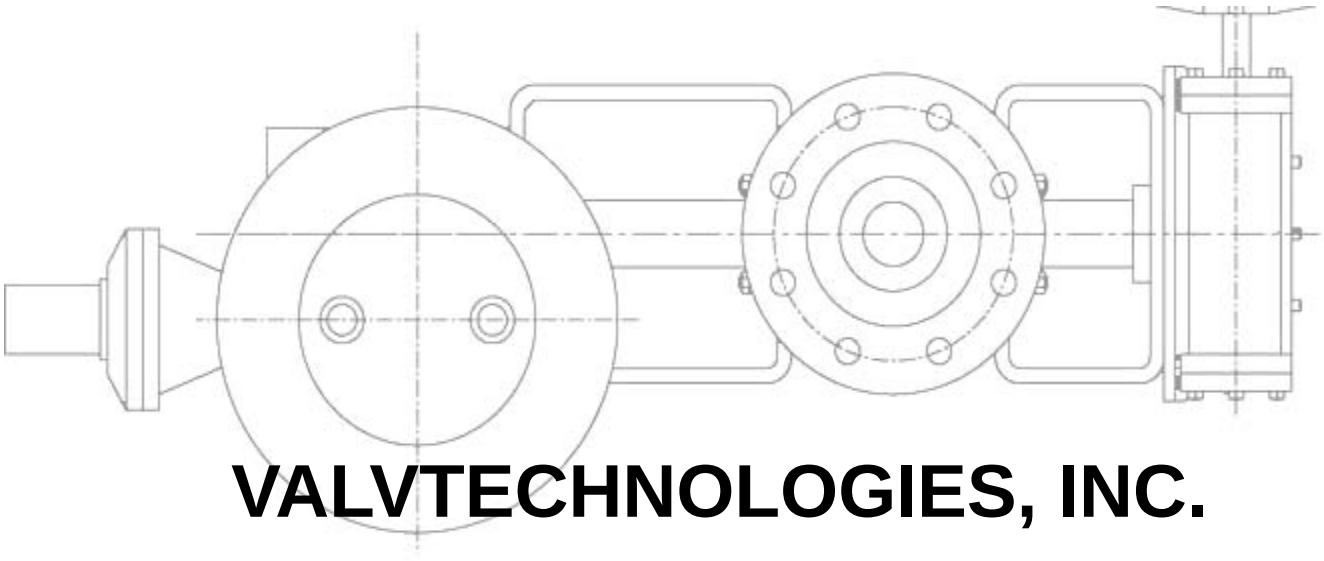
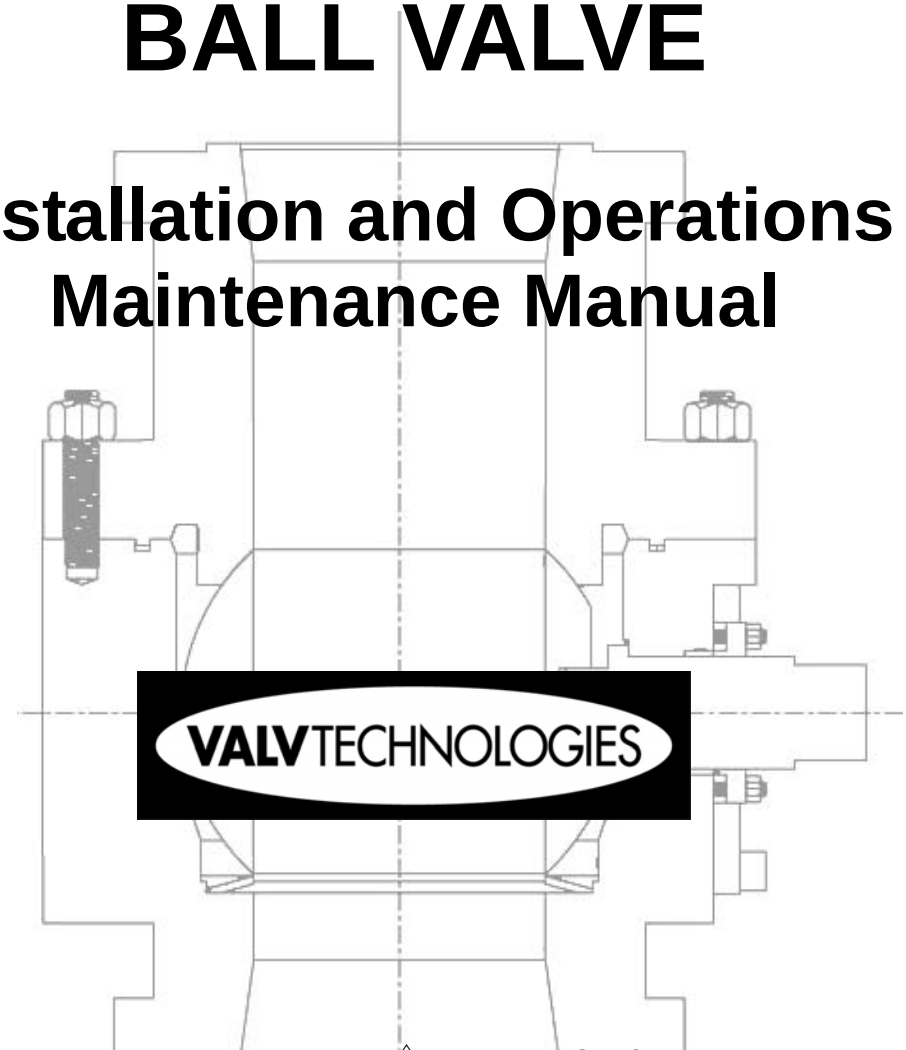


VALVTECHNOLOGIES, INC.

