FORGED STEEL
GATE, GLOBE & CHECK VALVES

API 602 • ASME CLASSES 150–4500 • 1/4 – 4” (8 – 100 mm)

- Power
- Oil & Gas
- Petrochemical

- Chemical
- Marine
- Pulp & Paper

- Cryogenics
- Mining
- Construction

HIGH PERFORMANCE • LOW EMISSIONS

Please note this is a condensed catalog. For a complete version, 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, knife gate and engineered severe service valves for critical applications in power, chemical and petrochemical, oil and gas, pulp and paper, mining, marine, cryogenic and general construction industries.

Founded in 1950, Velan earned a reputation for excellence as a major supplier of forged valves to nuclear power plants and the U.S. Navy. Velan has pioneered many innovative valve designs, emphasizing quality, safety, ease of operation, low emissions, simple in-line maintenance and long cycle life.

Velan's product lines are manufactured in thirteen specialized manufacturing plants, including six in Canada and U.S.A., four in Europe, and three in Asia. We have 1,400 employees, 75% of whom are located in our North American operations.

**VELAN FORGED STEEL GATE, GLOBE AND CHECK VALVES** have been proven in critical service applications for over 50 years. Today Velan's comprehensive range of API 602 gate, globe, check, angle, and bellows seal valves remain the leading choice for high performance in virtually any industrial application. New in this version, are 45° inclined globe valves, fabricated valves, and expanded information on valves for alkylation service.

Velan has sales offices and distributors located worldwide. Visit the Velan website at [www.velan.com](http://www.velan.com) for an updated contact list.

**NOTE:** The material in this catalog is for general information. For specific performance data and proper material selection, consult your Velan representative. Although every attempt has been made to ensure that the information contained in this catalog is correct, Velan reserves the right to change designs, materials or specifications without notice.

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SEMI-AUTOMATIC ASSEMBLY AND TESTING PLANT
FOR CLASS 800 (API 602) GATE VALVES

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

SAFER AND TIGHTER STEM SEAL
• Stem hardened and ground.
• Each packing ring individually inserted and compressed for better tightness.
• Two-piece self-aligning gland.
• Sturdy full-length threaded corrosion-resistant bolts provide the required high packing stress.
• Live-loading optional.
• Positive backseat: stem bevel against integral backseat.

TWO-PIECE STEM DRIVE RENEWABLE IN-LINE
This exclusive and handy feature found only on Velan small forged OS & Y gate valves enables:
• Replacement of stem nut in-line.
• Removal of handwheel without affecting the position of valve (closed or open).
• Better stem nut lubrication control.

BODY-GUIDED DISC IN GLOBE STOP, NEEDLE AND STOP-CHECK VALVES ELIMINATES SIDE THRUST ON STEM
The top- and bottom-guided disc assures perfect seat and disc alignment in spite of side thrust caused by high velocity flow.
This prevents stem from scoring and galling and provides longer disc seal and body life.

GASKET OD | ASME m | VELAN y | ASME m | VELAN y
--- | --- | --- | --- | ---
2 – 5.5" | 3 | 7 | 10,000 | 16,000 – 28,000

THREADED-IN STRENGTH WELDED BONNETS
(Full-penetration welds on special orders only)
Valves with threaded-in strength welded seats offer an additional level of safety against fugitive emissions.
The body-bonnet welds are made on fully automatic MIG Welders. Weld hardness is controlled (including the heat-affected zone) and maintained below 200 HB.

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PACKING CHAMBER DESIGN FOR LOW EMISSIONS

TEST RESULTS LEAD TO DESIGN OF LONG-LIFE LEAKPROOF STEM SEAL

THE VELAN STEM SEAL EVOLVED FROM THESE TEST FINDINGS:

• **Large loads.**
  Sealing is achieved when compression load is high and packing forms a mass of close fibers of low porosity and permeability (4,000 psi for graphite).

• **Short and narrow packing chambers** improve sealing.

• **Small clearances between vital parts.**

• **Precision stem and packing chambers.**
  Straightness, roundness and fine finish of stem and packing chamber wall are essential.

• **Short and narrow packing chamber.**
  Maximum six rings in a single set chamber, and, wherever possible, only $\frac{3}{8} - \frac{1}{4}$” (4.76–6.35 mm) wide.

