GM WORLDWIDE ENGINEERING STANDARDS	Test Procedure	GMW15663

Door Window System Glass Wipe Area Determination

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. This test evaluates the glass wiping characteristics of door outer beltline seals on movable door window systems.

1.2 Applicability. This procedure applies to all passenger cars, light duty trucks, and medium duty trucks. It can be used for all door, midgate and endgate glass systems which utilize an outer beltline weatherstrip seal. This test may also be performed as part of a window system durability schedule to evaluate glass wipe characteristics after outer belt wear.

1.3 Remarks. None.

2 References

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

2.1 External Standards/Specifications.

None

2.2 GM Standards/Specifications.

GMW15938

2.3 Additional References.

2.3.1 Outside Rearview Mirror Specifications.

- Subsystem Technical Specification (SSTS)
- Vehicle Technical Specification (VTS)

2.3.2 Release Documentation. Product Assembly, Orientation, Fit, etc. Specifications.

- Local Process Plans (LPP)
- Master Process Documents (MPD)

3 Resources

3.1 Facilities. GMNA Structural Development Lab or a similarly equipped test facility.

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.

Note: The following sections include fixturing and instrumentation typically used by the GMNA Structural Development Lab to perform this test. Other equipment may be substituted at the discretion of the testing facility as long as it provides the same data and/or data record, with equivalent accuracy as specified herein or by the requestor.

3.2.1 Fixturing.

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3.2.1.1 This test can be performed on a door mounted on a door cart or on a body. Doors without upper frames should be tested on a body or partial body.

3.2.1.2 Tape measure or scale to establish/determine grid line locations.

3.2.1.3 Combination square (or equivalent) of sufficient size to span the vertical distance of the door glass.

3.2.1.4 Colored material/cardboard to provide a contrasting background to the grid color. This aids in photographing areas not wiped clean by the belt strips.

3.2.1.5 Tape (that doesn't leave a residue) to apply contrasting colored material to the inner glass/door surface.

3.2.2 Instrumentation.

3.2.2.1 Variable Direct Current (DC) power supply (if testing power window systems) 12 V ± 4 V DC.

3.2.2.2 Permanent marking pen or equivalent to mark a reference grid on door glass surface.

3.2.2.3 Proper electrical connectors and leads, if testing power window systems.

3.2.2.4 Atomizer for spraying liquids, if applicable.

3.2.2.5 Dust gun, if applicable.

3.2.2.6 Specified material to apply to glass surface, i.e., grit, snow, slush, etc.

3.2.2.7 Camera to record final results.

3.3 Test Vehicle/Test Piece. One (1) door assembly including a manual or power window system and a complete glass guidance system, including belt strips, run channels, handle cranks, and any items affecting window system performance. A body or partial body is required for testing frameless doors. It is recommended that the test parts/assembly be dimensionally certified before testing is started.

Note: Additional information on test required material and its assembly can be found in the Release Documentation (see 2.3.2).

3.4 Test Time. The following is an estimate of the amount of time (work-hours) needed to perform this procedure.

Note: These time estimates are approximate averages. Actual times vary considerably depending on early component failures (and subsequent availability of replacement parts), testing to varying multiples of cycle lives, varying requirements for frequency of environmental test conditions, scheduling problems for test facilities, test equipment malfunctions, scheduling of overtime and/or multiple shifts, scheduling of witnesses for tests, actual readiness of test samples upon receipt, unique or additional requests for detailed test information, running multiple samples (times shown are for one system), etc.

These times consider preparation and other downtime, actual test, and analysis of data in capturing a total calendar time. Report writing, approval, processing, etc. are not included in these times.

Calendar time:	2 d
Test time:	6 h
Coordination time:	2 h

3.5 Test Required Information. The requesting engineer is responsible for providing specifications appropriate to the particular vehicle line being tested (reference VTS/SSTS paragraph numbers, if applicable. See 2.3.1).

