

Fisher™ ES and EAS easy-e™ Valves CL125 through CL600

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Figure 1. Fisher ES Valve with 657 Actuator



Introduction

Scope of Manual

This instruction manual includes installation, maintenance, and parts information for NPS 1/2 through 8 Fisher ES valves, and NPS 1 through 6 EAS valves, through CL600 ratings. Refer to separate manuals for instructions covering the actuator and accessories.

Do not install, operate, or maintain an ES valve without being fully trained and qualified in valve, actuator, and accessory installation, operation, and maintenance. To avoid personal injury or property damage, it is important to carefully read, understand, and follow all the contents of this manual, including all safety cautions and warnings. If you have any questions about these instructions, contact your [Emerson sales office](#) before proceeding.

Table 1. Specifications

<p>End Connection Styles</p> <p>Cast Iron Valves <i>Flanged:</i> CL125 flat-face or CL250 raised-face flanges per ASME B16.1</p> <p>Steel and Stainless Steel Valves <i>Flanged:</i> CL150, 300, and 600 raised-face or ring-type joint flanges per ASME B16.5 <i>Screwed or Socket Welding:</i> All available ASME B16.11 schedules that are consistent with CL600 per ASME B16.34 <i>Buttwelding:</i> Consistent with ASME B16.25</p> <p>Maximum Inlet Pressure⁽¹⁾</p> <p>Cast Iron Valves <i>Flanged:</i> Consistent with CL125B or 250B pressure-temperature ratings per ASME B16.1</p> <p>Steel and Stainless Steel Valves <i>Flanged:</i> Consistent with CL150, 300, and 600⁽²⁾ pressure-temperature ratings per ASME B16.34 <i>Screwed or Welding:</i> Consistent with CL600 pressure-temperature ratings per ASME B16.34</p>	<p>Shutoff Classifications</p> <p>See table 2</p> <p>Flow Characteristics</p> <p>Standard Cages: Linear, quick opening, or equal percentage Whisper Trim™ and WhisperFlo™ Cages: Linear</p> <p>Flow Directions</p> <p>Standard Cages: Normally up Whisper Trim and WhisperFlo Cages: Always up</p> <p>Approximate Weights</p> <table border="1"> <thead> <tr> <th rowspan="2">VALVE SIZE, NPS</th> <th colspan="2">WEIGHT</th> </tr> <tr> <th>kg</th> <th>Pounds</th> </tr> </thead> <tbody> <tr> <td>1/2 and 3/4</td> <td>11</td> <td>25</td> </tr> <tr> <td>1 and 1-1/4</td> <td>14</td> <td>30</td> </tr> <tr> <td>1-1/2</td> <td>20</td> <td>45</td> </tr> <tr> <td>2</td> <td>39</td> <td>67</td> </tr> <tr> <td>2-1/2</td> <td>45</td> <td>100</td> </tr> <tr> <td>3</td> <td>54</td> <td>125</td> </tr> <tr> <td>4</td> <td>77</td> <td>170</td> </tr> <tr> <td>6</td> <td>459</td> <td>350</td> </tr> <tr> <td>8</td> <td>408</td> <td>900</td> </tr> </tbody> </table>	VALVE SIZE, NPS	WEIGHT		kg	Pounds	1/2 and 3/4	11	25	1 and 1-1/4	14	30	1-1/2	20	45	2	39	67	2-1/2	45	100	3	54	125	4	77	170	6	459	350	8	408	900
VALVE SIZE, NPS	WEIGHT																																
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1. The pressure/temperature limits in this manual and any applicable standard or code limitation for the valve should not be exceeded.
2. Certain bonnet bolting material selections may require a CL600 easy-e valve assembly to be derated. Contact your [Emerson sales office](#).

Description

These single-port valves have cage guiding, quick-change trim, and unbalanced push-down-to-close valve plug action. Valve configurations are as follows:

ES—Globe style valve (figure 1) with metal-to-metal seating as standard for all general applications over a wide range of pressure drops and temperatures, and metal-to-PTFE seating is optional for more stringent shutoff requirements.

EAS—Angle valve version of ES, used to facilitate piping or in applications where a self draining valve body is required.

Specifications

Typical specifications for these valves are shown in table 1.

Installation

⚠ WARNING

Always wear protective gloves, clothing, and eyewear when performing any installation operations to avoid personal injury.

Personal injury or equipment damage caused by sudden release of pressure may result if the valve assembly is installed where service conditions could exceed the limits given in table 1 or on the appropriate nameplates. To avoid such injury or damage, provide a relief valve for over-pressure protection as required by government or accepted industry codes and good engineering practices.

Check with your process or safety engineer for any additional measures that must be taken to protect against process media.

If installing into an existing application, also refer to the WARNING at the beginning of the Maintenance section in this instruction manual.

Table 2. Available Shutoff Classifications per ANSI/FCI 70-2 and IEC 60534-4

Seating	Shutoff Class
Metal	IV (standard)
	V
PTFE	VI

CAUTION

When ordered, the valve configuration and construction materials were selected to meet particular pressure, temperature, pressure drop, and controlled fluid conditions. Since some body/trim material combinations are limited in their pressure drop and temperature ranges, do not apply any other conditions to the valve without first contacting your [Emerson sales office](#).

Before installing the valve, inspect the valve and pipelines for any damage and any foreign material which may cause product damage.

1. Before installing the valve, inspect the valve and associated equipment for any damage and any foreign material.
2. Make certain the valve body interior is clean, that pipelines are free of foreign material, and that the valve is oriented so that pipeline flow is in the same direction as the arrow on the side of the valve.
3. The control valve assembly may be installed in any orientation unless limited by seismic criteria. However, the normal method is with the actuator vertical above the valve. Other positions may result in uneven valve plug and cage wear, and improper operation. With some valves, the actuator may also need to be supported when it is not vertical. For more information, consult your Emerson sales office.
4. Use accepted piping and welding practices when installing the valve in the line. Internal elastomeric parts may stay in place during the welding procedure. For flanged valves, use a suitable gasket between the valve and pipeline flanges.

CAUTION

Depending on valve body materials used, post weld heat treating may be required. If so, damage to internal elastomeric and plastic parts, as well as internal metal parts is possible. Shrink-fit pieces and threaded connections may also loosen. In general, if post weld heat treating is to be performed, all trim parts should be removed. Contact your Emerson sales office for additional information.

5. With a leak-off bonnet construction, remove the pipe plugs (keys 14 and 16, figure 8) to hook up the leak-off piping. If continuous operation is required during inspection or maintenance, install a three-valve bypass around the control valve assembly.
6. If the actuator and valve are shipped separately, refer to the actuator mounting procedure in the appropriate actuator instruction manual.

⚠ WARNING

Personal injury could result from packing leakage. Valve packing was tightened before shipment; however, the packing might require some readjustment to meet specific service conditions.

Valves with ENVIRO-SEAL live-loaded packing or HIGH-SEAL Heavy-Duty live-loaded packing will not require this initial re-adjustment. See the Fisher instruction manuals titled ENVIRO-SEAL Packing System for Sliding-Stem Valves or Heavy-Duty Live-Loaded Packing System (as appropriate) for packing instructions. If you wish to convert your present packing arrangement to ENVIRO-SEAL packing, refer to the retrofit kits listed in the Parts Kits sub-section near the end of this manual.

Maintenance

Valve parts are subject to normal wear and must be inspected and replaced as necessary. Inspection and maintenance frequency depends on the severity of service conditions. This section includes instructions for packing lubrication, packing maintenance, trim maintenance, and ENVIRO-SEAL bellows seal replacement. All maintenance operations may be performed with the valve in the line.

⚠ WARNING

Avoid personal injury or damage to property from sudden release of pressure or uncontrolled process fluid. Before starting disassembly:

- Do not remove the actuator from the valve while the valve is still pressurized.
- Always wear protective gloves, clothing, and eyewear when performing any maintenance operations to avoid personal injury.
- Disconnect any operating lines providing air pressure, electric power, or a control signal to the actuator. Be sure the actuator cannot suddenly open the valve.
- Use bypass valves or completely shut off the process to isolate the valve from process pressure. Relieve process pressure on both sides of the valve. Drain the process media from both sides of the valve.
- Vent the power actuator loading pressure and relieve any actuator spring compression.
- Use lock-out procedures to be sure that the above measures stay in effect while you work on the equipment.
- The valve packing box may contain process fluids that are pressurized, *even when the valve has been removed from the pipeline*. Process fluids may spray out under pressure when removing the packing hardware or packing rings, or when loosening the packing box pipe plug.
- Check with your process or safety engineer for any additional measures that must be taken to protect against process media.

CAUTION

Follow instructions carefully to avoid damaging the product surfaces, which could result in damage to the product.

Note

Whenever a gasket seal is disturbed by removing or shifting gasketed parts, a new gasket should be installed upon reassembly. This is necessary to ensure a good gasket seal since the used gasket may not seal properly.

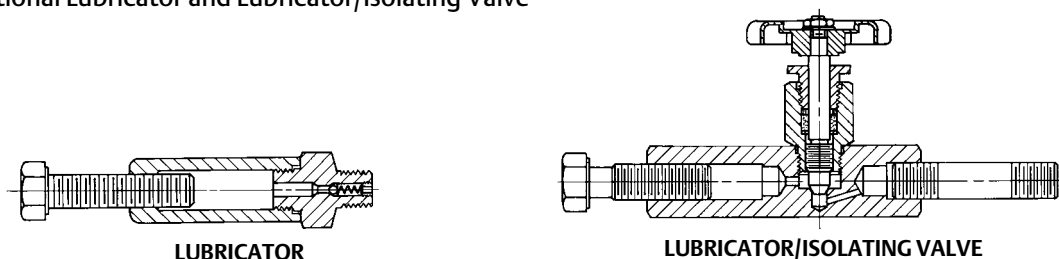
Note

If the valve has ENVIRO-SEAL or HIGH-SEAL live-loaded packing installed, refer to instruction manuals ENVIRO-SEAL Packing System for Sliding-Stem Valves ([D101642X012](#)), or HIGH-SEAL Live-Loaded Packing System ([D101453X012](#)), for packing

instructions. Figure 9 shows a typical HIGH-SEAL Packing system. Figures 10, 11, and 12 show typical ENVIRO-SEAL packing systems.

If the valve has an ENVIRO-SEAL bellows seal bonnet installed, refer to this manual. See the ENVIRO-SEAL Bellows Seal and Bonnet section for information on the bellows seal bonnet.

Figure 2. Optional Lubricator and Lubricator/Isolating Valve



10A9421-A
AJ5428-D
A0832-2

LUBRICATOR

LUBRICATOR/ISOLATING VALVE

Table 3. Body-to-Bonnet Bolt Torque Guidelines

VALVE SIZE, NPS		BOLT TORQUES ^(1, 4)			
ES	EAS	SA193-B7, SA193-B8M ⁽³⁾		SA193-B8M ⁽²⁾	
		N•m	Lbf•ft	N•m	Lbf•ft
1-1/4 or less	1	129	95	64	47
1-1/2, 1-1/2 x 1, 2, or 2 x 1	2 or 2 x 1	96	71	45	33
2-1/2 or 2-1/2 x 1-1/2	3 or 3 x 1-1/2	129	95	64	47
3, 3 x 2, or 3 x 2-1/2	4 or 4 x 2	169	125	88	65
4, 4 x 2-1/2, or 4 x 3	6 or 6 x 2-1/2	271	200	156	115
6	---	549	405	366	270
8	---	746	550	529	390

1. Determined from laboratory tests.
 2. SA193-B8M annealed.
 3. SA193-B8M strain hardened.
 4. For other materials, contact your [Emerson sales office](#) for torques.

