



Belt System – Door Mounted Restraint System Door Slam Durability

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. To determine the performance and integrity of the passive restraint door system as related to durability and structural door slams.

1.2 Applicability. To all door mounted passive restraint safety belt assemblies.

1.3 Remarks. This test is intended to reproduce the dynamic environment that the passive restraint system is subjected to when a door is opened and closed. The structural integrity of the door inner panel, the structural and electrical integrity of the retractor, and the susceptibility of the restraint system to lock-up from the door being opened and closed (nuisance lock) are all evaluated by this test. **Note:** See 4.3.2, it is a modification of GMW15085 (Door System - Freeze Performance Test) and GMW15094 (Door System - Pneumatic Interior Door Slam Durability Test) and, therefore, may be run simultaneously with the aforementioned tests.

2 References

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

2.1 External Standards/Specifications.

None

2.2 GM Standards/Specifications.

GMW14300

GMW14831

GMW15085

GMW15094

GMW14314

2.3 Additional References.

- American National Standard for Calibration, Calibration Laboratories and Measuring and Test Equipment – General Requirements
- GM Math File Log
- Master Process Documents (MPD)

3 Resources

3.1 Facilities. General Motors certified test lab.

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.

3.2.1 Safety belt assemblies to be tested.

3.2.2 Vehicle or sealed body with doors.

3.2.3 Door slam cycling machine, equipment capable of cycling door to full opened position is preferred.

3.2.4 Extension spring with approximate rate of 0.75 N/mm (5 lb/in).

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3.2.5 Force gauge (i.e., 500 N capacity).

3.2.6 Regulated Direct Current (DC) power supply (i.e., 5 A).

3.2.7 Fixture capable of maintaining buckle in body position and counting retractor lock-ups.

3.2.8 Cycle controller and counter.

3.2.9 Appropriate air cylinders and fixtures to unlatch door by exterior door handle.

3.2.10 Door slam fixture capable of slamming the door at various energy levels, (i.e., "The Cannon").

Note: All equipment must be calibrated in accordance with American National Standard for Calibration, Calibration Laboratories and Measuring and Test Equipment – General Requirements.

3.3 Test Vehicle/Test Piece. Not applicable.

3.4 Test Time. Time for setup and test as required.

3.5 Test Required Information. Record test data.

3.6 Personnel/Skills. Test technician/test engineer.

4 Procedure

4.1 Preparation.

4.1.1 Pretest Retractor Measurements.

4.1.1.1 Determine the static tilt angle sensitivity and the acceleration sensitivity level of each retractor per standard GMW14300.

Note: Only perform 4.1.1.2 thru 4.1.1.5 that do not require the retractor to be dismantled.

4.1.1.2 Either scribe or paint the edge of the block-out mechanism such that any movement relative to the retractor frame will be detected.

4.1.1.3 Measure the lock-bar to sprocket tooth gap.

4.1.1.4 Measure the force required to pull the lock-bar off from the magnet or the force required to override the solenoid.

4.1.1.5 Measure the continuity and resistance of any electrical connections on the component.

4.1.2 Installation.

4.1.2.1 Set the door to design intent for seal interference, door alignment and striker alignment.

4.1.2.2 Adjust the door glass using the Master Process Documents (MPD) and adjusting blocks (hard top systems only).

4.1.2.3 Remove the door trim inner panel and install the retractor reinforcement panel (if applicable) and retractors.

4.2 Conditions. See GMW14831.

4.2.1 Environmental Conditions. Not applicable.

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. Deviations from the requirements of this standard shall be approved by GM engineering and documented in the GM Math File Log.

4.3 Instructions.

4.3.1 Lock-Up Performance at Different Door Slam Energy Levels.

4.3.1.1 If a vehicle is being tested, make sure that the battery is fully charged. Connect a DC power supply to the battery or wire harness to power the block-out module mechanism.

4.3.1.2 Install the door trim panel and any other trim that interfaces with the door.

4.3.1.3 Close all windows and doors. When testing a body, all body openings must be sealed off.

4.3.1.4 Move the front seats full forward.

4.3.1.5 Align the door slam fixture also known as "The Cannon" such that when the door is opened to the release position, the cannon contacts the door 50.8 mm (2 in) forward of the rearward door edge and halfway between the belt line and lower edge of the door flange. Note that the cannon plunger should be approximately perpendicular to the door surface when the door is open to the release position (Figure A1 in Appendix A).

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