Stopping Distance Test Procedure — SAE J299 JAN80

SAE Recommended Practice
Completely Revised January 1980

THIS IS A PREPRINT WHICH IS SUBJECT TO REVISIONS AND CORRECTIONS. THE FINAL VERSION WILL APPEAR IN THE 1981 EDITION OF THE SAE HANDBOOK.

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LAND SEA AIR SPACE

PREPRINT

STOPPING DISTANCE TEST PROCEDURE—SAE J299 JAN80

SAE Recommended Practice

Report of the Brake Committee and Automotive Safety Committee, approved August 1972, completely revised by the Brake Committee January 1980.

1. Scope—This test procedure provides a method for determining stopping distances of all motor vehicles with any type of brake system.

2. Purpose—This code provides the test procedure and instructions to determine motor vehicle stopping distances on any level road surface from any desired initial vehicle speed. It allows the user to impose test conditions specified by any source and designates the preferred instrumentation and techniques for achieving the accuracy that is practical with current equipment.

3. Definitions

3.1 **Motor Vehicle**—Every device which is self-propelled and equipped with driver controls in, upon, or by which any person or property is or may be transported or drawn upon a highway or upon natural terrain, excepting devices moved by human or animal power or used exclusively upon stationary raiis.

3.2 **Start of Brake Application**—The initial movement of the brake system control.

3.3 **Stopping Distance**—The distance traveled by a motor vehicle from the start of a brake application to the point at which the motor vehicle stops.

3.4 **Initial Stopping Speed**—The speed of the motor vehicle at the start of brake application.

3.5 **Instrumentation System Delay**—The time between the start of brake application and the start of stopping distance readout.

4. Instrumentation and Equipment—All instrumentation and equipment used in this test procedure must maintain required accuracy throughout the test period.

4.1 **Speed Indicator**—Fifth wheel type device that not only monitors vehicle speed, but also makes an instrumented recording of actual initial stopping speed. Error must not exceed ±0.5 mph (0.8 km/h) or ±0.5% of the actual speed, whichever is greater.

4.2 **Stopping Distance Measuring Instrumentation**—Fifth wheel type distance meter triggered by contact or travel switch which detects movement within the first 0.125 in (3.2 mm) of travel of the center of the brake pedal pad, the tip of the brake treadle, or the tip of the brake control handle (initial movement). Total instrumentation system delay shall not exceed 0.020 s. Error of distance measuring instrumentation shall not exceed ±0.50 ft (±0.15 m) or ±1% of actual distance, whichever is greater.

5. Motor Vehicle Preparation

5.1 Perform motor vehicle and brake system preparation required to conform to specific desired test conditions. Record these conditions and operations.

5.2 Install and calibrate instrumentation. Record pertinent instrumentation information.

6. Test Procedure—The following test sequence shall be conducted at the test site:

6.1 Attain a speed sufficiently above the desired initial stopping speed to allow the driver to perform operations in paragraphs 6.2 and 6.3 and still comply with the requirements of paragraph 6.4. However, this speed shall not exceed desired initial stopping speed by more than 5 mph (8 km/h).

6.2 Release throttle.

6.3 If the stop is to be made in neutral or with clutch disengaged, perform the desired operation(s).

6.4 At the desired initial stopping speed, apply the brake control at the desired rate to any required limit(s) and maintain braking at the desired limit(s) until the motor vehicle reaches a full stop. The limit(s) shall be determined by the specific desired conditions and may be wheel skid, pedal force, deceleration, pressure, brake control movement, vehicle control, lane boundaries, or a combination of these.

NOTE: For vehicles with standard transmission, if stop is made in gear, the clutch should be disengaged when vehicle speed is reduced to below 10 mph (16 km/h) or as engine nears idle speed, whichever is the greater vehicle speed.

6.5 Record measured stopping distance and actual initial vehicle stopping speed plus wind velocity, wind direction, road grade (if other than level), vehicle direction, road surface data, vehicle data, test conditions, etc.

6.6 Repeat paragraphs 6.1, 6.2, 6.3, 6.4, and 6.5 as many times as specified for each set of conditions.

7. Distance Correction Formula for Small Initial Stopping Speed Errors—This correction can only be made if actual initial vehicle stopping speed is visibly recorded as recommended in paragraph 4.1. Stopping distance corrections for initial speed errors greater than ±2 mph (3.2 km/h) are invalid due to inaccuracy.

$$S_c = S_m \frac{V_d^2}{V_a^2}$$

where: V_d = desired initial vehicle stopping speed, mph (km/h)
V_a = actual initial vehicle stopping speed, mph (km/h)
S_m = measured stopping distance, ft (m)
S_c = calculated stopping distance from V_d, ft (m)

The ϕ symbol is for the convenience of the user in locating areas where technical revisions have been made to the previous issue of the report. If the symbol is next to the report title, it indicates a complete revision of the report.