

Memoryseal[®]

Resilient-seated ball valves



ASME classes: 150-600

Sizes: NPS ¼-24 (DN 8-600)

WOG: 600-2000



VELAN

VELAN'S PROFILE

VELAN AT A GLANCE

History

- Founded in 1950

People

- Over 2,000 employees

Product line

A world-leading range of valves across all major industrial applications:

- Cast steel gate, globe, check, and ball valves
- Forged steel gate, globe, check, and ball valves
- Triple-offset butterfly valves
- Knife gate valves
- Severe service valves
- Bellows seal valves
- Steam traps

Primary industries served

- Fossil, nuclear, and cogeneration power
- Oil and gas
- Refining and petrochemicals
- Chemicals and pharmaceutical
- LNG and cryogenics
- Marine
- HVAC
- Mining
- Water and wastewater
- Pulp and paper
- Subsea

Velan holds major applicable approvals:

- ASME Section III N and NPT for nuclear valves (since 1970)
- ISO 9001 (since 1991) and ISO 14001
- OHSAS 18001
- PED
- SIL
- GOST
- API 6A and API 6D
- TA-Luft
- Comprehensive quality programs that are compliant with the most stringent industry standards such as ISO 9001, API Q1, NCA 4000, ASME NQA-1 and 10 CFR 50 Appendix B.
- Velan has been surveyed and audited by leading organizations around the world such as Bureau Veritas, API, ASME, NUPIC, Newport News Shipbuilding, and DCMA.
- Total Process Improvement Program, including Lean Manufacturing and Six Sigma



Velan is one of the world's leading manufacturers of industrial steel valves, supplying gate, globe, check, ball, triple-offset butterfly, knife gate, control, and highly engineered severe service valves for critical applications in the chemical, petrochemical, oil and gas, fossil and nuclear power, cogeneration, pulp and paper, mining, marine and cryogenic industries. The company also supplies actuators and integrated control packages.

Founded in 1950, Velan has earned a reputation for product excellence and innovation by bringing to the market superior products with special emphasis on quality, safety, ease of operation, and long service life. Velan valves have an extremely broad installation base and are approved by major companies worldwide.

Velan concentrates on one business—the design, manufacture and marketing of steel valves in a broad range of types and sizes for high performance service in a wide range of applications. The company's talented people are focused on Velan's core values of quality, reliability, innovation, and integrity and mission to be the world's leading valve brand.

Headquartered in Montreal, Velan has several international subsidiaries.
For general inquiries:

Velan head office:
7007 Côte de Liesse, Montreal, QC H4T 1G2 Canada

Tel: +1 514 748 7743
Fax: +1 514 748 8635

Check our website for more specific contact information.

www.velan.com

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VELAN'S GLOBAL NETWORK

Head office



Montreal, Canada
Velan Inc.

- 17 production facilities
- 5 plants in North America
- 6 plants in Europe
- 6 plants in Asia
- 5 stocking and distribution centers
- Hundreds of distributors worldwide
- Over 60 service shops worldwide

Manufacturing plants

North America



Montreal, Canada
Velan Inc., Plant 1



Montreal, Canada
Velan Inc., Plant 2 and 7



Granby, Canada
Velan Inc., Plant 4 and 6



Montreal, Canada
Velan Inc., Plant 5



Williston, VT, U.S.A.
Velan Valve Corp., Plant 3



Europe



Lyon, France
Velan S.A.S.



Mennecy, France
Segault S.A.



Leicester, UK
Velan Valves Ltd.



Lisbon, Portugal
Velan Válvulas Industriais, Lda.



Lucca, Italy
Velan ABV S.p.A., Plant 1



Lucca, Italy
Velan ABV S.p.A., Plant 2

Asia



Ansan City, South Korea
Velan Ltd., Plant 1



Ansan City, South Korea
Velan Ltd., Plant 2



Ansan City, South Korea
Velan Ltd., Plant 3



Taichung, Taiwan
Velan Valvac Mfg. Co., Ltd.



Suzhou, China
Velan Valve (Suzhou) Co., Ltd.



Coimbatore, India
Velan Valves India Pvt. Ltd.

Distribution centers



Granby, Canada
VelCAN



Benicia, CA, U.S.A.
VelCAL




Marietta, GA, U.S.A.
VelEAST



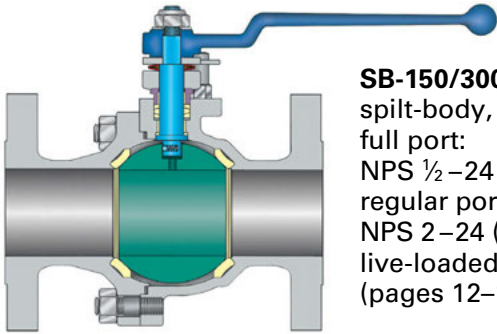
Houston, TX, U.S.A.
VelTEX



Willich, Germany
Velan GmbH

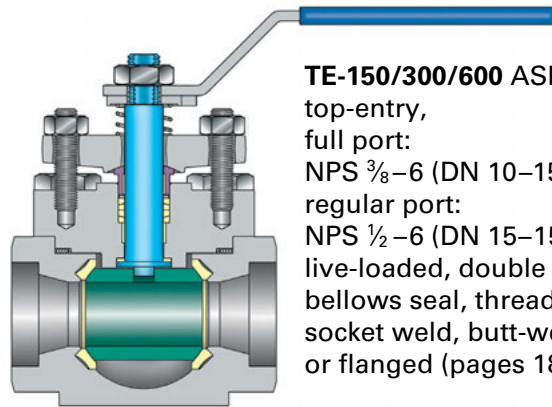
 – ASME N-stamp accredited manufacturer

HIGH PERFORMANCE MEMORYSEAL® BALL VALVES



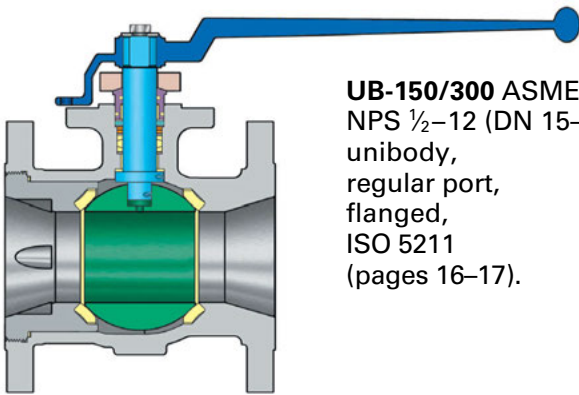
SB-150/300/600 ASME
spilt-body,
full port:
NPS ½–24 (DN 15–600),
regular port:
NPS 2–24 (DN 50–600),
live-loaded, flanged
(pages 12–15).

RATING	psi	°F	bar	°C
ASME class 150	285 100	100 450	20 7	38 232
ASME class 300	740 100	100 450	51 7	38 232
ASME class 600	1480 100	100 450	102 7	38 232
Steam 150 ⁽¹⁾	150	366	10	186
Steam 250 ⁽¹⁾	250	406	17	208



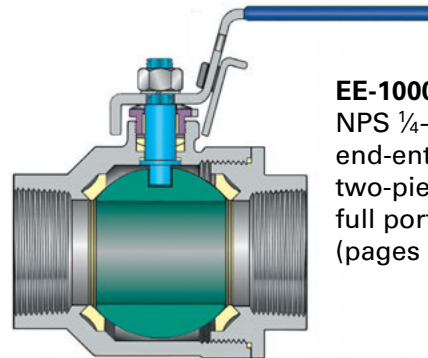
TE-150/300/600 ASME
top-entry,
full port:
NPS ⅜–6 (DN 10–150)
regular port:
NPS ½–6 (DN 15–150)
live-loaded, double packed,
bellows seal, threaded,
socket weld, butt-weld
or flanged (pages 18–23).

RATING	psi	°F	bar	°C
1480 WOG	1480 ⁽²⁾ 100	100 450	102 7	38 232
Steam 250 ⁽¹⁾	250	406	17	208
Steam 450 ⁽¹⁾	450	456	31	235



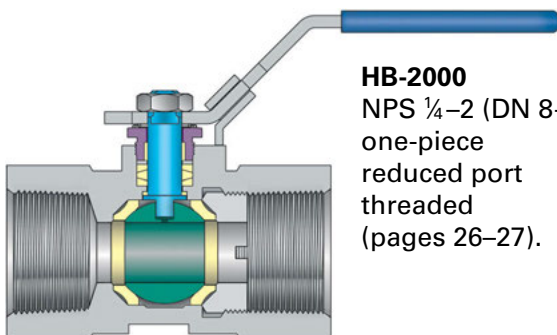
UB-150/300 ASME
NPS ½–12 (DN 15–300)
unibody,
regular port,
flanged,
ISO 5211
(pages 16–17).

RATING	psi	°F	bar	°C
ASME class 150	285 100	100 450	20 7	38 232
ASME class 300	740 100	100 450	51 7	38 232
Steam 150 ⁽¹⁾	150	366	10	186



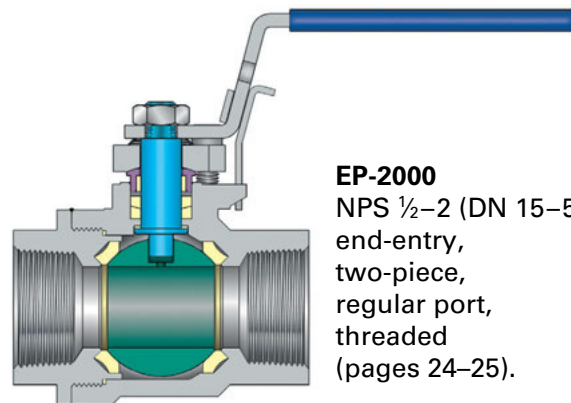
EE-1000
NPS ¼–2 (DN 8–50)
end-entry,
two-piece,
full port, threaded
(pages 24–25).

RATING	psi	°F	bar	°C
1000/1500 WOG	1500 ⁽²⁾ 100	100 450	103 7	38 232
Steam 150 ⁽¹⁾	150	366	10	186



HB-2000
NPS ¼–2 (DN 8–50)
one-piece
reduced port
threaded
(pages 26–27).

RATING	psi	°F	bar	°C
2000 WOG	2000 100	100 450	138 7	38 232



EP-2000
NPS ½–2 (DN 15–50)
end-entry,
two-piece,
regular port,
threaded
(pages 24–25).

RATING	psi	°F	bar	°C
1500/2000 WOG	2000 ⁽²⁾ 100	100 450	138 7	38 232
Steam 150 ⁽¹⁾	150	366	10	186

(1) See page 30 for material selection.

(2) See pressure-temperature charts on product pages for details.

A COMPREHENSIVE BALL VALVE LINE

**CAPABLE OF HANDLING A WIDE VARIETY OF LIQUIDS AND GASES
AT LOW, MEDIUM, AND HIGH PRESSURES**



Installation of NPS 6 (DN 150) SB-150 with extension handle at a Texas refinery.

Velan Memoryseal® ball valves can be equipped with electric, pneumatic, hydraulic or gear actuators.

See pages 35 to 43 for actuator sizing, torque requirements and technical data.

For Securaseal metal-seated ball valves, see special catalog VEL-MS.

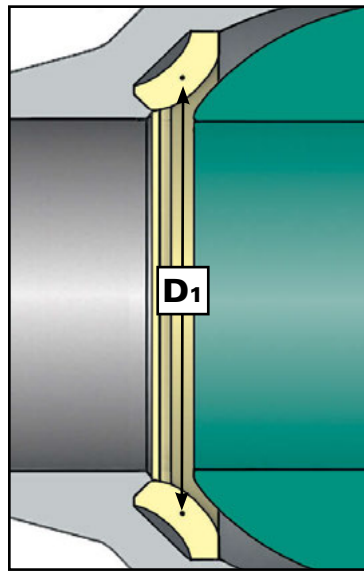
DESIGN AND TESTING STANDARDS AND SPECIFICATIONS

Pressure-temperature rating	shell	ASME B16.34
	valve	See seat materials (page 39).
Shell wall thickness	ASME B16.34	
Face-to-face	ASME B16.10	
Flange dimensions	ASME B16.5	
Materials (page 42)	ASTM	
Valve testing	API 598	
Fire safe testing	API 607, ISO 10497	

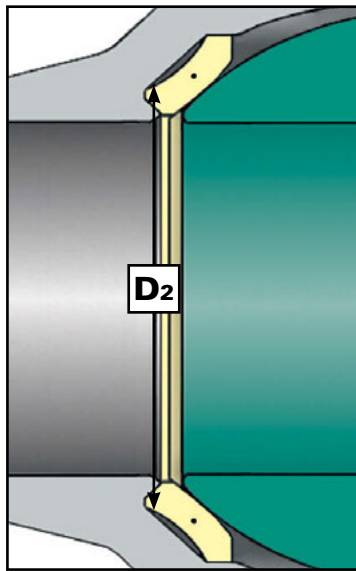
SIZE NPS DN	MANUFACTURING PROGRAM									
	TYPE	DESIGN	RATING ⁽¹⁾ psi	END CONNECTION	PORT	MATERIAL				PAGE
						CS	316	MO	ALLOY 20	
1/2-24 15-600	SB-150	Spilt-body	ASME class 150	FLG	Full	✓	✓	✓	✓	12-15
1/2-24 15-600	SB-300	Spilt-body	ASME class 300	FLG	Full	✓	✓	✓	✓	12-15
2-12 50-300	SB-600	Spilt-body	ASME class 600	FLG	Full	✓	✓			12-15
2-24 50-600	SB-150	Spilt-body	ASME class 150	FLG	Regular	✓	✓	✓	✓	12-15
2-24 50-600	SB-300	Spilt-body	ASME class 300	FLG	Regular	✓	✓	✓	✓	12-15
2-12 50-300	SB-600	Spilt-body	ASME class 600	FLG	Regular	✓	✓			12-15
1/2-12 15-300	UB-150	Unibody	ASME class 150	FLG	Regular	✓	✓	✓	✓	16-17
1/2 -12 15-300	UB-300	Unibody	ASME class 300	FLG	Regular	✓	✓	✓	✓	16-17
3/8-6 10-100	TE-150/300/600	Top-entry	ASME class 150/300/600	NPT, SW, BW, FLG	Full	✓	✓	✓	✓	18-23
1/2 -4 15-100	TE-150/300/600	Top-entry	ASME class 150/300/600	NPT, SW, BW, FLG	Regular	✓	✓	✓	✓	18-23
1/4-2 8-50	EE-1000	End-entry two-piece	1000/1500	NPT	Full		✓			24-25
1/2-2 15-50	EP-2000	End-entry two-piece	1500/2000	NPT	Regular	✓	✓			24-25
1/4-2 8-50	HB-2000	Bar stock one-piece	2000	NPT	Reduced	✓	✓		✓	26-27

(1) See pressure-temperature charts on product pages for details.

VELAN MEMORYSEAL® BALL VALVE TECHNOLOGY

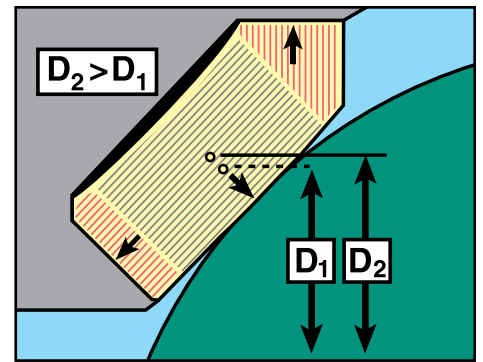


Before assembly



After assembly

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



AREA IN COMPRESSION **AREA IN-TENSION**

SEALING MEMORY

The Velan sealing memory is induced into the seats during the assembly process. When the ball is inserted into the valve body during assembly, it partially flattens the seat, creating a tensile stress in the center of the seat.

As a result, the seat core increases in diameter from D_1 to D_2 and, like a stretched elastic band, pushes against the ball. This ensures reliable sealing even at vacuum or low pressures.

SEAT STRENGTH

A seat in-tension is stronger than a seat in compression because the tensile strength of PTFE in-tension is 3600 psi (25 MPa) versus only 1800 psi

(12.5 MPa) for PTFE in compression. Greater strength means less fatigue, superior sealing ability, and longer cycle life.

The Memoryseal® seat is the only successful seat design in-tension rather than compression and will outlast other extreme seat designs.

LOWER TORQUES

Velan in-tension seats produce more uniform torque because the seat deflects into the cavity behind it to accommodate slight differences in machining tolerances or the normal expansion of PTFE as temperature increases. PTFE expands approximately seven times as much as metal.

CAVITY PRESSURE RELIEF

Memoryseal® seats are designed to relieve overpressure in the ball/body cavity. This capability is influenced by many variables including fluid characteristics, variations in pressure, seat materials, seat compression, temperature, and thermal cycles.

Positive release of cavity overpressure to the upstream side is ensured by bypassing the upstream seat through a drilled hole in the ball. This option is preferred in certain services such as liquid chlorine.

When the valve is in the open position, pressure relief is always through the vent in the top of the ball adjacent to the stem connection. For further information on cavity relief contact our Quarter-turn marketing department.

SUMMARY OF MEMORYSEAL® BENEFITS

IN-TENSION SEATS

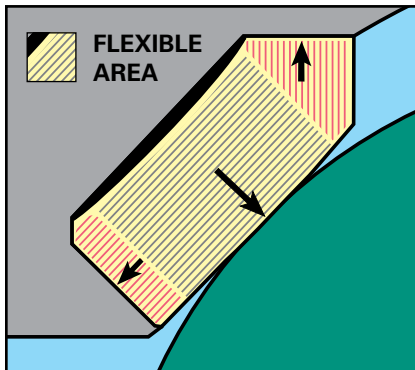
- Greater strength
- Less fatigue
- Positive bi-directional shutoff
- Uniform torque
- Compensate for temperature fluctuations
- Eliminate cold flow effects
- High cycle life

LARGER FLEXIBLE AREA

- Superior sealing

COMPETING DESIGNS

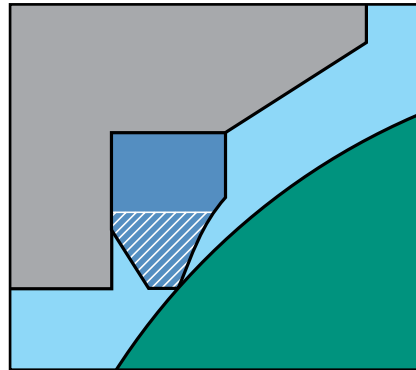
VELAN IN-TENSION FLEXIBLE SEAT



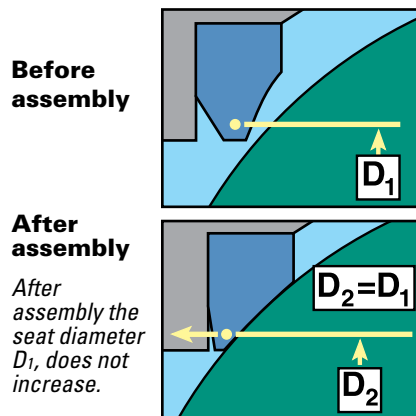
- ✓ Larger seat with smaller seating contact
- ✓ Larger flexible area = added flexibility
- ✓ Seat in-tension, stronger, 3600 psi tensile strength
- ✓ Greater flexible strength = tightness on low-pressure service
- ✓ Greater flexibility = lower torque
- ✓ Greater flexibility = better shock resistance to high DP
- ✓ Greater flexibility = compensation for pressure and temperature fluctuation
- ✓ Greater flexibility = longevity

The competing seat design illustrations shown on this page are general in nature and are not intended to show the exact design or performance of any specific manufacturer.

COMPETITIVE FLEXIBLE SEAT

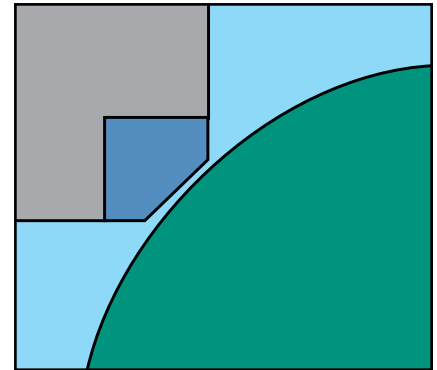


- ✗ Smaller, weaker seat
- ✗ Minimal flexible area, susceptible to fatigue
- ✗ Seat in compression, only 1800 psi tensile strength
- ✗ Can leak in low-pressure service due to fatigue
- ✗ Minimal flexibility; conservative torque
- ✗ Minimal flexibility, weak shock resistance to high DP
- ✗ Moderate compensation for pressure and temperature fluctuation
- ✗ Moderate flexibility = premature wear

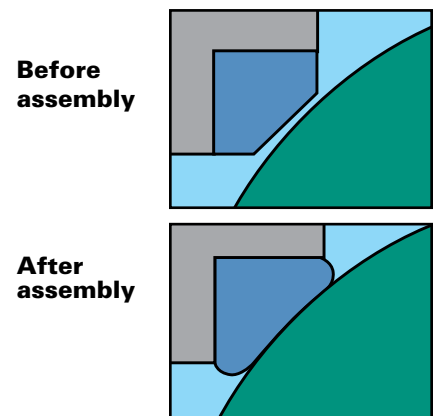


Seat contact is in compression, not tension.

NON FLEXIBLE JAM SEAT



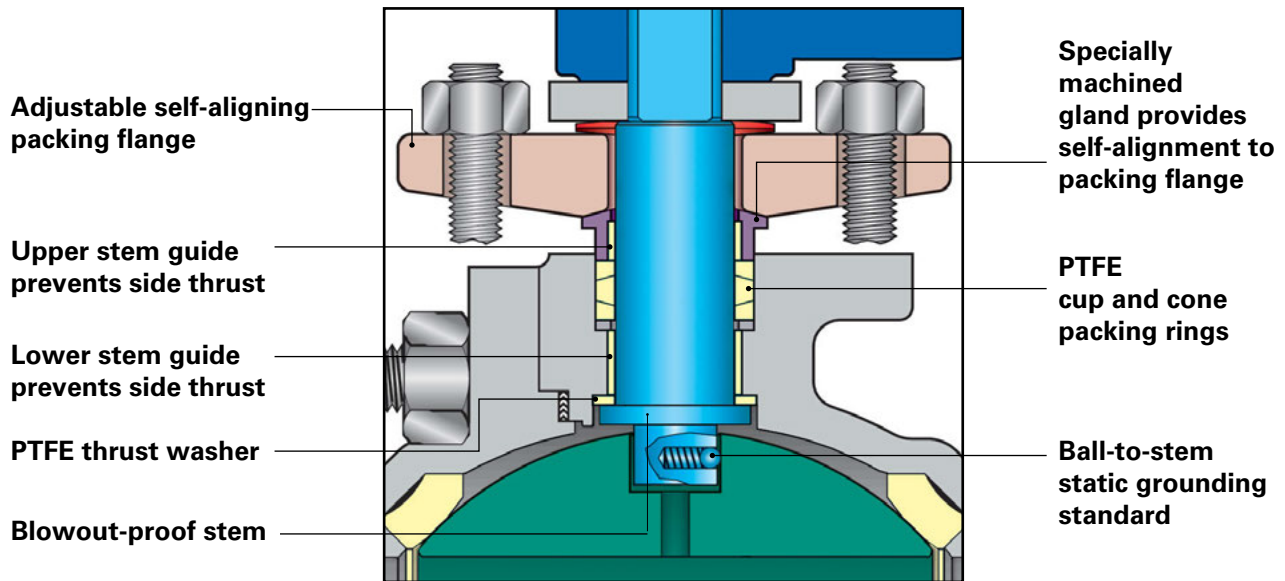
- ✗ Much smaller seat
- ✗ No flexibility, high compression: susceptible to cold flow
- ✗ Seat in compression, only 1800 psi tensile strength
- ✗ Can leak under low pressure service after short cycle life
- ✗ No flexibility, high compression, susceptible to high torque and severe torque variation
- ✗ No flexibility, no shock resistance to high DP
- ✗ No compensation for pressure and temperature fluctuation
- ✗ No flexibility = short cycle life



GREATER FLEXIBLE STRENGTH = GREATER PERFORMANCE
MEMORYSEAL® SEATS

VELAN E-20 ZERO LEAKAGE PACKING CHAMBER DESIGN

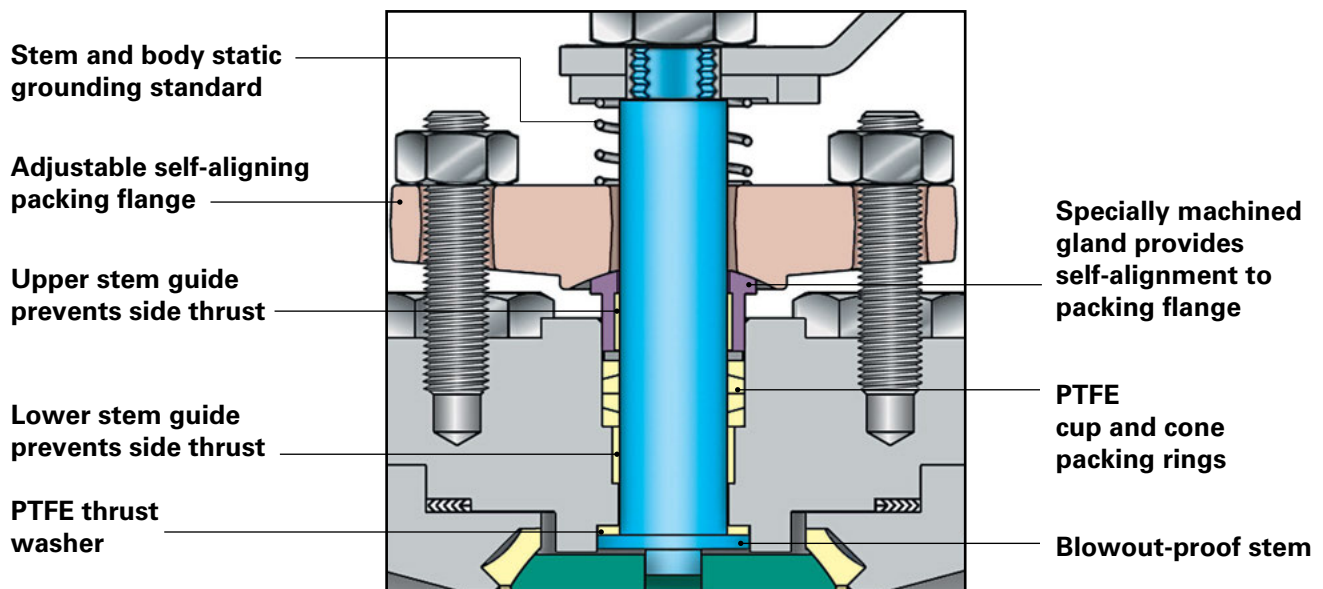
SB-150/300/600



THE E-20 PACKING CHAMBER OUTPERFORMS COMPETITIVE DESIGNS

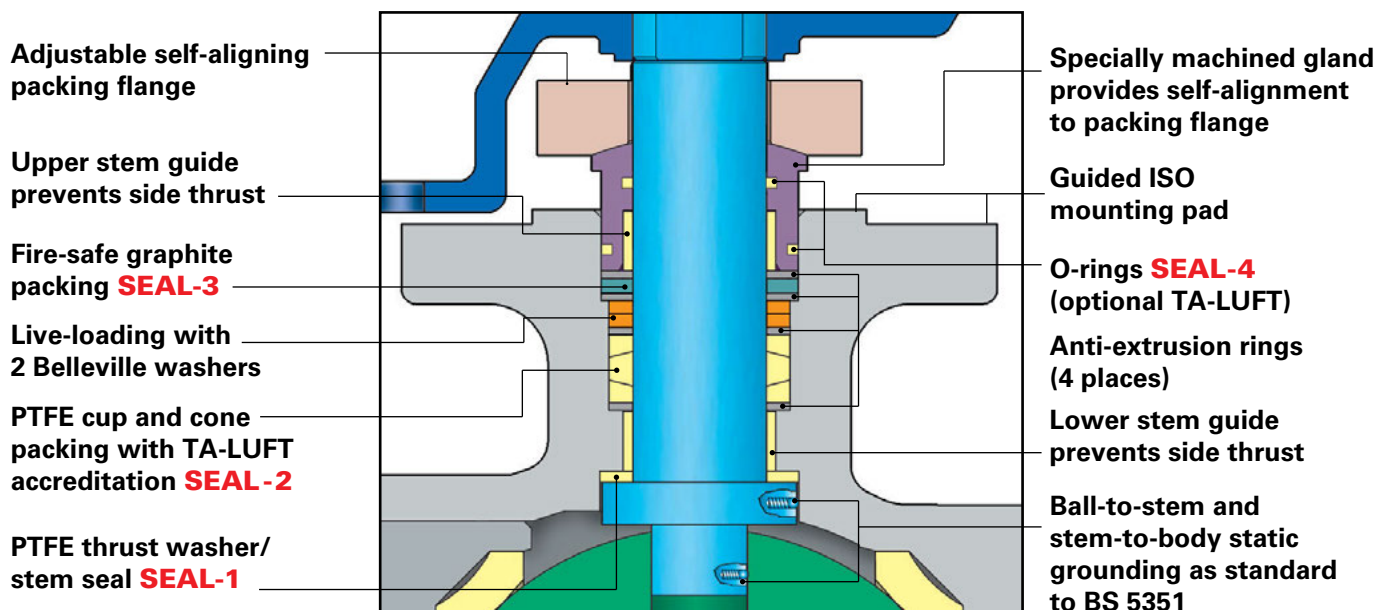
- **E-20 unique packing chamber design** maintains low emissions control for long lasting high cycle life.
- **Self-aligning packing flange** is independent of gland for equal compression of packing rings.
- **Upper and lower stem bushing** prevent side load on packing rings. Eliminates premature wear, therefore enhancing packing life.
- **Floating stem** eliminates thrust washer wear.
- **Stem shoulder** assures blowout-proof safety.
- **Cup and cone packing rings** for directional compression for a tighter seal and longer life.
- **Anti-static design**
Ball-spring device eliminates static electrical buildup between stem, ball, and body NPS 2–24 (DN 50–600). A separate external coil spring device that grounds stem to body is included in the full size range.

