

CHAPTER

9

**Braking System
Inspection**

Instructor Name: (Your Name)

Objectives

Upon completion and review of this chapter, the student should be able to:

- Explain the importance of changing brake fluid at manufacturer's specified time.
- Describe how to change brake fluid in a hydraulic braking system.
- Explain how to inspect and service a typical master cylinder.
- Describe how to inspect and service drum brakes.
- Explain how to inspect and check rotor runout.

Objectives Continued

- Describe the inspection process for brake lines and hoses.
- Explain how to inspect brake linings and pads and take accurate measurements of pad and lining thickness to determine serviceability.
- List and explain three different methods for bleeding a hydraulic brake system.
- Explain how to test the operation of the parking brakes.
- Describe how to test a truck's service brakes.
- List some of the out-of-service criteria for hydraulic braking systems.

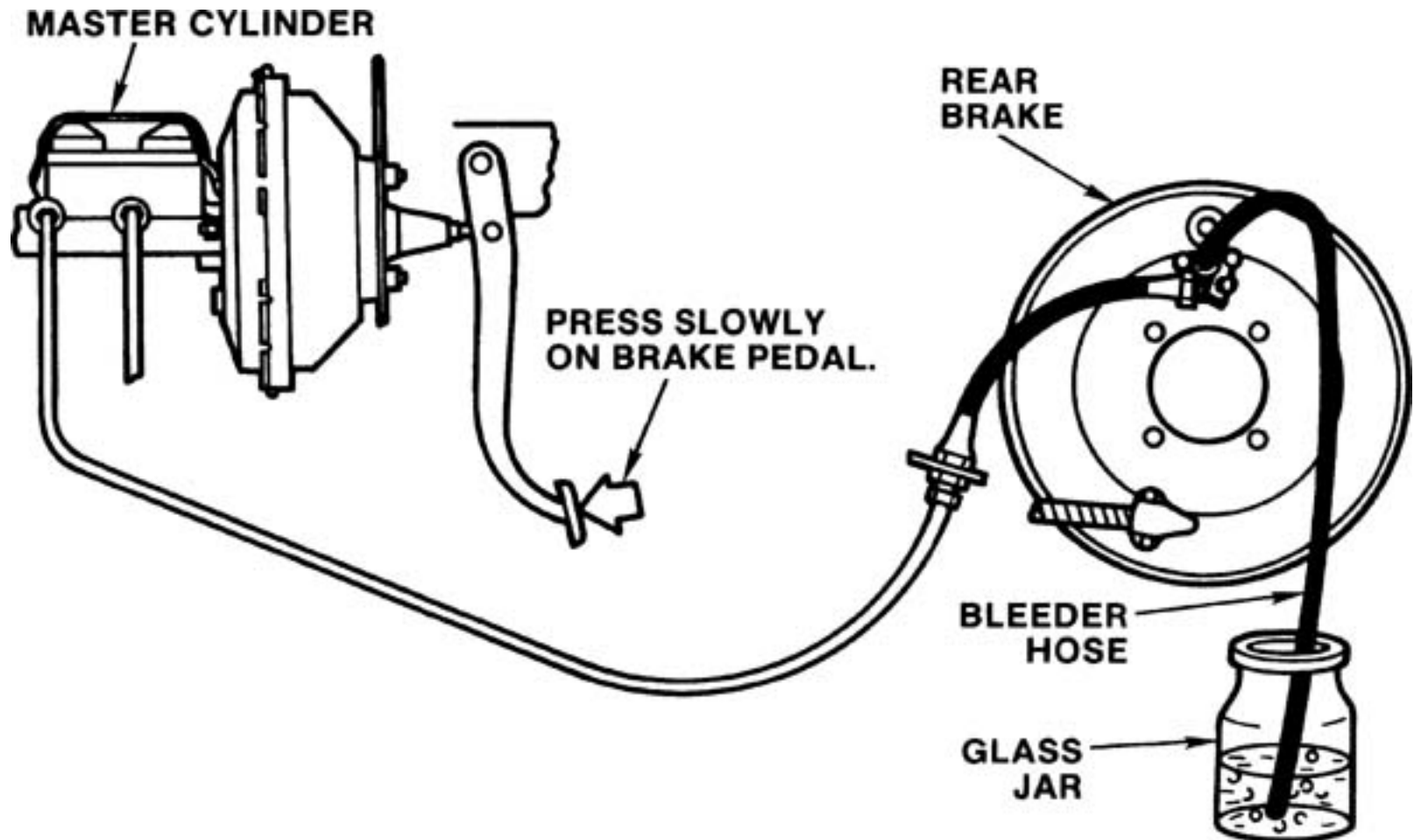
Objectives Continued

- Explain some of the safety precautions when working with air brake systems.
- Describe the procedures to service a truck's air supply system.
- Explain service and inspection procedures for a typical air dryer.
- Explain how the air dryer operates and how to perform a leakage test.
- List and explain in sequential order the procedures for testing the components of a typical air brake system.

