



Hood/Liftgate/Decklid Manual Dynamic Latching

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 standard is to determine the energy and velocity required to dynamically latch a manually operated, hood/liftgate/decklid systems. This will be used to set and confirm Global Customer Audit (GCA) Closing Velocity targets.

1.2 Applicability. All manually operated hood/liftgate/decklid closure systems.

1.3 Remarks. This procedure shall be performed on full vehicles only. All angle measurements shall be taken with 0 degrees defined as the closed position for each closure. When referring to a dynamic latching event, the closure system shall have an associated speed during travel prior to entering the latch area. A successful dynamic latching event can be described as the point when the closure fully engages the primary latch. All external applied force shall be removed prior to latching. It is essential to distinguish between a dynamic latching evaluation rather than a static latching evaluation, described in GMW14830. The data captured from Appendix A, Figure A1 will allow the requesting engineer to compare the physical data to the analytical data (ExClose) from Appendix A, Figure A2.

2 References

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

2.1 External Standards/Specifications.

None

2.2 GM Standards/Specifications.

GMW14269 GMW14830

2.3 Additional References.

CG583 Development/Validation Test and Review Vehicle

3 Resources

3.1 Facilities. The test shall be conducted on a flat, level surface in an indoor environment, unless otherwise specified by the requesting engineer.

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 Linear velocity meter (Tool No. MAM05380S) or rotational velocity meter/rate gyrometric. Refer to GMW14269 for examples.

3.2.2 Linear measuring device (tape measure).

3.2.3 Data acquisition system (if applicable).

3.2.4 Digital protractor or inclinometer (if applicable).

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3.3 Test Vehicle/Test Piece. The test shall be conducted using a full vehicle that has a manually operated front and rear closure system such as a hood, liftgate, or decklid.

3.4 Test Time.

Calendar time: 1 d to 4 d

Test time: 4 h

Coordination time: 4 h

3.5 Test Required Information. The requesting engineer will provide the velocity requirements for the specific closure in the CG583, if applicable, prior to the evaluation. Any additional evaluation requests will also be provided in the CG583. The supplier shall work with the GM Design Responsible Engineer to comprehend this requirement.

3.6 Personnel/Skills. One (1) technician and/or one (1) test engineer with experience in measuring closure latching energy and velocity that also has prior experience in data acquisition.

4 Procedure

4.1 Preparation.

4.1.1 Vehicle Setup.

4.1.1.1 Test Components. Ensure that the closure components are present and properly assembled.

4.1.1.2 Allow the vehicle to adjust to the environmental conditions (typically 4 h) before conducting the test, if applicable.

4.1.1.3 Close windows, moveable roofs, side doors, and any other closure to ensure that there will be air bind during testing.

4.1.1.4 Set up the data acquisition system, if applicable.

4.1.1.5 If applicable, power on the vehicle and place HVAC in Recirculation mode. After HVAC has achieved desired mode, turn the vehicle off.

4.1.2 Setup of Sensors for Standard Testing.

4.1.2.1 Velocity Sensor. Select either a linear velocity sensor or a rotational velocity sensor.

4.1.2.1.1 Linear.

4.1.2.1.1.1 Location on Vehicle

4.1.2.1.1.1.1 Attach the velocity meter to a flat surface on the vehicle within 30 mm of the feature line underneath the license plate (Liftgate) or at the base of the vehicle aligned with the striker (Decklid/Hood) unless otherwise specified by the requesting engineer. Refer to Figure 2 through Figure 6 for examples of velocity sensor positioning.

4.1.2.1.1.1.2 When using the GM standard linear velocity meter and fixture place the meter against the vehicle as close to the closure as possible. The velocity is captured at 50 mm door open position which is the midpoint of the two (2) lasers (35 mm and 65 mm door open position). Refer to Figure 1 for a visual representation of the sensor placement.

4.1.2.1.1.1.3 For other types of linear velocity meter devices, refer to that devices' manual for specific instructions on proper sensor placement. Communicate any differences of sensor placement and measurement with the requesting engineer.

4.1.2.1.1.2 If using a velocity meter that requires a data acquisition system, connect the sensor to the data acquisition system and verify that it is functioning properly. Zero the sensor in the data acquisition system.

4.1.2.1.1.3 If using a velocity sensor that requires a flag to be set on the gate, confirm that the flag travels through the sensor without contact and appropriately breaks the beam. If necessary, adjust the sensor or flag.

4.1.2.1.2 Rotational.

4.1.2.1.2.1 Secure the sensor onto the closure as close to the hinge centerline as possible. Refer to Figure 7 for an example of sensor location.

4.1.2.1.2.2 If applicable, connect the sensor to the data acquisition system and verify that it is functioning properly. Zero the sensor in the data acquisition system.

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4.1.2.2 Hinge Centerline to Velocity Sensor Distance. Refer to Figure 4 and Figure 6 for a visual representation of the hinge centerline to velocity sensor distance on a front (hood) and rear (liftgate) closure system.

4.1.2.1.1 Single-Pivot Hinge. Measure and record the minimum distance from the hinge centerline to the velocity sensor.

4.1.2.1.2 Multi-Pivot Hinge. The requesting engineer shall provide the location of the velocity sensor to the test engineer/technician.

Figure 1: Velocity Meter Distance to Liftgate Example

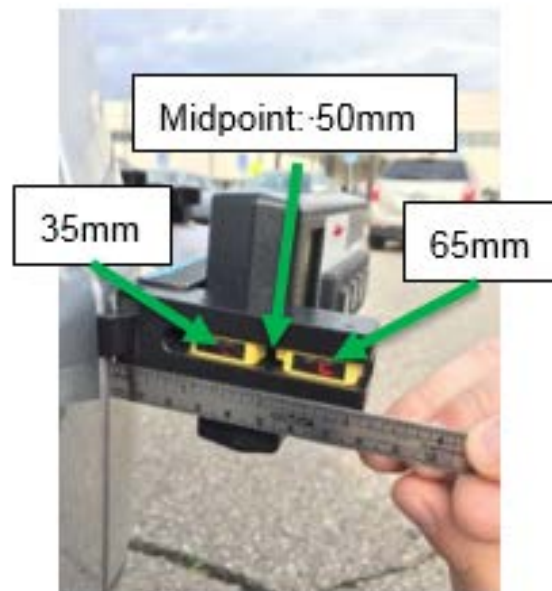


Figure 2: Example Position of Linear Velocity Meter for Liftgate



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