TE-150/300/600



VELAN E-20 ZERO LEAKAGE PACKING CHAMBER DESIGN

UB-150/300, NPS 2–12 (DN 50–300) 4-WAY SEAL



A UNIQUE HIGH INTEGRITY STEM SEAL WITH ISO ACTUATOR MOUNTING

• E-20 low emission stem seal

A **unique 4-way seal** assures low emissions control for long lasting high cycle life. TA-Luft certified (optional)⁽¹⁾. The first seal is on the stem shoulder. Next, the main cup and cone PTFE seal, precompressed to 3000 psi (21 MPa), is self-adjusting under live-loading with two spring washers. A third seal, fire safe graphite packing, is independently loaded and remains unaffected by the burnout of the main packing during fire. Finally, two O-ring seals provide additional seal performance (optional). The main stem seal does not require adjustment or attention. A flanged two-piece gland design provides additional reliability.

• Fully guided stem

Lower and upper guides prevent side load on packing rings. Eliminates premature wear therefore enhancing packing life.

• Anti-static design

Ball-spring devices eliminate static electrical buildup between stem, ball, and body.

• Blowout-proof stem

The internally assembled and back-seated stem provides blowout-proof safety.

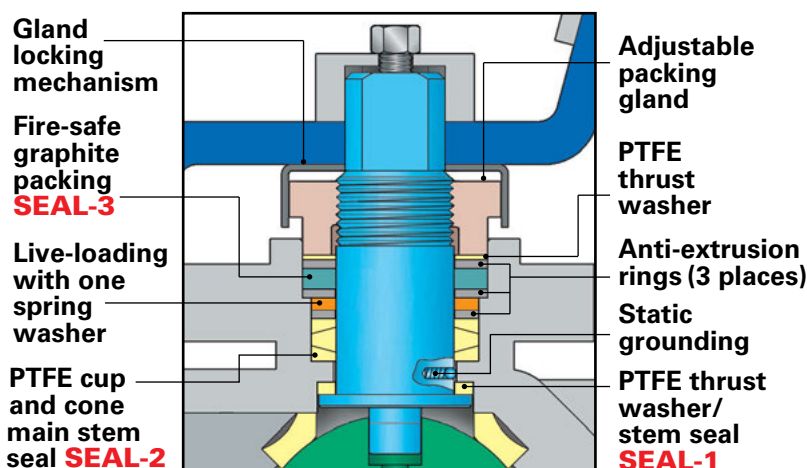
• Fire tested

The valves are designed, tested, and certified to meet the requirements of API 607 Rev. 5/ISO 10497.

UB-150/300 NPS ½–1½ (DN 15–40) 3-WAY SEAL

To achieve the required stem packing capability and performance within the limited space in these smaller valves, an impressive and **unique 3-way sealing system** has been developed that provides:

- Live-loaded cup and cone PTFE seal.
- Primary PTFE seal.
- Independently loaded fire-safe graphite packing.



(1) TA-Luft tested to below 1 ppm.

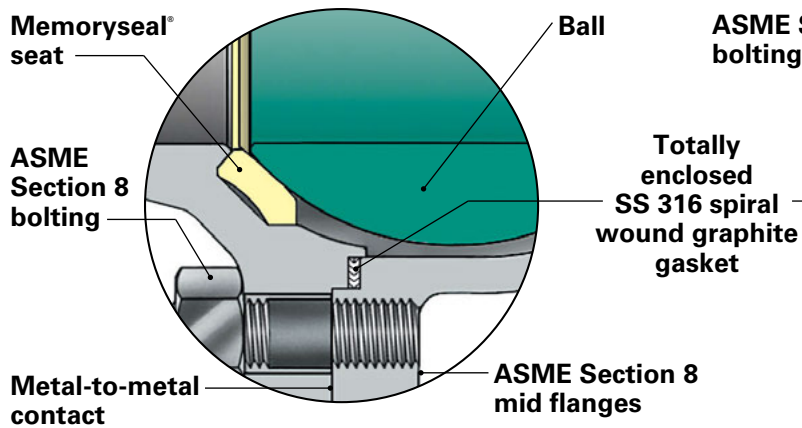
NOTE: locking mechanism may differ from design shown.

SUPERIOR BODY SEAL DESIGNS

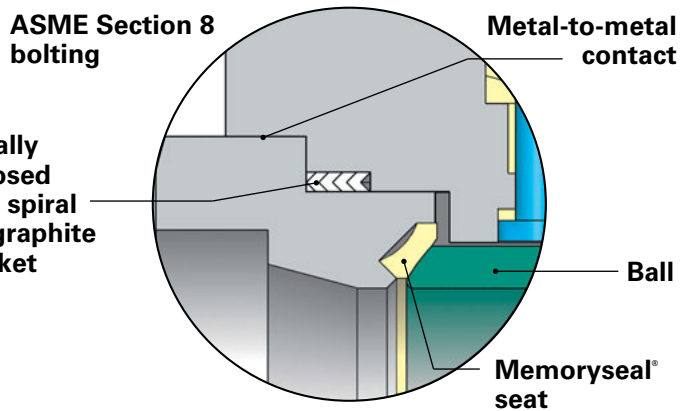
All body seal designs incorporate a secondary metal-to-metal contact area in addition to the primary gasket designs. Sealing designs for our split-body and top-entry use a totally enclosed

spiral wound SS 316 graphite gasket for the tightest seal in the valve industry. The unibody, end-entry and one-piece valves use solid PTFE seals with metal-to-metal back-up contact.

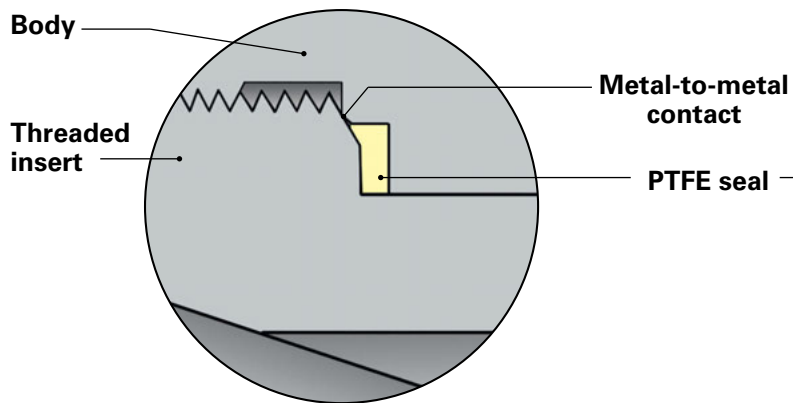
SPLIT-BODY SB-150/300/600



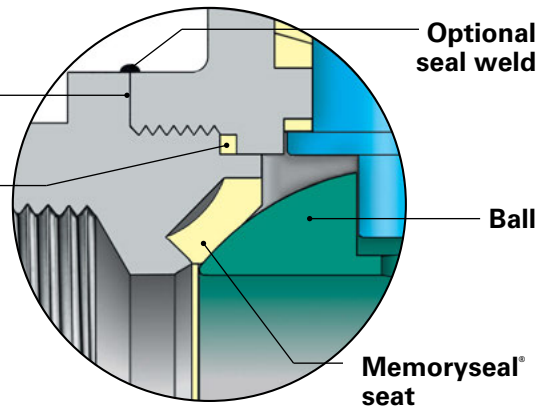
TOP-ENTRY TE-150/300/600



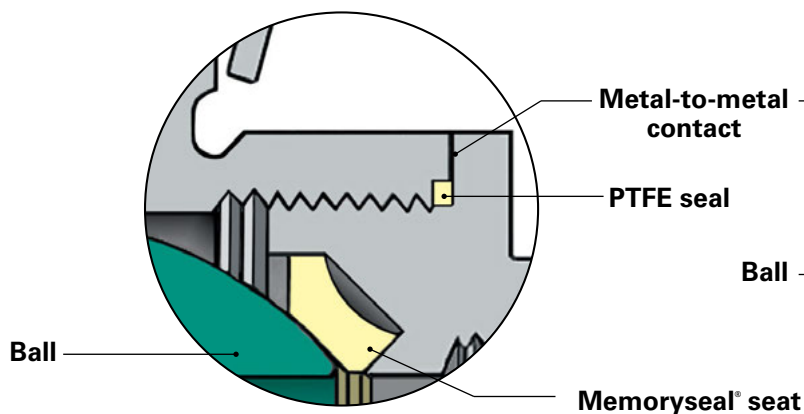
UNIBODY UB-150/300



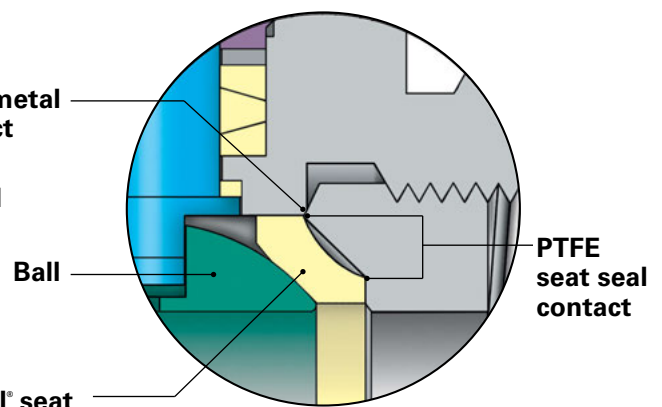
END-ENTRY EP-2000



END-ENTRY EE-1000



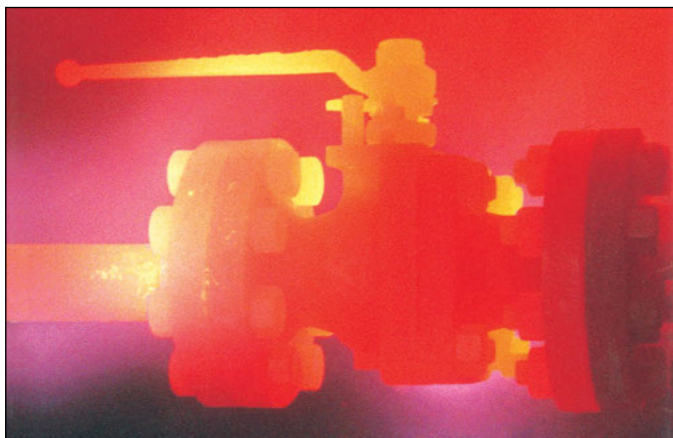
ONE-PIECE HB-2000



TESTING

FIRE TESTS

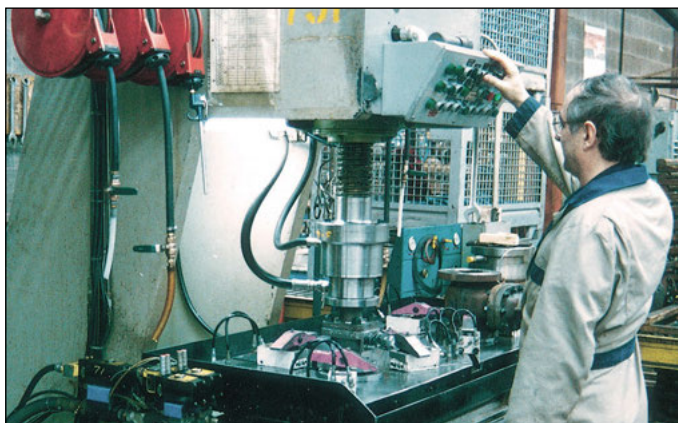
All Memoryseal® ball valves have successfully passed API 607 Rev. 5/ISO 10497⁽¹⁾ using graphite packing. Certificates available upon request.



(1) PTFE-based seat materials

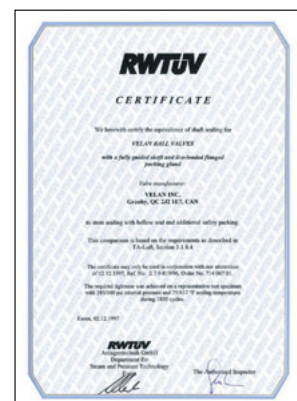
MANUFACTURING TESTS

All Memoryseal® ball valves are tested in accordance with API 598 and are bubble tight.



TA-LUFT QUALIFICATION

The certificate issued by RWTUV after testing Velan Memoryseal® ball valves states "We herewith certify the equivalence of shaft sealing for Velan ball valves with a fully guided shaft and live-loaded flanged packing gland to stem sealing with bellows seal and additional safety packing."



This is based upon the requirements described in TA-Luft, Section 3.1.8.4.

EMISSIONS TESTING

LOW FUGITIVE EMISSIONS

Based on extensive laboratory tests and field experience, we guarantee that standard Velan ball valves will provide low emission service on gaskets and stem seals under normal operating conditions, provided that gland and body-bonnet bolting is torqued to minimum values shown in the current Velan maintenance manuals.



Guaranteed Maximum emissions on new valves: 100 ppm for PTFE and graphite packing rings. (Contact your local Velan office for a copy of our Emissions Guarantee.)

CERTIFIED SIL 3

Independent assessment and certification by exida

- IEC 61508: 2010 Part 1–7
- Systematic Integrity: SIL 3 capable (per IEC 61508).

Assessment and FMEDA reports available at www.exida.com



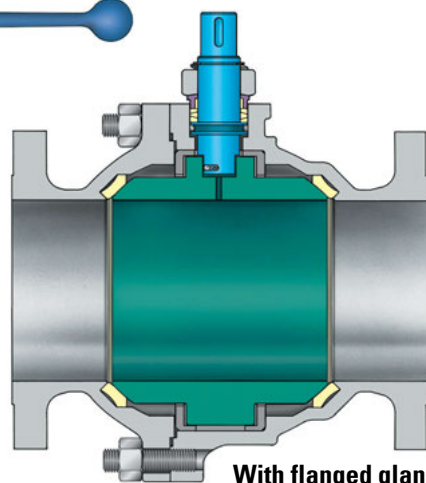
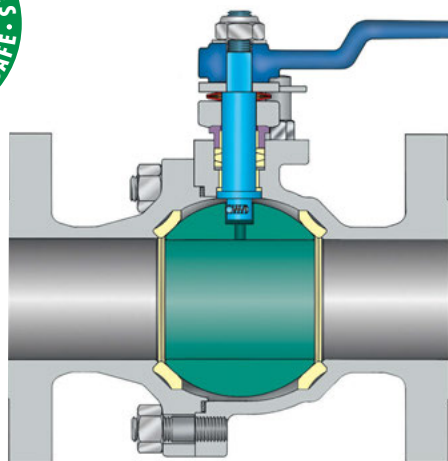
Please note, it is the responsibility of the Safety Instrumented Function (SIF) designer to verify that the selected equipment meets the requirements of the IEC 61508 and IEC 61511 functional safety standards. Verifying a SIF includes reviewing PFD AVG, Architectural Constraints, and SIL Capability. Velan recommends that the SIF designer carefully review all available documentation from the equipment manufacturer and use a commercially available software tools such as exSILentia™ from exida to perform the SIL Verification calculations.

SB-150/300/600 MEMORYSEAL® SPLIT-BODY



FULL AND REGULAR PORT FLANGED BALL VALVES

NPS ½–24 (DN 15–600)



With flanged gland

FLOATING BALL – SIZES: NPS (DN)			
CLASSES	150	300	600
Full port	½–8 (15–200)	½–6 (15–150) ⁽¹⁾	2–3 (50–80)
Regular port	2–10 (50–250)	2–8 (50–200)	2–4 (50–100)

TRUNNION BALL – SIZES: NPS (DN)			
CLASSES	150	300	600
Full port	10–24 (250–600)	8–24 (50–600) ⁽¹⁾	4–12 (100–300) ⁽²⁾
Regular port	12–24 (300–600)	10–24 (250–600)	6–12 (150–300) ⁽³⁾

DESIGN FEATURES

- Exclusive Memoryseal® seats compensate automatically for wear and fluctuations of pressure and temperature.
- Multiple solid cup and cone type PTFE stem seal or graphite packing.
- Two-piece self-aligning packing flange and gland.
- TA-Luft certified, (optional) PTFE and graphite packing.
- Stem guides reduce side thrust.
- Long cycle life.
- Low, uniform torques.
- Blowout-proof stem.
- Live-loaded thrust washer prevents galling and provides secondary stem seal.
- Fully enclosed spiral wound graphite filled stainless body gasket.
- Meets ASME B16.5, B16.10 and B16.34, API 608⁽⁴⁾, API 598, API 607⁽⁵⁾ Rev. 5/ISO 10497
- ASME Section 8 mid flanges and bolting eliminates weak center section.
- UL approved, SB-150/300 NPS 2–12 (DN 50–300) (optional).
- AGA and CGA approved, SB-150 full port NPS 2–8 (DN 50–200) (optional).

- Face-to-face dimensions meet ASME B16.10 long pattern or short pattern. Refer to page 15 for actual dimensions.
- Locking devices standard on lever operated valves.
- Trunnion-mounted ball on larger valves allows the ball to float in case of fire and shut off on the secondary metal seat.
- Cavity fillers available for NPS ½–12 (DN 15–300).
- Gear actuators standard⁽⁶⁾:
 SB-150/300: Full port: NPS 8–24 (DN 200–600)
 Regular port: NPS 10–24 (DN 250–600)
 SB-600: Full port: NPS 6–12 (DN 150–300)
 Regular port: NPS 8–12 (DN 200–300)

APPLICATIONS

The valves can handle a vast variety of fluids, slurries, semi-solids and almost any corrosive service in chemical, oil, petrochemical, gas, pulp, paper processing and other industries. Standard valves with RPTFE seats can handle steam service to 150 psig (10.3 bar). Valves with carbon graphite filled PTFE seats are suitable for steam up to 250 psig (17.2 bar).

- These rugged, versatile, high-performance ball valves can meet NACE specifications⁽⁷⁾.
- Fire tested in accordance with API 607⁽⁵⁾ Rev. 5/ISO 10497. (See page 11 for details.)

(1) Floating ball valve optional for NPS 8 (DN 200).

(2) Trunnion optional on NPS 2–3 (DN 50–80) full port valve.

(3) Trunnion optional on NPS 3–4 (DN 80–100) regular port valve.

(4) For latest revision compliance contact your local Velan office.

(5) API 607 Rev. 5 is optional, requires graphite packing.

(6) May be recommended on NPS 6 (DN 150) SB-150/300 full port or NPS 8 (DN 200) SB-150/300 regular port depending on service conditions.

(7) To ensure these valves meet NACE specifications, this requirement must be confirmed prior to placing the purchase order.

SB-150/300/600 MEMORYSEAL® SPLIT-BODY

STANDARD MATERIALS

PART	CARBON STEEL	STAINLESS STEEL
Body	WCB	CF8M
Ball	SS 316 ⁽⁴⁾	
Stem	SS 316 or SS 316 SH	
Stem Guide	PTFE or RPTFE	
Seat ⁽²⁾	MPTFE/PTFE/RPTFE/C-RPTFE	
Body seal	Spiral wound graphite/SS 316	
Thrust washer	RPTFE	
Packing ⁽³⁾	PTFE or graphite	
Gland ⁽⁵⁾	SS 304	
Gland flange	A 105	SS 316
Belleville washer or coil spring	Plated carbon steel or stainless steel	
Body stud	B7 or B7M	B8M, Class 2 ⁽¹⁾
Body nut	2H or 2HM	8M
Handle, NPS ½–1½ (DN 15–40)	Stainless steel	
Handle, NPS 2–6 (DN 50–150)	Malleable iron	
Nut	CS plated	CS plated or SS

(1) Strain hardened.

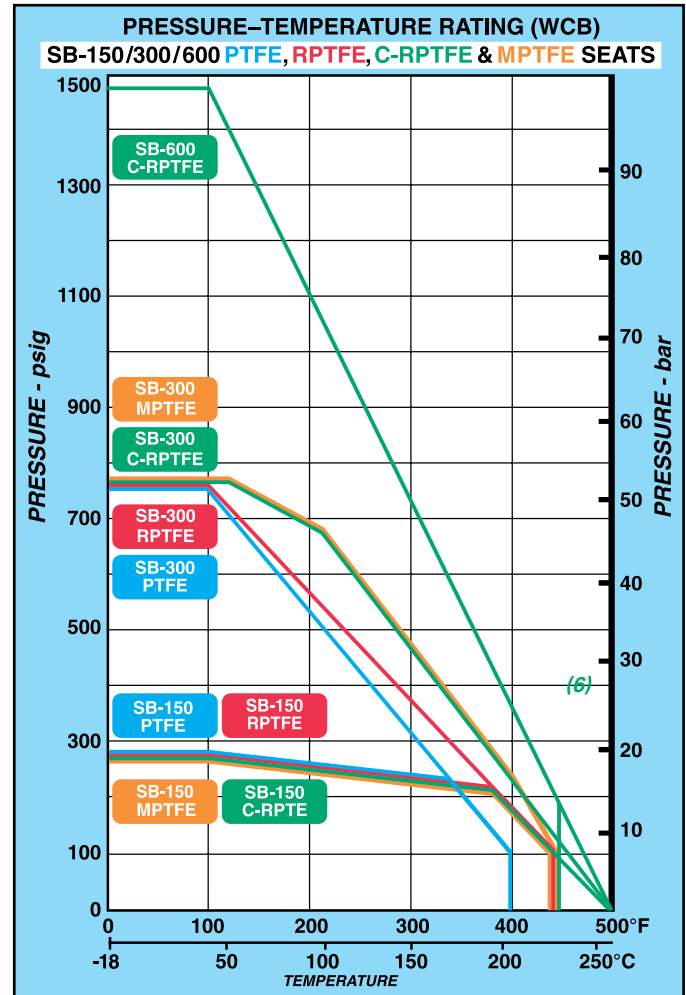
(2) C-RPTFE for Class 600.

(3) Use graphite packing for service above 400°F (204°C).

(4) SS 316/CR plated for Class 600.

(5) On NPS ½ (DN 15) gland integral with gland flange.

Materials and other technical data pages 35 to 42.
Dimensions and weights page 15.
Torque charts page 40-41.



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



SB-150 with air actuator.



Manual gear actuated ball valve.

