



Simulated Snow Plow 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 vehicle structural durability integrity when it is subjected to snow plowing operations.

1.2 Applicability. This standard is applicable to light duty and heavy duty trucks used for snow plowing operation.

1.3 Remarks.

1.3.1 This simulated durability test standard is intended to subject the structure of the vehicle to simulated snow plowing. Some selected inputs are representative of a greater than average severity customer operation. Other inputs represent a much lower severity, but are included to help identify performance, durability, and overall customer satisfaction issues..

1.3.2 This test does not encompass all known customer usage treatments. If more rigorous exposure to unique customer usage treatments is desired, other specialized testing should be considered as part of the vehicle test plan.

2 References

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

2.1 External Standards/Specifications.

None

2.2 GM Standards/Specifications.

GMW14264

GMW15444

GMW15445

3 Resources

3.1 Facilities. GM Desert Proving Ground Yuma (DPGY), USA.

3.1.1 Calibration. The test facilities and equipment shall be in good working order and shall have a valid calibration label. Record Calibration information on form shown in Appendix C, Data Sheet C1.

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. Some method of accurate speed indication should be provided to the driver for the accurate execution of the driving events. Some type of acceleration/deceleration rate indicator should also be provided to the driver.

Thermocouples and read-out instrumentation are also required for this test.

3.3 Test Vehicle/Test Piece. Test vehicle shall be equipped per owner's manual and/or snow plow equipment manufacturer's guide, for the class of snow plow equipment being used, unless specified by requesting engineer.

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3.4 Test Time. See Appendix A for the detail timing of the test.

Calendar time: 25 days
Test time: 9000 hours
Coordination time: 40 hours

3.5 Test Required Information. Not applicable.

3.6 Personnel/Skills. The procedures that comprise this test are intended to be performed by personnel specifically trained in the proper execution of the driving instructions. Refer to the appropriate proving ground driving instruction documents and related risk assessments. Different driver license requirements, knowledge of test content, and mandatory health checks for involved personnel have to be considered.

4 Procedure

4.1 Preparation. This procedure includes plowing; therefore, the test vehicle should be equipped with the appropriate hitch and wiring harness. Maximum vehicle speeds are to be supplied by test responsible personnel for driver reference. If the vehicle is equipped with a manual transmission the shift point speeds should also be determined and provided.

4.2 Conditions.

4.2.1 Environmental Conditions. The durability events can be performed in all types of weather typically experienced at the DPGY. However, in situations where severe weather causes certain driving maneuvers to be unsafe, events using those 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. Follow the instructions specified in Appendix A. Appendix B, Figure B1 is to be used as the Driver Log/Checkoff sheet to track the progress of the test.

4.3.1 Test Scheduling Guidelines.

4.3.1.1 Vehicle Break-In. The vehicle should not receive any "break-in" miles unless such are specifically required or recommended in the Owner's Manual in such terms that more than 90% of the vehicle purchasers or users would be expected to follow the recommendation. The intention of this Durability Test is to subject the vehicle to more severe than average operation and it is believed that the omission of "break-in" miles is more severe than is their inclusion.

If the test requester determines that "break-in" mileage is required, then the "break-in" procedure should be completed prior to execution of this test procedure.

4.3.2 Driver Responsibilities. The driver is to provide the first indication that the vehicle requires attention. During the execution of the test, the driver is to observe vehicle behavior, as would a customer, and inform the responsible individuals through written comment whenever a malfunction occurs, or unusual behavior is experienced. In essence, the driver should play the role of the customer and should initiate checkout for potential repair of the vehicle. The driver should be informed of this responsibility and should be instructed to keep accurate, thorough records on the vehicle. The driver is an important source of vehicle performance information for the test coordinator with whom the driver should actively communicate.

The proper execution of this durability test is highly dependent on close driver adherence to the events and the instructions contained therein. This is because accurate correlation with field experience can only be achieved by means of tailored combinations of vehicle speed, road surface, and driving maneuvers.

4.3.3 Inspections. All vehicles operated on this test must complete an inspection prior to continuing onto the other events. At the completion of the events or at the termination of the test due to any other reason, an inspection must also be performed.

4.3.3.1 Maintenance Scheduling Guidelines. Test vehicle maintenance/repair will be based on Owner's Manual recommendations and, as closely as possible, customer maintenance/repair practices.

4.3.3.2 Replacement Parts. The general guideline for replacement parts shall be that in those cases where a GM service part is used for 10% or more of the market, that part shall be used during this test. In those cases

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where GM's sales penetration is insignificant, the most widely used brand service part shall be used. In no case shall a part that is not or will not be available to the customer be used.

4.3.3.3 Tools. The vehicle is to be repaired and maintained with tools similar to those which would be used by a service facility working on the customer's vehicle.

4.3.3.4 Repair. Repair shall be performed when the test vehicle displays symptoms that would be detected by the customer and would be likely to prompt him to take the vehicle in for diagnosis and repair. On this basis, it is the test driver's role, as described in 4.3.3, to report that the vehicle requires attention. The driver should be viewing and evaluating the vehicle's behavior as would the owner and recommending checkout of possible malfunction.

Repair may also be performed when, in the opinion of the responsible test user, further operation of the vehicle would prove hazardous to test personnel. In that case, a separate test involving the part or system in question is to be conducted under controlled conditions to determine all effects and results of the malfunctions such as failure mode, second and third order failures. It is essential that the communication loop be closed in cases of this nature. Any communication or information resulting from such a test is to be carefully documented and preserved.

In the event that an additional malfunction is discovered during the inspection or repair of another item, it is to be evaluated carefully before any corrections are made. Consideration should be given to the probability that the customer's mechanic would have discovered the malfunction, informed the customer, and received the authorization for repair. The test user should use supporting information defining customer practice in repairing such items.

The individual performing the repair should prepare a report documenting the operation. These reports, as well as other findings, are a major result of the overall test process and should be recorded and analyzed as data relating to test vehicle reparability and serviceability.

5 Data

5.1 Calculations. Not applicable.

5.2 Interpretation of Results. The subjective rating scale should be used to document subjective evaluations of fluid leaks, squeaks/rattles, disturbances, performance and seat comfort items. Refer to GMW14264 Subjective Rating Scales for more information.

5.3 Test Documentation. Written documentation is to be generated and maintained on all significant factors involved in the test. These typically include vehicle, personnel, and equipment identifications; time, temperature, climate, incidents, or malfunctions; comments or observations from any involved personnel; and other factors that the test user deems appropriate. Photographic documentation should also be used where appropriate.

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.

6.1 Safety Precautions.

6.1.1 Instrumentation and other test equipment must be securely mounted in accordance with proving grounds traffic safety guidelines for mounting and usage of in-vehicle instrumentation.

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