BALL VALVE

Installation and Operations Maintenance Manual



ASME International

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INTRODUCTION

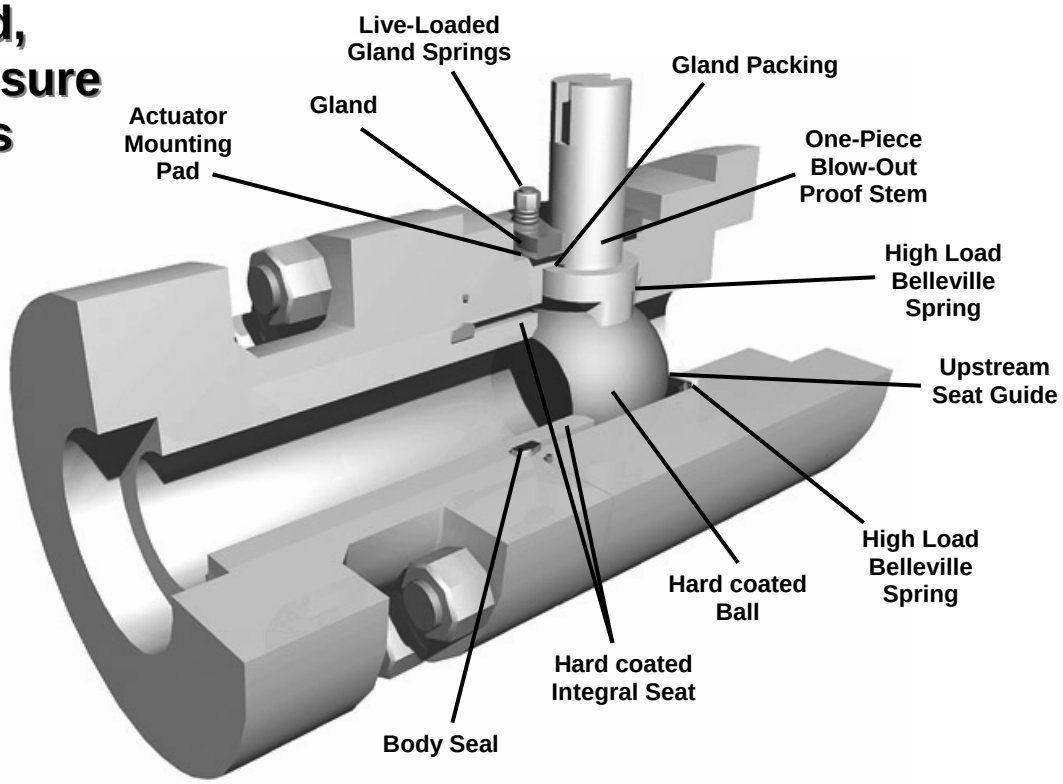
ValvTechnologies, Inc. is a global leader in the design and manufacturing of severe service zero-leakage metal seated ball valves for the Power and Process Industry.

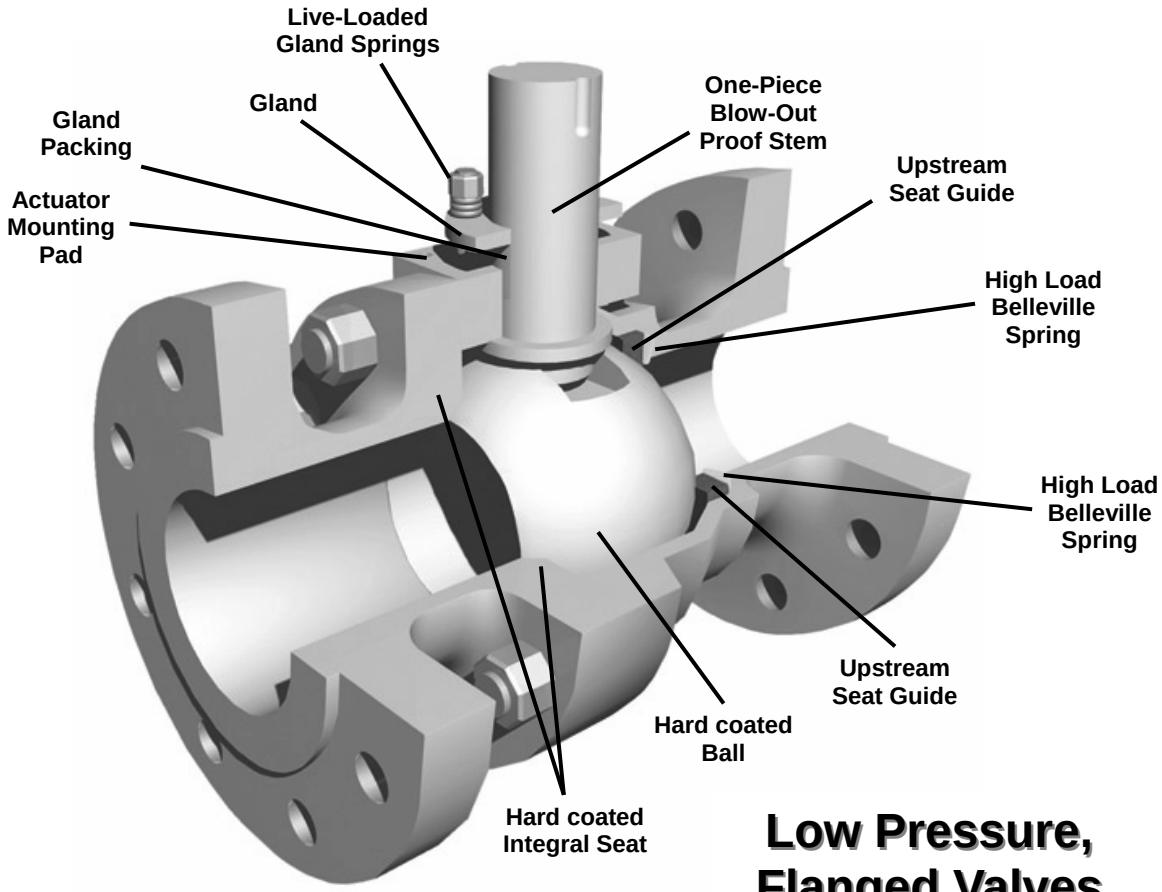
The purpose of this manual is to describe procedures that will ensure safe and successful installation, operation and maintenance of the metal-seated ball valve assuming a trouble free service life.

Difficulties encountered in the operation or maintenance of ValvTechnologies' valves should be directed to a ValvTechnologies, Inc. authorized repair facility or distributor, or to its Houston facility. Failure to do so may void the warranty.

