

VELAN FORGED STEEL GATE, GLOBE & CHECK VALVES

API 602 • ASME CLASSES 150–4500 • $\frac{1}{4}$ –4" (8–100 mm)



- Power
- Oil & Gas
- Petrochemical
- Chemical
- Marine
- Pulp & Paper
- Cryogenics
- Mining
- Construction

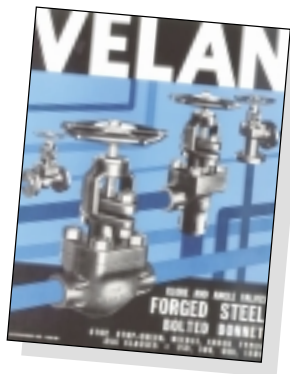
HIGH PERFORMANCE • LOW EMISSIONS

VELAN COMPANY PROFILE

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.

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SMALL FORGED STEEL VALVES, 1/4-4" (8-100 mm)

MANUFACTURING PROGRAM IN CARBON, ALLOY AND STAINLESS STEEL

Valve Type	Bonnet Type	Bonnet Joint	Flanged Ends	Threaded or Socket Weld		Butt Weld Ends	Male / Female Ends
				Conventional Port	Full Port		
GATE	OS & Y	Bolted	150, 300, 600, 1500, 2500	800, 1500, 1690	800, 1500	1500, 2500	
	OS & Y	Welded	150, 300, 600, 1500, 2500, 4500	800, 1500, 1690, 2500, 4500	800	1500, 2500	800, 1500
GLOBE		Bolted	150, 300, 600, 1500	800, 1500, 1690		1500	
	OS & Y	Welded	150, 300, 600, 1500	800, 1500, 1690		1500	
		Y-pattern	1500, 2500	1690, 2680, 4500	1690, 2680, 4500		
Valve Type	Type	Cover Joint	Flanged Ends	Threaded or Socket Weld		Butt Weld Ends	
CHECK	Piston	Bolted	150, 300, 600, 1500	800, 1500		1500	
	Piston	Welded	150, 300, 600, 1500	800, 1500		1500	
	Ball	Bolted	150, 300, 600	800, 1500		1500	
	Swing	Bolted	150, 300, 600	800			
	Swing	Coverless		800			
	Inclined piston	Welded	1500, 2500	1690, 2680, 4500		1690, 2680, 4500	

SEMI-AUTOMATIC ASSEMBLY AND TESTING PLANT

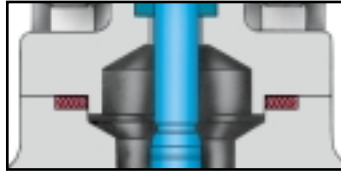
FOR CLASS 800 (API 602) GATE VALVES



EXCLUSIVE DESIGN FEATURES

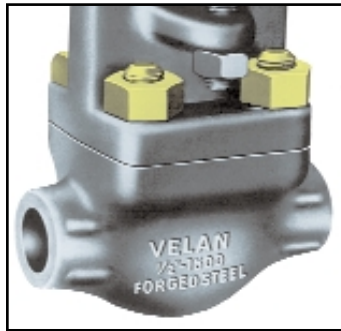
STRONGER, LEAKPROOF BODY-BONNET JOINT FULLY ENCASED SPIRAL WOUND GASKET

The design of the gasketed joint is critical. Its compression is better controlled in a fully enclosed cavity. Also, the possibility of unwinding of the SS spiral metal is eliminated.



STRONGER BOLTING ENSURES JOINT TIGHTNESS

Simple stress vs. deflection tests conducted on spiral wound gaskets in our laboratory confirmed that the control of leakage is highly dependent on gasket seating stress and that the values shown in the **ASME Section III Code**, namely the seating factor $m = 3$ and the seating stress $y = 10,000$ psi used in calculating bolt sizes, are highly insufficient. Our bolted joints are calculated to a minimum gasket stress of 16,000 psi which is essential for a leakproof joint.

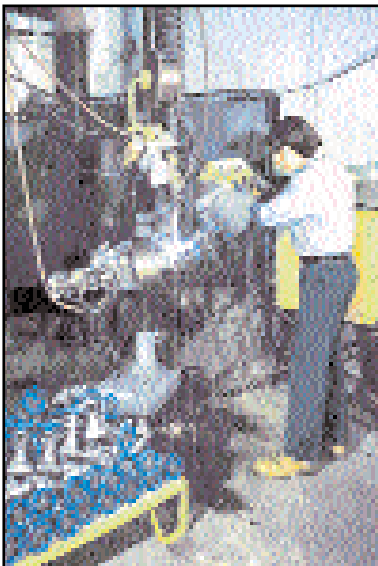


GASKET OD	ASME m	VELAN m	ASME y	VELAN y
2-5.5"	3	7	10,000	16,000-28,000

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.

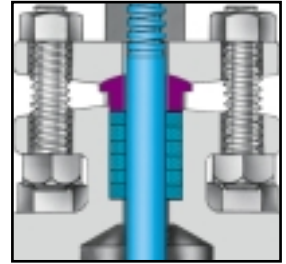
The body-bonnet welds are made on fully automatic MIG Welders. Weld hardness is controlled (including the heat-affected zone) and maintained below 200 HB.



Automatic MIG welder.

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:

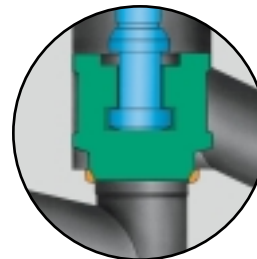
- Replacement of stem nut in-line.
- Removal of handwheel without affecting the position of valve (closed or open).
- Better stem nut lubrication control.



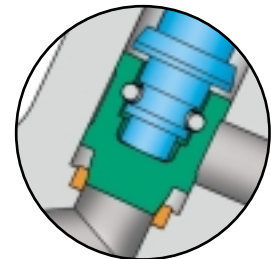
BODY-GUIDED DISC IN GLOBE STOP, NEEDLE AND STOP-CHECK VALVES ELIMINATES SIDE THRUST ON STEM

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.



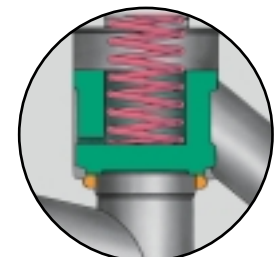
Solid Stellite disc for full Stellite trim



Solid Stellite disc for all Y-pattern valves

BODY-GUIDED DISC IN PISTON-CHECK VALVES

- Assures perfect alignment of disc and seat even at large flow velocities.
- Flat seating faces for low and medium pressures.

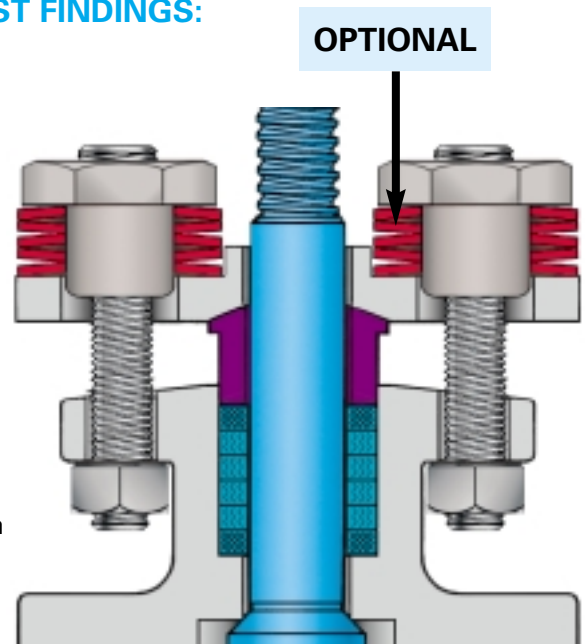


PACKING CHAMBER DESIGN FOR LOW EMISSIONS

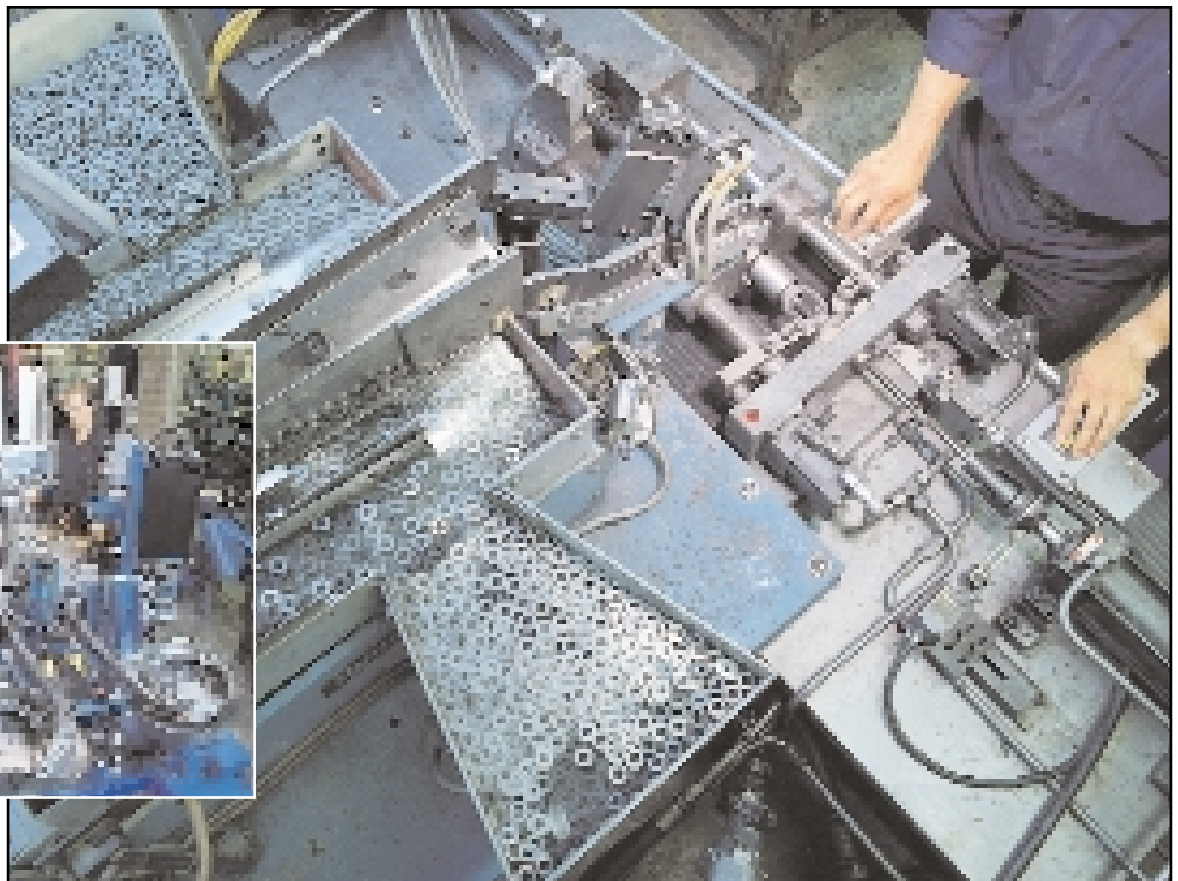
TEST RESULTS LEAD TO DESIGN OF LONG-LIFE LEAKPROOF STEM SEAL

THE VELAN STEM SEAL EVOLVED FROM THESE TEST FINDINGS:

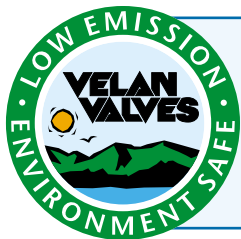
- **Large loads.**
Sealing is achieved when compression load is high and packing forms a mass of close fibers of low porosity and permeability (4,000 psi for graphite).
- **Short and narrow packing chambers** improve sealing.
- **Small clearances between vital parts.**
- **Precision stem and packing 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 $\frac{3}{16}$ – $\frac{1}{4}$ " (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.



Photos to the right and bottom illustrate packing machine and bonnet assembly machine.



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** $\pm 0.005"$ (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.**
- **Diametrical 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



Velan API 602 Class 800 forged steel gate valve.

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

CYCLES	PART TESTED	LEAKAGE (ppm)
1000	gasket	0
	packing	0



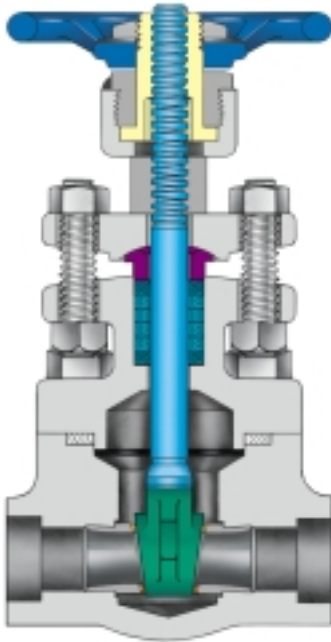
FORGED STEEL GATE VALVES, 1/4–2" (8–50 mm)

THREADED, SOCKET WELD & FLANGED

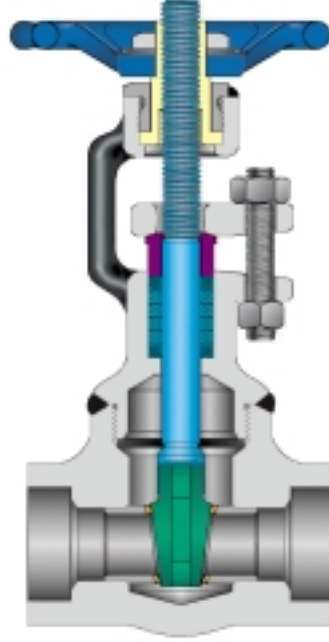
ASME CLASS 800: 1975 psi @ 100°F

ASME CLASS 1500: 3705 psi @ 100°F

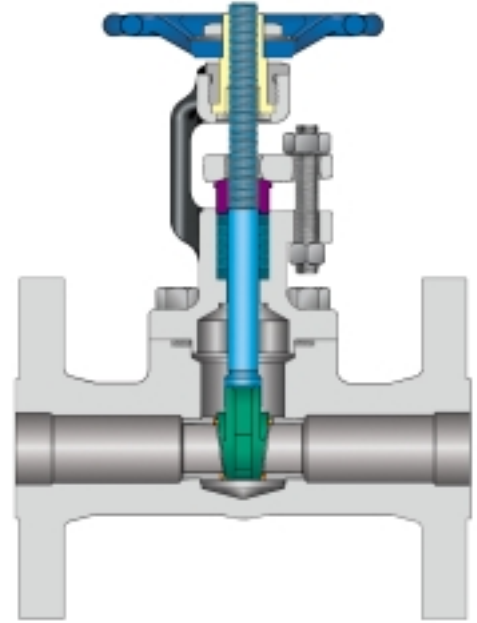
FLANGED ASME CLASSES 150, 300, 600, 1500



BOLTED BONNET
2054B–Class 800
3054B–Class 1500



WELDED BONNET
2054W–Class 800
3054W–Class 1500



FLANGED BOLTED BONNET
0054B–Class 150 2054B–Class 600
1054B–Class 300 3054B–Class 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 1/2–1 1/2" (15–40 mm), for ASME Classes 150, 300 & 600.

