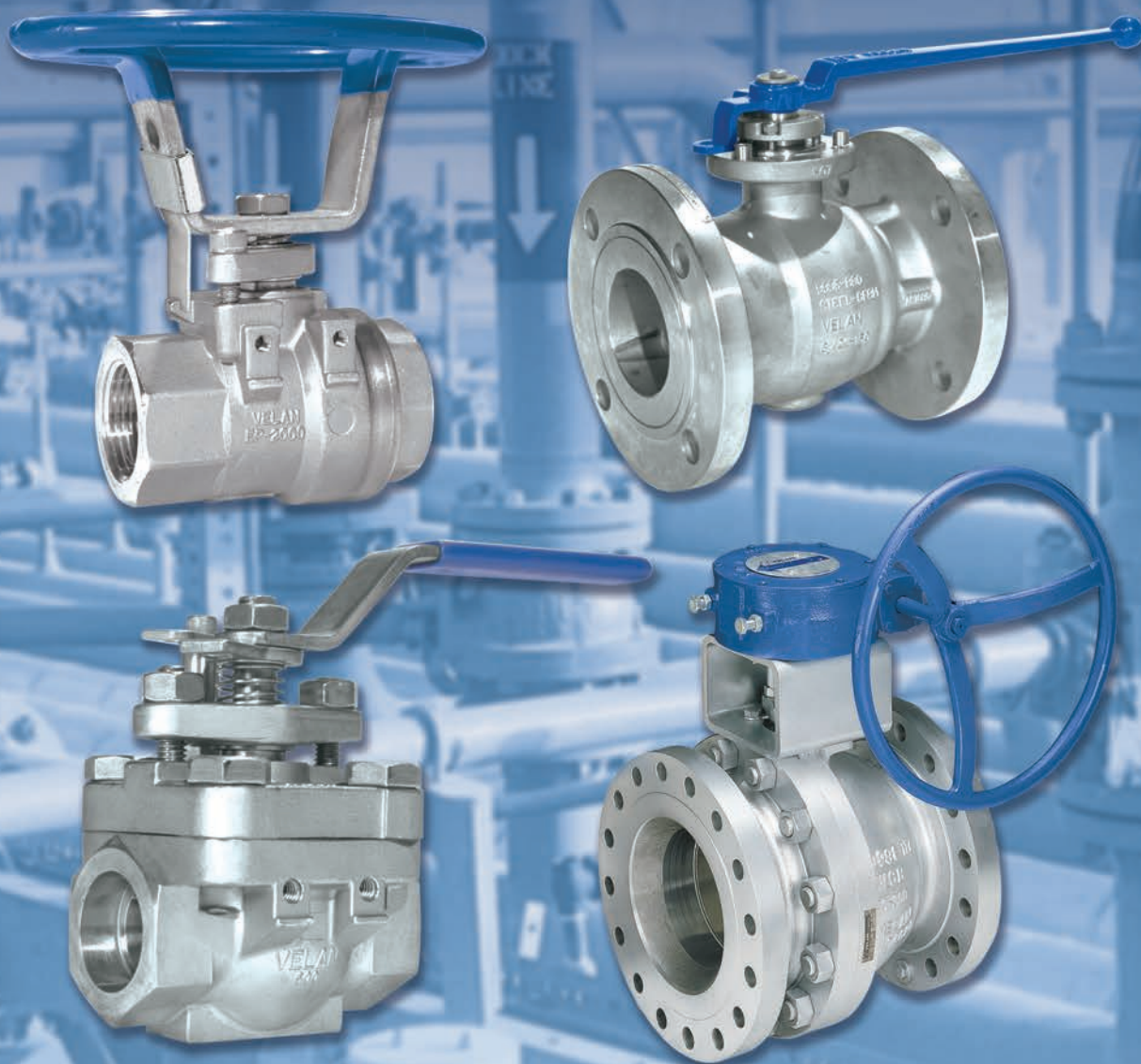


Memoryseal™

Resilient-seated ball valves



ASME classes: 150–600
Sizes: 1/4–24" (8–600 mm)
WOG: 600–2000

VELAN

VELAN'S PROFILE

VELAN AT A GLANCE

History

- Founded in 1950

Sales

- Over \$450 million

People

- Over 1,800 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

Quality

All major certifications and approvals

- ASME N stamp and NPT for nuclear valves (since 1970)
- ISO 9001 (since 1991)
Currently certified to ISO 9001:2008
- PED
- GOST (TR and RTN)
- API 6A and API 6D
- TA-Luft
- Quality programs fully compliant with ISO-9001, NCA 4000, ASME NQA-1 and 10 CFR 50 Appendix B, surveyed by ASME and audited by NUPIC, Northrop Grumman Newport News, DCMA, utilities, architect/ engineers, and other organizations from around the world

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



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.

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VELAN'S GLOBAL NETWORK

Head office



Montreal, Canada
Velan Inc.

- 15 production facilities
- 5 plants in North America
- 6 plants in Europe
- 4 plants in Asia
- 4 stocking and distribution centers
- Hundreds of distributors worldwide
- Service shops worldwide

Manufacturing Plants

North America



Montreal, Canada
Velan Inc.



Montreal, Canada
Velan Inc.



Granby, Canada
Velan Inc.



Montreal, Canada
Velan Inc.



Williston, VT, USA
Velan Valve Corp.



Europe



Lyon, France
Velan S.A.S.



Mennecey, France
Segault S.A.



Leicester, UK
Velan Valves Ltd.



Lisbon, Portugal
Velan Válvulas Industriais, Lda.



Lucca, Italy
Velan ABV S.p.A.



Lucca, Italy
Velan ABV S.p.A.

Asia



Ansan City, South Korea
Velan Ltd.



Ansan City, South Korea
Velan Ltd.



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



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

Distribution centers



Granby, Canada
VelCAN



Benicia, CA, USA
VelCAL



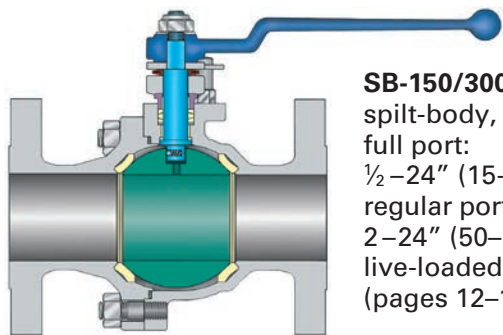
Marietta, GA, U.S.A.
VelEAST



Willich, Germany
Velan GmbH

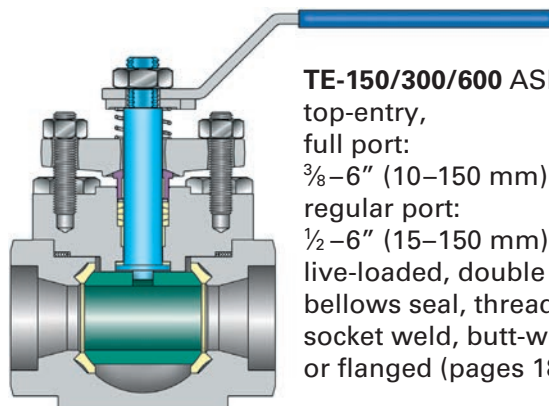
— ASME N-stamp accredited manufacturer

HIGH PERFORMANCE MEMORYSEAL™ BALL VALVES



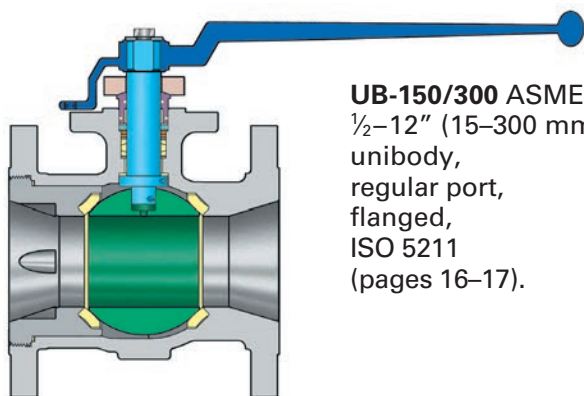
SB-150/300/600 ASME
spilt-body,
full port:
½–24" (15–600 mm),
regular port:
2–24" (50–600 mm),
live-loaded, flanged
(pages 12–15).

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



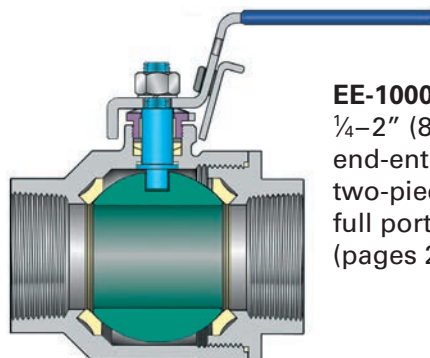
TE-150/300/600 ASME
top-entry,
full port:
⅜–6" (10–150 mm)
regular port:
½–6" (15–150 mm)
live-loaded, double packed,
bellows seal, threaded,
socket weld, butt-weld
or flanged (pages 18–23).

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



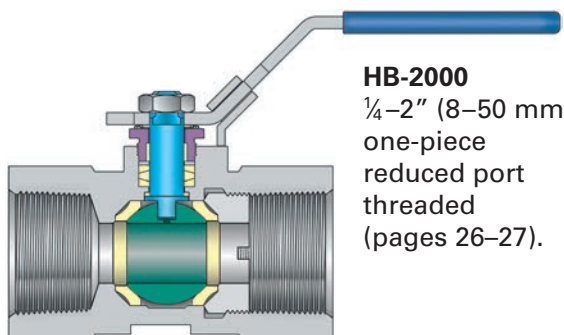
UB-150/300 ASME
½–12" (15–300 mm)
unibody,
regular port,
flanged,
ISO 5211
(pages 16–17).

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



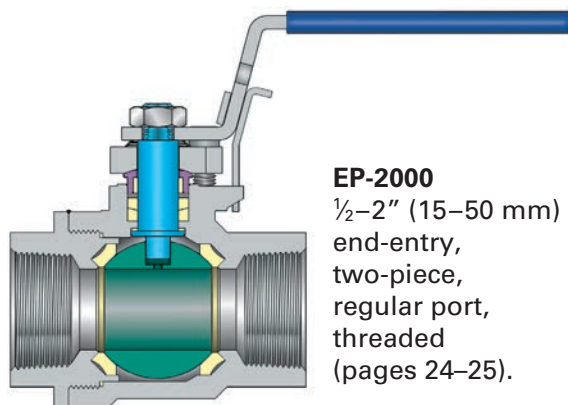
EE-1000
¼–2" (8–50 mm)
end-entry,
two-piece,
full port, threaded
(pages 24–25).

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
¼–2" (8–50 mm)
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
½–2" (15–50 mm)
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

A COMPREHENSIVE BALL VALVE LINE

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



Installation of 6" 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.**

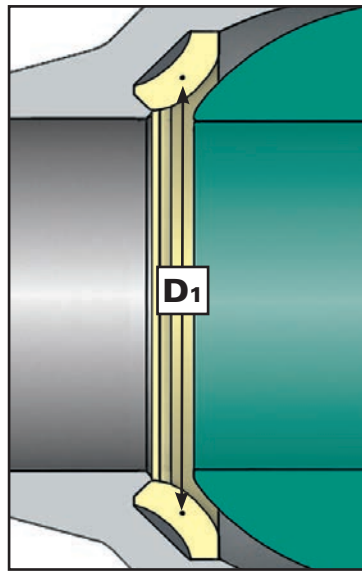
DESIGN AND TESTING STANDARDS AND SPECIFICATIONS

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	

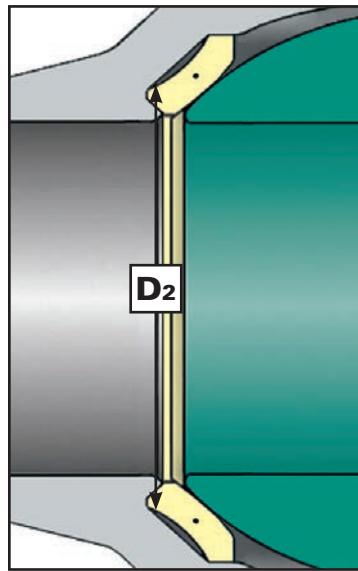
SIZE in mm	MANUFACTURING PROGRAM									
	TYPE	DESIGN	RATING ⁽¹⁾ psi	END CONNECTION	PORT	MATERIAL				PAGE
						CS	316	MO	ALLOY 20	
½–24 15–600	SB-150	Spilt-body	ASME class 150	FLG	Full	✓	✓	✓	✓	12–15
½–24 15–600	SB-300	Spilt-body	ASME class 300	FLG	Full	✓	✓	✓	✓	12–15
2–12 50–300	SB-600	Spilt-body	ASME 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
½–12 15–300	UB-150	Unibody	ASME class 150	FLG	Regular	✓	✓	✓	✓	16–17
½–12 15–300	UB-300	Unibody	ASME class 300	FLG	Regular	✓	✓	✓	✓	16–17
¾–6 10–100	TE-150/300/600	Top-entry	ASME class 150/300/600	NPT, SW BW, FLG	Full	✓	✓	✓	✓	18–23
½–4 15–100	TE-150/300/600	Top-entry	ASME class 150/300/600	NPT, SW BW, FLG	Regular	✓	✓	✓	✓	18–23
¼–2 8–50	EE-1000	End-entry two-piece	1000/1500	NPT	Full		✓			24–25
½–2 15–50	EP-2000	End-entry two-piece	1500/2000	NPT	Regular	✓	✓			24–25
¼–2 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

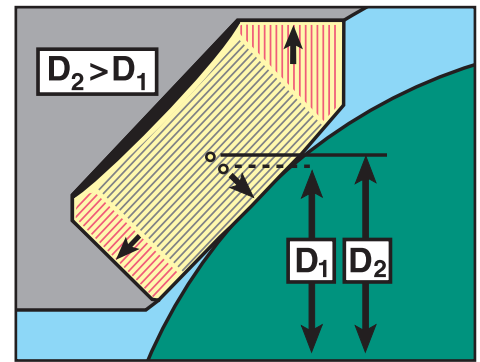


Before assembly



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

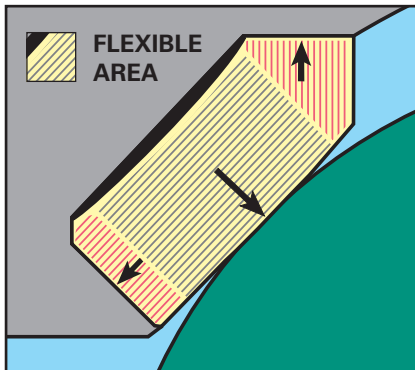
- Greater strength
- Less fatigue
- Positive bi-directional shutoff
- Uniform torque
- Compensate for temperature fluctuations
- Eliminate cold flow effects
- High cycle life

LARGER FLEXIBLE AREA

- Superior sealing

COMPETING DESIGNS

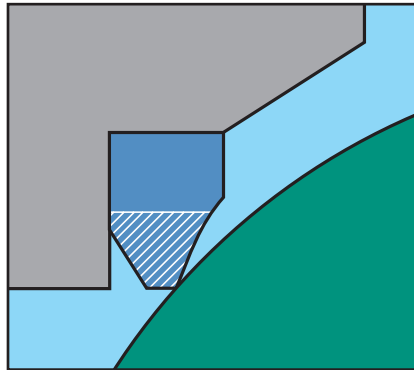
VELAN IN-TENSION FLEXIBLE SEAT



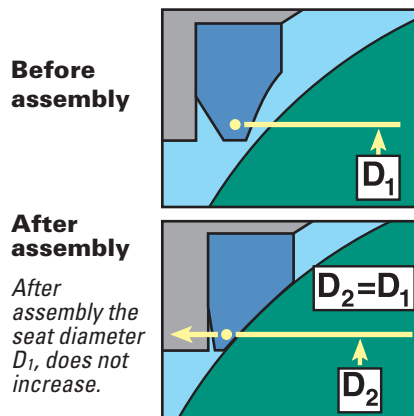
- ✓ Larger seat with smaller seating contact
- ✓ Larger flexible area = added flexibility
- ✓ Seat in-tension, stronger, 3600 psi tensile strength
- ✓ Greater flexible strength = tightness on low-pressure service
- ✓ Greater flexibility = lower torque
- ✓ Greater flexibility = better shock resistance 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

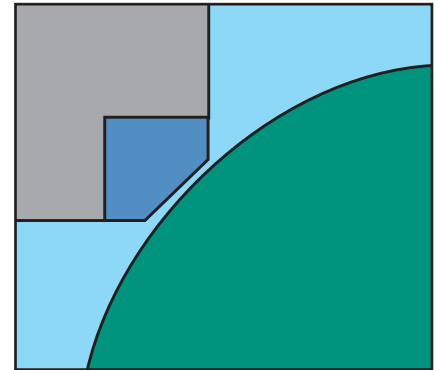


- ✗ Smaller, weaker seat
- ✗ Minimal flexible area, susceptible to fatigue
- ✗ Seat in compression, only 1800 psi tensile strength
- ✗ Can leak in low-pressure service due to fatigue
- ✗ Minimal flexibility; conservative torque
- ✗ Minimal flexibility, weak shock resistance to high DP
- ✗ Moderate compensation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

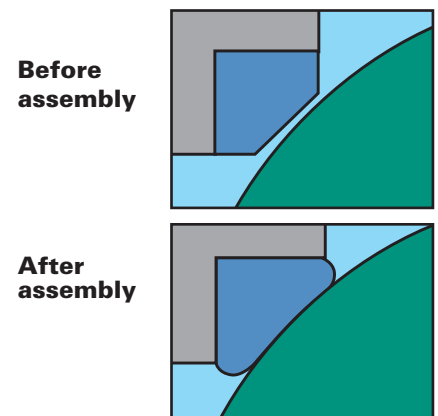


Seat contact is in compression, not tension.