• **Rings precompressed** to 3500–4000 psi for graphite and to 1800–2000 psi for Teflon to ensure equal stress distribution and effectiveness of all rings.

• **Stem and packing chamber walls.** Close roundness, straightness and superior 8–16 RMS or burnished surface finish.

• **Live-loading (optional).** Two sets of Belleville springs maintain a permanent packing stress of 3500–4000 psi.

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NEW GENERATION OF LOW FUGITIVE EMISSION VALVES

Velan offers standard forged gate, globe, and check valves qualification tested for compliance with EPA fugitive emissions regulations.

PARAMETERS FOR EXCEPTIONAL LOW EMISSION VALVE PERFORMANCE

DESIGN FACTORS FOR GASKET JOINTS

- Full enclosure to allow gasket to retain positive radial support during loading.
- Accurate control of compression through close tolerances of gasket groove and allowance for radial expansion.
- No radial machine marks.
- Minimum of three inner wraps to prevent buckling.
- Minimum of three tack welds.
- Minimum of three filler wraps.
- Close tolerance ± 0.005” (0.18 mm) for gasket thickness.
- Minimum width up to 5” (127 mm) ID of 0.30” (7.62 mm).
- Gasket resiliency tested regularly and inspected at receiving due to sensitivity to variations of quality.

JOINT TIGHTENING

- All small forged steel valve joints are tightened with multiple nut runners providing uniform loading and superior zero ppm tightness.
- Warning: Gasket is not reusable.

PACKING CHAMBER AND STEM PARAMETERS

- Stem hardened and ground to 16 RMS finish.
- 0.001” per inch straightness (0.03 mm per 25.4 mm straightness).
- 0.003” (0.08 mm) cylindricity.
- 63 RMS maximum surface finish of packing chamber.
- Diometrical clearances: stem-gland, stem-backseat: 0.030–0.040” (0.76–1.02 mm).
  packing chamber-gland: 0.015–0.020” (0.38–0.51 mm).
- Maximum of six packing rings.
- Individual compression: 3500–4000 psi for graphite rings.

TYPICAL TEST REPORT

TEST CONDITIONS

- Test Medium: Methane 500 and 1,000 psig, ambient temperature
- Instrument: Organic vapor analyzer OVA-108, range 1–10,000 ppm, adjusted for 100% methane
- Valve Type: API 602 Class 800 gate valve
- Sizes: 1/2 – 2” (15–50 mm)
- Packing: Graphite
- Gasket: Spiral wound SS 316 and graphite
- Trim: Wedge: 13 CR
  Seat: Stellite
- Quantity: 15 valves

TEST RESULTS: 15 GATE VALVES 1/2–2” (15–50 mm)

API 598 test All valves zero leakage
Methane test All valves zero leakage
Cycling test Gasket: 0 ppm (300 cycles) Packing: 0 ppm

API 598 TESTS FOR 1-1/2” (40 mm) GATE VALVES

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<th>CYCLES</th>
<th>PART TESTED</th>
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Velan API 602 Class 800 forged steel gate valve.

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FORGED STEEL GATE VALVES, ¼–2" (8–50 mm)
THREAD, SOCKET WELD & FLANGED
ASME CLASS 800: 1975 psi @ 100°F
ASME CLASS 1500: 3705 psi @ 100°F
FLANGED ASME CLASSES 150, 300, 600, 1500

DESIGN FEATURES

- A compact but extremely sturdy design for high pressure-temperature service.
- Solid Stellite 6 wedge (optional) ensures low friction and long service life.
- For Class 1500 valves and for steam service, seats are seal-welded to the body.
- Packing rings are precompressed to 4000 psi to provide a high integrity seal.
- For welded bonnet valves, the bonnet is threaded in and torqued to an engineered torque value and the body bonnet joint is strength-welded, offering double protection against leakage. (Body/bonnet threads and strength-weld).
- Fully guided wedge reduces wear on seating surfaces.
- Repairable 2-piece stem drive.

OPTIONAL FEATURES (SPECIAL APPLICATIONS)

- A special design is also available with double packing, leak-off connection, live-loading and a packing blowout for easy removal of old packing.
- Bolted Bonnet Gate Valves for Alkylation service (HF Acid service see page 19).
- Parallel Slide Gate Valves.
- API 603 ¼–1½" (15–40 mm), for ASME Classes 150, 300 & 600.