PART	STANDARD MATERIALS
Body	A105N
Bonnet	A105N
Gasket	Gr. 304 (stainless & graphite)
Packing flange	A105
Seat	Gr. 410 (stainless) HF Stellite 6
Wedge	CA15 HT or Stellite 6
Stem	Gr. 410 (stainless)
Stem nut	Gr. 416 (stainless)
Yoke bushing	12L14 steel
Gland	Gr. 416 (stainless)
Packing	Graphite
Gland bolt	Gr. B6
Gland nut	Gr. 2H
Cap screw	Gr. B7
Handwheel	Malleable iron
Handwheel nut	Steel
Handwheel lockwasher	Steel
Name plate	Aluminum

For other materials, trim and engineering data, see pages 21–25.

BOLTED BONNET GATE DIMENSIONS AND WEIGHTS

FLANGED FACE-TO-FACE

Size in mm	A Port		B End to End		C Center to Top Closed		D Center to Top Open		H Handwheel		K Socket Weld Bore		L Socket Weld Depth		Weight lb kg	
	800	1500	800	1500	800	1500	800	1500	800	1500	800	1500	800	1500	800	1500
	1/4 8	0.25 6	0.25 6	2.88 73	4.00 102	4.69 119	7.13 181	5.19 132	7.75 197	2.50 64	3.50 89	0.555 14.10	0.38 9.7	3.30 1.5	11.00 5.0	
3/8 10	0.25 6	0.35 9	2.88 73	4.00 102	4.69 119	7.13 181	5.19 132	7.75 197	2.50 64	3.50 89	0.690 17.53	0.38 10	3.30 1.5	11.00 5.0		
1/2 15	0.38 10	0.50 13	2.88 73	4.00 102	4.69 119	7.13 181	5.19 132	7.75 197	2.50 64	3.50 89	0.855 21.72	0.38 10	3.30 1.5	11.00 5.0		
3/4 20	0.50 13	0.69 18	3.25 83	5.00 127	5.91 150	7.25 184	6.75 171	7.88 200	3.50 89	3.50 89	1.065 27.05	0.50 13	5.30 2.4	13.00 5.9		
1 25	0.69 18	0.96 24	3.50 89	6.00 152	6.38 162	8.70 221	7.38 188	9.63 244	3.50 89	5.00 127	1.330 33.78	0.50 13	6.40 2.9	26.00 11.8		
1 1/4 32	1.25 32	1.25 32	5.00 127	7.00 178	7.77 197	9.12 232	9.12 232	10.63 270	5.00 127	6.00 152	1.675 42.55	0.50 13	15.00 6.8	34.00 15.4		
1 1/2 40	1.25 32	1.25 32	5.00 127	7.00 178	7.77 197	9.12 232	9.12 232	10.63 270	5.00 127	6.00 152	1.915 48.64	0.50 13	15.00 6.8	34.00 15.4		
2 50	1.50 38	2.00 ⁽¹⁾ 51	5.25 133	9.00 229	8.70 221	10.56 268	10.40 264	12.30 312	6.00 152	10.00 254	2.406 61.11	0.63 16	19.00 8.6	58.00 26.3		

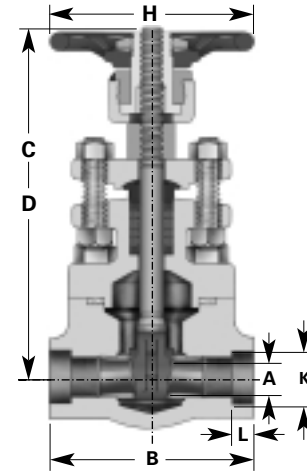
Size in mm	Flanged face-to-face					Weight lb kg
	150	300	600	1500	2500	
	1/4 8	4.00 102	5.50 139	6.50 165	8.50 216	
3/8 10	4.00 102	5.50 139	6.50 165	8.50 216	—	
1/2 15	4.25 108	5.50 139	6.50 165	8.50 216	10.38 264	
3/4 20	4.62 117	6.00 152	7.50 191	9.00 229	10.75 273	
1 25	5.00 127	6.50 165	8.50 216	10.00 254	12.12 308	
1 1/4 32	5.50 140	7.00 178	9.00 229	11.00 279	13.75 349	
1 1/2 40	6.50 165	7.50 191	9.50 241	12.00 305	15.12 384	
2 50	7.00 178	8.50 216	11.50 292	14.50 368	17.75 451	

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

BOLTED BONNET GATE FULL PORT DIMENSIONS AND WEIGHTS

Size in mm	A Port		B End to End		C Center to Top Closed		D Center to Top Open		H Handwheel		K Socket Weld Bore		L Socket Weld Depth		Weight lb kg	
	800	1500	800	1500	800	1500	800	1500	800	1500	800	1500	800	1500	800	1500
	1/4 8	0.25 6	—	4.00 102	—	7.10 180	—	7.8 198	—	3.50 89	3.50 89	0.555 14.10	0.38 10	—	—	10 4.5
3/8 10	0.35 9	—	4.00 102	—	7.10 180	—	7.8 198	—	3.50 89	3.50 89	0.690 17.53	0.38 10	—	—	10 4.5	—
1/2 15	0.50 13	3.25 83	4.00 102	5.90 150	8.7 221	6.63 168	7.88 200	3.50 89	3.50 89	3.50 89	0.855 21.72	0.38 10	6.20 2.8	12.00 5.4		
3/4 20	0.69 18	3.50 89	5.00 127	6.40 162	9.10 231	7.40 188	9.60 244	5.00 127	5.00 127	5.00 127	1.065 27.05	0.50 13	6.60 3.0	24.00 10.9		
1 25	0.96 24	5.00 127	7.00 178	7.80 198	9.10 231	9.10 231	10.60 269	6.00 152	6.00 152	6.00 152	1.330 33.78	0.50 13	15.00 6.8	32.00 14.5		
1 1/4 32	1.25 32	5.00 127	7.00 178	7.80 198	9.10 231	9.10 231	10.60 269	6.00 152	6.00 152	6.00 152	1.675 42.55	0.50 13	15.00 6.8	32.00 14.5		
1 1/2 40	1.50 38	5.25 133	9.00 229	8.60 218	10.60 269	10.40 264	12.30 312	6.00 152	10.00 254	10.00 254	1.915 48.64	0.50 13	20.00 9.1	50.00 22.7		
2 50	2.00 ⁽¹⁾ 51	6.00 152	9.00 229	10.90 277	11.50 292	13.12 333	13.75 349	8.00 203	10.00 254	10.00 254	2.406 61.11	0.62 16	24.00 10.9	60.00 27.2		

(1) 1.89" (48 mm) Class 1500



WELDED BONNET GATE VALVE DIMENSIONS AND WEIGHTS⁽²⁾

Size in mm	A Port				B End to End				C Center to Top Closed				D Center to Top Open				H Handwheel				K Socket Weld Bore	L Socket Weld Depth	Weight lb kg			
	800	1500	2500	4500	800	1500	2500	4500	800	1500	2500	4500	800	1500	2500	4500	800	1500	2500	4500			800	1500	2500	4500
	1/4 8	0.25 6	0.25 6	—	—	2.88 73	3.50 89	—	—	4.63 117	6.40 163	—	—	5.13 130	7.10 180	—	—	2.50 64	3.50 89	—			—	0.555 14.10	0.38 10	2.50 1.1
3/8 10	0.25 6	0.25 6	—	—	2.88 73	3.50 89	—	—	4.63 117	6.40 163	—	—	5.13 130	7.10 180	—	—	2.50 64	3.50 89	—	—	0.690 17.53	0.38 10	2.50 1.1	6.50 2.9	—	—
1/2 15	0.38 10	0.35 9	0.50 13	—	2.88 73	3.50 89	5.00 127	—	4.63 117	6.40 163	9.00 229	—	5.13 130	7.10 180	9.80 249	—	2.50 64	3.50 89	6.00 152	—	0.855 21.72	0.38 10	2.50 1.1	6.50 2.9	21.00 9.5	—
3/4 20	0.50 13	0.50 13	0.50 13	0.58 15	3.25 83	3.50 89	5.00 127	7.00 178	5.90 150	6.40 163	9.00 229	11.82 300	6.63 168	7.10 180	9.80 249	12.62 321	3.50 89	3.50 89	6.00 152	8.00 203	1.065 27.05	0.50 13	4.40 2.0	6.80 3.1	20.00 9.1	62 28
1 25	0.69 18	0.69 18	0.69 18	0.69 15	3.50 89	5.00 127	5.00 127	8.00 203	6.30 160	8.10 206	9.10 231	11.82 300	7.20 182	8.90 226	10.00 254	12.62 321	3.50 89	5.00 127	6.00 152	8.00 203	1.330 33.78	0.50 13	5.30 2.4	13.00 5.9	19.00 8.6	66 30
1 1/4 32	1.25 32	1.25 32	0.96 24	0.88 22	5.00 127	5.25 133	10.00 254	11.00 279	7.77 197	9.40 239	11.30 287	16.50 419	9.12 231	10.80 274	12.50 318	17.72 450	5.00 127	6.00 152	8.00 203	12.00 305	1.675 42.55	0.50 13	11.00 5.0	20.00 9.1	68.00 30.8	127 58
1 1/2 40	1.25 32	1.25 32	0.96 24	0.88 22	5.00 127	5.25 133	10.00 254	11.00 279	7.77 197	9.40 239	11.30 287	16.50 419	9.12 231	10.80 274	12.50 318	17.72 450	5.00 127	6.00 152	8.00 203	12.00 305	1.915 48.64	0.50 13	11.00 5.0	20.00 9.1	68.00 30.8	127 58
2 50	1.50 38	1.50 38	1.50 38	1.20 31	5.25 133	5.25 133	10.00 254	11.00 279	8.50 216	12.40 315	12.40 315	17.00 432	10.40 264	14.10 358	14.15 358	18.6 472	6.00 152	6.00 152	10.00 254	12.00 305	2.406 61.11	0.62 16	16.00 7.3	50.00 22.7	77.00 34.9	151 69

(2) Full bore also available for Classes 800 & 1500

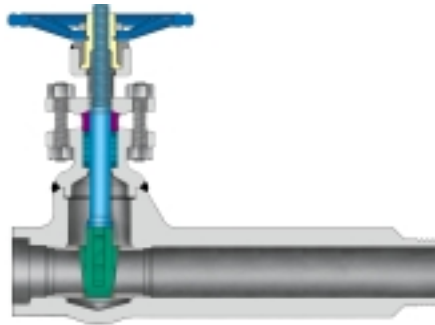


FORGED STEEL EXTENDED BODY GATE VALVES CONVENTIONAL PORT, 1/2– 2" (15– 50 mm)

THREADED OR SOCKET WELD FEMALE
API 602, ASME CLASSES 800, 1500



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



EXTENDED BODY – 2184W

PART	STANDARD MATERIALS
Body	A105N
Bonnet	A 105N
Packing flange	A 105
Seat	Gr. 410 (stainless) HF Stellite 6
Wedge	CA15 HT or Stellite 6
Stem	Gr. 410 (stainless)
Stem nut	Gr. 416 (stainless)
Yoke bushing	Steel
Gland	Gr. 416 (stainless)
Packing	Graphite
Gland bolt	Gr. B6 (stainless)
Gland nut	Gr. 2H
Handwheel	Malleable iron
Handwheel nut	Steel
Handwheel lockwasher	Steel
Name plate	Aluminum

For other materials, trim and engineering data, see pages 21 – 25.

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.

AVAILABLE VARIATIONS⁽²⁾

FEMALE STANDARD END	MALE EXTENDED END	
	Standard: 2184W, 3184W	IREB: 2174W, 3174W
Thread	Couplet, Thread or Socket	Couplet or Socket
Socket Weld	Couplet or Socket	

EXTENDED BODY GATE VALVE DIMENSIONS AND WEIGHTS

Size in mm	A Port		B End to End		C Center to Top Closed		D Center to Top Open		H Handwheel		K Socket Weld Bore	DA Short End to Center		DB Long End to Center		Weight lb kg	
	800 - 1500		800	1500	800	1500	800	1500	800	1500	800 - 1500	800	1500	800	1500	800	1500
	1/2 15	0.50 ⁽¹⁾ 13	5.63 143	5.75 146	5.90 150	6.2 158	6.6 168	6.8 173	3.5 89	3.5 89	0.855 21.72	1.63 41	1.75 44	4.00 102	4.00 102	5.0 2.3	7.7 3.5
3/4 20	0.50 13	5.63 143	5.75 146	5.90 150	6.2 158	6.6 168	6.8 173	3.5 89	3.5 89	1.065 27.05	1.63 41	1.75 44	4.00 102	4.00 102	5.0 2.3	8.8 4.0	
1 25	0.69 18	5.75 146	7.25 184	6.4 163	8.1 206	7.4 188	8.9 226	3.5 89	5.0 127	1.330 33.78	1.75 44	2.50 64	4.00 102	4.75 121	6.1 2.8	17.00 7.7	
1 1/4 32	1.25 32	7.00 178	–	7.6 193	–	9.2 234	–	5.0 127	–	1.675 42.55	2.25 57	–	4.75 121	–	13.00 6	–	
1 1/2 40	1.25 32	7.25 184	7.88 200	7.6 193	9.40 239	9.2 234	10.80 274	5.0 127	6.00 152	1.915 48.64	2.50 64	2.63 67	4.75 121	5.25 133	13.00 6	24.00 11	
2 50	1.50 38	7.88 200	12.25 311	8.50 216	12.40 315	10.40 264	14.10 358	6.00 152	10.00 254	2.406 61.11	2.63 67	5.00 127	5.25 133	7.25 184	19.00 9	55.00 25	

IREB GATE VALVE DIMENSIONS AND WEIGHTS

Size in mm	A Port		B End to End		C Center to Top Closed		D Center to Top Open		H Handwheel		K Socket Weld Bore	L Socket Weld Depth	DA Short End to Center		DB Long End to Center		Weight lb kg	
	800 - 1500		800	1500	800	1500	800	1500	800	1500	800 - 1500	800 - 1500	800	1500	800	1500	800	1500
	1/2 15	0.50 ⁽¹⁾ 13	8.63 219	8.88 226	5.90 150	6.2 158	6.63 168	6.8 173	3.50 89	3.50 89	0.855 21.72	0.38 10	1.63 41	1.75 44	7.00 178	7.13 181	6.6 3.0	8.8 4.0
3/4 20	0.50 13	8.63 219	8.88 226	5.90 150	6.2 158	6.63 168	6.8 173	3.50 89	3.50 89	1.065 27.05	0.50 13	1.63 41	1.75 44	7.00 178	7.13 181	6.6 3.0	10 4.5	
1 25	0.69 18	9.38 238	10.13 257	6.4 163	8.1 206	7.4 188	8.9 226	3.50 89	5.00 127	1.330 33.78	0.50 13	1.75 44	2.50 64	7.63 194	7.63 194	7.7 3.5	20 9.1	
1 1/4 32	1.25 32	10.50 266	10.63 270	7.6 193	9.4 239	9.2 234	10.8 274	5.0 127	6.00 152	1.675 42.55	0.50 13	2.50 64	2.63 67	8.00 203	8.00 203	15 6.8	30 14	
1 1/2 40	1.25 32	10.50 266	10.63 270	7.6 193	9.4 239	9.2 234	10.8 274	5.0 127	6.00 152	1.915 48.64	0.50 13	2.50 64	2.63 67	8.00 203	8.00 203	15 6.8	30 14	
2 50	1.50 38	11.88 302	14.25 362	8.50 216	12.4 315	10.4 264	14.1 358	6.00 152	10.00 254	2.406 61.11	0.62 16	2.63 67	5.00 127	9.25 235	9.25 235	25 11.3	66 30	

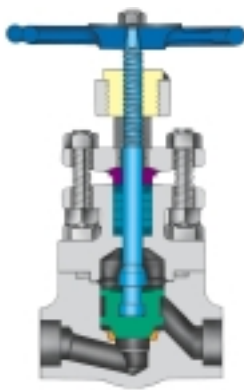
(1) 0.36" (9 mm) seat for 1/2" NPT male end only.

