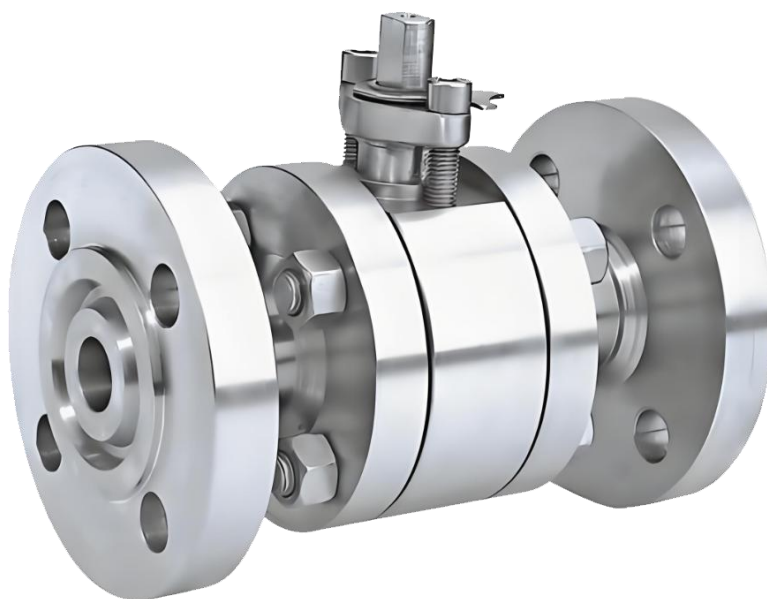


Q41H 锻钢三段式球阀

Q41H Forged Steel Three-Piece Ball Valve

使 用 说 明 书



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

Q41H 锻钢三段式球阀

型号: Q41H	规格: DN15-DN200
公称压力: 2.5-4.0Mpa	适用介质: 水、气、油
适用温度: $\leq 350^{\circ}\text{C}$	阀体材质: 锻钢、锻不锈钢
连接方式: 法兰	驱动方式: 气动、电动、手动、涡轮
其他参数: 制造标准按 GB/T12237	

Q41H Forged Steel Three-Piece Ball Valve

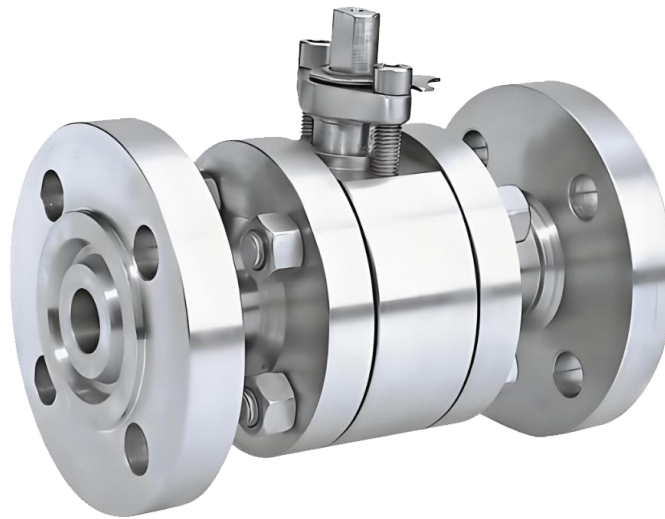
Model: Q41H	Specifications: DN15-DN200
Nominal Pressure: 2.5-4.0Mpa	Applicable Media: water, gas, oil
Applicable Temperature: $\leq 350^{\circ}\text{C}$	Body Material: forged steel, forged stainless steel
End Connection :flange	Operation: Manual, pneumatic, electric, gear
Other Parameters: Manufacturing standard according to GB/T12237.	

Q41H 锻钢三段式球阀概述

Q41H 锻钢三段式球阀是一种采用整体锻钢阀体、三段式螺栓连接结构的高性能工业球阀。阀体由高强度锻钢（如 A105）分段锻造并通过合金钢螺栓连接而成，内部采用金属硬密封设计。阀门通过旋转阀杆带动精密加工的球体实现 90 度启闭，专为高压、高温及严苛介质工况设计。其模块化三段式结构便于拆卸和维护，广泛应用于石油化工、天然气、电站及高压管线等关键系统，是实现可靠截断与在线维护的高端阀门设备。

Q41H Forged Steel Three-Piece Ball Valve Overview

The Q41H Forged Steel Three-Piece Ball Valve is a high-performance industrial ball valve featuring an integrally forged steel body and a three-piece bolted connection structure. The valve body is composed of high-strength forged steel segments (e.g., A105), joined together by alloy steel bolts, with an internally designed metal hard-seal system. The valve operates via a 90-degree rotation of the stem, which drives the precision-machined ball to open or close. It is specifically engineered for high-pressure, high-temperature, and demanding media conditions. The modular three-piece structure facilitates disassembly and maintenance, making it widely applicable in critical systems such as petrochemicals, natural gas, power plants, and high-pressure pipelines. This valve serves as a premium equipment solution for reliable shut-off and in-line maintenance capabilities.



