VELAN

HERMETICALLY-SEALED GATE AND GLOBE BELLOWS SEAL VALVES

ALSO: BALL AND CONTROL VALVES FOR EXTREME APPLICATIONS

SIZES: ½ – 12”
15 – 300 mm

Please note this is a condensed catalog. For a complete catalog, contact Velan directly.
Velan is one of the world's leading manufacturers of industrial valves, supplying forged and cast steel gate, globe, check, ball, butterfly and knife gate valves for critical applications in the chemical, petrochemical, oil and gas, fossil and nuclear power, cogeneration, pulp and paper and cryogenic industries.

Founded in 1950, Velan earned a reputation for excellence as a major supplier of forged valves for nuclear power plants and the U.S. Navy. Velan Inc., pioneered many designs which became industry standards, including bellows seal valves in 1954, all stainless steel knife gate valves and forged valves up to 24".

Velan valves are manufactured in 12 specialized plants, including five in Canada, two in Korea and one each in the U.S., France, U.K., Portugal and Taiwan. We have a total of 1,091 employees in North America and 384 overseas.
VELAN R&D QUALIFICATION TESTING

Extensive bellows seal qualification testing has been performed in the research and development department to prove the bellows cycle life.

Velan bellows seal valves are designed with a minimum of two plies. Multi-ply bellows are superior to single ply and diaphragm (welded construction) bellows.

MULTI-PLY

Hot loop for cycling four bellows seal valves at 1800 psig @ 650°F (124 bar @ 343°C).
BELLOWS DESIGN PARAMETERS

DESIGN PARAMETERS
Velan valves feature a formed multi-ply bellows welded to the stem and to the bottom of the bonnet, creating a hermetic seal or impermeable barrier. Bellows are available in stainless steel, Inconel, Hastelloy C and Monel for virtually all corrosive chemical applications.

CYCLE LIFE
- Axial movement of the bellows is limited to a maximum of 20–25% of the free length, depending on pressure/temperature and desired life cycle.

Velan bellows are designed for:
- **5,000 cycles** for ½–2" (15–50mm) Y-pattern ASME Class 1500-2500 valves, and
- **3,000 cycles** for ½–2" (15–50mm) gate valves.

Large valves, sizes 2½–12" (65–300mm) are offered with
- **3,000** life cycles for globe, and
- **2,000** cycles for gate valves.
- The bellows stroke is 50% in tension and 50% in compression.
- Proper stem guiding eliminates torsion of bellows.
- Stroke limitation for long bellows. To accommodate long lift for larger gate valves, two or three bellows are joined and each takes over part of the lift.

APPLICATIONS
- Reliability and total containment of toxic and aggressive fluids is achieved with bellows sealed stem and seal-welded body-bonnet joint.
- Operators, the public and the environment are protected from packing and gasket leakage.
- Maintenance-free service for 2,000 to 10,000 cycles.
- Ideal for steam, which is difficult to contain and where loss of energy is very costly.
- Bellows sealed valves are currently in use in difficult and toxic services for the following fluids:

<table>
<thead>
<tr>
<th>Acrylonitrile</th>
<th>Ethyl Mercaptan</th>
<th>Phosgene</th>
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<tbody>
<tr>
<td>Ammonia</td>
<td>Freon</td>
<td>Potassium (liquid)</td>
</tr>
<tr>
<td>Argon</td>
<td>Helium</td>
<td>Sodium (liquid)</td>
</tr>
<tr>
<td>Benzene</td>
<td>Hydrogen</td>
<td>Steam</td>
</tr>
<tr>
<td>Carbon Dioxide</td>
<td>Hydrogen Bromide</td>
<td>Sulfuric Acid</td>
</tr>
<tr>
<td>Caustic Solutions</td>
<td>Hydrogen Chloride</td>
<td>Titanium Tetrachloride</td>
</tr>
<tr>
<td>Chlorine</td>
<td>Hydrogen Sulfide</td>
<td>Toluene</td>
</tr>
<tr>
<td>Heat transfer oils/media</td>
<td>Hydrofluoric Acid (HF)</td>
<td>Vinyl Chloride</td>
</tr>
<tr>
<td>Dowtherm</td>
<td>Nitrogen</td>
<td></td>
</tr>
</tbody>
</table>

Also for sour gas and oil, cryogenic and vacuum service.

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Raw material for multi-ply bellows (Gr. 321 stainless steel, Inconel or Hastelloy C), tested for intergranular corrosion, tensile and elongation.

In-line inspection of tube welding prior to convolution forming.

Laser welding of bellows to end rings.

Microplasma welding of bellows.

Photos courtesy of Witzenmann GmbH

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Helium leak testing. Bellows are rejected if leakage exceeds $10^{-8}$ cm$^3$ per second.

Spring rate test verifies force needed to compress bellows.

Concentricity testing of bellows, end fittings.

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COMPACT FORGED STEEL BELLOWS SEAL GATE VALVES

THREADED, SOCKET WELD OR FLANGED ½–2˝ (15–50 mm)

API 602, CLASSES 800, 1500, ASME CLASSES 150–1500

DESIGN FEATURES:

- Long cycle life bellows (3000 cycles).
  Designed and qualification-tested for high pressure/temperature service.

- Bellows monitoring port (optional). A plug can be connected with the space above the bellows to monitor performance.

- Two secondary stem seals:
  a) Backseat in open position
  b) Graphite packing.

- Superior seating faces.
  Seats hardfaced with Stellite 6 and wedge is solid Stellite 6.

All standard valves available in A 105N, A 182 Gr. F22 & Gr. F316.

