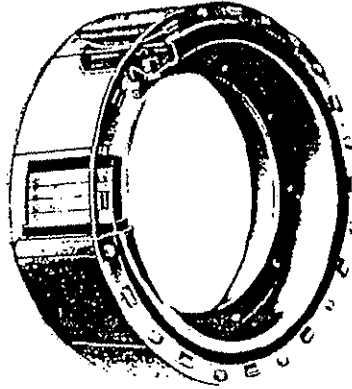
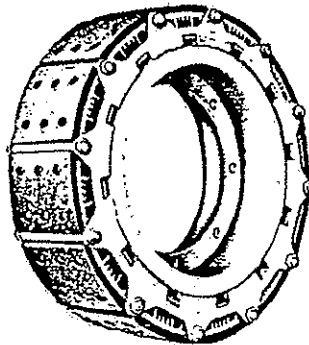


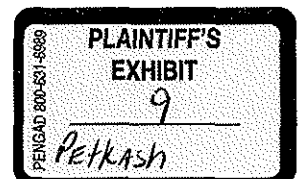


E6000

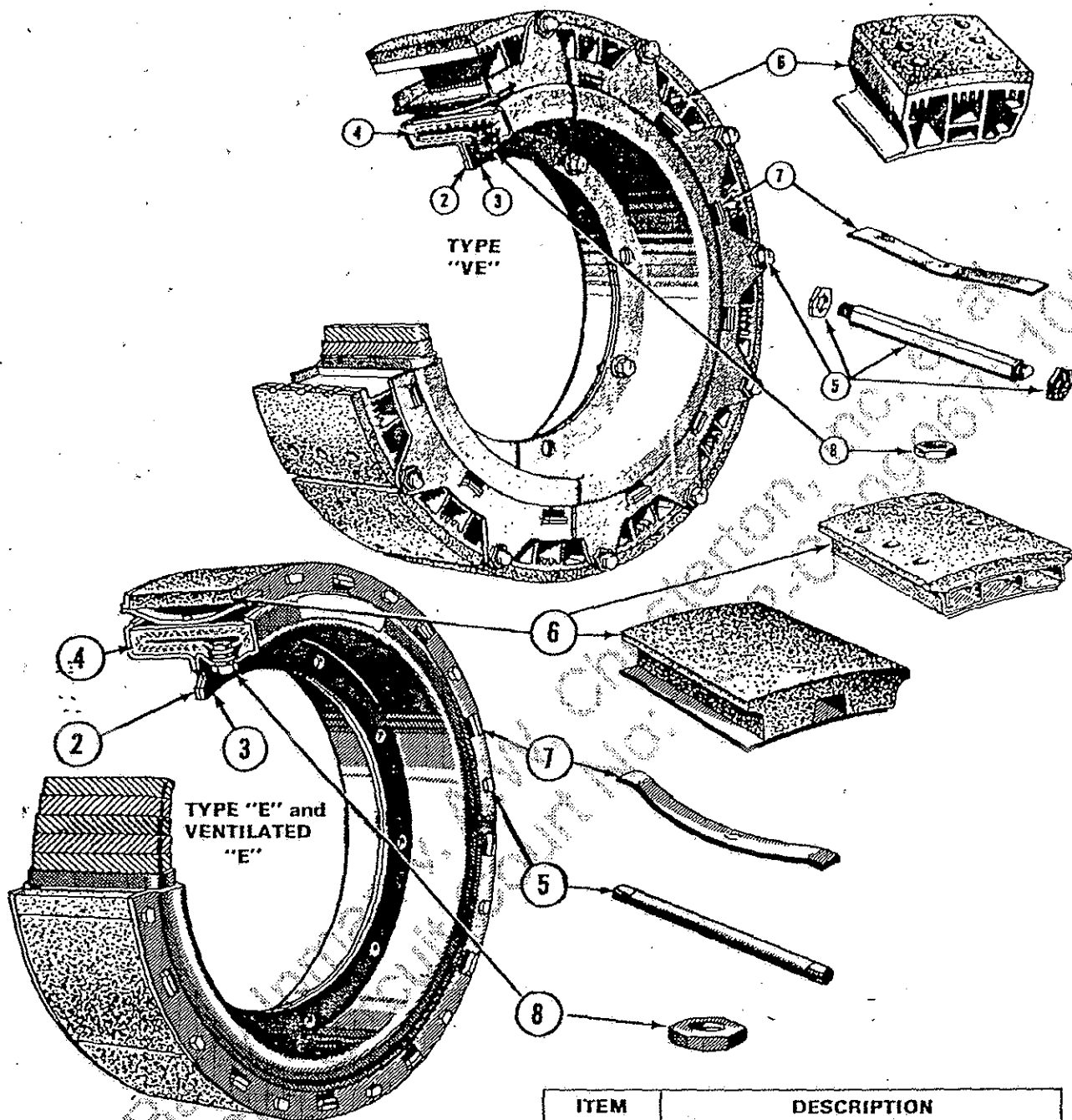
**INSTALLATION OPERATION &
MAINTENANCE OF THE AIRFLEX E
ELEMENT ASSEMBLY**



Revised 15 October 1982



COMPONENT PARTS FOR E TYPE ELEMENTS



ITEM	DESCRIPTION
1	Complete Element Assembly
2	Housing Half
3	Housing Half w/Valve Hole
4	Tube
5	Torque Bar*
6	Friction Shoe Assembly
7	Release Spring
8	Tube Stem Nut
9	Replacement Friction Blocks & Rivets

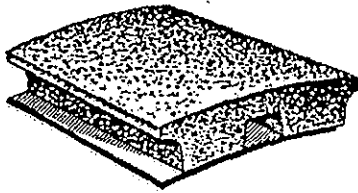
1 * Nuts required for VE Elements see Parts List Page 8.

I. OPERATION

A. DESCRIPTION

The Airflex® type "E" element assemblies are air actuated, radially expanding units, primarily designed for slip clutch and tension brake applications; however, they are also suited for medium speed cyclic operation and high acceleration loads.

The Airflex type "E" element is available with two different friction shoe designs. The type "VE" element is available with one friction shoe design. The design features of the friction shoe assemblies are illustrated below.

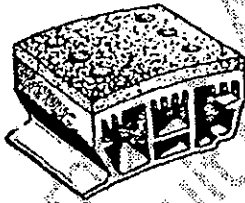


Type "E" used for light duty slip applications.



11

Type ventilate "E" used for medium duty slip applications.



Type "VE" used for maximum heat dissipation.

B. HOW IT WORKS

The neoprene rubber and cord actuating tube (4) is the primary moving part in the Airflex type "E" element assembly. When air pressure is introduced to the element assembly, the tube expands radially. This causes the release springs (7) to compress and the friction shoes (6) to make contact with the friction drum.

The frictional force or torque is controlled by the amount of applied air pressure, i.e. at 50 psig an element will have twice the torque it would have at 25 psig.

When the air pressure is released or decreased, the release springs assure total and positive retraction of the friction shoes (6).

Torque is transmitted from the friction shoes to the torque bars (5) and to the housing halves (2 & 3) of the assembly.

The maximum recommended air pressure is 110 psig for cyclic applications, 20 psig for air cooled slip applications and 30 psig for water cooled slip applications. Minimum air pressure is 5 psig on all slip applications.

The Airflex 12E475 element offers a unique feature with the use of lock-out bars. These are pins which slide through the housings and friction shoes and prevent the shoes from making contact with the friction drum. This feature allows the use of higher, more controllable air pressure when lower torque is required.

NOTE: When using lock-out bars, shoes must be locked out in pairs and always diametrically opposite.

The type "E" element assembly is available dual mounted for greater torque and thermal capacity. A variety of mounting components for either clutch or brake applications are available.

