

# KALREZ® Packing System for Fisher® Rotary-Shaft Valves

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## Introduction

### Scope of Manual

This instruction manual includes installation, maintenance, and parts information for KALREZ valve stem packing (KVSP) systems. These systems are available for Fisher rotary valves with 12.7 through 38.1 mm (1/2 through 1-1/2 inch) shaft diameters. The system can be used with many rotary valves, as shown in table 1. Refer to appropriate valve and actuator instruction manuals for necessary information relating to the disassembly and assembly of the valve and actuator.

Do not install, operate, or maintain a KALREZ packing system 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 Process Management sales office before proceeding.

### Description

See table 1 for valve designs and shaft diameters where KALREZ packing systems can be applied.

Emerson Process Management offers KALREZ packing systems that you can easily install into your existing valves or that you can purchase with new valves. The KVSP 500 Series uses Vespel® CR-6100 backup rings and KALREZ seal rings.

The external live-loading provides a constant load over the life of the packing material, which reduces the need for packing box adjustment and maintenance.

## Installation

Use these instructions to install KALREZ packing in valves that have standard packing, or when inspecting or replacing KALREZ packing.

Table 2 lists part numbers for KALREZ packing sets only. When retrofitting valves to KALREZ packing, contact your Emerson Process Management sales office for information on additional parts needed.



Table 1. Specifications

<p><b>Applicable Valve Designs</b></p> <p>A41, 8510, 8510B (single arrangements only), 8550, and 8560 valves; V100, V150, V200, V300 and V500 Vee-Ball™ valves; and CV500 Cam-Vee-Ball valves. See table 2</p>	<p>(1/2, 5/8, 3/4, 7/8, 1, 1-1/4 and 1-1/2 inches). See table 2</p>
<p><b>Applicable Shaft Diameters</b></p> <p><i>Vee-Ball and Eccentric Disc Valves:</i> ■ 12.7, ■ 15.9, ■ 19.1, ■ 22.2, ■ 25.4, ■ 31.8, and ■ 38.1 mm</p>	<p><b>Pressures and Temperatures<sup>(1)</sup></b></p> <p>Maximum Application Temperature 260°C (500°F)</p> <p>Maximum Application Pressure Pressure is limited to the maximum valve rating</p>
<p>1. The pressure/temperature limits in this manual, in the valve literature, and any applicable code or standard limitation should not be exceeded.</p>	

## Removing the Actuator

### **⚠ WARNING**

Avoid personal injury from sudden release of process pressure or uncontrolled movement of parts. Before performing any installation operations:

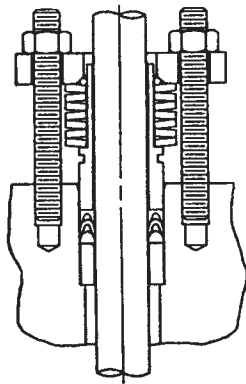
- Do not remove the actuator from the valve while the valve is still pressurized.
- Always wear protective gloves, clothing, and eyewear when performing any maintenance operations to avoid personal injury.
- Disconnect any operating lines providing air pressure, electric power, or a control signal to 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 power 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 other hazards that may be present from exposure to process media.

You must remove the actuator from the valve when you install KALREZ packing systems. To allow proper readjustment of the Vee-Ball, eccentric disc, or valve disc position, it is recommended that you remove the valve from the pipeline. Refer to appropriate valve and actuator instruction manuals.

### **⚠ WARNING**

Avoid personal injury or equipment damage from uncontrolled movement of parts. If a spring-return actuator is used, be sure the actuator spring is resting on its travel stop. If something is obstructing shaft rotation, it is possible that disconnecting the shaft connector will allow the spring to force the actuator to the end of its rotation. Refer to the appropriate valve and actuator instruction manuals to remove the actuator.

Figure 1. KALREZ Packing Arrangements



**STANDARD  
PACKING BOX**

V100 - 12.7, 19.1, 25.4, 31.8  
(1/2, 3/4, 7/8, 1, 1-1/4) SHAFT  
V150 - 12.7, 19.1, 25.4  
(1/2, 3/4, 1) SHAFT  
V200 & V300 - 12.7, 15.9, 19.1, 25.4  
(1/2, 5/8, 3/4, 1) SHAFT  
V500 - 12.7, 15.9, 25.4, 31.8  
(1/2, 5/8, 1, 1-1/4) SHAFT  
8510, 8550, 8560, & A41 - 12.7, 15.9, 19.1,  
25.4, 31.8 (1/2, 5/8, 3/4, 1, 1-1/4) SHAFT



