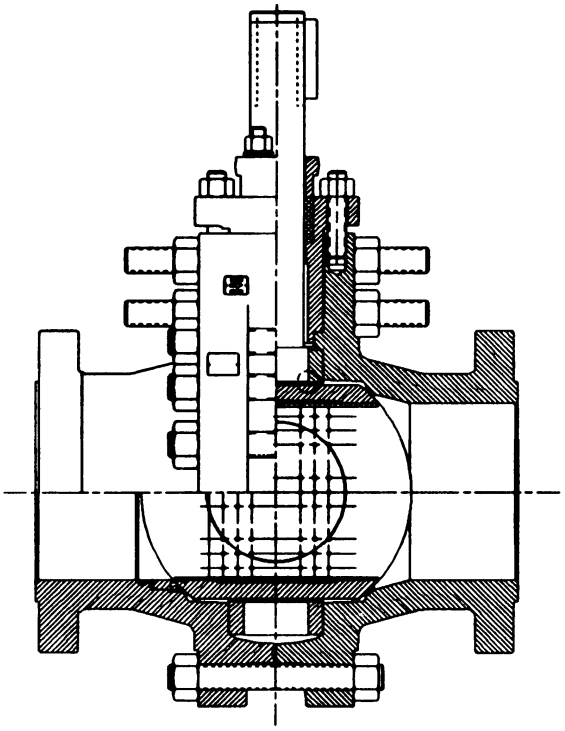
neles



1/2”–2” SERIES QDIF & DIF ANSI CLASS 600 BALL VALVES

Installation, Maintenance, and Operating Instructions
IMO - 205
ISSUE 2/2002

metso automation

Table of Contents **Page**

READ THESE INSTRUCTIONS FIRST!

These instructions provide information about safe handling and operation of the valve.
If you require additional assistance, please contact your authorized Metso Automation representative.

SAVE THESE INSTRUCTIONS!

1 GENERAL

1. 1 WARNING

FOR YOUR SAFETY AND PROTECTION, IT IS IMPORTANT THAT THE FOLLOWING PRECAUTIONS BE TAKEN PRIOR TO REMOVING THE VALVE FROM SERVICE OR BEFORE ANY DISASSEMBLY OF THE VALVE.

1. **AT ALL TIMES DURING THIS ENTIRE PROCEDURE. KEEP HANDS OUT OF THE VALVE. A REMOTELY ACTUATED VALVE COULD CLOSE AT ANY TIME AND RESULT IN SERIOUS INJURY.**
2. **KNOW WHAT MEDIA IS IN THE LINE. IF THERE IS ANY DOUBT, CHECK WITH THE PROPER AUTHORITY.**
3. **WEAR ANY PROTECTIVE CLOTHING OR EQUIPMENT NORMALLY REQUIRED WHEN WORKING WITH THE MEDIA INVOLVED.**
4. **DEPRESSURIZE THE LINE AND VALVE AS FOLLOWS:**
   - **A. OPEN THE VALVE AND DRAIN THE LINE.**
   - **B. CLOSE AND OPEN THE VALVE TO RELIEVE ANY RESIDUAL PRESSURE THAT MAY BE IN THE VALVE PRIOR TO REMOVING THE VALVE FROM SERVICE. LEAVE THE VALVE IN THE OPEN POSITION.**
   - **C. AFTER REMOVAL AND PRIOR TO ANY DISASSEMBLY, DRAIN ANY REMAINING MEDIA BY PLACING THE VALVE IN THE VERTICAL POSITION AND CAREFULLY OPENING AND CLOSING THE VALVE SEVERAL TIMES.**
5. **SEAT AND BODY RATINGS – THE PRACTICAL AND SAFE USE OF THIS PRODUCT IS DETERMINED BY BOTH THE SEAT AND BODY RATINGS. READ THE NAME TAG AND CHECK BOTH RATINGS. THIS PRODUCT IS AVAILABLE WITH A VARIETY OF SEAT MATERIALS. SOME OF THE SEAT MATERIALS HAVE PRESSURE RATINGS THAT ARE LESS THAN THE BODY RATINGS. ALL OF THE BODY AND SEAT RATINGS ARE DEPENDENT ON VALVE TYPE AND SIZE, SEAT MATERIAL, BOLTING MATERIAL, AND TEMPERATURE. DO NOT EXCEED THESE RATINGS.**

