

Title 11 DEPARTMENT OF TRANSPORTATION

Subtitle 22 MOTOR VEHICLE ADMINISTRATION — PREVENTIVE MAINTENANCE PROGRAM

Chapter 03 Preventive Maintenance Standards for Multipurpose Passenger Vehicles and Passenger Buses

Authority: Transportation Article, §§12-104(b) and 23-303, Annotated Code of Maryland

**PASSENGER BUS
PREVENTIVE MAINTENANCE REPORT**
(MD TR §§23-301--23-305; COMAR 11.22; FMCSR §396.17)

Owner's Name _____ Address _____

Telephone () _____

Make _____ Model _____ Year _____

Company Name _____ Tag Number _____

Manufacturer's Vehicle ID Number _____

Title Number _____

COMAR 11.22.03	Components	Passed	Failed	Date Repaired*
.02	Alignment			
.03	Suspension			
.04	Steering			
.05	Brake Systems - Hydraulic/Vacuum			
.06	Brake System - Air			
.07	Tires			
.08	Wheels, Rims, Lock Rings, Studs, and Nuts			
.09	Accelerator Pedal and Air Throttle			
.10	Fuel Storage and Delivery System			
.11	Exhaust System			
.12	Universal Joints and U-Clamps			
.13	Vehicle Frame, Body, and Sheet Metal			
.14	Lighting			
.15	Electrical System			
.16	Emergency Equipment			
.17	Seats and Seat Belts			
.18	Sun Visor			
.19	Mirrors			
.20	Glazing			
.21	Windshield Wipers and Washers			
.22	Defroster			
.23	Auto Trans Gear Selector/Neutral Safety Switch			
.24	Speedometer and Odometer			
.25	Brake and Clutch Pedal			
.26	Horn			

Inspected: (a) Date _____ (b) Vehicle Mileage _____

Inspected By (Print) _____ Repaired by (Print) _____

Certified by (Print) _____ (Signature)
(Owner or authorized representative)

11.22.03.01

.01 Applicability.

The standards, requirements, and procedures set forth in this chapter are applicable to equipment originally installed by the manufacturer or required by federal or State law or regulation on any vehicle registered as a Class M (multipurpose) passenger vehicle which has a seating capacity for 16 or more passengers including the driver or was previously registered as a Class H (school) vehicle or a Class P (passenger bus) vehicle, and which is used primarily to transport passengers, under the provisions of Transportation Article, Title 13, Annotated Code of Maryland, or any bus designed and used to carry more than 10 people owned by this State or any political subdivision of this State. Compliance with these minimum requirements may not be sufficient for the equipment to remain in compliance for 12 months or 25,000 miles, whichever occurs first. Therefore, more frequent maintenance, service, and repair as deemed necessary by the owner is permitted and recommended.

11.22.03.02

.02 Alignment.

A. Axles, beams, spindles, or mountings which are broken, damaged, worn, rusted, bent, or modified may affect wheel alignment, tracking, or vehicle handling or stability.

<i>Procedures:</i>	<i>Reject Vehicle If:</i>
(1) Inspect axles, beams, spindles, and mountings for broken, damaged, worn, rusted, bent, or modified conditions.	(1) Any axle, beam, spindle, or mounting is broken, worn, damaged, rusted, bent, or modified and affects vehicle handling, stability, tracking, or alignment.

.03 Suspension.

A. Spring and Attachments. Unequal vehicle height, broken or damaged spring leaves, spring shackles, bushings, center bolts, U-bolts, control arms, torque arms, torsion bars, or equalizers can affect vehicle steering, alignment, tracking, handling, and stability. With vehicle on a level surface, inspect:

<i>Procedures:</i>	<i>Reject Vehicle If:</i>
(1) Vehicle height.	(1) Uneven vehicle height permits tire or wheel contact with body or suspension parts.
(2) Springs.	(2) A spring leaf is broken, damaged, or missing.
(3) Spring shackles.	(3) Spring shackle is broken, loose, cracked, worn, or damaged.
(4) Bushings.	(4) Bushings are loose or missing.
(5) Center bolts.	(5) Spring center bolt is broken or missing.
(6) U-bolts.	(6) A U-bolt is broken, loose, or missing.
(7) Control arms.	(7) A control arm is bent, missing, or has a welded repair.
(8) Torque arms.	(8) A torque arm is bent, missing, or has a welded repair.
(9) Torsion bars.	(9) Torsion bar is loose, broken, or damaged.
(10) Equalizers.	(10) An equalizer is cracked, broken, or has a welded repair.

B. Torsion Bar. All other suspension components shall be inspected the same as leaf spring suspension.

<i>Procedures:</i>	<i>Reject Vehicle If:</i>
(1) Apply brakes, with engine running and transmission in gear. Slowly engage clutch and apply torque to drive wheels. Observe play in front mounting.	(1) Play exceeds 1/8 inch.
(2) Place pry bar between frame and torsion bar. Observe play in rear mounting, bushing, and pin.	(2) Play exceeds 1/8 inch.

C. Coil Springs and Mountings. Visually inspect coil springs, control arms, rear torque arms, axle strut (when equipped), and front and rear stabilizer bar (when equipped).

<i>Procedures:</i>	<i>Reject Vehicle If:</i>
(1) Coil springs.	(1) Spring is broken or sagging and lowers a corner of the vehicle more than 2 inches.
(2) Control arms.	(2) Control arm is bent, cracked, has a welded repair, or bushings are loose.
(3) Torque arms (if equipped).	(3) Torque arm is missing, bent, cracked, loose, or has a welded repair.
(4) Axle struts (if equipped).	(4) Axle strut is missing, bent, cracked, has a welded repair, or bushings are loose.
(5) Radius arms (if equipped).	(5) Radius arm is missing, bent, cracked, has a welded repair, or bushings are loose.
(6) Stabilizer bars (if equipped).	(6) Stabilizer bar is missing, disconnected, broken, loose, damaged, or has a welded repair.

