate=1.0Q

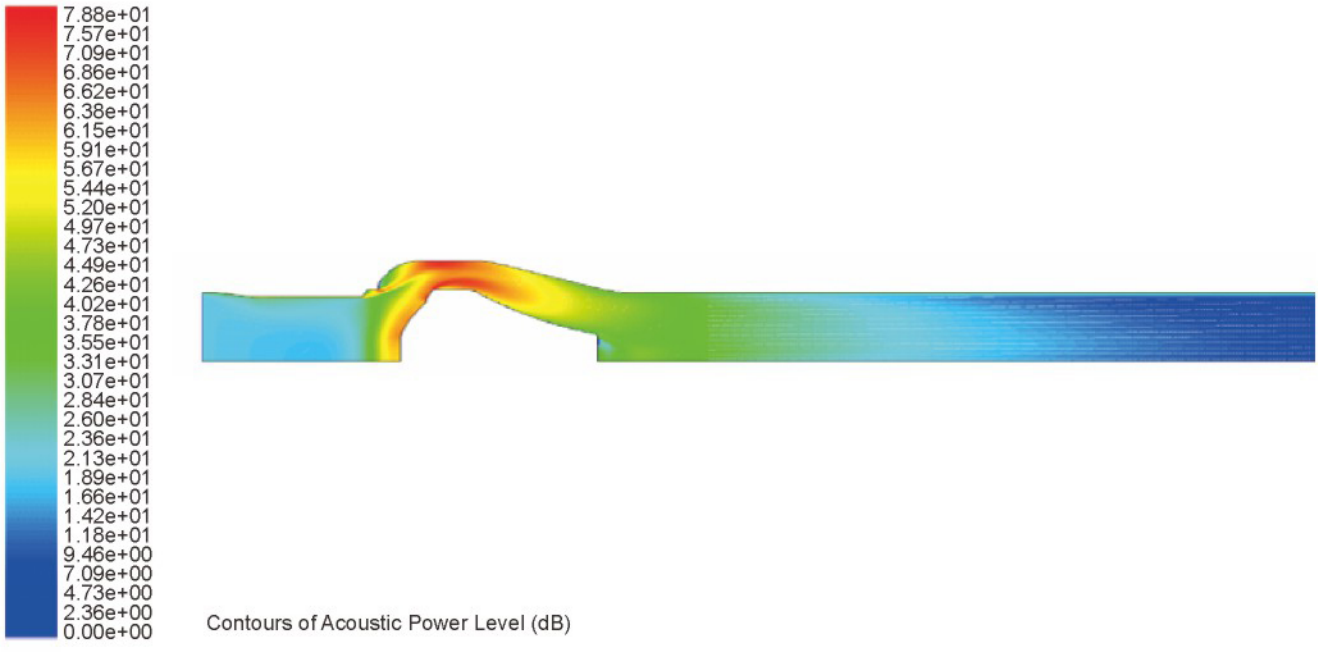
流量=1.5Q
Flow Rate=1.5Q

流量=2.0Q
Flow Rate=2.0Q

流量=2.5Q
Flow Rate=2.5Q



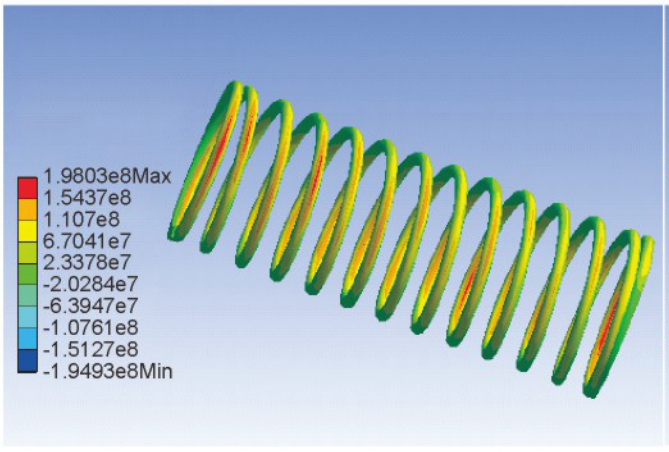
噪声分析 Noise analysis



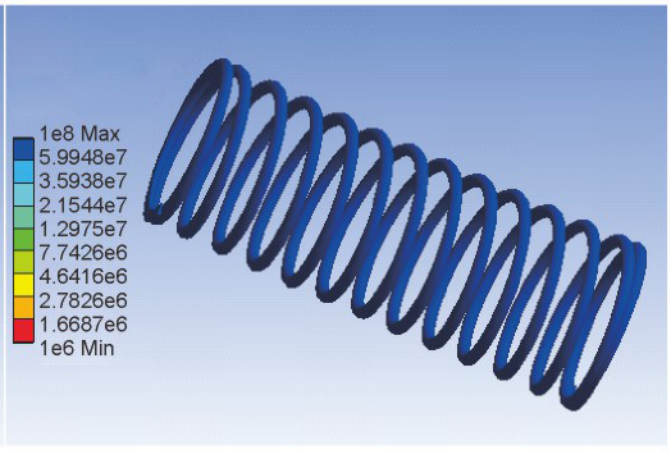
Contours of Acoustic Power Level (dB)

疲劳寿命分析 Fatigue Life Analysis

B: Static Structural (ANSYS)
Shear Stress
Type:Shear Stress (XY Plane)
Unit: Pa
Globel Coordinate System

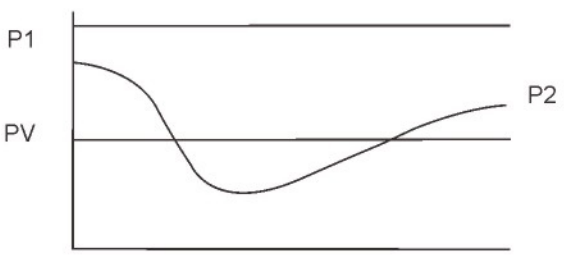


B: Static Structural (ANSYS)
Life
Type:Life

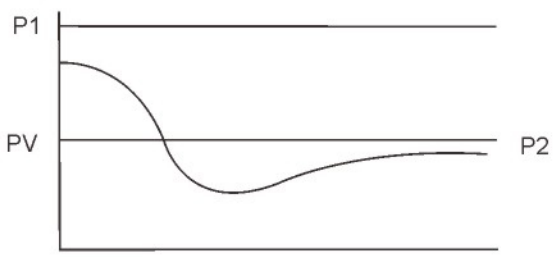


低温蝶阀
CRYOGENIC BUTTERFLY VALVE

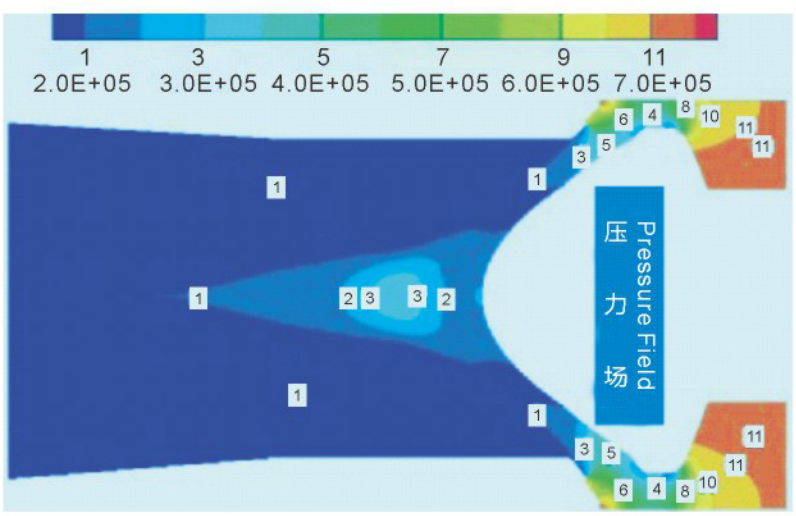
气蚀分析 Cavitation analysis

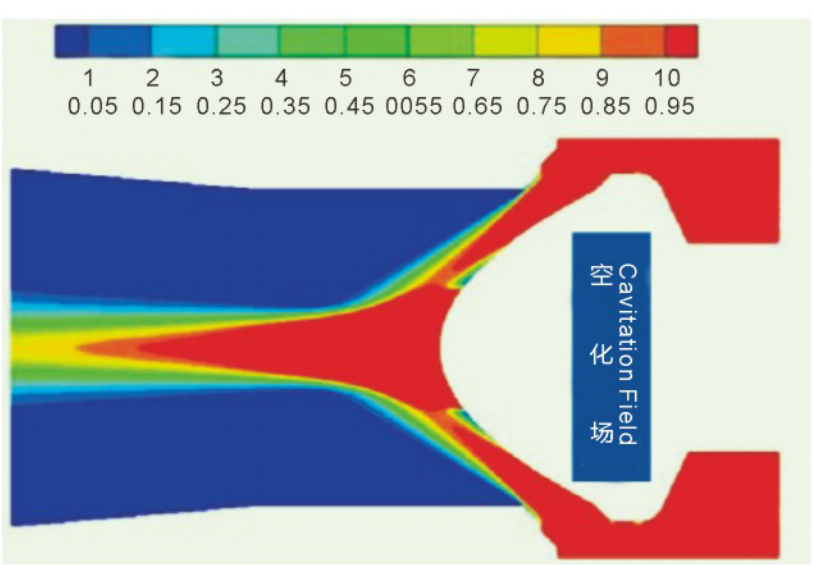


a)气蚀 Cavitation



b)闪蒸 Flash





低温蝶阀
CRYOGENIC BUTTERFLY VALVE

泰和石化 TAIHE PETROCHEMICAL

产品特点

- 满足低温国际标准和用户使用要求
- 采用直角防摩擦密封技术
- 符合ISO15848 & API 622 的低排放量
- 完全符合API 609 的防爆裂阀杆设计
- 阀门优化设计达到最大流量
- 弹性金属对金属密封技术
- 尺度系列：3"~ 60"
- 压力等级：Cl.150-Cl.900
- 顶装式设计易于在线维修
- 双向力矩阀座设计
- 防火试验符合API 607 要求
- 扭矩密封实现零泄漏
- 符合API 598 和API 6D 的弹性阀座
- 阀座为硬质合金.

Features & Benefits

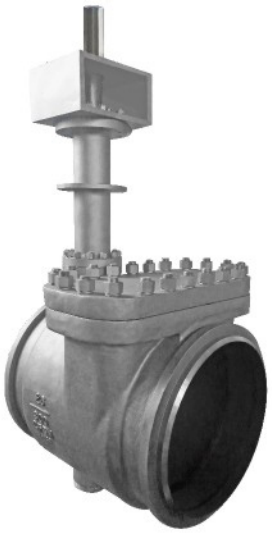
- Cryogenic extension in accordance with international & customer standards
- Quarter Turn non-rubbing & frictionless sealing
- Low fugitive emissions in compliance with ISO 15848 & API 622
- Anti Blow-Out stem design in full compliance with API 609
- Optimized disc design for maximum flow capacity
- Resilient metal-to-metal seal
- Size range from 3" to 60"
- Pressure range from Cl.150 to Cl.900 full rating
- Top-Entry design for easy in-line maintenance
- Bi-directional torque seated design
- Inherently Fire-Safe API 607 Tested
- Solid seal ring assures ZERO LEAKAGE
- according to API 598 resilient seated and API 6D
- Stellite hard-faced integral seat or hardened bolted seat

产品特点

- 满足低温(-196°C)国际标准和用户使用要求
- 压力等级：Class150~Class900
- 尺寸系列：3"~60"
- 三偏心阀门力矩密封，而非挤压密封；启闭过程非摩擦
- 蝶板与阀座为弹性金属对金属密封, 阀座堆焊钴基硬质合金, 阀座为面密封，而非线密封Discs and seats are
- 双向密封 Two-way Sealing.
- 防止阀杆吹出符合API609要求。
- 操作力矩小，阀座更换容易，无需设置限位结构。
- 蝶阀优化设计达到最大流量。
- 防火试验符合API607要求。
- 密封泄漏符合ISO15848, API622, API598和API6D要求。

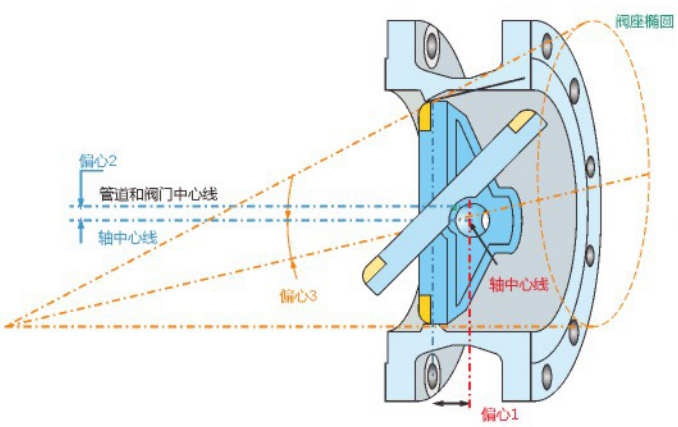
Features & Benefits

- To meet the low temperature (-196°C) international standards and user's requirements.
- Pressure Rating: Class150~Class900
- Dimension series: 3"~60"
- Tri-eccentric butterfly valve using torque seal, rather than squeeze seal, opening and closing process of non-frictional.using resilient metal-to-metal seals, The sealed surface is made of hard alloy of cobalt by overlaying welding. Using face seal, instead of linear seal.
- Blowout proof stem in accordance with API609 requirements.
- Small operating torque, easy seat replacement, do not need to set the limit structure.
- The butterfly valve is optimized for maximum flow.
- Fire-proof test in accordance with API607 requirements.
- Seal leakage in accordance with ISO15848,API622, API598 and API6D requirements.



低温蝶阀
CRYOGENIC BUTTERFLY VALVE

三偏心概念

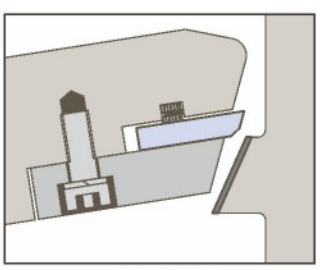


- 三偏心设计可以有效消除旋转过程中阀座和密封面之间的摩擦现象。
- 第一个偏心设计是把阀杆放在阀盘后方，实现了阀座和密封圈的可持续接触。
- 第二个偏心设计是把阀杆轴心偏离管路中心线，形成旋转过程中阀座与阀座远离的“凸轮效应”,避免旋转中的摩擦。
- 阀座和密封面在运行过程中形成一个斜圆台形，这就是第三个偏心 - 斜锥，是在原有双偏心的基础上增加了独特的偏心，谨慎选择阀座和密封面之间接触角，完全消除了90°行程中阀座与密封圈之间的全部摩擦。

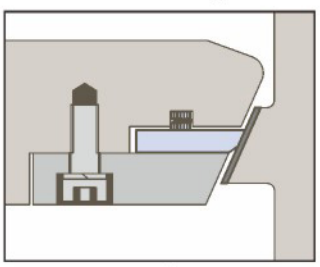
Triple Offset Concept

- The triple offset design has been developed in order to completely eliminate friction between seat and seal throughout the entire rotation.
- The first offset is given by placing the stem behind the disc, achieving a continuous contact between seat and seal.
- The second offset is given by placing the stem centerline away from the pipe centerline, achieving a “camming” action that drives the seal away from the seat uring rotation, thus removing any contact in the first few degrees of rotation
- Both seat and seal are then machined to match a conical profile with an inclined angle, adding the third offset to the well- known double offset design. The contact angle between seat and seal is carefully selected in order to avoid galling while limiting the required seating torque.

