



## Transmission Cable Efficiency and Lash 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 is designed to determine the efficiency and lash characteristics of automatic transmission range selection cables.

**1.2 Applicability.** This test applies to all passenger cars and light duty trucks.

**1.3 Remarks.** This test measures load and travel characteristics on automatic transmission range selection cables.

### 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

### 3 Resources

**3.1 Facilities.** GMNA Test Laboratory or other comparable facility.

**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.** Equipment specified is used by GMNA Test Laboratories. Substitution of other comparable equipment is permitted.

**3.2.1** Bedplate, mandrel fixture.

**3.2.2** Test fixture as per Appendix A, Figure A1.

**3.2.3** Linear actuator with speed control (industrial devices).

**3.2.4** Two (2) load cells.

**3.2.5** Linear Variable Displacement Transducer (LVDT) to measure cable travel.

**3.2.6** Data collection software/hardware, three (3) channel minimum.

**3.2.7** Hydraulic cylinder with valving to provide resistance.

#### 3.3 Test Vehicle/Test Piece.

**3.3.1 Test Material Required.** Transmission Shift Cable.

### 3.4 Test Time.

Calendar time: 3 days  
Test hours: 48 hours  
Coordination hours: 24 hours

**3.5 Test Required Information.** Not applicable.

**3.6 Personnel/Skills.** Basic lab skills and familiarity with GM test procedures and reports.

## 4 Procedure

### 4.1 Preparation.

**4.1.1** Sample inspection: Record part number and remove routing tags after a cursory inspection.

**4.1.2** Install cable in the mandrel fixture based on the cable molded length in Appendix A, Figure A1.

**4.1.2.1** Molded length refers to the cable conduit length measured between the conduit end fitting gage faces as per Appendix A, Figure A2.

**Note:** If the cable molded length is too short to allow installation in the mandrel fixture, then the test shall be run with the cable in the vehicle as installed routing position.

**4.1.3** Install cable conduit end fittings in nominal (gauge or bracket) plate/interface, per design intent cable bracket and shifter.

**4.1.4** Connect the cable transmission end to a nominal terminal attachment feature or load cell connected to the hydraulic cylinder.

**4.1.5** Connect the cable shifter end to a nominal terminal attachment feature on the linear actuator.

**4.1.6** Cycle cable through full travel to ensure proper resistance.

### 4.2 Conditions.

**4.2.1 Environmental Conditions.** Temperature: 23 °C and 120 °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 Efficiency.

**4.3.1.1** At the cable shifter end, pull cable through full travel at 12.5 mm/s with 67 N resistance attached to the cable transmission end. Record the force to pull cable versus cable travel.

**4.3.1.2** At the cable shifter end, push cable through full travel at 12.5 mm/s with 67 N resistance attached to the cable transmission end. Record the force to push cable versus cable travel.

**4.3.1.3** Repeat 4.3.1 with 133 N resistance.

**Note:** Paragraphs 4.3.1.1 and 4.3.1.2 shall be performed at 23 °C.

#### 4.3.2 Lash.

**4.3.2.1** With cable in routed position according to 4.1, attach the transmission end to a fixed nominal-sized feature representative of the intended production design.

**4.3.2.2** Apply an alternating 17.8 N force to the shifter end of cable and record the total travel of the shifter end.

**4.3.2.3** Repeat 4.3.2.2 with 67 N force.

**Note:** Paragraphs 4.3.2.2 and 4.3.2.3 shall be performed at 23 °C.

**4.3.2.4** Repeat 4.3.2.2 after having soaked the cable at 120 °C for 1 h.

**4.3.2.5** Repeat 4.3.2.2 with 67 N force and after having soaked the cable at 120 °C for 1 h.

## 5 Data

**5.1 Calculations.** Cable efficiency is calculated by dividing the resistance by the peak force required to move the cable. The peak force is to be obtained within the center 90% of full cable travel.