



Sound Transparency of Speaker Covering

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 to determine the acoustic transparency characteristics of a material or combination of materials, being considered for use as a covering for a speaker in a GM automotive sound system.

1.2 Applicability. Textile materials for speaker covering.

2 References

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

2.1 External Standards/Specifications.

IEC 60268-5

2.2 GM Standards/Specifications.

None

3 Resources

3.1 Facilities. Not applicable.

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.

- Pink Noise Generator
- Audio Power Amplifier

3.2.1 Audio Spectrum Analyzer. Capable of at least 1/3 Octave Measurements.

3.2.2 Measurement Microphone. Microphone capable of frequency measurement from 20 Hz to 20 kHz $\pm$ 0.5 dB.

- Microphone preamplifier
- Audio speaker

3.2.3 Speaker Coverings for Vehicle Speakers Larger Than 25.4 mm in Diameter. A full range speaker capable of effective frequency production from 100 Hz to 18 kHz equal in size to the vehicle speaker. The speaker must be preconditioned as defined in IEC 60268-5.

3.2.4 Speaker Coverings for Vehicle Speakers 25.4 mm in Diameter or Smaller. A speaker capable of effective frequency production from 2 kHz to 20 kHz equal in size to the vehicle speaker. The speaker must be preconditioned as defined in IEC 60268-5.

3.2.5 Speaker Enclosure. Speaker measuring enclosure as defined in IEC 60268-5.

3.3 Test Vehicle/Test Piece. Not applicable.

3.4 Test Time.

Calendar time:	1 day
Test hours:	2 hours
Coordination hours:	2 hours

3.5 Test Required Information. Not applicable.

3.6 Personnel/Skills. Personnel trained in accordance with the laboratory accreditation and standard operating procedure requirements.

4 Procedure

4.1 Preparation. Not applicable.

4.2 Conditions. Not applicable.

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. The covering sample being tested is placed over the face of the speaker in the test fixture. The transparency of the covering is characterized by the measurement of changes of amplitude passing through the covering on three (3) axes. This determination is made by comparison of the frequency spectrum achieved with covering in place versus the frequency spectrum achieved with the covering removed.

4.3.1 Test Setup. The procedures shall be run in either:

- A semi anechoic chamber.
- Quiet environment where the average background noise from 100 Hz to 20 kHz is 20 dB less in amplitude than that of the test signal being used.

4.3.1.1 Output of the pink noise generator is connected to the input of the power amplifier.

4.3.1.2 Output of the power amplifier is connected to the speaker mounted in the enclosure.

4.3.1.3 Enclosure is positioned so that the speaker is positioned vertically up.

4.3.1.4 Microphone is connected to the preamplifier input.

4.3.1.5 Preamplifier output is connected to the spectrum analyzer input.

4.3.1.6 The microphone is positioned one half meter over the speaker.

4.3.1.7 The microphone is placed at each of the following axes for testing:

- 0 degrees on the centerline of the speaker directly above the speaker.
- 30 degrees rotation from the centerline of the speaker.
- 60 degrees rotation from the centerline of the speaker. See Figure 1.

4.3.1.8 Set the signal generator and amplifier gains such that the spectrum analyzer reads about 60 dB to 70 dB sound pressure in the 500 Hz to 15 kHz frequency range.

4.3.1.9 Set up the analyzer for an averaging time of 16 s or longer.