VELAN

One-Piece Forged Metal-Seated

Power Ball Valves

U.S. Patent # 6,095,493

ASME Classes:
900–4500
Sizes: ½–4″
(15–100 mm)

For High Pressure/High Temperature Service in:

- ***Power***
- ***Process***

VELAN COMPANY PROFILE

Velan is one of the world's leading manufacturers of industrial steel valves, supplying gate, globe, check, ball, butterfly and knife gate valves for critical applications in the chemical, petrochemical, oil and gas, fossil and nuclear power, cogeneration, pulp and paper and cryogenic industries. See the back cover of this catalog for a summary of the many quality products that Velan designs and manufactures.

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

Velan valves are manufactured in 13 specialized manufacturing plants, including six in Canada & U.S.A., four in Europe and three in Asia. We have a total of 1,450 employees, 75% of whom are located in our North American operations.

CONTENTS

HEAD OFFICE & PLANT 5

MONTREAL, CANADA 115,000 sq. ft. (10,683 m^2)
3–24" (80–600 mm) butterfly, $\frac{3}{8}$–2" (10–50 mm) metal & resilient seated ball valves

MANUFACTURING LOCATIONS

CANADA

VELAN INC. HEAD OFFICE & PLANT 5
7007 Côte de Liesse
Montreal, QC H4T 1G2
Tel: (514) 748-7743
Fax: (514) 748-8635

PLANT 1
2125 Ward Avenue
Montreal, QC H4M 1T6
Tel: (514) 748-7743
Fax: (514) 748-8635

PLANT 2 / 7
550 McArthur Ave.
Montreal, QC H4T 1X8
Tel: (514) 748-7743
Fax: (514) 341-3032

PLANT 4 / 6
1010 Cowie Street
Granby, QC J2J 1E7
Tel: (450) 378-2305
Fax: (450) 378-6865

PROQUIP
835 Fourth Line
Oakville, ON L6L 5B8
Tel: (905) 842-1721
Fax: (905) 849-0923

U.S.A.

VELAN VALVE CORPORATION PLANT 3
94 Avenue C
Williston, VT 05495-9732
Tel: (802) 863-2562
Fax: (802) 862-4014

ENGLAND

VELAN VALVES LTD.
Unit 1, Pinfold Road
Lakeside Business Park
Thurmaston
Leicester LE4 8AS
Tel: 44-116 269-5172
Fax: 44-116 269-3695

ITALY

VELAN SRL
Via Delle Industrie 9/5
20050 Mezzago,
Tel: (39) 039 624-1101
Fax: (39) 039 688-3357

FRANCE

VELAN S.A.S.
90, rue Challemel Lacour
F 69 367 Lyon Cedex 7
Tel: (33) 4 78 61 67 00
Fax: (33) 4 78 72 12 18

PORTUGAL

VELAN VÁLVULAS INDUSTRIAIS, LDA.
Av. Ary dos Santos
1679-018 Famoes
Tel: (351-21) 934-7800
Fax: (351-21) 934-7809

TAIWAN

VELAN-VALVAC
P.O. Box 2020
Taichung, Taiwan
R.O.C.
Tel: (04) 2792649
Fax: (886) 42750855

KOREA

VELAN LTD.
1060-4 Shingil-Dong
Ansan City,
Kyunggi-do 425-833
Tel: (82) 31-491-2811
Fax: (82) 31-491-2813

DISTRIBUTION CENTERS

U.S.A.

VELCAL
537 Stone Road, Unit "A"
Benicia, CA 94510
Tel: (707) 745-4507
Fax: (707) 745-4708

VELEAST
605 Commerce
Park Drive SE
Marietta, GA 30060
Tel: (770) 420-2010
Fax: (707) 420-7063

VELNORTH
94 Avenue C
Williston, VT 05495-9732
Tel: (802) 651-0867
Fax: (802) 865-3030

GERMANY

VELAN GmbH
Daimlerstrasse 8
D-47877 Willich
Tel: (49) 2154/4938-00
Fax: (49) 2154/4938-99

GENERAL INFORMATION

Tel: (514) 748-7743

Fax: (514) 908-0213
(Power Ball Valve Quotations)

sales@velan.com

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

NOTE: *The material in this catalog is for general information. For specific performance data and proper material selection, consult your Velan representative. Although every attempt has been made to ensure that the information contained in this catalog is correct, Velan reserves the right to change designs, materials or specifications without notice.*

MANUFACTURING PLANTS AROUND THE WORLD

PLANT 1

MONTREAL, CANADA 109,000 sq. ft. (10,126 m^2)
¼–4" (8–100 mm) forged gate, globe & check valves, ASME 'N' stamp

PLANT 2 & 7

MONTREAL, CANADA 170,000 sq. ft. (15,800 m^2)
2–60" (50–1500 mm) forged & cast steel gate, globe, check, ball, knife and 3–36" (80–700 mm) butterfly valves ASME 'N' stamp

PLANT 4 & 6

GRANBY, CANADA 186,500 sq. ft. (17,325 m^2)
2–16" (50–400 mm) cast steel gate, globe and check valves,
¼–12" (8–300 mm) ball valves

TORONTO, CANADA ***Velan-Proquip*** 41,000 sq. ft. (3,800 m^2)
2–48" (50–1200 mm) wafer check valves,
½–24" (15–600 mm) clamp joint connectors

WILLICH, GERMANY 12,000 sq. ft. (1,115 m^2)

LEICESTER, ENGLAND 14,000 sq. ft. (1,300 m^2)
Steam traps, ⅜–2" (10–50 mm) bonnetless globe valves

LISBON, PORTUGAL 60,000 sq. ft. (5,600 m^2)
2–12" (50–300 mm) cast steel gate, globe & check valves

PLANT 3

WILLISTON, VERMONT, U.S.A. 155,000 sq. ft. (14,400 m^2)
2–24" (50–600 mm) forged and cast steel gate, globe and check valves, ASME 'N' stamp

LYON, FRANCE 160,000 sq. ft. (14,900 m^2) ¼–40" (8–1,000 mm)
forged & cast steel gate, globe and butterfly valves

MILAN, ITALY 40,000 sq. ft. (3,700 m^2)
1–64" (25–1600 mm) API 6A & 6D trunnion mounted ball valves

ANSAN CITY, SOUTH KOREA ***Plant 1*** 30,000 sq. ft. (2,800 m^2)
components and 2–4" (50–100 mm) cast steel valves

ANSAN CITY, SOUTH KOREA ***Plant 2*** 65,000 sq. ft. (5,800 m^2)
2–12" (50–300 mm) cast steel gate, globe, check, ball and knife gate valves

TAICHUNG, TAIWAN ***Velan-Valvac*** 20,000 sq. ft. (1,840 m^2)
¼–2" (8–50 mm) ball valves

VELAN VALVES IN POWER

With an installed base covering over 300 nuclear power plants and over 2,000 thermal power plants, and valves with over forty years of uninterrupted nuclear service, Velan is a market leader in power industry valves.

Velan's Power Ball Valve joins a long list of proven products for power, including our forged bolted bonnet and pressure seal valves, bonnetless y-pattern globe valves, cast steel valves, small forged valves, and bimetallic steam traps. As a matter of fact, most of the different types of valves that Velan designs and manufactures (see back cover) have been sold into power plant applications.

