VELAN

CRYOGENIC VAVES

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 1,116 employees in North America, and 360 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 VALVES FROM A SINGLE SOURCE

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"

STANDARD MANUFACTURING PROGRAM

VALVE TYPE	VALVE CLASS	MATERIAL BODY	MATERIAL TRIM	VALVE SIZE	in	⅛"	¼"	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)	✔				

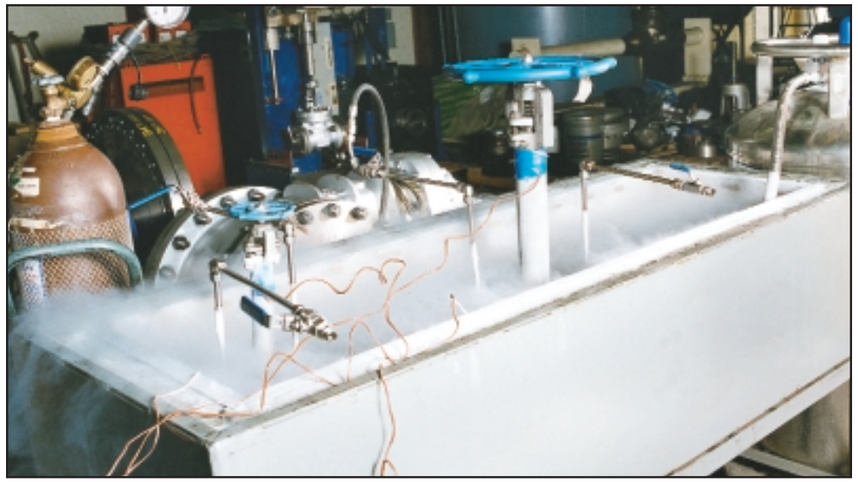
✔ STANDARD + OPTIONAL

GLAND PACKING MATERIALS

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

RELIABILITY THROUGH FUNCTIONAL QUALIFICATION TESTS

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.

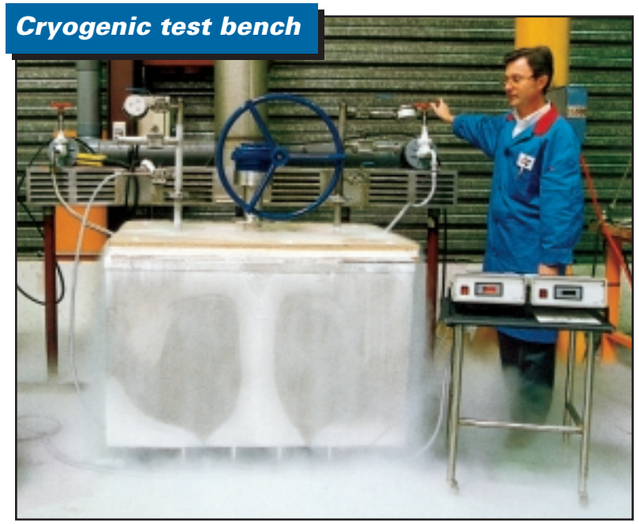
After test

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. flanged butterfly valve at -196°C(-320°F). 18 bar (260 PSI).*

Testing

Cryogenic test bench



After test

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

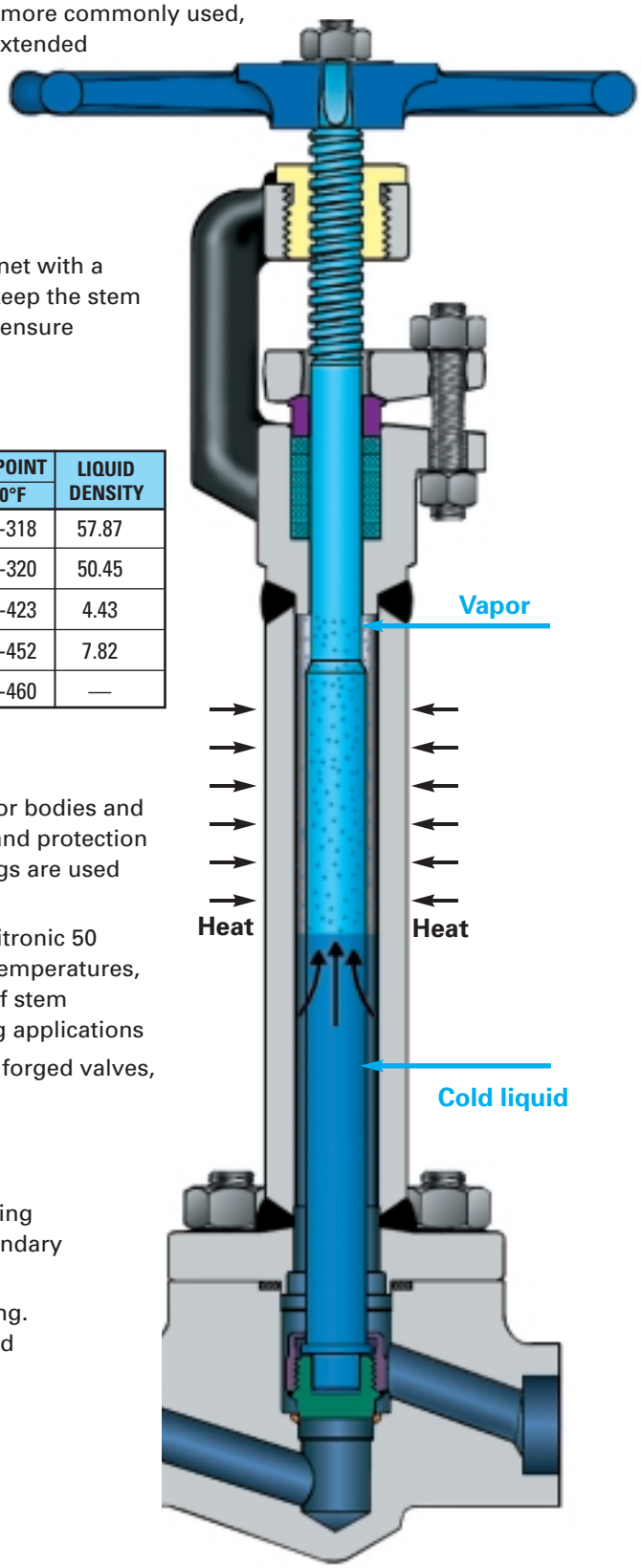
SUPERCRYOGENICS

- 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	—

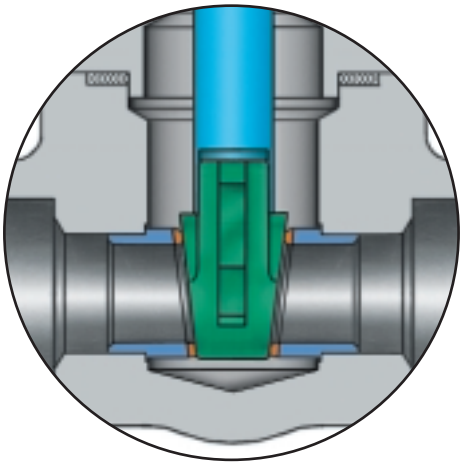
MATERIALS - WELDING - CLEANING

- **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 Kel-F, 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