TYPICAL A 105 VALVE PARTS LIST

<table>
<thead>
<tr>
<th>Part</th>
<th>Standard Materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body</td>
<td>A 105N</td>
</tr>
<tr>
<td>Body Extension</td>
<td>Steel ASTM A 106 Gr. B</td>
</tr>
<tr>
<td>Seat</td>
<td>Gr. 410 (stainless) HF</td>
</tr>
<tr>
<td>Wedge</td>
<td>Stellite 6</td>
</tr>
<tr>
<td>Bonnet</td>
<td>A 105N</td>
</tr>
<tr>
<td>Stem</td>
<td>Gr. 410 (stainless)</td>
</tr>
<tr>
<td>Packing rings</td>
<td>Graphite</td>
</tr>
<tr>
<td>Bellows(1)</td>
<td>Gr. 321 (stainless)</td>
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<tr>
<td>Gland stud</td>
<td>Gr. B6 (stainless)</td>
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<tr>
<td>Gland nut</td>
<td>Gr. 2H (stainless)</td>
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<tr>
<td>Gland</td>
<td>Gr. 416 (stainless)</td>
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<td>Packing flange</td>
<td>A 105</td>
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<tr>
<td>Stem nut</td>
<td>Gr. 416 (stainless)</td>
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<td>Yoke bushing</td>
<td>Steel</td>
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<tr>
<td>Handwheel</td>
<td>Malleable iron (painted)</td>
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<tr>
<td>Stem nut</td>
<td>Steel</td>
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<tr>
<td>Handwheel Lock washer</td>
<td>Steel</td>
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<tr>
<td>Name plate</td>
<td>Aluminum</td>
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</table>

(1) Hastelloy C and Inconel 625 also available.

A bolted bonnet version with provision for seal welding is available for nuclear and other applications.

Optional body, trim and bellows materials available on request.

PRESSURE/TEMPERATURE RATINGS

<table>
<thead>
<tr>
<th>Material</th>
<th>Temp. °F</th>
<th>Working Pressure psig</th>
<th>Shell Test Pressure psig</th>
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<tbody>
<tr>
<td></td>
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<td>1500</td>
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<tr>
<td>A 105N</td>
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<td>1975</td>
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<td></td>
<td>800</td>
<td>1100</td>
<td>2060</td>
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<tr>
<td>A 182 Gr. F 316</td>
<td>100</td>
<td>1920</td>
<td>3600</td>
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<tr>
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<td>800</td>
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DIMENSIONS

<table>
<thead>
<tr>
<th>Size in mm</th>
<th>Port</th>
<th>End to End</th>
<th>Handwheel</th>
<th>Center to Top Open</th>
<th>Socket Weld</th>
<th>Socket Weld</th>
<th>End to End (Flanged)</th>
<th>Bore</th>
<th>Depth</th>
<th>150</th>
<th>300</th>
<th>600</th>
<th>1500</th>
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<tr>
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(1) All dimensions are for A 105N and F316 only. For other materials see ¾˝ (20 mm) dimensions.

FIGURE NUMBERS

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<thead>
<tr>
<th>Class</th>
<th>Figure No.</th>
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<td>2054T</td>
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<td>1500</td>
<td>3054T</td>
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</table>

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**FORGED STEEL BELLOWS SEAL EXTENDED BODY GATE VALVES, CONVENTIONAL PORT, THREADED OR SOCKET WELD FEMALE ¼–2” (15–50 mm), API 602, CLASSES 800, 1500**

**DESIGN FEATURES:**
- **Long cycle life bellows (3000 cycles).**
  - Gr. 321 (stainless) for Class 800,
  - Gr. 321 or Inconel for Class 1500,
  - and Hastelloy C for chlorine service.
  - Optional materials available on request.
  - Designed and qualification-tested for high pressure/temperature service.
- **Bellows monitoring port** (optional).
  - A plug can be connected with the space above the bellows to monitor performance.
- **Two secondary stem seals:**
  - a) Backseat in open position
  - b) Graphite packing.
- **Superior seating faces.**
  - Seats hardfaced with Stellite 6 and wedge is solid Stellite 6.

**APPLICATIONS:**
The drain valve has a welded or threaded connection and is used for tapping of pressure vessels and header lines for vents, drains, or take-off lines and instrumentation.

**TWO TYPES:**
The valves are available with a standard extended body or integrally-reinforced extended body (“IREB” valves).

**FIGURE NUMBERS**

<table>
<thead>
<tr>
<th>Class</th>
<th>Standard</th>
<th>IREB</th>
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<tbody>
<tr>
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**AVAILABLE VARIATIONS**

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<th>END CONNECTION</th>
<th>IREB</th>
<th>STANDARD</th>
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<tbody>
<tr>
<td>Female thread</td>
<td>Male weld end</td>
<td>Male thread Male plain</td>
</tr>
<tr>
<td>Male socket weld</td>
<td>Male weld end</td>
<td>Male plain</td>
</tr>
</tbody>
</table>

**PRESSURE/TEMPERATURE RATINGS**

<table>
<thead>
<tr>
<th>Material</th>
<th>Temp. °F</th>
<th>Working Pressure psig</th>
<th>Shell Test Pressure psig</th>
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</thead>
<tbody>
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<td>°C</td>
<td>bar</td>
<td>bar</td>
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**STANDARD DIMENSIONS**

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<th>Size in mm</th>
<th>Port</th>
<th>End to End</th>
<th>OD ID</th>
<th>Male End OD ID</th>
<th>Length from Center</th>
<th>Handwheel</th>
<th>Socket Weld Bore</th>
<th>Socket Weld Depth</th>
<th>Center to Top Open</th>
</tr>
</thead>
<tbody>
<tr>
<td>½</td>
<td>5.63</td>
<td>13</td>
<td>5.75</td>
<td>0.84 0.63</td>
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<td>3.50 3.50</td>
<td>0.885 21.72</td>
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<td>1.065 27.05</td>
<td>0.50 11.25</td>
</tr>
<tr>
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<td>18</td>
<td>6.50</td>
<td>1.32 0.84</td>
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**IREB DIMENSIONS**

<table>
<thead>
<tr>
<th>Size in mm</th>
<th>Port</th>
<th>End to End</th>
<th>OD ID</th>
<th>Male End OD ID</th>
<th>Length from Center</th>
<th>Handwheel</th>
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<th>Socket Weld Depth</th>
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<tr>
<td>½</td>
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<td>1.32 0.84</td>
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<td>3.50 5.00</td>
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<td>1 1/2</td>
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<td>2</td>
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<td>2 1/2</td>
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<td>10.38</td>
<td>3.85 2.98</td>
<td>114.36 133</td>
<td>9.75 0.25</td>
<td>6.00 10.00</td>
<td>2.406 61.11</td>
<td>0.63 17.81</td>
</tr>
<tr>
<td>4</td>
<td>3.37</td>
<td>63</td>
<td>11.38</td>
<td>4.37 3.39</td>
<td>132.36 133</td>
<td>9.75 0.25</td>
<td>6.00 10.00</td>
<td>2.406 61.11</td>
<td>0.63 17.81</td>
</tr>
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<td>4.86 3.85</td>
<td>150.36 133</td>
<td>9.75 0.25</td>
<td>6.00 10.00</td>
<td>2.406 61.11</td>
<td>0.63 17.81</td>
</tr>
</tbody>
</table>

