



Test of Grab Handle/Coat Hook

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. Testing of grab handles according to various performance criteria. This standard determines the test conditions and the requirements for the testing of the grab handles in various versions, as well as those of the coat hooks which may be integral with or separate from the grab handle.

1.2 Applicability. Valid for all grab handles.

2 References

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

2.1 External Standards/Specifications.

None

2.2 GM Standards/Specifications.

GMW3059

GMW3232

GMW14162

GMW14264

3 Test Preparation and Evaluation

3.1 Resources.

3.1.1 Facilities.

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

3.1.1.2 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.

3.1.1.3 Milford Proving Ground or equivalent proving ground.

3.1.1.4 Expressway (Circle Track), Highway (Oval Track), Belgian Block roads.

3.1.1.5 Climatic chamber.

3.1.1.6 Durability test stand.

3.1.2 Equipment.

3.1.2.1 Tensile/compression gauge with (measuring range (0 to 100) N and (0 to 1000) N) with piston (diameter: 20 mm), hook and spacer.

3.1.2.2 Caliper gauge.

3.1.2.3 Clinometer.

3.1.2.4 Contact less device for measurement of opening time.

3.1.2.5 List all the measuring devices, serial numbers and calibrations in the Table A1, Appendix A.

3.1.3 Test Vehicle/Test Piece. Grab handles in installed condition.

GM Confidential

© Copyright 2018 General Motors Company All Rights Reserved

February 2018

Page 1 of 14



Documents
Document Sharing Hub

3.1.4 Test Time.

Calendar time: 14 d

Test time: 16 h

Coordination time: 8 h

3.1.5 Test Required Information. Not applicable.

3.1.6 Personnel/Skills. Not applicable.

3.2 Preparation. Not applicable.

3.3 Conditions.**3.3.1 Environmental Conditions.**

3.3.1.1 Unless other specified all performance requirements shall be fulfilled in a temperature range of (-30 to +80) °C.

3.3.1.2 The following temperatures shall be selected for each test:

- (-30 ± 3) °C
- (+23 ± 5) °C
- (+80 ± 3) °C

3.3.2 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.

3.4 Instructions. Not applicable.

3.5 Data. Not applicable.

3.6 Safety.

This Engineering Standard may involve safety requirements for hazardous materials, the method of operations and equipment. This standard does not propose to address all the safety issues associated with its use. It is the responsibility of the user of this standard to ensure compliance with all appropriate safety and health practices. This would include any specific training that may be required. The safety and health standards include site specific rules and procedures, company rules and procedures, and Government Standards. Contact shall be made with the appropriate site Safety and Health personnel for further direction and guidance in these matters.

3.7 Documentation. Samples of components or material released to this standard shall be tested for conformity with the requirements of this standard and approved by the responsible GM Department prior to the start of delivery of production level components or materials.

Any change to the component or material, e.g., design, function, properties, manufacturing process and/or location of manufacture requires a new release of the product. It is the sole responsibility of the supplier to provide the customer, unsolicited, with documentation of any change or modification to the product/process, and to apply for a new release.

If not otherwise agreed to, the entire verification test shall be repeated and documented by the supplier prior to start of delivery of the modified or changed product. In some cases, a shorter test can be agreed to between the responsible GM department and the supplier.

3.7.1 Test Results. Variables shall be provided for values which are not explicitly listed. The values are defined in Appendix D, Data Sheet D1. Deviations from these values shall be entered in the drawing under the relevant variables. The supplier shall work with the GM Design Responsible Engineer to comprehend these requirements. Subjective evaluation shall be performed according to GMW14264.

4 Requirements and Procedure**4.1 General.**

- a. The grab handles shall be checked for conformance to the current release status before each test.
- b. All fasteners shall be present, undamaged and correctly installed. If this is not the case, the fasteners shall be supplemented or corrected. Any modifications shall be noted.

GM Confidential

© Copyright 2018 General Motors Company All Rights Reserved

February 2018

Page 2 of 14



Documents
Document Sharing Hub

- c. Conformance of the dimensions of the grab handle to drawing specifications shall be checked using a caliper gauge.
- d. Conformance of the weight of the grab handle to specification shall be checked using a balance.
- e. All deviations shall be noted and, if possible, corrected.
- f. All data collected should be recorded in the Data Sheet B1, Appendix B and Data Sheet C1, Appendix C. The supplier shall work with the GM Design Responsible Engineer to comprehend these requirements.