Q41H 锻钢三段式球阀产品图

Q41H Forged Steel Three-Piece Ball Valve Product Image

Q41H 锻钢三段式球阀特点

1. 锻钢三段式高压结构：阀体采用锻钢分段锻造，强度高、耐高压。三段式螺栓连接设计无需从管道拆下即可进行内部检修和密封件更换，维护极为便捷。
2. 金属硬密封耐苛刻工况：球体与阀座采用堆焊硬质合金密封面，耐高温、耐磨损、耐冲蚀，适用于含颗粒介质及频繁操作的严苛工况。
3. 防火安全与双向密封：通常符合 API 607 防火标准，软密封辅助失效后仍能通过金属密封副保持基本密封。多数设计具备可靠的双向密封能力。
4. 操作稳定维护成本低：固定球设计操作扭矩低且稳定。三段式结构极大简化了维护流程，显著减少停机时间和全生命周期维护成本。
5. 标准化与高可靠性：设计与制造遵循 API 6D 等高标准规范，适用于高温高压及腐蚀性介质，在关键工业流程中提供高可靠性的截断保障。

Q41H Forged Steel Three-Piece Ball Valve Features

1. Forged Steel Three-Piece High-Pressure Structure:

The valve body is made of segmented forged steel, offering high strength and pressure resistance. The three-piece bolted connection design allows for internal inspection and seal replacement without removing the valve from the pipeline, significantly simplifying maintenance.

2. Metal Hard Seal for Demanding Conditions:

The ball and seat feature hard alloy overlay sealing surfaces, providing excellent resistance to high

temperatures, wear, and erosion. This makes the valve suitable for harsh applications involving particulate media and frequent operation.

3. Fire-Safe and Bidirectional Sealing:

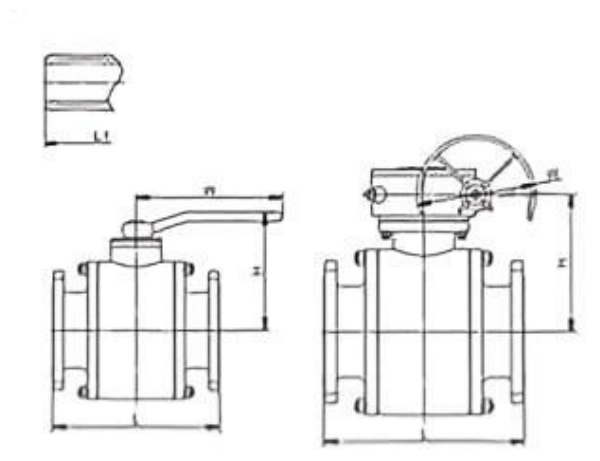
The valve typically complies with fire safety standards such as API 607, ensuring basic sealing performance through metal-to-metal sealing in the event of auxiliary soft seal failure. Most designs also offer reliable bidirectional sealing capability.

4. Stable Operation and Low Maintenance Costs:

The fixed ball design ensures low and stable operating torque. The three-piece structure greatly simplifies maintenance procedures, significantly reducing downtime and lifecycle maintenance costs.

5. Standardization and High Reliability:

Designed and manufactured in accordance with high standards such as API 6D, the valve is suitable for high-temperature, high-pressure, and corrosive media applications, providing highly reliable shut-off performance in critical industrial processes.



