

Airborne Sound Transmission Loss Measurement
Performed on One Wall Assembly with 25 mm (1")
Supress Panels for Supress Products LLC

Author



N.L. Brunette

Quality
Assurance



Dr. J.D. Quirt, Ph.D.
Group Leader

Approved



Dr. M.R. Atif, Ph.D.
Director, Indoor Environment

Report No: B3453.5
Report Date: November 1, 2006
Contract No: B3453
Reference: Agreement dated September 26, 2006
Program: Indoor Environment

3 pages
Copy No. 2 of 4 copies

This report may not be reproduced in whole or in part without the written consent of
both the client and the National Research Council Canada

Client: Supress Products
Specimen: 25 mm (1") Supress Panels
Specimen ID: B3453-5W
Construction Dates: October 31st and November 1st, 2006

Test Specimen:

The wall had a double row of wood studs; on the exterior face of both sides were Supress panels identified by the client as SED 4448. The double row of 38 x 89 mm wood studs were spaced 610 mm on center and an air space of 76 mm was left between the two rows of wood studs. The 89 mm thick, R12 glass fibre batts were installed in the cavities of the double row of wood studs. The joints of the 25 mm thick Supress panels were caulked with Supress acoustical sound sealant, then covered with a metal tape. The Supress panels were attached vertically to the studs with 51 mm long, type S drywall screws spaced 406 mm on centre, along the edges and in the field.

Specimen Properties

Element	Actual Thickness (mm)	Surface weight (kg/m ²)	Mass (kg)
Supress Panel - SED 4448		23.05	205.6
Glass Fibre Batts 90 mm		1.05	9.4
Wood Studs		4.43	39.5
Air		-	-
Wood Studs		4.39	39.2
Glass Fibre Batts 90 mm		1.03	9.2
Supress Panel - SED 4448		23.14	206.4
Total	306		509.3

Test Specimen Installation:

During the measurements, the test specimen was mounted in the IRC acoustical wall test opening which measures approximately 3.66 m x 2.44 m. The perimeter of the specimen was sealed on both sides with caulking and then covered with a metal tape.

The area used for the calculation of the airborne sound transmission loss was 8.92 m².

The results reported above apply only to the specific sample submitted for measurement. No responsibility is assumed for performance of any other specimen.

Airborne sound transmission loss measurements were conducted in accordance with the requirements of ASTM E90-04, "Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements".

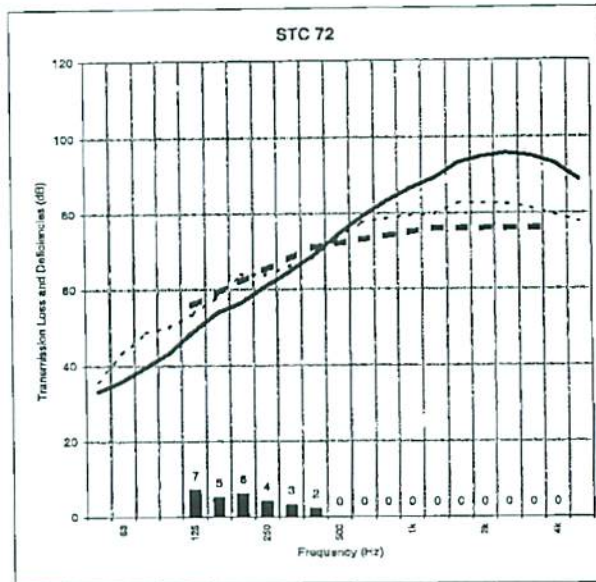
Client: Supress Products
 Specimen ID: B3453-5W
 Test ID: TLA-06-013
 Tested: 01-Nov-06

Small Room Volume: 138 m³
 Large Room Volume: 250 m³

Measured Temperature and Relative Humidity During

Room	Temperature, °C		Humidity %	
	Min	Max	Min	Max
Small	19.9	20.0	32.5	33.9
Large	22.0	22.0	26.1	26.7

Frequency (Hz)	Airborne Sound Transmission Loss (dB)	95% Confidence Limits
50	33 *	
63	36 *	
80	40 c	± 4.6
100	43 c	± 4.0
125	49 c	± 2.2
160	54	± 1.7
200	56	± 1.2
250	61	± 1.0
315	65	± 0.9
400	69	± 0.8
500	74 c	± 0.6
630	79	± 0.6
800	83 c	± 0.6
1000	87 *	± 0.5
1250	89 *	± 0.6
1600	93 *	± 0.6
2000	95 *	± 0.7
2500	96 *	± 0.8
3150	95 *	± 0.8
4000	93 *	± 0.8
5000	89 *	± 0.9
Sound Transmission Class (STC) = 72		



In the graph:

Solid line is the measured sound transmission loss for this specimen. Dashed line is the STC contour fitted to the measured values according to ASTM E413-04. The dotted line is 10 dB below the flanking limit established for this facility. For any frequency where measured transmission loss is above the dotted line, the reported value is potentially limited by vibration transmission via laboratory surfaces, and the true value may be higher than that measured.