弹性金属密封



阀门关闭
Valve Closing



径向压缩密封
Radially Compressed Seal

- 阀门只有在完全关闭时阀座和密封面才会接触。
- 应用到阀座上的扭矩产生均匀压缩在金属密封圈上的径向力
- 金属密封圈可以完美匹配阀座，实现双向气密关闭。

Resilient Metal Seal

- Contact between seat and seal is achieved only in the fully closed position.
- The torque applied to seat the valve generates radial forces that uniformly compress the metal seal ring.
- The seal ring is therefore energized and adjusts to perfectly match the seat, achieving bidirectional bubble-tight shutoff.

低温蝶阀
CRYOGENIC BUTTERFLY VALVE

泰和石化 TAIHE PETROCHEMICAL

超低温工作

○ 超低温工作要求阀门具备非常优秀的性能，金属三偏心超低温阀门得益于非常著名的三偏心设计具备的性能，如高纯度的动态垫片等材料，极其稳定可靠的密封圈和无柔性组件，使得三偏心成为阀门超低温工作的首选。在金属三偏心阀座的设计中，整个阀开关中密封圈和阀座之间无摩擦，结合同等热膨胀系数，保证了阀门的最佳性能和更长寿命。三偏心设计符合最严格的国际标准和用户要求的泄漏率。

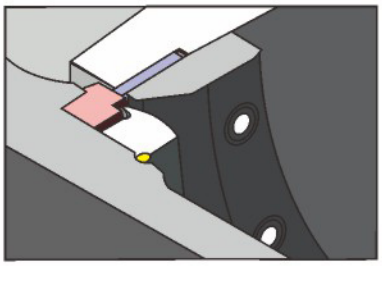
Cryogenic Service

- Cryogenic service is a very severe application that requires a valve with superior performance.
- Triple Offset Metal Seated Cryogenic Valve benefits from the well known triple eccentric design.
- The addition of features like the cryogenic extension, the careful selection of materials suc has dynamic gaskets in pure graphite, the use of solid seal ring for maximum robustness and the absence of any soft component make the Triple Offset the valve of choice for cryogenic service.
- In Triple Offset Metal Seated Valve design, the absence of rubbing between seal ring and seat throughout the entire valve stroke combined with the selection of materials of equal thermal expansion coefficient guarantee the best valve performance and long life cycle.
- The Triple Offset design delivers leakage rates according to the most stringent international and customer standard




螺栓阀座的选取

螺栓阀座是一个常见的标准设计，常见于顶装式结构中。这个设计使阀盘关闭时能够实现快速维修，对阀圈和其他标配零件是一个简单经济的替代选择。



Cryogenic Service

The Bolted Seat is available as an option on standard design, while it is always present in theTop-Entry configuration.This design allows quick maintenance during plant shut-downs, making very easy andeconomical the replacement of the seat ring, in addition to the standard spare parts.

低温蝶阀
CRYOGENIC BUTTERFLY VALVE

TAIHE PETROCHEMICAL

www.hblsth.com

简单的在线维修

○ 三偏心金属阀座顶装蝶阀是解决简单的在线维修的根本方法由于顶装法兰位于内部密封组件之上，并且设计采用螺栓座，从而可以保障快速便捷的维修。在工厂停机或快速旋转时，密封圈和阀座都是可以替换的备件组件的拆卸和重装无需使用特殊工具

Cryogenic Service

- EASY IN LINE MAINTENANCETriple Offset Metal Seated Top Entry Valve is the ultimate solutionfor easy in-line maintenance.Due to the Top-Entry flange located above the internal sealing elements and the use of boltedseat design, quick and easy main-tenance is guaranteed.Both the seal ring and the seat become spare parts that can be replaced during plantshut-downs or quick turn-arounds No special tools are required for components dism-antling and re-assembly.

适用标准 Applicable Standards

设计标准
DESIGN
API 609
ASME B16.34
ASME VIII
BS 6364
DIN 3840

结构长度
FACE TO FACE
API 609
ASME B16.10
ISO 5752

防火试验
FIRE TEST
API 607
BS 6755
ISO/FDIS 10497

连接标准
CONNECTION STANDARD
ASME
DIN
ISO
JIS

试验标准
TEST STANDARD
API 598
API 6D
BS 6364
BS 6755
EN 12266
ISO 5208

微泄漏排放标准
FUGITIVE EMISSIONS
API 622
ISO 15848
SHELL SPE 77-312
TA-LUFT

低温蝶阀
CRYOGENIC BUTTERFLY VALVE

泰和石化 TAIHE PETROCHEMICAL

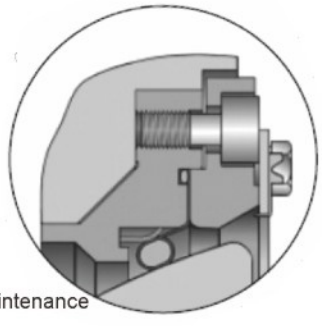
双向金属阀座

○ 阀座包含一个内置的铬镍铁合金弹簧、一个外置的不锈钢包膜和一个外置的柔性铜制包膜，延伸至同一个垫片之间的阀座。

○ 固定柔性阀座环可以给阀板供应互补的阀座压力。

Bi-directional Metal Valve Seat

- The seat contains an internal inconel spring, an internal envelope in stainless and a copper alloy external envelope which is flexible and extends to the same seating arrangement between the flanges.
- A flexible retaining ring provides a complementary seating pressure on the disc.



易维护
Easy Maintenance

在线维修

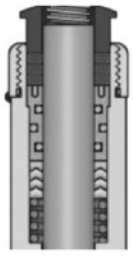
○ 侧进入设计实现了简单快速的在线维修，能够从侧面自由进入阀座和阀板进行检验和维修，不需要任何特殊工具

On-Line Maintenance

- The side entry design allows easy andquick in-line maintenance through theside cover with free access to the seat and disc for inspection or main tenance with out disassembly of actuators. Nospecial tools are required.

选材 OPTIONS

防火密封杆
（应用于LNG）
FIRE SAFE STEM SEAL
(for LNG applications)



○ 弹簧位于V型TF填充料上
○ O型环密封路径
○ 石墨防火填充料
○ 密封法兰

- Springs located on the V-type TF stuffings;
- O-type sealing path
- Graphite anti-fire stuffings
- Sealing flange

活载格兰密封压盖螺栓
LIVE-LOADED
GLAND BOLTING

○ 应用于温度快速起伏引起的连接处泄漏Bellville垫圈的活载螺栓。

- For applications where rapid temperature fluctuations take place which can cause joint leakage the bolting can be live-loaded with spring Bellville washers.

侧进入的防火操作

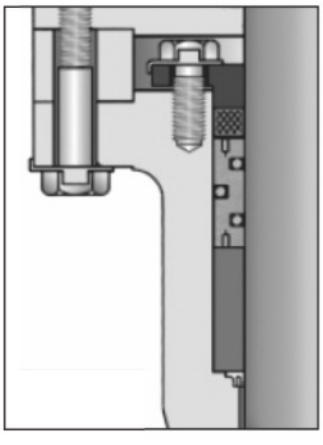
金属阀座和三通密封杆实现了防火操作

○ 使用SS柔性唇形垫片
○ 橡胶O型阀环
○ 石墨阀环

Side Entry For Firesafe Operation

Metallic seat and a 3-way stem sealing provides fire safe operation.

- Coated SS flexible lip gasket
- Viton O-rings
- Graphite rings



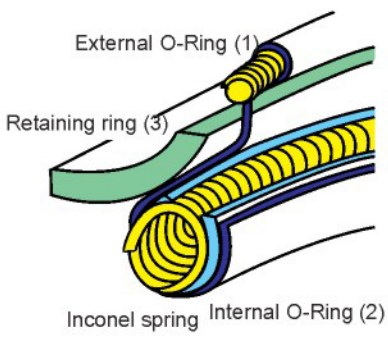
低温蝶阀
CRYOGENIC BUTTERFLY VALVE

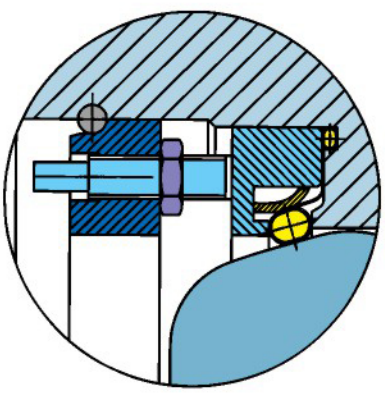
金属柔性阀座

○ 双弹簧金属O型环阀座提供了静态和动态密封以及内在的防火性能。每个O型环都有双重包膜，内膜是不锈钢的，外膜是铜制或镍合金。弹簧是铬镍铁合金。固定柔性阀环保证了对阀板的补充压力。我们采用了一个特殊的组装，使拧紧的螺丝被锁紧螺母固定，使其不会丢失在阀管内部。

Metallic flexible seat

● A double spring-energized metallic O-ring seatprovides a static (1) and dynamic seal (2) aswell as the inherent fire safe function. Each O-ring has a double envelope, the innerone in stainless steel, the external one in copperor nickel alloy. The spring is made of Inconel.The flexible retaining ring (3) ensures a complementary contact pressure onto the disc.Thanks to a special arrangement, the tighteningscrews are secured by a jam nut and can't belost inside the piping.





防火性能

○ 符合下列标准：
○ API 607
○ API 6FA
○ BS 6755

Fire safe function

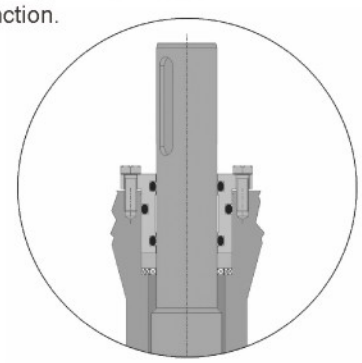
● In compliance with:
● API 607
● API 6FA
● BS 6755

密封阀杆

○ 密封阀管得益于叠加的O型环垫片和具有防火功能的柔性填充料。

Low pressure drop

● Stem sealing isachieved by a systemof superposed O-ringgaskets and a graphite packing for the fire-safe function.



低压泄漏

○ 用于气体：

$$\Delta P = P_1 - \sqrt{P_1^2 - 2\,dT\,(\frac{Q_g}{393\,Cv})^2}$$

ΔP = 压力差 单位：bar
P_1 = 上游压力 单位：bar
Qg = 流量体积 单位：立方米/小时
d = 标准条件下气体重力
T= 绝对温度 单位：K
Cv= 流量系数

○ 用于液体：

$$\Delta P = d\,(\frac{Q_L}{Kv})^2$$

ΔP=压力差 单位：bar
QL =液体流量 单位：bar
d = 液体重力
Cv = 流量系数=1.16Kv

Low pressure drop

● For gases

$$\Delta P = P_1 - \sqrt{P_1^2 - 2\,dT\,(\frac{Q_g}{393\,Cv})^2}$$

ΔP = Pressure drop : bar
P_1= Upstream pressure : bar
Qg = Volumetric flow of gas : m^3/h
d = Specific gravity of gas in standard conditions
T= Absolute temperature : K
Cv= Flow coefficient

● For liquids

$$\Delta P = d\,(\frac{Q_L}{Kv})^2$$

ΔP= Pressure drop : bar
QL = Flow of liquid:m^3/h
d = Specific gravity of liquid
Cv = Flow coefficient =1.16 Kv

低温蝶阀
CRYOGENIC BUTTERFLY VALVE

泰和石化 TAIHE PETROCHEMICAL

设计特征

- 三偏心阀盘旋转：提供防摩擦的气密性密封
- 低温阀杆填充（细节B）：由叠加的橡胶O型环和延伸石墨环（防火的）构成。
- 易散型排放（细节B）：符合IOS 15848标准
- 没有空洞（细节C）：没有空洞来阻止固态形成。
- 排水功能（细节C）：底盖可以移除
- 内在防爆裂功能： 有效防止轴承在压力下爆裂
- 内在防火性能：不锈钢结构和金属密封实现了内在防火性能。
- 延展阀盖：充足的气体流量使阀杆填充远离低温液体。延伸的阀盖长度能够有效应用于LNG。
- 驱动器：提供手动的、气动的（单一或双重型）、电动的、液压的来满足用户需求。开关或调节功能遵循规定。紧急情况下制动装置也能提供。
- 高质量铸造技术：根据客户需求在-321F（-196C）下进行放射控制、燃料渗透实验、铁素体含量控制、碰撞测试。
- 加固不锈钢轴承：在超低温下高循环持续运行。
- 可靠性高：符合IEC 61508安全性 可靠性

Design Features

- Triple-offset disc rotation: provides bubble tightsealing without rubbing or galling.
- Cryogenic stem packing (Detail B): composed ofsuperposed Viton O-rings and expanded graphite rings(fire-safe approved).
- Low fugitive emission (Detail B): in accordance withISO 15848.
- No cavity (Detail C): no cavity to prevent build-up ofsolids.
- Drainage possibility (Detail C): the bottom cover can beremoved if drainage is required.
- Internal blow-out protection (Detail C): prevents theshaft from blowing out under pressure.
- Inherent fire safe function: stainless steel constructionand metallic seal (item 5) provide inherent fire safefunction.
- Extended bonnet (item 2B): with a sufficient gascolumn to keep the stem packing away from coldfluid. Extended bonnet length is qualified for usein LNG application with type approvals from majorClassification Societies.
- Actuator: manual, pneumatic (single or double actingtype), electric or hydraulic according to customerspecification. ON/OFF or MODULATING functionaccording to the application. Fast acting actuators forEmergency Shut Down function (ESD) also available.
- High quality castings: radiographic control, dyepenetrant test, ferrite content control, impact test at-321°F (-196°C) according to customer's requirements.
- Reinforced stainless steel shaft bearings: for highcycles and smooth operation at very low temperature(item 55).
- High reliability: Safety integrity level requirementsaccording to IEC 61508.