Please note this is a condensed catalog. For a complete version, contact Velan directly.
## Welded Bonnet Gate Valve Dimensions

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<tr>
<th>Size in mm</th>
<th>A Port</th>
<th>B End to End</th>
<th>C Center to Top Closed</th>
<th>D Center to Top Open</th>
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## Bolted Bonnet Gate Full Port Dimensions

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## Bolted Bonnet Available with live-loading, double packing and leak-off or bellows seal for emission-free service.

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TWO TYPES

- This valve is available with an extended body or an integrally-reinforced extended body (IREB).
- Extended body gate valves have a welded or threaded connection and are used for tapping of pressure vessels and header lines for vents, drains or takeoff lines and instrumentation.
- Also available: extended body assemblies for vents, drains, and instrument root valves.

EXTRA LONG EXTENDED BODY GATE VALVES

**FORGED STEEL EXTENDED BODY GATE VALVES**

**CONVENTIONAL PORT, ½” – 2” (15 – 50 mm)**

**THREADED OR SOCKET WELD FEMALE**

API 602, ASME CLASSES 800, 1500

**INTEGRALLY-REINFORCED EXTENDED BODY – 2174W**

**AVAILABLE VARIATIONS(2)**

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**AVAILABLE VARIATIONS(2)**

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**IREB GATE VALVE DIMENSIONS**

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<td>Center to Top Open</td>
<td>Handwheel</td>
<td>Socket Weld Bore</td>
<td>Socket Weld Depth</td>
<td>Short End to Center</td>
<td>Long End to Center</td>
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<td>800</td>
<td>1500</td>
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<td>9.4</td>
<td>9.2</td>
<td>10.8</td>
<td>5.0</td>
</tr>
</tbody>
</table>

(1) 0.36” (9 mm) seat for 1/2” NPT male end only. (2) Bolted bonnet also available.

Please note this is a condensed catalog. For a complete version, contact Velan directly.
FORGED STEEL GLOBE VALVES
CONVENTIONAL PORT, 1/4 – 2” (8 – 50 mm)

THREADS OR SOCKET WELD
ASME CLASS 800: 1975 psi @ 100°F
ASME CLASS 1500: 3705 psi @ 100°F
FLANGED ASME CLASSES 150, 300, 600, 1500

BOLTED BONNET
2074B – Class 800
3074B – Class 1500

FLANGED BOLTED BONNET
0074B – Class 150
2074B – Class 600
1074B – Class 300
3074B – Class 1500

WELDED BONNET
2074W – Class 800
3074W – Class 1500

Available with live-loading, double packing and leak-off or bellows seal for emission-free service.

### BOLTED BONNET GLOBE DIMENSIONS

<table>
<thead>
<tr>
<th>Size</th>
<th>Port</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>K</th>
<th>L</th>
<th>Flanged Face to Face</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>mm</td>
<td></td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
<td>in</td>
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<td>1500</td>
</tr>
<tr>
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<td>0.50</td>
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<td>4.00</td>
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<td>8.20</td>
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<td>6</td>
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<td>0.09</td>
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<td>0.50</td>
<td>2.88</td>
<td>4.00</td>
<td>6.51</td>
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<td>8.40</td>
<td>4.0</td>
<td>6</td>
<td>1.915</td>
<td>0.50</td>
<td>0.61</td>
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<td>1.00</td>
<td>1.00</td>
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<td>6.00</td>
<td>7.55</td>
<td>8.70</td>
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<td>6</td>
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<td>10.70</td>
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<td>6.0</td>
<td>8</td>
<td>1.915</td>
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<td>1.25</td>
<td>5.00</td>
<td>7.00</td>
<td>10.70</td>
<td>11.00</td>
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<td>8</td>
<td>3.030</td>
<td>0.50</td>
<td>1.05</td>
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</table>

### AVAILABLE FEATURES

- Bolted Welded Bonnet
- Class 800 for Y-Pattern globe valves, see page 10.