D. Rubber Load Cushions. All other suspension components shall be inspected the same as leaf spring suspension.

<i>Procedures:</i>	<i>Reject Vehicle If:</i>
(1) Apply brakes, with engine running and transmission in gear, release clutch slowly to take up the slack, and inspect all attachments.	(1) Any mounting or attachment play exceeds 1/8 inch.

(2) Inspect all rubber pads and blocks.	(2) Rubber block is missing or rubber pad is split.
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E. Tandem Axle Walking Beams.

<i>Procedures:</i>	<i>Reject Vehicle If:</i>
(1) Inspect rubber insert in bushings.	(1) Rubber is dispersed from bushing resulting in visible movement between the bushing, insert or mounting bolts or pins. Compression of the rubber insert during vehicle movement is not cause for rejection.

F. Air Suspension (All Axles). Two procedures are required to inspect air suspension systems.

<i>Procedures:</i>	<i>Reject Vehicle If:</i>
(1) Apply air pressure and observe air pressure in braking system when suspension begins to lift vehicle.	(1) Suspension begins to lift vehicle before air pressure in the braking system reaches 55 psi.
(2) With normal air pressure in system, inspect: (a) Bushings. (b) Pivots. (c) Lines. (d) Air bags. (e) Shock absorbers, if equipped. (f) Air supply. (g) Suspension height.	(2) (a) Any bushing is loose. (b) A pivot is loose or worn. (c) Any line is cracked, broken, crushed, or leaks. (d) Air bag is cut, has an air leak, vehicle body and chassis is unsupported, and axle or body or chassis leans to one side. (e) Shock absorber is missing, broken, or disconnected. (f) Air supply is connected to main line or wet reservoir, or pressure protection valve is missing. (g) Suspension height does not meet manufacturer's specification.

G. Air Suspension Nondriving Rear Axle. Inspection is conducted with normal air pressure in suspension system.

<i>Procedures:</i>	<i>Reject Vehicle If:</i>
(1) Operate lift control and observe response of retractable axle.	(1) Axle does not respond to lift control switch on valve.
(2) Inspect for air leaks with retractable axle in both up and down position, and inspect for air pressure loss in one-way valves.	(2) Air leak is evident when axle is in up or down position or there is air pressure loss at tag suspension.

H. Shock Absorbers (if Equipped). Shock absorber inspection includes leakage, mounting, and all related attachments. When originally equipped with shock absorbers, inspect for:

<i>Procedures:</i>	<i>Reject Vehicle If:</i>
(1) Presence.	(1) Shock absorber is missing when originally equipped.
(2) Proper mounting.	(2) Shock absorber is not properly and adequately mounted.
(3) Leakage.	(3) There is visible leakage. Slight dampness is not cause for rejection.
(4) Condition of bushings.	(4) Any bushing is loose or missing.

I. Road Clearance.

<i>Procedures:</i>	<i>Reject Vehicle If:</i>
(1) Visually inspect for any suspension, frame, or body parts extending below the bottom edge of wheel rims.	(1) Any part extends below the lowest point of any wheel rim.

J. Kingpins. Raise or jack the vehicle by the frame or suspension. Brakes should be applied to eliminate wheel bearing play.

<i>Procedures:</i>	<i>Reject Vehicle If:</i>
(1) Grasp wheel and tire assembly at top and bottom and rock in and out. Observe movement at top or bottom of tire.	(1) Movement exceeds the following: Wheel size 16 inches or less—1/4 inch.

	17-18 inches—3/8 inch. More than 18 inches—1/2 inch.
(2) Place a bar under the tire and move tire and wheel assembly up and down. Observe movement between spindle support and axle.	(2) Vertical movement exceeds 3/32 inch.

K. Ball Joints. Inspect ball joints for vertical and horizontal movement, modifications, and damage.

<i>Procedures:</i>	<i>Reject Vehicle If:</i>
(1) Visually inspect ball joints for modifications or conditions which disguise wear.	(1) Ball joints are injected with plastic or modified in any way that disguises wear.
(2) Raise vehicle to unload ball joints and measure vertical and horizontal movement.	(2) Horizontal or vertical movement exceeds manufacturer's specifications.

.04 Steering.

A. Lash. Inspection of vehicles equipped with power steering shall be conducted with the engine running, power steering fluid at the proper level, and belts in proper condition and tension.

<i>Procedures:</i>	<i>Reject Vehicle If:</i>
(1) With front wheels in straight ahead position, turn steering wheel observed until turning motion can be observed at the front wheels. Mark rim of steering wheel and, using a pointer, turn the steering wheel in the opposite direction until motion can be observed at front wheels. Measure distance between mark and pointer.	(1) Measurement at rim of steering wheel exceeds the following: Wheel diameter less than 21 inches—3 inches; 21 inches or greater—3.5 inches.

B. Front Wheel Bearings. With front wheels raised, grasp wheel and tire assembly at top and bottom and rock wheel in and out. Wheel bearing movement is determined by movement of brake drum and backing plate or brake disc and shields. Do not confuse suspension or ball joint play with wheel bearing play.

<i>Procedures:</i>	<i>Reject Vehicle If:</i>
(1) With front wheels raised, rock top and bottom of tire and wheel assembly. Observe wheel bearing play.	(1) Wheel bearing play measured at sidewall of tire exceeds 1/8 inch.