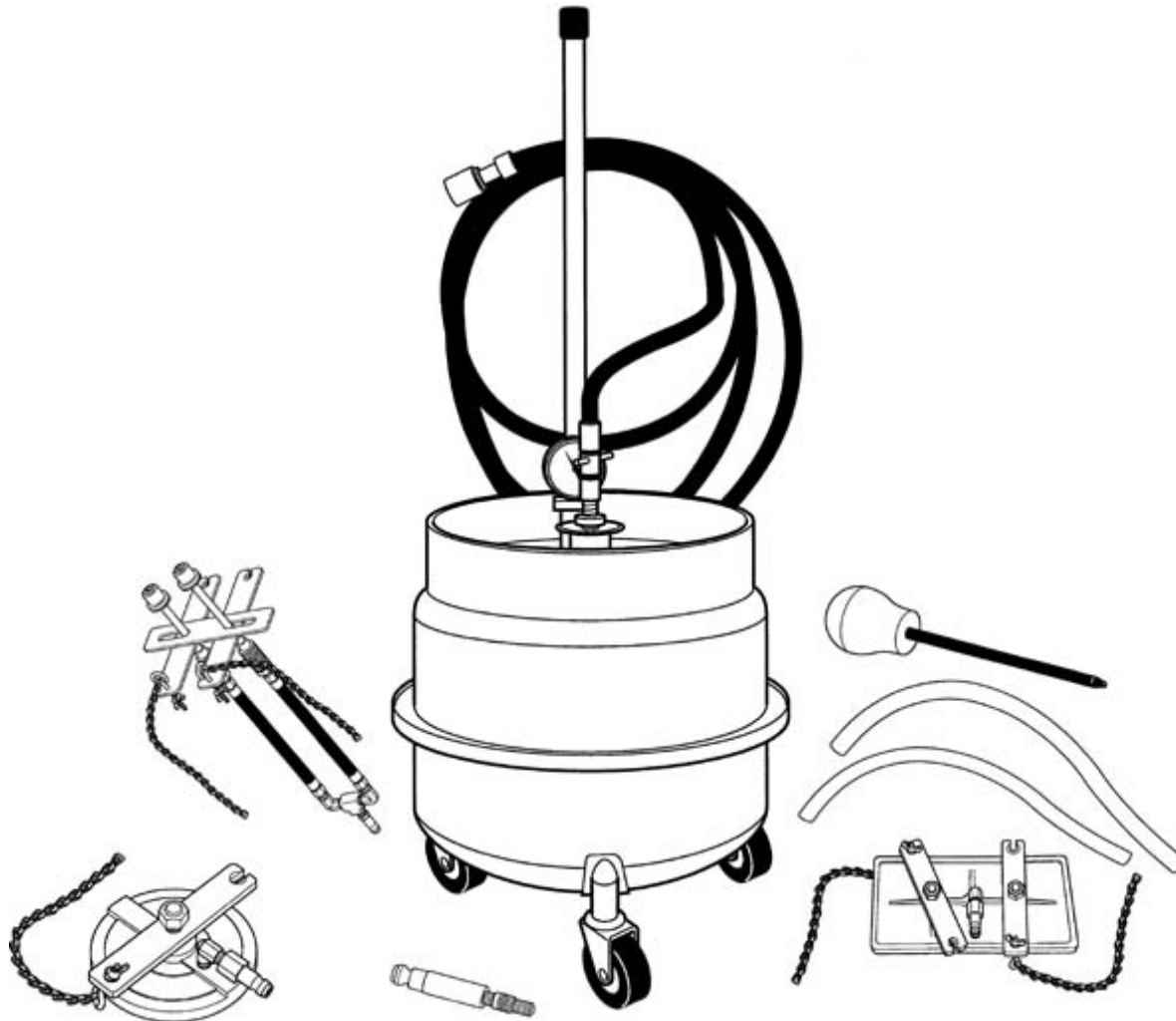
Objectives Continued

- Describe how to perform a check on the manual parking brakes or emergency parking brakes.
- Explain the inspection and testing procedure for checking the foundation brakes.
- List some of the out-of-service criteria for air brake systems.

