

**RECEIVING, UNLOADING, STORAGE,
INSTALLATION, OPERATION, & MAINTENANCE INSTRUCTIONS**

RECEIVING

Upon receipt of the damper(s) at the site, inspect all items for possible shipping damage or missing items, note on Bill of Lading. Also note any hardware or actuator crates that are separate from the dampers for later reference.

UNLOADING & HANDLING OF DAMPER(S)

Sound material handling practices must be utilized when unloading and handling the dampers. Care must be taken so as not to drop, drag, crush, or apply excessive twisting, racking, or skewing loads upon any damper frame, linkage, or any of the accessories that may be attached thereto that may cause permanent damage to the damper. When unloading large damper(s) that are not crated, use an appropriate sized spreader bar using lifting holes (if provided) or lugs to even the load. In no case should a chain or hook be used inside the damper frame since this could damage and distort blades, seals, or frame. **NEVER** use the actuator as a lifting device.

STORAGE INSTRUCTIONS

It is recommended that equipment, particularly with actuators and/or electrical accessories, be stored in a dry enclosed area in order to reduce condensation. Do not stack equipment directly on the ground or at elevations where possible flooding may occur. When stacking, dampers must be supported at a minimum of four equidistant places around the frame to insure that warping or bending of the frame does not occur.

DAMPER ACCESSORIES MUST REMAIN FREE OF ANY EXTERNAL LOADS. Where either dampers or damper crates are marked as to direction of damper position in storage, these directions must be followed.

If inside storage is not available, the equipment should be stacked as described above, secured, and covered with a vented weatherproof cover.

INSTALLATION INSTRUCTIONS

All bolts, nuts, and set screws are tightened prior to shipment but there is a possibility that some of the fasteners may have worked loose during shipment. The tightness of all bolts and nuts which fasten the actuator (when supplied) to the damper frame must be checked. The pipe and/or hose connections and fasteners used with damper accessories such as solenoids, limit switches or other controls must also be checked and any that are found loose should be tightened securely.

Dampers are normally bolted or welded in place. See the specific damper drawing(s) for mounting hole layout (if holes are provided). Lift damper in place using lifting holes (if provided) or lugs with an appropriate size spreader bar to even the load. Take care not to twist or rack the frame. Install the damper(s) per drawing(s) with respect to blade orientation and air flow. Damper(s) must be installed square and plumb. In the event of multipanel dampers, the sections should be welded or bolted together and the splice plates welded (if applicable) before installing the damper assembly.

When dampers are shipped in more than one section and splice plates for frames and/or linkage are supplied, the following procedure should be followed:

1. The damper sections can be assembled before installation or after mounting individual sections to their mounting surfaces. Method to be used will depend on lifting capabilities, space limitations and/or any other limitations applicable to the jobsite.
2. Bolt damper sections and linkage bar(s) (if applicable) together using hardware supplied.
3. The inside frame surfaces should line up and make a smooth junction with one another as if the frame was made of a one piece construction.
4. After bolting the linkage bar(s) together, check for proper blade rotation clearances and that the blades in the entire damper assembly open and close properly.
5. Sealweld sections together to prevent leakage through the frame and to insure that there is no movement between adjoining parts that were previously bolted together.

INSTALLATION INSTRUCTIONS cont.

Dampers with seals require the mullions (if applicable) be sealed to prevent leakage:

A. If the sections are to be assembled by welding:

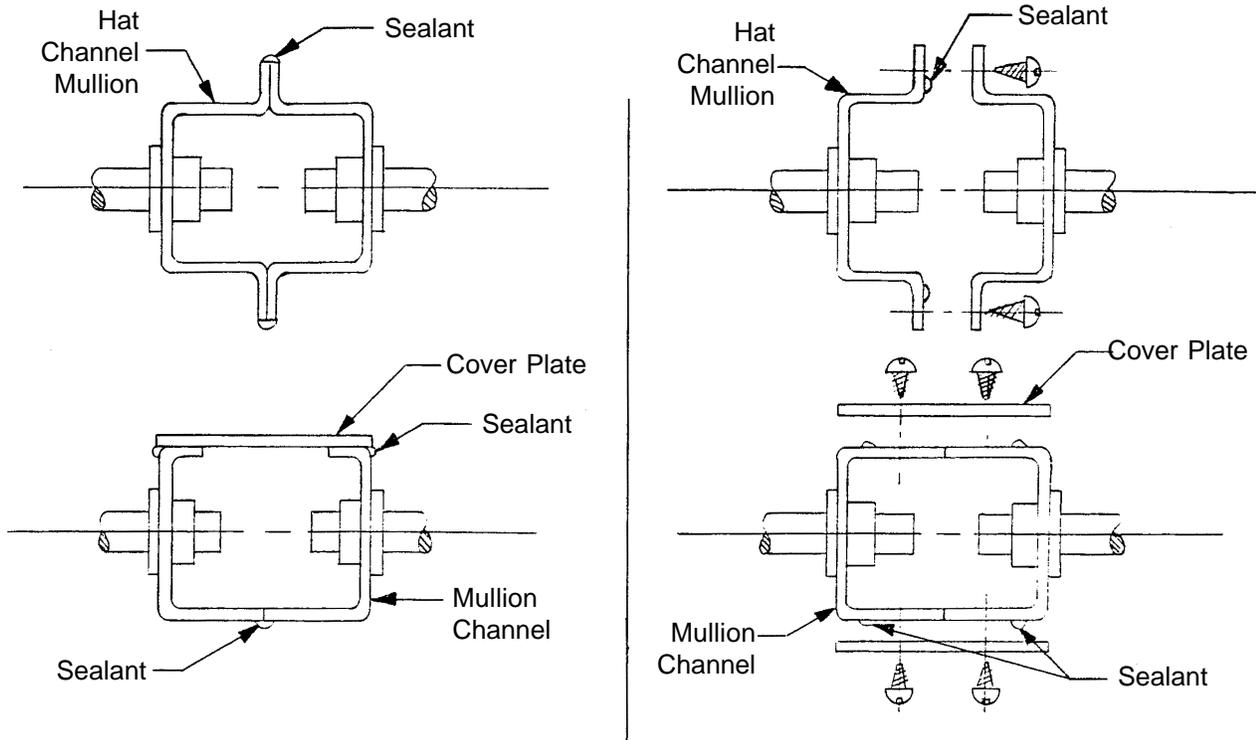
1. Allow metal to cool.
2. Seal the mullion channel flange edges or the channel flange to cover edge (see Fig. 1) with Dow Corning #732 Silastic or sealant suitable for the application, following manufacturer's procedures for cleaning and application.

B. If the sections are to be bolted:

1. Apply a 1/8" bead, minimum, of Dow Corning #732 Silastic or sealant suitable for the application to one flange and fasten the mating flange or cover plate with the appropriate hardware (see Fig. 2) after following manufacturer's procedures for cleaning and application.

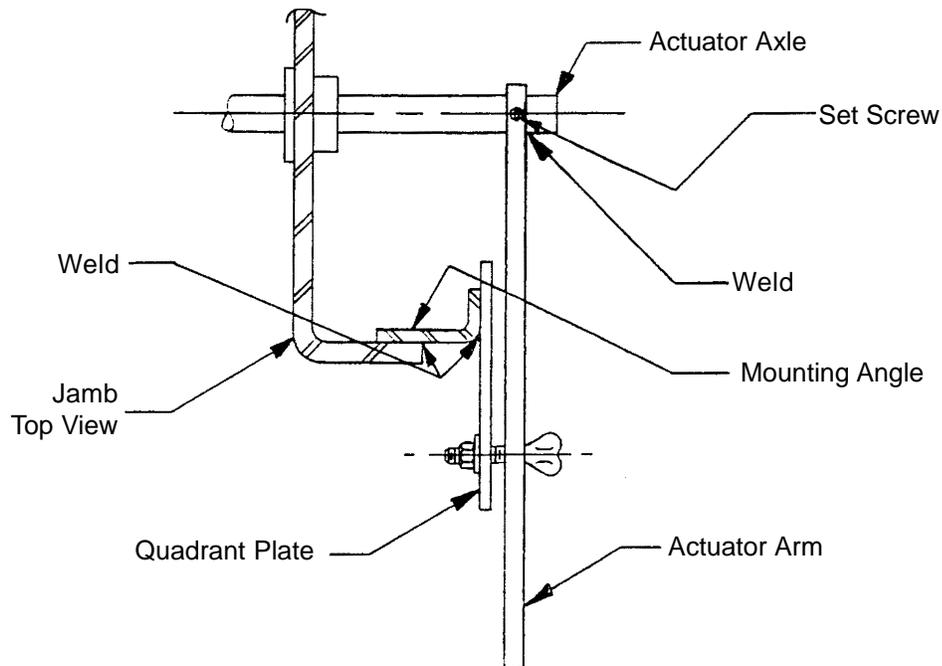
Prior to welding companion flanges (if provided) to their corresponding mounting surfaces, remove gaskets, if applicable. During welding, take steps to insure that the companion flange distortion is minimized with regards to squareness and flatness. After the welding has been completed and the metal cooled, remove any welding residue and dirt from the companion flange mating surface.

