



Sound Transmission Loss (STL) and Sound Power Based Insertion Loss (PBIL) Buck Evaluation 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.

1.1 Purpose. To measure the Sound Transmission Loss (STL) and Sound Power Based Insertion Loss (PBIL) of a subsystem installed in a test buck that is installed between a reverberation room and anechoic room.

1.2 Applicability. This procedure applies to passenger vehicle bucks placed between a reverberation room and anechoic room. This procedure can be used for development and/or validation of the STL or PBIL of automotive components.

1.3 Remarks. Wholly contained in the Sound Transmission Loss master test procedure GMW14173.

2 References

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

2.1 External Standards/Specifications.

None

2.2 GM Standards/Specifications.

GMW14173

2.3 Additional References.

Subsystem Technical Specifications (SSTS)

3 Resources

3.1 Facilities. Wholly contained in 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. Wholly contained in GMW14173.

3.3 Test Vehicle/Test Piece. The components that are required include the subsystem to be measured, sheet metal and necessary trim to capture the flanking path correctly.

The subsystem assembly shall be mounted into a prefabricated frame, positioned such that the subsystem is in the same plane of the reverberation room wall without significantly protruding into the reverberation room. Consideration should be given to installation of parts and maintaining the part location without added excessive adhesives (see 4.1.1).

3.4 Test Time.

Calendar time: 5 to 20 days

Test hours: 8 to 16 hours

Coordination hours: 1 to 2 hours

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3.5 Test Required Information. Wholly contained in GMW14173.

3.6 Personnel/Skills. Wholly contained in GMW14173.

4 Procedure

4.1 Preparation.

4.1.1 Test Specimen Preparation. Treat any opening of the test area including sheet metal, and/or components that are not part of the interior noise path. Treatment should be applied to both the source and non-source sides of the buck. In the areas where treatment is applied, the STL above 1 kHz shall exceed the STL of the test area by at least 10 dB.

When evaluating a dash mat, the mat should be placed against the metal as in production with no artificial air gaps. If necessary, adhesive can be applied around pass-through openings within a perimeter of approximately 40 mm. The pass-through opening in the sheet metal shall be treated in two (2) layers of noise patch material. The openings in the dash mat shall be treated with sound barrier assembly plugs sealed to the surrounding dash mat with tape and noise patch.

4.1.1.1 Reference Buck. For buck testing, a separate panel does not need to be constructed to check the flanking associated with buck fixtures. This is because the flanking associated with a buck is most commonly a result of how the vehicle sheet metal is fixture into the test frame as well as the test frame itself, not due to the interface between the test frame and the facility.

If a reference buck is constructed using a homogeneous limp material, typically a synthetic rubber sheet such as a sound barrier material is used.

An alternative to building a separate reference buck is to use a large flat area on an existing buck. The glass on a door buck is a good example.

4.2 Conditions. Wholly contained in GMW14173.

4.2.1 Environmental Conditions. Wholly contained in 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. Wholly contained in GMW14173.

5 Data

5.1 Calculations.

For STL: See GMW14173.

For PBIL:

- Measure the STL for the complete assembly.
- Measure the STL for the complete assembly minus the subsystem being evaluated.
- Subtract the STL obtained in step "b" from the STL obtained in step "a". The remainder is the PBIL for the subsystem that was removed.

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

5.3 Test Documentation. The data shall be recorded in $\frac{1}{3}$ octave bands.

6 Safety

This standard may involve hazardous materials, operations, and equipment. This standard does not propose to address all the safety problems associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

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