

# STRITT & PRIEBE INC.

## MANUAL VALVE TYPES AND USAGE

### Gate Valves

When to be used?	Used when a straight flow of fluid and minimum restriction is desired
Functionality	Stops or allows flow through the valve by either closing or opening the gate. Most gate valves consist of a body and bonnet that contains the disc or a gate. The closure element is attached to a stem that maintains an interface with a hand wheel. Pressure around the stem is contained through the use of packing material compressed into a chamber.
Features	<ul style="list-style-type: none"> <li>- Minimal pressure drop or flow restriction through the valve</li> <li>- Not suitable for throttling purposes as slapping of fluid against a partially open gate can cause extensive damage.</li> </ul>
Common materials used	
Types	Rising stem (i.e gate and stem as shown figure follow the same motion upwards) Non-rising stem (i.e gate and stem are independent of each other in motion) Discs used (instead of gates) could be either parallel or tapered
Advantages	<ul style="list-style-type: none"> <li>- Ability to cut through slurries</li> <li>- Large sizes available</li> </ul>
Disadvantages	<ul style="list-style-type: none"> <li>- Low pressure limitations</li> <li>- Lack of cleanliness</li> <li>- Low shut off</li> </ul>

### Ball valves

When to be used?	
Functionality	To signify an open valve, handle is in-line with the pipeline and perpendicular to pipeline for a closed valve. The ball valve consists of a hole that, when in-line with the direction of the pipeline, would allow the liquid to flow through.
Features	<ul style="list-style-type: none"> <li>- Complies with ASME face to face dimensions and pressure ratings, hence enabling ease in retrofitting.</li> <li>- Flange rating compliant with ASME</li> <li>- Provides fire safe protection.</li> <li>- Handle severe chemicals.</li> </ul>
Common materials used	Brass, bronze, cast iron, copper ductile iron, metal alloys, stainless and other steel types, and plastics
Types	Various configurations: <ul style="list-style-type: none"> <li>- 3-piece</li> <li>- End entry and top entry</li> </ul> They range from commodity type to high performance valves.
Advantages	<ul style="list-style-type: none"> <li>- Withstand extreme pressure/temperature and high volume flow.</li> <li>- High flow capacity</li> <li>- Withstand several chemicals</li> <li>- High coefficient of flow</li> <li>- High recovery valves (low pressure drop)</li> <li>- Less system wear due to lower velocity</li> </ul>
Disadvantages	<ul style="list-style-type: none"> <li>- Inability to handle slurry applications</li> <li>- Lack of cleanliness leading to contamination (Cavities in these valves allow for fluid or solid particles to become entrapped and clog the valve operation).</li> </ul>

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## Globe Valves

When to be used?	Excellent to be used as a control valve due to its complex flow path. This valve is known for precise throttling and control.
Functionality	Easily automated is operated using a liner rising-stem with multi turn hand wheel. Globe valves are linear motion valves with rounded bodies
Features	Structure is simpler than gate valves, manufacture and repair is more convenient.
Common materials used	For Body, metallic alloys (carbon steel alloys) and for packer material, PTFE and graphite.
Types	These are selected as per flow requirements, straight flow, angle flow (L shaped flow that enters from bottom and completes an L shape before exiting) and cross flow (T shaped flow, where fluid entering the T shaped valve joins with existing flow line running perpendicular).
Advantages	<ul style="list-style-type: none"> <li>- Can withstand high temperature and pressure</li> <li>- Precise throttling and control</li> <li>- The sealing system is does not experience the usual wear and tear, leading to a longer service life.</li> </ul>
Disadvantages	<ul style="list-style-type: none"> <li>- Lack of cleanliness</li> <li>- Low coefficient of flow</li> <li>- Inability to handle slurries</li> <li>- High pressure drop leading to more system wear</li> <li>- Fluid resistance is significantly large leading to higher power consumption (same reasoning as ball valves, cavities lead to entrapment)</li> </ul>

## Butterfly Valves

When to be used?	Can be used for liquids/gases that can easily be displaced when the valve disc closes.
Functionality	Butterfly valves control the flow of gas or liquid by means of a disk, which turns on a diametrical axis inside a pipe or by two semicircular plates hinged on a common spindle, which permits flow in only one direction.
Features	<ul style="list-style-type: none"> <li>- Complies with ASME face to face dimensions and pressure ratings, hence enabling ease in retrofitting.</li> <li>- Provides a bubble tight, bi-directional shut off.</li> </ul>
Common materials used	Available in plastic and rubber linings and solid metal bodies and discs. For body, materials used are Cast iron, ductile iron, aluminum, carbon steel, stainless steel
Types	Inflatable seated butterfly valve, double offset butterfly valve and triple offset butterfly valve.
Advantages	<ul style="list-style-type: none"> <li>- Relatively high coefficient of flow</li> <li>- Economical choice for large line sizes (i.e 8" and above)</li> <li>- Availability in chemically resistant materials</li> <li>- High recovery valve (low pressure drop, as only a disc stands in the way of the flow)</li> <li>- Less wear compared to globe valves</li> </ul>
Disadvantages	<ul style="list-style-type: none"> <li>- Lack of cleanliness and inability to handle slurry applications.</li> <li>- Not bubble tight</li> <li>- Cavities and leak paths around disc stem could trap fluids and slurries resulting in unwanted contamination</li> </ul>