材料 Materials　　Design Standards

部位 Part	ASTM等级 ASTM Grade	部位 Part	ASTM等级 ASTM Grade
阀体 Body	A351 CF8M	延迟杆 Extension Rod	A351 CF3M / A479 F316L
阀杆 Stem	A182 F316 / Gr.660	垫片 Gasket	石墨 Graphite
阀盘 Disc	A351 CF8M / A182 F316	螺栓 Stud	A 320 B 8M
金属密封 Metallic seal	铜制/镍合金 Copper / Nickel alloy	螺母 Nut	A 194 gr 8

低温蝶阀
CRYOGENIC BUTTERFLY VALVE

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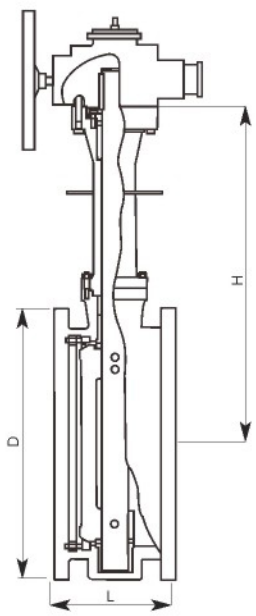


法兰式阀门	Flanged valves
DN 150 - 1200 NPS 6" - 48"	DN 150 - 1200 NPS 6" - 48"
Class 150 - 300	Class 150 - 300
Down to -252°C (-420°F)	Down to -252°C (-420°F)

可选版本	Available versions for
液化氢	Liquefied Hydrogen
液化氧	Liquefied Oxygen
液化氦、减少热量流失	Liquefied Helium,reduced thermal losses
流量控制	Flow control service
锻造设计	Forged Design

尺寸 Cv Dimensions, Cv

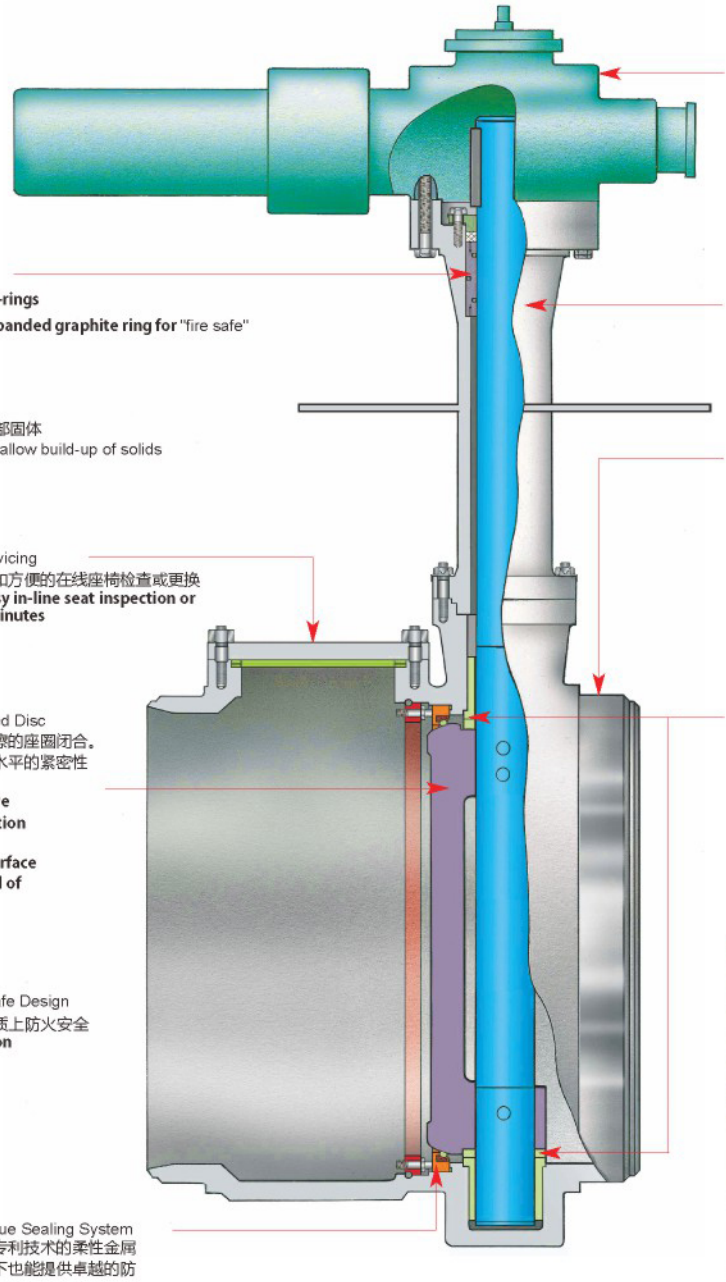
DN	NPS	Class 150				Class 300			
		L	H	D	Cv	L	H	D	Cv
150	6	140	610	280	930	140	610	317.5	930
200	8	152	640	343	1730	152	640	381	1730
250	10	165	665	407	2810	165	665	444.5	2810
300	12	178	715	483	4175	178	715	520.5	4175
350	14	190	760	534	5850	190	760	584	5850
400	16	216	807	597	7850	216	807	647.5	7850
450	18	222	855	635	10190	222	855	711	10190
500	20	229	932	699	12880	229	932	774.5	12880
600	24	267	1050	813	19370	267	1050	914.5	19370
650	26	288	1145	870	23200	288	1145	970	23200
700	28	292	1170	927	27440	292	1170	1035	27440
750	30	308	1220	985	32100	308	1220	1090	32100
800	32	318	1240	1060	37210	318	1240	1150	37210
900	36	330	1295	1170	48790	330	1295	1270	48790
1000	40	410	1590	1289	62320	-	-	-	-
1050	42	430	1590	1346	69860	-	-	-	-
1200	48	470	1700	1511	95770	-	-	-	-

更多规格请致电我公司销售部 (0717-2822168)
More specifications, please contact our Sales Department (86-717-2822168)

低温蝶阀
CRYOGENIC BUTTERFLY VALVE

泰和石化 TAIHE PETROCHEMICAL

阀门设计特点 Valve design features



- 执行器 Actuators
  气动、液压、电动或手动齿轮
  快速执行器的紧急关机功能(ESD)
  Pneumatic, hydraulic, electric or manual gear
  Fast acting actuators for Emergency Shut Down function (ESD)
- 阀杆密封 Stem Seal
- 氟橡胶O型圈 **Viton O-rings**
- 防火用膨胀石墨圈 **Expanded graphite ring for** "fire safe"
- 延长阀盖 Extended Bonnet
  有足够的气柱来保持阀杆填料远离冷流体
  With a sufficient gas column to keep the stem packing away from the cold fluid
- 无腔 No Cavity
  没有空腔允许积聚内部固体
  There is no cavity to allow build-up of solids
- 高质量铸件 High Quality Castings
  批准的铸造厂使用X射线和PT检查
  With X-ray and PT examinations from approved foundries
- 在线服务 In-Line Servicing
  在短时间内允许快速和方便的在线座椅检查或更换
  Allows quick and easy in-line seat inspection or replacement within minutes
- 偏心阀瓣 Off-Centered Disc
  确保逐渐平滑和低摩擦的座圈闭合。硬化密封面，提供高水平的紧密性和长使用寿命
  Ensures a progressive smooth and low friction seat-disc closing. Hardened sealing surface to provide high level of tightness and long lifetime
- 不锈钢轴承 Stainless Steel Shaft Bearings
  涂覆有切口强化PTFE, 用于高循环和平滑操作
  Coated with nickel-reinforced PTFE for high cycle and smooth operation
- 防火安全设计 Fire Safe Design
  所有金属结构提供本质上防火安全
  All metal construction providing inherent fire safe
- 独特的密封系统 Unique Sealing System
  结合偏心阀瓣旋转，专利技术的柔性金属座椅即使在高温波动下也能提供卓越的防撞切断
  Combined with the eccentric disc rotation, the patented flexible metallic seat provides an exceptional tight shut-off even with high temperature fluctuations

42"BW侧进入蝶阀低温试验后
42"BW Side Entry Butterfly Valve after cryogenic tests

可靠性 Reliability

○ 阀门操作的可靠性影响使用寿命和便于检查和维护。为了预测可靠性，声音阀门设计必须通过在临界操作条件下的应力分析和功能鉴定测试来备份。

- Reliability of valve operation affects service life and ease of inspection and maintenance. In order to predict reliability, a sound valve design must be backed up by a stress analysis and functional qualification testing under critical operating conditions.

低温蝶阀
CRYOGENIC BUTTERFLY VALVE

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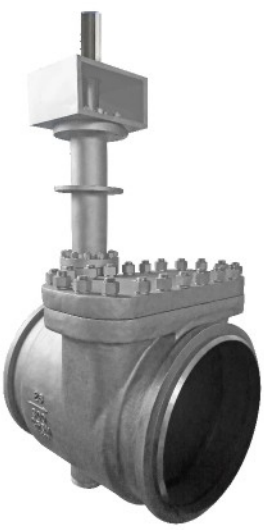
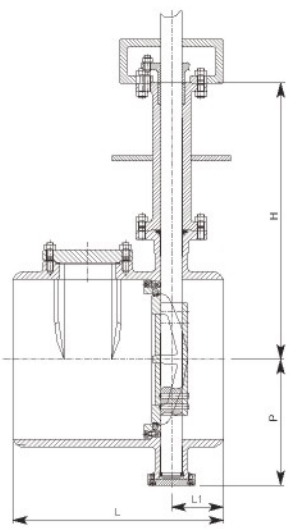
对接焊端阀 Butt weld end valves





DN 150-1050
NPS 6"-42"
150-300级别
低至-252°C(-420°F)

DN 150- 1050
NPS 6"-42"
Class 150 - 300
Down to -252°C(-420°F)

可应用的版本 Available versions for

- ○ 液化氢
- ○ 液化氧
- ○ 液化氦
- ○ 减少热损失
- ○ 流控服务
- ○ 锻造设计

- ● Liquefied Hydrogen
- ● Liquefied Oxygen
- ● Liquefied Helium
- ● Reduced thermal losses
- ● Flow control service
- ● Forged Design

材料 Materials

部位 Part	ASTM等级 Grade	部位 Part	ASTM等级 Grade
阀体Body	A351 CF3M	外延 Extension	A351 CF3M或or A479 F316L
阀杆 Stem	A479 F316或or Gr.660	垫片 Gasket	石墨 Graphite
阀盘 Disc	A351 CF8M 或or A182 F316	螺栓 Stud	A 320 B 8M
金属密封 Metallic seal	铜制或镍合金Copper or Nickel alloy	螺母 Nut	A 194 gr 8

尺寸 Cv Class 150 Dimensions, Cv Class 150

DN	150	200	250	300	350	400	450	500	600	650	700	750	800	900	950	1000	1050
NPS	6	8	10	12	14	16	18	20	24	26	28	30	32	36	38	40	42
H	610	640	665	715	760	807	855	932	1050	1110	1170	1220	1240	1295	1510	1590	1590
P	122	148	180	207	232	270	303	331	395	430	455	500	520	560	648	680	703
L	395	410	455	480	530	555	590	625	680	720	770	795	830	900	1100	1190	1190
L1	125	130	140	145	165	165	175	185	190	200	215	215	230	265	315	335	335
Cv	903	1730	2810	4175	5850	7850	10190	12880	19370	23200	27440	32100	37210	48790	55200	62320	69860

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低温蝶阀
CRYOGENIC BUTTERFLY VALVE

泰和石化 TAIHE PETROCHEMICAL

测试

- 1200m² 测试和检验区域，包括：
- 在环境温度下用于压力测试的酒精试验台
- 内部低温测试设施，包括两个氮池和一个阀门尺寸可达80”(DN 2000)的低温仓。
- 全部测试都根据最严格的国际标准进行

Testing

- 1200 m² dedicated to testing and inspection, including :
- alcohol test bench for pressure tests at ambient temperature.
- in-house cryogenic testing facility, including 2 nitrogen pools and a cryogenicbunker (for high pressure tests) forvalve sizes up to 80” (DN 2000).
- all our tests are performed in accordance with the most stringent internationalstandards.

核心资质认证

Core Certification

低温蝶阀
CRYOGENIC BUTTERFLY VALVE

液化气体的温度 Temperatures Of Liquified Gases

类型 Type	沸点 Boiling Point		液体密度 Liquid Density	类型 Type	沸点 Boiling Point		液体密度 Liquid Density
	0°C	0°F			0°C	0°F	
天然气 Natural gas (LNG)	-168	-270	26	空气 Air	-194.4	-318	57.87
甲烷 Methane (CH_4)	-161.5	-258	26.20	氮气 Nitrogen (N_2)	-195.8	-320	50.45
氧气 Oxygen (0_2)	-182.9	-296	71.20	氢气 Hydrogen (H_2)	-252.7	-423	4.43
氩气 Argon (A)	-185.9	-303	87.40	氦气 Helium (He)	-268.9	-452	7.82
二氧化碳 Carbon Dioxide (CO_2)	-78.5	-109	50.60	绝对零度 Absolute Zero	-273.16	-460	-

主要应用

- LNG液化厂
- LNG接收端
- 空气分离过程
- 石油化工过程
- 气体到液体(GTL)
- 航空航天储存设施

Main Applications

- " LNG Liquefaction Plants
- " LNG Receiving Terminals
- " Air Separation Processes
- " Petro-Chemical Processes
- " Gas To Liquid (GTL)
- " Aero-Space Storage Facilities

低温球阀
CRYOGENIC BALL VALVE

泰和石化 TAIHE PETROCHEMICAL

球阀标准

○ 设计标准
符合API6D 、 ASME B16.34 、 ASME Ⅷ、 BS6364 要求
○ 连接标准
符合API6D、ASME B16.10 、ASME B16.25
ASME B16.5要求
○ 微泄漏试验
符合ISO15848要求
○ 防火试验
符合API607要求
○ 强度和密封试验标准
符合API598、API6D、BS6364、ISO5208要求

Ball valve standard

- Design standards
  In accordance with API6D, ASME B16.34, ASME VIII, BS6364 requirements.
- Connection standards
  In accordance with API6D, ASME B16.10 ASME B16.25 ASME B16.5 requirements.
- Microleak test
  In accordance with IOS15848 requirements.
- Fire-proof test
  In accordance with API607requirements.
- Strength and sealing test standards
  In accordance with API598, API6D, BS6364,ISO 5208 requirements.

低温球阀
CRYOGENIC BALL VALVE

主要材料 Materials

零件 Parts	材料 Materials	零件 Parts	材料 Materials
阀体 body	ASTM A351 CF8M	填料垫 packing seat	ASTM A182 F316
球体 ball	ASTM A182 F316	填料压套 Packing bush	ASTM A182 F316
阀杆 stem	ASTM A182 FXM-19	轴承/推力垫 Bearing/thrust pad	PCTFE
金属阀座圈 Metallic seat ring	ASTM A182 F316	弹簧 spring	INCONEL X-750
非金属阀座 Nonmetallic seat ring	PCTFE	阀座与阀体间密封 Seal between seat and boby	Elgiloy+PTFE唇形密封圈和石墨防火带组合 Elgiloy+PTFE lip-seal and 316+graphitic fire belt
阀体密封 Valve seal	Elgiloy+PTFE唇形密封圈和316+石墨缠绕垫组合	阀杆密封Stem seal	Elgiloy+PTFE唇形密封圈和316+石墨填料组合 Elgiloy+PTFE lip-seal and 316+graphitic packing

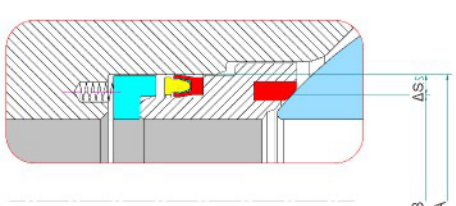
唇形圈泄压 Lip-ring pressure relief

○ 通过唇形圈的背面泄压，不考虑中腔压力的活塞效应，仅仅考虑管道压力的活塞效应，使得ΔS变小，从而降低阀门扭矩。

○ 设定弹簧力F, 系统压力P
压力来自管道，面积A>面积B
PA>PB, PA+F>PB
PA和F促使阀座紧贴球体

● Making ΔS smaller and reducing valve torque through the back lip seal pressure relief,which consider the piston effect of pipeline pressure rather than the piston effect of middle cavity pressure.

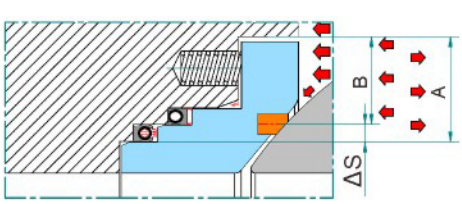
● Set the spring force F, system pressure P
Pressure from the pipe, Area A>B PA>PB, PA+F>PB
PA and F push the seat close to the ball



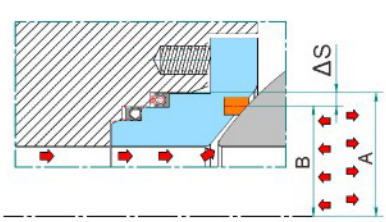
背压密封结构 Back pressure relief seal structure

○ 利用弹簧密封圈只能单向密封的特点，巧妙设计使得中腔压力通过密封件背面泄压

● Take advantage of the feature that spring sealing ring can only unidirectional seal,this skillful design makes the pressure of the middle cavity relief through the back pressure of the sealing.