For a complete version, contact Velan directly.
FORGED STEEL Y-PATTERN BONNETLESS GLOBE VALVES, ½ – 4" (15 – 100 mm)
CONVENTIONAL PORT OPENING, THREADED, SOCKET WELD OR BUTT WELD
ASME CLASSES 1690, 2680, 4500

DESIGN FEATURES

- Designed for quick and easy maintenance – one step removal of all working parts including packing.
- All pressure containing parts within one body-bonnet forging – no joints to leak or welds to cut for servicing.
- Non rotating stem allows a non-spinning disc, ensures low torque and prevents torsional damage of the packing.
- Fully enclosed, lubricated stem drive system with needle bearings ensures low operating torque.
- Solid Stellite disc, seat ring and backseat provide excellent long service life even in severe services.
- Backseat bevel on the stem, not on the disc, satisfies both API-600 and API-602 specifications.

NOTE: For more information consult Velan’s Y-Pattern Globe Valves catalogue VEL-BG.

FIGURE NUMBERS

<table>
<thead>
<tr>
<th>CLASS</th>
<th>STOP VALVE</th>
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<th>NEEDLE VALVE</th>
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<tr>
<td>1690</td>
<td>8076Z</td>
<td>8086Z</td>
<td>8096Z</td>
</tr>
<tr>
<td>2680</td>
<td>9076Z</td>
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</tr>
<tr>
<td>4500</td>
<td>5076Z</td>
<td>5086Z</td>
<td>5096Z</td>
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DIMENSIONS

<table>
<thead>
<tr>
<th>Size in mm</th>
<th>A Port</th>
<th>B End to End</th>
<th>C Center to Top</th>
<th>H Handwheel</th>
<th>BP Clearance Open</th>
<th>CF Center to End</th>
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</thead>
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<td>0.559</td>
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<td>7.50</td>
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<tr>
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<td>8.0</td>
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<td>4</td>
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<td>12.00</td>
<td>20.75</td>
<td>18.00</td>
<td>7.50</td>
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</table>

(1) For Classes 1690 & 2680, dimensions are as shown, or same as for 2" (50 mm) valve, depending on end connection.
(2) Impactor handle.
(3) For butt weld ends, weights is 110 lb (50 kg).

Please note this is a condensed catalog.
For a complete version, contact Velan directly.
FORGED STEEL 45° INCLINED GLOBE VALVES,
1/2 – 2” (15 – 50 mm)
CONVENTIONAL PORT OPENING, THREADED,
SOCKET WELD OR BUTT WELD
ASME CLASSES 800, 1690, 2680

Please note this is a condensed catalog.
For a complete version, contact Velan directly.
FORGED STEEL CHECK VALVES
CONVENTIONAL PORT OPENING, \(\frac{1}{8} - 2''\) (8 – 50 mm)
PISTON, BALL OR SWING TYPE ASME CLASSES 800, 1500
THREADED OR SOCKET WELD FLANGED
ASME CLASSES 150, 300, 600, 1500

<table>
<thead>
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<th>Specifications</th>
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<tr>
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<tr>
<td>Pintson check</td>
</tr>
<tr>
<td>Ball check</td>
</tr>
<tr>
<td>Swing check</td>
</tr>
</tbody>
</table>

(1) Ball type only
(2) Swing type only
(3) Bolted bonnet only
(4) Piston or swing type only
(5) Piston or ball type only
(6) Bolted bonnet swing check disc Stellite 6 only.

COVERLESS SWING CHECK

### BOLTED COVER PISTON, BALL AND SWING CHECK DIMENSIONS

<table>
<thead>
<tr>
<th>Size in mm</th>
<th>A Port</th>
<th>B End to End</th>
<th>C Center to Top</th>
<th>K Socket Weld</th>
<th>L Socket Weld</th>
<th>Flanged Face to Face</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>0.50</td>
<td>3.25</td>
<td>1.40</td>
<td>0.690</td>
<td>0.38</td>
<td>—</td>
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<tr>
<td>10</td>
<td>0.50</td>
<td>3.25</td>
<td>1.40</td>
<td>0.690</td>
<td>0.38</td>
<td>—</td>
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<tr>
<td>12.7</td>
<td>0.50</td>
<td>3.25</td>
<td>1.40</td>
<td>0.690</td>
<td>0.38</td>
<td>—</td>
</tr>
<tr>
<td>15</td>
<td>0.50</td>
<td>3.25</td>
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<td>0.690</td>
<td>0.38</td>
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<tr>
<td>16</td>
<td>0.50</td>
<td>3.25</td>
<td>1.40</td>
<td>0.690</td>
<td>0.38</td>
<td>—</td>
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<tr>
<td>20</td>
<td>0.50</td>
<td>3.25</td>
<td>1.40</td>
<td>0.690</td>
<td>0.38</td>
<td>—</td>
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<tr>
<td>25</td>
<td>0.50</td>
<td>3.25</td>
<td>1.40</td>
<td>0.690</td>
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</tr>
<tr>
<td>31.8</td>
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<td>3.25</td>
<td>1.40</td>
<td>0.690</td>
<td>0.38</td>
<td>—</td>
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<tr>
<td>32</td>
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<td>3.25</td>
<td>1.40</td>
<td>0.690</td>
<td>0.38</td>
<td>—</td>
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<tr>
<td>40</td>
<td>0.50</td>
<td>3.25</td>
<td>1.40</td>
<td>0.690</td>
<td>0.38</td>
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<tr>
<td>50</td>
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<td>3.25</td>
<td>1.40</td>
<td>0.690</td>
<td>0.38</td>
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(1) For swing check valves Classes 300, 600 and 1500 face-to-face dimensions are the same as for piston and ball check valves, for Class 150 swing check valves contact the factory.