PRODUCT DESCRIPTION

Forged, High Pressure Valves

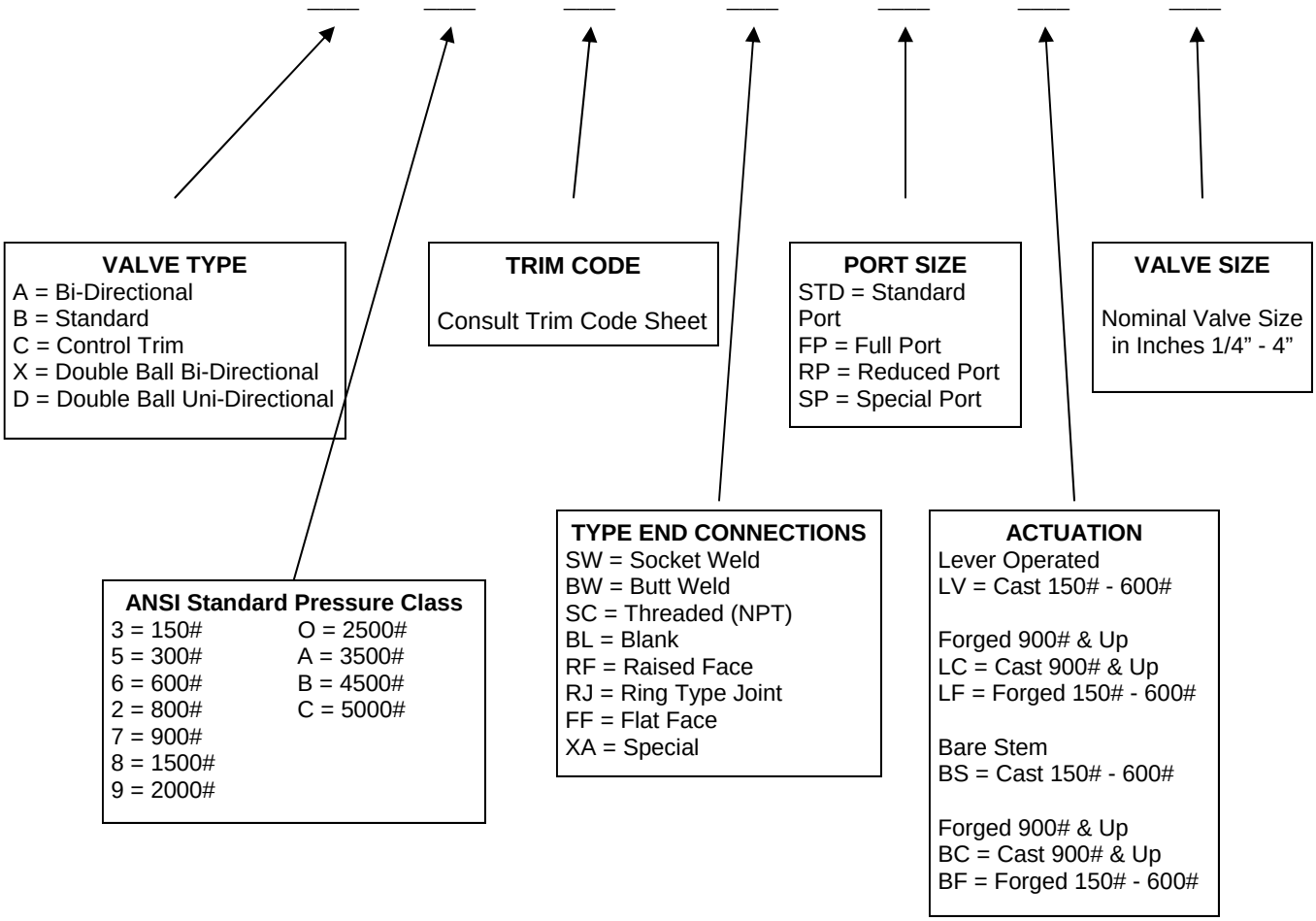




Low Pressure, Flanged Valves

V1 SERIES BALL VALVE PART NUMBERING SYSTEM*

Example: B — 3 — C6 — RF — FP — LV — 2



INSTALLATION

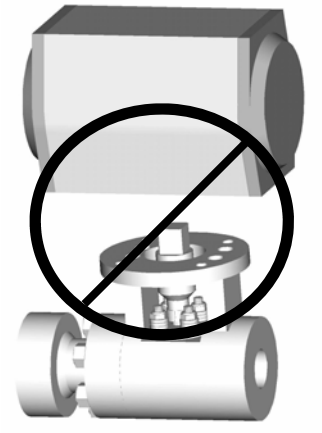
RECEIVING AND PREPARATION PROCEDURE

1) Remove shipping protection.
2) Inspect valve for transportation damage.
3) Inspect valve bore and remove any debris.
4) Cycle the valve inspecting the ball for coating damage.

ACTUATORS

WARNING!
VALVES SHOULD NEVER BE USED AS A STRUCTURAL MEMBER.

IMPORTANT!
Valves mounted with electric actuators should be cycled to the mid-stroke position before cycling under power.

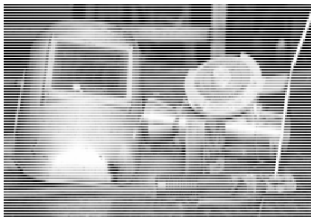


CAUTION! **Actuators are not to be mounted, removed, adjusted or re-installed to or from ValvTechnologies valves except by trained ValvTechnologies personnel.**

ORIENTATION

CAUTION! **Valves must be installed with the FLOW ARROW pointing from high to low pressure with the valve in the closed isolating position. Alternatively the high-pressure end will be labeled. The high-pressure end is defined as the end with the highest pressure, with the valve in the closed isolating position.**

NOTE: Uni-directional valves should not be installed in lines where a differential back pressure (from low to high pressure) of 200psi or more may exist.



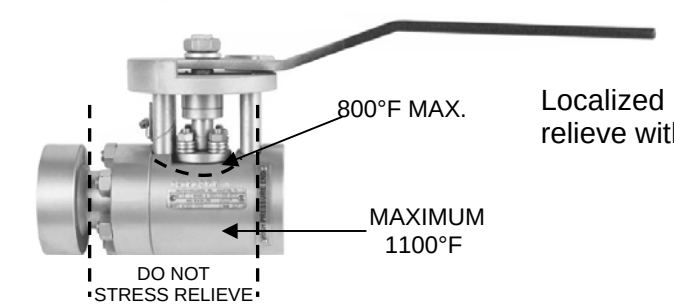
The use of radiation shields is advised if heat damage to the actuator is a concern.

Care is to be taken to minimize weld slag and splatter within the valve.

Do not strike arcs on the valve.

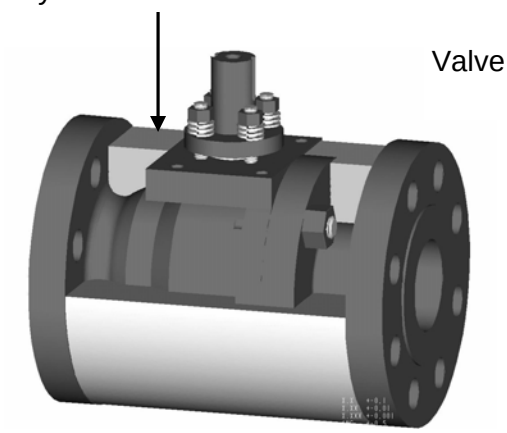
CAUTION!
Valve must be OPEN during welding.

***CAUTION!* Excessive temperature and incorrect insulating or stress relieving technique may damage the valve and void the warranty.**



Localized Stress Relief is acceptable, do not furnace stress relieve without consulting ValvTechnologies Engineering.

CAUTION!
Valve insulation is prohibited during stress relieving.



Valve service insulation is advised for valves expected to ex-

CAUTION!
No insulation is to be applied above the body flat.

POST INSULATION PROCEDURES

Piping system shall be cleaned and flushed.

Limit switch and position indicator operation should be observed as the valve is cycled several times.

CAUTION!
Valves and valve assemblies should never be used as load bearing members or be used as part of a load bearing structure.

OPERATION

VALVE LUBRICATION

ValvTechnologies metal-seated ball valve requires NO lubrication.

Re-tightening of body (with system de-pressurized) and gland packing bolting is permissible, if leakage occurs in these areas.

Required Torque values are given in Tables 1 & 2.

The use of Copper-Based Anti-Seize Grease for stud lubrication and Molybdenum Disulfide Anti-Seize Grease for packing lubrication is recommended.

