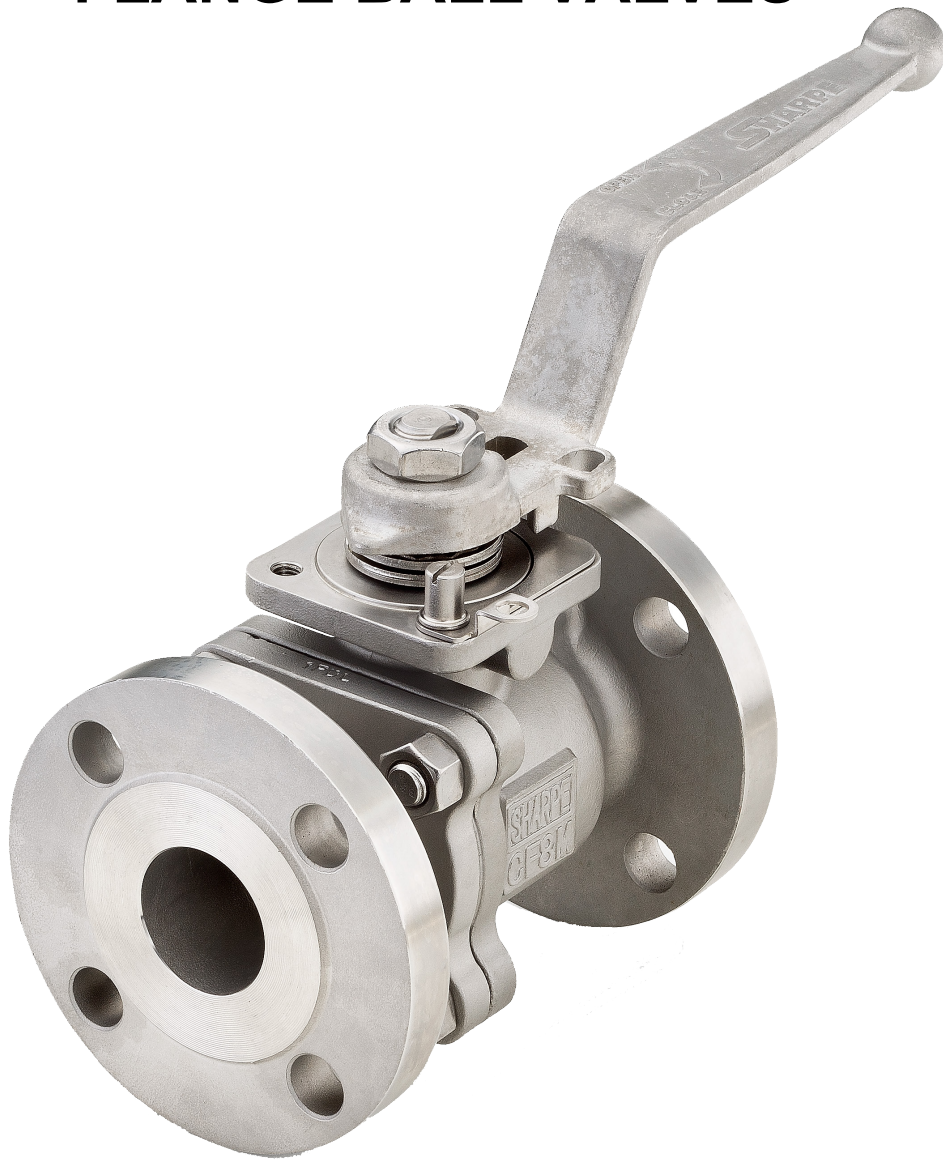


INSTALLATION, OPERATION AND MAINTENANCE MANUAL FOR SHARPE® 70 SERIES FLANGE BALL VALVES



Installation, Operation, and Maintenance Manual

Series 70 / FS70 Flanged Ball Valves Sizes ½" – 4", Classes 150, 300

GENERAL

The following instructions only refer to Sharpe® standard valves as described in the current catalog. Keep protective cover in place until moment of installation. Valve performance depends upon prevention of damage to ball surface. Upon removal of cover, make sure that the valve is completely open and free of obstruction.