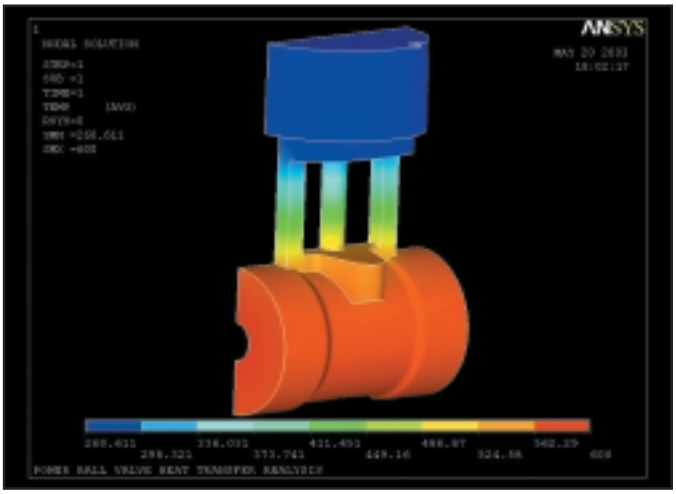
POWER BALL VALVES IN POWER GENERATION

1 1/2" (40 mm) Power Ball Valves in steam trap isolation at a major British power plant. Switching to Velan Power Ball Valves offered a low torque, easy to operate solution.

Velan Power Ball Valve in high pressure steam service.

- Attemperator Isolation Valves
- Boiler Feedwater Pump Recirculation
- Bottom Blowdown
- Bypass Injector Isolation
- Cogeneration (Emergency Shutdown System)
- Condensate Drain Lines Above/Below Turbine Throttle Valves
- Feedwater Heater Isolation
- Feedwater Heater Drain
- Feedwater Heater Loop Drain
- Isolation Turbine Drains
- Low Pressure Turbine Drains
- Main Steam Drum Vents
- Main Steam Extraction Bleed Valves
- Nuclear
- Pressurized Fluidized Beds (PFB)
- Reheat Isolation
- Steam Trap Isolation
- Seal Steam Isolation
- Steam (Saturated/Superheated)

TOTAL QUALITY & PROCESS IMPROVEMENT



Power Ball Valve heat transfer analysis

Velan has always remained totally committed to offering products and services that not only meet, but exceed customer expectations. All Velan valves are designed and manufactured with an emphasis on low emissions, safety, simple maintenance, ease of operation, and above all, long and reliable service life.

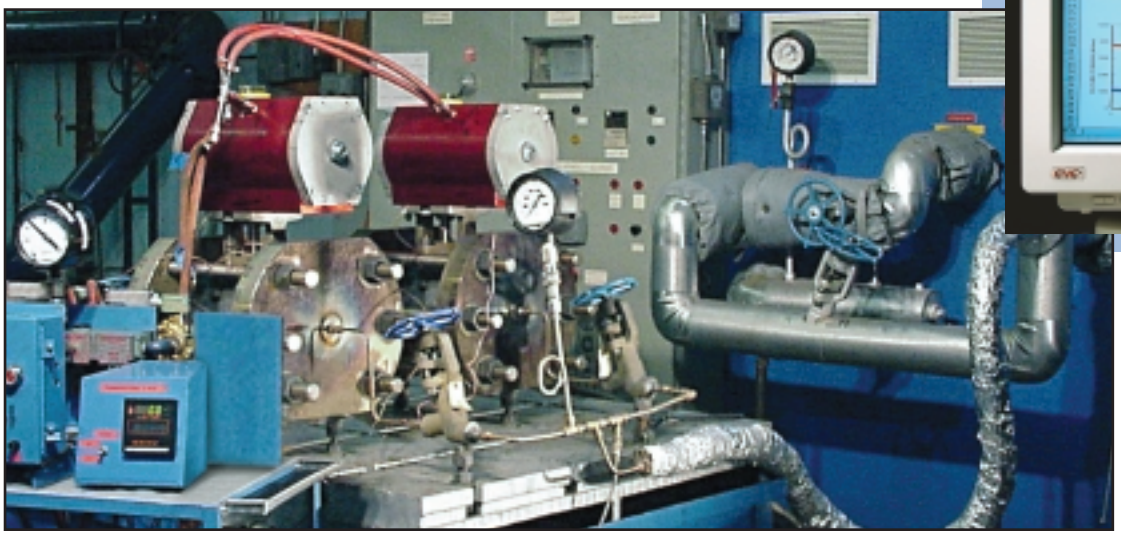
Combining almost 50 years of experience in critical applications in the power (nuclear, fossil and cogeneration), chemicals, oil and gas, coker, and mining industries, Velan has brought together a team of over 50 professional engineers who form the core of the Engineering Design Group. Advanced software applications, including finite element analysis, computational fluid dynamics and 3D solid modeling, help Velan design superior quality valves that meet the most demanding performance requirements.

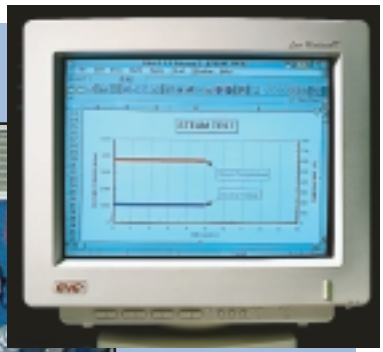
We have two R&D facilities, with steam boilers and superheaters, flow loops and cryogenic test stands.

In addition, we are engaged in advanced research in metal spray technology, using the services of independent laboratories for abrasion, sliding wear, bond strength testing, scanning electron microscopy and x-ray diffraction.

Velan's QA system is geared towards continuous improvement, process quality and stringent compliance to worldwide quality standards (e.g. ASME Section III, PED, TUV, ISO 9001:2000). Automated honing, mate-lapping, and vacuum testing of all metal-seated ball valves is an integral part of Velan's Quality Process. Advanced tooling design and optimized industrial engineering concepts, combined with state of the art manufacturing plants employing over 165 CNC machining centers, enable us to produce high quality products at competitive costs to our valued customers.

Velan performs statistical process control to monitor tool wear and concentricity of bores, during the manufacturing process.





Superheated steam cycling test in progress (950°F - 1800 psig / 510°C - 124 bar). 1000 cold and 1000 thermal cycles with 1000°F (538°C) superheated steam and five blowdowns with "0" leakage.

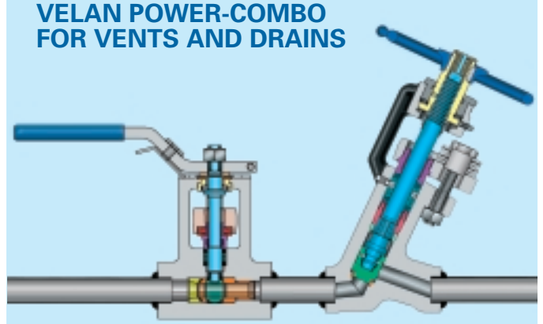
SUPERIOR DESIGN AND UNIQUE CONSTRUCTION ASSURES RELIABILITY AND LONG SERVICE LIFE

Socket Weld ½–2½" (15–65 mm)
Butt Weld ½–4" (15–100 mm)
ASME Class 900–4500

Velan's Power Ball Valve is a highly advanced, patented, forged, one-piece metal-seated valve designed for high pressure/high temperature applications in the power generation and process industries.

