VELAN

CRYOGENIC VALVES

Gate, Globe, Check, Ball & Butterfly Valves

PROFILE

Velan is one of the world's leading manufacturers of industrial valves, supplying forged and cast steel gate, globe, check, ball 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, all stainless steel knife gate valves and forged valves up to 24".

Velan valves are manufactured in 12 specialized manufacturing 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.

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Velan has Sales offices and distributors located worldwide.
Visit the Velan website at www.velan.com for an updated contact list.

Thermal gradients (heating or freezing) can cause certain media to expand in the line, creating internal pressure buildup and possibly causing valves to "stick" in the closed position. Consult the company if you encounter this problem or if you plan to use ball valves for high thermal gradient service.

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.*

"VELAN" ALL YOUR CRYOGENIC V

The cryogenic valve expertise *of Velan Inc. and Velan S.A.S. has been combined to offer the cryogenic industry the most complete and technically most advanced cryogenic valves line from one source: Gate, Globe, Check, Ball, and Butterfly valves.*

Gate Valves, 1/4–48" ASME Classes 150–2500, Forged 1/4–24", Cast 2–48"

Butterfly, 3–36", Side Entry, 3–36" ASME Classes 150

Globe Valves, 1/4–24" ASME Classes 150–2500, Forged 1/4–6", Cast 2–16"

ALVES FROM A SINGLE SOURCE

STANDARD MANUFACTURING PROGRAM

VALVE TYPE	VALVE CLASS	MATERIAL BODY	MATERIAL TRIM	VALVE SIZE	in	⅜"	½"	¾"	1	1½"	2"	2½"	3"	4"	6"	8"	10"	12"	14"	16"	18"	20"	24"	26"	30"	32"	36"	42"	48"
					mm	10	15	20	25	32	50	65	80	100	150	200	250	300	350	400	450	500	600	650	750	800	900	1000	1150
GATE	150	SS 316 CF8M	SS 316 Seating Stellite 6			✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
	300					✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
	600					✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔							
	900					✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔							
	1500					✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔							
	2500					✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔							
GLOBE	150	SS 316 CF8M	SS 316 Seating Stellite 6			✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔										
	300					✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔										
	600					✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔														
	900					✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔														
	1500					✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔														
	2500			Forged		✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔														
CHECK	150	SS 316 CF8M	SS 316 Seating Stellite 6			✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔					
	300					✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔							
	600					✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔							
	900					✔	✔	✔	✔	✔	✔	✔																		
	1500					✔	✔	✔	✔	✔	✔	✔																		
	2500			Forged		✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔							
BALL	150	CF8M	SS 316 RTFE			✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔							
	300					✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔							
	600					✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔												
BUTTER-FLY	150	CF8M	SS 316										✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
	300		Metal-seat										✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔		

OPTIONAL BODY MATERIALS

ASTM SPEC.	TYPE	TEMP. °F (°C)	VELAN CODE
A 352 LCC	LCC	-50°F (-46°C)	31
A 351 CF3M	316L	-425°F (-254°C)	14
A 351 CF8C	347	-425°F (-254°C)	31

BONNET GASKET MATERIALS

ALLOY VALVES	ASME CLASS					STAINLESS VALVES	ASME CLASS				
TYPE-MATERIAL	150	300	600	900	1500	TYPE-MATERIAL	150	300	600	900	1500
Corrugated steel/graphite	✔					Spiral wound/SS graphite		✔	✔	✔	✔
Corrugated stainless/TFE	✔					Spiral wound/SS-PTFE		✔	✔	✔	✔
Spiral wound SS/graphite		✔	✔	✔	✔	PTFE (Teflon)	✔				

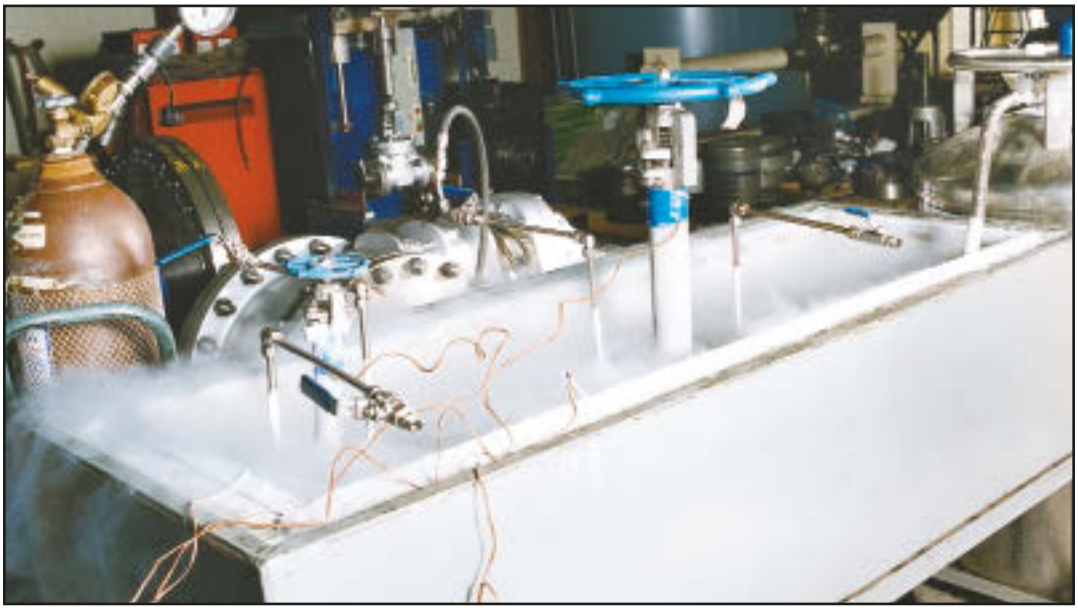
✔ STANDARD + OPTIONAL

GLAND PACKING MATERIALS

MATERIAL	SERVICE
TFE or RTFE	NON FIRE SAFE
RTFE & GRAPHITE	FIRE SAFE

RELIABILITY THROUGH FUNCTIONAL

Reliability *of valve operation affects service life and ease of inspection and maintenance. In order to predict reliability, a sound valve design must be backed up by a stress analysis and functional qualification testing under critical operating conditions. Typical tests performed on our valves are shown here.*

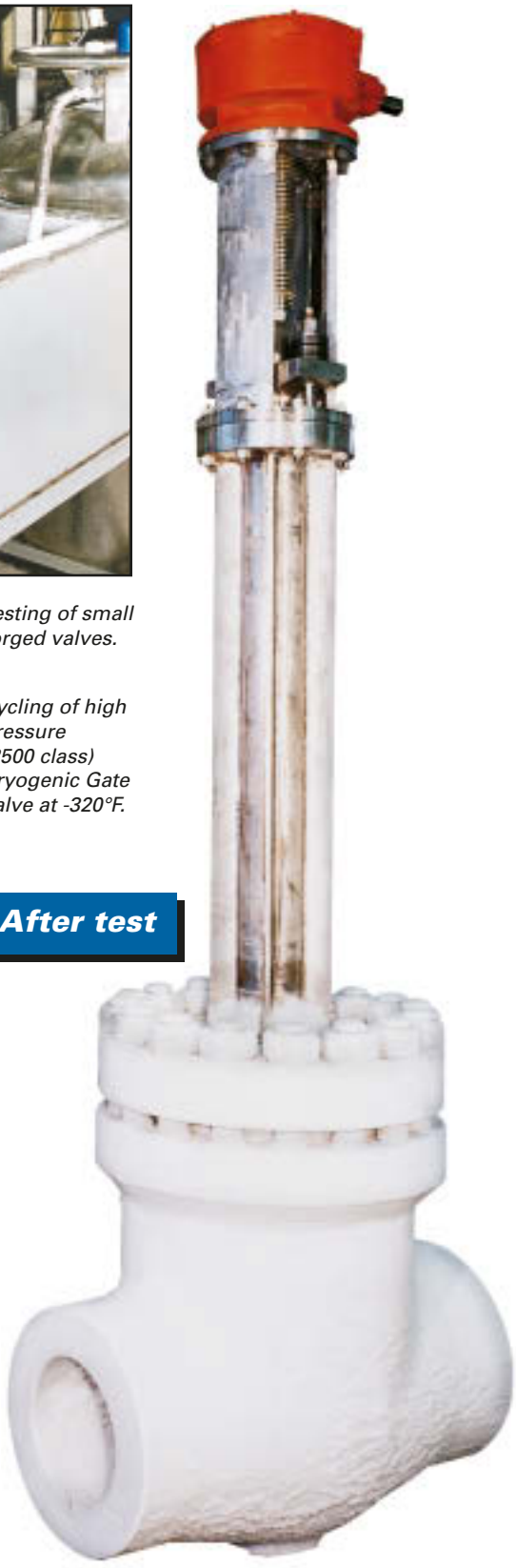


Testing

Testing of small forged valves.

Cycling of high pressure (2500 class) Cryogenic Gate valve at -320°F.

After test



QUALIFICATION TESTS

Top Left to right: *Functional Cryogenic testing of a 24" 150 Class Gate valve at -196°C (-320°F).*

Bottom Left to right: *Functional Cryogenic testing of a 36" Velan S.A.S. flanged butterfly valve at -196°C(-320°F). 18 bar (260 PSI).*

Testing

After test

Cryogenic test bench

After test

CERTIFICATIONS & REFERENCES

VELAN Inc. & VELAN S.A.S

Certifications

- ISO 9001, TÜV
- ASME "N" Stamp

- ISO 9001, TÜV

Qualifications–Type Approvals

- Lloyd
- N.K. Class
- Lloyd's Register of Shipping
- Bureau Veritas
- Korean Register of Shipping
- N.K.

- N.K. Class *(applied for)*
- Gaz de France
- Air Liquide
- CERN Geneva
- CEA/CENG

Velan User List

LNG TERMINALS

- CPC Taiwan Terminal
  CTIC
- Depa Greece Terminal
  Sofregaz
- Enel, Italy Terminal
  Filipo Fochi
- Gaz de France/ Sofregaz/
  France
- Hyproc LNG Terminals,
  Chantiers Atlantique
- KGS, Korea Terminal
  Sunkyong
- Korea Gas Corp/Korea
- Naftgas,
  Portugal Terminal
  Foster Wheeler, Technip
- Repsol-Enagas/Spain
- Sonatrach-Arzen,
  Skikda Terminals,
  Bechtel
- Tegana Empat, Lima
  CNMI
- Tegana Satu, DUA,
  TIGA
  France Dunkerque

LNG CARRIERS

- Hanjin
- NKK Two LNG
  Carriers
  NKK Nagasaki
- Petronas / CNIM
- Shell Shipping/CNIM
- Sonatrach / Chantiers
  de l'Atlantique

PETROCHEMICALS

- China National
  Toyo Engineering
  Fushun, P.R. of China
- Exxon Butyl
  Exxon Engineering
  Baton Rouge,
  Louisania U.S.A.
- Malaysia Ethylene
  Toyo Engineeering
  Kertin Terengganu,
  Malaysia
- Petrochemia Olefin
  Mitsui Engineering
  Aloubai, Saudi Arabia
- Phillips 66
  CF Braun EPC
  Texas, U.S.A.

GAS PROCESSING

- Sonatrach
  M.W. Kellog
  Ainelbia, Algeria
  Bethoria, Algeria
- Statoil, Norway
  Linde Engineering
  Karstoe, Norway

SUPERCRYOGENICS

- CERN Accelerator
  Geneva
- France Aerospace
  Air Liquide
  Chimontubi
  Europeen Transonic
  Windtunnel/NFM
- SNECMA/SEP

VELAN CRYOGENIC VALVE TECHNOLOGY

APPLICATIONS

The production, transport and storage of liquefied gases such as oxygen, nitrogen, argon, natural gas, hydrogen or helium (down to -425°F (-254°C)), to mention only some of the more commonly used, presents several technical problems. Velan specially-adapted extended bonnet forged valves offer safe and efficient service including LNG liquifaction plants and receiving terminals as well as cargo systems of LNG and aerospace ground support facilites for liquid, hydrogen and oxygen.

PRINCIPLE OF OPERATION

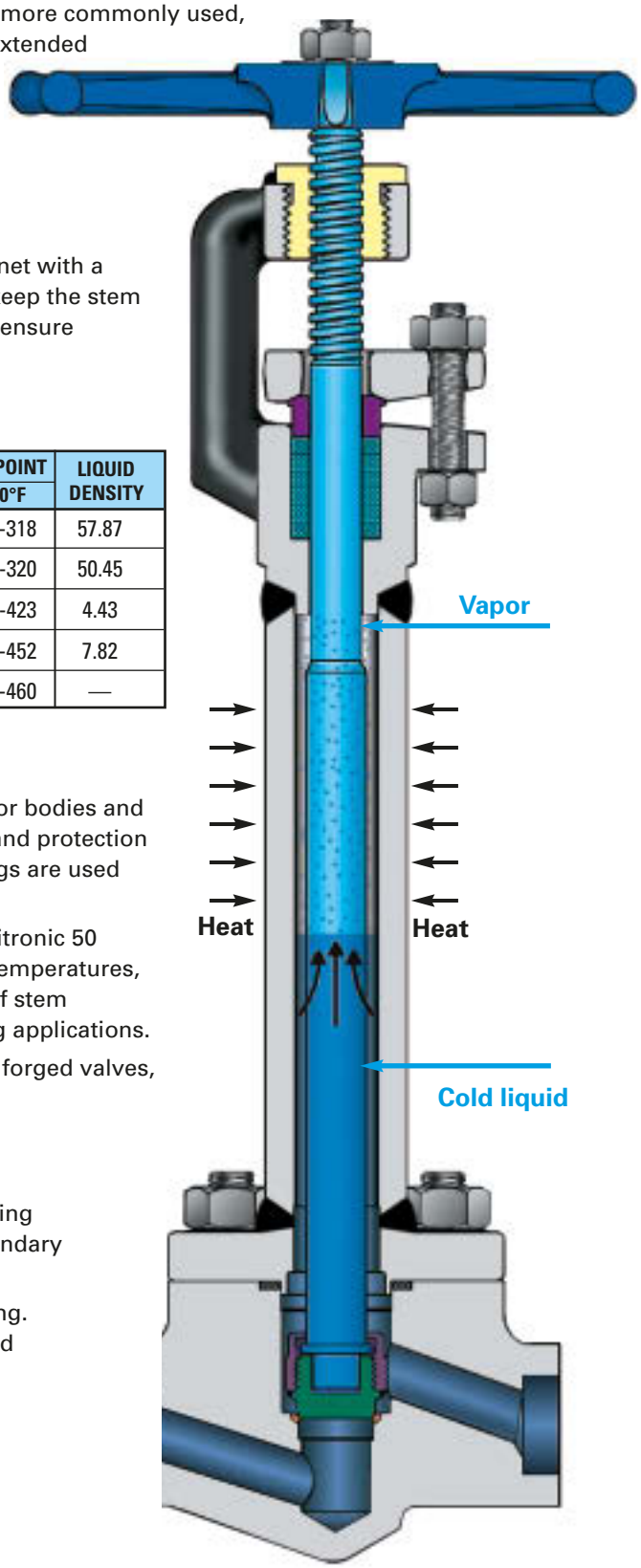
All valves except check valves are supplied with extended bonnet with a sufficient gas column length, usually specified by the user, to keep the stem seal packings exposed only to vapor and not the cold liquid to ensure functional integrity.

