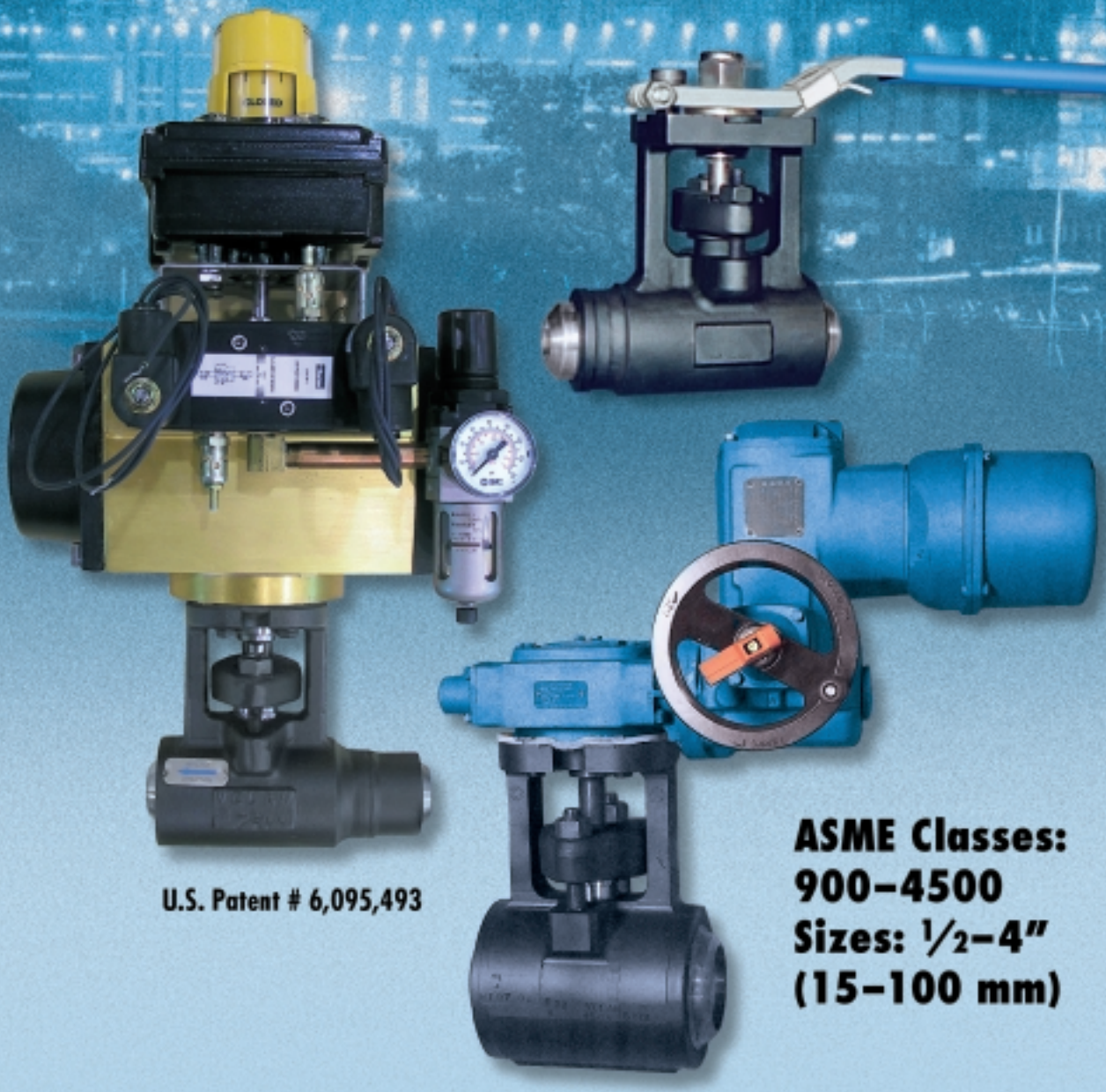
VELAN

Please note this is a condensed catalog.
For a complete version, contact Velan directly.