(2) Bolted bonnet also available.

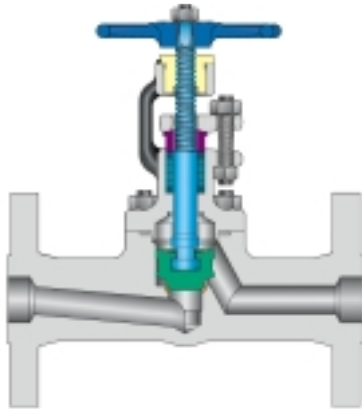


FORGED STEEL GLOBE VALVES CONVENTIONAL PORT, 1/4–2" (8–50 mm)

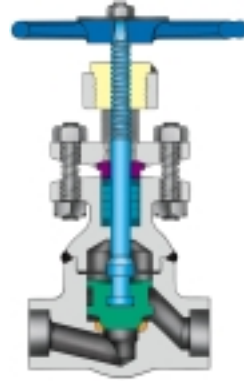
THREADED OR SOCKET WELD
 ASME CLASS 800: 1975 psi @ 100°F
 ASME CLASS 1500: 3705 psi @ 100°F
 FLANGED ASME CLASSES 150, 300, 600, 1500



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

PART	STANDARD MATERIALS
Body	A105N
Seat (integral)	Stellite 6
Bonnet	A 105N
Gasket	Gr. 304 (stainless and graphite)
Packing flange	A 105
Disc	CA15 HT or Stellite 6
Stem	Gr. 410 (stainless)
Stem nut	Gr. 416 (stainless) or bronze
Gland	Gr. 416 (stainless)
Packing	Graphite
Gland bolt	Gr. B6
Gland nut	Gr. 2H
Cap screw	Gr. B7
Handwheel	Malleable iron
Handwheel lockwasher	Steel
Name plate	Aluminum

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

For other materials, trim and engineering data, see pages 21–25.

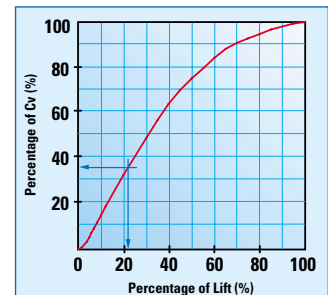
BOLTED BONNET GLOBE DIMENSIONS AND WEIGHTS

Size in mm	A Port		B End to End		C Center to Top Closed		D Center to Top Open		H Handwheel		K Socket Weld Bore	L Socket Weld Depth	Weight lb kg		Flanged Face to Face			
	800	1500	800	1500	800	1500	800	1500	800	1500			800	1500	150	300	600	1500
1/4	0.31	0.50	2.88	4.00	4.5	7.69	4.8	8.1	2.5	6	0.555	0.38	3.10	12.00	4.00	6.00	6.50	8.50
8	8	13	73	102	114	195	122	206	64	152	14.10	10	1.4	5.4	102	152	165	216
3/8	0.31	0.50	2.88	4.00	4.5	7.69	4.8	8.1	2.5	6	0.690	0.38	3.10	12.00	4.00	6.00	6.50	8.50
10	8	13	73	102	114	195	122	206	64	152	17.53	10	1.4	5.4	102	152	165	216
1/2	0.31	0.50	2.88	4.00	4.5	7.69	4.8	8.1	2.5	6	0.855	0.38	3.10	12.00	4.25	6.00	6.50	8.50
15	8	13	73	102	114	195	122	206	64	152	21.72	10	1.4	5.4	108	152	165	216
3/4	0.50	0.50	3.25	5.00	6.6	7.8	7.1	8.4	4.0	6	1.065	0.50	5.90	14.00	4.62	7.00	7.50	9.00
20	13	13	83	127	168	198	180	213	102	152	27.05	13	2.7	6.4	117	178	190	229
1	0.75	0.75	3.50	6.00	6.7	9.2	7.3	10.0	4.0	8	1.330	0.50	6.70	29.00	5.00	8.00	8.50	10.00
25	19	19	89	152	170	233	185	254	102	203	33.78	13	3.0	13.2	127	203	215	254
1 1/4	1.25	1.25	5.00	7.00	8.1	10.1	8.7	11.0	6.0	8	1.675	0.50	18.00	37.00	5.50	8.50	9.00	11.00
32	32	32	127	178	206	257	221	279	152	203	42.55	13	8.2	16.8	140	216	229	279
1 1/2	1.25	1.25	5.00	7.00	8.1	10.1	8.7	11.0	6.0	8	1.915	0.50	16.00	37.00	6.50	9.00	9.50	12.00
40	32	32	127	178	206	257	221	279	152	203	48.64	13	7.3	16.8	165	229	241	305
2	1.50	1.50	8.00	9.00	10.4	11.0	11.2	12.3	8.0	12	2.406	0.63	30.00	64.00	8.00	10.50	11.50	14.50
50	38	38	203	229	264	279	285	312	203	305	61.11	16	13.6	29.0	203	266	292	368

AVAILABLE FEATURES

Class	Bolted Bonnet		Welded Bonnet	
	800	1500	800	1500
Stop	2074B	3074B	2074W	3074W
Stop check	2084B	3084B	2084W	3084W
Needle	2094B	3094B	2094W	3094W
Flow control	2014B	3014B	2014W	3014W

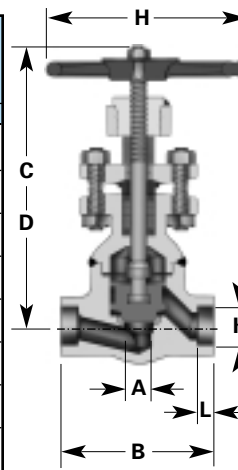
THROTTLING GLOBE VALVES



Regular style globe valves are suitable for moderate throttling applications. As a general rule, an adequately sized globe valve (i.e. with pipe velocity between 15 to 25 ft/sec for water and 200 to 300 ft/sec for steam) should not be throttled down below 35% of its maximum full open Cv capacity (approximately 20% of full stroke). Harsh throttling, below 35% of full Cv capacity, will require analysis by applications department to determine suitability under possible cavitation, flashing, noise and vibration.

WELDED BONNET GLOBE DIMENSIONS & WEIGHTS

Size in mm	A Port		B End to End		C Center to Top Closed		D Center to Top Open		H Handwheel		K Socket Weld Bore	L Socket Weld Depth	Weight lb kg	
	800	1500	800	1500	800	1500	800	1500	800	1500			800	1500
1/4	0.31	0.50	2.88	3.50	4.57	6.8	4.84	7.3	2.5	6.0	0.555	0.38	3.30	6.00
8	8	13	73	89	116	173	123	185	64	152	14.10	10	1.5	2.7
3/8	0.31	0.50	2.88	3.50	4.57	6.8	4.84	7.3	2.5	6.0	0.690	0.38	3.30	6.00
10	8	13	73	89	116	173	123	185	64	152	17.53	10	1.5	2.7
1/2	0.31	0.50	2.88	3.50	4.57	6.8	4.84	7.3	2.5	6.0	0.855	0.38	3.30	7.50
15	8	13	73	89	116	173	123	185	64	152	21.72	10	1.5	3.4
3/4	0.50	0.50	3.25	3.50	6.60	6.8	6.90	7.3	4.0	6.0	1.065	0.50	4.80	7.50
20	13	13	83	89	168	173	175	185	102	152	27.05	13	2.2	3.4
1	0.75	0.75	3.50	5.00	6.70	8.21	7.20	8.84	4.0	6.0	1.330	0.50	5.70	15.00
25	19	19	89	127	170	209	183	225	102	152	33.78	13	2.6	6.9
1 1/4	1.25	1.25	5.00	5.25	8.05	10.06	8.93	10.76	6.0	8.0	1.675	0.50	12.00	23.00
32	32	32	127	133	204	256	227	273	152	203	42.55	13	5.4	10.4
1 1/2	1.25	1.25	5.00	5.25	8.05	10.06	8.93	10.76	6.0	8.0	1.915	0.50	12.00	23.00
40	32	32	127	133	204	256	227	273	152	203	48.64	13	5.4	10.4
2	1.38	1.50	5.25	10.00	9.30	12.6	10.00	14.00	6.0	12.0	2.406	0.63	17.00	57.00
50	35	38	133	254	236	320	254	356	152	305	61.11	16	7.7	26

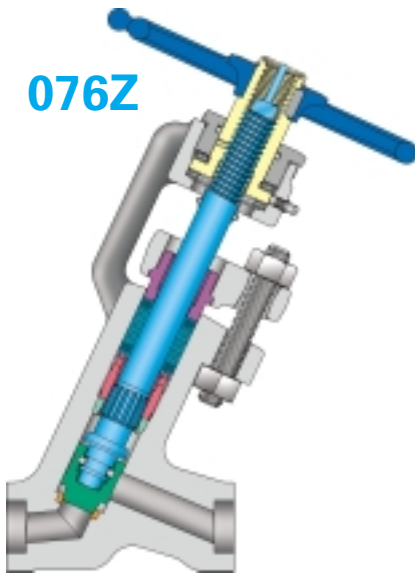


For Y-Pattern globe valves, see page 10.



FORGED STEEL Y-PATTERN BONNETLESS GLOBE VALVES, 1/2–4" (15–100 mm)

CONVENTIONAL PORT OPENING, THREADED,
SOCKET WELD OR BUTT WELD
ASME CLASSES 1690, 2680, 4500



076Z

NON-ROTATING STEM

Patented for quick serviceability,
(USA patent number 4356832).

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

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.

FIGURE NUMBERS

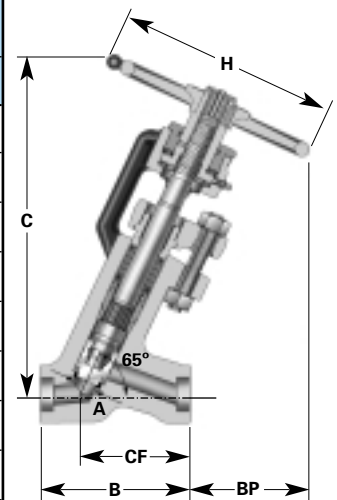
THREADED, SOCKET WELD OR BUTT WELD CONNECTIONS			
CLASS	STOP VALVE	STOP CHECK VALVE	NEEDLE VALVE
1690	8076Z	8086Z	8096Z
2680	9076Z	9086Z	9096Z
4500	5076Z	5086Z	5096Z

PART	STANDARD MATERIALS
Body	A105N
Seat (integral)	Stellite 6
Disc	Stellite 6
Stem	Gr. 410 (stainless)
Stem nut	A 439 Austenitic ductile iron Gr. D-2C
Backseat	Stellite 6
Splined bushing	Gr. 630 (stainless)
Packing washer	Gr. 304 (stainless)
Packing	Graphite
Split gland bushing	Gr. CA15 (stainless)
Packing flange	A 105
Gland stud	Gr. B7
Gland nut	Gr. 2H
Yoke bushing	Gr. 1020 steel
Thrust bearing	Steel
Stem protector	Steel
O-ring	Nitrile rubber
Handwheel	Malleable iron
Snap ring	Steel
Name plate	Gr. 304 (stainless)

For other materials, trim and engineering data, see pages 21–25.

DIMENSIONS, WEIGHTS AND CV

Size in mm	A Port		B End to End		C Center to Top		H Handwheel		BP Clearance Open		CF Center to End		Weight lb kg		CV Flow Coefficient	
	1690	4500	1690	4500	1690	4500	1690	4500	1690	4500	1690	4500	1690	4500	1690	4500
1/2 15	0.559 14.2	0.375 9.5	4.88 124	5.75 146	9.63 245	11.75 298	6.00 152	6.00 152	3.63 92	3.25 83	3.20 81	4.19 106	15 7	28 13	7	4
3/4 20	0.559 14.2	0.559 14.2	4.88 124	7.00 178	9.63 245	14.20 361	6.00 152	8.00 203	3.63 92	6.00 152	3.20 81	3.88 99	15 7	58 26	8	7
1 25	0.833 21.2	0.559 14.2	5.75 146	7.00 178	13.19 335	14.20 361	8.00 203	8.00 203	5.13 130	6.00 152	4.19 106	3.88 99	33 15	58 26	12	9
1 1/4 32	1.125 28.6	0.833 21.2	7.25 184	10.13 257	16.63 422	18.88 480	12.00 305	12.00 305	7.57 192	7.00 178	4.94 125	6.57 167	67 30	103 47	24	19
1 1/2 40	1.125 28.6	1.125 28.6	7.25 184	12.00 305	16.63 422	20.75 527	12.00 305	18.00 457	7.57 192	8.00 203	4.94 125	8.00 203	67 30	166 75	25	24
2 50	1.688 42.9	1.125 28.6	10.13 257	12.00 305	19.88 505	20.75 527	12.00 305	18.00 457	7.50 190	8.00 203	6.57 167	8.00 203	110 50	166 75	60	25
2 1/2 ⁽¹⁾ 65	1.688 42.9	1.50 38.1	12.00 305	12.00 305	20.69 526	20.75 527	16.00 ⁽²⁾ 406	16.00 ⁽²⁾ 406	7.25 184	7.25 184	8.00 203	8.00 203	166 ⁽³⁾ 75	166 75	60	47
3 ⁽¹⁾ 80	1.688 42.9	1.50 38.1	12.00 305	12.00 305	20.69 526	20.75 527	16.00 ⁽²⁾ 406	16.00 ⁽²⁾ 406	7.25 184	7.25 184	8.00 203	8.00 203	166 ⁽³⁾ 75	166 75	60	47
4 100	1.688 42.9	1.50 38.1	12.00 305	12.00 305	20.69 526	20.75 527	16.00 ⁽²⁾ 406	16.00 ⁽²⁾ 406	7.25 184	7.25 184	8.00 203	8.00 203	166 75	166 75	60	47

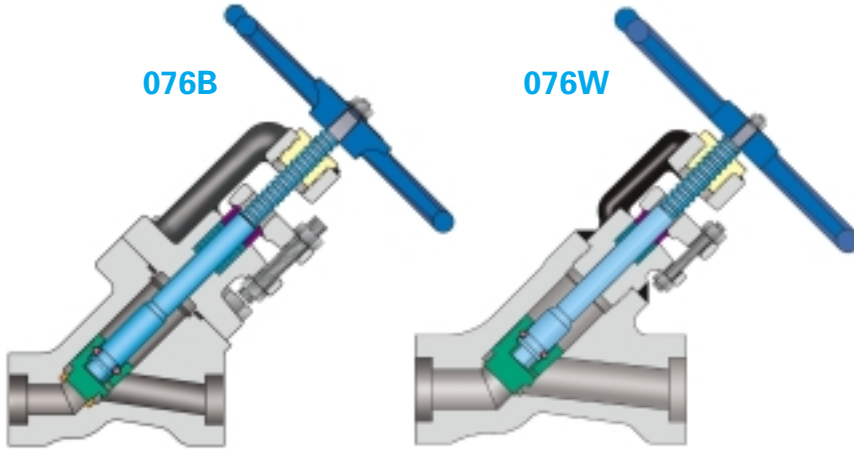


(1) For Classes 1690 & 2680, dimensions are as shown, or same as for 2" (50 mm) valve, depending on end connection.
(2) Impactor handle.
(3) For butt weld ends, weights is 110 lb (50 kg).