When shipped, valves contain a silicon based lubricant which aids the assembly of the valve; this may be removed with a solvent if found objectionable, alternatively, valves can be ordered pre of lubricants.

Certain ferrous valves are phosphate and oil dipped during the course of manufacture, but the processes used are completely non-toxic and the valves are quite safe to use for edible or potable products.

Safety Precautions

Before removing valve from pipeline: media flowing through a valve may be corrosive, toxic, flammable, or of a contaminant nature. Where there is evidence of harmful fluids having flowed through the valve, the utmost care must be taken. It is suggested that the following safety precautions should be taken when handling valves:

- Always wear eye shields
- Always wear gloves and overalls
- Wear protective footwear
- Wear protective headgear
- Ensure that running water is easily available
- Have suitable fire extinguisher ready if media is flammable

By checking line gauges, ensure that no pressure exists on either the upstream or the downstream sides of the valve.

Ensure that any media is released by operating valve slowly to half-open position.

Ideally, the valve should be decontaminated when the ball is in the half-open position. Leave valve in fully open position.

These valves, when installed, have body connectors which form an integral part of the pipeline, and the valve cannot be removed from the pipeline without being dismantled.

OPERATION

Sharpe® valves provide tight shut off when used under normal conditions and in accordance with Sharpe® valves published pressure/temperature chart.

If these valves are used in a partially open (throttled) position, seat life may be reduced.

Any media which might solidify, crystallize or polymerize should not be allowed to stand in the ball valve cavities unless regular maintenance is provided. If minimal maintenance is performed, Sharpe® valves offer Cavity Filled and/or steam jacketed ball valves.

Manual Operation

The type of wrench which is fitted to valve sizes ¼" to 2" is a cast handle with integral stop. Sharpe® valves have ¼ turn operation closing in a counter-clockwise direction.

It is possible to see when the valve is open or closed by the position of the wrench handle:

- When the wrench is perpendicular to the pipeline the valve is closed.
- When the wrench is parallel to the pipeline the valve is open.

The type of wrench which is fitted to valve sizes 2½" to 4" is a cast wrench block with a handle pipe and a stop plate.

Remote operation

Where manual operation is not required, valves may be automated for remote operation, instrument control, etc. A range of Sharpe® valves pneumatic and electric actuators are available. Operation will be in accordance with Sharpe® valves installation, operation and maintenance instructions for relevant actuator.

Valves with Actuators should be checked for alignment of the actuator to the valve. Angular or parallel misalignment may result in high operational torque and potential damage to the stem seals or stem.

MAINTENANCE

Sharpe® ball valves have been designed and engineered to provide long lasting and trouble-free service when used in accordance with the instructions and specifications herein.

Before installing the valves, the pipes must be flushed clean of dirt, burrs and welding residues, or you will damage the seats and ball surface.

The valves are split body, two piece construction full port ball valve. Design allows maintenance without the need for special tools.

These valves may be installed in any position using good pipe fitting practices. Flanges conform to ASME Standard B16.5, Class 150, 300, or 600.

General

With self-wipe ball/seats and pressure equalizing slots, Sharpe® valves have a long, trouble-free life, and maintenance is seldom required. When necessary, valves may be refurbished, using a small number of components, none of which require machining. Sharpe® valves are designed for easy service and assembly in the field.

The following checks should, however, help to extend valve life or reduce plant problems.

Stem leakage in valves

Examine the disk springs for damage. If in good condition, tighten the packing nut until disk springs are firmly compressed, then back nut off 1/16" of a turn. If damaged, dismantle the stem down to the gland, fit new disk springs with their outer edges touching. Further maintenance necessitates dismantling of the valve.

Leakage at body joint

Check for tightness in the body connector bolts. If loose, tighten body bolts. Standard wrenches should only be used. Excessive force will only stretch or strip the bolts.

If there is still leakage, this will be due to damage to body seal, and it will be necessary to dismantle the valve.

In-Line Leakage

Check that the valve is fully closed. If it is, leakage will be due to damaged seat or ball sealing surfaces, and it will be necessary to dismantle the valve.

