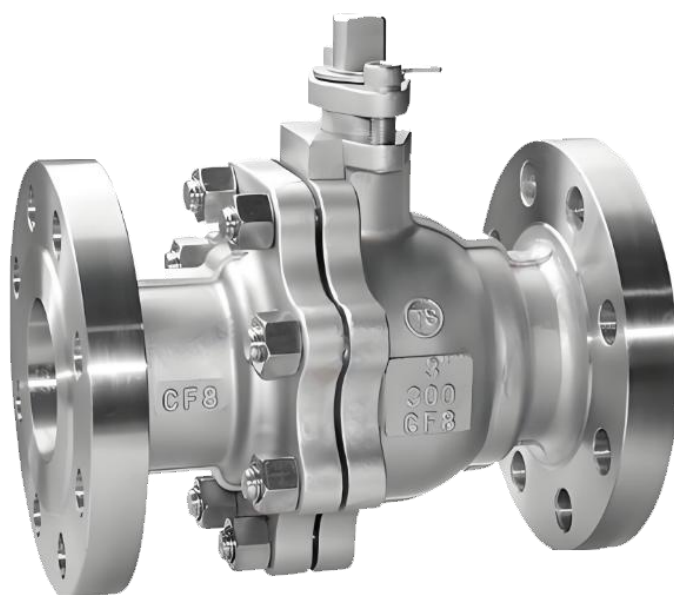


API 美标硬密封球阀

API Standard Metal Ball Valve

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开维喜阀门集团有限公司
Kaiweixi Valve Group Co., Ltd.

API 美标硬密封球阀

型号: API	规格: DN15-DN500
公称压力: 1.6Mpa-4.0Mpa	适用介质: 水、气、油
适用温度: $\leq 450^{\circ}\text{C}$	阀体材质: 不锈钢、碳钢
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 Metal Ball Valve

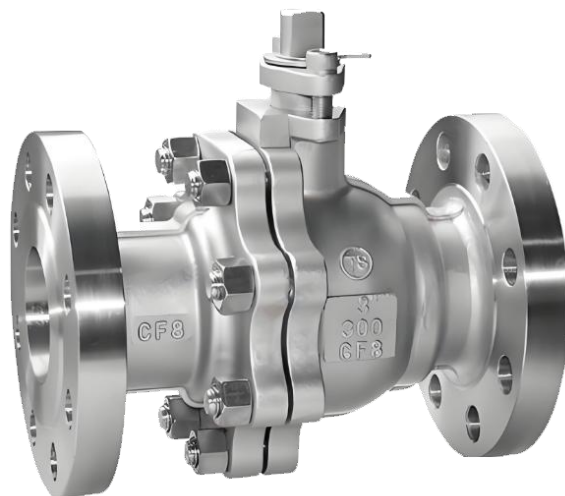
Model: API	Specifications: DN15-DN500
Nominal Pressure: 1.6Mpa-4.0Mpa	Applicable Media: water, gas, oil
Applicable Temperature: $\leq 450^{\circ}\text{C}$	Body Material: Stainless Steel, Carbon Steel.
End Connection : Flange	Operation: Manual, pneumatic, electric, gear
Other Parameters: Manufacturing standard according to API6D.	

API 美标硬密封球阀概述

API 美标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工业阀门，采用金属硬密封结构。阀体通常采用锻钢或铸钢材质，其球体与阀座密封面采用硬质合金材料堆焊或喷涂工艺，通过精密研磨实现金属对金属的严密密封。该阀门符合 API 6D、API 608 等标准，具有优异的耐高温、耐高压、耐磨损及耐冲蚀性能，适用于含固体颗粒、高温高压及腐蚀性介质的苛刻工况。广泛应用于石油、天然气、化工、煤化工及电力等领域的关键管路系统，是实现零泄漏安全截断的核心设备。

API Standard Metal Ball Valve Overview

The API Standard Metal Ball Valve is a high-performance industrial valve designed and manufactured in strict compliance with the American Petroleum Institute (API) standards, featuring a metal hard seal structure. The valve body is typically made of forged or cast steel. The sealing surfaces of the ball and seat are constructed using hard alloy materials applied through overlay welding or spraying processes, followed by precision grinding to achieve a tight metal-to-metal seal. This valve complies with API 6D, API 608, and other relevant standards. It offers excellent resistance to high temperatures, high pressure, wear, and erosion, making it suitable for harsh operating conditions involving solid particles, high temperatures and pressures, or corrosive media. Widely used in critical pipeline systems across the petroleum, natural gas, chemical, coal chemical, and power generation industries, it serves as a core component for achieving zero-leakage, safe shutoff functionality.