Prior to final installation of the damper, inspect the adjacent ductwork and surrounding area for any obstructions that will not allow freedom of movement of the damper linkage on the interior or exterior of the duct. The inside of the duct must be free of weld beads, bolts, braces, or any other obstructions within the damper blades and seals overall traverse area.



6. For those items where manual quadrant actuators are shipped loose to allow the jobsite option of desired orientation, the following procedures must be followed:

- a. Slide actuator arm onto actuator axle.
- b. Position quadrant plate to desired location with the mounting angle on the jamb flange.
- c. Tighten screw in quadrant arm so that when damper blades are half open, the quadrant arm is in the center of the slot in the quadrant plate.
- d. Clamp mounting angle to inside of jamb flange and actuate quadrant arm through the entire arc noting that when the arm is nearly at the closed position, that the blades are closed.
- e. When satisfied that the arm is in the closed position and the damper blades are tightly sealed, weld the mounting angle to the inside of the flange and the actuator arm to the axle.
- f. The welds should be approximately 3/4" long along the length of the angle and arm should be welded half around the axle.



When the damper is ready to be installed to the duct flange or other mounting surface, the surface should be secure enough to support the entire damper assembly.

This surface must be absolutely level and true to receive the damper so that no twist or strain is put on the damper in installation. Construction dirt should be removed from the damper and the mounting surfaces prior to installation. When gaskets are used between the damper and mounting surface, they should be applied to the mounting surface before the damper is placed into position.

MAINTENANCE INSTRUCTIONS

In general, this unit must be kept clean and free from foreign matter that may impede normal movement, and seating of blades and seals (if applicable). A cleaning schedule should be established and is entirely dependant upon the environment into which the damper is placed. The damper is basically maintenance free with the above exception and regular lubrication and seal inspection as indicated below:

Linkage Pivots: Lubricate with light oil as required to provide free movement.

MAINTENANCE INSTRUCTIONS cont.

Bearings:

1. Relubricable Ball

**Maximum In-Duct
Temperature**

**Lubrication
Required**

Frequency

300°F	Shell Alavania #2 or Mobil Lux #2	Every 3 months
450°F*	Mobil #532 or Mobil Lith. #22	or as required
800°F**	Dow Corning DC-41	

* Bearing temperature not to exceed 375°F.

** Bearing temperature not to exceed 500°F.

2. Self-Lubricating Cartridge - requires no additional lubrication.
3. Oil Impregnated Bronze Sleeve - requires no additional lubrication.
4. Freeway - Sealed Ball - requires no additional lubrication.
5. Nylon - requires no additional lubrication.
6. Teflon - requires no additional lubrication.
7. Stainless Steel Sleeve - Lubricate with light oil as required for free movement.

ELASTOMER SEAL / GASKET INSPECTION

The blade seals, jamb seals, and flange gaskets (if applicable) should be inspected for hardening and/or general deterioration due to damper operation and/or radiation exposure. *** **NOTE:** Elastomer type seals and gaskets have a five (5) year life.

*** Applies to Nuclear related jobs only.

Replace seals and gaskets, if required, per the following procedure:

GASKETS

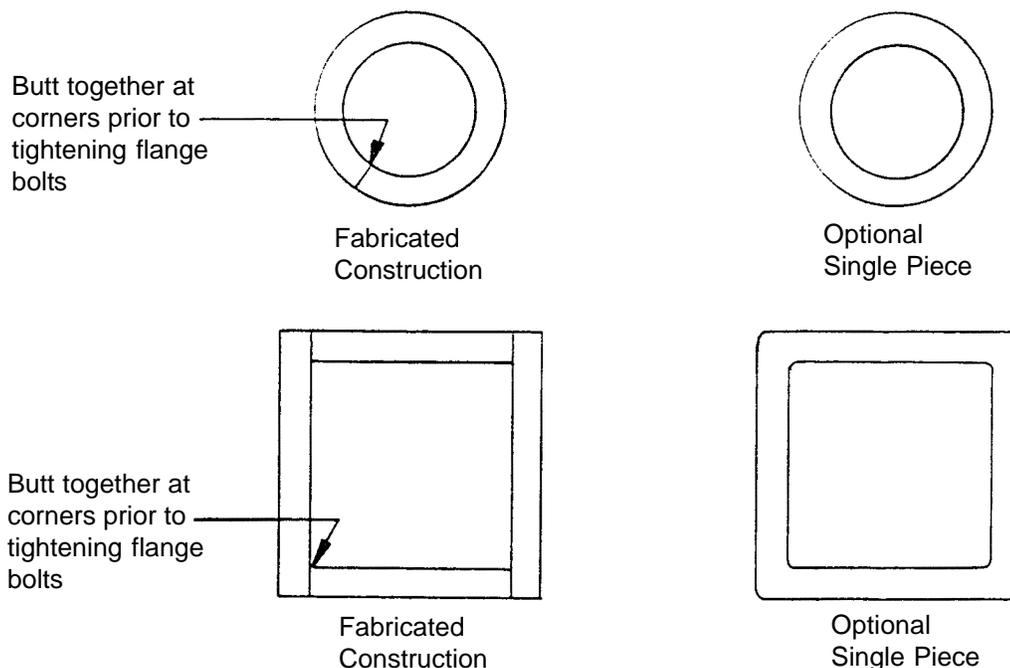
1. Dampers with flange mount are, if required, fitted with flange gaskets to lessen the amount of leakage to the atmosphere.
2. When periodic inspection reveals excessive leakage at the damper flange gaskets, it is recommended that the damper/duct flange bolts be checked for tightness and retightened if required.

GASKETS cont.

3. When further inspection reveals the damper/duct flange bolts are tight and the leakage is due to the deterioration of the gasket material, the gasket must be replaced.
 - 3.1 The gaskets are to be replaced with gaskets made from the gasket material specified on the specific damper drawing. See sketch below on fabrication of gasket.
 - 3.2 Remove the old gasket. Clean the damper and duct flange surfaces removing all old gasket material.
 - 3.3 Install new gasket and tighten damper/duct flange bolts. Note, prior to tightening, assure gasket butt joints at corners (fabricated type only) are tight.

GASKET FABRICATION

Gaskets can be either fabricated or one piece as shown below. The gasket must match the damper flange width and must not extend into the damper. Using damper flange, mark flange hole locations on gasket then punch.



SEALS

Dampers are equipped with seals to reduce the leakage through the damper when the blades are in the fully closed position. The damper seals should be inspected periodically for wear, damper and/or material deterioration due to radiation.

In all cases, seals must be replaced with seals of like kind as specified on the specific damper drawing. Use the following procedures (as applicable) for the replacement of seals.

1. **No. 9343 "D" Shaped Neoprene Seal** - (On blade edges and angle blade stops)



Remove worn or damaged seals making sure all seal material is off, leaving a smooth, clean, flat surface on which to install new seal. Cut the #9343 "D" shaped seal material to the desired length. Apply adhesive (3M Company's Scotch Grip #1357 Contact Cement) to the blade and the seal surface. Allow approximately ten minutes to dry and place into position. Seals should be left to stand approximately ten minutes to allow adhesive to set.

2. **EPT Seal** - (EPT = Ethylene Propylene Terpolymer) (on blade edges and/or jambs)



Removal and cutting is the same as above #9343 neoprene seals. The seals are supplied with a "dry-back" adhesive which is activated by Xylene. Replace seal in the above manner and allow to dry.

3. **Silicone Seal** - (on blade edges and/or jambs)



Removal and cutting is the same as above #9343 neoprene seal. The silicone seals must be attached using Dow Corning 1200 Prime Coat and 732-RTV adhesive following the instructions provided by Dow Corning. Apply to the blade or jamb surface. Replace seal in the above manner and allow to dry.

4. **Dual Durometer Side 'Y' Vinyl Blade Seals**



Remove by pulling seal off blade edge. Make sure blade is free from debris. Cut new seal material to desired length and press onto blade edge.

SEALS cont.

5. **EPDM**



Remove by pulling seal off blade edge. Make sure blade is free from debris. Cut new seal material to desired length and press onto blade edge with shorter leg to inside of "V" brake.

6. **Vinyl "Y" Grip Seal**



Remove by pulling seal off blade edge. Make sure blade is free from debris. Cut new seal material to desired length and press onto blade edge with the short leg of the seal to the inside of the "V" break.

7. **Polyurethane Sponge**

Remove worn or damaged seals making sure all seal material is off, leaving a smooth, clean, flat surface to install the new seal onto. Cut seal material to length.