Please note this is a condensed catalog. For a complete catalog, contact Velan directly.
CAST STEEL BELLOWS SEAL
BOLTED BONNET GATE VALVES

FLANGED OR BUTT WELD 2–12” (50–300 mm)
API 600, ASME CLASSES 150, 300, 600
WITH OPTIONAL PROVISION FOR SEAL WELDING

DESIGN FEATURES:

- **Long cycle life bellows (2000 cycles)** in Gr. 321 (stainless), Inconel for special applications, maybe replaced with Monel trim to resist corrosion or Hastelloy C for chlorine service.

- **Improved body-bonnet joint.**
  Graphite reinforced with SS foil gasket for Class 150 valves. Fully-encased, spiral wound graphite-filled Gr. 316 (stainless) gasket for Classes 300-600.

- **Bolted body-bonnet** for fast serviceability.
  Hermetically-sealed bonnets available for Classes 300 and 600.

- **Two or three section bellows assembly.**

- **Non-rotating stem** prevents torsion of bellows.

- **Two secondary stem seals:**
  a) Backseat in open position
  b) Graphite packing.

- **Welded-in seat** hardfaced with Stellite 6.

- **Wedge hardfaced** with Stellite 6 for long life.

- **Seating faces hardfaced** with Stellite 6, ground and lapped.

**STANDARD MATERIALS**

<table>
<thead>
<tr>
<th>Part</th>
<th>Carbon steel</th>
<th>Stainless steel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body/bonnet</td>
<td>A 216 Gr. WCB</td>
<td>A 351 Gr. CF8M</td>
</tr>
<tr>
<td>Wedge</td>
<td>Stellite faced</td>
<td>Stellite faced</td>
</tr>
<tr>
<td>Seats</td>
<td>Stellite faced A 105</td>
<td>CF8M</td>
</tr>
<tr>
<td>Stem</td>
<td>Gr. 13 CR</td>
<td>Gr. 316</td>
</tr>
<tr>
<td>Bellows</td>
<td>Gr. 321 (stainless) or Inconel</td>
<td></td>
</tr>
<tr>
<td>Stem nut</td>
<td>Austenitic ductile iron A 439 Gr. D-2C</td>
<td></td>
</tr>
<tr>
<td>Packing</td>
<td>Graphite</td>
<td></td>
</tr>
</tbody>
</table>

**PRESSURE/TEMPERATURE RATINGS**

<table>
<thead>
<tr>
<th>Material</th>
<th>Temp. °F</th>
<th>Working Pressure psig</th>
<th>Shell Test Pressure psig</th>
</tr>
</thead>
<tbody>
<tr>
<td>A 216 Gr. WCB</td>
<td>100 38</td>
<td>285 20</td>
<td>740 51</td>
</tr>
<tr>
<td>A 351 Gr. CF8M</td>
<td>800 125</td>
<td>80 5.5</td>
<td>410 28</td>
</tr>
<tr>
<td>A 351 Gr. CF8M</td>
<td>100 120</td>
<td>275 19</td>
<td>720 50</td>
</tr>
<tr>
<td>A 351 Gr. CF8M</td>
<td>1000 250</td>
<td>20 1.4</td>
<td>350 24</td>
</tr>
</tbody>
</table>

**DIMENSIONS AND WEIGHTS**

Please note this is a condensed catalog. For a complete catalog, contact Velan directly.
FORGED STEEL BELLOWS SEAL BOLTED BONNET GATE VALVES
2–6” (50–150 mm) ASME CLASSES 600, 1500
WITH OPTIONAL PROVISION FOR SEAL WELDING

DESIGN FEATURES:

- **Long cycle life bellows (2000 cycles)** in Gr. 321 (stainless) or Inconel. Designed for, and successfully tested in, high pressure/temperature conditions.
- **Bellows monitoring port** (optional). Connected to the space above the bellows to monitor performance.
- **Non-rotating stem** prevents torsion of bellows.
- **Two secondary stem seals:**
  a) Backseat in open position.
  b) Graphite packing.
- **Forged for higher safety.** Increased toughness, strength and fatigue resistance.
- **Two-part bellows.**
- **Low torque.**
  a) Non-rotating stem prevents torsion of bellows
  b) Stem nut thrust bearings
  c) Central lubrication
- **Seating faces hardfaced** with Stellite 6, ground and lapped.

STANDARD MATERIALS

<table>
<thead>
<tr>
<th>Part</th>
<th>Carbon steel</th>
<th>Stainless steel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body / bonnet</td>
<td>A 105</td>
<td>A 182 Gr. F316</td>
</tr>
<tr>
<td>Wedge</td>
<td>Stellite faced</td>
<td>Stellite faced</td>
</tr>
<tr>
<td>Seats</td>
<td>Stellite faced</td>
<td>Stellite faced F8M</td>
</tr>
<tr>
<td>Stem</td>
<td>Gr. 13 CR</td>
<td>Gr. 316</td>
</tr>
<tr>
<td>Bellows</td>
<td>Gr. 321 (stainless) or Inconel Manganese bronze</td>
<td></td>
</tr>
<tr>
<td>Stem nut</td>
<td>Manganese bronze</td>
<td></td>
</tr>
<tr>
<td>Packing</td>
<td>Graphite</td>
<td></td>
</tr>
</tbody>
</table>