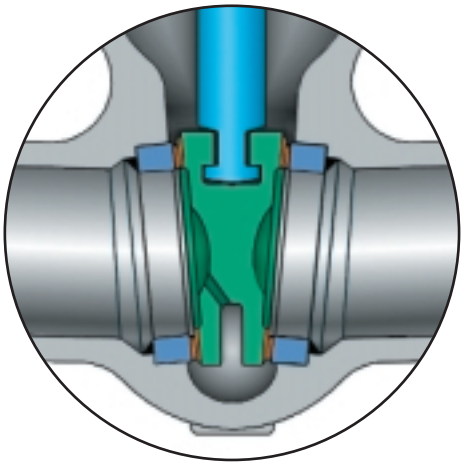
WEDGE/SEAT DESIGN

Forged ¼–2″



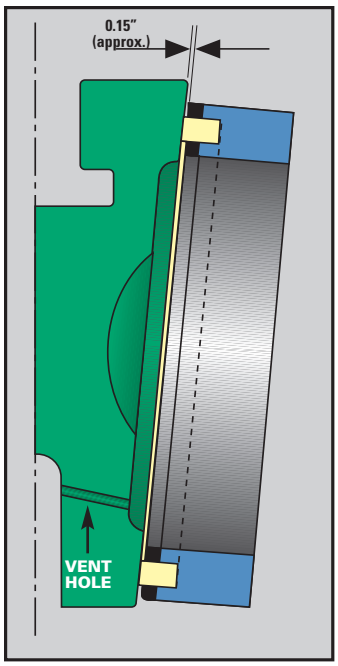
- Expanded seats with Stellite 6 faces.
- Solid wedge in CF8M or solid Stellite 6.

Forged & Cast 2–48″



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

DUALSEAL WITH KEL-F INSERT



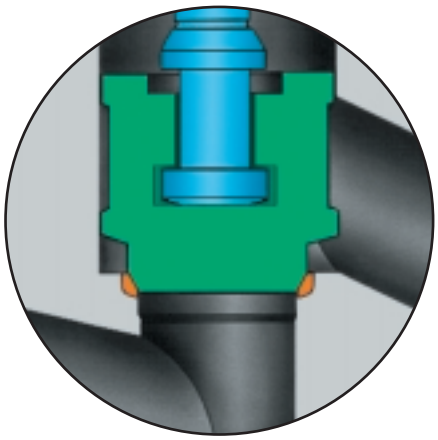
NOTE: All wedges have pressure relief vent.

VELAN CRYOGENIC GLOBE VALVE TECHNOLOGY

DISC/SEAT DESIGN

Forged ¼–2"

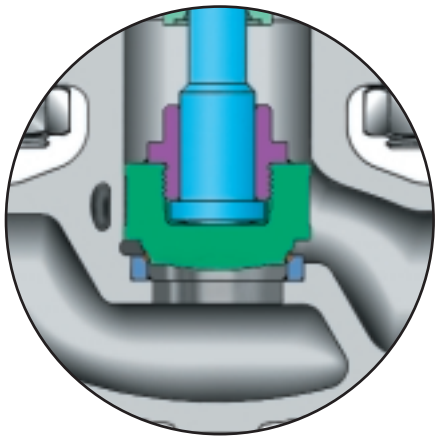
- Integral hardfaced seat Stellite 6



Cast Steel 2–16"

Conical seat

- Welded-in seat hardfaced with Stellite 6

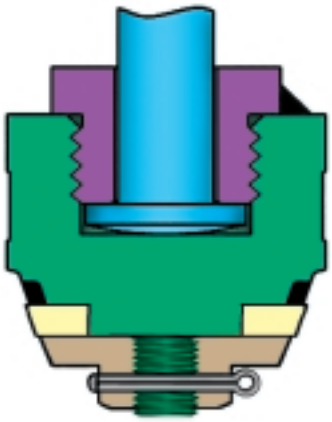


DUALSEAL WITH CTFE& PTFE INSERT

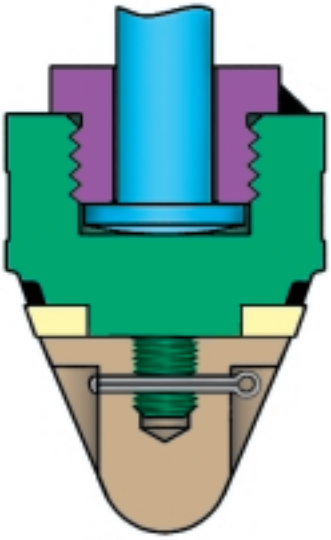
Forged, ¼–2"
Stop Globe & Stop Check
(flat seat)

Cast steel & Forged, 2–16"

Globe Disc



Needle Disc



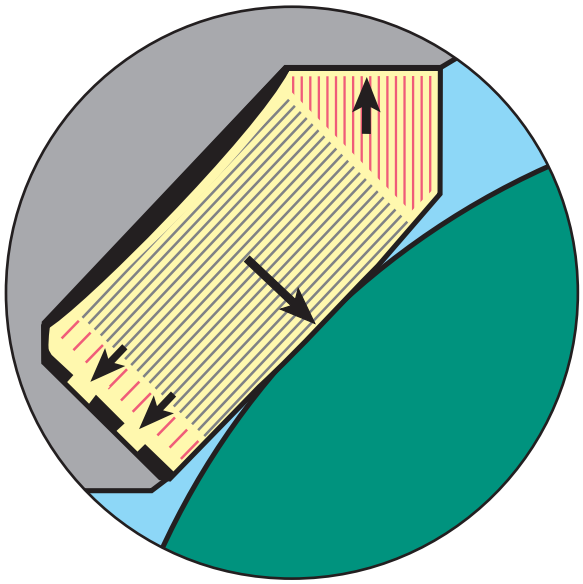
VELAN CRYOGENIC BALL VALVE TECHNOLOGY

PATENTED MEMORY SEAL SEATS

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

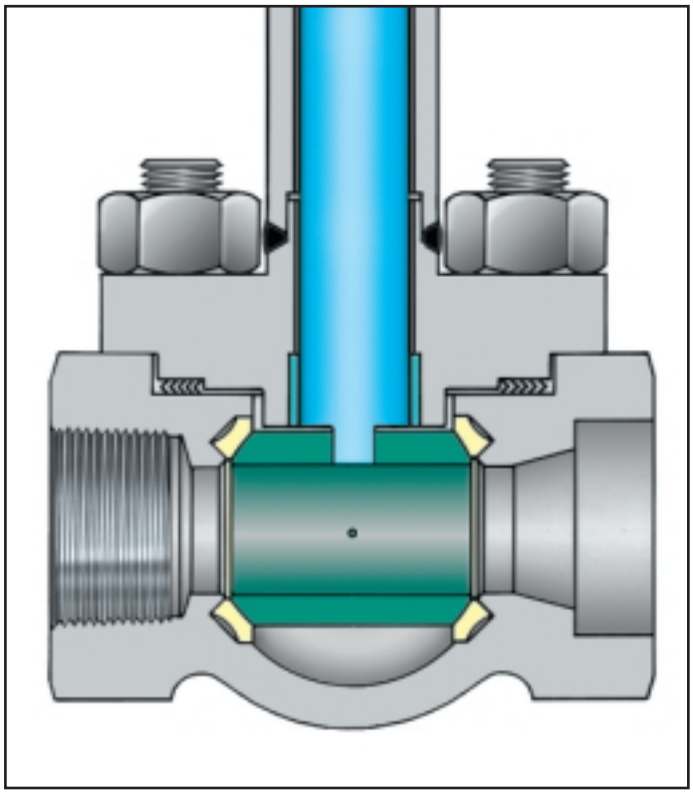
U. S. PATENT 3,384,341

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



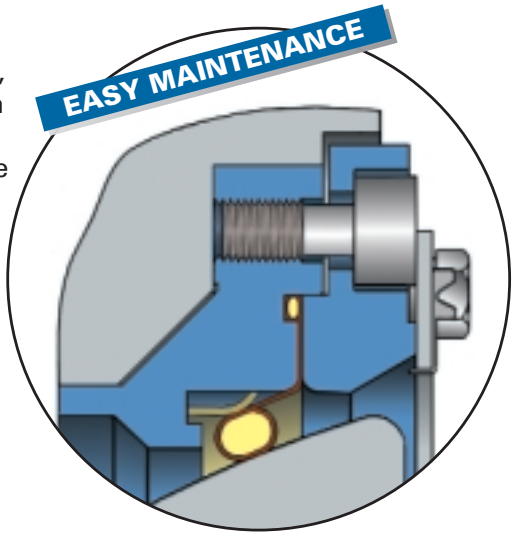
⅛" vent hole in all balls

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.

