ACOUSTIC LABORATORIES AUSTRALIA PTY LTD

Report ALA 11-086-2

Determination of the Airborne Sound Insulation of

13mm SUPABOARD 2 + 1 Layers

DUAL STEEL STUD PARTITION

Tested to AS1191

BUILD TECHNOLOGIES HOLDINGS Pty Ltd
Unit 8, 49 Prindiville Drive
WANGARA WA- 6065
20 July 2011

UNIT 3 / 2 HARDY STREET, SOUTH PERTH 6151 TEL: 9474 4477 FAX: 9474 5977

1. TEST OBJECTIVE

Build Technologies Holdings Pty Ltd commissioned Acoustic Laboratories Australia to measure the airborne sound insulation performance of a Supaboard dual stud partition with 1 + 2 layers Supaboard.

The tests were carried out at the Heafod Laboratory facility in Bayswater, Western Australia. The sample under test was mounted in a vertical aperture between two side-by-side reverberant rooms. The sound pressure level difference between these two rooms when a broadband sound source operates in the source room together with the total acoustic absorption in the receiving room is used to determine the airborne sound reduction of the sample.

The wall was tested to Australian Standard AS1191, *Acoustics - Method for Laboratory Measurement of Airborne Sound Insulation of Building Elements* as described in the report.

The results of the measurements have been rated in accordance with the Australian / International Standard AS / ISO 717-1 *Acoustics – Rating of sound insulation in buildings and of building elements – Part 1: Airborne Sound Insulation.*

2. DESCRIPTION

2.1 Test 1

Sample Size: 3,730mm wide by 2,640mm high Total area: 9.85m^2.

Product: The Test Sample was a 132mm Supaboard a Magnesium Oxide Board, in a dual steel stud, insulated frame partition. Density of Supaboard is 1,150 kg/m3

Description of Sample:

- 13mm Supaboard Magnesium Oxide Board @ approx. 14.9 kg/m2 dry jointed with a “H” shaped aluminium section
- 92 steel stud, 1.15mm BMT at 400 centres with
- 90mm R2 glasswool insulation supported in steel stud frame
- 20mm discontinuity (gap)
- 92 steel stud, 1.15mm BMT at 400 centres with
- 90mm R2 glasswool insulation supported in steel stud frame
- 13 mm Supaboard Magnesium Oxide Board @ approx. 14.9 kg/m2 dry jointed with a “H” shaped aluminium section
- Second sheet 13mm Supaboard Magnesium Oxide Board @ approx. 14.9 kg/m2; Glue fixed (screeded glue) and flush jointed

Overall thickness 243mm

2.2 Installation of the Sample:

Mounting of Sample The sample was installed with the one of the stud frames bridging the structural break between the two chambers.

Time of Installation and Test

- Initial wall was constructed Friday-Saturday 15/16 July, 2011
- Second sheet installed Thursday-Friday 21/22 July 2011
- Wall tested Sunday July 24, 2011

3. TEST FACILITIES

Size of test Rooms: The test facilities are constructed of reinforced concrete and are structurally isolated from each other. The rooms are parallelepiped with a reverberant source room volume 81m^3 and a reverberant receiver room volume of 208m^3. In accordance with clause 5.2.2 of AS1191, an adequate number of room modes exist above 126 Hz for the Source room and 92 Hz for the Receiver room.

Aperture between Rooms: The size of the opening between the rooms is 3.73m x 2.64 metres, 9.85m^2.

Acoustic Diffusion: Sound diffusion is achieved by the location of large 19mm structural ply panels randomly oriented and freely suspended.

Acoustic diffusion is provided in the Receiving Room by 6 panels of 1.44 m^2 each, and 7 panels of 2.88m^2 each. Total area (two sided) of panels is 51.8 m^2. being 24.3% of the of the total surface area of the room.

The Source Room has additional acoustic diffusion provided by 6 panels of 1.44 m^2. Total area (two sided) of panels is 17.3m^2; being 15.5% of the total surface area of the room.

Acoustic Absorption: The average absorption coefficients of the diffusers and the internal surfaces of the room is less than 0.06 in each test frequency band.