PRESSURE/TEMPERATURE RATINGS

<table>
<thead>
<tr>
<th>Material</th>
<th>Temp. °F</th>
<th>Working Pressure psig/bar</th>
<th>Shell Test Pressure psig/bar</th>
</tr>
</thead>
<tbody>
<tr>
<td>A 105</td>
<td>100</td>
<td>1490 102 2220 153 3705 256 5575 2225</td>
<td>231 335 384 5175 384</td>
</tr>
<tr>
<td>A 182 Gr. F316</td>
<td>800 427</td>
<td>825 57 1235 85 2050 142</td>
<td>153 2175 3250 5400 372</td>
</tr>
<tr>
<td>A 182 Gr. F316</td>
<td>1000 538</td>
<td>1000 700 1190 72 1700 121</td>
<td>150 2150 3250 5400 372</td>
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</tbody>
</table>

DIMENSIONS

<table>
<thead>
<tr>
<th>Size in mm</th>
<th>Center to Top Closed in mm</th>
<th>End to End (Butt Weld) in mm</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>600</td>
<td>900</td>
</tr>
<tr>
<td>2</td>
<td>25</td>
<td>635</td>
</tr>
<tr>
<td>2 ½</td>
<td>35</td>
<td>889</td>
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<tr>
<td>3</td>
<td>47</td>
<td>1194</td>
</tr>
<tr>
<td>4</td>
<td>57</td>
<td>1448</td>
</tr>
<tr>
<td>6</td>
<td>67</td>
<td>1702</td>
</tr>
</tbody>
</table>

All valves available in A 105N, A 182 Gr. F22 or Gr. F316.

Please note this is a condensed catalog. For a complete catalog, contact Velan directly.
**COMPACT FORGED STEEL BELLows SEAl GLOBE VALVES**

¾”–2” (15–50 mm)  
API 602 CLASS 800, ASME CLASSES 150 – 800

---

**Design Features:**
- Long cycle life bellows (10,000 cycles).
- Designed and qualification-tested for high pressure/temperature applications.
- Bellows monitoring port (optional). A plug can be connected to the space above the bellows to monitor performance.
- Two secondary stem seals:  
  a) Backseat in open position  
  b) Graphite packing.
- Superior seating faces. Seats hardfaced with Stellite 6, disc is solid Stellite 6.

---

**Typical A 105 Valve Parts List**

<table>
<thead>
<tr>
<th>Part</th>
<th>Standard Materials</th>
</tr>
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<tbody>
<tr>
<td>Body</td>
<td>A 105N</td>
</tr>
<tr>
<td>Body extension</td>
<td>Steel ASTM A106 Gr. B</td>
</tr>
<tr>
<td>Seat</td>
<td>Stellite (integral)</td>
</tr>
<tr>
<td>Disc</td>
<td>Stellite 6</td>
</tr>
<tr>
<td>Bonnet</td>
<td>A 105N</td>
</tr>
<tr>
<td>Stem</td>
<td>Gr. 410 (stainless)</td>
</tr>
<tr>
<td>Packing rings</td>
<td>Graphite</td>
</tr>
<tr>
<td>Bellows</td>
<td>Gr. 321 (stainless)</td>
</tr>
<tr>
<td>Gland stud</td>
<td>Gr. B6 (stainless)</td>
</tr>
<tr>
<td>Gland nut</td>
<td>Gr. 2H (stainless)</td>
</tr>
<tr>
<td>Gland</td>
<td>Gr. 416 (stainless)</td>
</tr>
<tr>
<td>Packing flange</td>
<td>A 105</td>
</tr>
<tr>
<td>Stem nut</td>
<td>Gr. 416 (stainless)</td>
</tr>
<tr>
<td>Yoke bushing</td>
<td>Steel</td>
</tr>
<tr>
<td>Handwheel (painted)</td>
<td>Malleable iron</td>
</tr>
<tr>
<td>Handwheel nut</td>
<td>Steel</td>
</tr>
<tr>
<td>Handwheel lock washer</td>
<td>Steel</td>
</tr>
<tr>
<td>Name plate</td>
<td>Aluminum</td>
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**Figure Numbers**

<table>
<thead>
<tr>
<th>Class</th>
<th>Figure No.</th>
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<tbody>
<tr>
<td>150</td>
<td>0074T</td>
</tr>
<tr>
<td>300</td>
<td>1074T</td>
</tr>
<tr>
<td>600/800</td>
<td>2074T</td>
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</table>

---

**Pressure/Temperature Ratings**

<table>
<thead>
<tr>
<th>Material</th>
<th>Temp. °F</th>
<th>Working Pressure psig</th>
<th>Shell Test Pressure psig</th>
</tr>
</thead>
<tbody>
<tr>
<td>A 105N</td>
<td>100</td>
<td>800</td>
<td>800</td>
</tr>
<tr>
<td></td>
<td>38</td>
<td>135</td>
<td>135</td>
</tr>
<tr>
<td>A 182 Gr. F316</td>
<td>100</td>
<td>2975</td>
<td>2975</td>
</tr>
<tr>
<td></td>
<td>38</td>
<td>132</td>
<td>132</td>
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**Dimensions**

<table>
<thead>
<tr>
<th>Size in mm</th>
<th>Port</th>
<th>End to End</th>
<th>Handwheel</th>
<th>Socket Weld Bore</th>
<th>Socket Weld Depth</th>
<th>Center to Top Open</th>
<th>End to End (Flanged)</th>
<th>150</th>
<th>300</th>
<th>600</th>
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</thead>
<tbody>
<tr>
<td>¼</td>
<td>0.31</td>
<td>2.88</td>
<td>2.50</td>
<td>0.855</td>
<td>0.38</td>
<td>7.00</td>
<td>4.25</td>
<td>6.00</td>
<td>6.50</td>
<td></td>
</tr>
<tr>
<td>⅜</td>
<td>0.50</td>
<td>3.25</td>
<td>3.50</td>
<td>1.065</td>
<td>0.50</td>
<td>9.00</td>
<td>4.63</td>
<td>7.00</td>
<td>7.50</td>
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<td>1/2</td>
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<td>1.330</td>
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<tr>
<td>1</td>
<td>1.25</td>
<td>5.00</td>
<td>6.00</td>
<td>1.675</td>
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<td>12.31</td>
<td>5.50</td>
<td>8.50</td>
<td>9.00</td>
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<tr>
<td>1 ¾</td>
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<td>9.00</td>
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<tr>
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<td>5.25</td>
<td>6.00</td>
<td>2.406</td>
<td>0.63</td>
<td>14.69</td>
<td>8.00</td>
<td>10.50</td>
<td>11.50</td>
<td></td>
</tr>
</tbody>
</table>