TEMPERATURES OF LIQUIFIED GASES

TYPE	BOILING POINT		LIQUID DENSITY	TYPE	BOILING POINT		LIQUID DENSITY
	0°C	0°F			0°C	0°F	
Natural gas (LNG)	-168	-270	26	Air	-194.4	-318	57.87
Methane (CH_4)	-161.5	-258	26.20	Nitrogen (N_2)	-195.8	-320	50.45
Oxygen (O_2)	-182.9	-296	71.20	Hydrogen (H_2)	-252.7	-423	4.43
Argon (A)	-185.9	-303	87.40	Helium (He)	-268.9	-452	7.82
Carbon Dioxide (CO_2)	-78.5	-109	50.60	Absolute Zero	-273.16	-460	—

MATERIALS - WELDING - CLEANING

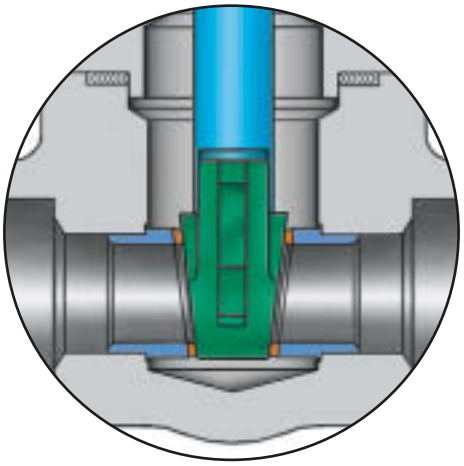
- **Body and bonnet:** Austenitic stainless steel forgings used for bodies and bonnets offer excellent impact strength, minimal heat loss and protection against corrosion. For cast steel valves radiographed castings are used only from specially approved foundries.
- **Stem:** To reduce galling, stems 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. Alternative 316L stems are used for less demanding applications.
- **Wetted parts:** All Austenitic stainless steel. On small ¼–2" forged valves, seats, wedges or discs are often Stellite 6.
- **Yoke bushings:** Bronze.
- **Lubrication:** Molykote 33 or Plex 2.
- **Packing:** PTFE or other plastic packing protected from freezing by a column of insulating gas. For fire safe operation a secondary packing is provided using graphite.
- **Seating faces:** Stellite 6 is used to prevent seizing and galling. When extremely tight shutoff is required, valves are supplied with CTFE, PTFE or other soft inserts.
- **Bolting:** Strain-hardened Austenitic stainless steel.
- **Welding:** Inconel electrodes must be used.
- **Cleaning:** All cryogenic valves are thoroughly degreased, cleaned and sealed to prevent contamination.



VELAN CRYOGENIC GATE VALVE TECHNOLOGY

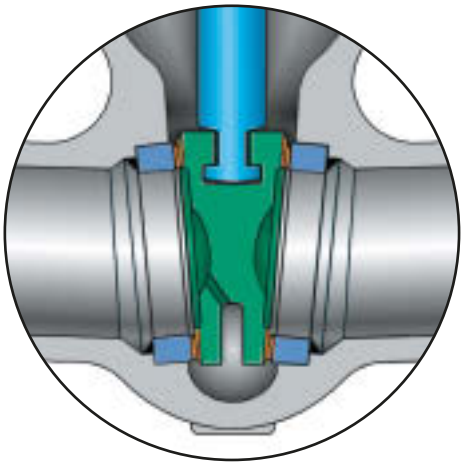
WEDGE/SEAT DESIGN

Forged ¼–2″



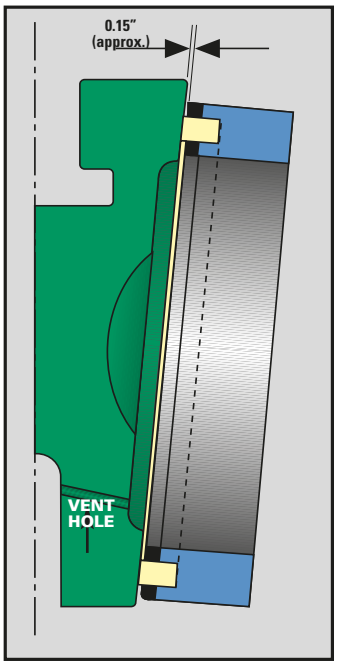
- Expanded seats with Stellite 6 faces.
- Solid wedge in CF8M or solid Stellite 6.

Forged & Cast 2–48″



- Welded in seats with Stellite 6 faces.
- Flexible wedge with pressure relief in CF8M or Stellite 6 faces.

DUALSEAL WITH CTFE & PTFE INSERT



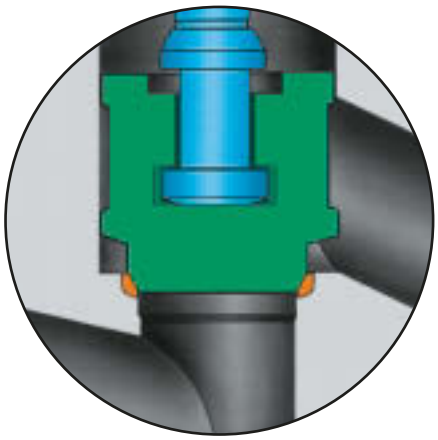
NOTE: All wedges have pressure relief vent.

VELAN CRYOGENIC GLOBE VALVE TECHNOLOGY

DISC/SEAT DESIGN

Forged ¼–2"

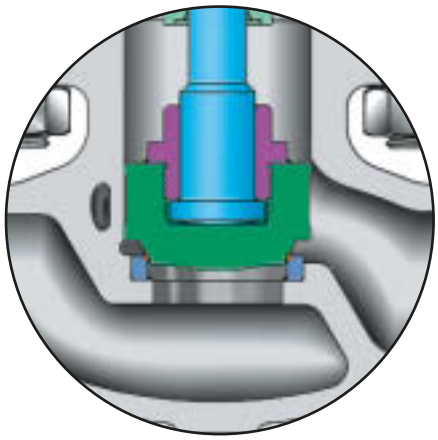
- Integral hardfaced seat Stellite 6



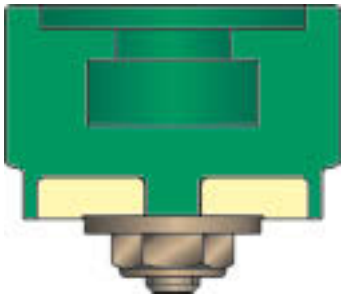
Cast Steel 2–16"

Conical seat

- Welded-in seat hardfaced with Stellite 6



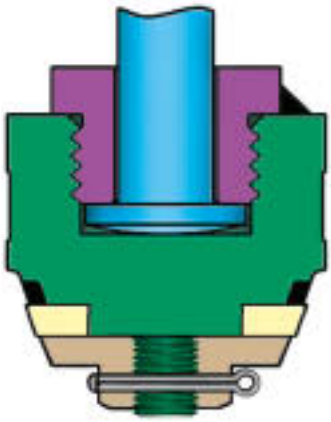
DUALSEAL WITH CTFE & PTFE INSERT ☐



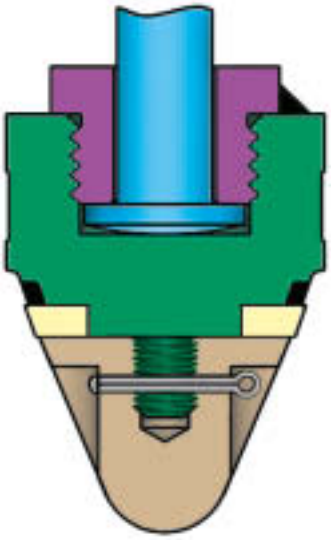
Forged, ¼–2"
Stop Globe & Stop Check
(flat seat)

Cast steel & Forged, 2–16"

Globe Disc



Needle Disc



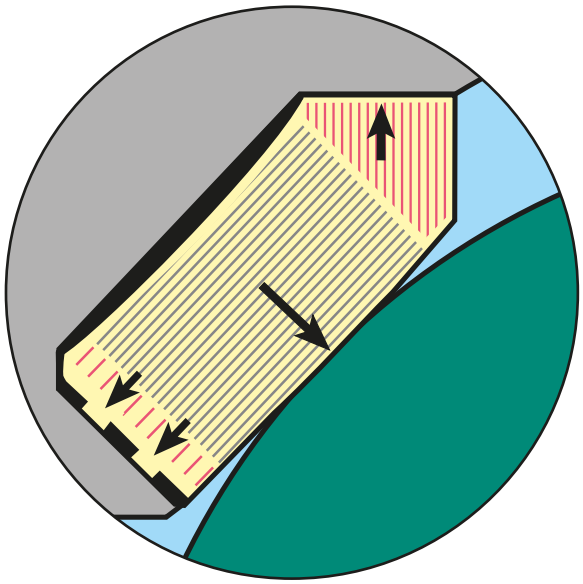
VELAN CRYOGENIC BALL VALVE TECHNOLOGY

PATENTED MEMORY SEAL SEATS

Velan concave-convex flexible "in-tension" seats with induced sealing memory

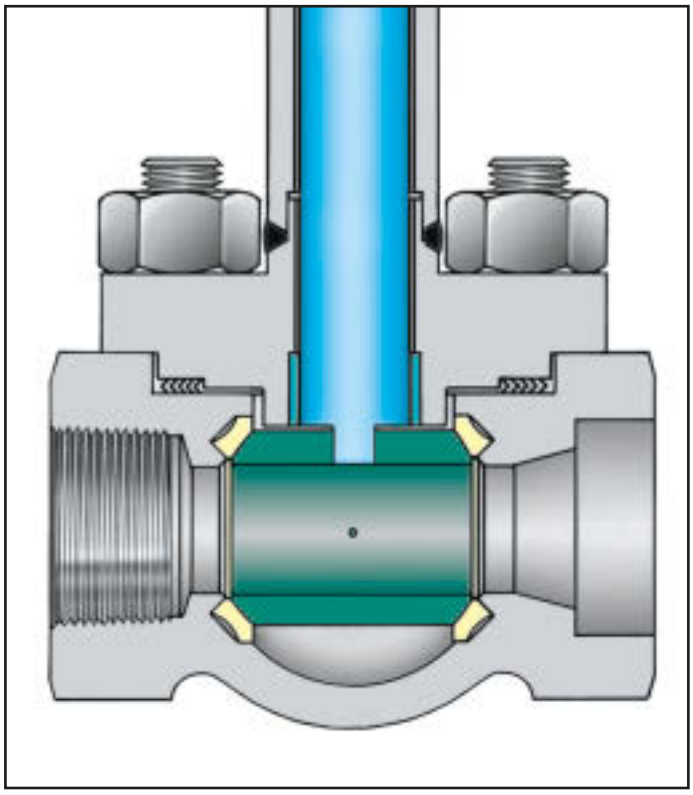
U.S. PATENT 3,384,341

The in-tension seats, when flattened during the ball valve assembly strech somewhat like an elastic band, ensuring reliable seat tightness even at low pressure.



TOP "ENTRY" ½–4"

for in-line service



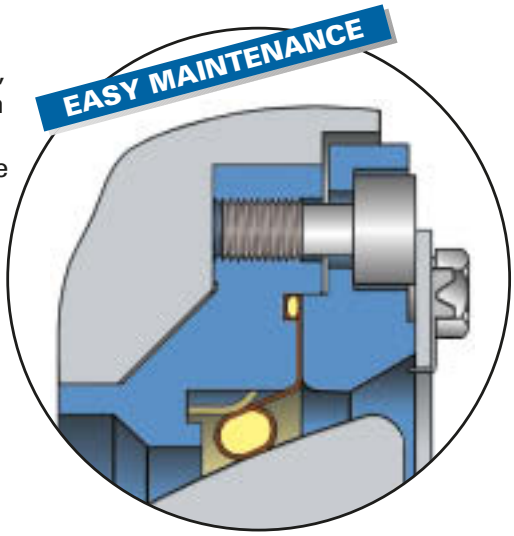
⅛" vent hole in all balls

VELAN CRYOGENIC BUTTERFLY VALVE TECHNOLOGY

METALLIC BI-DIRECTIONAL SEAT PATENTED

1. The seat contains an internal inconel spring, an internal envelope in stainless and a copper alloy external envelope which is flexible and extends to the same seating arrangement between the flanges.

2. A flexible retaining ring provides a complementary seating pressure on the disc.

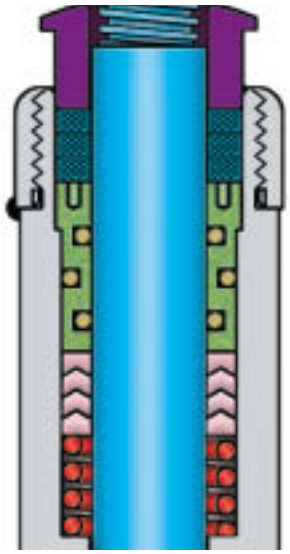


IN-LINE MAINTENANCE

The side entry design allows easy and quick in-line maintenance through the side cover with free access to the seat and disc for inspection or maintenance without disassembly of actuators. No special tools are required.

