

PY4 CY series CRYOGENICS



Applications

Where are MECA-INOX ball Cryogenic valves used ?

- Road Trailers
- ASU (Air Separation Unit)
 - Filling stations & Pumping systems
 - Gas recovery & transfer Units
- Off shore pumping systems
- Storage tank changing systems
- LNG (Liquified Natural Gas) injection systems
- Industrial processing : food & beverage, steel industry, hospitals, microelectronics...



On which applications ?

- Liquid Carbon Dioxide (LCO₂)
- Liquid Nitrogen (LN₂)
- Liquid Oxygen (LO₂)
- Liquid Natural Gas (LNG)

Standards

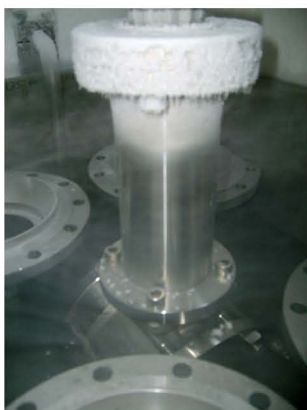
Our Cryogenic valves are fully compliant with European and international regulation: EN 1626 - ISO 21011

Degreasing & Packing

All components are degreased for oxygen service. Then, they are dried and assembled in a clean room according to EN 12 300 / ISO 23 208. Finally, they are packed into a sealed plastic bag tagged "Degreased for Oxygen Service".



Degreasing



Testing

All valves are pneumatically and hydraulically tested. Operating torques are measured at -320°F / -196°C and at maximum pressure difference allowed. A 40% safety margin is then added to ensure operation under the most several conditions.

Features & Benefits

UPPER STEM PACKING :

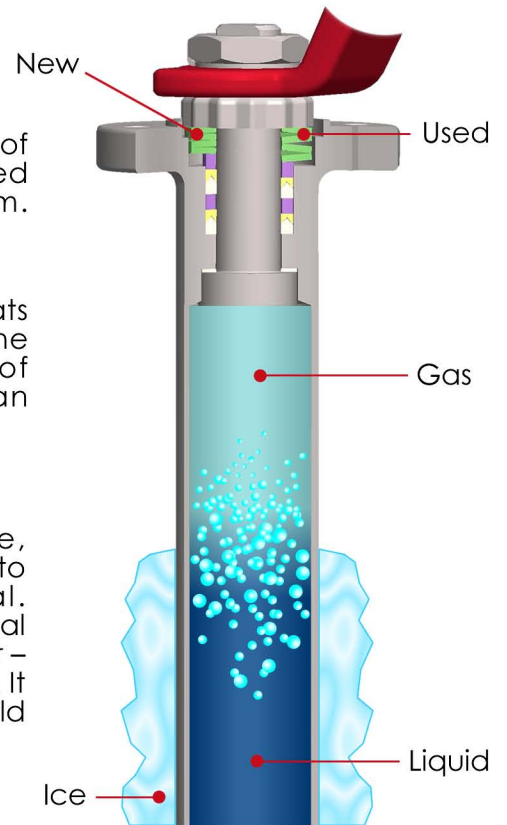
A double set of chevron packing, two glands and two pairs of live-loaded Belleville washers are located above a machined stop and thrust washer, at the top of the extended stem.

EXTENDED STEM :

Our entire valve, including ball, stem, extension tube and seats are designed specifically for cryogenic service. As such, the extended stem is precision machined from one piece of bar-stock. It has a larger ball engagement area and an oversized diameter throughout its length.

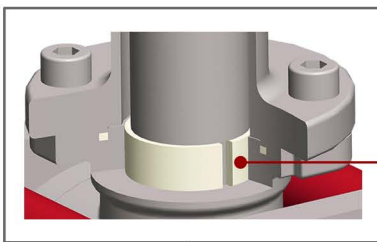
EXTENSION TUBE :

The extended stem is fully retained within a one-piece, machined extension tube that is bolted, without any welding to the valve body. Enclosed O'ring provide reliable seal. The extension precisely locates the stem and allows for minimal annular volume. Because it is made from a single extruded bar – it can be precisely machined and bolted to the valve body. It design create an upper gaseous volume to avoid any ice build up.



LOWER STEM BUSHING :

Where the stem leaves the valve body, there is a large, diagonally split-bushing that acts as a throttle bushing, restricting the flow of liquid into the extended tube. This keeps the vapor line as low as possible. Finally it is also used as stem centering bushing.



