


Airborne Sound Transmission Loss Measurements  
Performed on One Wall Assembly for Quiet Solution  
Inc.

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Report No: B3440.1  
Report Date: December 21, 2005  
Contract No: B3440  
Reference: Agreement dated November 24, 2005  
Program: Indoor Environment

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**Client:** Quiet Solution  
**Specimen:** Wall assembly with QR-525  
**Specimen ID:** B3440-1W  
**Construction Dates:** December 13th, 2005

**Test Specimen:**

The wall had a single row of wood studs; on the exterior face of one side was QuietRock QR-525 panels over a single layer of gypsum board and on the other gypsum board only. The 38 x 89 mm wood studs were spaced 610 mm on center. The 89 mm thick, R12 glass fibre batts were installed in the cavities of the single row of wood studs. The joints of the 15 mm thick QuietRock QR-525 panels and the type X, 16 mm thick gypsum boards were caulked with QuietSeal acoustical sound sealant then the joints were covered with a metal tape. The gypsum boards and the QuietRock QR-525 panels were attached vertically to the studs with 41mm long, type S drywall screws spaced 406 mm along the edges and in the field. The joints of the QuietRock QR-525 panels and the gypsum boards on the two sides of the wall were offset by 400 mm.

**Specimen Properties**

Element	Actual Thickness (mm)	Surface weight (kg/m <sup>2</sup> )	Mass (kg)
QR-525		13.79	123.0
Gypsum Board		10.81	96.4
Glass Fibre Batts		0.84	7.5
Wood Studs		4.96	44.2
Gypsum Board		10.56	94.2
<b>Total</b>	136		365.3

**Test Specimen Installation:**

During the measurements, the test specimen was mounted in the IRC acoustical wall test opening which measures approximately 3.66 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 m<sup>2</sup>.

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*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".

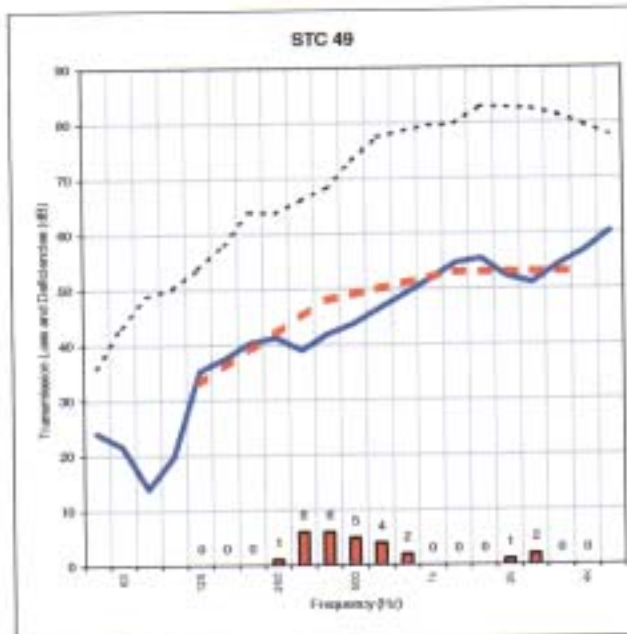
Client: Quiet Solution  
 Specimen ID: B3440-1W  
 Test ID: TLA-05-052  
 Tested: 13-Dec-05

Small Room Volume: 138 m<sup>3</sup>  
 Large Room Volume: 250 m<sup>3</sup>

**Measured Temperature and Relative Humidity During**

Room	Temperature, °C		Humidity %	
	Min	Max	Min	Max
Small	18.9	19.2	19.0	22.3
Large	22.4	22.5	16.9	17.7

Frequency (Hz)	Airborne Sound Transmission Loss (dB)	95% Confidence Limits
50	24	
63	22	
80	14	± 3.1
100	20	± 3.8
125	35	± 2.4
160	37	± 1.8
200	40	± 1.2
250	41	± 1.0
315	39	± 1.0
400	42	± 0.6
500	44	± 0.7
630	46	± 0.8
800	49	± 0.4
1000	52	± 0.5
1250	55	± 0.5
1600	55	± 0.4
2000	52	± 0.4
2500	51	± 0.7
3150	54	± 0.9
4000	57	± 1.0
5000	60	± 1.0
Sound Transmission Class (STC) = 49		



**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.

*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.