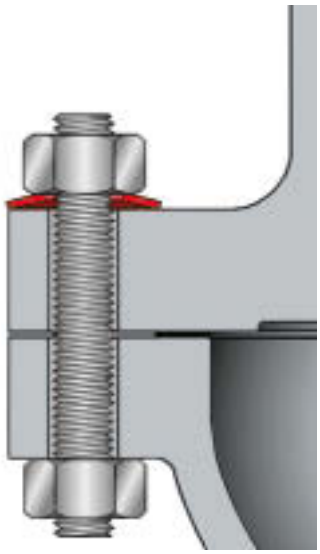
OPTIONS

FIRE SAFE STEM SEAL
(for LNG applications)



- Spring loaded chevron TF packing
- O-ring sealed follower
- Graphite fire safe packing
- Flanged gland

LIVE-LOADED GLAND BOLTING

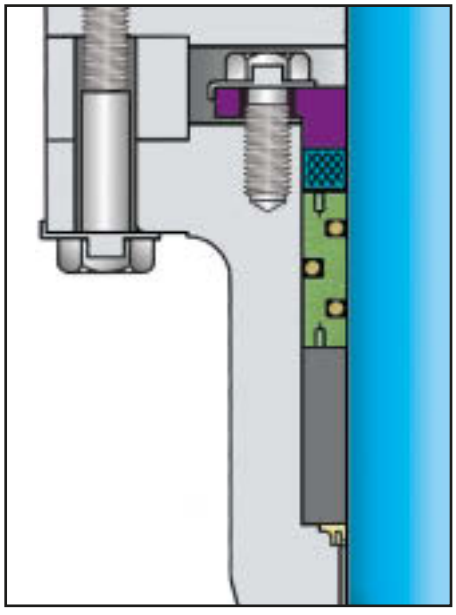


- For applications where rapid temperature fluctuations take place which can cause joint leakage the bolting can be live-loaded with spring Bellville washers.

SIDE ENTRY FOR FIRE SAFE OPERATION

Metallic seat and a 3-way stem sealing provides fire safe operation.

- Coated SS flexible lip gasket
- Viton O-rings
- Graphite rings



VELAN

Total Quality Commitment

Velan Total Quality Program

In 1990, during its 40th anniversary year, Velan embarked on an important new challenge: the creation and implementation of a Total Quality Management (TQM) program. The goal of the program is continuous improvement of all Velan products and services through teamwork, training and performance.

During the last several years, more than 1000 Velan employees have completed a five-day training course in statistical process controls (SPC). An important component of total quality management, SPC uses statistical techniques to measure variation in industrial and administrative processes. By measuring variation, employees can identify the root-cause of the problem and adjust their processes to eliminate non-conforming products.

The TQM process involves continuous improvement in all aspects of the business process, whether it is accounting, engineering, after sales support, information systems or tooling.

Our goal is to offer products and services which not only meet, but clearly exceed, the expectations of our customers.

Through training, teamwork and performance, our employees strive to achieve continuous improvement of all processes.

Our goal is Total Quality; our method is Total Commitment.

A.K. Velan,
President and C.E.O.

On-Line Networked SPC

Velan has installed on-line networked SPC computers operated by machinists themselves.

Each unit can handle four gageports and provide instant feedback on tool wear and lubrication to a control manager station.

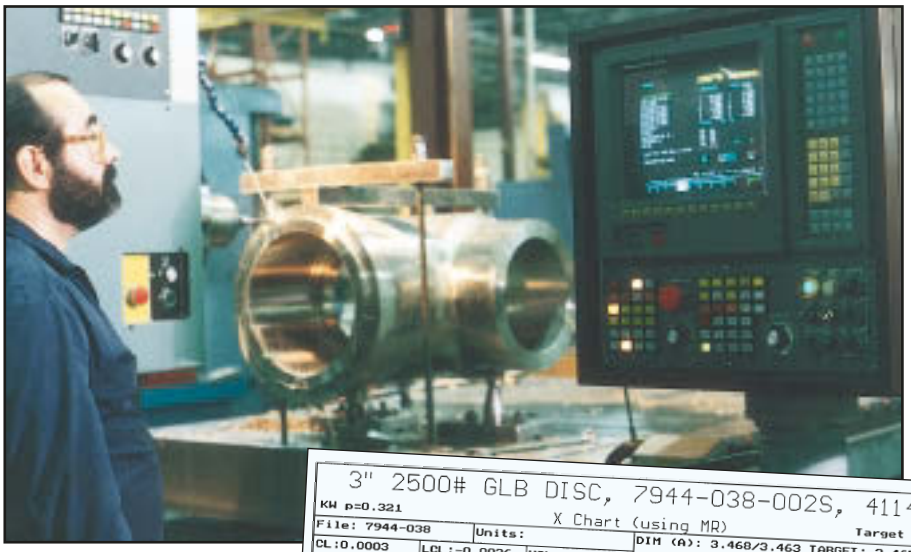
6 SYSTEMS ENSURE THE FINAL QUALITY GOALS

1. DESIGN

All valves are designed to comply with the requirements of ASME B16.34, the ASME code and specials to customer requirements as applicable.

2. QUALITY ASSURANCE

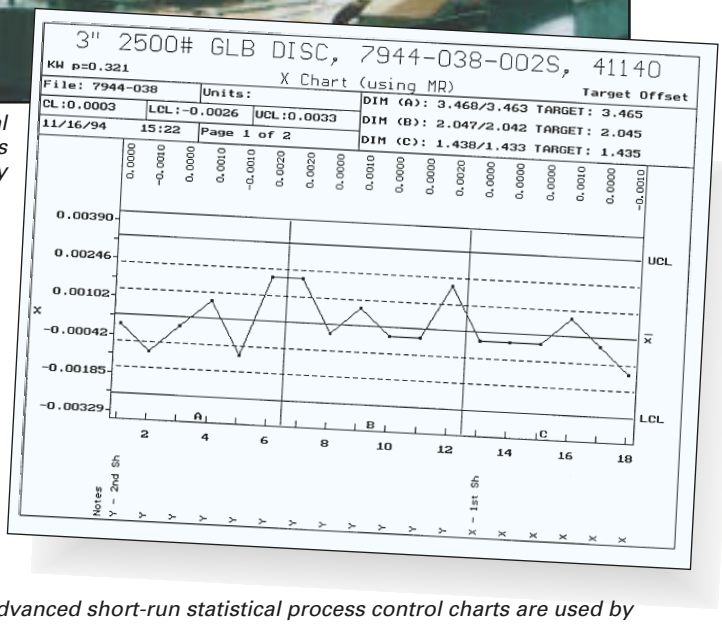
Every step from procurement through production, welding, assembly, testing and packaging is in accordance with written rules contained in QA manuals. (An ASME Section III manual for code valve production and an ISO 9001 QA manual for all other production.) Velan's four North American plants are certified to IS0 9001 and Plants 1 and 2 have ASME "N" stamp authorization, Plant 3 has a certificate of accreditation. Orders are reviewed by Engineering and QA Departments and all special customer requirements are incorporated into QCI (Quality Con-trol Instructions) issued for each project. The QA Department also operates calibration and gauge control systems, and trains and qualifies skilled welders and NDT inspectors.



Operator on CNC horizontal boring mill monitors his own quality

3. QUALITY CONTROL

The QC Department is responsible for all aspects of quality, from receiving of material to control of machining processes, welding, nondestructive testing,



Advanced short-run statistical process control charts are used by operators to monitor several characteristics on a single part simultaneously at plant 2.

TQM innovations at Plant 2 include "snag lists" of any problems encountered in daily engineering and manufacturing processes. The lists are compiled on a weekly basis and automatically become the first items on the agenda for TQM team meetings.

assembly, pressure testing, cleaning, painting and packaging. When required, a permanent record of all completed quality goals is prepared and sent to customers in the form of a "Valve Data Package".

4. PRESSURE TESTING

Each valve is pressure tested in accordance with ASME B16.34, the ASME Code, or special customer requirements as applicable. In all plants test status is integrated into production control/inventory management software.

5. IMPROVEMENT TEAMS

Continuous Improvement teams at point of manufacturing, ensure quality at source, process control, higher workmanship and operator ownership.

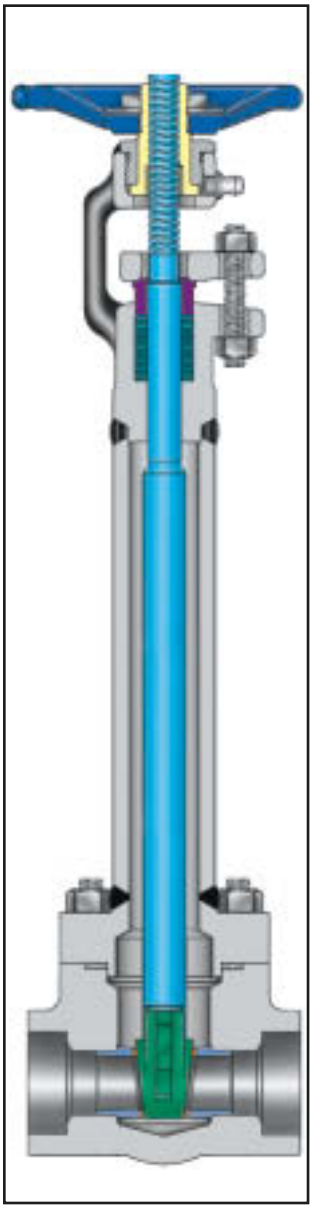
6. QUALIFICATION TESTING

Reliability through functional qualification tests. These tests are performed on all valves to determine reliability and service life.

FORGED AND CAST CRYOGENIC GATE VALVES, AUSTENITIC STAINLESS STEEL ½–48" (15–1200 mm)

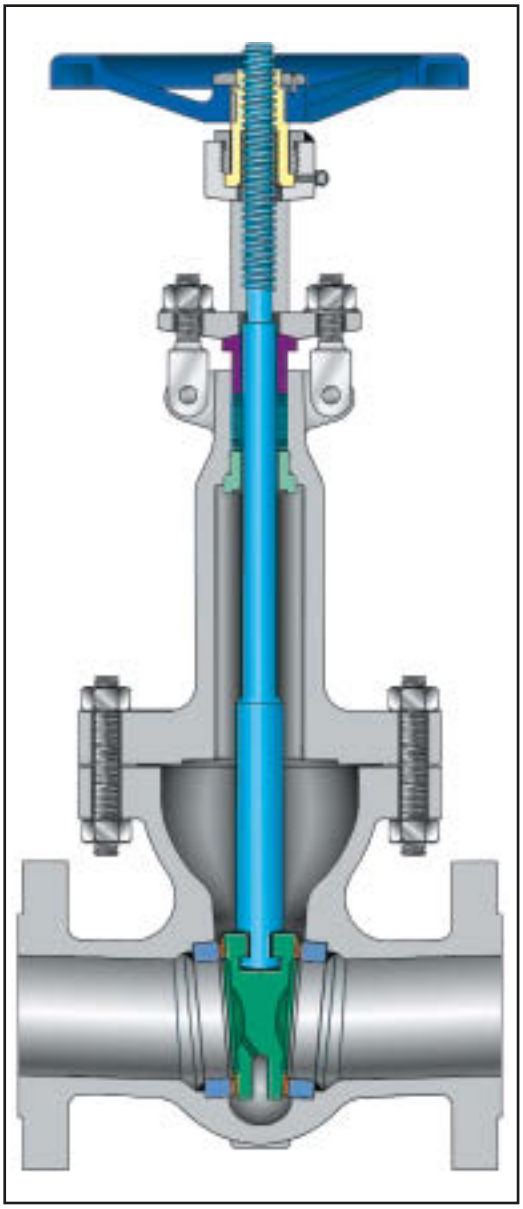
PRESSURE ASME CLASSES 150–2500

SHOWN CLASS 600



FORGED ¼–2"
ASME Class 150–2500

SHOWN CLASS 150



CAST 2–48"
ASME Class 150–600

FORGED 2–24"
ASME Class 600–2500

STANDARD MATERIALS

PART	FORGED ¼–2"	CAST 2–48"
Body(1)	SS 316	CF8M
Bonnet(1)	SS 316	CF8M
Stem(1)(3)	SS 316 or Nimonic	
Wedge(1)	CF8M or Stellite 6	
Seat(1)(2)	Stellite 6 faced, F 316	
Packing flange	SS 316	
Gland bushing	SS 316	
Packing ring(1)	TFE, RTFE and Graphite	
Gland stud	F 316, B8M	F 316, B8M
Gland nut	Gr. 8M	
Body/bonnet nut	Gr. 8M	
Body/bonnet stud	B8M	
Back seat(1)(3)	N/A	SS 316
Gasket(1)	SS spiral wound/ TFE or graphite	
Key	N/A	Carbon steel
Yoke bushing	N/A	Stainless steel
Bearing	N/A	Steel
Handwheel nut	Malleable iron	
Handwheel(1)	Malleable iron	
Grease fitting	N/A	Steel
Groove pin		Stainless steel
Bushing		Stainless steel
Washer		Stainless steel
Name plate		Stainless steel
Identification tag		Stainless steel
Rivet		Stainless steel
Stem nut	SS or Bronze	Ni-resist type DZC

(1) Other materials available
(2) Stellited

Class 900–2500 forged gate valves also available on request.