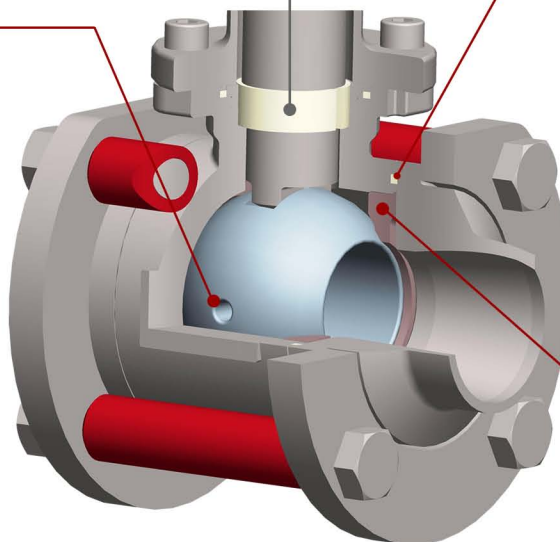
FULLY ENCLOSED BODY SEALS :

PTFE body seals are precisely located within machined grooves in the body and provide a reliable seal for all piping connections. These seals are more accommodating than coated metal, shaped seals that, once compressed, may not adequately adapt to piping stresses due to thermal expansion and contraction.

BALL :

In addition to the standard top-vent hole which equalizes pressures within the body and stem extension, there is a vent hole located on the upstream side that provides cavity relief when the valve is closed. There is a corresponding arrow engraved in the valve body that indicates the proper direction of flow.

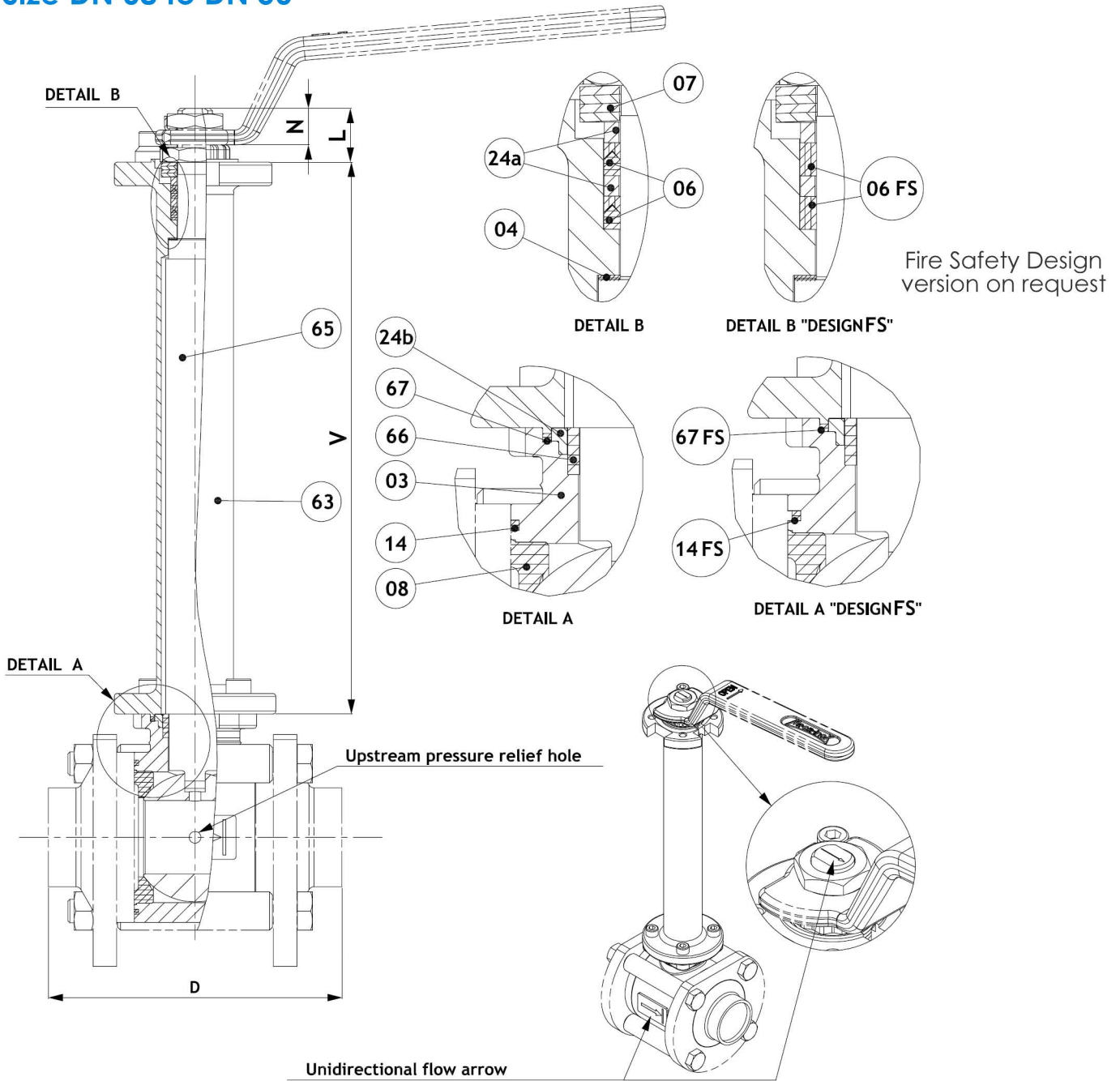
Overall, because of the increased ball / stem engagement area the valve is able to handle the greater torques seen in cryogenic applications.