Packing Lubrication

Note

ENVIRO-SEAL or HIGH-SEAL packing does not require lubrication.

⚠ WARNING

To avoid personal injury or property damage resulting from fire or explosion, do not lubricate packing used in oxygen service or in processes with temperatures over 260°C (500°F).

If a lubricator or lubricator/isolating valve (figure 2) is provided for PTFE/composition or other packings that require lubrication, it will be installed in place of the pipe plug (key 14, figure 8). Use a good quality silicon-base lubricant. Packing used in oxygen service or in processes with temperatures over 260°C (500°F) should not be lubricated. To operate the lubricator, simply turn the cap screw clockwise to force the lubricant into the packing box. The lubricator/isolating valve operates the same way except the isolating valve must first be opened and then closed after lubrication is completed.

Packing Maintenance

Key numbers refer to figure 3 for PTFE V-ring packing and to figure 5 for PTFE/composition packing, unless otherwise indicated.

For spring-loaded single PTFE V-ring packing, the spring (key 8, figure 3) maintains a sealing force on the packing. If leakage is noted around the packing follower (key 13, figure 3), check to be sure the shoulder on the packing follower is touching the bonnet. If the shoulder is not touching the bonnet, tighten the packing flange nuts (key 5, figure 8) until the shoulder is against the bonnet. If leakage cannot be stopped in this manner, proceed to the replacing packing procedure.

If there is undesirable packing leakage with other than spring-loaded packing, first try to limit the leakage and establish a stem seal by tightening the packing flange nuts.

If the packing is relatively new and tight on the stem, and if tightening the packing flange nuts does not stop the leakage, it is possible that the valve stem is worn or nicked so that a seal cannot be made. The surface finish of a new valve stem is critical for making a good packing seal. If the leakage comes from the outside diameter of the packing, it is possible that the leakage is caused by nicks or scratches around the packing box wall. If performing any of the following procedures, inspect the valve stem and packing box wall for nicks and scratches.

Replacing Packing

⚠ WARNING

Refer to the **WARNING** at the beginning of the Maintenance section in this instruction manual.

1. Isolate the control valve from the line pressure, and release pressure from the valve.
2. Disconnect the operating lines from the actuator and any leak-off piping from the bonnet. Disconnect the stem connector, then remove the actuator from the valve by unscrewing the yoke locknut (key 15, figure 8) or the hex nuts (key 26, figure 8).

⚠ WARNING

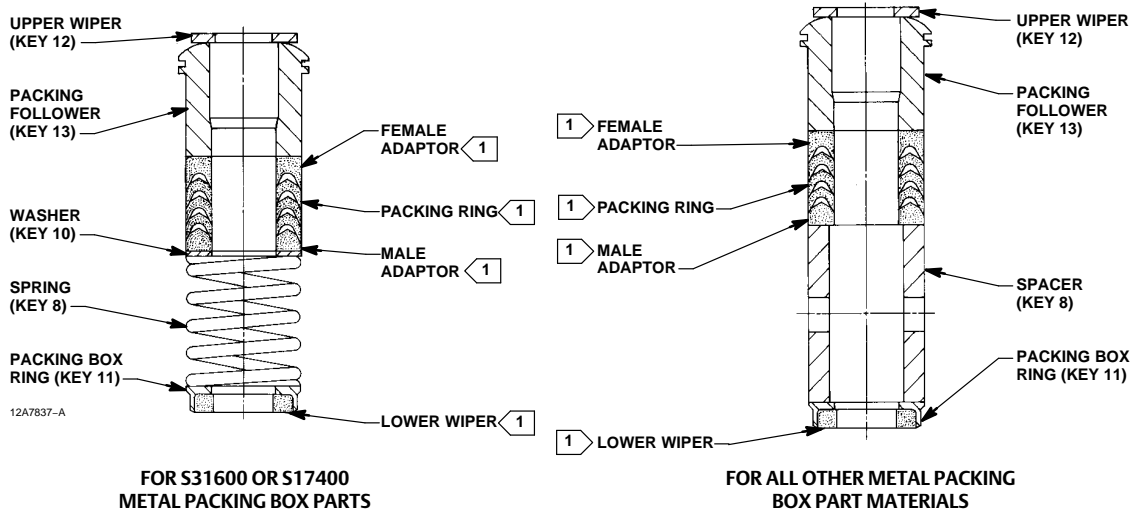
To avoid personal injury or property damage caused by uncontrolled movement of the bonnet, loosen the bonnet by following the instructions in the next step. Do not remove a stuck bonnet by pulling on it with equipment that can stretch or store energy in any other manner. The sudden release of stored energy can cause uncontrolled movement of the bonnet. If the cage sticks to the bonnet, proceed carefully with bonnet removal.

Note

The following step also helps to provide additional assurance that the valve body fluid pressure has been relieved.

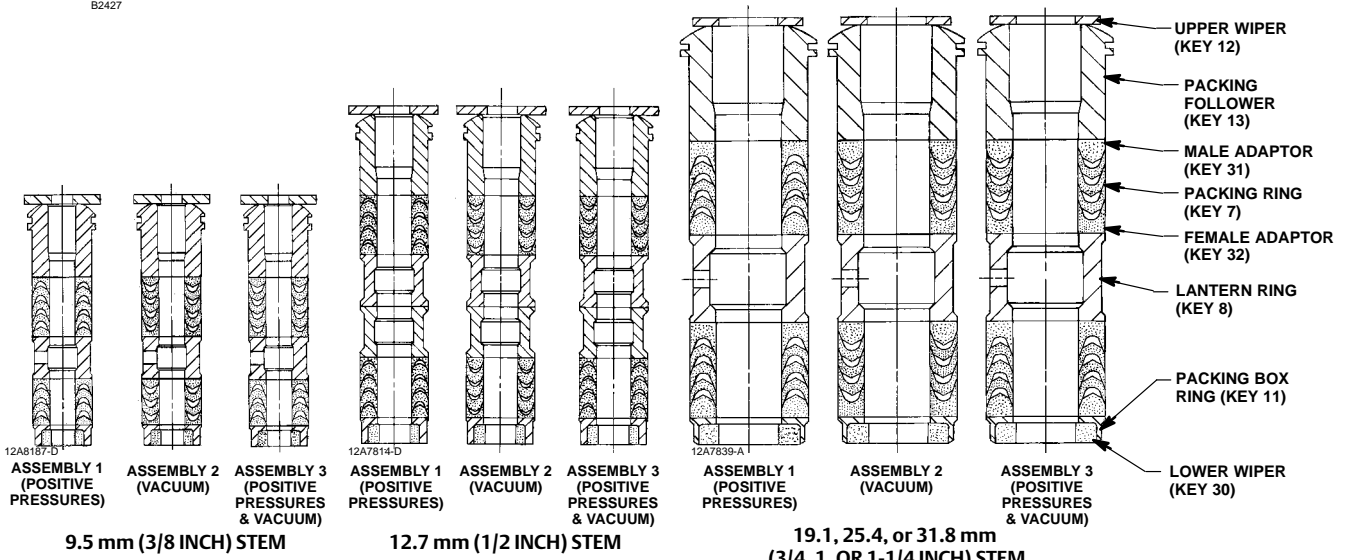
3. Hex nuts (key 5, figure 8) attach the bonnet to the valve. Loosen these nuts or cap screws approximately 3 mm (1/8 inch). Then loosen the body-to-bonnet gasketed joint by either rocking the bonnet or prying between the bonnet and valve body. Work the prying tool around the bonnet until the bonnet loosens.

Figure 3. PTFE V-Ring Packing Arrangements for Plain and Extension Bonnets



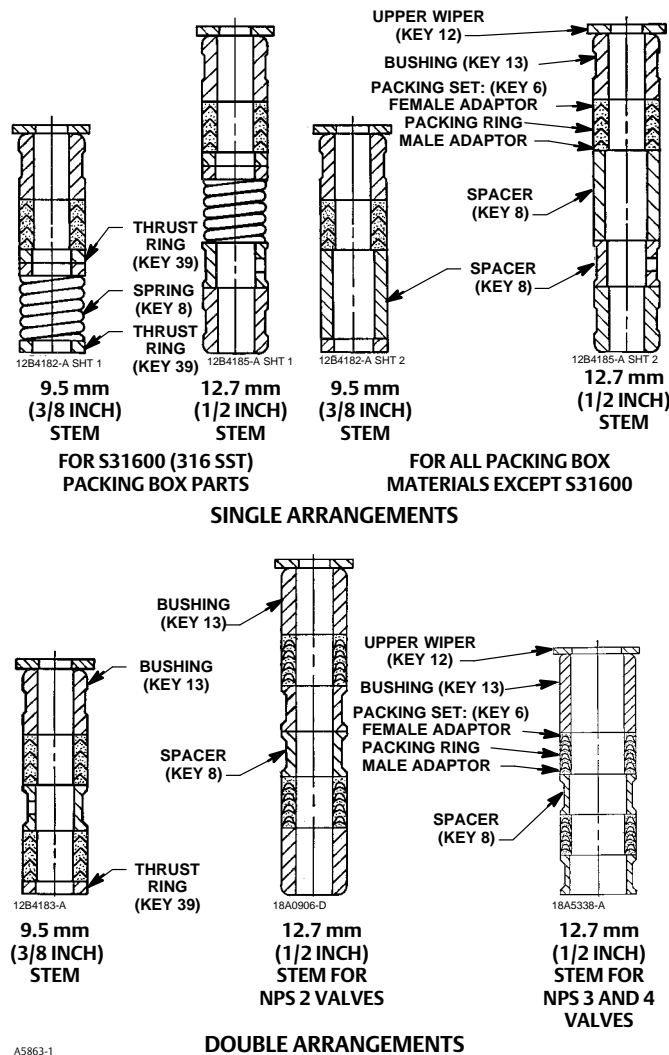
SINGLE ARRANGEMENTS

NOTE:
 1 PART OF PACKING SET (KEY 6) (SEE TABLE IN PARTS LIST).
 B2427



DOUBLE ARRANGEMENTS

Figure 4. PTFE Packing Arrangements for Use in ENVIRO-SEAL Bellows Seal Bonnets



- Loosen the packing flange nuts (key 5, figure 8) so that the packing is not tight on the valve stem. Remove any travel indicator parts from the valve stem threads.

CAUTION

Avoid damage to the seating surface caused by the valve plug and stem assembly dropping from the bonnet after being lifted part way out. When lifting the bonnet, temporarily install a valve stem locknut on the valve stem. This locknut will prevent the valve plug and stem assembly from dropping out of the bonnet.

If the cage starts to lift with the bonnet, tap it with a plastic mallet, or other soft material, to be sure it stays in the valve.

- Completely remove the cap screws (not shown) or hex nuts (key 16; figure 13, 14, or 15) that bolt the bonnet and valve together and carefully lift the bonnet off.
- Remove the locknut and separate the valve plug and stem from the bonnet. Set the parts on a protective surface to prevent damage to gasket or seating surfaces.

