开维喜阀门集团
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Q567H 超低温上装式球阀

Q567H Cryogenic Top-Entry Ball Valve

使用说明书

开维喜阀门集团有限公司

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Q567H 超低温上装式球阀

型号：Q567H　　规格： DN25-DN500
公称压力：PN16-250　　适用介质：燃气、液化气、液氧、液氮等气体、液态气体
适用温度：-196℃ ~-29℃　　阀体材质：低温钢、不锈钢、双向不锈钢
连接方式：焊接　　驱动方式：手动、气动、电动、涡轮
其他参数：制造标准按 BS 6364/ JB/T 7749

Q567H Cryogenic Top-Entry Ball Valve

Model:Q567H　　Specifications: DN25-DN500
Nominal Pressure:PN16-250
Applicable Media: Combustible gas, Liquefied gas, Liquid oxygen, Liquid nitrogen, Liquefied gases
Applicable Temperature:-196℃ ~-29℃
Body Material: Low-temperature steel, stainless steel,Duplex stainless steel
End Connection :welded　　Operation:Manual, pneumatic, electric,gear
Other Parameters: Manufacturing standard according to BS 6364/ JB/T 7749.

Q567H 超低温上装式球阀概述

Q567H 超低温上装式球阀专用于-196℃及以下的极端低温工况，如液化天然气(LNG)、液氢、液氦等介质。采用独特的上装式阀体结构与超长阀盖设计，允许在线维护与快速更换内件。关键部件选用经深冷处理的奥氏体不锈钢，结合金属密封副，确保在超低温下的密封可靠性、几何稳定性与长寿命。适用于航天燃料加注、大型 LNG 储运、尖端科研实验等对安全与维护性有严苛要求的领域。

Q567H Cryogenic Top-Entry Ball Valve Overview

The Q567H Cryogenic Top-Entry Ball Valve is specifically designed for extreme low-temperature applications down to -196°C and below, handling media such as liquefied natural gas (LNG), liquid hydrogen, and liquid helium. Its unique top-entry body structure and extended bonnet design enable online maintenance and rapid replacement of internal components. Critical parts are made from cryogenically treated austenitic stainless steel and paired with metal sealing surfaces, ensuring sealing reliability, geometric stability, and long service life under ultra-low temperature conditions. It is suitable for demanding fields such as aerospace fuel filling, large-scale LNG storage and transportation, and advanced scientific research experiments, where stringent safety and maintainability requirements must be met.

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Q567H 超低温上装式球阀产品图
Q567H Cryogenic Top-Entry Ball Valve Product Image

Q567H 超低温上装式球阀特点

1. 上装式在线维护结构 – 阀门无需从管道拆卸，通过顶部阀盖即可完成球体、阀座等内部组件的检查与更换，大幅减少停机时间。

2. 超深冷处理与特殊材料 – 所有承压件与内件均经过-196℃以下的深冷处理，并使用低温冲击韧性优异的材料，从根本上杜绝冷脆风险。

3. 超长阀颈与双重隔离 – 采用显著加长的双重保温阀颈，有效阻断外部热量传入及内部冷量外逸，防止阀杆填料结冰与操作机构冻伤。

4. 金属硬密封设计 – 采用高精度研磨的球体与硬化阀座构成金属对金属密封，耐磨损、抗冲刷，适用于双向切断及轻微压力波动工况。

5. 防火与安全设计 – 符合严格的国际防火标准，阀杆防吹出结构确保安全，并标配防静电装置，消除介质高速流动产生的静电风险。

6. 低摩擦与全通径 – 轴承系统经优化设计，操作扭矩小，且提供全通径流道，最大限度地减少压力损失与介质残留。

Q567H Cryogenic Top-Entry Ball Valve Features

1. Top-Entry Online Maintenance Structure – The valve does not need to be removed from the pipeline. Inspection and replacement of internal components such as the ball and seats can be performed through the top bonnet, significantly reducing downtime.

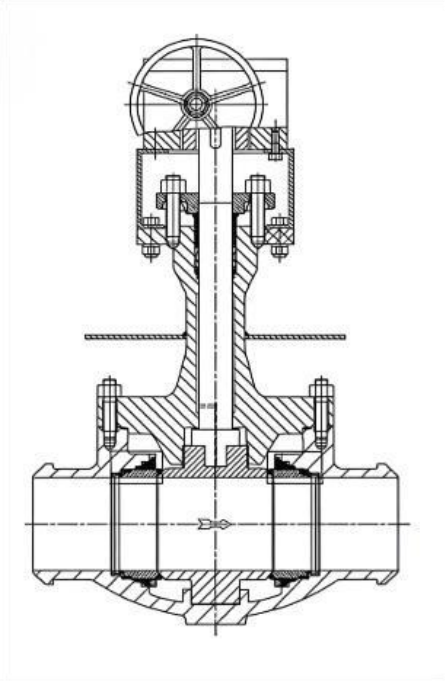
2. Ultra-Cryogenic Treatment and Special Materials – All pressure-containing parts and internal components undergo deep cryogenic treatment below -196°C and are made from materials with excellent low-temperature impact toughness, fundamentally eliminating the risk of cold brittleness.

