



Cold Weather Exposure 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 subject a vehicle to a developmental road test of its systems and components in an actual severe winter environment and permit an evaluation of their operating characteristics in cold weather.

1.2 Applicability. This specification is applicable to passenger vehicles and light duty trucks. GMW15016 Cold Weather Exposure Test is used to evaluate vehicles being sold in the following Extreme Cold countries:

Afghanistan	China	Kazakhstan	Russia
Armenia	Czech Republic	Kyrgyzstan	Sweden
Azerbaijan	Estonia	Latvia	Switzerland
Belarus	Finland	Lithuania	Tajikistan
Bosnia-Herzegovina	Georgia	Mongolia	Ukraine
Canada	Greenland	Norway	United States of America

1.3 Remarks. The primary intent of this test is to provide, in a period of approximately 9 weeks, exposure to operation in a cold ambient temperature environment of above average severity.

Engine cold starts are accelerated to provide 2 years of equivalent exposure for a typical customer in a cold ambient temperature environment of above average severity. Operation of other components and systems is not accelerated to the same degree, but does represent an amount of customer usage that would normally be accumulated in the same environment over a time period between 9 weeks and 2 years.

This test does not encompass all known customer usage treatments. Some of the limitations are due to accelerated usage and some are due to the constraints of the test site and dependence upon daily weather. 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	GMW15211	GMW15213	GMW15215
GMW15210	GMW15212	GMW15214	GMW15216

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2.3 Additional References.

2.3.1 Arjeplog.

DR.AJ.City	DR.AJ.Highway	DR.AJ.ShortTrip
DR.AJ.Extended	DR.AJ.Rural	

2.3.2 Heihe.

DR.HH.City	DR.HH.Highway	DR.HH.ShortTrip
DR.HH.ExtendedTrip	DR.HH.Rural	

2.3.3 Kapuskasing.

DR.KP.KC	DR.KP.KH	DR.KP.KS
DR.KP.KE	DR.KP.KR	

3 Resources

3.1 Facilities. General Motors Cold Weather Development Centers (Kapuskasing, Canada; Heihe, China; Arjeplog, Sweden; and various public roads and facilities as specified in the driving events near the testing 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. A factory installed tachometer is recommended for use in the Aggressive Cold Start procedure that is part of the Rural event. If the vehicle is not equipped with a factory installed tachometer, the Cold Weather Test Facility must install a tachometer before start of test, taking care to minimize changes to the original state of the vehicle.

3.3 Test Vehicle/Test Piece. Vehicles operated on this test for estimating their performance in a customer environment should be acquired in a manner similar to new car delivery to a retail customer. The vehicle should not be subjected to any special adjustments or treatments prior to delivery.

Vehicles operated on this test for any other purposes (e.g., component or vehicle design evaluation, design validation, development) should be acquired in a manner appropriate to that particular test intent.

3.4 Test Time. This test has 510 h to 560 h of specified test time. Test time varies by test facility. Repair, inspection, routine maintenance, refueling, and downtime will increase the total test time.

3.5 Test Required Information. Not applicable.

3.6 Personnel/Skills. The procedures which comprise this test are intended to be performed by personnel specifically trained in the proper execution of GMW15016.

4 Procedure

4.1 Preparation.

4.1.1 Engine oil and other lubricants should follow the manufacturer's recommendation for severe winter operation, unless otherwise requested for evaluation during this test.

4.1.2 Vehicles should be prepared prior to shipment to the test facility with engine coolant anti-freeze protection down to a temperature of -45 °C to prevent possible engine damage during transport to the test facility.

4.1.3 Light duty trucks and cargo vans requiring ballast must be identified to the test coordinator. Mass and location of ballast shall be determined in advance of vehicle arriving at facility to ensure ballast availability and correct installation. All ballast added shall be securely fastened to the vehicle using appropriate and acceptable cargo restraint methods and devices. Particulars regarding ballast shall be recorded.

4.1.4 The vehicle should not receive any break-in unless specified in the Owner's Manual or specified in the test request. If the vehicle is driven to the Cold Weather Test Facility or has undergone other pre-test usage, the details are to be recorded.

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Documents

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4.1.5 Vehicles being operated on this test to provide a basis for estimation of vehicle function in the hands of a customer are to be delivered as a customer vehicle, consequently receiving no further preparation.

Measurement of adjustments and settings may be made as deemed necessary to document the condition of the vehicle. These measurements must be made without significantly affecting the adjustment or setting being considered.

4.1.6 Vehicles being operated on this test for other purposes should be prepared in a manner appropriate to the particular test intent. Details of test component installation, adjustments, settings, and other pertinent information are to be recorded.

4.2 Conditions. The vehicle must arrive at the Cold Weather Test Facility early enough in the winter test time to allow the required number of vehicle cold starts at the required temperatures. Based on past temperature data, the vehicle must start testing by mid-January to have a reasonable chance of meeting this requirement.

4.2.1 Environmental Conditions. Not applicable.

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 Inspections. All vehicles operated on this test must complete a Start of Test Preparation Procedure and a GMW15215 Inspection event prior to continuing on other events. At the completion of the events, or at the termination of the test due to any other reason, an End of Test Procedure and a GMW15215 Inspection event must also be performed. These Inspection events are included in the overall inspection process as outlined in Appendix A, Table A1: Test/Inspection Sequence.

Following the second, third, and fourth inspection, a vehicle underbody wash will be performed immediately prior to leaving the garage for its next Vehicle Soak. Prior to the underbody wash the vehicle should not be driven for at least 1 h.

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

4.3.2.1 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 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.

4.3.2.2 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.

4.3.2.3 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 Section 4.3.11, to report that the vehicle requires attention. The driver should, in essence, be the customer, 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.

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