Figure 5. Detail of PTFE/Composition Packing Arrangements for Plain and Extension Bonnets

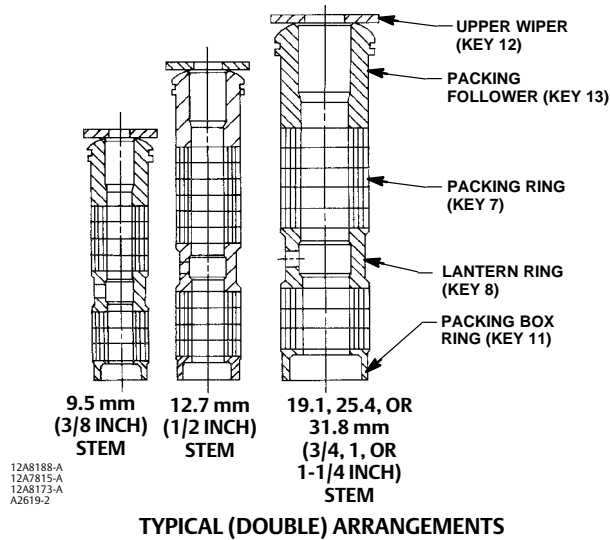


Figure 6. Double Graphite Ribbon/Filament Arrangements for use in ENVIRO-SEAL Bellows Seal Bonnets

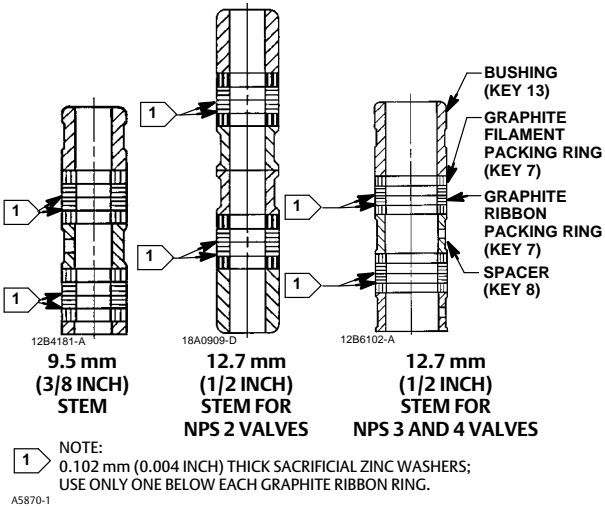
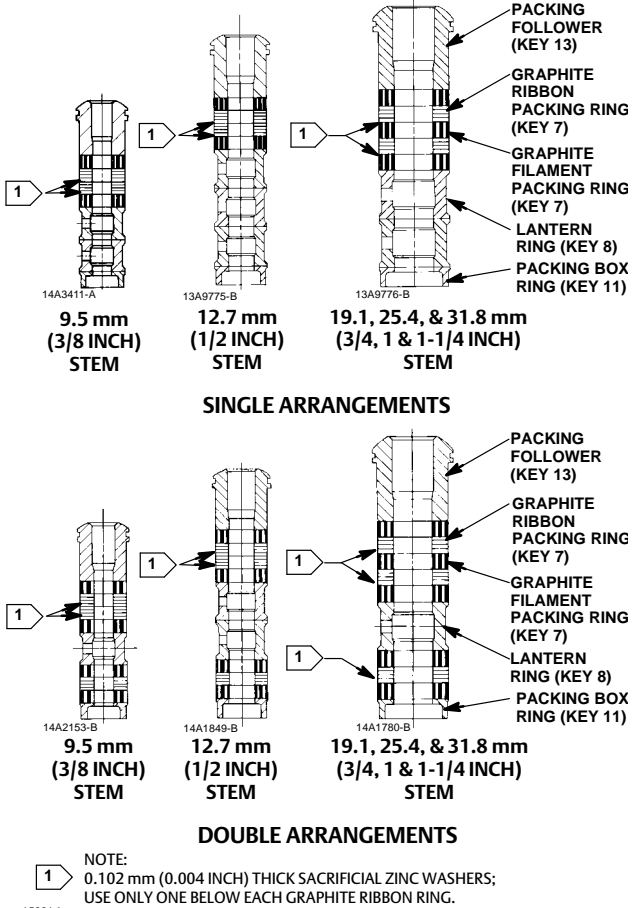


Figure 7. Detail of Graphite Ribbon/Filament Packing for Plain and Extension Bonnets



⚠ WARNING

To avoid personal injury due to leaking fluid, avoid damaging gasket sealing surfaces. The seating surface of the valve plug (key 2) is critical for proper shutoff. Protect these surfaces accordingly.

CAUTION

To prevent possible product damage, cover the opening in the valve in the following procedure to prevent foreign material from getting into the valve body cavity.

7. Remove the bonnet gasket (key 10, figure 13 through 15) and cover the opening in the valve to protect the gasket surface and prevent foreign material from getting into the valve body cavity.
8. Remove the packing flange nuts, packing flange, upper wiper, and packing follower (keys 5, 3, 12, and 13, figure 8). Carefully push out all the remaining packing parts from the valve side of the bonnet using a rounded rod or other tool that will not scratch the packing box wall. Clean the packing box and the metal packing parts.
9. Inspect the valve stem threads and packing box surfaces for any sharp edges which might cut the packing. Scratches or burrs could cause packing box leakage or damage to the new packing. If the surface condition cannot be improved by light sanding, replace the damaged parts by following the appropriate steps in the Trim Maintenance procedure.
10. Remove the covering protecting the valve body cavity and install a new bonnet gasket (key 10, figure 13 through 15), making sure the gasket seating surfaces are clean and smooth. Then slide the bonnet over the stem and onto the stud bolts (key 15, figure 13, 14, or 15) or onto the valve body cavity if cap screws (not shown) will be used instead.

Note

Proper performance of the bolting procedures in step 11 compresses the spiral wound gasket (key 12, figure 13 through 15) or load ring (key 26, figure 14) enough to both load and seal the seat ring gasket (key 13, figure 13, 14, or 15). It also compresses the outer edge of the bonnet gasket (key 10, figure 13 through 15) enough to seal the body-to-bonnet joint.

The proper bolting procedures in step 11 include--but are not limited to--ensuring that bolting threads are clean, and evenly tightening the cap screws, or the nuts onto the studs, in a crisscross pattern. Because of the boltup characteristics of spiral wound gaskets, tightening one cap screw or nut may loosen an adjacent cap screw or nut. Repeat the crisscross tightening pattern several times until each cap screw or nut is tight and the body-to-bonnet seal is made.

11. Install bolting, using proper bolting procedures during tightening so that the body-to-bonnet joint will withstand test pressures and application service conditions. The bolt torques in table 3 may be used as guidelines.
12. Install new packing and the metal packing box parts according to the appropriate arrangement in figure 3, 5, or 7. For split ring packing, alternate the positions of the splits to avoid creating a leak path. Place a smooth-edged pipe over the valve stem and gently tap each soft packing part into the packing box, being sure that air is not trapped between adjacent soft parts.
13. Slide the packing follower, upper wiper, and packing flange (keys 13, 12, and 3, figure 8) into position. Lubricate the packing flange studs (key 4, figure 8) and the faces of the packing flange nuts (key 5, figure 8). Install the packing flange nuts.
14. For spring-loaded PTFE V-ring packing, tighten the packing flange nuts until the shoulder on the packing follower (key 13, figure 8) contacts the bonnet.

For ENVIRO-SEAL or HIGH-SEAL live-loaded packing, refer to the note at the beginning of the Maintenance section.

For graphite packing, tighten the packing flange nuts to the maximum recommended torque shown in table 4. Then, loosen the packing flange nuts, and retighten them to the recommended minimum torque shown in table 4.

For other packing types, tighten the packing flange nuts alternately in small equal increments until one of the nuts reaches the minimum recommended torque shown in table 4. Then, tighten the remaining flange nuts until the packing flange is level and at a 90-degree angle to the valve stem.

- Mount the actuator on the valve assembly and reconnect the actuator and valve stem according to the procedure in the appropriate actuator instruction manual.

Trim Maintenance

⚠ WARNING

Refer to the **WARNING** at the beginning of the Maintenance section in this instruction manual.

CAUTION

In the following applicable procedures, to avoid damaging parts, do not grip the bellows shroud or other parts of the stem/bellows assembly. Grip only the flat areas on the stem where it extends out of the top of the bellows shroud.

Except where indicated, key numbers in this section are referenced in figure 13 for standard NPS 1/2 through 6 constructions, figure 14 for NPS 8 ES valves, figure 15 for Whisper Trim III cage detail, and figure 16 for WhisperFlo trim.

Disassembly

- Remove the actuator and the bonnet according to steps 1 through 6 of the Replacing Packing procedure of the Maintenance section.

Table 4. Recommended Torque for Packing Flange Nuts (Not for Spring-Loaded Packing)

VALVE STEM DIAMETER		PRESS-URE RATING	GRAPHITE TYPE PACKING				PTFE TYPE PACKING			
			Minimum Torque		Maximum Torque		Minimum Torque		Maximum Torque	
mm	Inches		N•m	Lbf•in	N•m	Lbf•in	N•m	Lbf•in	N•m	Lbf•in
9.5	3/8	CL125, 150	3	24	5	48	1	12	3	24
		CL250, 300	4	36	7	60	2	18	3	30
		CL600	5	48	8	72	3	24	4	36
12.7	1/2	CL125, 150	5	48	8	72	3	24	4	36
		CL250, 300	7	60	10	84	3	30	5	42
		CL600	10	84	14	120	5	42	7	60
19.1	3/4	CL125, 150	11	96	16	144	5	48	8	72
		CL250, 300	14	120	20	180	7	60	10	90
		CL600	20	180	30	264	10	90	15	132
25.4	1	CL300	24	216	37	324	12	108	16	144
		CL600	34	300	50	444	16	144	24	216
31.8	1-1/4	CL300	33	288	49	432	16	144	24	216
		CL600	45	396	66	588	22	192	33	288

⚠ WARNING

To avoid personal injury due to leaking fluid, avoid damaging gasket sealing surfaces. The surface finish of the valve stem (key 7) is critical for making a good packing seal. The inside surface of the cage or cage/baffle assembly (key 3), or cage retainer (key 31), is critical for smooth operation of the valve plug. The seating surfaces of the valve plug (key 2) and seat ring (key 9) are critical for proper shutoff. Unless inspection reveals otherwise, assume all these parts are in good condition and protect them accordingly.

2. Packing parts can be removed if desired. Replace these parts as described in the Replacing Packing procedure. Remove the load ring (key 26) from an NPS 8 ES valve, or the cage adaptor (key 4) from any restricted trim valve, and wrap it for protection.
3. Lift the valve plug and stem assembly out of the valve and set it on a protective surface. If the valve plug is to be reused, protect the valve plug seating surface to prevent scratches. On an NPS 6 ES valve with Whisper Trim III cage or WhisperFlo trim, also remove the bonnet spacer (key 32) and bonnet gasket (key 10) on top of the spacer. Then on any construction with a cage retainer (key 31), remove the cage retainer and its associated gaskets.

A Whisper Trim III and WhisperFlo trim cage retainer has two 3/8 inch-16 UNC tappings in which screws or bolts can be installed for lifting.

4. Remove the cage or cage/baffle assembly (key 3), the associated gaskets (keys 10, 11, and 12), and shim (key 51 for the ES valve, key 27 for the EAS valve). If the cage is stuck in the valve body, use a rubber mallet to strike the exposed portion of the cage at several points around its circumference.
5. Remove the seat ring or liner (key 9) or disk seat (key 22), seat ring gasket (key 13), and the seat ring adaptor (key 5) and adaptor gasket (key 14) where used in a restricted trim seat ring construction. PTFE seat constructions use a disk (key 23) sandwiched between the disk seat and disk retainer (key 21).
6. Inspect parts for wear or damage which would prevent proper operation of the valve. Replace or repair trim parts according to the following procedure for lapping metal seats or other valve plug maintenance procedures as appropriate.

