



Transmission Packaging Clearance Check (Dynamic)

1 Scope

Note: Nothing in this standard supersedes 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. Verification of critical package situations by determination of the minimum distances around the transmission and external shifter to body and other aggregates.

Packaging clearance testing of the external shifter including its add-on and mounting parts in the event of abuse.

1.2 Foreword. This standard was formerly known as GMI R-7E-1.

1.3 Applicability. This procedure is applicable for testing all FWD, AWD and RWD transmission.

2 References

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

2.1 External Standards/Specifications.

None.

2.2 GM Standards/Specifications.

None.

2.3 Additional References. Not applicable.

ADV Plan, SOR, SSTs, VCRI, VTS

3 Resources

3.1 Facilities. The procedure is based on the following tracks available on the German Dudenhofen Proving Ground (see Appendix B).

Other proving grounds with corresponding specifications to the below described may be applicable.

3.1.1 Skid-pad (see Appendix B, paragraph B1).

3.1.2 Washboard Track (see paragraph 7.1.2 and Appendix B, paragraph B2).

3.2 Equipment.

3.2.1 Plasticine (brand of modeling clay).

3.2.2 Calipers for measuring plasticine thickness.

3.2.3 Cycle counter.

3.2.4 Writing materials.

3.3 Test Vehicle/Test Piece. Test vehicle with a clutch and manual transmission as approved or as ordered. Enter this data into the data sheet.

3.3.1 Relevant transmission type with the most powerful engine version / most critical package.

3.2.3 Two sets of new parts for the external shifter including its add-on and mounting parts.

3.2.4 Other vehicle equipment according to release.

3.4 Test Time.

Calendar time: 3 days

Test hours: 9 hours

Coordination hours: 3 hours

3.5 Test Required Information. Possible sources are:

- SOR
- VTS (Vehicle Technical Specifications)
- SSTs (Sub System Technical Specifications)
- ADV Plan
- VCRI
- Application engineer
- Development Groups
- Drawings

3.6 Personnel/Skills. Not applicable.

4 Procedure

4.1 Preparation.

4.1.1 The external shifter and its add-on or mounting parts shall be checked according to the release values and adjusted if necessary.

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Originating Department: GME Specification Center

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4.1.2 The vehicle shall be refueled. The engine oil and coolant level as well as the tire pressure shall be checked and corrected if necessary.

4.1.3 Any narrow gaps between the external shifter and the body or other aggregates shall be fitted with Plasticine for the determination of critical distances.

4.1.4 An operational and acoustic test of the external shifter shall be performed before performing the test.

4.2 Conditions

4.2.1 Environmental Conditions. The ambient temperature shall be (+15 to +25) °C in order to remain within the range of application of plasticine. The test shall be performed on dry road conditions.

4.2.2 Test Conditions. Deviations from the requirements of this standard shall be agreed upon. Such requirements shall be specified on component drawings, test certificates, reports etc.

4.2.2.1 The tests shall be performed with the driver and the permissible total weight (GVWR) as specified in the vehicle datasheets.

4.3 Instructions.

4.3.1 Procedure.

4.3.1.1 Brake (full braking) from ≈ 30 km/h (1st gear) forward and reverse (on the flat section), 3 times without declutching.

4.3.1.2 Drive off quickly with power hop on the 12 %, 20 % uphill gradients forward and reverse 3 times.

4.3.1.3 Washboard track: Drive quickly 3 times and brake (full braking), decelerating from the resonant range (no control of steering wheel).

4.3.1.4 Release the clutch 3 times rapidly (see paragraph 7.1.3) in 1st gear and in reverse gear at 3000 min⁻¹ by slipping foot off the clutch pedal and simultaneously applying WOT (see paragraph 7.2).

4.3.1.5 Drive in a figure of 8 with maximum steering lock for the left and right curves (10 times), increasing the velocity until the driving wheels suffer severe slippage (according to transmission type – under steer / over steer respectively).

4.3.1.6 Drive in a circle both 3 times clockwise and 3 times anticlockwise, with a radius of 30 m and a maximum cornering speed.

4.3.1.7 Full braking without declutching, once maximum cornering speed is achieved according to paragraph 4.3.1.6 both forward and reverse.

4.3.2 Investigation of Critical Distances. The narrow gaps or minimum distances between the external shifter and body or other aggregates shall be determined using plasticine. For documentation use Appendix A, Datasheet No.2.

4.3.3 Final Check. A functional test and a noise test of the external shifter shall be performed after the test has been performed.

5 Data

5.1 Calculations. The test is considered passed if the external shifter, its mounting or add-on parts and the operation of the external shifter actuator remain flawless. The minimum distances using Plasticine shall be > 10 mm for all tests. Any fracture of the mounting or add-on parts is not permitted.

5.2 Interpretation of Results. Refer to corresponding targets (e.g. SSTS, VTS).

5.3 Test Documentation. The results shall be noted in datasheets as provided in Appendix A. With reference to this Test Procedure the test results shall be represented in a test report.

6 Safety

This Engineering Standard may involve safety requirements for hazardous materials, the method of operations and equipment. This standard does not propose to address all the safety issues associated with its use. It is the responsibility of the user of this standard to ensure compliance with all appropriate safety and health practices. This would include any specific training that may be required. The safety and health standards include site specific rules and procedures, corporate rules and procedures, and Government Standards. Contact shall be made with the appropriate site Safety and Health personnel for further direction and guidance in these matters.

7 Notes

7.1 Glossary.

7.1.1 Minimum Distance. See Appendix A, Datasheet 2. The minimum distances guarantee that no contact occurs in any position between the shifter and the body or the drive train in either parked or driving operating conditions. Other components also included are coolant and A/C hoses, brake lines and electronic cables. For all tests the minimum distances using plasticine shall be > 10 mm or according to specified value in applicable specification.

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7.1.2 Washboard Test Track. See Appendix B, paragraph B2. Corrugated profile as per sinusoidal curve with a height of 3 cm and a length of 70 cm.

7.1.3 Rapid Clutch Engagement. Driver shall engage the clutch as fast as possible while moving the foot through a normal engagement path. The foot is permitted to come off of the pedal at the top of travel.

Engagement time: ≈ 0.2 s

7.2 Acronyms, Abbreviations, and Symbols.

GVWR	Gross Vehicle Weight Rating
WOT	Wide Open Throttle

8 Coding System

This material specification shall be referenced in other documents, drawings, VTS, CTS, etc. as follows:

Test to GMW16139

9 Release and Revisions

This standard was originated in October 2008. It was first approved by GM Powertrain in May 2011. It was first published in May 2011.

Issue	Publication Date	Description (Organization)
1	MAY 2011	Initial publication.

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