



Ergonomic Evaluation of Door Trim Panel Installation

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 test procedure is to be used to determine the forces required to install a door trim panel onto a vehicle under specified conditions.

1.2 Applicability. This test procedure shall be used for all door trim panels attached to swing metal.

2 References

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

2.1 External Standards/Specifications.

None

2.2 GM Standards/Specifications.

GMW14234

2.3 Additional References. The supplier shall work with the GM Ergonomic Subject Matter Expert to comprehend these requirements.

- GM Ergonomist Statistical Toolbox
(https://gmweb.gm.com/manufacturing/me_ergonomics/gmergo/Ergonomic%20Analysis%20Tools/Secondary%20Analysis%20Tools/Statistics%20Tools/COPY_OF%20-%20Updated_GM%20Ergonomist%20Statistical%20Toolbox.xlsm).
- UAW-GM List of Gauges and Attachments

3 Resources

3.1 Facilities. Not applicable.

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. The following apparatus shall be used for the determination of installation force.

3.2.1 Ergonomic Force Measurement Tools. Digital Palm Gauge, similar to Hoggan microFET 2 (<http://www.hogganhealth.com>). Additional gauge information can be found at UAW-GM List of Gauges and Attachments.

3.2.2 Sheet Metal Measurement Tools. Calipers.

3.3 Test Vehicle/Test Piece.

3.3.1 Test Vehicle. A vehicle with production representative doors (not including the door trim panels) is required. All components which may interfere with door trim installation should be in place (lock rods, speakers, wiring, etc.)

3.3.2 Test Piece. The test piece should be a production representative door trim panel which includes all components (acoustic trim, wire harnesses, speaker grille, etc.)

GM Confidential

© Copyright 2017 General Motors Company All Rights Reserved

October 2017

Page 1 of 4



Documents
Document Sharing Hub

3.4 Test Time.

Calendar time: 1 day
Test time: < 1 h
Coordination time: 5 h

3.5 Test Required Information.

3.5.1 The door trim pad installation sequence to be followed by an assembly operator. **Note:** the Product Development Team (PDT) may be an appropriate forum to engage both Product and Manufacturing Engineering representatives in the determination of the installation sequence.

3.5.2 Fastener specifications for each fastener used as noted in the associated sheet metal specifications.

3.6 Personnel/Skills. The supplier shall work with the GM Ergonomic Subject Matter Expert to comprehend these requirements. The engineer performing the evaluation shall:

- Be trained in how to properly calibrate and use the equipment described in 3.2.
- Have completed the Force Measurement Methods and Statistical Tool Training (https://gmu.gm.com/web_based_courses/ergo_training_force_measure_methods/index.htm),

3.7 Environmental Conditions. All testing is to be performed at ambient conditions at a temperature of $23^{\circ}\text{C} \pm 5^{\circ}\text{C}$.

4 Procedure

4.1 Preparation.

4.1.1 Door Trim Pad. Identify door trim pad fastener locations on the a-surface of the door trim pad (e.g., with stickers). These locations will identify where the force gauge will be placed when testing each fastener location. Document the installation sequence on the stickers for each fastener location (i.e., identify the order in which each fastener will be installed at the assembly plant).

4.1.2 Door Sheet Metal. Document the method used to create the sheet metal holes for each fastener location (e.g., laser cut or punched). If punched, note if the fasteners are installed in the same direction as the punches (i.e., no burrs will be evident on the surface that is punched).

Measure the sheet metal hole size at each fastener location and confirm they are within the fastener print specification.

4.2 Conditions.

4.2.1 Environmental Conditions. The test shall be performed at ambient environmental conditions.

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 test piece and the test vehicle shall be positioned in such a manner that the installation method will reflect the method to be used at the assembly plant.

Using the equipment specified in 3.2, the door trim panel shall be installed onto the vehicle using no additional tools (hammer, mallet, etc.)

The fasteners shall be installed and evaluated in the order documented, described in 4.1.1. With the exception of the first fastener installed, all subsequent fasteners must be evaluated with all of the previous fasteners installed (e.g., when evaluating the fifth fastener the previous four fasteners must already be installed).

If all other product and process conditions are met including line height and clearances, each door trim fastener can have an allowable insertion force of up to 116 N (26 lb) insertion force with a recommended door line height (measured from bottom of door flange to floor) of 25 in to 29 in.

5 Data

5.1 Calculations. The results of the testing shall be determined based on the GM Ergonomist Statistical Toolbox (Stats Tool)
(https://gmweb.gm.com/manufacturing/me_ergonomics/gmmergo/Ergonomic%20Analysis%20Tools/Secondary)

GM Confidential

© Copyright 2017 General Motors Company All Rights Reserved

October 2017

Page 2 of 4



Documents

Document Sharing Hub