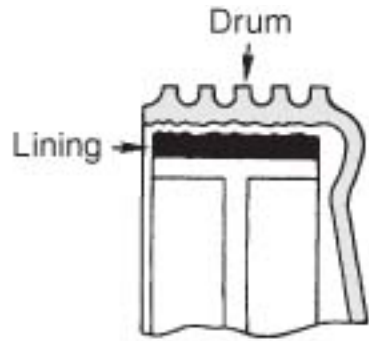
Manual Brake Bleeding Technique



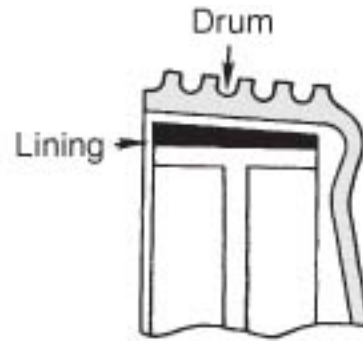
Pressure Brake Bleeding System



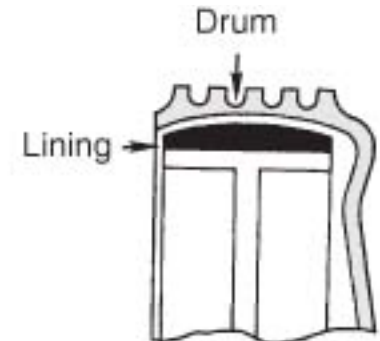
Brake Drum Wear



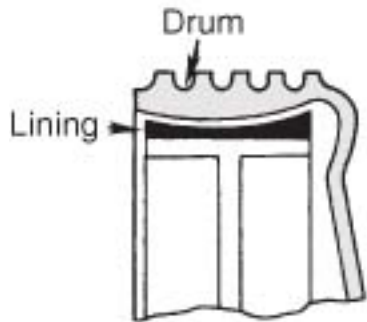
A Scored drum



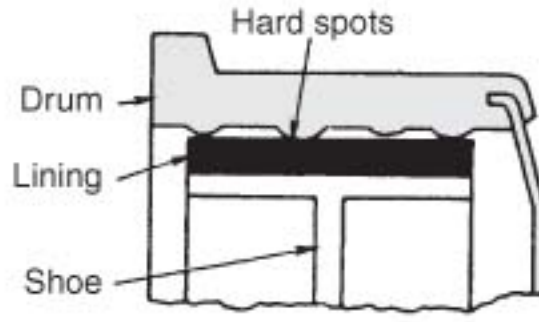
B Bell mouthed drum



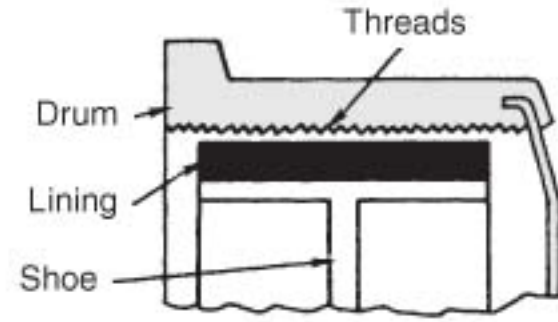
C Concave drum



D Convex drum



E Hard spots

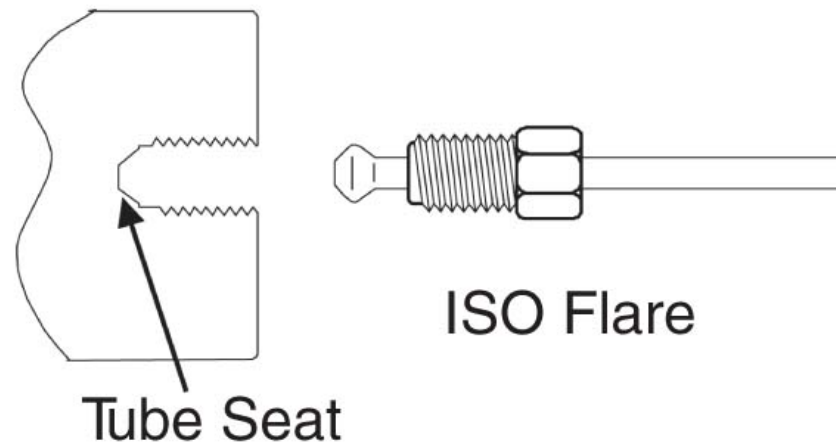
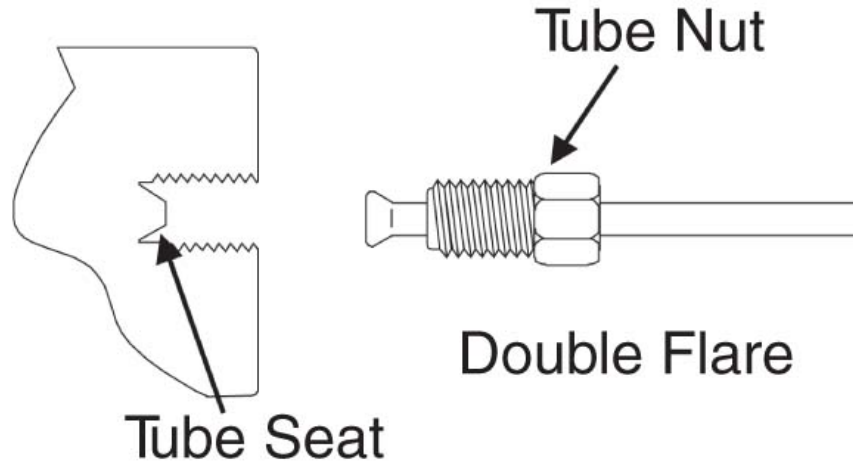


