

# Fisher™ EWD, EWS, and EWT Valves through NPS 12x8

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Figure 1. Fisher NPS 12x6 EW Series Valve With 667 Actuator



## Introduction

### Scope of Manual

This instruction manual includes installation, maintenance, and parts information for Fisher NPS 4x2 through 12x8 EWD, EWS, and EWT valves (figure 1). Refer to separate manuals for instructions covering the actuator and accessories.

Do not install, operate, or maintain an EW 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](#) or Local Business Partner before proceeding.

Table 1. Specifications

**End Connection Styles**

**Flanged Ends:** CL300, CL600, or CL900 Raised-face or ring-type joint flanges per ASME B16.5

**Buttwelding Ends:** Styles per ASME B16.25 schedules consistent with ASME B16.34 are: Schedules ■ 40 or ■ 80 for all CL300 and CL600 valves, Schedule ■ 80 or ■ XXS for NPS 8x6 CL900 valves, or Schedule ■ 80, ■ 100, or ■ 120 for NPS 12x8 CL900 valves.

**Maximum Inlet Pressures, Temperatures, and Pressure Drops<sup>(1)</sup>**

Consistent with applicable ■ CL300, ■ CL600<sup>(2)</sup>, or ■ CL900<sup>(3)</sup> pressure/temperature ratings per ASME B16.34, but do not exceed the pressure, temperature, and pressure drop conditions specified when the valve was ordered. Also see the Installation section.

Also see Bulletin 80.3:010 WhisperFlo™ Aerodynamic Attenuation Trims, D102362X012

**Shutoff Classifications**

See table 2

**C-seal trim:** High-temperature, Class V per ANSI/FCI 70-2 and IEC 60534-4

See table 3

**WhisperFlo Trim:**

- Class IV per ANSI/FCI 70-2 and IEC 60534-4
- Others per application

**Flow Characteristics**

**Standard Cages:** ■ Linear, ■ quick opening, or ■ equal percentage

**Whisper Trim™ and Cavitrol™ Cages:** Linear

**WhisperFlo Trim:** Linear (restricted linear cages and special, characterized cages are available--consult your [Emerson sales office](#) or Local Business Partner)

**Flow Directions**

**EWS and Standard Cage:** Normally up

**EWD or EWT with Standard Cage:** Normally down

**Whisper Trim Cages:** Always up

**Cavitrol Cages:** Always down

**WhisperFlo Trim:** Flow up (standard)—through the seat ring and out through the cage orifices

**Approximate Weights**

See table 4

**WhisperFlo Trim Material and Selection**

■ 410 Stainless Steel

■ Others per application

See appropriate valve body bulletin

**WhisperFlo Pressure/Temperature Capability**

■ -29 to 427°C (-20 to 800°F)

■ Others per application

See appropriate valve body bulletin for complementary information

**WhisperFlo Aerodynamic Trim Pressure Ratings<sup>(1,2)</sup>**

Up to 1500 psi drop

**WhisperFlo Velocity Limits**

WhisperFlo trim is designed for 0.3 MACH as an inherent outlet velocity limit. Variations higher and lower may be applied per special applications

**WhisperFlo Rangeability**

100:1

**WhisperFlo Noise Attenuation**

Approximately -40 dBA maximum depending on the  $\Delta P/P_1$  ratio per IEC 534-8-3 calculation procedure  
See Fisher Specification Manager

**Additional Specifications**

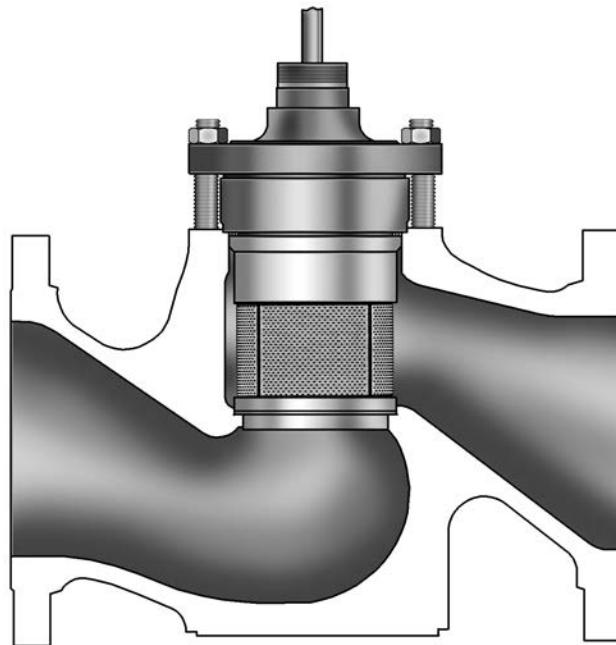
For specifications such as materials, port diameters, valve plug travels, yoke boss diameters, and stem diameters, refer to the Parts List

1. The pressure or temperature limits in this manual and any applicable standard limitations 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.

3. There are two different CL900 NPS 8x6 valve bodies, one for use only with Cavitrol III cages and the other for use with all other constructions. A CL900 valve with Cavitrol III cage can take full CL900 pressure drops. For information on other NPS 8x6 constructions that can take full CL900 pressure drops, contact your Emerson sales office. All other trim constructions are limited to CL600 pressure/temperature limits even though installed in a CL900 valve.

Figure 2. Cutaway Detail of the Fisher WhisperFlo Trim, Valve Body Typical



## Description

These single-port globe-style valves have cage guiding, clamped seat rings, and push-down-to-close valve plug action. Valve configurations are as follows:

**EWD:** Balanced valve plug with metal-to-metal seating for all general applications over a wide range of pressure drops and temperatures.

C-seal trim is available for EWD valves, CL300 and CL600, in sizes NPS 6x4x2-1/2, 6x4, 8x4, 8x6, 12x6, 10x8, and 12x8.

With C-seal trim, a balanced valve can achieve high-temperature, Class V shutoff. Because the C-seal plug seal is formed from metal (N07718 nickel alloy) rather than an elastomer, a valve equipped with the C-seal trim can be applied in processes with a fluid temperature of up to 593°C (1100°F), provided other material limits are not exceeded.

**EWS:** Unbalanced valve plug with metal-to-metal or optional metal-to-PTFE seating for all general applications requiring better shutoff capabilities than can be obtained with the EWD valve.

**EWT:** Balanced valve plug with either metal-to-PTFE seating (standard for all except Cavitrol III cages) for stringent shutoff requirements or metal-to-metal seating (standard for Cavitrol III cages, optional for all others) for higher temperatures.

Control valves with WhisperFlo cages (figure 2) provide additional attenuation for aerodynamic noise in very demanding vapor or gas applications with high-pressure drops. A WhisperFlo cage with an appropriately sized valve body is designed to reduce the noise level up to -40 dBA. For special applications, -50 dBA attenuation can be achieved.

## Specifications

Typical specifications for these valves are shown in table 1.

Table 2. Shutoff Classification Per ANSI/FCI 70-2 and IEC 60534-4

Valve	Seating	Shutoff Class
EWD	Metal	II (standard)
		III (optional for NPS 6x4 through 12x6 valves with optional single graphite piston ring or for NPS 10x8 and 12x8 valves with optional double piston rings)
		IV (optional for NPS 6x4 through 12x8 valves with optional multiple graphite piston rings)
EWS	Metal	IV (standard)
		V (optional, consult your <a href="#">Emerson sales office</a> or Local Business Partner)
EWS	PTFE	VI
EWT with all except Cavitrol III cages	PTFE	Standard Air Test (maximum leakage is 0.05 mL/min/psid/inch port diameter)
		V (optional)
	Metal	IV (standard)
EWT with 1-stage Cavitrol III cage	Metal	V (optional) <sup>(1)</sup>
		IV (standard)
EWT with 2-stage Cavitrol III cage	Metal	V (optional)
		V

1. Class V shutoff for EWT requires spring loaded seal ring, radius-seat plug, wide-bevel seat ring, and seat lapping. Not available with 8-inch port, quick-opening cage. Not available with S31600 (316 SS1) valve plug and seat ring.

Table 3. Additional Shutoff Classification for C-seal Trim Per ANSI/FCI 70-2 and IEC 60534-4

Valve	Valve Size, NPS	Port Diameter, Inches	Cage Style	Leakage Class
EWD (CL300, CL600)	6x4x2-1/2	2.875	Equal Percentage, Linear, Whisper I, Cavitrol III (2-stage)	V (for port diameters from 2.875 through 8-inch with optional C-seal trim)
	6x4 8x4	4.375	Equal Percentage, Linear, Whisper I, Cavitrol III (1-stage)	
	8x6 and 12x6	5.375	Whisper III (A3, B3, D3, D3), Cavitrol III (2-stage)	
	8x6 12x6	7	Equal Percentage, Linear, Whisper I, Cavitrol III (1-stage)	
	10x8 12x8	8	Equal Percentage, Linear, Whisper I, Cavitrol III (1-stage)	

## Educational Services

For information on available courses for the Fisher EW valve, as well as a variety of other products, contact:

Emerson Automation Solutions  
Educational Services - Registration  
Phone: 1-641-754-3771 or 1-800-338-8158  
E-mail: [education@emerson.com](mailto:education@emerson.com)  
[emerson.com/fishervalvetraining](http://emerson.com/fishervalvetraining)

## 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 or bursting of parts 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 overpressure 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.

**CAUTION**

When ordered, the valve configuration and construction materials were selected to meet particular pressure, temperature, pressure drop and controlled fluid conditions. Responsibility for the safety of process media and compatibility of valve materials with process media rests solely with the purchaser and end-user. 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](#) or Local Business Partner.

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

Table 4. Approximate Weights

END CONNECTION	VALVE SIZE, NPS														
	4X2		6X4		8X4		8X6		10X8		12X6		12X8		
	Kg	Lb	Kg	Lb	Kg	Lb	Kg	Lb	Kg	Lb	Kg	Lb	Kg	Lb	
CL300 (flanged only)	84	185	150	330	234	515	284	625	567	1250	500	1102	653	1440	
CL600	Flanged	100	220	195	430	272	600	308	680	744	1640	721	1590	857	1890
	Buttwelding	61	135	122	270	177	390	272	600	512	1130	526	1160	658	1450
CL900	Flanged	---	---	---	---	---	---	612	1350	---	---	---	---	1361	3000
	Buttwelding	---	---	---	---	---	---	454	1000	---	---	---	---	1293	2850

**CAUTION**

If hoisting the valve, use a nylon sling to protect the surfaces. Carefully position the sling to prevent damage to the actuator tubing and any accessories. Also, take care to prevent people from being injured in case the hoist or rigging slips unexpectedly. Refer to table 4 for valve assembly weights. Be sure to use adequately sized hoists and chains or slings to handle the valve.

1. Before installing the valve, inspect the valve body cavity 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. Install the control valve assembly 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 in 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 or Local Business Partner.

**Note**

If installing a valve with small internal flow passages, such as with WhisperFlo, Whisper Trim, or Cavitrol cages, consider installing an upstream strainer to prevent the lodging of particles in these passages. This is especially important if the pipeline cannot be thoroughly cleaned or if the flowing medium is not clean.

4. Use accepted piping and welding practices when installing the valve in the line. For flanged valve bodies, use a suitable gasket between the valve body 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, remove all trim parts. Contact your [Emerson sales office](#) or Local Business Partner for additional information.

5. With a leak-off bonnet construction, remove the pipe plugs (keys 14 and 16, figure 21) from the bonnet 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. Check with your process or safety engineer for any additional measures that must be taken to protect against process media.

Valves with ENVIRO-SEAL live-loaded packing or HIGH-SEAL live-loaded packing will not require this initial re-adjustment. See Fisher instruction manuals, ENVIRO-SEAL Packing System for Sliding-Stem Valves, [D101642X012](#), or HIGH-SEAL Live-Loaded Packing System, [D101453X012](#), (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 kit sub-section near the end of this manual.

## Inverted Globe Valve Applications (Actuator below valve)

Due to space restrictions in your application, you may be required to mount the valve/actuator assembly in an inverted orientation, with the actuator positioned below the valve. If so, the following procedures will help you with disassembly and assembly techniques.

## ⚠ WARNING

Avoid personal injury or property damage caused by components dropping.

With the valve/actuator upside down, components may drop during disassembly or assembly. Be careful not to position yourself below the valve in the path of falling parts.

As the bonnet/plug/cage is lowered from the valve body, the center of gravity will be above the lifting points. Take care to prevent the assembly from tipping over as it is lowered. Either leave the actuator attached to the plug and bonnet, attach straps to the stem, or provide other means to prevent tipping.

## Disassembly

1. Provide adequate support to the actuator while removing it from the bonnet.

2. Provide adequate support to the bonnet while removing the bonnet nuts.
3. Be aware that the bonnet/plug/cage may tip over as they are lowered from the valve body. Make provision to prevent tipping.
4. Be aware that the cage and seat ring may not come out with the bonnet and plug/stem assembly. If this occurs, make provision to support these parts, as they may fall out unexpectedly.

## Assembly

1. Start this assembly procedure with the plug/stem assembly already installed in the bonnet.
2. Put the gaskets and cage onto the bonnet and plug.
3. Place the seat ring with the seat ring gasket onto the cage, if applicable with the valve design.
4. Raise this bonnet/plug/cage assembly up into the valve body. Make provision to prevent tipping of these parts as they are being raised into the valve body.
5. Torque the bonnet nuts.
6. Mount the actuator.

## 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, lapping metal seats, and ENVIRO-SEAL bellows seal bonnet replacement. All maintenance operations may be performed with the valve in the line.

### **⚠ WARNING**

**Avoid personal injury or property damage from sudden release of process pressure. Before performing any maintenance operations:**

- 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 or close 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 pneumatic actuator loading pressure and relieve any actuator spring precompression.
- 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.**

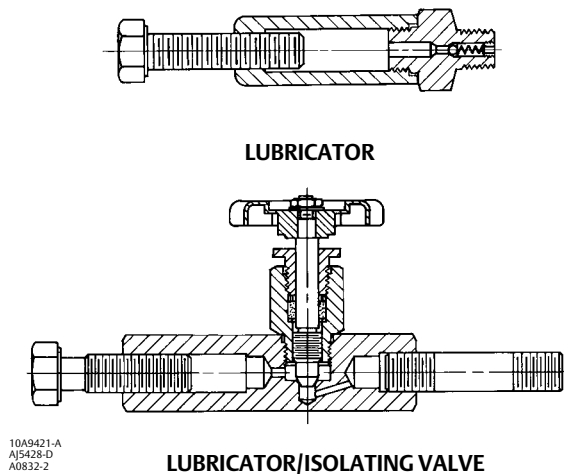
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**Note**

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

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Figure 3. Lubricator and Lubricator/Isolating Valve (optional)



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## Packing Lubrication

### CAUTION

Do not lubricate graphite packing. Graphite packing is self-lubricated. Additional lubrication may result in slip-stick movement of the valve.

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**Note**

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

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### ⚠ WARNING

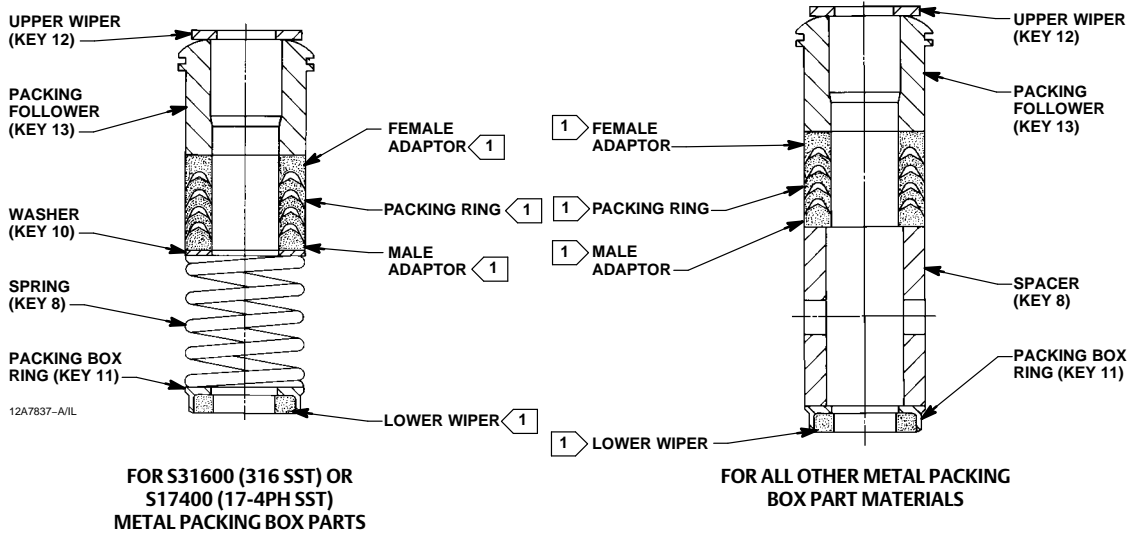
To avoid personal injury or property damage resulting from fire or explosion, do not lubricate packing used in oxygen service or in processes with temperatures over 260°C (500°F).

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If a lubricator or lubricator/isolating valve (figure 3) is provided for PTFE/composition or other packings that require lubrication, it will be installed in place of the pipe plug (key 14, figure 21). Use a good quality silicon-base lubricant. Do not lubricate packing used in oxygen service or in processes with temperatures over 260°C (500°F). 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 open the isolating valve before turning the cap screw and then close the isolating valve after lubrication is completed.

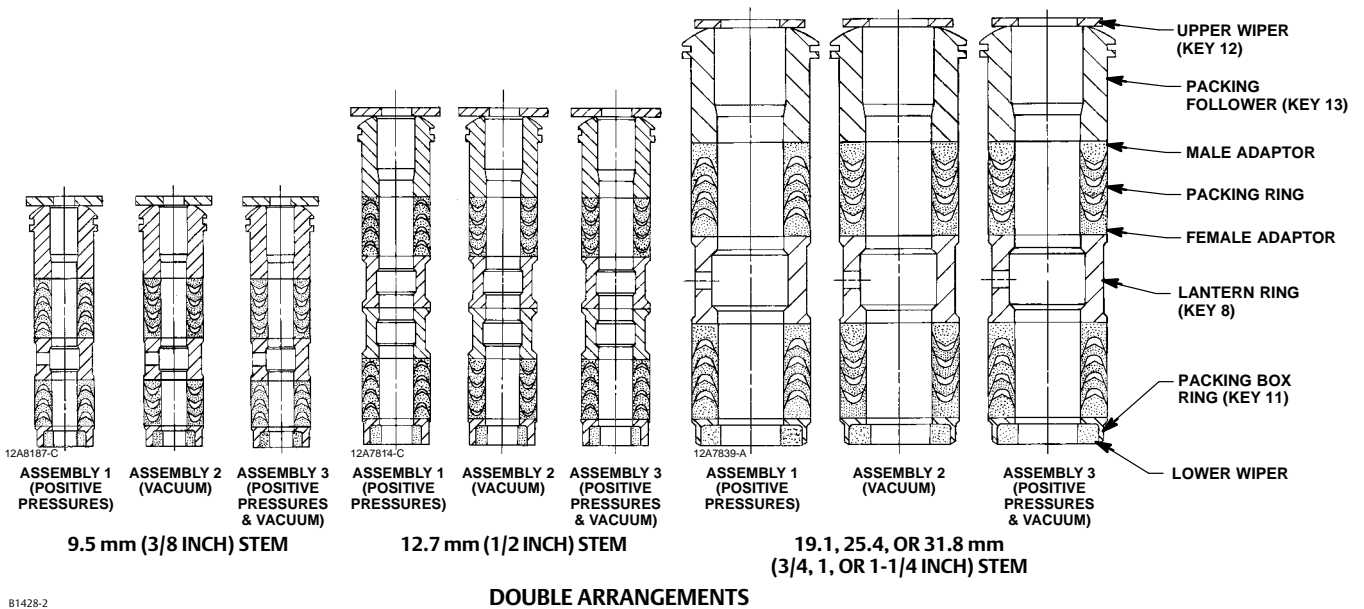


Figure 4. PTFE V-Ring Packing Arrangements



**SINGLE ARRANGEMENTS**

NOTE:  
 1 PACKING SET (KEY 6) (2 REQ'D FOR DOUBLE ARRANGEMENTS).  
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## Packing Maintenance

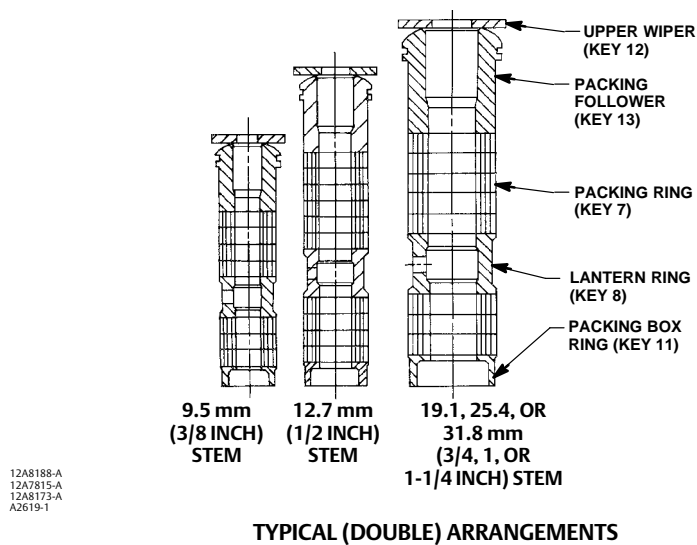
### Note

For valves with ENVIRO-SEAL live-loaded packing, see the Fisher instruction manual, ENVIRO-SEAL Packing System for Sliding-Stem Valves, [D101642X012](#), for packing instructions. For valves with HIGH-SEAL live-loaded packing, see the Fisher instruction manual, HIGH-SEAL Live-Loaded Packing System, [D101453X012](#), for packing instructions.