COVERLESS SWING CHECK DIMENSIONS (CLASS 800)

<table>
<thead>
<tr>
<th>Size in mm</th>
<th>A Port</th>
<th>B End to End</th>
<th>C Center to Top</th>
<th>K Socket Weld</th>
<th>L Socket Weld</th>
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<td>1.40</td>
<td>0.895</td>
<td>0.38</td>
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<td>12.7</td>
<td>0.50</td>
<td>3.25</td>
<td>1.40</td>
<td>0.895</td>
<td>0.38</td>
</tr>
<tr>
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<td>3.25</td>
<td>1.40</td>
<td>0.895</td>
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<tr>
<td>16</td>
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<td>3.25</td>
<td>1.40</td>
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<td>1.40</td>
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<td>3.25</td>
<td>1.40</td>
<td>0.895</td>
<td>0.38</td>
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</tbody>
</table>

CLASS 800 1975 psi @ 100°F
CLASS 1500 3705 psi @ 100°F

Please note this is a condensed catalog. For a complete version, contact Velan directly.
FORGED STEEL INCLINED PISTON CHECK VALVES
FOR HORIZONTAL AND VERTICAL LINES, ½ – 4” (15 – 100 mm)
THREADED, SOCKET WELD OR BUTT WELD
ASME CLASSES 1690, 2680, 4500

DESIGN FEATURES
• Solid Stellite 6 disc, fully guided for fast and full seating, even without spring.
• High Cv.
• Self-draining waterways.

DIMENSIONS, WEIGHTS AND CV

Please note this is a condensed catalog.
For a complete version, contact Velan directly.
FOR NUCLEAR POWER PLANTS AND OTHER CRITICAL SERVICE

VELAN

CRITICAL SERVICE
LIVE LOADED GATE & GLOBE VALVES
FORGED CARBON, ALLOY AND STAINLESS STEEL
ASME CLASSES 150–1500

DESIGN FEATURES
• Sturdy bonnet arms.
• Suitable for electric actuation.
• More repacking space.

GATE VALVES
• Seal welded seats.
• Stellite 6 or cobalt free wedge and seats.

GLOBE VALVES
• Stellite 6 or cobalt free seats and discs.
• Stop, Stop-Check, Needle, Flow Control
• Y-Pattern models for ASME Classes 1500 & 2500

OPTIONS
• Double packing with leak-off.
• Live-loading.
• Packing blowout fitting.

Please note this is a condensed catalog.
For a complete version, contact Velan directly.
COMPACT FORGED STEEL
BELLOWS SEAL VALVES
ZERO LEAKAGE

NOTE: For more information consult special bellows seal valve catalogue VEL-BS.

VALVE DESIGN PARAMETERS

• A valve with a bellows to seal off the stem enclosure is an ideal choice whenever leakage to the atmosphere is intolerable due to toxicity, chemical corrosion, radioactivity, other health or ecological reasons. In addition, seal welding the body-bonnet seal makes the valve hermetically sealed. The bellows is welded to the stem and to the bottom of the bonnet. Velan has been a leader in bellows seal valves since pioneering the technology in the 1950s.

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 10,000 cycles for ½–2” (15–50 mm) globe valves, 5000 cycles for bonnetless globe valves and 3000 cycles for ½–2” (15–50 mm) gate valves.
• The lift is 50% in extension and 50% in compression.
• Proper stem guiding eliminates torsion of bellows.
• Bellows in SS 321, Inconel or Hastelloy.