3. Extended Bonnet and Dual Isolation – The significantly extended double-insulated bonnet effectively blocks external heat transfer and internal cold leakage, preventing icing of the stem packing and freezing of the operating mechanism.

4. Metal Hard-Seal Design – A high-precision ground ball and a hardened seat form a metal-to-metal seal, offering wear and erosion resistance. Suitable for bidirectional shut-off and applications with slight pressure fluctuations.

5. Fire-Safe and Safety Design – Complies with stringent international fire safety standards. The stem features an anti-blowout structure for safety and comes standard with an anti-static device to eliminate electrostatic risks from high-velocity media flow.

6. Low Friction and Full-Bore Design – The optimized bearing system ensures low operating torque, while the full-bore flow path minimizes pressure loss and media residue.



Q567H 超低温上装式球阀结构图

Q567H Cryogenic Top-Entry Ball Valve Structure Diagram

零部件名称材料表

Parts Name Material List

序号NO.	名称 Name	材料 Material
1	阀体 body	不锈钢 stainless steel
2	球体 ball	不锈钢 stainless steel
3	密封垫 seal gasket	PTFE

4	填料 packing	PTFE+O 型圈 PTFE + O ring
5	阀杆 Stem	不锈钢 stainless steel

性能规范表 Performance Specification		
公称压力 Nominal Pressure	1.0/1.6/4/6.4/10/15	Mpa
强度试验压力 Shell Test	1.5/2.4/6/9.6/15/22.5	
密封试验压力 Seal Test	1.1/1.76/4.4/7.04/11/16.5	
适用温度 Suitable Temp.	-196~-29	℃

外形尺寸标准要求

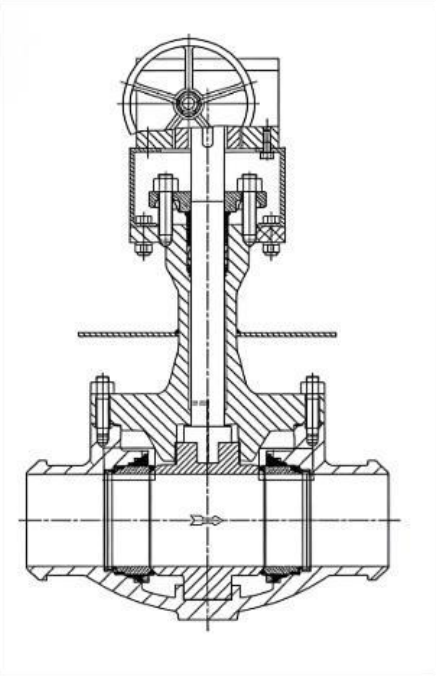
1、阀门的结构长度按 ASME16.10 的标准

2、连接法兰按 ASME16.50 的标准

Dimensions Standard Requirements

1. The structural length of the valve shall conform to the standard ASME16.10.

2. The connecting flange shall conform to the standard ASME16.50.



Q567H 超低温上装式球阀外形图

Q567H Cryogenic Top-Entry Ball Valve View Drawing

Q567H 超低温上装式球阀外形尺寸表

Q567H Cryogenic Top-Entry Ball Valve Dimensions Table

压力级	主要尺寸	公称通径															
		25	32	40	50	65	80	100	125	150	200	250	300	350	400	450	500

PN1.6MPa	L	160	180	200	230	290	310	350	400	480	600	730	850	980	1100	1200	1250
	H	240	260	307	360	410	483	512	543	581	617	672	723	758	791	828	870
	Kg	9.6	16	19	28	30	41	55	78	115	215	270	385	502	876	980	1240
PN2.5MPa	L	160	180	200	230	290	310	350	400	480	600	730	850	980	1100	1200	1250
	H	260	280	320	360	430	490	525	567	604	642	695	742	781	815	864	905
	Kg	9.5	16	19	28	30	45	59	82	121	230	289	402	540	913	1120	1280
PN4.0MPa	L	160	180	200	230	290	310	350	400	480	600	730	850	980	1100	1200	1250
	H	260	280	320	360	436	492	527	607	649	701	750	750	790	832	875	910
	Kg	10	17	20	25	32	45	59	82	115	230	295	402	540	913	1124	1348
PN6.4MPa	L	160	180	200	230	290	310	350	400	480	600	730	850	980	1100	1200	1250
	H	280	320	329	365	450	509	541	663	725	781	790	806	821	858	-	-
	Kg	10	17	20	25	32	52	68	106	168	281	355	498	689	1134	-	-
150Lb	L	127	140	165	178	190	203	229	356	394	457	533	610	686	762	864	914
300Lb	L	165	178	190	216	241	283	305	381	403	502	568	648	762	838	914	991
600Lb	L	216	229	241	292	330	356	432	508	559	660	787	838	889	991	1092	1194

