



Wiper Chisel Chatter Evaluation

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 is for development **only**. The test is to evaluate chisel chatter sensitivity of the wiper system by varying:

- Battery voltage.
- Temperature.
- Wetness of glass.
- Motor speed settings (low/high).
- Blade condition (permanent-set or new).

1.2 Applicability. This standard applies to all original equipment and replacement windshield wiper components for passenger cars, Multipurpose Passenger Vehicles (MPV), and trucks.

1.3 Remarks. This test may be used on windshield or rear glass as required.

This test is only one tool to use in the evaluation and development of wiper chatter and system performance. This test:

- Does not evaluate on-road blade chatter (due to no wind-lift inputs).
- Does not evaluate blade chatter under a range of humidity conditions.
- Was not designed to evaluate wiper system wipe quality (streaking, hazing, ballooning, scalloping, etc.)
- Was not designed to evaluate stick-slip chatter. All windshield contamination conditions (i.e., carwash wax, Rain-X products, road oil/grime, materials not to be used as stated in the Owner's manuals, etc.) that initiate stick-slip chatter should not be evaluated with this procedure.

This test can be used in an A/B comparison of the test vehicle to a vehicle with known chisel chatter performance in the field.

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

2.3 Additional References.

- GM Security Guidelines: <https://gmweb.gm.com/HR/Security/Pages/FutureGuide.aspx>.
- GM Windshield Washer Fluid, Optikleen Part Number 9985670.

3 Resources

3.1 Facilities. No special facilities required.

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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 Power Supply. A power supply capable of running the wiper system at the high speed setting specification when connected at the battery leads. Also, the voltage must be adjustable in one volt increments from 8 V to 16 V, inclusive.

3.2.2 Attack Angle Gage. The gage must be able to measure attack angles from -15° to +15° (Trico brand or equivalent).

3.2.3 Arm Tip Force Gage (Trico Brand or Equivalent).

3.2.4 Pump. Pump type spray device to deliver water solutions through a spray nozzle (a standard garden-type pesticide/fertilizer sprayer, or equivalent).

3.2.5 Wiper Motor Jumper Harness. A fabricated pass-through harness which will allow measurement of the voltage at the wiper motor, or equivalent rework of wiring.

3.2.6 Voltmeter (0 V to 20 V).

3.2.7 Permanent-Set Fixture. A fixture to hold wiper blades in position and that applies a wiper arm tip force to these blades. When the fixture is placed in an oven the rubber blade elements will take a "set." This will simulate the blade condition where blade elements have been parked on the windshield at elevated ambient temperatures for extended periods. The fixture is to be approved by GM SVE and GM Designing Engineer (DE) prior to construction and use.

3.2.8 Oven. Large enough to fit the permanent-set fixture and able to achieve a temperature of 80 °C (176 °F). At Milford Proving Ground one is available in Building 24 in the strain gauge room.

3.2.9 Cold Weather Gear. Adequate clothing to use when conducting tests at low temperature.

3.2.10 Stop watch. To time wiper cycles.

3.2.11 Glass Cleaner. Non-abrasive, non-chlorinated cleanser (Bon Ami or Alconox) and non-abrasive scrubbing pad to clean glass.

3.2.12 Washer Fluid. GM Windshield Washer Fluid, Optikleen (Part Number 9985670).

3.3 Test Vehicle/Test Piece.

3.3.1 Test vehicle or buck with test-intent wiper system and wiped glass.

3.3.1.1 Unless otherwise specified, three samples of components or systems shall be tested.

3.3.1.2 All components/systems used in testing shall be within drawing specifications and have supporting data prior to start of test.

3.3.1.3 Glass used for test bucks or vehicles must be within drawing tolerances and no cracks or known deformities are allowed. Supplier to provide source warrants from Glass Supplier for each test piece.

3.3.2 Wiper blades and arms to test-intent. Consider such variables as:

- Length.
- Material.
- Design height.
- Drag force of blades.

Minimum number of test wiper blades:

- Six blades for the "new" blade evaluations. Two blades will be used for each temperature evaluation.
- Six blades for the "permanent-set" blade evaluations. Two blades will be used for each temperature evaluation.

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3.4 Test Time.

Calendar time: 4 d
Test time: See the following
Coordination time: See the following

The following is an estimate on the amount of time (work hours) needed to perform this procedure. Preparation and other downtime, actual test, and analysis of data are considered in capturing a total calendar time.

Technician Resource: 24 h
Engineer Resource: 24 h
Total Calendar Duration: 4 d

3.5 Test Required Information.

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

3.5.2 Supplier to develop five phase document for all test failures.

3.5.3 Product Security. Security protocol for the test vehicle must be followed per GM Security Guidelines.

3.6 Personnel/Skills. Two people familiar with recognizing and rating chatter conditions. One person each to observe each wiper side. A third person to operate the wiper system would also be helpful.

4 Procedure

4.1 Preparation.

4.1.1 The engineer shall:

4.1.1.1 Determine the test settings (nominal, low or high-specification, etc.,) for:

- Blade attack angle.
- Wiper arm tip force.

4.1.1.2 Obtain specifications for wiper cycle speed for use in determining if the test wiper system cycle speed is within design or test-intent.

4.1.1.3 Be certain to schedule use of temperature facilities early.

4.1.1.4 Obtain the design-specified wiper arm tip force to be used for setting weights in preparation for permanent-set.

4.1.2 Prepare the permanent-set blades as follows:

4.1.2.1 Label each blade "P" with a paint pen (P = permanent set).

4.1.2.2 Place the blades on the permanent-set fixture. For symmetrical overlap wiper systems some of the wiper attachments might have to be rotated 180° in order to set the blades in the correct direction.

4.1.2.3 Load the blades with weights to achieve the design specified arm tip force.

4.1.2.4 Slide the fixture glass one inch to simulate the wipers coming to inwipe and parking. Ensure that the entire length of each blade is set in the correct direction.

4.1.2.5 Optional. It is preferred to have blade weights on the blades during the oven soak (allows a constant blade force even after blade material relaxes). However, some oven dimensions may not allow the blade weights to remain on the blades during soak (i.e., if fixture must be turned on its edge). If this is the case, set-screws on the fixture may be used (to maintain the load on the wipers while the fixture is in the oven) and the weights removed.

4.1.2.6 For Chloroprene (CR) or Ethylene Propylene Diene Monomer (EPDM) rubber elements, place the fixture in the oven at 80 °C (176 °F) for 15 h to 18 h. Set the oven to 70 °C ± 1 °C for Natural Rubber (NR).

4.1.2.7 After removing the fixture from the oven, allow the blades to soak at the test temperature for 4 h.

4.1.2.8 Remove weights (or loosen set screws) only when removing a blade from the fixture for testing. If the blades are set down after being removed from the fixture, be sure the rubber elements are facing upward.

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