4. TEST PROCEDURE

The test procedure involves a noise source fed to loudspeakers in the source room being measured in both the Source and Receiver rooms, and the measurement of Reverberation Times in the Receiver room.

Noise Source: Two wide band random noise generators were connected via an amplifier to two loudspeakers. The loud speakers were positioned in the trihedral corners of the room opposite the specimen under test.

The noise level of the source was adjusted so that the sound levels in the Receiving room were at least 10 dB above the Background noise level in all relevant frequency bands.

Microphone Positions: A single microphone was used for the measurement in both the Source and Receiver rooms. A total of 7 microphone positions in the source room were used, and 12 microphone positions in the receiving room. Microphone positions were selected to comply with requirements of AS 1191.

Reverberation Time Measurements: The Reverberation Time in the receiving room was measured using 2 source positions and 6 microphone positions, providing 12 independent source / microphone positions. 5 decays at each measurement position were measured, a total of 60 reverberant decays.

The 5 decays at each measurement position were first ensemble averaged, and then the results at each of the 12 measurement positions were arithmetically averaged.

Test Equipment:

- Neutrik Minirator MR1 – Professional sound source.
- Yamaha P3200 Stereo Amplifier Type 3600 – 400 watt / channel
- Behringer Eurorack MX602A Serial D002205486
- B&K Analyser Type 2260 Serial No 172181 – (Cal: 26/5/10)
- B&K Microphone Type 4189 Serial No 1783702 (Cal: 26/5/10)
- Rion NC73 Sound Level Calibrator Serial No 1030728 – (Cal: 20/9/10)
- Lorantz Speakers
- Vaisla HM34C Humidity & Temperature Meter Serial No: V2910014

5. RESULTS

Results: The airborne Sound Reduction (R dB) of the Test Samples was tested at each one third octave band with centre frequencies between 100 and 5000 Hertz. The results of the measurements are given in the attached Data Sheet. The Weighted Sound Reduction Coefficient with spectrum adaptation terms is:

Test Sample as clause 2.1 above: R_w,(C, C_{tr}) 59 (-3, -7)

Resultant R_w 59 **Resultant $R_w + C_{tr}$ 52**

Weighted Sound Reduction Index Rw: The weighted sound reduction index R_w for the sample has been determined in accordance with AS/NZS-ISO 717.1 *Acoustics – Rating of Sound Insulation in Buildings and of Building Elements Part 1: Airborne Sound Insulation*. The value of the spectrum adaptation terms C, and C_{tr} have been determined and are added to the Rw value. The spectrum adaptation term "C" is used for broad band –pink noise types sources, and C_{tr} is used for traffic noise sources.

Precision: The precision in the results is expressed as the 95% confidence interval in the transmission loss. This interval is estimated from the 95% confidence interval in each of the source room average level, receiver room average level, and the receiver room absorption / surface area of sample component. The precision in terms of the maximum standard deviation in sound transmission values for each of the one third octave bands in all cases is within the recommended upper limit for 95% confidence limit, outlined in Table B1 of AS1191-2002.

f.Hz	δ dB Test 1	Upper Limit AS1191	f.Hz	δ dB Test 1	Upper Limit AS1191
100	2.4	3.7	**630**	0.6	1.1
125	3.4	3.5	**800**	0.4	1.1
160	1.6	3.3	**1k**	0.6	1.1
200	1.3	3.0	**1.25k**	0.5	1.1
250	1.2	2.5	**1.6k**	0.4	1.1
315	1.5	2.0	**2k**	0.4	1.1
400	1.0	1.6	**2.5k**	0.4	1.1
500	0.8	1.3	**3.15k**	0.4	1.1

95% Confidence Interval, δ dB

25 July 2011

Test and Report by
N Gabriels B Arch, MAAS

Date

Checked by
K Hearne B.Arch, MAAS

ACOUSTIC LABORATORIES AUSTRALIA PTY LTD

Unit 3/2 Hardy Street
South Perth 6151
Tel: 9474 4477
Fax: 9474 5977

AIRBORNE SOUND TRANSMISSION LOSS

ALA Test No.: 11-086-2
Project: Supaboard - Dual stud frame
Specimen: Dual 92mm stud, 2 + 1 Supaboard, 2 x 90mm glasswool insulation