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



45° BOLTED BONNET

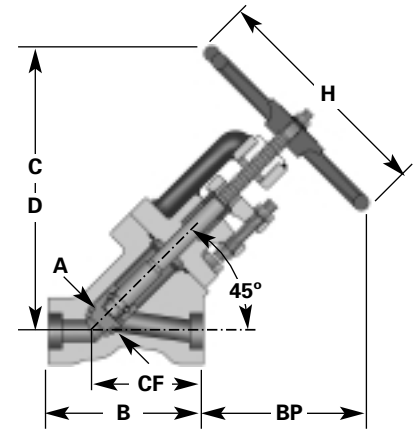
45° WELDED BONNET

PART	STANDARD MATERIALS
Body	A105N
Bonnet	A105N
Seat (integral)	Stellite 6
Disc	Stellite 6
Stem	Gr. 410 (stainless)
Stem nut	CS CD plated
Gland bushing	Gr. 416 (stainless)
Yoke bushing	AL Brz C64200
Cap Screw	Gr. B7
Gasket	Gr. 304 & Graphite
Packing	Graphite
Packing flange	CS
Gland stud	Gr. B6
Gland nut	Gr. 2H
Handwheel	Malleable iron
Name plate	Aluminum

For other materials, trim and engineering data, see pages 21–25.

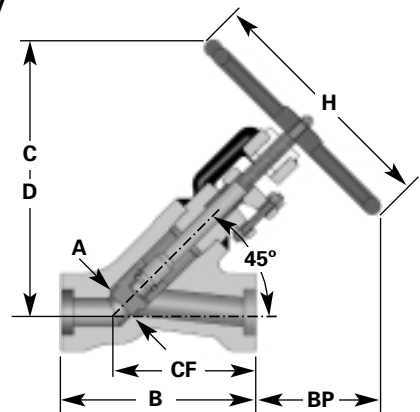
BOLTED BONNET GLOBE 45° INCLINED VALVE DIMENSIONS, WEIGHTS & CV

Size	A		B		C		D		H		BP		CF		Weight		CV
	Port	End to End	Center to Top Closed	Center to Top Open	Handwheel	Clearance Open	Center to End	lb	kg	Flow Coefficient							
in	800	1690	800	1690	800	1690	800	1690	800	1690	800	1690	800	1690	800	1690	
1/2 15	0.559 14.2	4.00 102	4.88 124	6.76 172	8.81 224	7.20 183	9.25 235	4.00 102	6.00 152	4.22 107	5.50 140	2.88 73	3.50 99	12.00 5.4	15.00 7		8
3/4 20	0.559 14.2	4.00 102	4.88 124	6.76 172	8.81 224	7.20 183	9.25 235	4.00 102	6.00 152	4.22 107	5.50 140	2.88 73	3.50 99	12.00 5.4	15.00 7		9
1 25	0.833 21.2	4.88 124	5.75 146	7.16 182	10.60 269	7.78 198	11.22 285	4.00 102	8.00 203	4.17 106	6.75 172	3.50 89	4.19 106	15.00 7	22.00 10		14
1 1/4 32	1.125 28.6	5.75 146	7.25 184	9.05 230	11.72 298	9.85 250	12.51 318	6.00 152	8.00 203	5.40 137	6.73 171	4.19 106	5.50 140	33.00 15	36.00 16		28
1 1/2 40	1.125 28.6	5.75 146	7.25 184	9.05 230	11.72 298	9.85 250	12.51 318	6.00 152	8.00 203	5.40 137	6.73 171	4.19 106	5.50 140	33.00 15	36.00 16		29
2 50	1.50 38.1	7.25 184	10.13 275	11.72 298	14.32 364	12.78 325	15.38 391	8.00 203	12.00 305	7.00 172	7.58 193	5.50 140	7.38 187	67.00 30	72.00 37		54



WELDED BONNET GLOBE 45° INCLINED VALVE DIMENSIONS, WEIGHTS & CV

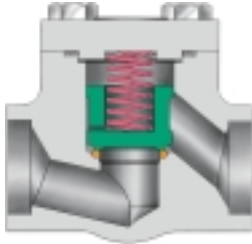
Size	A		B		C		D		H		BP		CF		Weight		CV
	Port	End to End	Center to Top Closed	Center to Top Open	Handwheel	Clearance Open	Center to End	lb	kg	Flow Coefficient							
in	1690 & 2680	1690 & 2680	1690 & 2680	1690 & 2680	1690 & 2680	1690 & 2680	1690 & 2680	1690 & 2680	1690 & 2680	1690 & 2680	1690 & 2680	1690 & 2680	1690 & 2680	1690 & 2680	1690 & 2680		
1/2 15	0.559 14.2	4.88 124	7.75 197	8.19 208	6.00 152	4.00 102	3.50 99	9.50 4									8
3/4 20	0.559 14.2	4.88 124	7.75 197	8.19 208	6.00 152	4.00 102	3.50 99	9.50 4									9
1 25	0.833 21.2	5.75 146	9.73 247	10.38 264	8.00 203	5.19 132	4.19 106	18.00 8									14
1 1/4 32	1.125 28.6	7.25 184	11.37 28	12.22 310	8.00 203	6.38 162	5.50 140	37.00 17									28
1 1/2 40	1.125 28.6	7.25 184	11.37 28	12.22 310	8.00 203	6.38 162	5.50 140	37.00 17									29
2 50	1.50 38.1	10.13 275	14.19 360	15.26 388	12.00 305	7.45 189	7.38 187	55.00 25									54



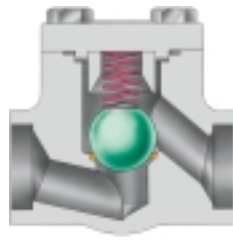


FORGED STEEL CHECK VALVES CONVENTIONAL PORT OPENING, 1/4–2" (8–50 mm)

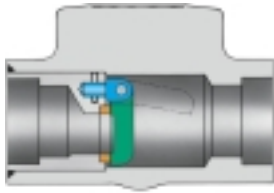
PISTON, BALL OR SWING TYPE ASME CLASSES 800, 1500
THREADED OR SOCKET WELD FLANGED
ASME CLASSES 150, 300, 600, 1500



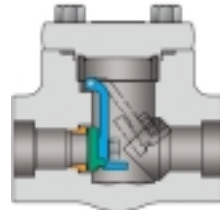
PISTON BOLTED COVER



BALL TYPE BOLTED COVER



COVERLESS SWING CHECK



SWING CHECK BOLTED COVER

STANDARD MATERIALS

PART	STANDARD MATERIALS
Body	A105N
Cover	A 105N
Seat, integral	Stellite 6
Disc ⁽⁴⁾	CA15HT or Stellite 6 ⁽⁶⁾
Ball ⁽¹⁾	Gr. 440C
Spring ⁽⁵⁾	Gr. 302
Cap screw ⁽³⁾	Gr. B7
Gasket ⁽³⁾	Gr. 304 (stainless and graphite)
Swing holder ⁽²⁾	CA15HT
Swing pin ⁽²⁾	Gr. 410

For other materials, trim and engineering data, see pages 21–25.

SPECIFICATIONS

TYPE	BOLTED COVER	COVERLESS
Piston check	034B	—
Ball check	024B	—
Swing check	114B	114W

- (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.

BOLTED COVER PISTON, BALL AND SWING CHECK DIMENSIONS AND WEIGHTS

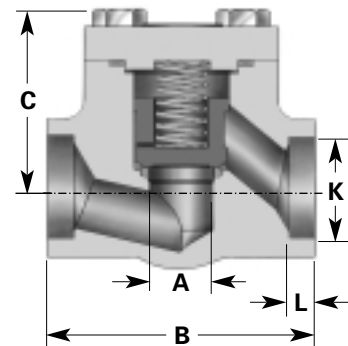
Size in mm	A Port				B End to End				C Center to Top Bolts				K Socket Weld	L Socket Weld	Weight lb kg				Flanged Face to Face			
	Piston & Ball		Swing Check		Piston & Ball		Swing Check		Piston & Ball		Swing Check		Piston, Ball & Swing Check		Piston & Ball		Swing Check		Piston, Ball & Swing Check			
	800	1500	800	1500	800	1500	800	1500	800	1500	800	1500	Bore	Depth	800	1500	800	1500	150	300	600	1500
1/4 8	0.31 7.8	0.50 12.7	—	—	2.88 73	4.00 102	—	—	1.90 48	2.70 68	—	—	0.555 14.10	0.38 10	2.1 1.0	6.6 3.0	—	—	4.00 102	—	—	—
3/8 10	0.31 7.8	0.50 12.7	—	—	2.88 73	4.00 102	—	—	1.90 48	2.70 68	—	—	0.690 17.53	0.38 10	2.1 1.0	6.6 3.0	—	—	4.00 102	—	—	—
1/2 15	0.31 7.8	0.50 12.7	0.50 12.7	0.50 12.7	2.88 73	4.00 102	3.50 89	6.00 152	1.90 48	2.70 68	2.50 64	3.70 94	0.855 21.72	0.38 10	2.1 1.0	6.6 3.0	4.6 2.1	4.4 2.0	4.25 108	6.00 152	6.50 165	8.50 216
3/4 20	0.50 12.7	0.50 12.7	0.50 12.7	0.50 12.7	3.25 83	5.00 127	3.50 89	6.00 152	2.30 58	2.90 74	2.50 64	3.70 94	1.065 27.05	0.50 13	3.9 1.8	6.6 3.0	4.6 2.1	6.6 3.0	4.62 117	7.00 178	7.50 191	9.00 229
1 25	0.75 19.1	0.75 19.1	0.75 19.1	0.75 19.1	3.50 89	6.00 152	5.00 127	6.00 152	2.60 66	3.50 89	3.50 89	3.70 94	1.330 33.78	0.50 13	4.8 2.2	17 8	12 5.4	12 5.4	5.00 127	8.50 216	8.50 216	10.00 254
1 1/4 32	1.25 31.8	1.25 31.8	1.25 31.8	1.25 31.8	5.00 127	7.00 178	5.25 133	7.00 178	3.70 94	4.20 107	3.40 86	3.70 94	1.675 42.55	0.50 13	13 5.9	26 12	15 7	19 9	5.50 140	9.00 229	9.00 229	11.00 279
1 1/2 40	1.25 31.8	1.25 31.8	1.25 31.8	1.25 31.8	5.00 127	7.00 178	5.25 133	7.00 178	3.70 94	4.20 107	3.40 86	4.20 107	1.915 48.64	0.50 13	11 5.0	26 12	15 7	19 9	6.50 165	9.50 241	9.50 241	12.00 305
2 50	1.50 38.1	1.50 38.1	1.50 38.1	1.50 38.1	8.00 203	9.00 229	6.00 152	9.00 229	4.80 122	5.40 137	4.30 109	5.20 132	2.406 61.11	0.63 16	22 10.0	41 19	21 10	26 12	8.00 203	10.50 267	11.50 292	14.50 368

(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.

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

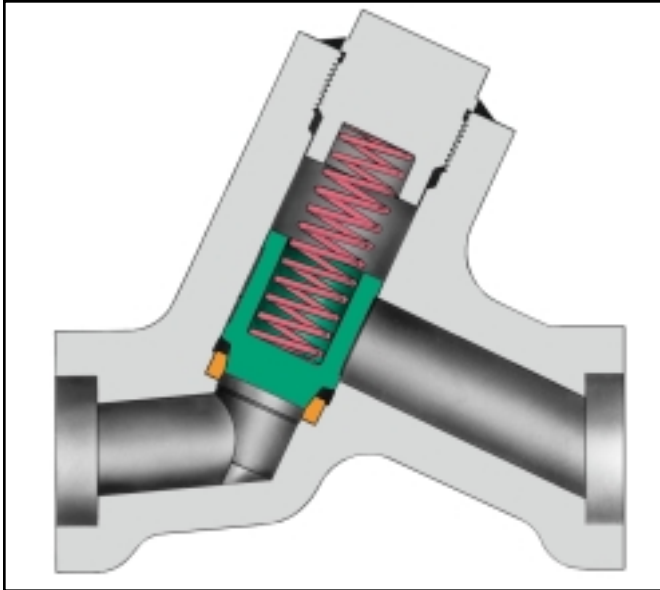
COVERLESS SWING CHECK DIMENSIONS AND WEIGHTS (CLASS 800)

Size in mm	A Port	B End to End	C Center to Top of Body	K Socket Weld Bore	L Socket Weld	Weight lb kg
1/4 8	0.50 13	3.25 83	1.40 36	0.555 14.10	0.38 10	2.2 1
3/8 10	0.50 13	3.25 83	1.40 36	0.690 17.53	0.38 10	2.2 1
1/2 15	0.50 13	3.25 83	1.40 36	0.855 21.72	0.38 10	2.2 1
3/4 20	0.50 13	3.25 83	1.40 36	1.065 27.05	0.50 13	2.2 1
1 25	0.75 19	3.50 89	1.70 43	1.330 33.78	0.50 13	2.8 1.3
1 1/4 32	1.25 32	5.00 127	2.50 64	1.675 42.55	0.50 13	7.2 3.3
1 1/2 40	1.25 32	5.00 127	2.50 64	1.915 48.64	0.50 13	7.2 3.3
2 50	1.50 38	5.25 133	2.30 58	2.406 61.11	0.63 16	10 4.5





**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



PART	STANDARD MATERIALS			
Body	A 105N	A182 Gr. F22	A182 Gr. F316	A 182 Gr. F91
Cover	A 105N	A182 Gr. F22	A182 Gr. F316	A 182 Gr. F91
Disc	Stellite 6			
Seat, integral	Stellite 6			
Spring ⁽¹⁾	Gr. 302 (stainless)	Inconel X750	Gr. 302 (stainless)	Inconel X750

DESIGN FEATURES

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

For other materials, trim and engineering data, see pages 21–25.

