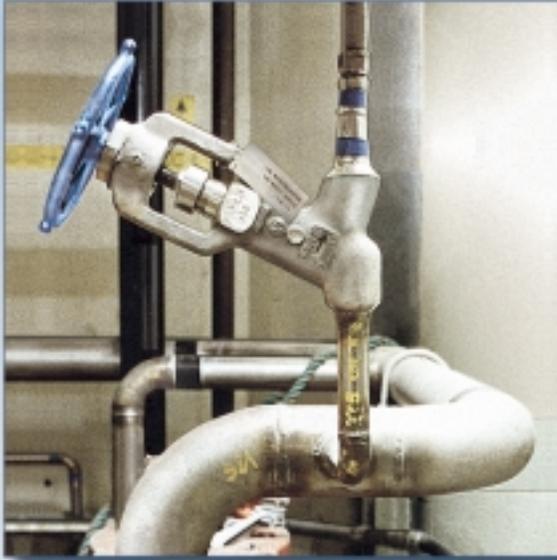


# VELAN

## HERMETICALLY-SEALED GATE AND GLOBE BELLOWS SEAL VALVES



**ALSO: BALL AND CONTROL VALVES  
FOR EXTREME APPLICATIONS**

**SIZES: 1/2 - 12"  
15 - 300 mm**

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

# PROFILE

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

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

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

## CONTENTS

Bellows Seal Technology .....	2-5
Design Features .....	3
Compact Forged Steel	
Gate Valves, ½-2" (15-50 mm).....	6
Forged Steel Extended Body	
Gate Valves, ½-2" (15-50 mm).....	7
Cast Steel Gate Valves, 2-12" (50-300 mm) .....	8
Forged Steel Gate Valves, 2-6" (50-150 mm) .....	9
Compact Forged Steel	
Globe Valves, ½-2" (15-50 mm).....	10
Cast Steel Globe Valves, 2-8" (50-200 mm) .....	11
Forged Steel Y-Pattern Globe, ½-2" (15-50 mm).....	12
Forged Steel Globe Valves, 2½-8" (65-200 mm) .....	13
Ball Valves, ½-2" (15-50 mm) .....	14-15
Control Valves, ½-6" (15-150 mm).....	16
How to Order .....	17

***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.***

## GENERAL INFORMATION

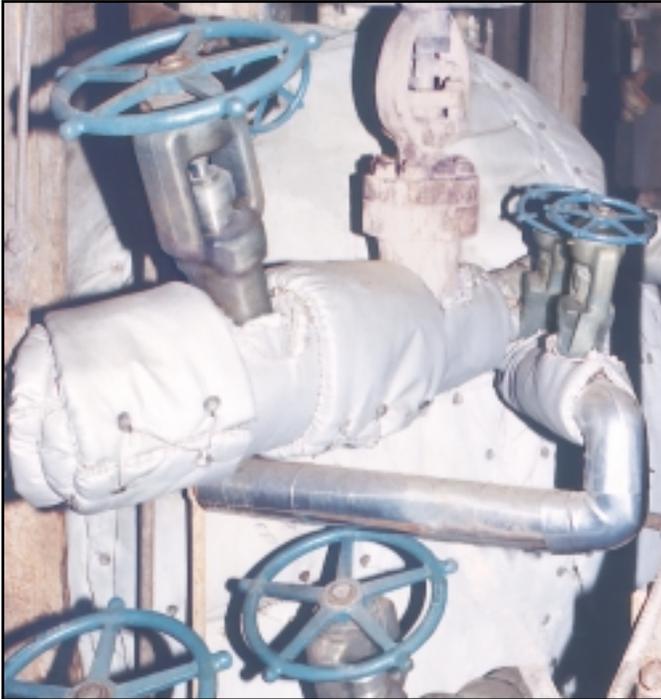
Tel: (514) 748-7743  
Fax: (514) 748-8635  
Web: [www.velan.com](http://www.velan.com)

**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.

**Please note this is a condensed catalog.  
For a complete catalog, contact Velan directly.**

# VELAN BELLOWS SEAL VALVES

## SUPERIOR PERFORMANCE BASED ON 45 YEARS OF EXPERIENCE



2500 Class HP/HT Bonnetless Globe Valves in power stations (see page 12).

### OVERALL DESIGN FEATURES:

- **No torsion of bellows.**  
Non-rotating stem prevents torsion of bellows and ensures long cycle life on all valves.
- **Long cycle life bellows.**  
Designed for and successfully tested in high pressure/temperature applications.
- **Low torque** due to non-rotating stem, central grease fitting for lubrication of stem nut and for high pressure valves, stem thrust bearing.
- **Two secondary stem seals:**
  - a) backseat (stem bevel) protects from line pressure when open and
  - b) stem packing.
- **Hermetically sealed.** Body-bonnet welds provide a hermetically-enclosed vessel in most designs.
- **In-line servicing.** Stem-bellows assembly can easily be removed and replaced on valves with bolted bonnet. On seal-welded valves, removal and replacement of weld is necessary. Special power tools are available for cutting seal weld.

## QUALIFICATION TESTING



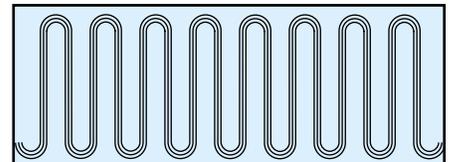
Hot loop for cycling four bellows seal valves at 1800 psig @ 650°F (124 bar @ 343°C).

### VELAN R&D QUALIFICATION TESTING

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

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

### MULTI-PLY



# BELLOWS DESIGN PARAMETERS

## DESIGN PARAMETERS

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

## CYCLE LIFE

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

Velan bellows are designed for:

**10,000 cycles**  
for ½–2" (15–50mm)  
Class 800 globe valves,

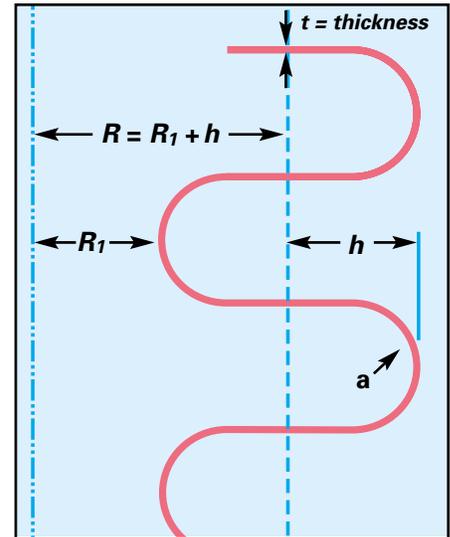
### 5,000 cycles

for ½–2" (15–50mm)  
Y-pattern ASME Class 1500-2500  
valves, and

### 3,000 cycles for ½–2"

(15–50mm) gate valves.  
Large valves, sizes 2½–12"  
(65–300mm) are offered with  
**3,000** life cycles for globe, and  
**2,000** cycles for gate valves.

- The bellows stroke is 50% in tension and 50% in compression.
- Proper stem guiding eliminates torsion of bellows.
- Stroke limitation for long bellows. To accommodate long lift for larger gate valves, two or three bellows are joined and each takes over part of the lift.



Increase in radius  $R$  and thickness  $t$  reduces stress during deflection.