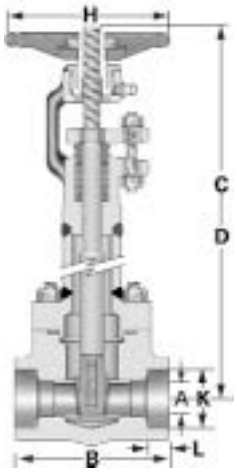
DESIGN PARAMETERS

ITEM	APPLICABLE SPECIFICATION
Wall thickness and general valve design	API 602 (forged), API 600 (cast)
Pressure–temperature rating	ASME B16.34
Face-to-face dimensions for butt weld and flanged valves	ASME B16.10
Flange design	ASME B16.5
Butt welding design	ASME B16.25
Materials	ASTM

SMALL FORGED GATE DIMENSIONS*

** Add height of extension 12–16" to C, D.*

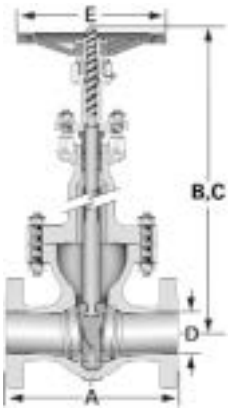
Size in mm	A Port 800	A Port 1500	B End to End 800	B End to End 1500	C Center-Top Closed 800	C Center-Top Closed 1500	D Center-Top Open 800	D Center-Top Open 1500	H Handwheel 800	H Handwheel 1500	K Socket Weld Bore	L Socket Weld Depth	Flanged Valves Face to Face 150	300	600	1500
¼ 8	0.25 6	0.25 6	2.88 73	4.00 102	4.69 119	7.10 180	5.20 132	7.80 198	2.50 64	3.50 89	0.555 14.10	0.38 10	4.00 102	5.50 139	6.50 165	8.50 216
⅜ 10	0.25 6	0.35 9	2.88 73	4.00 102	4.69 119	7.10 180	5.20 132	7.80 198	2.50 64	3.50 89	0.690 17.53	0.38 10	4.00 102	5.50 139	6.50 165	8.50 216
½ 15	0.38 10	0.50 13	2.88 73	4.00 102	4.69 119	7.10 180	5.20 132	7.80 198	2.50 64	3.50 89	0.855 21.72	0.38 10	4.25 165	5.50 139	6.50 165	8.50 216
¾ 20	0.50 13		3.25 83	5.00 127	5.88 150	7.25 184	6.80 173	7.90 201	3.50 89	3.50 89	1.065 27.05	0.50 13	4.62 117	6.00 152	7.50 190	9.00 229
1 25	0.69 18		3.50 89	6.00 152	6.38 162	8.70 221	7.40 188	9.60 244	3.50 89	5.00 127	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	7.00 178	7.62 193	9.10 231	9.30 236	10.60 269	5.00 127	6.00 152	1.675 42.55	0.50 13	5.50 165	7.00 178	9.00 227	11.00 279
1½ 40	1.25 32		5.00 127	7.00 178	7.62 193	9.10 231	9.30 236	10.60 269	5.00 127	6.00 152	1.915 48.64	0.50 13	6.50 190	7.50 191	9.50 241	12.00 305
2 50	1.50 38		5.25 133	9.00 229	8.69 221	10.60 269	10.40 264	12.30 312	6.00 152	10.00 254	2.406 61.11	0.62 16	7.00 178	8.50 221	11.50 292	14.50 368



CAST STEEL GATE VALVE DIMENSIONS* (CLASSES 150–600)

** Add height of extension to B, C.*

SIZE in mm	ASME 150 (PN 20) A BW	A FL	B(1)	C(1)	D	E	ASME 300 (PN 50) A	B(1)	C(1)	D	E	ASME 600 (PN 100) A	B(1)	C(1)	D	E
2 50	8.50 216	7.00 178	15.25 387	20.06 510	2.00 51	8.00 203	8.50 216	15.25 387	20.06 510	2.00 51	8.00 203	11.50 292	15.38 391	20.06 510	2.00 51	8.00 203
2½ 65	9.50 241	7.50 191	16.62 422	20.75 527	2.50 64	8.00 203	9.50 241	16.62 422	21.81 554	2.50 64	8.00 203	13.00 330	18.75 476	24.18 614	2.50 64	10.00 254
3 80	11.12 282	8.00 203	18.88 480	24.18 614	3.00 76	10.00 254	11.12 283	20.00 508	26.18 665	3.00 76	10.00 254	14.00 356	21.62 549	27.75 705	3.00 76	10.00 254
4 100	12.00 305	9.00 229	22.13 562	28.25 718	4.00 102	10.00 254	12.00 305	23.38 594	30.37 771	4.00 102	10.00 254	17.00 432	25.87 657	32.87 835	4.00 102	14.00 356
6 150	15.88 403	10.50 267	31.00 787	37.87 962	6.00 152	14.00 356	15.87 403	32.25 819	40.25 1022	6.00 152	14.00 356	22.00 559	36.37 924	44.31 1125	6.00 152	20.00 508
8 200	16.50 419	11.50 292	37.62 956	45.75 1162	8.00 203	18.00 457	16.50 419	40.81 1037	50.00 1270	8.00 203	18.00 457	26.00 660	43.87 1114	53.12 1349	8.00 203	24.00 610
10 250	18.00 457	13.00 330	46.88 1191	56.12 1425	10.00 254	20.00 508	18.00 457	49.12 1248	59.25 1505	10.00 254	20.00 508	31.00 787	49.00 1245	59.50 1511	10.00 254	30.00 762
12 300	19.75 502	14.00 356	56.75 1441	67.75 1721	12.00 305	20.00 508	19.75 502	59.38 1508	71.00 1803	12.00 305	20.00 508	33.00 838	60.87 1546	72.50 1842	12.00 305	30.00 762
14 350	22.50 572	15.00 381	61.38 1559	75.00 1905	13.25 337	24.00 610	30.00 762	61.38 1559	70.00 1778	13.25 337	24.00 610	35.00 889	72.50 1842	85.00 2159	12.88 327	(2)
16 400	24.00 610	16.00 406	68.75 1746	85.00 2159	15.25 387	24.00 610	33.00 838	68.75 1746	80.00 2032	15.25 387	30.00 762	39.00 991	82.25 2089	95.00 2413	14.75 375	(2)
18 450	26.00 660	17.00 432	73.25 1861	90.00 2286	17.25 438	24.00 610	36.00 914	77.88 1978	94.00 2388	17.00 432	(2)	43.00 1092	87.06 2211	100.00 2540	16.50 419	(2)
20 500	28.00 711	18.00 457	82.88 2105	100.00 2540	19.25 489	30.00 762	39.00 991	86.50 2197	100.00 2540	19.00 483	(2)	47.00 1194	102.50 2604	120.00 3048	18.25 464	(2)
24 600	32.00 813	20.00 508	96.00 2438	115.00 2921	23.25 591	30.00 762	45.00 1143	101.25 2572	125.00 3175	23.00 584	(2)	55.00 1397	114.75 2915	135.00 3429	22.00 559	(2)
30 750	36.00 914	24.00 610	124.25 3156	140.00 3556	29.25 743	(2)	55.00 1397	123.81 3145	145.00 3683	29.25 743	(2)	56.00 1422	122.50 3112	150.00 3810	24.75 629	(2)
36 900	40.00 1016	28.00 711	146.68 3726	166.00 4216	35.25 895	(2)	68.00 1727	147.81 3754	170.00 4318	35.25 895	(2)	68.00 1727	145.13 3686	170.00 4318	29.00 737	(2)
42 1050	44.00 1118	31.00 787	166.50 4229	190.00 4826	40.25 1022	(2)	– –	– –	– –	– –	– –	– –	– –	– –	– –	– –
48 1200	– –	36.00 914	189.81 4821	214.00 5436	46.00 1168	(2)	– –	– –	– –	– –	– –	– –	– –	– –	– –	– –



B = Center to Top Open
C = Dismantling Height

BW = Butt weld
FL = Flanged

(1) *Height does not include actuators.*

(2) *Gear actuators.*

CLASSES 900-1500

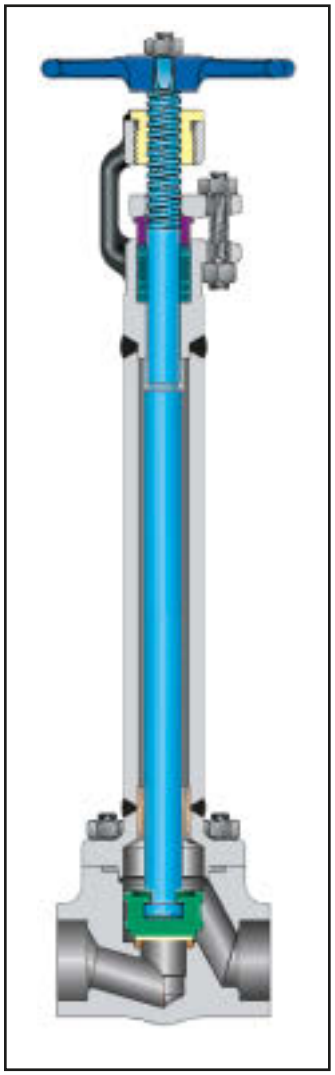
** Add height of extension 12–18" to B, C.*

SIZE in mm	ASME 900 (PN 150) A	B(1)	C(1)	D	E	ASME 1500 (PN 250) A	B(1)	C(1)	D	E
2 50	14.50 368	20.88 530	30.00 762	1.88 48	10.00 254	14.50 368	20.88 530	30.00 762	1.88 48	10.00 254
3 80	15.00 381	25.31 643	35.00 889	2.88 73	14.00 356	18.50 470	25.25 641	35.00 889	2.75 70	14.00 356
4 100	18.00 457	28.38 721	40.00 1016	3.88 99	18.00 457	21.50 546	28.38 721	40.00 1016	3.63 92	18.00 457
6 150	24.00 610	38.56 979	50.00 1270	5.75 146	20.00 508	27.75 705	38.56 979	50.00 1270	5.38 137	(2)
8 200	– –	– –	– –	– –	– –	32.75 832	45.12 1046	60.00 1524	7.00 178	(2)

FORGED AND CAST CRYOGENIC, GLOBE VALVES IN AUSTENITIC STAINLESS STEEL

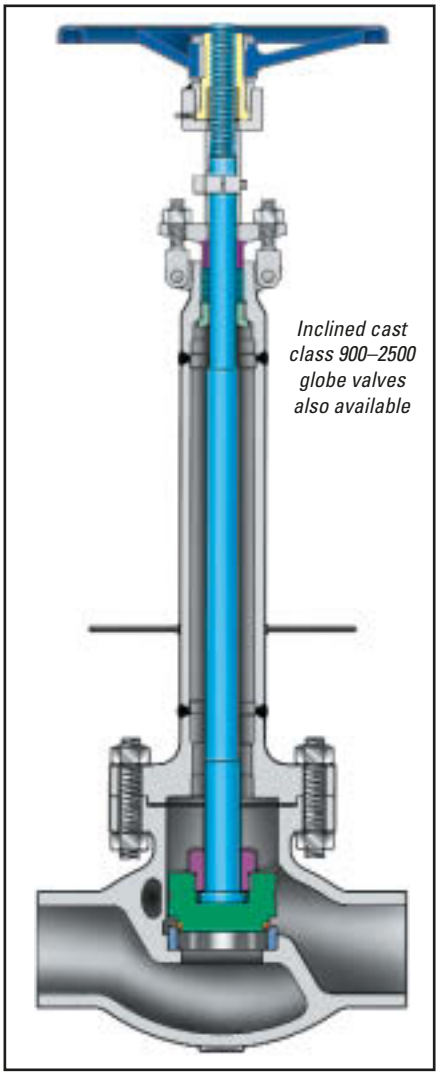
FORGED ¼–2" (8–50 mm) ASME CLASSES 150–2500,
CAST 2–16" (50–400 mm) ASME CLASSES 150–2500

SHOWN CLASS 600



FORGED ¼–2" ASME Class 150–2500

SHOWN CLASS 300



Inclined cast class 900–2500 globe valves also available

Cast 2–16" ASME Class 150–600

Forged 2–8" ASME Class 900–2500

DESIGN FEATURES FOR CAST STEEL:

- **Seat** face Stellited, ground and lapped to a mirror finish. Conical seat machined to 8 RMS.
- **Flat disc.** Floating stem-disc engagement, hardfaced with Stellite 6 or Monel, ground and lapped with seat.
- **Tapered disc.** Body-guided disc, hardfaced with Stellite 6 or Monel, ground and lapped with seat.
- **Body and bonnet.** Castings are precision machined. One-piece bonnet for better alignment, fewer parts.
- **Stuffing box** finish to 63 AARH or better.
- **Body and bonnet joint** accurately machined. Fully enclosed gasket. Gasket materials on page 3.

STANDARD MATERIALS

PART	TYPE	
	FORGED	CAST
Body(1)	F 316	CF8M
Seat(1)(2)	Integral Stellite	Stellite 6 faced F 316
Bonnet(1)	F 316	CF8M
Stem(1)(3)	SS 316	
Packing ring(1)	RTFE and graphite	
Gland stud	F 316, B8M	
Gland nut	Gr. 8M	
Packing flange	SS	
Gland bushing	SS	
Bonnet stud	B8M	
Bonnet nut	Gr. 8M	
Hinge pin	N/A	SS
Gasket(1)	Spiral SS/graphite	
Stem nut	Ni-resist type DZC	
Handwheel nut	Gr. 2M	
Handwheel(1)	Malleable iron	
Backseat(1)(3)	Integral	SS 316
Disc nut	N/A	SS 304 or 316
Disc	Stellite 6	CF8M or F 316

(1) Other materials available. (2) Stellited. (3) Hardened.
(4) For eye bolts Gr.B, for studs B7 is used.
(5) For eye bolts F316, for studs B8M or 630 is used.

- **Stem** with precision Acme threads and burnished finish.
- **Gland** has two-piece construction for easy alignment.
- **Yoke bushing.** Ni-resist, renewable in-line, non-rotating yoke bushing, rotating stem (as shown).
  The following valves are supplied with a rotating stem nut, non-rotating stem and two thrust bearings:
  Class 150: 12" (300 mm) and up,
  Class 300: 8" (200 mm) and up,
  Class 600: 6" (150 mm) and up.
- **Impactor handwheels.** Globe and stop check valves require higher closing torques than gate valves with the same seat diameter and pressure class. The most economical mechanism for tight shutoff is the impactor handwheel. Two lugs cast under the wheelstrike simultaneous blows and give 3–10 times the closing force of standard handwheels. Impactor handwheels are supplied at manufacturer's option unless specified by customer.