Table 5. Valve Stem Connection Torque and Pin Replacement

VALVE STEM CONNECTION (VSC)		BOLT TORQUE, MINIMUM TO MAXIMUM		HOLE SIZE	
mm	Inches	N•m	Lbf•ft	mm	Inch
9.5	3/8	40-47	25-35	2.41 - 2.46	0.095 - 0.097
12.7	1/2	81-115	60-85	3.20 - 3.25	0.126 - 0.128
19.1	3/4	237-339	175-250	4.80 - 4.88	0.189 - 0.192
25.4	1	420-481	310-355	6.38 - 6.45	0.251 - 0.254
31.8	1-1/4	827-908	610-670	6.38 - 6.45	0.251 - 0.254

Table 6. Standard Material Designations

Standard Designation	Common Name or Trade Name
CoCr-A Hardfacing Alloy R30006 S17400 SST S31600 SST	CoCr-A Alloy 6 Casting 17-4PH Stainless Steel 316 Stainless Steel
S41000, S41600, CA15 WCC Carbon Steel Casting	13Cr 400-Series SST WCC

CAUTION

To avoid damaging the ENVIRO-SEAL bellows seal bonnet assembly, do not attempt to lap the metal seating surfaces. The design of the assembly prevents rotation of the stem and any forced lapping rotation will damage internal components of the ENVIRO-SEAL bellows seal bonnet.

Lapping Metal Seats

A certain amount of leakage should be expected with metal-to-metal seating in any valve body. If the leakage becomes excessive, however, the condition of the seating surfaces of the valve plug and seat ring can be improved by lapping. (Deep nicks should be machined out rather than ground out.) Use a good quality lapping compound of a mixture of 280 to 600-grit. Apply the compound to the bottom of the valve plug.

Assemble the valve to the extent that the cage and the cage retainer and bonnet spacer (if used) are in place and the bonnet is bolted to the valve body. A simple handle can be made from a piece of strap iron locked to the valve plug stem with nuts. Rotate the handle alternately in each direction to lap the seats. After lapping, remove the bonnet and clean the seat surfaces. Completely assemble as described in the assembly portion of the trim maintenance procedure and test the valve for shutoff. Repeat the lapping procedure if leakage is still excessive.

CAUTION

To avoid weakening the stem or adaptor that may cause failure in service, never reuse an old stem or adaptor with a new valve plug. Using an old stem or adaptor with a new plug requires drilling a new pin hole in the stem (or adaptor in case an ENVIRO-SEAL bellows seal bonnet is being used), which will weaken the stem. However, a used valve plug may be reused with a new stem or adaptor.

Valve Plug Maintenance

Except where indicated, key numbers are referenced in figure 13 for NPS 1/2 through 6 constructions, figure 14 for NPS 8 ES valves, figure 15 for Whisper Trim III cage detail, and figure 16 for WhisperFlo trim.

1. Remove the valve plug (key 2) according to the disassembly portion of the trim maintenance procedure.
2. To replace the valve stem (key 7), drive out the pin (key 8). Unscrew the valve plug from the stem or adaptor.
3. To replace the adaptor (key 24, figure 8) on ENVIRO-SEAL bellows seal bonnets, place the plug stem assembly and valve plug in a soft-jaw chuck or other type of vise so that the jaws grip a portion of the valve plug that is not a seating surface. Drive out or drill out the pin (key 36, figure 8). Reverse the plug stem assembly in the soft-jaw chuck or vise. Grip the flat areas on the valve stem just below the threads for the actuator/stem connection. Unscrew the valve plug/adaptor assembly (key 24, figure 8) from the valve stem assembly (key 20, figure 8).
4. Screw the stem or adaptor into the valve plug. Tighten to the torque value given in table 5. Refer to table 5 to select the proper hole size. Drill through the stem or adaptor, using the hole in the valve plug as a guide. Remove any chips or burrs and drive in a new pin to lock the assembly.
5. For ENVIRO-SEAL bellows seal bonnets, grip the flats of the stem extending out of the top of the bellows shroud with a soft-jaw chuck or other type of vise. Screw the valve plug/adaptor assembly onto the valve stem. Tighten as necessary to align the pin hole in the stem with one of the holes in the adaptor. Secure the adaptor to the stem with a new pin.

Assembly

Except where indicated, key numbers are referenced in figure 13 for standard NPS 1/2 through 6 constructions, figure 14 for NPS 8 ES valves, figure 15 for Whisper Trim III cage detail, and figure 16 for WhisperFlo trim.

1. With a restricted trim seat ring construction, install the adaptor gasket (key 14) and seat ring adaptor (key 5).
2. Install the seat ring gasket (key 13), seat ring or liner (key 9), or disk seat (key 22). With a PTFE seat construction, install the disk and disk retainer (keys 21 and 23).
3. Install the cage or cage/baffle assembly (key 3). Any rotational orientation of the cage or assembly with respect to the valve is acceptable. A Whisper Trim III cage designated by level A3, B3, or C3 may be installed with either end

- up. The level D3 cage/baffle assembly, however, must be installed with the hole pattern end next to the seat ring. If a cage retainer (key 31) is to be used, place it on top of the cage.
4. Slide the valve plug (key 2) and stem assembly, or valve plug and ENVIRO-SEAL bellows seal assembly, into the cage.
 5. Place the gaskets (key 10, or keys 11, 12 and 14, if used) and the shim (key 27 or key 51) on top of the cage or cage retainer. If there is a cage adaptor (key 4) or a bonnet spacer (key 32), set it on the cage or cage retainer gaskets and place another flat sheet gasket (key 10) on top of the adaptor or spacer. If there is only a cage retainer, place another flat sheet gasket on the retainer.
 6. With an NPS 8 ES valve, install the load ring (key 26).

CAUTION

To avoid damaging packing with the valve stem threads, use care when installing the bonnet if the packing was not removed from the bonnet.

Table 7. Recommended Torque for ENVIRO-SEAL Bellows Seal Packing Flange Nuts

VALVE SIZE	VALVE STEM DIAMETER THROUGH PACKING	MINIMUM TORQUE		MAXIMUM TORQUE	
		N•m	Lbf•in	N•m	Lbf•in
1/2 - 2	1/2	3	24	5	48
3 - 4	1	7	60	10	84

7. Mount the bonnet on the valve and complete assembly according to steps 10 through 14 of the Replacing Packing procedure, omitting steps 11 and 12 if new packing is not being installed, and being sure to observe the note prior to step 11.

ENVIRO-SEAL Bellows Seal and Bonnet

Replacing a Plain or Extension Bonnet with an ENVIRO-SEAL Bellows Seal (Stem/Bellows Assembly) and Bonnet

1. Remove the actuator and bonnet according to steps 1 through 6 of the Replacing Packing procedure of the Maintenance section.
2. With care, remove the valve plug and stem assembly from the valve body. If necessary, lift out the cage, also.

CAUTION

To prevent possible product damage, cover the opening in the valve in the following procedure to protect the sealing surfaces and to prevent foreign material from getting into the valve body cavity.

3. Remove and discard the existing bonnet gasket. Cover the valve body opening to protect sealing surfaces and to prevent foreign material from entering the valve body cavity.

Note

The ENVIRO-SEAL stem/bellows assembly for easy-e valves is available only with a threaded and drilled plug/adaptor/stem connection. The existing valve plug can be reused with the new stem/bellows assembly or a new plug can be installed.

4. Inspect the existing valve plug. If the plug is in good condition, it can be reused with the new ENVIRO-SEAL stem/bellows assembly. To remove the existing valve plug from the stem, first, place the existing plug stem assembly and valve plug in a soft-jaw chuck or other type of vise so that the jaws grip a portion of the valve plug that is not a seating surface. Drive out or drill out the pin (key 8).
5. Then, reverse the plug stem assembly in the soft-jaw chuck or vise. Grip the valve stem in an appropriate place and unscrew the existing plug from the valve stem.

CAUTION

When installing a valve plug on the ENVIRO-SEAL stem/bellows assembly, the valve stem must not be rotated. Damage to the bellows may result.

To avoid damaging parts, do not grip the bellows shroud or other parts of the stem/bellows assembly. Grip only the flat areas on the stem where it extends out of the top of the bellows shroud.

Note

The ENVIRO-SEAL stem/bellows assembly has a one-piece stem.

6. To attach the valve plug to the stem of the new ENVIRO-SEAL stem/bellows assembly, it is necessary to first attach the plug to the adaptor (key 24). Locate the adaptor. Notice that a hole has not been drilled in the threads where the plug screws onto the adaptor. Secure the valve plug in a soft-jaw chuck or other type of vise. Do not grip the plug on any seating surface. Position the plug in the chuck or vise for easy threading of the adaptor. Thread the adaptor into the valve plug and tighten to the appropriate torque value.
7. Select the proper size of drill bit and drill through the adaptor using the hole in the valve plug as a guide. Remove any metal chips or burrs and drive in a new pin to lock the plug/adaptor assembly together.
8. Attach the plug/adaptor assembly to the ENVIRO-SEAL stem/bellows assembly by first securing the stem/bellows assembly in a soft-jaw chuck or other type of vise so that the jaws of the chuck or vise grip the flats of the stem extending out of the top of the bellows shroud. Screw the valve plug/adaptor assembly onto the valve stem. Tighten as necessary to align the pin hole in the stem with one of the holes in the adaptor. Secure the adaptor to the stem with a new pin.
9. Inspect the seat ring (key 9) and soft seat parts (keys 21, 22, and 23). Replace, if necessary.
10. Place a new gasket (key 10) into the valve body in place of the bonnet gasket. Install the new stem/bellows assembly with valve plug/adaptor by placing it into the valve body on top of the new bellows gasket.
11. Place a new gasket (key 22) over the stem/bellows assembly. Place the new ENVIRO-SEAL bonnet over the stem/bellows assembly.

Note

Stud(s) and nut(s) should be installed such that the manufacturer's trademark and material grade marking is visible, allowing easy comparison to the materials selected and documented in the Emerson/Fisher serial card provided with this product.

⚠ WARNING

Personal injury or damage to equipment could occur if improper stud and nut materials or parts are used. Do not operate or assemble this product with stud(s) and nut(s) that are not approved by Emerson/Fisher engineering and/or listed on the serial card provided with this product. Use of unapproved materials and parts could lead to stresses exceeding the design or code limits intended for this particular service. Install studs with the material grade and manufacturer's identification

mark visible. Contact your Emerson representative immediately if a discrepancy between actual parts and approved parts is suspected.

12. Properly lubricate the bonnet stud bolts. Install and tighten the bonnet hex nuts to the proper torque.
13. Install new packing and the metal packing box parts according to the appropriate arrangement in figure 3.
14. Install the packing flange. Properly lubricate the packing flange stud bolts and the faces of the packing flange nuts.
For ENVIRO-SEAL or HIGH-SEAL live-loaded packing, refer to the note at the beginning of the Maintenance section.

For graphite packing, tighten the packing flange nuts to the maximum recommended torque shown in table 7. Then, loosen the packing flange nuts, and retighten them to the recommended minimum torque shown in table 7.