2 INSTALLATION

2.1 General

1. Proper flow direction is critical for valves with one seat and to valves with Q-trim, please reference flow direction arrow on body for correct flow direction.
2. To ensure that good Installation is achieved, standard piping practices should be followed. Follow the recommended practices of the flange gasket manufacturer when tightening bolts holding the valve in line.
3. Refer to the MAINTENANCE section for packing / v-ring set adjustment.

If there is weepage past the packing set upon installation, it means the valve may have been subject to wide temperature variations in shipment. Leak-tight performance will be restored by a simple packing adjustment described in the MAINTENANCE section.

3 MAINTENANCE

3.1 General

1. Overhaul maintenance consists of replacing all seat(s), seals, discs, springs, and bearing liners. A standard service kit consisting of these parts may be obtained through your Metso Automation Representative. Refer to the Disassembly and Assembly sections for details on installing the service kits.
2. Good operating procedures requires periodic observation to ensure that the valve is functioning well. The frequency of observation will depend on the application. Routine maintenance consists of periodically tightening the packing nuts (18) to compensate for disk spring deflection and stem seal wear. Check the disc spring height dimension in Figure 3, p. 8, before adjusting packing nuts

3.2 Service Kits

General service kits include seals, bearing liners and disc springs. Seat service kits include seat, spring, o-ring(s) and back-up rings. (See below)

General Service Kits	
Valve Size	**Service Kit**
6″	00 202 1098 00
8″	00 202 1099 00
10″	00 202 1100 00
12″	00 202 1101 00

Seat Service Kits*		
Valve Size	**Seat Type**	**Service Kit**
6″	Soft	00 202 1102 00
8″	Soft	00 202 1103 00
10″	Soft	00 202 1104 00
12″	Soft	00 202 1105 00
6″	Metal	00 202 1106 00
8″	Metal	00 202 1107 00
10″	Metal	00 202 1108 00
12″	Metal	00 202 1109 00

* If double-seated, two (2) are required

3.3 Service Centers

We recommend that valves be sent to our service center for maintenance. Service centers are equipped to provide rapid turn around at reasonable cost and offer a new valve warranty with all reconditioned valves. A list of current Service Centers is provided on the next page.

3.4 Tools

Special tools are not required for the general maintenance of QD IF valves.

3.5 Disassembly

1. When performing work on this valve use normal safety precautions to protect yourself and others against any residual media or trapped pressure in the line.
2. Depressurize and drain the line. Cycle the valve several times before performing work. This will relieve any pressure still inside the valve.

3. If the valve is going to be returned to a Service Center for repairs DO NOT disassemble it
4. If replacing stem packing (69) only, proceed to steps 8 and 9. Actuator removal not required.
5. Turn the valve to the open position. Remove actuator.
6. Disassembly to be undertaken on a clean, level surface. Care must be taken so that flange serrations are not damaged.
7. Remove the valve from the line and stand it on its flange end with the flow arrow pointing down.
8. Remove live-loaded gland packing nuts (18). Remove and discard disc springs (150). Check for and remove any burrs from the key way edges. Remove the gland (9).
9. Remove and discard stern packing (69). If replacing stern packing only stop here and reference ASSEMBLY section for packing installation.
10. Remove the bonnet bushing fasteners (17) and slide the bonnet bushing off of the stem.
11. Remove the studs (11 and 12) and nuts (15) that fasten the body halves together. Lift the upper body half off and place it on its center flange. Care must be taken so that flange serrations are not damaged.
12. Lift the ball/stern (3) from the body and place it onto a clean soft surface. Extra care must be taken not to damage the ball surface.
13. Remove and discard stem retainer gaskets (66) and body-gasket(s) (65). Care must be taken when removing not to round over any edges at the body/bonnet bushing joint.
14. Remove stem bearings (4) from ball/stem.
15. Remove and discard bearing liners (60).
16. Remove and discard thrust bearing (89) from ball/stem. If not replacing seats proceed to step 21.
17. To remove seat (7) from body half, using a soft metal driver, hammer the end of the seat lightly through the flow opening (away from the end flange).