Key numbers refer to figure 4 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 4) maintains a sealing force on the packing. If leakage is noted around the packing follower (key 13, figure 4), 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 21) until the shoulder is against the bonnet. If leakage cannot be stopped in this manner, go to the Replacing Packing procedure.

Figure 5. Detail of PTFE/Composition Packing Arrangements



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, the valve stem may be 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, the leakage may be 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

Avoid personal injury or property damage from sudden release of process pressure. Before performing any maintenance operations:

- 
- 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 or close 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 pneumatic actuator loading pressure and relieve any actuator spring precompression.
  - 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.
- 

1. Isolate the control valve from the line pressure, release pressure from both sides of the valve, and drain the process media from both sides of the valve. If using a power actuator, also shut-off all pressure lines to the power actuator and release all pressure from the actuator. Use lock-out procedures to be sure that the above measures stay in effect while you work on the equipment.
2. Disconnect the operating lines from the actuator and any leak-off piping from the bonnet. Disconnect the stem connector, and then remove the actuator from the valve by unscrewing the yoke locknut (key 15, figure 21) or the hex nuts (key 26, figure 21).
3. Loosen the packing flange nuts (key 5, figure 21) so that the packing is not tight on the valve stem. Remove any travel indicator parts and stem locknuts from the valve stem threads.

### **⚠ 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.

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#### **Note**

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

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4. Hex nuts (key 16, figure 22, 23 or 24) attach the bonnet (key 1, figure 21) to the valve body (key 1, figure 22, 23 or 24). Loosen these nuts 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. If no fluid leaks from the joint, proceed with bonnet removal as described in the following steps.

### **CAUTION**

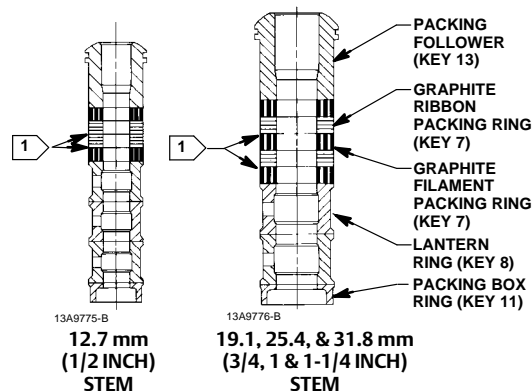
To avoid damage to the seating surface caused by the valve plug and stem assembly dropping from the bonnet after being lifted part way out, temporarily install a valve stem locknut on the valve stem when lifting the bonnet. The locknut prevents the valve plug and stem assembly from dropping out of the bonnet.

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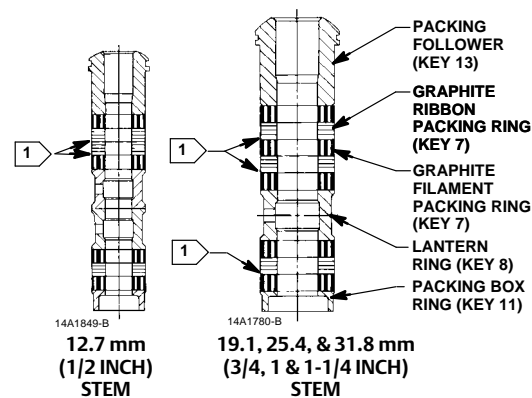
5. Completely remove the hex nuts (key 16) and carefully lift the bonnet off the valve body.

6. 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.
7. Remove the bonnet gasket (key 10, figure 22 through 24), and cover the opening in the valve body 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 21). 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 that 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 cavity and install a new bonnet gasket (key 10, figure 22 through 24), making sure the gasket seating surfaces are clean and smooth. Place the stem and valve plug into the valve body and slide the bonnet over the stem and onto the stud bolts (key 15, figure 22, 23, or 24).

Figure 6. Detail of Graphite Ribbon/Filament Packing




**SINGLE ARRANGEMENTS**



**DOUBLE ARRANGEMENTS**

A6067

NOTES:  
 0.102 mm (0.004 INCH) THICK SACRIFICIAL ZINC WASHERS;  
 USE ONLY ONE BELOW EACH GRAPHITE RIBBON RING.

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**Note**

Proper performance of the tightening procedures in step 11 compresses the spiral wound gasket (key 12, figure 22 through 23) or load ring (key 26, figure 24) enough to both load and seal the seat ring gasket (key 13, figure 22, 23 or 24). It also compresses the outer edge of the bonnet gasket (key 10, figure 22 through 24) 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 nuts onto the studs in a criss-cross pattern. Because of the bolt-up characteristics of spiral wound gaskets, tightening one nut may loosen an adjacent nut. Repeat the criss-cross tightening pattern several times until each nut is tight and the body-to-bonnet seal is made. When the operating temperature has been reached, perform this torquing procedure once again.

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**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.

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**⚠ 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 Automation Solutions representative immediately if a discrepancy between actual parts and approved parts is suspected.**

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11. Lubricate the bolting (not necessary if factory pre-lubricated stud bolt nuts are used) and install it, using proper bolting procedures during tightening so that the body-to-bonnet joint will withstand test pressures and application service conditions. Use the bolt torques in table 5 as guidelines.
12. Install new packing and the metal packing box parts according to the appropriate arrangement in figure 4, 5, or 6. Place a smooth-edged pipe over the valve stem and gently tap each soft packing part into the packing box.
13. Slide the packing follower, upper wiper, and packing flange (keys 13, 12, and 3, figure 21) into position. Lubricate the packing flange studs (key 4, figure 21) and the faces of the packing flange nuts (key 5, figure 21). 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 21) contacts the bonnet.

For **graphite packing**, tighten the packing flange nuts to the maximum recommended torque shown in table 6. Then, loosen the packing flange nuts, and retighten them to the recommended minimum torque shown in table 6.

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

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. Then, tighten the remaining flange nuts until the packing flange is level and at a 90-degree angle to the valve stem.

15. 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**

Avoid personal injury or property damage from sudden release of process pressure. Before performing any maintenance operations:

- 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 or close 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 pneumatic actuator loading pressure and relieve any actuator spring precompression.
- 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.

Table 5. Body-to-Bonnet Bolt Torque Guidelines

VALVE SIZE, NPS		BOLT TORQUES <sup>(1, 2)</sup>	
		N•m	Lbf•ft
4x2		102	75
6x4 or 8x4		259	191
8x6	CL300 or CL600	548	404
	CL900	1315	970
10x8		745	550
12x6		548	404
12x8	CL300 or CL600	732	540
	CL900	2712	2000

1. Determined from laboratory tests.  
2. For other materials, contact your [Emerson sales office](#) or Local Business Partner for torques.

Table 6. Recommended Torque for Packing Flange Nuts

VALVE STEM DIAMETER		PRESSURE RATING	GRAPHITE TYPE PACKING				PTFE TYPE PACKING			
			Minimum Torque		Maximum Torque		Minimum Torque		Maximum Torque	
			N•m	Lbf•In	N•m	Lbf•In	N•m	Lbf•In	N•m	Lbf•In
12.7	1/2	CL300	7	59	10	88	3	28	5	42
12.7		CL600	9	81	14	122	4	39	7	58
19.1	3/4	CL300	15	133	23	199	7	64	11	95
19.1		CL600	21	182	31	274	10	87	15	131
25.4	1	CL300	26	226	38	339	12	108	18	162
25.4		CL600	35	310	53	466	17	149	25	223
31.8	1-1/4	CL300	36	318	54	477	17	152	26	228
31.8		CL600	49	437	74	655	24	209	36	314

**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.**

For C-seal construction, see the appropriate C-seal sections in this instruction manual.

Except where indicated, key numbers in this section are referenced in figure 22 for EWD constructions, figure 22 for restricted trim detail, figure 23 for EWS constructions, and figure 24 for EWT constructions. Refer to figures 26 and 27 for Cavitol III, figure 27 for Whisper Trim III, and figure 29 for WhisperFlo construction.

**Trim Removal**

1. Remove the actuator and the bonnet according to steps 1 through 5 of the Replacing Packing procedure.

**⚠ WARNING**

**Avoid personal injury or property damage from valve or packing leakage.**

**When lifting the valve plug stem (key 7) and attached valve plug (key 2) out of the valve, be certain that the cage (key 3) remains in the valve (key 1). This will prevent cage damage that might be caused by the cage dropping back into the valve after being lifted part way out.**

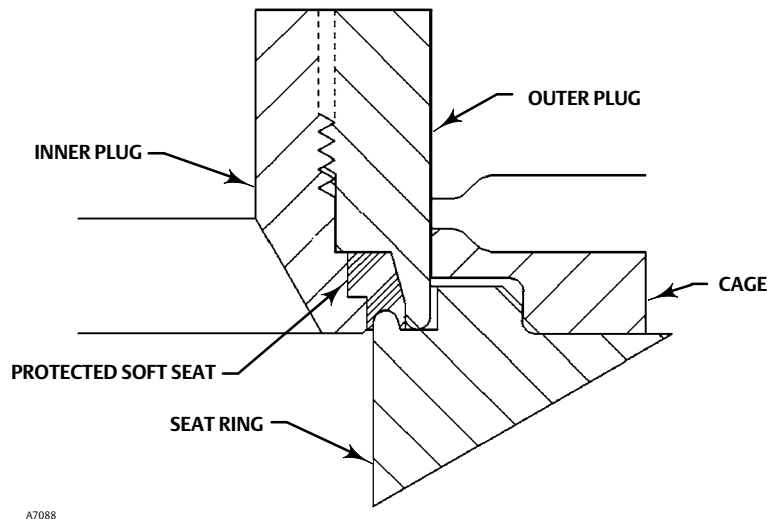
**Use care to avoid damaging gasket sealing surfaces.**

**Each graphite piston ring (key 6) in an EWD valve is brittle and in two pieces. Use care to avoid damage to the piston ring(s) caused by dropping or rough handling.**

**Any damage to the gasket sealing surfaces could cause the valve to leak. 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 and for making a seal with the piston ring (key 6) or seal ring (key 28). The seating surfaces of the valve plug (key 2) and the seat ring (key 9) on a metal-seat construction are critical for tight shutoff. Protect these parts accordingly while disassembling the trim.**

2. Remove the packing flange nuts, packing flange, upper wiper, and packing follower (keys 5, 3, 24, and 25, figure 21). 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.
3. 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.
4. Remove the load ring (key 26) from an NPS 10x8 or 12x8 valve or the cage adaptor (key 4) from any restricted-trim valve through NPS 8x4, and wrap it for protection.
5. On a 102 mm (4-inch) travel valve with Whisper Trim I cage or on any NPS 8x6 or 12x6 valve with Whisper Trim III cage, 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 cage retainer has two 3/8-inch - 16 UNC tappings in which screws or bolts can be installed for lifting.
6. Remove the cage or cage/baffle assembly (key 3) and the associated gaskets (keys 10, 11, and 12). With full-capacity constructions that have FGM gasket sets, a shim (key 53) is used instead of the cage gasket (key 11). If the cage is stuck in the valve, use a rubber mallet to strike the exposed portion of the cage at several points around its circumference.

Figure 7. TSO (Tight Shutoff Trim), Detail of Protected Soft Seat



7. For constructions other than TSO (tight shutoff trim), remove the seat ring (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-capacity construction. EWS and EWT PTFE-seat constructions use a disk (key 23) sandwiched between the disk seat and disk retainer (key 21). A CL900 NPS 8x6 EWT construction with Cavitrol III cage has its spiral wound gasket (key 12) on the side of the seat ring opposite the seat ring gasket.
8. For TSO (tight shutoff trim) constructions, perform the following steps (refer to figures 7 and 8):
  - Remove the piston ring, anti-extrusion rings, backup ring, and retainer.
  - Remove the set screws that lock the outer plug to the inner plug.
  - Using a strap wrench or similar tool, unscrew the outer plug from the inner plug. Do not damage the outer plug guide surfaces.
  - Remove the protected soft seat seal.
  - Inspect the parts for damage and replace if needed.
9. For all constructions, inspect parts for wear or damage that would prevent proper operation of the valve. Replace or repair trim parts according to the following procedures for lapping metal seats or other valve plug maintenance procedures, as appropriate.

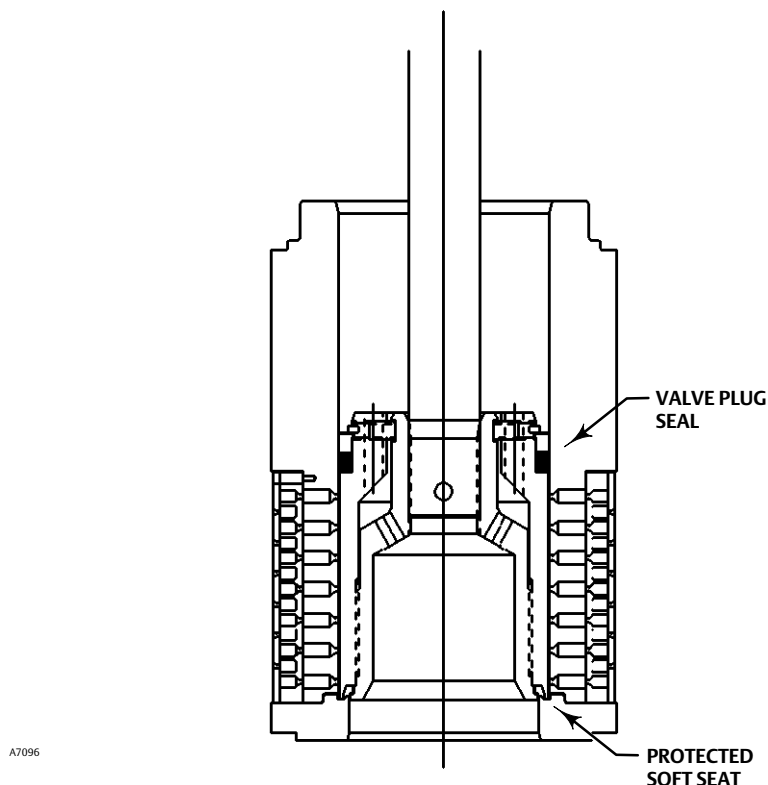
## Lapping Metal Seats

### 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 rotation will damage internal components of the ENVIRO-SEAL bellows seal bonnet.



Figure 8. Typical Balanced TSO Trim



Except with respect to the ENVIRO-SEAL Bellows Seal Bonnet assembly, with metal seat constructions, seating surfaces of the valve plug and seat ring (keys 2 and 9, figures 24 through 26) can be lapped for improved shutoff. (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 cage retainer and bonnet spacer, if used) is in place and the bonnet is bolted to the valve. 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 the valve as described in the Trim Replacement portion of the Trim Maintenance section, and test the valve for shutoff. Repeat the lapping procedure if leakage is still excessive.

## Valve Plug Maintenance

Except where indicated, key numbers in this section are referenced in figure 22 for EWD valve plugs, figure 23 for EWS valve plugs, and figure 24 for EWT valve plugs.

### CAUTION

**If replacing the piston ring (key 6) or seal ring (key 28), be careful not to scratch the surfaces of the ring groove in the valve plug or any of the surfaces of the replacement ring, or the replacement ring may not seal properly.**

1. With the valve plug (key 2) removed, according to the Trim Removal section, proceed as appropriate:

For the EWD carbon-filled PTFE piston ring, the ring is split in one place. If there is visible damage, spread the ring slightly, and remove it from the groove in the valve plug. To install a carbon-filled PTFE piston ring, spread the ring apart slightly at the split, and install it over the stem and into the groove in the valve plug. The open side must face along the stem, depending on flow direction, as shown in figure 22.

For each EWD graphite piston ring, the ring can be easily removed since it is in two pieces. A new graphite piston ring is furnished as a complete ring. Use a vise with smooth or taped jaws to break this replacement ring into halves. Place the new ring in the vise so that the jaws will compress the ring into an oval. Slowly compress the ring until it snaps on both sides. If one side snaps first, do not try to tear or cut the other side. Instead, keep compressing the ring until the other side snaps. Be sure to match the broken ends when installing the ring in the valve plug groove.

For the EWT two-piece seal ring, the ring cannot be reused as it is a closed ring, which must be pried and/or cut from the groove. Then the elastomeric backup ring (key 29) can be spread slightly and removed.

To install a new two-piece seal ring, apply a general purpose silicone-base lubricant to both the backup ring and seal ring (keys 29 and 28). Place the backup ring over the stem (key 7) and into the groove. Place the seal ring over the top edge of the valve plug (key 2) so that it enters the groove on one side of the valve plug. Slowly and gently stretch the seal ring, and work it over the top edge of the valve plug. The PTFE material in the seal ring must be permitted time to cold-flow during the stretching procedure; so avoid jerking sharply on this ring. Stretching the seal ring over the valve plug may make it seem unduly loose when in the groove, but it will contract to its original size after insertion into the cage.

For the EWT spring-loaded seal ring, the ring used on a valve plug having a 136.5 mm (5.375 inch) or less port diameter may be removed undamaged by first working the retaining ring (key 27) off with a screwdriver. Then carefully slide the metal backup ring (key 29) and seal ring (key 28) off the valve plug (key 2). The spring-loaded seal ring used on a valve plug having a 178 mm (7-inch) or greater port diameter must be carefully pried and/or cut from its groove. Therefore, it cannot be reused.

A spring-loaded seal ring must be installed so that its open side faces toward either the top or the bottom of the valve plug, depending on flow direction, as shown in view A of figure 24. To install a spring-loaded seal ring on a valve plug with a 136.5 mm (5.375 inch) or less port diameter, slide the seal ring (key 28) onto the valve plug followed by the metal backup ring (key 29). Then install the retaining ring (key 27) by inserting one end in the groove and, while turning the plug, press the ring into the groove. Again, be careful not to scratch any surfaces of the ring or plug.

To install the seal ring on a valve plug with 178 mm (7-inch) or greater port diameter, lubricate it with a general purpose silicone-base lubricant. Then gently stretch the seal ring, and work it over the top edge of the valve plug. The PTFE material in the seal ring must be permitted time to cold-flow during the stretching procedure; so avoid jerking sharply on the ring. Stretching the seal ring over the valve plug may make it seem unduly loose when in the groove, but it will contract to its original size after insertion into the cage.

## CAUTION

**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). This drilling weakens the stem or adaptor and may cause failure in service. However, a used valve plug may be reused with a new stem or adaptor except with Cavitrol III trim.**

### Note

The valve plug and valve plug stem for Cavitrol III trim are a matched set and must be ordered together. If the Cavitrol III valve plug or valve plug stem is damaged, replace the entire assembly (key 2, figure 26 and 27).

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 21) 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 the pin (key 36, figure 21). Reverse the plug stem assembly and valve plug 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 21) from the valve stem assembly (key 20, figure 21).
4. Screw the new stem or adaptor into the valve plug. Tighten to the torque value given in table 7. Refer to table 7 to select the proper drill 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.

### Trim Replacement

Except where indicated, key numbers in this section are referenced in figure 22 for EWD constructions, figure 22 for restricted trim detail, figure 23 for EWS construction, and figure 24 for EWT constructions. Refer to figures 26 and 27 for Cavitrol III, figure 28 for Whisper Trim III, and figure 29 for WhisperFlo constructions.

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 (key 9), or disk seat (key 22). With a PTFE-seat construction install the disk and disk retainer (keys 21 and 23). With an NPS 8x6 CL900 EWT valve with Cavitrol III cage, install the spiral wound gasket (key 12) on the seat ring.
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 or Cavitrol III cage 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. For constructions other than TSO (tight shutoff trim), slide the valve plug (key 2) and stem assembly or valve plug and ENVIRO-SEAL bellows seal assembly into the cage. Make sure the piston ring or seal ring (key 6 or 28) is evenly engaged in the entrance chamfer at the top of the cage (key 3) or cage retainer (key 31) to avoid damaging the ring.
5. For TSO (tight shutoff) trim constructions, perform the following steps (refer to figures 7 and 8).
  - Thread the outer plug onto the inner plug until the parts seat metal to metal, using a strap wrench or similar tool that will not damage the outer plug guide surfaces.
  - Mark the top of the inner plug and outer plug with alignment marks in the assembled position.

Table 7. Valve Stem to Plug Torque and Pin Replacement Data

VALVE STEM DIAMETER		STEM TORQUE, MINIMUM TO MAXIMUM		DRILL SIZE, INCHES
mm	Inch	N•m	Lbf•ft	
12.7	1/2	81 to 115	60 to 85	1/8
19.1	3/4	237 to 339	175 to 250	3/16
25.4	1	420 to 481	310 to 355	1/4
31.8	1-1/4	827 to 908	610 to 670	1/4

- Disassemble the outer plug from the inner plug and install the seal over the inner plug, so that the seal rests below the threaded area.
- Thread the outer plug onto the inner plug and tighten with a strap wrench or similar tool until the alignment marks line up. This will ensure that the plug parts are metal to metal and the seal is compressed properly. Do not damage the outer plug guide surfaces.
- Install set screws centering the inner plug in the outer plug and torque to 11 N•m (8 lbf•ft).