U.S. Patent # 6,095,493

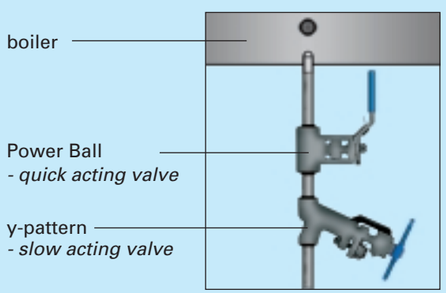
VELAN POWER-COMBO FOR VENTS AND DRAINS



Y-Pattern & Power Ball Valve Tandem

Capitalizing on the proven design features and superior performance of our Power Ball and y-pattern globe valves, Velan introduces our innovative POWER-COMBO, matching the Power Ball (as the shut-off valve) with our forged, one-piece y-pattern (as the flow on/off valve) for vent and drain service in high pressure /temperature systems.

This tandem provides for a higher measure of system integrity assurance, while extending the service life of the valves in this tough application, and can be pre-fabricated at the factory, at our authorized repair facilities (Simply provide pipe material, schedule and applicable dimensions at time of request for quotation), or at the site by the owner.



Note: Configuration of the POWER-COMBO is at the discretion of the owners/user. The Power Ball Valve can be supplied with a gear and handwheel, thus meeting the requirements for a slow acting valve.

INTEGRAL ISO MOUNTING PAD FOR AUTOMATION

Allows for direct mount of actuator to valve without bolting/welding on required mounting bracket. Fully guided oversized stem prevents misalignment between the ball and actuator.

HANDLE-STEM CONNECTION ADJUSTABLE FOR WEAR

DOUBLE STEM BLOW OUT PROTECTION

High stem thrust from internal pressure is borne by external, life-lubricated bearing on stem shoulder. The split yoke bushing cannot be removed in-line. Secondary protection with stem shoulder against split gland bushing. Design precludes loading the stem to the point where it can push the ball through the seat.

RUGGED, FULLY GUIDED ONE-PIECE STEM

Stem material is Gr. A638-660, a super alloy which retains 92% of strength at 1200˚F (650°C). Bottom and top are fully guided with bushings. This (no wobbling) prevents side loads which can damage packing and cause leakage.

EMISSION FREE VALVE

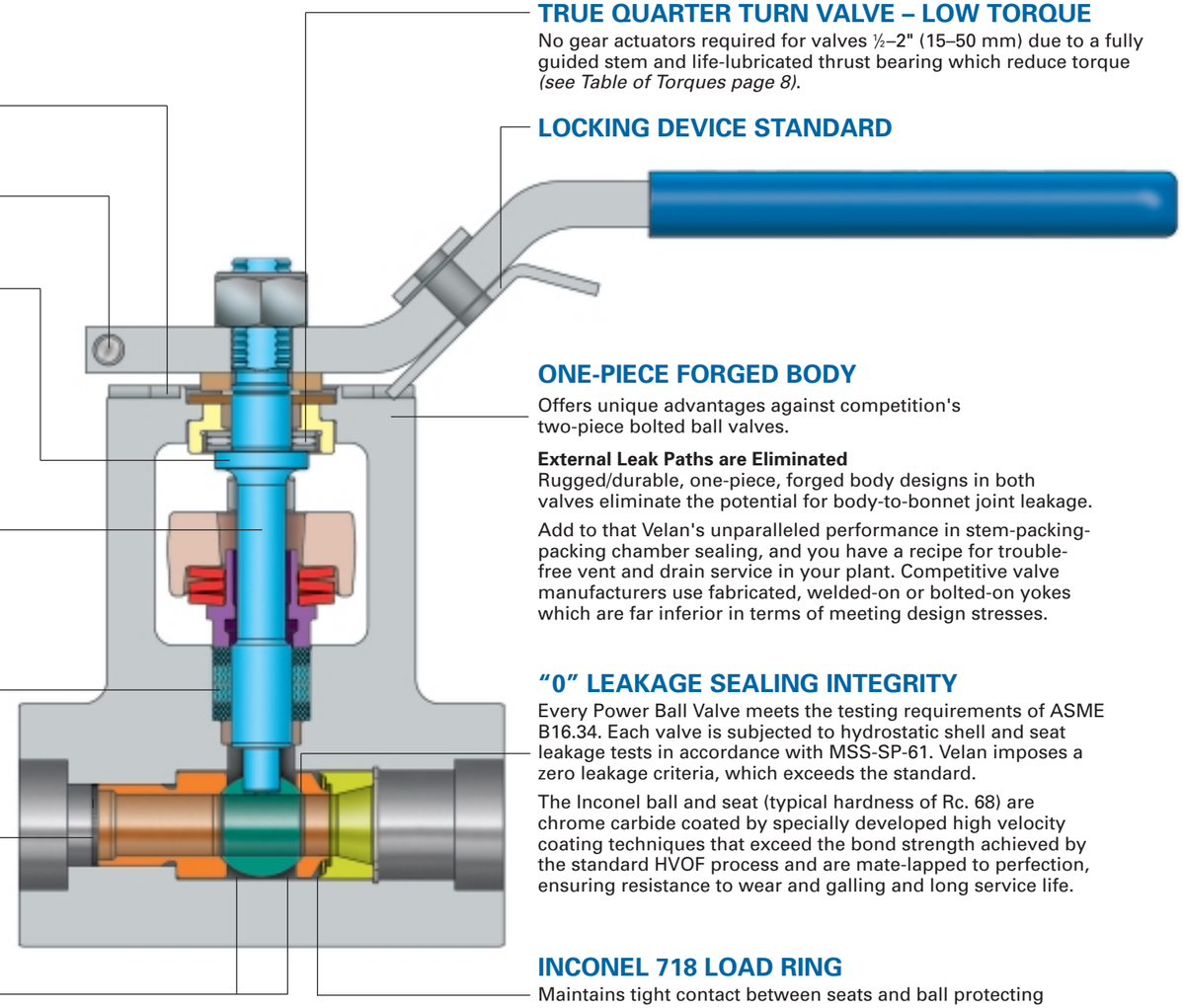
An advanced packing chamber design with a two-piece self-adjusting gland bushing and live-loading provide long lasting, maintenance-free, stem packing tightness.

SEAL WELDED DOWNSTREAM SEAT

High temperatures/pressures/flow rates are handled better by downstream seat anchored in place by seal weld.

ISOLATED BODY CAVITY

Ball and seats are in full contact all the time, isolating the body cavity from flow to prevent build-up of solids.



TRUE QUARTER TURN VALVE – LOW TORQUE

No gear actuators required for valves ½–2" (15–50 mm) due to a fully guided stem and life-lubricated thrust bearing which reduce torque *(see Table of Torques page 8)*.

LOCKING DEVICE STANDARD

ONE-PIECE FORGED BODY

Offers unique advantages against competition's two-piece bolted ball valves.

External Leak Paths are Eliminated
Rugged/durable, one-piece, forged body designs in both valves eliminate the potential for body-to-bonnet joint leakage.