CLASS	1690	2680	4500
Figure No.	8036W	9036W	5036W

DIMENSIONS, WEIGHTS AND CV

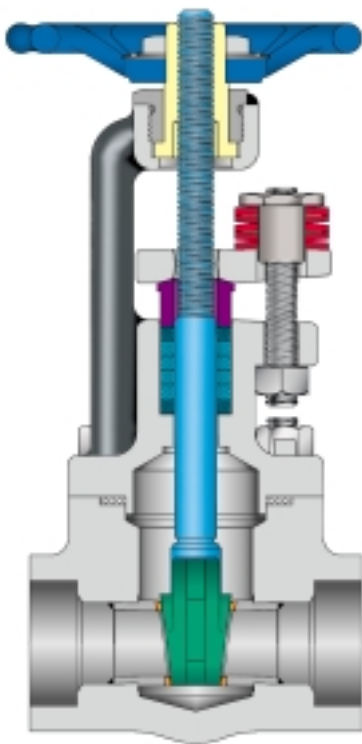
Size in mm	Port Opening		End to End		Center to Top		Socket Weld Bore	Socket Depth	Approx. Weight lb kg		Cv Flow Coefficient	
	1690 & 2680	4500	1690 & 2680	4500	1690 & 2680	4500			1690 & 2680	4500	1690 & 2680	4500
1/2 15	0.559 14.2	0.375 9.5	4.88 124	5.75 146	3.44 87	4.75 121	0.855 21.7	0.375 9.5	6.1 3	25 11	7	4
3/4 20	0.559 14.2	0.559 14.2	4.88 124	7.00 178	3.44 87	5.25 133	1.065 27.1	0.500 12.7	5.7 2.6	25 11	8	7
1 25	0.833 21.2	0.559 14.2	5.75 146	7.00 178	4.69 119	5.25 133	1.330 33.8	0.500 12.7	12 5	25 11	12	9
1 1/4 32	1.125 28.6	0.833 21.2	7.25 184	10.13 257	5.63 143	6.88 175	1.675 42.5	0.500 12.7	22 10	42 19	24	19
1 1/2 40	1.125 28.6	1.125 28.6	7.25 184	10.13 257	5.63 143	6.88 175	1.915 48.6	0.500 12.7	22 10	42 19	25	24
2 50	1.688 42.9	1.125 28.6	10.13 257	12.00 305	6.94 176	8.44 214	2.406 61.1	0.625 15.9	43 20	87 40	60	25
2 1/2 ⁽²⁾ 65	1.688 42.9	1.50 38.1	12.00 305	12.00 305	8.44 214	8.44 214	2.906 73.8	0.625 15.9	94 43	110 50	60	47
3 ⁽²⁾ 80	1.688 42.9	1.50 38.1	12.00 305	12.00 305	8.44 214	8.44 214	3.535 89.8	0.625 15.9	94 43	110 50	60	47
4 100	1.688 42.9	1.50 38.1	12.00 305	12.00 305	8.44 214	8.44 214	(3)	(3)	94 43	110 50	60	47

(1) Consult Velan for spring materials if continuous operating temperature is above 800°F (427°C).
 (2) For Classes 1690 & 2680, dimensions are as shown, or same as for 2" (50 mm) valve, depending on end connection.
 (3) 4" (100 mm) butt weld or flanged connection only.



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

FOR NUCLEAR POWER PLANTS AND OTHER CRITICAL SERVICE



GATE

DESIGN FEATURES

- Sturdy bonnet arms.
- Suitable for electric actuation.
- More repacking space.

GATE VALVES

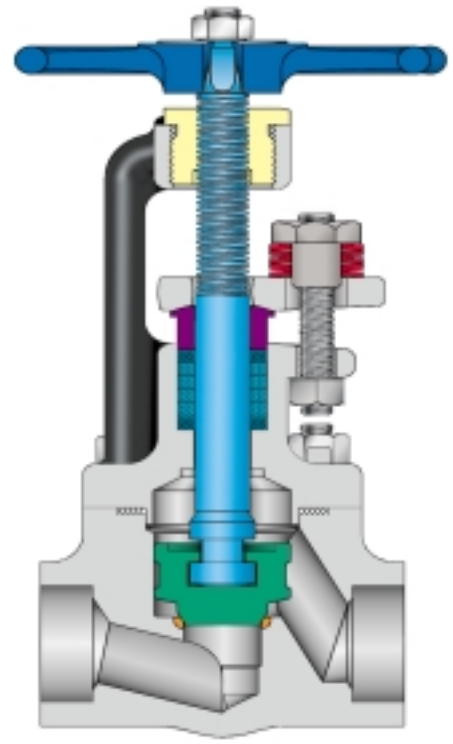
- Seal welded seats.
- Stellite 6 or cobalt free wedge and seats.

GLOBE VALVES

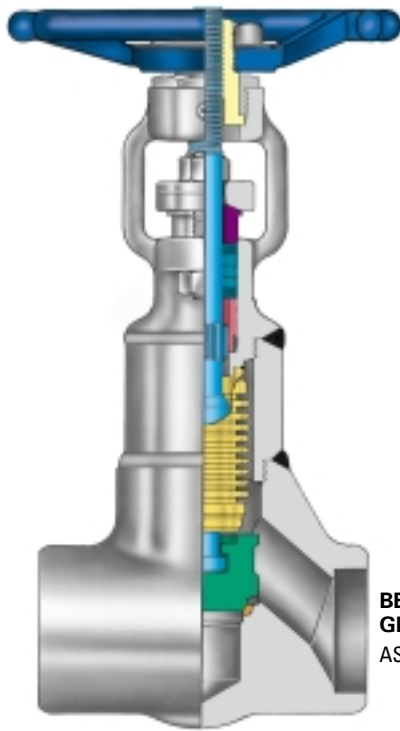
- Stellite 6 or cobalt free seats and discs.
- Stop, Stop-Check, Needle, Flow Control
- Y-Pattern models for ASME Classes 1500 & 2500

OPTIONS

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



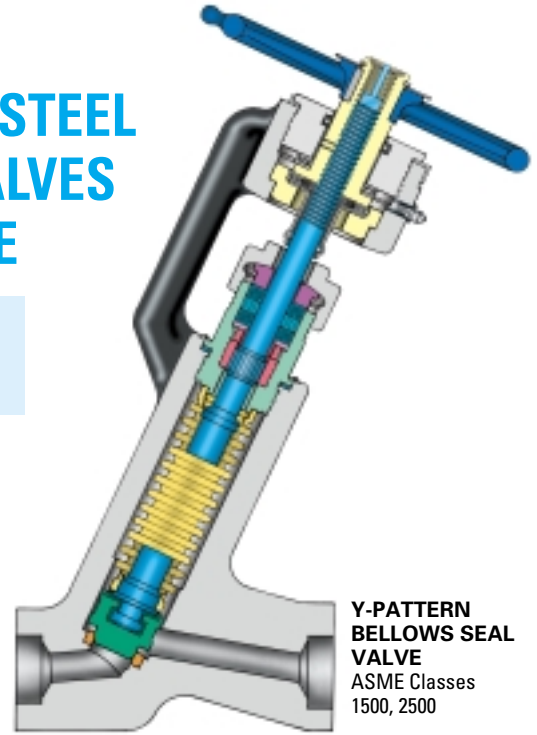
GLOBE



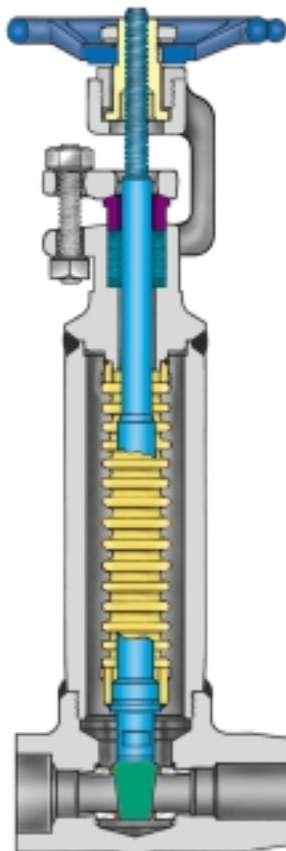
COMPACT FORGED STEEL BELLOWS SEAL VALVES ZERO LEAKAGE

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

**BELLOWS SEAL
GLOBE VALVE**
ASME Classes 150–600



**Y-PATTERN
BELLOWS SEAL
VALVE**
ASME Classes
1500, 2500



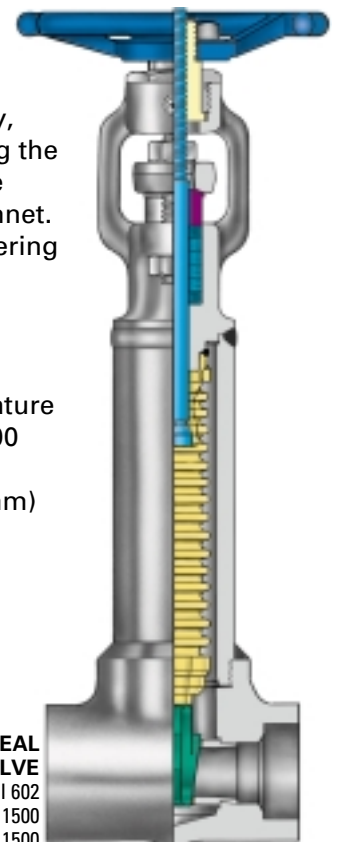
VALVE DESIGN PARAMETERS

- 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.

**BELLOWS SEAL
DRAIN VALVE**
API 602
Classes 800–1500

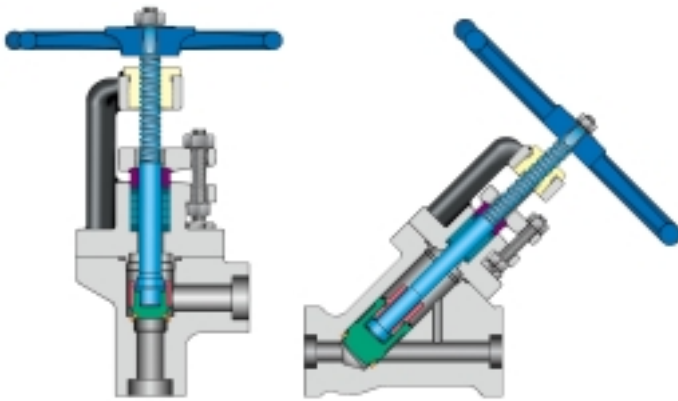


**BELLOWS SEAL
GATE VALVE**
API 602
Classes 800–1500
Flanged ASME Classes 150–1500



BOILER PLANT SERVICE VALVES, 1/2–2" (15–50 mm)

(SEE PAGE 10 FOR Y-PATTERN GLOBE VALVES)



ANGLE

45° INCLINED BOLTED BONNET

FIGURE NUMBERS

CLASS	ANGLE	45° INCLINED
600	2215B	2216B
1500	3215B	3216B

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

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.

CODES AND SPECIFICATIONS

Velan boiler blowoff valves meet all applicable specifications of the ASME boiler code, U.S. military standards (listed on qualified product list), U.S. Coast Guard, American Bureau of Shipping and Lloyd's.

FLANGED OR WELDED ENDS	CLASS 600*	CLASS 1500	CLASS 2500
Basic steam rating	535 psi @ 850°F	1340 psi @ 850°F	2230 psi @ 850°F
Max. boiler pressure	935 psi	2455 psi	3206 psi
Maximum non-shock	1480 psi @ 100°F	3705 psi @ 100°F	6170 psi @ 100°F

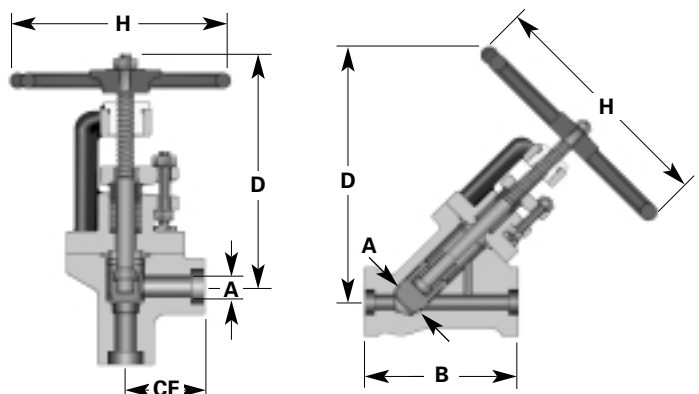
* Use for Classes 300 and 400 boilers.

ANGLE VALVE DIMENSIONS

Size in mm	A Port	CF				D		H	
		Center to End Weld End		Center to Face Flanged		Center to Top Open		Handwheel Diameter	
		600	1500	600	1500	600	1500	600	1500
1/2 15	0.453 11.5	2.00 51	2.00 51	3.25 83	4.25 108	7.48 190	7.48 190	6.00 152	6.00 152
3/4 20	0.625 15.9	2.50 64	2.50 64	3.75 95	4.50 114	7.48 190	7.48 190	6.00 152	6.00 152
1 25	1 25.4	3.00 76	3.00 76	4.25 108	5.00 127	9.50 241	9.50 241	8.00 203	8.00 203
1 1/4 32	1.448 36.8	3.50 89	3.50 89	4.50 114	5.50 140	10.56 268	10.56 268	12.00 305	12.00 305
1 1/2 40	1.448 36.8	3.50 89	3.50 89	4.75 121	6.00 152	10.56 268	10.56 268	12.00 305	12.00 305
2 50	1.750 44.5	4.50 114	4.50 114	5.75 146	7.25 184	11.06 281	11.06 281	12.00 305	12.00 305

45° INCLINED VALVE DIMENSIONS

Size in mm	A Port	B				D		H	
		End to End Weld End		Face to Face Flanged		Center to Top Open		Handwheel Diameter	
		600	1500	600	1500	600	1500	600	1500
1 25	1.50 38.1	8.00 203	8.00 203	12.00 305	12.00 305	15.20 386	15.20 386	12.00 305	12.00 305
1 1/2 40	1.50 38.1	8.00 203	8.00 203	12.00 305	12.00 305	15.20 386	15.20 386	12.00 305	12.00 305
2 50	1.50 38.1	8.00 203	8.00 203	12.00 305	14.50 368	15.20 386	15.20 386	12.00 305	12.00 305



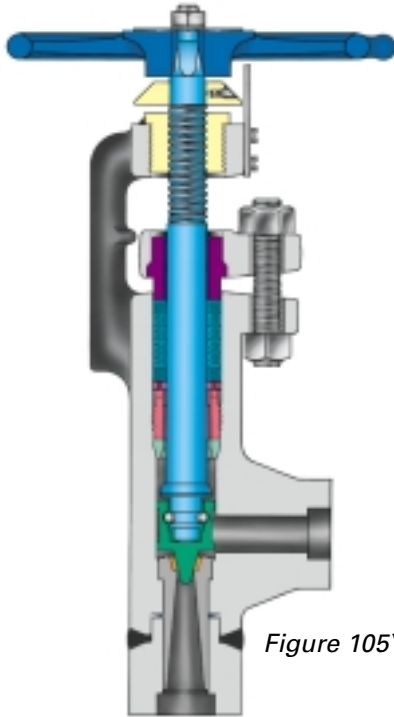


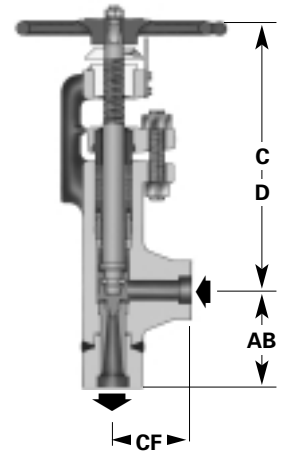
Figure 105Y

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: 1/8" to 1 1/8" (3.18 to 28.58 mm), depending on the capacity required.