管道压力
Pressure form pipes



中腔压力
Pressure form middle cavity

低温球阀
CRYOGENIC BALL VALVE

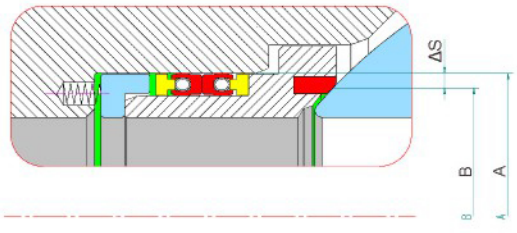
泰和石化 TAIHE PETROCHEMICAL

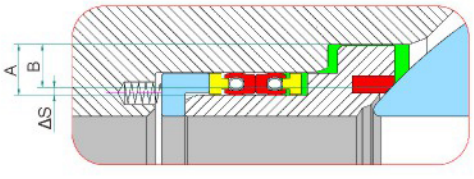
双向密封原理

○ 设定弹簧力F, 系统压力P 压力来自管道，面积A>面积B支承圈受到F+PXΔS向右方向的力，阀座贴紧球面
○ 压力来自中腔，面积A > 面积B支承圈受到F+PXΔS向右方向的力，阀座贴紧球面
○ 双向密封设计的诀窍在于阀座封面处于唇形圈的两个密封面之间

Double seal structure

- Set the spring force F, system pressure P
  Pressure from the pipe, Area A>B
- Pressure comes from the middle cavity, Area A>B, support ring takes pressure from F+P×ΔS from the right, pushing valve Seat pressed close to the ball surface.
- The secret of double seal structure is that seat sealing be settled between lip-ring and seal surface.



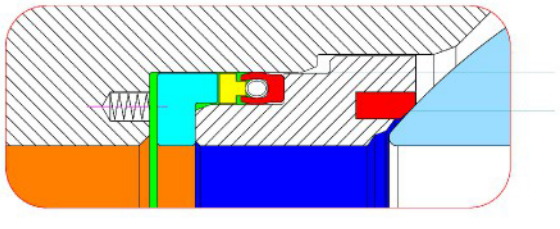


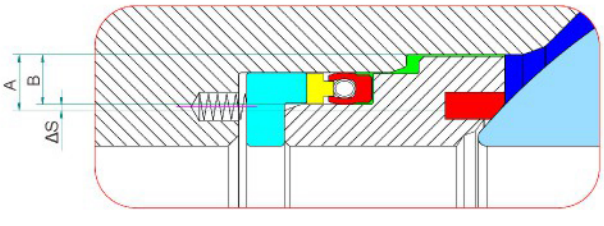
DBB自泄压阀座

○ 压力来自中腔，面积A > B,当中腔压力升高到一定数值时，PA > PB+FPA使阀座脱离球面
○ 设定弹簧力F, 系统压力P
压力来自管道，面积A>面积B
PA>PB, PA+F>PB
PA和F促使阀座紧贴球体
○ LNG气化后体积扩大为原来的600多倍，异常升压的问题普遍存在。当球阀关闭后，残留在阀腔内的LNG从周围环境中大量吸收热量迅速气化，在阀体内产生很高的压强，从而破坏球体及阀座组件，使球阀不能正常工作。所以在入口端加泄压孔，以保证腔体和入口管道的压力平衡，防止异常升压。

DBB self-relief seat

- Pressure comes from the middle cavity, Area A>B
  when chamber pressure reaches a certain value, PA>PB+F
  PA push seat away from ball surface
- Set the spring force F, system pressure P
  Pressure from the pipe, Area A>B PA>PB, PA+F>PB
  PA and F push the seat close to the ball
- The volume will expand to 600 times multiple after LNG gasified, the problem of pressure rising unusually is common. After ball valve turn off , the remain LNG will gasify fast by absorbing heat from surroundings , creating high pressure inside the valve, which will destroy the ball seat, then the ball valve can't work anymore. To solve the problem, we install a pressure relief device in the inlet to balance the pressure, avoid pressure rising unusually.





低温球阀
CRYOGENIC BALL VALVE

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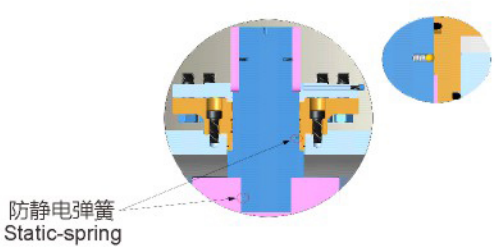
防静电结构设计 Static-free structure

○ 由于LNG易燃易爆，设计时考虑防静电。对非金属与金属接触，且有相对运动的部位设置防静电结构，使其电阻值小于10Ω。

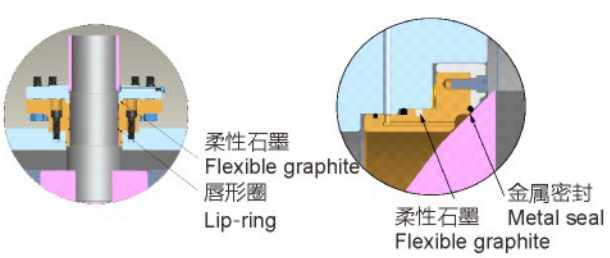
● We design the static-free structure to avoid LNG burning and exploring. The static-free device is setted up between the metallic and nonmetallic parts，the resistance will below 10Ω.



防火结构设计 Fire prevention structure

○ 阀体和阀盖连接部位采用Lip-seal密封圈和石墨缠绕垫片的双道密封结构，阀杆密封部位也采用Lip-seal密封圈、石墨填料组和O形圈多重密封结构。当火灾发生时，Lip-seal密封圈熔化失效，此时中腔石墨缠绕垫片和阀杆石墨填料组起主要密封作用，防止发生外漏。

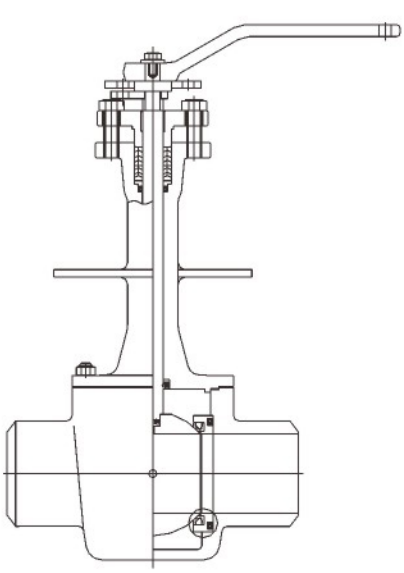
● The part between valve body and bonnet has double sealing structure with Lip-seal and graphitic gasket, valve stem also has the sealing structure with Lip-seal, graphitic filling materials and O circle. When it's on fire, Lip-seal will melt, graphitic gasket and graphitic filling materials will still working,avoid leaking.

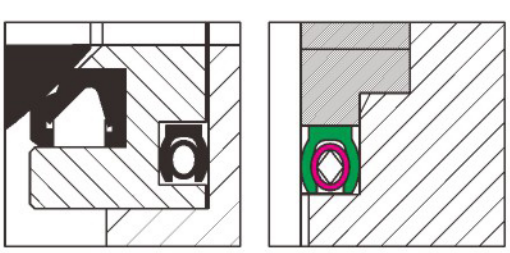


低温浮动球阀 Cryogenic Float Ball Valve

○ 低温下阀座材质变硬且收缩，补偿性差，弹簧的加入不但弥补了材料的收缩量，还提供了足够的弹性使得阀座始终紧贴密封面，密封效果更好更稳定，并降低了阀门扭矩。阀座后密封，在球体上朝着压力进口端的方向开孔，使得中腔与进口端连通，防止中腔压力过高。

● seat material turns hard and shrink, poor compensatory, adding spring not only makes up material shrinkage, but also provides enough resilience, which will make the seat always clings to the seal face, thus to get better sealing and more steady, and reduce valve torque. Sealing at the back of seat, and trepanning in the direction of pressure entry face on the ball, will make the mesocoele connect with the entry face, and avoid mesocoele get high pressure.





低温球阀
CRYOGENIC BALL VALVE

泰和石化 TAIHE PETROCHEMICAL

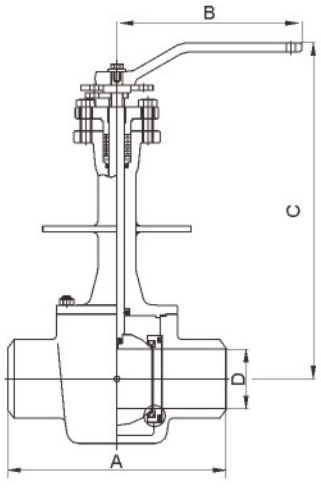
设计特点

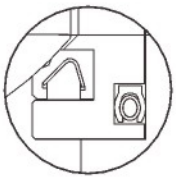
- 符合ASME B16.5，ASME B16.34，API 608，API 598的标准
- 结构长度符合ASME B16.10长图案
- 齿轮制动器符合8-24"(200-600mm) SB-150/300和6-12"(150-300mm) SB-600 阀门
- 记忆密封阀座自动补偿压力和温度的磨损和波动
- 长寿命周期
- 低扭矩
- 爆裂检验阀杆
- 阀杆轴承减少侧推力
- 多种固体聚四氟乙烯或V型阀杆密封(可调整的)
- 活载止推垫圈防止卡住并提供第二个阀杆密封
- 完全封闭的缠绕石墨填充不锈的阀体垫片
- 必选装置选用1/2-6" (15-150mm)阀门(SB600 最高4"(100mm))
- 所有的球体都有气孔

Design Features:

- Meets ASME BI6.5,ASME B 16.34, API 608, API 598.
- Face-to-face dimensions meet ASME B16.10 long pattern.
- Gear actuator standard on 8-24"(200-600 mm)SB-150/300 and 6-12"(150-300 mm) SB-600 valves.
- Memory Seal seats compensate automatically for wear and fluctuations of pressure and temperature.
- Long cycle life.
- Low torques.
- Blowout-proof stem.
- Stem bearing reduces side thrust.
- Multiple solid PTFE or chevron type stem seal (adjustable).
- Live-loaded thrust washer prevents galling and provide secondary stem seal.
- Fully endosed spiral wound graphite filled stainless body gasket.
- Locking devices optional on H-6-(15-150 mm) valves <SB600 up to 4" (100 mm)
- Air vent on all balls.

浮动球阀规格 Floating Ball Valve Dimensions





尺寸 Size		Class150				Class300				Class600			
mm	in	A	B	C	D	A	B	C	D	A	B	C	D
15	1/2	108	134.9	178	12.7	139.7	134.9	178	12.7	-	-	-	-
20	3/4	117.5	141.2	184	19.1	152.4	141.2	184	19.1	-	-	-	-
25	1	127.0	141.2	195	51.9	165.1	141.2	195	25.4	-	-	-	-
40	1½	165.1	198.4	280	38.1	190.5	198.4	280	38.1	-	-	-	-
50	2	177.8	263.6	280	50.8	215.9	263.6	280	50.8	292.1	302.3	280	50.8
65	2½	190.5	302.3	380	63.5	241.3	302.3	380	63.5	-	-	-	-
80	3	203.2	302.3	420	76.2	282.5	302.3	420	76.2	355.6	660.4	420	76.2
100	4	228.6	508.0	500	101.6	304.8	508.0	500	101.6	431.8	660.4	500	101.6
150	6	393.7	660.4	620	152.4	403.1	660.4	620	152.4	558.8	-	620	152.4
200	8	457.2	-	740	203.2	501.6	-	740	203.2	660.4	-	740	203.2
250	10	533.4	-	880	254.0	563.3	-	880	254.0	787.4	-	880	254.0
300	12	609.6	-	1020	304.8	647.7	-	1020	304.8	838.2	-	1020	304.8
350	14	685.8	-	1180	336.5	762.0	-	1180	336.5	-	-	-	-
400	16	762.0	-	1295	387.4	838.2	-	1295	387.4	-	-	-	-
450	18	863.6	-	1420	438.2	914.4	-	1420	431.8	-	-	-	-
500	20	914.4	-	1580	489.0	990.6	-	1580	482.6	-	-	-	-
600	24	1066.8	-	1730	590.6	1143.0	-	1730	584.2	-	-	-	-

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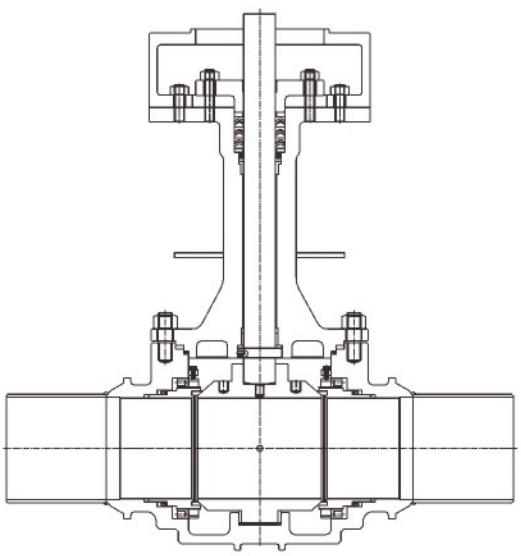
低温球阀
CRYOGENIC BALL VALVE

顶装式球阀 Top-entry Ball Valve



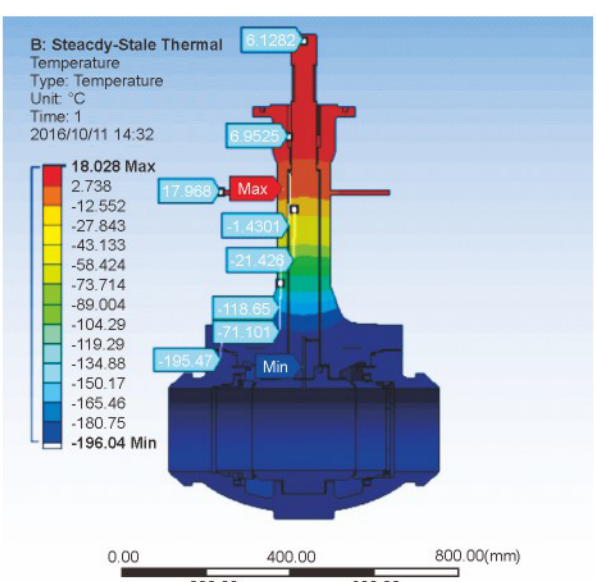
○ DBB结构
进口端和出口端均为单活塞

○ DIB-1结构
进口端和出口端均为双活塞

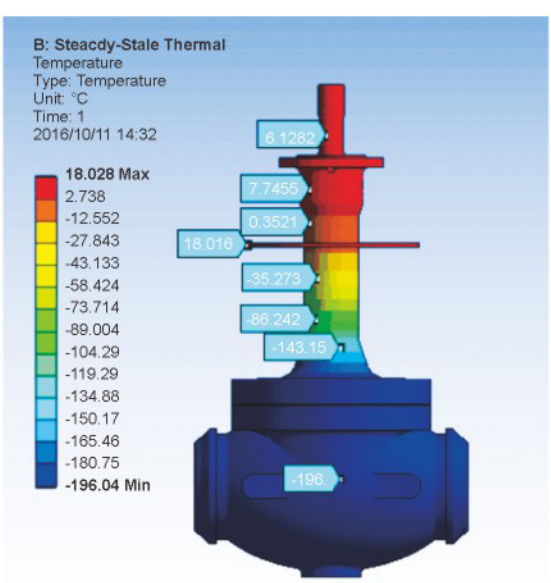
○ DBB-2结构
进口端单活塞，出口端双活塞

- DBB structure
  Inlet and outlet ends are single piston
- DIB - 1 structure
  Inlet and outlet ends are double piston
- DBB - 2 structure
  IInset end is single piston and outlet