Note: stem leakage and leakage at body joint, if not cured by simple means described above, necessitate dismantling valve. If there is not stem leakage, the stem assembly should not be touched.

Leakage at Pipeline Joint

Screwed valves: test for tightness of screwed thread. If loose, tighten with Standard wrench - excessive force will only split the connector. Normal Jointing material should be used in the correct quantity.

REFURBISHING (Valve sizes 1/2" to 2")

Note: there are many valve builds and each has its own parts and order of assembly. Here we only give the standard valve assembly instructions. For more details contact Sharpe.

Before disassembly of valves from the pipeline follow these instructions:

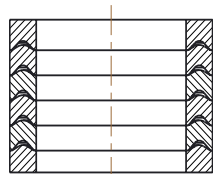
1. Cycle the valve with the line pressure fully relieved before attempting to remove the valve from the pipeline to insure pressure has also been discharged from the valve cavity.
2. Remove flange bolts and nuts and lift valve from line. Care should be taken to avoid scratching or damaging flange facings.
3. Remove body end nuts [23], using proper wrench size. Lift off end cap [2]. One seat [4] should come out with body end.
4. Remove and discard the seat and body seal [5]. Be careful not to damage the sealing surfaces of the end cap.
5. To take out the ball [3], rotate stem [6] so ball is in fully closed position. Carefully lift ball off stem tang and from body with a "rolling" motion. With large valves it is recommended using a strap and lifting device to remove the ball.
Note: Extreme caution should be taken to avoid damage to the ball.
6. To dismantle the stem assembly, first remove the handle nut [19] and handle [18] from stem. Using wrench to prevent the stem from turning, remove the lock tab [17], packing nut [16], disk springs [15] and gland [14]. It is normally not possible to remove stem packing at this stage.
7. Withdraw the stem [6] through the body cavity and remove the thrust bearings [7, 8] from the stem. Stem packing [9, 10, 11] may now be removed from the top of the stem bore.
8. Take out other seat [4].
9. Clean all components thoroughly and examine all seating/sealing surfaces in the body and end cap.
10. If there is build-up of solids which cleaning fluids will not remove, use a board, flat or blunt tool (do not scratch the machined surfaces).
11. No eroded or corroded leak paths are permissible. If any are found, the part must be replaced. The ball must have no scratches across its seating surfaces and any damage to the port lip will destroy the new seats – a damaged ball must not be reused, install a new ball.

Rebuilding

Before rebuilding, check that all the correct components are available and that they are fit for re-assembling. When rebuilding, cleanliness is essential to allow long valve life and provide cost-effective maintenance.

1. Install one seat [4] in the body [1] cavity with the spherical curvature facing the ball.
2. Lubricate the new stem thrust bearings [7,8] and stem packing [9, 10, 11], with appropriate lubricant.
3. Fit the stem thrust bearing to the stem, with the PEEK [7] first and then the Nova [8].
4. Insert the stem and thrust bearings through body cavity into stem hole and push it up into body recess. Fit together the bottom [9], middle [10] and top [11] stem packing to make it easier to assemble.

Note: the stem packings have different shapes and must be fitted together as shown. There will always be a bottom and top stem packing and depending on the stem build there can be a number of middle stem packings.



- the bottom is flat on the bottom and triangular on the top.



- the middle is triangular on bottom and top.



- the top is triangular on the bottom and flat on the top.