For other packing types, tighten the packing flange nuts alternately in small equal increments until one of the nuts reaches the minimum recommended torque shown in table 7. Then, tighten the remaining flange nuts until the packing flange is level and at a 90-degree angle to the valve stem.
15. Install travel indicator parts, stem locknuts, and mount the actuator on the valve body according to the procedure in the appropriate actuator instruction manual.

Replacement of an Installed ENVIRO-SEAL Bellows Seal (Stem/Bellows Assembly)

1. Remove the actuator and bonnet according to steps 1 through 6 of the Replacing Packing procedure of the Maintenance section.

CAUTION

To prevent possible product damage, cover the opening in the valve in the following procedure to protect the sealing surfaces and to prevent foreign material from getting into the valve body cavity.

2. With care, remove the ENVIRO-SEAL stem/bellows assembly. If necessary, lift out the cage, also. Remove and discard the existing bonnet gasket and bellows gasket. Cover the valve body opening to protect sealing surfaces and to prevent foreign material from entering the valve body cavity.

Note

The ENVIRO-SEAL stem/bellows assembly for easy-e valves is available only with a threaded and drilled plug/adaptor/stem connection. The existing valve plug can be reused with the new stem/bellows assembly or a new plug can be installed.

3. Inspect the existing valve plug. If the plug is in good condition, it can be reused with the new stem/bellows assembly.

CAUTION

When removing/installing a valve plug on the ENVIRO-SEAL stem/bellows assembly, the valve stem must not be rotated. Damage to the bellows may result.

To avoid damaging parts, do not grip the bellows shroud or other parts of the stem/bellows assembly. Grip only the flat areas on the stem where it extends out of the top of the bellows shroud.

Note

The ENVIRO-SEAL stem/bellows assembly has a one-piece stem.

4. To remove the existing valve plug from the stem, first, place the existing plug stem assembly and valve plug in a soft-jaw chuck or other type of vise so that the jaws grip a portion of the valve plug that is not a seating surface. Drive out or drill out the pin.
5. Then, reverse the plug stem assembly in the soft-jaw chuck or vise. Grip the flat areas on the valve stem just below the threads for the actuator/stem connection. Unscrew the existing plug from the valve stem.
6. To attach either the existing valve plug or a new one to the stem of the new ENVIRO-SEAL stem/bellows assembly, it is necessary to first attach the plug to the adaptor. Locate the adaptor. Notice that a hole has not been drilled in the threads where the plug screws onto the adaptor. Secure the valve plug in a soft-jaw chuck or other type of vise. Do not grip the plug on any seating surface. Position the plug in the chuck or vise for easy threading of the adaptor. Thread the adaptor into the valve plug and tighten to the appropriate torque value.
7. Complete the installation by following steps 7 through 9 and steps 12 through 15 of the ENVIRO-SEAL Bellows Seal and Bonnet installation instructions given above.

Purging the ENVIRO-SEAL Bellows Seal Bonnet

The ENVIRO-SEAL bellows seal bonnet has been designed so that it can be purged or leak tested. Refer to figure 8 for an illustration of an ENVIRO-SEAL bellows seal bonnet, and perform the following steps for purging or leak testing.

1. Remove the two diametrically opposed pipe plugs (key 16).
2. Connect a purging fluid to one of the pipe plug connections.
3. Install appropriate piping or tubing in the other pipe plug connection to pipe away the purging fluid or to make a connection to an analyzer for leak testing.
4. When purging or leak testing has been completed, remove the piping or tubing and reinstall the pipe plugs (key 16).

Parts Ordering

Each body-bonnet assembly is assigned a serial number which can be found on the valve. This same number also appears on the actuator nameplate when the valve is shipped from the factory as part of a control valve assembly. Refer to the serial number when contacting your [Emerson sales office](#) for technical assistance. When ordering replacement parts, refer to the serial number and to the eleven-character part number for each part required from the following parts kit or parts list information.

Refer to table 6 for standard and common material designations.

⚠ WARNING

Use only genuine Fisher replacement parts. Components that are not supplied by Emerson Automation Solutions should not, under any circumstances, be used in any Fisher valve, because they may void your warranty, might adversely affect the performance of the valve, and could cause personal injury and property damage.

Parts Kits

Note

Kits do not apply to alloy C (N10276 and CW2M), Alloy 20 (N08020 and CN7M), or alloy 400 (N04400 and M35-1) trims.

Gasket Kits

Gasket Kits (includes keys 10, 11, 12, 13, and 51); Plus 14 and 20 on Some Restricted Capacity Valves

DESCRIPTION	Standard Trim Cage Whisper Trim I Cage	Whisper Trim III Cage WhisperFlo Cage
	-198 to 593° C (-325 to 1100°F)	
Full Capacity Valves	Part Number	Part Number
NPS 1/2, 3/4, 1, and 1-1/4 (NPS 1 EAS)	RGASKETX162	RGASKETX422
NPS 1-1/2 (NPS 2 EAS)	RGASKETX172	RGASKETX432
NPS 2	RGASKETX182	RGASKETX442
NPS 2-1/2 (NPS 3 EAS)	RGASKETX192	RGASKETX452
NPS 3 (NPS 4 EAS)	RGASKETX202	RGASKETX462
NPS 4 (NPS 6 EAS)	RGASKETX212	RGASKETX472
NPS 6	RGASKETX222	RGASKETX482
NPS 8	RGASKETX232	10A3265X152
Restricted Capacity Valves w/ Metal Seating		
NPS 1-1/2 x 1 (NPS 2 x 1 EAS)	RGASKETX242	---
NPS 2 x 1	RGASKETX252	---
NPS 2-1/2 x 1-1/2 (NPS 3 x 1-1/2 EAS)	RGASKETX262	---
NPS 3 x 2 (NPS 4 x 2 EAS)	RGASKETX272	---
NPS 4 x 2-1/2 (NPS 6 x 2-1/2 EAS)	RGASKETX282	---

Packing Kits

Standard Packing Repair Kits (Non Live-Loaded)

REPAIR KIT MATERIAL	STEM DIAMETER, mm (INCH) YOKE BOSS DIAMETER, mm (INCH)				
	9.5 (3/8) 54 (2-1/8)	12.7 (1/2) 71 (2-13/16)	19.1 (3/4) 90 (3-9/16)	25.4 (1) 127 (5)	31.8 (1-1/4) 127 (5, 5H)
	Part Number				
PTFE (Contains keys 6, 8, 10, 11, and 12)	RPACKX00012	RPACKX00022	RPACKX00032	RPACKX00342	RPACKX00352
Double PTFE (Contains keys 6, 8, 11, and 12)	RPACKX00042	RPACKX00052	RPACKX00062	RPACKX00362	RPACKX00372
PTFE/Composition (Contains keys 7, 8, 11, and 12)	RPACKX00072	RPACKX00082	RPACKX00092	---	---
Single Graphite Ribbon/Filament (Contains keys 7 [ribbon ring], 7 [filament ring], 8, and 11)	RPACKX00102	RPACKX00112	RPACKX00122	---	---
Single Graphite Ribbon/Filament (Contains keys 7 [ribbon ring], 7 [filament ring], and 11)	---	---	---	RPACKX00532	RPACKX00542
Single Graphite Ribbon/Filament (Contains keys 7 [ribbon ring], 7 [filament ring])	RPACKX00132	RPACKX00142	RPACKX00152	---	---
Double Graphite Ribbon/Filament (Contains keys 7 [ribbon ring], 7 [filament ring], 8, and 11)	RPACKX00162	RPACKX00172	RPACKX00182	---	---

ENVIRO-SEAL Packing Retrofit Kits

Retrofit kits include parts to convert valves with existing standard bonnets to the ENVIRO-SEAL packing box construction.

Refer to figure 10 for key numbers for PTFE packing, to figure 11 for key numbers for Graphite ULF packing, and to figure 12 for key numbers for duplex packing.

PTFE kits include keys 200, 201, 211, 212, 214, 215, 217, 218, tag, and cable tie. Graphite ULF kits include keys 200, 201, 207, 208, 209, 210, 211, 212, 214, 216, 217, tag, and cable tie. Duplex kits include keys 200, 201, 207, 209, 211, 212, 214, 215, 216, 217, tag, and cable tie.

Stems and packing box constructions that do not meet Fisher stem finish specifications, dimensional tolerances, and design specifications may adversely alter the performance of this packing kit.

For part numbers of individual components in the ENVIRO-SEAL packing kits, refer to instruction manual ENVIRO-SEAL Packing System for Sliding-Stem Valves, [D101642X012](#).

ENVIRO-SEAL Packing Retrofit Kits

PACKING MATERIAL	STEM DIAMETER, mm (INCH) YOKE BOSS DIAMETER, mm (INCH)				
	9.5 (3/8) 54 (2-1/8)	12.7 (1/2) 71 (2-13/16)	19.1 (3/4) 90 (3-9/16)	25.4 (1) 127 (5)	31.8 (1-1/4) 127 (5, 5H)
	Part Number				
Double PTFE	RPACKXRT012	RPACKXRT022	RPACKXRT032	RPACKXRT042	RPACKXRT052
Graphite ULF	RPACKXRT262	RPACKXRT272	RPACKXRT282	RPACKXRT292	RPACKXRT302
Duplex	RPACKXRT212	RPACKXRT222	RPACKXRT232	RPACKXRT242	RPACKXRT252

ENVIRO-SEAL Packing Repair Kits

Repair kits include parts to replace the “soft” packing materials in valves that already have ENVIRO-SEAL packing arrangements installed or in valves that have been upgraded with ENVIRO-SEAL retrofit kits.

Refer to figure 10 for key numbers for PTFE packing, to figure 11 for key numbers for Graphite ULF packing, and to figure 12 for key numbers for duplex packing.

PTFE repair kits include keys 214, 215, and 218. Graphite ULF repair kits include keys 207, 208, 209, 210, and 214. Duplex repair kits include keys 207, 209, 214, and 215.

Stems and packing box constructions that do not meet Fisher stem finish specifications, dimensional tolerances, and design specifications may adversely alter the performance of this packing kit.

For part numbers of individual components in the ENVIRO-SEAL packing kits, refer to instruction manual ENVIRO-SEAL Packing System for Sliding-Stem Valves, [D101642X012](#).

ENVIRO-SEAL Packing Repair Kits

PACKING MATERIAL	STEM DIAMETER, mm (INCH) YOKE BOSS DIAMETER, mm (INCH)				
	9.5 (3/8) 54 (2-1/8)	12.7 (1/2) 71 (2-13/16)	19.1 (3/4) 90 (3-9/16)	25.4 (1) 127 (5)	31.8 (1-1/4) 127 (5, 5H)
	Part Number				
Double PTFE (contains keys 214, 215, & 218)	RPACKX00192	RPACKX00202	RPACKX00212	RPACKX00222	RPACKX00232
Graphite ULF (contains keys 207, 208, 209, 210, and 214)	RPACKX00592	RPACKX00602	RPACKX00612	RPACKX00622	RPACKX00632
Duplex (contains keys 207, 209, 214, and 215)	RPACKX00292	RPACKX00302	RPACKX00312	RPACKX00322	RPACKX00332

easy-e Low-e Bonnet Repair Kits

Kit consists of plain bonnet, Graphite / Inconel gasket set, ENVIRO-SEAL packing retro-fit kit, packing flange, packing flange studs and nuts. New stem is not included.