Add to that Velan's unparalleled performance in stem-packing-packing chamber sealing, and you have a recipe for trouble-free vent and drain service in your plant. Competitive valve manufacturers use fabricated, welded-on or bolted-on yokes which are far inferior in terms of meeting design stresses.

"0" LEAKAGE SEALING INTEGRITY

Every Power Ball Valve meets the testing requirements of ASME B16.34. Each valve is subjected to hydrostatic shell and seat leakage tests in accordance with MSS-SP-61. Velan imposes a zero leakage criteria, which exceeds the standard.

The Inconel ball and seat (typical hardness of Rc. 68) are chrome carbide coated by specially developed high velocity coating techniques that exceed the bond strength achieved by the standard HVOF process and are mate-lapped to perfection, ensuring resistance to wear and galling and long service life.

INCONEL 718 LOAD RING

Maintains tight contact between seats and ball protecting seats in an open and closed position. Accommodates high temperature transients, allowing thermal expansion.

DIRECT MOUNT ISO MOUNTING FLANGE

The unique one-piece forged body construction of the Power Ball Valve includes an integral mounting flange for automation. Both the mounting pad and valve stem dimensions meet ISO-5211 standards, which allow for the direct-mount of actuators without the need for additional brackets and/or drive couplings. In addition to significant cost savings, a direct-drive actuator ensures the best possible alignment between the ball and operator.

Dimensions for the actuator attachments are as follows:

- Sizes ½–1½" (15–40 mm): F05 (includes 1½" 900–2800)
- Sizes 1½–2" (40–50 mm): F10 (includes 1½" 4500)
- Sizes 2½–4" (65–100 mm): F12

Valve stems are supplied standard with flat head (double-D) type drive. This allows for manual lever operated valves to be retrofitted with an actuator in the field. Square head drive is also available upon request.

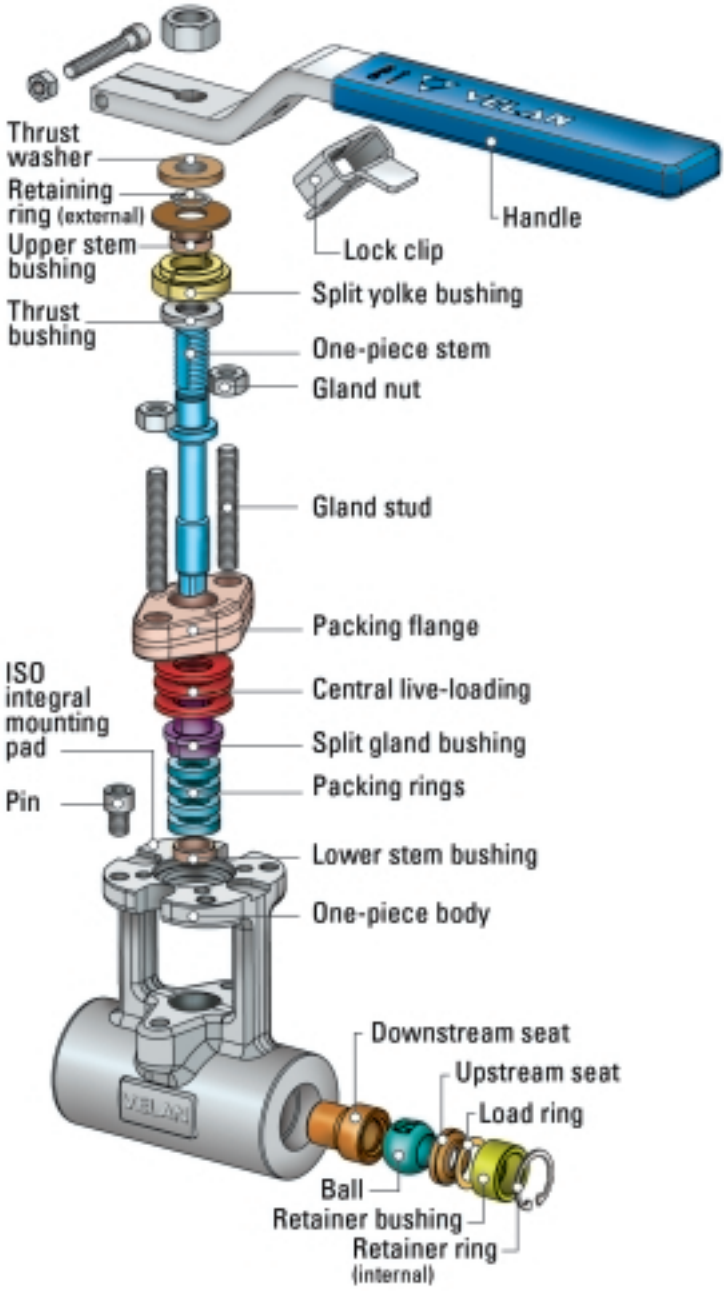
For high temperature service, Velan can supply a heat gasket, placed between the valve and actuator, and/or actuators with high temperature trim, to protect the operator from heat transferred through the valve.

For specific questions relating to automation, especially with regards to top-works, torque requirements and temperature limitations, please contact Velan's Metal-Seated Quarter Turn Marketing Department.

DESIGNED FOR LONG SERVICE

REMOVAL OF PARTS

- Valve parts can only be disassembled for service outside the line after removal from pipe. This provides safety in high pressure operation.
- The ball in closed position and the upstream seat must be removed first to allow removal of all other parts.
- The gland bushing and yoke bushing are split to facilitate disassembly.
- See Power Ball Valve Maintenance Manual (PBVM).



STANDARD MATERIALS

PART	MATERIALS FOR CLASSES 900, 1690, 2800
Body	A105, A182 F22 Cl. 3, A182 F91, A182 F316
Stem	A638 Gr.660
Ball	B637 Gr. 718 Chrome Carbide coated
Downstream seat	B637 Gr.718 Chrome Carbide coated
Upstream seat	A479 Gr.431, Nitrided
Stem bushing (upper)	A479 Gr.410 Condition 2, Nitrided
Stem bushing (lower)	A479 Gr.410 Condition 2, Nitrided
Packing flange	A182 F22 Cl. 3
Split gland bushing	A479 Gr.410 Condition 2
Packing rings	Die Formed Flexible Graphite
Anti-extrusion rings	Braided Graphite (no Teflon)
Stud (packing flange)	A193 B7 *Option: A193 B16*
Nut (packing flange)	A194 2H *Option: A194 Gr.4*
Lock nut	SS 304 *Option: A194 Gr.8*
Retaining ring (internal)	A564 15-7 P.H.
Thrust bearing	CS SAE 1060-1090
Handle	CS A36 (with plastic cover)
Lock clip	CS A516 Chrome-plated *Option: SS Commercial*
Belleville washer	H11/H13
Load ring	B 670 Gr.718 P.H.
Stop pin	A574 Alloy Steel
Split yoke bushing	A479 Gr.410 Condition 2
Thrust washer	Alloy Steel Commercial
Retainer bushing	A479 Gr.410 Condition 2
Retaining ring (external)	Alloy Steel Commercial
Butt weld nipple	A105, A182 F22 Cl. 3, A182 F91, A182 F316