Service Center Locations in North America For Jamesbury and Neles Products

Georgia

Atlanta Service Center
320 Thornton Rd., Suite 102
Lithia Springs, GA 30122
Phone: 1-800-825-8376
1-770-939-1100
Fax: 1-770-739-2747
Emergency: 1-800-261-5201
(Jack Piper - Service Center Mgr.)
E-Mail: jack.piper@metso.com

Massachusetts

Northeast Service Center
Southwest Industrial Park
58 Polito Drive
Shrewsbury, MA 01545
Phone: 1-800-255-2669
Fax: 1-508-799-6497
Emergency Pager: 1-888-631-0637
(Tom Hughes - Service Center Mgr.)
E-Mail: tom.hughes@metso.com

Texas

Houston Service Center
15603 West Hardy Street
Suite 355
Houston, TX 77060
Phone: 1-281-445-9989
Fax: 1-281-445-9689
(Brenda Bragg - Service Center Mgr.)
E-Mail: brenda.bragg@metso.com

Washington

Northwest Service Center
12906 N.E. 95th Street
Vancouver, WA 998682
Phone: 1-800-535-3745
1-360-254-6980
Fax: 1-360-254-6955
Emergency: 1-360-921-4737
(John Payne - Service Center Mgr.)
E-Mail: john.payne@metso.com

Edmonton, Alberta

Edmonton Service Centre
4611-101 Street
Edmonton, Alberta T6E 5C6
Phone: 1-403-434-7744
Fax: 1-403-434-7867
Emergency pgr.:1-800-297-2444 (Canada only)
(Alex Haikalis - Service Centre Mgr.)
E-Mail: alex.Haikalis@metso.com

Vancouver, BC

Vancouver Service Centre
102/103 19045 Building B
94th Ave.
Surrey, British Columbia V4N 3S4
Phone: 1-604-882-9001
Fax: 1-604-882-8055
Emergency: 1-800-297-2444 (Canada only)
(Kevin Browne - Service Centre Mgr.)
E-Mail: kevin.browne@metso.com

Montreal, Quebec

Montreal Service Centre
32 AB Hymus Blvd.
Pointe Claire, Quebec H9R 1C9
Phone: 1-514-630-6998
Fax: 1-514-630-5598
Emergency: 1-800-297-2444 (Canada only)
(Michel Chenier - Service Centre Mgr.
E-Mail: michel.Chenier@metso.com

Oakville, Ontario

Oakville Service Centre
17-1155 North Service Road W.
Oakville, Ontario L6M 3E3
Phone: 1-905-847-6176
Fax: 1-905-847-7492
Emergency: 1-800-297-2444 (Canada only)
(Mark Hawkins - Service Centre Mgr.)
E-Mail: mark.Hawkins@metso.com

18. Remove and discard seat spring (62).
19. Remove and discard O-rings (63). and back-up rings (64).
20. If double seated valve repeat steps 17-19 for removal of second seat from other body half.
21. After cleaning and inspection keep all parts well protected. Pay particular attention to the ball, seats, and body joint surfaces.
22. If any damage is found so severe that the valve cannot be repaired by replacing the spare parts, reassemble valve and return to authorized Service Center.