SEATS :

The shape of our PTFE seats is designed to keep operating torques low and constant all the way down to -320°F and at maximum rated pressure.

Size DN 08 to DN 50

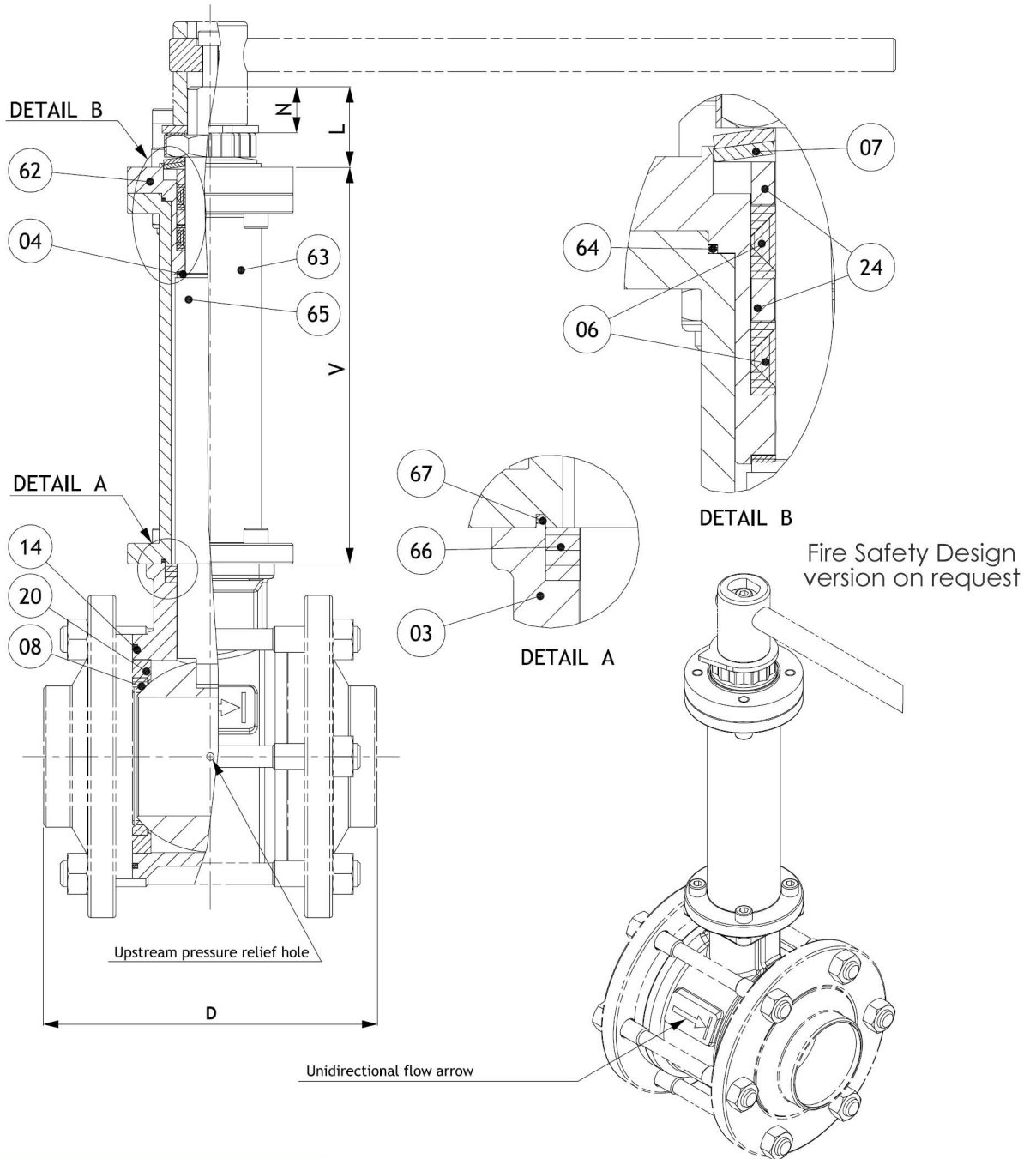


| Item | Qty | Description | Material (ASTM) |
|---------|-----|----------------------|-----------------|
| 03 | 1 | Body | CF-3M |
| 04 | 1 | Stem thrust seal | 20%PEEK PTFE |
| 06 | 2 | Gland packing | PTFE |
| 06 FS** | 2 | Gland packing | Graphite |
| 07 | 4 | Spring washers | 301 |
| 08 | 2 | Seat | PTFE+Carbon |
| 14 | 2 | Body seal | PTFE |
| 14 FS** | 2 | Body seal | Graphite |
| 24a | 2 | Gland | 316L |
| 24b | 1 | Guide ring | 316L |
| 63 | 1 | Extension tube | 316L |
| 65 | 1 | Extended stem | 316L |
| 66 | 1 | Split ring | PTFE |
| 67 | 1 | Lower extension seal | PTFE |
| 67 FS** | 1 | Lower extension seal | Graphite |

FS** Fire Safe design

| | | | | | | | Size |
|----------------|-------------------|--------------------------|------|------|-------|-----|------|
| Size Full bore | Size Reduced bore | Pressure Bars at -196 °C | L | N | V | D | |
| DN 08-12 | DN 15 | 40 | 13,4 | 8,7 | 157 | 65 | |
| DN 15 | DN 20 | 40 | 13,4 | 8,7 | 157 | 70 | |
