



Performance Tests for Handles in the Rear Compartment Load Floor

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. The purpose of this test procedure is to assess the handle assembly performance in the rear compartment load floor lid.

1.2 Applicability. For handle assemblies installed in the rear compartment load floor lid. The handle assembly consists of at least (but not limited to) these components:

- Housing.
- Lever.

Note: Figure 1 and Figure 3 show the housing and lever concept. Appendix B shows a "pocket handle" design concept for reference (no latching mechanism).

1.3 Remarks. This procedure evaluates the load floor handle performance under the specific conditions described in Section 4.

2 References

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

2.1 External Standards/Specifications.

None

2.2 GM Standards/Specifications.

None

2.3 Additional References.

- Engineering drawing for the handle assembly and surrounding components (e.g., load floor).
- GM Evaluation Test Report.
- Installation instructions.

3 Resources

3.1 Facilities.

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 The test equipment shall be set up in such a manner that it is not deformed or destroyed by the forces to be expected.

3.2.2 Even if the test piece is destroyed, the test system shall not reveal any deformation.

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December 2015

Page 1 of 8

3.2.3 Test Equipment.

3.2.3.1 Tension/compression gauge.

3.2.3.2 Clamping device.

3.2.3.3 Load device with a weight of 30 kg.

3.3 Test Vehicle/Test Piece. Each test piece shall consist of a:

- Handle assembly (housing and lever), installed in a
- Rear compartment load floor lid.

Note: At least three pieces shall be tested.

3.4 Test Time. Not applicable.

3.5 Test Required Information.

- Installation Instructions.
- Engineering drawing for the handle assembly and surrounding components (e.g., load floor).

3.6 Personnel/Skills. Technical personnel.

4 Procedure

4.1 Preparation.

4.1.1 The test piece can be tested in the vehicle in the as-installed position.

4.1.2 The test piece can also be tested with the rear compartment load floor lid installed in a fixture (clamping device).

4.1.3 The points of force application shall be taken from the engineering drawing for the handle assembly (see 3.5).

4.1.4 A small hook or other means may be used to apply the force to the edge of the housing. If holes are drilled into the handle assembly to apply the forces, the holes shall not affect the strength or integrity of the handle assembly.

4.2 Conditions.

4.2.1 **Environmental Conditions.** All tests shall be performed at $+80\text{ }^{\circ}\text{C} \pm 3\text{ }^{\circ}\text{C}$; $-30\text{ }^{\circ}\text{C} \pm 3\text{ }^{\circ}\text{C}$; $+23\text{ }^{\circ}\text{C} \pm 3\text{ }^{\circ}\text{C}$, in this order. The test sample shall be soaked for two (2) h at each temperature before conducting the test.

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.** The forces to be applied to the handle assembly are defined as follows; see Table 1.

4.3.1 **Force F_1 :** Acting to remove or detach the handle assembly from the rear compartment load floor (see Figure 1 and Figure 3). The F_1 test will validate a two piece handle design. The test is intended to replicate a specific condition where a customer drags an object over the load floor and the object gets stuck into the upper section of the handle. Thus, the customer lifts the object and causes a detachment of the upper section of the handle. F_1 shall not be executed unless there is a new two-piece load floor handle design that has a performance concern based on the conditions previously stated and a potential failure mode documented in the program Design Failure Mode and Effect Analysis (DFMEA) and/or Design Review Based on Failure Mode (DRBFM). This force shall be applied only when the handle is in a higher plane (i.e., over-flushed) than the load floor. For any other cases (e.g., handle is flushed or sub-flushed in the load floor), the test does not apply. A wedge shall be used to apply the vertical load (do not drill the edge of the handle housing since it may weaken it).

For this test, the handle shall be installed in the load floor. Apply Force F_1 to the edge of the housing, perpendicular to the load floor lid, in the center of each side of the housing (i.e., if the housing is square, then F_1 is applied four times in total). The four loads shall be applied separately (do not apply the load in the four sides at the same time).

4.3.2 **Force F_2 :** Acting to remove or detach the latching mechanism from the handle assembly (only applies if the handle has a latching mechanism), see Figure 2. For this test, the handle can be fixed in a test device. The load floor is not required.

Apply Force F_2 to the latch perpendicular to the load floor lid in the opposite direction to F_1 .

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December 2015

Page 2 of 8

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4.3.3 Force F_3 : Acting to exercise the handle assembly simulating the lifting/closing condition of the load floor under load. For this test, the handle shall be installed in the load floor.

The test piece can be tested in the vehicle in its as-installed position. A half buck may be used.

The test piece can also be tested with the rear compartment load floor lid installed in a fixture (clamping device).

This test should be used to validate the performance of the load floor handle under load (e.g., handle interface with the load floor, handle mechanism, etc.) An equivalent weight of 30 kg shall be distributed along the side of the handle, and shall be located in between the distance of the handle edge and the load floor edge in the cross car direction (see Figure 4). Using the load floor handle (see Figure 3), the load floor shall be lifted gradually (not exceeding 1 cm/s) to overcome its inertia, then the movement shall be continued until reaching 15 cm of height, measured from the load floor most rearward end, from its design original plane (see Figure 5). This cycle shall be run five (5) times at each environmental condition described in 4.2.1. The weight is allowed to roll forward off of the load floor as it is opened.

4.3.4 Force F_4 : Acting to exercise the handle in the opening direction (only applies if the handle has a latching mechanism). F_4 is defined to evaluate the load comfort of the handle when operating the latch mechanism (see Figure 3).

Apply F_4 which is the unlatching/opening force acting on the lever to unlatch/open the handle assembly.

For this test, the handle shall be installed in the load floor.

Measure and record the actual forces applied on Data Sheet A1 (see Appendix A).

The forces F_1 , F_2 , F_3 and F_4 described in 4.3.1 through 4.3.4 shall be applied only one time on each test piece.

Note: The forces are applied under static conditions.

Note: No destruction of the test piece shall occur.

Table 1: Force (F_1 , F_2 , F_3 , F_4) Requirements

F_1 (N)	F_2 (N)	F_3 (kg)	F_4 (N)
300	300	30	≤ 30

Figure 1: F_1 Locations (Example)



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December 2015

Page 3 of 8