FLOW COEFFICIENT C_v ⁽⁷⁾ SB-150/300/600

SIZE NPS (DN)	FULL PORT	REGULAR PORT
½ (15)	12	—
¾ (20)	50	—
1 (25)	100	—
1½ (40)	250	—
2 (50)	430	130
2½ (65)	720	—
3 (80)	1,020	250
4 (100)	2,000	540
6 (150)	5,500	770
8 (200)	9,800	1,900
10 (250)	16,400	3,900
12 (300)	23,800	6,700
14 (350)	27,500	5,200
16 (400)	36,000	8,050
18 (450)	46,000	12,500
20 (500)	57,000	15,500
24 (600)	75,000	27,000

(7) $K_v = C_v \times 0.85$

SB-150/300/600 MEMORYSEAL® SPLIT-BODY

ALTERNATIVE PACKING CHAMBER DESIGN

DESIGN FEATURES:

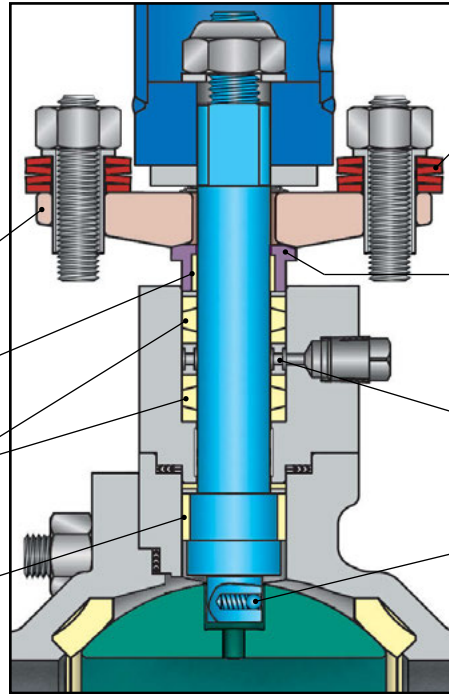
- Velan's double packed arrangement uses the E-20 packing style, double stacked live-loaded packing flange and lantern ring for emissions measuring or collection.

Adjustable self-aligning packing flange

Upper stem guide prevents side thrust

Two sets of PTFE cup and cone packing rings

Lower stem guide prevents side thrust



Belleville washers provide live-loading for extended maintenance free cycle life

Specially machined gland provides self-alignment to packing flange

Lantern ring with plugged port

Ball-to-stem static grounding standard

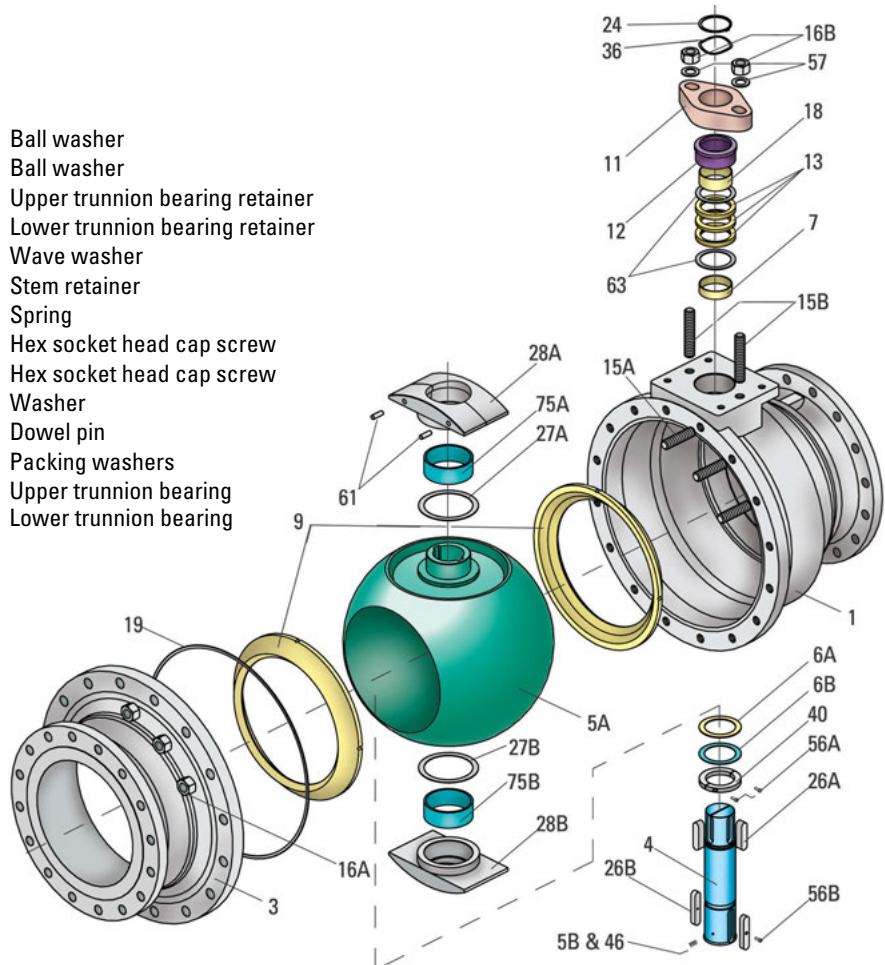
SPLIT-BODY VIEW

ITEM DESCRIPTION

1	Body	27A	Ball washer
3	Body end	27B	Ball washer
4	Stem	28A	Upper trunnion bearing retainer
5A	Ball	28B	Lower trunnion bearing retainer
5B	Grounding ball	36	Wave washer
6A	Thrust washer (PTFE)	40	Stem retainer
6B	Thrust washer (metal)	46	Spring
7	Stem bushing	56A	Hex socket head cap screw
9	Seat	56B	Hex socket head cap screw
11	Packing flange	57	Washer
12	Gland bushing	61	Dowel pin
13	Packing rings	63	Packing washers
15A	Body stud	75A	Upper trunnion bearing
15B	Packing flange stud	75B	Lower trunnion bearing
16A	Body end nut		
16B	Packing flange stud nut		
18	Gland bushing sleeve		
19	Body seal		
24	Retaining ring		
26A	Key		
26B	Key		

DESIGN IS FOR:

NPS 16–24 (DN 400–600)
150/300 Full port
NPS 20–24 (500–600)
150/300 Regular port



SB-150/300/600 DIMENSIONS AND WEIGHTS

SIZE NPS DN	SB-150 FULL PORT						WEIGHT lb kg
	A	B	C	D	E	F	
1/2	4.25	3.27	5.27	1.62	0.50	3.50	5.0
15	108	83	134	41	13	89	2.3
3/4	4.63	3.82	5.56	1.75	0.75	3.88	7.3
20	118	97	141	44	19	99	3.3
1	5.00	4.02	5.56	2.05	1.00	4.25	8.5
25	127	102	141	52	25	108	3.9
1 1/2	6.50	5.02	7.69	2.55	1.50	5.00	16.5
40	165	128	195	65	38	127	7.5
2	7.00	5.44	10.38	2.89	2.00	6.00	24
50	178	138	264	73	51	152	11
2 1/2	7.50	6.97	11.88	3.25	2.50	7.00	42
65	191	177	302	83	64	178	19
3	8.00	7.38	11.88	3.77	3.00	7.50	50
80	203	187	302	96	76	191	23
4	9.00	10.31	19.88	4.52	4.00	9.00	89
100	229	262	505	115	102	229	40
6	15.50	12.56	25.88	6.24	6.00	11.00	192
150	394	319	657	158	152	279	87
8	18.00	16.09	—	8.13	8.00	13.50	391
200	457	409	—	207	203	343	177
10	21.00	20.84	—	10.50	10.00	16.00	762
250	533	529	—	267	254	406	346
12	24.00	22.59	—	12.00	12.00	19.00	1072
300	610	574	—	305	305	483	486
14	27.00	24.22	—	13.50	13.25	21.00	1370
350	686	615	—	343	337	533	621
16	30.00	24.13	—	15.00	15.25	23.50	1860
400	762	613	—	381	387	597	844
18	34.00	25.92	—	17.00	17.25	25.00	2571
450	864	658	—	432	438	635	1166
20	36.00	29.69	—	18.00	19.25	27.50	3238
500	914	754	—	457	489	699	1469
24	42.00	34.81	—	21.00	23.25	32.00	5250
600	1067	884	—	533	591	813	2381

SIZE NPS DN	SB-300 FULL PORT						WEIGHT lb kg
	A	B	C	D	E	F	
5.50	3.27	5.27	2.06	0.50	3.75	6.6	6.6
140	83	134	52	13	95	3.0	3.0
6.00	3.82	5.56	2.55	0.75	4.63	10.3	10.3
152	97	141	65	19	118	4.7	4.7
6.50	4.02	5.56	2.61	1.00	4.88	12.8	12.8
165	102	141	66	25	124	5.8	5.8
7.50	5.02	7.69	2.92	1.50	6.13	24	24
191	128	195	74	38	156	11	11
8.50	5.44	10.38	3.83	2.00	6.50	33	33
216	138	264	97	51	165	15	15
9.50	6.97	11.88	4.00	2.50	7.50	56	56
241	177	302	102	64	191	25	25
11.12	7.38	11.88	5.30	3.00	8.25	76	76
282	187	302	135	76	210	34	34
12.00	10.31	19.88	5.99	4.00	10.00	125	125
305	262	505	152	102	254	57	57
15.88	12.56	25.88	6.65	6.00	12.50	256	256
403	319	657	169	152	318	116	116
19.75	16.04	—	8.78	8.00	15.00	814	814
502	407	—	223	203	381	369	369
22.38	20.84	—	11.19	10.00	17.50	952	952
568	529	—	284	254	445	432	432
25.50	22.59	—	12.75	12.00	20.50	1313	1313
648	574	—	324	305	521	596	596
30.00	24.22	—	15.00	13.25	23.00	1807	1807
762	615	—	381	337	584	820	820
33.00	24.13	—	16.50	15.25	25.50	2410	2410
838	613	—	419	387	648	1093	1093
36.00	25.92	—	18.00	17.00	28.00	3321	3321
914	658	—	457	432	711	1506	1506
39.00	29.69	—	19.50	19.00	30.50	3973	3973
991	754	—	495	483	775	1802	1802
45.00	34.81	—	22.50	23.00	36.00	6722	6722
1143	884	—	572	584	914	3049	3049

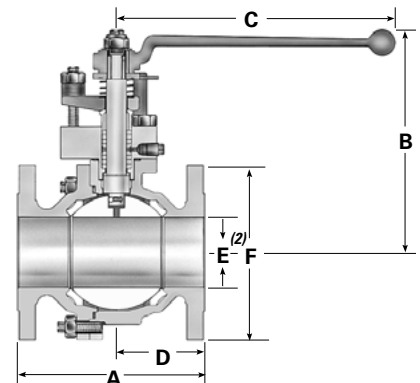
SIZE NPS DN	SB-600 FULL PORT						WEIGHT lb kg
	A	B	C	D	E	F	
11.50	7.44	11.88	5.00	2.00	6.50	69	69
292	189	302	127	51	165	31	31
14.00	11.12	25.88	6.19	3.00	8.25	147	147
356	282	657	157	76	210	67	67
17.00	13.71	25.88	7.00	4.00	10.75	347	347
432	348	657	178	102	273	157	157
22.00	18.68	—	9.25	6.00	14.00	637	637
559	474	—	235	152	356	289	289
26.00	19.26	—	11.00	8.00	16.50	1050	1050
660	489	—	279	203	419	476	476
31.00	21.16	—	14.50	10.00	20.00	1580	1580
787	537	—	368	254	508	717	717
33.00	22.41	—	15.25	12.00	22.00	2092	2092
838	569	—	387	305	559	949	949

SIZE NPS DN	SB-150 REGULAR PORT						WEIGHT lb kg
	A	B	C	D	E	F	
2	7.00	5.02	7.69	3.04	1.50	6.00	19.8
50	178	128	195	77	38	152	9.0
3	8.00	5.44	10.38	4.00	2.00	7.50	35
80	203	138	264	102	51	191	16
4	9.00	7.38	11.88	4.36	3.00	9.00	68
100	229	187	302	111	76	229	31
6	10.50	10.31	19.88	4.74	4.00	11.00	130
150	267	262	505	120	102	279	59
8	11.50	12.56	25.88	5.71	6.00	13.50	236
200	292	319	657	145	152	343	107
10	13.00	16.03	—	6.37	8.00	16.00	401
250	330	407	—	162	203	406	182
12	14.00	20.84	—	7.00	10.00	19.00	696
300	356	529	—	178	254	483	316
14	15.00	20.84	—	7.50	10.00	21.00	775
350	381	529	—	191	254	533	352
16	16.00	22.59	—	8.00	12.00	23.50	1610
400	406	574	—	203	305	597	730
18	34.00	25.22	—	17.00	14.00	25.00	1677
450	864	641	—	432	356	635	761
20	36.00	24.13	—	18.00	15.25	27.50	2171
500	914	613	—	457	387	699	985
24	42.00	27.28	—	21.00	17.25	32.00	3650
600	1067	693	—	533	438	813	1656

SIZE NPS DN	SB-300 REGULAR PORT						WEIGHT lb kg
	A	B	C	D	E	F	
8.50	5.02	7.69	3.92	1.50	6.50	26	26
216	128	195	100	38	165	12	12
11.12	5.44	10.38	5.56	2.00	8.25	52	52
282	138	264	141	51	210	24	24
12.00	7.38	11.88	5.99	3.00	10.00	102	102
305	187	302	152	76	254	46	46
15.88	10.31	19.88	7.94	4.00	12.50	183	183
403	262	505	202	102	318	83	83
16.50	12.56	25.88	8.25	6.00	15.00	350	350
419	319	657	210	152	381	159	159
18.00	16.09	—	9.00	8.00	17.50	618	618
457	409	—	229	203	445	280	280
19.75	20.84	—	9.13	10.00	20.50	1097	1097
502	529	—	232	254	521	498	498
22.50	20.84	—	11.25	10.00	23.00	1097	1097
572	529	—	286	254	584	498	498
24.00	22.59	—	12.00	12.00	25.50	1477	1477
610	574	—	305	305	648	670	670
26.00	25.22	—	12.01	14.00	28.00	2013	2013
660	641	—	305	356	711	913	913
28.00	24.13	—	14.00	15.25	30.50	2746	2746
711	613	—	356	387	775	1246	1246
32.00	27.28	—	16.00	17.25	36.00	4600	4600
813	693	—	406	438	914	2087	2087

SIZE NPS DN	SB-600 REGULAR PORT						WEIGHT lb kg
	A	B	C	D	E	F	
11.50	5.35	10.38	4.74	1.60	6.50	46	46
292	136	264	120	41	165	21	21
14.00	7.44	11.88	7.00	2.00	8.25	88	88
356	189	302	178	51	210	40	40
17.00	11.12	25.88	8.50	3.00	10.75	187	187
432	282	657	216	76	273	85	85
22.00	13.71	25.88	11.00	4.00	14.00	435	435
559	348	657	279	102	356	197	197
26.00	18.68	—	13.00	6.00	16.50	755	755
660	474	—	330	152	419	342	342
31.00	19.26	—	12.50	8.00	20.00	1150	1150
787	489	—	318	203	508	522	522
33.00	21.16	—	14.50	10.00	22.00	1728	1728
838	537	—	368	254	559	784	784

Full port, live-loaded, and double packed



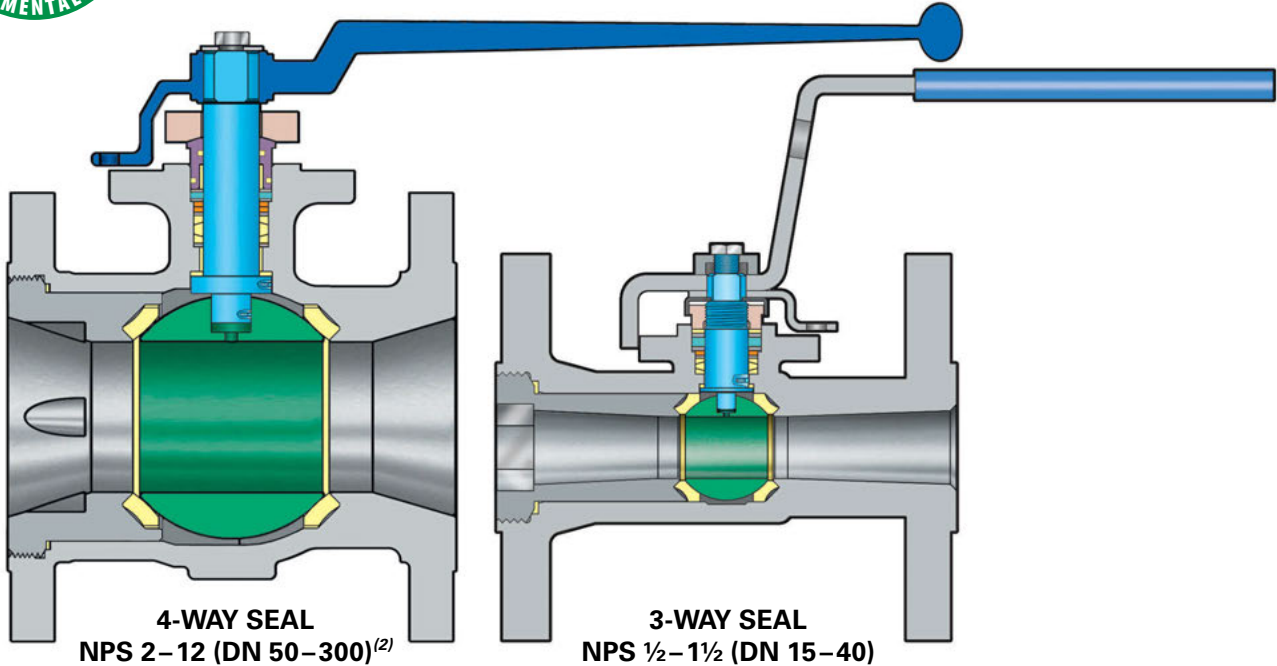
(1) For regular port and other sizes and pressure classes, contact your local Velan office. (2) Seat diameter.

UB-150/300 MEMORYSEAL® UNIBODY



REGULAR PORT FLANGED BALL VALVES⁽¹⁾

ISO 5211, NPS ½–12 (DN 15–300)



DESIGN FEATURES

- Exclusive Memoryseal® seats compensate automatically for wear and fluctuations of pressure and temperature.
- Unique 4-way and 3-way packing arrangements for superior stem sealing (refer to page 9 for details).
- TA-Luft certified (optional).
- Multiple solid cup and cone type PTFE stem seal and graphite packing.
- Stem guides prevent side thrust.
- Long cycle life.
- Low, uniform torques.
- Blowout-proof stem.
- Fully enclosed PTFE body seal.
- Metal-to-metal contact between insert and body act as secondary seal and prevents over compression of the seats.
- Pipe flange gasket acts as third precautionary seal as threads from the insert are within the raised face flange.
- Meets worldwide specifications. Design ASME B16.34, API 608⁽³⁾. Fire tested to API 607 Rev. 5/ISO 10497. ISO/CAP1 for all parameters of standardized valve automation.

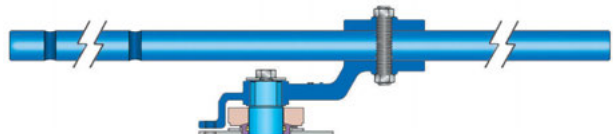
- Locking device standard for valves with lever handle.
- Highest standards of quality. Over its 50 years of production activities Velan has earned a worldwide reputation for quality in design, manufacturing and valve performance.

APPLICATIONS

The valves can handle a vast variety of fluids, slurries, semi-solids and almost any corrosive service in chemical, petrochemical, oil, gas, pulp and paper, processing and other industries.

- These rugged, versatile, high-performance ball valves can meet NACE specifications⁽⁴⁾.

Adjustable handle standard NPS 4–8 (DN 100–200)



(1) NPS ½ (DN 15) is full port

(2) Handle may differ on valves NPS 4–8 (DN 100–200).

Gear actuators are included on valves NPS 10–12 (DN 250–300).

(3) For latest revision compliance contact your local Velan office.

(4) To ensure these valves meet NACE specifications, this requirement must be confirmed prior to placing the purchase order.

UB-150/300 MEMORYSEAL® UNIBODY

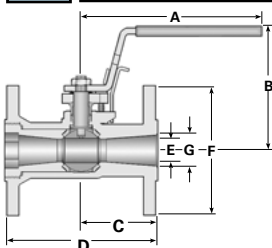
STANDARD MATERIALS⁽¹⁾

PART	CARBON STEEL	STAINLESS STEEL
Body	WCB	CF8M
Ball	SS 316	
Stem	SS 316	
Stem guide	PTFE or RPTFE	
Seat	MPTFE/PTFE/RPTFE	
Sleeve seal	PTFE	
Thrust washer	RPTFE	
Packing	PTFE and graphite	
Gland	SS 304	
Gland flange	WCB	CF8M
Soc HD cap screw	SS 304	SS 304
Belleville washer	Stainless steel	
Packing washer	Stainless steel	
Handle: NPS 1/2–1 1/2 (DN 15–40)	SS 304	
Safety clip: NPS 1/2–1 1/2 (DN 15–40)	SS 304	
Handle: NPS 2 (DN 50) and up	Malleable iron	
Cap screw	CS plated	CS plated or SS

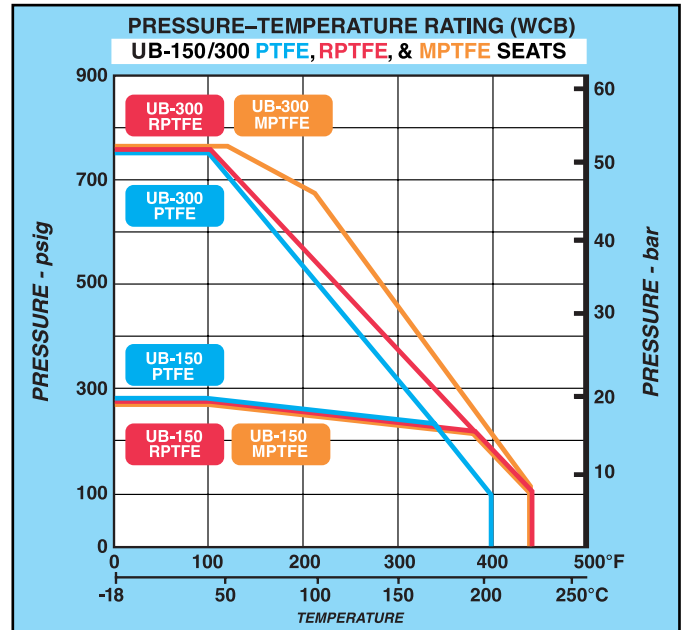
DIMENSIONS, WEIGHTS, Cv, AND ISO FLANGES

SIZE NPS DN	UB-150								WEIGHT lb kg	ISO Mtg. Flange
	A	B	C	D	E	F	G	Cv ⁽²⁾		
1/2 15	5.90 150	3.45 88	2.12 54	4.25 108	0.50 13	3.50 89	0.50 13	9	3.4 1.5	F03
3/4 20	5.90 150	3.79 96	2.31 59	4.62 117	0.62 16	3.88 99	0.75 19	15	4.5 2.0	F03
1 25	7.80 198	3.91 99	2.50 64	5.00 127	0.75 19	4.25 108	1.00 25	42	6.4 2.9	F04
1 1/2 40	7.81 198	4.89 124	3.25 83	6.50 165	1.18 30	5.00 127	1.50 38	125	18.6 8.4	F04
2 50	9.00 229	4.59 117	3.72 94	7.00 178	1.50 38	6.00 152	2.00 51	165	19.2 8.7	F07
3 80	11.88 302	5.96 151	4.00 102	8.00 203	2.31 59	7.50 191	3.00 76	350	36 16	F07
4 100	(3)	9.01 229	4.50 114	9.00 229	3.01 76	9.00 229	4.00 102	540	67 30	F10
6 150	(3)	11.71 297	5.25 133	10.50 267	4.40 112	11.00 279	6.00 152	1000	123 56	F12
8 200	(3)	14.16 360	5.75 146	11.50 292	5.70 145	13.50 343	8.00 203	1500	200 91	F14
10 250	(4)	13.64 346	6.50 165	13.00 330	7.33 186	16.00 406	10.00 254	2850	314 142	F16
12 300	(4)	15.04 382	7.00 178	14.00 356	9.01 229	19.00 483	12.00 305	4800	487 221	F16

SIZE NPS DN	UB-300								WEIGHT lb kg	ISO Mtg. Flange
	A	B	C	D	E	F	G	Cv ⁽²⁾		
1/2 15	5.90 150	3.45 88	3.38 86	5.50 140	0.50 13	3.75 95	0.50 13	9	4.5 2.0	F03
3/4 20	5.90 150	3.79 96	3.69 94	6.00 152	0.62 16	4.62 117	0.75 19	15	7.1 3.2	F03
1 25	7.80 198	3.91 99	4.00 102	6.50 165	0.75 19	4.88 124	1.00 25	42	10.0 4.5	F04
1 1/2 40	7.80 198	4.89 124	4.25 108	7.50 191	1.18 30	6.12 155	1.50 38	125	18.6 8.4	F04
2 50	9.00 229	4.59 117	4.62 117	8.50 216	1.50 38	6.50 165	2.00 51	165	25 11	F07
3 80	11.88 302	5.96 151	6.63 168	11.12 282	2.31 59	8.25 210	3.00 76	350	54 24	F07
4 100	(3)	9.01 229	6.00 152	12.00 305	3.01 76	10.00 254	4.00 102	540	97 44	F10
6 150	(3)	11.71 297	8.63 219	15.88 403	4.40 112	12.50 318	6.09 155	1000	187 85	F12
8 200	(3)	14.16 360	8.25 210	16.50 419	5.70 145	15.00 381	8.00 203	1770	303 137	F14
10 250	(4)	13.64 346	9.00 229	18.00 457	7.33 186	17.50 445	10.00 254	2850	474 215	F16
12 300	(4)	15.04 382	9.88 251	19.75 502	9.01 229	20.50 521	12.00 305	4800	742 337	F16

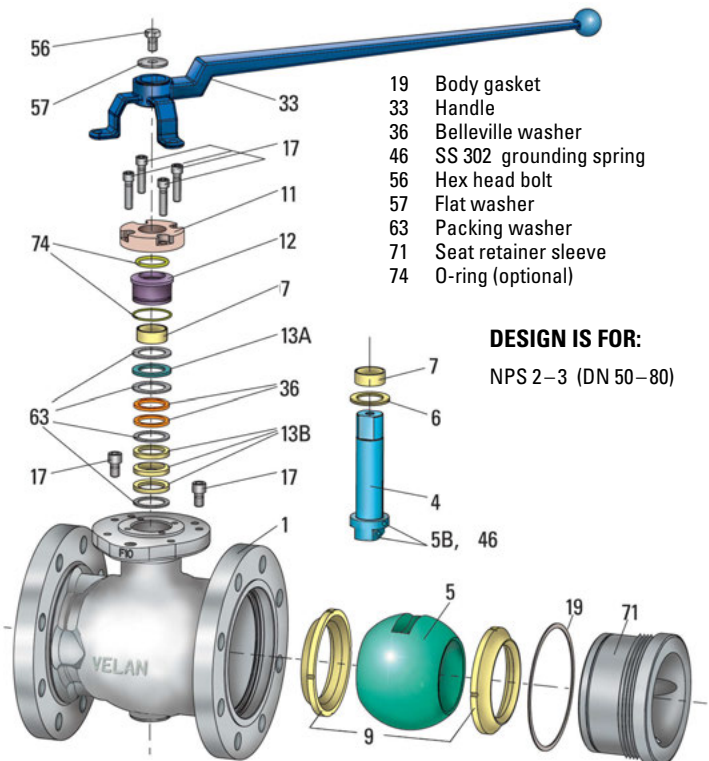


- (1) Other materials are available.
- (2) $K_v = C_v \times 0.85$.
- (3) Adjustable handle.
Contact your local Velan office for dimensional data.
- (4) UB-300 NPS 10 and 12 (DN 250 and 300) are gear actuated.