---

**Please note this is a condensed catalog.**

**Optional body, trim and bellows materials available on request.**

**All standard valves available in A 105N, A 182 Gr. F22 and Gr. F316.**

---

**For a complete catalog, contact Velan directly.**
DESIGN FEATURES:

- **Long cycle life bellows** (3000 cycles) in Gr. 321 (stainless), Inconel for special applications, or Hastelloy C for chlorine service.
- **Bolted body-bonnet joints** for fast serviceability. Fully enclosed spiral wound Gr. 316 (stainless) graphite gaskets.
- **Non-rotating stem** prevents torsion of bellows.
- **Two-secondary stem seals:**
  a) Back seat in open position.  
  b) Graphite packing.
- **Bellows monitoring port** (optional). A plug can be connected to the space above the bellows to monitor performance.
- **Seat and disc hardfaced with Stellite 6**, ground and lapped.

STANDARD MATERIALS

<table>
<thead>
<tr>
<th>Part</th>
<th>Carbon Steel</th>
<th>Stainless Steel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body/bonnet</td>
<td>A 216 Gr. WCB</td>
<td>A 351 Gr. CF8M</td>
</tr>
<tr>
<td>Stem</td>
<td>Gr. 13 CR</td>
<td>Gr. 316</td>
</tr>
<tr>
<td>Disc(1)</td>
<td>CA-15 or 13CR or A 105 HF</td>
<td>CF8M HFor F316 HF</td>
</tr>
<tr>
<td>Bellows</td>
<td>Gr. 321 (stainless), Inconel or Hastelloy</td>
<td></td>
</tr>
<tr>
<td>Bellows fitting</td>
<td>Gr. 321 (stainless)</td>
<td></td>
</tr>
<tr>
<td>Packing</td>
<td>Graphite</td>
<td></td>
</tr>
<tr>
<td>Seat</td>
<td>Integral hardfaced Stellite 6</td>
<td></td>
</tr>
<tr>
<td>Stem nut</td>
<td>Manganese bronze</td>
<td></td>
</tr>
</tbody>
</table>

(1) Soft disc inserts available for gas or vacuum service.

FIGURE NUMBERS

<table>
<thead>
<tr>
<th>Class</th>
<th>Figure No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>150</td>
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<td>1074V</td>
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<tr>
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<td>2074V</td>
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PRESSURE/TEMPERATURE RATINGS

<table>
<thead>
<tr>
<th>Class</th>
<th>Material</th>
<th>Temp. °F</th>
<th>Working Pressure</th>
<th>Shell Test Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>°C</td>
<td>psig bar</td>
<td>psig bar</td>
</tr>
<tr>
<td>150</td>
<td>A 216 Gr. WCB</td>
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<td>285</td>
<td>740</td>
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<td></td>
<td>38</td>
<td>20</td>
<td>51</td>
</tr>
<tr>
<td></td>
<td></td>
<td>800</td>
<td>427</td>
<td>85</td>
</tr>
<tr>
<td></td>
<td>A 351 Gr. CF8M</td>
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<td>275</td>
<td>720</td>
</tr>
<tr>
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<td></td>
<td>38</td>
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<td>50</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1000</td>
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<td>538</td>
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<td>24</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1000</td>
<td>538</td>
<td>350</td>
</tr>
</tbody>
</table>

Available in A 216 Gr. WCB, A 217 Gr. WC6, A 217 Gr. C5, A 352 Gr. LCB and A 351 Gr. CF8M.

Please note this is a condensed catalog. For a complete catalog, contact Velan directly.
FORGED STEEL BELLOWS SEAL
Y-PATTERN GLOBE VALVES
½ –2” (15–50 mm) ASME CLASSES 1500, 2500

DESIGN FEATURES:

- Long cycle life bellows (5000 cycles).
  Gr. 321 (stainless) for Class 1500, Hastelloy for Class 2500. Optional materials available on request. Designed for, and successfully tested in high pressure/temperature conditions.

- No torsion of bellows.
  Splined stem prevents torsion of bellows and assures long cycle life.

- Low torque due to:
  a) non-rotating stem
  b) yoke nut thrust bearings
  c) central grease fitting for lubrication of stem nut.

- Two secondary stem seals:
  a) Backseat in open position
  b) Graphite packing.

- In-line servicing. Stem-bellows assembly can easily be removed and replaced on valves with threaded (O-ring seat) bonnet. On seal-welded valves, removal and replacement of weld is necessary. Special tools are available for cutting the seal weld.

- Solid Stellite disc and seat. (Seat vacuum brazed).

STANDARD MATERIALS

<table>
<thead>
<tr>
<th>Part</th>
<th>Carbon Steel</th>
<th>Alloy Steel</th>
<th>Stainless Steel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body</td>
<td>A 105N</td>
<td>A 182 Gr. F22</td>
<td>A 182 Gr. F316</td>
</tr>
<tr>
<td>Seat</td>
<td>Stellite 6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disc</td>
<td>Stellite 6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stem</td>
<td>Gr. 410 (stainless)</td>
<td>Gr. 316B (stainless)</td>
<td></td>
</tr>
<tr>
<td>Stem nut</td>
<td>Austenitic ductile iron A 439 Gr. D-2C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bellows</td>
<td>Class 1500 Gr. 321 (stainless) or Inconel Class 2500 Hastelloy C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bellows fitting</td>
<td>Gr. 321 (stainless)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spline bushing</td>
<td>Gr. 630 (stainless)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

DIMENSIONS

<table>
<thead>
<tr>
<th>Size in mm</th>
<th>End to End</th>
<th>Center to Top</th>
<th>Handwheel</th>
</tr>
</thead>
<tbody>
<tr>
<td>½</td>
<td>5.75</td>
<td>11.90</td>
<td>6.00</td>
</tr>
<tr>
<td>⅜</td>
<td>5.75</td>
<td>11.90</td>
<td>6.00</td>
</tr>
<tr>
<td>1</td>
<td>5.75</td>
<td>11.90</td>
<td>6.00</td>
</tr>
<tr>
<td>1½</td>
<td>10.13</td>
<td>18.90</td>
<td>12.00</td>
</tr>
<tr>
<td>1½</td>
<td>10.13</td>
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</tr>
<tr>
<td>2</td>
<td>10.13</td>
<td>18.90</td>
<td>12.00</td>
</tr>
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</table>