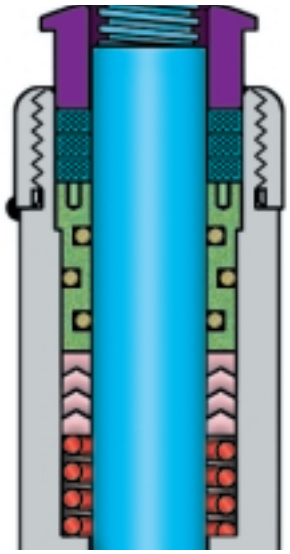


IN-LINE MAINTENANCE

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.

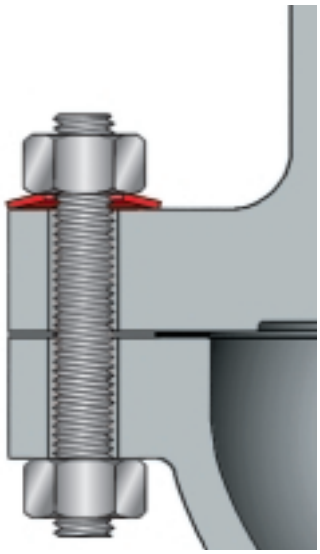
OPTIONS

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

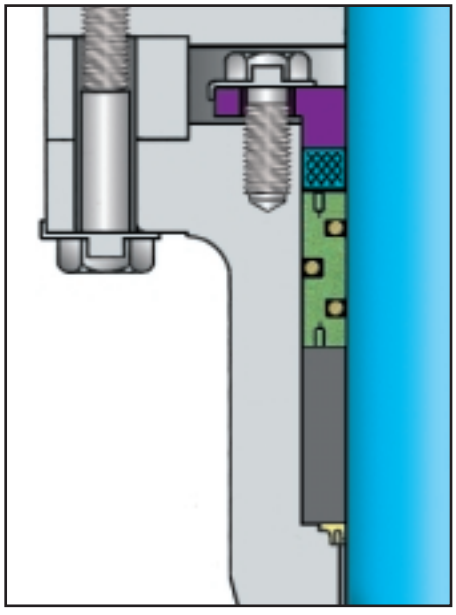


- For applications where rapid temperature fluctuations take place which can cause joint leakage the bolting can be live-loaded with spring Bellville washers.

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.

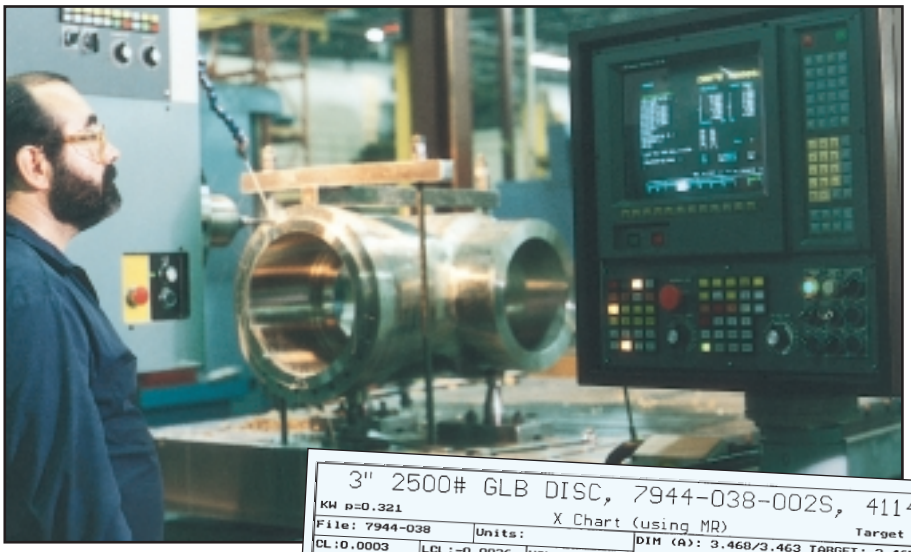
6 SYSTEMS ENSURE THE FINAL QUALITY GOALS

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

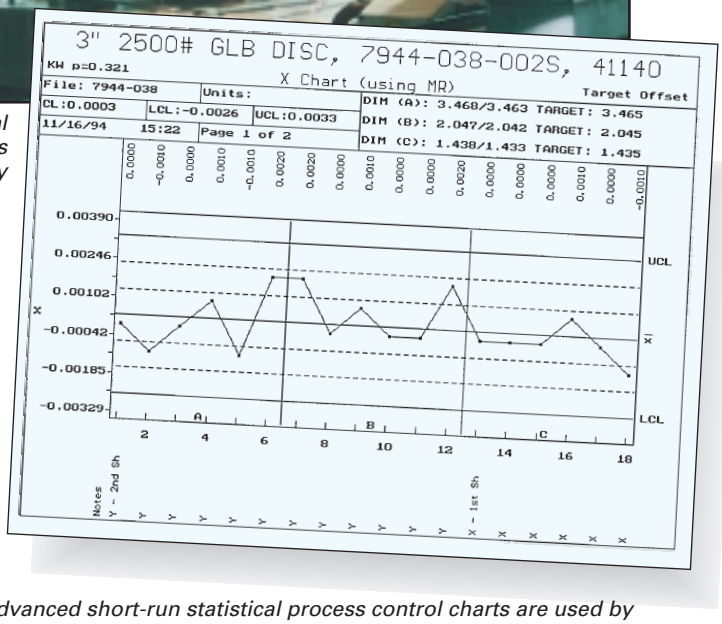
Every step from procurement through production, welding, assembly, testing and packaging is in accordance with written rules contained in QA manuals. (An ASME Section III manual for code valve production and an ISO 9001 QA manual for all other production.) Velan's four North American plants are certified 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.