F Threaded drum

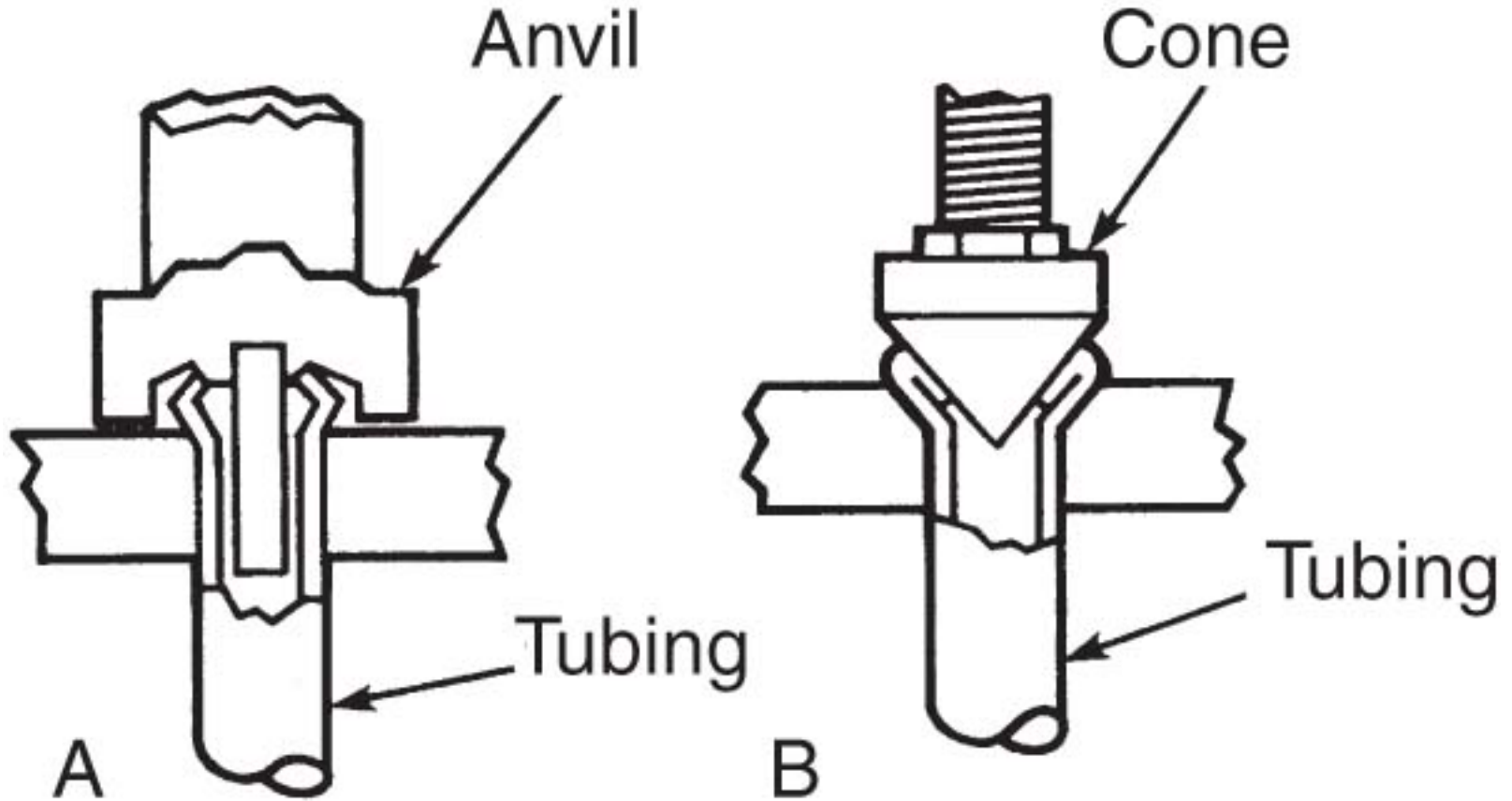
CAUTION

Never paint the outside of the drum. Paint insulates the drum, preventing the dissipation of heat. This heat must be dissipated to the atmosphere around the drum to prevent brake fade.