API 美标硬密封球阀产品图
API Standard Metal Ball Valve Product Image

API 美标硬密封球阀特点

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. 硬质合金密封耐苛刻工况：球体与阀座采用硬质合金密封面，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. 防火与双向密封安全：符合 API 607 防火标准，软密封辅助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。
4. 低扭矩长寿命设计：采用固定球或浮动球优化结构，操作扭矩稳定。硬密封面磨损率低，设计寿命远高于软密封阀门。
5. 智能维护与高可靠性：可配备阀座注脂系统和状态监测接口，支持预防性维护。模块化设计便于关键部件更换，全生命周期成本低。

API Standard Metal Ball Valve Features

1. Strict Compliance with API Standards:

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

2. Hard Alloy Sealing for Demanding Conditions:

The ball and seat feature hard alloy sealing surfaces, offering excellent resistance to high temperatures, wear, and erosion. This makes the valve suitable for media containing solid particles and

frequent operation.

3. Fire-Safe and Bidirectional Sealing:

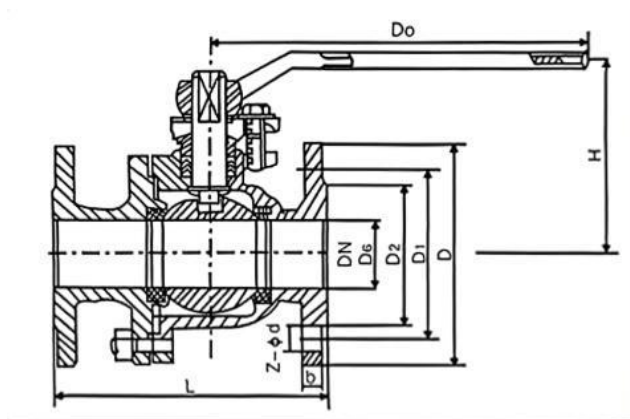
Compliant with API 607 fire-safe standards, the valve maintains sealing through its metal sealing pair even if auxiliary soft sealing materials fail. It typically provides bidirectional sealing capability.

4. Low-Torque and Long-Life Design:

The valve incorporates optimized fixed-ball or floating-ball structures, ensuring stable operating torque. The hard sealing surfaces exhibit low wear rates, resulting in a design life significantly longer than that of soft-seal valves.

5. Smart Maintenance and High Reliability:

The valve can be equipped with a seat injection system and condition monitoring interfaces, supporting preventive maintenance. Its modular design facilitates the replacement of key components, reducing the total lifecycle cost.



API 美标硬密封球阀结构图

API Standard 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	ZG1Cr18Ni9Ti、CF8、CF3 、CF8M、 ZG1Cr18Ni12Mo2Ti
2	球体 ball	1Cr18Ni9Ti、1Cr18Ni12Mo2Ti、304、304L、316
3	密封垫 seal gasket	PTFE、PPL、硬质合金、不锈钢 Hard Alloy, Stainless Steel
4	填料 packing	PTFE、PPL、硬质合金、不锈钢 Hard Alloy, Stainless Steel
5	阀杆 stem	1Cr18Ni9Ti、1Cr18Ni12Mo2Ti、304、304L、316

性能规范表 Performance Specification

公称压力 Nominal Pressure	1.6-4.0	Mpa
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强度试验压力 Shell Test	2.4-6.0	
密封试验压力 Seal Test	1.76-4.4	
适用温度 Suitable Temp.	450	℃

