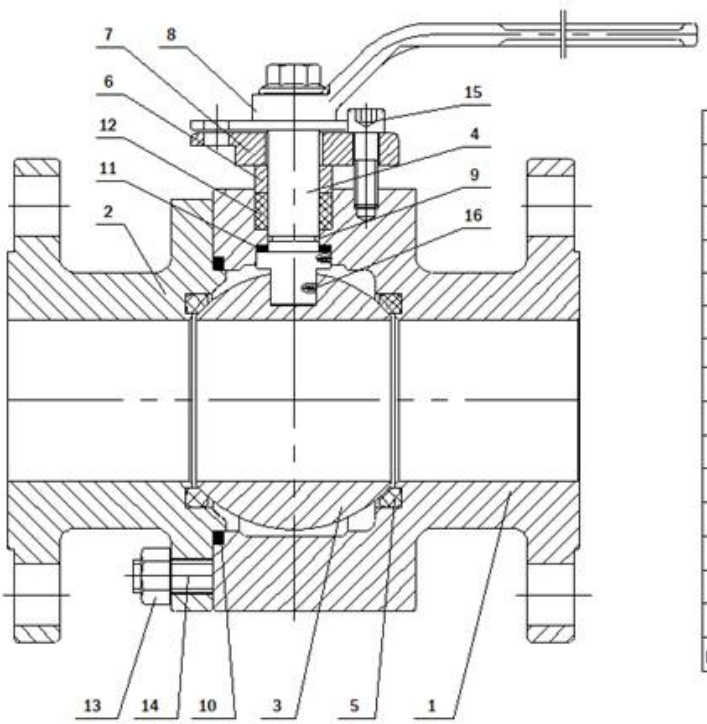
What is a forged Ball Valve?

A forged ball valve is a type of valve that is made from forged materials, typically steel. The valve has a spherical ball inside that rotates to control the flow of fluid through the valve. The forging process involves heating the metal to a high temperature and then shaping it using a hammer or press. This results in a stronger and more durable valve compared to valves made from cast materials. Forged ball valves are commonly used in high-pressure and high-temperature applications, such as in the oil and gas industry.



No.	Description
16	ANTISTATIC DEVICES
15	SCRW
14	STUD
13	NUT
12	PACKING
11	WASHER
10	GASKET
9	O-RING
8	LEVER
7	GLAND FLANGE
6	GLAND
5	SEAT
4	STEM
3	BALL
2	BONNET
1	BODY

Components of a forged ball valve

Hand lever/handwheel

The handwheel or hand lever on a forged ball valve is where the valve operator applies force to turn the valve to either close or open fluid flow.

Stem

The stem of a forged ball valve connects the ball and the handwheel. It ensures that force is transmitted from the hand lever to the ball when the operator needs to operate the valve.

Ball

This is a ball-shaped component with a through hole. The ball opens fluid flow when the hole aligns itself with the pipe conveying the fluid and closes when it is aligned at an angle of 90o degrees to the same pipe. The work of the ball is to close or open the valve as necessary.

Seat

The seat is a component meant to seal the inside of the valve and uniformly distribute ball seating stress. It also prevents fluid leakage between the ball and the valve body when the valve is closed. Forged ball valve manufacturers make the seats from metallic or soft materials like rubber and plastic. The seat material choice depends on the application area and the fluid's expected temperatures. For hot liquids, metallic seats are used, while for temperatures below 65oC, soft materials are used.