3.6 Assembly

1. Place body halves with body joints facing upwards on a clean, level surface. The halves come in matched sets, and are identified as such.
2. Assemble parts in the following order. (a) seat(s), (b) ball with bearings, (c) body joint between body halves and bonnet, (d) bonnet bushing with gland and live-loading.
3. When replacing metal seat (s) lap the seat (s) to the ball as follows:

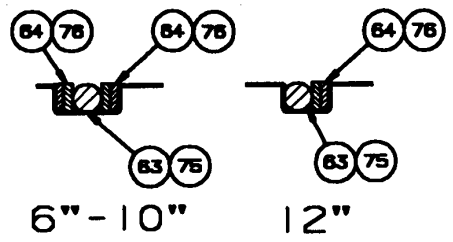
USE EXTREME CARE WHEN LAPPING SEATS TO BALL, AS EXCESSIVE PRESSURE AGAINST THE SEATS WILL CAUSE UNEVEN LAPPING OF SEATS, LAPPING FOR TOO LONG WILL DO DAMAGE TO HARD SURFACING OF THE BALL

3A. Use a 600 grit or finer silicon carbide lapping compound. Hold the ball by the shaft with the seat side of the ball up. Coat evenly with a film of the lapping compound and place the seat on the ball. Use both hands to exert an even pressure of the seat on the ball and rub the seat back and forth from the full closed position on the ball to the hill open position of the ball. Repeat this wiping action occasionally turning the seat 1/8 to 1/4 revolution, always maintaining a constant pressure. Lap in this method only long enough to indicate a good ball/seat fit. IF THE VALVE IS DOUBLE-SEATED MAKE SURE THE SEAT IS MATED TO THE BALL SIDE IT WAS LAPPED TO.

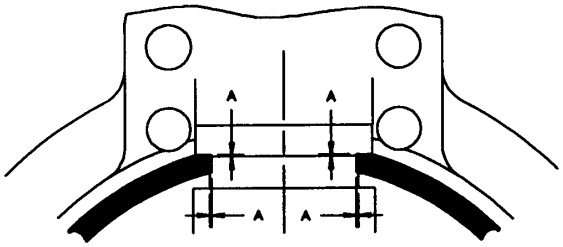
3B. If the valve is double-seated, rotate the ball 180° and repeat procedure for new seat.

4. Lubricate the O-ring (s) with a media compatible lubricant. Do not over lubricate.

S. On 6" - 10" valves place the back-up rings (64 and 76), one on each side of the O-ring into their corresponding grooves. On 12" valves place one pair of back-up rings only (these will be in front of the O-ring) closer to the ball. Push rings fully into the grooves. Each back-up ring (64 or 76) is a single continuous piece. The length will allow it to wrap twice in the groove, but not overlap a third time at the ends.



6. Place the seat spring (62) against the shoulder on the back side of the seat (7). Apply a slight longitudinal tension to overlap and interlock the spring ends. Be careful not to twist the seat spring around its longitudinal axis.
7. Metal seats require alignment between seat and body. Press the pin (78) into the seat. Rotate seat so that seat pin (78) aligns with the hole in the body. Soft seats do not require alignment.
8. Start the seat into its position by hand. If necessary, use a plastic or rubber hammer to assist. Tap equally around seat circumference to avoid cocking the seat In the seat cavity. Be sure that alignment pin (78) is aligned with locating hole in the body. It is not necessary to push seat fully into position. When the halves are bolted together later, seats will move into position.
9. When installing seats, use extra care not to damage the seat sealing areas. These include the main seating surface, O-rings, and backup rings. Lightly lubricate the seat.
10. For double-seated valves only, repeat steps above to install second seat in the other body half.
11. Insert the bearing liners (60) into the bearing shells (4) so that the PTFE surface will be in contact with the shaft. The bearing liner lip is pushed completely into the bearing shell aiding in alignment and orientation.
12. Slide the two thrust bearings (89) into their bearing shells (4), with the PTFE surfaces facing out.
13. Slide the assembled bearings onto each end of the ball. PTFE surfaces face towards the ball.
14. Place the body gasket (65) into the groove of the female body half (1), using a media compatible lubricant to hold the gasket in place, and cut the ends at the neck approximately 0.010" into the shaft bore area (each side) as shown below. Refer to the center body joint to identify the female/male body halves. "Female" is grooved half.