ITEM DESCRIPTION

- | | |
|--------------------------|-----------------------------|
| 1 Body | 9 Seat |
| 4 Stem | 11 Packing flange |
| 5 Ball | 12 Gland bushing |
| 5B SS 316 grounding ball | 13A Packing ring (graphite) |
| 6 Thrust washer | 13B Packing ring (PTFE) |
| 7 Stem bushing | 17 Socket head cap screw |



DESIGN IS FOR:
NPS 2–3 (DN 50–80)

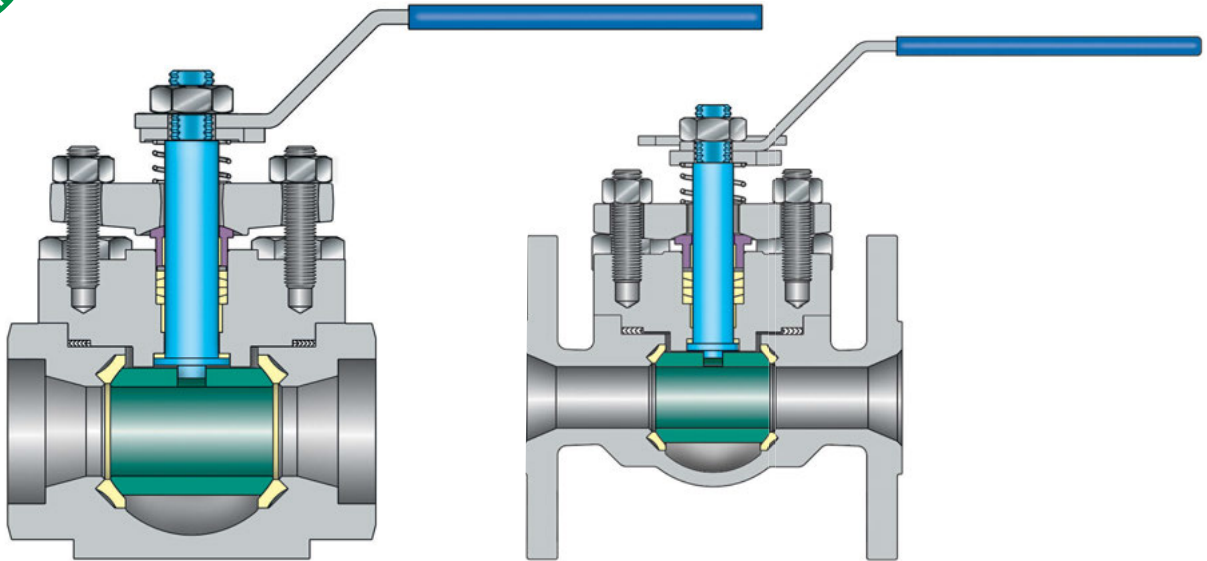
Materials and other technical data pages 35 to 42.
Torque charts page 40-41.

TE-150/300/600 MEMORYSEAL® TOP-ENTRY



REGULAR AND FULL PORT BALL VALVES

REGULAR PORT NPS ½–6 (DN 15–150), FULL PORT NPS ¾–6 (DN 10–150)
THREADED, SOCKET WELD, BUTT-WELD, OR FLANGED



Butt-weld NPS ½–6 (DN 15–150)

Socket weld and threaded NPS ¾–3 (DN 10–80)

Flanged NPS ½–6 (DN 15–150)

DESIGN FEATURES

- Exclusive Memoryseal® seats compensate automatically for wear and fluctuations of pressure and temperature.
- Multiple solid cup and cone type PTFE stem seal or graphite packing.
- Two-piece self-aligning packing flange and gland.
- Stem guides in cover and gland bushing eliminate side thrust.
- Longer cycle life.
- Lower, uniform torque.
- Blowout-proof stem.
- Live-loaded thrust washer prevents galling and provides a secondary stem seal.
- Meets ASME B16.5, B16.10 and B16.34, API 608⁽¹⁾, API 598, API 607 Rev. 5/ISO 10497.
- Fully-enclosed spiral wound graphite filled stainless body gasket.
- Permits in-line access for seat replacement.
- ASME Section 8 cover/body flange connection and bolting provide high sealing integrity of body gasket.
- Body-cover joint not affected by pipe stresses.
- Wall thickness complies with ASME B16.34.
- Can be welded into line without disassembly in accordance with Velan installation instructions.
- Stainless steel trim on all valves including handle.

- Oval handles with locking device, as well as extensions available.
- Ball-to-stem only NPS 2 (DN 50) full port and larger and stem-to-body static grounding.
- Locking devices standard.
- Tapping for mounting actuators standard.
- AGA and CGA approved, regular port, threaded ends (optional) NPS ½–2 (DN 15–50).
- These rugged, versatile, high-performance ball valves can meet NACE specifications⁽³⁾.
- Optional topworks (page 20):
 1. Live-loaded single or double packing.
 2. TA-Luft certified (optional) with live-loading packing. (Please contact the factory.)
 3. Bellows seal design.
- Fire tested in accordance with API 607 Rev. 5/ISO 10497. (See page 11 for details.)

APPLICATIONS

A superior quality, rugged, and universal purpose valve for all fluids, slurries, semi-solids, and corrosive services in endless industrial, chemical, and original equipment applications.

- Dimensions and weights on page 21.

(1) For latest revision compliance contact your local Velan office.
 (2) TA-Luft certified (optional).
 (3) To ensure these valves meet NACE specifications, this requirement must be confirmed prior to placing the purchase order.

TE-150/300/600 MEMORYSEAL® TOP-ENTRY

STANDARD MATERIALS

PART	CARBON STEEL			STAINLESS 316 (CF8M)	MONEL	ALLOY 20	HASTELLOY C	TITANIUM
	SS 316 trim	Monel trim	Hastelloy C trim					
Body and bonnet	A 105 or WCB			CF8M	Monel	Alloy 20	Hast. C	Titanium
Seat	MPTFE ⁽¹⁾ /graphite/PEEK			MPTFE ⁽¹⁾ /graphite/PEEK				
Ball	SS 316 ⁽⁵⁾	Monel	Hast. C	SS 316 ⁽⁵⁾	Monel	Alloy 20	Hast. C	Titanium
Stem	SS 316	Monel	Hast. C	SS 316	Monel	Alloy 20	Hast. C	Titanium
Thrust washer	RPTFE			RPTFE				
Body seal	SS 316 graphite			SS 316 graphite	Monel-graphite	Alloy 20-graphite	Hast. C-graphite	Titanium-graphite
Packing	PTFE, graphite or PEEK			PTFE, graphite or PEEK				
Stem bushing	RPTFE			RPTFE				
Packing flange	WCB			CF8M				Titanium
Gland follower	SS 304			SS 304	Monel	Alloy 20	Hast. C	Titanium
Bonnet studs/cap screws	B7			B8M Cl.2				
Bonnet nuts	2H			8M				
Handle	SS 304/Malleable Iron			SS 304/Malleable Iron				
Handle nut	SS/Cadmium-plated CS			SS/Cadmium-plated CS				
Coil spring	SS 302			SS 302				

(1) Other materials available (see page 39).

PRESSURE-TEMPERATURE RATING

MEDIUM	SEAT CONDITIONS	SERVICE
WOG	MPTFE and RPTFE	1480 psig ⁽²⁾ @ 100°F (102 bar @ 38°C)
	PTFE	100 psig @ 400°F (7 bar @ 204°C)
	RPTFE	100 psig @ 450°F (7 bar @ 232°C)
Steam	MPTFE and RPTFE	250 psig @ 406°F (17 bar @ 208°C)
	C-RPTFE	450 psig @ 456°F (31 bar @ 235°C)

(2) See pressure-temperature rating chart for details by size.

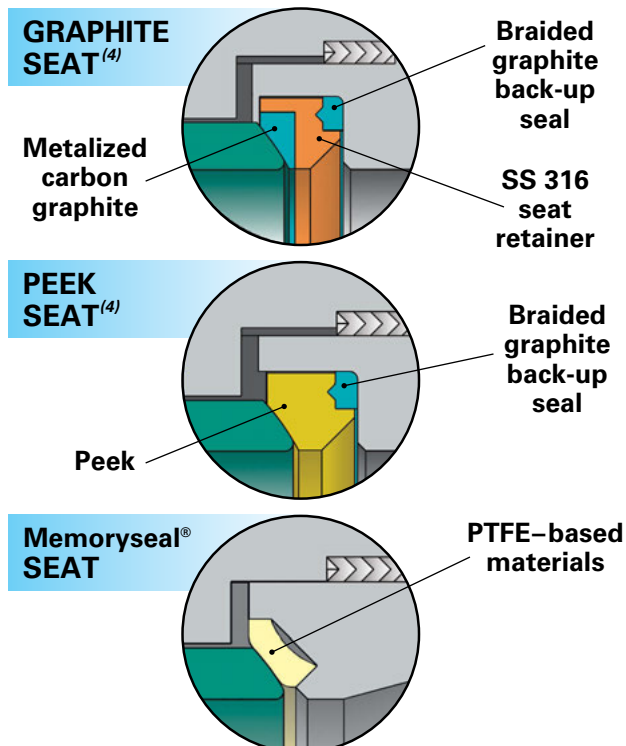
FLOW COEFFICIENTS $C_v^{(3)}$ – TE-150/300/600 VALVES

SIZE NPS (DN)	REGULAR PORT	FULL PORT	SIZE NPS (DN)	REGULAR PORT	FULL PORT
3/8 (10)	—	6	2 (50)	104	322
1/2 (15)	8	26	3 (80)	200	760
3/4 (20)	13.5	75	4 (100)	540	2,000
1 (25)	34	103	6 (150)	770	5,500
1 1/2 (40)	65	206	—	—	—

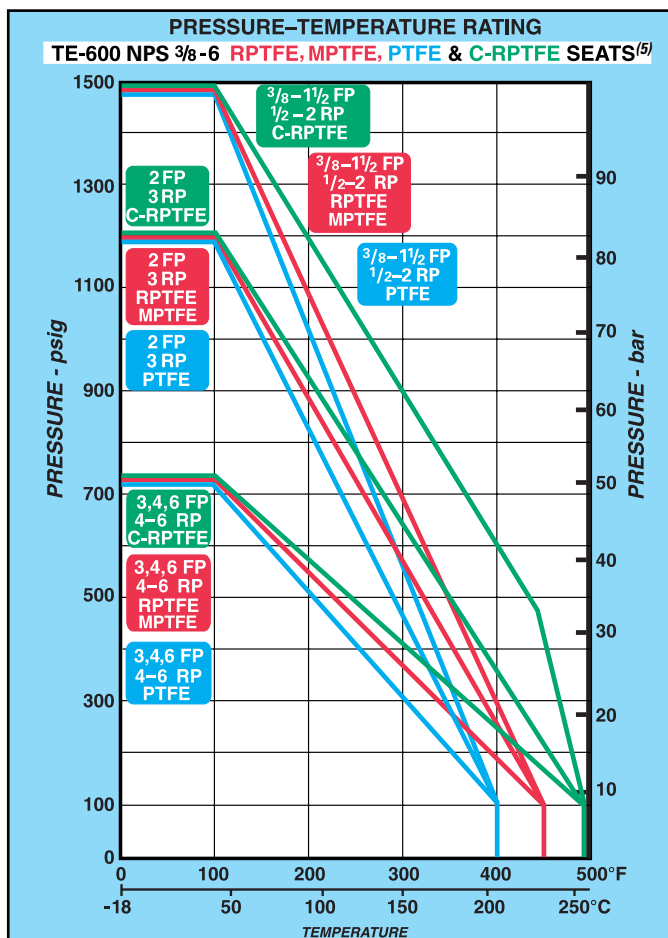
(3) $K_v = C_v \times 0.85$

Materials and other technical data pages 35 to 42.
Dimensions and weights page 15. Torque charts page 40-41.

SEAT DESIGNS



(4) SS 316 chrome-plated ball is standard for valves with graphite and PEEK seats.



Note: Above chart shows sizes in NPS.

(5) For graphite, or PEEK seats consult the factory.

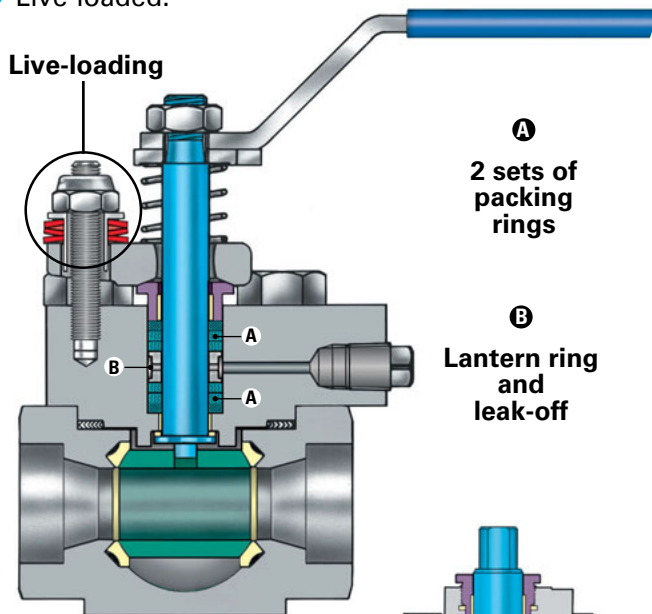
TE-150/300/600 MEMORYSEAL® TOP-ENTRY

ALTERNATIVE PACKING CHAMBER DESIGN

FOR 0 PPM FUGITIVE EMISSIONS

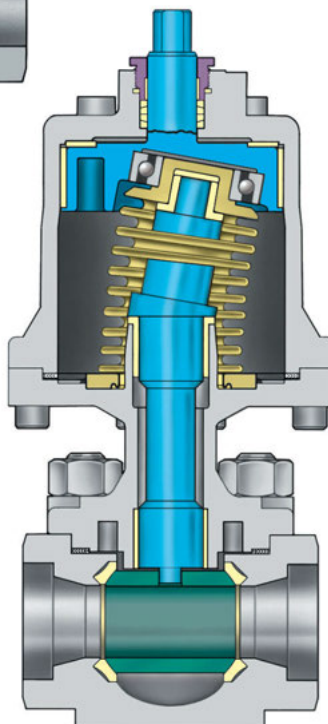
DOUBLE PACKED

- Double packing with leak-off. Two sets of packing rings are precompressed to 2,000 psi (14 MPa) in PTFE or 4,000 psi (28 MPa) in graphite. A lantern ring and leak-off allow removal of leakage, if any, from bottom packing set.
- Tested to 500,000 cycles with 0 ppm⁽¹⁾ emissions.
- Live-loaded.



BELLOWS SEAL

- Hermetically sealed bellows in Hastelloy C.
- Secondary PTFE or graphite packing seal.
- A unique bellows seal design tested to 100,000 cycles with stainless steel driver unit allows installation of standard, pneumatic or electric actuator.

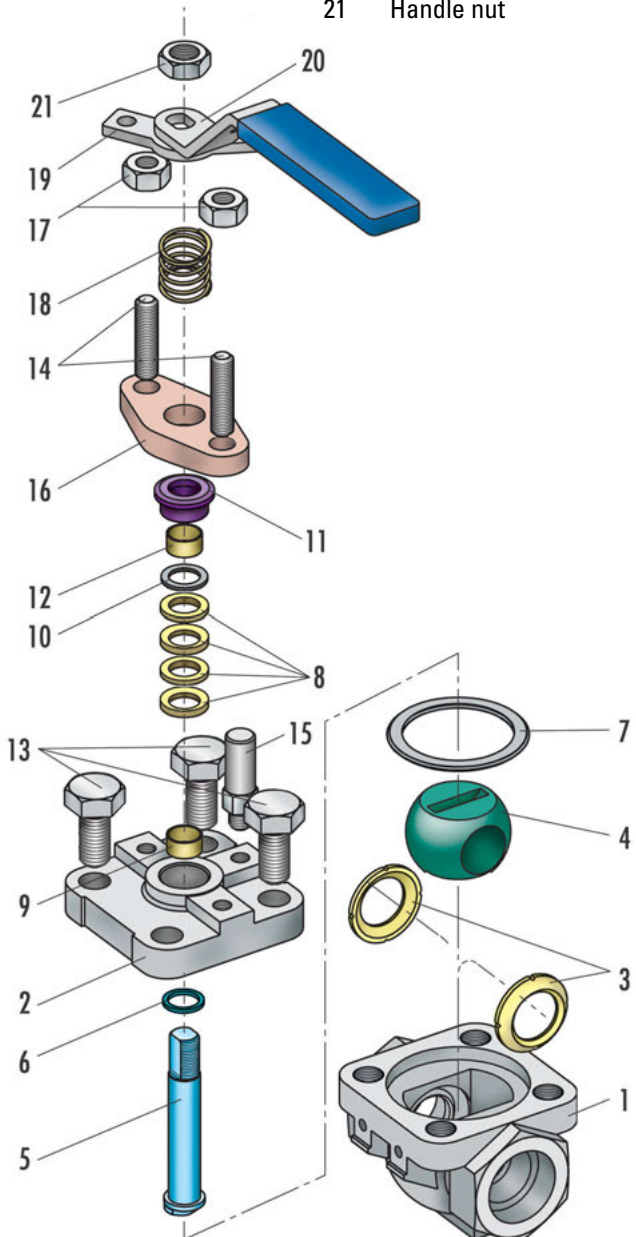


(1) Contact your local Velan office for details.

TOP-ENTRY VIEW

ITEM DESCRIPTION

1	Body	11	Gland bushing
2	Bonnet	12	Gland bushing sleeve
3	Seat	13	Bonnet screw
4	Ball	14	Gland stud
5	Stem	15	Handle stop pin
6	Thrust washer	16	Packing flange
7	Body seal	17	Gland nut
8	Packing ring	18	Coil spring
9	Stem bushing	19	Handle stop plate
10	Packing washer	20	Handle
		21	Handle nut



TE-150/300/600 DIMENSIONS AND WEIGHTS

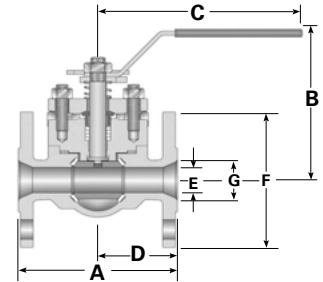
TE-150/300/600

SIZE NPS DN	CLASS 150/300 FLANGED						REGULAR PORT						WEIGHT lb kg
	A	B	C	D	E	F	G	H	I	J	K	L	
1/2	4.25	5.50	3.47	4.62	2.12	2.75	0.44	3.50	3.75	0.50	4.2	5.5	
15	108	140	88	117	54	70	11	89	95	13	1.9	2.5	
3/4	4.62	6.00	3.60	4.62	2.31	3.00	0.56	3.88	4.62	0.75	5.1	8.4	
20	117	152	91	117	59	76	14	99	117	19	2.3	3.8	
1	5.00	6.50	4.82	6.44	2.50	3.25	0.81	4.25	4.88	1.00	9.6	13.0	
25	127	165	122	164	64	83	21	108	124	25	4.4	5.9	
1 1/2	6.50	7.50	5.66	7.55	3.25	3.75	1.19	5.00	6.12	1.50	19.0	25	
40	165	191	144	192	83	95	30	127	155	38	8.6	11	
2	7.00	8.50	5.92	7.55	3.50	4.25	1.50	6.00	6.50	2.00	28	34	
50	178	216	150	192	89	108	38	152	165	51	13	15	
3	8.00	11.12	6.45	11.91	4.00	5.56	2.00	7.50	8.25	3.00	46	61	
80	203	282	164	303	102	141	51	191	210	76	21	28	
4	9.00	12.00	9.13	19.88	4.50	6.00	3.00	9.00	10.00	4.00	103	124	
100	229	305	232	505	114	152	76	229	254	102	47	56	
6	15.50	15.88	11.95	25.88	7.75	7.94	4.00	11.00	12.50	6.00	230	271	
150	394	403	304	657	197	202	102	279	318	152	104	123	

- (1) Body is with welded on flanges and threaded holes.
(2) Intermediate class 470 (for CF8M body material).

SIZE NPS DN	CLASS 150/300 FLANGED						FULL PORT						WEIGHT lb kg
	A	B	C	D	E	F	G	H	I	J	K	L	
3 ⁽¹⁾	—	11.12	9.13	19.88	—	5.56	3.00	—	8.25	—	111	50	
80	—	282	232	505	—	141	76	—	210	—	11	50	
4	17.00	18.00	11.95	25.88	8.50	9.00	4.00	10.00	10.00	220	240	109	
100	432	457	304	657	216	229	102	254	254	100	100	109	
6	21.50	22.00	13.75	—	10.75	11.00	6.00	11.00	12.50	474	517	235	
150	546	559	349	—	273	279	152	318	318	215	215	235	

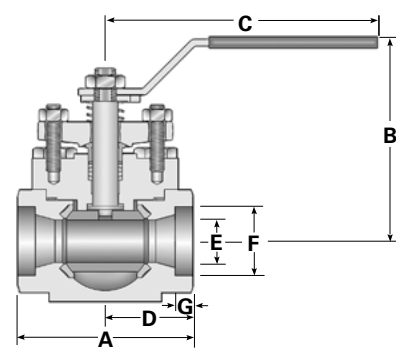
SIZE NPS DN	CLASS 600 FLANGED						FULL PORT	WEIGHT lb kg
	A	B	C	D	E	F		
1/2	6.50	3.60	4.62	3.25	0.50	3.75	7.6	
15	165	91	117	83	13	95	3.4	
3/4	7.50	4.82	6.44	3.75	0.75	4.62	13.8	
20	191	122	164	95	19	117	6.3	
1	8.50	5.66	7.55	4.25	1.00	4.88	23	
25	216	144	192	108	25	124	10	
1 1/2	9.50	5.92	7.55	4.75	1.50	6.12	35	
40	241	150	192	121	38	155	16	
2 ⁽²⁾	11.50	6.45	11.91	5.75	2.00	6.50	37	
50	292	164	303	146	51	165	17	



TE-600

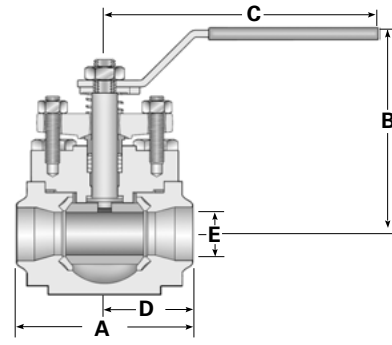
SIZE NPS DN	THREADED, SOCKET WELD						REGULAR PORT						WEIGHT lb kg
	A	B	C	D	E	F	G	H	I	J	K	L	
1/2	2.62	3.47	4.62	1.31	0.44	0.86	0.38	2.3					
15	67	88	117	33	11	22	10	1.0					
3/4	3.25	3.60	4.62	1.63	0.56	1.07	0.50	3.2					
20	83	91	117	41	14	27	13	1.5					
1	3.75	4.82	6.44	1.88	0.81	1.33	0.50	6.8					
25	95	122	164	48	21	34	13	3.1					
1 1/4	4.88	5.66	7.55	2.44	1.19	1.68	0.50	13.8					
40	124	144	192	62	30	43	13	6.3					
1 1/2	4.88	5.66	7.55	2.44	1.19	1.92	0.50	13.8					
40	124	144	192	62	30	49	13	6.3					
2	6.00	5.92	7.55	3.00	1.50	2.41	0.62	22					
50	152	150	192	76	38	61	16	10					
2 1/2	7.25	6.45	11.91	3.63	2.00	2.91	0.62	37					
65	184	164	303	92	51	74	16	17					
3	7.25	6.45	11.91	3.63	2.00	3.54	0.62	37					
80	184	164	303	92	51	90	16	17					

SIZE NPS DN	THREADED, SOCKET WELD						FULL PORT						WEIGHT lb kg
	A	B	C	D	E	F	G	H	I	J	K	L	
3/8	2.62	3.47	4.62	1.31	0.44	0.69	0.38	2.3					
10	67	88	117	33	11	18	10	1.0					
1/2	3.25	3.60	4.62	1.63	0.56	0.86	0.38	3.2					
15	83	91	117	41	14	22	10	1.5					
3/4	3.75	4.82	6.44	1.88	0.81	1.07	0.50	6.8					
20	95	122	164	48	21	27	13	3.1					
1	4.88	5.66	7.55	2.44	1.19	1.33	0.50	13.8					
25	124	144	192	62	30	34	13	6.3					
1 1/2	6.00	5.92	7.55	3.00	1.50	1.92	0.50	22					
40	152	150	192	76	38	49	13	10					
2	7.25	6.45	11.91	3.63	2.00	2.41	0.62	37					
50	184	164	303	92	51	61	16	17					
3	11.12	9.13	19.88	5.56	3.00	3.54	0.62	52					
80	282	232	505	141	76	90	16	24					



SIZE NPS DN	BUTT-WELD						REGULAR PORT						WEIGHT lb kg
	A	B	C	D	E	F	G	H	I	J	K	L	
1/2	2.62	3.47	4.62	1.31	0.44	0.44	0.38	2.3					
15	67	88	117	33	11	11	10	1.0					
3/4	3.25	3.60	4.62	1.63	0.56	0.56	0.50	3.2					
20	83	91	117	41	14	14	13	1.5					
1	3.75	4.82	6.44	1.88	0.81	0.81	0.50	6.8					
25	95	122	164	48	21	21	13	3.1					
1 1/4	4.88	5.66	7.55	2.44	1.19	1.19	0.50	13.8					
32	124	144	192	62	30	30	13	6.3					
1 1/2	4.88	5.66	7.55	2.44	1.19	1.19	0.50	13.8					
40	124	144	192	62	30	30	13	6.3					
2	6.00	5.92	7.55	3.00	1.50	1.50	0.62	22					
50	152	150	192	76	38	38	16	10					
2 1/2	7.25	6.45	11.91	3.63	2.00	2.00	0.62	37					
65	184	164	303	92	51	51	16	17					
3	7.25	6.45	11.91	3.63	2.00	2.00	0.62	37					
80	184	164	303	92	51	51	16	17					
4 ⁽³⁾	12.00	9.13	19.88	6.00	3.00	3.00	0.62	86					
100	305	232	505	152	76	76	16	39					

SIZE NPS DN	BUTT-WELD						FULL PORT						WEIGHT lb kg
	A	B	C	D	E	F	G	H	I	J	K	L	
1/2	3.25	3.60	4.62	1.63	0.56	0.56	0.38	3.2					
15	83	91	117	41	14	14	10	1.5					
3/4	3.75	4.82	6.44	1.88	0.81	0.81	0.50	6.8					
20	95	122	164	48	21	21	13	3.1					
1	4.88	5.66	7.55	2.44	1.19	1.19	0.50	13.8					
25	124	144	192	62	30	30	13	6.3					
1 1/2	6.00	5.92	7.55	3.00	1.50	1.50	0.62	22					
40	152	150	192	76	38	38	16	10					
2 ⁽³⁾	7.25	6.45	11.91	3.63	2.00	2.00	0.62	37					
50	184	164	303	92	51	51	16	17					
3 ⁽³⁾	12.00	9.13	19.88	6.00	3.00	3.00	0.62	86					
80	305	232	505	152	76	76	16	39					



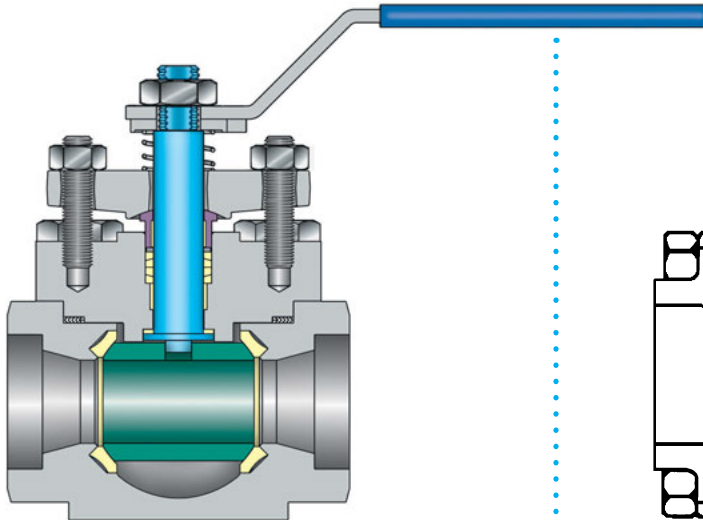
(3) Dimensions are for class 150/300. For other pressure classes contact your local Velan office.

