



Fuel Filler and Charge Port Door, Vertical Rigidity

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 procedure is to determine, if a fuel filler or charge port door system meets the Checkload requirements of the appropriate Subsystem Technical Specifications (SSTS).

1.2 Applicability. This procedure applies to all cars and trucks which utilize a hinged door to cover the fuel filler or charge port pocket and cap.

1.3 Remarks. The fuel filler or charge port door may undergo Checkload Strength testing as part of a durability test (GMW15659).

2 References

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

2.1 External Standards/Specifications.

None

2.2 GM Standards/Specifications.

GMW15659

2.3 Additional References. The following reference materials (procedures, documents, standards, etc.) may be required to perform this test:

- Charge Ports SSTS
- Dimensional Technical Specifications (DTS)
- Fuel Filler Door Module SSTS
- Release Documentation. This includes Material Process Document (MPD) which shows any product assembly orientation, fit, assembly specifications, etc., for the system being evaluated
- Vehicle Technical Specifications (VTS)

As of the issue/revision date for this procedure, there was no known, current Federal, State or Local legal requirements that apply to, or affect, the contents of this procedure.

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.

3.1.3 Major Facility. GM Body Test Lab or a similarly equipped test facility.

3.1.4 Minor Facility. Designated floor space (slot) for a test cart.

3.2 Equipment.

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Note: The following items include fixtures and instrumentation typically used 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 requesting engineer.

3.2.1 Fixturing.

3.2.1.1 Assorted clamps and holding fixtures used to mount a dial indicator or displacement transducer.

3.2.1.2 Load actuator stanchion, if not using a handheld force gage.

3.2.2 Instrumentation.

3.2.2.1 Torque wrench(es) with a range of approximately 1.5 times the maximum torque specified by the requesting engineer.

3.2.2.2 Load cell 100 N or equivalent.

3.2.2.3 Displacement transducer (Linear Variable Displacement Transducer, encoder, or string potentiometer) and associated mounting hardware.

3.2.2.4 Actuator (electrical or mechanical) to apply the test load at a specified rate and magnitude (including the associated controls).

3.2.2.5 Amplifiers/signal conditioners for load cells and displacement transducers.

3.2.2.6 Cables and wiring as needed.

3.2.2.7 Data recording equipment (x-y plotter or computer data acquisition).

3.2.2.8 Force gage (50 N or equivalent).

3.2.2.9 Dial indicator (25 mm or equivalent).

3.2.2.10 Structure test unit console (a special control device consisting of a data acquisition computer, signal conditioning equipment, related software, actuator motor control, and related equipment).

Note: The console will require specific load and displacement instrumentation with parameters matching the software requirements.

3.3 Test Vehicle/Test Piece.

3.3.1 Test Material. A fuel filler or charge port door and hinge that have been subjected to the production paint and bake process. This test is typically performed on a body or cutout section of a body.

3.3.2 It is recommended that the fuel filler or charge port door be subjected to the production-intent assembly, paint, and bake process to ensure representative strength characteristics. It is also recommended that the fuel filler or charge port door be dimensionally certified before testing is started.

3.3.3 Record on Datasheet A2 (Appendix A), whether or not the fuel filler or charge port door subsystem has been painted and/or dimensionally checked.

Note: This procedure can be conducted on any level of experimental, production, or prototype material. However, consideration should be given to the effects of build tolerances, different paint processes, and the effect of paint bake ovens on the adhesives and springs used on the design. For example, a fuel filler or charge port door spring that has not been exposed to the production paint and bake process may have more output than one that has been exposed.

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 problems
- 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.

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Documents

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- 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: 4 h

Coordination time: 5 h

3.5 Test Required Information. The requesting engineer is responsible for providing specifications appropriate to the particular vehicle line being tested. (See 2.3).

3.5.1 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 versus right hand)
- Color, mold or die source, etc. (includes the issue in 3.3.1)

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

3.5.2.1 Load. The force that is to be applied to the fuel filler or charge port door can be found in the SSTs.

3.5.2.2 Displacement measurement location.

3.5.2.3 Specifications for allowable deflection, gaps and flushness, operating effort, and or set deflection resulting from this test.

3.5.2.4 Fastener torques.

3.5.2.5 Load direction, if other than vertical.

3.5.2.6 Test Sequence, if run in conjunction with durability cycle or checkload.

3.5.2.7 Load location. The load shall be applied to:

- The finger cup of the door at the vertical centerline, if present, or
- Fifteen (15) mm forward of the rear edge of the door at the vertical centerline if there is no finger cup, or
- Alternatively using a convenient feature on the hinge within 25 mm from the rearmost point on the door.

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.

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 the correct design level and assembled properly. Thoroughly check for the existence of any flaws, cracks, etc., which could affect the durability results. Record all observations including "no visible cracks" on Datasheet A2 (Appendix A).

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).

4.1.3 Facilities and/or Equipment Preparation. Record the instrumentation calibration information on Datasheet A1 (Appendix A) or an equivalent document.

4.2 Conditions.

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