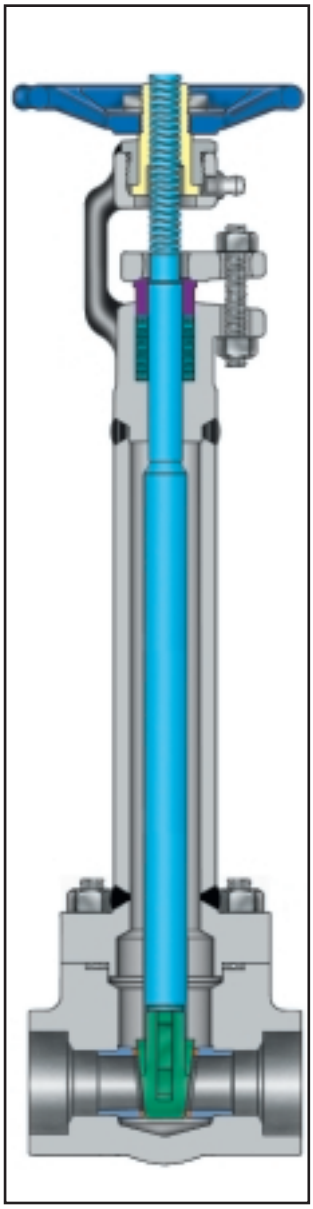
6. QUALIFICATION TESTING

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)

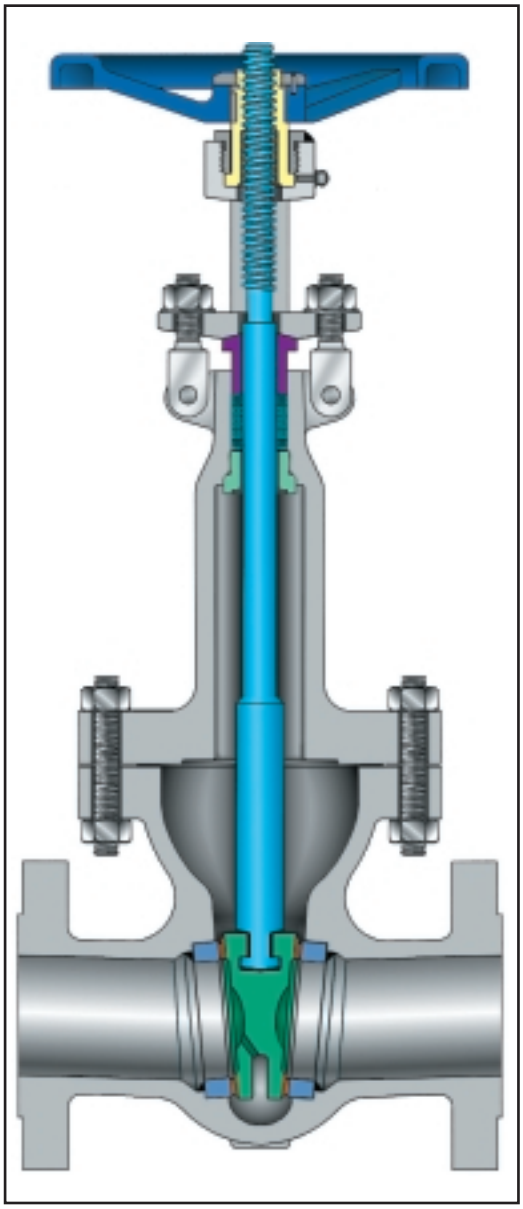
PRESSURE ASME CLASSES 150–2500

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

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

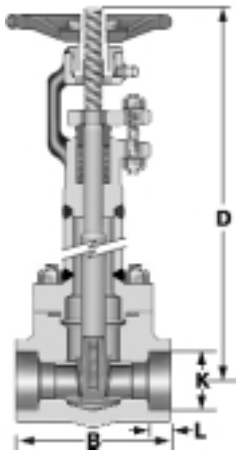
DESIGN PARAMETERS

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 D.*

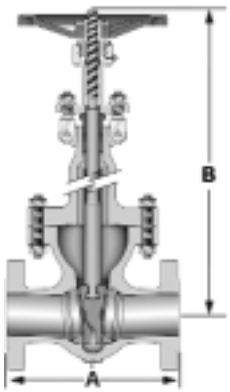
Size in mm	B End to End 800	B End to End 1500	D Center-Top Open 800	D Center-Top Open 1500	K Socket Weld Bore	L Socket Weld Depth	Flanged Valves Face to Face 150	300	600	1500
¼ 8	2.88 73	4.00 102	5.20 132	7.80 198	0.555 14.10	0.38 10	4.00 102	5.50 139	6.50 165	8.50 216
⅜ 10	2.88 73	4.00 102	5.20 132	7.80 198	0.690 17.53	0.38 10	4.00 102	5.50 139	6.50 165	8.50 216
½ 15	2.88 73	4.00 102	5.20 132	7.80 198	0.855 21.72	0.38 10	4.25 165	5.50 139	6.50 165	8.50 216
¾ 20	3.25 83	7.25 184	6.80 173	3.50 89	1.065 27.05	0.50 13	4.62 117	6.00 152	7.50 190	9.00 229
1 25	3.50 89	8.70 221	7.40 188	5.00 127	1.330 33.78	0.50 13	5.00 127	6.50 165	8.50 216	10.00 254
1¼ 32	5.00 127	9.10 231	9.30 236	6.00 152	1.675 42.55	0.50 13	5.50 165	7.00 178	9.00 227	11.00 279
1½ 40	5.00 127	9.10 231	9.30 236	6.00 152	1.915 48.64	0.50 13	6.50 190	7.50 191	9.50 241	12.00 305
2 50	5.25 133	10.60 269	10.40 264	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.*

SIZE in mm	ASME 150 (PN 20) A BW	A FL	B(1)	ASME 300 (PN 50) A	B(1)	ASME 600 (PN 100) A	B(1)
2 50	8.50 216	7.00 178	15.25 387	8.50 216	15.25 387	11.50 292	15.38 391
2½ 65	9.50 241	7.50 191	16.62 422	9.50 241	16.62 422	13.00 330	18.75 476
3 80	11.12 282	8.00 203	18.88 480	11.12 283	20.00 508	14.00 356	21.62 549
4 100	12.00 305	9.00 229	22.13 562	12.00 305	23.38 594	17.00 432	25.87 657
6 150	15.88 403	10.50 267	31.00 787	15.87 403	32.25 819	22.00 559	36.37 924
8 200	16.50 419	11.50 292	37.62 956	16.50 419	40.81 1037	26.00 660	43.87 1114
10 250	18.00 457	13.00 330	46.88 1191	18.00 457	49.12 1248	31.00 787	49.00 1245
12 300	19.75 502	14.00 356	56.75 1441	19.75 502	59.38 1508	33.00 838	60.87 1546
14 350	22.50 572	15.00 381	61.38 1559	30.00 762	61.38 1559	35.00 889	72.50 1842
16 400	24.00 610	16.00 406	68.75 1746	33.00 838	68.75 1746	39.00 991	82.25 2089
18 450	26.00 660	17.00 432	73.25 1861	36.00 914	77.88 1978	43.00 1092	87.06 2211
20 500	28.00 711	18.00 457	82.88 2105	39.00 991	86.50 2197	47.00 1194	102.50 2604
24 600	32.00 813	20.00 508	96.00 2438	45.00 1143	101.25 2572	55.00 1397	114.75 2915
30 750	36.00 914	24.00 610	124.25 3156	55.00 1397	123.81 3145	56.00 1422	122.50 3112
36 900	40.00 1016	28.00 711	146.63 3726	68.00 1727	147.81 3754	68.00 1727	145.13 3686
42 1050	44.00 1118	31.00 787	166.50 4229	– –	— —	– –	– –
48 1200	– –	36.00 914	189.81 4821	– –	— –	– –	– –



B = Center to Top Open

BW = Butt weld

FL = Flanged

(1) Height does not include actuators.