NON FLEXIBLE JAM SEAT



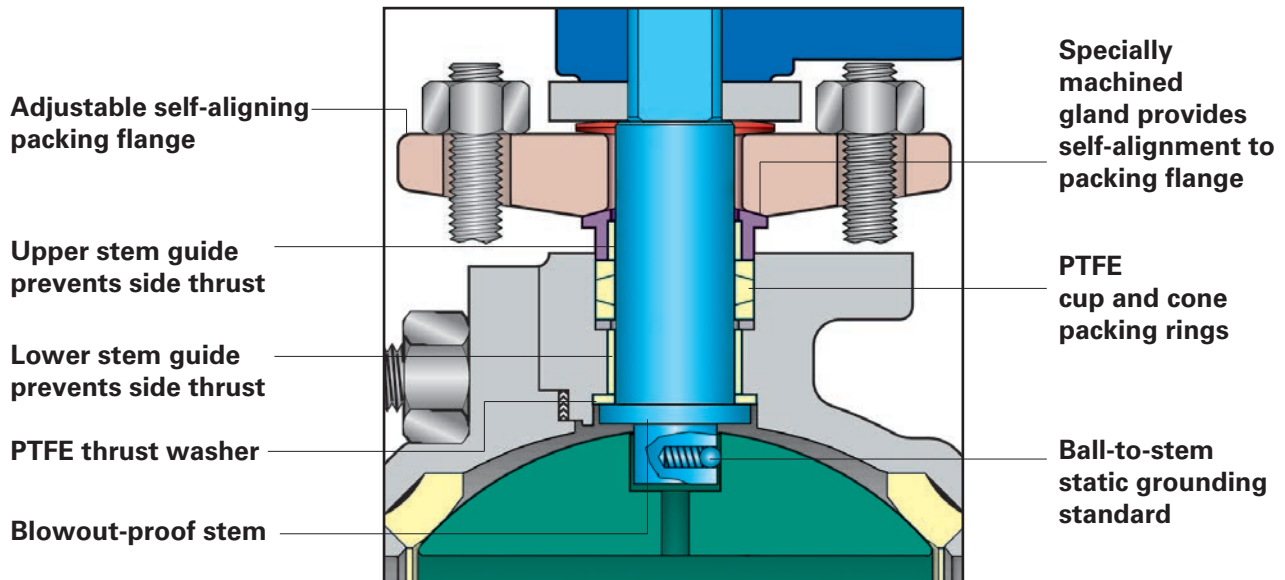
- ✗ Much smaller seat
- ✗ No flexibility, high compression: susceptible to cold flow
- ✗ Seat in compression, only 1800 psi tensile strength
- ✗ Can leak under low pressure service after short cycle life
- ✗ No flexibility, high compression, susceptible to high torque and severe torque variation
- ✗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

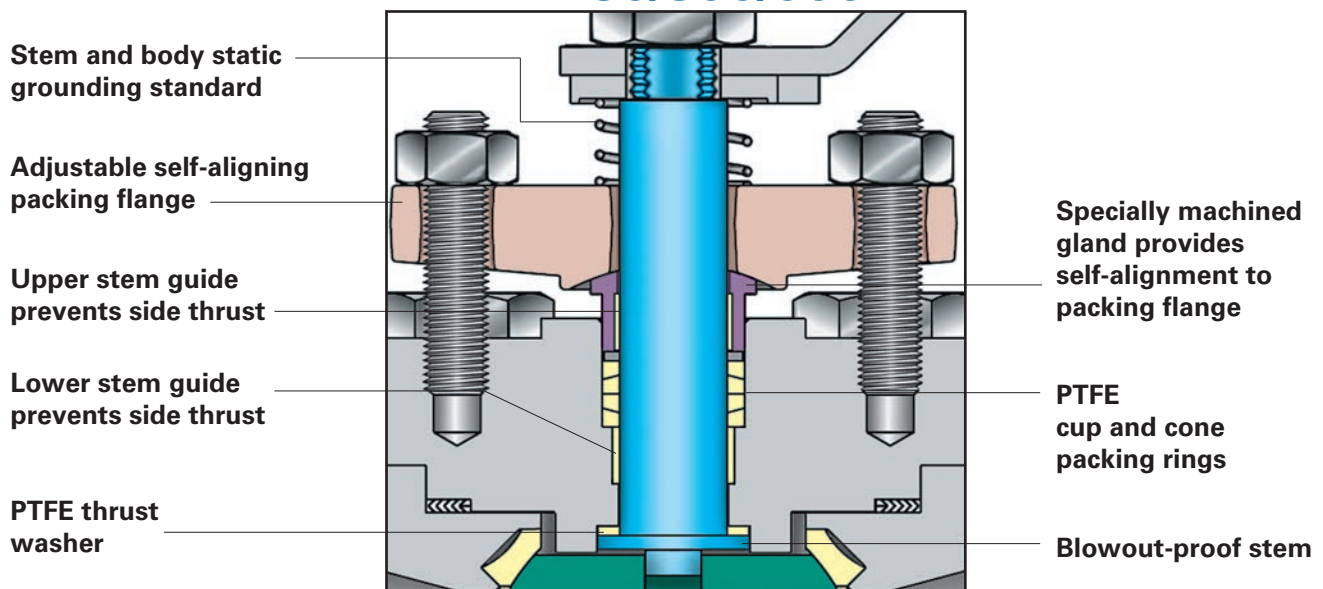
SB-150/300/600



THE E-20 PACKING CHAMBER OUTPERFORMS COMPETITIVE DESIGNS

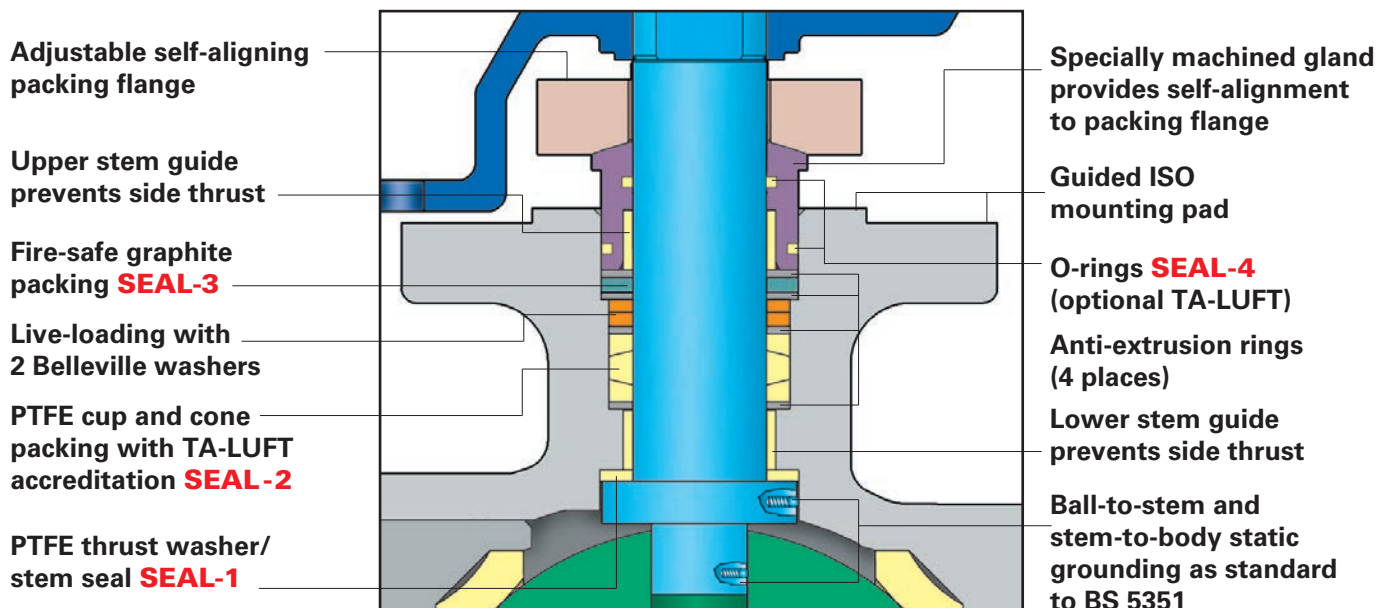
- **E-20 unique packing chamber design** maintains low emissions control for long lasting high cycle life.
- **Self-aligning packing flange** is independent of gland for equal compression of packing rings.
- **Upper and lower stem bushing** prevent side load on packing rings. Eliminates premature wear, 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 2-24" (50-600 mm). 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, 2-12" (50-300 mm) 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.

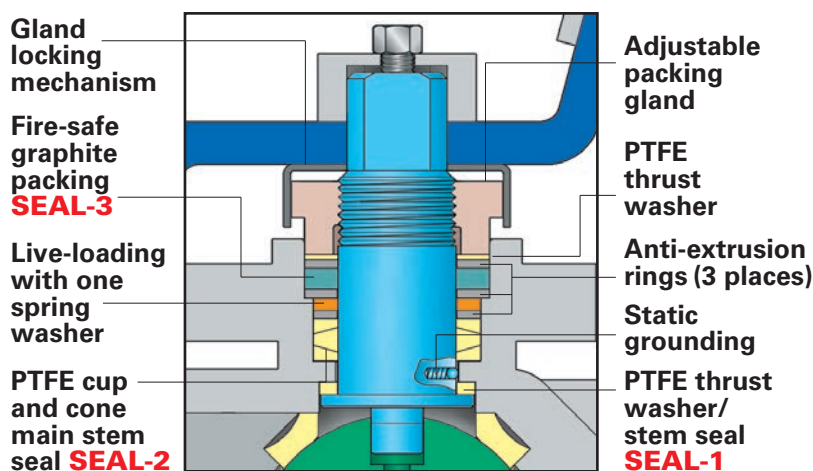
• Fire tested

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

UB-150/300 1/2-1 1/2" (15-40 mm) 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.



NOTE: locking mechanism may differ from design shown.

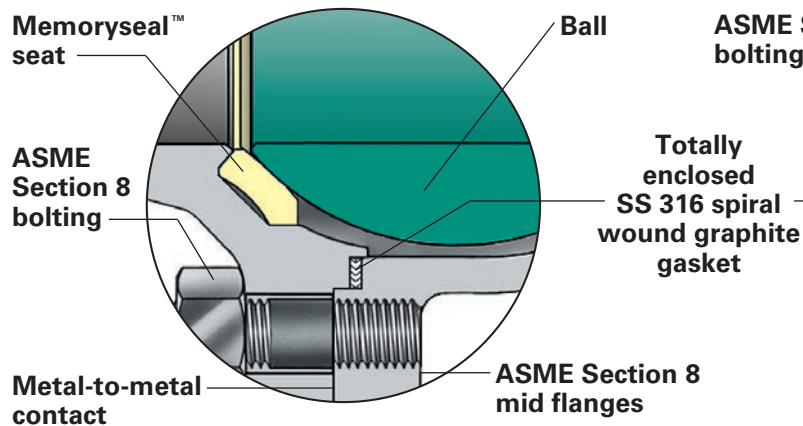
(1) TA-Luft tested to below 1 ppm.

SUPERIOR BODY SEAL DESIGNS

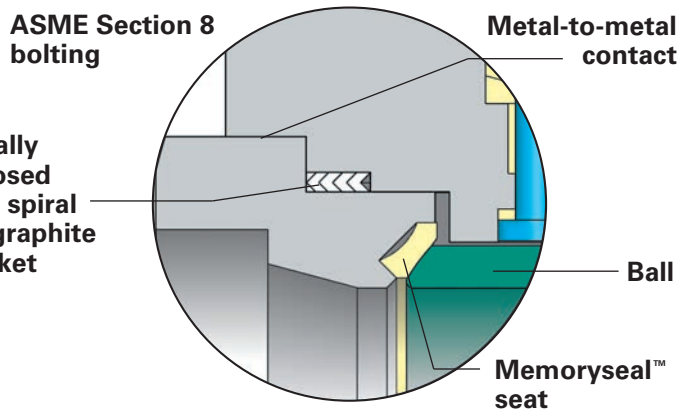
All body seal designs incorporate a secondary metal-to-metal contact area in addition to the primary gasket designs. Sealing designs for our split-body and top-entry use a totally enclosed

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.

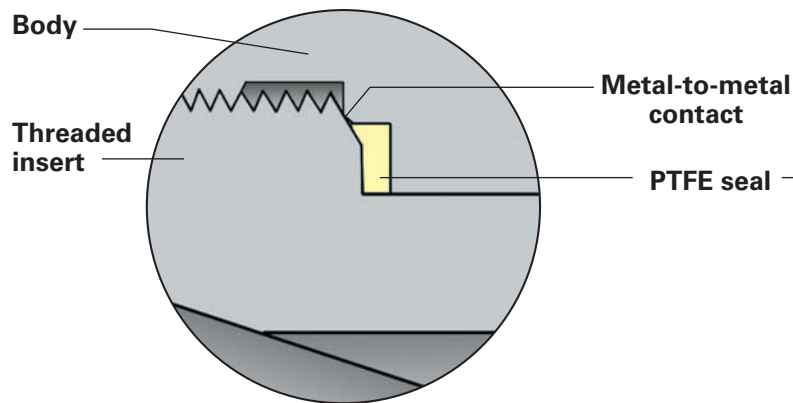
SPLIT-BODY SB-150/300/600



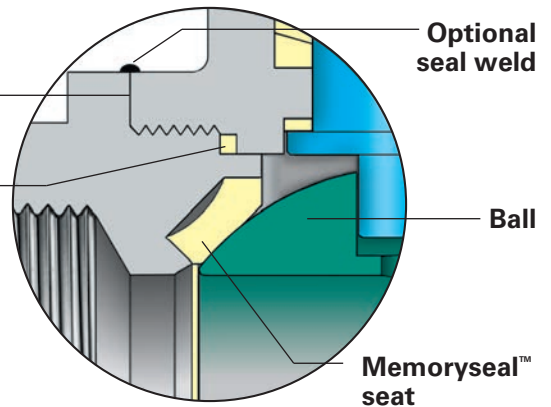
TOP-ENTRY TE-150/300/600



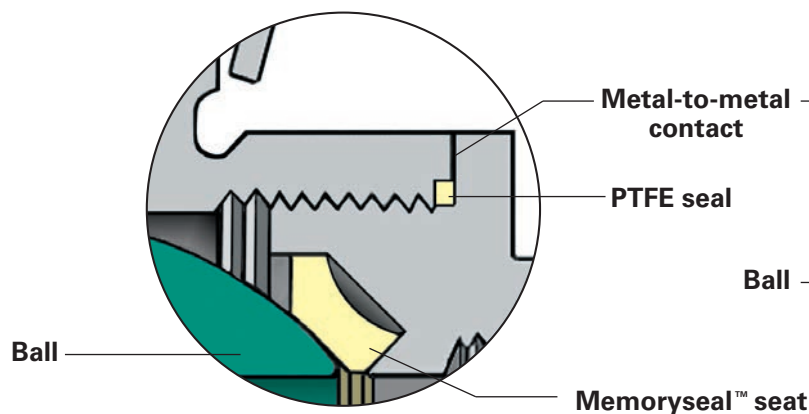
UNIBODY UB-150/300



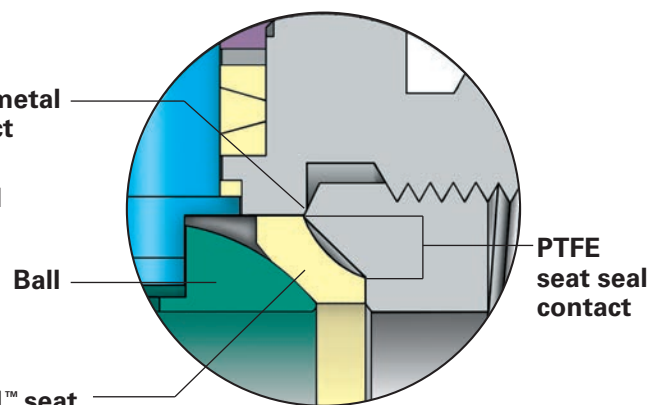
END-ENTRY EP-2000



END-ENTRY EE-1000



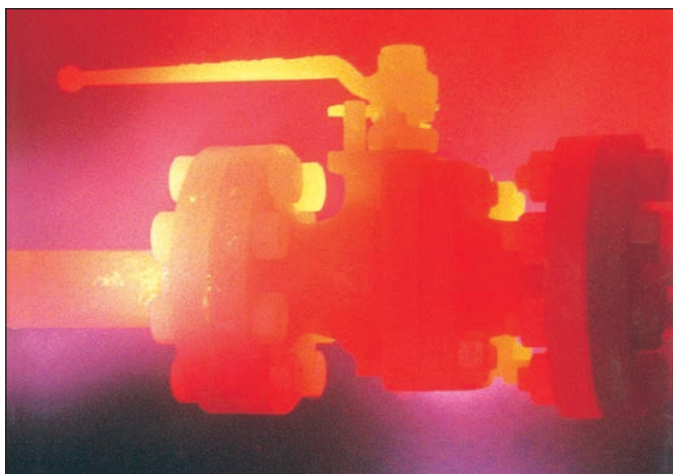
ONE-PIECE HB-2000



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.



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.

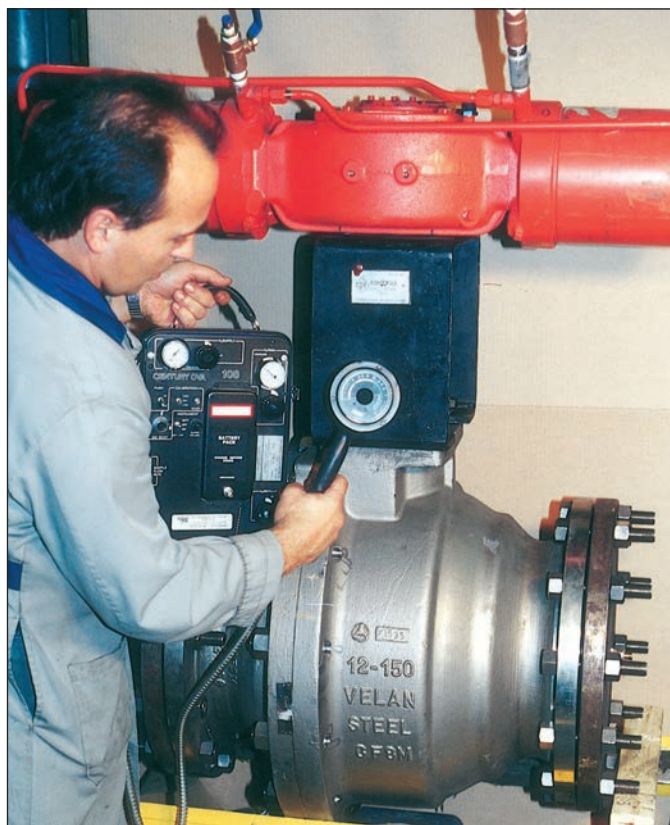
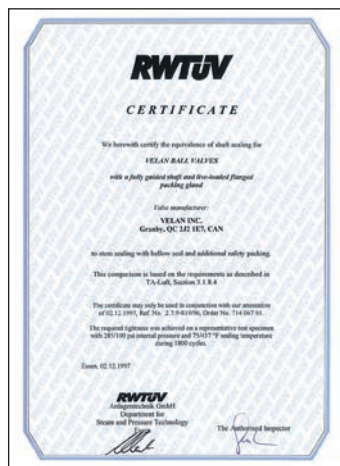
Guaranteed Maximum emissions on new valves: 20 ppm – PTFE packing rings and 100 ppm graphite packing rings. (Contact your local Velan office for a copy of our Emissions Guarantee.)