5. For Vacuum service it is recommended to insert the stem packing upside down.
6. Fit gland [14] and disk springs [15]. Put the first spring concave side down and the second spring concave side up. Repeat that with the other two springs.
7. Using a wrench to prevent the stem from turning, fit the packing nut [16] and tighten to the torque figures in **table 1**.
8. Place the lock tab [17] on the packing nut [16] and adjust the orientation of the nut (loosen the nut if you needed).
9. Operate the stem several times and readjust. Overnighting will only reduce the life of the stem assembly.
10. Fit the handle [18] to stem and the handle nut [19] to the handle.
11. Rotate the stem to the closed position - handle is perpendicular to the pipeline.
12. With the stem still in the closed position, the ball [3] may be inserted into the body [1] cavity by sliding the ball slot over the stem tang. Once the ball is seated inside the body roll it so the center of its slot is aligned with the stem.
13. Rotate the ball with the handle to the open position.
Note: for ease of assembly the ball should be in the open position when fitting the end cap. Also, with the valve in the open position, the ball is retained by the stem tang and cannot fall out of the body cavity.
14. Fit the body seal [5] in its groove.
15. Fit the remaining seat [4] to the end cap [2].
Note: a trace of silicon based lubricant or clean grease (such as petroleum Jelly), if compatible with the future pipeline media, will ease the rebuilding by holding the seat rings and body connector seals in place. Use no grease with abrasive additives.
16. Put the end cap into the body holding the seat in its place and align the flange bolt holes to straddle the valve centerlines.
Note: Be careful not to damage body seal when putting the end cap into the body.
17. Install body nuts and tighten in a "Star" pattern to the torque specified in **Table 2**.

Take care to make sure that complete engagement of studs with body flange is maintained. There should be at least one stud thread exposed on each side.

18. Cycle the valve open and closed several times slowly to ensure that the operation is smooth and free of binding or sticking.

REFURBISHING (Valve sizes 2½" to 4")

Following are the instructions for refurbishing and rebuilding the stem assemblies of sizes 2½" to 4".

1. To dismantle the stem assembly, first remove the wrench bolt [23], the wrench block [21] and handle pipe [22] from stem.
2. Remove the lock [20].
3. To remove the lock tab use a flat screw driver and bend the flats open to enable opening the packing nut [19].
4. Using wrench to prevent the stem from turning, remove the packing nut [19], lock tab [18], disk springs [17], stop plate [16] and gland [15]. It is normally not possible to remove stem packing at this stage.
5. Withdraw the stem [7] through the body cavity and remove the thrust bearings [8, 9] from the stem. Stem packing [10, 11, 12] may now be removed from the top of the stem bore.

Rebuilding (Valve sizes 2½" to 4")

1. Fit the stem thrust bearing to the stem, with the PEEK [8] first and then the Nova [9].
2. Insert the stem and thrust bearings through body cavity into stem hole and push it up into body recess. Fit together the bottom [10], middle [11] and top [12] stem packing to make it easier to assemble.

Note: the stem packings have different shapes and must be fitted together as shown. There will always be a bottom and top stem packing and depending on the stem build there can be a number of middle stem packings.

For Vacuum service it is recommended to insert the stem packing upside down.

3. Fit gland [15], stop plate [16] disk springs [7] and lock tab [18].
4. Using a wrench to prevent the stem from turning, fit the packing nut [19] and tighten to the torque figures in **table 1**.
5. Bend the lock tab [17] flats on the packing nut [16] sides using a hammer and mallet. Adjust the orientation of the nut if needed.
6. Fit the wrench block [21] to stem and insert the handle pipe [22] to the wrench block.
7. Fit the wrench bolt [23] to the wrench block and tighten to the stem.
8. Operate the stem several times and readjust.

Maintenance kits

Maintenance kits are available from Sharpe® valves. These kits consist of the following parts:

1. 2 seat rings, 1 body seal.
2. 2 stem thrust seals (1 PEEK, 1 Nova), 1 gland, 4 Belleville washers.

Depending on the valve stem build these kits also consist of the following items.

Standard PTFE stem packing:

1. For sizes ¼"-1¼": 1 bottom, 4 middle, 1 top.
2. For sizes 1½"-2": 1 bottom, 5 middle, 1 top.
3. For sizes 2½"-4": 1 bottom, 6 middle, 1 top.

Standard Graphite stem packing:

- For sizes ¼"-2": 2 graphite packing.
- For sizes 2½"-4": 5 graphite packing.

Note: Other stem packing options are available including fire safe, high temperature, fugitive emission, vacuum, high cycle and more.

When ordering maintenance kits, please be sure to specify type and size of valve and seating material required.

Where a valve needs repairing, rather than maintaining, it must be noted that only Sharpe® valves authorized spare parts should be used, and these include basic components such as bolts, screws and nuts, etc. In addition to maintenance kits, spare parts available from Sharpe® valves are balls, stems, glands. If additional parts are required, it is normally recommended that the complete valve be replaced.