4.2 Appearance.

4.2.1 Fit. Conformance to drawing specifications shall be evaluated subjectively according to GMW14264.

- a. The fit shall achieve Rating 8 (Table 1, GMW14264).

4.2.2 Surface Appearance. The surfaces of the grab handle and handle base plate shall be subjectively evaluated according to GMW14264.

- a. There shall be no sunk spots, flashes or mismatching on the surfaces of the grab handle and handle base plate.
- b. Grained grab handles shall have a uniform surface structure and a matt appearance.
- c. The surface shall achieve Rating 8 (Table 1, GMW14264).

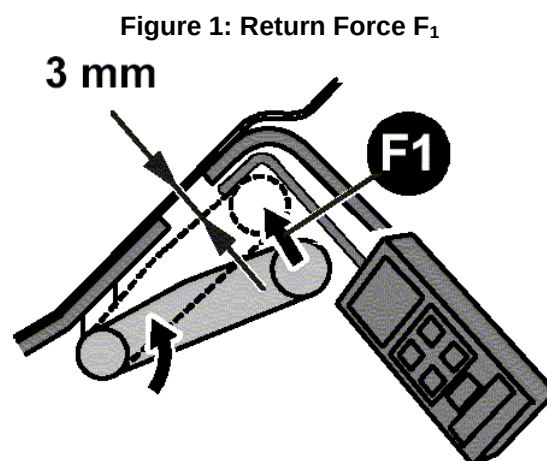
4.2.3 Haptics. The haptic characteristics of the grab handle shall be tested and subjectively evaluated according to GMW14264.

- a. The haptics shall achieve Rating 8 (Table 1, GMW14264).

4.3 Actuating Forces.

4.3.1 Return Force F₁.

- a. The tensile/compression gauge with hook shall be used for measurement of the return force.
- b. The grab handle shall be raised 3 mm from the headlining.
- c. The hook of the tensile/compression gauge shall be inserted in the space thus created between the grab handle and the headlining.
- d. A spacer shall be fastened to the tensile/compression gauge which is supported by the headlining so that the distance from the grab handle and headlining remains constant.
- e. Subsequently, the grab handle shall be positioned against the measuring device and the return force measured (see Figure 1).



- f. The required return force F₁ shall be taken from Appendix D.

4.3.2 Return Force F₂.

- a. The tensile/compression gauge with hook shall be used for measurement of the release force.

GM Confidential

© Copyright 2018 General Motors Company All Rights Reserved

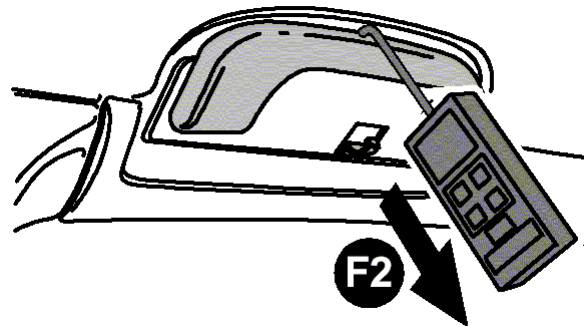
February 2018

Page 3 of 14



Documents
Document Sharing Hub

- b. The tensile/compression gauge shall be applied to the center of the grab handle.
- c. Direction of tension is tangential to the folding arc of the handle.
- d. Subsequently, the force required to release the grab handle from its initial position on the headlining shall be determined (see Figure 2).

Figure 2: Release Force F_2 

- e. The required release force F_2 shall be taken from Appendix D.

4.3.3 Maximum Folding Force F_3 .

- a. The tensile/compression gauge with hook shall be used for measurement of the maximum folding force.
- b. The tensile/compression gauge shall be applied to the center of the grab handle. Direction of tension is tangential to the folding arc of the handle.
- c. Subsequently, the force required to fully fold down the grab handle shall be determined (see Figure 3).