C. Steering Travel. Turn steering wheel through full right and full left cycle. The vehicle may be slowly moved or the steering wheels raised to ease inspection. Inspect for:

<i>Procedures:</i>	<i>Reject Vehicle If:</i>
(1) Binding.	(1) There is binding in a cycle.
(2) Jamming.	(2) There is jamming in a cycle.
(3) Travel left and right.	(3) Travel from center to full right and center to full left is not within plus or minus 1/2 revolution.
(4) Tire clearance when stops are contacted.	(4) There is less than 1 inch clearance between tire and body or chassis when stops are contacted.
(5) Steering wheel conditions.	(5) Steering wheel is damaged or is not the original or equivalent.

D. Steering Linkage. Move steering wheel left and right and observe movement in steering components. If the vehicle is equipped with power steering, run the engine. Visually inspect:

<i>Procedures:</i>	<i>Reject Vehicle If:</i>
(1) Tie rods.	(1) Bent or welded.
(2) Tie rod ends.	(2) Loose, worn, bent, welded, or modified to disguise wear.
(3) Drag link.	(3) Loose, worn, heated, or welded, unless the parts manufacturer requires welding.
(4) Pitman arm.	(4) Loose, insecurely mounted, or bolts are loose or missing.
(5) Steering box.	(5) Loose, insecurely mounted, or bolts are loose or missing.
(6) Lock nuts.	(6) Missing or are not proper type or size.
(7) Cotter pins.	(7) Loose or improperly attached.

E. Power Steering System. Manually and visually inspect entire system for:

<i>Procedures:</i>	<i>Reject Vehicle If:</i>
(1) Fluid level.	(1) Less than recommended level.
(2) Belts.	(2) Missing, loose, frayed, cracked, or incorrect type.

(3) Hoses.	(3) Missing, cracked, leaking, rubbing moving parts, or is improper type.
(4) Pump.	(4) Missing, not functioning, loose, or leaking.
(5) Cylinder (If applicable).	(5) Missing, not functioning, loose, or leaking.
(6) Assist function.	(6) No assist when steering wheel is turned.
(7) Steering box.	(7) Loose or leaking.

F. Collapsible Steering Column (if applicable). Inspect for condition and mounting.

<i>Procedures:</i>	<i>Reject Vehicle If:</i>
(1) Grasp steering wheel or column and attempt to move horizontally and vertically.	(1) Steering column moves more than 1/4 inch either horizontally or vertically.

.05 Brake Systems — Hydraulic and Vacuum.

A. Parking Brakes.

<i>Procedures:</i>	<i>Reject Vehicle If:</i>
(1) Apply parking brake using driver's manual control.	(1) Application of parking brake fails to hold the vehicle stationary.
(2) Application.	(2) Parking brakes do not fully apply and release when driver's control operated.
(3) Control accessibility.	(3) Parking brake control cannot be reached from driver's seat.
(4) Holding power.	(4) Operating mechanism fails to hold brakes in applied position without manual effort.
(5) Mechanical components.	(5) Any component is seized, missing, incorrectly installed, loose, broken, or worn to such extent as to restrict the effectiveness.

B. Brake Lines and Hoses. Visually inspect:

<i>Procedures:</i>	<i>Reject Vehicle If:</i>
(1) Lines and hoses.	(1) Any line is cracked, chafed, flattened, insecurely mounted, restricted, any repairs other than steel tubing (tubing connections shall be double flared), leaking, or welded.
(2) Master cylinder.	(2) Master cylinder leaks, is loose, or fluid level below 1/2 inch of top.
(3) Cap.	(3) Cap is missing, vent holes are plugged, or gasket missing or damaged.

C. Brake Failure Indicators. Visually inspect:

<i>Procedures:</i>	<i>Reject Vehicle If:</i>
(1) Warning indicator.	(1) Lamp fails to operate when ignition switch is in start position, or lamp operates continuously.
(2) Pressure differential switch.	(2) Lamp comes on with engine running and brake pedal depressed as hard as possible.

D. Brake Pedal Reserve and Leakage Test. Without pumping or repeated brake pedal applications, apply a moderate foot force to pedal and maintain for 1 minute. Inspect:

<i>Procedures:</i>	<i>Reject Vehicle If:</i>
(1) Leakage.	(1) Pedal moves slowly in applied direction.
(2) Travel.	(2) Depressed height is more than 75 percent of total possible travel or does not meet manufacturer's specifications.
(3) Pedal pad.	(3) Pedal pad is loose, broken, or missing (if fitted by manufacturer).

E. Hydraulic System with Hydraulic Assist. Vehicles equipped with an electrically driven hydraulic pump that functions in the event of a power steering failure may be checked by applying pressure on the brake pedal and turn the ignition switch from "off" to "on" position.

<i>Procedures:</i>	<i>Reject Vehicle If:</i>
(1) Apply moderate pressure to brake pedal and turn ignition switch on and off.	(1) No assist in service brakes is detected.

(2) Visually inspect brake warning indicator (if applicable).	(2) Brake warning indicator fails to function when assist pump is not operating.
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F. Vacuum System.

<i>Procedures:</i>	<i>Reject Vehicle If:</i>
(1) Visually inspect lines, hoses, clamps, and connections.	(1) There are any missing, broken, collapsed, chafed lines, hoses, clamps, or connections.
(2) Visually inspect vacuum tank.	(2) Tank is leaking, loose, or damaged.
(3) Clamps.	(3) Any clamp is loose, missing, or broken.

G. Power Brake Operation.

<i>Procedures:</i>	<i>Reject Vehicle If:</i>
(1) With engine off, deplete all vacuum from system. Apply moderate pressure to brake pedal and start engine.	(1) Brake pedal does not move downward when engine is started.
(2) Visually inspect brake booster.	(2) Booster is loose or damaged.

