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Isowall Panels

SOUND TRANSMISSION LOSS OF A TEST PANEL

for

ISOWALL LTD.

by

R.W. Guy

1. Sound Transmission Loss: Test Standard

The following sound transmission loss test was undertaken via the sound intensity measurement technique for measuring transmitted sound intensity and the Reverberant Room technique for inferring incident intensity from measured sound pressure level. No National Standard exists for this technique at the present time, however the technique has been validated*.

2. The Test Sample

The exposed test sample was of dimensions 1185 x 1200 mm x 152 mm thick, and consisted of three layers. The layers were as follows:

Metallic sheet	0.6 mm
Open cell rigid foam	76.2 mm (3")
Glass fibre sheet	1.25 mm

The sheets were bonded to the rigid foam, and the metallic sheet had a regular profile over its face of 107 mm (4¼") flat 15 mm (¾") depressed below flat by approximately 1.6 mm (1/16"). The glass fibre sheet on the other side was flat.

The panel was flush mounted in a containing wall and positioned so as to present the profiled metal siding surface to the source room.

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* Guy, R.W., De Mey, A. "Measurement of Sound Transmission Loss by Sound Intensity," Canadian Acoustics, April 1985, 25-44.

ATTN Kevin M.

4. Results

TABLE 1

Third Octave Transmission Loss Test Results

Third Octave Hz	Source Intensity dB	Transmitted Intensity dB	TL
125	89	73.2	15.8
160	90.5	71.9	18.6
200	90.2	71.9	18.3
250	89	66.9	22.1
315	85.5	64.5	21.0
400	89.4	64.9	24.5
500	91	65.1	25.9
630	90.3	64.5	25.8
800	90.1	65.9	24.2
1000	89	70.5	18.5
1250	89.7	72.3	17.4
1600	89.9	56.8	33.1
2000	89.0	44.4	44.6
2500	89.9	40.1	49.8
3150	89.1	35.6	53.5
4000	88.2	39.5	48.7

Sound Transmission Class (STC) = 22

3. Precision of Results

All sound pressure levels were measured to an accuracy of ± 0.5 dB. Sound intensity measurements (accurate to ± 1 dB. assuming a monopole source) were taken at eighty evenly distributed points over the panels surface area. Testing was repeated twice with measured results agreeing within 0.3 dB and typically not differing by more than 0.1 dB.

5. The Test Facility

The transmission loss suite of the Centre for Building studies (C.B.S) at Concordia Unviersity consists of 2 rectangular rooms of differing dimensions. The larger room has a volume of approximately 94 m^3 and is used as a reverberation chamber in the case of sound absorption measurements and as the source room in the case of transmission loss measurements. The smaller room, the receiving room in the case of transmission loss measurements has a volume of about 32 m^3. The test aperture between the rooms has an area of 7.5 m^2 and the facility is shown in Fig. 1.

The larger room, with the addition of two low frequency panel absorbers, 143 bottle absorbers, a biconical rotation diffuser, two stationery diffusers, and a 3 metre linear microphone traverse has been shown to comply with the qualification requirements outlined in American National Standards S1.21 for the one third octave bands having centre frequencies between 100 Hz and 10kHz for both discrete and broad band noise sources.**

The common apperture of the transmission loss suite was filled with a wall having a sound transmission class exceeding 55, and lined on the test room side with 1/16" thick aluminum sheeting. Within this wall was set the panel under test; it was located such that the metal siding surface faced towards the larger room.

** Lang, M.A., Rennie, J.M., "Qualification of a 94-Cubmic Metre Reverberation Room Uner ANS S1.21", Noise Control Engineering, Sept. 81, 64-70.

6. Instrumentation

i)	Noise Generator	B&K Type 1405	Serial No. 503103
ii)	Power Amplifier	B&K Type 2706	Serial No. 562754
iii)	Microphone	B&K Type 4165	Serial No. 708487
iv)	Pistonphone	B&K Type 4220	Serial No. 578016
v)	Sound Intensity Analyser (third octave analyser)	B&K type 2134	Serial No. 973342

Calibration

Pistonphone calibration was undertaken at the start and end of each test, no marked deviation from calibrator was found throughout the test series.