CLASSES 900-1500

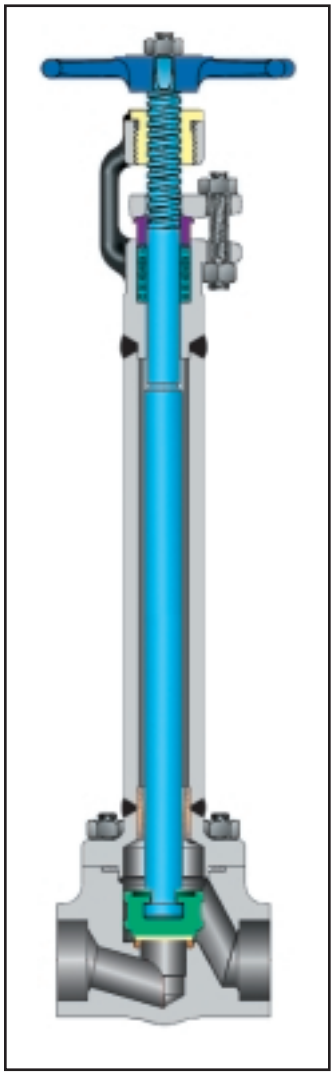
** Add height of extension 12–18" to B.*

SIZE in mm	ASME 900 (PN 150) A	B(1)	ASME 1500 (PN 250) A	B(1)
2 50	14.50 368	20.88 530	14.50 368	20.88 530
3 80	15.00 381	25.31 643	18.50 470	25.25 641
4 100	18.00 457	28.38 721	21.50 546	28.38 721
6 150	24.00 610	38.56 979	27.75 705	38.56 979
8 200	– –	– –	32.75 832	45.12 1046

FORGED AND CAST CRYOGENIC, GLOBE VALVES IN AUSTENITIC STAINLESS STEEL

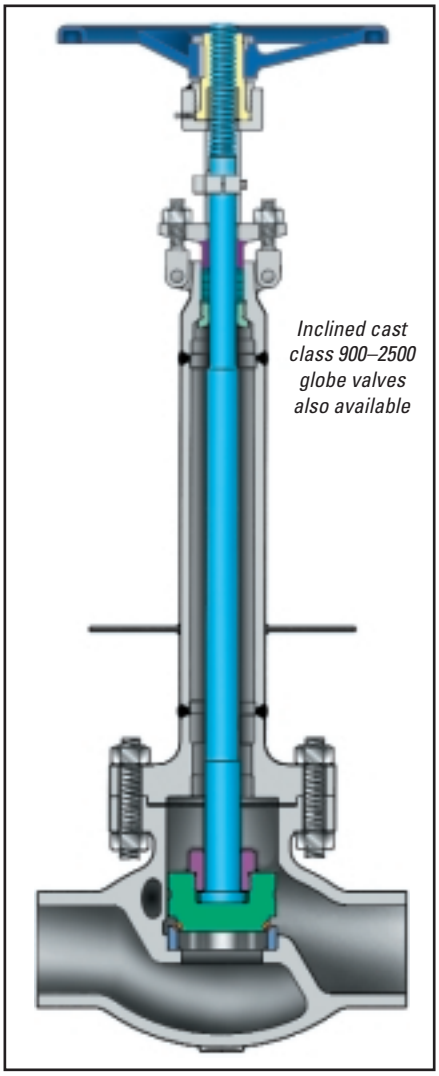
FORGED ¼–2" (8–50 mm) ASME CLASSES 150–2500,
CAST 2–16" (50–400 mm) ASME CLASSES 150–2500

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.
- **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 D.*

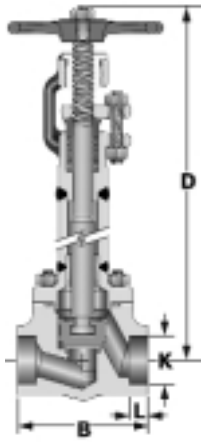
Size in mm	B End to End		D Center-Top Open		K Socket Weld Bore	L Socket Weld Depth	Flanged Valves Face to Face			
	800	1500	800	1500			150	300	600	1500
¼ 8	2.88 73	4.00 102	4.8 122	7.9 201	0.555 14.10	0.38 10	4.00 102	6.00 152	6.50 165	8.50 216
⅜ 10	2.88 73	4.00 102	4.8 122	7.9 201	0.690 17.53	0.38 10	4.00 102	6.00 152	6.50 165	8.50 216
½ 15	2.88 73	4.00 102	4.8 122	7.9 201	0.855 21.72	0.38 10	4.25 108	6.00 152	6.50 165	8.50 216
¾ 20	3.25 83	5.00 127	7.1 180	8.1 206	1.065 27.05	0.50 13	4.62 117	7.00 178	7.50 190	9.00 229
1 25	3.50 89	6.00 152	7.3 185	10.2 259	1.330 33.78	0.50 13	5.00 127	8.00 203	8.50 215	10.00 254
1¼ 32	5.00 127	7.00 178	8.7 221	11.0 279	1.675 42.55	0.50 13	5.50 140	8.50 216	9.00 229	11.00 279
1½ 40	5.00 127	7.00 178	8.7 221	11.0 279	1.915 48.64	0.50 13	6.50 165	9.00 229	9.50 241	12.00 305
2 50	8.00 203	9.00 229	11.2 285	12.3 312	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.*

SIZE in mm	ASME 150 (PN 20)		ASME 300 (PN 50)		ASME 600 (PN 100)	
	A	B(1)	A	B(1)	A	B(1)
2 50	8.00 203	15.00 381	10.50 267	15.00 381	11.50 292	15.00 381
2½ 65	8.50 216	15.44 392	11.50 292	15.44 392	13.00 330	17.37 441
3 80	9.50 241	16.88 429	12.50 318	16.88 429	14.00 356	19.37 492
4 100	11.50 292	19.31 491	14.00 356	19.31 491	17.00 432	23.00 584
6 150	16.00 406	23.56 598	17.50 445	23.56 598	22.00 559	31.50 800
8 200	19.50 495	25.75 654	22.00 559	35.88 911	26.00 660	42.50 1080
10 250	24.50 622	35.13 892	24.50 622	39.81 1011	– –	– –
12 300	27.50 699	40.87 1038	28.00 711	44.06 1119	– –	– –
14 350	31.00 787	53.31 1354	33.00 838	53.31 1354	– –	– –
16 400	36.00 914	57.32 1456	34.00 863	57.32 1456	– –	– –

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

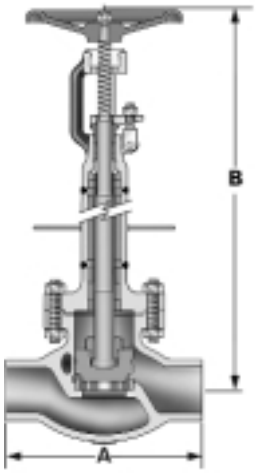


FORGED

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

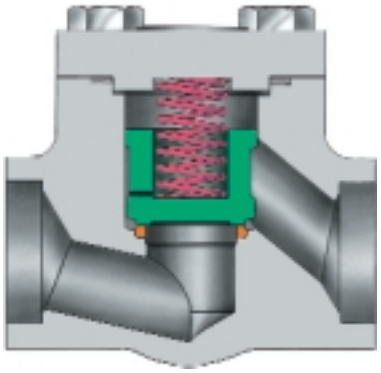


CAST

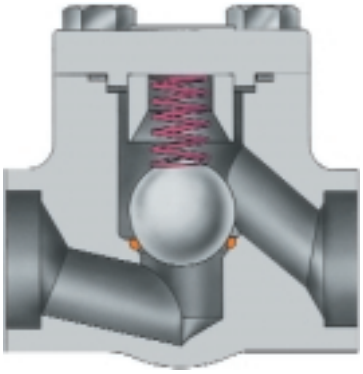
FORGED ¼–2" (8–50 mm) AND 2–36" (50–900 mm) STAINLESS OR ALLOY STEEL, PISTON, SWING CHECK & BALL VALVES ¼–2" (8–50 mm)

