

API 美标固定硬密封球阀

API Standard Trunnion Mounted Metal Ball Valve

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开维喜阀门集团有限公司
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API 美标固定硬密封球阀

型号: API	规格: 4"-24"
公称压力: 150LB~1500LB	适用介质: 水、气、油
适用温度: ≤450℃	阀体材质: 铸钢、不锈钢
连接方式: 法兰	驱动方式: 手动、气动、电动、涡轮
其他参数: 制造标准按 API608/API6D	

API Standard Trunnion Mounted Metal Ball Valve

Model: API	Specifications: 4"-24"
Nominal Pressure: 150LB~1500LB	Applicable Media: water, gas, oil
Applicable Temperature: ≤450℃	Body Material: Stainless Steel, carbon steel
End Connection : Flange	Operation: Manual, pneumatic, electric, gear
Other Parameters: Manufacturing standard according to API6D.	

API 美标固定硬密封球阀概述

API 美标固定硬密封球阀是严格遵循美国石油学会（API）标准设计制造的高性能阀门，采用固定球结构与金属硬密封技术。阀体采用锻钢或铸钢材质，球体由上下转轴固定支撑，密封副采用堆焊硬质合金的球面与阀座构成。该阀门符合 API 6D、API 608 等标准，通过弹簧预紧或压力辅助实现金属对金属的严密密封，适用于高温、高压、含固体颗粒及腐蚀性介质的严苛工况。广泛应用于石油、天然气、化工、煤化工及长输管线等关键系统，是实现零泄漏截断与可靠控制的高端工业阀门。

API Standard Trunnion-Mounted Metal Ball Valve Overview

The API Standard Trunnion-Mounted Metal Ball Valve is a high-performance valve designed and manufactured in strict compliance with the standards of the American Petroleum Institute (API). It features a trunnion-mounted ball structure and metal Metal technology. The valve body is made of forged or cast steel, with the ball fixed and supported by upper and lower trunnions. The sealing pair consists of a hard-alloy overlay-welded spherical surface and a seat, forming a robust metal-to-metal seal. This valve conforms to API 6D, API 608, and other relevant standards. Sealing is achieved through spring preload or pressure assistance, ensuring a tight metal-to-metal seal. It is suitable for demanding operating conditions, including high temperatures, high pressures, and media containing solid particles or corrosive substances. Widely used in critical systems such as petroleum, natural gas, chemical, coal chemical, and long-distance pipelines, it is a high-end industrial valve designed to achieve zero-leakage shut-off and reliable control.



API 美标固定硬密封球阀产品图

API Standard Trunnion Mounted Metal Ball Valve

API 美标固定硬密封球阀特点

- 1.严格 API 标准符合性：全过程遵循 API 6D、API 608 等标准，在压力等级、结构设计、材料及防火测试（API 607）方面满足美标严苛要求。
- 2.金属硬密封耐苛刻工况：球体与阀座密封面采用硬质合金材料，耐高温、耐磨损、耐冲蚀，适用于含固体颗粒介质及频繁操作场合。
- 3.固定球低扭矩设计：球体轴承固定，转动摩擦力小，操作扭矩稳定。弹簧加载阀座提供初始密封并具备磨损自动补偿能力。
- 4.防火与双向密封安全：符合 API 607 防火标准，软密封材料失效后仍能通过金属密封副保持密封。通常具备双向密封能力。
- 5.长寿命智能维护：设计寿命长，维护周期远优于软密封阀门。可配备阀座注脂系统，支持在线维护和状态监测，降低全生命周期成本。

API Standard Trunnion-Mounted Metal Ball Valve Features

1. Strict Compliance with API Standards:

The entire design, manufacturing, and testing process adheres to standards such as API 6D, API 608, and others, meeting stringent American standard requirements for pressure class, structural design, materials, and fire testing (API 607).