外形尺寸标准要求

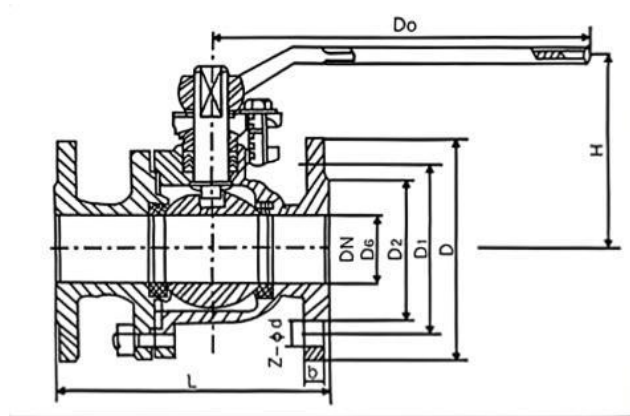
1、阀门的结构长度按 ASME B16.10 的标准

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 美标硬密封球阀外形图

API Standard Metal Ball Valve View Drawing

API 美标硬密封球阀外形尺寸表

API Standard Metal Ball Valve Dimensions Table

1.6MPa	DN	L	D	D1	D2	b	n-φd	H	D0
凸面法兰 RF Q41F Q41PPL 16C 16P 16R	15	130	95	65	45	14	4-14	78	140
	20	140	105	75	55	14	4-14	84	160
	25	150	115	85	65	14	4-14	95	180
	32	165	135	100	78	16	4-18	150	250
	40	180	145	110	85	16	4-18	150	300
	50	200	160	125	100	18	4-18	170	350
	65	220	180	145	120	20	4-18	195	350
	80	250	195	160	135	20	8-18	215	400
	100	280	215	180	155	20	8-18	250	500
	125	320	245	210	185	22	8-18	265	600
	150	360	280	240	210	24	8-23	270	800

	200	400	335	295	265	26	12-23	330	1200
2.5MPa	15	130	95	65	45	16	4-14	103	140
凸面法兰 RF Q41F Q41PPL 25 25P 25R	20	140	105	75	55	16	4-14	112	160
	25	150	115	85	65	16	4-14	123	180
	32	165	135	100	78	18	4-18	150	250
	40	180	145	110	85	18	4-18	156	300
	50	200	160	125	100	20	8-18	172	350
	65	220	180	145	120	22	8-18	197	350
	80	250	195	160	135	22	8-23	222	400
	100	280	230	190	160	24	8-23	253	500
	125	320	270	220	188	28	8-25	275	600
	150	360	300	250	218	30	8-25	286	800
	200	400	360	310	278	34	12-25	340	1200

4.0MPa	DN	L	D	D1	D2	D6	b	n-Φd	H	D0
凹凸法兰 MFM Q41F Q41PPL 40 40P 40R	15	130	95	65	45	40	16	4-14	103	140
	20	140	105	75	55	51	16	4-14	112	160
	25	150	115	85	65	58	16	4-14	123	160
	32	180	135	100	78	66	18	4-18	150	250
	40	200	145	110	85	76	18	4-18	156	250
	50	220	160	125	100	88	20	4-18	172	350
	65	250	180	145	120	110	22	8-18	197	350
	80	280	195	160	135	121	22	8-18	222	450
	100	320	230	190	160	150	24	8-23	253	450
	125	400	270	220	188	176	28	8-25	275	600
	150	400	300	250	218	204	30	8-25	286	800
	200	550	375	320	282	260	38	12-30	340	1200
6.4MPa	15	165	105	75	55	40	18	4-14	105	140
凹凸法兰 MFM Q41F Q41PPL	20	190	125	90	68	51	20	4-18	125	160
	25	216	135	100	78	58	22	4-18	135	250
	32	229	150	110	82	66	24	4-23	150	350

64	40	241	165	125	95	76	24	4-23	165	350
64P	50	292	175	135	105	88	26	4-23	175	450
64R	65	330	200	160	130	110	28	8-23	200	450
	80	356	210	170	140	121	30	8-23	210	600
	100	432	250	200	168	150	32	8-25	250	700
	125	508	295	240	202	176	36	8-30	295	1100
	150	559	340	280	240	204	38	8-34	340	1500

API 美标硬密封球阀安装、使用与维护说明

安装指南

1. 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。清洁阀门内腔及管道密封面，检查硬质合金密封面有无运输损伤。
2. 法兰连接与紧固：使用符合 ASME 标准的金属缠绕垫等硬密封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。
3. 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，并采取有效的分段冷却措施，防止焊接高温影响硬质合金密封面性能。
4. 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。安装后需验证全开和全关位置的准确性。
5. 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，试验过程中检查所有连接处有无泄漏，并验证阀门启闭功能。

使用操作

1. 启闭操作：通过执行器或手动装置进行 90 度旋转操作。硬密封阀门初期磨合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。
2. 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。
3. 常规运行：本阀门适用于高压、高温、含固体颗粒及腐蚀性介质的严苛工况，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

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 Metal Ball Valve

Installation Guide

1. Pre-Installation Preparation

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

2. Flange Connection and Tightening

Use hard seal gaskets (such as ASME-compliant spiral-wound metal gaskets) and high-strength alloy steel bolts. 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 sectional cooling measures must be applied to prevent welding heat from affecting the performance of the hard alloy sealing 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. During 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 operating torque during the initial break-in period is normal for hard-seal 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, media containing solid particles, and corrosive environments. 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 hard-seal 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 hard-seal 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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