Parts from different valve series should not be interchanged.

Tightening Torque Tables

**Table 1
STEM NUT TIGHTENING TORQUE**

VALVE SIZE	THREAD	TORQUE (NM)	TORQUE (LBS.IN)
¼" - ¾"	M10	9	80
1" - 1¼"	M12	13	115
1½" - 2"	M18	30	265
2½"	1" - 14	60	530
3" - 4"	1½" - 12	80	700

**Table 2
BODY BOLTS TIGHTENING TORQUE (Grade 1)**

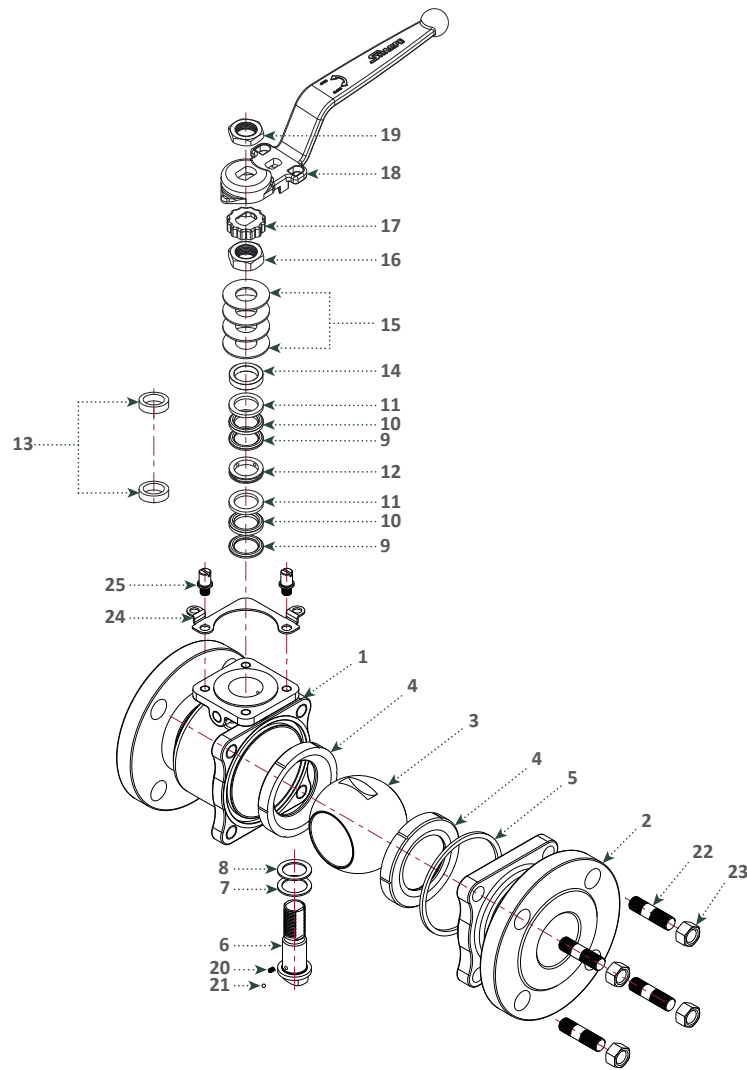
CLASS 150

VALVE SIZE	THREAD	TORQUE (NM)	TORQUE (LBS.IN)
½"	5/16"-18	7	65
¾"	5/16"-18	7	65
1"	3/8"-16	14	125
1½"	1/2"-13	28	250
2"	1/2"-13	28	250
2½"	1/2"-13	28	250
3"	1/2"-13	28	250
4"	1/2"-13	28	250

CLASS 300

VALVE SIZE	THREAD	TORQUE (NM)	TORQUE (LBS.IN)
½"	5/16"-18	7	65
¾"	5/16"-18	7	65
1"	3/8"-16	14	125
1½"	1/2"-13	28	250
2"	5/8"-11	55	355
2½"	5/8"-11	55	355
3"	5/8"-11	55	355
4"	5/8"-11	55	355