Common Line Flares



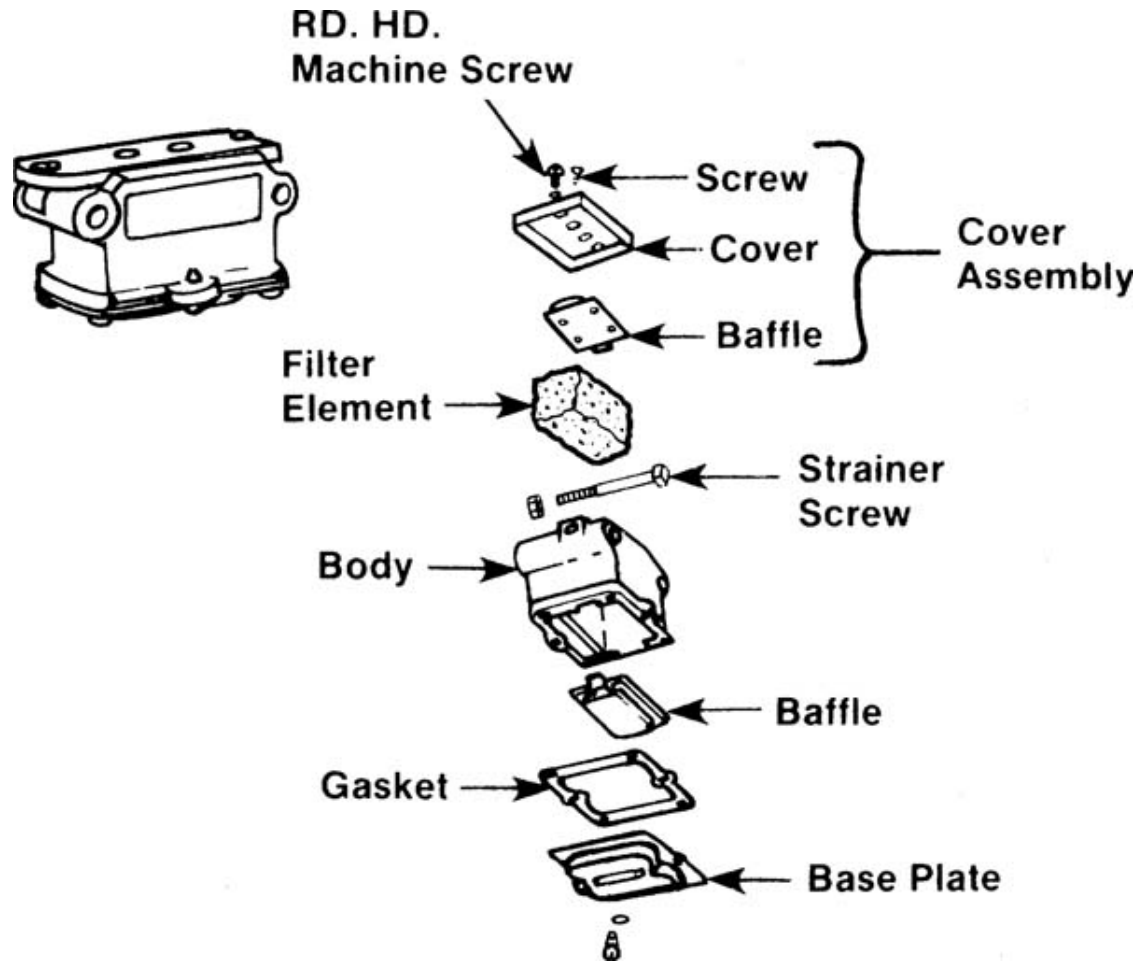
Making a Double Flare



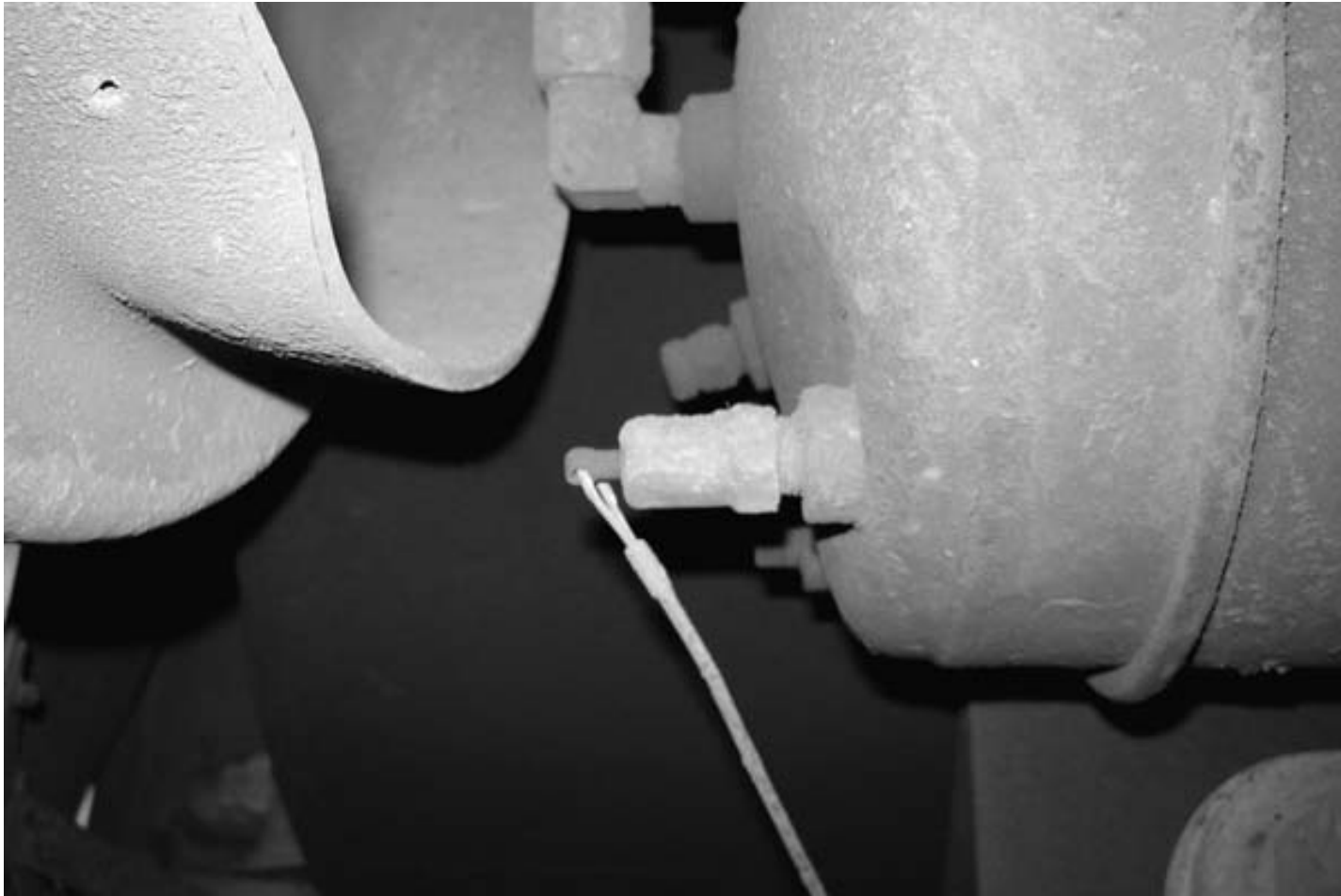
Shop Talk

Grease on the lining edge, back of shoe, or drum edge and oil stains with no evidence of fresh oil leakage are not conditions for out-of-service.