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

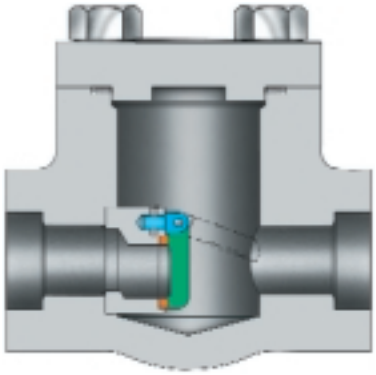
FORGED STEEL



PISTON BOLTED COVER



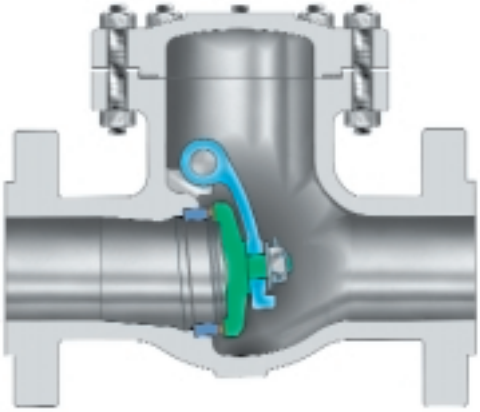
BALL TYPE BOLTED COVER



SWING CHECK BOLTED COVER

CAST STEEL

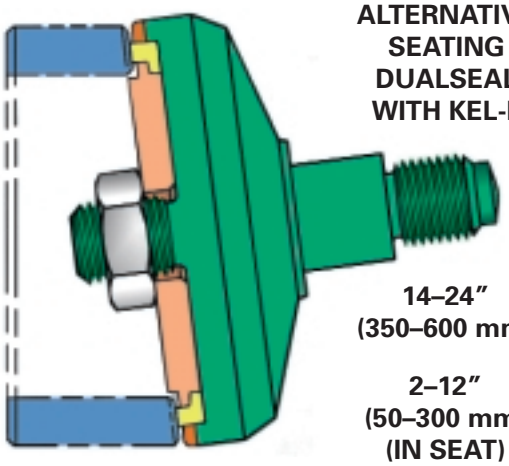
SWING CHECK VALVE



SWING CHECK VALVE

UNIQUE FEATURES OF SWING CHECKS

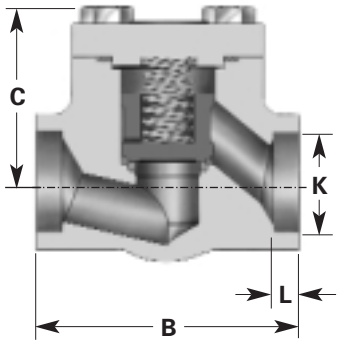
- **DISC SHAFT**
  does not penetrate body.
- **DISC**
  securely attached to hanger.
- **BODY-BONNET BOLTING**
  can be live loaded for fluctuating temperatures.



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

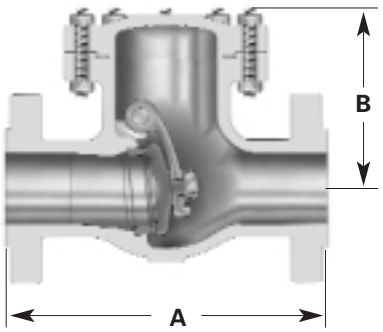


BOLTED COVER PISTON AND BALL CHECK DIMENSIONS AND WEIGHTS

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

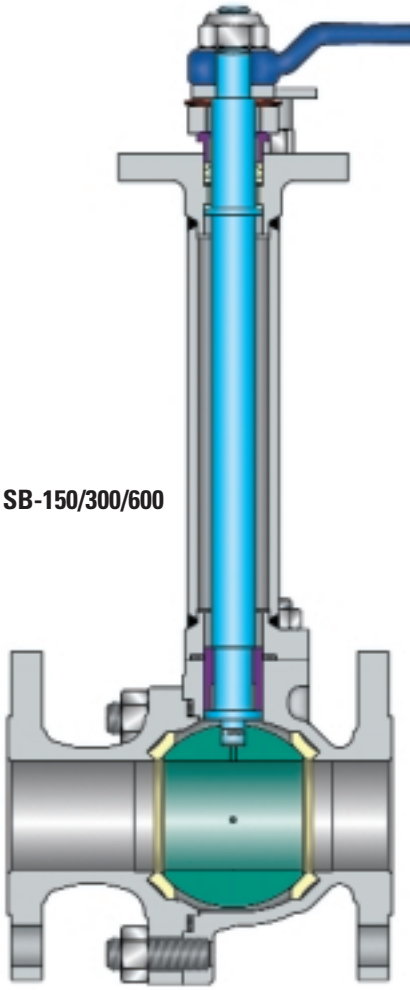
CHECK VALVE DIMENSIONS

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	A	B	A	B	A	B	A	B
2 50	8.00 203	5.75 146	10.50 267	6.00 152	11.50 292	6.25 159	14.50 368	9.50 241	14.50 368	9.50 241
2½ 65	8.50 216	6.13 156	11.50 292	6.25 159	13.00 330	6.38 162	16.50 419	10.00 254	16.50 419	10.00 254
3 80	9.50 241	7.63 194	12.50 318	7.63 194	14.00 356	8.63 219	15.00 381	10.38 264	18.50 470	11.19 284
4 100	11.50 292	8.63 219	14.00 356	8.63 219	17.00 432	9.13 232	18.00 457	11.69 297	21.50 546	12.00 305
6 150	14.00 356	10.75 273	17.50 445	10.75 273	22.00 559	11.50 292	24.00 610	15.00 381	27.75 705	16.50 419
8 200	19.50 495	12.75 324	21.00 533	12.75 324	26.00 660	13.50 343	29.00 737	19.25 489	32.75 832	20.87 530
10 250	24.50 622	15.38 391	24.50 622	16.13 410	31.00 787	16.37 416	— —	— —	— —	— —
12 300	27.50 699	16.88 429	28.00 711	17.00 432	33.00 838	18.13 461				
14 350	31.00 787	19.63 499	33.00 838	19.63 499	35.00 889	20.93 532				
16 400	34.00 864	22.00 559	34.00 864	22.50 572	39.00 991	23.38 594				
18 450	38.50 978	25.00 635	38.50 978	25.00 635	43.00 1092	24.00 610				
20 500	38.50 978	26.50 673	40.00 1016	26.50 673	47.00 1194	26.00 660				
24 600	51.00 1295	31.25 794	53.00 1346	31.25 794	55.00 1397	30.50 775				
30 750	60.00 1524	37.00 940								
36 900	77.00 1956	41.88 1064								

