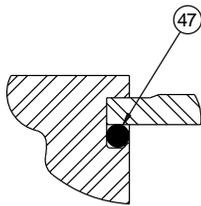
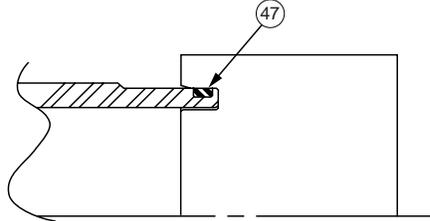


# Piston Seal Kits

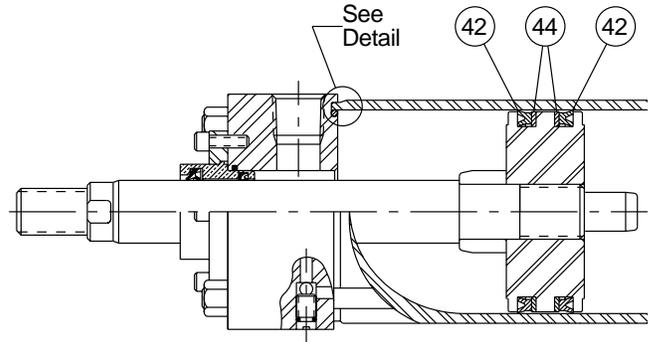
## (Piston & Tube End Seals) For AV Series Air Cylinders



Detail 1 1/2"-14" Bores



Detail 1" Bore



AV Series Piston Seal Kit

### Kits for AV Series Cylinders –

- contain 2 each of the following:
  - symbol 42, Piston lipseal
  - symbol 44, Piston back-up washer
  - symbol 47, O-ring, cylinder tube to head and cap seal

Service kits of expendable parts for fluid power cylinders are stocked in principal industrial locations across the U.S.A. and other countries. For prompt delivery and complete information, contact your nearest distributor.

**Standard Seals** – Class 1 Service Kits are standard and contain Buna-N seals. These seals are suitable for use when air, or hydraulic (mineral-based) oil are the operating medium.

The recommended operating temperature range for standard seals is -10°F (-23°C) to +165°F (+74°C).

**Fluorocarbon Seals** – Class 5 Service Kits contain fluorocarbon seals and are especially suited for elevated temperature service. Fluorocarbon seals (Class 5) should be used for high temperature service within a temperature range of -10°F (-23°C) to +250°F (+121°C). Fluorocarbon seals may be operated to +400°F (+204°C) with limited service life. For temperatures above +250°F (+121°C) cylinders must be manufactured with a non-studded piston rod end thread and a pinned piston to rod connection.

**Warning** – The piston rod stud and the piston rod to piston threaded connections are secured with an anaerobic adhesive which is temperature sensitive. Cylinders specified with fluorocarbon seals are assembled with anaerobic adhesive having a maximum operating temperature rating of +250°F (+121°C). Cylinders specified with all other seal compounds are assembled with anaerobic adhesive having a maximum operating temperature rating of +165°F (+74°C). These temperature limitations are necessary to prevent the possible loosening of threaded connections. Cylinders originally manufactured with standard seals that will be exposed to ambient temperatures above +165°F (+74°C) must be modified for higher temperature service. Contact the factory immediately and arrange for the piston to rod and the stud to piston rod connections to be properly reassembled to withstand the higher temperature service.