H. Vacuum Reserve.

<i>Procedures:</i>	<i>Reject Vehicle If:</i>
(1) Start engine and build full vacuum. Shut off engine and make one brake application.	(1) Reserve is insufficient to make one full brake application.
(2) Inspect operation of low vacuum indicator.	(2) Indicator fails to operate when system is reduced to 8 inches Hg vacuum.

I. Vacuum Pump (if Applicable).

<i>Procedures:</i>	<i>Reject Vehicle If:</i>
(1) If the system is not equipped with a vacuum gauge, attach a gauge between the pump and reservoir and operate the pump. If the system also uses engine vacuum, disconnect and plug engine vacuum source.	(1) Vacuum pump is not capable of maintaining 18 inches Hg vacuum.

J. Drum Brakes—Hydraulic.

<i>Procedures:</i>	<i>Reject Vehicle If:</i>
(1) Apply a moderate force to the brake pedal for 1 minute. Then check all brake drum and backing plate exterior edges for evidence of brake fluid, oil, or grease leakage.	(1) Brake fluid, oil, or grease is evident at exterior edge of any backing plate or brake drum.
(2) If the backing plate or brake drum has inspection holes, visually inspect thickness of brake lining.	(2) The brake lining thickness appears to be 1/16 inch or less.
(3) Visually inspect exterior surfaces of backing plates for damage.	(3) Any backing plate is bent or damaged.
(4) Visually inspect brake drums for cracks.	(4) Any brake drum is cracked.
(5) Removal of all wheels and brake drums on an axle is only required when a rejection occurs under §J(2). Otherwise only remove the wheel and brake drum for the wheel where the defect is suspected. When wheels and brake drums are removed, perform the inspections specified in §J(6)—(10).	(5) (Rejection not applicable in this step)
(6) Bonded Lining. (a) Measure thickness of lining at thinnest point. (b) Inspect lining condition.	(6) (a) Thinnest point of remaining bonded lining is 1/16 inch or less. (b) Bonded lining is broken, cracked, loose, missing, wear is extremely uneven, or lining is contaminated with oil, grease, or brake fluid.
(7) Riveted Lining. (a) Measure thickness of lining at thinnest point above rivet	(7) (a) Thinnest point of remaining lining above a rivet head is

head. (b) Inspect lining condition.	1/16 inch or less. (b) Lining or rivet is broken, cracked, loose, missing, wear is extremely uneven, or lining is contaminated with oil, grease, or brake fluid.
(8) Mechanical Components. (a) Visually inspect self-adjusters. (b) Visually inspect self-adjuster cables or mechanisms. (c) Anchor pins and hold-down springs. (d) Visually inspect backing plate.	(8) (a) Self-adjuster is missing, seized, inoperable, not for proper side of vehicle, or extremely worn. (b) Cable or mechanism is missing, broken, loose, or inoperable. (c) Any pin or spring is missing, broken, loose, or extremely worn. (d) Backing plate is worn, bent, or damaged to prevent free movement of brake shoes.
(9) Wheel Cylinders. (a) Inspect for operation. (b) Inspect for leaks. (c) Inspect dust seals.	(9) (a) Any wheel cylinder fails to operate. (b) Any cylinder leaks. (c) Any dust seal is missing, damaged, or deteriorated.
(10) Brake Drums. (a) Visually inspect for damage and cracks. (b) Measure inside diameter of drum for wear and remachining.	(10) (a) Any drum contains cracks in the friction surface which extend to the outer edge of the bore, or any drum contains any external cracks. (b) Any combination of wear and remachining exceeds the brake drum manufacturer's limits. If a limit is not available, the maximum combination of wear and remachining may not exceed 0.090 inch greater than the original inside diameter of the drum if the original diameter of the drum is 11 inches or less. For drums greater than 11 inches inside diameter, the maximum wear and remachining may not exceed 0.120 inch greater than the original inside diameter.

K. Disc Brakes—Hydraulic.

<i>Procedures:</i>	<i>Reject Vehicle If:</i>
(1) Apply a moderate force to the brake pedal for 1 minute. Then check all calipers and rotor (disc) surfaces for evidence of brake fluid oil, or grease leakage.	(1) Brake fluid, oil, or grease is evident or visible on accessible surfaces of any caliper or rotor (disc).
(2) If brake linings are visible, visually inspect thickness of lining.	(2) Brake lining thickness appears to be 1/16 inch or less.
(3) If rotors (discs) are visible, visually inspect for cracks or damage.	(3) Any rotor (disc) is cracked or damaged.
(4) Removal of all wheels on an axle is only required when a rejection occurs under §K(2). Otherwise remove only the wheel where the defect is suspected. When wheels are removed, perform the inspections specified in §K(5)—(8).	(4) (Rejection not applicable in this step)
(5) Bonded Linings. (a) Measure thickness of lining at thinnest point. (b) Inspect lining condition.	(5) (a) Thinnest point of remaining lining is 1/16 inch or less. (b) Bonded lining is broken, cracked, loose, missing, wear is extremely uneven, or lining is contaminated with oil, grease, or brake fluid.
(6) Riveted Lining. (a) Measure thickness of lining at thinnest point above rivet head. (b) Inspect lining condition.	(6) (a) Thinnest point of remaining lining above a rivet head is 1/16 inch or less. (b) Lining or rivet is broken, cracked, loose, missing, wear is extremely uneven, or lining is contaminated with oil, grease, or brake fluid.
(7) Calipers. Visually inspect leaks, operation, and anti-vibration components.	(7) Caliper is leaking, fails to operate, or piston is seized.