PRESSURE/TEMPERATURE RATINGS

<table>
<thead>
<tr>
<th>Material</th>
<th>Temp. °F / °C</th>
<th>Working Pressure psig / bar</th>
<th>Shell Test Pressure psig / bar</th>
</tr>
</thead>
<tbody>
<tr>
<td>A 105N</td>
<td>100/38</td>
<td>3705/256</td>
<td>5575/384</td>
</tr>
<tr>
<td>A 182 Gr. F22</td>
<td>100/38</td>
<td>3750/259</td>
<td>5625/388</td>
</tr>
<tr>
<td>A 182 Gr. F316</td>
<td>100/38</td>
<td>3600/248</td>
<td>5400/372</td>
</tr>
</tbody>
</table>

Please note this is a condensed catalog.
For a complete catalog, contact Velan directly.
DESIGN FEATURES:

- **Long cycle life bellows (3000 cycles)** in Gr. 321 (stainless) or Inconel. Designed and successfully tested in high pressure/temperature conditions.

- **Two-part bellows.**

- **Two secondary stem seals:**
  a) backseat in open position
  b) graphite packing.

- **Low torque.**
  a) Non-rotating stem prevents torsion of bellows
  b) Stem nut thrust bearings
  c) Central lubrication.

- **Bellows monitoring port (optional).**
  A plug can be connected to the space above the bellows to monitor performance.

- **Forged for higher safety.**
  Increased toughness, strength and fatigue resistance.

- **Guided disc.** Seat and disc hardfaced with Stellite 6, ground and lapped.

STANDARD MATERIALS

<table>
<thead>
<tr>
<th>Part</th>
<th>Carbon steel</th>
<th>Stainless steel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body/bonnet</td>
<td>A 105</td>
<td>A 182 Gr. F316</td>
</tr>
<tr>
<td>Stem</td>
<td>Gr. 13 Cr</td>
<td>Gr. 316</td>
</tr>
<tr>
<td>Disc</td>
<td>A 105(1)</td>
<td>Gr. F316(1)</td>
</tr>
<tr>
<td>Bellows</td>
<td>Gr. 321 (stainless), Inconel or Hastelloy</td>
<td></td>
</tr>
<tr>
<td>Bellows fitting</td>
<td>Gr. 321 (stainless)</td>
<td></td>
</tr>
<tr>
<td>Packing</td>
<td>Graphite</td>
<td></td>
</tr>
<tr>
<td>Seat</td>
<td>Integral Hardfaced Stellite 6</td>
<td></td>
</tr>
<tr>
<td>Stem nut</td>
<td>Manganese bronze</td>
<td></td>
</tr>
</tbody>
</table>

(1) Soft disc inserts available for gas or vacuum service.
(2) Hardfaced Stellite 6

FIGURE NUMBERS

<table>
<thead>
<tr>
<th>Class</th>
<th>Figure No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>600</td>
<td>2074R</td>
</tr>
<tr>
<td>900</td>
<td>7074R</td>
</tr>
<tr>
<td>1500</td>
<td>3074R</td>
</tr>
</tbody>
</table>

PRESSURE/TEMPERATURE RATINGS

<table>
<thead>
<tr>
<th>Material</th>
<th>Temp. °F °C</th>
<th>Working Pressure psig bar</th>
<th>Shell Test Pressure psig bar</th>
</tr>
</thead>
<tbody>
<tr>
<td>A 105</td>
<td>38 1480</td>
<td>2220 3705</td>
<td>2225 3350 5575</td>
</tr>
<tr>
<td></td>
<td>102 153</td>
<td>256 256</td>
<td>153 231 364</td>
</tr>
<tr>
<td></td>
<td>427 85</td>
<td>2060 2060</td>
<td>85 142</td>
</tr>
<tr>
<td>A 182 Gr. F316</td>
<td>100 1440</td>
<td>2160 3600</td>
<td>199 2175 5400</td>
</tr>
<tr>
<td></td>
<td>99 149</td>
<td>149 248</td>
<td>99 150 224</td>
</tr>
<tr>
<td></td>
<td>539 538</td>
<td>384 406</td>
<td>538 48 65</td>
</tr>
<tr>
<td></td>
<td>590 569</td>
<td>72 1750</td>
<td>569 26 32</td>
</tr>
</tbody>
</table>

DIMENSIONS

<table>
<thead>
<tr>
<th>Size in mm</th>
<th>Center to Top of Handwheel in mm</th>
<th>End to End in mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>600</td>
<td>900</td>
<td>1500</td>
</tr>
<tr>
<td>2½ 65</td>
<td>22 26 29</td>
<td>8,50 216 254</td>
</tr>
<tr>
<td>3 80</td>
<td>23 28 31</td>
<td>10 254 305</td>
</tr>
<tr>
<td>4 100</td>
<td>31 35 38</td>
<td>12 305 356</td>
</tr>
<tr>
<td>6 150</td>
<td>41 47 51</td>
<td>22 559 508</td>
</tr>
<tr>
<td>8 200</td>
<td>44 55 60</td>
<td>26 660 711</td>
</tr>
<tr>
<td>10 250</td>
<td>48 59 65</td>
<td>31 787 864</td>
</tr>
</tbody>
</table>

Please note this is a condensed catalog. For a complete catalog, contact Velan directly.
**TE-150/300 BELLows SEAL MEMORY SEAL BALL VALVES**

**CARBON, STAINLESS STEEL AND OTHER MATERIALS**

**REGULAR PORT ½—2” (15—50 mm) FULL PORT ½—1½” (15—40 mm),**

**SCREWED, SOCKET WELD, BUTT WELD, FLANGED, ASME Classes 150, 300**

**DESIGN FEATURES:**

- Hermetically sealed.
- Laboratory testing to 100,000 cycles with “0” ppm emissions.
- Long cycle life bellows in Hastelloy C.
- Secondary PTFE or graphite packing seal.
- A unique bellows seal design with stainless steel driver unit allows installation of standard, pneumatic or electric actuator.
- Only one fully-encased spiral wound SS 316 graphite gasket is exposed to pressure. The gasket in the driver unit acts only in the event of bellows failure.
- Design permits disassembly in-line.
- Unique "in-tension" seats with induced sealing memory compensate for wear and pressure/temperature fluctuations.
- Stainless steel trim.
- Fire safe to API 607 Rev. 3, and BS 6755 (standard valves) and API 607 Rev. 4 (graphite packing).