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 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)

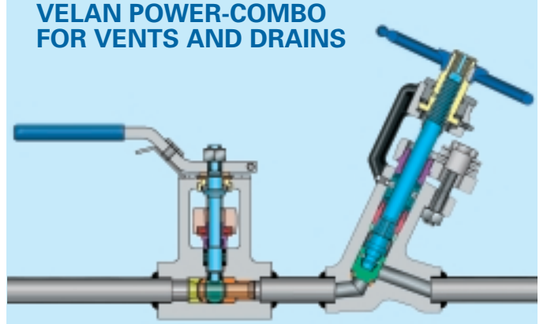
SUPERIOR DESIGN AND UNIQUE CONSTRUCTION ASSURES RELIABILITY AND LONG SERVICE LIFE

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

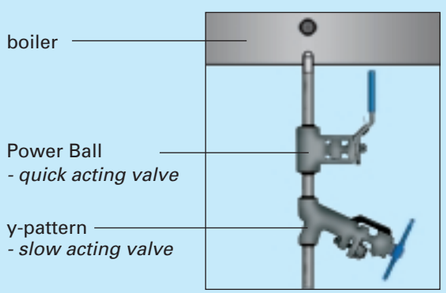
VELAN POWER-COMBO FOR VENTS AND DRAINS



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

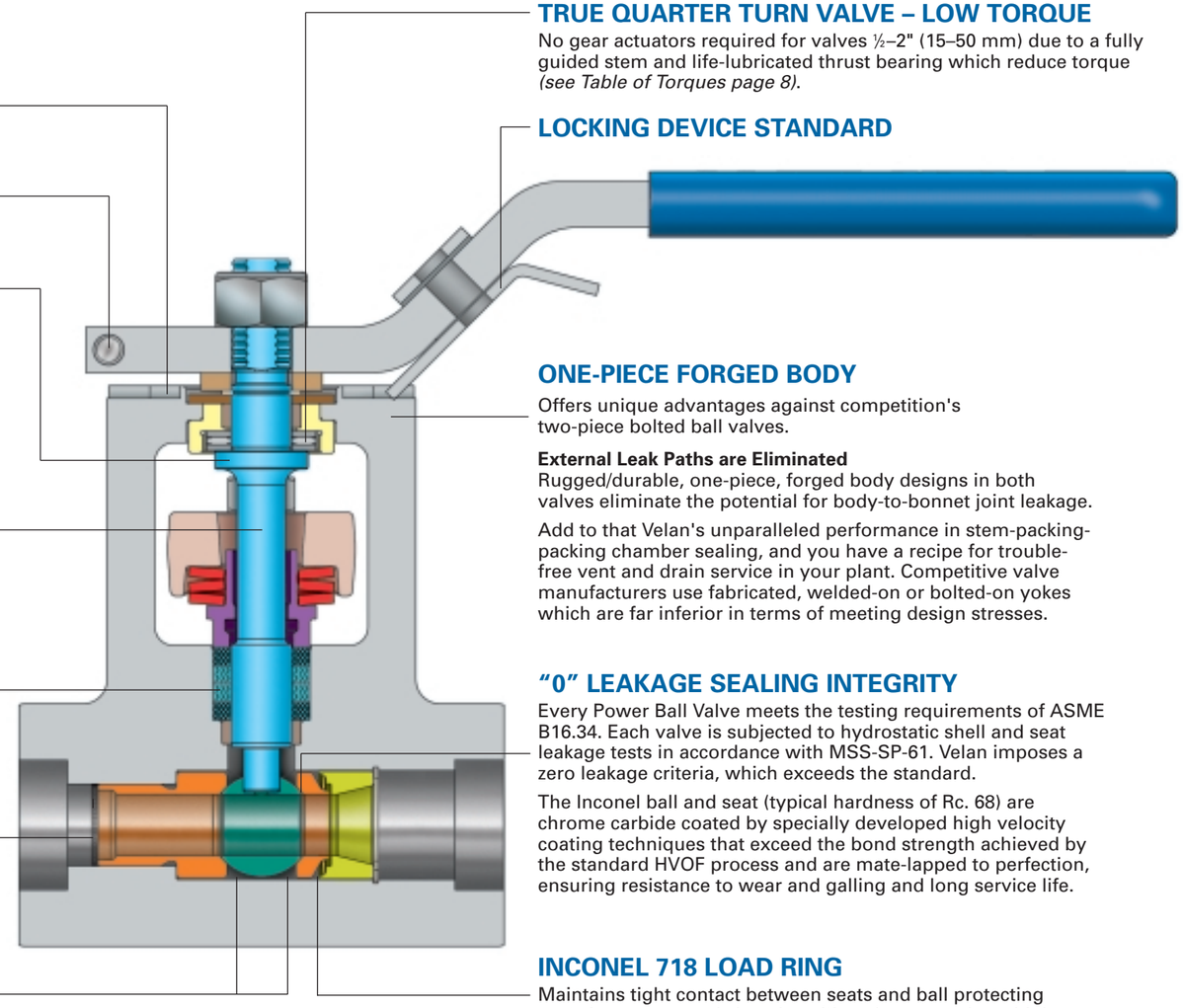
An advanced packing chamber design with a two-piece self-adjusting gland bushing and live-loading provide long lasting, maintenance-free, stem packing tightness.