2. Metal Hard Seal for Demanding Conditions:

The sealing surfaces of the ball and seat are made of hard alloy materials, offering high resistance to temperature, wear, and erosion. This makes the valve suitable for media containing solid particles and frequent operation.

3. Low-Torque Design with Trunnion-Mounted Ball:

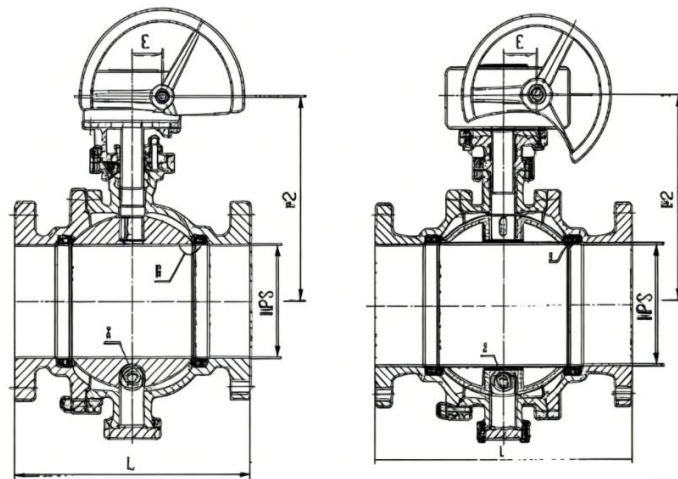
The ball is supported by trunnions, reducing rotational friction and ensuring stable operating torque. The spring-loaded seats provide initial sealing and feature automatic wear compensation.

4. Fire-Safe and Bidirectional Sealing:

Compliant with API 607 fire-safe standards, the valve maintains sealing through its metal sealing pair even if soft sealing materials fail. It typically offers bidirectional sealing capability.

5. Long Service Life and Smart Maintenance:

Designed for extended service life, its maintenance intervals are significantly longer than those of soft-seal valves. The valve can be equipped with a seat injection system, supporting online maintenance and condition monitoring to reduce lifecycle costs.



API 美标固定硬密封球阀结构图

API Standard Trunnion Mounted Metal 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	CF8,CF3M
2	球体 ball	304,316L
3	密封垫 seal gasket	PTFE、PPL、硬质合金、不锈钢 Hard Alloy, Stainless Steel
4	填料 packing	不锈钢+柔性石墨 Stainless Steel + Flexible Graphite、PTFE
5	阀杆 stem	304,316L

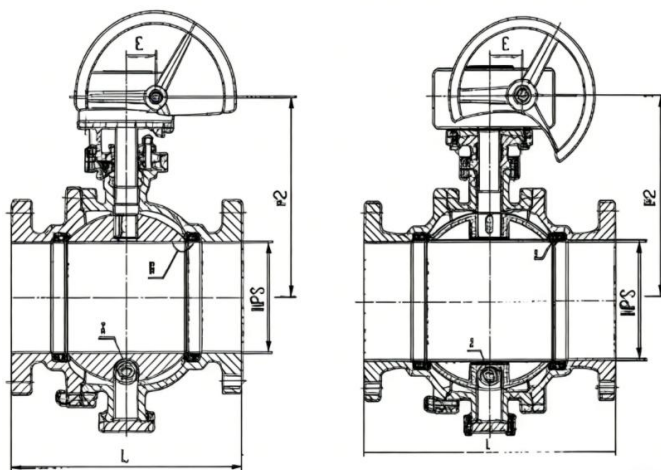
性能规范表 Performance Specification		
公称压力 Nominal Pressure	2-25	Mpa
强度试验压力 Shell Test	3-37.5	
密封试验压力 Seal Test	2.2-27.5	
适用温度 Suitable Temp.	450	℃

外形尺寸标准要求

- 1、阀门的结构长度按 ASME B16.10 的标准
- 2、连接法兰按 ASME B16.50 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.