Testing worst case scenarios may uncover some potential problems. Discuss with the requesting engineer, if testing should include some worst case scenarios. Depending on which test is being performed and which level of parts or systems is being tested, consider if any of the following may apply: tolerance stack-ups, build variations, misalignment, minimum/maximum fastener torque(s), lubrication, environmental extremes, location of customer representative load application, symmetry (Left Hand vs. Right Hand), color, mold or die source, etc.

3.5.1 The following specifications or information are required to run this test:

3.5.1.1 Types of materials to be applied to glass surfaces.

3.5.1.2 Environmental exposure conditions and length of time.

3.5.1.3 Door glass operation range and number of cycles before evaluation.

3.5.1.4 Grid size to use for area determination and location.

3.5.1.5 Specific locations and areas of concern on glass surface.

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3.6 Personnel/Skills. Prior experience in setting up and running similar tests and experience in the use of the referenced test equipment are critical to achieving the estimated times shown in 3.4.

4 Procedure

4.1 Preparation.

4.1.1 Sample Inspection. The test and requesting engineers should inspect the test items to ensure all material listed in 3.3 is of correct design level and assembled properly.

Note: Check to make sure glass and belt strips are clean before test begins. Any dirt or grease on the glass surface before test may be deposited on the belt strips and could affect test results.

4.1.1.1 Cycle the window system full up and full down a minimum of five (5) times prior to the start of test to assure proper operation and seating of system components. Note any irregular sounds or erratic operation indicating a potential problem with assembly or design and verify observations with the release engineer.

4.1.2 Sample Preparation. This test is normally run on the test subject in an as received condition. If it is requested to be run in a specifically adjusted condition, follow the applicable procedure(s).

4.1.2.1 If necessary, measure and adjust gap and rabbet dimensions (refer to Door System Alignment to Body GMW15938) for doors mounted on a body to ensure design requirements are being met.

4.1.2.2 Clean all glass surfaces before test using an appropriate cleaner and avoid wetting the outer belt seal.

4.1.2.3 Reference 3.5, determine special areas of concern on the glass surface and which size grid dimensions will be required for wipe area determination. The smaller the grid size, the more accurate the wipe area dimensions. Alternately, a grid pattern may be projected on the photo taken in 4.3.2.4 to determine the area covered by material after test.

4.1.2.4 Measure and mark points at the specified dimensions horizontally and vertically across the glass surface using a permanent marking pen and scale. The grid can be drawn on the outside or inside of the glass surface.

4.1.2.5 Draw the horizontal lines on the glass surface using the door beltline as a reference and guide. Draw the vertical lines on the glass surface by resting one edge of the combination square on the beltline and using the vertical edge as a drawing guide.

4.1.3 Facilities and/or Equipment Preparation. Record the instrumentation calibration information on the attached Calibration see Appendix A, Data Sheet A1 or an equivalent document.

4.2 Conditions.

4.2.1 Environmental Conditions. Unless otherwise specified in this document's text or by the requesting engineer, the typical environmental conditions for this test are the temperature, humidity and pressure at the major test facility. Reference 3.1. Unless otherwise noted, these conditions are typically 22 °C ± 3 °C, relative humidity of 40% ± 20%, and atmospheric pressure equivalent to the local barometric pressure (which is variable during any given day and from day to day).

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 Setup Instructions. Perform any functional/operational tests/evaluations as requested or as may be referenced in Section 2. Specifically, cycle the window system up and down. As applicable, note any irregular sounds or erratic operation indicating a potential problem with design, manufacture, or assembly and verify observations with the requesting engineer.

4.3.1.1 Start with the door glass in a full up position.

4.3.1.2 If the door is mounted on a body, make sure it is fully latched on the striker.

4.3.1.3 Determine from the requesting engineer what type of material(s) or combination of materials is to be applied to the outer glass surface. Glass surfaces may require exposure to environmental extremes to obtain the proper test conditions, i.e., exposure to high humidity will provide a water vapor coverage, while exposure to extreme cold after humidity will provide a frosted surface.

4.3.2 Test Operation Instructions.

4.3.2.1 Apply the specified materials and/or expose the test sample to the required environmental conditions for the specified length of time. Reference 3.5.

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