



Inside and Outside Rear View Mirrors - Stability and Adjustment

1 Scope

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 standard is to determine stability and adjustability of motor vehicle mirrors that are consistent with the requirements of:

- Federal Motor Vehicle Safety Standard (FMVSS) 111.
- Canada Motor Vehicle Safety Standard (CMVSS) 111.
- European Economic Community (EEC) 71/127 and Economic Commission for Europe (ECE) R46.01 and R46.02 (Supplement 4) requirements for Europe.
- Japan Article 44 Attachments 79, 80, and 81, Test Requirements and Instructions for Automobile Standards (TRIAS) 44-J079-01, TRIAS 44-J080-01, TRIAS 44-J081-01.
- Gulf States: Gulf Cooperation Council (GCC) Standardization Organization (GSO) 421 and 422.
- Korea Motor Vehicle Safety Standard (KMVSS) Articles 50 and 108.

1.2 Foreword. This procedure contains vehicle road and static tests used in evaluating whether a vehicle meets regulatory requirements for:

- Stability of mirror mounts (Road Test).
- Specified mirrors capability of being adjusted from the driver's seat (if it cannot be determined by design analysis) (Static Test).

1.2.1 This procedure may also be used to evaluate mirror stability against platform requirements that may be higher than the GMW14264 subjective rating of 5 or better needed to verify a **stable support**.

1.2.2 For additional performance targets, refer to:

- GMW16157 Inside Rear View Mirror (ISRVM)/Outside Rear View Mirror (OSRVM) Shared Requirements.
- GMW16158 ISRVM General/Mechanical Requirements.
- CG1741 OSRVM Global Component Technical Specification (CTS).

1.3 Applicability. To be used for Passenger cars, and/or multipurpose passenger vehicles, trucks.

2 References

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

2.1 External Standards/Specifications.

CMVSS 111	EEC 71/127	GSO 422	TRIAS 44-J079-01
ECE R46.01	FMVSS 111	KMVSS Article 50	TRIAS 44-J080-01
ECE R46.02	GSO 421	KMVSS Article 108	TRIAS 44-J081-01

2.2 GM Standards/Specifications.

GMW14264	GMW16158
GMW16157	

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2.3 Additional References.

- CG190
- CG1741 OSRVM Global CTS
- GM Global Legal Database
- Master Process Documents (MPD), Local Process Plans (LPP)
- Side Closures Subsystem Technical Specifications (SSTS)
- Uniform Product Codes (UPC)
- Vehicle Technical Specification (VTS)

3 Resources

3.1 Facilities. GM Milford Proving Ground (MPG) roads or equivalent. See Table B1 in Appendix B for the regional road systems.

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. Not applicable.

3.3 Test Vehicle/Test Piece.

3.3.1 Test Vehicle. Vehicle to be at curb mass plus any evaluators.

3.3.2 Test Mirrors. If testing for compliance.

3.3.2.1 A minimum of three mirrors should be tested. Testing additional mirrors raises the confidence level of the testing.

3.3.2.2 Verify that each mirror represents design released for production.

3.3.2.3 Mark each mirror for identification throughout test.

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

3.4.1 Preparation and other downtime, actual test, and analysis of data are considered in the total calendar time.

Technician resource: 12 hours

Engineer resource: 12 hours

Total calendar duration: 1 day

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, MPD, LPP as applicable, see 2.3).

3.5.1 Testing worst case scenarios may uncover some potential problems. Discuss with the requesting engineer if testing should include some worst case scenarios.

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

3.6.1 Evaluators.

3.6.1.1 For mirror image stability rating, select a jury of three evaluators experienced in on-road mirror evaluation.

3.6.1.2 For mirror adjustability (from driver's seat) evaluation, select three persons to represent the range of seated height (see Table 1) for driving population (acceptance range is ± 25 mm (± 1 in) for listed values). Seated height is the vertical distance from a hard sitting surface to the top of the head (not the hair). The individual should be seated erect (not relaxed) with their back against a vertical surface.

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Table 1: Seated Height Chart

Percentile	Millimeters	Inches
5	785	31.0
50	876	34.5
95	965	38.0

4 Procedure

4.1 Preparation.

4.1.1 Record information on Data Sheet A3 for test vehicle and mirror. Obtain maximum vehicle speed for Europe testing.

4.1.2 Stability Testing Only. Test ride vehicle to be sure that no abnormal vibration exists from tires, suspension, etc. Correct, if necessary (i.e., dynamic balancing). Adjust tire pressure to vehicle manufacturer recommendations.

4.1.3 Stability Testing Only. The Outside Rear View Mirror should be installed at its minimum torque spec to represent a worst-case assembly condition. Similarly, the T20 Torx set screw in the Inside Rear View Mirror should also be set to its minimum torque spec as well to model a worst-case assembly condition.

4.2 Conditions.

4.2.1 Environmental Conditions. Conduct test when wind velocity is 32 km/h (20 mph) or less. In addition, 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.

4.3.1 Mirror Stability Test. Passenger Cars, Multipurpose Vehicles, and Trucks with Gross Vehicle Mass (Weight) Rating (GVMR) of 4536 kg (10 000 lb) or less.

4.3.1.1 Select evaluators (see 3.6.1).

4.3.1.2 The test events are:

4.3.1.2.1 Vehicle stopped, engine idling, in DRIVE.

4.3.1.2.2 Random short wave road surface (e.g., Milford Proving Ground (MPG) 12 Mile Road – Fenn Holden Test Area) 56 km/h (35 mph).

4.3.1.2.3 Multiple swells road surface (e.g., MPG Pontiac Trail – Fenn Holden Test Area) 56 km/h (35 mph).

4.3.1.2.4 Frost heave impacts road surface (e.g., MPG 3rd Lane Oval Track) 89 km/h (55 mph).

4.3.1.2.5 Smooth road surface (e.g., MPG Circular Track). Increase speed from 72 km/h to 129 km/h (45 mph to 80 mph) slowly. Find critical vehicle speed with most vibration. Continue testing and rate at this speed. Record this speed on Data Sheet A3.

4.3.1.2.6 Europe, Saudi Arabia, and the Gulf States. Additional testing from 129 km/h (80 mph) to up to 80% of the vehicle's maximum designed speed or 150 km/h (93.8 mph), whichever is less.

4.3.1.2.7 Each evaluator is to operate the test vehicle for each test event and independently evaluate each rearview mirror. Care should be taken that an evaluator's rating is not influenced by another. This could happen if two or more evaluators ride in the test vehicle. Drive each route at stated speeds, using all road surface conditions, until each evaluator is confident with his ratings.

Note: Trucks have weight restrictions on the test sight roads. Consult Traffic Safety for details. Use the Truck Test Loop when weight restrictions apply.

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