

SAE The Engineering Society
For Advancing Mobility
Land Sea Air and Space®

A Product of the
Cooperative Engineering Program

SAE J201 MAY89

**In-Service Brake
Performance Test
Procedure
Passenger-Car and
Light-Duty Truck**

SAE Recommended Practice
Reaffirmed May 1989

SAENORM.COM : Click to view the full PDF 01/20/19905

S. A. E.
LIBRARY

Submitted for Recognition as
an American National Standard

SAENORM.COM : Click to view the full PDF of j201_198905

No part of this publication may be reproduced in any form, in an electronic retrieval system or otherwise, without the prior written permission of the publisher.

Copyright 1989 Society of Automotive Engineers, Inc.

IN-SERVICE BRAKE PERFORMANCE TEST PROCEDURE PASSENGER-CAR AND LIGHT-DUTY TRUCK

1. SCOPE:

This SAE Recommended Practice establishes a uniform procedure for testing the brake systems (service and parking) of all passenger cars, light-duty trucks, and multipurpose passenger vehicles up to and including 10 000 lb (4500 kg) GVWR.

2. PURPOSE:

The purpose of the test code is to evaluate brake system performance of vehicles in service for compliance with regulations.

- 2.1 The test code is expected to be utilized as a basis for a brake evaluation conducted by State or Federal officials engaged in highway safety programs.
- 2.2 The primary consideration is that this test requires a minimum of instrumentation, time, driver skill, and cost to conduct.

3. INSTRUMENTATION:

- 3.1 Decelerometer (U-tube or equivalent)
- 3.2 Pedal force indicator
- 3.3 Pedal travel indicator
- 3.4 Speedometer
- 3.5 Stop watch

SAE Technical Board Rules provide that: "This report is published by SAE to advance the state of technical and engineering sciences. The use of this report is entirely voluntary, and its applicability and suitability for any particular use, including any patent infringement arising therefrom, is the sole responsibility of the user."

SAE reviews each technical report at least every five years at which time it may be reaffirmed, revised, or cancelled. SAE invites your written comments and suggestions.

4. INSTALLATION DETAILS:

- 4.1 Install and adjust decelerometer to vehicle.
- 4.2 Install pedal force and travel indicator to manufacturer's procedure and calibrate.
- 4.3 Brake system is to be tested as received without any changes or adjustments.

5. VEHICLE TEST WEIGHT:

- 5.1 The vehicle is to be tested at the "as received" load excluding passengers. Official observer permissible.
- 5.2 The load may be repositioned or removed if a hazardous condition exists.

6. TEST FACILITY:

- 6.1 Selected test area shall be a paved 12 ft (3.7 m) lane of adequate length, dry, clean, straight, essentially level, and not heavily traveled.
- 6.2 Provide a 15% grade of sufficient length and skid resistance to support the entire test vehicle.

7. TEST PROCEDURE:

7.1 Test Notes (to be recorded on data sheet - Fig. 1):

- 7.1.1 Vehicle make, model name, year, and serial number.
- 7.1.2 Vehicle odometer reading.
- 7.1.3 Condition of each tire.
- 7.1.4 Type of brake (disc, drum) (power, manual).
- 7.1.5 Brake warning lamp operation.
- 7.1.6 Brake stop lamps operation.
- 7.1.7 Any change in pedal height when held for 10 s at 20 lb (89 N) pedal force.
- 7.1.8 Any change in pedal height when held for 10 s at 150 lb (667 N) pedal force and if pedal reached its limit of travel.
- 7.1.9 If parking brake application will lock the wheels with the vehicle on the 15% grade.
- 7.1.10 Any unusual brake or vehicle noises.
- 7.1.11 Any unusual brake action such as pulls, roughness, etc.
- 7.1.12 If wheel slide occurred during the brake snubs and designate which wheel.