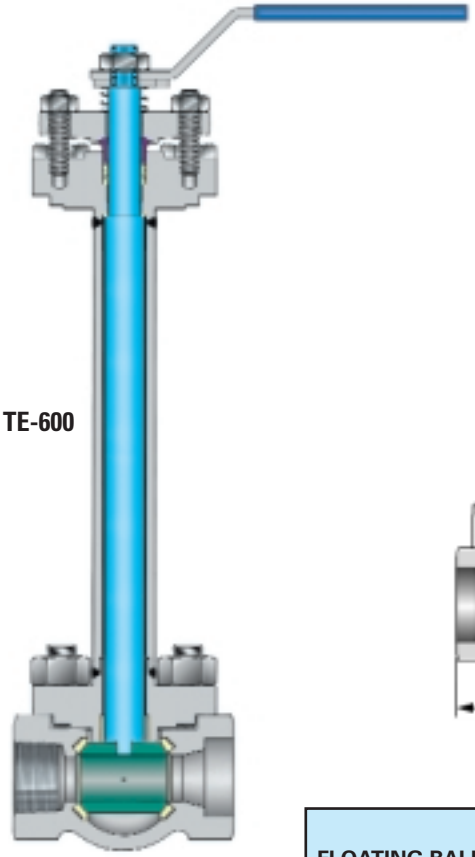


TOP-ENTRY ½–3" (15–80 mm), SB-150/300/600 SPLIT-BODY ½–24" (15–600 mm) FULL PORT MEMORY SEAL BALL VALVES,

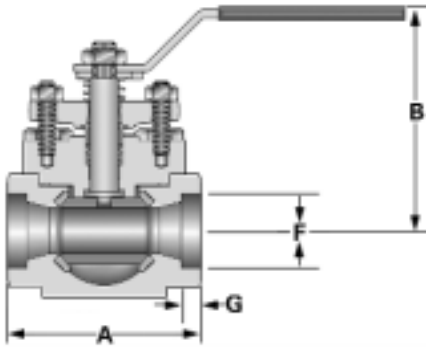
WELD OR FLANGED ENDS, IN STAINLESS STEEL



SB-150/300/600



TE-600



	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" SB-150/300 and 6–12" 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" valves (SB600 up to 4"
- 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	F	G
⅜ 10	2.63 67	3.47 88	0.69 18	0.38 10
½ 15	3.25 83	3.60 91	0.86 22	0.38 10
¾ 20	3.75 95	4.82 122	1.07 27	0.50 13
1 25	4.88 124	5.66 144	1.33 34	0.50 13
1½ 40	6.00 152	5.92 150	1.92 49	0.50 13
2 50	7.25 184	6.45 164	2.41 61	0.63 16
3 80	11.12 283	9.13 232	3.54 90	0.63 16

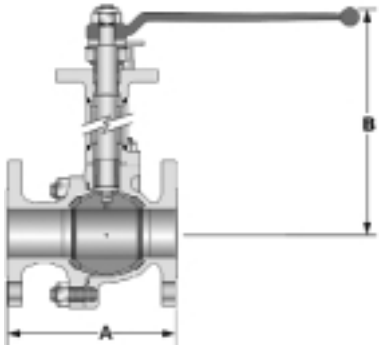
(2) Add height of extension to B.

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

SPLIT-BODY DIMENSIONS[2]

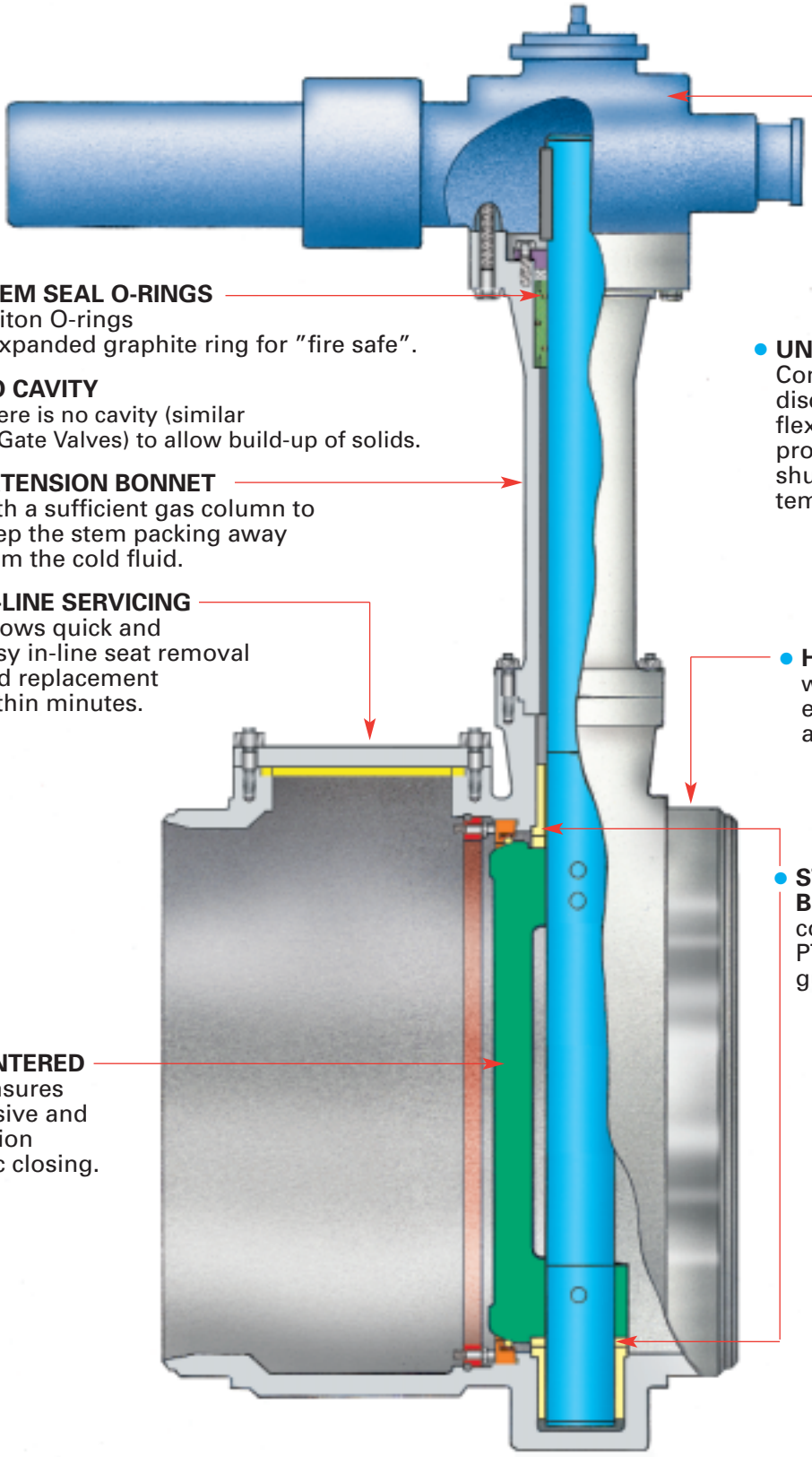
SIZE in mm	SB-150 FULL PORT		SB-300 FULL PORT	
	A	B	A	B
½ 15	4.25 108	3.49 88.5	5.50 139.7	3.49 88.5
¾ 20	4.63 117.5	4.09 103.9	6.00 152.4	4.09 103.9
1 25	5.00 127.0	4.21 107.0	6.50 165.1	4.21 107.0
1½ 40	6.50 165.1	4.85 123.1	7.50 190.5	4.85 123.1
2 50	7.00 177.8	5.44 138.2	8.50 215.9	5.44 138.2
2½ 65	7.50 190.5	6.97 177.0	9.50 241.3	6.97 177.0
3 80	8.00 203.2	7.38 187.5	11.12 282.5	7.38 187.5
4 100	9.00 228.6	10.33 262.3	12.00 304.8	10.33 262.3
6 150	15.50 393.7	12.56 319.0	15.87 403.1	12.56 319.0
8 200	18.00 457.2	13.06 331.8	19.75 501.6	13.06 331.7
10 250	21.00 533.4	18.84 478.6	22.37 568.3	18.84 478.6
12 300	24.00 609.6	22.59 573.8	25.50 647.7	22.59 573.8
14 350	27.00 685.8	24.22 615.1	30.00 762.0	24.22 615.1
16 400	30.00 762.0	24.13 612.8	33.00 838.2	24.13 612.8
18 450	34.00 863.6	27.28 692.8	36.00 914.4	27.28 692.8
20 500	36.00 914.4	29.69 754.1	39.00 990.6	29.69 754.1
24 600	42.00 1066.8	35.06 890.6	45.00 1143.0	35.06 890.6



SB-600 FULL PORT	
A	B
11.50 292.1	7.44 188.9
— —	— —
14.00 355.6	11.12 282.4
17.00 431.8	13.71 348.3
22.00 558.8	17.19 436.5
26.00 660.4	19.26 489.3
31.00 787.4	21.16 537.3
33.00 838.2	22.41 569.1

(2) Add height of extension to B.