Please note this is a condensed catalog. For a complete version, contact Velan directly.
FIGURE NUMBERS

<table>
<thead>
<tr>
<th>CLASS</th>
<th>ANGLE</th>
<th>45° INCLINED</th>
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<tr>
<td>1500</td>
<td>3215B</td>
<td>3216B</td>
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</table>

APPLICATIONS

- Power and utility boilers
- Cogeneration systems
- Chemical recovery boilers
- Wood-fired boilers
- Solid waste fuel-firing systems
- Circulating fluidized bed (CFB) boilers
- Industrial waste recovery and incineration plants

TYPICAL SERVICE

- Blowoff
- Gauge shutoff
- Vents
- Acid cleaning
- Main stop drains
- Feedwater
- Steam sampling
- Chemical feed
- Water/steam shutoff

Many installations use a tandem combination of two valves. The valve closer to the boiler should be wide open first and then the second valve opened slowly. At the end of the blowoff period, a reverse procedure should be used.

DESIGN FEATURES

These special blowoff valves are available in bolted bonnet angle and streamlined flow 45° inclined designs for Class 600 and 1500 primary service and in bonnetless angle and inclined designs for Class 2500.

- Stellite 6 seats and fully-guided Stellite 6 discs resist the excessive corrosion and erosion effects aggravated by grid and boiler scale particles and high temperature changes.
CLASS 600, 1500 & 2500 FORGED ANGLE, CONTINUOUS BLOWDOWN VALVES

This valve is designed for continuous blow-down but can also be used for sampling and boiler feed pump bypass relief where high pressure drop causes erosion and cavitation which can destroy conventional globe valves. It incorporates a hardfaced Stellite 6 disc and seat and a venturi diffuser from stainless steel type 316. Orifice range: ⅛ to 1⅛" (3.18 to 28.58 mm), depending on the capacity required.

<table>
<thead>
<tr>
<th>Size in mm</th>
<th>AB Center to Bottom</th>
<th>CF Center to End</th>
<th>C Center to Top Closed</th>
<th>D Center to Top Open</th>
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</table>

**NOTE:** Contact Velan Engineering Department for other details.

OTHER FORGED VALVES FOR BOILERS PLANT SERVICE:

- **Gate and Globe**
  2⅛ – 24” (65 – 600 mm)
  Bolted or Pressure Seal,
  ASME Classes 600 – 4500

- **Gate and Globe**
  ⅛ – 2” (8 – 50 mm)
  Bolted and Welded Bonnet,
  ASME Classes 800 – 1500

- **Swing, Piston & Tilting Disc Check Valves**
  ⅛ – 24” (15 – 600 mm)
  Bolted or Pressure Seal,
  ASME Classes 600 – 4500

- **Y-Pattern Bonnetless Globe Valves**
  ⅛ – 4” (8 – 100 mm)
  ASME Classes 1690 – 4500

- **Y-Pattern Piston Check**
  ⅛ – 4” (8 – 100 mm)
  ASME Classes 600 – 4500

Please note this is a condensed catalog. For a complete version, contact Velan directly.
FORGED CRYOGENIC GATE, GLOBE AND CHECK VALVES, ½ – 2” (15 – 50 mm)
IN AUSTENITIC STAINLESS STEEL
ASME CLASSES 150 – 1500

APPLICATIONS
Velan is a world leader in valves for cryogenic applications. Velan forged cryogenic gate, globe and check valves are specially designed to handle the technical problems that arise in the production, transport and storage of liquified gases such as Oxygen, Nitrogen, Argon, Natural Gas, Hydrogen or Helium (down to -425°F/-254ºC). Velan specially adapted extended bonnet forged valves offer safe and efficient service.

