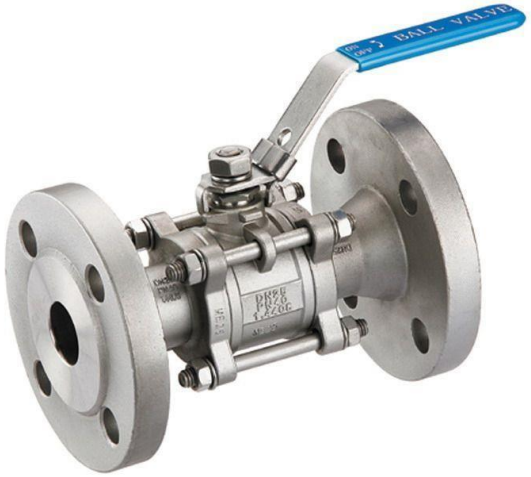
VALVES


BALL VALVE

Introduction

Valves

In industrial piping there is continuous flow of fluids and a check is regulate the flow. The device use to reduce the flow is called valve.

Definition

Mechanical device that is used in industrial piping for control of flow and pressure.

Function

1. Regulation of flow
2. Isolation of equipment
3. Change the direction of Flow (Its not a primary function)

Introduction

Types Of Valves

There are various types of valves depending upon construction and function their names are given below.

1. Gate valve
2. Butterfly valve
3. Globe valve
4. Diaphragm valve
5. Ball valve
6. Check / None-Return valve
7. Plug valve
8. Safety / Relief valve
9. Auto control valve

Introduction

Parts Of Valves

A valve consists of different parts. Some of the more important and common ones are listed below.

1. Body
2. Gland
3. Bonnet
4. Hand – Wheel
5. Stem
6. Disc / Diaphragm
7. Seat

Gate Valve

Gate Valve

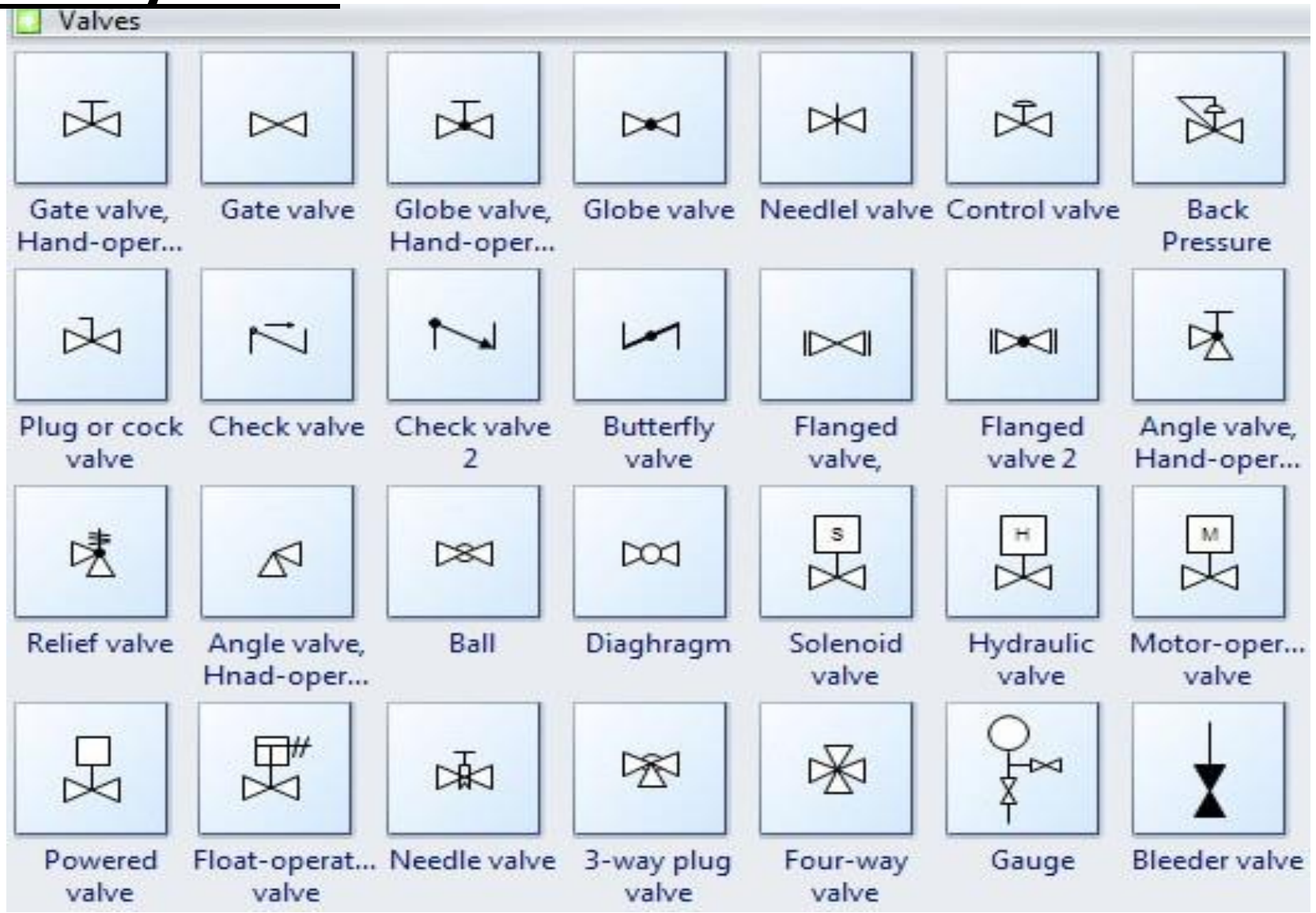
Gate Valves

Gate valve features a disc or wedge sliding in a track or seat which can be lifted in a direction at right angles to the valve until clear of the flow path.

Basically gate valves are of single design. Fluid flows straight through them. A gate valve stops flow by placing a metal gate or disc across the opening and when it is fully opened, the gate is raised completely out of the passage.

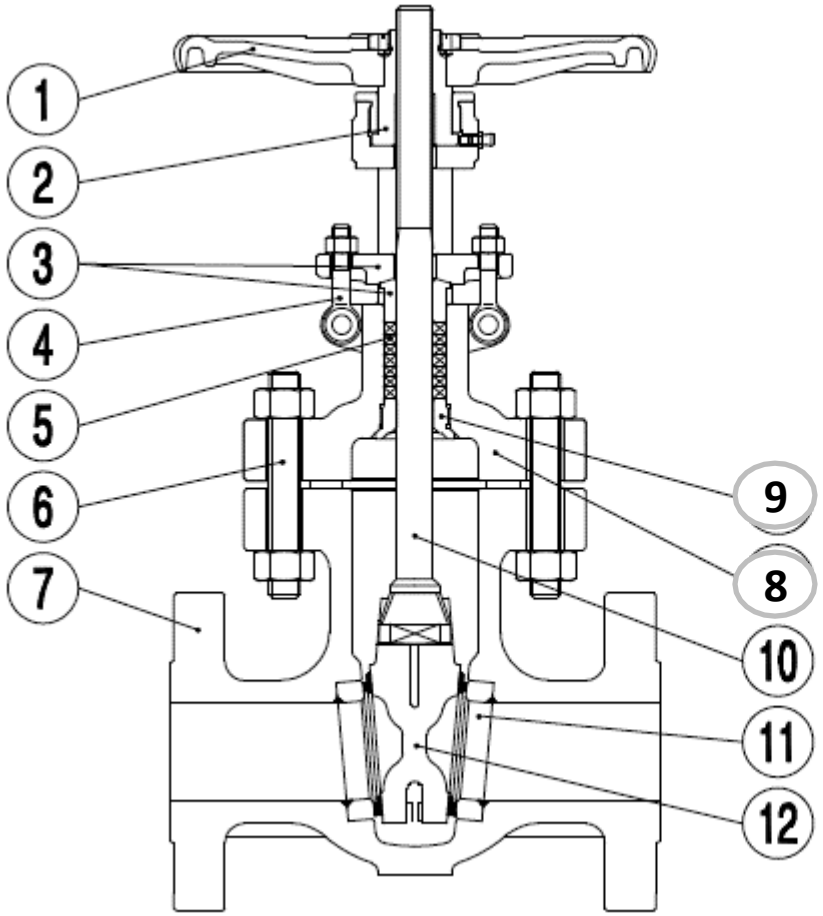
Gate Valves

P & ID Symbols



Gate Valves

Parts of Gate Valve



IT.	DESCRIPTION
1	HANDWHEEL
2	YOKE SLEEVE
3	GLAND FLANGE
4	GLAND EYE BOLT
5	PACKING
6	BONNET BOLT
7	BODY
8	BONNET
9	BACK SEAT
10	STEM
11	SEAT RING
12	WEDGE

