



Parking Brake Roll Away Test

1 Scope

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 is to evaluate the influence of thermal change on the parking brake performance.

1.2 Foreword. Not applicable.

1.3 Applicability. This standard applies to passenger cars and light duty trucks with a parking brake acting on a drum brake corner and with a parking brake integral to or in combination with the disc brake caliper. This standard is not applicable to disc brakes with a separate parking brake mechanism in the rotor hat section (drum-in-hat parking brakes).

2 References

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

2.1 External Standards/Specifications.

None

2.2 GM Standards/Specifications.

GMW14925 GMW15102

2.3 Additional References.

- Brakes-141 Best Practice - The supplier shall work with the GM responsible engineer to comprehend this requirement.
- Global Document Management System

3 Resources

3.1 Facilities. Twenty percent (20%) slope, dry, asphalt or concrete paved road or equivalent facility such as a variable grade ramp capable of 20% grade. (20% standard work; 30% slope by request only).

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.

3.2 Equipment. This test equipment shall be calibrated and details of calibration shall be entered in test instrument calibration sheet in Figure A1.

3.2.1 Thermocouples: 0 to 1000 °C (K type), measures parking brake pad and atmospheric temperatures.

3.2.2 Pedal Force Transducer: 0 to 1000 N, measures effort placed on brake lever.

3.2.3 Indicator: 0 to 1000 N. Shows reading of the lever effort with a point and dial or equivalent.

3.2.4 Amplifier: Four channel minimum, (if required). Amplifies output from measuring instruments.

3.2.5 Recorder: Four channel minimum, records various data including temperatures and lever effort.

3.3 Test Vehicle/Test Piece. As specified in test request.

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3.4 Test Time.

Calendar time:	1 to 3 days
Test hours:	12 to 16 hours
Coordination hours:	6 to 8 hours

3.5 Test Required Information. Not applicable.

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

4 Procedure

4.1 Preparation.

4.1.1 Check parking brake system to specifications. Install new parking brake (service brake) lining. Install thermocouples in the friction material. Follow instructions in GMW15102 for thermocouple installation.

4.1.2 Install and calibrate instrumentation.

4.1.3 Ballast the vehicle to Gross Vehicle Weight Rating unless otherwise specified in test request.

4.1.4 Adjust tire pressure to recommended level for vehicle test weight.

4.1.5 Install parking brake lever force transducer on the specified position of parking brake lever per Figure B1. Also see Brakes-141 Best Practice.

4.2 Conditions.

4.2.1 Environmental Conditions. Road surface must be dry.

4.2.2 Test Conditions. Deviations from the requirements of this standard shall have been agreed upon. Such requirements shall be specified on component drawings, test certificates, reports, etc.

4.3 Instructions.

4.3.1 To condition the friction material, perform a 200 stop burnish following instructions per GMW15102.

4.3.2 After the burnish, establish a parking brake lining or pad temperature at or below 50 °C. Drive the vehicle onto the 20% grade or 30% grade surface per the Brake Subsystem Technical Specification (SSTS) in the ascending position. Hold the vehicle stationary on the grade with the service brakes. (Find the minimum pressure on the service brake to hold the car stationary, e.g., 20 bar at 20% grade.)

Using the service brakes and the parking brake, find the minimum effort on the parking brake apply so that vehicle holds on the grade. Check that the vehicle holds at least five minutes. Record the apply effort and notch number (if applicable) to hold the grade.

4.3.3 Remove the vehicle from the grade and perform brake snubs or parking brake snubs to heat the parking brake lining or pad. For drum brakes, heat to a temperature of 250 °C, and for disc brakes, heat to a temperature of 400 °C.

4.3.4 Return vehicle to the 20% grade or 30% grade surface per the Brake SSTS in the ascending position. Hold the vehicle stationary on the grade with the service brakes. When parking brake lining cools to 200 °C for drum brakes or 350 °C for disc brakes, using the service brakes and the parking brake, find the minimum effort on the parking brake apply so that vehicle holds on the grade. Apply parking brake three more notches, or to the maximum 400 N hand lever or 500 N foot lever force. As the parking brake lining cools, note any movement of the vehicle. When the parking brake lining temperature reaches 60 °C, the driver should rock the vehicle slightly to check the stationary state. Continue the test until the parking brake lining temperature cools to ambient plus 10 °C or until the vehicle rolls or slides whichever occurs first.

4.3.5 Repeat 4.3.2 through 4.3.4 with the vehicle in the descending position.

4.3.6 If requested, repeat 4.3.2 through 4.3.5 with parking brake linings worn to the wear limit, as defined in the test request. (A 2 mm minimum thickness is suggested.) If worn linings are made by grinding/machining the friction material to a minimum thickness, the linings should be burnished per 4.3.1 unless otherwise specified.

4.3.7 If lining friction behavior shows a significant change below 150 °C (see Figure A3 for example), it is recommended to rerun the test with reduced initial temperature. Example based on Figure A3 which is data from GMW14925: Initial temperature is 90 °C, cool down to 40 °C. (Reason: 25% friction lost between 90 °C and 40 °C).

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5 Data

5.1 Calculations. Not applicable.

5.2 Interpretation of Results. Compare test results to applicable technical specification requirements.

5.3 Test Documentation. Test report should include completed instrumentation calibration sheet (example in Figure A1), test sheet (example in Figure A2), and any data graphs. Publish in an engineering test report stored in the GM Global Document Management System.

6 Safety

This standard may involve hazardous materials, operations, and equipment. This standard does not propose to address all the safety problems associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

7 Notes

7.1 Glossary. Not applicable.

7.2 Acronyms, Abbreviations, and Symbols.

SSTS Subsystem Technical Specification

8 Coding System

This standard shall be referenced in other documents, drawings, etc., as follows:

Test to GMW15587

9 Release and Revisions

This standard was originated in April 2007. It was first approved by Chassis Global Brake Subsystem Leadership Team in April 2007. It was first published in September 2007.

Issue	Publication Date	Description (Organization)
1	SEP 2007	Initial publication.
2	AUG 2008	Revised 4.3.2 and 4.3.4 to add content from procedure R.FR.05.052. Corrected Figure B1. (Chassis Global Brake Subsystem Leadership Team)
3	JUN 2013	References to FMVSS 135 changed to GMW15102. 3.1: added comment on 30% grade. 3.1.1, 3.1.2: added from template. 4.1.5: added reference to Best Practice. 4.3.2: added content. 4.3.4: changed end temperature. 4.3.7: added. 5.3: revised. Figure A3: added. (Brake Global Subsystem Leadership Team)

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