| DN 20 | DN 25 | 40 | 18,4 | 12,6 | 188 | 85 | |
| DN 25 | DN 32 | 40 | 18,4 | 12,6 | 188 | 100 | |
| DN 32 | DN 40 | 40 | 24,2 | 16,2 | 211,5 | 110 | |
| DN 40 | DN 50 | 40 | 24,2 | 16,2 | 211,5 | 125 | |
| DN 50 | DN 65 | 40 | 29,6 | 19 | 208,8 | 150 | |

Size DN 65 à DN 150



| Item | Qty | Description | Material (ASTM) |
|------|-----|----------------------|-----------------|
| 03 | 1 | Body | CF-3M |
| 04 | 1 | Stem thrust seal | 20%PEEK PTFE |
| 06 | 2 | Gland packing | PTFE |
| 07 | 4 | Spring washers | 301 |
| 08 | 2 | Seat | PTFE+Carbon |
| 14 | 2 | Body seal | PTFE |
| 20 | 2 | Seat retaining ring | 316L |
| 24 | 2 | Gland | 316L |
| 62 | 1 | Manual flange | 316L |
| 63 | 1 | Extension tube | 316L |
| 64 | 1 | Upper extension seal | 316L |
| 65 | 1 | Extended stem | 316L |
| 66 | 1 | Split ring | PTFE |
| 67 | 1 | Lower extension seal | PTFE |

| Size | | | | | | |
|----------------|-------------------|--------------------------|------|----|-----|-----|
| Size Full bore | Size Reduced bore | Pressure Bars at -196 °C | L | N | V | D |
| DN 65 | DN 80 | 10 | 43,2 | 25 | 214 | 180 |
| DN 80 | DN 100 | 10 | 43,2 | 25 | 216 | 210 |
| DN 100 | DN 150 | 10 | 49 | 30 | 216 | 230 |

