

Q61Y 锻钢三段式球阀

Q61Y 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.

Q61Y 锻钢三段式球阀

型号: Q61N	规格: DN10-DN100
公称压力: 16Mpa, 32Mpa	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: 对焊	驱动方式: 气动、电动、手动
其他参数: 制造标准按 GB/T12237	

Q61Y Forged Steel Three-Piece Ball Valve

Model: Q61N	Specifications: DN10-DN100
Nominal Pressure: 16Mpa, 32Mpa	Applicable Media: water, gas, oil
Applicable Temperature: $\leq 350^{\circ}\text{C}$	Body Material: forged steel, forged stainless steel
End Connection : butt welded	Operation: Manual, pneumatic, electric
Other Parameters: Manufacturing standard according to GB/T12237.	

Q61Y 锻钢三段式球阀概述

Q61Y 锻钢三段式球阀是一种采用锻钢阀体、三段式螺栓连接结构的高性能硬密封球阀。阀体由 A105 等高强度锻钢分段锻造，通过合金钢螺栓连接构成，球体与阀座密封面采用堆焊硬质合金的金属硬密封。阀门通过旋转阀杆带动固定球实现 90 度可靠启闭，专为高压、高温及含颗粒、腐蚀性介质的苛刻工况设计。该阀门结合了锻钢材质的高承压性、三段式结构的易维护性与硬密封的耐用性，广泛应用于石油化工、天然气、电站及关键工业装置的高压小口径管路中。

Q61Y Forged Steel Three-Piece Ball Valve Overview

The Q61Y Forged Steel Three-Piece Ball Valve is a high-performance hard-seal ball valve featuring a forged steel body and a three-piece bolted construction. The valve body is forged from high-strength materials such as A105 steel in three sections, which are securely assembled using alloy steel bolts. The sealing surfaces of the ball and seats employ hard-metal overlay welding, forming a durable metal-to-metal seal. The valve achieves reliable 90-degree opening and closing through the rotation of the stem, which drives a fixed ball design. This valve is specifically engineered for demanding applications involving high pressure, high temperatures, and abrasive or corrosive media. It combines the high pressure-bearing capability of forged steel, the easy maintenance enabled by the three-piece structure, and the durability of hard-sealed surfaces. It is widely used in critical high-pressure, small-bore pipelines across industries such as petrochemicals, natural gas, power generation, and other vital industrial facilities.



Q61Y 锻钢三段式球阀产品图
Q61Y Forged Steel Three-Piece Ball Valve

Q61Y 锻钢三段式球阀特点

1. 锻钢三段式高压结构：阀体采用分段锻造成型，材质均匀强度高，三段式螺栓连接设计可在无需拆卸管道的情况下对中段阀体进行内部检修和密封件更换。
2. 金属硬密封耐苛刻工况：球体与阀座采用硬质合金密封面，耐高温、耐磨损、耐冲蚀，适用于蒸汽、含颗粒介质及频繁操作的严苛条件。
3. 防火安全与可靠密封：符合 API 607 等防火标准，软性辅助密封失效后仍能通过金属密封副保持基本密封。通常具备可靠的双向密封能力。
4. 操作稳定维护成本低：固定球结构操作扭矩低且平稳。三段式模块化设计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. 长寿命高可靠性：锻钢材质抗腐蚀性强，硬密封面磨损率低，设计寿命长。适用于高压高温的关键流程，提供高可靠性的截断保障。

Q61Y Forged Steel Three-Piece Ball Valve Features

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

The valve body is manufactured through segmented forging, ensuring uniform material properties and high strength. Its three-piece bolted design allows internal maintenance and seal replacement of the center section without disassembling the pipeline.

2. Metal Hard Seal for Demanding Service Conditions:

The ball and seats feature hard alloy sealing surfaces, providing high temperature resistance, wear resistance, and erosion resistance. This makes the valve suitable for steam, particulate-laden media, and

frequently operated harsh environments.

3. Fire Safety and Reliable Sealing:

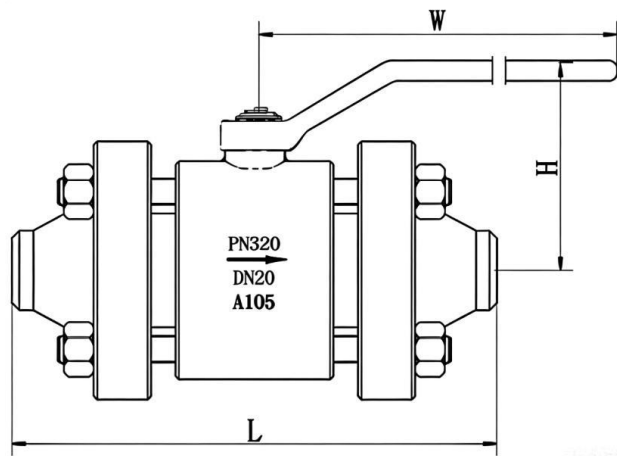
Compliant with fire safety standards such as API 607, the valve maintains basic sealing through its metal sealing pair even if the soft secondary seals fail. It typically offers reliable bidirectional sealing capability.