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.

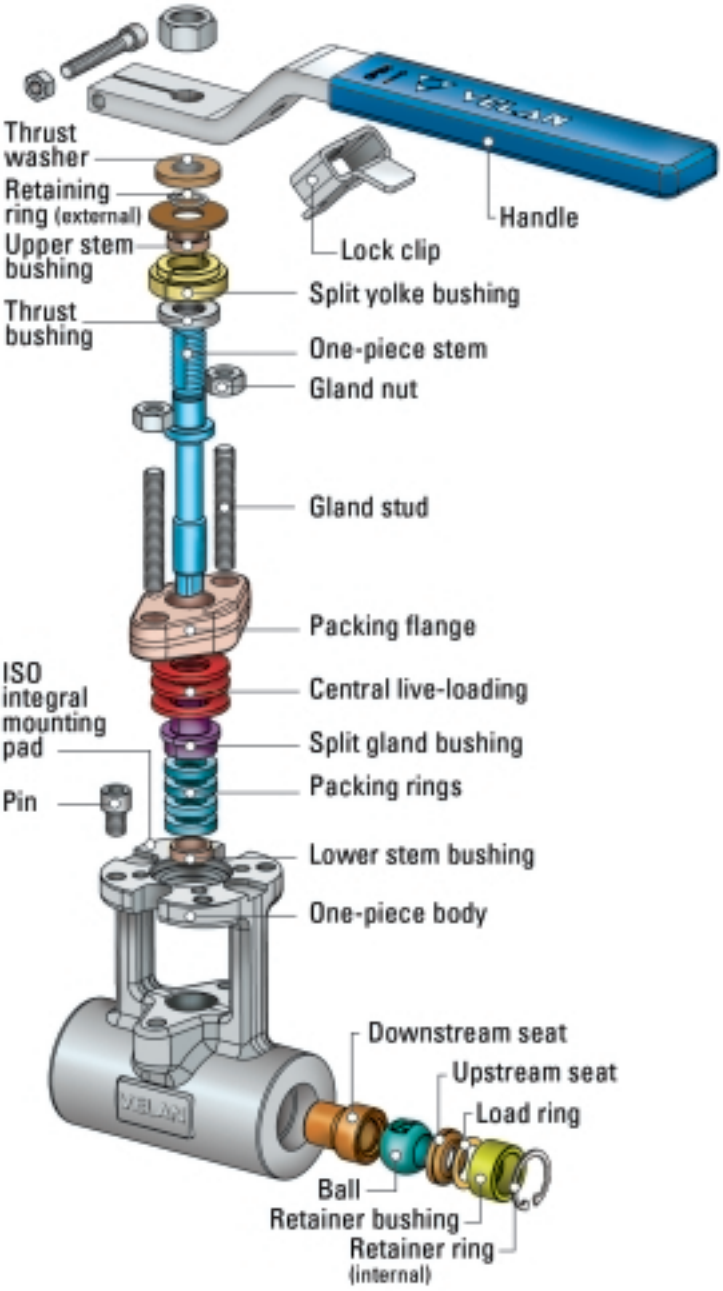
For high temperature service, Velan can supply a heat gasket, placed between the valve and actuator, and/or actuators with high temperature trim, to protect the operator from heat transferred through the valve.