Q41H 锻钢三段式球阀结构图

Q41H Forged Steel Three-Piece 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	铸钢、碳钢 cast steel, stainless steel
2	球体 ball	铸钢、碳钢 cast steel, stainless steel
3	密封垫 seal gasket	PTFE、对位聚苯 Poly
4	填料 packing	PTFE、柔性石墨 Flexible Graphite
5	阀杆 stem	铸钢、碳钢 cast steel, carbon steel

性能规范表 Performance Specification

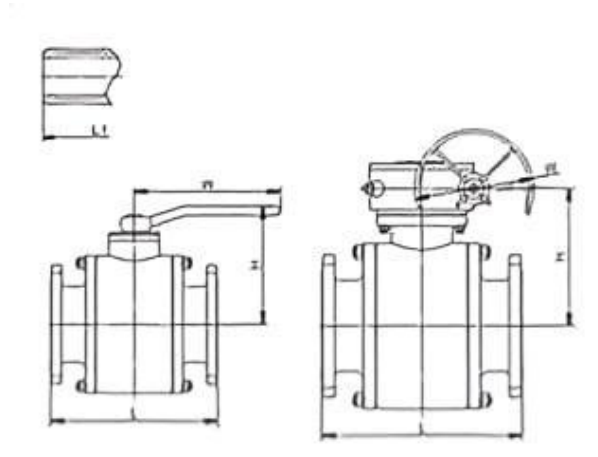
公称压力 Nominal Pressure	2.5/4	Mpa
强度试验压力 Shell Test	3.75/6	
密封试验压力 Seal Test	2.75/4.4	
适用温度 Suitable Temp.	350	℃

外形尺寸标准要求

- 1、阀门的结构长度按 GB/T12221 的标准
- 2、连接法兰按 GB9113 的标准

Dimensions Standard Requirements

1. The structural length of the valve shall conform to the standard GB/T12221.
2. The connecting flange shall conform to the standard GB9113.



Q41H 锻钢三段式球阀外形图

Q41H Forged Steel Three-Piece Ball Valve View Drawing

Q41H 锻钢三段式球阀外形尺寸表

Q41H Forged Steel Three-Piece Ball Valve Dimensions Table

DN	mm	15	20	25	32	40	50	65	80	100	125	150	200
NPS	in	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	5	6	8
400LB 法兰 Flange	L	165	190	216	—	241	292	330	356	406 (432)	—	—	—
6.4MPa 法兰 Flange	L	165	190	216	229	241	292	330	356	432	508	559	660
10.0MPa 法兰 Flange	L	165	190	216	229	241	292	330	356	432	508	559	660
对焊 Butt Welding	L1	165	190	216	—	241	292	330	356	406 (432)	—	—	

Q41H 锻钢三段式球阀安装、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）、法兰标准及锻钢材质（如 A105）是否符合高压管道设计要求。清洁阀门内腔及管道法兰密封面，确保无任何杂质。检查三段阀体连接螺栓的紧固状态。

2. 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。将阀门整体置于管道法兰之间，确保阀体流向箭头与介质流向严格一致。按 API 或 ASME 规范采用十字对称顺序分步、均匀拧紧管道法兰螺栓至规定扭矩。

3. 三段式结构注意事项：安装时无需拆卸阀门的三段式连接螺栓。在吊装和紧固管道法兰过程中，应避免对阀门施加扭曲力或不当外力，防止内部密封组件错位或阀体变形。

4. 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，并对阀体采取分段冷却措施，防止焊接高温影响硬质合金密封面性能。

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 等高压规范，试验过程中检查所有连接处有无泄漏。

使用操作

1. 启闭操作：通过手柄、齿轮箱或执行器进行 90 度旋转操作。锻钢阀门配合硬密封，初期操作扭矩可能略大，属正常现象。操作应平稳，达到机械限位即停止，严禁使用加长杠杆强行操作。

2. 状态确认：通过执行器位置反馈、阀杆指示器或机械限位标志明确判断阀门开关状态。高压或关键管线建议设置永久性状态标牌。

3. 常规运行：本阀门适用于高压、高温工况的全开或全关闭断，原则上不推荐用于流量调节。长期全开运行时，建议定期进行全行程开关操作。

4. 注意事项：带压操作时若感觉扭矩异常持续增大，应立即停止并检查系统压力是否超标或阀门内部是否出现卡滞、结垢等异常。

维护保养

1. 定期检查：定期检查管道法兰连接处有无泄漏，阀体表面有无异常腐蚀或损伤。检查三段式阀体连接螺栓及所有外部紧固件是否保持规定扭矩。

2. 在线维护（利用三段式结构）：若需检查、清洗或更换阀座、密封件，可在系统完全泄压后，仅拆卸中段阀体两端的连接螺栓，将中段阀体移开进行维护，无需拆卸阀门与管道的连接。

