GM WORLDWIDE ENGINEERING STANDARDS	Test Procedure	GMW17210

Vehicle Level Headlamp Cleaning (Wash) System 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. This standard defines an assessment and standardizes the test methodology for validation performed by experts regarding performance of Headlamp Cleaning Systems. It does not replace regular test and validation work covered by other standards.

This work includes a complete subjective assessment on all criteria under customer perspective as listed in Appendix A. This is a living document and any suggestions or revision will be reviewed and/or updated annually by the Wiper/Wash Global Subsystem Leadership Team (GSSLT).

1.2 Applicability. Applies to all GM vehicles with Headlamp Cleaning System. In addition to the requirements of this specification, the system shall also fulfill the legal requirements of the countries in which they are operated, in conjunction with a high pressure headlamp washer system.

2 References

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

2.1 External Standards/Specifications.

ECE R45

2.2 GM Standards/Specifications.

GMW3600 GMW16300 (ID)

(ID) = This standard is limited to internal distribution within General Motors and shall not be distributed outside this company. Contact the GM Lead Engineer for further instructions.

2.3 Additional References.

- Five Phase Template
- GM Product Security Guidelines (https://gmweb.gm.com/HR/Security/Pages/FutureGuide.aspx)
- Program Specific Component Technical Specification (CTS)
- Program Specific Subsystem Technical Specification (SSTS)

3 Resources

3.1 Facilities. Public roads, winter test location, summer test location, climatic chamber. Proving Grounds shall provide a high speed track without speed limit and at least one road with rough surface. Automatic car wash.

Room capable of holding a vehicle and a viewing screen 25 m from the front end of vehicle. Room shall be capable of being dark

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. As required by the indicated test methods and specifications.

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3.2.1 Temperature Chamber. Recirculating air temperature chamber with air extraction system.

Test room:	Suitable size
Passages:	Suitable
Temperature range (-40 °C to +120 °C):	Continuously adjustable
Permissible temperature deviation:	±3 °C
Explosion proof	
Controlled humidity	

3.2.2 Digital Camera. Digital camera capable of zooming and taking videos.

3.2.3 Water Hardness. Verify that the hardness of the water does not exceed 3.17 grains per liter (12 grains per gallon). The water hardness certification may be obtained from the local water supplier. Otherwise, contractor shall obtain an equivalent certification or conduct such test within 60 days of beginning compliance test run. A suitable water softener shall be used if required.

3.2.4 Light meter/lumen meter.

3.3 Test Vehicle/Test Piece. Integration and validation vehicles with most powerful engine (except in winter test).

3.3.1 Test Samples. If not otherwise specified, for the purpose of initial sampling and release testing according to this specification, at least 3 pair of samples shall be used. The test samples shall be successively numbered. The factory test certificate shall contain the rated values and the actual values measured by the supplier as required in the specification and the drawings from the material and operational data.

3.3.2 Conditioning. If not otherwise specified in the individual tests, the tests shall be performed in the as-received condition at +23 °C ± 3 °C without any preconditioning.

3.3.3. Number of Test Samples. For the performance of a test according to this specification, three (3) pairs of samples (for the right and left) are requisite, which are to be delivered with a test certificate.

3.3.4 Quality Control. For the control of the quality of production, the Division Quality Control and Inspection is responsible. Any change at the jet horn compared to the released test samples requires GM approval.

3.3.5 Emerging Market Environmental Conditions. Emerging Markets are to use the following unless stated otherwise in the program specific Subsystem Technical Specification (SSTS) or the program specific Component Technical Specification (CTS).

T_{min} = -20 °C for India

T_{min} = -40 °C for Russia

T_{min} = -15 °C for South America only

3.4 Test Time. Regular and according ECE R45.

Calendar time:	8 days
Test hours:	60 hours
Coordination hours:	10 hours

3.5 Test Required Information.

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

3.5.1.1 Supplier to develop five (5) phase document for all test failures. Include photographs of the test setup and the individual test results.

3.5.2 Test Documentation.

3.5.2.1 Record measurements and results as specified by individual procedures in the final test report.

3.5.2.2 Document the test results in a test certificate or report. Test reports shall include all of the following: test equipment serial numbers, calibration information, description of test material (including design revision, lot or batch, options, etc.), test specification date, pertinent setup information, and photographs. The supplier shall write evaluation reports to document the results of all their validation activities and shall make the test results

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and evaluation reports available to GM engineers upon request (see GMW3600). All reports are to be in the English language. Document all test results, parameters and findings.

3.5.2.3 Photos of the test fixture and test sample.

3.5.2.4 The following is also required for **all** test reports:

- Procedure number and section numbers on all test reports.
- Requirement being met and SSTS or CTS requirement number.
- All test parameters for environment and equipment.
- Any authorized deviations to the plan.

3.5.2.5 Test Results. Test reports with supplier letterhead are to be generated by supplier performing test and electronically distributed to GM Validation. All test reports shall be in the English language.

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

3.6 Personnel/Skills. For subjective evaluation, experienced evaluators are requested. High speed test requires two drivers, two cars and one evaluator or an adequate video system. Supplier engineer is also recommended but not required.

4 Procedure

4.1 Preparation.

- Remove all camouflage from the front end of the vehicle.
- Ensure the latest Headlamp Cleaning System is in the vehicle.
- Test vehicle has to be completed with pre-validated (supplier) parts.

4.2 Conditions.

4.2.1 Environmental Conditions. The tested temperature range must fulfill ECE R45.

4.2.1.1 Regular. Ambient temperature: 23 °C ± 3 °C.

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 Headlamp Cleaning System (HLC).

4.3.1.1 Functionality During Idling of the Vehicle for Horn and Telescopic.

4.3.1.1.1 Purpose. The purpose of these tests is to ensure proper function of the Headlamp Cleaning System while the vehicle is in the idle condition.

4.3.1.1.2 Test Equipment.

4.3.1.1.2.1 Digital camera.

4.3.1.1.3 Test Samples.

4.3.1.1.3.1 One (1) vehicle with Headlamp Cleaning System.

4.3.1.1.4 Test Preparation. Remove all camouflage from the front end of the vehicle.

Ensure the latest Headlamp Cleaning System is in the vehicle.

4.3.1.1.5 Test Conditions. To be run under ambient conditions.

4.3.1.1.6 Procedure. During vehicle idling, the HLC has to be actuated ten (10) times. The HLC has to be checked to ensure it is properly functioning. Ensure that the washer reservoir is filled.

Note: Wait two minutes between every third activation to avoid thermal incident of the HLC components.

4.3.1.1.7 Test Requirements

- Function properly per the requirements in the program specific SSTS. Headlamp Cleaner shall actuate and spray as intended.
- No appearance issues with the class A surfaces.
- Meet regulatory requirements.

4.3.1.2 Functionality During Driving for Telescopic Nozzle.

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