**NOTE:**

1. For hazardous service, the customer must arrange to have a redundant ball position indicator (like a proximity switch) installed to insure safety in the event of mechanical failure of the Bellows seal unit.
2. The customer must verify that all internal components of the valve and bellows seal unit are compatible with the application fluid.

Please note this is a condensed catalog. For a complete catalog, contact Velan directly.
### TYPICAL MATERIALS LIST
FOR A STAINLESS STEEL VALVE

<table>
<thead>
<tr>
<th>Part</th>
<th>Standard Materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body / Bonnet</td>
<td>A 351 Gr. C8FM</td>
</tr>
<tr>
<td>Spindle</td>
<td>Gr. 316</td>
</tr>
<tr>
<td>Ball</td>
<td>A 351 Gr. C8FM</td>
</tr>
<tr>
<td>Seat</td>
<td>PTFE, RPTFE, E-PTFE, C-RPTFE</td>
</tr>
<tr>
<td>Housing</td>
<td>A 351 Gr. C8FM</td>
</tr>
<tr>
<td>Packing ring</td>
<td>PTFE</td>
</tr>
<tr>
<td>Stud</td>
<td>Gr. 8M Cl. 2</td>
</tr>
<tr>
<td>Nut</td>
<td>Gr. 8M</td>
</tr>
<tr>
<td>Housing screw</td>
<td>Gr. B8M Cl. 2</td>
</tr>
<tr>
<td>Bonnet seal</td>
<td>Gr. 316 spiral wound graphite</td>
</tr>
<tr>
<td>Housing seal</td>
<td>Gr. 316 graphite laminate</td>
</tr>
<tr>
<td>Garlock bearing</td>
<td>Steel / Bronze / PTFE</td>
</tr>
<tr>
<td>Thrust bearing</td>
<td>FOF 321</td>
</tr>
<tr>
<td>Ball bearing</td>
<td>SAE 52100</td>
</tr>
<tr>
<td>Handle nut</td>
<td>SS</td>
</tr>
<tr>
<td>Locking device</td>
<td>Gr. 304</td>
</tr>
<tr>
<td>Handle</td>
<td>Gr. 304</td>
</tr>
<tr>
<td>Spring</td>
<td>Gr. 302</td>
</tr>
<tr>
<td>Packing nut sleeve</td>
<td>RPTFE</td>
</tr>
<tr>
<td>Spindle sleeve</td>
<td>PPS</td>
</tr>
<tr>
<td>Spindle bushing</td>
<td>RPTFE</td>
</tr>
<tr>
<td>Bellows bushing</td>
<td>PPS</td>
</tr>
<tr>
<td>Packing nut</td>
<td>Gr. 304</td>
</tr>
<tr>
<td>NPT plug</td>
<td>Gr. F316</td>
</tr>
<tr>
<td>Nameplate</td>
<td>SS</td>
</tr>
<tr>
<td>Tag plate</td>
<td>SS</td>
</tr>
<tr>
<td>Driver</td>
<td>CF8M</td>
</tr>
<tr>
<td>Bellows assy.</td>
<td>C-276 / SS 316 Hastelloy</td>
</tr>
</tbody>
</table>

#### TE-150/300 SOCKET WELD OR THREADED BELLOWS SEAL

<table>
<thead>
<tr>
<th>SIZE (IN)</th>
<th>TE-600 (REGULAR PORT)(1)</th>
<th>(FULL PORT)(2)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>1⁄2</td>
<td>15</td>
<td>67</td>
</tr>
<tr>
<td>3⁄4</td>
<td>20</td>
<td>83</td>
</tr>
<tr>
<td>1</td>
<td>25</td>
<td>95</td>
</tr>
<tr>
<td>11⁄2</td>
<td>40</td>
<td>124</td>
</tr>
<tr>
<td>2</td>
<td>50</td>
<td>152</td>
</tr>
</tbody>
</table>

(1) For butt weld dimensions, contact the factory.

#### TE-150/300 FLANGED REGULAR PORT(1)

<table>
<thead>
<tr>
<th>SIZE (IN)</th>
<th>CLASS 150</th>
<th>CLASS 300</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>mm</td>
<td>mm</td>
<td>mm</td>
</tr>
<tr>
<td>15</td>
<td>4.25</td>
<td>108</td>
</tr>
<tr>
<td>20</td>
<td>4.63</td>
<td>118</td>
</tr>
<tr>
<td>25</td>
<td>5.00</td>
<td>127</td>
</tr>
<tr>
<td>30</td>
<td>5.50</td>
<td>145</td>
</tr>
<tr>
<td>35</td>
<td>6.00</td>
<td>165</td>
</tr>
</tbody>
</table>

(1) For dimensions B and C, refer to table above.

For other sizes, pressure classes and torque values please consult the factory.
BELLOWS SEAL CONTROL VALVES FOR EXTREME APPLICATIONS

½”–6” (15–150 mm), CLASS 150–600

DESIGN FEATURES:
- No fugitive emission.
- Straight or angle body.
- Equal percentage or linear characteristic.
- Metal or soft seat.
- Low maintenance.

RANGE:
- SIZES: 1/2–6” (15–150 mm).
- Class 150 to 600.
- Cv from 0.1 to 500.
- Up to 425°C (797°F).
- Flanged or BW body

OPTIONS:
- Pneumatic actuator
- Positioner, airset
- Limit switches

APPLICATIONS:
- Hazardous fluids
- Nuclear plants
-准确蒸汽控制
- Pilot plants
- Laboratories
- Accurate steam control

BELLOWS SEAL CONTROL VALVES FOR HIGH TEMPERATURES

DESIGN FEATURES:
- Low thermal losses
- Exposure with liquid helium 1.4 K or -271.75°C.
- Excellent seat tightness
- Angle or Straight pattern.
- Cold box mounting
- Vacuum jacket available
- Intelligent positioners available

APPLICATIONS:
- Very low temperatures
- Liquefied Helium, Hydrogen or Oxygen.
- Rocket launching sites
- Aerospace
- Superconductivity applications.