Size in mm	AB Center to Bottom		CF Center to End	C Center to Top Closed	D Center to Top Open	Weight lb kg
	SW	NPT				
1/2 15	2.25 57	–	3.19 81	11.9 302	12.6 320	30 14
3/4 20	3.12 79	3.62 92	3.19 81	11.9 302	12.6 320	30 14
1 25	3.92 100	4.42 112	3.19 81	11.9 302	12.6 320	30 14
1 1/2 40	4.95 126	–	3.00 76	15.6 396	16.5 419	66 30
2 50	6.50 165	–	5.00 127	17.1 434	18.50 470	101 46

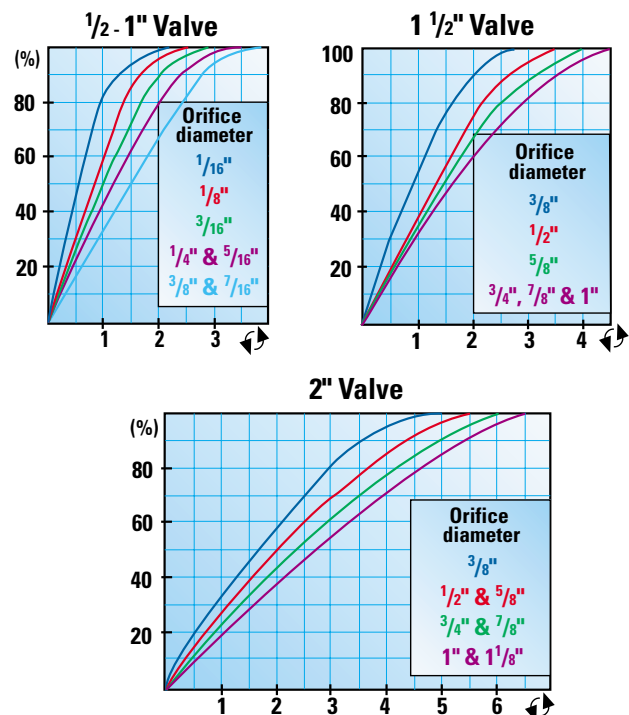
NOTE: Contact Velan Engineering Department for other details.

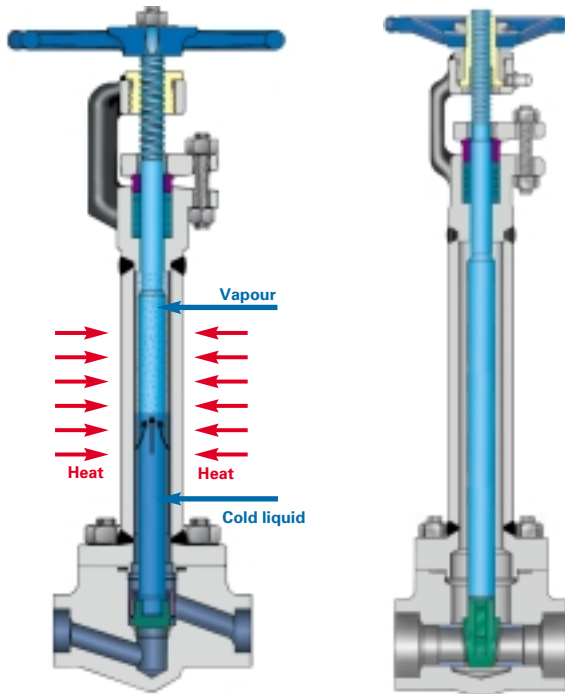


OTHER FORGED VALVES FOR BOILERS PLANT SERVICE:

- **Gate and Globe**
2 1/2" – 24" (65 – 600 mm)
Bolted or Pressure Seal,
ASME Classes 600 – 4500
- **Gate and Globe**
1/4" – 2" (8 – 50 mm)
Bolted and Welded Bonnet,
ASME Classes 800 – 1500
- **Swing, Piston & Tilting Disc Check Valves**
1/2" – 24" (15 – 600 mm)
Bolted or Pressure Seal,
ASME Classes 600 – 4500
- **Y-Pattern Bonnetless Globe Valves**
1/4" – 4" (8 – 100 mm)
ASME Classes 1690 – 4500
- **Y-Pattern Piston Check**
1/4" – 4" (8 – 100 mm)
ASME Classes 600 – 4500

WIDE OPEN CAPACITIES (%) VS HANDWHEEL TURNS





With Stellite 6 faced seat
and solid Stellite 6 wedge

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 $-425^{\circ}\text{F}/-254^{\circ}\text{C}$). Velan specially adapted extended bonnet forged valves offer safe and efficient service.

TABLE OF LIQUIFIED GASES

Type	Boiling Point		Liquid Density lb/ft ³
	°C	°F	
Natural gas (LNG)	-168.0	-270	26.00
Methane (CH ₄)	-161.5	-258	26.20
Oxygen (O ₂)	-182.9	-296	71.20
Argon (A)	-185.9	-303	87.40
Helium (He)	-268.9	-452	7.82
Carbon Dioxide (CO ₂)	-78.5	-109	50.60
Air	-194.4	-318	57.87
Nitrogen (N ₂)	-195.8	-320	50.45
Hydrogen (H ₂)	-252.7	-423	4.43
Absolute Zero	-273.16	-460	—

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 1/2–2" (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

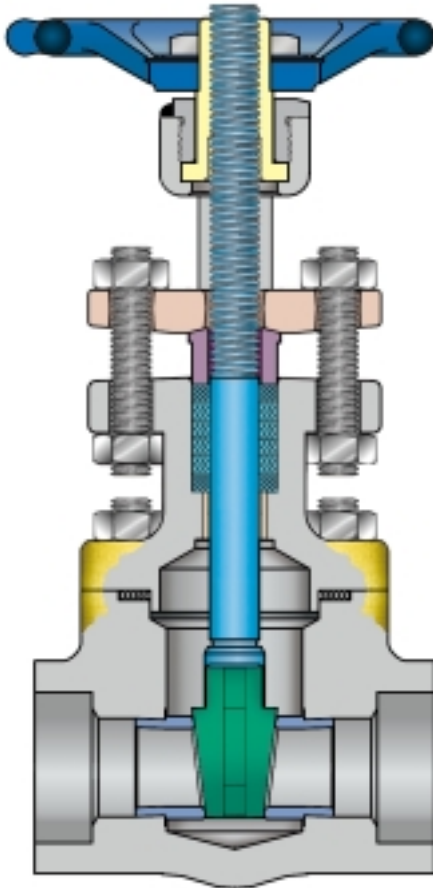
- **All Stainless Steel 1/2–2" (15 – 50 mm) Gate Valves,** Classes 150-1500.
- **All Stainless Steel 1/2–2" (15 – 50 mm) Globe Valves⁽¹⁾,** Classes 150-1500.
- **All Stainless Steel 1/2–2" (15 – 50 mm) Check Valves⁽¹⁾,** Classes 150-1500.

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



Hydrofluoric Acid is one of the strongest and most corrosive acids. Industries using HF acid in their manufacturing process have placed an increasing emphasis on safety in using this product.

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.



GATE VALVE

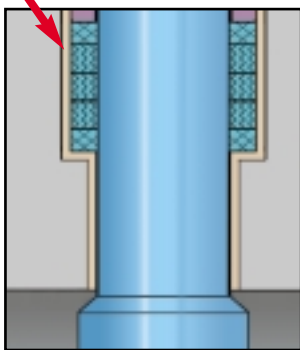
DESIGN FEATURES:

- **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.

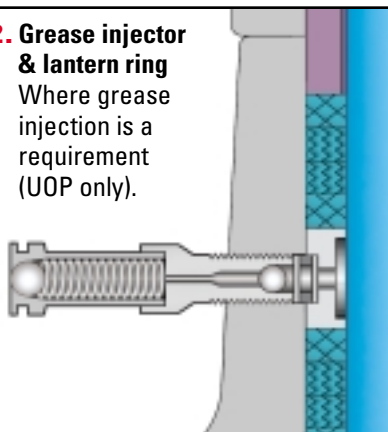
OPTIONAL DESIGN FEATURES

1. Nickel overlay packing box liner



2. Grease injector & lantern ring

Where grease injection is a requirement (UOP only).



3. CTFE seat insert

Resists abrasion and corrosion





FABRICATED GATE, GLOBE, CHECK VALVES,
1/4–2" (8–50 mm)
ASME CLASSES 150–2680



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

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.

DESIGNS:

- Gate
- Extended body gate
- Globe
- 45° Inclined globe
- Critical services
- Y-Pattern bonnetless globe
- Piston bolted cover check
- Ball type bolted cover check
- Coverless swing check

Materials
 Hastelloy
 F314L
 Alloy 20
 F347
 Inconel
 F9
 Duplex F51
 F91
 F44
 Incoloy
 Super duplex
 Many other approved materials are also available.

Connections
 Flanged
 NPT
 Socket weld
 Butt weld

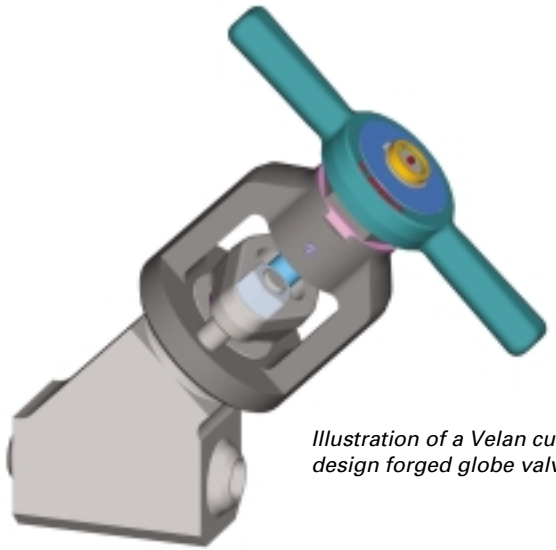


Illustration of a Velan custom design forged globe valve.

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.

ENGINEERING DATA

SPECIFICATION OF FORGED VALVE MATERIALS BODY AND BONNET, PACKING FLANGE, WEDGE-DISC-SEAT

TABLE 1

DESCRIPTION		CARBON STEEL		ALLOY STEEL					STAINLESS STEEL		
		A 105N ⁽²⁾	A 350 Gr. LF2 ⁽²⁾	1¼ Cr ½ Mo A 182 Gr. F11	2¼ Cr-1 Mo A 182 Gr. F22 Cl.3	5% Cr A 182 Gr. F5	9% Cr A 182 Gr. F9	9% Cr A 182 Gr. F91	316		321
ASTM DESIGNATION									A 182 Gr. F316	A 182 Gr. F316L	A 182 Gr. F321
COMPOSITION %	Carbon	0.35 max.	0.35 max.	0.10-0.20	0.05-0.15 max.	0.15 max.	0.15 max.	0.08-0.12	0.08 max. ⁽³⁾	0.035 max.	0.08 max.
	Manganese	0.60-1.05	0.60-1.35 max.	0.30-0.80	0.30-0.60	0.30-0.60	0.30-0.60	0.30-0.60	2.00 max.	2.00 max.	2.00 max.
	Phosphorus	0.035 max.	0.035 max.	0.040 max.	0.040 max.	0.030 max.	0.030 max.	0.020 max.	0.045 max.	0.045 max.	0.045 max.
	Sulphur	0.040 max.	0.040 max.	0.040 max.	0.040 max.	0.030 max.	0.030 max.	0.010 max.	0.030 max.	0.03 max.	0.03 max.
	Silicon	0.10-0.35 max.	0.15-0.30	0.50-1.00	0.50 max.	0.50 max.	0.50-1.00	0.20-0.50	1.00 max.	1.00 max.	1.00 max.
	Nickel	—	—	—	—	0.50 max.	—	0.4 max.	10.0-14.0	10.0-15.0	9.0-12.0
	Chromium	—	—	1.00-1.50	2.00-2.50	4.0-6.0	8.0-10.0	8.0-9.50	16.0-18.0	16.0-18.0	17.0 min.
	Molybdenum	—	—	0.44-0.65	0.87-1.13	0.44-0.65	0.90-1.10	0.85-1.05	2.0-3.0	2.0-3.0	(4)
Special Tests	—	impact-50°F	—	—	—	—	—	—	—	—	
Heat Treatment	Normalized	QT or NT ⁽⁵⁾	NT ⁽⁵⁾	NT ⁽⁵⁾	NT ⁽⁵⁾	NT ⁽⁵⁾	NT ⁽⁵⁾	Sol. annealed	Sol. annealed	—	
Tensile psi min.	70,000	70,000	70,000	75,000	70,000	85,000	85,000	75,000	70,000	75,000	
Yield psi min.	36,000	36,000	40,000	45,000	40,000	55,000	60,000	30,000	25,000	30,000	
Elong. % Min.	22	22	20	20	20	20	20	30	30	30	
R. Area % Min.	30	30	30	30	35	40	40	50	50	50	
Hardness* HB ⁽¹⁾	187 max.	197 max.	143-207	156-207	143-217	179-217	248 max.	—	—	—	

(1) All forgings are softer than 237 HB = 22 HRC.

(2) A 105N, A 350 Gr. LF2 Standard at Velan, 0.25 C max.

(3) Material code 13 : 0.035 max., Material Code 17: 0.04-0.08.

(4) Titanium: min. 5 x C, max. 6 x C.