Valve body

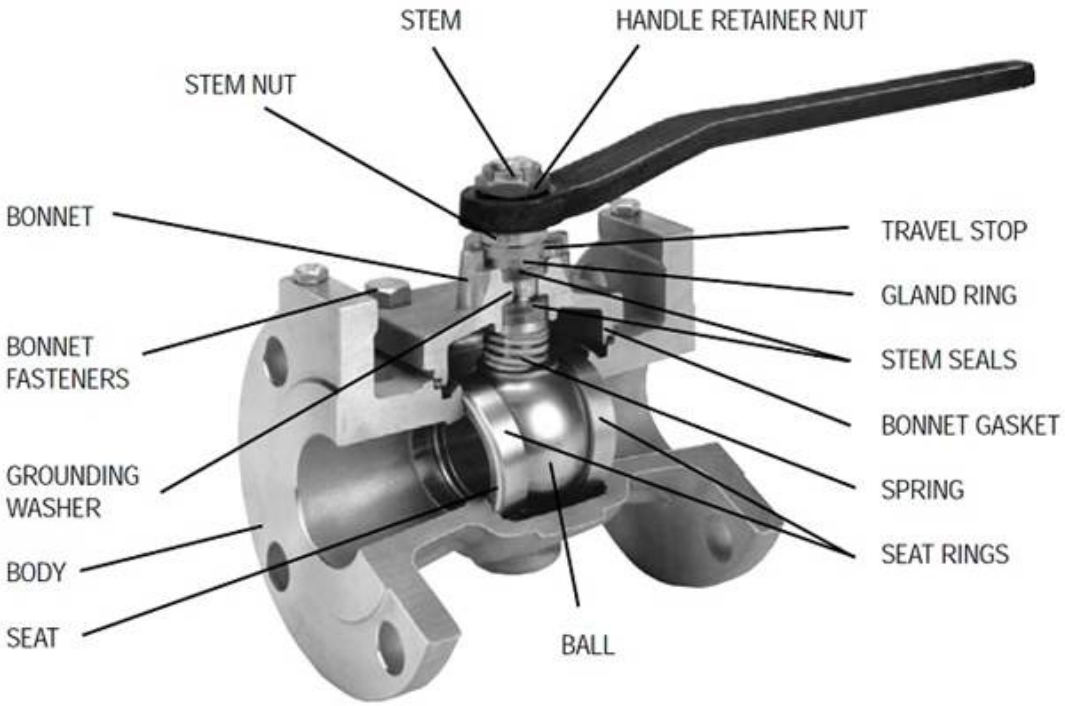
The valve body, also known as valve housing, covers all internal parts of the pump, such as the ball, seats, seals, and rings. The body provides the valve's inlet and exit ports for the fluid flow. It also helps to prevent contaminants and solids from entering the pump.

Bonnet

The bonnet is mounted on the valve body, and the two are connected using bolts and nuts. The work of the bonnet is to cover the valve stem and packing. It also enhances the safety of the stem and packing.

Packing

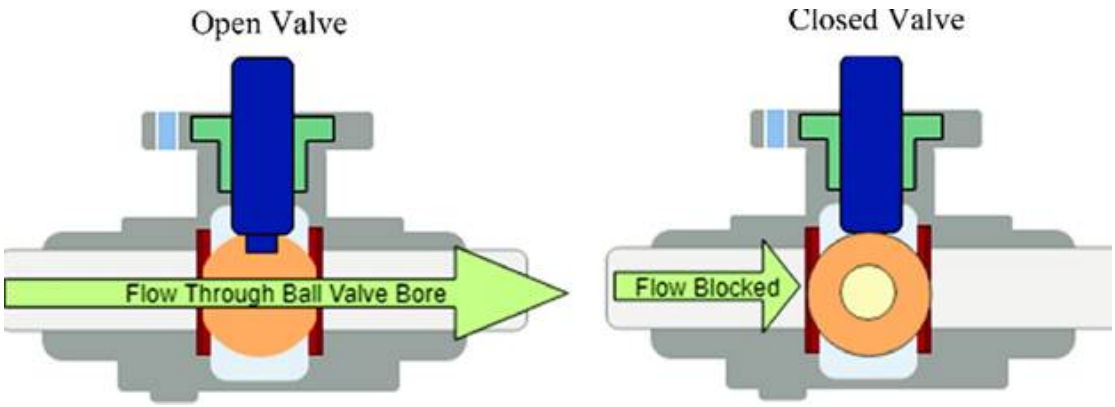
Packing is a seal that prevents fluid leakage around the stem. It also prevents the entrance of dirt and solids into the pump via the stem.



How does a forged ball valve work?

A forged ball valve closes or opens liquid flow depending on the alignment of the ball center hole to the valve entry port. The ball gets the power to open/close from the handwheel or hand lever through the stem. The valve opens when the handwheel is rotated in the clockwise direction until it makes an angle of 90o degrees. Turning the handwheel forces the stem to rotate. Since the stem and ball are connected, the ball also makes the same clockwise rotation. Due to the ball rotating for a quarter turn, it makes the hole at its center aligned to the valve entrance and the pipe connected to the valve. As such, the valve is left open, allowing liquid to flow through the valve.