Bolt Tension may be decreased to 25% shown in Tables 1 & 2 when other or no lubrication is used.

TABLE 1
BODY BOLT TORQUE VALUES

BOLT SIZE - INCHES (mm)	TORQUE ft/lbs (Nm)	
	B7 OR EQUAL	B8M OR EQUAL
5/16 (8)	12 (16)	4 (5)
3/8 (10)	18 (24)	6 (8)
7/6 (30)	29 (39)	9 (12)
1/2 (13)	45 (61)	13 (18)
9/16 (14)	50 (68)	19 (26)
5/8 (16)	85 (115)	26 (35)
3/4 (19)	150 (203)	45 (61)
7/8 (22)	240 (325)	70 (95)
1 (25)	355 (481)	110 (149)
1-1/8 (29)	510 (691)	155 (210)
1-1/4 (32)	700 (949)	210 (285)
1-3/8 (35)	950 (1288)	290 (393)
1-1/2 (38)	1250 (1695)	370 (502)
1-5/8 (41)	1600 (2169)	480 (651)
1-3/4 (44)	2060 (2793)	500 (678)
1-7/8 (48)	2500 (3390)	750 (1017)
2 (51)	3000 (4067)	900 (1220)
3 (76)	10300 (13965)	3100 (4203)
3-1/2 (89)	16500 (22371)	5000 (6779)

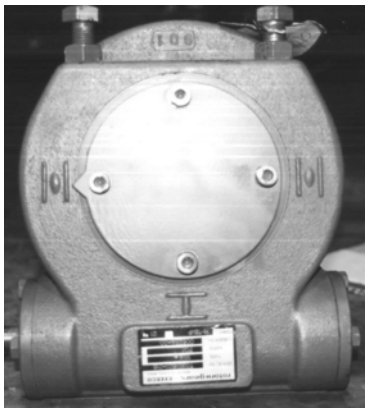
NOTE: Due to the ValvTechnologies valve's metal-to-metal sealing surface operating torques are considerably higher than comparable soft seated ball valves.

TABLE 2
GLAND TORQUE

STUD DIAMETER	NOMINAL BALL	TORQUE VALUE in/lb (Nm)			
THREAD PITCH- in (mm)	INSIDE DIAMETER- in (mm)	GLAND TORQUE		NEVER EXCEED	
5/16 - 18 (8)	5/8 (16)	48	(5.4)	60	(6.8)
5/16 - 18 (8)	1-1/16 (27)	48	(5.4)	60	(6.8)
3/8 - 16 (10)	2-1/8 (54)	84	(9.5)	105	(11.9)
3/8 - 16 (10)	3-1/16 (78)	84	(9.5)	105	(11.9)
3/8 - 16 (10)	4-1/16 (103)	84	(9.5)	105	(11.9)
7/16 - 14 (11)	-	132	(14.9)	165	(18.7)
1/2 - 13 (13)	5-1/8 (13)	204	(23.1)	225	(25.5)
1/2 - 13 (13)	6-1/16 (154)	204	(23.1)	225	(25.5)
9/16 - 12 (14)	-	252	(28.5)	315	(35.6)
5/8 - 11 (16)	-	396	(44.8)	495	(56.0)

Note: Values are for B8M, Class 1 bolting.

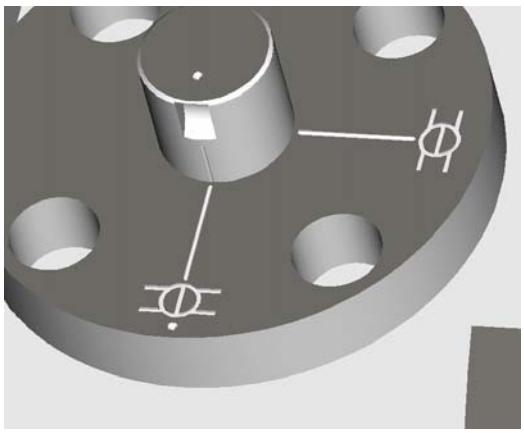
STEM ROTATION DIRECTION AND VALVE POSITION INDICATION



All ValvTechnologies ball valves (unless specifically stated) are operated clockwise to close and counter-clockwise to open.

Typical valve hand wheels and levers require 80 lbf. (335N) of handle force to operate.

Lever operated are shown to be open when the handle lies on the same axis as the valve bore. The valve indicated closed when the handle is at 90^{o} to the valve bore.



The stem, gland and ball (and in some instances the drive sleeve) bear markings as shown to the left. The marks will line up on the left of a closed valve, when looking down on the stem and facing downstream.

On actuated and gear-operated valves an arrow shows the valve position.

ACTUATOR OPERATION

Valve actuators must be installed, operated and maintained as per their manufacturer's written instruction. In the event of a conflict between these instructions and those contained in this manual an authorized ValvTechnologies distributor or to ValvTechnologies Houston facility should be contacted.

The lubricant of worm gear actuators should be inspected every three months and be replenished or replaced if required.

MAINTENANCE

DISASSEMBLY

WARNING! DISASSEMBLY AND REPAIR OF VALVTECHNOLOGIES VALVE ASSEMBLIES BY UNAUTHORIZED PERSONNEL MAY BE HAZARDOUS AND NEGATE WARRANTIES.

CAUTION! **During disassembly particular care should be taken not to damage mating, packing, or sealing surfaces.**

CAUTION! **Packing must be replaced if gland nuts are loose. Only approved ValvTechnologies packing shall be used.**

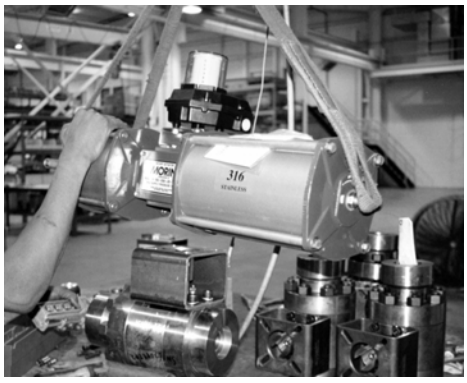
DISASSEMBLY (CONTINUED)

1) Valve shall be cycled closed.

2) Orientation and position shall be marked on valve components, particularly the side of the ball matched to the seat, prior to removal.

3) Marking should be indelible to the valve cleaning process, but should not damage the parts (i.e. NO STAMPING).

CAUTION!
Balls are matched to end caps – these matched pairs should never be separated or interchanged.



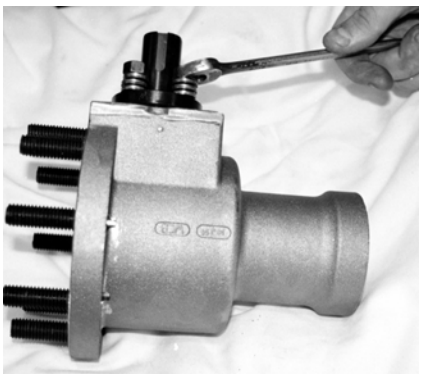
4) Avoiding excessive force, remove the entire actuator assembly.