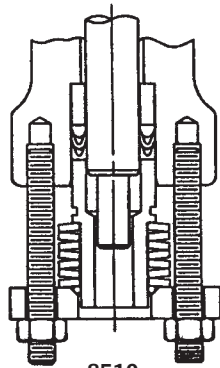
**OUTBOARD END  
PACKING BOX**

8510 - 12.7, 15.9, 19.1, 25.4,  
31.8 (1/2, 5/8, 3/4, 1, 1-1/4)  
SHAFT



**OPTIONAL DEEP  
PACKING BOX**

V100 - 12.7, 19.1, 25.4 (1/2, 3/4, 7/8, 1) SHAFT



8510

OUTBOARD END



**STANDARD  
PACKING BOX**

V100, V500, 8510, 8550, 8560 &  
A41 - 38.1 (1-1/2) SHAFT



**OUTBOARD END  
PACKING BOX**

8510 - 38.1 (1-1/2) SHAFT



**STANDARD  
PACKING BOX**

V150 - 31.8, 38.1 (1-1/4, 1-1/2) SHAFT  
V200 - 31.8 (1-1/4) SHAFT  
V150 - 31.8, 38.1 (1-1/4, 1-1/2) SHAFT

**OPTIONAL DEEP  
PACKING BOX**

V100 - 38.1 (1-1/2) SHAFT

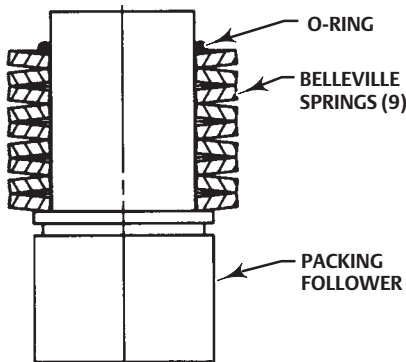


**OPTIONAL DEEP  
PACKING BOX**

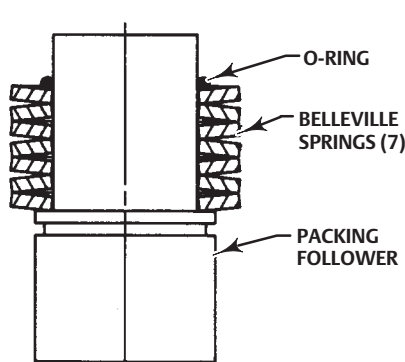
V100 - 31.8 (1-1/4) SHAFT

mm(INCHES)

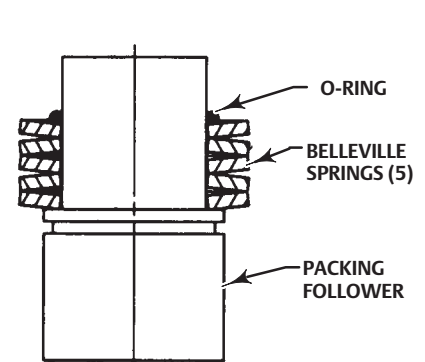
Figure 2. Belleville Spring Stacking Order



1288319-A  
SIZE 12.7 & 15.9 mm  
(1/2 & 5/8-inch) SHAFT



1288320-A  
SIZE 19.1, 22.2 & 25.4 mm  
(3/4, 7/8, & 1-inch) SHAFT



1288321-A  
SIZE 31.8 & 38.1 mm  
(1-1/4 & 1-1/2 inch) SHAFT

## Installing a KALREZ Packing System

Refer to figure 1.

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### Note

When installing a KALREZ packing system into an insulated valve, do not cover the Belleville packing springs with insulation.

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### CAUTION

**Use caution when removing existing internal packing parts. Do not scratch, nick, or dent the valve shaft.**

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### Note

The valve shaft surface condition is critical in obtaining a good seal. If the valve shaft surface is scratched, nicked, or worn, replace the valve shaft before installing the KALREZ Packing System.

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1. Remove old packing parts from the packing box by using the valve instruction manual procedures. Refer to the appropriate valve instruction manual to replace the valve shaft and valve parts.
  2. If the piping and valve are insulated, do not allow the insulation to cover the KALREZ Belleville springs.
  3. If you are converting an existing valve to this packing, remove existing packing box studs from the valve body, and replace them with longer studs (as required).
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### Note

KVSP packing systems should be installed as a complete set, NOT AS INDIVIDUAL PIECES OR COMPONENTS.

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### Note

Ensure that the Belleville springs are stacked properly (see figure 2) and packing box parts are assembled in the correct order (see figure 1). Packing parts cannot function properly if the Belleville springs or other packing parts are not stacked correctly.

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4. All kits include a single use packet of KRYTOX® GPL 206 high performance fluorinated grease to maximize service life and ease of assembly. KRYTOX lubricants are chemically inert to the chemicals regulated under the U.S. Clean Air Act, non-reactive to gaseous and liquid oxygen and chlorine services, with chemical compatibility consistent with KALREZ and the KVSP Systems.
5. Apply the KRYTOX lubricant **liberally** to both the I.D. (inner diameter) and O.D. (outer diameter) surfaces of each KVSP component before installing. All exposed surfaces of the packing assembly should be fully covered.
6. With the shaft in place in the valve, install the packing parts into the valve packing box. Carefully slide the packing down the shaft while being careful not to force the packing and damage it on the shaft spline. Use figures 1 and 2 to ensure that the packing parts and spring pack are assembled in the correct order.
7. Be careful NOT to position the KVSP packing system adjacent to any lubrication holes in the packing box which could compromise its sealing performance.