# APPLICATIONS

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

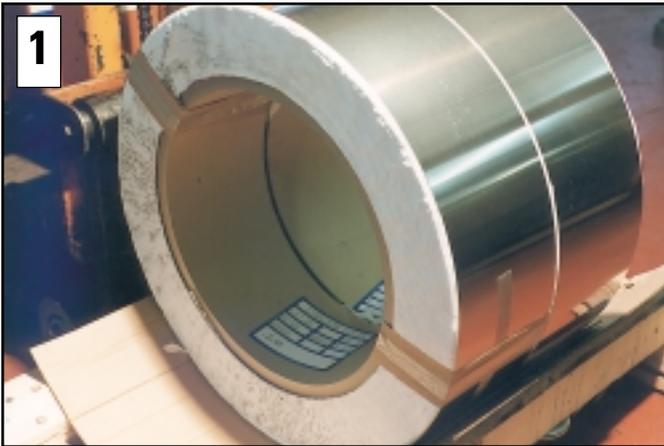
Acrylonitrile	Ethyl Mercaptan	Phosgene
Ammonia	Freon	Potassium (liquid)
Argon	Helium	Sodium (liquid)
Benzene	Hydrogen	Steam
Carbon Dioxide	Hydrogen Bromide	Sulfuric Acid
Caustic Solutions	Hydrogen Chloride	Titanium Tetrachloride
Chlorine	Hydrogen Sulfide	Toluene
Heat transfer oils/media	Hydrofluoric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

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



Class 2500 hermetically-sealed Y-pattern bellows sealed valves.

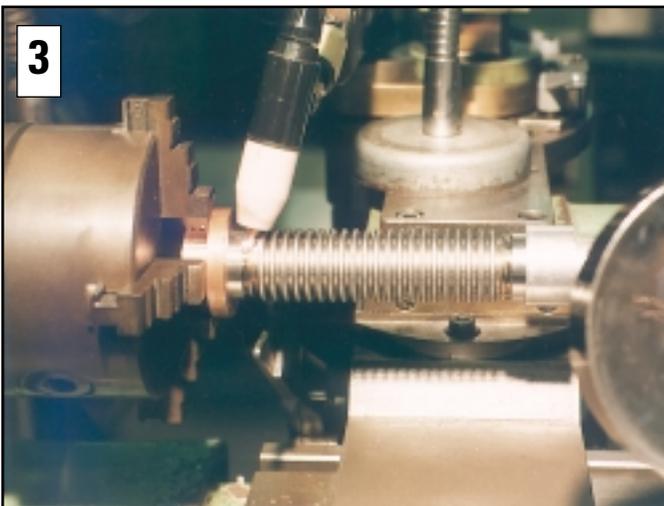
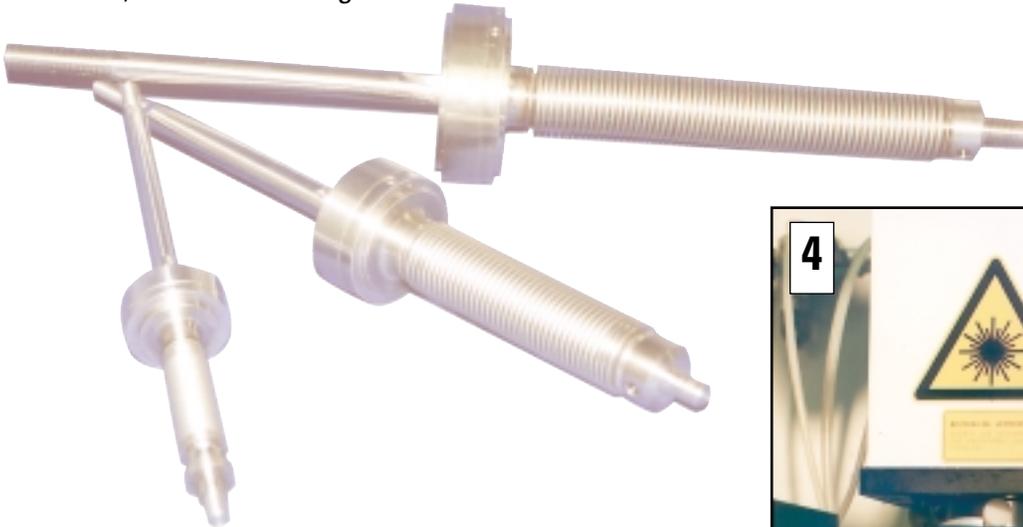
# HIGHLIGHTS OF BELLOWS PRODUCTION AND TESTING



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



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



Microplasma welding of bellows.

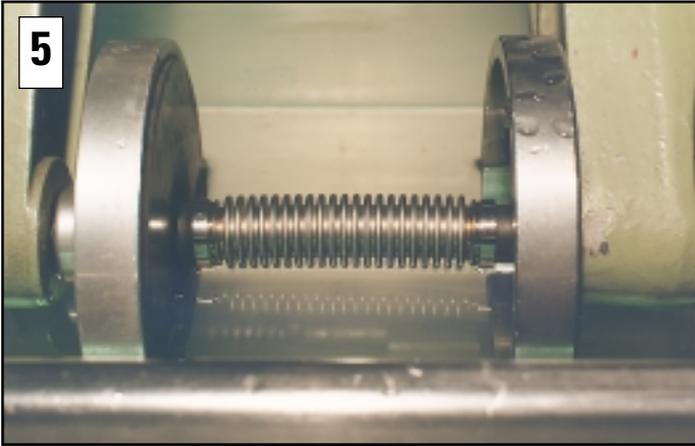


Laser welding of bellows to end rings.

*Photos courtesy  
of Witzenmann GmbH*

**Please note this is a condensed catalog.  
For a complete catalog, contact Velan directly.**

# HIGHLIGHTS OF BELLOWS PRODUCTION AND TESTING



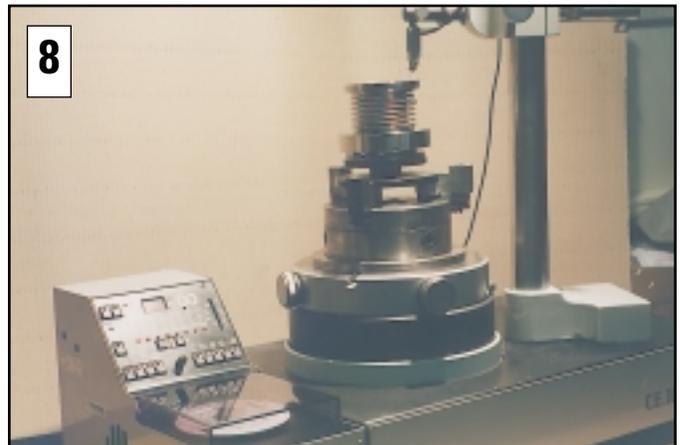
5 Nitrogen bubble test under water.



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



7 Spring rate test verifies force needed to compress bellows.

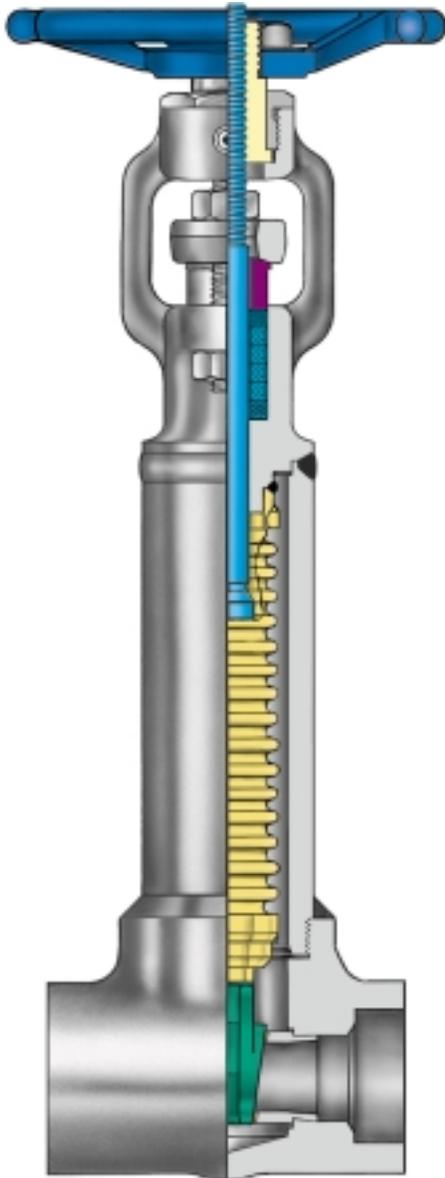


8 Concentricity testing of bellows, end fittings.



# COMPACT FORGED STEEL BELLOWS SEAL GATE VALVES

THREADED, SOCKET WELD OR FLANGED ½–2" (15–50 mm)  
API 602, CLASSES 800, 1500, ASME CLASSES 150–1500



### DESIGN FEATURES:

- **Long cycle life bellows (3000 cycles).**  
Designed and qualification-tested for high pressure/temperature service.
- **Bellows monitoring port (optional).** A plug can be connected with the space above the bellows to monitor performance.
- **Two secondary stem seals:**
  - a) Backseat in open position
  - b) Graphite packing.
- **Superior seating faces.**  
Seats hardfaced with Stellite 6 and wedge is solid Stellite 6.

