

Q41Y 三片式锻钢球阀

Q41Y 3PCS Forged Steel Ball Valve

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

Q41Y 三片式锻钢球阀

型号: Q41Y-16/40/64/100
公称压力: PN16, PN40, PN100, PN64
适用温度: $\leq 400^{\circ}\text{C}$
连接方式: 法兰
其他参数: 制造标准按 GB/T 12237

规格: DN15-DN200
适用介质: WOG、颗粒介质、高温介质
阀体材质: 锻钢、锻不锈钢
驱动方式: 手动、气动、电动

Q41Y 3PCS Forged Steel Ball Valve

Model: Q41Y-16/40/64/100 Specifications: DN15-DN200
Nominal Pressure: PN16, PN40, PN100, PN64
Applicable Media: Water, steam, petroleum products and similar liquids, gas
Applicable Temperature: $\leq 400^{\circ}\text{C}$ Body Material: forged steel, forged stainless steel
End Connection : Flange Operation: Manual, pneumatic, electric
Other Parameters: Manufacturing standard according to GB/T 12237.

Q41Y 三片式锻钢球阀概述

Q41Y 三片式锻钢球阀是一种采用锻钢阀体、由三部分螺栓连接构成的耐高压球阀。阀体与组件通常采用 A105、F304/F316 等锻钢材料，通过锻造工艺获得致密组织，具备更高的机械强度与承压能力。其核心密封采用球体表面堆焊或喷涂硬质合金（如司太立合金）、阀座为金属或增强石墨的三维硬密封结构，可在高温高压及频繁操作下保持密封稳定性。该阀门设计符合 API、ASME 等高标准规范，公称压力可达 Class 1500，广泛应用于石油化工、油气开采、电站、炼化等关键管路上，适用于水、蒸汽、油品、天然气等苛刻工况的可靠截断。

Q41Y 3PCS Forged Steel Ball Valve Overview

Q41Y three piece forged steel ball valve is a high-pressure resistant ball valve composed of a forged steel valve body and three bolted connections. The valve body and components are usually made of forged steel materials such as A105, F304/F316, which obtain a dense structure through forging processes and have higher mechanical strength and pressure bearing capacity. The core seal adopts a three-dimensional hard sealing structure with spherical surface welding or spraying hard alloy (such as Stellite alloy), and the valve seat is made of metal or reinforced graphite, which can maintain sealing stability under high temperature, high pressure and frequent operation. This valve is designed to comply with high standard specifications such as API and ASME, with a nominal pressure of up to Class 1500. It is widely used in key pipelines such as petrochemicals, oil and gas extraction, power plants, and refining, and is suitable for reliable cutoff of harsh working conditions such as water, steam, oil products, and natural gas.



Q41Y 三片式锻钢球阀产品图
Q41Y 3PCS Forged Steel Ball Valve Product Image

Q41Y 三片式锻钢球阀特点

1. 高压高温性能卓越：整体锻钢阀体结构致密，无铸造缺陷，机械性能优异，能可靠承受高压、高温及频繁压力波动的严苛工况，安全性高。
2. 硬质金属密封耐磨耐用：球体与阀座采用硬质合金配对或金属对增强聚四氟乙烯/石墨的密封形式，耐冲刷、耐高温，适用于高温及带微小颗粒的介质，使用寿命长。
3. 三片式结构维护便捷：阀体由中间阀体及两端连接体通过螺栓紧固构成，无需从管道上完全拆除即可方便地拆卸中腔，便于快速检查、清洗或更换内部密封组件，大幅降低维护成本与时间。
4. 连接可靠适应性强：标准配置为法兰连接，也可根据需求提供对焊端。结构紧凑且坚固，部分型号支持阀体全焊接设计，适用于埋地或对泄漏要求极高的环境。
5. 防火与双向密封设计：通常符合 API 607/API 6FA 防火测试标准，在软密封失效时仍能通过金属辅助密封保证一定密封性。多数设计为双向密封，不受介质流向限制。

