

GLOBE VALVE DESIGN DISC STYLE TYPES

OPERATION

Australian Pipeline Valve globe valves are for services requiring frequent operation for on-off isolation service as well as throttling. Never attempt throttling at under 20% of stem travel. Closer throttling, can result in higher pressure drops which may cause excessive velocities or cavitation and could cause vibration or high noise levels resulting in damage to the valve or adjacent components/structure.

LIFE

Heavy API 623 construction provides years of reliable service.

DESIGN

Available in bolted and pressure seal bonnet, outside screw and yoke, rising stem with ball or plug type disc, and have flanged or butt weld ends. Screw down non-return (Stop check) also available. Stem with precision Acme threads and burnished finish. Valve suitable for horizontal installation. Conical seating surfaces 13Cr hardfaced/stellite, ground and lapped to a Ra 0.4~0.8 µm finish. Tapered plug type disc as standard. Body guided disc on larger sizes, and higher classes on smaller sizes, accurately mates the hardfaced surface of the disc with the surface of the seat. Body and bonnet joint accurately machined. fully enclosed gasket. Rotating stem nut. Austenitic ductile iron Gr. D-2C, renewable in-line.

STANDARD

To ASME B16.34 / API 623.

Dimensions to ASME B16.10 and ISO 5752.

Wall thickness, stem smoothness and stuffing box finish complies with API 623.

APV stuffing box smoothness \leq Ra 3.2 µm superior to API 623 / API 600.

Stem smoothness \leq Ra 0.80 µm as per API 600/API 623.



API 622 & ISO 15848-1
Fugitive Emission Certified



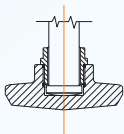
Endurance Tested



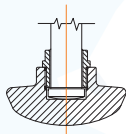
API 607-7th & ISO 10497
Firesafe Certified



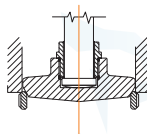
COMMON DISC STYLES



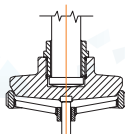
Plug Disc



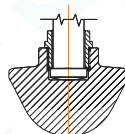
Ball Disc



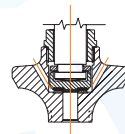
Body Guided Disc



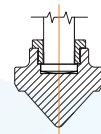
Pin Guided Disc



Parabolic Disc



Equilibrated Disc

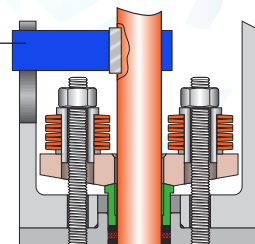


Vee Point Disc
(Needle)

TORQUE ARM

Torque Arm

Used in larger sizes and higher pressures the torque arm prevents stem movement which reduces wear on packing rings and enables better sealing as well as reducing torque. Non rotating stem, only the stem nut rotates. The arm also provides visual stem position indication and can be interfaced with position switches. Optional live loaded packing system is shown. Provides improved valve life for throttling applications.



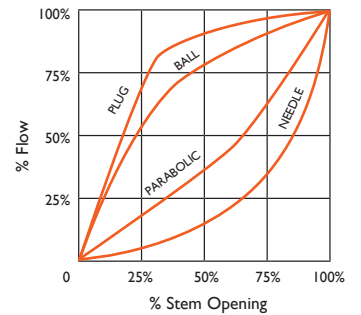
APPLICATIONS OF DIFFERENT DISC TYPES

Globe valves can be supplied with various types of disc depending on the application.

Each style provides various levels of control. The correct selection of disc and material of construction and hardfacing, will minimise wear caused by cavitation in more severe applications.

Disc Functionality

The chart shows the stem opening related to the quantity of flow provided. It also indicates the grade of control over the fluid between the different type of discs.



PARABOLIC TYPE DISC

Similar to the ball type disc, but its parabolic design provides a higher flow regulation and improved wear resistance.



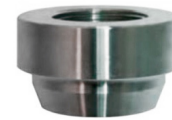
NEEDLE TYPE DISC

Provides a finer level of regulation with a better flow rate.



BALL TYPE DISC

Lower half of the disc has a ball shape, permitting flow passage and flow stop, having the possibility to control partially the flow mainly in low pressure service.



PLUG TYPE DISC

The tapered v-plug disc has a flat finished bottom, being the most common standard globe disc type, as well as simple and economical. Designed to permit flow passage or flow stop without a high degree of regulation. In larger sizes and higher pressures a guided disc and a stem guide is required for throttling applications. It is primarily used for positive shut off service and is also used to control flow. Whilst it has a taper, it is also available in superior longer and more tapered design variants depending on size, class and valve style.

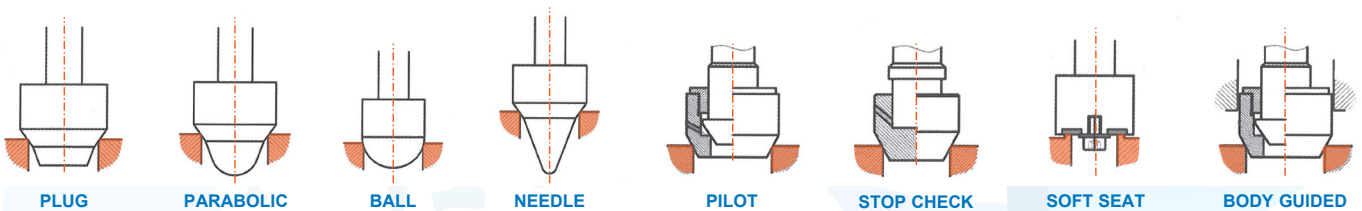


Caution

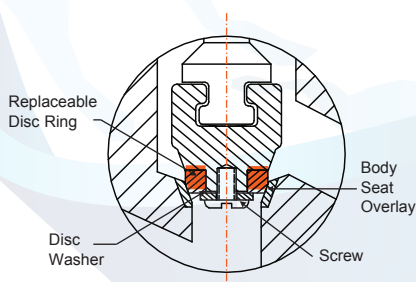
Using a standard plug disc for flow control should be done with a high degree of caution - refer to API RP 615 section 5:3 and USA Process Industries Practices PCECV001

Never use globe valves to throttle at under 20% of stem travel. Over 60% of stem travel may also significantly reduce valve life unless disc is body guided and a stem guide is fitted.