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

### TYPICAL A 105 VALVE PARTS LIST

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

<sup>(1)</sup> Hastelloy C and Inconel 625 also available.

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

Optional body, trim and bellows materials available on request.

### PRESSURE/TEMPERATURE RATINGS

Material	Temp. °F °C	Working Pressure psig bar		Shell Test Pressure psig bar	
		800	1500	800	1500
A 105N	100 38	1975 136	3705 256	2975	5575
	800 427	1100 76	2060 142		
A 182 Gr. F316	100 38	1920 132	3600 248	2900	5400
	1000 538	935 64	1750 121		

### FIGURE NUMBERS

Class	Figure No.
150	0054T
300	1054T
600/800	2054T
1500	3054T

### DIMENSIONS

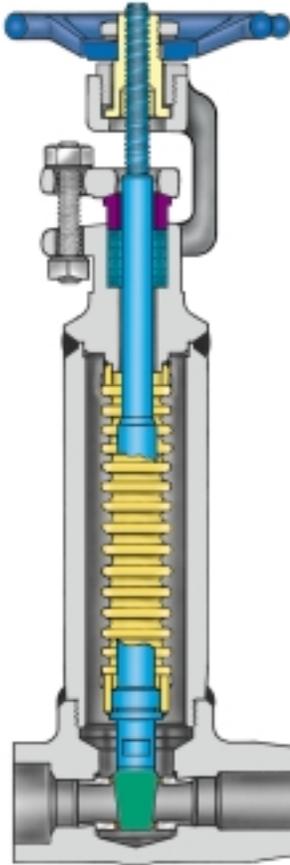
Size in mm	Port		End to End		Handwheel		Center to Top Open		Socket Weld	Socket Weld	End to End (Flanged)			
	800	1500	800	1500	800	1500	800	1500	Bore	Depth	150	300	600	1500
½ <sup>(1)</sup> 15	0.38 10	0.50 13	2.88 73	3.50 89	2.50 64	3.50 89	7.20 183	13.50 343	0.855 21.72	0.38 10	4.25 108	5.50 139	6.50 165	8.50 216
¾ 20	0.50 13		3.25 83	3.50 89	3.50 89	3.50 89	11.25 286	13.50 343	1.065 27.05	0.50 13	4.63 118	6.00 152	7.50 191	9.00 229
1 25	0.69 18		3.50 89	5.00 127	3.50 89	5.00 127	12.56 319	17.00 431	1.330 33.78	0.50 13	5.00 127	6.50 165	8.50 216	10.00 254
1¼ 32	1.25 32		5.00 127	5.25 133	6.00 152	8.00 203	15.50 393	22.63 575	1.675 42.55	0.50 13	5.50 140	7.00 178	9.00 227	11.00 279
1½ 40	1.25 32		5.00 127	5.25 133	6.00 152	8.00 203	15.50 393	22.63 575	1.915 48.64	0.50 13	6.50 165	7.50 191	9.50 241	12.00 305
2 50	1.50 38		5.25 133	10.00 254	6.00 152	10.00 254	17.81 452	25.94 659	2.406 61.11	0.63 16	7.00 178	8.50 221	11.50 292	14.50 368

<sup>(1)</sup> All dimensions are for A 105N and F316 only. For other materials see ¾" (20 mm) dimensions.



# FORGED STEEL BELLOWS SEAL EXTENDED BODY GATE VALVES,

CONVENTIONAL PORT, THREADED OR SOCKET WELD FEMALE  
½–2" (15–50 mm), API 602, CLASSES 800, 1500



### DESIGN FEATURES:

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

### APPLICATIONS:

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

### TWO TYPES:

The valves are available with a standard extended body or integrally-reinforced extended body ("IREB" valves).

For Standard Materials Table see page 6.

### FIGURE NUMBERS

Class	Standard	IREB
800	2184T	2174T
1500	3184T	3174T

### AVAILABLE VARIATIONS

END CONNECTION	IREB	STANDARD
Female thread	Male weld end	Male thread Male plain
Female socket weld	Male weld end	Male plain

### PRESSURE/TEMPERATURE RATINGS

Material	Temp. °F °C	Working Pressure psig bar		Shell Test Pressure psig bar	
		800	1500	800	1500
A 105N	100	1975	3705	2975	5575
	38	136	256		
	800	1100	2060		
	427	76	142	205	384
A 182 Gr. F 316	100	1920	3600	2900	5400
	38	132	248		
	1000	935	1750		
	538	64	121		

### STANDARD DIMENSIONS

Size in mm	Port	End to End		Male End				Handwheel		Socket Weld Bore	Socket Weld Depth	Center to Top Open	
				OD	ID	Length from Center							
		800	1500			800	1500	800	1500				
½ 15	0.50 13	5.63	5.75	0.84	0.63	4.00	4.00	3.50	3.50	0.885	0.38	11.25	13.50
		143	146	21.33	16.0	102	102	89	89	21.72	10	286	343
¾ 20	0.50 13	5.63	5.75	1.05	0.63	4.00	4.00	3.50	3.50	1.065	0.50	11.25	13.50
		143	146	26.67	16.0	102	102	89	89	27.05	13	286	343
1 25	0.69 18	5.75	6.50	1.32	0.84	4.00	4.00	3.50	5.00	1.330	0.50	12.56	17.00
		146	165	33.53	21	102	102	89	127	33.78	13	319	432
1½ 40	1.25 32	7.25	7.88	1.90	1.50	4.75	5.25	6.00	8.00	1.915	0.50	15.50	22.63
		184	200	48.26	38.1	121	133	152	203	48.64	13	394	575
2 50	1.50 38	7.88	12.25	2.38	1.69	5.25	7.25	6.00	10.00	2.406	0.63	17.81	26.00
		200	311	60.45	42.9	133	184	152	254	61.11	16	450	660