SMALL FORGED BOLTED BONNET GLOBE DIMENSIONS*

** Add height of extension to C, D.*

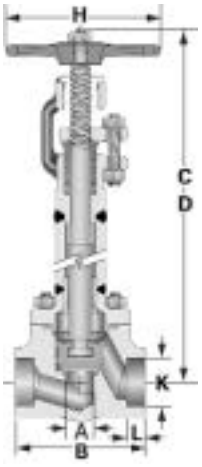
Size in mm	A Port		B End to End		C Center-Top Closed		D Center-Top Open		H Handwheel		K Socket Weld Bore	L Socket Weld Depth	Flanged Valves Face to Face			
	800	1500	800	1500	800	1500	800	1500	800	1500			150	300	600	1500
¼ 8	0.31 8	0.45 11	2.88 73	4.00 102	4.5 114	7.4 188	4.8 122	7.9 201	2.5 64	6 152	0.555 14.10	0.38 10	4.00 102	6.00 152	6.50 165	8.50 216
⅜ 10	0.31 8	0.45 11	2.88 73	4.00 102	4.5 114	7.4 188	4.8 122	7.9 201	2.5 64	6 152	0.690 17.53	0.38 10	4.00 102	6.00 152	6.50 165	8.50 216
½ 15	0.31 8	0.45 11	2.88 73	4.00 102	4.5 114	7.4 188	4.8 122	7.9 201	2.5 64	6 152	0.855 21.72	0.38 10	4.25 108	6.00 152	6.50 165	8.50 216
¾ 20	0.50 13	0.63 16	3.25 83	5.00 127	6.6 168	7.7 196	7.1 180	8.1 206	4.0 102	6 152	1.065 27.05	0.50 13	4.62 117	7.00 178	7.50 190	9.00 229
1 25	0.75 19	1.00 25	3.50 89	6.00 152	6.7 170	9.4 239	7.3 185	10.2 259	4.0 102	8 203	1.330 33.78	0.50 13	5.00 127	8.00 203	8.50 215	10.00 254
1¼ 32	1.25 32	1.31 33	5.00 127	7.00 178	8.1 206	10.3 262	8.7 221	11.0 279	6.0 152	8 203	1.675 42.55	0.50 13	5.50 140	8.50 216	9.00 229	11.00 279
1½ 40	1.25 32	1.31 33	5.00 127	7.00 178	8.1 206	10.3 262	8.7 221	11.0 279	6.0 152	8 203	1.915 48.64	0.50 13	6.50 165	9.00 229	9.50 241	12.00 305
2 50	1.50 38	1.75 44	8.00 203	9.00 229	10.9 277	11.1 282	11.2 285	12.3 312	8.0 203	12 305	2.406 61.11	0.63 16	8.00 203	10.50 266	11.50 292	14.50 368

CAST STEEL GLOBE VALVE DIMENSIONS*

** Add height of extension 12–18" to B, C.*

SIZE in mm	ASME 150 (PN 20)					ASME 300 (PN 50)					ASME 600 (PN 100)				
	A	B(1)	C(1)	D	E	A	B(1)	C(1)	D	E	A	B(1)	C(1)	D	E
2 50	8.00 203	15.00 381	19.00 483	2.00 51	8.00 203.2	10.50 267	15.00 381	19.00 483	2.00 51	8.00 203	11.50 292	15.00 381	19.43 494	2.00 51	10.00 254
2½ 65	8.50 216	15.44 392	19.00 483	2.50 64	10.00 254	11.50 292	15.44 392	20.00 508	2.50 64	10.00 254	13.00 330	17.37 441	22.12 562	2.50 64	10.00 254
3 80	9.50 241	16.88 429	21.00 533	3.00 76	10.00 254	12.50 318	16.88 429	22.00 559	3.00 76	10.00 254	14.00 356	19.37 492	24.81 630	3.00 76	14.00 356
4 100	11.50 292	19.31 491	24.00 610	4.00 102	14.00 356	14.00 356	19.31 491	25.00 635	4.00 102	14.00 356	17.00 432	23.00 584	28.62 727	4.00 102	24.00 610
6 150	16.00 406	23.56 598	30.00 762	6.00 152	24.00 610	17.50 445	23.56 598	31.00 787	6.00 152	24.00 610	22.00 559	31.50 800	38.12 968	6.00 152	30.00 762
8 200	19.50 495	25.75 654	34.00 864	8.00 203	24.00 610	22.00 559	35.88 911	44.00 1118	8.00 203	18.00(2)(3) 457	26.00 660	42.50 1080	47.00 1194	7.88 200	24.00(2)(3) 610
10 250	24.50 622	35.13 892	44.00 1118	10.00 254	30.00 762	24.50 622	39.81 1011	50.00 1270	10.00 254	18.00(2)(3) 457	– –	– –	– –	– –	– –
12 300	27.50 699	40.87 1038	52.00 1321	12.00 305	30.00 762	28.00 711	44.06 1119	58.00 1473	12.00 305	30.00(2)(3) 762	– –	– –	– –	– –	– –
14 350	31.00 787	53.31 1354	68.00 1727	13.25 337	24.00(2)(3) 610	33.00 838	53.31 1354	68.00 1727	13.25 337	36.00(2)(3) 914	– –	– –	– –	– –	 –
16 400	36.00 914	57.32 1456	70.00 1778	15.25 387	30.00(2)(3) 762	34.00 863	57.32 1456	70.00 1778	15.25 387	36.00(2)(3) 914	– –	– –	– –	– –	– –

(1) Height does not include actuators. (2) Impactor handwheel. (3) Gear actuator is optional.

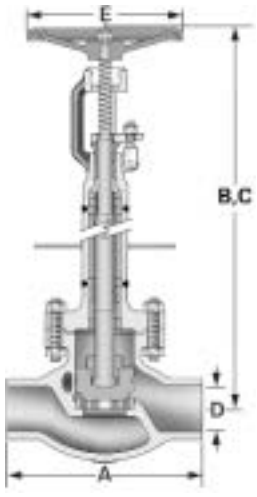


FORGED

Inclined cast Class 900–2500 globe valves also available

DESIGN SPECIFICATIONS

ITEM	APPLICABLE SPECIFICATION
Wall thickness and general valve design	API 600, BS 1873
Pressure–Temperature rating	ASME B16.34
Face-to-face dimensions for butt weld and flanged valves	ASME B16.10
Flange design	ASME B16.5
Butt welding design	ASME B16.25
Cryogenic valves	BS 1873

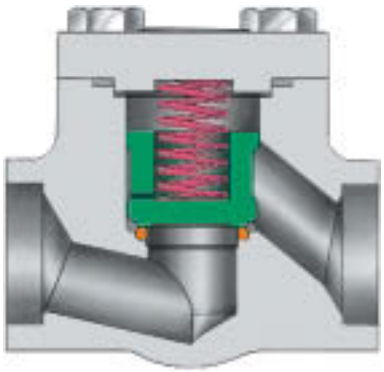


CAST

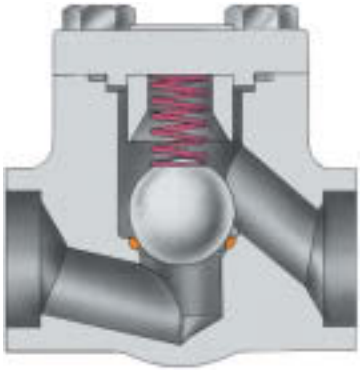
FORGED ¼–2" (8–50 mm) AND 2–36" (50–900 mm) STAINLESS OR ALLOY STEEL, PISTON, SWING CHECK & BALL VALVES ¼–2" (8–50 mm)

FORGED ASME CLASSES 150–2500,
CAST 2–36" (50–900 mm) ASME CLASSES 150–2500

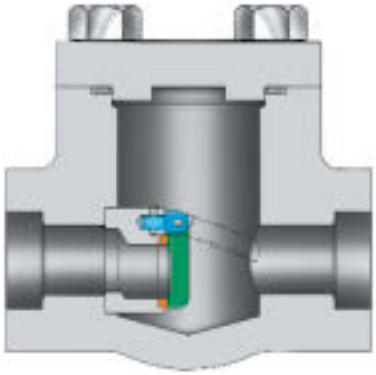
FORGED STEEL



PISTON BOLTED COVER



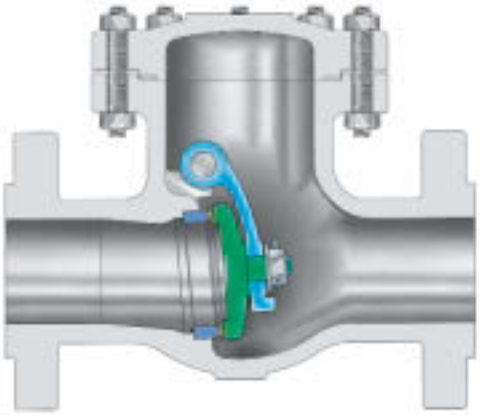
BALL TYPE BOLTED COVER



SWING CHECK BOLTED COVER

CAST STEEL

SWING CHECK VALVE

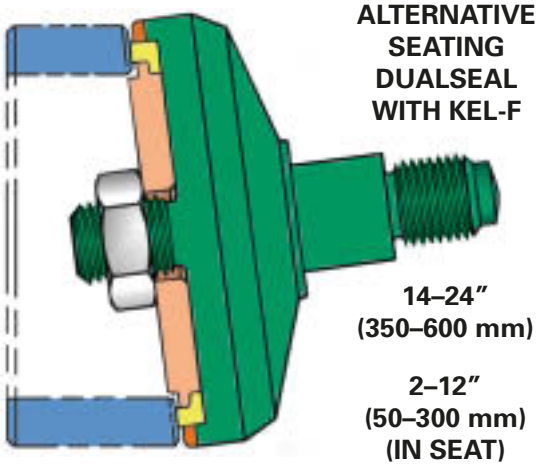


SWING CHECK VALVE

PART	STANDARD MATERIALS	
	FORGED	CAST
Body	316	CF8M
Seat	Integral Stellite 6	Stellite 6 faced F316
Hinge pin	316	SS 630 or 660
Gasket	Spiral SS/graphite	
Cover stud	B8M	B8M
Cover nut	Grade 2H B8M	Gr. 8M
Cover	316	CF8M
Washer	Commercial	
Disc	316	CF8M
Disc hanger	CF8M	CF8M
Disc nut	Gr. 8M	Gr. 8M

UNIQUE FEATURES OF SWING CHECKS

- **DISC SHAFT** does not penetrate body.
- **DISC** securely attached to hanger.
- **BODY-BONNET BOLTING** can be live loaded for fluctuating temperatures.



ALTERNATIVE SEATING DUALSEAL WITH KEL-F

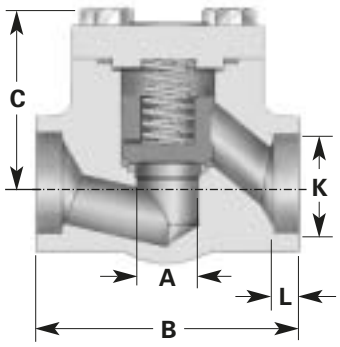
14–24"
(350–600 mm)

2–12"
(50–300 mm)
(IN SEAT)

FOR TIGHT SEATING

DESIGN SPECIFICATIONS

ITEM	APPLICABLE SPECIFICATION
Wall thickness and general valve design	API 602 (forged) API 600 (cast)
Pressure–temperature rating	ASME B16.34
Face-to-face dimensions for butt weld and flanged valves	ASME B16.10
Flange design	ASME B16.5
Butt welding design	ASME B16.25
Materials	ASTM

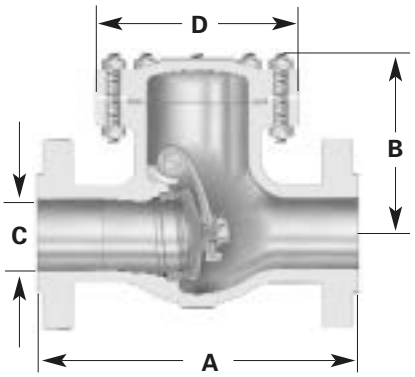


BOLTED COVER PISTON AND BALL CHECK DIMENSIONS AND WEIGHTS

SIZE in mm	A Port		B End-to-End		C Center- Top Bolts		K Socket Weld Bore	L Socket Weld Depth	Weight lb kg		Flanged Valves Face to Face			
	800	1500	800	1500	800	1500			800	1500	150	300	600	1500
¼ 8	0.31 8	0.45 11	2.88 73	4.00 102	1.75 44	2.6 66	0.555 14.10	0.38 10	2.00 0.9	4.00 1.8	4.00 102	– –	– –	– –
⅜ 10	0.31 8	0.45 11	2.88 73	4.00 102	1.75 44	2.6 66	0.690 17.53	0.38 10	2.00 0.9	4.00 1.8	4.00 102	– –	– –	– –
½ 15	0.31 8	0.45 11	2.88 73	4.00 102	1.75 44	2.6 66	0.855 21.72	0.38 10	2.00 0.9	4.00 1.8	4.25 108	6.00 152	6.50 165	8.50 216
¾ 20	0.50 13	0.63 16	3.25 83	5.00 127	2.1 53	2.8 71	1.065 27.05	0.50 13	3.00 1.3	6.00 2.7	4.62 117	7.00 178	7.50 190	9.00 227
1 25	0.75 19	1.00 25	3.50 89	6.00 152	2.3 58	3.4 86	1.330 33.78	0.50 13	4.00 1.8	11.00 5.0	5.00 127	8.00 203	8.50 216	10.00 254
1¼ 32	1.25 32	1.31 33	5.00 127	7.00 178	3.3 84	3.9 99	1.675 42.55	0.50 13	11.00 5.0	17.00 7.7	5.50 140	8.50 221	9.00 227	11.00 279
1½ 40	1.25 32	1.31 33	5.00 127	7.00 178	3.3 84	3.9 99	1.915 48.64	0.50 13	11.00 5.0	17.00 7.7	6.50 165	9.00 227	9.50 241	12.00 305
2 50	1.50 38	1.75 44	8.00 203	9.00 229	4.3 109	4.4 112	2.406 61.11	0.63 16	20.00 9.0	24.00 10.9	8.00 203	10.50 267	11.50 292	14.50 268