Figure 3: Maximum Folding Force F_3 

- d. The maximum folding force F_3 shall be taken from, Appendix D.

4.4 Return Delay t_1 .

The return delay for grab handles with return damping shall be determined.

- a. The grab handle shall be folded down and then released. The time required for the grab handle to return to the initial position on the vehicle headlining shall be determined.
- b. Measurement of opening time shall be performed by the use of a contact less automatic stop watch which measures the time, e.g., via light barrier. Due to this a manual measurement is not permitted.
- c. The required return delay t_1 shall be taken from Appendix D.

4.5 Vibration. No disturbing vibration shall occur at the grab handle in the stationary vehicle with the engine running or when driving on Expressway, Highway, Belgian Blocks (e.g., on Milford Proving Ground, or equivalent).

4.6 Noises. The impact noise of the grab handle on folding back against the headlining shall be tested and subjectively evaluated according to GMW14264.

GM Confidential

© Copyright 2018 General Motors Company All Rights Reserved

- a. The impact noise of the grab handle on folding back against the headlining shall achieve Rating 7 (Table 3, GMW14264).
- b. No disturbing noises shall be emitted by the grab handle during folding.
- c. No disturbing noises shall be emitted by the grab handle in the stationary vehicle with the engine running or when driving on Expressway, Highway, Belgian Blocks (e.g., on Milford Proving Ground, or equivalent).
- d. No disturbing noises shall be emitted by the grab handle when the doors/luggage compartment lid/tailgate are closed.

4.7 Dimensional Stability of Coat Hook.

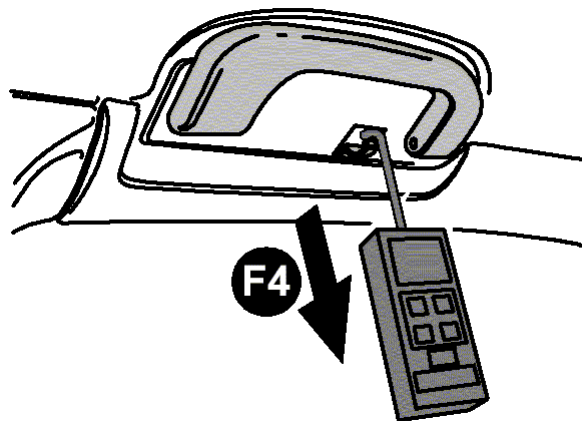
- a. The dimensional stability of the coat hook shall be determined by suspension of a 30 N weight under temperature load.
- b. The test period at $(-30 \pm 3)^\circ\text{C}$, $(+23 \pm 5)^\circ\text{C}$ and $(+60 \pm 3)^\circ\text{C}$ is 2 h respectively.
- c. After the test, the deformation shall be measured with the weight at test temperature and after cooling or heating to $(+23 \pm 5)^\circ\text{C}$ without the weight.
- d. Provided that the function of the hook is fulfilled, the deformation of the coat hook at test temperature with weight shall be 8 mm maximum.
- e. After removal of the load, and provided that function and appearance are not impaired, the remaining deformation shall be 3 mm maximum.

4.8 Misuse Forces.

4.8.1 Coat Hook Detaching Force F_4 .

- a. The tensile/compression gauge with hook shall be used for the measurement of detaching force for the coat hook.
- b. The coat hook shall be loaded vertically downwards with a force F_4 at $(+60 \pm 3)^\circ\text{C}$ (see Figure 4).

Figure 4: Coat Hook Detaching Force F_4



- c. The required detaching force F_4 shall be taken from Appendix D.

4.8.2 Grab Handle Detaching Force at 45° . The tensile/compression gauge with hook shall be used for measurement of the detaching force in horizontal direction.

4.8.2.1 Version 1.

- a. The grab handle shall be folded down to the 45° position.
- b. The tensile/compression gauge shall be applied to the center of the grab handle at 45° below the horizontal (see Figure 5).
- c. The force at which the handle breaks or the fastening points are detached shall be determined.

GM Confidential

© Copyright 2018 General Motors Company All Rights Reserved

February 2018

Page 5 of 14

AVA Documents
Document Sharing Hub