TE-600 LIVE-LOADED WITH DOUBLE PACKING AND LEAK-OFF

SIZE NPS DN	THREADED, SOCKET WELD				REGULAR PORT			WEIGHT lb kg
	A	B	C	D	E	F	G	
1/2 15	2.62 67	4.31 109	4.62 117	1.31 33	0.44 11	0.86 22	0.38 10	4.0 1.8
3/4 20	3.25 83	4.44 113	4.62 117	1.63 41	0.56 14	1.07 27	0.50 13	5.0 2.3
1 25	3.75 95	5.60 142	6.44 164	1.88 48	0.81 21	1.33 33	0.50 13	8.9 4.0
1 1/2 40	4.88 124	6.37 162	7.55 192	2.42 62	1.19 30	1.92 49	0.50 13	16.2 7.3
2 50	6.00 152	6.55 166	7.55 192	3.00 76	1.50 38	2.41 61	0.62 16	26 12
3 80	7.25 184	7.95 199	11.91 303	3.62 92	2.00 51	3.54 90	0.62 16	43 20
4 (4) 100	12.00 305	11.67 296	19.88 505	6.00 152	3.00 76	4.55 116	0.75 19	90 41

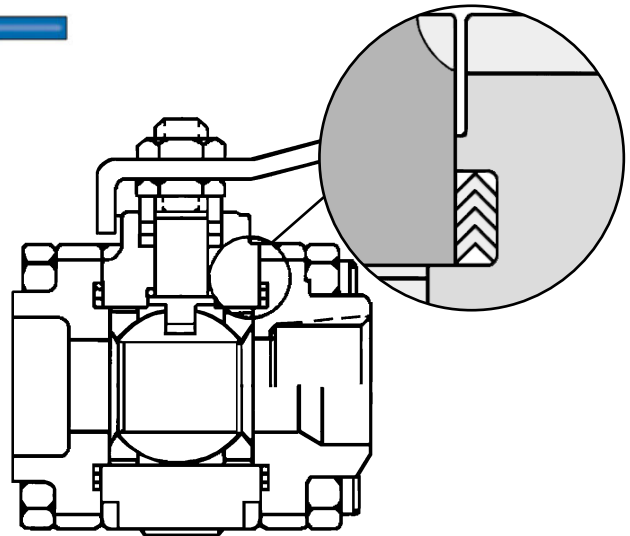
VELAN TOP-ENTRY BALL VALVES SUPERIOR TO THREE-PIECE BALL VALVES

VELAN FIRE SAFE TOP-ENTRY



- 1 Two leakage paths (gasket and packing).
- 2 Fully guided stem.
- 3 In lab tests 0 ppm⁽¹⁾ emissions to 100,000 cycles, 500,000 with live-loading.
- 4 Easy to weld the one-piece body into the line without disassembly. The integrity of the valve is not affected.
- 5 All parts can be easily serviced or replaced in-line.

THREE-PIECE FIRE SAFE VALVES



- 1 Three leakage paths (2 gaskets and packing).
- 2 Stem can wobble, cause leakage.
- 3 Greater emissions, lower cycle life.
- 4 Welding can affect the integrity of the valve due to tendency to separate the three-bolted body parts during the welding.
- 5 Valve can not be serviced in-line, because the fire safe design with spiral wound gaskets requires internal guiding of the two end pieces. The guiding prevents the centerpiece from swinging out.

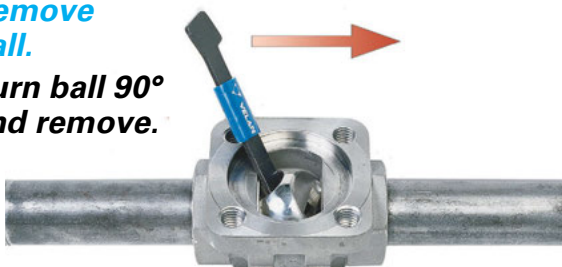
(1) Consult your local Velan office for details.

IN-LINE SERVICE

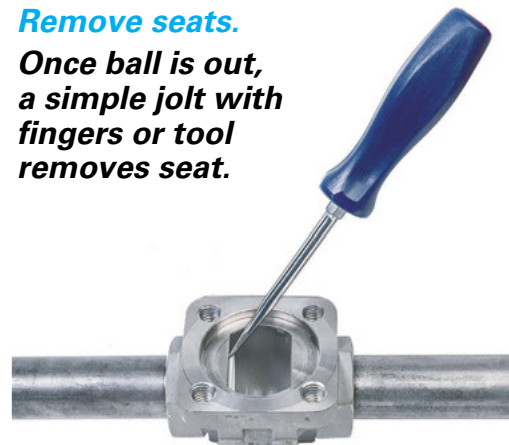
STEP 1
*Remove
cover
assembly.*



STEP 2
*Remove
ball.*
*Turn ball 90°
and remove.*

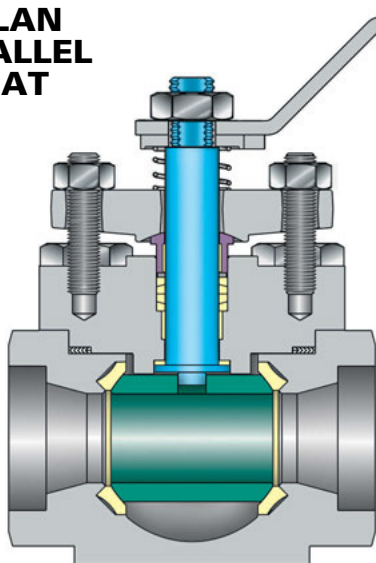


STEP 3
Remove seats.
*Once ball is out,
a simple jolt with
fingers or tool
removes seat.*

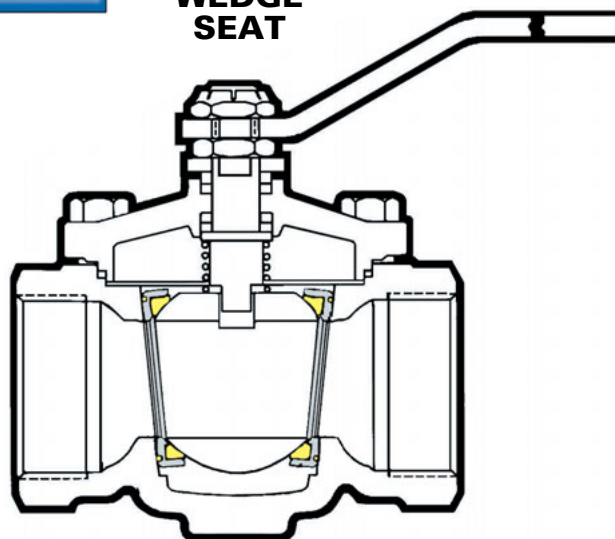


VELAN PARALLEL SEAT TOP-ENTRY VERSUS WEDGE SEAT DESIGN

**VELAN
PARALLEL
SEAT**



**WEDGE
SEAT**



FEATURES		VELAN PARALLEL SEAT	WEDGE SEAT
1	Memoryseal® parallel seats	yes	no
2	E-20 packing style	yes	no
3	100 ppm maximum emission guarantee	yes	no
4	Separate self-aligning packing flange and gland	yes	no
5	Fully guided stem independent of packing rings	yes	no
6	Cup and cone packing	yes	no
7	Locking device standard	yes	no
8	Straight through bore	yes	not in full port design
9	Optional two stud live-loading	yes	no
10	Stem bushings to prevent side thrust	yes	no
11	Fire safe to API 607 Rev. 5/ISO 10497	optional	no
12	Class 600 bonnet and bolting used on Class 150 and 300 valves	yes	no
13	High temperature service	yes	not without ball stop and special bonnet

The competing seat design illustrations shown on this page are general in nature and are not intended to show the exact design or performance of any specific manufacturer.

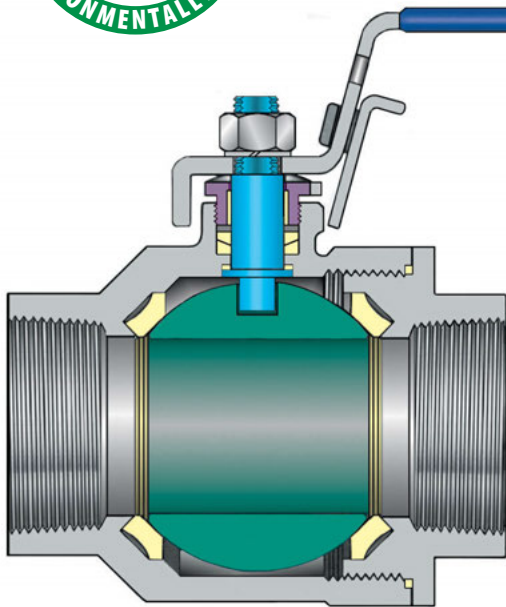
END-ENTRY MEMORYSEAL® BALL VALVES



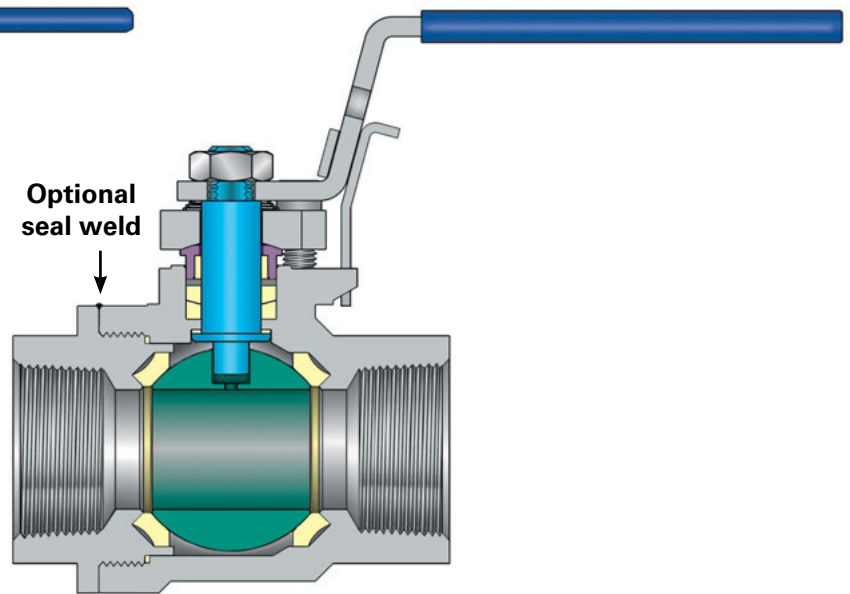
EE-1000 AND EP-2000 END-ENTRY

EE-1000 CF8M, FULL PORT, NPS ¼–2 (DN 8–50), MPTFE SEATS

EP-2000, REGULAR PORT, NPS ½–2 (DN 15–50)
WCB, CF8M, AND MPTFE SEATS



EE-1000



EP-2000 with flanged gland

DESIGN FEATURES

- Exclusive Memoryseal® seats compensate automatically for wear and fluctuations in pressure and temperature.
- Multiple solid cup and cone type PTFE stem seal or graphite packing.
- Adjustable packing flange – EP-2000.
- Adjustable threaded gland – EE-1000.
- Stem guides reduce side thrust.
- Long cycle life.
- Low, uniform torques.
- Blowout-proof stem.
- Live-loaded thrust washer prevents galling and provides a secondary stem seal.
- Fully enclosed body seal plus metal-to-metal seal for body and body end. Body seal protects threads from medium on EP-2000.
- Rugged two-piece design with wall thickness to B16.34 (EP-2000).
- Stainless handle with safety clip. Oval handwheel also available.
- Provision for seal welding on EP-2000.
- Fire tested in accordance with API 607 Rev.5/ISO 10497. (See page 11 for details.)

APPLICATIONS

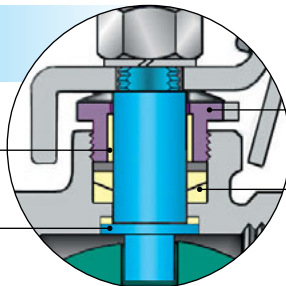
The EE-1000 is a full port all stainless steel valve for corrosive service.

The EP-2000 is a regular port WCB or CF8M heavy duty valve for oilfields, chemical, and general use.

STEM SEAL DESIGNS

EE-1000

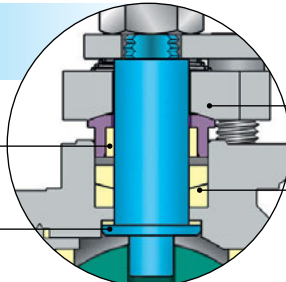
Stem guide prevents side thrust
Blowout-proof stem



Threaded gland
Cup and cone packing rings

EP-2000

Stem guide prevents side thrust
Blowout-proof stem



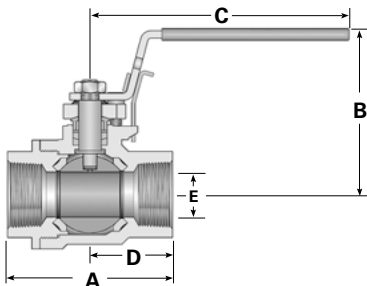
Adjustable self-aligning packing flange
Cup and cone packing rings

END-ENTRY MEMORYSEAL® BALL VALVES

STANDARD MATERIALS

PART	EE-1000	EP-2000 CARBON STEEL	EP-2000 STAINLESS STEEL
Body	CF8M	WCB	CF8M
Body end	CF8M	WCB	CF8M
Stem	SS 316	SS 316	SS 316
Ball	SS 316	SS 316	SS 316
Thrust washer	RPTFE	RPTFE	RPTFE
Seat	MPTFE	MPTFE	MPTFE
Packing flange	N/A	WCB	CF8M
Gland bushing	SS 304	SS 304	SS 304
Packing ring ⁽¹⁾	PTFE	PTFE	PTFE
Gland bolt	N/A	Gr. B7	Gr. B8M Cl. 2
Gland bushing sleeve	RPTFE	RPTFE	RPTFE
Body seal	PTFE	PTFE	PTFE
Handle nut	Stainless	Stainless	Stainless
Locking device	SS 304	SS 304	SS 304
Handle	SS 304	SS 304	SS 304
Spring	SS 302	SS 302	SS 302
Packing washer	N/A	SS 316	SS 316

(1) Use graphite packing for service above 400°F (204°C).



FLOW COEFFICIENT Cv

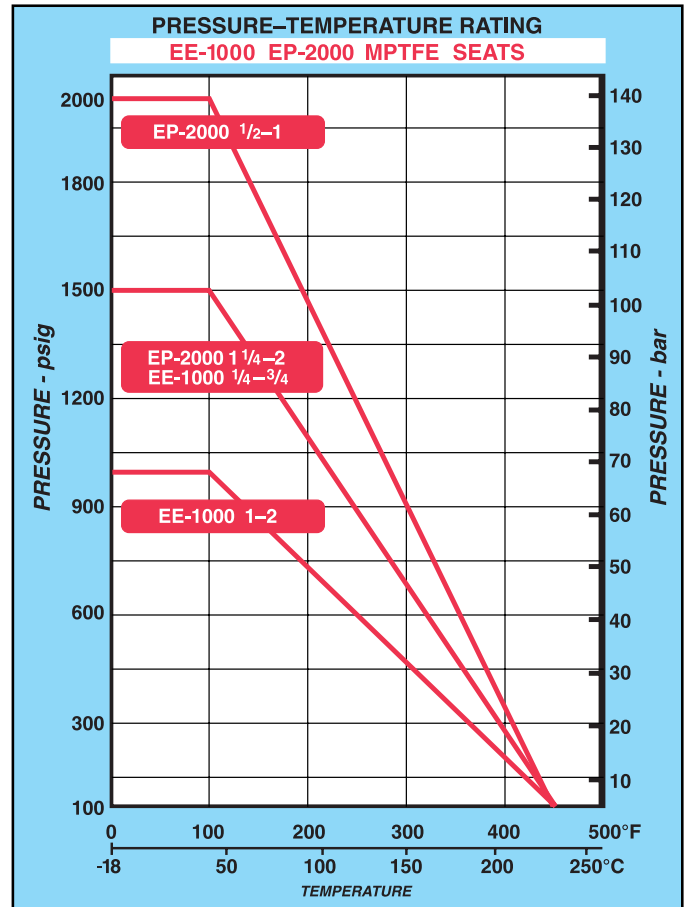
SIZE NPS (DN)	Cv ⁽²⁾	
	EE-1000	EP-2000
1/4 (8)	5.0	—
3/8 (10)	5.7	—
1/2 (15)	13.5	10
3/4 (20)	50	19
1 (25)	93	39
1 1/4 (32)	170	65
1 1/2 (40)	250	87
2 (50)	450	112

(2) $K_v = C_v \times 0.85$

DIMENSIONS AND WEIGHTS

SIZE NPS DN	EP-2000 REGULAR PORT					WEIGHT lb kg
	A	B	C	D	E	
1/2 15	2.50 64	3.33 85	5.47 139	1.26 32	0.50 13	1.2 0.5
3/4 20	2.93 74	3.38 86	5.47 139	1.49 38	0.63 16	1.5 0.7
1 25	3.46 88	4.07 103	5.92 150	1.69 43	0.81 21	3.0 1.4
1 1/4 32	4.20 107	4.26 108	5.92 150	2.12 54	1.01 26	4.3 2.0
1 1/2 40	4.55 116	4.87 124	7.82 199	2.28 58	1.25 32	6.3 2.9
2 50	5.14 131	5.06 129	7.82 199	2.57 65	1.50 38	8.7 3.9

SIZE NPS DN	EE-1000 FULL PORT					WEIGHT lb kg
	A	B	C	D	E	
1/4 8	2.06 52	2.25 57	4.81 122	1.03 26	0.36 9	0.4 0.2
3/8 10	2.06 52	2.25 57	4.81 122	1.03 26	0.36 9	0.4 0.2
1/2 15	2.50 64	2.60 66	5.00 127	1.27 32	0.50 13	0.9 0.4
3/4 20	3.11 79	2.97 75	5.19 132	1.56 40	0.81 21	1.8 0.8
1 25	3.74 95	3.16 80	6.57 167	1.87 48	1.02 26	2.5 1.1
1 1/4 32	4.24 108	4.16 106	7.85 199	2.12 54	1.25 32	4.6 2.1
1 1/2 40	4.75 121	4.34 110	7.85 199	2.37 60	1.50 38	5.8 2.6
2 50	5.74 146	4.76 121	8.19 208	2.87 73	2.00 51	10.1 4.6



Note: Above chart shows sizes in NPS.

Materials and other technical data pages 35 to 42.
Torque charts on page 40-41.



EE-1000
NPS 1 (DN 25)

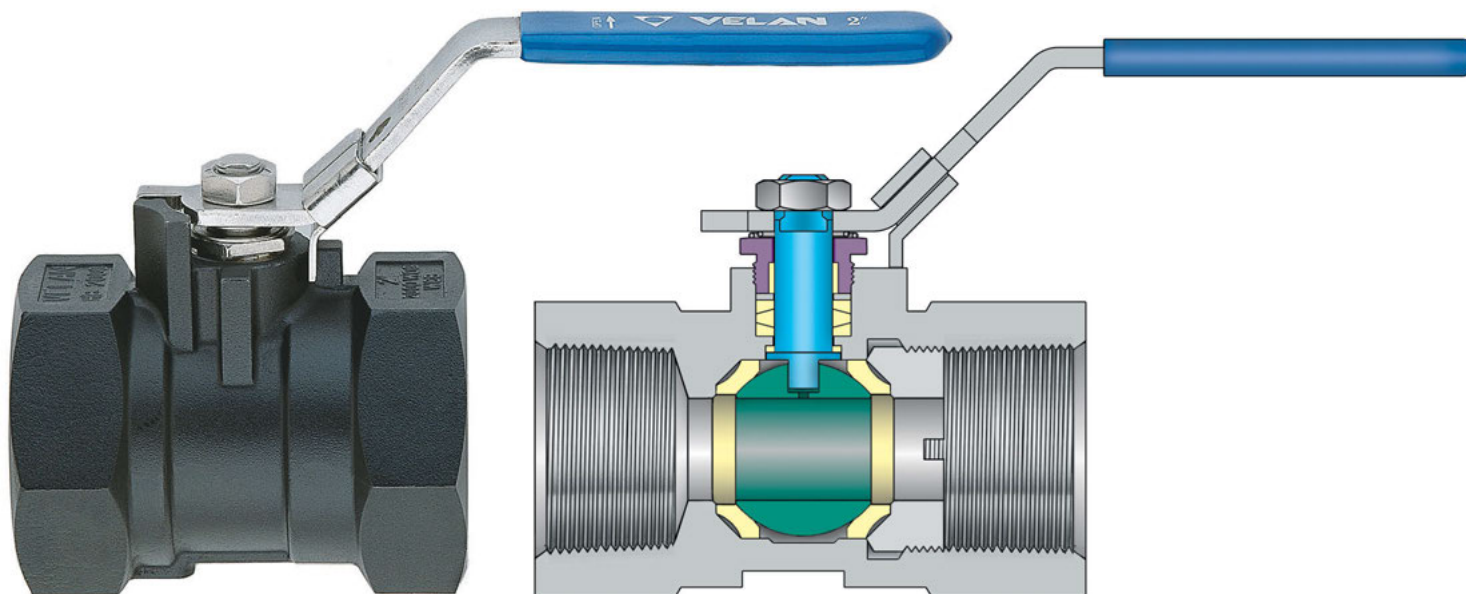


EP-2000
NPS 1 1/2 (DN 40)
with optional seal weld

HB-2000 MEMORYSEAL® BALL VALVES

ONE-PIECE REDUCED PORT

NPS 1/4-2 (DN 8-50), THREADED ENDS, MPTFE/RPTFE SEATS



DESIGN FEATURES

- Exclusive Memoryseal® seats compensate automatically for wear and fluctuations in pressure and temperature.
- Multiple solid cup and cone type PTFE stem seal or graphite packing.
- Adjustable self locking threaded gland NPS 1/2 – 2 (DN 15 – 50).
- Stem guide in gland bushing prevents side thrust.
- Long cycle life.
- Low, uniform torques.
- Blowout-proof stem.
- Thrust washer prevents galling, reduces torque and provides secondary stem seal.
- One-piece heavy wall body for high structural strength to ASME B16.34.
- Full size packing chamber.
- Protective metal washer for packing rings.
- Stainless steel handle with safety clip. Oval handwheel also available with safety clip.

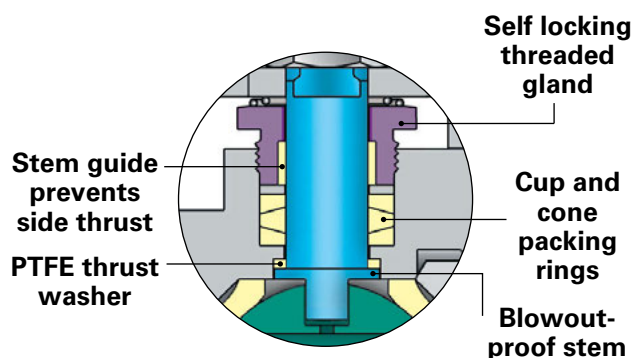
APPLICATIONS

A rugged low-cost ball valve for many industrial, commercial, and original equipment manufacturers.

For water, oil, gas and saturated steam up to 150 psig (10.3 bar).

- Fire tested in accordance with API 607 Rev.5/ISO 10497. (See page 11 for details.)