Bonnet Material	Packing Type	Valve Size, NPS	Stem Size	Part Number		
WCC ⁽¹⁾	ENVIRO-SEAL PTFE	0.5-1.25	3/8"	RLEPBNTX012		
		1.5	3/8"	RLEPBNTX022		
		2	1/2"	RLEPBNTX032		
		2.5	1/2"	RLEPBNTX042		
		3	1/2"	RLEPBNTX052		
		4	1/2"	RLEPBNTX062		
		6	3/4"	RLEPBNTX072		
	ENVIRO-SEAL Graphite ULF	0.5-1.25	3/8"	RLEPBNTX152		
		1.5	3/8"	RLEPBNTX162		
		2	1/2"	RLEPBNTX172		
		2.5	1/2"	RLEPBNTX182		
		3	1/2"	RLEPBNTX192		
		4	1/2"	RLEPBNTX202		
		6	3/4"	RLEPBNTX212		
SST ⁽¹⁾	ENVIRO-SEAL PTFE	0.5-1.25	3/8"	RLEPBNTX082		
		1.5	3/8"	RLEPBNTX092		
		2	1/2"	RLEPBNTX102		
		2.5	1/2"	RLEPBNTX112		
		3	1/2"	RLEPBNTX122		
		4	1/2"	RLEPBNTX132		
	ENVIRO-SEAL Graphite ULF	0.5-1.25	3/8"	RLEPBNTX222		
		1.5	3/8"	RLEPBNTX232		
		2	1/2"	RLEPBNTX242		
		2.5	1/2"	RLEPBNTX252		
		3	1/2"	RLEPBNTX262		
		4	1/2"	RLEPBNTX272		
		WCC	ENVIRO-SEAL Duplex	0.5-1.25	3/8"	RLEPBNTX292
				1.5	3/8"	RLEPBNTX302
2	1/2"			RLEPBNTX322		
2.5	1/2"			RLEPBNTX332		
3	1/2"			RLEPBNTX342		
4	1/2"			RLEPBNTX352		
6	3/4"			RLEPBNTX362		
SST	ENVIRO-SEAL Duplex	0.5-1.25	3/8"	RLEPBNTX372		
		1.5	3/8"	RLEPBNTX392		
		2	1/2"	RLEPBNTX412		
		2.5	1/2"	RLEPBNTX422		
		3	1/2"	RLEPBNTX432		
		4	3/4"	RLEPBNTX442		

1. Compliant with NACE MR0175-2003 and prior, NACE MR0175 / ISO 15156 (all revisions), and NACE MR0103 (all revisions).

Parts List

Note

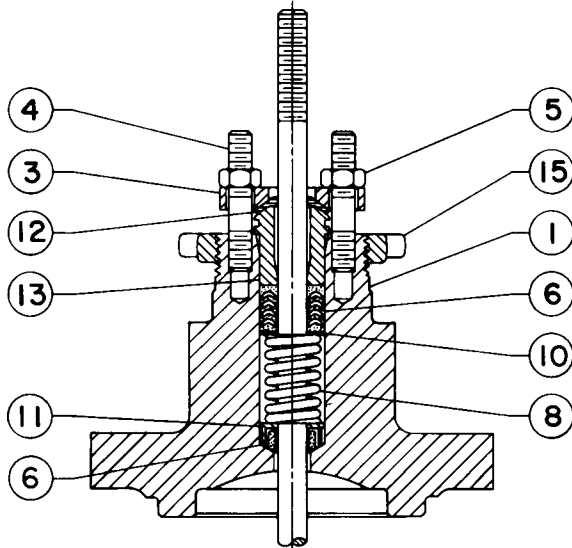
Contact your [Emerson sales office](#) for part numbers.

Bonnet (figures 3-12)

Key	Description
1	Bonnet/ENVIRO-SEAL bellows seal bonnet If you need a bonnet or an ENVIRO-SEAL bellows seal bonnet as a replacement part, order by valve size and stem diameter, serial number, and desired material.
2	Extension Bonnet Baffle
3	Packing Flange
3	ENVIRO-SEAL bellows seal packing flange
4	Packing Flange Stud
4	ENVIRO-SEAL bellows seal stud bolt
5	Packing Flange Nut
5	ENVIRO-SEAL bellows seal hex nut
6*	Packing set
6*	ENVIRO-SEAL bellows seal packing set
7*	Packing ring
7*	ENVIRO-SEAL bellows seal packing ring
8	Spring
8	Lantern ring
8	ENVIRO-SEAL bellows seal spring
8	ENVIRO-SEAL bellows seal spacer

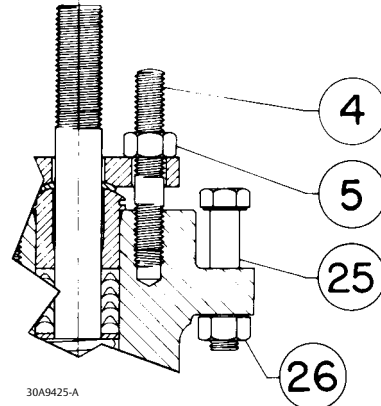
Key	Description
10	Special washer
11*	Packing Box Ring
12*	Upper Wiper
12*	ENVIRO-SEAL bellows seal upper wiper
13*	Packing Follower
13*	ENVIRO-SEAL bellows seal bushing
13*	ENVIRO-SEAL bellows seal bushing/liner
14	Pipe Plug for 1/4 NPT Tapping in Packing Box
14	Lubricator
14	Lubricator/Isolating Valve
15	Yoke Locknut
15	ENVIRO-SEAL bellows seal Locknut
16	Pipe Plug for 1/2 NPT Tapped Extension Bonnets
16	ENVIRO-SEAL bellows seal pipe plug
20*	ENVIRO-SEAL bellows seal stem/bellows assembly
22*	ENVIRO-SEAL bellows seal bonnet gasket
24	ENVIRO-SEAL bellows seal adaptor
25	Cap Screw for 127 mm (5 inch) yoke boss
26	Hex Nut for 127 mm (5 inch) Yoke Boss
27	Pipe Nipple for Lubricator/Isolating Valve
28	ENVIRO-SEAL bellows seal nameplate, warning
29	ENVIRO-SEAL bellows seal drive screw
34	Lubricant, anti-seize
36	ENVIRO-SEAL bellows seal pin
37	ENVIRO-SEAL bellows seal warning tag
38	ENVIRO-SEAL bellows seal tie
39	ENVIRO-SEAL bellows seal thrust ring

Figure 8. Typical Bonnets



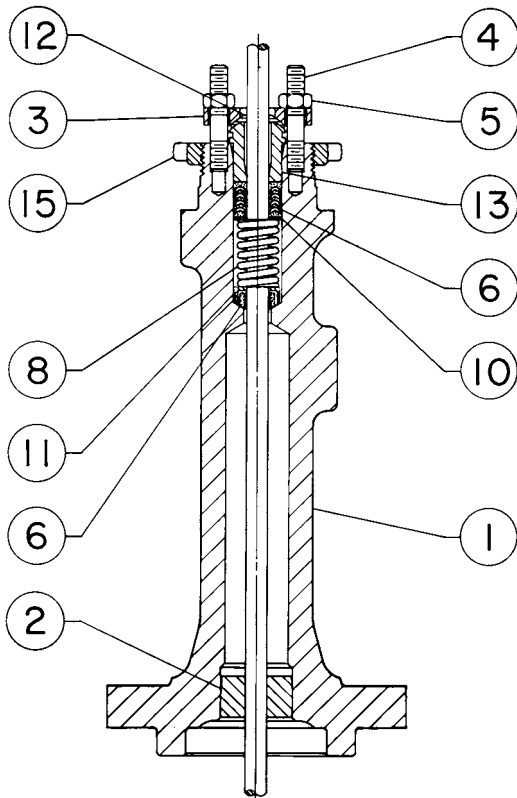
E0201

PLAIN BONNET



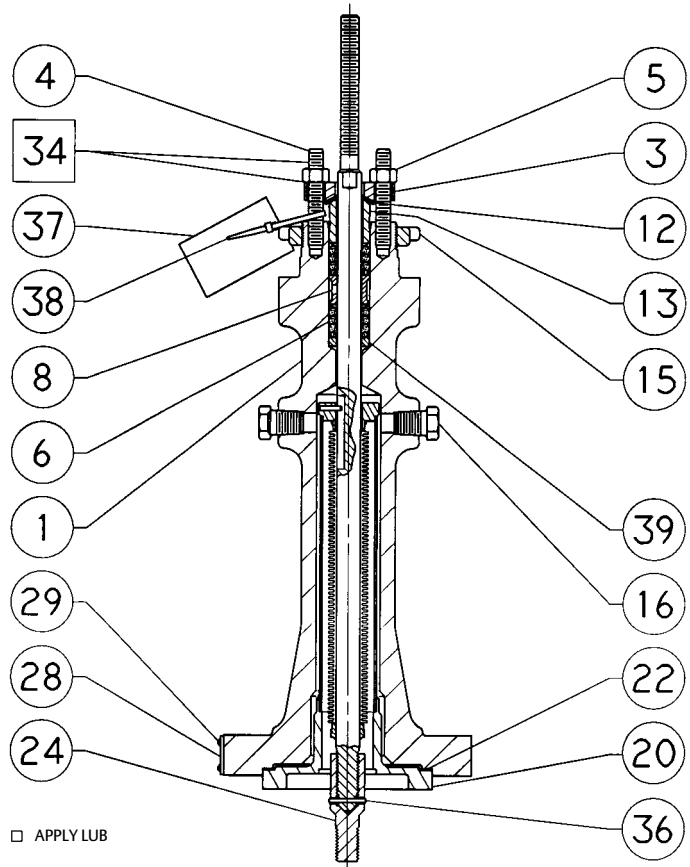
30A9425-A

DETAIL OF 5-INCH (127 mm) YOKE
BOSS ACTUATOR BOLTING



CU3911-D

STYLE 1 OR 2
EXTENSION BONNET

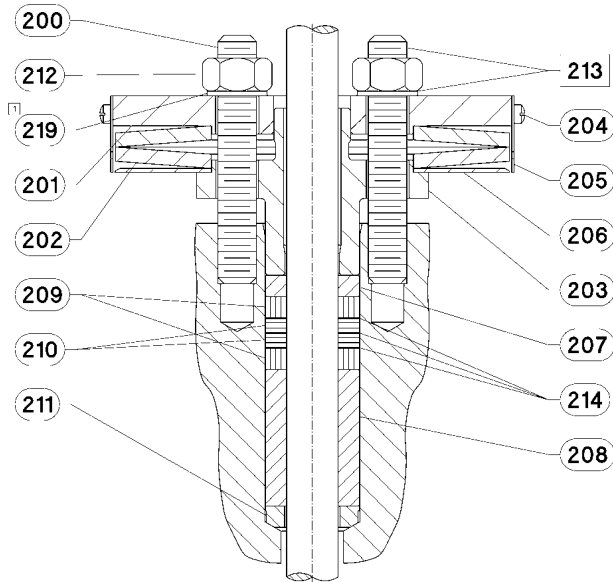


□ APPLY LUB

42B3947-A

ENVIRO-SEAL
BELLOWS SEAL BONNET

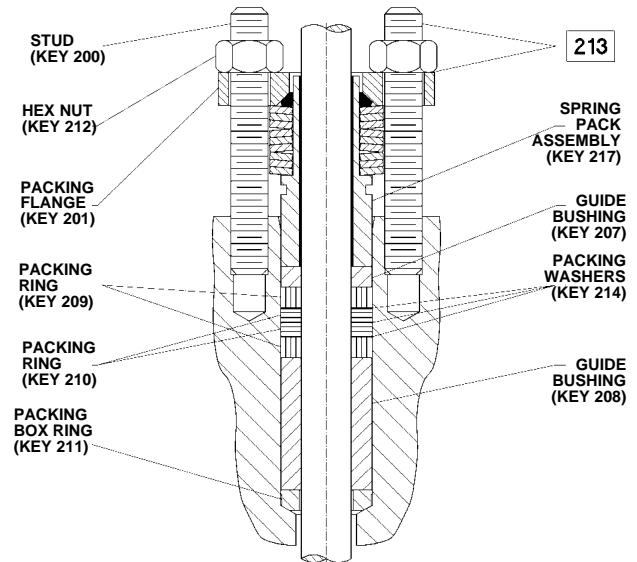
Figure 9. Typical HIGH-SEAL Graphite ULF Packing System



