



Door System - Theft Resistance Security 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 determine door system theft resistance performance.

1.2 Applicability. This procedure applies to all passenger cars, light duty trucks and medium duty trucks having swing-open doors, endgates, and sliding side doors, and can be used to evaluate any body-mounted, movable, glass systems (doors, quarters, sunroof, etc.)

1.3 Remarks. This test determines the ability of the door locking system and the movable window system to resist attempts to gain forced entry into a vehicle. This test procedure describes two very specific test methods, but depends on the test and requesting personnel to investigate and evaluate other potential theft test methods and to obtain any "equipment", as necessary, to perform additional tests. See B1 in Appendix B of this document.

2 References

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

2.1 External Standards/Specifications.

None

2.2 GM Standards/Specifications.

GMW15081

2.3 Additional References.

- Front and Rear Side Doors Subsystem Technical Specifications (SSTS)
- Vehicle Technical Specifications (VTS)

3 Resources

3.1 Facilities. GMNA Body Test Lab or similarly equipped test facility.

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 list(s) include fixturing and instrumentation typically used by the GMNA Body Test Lab 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. The following fixturing is for the two theft methods specifically covered by this procedure. Other theft methods, as determined by the test or requesting engineers, may require additional fixturing.

3.2.1.1 For the Door Lock System Theft Test.

3.2.1.1.1 Rigid hinge and lock pillar fixture or a door cart, to mount the doors on, if not testing on a body.

3.2.1.1.2 "Slim Jim" (Theft Entry Tool – Figure A1).

3.2.1.2 For the Door Window System Theft Test.

3.2.1.2.1 Rigid hinge and lock pillar fixture or a door cart, to mount the doors on, if not testing on a body.

3.2.1.2.2 Mounting fixture for a Linear Variable Differential Transformer (LVDT) or similar displacement measuring device.

3.2.1.2.3 Closed loop electric or hydraulic ram.

3.2.1.2.4 Wiring/switches to achieve power window dynamic braking and to allow normal window operation. (if not in existence on the test door/body). **Note:** For the 7-pin motor, it is not necessary to provide power. For the 2-pin, power cannot be applied, but the motor terminals must be shorted to each other. The PWE should automatically short the terminals when the power to the relay is off.

3.2.1.2.5 Manual window crank handle, if applicable.

3.2.1.2.6 A marking pen.

3.2.1.2.7 A device which fits over the edge of the window, attaches to the load cell, is padded at the glass contact area and is wide enough to minimize "point loading" of the window glass (and possible glass shattering), and which allows load application approximately parallel to the window travel path.

3.2.2 Instrumentation. The following instrumentation is for the two theft methods specifically covered by this procedure. Other theft methods, as determined by the test or requesting engineers, may require additional instrumentation.

3.2.2.1 For the Door Lock System Theft Test.

3.2.2.1.1 Stop Watch.

3.2.2.1.2 Torque Wrench(es) with a capacity of approximately 1.5 times each fastener torque referenced.

3.2.2.2 For the Door Window System Theft Test.

3.2.2.2.1 A Load cell with a capacity approximately 1.5 times the load specification.

3.2.2.2.2 Regulated power supply – 12 VDC, for power window systems.

3.2.2.2.3 Recording device for window glass loading versus displacement.

3.2.2.2.4 A Linear Variable Displacement Transducer (LVDT) with a range of at least one and a half times the maximum expected glass displacement.

3.2.2.2.5 LVDT Signal Conditioner, Daytronic model 3230 or equivalent.

3.2.2.2.6 One hundred fifty millimeters (150 mm) measuring scale.

3.2.2.2.7 Window System Test Controller. (See GMW15081 - Window System, Dropping Type Power and Manual Performance/Stall Test).

3.3 Test Vehicle/Test Piece. One fully assembled door with the entire window and lock systems, including, but not limited to: glass and glass guidance components, window regulator and attaching hardware, all seals, applicable interior and exterior trim, door key and key cylinder, and door latch, handle and lock rods. For the most realistic theft evaluation, a vehicle or body is recommended. Also recommended is an evaluation of both manual and power window systems. It is recommended that the door assembly and door components be dimensionally certified before testing is started.

Note: Painting the door gloss black over white primer may aid the test engineer in visual damage detection (gloss black to highlight panel deformation, white primer to highlight scratching and chipping).

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

Calendar time:	1 d
Test hours:	8 h
Coordination hours:	8 h

Note: These time estimates are approximate averages. Actual times vary considerably depending on early component failures (and subsequent availability of replacement parts), testing to varying multiples of cycle lives, varying requirements for frequency of environmental test conditions, scheduling problems for test facilities, test equipment malfunctions, scheduling of overtime and/or multiple shifts, scheduling of "witnesses" for tests, actual readiness of test samples upon receipt, unique or additional requests for test details, running multiple samples (times shown are for one 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 this time.

3.5 Test Required Information. The requesting engineer is responsible for providing specifications appropriate to the particular vehicle line being tested (reference Vehicle Technical Specification (VTS)/Subsystem Technical Specification (SSTS) paragraph numbers if applicable). See 2.3.

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 vs. Right Hand), color, mold or die source, etc. The following specifications or information are required to run this test:

3.5.1 Door Lock System Theft Test.

3.5.1.1 Maximum time allowed to gain forced entry into the vehicle.

3.5.1.2 Door system fasteners' torque values.

3.5.1.3 Maximum allowable visible or functional damage.

3.5.1.4 Likely rods, levers, etc., to attempt to move.

3.5.1.5 Allowable efforts for the inside/outside door handles, inside manual lock actuator and key cylinder.

3.5.2 Door Window System Theft Test.

3.5.2.1 Loading application point(s).

3.5.2.2 Window position(s) at start of test.

3.5.2.3 Maximum load to be applied to window.

3.5.2.4 Load increment and/or rate of loading.

3.5.2.5 Maximum window displacement and set.

3.5.2.6 Duration of loading.

3.5.2.7 Door Window System – Operating Performance Test Specifications.

3.5.2.8 Door window system fasteners' torque values.

3.5.3 Other Methods (service tools and special electronic circuit packages). Discuss and resolve if any testing is needed with the requesting engineer.

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 Test Time".

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 and assembled properly. Check for cracks, paint chips, dents, etc. Document any variation/deviation in assembly, etc. This is done for posttest analysis purposes.

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).

4.1.2.1 It is recommended that the door be heat cured (per the production paint bake process) to ensure proper strength of the structural adhesives. Install and adjust the window and lock systems per the production process and torque all fasteners to specified torque values (see 3.5). Do not apply tape to the door glass for safety considerations (to contain glass fragments should shattering occur) when performing the window system theft test. This is because shattering the glass is a failure mode and tape could affect the stiffness of the glass, altering test results. Follow safe operating procedures, including wearing safety glasses and safety gloves, when performing this test.

4.1.2.2 Mark all window system fasteners and attachments to check for movement or rotation during test.

4.1.3 Facilities and/or Equipment Preparation.

4.1.3.1 Record the instrumentation calibration information on the attached Data Sheet A1 Instrument Calibration or an equivalent document, such as the Global Engineering Equipment Tracking System (GEETS).