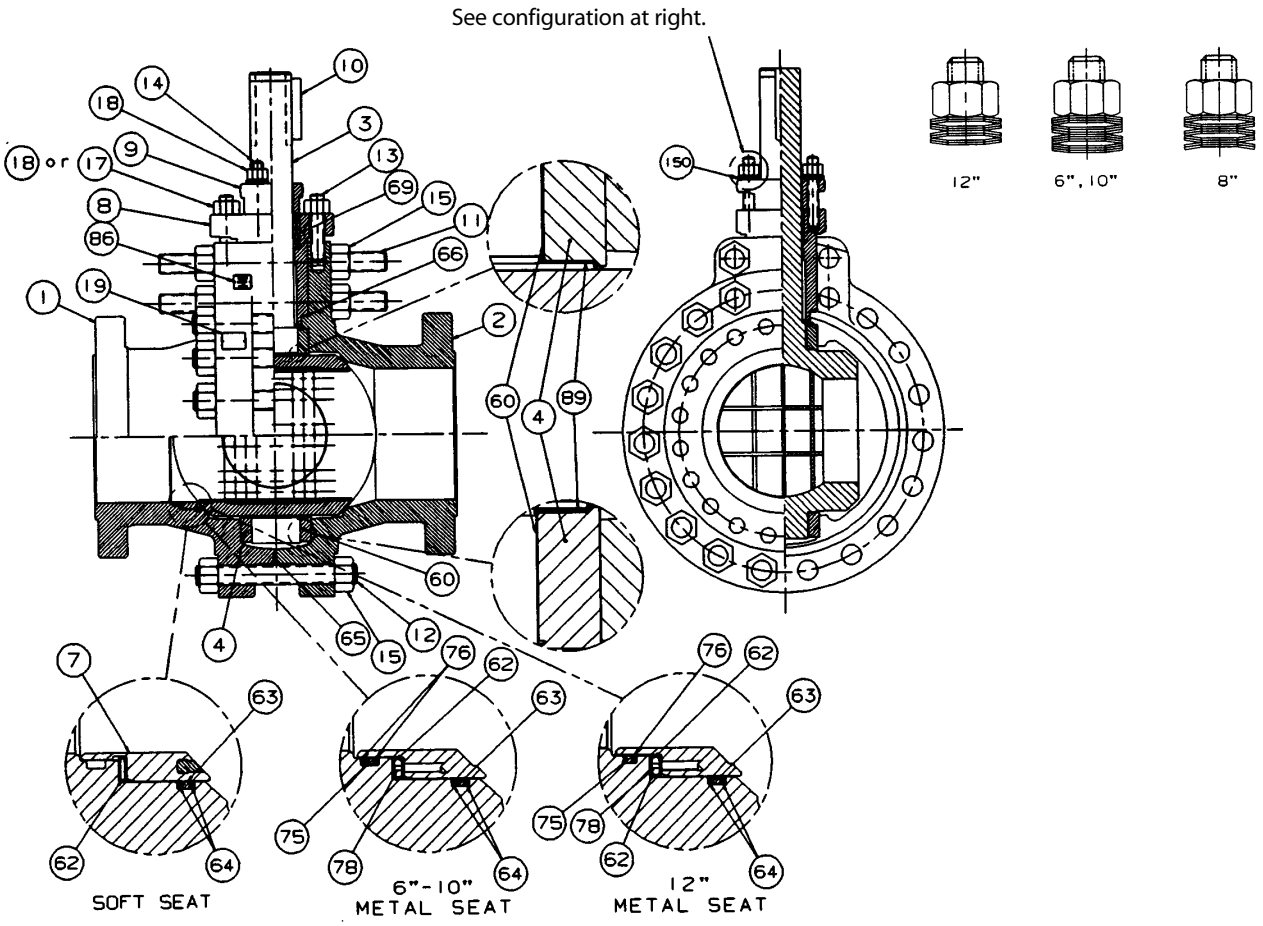
A = Approximately 0.010 inch (0.25 mm)

I S. Replace ball sub-assembly (3) into the female body half (1). The bearings will centralize the ball. The ball should be placed corresponding to the "closed" position.