Bore Size	Buna-N Seals Class 1	Bore Size	Fluorocarbon Seals Class 5
	AV Series		AV Series
	Contains 2 ea. Symbols: 42, 44 & 47		Contains 2 ea. Symbols: 42, 44 & 47
1	AV-KB100-100	1	AV-KB200-100
1 1/2	AV-KB100-150	1 1/2	AV-KB200-150
2	AV-KB100-200	2	AV-KB200-200
2 1/2	AV-KB100-250	2 1/2	AV-KB200-250
3 1/4	AV-KB100-300	3 1/4	AV-KB200-300
4	AV-KB100-400	4	AV-KB200-400
5	AV-KB100-500	5	AV-KB200-500
6	AV-KB100-600	6	AV-KB200-600
7	AV-KB100-700	7	AV-KB200-700
8	AV-KB100-800	8	AV-KB200-800
10	AV-KB100-1000	10	AV-KB200-1000
12	AV-KB100-1200	12	AV-KB200-1200
14	AV-KB100-1400	14	AV-KB200-1400

Rod Dia.	Bushing Wrench	Spanner Wrench
3	069596 0000	011677 0000
3 1/2	069597 0000	011677 0000
4	069598 0000	011678 0000
4 1/2	083877 0000	011678 0000
5	069599 0000	011678 0000
5 1/2	069600 0000	011678 0000

**WARNING**

**FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS AND/OR SYSTEMS DESCRIBED HEREIN OR RELATED ITEMS CAN CAUSE DEATH, PERSONAL INJURY AND PROPERTY DAMAGE.**

This document and other information from the Company, its subsidiaries and authorized distributors provide product and/or system options for further investigation by users having expertise. It is important that you analyze all aspects of your application, including consequences of any failure and review the information concerning the product or system in the current product catalog. Due to the variety of operating conditions and applications for these products or systems, the user, through its own analysis and testing, is solely responsible for making the final selection of the products and systems and assuring that all performance, safety and warning requirements of the application are met.

The products described herein, including without limitation, product features, specifications, designs, availability and pricing, are subject to change by the Company and its related companies at any time without notice.

# Service Bulletin M0995-M1

Issued: November, 2002

## Miller Lube-A-Cyl...

is recommended for use in air cylinders during normal operation, and particularly when servicing and re-assembling cylinders. It is a multi-purpose lubricant in grease form that provides lubrication without deteriorating effects on synthetic seals. Particularly recommended for use in low pressure air cylinders because of its special ability to adhere to metal surfaces. It produces a thin film which will not blow out with exhaust air. It provides piston, rod and seal lubrication, and has excellent resistance to water and mechanical breakdown with temperature range of -10°F (-23°C) to +350°F (+177°C). Lube-A-Cyl is packaged in 1½-oz. tubes, a sufficient quantity for average size air cylinder. One application should last for a period of from 6 to 18 months, depending upon service. Lube-A-Cyl is available in 1½-oz. tubes. Order by part no. 0761630000.

## Servicing The Piston Seals

Disassemble the cylinder completely, remove the old seals and clean all of the parts. The cylinder bore and the piston should then be examined for evidence of scoring. (The light scratch marks usually present on both cylinder bore and piston will generally cause no difficulty.)

Apply "Lube-A-Cyl" to O.D. of piston and to both grooves. Install one piston seal in the groove nearest the rod. The two "lips" of this lipseal should face toward the rod end of the piston. Install one back-up washer (sym. #44) in the same groove opposite the "lip" end of the piston Lipseal (sym. #42). Coat the inside of the cylinder tube with "Lube-A-Cyl" and insert the piston, cap end first into the cylinder tube as shown in Figure 1 below.

Next, turn the cylinder tube on its side and push the piston through the tube just far enough to expose the groove for the second seal (see Figure 2 below). Be careful not to move the piston too far so as to expose the first seal. If this is done, the "lip" of this Lipseal may slip past the cylinder tube and be damaged when the piston is pulled back into the cylinder tube. If the piston should move too far, pass the piston and rod completely through the cylinder tube and again start the piston from the original end. Now, install the second Lipseal and back-up washer in the exposed groove with the two "lips" facing away from the rod and pull piston into the cylinder tube.

The piston is sealed and securely locked to the piston rod with anaerobic adhesive. This threaded connection should only be disassembled or reassembled by factory trained personnel.