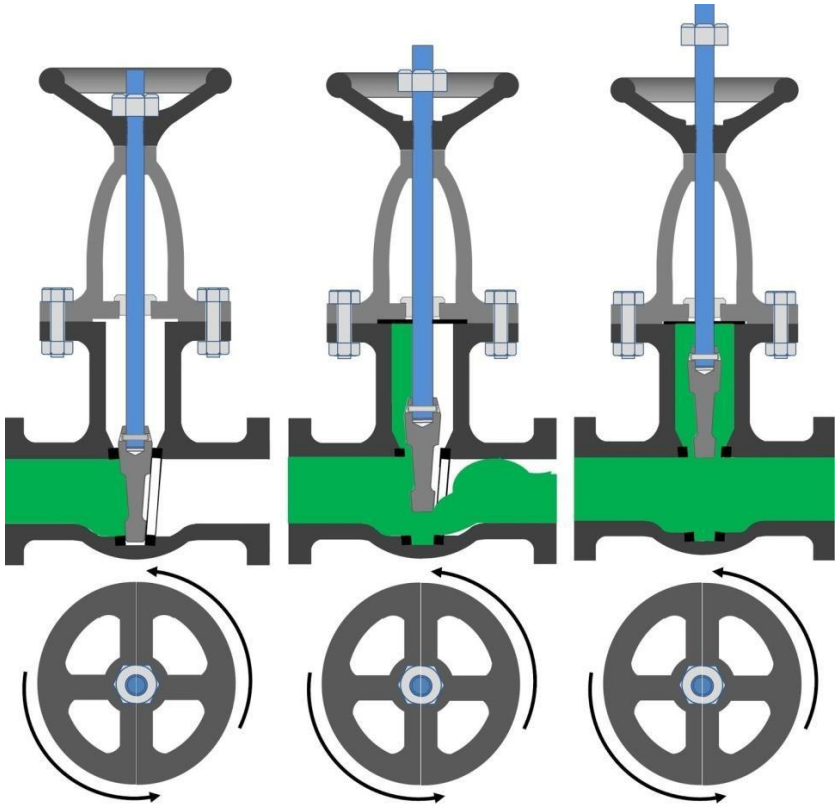
Gate Valves

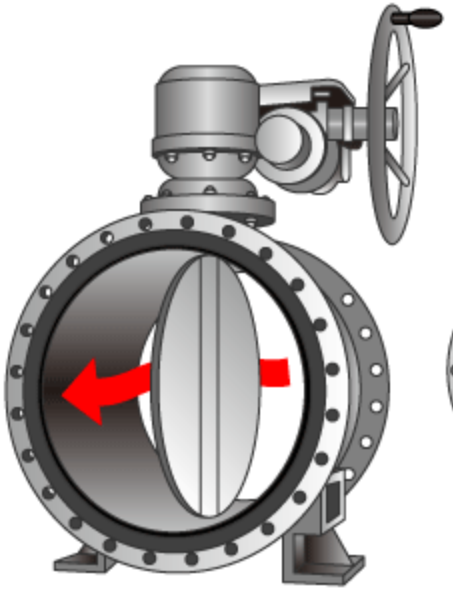
Parts of Gate Valve

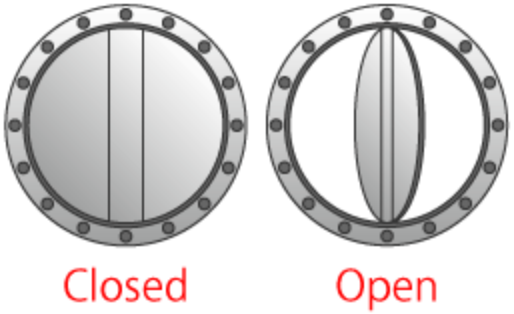
Item	Component
1	Body
2	Bonnet Seal
3	Seat
4	Gate
5	Down Stop Ring
6	Stem
7	Bonnet
8	Body Stud
9	Body Nut
10	Stem Seal Assy.
11	Retainer
12	Secondary Seal
13	Stem Screw
14	Key
15	Bearing
16	Lube Fitting
17	Screw Housing
18	Bonnet Stud
19	Bonnet Nut
20	Stem Screw Seal
21	Handle Assy.
22	Tube
23	Stem Protector

Gate Valves

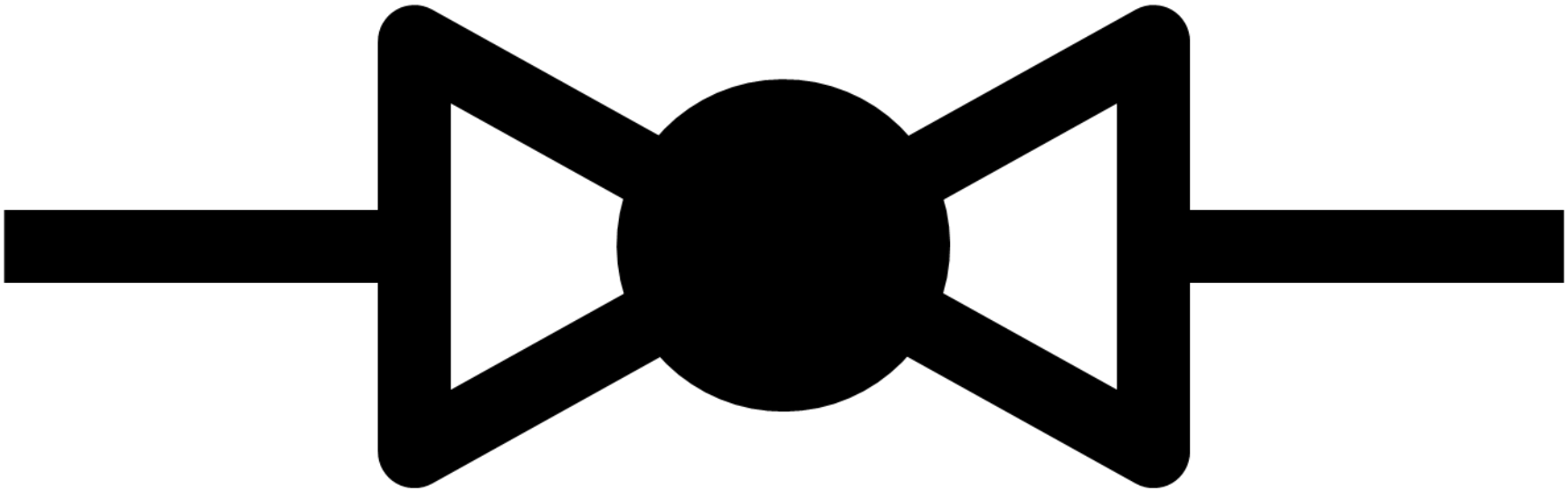
Gate Valve Working







Globe Valves



Globe Valves

Globe Valves

Globe valve differs in body design to a gate valve. It has indirect passage, so maximum pressure drop occurs in it. This type of valve is much suitable for regulating the flow of fluid and for tight shut off. Globe valve has seat fitted in the body and a disc connected to the stem.

Globe Valves

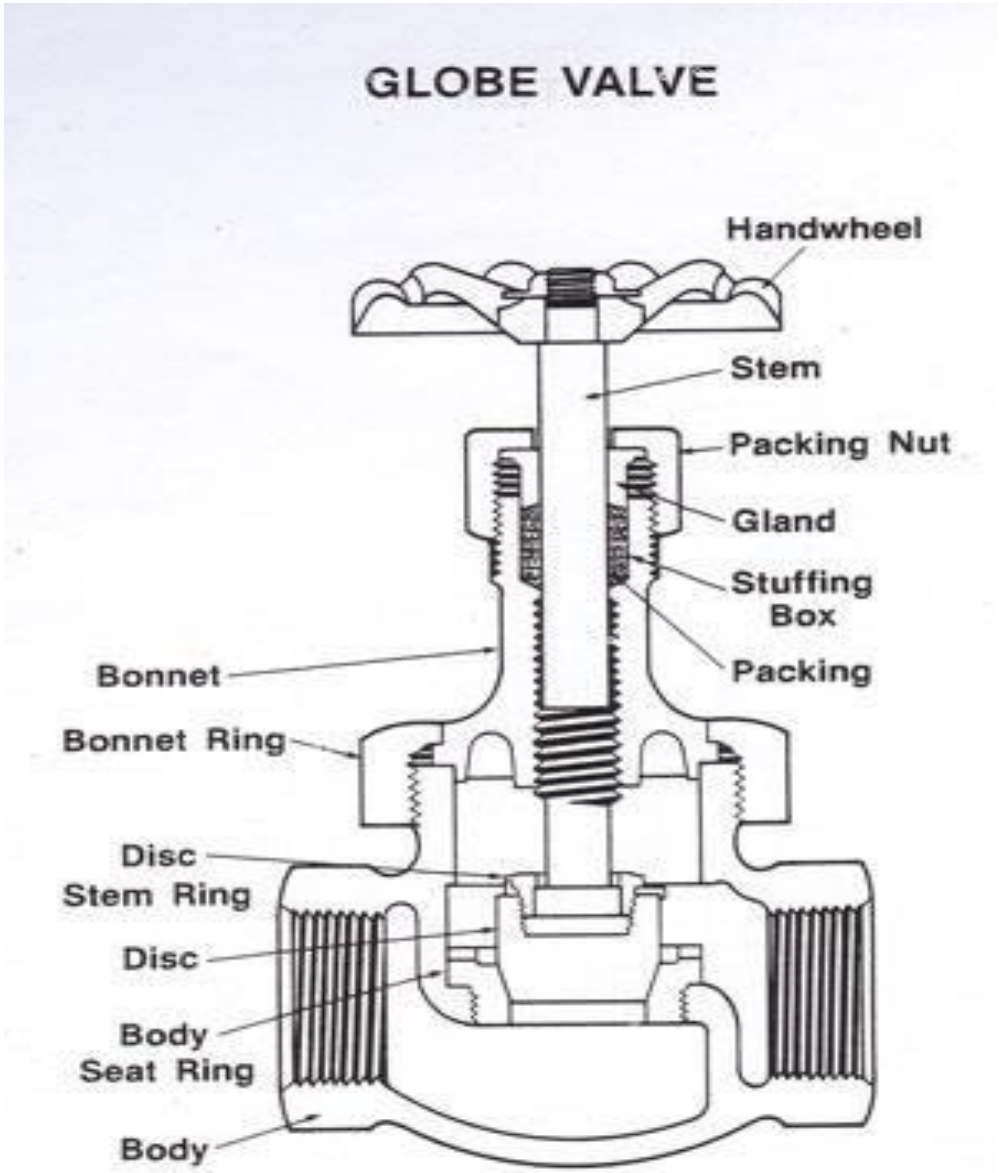
Types

Globe valves are produced with a variety of disc or plug and seat, such as:

1. Ordinary disc globe valve
2. Plug type disc globe valve
3. Needle point disc globe valve
4. y-type globe valve
5. Angle type globe valve
6. Composition disc globe valve