### IREB DIMENSIONS

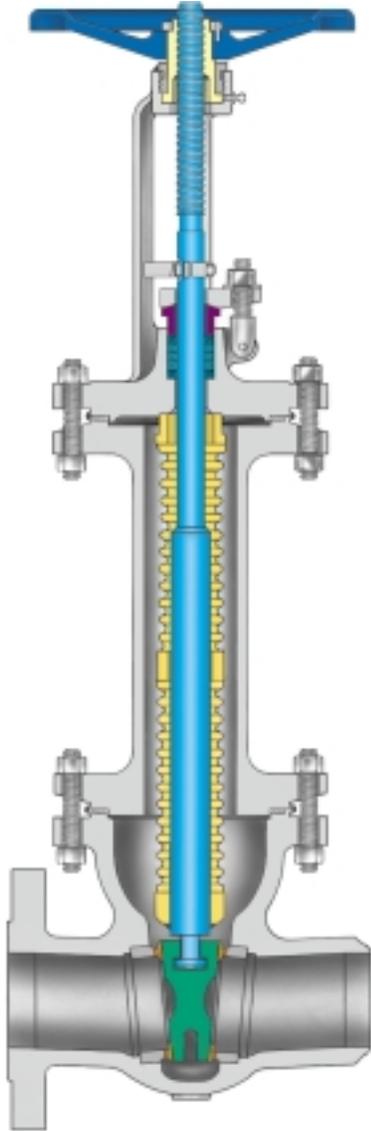
Size in mm	Port	End to End		Male End				Handwheel		Socket Weld Bore	Socket Weld Depth	Center to Top Open	
				OD	ID	Length from Center							
		800	1500			800	1500	800	1500				
½ 15	0.50 13	8.63	8.88	0.97	0.75	7.00	7.13	3.50	3.50	0.885	0.38	11.25	13.50
		219	226	24.6	19.1	178	181	89	89	21.72	10	286	343
¾ 20	0.50 13	8.63	8.88	0.97	0.75	7.00	7.13	3.50	3.50	1.065	0.50	11.25	13.50
		219	226	24.6	19.1	178	181	89	89	27.05	13	286	343
1 25	0.69 18	9.38	10.13	1.22	1.00	7.63	7.63	3.50	5.00	1.330	0.50	12.56	17.00
		238	258	31.0	25.4	194	194	89	127	33.78	13	319	432
1½ 40	1.25 32	10.50	10.63	1.72	1.50	8.00	8.00	6.00	8.00	1.915	0.50	15.50	22.63
		267	270	43.7	38.1	203	203	152	203	48.64	13	394	575
2 50	1.50 38	11.88	14.25	2.22	1.69	9.25	9.25	6.00	10.00	2.406	0.63	17.81	25.94
		302	362	56.4	42.9	235	235	152	254	61.11	16	452	659

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



# CAST STEEL BELLOWS SEAL BOLTED BONNET GATE VALVES

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



### DESIGN FEATURES:

- **Long cycle life bellows (2000 cycles)** in Gr. 321 (stainless), Inconel for special applications, maybe replaced with Monel trim to resist corrosion or Hastelloy C for chlorine service.
- **Improved body-bonnet joint.** Graphite reinforced with SS foil gasket for Class 150 valves. Fully-encased, spiral wound graphite-filled Gr. 316 (stainless) gasket for Classes 300-600.
- **Bolted body-bonnet** for fast serviceability. Hermetically-sealed bonnets available for Classes 300 and 600.
- **Two or three section bellows assembly.**
- **Non-rotating stem** prevents torsion of bellows.
- **Two secondary stem seals:**
  - a) Backseat in open position
  - b) Graphite packing.
- **Welded-in seat** hardfaced with Stellite 6.
- **Wedge hardfaced** with Stellite 6 for long life.
- **Seating faces hardfaced** with Stellite 6, ground and lapped.

### STANDARD MATERIALS

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

### FIGURE NUMBERS

Class	Figure No.
150	0064V
300	1064V
600	2064V

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

### PRESSURE/TEMPERATURE RATINGS

Material	Temp. °F °C	Working Pressure psig bar			Shell Test Pressure psig bar		
		150	300	600	150	300	600
A 216 Gr. WCB	100	285	740	1480	450	1125	2225
	38	20	51	102			
A 351 Gr. CF8M	800	80	410	825	31	78	153
	427	5.5	28	57			
A 351 Gr. CF8M	100	275	720	1440	425	1100	2175
	38	19	50	99			
	1000	20	350	700			
	538	1.4	24	48	29	76	150

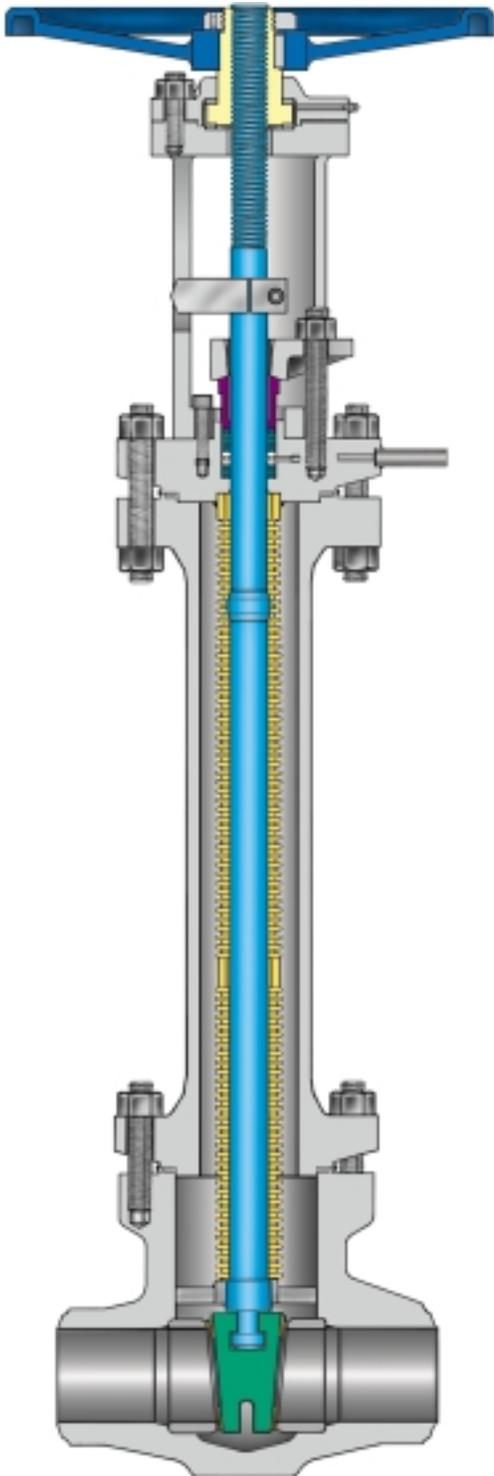
### DIMENSIONS AND WEIGHTS

Size in mm	Class 150				Class 300				Class 600			
	Center to Top Closed	Center to Top Open	Face to Face		Center to Top Open	Face to Face		Center to Top Open	Face to Face			
			BW	FL		BW	FL		BW	FL		
2	28.92	31.27	8.50	7.00	31.25	8.50	8.50	36.38	11.50	11.50		
50	735	794	216	178	794	216	216	924	292	292		
2½	31.17	33.93	9.50	7.50	33.38	9.50	9.50	38.75	13.00	13.00		
65	792	862	241	191	848	241	241	984	330	330		
3	31.25	35.37	11.13	8.00	34.37	11.13	11.13	39.75	14.00	14.00		
80	794	898	283	203	873	283	283	1010	356	356		
4	36.00	40.37	12.00	9.00	39.87	12.00	12.00	46.81	17.00	17.00		
100	914	1025	305	229	1013	305	305	1189	432	432		
6	52.00	58.87	15.88	10.50	58.50	15.88	15.88	63.44	22.00	22.00		
150	1321	1495	403	267	1486	403	403	1611	559	559		
8	59.25	67.75	16.50	11.50	68.19	16.50	16.50	82.75	26.00	26.00		
200	1505	1721	419	292	1732	419	419	2102	660	660		
10	70.44	81.31	18.00	13.00	80.75	18.00	18.00	100.25	31.00	31.00		
250	1789	2065	457	330	2051	457	457	2546	787	787		
12	80.53	93.03	19.75	14.00	91.12	19.75	19.75	116.75	33.00	33.00		
300	2045	2363	502	356	2314	502	502	2966	838	838		