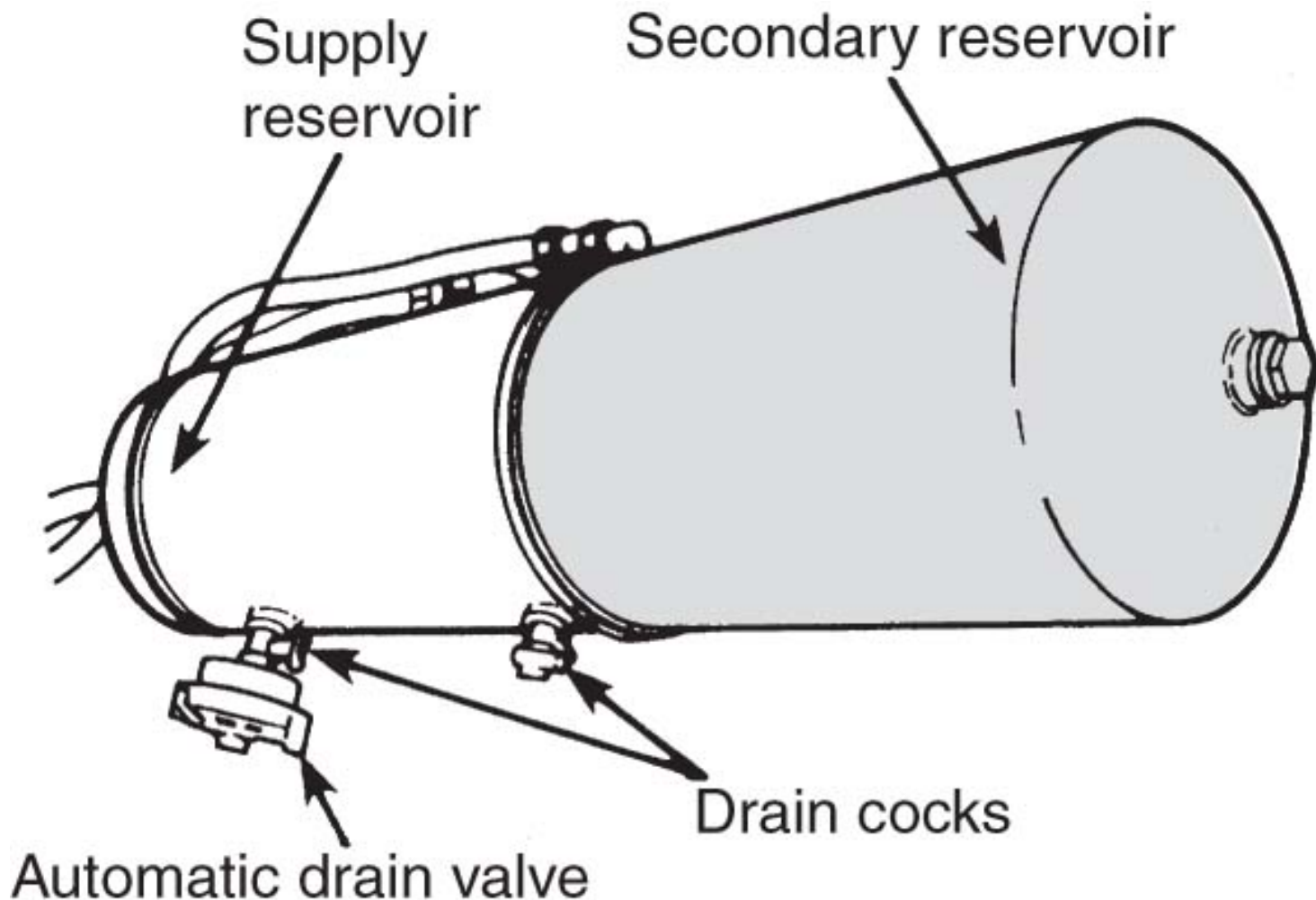
Air Compressor Induction System



Manual Air drain Valve



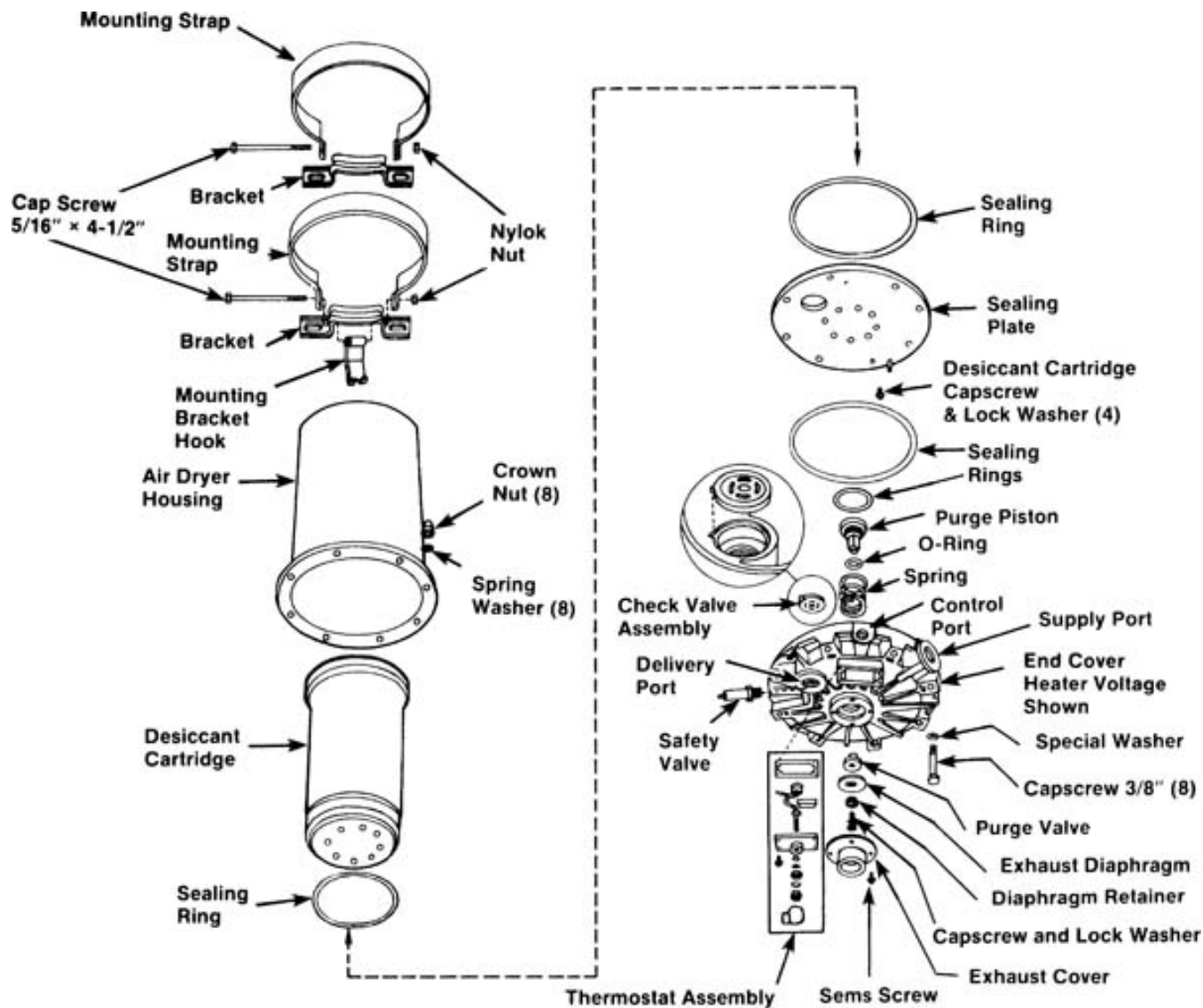
Double Air Tank with Automatic Drain Valve



