



Sound Transmission Loss (STL) Pass-Through Evaluation Test Procedure

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.

Note: The Sound Transmission Loss Master Test Procedure, GMW14173, shall be referenced for more detailed information corresponding to the following procedure.

1.1 Purpose. To measure the sound transmission loss of a pass-through assembled in a standardized fixture and installed in a window between a reverberation room and an anechoic chamber

1.2 Applicability. This Sound Transmission Loss (STL) test procedure is appropriate for development and/or validation of a pass-through that can be incorporated into a fixture that will fit into an opening between a reverberation room and an anechoic chamber.

The pass-through performance includes the performance of the pass-through and the interface of the pass-through to surrounding components including, but not limited to, front of dash sheet metal and insulator mat.

1.3 Remarks. The test panel for pass-throughs must be tested in two (2) configurations. The first configuration is called the homogenous panel and the second configuration is called the test specimen panel or composite panel. The homogenous pane is essentially the test specimen panel with the pass-through removed. In place of the pass-through is a plug constructed from materials with the same properties as the remainder of the test specimen panel.

2 References

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

2.1 External Standards/Specifications.

ASTM E90

2.2 GM Standards/Specifications.

GMW14173

2.3 Additional References.

Subsystem Technical Specification (SSTS)

3 Resources

3.1 Facilities. Reference GMW14173.

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. Reference GMW14173.

3.3 Test Vehicle/Test Piece. The components required include the pass-through, sheet metal, insulator mat and any other hardware required to correctly emulate in-vehicle execution.

The vehicle program intent, insulator mat material shall be used for measuring pass-through performance with the exception being front of dash materials with insufficient (within 10 dB of pass-through requirement for the

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1600 Hz $\frac{1}{3}$ octave band and higher) STL to measure the pass-through performance. If the insulator mat STL performance is not sufficient, a sound barrier assembly with same thickness and replicating the pass-through and insulator mat in-vehicle interface shall be substituted.

3.4 Test Time.

Calendar time: 2 to 3 days
Test hours: 4 to 8 hours
Coordination hours: 1 to 2 hours

3.5 Test Required Information. The pass-through area and the area of the opening in the panel sheet metal are required to complete area weighted post-processing calculations. The area of the pass-through is considered to be the largest surface area on the test specimen panel that is not BOTH sheet metal AND insulator mat. The pass-through area is very important to the quality of the data and shall be carefully calculated and noted in test documentation.

3.6 Personnel/Skills. Reference GMW14173.

4 Procedure

4.1 Preparation.

4.1.1 Flanking Check Panel. The recommended construction is 4.88 kg/m² limp mass barrier with 25 mm equivalent insulator mat on a 0.76 mm steel panel.

4.1.2 Test Specimen Panel Preparation. The pass-through position shall emulate in-vehicle implementation. Design intent sheet metal thickness, sheet metal opening size and dash mat opening size shall be used to construct the test panel. The interface between the pass-through and the front of dash material shall duplicate in-vehicle performance, which may include the use of molded parts, brackets and insulator mat or sound barrier assembly with correct material thickness. See Appendix A for additional instructions for specific pass-throughs.

Although the interface between the front of dash material and pass through is critical, the dash mat material is not being evaluated, thus, the actual dash material is not required and shall be simulated with sound barrier material. This is especially important for those programs implementing a dissipative front of dash material.

In designs where the dash mat material covers the pass-through, the production intent material should be used in the specific area over the pass-through while the remaining area of the test panel is covered with sound barrier material.

4.1.3 Homogenous Panel Preparation. The homogenous panel shall be constructed by un-installing the pass-through from the test specimen panel. Any openings in sheet metal and insulator mat shall be treated with a "plug" made with the exact same materials properties as the remainder of the test specimen panel. In most cases, the material removed to create the pass-through opening is available for use as the hole plug. Sheet metal and sound barrier assembly plugs shall be sealed to eliminate leakage at the plug interface and to produce uniform panel STL.

4.2 Conditions. Reference GMW14173.

4.2.1 Environmental Conditions. Reference GMW14173.

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. Reference GMW14173. The test specimen shall be measured twice, once as a homogenous panel and the second time with the pass-through installed.

5 Data

5.1 Calculations. An additional calculation to GMW14173 shall be made and is listed in Appendix B.

5.2 Interpretation of Results. Verify whether Subsystem Technical Specification (SSTS) requirements are achieved, when appropriate.

5.3 Test Documentation. The data shall be stored in one-third ($\frac{1}{3}$) octave bands.

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