4. Stable Operation and Low Maintenance Costs:

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

5. Long Service Life and High Reliability:

The forged steel material offers strong corrosion resistance, while the hard sealing surfaces exhibit low wear rates, ensuring an extended design life. Ideal for critical high-pressure and high-temperature processes, the valve provides highly reliable shutoff performance.



Q61Y 锻钢三段式球阀结构图

Q61Y 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	碳钢 carbon steel
2	球体 ball	不锈钢 stainless steel
3	密封垫 seal gasket	PTFE
4	填料 packing	PTFE
5	阀杆 stem	1CR13

性能规范表 Performance Specification

公称压力 Nominal Pressure	16/32	Mpa
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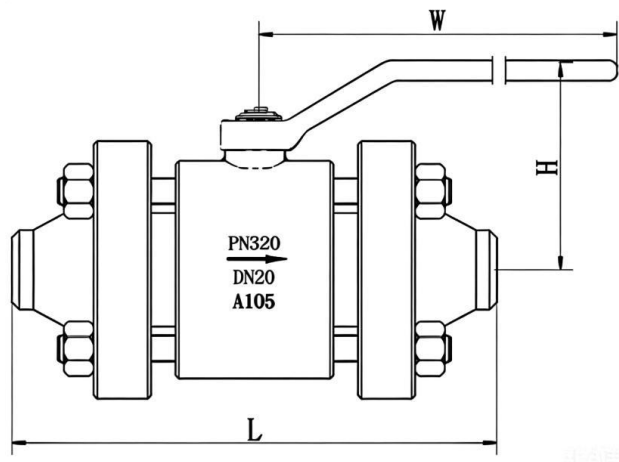
强度试验压力 Shell Test	24/48	
密封试验压力 Seal Test	17.6/35.2	
适用温度 Suitable Temp.	350	℃

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.



Q61Y 锻钢三段式球阀外形图

Q61Y Forged Steel Three-Piece Ball Valve View Drawing

Q61Y 锻钢三段式球阀外形尺寸表

Q61Y Forged Steel Three-Piece Ball Valve Dimensions Table

DN	10	15	20	25	32	40	50	65	80	100
A(法兰)	210	230	240	260	300	400	400	490	580	620
L(对焊)	150	170	190	205	230	260	330	360	380	430

Q61Y 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、连接方式（如对焊）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端口，确保无任何杂质。检查三段式阀体连接螺栓的紧固状态。
2. 对焊连接操作：焊接必须由合格焊工按评定合格的焊接工艺规程执行。焊接时阀门应处于全开位置，并必须对阀体（尤其是中段）采取持续有效的强制冷却措施，防止焊接高温影响硬质合金密封面的性能。

3. 三段式结构注意事项：安装焊接过程中，严禁拆卸阀门的三段式连接螺栓。需确保阀门在组对和焊接时不受扭曲应力，防止内部密封组件错位。
4. 焊后处理：焊接完成后，应根据材料规范要求焊后热处理以消除应力。必须对焊缝进行外观检查及规定的无损检测（如 RT 或 UT）。
5. 系统压力测试：阀门焊接安装后参与管道系统的强度试验和严密性试验。试验压力需符合高压设计规范（如 ASME B16.34），试验后检查焊缝及阀体各连接处有无泄漏。

使用操作

1. 启闭操作：通过执行器或加长操作杆进行平稳的 90 度旋转操作。硬密封阀门初期操作扭矩可能略大，属正常磨合现象。操作应到位，达到机械限位后即停止。
2. 状态确认：通过执行器反馈信号或阀杆顶部指示器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、高温及苛刻介质的全开或全关闭断，不应用于流量调节。长期处于静态时，建议定期进行全行程开关操作。
4. 注意事项：带压操作时，若操作扭矩异常持续增大，应立即停止。应检查系统压力是否超标、阀门内部是否出现卡滞或是否有杂质影响硬密封面。

