



Outside Rear View Mirror Cable/Lever Remote Manual Actuator Strength Test

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 Outside Rear View Mirror (OSRVM) cable/lever remote manual actuator strength and the strength of its attachments to the door inner, door trim, instrument panel, or console.

1.2 Applicability. This procedure applies to all passenger cars, light duty trucks, and medium duty trucks having power and manual, outside rearview mirror systems with knob or joy-stick type remote actuators.

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.

GMW15799

2.3 Additional References.

2.3.1 Evaluation Report. CG190.

2.3.2 Outside Rearview Mirror Specifications.

- Component Technical Specification (CTS)
- Vehicle Technical Specification (VTS)

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

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

3 Resources

3.1 Facilities. The facility should have all of the equipment listed in 3.2 and be capable of providing the conditions required in 4.2.

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 list(s) include fixturing and instrumentation typically used 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.

GM Confidential

© Copyright 2018 General Motors Company All Rights Reserved

July 2018

Page 1 of 7

3.2.1.1 A body with fully assembled door is preferred to provide for proper cable routing (if applicable) and mirror support. A mirror holding fixture using actual body parts at the actuator attachment area may be used as an alternative.

3.2.1.2 Mirror actuator force gage adapters to apply load to the actuator knob.

3.2.2 Instrumentations.

3.2.2.1 A hand-held force gage with a capacity approximately 1.5x the specified load to be applied (see 3.5).

3.2.2.2 Power supply (12 V DC) with appropriate power mirror connectors.

3.3 Test Vehicle/Test Piece. Additional information on test required material and its assembly can be found in the Release and Process Documentation (see 2.3).

3.3.1 One (1) mirror assembly of the type specified for test. Additional mirror assemblies may be required for reliability purposes or in the event of breakage, when testing the remote actuator to ultimate strength.

3.3.2 Instrument panel, interior trim, consoles, and related actuator escutcheons, attachments, etc., which may affect mirror system strength.

3.3.3 A body with a fully assembled door is preferred to provide for proper cable routing (if applicable) and mirror support.

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 part of these times.

Technician resource: 2 h

Engineer resource: 4 h

Total calendar duration: 1 d

3.5 Test Required Information.

3.5.1 The requesting engineer is responsible for providing specifications appropriate to the particular vehicle line being tested (reference VTS/Subsystem Technical Specifications (SSTS) paragraph numbers, if applicable. See 2.3).

3.5.2 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.

3.5.3 The following specifications or information are required to run this test.

3.5.3.1 Point of load application on the mirror actuator knob.

3.5.3.2 Specified load to be applied to the mirror actuator knob, and if test to failure is required.

3.5.3.3 Order and direction of applied load.

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.

GM Confidential

© Copyright 2018 General Motors Company All Rights Reserved

July 2018

Page 2 of 7

AVA Documents
Document Sharing Hub

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.

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).

4.1.3 Facilities and/or Equipment Preparation. Record the instrumentation information on 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 (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.

Note: Unless this test is being performed on a competitive vehicle, structural analysis data should be available for the test being performed. For correlation purposes, communication between test and analysis personnel must take place to ensure that the loading conditions, restraints, and measurement locations are consistent between the test and analysis procedures.

4.3.1 Setup Instructions. Perform any functional/operational tests/evaluations as requested or as may be referenced in Section 2. Specifically, for the mirror cable/lever remote manual actuator, cycle the mirror system through full travel in all directions a minimum of three times, prior to the start of test, to assure proper operation and seating of all system components. 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.

4.3.2 Operating Instructions.

4.3.2.1 Determine the point of load application as directed in 3.5.3.1.

4.3.2.2 Perform the Outside Rear View Mirror, Performance Test, GMW15799.

4.3.2.3 Slowly apply a steadily increasing load to the actuator knob in the upward mirror movement direction (or as specified in 3.5) using the handheld force gage. Apply and maintain the load perpendicular to the actuator throughout travel. The applied loads are specified in 3.5.3.2.

4.3.2.4 Record the applied load and note any visible deformation, bending, breaking, etc. Note the load at which the mirror actuator assembly cracks or becomes non-functional, if applicable. The actuator may bottom-out on the actuator bezel and give inaccurate torque readings (as calculated in 4.3.2.7).

4.3.2.5 Perform the Outside Rear View Mirror, Performance Test, GMW15799, once again (see 4.3.2.2).

4.3.2.6 Repeat 4.3.2.2 thru 4.3.2.5 for the remaining three directions (downward, left to right, and right to left).

4.3.2.7 If torque values are needed, measure the length of the actuator arm from the point of load application to the center of rotation as determined from the part drawing. See 3.5.3.1, which provides the point of load application.

Compute the torques at the actuator knob using:

$$T = F \times L$$

Where:

T = Torque

F = Force

L = Length

GM Confidential

© Copyright 2018 General Motors Company All Rights Reserved

July 2018

Page 3 of 7



Documents

Document Sharing Hub