1. FIND NUMBER 219 NOT REQUIRED WITH 3/8 INCH STEM

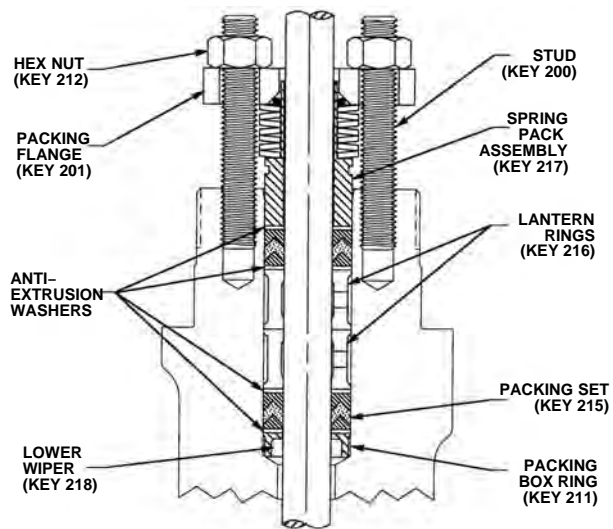
39B4153-A

Figure 11. Typical ENVIRO-SEAL Packing System with Graphite ULF Packing



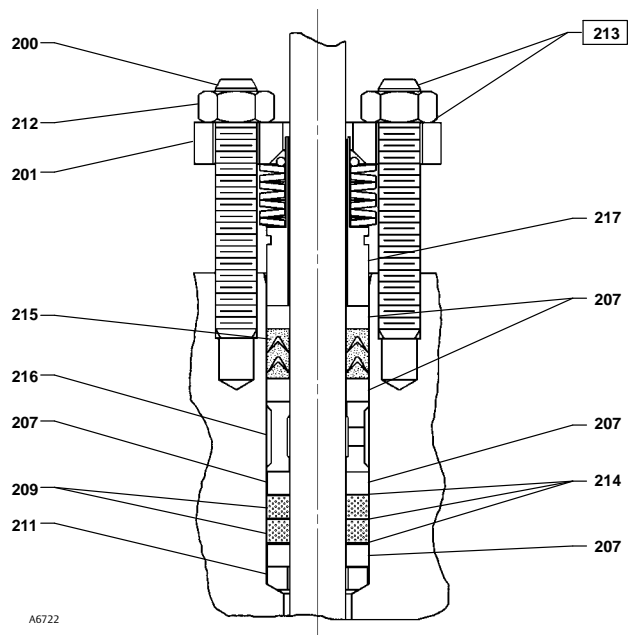
39B4612/A

Figure 10. Typical ENVIRO-SEAL Packing System with PTFE Packing



A6297-1

Figure 12. Typical ENVIRO-SEAL Packing System with Duplex Packing

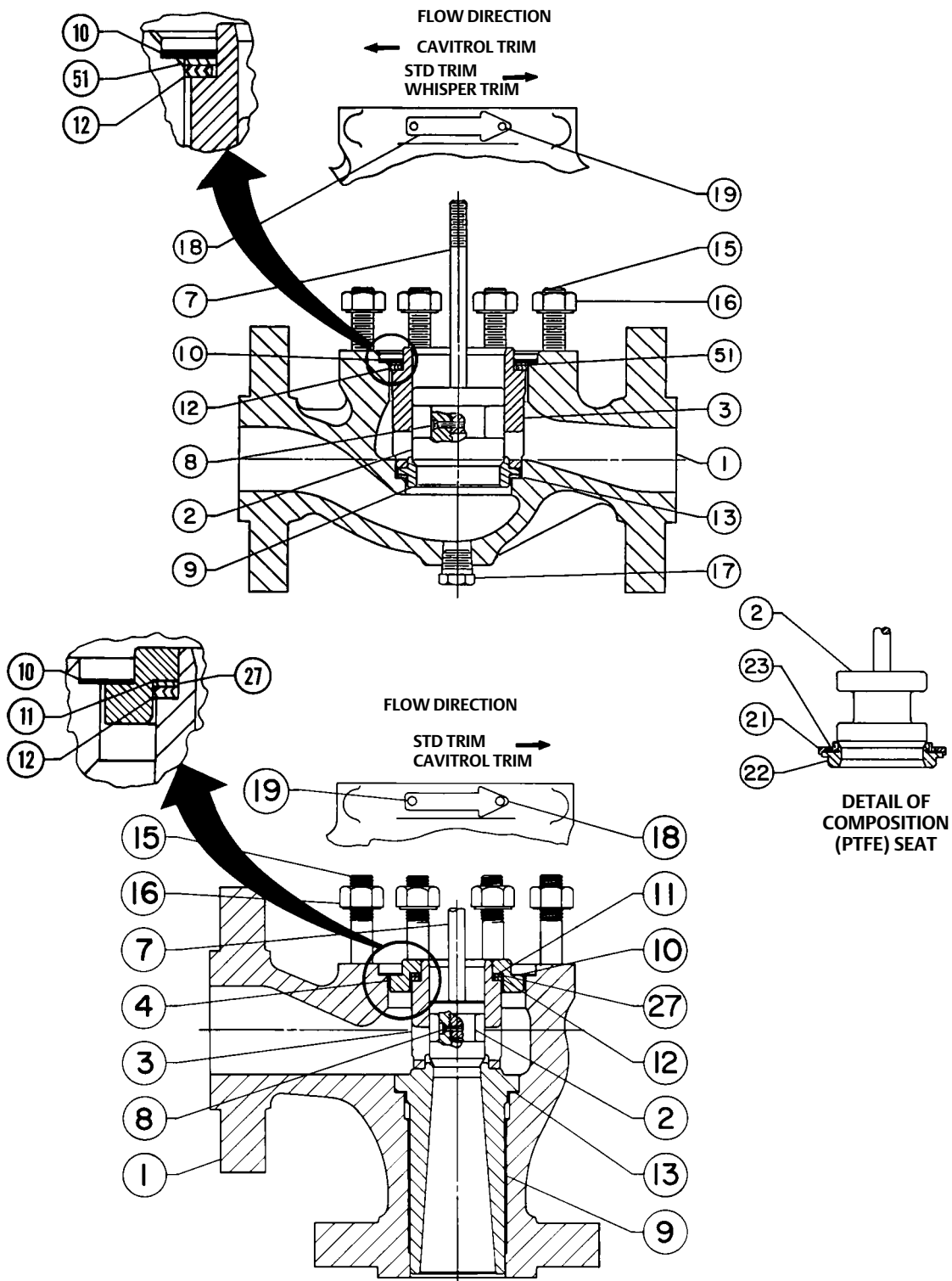


A6722

Valve Body (figures 13-15)

Key	Description
1	Valve Body If you need a valve body as a replacement part, order by valve size, serial number, and desired material.
2*	Valve plug
3*	Cage
4	Trim adaptor
5	Trim adaptor
7*	Valve plug stem
8*	Pin
9*	Liner
9*	Seat Ring
10*	Bonnet Gasket
11*	Cage Gasket
12*	Spiral-Wound Gasket
13*	Seat Ring or Liner Gasket
14*	Adaptor Gasket
22*	Disk Seat
23*	Disk
26	Load Ring
27*	Shim
31*	Whisper Trim III Cage Retainer for Levels A3, B3 & C3 (NPS 6 ES only)
31*	Whisper Trim III Cage retainer & Baffle Ass'y for Level D3 (NPS 6 ES only)
32	Whisper Trim III Bonnet Spacer
51*	Shim
53	Nameplate
54	Wire
15	Cap Screw
15	Stud
16	Nut
17	Pipe Plug
18	Flow Direction Arrow
19	Drive Screw
20*	Adaptor Gasket
21*	Seat Disk Retainer

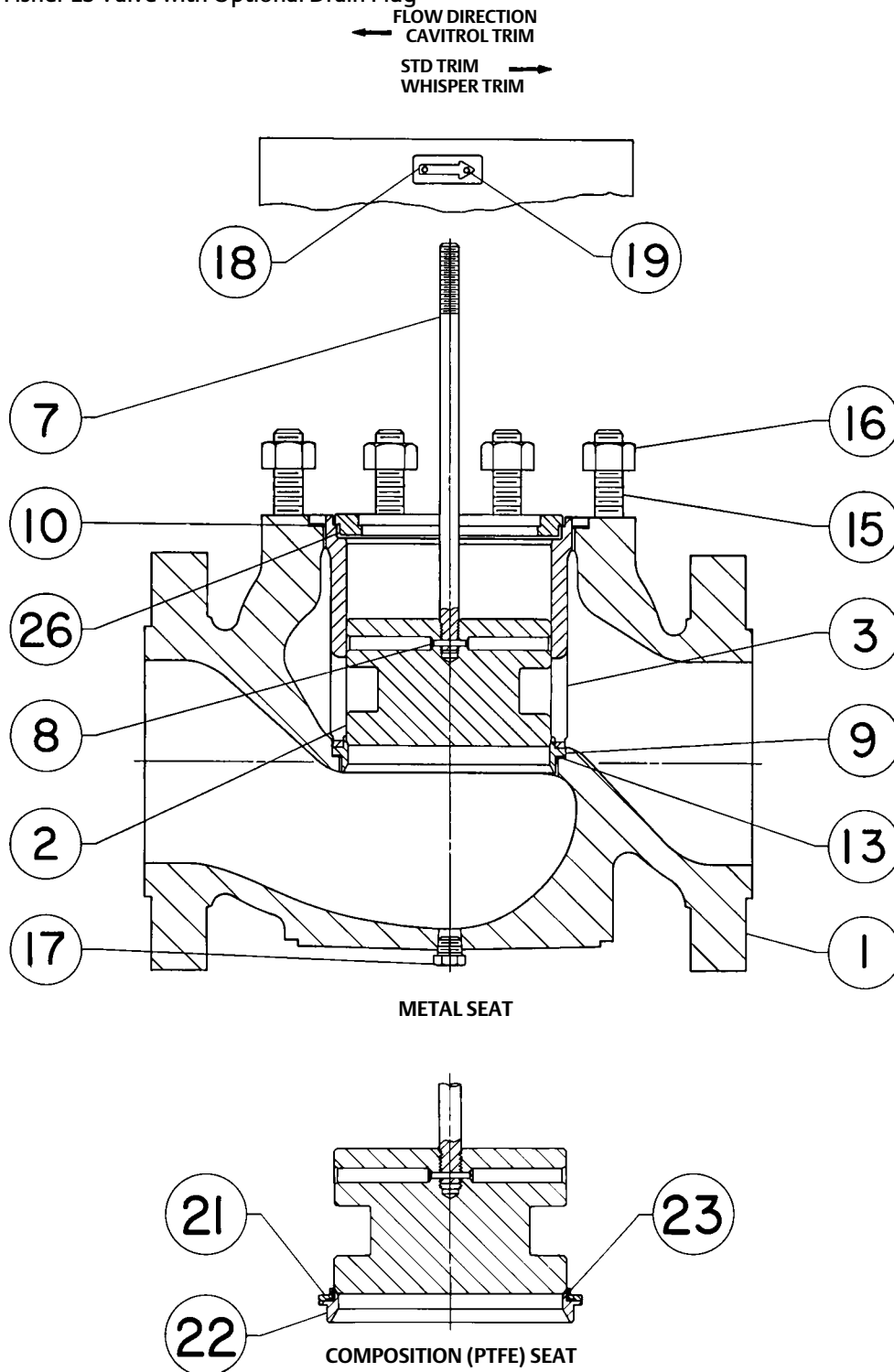
Figure 13. NPS 1/2 through 6 Fisher ES and EAS Valves