<p>(8) Rotors (Discs).</p> <p>(a) Visually inspect for damage and cracks.</p> <p>(b) Measure thickness of rotor for wear and remachining.</p>	<p>(8)</p> <p>(a) Any rotor is broken, cracked into the hub, or friction surface cracks extend to the periphery of the rotor.</p> <p>(b) Any combination of wear and remachining reduces the thickness of the rotor to less than the minimum thickness established by the manufacturer or that stamped on the rotor.</p>
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L. Brake Lines and Hoses—Hydraulic.

<i>Procedures:</i>	<i>Reject Vehicle If:</i>
(1) Visually inspect lines and hoses for condition, mounting, restrictions, and proper material and repair.	(1) Any line or hose is leaking, cracked, chafed, flattened, restricted, welded, insecurely mounted, replaced with other than steel tubing, or connections are connections are not double flared.

M. Master Cylinder. Visually inspect master cylinder for:

<i>Procedures:</i>	<i>Reject Vehicle If:</i>
(1) Fluid level.	(1) Any reservoir fluid level is more than 1/2 inch below top of reservoir.
(2) Leaks.	(2) There is evidence of a fluid leak.
(3) Damage.	(3) There is evidence of damage.
(4) Mounting.	(4) Master cylinder is not securely mounted.
(5) Cap.	(5) Cap is missing, has plugged vents, or gasket is missing or damaged.

11.22.03.06

.06 Brake System — Air.

A. Low Air Indicator.

<i>Procedures:</i>	<i>Reject Vehicle If:</i>
(1) Operation.	(1) Indicator fails to operate or fails to function when air pressure reserve is reduced to 60 psi.

B. Compressor and Belt or Belts.

<i>Procedures:</i>	<i>Reject Vehicle If:</i>
(1) Inspect compressor for condition and mounting.	(1) Compressor is damaged, loose, or mounts are loose, cracked, or bolts are missing.
(2) Inspect belts for presence, condition, and tension.	(2) Belt is missing, broken, cracked, deteriorated, or loose.

C. Compressor Operation. Air pressure shall be reduced to 50 psi and the engine started and operated at approximately 1200 rpm.

<i>Procedures:</i>	<i>Reject Vehicle If:</i>
(1) With air pressure reduced to 50 psi, observe time to build pressure to 90 psi.	(1) Time required to build air pressure from 50 psi to 90 psi exceeds 3 minutes.
(2) Governor. (a) Cut-Out Pressure. With engine running at approximately 1200 rpm, observe compressor cut-out pressure. (b) Cut-In Pressure. With engine idling, deplete air pressure and observe compressor cut-in pressure.	(2) (a) Cut-out pressure is greater than 135 psi. (b) Cut-in pressure is less than 80 psi.

D. Air Leakage. Inspection for leakage shall be conducted with a fully charged system and brakes fully applied.

<i>Procedures:</i>	<i>Reject Vehicle If:</i>
(1) Single Vehicle. With a fully charged system, stop engine and observe pressure drop in 1 minute.	(1) Air pressure drop is greater than 3 psi in 1 minute.
(2) Combination of Vehicles. With a fully charged system, stop engine and observe pressure drop in 1 minute.	(2) Air pressure drop is greater than 4 psi in 1 minute.

E. Air Reserve.

<i>Procedures:</i>	<i>Reject Vehicle If:</i>
(1) Drop in Reservoir Pressure. With a fully charged system and engine off, make one full brake application.	(1) Air pressure reservoir pressure is reduced by 30 percent or more on one full brake application.

F. Air Reservoir and Valves.

<i>Procedures:</i>	<i>Reject Vehicle If:</i>
(1) Air Reservoir. With system fully charged, open primary (wet) tank drain valve and observe operation of check valve. Then open drain valve on secondary (dry) tank.	(1) Check valve does not close and air is retained in the secondary (dry) tank or tanks.
(2) Contamination. Observe any oil or water expelled from all tanks.	(2) Any deposits of oil or water cannot be expelled.
(3) Quick Release Valves. Make full brake application and release brakes.	(3) Air is not quickly exhausted through exhaust port when brakes are released.
(4) Relay Valves. Apply and release brakes and observe function of proper brake chambers.	

	(4) Air is not directed to proper brake chamber when brakes are applied or air is not quickly exhausted when brakes are released.
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G. Parking and Emergency Brake Application. Vehicles with original equipment air-operated parking brakes are permissible. There are different systems designed for automatic or manual operation of the system as the design allows (check automatic application of brakes when air tanks are being drained).

<i>Procedures:</i>	<i>Reject Vehicle If:</i>
(1) Using park brake control valve, release air pressure from brakes.	(1) Push rods are extended and vehicle can be moved.
(2) Observe if mechanism releases brakes when control valve is operated.	(2) Brakes do not fully release.

H. Air System.

<i>Procedures:</i>	<i>Reject Vehicle If:</i>
(1) Visually inspect gladhands for condition and mounting.	(1) Gladhands are damaged, have damaged seals, or are insecurely mounted.
(2) Visually inspect lines and hoses for: (a) Type. (b) Condition. (c) Mounting.	(2) (a) Not an approved type. (b) Broken, cracked, chafed, abraded, or kinked. (c) Insecurely mounted or contacting the exhaust system or any moving part.
(3) Inspect air tanks for: (a) Presence and connection. (b) Condition. (c) Leaks. (d) Mounting.	(3) (a) Tank is missing or not connected. (b) Tank is cracked, damaged, or field repaired. (c) Tank or connections leak. (d) Tank, mounting brackets, or springs are missing, broken, cracked, or loose.
(4) Inspect drain cocks and moisture ejectors (if equipped) for: (a) Presence and condition. (b) Leaks.	(4) (a) Drain cock is missing, broken, damaged, or is inoperable. (b) Drain cock or moisture ejector leaks air.