API 美标固定硬密封球阀外形图

API Standard Trunnion Mounted Metal Ball Valve View Drawing

API 美标固定硬密封球阀外形尺寸表

API Standard Trunnion Mounted Metal Ball Valve Dimensions Table

150LB

NPS	2"	2 1/2"	3"	4"	5"	6"	8"	10"	12"	14"	16"	18"	20"	24"	28"	32"	36"
DN	51	64	76	102	127	152	203	254	305	337	387	438	489	591	686	781	876
L	RF	178	191	203	229	356	394	457	533	610	686	762	864	914	1067	1245	1524
	BW	216	241	283	305	381	457	521	559	635	762	838	914	991	1143	1346	1727
H1	102	114	127	152	184	219	273	360	395	430	470	550	580	700	800	950	1100
H2	107	125	152	178	300	330	398	495	580	625	670	698	840	1050	1100	1150	1247
E							116	116	171	171	257	257	257	150	83	83	123
W	230	400	400	650	1050	1050	600	600	800	800	800	800	800	800	800	800	800
WT (kg)	120	16	22	35	58	74	205	322	460	576	864	1280	1600	3540	4500	5940	7540

Class 300 单位: mm

NPS	2"	2 1/2"	3"	4"	5"	6"	8"	10"	12"	14"	16"	18"	20"	24"	28"	32"	36"
DN	51	64	76	102	127	152	203	254	305	337	387	438	489	591	686	781	876
L	RF	216	241	283	305	381	403	502	568	648	762	838	914	991	1143	1346	1524
	BW	216	241	283	305	381	457	521	559	635	762	838	814	991	1143	1346	1524
	H1	102	114	127	152	184	219	273	360	395	430	470	550	580	700	800	950
	H2	107	125	152	178	300	330	398	495	580	625	670	698	840	1050	1100	1247
	E							116	116	171	171	257	257	257	150	83	123
	W	230	400	400	650	1050	1050	600	600	800	800	800	800	800	800	800	800
WT (kg)	15	24	30	55	87	118	255	370	533	640	1030	1542	2100	4200	5300	7860	8684

Class 400 单位: mm

NPS	2"	2 1/2"	3"	4"	6"	8"	10"	12"	14"	16"	20"	24"
DN	51	64	76	102	152	203	254	305	337	387	489	591
L	RF	292	330	356	406	495	597	673	762	826	902	1054
	RTJ	295	333	359	410	498	600	676	765	829	905	1060
	H1	114	124	133	159	250	294	395	445	500	530	660
	H2	108	155	197	235	300	374	445	512	550	615	810
	E	116	116	116	116	116	171	171	257	257	257	150
	W	600	600	600	600	600	800	800	800	800	800	800
WT (kg)	23	35	49	91	192	355	640	880	1100	1540	2800	5300

Class 600 单位: mm

NPS	2"	2 1/2"	3"	4"	6"	8"	10"	12"	14"	16"	20"	24"	28"
DN	51	64	76	102	152	203	254	305	337	387	489	591	686
L	RF	292	330	356	432	559	660	787	838	889	991	1194	1397
	RTJ	295	333	359	435	562	664	791	841	892	994	1200	1407
	H1	114	124	133	159	250	294	395	445	500	530	660	800
	H2	108	155	197	235	300	374	445	512	550	615	810	1010
	E	116	116	116	116	116	171	171	257	257	257	150	83
	W	600	600	600	600	600	800	800	800	800	800	800	800
WT (kg)	35	38	55	102	232	390	710	960	1700	1970	3250	5800	6700

Class 900 单位: mm

NPS	2"	2 1/2"	3"	4"	6"	8"	10"	12"	14"	16"	18"	20"	24"
DN	51	64	76	102	152	203	254	305	324	375	426	473	572
L	RF	368	419	381	457	610	737	838	965	1029	1130	1219	1321
	RTJ	371	422	384	460	613	740	841	968	1038	1140	1232	1334
	H1	217	241	259	297	360	322	420	470	510	600	700	810
	H2	126	158	191	216	270	394	502	572	675	762	866	894