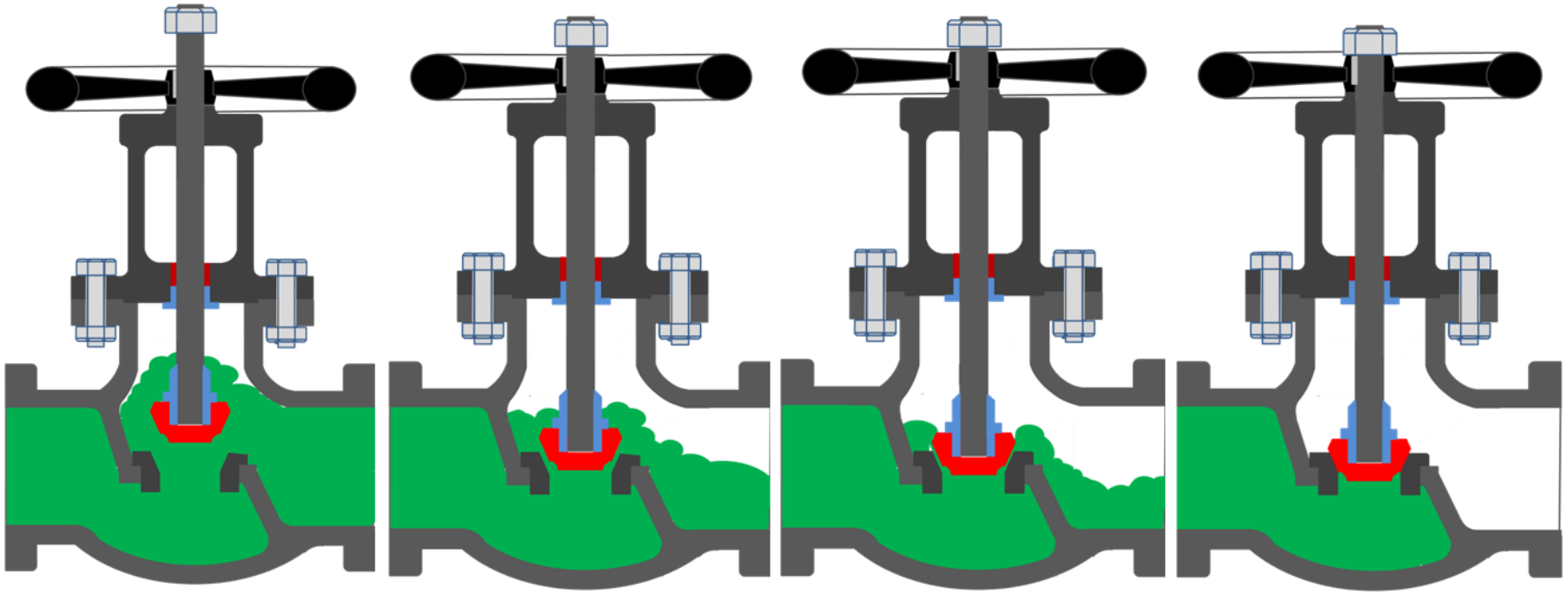
Globe Valves

Parts Of Globe Valves



Globe Valves

Globe Valves Working



1.Fully Open

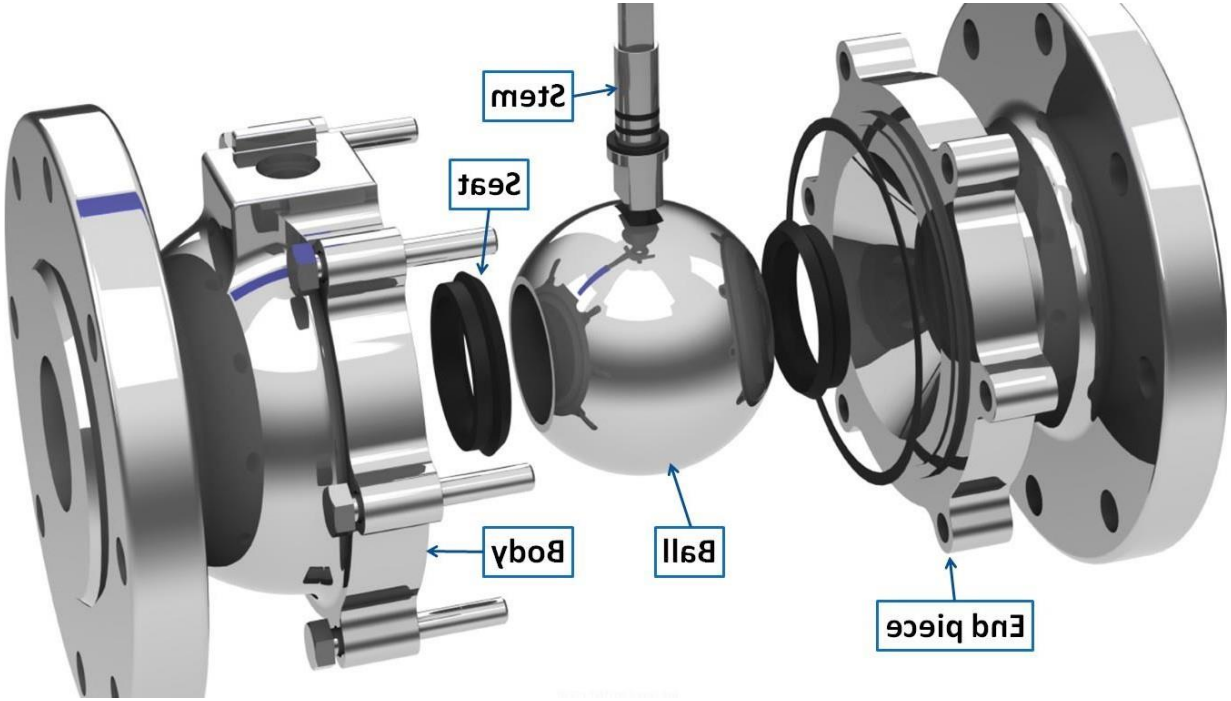
2.Throttling

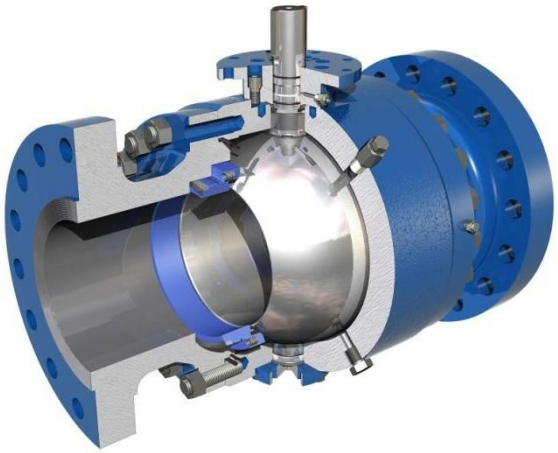
3.Throttling

3.Fully Closed

Ball valve

Ball valve





Ball Valves

The ball valve features a spherical shaped plug with a bored passage through it.

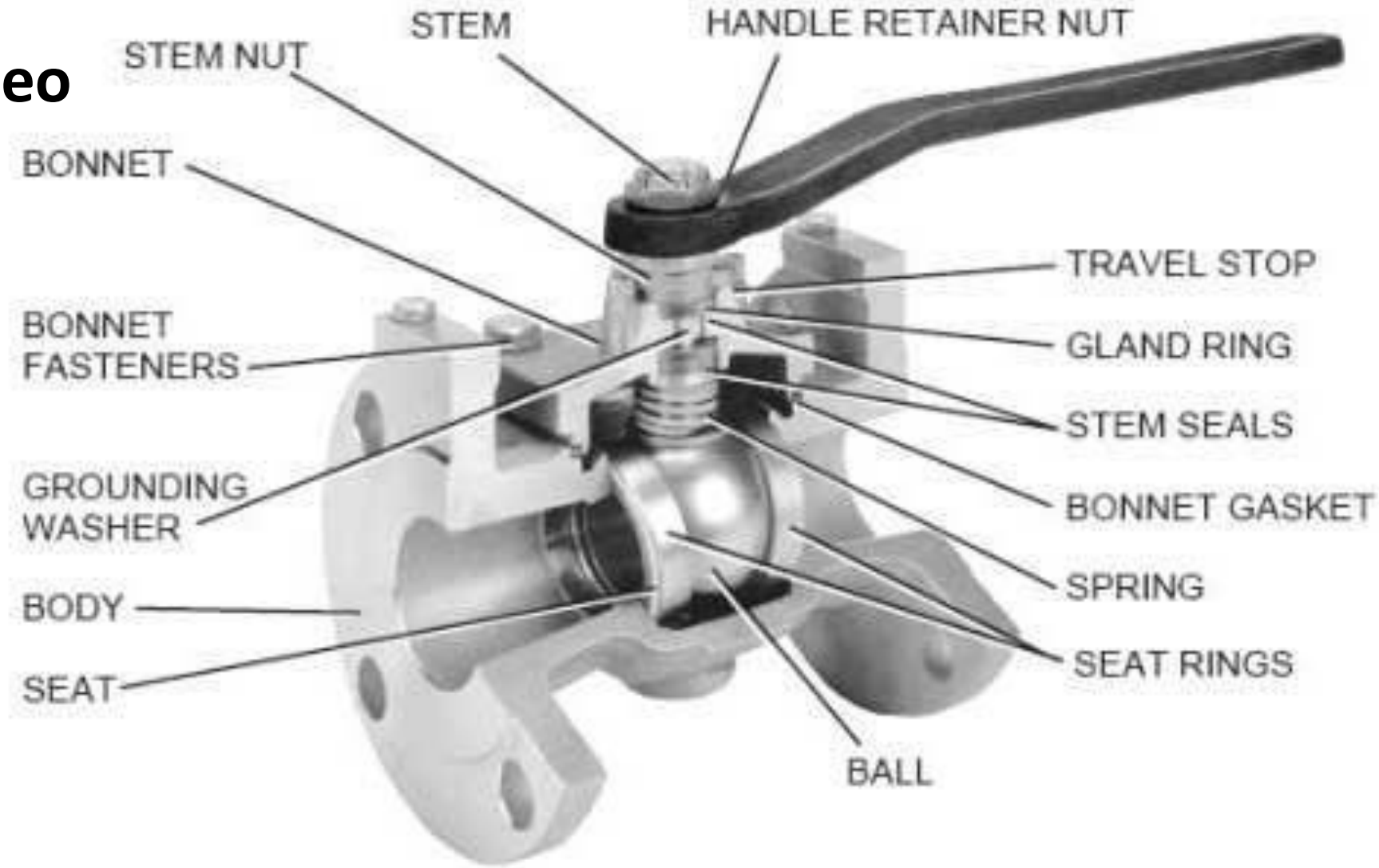
Valve can be operated by means of a lever so that bored passage in the ball lines up with the seat opening at right angle to the seat opening.

Ball valves have the advantages of quick open-shut-off action, little tendency to stick, minimum resistance to flow, easy maintenance and the lever serves as an open-shut indicator.