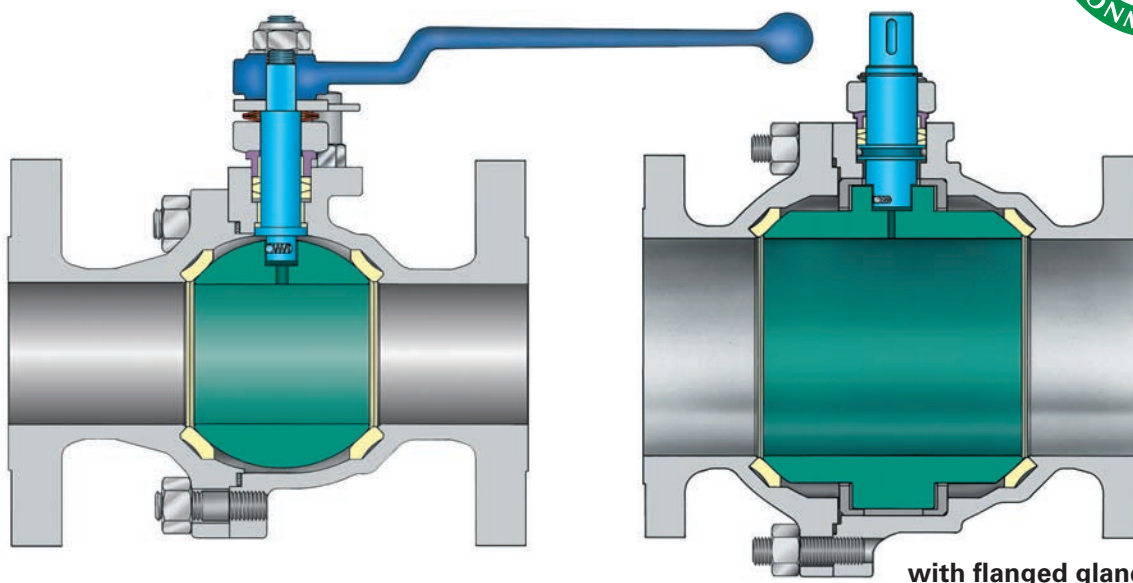
TA-LUFT QUALIFICATION

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.





with flanged gland

FLOATING BALL	150	300	600
Full Port	½–8" (15–200 mm)	½–6" (15–150 mm) ⁽¹⁾	2–3" (50–80 mm)
Regular Port	2–10" (50–250 mm)	2–8" (50–200 mm)	2–4" (50–100 mm)

TRUNNION BALL	150	300	600
Full Port	10–24" (250–600 mm)	8–24" (50–600 mm) ⁽¹⁾	4–12" (100–300 mm) ⁽²⁾
Regular Port	12–24" (300–600 mm)	10–24" (250–600 mm)	6–12" (150–300 mm) ⁽³⁾

(1) Floating ball optional for 8" (200 mm) valve. (2) Trunnion optional on 2–3" (50–80 mm) full port valve.
(3) Trunnion optional on 3–4" (80–100 mm) regular port valve.

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.
- PTFE TA-Luft certified live-loaded packing available.
- 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 2–12" (50–300 mm) (optional).
- AGA and CGA approved, SB-150 Full Port 2–8" (50–200 mm) (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 ½–12" (15–300 mm).
- Gear actuators⁽⁶⁾ standard: SB-150/300 8–24" (200–600 mm) full port and 10–24" (250–600 mm) regular port, SB-600 6–12" (150–300 mm) full port and 8–12" (200–300 mm) regular port.

APPLICATIONS

These rugged, versatile, high performance ball valves meet all requirements for oil and gas pipeline service and, when required, can meet NACE specifications. 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).

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

(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 6" (150 mm) SB-150/300 full port or 8" (200 mm) SB-150/300 regular port depending on service conditions.

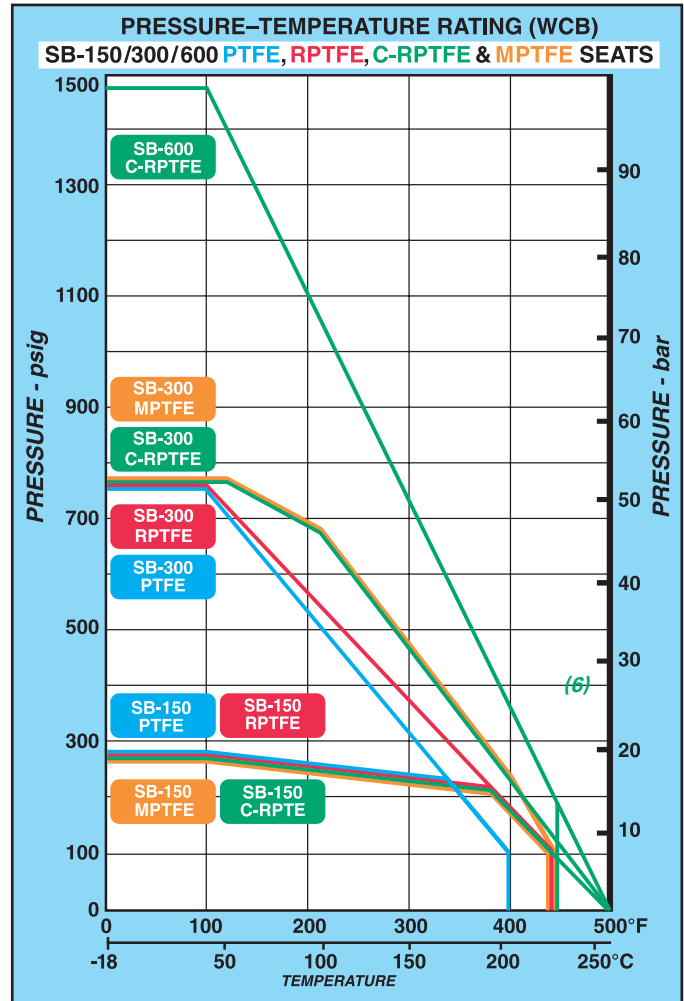
SB-150/300/600 SPLIT-BODY

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 ½–1½" (15–40 mm)	Stainless steel	
Handle 2– 6" (50–150 mm)	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 ½" (15 mm) 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.

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

SIZE in (mm)	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 with air actuator.



Manual gear actuated ball valve.

SB-150/300/600 SPLIT-BODY

ALTERNATIVE PACKING CHAMBER DESIGN

DESIGN FEATURES:

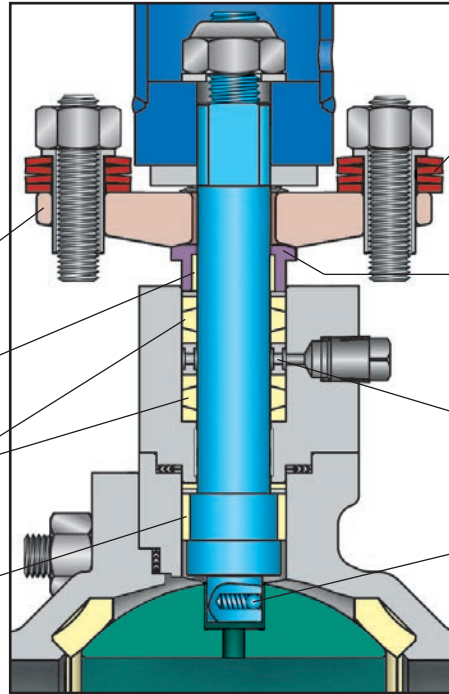
- Velan's double packed arrangement uses the E-20 packing style, double stacked live-loaded packing flange and lantern ring for emissions measuring or collection.

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

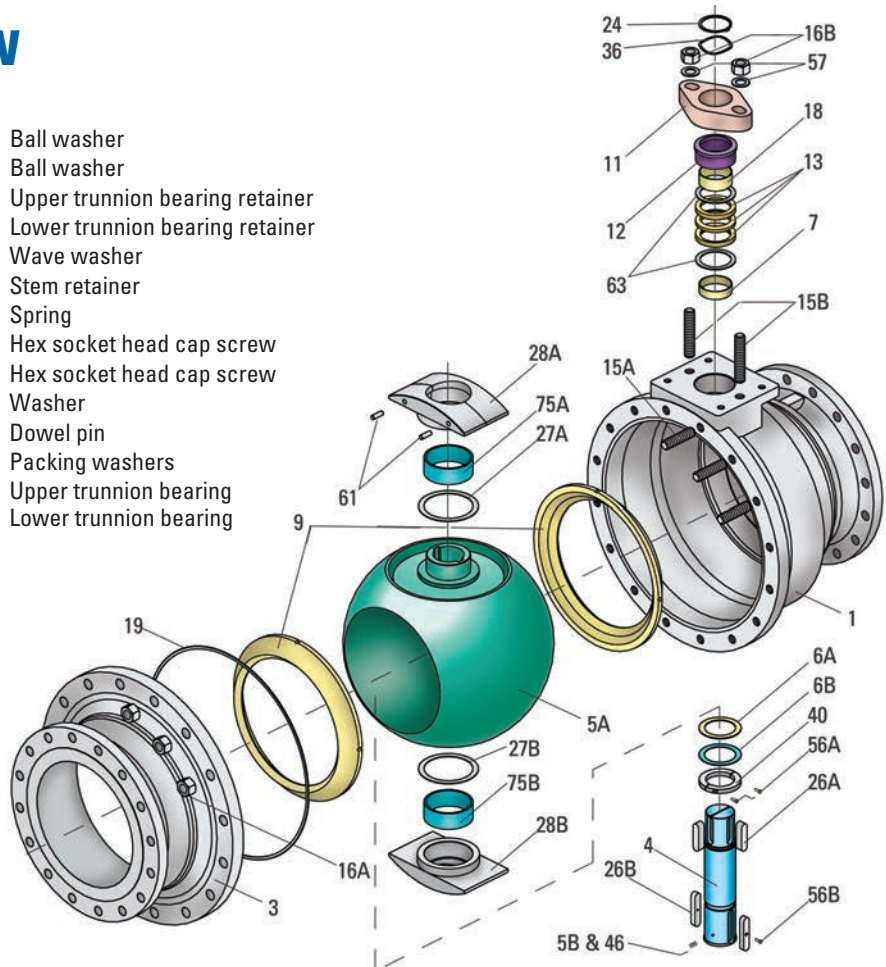
SPLIT-BODY VIEW

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:

16 - 24" (400-600 mm)
150 / 300 FULL PORT
20 - 24" (500-600 mm)
150 / 300 REGULAR PORT



SB-150/300/600 DIMENSIONS AND WEIGHTS

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

SIZE in mm	SB-300 FULL PORT						WEIGHT lb kg
	A	B	C	D	E	F	
1/2 15	5.50 140	3.27 83	5.27 134	2.06 52	0.50 13	3.75 95	6.6 3.0
3/4 20	6.00 152	3.82 97	5.56 141	2.55 65	0.75 19	4.63 118	10.3 4.7
1 25	6.50 165	4.02 102	5.56 141	2.61 66	1.00 25	4.88 124	12.8 5.8
1 1/2 40	7.50 191	5.02 128	7.69 195	2.92 74	1.50 38	6.13 156	24 11
2 50	8.50 216	5.44 138	10.38 264	3.83 97	2.00 51	6.50 165	33 15
2 1/2 65	9.50 241	6.97 177	11.88 302	4.00 102	2.50 64	7.50 191	56 25
3 80	11.12 282	7.38 187	11.88 302	5.30 135	3.00 76	8.25 210	76 34
4 100	12.00 305	10.31 262	19.88 505	5.99 152	4.00 102	10.00 254	125 57
6 150	15.88 403	12.56 319	25.88 657	6.65 169	6.00 152	12.50 318	256 116
8 200	19.75 502	16.04 407	—	8.78 223	8.00 203	15.00 381	814 369
10 250	22.38 568	20.84 529	—	11.19 284	10.00 254	17.50 445	952 432
12 300	25.50 648	22.59 574	—	12.75 324	12.00 305	20.50 521	1313 596
14 350	30.00 762	24.22 615	—	15.00 381	13.25 337	23.00 584	1807 820
16 400	33.00 838	24.13 613	—	16.50 419	15.25 387	25.50 648	2410 1093
18 450	36.00 914	25.92 658	—	18.00 457	17.00 432	28.00 711	3321 1506
20 500	39.00 991	29.69 754	—	19.50 495	19.00 483	30.50 775	3973 1802
24 600	45.00 1143	34.81 884	—	22.50 572	23.00 584	36.00 914	6722 3049

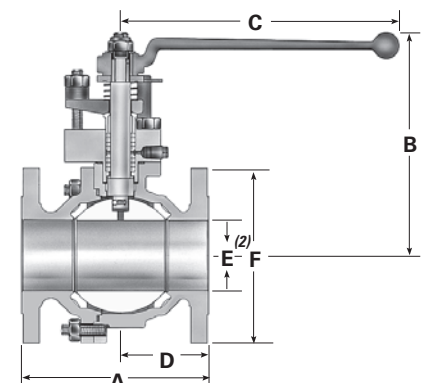
SIZE in mm	SB-600 FULL PORT						WEIGHT lb kg
	A	B	C	D	E	F	
1/2 15	—	—	—	—	—	—	—
3/4 20	—	—	—	—	—	—	—
1 25	—	—	—	—	—	—	—
1 1/2 40	—	—	—	—	—	—	—
2 50	11.50 292	7.44 189	11.88 302	5.00 127	2.00 51	6.50 165	69 31
2 1/2 65	—	—	—	—	—	—	—
3 80	14.00 356	11.12 282	25.88 657	6.19 157	3.00 76	8.25 210	147 67
4 100	17.00 432	13.71 348	25.88 657	7.00 178	4.00 102	10.75 273	347 157
6 150	22.00 559	18.68 474	—	9.25 235	6.00 152	14.00 356	637 289
8 200	26.00 660	19.26 489	—	11.00 279	8.00 203	16.50 419	1050 476
10 250	31.00 787	21.16 537	—	14.50 368	10.00 254	20.00 508	1580 717
12 300	33.00 838	22.41 569	—	15.25 387	12.00 305	22.00 559	2092 949

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

SIZE in mm	SB-300 REGULAR PORT						WEIGHT lb kg
	A	B	C	D	E	F	
1/2 15	8.50 216	5.02 128	7.69 195	3.92 100	1.50 38	6.50 165	26 12
3/4 20	11.12 282	5.44 138	10.38 264	5.56 141	2.00 51	8.25 210	52 24
1 25	12.00 305	7.38 187	11.88 302	5.99 152	3.00 76	10.00 254	102 46
1 1/2 40	15.88 403	10.31 262	19.88 505	7.94 202	4.00 102	12.50 318	183 83
2 50	16.50 419	12.56 319	25.88 657	8.25 210	6.00 152	15.00 381	350 159
2 1/2 65	18.00 457	16.09 409	—	9.00 229	8.00 203	17.50 445	618 280
3 80	19.75 502	20.84 529	—	9.13 232	10.00 254	20.50 521	1097 498
4 100	22.50 572	20.84 529	—	11.25 286	10.00 254	23.00 584	1097 498
6 150	24.00 610	22.59 574	—	12.00 305	12.00 305	25.50 648	1477 670
8 200	26.00 660	25.22 641	—	12.01 305	14.00 356	28.00 711	2013 913
10 250	28.00 711	24.13 613	—	14.00 356	15.25 387	30.50 775	2746 1246
12 300	32.00 813	27.28 693	—	16.00 406	17.25 438	36.00 914	4600 2087

SIZE in mm	SB-600 REGULAR PORT						WEIGHT lb kg
	A	B	C	D	E	F	
1/2 15	11.50 292	5.35 136	10.38 264	4.74 120	1.60 41	6.50 165	46 21
3/4 20	14.00 356	7.44 189	11.88 302	7.00 178	2.00 51	8.25 210	88 40
1 25	17.00 432	11.12 282	25.88 657	8.50 216	3.00 76	10.75 273	187 85
1 1/2 40	22.00 559	13.71 348	25.88 657	11.00 279	4.00 102	14.00 356	435 197
2 50	26.00 660	18.68 474	—	13.00 330	6.00 152	16.50 419	755 342
2 1/2 65	31.00 787	19.26 489	—	12.50 318	8.00 203	20.00 508	1150 522
3 80	33.00 838	21.16 537	—	14.50 368	10.00 254	22.00 559	1728 784

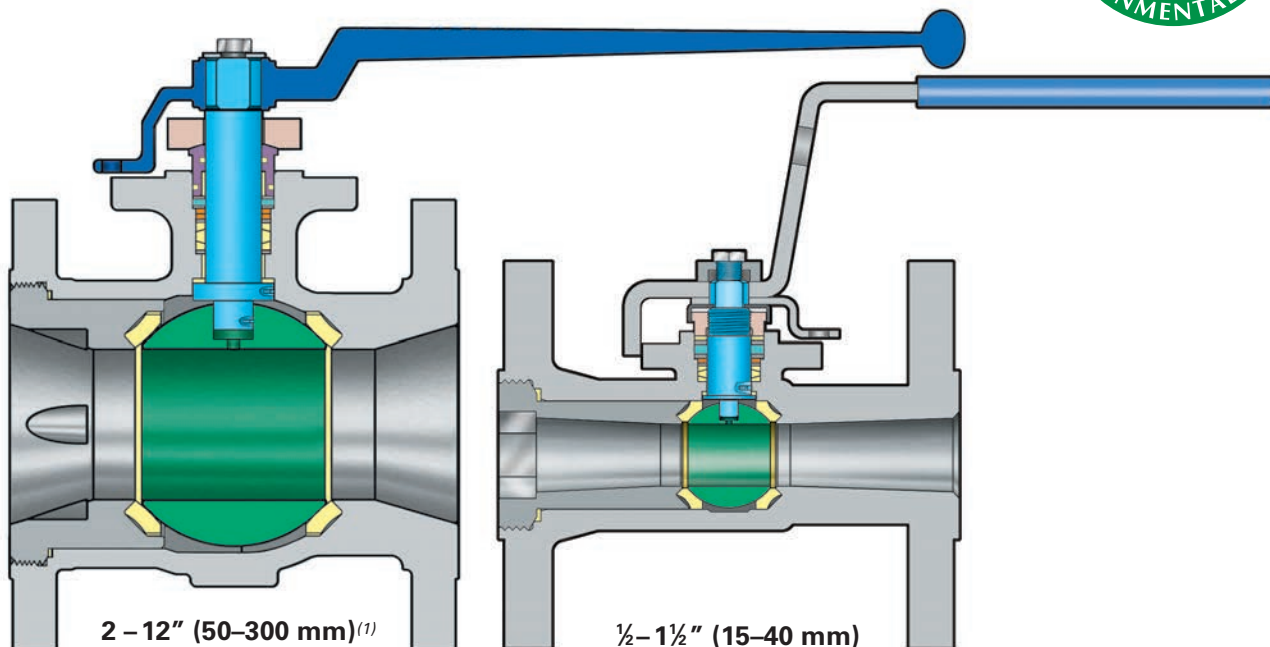
Full port, live-loaded, and double packed



SIZE in mm	LIVE-LOADED DOUBLE PACKED FULL PORT (1)						WEIGHT lb kg
	A	B	C	D	E	F	
2 50	7.00 178	9.77 248	10.38 264	2.89 73	2.00 51	6.00 152	30 14
3 80	8.00 203	11.73 298	11.88 302	3.77 96	3.00 76	7.50 191	58 26
4 100	9.00 229	14.78 375	19.88 505	4.52 115	4.00 102	9.00 229	97 44
6 150	15.50 394	17.65 448	25.88 657	6.24 158	6.00 152	11.00 279	212 96

SIZE in mm	LIVE-LOADED DOUBLE PACKED FULL PORT (1)						WEIGHT lb kg
	A	B	C	D	E	F	
2 50	8.50 216	9.77 248	10.38 264	3.83 97	2.00 51	6.50 165	45 20
3 80	11.12 282	11.73 298	11.88 302	5.30 135	3.00 76	8.25 210	82 37
4 100	12.00 305	14.78 375	19.88 505	5.99 152	4.00 102	10.00 254	137 62
6 150	15.88 403	17.65 448	25.88 657	6.65 169	6.00 152	12.50 318	278 126

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



ISO 5211

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 overcompression 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⁽²⁾, fire tested to API 607 Rev. 5/ ISO 10497. ISO/CAP1 for all parameters of standardized valve automation.