# FORGED STEEL BELLOWS SEAL BOLTED BONNET GATE VALVES

2–6" (50–150 mm) ASME CLASSES 600, 1500  
WITH OPTIONAL PROVISION FOR SEAL WELDING



## DESIGN FEATURES:

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

## STANDARD MATERIALS

Part	Carbon steel	Stainless steel
Body/ bonnet	A 105	A 182 Gr. F316
Wedge	Stellite faced	Stellite faced
Seats	Stellite faced A 105	Stellite faced CF8M
Stem	Gr. 13 CR	Gr. 316
Bellows Stem nut	Gr. 321 (stainless) or Inconel Manganese bronze	
Packing	Graphite	

## PRESSURE/TEMPERATURE RATINGS

Material	Temp. °F °C	Working Pressure psig bar			Shell Test Pressure psig bar		
		600	900	1500	600	900	1500
A 105	100	1480	2220	3705	2225	3350	5575
	38	102	153	256			
	800	825	1235	2060	153	231	384
	427	57	85	142			
A 182 Gr. F316	100	1440	2160	3600	2175	3250	5400
	38	99	149	248			
	1000	700	1050	1750	150	224	372
	538	48	72	121			

## FIGURE NUMBERS

Class	Figure No.
600	2054R
900	7054R
1500	3054R

## DIMENSIONS

Size in mm	Center to Top Closed			End to End (Butt Weld)		
	in mm	in mm	in mm	in mm	in mm	in mm
	600	900	1500	600	900	1500
2	25	30	36	8.50	8.50	8.50
50	635	762	914	216	216	216
2½	35	42	50	10	10	10
65	889	1067	1270	254	254	254
3	47	56	67	12	12	12
80	1194	1422	1702	305	305	305
4	57	68	81	12	14	16
100	1448	1727	2057	305	356	406
6	67	80	96	18	20	22
150	1702	2032	2438	457	508	559

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

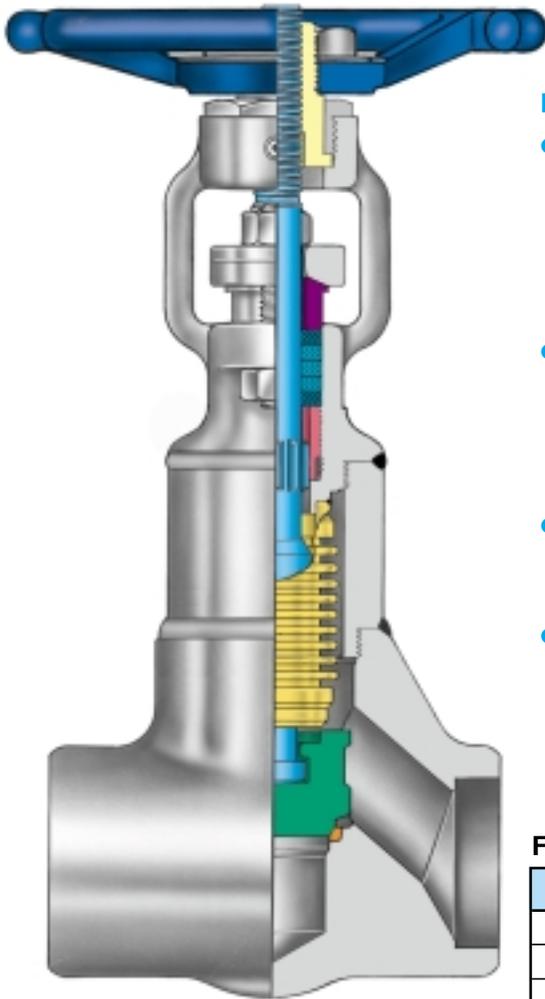
Please note this is a condensed catalog.  
For a complete catalog, contact Velan directly.



# COMPACT FORGED STEEL BELLOWS SEAL GLOBE VALVES

½–2" (15–50 mm)

API 602 CLASS 800, ASME CLASSES 150 – 800



### DESIGN FEATURES:

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

### TYPICAL A 105 VALVE PARTS LIST

Part	Standard Materials
Body	A 105N
Body extension	Steel ASTM A 106 Gr. B
Seat	Stellite (integral)
Disc	Stellite 6
Bonnet	A 105N
Stem	Gr. 410 (stainless)
Packing rings	Graphite
Bellows	Gr. 321 (stainless)
Gland stud	Gr. B6 (stainless)
Gland nut	Gr. 2H (stainless)
Gland	Gr. 416 (stainless)
Packing flange	A 105
Stem nut	Gr. 416 (stainless)
Yoke bushing	Steel
Handwheel (painted)	Malleable iron
Handwheel nut	Steel
Handwheel lock washer	Steel
Name plate	Aluminum

### FIGURE NUMBERS

Class	Figure No.
150	0074T
300	1074T
600/800	2074T

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

Optional body, trim and bellows materials available on request.

### PRESSURE/TEMPERATURE RATINGS

Material	Temp. °F °C	Working Pressure	Shell Test Pressure
		psig bar	psig bar
A 105N	100	1975	2975 205
	38	136	
	800	1100 76	
A 182 Gr. F316	100	1920	2900 200
	38	132	
	1000	935 64	

### DIMENSIONS

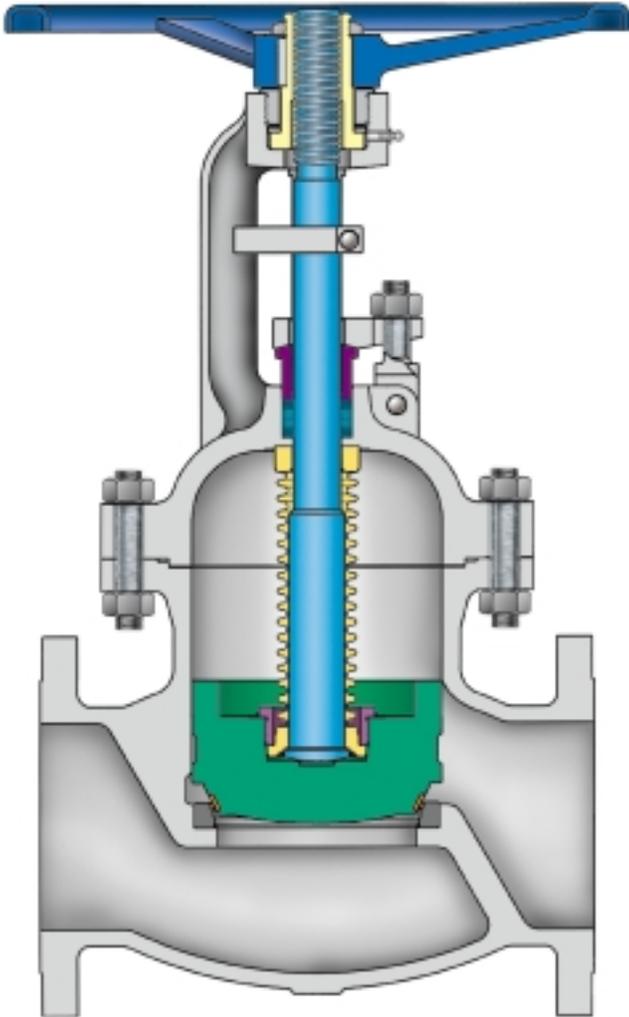
Size in mm	Port	End to End	Handwheel	Socket Weld Bore	Socket Weld Depth	Center to Top Open	End to End (Flanged)		
							150	300	600
½ <sup>(1)</sup> 15	0.31 8	2.88 73	2.50 64	0.855 21.72	0.38 10	7.00 178	4.25 108	6.00 152	6.50 165
¾ 20	0.50 13	3.25 83	3.50 89	1.065 27.05	0.50 13	9.00 229	4.63 117	7.00 178	7.50 191
1 25	0.75 19	3.50 89	3.50 89	1.330 33.78	0.50 13	10.10 257	5.00 127	8.00 203	8.50 216
1¼ 32	1.25 32	5.00 127	6.00 152	1.675 42.55	0.50 13	12.31 313	5.50 140	8.50 216	9.00 229
1½ 40	1.25 32	5.00 127	6.00 152	1.915 48.64	0.50 13	12.31 313	6.50 165	9.00 229	9.50 241
2 50	1.38 35	5.25 133	6.00 152	2.406 61.11	0.63 16	14.69 373	8.00 203	10.50 267	11.50 292

(1) All dimensions are for A 105N and F316 only. For other materials see ¾" (20 mm) dimensions.