I. Brake Mechanical Components. Do not attempt to dismantle a double diaphragm spring brake unit while it is on the vehicle. Utilize a safety cage and remove the entire unit from the vehicle. Replace with a new or rebuilt assembly. When rebuilding or overhauling a brake chamber, strict adherence to manufacturer's procedures is required. Inspect brake chamber for:

<i>Procedures:</i>	<i>Reject Vehicle If:</i>
(1) Function.	(1) Brake chamber fails to function as designed.
(2) Leaks.	(2) Brake chamber leaks or diaphragm is damaged.
(3) Damage.	(3) Brake chamber is damaged so as to affect operation.
(4) Mounting.	(4) Brake chamber or mounting hardware is broken, loose, damaged, or bolts are missing.
(5) Push rods.	(5) Push rod is broken, bent, or misaligned with slack adjuster.
(6) Clevis yokes.	(6) Clevis yoke is broken, cracked, or worn.
(7) Clevis pins.	(7) Clevis pin is missing, worn, or cotter pin is missing or an improper substitute is used.
(8) Push rod clevis pin hole setting.	(8) Except on front wheels, slack adjuster effective length is not the same on all wheels.
(9) Slack adjuster.	(9) Slack adjuster is inoperative, broken, bent, or extremely worn.
(10) Slack adjuster nut self-locking sleeve.	(10) Adjusting nut self-locking sleeve does not function.

J. Slack Adjuster (Push Rod) Travel. With the assistance of a second party, make a treadle valve application at 85 psi in system and note rod travel.

<i>Procedures:</i>	<i>Reject Vehicle If:</i>
(1) With brakes released, inspect angle of push rod and slack adjuster arm.	(1) Push rod and slack adjuster arm is less than 90 degrees when brakes are released.
(2) Measure push rod travel from fully released to fully applied positions.	(2) Push rod travel exceeds limits in Table 1.
(3) On steering axle, inspect for difference of travel between sides.	(3) Push rod travel on one side is not within 1/4 inch of other side.

TABLE 1

S-CAM BRAKES—PUSH ROD TRAVEL LIMITS (Dimensions in Inches)			
<i>Type</i>	<i>Effective Area (Sq. In.)</i>	<i>Outside Diameter* (Inches)</i>	<i>Maximum Stroke (Inches)</i>
BOLT TYPE BRAKE CHAMBER DATA			
A	12	6 -15/16	1-3/8
B	24	9 -3/16	1 -3/4
C	16	8 -1/16	1 -3/4
D	6	5 -1/4	1 -1/4
E	9	6 -3/16	1 -3/8
F	36	11	2 -1/4
G	30	9 -7/8	2
ROTOCHAMBER DATA			
9	9	4 -9/32	1 -1/2
12	12	4 -13/16	1 -1/2
16	16	5 -13/32	2
20	20	5 -15/16	2
24	24	6 -13/32	2
30	30	7 -1/16	2 -1/4
36	36	7 -5/8	2 -3/4
50	50	8 -7/8	3
CLAMP TYPE BRAKE CHAMBER DATA			
6	6	4 -1/2	1 -1/4
9	9	5 -1/4	1 -3/8
12	12	5 -11/16	1 -3/8
16	16	6 -3/8	1 -3/4
20	20	6 -25/32	1 -3/4
24	24	7 -7/32	1 -3/4**
30	30	8 -3/32	2
36	36	9	2 -1/4
*Dimensions listed do not include cap screw head projections for rotochambers and bolt clamp projections for clamp type brake chambers.			
**2 inches for long stroke design.			
BENDIX WESTINGHOUSE			
DD2			2
DD3			2

K. Wedge Brake. With the assistance of a second party, make a full brake application.

<i>Procedures:</i>	<i>Reject Vehicle If:</i>

(1) Measure total shoe movement from fully released to fully applied position.	(1) Brake shoe movement on wedge brakes exceeds 1/16 inch.
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L. Brake Camshafts.

<i>Procedures:</i>	<i>Reject Vehicle If:</i>
(1) Inspect operation of brakes.	(1) Brake camshaft condition renders any brake inoperable.
(2) Inspect travel of brake cams.	(2) Any cam is on end or turns over when brakes are applied.
(3) Inspect for camshaft and bushing wear.	(3) There is more than 1/8 inch wear between camshaft and bushings.

M. Brake Linings—Air Brakes. Visually inspect brake shoes. If shoes cannot be seen, removal of the lower portion of the dust cover is required.

<i>Procedures:</i>	<i>Reject Vehicle If:</i>
(1) Inspect for presence and condition of lining.	(1) Any lining is missing, cracked, broken, or not securely attached to the brake shoe.
(2) Measure thickness at center of shoe. It may be necessary to back off slack adjusters to make an accurate measurement.	(2) Brake lining thickness is worn to 1/4 inch or less at center of shoe.
(3) Visually inspect for contamination.	(3) Lining is contaminated with oil or grease.

N. Brake Drums—Air Brakes.

<i>Procedures:</i>	<i>Reject Vehicle If:</i>
(1) Visually inspect for damage and cracks.	(1) Any drum contains cracks in the friction surface which extend to the outer edge of the bore, or any drum contains any external cracks.
(2) Removal of any wheel and brake drum is only required when a rejection occurs under §N(1). When any wheel and brake drum is removed, perform the inspection specified in §N(3).	(2) (Rejection not applicable in this step)
(3) Measure inside diameter of drum for wear and remachining.	(3) Any combination of wear and remachining exceeds the brake drum manufacturer's limits. If a limit is not available, the maximum combination of wear and remachining may not exceed 0.090 inch greater than the original inside diameter of the drum if the original diameter of the drum is 11 inches or less. For drums greater than 11 inches inside diameter, the maximum wear and remachining may not exceed 0.120 inch greater than the original inside diameter.