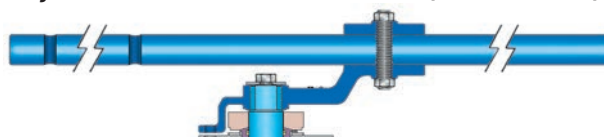
- Locking device standard for valves with lever handle.
- Highest standards of quality. Over its 50 years of production activities Velan has earned a worldwide reputation for quality in design, manufacturing and valve performance.

APPLICATIONS

These rugged, versatile, high performance ball valves meet requirements for oil and gas pipeline service and can meet NACE specifications when required.

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.

Adjustable handle standard 4–8" (100–200 mm)



(1) Handle may differ on valves 4–8" (100–200 mm).
Gear actuators are included on valves 10–12" (250–300 mm).

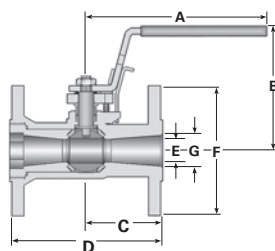
(2) For latest revision compliance contact your local Velan office.

UB-150/300 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	CS	SS 304
Belleville washer		Stainless steel
Packing washer		Stainless steel
Handle 1/2–1 1/2" (15–40 mm)		SS 304
Safety clip 1/2–1 1/2" (15–40 mm)		SS 304
Handle 2" (50 mm) and up		Malleable iron
Cap screw	CS plated	CS plated or SS

(1) Other materials are available.



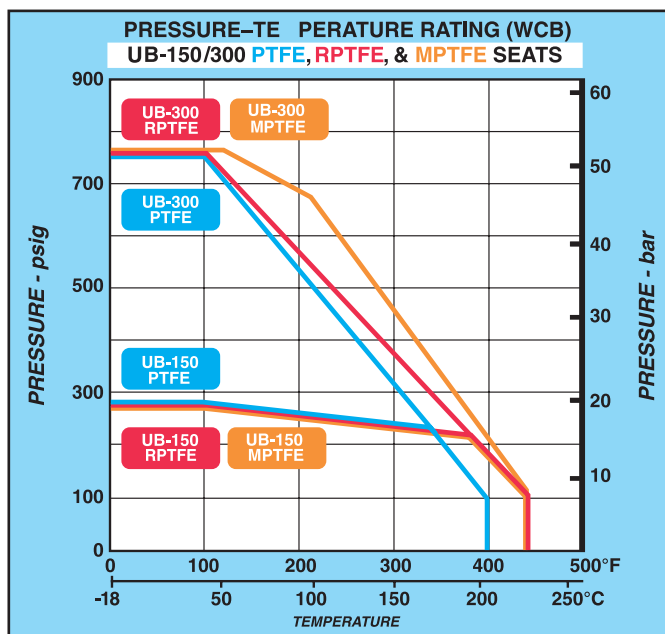
DIMENSIONS, WEIGHTS, Cv AND ISO FLANGES

SIZE in mm	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 in mm	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

(2) $K_v = C_v \times 0.85$. (3) Adjustable handle. Contact your local Velan office for dimensional data.

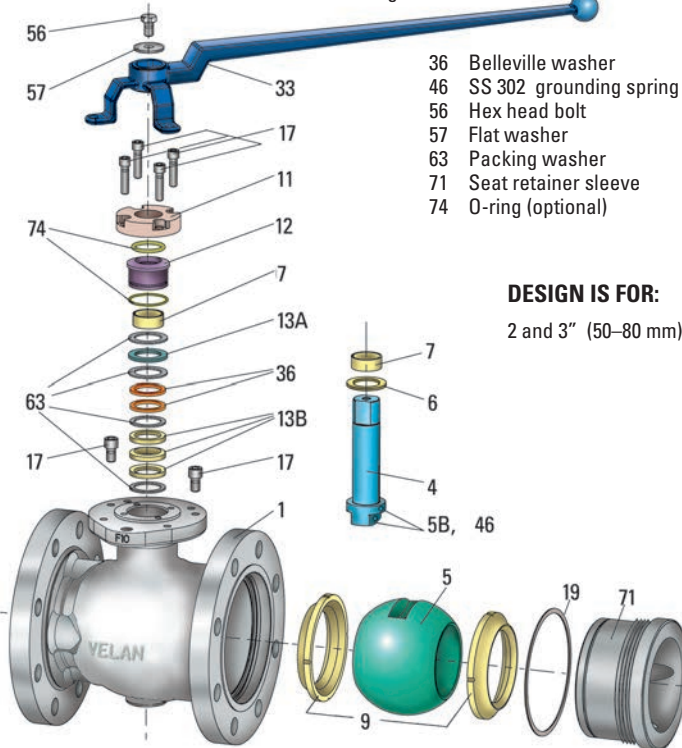
(4) UB 300 10 and 12" (250 and 300 mm) are gear actuated.



UB-150/300 VIEW

ITEM DESCRIPTION

- | | | |
|--------------------------|-------------------|-----------------------------|
| 1 Body | 6 Thrust washer | 13A Packing ring (graphite) |
| 4 Stem | 7 Stem bushing | 13B Packing ring (PTFE) |
| 5 Ball | 9 Seat | 17 Socket head cap screw |
| 5B SS 316 grounding ball | 11 Packing flange | 19 Body gasket |
| | 12 Gland bushing | 33 Handle |



DESIGN IS FOR:
2 and 3" (50–80 mm)

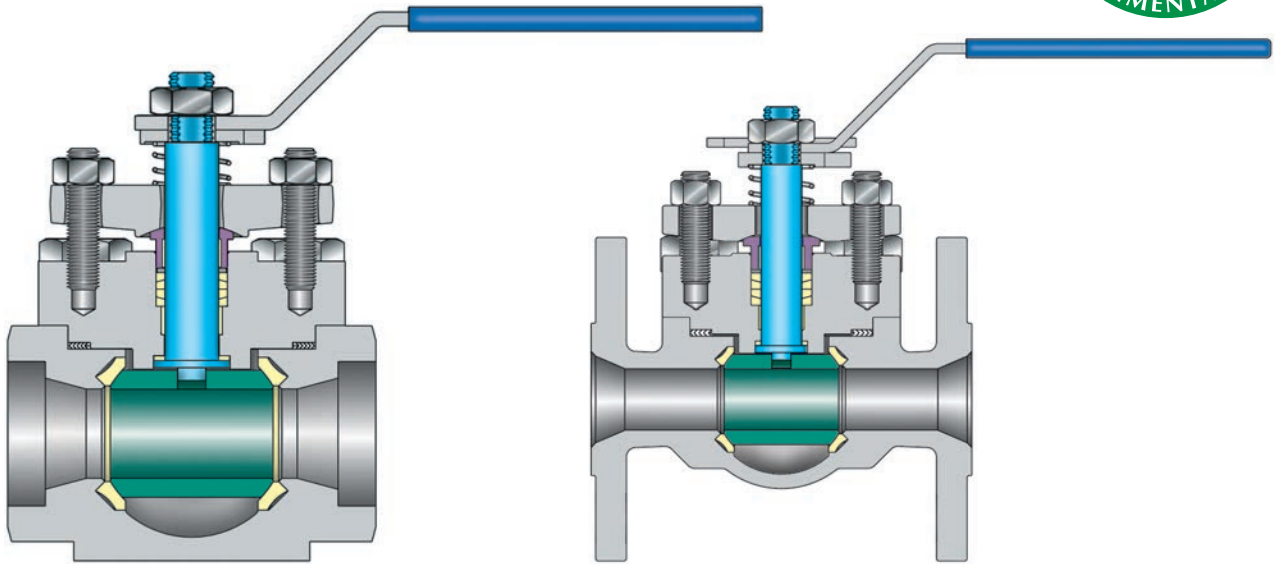
Materials and other technical data pages 35 to 42.
Torque charts page 40-41.

TE-150/300/600 MEMORYSEAL™ TOP-ENTRY REGULAR AND FULL PORT BALL VALVES

REGULAR PORT ½–6" (15–150 mm)

FULL PORT ¾–6" (10–150 mm)

THREADED, SOCKET WELD, BUTT-WELD, OR FLANGED
CLASSES 150, 300, 600



Butt-weld ½–6" (15–150 mm) Socket weld and threaded ¾–4" (10–100 mm) Flanged ½–6" (15–150 mm)

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 (2" (50 mm) 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) ½–2" (15–50 mm).
- Valves can meet NACE specifications for sour gas service when required.
- Optional topworks (page 20):
 1. Live-loaded single or double packing.
 2. TA-Luft certified when supplied with PTFE live-loading packing (optional).
 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.

TE-150/300/600 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	PTFE 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	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.

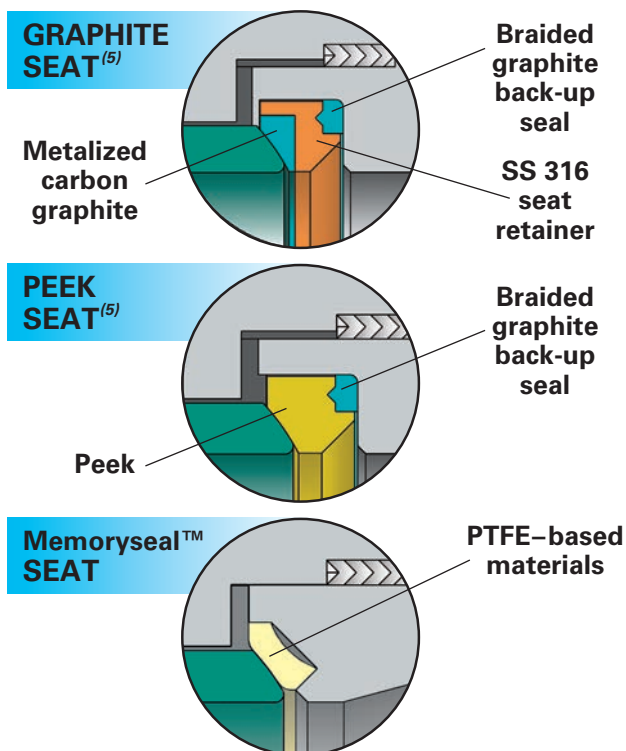
FLOW COEFFICIENTS $C_v^{(3)}$ – TE-150/300/600 VALVES

SIZE in (mm)	REG. PORT	FULL PORT	SIZE in (mm)	REG. 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	—	—	—

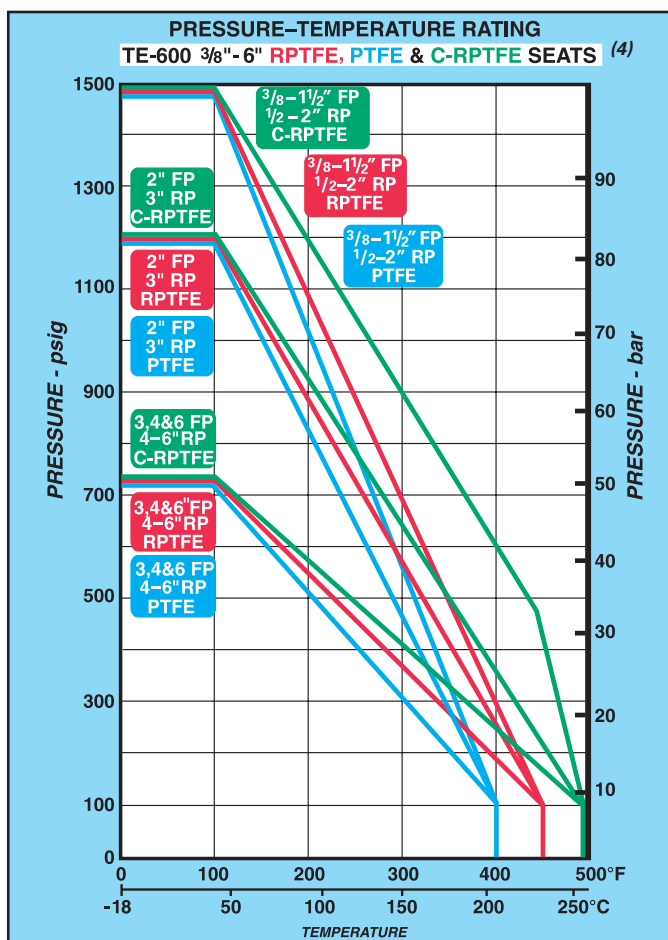
(3) $K_v = C_v \times 0.85$

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

SEAT DESIGNS



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



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

TE-150/300/600 TOP-ENTRY

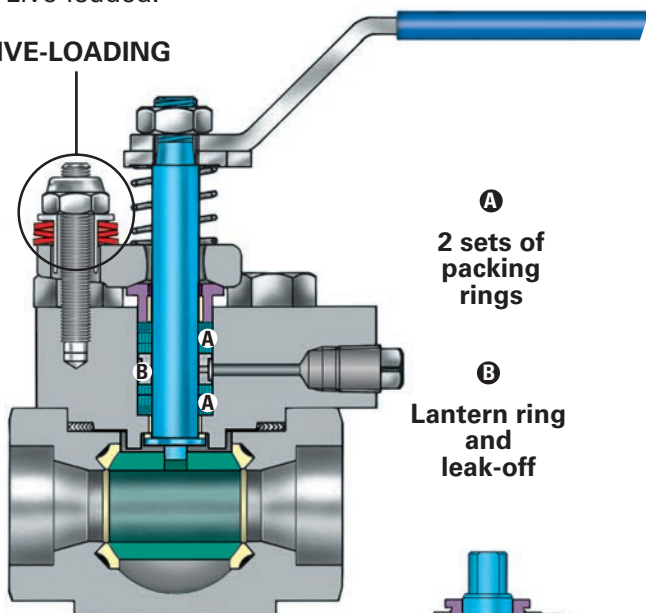
ALTERNATIVE PACKING CHAMBER DESIGN

FOR 0 PPM FUGITIVE EMISSIONS

DOUBLE PACKED

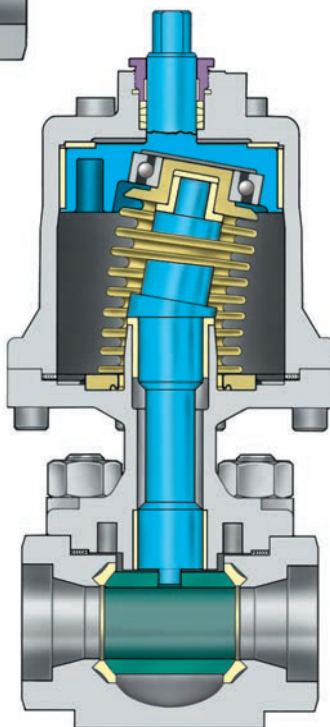
- Double packing with leak-off.
- Two sets of packing rings are precompressed to 2,000 psi (14 MPa) in PTFE or 4,000 psi (28 MPa) in graphite. A lantern ring and leak-off allow removal of leakage, if any, from bottom packing set.
- Tested to 500,000 cycles with 0 ppm^m emissions.
- Live-loaded.

LIVE-LOADING



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.

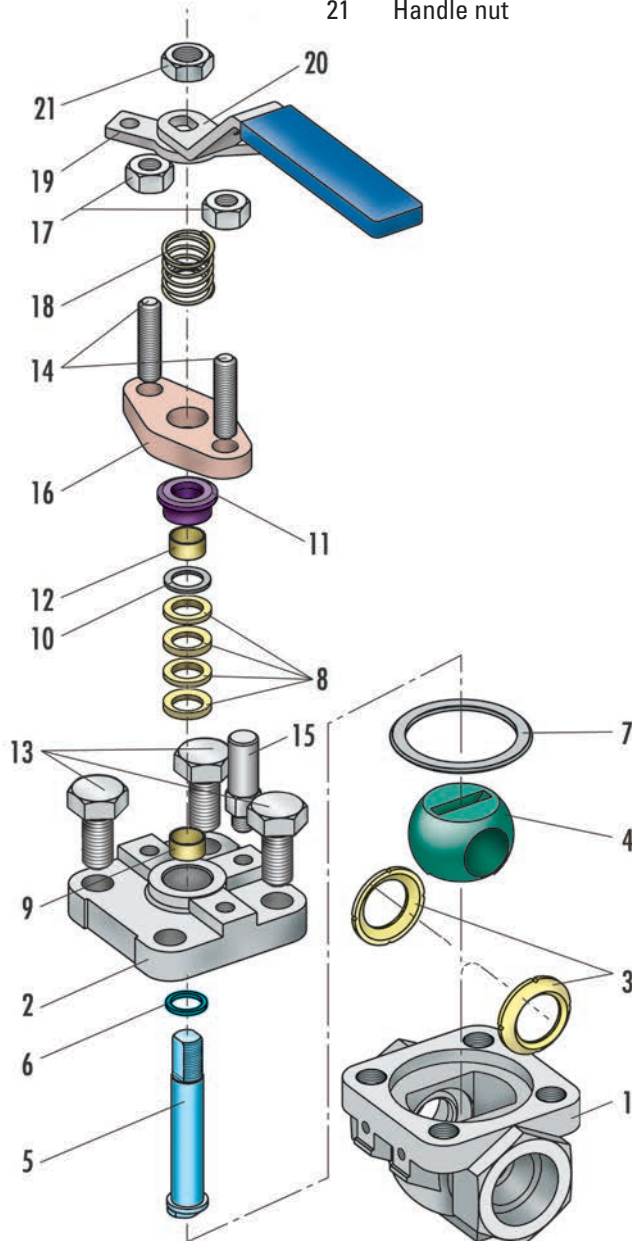


(1) contact your local Velan office for details .