# CAST STEEL BELLOWS SEAL BOLTED BONNET GLOBE VALVES

2–8" (50–200 mm) API 600, ASME CLASSES 150, 300, 600



## DESIGN FEATURES:

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

## STANDARD MATERIALS

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

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

## FIGURE NUMBERS

Class	Figure No.
150	0074V
300	1074V
600	2074V

## PRESSURE/TEMPERATURE RATINGS

Material	Temp. °F °C	Working Pressure			Shell Test Pressure		
		150	300	600	150	300	600
A 216 Gr. WCB	100 38	285 20	740 51	1480 102	450 31	1125 78	2225 153
	800 427	80 5.5	410 28	825 57			
A 351 Gr. CF8M	100 38	275 19	720 50	1440 99	425 29	1100 76	2175 150
	1000 538	20 1.4	350 24	700 48			

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

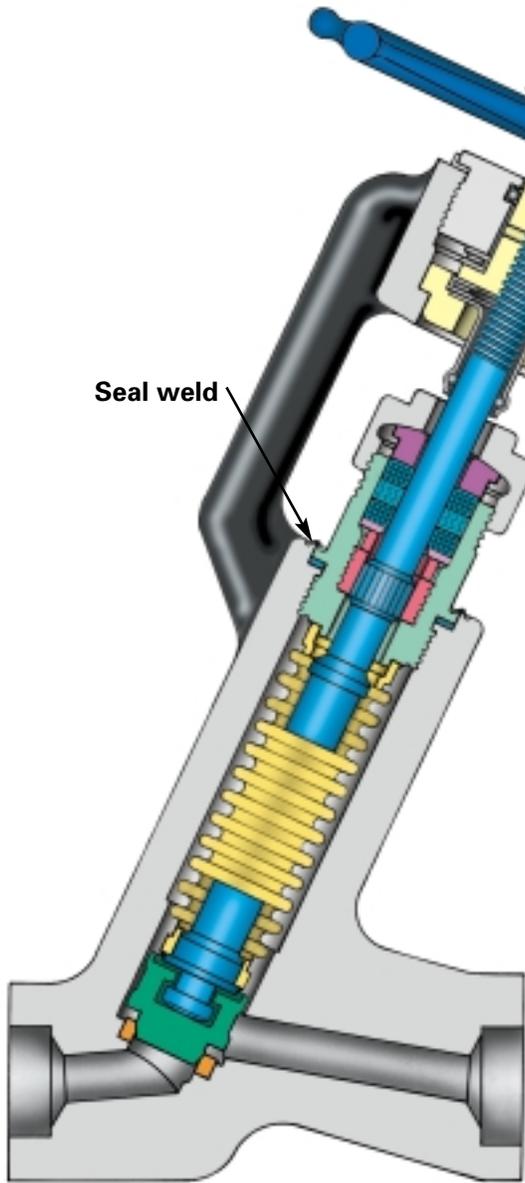
## DIMENSIONS AND WEIGHTS

Size in mm	Class 150		Class 300		Class 600	
	Center to Top Open	End to End BW or FL	Center to Top Open	End to End BW or FL	Center to Top Open	End to End BW or FL
2 50	14.98 380	8.00 203	14.98 380	10.50 267	18.14 461	11.50 292
2½ 65	15.34 374	8.50 390	15.34 374	11.50 390	19.43 457	13.00 494
3 80	17.82 453	9.50 241	17.82 453	12.50 318	25.03 636	14.00 356
4 100	22.16 563	11.50 292	22.16 563	14.00 356	28.75 730	17.00 432
6 150	25.01 635	16.00 406	25.01 635	17.50 445	40.32 1024	22.00 559
8 200	30.46 774	19.50 495	33.59 853	22.00 559	53.56 1360	26.00 660



# FORGED STEEL BELLOWS SEAL Y-PATTERN GLOBE VALVES

½ -2" (15-50 mm) ASME CLASSES 1500, 2500



### DESIGN FEATURES:

- **Long cycle life bellows (5000 cycles).**  
Gr. 321 (stainless) for Class 1500, Hastelloy for Class 2500. Optional materials available on request. Designed for, and successfully tested in high pressure/temperature conditions.
- **No torsion of bellows.**  
Splined stem prevents torsion of bellows and assures long cycle life.
- **Low torque due to:**
  - a) non-rotating stem
  - b) yoke nut thrust bearings
  - c) central grease fitting for lubrication of stem nut.
- **Two secondary stem seals:**
  - a) Backseat in open position
  - b) Graphite packing.
- **In-line servicing.** Stem-bellows assembly can easily be removed and replaced on valves with threaded (O-ring seat) bonnet. On seal-welded valves, removal and replacement of weld is necessary. Special tools are available for cutting the seal weld.
- **Solid Stellite disc and seat.** (Seat vacuum brazed).

### STANDARD MATERIALS

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

### DIMENSIONS

Size in mm	End to End	Center to Top	Handwheel
½	5.75	11.90	6.00
15	146	302	152
¾	5.75	11.90	6.00
20	146	302	152
1	5.75	11.90	6.00
25	146	302	152
1¼	10.13	18.90	12.00
32	257	480	305
1½	10.13	18.90	12.00
40	257	480	305
2	10.13	18.90	12.00
50	257	480	305

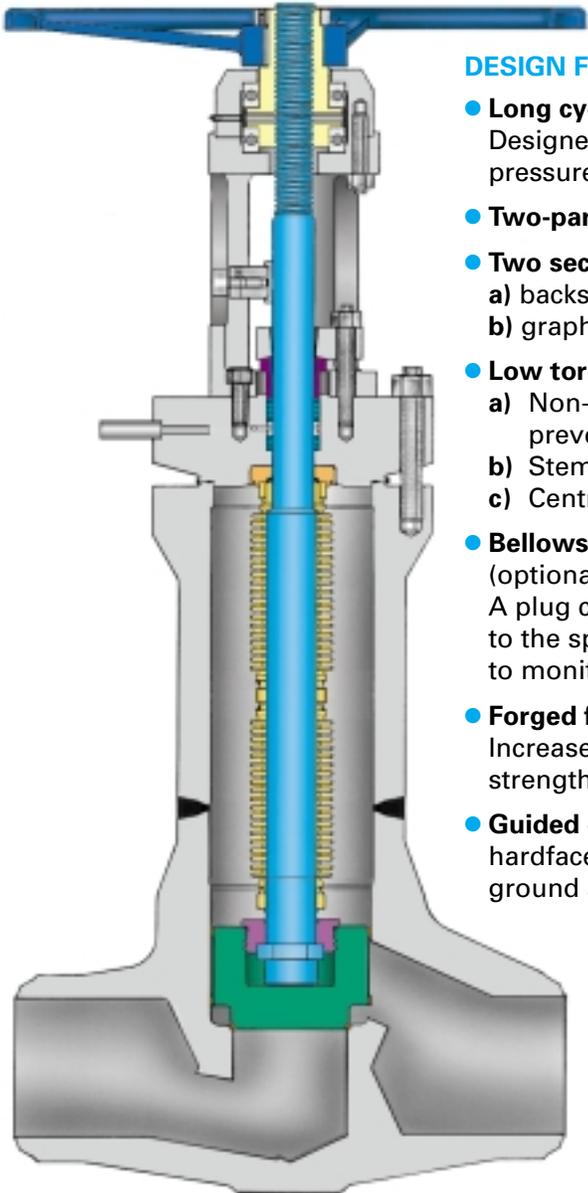
### PRESSURE/TEMPERATURE RATINGS

Material	Temp. °F °C	Working Pressure psig bar		Shell Test Pressure psig bar	
		1500	2500	1500	2500
A 105N	100	3705	6170	5575	9275
	38	256	426		
	800	2060	3430	384	640
	427	142	237		
A 182 Gr. F22	100	3750	6250	5625	9375
	38	259	431		
	1000	1305	2170	388	647
	538	90	150		
A 182 Gr. F316	100	3600	6000	5400	9000
	38	248	414		
	1000	1750	2915	372	621
	538	121	201		