维护保养

1. 定期检查：定期检查对焊缝区域有无裂纹或腐蚀，检查阀体表面有无异常。检查三段式阀体连接螺栓及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）：若需检查或更换阀座、密封件，可在系统完全泄压并冷却后，仅拆卸中段阀体两端的连接螺栓，将中段阀体移开进行内部维护，无需切割管道。
3. 硬密封面检查与修复：维护时应重点检查球体与阀座的硬质合金密封面，查看是否有磨损、冲蚀或划伤。轻微损伤可由专业人员在现场或车间研磨修复，严重损坏需更换整个密封副组件。
4. 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高压工况的专用填料。
5. 长期停用：阀门长期存放应处于全开或全关位置。对于苛刻介质工况，应进行彻底清洗和吹扫。对阀杆等外露金属表面采取防锈保护。重新启用前需进行全面的压力测试和功能检查。

Q61Y Forged Steel Three-Piece Ball Valve Installation, Operation & Maintenance Instructions

Installation Guide

1. Pre-Installation Preparation: Verify that the valve model, pressure rating, connection type (e.g., butt-weld), and forged steel material grade (e.g., A105) comply with the high-pressure piping design requirements. Thoroughly clean the valve's inner cavity and pipe ends to ensure they are completely free of contaminants. Check the tightness of the bolts connecting the three-piece valve body.
2. Butt-Weld Connection Procedure: Welding must be performed by a qualified welder strictly following

a qualified Welding Procedure Specification (WPS). The valve must be in the fully OPEN position during welding. Continuous and effective forced cooling of the valve body, particularly the center section, is mandatory to prevent welding heat from affecting the performance of the hard-faced sealing surfaces.

3. Precautions for Three-Piece Structure: It is strictly forbidden to disassemble the bolts connecting the three pieces of the valve during installation and welding. Ensure the valve is not subjected to torsional stress during alignment and welding to prevent misalignment of internal sealing components.
4. Post-Weld Treatment: Upon completion of welding, perform Post Weld Heat Treatment (PWHT) for stress relief as required by the applicable material specification. Conduct visual inspection and specified Non-Destructive Examination (NDE), such as Radiographic Testing (RT) or Ultrasonic Testing (UT), on all welds.
5. System Pressure Testing: After installation and welding, the valve shall participate in the piping system's strength (hydrostatic) and leak tests. Test pressures must comply with high-pressure design codes such as ASME B16.34. Following testing, inspect all welds and valve body joints for any leakage.

Operation

1. Opening/Closing Operation: Operate the valve via a smooth 90-degree rotation using an actuator or extended hand lever. For hard-seat valves, the initial operating torque may be slightly higher, which is normal during the break-in period. Rotate fully until the mechanical stop is reached and then cease operation.
2. Position Indication: Positively determine the valve status (open/closed) via actuator feedback signals or the position indicator at the top of the stem. Permanent status tags are recommended for high-pressure or critical pipelines.
3. Normal Service: This valve is designed for ON/OFF isolation service in high-pressure, high-temperature, and demanding media applications. It must NOT be used for flow regulation or throttling. For valves remaining static for extended periods, periodic full-stroke cycling is recommended.
4. Precautions: When operating under pressure, if a persistent abnormal increase in operating torque is detected, stop immediately. Investigate potential causes such as excessive system pressure, internal valve binding, or contamination affecting the hard sealing surfaces.

Maintenance

1. Periodic Inspection: Regularly inspect butt-weld areas for cracks or corrosion, and check the valve exterior for abnormalities. Verify that the three-piece body connecting bolts and external fasteners maintain their specified torque values.
2. In-Line Maintenance (Utilizing Three-Piece Design): To inspect or replace seats/seals, after the system is completely depressurized and cooled, only the bolts connecting the center body section need to be removed. The center section can then be separated for internal maintenance without cutting the pipeline.

3. **Hard Seal Inspection and Refurbishment:** During maintenance, closely inspect the hard-faced sealing surfaces of the ball and seats for wear, erosion, or scoring. Minor damage can be re-lapped or refinished by qualified personnel on-site or in a workshop. Severe damage requires replacement of the entire seal assembly.
4. **Stem Seal Maintenance:** If minor external leakage occurs at the stem packing, attempt to correct it by evenly and moderately tightening the gland nuts. If leakage persists or is severe, the system must be depressurized to replace the stem packing with a type suitable for high-temperature/high-pressure service.
5. **Long-Term Storage/Out-of-Service:** Valves stored for extended periods should be left in either the fully open or fully closed position. For valves used with harsh media, perform thorough cleaning and purging. Apply anti-corrosion protection to exposed metal surfaces such as the stem. Conduct comprehensive pressure testing and functional checks before returning the valve to service.

非常感谢您的阅读！

Thank you very much for reading!

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