

PRESSURE SEAL BONNET DESIGN

Australian Pipeline Valve gate, globe and check valves are available with pressure seal bonnets in 900 to 2500 class. The pressure seal design is superior to the bolted design. With the bolted body design, as pressure increases the gasket sealing force reduces, allowing the possibility of a potential leak point. Whereas with the pressure seal design, increasing fluid pressure increases the gasket sealing force.

The Bonnet bolts effect a seal on the pressure seal joint which forces the bonnet onto the 'bridgeman' soft metallic gasket which in turn is forced up hard against the outer body. Refer table 1 below. The higher the line pressure, the higher the sealing force against the gasket, further tightening the seal. The thrust rings are embedded in the body. In smaller forged valves sometimes a 'breach-lock' threaded bonnet insert is used instead of a bolt energised bonnet.

Pressure seal bonnets are superior to traditional bolted bonnets and are ideal for high pressures and situations in power plants and refineries where frequent pressure surges, start-ups and shut-downs occur.

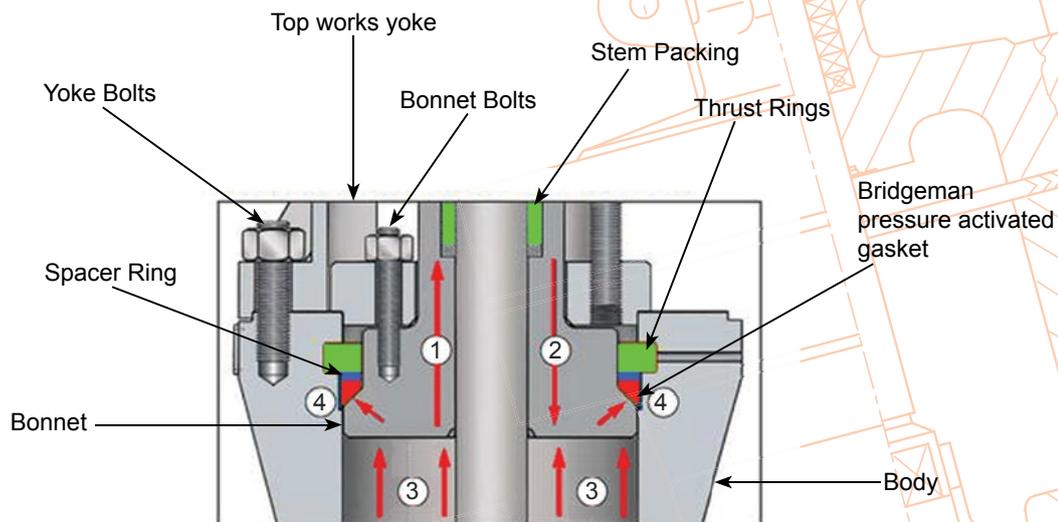
The bonnet gasket is metallic. A 'bridgeman' gasket is used as its design ensures that pressure acting against it further increases the seal against the surface effecting a self-energised seal. In larger sizes this gasket is silver plated as silver provides a softer surface to flow the gasket metal into the mating flange surface. Flexible custom made expanded graphite gaskets are also available. Another superior option for larger sizes is 316 + Graphite gasket. In very large sizes graphite gaskets can be specified in conjunction with live loading bonnet bolt washers that can be tightened to ensure a constant force is applied to the bonnet gasket.

There are 3 different designs of pressure seal bonnet: - threaded locknut type (breachlock), bonnet take-up type (bolted yoke arm) and bolted type shown below.

Some other key features of APV pressure seal valves are as follows:

- No pressure retaining body/bonnet flanges or bolting results in lighter weight design compared to bolted bonnet.
- Differential angle between bonnet and gasket, concentrates the gasket seal force for a better seal at gasket tip.
- Take-up plate and bolting creates initial gasket seal and ensures seal throughout the entire range of working pressures.
- Take-up plate is a separate piece from the yoke arm which allows removal of the yoke arm without disturbing pressure seal joint.
- APV uses a metal gasket in it's standard pressure seal design which is a stronger material with a longer lifetime and lower coefficient of thermal expansion compared to softer gaskets.

Table 1



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|-----|---|
| 1/2 | Bonnet can move up or down as pressure increases and decrease |
| 3 | Line Pressure |
| 4 | Line pressure further tightens Bridgeman gasket seal |

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Pressure Seal Bonnet Valve R3 - A8