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

Please note this is a condensed catalog. For a complete version, contact Velan directly.

PART	MATERIALS FOR CLASS 4500
Body	A182 F22 Cl. 3, A182 F91

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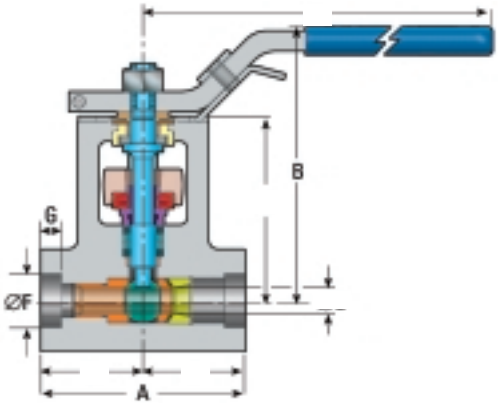
STANDARD DIMENSIONS, Cv FLOW COEFFICIENT & WEIGHTS

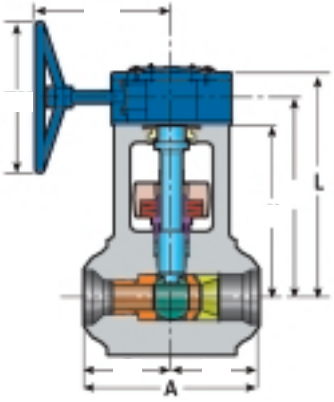
Size in mm	Class	A			B				∅F	G			L					
		SW	BW	BW_N														
½" 15	900–2800	5.00 127	5.00 127	6.50 165	6.76 172				0.865 22.0	0.38 10			– –					
½" 15	4500	5.00 127	5.00 127	6.50 165	6.76 172				0.865 22.0	0.38 10			– –					
¾" 20	900–2800	5.00 127	5.00 127	6.50 165	6.76 172				1.075 27.3	0.50 13			– –					
¾" 20	4500	5.00 127	5.00 127	6.50 165	6.74 171				1.075 27.3	0.50 13			– –					
1" 25	900–2800	5.00 127	5.00 127	6.50 165	6.76 172				1.340 34.0	0.50 13			– –					
1" 25	4500	5.25 133	5.25 133	6.75 171	6.74 171				1.340 34.0	0.50 13			– –					
1¼" 32	900–2800	5.25 133	5.25 133	6.75 171	6.76 172				1.685 42.8	0.50 13			– –					
1¼" 32	4500	5.25 133	5.25 133	6.75 171	6.74 171				1.685 42.8	0.50 13			– –					
1½" 40	900–2800	5.25 133	5.25 133	6.75 171	6.76 172				1.925 48.9	0.50 13			– –					
1½" 40	4500	7.50 191	7.50 191	9.50 241	10.63 270				1.925 48.9	0.50 13			– –					
2" 50	900–2800	7.50 191	7.50 191	9.50 241	10.63 270				2.416 61.4	0.62 16			– –					
2" 50	4500	7.50 191	7.50 191	9.50 241	10.63 270				2.416 61.4	0.62 16			– –					
2½" 65	900–2800	10.00 254	10.00 254	12.50 318	– –				2.919 74.1	0.62 16			13.43 341					
2½" 65	4500	10.00 254	10.00 254	12.50 318	– –				2.919 74.1	0.62 16			13.43 341					
3" 80	900–2800	12.50 318	10.00 254	12.50 318	– –				– –	– –			13.43 341					
3" 80	4500	12.50 318	10.00 254	12.50 318	– –				– –	– –			13.43 341					
4" 100	900–2800	– –	10.00 254	– –	– –				– –	– –			13.43 341					
4" 100	4500	– –	10.00 254	– –	– –				– –	– –			13.43 341					