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



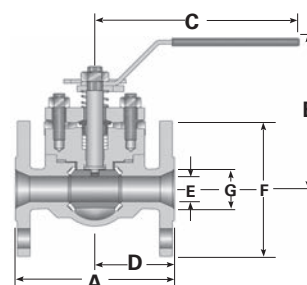
TE-150/300/600 DIMENSIONS AND WEIGHTS

TE-150/300/600

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

SIZE in mm	CLASS 150/300 FLANGED										FULL PORT				WEIGHT lb kg
	A		B	C	D		E		G						
	150	300	150/300	150/300	150	300	150/300	150	300	150	300				
3 ⁽²⁾ 80	—	11.12 282	9.13 232	19.88 505	—	5.56 141	3.00 76	—	8.25 210	—	111 50				
4 100	17.00 432	18.00 457	11.95 304	25.88 657	8.50 216	9.00 229	4.00 102	9.00 229	10.00 254	220 100	240 109				
6 150	21.50 546	22.00 559	13.75 349	—	10.75 273	11.00 279	6.00 152	11.00 279	12.50 318	474 215	517 235				

SIZE in mm	CLASS 600 FLANGED FULL PORT						WEIGHT lb kg
	A	B	C	D	E	G	
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 ⁽³⁾	11.50	6.45	11.91	5.75	2.00	6.50	37
50	292	164	303	146	51	165	17

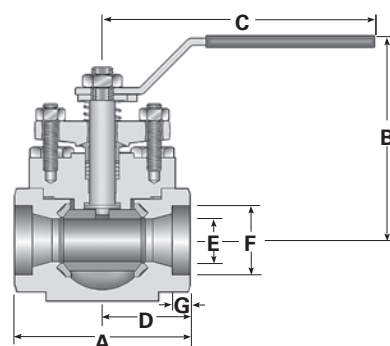


- (2) Body is with welded on flanges and threaded holes.
(3) Intermediate class 470 (for CF8M body material).

TE-600

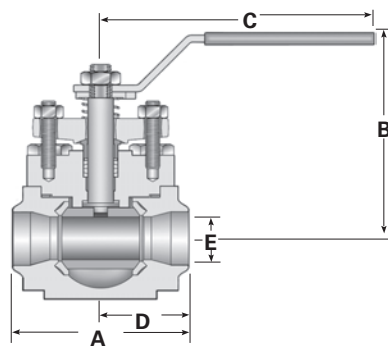
SIZE in mm	THREADED, SOCKET WELD				REGULAR PORT			WEIGHT lb kg
	A	B	C	D	E	F	G	
1/2	2.62	3.47	4.62	1.31	0.44	0.86	0.38	2.3
15	67	88	117	33	11	22	10	1.0
3/4	3.25	3.60	4.62	1.63	0.56	1.07	0.50	3.2
20	83	91	117	41	14	27	13	1.5
1	3.75	4.82	6.44	1.88	0.81	1.33	0.50	6.8
25	95	122	164	48	21	34	13	3.1
1 1/4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



SIZE in mm	BUTT-WELD			REGULAR PORT		WEIGHT lb kg
	A	B	C	D	E	
½ 15	2.62 67	3.47 88	4.62 117	1.31 33	0.44 11	2.3 1.0
¾ 20	3.25 83	3.60 91	4.62 117	1.63 41	0.56 14	3.2 1.5
1 25	3.75 95	4.82 122	6.44 164	1.88 48	0.81 21	6.8 3.1
1½ 40	4.88 124	5.66 144	7.55 192	2.44 62	1.19 30	13.8 6.3
2 50	6.00 152	5.92 150	7.55 192	3.00 76	1.50 38	22 10
3 ⁽¹⁾ 80	11.12 282	6.45 164	11.91 303	5.56 141	3.00 51	46 21
4 ⁽¹⁾ 100	12.00 305	9.13 232	19.88 505	6.00 152	3.00 76	86 39

SIZE in mm	BUTT-WELD			FULL PORT		WEIGHT lb kg
	A	B	C	D	E	
1/2 15	3.25 83	3.60 91	4.62 117	1.63 41	0.56 14	3.2 1.5
3/4 20	3.75 95	4.82 122	6.44 164	1.88 48	0.81 21	6.8 3.1
1 25	4.88 124	5.66 144	7.55 192	2.44 62	1.19 30	13.8 6.3
1 1/2 40	6.00 152	5.92 150	7.55 192	3.00 76	1.50 38	22 10
2 (1) 50	7.25 184	6.45 164	11.91 303	3.63 92	2.00 51	46 21
3 (1) 80	12.00 305	9.13 232	19.88 505	6.00 152	3.00 76	86 39



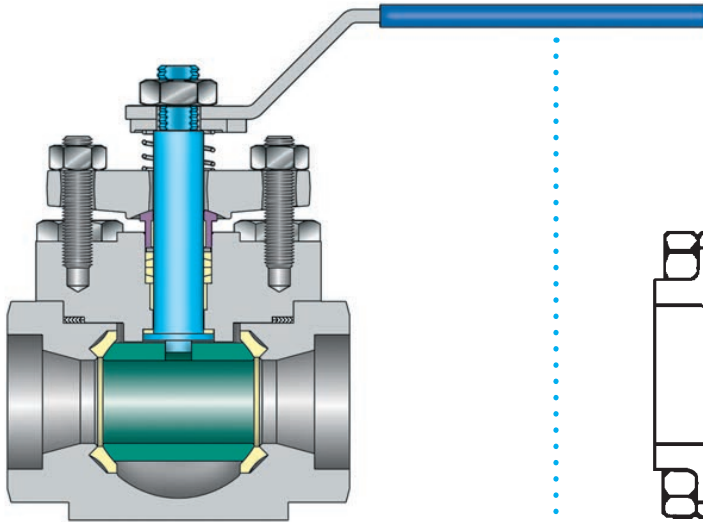
- (1) Dimensions are for class 150/300. For other pressure classes contact your local Velan office.

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

SIZE in mm	THREADED, SOCKET WELD				REGULAR PORT			WEIGHT lb kg
	A	B	C	D	E	F	G	
1/2	2.62	4.31	4.62	1.31	0.44	0.86	0.38	4.0
15	67	109	117	33	11	22	10	1.8
3/4	3.25	4.44	4.62	1.63	0.56	1.07	0.50	5.0
20	83	113	117	41	14	27	13	2.3
1	3.75	5.60	6.44	1.88	0.81	1.33	0.50	8.9
25	95	142	164	48	21	34	13	4.0
1 1/2	4.88	6.37	7.55	2.44	1.19	1.92	0.50	16.2
40	124	162	192	62	30	49	13	7.3
2	6.00	6.55	7.55	3.00	1.50	2.41	0.62	26
50	152	166	192	76	38	61	16	12
3	7.25	7.83	11.91	3.62	2.00	3.54	0.62	43
80	184	199	303	92	51	90	16	20
4	12.00	11.67	19.88	6.00	3.00	4.55	0.75	90
100	305	296	505	152	76	116	19	41

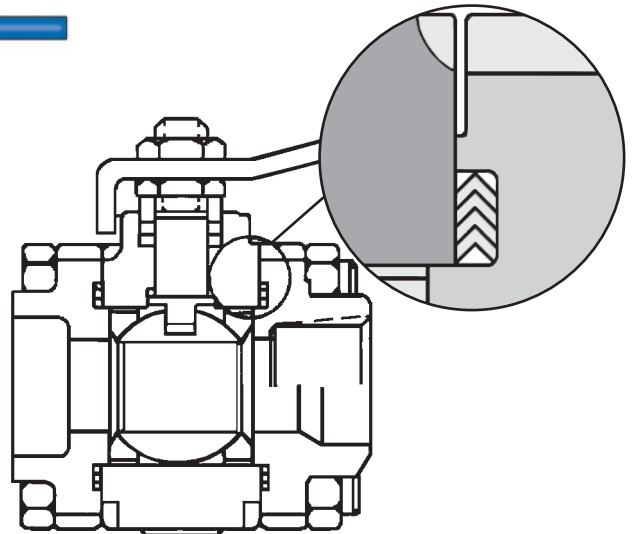
VELAN TOP-ENTRY BALL VALVES SUPERIOR TO THREE-PIECE BALL VALVES

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.

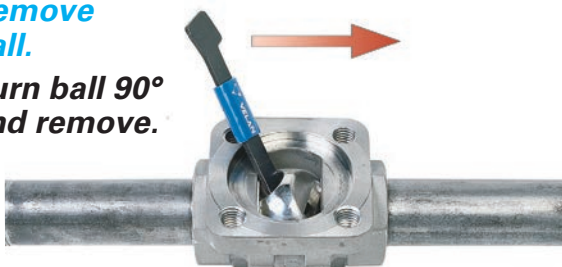
(1) Consult your local Velan office for details.

IN-LINE SERVICE

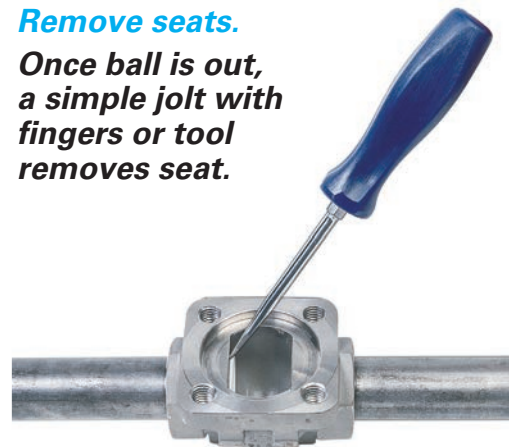
STEP 1
*Remove
cover
assembly.*



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

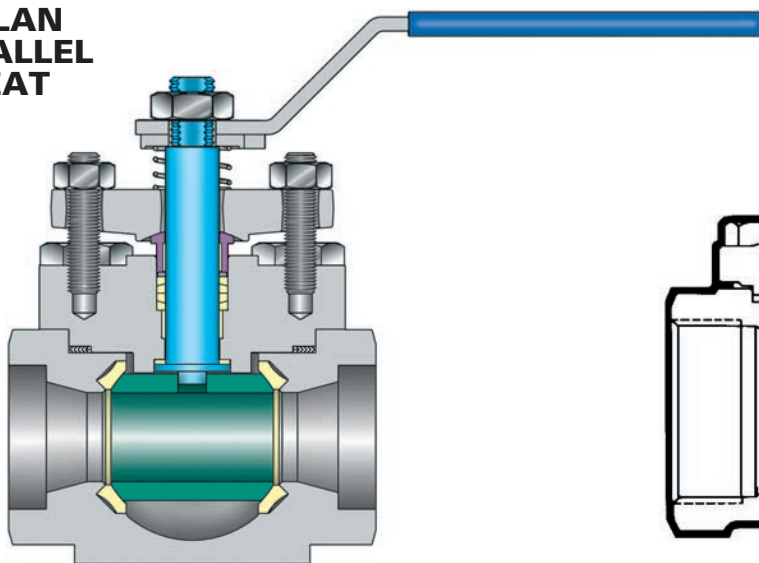


STEP 3
Remove seats.
*Once ball is out,
a simple jolt with
fingers or tool
removes seat.*

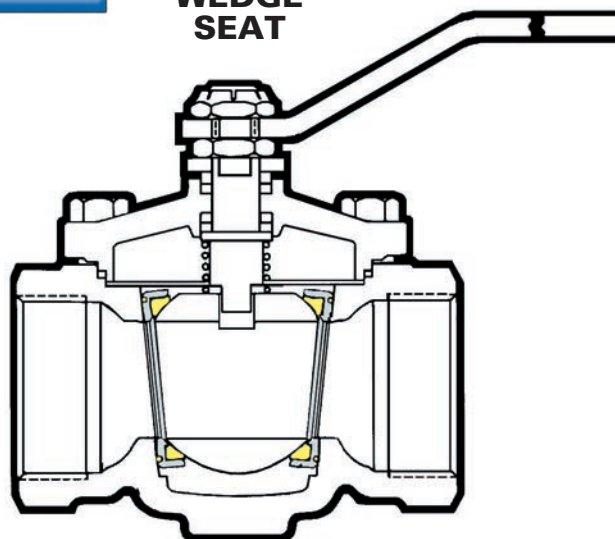


VELAN PARALLEL SEAT TOP-ENTRY VERSUS WEDGE SEAT DESIGN

**VELAN
PARALLEL
SEAT**



**WEDGE
SEAT**



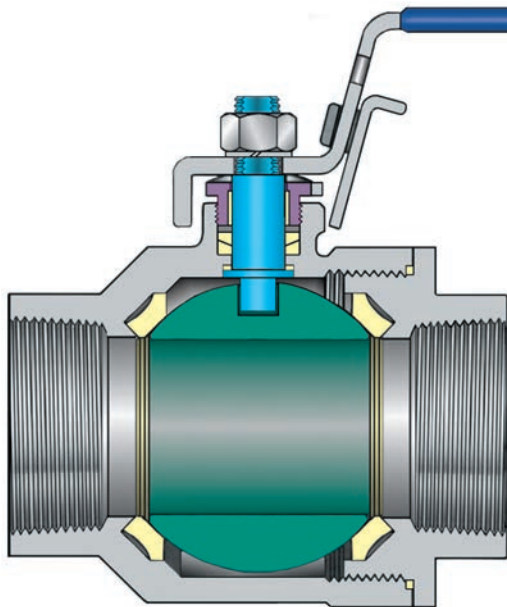
FEATURES		VELAN PARALLEL SEAT	WEDGE SEAT
1	Memoryseal™ parallel seats	yes	no
2	E-20 packing style	yes	no
3	20 ppm maximum emission guarantee	yes	no
4	Separate self-aligning packing flange and gland	yes	no
5	Fully guided stem independent of packing rings	yes	no
6	Cup and cone packing	yes	no
7	Locking 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.

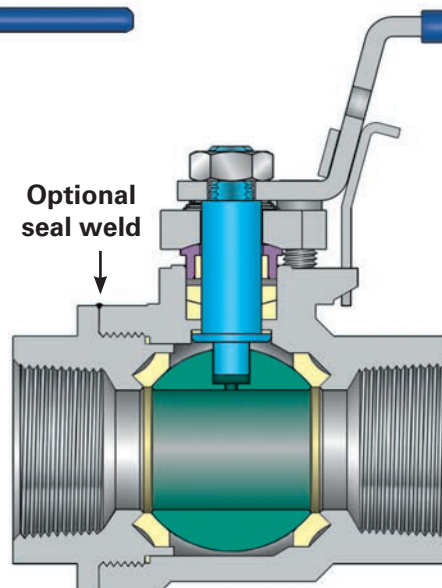
END-ENTRY MEMORYSEAL™ BALL VALVES

EE-1000 CF8M, FULL PORT, ½–2" (8–50 mm)
MPTFE SEAT

EP-2000 REGULAR PORT, ½–2" (15–50 mm)
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.

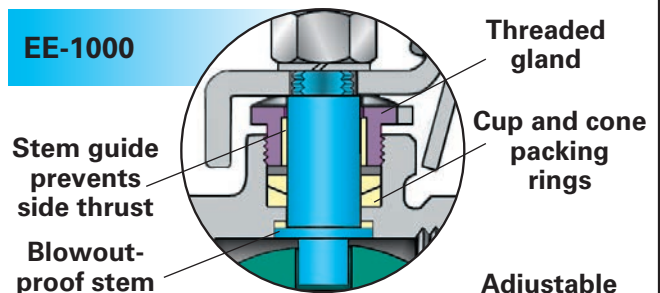
APPLICATIONS

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

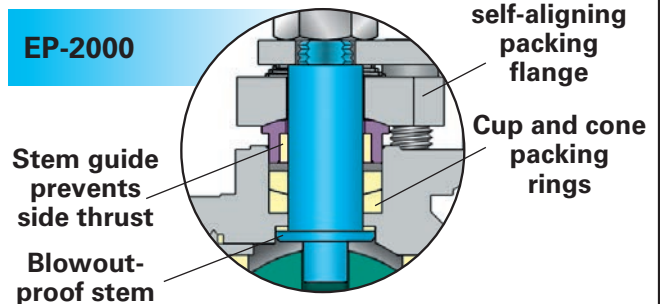
The EP-2000 is a regular port WCB or CF8M heavy duty valve for oilfields, chemical, and general use.