- Assemble the piston ring, anti-extrusion rings, backup ring, and retainer.
- 6. For all constructions, place the gaskets (keys 12, 11 or 14 if used, and 10) and the shim, if used (key 53), 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 adapter or spacer. If there is only a cage retainer or bonnet spacer, place another flat sheet gasket on the retainer or spacer.
- 7. With an NPS 10x8 or 12x8 valve, install the load ring (key 26).
- 8. Mount the bonnet on the valve, and complete assembly according to steps 11 through 15 of the Replacing Packing section. Be sure to observe the note prior to step 11.

## Retrofit: Installing C-seal Trim

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### Note

Additional actuator thrust is required for a valve with C-seal trim. When installing C-seal trim in an existing valve, contact your [Emerson sales office](#) or Local Business Partner for assistance in determining new actuator thrust requirements.

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Assemble the new valve plug/retainer assembly (with C-seal plug seal) using the following instructions:

### CAUTION

**To avoid leakage when the valve is returned to service, use appropriate methods and materials to protect all sealing surfaces of the new trim parts while assembling the individual parts and during installation in the valve body.**

---

1. Apply a suitable high-temperature lubricant to the inside diameter of the C-seal plug seal. Also, lubricate the outside diameter of the valve plug where the C-seal plug seal must be pressed into the proper sealing position (figure 9).
2. Orient the C-seal plug seal for correct sealing action based on the process fluid flow direction through the valve.
  - The open interior of the C-seal plug seal must face up in a valve with flow-up construction (figure 9).
  - The open interior of the C-seal plug seal must face down in a valve with flow-down construction (figure 9).

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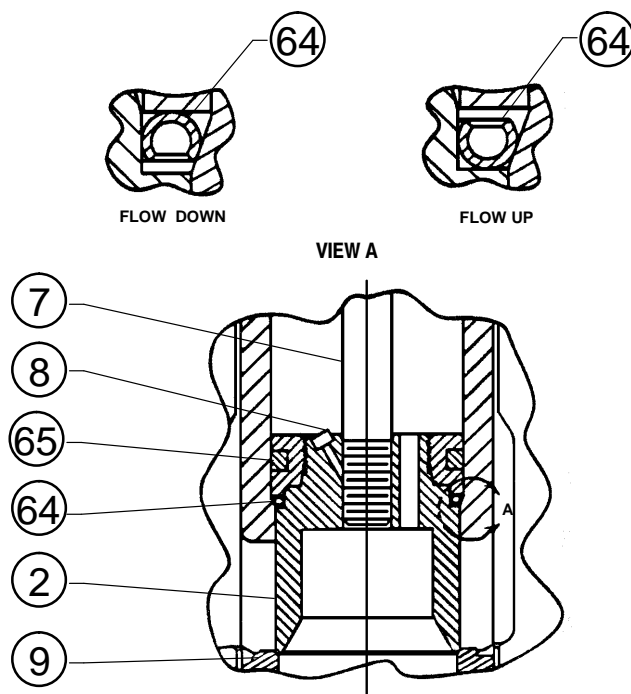
### Note

An installation tool must be used to properly position the C-seal plug seal on the valve plug. A tool is available as a spare part from Emerson or a tool could be manufactured following the dimensions given in figure 10.

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3. Place the C-seal plug seal over the top of the valve plug and press the C-seal plug seal onto the plug using the C-seal installation tool. Carefully press the C-seal plug seal onto the plug until the installation tool contacts the horizontal reference surface of the valve plug (figure 11).
4. Apply a suitable high-temperature lubricant to the threads on the plug. Then, place the C-seal retainer onto the plug and tighten the retainer using an appropriate tool such as a strap wrench.
5. Using an appropriate tool such as a center punch, stake the threads on top of the plug in one place (figure 12) to secure the C-seal retainer.

Figure 9. Fisher EWD with C-seal Trim



A6790

6. Install the new plug/retainer assembly with C-seal plug seal on the new stem following the appropriate instructions in the Trim Replacement section of this manual.
7. Install piston rings by following instructions in the Trim Replacement section of this manual.
8. Remove the existing valve actuator and bonnet following the appropriate instructions in the Replacing Packing section in this manual.

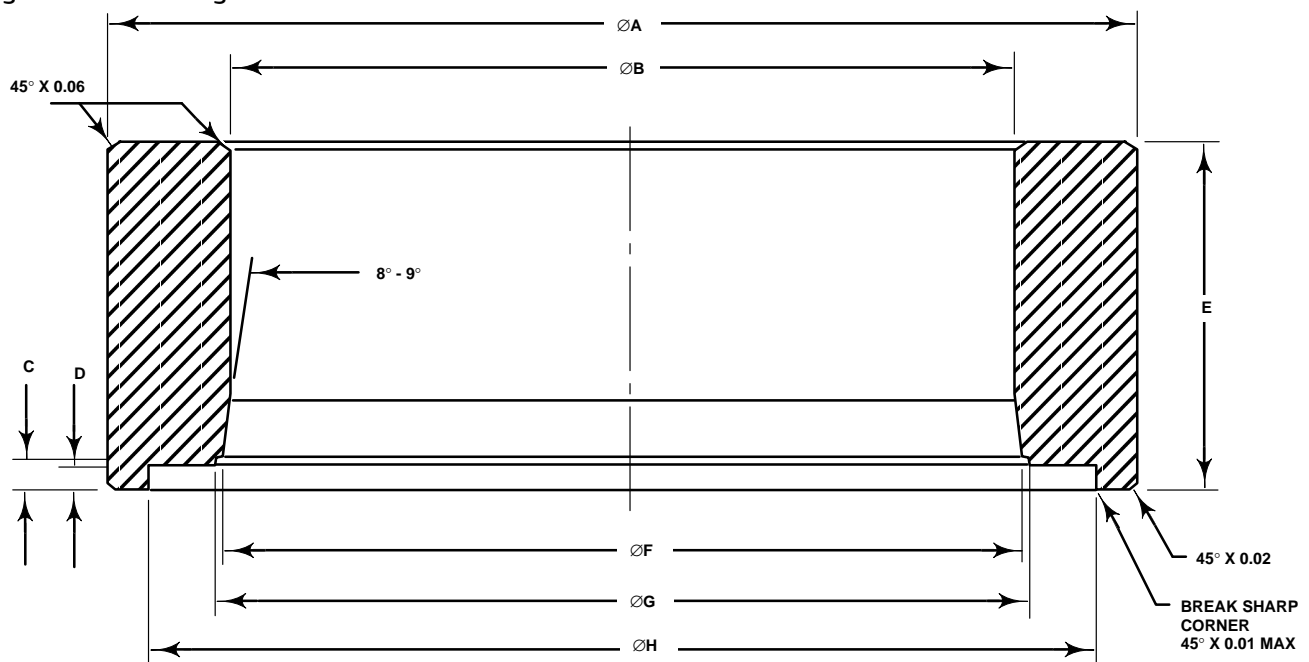
### CAUTION

**Do not remove the existing valve stem from the valve plug unless you are planning to replace the valve stem. Never reuse an old valve stem with a new plug or reinstall a valve stem after it has been removed. Replacing a valve stem requires drilling a new pin hole in the stem. This drilling weakens the stem and may cause failure in service. However, a used valve plug may be reused with a new valve stem.**

9. Remove the existing valve stem and plug, cage, and seat ring from the valve body following the appropriate instructions in the Trim Removal section in this manual.
10. Replace all gaskets according to appropriate instructions in the Trim Replacement section in this manual.
11. Install the new seat ring, cage, valve plug/retainer assembly, and stem into the valve body and completely reassemble the valve package following the appropriate instructions in the Trim Replacement section in this manual.

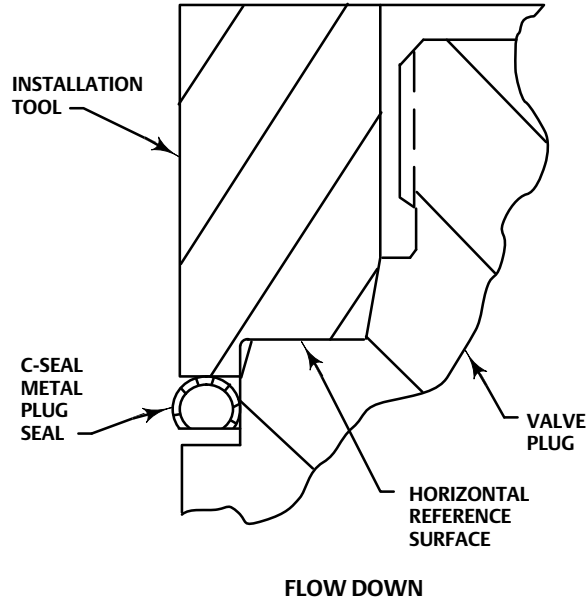
FOR VALVE PLUGS FITTING PORT SIZE (Inches)	DIMENSIONS, mm (See Drawing Below)								Part Number (To Order A Tool)
	A	B	C	D	E	F	G	H	
2.875	82.55	52.324 - 52.578	4.978 - 5.029	3.708 - 3.759	41.148	52.680 - 52.781	55.118 - 55.626	70.891 - 71.044	24B9816X012
3.4375	101.6	58.674 - 58.928	4.978 - 5.029	3.708 - 3.759	50.8	61.011 - 61.112	63.449 - 63.957	85.166 - 85.319	24B5612X012
3.625	104.394	65.024 - 65.278	4.978 - 5.029	3.708 - 3.759	50.8	68.936 - 69.037	71.374 - 71.882	89.941 - 90.094	24B3630X012
4.375	125.984	83.439 - 83.693	4.978 - 5.029	3.708 - 3.759	50.8	87.351 - 87.452	89.789 - 90.297	108.991 - 109.144	24B3635X012
5.375	142.748	100.076 - 100.33	4.978 - 5.029	3.708 - 3.759	45.974	103.835 - 103.937	106.274 - 106.782	128.219 - 128.372	23B9193X012
7	184.15	141.376 - 141.630	4.978 - 5.029	3.708 - 3.759	60.198	145.136 - 145.237	147.574 - 148.082	169.520 - 169.672	23B9180X012
8	209.55	166.776 - 167.030	4.978 - 5.029	3.708 - 3.759	55.88	170.536 - 170.637	172.974 - 173.482	194.920 - 195.072	24B9856X012
FOR VALVE PLUGS FITTING PORT SIZE (Inches)	DIMENSIONS, INCHES (See Drawing Below)								Part Number (To Order A Tool)
	A	B	C	D	E	F	G	H	
2.875	3.25	2.060 - 2.070	0.196 - 0.198	0.146 - 0.148	1.62	2.074 - 2.078	2.170 - 2.190	2.791 - 2.797	24B9816X012
3.4375	4.00	2.310 - 2.320	0.196 - 0.198	0.146 - 0.148	2.00	2.402 - 2.406	2.498 - 2.518	3.353 - 3.359	24B5612X012
3.625	4.11	2.560 - 2.570	0.196 - 0.198	0.146 - 0.148	2.00	2.714 - 2.718	2.810 - 2.830	3.541 - 3.547	24B3630X012
4.375	4.96	3.285 - 3.295	0.196 - 0.198	0.146 - 0.148	2.00	3.439 - 3.443	3.535 - 3.555	4.291 - 4.297	24B3635X012
5.375	5.62	3.940 - 3.950	0.196 - 0.198	0.146 - 0.148	1.81	4.088 - 4.092	4.184 - 4.204	5.048 - 5.054	23B9193X012
7	7.25	5.566 - 5.576	0.196 - 0.198	0.146 - 0.148	2.37	5.714 - 5.718	5.810 - 5.830	6.674 - 6.680	23B9180X012
8	8.25	6.566 - 6.576	0.196 - 0.198	0.146 - 0.148	2.20	6.714 - 6.718	6.810 - 6.830	7.674 - 7.680	24B9856X012

Figure 10. C-seal Plug Seal Installation Tool



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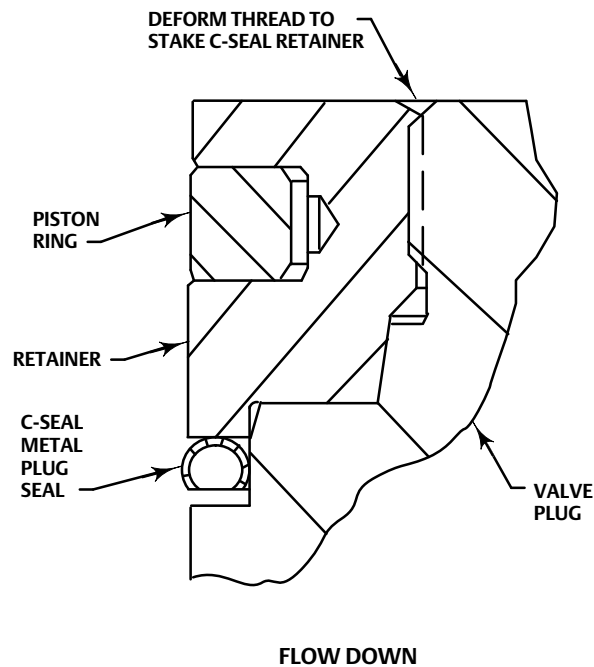
Figure 11. Installing the C-seal Plug Seal Using the Installation Tool



NOTE:  
PRESS INSTALLATION TOOL OVER VALVE PLUG UNTIL THE TOOL CONTACTS THE HORIZONTAL REFERENCE SURFACE OF THE VALVE PLUG.

A6778

Figure 12. Stake the Threads of the C-seal Retainer



A6779

## CAUTION

To avoid excessive leakage and seat erosion, the valve plug must be initially seated with sufficient force to overcome the resistance of the C-seal plug seal and contact the seat ring. You can correctly seat the valve plug by applying the full actuator load. This force will adequately drive the valve plug to the seat ring, thus giving the C-seal plug seal a predetermined permanent set. Once this is done, the plug/retainer assembly, the cage, and the seat ring become a matched set.

With full actuator force applied and the valve plug fully seated, align the actuator travel indicator scale with the lower end of valve travel. Refer to the appropriate actuator instruction manual for information on this procedure.

## Replacement of Installed C-seal Trim

### Trim Removal (C-seal Constructions)

1. Remove the valve actuator and bonnet following the appropriate instructions in the Replacing Packing section in this manual.

## CAUTION

To avoid leakage when the valve is returned to service, use appropriate methods and materials to protect all sealing surfaces of the trim parts during maintenance.

Use caution when removing piston ring(s) and C-seal plug seal to avoid scratching any sealing surface.

## CAUTION

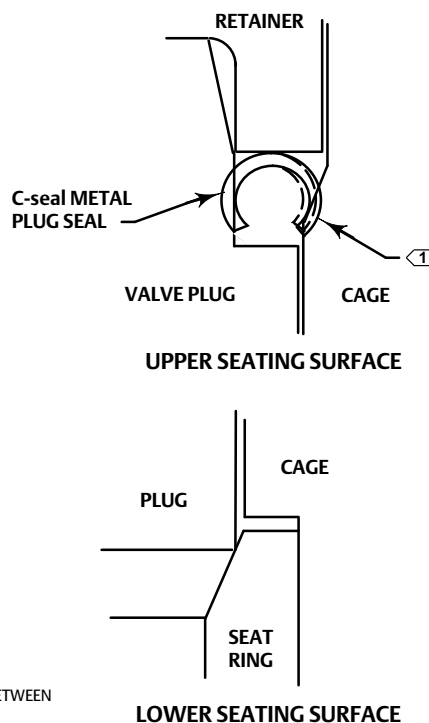
Do not remove the valve stem from the plug/retainer assembly unless you are planning to replace the valve stem.

Never reuse an old valve stem with a new plug or reinstall a valve stem after it has been removed. Replacing a valve stem requires drilling a new pin hole in the stem. This drilling weakens the stem and may cause failure in service. However, a used valve plug may be reused with a new valve stem.

2. Remove the plug/retainer assembly (with C-seal plug seal), cage, and seat ring from the valve body following the appropriate instructions in the Trim Removal section of this manual.
3. Locate the staked thread on top of the valve plug (figure 12). The staked thread secures the retainer. Use a drill with a 1/8 inch bit to drill out the staked area of the thread. Drill approximately 1/8 inch into the metal to remove the staking.
4. Locate the break between sections of the piston ring(s). Using an appropriate tool such as a flat-blade screwdriver, carefully pry out the piston ring(s) from the groove(s) in the C-seal retainer.
5. After removing the piston ring(s), locate the 1/4-inch diameter hole in the groove. In a retainer with two piston ring grooves, the hole will be found in the upper groove.
6. Select an appropriate tool such as a punch and place the tip of the tool into the hole with the body of the tool held tangent to the outside diameter of the retainer. Strike the tool with a hammer to rotate the retainer and free it from the valve plug. Remove the retainer from the plug.
7. Use an appropriate tool such as a flat-blade screwdriver to pry the C-seal plug seal off the plug. Use caution to avoid scratches or other damage to the sealing surfaces where the C-seal plug seal makes contact with the valve plug (figure 13).



Figure 13. Lower (Valve Plug to Seat Ring) and Upper (C-seal Plug Seal to Cage) Seating Surfaces



NOTE:  
 1 > UPPER SEATING SURFACE IS THE AREA OF CONTACT BETWEEN THE C-seal METAL PLUG SEAL AND THE CAGE.

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8. Inspect the lower seating surface where the valve plug contacts the seat ring for wear or damage which would prevent proper operation of the valve. Also, inspect the upper seating surface inside the cage where the C-seal plug seal contacts the cage, and inspect the sealing surface where the C-seal plug seal makes contact with the plug (figure 13).
9. Replace or repair trim parts according to the following procedure for lapping metal seats, remachining metal seats, or other valve plug maintenance procedures as appropriate.

### Lapping Metal Seats (C-seal Constructions)

Before installing a new C-seal plug seal, lap the lower seating surface (valve plug to seat ring, figure 13) following appropriate procedures in the Lapping Metal Seats section of this manual.

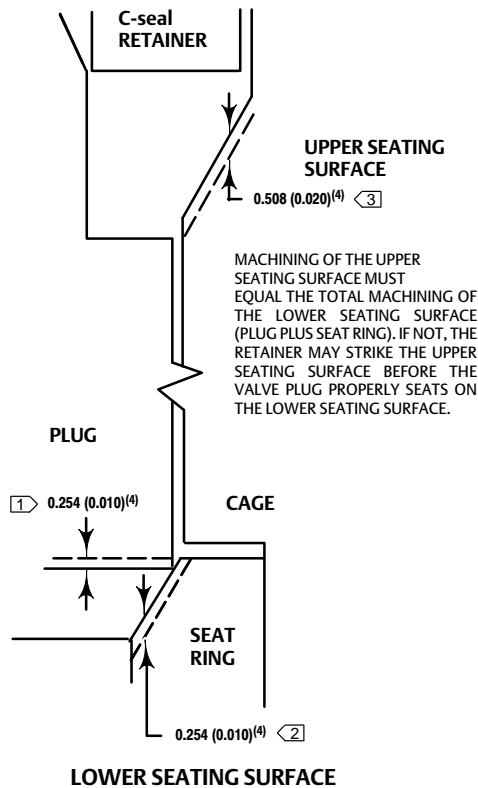
### Remachining Metal Seats (C-seal Constructions)

See figure 14. A valve plug with a C-seal metal plug seal features two seating surfaces. One seating surface is found where the valve plug contacts the seat ring. The second seating surface is found where the C-seal plug seal contacts the upper seating surface in the cage. If you machine the seats on the seat ring and/or plug, you must machine an equal dimension from the seating area in the cage.

## CAUTION

**If metal is removed from the seat ring and plug and a corresponding amount is not removed from the cage seating area, the C-seal plug seal will be crushed as the valve closes and the C-seal retainer will strike the seating area of the cage, preventing the valve from closing.**

Figure 14. Example of Machining the Lower (Valve Plug to Seat Ring) and Upper (C-seal Plug Seal to Cage) Seating Surfaces



NOTE:

PLUS

1> REMOVAL OF 0.254 mm (0.010 inch) FROM THE VALVE PLUG  
 2> REMOVAL OF 0.254 mm (0.010 inch) FROM THE SEAT RING  
 3> REMOVAL OF 0.508 mm (0.020 inch) FROM THE UPPER SEATING SURFACE IN THE CAGE  
 4. THESE VALUES ARE FOR EXAMPLE ONLY. REMOVE ONLY THE MINIMUM AMOUNT OF MATERIAL REQUIRED TO REFURBISH THE SEATS.

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## Trim Replacement (C-seal Constructions)

1. Apply a suitable high-temperature lubricant to the inside diameter of the C-seal plug seal. Also, lubricate the outside diameter of the valve plug where the C-seal plug seal must be pressed into the proper sealing position (figure 9).
2. Orient the C-seal plug seal for correct sealing action based on the process fluid flow direction through the valve.
  - The open interior of the C-seal plug seal must face up in a valve with flow-up construction (figure 9).
  - The open interior of the C-seal plug seal must face down in a valve with flow-down construction (figure 9).

### Note

An installation tool must be used to properly position the C-seal plug seal on the valve plug. A tool is available as a spare part from Emerson or a tool could be manufactured following the dimensions given in figure 10.