C. ELEMENT ADJUSTMENT

The airflex type "E" elements require no adjustment or lubrication. The flexibility of the rubber tube compensates for friction shoe wear and there is no metal to metal contact such as mechanical linkage, springs, gears, etc. to require lubrication.

II. INSTALLATION

Caution Air inflation of the Airflex element tube without a friction drum in place may cause permanent damage to the element.

A. MOUNTING

The element must be inserted squarely onto the hub register and the mounting bolts equally torqued. The element must be properly centered within the friction drum so as to provide adequate running clearance.

B. ALIGNMENT

Good alignment is essential for optimum clutch performance and consistency. Misalignment results in vibration and preloaded bearing, gears and other machine components.

These factors reduce the service life of other machine components considerably. To extend the service life of machine components, we recommend the closest possible alignment.

C. AIR SYSTEM

Typical control systems shown on page 4.

1. AIR PIPING

Pneumatic piping should be free of foreign material such as pipe dope, metal chips, etc. Pipe ends should be reamed after cutting to prevent reductions of effective pipe diameter. Selecting the proper size of pipe and valve is very important for proper operation in cyclic applications. Keep the number of 90° elbows and sharp bends to a minimum and avoid the use of street elbows in piping.

Undersized pipe or air system components will cause sluggish response, and may contribute to accelerated wear of friction lining. Air line lubricators are not required for the Airflex element and, if used, should be of the nonadjustable mist type.

2. AIR TANK

For elements operating on rapid cyclic duty an air accumulator tank with pressure regulator and gauge is recommended except in those cases where the installation may be near a large supply line. Always install the pressure regulator in the supply line to the tank and provide a drain at the bottom for blowing off condensation which may accumulate in the system. The air tank also serves as an excellent filter.

3. CONTROL VALVES

The controlling air valve should be mounted as close to the element as possible. For cyclic applications, the solenoid air valve should be a three-way pilot-operated poppet type. If you have special control problems, our Engineering Department will submit recommendations upon request.

4. AIRFLEX ROTORSEAL

Air to operate a clutch is usually introduced into the end of the shaft through the Airflex rotorseal, which must be connected with a section of flexible air hose. Rigid piping to the rotorseal will tend to preload the bearings. Air to operate a brake is usually introduced directly to the inlet valve on the element.

The Airflex rotorseal is designed to give trouble-free service under the most severe conditions, without requiring special attention.

Due to the extreme accuracy and close tolerance on internal parts, considerable care is required when rebuilding rotorseals in the field. Many customers consider the rotorseal as a disposable item since a replacement is relatively inexpensive. See operation and maintenance instructions per table 1.

Rotorseal Type	Maintenance and Service Instructions
AA2, B2, B3, C2	RS9010
RH	RS9030
AD, BD, FDA	RS9040
BT	RS9070

