



Rear Window and Quarter Window Defrost Static Test Procedure

1 Scope

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 Foreword. This is a component level test. 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).

1.3 Applicability. The applicability for this standard is for all passenger cars and trucks that have an electrically heated fixed window (rear or quarter).

2 References

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

2.1 External Standards/Specifications.

None

2.2 GM Standards/Specifications.

GMW3600

2.3 Additional References.

- 9985864 - Part Number for GM Approved Windshield Cleaner.
- CG3707 - Heated Backlight Grid Calculation.

3 Resources

3.1 Facilities. The test facilities shall be accredited to ISO/IEC standards or by the International Laboratory Accreditation Cooperation (ILAC). However, all measuring variables as specified in this specification shall be determined correctly with respect to their physical definition.

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 with the capability of temperatures down to -20 °C. Environmental chamber large enough to hold and fixture the production glass with an area for viewing and taking pictures. Thermal chamber large enough to contain fully assembled body glazing and capable of:

- 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 at vehicles installed angle and 45 degrees.

3.2.3 Stopwatch.

3.2.4 Oil based marker.

3.2.5 A 9 V to 16 V power supply capable of 40 A, and if necessary, an electrical power supply device that reflects vehicle electrical interface (mating connector, wire gage, 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, part number 9985864 or equivalent to assure 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 and the smallest battery, but with 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). Equipment and test sample detail is included in Section 3.2 of this standard.

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

3.5.2 Supplier to develop 5-phase document for all test failures.

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

4 Procedure

4.1 Preparation. Not applicable.

4.2 Conditions. All conditions specified shall be targeted toward the specified value with any given tolerance ($\pm$) used to compensate for variation. During testing, conditions specified shall not be readjusted within the tolerance unless it is to maintain the particular test condition within the specified tolerance. If such an adjustment is made, it shall be approved by the appropriate GM engineer prior to the start of any testing. Unless otherwise specified, perform the tests in the as received condition without any special pre-conditioning.

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 Clean the inner and outer surface of the glass with the GM approved cleaner or equivalent.

4.3.2 Mark on the outer surface of glass 2 marks (center of glass) approximately 50 mm long spaced between each grid line, using the spacing distance as in the equation ($28.5/4 = 7.1$). Mark 7.0 mm (rounded) going up

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and down from each grid line using oil based pen or permanent equivalent. Repeat in 2 areas (right and left of center) across the glass. See Figure 1.

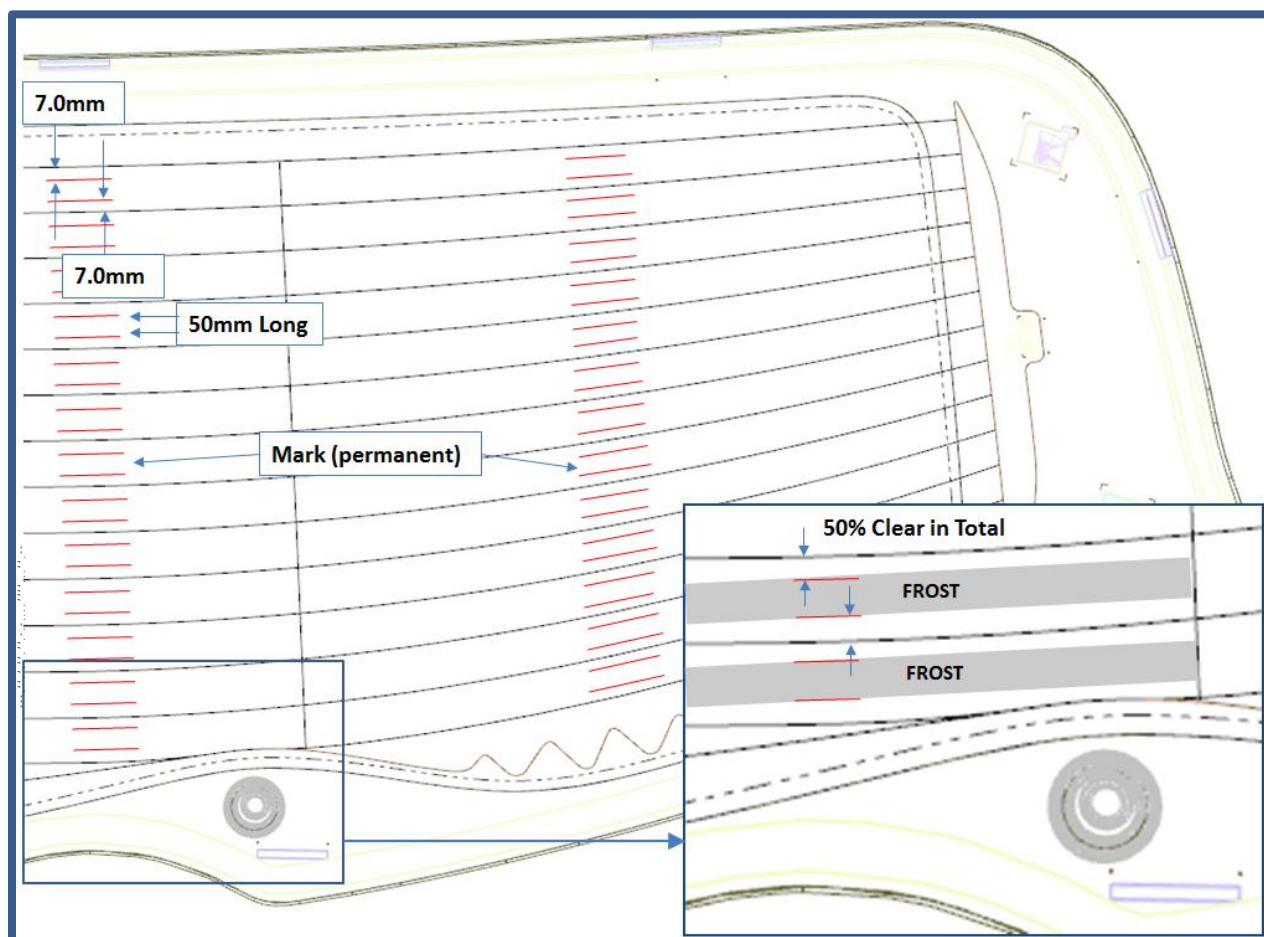


Figure 1: Proper Glass Marking

- 4.3.3 Measure the resistance of the heated grids at ambient temperature at vehicle amperage.
- 4.3.4 Fixture the part at a 45 degree angle. Take pictures perpendicular to part to ensure a high quality photograph.
- 4.3.5 Hold the part in environmental chamber at $(-20\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C})$ for at least 1 h prior to spraying.
- 4.3.6 Spray the part (approximately 500 mL/m^2) using a spray bottle, to build up a uniform ice layer on the outside surface of glass.
- 4.3.7 Continue to condition the test part in the environment chamber for a minimum of 30 minutes.
- 4.3.8 Connect the power source to the test piece.
- 4.3.9 Apply V_{NOM} to the test part and start timer.
- 4.3.10 Take photographs at 1 minute intervals until part achieves 100% cleared in Day Light Opening (DLO).
- 4.3.11 Record amperage and voltage at the glass heat elements for each 1 minute time interval.
- 4.3.12 Repeat procedure with the following exceptions:
 - Use vehicle's idle voltage (V_{IDLE}) condition instead of V_{NOM} .
 - Fixture the component at vehicle's installation angle instead of 45 degrees.