STEM SEAL DESIGNS

EE-1000



EP-2000

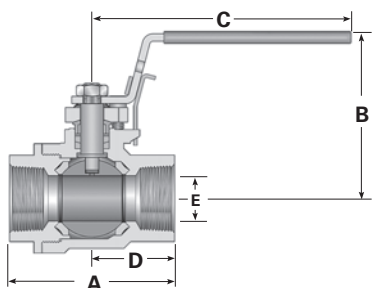


EE-1000 AND EP-2000 END-ENTRY

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

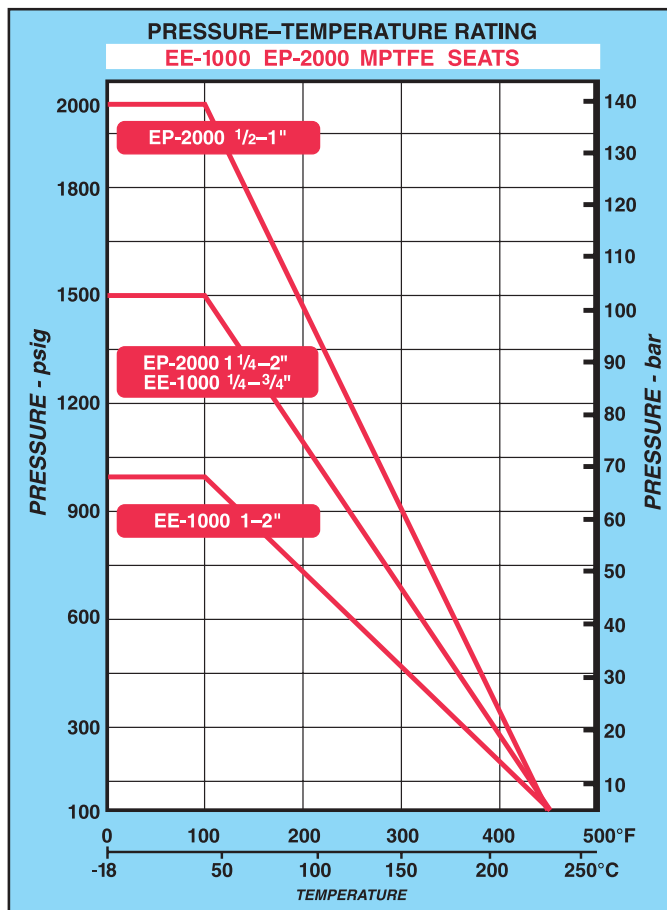
SIZE in (mm)	Cv ⁽²⁾	
	EE-1000	EP-2000
1/4 (8)	5.0	—
3/8 (10)	5.7	—
1/2 (15)	13.5	10
3/4 (20)	50	19
1 (25)	93	39
1 1/4 (32)	170	65
1 1/2 (40)	250	87
2 (50)	450	112

(2) $K_v = C_v \times 0.85$

DIMENSIONS AND WEIGHTS

SIZE in mm	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 in mm	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



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



1" EE-1000



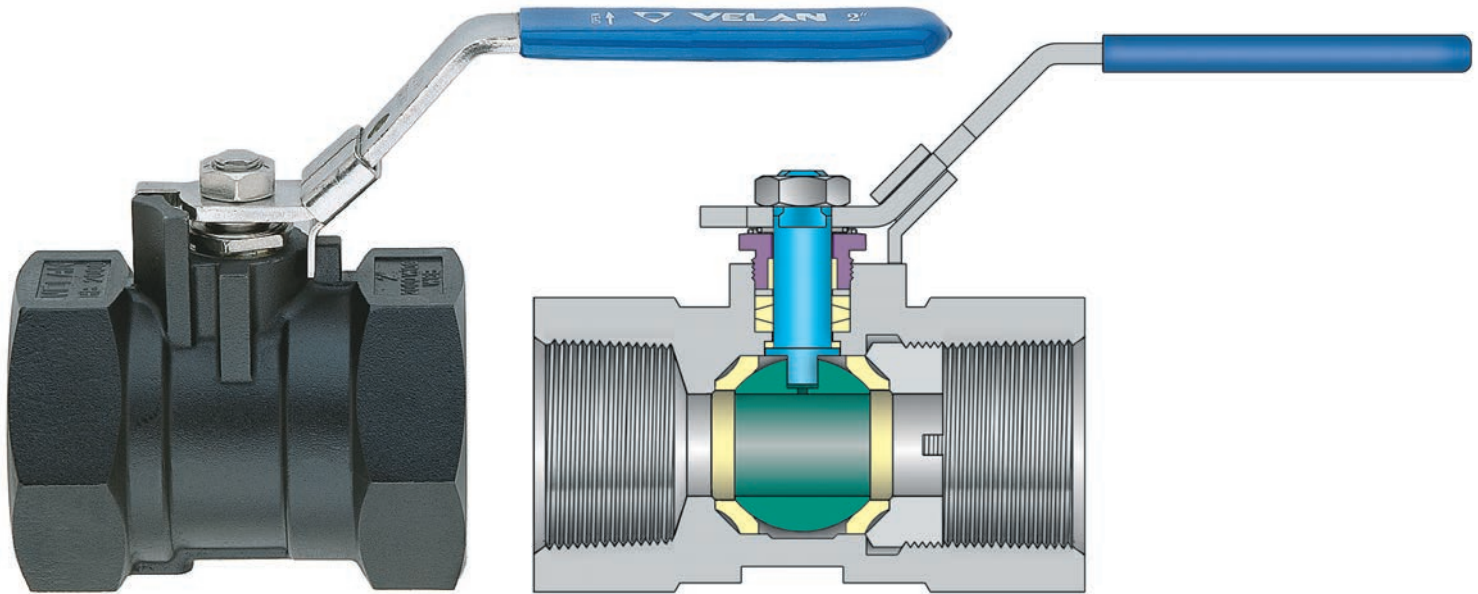
1 1/2" EP-2000
with seal weld
(optional)



HB-2000 MEMORYSEAL™ ONE-PIECE (REDUCED PORT) BALL VALVES

¼–2" (8–50 mm)

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 ½ – 2" (15–50 mm).
- 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.

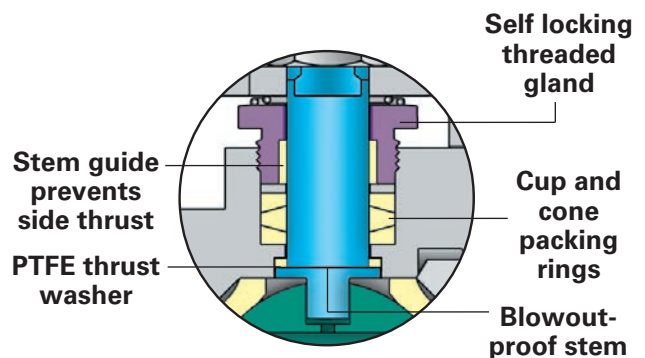
APPLICATIONS

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 ONE-PIECE

STANDARD MATERIALS

PART	CARBON STEEL	STAINLESS STEEL	ALLOY 20
Body	A 108 or WCB	SS 316 or CF8M	Alloy 20
Seat retainer	A 108	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

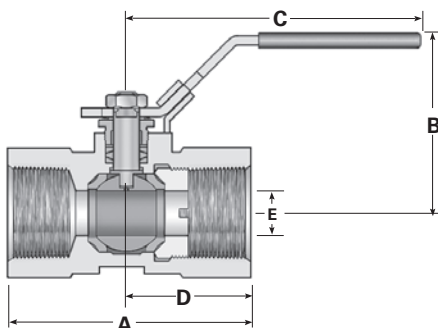
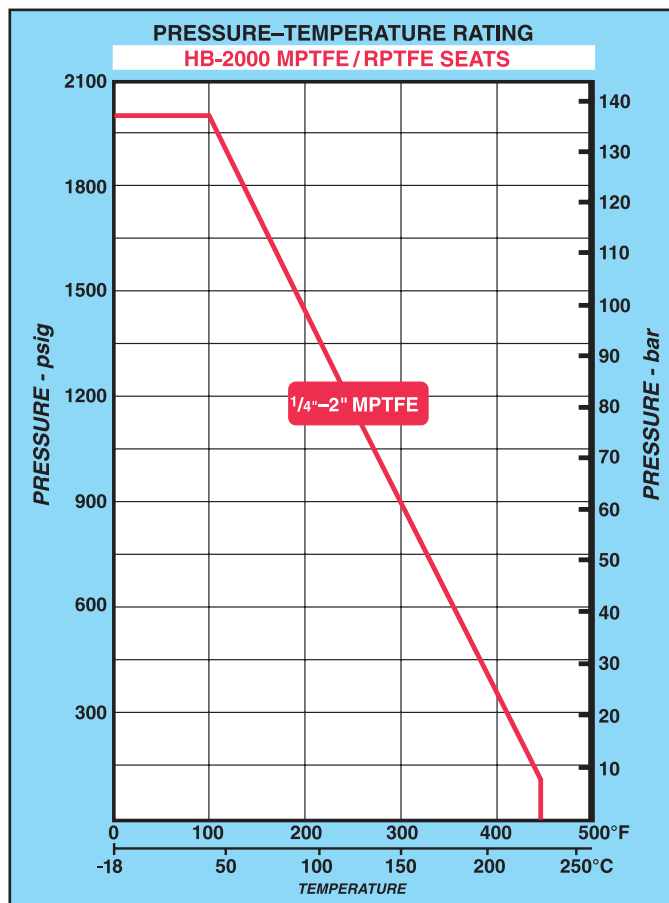
SIZE in (mm)	Cv ⁽¹⁾	SIZE in (mm)	Cv ⁽¹⁾
¼ (8)	2.5	1 (25)	14.0
⅜ (10)	3.5	1¼ (32)	33.0
½ (15)	4.8	1½ (40)	45.0
¾ (20)	9.5	2 (50)	58.0

(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.



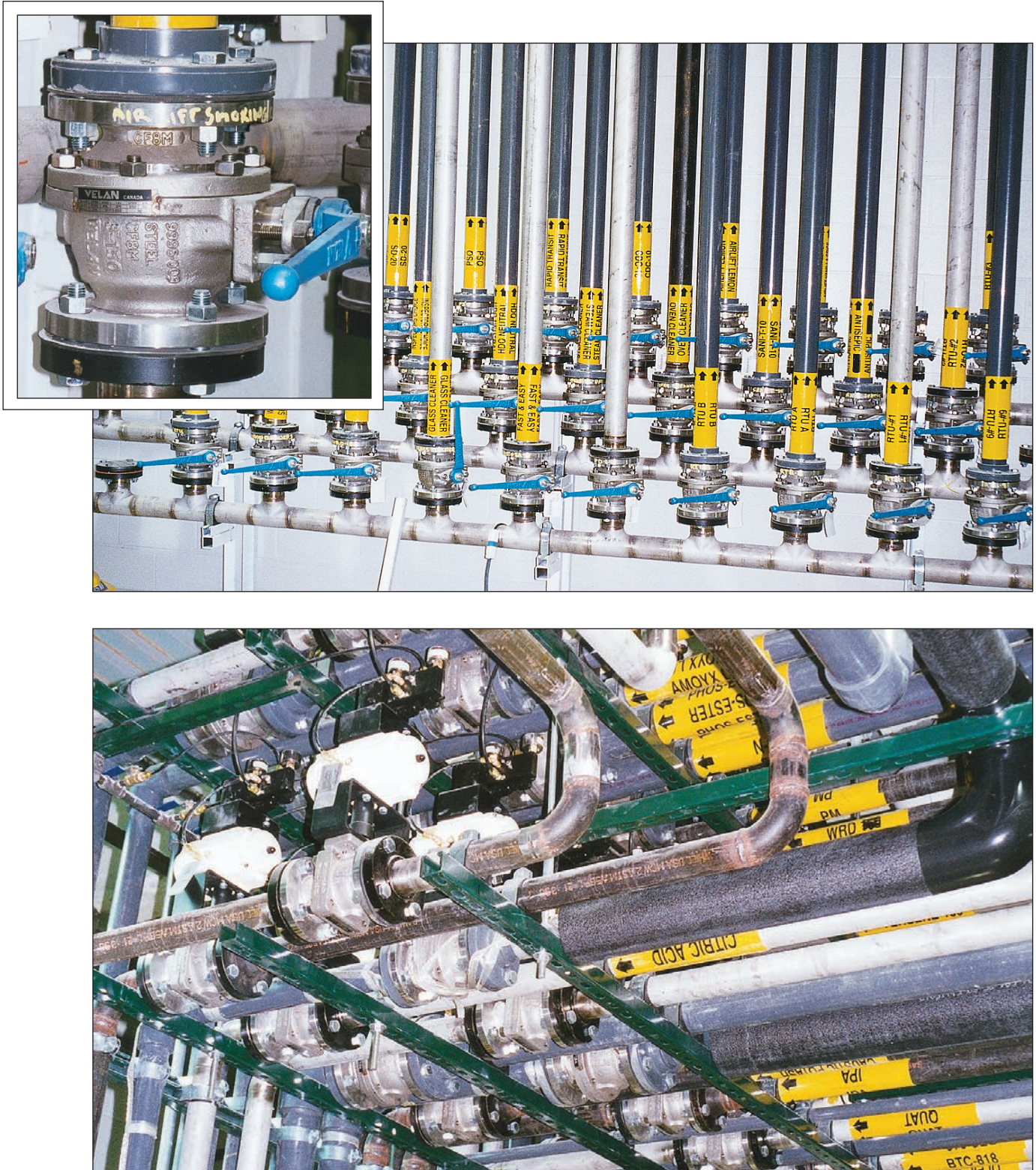
DIMENSIONS AND WEIGHTS

SIZE in mm	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

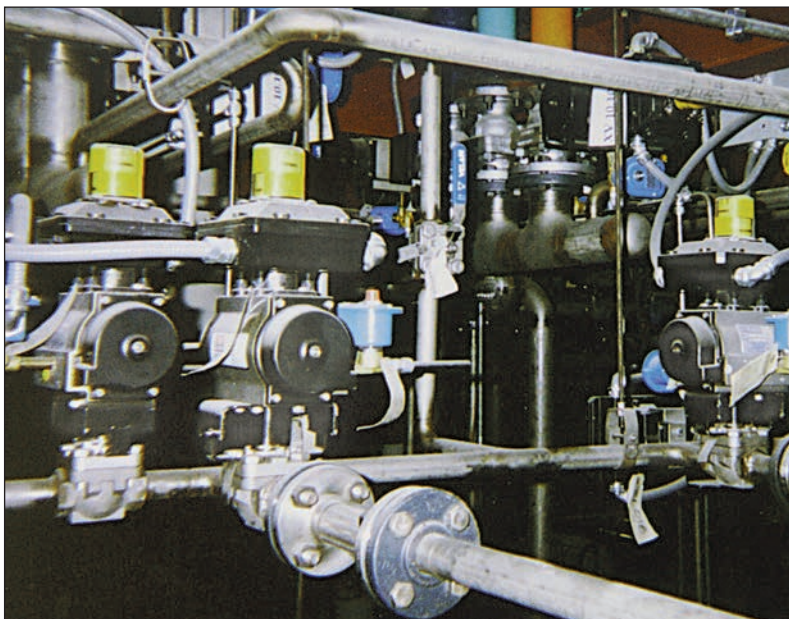
VELAN BALL VALVES IN-SERVICE

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.



VELAN BALL VALVES IN-SERVICE



Photos on page 28: Split-body ball valves installed in a chemical plant in Ohio.

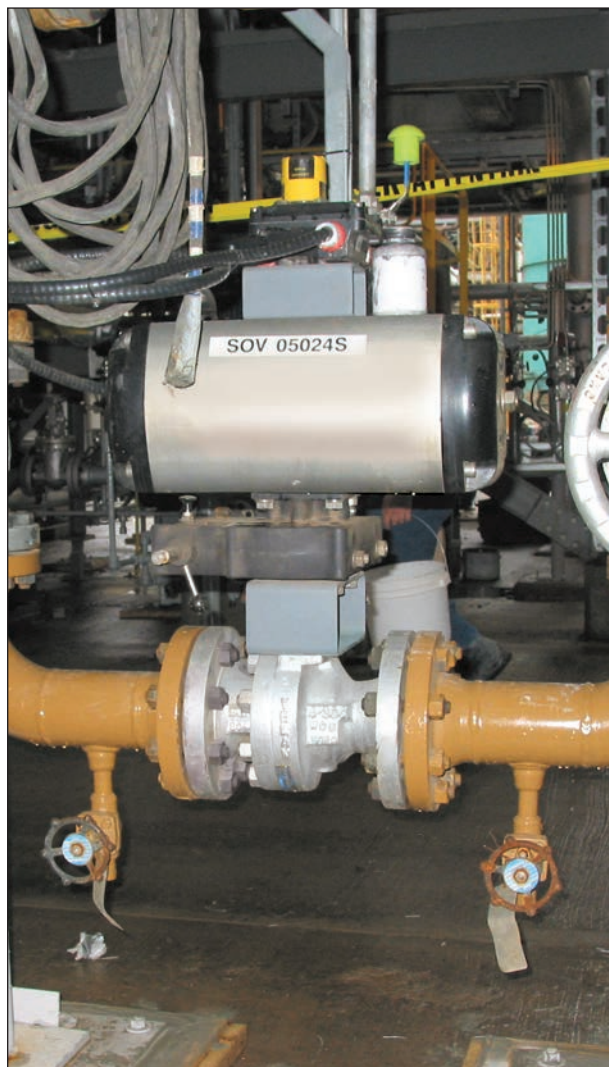
Photos on this page

Top right: Top-entry ball valve installation.

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

Bottom left: 20" (500 mm) split-body bypass ball valve installed at James Bay in Canada.

Bottom right: 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
50 psig (3.5 bar)	All up to 3" (80 mm)	MPTFE	PTFE
150 psig (10.3 bar)	All	RPTFE	PTFE
250 psig (17.2 bar)	SB-300/600	C-RPTFE	Graphite
	TE-300/600	RPTFE	
450 psig (31 bar)	TE-300/600 1/2–4" (15–100 mm)	C-RPTFE	Graphite
500 psig (34.5 bar)	TE-300/600 1/2–4" (15–100 mm)	Graphite PEEK	Graphite

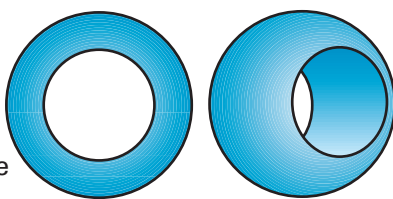
(1) Saturated steam, on/off operation.

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

THROTTLING SERVICE CONTROL VALVES

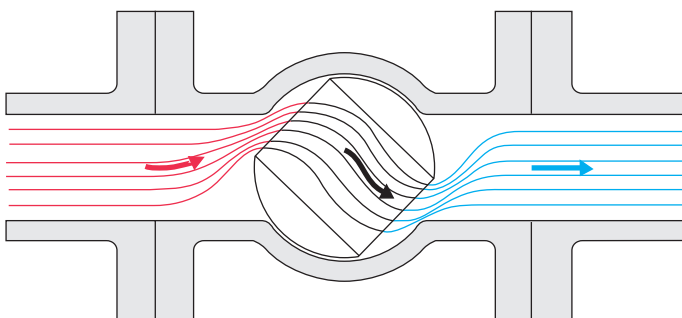
HOW IT WORKS

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.

