Flowserve Valbart Cryogenic Valves

Optimized design
Valbart cryogenic valves are designed to meet the most demanding end-users requirements in terms of leakage rates and fugitive emission performance. Body construction and flexible trim configurations deliver durable functionality and high performance in the most stringent of cryogenic applications.

Services
Nitrogen (-320°F / -196°C) Helium (-452°F/-269°C)
Oxygen (-297°F/-183°C) Hydrogen (-423°F/-253°C)
Argon (-303°F /-186°C) Krypton (-244°F/-153°C)
Carbon Dioxide (-109°F/-78°C) Methane (-259°F/-162°C)
Carbon Monoxide (-312°F/-191°C) Neon (-410°F/-246°C)
Ethylene (-155°F/-104°C) Nitric Oxide (-241°F/-151°C)
Fluorine (-307°F/-188°C) Propane (-44°F/-42°C)

Applications
LNG Plants Loading/Unloading
Chemical Plants Storage
Gas Liquefaction Re-gasification

Accurate Material Selection & Production Technology
Austenitic stainless steel grades (316 – 304 - 321) are used for pressure containing and controlling parts ensuring optimum performance at cryogenic temperatures. Components are produced from high quality forgings and casting (traditional or centrifuged). High strength materials like 316LN-Mod or Nitronic-50® are available for HP applications (900# & above).

PCTFE (Kel-F®), RPTFE and PEEK are applied as seat inserts. Lip-seals (PTFE jacket & Eligiloy® springs) are used as primary static and dynamic seals.

Applicable Specifications
API 6A/ API 6D
ASME B 16.34
BS 6364

Available Configuration

<table>
<thead>
<tr>
<th>BODY DESIGN</th>
<th>TOP ENTRY</th>
<th>SIDE ENTRY</th>
<th>RISING STEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRESSURE CLASS</td>
<td>SIZE RANGE</td>
<td>SIZE RANGE</td>
<td>SIZE RANGE</td>
</tr>
<tr>
<td>150# - 600#</td>
<td>2” - 56”</td>
<td>2” - 56”</td>
<td>1” - 24”</td>
</tr>
<tr>
<td>900#</td>
<td>2” - 36”</td>
<td>2” - 36”</td>
<td>1” - 20”</td>
</tr>
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<td>1500#</td>
<td>2” - 30”</td>
<td>2” - 30”</td>
<td>1” - 16”</td>
</tr>
<tr>
<td>2500#</td>
<td>2” - 24”</td>
<td>2” - 24”</td>
<td>1” - 8”</td>
</tr>
<tr>
<td>API 5000</td>
<td>2” 1/16 - 13” 5/8</td>
<td>2” 1/16 - 13” 5/8</td>
<td>-</td>
</tr>
<tr>
<td>API 10000</td>
<td>1” 3/16 - 13” 5/8</td>
<td>1” 3/16 - 13” 5/8</td>
<td>-</td>
</tr>
</tbody>
</table>

LOW TEMP LIMITS

-320°F/-196°C -320°F/-196°C -452°F/-269°C

FLOW DIRECTION
Uni-Directional ✓ ✓ ✓
Bi-Directional ✓ ✓ -

END CONNECTION
Butt Weld ✓ ✓ ✓
Flanged RF/ RTJ ✓ ✓ ✓
HUB ✓ ✓ ✓

SEATING
Soft Seated ✓ ✓ ✓
Metal Seated ✓ ✓ ✓

SEAT DESIGN
SPE ✓ ✓ -
DPE ✓ ✓ -
COMBINED SPE/ DPE ✓ ✓ -
Cryogenic Ball Valve Features

- Extended Bonnet Design: Improves seal performance at extremely low temperatures by isolating the stem seals from the cold media.

- Soft and Metal Seat Selection: Ensures correct functionality at all possible combinations of temperatures, fluid types and leakage rates.

- Double Stem Seals: A primary energized lip seal guarantees optimum leakage resistance in demanding cryogenic applications. In critical applications, the leak-proof integrity of the valve is further enhanced by a combination of the primary energized lip seal and an optional chevron packing (see Figure 1). The stem packing can be adjusted or live-loaded depending on customer requirement.

- Self Energized Body Seals: Zero leakage is achieved at extremely low temperatures and high/low pressure conditions through the primary spring energized lip seal.

- Internal Relief: Automatic excessive body pressure discharge through internal self relieving system. Pressure can be discharged upstream or downstream depending on customer requirement. This feature is not applicable for Rising Stem Ball Valves since the valve is undirectional by design.

Advantages

- 5 Cold boxes up to 56”
- Liquid nitrogen testing facility down to -196°C.
- HP direct nitrogen gasifying system for body and seat gas tests up to 420 barg (higher test pressure available with boosters).
- Helium HP gas test for -196°C testing.
- Helium mass spectrometer for fugitive emission test.
- Torque test tools c/w strain gauges torque cells.
- Data acquisition electronic system.

Flowserve Valbart In-House Cryogenic Testing Facilities

Figure 1. Typical Cryogenic Valve Stem Configuration
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