Peel the paper backing off the seal material and place into desired position, pressing firmly so the seal will adhere to the surface.

8. **#7980 Blade Seal Silicone Rubber** - (on blade edges)



Using masking tape or equivalent, mark location of bulb-end of seal relative to blade edge. Remove worn or damaged seal material by removing the rivets or sheet metal screws through the hold-down strip that secure the seal to the blade edge. Fasteners to be discarded and hold-down strips to be saved and re-used, if condition allows. Cut seal material to length using old seal as a guide. Lay new seal material along blade edge along location guide, i.e., masking tape or equivalent, and secure with hold-down strip and new fasteners.

9. **Silicone Sealing Compound** - Dow Corning RTV #732 (on mullions or blade stops)

Remove hardened or deteriorated material with light duty wire brush or equivalent tool. Touch up any galvanizing or painting with zinc rich compound or touch up paint as required by applicable drawing. Allow protective coating to dry. Replace missing or removed sealing compound following manufacturer's instructions. Finished appearance should simulate original seal as closely as possible.

SEALS cont.

10. **Metal Flexible Strip Seals**

- A. Inspect damper seals periodically for wear or damage. Worn or damaged seals may cause excessive leakage through the closed damper.
- B. Replacement: Seals are held in place by bolts and nuts or self-tapping screws. Remove the hold-down strips and seals and discard the worn seals only. Using the blade as a guide, locate and drill through the replacement seals. Install new seals with existing screws and bolts. The new seal must be installed sandwiched between the blade skin and hold down strip.

NOTE: Inlet and outlet ducts must be of sufficient length to contain the blade in the open position and the duct inner surface where the damper blade traverses must be smooth and free of protrusions or welds that may interfere with or damage the blade end seals.