STEM SEAL DESIGN



HB-2000 MEMORYSEAL® BALL VALVES

STANDARD MATERIALS

PART	CARBON STEEL	STAINLESS STEEL	ALLOY 20
Body	WCB	CF8M	Alloy 20
Seat retainer	WCB	SS 316	Alloy 20
Ball		SS 316	Alloy 20
Seat		MPTFE/RPTFE	
Stem		SS 316	Alloy 20
Thrust washer		RPTFE	
Packing		PTFE	
Packing nut		SS 304	
Packing nut sleeve		RPTFE	
Packing washer		SS 316	
Handle nut		Stainless steel	
Handle		Stainless steel	
Coil spring		Stainless steel	

HB-2000 PRESSURE-TEMPERATURE RATING

MEDIUM	SERVICE CONDITIONS
WOG	2000 psig @ 100°F (138 bar @ 38°C)
	100 psig @ 450°F (7 bar @ 232°C)

FLOW COEFFICIENT Cv

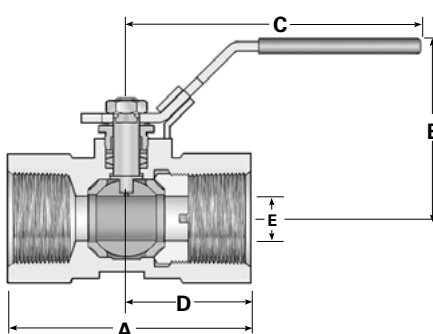
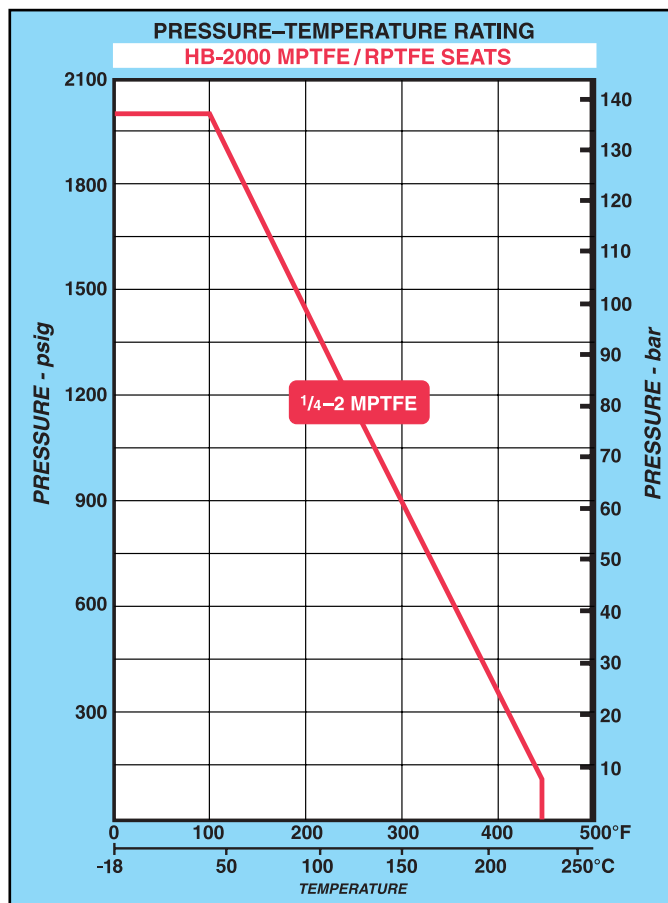
SIZE NPS (DN)	Cv ⁽¹⁾	SIZE NPS (DN)	Cv ⁽¹⁾
¼ (8)	2.5	1 (25)	14.0
⅜ (10)	3.5	1¼ (32)	33.0
½ (15)	4.8	1½ (40)	45.0
¾ (20)	9.5	2 (50)	58.0

(1) $K_v = C_v \times 0.85$

Materials and other technical data
pages 35 to 42.



HB-2000 with oval handle and safety clip.
For different types of handle designs available
see page 34.



Note: Above chart
shows sizes in NPS.

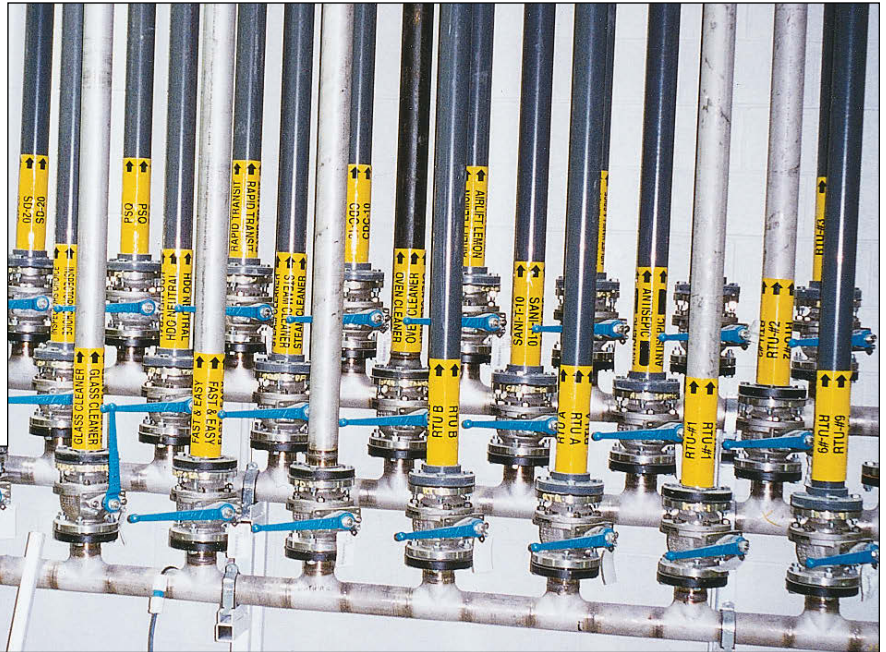
DIMENSIONS AND WEIGHTS

SIZE NPS DN	HB-2000					WEIGHT lb kg
	A	B	C	D	E	
¼ 8	1.58 40	1.26 32	2.67 68	0.83 21	0.23 6	0.3 0.1
⅜ 10	1.75 44	1.36 35	3.24 82	0.90 23	0.33 8	0.3 0.1
½ 15	2.43 62	1.98 50	3.83 97	1.30 33	0.36 9	0.8 0.4
¾ 20	2.75 70	2.28 58	4.00 102	1.43 36	0.50 13	1.1 0.5
1 25	3.38 86	2.53 64	4.00 102	1.73 44	0.63 16	1.9 0.9
1¼ 32	3.69 94	3.33 85	6.12 155	1.94 49	0.75 19	3.2 1.5
1½ 40	4.00 102	3.42 87	6.12 155	2.09 53	0.93 24	4.1 1.9
2 50	4.50 114	4.13 105	7.06 179	2.27 58	1.21 31	6.7 3.0

VELAN BALL VALVES IN-SERVICE

Velan valves have a long history of proving themselves in many of the industrial world's toughest applications. Velan offers one of the most comprehensive lines of industrial valves available from any manufacturer.

A commitment to ongoing design innovations and the latest in manufacturing technology allows Velan to offer a wide range of engineered solutions at an exceptional value. There simply is no substitute for experience and proven performance.

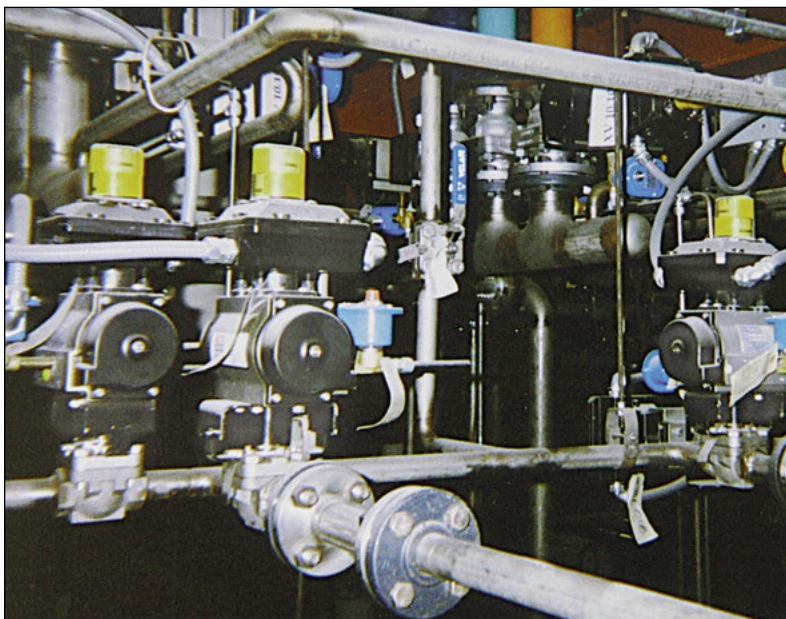


Split-body ball valves installed in a chemical plant in Ohio.

VELAN BALL VALVES IN-SERVICE



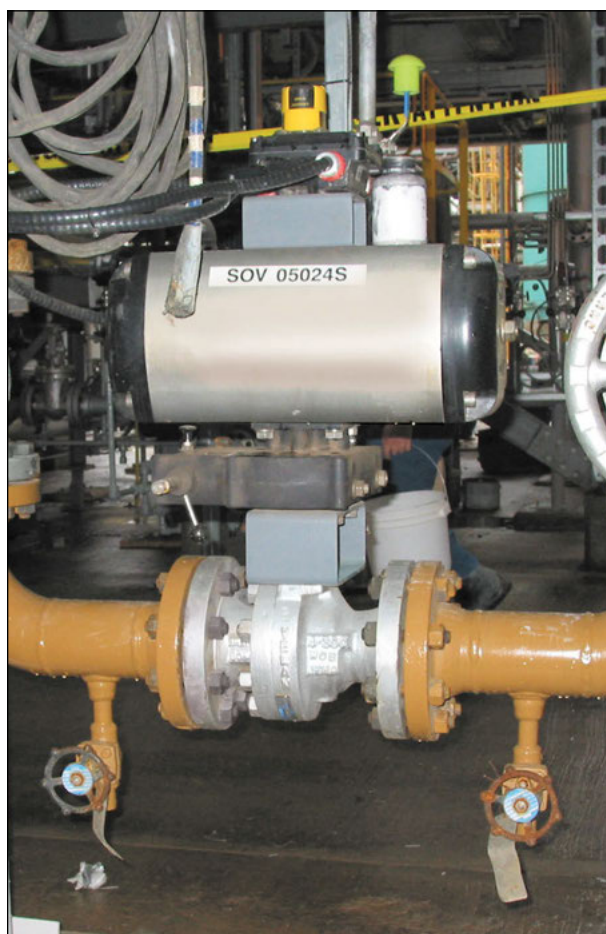
Split-body ball valves installed in a waste water treatment plant in Canada.



Top-entry ball valve installation.



NPS 20 (DN 500) split-body bypass ball valve installed at James Bay in Canada.



Automated split-body ball valve on hydrocarbon service at a Petro Canada refinery in Montreal, Quebec. The valve has been cycling every hour 24/7.

VELAN SPECIAL SERVICES

ON-OFF STEAM SERVICE

Steam and a mixture of steam and condensate containing dissolved gases like carbon dioxide and oxygen are more corrosive than water. High velocity during cycling can damage valve parts—especially resilient seats. Bronze bodies are also subject to corrosion by alkaline “carry-over” of boiler water or free ammonia. Valve materials must be carefully selected.

ADDITIONAL DESIGN FEATURES

All balls are provided with a 1/8" (3 mm) hole drilled into the T-slot to prevent excessive pressure build-up in the cavity from trapped liquid when the valve is in the open position. Special handles are available to meet safety and insulation requirements (see page 39).

APPLICATIONS

Trap lines, condensate drains, steam tracing lines, steam cleaning machines, laundry units, sterilizers, kettles, boiler shutoff and blowdown, cold/hot water lines, heating coils, steam-jacketing systems, paper machines, vulcanizing equipment, boiler feedwater, drip legs, bypass lines, etc.

All carbon and stainless steel valves with standard trim can be used for steam service. For pressure—limitations, see the table below.

**SELECTION TABLE
MATERIALS AND TRIM FOR STEAM SERVICE**

Steam ⁽¹⁾	Type and size ⁽²⁾	Seat	Packing
150 psig (10.3 bar)	All	RPTFE and MPTFE	PTFE
250 psig (17.2 bar)	SB-300/600	C-RPTFE	Graphite
	TE-300/600	RPTFE and MPTFE	
450 psig (31 bar)	TE-300/600 NPS 1/2–4 (DN 15–100)	C-RPTFE	Graphite
500 psig (34.5 bar)	TE-300/600 NPS 1/2–4 (DN 15–100)	Graphite PEEK	Graphite

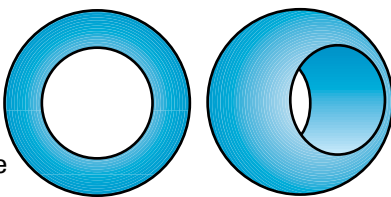
(1) Saturated steam, on/off operation.

(2) Consult ASME B 16.34 for body pressure–temperature rating.

THROTTLING SERVICE CONTROL VALVES

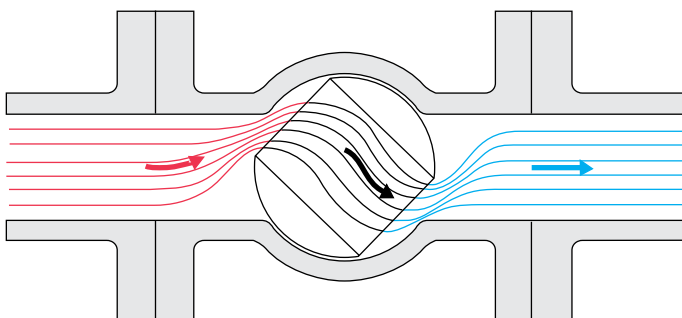
HOW IT WORKS

1. In the fully open position there is no obstruction to flow. The maximum Cv values shown on the product pages are substantially larger than for any other throttling valve. Half size pipeline valves can be used.
2. When throttling, the pressure drop is distributed over two orifices reducing the velocity and erosion effect and improving the flow pattern on low flow.
3. The ball valve has an equal percentage flow characteristic as shown on the diagram, providing reliable throttling of gases and liquids within a 20–100% range.

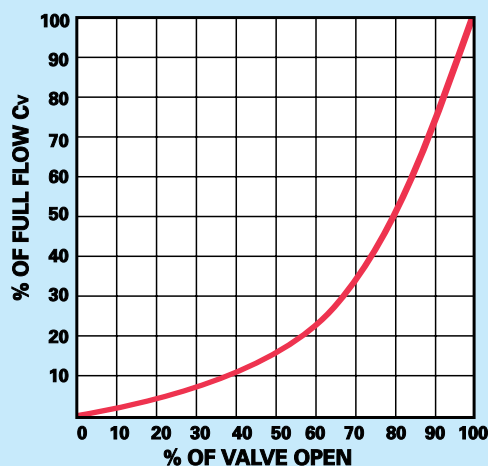


All styles of valves are suitable for manual throttling and can be equipped with special dials indicating the 20–100% throttling range.

All can also be supplied with pneumatic actuators and positioners, electric actuators with electronic servo-amplifiers or diaphragm actuators for automatic control.



FLOW DIAGRAM



VELAN SPECIAL SERVICES

VACUUM SERVICE

Memoryseal® ball valves can be used to 0.02 mm Hg or 20 micron at -50° to 400°F (-46° to 204°C) without modification due to the standard value-added advantages of our seat, packing chamber and gasket designs. For vacuum service up to 0.01 micron at 0° to +300°F (-18° to +149°C), please see below.

RATING	psi/bar	mm Hg	Micron
low	0.485/0.0334	25	—
standard valve	—	0.02	20
medium	—	0.001	1
high	—	1×10^{-6}	1×10^{-3}
very high	—	1×10^{-9}	1×10^{-6}

BALL VALVES FOR VACUUM SERVICE UP TO 0.01 MICRON AT 0° TO +300°F (-18° TO +149°C)

A. DESIGN – PRODUCTION

1. Seats and seals must be MPTFE or PTFE.
2. All mating surfaces sprayed with MPTFE or PTFE.
3. Seats and balls individually selected for finish.
4. All metal parts vapor degreased.
5. Body seat surfaces lapped to 16–32 RMS.

B. TESTING: Helium leak detector.

C. PACKAGING: All valve ends sealed off.

D. FIGURE NUMBER DESIGNATION: J
Example: **F10-01413-SSTJ**

CHLORINE SERVICE

Chlorine is extremely corrosive and toxic, and the corrosion rate increases with the percentage of water moisture. Up to 50 parts per million or 0.005% water, chlorine is considered dry. Above this level, it is considered wet. The liquid gas curve of chlorine is shown in the diagram below. There is also danger due to a high coefficient of thermal expansion. When cold liquid chlorine is trapped in the non-expanding space of the ball valve cavity, highly destructive pressures can develop.

Velan ball valves, factory ordered for chlorine service, are specially prepared to meet Chlorine Institute Pamphlet 6 requirements.

1. RELEASE OF CAVITY PRESSURE

Positive release to the upstream side is ensured in bypassing the upstream seat through a drilled hole in the ball. These valves must be installed in one direction only. An arrow indicates the directional use of the valve.

Self-relieving seats are also available. If required, please contact your local Velan office.

2. STANDARD MATERIALS

BODY: A 105 or WCB carbon steel.

SEATS: MPTFE.

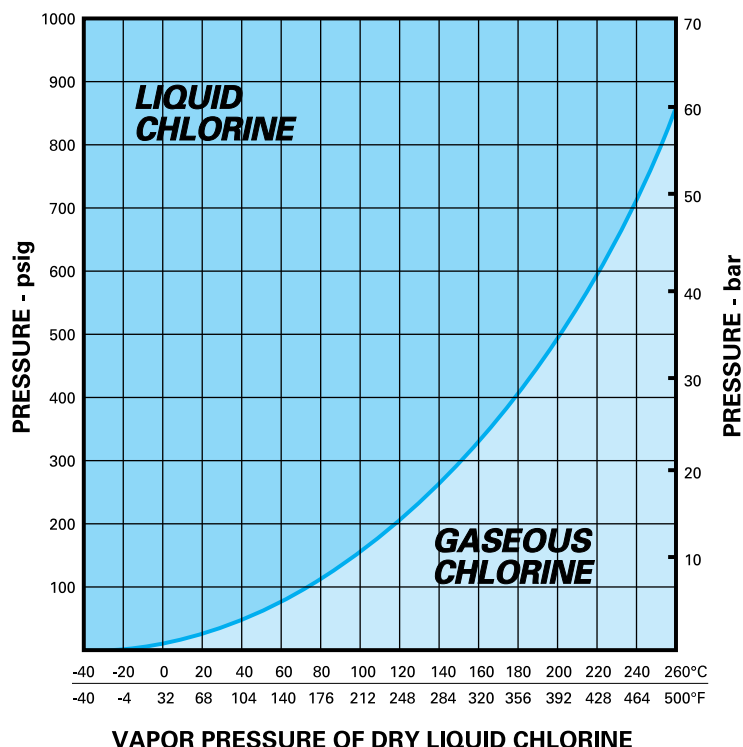
TRIM: Monel or Hastelloy C as per customer selection. Other materials are also available to customer specifications.

3. CLEANING

All parts are carefully cleaned and are black light tested to ensure they are free of hydrocarbons, alcohol, or moisture. Valves are dried after hydrotest and packed in plastic bags with a desiccant.

4. FIGURE NUMBER DESIGNATION: C

Example: **F10-01413-SSEC**



VELAN SPECIAL SERVICES

CRYOGENIC SERVICE

Valves to be used in cryogenic service have extended stems located in a sufficiently long tube to provide an insulating gas column above the cold fluid to prevent shrinkage of the stem packing.

NOTE: Cryogenic service valves are to be equipped with special seat designs.

The extension also allows for packing adjustments and maintenance when valves are installed in cold box service.

A 1/8" (3 mm) vent hole is provided in balls for cryogenic ball valves. Standard material for cryogenic service is austenitic stainless steel for all parts and bolting, offering excellent impact strength, minimizing heat loss and protecting against corrosion.

Extensions are usually specified by customers. Velan standard lengths for extensions are:

- 12" (305 mm) for valves NPS 1/2–2 (DN 15–50)
- 14–18" (356–457 mm) for valves NPS 2 1/2–12" (DN 65–300).

When welded, Inconel electrodes are used for all austenitic stainless steel valves.

TESTING

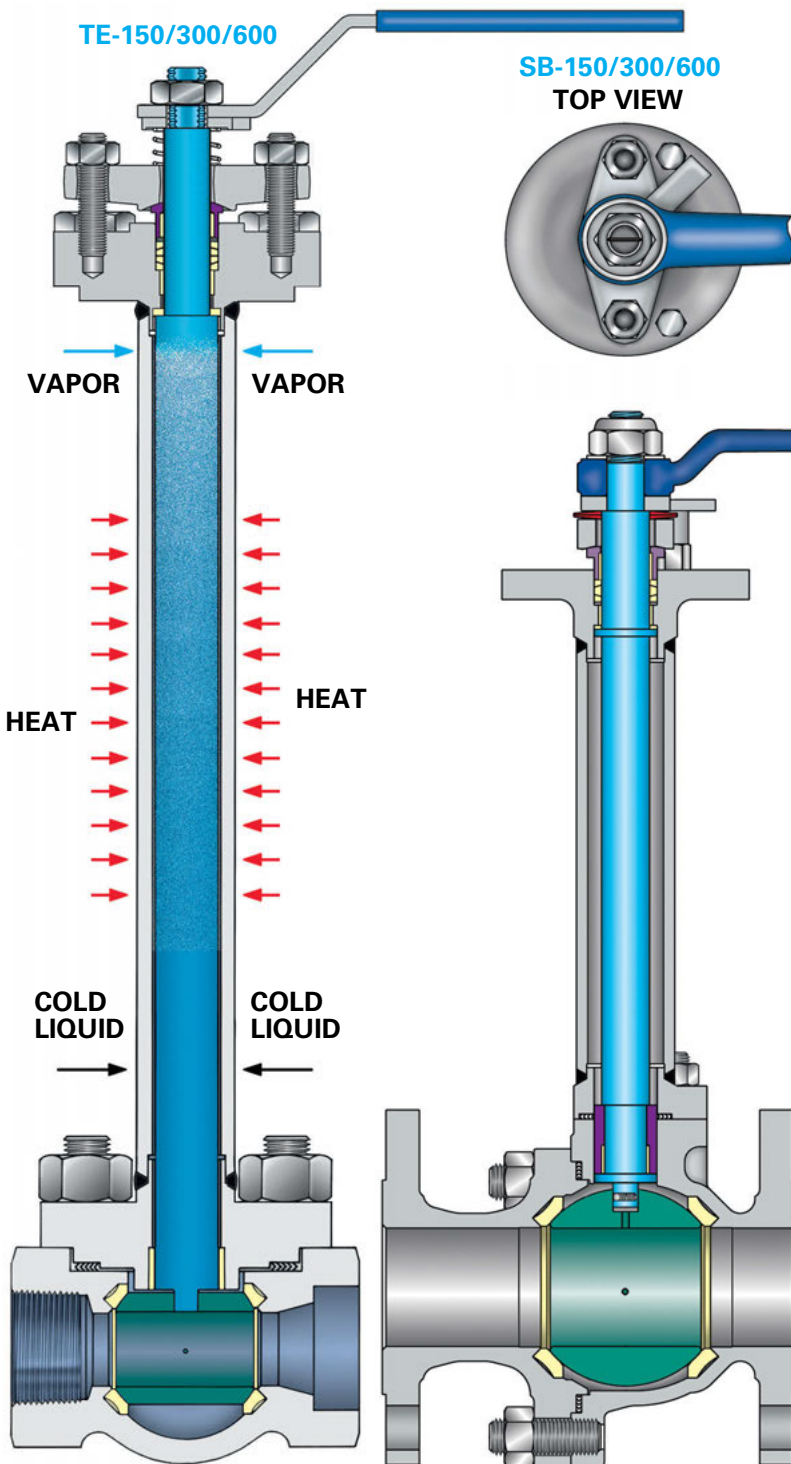
Valves can be qualification tested at cryogenic temperatures with nitrogen or helium gas.

SPECIAL CLEANING

All cryogenic valves are thoroughly degreased and cleaned, and pipe ends are sealed to prevent contamination.

LIVE-LOADED BODY BOLTING (OPTIONAL)

For applications where rapid temperature fluctuations (example: LNG loading platform) can cause joint leakage, body-bonnet bolting is live-loaded with Belleville spring washers.



CRYOGENIC GASES

TYPE	BOILING POINT		LIQUID DENSITY (lb/ft ³)	TYPE	BOILING POINT		LIQUID DENSITY (lb/ft ³)
	°C	°F			°C	°F	
Natural gas, LNG	-168	-270	26.0	Air	-194.40	-318	57.87
Methane, CH ₄	-161.5	-258	26.2	Nitrogen, N ₂	-195.80	-320	50.45
Oxygen, O ₂	-182.9	-296	71.2	Hydrogen, H ₂	-252.70	-423	4.43
Argon, Ar	-185.9	-303	87.4	Helium, He	-268.90	-452	7.82
Carbon dioxide, CO ₂	-78.5	-109	50.6	Absolute zero	-273.16	-460	–

VELAN SPECIAL SERVICES

CAVITY FILLERS

PTFE cavity fillers are used to fill the void in the valve cavity between the body, ball, and seats.

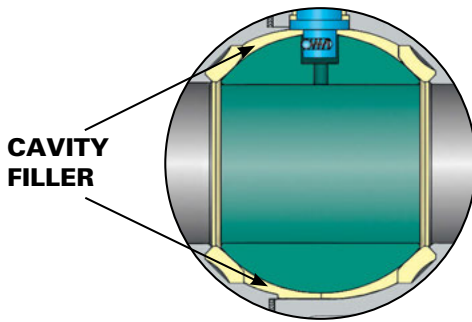
These PTFE sleeves reduce the chances of residual particles contaminating multiple use lines. They are also used in slurry services and processes that could solidify if left in a closed valve body.

They are available in:

- SB-150/300 regular port, NPS 2–8 (DN 50–200)
- SB-150/300 full port, NPS ½–6 (DN 15–150)

Cavity fillers are an option and can be identified by using the letter “F” in the last position of the figure number (see page 43).

