Door Lock System (Child Security Lock Actuator) – Strength Test

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 evaluate the strength of the door lock system's child security actuator.

1.2 Applicability. This procedure applies to all passenger cars, light duty trucks, and medium duty trucks having manual child security locks on swing open door systems, sliding side doors, and station wagon end gates. This procedure does not apply to vehicles equipped with power child security locks.

The Effort Test GMW15780, and the Strength Test GMW15781, can be run on the same samples, but the Effort Test must be conducted first.

1.3 Remarks. Not applicable.

2 References

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

2.1 External Standards/Specifications.

None

2.2 GM Standards/Specifications.

GMW15780

2.3 Additional References.

- Subsystem Technical Specifications (SSTS).
- Vehicle Technical Specifications (VTS).

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.

Note: The following description includes fixturing, and instrumentation, typically used by the Body Test Laboratory to perform this test. Other equipment may be substituted at the discretion of the testing facility as long as it provides the same data and/or data record, with equivalent accuracy as specified herein or by the requestor.

3.2.1 Fixturing.

3.2.1.1 If the door is not on a body, it must be rigidly clamped to a fixture, such as a laboratory door cart, that can constrain it, in approximate body position. It may be necessary to clamp the test fixture (or door cart) to a bed plate to prevent tipping during loading.

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3.2.1.2 Force gage or torque wrench accessories, as required, needed to load the specific type of actuator being tested. See Appendix A, Figure A1 for typical actuator illustrations and description of load application appropriate to each.

3.2.2 Instrumentation. Force gage with at least 100 N capacity, or torque wrench with at least 50 Nm capacity depending on actuator type.

3.3 Test Vehicle/Test Piece. One (1) properly assembled door including any parts that may affect child security lock performance. Ensure that the entire locking assembly is present, including the lock module, attaching rods, interior lock components, and door trim (if necessary). If parts are omitted from the test sample, the parts should be noted on Appendix B, Data Sheet B1. It is recommended that the door and latching/locking system be dimensionally certified before testing begins.

3.4 Test Time. The following is an estimate of the amount of time (work hours) needed to perform this procedure.

Note: These time estimates are approximate averages. Actual times vary considerably depending on early component failures (and subsequent availability of replacement parts), scheduling problems for test facilities, test equipment malfunctions, scheduling of overtime and/or multiple shifts, actual readiness of test samples upon receipt, unique or additional requests for detailed test information, running multiple samples (times shown are for one (1) system), etc.

These times consider preparation and other downtime, actual test, and analysis of data in capturing a total calendar time. Report writing, approval, processing, etc., are not part of these times.

Calendar time:	1 d
Test time:	1 h
Coordination time:	2 h

3.5 Test Required Information. The requesting engineer is responsible for providing specifications appropriate to the particular vehicle line being tested. (Reference VTS/SSTS if applicable.) Testing worst case scenarios may uncover some potential problems. Discuss with the requesting engineer, if testing should include some worst case scenarios. Depending on which test is being performed and which level of parts or systems is being tested, consider if any of the following may apply:

- Tolerance stack ups.
- Build variations.
- Misalignment.
- Minimum/maximum fastener torque(s).
- Lubrication, environmental extremes.
- Location of customer representative load application.
- Symmetry (left hand/right hand), color, mold or die source, etc.

3.5.1 The following specifications or information are required to run this test.

3.5.1.1 The maximum load the child security lock actuator must be able to withstand without any breakage or perceptible performance degradation. The actuator should remain in the position it is moved to and there shall be no intermediate position.

3.5.1.2 The performance objective for the child security lock operating effort.

3.5.1.3 When this feature is engaged (in the activated position), door opening must only be possible using the outside handle, with the inside lock lever in the unlocked position or locked position. There shall be no intermediate position of the feature that might confuse the customer.

3.5.1.4 The actuator shall not be accessible to the rear seat occupant when the rear door is closed.

3.6 Personnel/Skills. Prior experience in setting up and running similar tests and experience in the use of the referenced test equipment are critical to achieving the estimated times shown in 3.4.

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4 Procedure

4.1 Preparation.

4.1.1 Sample Inspection. The test and requesting engineers should inspect the test items to ensure all material listed in 3.3 is of correct design level (requesting engineer is to confirm that the parts provided for the test are at the correct engineering change level) and assembled properly. Specifically, check for any paint chipping scratching or burrs around the child security actuator.

4.1.2 Sample Preparation. This test is normally run on the test subject in an as received condition. If it is requested to be run in a specifically adjusted condition, follow the applicable procedure(s).

To avoid recording initial false readings on newly assembled doors, operate the child security lock actuator a few times, with the rear door inside lock actuator in both positions and the door latch in the door open condition/position before testing begins. This break in the system will reduce the influence of burrs, mold flash, etc., that may be present on newly assembled doors. As applicable, note any irregular sounds or erratic operation indicating a potential problem with design manufacture, or assembly and verify observations with the requesting engineer.

4.1.3 Facilities and/or Equipment Preparation. Record the instrumentation calibration information.

4.2 Conditions.

4.2.1 Environmental Conditions. Unless otherwise specified in this document's text or by the requesting engineer, the typical environmental conditions for this test are the temperature, humidity, and pressure at the test facility (3.1). Unless otherwise noted, these conditions are typically 22 °C ± 3 °C, relative humidity of 40% ± 20%, and atmospheric pressure equivalent to the local barometric pressure (which is variable during any given day and from day to day).

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.

4.3.1 Setup Instructions. Perform any functional/operational tests/evaluations as requested or as may be referenced in 4.1.

4.3.2 Test Operation Instructions.

4.3.2.1 Apply the specified force or torque (refer to 3.5.1.1 through 3.5.1.4) to the child security actuator in the **activating** direction by pushing or turning, depending on the actuator style. Ensure that the latch is in the **door open** condition. Use a smooth and constantly increasing force to reduce the possibility of false readings due to sudden starts or stops. Refer to Appendix A, Figure A1 for an illustration of appropriate actuator loading conditions. Note any breakage or deformation that occurs.

4.3.2.2 Repeat step 4.3.1.

4.3.2.3 Repeat step 4.3.2.1 in the **deactivating** direction.

4.3.2.4 Repeat step 4.3.1.

4.3.2.5 As an optional test, additional force/torque may be applied to the actuator until loss of function or breakage is encountered.

4.3.3 Posttest Instructions. No posttest evaluations required.

5 Data

Appendix B, Data Sheet B1 will be used in all test locations.

5.1 Calculations. Not applicable.

5.2 Interpretation of Results. Not applicable.

5.3 Test Documentation. See Appendix B, Data Sheet B1.

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