3. Place the C-seal plug seal over the top of the valve plug and press it onto the plug using the installation tool. Carefully press the C-seal plug seal onto the plug until the installation tool contacts the horizontal reference surface of the valve plug (figure 11).
4. Apply a suitable high-temperature lubricant to the threads on the plug. Then, place the C-seal retainer onto the plug and tighten the retainer using an appropriate tool such as a strap wrench.
5. Using an appropriate tool such as a center punch, stake the threads on top of the plug in one place (figure 12) to secure the C-seal retainer.
6. Replace the piston ring(s) following instructions in the Trim Replacement section of this manual.
7. Return the seat ring, cage, plug/retainer assembly, and stem to the valve body and completely reassemble the valve package following the appropriate instructions in the Trim Replacement section of this manual.

**CAUTION**

To avoid excessive leakage and seat erosion, the valve plug must be initially seated with sufficient force to overcome the resistance of the C-seal plug seal and contact the seat ring. You can correctly seat the valve plug by applying the full actuator load. This force will adequately drive the valve plug to the seat ring, thus giving the C-seal plug seal a predetermined permanent set. Once this is done, the plug/retainer assembly, the cage, and the seat ring become a matched set.

With full actuator force applied and the valve plug fully seated, align the actuator travel indicator scale with the lower end of valve travel. Refer to the appropriate actuator instruction manual for information on this procedure.

## ENVIRO-SEAL Bellows Seal Bonnet

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

Except where indicated, key numbers in this section are referenced in figure 22 for EWD constructions, figure 22 for restricted trim detail, figure 23 for EWS constructions, and figure 24 for EWT constructions. Refer to figures 26 and 27 for Cavitrol III, figure 27 for Whisper Trim III, and figure 29 for WhisperFlo constructions.

Table 8. Recommended Torque for ENVIRO-SEAL Bellows Seal Bonnet Packing Flange Nuts

VALVE SIZE, NPS	VALVE STEM DIAMETER THROUGH PACKING	MINIMUM TORQUE		MAXIMUM TORQUE	
		N•m	Lbf•in	N•m	Lbf•in
4x2	1/2	2	22	4	33
6x4 to 12x8	1	5	44	8	67

1. Remove the actuator and bonnet according to steps 1 through 6 of the Replacing Packing procedure in the Maintenance section.
2. Lift out the cage.
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 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.**

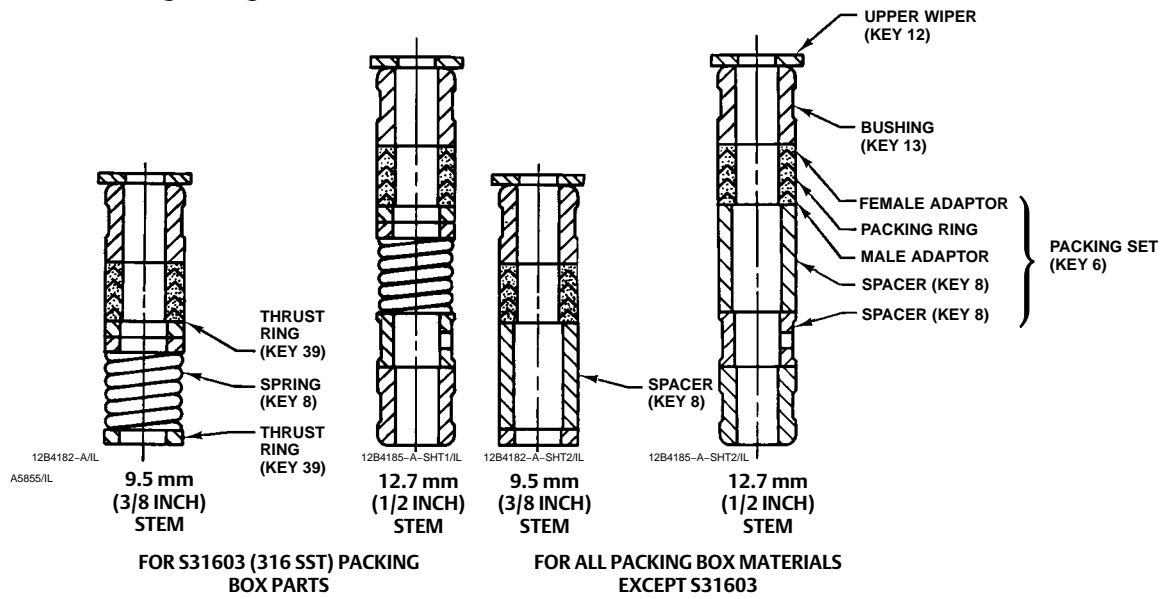
**Do not grip the bellows shroud or other parts of the stem/bellows assembly. Grip only the flat areas on the stem where it extends out of the top of the bellows shroud.**

## Note

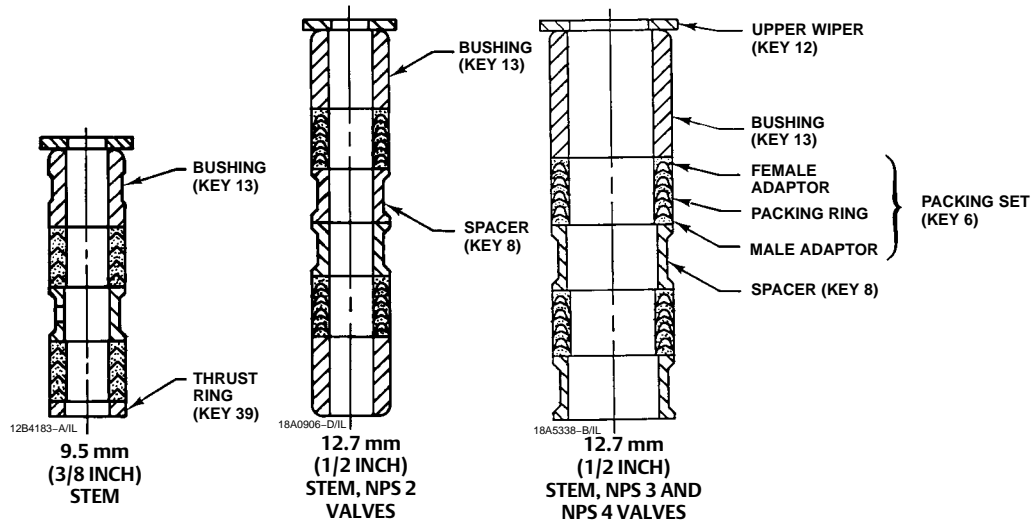
The ENVIRO-SEAL stem/bellows assembly has a one-piece stem.

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, figure 21). 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 (key 8) 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 the plug/adaptor assembly until it is snug. Then turn the plug/adaptor assembly to the next pin hole in the valve stem. Drive in new pin (key 36, figure 21) to lock the assembly.
9. Inspect the seat ring (key 9). 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, figure 21) over the stem/bellows assembly. Place the new ENVIRO-SEAL bonnet over the stem/bellows assembly.

Figure 15. PTFE Packing Arrangement for Use in Fisher ENVIRO-SEAL Bellows Seal Bonnets



**SINGLE ARRANGEMENTS**



**DOUBLE ARRANGEMENTS**

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**Note**

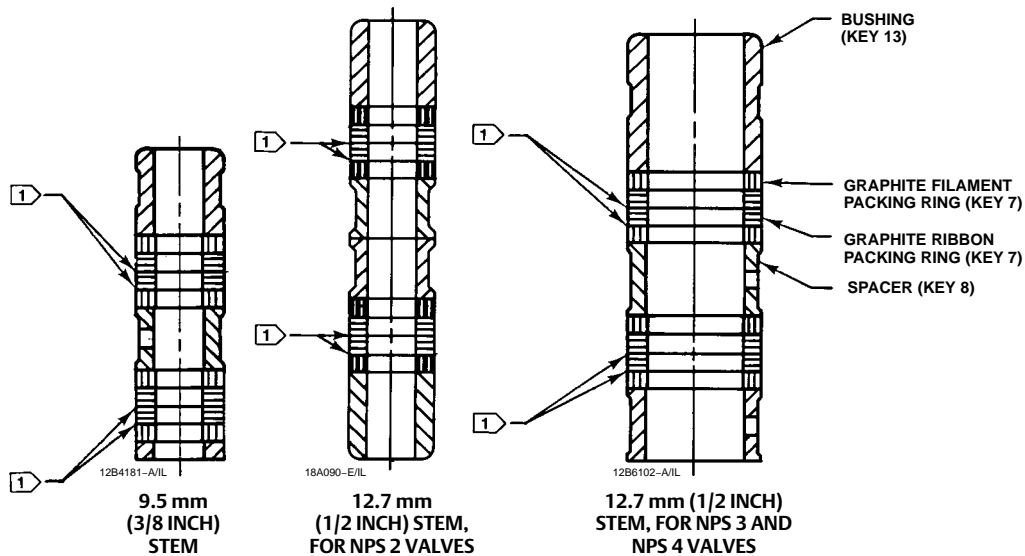
Stud(s) and nut(s) should be installed such that the manufacturer's trademark and material grade marking is visible, allowing easy comparison to the materials selected and documented in the Emerson/Fisher serial card provided with this product.

**⚠ 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 Automation Solutions 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 the new packing and the metal packing box parts according to the appropriate arrangement in figure 15 or 16.
14. Install the packing flange. Properly lubricate the packing flange stud bolts and the faces of the packing flange nuts.

Figure 16. Double Graphite Ribbon/Filament Arrangements for Use in Fisher ENVIRO-SEAL Bellows Seal Bonnets



NOTE:  
1 0.102 mm (0.004 INCH) THICK SACRIFICIAL ZINC WASHERS; USE ONLY ONE BELOW EACH GRAPHITE RIBBON RING.

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For **graphite packing**, tighten the packing flange nuts to the maximum recommended torque shown in table 8. Then, loosen the packing flange nuts, and retighten them to the recommended minimum torque shown in table 8.

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 8. Then, tighten the remaining flange nut until the packing flange is level and at a 90-degree angle to the valve stem.

15. Install the travel indicator parts and stem locknuts; 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 Bonnet (Stem/Bellows Assembly)

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

### CAUTION

The ENVIRO-SEAL stem/bellows assembly for easy-e valves is available only with a threaded and pinned plug/adaptor/stem connection. The existing valve plug can be reused with the new stem/bellows assembly or a new plug can be installed. If the existing valve plug is reused, and the adaptor is in good condition, it may be reused also. However, never reuse an old adaptor with a new valve plug. Using an old adaptor with a new valve plug requires drilling a new pin hole in the adaptor. This drilling weakens the adaptor and may cause failure in service. However, a used valve plug may be reused with a new adaptor.

3. Inspect the existing valve plug and adaptor. If they are in good condition, they can be reused with the new stem/bellows assembly and they do not need to be separated.

### 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.

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. If the valve plug and adaptor are not in good condition and must be replaced, the valve plug/adaptor assembly must first be removed from the stem/bellows assembly and then the valve plug removed from the adaptor. First, place the stem/bellows 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). Drive out the pin (key 36, figure 21).
5. Then, reverse the stem/bellows and plug/adaptor 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 plug/adaptor assembly from the stem/bellows assembly. Unscrew the valve plug from the adaptor.
6. To attach either the existing or a new valve plug to the stem of the new ENVIRO-SEAL stem/bellows assembly, first attach the plug to the adaptor (if the valve plug was removed from the adaptor) as follows:
  - Locate the adaptor. Notice that a hole has not been drilled in the new adaptor 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 15 of the ENVIRO-SEAL Bellows Seal 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 21 for an illustration of an ENVIRO-SEAL bellows seal bonnet. Perform the following steps for purging or leak testing.

1. Remove the two diametrically opposed pipe plugs (key 16, figure 21).
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, figure 21).

## 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](#) or Local Business Partner for technical assistance. When ordering replacement parts, refer to the serial number and to the 11-character part number for each part required from the following parts list.

### **⚠ 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.**

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## Parts Kits

### Gasket Kits

Gasket Kits (includes keys 10, 12, 13, and 53; plus 11 and 14 for restricted trim)

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
	-198 to 593°C (-325 to 1100°F)	
	Part Number	Part Number
4x2	RGASKETX182	RGASKETX442
6x4x2-1/2	RGASKETX282	---
6x4 or 8x4	RGASKETX212	RGASKETX472
8x6 or 12x6 CL300, CL600, or CL900	RGASKETX392	---
8x6 or 12x6 Whisper Trim I	RGASKETX412 <sup>(1)</sup>	---
10x8 or 12x8	RGASKETX232	10A3265X152

1. Includes a quantity 2 of key 10.

## Packing Kits

### Standard Packing Repair Kits

Packing repair kits for standard packing include keys 6, 8, 10, 11 and 12.

#### Note

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

### Standard Packing Repair Kits (Non Live-Loaded)

Stem Diameter, mm (Inches) Yoke Boss Diameter, mm (Inches)	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)
PTFE (Contains keys 6, 8, 10, 11, and 12)	RPACKX00022	RPACKX00032	RPACKX00342	RPACKX00352
Double PTFE (Contains keys 6, 8, 11, and 12)	RPACKX00052	RPACKX00062	RPACKX00362	RPACKX00372
PTFE/Composition (Contains keys 7, 8, 11, and 12)	RPACKX00082	RPACKX00092	---	---
Single Graphite Ribbon/Filament (Contains keys 7 [ribbon ring], 7 [filament ring], 8, and 11)	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])	RPACKX00142	RPACKX00152	---	---
Double Graphite Ribbon/Filament (Contains keys 7 [ribbon ring], 7 [filament ring], 8, and 11)	RPACKX00172	RPACKX00182	---	---

## HIGH-SEAL and ENVIRO-SEAL Packing Retrofit Kits

Retrofit kits include parts to convert valves with existing standard bonnets to the HIGH-SEAL or ENVIRO-SEAL packing box construction. Refer to figure 17 for key numbers for HIGH-SEAL packing. For ENVIRO-SEAL packing, refer to figure 18 for PTFE packing key numbers, figure 19 for Graphite ULF packing key numbers, and figure 20 for duplex packing key numbers.

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

### HIGH-SEAL Packing Retrofit Kits

Stem Diameter, mm (Inches) Yoke Boss Diameter, mm (Inches)	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)
4200 psi Process Pressure Rating (Contains keys 200 through 212)	11B2182X052	11B2184X052	11B2187X052	11B2189X052

### ENVIRO-SEAL Packing Retrofit Kits

Stem Diameter, mm (Inches) Yoke Boss Diameter, mm (Inches)	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)
Double PTFE (Contains keys 200, 201, 211, 212, 214, 215, 217, 218, tag, cable tie)	RPACKXRT022	RPACKXRT032	RPACKXRT042	RPACKXRT052
Graphite ULF (Contains keys 200, 201, 207, 208, 209, 210, 211, 212, 214, 217, tag, cable tie)	RPACKXRT272	RPACKXRT282	RPACKXRT292	RPACKXRT302
Duplex (Contains keys 200, 201, 207, 209, 211, 212, 214, 215, 216, 217, tag, cable tie)	RPACKXRT222	RPACKXRT232	RPACKXRT242	RPACKXRT252

## ENVIRO-SEAL Packing Repair Kits

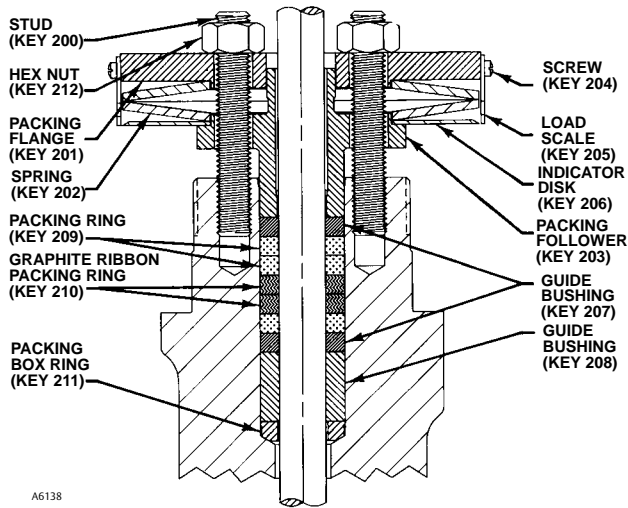
Repair kits include parts to replace the "soft" packing materials in valves that already have ENVIRO-SEAL packing arrangements installed or in valves that have been upgraded with ENVIRO-SEAL retrofit kits. Refer to figure 18 for key numbers for PTFE packing, figure 19 for key numbers for Graphite ULF packing, and figure 20 for key numbers for duplex packing.

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

### ENVIRO-SEAL Packing Repair Kits

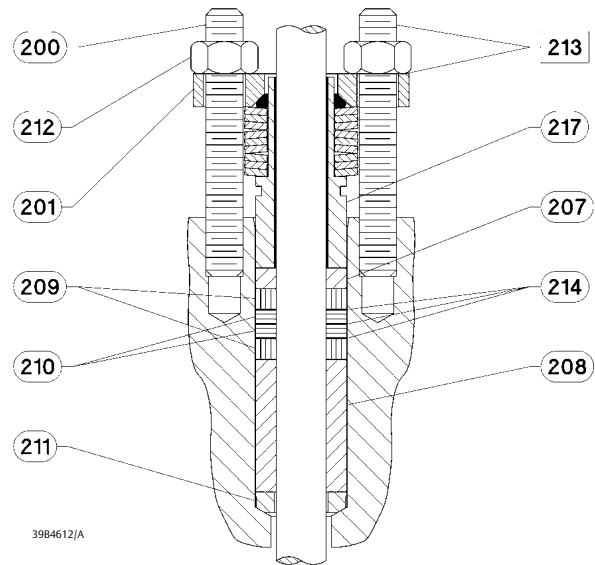
Stem Diameter, mm (Inches) Yoke Boss Diameter, mm (Inches)	12.7 (1/2) 71 (2-13/16)	19.1 (3/4) 90 (3-9/16)	25.4 (1) 127 (5)	31.8 (1-1/4) 127 (5, 5H)
Double PTFE (Contains keys 214, 215, 218)	RPACKX00202	RPACKX00212	RPACKX00222	RPACKX00232
Graphite ULF (Contains keys 207, 208, 209, 210, 214)	RPACKX00602	RPACKX00612	RPACKX00622	RPACKX00632
Duplex (Contains keys 207, 209, 214, 215)	RPACKX00302	RPACKX00312	RPACKX00322	RPACKX00332

Figure 17. Typical Fisher HIGH-SEAL Packing System



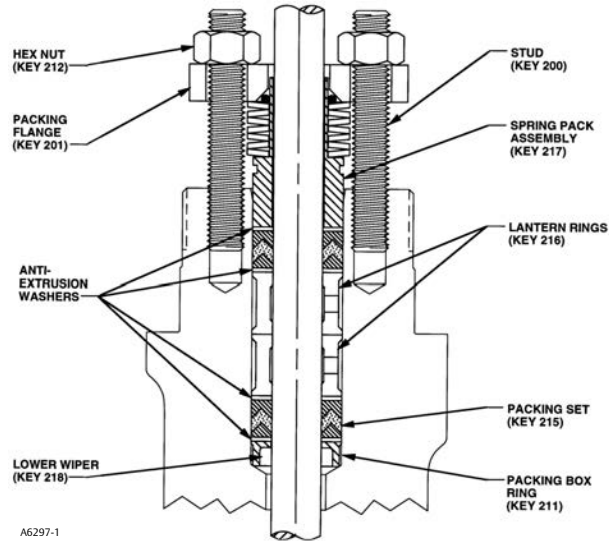
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Figure 19. Typical Fisher ENVIRO-SEAL Packing System with Graphite ULF Packing



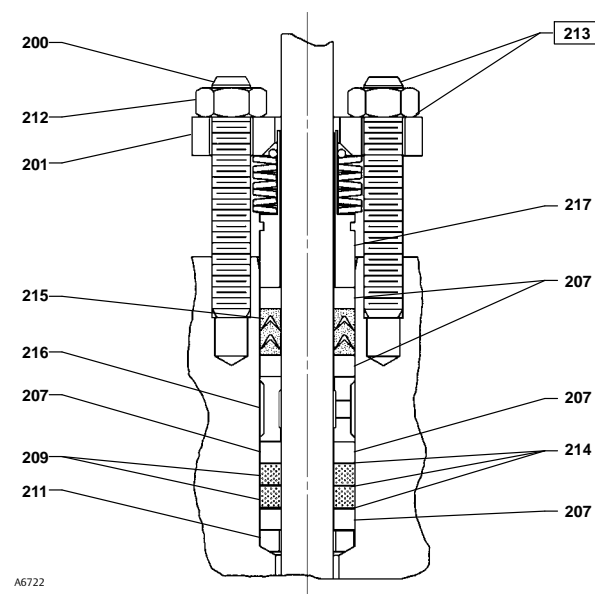
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Figure 18. Typical Fisher ENVIRO-SEAL Packing System with PTFE Packing



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Figure 20. Typical Fisher ENVIRO-SEAL Packing System with Duplex Packing



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## Parts List

Numerous available combinations of valve parts make selection of some parts difficult; when ordering valve parts for which a part number is not listed, provide the valve serial number with the order, permitting proper selection of replacement parts to be made at the factory.

### Note

Part numbers are shown for recommended spares only. For part numbers not shown, contact your [Emerson sales office](#) or Local Business Partner.