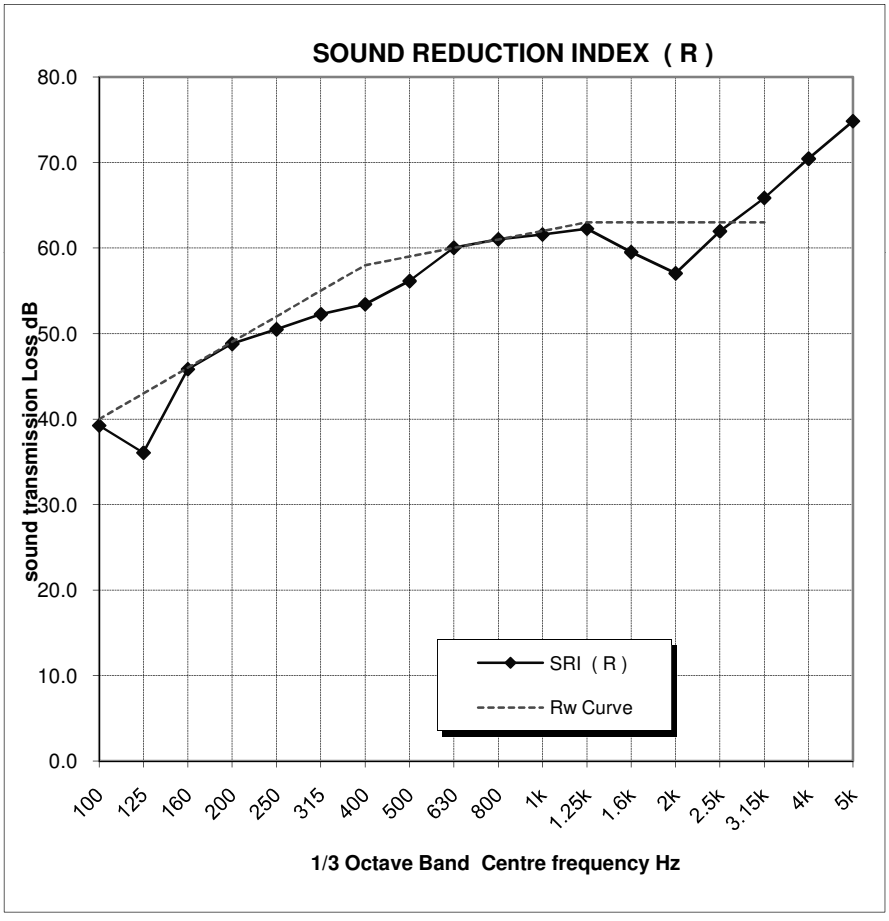
Description of Specimen: **Meas. Date:** 2011 Jul 24

13mm Supaboard at 14.9 kg/m2, with "H" section Joiners
92mm stud 1.15mm steel at 400 cs, with 90mm R2 glaswool insulation
20mm cavity
92mm stud 1.15mm steel at 400 cs, with 90mm R2 glaswool insulation
13mm Supaboard at 14.9 kg/m2, with "H" section Joiners
13mm Supaboard at 14.9 kg/m2, Fixed with screeded glue and flush Jointed

Overall thickness in mm: 243

	Rw	C	Ctr	Tested to
Weighted Sound Reduction Index	**59**	**-3**	**-7**	AS1191

Centre Frequency	SRI (R)	Rw Curve	Deficiencies
Hz	dB	dB	dB
100	39.2	40	0.8
125	36.1	43	6.9
160	45.8	46	0.2
200	48.8	49	0.2
250	50.5	52	1.5
315	52.3	55	2.7
400	53.4	58	4.6
500	56.2	59	2.8
630	60.0	60	
800	61.0	61	
1k	61.6	62	0.4
1.25k	62.3	63	0.7
1.6k	59.5	63	3.5
2k	57.0	63	6.0
2.5k	62.0	63	1.0
3.15k	65.8	63	
4k	70.4		
5k	74.8		
			Total
Rw	59		31.3



Signatory:.. Date: 25/07/2011 Kingsley Hearne .

Tester: N Gabriels B.Arch, MAAS Checked: K Hearne B.Arch, MAAS