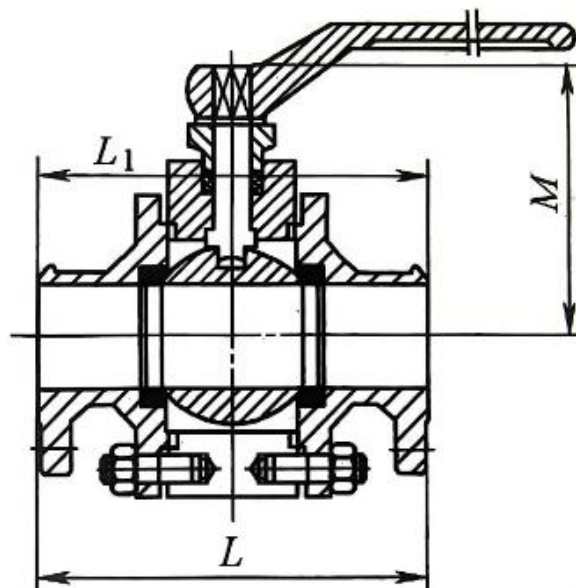
Q41Y 3PCS Forged Steel Ball Valve Features

1. Excellent high pressure and high temperature performance: The overall forged steel valve body has a dense structure, no casting defects, excellent mechanical properties, and can reliably withstand harsh working conditions such as high pressure, high temperature, and frequent pressure fluctuations, with high safety.
2. Hard metal sealing is wear-resistant and durable: The ball and valve seat are sealed with hard alloy or metal reinforced PTFE/graphite, which is resistant to erosion and high temperature, suitable for high temperature and media with small particles, and has a long service life.
3. Convenient maintenance of the three piece structure: The valve body is composed of a middle valve

body and two end connecting bodies that are fastened by bolts. The middle chamber can be easily disassembled without completely removing it from the pipeline, making it easy to quickly inspect, clean or replace internal sealing components, greatly reducing maintenance costs and time.

4. Reliable connection and strong adaptability: The standard configuration is flange connection, and welding ends can also be provided according to demand. Compact and sturdy structure, some models support fully welded valve body design, suitable for underground or environments with extremely high leakage requirements.

5. Fireproof and bidirectional sealing design: usually in compliance with API 607/API 6FA fire testing standards, it can still ensure a certain degree of sealing through metal assisted sealing even when the soft seal fails. Most designs are bi-directional seals that are not restricted by the flow direction of the medium.



Q41Y 三片式锻钢球阀结构图

Q41Y 3PCS Forged Steel 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	碳钢、不锈钢 Carbon steel, stainless steel
2	球体 Ball	不锈钢 stainless steel
3	密封圈 sealing ring	喷焊、堆焊、硬质合金 Spray welding, overlay welding, hard alloy
4	填料 packing	柔性石墨 flexible graphite
5	阀杆 Stem	2Cr13、不锈钢 stainless steel

性能规范表 Performance Specification

公称压力 Nominal Pressure	1.6/4/6.4/10	MPa
强度试验压力 Shell Test	2.4/6/9.6/15	

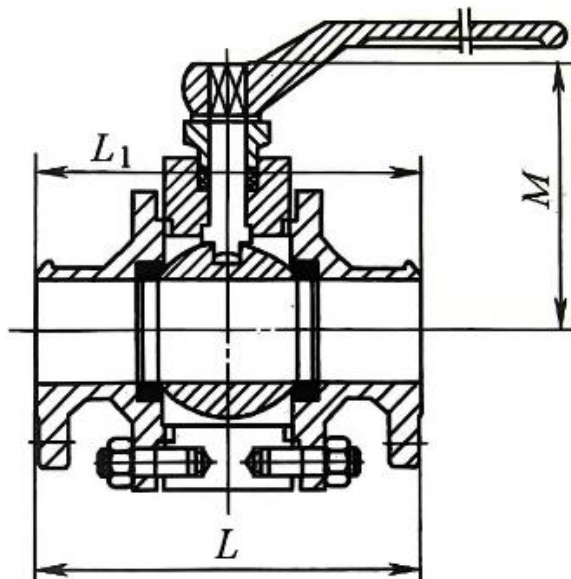
密封试验压力 Seal Test	1.76/6.6/7.04/16.5	
适用温度 Suitable Temp.	≤400	℃

外形尺寸标准要求

- 1、阀门的结构长度按 GB/T 12221 的标准
- 2、连接法兰按 GB/T 9113 的标准

Dimensions Standard Requirements

1. The structural length of the valve shall conform to the standard GB/T 12221.
2. The connecting flange shall conform to the standard GB/T 9113.



