



SURFACE VEHICLE RECOMMENDED PRACTICE

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Test Procedure for Air Reservoir Capacity - Truck and Bus

RATIONALE

This document has been stabilized because it covers technology, products, or processes which are mature and not likely to change in the foreseeable future.

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1. SCOPE

This SAE Recommended Practice provides instructions and test procedures for air braked vehicles including but not limited to trucks, truck-tractors, trailers, dollies, and buses used on highways but does not include off-highway vehicles.

1.1 Purpose

This document provides a method of determining the air reservoir capacity of highway type vehicles using compressed air to actuate or transmit actuation power to the foundation brakes. Air reservoir capacity is the ability to provide adequate brake pressure after a number of brake applications.

2. REFERENCES

2.1 Applicable Publications

The following publications form a part of this specification to the extent specified herein. Unless otherwise indicated, the latest issue of SAE publications shall apply.

2.1.1 SAE Publication

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or 724-776-4970 (outside USA), www.sae.org.

SAE J1609 Air Reservoir Capacity Performance Guide—Commercial Vehicles

2.1.2 Federal Publication

Available from the United States Government Printing Office, 732 North Capitol Street, NW, Washington, DC 20401, Tel: 202-512-1800, www.gpoaccess.gov/cfr/retrieve.html.

Code of Federal Regulations Title 49 Part 571.121 Air Brake Systems

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3. INSTRUMENTATION AND EQUIPMENT

3.1 Instrumentation

3.1.1 Timing device accurate to within 1% of elapsed time.

3.1.2 Pressure gauges or electronic pressure measuring systems accurate to within 2% of pressure.

3.2 Equipment

3.2.1 Powered Vehicles

3.2.1.1 (Optional) Two pressure regulator valves which can be set to limit output pressures to 586 kPa (85 psi) with input pressures up to the air compressor cut-out pressure. The pressure drop through the valve shall not be more than 3.45 kPa (1/2 psi) when the input pressure is between 276 and 586 kPa (40 and 85 psi).

3.2.2 Trailers and Dollies

3.2.2.1 Air source regulated to 930 kPa $\pm$ 34.5 kPa (135 psi $\pm$ 5 psi) with shut-off valve.

3.2.2.2 "Trailer test rig" (test fixture described in Figure 1 of FMVSS 121) with an additional reservoir volume plumbed directly into the "trailer-test rig" reservoir to give a total "trailer test rig" reservoir volume of 19.7 L (1200 in³). See Figure 1.

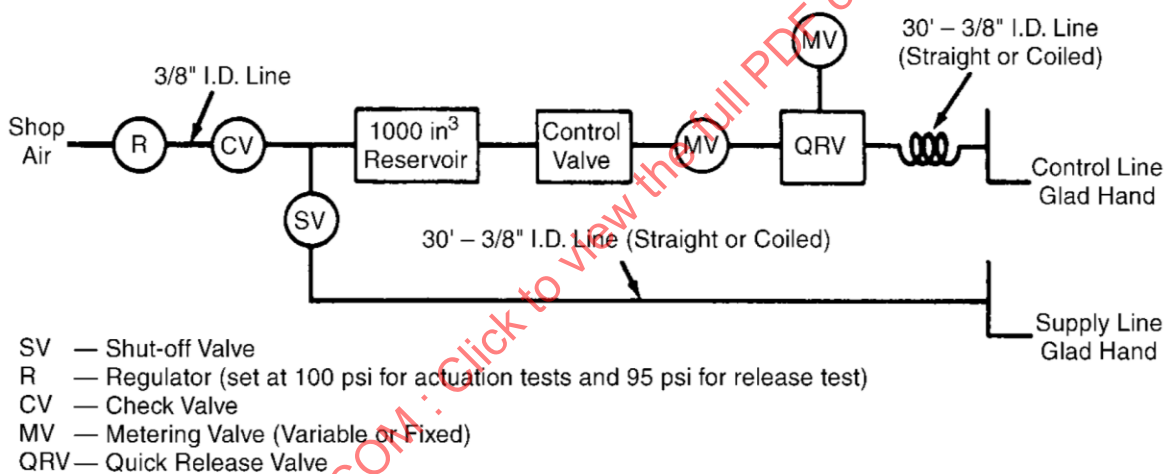


FIGURE 1 - TRAILER TEST RIG

3.2.2.3 (Optional) Pressure regulator valve, connected between two gladhand couplers, which can be set to limit output pressures to 586 kPa (85 psi) with input pressures up to 150 psi. The pressure drop through the valve shall not be more than 3.45 kPa (1/2 psi) when the input pressure is between 276 and 586 kPa (40 and 85 psi).