PART	MATERIALS FOR CLASS 4500
Body	A182 F22 Cl. 3, A182 F91
Stem	A638 Gr.660
Ball	B637 Gr.718 Chrome Carbide coated
Downstream seat	B637 Gr.718 Chrome Carbide coated
Upstream seat	A479 Gr.431, Nitrided
Stem bushing (upper)	A479 Gr.410 Condition 2, Nitrided
Stem bushing (lower)	A479 Gr.410 Condition 2, Nitrided
Packing flange	A182 F22 Cl. 3
Split gland bushing	A479 Gr.410 Condition 2
Packing rings	Die Formed Flexible Graphite
Anti-extrusion rings	Braided Graphite (no Teflon)
Stud (packing flange)	A193 B7 *Option: A193 B16*
Nut (packing flange)	A194 2H *Option: A194 Gr.4*
Lock nut	SS 304 *Option: A194 Gr.8*
Retaining ring (internal)	A564 15-7 P.H.
Thrust bearing	CS SAE 1060-1090
Handle	CS A36 (with plastic cover)
Lock clip	CS A516 Chrome-plated *Option: SS Commercial*
Belleville washer	H11/H13
Load ring	B 670 Gr.718 P.H.
Stop pin	A574 Alloy Steel
Split yoke bushing	A479 Gr.410 Condition 2
Thrust washer	Alloy Steel Commercial
Retainer bushing	A479 Gr.410 Condition 2
Retaining ring (external)	Alloy Steel Commercial
Butt weld nipple	A182 F22 Cl. 3, A182 F91

STANDARD DIMENSIONS, Cv FLOW COEFFICIENT & WEIGHTS

Size in mm	Class	A			B	C	D	⌀E	⌀F	G	H	J	L	M	⌀N	P	Cv	Weight* c/w handle
		SW	BW	BW_N													Kv	lb/kg
½"	900–	5.00	5.00	6.50	6.76	10.60	2.50	0.44	0.865	0.38	4.53	4.00	–	–	–	–	9	13.0
15	2800	127	127	165	172	269	63	11	22.0	10	115	102	–	–	–	–	8	5.9
½"	4500	5.00	5.00	6.50	6.76	10.60	2.50	0.44	0.865	0.38	4.53	4.00	–	–	–	–	9	13.0
15		127	127	165	172	269	63	11	22.0	10	115	102	–	–	–	–	8	5.9
¾"	900–	5.00	5.00	6.50	6.76	10.60	2.50	0.44	1.075	0.50	4.53	4.00	–	–	–	–	9	12.9
20	2800	127	127	165	172	269	63	11	27.3	13	115	102	–	–	–	–	8	5.9
¾"	4500	5.00	5.00	6.50	6.74	10.60	2.50	0.44	1.075	0.50	4.53	4.00	–	–	–	–	9	12.9
20		127	127	165	171	269	63	11	27.3	13	115	102	–	–	–	–	8	5.9
1"	900–	5.00	5.00	6.50	6.76	10.60	2.50	0.63	1.340	0.50	4.53	4.00	–	–	–	–	10	12.6
25	2800	127	127	165	172	269	63	16	34.0	13	115	102	–	–	–	–	9	5.7
1"	4500	5.25	5.25	6.75	6.74	10.60	2.63	0.63	1.340	0.50	4.53	4.13	–	–	–	–	10	16.7
25		133	133	171	171	269	67	16	34.0	13	115	105	–	–	–	–	9	7.6
1¼"	900–	5.25	5.25	6.75	6.76	10.60	2.63	0.63	1.685	0.50	4.53	4.13	–	–	–	–	18	16.5
32	2800	133	133	171	172	269	67	16	42.8	13	115	105	–	–	–	–	15	7.5
1¼"	4500	5.25	5.25	6.75	6.74	10.60	2.63	0.63	1.685	0.50	4.53	4.13	–	–	–	–	18	16.5
32		133	133	171	171	269	67	16	42.8	13	115	105	–	–	–	–	15	7.5
1½"	900–	5.25	5.25	6.75	6.76	10.60	2.63	0.63	1.925	0.50	4.53	4.13	–	–	–	–	18	16.3
40	2800	133	133	171	172	269	67	16	48.9	13	115	105	–	–	–	–	15	7.4
1½"	4500	7.50	7.50	9.50	10.63	24.10	3.75	1.06	1.925	0.50	7.76	5.75	–	–	–	–	35	54.4
40		191	191	241	270	612	95	27	48.9	13	197	146	–	–	–	–	30	24.7
2"	900–	7.50	7.50	9.50	10.63	24.10	3.75	1.06	2.416	0.62	7.76	5.75	–	–	–	–	51	53.7
50	2800	191	191	241	270	612	95	27	61.4	16	197	146	–	–	–	–	43	24.4
2"	4500	7.50	7.50	9.50	10.63	24.10	3.75	1.06	2.416	0.62	7.76	5.75	–	–	–	–	51	53.7
50		191	191	241	270	612	95	27	61.4	16	197	146	–	–	–	–	43	24.4
2½"	900–	10.00	10.00	12.50	–	–	5.00	1.50	2.919	0.62	10.00	7.50	13.43	9.92	24.00	11.59	85	115.0
65	2800	254	254	318	–	–	127	38	74.1	16	254	191	341	252	600	295	72	52.2
2½"	4500	10.00	10.00	12.50	–	–	5.00	1.50	2.919	0.62	10.00	7.50	13.43	9.92	24.00	11.59	85	115.0
65		254	254	318	–	–	127	38	74.1	16	254	191	341	252	600	295	72	52.2
3"	900–	12.50	10.00	12.50	–	–	5.00	1.50	–	–	10.00	–	13.43	9.92	24.00	11.59	104	100.3
80	2800	318	254	318	–	–	127	38	–	–	254	–	341	252	600	295	88	45.5
3"	4500	12.50	10.00	12.50	–	–	5.00	1.50	–	–	10.00	–	13.43	9.92	24.00	11.59	104	100.3
80		318	254	318	–	–	127	38	–	–	254	–	341	252	600	295	88	45.5
4"	900–	–	10.00	–	–	–	5.00	1.50	–	–	10.00	–	13.43	9.92	24.00	11.59	93	101.3
100	2800	–	254	–	–	–	127	38	–	–	254	–	341	252	600	295	79	46.0
4"	4500	–	10.00	–	–	–	5.00	1.50	–	–	10.00	–	13.43	9.92	24.00	11.59	93	101.3
100		–	254	–	–	–	127	38	–	–	254	–	341	252	600	295	79	46.0

*BW_N = Butt Weld End with Nipple. * For weights of assemblies with gear actuators contact Velan Engineering.*