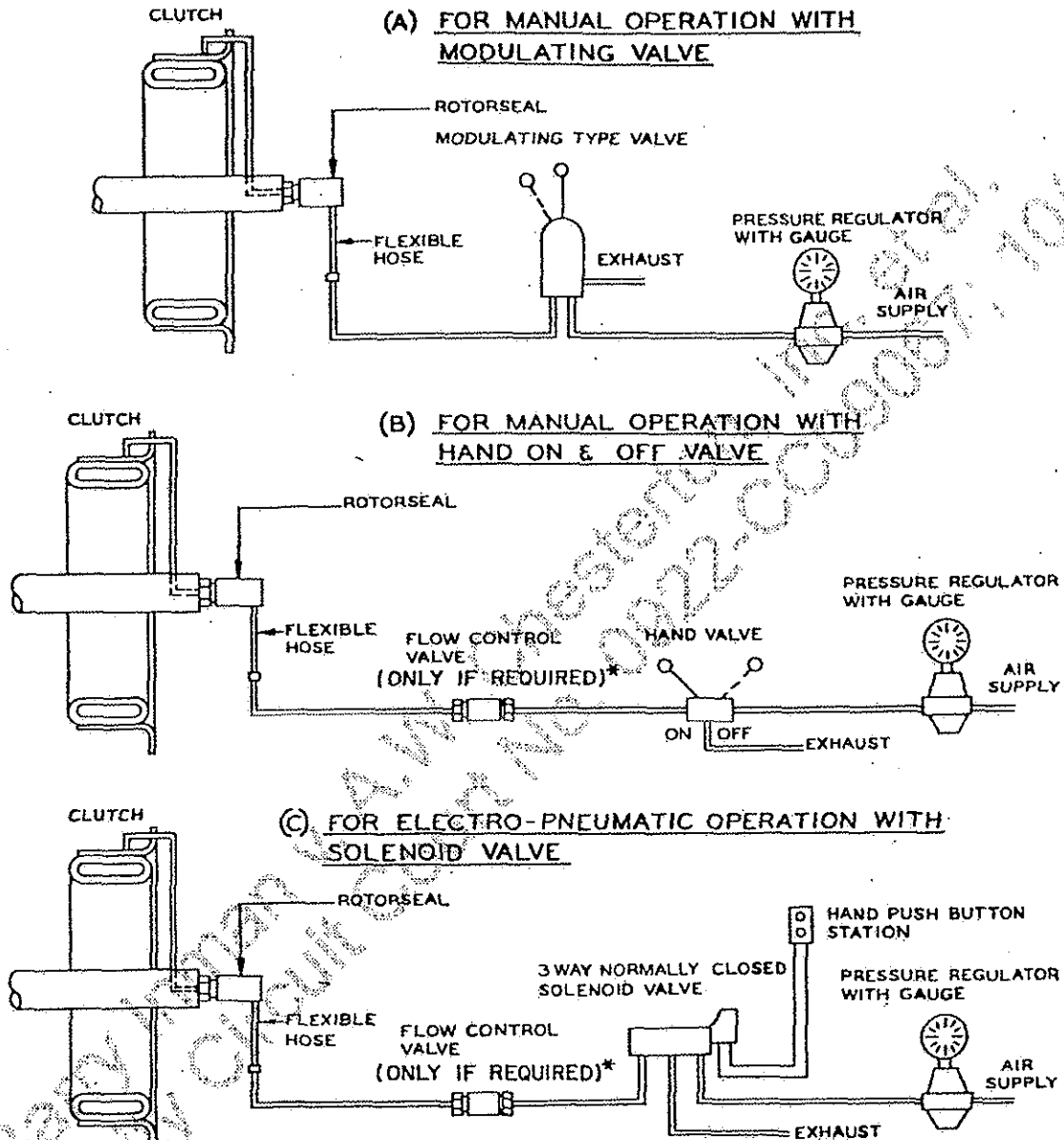
TABLE 1

5. QUICK RELEASE VALVE

The Airflex quick release valve is a quick dumping air valve developed for instantaneous release of air from element. The quick release valve contains a plunger assembly which is designed to function on a differential in air pressure, controlled by the solenoid valve. It is very important that each quick release valve exhaust freely. If it fails to exhaust or seal, the end cap should be removed, the plunger cleaned and the internal surface of the housing wiped out. The plunger would be lubricated with light lube oil and reassembled. See operation and maintenance instructions QRV9080.

Exhaust noise from the quick release valve can be reduced by using a muffler which is available as an optional feature. With the muffler the noise energy level can be reduced by 90%. This is well below specifications of the Walsh-Healy Act.

TYPICAL CONTROL SYSTEMS



* Use valve with free flow in exhaust direction.

III. MAINTENANCE

A. POINTS TO CHECK WHEN INSPECTING THE AIRFLEX ELEMENT:

- 1) The wear and condition of the friction shoe assemblies. See Figure E for wear gap measurement. See Table 3 for maximum allowable gap. See Table 2 for minimum lining thickness.

- a) If the friction linings are glazed, this condition can be corrected by sanding the friction lining to remove the glaze. Linings that have been worn to the minimum allowable thickness should be replaced.