5) Remove body nuts and separate body and end cap.

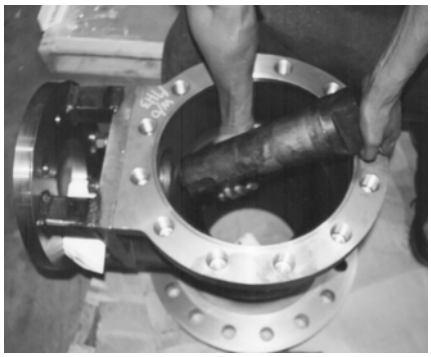
6) Remove body seal or gasket, depending upon valve design

7) Remove body gasket. (if applicable)

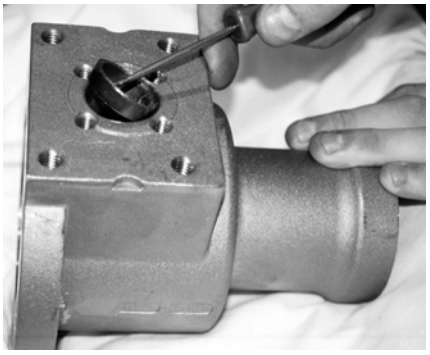
8) Remove ball, after marking orientation and protect from possible damage.



9) Remove gland nuts, gland spring and gland.



10) Remove Stem.



11) Remove packing, using packing pick or equivalent.

12) Inspect ALL components, note defects and replace if required, then de-grease using a solvent in preparation for re-assembly.

***CAUTION!* Sand blasting is not permissible, as it may destroy or damage critical surfaces.**

REPAIR AND REWORK

Prior to re-assembly all the following components should be replaced or inspected and verified as acceptable:

√ Packing
√ Body Gasket
√ Belleville Spring—Should be replaced if deformed or collapsed below the values of Table 3.
√ Ball and Seat

If no damage is evident the ball may be re-lapped to the seat, using methods outlined below:

⇒ If ball/end cap cannot be re-lapped. The seat must be re-machined, re-coated and re-lapped to the new ball. This must be done by an approved ValvTechnologies facility.

⇒ The seat may be re-worked several times, as a rework face tolerance is designed into the end cap. *Contact ValvTechnologies for MOB Tolerance Ranges.*

Other Valve Components:

⇒ In general these may be cleaned and returned to service.

⇒ If rework is required, consult ValvTechnologies Engineering Department.

⇒ The ball is lapped to the end cap using 3-micron diamond compound.

⇒ Ball is moved in a figure of eight motion against the end cap.

⇒ End cap is held and turned (at 30 r.p.m.) on a rotating table.

⇒ If no rotating table is available end cap is to be placed on solid, clean surface and rotate by hand during lapping.

⇒ The ball/end cap seal shall be tested by sliding the mating surface of the cleaned ball against the cleaned end cap seal ing area. If a visible unbroken band appears the seal is acceptable *(as shown to the right).*

TABLE 3 BELLEVILLE SPRING HEIGHTS

NOMINAL BORE SIZE (inches)	SPRING HEIGHT (inches)	
	MINIMUM	MAXIMUM
5/8	.110	.126
1-1/8	.135	.150
1-1/2	.135	.160
2-1/8	.220	.240
3-1/16	.265	.290
3-1/2	.350	.362
4-1/16	.320	.340
5-1/8	.430	.460
6-1/16	.500	.530
7-1/8	.400	.430
8-1/16	.460	.500
10-1/16	.640	.680

TABLE 3 (continued) BELLEVILLE SPRING HEIGHTS

12-1/8	.760	.800
13-1/4	.790	.830
15-1/4	.890	.930
17-1/4	1.080	1.160
19-1/4	.860	1.020
21-1/4	1.390	1.460

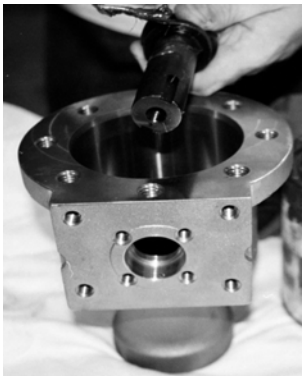
NOTE: If dimensions are not within this range, then ValvTechnologies, Inc. Engineering approval is required prior to assembly.

RE-ASSEMBLY

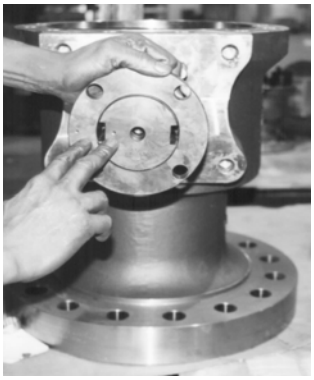
CAUTION! **Only approved ValvTechnologies components should be used in the re-assembled valve.**

NOTE: It is recommended that all internal carbon steel valve parts and surfaces be coated with light motor oil.

1) Body is placed on its inlet flange, clamped hub or welded end with the body cavity facing up.



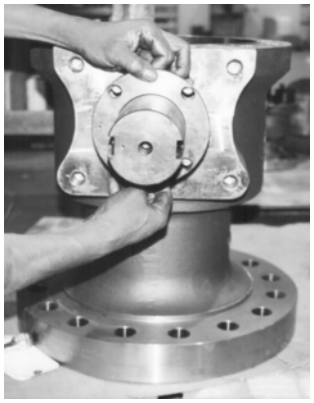
2) Stem shall be inserted through the stem hole from the body cavity side.



3) Stem is to be oriented so that tongue flats are parallel to bore.

NOTE: The stems' packing contact areas shall be coated with Molybdenum Disulfide Anti-Seize Grease.

NOTE: Mark on top of stem should be on the left of the valve, when looking down on the stem and facing downstream.



4) Replace stem packing and gland.

NOTE: Mark on gland will be on the left of the valve.

5) Install the gland springs with their conical ends facing each other. Gland springs are hand tightened.

NOTE: Always coat both ends of gland nuts with a copper-based anti-seize lubricant to achieve correct stud tension and corrosion protection.

6) Force the stem against the body by using a stem jack.

7) Uniformly tighten packing gland nuts to the specified torque value *(see Table 2).*

NOTE:
A stem jack is a double nut stud or a soft (plastic or brass) object.

Installing Actuator

8) Assemble actuator, lever and/or mounting bracket as necessary.

Actuator and valve must both be in the closed position.

CAUTION!
Great care must be taken when reinstalling an actuator. The stem MUST be prevented from being driven into the ball.

9) All operator adapter plates supplied by ValvTechnologies have a machined hole in the middle of the plate. When this plate is mounted to the valve, it should be concentric with the shaft before the bolts are tightened holding the mounting plate to the valve. After tightening the bolts, the concentricity should again be checked. Any misalignment of the operator to the valve may cause binding in the operator, which may cause damage to either the valve or the operator.