低温球阀长颈阀盖 Cryogenic Ball Valve Long-necked bonnet



开启状态时的温度场分布
temperature field distribution when opening



关闭状态时的温度场分布
temperature field distribution when closing

低温球阀
CRYOGENIC BALL VALVE

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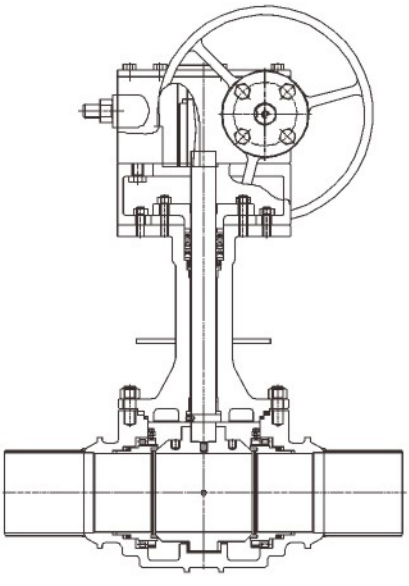
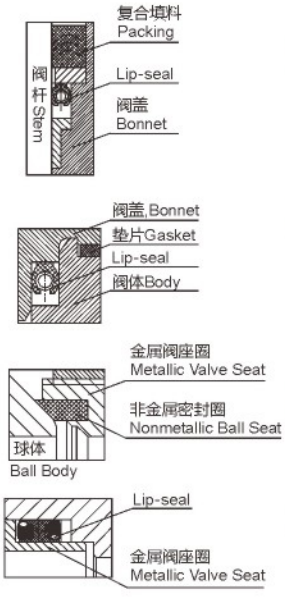
结构设计模块 Structure design





阀杆旋转动密封
(lip-seal密封圈+柔性石墨填料+O型圈)
Stem seal by rotating
(lip-seal ring+flexible graphite packing+O-ring)

体盖径向静密封
(lip-seal密封圈+缠绕式垫片)
Static radial seal in bonnet
(lip-seal ring+wound gasket)

阀座摩擦动密封(PCTFE阀座)
Seat seal by dynamic friction
(PCTFE seat)

阀座往复动密封(lip-seal密封圈)
Seat seal by reciprocating dynamic
(lip-seal ring)

阀杆密封结构 Features & Benefits

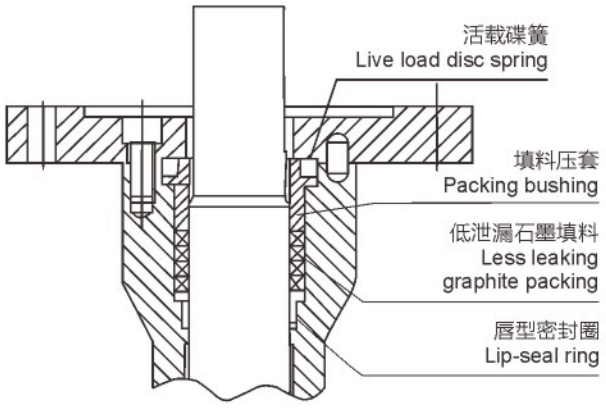
○ 阀杆密封采用三重密封机构：石墨+ 唇式密封机构（PCTFE+FL-GLOY)+O型圈密封，碟簧组预紧

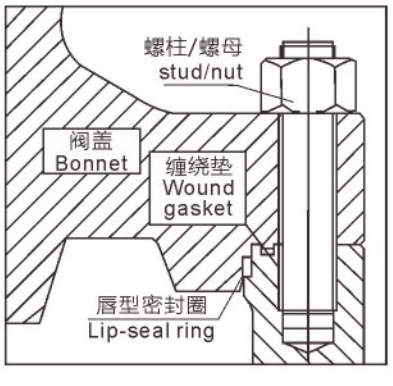
● Triple sealing structure for Stem:graphite+lip-seal(PCTFE+FL-GLOY)+O-ring,disc spring preload

中法兰密封结构 Middle-flange

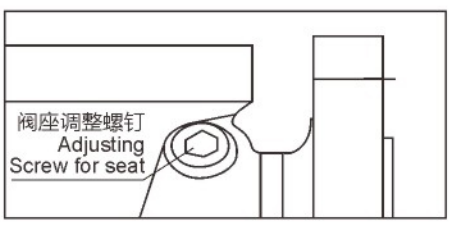
○ 中法兰处采用双重密封机构：缠绕式垫片（不锈钢+石墨）+唇式密封机构（PTFE+FLGLOY）+ 唇式密封机构（PCTFE+FL-GLOY)+O型圈密封，碟簧组预紧

● Double sealing mechanism for middle-flange:Wound gasket (stainless steel+graphite) +lip-seal (PCTFE+GLOY) +lip-seal (PCTFE+FL-GLOY)+O-ring,disc spring preload

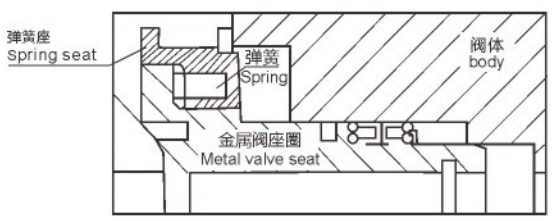




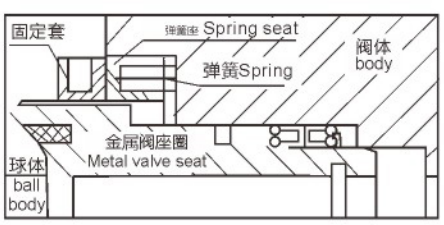
在线维护结构 On-line Maintenance Structure



外置螺钉调整拆装阀座
The adjustable and assemble seat
with external screw

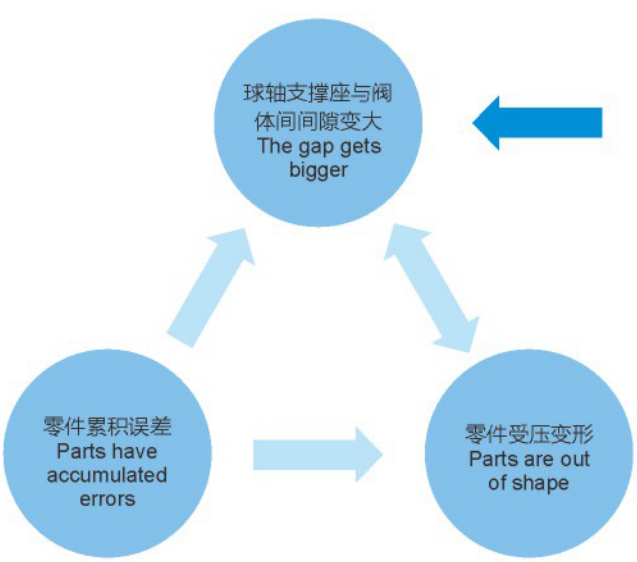


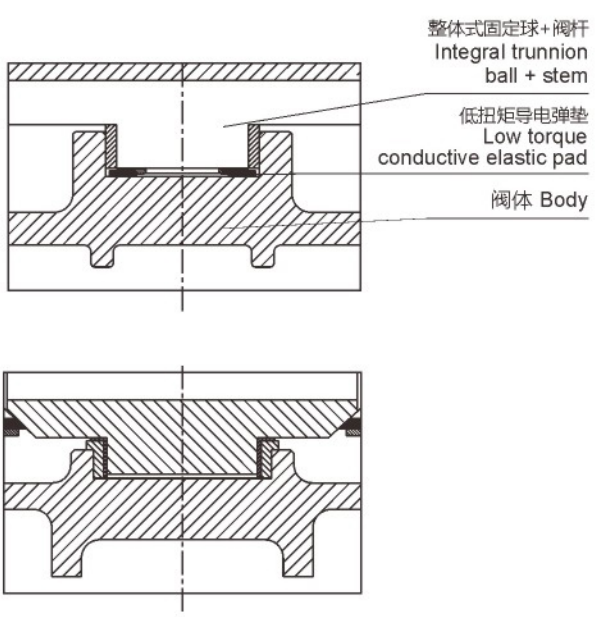
卡簧挡圈或锁链式结构拆装阀座
The adjustable and assemble seat with
Circlip ring or chain structure



螺纹紧定结构拆装阀座
The adjustable and assemble seat
with the thread tight structure

球轴支撑座与阀体间 Gap between Ball bearing brackets and valve body

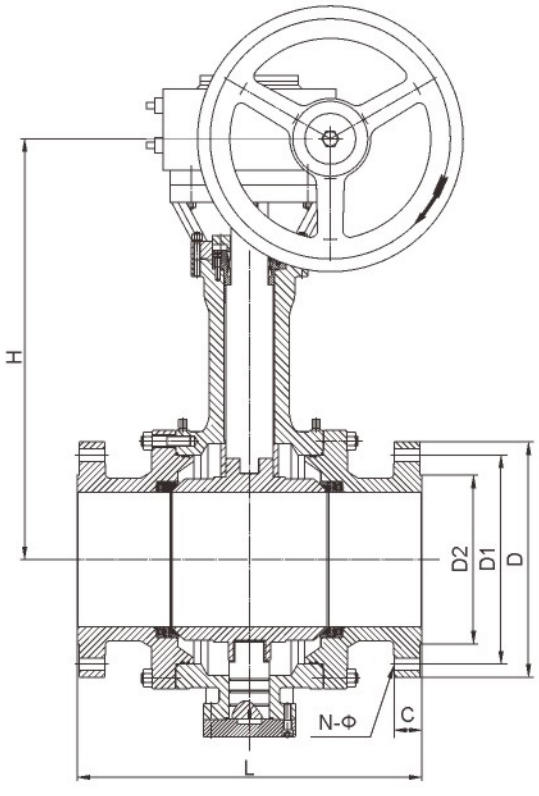




低温球阀
CRYOGENIC BALL VALVE

泰和石化 TAIHE PETROCHEMICAL

固定球阀规格 Fixed Ball Valve Dimensions



DN	1.6MPa							2.5MPa						
	L	D	D1	D2	C	N-Φ	H	L	D	D1	D2	C	N-Φ	H
100	305	215	180	155	20	8-18	500	305	230	190	160	24	8-23	500
125	356	245	210	185	22	8-18	580	356	270	220	188	28	8-26	580
150	394	280	240	210	24	8-23	620	394	300	250	218	30	8-26	620
200	457	335	295	265	26	12-23	740	457	360	310	278	34	12-26	740
250	533	405	355	320	30	12-25	880	533	425	370	332	36	12-30	880
300	610	460	410	375	30	12-25	1020	610	485	430	390	40	16-30	1020
400	762	580	525	485	36	16-30	1295	762	610	550	505	48	16-34	1295
500	914	705	650	608	44	20-33	1580	914	730	660	610	52	20-36	1580
600	1067	840	770	718	48	20-36	1730	1067	840	770	718	56	20-41	1730

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低温球阀
CRYOGENIC BALL VALVE

固定球阀规格 Fixed Ball Valve Dimensions

DN	4.0MPa							6.4MPa						
	L	D	D1	D2	C	N-Φ	H	L	D	D1	D2	C	N-Φ	H
100	305	230	190	160	24	8-23	500	406	250	200	168	32	8-25	500
125	381	270	220	188	28	8-25	580	508	295	240	202	36	8-30	580
150	403	300	250	218	30	8-26	620	495	340	280	240	38	8-34	620
200	502	375	320	282	38	12-30	740	597	405	345	300	44	12-34	740
250	568	445	385	345	42	12-34	880	673	470	400	352	48	12-36	880
300	648	510	450	408	46	16-34	1020	762	530	460	412	54	16-36	1020
400	838	655	585	535	58	16-41	1295	902	670	585	525	66	16-42	1295
500	991	755	670	612	62	20-41	1580	1054	800	705	640	70	20-48	1580
600	1143	890	795	730	64	20-48	1730	1232	930	820	750	76	20-58	1730

DN	10.0MPa							16.0MPa						
	L	D	D1	D2	C	N-Φ	H	L	D	D1	D2	C	N-Φ	H
100	432	265	210	172	38	8-30	500	457	300	240	200	48	8-34	500
125	508	310	250	210	42	8-34	580	559	355	285	238	60	8-41	580
150	559	350	290	250	46	12-34	620	610	390	318	270	66	12-41	620
200	660	430	360	312	54	12-36	740	737	480	400	345	78	12-48	740
250	787	500	430	382	60	12-41	880	838	580	485	425	88	12-54	880
300	838	585	500	442	70	16-42	1020	965	665	570	510	100	16-54	1020
400	991	715	620	558	80	16-48	1295	-	-	-	-	-	-	-

更多规格请致电我公司销售部 (0717-2822168)
More specifications, please contact our Sales Department (86-717-2822168)

低温球阀
CRYOGENIC BALL VALVE

泰和石化 TAIHE PETROCHEMICAL

固定球阀规格 Fixed Ball Valve Dimensions

NPS	Class 150							Class 300						
	L	D	D1	D2	C	N-Φ	H	L	D	D1	D2	C	N-Φ	H
4	305	229	190.5	157	24	8-19	500	305	255	200	157	30	8-22	500
5	356	254	216	186	24	8-22	580	381	280	235	186	35	8-22	580
6	394	280	241.5	216	26	8-22	620	403	320	270	216	35	12-22	620
8	457	345	298.5	270	28	8-22	740	502	380	330	270	40	12-25	740
10	533	405	362	324	30	12-25	880	568	445	387.5	324	46	16-28.5	880
12	610	485	432	381	32	12-25	1020	648	520	451	381	49	16-32	1020
16	762	595	540	470	35	16-28.5	1295	838	650	571.5	470	56	20-35	1295
20	914	700	635	584	41	20-32	1580	991	775	686	584	62	24-35	1580
24	1067	815	749.5	692	46	20-35	1730	1143	915	813	692	68	24-41	1730

NPS	Class 600							Class 900						
	L	D	D1	D2	C	N-Φ	H	L	D	D1	D2	C	N-Φ	H
4	432	275	216	168	38	8-25	500	457	290	234.9	168	44.5	8-32	500
5	508	330	267	197	44.5	8-29	580	559	350	279.5	197	51	8-35.5	580
6	559	355	292	227	48	12-29	620	610	380	317.5	227	56	12-32	620
8	660	420	349	281	56	12-32	740	737	470	393.7	281	64	12-39	740
10	787	510	432	335	64	16-35	880	838	545	469.9	335	70	16-39	880
12	838	560	489	392	67	20-35	1020	965	610	533.4	392	80	20-39	1020
16	991	685	603	481	77	20-41	1295	1130	705	615.9	481	89	20-45	1295

NPS	Class 1500							Class 2500						
	L	D	D1	D2	C	N-Φ	H	L	D	D1	D2	C	N-Φ	H
4	546	310	241.3	194	54	8-32	500	673	355	273	203	76.5	8-42	500
5	673	375	292	229	73.5	8-35.5	580	914	485	368.3	279	108	8-54	580
6	705	395	317.5	248	83	12-32	620	1022	550	438.1	340	127	12-54	620
8	832	485	393.7	318	92	12-39	740	-	-	-	-	-	-	-
10	991	585	482.6	371	108	16-39	880	1270	675	539.7	425	165.5	12-68	880
12	1130	675	571.5	438	124	20-39	1020	1422	760	619.1	495	184.5	12-74	1020