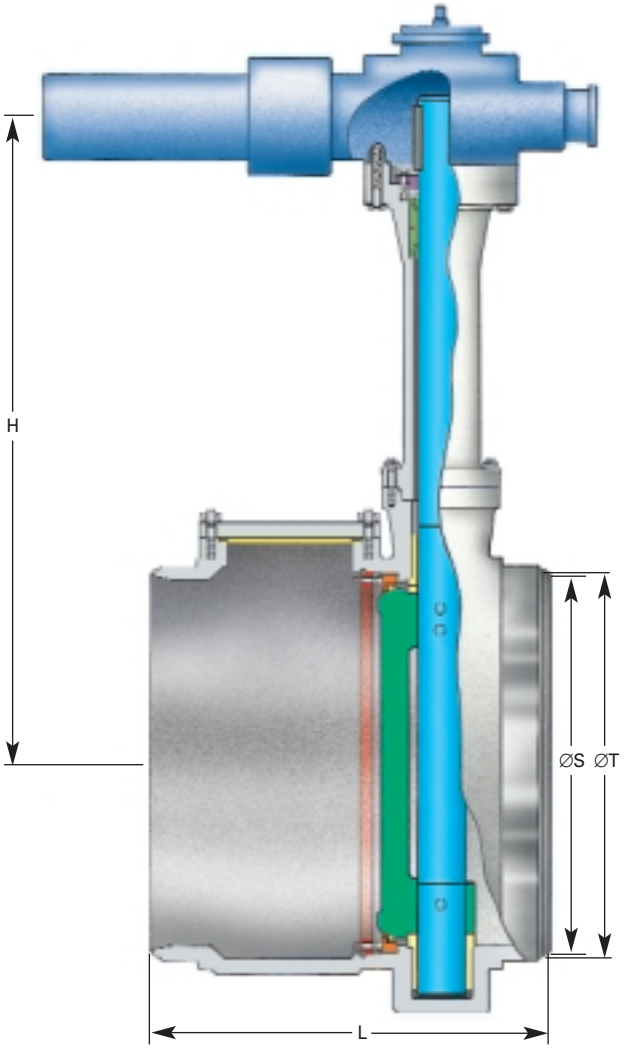
HIGH PERFORMANCE CRYOGENIC BUTTERFLY VALVE
DESIGN FEATURES

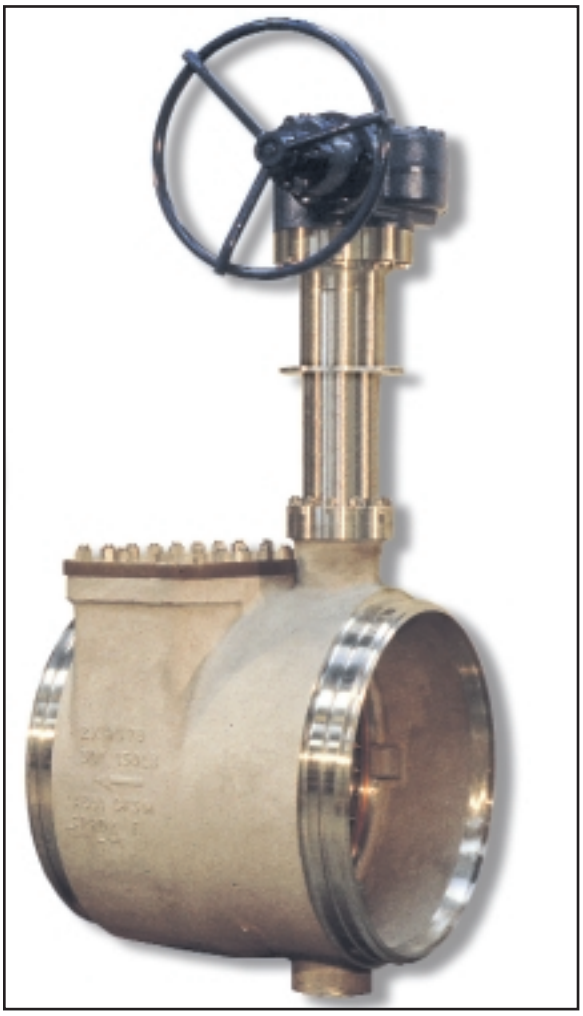


- **ACTUATORS**
  Pneumatic, hydraulic, electric or manual gear temperature.
- **STEM SEAL O-RINGS**
  • Viton O-rings
  • Expanded graphite ring for "fire safe".
- **NO CAVITY**
  There is no cavity (similar to Gate Valves) to allow build-up of solids.
- **EXTENSION BONNET**
  with a sufficient gas 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.

HIGH PERFORMANCE CRYOGENIC BUTTERFLY VALVES "SIDE-ENTRY" BUTT WELD END 3–36" (80–900 mm) ASME CLASS 150





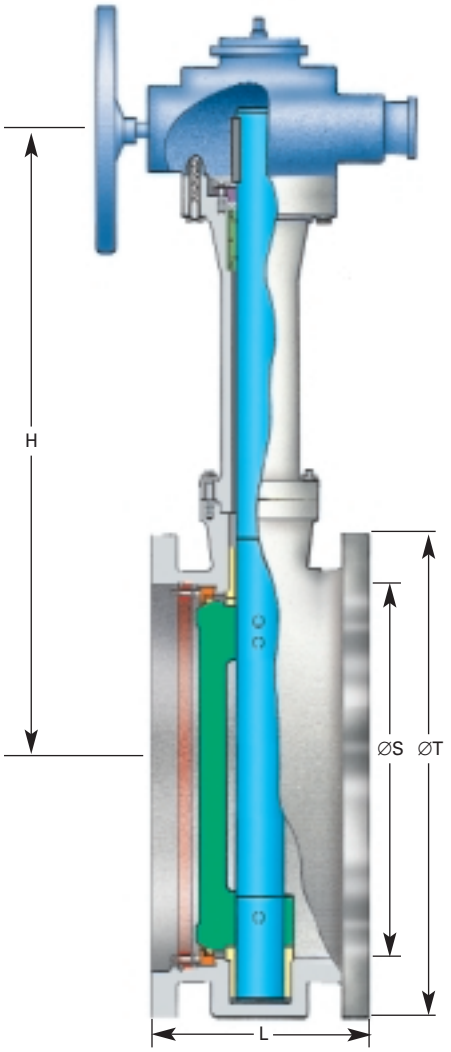
DIMENSIONS & FLOW COEFICIENT Cv

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	1600	2400	3900	5200	8200	11000	12500	16200	25000	33500	38000	43000	53000

(1) ASME B16.25.

VELAN S.A.

HIGH PERFORMANCE CRYOGENIC BUTTERFLY VALVES "SIDE-ENTRY" WELDED END & FLANGED, 3–36" (80–900 mm) ASME CLASS 150



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

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	1600	2400	3900	5200	8200	11000	12500	16200	25000	33500	38000	43000	53000

(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.