Ball Valves

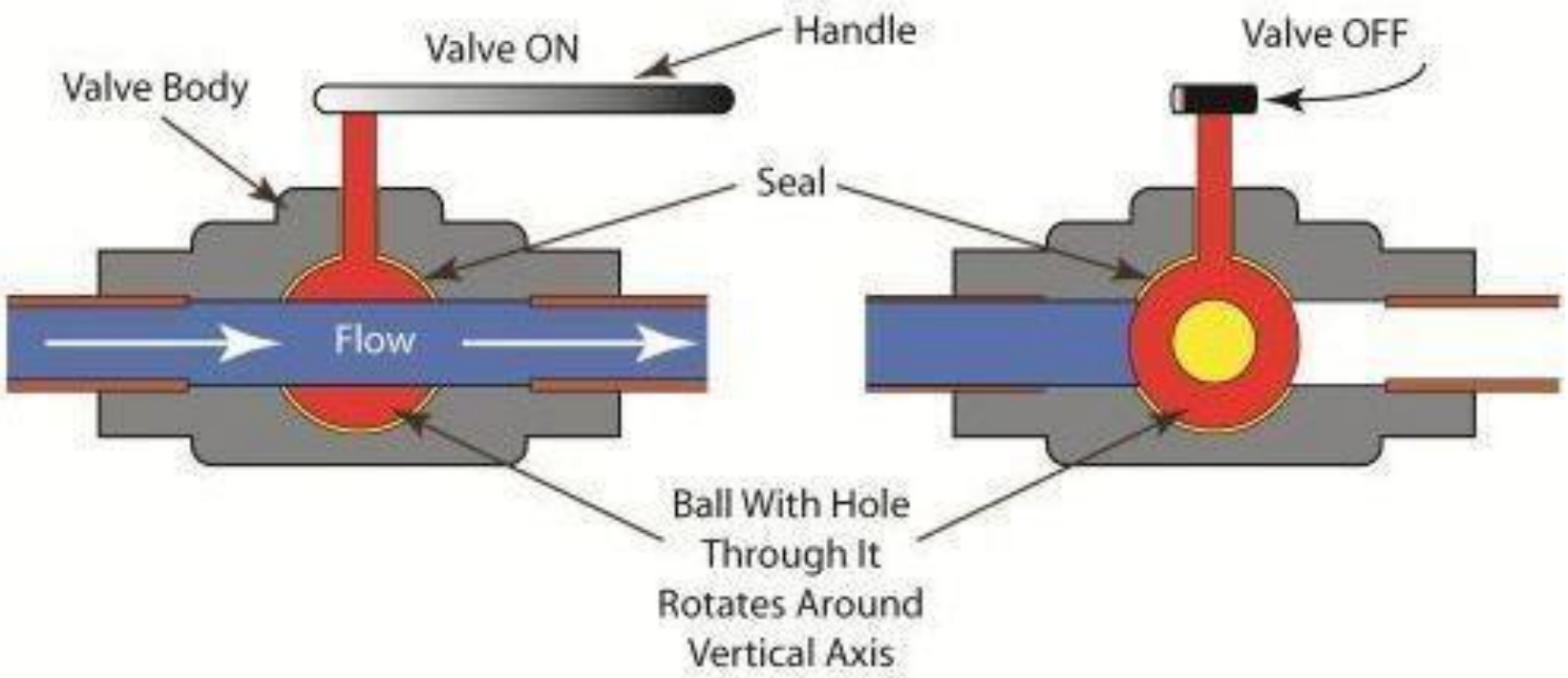
Parts Of Ball valve

eo

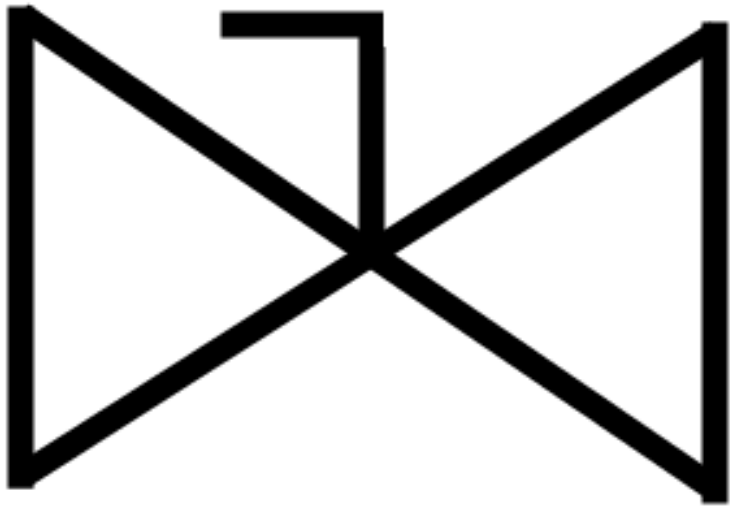


Ball Valves

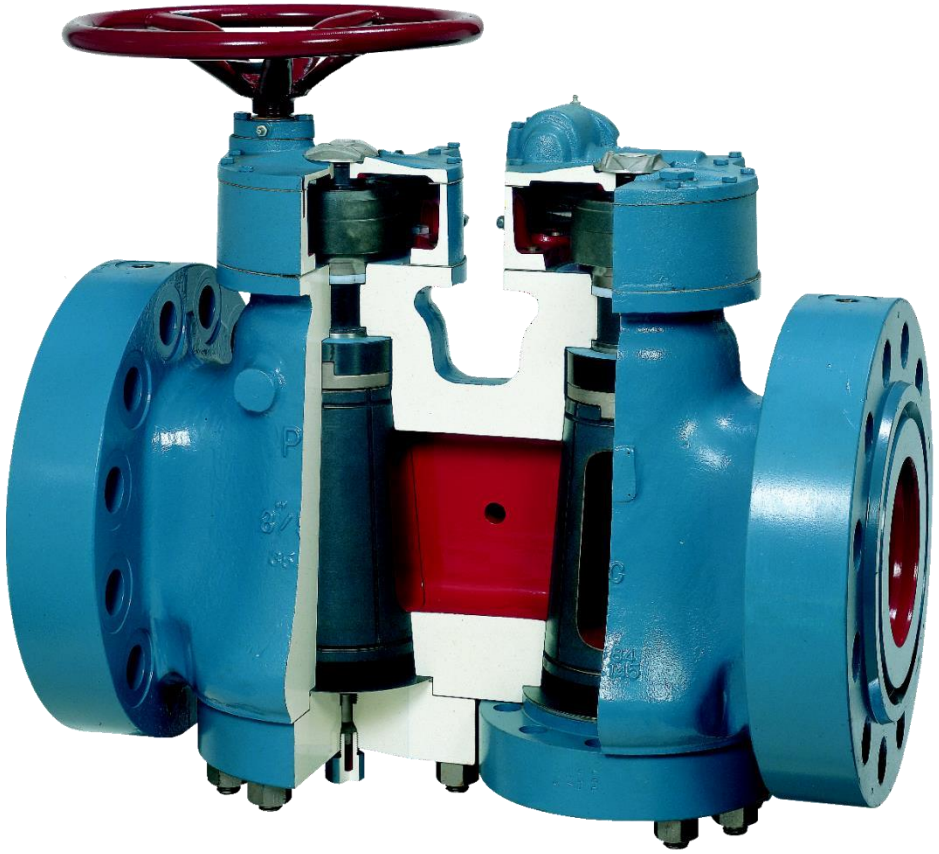
Working Ball Valve



Plug Valves



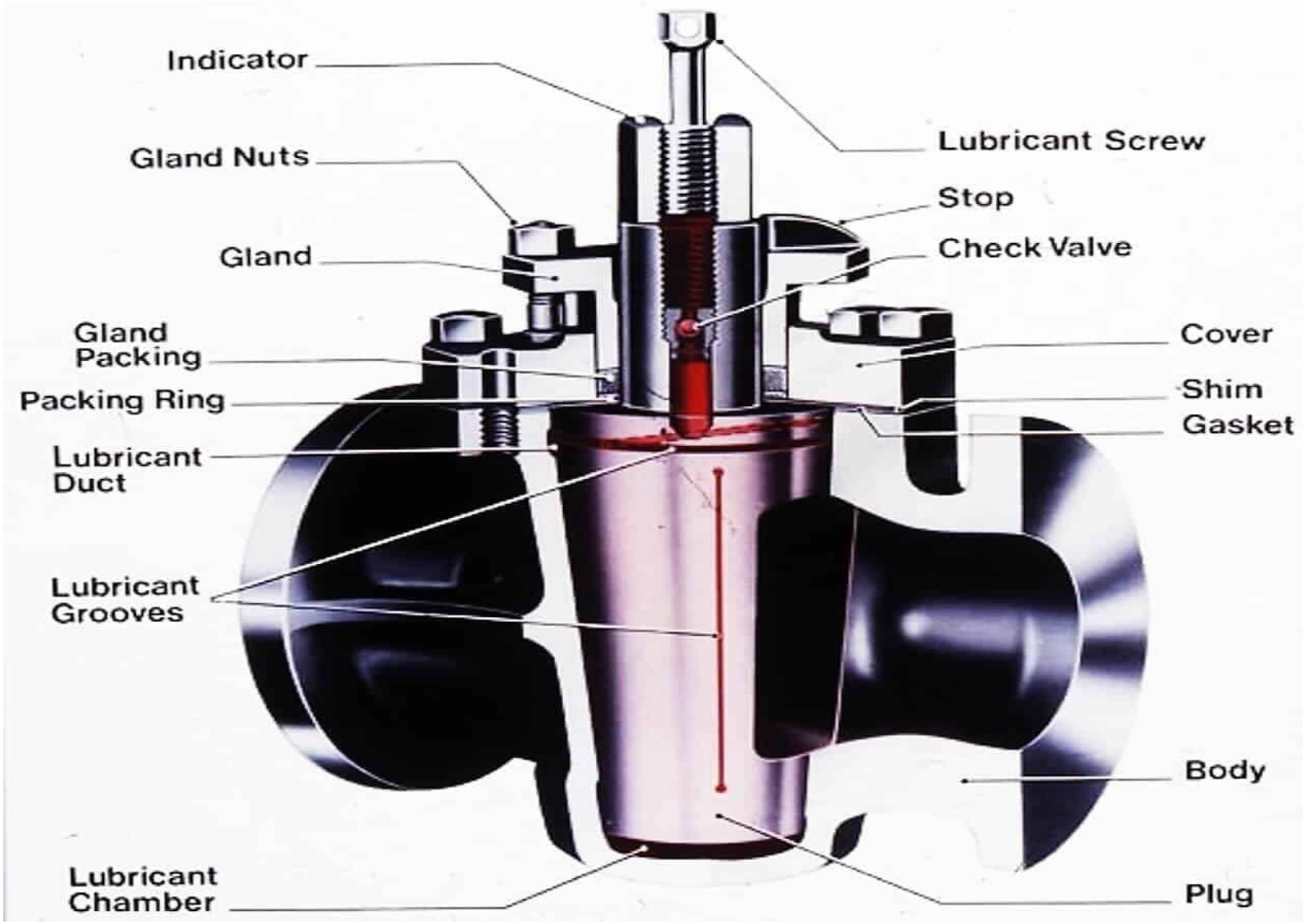
Plug Valve



Plug Valves

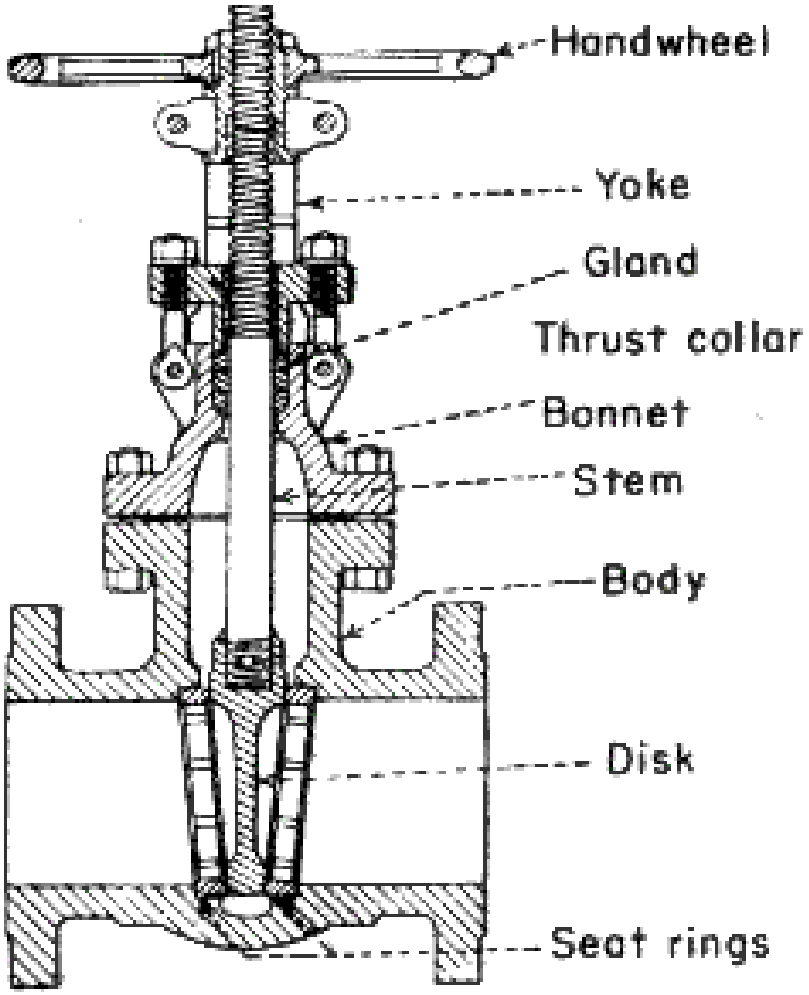
Basically a plug valve consists of a cylindrical or tapered plug which fits snugly in the valve's housing. A nearly rectangular opening in the plug allows the fluid to pass through when opening is in line with the axis of the valve housing.