Example: F10-01413-SSTF



SOUR GAS SERVICE

All Velan Memoryseal® valves can meet the material requirements of NACE⁽¹⁾.

For material selection and figure number designation, please contact your local Velan office.

(1) To ensure these valves meet NACE specifications, this requirement must be confirmed prior to placing the purchase order.

BUTADIENE SERVICE

MPTFE is recommended for seat material.

The molecular structure of this enhanced PTFE, (which prevents a “popcorning” effect normally associated with standard PTFE material in this service), and Velan’s flexible Memoryseal® seat design, (which compensates for wear and high torque), are ideally suited for butadiene service.

The figure number designation for MPTFE seat material is: “E”

Example: F10-01413-SSEA

NUCLEAR SERVICE



Velan holds an ASME N Certificate of Authorization to manufacture nuclear valves and components in Classes I, II, and III in its U.S. and Canadian plants. Strict quality control in all facets of procurement of material and production assures conformance to all ASME requirements for nuclear service.

For further information on valve selection please contact your local Velan office.

HYDROGEN PEROXIDE SERVICE

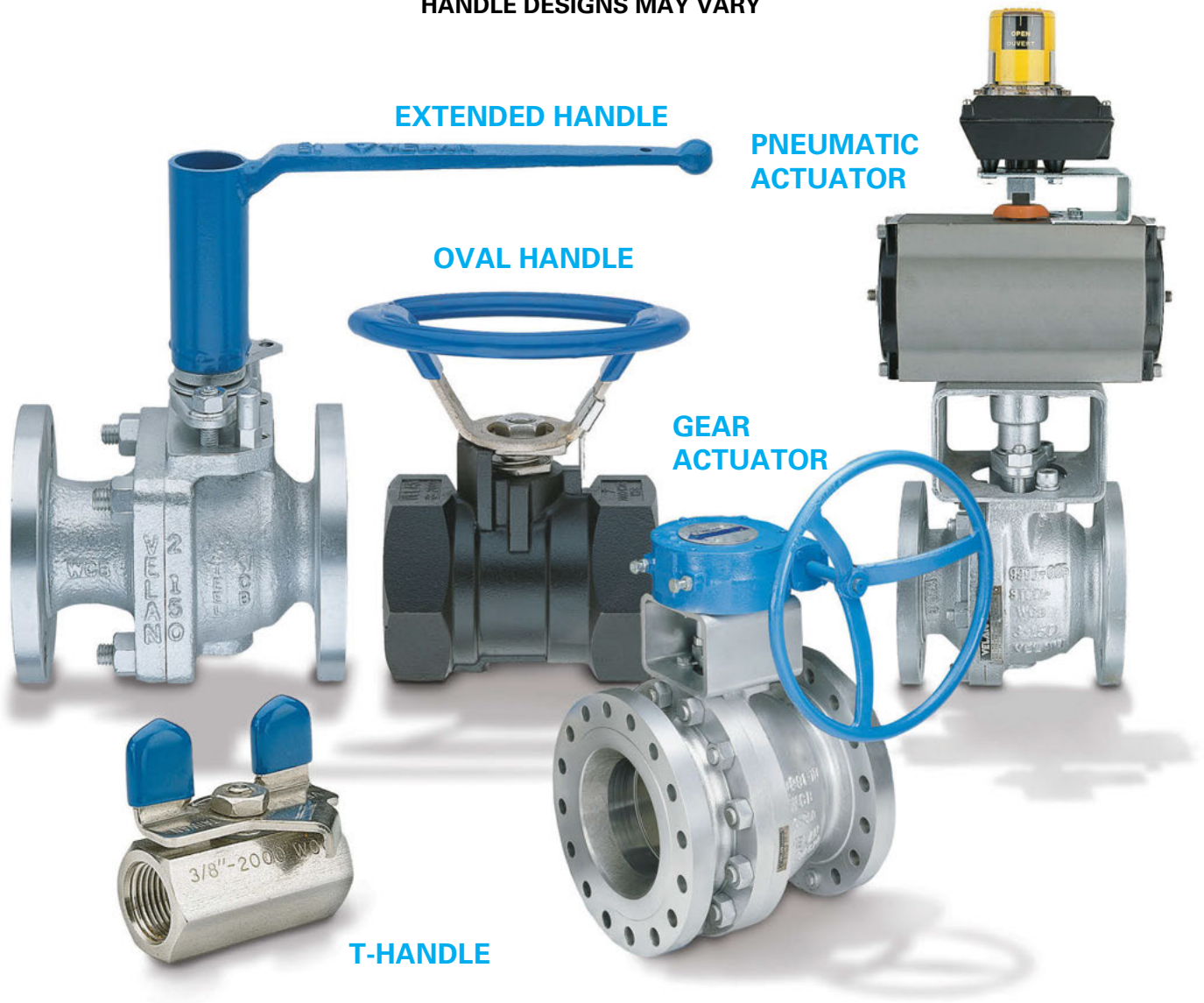
Valves are supplied in SS 316 to resist deterioration associated with hydrogen peroxide service.

Special passivation is available, if requested. All balls must be drilled to relieve trapped hydrogen peroxide, which may build up pressure in the valve cavity. Valves must be cleaned internally and degreased as they are in oxygen or chlorine service.

Valves must be provided with PTFE packing and stainless steel gasket (graphite free).

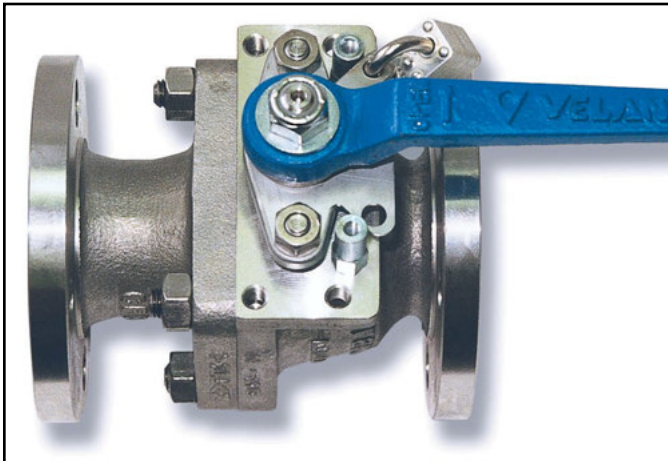
SPECIAL HANDLES AND ACTUATORS

HANDLE DESIGNS MAY VARY

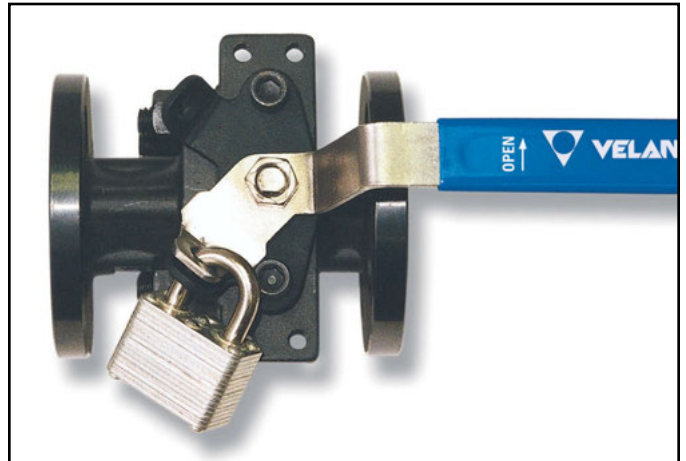


LOCKING DEVICES

Standard on NPS 2–8 (DN 50–200) SB-150/300/600



Standard on NPS ½–1½ (DN 15–40) SB-150/300



BALL VALVES – MANUAL GEAR ACTUATORS

Velan recommends manual gear actuators on all NPS 8–12 (DN 200–300) valves that are not equipped with air or electric actuators. Manual gear actuators are also used on NPS 3–6 (DN 80–150) valves where operating space is too small for lever handles.

The actuators are fully enclosed and a pointer indicates the position of the ball.

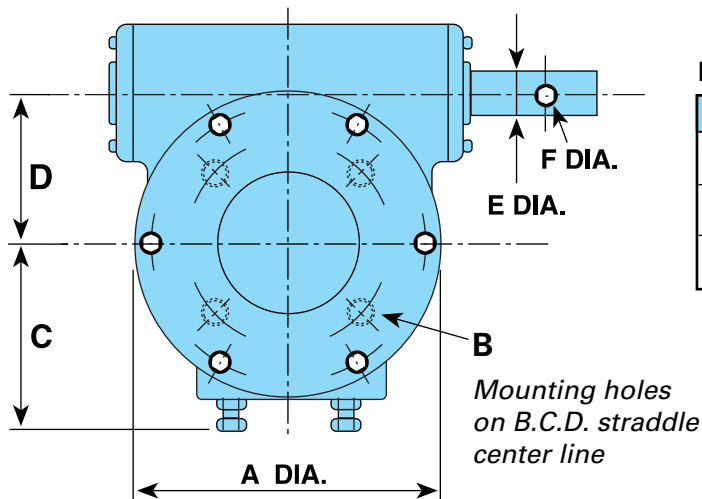
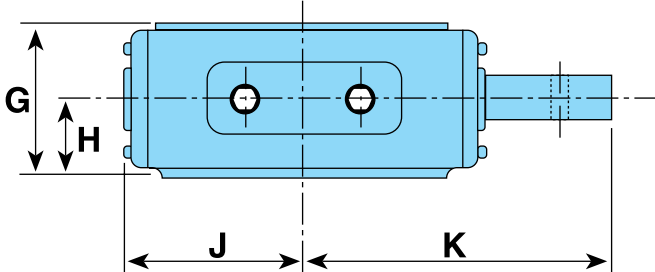
Handle extensions, chain sprockets, and right angle drives are available.



Standard on NPS 2–8 (DN 50–200) SB-150/300/600.



Split-body ball valve in pulp and paper.



TORQUE RATINGS

UNIT	RATIO	MAXIMUM OUTPUT TORQUE		MAXIMUM SHAFT DIAMETER		WEIGHT		EFFICIENCY
	Basic	lb-in	Nm	in	mm	lb	kg	Basic
GO-2	30:1	4,800	542	1.437	36	22	10	0.25
GO-3	50:1	9,000	1,017	2.250	57	29	13	0.25
GO-4	80:1	21,000	2,373	3.250	83	70	32	0.25

DIMENSIONS

UNIT	A	B	C	D	E	F	G	H	J	K
GO-2	6.37 162	4 x 3/8 – 16 UNC, 3 7/8" (98.4 mm) B.C.D.	4.00 102	2.50 64	0.75 19	0.18 4.57	3.50 89	1.50 38	3.18 81	8.00 203
GO-3	7.12 181	4 x 1/2 – 13 UNC, 5" (127 mm) B.C.D.	4.25 108	3.12 79	0.75 19	0.18 4.57	3.75 95	1.50 38	3.50 89	8.00 203
GO-4	10.00 254	4 x 3/4 – 10 UNC, 6 1/2" (165 mm) B.C.D.	5.75 146	4.50 114	1.00 25	0.25 6.35	4.50 114	2.25 57	5.18 132	9.81 249

AUTOMATED VALVES

Velan ball valves are available in a variety of automation packages that include pneumatic, electric, and hydraulic. Automation is done either by Velan at its own facilities located around the world or by authorized automation centers. In either case, automation is done in accordance with strict guidelines of quality assurance, engineering standards, and performance.

Velan automated ball valves have been supplied to the following:

- Oil refining
- Petrochemical
- Power
- Pulp and paper
- Chemical
- Pharmaceuticals
- Oil and Gas



Part of a shipment for 260 Velan automated ball valves being shipped to a large chemical company.

Thanks to Velan's flexible automation program, we can offer the best actuation package and accessories to meet the customer's needs, whatever their performance and commercial requirements.

Velan maintains "Specification for Valve Automation" and "Quarter Turn Actuation Standards" documents. Only those automation centers that adhere to these standards and are approved by Velan audits earn the status of "Authorized Velan Automation Center."

This program ensures our ball valves can be automated by a wide range of actuators and accessories, regardless of whether the actuation is done at Velan or at an authorized automation center.

All automated ball valves from Velan or authorized automation centers have a discrete serial number data sheet on permanent file. This permanent record contains the source of supply and data



Velan split-body automated ball valves sizes NPS ½ – 4 (DN 15–100) installed in a major chemical plant, in Ohio.

on all components such as actuators, solenoid valves, limit switches, and positioners. All the test data—such as operational and seat leak tests—are recorded as well.

HIGH CYCLE LIFE, AUTOMATION, AND CONTROL

FOR AUTOMATED VALVE SERVICE VELAN'S SUPERIOR E-20 PACKING DESIGN MAKES THE DIFFERENCE



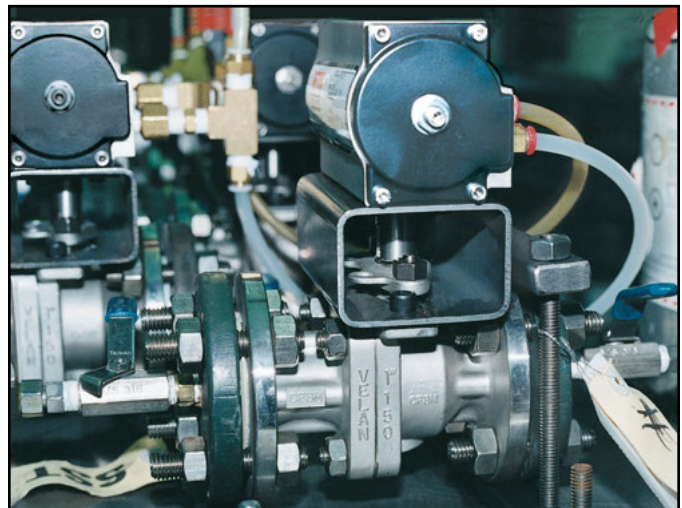
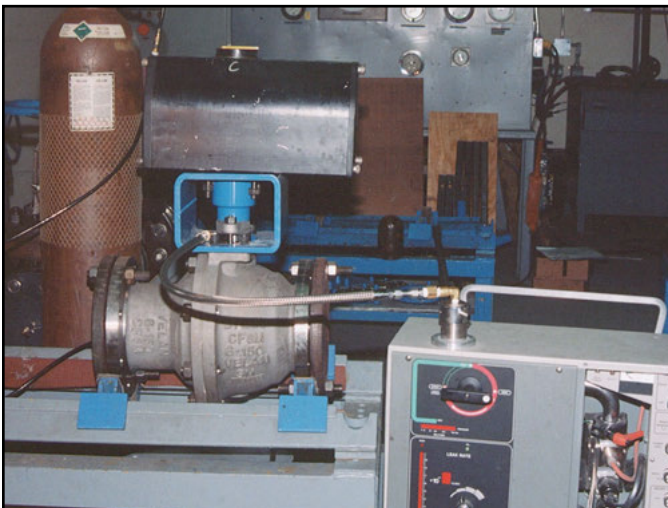
Velan supplies automated packages with integral control actuation.

The higher cycle rates resulting from the automation of ball valves for either remote operations or throttling control necessitate superior stem packing designs.

The Velan E-20 stem packing designs shown on page 8 and 9 (as well as the optional designs shown throughout the catalog) are intended for automated valve service.

The integrity of these designs has been verified by our own laboratory testing, operational experience, and in qualification tests by external inspection agencies. This ensures trouble free service in automated and throttling control and the best in stem packing integrity.

VELAN Control Valve Specification																																																																																			
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TA-LUFT qualification test on a NPS 6 (DN 150) and a NPS 1 (DN 25) SB-150 ball valve.

SIZING OF ACTUATORS

ELEMENTS AFFECTING THE VALVE TORQUE

The torque requirements of soft seated ball valves depend on many factors:

VALVE DESIGN AND MATERIAL SELECTION

- **Seat design and material selection**
Velan seats were developed to ensure maximum flexibility and low torque. The friction force depends on the seat material, and the applicable torque multipliers are shown in the seat material selection table on page 39.
- **Ball – free-floating or trunnion-mounted?**
A free floating ball is forced against the downstream seat by the fluid pressure and the resulting torque is a product of the friction force and the seat/ball contact radius. The fluid load is carried by the bearings in a trunnion-mounted ball valve, resulting in a lower torque overall.
- **Stem seal**
The torque resulting from the stem-packing friction depends on the packing chamber depth, the type of materials, and the size of the stem/packing rings – smaller the valve, the greater the importance of the stem seal factor.

SERVICE CONDITIONS

- **Differential pressure**
The breakaway torque increases substantially with the differential pressure on larger ball valves. On small ball valves, up to NPS 1 (DN 25), where the stem packing friction is higher than the ball/seat torque, the overall torque remains approximately the same.
- **Frequency of operation**
When a valve remains in the closed position for extended periods of time, the breakaway torque increases due to the resilient material filling the voids in the ball caused by machining and other problems.
- **Fluid influence**
The torque tends to be lower with oils, but higher with gas or other liquids with solids or slurries. Dirt and solid particles can become embedded in the seats, which greatly increases the torque. Note that torque data on the product pages is the result of laboratory tests with clean water at ambient temperature.
- **Influence of temperature**
Within the operating temperature range, the torque, in most cases, remains constant—except at low cryogenic levels when the seats become more rigid.
- **Limitation to speed of actuation**
Resilient materials such as virgin PTFE or reinforced PTFE (RPTFE) can be damaged by a fast turning ball under pressure. The speed limits for closing or opening the ball valves for sizes:
 - NPS ½–2½ (DN 15–65), 0.5 second
 - NPS 3–6 (DN 80–150), 1-second
 - NPS 8–12 (DN 200–300), 5-seconds

TYPICAL EXAMPLES FOR SIZING ACTUATORS BASED ON ACTUATOR TORQUING EQUATION

To obtain the torque requirements for an actuator:

- Step 1** Determine the basic, maximum torque “**TT**” for a particular valve and pressure differential from torque tables on the product pages.
- Step 2** Determine the seat factor “**MF**”, from *Table 1* (page 39). For PTFE or RPTFE, the factor is 1.0.
- Step 3** Determine the fluid factor “**FF**”, from *Table 2* (page 39).
- Step 4** Determine the frequency of operation factor “**OF**”, from *Table 3* (page 39).

Using the data from Steps 1–4, the actuator torque equation “**AT**” can now be established:

$$AT = TT \times MF \times FF \times OF = \text{lbf}\cdot\text{in (Nm)}$$

$$AT = (\text{Step 1}) \times (\text{Step 2}) \times (\text{Step 3}) \times (\text{Step 4}) = \text{lbf}\cdot\text{in}$$

Example for a split-body flanged in CF8M, full port:

- Application:** Liquid oxygen evaporizer.
- Service:** Clean, dry, oxygen gas.
Differential pressure 60 psid (4.1 bar).
- Service temp.:** 70°F (21°C).
- Cycle time:** Every 6 hours.
- Valve size:** SB-150, NPS 4 (DN 100).
- Seat material:** PTFE.
- Actuator:** Pneumatic actuator with spring return, fail closed.
- Air supply:** 90 psig (6.2 bar).

Sizing of torque:

- TT** = 2000 lbf·in (226 Nm), For $\Delta P = 60$ psid (4.1 bar).
- MF** = 1 (PTFE) (*Table 1*)
- FF** = 1.3 (*Table 2*)
- OF** = 1 (*Table 3*)

Minimum break torque required

$$AT = 2000 (226 \text{ Nm}) \times 1 \times 1.3 \times 1 = 2600 \text{ lbf}\cdot\text{in (294 Nm)}$$

Selection of actuator:

In the above example, 2600 lbf·in (294 Nm) is the minimum required valve break torque or the minimum required actuator output torque. Since allowances for the fluid type, seat material, and frequency of operation have already been incorporated into the torque calculation, additional safety factors are not required. However, it is good practice to apply an additional 1.5 multiplier to the break torque when selecting a pneumatic actuator. This will ensure smooth operation and protection from occasional reduction of air pressure. This is sufficient data when constant torque type actuators such as rack and pinion double acting or electric actuators are used. However, when scotch-yoke type, spring return–fail closed, or spring return–fail open actuators are used, factor the break torque by 0.70 for run torque and by 0.80 for reseal torque.

ACTUATOR TORQUE REQUIREMENT CALCULATIONS

IMPORTANT NOTES

- Published factors are to be used as a guide.
- The actuator selection has to be based also on economic considerations. A valve that has an important function, or one that is out of reach for service, should have a larger actuator than would normally be selected.

TABLE 1 SEAT FACTOR "MF" AND SEAT MATERIAL SELECTION

SEAT MATERIAL	APPLICATION AND LIMITATIONS					FACTOR "MF" ⁽¹⁾
	TEMP. RANGE °F (°C)	CHEMICAL	RADIATION	TYPE OF VALVE	SERVICE APPLICATION	
PTFE (T) Virgin polytetrafluoroethylene	-100 to 400 (-73 to 204) <i>See Note 2</i>	All except: - Molten alkali metals - Liquid or gaseous fluorine - A few fluorochemicals (i.e., CLF ₃ and OF ₂)	10 ⁴ RAD	EE-1000 EE-1500 SB-150/300 TE-150/300/600 UB-150/300	Chemical and cryogenic service.	1.0
RPTFE (G) 15% Glass reinforced	-100 to 450 (-73 to 232)	All except: - Molten alkali metals - Liquid or gaseous fluorine - A few fluorochemicals (i.e., CLF ₃ and OF ₂)	10 ⁴ RAD	EE-1000 EP-2000 HB-2000 OP-4000 SB-150/300 TE-150/300/600 UB-150/300	Used as standard for low and medium pressure service for steam service up to 150 psig (10.3 bar).	1.0
C-RPTFE (C) Carbon graphite reinforced PTFE	-100 to 500 (-73 to 260) <i>See Note 3</i>	All except: - Molten alkali metals - Liquid or gaseous fluorine - A few fluorochemicals (i.e., CLF ₃ and OF ₂) - Fluid media with carbon	10 ⁴ RAD	SB-150/300/600 TE-150/300/600	For high temperature and high pressure service. For steam up to 450 psig (31 bar).	1.0
MPTFE (E) Modified polytetrafluoroethylene	-100 to 450 (-73 to 232)	All except: - Molten alkali metals - Liquid or gaseous fluorine - A few fluorochemicals (i.e., CLF ₃ and OF ₂)	10 ⁴ RAD	EE-1000 EP-2000 SB-150/300 TE-150/300/600	For low and medium pressure service. Particularly recommended for use on styrene and butadiene.	1.0
PFA (K) Perfluoroalkoxyterafluoroethylene	-60 to 440 (-51 to 227)	All except: - Molten alkali metals - Liquid or gaseous fluorine - A few fluorochemicals (i.e., CLF ₃ and OF ₂)	2 x 10 ⁶ RAD	SB-150/300/600 TE-150/300/600	For applications with polymeric monomers, for example styrene or butadiene.	2.0
PEEK (P) Polyetheretherketon, reinforced by glass or graphite	-60 to 500 (-51 to 260)	Strong acids and bases at high concentration and temperature will affect the material.	10 ⁹ RAD	SB-150/300 TE-150/300/600	Best suited for high pressure and temperature service with steam in a radiation environment.	2.0
UHMW-PE (U) Ultra high molecular weight polyethylene	-60 to 200 (-51 to 93)	At temperatures below 140°F (60°C), the material is unaffected by a large number of solvents. It is attacked by aromatic and halogenated hydrocarbons and strong oxidizing agents (nitric acid, oleum and halogens).	10 ⁷ RAD	SB-150/300/600 TE-150/300/600	Where high chemical resistance and abrasion resistance are required.	1.3

TABLE 2 FLUID FACTOR "FF"

LIQUID	FACTOR "FF" ⁽¹⁾
Clean particle-free, non-lubricating (e.g.: water, alcohol or solvents)	1.0
Clean particle-free, lubricating oil	0.5 to 0.8
Slurry (liquids carrying solids) or heavy corroded and contaminated system	1.3 to 2.0
Gas or saturated steam, clean and wet	1.0
Gas or superheated steam, clean and dry	1.3
Gas, dirty (e.g.: natural gas)	1.2 to 1.5

TABLE 3 FREQUENCY OF OPERATION FACTOR "OF"

LIQUID	FACTOR "OF" ⁽¹⁾
Once per day or greater	1.0
Once per week or greater	1.3
Once per month or greater	1.4
Once per four-month or greater	1.5

- (1) The seat, fluid, and frequency of operation factors should be considered as a guide only and should be adjusted according to experience and judgment. Velan is not responsible directly or indirectly for actuator selection by third parties.
- (2) Down to -325°F (-198°C) for cryogenic service with special seats for Class 150/300. For temperatures below -100°F (-73°C), our cryogenic seat must be used the standard seat is not to be used for these lower temperatures.
- (3) Down to -325°F (-198°C) for cryogenic service with special seats for Class 600. For temperatures below -100°F (-73°C), our cryogenic seat must be used the standard seat is not to be used for these lower temperatures.