(5) QT: Quenched and tempered

NT: Normalized and tempered

TRIM SPECIFICATION

TABLE 2

ASTM DESIGNATION		BAR STOCK							CAST			
		CR 13		STAINLESS STEELS			MONEL		HASTELLOY	MONEL	STELLITE 6	AUSTENITIC DUCTILE
		A 479 410 ⁽⁵⁾	A 582 416 ⁽⁵⁾	A 479 316 ST. HARD.	A 479 316	A 564 630	B 164 MONEL	AMS 467D K-MONEL	B574 N 10276	A 494 M-25S	AMS 5387 A	A 439 D-2C
COMPOSITION %	Carbon	0.15	0.15	0.08	0.08	0.07	0.3	0.25	0.010	0.25	0.9-1.4	2.90
	Manganese	1.00	1.25	2.00	2.00	1.00	2.0	1.50	1.0	1.50	1.0	1.80-2.40
	Phosphorus	0.040	0.06	0.045	0.045	0.040	—	0.02	0.04	0.03	0.04	0.08
	Sulphur	0.030	0.15 min.	0.030	0.030	0.030	0.024	0.010	0.03	0.03	0.04	—
	Silicon	1.00	1.00	1.00	1.00	1.00	0.5	1.00	0.08	3.5-4.5	1.5	1.00-3.00
	Nickel	—	—	10.00-14.00	10.00-14.00	3.00-5.00	63.0	63.00-70.00	Balance	Balance	3.0	21.00-24.00
	Chromium	11.50-13.50	12.00-14.00	16.00-18.00	16.00-18.00	15.00-17.50	—	—	14.5-16.5	—	27.0-31.0	0.50
	Molybdenum	—	—	2.00-3.00	2.00-3.00	—	—	—	15.0-17.0	—	1.5	—
	Copper	—	—	—	—	3.00-5.00	28.0-34.0	Balance	—	27.0-33.0	—	—
	Aluminum	—	—	—	—	—	—	—	—	—	—	—
	Cobalt	—	—	—	—	—	—	—	—	—	Balance	—
Tungsten	—	—	—	—	—	—	—	—	—	3.5-5.5	—	
Iron	—	—	—	—	—	—	—	—	3.50 Max.	3.0	—	
Special Condition	Temper	Hard	Level 2	—	—	Hot worked	Hot Fin.	—	Age Hard.	—	—	
Heat Treat.	Class 2	Hard Temper	Sol. annealed	Sol. annealed	H 1100	—	—	—	—	—	—	
Tensile psi min.	110,000	—	95,000	75,000	140,000	80,000	140,000	100,000	—	130,000	58,000	
Yield psi min.	85,000	—	75,000	30,000	115,000	40,000	100,000	41,000	—	—	28,000	
Elong. % min.	15	—	25	30	14	30	20	40	—	1	20	
R. Area % min.	45	—	40	40	45	—	—	—	—	—	—	
Hardness HB	269 max.	293-352	—	—	302 min.	—	326 min.	—	300 min.	344 min.	121-171	

(5) Cr 13 available in soft form. Less than 237 HB. Non-Cobalt hard facing alloy available.

ENGINEERING DATA

STEM PACKING

TYPE OF PACKING	JOHN CRANE DESIGNATION	TYPE OF SERVICE	SERVICE TEMP. °F
Die-formed graphite sandwiched between braided graphite	1625A and 237 or equal	Steam, Air, Water, Oils, Liquefied Petroleum	up to 1400
Teflon V-rings	C-VH	All Acids, Alkali, Solvents, Gases, Except Fluorine	-120 to +500
Braided Teflon	C-1046	Hydrogen, Peroxide, Oleum, Acids, Alkali	-100 to +400

TRIM MATERIALS

TRIM (CODE)	WEDGE/DISC SEATING SURFACE	SEAT SURFACE	STEM
13% Cr (TY)	CA15	Stellite 6	410
Full Stellite (TS)	Stellite 6	Stellite 6	410
316 (MY)	CF8M or 316	Stellite 6	316
316 full Stellite (MS)	Stellite 6	Stellite 6	316
Monel (XY)	Monel	Stellite 6	Monel
Monel (XX)	Monel	Monel	Monel
Hastelloy (HC)	Hastelloy C	Stellite 6	Hastelloy C
(SX)	CF8M	CF8M	316

BODY-BONNET GASKETS

GASKET TYPE	VALVE TYPE	REMARKS
Spiral wound Gr. 304 (stainless) + graphite	Forged valves	Asbestos-free max. 1400°F
Spiral wound Gr. 304 (stainless) + Teflon	Forged valves for chemical industry	Asbestos-free max. 500°F
Spiral wound Monel + Teflon	Forged valves for chemical industry	Asbestos-free max. 500°F

HF (HYDROFLUORIC ACID) VALVES

FOR HF SERVICE, WE RECOMMEND THE FOLLOWING TRIM:

STEM:	Monel K
WEDGE & DISC:	Monel or Monel with Teflon, with additional side clearance to prevent buildup.
SEATS:	Monel
GASKET:	Monel and Teflon
PACKING:	Teflon V-rings
BOLTS:	Replace with A 193-B7M studs & A 194-2HM nuts.

SOUR SERVICE VALVES

TO MEET STANDARDS MR0175 (REV. 1994)

Velan manufactures the complete range of valves shown in this catalog in compliance with NACE standard MR0175 (REV.1994).

Trim materials must be selected by customers from the table below based on experience with resistance to corrosion against sulphides (sour gas) found in processing crude oil.

TYPE OF TRIM (CODE)	WEDGE/DISC SEATING SURFACE	SEAT SURFACE	STEM	BONNET BOLTING
NA	13% Chrome*	Stellite 6	410*	Gr. B7M/2HM*
NB	Stellite 6 or CF8M	Stellite 6	316 or 630	Gr. B7M/2HM* or 630
NC	Monel	Stellite 6	Monel or Monel K	Gr. B7M/2HM* or 630

*RC 22 maximum

CHLORINE VALVES

STEM:	Monel K
WEDGE OR DISC:	Monel or Monel with Teflon
SEAT:	Monel
GASKET:	Monel and Teflon
PACKING:	Teflon V-rings
BOLTS:	A193-B7

NOTE: Special cleaning procedure and packing available.

PRESSURE-TEMPERATURE RATINGS FOR FORGED STEEL GATE VALVES

API 602, CLASS 800

Service Temperature (Degrees)		A 105 ⁽¹⁾ A 350 Gr. LF2 ⁽¹⁾ A 216 Gr. WCB ⁽¹⁾		A 350 Gr. LF3 ⁽²⁾ A 352 Gr. LC2 ⁽²⁾ A 352 Gr. LC3 ⁽²⁾		A 182 Gr. F11 Cl.2 ⁽³⁾ A 217 Gr. WC6 ⁽⁴⁾		A 182 Gr. F22 Cl. ⁽³⁾ A 217 Gr. WC9 ⁽⁴⁾		A 182 Gr. F5 A 182 Gr. F5a A 217 Gr. C5		A 182 Gr. F9 A 217 Gr. C12		A 182 Gr. F316 ⁽⁵⁾ A 351 Gr. CF3M ⁽⁵⁾ A 351 Gr. CF8M	
°F	°C	psig	MPa	psig	MPa	psig	MPa	psig	MPa	psig	MPa	psig	MPa	psig	MPa
-20 to 100	-29 to 38	1975	13.62	2000	13.79	2000	13.79	2000	13.79	2000	13.79	2000	13.79	1920	13.24
200	93.5	1800	12.41	2000	13.79	2000	13.79	2000	13.79	1985	13.69	2000	13.79	1655	11.41
300	149	1750	12.07	1940	13.38	1925	13.28	1940	13.38	1910	13.17	1940	13.38	1495	10.31
400	204.5	1690	11.65	1880	12.96	1850	12.76	1880	12.97	1880	12.96	1880	12.96	1370	9.45
500	260	1595	11.00	1775	12.24	1775	12.24	1775	12.24	1775	12.24	1775	12.24	1275	8.79
600	315.5	1460	10.07	1615	11.14	1615	11.14	1615	11.14	1615	11.14	1615	11.14	1205	8.31
650	343.5	1430	9.86	1570	10.82	1570	10.82	1570	10.82	1570	10.82	1570	10.82	1185	8.17
700	371	1420	9.79			1515	10.45	1515	10.45	1515	10.45	1515	10.45	1160	8.00
750	399	1345	9.27			1420	9.79	1420	9.79	1410	9.72	1420	9.79	1140	7.86
800	426.5	1100	7.58			1355	9.34	1355	9.34	1355	9.21	1355	9.34	1125	7.76
850	454.5	715	4.93			1300	8.96	1300	8.96	1290	8.90	1300	8.96	1115	7.69
900	482	460	3.17			1200	8.27	1200	8.27	985	6.79	1200	8.27	1105	7.62
950	510	275	1.90			850	5.86	1005	6.93	735	5.07	1005	6.93	1030	7.10
1000	538	140	0.96			575	3.97	695	4.79	530	3.66	675	4.66	935	6.45
1050	565.5					385	2.66	465	3.21	385	2.66	460	3.17	915	6.31
1100	593.5					255	1.76	295	2.03	265	1.83	300	2.07	815	5.62
1150	621					165	1.14	180	1.24	165	1.14	200	1.38	630	4.34
1200	649					100	0.69	110	0.76	95	0.66	140	0.97	495	3.41
1250	676.5													390	2.69
1300	704.5													310	2.14
1350	732													255	1.76
1400	760													200	1.38
1450	788													155	1.07
1500	815.5													110	0.76

1) Permissible but not recommended for prolonged use above about 800°F (425 °C).

2) Not to be used over 650°F (345 °C).

3) Permissible but not recommended for prolonged use above about 1100°F (595 °C).

4) Not to be used over 1100°F (595 °C).

5) Not to be used over 850°F (455 °C).

6) At temperatures over 1000°F (538 °C) use only when the carbon content is 0.04% or higher (material code 17).

NOTE: All other small forged steel valves ¼–2" have pressure-temperature ratings to B16.34.

ENGINEERING DATA ASME B16.34 PRESSURE TEMPERATURE RATINGS

Selection Rules :

- A) Valve sizes up to and including 2½":** Standard Class : Flanged Limited Class: Socket weld, butt weld or (threaded up to Class 2500)
B) Valve sizes 3" and up : Standard Class : Flanged or butt weld Special Class: Butt weld only (if ASME B16.34, para. 2.1.2 is invoked)

FORGED CARBON STEEL A 105N

Working Pressure by Classes, psig

CLASS	150		300		600		1500			1690		2500		2680			4500	
Shell Test, psig	450	1125	2225	5575	5625	6275	6350		9275	9375	9925	10050		16675	16875			
Seat Test, psig	325	825	1650	4100	4125	4600	4650		6800	6875	7300	7375		12225	12375			
Temp. °F	STANDARD	STANDARD	STANDARD	STANDARD	LIMITED (3)	STANDARD	SPECIAL (2)	LIMITED (3)	STANDARD	LIMITED (3)	STANDARD	SPECIAL (2)	LIMITED (3)	STANDARD	SPECIAL (2)	LIMITED (3)		
-20 to 100	285	740	1480	3705	3750	4175	4225	4225	6170	6250	6615	6700	6700	11110	11250	11250		
200	260	675	1350	3375	3750	3805	4225	4225	5625	6250	6030	6700	6700	10120	11250	11250		
300	230	655	1315	3280	3750	3695	4225	4225	5470	6250	5865	6700	6700	9845	11250	11250		
400	200	635	1270	3170	3750	3570	4225	4225	5280	6250	5660	6700	6700	9505	11250	11250		
500	170	600	1200	2995	3750	3375	4225	4225	4990	6250	5350	6700	6700	8980	11250	11250		
600	140	550	1095	2735	3565	3080	4015	4015	4560	5940	4890	6370	6370	8210	10690	10690		
650	125	535	1075	2685	3495	3025	3940	3940	4475	5825	4795	6245	6245	8055	10485	10485		
700	110	535	1065	2665	3470	3000	3910	3910	4440	5780	4760	6195	6195	7990	10405	10405		
750	95	505	1010	2520	3150	2840	3550	3550	4200	5250	4500	5630	5630	7560	9450	9450		
800	80	410	825	2060	2570	2320	2895	2895	3430	4285	3675	4595	4595	6170	7715	7715		
850(4)	65	270	535	1340	1670	1510	1880	1880	2230	2785	2390	2985	2985	4010	5015	5015		

FORGED CHROME-MOLY STEEL A 182 Gr. F22 Cl.3

Working Pressure by Classes, psig

CLASS	150		300		600		1500			1690		2500		2680			4500		
Shell Test, psig	450	1125	2250	5625		6350			9375		10050		16875		12375				
Seat Test, psig	325	825	1650	4125		4650		6875		7375		7375		12375		12375			
Temp. °F	STANDARD	STANDARD	STANDARD	STANDARD	LIMITED (3)	STANDARD	SPECIAL (2)	LIMITED (3)	STANDARD	LIMITED (3)	STANDARD	SPECIAL (2)	LIMITED (3)	STANDARD	SPECIAL (2)	LIMITED (3)			
-20 to 100	290	750	1500	3750	3750	4225	4225	4225	6250	6250	6700	6700	6700	11250	11250	11250			
200	260	750	1500	3750	3750	4225	4225	4225	6250	6250	6700	6700	6700	11250	11250	11250			
300	230	730	1455	3640	3705	4100	4175	4175	6070	6180	6505	6625	6625	10925	11120	11120			
400	200	705	1410	3530	3620	3975	4075	4075	5880	6035	6300	6470	6470	10585	10865	10865			
500	170	665	1330	3325	3600	3745	4055	4055	5540	6000	5935	6430	6430	9965	10800	10800			
600	140	605	1210	3025	3600	3405	4055	4055	5040	6000	5400	6430	6430	9070	10800	10800			
650	125	590	1175	2940	3580	3310	4030	4030	4905	5965	5255	6395	6395	8825	10735	10735			
700	110	570	1135	2840	3555	3200	4005	4005	4730	5930	5070	6355	6355	8515	10670	10670			
750	95	530	1065	2660	3450	2995	3885	3885	4430	5750	4745	6160	6160	7970	10350	10350			
800	80	510	1015	2540	3365	2860	3790	3790	4230	5605	4530	6010	6010	7610	10095	10095			
850	65	485	975	2435	3215	2740	3620	3620	4060	5355	4350	5740	5740	7305	9645	9645			
900	50	450	900	2245	3000(5)	2530	3380	3380(5)	3745	5000(5)	4010	5360	5360(5)	6740	9000	9000(5)			
950	35	375	755	1885	2405(5)	2125	2655	2720(5)	3145	4075(5)	3370	4210	4380(5)	5665	7070	7555(5)			
1000	20	260	520	1305	1740(5)	1470	1835	1975(5)	2170	3040(5)	2325	2910	3285(5)	3910	4885	6050(5)			
1050	20(1)	175	350	875	1170	985	1230	1325	1455	2035	1560	1950	2200	2625	3280	4060			
1100	20(1)	110	220	550	730	620	770	830	915	1280	980	1225	1385	1645	2055	2545			

FORGED STAINLESS STEEL A 182 Gr. F316(6)

Working Pressure by Classes, psig

CLASS	150		300		600		1500			1690		2500		2680			4500	
Shell Test, psig	425	1100	2175	5400	5625	6100	6350		9000	9375	9650	10050		16200	16875			
Seat Test, psig	325	800	1600	3975	4125	4475	4650		6600	6875	7075	7375		11900	12375			
Temp. °F	STANDARD	STANDARD	STANDARD	STANDARD	LIMITED (3)	STANDARD	SPECIAL (2)	LIMITED (3)	STANDARD	LIMITED (3)	STANDARD	SPECIAL (2)	LIMITED (3)	STANDARD	SPECIAL (2)	LIMITED (3)		
-20 to 100	275	720	1440	3600	3750	4055	4225	4225	6000	6250	6430	6700	6700	10800	11250	11250		
200	235	620	1240	3095	3450	3485	3885	3885	5160	5750	5530	6160	6160	9290	10350	10350		
300	215	560	1120	2795	3120	3150	3515	3515	4660	5200	4995	5575	5575	8390	9360	9360		
400	195	515	1025	2570	2850	2895	3210	3210	4280	4750	4585	5090	5090	7705	8550	8550		
500	170	480	955	2390	2655	2690	2990	2990	3980	4430	4265	4745	4745	7165	7970	7970		
600	140	450	900	2255	2520	2540	2835	2835	3760	4195	4030	4495	4495	6770	7555	7555		
650	125	445	890	2220	2465	2500	2775	2775	3700	4105	3965	4400	4400	6660	7395	7395		
700	110	430	870	2170	2420	2445	2725	2725	3620	4035	3880	4325	4325	6515	7265	7265		
750	95	425	855	2135	2380	2405	2680	2680	3560	3965	3815	4250	4250	6410	7135	7135		
800	80	420	845	2110	2355	2375	2650	2650	3520	3930	3770	4210	4210	6335	7070	7070		
850	65	420	835	2090	2330	2350	2625	2625	3480	3885	3730	4165	4165	6265	6990	6990		
900	50	415	830	2075	2315	2338	2605	2605	3460	3855	3705	4130	4130	6230	6945	6945		
950	35	385	775	1930	2290	2175	2580	2580	3220	3815	3450	4090	4090	5795	6870	6870		
1000	20	350	700	1750	2105	1970	2370	2370	2915	3505	3125	3755	3755	5245	6310	6310		
1050(6)	20(1)	345	685	1720	2105(5)	1935	2370	2370(5)	2865	3505(5)	3070	3755	3755(5)	5155	6310	6310(5)		
1100(6)	20(1)	305	610	1525	1945(5)	1715	2145	2195(5)	2545	3295(5)	2725	3405	3540(5)	4575	5720	6110(5)		
1150(6)	20(1)	235	475	1185	1580(5)	1330	1665	1795(5)	1970	2760(5)	2110	2640	2980(5)	3550	4435	5495(5)		
1200(6)	20(1)	185	370	925	1230	1040	1300	1400	1545	2160	1655	2065	2330	2775	3470	4300		
1250(6)	20(1)	145	295	735	980	829	1035	1115	1230	1715	1315	1645	1855	2210	2765	3425		

- 1) For welding end valves only. Flanged end ratings terminate at 1000°F.
- 2) Special Class: requires additional inspection per ASME B16.34, para. 2.1.2.
- 3) Limited Class: Only up to and including 2 ½". Flanged valves are not allowed.
- 4) Permissible but not recommended for prolonged usage above 800°F (425 °C).
- 5) Do not interpolate between these temperatures. Consult the factory.
- 6) At temperatures over 1000°F (538 °C) use only when the carbon content is 0.04% or higher (material code 10).