16. For valves that include the Q-Trim™ (Quiet Trim) design, proper flow direction is critical to the noise performance. It is possible to incorrectly install the ball 180° out of phase. To prevent this, please refer to the flow direction arrow on top of the stem and body for correct flow direction. The ball arrow indicates flow direction when the ball is open. Note that the ball rotates 90° clockwise from fully open to closed. This is an "upstream seating" valve. For all seat configurations, the female body is the normal inlet side and the body flow arrow should be attached and oriented to indicate this.

(Text continues on page 8.)

4. EXPLODED VIEWS AND PARTS LIST



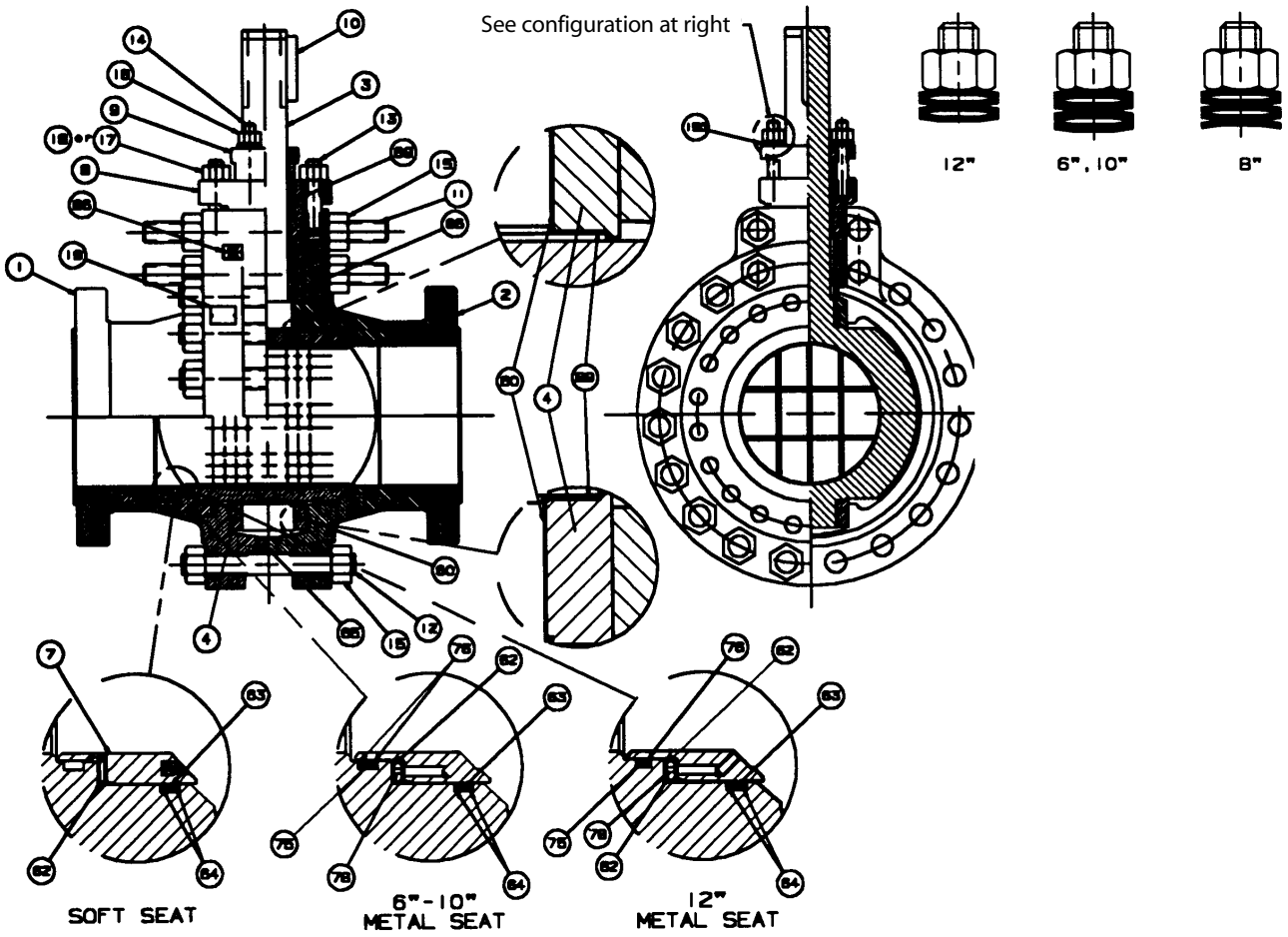
PARTS		
Item	Part Name	Qty.
1	Female Body Half	1
2	Male Body Half	1
3	Ball S/A	1
4	Stem Bearing	2
7	Seat S/A	1
8	Bonnet Bushing	1
9	Gland	1
10	Key	1
11	Bonnet Stud	4
12	Body Stud	*
13	Bonnet Bushing Stud	4
14	Gland Stud	*
15	Body/Bonnet Hex Nut	*
17	Bonnet Bushing Hex Nut	*
18	Gland Hex Nut	*
19	Name Plate	1
60	Bearing Liner	2
62	Spring	1
63	O-Ring	1
64	Back-Up Ring	2
65	Body Joint Gasket	*
66	Bonnet Bushing Gasket	2
69	Stem Packing	*
75	O-Ring	1
76	Back-Up Ring	*a
78	Spring Pin	1a
86	Flow Arrow	1
89	Thrust Bearings	2
150	Disc Springs	*