更多规格请致电我公司销售部 (0717-2822168)
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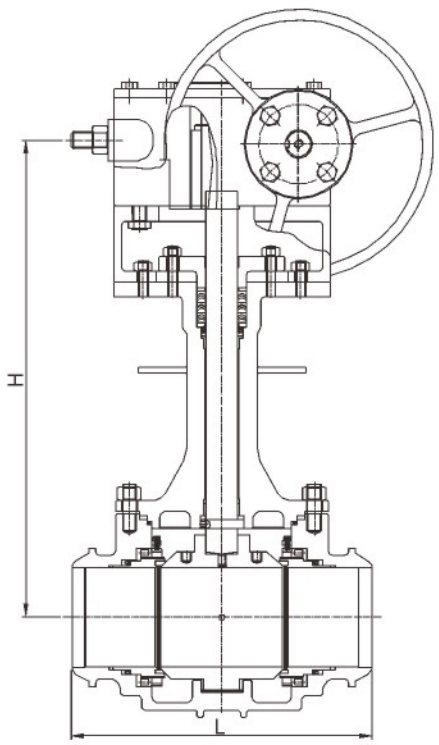
低温球阀
CRYOGENIC BALL VALVE

顶装式球阀规格　Top Mounted Ball Valve Dimensions



DN	1.6MPa Class150		2.5, 4.0MPa Class300		6.4MPa		10.0MP Class600		16.0MPa Class900		Class1500	
	L	H	L	H	L	H	L	H	L	H	L	H
100	305	500	305	500	406	500	432	500	457	500	546	500
125	356	580	381	580	508	580	508	580	559	580	673	580
150	394	620	403	620	495	620	559	620	610	620	705	620
200	457	740	502	740	597	740	660	740	737	740	832	740
250	533	880	568	880	673	880	787	880	838	880	991	880
300	610	1020	648	1020	762	1020	838	1020	965	1020	1130	1020
400	762	1295	762	1295	902	1295	991	1295	1130	1295	1384	1295
500	914	1580	991	1580	1054	1580	1194	1580	1321	1580	1664	1580
600	1067	1730	1143	1730	1232	1730	1397	1730	1549	1730	2040	1730
700	1245	1950	1346	1950	-	-	-	-	-	-	-	-
800	1372	2180	1524	2180	-	-	-	-	-	-	-	-
1000	1900	2430	1900	2430	-	-	-	-	-	-	-	-
1200	2180	2550	2180	2550	-	-	-	-	-	-	-	-

更多规格请致电我公司销售部 (0717-2822168)
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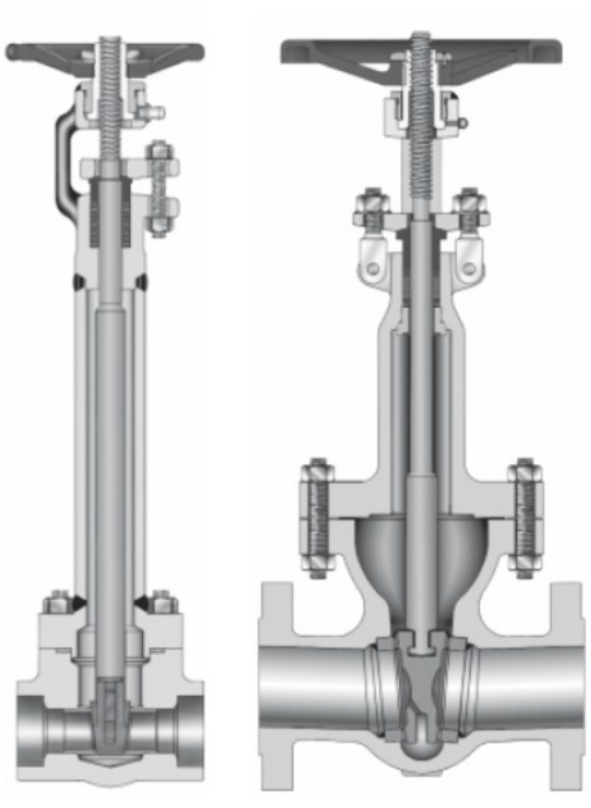
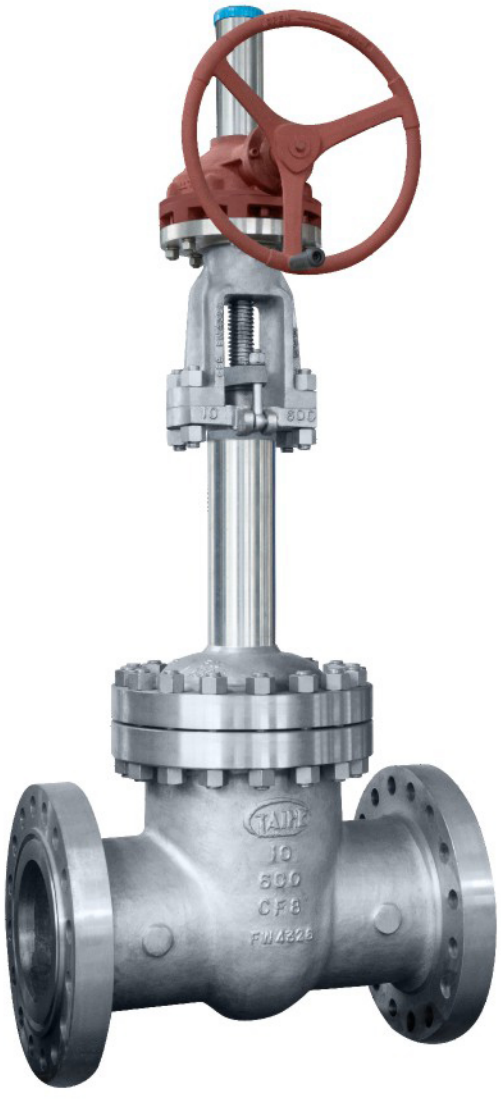
低温闸阀
CRYOGENIC GATE VALVE

泰和石化 TAIHE PETROCHEMICAL





设计规范 Design Specifications

项目 Item	应用规范 Applicable Specification
壁厚与通用阀门设定 Wall thickness and general valve design	API 602(forged), API 600(cast)
压力-温度等级 Pressure–Temperature rating	ASME B16.34
结构长度 Face-to-face dimensions	ASME B16.10
法兰设计 Flange design	ASME B16.5
对焊连接设计 Butt welding design	ASME B16.25
低温阀门 Cryogenic valves	BS 6364

低温闸阀
CRYOGENIC GATE VALVE

TAIHE PETROCHEMICAL

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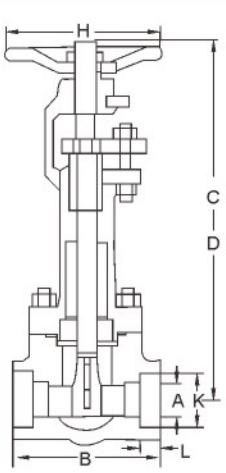
材料表 Standard Materials

零件 Part	锻钢 Forged 1/4-2"	铸钢 CAST 2-48"
阀体 Body	SS 316	CF8M
阀盖 Bonnet	SS 316	CF8M
阀杆 Stem	SS 316 / Nimonic	
楔子 Wedge	CF8M / STL 6	
阀座 Seat	STL 6	
填料法兰 Packing flange	SS 316	
密封垫片 Gland bushing	SS 316	
填料环 Packing ring	RTFE + GRAP	
压盖螺栓 Gland stud	F316, B8M	F316,B8M
压盖螺母 Gland nut	Gr.8M	
阀体/阀盖螺母 Body/bonnet nut	Gr.8M	
阀体/阀盖螺栓 Body/bonnet stud	B8M	
上密封阀座 Back seat	N/A	SS 316
垫圈 Gasket	石墨缠绕垫 Spiral SS/GRAP	
键 Key	N/A	碳钢 Carbon steel
支架衬套 Yoke bushing	N/A	不锈钢 Stainless steel
轴承 Bearing	N/A	钢 Steel
手轮螺母 Handwheel nut	可锻铸铁 Malleable iron	
手轮 Handwheel	可锻铸铁 Malleable iron	
润滑油嘴 Grease fitting	N/A	钢 Steel
槽销 Groove pin		不锈钢 Stainless steel
衬套 Bushing		不锈钢 Stainless steel
垫圈 Washer		不锈钢 Stainless steel
名牌 Name plate		不锈钢 Stainless steel
识别标签 Identification tag		不锈钢 Stainless steel
铆钉 Rivet		不锈钢 Stainless steel
阀杆螺母 Stem nut	不锈钢/铜 SS / Bronze	Ni-resisttype DZC

锻钢闸阀尺寸 Forged Gate Dimensions

尺寸 Size		A	B	C	D	H	K	L	结构长度 Flanged Valves Face To Face		
mm	in	800	800	800	800	800			150	300	600
8	1/4	6	73	119	132	64	14.10	10	102	139	165
10	3/8	6	73	119	132	64	17.53	10	102	139	165
15	1/2	10	73	119	132	64	21.72	10	165	139	165
20	3/4	13	83	150	173	89	27.05	13	117	152	190
25	1	18	83	162	188	89	33.73	13	127	165	216
32	1 1/4	32	127	193	236	127	42.55	13	165	178	227
40	1 1/2	32	127	193	236	127	48.64	13	190	191	241
50	2	38	133	221	264	152	61.11	16	178	221	292



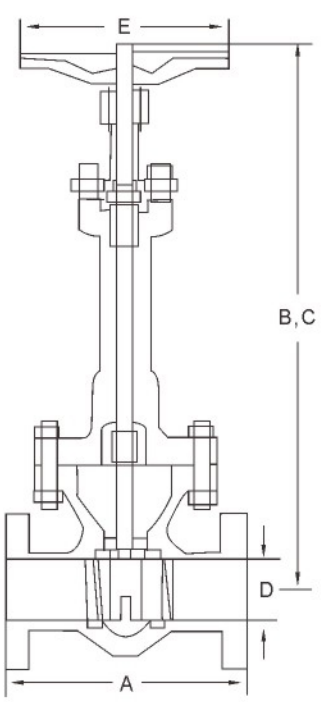
更多规格请致电我公司销售部 (0717-2822168)
More specifications, please contact our Sales Department (86-717-2822168)

低温闸阀
CRYOGENIC GATE VALVE

泰和石化 TAIHE PETROCHEMICAL

铸钢闸阀尺寸 Cast Steel Gate Valve Dimensions* (Class 150–600)

尺寸 Size		ASME 150(PN 20)						ASME 300 (PN 50)					ASME 600(PN 100)				
mm	in	A		B	C	D	E	A	B	C	D	E	A	B	C	D	E
		BW	FL														
50	2	216	178	387	510	51	203	216	387	510	51	203	292	391	510	51	203
65	2½	241	191	422	527	64	203	241	422	554	64	203	330	476	614	64	254
80	3	282	203	480	614	76	254	283	508	665	76	254	356	549	705	76	254
100	4	305	229	562	718	102	254	305	594	771	102	254	432	657	835	102	356
150	6	8403	267	787	962	152	356	403	819	1022	152	356	559	924	1125	152	508
200	8	419	292	956	1162	203	457	419	1037	1270	203	457	660	1114	1349	203	610
250	10	457	330	1191	1425	254	508	457	1248	1505	254	508	787	1245	1511	254	762
300	12	502	356	1441	1721	305	508	502	1508	1803	305	508	838	1546	1842	305	762
350	14	572	381	1559	1905	337	610	762	1559	1778	337	610	889	1842	2159	327	-
400	16	610	406	1746	2159	387	610	838	1746	2032	387	762	991	2089	2413	375	-



B=开启高度
C=关闭高度
BW=对焊接
FL=法兰

B=center To Top Open
C=dismantling Height
BW=butt Weld
FL=flanged

Class 900-1500

尺寸 Size		ASME 900(PN 150)					ASME 1500(PN 250)				
mm	in	A	B	C	D	E	A	B	C	D	E
50	2	368	530	762	48	254	368	530	762	48	254
80	3	381	643	889	73	356	470	641	889	70	356
100	4	457	721	1016	99	457	546	721	1016	92	457
150	6	610	979	1270	146	508	705	979	1270	137	-
200	8	-	-	-	-	-	932	1046	1524	178	-

更多规格请致电我公司销售部 (0717-2822168)
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低温截止阀
CRYOGENIC GLOBE VALVE

TAIHE PETROCHEMICAL

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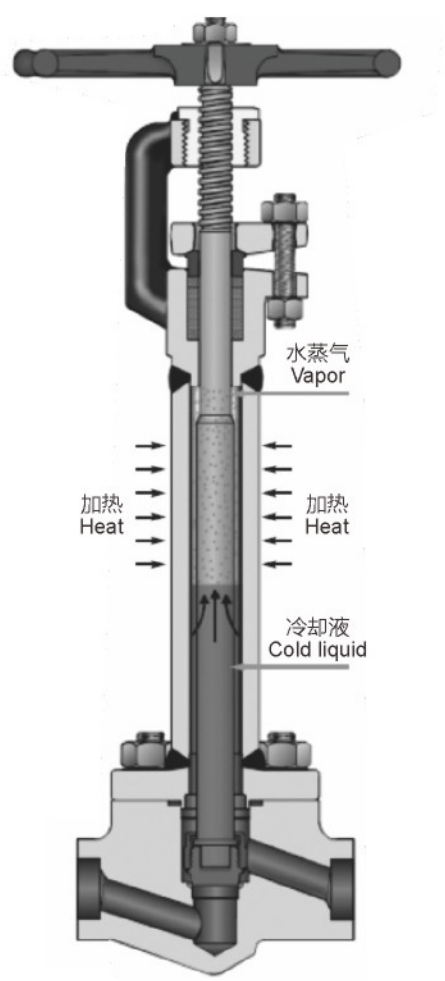
设计规范 Design Specifications

项目 Item	应用规范 Applicable Specification
壁厚与通用阀门设定 Wall thickness and general valve design	API 600, BS 1873
压力-温度等级 Pressure–Temperature rating	ASME B16.34
结构长度 Face-to-face dimensions	ASME B16.10
法兰设计 Flange design	ASME B16.5
对焊连接设计 Butt welding design	ASME B16.25
低温阀门 Cryogenic valves	BS 6364



设计特点

- **阀体和阀帽:** 奥氏体不锈钢锻件用在阀体和阀帽具有极好的冲击强度，最小的热损耗和防腐蚀保护。只有特别批准铸造厂可使用铸钢阀门进行铸件。
- **阀杆:** 为了减少磨损，阀杆是预先在氮50(等级XM-19 a479)中高度拉伸，即使在极低的温度，优良的低摩擦和无磨损下阀杆接触点自由运动。替代316l阀杆用于要求不高的应用。
- **部件:** 全奥氏体不锈钢，小规格1/4-2"锻钢阀门、阀座、楔板或阀瓣通常是STL6。
- **轭架套管:** 铜
- **润滑:** 二硫化钼润滑剂33或复合润滑脂2
- **包装:** 聚四氟乙烯或其他塑料包装使用绝缘气体柱进行冷冻保护，使用石墨的二次包装用于防火操作。
- **阀座面:** STL是用来防止磨损和擦伤。如需软密封，阀门提供PCTFE或PTFE等其它密封材料
- **螺栓连接:** 硬化奥氏体不锈钢。
- **焊接:** 必须使用镍电极。
- **清洁:** 所有低温阀门进行脱脂、清洗和密封，以防止污染。

Design Features

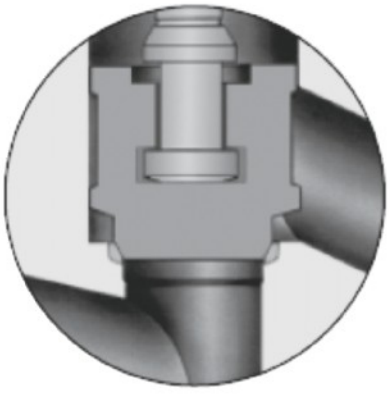
- **Body and bonnet**: Austenitic stainless steel forgings used for bodies and bonnets offer excellent impact strength, minimal heat loss and protection against corrosion. For cast steel valves radiographed castings are used only from specially approved foundries.
- **Stem**: To reduce galling, stems are made from advanced Nitronic 50 (grade XM-19 A479) with high tensile even at extreme low temperatures, excellent low friction and galling-free movement at points of stem contact. Alternative 316L stems are used for less demanding applications.
- **Wetted parts**: All Austenitic stainless steel. On small 1/4-2" forged valves seats, wedges or discs are often Stellite 6.
- **Yoke bushings**: Bronze.
- **Lubrication**: Molykote 33 or Plex 2.
- **Packing**: PTFE or other plastic packing protected from freezing by a column of insulating gas. For fire safe operation a secondary packing is provided using graphite.
- **Seating faces**: Stellite 6 is used to prevent seizing and galling. When extremely tight shutoff is required, valves are supplied with PCTFE, PTFE or other soft inserts.
- **Bolting:** Strain-hardened Austenitic stainless steel.
- **Welding:** Inconel electrodes must be used.
- **Cleaning:** All cryogenic valves are thoroughly degreased, cleaned and sealed to prevent contamination.