Q41Y 三片式锻钢球阀外形图
Q41Y 3PCS Forged Steel Ball Valve View Drawing

Q41Y 三片式锻钢球阀外形尺寸表

Q41Y 3PCS Forged Steel Ball Valve Dimensions Table

PN	SIZE	公称尺寸 DN											
		15	20	25	32	40	50	65	80	100	125	150	200
16、20	L	108	117	127	140	165	178	191	203	229	356	394	457
	L1	140	152	165	178	190.5	216	241	283	305	381	457	521
	M	59	63	75	95	95	107	142	152	178	252	272	342
40、50	L	140	152	165	178	190.5	216	241	283	305	381	403	502
	L1	140	152	165	178	190.5	216	241	283	305	381	—	—
	M	59	63	75	95	95	107	142	152	178	252	272	342
100	L	165	190.5	216	178	241	292	330	356	406/432	—	559	660
	L1	165	190.5	216	178	241	292	330	356	406/432	—	559	660

	M	59	63	75	95	95	167	180	198	198	-	-	-
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Q41Y 三片式锻钢球阀安装、使用与维护说明书

安装指南

1. 安装前准备：核对阀门型号、压力等级、材质及连接标准是否与管路设计一致。彻底清洁阀门内腔及管道端口，去除所有异物。检查螺栓、螺母的材质与规格，确保其符合高压连接要求。
2. 吊装与搬运：使用阀体上的吊环或通过阀体中部进行吊装，避免碰撞法兰密封面及阀杆。由于阀体为锻件且结构坚固，搬运时仍需小心轻放。
3. 对中与连接：将阀门置于管道法兰之间，确保两端管道法兰对中良好。插入合适的垫片，按对角线顺序分多次均匀拧紧连接螺栓，最终扭矩需达到标准规定值，以保证法兰面均匀受压，避免阀体产生附加应力。
4. 焊接端连接（如适用）：若为对焊连接，需按焊接工艺规程进行坡口准备与焊接，焊接时需采取防止阀内密封件过热受损的措施（如阀体浇水冷却），建议阀门处于半开状态。
5. 操作空间：确保阀门手轮或执行器有足够的操作与维护空间。对于大口径高压阀门，管道系统应设计适当的支撑。

使用操作

1. 启闭操作：通过手轮、齿轮箱或执行器平稳操作。硬密封阀门初始使用时操作力矩可能略大，属正常现象。操作时需旋转到位（通常有机械限位），但禁止使用加长杠杆强行超扭矩操作。
2. 状态确认：通过手轮位置或执行器指示器清晰判断开关状态。全开时流道畅通，全关时实现硬密封截断。
3. 工况适应：本阀门设计用于高温、高压及频繁操作的苛刻工况，适用于启闭截断，不应用于节流调节，以免损坏硬密封面。
4. 运行监控：在初始投入运行或工况变化时，注意检查阀门外部及连接处有无异常泄漏或振动。

维护保养

1. 定期检查：定期检查法兰连接处有无泄漏，阀杆填料函状况，以及所有紧固螺栓的紧固状态。检查阀门外部防腐层是否完好。
2. 在线维护（利用三片式结构）：若需检查或更换内部阀座、密封圈，可在系统泄压后，仅拆卸阀门中体两端的连接螺栓，将中体部分移开，即可在不完全拆除阀门的情况下进行维护，大幅节省检修时间。
3. 密封性能维护：若出现轻微内漏，可尝试多次开关冲刷密封面。若无效，则需按上述方法拆检中腔，检查硬质合金密封面是否磨损或有损伤，轻微划痕可由专业人员研磨修复，严重损坏需更换密封组件。
4. 阀杆填料调整：若阀杆处出现外漏，可均匀拧紧填料压盖螺母。若调整无效，则需在泄压后更换高温高压填料。
5. 长期停用与存放：阀门长期停用应置于全开或全关位置，排空腔内介质。存放于干燥处，对加工表面采取防锈措施。重新启用前，应对操作机构进行测试并检查密封性能。

