



SURFACE VEHICLE RECOMMENDED PRACTICE

J1505™

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Brake Force Distribution Test Procedure - Trucks and Buses

RATIONALE

This revision includes clarification statements in the scope, in 3.1.5, and grammatical corrections.

1. SCOPE

This SAE Recommended Practice provides the test procedure and instructions for air braked single unit trucks, buses, and combination vehicles. Brake force distribution testing with systems post-reduced stopping distance changes is still appropriate; however, vehicles with electronically controlled braking systems are not covered in this document and may need to be addressed in the future. It also provides recommendations for:

- a. Instrumentation and equipment.
- b. Vehicle preparation.
- c. Calculating distribution of brake force.

1.1 Purpose

This procedure provides a method to determine the brake force distribution and threshold pressures for trucks and buses with a GVWR greater than 4536 kg (10000 pounds).

Other equipment and procedures could be used to determine approximate relative work or energy being absorbed by a vehicle's brakes. A performance-based brake tester can determine low pressure/low speed torques of different brakes. A temperature/thermal balance can show relative temperatures of brakes, thus indicating approximate energy absorbed.

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Documents

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2. REFERENCES

2.1 Applicable Documents

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 Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or +1 724-776-4970 (outside USA), www.sae.org.

SAE J225 Brake Force Distribution Field Test Procedure for Truck and Bus

SAE J1626 Braking, Stability, and Control Performance Test Procedures for Air- and Hydraulic-Brake Equipped Trucks, Truck-Tractors, and Buses

SAE J1854 Brake Force Distribution Performance Guide - Truck and Bus

SAE J2115 Air Brake Performance and Wear Test Code Commercial Vehicle Inertia Dynamometer

2.2 Related Publications

The following publications are provided for information purposes only and are not a required part of this SAE Technical Report.

2.2.1 FMVSS Publications

Available from The Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

FMVSS (Federal Motor Vehicle Safety Standard) Title 49 CFR 57.121 - Air Brake Systems

3. INSTRUMENTATION, EQUIPMENT, AND FACILITIES

3.1 Each vehicle should be equipped with:

3.1.1 A speed measuring device capable of measuring vehicle speed to within ± 0.32 km/h (± 0.2 mph) with a speed signal update rate greater than 20 Hz.

3.1.2 A means of measuring time to within ± 0.1 second between two speeds, such as a strip chart recorder or digital timer that receives a signal from the speed measuring device.

3.1.3 Two pressure transducers and a recording device accurate to within 3.5 kPa (± 0.5 psi). Note: Pressure sensors should be calibrated daily to ensure accuracy at low pressures.

3.1.4 Brake lining thermocouples as per SAE J2115 and a suitable temperature readout device accurate to within ± 11 °C (± 20 °F). If brake lining thermocouples are not used, a contact pyrometer or other method may be used to ensure that adequate cooling time is provided between tests to ensure that brake heating and fade do not contaminate results.

3.1.5 Valving to allow brakes on each axle or axle set to be operated, controlled, and evaluated independently. Valving should provide the driver override capability for safety, but must not disturb the inherent pressure differentials in the vehicle brake system.

3.1.6 An external application system (see Figure 1) that can apply the braking system with a constant input is recommended. (Use of the driver's foot to apply the brakes may increase variation in the test results.) This system must be designed, installed, and utilized in such a way as to take into account the inherent pressure differentials in the vehicle brake system.