CAUTION!
If the operator drive does not readily slip onto the valve, the stem, key and if necessary, drive sleeve should be inspected for burrs, etc.

CAUTION!
Only ValvTechnologies approved personnel should mount actuators. The valve MUST be tested after the actuator mounting process to verify zero leakage.

10) Remove Stem Jack.

11) Set operator closed stop with ball precisely in closed orientation.

12) Cycle the valve several times and re-torque the packing gland nuts.

13) Measure Critical Assembly Fit Dimensions

NOTE: This measurement is only required on valves with a metal body seal.

Pressure Seal Standoff

14) Place body with end cap end up. Carefully align pressure seal parallel with body face. Very carefully place the end cap atop the body and pressure seal. All must be horizontal.

15) Check the body gap (pressure seal standoff). See Table 4. If the gap is out of tolerance, an oversized body may be used.

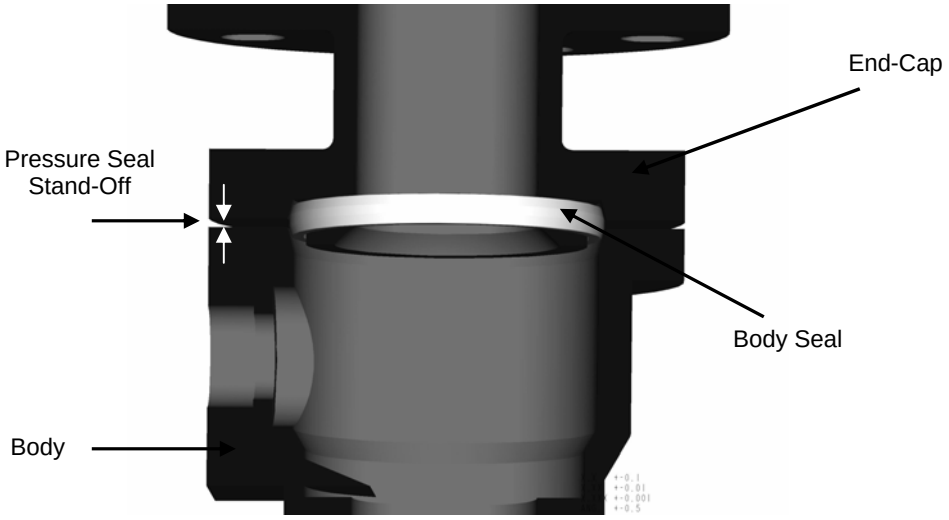


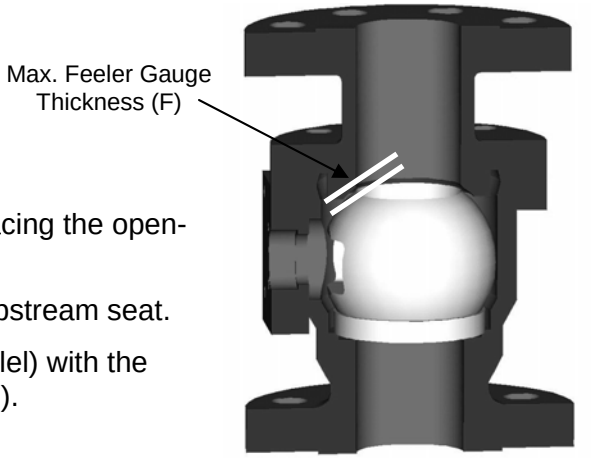
TABLE 4
ASSEMBLY STAND OFF OF PRESSURE SEAL (without ball)
(PRESSURE SEAL VALVES ONLY)

NOMINAL BALL BORE (I.D.) – in. (mm)	STAND OFF – in. (mm)	
	MINIMUM	MAXIMUM
5/8 (16)	.023 (.584)	.041 (1.0414)
1-1/16 (27)	.041 (1.0414)	.068 (1.727)
1-1/2 (38)	.045 (1.143)	.068 (1.727)
2-1/8 (54)	.048 (1.219)	.071 (1.803)
3-1/16 (78)	.078(1.981)	.105 (2.667)
4-1/16 (103)	.095 (2.413)	.125 (3.175)
5-1/8 (130)	.120 (3.048)	.145 (3.683)
6-1/16 (154)	.145 (3.683)	.178 (4.521)
8-1/16 (205)	.180 (4.572)	.210 (5.334)
10-1/16 (256)	.230 (5.842)	.260 (6.604)
12-1/8 (308)	.275 (6.985)	.310 (7.874)
15-1/4 (387)	.305 (7.747)	.345 (8.763)
17-1/4 (438)	.330 (8.382)	.370 (9.398)
19-1/4 (489)	.350 (8.89)	.390 (9.906)
21-1/4 (540)	.380 (9.652)	.430 (10.922)

Note: If standards are not in this range, then ValvTechnologies Engineering approval is required prior to assembly.

Lock-Up Gap for Large Bore Valves

NOTE: For small bore (5/8", 1-1/16" and 2-1/8"), low pressure (150# - 300#) valves, this measurement is not taken directly, but is calculated after measuring the spring standoff.



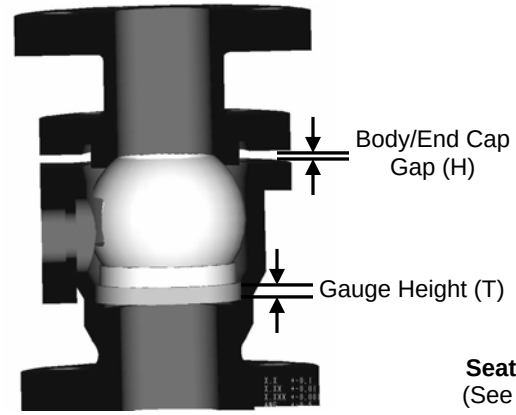
16) Place the upstream seat into the valve body with radius facing the opening, end cap end.

17) Insert the ball into the body, over the stem and onto the upstream seat.

18) Place the end cap carefully on the body and line up (parallel) with the body. Measure the lock-up gap (seat/ball gap without a spring).

Lock-Up Gap

Seat/Ball Gap = F x 1.4
(See Table 5 for limits)



Lock-Up Gap (With Gauge)

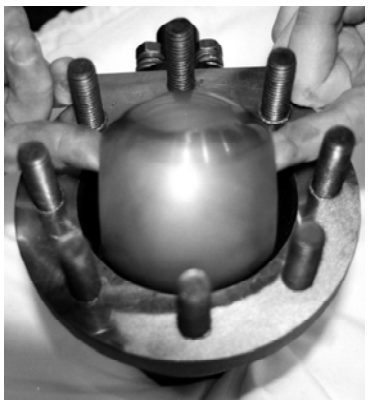
NOTE: If this measurement cannot be taken directly because of access, use alternative method, shown to the left.