a = Metal Seat Only
* = Qty. Varies; see adjacent table.

Item	Valve Size	Qty.
12	6", 8", 12"	16
12	10"	22
14	6", 8", 10"	2
14	12"	4
15	6", 8", 12"	40
15	10"	52
17	6", 8", 10"	6
17	12"	4
18	6", 8", 10"	0
18	12"	4
65	6"	1
65	8", 10", 12"	2
69	6"	4
69	8", 10", 12"	5
76	6", 8", 10"	2
76	12"	1
150	6", 10"	24
150	8"	20
150	12"	32

Figure 1 Single-Seated Valves

5. EXPLODED VIEWS AND PARTS LIST (Continued)



PARTS

Item	Part Name	Qty.
1	Female Body Half	1
2	Male Body Half	1
3	Ball S/A	1
4	Stem Bearing	2
7	Seat S/A	2
8	Bonnet Bushing	1
9	Gland	1
10	Key	1
11	Bonnet Stud	4
12	Body Stud	*
13	Bonnet Bushing Stud	4
14	Gland Stud	*
15	Body/Bonnet Hex Nut	*
17	Bonnet Bushing Hex Nut	*
18	Gland Hex Nut	*
19	Name Plate	1
60	Bearing Liner	2
62	Spring	2
63	O-Ring	2
64	Back-Up Ring	4
65	Body Joint Gasket	*
66	Bonnet Bushing Gasket	2
69	Stem Packing	*
75	O-Ring	2
76	Back-Up Ring	*a
78	Spring Pin	2a
86	Flow Arrow	1
89	Thrust Bearings	2
150	Disc Springs	*

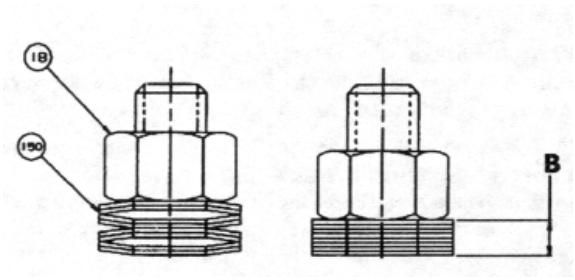
a = Metal Seat Only
* = Qty. Varies; see adjacent table.