7. Procedure

The incident intensity was calculated from the mean steady state sound pressure level measured in the reverberation chamber by assessing 7 separate, 64 second average measurements along the major cross diagonal of the room.

The transmitted sound intensity was measured directly using the B & K Sound Intensity Microphone Probe type 3519, using the face-to-face microphone configuration. The ½" microphones with 12 mm spacer were chosen which gives a useful frequency range, of 125 Hz to 5 k Hz with an accuracy of ±1dB assuming a monople source.

The intensity radiated through the panel was measured at 10 cm. behind the surface employing an array of 100 evenly distributed points over the surface.

During the measurements the intensity microphone probe was mounted on a mechanical traverse system that enabled the probe to be fixed during each measurement interval. It was then moved by hand from point to point, after recording an 8 second linear average.

This test procedure was completely repeated twice.

Third Octave test results for the transmission loss are reported in Table 1, and shown in Figure 2.

All data was stored on paper tape through the use of the Remote Indicating Unit ZH 0250 (B&K).

In order to avoid reverberant field effects on the intensity measurement accuracy the three non-parallel walls of the receiving room were covered with a thick sound absorbent material. Measurements of sound pressure and sound intensity ratio at points over the panel surface were undertaken and revealed no need for reactivity induced measurement corrections.

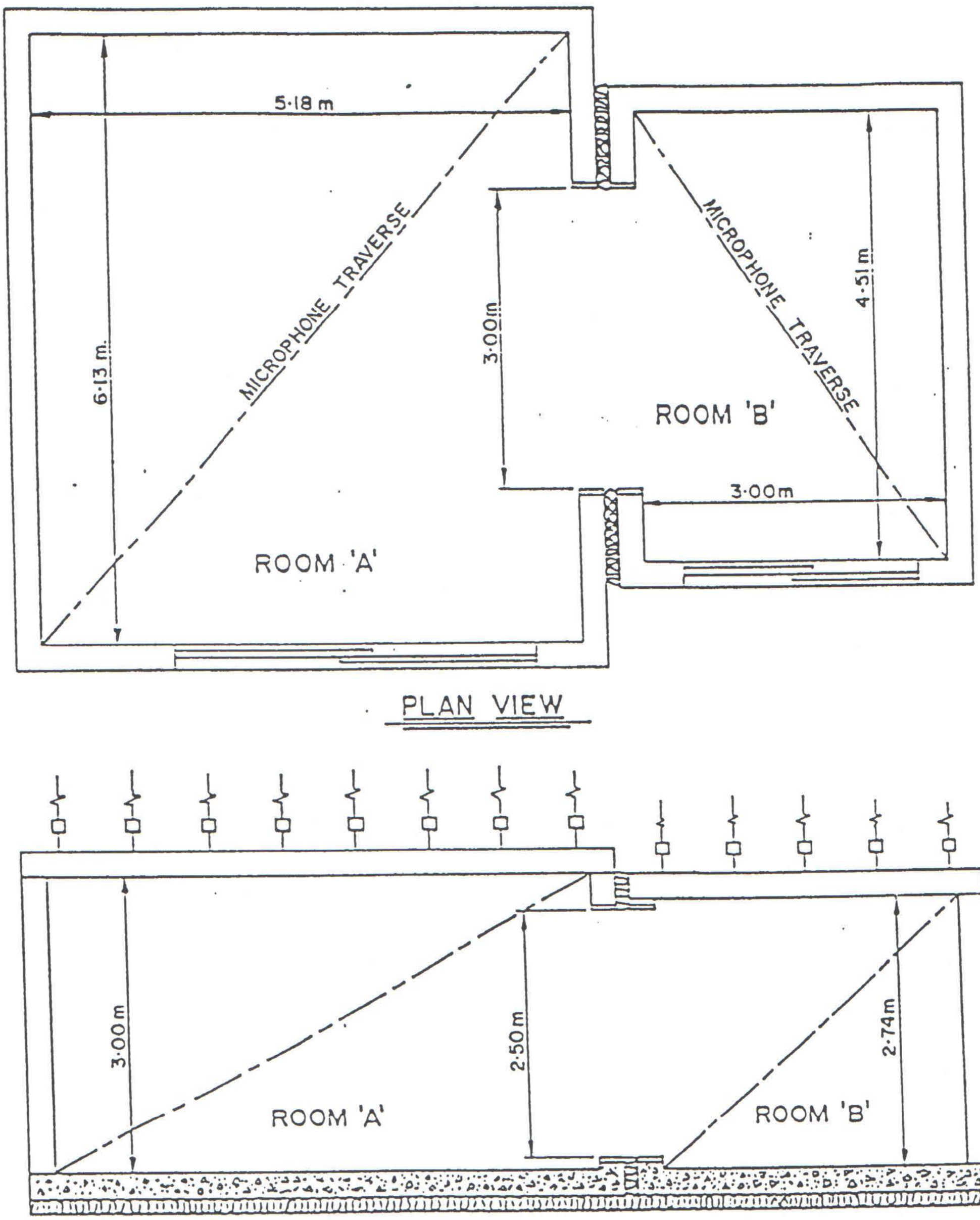

Fig. 1 General Layout of Transmission Loss Suite at the Centre for Building Studies, Concordia University.