## Bonnet (figures 4, 5, 6, and 21)

Key	Description	Part Number
1	Bonnet If you need a bonnet and/or and ENVIRO-SEAL bellows seal bonnet as a replacement part, order by valve size and stem diameter, serial number, and desired material.	
2	Extension Bonnet Bushing	
3	Packing Flange	
3	ENVIRO-SEAL bellows seal packing flange	
4	Packing Flange Studs	
4	ENVIRO-SEAL bellows seal stud bolt (2 req'd)	
5	Packing Flange Nuts	
5	ENVIRO-SEAL bellows seal packing flange nut (2 req'd)	
6*	Single PTFE V-Ring Packing Set	See following table
6*	ENVIRO-SEAL bellows seal packing set PTFE (1 req'd for single, 2 req'd for double)	
	Size 4x2 w/ 12.7 mm (1/2 inch) stem	12A9016X012
	Sizes 6x4x2-1/2, 6x4, & 8x4 w/ 12.7 mm (1/2 inch) stem	
	(For double PTFE only)(2 req'd)	12A8832X012
7*	Individual Packing Ring	See following table
7*	ENVIRO-SEAL bellows seal packing ring Double packing graphite filament (4 req'd)	
	Size 4x2 w/ 12.7 mm (1/2 inch) stem	1P3905X0172
	Sizes 6x4x2-1/2, 6x4, & 8x4 w/ 12.7 mm (1/2 inch) stem	14A0915X042
7*	ENVIRO-SEAL bellows seal packing ring Double packing graphite ribbon (4 req'd)	
	Size 4x2 w/ 12.7 mm (1/2 inch) stem	18A0908X012
	Sizes 6x4x2-1/2, 6x4, & 8x4 w/ 12.7 mm (1/2 inch) stem	18A0918X012
8	Packing Box Spring or Lantern Ring	
8	ENVIRO-SEAL bellows seal spring, 316 SST Size 4x2 w/ 12.7 mm (1/2 inch) stem (single packing only)	
8	ENVIRO-SEAL bellows seal spacer, S31600 For single PTFE packing Size 4x2 w/ 12.7 mm (1/2 inch) stem	

Key	Description	Part Number
	For double PTFE, graphite rib/fil packing Size 4x2 w/ 12.7 mm (1/2 inch) stem (2 req'd) Size 6x4x2-1/2, 6x4, & 8x4 w/ 12.7 mm (1/2 inch) stem (2 req'd)	
8	ENVIRO-SEAL bellows seal spacer, N10276 For single PTFE packing Size 4x2 w/ 12.7 mm (1/2 inch) stem (1 req'd)	
	For double PTFE, graphite rib/fil packing Size 4x2 w/ 12.7 mm (1/2 inch) stem (2 req'd) Size 6x4x2-1/2, 6x4, & 8x4 w/ 12.7 mm (1/2 inch) stem (2 req'd)	
9*	Individual Packing Ring	See following table
10	Special Washer	See following table
11*	Packing Box Ring, S31600	
	12.7 mm (1/2 inch) stem	1J873235072
	19.1 mm (3/4 inch) stem	1J873335072
	25.4 mm (1 inch) stem	1J873435072
	31.8 mm (1-1/4 inch) stem	1J873535072
12*	Upper Wiper, felt	
	12.7 mm (1/2 inch) stem	1J872706332
	19.1 mm (3/4 inch) stem	1J872806332
	25.4 mm (1 inch) stem	1J872906332
	31.8 mm (1-1/4 inch) stem	1J873006332
12*	ENVIRO-SEAL bellows seal upper wiper, felt Size 4x2 w/ 12.7 mm (1/2 inch) stem Sizes 6x4x2-1/2, 6x4, & 8x4 w/ 12.7 mm (1/2 inch) stem	18A0868X012
13	Packing follower, 316 stainless steel	18A0870X012
13*	ENVIRO-SEAL bellows seal bushing size 4x2 w/ 12.7 mm (1/2 inch) stem (2 req'd)	
	S31600 (316 SST)	18A0820X012
	R30006 (alloy 6)	18A0819X012
	S31600 chrome coated	11B1155X012
	For size 6x4x2-1/2, 6x4, & 8x4 w/ 12.7 mm (1/2 inch) stem (1 req'd)	
	S31600 (316 SST)	18A0824X012
	R30006 (alloy 6)	18A0823X012
	S31600 chrome coated	11B1157X012
13*	ENVIRO-SEAL bellows seal bushing/liner size 4x2 w/ 12.7 mm (1/2 inch) stem (2 req'd)	
	N10276 bushing, PTFE/glass liner	12B2713X012
	N10276 bushing, PTFE/carbon liner	12B2713X042
	For size 6x4x2-1/2, 6x4, & 8x4 w/ 12.7 mm (1/2 inch) stem (1 req'd)	
	N10276 bushing, PTFE/glass liner	12B2715X012
	N10276 bushing, PTFE/carbon liner	12B2715X042
14	Packing Box Pipe Plug	
14	Lubricator, steel/440 SST	
14	Lubricator/Isolating Valve Assy. pl steel	
15	Yoke Locknut, steel	
15	ENVIRO-SEAL bellows seal yoke locknut, steel	
16	Pipe Plug for double-tapped bonnet For size 4x2 thru 12x6 valve Steel for WCC steel bonnet S31600 for chrome moly steel or 316 SST bonnet For size 10x8 or 12x8 valve Steel for WCC steel bonnet	

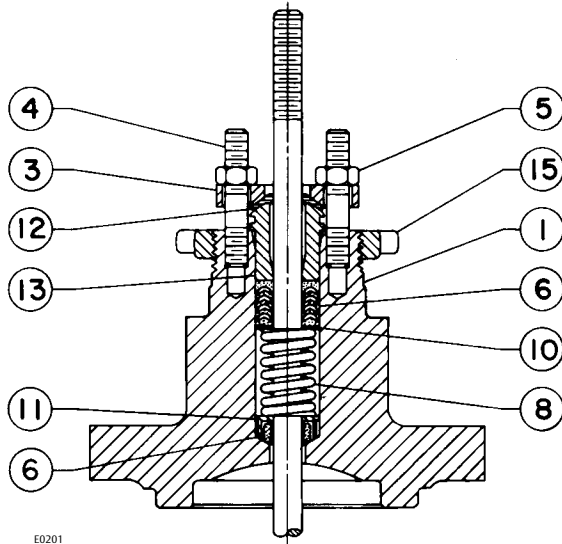
Key	Description	Part Number	Key	Description	Part Number
	S31600 for chrome moly steel or 316 SST bonnet			N06022 trim, N06022 bellows	
16	ENVIRO-SEAL bellows seal pipe plug (2 req'd)			Size 4x2 w/ 12.7 mm (1/2 inch) stem	32B4226X042
20*	ENVIRO-SEAL bellows seal stem/bellows assembly			Size 6x4x2-1/2, 6x4, & 8x4 w/ 12.7 mm (1/2 inch) stem	32B4228X042
	1 ply bellows		22*	ENVIRO-SEAL bellows seal bonnet gasket, graphite/laminate	
	S31603 (316L SST) trim, N06625 bellows			Size 4x2 valve	12B6318X022
	Size 4x2 w/ 12.7 mm (1/2 inch) stem	32B4226X012		Size 6x4x2-1/2, 6x4, & 8x4 valve	12B6320X022
	Size 6x4x2-1/2, 6x4, & 8x4 w/ 12.7 mm (1/2 inch) stem	32B4228X012	24	ENVIRO-SEAL bellows seal adaptor	
	N06022 trim, N06022 bellows		25	Cap Screw for 127 mm (5 inch) yoke boss, steel (8 req'd)	
	Size 4x2 w/ 12.7 mm (1/2 inch) stem	32B4226X022		Size 12x8 valve, CL900	
	Size 6x4x2-1/2, 6x4, & 8x4 w/ 12.7 mm (1/2 inch) stem	32B4228X022	26	Hex Nut for 127 mm (5 inch) yoke boss, pl steel (8 req'd)	
20*	ENVIRO-SEAL bellows seal stem/bellows assembly (cont'd)		27	Pipe Nipple for lubricator/isolating valve	
	2 ply bellows		28	Warning Nameplate for ENVIRO-SEAL bellows	
	S31603 (316L SST) trim, N06625 bellows		29	Drive Screw for ENVIRO-SEAL bellows, stain- less steel (2 req'd)	
	Size 4x2 w/ 12.7 mm (1/2 inch) stem	32B4226X032	36*	ENVIRO-SEAL bellows seal pin, N06022	12B3951X012
	Size 6x4x2-1/2, 6x4, & 8x4 w/ 12.7 mm (1/2 inch) stem	32B4228X032	37	Warning Tag for ENVIRO-SEAL bellows	
			38	Tie for ENVIRO-SEAL bellows	
			39	ENVIRO-SEAL bellows seal thrust ring	
				Trim S31600	
				Single PTFE Packing	
				Size 4x2 w/ 12.7 mm (1/2 inch) stem (2 req'd)	

**Keys 6\*, 7\*, 8, and 10 Packing Box Parts**

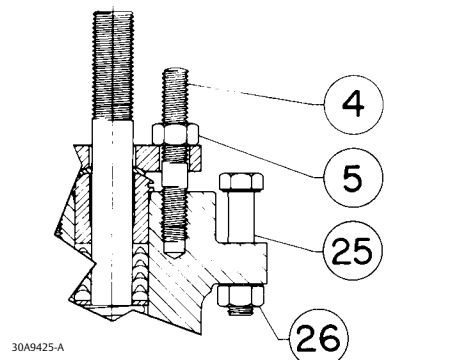
DESCRIPTION		KEY NO.	STEM DIAMETER, mm (INCHES)				
			12.7 (1/2)	19.1 (3/4)	25.4 (1)	31.8 (1-1/4)	
PTFE V-Ring Packing	Packing Set, PTFE (1 req'd for single, 2 req'd for double) <sup>(1)</sup>	6	1R290201012	1R290401012	1R290601012	1R290801012	
	Spring, Stainless Steel (for single only)	8	1F125537012	1F125637012	1D582937012	1D387437012	
	Lantern Ring, Stainless Steel (for double only)	8	1J269335072	0N028435072	0U099735072	0W087135072	
	Quantity required	Double	---	2	1	1	1
	Special washer, Stainless Steel (for single only)	10	1F125136042	1F125036042	1H982236042	1H995936042	
PTFE/composition Packing	Packing Ring, PTFE composition	7	1E319001042	1E319101042	1D7518X0012	1D7520X0012	
	Quantity required	Double	---	10	8	8	8
	Lantern Ring, Stainless Steel (1 req'd)	8	1J9623 35072	0N028435072	0U099735072	0W087135072	
Graphite Ribbon/Filament	Graphite Ribbon Ring	7	1V3802X0022	1V2396X0022	1U6768X0022	1V5666X0022	
	Quantity required	Single	---	2	2	2	2
		Double	---	3	3	3	3
	Graphite Filament Ring	7	1E3190X0222	1E3191X0282	1D7518X0132	1D7520X0162	
	Quantity required	Single	---	2	3	3	3
		Double	---	4	5	5	5
	Lantern Ring	8	1J962335072	0N028435072	0U099735072	0W087135072	
	Quantity required	Single	---	3	2	2	2
	Double	---	2	1	1	1	

1. Key 6 for double construction contains one extra Lower Wiper for all sizes. Discard upon assembly.

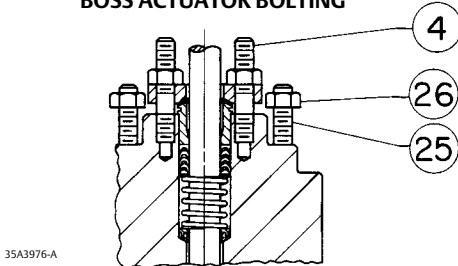
Figure 21. Typical Fisher Bonnet with Single PTFE V-Ring Packing Set



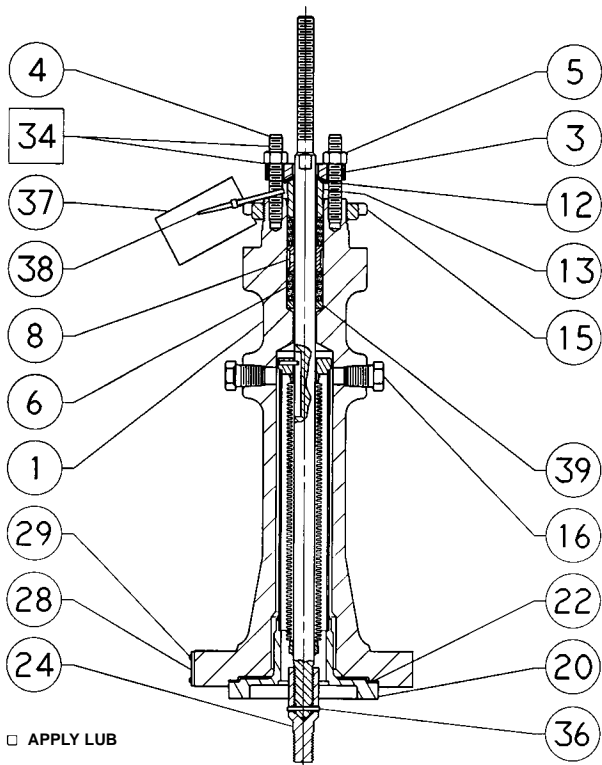
PLAIN BONNET



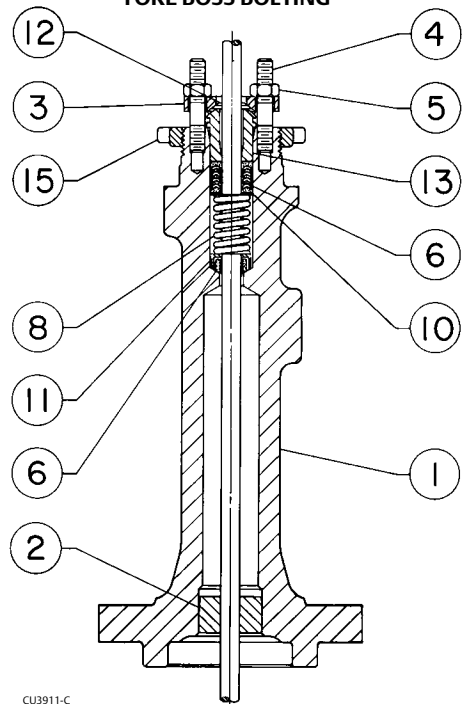
DETAIL OF 5-INCH (127 mm) YOKE BOSS ACTUATOR BOLTING



DETAIL OF NPS 12x8 CL900 YOKE BOSS BOLTING



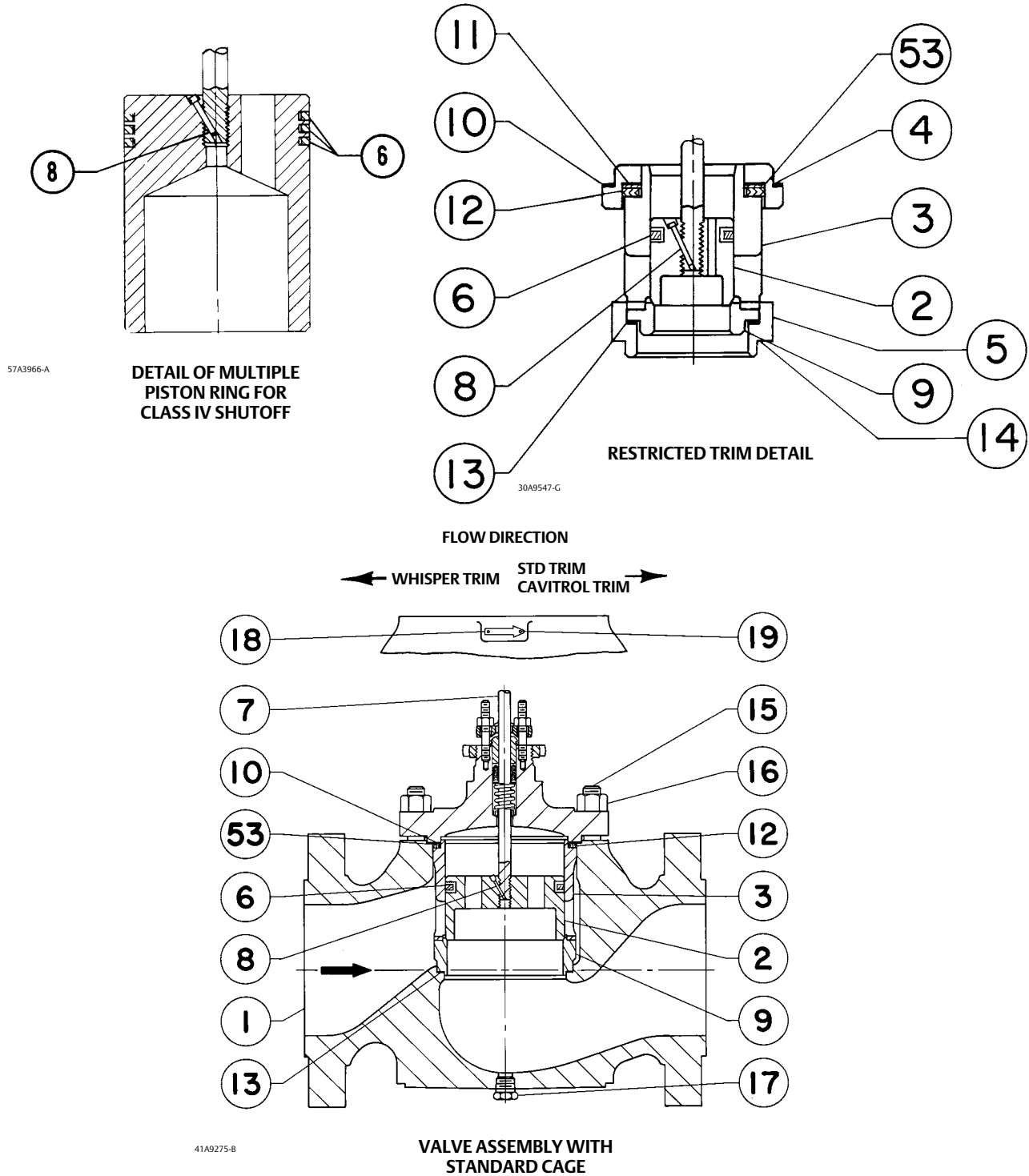
ENVIRO-SEAL BELLOWS SEAL BONNET



STYLE 1 OR 2 EXTENSION BONNET



Figure 22. Fisher EWD Valve through NPS 12x6 with Optional Drain Plug





Key	Description	Part Number	Key	Description	Part Number
17	Pipe Plug for drain-tapped valve			Spring-loaded <sup>(1)</sup> PTFE for all except 2-stage Cavitrol III	
18	Flow Arrow, SST			Size 4x2 valve	10A4206X012
19	Drive screw, SST (6 req'd)			Size 6x4x2-1/2 valve	10A4215X012
21*	Disk Retainer for PTFE-seat EWS or EWT			Size 6x4 or 8x4 valve	10A4223X012
	Size 4x2 valve, S31600	1V710835072		Size 8x6 or 12x6 valve	
	Size 6x4x2-1/2 valve, S31600	1V710935072		For std and Whisper Trim I cages	10A2643X022
	Size 6x4 or 8x4 valve, CF8M	1V711533092	29*	Size 10x8 or 12x8 valve	10A3261X012
	Size 8x6 or 12x6 valve, CF8M			Backup Ring for EWT 2-piece seal ring	
	For all except Whisper Trim III cages	1V711833092		w/o spring loading	
	Size 10x8 or 12x8 valve			Fluorocarbon <sup>(2)</sup>	
	CF8M 10A4466X012			Size 4x2 valve	1V550705292
	R30006 (Alloy 6)	10A4466X022		Size 6x4x2-1/2 valve	1V659405292
22*	Disk Seat for PTFE-seat EWS or EWT			Size 6x4 or 8x4 valve	1V659805292
	Size 4x2 valve			Size 8x6 or 12x6 valve	
	S31600	10A5936X012		For std. Whisper Trim I cages	1V660005292
	S41600 (416 SST) HT	10A5936X072		Ethylene-Propylene	
	Size 6x4x2-1/2 valve, S31600	1V711135072		Size 4x2 valve	1V5507X0042
	Size 6x4 valve, CF8M	1V712533092		Size 6x4x2-1/2 valve	1V6594X0032
	Size 8x4 valve, S31600	1V712633092		Size 6x4 or 8x4 valve	1V6598X0022
	Size 8x6 or 12x6 CL300 or CL600 valve, 316 SST			Size 8x6 or 12x6 valve	
	For all except Whisper Trim III cages			For std, Whisper Trim I cages	1V6600X0022
	Size 8x6 valve only		29*	Backup Ring for spring-loaded EWT seal rings	
	51 mm (2 inch) or 76 mm (3 inch) travel	2V721733092		For all except 2-stage Cavitrol III constructions	
	102 mm (4 inch) travel	20A1180X012		Size 4x2 valve, S41600	10A4208X012
	Size 12x6 valve only			Size 6x4x2-1/2 valve, S41600	10A4217X012
	51 mm (2 inch) or 76 mm (3 inch) travel	2V712733092		Size 6x4 or 8x4 valve, S41600	10A4224X012
	102 mm (4 inch) travel	20A1180X012		For Whisper III constructions only	
	Size 8x6 CL900 valve, CF8M	21A9344X012		Size 8x6 or 12x6 valve	
	Size 10x8 or 12x8 valve			S41600	12A3332X012
	CF8M	20A4467X012	31*	S31600	12A3332X022
	R30006	20A4467X022		Cage Retainer, required for Whisper Trim III and Cavitrol III cages	
23*	Disk for PTFE-seat EWS or EWT, PTFE			only. See your Emerson Automation Solutions sales office.	
	Size 4x2 valve	1V710706242	32	Bonnet Spacer	
	Size 6x4x2-1/2 valve	1V711006242	51	Anti-seize lubricant (not furnished)	
	Size 6x4 or 8x4 valve	1V711606242	52	Cage Spacer	
	Size 8x6 or 12x6 valve		53*	Shim	See following table
	For all except Whisper Trim III cages	1V711906242	55	Wire	
	Size 10x8 or 12x8 valve	20A4468X012			
26	Load Ring for Size 10x8 or 12x8 valve only				
27*	Retaining Ring for spring-loaded EWT seal rings, 302 SST				
	All except 2-stage Cavitrol III construction				
	Size 4x2 valve	10A4210X012			
	Size 6x4 or 8x4 valve	10A4225X012			
	Size 6x4x2-1/2 valve, std construction only	10A4219X012			
28*	EWT 2-Piece Seal Ring for all except Cavitrol III constructions				
	Carbon-filled PTFE (not used w/ size NPS 12x8 valve)				
	Size 4x2 valve	1V550805092			
	Size 6x4x2-1/2 valve	1V659505092			
	Size 6x4 or 8x4 valve	1V659905092			
	Size 8x6 or 12x6 valve				
	For std, Whisper Trim I cages	1V660105092			