Plug Valves


Indicator
Gland Nuts
Gland
Gland Packing
Packing Ring
Lubricant Duct
Lubricant Grooves
Lubricant Chamber
Lubricant Screw
Stop
Check Valve
Cover
Shim
Gasket
Body
Plug

Plug Valves

Parts Of Plug Valve



Plug Valves

Working

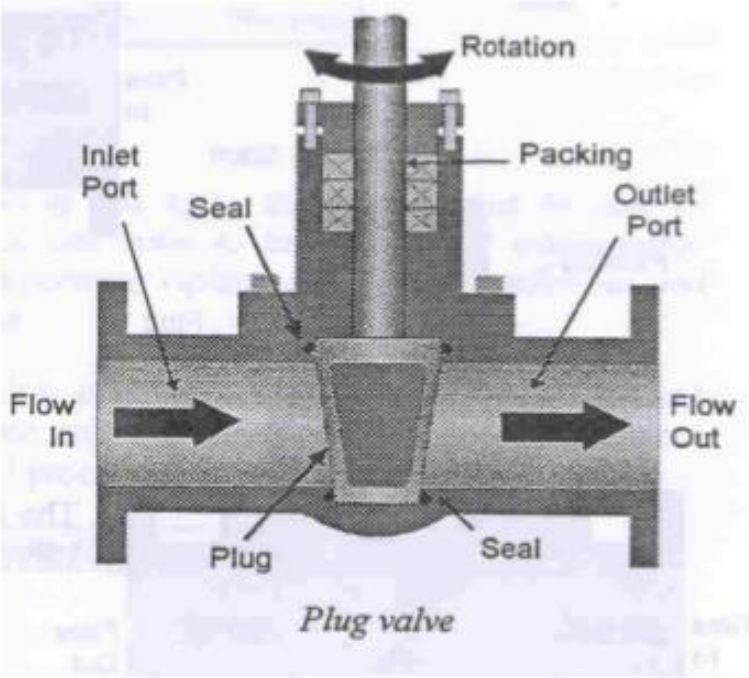
By turning the lever attached to the stem of the plug, one quarter of a turn, the valve is completely closed. A stuffing box gland packing prevents leakage along the plug stem. Tapered plugs have tendency to join in the tapered seat and cause bad scoring if forced to turn. To eliminate this problem most plug valves are lubricated. Lubricant is supplied

Plug Valves

Working Of Plug Valve

Valves

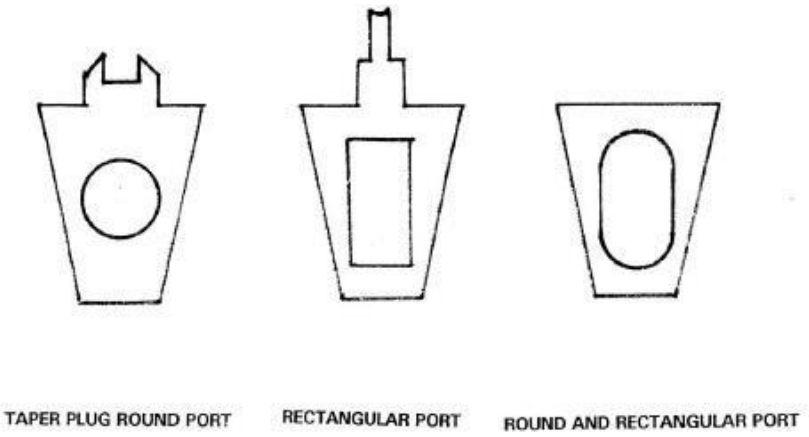
Plug valve – for throttling service, little likelihood of leakage when closed.



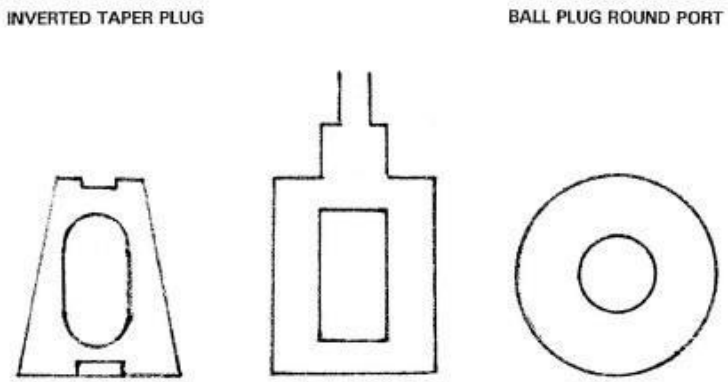
Plug valve

Plug Valves

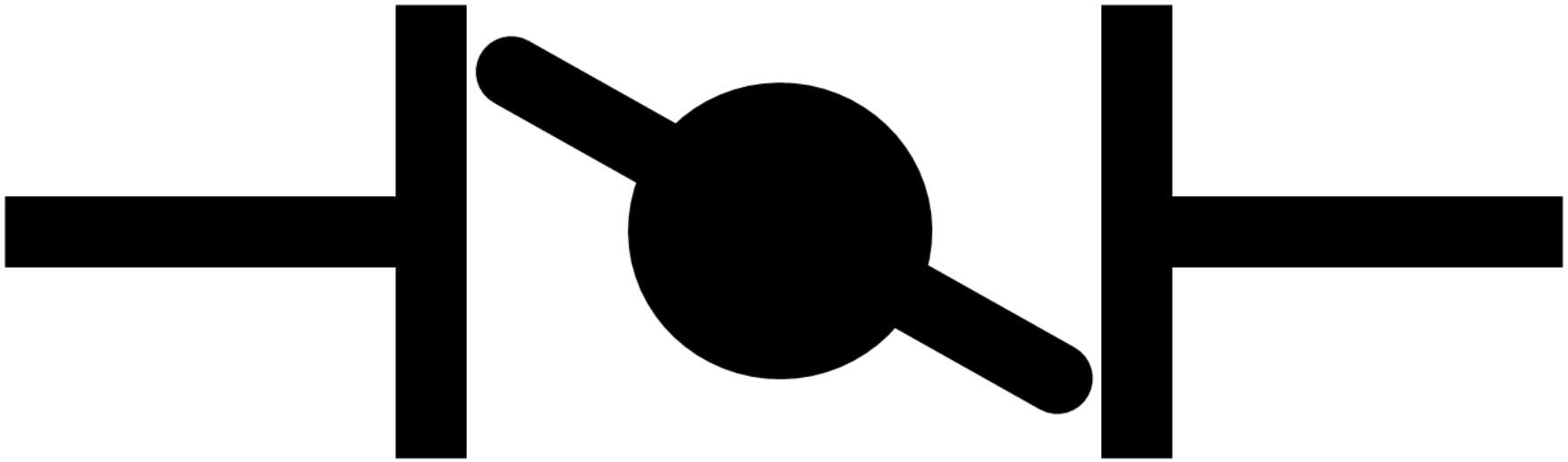
Type Of Plug Valve Video



1. Taper plug round port.
2. Taper Plug rectangular port.
3. Taper plug round and rectangular port.
4. Ball plugs round port.
5. Cylindrical Plug rectangular port.
6. Inverted taper plug rectangular port.