# FORGED STEEL BELLOWS SEAL BOLTED BONNET GLOBE VALVES

2½–10" (65–250 mm) ASME CLASSES 600, 900, 1500  
WITH OPTIONAL PROVISION FOR SEAL WELDING



### DESIGN FEATURES:

- **Long cycle life bellows (3000 cycles)** in Gr. 321 (stainless) or Inconel. Designed and successfully tested in high pressure/temperature conditions.
- **Two-part bellows.**
- **Two secondary stem seals:**
  - a) backseat in open position
  - b) graphite packing.
- **Low torque.**
  - a) Non-rotating stem prevents torsion of bellows
  - b) Stem nut thrust bearings
  - c) Central lubrication.
- **Bellows monitoring port** (optional). A plug can be connected to the space above the bellows to monitor performance.
- **Forged for higher safety.** Increased toughness, strength and fatigue resistance.
- **Guided disc.** Seat and disc hardfaced with Stellite 6, ground and lapped.

### STANDARD MATERIALS

Part	Carbon steel	Stainless steel
Body/bonnet	A 105	A 182 Gr. F316
Stem	Gr. 13 CR	Gr. 316
Disc <sup>(1)</sup>	A 105 <sup>(2)</sup>	Gr. F 316 <sup>(2)</sup>
Bellows	Gr. 321 (stainless), Inconel or Hastelloy	
Bellows fitting	Gr. 321 (stainless)	
Packing	Graphite	
Seat	Integral Hardfaced Stellite 6	
Stem nut	Manganese bronze	

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

(2) Hardfaced Stellite 6

### FIGURE NUMBERS

Class	Figure No.
600	2074R
900	7074R
1500	3074R

### PRESSURE/TEMPERATURE RATINGS

Material	Temp. °F °C	Working Pressure psig bar			Shell Test Pressure psig bar		
		600	900	1500	600	900	1500
A 105	100	1480	2220	3705	2225	3350	5575
	38	102	153	256			
	800	825	1235	2060			
A 182 Gr. F316	427	57	85	142	150	224	372
	100	1440	2160	3600			
	38	99	149	248			
	1000	700	1050	1750			
	538	48	72	121			

### DIMENSIONS

Size in mm	Center to Top of Handwheel in mm			End to End in mm		
	600	900	1500	600	900	1500
2½	22	26	29	8.50	10	10
65	559	660	737	216	254	254
3	23	28	31	10	12	12
80	584	711	787	254	305	305
4	31	35	38	12	14	16
100	787	889	965	305	356	406
6	41	47	51	22	20	22
150	1041	1194	1295	559	508	559
8	44	55	60	26	26	28
200	1118	1270	1524	660	660	711
10	48	59	65	31	31	34
250	1219	1499	1651	787	787	864

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



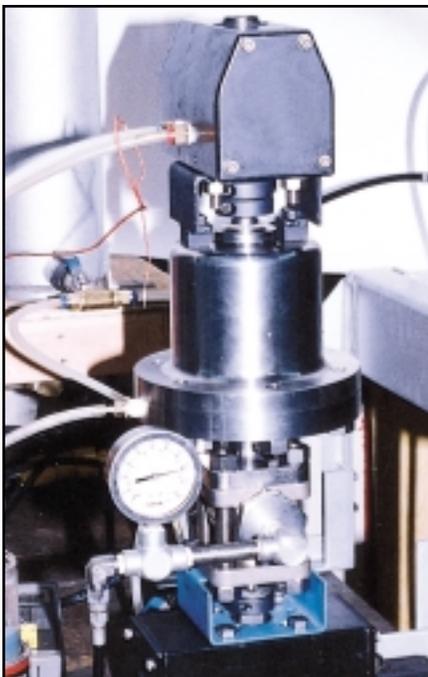
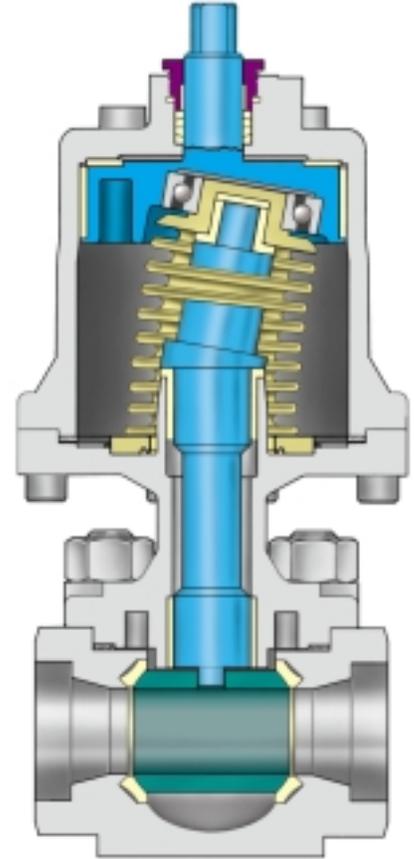
## TE-150/300 BELLOWS SEAL MEMORY SEAL BALL VALVES

CARBON, STAINLESS STEEL AND OTHER MATERIALS  
REGULAR PORT ½–2" (15–50 mm) FULL PORT ½–1½" (15–40 mm),  
SCREWED, SOCKET WELD, BUTT WELD, FLANGED, ASME Classes 150, 300



### DESIGN FEATURES:

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



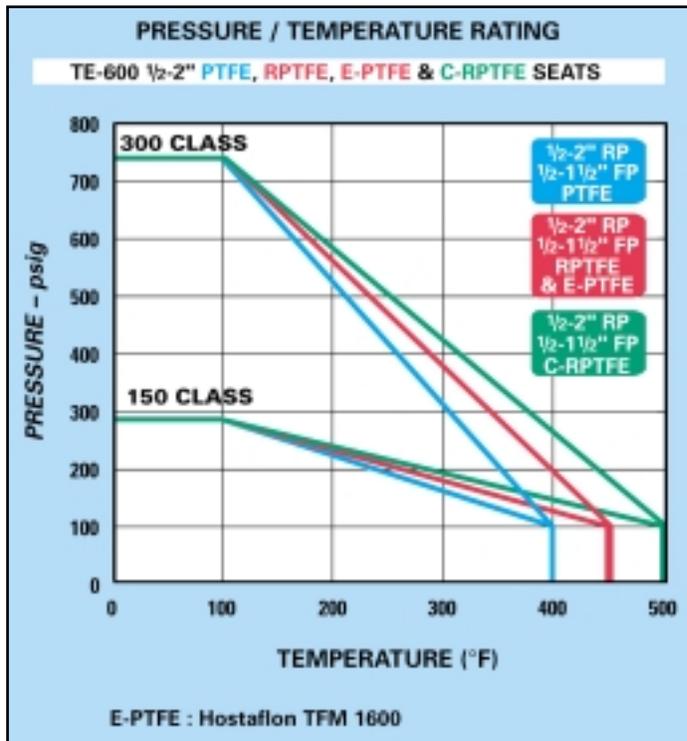
Laboratory testing for 100,000 cycles with 0 ppm.