Operating Torques

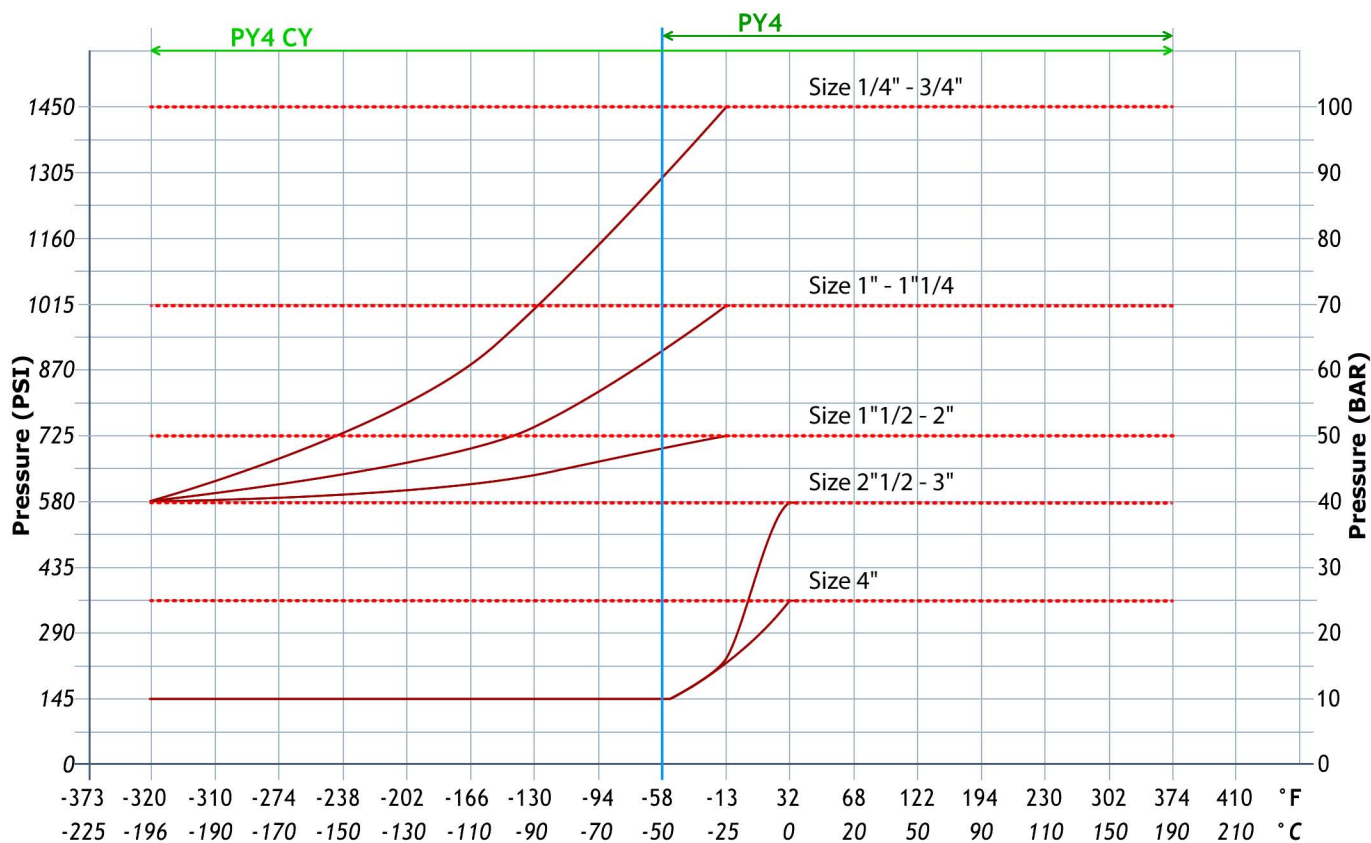
| Size | | Max dP at -196 °C / -320 °F (Bar) | PN (Bar) | Torque values Nm at -196 °C / -320 °F |
|------------|--------------|---|-------------|--|
| Full bore | Reduced bore | | | |
| DN 08 - 12 | DN 15 | 40 | 100 | 6 N.m |
| DN 15 | DN 20 | 40 | 100 | 11 N.m |
| DN 20 | DN 25 | 40 | 100 | 16 N.m |
| DN 25 | DN 32 | 40 | 70 | 26 N.m |
| DN 32 | DN 40 | 40 | 70 | 51 N.m |
| DN 40 | DN 50 | 40 | 50 | 86 N.m |
| DN 50 | DN 65 | 40 | 50 | 157 N.m |
| DN 65 | DN 80 | 10 | 40 | 172 N.m |
| DN 80 | DN 100 | 10 | 40 | 172 N.m |
| DN 100 | DN 150 | 10 | 25 | 301 N.m |