E	116	116	116	116	171	171	257	257	150	150	180	180	220
W	600	600	600	600	800	800	800	800	800	800	800	800	800
WT (kg)	50	60	80	125	270								

Class 1500 单位: mm

	NPS	2"	21/2"	3"	4"	6"	8"	10"	12"	14"	16"	18"	20"	24"
L	DN	51	64	76	102	146	194	241	289	318	361	395	440	504
	RF	368	419	381	546	705	832	991	1130	1257	1384	1537	1664	1698
	RTJ	371	422	384	549	711	841	1000	1146	1276	1407	1559	1686	1902
	H1	126	158	191	216	296	378	495	542	590	670	710	750	850
	H2	217	241	259	297	365	475	578	696	761	831	900	950	1080
	E	116	116	116	116	171	257	257	481	150	180	220	220	280
	W	600	600	600	600	800	800	800	800	800	800	800	800	800
	WT (kg)	50	75	117	216	380								

API 美标固定硬密封球阀安装、使用与维护说明

安装指南

- 安装前准备:** 核对阀门型号、压力等级 (Class)、连接标准及阀体材质是否符合 API 6D 和管道设计要求。检查硬密封球体与阀座表面, 确保无损伤。清洁阀门内腔及管道密封面。
- 法兰连接与紧固:** 使用符合 ASME 标准的金属垫片及高强度合金钢螺栓。将阀门置于管道法兰之间, 确保阀体流向箭头与介质流向严格一致。按 API 规范采用十字对称顺序分步、均匀拧紧所有螺栓至规定扭矩。
- 焊接端连接 (如适用):** 若为对焊端阀门, 需由合格焊工按评定合格的焊接工艺规程施焊。焊接时阀门应处于全开位置, 并采取有效的阀体冷却措施, 防止高温影响硬密封面性能。
- 执行机构安装:** 若配备执行器, 需确保驱动轴与阀杆精确对中, 并按照制造厂要求调整行程和扭矩限制。安装后验证全开和全关位置的准确性。
- 系统压力测试:** 阀门安装后参与管道系统的压力试验。试验压力需符合 ASME B16.34 等规范, 试验后检查所有连接处有无泄漏, 并验证阀门启闭功能。

使用操作

- 启闭操作:** 通过执行器或手动装置进行 90 度旋转操作。硬密封阀门初期操作扭矩可能略大, 属正常现象。操作应平稳, 达到限位后停止。
- 状态确认:** 通过执行器反馈信号或阀杆位置指示器明确判断阀门开关状态。重要管线建议设置机械位置指示牌。
- 常规运行:** 本阀门适用于高压、高温及含颗粒介质的严苛工况, 可用于截断及有限度的调节。长期静态运行后首次操作应缓慢进行。

4. 注意事项：严禁在阀门处于部分开启状态下长期承受高速含固体颗粒介质的冲刷，以免损坏硬密封面。若操作扭矩异常持续增大，应立即停机检查。

维护保养

1. 定期检查：定期检查法兰连接处有无泄漏，阀体及外露部分有无异常腐蚀或损伤。检查所有外部紧固件及执行机构连接状态。
2. 密封系统维护：阀门通常配备阀座注脂系统。应根据运行工况定期通过注脂阀注入专用高温密封脂，以润滑密封面、减少磨损并维持密封性能。
3. 阀杆密封维护：若阀杆处出现外漏，可均匀适度拧紧填料压盖螺母。若无效或泄漏严重，需在系统泄压后更换适用于高温工况的填料。
4. 内部检修：硬密封球阀的内部检修通常要求较高专业性。如需检修，应先确认系统已完全泄压、隔离并冷却。重点检查硬质合金密封面的磨损、冲蚀及划伤情况，轻微损伤可由专业人员研磨修复，严重损坏需更换阀座或球体组件。
5. 长期停用：阀门长期存放应处于全开或全关位置。通过注脂系统向密封面注入足量保养脂进行保护。对阀杆等外露金属表面采取防锈措施。重新启用前需彻底清洁注脂通道，并进行全面的压力测试和功能检查。