3. 密封系统维护：阀门通常配备阀座注脂系统。可根据运行情况定期通过注脂阀注入专用高温高压密封脂，以润滑硬密封面并维持密封性能。若出现轻微内漏，可尝试注脂进行临时性处理。

4. 内部检修：进行内部检修时，应确保系统已完全泄压并冷却。重点检查球体与阀座的硬质合金密封面磨损、冲蚀及划伤情况。轻微损伤可由专业人员研磨修复，严重损坏需更换密封组件。

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 Q41H Forged Steel Three-Piece Ball Valve Installation Guide

1. Pre-Installation Preparation: Verify that the valve model, pressure class (Class), flange standard, and forged steel material (e.g., A105) comply with the high-pressure pipeline design requirements. Clean the valve inner cavity and the pipeline flange sealing surfaces thoroughly, ensuring they are free of any

impurities. Inspect the tightness of the connecting bolts between the three-piece body sections.

2. Flange Connection and Tightening: Use ASME-compliant metal gaskets and high-strength alloy steel bolts. Position the fully assembled valve between the pipeline flanges, ensuring the flow direction arrow on the valve body strictly aligns with the media flow direction. Tighten the pipeline flange bolts in a crisscross pattern and in stages as specified by API or ASME standards until the designated torque is reached uniformly.

3. Considerations for Three-Piece Structure: Do not disassemble the connecting bolts of the three-piece valve during installation. During hoisting and tightening of pipeline flanges, avoid applying torsional or undue external forces to the valve to prevent misalignment of internal sealing components or body deformation.

4. Welded End Connection (if applicable): For butt-weld-end valves, welding must be performed by qualified welders using qualified welding procedure specifications (WPS). The valve should be in the fully open position during welding. Employ controlled cooling measures on the valve body to prevent welding heat from affecting the performance of the hard alloy sealing surfaces.

5. System Pressure Testing: The installed valve must participate in the pipeline system's pressure test. The test pressure must comply with high-pressure standards such as ASME B16.34. Inspect all connections for leaks during the test.

Operation

1. Opening/Closing Operation: Operate the valve via a 90-degree rotation of the hand lever, gearbox, or actuator. Initially, operating torque for forged steel valves with hard seals may be slightly higher, which is normal. Operate smoothly and stop once the mechanical stop is reached. Using extended levers for forced operation is strictly prohibited.

2. Position Indication: Clearly determine the valve's open/closed position via actuator feedback, stem indicator, or mechanical stop marks. For high-pressure or critical pipelines, installing permanent status tags is recommended.

3. Normal Service: This valve is designed for on/off isolation in high-pressure and high-temperature applications and is not recommended for flow throttling. If the valve remains fully open for extended periods, periodic full-stroke operation is advised.

4. Precautions: If an abnormal and persistent increase in operating torque is felt during pressurized operation, stop immediately. Investigate whether system pressure exceeds limits or if internal issues such as jamming or scaling have occurred.

Maintenance

1. Regular Inspection: Periodically inspect pipeline flange connections for leaks and the valve exterior for abnormal corrosion or damage. Check that the connecting bolts of the three-piece body and all external fasteners maintain the specified torque.

2. In-Line Maintenance (Utilizing the Three-Piece Structure): To inspect, clean, or replace seats and seals, fully depressurize the system. Then, only the connecting bolts at both ends of the center body section need to be removed to slide the center section out for maintenance, eliminating the need to disconnect the valve from the pipeline.

3. Sealing System Maintenance: The valve is typically equipped with a seat injection system. Based on operating conditions, periodically inject specialized high-temperature, high-pressure sealing grease through the injection fittings to lubricate the hard seal surfaces and maintain sealing performance. Minor internal leakage may be temporarily addressed by injecting grease.

4. Internal Inspection: Before performing internal inspection, ensure the system is fully depressurized and

cooled. Focus on inspecting the hard alloy sealing surfaces of the ball and seats for wear, erosion, and scratches. Minor damage can be repaired by qualified personnel through grinding; severely damaged components require replacement.

5. Long-Term Storage: Valves in long-term storage should be in the fully open or fully closed position. Protect the sealing surfaces by injecting a sufficient amount of preservation grease through the injection system. Apply anti-corrosion measures to exposed metal surfaces such as the stem. Before recommissioning, clean the grease injection channels and conduct comprehensive pressure testing and functional checks.

非常感谢您的阅读！

Thank you very much for reading!

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