## Tightening Procedures

A modified tightening procedure is recommended for live-loading the KVSP System to help ensure the correct loading force is used during the life of the packing and to help avoid any overcompression of the packing. This procedure also creates open space within the spring set that allows dynamic movement of the packing system to compensate for any volumetric changes that occur during thermal cycling.

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### Note

The following tightening procedure will change the final loading force to about 1/2 of a fully compressed disc spring.

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1. Hand tighten the gland nuts on the Belleville disc springs and measure the uncompressed or free height.
2. Fully compress the Belleville disc springs alternately and evenly to the flat condition. The flat condition will be evident by a sharp increase in the applied nut torque. Note that there may appear to be space left between the springs; this is due to friction between the springs. Measure the compressed height.
3. Back off the disc spring deflection by 1/3 or 33% of the difference between (1) the free, uncompressed spring height and (2) the fully compressed spring height.
4. The KVSP Systems are designed so the components move together during service to eliminate free space within the packing system. This is part of the system's design and will occur automatically during service without further adjustment from normal mechanical and thermal cycling. The resulting working height is then established half way between (1) the free, uncompressed height and (2) the fully compressed position; this also provides approximately 50% of the load force available from the fully compressed disc spring. This new set position helps give the system an ideal and balanced load, allowing for expansion and contraction due to temperature variations in the process and maximizing the service life.

## Other Considerations

When retrofitting an existing packing system or repacking a valve with KALREZ packing that has been in service, check the condition of the packing bore after you have removed the packing. An easy method for cleaning debris and minor imperfections from the bore is to use a brake cylinder hone attached to an electric drill. This method will do a good job of cleaning the packing bore without changing the dimension of the bore.

When you have completed this exercise, a good guideline to use in checking the condition of the packing bore is the 20/20 rule. If less than 20% of the surface area of the bore is pitted and if there are no pits deeper than 0.020 inch, then your packing should work fine. This does not need to be an exact measurement; visual inspection is adequate. If the packing bore does not meet this criteria, however, you should replace the valve.

Table 2. Rotary KALREZ Applications and Packing Set Part Numbers

Valve	Valve Size, NPs	Shaft Diameter		KVSP-500 PACKING SET
		mm	Inches	Part Number
V100 (std or deep packing box) V150 V200 V500 8510 8510 (outboard end) 8550 8560 (CL150) A41 (CL150)	1, 1-1/2, 2 2 1 1 2 2 2 3 3	12.7	1/2	24B6255X012
V200 V300 V500 8510 8510 (outboard end) 8550 8560 (CL150) 8560 (CL300) A41 (CL150) A41 (CL300)	1-1/2, 2 2 1-1/2, 2 3 3 3 4 3 4 3	15.9	5/8	24B6255X022
V100 (std or deep packing box) V150, V200, V300 8510 8510 (outboard end) 8550 8560 (CL150) 8560 (CL300) A41 (CL150) A41 (CL300)	3 3, 4 4 4 4 6 4 6 4	19.1	3/4	24B6255X032
V100 V100 (deep packing box)	4 4	22.2	7/8	24B6255X042
V100 (std or deep packing box) V150, V200, V300 V500 CV500 8510 8510 (outboard end) 8550 8560 (CL150) 8560 (CL300) A41 (CL150) A41 (CL300)	6 6 3 3 6 6 6 8 4 8 4	25.4	1	24B6255X052
V100 (std or deep packing box) V150, V200, V300 V500 CV500 8510 8510 (outboard end) 8550 8560 (CL150) 8560 (CL300) A41 (CL150) A41 (CL300)	8, 10, 12 8, 10 4 4 8, 10 8, 10 8, 10 10 8 10 8	31.8	1-1/4	24B6255X062
V100 (std or deep packing box) V150, V300 V500 CV500 8510 8510 (outboard end) 8550 8560 (CL150) 8560 (CL300) A41 (CL150) A41 (CL300)	12 12 6, 8 6, 8 12 12 12 12 10 12 10	38.1	1-1/2	24B6255X072

**⚠ WARNING**

**Use only genuine Fisher replacement parts. Components that are not supplied by Emerson Process Management 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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**Note**

Neither Emerson, Emerson Process Management, nor any of their affiliated entities assumes responsibility for the selection, use, or maintenance of any product. Responsibility for the selection, use, and maintenance of any product remains with the purchaser and end user.

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Emerson Process Management  
Marshalltown, Iowa 50158 USA  
Sorocaba, 18087 Brazil  
Chatham, Kent ME4 4QZ UK  
Dubai, United Arab Emirates  
Singapore 128461 Singapore

[www.Fisher.com](http://www.Fisher.com)