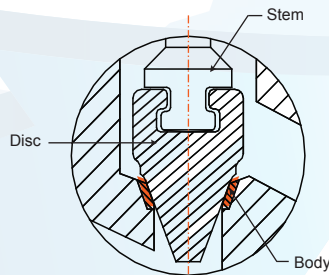
FULL RANGE OF DISC STYLES



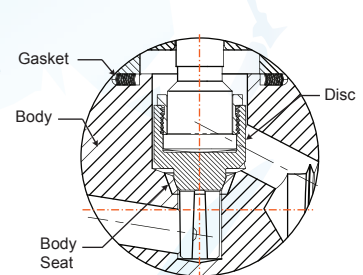
FORGED (SMALL DIAMETER) GLOBE VALVE SEATING/DISC TYPES (6~65NB)



Elastomeric or Plastic Seat Insert



Needle Point Metering Plug



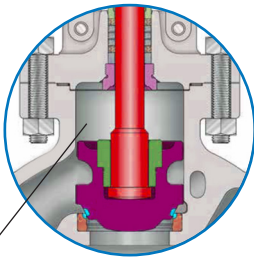
Flow Control Nozzle

BODY GUIDED DISC

The high-pressure drop in Globe Valves requires a body guided plug to resist vibrations induced by high flow velocity in the Valve Throat. Flow regulation/throttling will cause erosion. While practically all materials will experience erosion, Stellite material has the capability to absorb impulsive force of the flow resisting corrosion and cavitation. When the high regulation of the flow is a requirement, the surfaces of the seat ring and the disc must be covered with Stellite. API 623 requires that globe valves must have a fully guided disc, in order to securely retain the disc to endure the hydraulic forces and vibrations when the valve is throttling. The main purpose of this design is not to transfer lateral forces to the stem, because the allowances between the stem and the disc are larger than the allowance between the body guides and the disc. This keeps the valve packing in position and prevents leakage.



API 623 Guided disc style



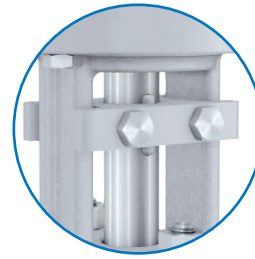
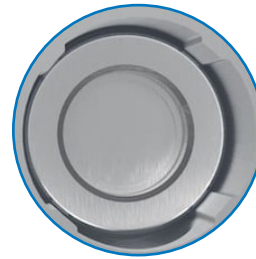
Body Guided Disc

Body guided disc style (as required by API 623) eliminates side thrust and provides longer disc, seat and body life as well as ensuring positive shut-off and low closing torque. Provides improved valve life for throttling applications.



Fully Guided Body Disc

API 623 compliant



Stem Torque Arm

Non-rotating stem provides better performance of the packing to provide lower fugitive emissions and reduces operating torque.

DIFFERENT BODY/PORT TYPES

The differences between **T-pattern** **Y-pattern** and **right-angle [angle] globe valves** mainly come down to flow path geometry, pressure drop, and typical applications. Here's a clear breakdown:

T-Pattern Globe Valve [Standard Design]

This is the most common globe valve design. The external body indicates a T-pattern although some castings follow the S-pattern path way of the port, but the port design is the same.

- **Flow path:** Fluid enters and exits in a straight line, but internally makes a sharp 90° turn [changing direction twice] in an 'S' flow path [some call it a 'Z' flow path].
- **Pressure drop:** High - because of the abrupt change in direction.
- **Flow efficiency:** Lower compared to other designs.
- **Sealing/control:** Excellent throttling and shutoff control.
- **Typical use:** General-purpose applications where tight shutoff is more important than flow efficiency.

Y-Pattern Globe Valve

This design modifies the body to reduce resistance.

- **Flow path:** Angled [~45°], creating a smoother, straighter low path.
- **Pressure drop:** Lower than T-pattern.
- **Flow efficiency:** Better than T-pattern.
- **Sealing/control:** Still good, but slightly less precise than T-pattern.
- **Typical use:** High-pressure or high-flow systems where energy loss matters.

Right-Angle [Angle] Globe Valve

Also called an angle globe valve.

- **Flow path:** Fluid makes a single 90° turn, entering and exiting at right angles.
- **Pressure drop:** Moderate - less than T-pattern, more than Y-pattern [generally].
- **Flow efficiency:** Better than T-pattern in systems that already require a turn.
- **Sealing/control:** Good throttling capability.
- **Typical use:** When piping needs a change direction [can replace elbow + valve]. Combines a valve + pipe bend in one unit.



Quick Comparison

Feature	T-Pattern	Y-Pattern	Right-Angle [Angle]
Flow Direction	Straight [internal 90° turn]	Angled [~45°]	90° turn
Pressure Drop	High	Low	Medium
Flow Efficiency	Lowest	Highest	Medium
Throttling Control	Excellent	Good	Good
Best Use Case	General control	High-efficiency flow	Direction change



Simple Way to Remember

- **T-pattern** = most restrictive, best control
- **Y-pattern** = smoothest flow, most efficient
- **Angle valve** = useful when you need to turn anyway

~ World's Largest Valve & Actuator Stock Range ~

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