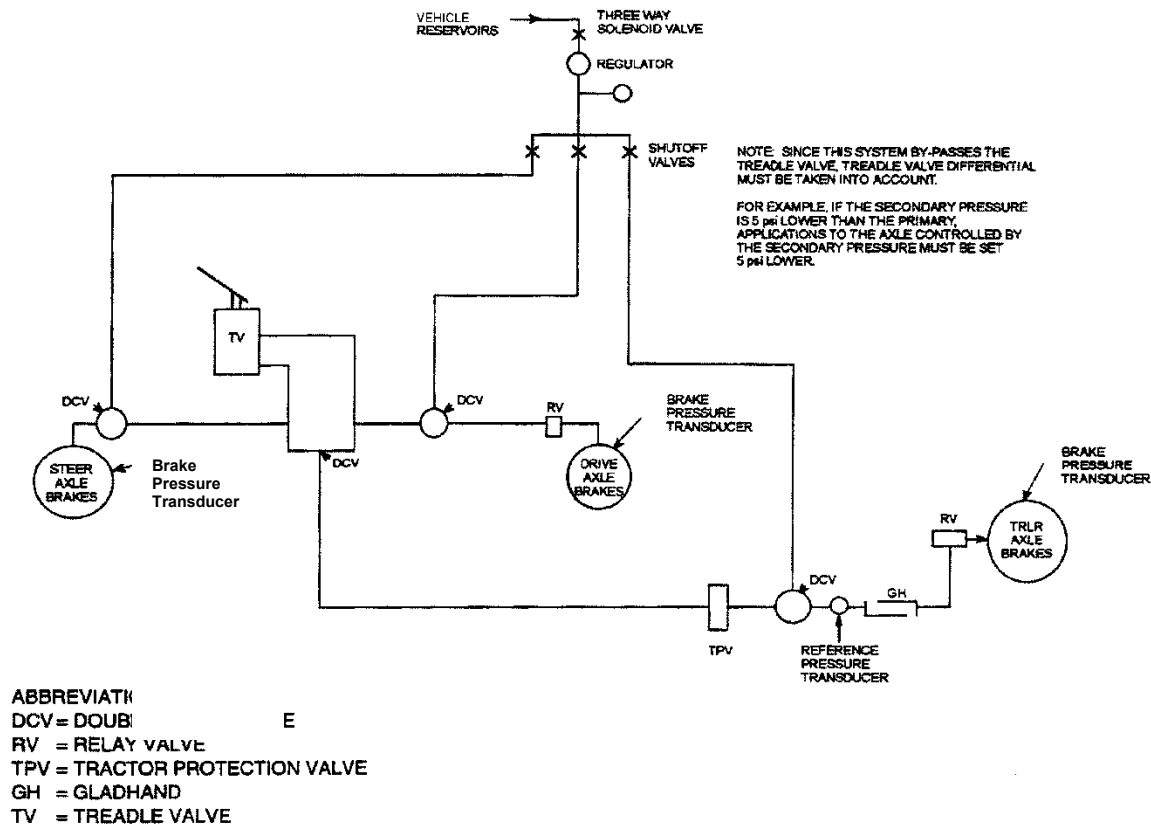


Figure 1 - External system for brake application

- 3.1.7 A system such as a treadle stop may be used, provided that the brakes are applied at a controlled rate so as to minimize pressure overshoot during the brake application. Caution must be exercised when applying the brakes on individual axles during partial system testing. The stopping ability of the vehicle will be reduced.
- 3.1.8 Measure and record ambient temperature and wind conditions, including wind speed and direction.
- 3.1.9 Test should be run on a straight 3.6 m (12 feet) wide roadway with a dry Portland cement concrete or equivalent surface to reduce the likelihood of wheel lock-up. The vehicle shall be aligned with the center of the roadway at the beginning of each stop. The roadway should be dry and flat with no more than a 1% grade in all directions, including crown. Due to reduced stopping ability of the vehicle, the roadway should either be part of a circular path, or must contain sufficient run-out area, so in event of unanticipated braking force reduction or equipment failure, the vehicle has sufficient track length to coast to a stop.
4. VEHICLE INFORMATION AND DATA
- 4.1 Vehicle information sheet (see Figure 2) to be filled in prior to starting test.
- 4.2 Test data sheet (see Figure 3) to be used as a work sheet during testing.
- 4.3 Vehicle information and test data sheets may be used for or extended to single unit trucks, buses, or multiple combination vehicles.

Test No.: _____ Test Date(s) – From: _____ To: _____
 Test Organization: _____ Test Location: _____
 Vehicle Year, Make, and Model: _____
 Vehicle VIN: _____ D.O.M: _____ Wheelbase, mm (inch): _____
 Trailer Year, Make, and Model: _____
 Trailer VIN: _____
 GAWR Vehicle: Front _____ Rear _____ Trailer _____
 Weight Distribution:
 Vehicle: Front _____ Rear _____ Trailer _____
 Trailer Axles (s) _____
 Gross Total _____

BRAKES:

	Type ¹	Size	Make	Lining Make	Lining Edge Codes
Vehicle: Front	_____	_____	_____	_____	_____
Rear	_____	_____	_____	_____	_____
Trailer:	_____	_____	_____	_____	_____

BRAKE DRUM/ROTOR:

	Type ²	Make	Weight (optional)	Dust Shields (Y/N)
Vehicle: Front	_____	_____	_____	_____
Rear	_____	_____	_____	_____
Trailer:	_____	_____	_____	_____

ACTUATION DETAILS:

	Air Chamber Make/Model/Size	Slack Adjusters Length or Wedge Angle	Type ³	Adjustment Stroke @ 551 kPa (80 psi)	Cam ⁴ Rotation
Vehicle: Front	_____	_____	_____	_____	_____
Rear-fwd.	_____	_____	_____	_____	_____
Rear-rear	_____	_____	_____	_____	_____
Trailer: Front	_____	_____	_____	_____	_____
Rear	_____	_____	_____	_____	_____

TIRES:

	PSI	Size	Type ⁵	Data Book SLR mm (inch)
Vehicle: Front	_____	_____	_____	_____
Rear-fwd.	_____	_____	_____	_____
Rear-rear	_____	_____	_____	_____
Trailer: Front	_____	_____	_____	_____
Rear	_____	_____	_____	_____

SPECIAL CONDITIONS:

Special conditions or equipment, which might affect brake performance: _____

¹ Cam, disc, wedge, etc.

² Cast or composite drum, vented or non-vented rotor, etc.

³ Automatic, manual, etc.

⁴ With or opposite forward drum rotation

⁵ Single or dual, radial or bias-ply, etc.

⁶ If stroke cannot be measured (disc, wedge brakes), leave section blank. Refer to manufacturer's manual to assure proper adjustment is maintained.

Figure 2 - Vehicle information sheet