3.2.3 Additional Equipment for Towing Vehicles

3.2.3.1 Dummy coupler capable of sealing the supply (emergency) line.

3.2.3.2 A "0.820 L (50 in³) reservoir" attached to an air line coupler by a pipe/tube having an inside diameter of at least 12.7 mm (1/2 in) so that the total volume of the assembly is 0.820 L (50 in³).

4. VEHICLE CONDITION

- 4.1 All air connections shall be secured so that the leakage rate for the entire air system, with all service brakes applied and parking brakes released, with pressure of $586 \text{ kPa} \pm 34.5 \text{ kPa}$ (85 psi $\pm$ 5 psi), shall not exceed 6.89 kPa (1 psi) per minute. For leakage rate evaluation of towing vehicles, the "0.820 L (50 in³) reservoir" coupler shall be connected to the rear control line coupler and the dummy coupler to the rear supply line coupler. Parking brake and trailer air supply valves shall be positioned so that the parking brakes are released and the supply line to any towed vehicle coupler is pressurized. The control line to any couplers for towed vehicles shall also be pressurized to $586 \text{ kPa} \pm 34.5 \text{ kPa}$ (85 psi $\pm$ 5 psi).
- 4.2 Brakes on new vehicles shall be burnished in accordance with paragraph S6.1.8 of FMVSS 121. Brakes on used vehicles need not be burnished if the friction material contact surface is over 80% for drum brakes and over 99% for disc brakes.
- 4.3 Brakes are to be adjusted to the vehicle manufacturer's published instructions. Where instructions differ between new and burnished linings/pads, adjustments specified for burnished linings/pads shall be followed.
- 4.4 If the vehicle is equipped with any type of load proportioning valve(s), the vehicle axles, which are affected by these valves, shall be loaded to their GAWRs or the valve(s) bypassed.
- 4.5 If the vehicle is equipped with any air reservoir(s) to operate systems other than the brake system, such reservoirs shall be isolated. All air operated equipment outside of the brake system shall be in the "off" position.

5. TEST PROCEDURE

5.1 Trucks, Truck-Tractors, and Buses

- 5.1.1 Park the vehicle on a level surface and chock the wheels. Drain all air tanks of moisture to obtain maximum air tank capacity.
- 5.1.2 On towing vehicles, attach the "0.820 L (50 in³) reservoir" coupler to the vehicle's trailer control line coupler and the dummy coupler to the trailer supply line coupler.
- 5.1.3 Install a pressure gage (transducer) in the "0.820 L (50 in³) reservoir," the reservoir that controls the compressor "cut-in" and "cut-out," and in one service brake actuator of each set of actuators having a common input pressure.
- 5.1.4 If the optional regulator valves are used to regulate brake application pressures, install one in each line supplying air to the foot valve at its respective reservoir.
- 5.1.5 Position the parking brake air control valve(s) in the cab so that the parking brakes are released and, if the test vehicle is a towing vehicle, the trailer air supply line is pressurized.
- 5.1.6 Charge the air system to the vehicle manufacturer's specified minimum "cut-out" pressure.
- 5.1.7 Make at least 5 full brake applications, by fully depressing the foot valve, to exercise the brake system.
- 5.1.8 If the regulator valves specified in 3.2.1.1 are used, adjust the valves so that the output is 586 kPa (85 psi) when the foot valve is fully depressed.
- 5.1.9 Charge the air system to the vehicle manufacturer's specified minimum "cut-out" pressure. Isolate the air system from the air supply so that the reservoirs are not supplied with air during the test.
- 5.1.10 Make a brake application that results in 586 kPa (85 psi) (or the maximum possible when 586 kPa (85 psi) is not obtainable) in the brake actuator with the least pressure and hold for 5 to 15 s. Record the brake actuator pressure(s), and when applicable record the 0.820 L (50 cubic inch) reservoir pressure.