ENGINEERING DATA

FORGED STAINLESS STEEL A 182 Gr. F91

Working Pressure by Classes, psig

CLASS	150		300		600		800		1500		1690		2500		2680		4500	
Shell Test, psig	450	1125	2250	3000	5625	6350	9375	10050	16875									
Seat Test, psig	325	825	1650	2200	4125	4650	6875	7375	12375									
Temp. °F	STANDARD	STANDARD	STANDARD	STANDARD	LIMITED ⁽³⁾	STANDARD	LIMITED ⁽³⁾	STANDARD	SPECIAL ⁽²⁾	LIMITED ⁽³⁾	STANDARD	LIMITED ⁽³⁾	STANDARD	SPECIAL ⁽²⁾	LIMITED ⁽³⁾	STANDARD	SPECIAL ⁽²⁾	LIMITED ⁽³⁾
-10 to 200	290	750	1500	2000	2000	3750	3750	4225	4225	4225	6250	6250	6700	6700	6700	11250	11250	11250
200	260	750	1500	2000	2000	3750	3750	4225	4225	4225	6250	6250	6700	6700	6700	11250	11250	11250
300	230	730	1455	1940	2000	3640	3750	4100	4225	4225	6070	6250	6505	6700	6700	10925	11250	11250
400	200	705	1410	1880	2000	3530	3750	3975	4225	4225	5880	6250	6300	6700	6700	10585	11250	11250
500	170	665	1330	1770	2000	3325	3750	3745	4225	4225	5540	6250	5935	6700	6700	9965	11250	11250
600	140	605	1210	1610	2000	3025	3750	3405	4225	4225	5040	6250	5400	6700	6700	9070	11250	11250
650	125	590	1175	1565	2000	2940	3750	3310	4225	4225	4905	6250	5255	6700	6700	8825	11250	11250
700	110	570	1135	1515	1955	2840	3655	3200	4130	4120	4730	6110	5070	6550	6550	8515	10995	10995
750	95	530	1065	1415	1940	2660	3645	2995	4105	4105	4430	6070	4750	6505	6505	7970	10930	10930
800	80	510	1015	1355	1920	2540	3600	2860	4055	4055	4230	6000	4535	6430	6430	7610	10800	10800
850	65	485	975	1295	1805	2435	3385	2745	3815	3815	4060	5645	4350	6050	6050	7305	10160	10160
900	50	450	900	1200	1600 ⁽⁵⁾	2245	3000 ⁽⁵⁾	2530	3380	3380 ⁽⁵⁾	3745	5000 ⁽⁵⁾	4015	5360	5360 ⁽⁵⁾	6740	9000	9000 ⁽⁵⁾
950	35	385	775	1030	1270 ⁽⁵⁾	1930	2410 ⁽⁵⁾	2175	2658	2725 ⁽⁵⁾	3220	4075 ⁽⁵⁾	3450	4210	4380 ⁽⁵⁾	5795	7070	7555 ⁽⁵⁾
1000	20	365	725	965	1160 ⁽⁵⁾	1820	2250 ⁽⁵⁾	2050	2370	2555 ⁽⁵⁾	3030	3925 ⁽⁵⁾	3245	3755	4245 ⁽⁵⁾	5450	6310	7555
1050	20 ⁽¹⁾	360	720	960	1160	1800	2250	2025	2370	2555	3000	3925	3215	3755	4245	5400	6310	7555
1100	20 ⁽¹⁾	300	605	805	1040	1510	2015	1700	2125	2290	2515	3520	2695	3370	3805	4525	5655	7005
1150	20 ⁽¹⁾	225	445	595	765	1115	1490	1255	1570	1690	1855	2595	1990	2485	2810	3345	4180	5180
1200	20 ⁽¹⁾	145	290	380	495	720	960	810	1015	1090	1200	1680	1285	1605	1815	2160	2700	3345

Note: Footnotes 1, 2, 3 & 5 for the table above, see page 23.

Cv FLOW COEFFICIENT TABLES

Size in mm	Bolted Bonnet, Welded Bonnet Gate & Bellows Seal Gate Standard Port				Bolted Bonnet & Welded Bonnet Gate Full Port		Y-Pattern Bonnetless Globe		Bolted Bonnet Globe 45° Incl.	Welded Bonnet Globe 45° Incl.
	150-800	1500-1690 ⁽¹⁾	2500 ⁽²⁾	4500 ⁽²⁾	800	1500-1690 ⁽¹⁾	1690-2680	4500	800-1690	1690-2680
1/4 8	2.6	2.6	—	—	2.6	2.6	5	3	—	—
3/8 10	2.6	5	—	—	5	5	6	3	—	—
1/2 15	7	14 ⁽³⁾	14	—	14	14	7	4	8	8
3/4 20	14	14	14	25	30	30	8	7	9	9
1 25	30	30	30	25	58	58	12	9	14	14
1 1/4 32	100	100	58	48	100	100	24	19	28	28
1 1/2 40	100	100	58	48	160	160	25	24	29	29
2 50	160	160	160	92	280	250	60	25	54	54
2 1/2 65	—	—	—	—	—	—	60	47	54	—
3 80	—	—	—	—	—	—	60	47	54	—
4 100	—	—	—	—	—	—	60	47	—	—

Size in mm	Bolted Bonnet, Welded Bonnet Gate Bonnet Globe Vertical & Angle ⁽⁴⁾		Bolted Bonnet & Welded Bonnet Bellows Seal Globe	Y-Pattern Bellows Seal Globe	Bolted Bonnet Angle Globe (Boiler Blowoff)	Bolted Bonnet 45° Incl. Globe (Boiler Blowoff)	Welded Bonnet Parallel Full Bore	Swing Check Valves	Piston Check Valves (Vertical)		Piston Check Valves (Inclined)	
	150-800	150-1690 ⁽¹⁾	150-800	1500-2500	600-1500	600-1500	600-1500	150-800	150-800	900-1500	1690-2680	4500
1/4 8	1.5	1.5	—	—	—	—	—	—	1.8	2	6	3
3/8 10	2	2	—	—	—	—	—	—	1.8	2	6	3
1/2 15	3	3	2.5	5	3	—	—	9	2	3	7	4
3/4 20	4	4	3.5	5.8	6	—	—	10	3	4	8	7
1 25	6	6	4.5	10.5	16	18	62	22	6	6	12	9
1 1/4 32	14	14	8.3	23	29	50	—	55	14	14	24	19
1 1/2 40	14	14	8.3	23	29	50	—	55	14	14	25	23
2 50	33	33	17	34	54	62	280	82	25	33	60	42

1) Bolted Bonnet Only

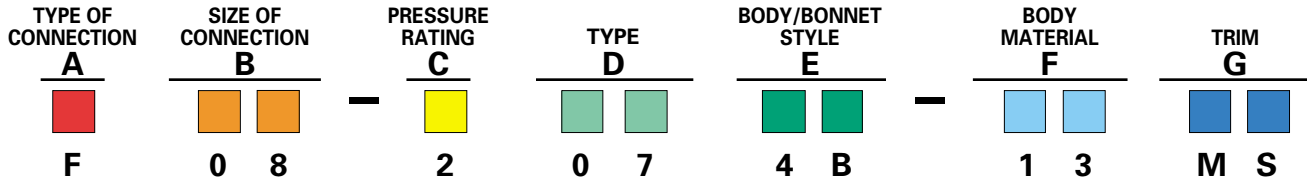
2) Welded Bonnet Only

3) 14" for Bolted Bonnet & 6" for Welded Bonnet

4) Bolted Bonnet Class 1690 only (Horseshoe)

Note: Metric Equivalent of Cv is Kv: $Kv = Cv \times 0.85$

HOW TO ORDER



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.

A TYPE OF CONNECTION			
B - Butt weld	F - Flanged B16.5 (B16.47 series A)	U - Undrilled flanges	
C - Combination (socket weld / threaded)	R - Flanged ring joint	W - Socket weld	
	S - Threaded	X - Butt weld (intermediate class)	
B SIZE OF CONNECTION			
Customers have the choice of specifying valve size as part of the valve figure number (B) using the numbers below, or indicating valve size separately.			
EXAMPLES: F08-2074B-13MS (valve size is part of figure number) 2"F-2074B-13MS (valve size is shown separately)			
01 - ¼" (8 mm)	04 - ¾" (20 mm)	07 - 1½" (40 mm)	10 - 3" (80 mm)
02 - ⅜" (10 mm)	05 - 1" (25 mm)	08 - 2" (50 mm)	11 - 3½" (90 mm)
03 - ½" (15 mm)	06 - 1¼" (32 mm)	09 - 2½" (65 mm)	12 - 4" (100 mm)
C PRESSURE RATING			
0 - 150	2 - 600 or 800 API 602	3 - 1500	5 - 4500
1 - 300		4 - 2500	6 - 400
		7 - 900	8 - 1690
		9 - 2680	X - Special
D VALVE TYPE			
01 - Flow control	08 - Stop check	17 - IREB gate	
02 - Ball check	09 - Needle	18 - Extended body gate	
03 - Piston check	10 - Continuous blowdown	21 - Boiler blowoff	
05 - Conventional port gate	11 - Swing check	22 - Pressure relief	
06 - Full port gate	15 - Instrument	23 - Double disc gate	
07 - Stop globe		34 - Tilting disc check	
E BODY / BONNET STYLE			
4 - Vertical	A - Special	S - Y-pattern bellows seal (non-rotating stem)	
5 - Angle	B - Bolted bonnet (forged)	T - All welded bellows seal	
6 - Inclined	D - Diaphragm	W - Welded bonnet	
7 - Inclined Y-pattern screwed yoke	E - Extended bonnet (cryogenic)	Y - Bonnetless (rotating stem)	
8 - Elbow down	R - Forged bolted bellows seal	Z - Bonnetless (non-rotating stem)	
F BODY MATERIAL			
02 - A105, WCB	12 - F304L, CF3	20 - Inconel ^(†)	27 - LF3/LC3
04 - F5, C5	13 - F316 ^(††) , CF8M	21 - Hastelloy C ^(†)	31 - LCC
05 - F11, WC6	14 - F316L, CF3M	22 - Titanium Gr.5	32 - F51
06 - F22, WC9	15 - F347, CF8C	23 - Alloy 20	34 - F91, C12A
09 - F9, C12	16 - F304H	24 - LF1	35 - F44, 254 5MO
10 - F316H/F316 ^(††)	18 - F321	25 - LCB	36 - F321H
11 - F304, CF8	19 - Monel M35	26 - LF2	37 - Incoloy ^(†)

(†) Must specify grade.

(††) Material code "10" F316H/F316 has a minimum carbon content of 0.04 and is to be used if temperatures are over 1000°F (538°C).

Material code "13" forged F316, is not suitable for temperatures above 1000°F (538°C) as it is dual certified (F316/F316L)

G TRIM				API Number	If applicable BELLOWS ⁽²⁾
CODE	WEDGE/DISC SURFACE ⁽¹⁾	SEAT SURFACE ⁽¹⁾	STEM		
AS	Stellite 6 ⁽³⁾	Stellite 6 ⁽³⁾	321		321
CS	Alloy 20	Stellite 6 ⁽³⁾	Alloy 20		
HC	Hastelloy C	Stellite 6 ⁽³⁾	Hastelloy C		Hastelloy C
HM	HF-Acid Trim	HF-Acid Trim	HF-Acid Trim		
MC	CF8M or 316 w/ CTFE insert ⁽⁴⁾	Stellite 6 ⁽³⁾	316		
MS	Stellite 6 ⁽³⁾	Stellite 6 ⁽³⁾	316/316L		321
MY	CF8M or 316	Stellite 6 ⁽³⁾	316	12	321
PA	NOREM	NOREM	630		IN 625
TS	Stellite 6 ⁽³⁾	Stellite 6 ⁽³⁾	13 CR (410) ⁽⁵⁾	5	321
TY	13 CR (410 or CA15)	Stellite 6 ⁽³⁾	13 CR (410)	8	321
XX	Monel	Monel	Monel	9	
XY	Monel	Stellite 6 ⁽³⁾	Monel	11	
NA	13 CR (410 or CA15) HRC 22 max	Stellite 6 ⁽³⁾	13 CR (410) HRC 22 max.	8 ⁽⁶⁾	
NB		CF8M	Stellite 6 ⁽³⁾	316	12 ⁽⁶⁾
NC	Monel	Stellite 6 ⁽³⁾	Monel	11 ⁽⁶⁾	Hastelloy C
NE	Stellite 6 ⁽³⁾	Stellite 6 ⁽³⁾	13 CR (410) HRC 22 max.	5 ⁽⁶⁾	
NF	Stellite 6 ⁽³⁾	Stellite 6 ⁽³⁾	Same as Body		

Consult Velan's website at 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) 616HT Manufacturer's Std. (F91 and C12A only).
- (6) NACE service valves are supplied with all materials conforming to NACE MR0175. (Including bolting with max. hardness of RC22).

For installation instructions see Service Manual.

For diagnostic troubleshooting visit the Velan website at www.velan.com.