The valve closes when the handwheel is rotated in the anticlockwise direction for another 90o degrees. As such, the ball's central hole becomes perpendicular to the pipe connected to the valve. This arrangement closes the fluid flow path rendering the valve closed. Due to the valve seat, the fluid finds it hard to leak or flow through the valve. The valve can also be used for throttling in which the hand lever is slightly turned. This allows some amount of fluid flow. However, using a forged ball valve for throttling flow under high-pressure conditions causes valve seats to wear rapidly.



Types of forged ball valves

Three-way forged ball valves

This valve type has three ports, unlike the most common one with two ports (inlet and exit ports). Forged ball valve manufacturers design this valve for mixing and diverting fluid flow in different industrial applications. This valve is advantageous because it does the work that two or more valves can do. The valve operates by turning the ball via the handwheel. The ball rotation aligns its center cut-out channels to the valve inlet and outlet ports. Two versions of the valve are the T version and the L version. The valve with L-shaped cut-out bore allows fluid flow at a 90o degrees from one port to another. The valve has two inlets and one outlet. For the L-shaped valve, fluid can flow from two different inlets to the exit at an angle of 90o degrees.

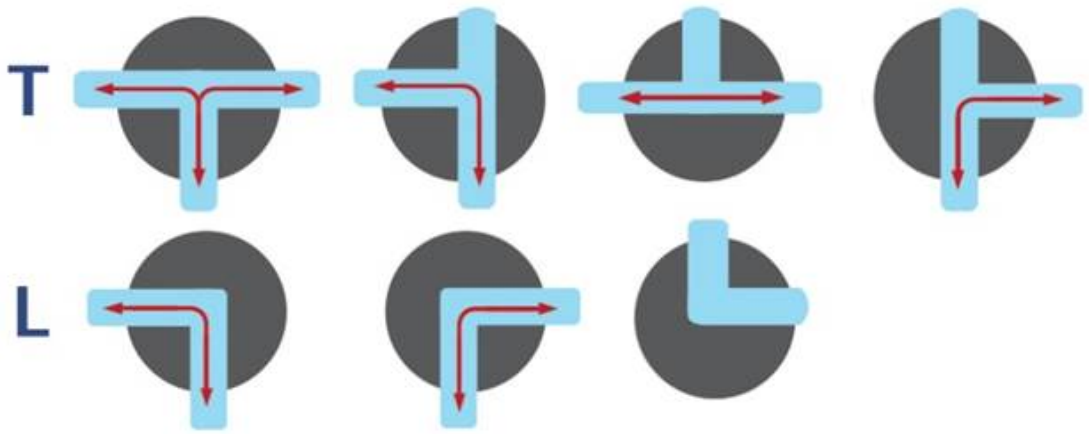


Figure: T and L forged ball valve.

The T-patterned valve is also known as a mixer-forged ball valve. It is also used to direct fluid flow from right, left, or straight through. Since the valve can combine two fluid streams into one exit stream, this valve is good in applications that need fluid mixing, such as chemical and

pharmaceuticals.



Figure: Three-way forged ball valve

Side entry forged ball valve.

A side entry forged ball valve is a valve in which the ball is assembled from its sides. The assembly connects two or three pieces of the valve body. Bolts or studs assemble each body part to join them into two pieces. The assembly is done after the forging each piece of the valve body. Side entry valve types have the advantage of reduced defects common when the valve is made through the casting method. The valve also has the advantage of being easy to assemble and the trim parts being easy to align. These valves are widespread in the market and industries due to their ease of assembly, repair, and cleaning.



Figure: Side entry forged ball valve.

Top entry forged ball valve.

Top entry forged ball valve is one in which the ball is assembled from the top side. This valve is similar to the globe valve but it uses a ball to control fluid flow. The valve is made up of one single body. Forged ball valve manufacturers recommend this valve for use where there is minimum disassembly for maintenance of internal parts. This valve is solid and suitable for heavy-duty applications involving high flow rates and pressure. The construction of this valve allows minimum thread connection, which reduces the possibility of fluid leakage.