### C-seal Trim (figure 9)

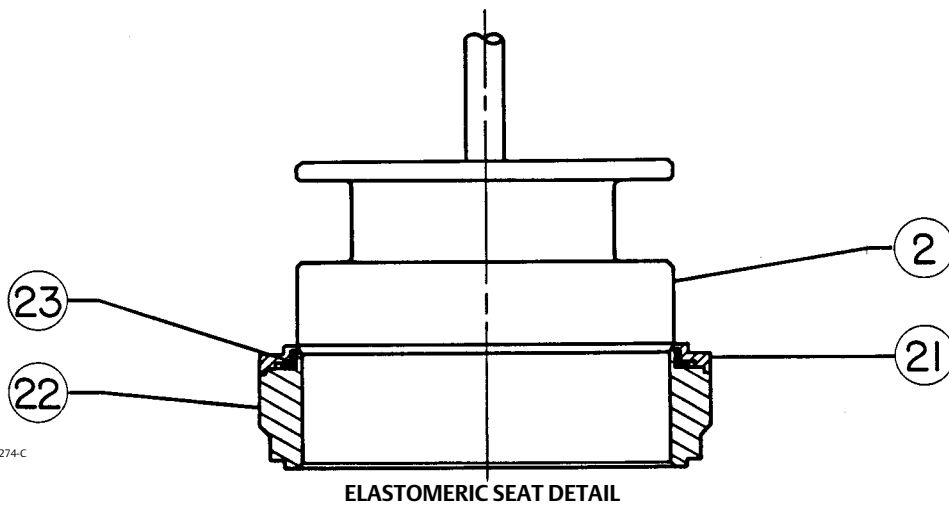
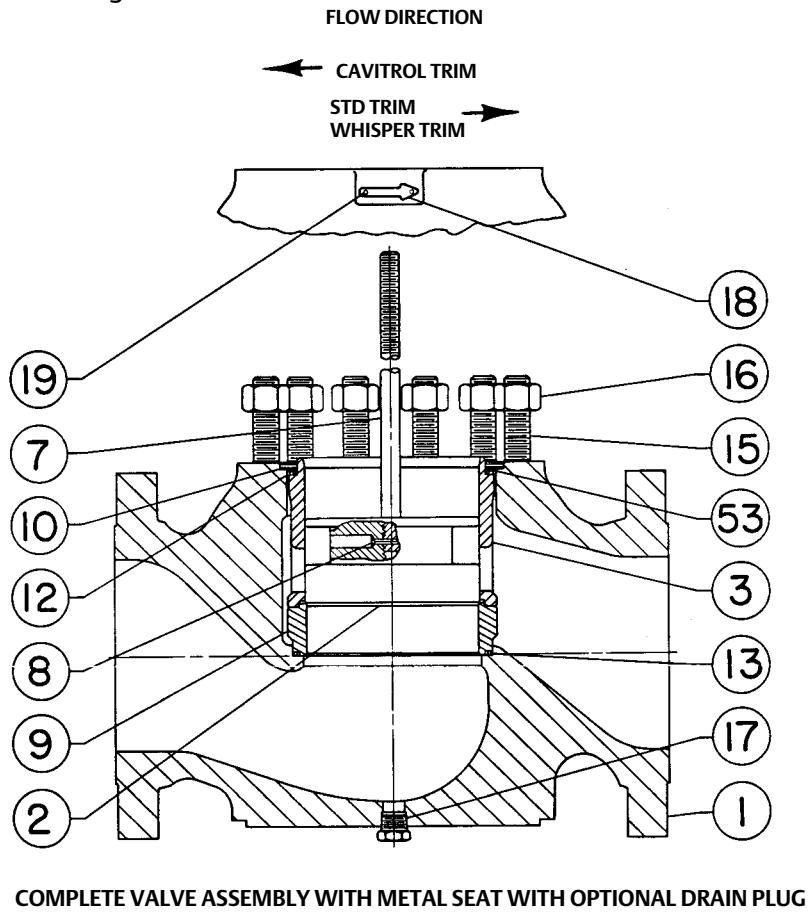
2*	Plug/Retainer	see following table
3*	Cage	see following table
7*	Valve Plug Stem, S20910	see following table
9*	Seat Ring	see following table
64*	C-seal, N07718	see following table

### TSO Trim (figures 7 and 8)

3*	Cage	See following table
9*	Seat Ring	See following table
2*	Plug/Stem Assembly	See following table
28*	Seal Ring	See following table
63*	Anti-Extrusion Ring	See following table
29*	Back Up Ring	See following table
27*	Retaining Ring	See following table

\* Recommended spare parts  
 1. Spring is N06022.  
 2. Not for steam or water above 82°C (180°F).

Figure 23. Fisher EWS Valve through NPS 12x6



31A9274-C

Figure 24. Typical Fisher EWT Valve Assemblies

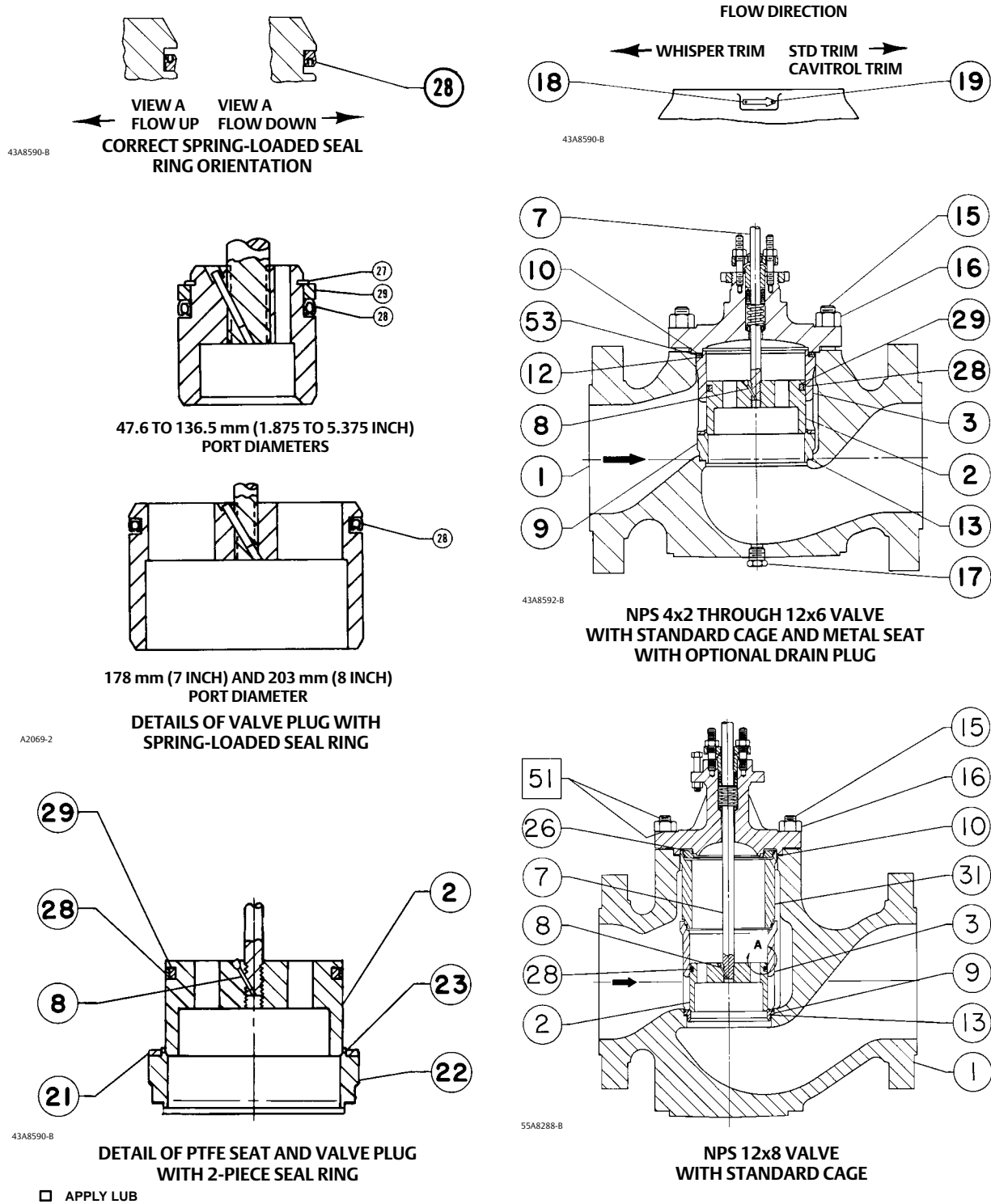
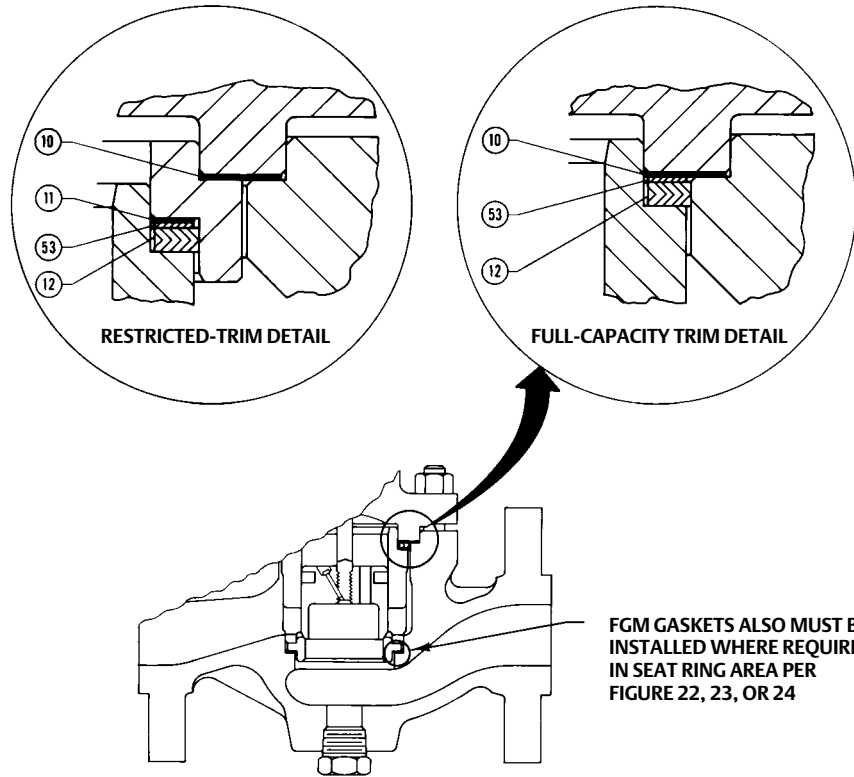