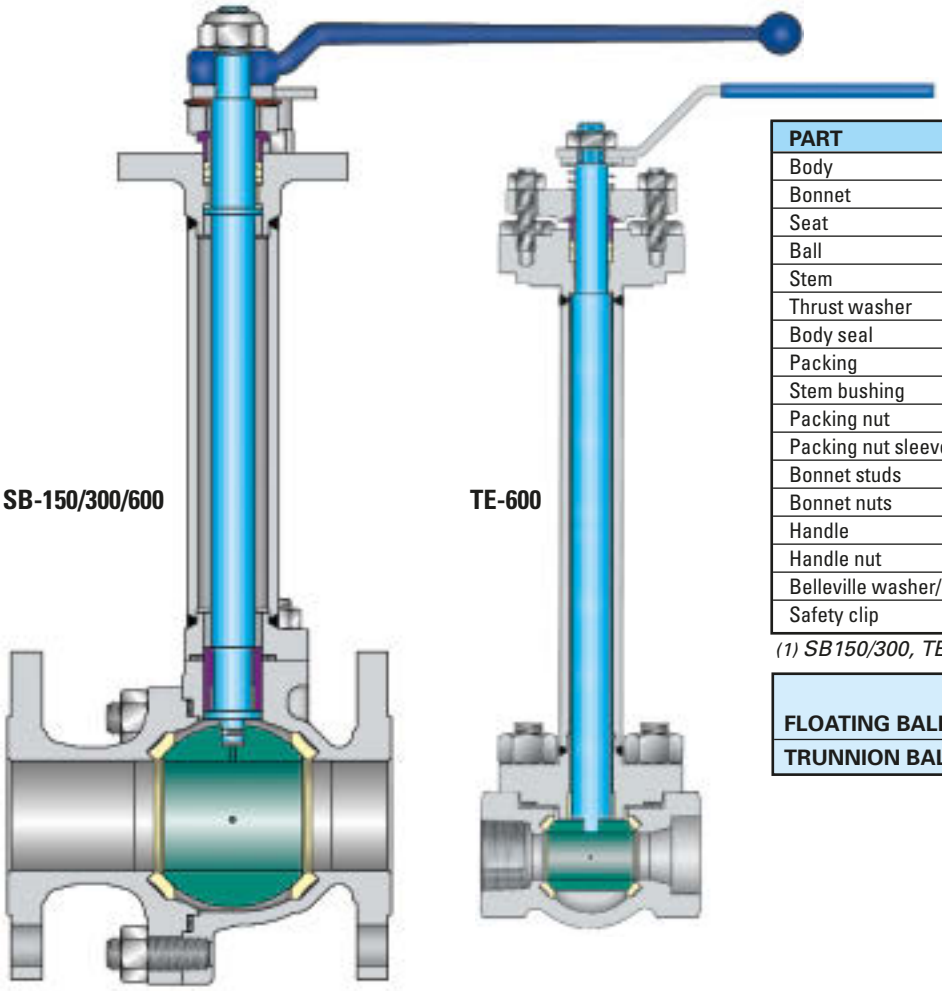
CHECK VALVE DIMENSIONS

SIZE in mm	ASME 150 (PN 20)				ASME 300 (PN 50)				ASME 600 (PN 100)				ASME 900 (PN 150)				ASME 1500 (PN 250)			
	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D
2 50	8.00 203	5.75 146	2.00 51	6.75 171	10.50 267	6.00 152	2.00 51	6.75 171	11.50 292	6.25 159	2.00 51	6.75 171	14.50 368	9.50 241	1.88 48	8.63 219	14.50 368	9.50 241	1.88 48	8.63 219
2½ 65	8.50 216	6.13 156	2.50 64	6.75 171	11.50 292	6.25 159	2.50 64	6.75 171	13.00 330	6.38 162	2.50 64	7.50 191	16.50 419	10.00 254	2.25 57	9.25 235	16.50 419	10.00 254	2.25 57	9.25 235
3 80	9.50 241	7.63 194	3.00 76	8.50 216	12.50 318	7.63 194	3.00 76	8.50 216	14.00 356	8.63 219	3.00 76	9.63 245	15.00 381	10.38 264	2.88 73	10.50 267	18.50 470	11.19 284	2.75 70	10.50 267
4 100	11.50 292	8.63 219	4.00 102	10.00 257	14.00 356	8.63 219	4.00 102	10.00 254	17.00 432	9.13 232	4.00 102	12.00 305	18.00 457	11.69 297	3.88 99	12.25 311	21.50 546	12.00 305	3.63 92	12.25 311
6 150	14.00 356	10.75 273	6.00 152	12.50 318	17.50 445	10.75 273	6.00 152	12.50 318	22.00 559	11.50 292	6.00 152	15.75 400	24.00 610	15.00 381	5.75 146	15.25 387	27.75 705	16.50 419	5.38 137	16.00 406
8 200	19.50 495	12.75 324	8.00 203	15.75 400	21.00 533	12.75 324	8.00 203	15.75 400	26.00 660	13.50 343	7.88 200	15.75 400	29.00 737	19.25 489	7.50 191	18.38 467	32.75 832	20.87 530	7.00 178	20.75 527
10 250	24.50 622	15.38 391	10.00 254	18.50 470	24.50 622	16.13 410	10.00 254	18.50 470	31.00 787	16.37 416	10.00 254	19.50 495	— —	— —	— —	— —	— —	— —	— —	— —
12 300	27.50 699	16.88 429	12.00 305	20.50 521	28.00 711	17.00 432	12.00 305	20.50 521	33.00 838	18.13 461	12.00 305	22.50 572								
14 350	31.00 787	19.63 499	13.25 337	23.00 584	33.00 838	19.63 499	13.25 337	23.00 584	35.00 889	20.93 532	12.88 327	26.25 667								
16 400	34.00 864	22.00 559	15.25 387	26.50 673	34.00 864	22.50 572	15.25 387	26.50 673	39.00 991	23.38 594	14.75 375	28.25 718								
18 450	38.50 978	25.00 635	17.13 435	28.50 724	38.50 978	25.00 635	17.13 435	28.50 724	43.00 1092	24.00 610	16.50 419	30.25 768								
20 500	38.50 978	26.50 673	19.00 483	31.50 800	40.00 1016	26.50 673	19.00 483	31.50 800	47.00 1194	26.00 660	18.25 464	39.00 991								
24 600	51.00 1295	31.25 794	23.25 591	37.00 940	53.00 1346	31.25 794	23.25 591	37.00 940	55.00 1397	30.50 775	22.00 559	39.75 1010								
30 750	60.00 1524	37.00 940	29.75 743	44.63 1134																
36 900	77.00 1956	41.88 1064	35.25 895	53.00 1346																



TOP-ENTRY ½–3" (15–80 mm), SB-150/300/600 SPLIT-BODY ½–24" (15–600 mm) FULL PORT MEMORY SEAL BALL VALVES,

WELD OR FLANGED ENDS, IN STAINLESS STEEL



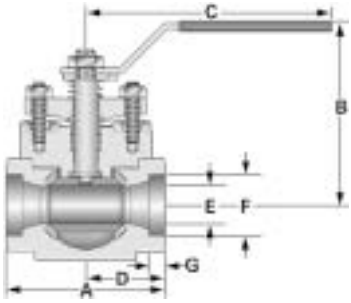
SB-150/300/600 TE-600

STANDARD MATERIALS

PART	STAINLESS STEEL
Body	F 316–A 182 (CF8M)
Bonnet	F 316–A 182 (CF8M)
Seat	PTFE(1)
Ball	SS 316
Stem	SS 316
Thrust washer	Reinforced Teflon
Body seal	Spiral wound SS/TFE or SS Graphite
Packing	TFE, RTFE or RTFE/graphite
Stem bushing	TFE or RTFE
Packing nut	SS 304
Packing nut sleeve	TFE or RTFE
Bonnet studs	SS B8M Class 2
Bonnet nuts	SS Gr.8 (SH)
Handle	Malleable iron
Handle nut	Stainless steel
Belleville washer/coil spring	Stainless steel
Safety clip	Stainless steel

(1) SB150/300, TE600-PTFE, SB6000-C-RPTFE.

	150	300	600
FLOATING BALL	½–8"	½–8"	2–4"
TRUNNION BALL	10–24"	8–24"	2–12"



DESIGN FEATURES:

- Meets ASME B16.5, ASME B16.34, API 608, API 598.
- Face-to-face dimensions meet ASME B16.10 long pattern.
- Gear actuator standard on 8–24" (200–600 mm) SB-150/300 and 6–12" (150–300 mm) SB-600 valves.
- Memory Seal seats compensate automatically for wear and fluctuations of pressure and temperature.
- Long cycle life.
- Low torques.
- Blowout-proof stem.
- Stem bearing reduces side thrust.
- Multiple solid PTFE or chevron type stem seal (adjustable).
- Live-loaded thrust washer prevents galling and provide secondary stem seal.
- Fully enclosed spiral wound graphite filled stainless body gasket.
- Locking devices optional on ½–6" (15–150 mm) valves (SB600 up to 4" (100 mm)).
- Air vent on all balls.

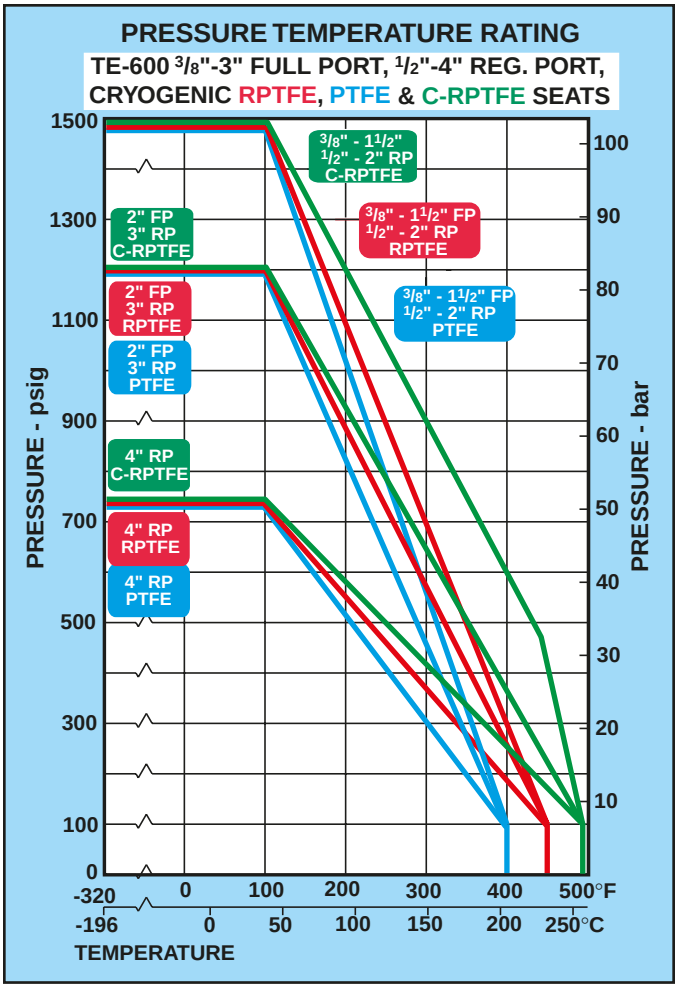
FIRE SAFE TO API 607, BS 6755

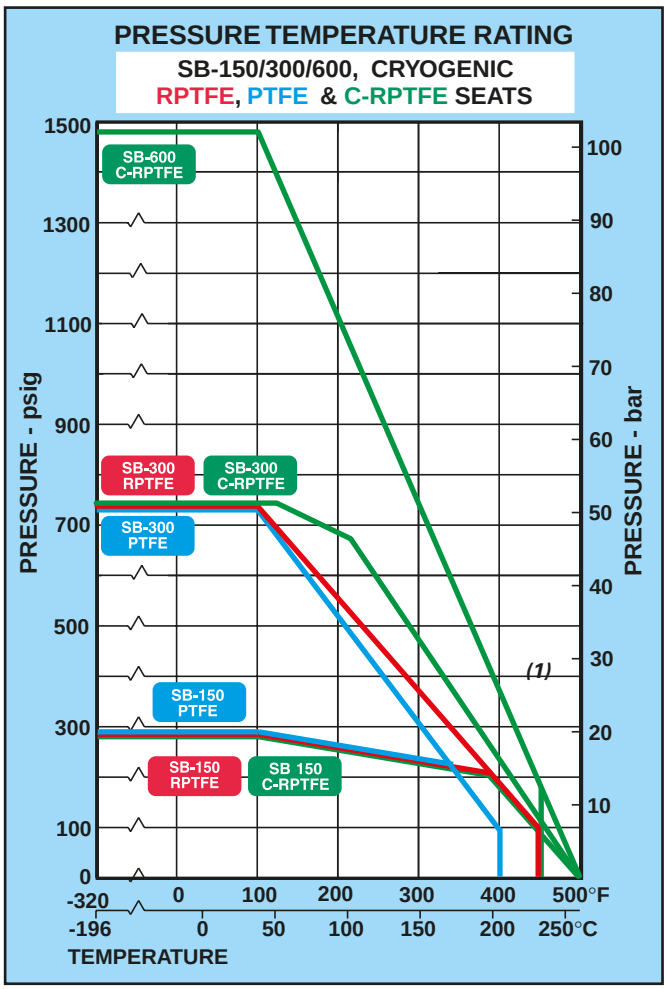
1. Body gasket SS 316 and graphite (standard).
2. Ball seats on body edge.
3. Stem shoulder seats on body.