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

Socket Weld Ends



Butt Weld Ends



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	
½" (15)	80	✓	✓	0.840 (21.3)	0.546 (13.87)	0.22 (5.59)	0.29 (7.37)	
	160				0.464 (11.79)	0.28 (7.11)	0.38 (9.65)	
	XXS(1)				0.252 (6.40)	0.44 (11.18)	0.59 (14.99)	
¾" (20)	80	✓	✓	1.050 (26.7)	0.742 (18.85)	0.23 (5.84)	0.31 (7.87)	
	160				0.612 (15.55)	0.33 (8.38)	0.44 (11.18)	
	XXS(1)				0.434 (11.02)	0.46 (11.68)	0.62 (15.75)	
1" (25)	80	✓	✓	1.315 (33.4)	0.957 (24.31)	0.27 (6.86)	0.36 (9.14)	
	160				0.815 (20.70)	0.38 (9.65)	0.50 (12.70)	
	XXS(1)				0.599 (15.22)	0.54 (13.72)	0.72 (18.29)	
1¼" (32)	80	–	–	1.660 (42.2)	1.278 (32.46)	0.29 (7.37)	0.38 (9.65)	
	160				1.160 (29.46)	0.38 (9.65)	0.50 (12.70)	
	XXS(1)	✓	✓		0.896 (22.76)	0.57 (14.48)	0.76 (19.30)	
1½" (40)	80	–	✓	1.900 (48.3)	1.500 (38.10)	0.30 (7.62)	0.40 (10.16)	
	160				1.337 (33.96)	0.42 (10.67)	0.56 (14.22)	
	XXS	✓			1.100 (27.94)	0.60 (15.24)	0.80 (20.32)	
2" (50)	80	–	–	2.357 (60.3)	1.939 (49.25)	0.33 (8.38)	0.44 (11.18)	
	160	✓	✓		1.687 (42.85)	0.52 (13.21)	0.69 (17.53)	
	XXS(1)				1.503 (38.18)	0.65 (16.51)	0.87 (22.10)	
2½" (65)	80	✓	✓	2.875 (73.0)	2.323 (59.00)	0.41 (10.41)	0.55 (13.97)	
	160				2.125 (53.98)	0.56 (14.22)	0.75 (19.05)	
	XXS(1)				1.771 (44.98)	0.83 (21.08)	1.10 (27.94)	
3" (80)	80	–	–	3.500 (88.9)	2.900 (73.66)	0.45 (11.43)	0.60 (15.24)	
	160	✓	✓		2.624 (66.65)	0.66 (16.76)	0.88 (22.35)	
	XXS				2.300 (58.42)	0.90 (22.86)	1.20 (30.48)	
4" (100)	80	–	–	4.500 (114.3)	3.826 (97.18)	0.51 (12.95)	0.67 (17.02)	
	160				3.438 (87.33)	0.80 (20.32)	1.06 (26.92)	
	XXS(1)				3.152 (80.06)	1.01 (25.65)	1.35 (34.29)	

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

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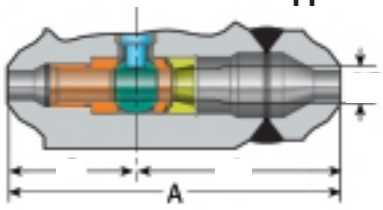
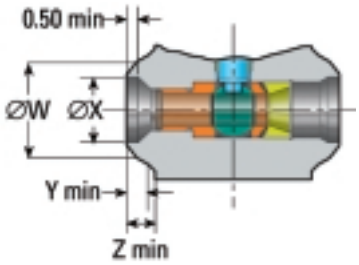
Butt Weld End with Nipple



Butt Weld End



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).