Figure 25. FGM Gasket Detail with Optional Drain Plug



A2713\*

Figure 26. NPS 4x2 Through 12x8 Fisher Valves with 1-Stage Cavitrol III Cage

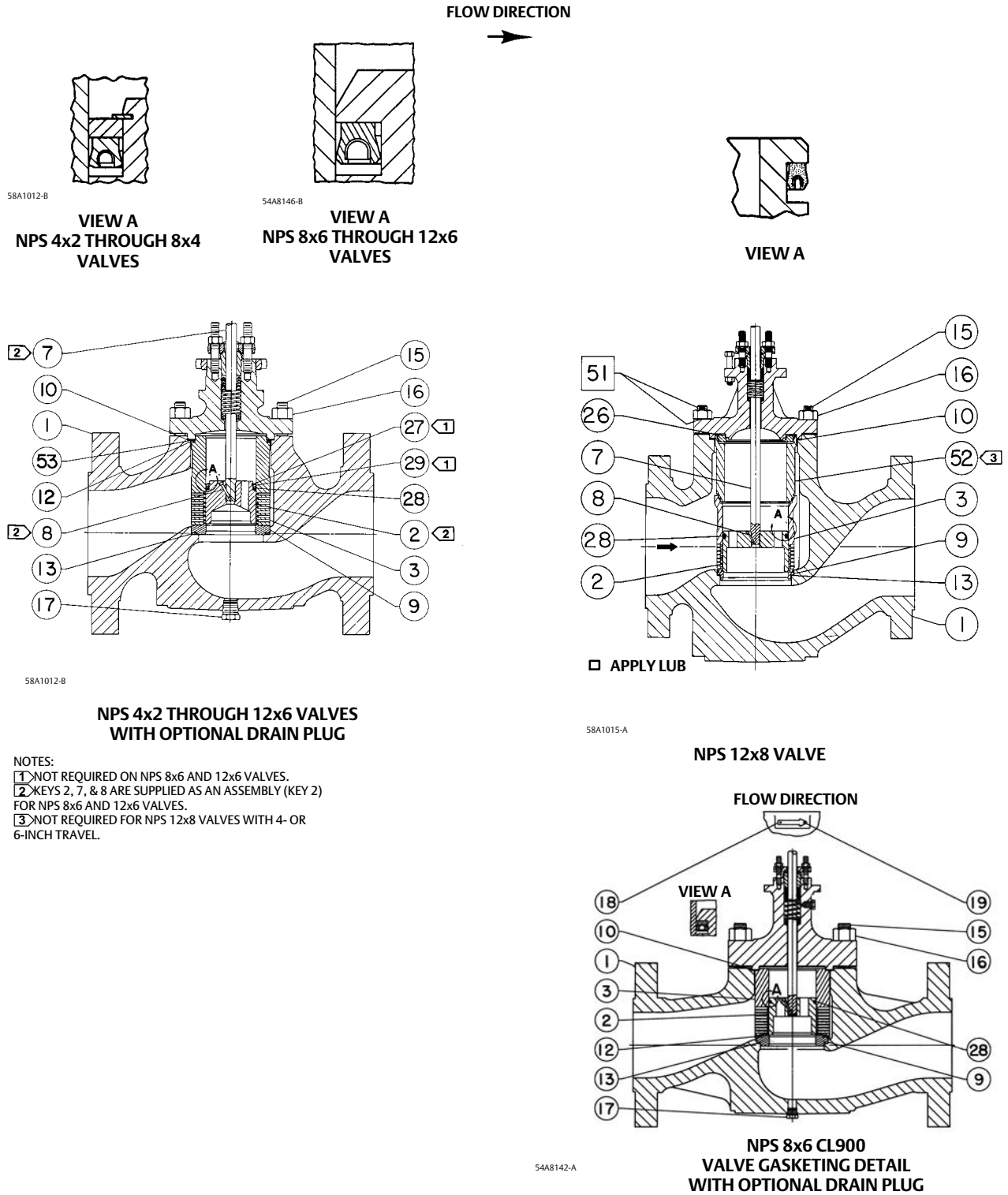


Figure 27. NPS 4x2 Through 12x8 Fisher Valves with 2-Stage Cavitrol III Cage

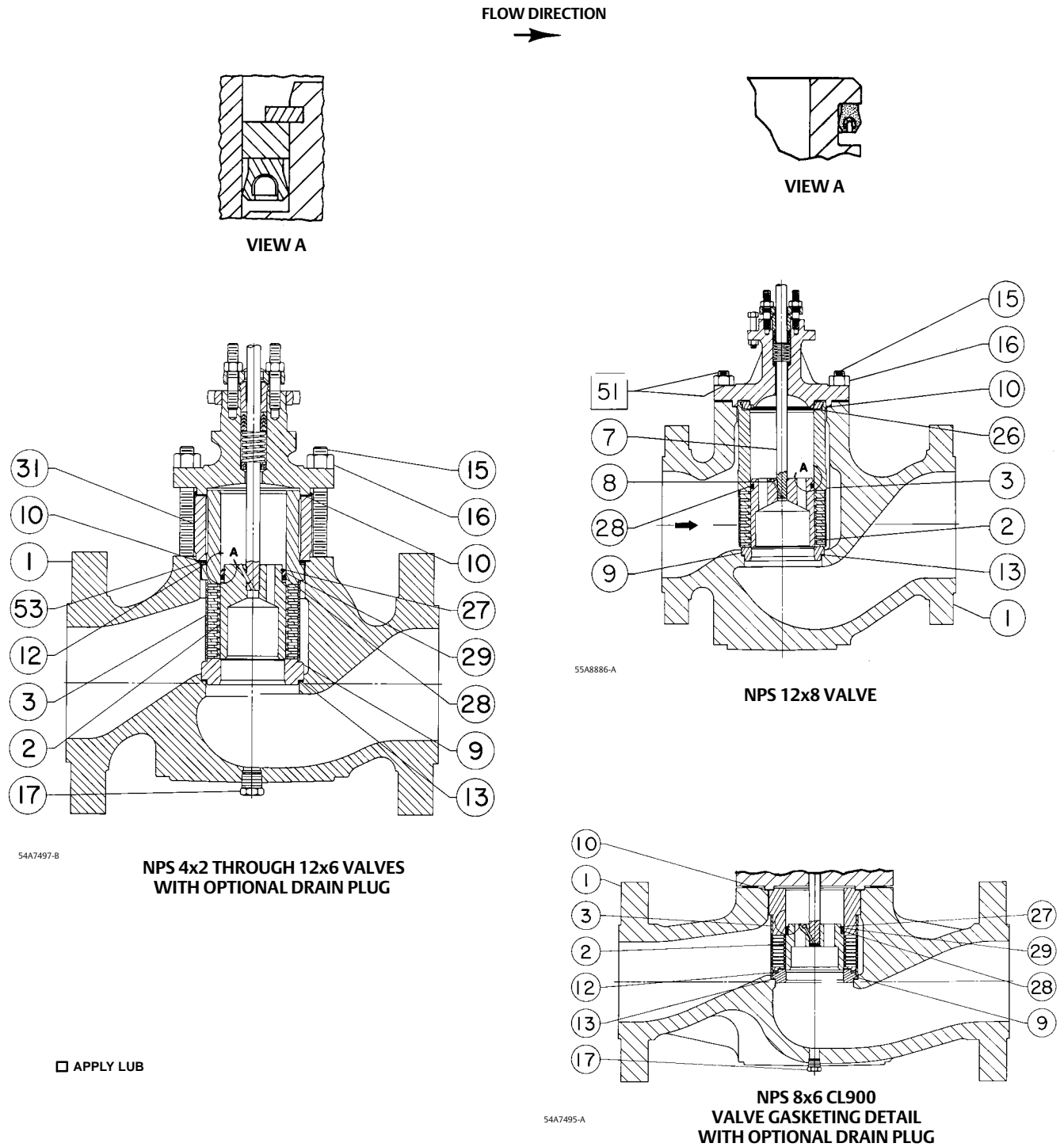


Figure 28. Typical Fisher EWD Valve with Whisper Trim III Cage

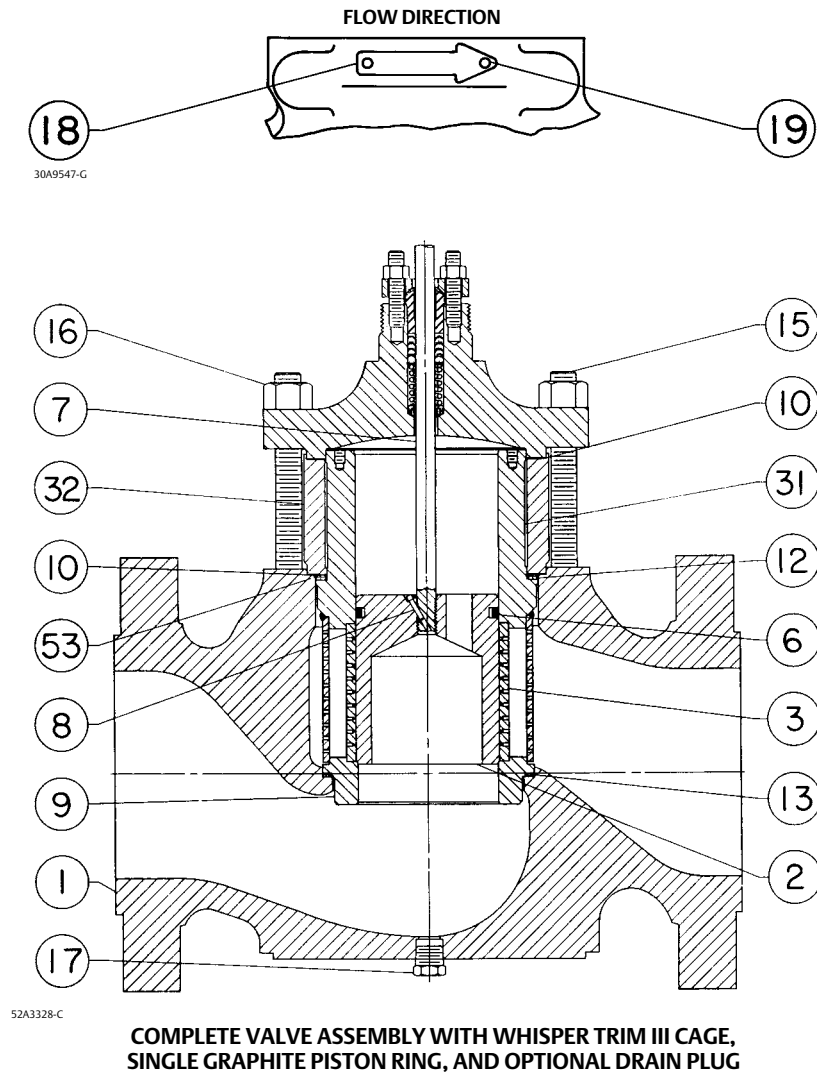
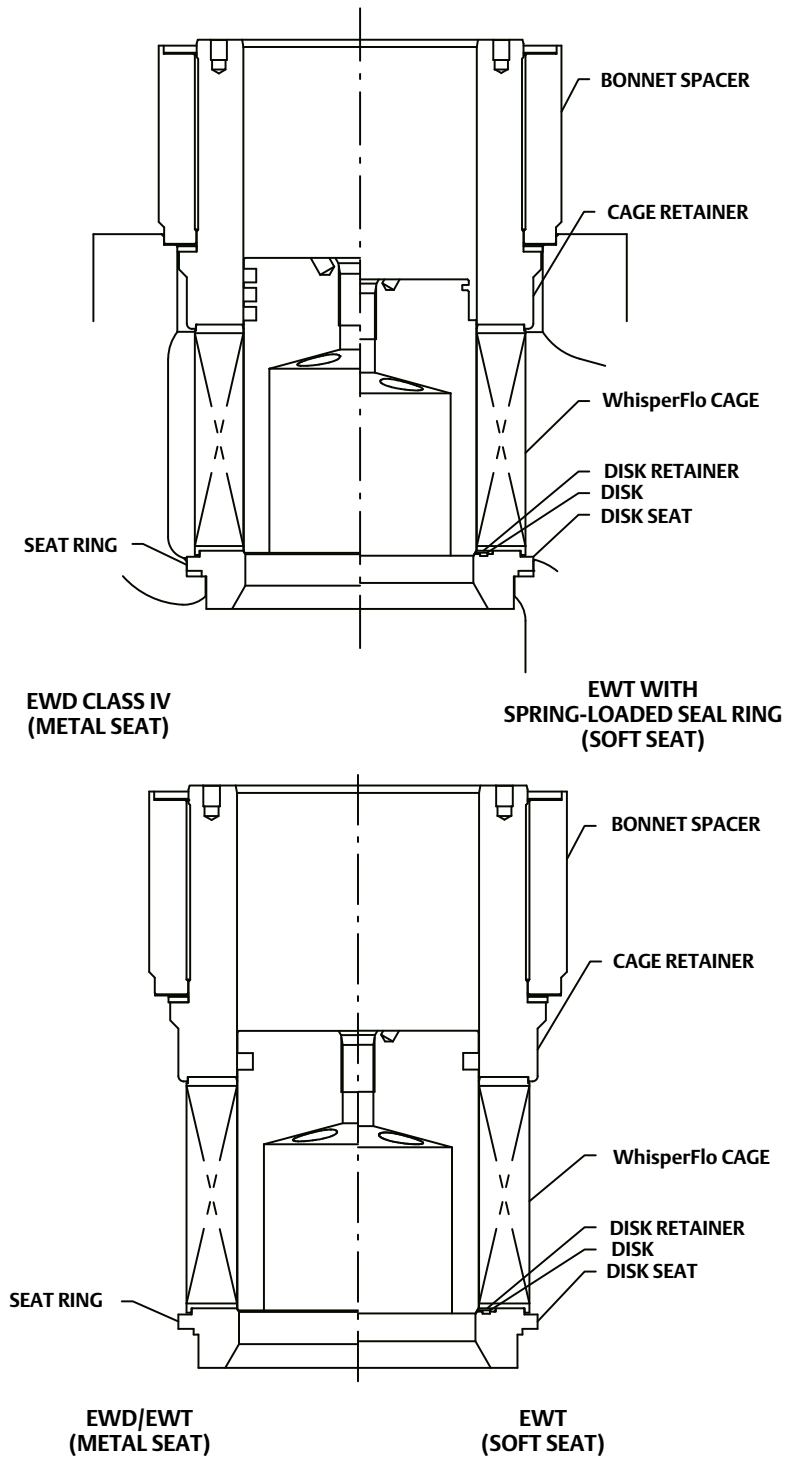


Figure 29. Typical Fisher WhisperFlo Trims





Key 2\* Fisher EWD Valve Plug

VALVE SIZE, NPS		MATERIAL	STEM DIA, mm (INCH)				
			12.7 (1/2)	19.1 (3/4)	25.4 (1)	31.8 (1-1/4)	
4 x 2 (for 1 piston ring only)		Hardened S41600 (416 SST)	1V657546172	1V657646172	---	---	
		S31600 (316 SST)	1V657535072	1V657635072	---	---	
		S31600/CoCr-A on seat and guide <sup>(1)</sup>	11A5326X012	11A5327X012	---	---	
		S31600/CoCr-A on seat and guide <sup>(2)</sup>	11A5328X012	11A5329X012	---	---	
6 x 4 x 2-1/2 (for 1 piston ring only)		Hardened S41600	1V657746172	1V657846172	---	---	
		S31600	1V657735072	1V657835072	---	---	
		S31600/CoCr-A on seat and guide <sup>(1)</sup>	11A5332X012	11A5333X012	---	---	
		S31600/CoCr-A on seat and guide <sup>(2)</sup>	11A5334X012	11A5335X012	---	---	
6 x 4 or 8 x 4		For 1 piston ring	Hardened S41600	1V658146172	1V658246172	1V658346172	
			S31600	1V658135072	1V658235072	1V658335072	
			S31600/CoCr-A on seat and guide <sup>(1)</sup>	11A5344X012	11A5345X012	11A5346X012	
			S31600/CoCr-A on seat and guide <sup>(2)</sup>	11A5347X012	11A5348X012	11A5349X012	
		For 3 piston rings	Hardened S41600	27A3932X012	27A3933X012	---	---
			S31600	27A3932X012	27A3933X012	---	---
			S31600/CoCr-A on seat and guide <sup>(1)</sup>	27A3938X012	27A3939X012	---	---
			S31600/CoCr-A on seat and guide <sup>(2)</sup>	27A3941X012	27A3942X012	---	---
8 x 6 or 12 x 6, except for Whisper Trim III cages		For 1 piston ring	Hardened S41600	---	1V658446172	1V658546172	1V658646172
			S31600	---	1V658435072	1V658535072	1V658635072
			S31600/CoCr-A on seat and guide <sup>(1)</sup>	---	21A5351X012	20A0103X012	20A4608X012
			S31600/CoCr-A on seat and guide <sup>(2)</sup>	---	21A5353X012	21A5354X012	21A5355X012
		For 3 piston rings	Hardened S41600	---	27A3944X012	27A3945X012	---
			S31600	---	27A3944X022	27A3945X022	---
			S31600/CoCr-A on seat and guide <sup>(1)</sup>	---	27A3950X012	27A3951X012	---
			S31600/CoCr-A on seat and guide <sup>(2)</sup>	---	27A3953X012	27A3954X012	---
10 x 8 or 12 x 8		For 1 piston ring	Hardened S41600	---	21A5356X012	21A5357X012	21A5358X012
			S31600	---	21A5356X022	21A5357X022	21A5358X022
			S31600/CoCr-A on seat and guide <sup>(1)</sup>	---	21A5362X012	21A5363X012	21A5364X012
			S31600/CoCr-A on seat and guide <sup>(2)</sup>	---	21A5365X012	21A5366X012	21A5367X012
		For 2 piston rings	Hardened S41600	---	27A3956X012	27A3957X012	---
			S31600	---	27A3956X022	27A3957X022	---
			S31600/CoCr-A on seat and guide <sup>(1)</sup>	---	27A3962X012	27A3963X012	---
			S31600/CoCr-A on seat and guide <sup>(2)</sup>	---	27A3965X012	27A3966X012	---

1. Not for use with CB7CU-1 (17-4PH SST) cages above 210°C (410°F) or R30006 (Alloy 6) cages above 427°C (800°F).

2. High-temperature material (identified by an H stamped on top of the plug) for use with CB7CU-1 cages above 210°C (410°F) or R30006 cages above 427°C (800°F).

Key 2\* Fisher EWS Valve Plug

VALVE SIZE, NPS		MATERIAL	STEM DIA, mm (INCH)			
			12.7 (1/2)	19.1 (3/4)	25.4 (1)	31.8 (1-1/4)
4 x 2		Hardened S41600 (416 SST)	11A5214X012	11A5215X012	---	---
		S31600 (316 SST)	11A5214X022	11A5215X022	---	---
		S31600/CoCr-A on seat and guide <sup>(1)</sup>	11A5218X012	11A5219X012	---	---
		S31600/CoCr-A on seat and guide <sup>(2)</sup>	11A5220X012	11A5221X012	---	---
6 x 4 x 2-1/2		Hardened S41600	11A5222X012	11A5223X012	---	---
		S31600	11A5222X022	11A5223X022	---	---
		S31600/CoCr-A on seat and guide <sup>(1)</sup>	11A5226X012	11A5227X012	---	---
		S31600/CoCr-A on seat and guide <sup>(2)</sup>	11A5228X012	11A5229X012	---	---
6 x 4 or 8 x 4		Hardened S41600	11A5238X012	11A5239X012	11A5240X012	---
		S31600	11A5238X022	11A5239X022	11A5240X022	---
		S31600/CoCr-A on seat and guide <sup>(1)</sup>	11A5244X012	11A5245X012	11A5246X012	---
		S31600/CoCr-A on seat and guide <sup>(2)</sup>	11A5247X012	11A5248X012	11A5249X012	---
8 x 6 or 12 x 6	Except for Whisper Trim III cages	Hardened S41600	---	11A5250X012	11A5251X012	11A5252X012
		S31600	---	11A5250X022	11A5251X022	11A5252X022
		S31600/CoCr-A on seat and guide <sup>(1)</sup>	---	11A5256X012	11A5257X012	11A5258X012
		S31600/CoCr-A on seat and guide <sup>(2)</sup>	---	11A5259X012	11A5260X012	11A5261X012
10 x 8 or 12 x 8		Hardened S41600	---	21A5262X012	21A5263X012	21A5264X012
		S31600	---	21A5262X012	21A5263X012	21A5264X012
		S31600/CoCr-A on seat and guide <sup>(1)</sup>	---	21A5268X012	21A5269X012	21A5270X012
		S31600/CoCr-A on seat and guide <sup>(2)</sup>	---	21A5271X012	21A5272X012	21A5273X012

1. Not for use with CB7CU-1 (17-4PH SST) cages above 210°C (410°F) or R30006 (Alloy 6) cages above 427°C (800°F).  
2. High-temperature material (identified by an H stamped on top of the plug) for use with CB7CU-1 cages above 210°C (410°F) or R30006 cages above 427°C (800°F).

Key 2\* Valve Plug for Fisher EWT with Two-Piece Seal Ring

VALVE SIZE, NPS		MATERIAL	STEM DIA, mm (INCH)			
			12.7 (1/2)	19.1 (3/4)	25.4 (1)	31.8 (1-1/4)
4 x 2		Hardened S41600 (416 SST)	1V657546172	1V657646172	---	---
		S31600 (316 SST)	1V657535072	1V657635072	---	---
		S31600/CoCr-A on seat and guide <sup>(1)</sup>	11A5326X012	11A5327X012	---	---
6 x 4 x 2-1/2		Hardened S41600	1V657746172	1V657846172	---	---
		S31600	1V657735072	1V657835072	---	---
		S31600/CoCr-A on seat and guide <sup>(1)</sup>	11A5332X012	11A5333X012	---	---
6 x 4 or 8 x 4		Hardened S41600	1V658146172	1V658246172	1V658346172	---
		S31600	1V658135072	1V658235072	1V658335072	---
		S31600/CoCr-A on seat and guide <sup>(1)</sup>	11A5344X012	11A5345X012	11A5346X012	---
8 x 6 or 12 x 6, except for Whisper Trim III cages	For 51 or 76 mm (2 or 3 inch) travel	Hardened S41600	---	1V658446172	1V658546172	1V658646172
		S31600	---	1V658435072	1V658535072	1V658635072
	For 102 mm (4 inch) travel	S31600/CoCr-A on seat and guide <sup>(1)</sup>	---	21A5351X012	20A0103X012	20A608X012
		Hardened S41600	---	11A2622X012	---	---
		S31600	---	11A2622X022	---	---
		S31600/CoCr-A on seat and guide <sup>(1)</sup>	---	21A8128X012	---	---

1. Not for use with CB7CU-1 (17-4PH SST) cages above 210°C (410°F).

Key 2\* Valve Plug for Spring-Loaded Fisher EWT Seal Ring (except for Cavitrol III constructions)

VALVE SIZE, NPS		MATERIAL	STEM DIA, mm (INCH)			
			12.7 (1/2)	19.1 (3/4)	25.4 (1)	31.8 (1-1/4)
4 X 2		Hardened S41600 (416 SST)	20A4097X012	20A4098X012	---	---
6 x 4 x 2-1/2		Hardened S41600	20A9533X012	20A4144X012	---	---
6 x 4 or 8 x 4		Hardened S41600	20A2641X012	20A4194X012	20A4195X012	---
8 x 6 or 12 x 6, except for Whisper Trim III cages		Hardened S41600	---	20A2642X012	20A5621X012	20A7343X012
		S31600/CoCr-A on seat and guide <sup>(1)</sup>	---	21A8443X012	20A6706X012	---
10 x 8 or 12 x 8		Hardened S41600	---	21A5356X012	21A5357X012	21A5358X012
		S31600	---	21A5356X022	21A5357X022	21A5358X022
		S31600/CoCr-A on seat and guide <sup>(1)</sup>	---	21A5362X012	21A5363X012	21A5364X012

1. Not for use with CB7CU-1 (17-4PH SST) cages above 210°C (410°F).

C-seal Parts for Fisher EWD Valve (Keys 3\*, 2\*, 9\*, 64\*, 6\*, and 7\*)

VALVE SIZE	PORT DIA	TRAVEL	TRIM	STEM DIA	CHARACTER- ISTIC	CAGE	PLUG/ RETAINER	SEAT RING	C-seal	PISTON RING	STEM
NPS	Inch	Inch		mm (Inch)		Key 3	Key 2	Key 9	Key 64	Key 6	Key 7
6X4	4.375	2	1	12.7 (1/2)	Linear	34B5346X022	37B2279X012	23B6129X012	23B9197X012	14B5341X012	1U2305X0142 <sup>(1)</sup> 1U2306X0192 <sup>(2)</sup>
					Equal %	37B3194X012					
					Whisper I	34B9852X012					
				19.1 (3/4)	Linear	34B5346X022	37B2279X022	23B6129X012	23B9197X012	14B5341X012	1K5877X0132 <sup>(1)</sup> 1U4446X0102 <sup>(2)</sup>
					Equal %	37B3194X012					
					Whisper I	34B9852X012					
				25.4 (1)	Linear	34B5346X022	37B2279X032	23B6129X012	23B9197X012	14B5341X012	1K7796X0062 <sup>(1)</sup> 1K7891X0242 <sup>(2)</sup>
					Equal %	37B3194X012					
					Whisper I	34B9852X012					
			3H	12.7 (1/2)	Linear	34B5346X012	34B5345X032	23B6150X012	23B9197X012	14B5341X012	1U2305X0142 <sup>(1)</sup> 1U2306X0192 <sup>(2)</sup>
					Equal %	37B3194X022					
					Whisper I	---					
				19.1 (3/4)	Linear	34B5346X012	34B5345X012	23B6150X012	23B9197X012	14B5341X012	1K5877X0132 <sup>(1)</sup> 1U4446X0102 <sup>(2)</sup>
					Equal %	37B3194X022					
					Whisper I	---					
				25.4 (1)	Linear	34B5346X012	34B5345X022	23B6150X012	23B9197X012	14B5341X012	1K7796X0062 <sup>(1)</sup> 1K7891X0242 <sup>(2)</sup>
					Equal %	37B3194X022					
					Whisper I	---					
			37H	12.7 (1/2)	Linear	34B5346X022	34B5345X032	23B6150X012	23B9197X012	14B5341X012	1U2305X0142 <sup>(1)</sup> 1U2306X0192 <sup>(2)</sup>
					Equal %	37B3194X012					
					Whisper I	34B9852X012					
				19.1 (3/4)	Linear	34B5346X022	34B5345X012	23B6150X012	23B9197X012	14B5341X012	1K5877X0132 <sup>(1)</sup> 1U4446X0102 <sup>(2)</sup>
					Equal %	37B3194X012					
					Whisper I	34B9852X012					
25.4 (1)	Linear	34B5346X022		34B5345X022	23B6150X012	23B9197X012	14B5341X012	1K7796X0062 <sup>(1)</sup> 1K7891X0242 <sup>(2)</sup>			
	Equal %	37B3194X012									
	Whisper I	34B9852X012									
8X4	4.375	2	1	12.7 (1/2)	Linear	34B5346X022	37B2279X012	23B6130X012	23B9197X012	14B5341X012	1U2305X0142 <sup>(1)</sup> 1U2306X0192 <sup>(2)</sup>
					Equal %	37B3194X012					
					Whisper I	34B9852X012					
				19.1 (3/4)	Linear	34B5346X022	37B2279X022	23B6130X012	23B9197X012	14B5341X012	1K5877X0132 <sup>(1)</sup> 1U4446X0102 <sup>(2)</sup>
					Equal %	37B3194X012					
					Whisper I	34B9852X012					
				25.4 (1)	Linear	34B5346X022	37B2279X032	23B6130X012	23B9197X012	14B5341X012	1K7796X0062 <sup>(1)</sup> 1K7891X0242 <sup>(2)</sup>
					Equal %	37B3194X012					
					Whisper I	34B9852X012					
			3H	12.7 (1/2)	Linear	34B5346X012	34B5345X032	23B6130X032	23B9197X012	14B5341X012	1U2305X0142 <sup>(1)</sup> 1U2306X0192 <sup>(2)</sup>
					Equal %	37B3194X022					
					Whisper I	---					
				19.1 (3/4)	Linear	34B5346X012	34B5345X012	23B6130X032	23B9197X012	14B5341X012	1K5877X0132 <sup>(1)</sup> 1U4446X0102 <sup>(2)</sup>
					Equal %	37B3194X022					
					Whisper I	---					
				25.4 (1)	Linear	34B5346X012	34B5345X022	23B6130X032	23B9197X012	14B5341X012	1K7796X0062 <sup>(1)</sup> 1K7891X0242 <sup>(2)</sup>
					Equal %	37B3194X022					
					Whisper I	---					

1. For Standard Bonnet.  
2. For Style 1 Extension Bonnet.

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C-seal Parts for Fisher EWD Valve (Keys 3\*, 2\*, 9\*, 64\*, 6\*, and 7\*) (continued)