TOP-ENTRY DIMENSIONS(2)

SIZE in mm	TE-600 MANUAL (FULL PORT)(1)						
	A	B	C	D	E	F	G
⅜ 10	2.63 67	3.47 88	4.62 117	1.31 33	0.44 11	0.69 18	0.38 10
½ 15	3.25 83	3.60 91	4.62 117	1.63 41	0.56 14	0.86 22	0.38 10
¾ 20	3.75 95	4.82 122	6.44 164	1.88 48	0.81 21	1.07 27	0.50 13
1 25	4.88 124	5.66 144	7.31 186	2.44 62	1.19 30	1.33 34	0.50 13
1½ 40	6.00 152	5.92 150	7.31 186	3.00 76	1.50 38	1.92 49	0.50 13
2 50	7.25 184	6.45 164	11.91 302	3.63 92	2.00 51	2.41 61	0.63 16
3 80	11.12 283	9.13 232	19.88 505	5.56 141	3.00 76	3.54 90	0.63 16

(2) Add height of extension to B.

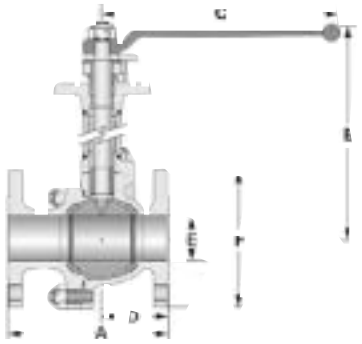




(1) Maximum 450°F (232°C) for valves with trunnion balls.

SPLIT-BODY DIMENSIONS[2]

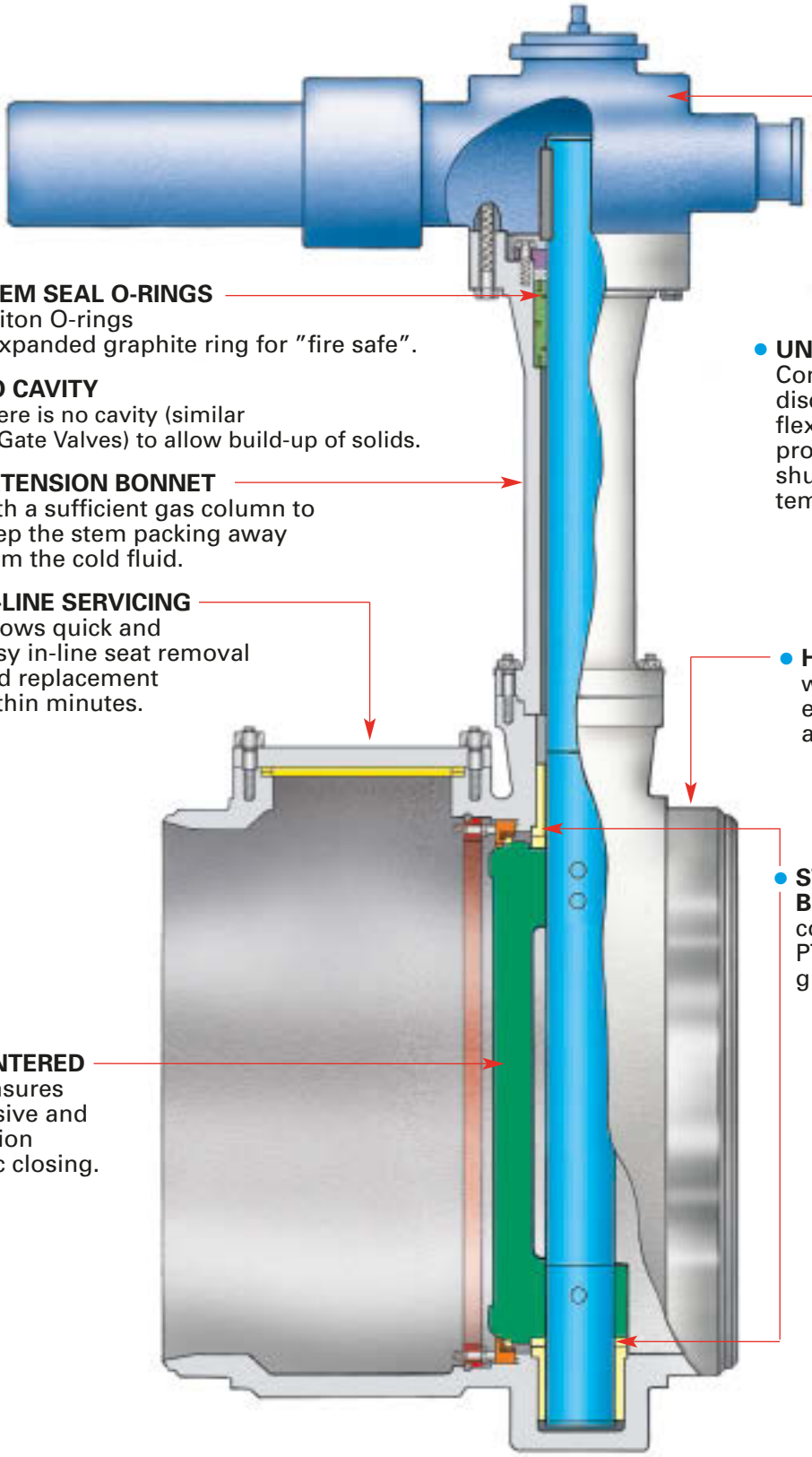
SIZE in mm	SB-150 FULL PORT						SB-300 FULL PORT					
	A	B	C	D	E	F	A	B	C	D	E	F
½ 15	4.25 108	3.49 88.5	5.31 134.9	1.62 41.1	0.50 12.7	3.50 88.9	5.50 139.7	3.49 88.5	5.31 134.9	2.06 52.3	0.50 12.7	3.75 95.3
¾ 20	4.63 117.5	4.09 103.9	5.56 141.2	1.75 44.5	0.75 19.1	3.88 98.6	6.00 152.4	4.09 103.9	5.56 141.2	2.55 64.8	0.75 19.1	4.63 117.5
1 25	5.00 127.0	4.21 107.0	5.56 141.2	2.05 108.0	1.00 51.9	4.25 108.0	6.50 165.1	4.21 107.0	5.56 141.2	2.61 66.2	1.00 25.4	4.88 123.8
1½ 40	6.50 165.1	4.85 123.1	7.81 198.4	2.55 64.6	1.50 38.1	5.00 127.0	7.50 190.5	4.85 123.1	7.81 198.4	2.92 74.2	1.50 38.1	6.13 155.6
2 50	7.00 177.8	5.44 138.2	10.38 263.6	2.89 73.4	2.0 50.8	6.00 152.4	8.50 215.9	5.44 138.2	10.38 263.6	3.83 97.3	2.00 50.8	6.50 165.1
2½ 65	7.50 190.5	6.97 177.0	11.9 302.3	3.25 82.5	2.5 63.5	7.00 177.8	9.50 241.3	6.97 177.0	11.9 302.3	4.00 101.6	2.50 63.5	7.50 190.5
3 80	8.00 203.2	7.38 187.5	11.9 302.3	3.77 95.7	3.0 76.2	7.50 190.5	11.12 282.5	7.38 187.5	11.9 302.3	5.30 134.6	3.00 76.2	8.25 209.6
4 100	9.00 228.6	10.33 262.3	20.0 508.0	4.52 114.8	4.0 101.6	9.00 228.6	12.00 304.8	10.33 262.3	20.00 508.0	5.99 152.1	4.00 101.6	10.00 254.0
6 150	15.50 393.7	12.56 319.0	26.0 660.4	6.24 158.5	6.0 152.4	11.00 279.4	15.87 403.1	12.56 319.0	26.00 660.4	6.65 168.8	6.00 152.4	12.50 317.5
8 200	18.00 457.2	13.06 331.8	— —	8.13 206.4	8.0 203.2	13.50 342.9	19.75 501.6	13.06 331.7	— —	8.78 223.0	8.00 203.2	15.00 381.0
10 250	21.00 533.4	18.84 478.6	— —	10.50 266.7	10.00 254.0	16.00 406.4	22.37 568.3	18.84 478.6	— —	11.19 284.2	10.00 254.0	17.50 444.5
12 300	24.00 609.6	22.59 573.8	— —	12.00 304.8	12.00 304.8	19.00 482.6	25.50 647.7	22.59 573.8	— —	12.75 323.8	12.00 304.8	20.50 520.7
14 350	27.00 685.8	24.22 615.1	— —	13.50 342.9	13.25 336.5	21.00 533.4	30.00 762.0	24.22 615.1	— —	15.00 381.0	13.25 336.5	23.00 584.2
16 400	30.00 762.0	24.13 612.8	— —	15.00 381.0	15.25 387.4	23.50 596.9	33.00 838.2	24.13 612.8	— —	16.50 419.1	15.25 387.4	25.50 647.7
18 450	34.00 863.6	27.28 692.8	— —	17.00 431.8	17.25 438.2	25.00 635.0	36.00 914.4	27.28 692.8	— —	18.00 457.2	17.00 431.8	28.00 711.2
20 500	36.00 914.4	29.69 754.1	— —	18.00 457.2	19.25 489.0	27.50 698.5	39.00 990.6	29.69 754.1	— —	19.50 495.3	19.00 482.6	30.50 774.7
24 600	42.00 1066.8	35.06 890.6	— —	21.00 533.4	23.25 590.6	32.00 812.8	45.00 1143.0	35.06 890.6	— —	22.50 571.5	23.00 584.2	36.00 914.4



SIZE in mm	SB-600 FULL PORT					
	A	B	C	D	E	F
2 50	11.50 292.1	7.44 188.9	11.90 302.3	5.00 127.0	2.00 50.8	6.50 165.1
2½ 65	— —	— —	— —	— —	— —	— —
3 65	14.00 355.6	11.12 282.4	26.00 660.4	6.19 157.2	3.00 76.2	8.25 209.6
4 100	17.00 431.8	13.71 348.3	26.00 660.4	7.00 177.8	4.00 101.6	10.75 273.1
6 150	22.00 558.8	17.19 436.5	— —	9.25 235.0	6.00 152.4	14.00 355.6
8 200	26.00 660.4	19.26 489.3	— —	11.00 279.4	8.00 203.2	16.50 419.1
10 250	31.00 787.4	21.16 537.3	— —	14.50 368.3	10.00 254.0	20.00 508.0
12 300	33.00 838.2	22.41 569.1	— —	15.25 387.4	12.00 304.8	22.00 558.8

(2) Add height of extension to B.

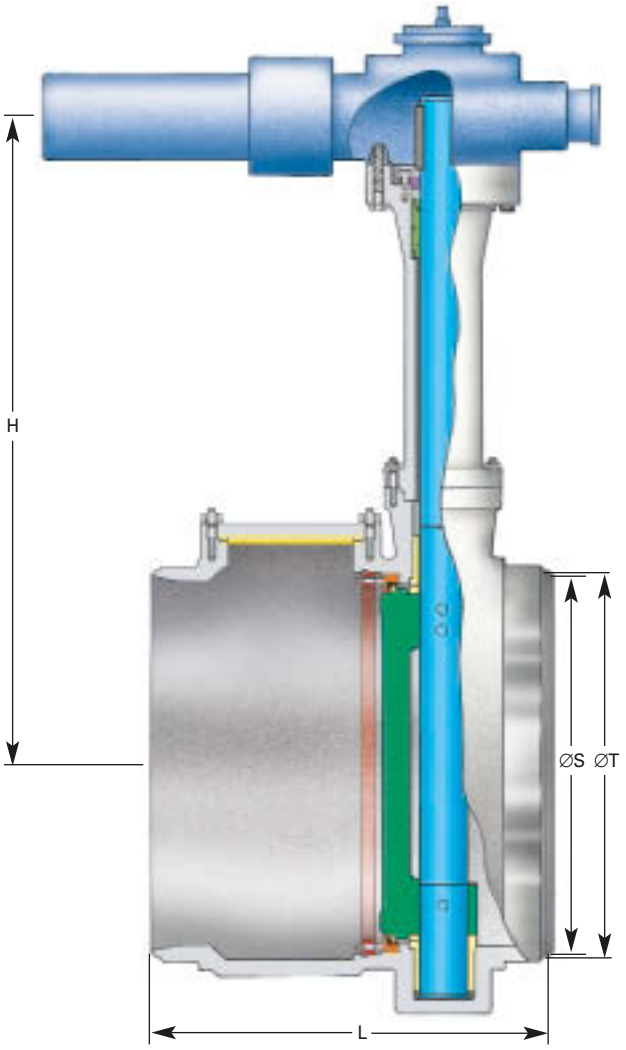
HIGH PERFORMANCE CRYOGENIC BUTTERFLY VALVE
DESIGN FEATURES



- **ACTUATORS**
  Pneumatic, hydraulic, electric or manual gear temperature.
- **STEM SEAL O-RINGS**
  • Viton O-rings
  • Expanded graphite ring for "fire safe".
- **NO CAVITY**
  There is no cavity (similar to Gate Valves) to allow build-up of solids.
- **EXTENSION BONNET**
  with a sufficient gas column to keep the stem packing away from the cold fluid.
- **IN-LINE SERVICING**
  Allows quick and easy in-line seat removal and replacement within minutes.
- **UNIQUE SEALING SYSTEM**
  Combined with the eccentric disc rotation, the patented flexible metallic seat provides an exceptional tight shutt-off even with high temperature fluctuations.
- **HIGH QUALITY CASTINGS**
  with X-ray and PT examination from approved foundries
- **STAINLESS STEEL SHAFT BEARINGS**
  coated with nickel-reinforced PTFE for perfect stem guiding and smooth closing.
- **OFF-CENTERED DISC** ensures progressive and low friction seat-disc closing.

VELAN S.A.S.