MOLDED BLOCK E SERIES		
ELEMENT SIZE	MINIMUM ALLOWABLE LINING THICKNESS (IN.)	MAXIMUM ALLOWABLE WEAR ON DRUM DIA. (IN.)
12E475	.688	.094
14E475 Thru 27E475	.812	.094
30E600 & 34E600	1.062	.094
40E700	1.062	.125
VENTILATED E SERIES		
12E475	.032	.094
14E475 Thru 34E600	.188	.094
40E700	.188	.125
VE SERIES		
19VE475	.250	.094
24VE475	.188	.094
27VE475	.188	.094

TABLE 2

NOTE: The number preceding letters E or VE in the element size designates the original drum diameter in inches.

EXAMPLE: 14E475—Original Drum Diameter = 14 inches. Maximum allowable drum Dia. is $14\frac{43}{32}$ " = $14\frac{3}{32}$ "

- 2) The condition of the friction surface of the drum. (See table 2).

- a) If the drum surface is badly grooved or worn, the surface may be remachined. The minimum drum diameter should not exceed the wear shown in table 2.

- 3) The condition of the rubber tube. (Ref. paragraph 5d below).

- a) If there are air bubbles or signs of ply separation on the tube, the tube must be replaced.

- 4) Oil or grease on the friction surface.

- a) If oil or grease accidentally gets on a clutch actuating element, the oil or grease should be wiped off with a cloth dampened with gasoline or naphtha, and then wiped dry. If friction shoes have been contaminated, they should be removed and cleaned. (See instructions below for friction shoe replacement.) For light contamination, Fuller's Earth may be used to remove grease or oil from the friction lining surface. If the lining is saturated with oil or grease, a solvent such as VM and P Naptha or Petroleum Ether should be used to degrease the lining.

A cloth dampened with the solvent may be used to wipe the grease off the lining, or the friction shoe assembly may be dipped into the solvent. Severely saturated linings may have to be replaced.

Caution: The recommended solvents are flammable and should be used with the proper safety precautions.

- 5) Friction shoes do not retract.

- a) Contamination of the quick release valve may not permit complete air exhausting of the tube. This will not allow the shoes to retract properly. Inspect quick release valve, see paragraph 5 page 3.
- b) If release springs are broken, shoes will not retract properly. To replace broken springs, follow instructions under Replacement of Friction Shoes.
- c) If the element is exposed to severe contamination, a deposit may form. This can prevent the friction shoes from retracting. To correct this condition, the friction shoes must be removed (per instructions below) and deposits cleaned off.
- d) Heat curing of the rubber can harden the actuating tube so much that it actually resists proper friction shoe retraction. If a tube is in this condition, it must be replaced.

- 6) Leaks in the air lines or in the rotor seal.

- a) Repair as necessary.

B. REPLACEMENT OF FRICTION SHOES AND RELEASE SPRINGS

Friction shoes should be replaced or relined when the friction material has worn down to the minimum allowable lining thickness shown in table 2. Excessive lining wear may cause the release springs to break and may also result in scoring of the friction drum surface.

REPLACEMENT OF RELEASE SPRINGS

Procedure: Place blade of screwdriver on the end of the release spring. By striking the screwdriver with a hammer, the spring is pushed through the slot and out the opposite side. It can then be grasped and pulled out.

NOTE: Any element assembly with 60# springs has two springs (installed piggy-back) per friction shoe assembly.

To install, insert replacement spring into the appropriate slot with the curved part toward the tube (see cut-away view on Page 1). Drive the spring into the slot until the dimple on the spring seats into the hole in the backing plate.

REPLACEMENT OF FRICTION SHOES

Remove release springs (see above). With the springs removed the friction shoes will slide out easily. A screwdriver may be required when removing the first shoe. The rest of the shoes should slide out easily. It is not necessary to remove torque bars.

NOTE: When the friction shoes are removed, the rubber tube is exposed and should be visually inspected and all foreign material removed.

The following is a description of the three different friction shoe assemblies shown on page 2.