VALVE SIZE	PORT DIA	TRAVEL	TRIM	STEM DIA	CHARACTER-ISTIC	CAGE	PLUG/RETAINER	SEAT RING	C-seal	PISTON RING	STEM			
NPS	Inch	Inch		mm (Inch)		Key 3	Key 2	Key 9	Key 64	Key 6	Key 7			
8X4	4.375	2	37H	12.7 (1/2)	Linear	34B5346X022	34B5345X032	23B6130X032	23B9197X012	14B5341X012	1U2305X0142 <sup>(1)</sup> 1U2306X0192 <sup>(2)</sup>			
					Equal %	37B3194X012								
					Whisper I	34B9852X012								
				19.1 (3/4)	Linear	34B5346X022	34B5345X012	23B6130X032	23B9197X012	14B5341X012	1K5877X0132 <sup>(1)</sup> 1U4446X0102 <sup>(2)</sup>			
					Equal %	37B3194X012								
					Whisper I	34B9852X012								
				25.4 (1)	Linear	34B5346X022	34B5345X022	23B6130X032	23B9197X012	14B5341X012	1K7796X0062 <sup>(1)</sup> 1K7891X0242 <sup>(2)</sup>			
					Equal %	37B3194X012								
					Whisper I	34B9852X012								
8X6	7	2	1	19.1 (3/4)	Linear	33B9178X012	33B9195X012	20B0811X012	23B9182X012	13B9176X012	1K5877X0132 <sup>(1)</sup> 1U4446X0102 <sup>(2)</sup>			
					Equal %	34B3628X012								
					Whisper I	---								
				25.4 (1)	Linear	33B9178X012	33B9195X022	20B0811X012	23B9182X012	13B9176X012	1N7047X0052 <sup>(1)</sup> 1L8776X0032 <sup>(2)</sup>			
					Equal %	34B3628X012								
					Whisper I	---								
			3H	19.1 (3/4)	Linear	---	34B7699X022	33B8104X012	23B9182X012	13B9176X012	1K5877X0132 <sup>(1)</sup> 1U4446X0102 <sup>(2)</sup>			
					Equal %	---								
					Whisper I	34B9828X012								
				25.4 (1)	Linear	---	34B7699X012	33B8104X012	23B9182X012	13B9176X012	1N7047X0052 <sup>(1)</sup> 1L8776X0032 <sup>(2)</sup>			
					Equal %	---								
					Whisper I	34B9828X012								
			37H	19.1 (3/4)	Linear	33B9178X012	34B7699X022	33B8104X012	23B9182X012	13B9176X012	1K5877X0132 <sup>(1)</sup> 1U4446X0102 <sup>(2)</sup>			
					Equal %	34B3628X012								
					Whisper I	---								
				25.4 (1)	Linear	33B9178X012	34B7699X012	33B8104X012	23B9182X012	13B9176X012	1N7047X0052 <sup>(1)</sup> 1L8776X0032 <sup>(2)</sup>			
					Equal %	34B3628X012								
					Whisper I	---								
			12X6	7	2	1	19.1 (3/4)	Linear	33B9178X012	33B9195X012	33B6131X012	23B9182X012	13B9176X012	1K5877X0132 <sup>(1)</sup> 1U4446X0102 <sup>(2)</sup>
								Equal %	34B3628X012					
								Whisper I	34B9828X022					
							25.4 (1)	Linear	33B9178X012	33B9195X022	33B6131X012	23B9182X012	13B9176X012	1N7047X0052 <sup>(1)</sup> 1L8776X0032 <sup>(2)</sup>
								Equal %	34B3628X012					
								Whisper I	34B9828X022					
3H	19.1 (3/4)	Linear				33B9178X022	34B7699X022	33B6133X012	23B9182X012	13B9176X012	1K5877X0132 <sup>(1)</sup> 1U4446X0102 <sup>(2)</sup>			
		Equal %				34B3628X022								
		Whisper I				34B9828X012								
	25.4 (1)	Linear				33B9178X022	34B7699X012	33B6133X012	23B9182X012	13B9176X012	1N7047X0052 <sup>(1)</sup> 1L8776X0032 <sup>(2)</sup>			
		Equal %				34B3628X022								
		Whisper I				34B9828X012								
37H	19.1 (3/4)	Linear				33B9178X012	34B7699X022	33B6133X012	23B9182X012	13B9176X012	1K5877X0132 <sup>(1)</sup> 1U4446X0102 <sup>(2)</sup>			
		Equal %				34B3628X012								
		Whisper I				34B9828X022								
	25.4 (1)	Linear				33B9178X012	34B7699X012	33B6133X012	23B9182X012	13B9176X012	1N7047X0052 <sup>(1)</sup> 1L8776X0032 <sup>(2)</sup>			
		Equal %				34B3628X012								
		Whisper I				34B9828X012								

1. For Standard Bonnet.  
 2. For Style 1 Extension Bonnet.  
 3. Requires bonnet spacer 34B1369.

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C-seal Parts for Fisher EWD Valve (Keys 3\*, 2\*, 9\*, 64\*, 6\*, and 7\*) (continued)

VALVE SIZE	PORT DIA	TRAVEL	TRIM	STEM DIA	CHARACTERISTIC	CAGE	PLUG/RETAINER	SEAT RING	C-seal	PISTON RING	STEM			
NPS	Inch	Inch		mm (Inch)		Key 3	Key 2	Key 9	Key 64	Key 6	Key 7			
10X8	8	3	1	19.1 (3/4)	Linear	37B1663X022	37B6392X022	29A9704X012	34B9827X012	24B9826X012	1K5880X0262 <sup>(1)</sup>			
					Equal %	37B5635X022								
				25.4 (1)	Linear	37B1663X022	37B6392X012	29A9704X012	34B9827X012	24B9826X012	10A3282X222 <sup>(2)</sup>			
					Equal %	37B5635X022								
				2	1	25.4 (1)	Whisper I	47B6378X012	37B6389X012	29A9704X012	34B9827X012	24B9826X012	10A3282X222 <sup>(2)</sup>	
							Whisper I	47B5214X012						
		3.5 <sup>(3)</sup>	2	31.8 (1-1/4)	Whisper I	47B6378X012	37B6379X012	29A9704X012	34B9827X012	24B9826X012	10A6073X072 <sup>(2)</sup>			
					Whisper I	47B5214X012								
		3.5 <sup>(3)</sup>	3	3H	19.1 (3/4)	Linear	37B1663X012	37B1665X032	29A9704X022	34B9827X012	24B9826X012	1K5880X0262 <sup>(1)</sup>		
						Equal %	37B5635X012							
		25.4 (1)	3	3H	25.4 (1)	Linear	37B1663X012	37B1665X012	29A9704X022	34B9827X012	24B9826X012	10A3282X222 <sup>(2)</sup>		
						Equal %	37B5635X012							
31.8 (1-1/4)	3	3H	31.8 (1-1/4)	Linear	37B1663X012	37B1665X022	29A9704X022	34B9827X012	24B9826X012	1L2298X0202 <sup>(2)</sup>				
				Equal %	37B5635X012									
10X8	8	3	37H	19.1 (3/4)	Linear	37B1663X022	37B1665X032	29A9704X022	34B9827X012	24B9826X012	1K5880X0262 <sup>(1)</sup>			
					Equal %	37B5635X022								
				25.4 (1)	3	37H	25.4 (1)	Linear	37B1663X022	37B1665X012	29A9704X022	34B9827X012	24B9826X012	10A3282X222 <sup>(2)</sup>
								Equal %	37B5635X022					
				31.8 (1-1/4)	2	37H	31.8 (1-1/4)	Linear	37B1663X022	37B1665X022	29A9704X012	34B9827X012	24B9826X012	1L2298X0202 <sup>(2)</sup>
								Equal %	37B5635X022					
		25.4 (1)	3.5 <sup>(3)</sup>	2	37H	25.4 (1)	Whisper I	47B6378X012	34B9848X012	29A9704X012	34B9827X012	24B9826X012	10A3282X222 <sup>(2)</sup>	
							Whisper I	47B5214X012						
		31.8 (1-1/4)	3.5 <sup>(3)</sup>	2	37H	31.8 (1-1/4)	Whisper I	47B6378X012	---	29A9704X012	34B9827X012	24B9826X012	10A6073X072 <sup>(2)</sup>	
							Whisper I	47B5214X012						
		3.5 <sup>(3)</sup>	2	37H	31.8 (1-1/4)	31.8 (1-1/4)	Whisper I	47B6378X012	---	29A9704X012	34B9827X012	24B9826X012	10A6073X072 <sup>(2)</sup>	
							Whisper I	47B5214X012						
3.5 <sup>(3)</sup>	2	37H	31.8 (1-1/4)	31.8 (1-1/4)	Whisper I	47B6378X012	---	29A9704X012	34B9827X012	24B9826X012	10A6073X072 <sup>(2)</sup>			
					Whisper I	47B5214X012								
12X8	8	3	3H	25.4 (1)	Linear	37B1663X012	37B1665X012	29A9704X022	34B9827X012	24B9826X012	10A3282X222			
					Equal %	37B5635X012								
				31.8 (1-1/4)	Linear	37B1663X012	37B1665X022	29A9704X022	34B9827X012	24B9826X012	10A3282X222			
					Equal %	37B5635X012								

1. For Standard Bonnet.  
2. For Style 1 Extension Bonnet.  
3. Requires bonnet spacer 34B1369.

TSO Parts for Fisher EWT Valve (Keys 3\*, 9\*, 2\*, 28\*, 63\*, 29\*, and 27\*)<sup>(1)</sup>

VALVE SIZE	PORT DIA	STEM DIAMETER		CHARACTERISTIC	CAGE	SEAT RING	PLUG/STEM ASSY	SEAL RING	ANTI-EXT RING	BACKUP RING	RETAINING RING
NPS	Inch	mm	Inch		Key 3	Key 9	Key 2	Key 28	Key 63	Key 29	Key 27
6x4	4.1875	19.1	3/4	Linear	2U236633272	38B0278X012	38B0282X012	10A4223X142	21B9341X012	10A4224X012	10A4225X012
				Equal %	2U236333272						
				Quick Open	2U236033272						
				Whisper	23A8915X032						
8x4	4.1875	19.1	3/4	Linear	2U236633272	38B0279X012	38B0282X012	10A4223X142	21B9341X012	10A4224X012	10A4225X012
				Equal %	2U236333272						
				Quick Open	2U236033272						
				Whisper	23A8915X032						
8x6	6.8125	19.1	3/4	Linear	2U505933272	38B0280X012	38B0284X012	10A2643X112	22B5998X012	12B5997X012	14A4652X012
				Equal %	2U506133272						
				Quick Open	2U506333272						
				Whisper	23A8913X032						
12x6	6.8125	19.1	3/4	Linear	2U505933272	38B0281X012	38B0284X012	10A2643X112	22B5998X012	12B5997X012	14A4652X012
				Equal %	2U506133272						
				Quick Open	2U506333272						
				Whisper	23A8913X032						

1. Travel is 2-Inch. Trim is 812.

Key 3\* Cage (except for Whisper Trim III and Cavitrol III constructions)

Valve Size, NPS	Cage Style		Standard Stainless Steel <sup>(1)</sup>	CF8M (316 SST), Electroless Nickel Coating	R30006 (Alloy 6)	
4x2	Quick-opening		2U223433272	2U740448932	2U223439102	
	Equal percentage		2U223733272	2U741048932	2U223739102	
	Linear		2U224033272	2U741648932	2U224039102	
	Whisper Trim I		2V502533272	---	2V5025X0012	
6x4x2-1/2	Quick-opening		2U227633272	2U740548932	2U227639102	
	Equal percentage		2U227933272	2U741148932	2U227939102	
	Linear		2U228233272	2U741748932	2U228239102	
	Whisper Trim I		2V502633272	2V503348932	2V5026X0012	
6x4 or 8x4	Quick-opening		2U236033272	2U740748932	2U236039102	
	Equal percentage		2U236333272	2U741348932	2U236339102	
	Linear		2U236633272	2U741948932	2U236639102	
	Whisper Trim I		23A8915X032	---	23A8915X012	
8x6 or 12x6, except for Whisper Trim III cages	Quick-opening		2U506333272	2U8069	2U506339102	
	Equal percentage		2U505933272	2U8067	2U505939102	
	Linear		2U506133272	2U8068	2U506139102	
	Whisper Trim I	51 mm (2 inch) travel		23A8913X032	---	23A8913X012
		102 mm (4 inch) travel	NPS 8x6 valve	23A7190X012	---	23A7190X022
NPS 12x6 valve	23A7191X012		---	23A7191X022		
10x8 or 12x8	Quick-opening		20A3249X012	20A5469X012	20A3249X092	
	Equal percentage		20A3245X012	20A5467X012	20A3245X092	
	Linear		20A3247X012	20A5468X012	20A3247X092	
	Whisper Trim I, NPS 10x8 valve only, 102 mm (4-inch) travel		43B7381X012	---	---	

1. Standard stainless steel is CB7CU-1 (S17400 H900). S41600 (416 SST) is standard for Whisper Trim III cages in NPS 8X6 and NPS 12X6 with 5.375 inch port.

Actuator Groups (by Type Number)

Group 1 54 mm (2-1/8 inches), 71 mm (2-13/16 inches) or 90 mm (3-9/16 inches) Yoke Boss	Group 100 127 mm (5 inches) Yoke Boss	Group 101 127 mm (5 inches) Yoke Boss	Group 403 90.5 mm (3-9/16 inches) Yoke Boss
585C Series—50.8 mm (2 inches) travel	585C	667	585C
472 & 473	472		1008
657 & 667—76.2 mm (3 inches) travel	473		
1008—71.4 mm (2-13/16 inches) yoke boss	657		
	1008		

Key 7\* Valve Stem (except for Cavitrol III constructions)

VALVE SIZE, NPS	STEM DIA		ACTUATOR GROUP	BONNET					
	mm	Inch		Plain		Style 1 Extension		Style 2 Extension	
				S31600 (316 SST)	S31600 Cr Pl(1)	S31600	S31600 Cr Pl(1)	S31600	
4x2	12.7	1/2	1	1K586935162	1K586946592	1U226335162	1U226346592	1U226435162	
	19.1	3/4	1	1U226535162	1U226546592	1L400135162	1L400146592	---	
6x4x2-1/2	12.7	1/2	1	1P669335162	1P669346592	1K587335162	1K587346592	1V782535162	
	19.1	3/4	1	1K587735162	1K587746592	1V782435162	1V782446592	1V240035162	
6x4 or 8x4	12.7	1/2	1	1U230535162	1U230546592	1U230635162	1U230646592	1U230735162 <sup>(3)</sup>	
	19.1	3/4	1	1K587735162	1K587746592	1U444635162	1U444646592	1U240035162	
	25.4	1	100	1U217535162	1U217546592	---	---	---	
	25.4	1	101	1K759035162	1K759046592	---	---	---	
8x6 CL300 or CL600, except for Whisper Trim III cages	51 mm (2-Inch) travel	19.1	3/4	1	1L996435162	1L996446592	1U507135162	1U507146592	1U524435162
		25.4	1	100	1N704735162	1N704746592	1K785135162	1K785146592	---
		25.4	1	101	1K759135162	1K759146592 <sup>(3)</sup>	1P597335162 <sup>(3)</sup>	1P597346592 <sup>(3)</sup>	---
		31.8	1-1/4	100	1K415435162	1K415446592	1R562435162	1R562446592	---
	76 mm (3-Inch) travel	31.8	1-1/4	101	1K775335162	1K775346592	1U316235162	1U316246592	---
		19.1	3/4	1	1U293835162	---	1U928235162	---	---
	25.4	1	100, 101	1N704735162	1N704746592	1K785135162	1K785146592	---	
		31.8	1-1/4	100, 101	1K415435162	1K415446592	1N770735162	---	---
	102 mm (4-Inch) travel	19.1	3/4	1, 403	1U294135162	---	10A9265X552	---	10A9265X562
	8x6 CL900	51 mm (2-Inch) travel	19.1	3/4	1	1K588035162	---	---	---
25.4			1	100	1K778335162	---	---	---	---
25.4			1	101	1L2687X0012 <sup>(2)</sup>	---	---	---	---
31.8			1-1/4	100	1N325635162 <sup>(3)</sup>	---	---	---	---
76 mm (3-Inch) travel		101	100	1U9886X0012	---	---	---	---	---
		101	100	1U316235162	---	---	---	---	---
		19.1	3/4	1	1K588035162	---	---	---	---
		25.4	1	100, 101	1N325635162	---	---	---	---
31.8	1-1/4	100, 101	1U316235162	---	---	---	---		
12x6 except for Whisper Trim III cages	51 or 76 mm (2 or 3-Inch) travel	19.1	3/4	1	1L996435162	1L996446592	1U507135162	1U507146592	1U524435162
		100	1N704735162	1N704746592	1K785135162	1K785146592	---		
		101	1K759135162	1K759146592	1P597335162 <sup>(4)</sup>	1P597346592 <sup>(4)</sup>	---		
	31.8	1-1/4	100	1K415435162	1K415446592	1R562435162	1R562446592	---	
			101	1K775335162	1K775346592	1U316235162	1U316246592	---	
	102 mm (4-Inch) travel	19.1	3/4	1, 403	1U294135162	---	10A9265X552	---	10A9265X562
10x8	51 mm (2-Inch) travel	19.1	3/4	1	1K588035162	1K5880X0262	1U928235162	1U9282X0192	---
		25.4	1	100	1K7891X0012	---	1K7891X0012	---	---
	76 mm (3-Inch) travel	25.4	1	100, 101	10A3282X012	---	10A3282X012	---	---
		31.8	1-1/4	100	1L2298X0012	---	1L2298X0012	---	---

-continued-



Key 7\* Valve Stem (except for Cavitrol III constructions) (continued)

VALVE SIZE, NPS		STEM DIA		ACTUATOR GROUP	BONNET				
					Plain		Style 1 Extension		Style 2 Extension
		mm	Inch		S31600 (316 SST)	S31600 Cr Pl(1)	S31600	S31600 Cr Pl(1)	S31600
12x8, CL300 or CL600	51 mm (2-Inch) travel	19.1	3/4	1	10A9265X882	---	1L818235162	---	---
		25.4	1	100	11A3429X452	---	11A3429X452	---	---
		31.8	1-1/4	100	1V2092X0032	---	1V2092X0032	---	---
	76 mm (3-Inch) travel	25.4	1	100, 101	1L294135162	---	1L294135162	---	---
31.8		1-1/4	100, 101	11A3430X012	---	11A3430X012	---	---	
12x8, CL900	51 mm (2-Inch) travel	19.1	3/4	1	10A9265XB52	---	---	---	---
		25.4	1	100	11A3429XA92	---	---	---	---
		31.8	1-1/4	100	11A3430X362	---	---	---	---
	76 mm (3-Inch) travel	25.4	1	100, 101	11A3429XA82	---	---	---	---
31.8		1-1/4	100, 101	11A3430X622	---	---	---	---	

1. Use when temperatures are over 427°C (800°F).  
 2. For EWD with multipiston ring.  
 3. Not for EWD with multipiston ring.  
 4. Not for 51 mm (2-Inch) travel EWD with multipiston ring.

Key 9\* Metal-Seat Seat Ring (except for Cavitrol III constructions)

VALVE SIZE, NPS			MATERIAL		
			S41600 (416 SST)	CF8M (316 SST)	CF8M/CoCr-A (316 SST)
4x2			10A5935X012	10A5935X022 <sup>(2)</sup>	10A5935X032 <sup>(3)</sup>
6x4			1V676446172	1V676433092	2V676546062 <sup>(5)</sup>
6x4x2-1/2			1U222746172	1U222735072 <sup>(2)</sup>	1U222739102 <sup>(3)</sup>
8x4			1V642346172	1V642333092 <sup>(2)</sup>	2V642446062 <sup>(4)</sup>
8x6, CL300 or CL600	Except for Whisper Trim III cages	51 mm (2-Inch) travel 76 mm (3-Inch) or 102 mm (4-Inch) travel	2V721546172 <sup>(1)</sup> 2V9406X00B2 <sup>(1)</sup>	2V721533092 2V9406X00A2	2V721646062 20A1181X012
8x6 CL900	51 mm (2-Inch) travel 76 mm (3-Inch) travel		21A8231X012 <sup>(1)</sup> 21A9345X012 <sup>(1)</sup>	--- ---	21A9343X012 <sup>(4)</sup> 21A9346X012
12x6	Except for Whisper Trim III cages	51 mm (2-Inch) travel 76 mm (3-Inch) travel 102 mm (4-Inch) travel	2V643946172 20A6345X012 2V9406X00B2 <sup>(1)</sup>	2V643933092 20A6345X022 2V9406X00A2	2V644046062 --- 20A1181X012
10x8 or 12x8			20A3260X012 <sup>(1)</sup>	20A3260X022	20A3260X152 <sup>(1)</sup>

1. CA15 is substituted for this construction.  
 2. S31600 (316 SST) is substituted for this construction.  
 3. R30006 is substituted for this construction.  
 4. S31600/CoCr-A is substituted for this construction.  
 5. S31600/CoCr-A hard faced seat ring.

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	Adapter Gasket	
12	Spiral-Wound Gasket	N06600/Graphite
53	Shim	S31600

Keys 10\*, 11\*, 12\*, 13\*, 14\*, and 53\* Gaskets and Shims

Valve Size, NPS	Key Number	Standard Trim Cage Whisper Trim I Cage Cavitrol III - 1 Stage Cage	Cavitrol III - 2 Stage Cage Whisper Trim III Cage WhisperFlo Cage
		-198 to 593°C (-325 to 1100°F)	
		Part Number	Part Number
4x2	Set	RGASKETX182	RGASKETX442
	10	1R3299X0042	1R3299X0042 (qty 2)
	12	1R329799442	1R329799442
	13	1R3296X0042	1R3296X0042
	53	16A1938X012	16A1938X012
6x4x2-1/2	Set	RGASKETX282	---
	10	1R3724X0042	---
	11	1R3846X0042	---
	12	1R384599442	---
	13	1R3844X0052	---
	14	1J5047X0062	---
6x4 or 8x4	Set	RGASKETX212	RGASKETX472
	10	1R3724X0042	1R3724X0042 (qty 2)
	12	1R372299442	1R372299442
	13	1J5047X0062	1J5047X0062
	53	16A1941X012	16A1941X012
8x6 or 12x6 CL300, CL600, or CL900	Set	RGASKETX392	---
	10	1U5081X0052	---
	12	1U508599442	---
	13	1V644199442	---
	53	16A1942X012	---
8x6 or 12x6 Whisper I	Set	RGASKETX412	---
	10 (qty 2)	1U5081X0052	---
	12	1U508599442	---
	13	1V644199442	---
	53	16A1942X012	---
10x8 or 12x8	Set	RGASKETX232	10A3265X152
	10	10A3265X112	10A3265X112 (qty 2)
	13	10A3266X082	10A3266X082



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