Parts & Materials



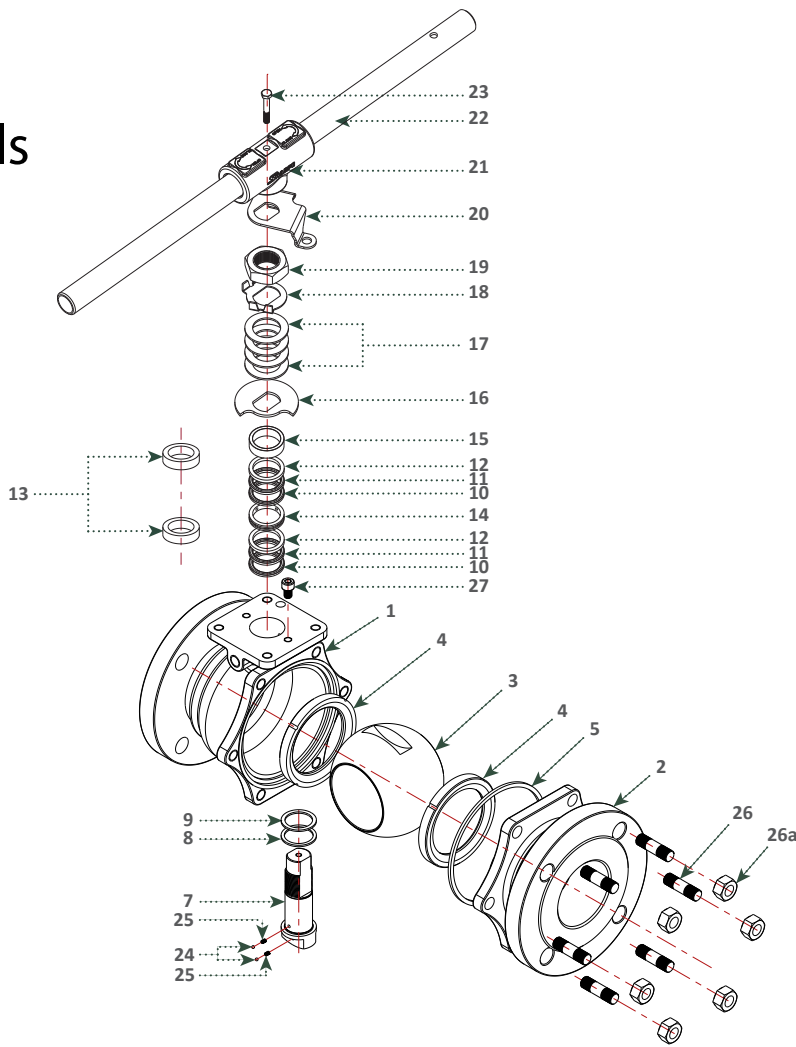
Sizes 1/2" - 2"

ITEM	DESCRIPTION	MATERIAL	QTY	
1	Body	Stainless Steel	ASTM A351 CF8M	1
		Carbon Steel	ASTM A216 WCB	
		SMO	ASTM A351 CK3MCuN	
		Alloy 20	ASTM A351 CN7M	
		Hastelloy C	ASTM A494 TYPE CW-12MW	
		Monel	ASTM A494 GR M35-1	
2	End Cap	Stainless Steel	ASTM A351 CF8M/CF3M	2
		Carbon Steel	ASTM A216 WCB	
		SMO	ASTM A351 CK3MCuN	
		Alloy 20	ASTM A351 CN7M	
		Hastelloy C	ASTM A494 TYPE CW-12MW	
		Monel	ASTM A494 GR M35-1	
3	Ball	316 Stainless Steel	SMO 254	1
		Alloy 20	17-4PH	
		Hastelloy C	Monel	
4*	Seat	PTFE, RTFE, TFM®, Nova, PEEK, DELRIN®, UHMWPE	2	
5*	Body Seal	PTFE, RTFE, Graphite, Viton®	1	
6	Stem	316 Stainless Steel	SMO 254	1
		Alloy 20	17-4PH	
		Hastelloy C	Monel	
			Inconel	