Seat/Ball Gap = T– H
(See Table 5 for limits)

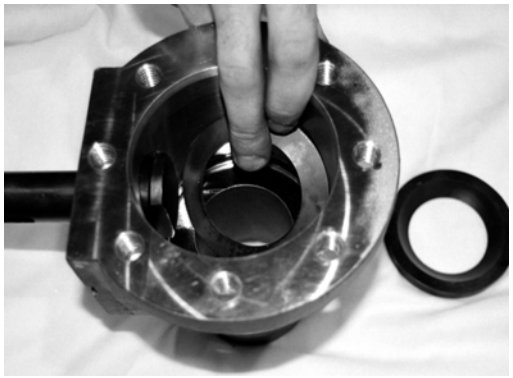
Belleville Spring Standoff

19) Measure Belleville Spring height. Refer to Table 3, for acceptable height range. If height is out of specification, replace with a new spring.

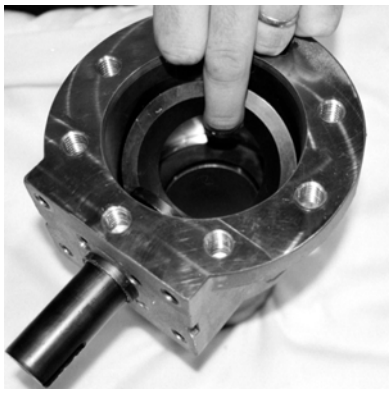
NOTE: Some spring height is always lost due to "set" during first use. ValvTechnologies, Inc. recommends that the spring always be replaced during an overhaul.



20) Remove the end cap, ball and seat.

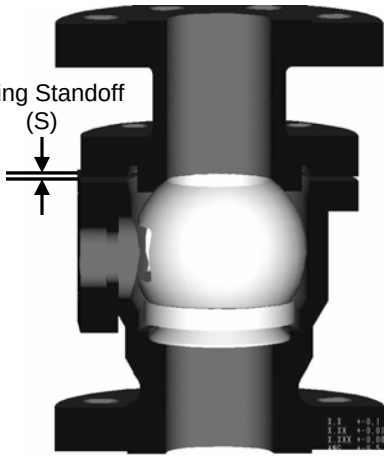


21) Insert the Belleville Spring with the large end resting in the body pocket.



22) Insert the upstream seat loose with the curved seat facing you, away from the Belleville Spring.

23) Insert the ball with the mate lapped end facing away from the upstream seat.

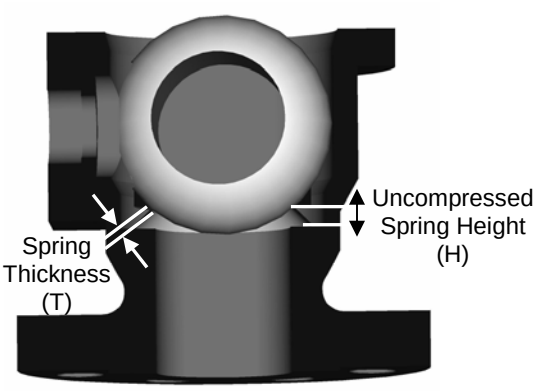


Spring Standoff Gap

Spring Standoff = S
(See Table 6 for limits)

24) Gently place end cap atop the body, maintaining end cap to body face parallel as end cap is lowered onto body.

25) Using feeler gauges, measure Belleville Spring standoff between the end cap and body.



Lock-Up Gap for 5/8", 1-1/16" & 2-1/8" Bore Valves

Seat/Ball Gap = H-T-Spring Standoff (S)
(See Table 5 for limits)

NOTE: To obtain an accurate spring stand off measurement, place one set of gauges 180^0 away from the other and use stacks of approximately equal thickness. Measure the two stacks together and divide by two for the average gap ("g"). Check the value of "g" against Table 6.

TABLE 5
SEAT/BALL GAP WITHOUT SPRING

NOMINAL BALL BORE (I.D.) – in. (mm)	SEAT/BALL GAP – in. (mm)	
	MINIMUM	MAXIMUM
5/8 (16)	N/A	.087 (2.210)
1-1/8 (29)	N/A	.075 (1.905)
1-1/2 (38)	.032 (.813)	.046 (1.168)
2-1/8 (150#-300#) (54)	N/A	N/A
2-1/8 (600#-4500#) (54)	.040 (1.016)	.056 (1.422)
3-1/16 (78)	.053 (1.346)	.067 (1.702)
3-1/2 (90)	.033 (.838)	.046 (1.168)
4-1/16 (103)	.043 (1.092)	.056 (1.422)
5-1/8 (130)	.037 (.9398)	.052 (1.321)
6-1/16 (154)	.057 (1.448)	.079 (2.007)
7-1/8 (181)	.040 (1.016)	.053 (1.346)
8-1/16 (205)	.066 (1.676)	.084 (2.134)
10-1/16 (256)	.053 (1.346)	.065 (1.651)
12-1/8 (308)	.064 (1.626)	.083 (2.108)
13-1/4 (337)	.085 (2.159)	.100 (2.54)
15-1/4 (387)	.105 (2.667)	.120 (3.048)
17-1/4 (438)	.130 (3.302)	.145 (3.683)
19-1/4 (489)	.135 (3429)	.165 (4.191)
21-1/4 (540)	.190 (4.826)	.210 (5.334)

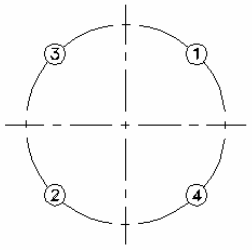
Complete Assembly

26) Remove the end cap and insert the body gasket/seal.

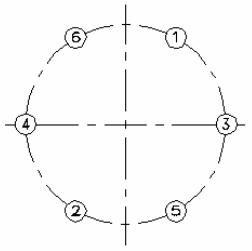
27) Recheck/re-inspect the sealing faces on ball, body and end cap to ensure they were not damaged during handling.

28) Replace all damaged body studs. Apply Copper-Based Anti-Seize Grease high temperature compound to the threads.

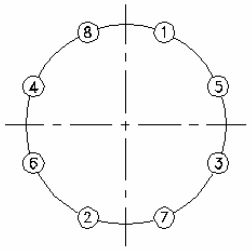
BOLT TIGHTENING PATTERN



4 STUDS



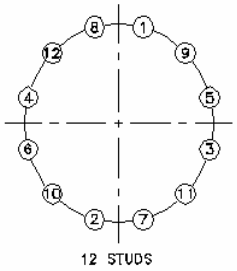
6 STUDS



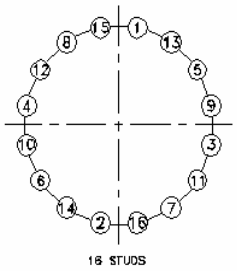
8 STUDS

29) Replace Belleville spring, upstream seat and ball. Ensure the mate lapped side is facing the end cap in the valve body.

30) Insert the **new** ValvTechnologies body seal or gasket into the body, being certain that the top surface is precisely parallel with the body face.