Item	Valve Size	Qty.
12	6", 8", 12"	16
12	10"	22
14	6", 8", 10"	2
14	12"	4
15	6", 8", 12"	40
15	10"	52
17	6", 8", 10"	6
17	12"	4
18	6", 8", 10"	0
18	12"	4
65	6"	1
65	8", 10", 12"	2
69	6"	4
69	8", 10", 12"	5
76	6", 8", 10"	4
76	12"	2
150	6", 10"	24
150	8"	20
150	12"	32

Figure 2 Double-Seated Valves

17. Lift male body half (2) onto female body half (1). If double seated, care must be taken to insure that seat does not fall out when inverting this body half to mate with female half
18. Check that the bonnet bushing gasket surfaces of each body half are approximately aligned (parallel).
19. Using Never-Seez® or equivalent, lubricate the flange (12), neck (11), bonnet bushing (13), studs and nuts (15 and 17), gland (9), and studs and nuts (14 and 18).
20. Push the bonnet bushing (without packing) onto the stem.
21. Hand tighten bonnet bushing nuts to aid in final alignment of the sealing surfaces and/or the body halves and bonnet bushing. Then tighten to approximately 75% of the required torque per Table 1.
22. Install the body joint flange (12) and neck (11) studs and nuts (15). Hand tighten bolting, centralizing stud protrusion beyond nuts. Then tighten to 10% of final torque per Table I using tightening sequence per Figure 4.
23. Then tighten flange and neck bolting to final torque per Table I using tightening sequence per Figure 4.
24. Remove the bonnet bushing nuts (17). Remove the bonnet bushing.
25. Install bonnet bushing gasket (s) (66) onto the bonnet bushing shoulder, and push the bonnet bushing onto the stem.
26. Install and tighten the bonnet bushing nuts (17) per Figure 4 and Table 1 below.
27. Install the stem packing (69) rings over shaft into bonnet bushing. If rings are split. trim edges at 45° and stagger the splits.
28. Install gland (9) over shaft and onto stem packing.
29. Install disc springs (150). Refer to Figure 1 (single-seated valves), or Figure 2 (double-seated valves).
30. Install and tighten live-loading nuts (18). Refer to Figures 3 or 1 and 2. If valve is 6" –10" gland has two studs, if valve is 12", gland has four studs and tightening sequence is the same as shown for the bonnet bushing In Figure 4.
31. If possible, valve should be flanged, pressurized and checked for leaks before being reinstalled in pipeline.

5 BOLTING SEQUENCE FOR BODY AND BONNET BUSHING (See Figure 4)



Disc Spring Height	
Valve Size	"B" (Inch)
6"	1.25
8"	1.25
10"	1.50
12"	1.00

NOTE: Disc springs shown as examples only. See Figures 1 and 2 for specific configurations.

Figure 3 Disc Springs

Table I

Recommended Bolting Torques

For Lubricated Body and Bonnet Studs and Nuts

Fastener Size	Fastener Material	I.D. Mark	Torque LB. - FT.
3/4 - 10 UNC	A193 GR. B7	B7	270
7/8 - 9 UNC	A193 GR. B7	B7	410
1 - 8 UN	A193 GR. B7	B7	600
1-1/4 - 8UN	A193 GR. B7	B7	1260
1-3/4 - 8UN	A193 GR. B7	B7	3310

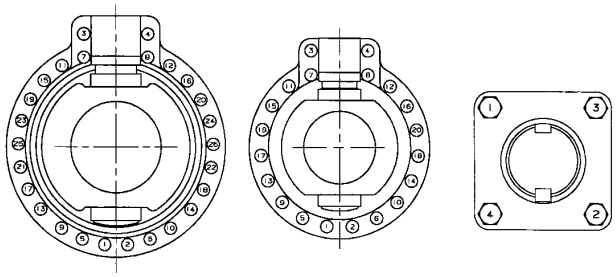


Figure 4 Bolting Sequence

Subject to change without notice.

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