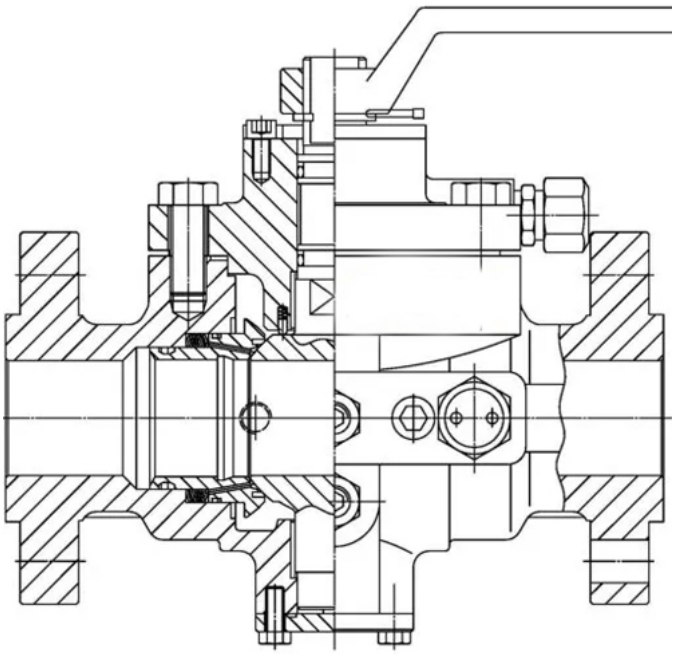


Figure: Forged top entry ball valve.

Single-body forged ball valve.

This is a forged ball valve in which the body is made up of one single piece. This type of valve is very reliable since it hardly has any fluid leakage common in other valves whose body is joined using bolts. The valve also has the advantage of being small in size and low cost. However, this valve cannot open its body for repair, maintenance, or cleaning. Once the valve becomes defective, it is no longer helpful. The single-body forged ball valve is best for small flow rate and pressure applications that involve clean fluid free.

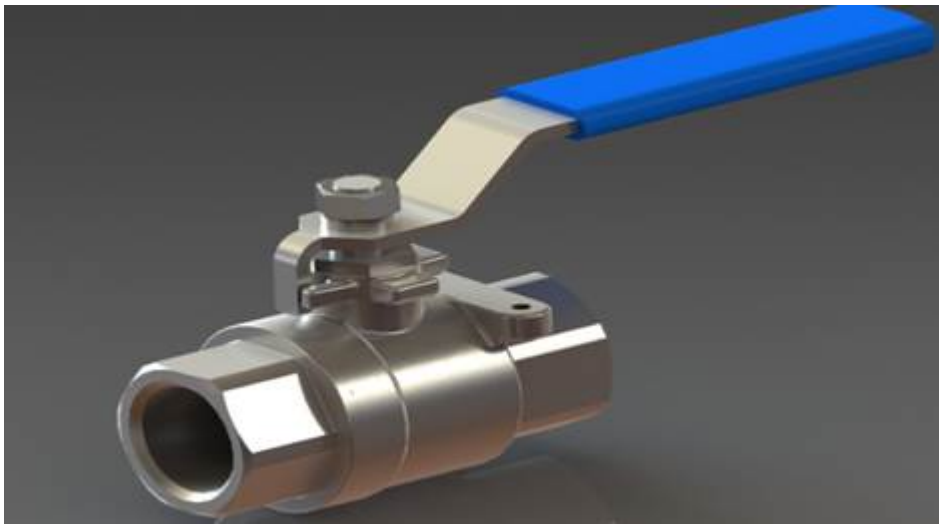


Figure: Single body forged ball valve.

Two-piece body forged ball valve.

This is the forged ball valve that has two pieces of the valve body. One of the pieces contains the end joint and the body, while the second piece is attached to the first piece to fix the valve trim in a proper position. One main advantage of using this valve is that it is easy to assemble and disassemble for repair, maintenance, and cleaning. However, it has to be removed entirely from the piping system for the two pieces to be separated. Comparing this valve to the single body type, it is far better since it can accommodate higher pressure and flow rate and it is repairable.