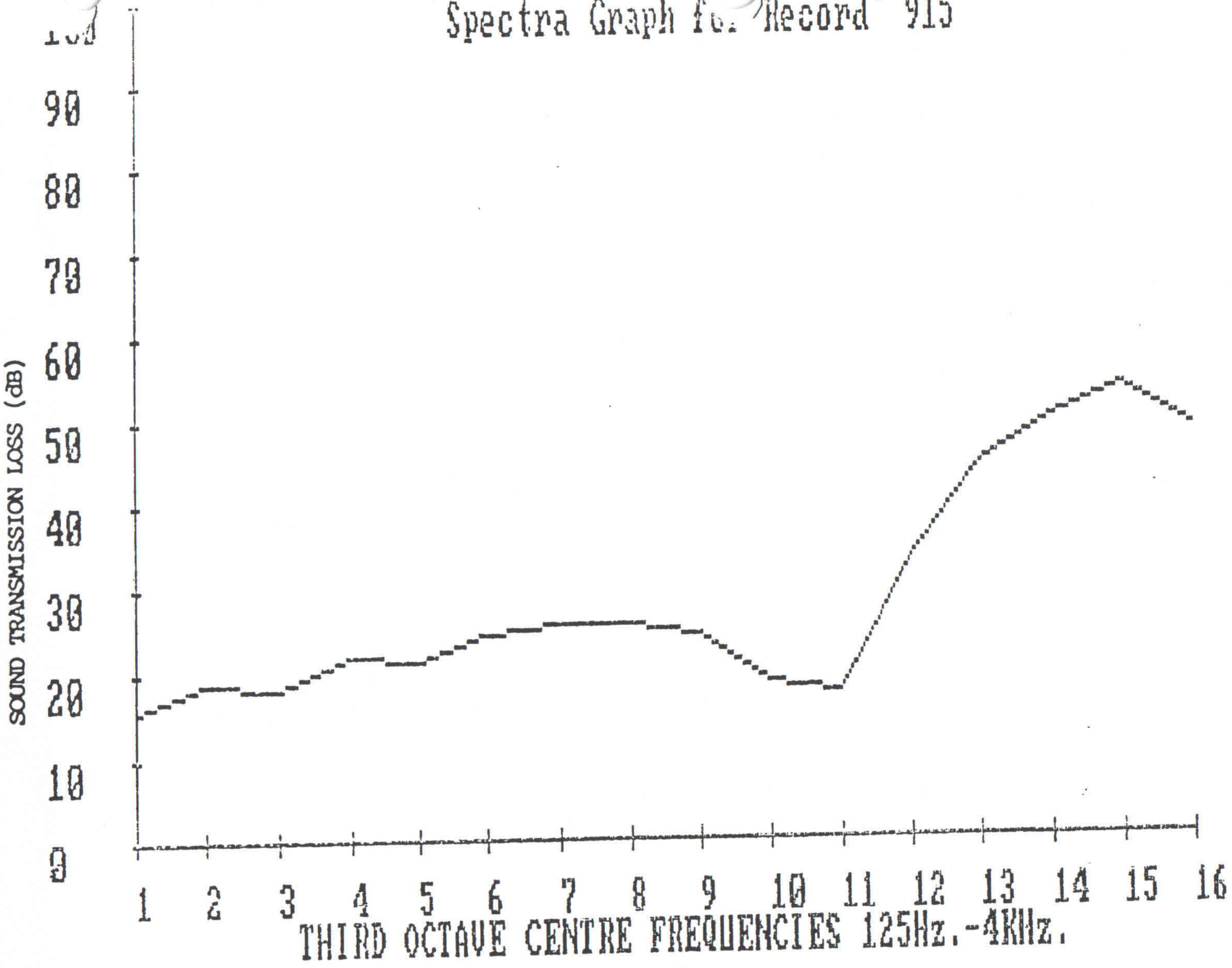

FIGURE 2: SOUND TRANSMISSION LOSS OF A THREE LAYER PANEL FOR ISOWALLL

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BXUVC.W007
Fire Resistance Ratings