30A9543-D

CU9974-E

Figure 14. NPS 8 Fisher ES Valve with Optional Drain Plug



40A3288-C
B1884-1

Figure 15. Whisper Trim III Cage Detail with Optional Drain Plug

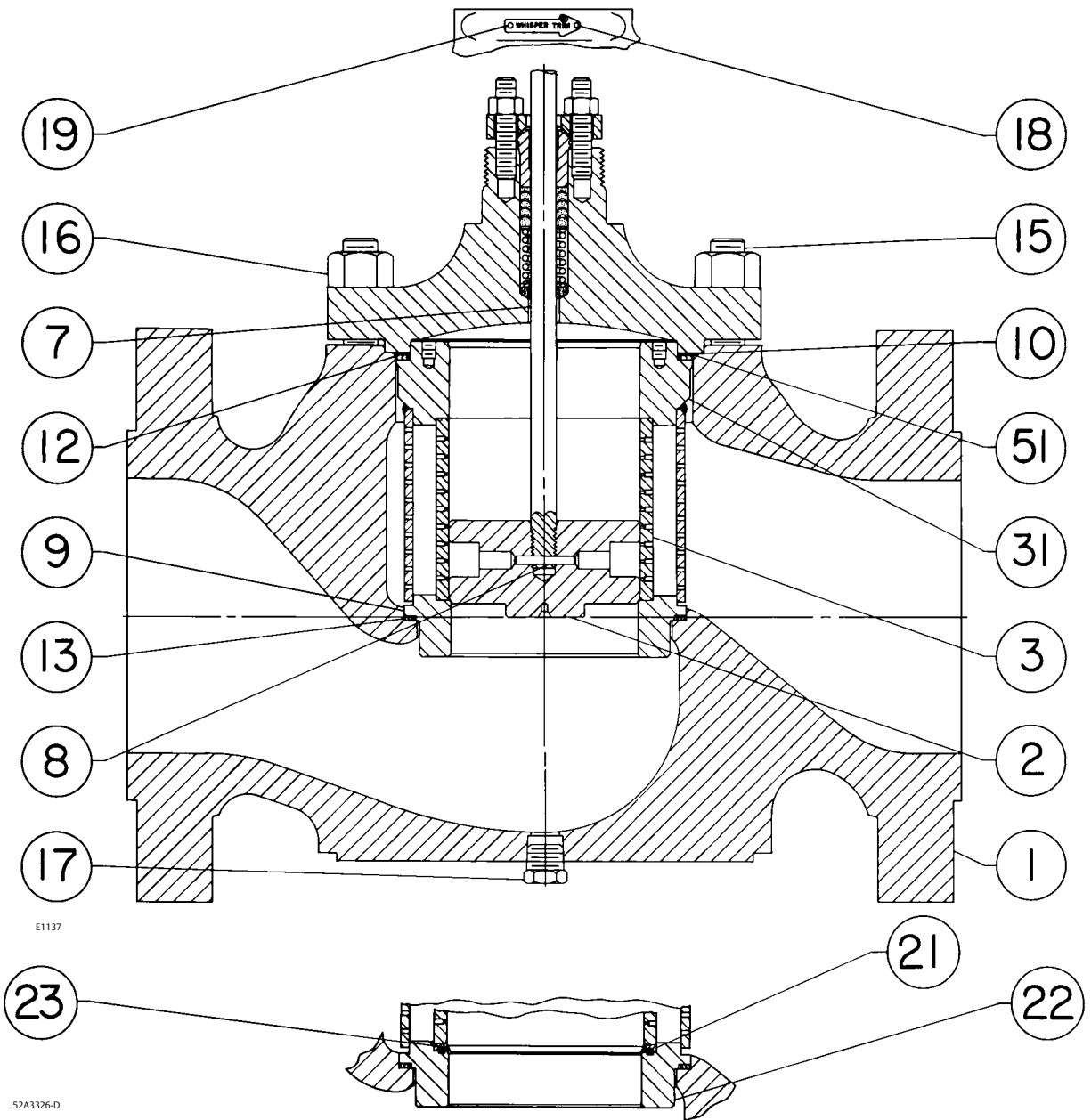
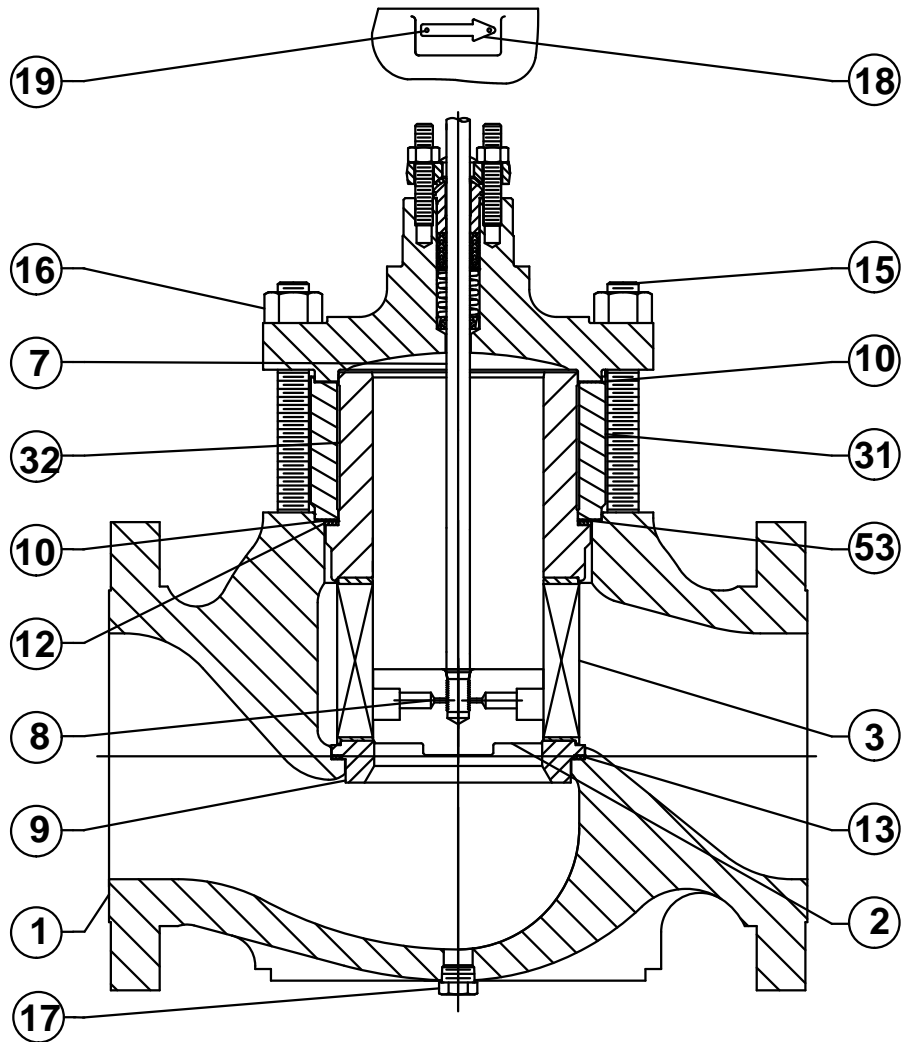


Figure 16. Fisher ES Valve Assembly with WhisperFlo Cage with Optional Drain Plug



E1138

Gaskets and Shims Parts Kit⁽⁹⁾

Valve Size, NPS		Standard Trim Cage Whisper Trim I Cage Cavitrol III - 1 Stage Cage	Cavitrol III - 2 Stage Cage Whisper Trim III Cage WhisperFlo Cage	VALVE SIZE, NPS		Standard Trim Cage Whisper Trim I Cage Cavitrol III - 1 Stage Cage	Cavitrol III - 2 Stage Cage Whisper Trim III Cage WhisperFlo Cage
ET	EAT	-198 to 593 °C (-325 to 1100 °F)		ET	EAT	-198 to 593 °C (-325 to 1100 °F)	
		Part Number				Part Number	
1/2, 3/4, 1 or 1-1/4	1	RGASKETX162 ⁽¹⁾⁽²⁾	RGASKETX422 ⁽³⁾	3	4	RGASKETX202 ⁽¹⁾⁽²⁾	RGASKETX462 ⁽³⁾
1-1/2	2	RGASKETX172 ⁽¹⁾⁽²⁾	RGASKETX432 ⁽³⁾	3 x 2	4 x 2	RGASKETX272 ⁽¹⁾⁽⁴⁾	---
1-1/2 x 1	2 x 1	RGASKETX242 ⁽¹⁾⁽⁵⁾	---	4	6	RGASKETX212 ⁽¹⁾⁽²⁾	RGASKETX472 ⁽³⁾
2	---	RGASKETX182 ⁽⁶⁾	RGASKETX442 ⁽³⁾	4 x 2-1/2	6 x 2-1/2	RGASKETX282 ⁽¹⁾⁽⁴⁾	---
2 x 1	---	RGASKETX252 ⁽⁴⁾	---	6	---	RGASKETX222 ⁽⁶⁾	RGASKETX482 ⁽⁶⁾
2-1/2	3	RGASKETX192 ⁽¹⁾⁽²⁾	RGASKETX452 ⁽³⁾	8	---	RGASKETX232 ⁽⁷⁾	
2-1/2 x 1-1/2	3 x 1-1/2	RGASKETX262 ⁽¹⁾⁽⁴⁾	---				

1. Set number good for both ES and EAS valve
 2. Kit includes key 10, 12, 13, 27 or 51
 3. Kit includes key 10, qty 2; 12; 13; 51
 4. Kit includes key 10, 11, 12, 13, 14, 27 or 51
 5. Kit includes key 10, 11, 12, 13, 20, 27 or 51
 6. Kit includes key 10, 12, 13, 51
 7. Kit includes key 10 and 13
 8. Kit includes key 10, qty 2; and 13
 9. See table below for gasket descriptions

Gasket Descriptions

KEY NUMBER	DESCRIPTION	MATERIAL
		FGM -198° to 593°C (-325° to 1100°F)
10	Bonnet Gasket	Graphite/S31600
11	Cage Gasket	
13	Seat Ring or Liner Gasket	
14 or 20	Adapter Gasket	
12	Spiral Wound Gasket	N06600/Graphite
27 or 51	Shim	S31600

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