Vehicle:
 Make _____ Model Name _____ Year _____
 Odometer Reading _____ Serial Number _____

Tire Condition:

	LF	RF	LR	RR
GOOD				
AVG.				
POOR				

Type of Brakes: Front-Disc _____ Drum _____

Rear-Disc _____ Drum _____

Type of Actuation: Power _____ Manual _____

Driver _____ Observer (Official) _____

Performance Data:

1. Brake Warning Lamp Operable—YES _____ NO _____

2. Brake Stop Lamps Operable— YES _____ NO _____

3. Static Check

Record—Pedal Travel

20 (lb) 150 (lb)
 89 (N) 667 (N)

Initial		
After 10 s		
Change		

Limit of pedal travel reached YES _____ NO _____

4. Parking Brake Test—Hold vehicle on 15% grade with regulatory test force.

Force Applied _____

Locked Wheels—YES _____ NO _____

5. Preliminary snub a) 30-10 mph at 10 ft/s² (48-16 km/h at 3 m/s²)

b) 40-20 mph at 16 ft/s² (64-32 km/h at 5 m/s²)

Record—Pedal Force _____

Deceleration _____

Brake Action (Wheel slide, pulls, roughness, light or heavy pedal, etc. and deceleration attained if less than specified.)

6. Highway Stopping Test—(1) stop from 50 to 60 mph (80 to 97 km/h) not to exceed 20 ft/s² (6 m/s²)

Record—Pedal Force _____

Deceleration _____

Brake Action (Wheel slide, pulls, roughness, light or heavy pedal, etc. and deceleration attained if less than specified.)

7. General Comments on Braking Performance

FIGURE 1 - Report Form
Brake Test - Vehicle In-Service

7.1.13 Maximum sustained deceleration attained.

7.1.14 Maximum pedal force required.

7.2 Static Check:

7.2.1 Verify warning lamp operation as indicated by vehicle manufacturer.

7.2.2 If vehicle is so equipped, observe brake warning lamp indicator during test.

7.2.3 With vehicle stopped and the engine running, apply 20 lb (89 N) force to the brake pedal and hold for 10 s.

7.2.4 Note if there is any change in pedal height during the 10 s.

7.2.5 With vehicle stopped and the engine running, apply 150 lb (667 N) force to the brake pedal and hold for 10 s.

7.2.6 Note if there is any change in pedal height during the 10 s or if the pedal reaches the limit of its travel.

7.3 Parking Brake:

7.3.1 Drive vehicle up a 15% grade, apply the service brake to stop, and hold the vehicle.

7.3.2 Place transmission selector in neutral.

7.3.3 Apply the parking brake up to the regulatory load, but do not exceed 200 lb (890 N) force for a foot operated mechanism or 100 lb (445 N) for a hand operated mechanism. Remove foot or hand from the parking brake apply mechanism.

7.3.4 Release the service brake.

7.3.5 Observe if wheels remain locked.

7.4 Preliminary Snub Test to Acquaint Driver with Vehicle [to be conducted within 12 ft (3.7 m) wide test lane]:

7.4.1 Snubs required - 1.

7.4.1.1 Snub speed - 30-10 mph (48-16 km/h).

7.4.1.2 Snub deceleration (sustained) - 10 ft/s² (3 m/s²).

7.4.1.3 Moderate apply rate [do not exceed 150 lb (667 N)].

7.4.1.4 Abort snub if wheel slide occurs and discontinue test.

7.4.2 Snubs required - 1.

7.4.2.1 Snub speed - 40-20 mph (64-32 km/h).

7.4.2.2 Snub deceleration (sustained) - 16 ft/s² (5 m/s²).

7.4.2.3 Moderate apply rate [do not exceed 150 lb (667 N)].

7.4.2.4 Abort snub if wheel slide occurs and discontinue test.

7.5 Highway Stopping Test [to be conducted within the 12 ft (3.7 m) wide test lane]:

7.5.1 Stops required - 1.

7.5.1.1 Initial speed - 50-60 mph (80-97 km/h) or maximum practical speed attainable within the test area if less than 50 mph (80 km/h).

7.5.1.2 Sustained deceleration attainable - not to exceed 20 ft/s² (6 m/s²).

7.5.1.3 Pedal force - 150 lb (667 N) maximum.

7.5.1.4 Brake apply rate - Maximum rate possible when maintaining deceleration control (not a spike) up to 20 ft/s² (6 m/s²).

7.6 Repeat Testing:

7.6.1 If the vehicle brake systems exhibit marginal performance with respect to the regulatory requirements, tests for 7.4 or 7.5 may be repeated.

8. REPORT FORM:

General Data and Report Form, Fig. 1.