Q567H 超低温上装式球阀安装、使用与维护说明

安装说明：

1. 安装前应确认阀门规格与管道设计压力、温度匹配，彻底清除管道内异物，确保流道洁净干燥。

2. 阀门安装方向需与介质流向一致，通常推荐阀杆垂直向上安装，以利于上装结构的操作与维护。

3. 采用法兰连接时，应使用与超低温工况匹配的螺栓与垫片，并采用十字对称方式逐级拧紧，保证密封均匀。

4. 对于焊接端阀门，焊接前必须使阀门处于全开位置，并采取有效的降温保护措施，防止内部密封件受高温损伤。

5. 安装完成后，需在常温下进行初步的启闭操作测试与气密性检查，确认无误后方可进行系统预冷。

使用说明：

1. 阀门投入运行前，必须严格执行预冷程序，应缓慢、渐进地向管路通入低温介质，使阀体均匀冷却至工作温度，避免热冲击。

2. 操作时请确认阀门处于全开或全关位置，不可用作节流调节，以避免介质对密封面的局部冲蚀。

3. 手动操作如感到异常阻力增大，应立即停止，排查是否因内部冰堵或部件冷缩导致，不得强行扳动。

4. 对于配有执行机构的阀门，需定期在低温状态下验证执行器的动作行程与阀门实际开闭位置是否完全同步。

5. 在系统运行期间，应定期检查阀杆填料处及阀体连接部位是否有泄漏或异常结霜现象。

维护说明：

1. 上装式结构允许在线维护。维护前需将阀门置于全关位置，排空阀腔压力，在确保安全的前提下方可进行上盖拆卸。

2. 定期检查阀座密封副的磨损情况。通过阀体上方的维修孔，可相对方便地检查或更换阀座、球体及密封件。

3. 拆卸下的内部零件在复装前，必须使用合适的清洁剂彻底清洗并完全干燥，所有密封面应避免磕碰划伤。

4. 更换的所有密封件与紧固件必须为原厂指定的超低温专用材质，普通材料无法满足深冷工况要求。

5. 维护组装后，应在常温与设计低温两种状态下分别进行密封性能测试，合格后方可重新投入系统使用。

Installation, Operation, and Maintenance Instructions for Q567H Cryogenic Top-Entry Ball Valve

Installation Instructions:

1. Before installation, verify that the valve specifications match the pipeline design pressure and temperature. Thoroughly remove any foreign objects from the pipeline to ensure the flow path is clean and dry.

2. The valve installation direction must align with the media flow direction. It is generally recommended to install the valve with the stem vertical and facing upward to facilitate operation and maintenance of the top-entry structure.

3. For flange connections, use bolts and gaskets compatible with ultra-low temperature conditions. Tighten the bolts gradually in a cross-symmetrical pattern to ensure even sealing.

4. For welding-end valves, ensure the valve is fully open before welding and implement effective cooling protection measures to prevent damage to internal seals from high temperatures.

5. After installation, perform initial open-close operation tests and leak checks at ambient temperature. Proceed to system pre-cooling only after confirming no issues.

Operation Instructions:

1. Before putting the valve into service, strictly follow the pre-cooling procedure. Introduce the low-temperature medium into the pipeline slowly and gradually to allow the valve body to cool evenly to the operating temperature and avoid thermal shock.

2. Ensure the valve is in the fully open or fully closed position during operation. Do not use it for throttling to prevent localized erosion of the sealing surfaces by the medium.

3. If abnormal resistance is felt during manual operation, stop immediately. Investigate whether it is caused by internal ice blockage or component contraction due to cold, and avoid forcing the valve.

4. For valves equipped with actuators, periodically verify in low-temperature conditions that the actuator travel and the actual open-close position of the valve are fully synchronized.

5. During system operation, regularly check for leaks or abnormal frost formation at the stem packing and valve body connection points.

Maintenance Instructions:

1. The top-entry structure allows online maintenance. Before maintenance, place the valve in the fully

closed position, depressurize the valve cavity, and only proceed with disassembling the top cover after ensuring safety.

2. Regularly inspect the wear condition of the seat sealing pair. Through the maintenance port on the top of the valve body, the seats, ball, and seals can be relatively easily inspected or replaced.

3. Before reassembling any disassembled internal components, thoroughly clean them with a suitable cleaning agent and ensure they are completely dry. Avoid impact or scratches on all sealing surfaces.

4. All replacement seals and fasteners must be made from ultra-low temperature-specific materials designated by the original manufacturer, as standard materials cannot meet the requirements of cryogenic conditions.

5. After maintenance and reassembly, conduct sealing performance tests separately under both ambient temperature and design low-temperature conditions. Only after passing these tests can the valve be returned to service.

非常感谢您的阅读！

Thank you very much for reading!

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