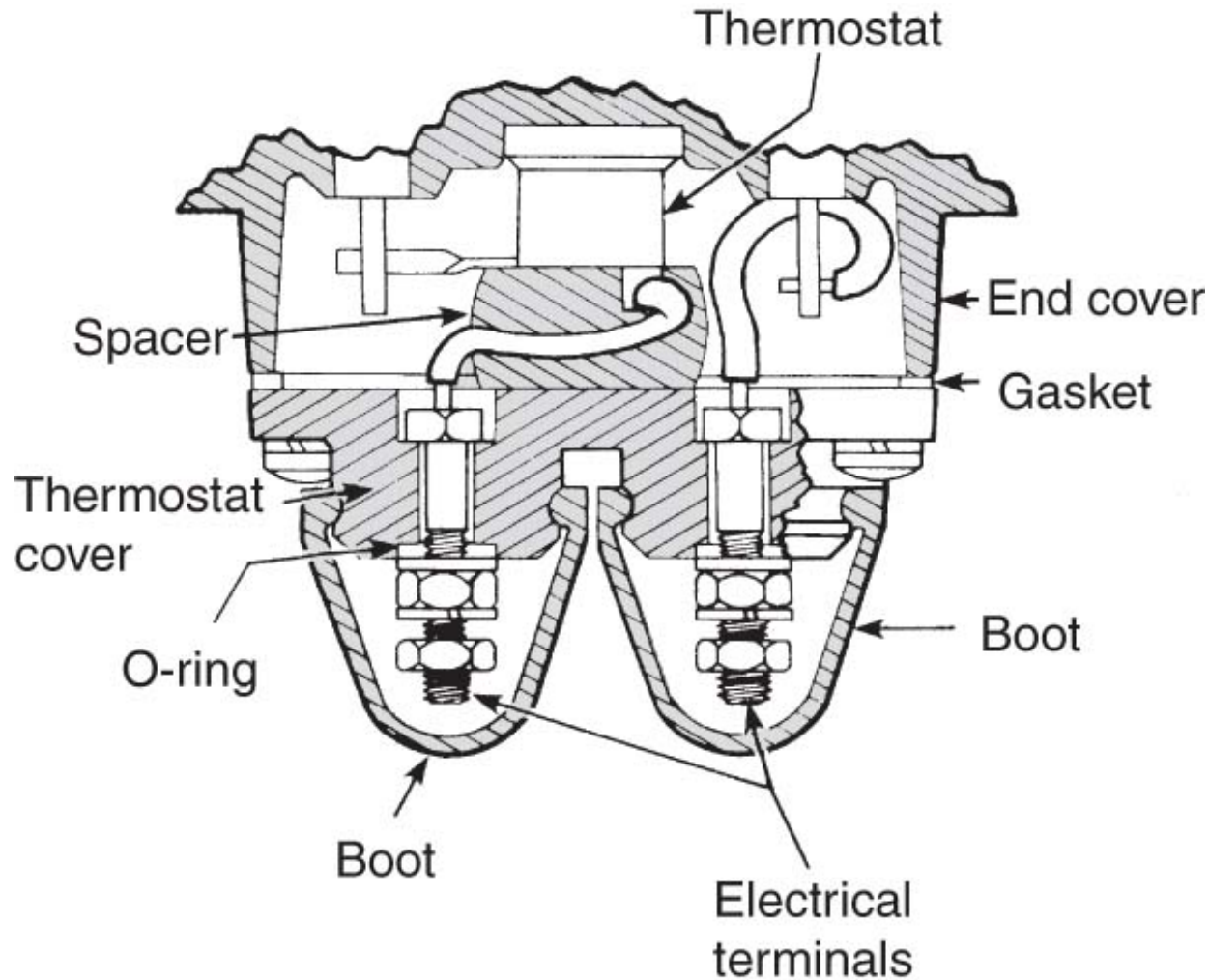
NOTE

All air tanks that are FMVSS 121 compliant must have a means of mechanically draining them. Most automatic drain valves are equipped with a mechanical dump valve, but it can be difficult to locate.

Typical Air Dryer



Air Dryer Thermostat



Cracked Brake Shoe Lining



Standard Stroke Clamp Type Brake Chambers

Type	Outside Diameter	Brake Adjustment Limit
6	4-1/2 inch (114 mm)	1-1/4 inch (32 mm)
9	5-1/4 inch (133 mm)	1-3/8 inch (35 mm)
12	5-11/16 inch (145 mm)	1-3/8 inch (35 mm)
16	6-3/8 inch (162 mm)	1-3/4 inch (45 mm)
20	6-25/32 inch (172 mm)	1-3/4 inch (45 mm)
24	7-7/32 inch (184 mm)	1-3/4 inch (45 mm)
30	8-3/32 inch (206 mm)	2 inch (51 mm)
36	9 inch (229 mm)	2-1/4 inch (57 mm)

Long Stroke Clamp Type Brake Chambers

Type	Outside Diameter	Brake Adjustment Limit
12	5-11/16 inch (145 mm)	1-3/4 inch (45 mm)
16	6-3/8 inch (162 mm)	2.0 inch (51 mm)
20	6-25/32 inch (172 mm)	2.0 inch (51 mm)
24	7-7/32 inch (185 mm)	2.0 inch (51 mm)
24*	7-7/32 inch (185 mm)	2.5 inch (64 mm)
30	8-3-32 inch (206 mm)	2.5 inch (64 mm)

*For 3-inch maximum stroke type 24 chambers.

Summary

- It is good practice to consult the manufacturer's service literature when performing repairs.
- Use the manufacturer's specific fluid to ensure proper operation of the braking system.
- Never mix incompatible brake fluids.
- Brake fluid is hygroscopic.
- Never use brake fluid from a container that has been used to store any other liquid.

Summary Continued

- Brake fluid should be changed regularly according to the vehicle manufacturer's specifications.
- Bleeding the brakes involves purging air from the hydraulic circuit.
- Rebuilding of master cylinders should be done only by qualified technicians due to their complexity and importance from a safety point of view.
- Brake drums may be segregated into two groups, inboard and outboard.

Summary Continued

- Brake fade is the reduction in stopping power that can occur after repeated application of the brakes.
- Never paint the outside of a brake drum.
- Rotor radial runout should not exceed the OEM TIR specification, usually around 0.030 inch (0.762 mm).