O. Disc Brakes—Air.

<i>Procedures:</i>	<i>Reject Vehicle If:</i>
(1) Inspect all calipers and rotor (disc) surfaces for oil or grease contamination.	(1) Oil or grease is evident on accessible surfaces of any caliper or rotor (disc).
(2) If brake linings are visible, visually inspect thickness of lining.	(2) Brake lining thickness appears to be 1/8 inch or less.
(3) If rotors (discs) are visible, visually inspect for cracks or damage.	(3) Any rotor is cracked or damaged.
(4) Removal of all wheels on an axle is only required when a rejection occurs under §O(2). Otherwise remove only the wheel where the defect is suspected. When wheels are removed, perform the inspections specified in §O(5)—(8).	(4) (Rejection not applicable in this step)
(5) Bonded Linings. (a) Measure thickness of lining at thinnest point. (b) Inspect lining condition.	(5) (a) Thinnest point of remaining lining is 1/8 inch or less. (b) Bonded lining is broken, cracked, loose, missing, wear is extremely uneven, or lining is contaminated with oil, grease, or brake fluid.

<p>(6) Riveted Lining. (a) Measure thickness of lining at thinnest point above rivet head. (b) Inspect lining condition.</p>	<p>(6) (a) Thinnest point of remaining lining above a rivet head is 1/8 inch or less. (b) Lining or rivet is broken, cracked, loose, missing, wear is extremely uneven, or lining is contaminated with oil, grease, or brake fluid.</p>
<p>(7) Calipers. Visually inspect for damage and cracks.</p>	<p>(7) Caliper is leaking, fails to operate, or piston is seized.</p>
<p>(8) Rotors (Discs). (a) Visually inspect for damage and cracks. (b) Measure thickness of rotor for wear and remachining.</p>	<p>(8) (a) Any rotor is broken, cracked into the hub, or friction surface cracks extend to the periphery of the rotor. (b) Any combination of wear and remachining reduces the thickness of the rotor to less than the minimum thickness established by the manufacturer or that stamped on the rotor.</p>

.07 Tires.

A. Tire Inspection—Steering Axle.

<i>Procedures:</i>	<i>Reject Vehicle If:</i>
(1) Inspect for tire wear. (a) Tires without tread wear indicators. (b) Tires with tread wear indicators.	(1) (a) Tire is worn so that less than 4/32 inch remains when measured in any two major grooves at three equally spaced intervals around circumference of a tire. (b) Tread wear indicator contacts the road in any two adjacent major grooves at three equally spaced intervals around circumference of a tire.
(2) Inspect for tread cuts, snags, or sidewall cracks.	(2) Tire has tread cuts, snags, or sidewall cracks in any direction and deep enough to expose cord fabric.
(3) Inspect for exposed cord fabric.	(3) Tire has any part of the breaker strip or casing ply exposed in the tread.
(4) Inspect for bumps, bulges, or knots.	(4) Tire has visible bump, bulge, or knot related to tread or sidewall separation.
(5) Inspect for patching.	(5) Tire has a boot, blowout patch, or other ply repair.
(6) Inspect for tire matching.	(6) Bias ply and radial ply tires are mixed on same axle, or tires on same axle are not equivalent to size recommended by tire or vehicle manufacturer.
(7) Inspect for restricted usage.	(7) Tire is labeled "Not for Highway Use" or other labeling which excludes use on a steering axle.
(8) Inspect for regrooved or recut tires.	(8) Tire is regrooved or recut and regrooving or recutting is not permitted by tire manufacturer.
(9) Inspect for proper mounting.	(9) Tire has tire flap protruding through valve stem slot in rim.
(10) Inspect valves and valve stems for leaks and mounting.	(10) Valve stem leaks, is damaged due to misalignment, or is positioned to interfere with checking tire air pressure.
(11) Inspect for wheel and tire mounting.	(11) Tire or wheel contacts vehicle chassis or body.
(12) Inspect for weight limit rating.	(12) Gross vehicle axle weight exceeds tire load rating, which includes under-inflated tires.

B. Tire Inspection—Nonsteering Axle.

<i>Procedures:</i>	<i>Reject Vehicle If:</i>
(1) Inspect for tire wear. (a) Tires without tread indicators. (b) Tires with tread wear indicators.	(1) (a) Tire is worn so that less than 2/32 inch remains when measured in any two major grooves at three equally spaced intervals around circumference of a tire. (b) Tread wear indicator contacts the road in any two adjacent major grooves at three equally spaced intervals around circumference of a tire.
(2) Inspect for tread cuts, snags, or sidewall cracks.	(2) Tire has tread cuts, snags, or sidewall cracks in any direction and deep enough to expose cord fabric.
(3) Inspect for exposed cord fabric.	(3) Tire has any part of the breaker strip or casing ply exposed in tread.
(4) Inspect for bumps, bulges, or knots.	(4) Tire has visible bump, bulge, or knot related to tread or sidewall separation.
(5) Inspect for patching.	(5) Tire has a boot, blowout patch, or other temporary ply repair.
(6) Inspect for tire matching.	