A) Style "E"

The friction block is bonded and screwed to a metal backing plate. The entire assembly must be replaced as a unit.

B) Style "Ventilated E" and "VE"

The friction block is riveted to the backing plate. Replacement friction blocks and rivets are available. To replace friction blocks only, follow the steps outlined below.

IMPORTANT: New rivets are furnished with replacement friction blocks.

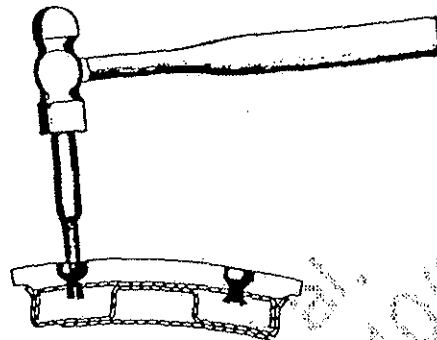
Step A

- 1) Remove old block by shearing off upset portion of rivet with a sharp, single bevel chisel. A dull chisel will distort rivet and mutilate holes in backing plate.
- 2) Remove rivets and block.
- 3) Clean all foreign matter from backing plate.

To assemble "Ventilate E" friction shoes

- 1) Fastening new block (with wedge-type rivets) lay on new block and insert all wedge-type rivets. Clamp block tightly to backing plate being sure that backing plate is "backed up" on curved surface so that the backing plate lip is not bent out of shape.

Expand rivets by driving pin flush with head of rivet as shown.



It is not necessary to use too hard a blow since rivet drives easily.

- 2) Removal of block (where wedge-type rivets are used) to remove replacement blocks drive pin out of rivet, as shown, and either shear off with sharp single-bevel chisel or drill out rivet with 1/4" drill. Install new blocks as instructed in Step No. 2.

To assemble "VE" Friction Blocks.

NOTE: Goodrich RIVNUT Header tool is required. Obtain from local Goodrich RIVNUT supplier or from the factory. Airflex part number is 153X38.

- 1) Place new friction block on backing plate.

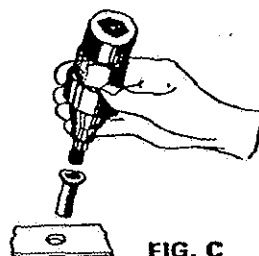


FIG. C

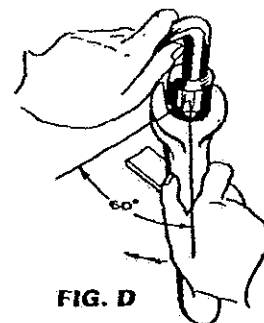


FIG. D

- 2) Using B.F. Goodrich Rivnut Header (available from Airflex Plant) select one of Rivnuts furnished with new block and engage all threads of the Rivnut on the pull-up stud. (See Fig. C). Hold hex nut and rotate by hand the Allen bolt with hex counter sunk hole (called the jack screw) until head of rivnut is snug against shoulder on tool. Insert Rivnut through hole in one corner of friction block and backing plate.

3) Place Allen wrench in socket of jack screw and hold stationary. Turn hex (Fig. D) in clockwise direction with a wrench while holding Rivnut Header at right angle to the work. Power is best applied through angle shown.

4) Turn the nut until firm resistance indicates complete upset of the Rivnut. Approx. 1 to 1-3/4 turns will be required.

5) Break nut loose with counterclockwise movement of end wrench. Remove both wrenches from the tool.

6) Remove tool from Rivnut by revolving entire tool in counterclockwise direction.

7) Repeat above operation with successive Rivnuts working diagonally from corner to corner, and then following in like fashion between the two remaining corners. Then fill in any remaining holes.

8) Repeat on remaining friction shoes until the entire set has been relined.

To install new or relined friction shoe assembly, reverse disassembly procedure.

REPLACEMENT OF ACTUATION TUBE

The type "E" elements are available with either a continuous or butt end tube. The butt end tube is a "wrap-around" style which can be installed without having to remove element from the shaft.