TABLE OF LIQUIFIED GASES

<table>
<thead>
<tr>
<th>Type</th>
<th>Boiling Point °C</th>
<th>°F</th>
<th>Liquid Density lb/ft³</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural gas (LNG)</td>
<td>-168.0</td>
<td>-270</td>
<td>26.00</td>
</tr>
<tr>
<td>Methane (CH₄)</td>
<td>-161.5</td>
<td>-258</td>
<td>26.20</td>
</tr>
<tr>
<td>Oxygen (O₂)</td>
<td>-182.9</td>
<td>-326</td>
<td>71.20</td>
</tr>
<tr>
<td>Argon (Ar)</td>
<td>-185.9</td>
<td>-303</td>
<td>87.40</td>
</tr>
<tr>
<td>Helium (He)</td>
<td>-268.9</td>
<td>-452</td>
<td>7.82</td>
</tr>
<tr>
<td>Carbon Dioxide (CO₂)</td>
<td>-78.5</td>
<td>-109</td>
<td>50.80</td>
</tr>
<tr>
<td>Air</td>
<td>-194.4</td>
<td>-318</td>
<td>57.87</td>
</tr>
<tr>
<td>Nitrogen (N₂)</td>
<td>-195.8</td>
<td>-320</td>
<td>50.45</td>
</tr>
<tr>
<td>Hydrogen (H₂)</td>
<td>-252.7</td>
<td>-423</td>
<td>4.43</td>
</tr>
<tr>
<td>Absolute Zero</td>
<td>-273.16</td>
<td>-460</td>
<td>—</td>
</tr>
</tbody>
</table>

NOTE: For more information consult Velan’s Cryogenic Valves catalogue VEL-CRYO.

DESIGN FEATURES
All basic design features of Velan forged steel valves outlined in this catalog are adapted to special service conditions at cryogenic temperatures.

- **Extended bonnets** with sufficient gas column length, usually specified by customer, are supplied for all valves to keep stem packing at sufficient distance away from the cold fluid to remain functional.
- **Solid Stellite 6** wedges on ½ – 2” (15 – 50 mm) valves operate with no galling in cryogenic service.
- **Kel-F inserts (optional)** for globe, piston, and swing check discs.
- **Cleaning**: All cryogenic valves are thoroughly degreased and cleaned and pipe ends are sealed to prevent contamination.

MATERIALS

- **Body and bonnet**: Austenitic stainless steel forgings used for bodies and bonnets offer excellent impact strength, minimal heat loss and protection against corrosion.
- **Stem**: To reduce galling, stems are made from advanced Nitronic 50 (grade XM-19 A479) with high tensile even at extreme low temperatures, excellent low friction and galling-free movement at points of stem contact.
- **Wetted parts**: All Austenitic Stainless Steel and Stellite 6.
- **Yoke bushings**: Bronze.
- **Packing**: Teflon or other plastic packing protected from freezing by a column of insulating gas.
- **Seating faces**: Stellite 6 is used to prevent seizing and galling. When extremely tight shutoff is required, globe and check valves may be supplied with Kel-F, Teflon or other soft inserts.
- **Bolting**: Strain-hardened Austenitic Stainless Steel.
- **Lubrication of yoke bushing nut (yoke nut)**: Exxon: Nebula EPI
  Shell: Darina EPI
  Lubriplate No. 930-AA or 930-AAA

FORGED CRYOGENIC VALVE RANGE

- **All Stainless Steel ½ – 2” (15 – 50 mm) Gate Valves**, Classes 150-1500.
- **All Stainless Steel ½ – 2” (15 – 50 mm) Globe Valves**, Classes 150-1500.
- **All Stainless Steel ½ – 2” (15 – 50 mm) Check Valves**, Classes 150-1500.

(1) Dualseal disc and Kel-F insert are optional for globe and check valves.

Please note this is a condensed catalog.
For a complete version, contact Velan directly.
Fugitive emissions are a critical factor in the performance of any HF Acid valve and at Velan, we have been committed to reducing emissions beyond the industry standards, and providing the highest quality products to our customers for over 50 years. Velan offers a comprehensive line of Phillips and UOP approved API 602 gate, globe and check HF acid valves with several benefits.

**DESIGN FEATURES:**

- **Stem Drive** – two-piece allows for replacement of yoke bushing in-line, removal of handwheel without affecting position of valves (closed or opened).
- **Rising Stem** – makes for easy visibility for open-close indications.
- **Gland** – two piece gland bushing/packing flange is self-aligning to prevent stem damage for cocked gland.
- **Stem made from hardened Monel K500** for strength and durability.
- **Nickel plated overlay in stem hole for carbon steel valves** to combat severe alkylation conditions.
- **HF acid detecting paint** to ensure valve sealing integrity.
- **Bonnet** – large extended type bonnet grade.
- **Bonnet Joint** – encapsulated gasket design.
- **Body** – high quality Monel or A105 normalized body with API 602 wall thickness for maximum service.
- **Wedge** solid Monel.
- **Seat rings** – made of solid Monel 400.