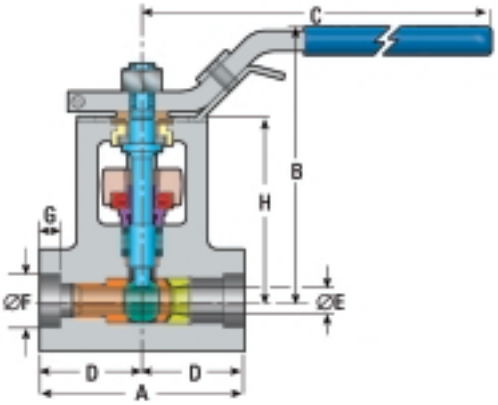
DIMENSIONS FOR BUTT WELD END

CONFORMING TO REQUIREMENTS OF ASME B16.25 & B36.10

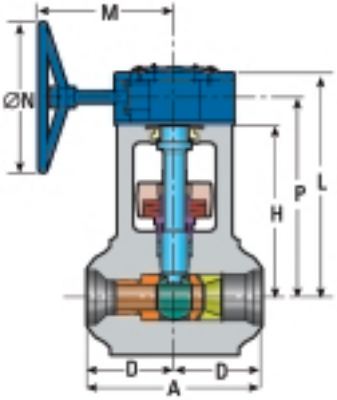
NPS in (mm)	Pipe Sch. number	BW w/Nipple		in (mm)				
		900-2800	4500	⌀W	⌀X	Y	Z	Wall Thickness
½" (15)	80	✓	✓	0.840 (21.3)	0.546 (13.87)	0.22 (5.59)	0.29 (7.37)	0.147 (3.73)
	160				0.464 (11.79)	0.28 (7.11)	0.38 (9.65)	0.188 (4.78)
	XXS(1)				0.252 (6.40)	0.44 (11.18)	0.59 (14.99)	0.294 (7.47)
¾" (20)	80	✓	✓	1.050 (26.7)	0.742 (18.85)	0.23 (5.84)	0.31 (7.87)	0.154 (3.91)
	160				0.612 (15.55)	0.33 (8.38)	0.44 (11.18)	0.219 (5.56)
	XXS(1)				0.434 (11.02)	0.46 (11.68)	0.62 (15.75)	0.308 (7.82)
1" (25)	80	✓	✓	1.315 (33.4)	0.957 (24.31)	0.27 (6.86)	0.36 (9.14)	0.179 (4.55)
	160				0.815 (20.70)	0.38 (9.65)	0.50 (12.70)	0.250 (6.35)
	XXS(1)				0.599 (15.22)	0.54 (13.72)	0.72 (18.29)	0.358 (9.09)
1¼" (32)	80	–	–	1.660 (42.2)	1.278 (32.46)	0.29 (7.37)	0.38 (9.65)	0.191 (4.85)
	160				1.160 (29.46)	0.38 (9.65)	0.50 (12.70)	0.250 (6.35)
	XXS(1)	✓	✓		0.896 (22.76)	0.57 (14.48)	0.76 (19.30)	0.382 (9.70)
1½" (40)	80	–	✓	1.900 (48.3)	1.500 (38.10)	0.30 (7.62)	0.40 (10.16)	0.200 (5.08)
	160				1.337 (33.96)	0.42 (10.67)	0.56 (14.22)	0.281 (7.14)
	XXS	✓			1.100 (27.94)	0.60 (15.24)	0.80 (20.32)	0.400 (10.16)
2" (50)	80	–	–	2.357 (60.3)	1.939 (49.25)	0.33 (8.38)	0.44 (11.18)	0.218 (5.54)
	160	✓	✓		1.687 (42.85)	0.52 (13.21)	0.69 (17.53)	0.344 (8.74)
	XXS(1)				1.503 (38.18)	0.65 (16.51)	0.87 (22.10)	0.436 (11.07)
2½" (65)	80	✓	✓	2.875 (73.0)	2.323 (59.00)	0.41 (10.41)	0.55 (13.97)	0.276 (7.01)
	160				2.125 (53.98)	0.56 (14.22)	0.75 (19.05)	0.375 (9.53)
	XXS(1)				1.771 (44.98)	0.83 (21.08)	1.10 (27.94)	0.552 (14.02)
3" (80)	80	–	–	3.500 (88.9)	2.900 (73.66)	0.45 (11.43)	0.60 (15.24)	0.300 (7.62)
	160	✓	✓		2.624 (66.65)	0.66 (16.76)	0.88 (22.35)	0.438 (11.13)
	XXS				2.300 (58.42)	0.90 (22.86)	1.20 (30.48)	0.600 (15.24)
4" (100)	80	–	–	4.500 (114.3)	3.826 (97.18)	0.51 (12.95)	0.67 (17.02)	0.337 (8.56)
	160				3.438 (87.33)	0.80 (20.32)	1.06 (26.92)	0.531 (13.49)
	XXS(1)				3.152 (80.06)	1.01 (25.65)	1.35 (34.29)	0.674 (17.12)

(1) Not available for Class 900. XXS= Double Extra Strong Wall Thickness.

Socket Weld Ends



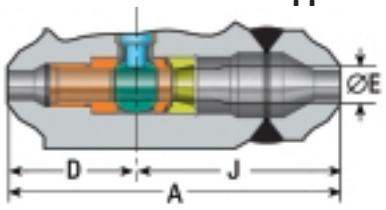
Butt Weld Ends



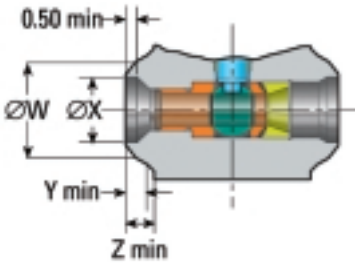
NOTE: *If specifying a butt weld end valve, please refer to "Dimensions for butt weld end" table (left), to determine if the valve is available with an integral butt weld or nipple on one end.*

For standard dimension "A", (see table above) use column "BW" when specifying valves with an integral butt weld, and column "BW_N" when specifying valves with a nipple. For any special requirements, please consult the factory .

Butt Weld End with Nipple



Butt Weld End



PRESSURE/TEMPERATURE RATING

FORGED CARBON STEEL A105

Working Pressure, psig

CLASS	1690			2800			4500		
Shell Test, psig Seat Test, psig	6275 4600	6350 4650		10385 7601	10500 7700		16675 12221	16875 12375	
Temp. °F	STANDARD	SPECIAL[2]	LIMITED[3]	STANDARD	SPECIAL[2]	LIMITED[3]	STANDARD	SPECIAL[2]	LIMITED[3]
-20 to 100	4175	4225	4225	6910	7000	7000	11110	11250	11250
200	3805	4225	4225	6295	7000	7000	10120	11250	11250
300	3695	4225	4225	6125	7000	7000	9845	11250	11250
400	3570	4225	4225	5910	7000	7000	9505	11250	11250
500	3375	4225	4225	5585	7000	7000	8980	11250	11250
600	3080	4015	4015	5105	6650	6650	8210	10690	10690
650	3025	3940	3940	5010	6520	6520	8055	10485	10485
700	3000	3910	3910	4970	6470	6470	7990	10405	10405
750	2840	3550	3550	4700	5880	5880	7560	9450	9450
800	2320	2895	2895	3840	4800	4800	6170	7715	7715
850[1]	1510	1880	1880	2495	3120	3120	4010	5015	5015