	(6) Bias ply and radial ply tires are mixed on same axle, or tires on same axle are not equivalent to size recommended by tire or vehicle manufacturer.
(7) Inspect for restricted usage.	(7) Tire is labeled "Not for Highway Use" or other labeling which excludes use on a highway vehicle.
(8) Inspect for regrooved or recut tires.	(8) Tire is regrooved or recut and regrooving or recutting is not permitted by tire manufacturer, or vehicle is equipped with regrooved tires on the steering axle.
(9) Inspect for recapped or retreaded tires on front wheels.	(9) Equipped with recapped or retreaded tires on the front wheels.
(10) Inspect for proper mounting.	(10) Tire has tire flap protruding through valve stem slot in rim.
(11) Inspect valves and valve stems for leaks and mounting.	(11) Valve stem leaks, is damaged due to misalignment, or is positioned to interfere with checking tire air pressure.
(12) Inspect for wheel and tire mounting.	(12) Tire or wheel contacts vehicle chassis or body.
(13) Inspect for weight limit rating.	(13) Gross vehicle axle weight exceeds tire load rating, which includes under-inflated tires.
(14) Inspect spare tire storage (if equipped).	(14) A spare tire is not properly secured.

.08 Wheels, Rims, Lock Rings, Studs, and Nuts.

A. Wheels. Visually inspect:

<i>Procedures:</i>	<i>Reject Vehicle If:</i>
(1) Disc Wheels. (a) Inspect for condition of wheels. (b) Inspect stud holes.	(1) (a) Wheel is broken, cracked, bent, warped, welded, or loose. (b) Any stud hole is elongated.
(2) Cast Wheels. (a) Inspect for condition of wheels. (b) Inspect stud holes.	(2) (a) Wheel is broken, cracked, bent, scraped, welded, loose, or clamping area is worn. (b) Any stud hole is elongated.

B. Rims. Visually inspect for:

<i>Procedures:</i>	<i>Reject Vehicle If:</i>
(1) Wheel and rim matching.	(1) Wheel and rim are mismatched.
(2) Damage.	(2) Rim is broken, cracked, bent, warped, or loose.

C. Lock Rings.

<i>Procedures:</i>	<i>Reject Vehicle If:</i>
(1) Inspect for butted lock rings.	(1) Locking ring end clearance is less than 1/8 inch.

D. Studs, Nuts, and Clamps. Inspect for:

<i>Procedures:</i>	<i>Reject Vehicle If:</i>
(1) Presence and tightness.	(1) Stud, nut, or clamp is missing or loose.
(2) Thread engagement.	(2) Threads are cross-threaded or improperly engaged.
(3) Condition.	(3) Stud, nut, or clamp is broken, cracked, bent, welded, or seized.

11.22.03.09

.09 Accelerator Pedal and Air Throttle.

A. Inspect pedals for:

<i>Procedures:</i>	<i>Reject Vehicle If:</i>
(1) Binding.	(1) Engine speed does not return to idle.
(2) Mounting.	(2) Pedals are not properly and securely mounted.
(3) Condition of linkage.	(3) Linkage is worn, damaged, or contains improper retaining components.
(4) Return springs.	(4) Return springs are missing, loose, or weak.

11.22.03.10

.10 Fuel Storage and Delivery System.

A. Fuel Storage. Visually inspect:

<i>Procedures:</i>	<i>Reject Vehicle If:</i>
(1) Tank.	(1) Tank is leaking, cracked, has broken welds, not an approved type or if mounted forward of steering axle and is wider than the vehicle.
(2) Tank mounting.	(2) Tank mounts are missing, cracked, loose, have loose bolts, or bolts are missing.
(3) Caps.	(3) Tank cap is missing or does not seal to prevent spillage.

B. Fuel Delivery System. Visually inspect:

<i>Procedures:</i>	<i>Reject Vehicle If:</i>
(1) Pump.	(1) Pump is disconnected or bypassed to provide a gravity fuel feed, pump is loose, leaking, or not securely mounted.
(2) Lines and connections.	(2) Lines or connections are leaking, crimped, restricted, improperly mounted, any line or connection is less than 1-1/2 inches from the exhaust system or moving vehicle or engine parts, or located inside the passenger compartment.

11.22.03.11

.11 Exhaust System.

A. Visually inspect:

<i>Procedures:</i>	<i>Reject Vehicle If:</i>
(1) Manifolds.	(1) Manifold is broken, cracked, or leaking.
(2) Muffler or mufflers.	(2) Muffler is missing or leaking.
(3) Exhaust pipe or pipes.	(3) Exhaust pipe is missing, leaking, or perforated.
(4) Exhaust turbo charger (if applicable).	(4) Exhaust turbo charger has an audible leak at seals.
(5) Heat shields (if applicable).	(5) Heat shields are missing, loose, or improperly mounted.
(6) Location.	(6) Any part of exhaust system is less than 1-1/2 inches from fuel system, brake system, or other nonshielded combustible material.
(7) Exhaust outlet.	(7) Exhaust outlet does not expel exhaust beyond perimeter of the passenger compartment.

11.22.03.12

.12 Universal Joints and U-Clamps.

A. Universal Joints. With spring brakes on and gear selector in neutral, place a small bar between the yoke and the U-joint and rotate the shaft back and forth.

<i>Procedures:</i>	<i>Reject Vehicle If:</i>
(1) Visually inspect universal joints for looseness, missing or loose bolts, and proper phasing.	(1) There is free play in a universal joint, bolt is missing or loose, or joints are not in proper phase.
(2) Visually inspect U-clamps.	(2) U-clamp is missing, loose, nut is missing or loose, or nut or bolt is not locked.
(3) Visually inspect steady bearing for wear and proper mounting.	(3) Steady bearing is loose or worn.
(4) Inspect for presence of drive shaft protection open on vehicles with drive shaft extending lengthwise under floor of passenger compartment.	(4) Not equipped with at least one guard or bracket at the sliding connection end of drive shaft.