**NOTE:** For more information consult Velan’s HF Acid Gate, Globe & Check Valves brochure VEL-HFA.
As a leading manufacturer of API 602 forged gate, globe and check valves, Velan maintains one of the largest and most comprehensive inventories available from any manufacturer. Despite tens of thousands of ready-to-ship valves located around the world, requirements inevitably come up for non-standard items, and Velan has the perfect solution: fabricated valves. Built from forged bar stock materials, Velan fabricated gate, globe and check valves offer the advantage of short lead times for non-stock items in exotic alloys.

**Take advantage of increased flexibility with Velan custom-design fabricated valves.**

Velan can readily provide fabricated valves in a wide variety of designs. Furthermore, our Engineering Department has the expertise to custom-design a valve to best handle your critical requirements. Backed up by advanced software tools, including finite element analysis, computational fluid dynamics and 3D solid modeling, Velan has a long history of designing and manufacturing superior quality valves that outperform the most demanding performance requirements.

**NOTE:** Contact Velan Sales for more information.

Please note this is a condensed catalog. For a complete version, contact Velan directly.
The figure numbers shown on this key are designed to cover essential features of Velan valves. Please use figure numbers to ensure prompt and accurate processing of your order. A detailed description must accompany any special orders.

### HOW TO ORDER

<table>
<thead>
<tr>
<th>A</th>
<th>TYPE OF CONNECTION</th>
<th>B</th>
<th>SIZE OF CONNECTION</th>
<th>C</th>
<th>PRESSURE RATING</th>
<th>D</th>
<th>BODY/BONNET STYLE</th>
<th>E</th>
<th>BODY MATERIAL</th>
<th>F</th>
<th>TRIM</th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>But weld</td>
<td>0</td>
<td>8</td>
<td>2</td>
<td>0</td>
<td>7</td>
<td>4</td>
<td>B</td>
<td>1</td>
<td>3</td>
<td>M</td>
</tr>
</tbody>
</table>

Example: is a 2” 600 Class stainless steel bolted bonnet globe valve with MS trim.

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### PRESSURE RATING

- 0 - 150
- 1 - 300
- 2 - 600 or
- 0 - 400
- 0 - 1600
- 0 - Special

### VALVE TYPE

- 01 - Flow control
- 02 - Ball check
- 03 - Piston check
- 05 - Conventional port gate
- 06 - Full port gate
- 07 - Stop globe

### BODY / BONNET STYLE

- 4 - Vertical
- 5 - Angle
- 6 - Inclined
- 7 - Inclined Y-pattern screwed yoke
- 8 - Elbow down

### BODY MATERIAL

- 02 - A105, WCB
- 03 - F9, C5
- 05 - F11, WC6
- 06 - F22, WC9
- 09 - F9, C12
- 10 - F316/F316H
- 11 - F304, CF8
- 12 - F304L, CF3
- 13 - F316H, CF8M
- 14 - F316L, CF3M
- 15 - F347, CF8C
- 16 - F304H
- 17 - F321
- 18 - F304L
- 19 - Monel M35
- 20 - Inconel
- 22 - Titanium Gr.5
- 23 - Alloy 20
- 24 - LF1
- 25 - LCB
- 26 - LF2
- 27 - LF3/LC3
- 37 - Incoloy

### TRIM

- A - Special
- B - Bolted bonnet (forged)
- C - Inclined
- D - Forged bolted bonnets

### HOW TO ORDER

Consult Velan’s website at [www.velan.com](http://www.velan.com) for a complete list of available trim materials.

(1) Base material is either the same as the body or solid trim at manufacturer’s option.
(2) Bellows material shown as standard, Inconel can be used in lieu of 321 and Hastelloy C in lieu of Inconel, where design and/or pressure class applicable.
(3) Stellite 6 or Stellite 21 based on material or application at manufacturer’s option.
(4) Inserts may be in seat or wedge at manufacturer’s option.
(5) NB, NACE service valves are supplied with all materials conforming to NACE MR0175.

For installation instructions see Service Manual.

For diagnostic troubleshooting visit the Velan website at [www.velan.com](http://www.velan.com).