FORGED CHROME-MOLY STEEL A182-F22 CL. 3

Working Pressure, psig

CLASS	1690			2800			4500		
Shell Test, psig Seat Test, psig	6275 4600	6350 4650		10500 7700			16875 12375		
Temp. °F	STANDARD	SPECIAL[2]	LIMITED[3]	STANDARD	SPECIAL[2]	LIMITED[3]	STANDARD	SPECIAL[2]	LIMITED[3]
-20 to 100	4225	4225	4225	7000	7000	7000	11250	11250	11250
200	4225	4225	4225	7000	7000	7000	11250	11250	11250
300	4100	4175	4175	6795	6920	6920	10925	11120	11120
400	3975	4075	4075	6585	6760	6760	10585	10865	10865
500	3745	4055	4055	6200	6720	6720	9965	10800	10800
600	3405	4055	4055	5640	6720	6720	9070	10800	10800
650	3310	4030	4030	5490	6680	6680	8825	10735	10735
700	3200	4005	4005	5295	6640	6640	8515	10670	10670
750	2995	3885	3885	4960	6440	6440	7970	10350	10350
800	2860	3790	3790	4735	6275	6275	7610	10095	10095
850	2740	3620	3620	4545	5995	5995	7305	9645	9645
900	2530	3380	3380[4]	4190	5600	5600[4]	6740	9000	9000[4]
950	2125	2655	2720[4]	3520	4400	4580[4]	5665	7070	7555[4]
1000	1470	1835	1975[4]	2430	3040	3455[4]	3910	4885	6050[4]
1050	985	1230	1325	1630	2035	2315	2625	3280	4060
1100	619	772	832	1025	1282	1457	1645	2055	2546

FORGED CHROME-MOLY STEEL A182-F91

Working Pressure, psig

CLASS	1690			2800			4500		
Shell Test, psig Seat Test, psig	6350 4650			10500 7700			16875 12375		
Temp. °F	STANDARD	SPECIAL[2]	LIMITED[3]	STANDARD	SPECIAL[2]	LIMITED[3]	STANDARD	SPECIAL[2]	LIMITED[3]
-20 to 100	4225	4225	4225	7000	7000	7000	11250	11250	11250
200	4225	4225	4225	7000	7000	7000	11250	11250	11250
300	4100	4225	4225	6795	7000	7000	10925	11250	11250
400	3975	4225	4225	6585	7000	7000	10585	11250	11250
500	3745	4225	4225	6200	7000	7000	9965	11250	11250
600	3405	4225	4225	5640	7000	7000	9070	11250	11250
650	3310	4225	4225	5490	7000	7000	8825	11250	11250
700	3195	4120	4120	5295	6840	6840	8515	10995	10995
750	2995	4105	4105	4960	6795	6795	7970	10930	10930
800	2860	4055	4055	4735	6720	6720	7610	10800	10800
850	2740	3810	3810	4545	6320	6320	7305	10160	10160
900	2530	3380	3380	4190	5600	5600	6740	9000	9000
950	2175	2655	2720	3605	4400	4580	5795	7070	7555
1000	2050	2370	2555	3390	3925	4460	5450	6310	7555
1050	2025	2370	2555	3360	3925	4460	5400	6310	7555
1100	1700	2120	2290	2815	3520	4000	4525	5655	7005
1150	1255	1570	1690	2075	2595	2950	3345	4180	5175
1200	810	1010	1090	1340	1680	1905	2160	2700	3345

FORGED STAINLESS STEEL A182 Gr. F316

Working Pressure, psig

CLASS	1690			2800			4500		
Shell Test, psig Seat Test, psig	6100 4475	6350 4650		10080 7392	10500 7700		16200 11900	16875 12375	
Temp. °F	STANDARD	SPECIAL[2]	LIMITED[3]	STANDARD	SPECIAL[2]	LIMITED[3]	STANDARD	SPECIAL[2]	LIMITED[3]
-20 to 100	4055	4225	4225	6720	7000	7000	10800	11250	11250
200	3485	3885	3885	5780	6440	6440	9290	10350	10350
300	3150	3515	3515	5220	5820	5820	8390	9360	9360
400	2895	3210	3210	4790	5320	5320	7705	8550	8550
500	2690	2990	2990	4455	4960	4960	7165	7970	7970
600	2540	2835	2835	4210	4695	4695	6770	7555	7555
650	2500	2775	2775	4140	4595	4595	6660	7395	7395
700	2445	2725	2725	4050	4520	4520	6515	7265	7265
750	2405	2680	2680	3985	4440	4440	6410	7135	7135
800	2375	2650	2650	3940	4400	4400	6335	7070	7070
850	2350	2625	2625	3895	4350	4350	6265	6990	6990
900	2338	2605	2605	3875	4315	4315	6230	6945	6945
950	2175	2580	2580	3605	4270	4270	5795	6870	6870
1000	1970	2370	2370	3260	3925	3925	5245	6310	6310
1050[5]	1935	2370	2370[4]	3205	3925	3925[4]	5155	6310	6310[4]
1100[5]	1715	2145	2195[4]	2850	3560	3705[4]	4575	5720	6110[4]
1150[5]	1330	1665	1795[4]	2205	2760	3135[4]	3550	4435	5495[4]
1200[5]	1040	1300	1400	1730	2160	2455	2775	3470	4300
1250[5]	825	1035	1115	1375	1720	1950	2210	2765	3425

(1) Permissible but not recommended for prolonged usage above 800°F (425°C)
(2) Special Class: requires additional inspection per ASME B16.34, para. 2.1.2.
(3) Limited Class: only up to and including 2 ½" (65 mm) socket weld all Classes. Flanged valves are not allowed.
(4) Do not interpolate between these temperatures. Consult the factory.
(5) At temperatures over 1000°F (538°C) use only when the carbon content is 0.04% or higher (material code 10).

TORQUE VALUES FOR CLASSES 1690, 2800, 4500[6]

SIZE in (mm)	CLASS	FIGURE NUMBER	HANDLE LENGTH in (mm)	AT SATURATED STEAM 662°F (350°C)			AT SUPERHEATED STEAM 1000°F (538°C)			C/W 1.5 SAFETY FACTOR AT SUPERHEATED STEAM	
				DESIGN PRESSURE psig (bar)	TORQUE MAX lbf•in (Nm)	HANDLE FORCE lbf (N)	DESIGN PRESSURE psig (bar)	TORQUE MAX lbf•in	HANDLE FORCE lbf (N)	TORQUE MAX lbf•in (Nm)	HANDLE FORCE lbf (N)
½ – ¾" (15–20)	1690	W03-82Q	10.5 (267)	2611 (180)	227 (26)	22 (98)	1470 (120)	209 (24)	20 (89)	313 (36)	30 (133)
	2800	W03-92Q					2430 (168)	224 (25)	21 (93)	336 (38)	32 (142)
	4500	W03-52Q					3910 (270)	249 (28)	24 (107)	374 (42)	36 (160)
1– 1¼" (25–32)	1690	W05-82Q	10.5 (267)	2611 (180)	305 (35)	29 (129)	1470 (120)	252 (29)	24 (107)	378 (43)	36 (160)
	2800	W05-92Q					2430 (168)	297 (34)	28 (125)	446 (50)	42 (187)
	4500	W05-52Q					3910 (270)	365 (41)	35 (156)	548 (62)	52 (231)
1½" (40)	1690	W07-82Q	10.5 (267)	2611 (180)	305 (35)	29 (129)	1470 (120)	252 (29)	24 (109)	378 (43)	36 (160)
	2800	W07-92Q					2430 (168)	297 (34)	28 (125)	446 (50)	42 (187)
	4500	W07-52Q	24 (610)		1324 (150)	55 (245)	3910 (270)	1587 (179)	66 (294)	2381(269)	99 (441)
2" (50)	1690	W08-82Q	24 (610)	2611 (180)	1324 (150)	55 (245)	1470 (120)	1092 (123)	46 (205)	1638 (185)	68 (303)
	2800	W08-92Q					2430 (168)	1287 (145)	54 (240)	1931 (218)	80 (356)
	4500	W08-52Q					3910 (270)	1587 (179)	66 (294)	2381 (269)	99 (441)
2½ – 4" (65–100)	1690	W09-82Q	24 (610)	2611 (180)	1324 (150)	55 (245)	1470 (120)	2290 (259)	GEAR	3435 (388)	GEAR
	2800	W09-92Q					2430 (168)	2862 (323)	GEAR	4293 (485)	GEAR
	4500	W09-52Q					3910 (270)	3744 (423)	GEAR	5616 (635)	GEAR

(6) For Class 900 torque values contact the factory.