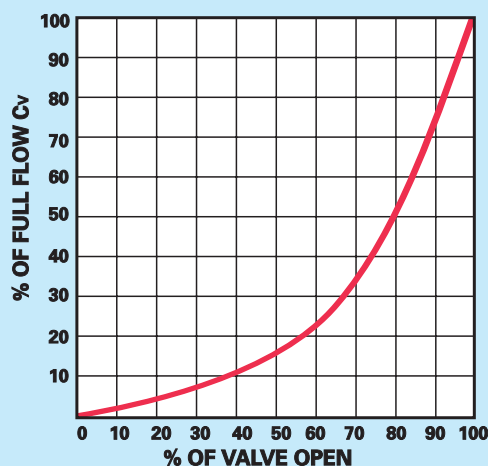


All styles of valves are suitable for manual throttling and can be equipped with special dials indicating the 20–100% throttling range.

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.

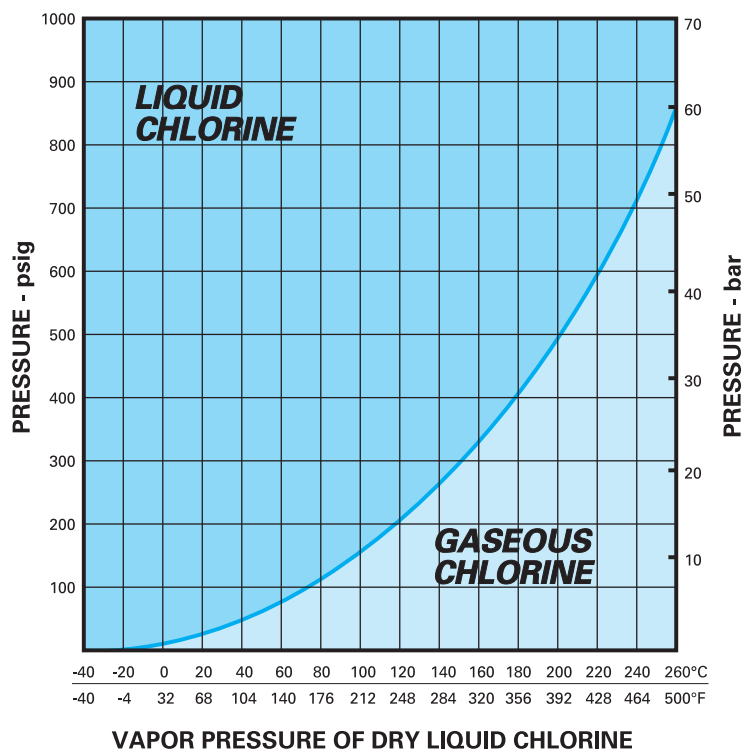
TRIM – Monel or Hastelloy C as per customer selection. Other materials are also available to customer specifications.

3. CLEANING

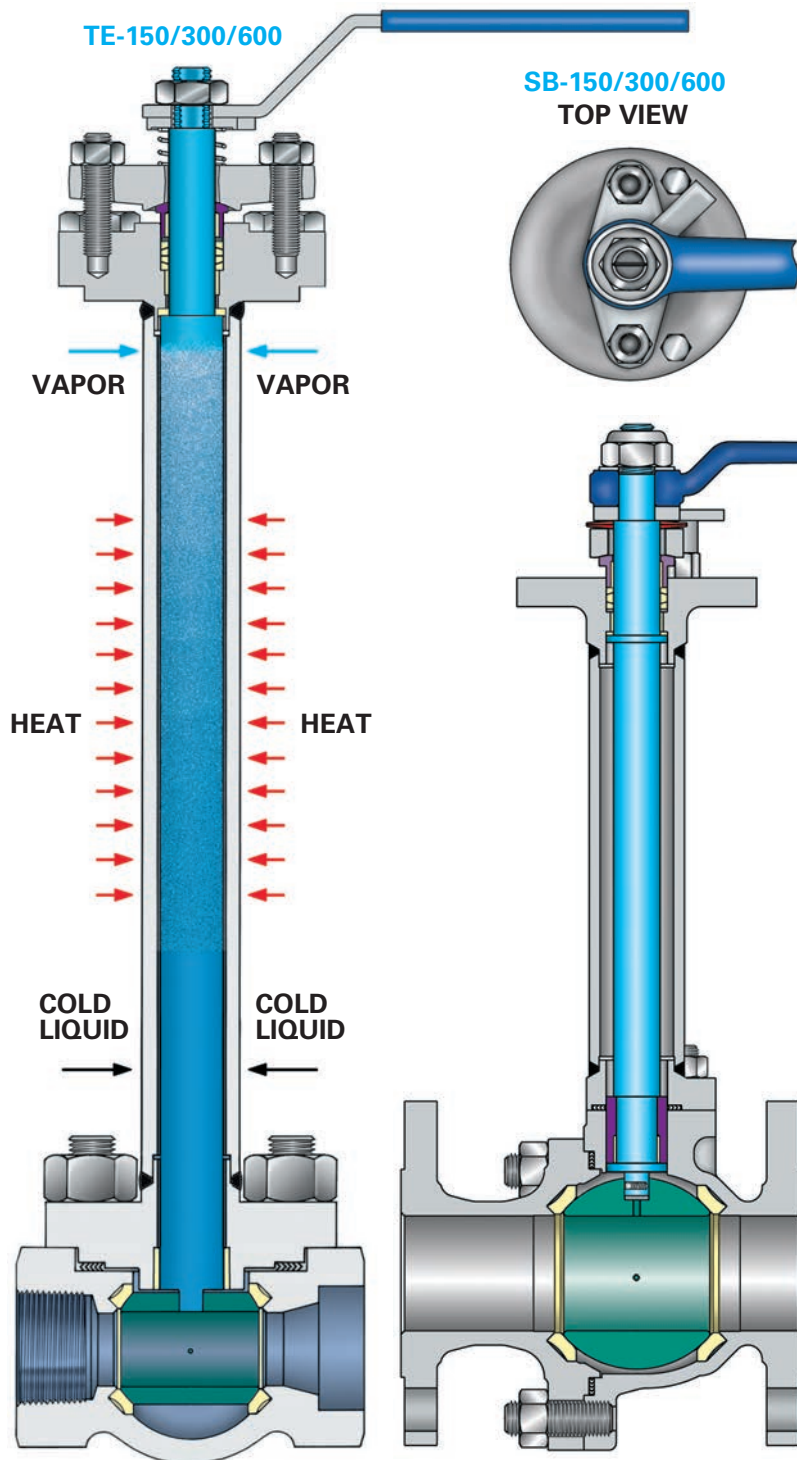
All parts are carefully cleaned and are black light tested to ensure they are free of hydrocarbons, alcohol, or moisture. Valves are dried after hydrotest and packed in plastic bags with a desiccant.

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 $\frac{1}{8}$ " (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" (300 mm) for $\frac{1}{2}$ –2" (15–50 mm) valves and 14–18" (350–450 mm) for 2 $\frac{1}{2}$ –12" (65–300 mm) valves.

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)

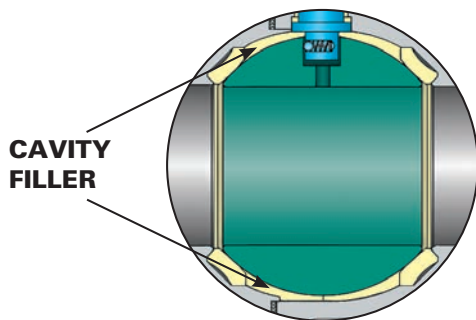
For applications where rapid temperature fluctuations (example: LNG loading platform) can cause joint leakage, body-bonnet bolting is live-loaded with Belleville spring washers.

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 and SB-300 ball valves 2–8" (50–200 mm) regular port, ½–6" (15–150 mm) full port and in our UB-150/300 design in sizes ½–8" (15–200 mm).

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 when required.

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

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.

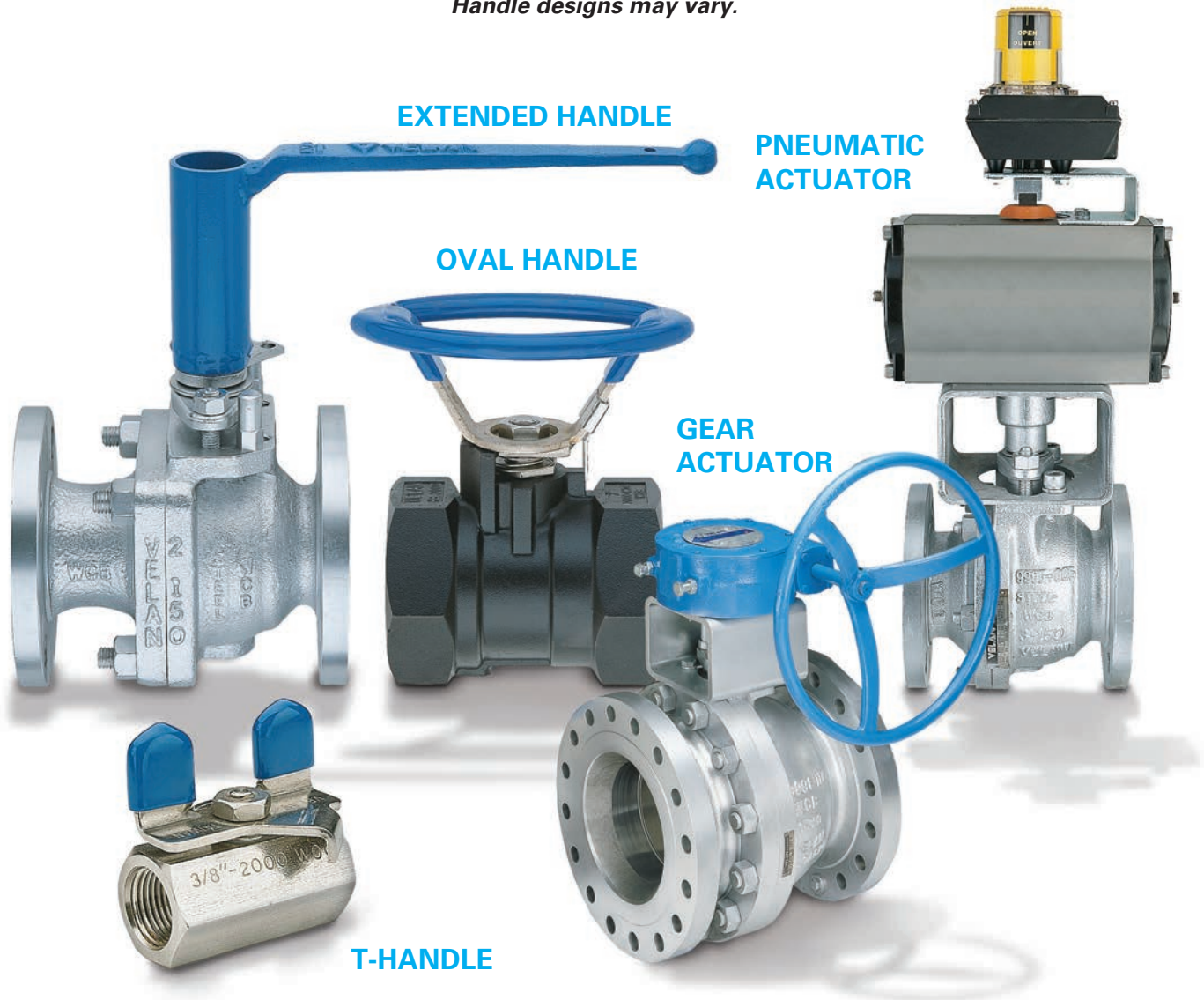
HYDROGEN PEROXIDE SERVICE

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.

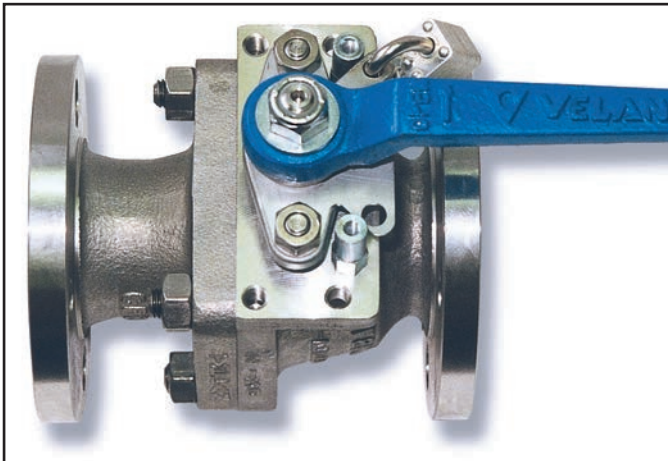
SPECIAL HANDLES AND ACTUATORS

Handle designs may vary.



LOCKING DEVICES

Standard on 2–8" (50–200 mm) SB-150/300/600



Standard on ½–1½" (15–40 mm) SB-150/300



BALL VALVES – MANUAL GEAR ACTUATORS

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

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

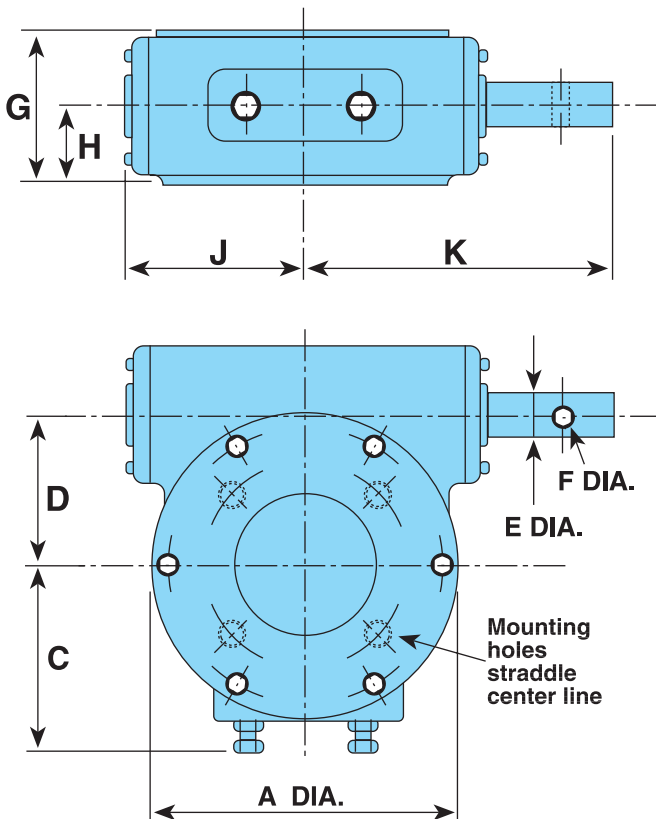
Handle extensions, chain sprockets, and right angle drives are available.



Standard on 2–8" (50–200 mm) 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

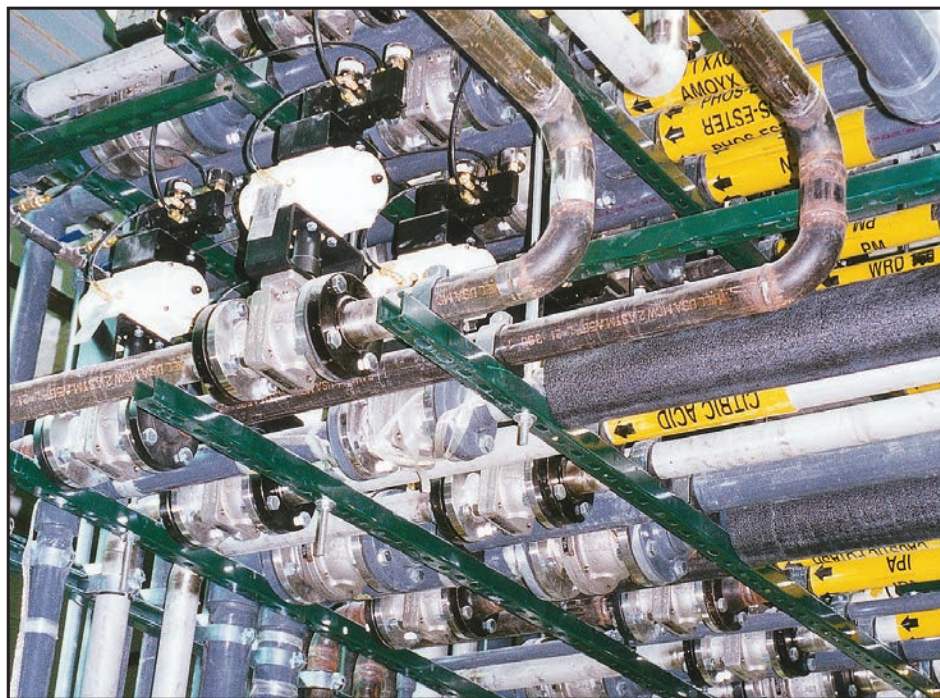
Velan ball valves are available in a variety of automation packages that include pneumatic, electric, and hydraulic. Automation is done either by Velan at its own facilities located around the world or by authorized automation centers. In either case, automation is done in accordance with strict guidelines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



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

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 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



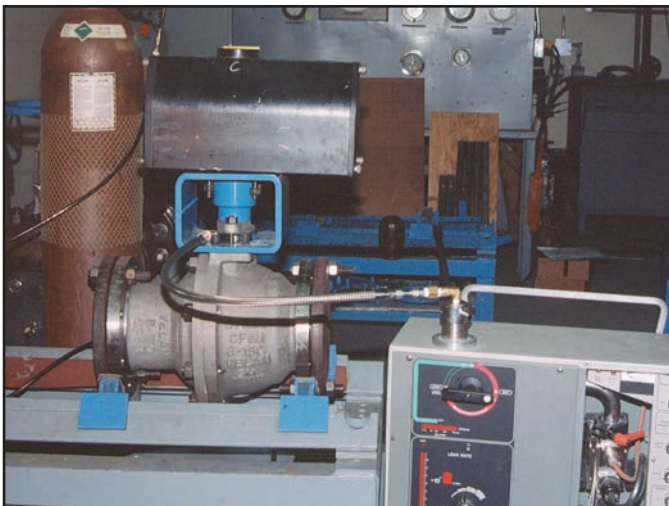
Velan supplies automated packages with integral control actuation.