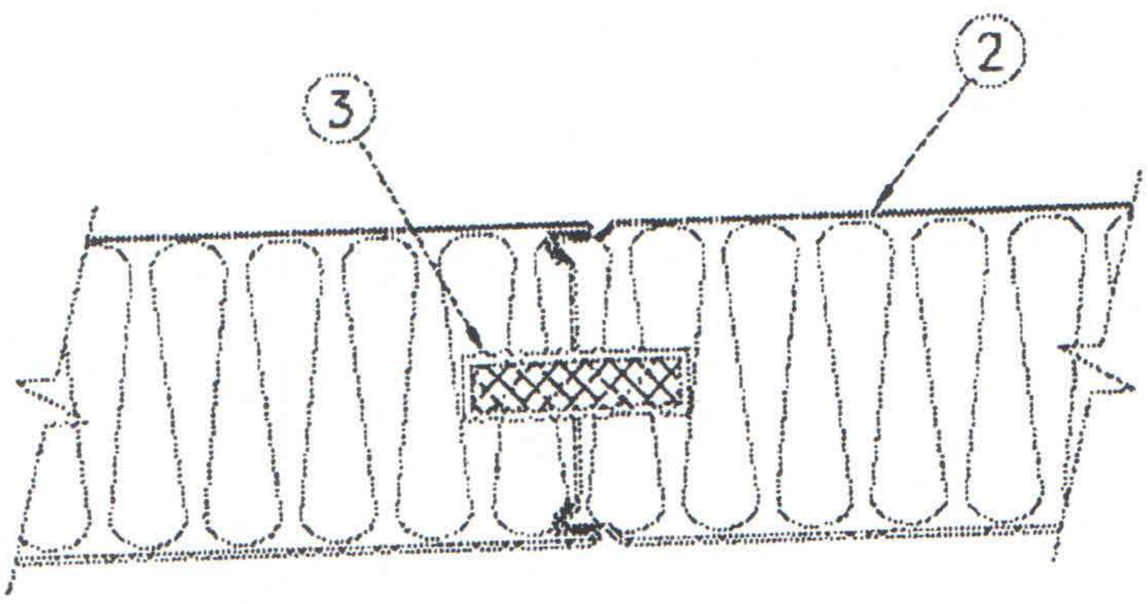
Fire Resistance Ratings

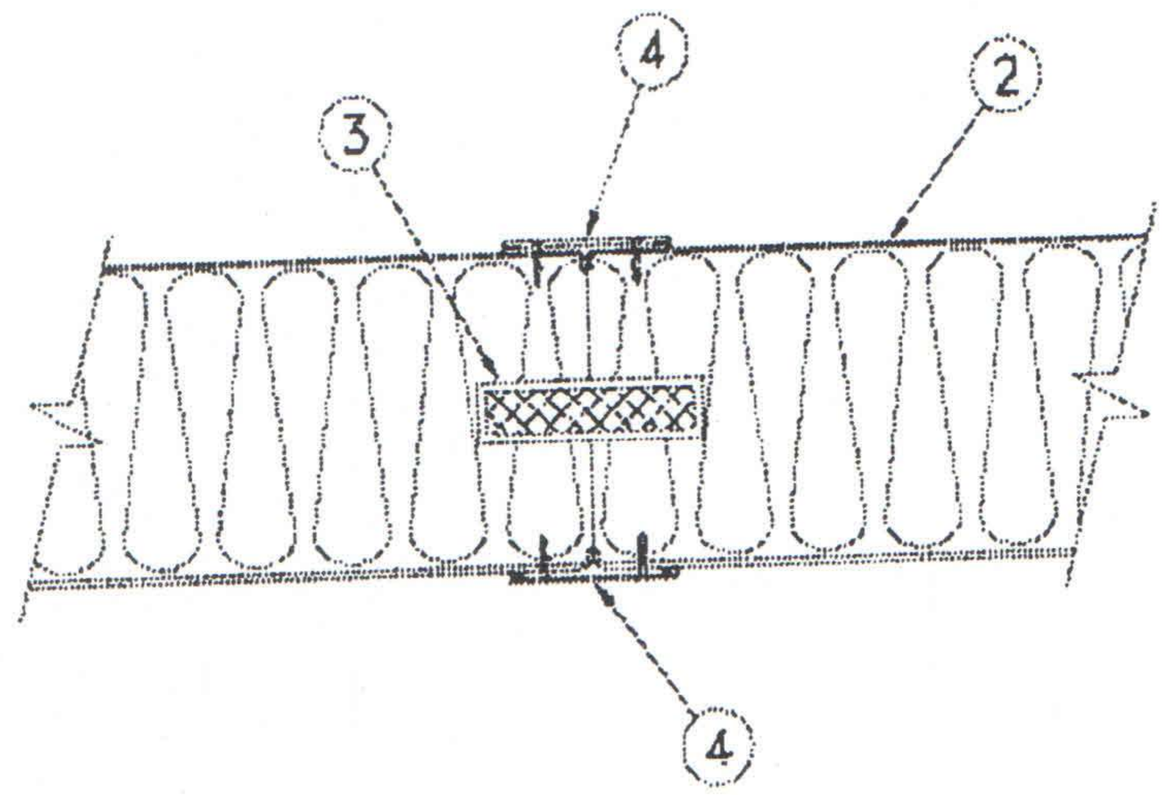
See General Information for Fire Resistance Ratings

Design No. W007

June 05, 2003

Assembly Rating - 1, 2 and 3 h (See Item 2)





Non-Bearing Wall

1. **Floor, Ceiling and Side Runners (not shown)** — Angle-shaped, fabricated from

0.52 mm thick cold-rolled steel, with 38 mm by 50 mm legs. The 38 mm legs attached to masonry by angles about the periphery anchored to masonry at 610 mm OC. The 50 mm legs attached to partition panels with 19 mm long Type S scres spaced 305 mm OC.

• 2. **Partition Panel Units —** (Guide No. 40 U18.16). Metal-faced panels nominal 102, 127 or 152 mm thick by 1220 mm wide. Panels supplied with either nestled joint or butt joint. Both supplie with grooves 12 mm wide by 35 mm deep cut along vertical edges. Adjacent units are friction fitted together along vertical edges. Assembly rating of 1, 2 or 3 h is applicable to walls constructed with panels of nominal thickness of 102, 127 or 152 mm respectively.

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3. **Splines —** Nominal 12 mm thick by 70 mm wide calcium silicate splines inserted in vertical grooves between adjacent units along the entire length.

4. **Cover Profile —** Cover profile used only in conjunction with butt joint, T-shaped, nominal 16 mm deep by 51 mm wide, fabricated of 0.52 mm thick cold-rolled steel. Used at each vertical butt joint and attached to panels with 16 mm long Type S screws at 305 mm OC.

5. **Caulking Compound (not shown)** — 6 mm wide bead of silicone sealant placed on vertical cover profile edges, nestled vertical joint, and around periphery support angle edges.

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