Assemble both cap and head, complete with cylinder tube seals, to each end of the cylinder tube. If the bore diameter is less than 7" and rod diameter is greater than 2½", thread the bushing through the bushing retainer, then slip bushing and retainer over the end of the rod and pilot bushing into the head. Do NOT seat bushing against the head until tie rod nuts are tightened to the proper torque (see table below). After nuts are torqued, firmly seat the bushing against the head using a bushing wrench. If the cylinder bore diameter is 7" or greater, or rod diameter is 3" or over, tighten the tie rod nuts to the torques specified in table below and then install the bushing retainer plate and bushing. Seat the bushing against the head using a bushing wrench.

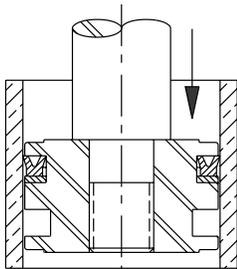


Figure 1

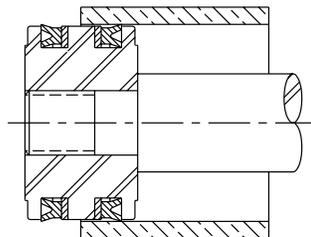


Figure 2

In the case of a Model 89 – center trunnion mounted – cylinder, care must be taken to prevent binding the cylinder tube when repositioning the trunnion collar. The proper method of assembling this type of cylinder is as follows:

After the piston seals have been inserted and the piston is in the cylinder tube to its approximate position, fit the cap with its seal onto the tube. Then "stud" into the trunnion collar the four tie rods that connect the cap to the trunnion collar. Bring up the four tie rod nuts at the cap. Distances from the inner face of the cap to the finished face of the trunnion collar should then be made equal at all four tie rods when all four tie rod nuts are in contact with the cap.

Finally, when the assembly is ready for final tightening, it may be necessary to adjust the tie rod nuts at the cap when torquing the tie rod nuts at the head in order to locate the trunnion collar in its final position.

As a check to be certain the mount will not interfere with cylinder operation, move the piston by hand to determine whether there is any tendency to bind at the spot where the trunnion collar is located. If any binding is noticeable, readjust the tie rods.

**NOTE:** An extreme pressure lubricant (such as molybdenum disulphide) should be used on the tie rod threads and nut bearing faces to reduce friction and tie rod twist. Tie rod twist can be eliminated by chalking a straight line on each tie rod before torquing, and backing off the nut after torquing so this line is straight again. This is particularly important on long-stroke cylinders.

## Tie Rod Torque\*

Cylinder Bore Size	AV Series	
1"	2 ft.-lbs.	41 cm-kg
1½"	5 ft.-lbs.	69 cm-kg
2" & 2½"	11 ft.-lbs.	15 N-m
3¼" & 4"	25 ft.-lbs.	34 N-m
5" & 6"	60 ft.-lbs.	81 N-m
7"	90 ft.-lbs.	122 N-m
8"	110 ft.-lbs.	149 N-m
10"	150 ft.-lbs.	201 N-m
12"	172 ft.-lbs.	233 N-m
14"	275 ft.-lbs.	373 N-m

\*-0%, +5% tolerance.

When assembling the cylinder, be sure to torque the tie rods evenly. See note above.

## Retainer Bolt Torque

### For Cylinders with Round or Small Square Bushing Retainer

Screw Size	Torque*	
#10	15 in.-lbs.	17 cm-kg
¼"	60 in.-lbs.	69 cm-kg
5/16"	10 ft.-lbs.	14 N-m
3/8"	20 ft.-lbs.	27 N-m
7/16"	35 ft.-lbs.	48 N-m

\*-0%, +5% tolerance

**Cylinder Division (USA)** 800 N. York Road  
Bensenville, IL 60106  
(630) 766-3400

**Cylinder Division (Canada)** 1214 Kamato  
Mississauga, Ontario,  
Canada L4W 1Y1  
(905) 625-2780