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

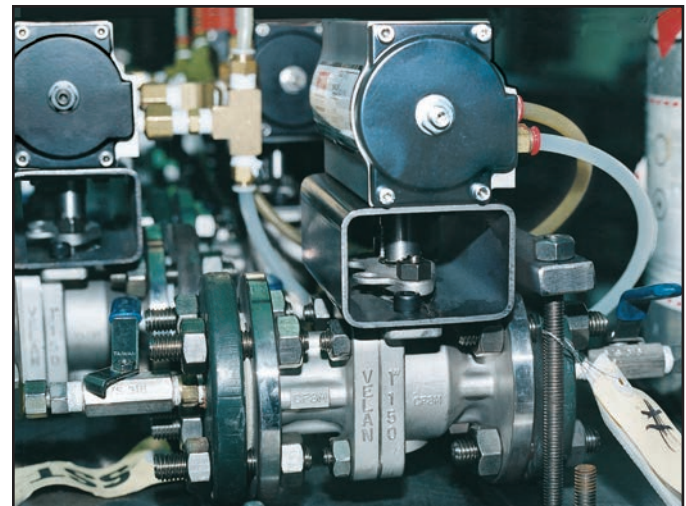
The Velan E-20 stem packing designs shown on page 8 and 9 (as well as the optional designs shown throughout the catalog) are intended for automated valve service.

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			
CUSTOMER INFORMATION		SPECIFICATIONS	
Name: _____		Item: _____	
Address: _____		Quantity: _____	
Contact: _____		Application: _____	
Quote No: _____		Tag #: _____ Velan model #: _____	
Date: _____		Size: _____ Pressure Class: _____	
BODY		ACTUATOR	
Style <input type="checkbox"/> Split-body <input type="checkbox"/> Butterfly <input type="checkbox"/> Top-Entry		Type <input type="checkbox"/> Diaphragm <input type="checkbox"/> Piston <input type="checkbox"/> Manual	
<input type="checkbox"/> Scrd <input type="checkbox"/> SWE		<input type="checkbox"/>	
End connections <input type="checkbox"/> Flange <input type="checkbox"/> ANSI Rt		Manufacturer _____	
<input type="checkbox"/> BWE Schedule _____		Model # _____	
<input type="checkbox"/> Wafer _____ ANSI _____		Air to actuator _____	
<input type="checkbox"/> Logged _____ ANSI _____		Air fails valve to <input type="checkbox"/> As is <input type="checkbox"/> Open <input type="checkbox"/> Close	
Material <input type="checkbox"/> Carbon steel <input type="checkbox"/> 316 SST <input type="checkbox"/>		Valve torque required _____	
Trim Port _____		Auxiliary handwheel _____	
CV _____		SOLENOID VALVE	
Seat Material/Type _____		Manufacturer _____	
Trim Material <input type="checkbox"/> Stainless <input type="checkbox"/> Stellite/SS <input type="checkbox"/>		Model # _____	
<input type="checkbox"/> Full Stellite <input type="checkbox"/>		Nema _____	
Trim Type <input type="checkbox"/> Standard <input type="checkbox"/> Low torque		Voltage _____	
Seat <input type="checkbox"/> Scraper <input type="checkbox"/> High temp. <input type="checkbox"/> Single seat		Style <input type="checkbox"/> 4-way <input type="checkbox"/> 3-way <input type="checkbox"/>	
Construction <input type="checkbox"/> Locked <input type="checkbox"/>		POSITIONER	
Characteristic <input type="checkbox"/> Quick-Opening <input type="checkbox"/> Linear		Manufacturer _____	
<input type="checkbox"/> Equal-Percentage <input type="checkbox"/>		Model # _____	
Shutoff Class <input type="checkbox"/> Standard <input type="checkbox"/>		Input signal <input type="checkbox"/> 3 to 15 psi <input type="checkbox"/> 6 to 30 psi	
BONNET		<input type="checkbox"/> 4 to 20 mA <input type="checkbox"/>	
Packing <input type="checkbox"/> Bellows seal <input type="checkbox"/> Graphite <input type="checkbox"/> Live-loaded		Supply pressure _____	
<input type="checkbox"/> Double packed <input type="checkbox"/> Leak off <input type="checkbox"/> TFE		Accessories <input type="checkbox"/> Gauges <input type="checkbox"/> Air set <input type="checkbox"/> By pass	
SPECIAL SERVICE		Increase signal valve <input type="checkbox"/> Opens <input type="checkbox"/> Closes	
<input type="checkbox"/> Nace <input type="checkbox"/> Cryogenic <input type="checkbox"/> Fire-safe <input type="checkbox"/>		LIMIT SWITCHES	
SERVICES CONDITIONS <input type="checkbox"/> Throttling <input type="checkbox"/> On-Off		Manufacturer _____	
Flowing media _____		Model # _____	
Critical Pressure _____		Voltage _____	
Vapor Pressure P ₁ (Paia) _____		No. switches _____	
Specific Gravity _____		Type <input type="checkbox"/> S.P. <input type="checkbox"/> D.P. <input type="checkbox"/>	
Inlet Temperature _____		Nema _____	
Pressure P ₁ (Paia) _____		WORKSHEET	
Pressure P ₂ (Paia) _____		Net price	
ΔP Shutoff (Paig) _____		Cost	
Flow Rate, Give Units _____			
Req'd Flow Coeff. <input type="checkbox"/> C _v _____			
Valve coefficient _____			
Noise level (dBA) _____			
		Approximate Shipping Lb. _____	
		Net Price _____	
		Adder Price _____	
		Total Net Price _____	



TA-LUFT qualification test on a 6" (150 mm) and a 1" (25 mm) 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 –the 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 1" (25 mm), 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 ½–2½" (15–65 mm) are 0.5 second, valves 3–6" (80–150 mm) one second and valves 8–12" (80–150 mm), five seconds.

TYPICAL EXAMPLES

FOR SIZING ACTUATORS BASED ON ACTUATOR TORQUING EQUATION

TO OBTAIN THE TORQUE REQUIREMENTS FOR A GIVEN 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 from Table 3 (pg. 39) the seat material factor "MF".
For PTFE or RPTFE, the factor is 1.0.

STEP 3 Determine from Table 1 (pg. 39) the fluid factor "FF"

STEP 4 Determine from Table 2 (pg. 39) the frequency of operation factor "OF"

STEP 5 Using the data from steps 1–4, the actuator torque equation "AT" can now be established:

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

(STEP 1) (STEP 2) (STEP 3) (STEP 4)

EXAMPLE 1: split-body flanged in CF8M, full port

Application: Liquid oxygen evaporizer.

Service: Clean, dry, oxygen gas.

Differential pressure 60 psid (4.1 bar).

Service temperature: 70°F (21°C).

Cycle time: Every 6 hours.

Valve size: SB-150 4" (100 mm).

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 3),

FF = 1.3 (Table 1), OF = 1 (Table 2)

Minimum break torque required

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

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 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 2 FREQUENCY OF OPERATION FACTOR "OF"

FREQUENCY	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 months or greater	1.5

TABLE 3 SEAT FACTOR "MF" AND SEAT MATERIAL SELECTION

SEAT FACTOR MF ⁽¹⁾	SEAT MATERIAL	APPLICATION AND LIMITATIONS				
		RANGE (°F/°C)	CHEMICAL	RADIATION	TYPE OF VALVE	SERVICE APPLICATION
T 1.0	Virgin polytetrafluoro-ethylene PTFE	-100 to 400 -73 to 204 (2)	All except: - Molten alkali metals - Liquid or gaseous fluorine - A few fluoro-chemicals (i.e., ClF ₃ and OF ₂ ...).	10 ⁴ RAD	SB-150/300 UB-150/300 EE-1000 EE-1500 TE-150/300/600	Chemical and cryogenic service.
G 1.0	Glass reinforced (15%) (RPTFE)	-100 to 450 -73 to 232	Same as "T"	10 ⁴ RAD	EE-1000 EP-2000 HB-2000 OP-4000 SB-150/300 UB-150/300 TE-150/300/600	Used as standard for low and medium pressure service for steam service up to 150 psig (10.3 bar)
C 1.0	Carbon graphite reinforced PTFE (C-RPTFE)	(3) -100 to 500 -73 to 260	Same as "T" and "G" except for compatibility of fluid media with carbon.	10 ⁴ RAD	SB-150/300 SB-600 TE-150/300/600	For high temperature and high pressure service. For steam up to 450 psig (31 bar)
E 1.0	Modified polytetrafluoro-ethylene (MPTFE)	-100 to 450 -73 to 232	Same as "T"	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
K 2.0	PFA Perfluoroalkoxytetra-fluoroethylene	-60 to 440 -51 to 227	All except: - Molten alkali metals - Liquid or gaseous fluorine - Few fluoro-chemicals (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.
P 2.0	PEEK 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	TE-150/300/600 SB-150/300	Best suited for high pressure and temperature service with steam in a radiation environment.
U 1.3	UHMW-PE Ultra high molecular weight polyethylene	-60 to 200 -51 to 93	At temperatures below 140°F (284°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.

- 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.
- 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.
- 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 in mm	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 in mm	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 in mm	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 in mm	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 in mm	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 in mm	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	2400 271	—	—	—	—

TE-150/300/600 FULL PORT

lb·in/Nm

SIZE in mm	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	2400 271	—	—	—	—

EE-1000

lb·in/Nm

SIZE in mm	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 mm	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.

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/cm ³)	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: 1", (25 mm) 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 - Threaded		
E - Welded stubs 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		
B SIZE OF CONNECTION			
Customers have the choice of specifying valve size as part of the valve figure number (B) using the numbers below, or indicating valve size separately.			
EXAMPLES: S05-B0202-SSGA (valve size is part of figure number) 1" (25 mm) S-B0202-SSGA (valve size is shown separately)			
01 - ¼" (8 mm)	07 - 1½" (40 mm)	14 - 6" (150 mm)	21 - 18" (450 mm)
02 - ⅜" (10 mm)	08 - 2" (50 mm)	15 - 8" (200 mm)	22 - 20" (500 mm)
03 - ½" (15 mm)	09 - 2½" (65 mm)	16 - 10" (250 mm)	23 - 22" (550 mm)
04 - ¾" (20 mm)	10 - 3" (80 mm)	18 - 12" (300 mm)	24 - 24" (600 mm)
05 - 1" (25 mm)	12 - 4" (100 mm)	19 - 14" (350 mm)	
06 - 1¼" (32 mm)	13 - 5" (125 mm)	20 - 16" (400 mm)	
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 for butt-weld 2½" and larger ⁽¹⁾ : 0 - 150 1 - 300 2 - 600			
D PORT			
0 - Regular or reduced port 5 - Full port, short pattern 1 - Full port 2 - Special			
E TYPE			
1 - End-entry (two-piece) 2 - Bar stock (one-piece) 3 - One-piece/Unibody 4 - Split-body 6 - Top-entry T - Top-entry non-Memoryseal™ seat ⁽³⁾ X - Split-body non-Memoryseal™ seat ⁽³⁾			

F BODY MATERIAL					
02 - A105, WCB	15 - F347, CF8C	27 - LF3/LC3	39 - LC2		
03 - F1, WC1	18 - F321	28 - F317, CG8M	40 - Titanium Gr. 3		
04 - F5, C5	19 - Monel M35	29 - F317L, CG3M	41 - Titanium Gr. 7		
05 - F11, WC6	20 - Inconel ⁽²⁾	31 - LCC	42 - Titanium Gr. 12		
06 - F22, WC9	21 - Hastelloy C	32 - F51	43 - F53		
09 - F9, C12	22 - Titanium Gr. 5	34 - F91, C12A	44 - Ferralium 255		
11 - F304, CF8	23 - Alloy 20	35 - F44, 254 5M0	45 - F55		
12 - F304L, CF3	24 - LF1	36 - F321H	46 - GS-C25N		
13 - F316, CF8M	25 - LCB	37 - Incoloy 825	47 - F347H		
14 - F316L, CF3M	26 - LF2	38 - LC1			
G TRIM					
CODE	BALL	STEM	CODE	BALL	STEM
AL	Aluminum	Aluminum	NN	316 Ni plated	Nitronic 50
AY	Alloy 20	Alloy 20	NP	316 Ni plated	316
BR	Brass CR plated	Brass	SB	304	304
CA	CA6NM	CA6NM	SN	316 Cr plated	Nitronic 50
CB	C5	C5	SP	316 Cr plated	316
CC	CS-CR plated	CS plated	SS	316	316
CN	CS-Ni plated	316	SV	317	317
CP	CS-CR plated	316	TI	Titanium Gr. 3	Titanium Gr. 3
CR	13% Chr.	630	TN	Stellite®	Nitronic 50
CT	C12	C12	TP	Stellite®	316
HC	Hastelloy C	Hastelloy C	TR	Stellite®	630
IN	Inconel	Inconel	TT	Stellite®	Stellite®
MO	Monel	Monel	PR	316 Cr plated	630
H SEAT MATERIAL					
B - Bronze-filled PTFE	L - Delrin	W - Devlon			
C - Graphite reinforced PTFE	P - Peek 30% glass ⁽³⁾	Z - Tefzel			
D - Carbon filled nylon	Q - Metalized carbon graphite M110 ⁽³⁾				
E - MPTFE	R - Metalized carbon graphite M444 ⁽³⁾				
F - FEP	S - PPS				
G - Glass reinforced PTFE	T - PTFE				
K - PFA	U - UHMWPE				
I SPECIAL SERVICE					
A - Standard	H - Cryogenic	T - Bonnet, double packing			
B - Block and bleed	I - NACE sour gas	U - TA-LUFT stem seal			
C - Chlorine	J - Vacuum	V - Bellows seal ⁽⁴⁾			
E - TE-600	N - Nuclear	W - Seal joint			
F - Cavity filler	Q - API 6D	Z - Fire-tested to API 607 rev. 5 /ISO 10497			
G - Oxygen					
J SPECIAL PRODUCT					
E - ISO 5211, API 607 rev. 5/ISO 10497					

⁽¹⁾ Actual valve pressure temperature ratings depend on choice of materials.

⁽²⁾ Must specify grade.

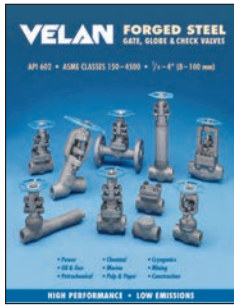
⁽³⁾ For P, Q, and R seats use Type T for Top-entry (Ex: WXX-G1113-SPRE) or Type X for Split-body (Ex: FXX-01X13-SPRA).

⁽⁴⁾ 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.

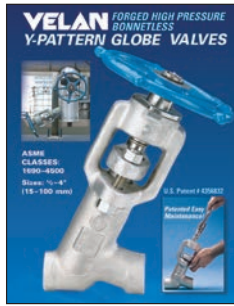
⁽⁵⁾ For UB series only E-10 ISO 5211, API 607 rev. 5/ISO 10497

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

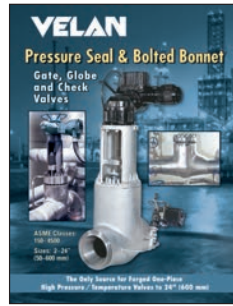
ASME pressure classes 150–4500 in carbon, alloy, and stainless steel



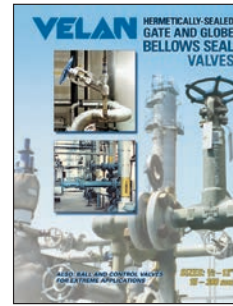
VEL-SFV



VEL-BG



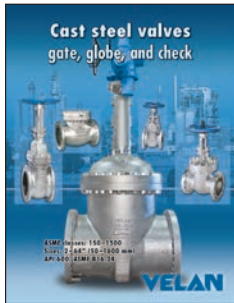
VEL-PS



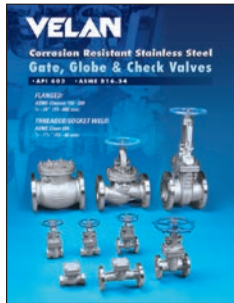
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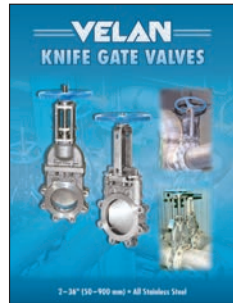
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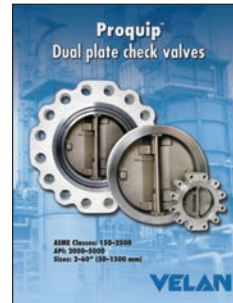
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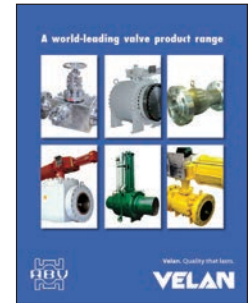
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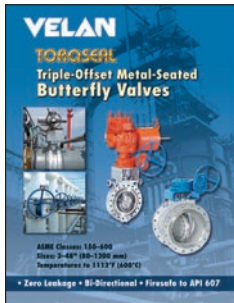
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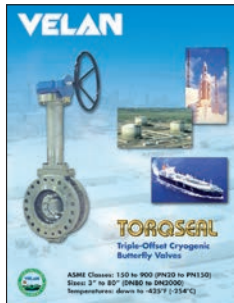
VEL-PQCV



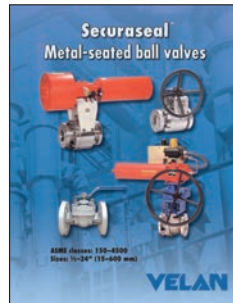
BRO-FLBABV



VEL-BF



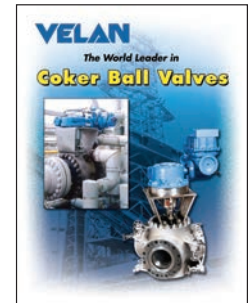
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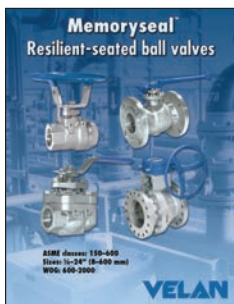
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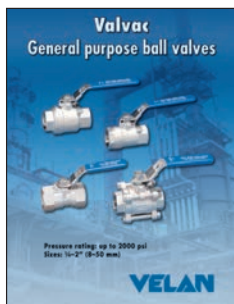
CAT-PBV



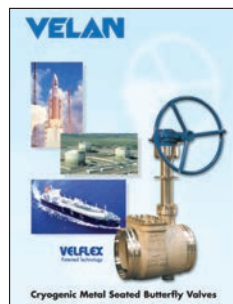
VEL-CBV



VEL-BV



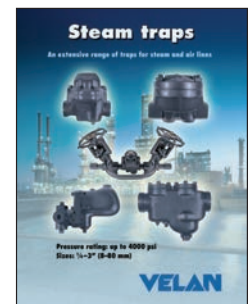
CAT-GPBV



CAT-SAS-CFLEX



CAT-SAS-CCON



CAT-ST

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

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

Check our website for more
specific contact information.

Tel: (514) 748-7743 **Fax:** (514) 748-8635

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