HIGH PERFORMANCE CRYOGENIC BUTTERFLY VALVES "SIDE-ENTRY" BUTT WELD END 6–42" (150–1050 mm) ASME CLASS 150



STANDARD MATERIALS

PART	ASTM	PART	ASTM
Body	A 351 CF8M	Shaft	A 182 F316
Stem	A 182 F316	Gasket	Graphite
Disc	A 351 CF8M	Stud	A 320 B8M
Metallic seal	Copper Alloy	Nut	A 1948

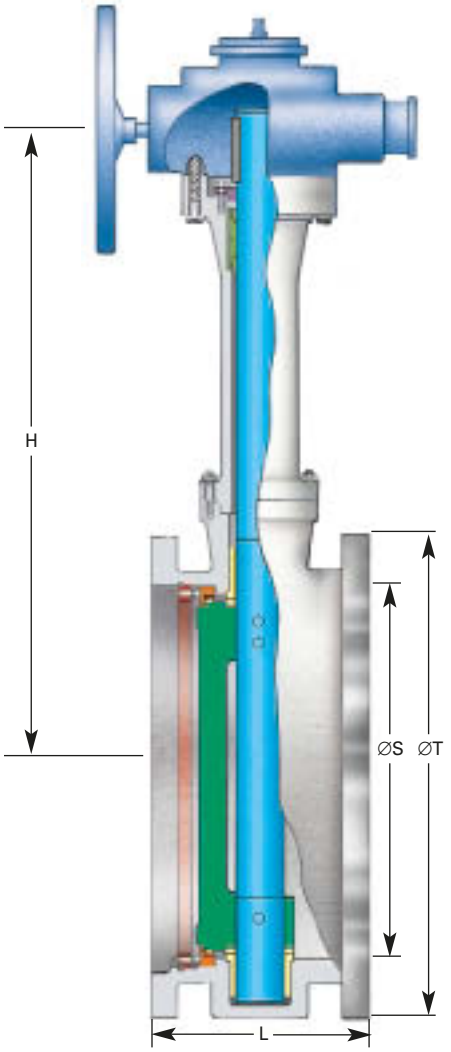
DIMENSIONS & FLOW COEFICIENT Cv

NOMINAL DIAMETER	VALVE SIZE in/mm												
	6 150	8 200	10 250	12 300	14 350	16 400	18 450	20 500	24 600	28 700	30 750	32 800	36 900
ØT(1)	6.63 168.3	8.63 219.1	10.75 273	12.75 323.9	14.00 355.6	16.00 406.4	18.00 457.2	20.00 508	24.00 609.6	27.99 711	30.00 762	32.01 813	35.98 914
ØS(1)	6.36 161.5	8.33 211.5	10.42 264.6	12.39 314.7	13.62 346	15.62 396.8	17.63 447.8	19.64 498.9	23.5 596.9	27.41 696.3	29.37 746.1	31.39 797.2	35.41 899.5
L	15.55 395	16.14 410	17.91 455	18.90 480	20.87 530	21.85 555	23.23 590	24.61 625	26.77 680	29.53 750	30.51 775	32.68 830	35.63 905
H	25.91 658	26.89 683	28.27 718	30.71 780	33.07 840	34.92 887	37.32 948	40.75 1035	46.06 1170	49.21 1250	25.28 1328	58.07 1475	66.93 1700
Cv	1300	2300	3700	5200	7300	9600	12000	16000	24000	30500	35000	40500	49000

(1) ASME B16.25.

VELAN S.A.S.

HIGH PERFORMANCE CRYOGENIC BUTTERFLY VALVES "SIDE-ENTRY" WELDED END & FLANGED, 3–48" (80–1200 mm) ASME CLASS 150



NOTE: *Flat (FF) and smooth finish (SF) faces.*

STANDARD MATERIALS

PART	ASTM	PART	ASTM
Body	A 351 CF8M	Shaft	A 182 F316
Stem	A 182 F316	Gasket	Graphite
Disc	A 351 CF8M	Stud	A 320 B8M
Metallic seal	Copper Alloy	Nut	A 1948

NOMINAL DIAMETER	VALVE SIZE in/mm														
	3 80	4 100	6 150	8 200	10 250	12 300	14 350	16 400	18 450	20 500	24 600	28 700	30 750	32 800	36 900
ØT(1)	5.16 191	9.02 229	11.02 280	13.50 343	16.02 407	19.02 483	21.02 534	23.50 597	25.00 635	27.52 699	32.01 813	36.50 927	38.78 985	41.73 1060	46.06 1170
ØS(1)	3.15 80	3.94 100	5.91 150	7.87 200	9.84 250	11.81 300	13.19 335	15.16 385	17.13 435	19.09 485	23.03 585	26.77 680	28.54 725	30.71 780	34.65 880
L(2)	4.49 114	5.00 127	5.51 140	5.98 152	6.50 165	7.01 178	7.48 190	8.50 216	8.74 222	9.02 229	10.51 267	11.50 292	12.13 308	12.52 318	12.99 330
L(3)	7.09 180	7.48 190	8.27 210	9.06 230	9.84 250	10.63 270	11.42 290	12.20 310	12.99 330	13.78 350	15.35 390	16.93 430	17.72 450	18.50 470	20.08 510
H	25.98 660	25.98 660	25.91 658	26.89 683	28.27 718	30.70 780	33.07 840	34.92 887	37.32 948	40.75 1035	46.06 1170	49.21 1250	52.28 1328	58.07 1475	66.93 1700
Cv	500	800	1300	2300	3700	5200	7300	9600	12000	16000	24000	30500	35000	40500	49000

(1) ASME B16.25. (2) ISO 5752 short pattern or BS 5155. (3) ISO 5752 long pattern or DIN 3202 F4

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. For butterfly valves contact the factory for figure number information.

B *SIZE OF CONNECTION (ALL VALVES)

Customers have the choice of specifying valve size as part of the valve figure ("B") using the numbers below, or indicating valve size separately.

Examples:

F10-0064C–02TY (valve size is part of figure number)

3"F-0064C–02TY (valve size is shown separately)

03 – ½"	**07** – 1½"	**10** – 3"	**13** – 5"	**16** – 10"	**20** – 16"	**23** – 22"	**28** – 28"	**34** – 34"	**48** – 48"
04 – ¾"	**08** – 2"	**11** – 3½"	**14** – 6"	**18** – 12"	**21** – 18"	**24** – 24"	**30** – 30"	**36** – 36"	**99** – SPECIAL
05 – 1"	**09** – 2½"	**12** – 4"	**15** – 8"	**19** – 14"	**22** – 20"	**26** – 26"	**32** – 32"	**42** – 42"	

GATE, GLOBE & CHECK

Type of connection	Size of connection		Pressure rating	Type		Body/Bonnet & Style		Body Material		Trim Material	
A	B		C	D		E		F		G	
eg: F	1	0	– 0	0	6	4	C	– 1	3	T	Y

(Flanged 3" 150 class cast stainless steel full bore gate valve with TY trim).

A TYPE OF CONNECTION

A – Special
B – Butt weld
F – Flanged
R – Flanged, ring joint
S – Threaded
W – Socket weld

B SIZE OF CONNECTION*

(SEE EXPLANATION ABOVE)

C CLASS

0 – 150 **1** – 300 **2** – 600 **3** – 1500 **4** – 2500 **6** – 400 **7** – 900

D VALVE TYPE

05 – Conventional port gate
06 – Full port gate
07 – Stop (globe)
08 – Stop check
09 – Needle
11 – Swing check

E BODY/BONNET STYLE

4C – Vertical bolted bonnet
4E – Extended bonnet for cryogenic service

F BODY MATERIAL

11 – Stainless steel, F304, CF8
12 – Stainless steel, F304L, CF3
13 – Stainless steel, F316, CF8M
14 – Stainless steel, F316L, CF3M
15 – Stainless steel, F347, CF8C
19 – Monel
23 – Alloy 20
25 – LCB
26 – LF2
27 – LF3
31 – LCC

G TRIM MATERIAL: GATE, GLOBE & CHECK

Code	Wedge/Disc Seating Surface(1)	Seat Surface(1)	Stem
MY	CF8M or 316	Stellite 6	SS 316
MS	CF8M or 316	Stellite 6	SS 316
MX	CF8M	SS 316	SS 316

(1) Base material is either the same as the body or solid a manufacturer's option.

BALL

Type of connection	Size of connection		Model number or Body Pressure rating	Port	Type	Body Material		Trim Material		Port	Special Service
A	B		C	D	E	F		G		H	I
eg: F	1	0	– 0	1	4	1	3	– S	S	G	H

(Flanged 3" 150 split-body ASME class 150 full port stainless steel cryogenic ball valve with stainless steel trim).

A TYPE OF CONNECTION

A – Special
B – Butt weld
F – Flanged
S – Threaded
W – Socket weld

B SIZE OF CONNECTION*

(SEE EXPLANATION ABOVE)

C MODEL NUMBER OR BODY PRESSURE RATING

For threaded or socket weld use model number
G – TE-600
For flanged or butt weld use body pressure rating(2)
0 – 150 ASME **1** – 300 ASME **2** – 600 ASME

D PORT

0 – Reduced/regular port **1** – Full port

E TYPE

4 – Split-body **6** – Top-entry

F BODY MATERIAL

(REFER TO GATE, GLOBE, AND CHECK ABOVE)

G TRIM MATERIAL BALL VALVE

Code	Ball	Stem
SS	SS 316	SS 316

H SEAT MATERIAL (Resilient seat)

C – Carbon graph reinforced PTFE **T** – PTFE

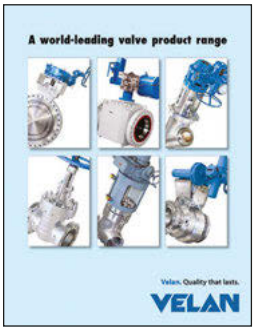
I SPECIAL SERVICE OR DESIGN

H – Cryogenic

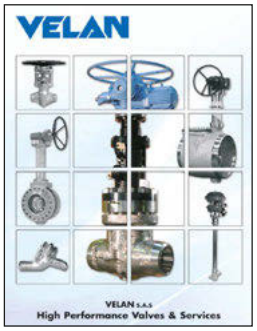
(2) Actual valve pressure/temperature ratings depend on choice of materials.

The most comprehensive line of industrial forged and cast steel gate, globe, check, ball, butterfly, and knife gate valves and steam traps.

ASME pressure classes 150–4500 in carbon, alloy, and stainless steel

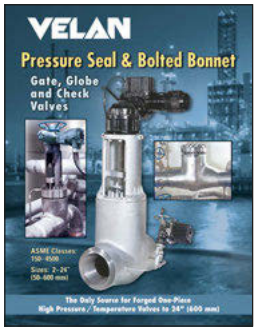


BRO-FLB

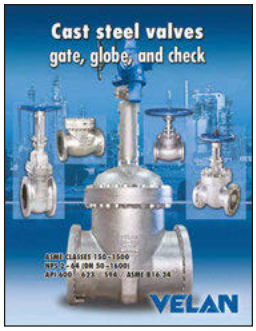


SAS-FLB

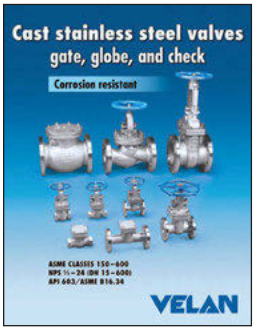
ABV-FLB



VEL-PS



CAT-CSV



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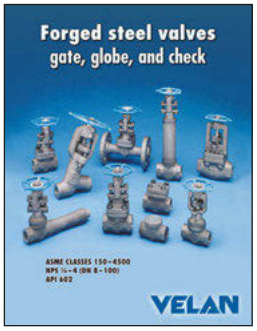

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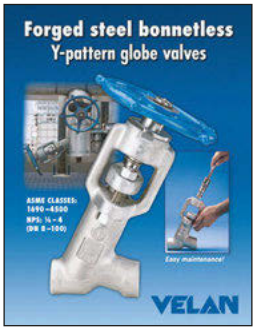
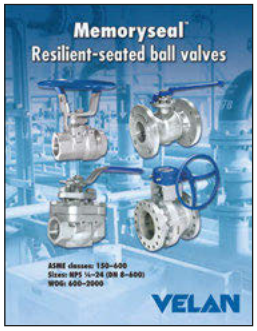
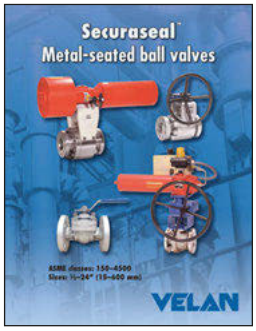


CAT-BG

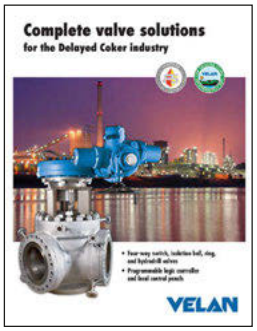


CAT-BV

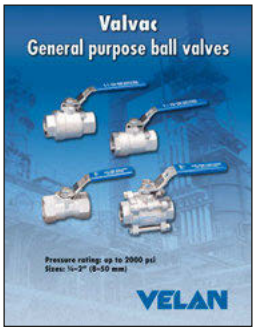


VEL-MS

CAT-PBV



BRO-CBV



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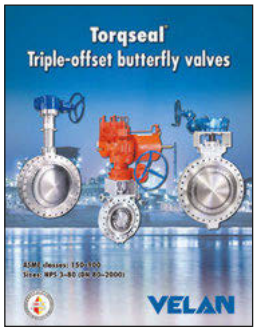
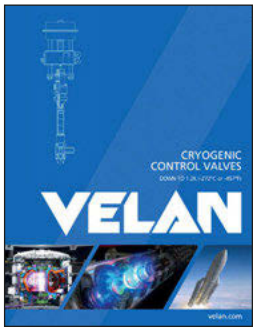


CAT-BF



SAS-CCV

⚠WARNING: The use of chainwheels may present a risk of serious injury to personnel or damage to property if the chainwheel becomes detached and falls. The end user and purchaser shall be responsible to ensure the correct installation, operation, maintenance and safety provisions related to chainwheels. Velan does not assume any liability whatsoever for the safe application and operation of chainwheels supplied by parties other than Velan or for chainwheels that are used without a suitably designed safety device.

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