ITEM	DESCRIPTION	MATERIAL	QTY
7*	Thrust Bearing - Bottom	PEEK, UHMWPE, NYLATRON	1
8*	Thrust Bearing - Top	Nova, PEEK, UHMWPE, NYLATRON	1
9*	Stem Packing - Bottom	PTFE, TFM®, Nova	2
10**	Stem Packing - Middle	PTFE, TFM®, Nova	2
11*	Stem Packing - Top	PTFE, TFM®, Nova	2
12	Lantern Ring	Stainless Steel	1
13*	Stem Packing	Graphite (Fire safe or high temperature)	2
14	Gland	Stainless Steel	1
15	Belleville Spring	S.ST 17-7	4
16	Packing Nut	Stainless Steel	1
17	Lock Tab	Stainless Steel	1
18	Handle	ASTM A351 CF8 / CS	1
19	Handle Nut	Stainless Steel	1
20	Anti - Static Ball	Stainless Steel	1
21	Anti - Static Spring	Hard Drawn	1
22	Body Bolt	A193 Gr. B8A	4
23	Body Nut	A194 Gr. B8	4
24	Lock Plate	Stainless Steel	1
25	Stop Pin	Stainless Steel	2

The quantities listed in the stem arrangement are for fugitive emission assemblies. Standard stem assemblies carry more seals and no lantern rings.
 * these parts are used in repair kits. ** middle stem packing is only used from size 1-1/2" and above.

Parts & Materials



Sizes 2½" - 4"

ITEM	DESCRIPTION	MATERIAL	QTY
1	Body	Stainless Steel ASTM A351 CF8M	1
		Carbon Steel ASTM A216 WCB	
		SMO ASTM A351 CK3MCuN	
		Alloy 20 ASTM A351 CN7M	
		Hastelloy C ASTM A494 TYPE CW-12MW	
		Monel ASTM A494 GR M35-1	
2	End Cap	Stainless Steel ASTM A351 CF8M/CF3M	1
		Carbon Steel ASTM A216 WCB	
		SMO ASTM A351 CK3MCuN	
		Alloy 20 ASTM A351 CN7M	
		Hastelloy C ASTM A494 TYPE CW-12MW	
		Monel ASTM A494 GR M35-1	
3	Ball	316 Stainless Steel SMO 254	1
		Alloy 20 17-4PH	
		Hastelloy C	
		Monel	
4*	Seat	PTFE, RTFE, TFM®, Nova, PEEK, DELRIN®, UHMWPE	2
5*	Body Seal	PTFE, RTFE, Graphite, Viton®	1
7	Stem	316 Stainless Steel SMO 254	1
		Alloy 20 17-4PH	
		Hastelloy C	
		Monel Inconel	

ITEM	DESCRIPTION	MATERIAL	QTY
8*	Thrust Bearing - Bottom	PEEK, UHMWPE, NYLATRON	1
9*	Thrust Bearing - Top	Nova, PEEK, UHMWPE, NYLATRON	1
10*	Stem Packing - Bottom	PTFE, TFM®, Nova	2
11*	Stem Packing - Middle	PTFE, TFM®, Nova	2
12*	Stem Packing - Top	PTFE, TFM®, Nova	2
13*	Stem Packing	Graphite (Fire safe or high temperature)	2
14	Lantern Ring	Stainless Steel	1
15	Gland	Stainless Steel	1
16	Stop Plate	Stainless Steel	1
17	Belleville Washer	S.ST 17-7	4
18	Lock Tab	Stainless Steel	1
19	Packing Nut	Stainless Steel	1
20	Lock	Stainless Steel	1
21	Wrench Block	Stainless Steel ASTM A351 CF8	1
22	Handle Pipe	Stainless Steel	1
23	Wrench Bolt	Stainless Steel	1
24	Anti-Static Ball	Stainless Steel	1
25	Anti-Static Spring	Hard Drawn	1
26	Body Bolt	A193 Gr. B8A	6
26a	Body Nut	A193 Gr. B8	8
27	Stop pin	Stainless Steel	1

The quantities listed in the stem arrangement are for fugitive emission assemblies. Standard stem assemblies carry more seals and no lantern rings.

* these parts are used in repair kits.