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ACOUSTIC SYSTEMS ACOUSTICAL RESEARCH FACILITY OFFICIAL LABORATORY REPORT AS-TL1945



Subject: Sound Transmission Loss Test

Date: March 04, 2002

Contents: Transmission Loss Data, One-third Octave Bands
Transmission Loss Data, One-third Octave Bands
Sound Transmission Class Rating
Outdoor/Indoor Transmission Class Rating

on

7/8" Acoustic Composite

for

Rendered by Manufacturer and released to
Acoustical Surfaces
123 Columbia Court North
Chaska, MN 55318

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INTRODUCTION

The Transmission Loss of a partition in a specified frequency band is defined as ten times the common logarithm of the airborne sound power incident on the partition to the sound power transmitted by the partition and radiated on the other side. The quantity so obtained is expressed in decibels.

APPLICABLE STANDARDS

ASTM E 90-99, "Standard Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements"

ASTM E 413-87, "Classification for Sound Insulation Rating"

ASTM E 1332-90, "Classification for Determination of Outdoor-Indoor Transmission Class"

SPECIMEN DESCRIPTION

The test specimen consisted of multi-layer composition acoustic material whose overall dimensions were 1219 mm in width by 2413 mm in length by 38 mm in depth [48 by 95 by 1-1/2 inches]. The test specimen was designed, manufactured, submitted for test, and designated "7/8" Acoustic Composite" by manufacturer for Acoustical Surfaces Inc. 123 Columbia Court North, Suite 201, Chaska MN 55318. The test specimen had a calculated density of 147 kg/m³ [9.2 pounds per cubic foot]. The specimen components were constructed of acoustic insulator material of thickness 9.5 mm [3/8 inch] and quoted density 208 kg/m³ [13 pounds per cubic foot]; a barrier material of non-woven synthetic material with thickness 3.2 mm [1/8 inch]; another layer of acoustic insulator material of thickness 9.5 mm [3/8 inch] and quoted density 208 kg /M3 [13 pounds per cubic foot]; and, a reinforced foil vapor barrier of thickness 0.03 mm [0.001 inches]. The reinforced foil vapor barrier faced the Source Room for this test. At the request of the client, additional details of the insulator material's specific composition are withheld for the purposes of safeguarding proprietary control over this product. (These construction details remain as part of the controlled test file to fulfill test specimen documentation requirements.)

The weight of the test specimen was measured as 9.5 kg [21 pounds], producing a weight per unit area of 3.2 kg/m² [0.67 pounds per square foot]

TEST SPECIMEN MOUNTING

The specimen was mounted in a filler wall within the 2440 mm by 2440 mm transmission loss test opening. The interior and exterior faces of the specimen were sealed to the test aperture edge with batten strips and tape. The calculated transmission loss of the composite assembly (test specimen and filler wall) was adjusted to account for sound power transmitted through the filler wall.

DESCRIPTION OF TEST

Two (2) loudspeakers in a 200 cubic meter reverberation chamber, designated as the "Source Room", produced broadband pink noise. A 254 cubic meter reverberation chamber, designated as the "Receive Room", is coupled to the Source Room through the transmission loss opening. The steady-state space-time average sound pressure levels in the Source and Receive Room were determined using rotating microphone booms and a Norsonic NI-830 Dual Channel Real Time Analyzer. The precision of the resulting calculated Sound Transmission Loss varies with frequency band and is included in the Data Table that follows. The test was performed in accordance with ASTM E 90-99 except where discussed. This test took place at ACOUSTIC SYSTEMS ACOUSTICAL RESEARCH FACILITY, Austin, Texas, on February 19, 2002.

SOUND ABSORPTION DATA

The Sound Transmission Loss of the test specimen at the preferred one-third octave band center frequencies is tabulated below and then presented graphically. Octave-band Transmission Loss values are calculated as described in Section 12.4 of ASTM E90-99.

7/8" Acoustic Composite

| 1/3 Octave Band Center Freq. (Hz) | Transmission Loss (dB) | Uncertainty (+/-dB) | NOTES | Octave Band TL (dB) | STC Deficiencies |
|-----------------------------------|------------------------|---------------------|-------|---------------------|------------------|
| 50 | 10 | | [g] | | |
| 63 | 11 | | [g] | 10 | |
| 80 | 8 | 2.4 | [g] | | |
| 100 | 7 | 2.0 | | | |
| 125 | 11 | 2.6 | | 9 | |
| 160 | 11 | 1.6 | | | |
| 200 | 10 | 0.7 | | | |
| 250 | 10 | 0.9 | | 10 | |
| 315 | 11 | 0.7 | | | 2 |
| 400 | 12 | 0.6 | | | 4 |
| 500 | 13 | 0.5 | | 13 | 4 |
| 630 | 15 | 0.5 | | | 3 |
| 800 | 15 | 0.4 | | | 4 |
| 1000 | 15 | 0.4 | | 16 | 5 |
| 1250 | 17 | 0.3 | | | 4 |
| 1600 | 18 | 0.2 | | | 3 |
| 2000 | 21 | 0.3 | | 20 | |
| 2500 | 24 | 0.3 | | | |
| 3150 | 28 | 0.2 | | | |
| 4000 | 31 | 0.2 | | 30 | |
| 5000 | 35 | 0.3 | | | |
| 6300 | 38 | 0.4 | | | |
| 8000 | 42 | 0.5 | | 41 | |
| 10000 | 44 | 0.8 | | | |
| STC | 17 | | | | |
| OITC | 14 | | | | |

Note: Reverberation times are calculated based on the first 15 dB of decay including an initial 5 dB drop. Acoustic Systems maintains in its files quality assurance documentation indicating the result magnitude and uncertainty are consistent with calculation methods of Section 11.4.1 of ASTM E 90-99. [a]: Receive room SPL corrected for background noise; [b]: Receive room SPL too close to ambient. Correction of 2 dB applied and result represents lower bound for TL in this band; [c]: Correction made for flanking transmission; [d]: Transmission Loss of specimen too close to facility limit. No facility correction applied and result represents lower bound for TL in this band; [e]: Transmission Loss of specimen too close to filler wall. Result represents lower bound for TL in this band; [f]: Insufficient precision to meet requirements of Section A.2.2 of ASTM E 90-99; [g]: An insufficient number of statistically independent samples are available in the band to determine precision.

During the test, environmental conditions in the Receive Room were 24.3C with 77.5% relative humidity. Conditions in the Source Room were 24.6C with 77.3% relative humidity. The precision values [±] tabulated above represent 95% probability that the true mean value lies within the stated range.

Respectfully Submitted,



Michael C. Black
 Laboratory Technical Director

7/8" Acoustic Composite AS-TL 1954; STC 17 OITC 14