### NOTE:

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

**TYPICAL MATERIALS LIST  
FOR A STAINLESS STEEL VALVE**

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



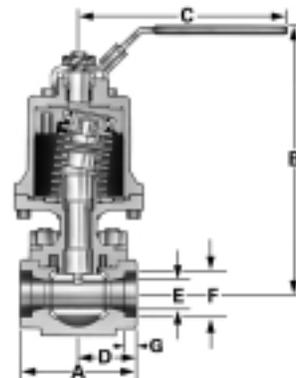
All valves available in A 105, A 182 Gr. F22 and Gr. A 315 C8FM

For other sizes, pressure classes and torque values please consult the factory.

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

SIZE in mm	TE-600 (REGULAR PORT) <sup>(1)</sup>						
	A	B	C	D	E	F	G
1/2	2.63	9.27	7.32	1.31	0.44	0.86	0.38
15	67	235	186	33	11	22	10
3/4	3.25	9.40	7.32	1.63	0.56	1.07	0.50
20	83	239	186	41	14	27	13
1	3.75	9.90	7.32	1.88	0.81	1.33	0.50
25	95	252	186	48	21	34	13
1 1/2	4.88	11.03	7.32	2.44	1.19	1.92	0.50
40	124	280	186	62	30	49	13
2	6.00	11.63	7.32	3.00	1.50	2.41	0.63
50	152	296	186	76	38	61	16

SIZE in mm	TE-600 (FULL PORT) <sup>(1)</sup>						
	A	B	C	D	E	F	G
1/2	3.25	9.40	7.32	1.63	0.56	0.86	0.38
15	83	239	186	41	14	22	10
3/4	3.75	9.90	7.32	1.88	0.81	1.07	0.50
20	95	252	186	48	21	27	13
1	4.88	11.03	7.32	2.44	1.19	1.33	0.50
25	124	280	186	62	30	34	13
1 1/2	6.00	11.63	7.32	3.00	1.50	1.92	0.50
40	152	296	186	76	38	49	13

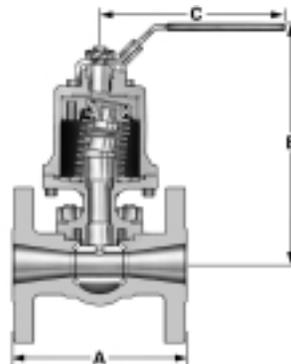


(1) For butt weld dimensions, contact the factory.

**TE-150/300 FLANGED REGULAR PORT<sup>(1)</sup>**

SIZE	CLASS 150		CLASS 300		
	A		A		
	in	mm	in	mm	
1/2	15	4.25	108	5.50	140
3/4	20	4.63	118	6.00	152
1	25	5.00	127	6.50	165
1 1/2	40	6.50	165	7.50	191
2	50	7.00	178	8.50	216

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





### BELLOWS SEAL CONTROL VALVES FOR HIGH TEMPERATURES

#### DESIGN FEATURES:

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

#### RANGE:

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

#### OPTIONS:

- Pneumatic actuator
- Positioner, airset
- Limit switches

#### APPLICATIONS:

- Hazardous fluids
- Nuclear plants
- Accurate steam control
- Pilot plants
- Laboratories
- Accurate steam control



### BELLOWS SEAL CONTROL VALVES FOR CRYOGENICS

#### DESIGN FEATURES:

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

#### APPLICATIONS:

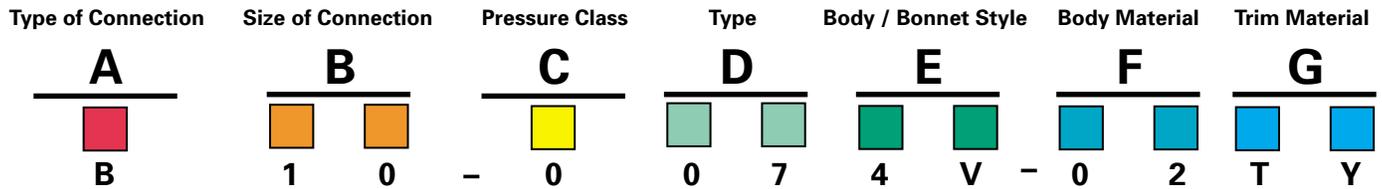
- Very low temperatures
- Liquefied Helium, Hydrogen or Oxygen.
- Rocket launching sites
- Aerospace
- Superconductivity applications.

#### REFERENCES

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

# HOW TO ORDER BELLOWS SEAL VALVES

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



E.G.: 3" ASME Class 150 bolted bonnet bellows seal globe valve in cast carbon steel with a butt weld connection.

## A TYPE OF CONNECTION

- |                    |                   |   |
|--------------------|-------------------|---|
| <b>A</b> Special   | <b>F</b> Flanged  | <b>W</b> Socket weld                    |
| <b>B</b> Butt weld | <b>S</b> Threaded | <b>X</b> Butt weld (intermediate Class) |

## B SIZE OF CONNECTION

- |                  |                    |                    |                    |                    |                |                 |                 |
|------------------|--------------------|--------------------|--------------------|--------------------|----------------|-----------------|-----------------|
| <b>03</b> - 1/2" | <b>05</b> - 1"     | <b>07</b> - 1 1/2" | <b>09</b> - 2 1/2" | <b>11</b> - 3 1/2" | <b>13</b> - 5" | <b>15</b> - 8"  | <b>18</b> - 12" |
| <b>04</b> - 3/4" | <b>06</b> - 1 1/4" | <b>08</b> - 2"     | <b>10</b> - 3"     | <b>12</b> - 4"     | <b>14</b> - 6" | <b>16</b> - 10" |                 |

## C CLASS

- |                 |  |
|-----------------|--|
| <b>0</b> - 150  | <b>2</b> - 600 flanged or 800 socket weld, butt weld or threaded |
| <b>1</b> - 300  | <b>3</b> - 1500  |
| <b>4</b> - 2500 | <b>6</b> - 400   |
| <b>7</b> - 900  |  |

## D VALVE TYPE

- |                                |                          |                   |
|--------------------------------|--------------------------|-------------------|
| <b>05</b> - Standard port gate | <b>07</b> - Stop (globe) | <b>18</b> - Drain |
| <b>06</b> - Full port gate     | <b>17</b> - IREB         |                   |

## E BODY/BONNET STYLE

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

## F BODY MATERIAL

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

## G TRIM MATERIAL

PRODUCT	TRIM CODE	WEDGE / DISC SEATING SURFACE <sup>(1)</sup>	SEAT SURFACE <sup>(1)</sup>	STEM
1/2 - 2" Forged	TS MS	Stellite 6	Stellite 6	13% CR 316 or 630
2 1/2 - 12" Forged	TS MS	Stellite 6	Stellite 6	13% CR 316 or 630
2 - 12" Cast	TY TS MY MS	Stellite 6 or 13 CR	Stellite 6	13% CR 13% CR SS 316 SS 316
NACE H <sub>2</sub> S SERVICE	NA <sup>(2)</sup>	13 CR (410 or CA 15)	Stellite 6	410 HRC 22 max.
	NB <sup>(2)</sup>	Stellite or CF8M	Stellite 6	SS 316
	NC <sup>(2)</sup>	Monel	Stellite 6	Monel or Monel K

<sup>(1)</sup> Base material may be same as body or same as trim at manufacturer's option.

<sup>(2)</sup> NA, NB and NC trims are for NACE service and are supplied with bolting with maximum hardness of Rc. 22.