低温截止阀
CRYOGENIC GLOBE VALVE

泰和石化 TAIHE PETROCHEMICAL

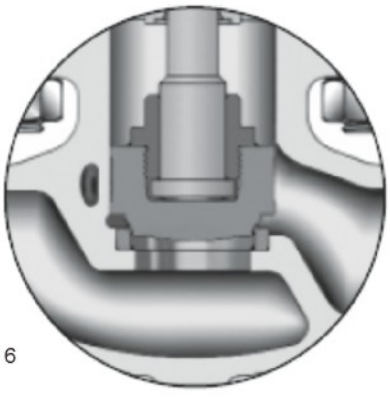
阀座和阀瓣 Disc/Seat Design

锻钢1/4-2"
整体STL6阀座



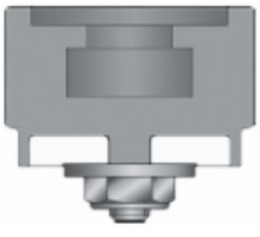
Forged 1/4-2"
Integral hardfaced seat STL 6

铸钢 2-16"
阀座堆焊STL6



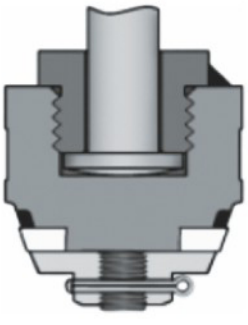
Cast Steel 2–16"
Welded-in seat hardfaced with STL 6

双密封三氟氯乙烯和聚四氟乙烯插入 Dualseal With CTFE & PTFE Insert



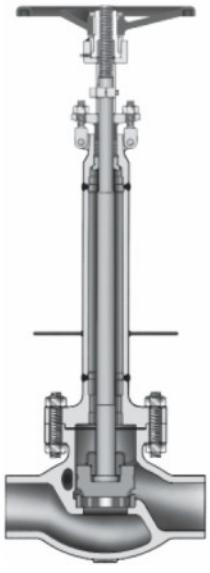
锻钢1/4-2"
截止阀&止回阀
(平面阀座)

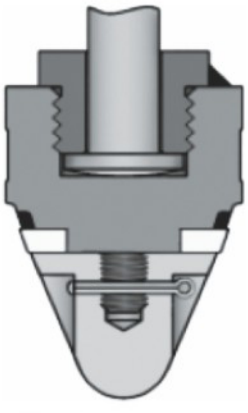
Forged 1/4 –2"
Stop Globe & Stop Check
(flat seat)



铸钢&锻钢 2-16"
球型阀座

Cast steel & Forged, 2–16"
Globe Disc





针型阀座

Needle Disc

低温截止阀
CRYOGENIC GLOBE VALVE

材料表 Standard Materials

部件 Part	类型 Type	
	锻钢 Forged	铸钢 Cast
阀体 Body	F316	CF8M
阀座 Seat	STL	STL
阀盖 Bonnet	F316	CF8M
阀杆 Stem	SS316	
密封环 Packing ring	RTFE + GRAP	
压盖螺栓 Gland stud	F 316, B8M	
压盖螺母 Gland nut Gr. 8M	Gr. 8M	
法兰垫 Packing flange	SS	
压盖衬套 Gland bushing	SS	
阀盖螺栓 Bonnet stud	B8M	
阀盖螺母 Bonnet nut	Gr.8M	
铰链销 Hinge pin	N/A	SS
垫圈 Gasket	石墨缠绕垫 Spiral SS/GRAP	
阀杆螺母 Stem nut	ZQAL9-4	
手轮螺母 Handwheel nut	Integral	Gr.2M
手轮 Handwheel	可锻铸铁 Malleable iron	
上密封 Backseat	STL	SS 316
阀瓣螺母 Disc nut	N/A	SS 304 or 316
阀瓣 Disc	STL 6	CF8M or F 316

低温截止阀
CRYOGENIC GLOBE VALVE

泰和石化 TAIHE PETROCHEMICAL

铸钢的设计特点

○ 阀座表面堆焊，打磨和抛光达到镜面光洁度。锥形阀加工到8RMS。

○ 平板阀. 固定浮动的阀杆，经过STL6或蒙乃尔硬化，随阀座进行研磨抛光。

○ 锥形阀. 导向阀体，经过STL6或蒙乃尔硬化，随阀座进行打磨抛光。

○ 阀体和阀盖. 铸件是精密加工的。一体式阀帽可更好的对齐，零部件少。

○ 填料箱达到63AARH或更好。

○ 阀体和阀盖精密加工。全封闭密封垫，阀垫材料在第3页。

○ 阀杆具有精密梯形螺纹和经过抛光的表面光泽度。

○ 填料盖是两件式结构，便于调整。

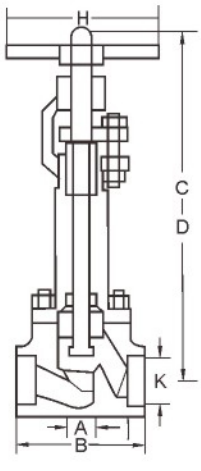
○ 阀杆螺母，镍铜铬耐蚀铸铁，可更换，非旋转轭架套管，旋转阀杆(如图所示)
下列阀门提供一个旋转阀杆螺母，一个非旋转阀杆和两个推力轴承
Class 150: 12" (300mm)和以上
Class 300: 8" (200mm)和以上
Class 600: 6" (150mm)和以上

○ 冲击式手轮，同阀座直径和压力等级的截止阀和截止止回阀。关于密封，最简化的手法是冲击式手轮，除非客户指定制造商规定两耳铸轮同时撞击下给3-10倍标准手轮关闭力。

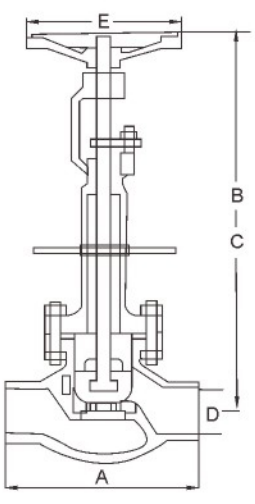
Design Features For Cast Steel:

- Seat face Stellited, ground and lapped to a mirror finish. Conical seat machined to 8 RMS.
- Flat disc. Floating stem-disc engagement, hardfaced with Stellite 6 or Monel, ground and lapped with seat.
- Tapered disc. Body-guided disc, hardfaced with Stellite 6 or Monel, ground and lapped with seat.
- Body and bonnet. Castings are precision machined. One-piece bonnet for better alignment, fewer parts.
- Stuffing box finish to 63 AARH or better.
- Body and bonnet joint accurately machined. Fully enclosed gasket. Gasket materials on page 3.
- Stem with precision Acme threads and burnished finish.
- Gland has two-piece construction for easy alignment.
- Yoke bushing. Ni-resist, renewable in-line, non-rotating yoke bushing, rotating stem (as shown).
  The following valves are supplied with a rotating stem nut, non-rotating stem and two thrust bearings:
  Class 150: 12" (300 mm) and up,
  Class 300: 8" (200 mm) and up,
  Class 600: 6" (150 mm) and up.
- Impactor handwheels. Globe and stop check valves require higher closing torques than gate valves with the same seat diameter and pressure class. The most economical mechanism for tightshutoff is the impactor handwheel. Two lugs cast under the wheelstrike simultaneous blows and give 3~10 times the closing force of standard handwheels. Impactor handwheels are supplied at manufacturer's option unless specified by customer.

锻造螺栓阀盖尺寸 Small Forged Bolted Bonnet Globe Dimensions*



锻钢
Forged



铸钢
Cast

尺寸 Size		A	B	C	D	H	K	L	结构长度 Flanged Valves Face to Face		
mm	in	800	800	800	800	800			150	300	600
8	1/4	8	73	114	122	64	14.10	10	102	152	165
10	3/8	8	73	114	122	64	17.53	10	102	152	165
15	1/2	8	73	114	122	64	21.72	10	108	152	165
20	3/4	13	83	168	180	102	27.05	13	117	178	190
25	1	19	89	170	185	102	33.78	13	127	203	215
32	1 1/4	32	127	206	221	152	42.55	13	140	216	229
40	1 1/2	32	127	206	221	152	48.64	13	165	229	241
50	2	38	203	277	285	203	61.11	16	203	266	292

更多规格请致电我公司销售部 (0717-2822168)
More specifications, please contact our Sales Department (86-717-2822168)

低温截止阀
CRYOGENIC GLOBE VALVE

铸钢截止阀尺寸 Cast Steel Globe Valve Dimensions*

尺寸 Size		ASME 150 (PN 20)					ASME 300 (PN 50)					ASME 600 (PN 100)				
mm	in	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
50	2	203	381	483	51	203.2	267	381	483	51	203	292	381	494	51	254
65	2½	216	392	483	64	254	292	392	508	64	254	330	441	562	64	254
80	3	241	429	533	76	254	318	429	559	76	254	356	492	630	76	356
100	4	292	491	610	102	356	356	491	635	102	356	432	584	727	102	610
150	6	406	598	762	152	610	445	598	787	152	610	559	800	968	152	762
200	8	495	654	864	203	610	559	911	1118	203	457	660	1080	1194	200	610
250	10	622	892	1118	254	762	622	1011	1270	254	457	-	-	-	-	-
300	12	699	1038	1321	305	762	711	1119	1473	305	762	-	-	-	-	-
350	14	787	1354	1727	337	610	838	1354	1727	337	914	-	-	-	-	-
400	16	914	1456	1778	387	762	863	1456	1778	387	914	-	-	-	-	-

更多规格请致电我公司销售部 (0717-2822168)
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低温止回阀
CRYOGENIC CHECK VALVE

泰和石化 TAIHE PETROCHEMICAL

设计标准 Design Specifications

项目 Item	应用规范 Applicable Specification
壁厚与通用阀门设计 Wall thickness and general valve design	API 602 (锻钢Forged) API 600 (铸钢Cast)
压力-温度等级 Pressure-temperature rating	ASME B16.34
结构长度 Face-to-face dimensions	ASME B16.10
法兰设计 Flange design	ASME B16.5
焊接端设计 Butt welding design	ASME B16.25
材料 Materials	ASTM

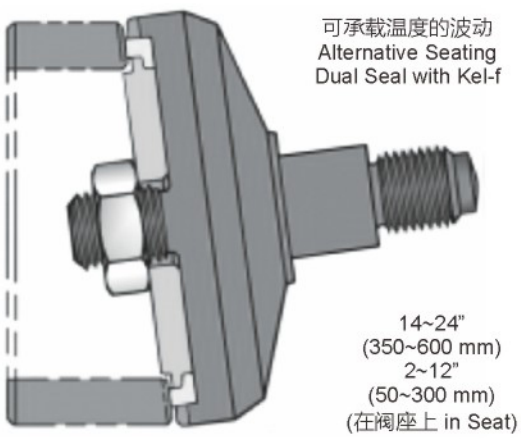
锻钢 Unique Featuresof Swing Checks

- 盘轴
  不穿透阀体
- 阀瓣
  牢固地连接到吊架上
- 阀帽
  可承载温度的波动

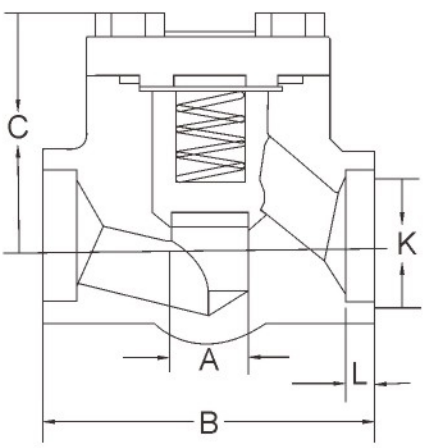
- DISC SHAFT
  does not penetratebody.
- DISC
  securely attached tohanger.
- BODY-BONNET
  BOLTINGcan be live loaded forfluctuatingtemperatures.

部位 Part	标准物料 Standard Materials	
	锻造 Forged	铸造 Cast
阀体 Body	316	CF8M
阀座 Seat	STL6	
铰接销 Hinge pin	316	SS 630 / 660
垫片 Gasket	GRAP+304	
螺栓 Cover stud	B8M	B8M
螺母 Cover nut	2H B8M	Gr. 8M
盖 Cover	316	CF8M
垫圈 Washer	304	
阀瓣 Disc	316	CF8M
阀瓣支架 Disc hanger	CF8M	CF8M
阀瓣螺 Disc nut	Gr. 8M	Gr. 8M

低温止回阀
CRYOGENIC CHECK VALVE



固定阀座
For Tight Seating



螺栓阀盖与球阀尺寸和重量 Bolted Cover Piston And Ball Check Dimensions and Weights

尺寸 SIZE		A	B	C	K	L	结构长度 Flanged Valves Face to Face		
mm	in	800	800	800			150	300	600
8	1/4	8	73	44	14.10	10	102	–	–
10	3/8	8	73	44	17.53	10	102	–	–
15	1/2	8	73	44	21.72	10	108	152	165
20	3/4	13	83	53	27.05	13	117	178	190
25	1	19	89	58	33.78	13	127	203	216
32	1 1/4	32	127	84	42.55	13	140	221	227
40	1 1/2	32	127	84	48.64	13	165	227	241
50	2	38	203	109	61.11	16	203	267	292

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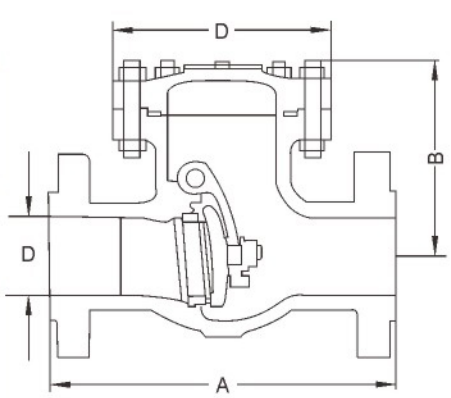
More specifications, please contact our Sales Department (86-717-2822168)