Butterfly Valve



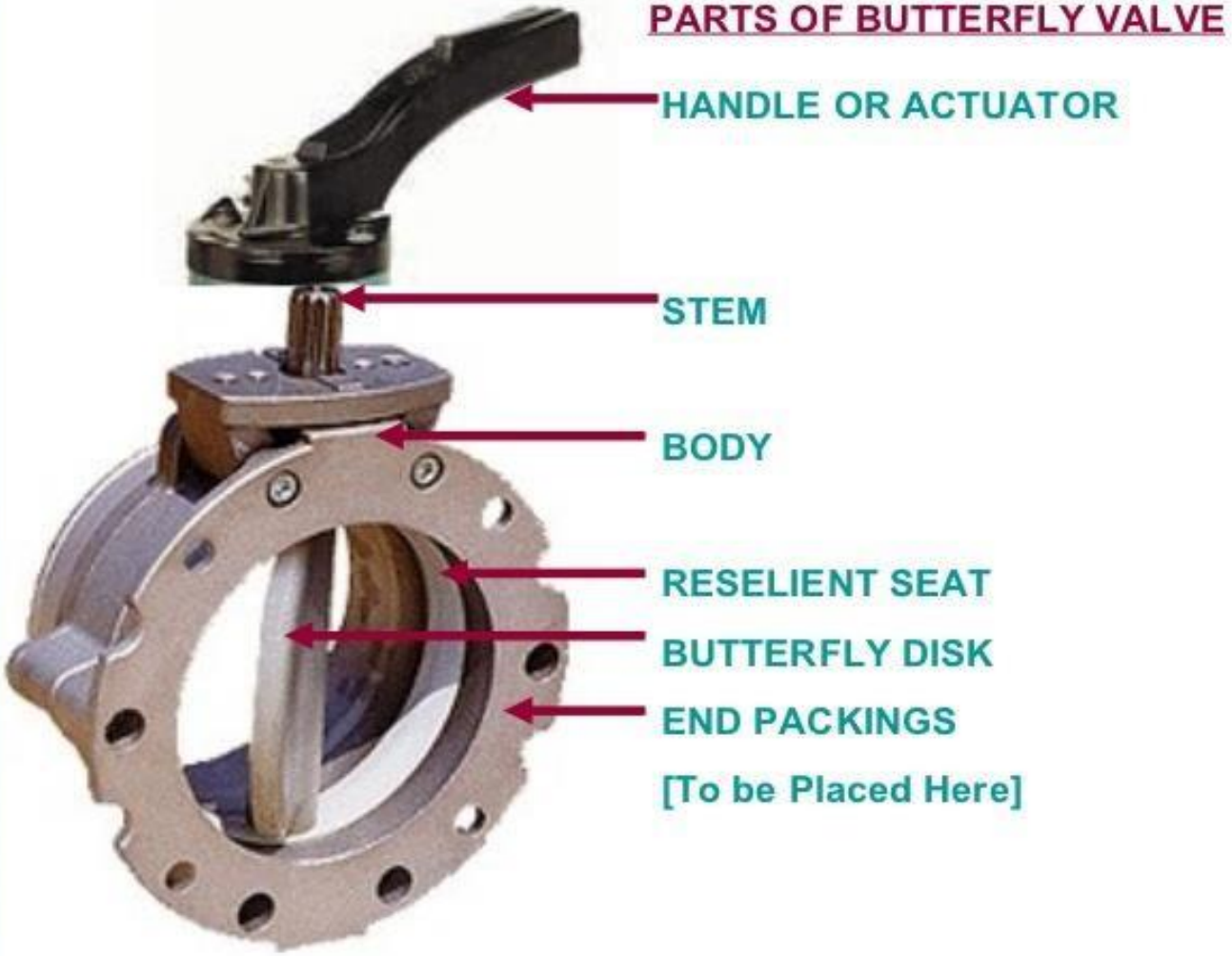
Butterfly Valve

Butterfly Valve

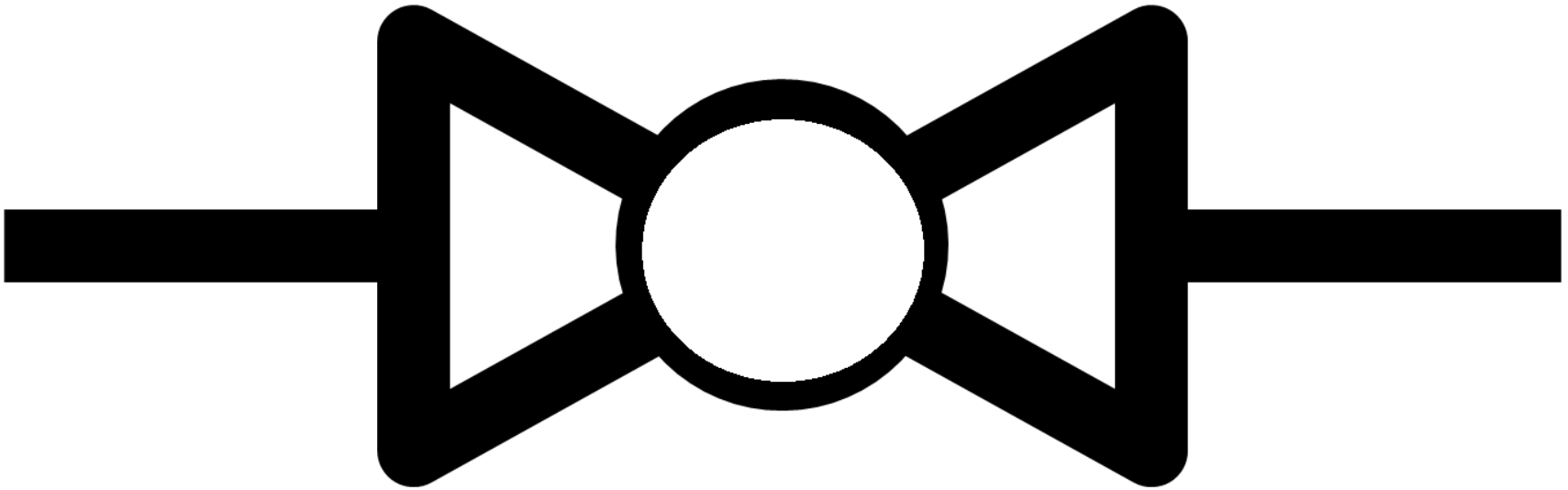
The butterfly valve has a flat disc that can be rotated 90 degrees from the wide open to fully closed position. This type of valve is normally fitted with a lever or hand wheel but a pneumatic or electric operator depending on the size of valve and its application is also provided. This valve is commonly used as a stop valve in water supply and circulating systems.

Butterfly Valve

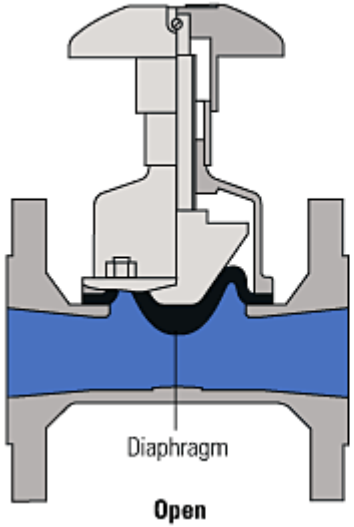
BUTTERFLY VALVE

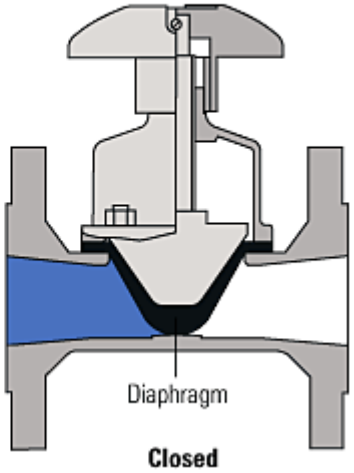


Diaphragm Valve



Diaphragm Valve





Diaphragm Valve

In the diaphragm valve, the entire bonnet area is sealed off from the main valve body by a flexible diaphragm made of rubber, Teflon etc. This eliminates the possibility of leakage along the valve stem, so no stuffing box is needed. Since the diaphragm only has to seal, it is not subjected to crushing / or rapid wear. The valve disc and stem is joined to the diaphragm with special leak-proof connections. This type of valve is used to control the corrosive fluids.

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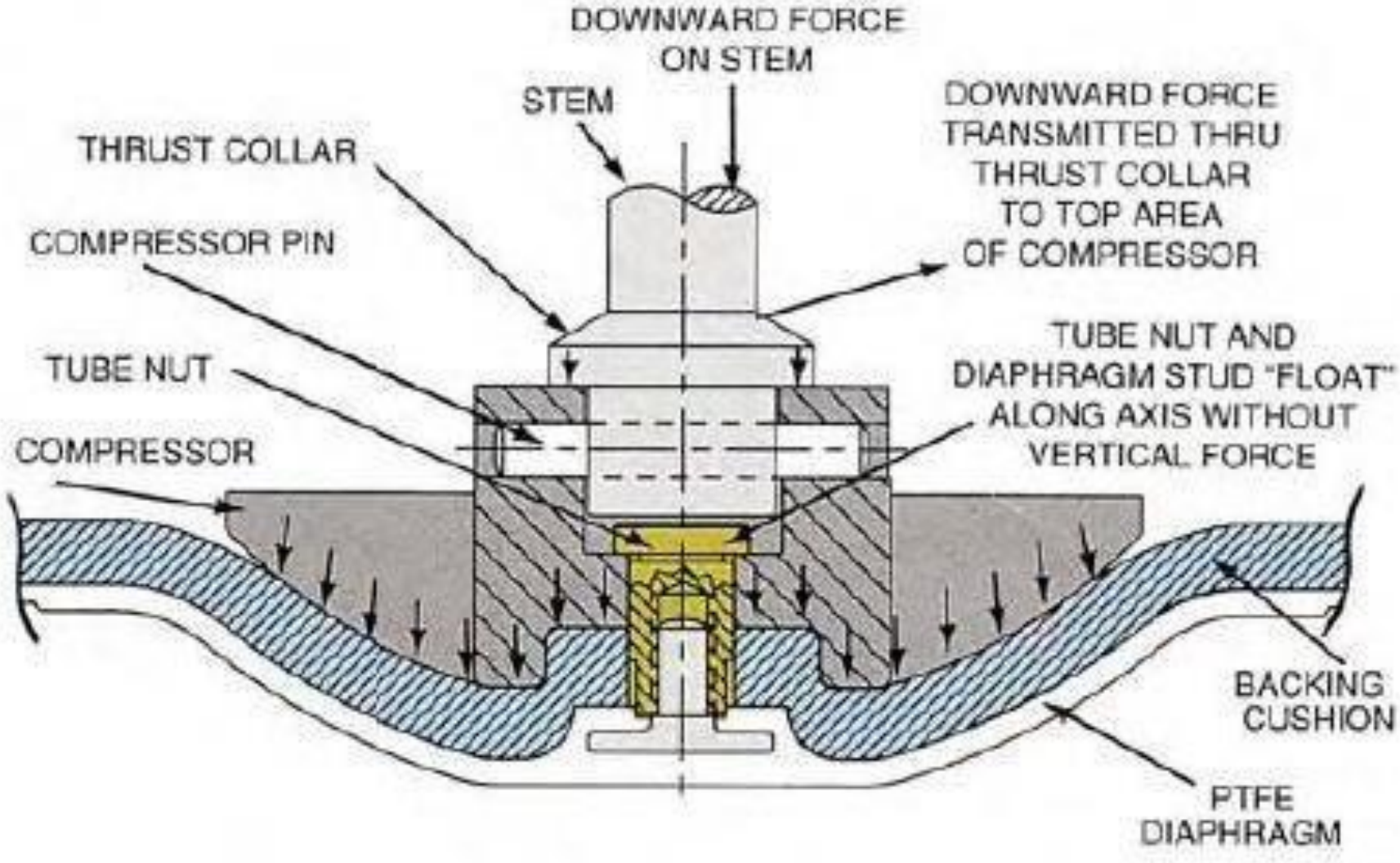
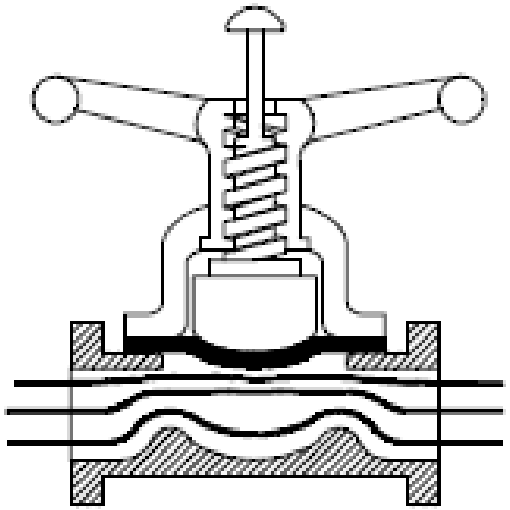
Diaphragm Valve