Installation, Operation, and Maintenance Instructions for API Standard Trunnion-Mounted Metal Ball Valve

Installation Guide

1. Pre-Installation Preparation:

Verify that the valve model, pressure class (Class), connection standard, and body material comply with API 6D and pipeline design requirements. Inspect the surfaces of the Metal ball and seat for any damage. Clean the internal cavity of the valve and the pipeline sealing surfaces.

2. Flange Connection and Tightening:

Use metal gaskets and high-strength alloy steel bolts that comply with ASME standards. Position the valve between the pipeline flanges, ensuring the flow direction arrow on the valve body strictly aligns with the medium flow direction. Gradually and evenly tighten all bolts to the specified torque in a crosswise symmetrical sequence as per API standards.

3. Welded-End Connection (If Applicable):

For butt-weld end valves, welding must be performed by a qualified welder following approved welding procedures. The valve should be fully open during welding, and effective cooling measures must be applied to the valve body to prevent high temperatures from affecting the Metal surfaces.

4. Actuator Installation:

If equipped with an actuator, ensure precise alignment between the drive shaft and the valve stem. Adjust the travel and torque limits according to the manufacturer's instructions. After installation, verify the

accuracy of the fully open and fully closed positions.

5. System Pressure Testing:

After installation, the valve must participate in the pipeline system's pressure test. The test pressure must comply with standards such as ASME B16.34. After testing, inspect all connections for leaks and verify the valve's opening and closing functionality.

Operation Instructions

1. Opening and Closing Operations:

Operate the valve by rotating it 90 degrees using an actuator or manual device. A slightly higher initial operating torque is normal for Metal valves. The operation should be smooth and stopped once the mechanical limit is reached.

2. Status Confirmation:

Confirm the valve's open or closed status using the actuator feedback signal or the stem position indicator. For critical pipelines, it is recommended to install mechanical position indicators.

3. Normal Operation:

This valve is suitable for demanding conditions, including high pressure, high temperature, and media containing particles. It can be used for isolation and limited flow regulation. The first operation after prolonged static periods should be performed slowly.

4. Precautions:

Do not expose the valve to prolonged high-velocity flow containing solid particles in a partially open state, as this may damage the Metal surfaces. If abnormal and persistent torque increase occurs during operation, stop immediately and inspect the valve.

Maintenance

1. Regular Inspections:

Periodically inspect flange connections for leaks and check the valve body and exposed parts for abnormal corrosion or damage. Verify the condition of all external fasteners and actuator connections.

2. Seal System Maintenance:

The valve is typically equipped with a seat injection system. Based on operating conditions, periodically inject specialized high-temperature sealant through the injection valve to lubricate the sealing surfaces, reduce wear, and maintain sealing performance.

3. Stem Seal Maintenance:

If external leakage occurs at the stem, evenly and moderately tighten the packing gland nut. If ineffective or if leakage is severe, replace the packing suitable for high-temperature conditions after

depressurizing the system.

4. Internal Maintenance:

Internal maintenance of Metal ball valves typically requires professional expertise. Before performing maintenance, ensure the system is fully depressurized, isolated, and cooled. Focus on inspecting the hard-alloy sealing surfaces for wear, erosion, and scratches. Minor damage can be repaired by professionals through grinding, while severe damage requires replacement of the seat or ball assembly.

5. Long-Term Storage:

For long-term storage, the valve should be in the fully open or fully closed position. Protect the sealing surfaces by injecting an adequate amount of preservative grease through the injection system. Apply anti-rust measures to the stem and other exposed metal surfaces. Before returning the valve to service, thoroughly clean the injection channels and perform comprehensive pressure testing and functional checks.

非常感谢您的阅读！

Thank you very much for reading!

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