



Mexico Brake Test - Stopping Distance Determination

1 Introduction

Note: Nothing in this standard supercedes applicable laws and regulations.

Note: In the event of conflict between the English and domestic language, the English language shall take precedence.

1.1 Purpose. This standard establishes the conditions and the test method in order to evaluate the stopping distance in vehicles of up to 2727 kg of Gross Vehicle Weight Rating (GVWR).

This standard tests vehicles according to the requirements of Mexico NMX-D-148-1979.

1.2 Applicability. This standard is applicable to vehicles with GVWR up to 2727 kg that will be sold in Mexico.

1.3 Remarks. This standard is used to evaluate the stopping distance of vehicles under two conditions: the vehicle at curb weight with two (2) occupants, and the vehicle at its GVWR. This standard describes the test conducted by the GM Mexico Road Test Group published in CA-T-003.

The certification test may be conducted at 2000 m $\pm$ 200 m above sea level. The difference in altitude between the GM test site and the 2000 m altitude test site and any resulting brake performance differences should be considered when interpreting the test results.

2 References

Note: Only the latest approved standards are applicable unless otherwise specified.

2.1 External Standards/Specifications.

NMX-D-148-1979

2.2 GM Standards/Specifications.

GMW15102

2.3 Additional References.

CA-T-003 GM Mexico Test Procedure (ID)

(ID) = This document is limited to internal use within General Motors and shall not be accessed outside this company. Contact the GM Lead Engineer for further instructions.

3 Resources

3.1 Facilities. The surface of the test road shall be asphalt, horizontal and shall not contain waves deeper than 1.5% between two points. The road shall be dry and have normal adherence. The lane should be a minimum of 3.5 m wide.

3.1.1 Calibration. The test facilities and equipment shall be in good working order and shall have a valid calibration label.

3.1.2 Alternatives. Alternative test facilities and equipment may also be used. However, all measuring variables as specified in this standard shall be determined correctly with respect to their physical definition.

3.1.3 The surface of the test road shall be asphalt, horizontal and shall not contain waves deeper than 1.5% between two (2) points. The road shall be dry and have normal adherence. The lane should be 3.5 m wide.

3.2 Equipment.

3.2.1 Fifth Wheel. Install a fifth wheel or equivalent device to measure and record vehicle speed and stopping distance.

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3.2.2 Pedal Force Transducer. Install a force transducer on the service brake pedal that is capable of recording and displaying pedal force data to the driver.

3.2.3 Accelerometer. Install an accelerometer within the vehicle in a level position as near the centerline of the vehicle as possible.

3.2.4 Vacuum Transducer. For vehicles equipped with a vacuum power assist brake booster, installation of a vacuum transducer capable of measuring 0 kPa to 95 kPa on the booster side of the check valve is recommended to record booster vacuum. An adapter at the booster may be required.

3.2.5 Chronometer. (If not integral with other equipment.)

3.2.6 Data Acquisition System. The system shall be capable of recording and displaying the test data to the driver at 100 Hz scan rate. An external trigger is recommended.

3.2.7 Thermocouple and Readout Device. Monitoring the initial brake temperature at the start of each stop may be requested. Use an embedded thermocouple in the center of the brake pad per GMW15102.

3.3 Test Vehicle/Test Piece.

3.3.1 The brake system shall be production representative. The brake corners shall be in green (new) condition unless otherwise specified in the test request.

3.3.2 The vehicle suspension shall be production representative.

3.3.3 The tires shall be the production released tires with the greatest frequency of installation in the plant. Tires shall be of the same part number as those leaving the plant for sale on the vehicle.

3.4 Test Time.

Calendar time: 1 day to 2 days

Test time: 4 h to 6 h

Coordination time: 2 h to 4 h

3.5 Test Required Information. Not applicable.

3.6 Personnel/Skills. Brake technician or engineer trained to perform the instructions in Section 4.

4 Procedure

4.1 Preparation.

4.1.1 Install and set up the fifth wheel according to the operation instructions of the equipment manufacturer. Install and set up other equipment, if required or requested, according to the equipment manufacturer operating instructions. Vehicle speed, stopping distance, elapsed time, pedal force and vehicle deceleration shall be measured. Booster vacuum and/or brake pad temperature may be requested.

4.1.2 The fuel tank shall contain at least 75% of total capacity during test.

4.1.3 The tire pressure shall be set according to the vehicle manufacturer recommendation at the start of test. Set tire pressure for cold tires and for the vehicle weight for the test.

4.1.4 For curb weight condition, the vehicle shall be at the weight of a vehicle with original manufacturer equipment and with fluid levels at the nominal capacity. For testing, the vehicle should be loaded with the driver, instrumentation, and a maximum of one (1) passenger seated in the front passenger seat of the vehicle.

4.1.5 For the GVWR condition, the vehicle is loaded to its GVWR such that the mass distribution on each axle, as measured at the tire-ground interface, is as close to the specified worst case distribution as possible without the use of extreme measures and the total weight does not exceed the GVWR. Both minimum percent front and maximum percent front GVWR mass distributions shall be known, and worst case shall be determined. For testing, the vehicle should be loaded to the requested GVWR including driver, instrumentation, and a maximum of one (1) passenger seated in the front passenger seat of the vehicle as part of the ballast.

4.1.6 The test vehicle shall be tested with closures/openings closed (doors, windows, trunk, hood, etc.), except as required for instrumentation purposes.

4.2 Conditions.

4.2.1 Environmental Conditions.

4.2.1.1 The wind speed shall not be > 10 km/h.

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