



Outside Rear View Mirrors Hand-Simulated Free Return (Breakaway) 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. The purpose of this GMW is to provide a simple hand-simulated procedure to confirm basic free-return Outside Rear View Mirror (OSRVM) functionality for robustness against slow impacts as may be encountered in customer usage (for example, from certain car washes), if it is ever questioned in a vehicle assembly plant, in a dealership, or during proving grounds vehicle level testing to protect against and/or to detect a quality spill.

Note: This GMW is not intended to be a validation test of OSRVM component technical specifications (CTS), as the supplier is engineering responsible for component level validation (Level III Supplier Integration). As such, each subsequent program with usage of a “breakaway” OSRVM is NOT expected to perform this GMW to verify its free-return functionality.

1.2 Applicability. This procedure applies to all passenger cars, light duty trucks, and medium duty trucks having breakaway-style OSRVs.

1.3 Remarks. While breakaway-style OSRVs are not part of the GM OSRVM strategy moving forward, this test procedure may be useful in evaluating the functional performance of legacy OSRVM systems, specifically in emerging market situations that may still have usage of older vehicle architectures and programs.

Note that at this time breakaway-style OSRVs are not an approved GM Bill of Materials (BOM) Row. As such, any potential new breakaway OSRVs would require an approved deviation from the Mirrors BOM Family Owner (BFO), Mirrors Global Subsystem Leadership Team (GSSLT) Leader, and Mirrors BOM Leader.

2 References

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

2.1 External Standards/Specifications.

IATF 16949

2.2 GM Standards/Specifications.

GMW14528

GMW16157

2.3 Additional References.

- CG190 Evaluation Report Template

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.

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3.2 Equipment. This test can either be conducted on a fixture/bench, on a built-up door assembly, or on a vehicle.

3.2.1. Bench Test. Breakaway OSRVs mounted to a rigid test fixture with a representative mounting surface to the OSRV, as shown in Figure 1 and Figure 2.

3.2.2 Door System Test. Breakaway OSRV mounted to a door assembly.

3.2.3 Vehicle Test. Breakaway OSRV mounted on a vehicle, as shown in Figure 3 and Figure 4.

Note: All instrumentation is to be calibrated as required to IATF 16949 or most current standard and recorded as appropriate.

3.3 Test Vehicle/Test Piece.

3.3.1 Test Vehicle. A test vehicle is not required unless a vehicle is being used as a test fixture per 3.2.3.

3.3.2 Test Piece. The breakaway OSRV assembly is the test piece of interest for this procedure.

3.4 Test Time.

Calendar time: 1 d

Test time: 20 h

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 Vehicle Technical Specification (VTS)/Subsystem Technical Specification (STS) paragraph numbers if applicable).

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.

3.6 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 insure all material listed in 3.3 is of correct design level and assembled properly.

4.1.2 Sample Preparation.

4.1.2.1 Sample Condition. 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).

4.1.2.2 Sample Identification. The mirrors to be tested shall be clearly numbered and/or otherwise identified so that it is possible post-test to easily match test data to its specific test sample.

4.1.3 Facilities and/or Equipment Preparation. Record the instrumentation calibration information on Data Sheet A1, Instrumentation Log, or an equivalent document.

4.1.4 Test Setup.

4.1.4.1 Assemble the mounting plates to the fixture (reference 3.2.1), the side door assembly to a fixture (reference 3.2.2), or prepare the vehicle for testing (reference 3.2.3) depending upon whether a bench test, a door system test, or a vehicle-level test is desired, respectively.

4.1.4.2 Mount the OSRVs to the test fixture, to the door assembly, or to the vehicle as required. Ensure that the mirror's fasteners are torqued to specification (even if the door system or the vehicle arrives to the test facility with the OSRVs preinstalled).

4.1.4.3 Inspect the condition of the OSRVs and of the fixture/door system/vehicle and document any potential issues/concerns that may have a possible effect on the test data.

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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). Per GMW16157, unless otherwise specified, tests shall be performed in the as received condition at $T_{room} = 23\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$. The relative humidity is typically $40\% \pm 20\%$, and the atmospheric pressure should be 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.

If the local test conditions are outside the range as specified in 4.2.1, then these alternative conditions shall be documented with the test results both pre and posttest.

Note: Deviations shall have prior approval before test initiation.

4.3 Instructions.

4.3.1 Pull the OSRVM forward to its maximum position (i.e., when the travel mechanically bottoms-out; reference Figure 1), and then release it and allow it to spring back to its neutral (initial position), as shown in Figure 2.

Note: Figure 3 and Figure 4 illustrate this same OSRVM system in its nominal design position mounted on a vehicle. These pictures are included so that the OSRVM's nominal position relative to the vehicle side is understood versus the OSRVM head in maximum forward position (Figure 1) and springing back into maximum rearward position (Figure 2).

4.3.2 If the mirror glass is displaced during step 4.3.1, then it shall be repositioned to its neutral position prior to continuation of this test.

4.3.3 Repeat steps 4.3.1 and 4.3.2, at a cycle frequency no greater than 30 tests per minute.

4.3.4 At every 50th test cycle, inspect the OSRVM for any potential damage/degradation, especially the pins in the structural hinge and/or in the breakaway spring mechanism.

4.3.5 Continue the test until the greater of the following two conditions are met:

4.3.5.1 The number of cycles has exceeded 3x the required test cycles of the automatic car wash test of GMW14528.

4.3.5.2 At least 500 test cycles have been completed without incident.



Figure 1: Breakaway OSRVM Head Pulled to its Maximum Forward Position

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