


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

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Client: Quiet Solution
Specimen: Wall assembly with QR-525
Specimen ID: B3440-3W
Construction Dates: December 15th, 2005

Test Specimen:

The wall had two rows of wood studs; on each exterior face was a single layer of QuietRock QR-525 panels. The 38 x 89 mm wood studs were spaced at 406 mm on center with an air space of 75 mm between the two rows of studs. The 89 mm thick, R12 glass fibre batts, were installed in the cavities of the two rows of wood studs. The 15 mm thick QuietRock QR-525 panels were attached vertically to the wood studs with 41 mm long, type S drywall screws, spaced at 406 mm along the edges and in the field. The joints of the QuietRock QR-525 panels on the two sides of the wall were offset by 400 mm. The joints of the QuietRock QR-525 panels were caulked with QuietSeal acoustical sound sealant and covered with a metal tape on both sides of the wall assembly.

Specimen Properties

Element	Actual Thickness (mm)	Surface weight (kg/m ²)	Mass (kg)
QR-525		13.79	123.0
Glass Fibre Batts		0.84	7.5
Wood Studs		6.00	53.5
Air		-	-
Wood Studs		5.87	52.4
Glass Fibre Batts		0.85	7.6
QR-525		13.80	123.1
Total	283		367.1

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 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".

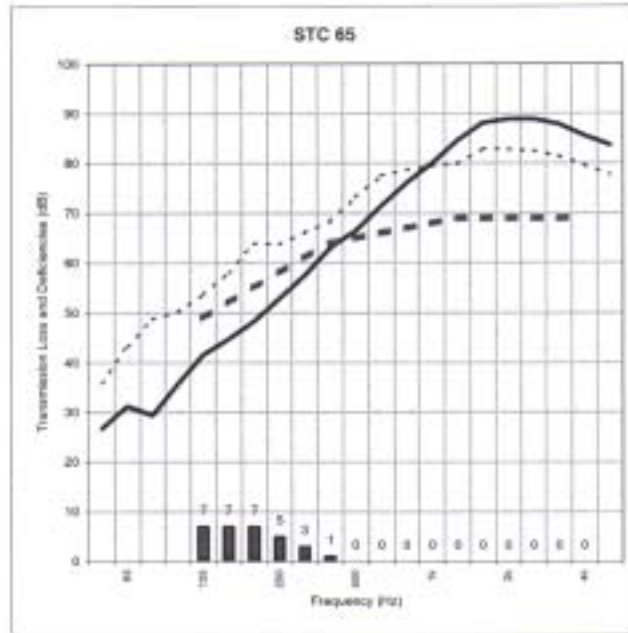
Client: Quiet Solution
Specimen ID: B3440-3W
Test ID: TLA-05-054
Tested: 15-Dec-05

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	19.1	19.6	23.4	26.3
Large	22.5	22.6	16.0	17.3

Frequency (Hz)	Airborne Sound Transmission Loss (dB)	95% Confidence Limits
50	27	
63	31	
80	29	± 3.8
100	36	± 3.9
125	42	± 2.5
160	45	± 1.7
200	48	± 1.3
250	53	± 0.7
315	58	± 0.9
400	63	± 0.7
500	66	± 0.7
630	71	± 0.6
800	76	± 0.4
1000	80 c	± 0.4
1250	85 c	± 0.4
1600	88 *	± 0.4
2000	89 *	± 0.6
2500	89 *	± 0.5
3150	88 *	± 0.7
4000	86 *	± 0.6
5000	84 *	± 0.7
Sound Transmission Class (STC) = 65		



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 above 1000 Hz are potentially limited by flanking and the true values may be higher than those measured. Because the bands controlling the STC (125 to 500 Hz) were not significantly affected by flanking, the STC value should be valid.

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.