Parts Of Diaphragm Valve

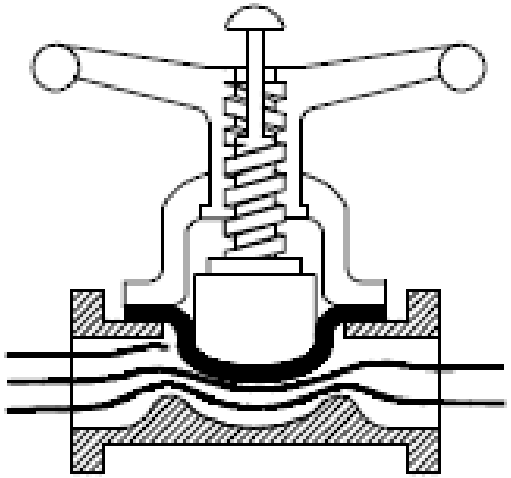


Diaphragm Valve

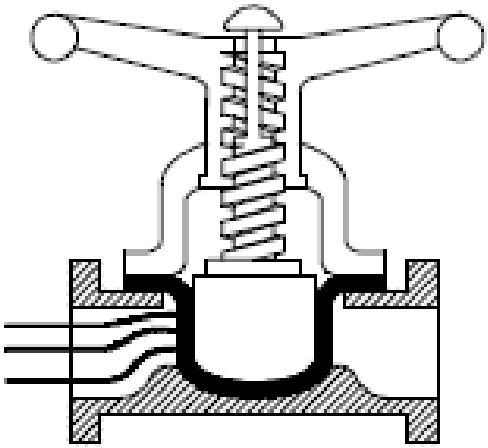
Working Of Diaphragm Valve



Open



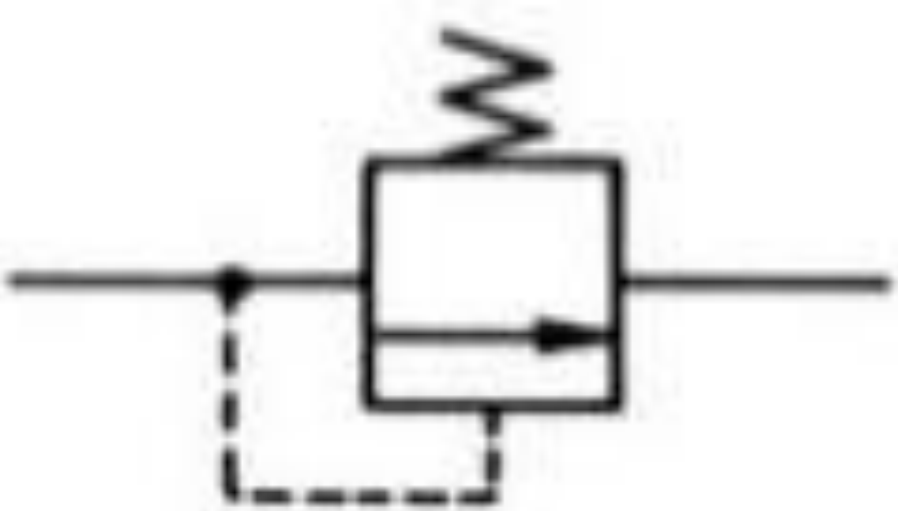
Throttling



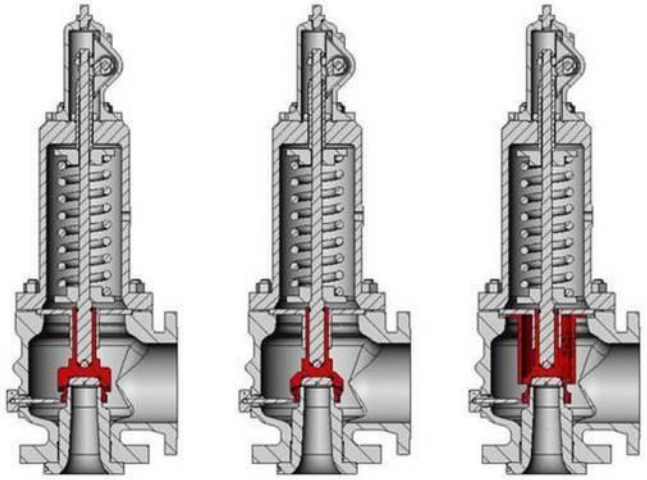
Closed

Diaphragm Valve Basics

Safety Valve



Safety Valves



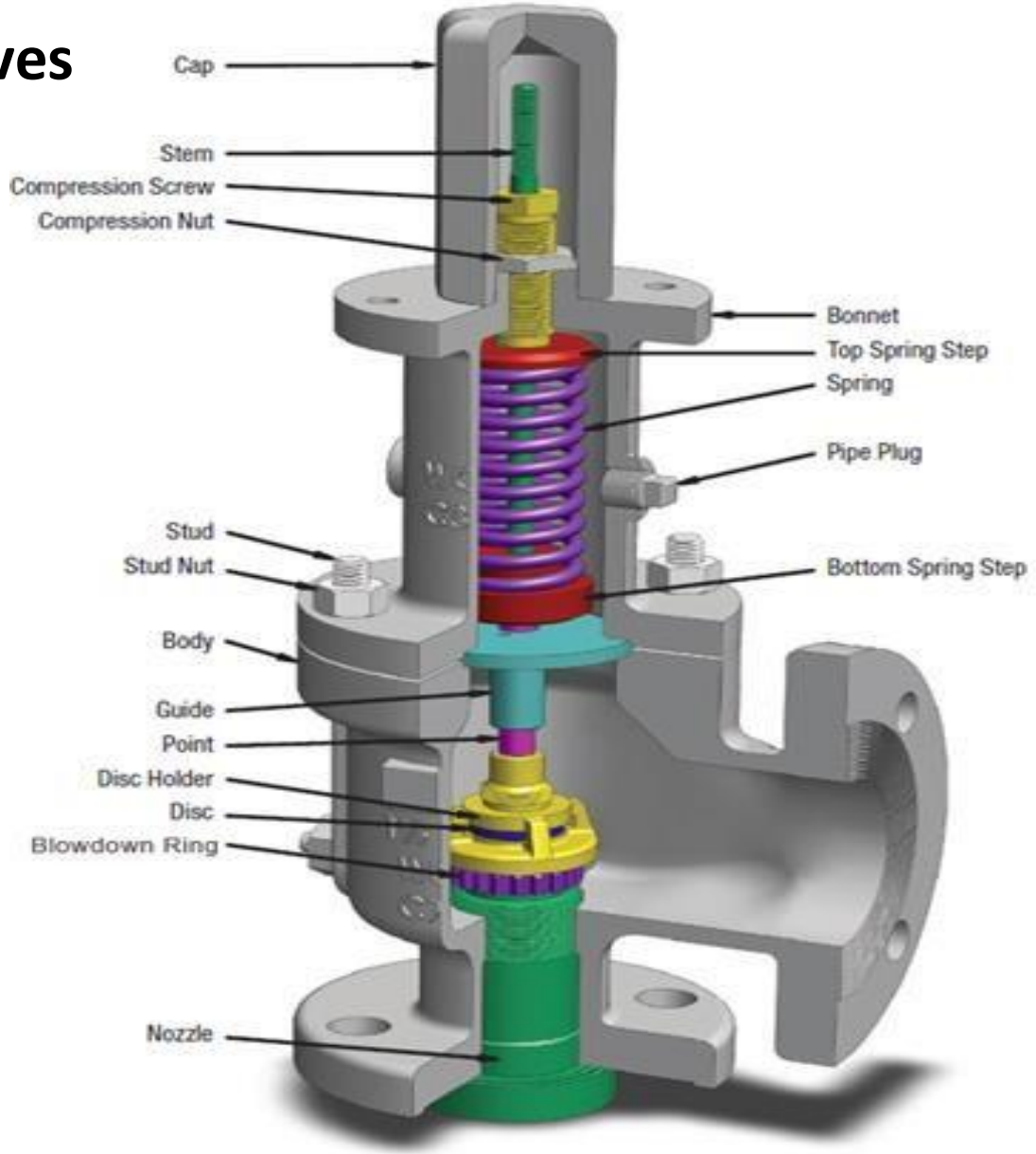
Safety Valves

Relief and safety valves are commonly installed to protect the equipment, lines and vessels from excessive pressure. Relief valves are designed to release excessive pressure from the systems liquids while the safety valves for gaseous fluids (I.E. Air, gas, steam).

The main parts of the valves are adjusting screw with which the setting of the pressure is adjusted, a spring to give tension on the disc against seat and a disc stem. A lever is also provided for manual operation. Since functioning of these valves is very important, its routine inspection and testing is very essential.

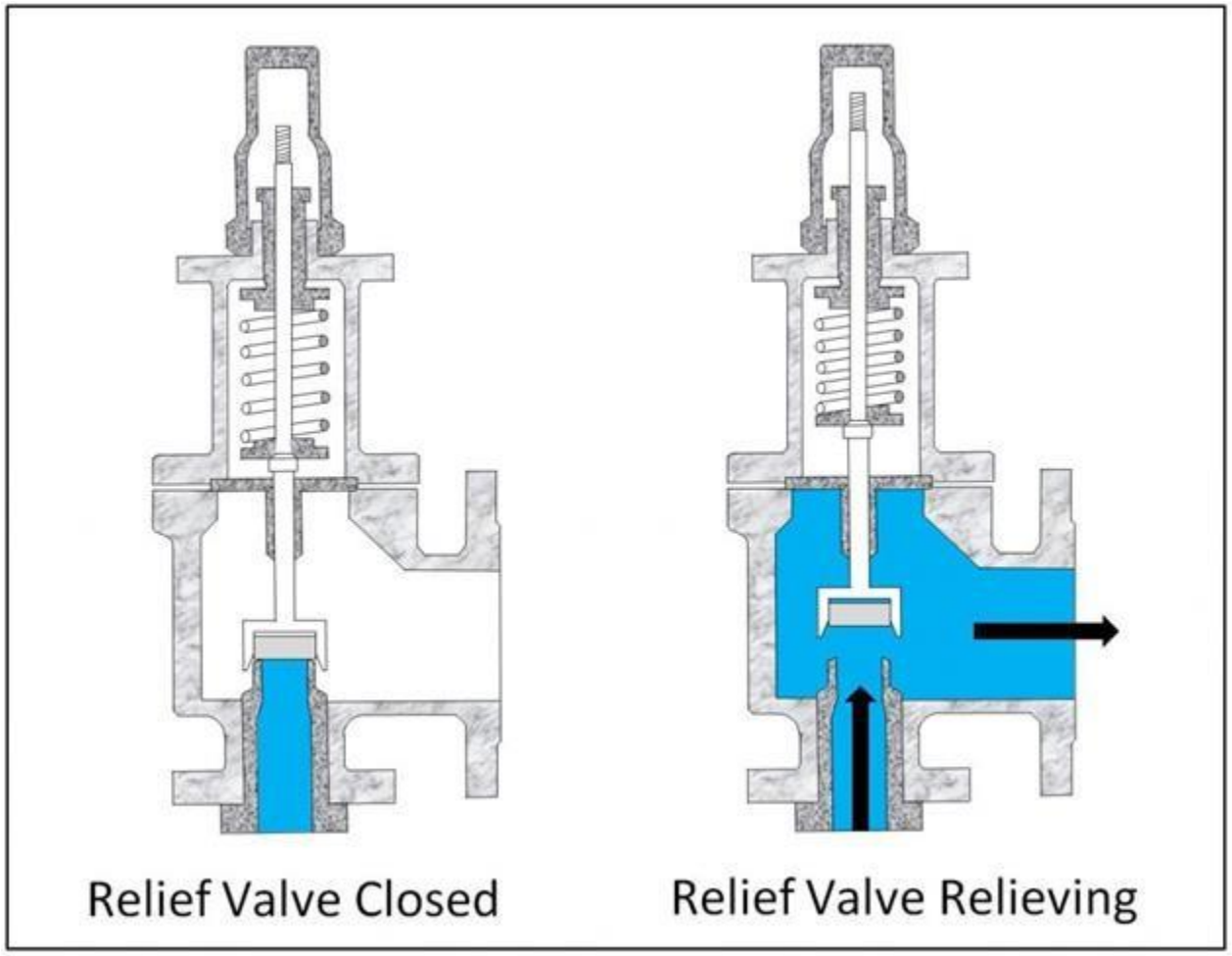
Safety Valves

Parts of Safety valves



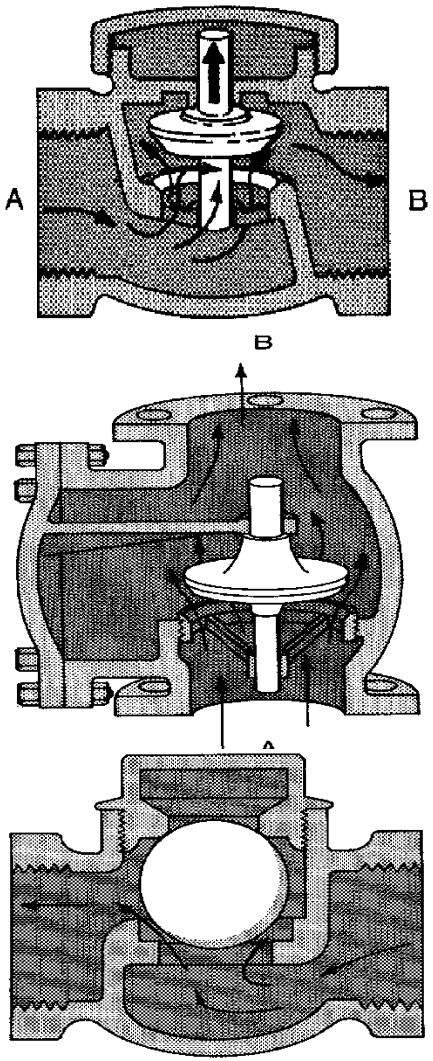
Safety Valves

Working of Safety valves



CHECK VALVES

- CLASSIFICATION
  - FOOT VALVE
  - BALL CHECK VALVE
  - SWING CHECK VALVE
  - TILTING DISC CHECK VALVE
  - VERTICAL LIFT CHECK VALVE
  - HORIZONTAL LIFT CHECK VALVE