低温止回阀
CRYOGENIC CHECK VALVE

泰和石化 TAIHE PETROCHEMICAL

止回阀尺寸 Unique Featuresof Swing Checks

尺寸 SIZE		ASME 150 (PN 20)				ASME 300 (PN 50)				ASME 600 (PN 100				ASME 900 (PN 150)				ASME 1500 (PN 250)			
mm	in	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D
50	2	203	146	51	171	267	152	51	171	292	159	51	171	368	241	48	219	368	241	48	219
65	21/2	216	156	64	171	292	159	64	171	330	162	64	191	419	254	57	235	419	254	57	235
80	3	241	194	76	216	318	194	76	216	356	219	76	245	381	264	73	267	470	284	70	267
100	4	292	219	102	257	356	219	102	254	432	232	102	305	457	297	99	311	546	305	92	311
150	6	356	273	152	318	445	273	152	318	559	292	152	400	610	381	146	387	705	419	137	406
200	8	495	324	203	400	533	324	203	400	660	343	200	400	737	489	191	467	832	530	178	527
250	10	622	391	254	470	622	410	254	470	787	416	254	495	-	-	-	-	-	-	-	-
300	12	699	429	305	521	711	432	305	521	838	461	305	572								
350	14	787	499	337	584	838	499	337	584	889	532	327	667								
400	16	864	559	387	673	864	572	387	673	991	594	375	718								
450	18	978	635	435	724	978	635	435	724	1092	610	419	768								
500	20	978	673	483	800	1016	673	483	800	1194	660	464	991								
600	24	1295	794	591	940	1346	794	591	940	1397	775	559	1010								



更多规格请致电我公司销售部 (0717-2822168)
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质量方针
QUALITY POLICY

TAIHE PETROCHEMICAL

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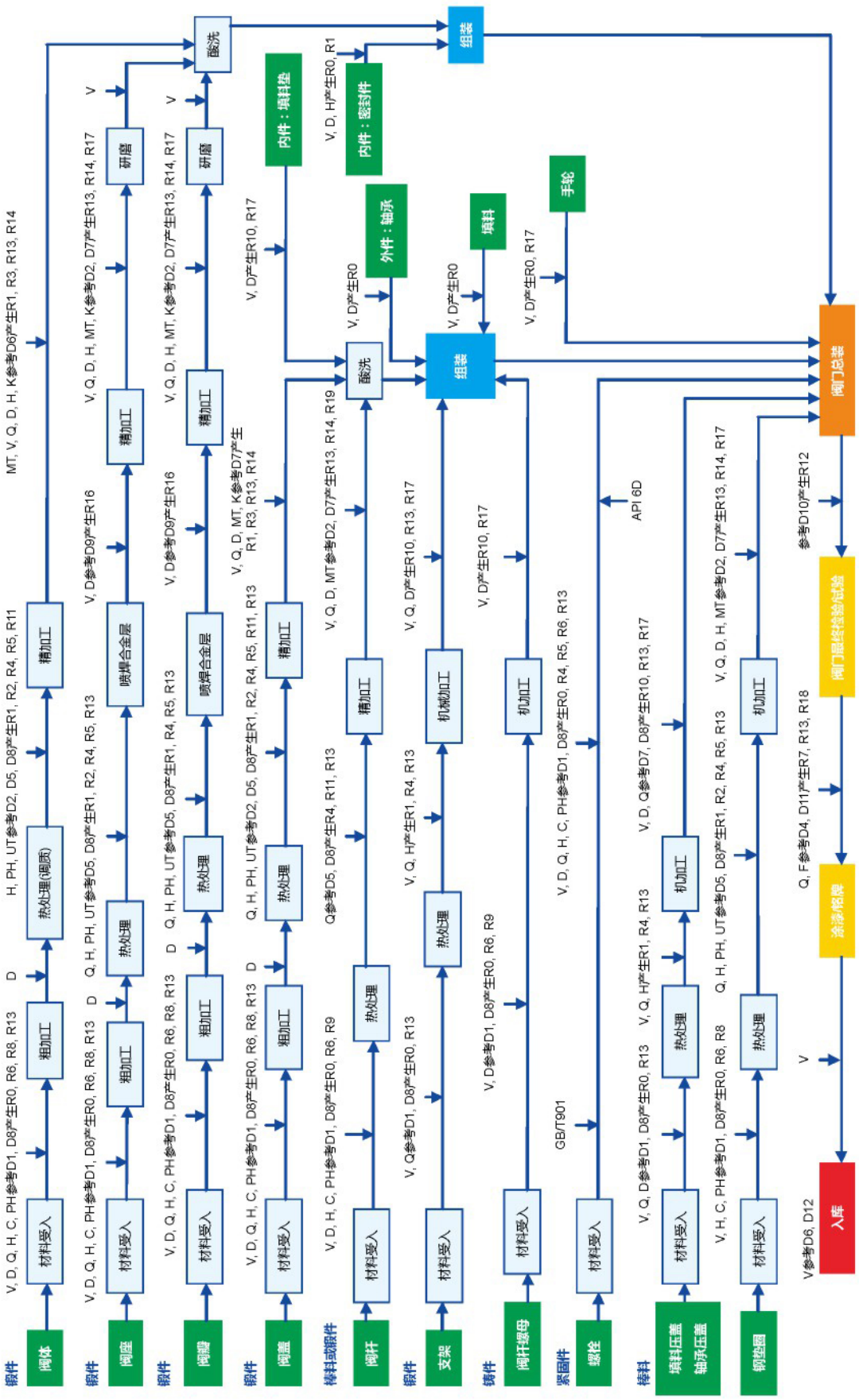
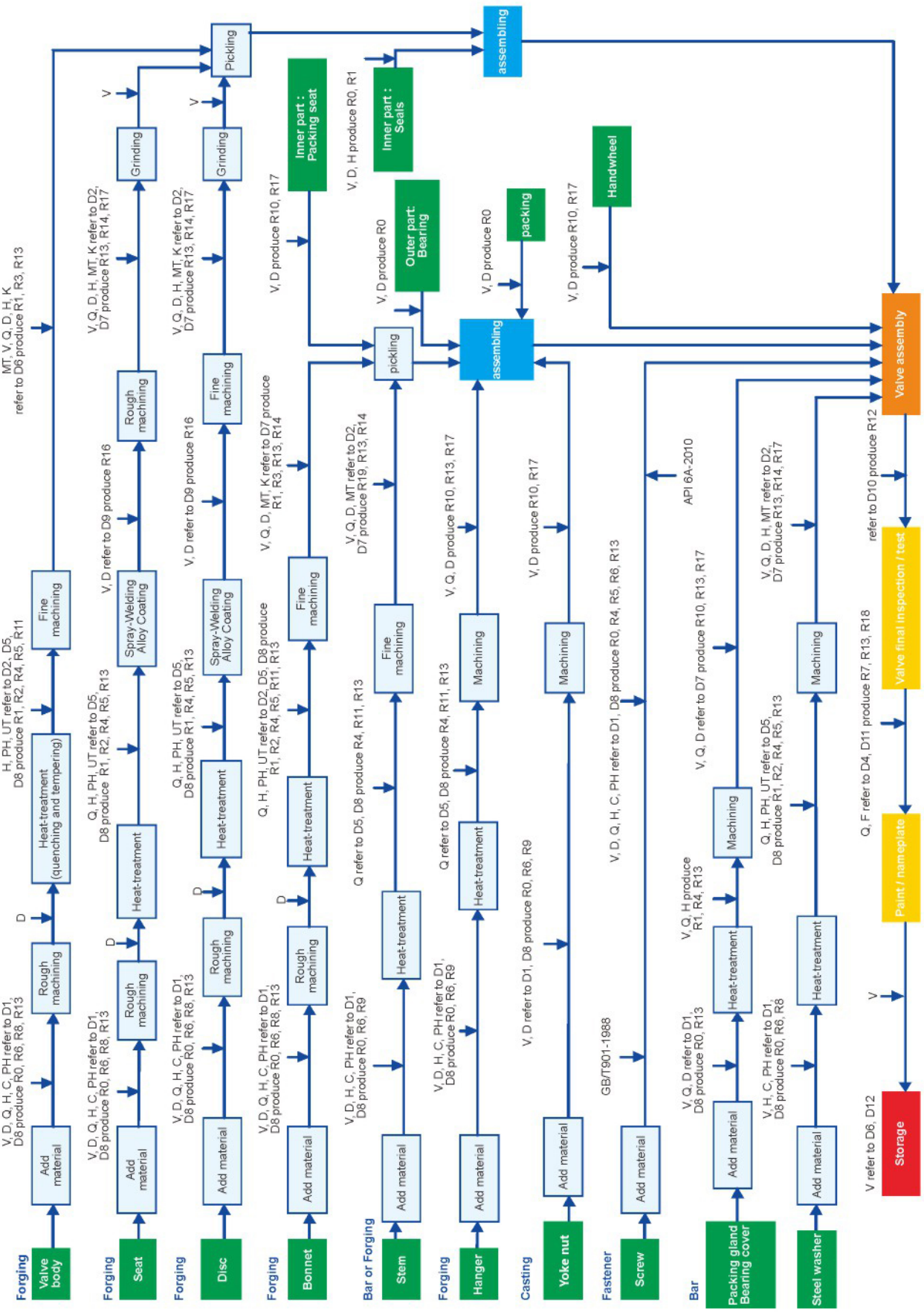
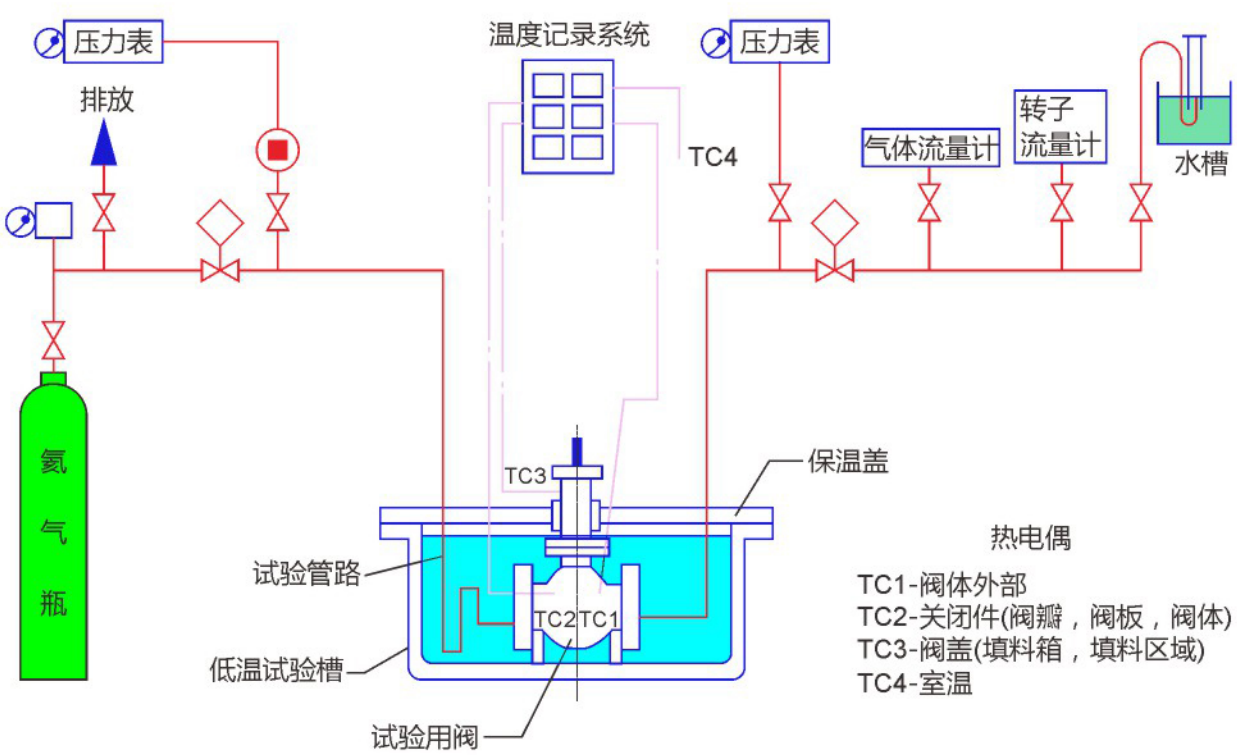
说明 Instruction	参考文件 Reference documents	质量记录 Quality record
V 目视检查 V Visual inspection	D1 THSH/JS-001 进货材料检验规范 D1 THSH/JS-001 Purchase material inspection specification	R0 进货物资检验记录 THSH/QR-7.4-10 R0 Purchase material inspection record THSH/QR-7.4-10
D 尺寸检查 D Dimension inspection	D2 THSH/JS-002 无损检测工艺规范 D2 THSH/JS-002 Nondestructive testing process specification	R1 热处理报告 THSH/QR-7.5.2-05 R1 Heat treatment report THSH/QR-7.5.2-05
Q 低温处理/测试 Q Cryogenic treatment / test	D3 THSH/ZJ-004 低温处理/测试规范 D3 THSH/ZJ-004 Cryogenic treatment / test specification	R2 超声波探伤报告(外) R2 Ultrasonic inspection report (external)
H 硬度检查 H Hardness test	D4 THSH/6D-006 API 6D最终检验规范 D4 THSH/6D-006 API 6D Final inspection specification	R3 磁粉探伤报告(外) R3 Magnetic particle inspection report (external)
C 化学分析 C Chemical analysis	D5 THSH/JS-004 热处理工艺规范 D5 THSH/JS-004 Heat treatment Process specification	R4 硬度检验报告 R4 Hardness test report
PH 机械性能 PH Mechanical properties	D6 THSH/JS-009 包装技术要求规范 D6 THSH/JS-009 Packaging technology specification	R5 机械性能试验报告(外) R5 Mechanical performance test report (external)
F 最终检验 F Final inspection	D7 THSH/JS-003 机械加工工艺与检验规范 D7 THSH/JS-003 Machining process and inspection specification	R6 化学成份报告(外) R6 Chemical composition report (external)
UT 超声探伤 UT Ultrasonic flaw detection	D8 THSH/JS-010 采购技术要求规范 D8 THSH/JS-010 Purchasing technical requirement specification	R7 最终检验报告 THSH/QR-8.2.4-06 R7 Final inspection report THSH/QR-8.2.4-06
PT 渗透探伤 PT Penetration inspection	D9 THSH/6A-005 API 6A焊接试验规范 D9 THSH/6A-005 API 6Awelding test specification	R8 锻件合格证明书(外) R8 Certificate of qualification (external)
MT 磁粉探伤 MT Magnetic particle inspection	D10 THSH/JS-006 装配工艺规范 D10 THSH/JS-006 Assembling process specification	R9 材料合格证明书(外) R9 Material certificate of conformity (external)
K 可追溯性 K Traceability	D11 THSH/6A-003 API 会标标识规范 D11 THSH/6A-003 API Logo identify specification	R10 首检检验记录 THSH/QR-8.2.4-01 R10 Initial inspection record THSH/QR-8.2.4-01
	D12 THSH/JS-008 产品涂漆技术要求规范 D12 THSH/JS-008 Painting technical specifications	R11 时—温曲线表(自动) R11 Hour- Temperature curve table (automatic)
		R12 压力试验记录 R12 Pressure test record
		R13 低温处理/测试记录 R13 Cryogenic treatment / test record
		R14 工序流程卡 THSH/QR-8.2.4-03 R14 Process flow card THSH/QR-8.2.4-03
		R15 焊接工艺规程(WPS)THSH/QR-7.5.2-01 R15 Welding procedure specification (WPS) THSH/QR-7.5.2-01
		R16 焊接工艺评定记录(PQR)THSH/QR-7.5.2-02 R16 Welding procedure qualification record (PQR) THSH/QR-7.5.2-02
		R17 完工检验记录 THSH/QR-8.2.4-02 R17 Completed inspection record THSH/QR-8.2.4-02
		R18 产品合格证明书 THSH/QR-8.2.4-07 R18 Product compliance certificate THSH/QR-8.2.4-07

质量方针
QUALITY POLICY



质量方针
QUALITY POLICY





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更是推进您项目进展的伙伴

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where we serve.
We are not only your supplier,
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