



Laboratory Evaluation of Component ETRS Console Shifter Sounds

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 standard describes a laboratory method for evaluating select sound quality metrics for the operation of component Electronic Transmission Range Selection (ETRS) console shifters.

1.2 Applicability. All component ETRS console shifter core mechanisms.

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.

GMW14155

2.3 Additional References.

- Component Technical Specification (CTS)
- Subsystem Technical Specification (SSTS)

3 Resources

3.1 Facilities. Details given in GMW14155.

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. For details refer to GMW14155.

3.3 Test Vehicle/Test Piece. ETRS console shifter core mechanism.

3.4 Test Time.

Calendar time: 1 day

Test time: 4 h

Coordination time: 2 h

3.5 Test Required Information. Not applicable.

3.6 Personnel/Skills. Details given in GMW14155.

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4 Procedure

4.1 Preparation. General preparation according to GMW14155.

4.1.1 Evaluate the ETRS shifter in a free-free condition. Position the ETRS shifter on a foam pad to provide vibration isolation from the test bench.

4.1.2 Position the microphone 500 mm from the center of the top of the shifter and perpendicular to the shifter in the manner as shown in Appendix A, Figure A1.

4.2 Conditions.

4.2.1 Environmental Conditions. Not applicable.

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 Evaluate all modes of operation individually: Park to Drive, Drive to Park, Park to Reverse, Reverse to Park, etc.

4.3.2 Manually move the shift lever from one position to the next using a "normal" force. This is the force that a Customer would be expected to use in operating the shifter.

4.3.3 Record five (5) operations for each mode.

5 Data

5.1 Calculations. Calculate Loudness vs. Time as described in GMW14155.

5.1.1 Maximum Loudness. Calculate the maximum loudness as described in GMW14155 for each of the five (5) runs for each mode of operation. Make a list of the five (5) maximum values then discard the highest and lowest values. Average the remaining three (3) values to calculate the arithmetic Average Maximum Loudness for each mode of operation. Tabulate results in a data sheet such as in Appendix B, Data Sheet B1.

5.1.2 Root Mean Square (RMS) Loudness. Using the Loudness vs. Time data from the three (3) remaining runs identified in 5.1.1, calculate the RMS Loudness between 5 Sones and 5 Sones as described in GMW14155 for each of the three (3) remaining runs for each mode of operation. Average the three (3) values to calculate the arithmetic Average RMS Loudness for each mode of operation. Tabulate results in a data sheet such as in Appendix B, Data Sheet B1.

5.1.3 RMS Sharpness. Calculate the RMS Sharpness as described in GMW14155 for each of the three (3) runs for each mode of operation. Average the three (3) values to calculate the arithmetic Average RMS Sharpness for each mode of operation. Tabulate results in a data sheet such as in Appendix B, Data Sheet B1.

5.2 Interpretation of Results. Details given in GMW14155.

5.3 Test Documentation. Report Arithmetic Average Maximum Loudness, Arithmetic Average RMS Loudness, and Arithmetic Average RMS Sharpness values using Appendix B, Data Sheet B1 or similar format. A test report should be provided to GM with the results. Failure to achieve required levels as documented in Component Technical Specification (CTS) and/or Subsystem Technical Specification (SSTS) should be documented in Problem Resolution and Tracking System (PRTS) or other appropriate tracking system.

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, company 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.

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