Bars at bottom of graph show deficiencies. At each frequency the difference between the shifted reference contour value and the measured data is calculated. Only deficiencies, that is, where the measured data are less than the reference contour, are counted in the fitting procedure for the STC, defined in ASTM E413.

In the table:

Values marked "c" indicate that the measured background level was between 5 dB and 10 dB below the combined receiving room level and background level. The reported values have been corrected according to the procedure outlined in ASTM E90-04.

Values marked "*" indicate that the measured background level was less than 5 dB below the combined receiving room level and background level. The reported values provide an estimate of the lower limit of airborne sound transmission loss.

Note: At some frequencies, the measured sound transmission loss for this specimen was less than 10 dB below the limiting transmission loss established for flanking (structure-borne) transmission via facility surfaces. Hence the measured values are potentially limited by flanking and the true values may be higher than those measured. The STC value is not limited by flanking.

The results reported above apply only to the specific sample submitted for measurement. No responsibility is assumed for performance of any other specimen.

**APPENDIX:
Airborne Sound Transmission
Wall Facility**

National Research Council Canada
Institute for Research in Construction
Acoustics Laboratory
1200 Montreal Road, Ottawa, Ontario K1A 0R6
Tel: 613-993-2305 Fax: 613-954-1495

Facility and Equipment: The acoustics test facility comprises two reverberation rooms (referred to in this report as the small and large rooms) with a moveable test frame between the two rooms. In each room, a calibrated Bruel & Kjaer type 4166 condenser microphone with preamp is moved under computer control to nine positions, and measurements are made in both rooms using a real time analyzer controlled by a desktop PC-type computer. Each room has four loudspeakers driven by separate amplifiers and noise sources controlled by the computer. To increase the randomness of the sound field, there are also fixed diffusing panels in each room.

Test Procedure: Airborne sound transmission measurements were conducted in accordance with the requirements of ASTM E90-04, "Standard Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions". Airborne sound transmission loss tests were performed in the forward (receiving room is the large room) and reverse (receiving room is the small room) directions. Results presented in this report are the average of the tests in these two directions. In each case, sound transmission loss values were calculated from the average sound pressure levels of both the source and receiving rooms and the average reverberation times of the receiving room. One-third octave band sound pressure levels were measured for 32 seconds at nine microphone positions in each room and then averaged to get the average sound pressure level in each room. Five sound decays were averaged to get the reverberation time at each microphone position in the receiving room; these times were averaged to get the average reverberation times for the room. Information on the flanking limit of the facility and reference specimen test results are available on request.

Significance of Test Results: ASTM E90-04 requires measurements in 1/3-octave bands in the frequency range 100 Hz to 5000 Hz. Within those ranges, reproducibility has been assessed by inter-laboratory round robin studies. The standards recommend making measurements and reporting results over a larger frequency range, and this report presents such results, which may be useful for expert evaluation of the specimen performance. The precision of results outside the 100 to 5000 Hz range has not been established, but is expected to depend on laboratory-specific factors.

Sound Transmission Class (STC): was determined in accordance with ASTM E413-04, "Classification for Rating Sound Insulation". The Sound Transmission Class (STC) is a single-figure rating scheme intended to rate the acoustical performance of a partition element separating offices or dwellings. The higher the value of the rating, the better the performance. The rating is intended to correlate with subjective impressions of the sound insulation provided against the sounds of speech, radio, television, music, and similar sources of noise characteristic of offices and dwellings. The STC is of limited use in applications involving noise spectra that differ markedly from those referred to above (for example, heavy machinery, power transformers, aircraft noise, motor vehicle noise). Generally, in such applications it is preferable to consider the source levels and insulation requirements for each frequency band.

Confidence Limits: Acoustical measurement in rooms is a sampling process and as such has associated with it a degree of uncertainty. By using enough microphone and loudspeaker positions, the uncertainty can be reduced and upper and lower limits assigned to the probable error in the measurement. These limits are called 95% confidence limits. They are calculated for each test according to the procedures in ASTM E90-04 and must be less than upper limits given in the standards. These confidence limits do not relate directly to the variation expected when a nominally identical specimen is built, installed and tested (repeatability). Nor do they relate directly to the differences expected when nominally identical specimens are tested in different laboratories (reproducibility).

In Situ Performance: Ratings obtained by this standard method tend to represent an upper limit to what might be measured in a field test, due to structure-borne transmission ("flanking") and construction deficiencies in actual buildings.