- Excessive rotor runout or wobble increases pedal travel because of opening up the caliper piston and can cause pedal pulsation and chatter.

Summary Continued

- When performing the service inspection, visually inspect the condition of the brake lines and hoses.
- The thickness of the brake lining should be measured at its thinnest point.
- The number of defective brakes is equal to or greater than 20 percent of the service brakes on the vehicle or combination.
- Compressed air can be dangerous if not handled with caution.

Summary Continued

- While working on an air brake system, make sure the wheels are blocked to prevent the vehicle from moving.
- Always wear eye protection when draining an air tank and point the discharged air away from yourself and other people.
- The compressor must have an unrestricted supply of clean filtered air.
- Draining the contaminants from the air tanks is a task that must be performed at every level of service.

Summary Continued

- All air tanks that are FMVSS 121 compliant must have a means of mechanically draining them.
- The air supply leakage test should be performed regularly on a PM service.
- Locating an air leak on the vehicle's air supply system is a task that can easily be performed. This can be done by applying a simple soap and water solution to suspected air leaks.

Summary Continued

- Maximum allowable leakage/drop-off rates are often defined by local jurisdictions (state and provincial governments).
- Air dryer service will depend upon the kinds of ambient conditions that the vehicle is operated in.
- To perform parking/emergency brake checks, make sure the air pressure in the system pressure is at normal working pressure, between cut-in and cutout.

Summary Continued

- Checking the pushrod travel using the applied stroke method is only done after the brake adjustment has been performed.
- The automatic slack adjuster compensates for brake lining wear by adjusting drum to lining clearance.
- Air brake chambers can be segregated into standard size and long stroke. It is important that the technician be able to distinguish the difference between the two, as it will have an effect on the allowable pushrod travel.