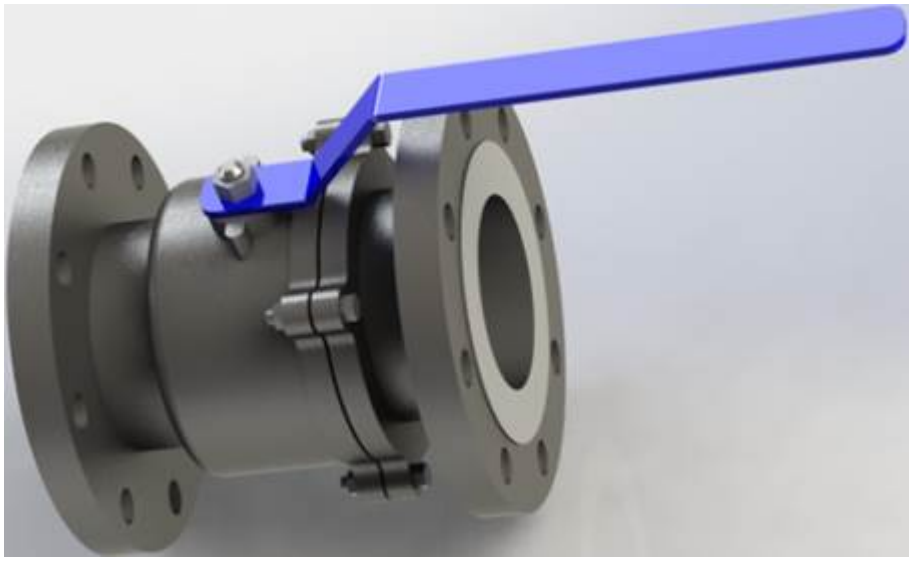


Figure: Two-piece forged ball valve.

Advantages

Strength: Forged steel valves are known for their strength and durability, making them suitable for use in high pressure and temperature environments. They are also resistant to fatigue and stress corrosion cracking.
Surface finish: The forging process used to make forged steel valves can result in a smoother surface finish compared to other types of valves. This smooth finish may be more resistant to corrosion over time.
Size: Forged steel valves can be made in a wide range of sizes, as the forging process allows for the creation of large, complex shapes.
Customization: Forged steel valves can be customized to meet specific requirements, as the forging process allows for the creation of complex shapes and intricate details.
Quality control: The quality of a forged steel valve is more consistent due to the precision of the forging process. This can result in a higher quality product with more consistent performance.
Overall, forged steel valves are a reliable and high-quality option for many industries due to their strength, surface finish, size, customization options, and quality control. They are generally more expensive than other types of valves due to the more complex manufacturing process.

Disadvantages

There are a few potential disadvantages to using forged steel valves:

Cost: Forged steel valves are generally more expensive than other types of valves due to the more complex manufacturing process.
Weight: Forged steel valves tend to be heavier than other types of valves, which may be a consideration in certain applications where weight is a concern.
Corrosion resistance: Forged steel valves may not be as corrosion-resistant as some other types of valves, such as cast steel valves, due to the rougher surface finish created by the forging process.
Lead time: The forging process used to make forged steel valves can be time-consuming, which may result in longer lead times for delivery.

Overall, while forged ball valves have many advantages, they may not be the best choice for every application due to their potential limitations in cost, weight, corrosion resistance, and lead time. It is important to carefully consider the specific requirements of the application when choosing a valve

Common Applications of Forged Steel Industrial Ball Valves

Forged steel industrial ball valves are used in a wide range of industries. Here are some common applications:

Oil and Gas

In the oil and gas industry, valves must be strong enough to handle high pressure and temperature. Forged steel valves are perfect for this. They control the flow of oil and gas safely, without leaks.

Chemical Processing

Chemicals can be very harsh on equipment. Forged steel resists corrosion, so it's often used in chemical plants. These valves can handle acids, bases, and other strong substances without breaking down.

Water Treatment

Forged steel valves are also found in water treatment facilities. These valves control water flow and are built to last in wet conditions.

Power Plants

In power plants, steam and high pressure are common. Forged steel industrial ball valves are used to control steam and water flow safely. They are durable enough to handle intense conditions.

Manufacturing and Heavy Industry

Forged steel valves are used in many manufacturing plants. They help control the flow of materials and keep systems running smoothly.

Troubleshooting forged ball valves

The fluid does not flow through the valve

- Foreign materials in the valve. Disassemble the valve according to the forged ball valve manufacturer's instructions and clean off solids blocking the valve.
- The valve is closed. Turn the valve for a quarter turn to open the fluid flow.
- Pipe blockage. Check the pipe and remove any materials that might be blocking fluid flow.

Leakage from through the seat

- The seat is damaged. Replace the valve seat.
- Foreign materials clogged the seat. Remove the foreign materials.
- Excess fluid pressure. Use the valve at the pressure recommended by the forged ball valve manufacturer.

Leakage through the body gasket

- The bolts connecting the pipe and the valve are loose. Tighten the bolts and nuts.
- The fluid flow is at high pressure. Ensure the valve is used at the pressure recommended by the forged ball valve manufacturer.
- The body gasket is damaged. Replace the gasket.