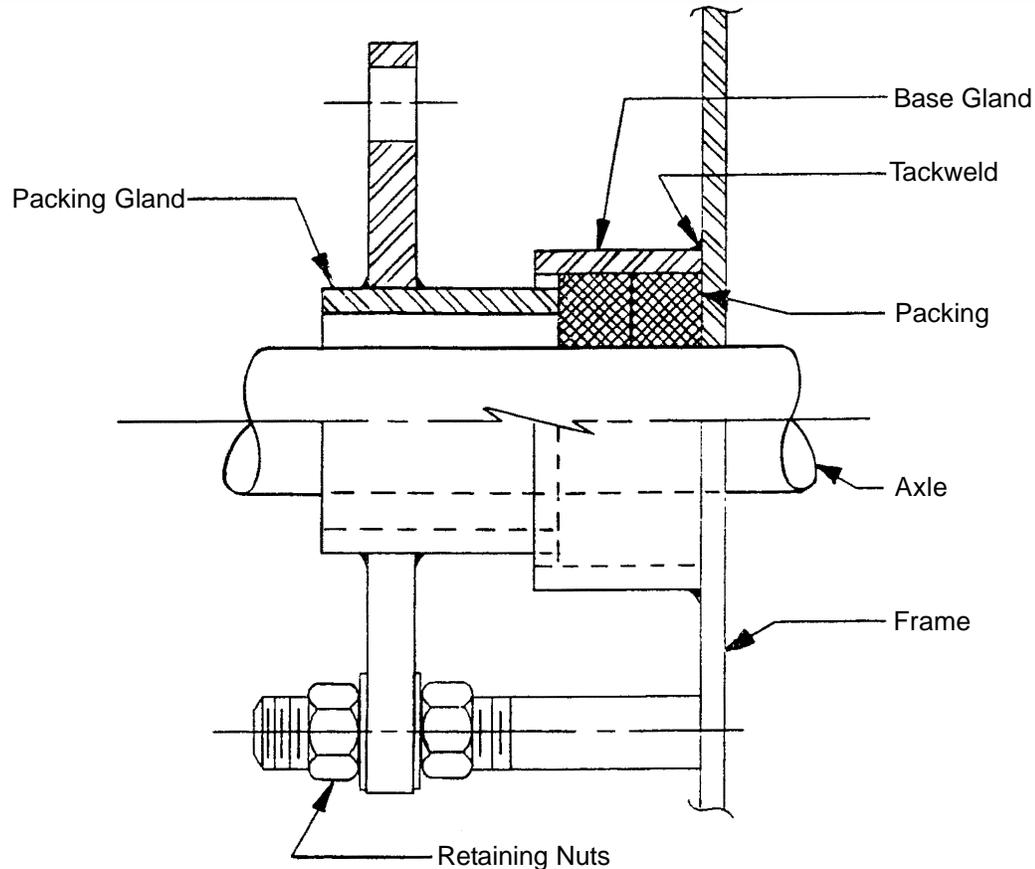
STUFFING BOXES / GLAND TYPE

Stuffing Box Adjustment: After a period of operation, some leakage around the axles may appear. This is normal, and is caused by the packing "wearing in". Torque the retaining nuts on the packing glands to 45-50 inch-lbs.; this will eliminate the leakage. After several tightenings, it may be necessary to replace the packing; see REPLACEMENT OF PARTS.

NOTE: Do not back off retaining nuts once they have been tightened. The packing is not resilient enough to spring back, and excessive leakage will occur.

REPLACEMENT OF PARTS

Stuffing Box Packing: Remove retaining nuts from packing gland, back out packing gland and remove old packing. New packing should be formed into circles, cutting the joints at a 30° angle. Two rings of packing are required for each box. Place the new packing around the axle, and replace the packing gland. Torque packing gland nuts to 50 inch-lbs.



STUFFING BOXES "O" RING REPLACEMENT

This procedure shall be followed when "O" ring replacement is mandated by excessive external leakage at the damper axle. It is recommended that all "O" rings on each specific damper be replaced at the same time even though not all "O" rings are allowing leakage. "O" rings must be replaced with "O" rings of like kind.

"O" RING REMOVAL

1. Alignment mark quadrant arm and/or linkage arm for reassembly.
- *2. Remove quadrant arm and saddle (actuator end) and linkage, if applicable, from axle.
3. Remove any raised metal, i.e., burrs present on the axles.

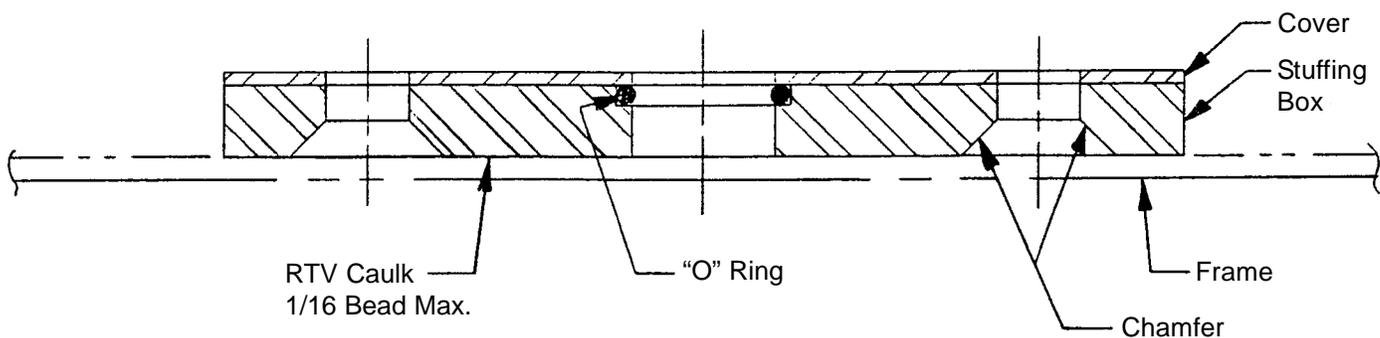
NOTE: From this point on it is recommended that each axle end be addressed on an individual basis and completed before moving on to the next axle end.

4. Remove the cover plate hold down nuts, remove cover plate and slide the bearing from the shaft.
5. Remove the "O" ring.

"O" RING REPLACEMENT

1. Clean "O" ring counterbore in stuffing box.
 2. Check axle end for raised material that may damage the "O" ring during installation.
 3. Lubricate the new "O" ring with petroleum jelly. Slide "O" ring over axle and place in counterbore in "O" ring stuffing box. Exercise care not to cut "O" ring during replacement.
 4. Replace the bearing and cover plate. Tighten hold down nuts.
 - * 5. Replace saddle and quadrant arm (actuator slide) and any linkage removed, as applicable. Line up alignment marks and make final connection.
 6. Check damper operation and correct if required.
- * Damper may have electric or pneumatic actuator. If applicable, remove and replace these actuators as indicated on drawings or procedures defined elsewhere in this manual.

COMBINATION BRG/O-RING TYPE



ACTUATOR & ACCESSORIES - See attached literature for information on actuator(s) and accessories.