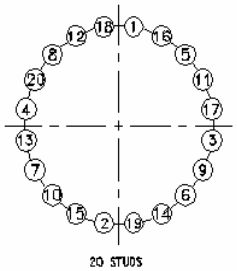


12 STUDS



16 STUDS

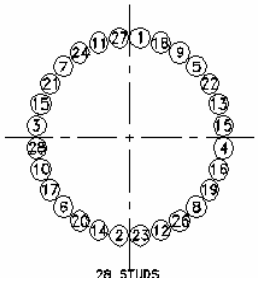
31) Tighten the body studs/nuts evenly, observing the body gasket pull-down. Using gradually increasing torque levels, tighten opposite bolts using a **star-like pattern** until the body and end cap are pulled face-to face.



20 STUDS

CAUTION! **Never turn a nut more than ¼ turn with out moving to a different body nut.**

32) During the entire initial pull-down the two faces should remain precisely parallel. Failure to do so may result in a faulty seal. Torque in a star pattern to 1/3 of torque value listed in Table 1. Then torque in a star pattern to 2/3 of torque value listed in Table 1. Then repeat again at the full torque value of Table 1. For valves larger than 10 inches, repeat the last torque values (full torque).



NOTE: THE STAR PATTERN IS EXTREMELY IMPORTANT.

33) Cycle the valve manually to verify that it is functioning correctly.

34) Re-torque the packing gland bolts evenly to the values given in Table 2.

TESTING

1) Valves may be tested in accordance with ValvTechnologies' Quality Procedure, VQP 010.

2) When performing the seat test, the pressure must be applied on the upstream side. The arrow on the valve (or the label indicating the high pressure end) will indicate the direction in which pressure should be applied.

NOTE: Bi-directional valves must be tested with consideration for the required reverse pressure sealing. Prior to any testing of bi-directional valves, a ValvTechnologies approved service center should be consulted to gain the correct test procedure and test pressure.

TROUBLE SHOOTING

MALFUNCTION	POSSIBLE CAUSE	REMEDIAL ACTION
Valve will not rotate or operate	1) Actuator has failed 2) Valve packed with debris 3) Stem key has sheared 4) Ball seat gap incorrect	1) Replace or repair actuator 2) Cycle & flush valve to remove debris 3) Determine cause of shearing & correct/replace keys 4) Call Factory
Stem Packing Leaking	1) Gland bolts loose 2) Packing damaged or missing 3) Seal misaligned	1) Tighten gland bolts 2) Shut down system & replace packing 3) Replace & properly align
Body Gasket Leaking	1) Body Bolts loose 2) Body gasket damaged 3) Body gasket seating faces in body or end piece damaged	1) Tighten body bolts 2) Remove valve from service & replace body gasket 3) Return parts to ValvTechnologies for rework
Valve Ball/Seat Leaking	1) Valve not fully closed 2) Debris trapped in valve 3) Seat or ball damaged	1) Close the valve 2) Cycle & flush to remove debris.

PARTS INVENTORY PLANNING

In order to maintain the highest level of safety as well as minimize cost while maximizing plant efficiency the following guidelines have been established for part inventory levels:

PARTS CLASSIFICATION

CLASS	PARTS USAGE	VALVE AVAILABILITY
A	Most Frequent	70%
B	Less Frequent	85%
C	Seldom Replaced	90%
D	Rarely Replaced	95%
E	Typically Never Replaced	100%

Refer to the Recommended Spare Parts List for V1 Series Ball Valves below.

RECOMMENDED SPARE PARTS FOR V1 SERIES BALL VALVES

CLASS	PART DESCRIPTION	QTY/SAME TYPE & SIZE	PERCENT COVERAGE
A	Gland Packing Gland Load Springs	1/3	70%
B	Body Gasket (Metal) Belleville Spring	1/5	85%
C	End Cap / Integral Seat Ball Upstream Seat	1/10	90%
D	Drive Sleeve Stem Gland	1/15	95%
E	Yoke Pillers Bridge Thrust Bearing Body Studs & Nuts	1/20	100%

Factory Authorized Service Centers

TEXAS

*ValvTechnologies, Inc.
5904 Bingle Road
Houston, Texas 77092 U.S.A.
Telephone: (713) 860-0400
Facsimile: (713) 860-0499
E-mail: sales@valv.com
Web: www.valv.com

Celtex Industries
White Oak, Texas
(903) 297-8481

Puffer Sweiven -- Stafford
Stafford, Texas
(281) 240-2000

Puffer Sweiven – La Porte
La Porte, Texas
(281) 470-2000

Puffer Sweiven – Port Arthur
Port Arthur, Texas
(409) 736-2861

COLORADO

Nichols-Given Associates, Inc.
Englewood, Colorado
(303) 773-1401

FLORIDA

American Valve & Pump
Lakeland, Florida
(863) 709-0455

LOUISIANA

Carter Chambers
Baton Rouge, LA
(225) 926-2236

MASSACHUSETTS

Power House Supply
Newburyport, Massachusetts
(978) 499-9888

MINNESOTA

Swanson Flo-Systems, Co.
Plymouth, Minnesota
(763) 383-4700

NEW JERSEY

Control Associates, Inc.
Allendale, New Jersey
(201) 934-9200

NORTH CAROLINA

Specialty Valve & Controls
Charlotte, North Carolina
(704) 522-9873

OHIO

TRIVACO
Loveland, Ohio
(513) 697-9890

WEST VIRGINIA

GSB, Inc.
Hurricane, W. Virginia
(304) 562-3304

INTERNATIONAL

AUSTRALIA

FLOTECH Controls PTY LTD
Balgowlah, NSW Australia
612 9949 4888

BRAZIL

ValvTechnologies, Inc.
São Paulo, Brasil
+55-12-3939-4522

CANADA

CG Industrial Specialties
Edmonton, Alberta, Canada
(780) 462-1014

CHILE

Soltex Chile S.A.
Quilicura-Santiago, Chile
562 7304700

CHINA

Beijing Carve Out Valve Equipment Co.
Hai Dian District, Beijing, China
8610-51717896

FRANCE

SMRI
Martigues, FRANCE
+33-04-42-13-00-80

ITALY

Argo International Europe Ltd.
Sesto Florentino, Fl, Italy
39 055 420 6047

CON-PRO TOSCANA
Rosignano Solvay (LI), Italy
+39 0586 7688.1

PERU

HIGH TECH SERVICE SAC
Lima, Peru
511-376-4101

INDUSTRIAL FACTORY S.A.
Lima, Peru
511-336-7773

METALSPRAY SAC
Lima, Perú

RUSSIA

DS Controls
Veliky Novgorod, Russia
+7 (8162) 15-79-28

SOUTH AFRICA

Spirax Sarco (Pty) Ltd.
Gauteng, South Africa
+27 (11) 230 1300
511-361-1106

UNITED KINGDOM

MCE plc
Stockton-on-Tees, UK
+44 (0) 1642 882211

VENEZUELA

Puffer Sweiven – Venezuela
Edo. Zulia, Venezuela
58-261-7573410 / 8445

* Corporate office and manufacturing plant