TORQUES FOR MEMORYSEAL® BALL VALVES

Seats: MPTFE, PTFE, RPTFE for SB-150/300 or C-RPTFE for SB-600

Packing: PTFE standard temperature range between -20°F and 400°F (-29°C and 204°C)

Net torque values⁽¹⁾ for clean fluids (lb.in/Nm)

SB-150/300 REGULAR PORT

lb-in/Nm

SIZE NPS DN	Maximum Differential Pressure - psi/bar								
	0	100 6.9	200 13.8	300 20.7	400 27.6	500 34.5	600 41.4	700 48.3	740 51
2 50	240 27	240 27	240 27	240 27	240 27	270 31	310 35	350 40	360 41
3 80	410 46	410 46	410 46	410 46	410 46	450 51	505 57	575 65	600 68
4 100	850 96	850 96	850 96	850 96	950 107	1050 119	1150 130	1300 147	1400 158
6 150	1900 215	1900 215	1900 215	2000 226	2300 260	2700 305	3000 339	3500 396	3700 418
8 200	4500 509	4500 509	4500 509	5000 565	5800 655	6300 712	7000 791	8000 904	8200 927
10 250	8400 949	8400 949	9000 1017	9900 1119	11000 1243	12000 1356	13000 1469	14500 1639	15000 1695
12 300	11500 1300	11500 1300	12000 1356	13000 1469	14000 1582	15000 1695	16000 1808	17000 1921	18000 2034
14 350	11500 1300	11500 1300	12000 1356	13000 1469	14000 1582	15000 1695	16000 1808	17000 1921	18000 2034
16 400	15000 1695	15000 1695	16000 1808	17000 1921	20000 2260	21500 2430	22500 2543	23000 2599	23500 2656
18 450	27500 3108	27500 3108	30000 3390	34000 3842	37500 4238	40000 4520	43000 4859	46000 5198	49000 5537
20 500	31000 3503	31000 3503	37000 4181	45000 5085	50000 5650	53000 5989	60000 6780	65000 7345	68000 7684
24 600	38000 4294	38000 4294	44000 4972	50000 5650	56000 6328	61000 6893	68000 7684	75000 8475	78000 8814

SB-150/300 FULL PORT

lb-in/Nm

SIZE NPS DN	Maximum Differential Pressure - psi/bar								
	0	100 6.9	200 13.8	300 20.7	400 27.6	500 34.5	600 41.4	700 48.3	740 51
1/2 15	30 3	30 3	30 3	30 3	30 3	30 3	30 3	30 3	30 3
3/4 20	55 6	55 6	55 6	55 6	55 6	55 6	55 6	55 6	55 6
1 25	80 9	80 9	80 9	80 9	80 9	80 9	95 11	120 14	130 15
1 1/2 40	240 27	240 27	240 27	240 27	240 27	270 31	310 35	350 40	360 41
2 50	410 46	410 46	410 46	410 46	410 46	450 51	505 57	575 65	600 68
2 1/2 65	600 68	600 68	600 68	600 68	610 69	700 79	800 90	900 102	920 104
3 80	850 96	850 96	850 96	850 96	950 107	1050 119	1150 130	1300 147	1400 158
4 100	1900 215	1900 215	1900 215	2000 226	2300 260	2700 305	3000 339	3500 396	3700 418
6 150	4500 509	4500 509	4500 509	5000 565	5800 655	6300 712	7000 791	8000 904	8200 927
8 200	8400 949	8400 949	9000 1017	9900 1119	11000 1243	12000 1356	13000 1469	14500 1639	15000 1695
10 250	11500 1300	11500 1300	12000 1356	13000 1469	14000 1582	15000 1695	16000 1808	17000 1921	18000 2034
12 300	15000 1695	15000 1695	16000 1808	17000 1921	20000 2260	21500 2430	22500 2543	23000 2599	23500 2656
14 350	27500 3108	27500 3108	30000 3390	34000 3842	37500 4238	40000 4520	43000 4859	46000 5198	49000 5537
16 400	31000 3503	31000 3503	37000 4181	45000 5085	50000 5650	53000 5989	60000 6780	65000 7345	68000 7684
18 450	38000 4294	38000 4294	44000 4972	50000 5650	56000 6328	61000 6893	68000 7684	75000 8475	78000 8814
20 500	45000 5085	45000 5085	60000 6780	70000 7910	80000 9040	82000 9266	90000 10170	100000 11300	110000 12430
24 600	55000 6215	60000 6780	90000 10170	130000 14690	145000 16385	150000 16950	165000 18645	175000 19775	195000 22035

SB-600 REGULAR PORT

lb-in/Nm

SIZE NPS DN	Maximum Differential Pressure - psi/bar							
	0	200 13.8	400 27.6	600 41.4	800 55.2	1000 69	1200 82.8	1480 102.1
2 50	275 31	275 31	275 31	316 36	397 45	479 54	561 63	675 76
3 80	410 46	410 46	450 51	491 50	532 60	620 70	674 76	750 85
4 100	1400 158	1400 158	1400 158	1520 172	1760 199	2000 226	2167 245	2400 271
6 150	3100 350	3100 350	3100 350	3480 393	4240 479	5000 565	5417 612	6000 678
8 200	10000 1130	10000 1130	10000 1130	11200 1266	13600 1537	16883 1908	17667 1996	20000 2260
10 250	14000 1582	14000 1582	14000 1582	23000 2599	29000 3277	35000 3955	41250 4661	50000 5650
12 300	24000 2712	24000 2712	24000 2712	38571 4359	48286 5456	58000 6554	69250 7825	85000 9605

SB-600 FULL PORT

lb-in/Nm

SIZE NPS DN	Maximum Differential Pressure - psi/bar							
	0	200 13.8	400 27.6	600 41.4	800 55.2	1000 69	1200 82.8	1480 102.1
2 50	410 46	410 46	450 51	491 50	532 60	620 70	674 76	750 85
3 80	1400 158	1400 158	1400 158	1520 172	1760 199	2000 226	2167 245	2400 271
4 100	3100 350	3100 350	3100 350	3480 393	4240 479	5000 565	5417 612	6000 678
6 150	10000 1130	10000 1130	10000 1130	11200 1266	13600 1537	16883 1908	17667 1996	20000 2260
8 200	14000 1582	14000 1582	14000 1582	23000 2599	29000 3277	35000 3955	41250 4661	50000 5650
10 250	24000 2712	24000 2712	24000 2712	38571 4359	48286 5456	58000 6554	69250 7825	85000 9605
12 300	33300 3763	33300 3763	39875 4506	57120 6455	74360 8403	91600 10351	108850 12300	132990 15028

(1) Values in Nm have been calculated by multiplying lb-in values by 0.113.

TORQUES FOR MEMORYSEAL® BALL VALVES

Seats: MPTFE, PTFE, RPTFE for SB-150/300 or C-RPTFE for SB-600

Packing: PTFE standard temperature range between -20°F and 400°F (-29°C and 204°C)

Net torque values⁽¹⁾ for clean fluids (lb.in/Nm)

UB-150/300 REGULAR PORT

lb-in/Nm

SIZE NPS DN	Maximum Differential Pressure - psi/bar								
	0	100 6.9	200 13.8	300 20.7	400 27.6	500 34.5	600 41.4	700 48.3	740 51
1/2 15	40 5	40 5	40 5	40 5	40 5	40 5	40 5	40 5	40 5
3/4 20	70 8	70 8	70 8	70 8	70 8	70 8	72 8	73 8	75 8
1 25	100 11	100 11	100 11	100 11	100 11	100 11	105 12	110 12	120 14
1 1/2 40	200 23	200 23	200 23	200 23	200 23	220 25	260 29	280 32	300 34
2 50	230 26	230 26	230 26	230 26	230 26	290 33	325 37	375 42	400 45
3 80	410 46	410 46	410 46	420 47	525 59	625 71	740 84	790 89	875 99
4 100	850 96	850 96	850 96	860 97	910 103	980 111	1150 130	1300 147	1500 170
6 150	2500 283	2500 283	2500 283	2900 328	3250 367	3500 396	4200 475	4500 509	4700 531
8 200	4250 480	4250 480	4300 486	4600 520	5000 565	5650 638	6200 701	6500 735	7000 791
10 250	6600 746	6600 746	7000 791	7500 848	8100 915	9100 1028	11000 1243	12000 1356	13000 1469
12 300	12000 1356	12000 1356	13000 1469	14000 1582	15000 1695	17000 1921	18500 2091	20000 2260	21000 2373

TE-150/300/600 REGULAR PORT

lb-in/Nm

SIZE NPS DN	Maximum Differential Pressure - psi/bar								
	0	200 13.8	400 27.6	600 41.4	800 55.2	1000 69	1200 82.8	1400 96.6	1480 102.1
1/2 15	45 5	45 5	45 5	45 5	45 5	45 5	45 5	45 5	45 5
3/4 20	70 8	70 8	70 8	70 8	70 8	70 8	80 9	88 10	90 10
1 25	130 15	130 15	130 15	130 15	135 15	150 17	160 18	180 20	200 23
1 1/2 40	240 27	240 27	240 27	275 31	320 36	365 41	430 49	490 55	525 59
2 50	420 47	420 47	430 49	480 54	525 59	620 70	700 79	780 88	810 92
3 80	600 68	600 68	650 73	825 93	1100 124	1400 158	1800 203	—	—
4 100	1350 153	1350 153	1650 186	2100 237	2325 ⁽²⁾ 263	—	—	—	—
6 150	2000 226	2854 323	4446 502	6037 682	7151 ⁽²⁾ 808	—	—	—	—

TE-150/300/600 FULL PORT

lb-in/Nm

SIZE NPS DN	Maximum Differential Pressure - psi/bar								
	0	200 13.8	400 27.6	600 41.4	800 55.2	1000 69	1200 82.8	1400 96.6	1480 102.1
1/2 15	70 8	70 8	70 8	70 8	70 8	70 8	80 9	88 10	90 10
3/4 20	130 15	130 15	130 15	130 15	135 15	150 17	160 18	180 20	200 23
1 25	240 27	240 27	240 27	275 31	320 36	365 41	430 49	490 55	525 59
1 1/2 40	420 47	420 47	430 49	480 54	525 59	620 70	700 79	780 88	810 92
2 50	600 68	600 68	650 73	825 93	1100 124	1400 158	1800 203	—	—
3 80	1350 153	1350 153	1650 186	2100 237	2325 ⁽²⁾ 263	—	—	—	—
4 100	2000 226	2854 323	4446 502	6037 682	7151 ⁽²⁾ 808	—	—	—	—
6 150	4250 480	7098 802	12296 1389	17494 1977	21132 ⁽²⁾ 2388	—	—	—	—

EE-1000

lb-in/Nm

SIZE NPS DN	Maximum Differential Pressure - psi/bar						
	0	250 17.2	500 34.5	750 51.7	1000 69	1250 86.2	1500 103.4
1/4 8	20 2	20 2	20 2	20 2	20 2	20 2	20 2
1/2 15	30 3	30 3	30 3	30 3	30 3	40 5	50 6
3/4 20	54 6	54 6	54 6	54 6	83 9	112 13	140 16
1 32	88 10	88 10	88 10	134 15	180 20	—	—
1 1/2 40	240 27	240 27	240 27	320 36	400 45	—	—
2 50	400 45	400 45	400 45	550 62	700 79	—	—

EP-2000

lb-in/Nm

SIZE NPS DN	Maximum Differential Pressure - psi/bar								
	0	250 17.2	500 34.5	750 51.7	1000 69	1250 86.2	1500 103.4	1750 120.7	2000 137.9
1/2 15	41 5	41 5	41 5	41 5	43 5	54 6	65 7	80 9	96 11
3/4 20	53 6	53 6	53 6	53 6	66 7	81 9	100 11	127 14	160 18
1 25	69 8	69 8	69 8	72 8	85 10	100 11	125 14	149 17	180 20
1 1/4 32	93 11	93 11	93 11	102 12	115 13	127 14	140 16	—	—
1 1/2 40	166 19	166 19	166 19	195 22	225 25	285 32	348 39	—	—
2 50	260 29	260 29	260 29	350 40	375 42	450 51	520 59	—	—

(1) Values in Nm have been calculated by multiplying lb-in values by 0.113.

(2) The indicated torque values are for 740 psi or 51 bar only.

MATERIAL SPECIFICATIONS

SPECIFICATIONS FOR SEAT AND SEAL MATERIALS

PROPERTIES (UNITS)	VIRGIN PTFE	FILLED PTFE		HIGH PRESSURE	
		15% GLASS (RPTFE)	CARBON GRAPHITE (C-RPTFE)	TO 200°F (93°C)	TO 450°F (232°C)
				NYLATRON	TORLON + PEEK + 30% GLASS
Specific gravity (g/cm³)	2.16	2.22	2.3	1.14 – 1.18	1.45 1.49
Tensile strength (psi) 73°F (23°C)	4000	2800 – 3600	3.100	10,000 – 14,000	33,000 25,000
Modulus of elasticity (psi)	50,000 – 90,000	312,000	213,000	450,000 – 600,000	1,400,000 1,100,000
Compressive stress psi at 1% offset	1,000	1,000	1,025	12,000 – 13,000	45,000 30,000
Coefficient of friction (dry vs steel) dynamic	0.15	0.35	0.25	0.15 – 0.35	0.20
Deformation under load % 2000 psi (138 bar) /24Hrs.	15 (2000 psi) 6.2 (1200 psi)	4.9 (1200 psi)	7.3	0.5 – 2.5	0.5
Continuous service range temperature °F	-320 +400	-100 +450	-100 +450	-30 +200	-30 +450
Limiting PV (psi x ft/min)	2,200	11,000	20,000	50,000	20,000 30,000

STEM PACKING

TYPE	USE	TEMP. RANGE °F / °C	MAX. PRESSURE psi / bar	PH
PTFE	acids, alkalis solvents, hydraulics	-120 +500 -85 +260	2000 138	0 – 14
Chevron molded PTFE	universal, limited pressure	-120 +500 -85 +260	1000 69	0 – 14
Braided graphite	100% fire safe operation	-120 +500 -85 +260	4000 276	0 – 14
Woven PTFE yarn impregnated with PTFE	cryogenic	-400 +500 -240 +260	2000 138	0 – 14

Material specifications reflect the properties of the specific materials and may exceed the limitations or ratings of the ball valve.

SPECIFICATIONS FOR BOLTING














ASTM DESIGNATION	BOLTS				NUTS		
	ALLOY STEEL	STAINLESS STEEL			CARBON STEEL	STAINLESS STEEL	
	A193 B7	A193 B6	A193 B8MSH	A433 630	A194 2H	A194 8M	A194 6
Carbon	0.37 – 0.49	0.15	0.08	0.07	0.40	0.08	0.15
Manganese	0.65 – 1.12	1.00	2.00	1.00	1.00	2.00	1.00
Phosphorus	0.040	0.040	0.045	0.040	0.040	0.045	0.040
Sulphur	0.04	0.030	0.030	0.050	0.050	0.030	–
Silicon	0.15 – 0.35	1.00	1.00	1.00	0.40	1.00	1.00
Nickel	–	–	10.0 – 14.0	3.00 – 5.00	–	10.00 – 14.0	–
Chromium	0.75 – 1.20	11.50 – 13.50	16.0 – 18.0	15.00 – 17.50	–	16.0 – 18.0	11.5 – 13.5
Molybdenum	0.15 – 0.25	–	2.00 – 3.00	–	–	2.00 – 3.00	–
Copper	–	–	–	3.00 – 5.00	–	–	–
Cobalt	–	–	–	–	–	–	–
Tungsten	–	–	–	–	–	–	–
Boron	–	–	–	–	–	–	–
Iron	–	–	–	–	–	–	–
Special cond.	–	–	Strain hard	Age hard	–	–	–
Heat treatment	Temp.	Temp.	Carb. sol.	–	–	–	–
Tensile psi minimum	125,000	110,000	125,000	140,000	–	–	–
Yield psi min	105,000	85,000	100,000	115,000	–	–	–
Elong. % min	16	15	12	14	–	–	–
Red. area % minimum	50	50	35	45	–	–	–
Hardness HB	–	–	–	–	248–352	126–300	228–271

BODY GASKETS AND SEALS

TYPE	USE	TEMP. RANGE °F / °C	PH
Spiral wound 316 + graphite	100% fire safe	-328 + 500 -200 + 260	0-14
Spiral wound 316 + PTFE	Cryogenic high corrosion	-328 + 500 -200 + 260	0-14
Solid PTFE	Internal body seals 100% fire safe	-328 + 500 -200 + 260	0-14
Solid graphite	Internal body seals 100% fire safe	-328 + 500 -200 + 260	0-14
Spiral wound monel + PTFE	Highly corrosive service	-328 + 500 -200 + 260	0-14

HOW TO ORDER MEMORYSEAL® BALL VALVES

- The figure numbers shown on this brochure are designed to cover essential features on Velan valves.
- Please use the figure numbers to ensure prompt and accurate processing of your order.
- A detailed description must also accompany any special orders.

TYPE OF CONNECTION	SIZE OF CONNECTION	CLASS OR MODEL NUMBER	PORT	TYPE	BODY MATERIAL	TRIM MATERIAL	SEAT MATERIAL	SPECIAL SERVICE	SPECIAL PRODUCT
A	B	C	D	E	F	G	H	I	J
	 				 	 			
S	0 5	B	0	2	0 2	S S	G	A	

Example: NPS 1 (DN 25) threaded, HB-2000, standard port valve in carbon steel with stainless steel trim and glass-filled Teflon seat for standard service.

A TYPE OF CONNECTION			
B	Butt-weld	P	Flanged (B16.47 series B) API 605
C	Combination (socket weld/threaded)	R	Flanged ring joint
D	DIN flanges	S	Thread NPT
E	Welded studs (butt-weld)	T	Studded drilled and tapped
F	Flanged B16.5 (B16.47 series A)	U	Undrilled flanges
G	Small tongue and groove	W	Socket weld
K	Compact flanges	Z	Welded stubs socket weld ends

B SIZE OF CONNECTION			
Customers have the choice of specifying valve size as part of the valve figure number (B) using the numbers below, or indicating valve size separately. Sizes shown in NPS (DN)			
EXAMPLES:			
S05-B0202-SSGA (valve size is part of figure number)			
NPS 1 (DN 25) S-B0202-SSGA (valve size is shown separately)			
01	1/4 (8)	07	1 1/2 (40)
02	3/8 (10)	08	2 (50)
03	1/2 (15)	09	2 1/2 (65)
04	3/4 (20)	10	3 (80)
05	1 (25)	11	3 1/2 (90)
06	1 1/4 (32)	12	4 (100)
13	5 (125)	14	6 (150)
15	8 (200)	16	10 (250)
18	12 (300)	19	14 (350)
20	16 (400)	21	18 (450)
22	20 (500)	23	22 (550)
24	24 (600)		

C MODEL NUMBER / CLASS			
For threaded or socket weld use model number:			
B	HB-2000	C	EE-1000
G	TE-600	P	EP-2000
For all flanged and butt-weld NPS 2½ (DN 65) and larger ⁽¹⁾ :			
0	150	1	300
2	600		

D PORT			
0	Regular port	2	Special or reduced port
1	Full port	5	Full port, short pattern

E TYPE			
1	End-entry (two-piece)	4	Split-body
2	Bar stock (one-piece)	6	Top-entry
3	One-piece/Unibody	T	Top-entry non-Memoryseal® seat ⁽²⁾

- Actual valve pressure temperature ratings depend on choice of materials.
- For P, Q, and R seats use Type T for Top-entry (Ex: WXX-G1T13-SPRE).
- Forged F316 material code "13", is not suitable for temperatures above 1000°F (538°C) as it is dual certified (F316/F316L).
- For Top-entry ball valves standard material of bellows is Hastelloy C. If any other kind of bellows is required the material must be clearly specified on the order.
- For UB series only ISO 5211, API 607 rev. 5/ISO 10497

Note: Velan valves for NACE service (as indicated by figure number and/or description) comply with the metallurgical requirements of the current NACE MR0103 and MR0175 / ISO 15156. Material selection is dependent on the actual environment and it is therefore the equipment End User's responsibility to ensure that the materials are suitable for the intended service. Please contact Velan for any questions regarding the application of our products for NACE service.

F BODY MATERIAL			
02	A105, WCB	20	Inconel 625
03	CHR. MOLY F1, WC1	21	Hastelloy C
04	CHR. MOLY F5, C5	22	Titanium Gr. 5
05	CHR. MOLY F11, WC6	23	Alloy 20 (CN7M)
06	CHR. MOLY F22, WC9	24	LF1
09	CHR. MOLY F9, C12	25	LCB
11	S/S F304, CF8	26	LF2/LCB
12	S/S F304L, CF3	27	LF3/LC3
13	S/S F316, CF8M ⁽³⁾	28	S/S F317, CG8M
14	S/S F316L, CF3M	29	S/S F317L CG3M
15	S/S F347, CF8C	31	LCC
18	S/S F321	32	S/S F51, 4A, CD3MN
19	Monel M35	34	F91/C12A
35	S/S F44 (254SMO) CK3MCuN	36	S/S F321H
37	Incoloy 825	38	LC1
39	LC2	40	Titanium Gr. 2/3
41	Titanium Gr. 7	42	Titanium GR. 12
43	Titanium 45 Niobium	44	Ferrallium 255
45	S/S F55 / 6A, CD3MWCuN	46	GS C25N
47	S/S F347H		

G TRIM				
Code	Ball	Stem	Code	Ball
AL	Aluminum	Aluminum	NP	316 Ni plated
AY	Alloy 20	Alloy 20	PR	316 Cr. plated
BR	Brass Cr. plated	Brass	SB	304
CA	CA6NM	CA6NM	SN	316 Cr. plated
CB	C5	C5	SP	316 Cr. plated
CC	CS-CR plated	CS plated	SR	316
CN	CS-Ni plated	316	SS	316
CP	CS-CR plated	316	SV	317
CR	13% Chr.	630	TI	Titanium Gr.2/3
CT	C12	C12	TN	CoCr alloy
HC	Hastelloy C	Hastelloy C	TP	CoCr alloy
IN	Inconel	Inconel	TR	CoCr alloy
MO	Monel	Monel	TT	CoCr alloy
NN	316 Ni plated	Nitronic 50		

H SEAT/SEAL MATERIAL			
B	Bronze-filled PTFE	K	PFA
C	Graphite reinforced PTFE	L	Delrin
D	Carbon filled nylon	P	Peek 30% glass ⁽²⁾
E	MPTFE	Q	Metalized carbon graphite M110 ⁽²⁾
F	FEP	R	Metalized carbon graphite M444 ⁽²⁾
G	Glass-reinforced PTFE		
S	PPS	T	Teflon
U	UHMWPE	W	Devlon
Z	Tefzel		

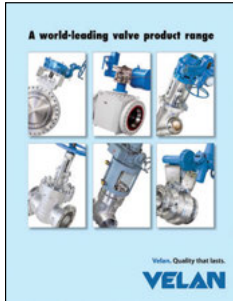
I SPECIAL SERVICE			
A	Standard	H	Cryogenic
B	Block and bleed	I	NACE sour gas
C	Chlorine	J	Vacuum
E	TE-600	N	Nuclear
F	Cavity filler	Q	API 6D
G	Oxygen		
T	Bonnet, double packing	U	TA-LUFT stem seal
V	Bellows seal ⁽⁴⁾	W	Seal joint
Z	Fire-tested to API 607 rev. 5 ISO 10497		

J SPECIAL PRODUCT ⁽⁵⁾	
E	ISO 5211, API 607 rev. 5/ISO 10497

Note: CoCr alloy as used throughout this catalog refers to cobalt chrome hardfacing alloys as supplied by Kennametal Stellite™, and other approved manufacturers.

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

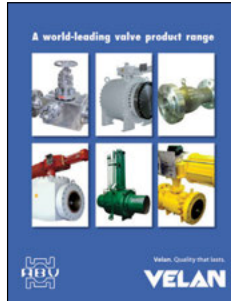
ASME pressure classes 150–4500 in carbon, alloy, and stainless steel



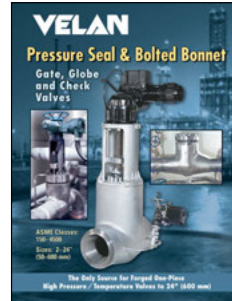
BRO-FLB



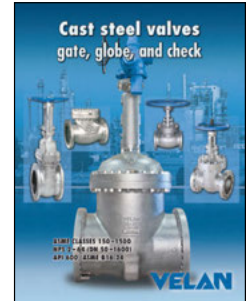
SAS-FLB



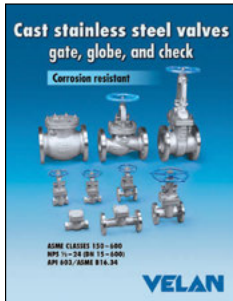
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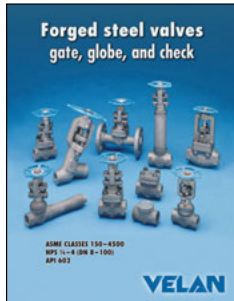
VEL-PS



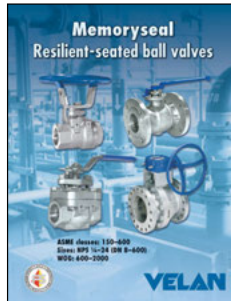
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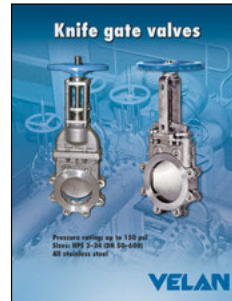
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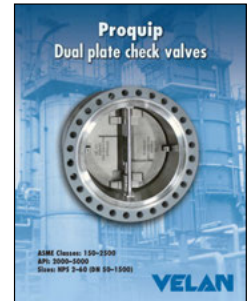
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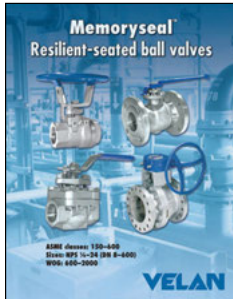
CAT-BG



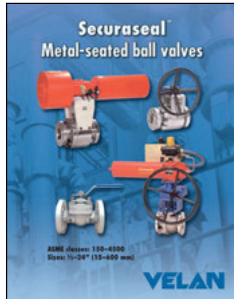
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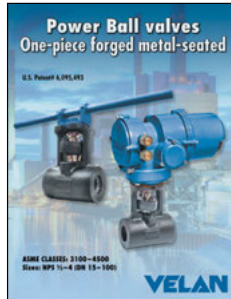
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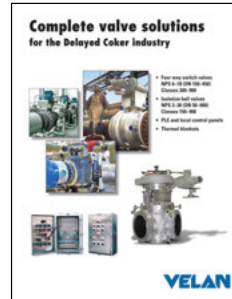
CAT-BV



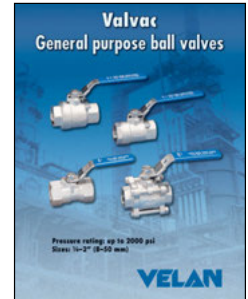
VEL-MS



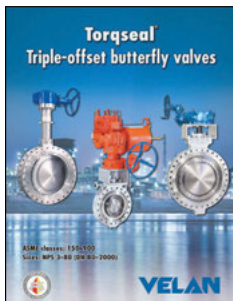
CAT-PBV



BRO-CBV



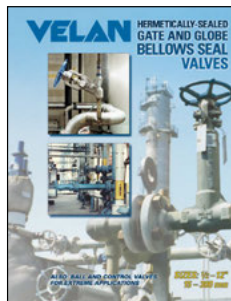
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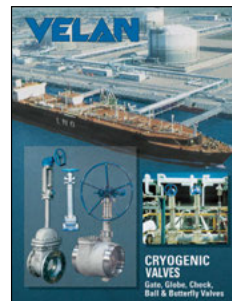
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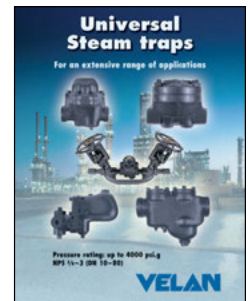
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