PY4 CY with pneumatic actuator

Pressure-Temperature Diagrams

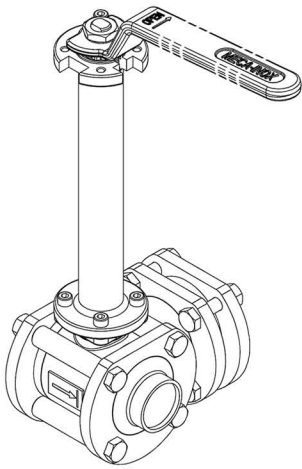
(- - - - -) Valve pressure rating
 (—) Max dP for operating
 All values are given for full bore size



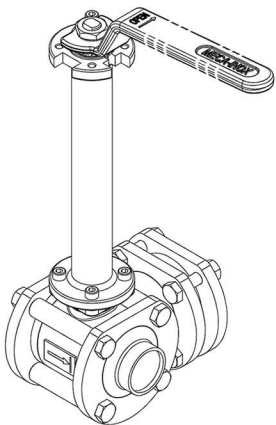
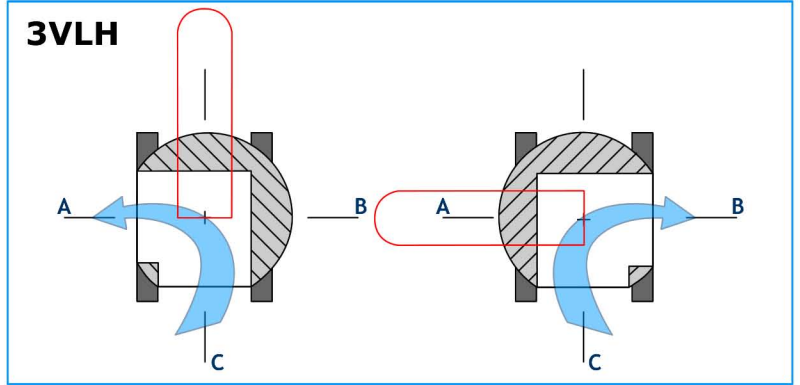
Size DN 08 to DN 150

Full bore & Reduce bore

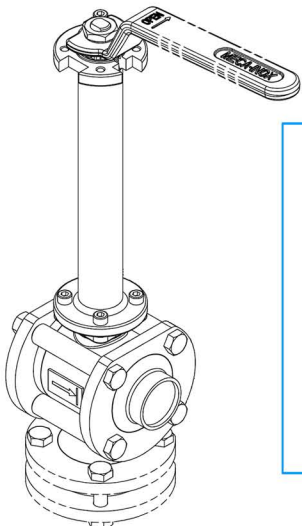
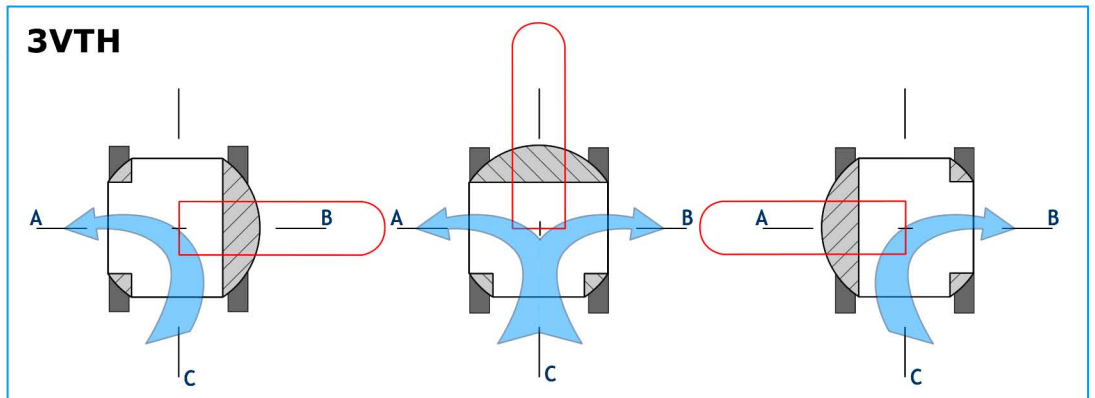
APP



Horizontal inlet / L port / Diverting flow (A or B)



Horizontal inlet / T port / Diverting flow (A or B) or mixing (A & B)



Vertical inlet / L port / Diverting flow (A or B) or flow stop