BELLOWS SEAL CONTROL VALVES FOR CRYOGENICS

REFERENCES
AIR-LIQUIDE, AEROSPATIALE, ALSTOM, ARIANESPACE, BOC INDIA, BP, CEA, CEGELEC, CENTRE SPATIAL DE KOUROU, CERN, CENG, CNES, COGEMA, CRYO DIFFUSION, EDF, ELF, EURODIF, FRAMATOME, GAZ DE FRANCE, GOODYEAR, ISRO, IPR, IFP, KELLOG, KODAK, LINDE, MICHELIN, OXFORD INSTRUMENTS, SONATRACH, SPIE, SGN, SOLVAY, RHONE-POULENC, TECHNIP, TOTAL, TRACTEBEL...

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## HOW TO ORDER BELLOWS SEAL VALVES

Velan figure numbers are designed to cover essential features. When ordering please show figure numbers to preclude misunderstanding of your requirements. A detailed description for SPECIALS must always accompany order.

<table>
<thead>
<tr>
<th>Type of Connection</th>
<th>Size of Connection</th>
<th>Pressure Class</th>
<th>Type</th>
<th>Body / Bonnet Style</th>
<th>Body Material</th>
<th>Trim Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Special</td>
<td>03 - ½&quot;</td>
<td>0 - 150</td>
<td>B</td>
<td>Flanged</td>
<td>A105, WCB</td>
<td>01 - Special</td>
</tr>
<tr>
<td>B Butt weld</td>
<td>04 - ¾&quot;</td>
<td></td>
<td>C</td>
<td>Socket weld</td>
<td>Chr. Moly F11, WC6</td>
<td>05 - Chr. Moly F11, WC6</td>
</tr>
<tr>
<td>S Threaded</td>
<td>05 - 1&quot;</td>
<td>2 - 600</td>
<td>D</td>
<td></td>
<td>Stainless Steel F316, CF8M</td>
<td>13 - Stainless Steel F316, CF8M</td>
</tr>
<tr>
<td>X Butt weld</td>
<td>06 - 1¼&quot;</td>
<td>3 - 1500</td>
<td>E</td>
<td></td>
<td>Chr. Moly F22, WC9</td>
<td>06 - Chr. Moly F22, WC9</td>
</tr>
<tr>
<td>W Socket weld</td>
<td>07 - 1½&quot;</td>
<td>4 - 2500</td>
<td>F</td>
<td></td>
<td>Stainless Steel F316L, CF3M</td>
<td>14 - Stainless Steel F316L, CF3M</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6 - 400</td>
<td>G</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>7 - 900</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### TYPE OF CONNECTION

- **A** Special
- **B** Butt weld
- **C** Socket weld
- **D** Flanged
- **F** Threaded
- **X** Butt weld (intermediate Class)

### SIZE OF CONNECTION

- 03 - ½"
- 04 - ¾"
- 05 - 1"
- 06 - 1¼"
- 07 - 1½"
- 08 - 2"
- 09 - 2½"
- 10 - 3"
- 11 - 3½"
- 12 - 4"
- 13 - 5"
- 14 - 6"
- 15 - 8"
- 16 - 10"
- 17 - 12"
- 18 - 18"

### CLASS

- 0 - 150 flanged or socket weld, butt weld or threaded
- 1 - 300
- 2 - 600
- 3 - 1500
- 4 - 2500
- 6 - 400
- 7 - 900

### VALVE TYPE

- 05 - Standard port gate
- 06 - Full port gate
- 07 - Stop (globe)
- 17 - IREB
- 18 - Drain

### BODY/BONNET STYLE

- 4 - Vertical
- 6 - Y-pattern (inclined)
- T - Bellows seal all welded design
- R - Forged bolted bonnet bellows seal
- S - Bellows seal made in Y-pattern forging
- V - Cast bolted bonnet bellows seal

### BODY MATERIAL

- 01 - Special
- 02 - A105, WCB
- 05 - Chr. Moly F11, WC6
- 13 - Stainless Steel F316, CF8M
- 06 - Chr. Moly F22, WC9
- 14 - Stainless Steel F316L, CF3M

### TRIM MATERIAL

<table>
<thead>
<tr>
<th>PRODUCT</th>
<th>TRIM CODE</th>
<th>WEDGE / DISC SEATING SURFACE(1)</th>
<th>SEAT SURFACE(1)</th>
<th>STEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>½ –2” Forged</td>
<td>TS MS</td>
<td>Stellite 6</td>
<td>Stellite 6</td>
<td>13% CR 316 or 630</td>
</tr>
<tr>
<td>2½ –12” Forged</td>
<td>TS MS</td>
<td>Stellite 6</td>
<td>Stellite 6</td>
<td>13% CR 316 or 630</td>
</tr>
<tr>
<td>2 –12” Cast</td>
<td>TY TS MY MS</td>
<td>Stellite 6 or 13 CR</td>
<td>Stellite 6</td>
<td>13% CR 316 or 630</td>
</tr>
<tr>
<td>NACE H₂S SERVICE</td>
<td>NA(2)</td>
<td>13 CR (410 or CA 15)</td>
<td>Stellite 6</td>
<td>410 HRC 22 max.</td>
</tr>
<tr>
<td></td>
<td>NB(2)</td>
<td>Stellite or CF8M</td>
<td>Stellite 6</td>
<td>SS 316</td>
</tr>
<tr>
<td></td>
<td>NC(2)</td>
<td>Monel</td>
<td>Stellite 6</td>
<td>Monel or Monel K</td>
</tr>
</tbody>
</table>

(1) Base material may be same as body or same as trim at manufacturer’s option.
(2) NA, NB and NC trims are for NACE service and are supplied with bolting with maximum hardness of Rc. 22.

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