



Roof Carrier Abbreviated Durability 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 provide a global method to evaluate the vehicle structural durability of roof carrier assemblies on an abbreviated basis, in order to identify and correct issues prior to the completion of the full general durability vehicle test.

1.2 Applicability. All roof carrier assemblies.

2 References

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

2.1 External Standards/Specifications.

None

2.2 GM Standards/Specifications.

GMW15445

2.3 Additional References.

2.3.1 Cruz Alta Proving Ground.

DR.CA.1061 DR.CA.1316 DR.CA.1401

2.3.2 Dudenhofen Proving Ground.

DR.DH.PB at 40 kph DR.DH.PH-1&2 DR.DH.RC; DR.DH.Twist DR.DH.TTG

2.3.3 Guangde Proving Ground.

DR.GD.IB DR.GD.PY DR.GD.ZN
DR.GD.PX DR.GD.TW

2.3.4 Milford Proving Ground.

DL.MF.EB DR.MF.IB DR.MF.PY
DL.MF.EX DR.MF.PX

3 Resources

3.1 Facilities. General Motors Proving Grounds:

- Cruz Alta Proving Ground (GM Brazil)
- Dudenhofen Proving Ground (GM Europe)
- Guangde Proving Ground (GM Korea, PATAC)
- Milford Proving Ground (GMNA)

3.1.1 Calibration. The test facilities and equipment shall be in good working order and shall have a valid calibration label.

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Documents

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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 Cargo Test Box. An accessory mid-size cargo box (Part Number (PN) 19329018), large cargo box (PN 19329019), or regional equivalent is required to evaluate clearances to the sheet metal and sunroof in all positions (closed, vented, comfort, and retracted) and hold the load during test. See Figure 1.

Figure 1: PN 19329018 Mid-Size Cargo Box



3.3 Test Vehicle/Test Piece. Test vehicle equipped with production roof carrier assembly.

3.4 Test Time.

Calendar time: 2 days
Test hours: 8 hours
Coordination hours: 4 hours

3.5 Test Required Information. Not applicable.

3.6 Personnel/Skills. The driving modules that comprise this test are intended to be performed by personnel specifically trained in the proper execution of the driving modules.

4 Procedure

4.1 Preparation.

4.1.1 Assembly Instructions. The Design Release Engineer (DRE) is to provide the roof carrier and cargo box assembly instructions and specify the roof carrier assembly maximum load. Document the maximum load in the Data Sheet for the region of test.

4.1.2 Cargo Box Selection. The DRE is to provide direction on size of cargo box that is compatible with roof carrier assembly. If a roof carrier assembly is capable of using both a mid-size and large cargo box, the large cargo box is to be used for the test.

4.1.3 Attachment. Attach roof rack per assembly instructions, measuring and recording the torque of all attachment bolts. Use the minimum recommended torque for all attachment bolts. Document minimum torque and measured torque values in the Data Sheet for the region of test.

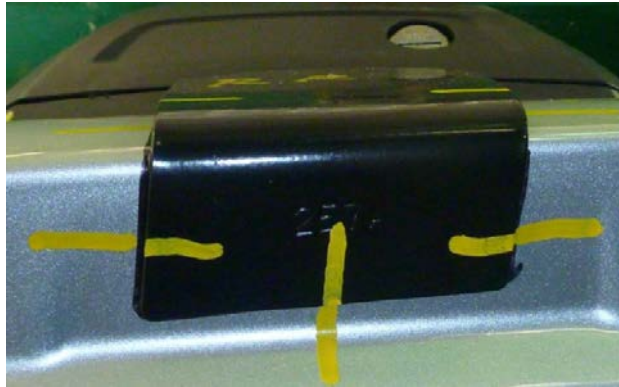
4.1.4 Mark Key Locations. Mark key locations of the roof carrier assembly relationship to the vehicle. These marks should be sufficient to capture fore/aft or lateral movement of the roof carrier assembly at the end of test. See Figure 2.

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Figure 2: Method to Measure Roof Carrier Movement

4.1.5 Attach Cargo Box. Attach cargo box to roof carrier per assembly instructions.

4.1.6 Load Cargo Box. A load per GMW15445 is to be prepared with a total weight equal to the manufacturer's recommended maximum load. All weight bags should be evenly distributed within the cargo box.

4.2 Conditions.

4.2.1 Environmental Conditions. The driving procedures can be performed in all types of weather. However, in situations where severe weather makes certain driving maneuvers unsafe, modules using these maneuvers should be postponed until road conditions improve.

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. Run the abbreviated schedule specified by region, as shown in Appendix A, Data Sheet A1 thru Appendix D, Data Sheet D1. This test must run in the specified sequence.

5 Data

5.1 Calculations. Not applicable.

5.2 Interpretation of Results. Not applicable.

5.3 Test Documentation. Issues are to be documented in the comments section of the Data Sheet for each region, as shown in Appendix A through Appendix D. Pre-test and post-test pictures are required with the description of each issue. Examples of potential failure modes include: Load contact to roof, load contact to any sunroof position, loss of attachment, loss of torque, excessive deflection under load, excessive permanent deflection, movement greater than 10 mm in any direction, cracking, buzzing, squeaking, and rattles.

6 Safety

This standard may involve hazardous materials, operations, and equipment. This standard does not propose to address all the safety problems associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

In general, a risk assessment needs to be performed for every driving instruction prior to executing this standard. (**Note:** National law needs to be considered while performing a risk assessment.) The required rating of risk by exposure probability and possible violation will be done in a separate document. Every identified risk must be named inside the risk assessment for the relevant driving instruction in order to announce that risk to employees. Within the risk assessment, the vehicle equipment and different vehicle build stages have to be considered. After performing a risk assessment, non-acceptable risk needs to be mitigated by appropriate countermeasures. Here technical measures are preferred because these are independent from attendant circumstances. In case technical measures are not appropriate, organizational and/or personal measures will apply. This includes training, wearing of Personal Protection Equipment, or arrangement of idle time.

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