The valve is hard to operate

- Foreign materials stuck on the stem. Open the valve bonnet and clean off foreign materials.

- Defective seat. Replace the valve seat.

Reasons for Opting for a Forged Steel Ball Valve

There are several advantages to forged steel ball valves. They include:

- High strength: Forging makes the valve body robust, reducing the chances of cracking or failure under pressure.
- Long-Lasting Performance: These valves support high pressures and temperatures without failing rapidly.
- Leak-proof sealing: These valves are designed to close tightly. This minimizes the chances of any leaks.
- Compact structure: Forged ball valves are mostly smaller and lighter than cast ones.
- Resistance to corrosion: With proper coatings, these valves can resist rust and chemical damage.

Main Factors to Think About when Opting for a Forged Steel Ball Valve

Understand your application

Before you make the final decision to choose a forged ball valve, first, properly learn about your project's needs:

Firstly, identify and determine the type of liquid (water, gas, oil, or chemicals) that is flowing. Secondly, determine if the liquid is corrosive or hazardous. Thirdly, find out the operating temperature and pressure. Then, know whether the system is automated or manual. Next, determine how often the valve will be used.

Knowing this intricate information will help you select the right value, size, and attributes.

Choose the Correct Valve Size

It's pivotal to match the valve size with the dimensions of the pipeline. A bad match can lead to bad flow control or loss of pressure. Common sizes start from half an inch to 4 inches or more.

Tip: Always match the valve dimensions with the pipe diameter unless your system has unique flow control requirements.

Select the Correct Pressure Rating

Forged steel ball valves come in numerous pressure classes (Frequently labeled as Class 150, 300, 600, etc.). These figures indicate the maximum pressure the valve can withstand without posing any danger.

- For low-pressure systems, Class 150 or 300 might be adequate.
- For high-pressure systems, you may require Class 600 or more.

Always check the system pressure and select the valve that meets or goes beyond it.

Choose the Right End Connections

There are numerous types of connections for forged ball valves. For example:

- Threaded (Screwed): Easy to install and are good for smaller pipelines.
- Socket Weld: Offers a vigorous connection than threading; better for higher pressure.
- Butt Weld: Used for high-temperature or high-pressure systems.
- Flanged Ends: They are easy to maintain and are commonly used in larger pipelines.

Select the connection type based on your piping system and the ease of installation.

Choose the Correct Material

There is a chance that the valve body and internal components may be constructed from different materials. It depends on the liquid that will pass through the valve.

Common materials include:

- Carbon steel: Appropriate for oil, gas, and water. Not suitable for corrosive liquids.
- Stainless steel: Fantastic for corrosive environments such as chemical plants or underwater (marine) use.
- Alloy steel: Can withstand high temperatures and pressure.

Tip: If your liquid is corrosive, always opt for stainless steel or choose coated options.

Make a Decision B/W Full Port and Minimized Port

- Full-port ball valves: These valves contain a hole in the ball with dimensions equal to those of the pipeline. They enable maximum flow without any hurdle.

- Minimized port ball valves: These valves have a mini-bore as compared to a pipeline. This disrupts the flow slightly. Nonetheless, it is more compact and available.

Select a complete port if flow efficiency is pivotal. Use a minimized port for general shut-off goals. This is the place where complete show liquid is not needed.

Manual or Activation Functioning?

- Manual ball valves: They are simple. This is how they work: In manual ball valves, we hold a lever or handle, raise or lower it to open and close them.
- Activated ball valves: They are operated using electric, pneumatic, or hydraulic actuators. They are perfect for automation, remote control, or frequent functioning.

If your system requires automatic functioning or remote access, choose an actuated valve.

Look for Fire-Safe and Anti-Static Attributes

In industries such as oil and gas, safety is pivotal.

- Fire-safe valves: These valves block liquid leaks in the event of a fire.
- Anti-static devices: These prevent sparks from occurring due to the contact of metal components and liquids, such as oil and gas.

If your project has flammable substances, ensure you select valves with these safety attributes.

Upkeep and Spare Parts Availability

Select a valve that is easy to use. See if the manufacturer offers:

- Spare parts (such as seats, seals, or handles)
- Technical support
- Upkeep instructions

A valve that requires less effort to repair or service saves both time and money.

Cost vs. Quality

Price is indeed pivotal. However, never prioritize money over quality. A low-priced valve may fail early, causing leaks or even serious accidents.

Always buy a valve that provides long-term longevity, even if it's expensive.

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