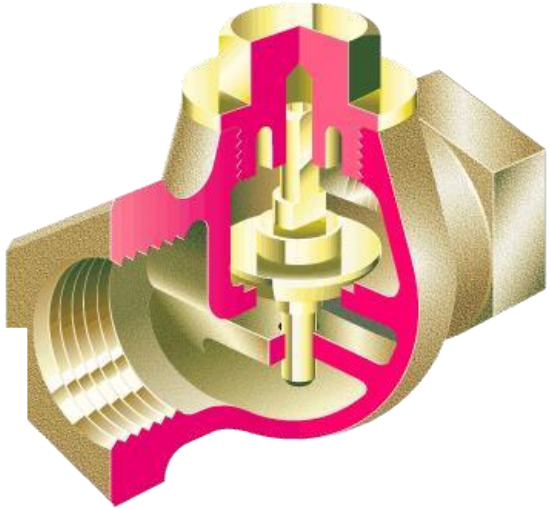


Double-door Check Valve

- Better flow than lift checks and most often use a wafer body for low cost and easy installation

Wafer Check Valve

CHECK VALVE - TYPES



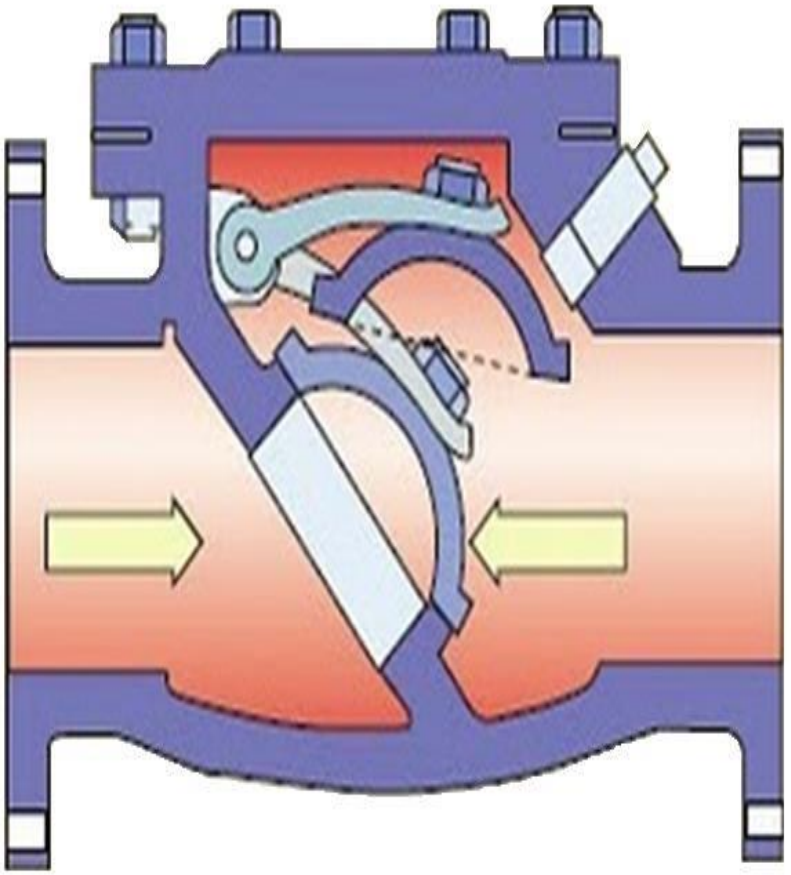
- VERTICAL LIFT CHECK VALVE

- BALL CHECK VALVE

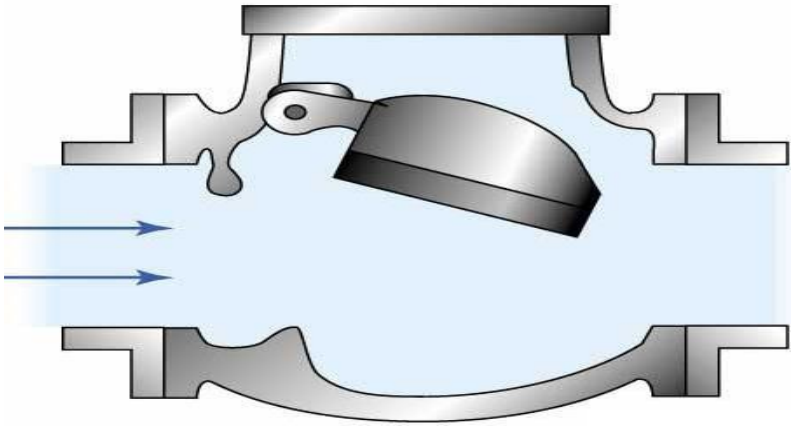
Check Valves

Swing Check Valve

- least pressure drop and offer simple automatic closure



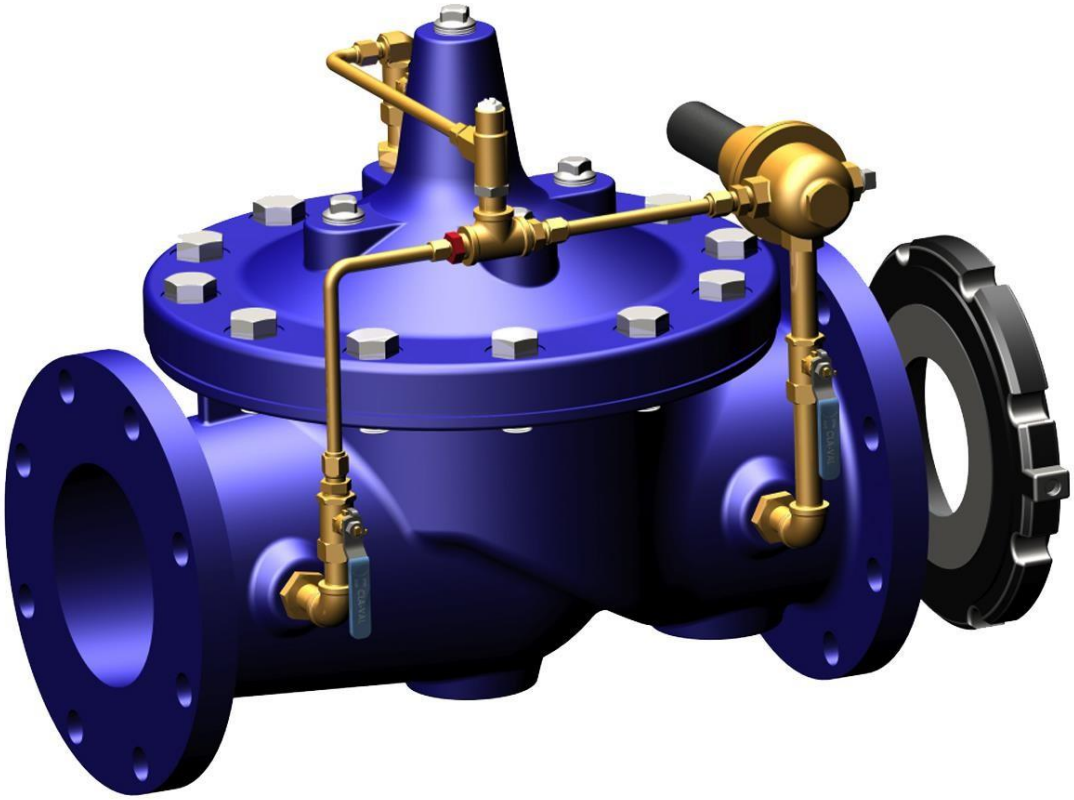
CHECK VALVE - TYPES



- SWING CHECK VALVE
- TILTING DISC CHECK VALVE

Auto Control Valve

Auto Control Valve



Auto Control Valve

The valves which control the flow, pressure, level or temperature automatically are called the auto control valves. These valves are designed to pass a specified amount of fluid in a unit time as required by the process. They are essentially refined needle or globe valves. Pneumatically operated control valve actuators are the most popular type in use but electric hydraulic and manual actuators are also widely used. The spring and diaphragm pneumatic actuator is commonly specified, due to its dependability and its simplicity of design.

Auto Control Valve

Valves Classification by Function

On-Off Services

- Gate Valves
- Plug Valves
- Ball Valves

Throttling Services

- Globe Valves
- Angle & Valves
- Needle Valves
- Butterfly Valves
- Diaphragm Valves

Prevention of Back Flow

- Swing Check Valve
- Lift Check Valves
- Ball Check Valves

Pressure Controls

- Safety and Relief Valves

Other Controls

- Temperature – Regulating Valves
- Flow Regulation Valves

MISCELLANEOUS VALVES ASSEMBLY

MISCELLANEOUS VALVES ASSEMBLY

If required replace the stem packing

1. Open the valve completely in order to realize the tightness of the stem on the back seat.

2. Take off the eye bolts nuts.

3. Lift up the gland pusher and check packing tightness. If the packing has become brittle or hard. All packing rings should be replaced.

4. Insert the new stem packing pressing it by gland pusher, but being careful not to scratch stem or inside wall of the packing chamber.

5. Put the gland and the gland pusher in their final position.

6. Tight the eye bolts nuts alternatively.

MISCELLANEOUS VALVES ASSEMBLY

Bonnet Gasket

During the working in case of leakage from body and bonnet tighten the bonnet stud. Seat of the body and the wedge In case of leakage through seat rings adopt the following procedures

1. Open the gate completely.
2. UN screws the bonnet stud nuts and removes studs.
3. Lift up the yoke, bonnet stem wedge.
4. Check the body seating faces.

If damaged send to the Machine Shop.

Seat Ring Substitution

1. Remove the bonnet and the gate as described above.
2. The seat ring is provided with at least four key way using a special tool available upon request, the seat ring may be screwed unscrewed into body seat housing.
3. The soft insert, if any shall be inspected.

Thank You