



Rear Window and Quarter Window Vehicle Defrost Test Procedure

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 standard is to validate the performance capability of electrically heated rear or quarter windows under a static condition. The data will be used to predict performance of the vehicle level dynamic test.

1.2 Applicability. This standard applies to all passenger cars and trucks that have an electrically heated fixed window (rear or side).

1.3 Remarks. This document is intended to test performance requirements of a heated rear window or quarter window. This document is the GM worldwide fixed glass testing standard for static defrost test. Its purpose is to establish a common test methodology for fixed heated glass to ensure that a high-quality world class system is consistently developed and produced. This is a living document and any suggestions or revisions will be reviewed and/or updated annually by the Fixed Glass Global Subsystem Leadership Team (GSSLT).

2 References

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

2.1 External Standards/Specifications.

None

2.2 GM Standards/Specifications.

9985864

GMW3600

GMW14264

2.3 Additional References.

- Subsystem Technical Specification (SSTS)
- 5-Phase Document

3 Resources

3.1 Facilities. The test facilities shall be accredited to the International Organization for Standardization/International Electrotechnical Commission (ISO/IEC) standards or by the International Laboratory Accreditation Cooperation (ILAC).

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.

3.2.1 Environmental chamber capable of temperatures to -40 °C. The environmental chamber must be large enough to hold a fixture with the production glass and have an area for viewing and taking pictures. A thermal chamber large enough to contain fully assembled body glazing, having the following capabilities:

- Controlled humidity.
- Explosion-proof thermal cabinet for circulating air operation with extraction.

- Continuously adjustable temperature range: -40 °C to +120 °C.
- Test Room: Suitable size.
- Executions: Suitable size.

3.2.2 Fixture for holding the glass in near-vertical position.

3.2.3 Stopwatch.

3.2.4 Oil-based marker.

3.2.5 A 9 V to 16 V power supply capable of 20 A, and if necessary, an electrical power supply device that reflects vehicle electrical interface (mating connector, wire gauge, control box, etc.)

3.2.6 Voltage and current measuring equipment for recording.

3.2.7 Spray bottle.

3.2.8 Digital camera capable of taking high quality pictures.

3.2.9 GM approved windshield cleaner 9985864 or equivalent to ensure water sheeting action.

3.2.10 GM approved test route.

3.2.11 Temperature gauge.

3.3 Test Vehicle/Test Piece. Test samples shall be of production-intent design and material for design validation (DV) or production-intent design and materials manufactured with production processes (home line) for product validation (PV). Any changes to the components or material, e.g., design, fit, form, function, properties, manufacturing process, and/or location of manufacture, require revalidation. GM shall approve validation methods for product/process changes before the supplier is committed to the change. Refer to GMW3600.

For the vehicle test, the vehicle with the lowest alternator rating, the smallest battery, and the maximum amount of electrical components for the respective vehicle model shall be used.

3.4 Test Time.

Calendar time: 1 day

Test hours: 4 hours

Coordination hours: 4 hours

3.5 Test Required Information. Requirements from the Subsystem Technical Specification (SSTS) or respective specification are necessary in order to execute test methods in this procedure. (See Section 4). For equipment and test sample details, see 3.2.

3.5.1 GM Validation is to be notified of test failures within 24 h of occurrence.

3.5.2 Supplier must develop a 5-Phase Document for all test failures.

3.6 Personnel/Skills. The test facility shall have sufficient personnel with the necessary education, training, technical knowledge, and experience for performing the required tests.

4 Procedure

4.1 Preparation.

4.1.1 Before carrying out the test, ensure the following:

- Window heater complies with the release status.
- Window and window heater are undamaged.
- Window is clean.
- All electrical components function properly.
- Any possible deviations are to be corrected. If this is not possible, the deviations are to be noted.

4.1.2 The vehicle or the window shall be either on an open piece of ground or in the climatic chamber and cooled to -20 °C ± 3 °C. The window is then sprayed with water from a manual spray bottle to ice it. The water is sprayed onto the window from a distance of 30 cm from left to right and from top to bottom. The spray points are located 20 cm from one another. Each spray point is sprayed twice.

4.1.3 Environmental Conditions. The test temperature shall be $-20\text{ }^{\circ}\text{C} \pm 3\text{ }^{\circ}\text{C}$.

4.2 Conditions.

4.2.1 Environmental Conditions.

4.2.1.1 No precipitation (rain, snow, fog, etc.) on the window.

4.2.1.2 When performing the road test, there shall be no dirt, snow, or similar potential contaminants on the window.

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 Stationary Test.

Note: The test can be performed as a road test or in the climatic chamber.

4.3.2 Once the layer of ice has reached ambient temperature, the window heater is switched on with the engine running (idle speed). At the same time, all electrical components (light, ventilation, radio, seat heater, etc.), with the exception of the wipers, shall be switched on at full power. The ventilation system shall be directed only to the footwell when the heater is switched off.

4.3.3 The time shall be measured as follows, using a stopwatch:

- Until the first visible defrosting is completed.

If the window heater automatically switches off before the window is completely free of ice, the area that is free of ice up to that point shall be evaluated subjectively according to GMW14264. The window heater shall then be switched on again and the overall time required to defrost the window completely shall be measured.

4.4 City Test Cycle. This test shall be performed with the side and rear windows iced.

4.4.1 Once the layer of ice has reached ambient temperature, the window heater is switched on with the engine running. At the same time, all electrical components (light, ventilation, radio, seat heater, etc.), with the exception of the wipers, shall be switched on at full power. The ventilation system shall be directed only to the windshield when the heater is on full power. The run is started immediately. The maximum speed is limited to 50 km/h and shall be interrupted with occasional stops (traffic lights, etc.)

4.4.2 The time shall be measured as follows, using a stopwatch:

- Until the first visible defrosting.
- Until defrosting is completed.

If the window heater automatically switches off before the window is completely free of ice, the area that is free of ice up to that point shall be evaluated subjectively according to GMW14264. The window heater shall then be switched on again and the overall time required to completely defrost the window shall be measured.

4.5 Overland Test. This test shall be performed with the side and rear windows iced.

4.5.1 Once the layer of ice has reached ambient temperature, the window heater is switched on with the engine running. At the same time, all electrical components (light, ventilation, radio, seat heater, etc.), with the exception of the wipers, shall be switched on at full power. The ventilation system shall be directed only to the windshield when the heater is on full power. The run is started immediately. The run shall be performed at a constant 100 km/h.

4.5.2 The time shall be measured as follows, using a stopwatch:

- Until the first visible defrosting.
- Until defrosting is completed.

If the window heater automatically switches off before the window is completely free of ice, the area that is free of ice up to that point shall be evaluated subjectively according to GMW14264. The window heater shall then be switched on again and the overall time required to completely defrost the window shall be measured.

The supplier shall write evaluation reports to document the results of all validation activities and shall make the test results and evaluation reports available to GM engineers upon request. See GMW3600. All test reports are to be in English.