Installation, Use, and Maintenance Manual for Q41Y 3PCS Forged Steel Ball Valve

Installation Guide

1. Preparation before installation: Check whether the valve model, pressure rating, material, and connection standards are consistent with the pipeline design. Thoroughly clean the valve cavity and pipeline ports, and remove all foreign objects. Check the material and specifications of bolts and nuts to ensure they meet the requirements for high-voltage connections.
2. Lifting and handling: Use lifting rings on the valve body or lift through the middle of the valve body to avoid collision with the flange sealing surface and valve stem. Due to the forged and sturdy structure of the valve body, it still needs to be handled with care during transportation.
3. Alignment and Connection: Place the valve between the pipeline flanges to ensure that the flanges on both ends of the pipeline are well aligned. Insert appropriate gaskets and tighten the connecting bolts evenly in diagonal order multiple times. The final torque should reach the standard specified value to ensure uniform compression of the flange surface and avoid additional stress on the valve body.
4. Welding end connection (if applicable): If it is a butt welding connection, groove preparation and welding should be carried out according to the welding process specification. During welding, measures should be taken to prevent overheating and damage to the sealing components inside the valve (such as watering and cooling the valve body). It is recommended that the valve be in a semi open state.
5. Operating space: Ensure that the valve handwheel or actuator has sufficient operating and maintenance space. For large-diameter high-pressure valves, appropriate support should be designed for the pipeline system.

Usage and Operation

1. Opening and closing operation: Smooth operation through handwheel, gearbox or actuator. The initial operating torque of hard sealed valves may be slightly higher, which is a normal phenomenon. When operating, it is necessary to rotate to the correct position (usually with mechanical limits), but it is prohibited to use an extended lever to forcefully exceed the torque.
2. Status confirmation: Clearly determine the switch status through the handwheel position or actuator indicator. When fully open, the flow channel is unobstructed, and when fully closed, a hard seal cutoff is achieved.
3. Working condition adaptation: This valve is designed for harsh working conditions such as high temperature, high pressure, and frequent operation, suitable for opening and closing cut-off, and should not be used for throttling adjustment to avoid damaging the hard sealing surface.
4. Operation monitoring: During initial operation or changes in working conditions, pay attention to checking for any abnormal leaks or vibrations on the outside and connections of the valve.

maintenance

1. Regular inspection: Regularly check for leaks at the flange connection, the condition of the valve stem packing box, and the tightening status of all fastening bolts. Check if the external anti-corrosion coating of the valve is intact.
2. Online maintenance (using a three piece structure): If it is necessary to inspect or replace the internal valve seat and sealing ring, after the system is depressurized, only the connecting bolts at both ends of the valve body can be removed, and the body part can be moved away for maintenance without completely removing the valve, greatly saving maintenance time.
3. Sealing performance maintenance: If there is a slight internal leakage, try opening and closing

multiple times to flush the sealing surface. If it is ineffective, the middle chamber needs to be disassembled and inspected according to the above method to check whether the hard alloy sealing surface is worn or damaged. Minor scratches can be repaired by professional grinding, and severe damage requires replacement of the sealing component.

4. Valve stem packing adjustment: If there is leakage at the valve stem, the packing gland nut can be tightened evenly. If the adjustment is ineffective, the high-temperature and high-pressure packing needs to be replaced after pressure relief.

5. Long term disuse and storage: Valves that are not in use for a long time should be placed in the fully open or fully closed position to discharge the medium inside the cavity. Store in a dry place and take rust prevention measures on the processed surface. Before reactivation, the operating mechanism should be tested and the sealing performance checked.

非常感谢您的阅读！

Thank you very much for reading!

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