ACOUSTIC LABORATORIES AUSTRALIA PTY LTD

Report ALA 09-080-3

Determination of the Airborne Sound Insulation of

75mm XFLAM PANEL ™

Tested to AS1191

Austral Insulation (WA) Pty Ltd
1 Denninup Way
MALAGA WA 6090

27 March 2009

1. TEST OBJECTIVE

Austral Insulation (WA) Pty Ltd. commissioned the Acoustic Laboratories Australia to measure the acoustic performance of a **XFLAM PANEL**^{TM}, a fire rated panel, in terms of the Airborne Sound Insulation.

The tests were carried out at the Heafod Laboratory facility in Bayswater, Western Australia. The samples under test were 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 transmission loss of the sample. The sample was tested to Australian Standard AS1191, *Acoustics - Method for Laboratory Measurement of Airborne Sound Insulation of Building Elements* as described in the report.

2. DESCRIPTION

2.1 Test Sample

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

Description:
- o 75mm XFLAM PANEL^{TM} as manufactured by Austral Insulation

Consisting of
- o 0.6mm colorbond steel
- o 73.8mm XFLAM core
- o 0.6mm colorbond steel

Surface weight of material is 13.7 Kg/m^2

Sample was tested on March 26, 2009

2.2 Installation of the Sample:

Specimen Mounting:
- o The 75mm panel was mounted over structural break between the two room
- o Perimeter of sample was sealed with caulking compound

Time of Installation and Test
- o Panel was installed midday of 25 March 2009
- o Test was carried out morning of 26 March 2009

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 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: 25/3/08)
B&K Microphone Type 4189 Serial No 1783702 (Cal: 25/3/08)
B&K Calibrator Type 4230 Serial No 724157 – (Cal: 25/3/08)
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}) 25 (-2, -2)

Resultant R_w 25 **Resultant $R_w + C_{tr}$ 23**

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	Upper Limit AS1191	f.Hz	δ dB	Upper Limit AS1191
100	2.1	3.7	**630**	0.7	1.1
125	1.9	3.5	**800**	0.6	1.1
160	1.3	3.3	**1k**	0.4	1.1
200	1.9	3.0	**1.25k**	0.6	1.1
250	1.5	2.5	**1.6k**	0.6	1.1
315	0.7	2.0	**2k**	0.7	1.1
400	0.8	1.6	**2.5k**	0.4	1.1
500	0.5	1.3	**3.15k**	0.4	1.1

95% Confidence Interval, δ dB

N Gabriels B Arch, MAAS — Test and Report by

25 Mar 09 — Date

K Hearne B.Arch, MAAS — Checked by

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AIRBORNE SOUND TRANSMISSION LOSS

ALA Test No.: 09-080-3
Project: XFLAM PANEL TM
Specimen: XFlam Panel with XFlam core

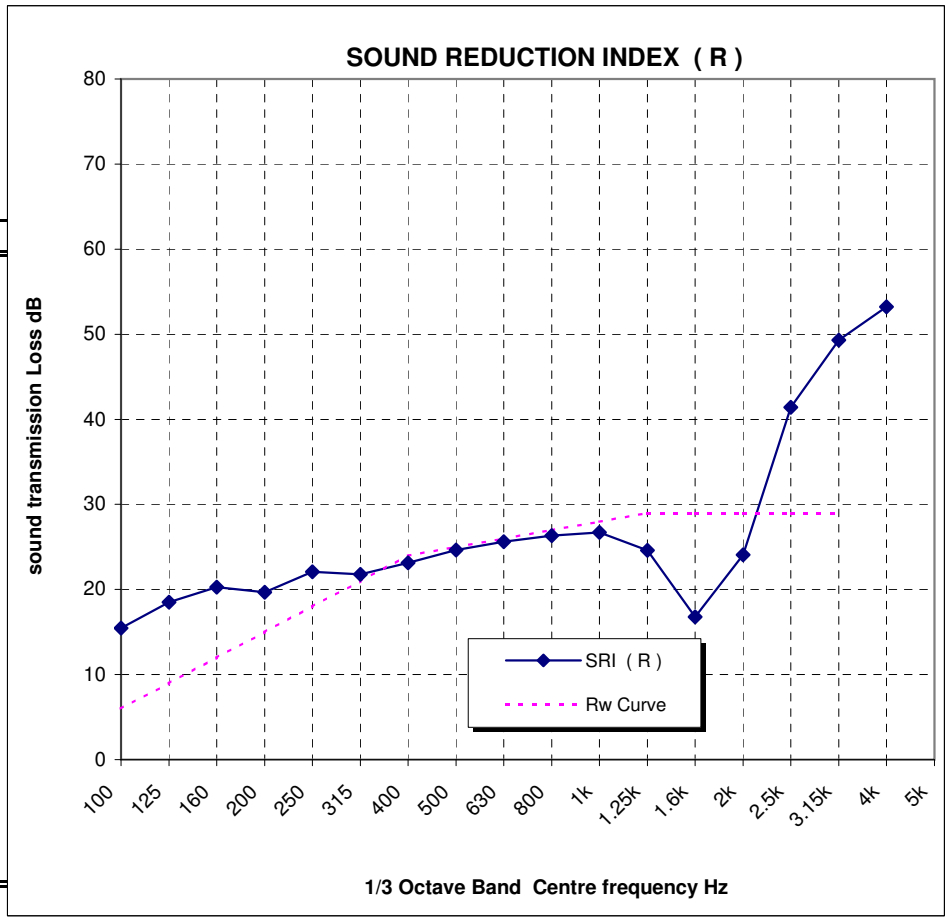
Description of Specimen:

0.6mm colorbond steel
XFLAM Core
0.6mm colorbond steel
Surface Mass 13.7 Kg/m2

Meas. Date: 2009 Mar 26

	Rw	C	Ctr	Tested to
Weighted Sound Reduction Index	**25**	**-2**	**-2**	AS1191

Centre Frequency	SRI (R)	Rw Curve	Deficiencies
Hz	dB	dB	dB
100	15	6	
125	18	9	
160	20	12	
200	20	15	
250	22	18	
315	22	21	
400	23	24	0.9
500	25	25	0.4
630	26	26	0.4
800	26	27	0.7
1k	27	28	1.3
1.25k	25	29	4.4
1.6k	17	29	12.2
2k	24	29	4.9
2.5k	41	29	
3.15k	49	29	
4k	53		
5k			
			Total
Rw	25		25.2



Signatory:.. .....I 25-Mar-09

Tester: N Gabriels B.Arch, MAAS

Checked: K Hearns B.Arch, MAAS