ACTUATORS

GEAR ACTUATORS

Velan worm gear actuators provide reliable and dependable manual operation for 2½–4" (65–100 mm) Power Ball Valves. The gear is designed to operate in the range of 90°, ±5° and is equipped with angular dial indicator. VW worm gear actuators feature a gear segment and a rigid, reversible shaft with integral worm. The gear actuators comply with ISO 5211 and are suitable for high temperature service.

AIR & ELECTRIC ACTUATORS

Velan supplies high quality pneumatic rack & pinion and scotch yoke actuators for ½–4" (15–100 mm) Power Ball Valves. All actuators are totally enclosed. External adjustment stops provide accurate adjustment for closing and opening positions. All moving parts are permanently lubricated. Actuators can be installed in the field, although it is preferable that they be installed and tested in the factory.

GEAR ACTUATOR

AIR ACTUATOR

ELECTRIC ACTUATOR

HOW TO ORDER

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

TYPE OF CONNECTION	SIZE OF CONNECTION			CLASS	PORT	TYPE	BODY MATERIAL			TRIM MATERIAL BALL/SEAT	TRIM MATERIAL STEM	COATINGS	SPECIAL SERVICE OR DESIGN
A	B			C	D	E	F			G		H	I
W	0	5	—	9	2	Q	0	2	—	F	R	B	A

EXAMPLE: *1" 2800 Class socket weld A105 ball valve*

A TYPE OF CONNECTION

B – Butt weld **W**– Socket weld

B SIZE OF CONNECTION

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

Examples:
1"W-92Q02-FRBA (valve size shown separately)
W05-92Q02-FRBA (valve size in figure number)

03 – ½" (15 mm)
04 – ¾" (20 mm)
05 – 1" (25 mm)
06 – 1¼" (32 mm)
07 – 1½" (40 mm)
08 – 2" (50 mm)
09 – 2½" (65 mm)
10 – 3" (80 mm)
12 – 4" (100 mm)

C PRESSURE RATING

For threaded or socket weld use model number:

5 – 4500
7 – 900
8 – 1690
9 – 2800

D PORT

2 – Reduced port

E TYPE

Q – One-Piece Forged Metal-Seated Power Ball

F BODY MATERIAL

02 – A105
06 – F22
10 – S/S F316H/F316(1)
13 – F316
34 – F91

G BALL & SEAT MATERIAL

F – Inconel 718

STEM MATERIAL

R – A638 Gr. 660 (Gr. 616 may be substituted for 900–2800 pressure classes)

H COATINGS (Ball and Seats unless noted)

B – Chrome Carbide **G** – Stellite

I SPECIAL SERVICE OR DESIGN

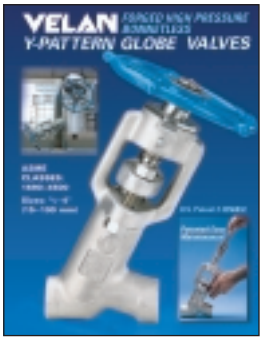
A – Standard

(1) Material Code "10" F316H/F316 has a minimum carbon content of 0.04 and is to be used if temperatures are over 1000°F (538°C). Forged F316, Material Code "13", is not suitable for temperatures above 1000°F (538°C) as it is dual certified (F316/F316L).

THE MOST COMPREHENSIVE LINE OF INDUSTRIAL FORGED AND CAST STEEL GATE, GLOBE, CHECK, BALL, BUTTERFLY AND KNIFE GATE VALVES

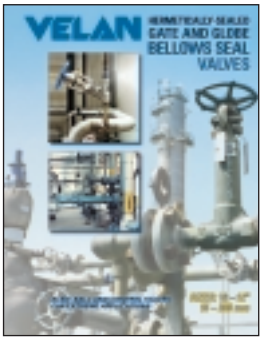
ASME Pressure Classes 150–4500 in Carbon, Alloy and Stainless Steel

VEL-PS



VEL-BG

VEL-SFV

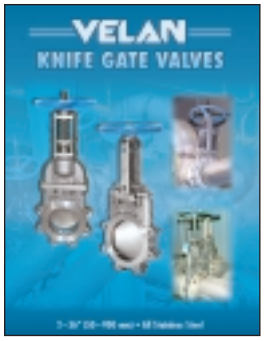


VEL-BS

VEL-CRYO

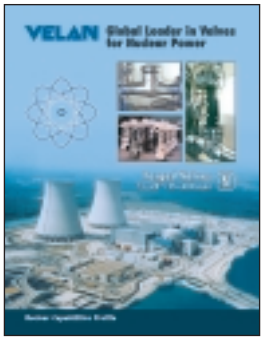
VEL-CSV

VEL-API-603



VEL-KGV

VEL-PRO-CV

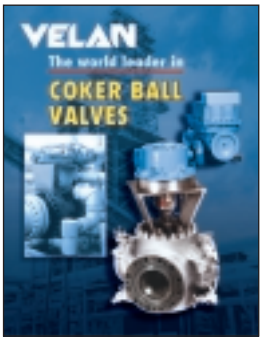


VEL-NCP

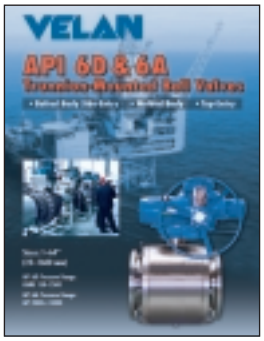
VEL-BF

VEL-MS

VEL-PBV

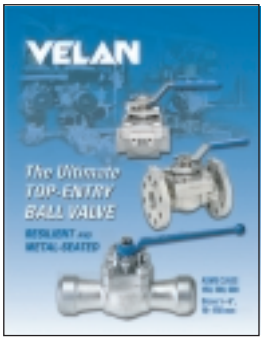


VEL-CBV



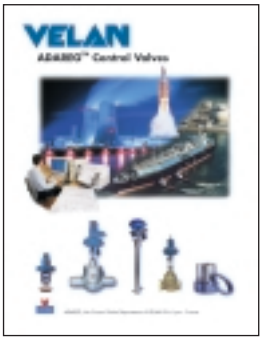
VEL-BV6D

VEL-BV



VEL-TE

VEL-GP2BV



VEL-ADCV

VEL-ST

www.velan.com

Printed in Canada