To remove tube, disassemble springs, friction shoes and torque bars. Split the element halves. Remove tube stem nut. Remove tube. Clean both housing halves thoroughly!!

To assemble, reverse the above procedure.

NOTE: The tube stem nut should be torqued to 55 #ft.

In any correspondence regarding Airflex equipment, always refer to size (diameter and width of friction surface) and serial number stamped on rim of element near air entry hole.

Call or write Eaton Corporation, Industrial Drives Division, Airflex Plant, 9919 Clinton Road, Cleveland, Ohio 44144.

E ELEMENT - MAXIMUM ALLOWABLE FRICTION MATERIAL/DRUM WEAR TABLES

FIGURE E

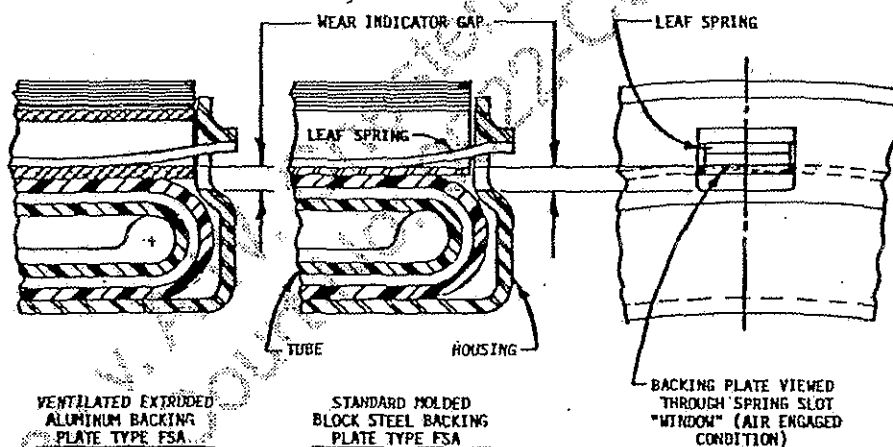


TABLE 3

WEAR INDICATOR GAP AT MAXIMUM ALLOWABLE WEAR CONDITION (INCH)		
AIR APPLIED		
UNIT FULLY ENGAGED WITH DRUM		
UNIT SIZE	VENTILATED EXTRUDED AL B/P TYPE FSA	STANDARD MOLDED BLOCK TYPE FSA
12E475	.08	.17
14E475	.18	.22
16E475	.14	.18
19E475	.18	.23
21.5E475	.19	.24
24E475	.23	.27
27E475	.17	.21
30E600	.02	.10
34E600	.02	.10
40E700	.10	.17

* NOTE: WEAR INDICATOR GAPS INCREASE WITH FRICTION MATERIAL/DRUM WEAR. THEREFORE, INDICATOR GAPS OF LESS THAN THE ABOVE TABULATED VALUES ARE ACCEPTABLE FOR CONTINUED OPERATION; WHEREAS, WHEN INDICATOR GAPS ARE EQUAL TO OR GREATER THAN THE ABOVE TABULATED VALUES, THE FRICTION LININGS MUST BE REPLACED.

5

3215. ELEMENTS

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Airflex[®]

Form ML-318

Revised March 15, 1980

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Eaton warrants to the Purchaser that each new Airflex Product or part manufactured to be delivered hereunder will be free from defects in material, workmanship and title, and will deliver its rated capacity provided such Product is properly cared for, operated under normal conditions and with competent supervision. If it appears within 12 months from the date of shipment, that the Product delivered hereunder does not meet the warranties specified above and the Purchaser notifies Eaton promptly, Eaton shall thereupon correct any defect, including non-conformance with the specifications, at its option, either by repairing any defective part or parts or by making available at Eaton's plant a repaired or replacement part. The liability of Eaton to the Purchaser (except as to title) arising out of the supplying of said Product, or its use, whether on warranty, contract or otherwise, shall not in any case exceed the cost of correcting defects in the Product as herein provided and upon the expiration

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