

ACTUATOR SIZING FLOATING BALL VALVES

For the torque value required to turn a floating ball valve through its 90° travel, consider torque requirements at these five basic positions:

- BTO** – break open torque: the torque required to unseat the closed valve. 100% of the stated torque
- RTO** – opening torque: the torque needed to move the valve to the fully open position. Average 70% of stated torque*
- ETO** – open breakout torque: the torque required to move the valve from the fully open position. 70% of stated torque*
- ETC** – closing torque: the torque required to reseat a closing valve. 85% of stated torque*
- RTC** – running torque: the torque needed to keep the ball moving through it's travel. 50% of stated torque*
- MAST** – Maximum stem torque

*Average estimating guide based on floating ball and smaller size trunnion ball valves. Large trunnion ball valves have different ratios.

ELEMENTS THAT AFFECT BALL VALVE OPERATING TORQUE

For a particular size and differential pressure, the torque values of soft seated ball valves depend on many factors. Use the torque multipliers stated below along with the selected valve's stated break, end to close and end to open torques as needed for your application.

Seat Material: The friction force or degree of holding force depends on the seat material type.

Seat Material	Seat Type Multiplier*1
15% - 25% Glass RPTFE	1.0
Virgin PTFE	0.8
Carbon Graphite RPTFE	1.0
PEEK	2.3
Delrin	2.0

*1 - For floating ball valves up to 150NM. For larger valves consult us.

Fluid Type: Torque values depend on media type. Torque will become higher with dry, gasses or liquids with solids and lower with oils. Torque multipliers are shown in the table (based on normal temperatures).

Fluid	Fluid Type Multiplier
Gas or superheated steam, clean / dry	1.2 - 1.3
Viscous fluid	1.4 - 1.6
Liquids containing abrasive solids	1.3 - 2.0*2
Clean / non-lubricating	1.0
Clean / lubricating	0.8

*2 - Can be higher.

Frequency of Operation: When a valve remains in closed position for extended periods of time, the breakout torque increases.

Frequency	Frequency Multiplier
Once per day or greater	1.0
Once per week or greater	1.3
Once per month or greater	1.4
Once per 4 months or greater	1.5
Critical ESD services	1.8

Temperature Effect: For operating temperature from 100°C to 218°C, use the torque multiplier given. For 0° to 99°C no temperature multiplier is required. For operating temperatures less than 0°C and above 218°C consult us.

$$\text{Temperature Multiplier} = \text{Temp } ^\circ\text{C} \div 100$$

The above is an approximate guide only for estimating purposes. Australian Pipeline Valve will do exact sizing upon request. Australian Pipeline Valve manufacture a large range of scotch yoke, heavy duty quarter turn pneumatic and hydraulic valve actuators in double acting and spring return.

~Manufacturers of Valves & Actuators~

© Copyright Australian Pipeline Valve 2013

Actuator Torque Sizing Valve R1 - AS