



Report ALA 14-084-1

**Measurement of the Sound Absorption
in a Reverberation Room**

ENDUROPANEL 40/10 Perf

18mm slotted ply

Tested to AS / ISO 354-2006

Revision 1

Roomtmove
3/9 Church Road
MAddington WA 6109

30 May 2014

1. TEST OBJECTIVE

Roomtmove commissioned Acoustic Laboratories Australia to measure the sound absorption of their slotted ply Enduropanel. Testing was carried out on 20 May, 2014. The test was carried out at the Heafod Laboratory facility in Bayswater, Western Australia. The sample under test was installed on the floor (Type A mounting) of the Reverberation Room.

The sound absorption coefficients are determined from the surface area of the sample and the reverberation times in the Reverberation Room with the room both empty and with sample under test. The test was carried out in accordance with Australian Standard AS / ISO 354-2006, *Acoustics – Measurement of Sound Absorption in a Reverberation Room*.

2. DESCRIPTION OF SAMPLE

2.1 Sample Under Test

The sample under test was

- 18mm slotted ply with acoustic fabric backing
- Slots in ply were 11mm deep, 10mm wide and at 50mm centres
- 10mm diameter holes were located at 25mm centres within the slots
- Percentage open area has been determined at 6.2%
- Slotted ply was backed with 50mm Bradford glasswool insulation @ 32 Kg/m³
- Insulation was enclosed within ply enclosure for Lab test purposes

2.2 Installation of the Sample:

The sample was supported directly on the concrete floor of the Reverberation Room – Type A Mounting. The sample panels were butt jointed. The sample panels came with their own ply enclosure of the insulation on the back of the panels. No further perimeter edge enclosure was provided.

The sample size was 3,600 mm x 3,000 mm. Total area 10.8m².

The empty room reverberation time was measured with the sample removed from the Reverberation Room.

3. TEST FACILITIES

3.1 Reverberation Room

Volume and Shape: The Reverberation Room is a parallelepiped room with a volume of 208m³. The shape of the room complies with the requirements of Clause 6 of AS / ISO 354. The room is constructed of reinforced concrete and is structurally isolated from adjoining areas.

Acoustic Diffusion: Sound diffusion is achieved by the location of large 19mm thick structural ply panels randomly oriented and freely suspended. A total of 6 panels of 1.44 m² each, and 5 panels of 2.88m² each are provided. Total area (two sided) of panels is 46 m². Acoustic diffusion meets the requirements of Annex A of

AS / ISO 354. Total area of acoustic diffusers (both sides) is 22% of total surface area.

3.2 Temperature and Relative Humidity

The temperature and relative humidity conditions during the test were:

	Room with Sample	Empty Room
Temperature	20°C	24 °C
Relative Humidity	71 %	54 %

4. TEST PROCEDURE

4.1 Generation of the Sound Field

The test procedure involves generating a noise source fed to loudspeakers located in the trihedral corners of the Reverberation Room. The internal noise source of the Bruel and Kjaer 2270 Analyser is used as the noise source. The noise source is interrupted and the decay of sound measured in each of the one third octave bands. Two loudspeaker positions are used in the measurement procedure.

4.2 Measurement of Signal

Microphone Positions: A single microphone was used for the measurement. 8 microphone positions were used in conjunction with the two sound source positions. Six sound decays are obtained at each microphone source position; this represents 16 independent source / microphone positions, a total of 96 decays. Microphone positions were selected to comply with requirements of ISO 354.

Averaging: Results of six sound decays at each of the 16 source / microphone positions were ensemble averaged, and these results for the 16 source / microphone positions were then arithmetically averaged.

Test Equipment: Instrumentation included:

- B&K Analyser Type 2270 Serial No 2644641 – (Cal: 5/10/12)
- B&K Microphone Type 4189 Serial No 2643586 - (Cal: 5/10/12)
- Rion NC73 Sound Level Calibrator Serial No 10307218 - (Cal: 11/10/12)
- Behringer Eurorack MX602A – Serial D002205486
- Yamaha P3200 Stereo Amplifier– 400 watt / channel
- Lorantz Speakers
- Vaisla HM34C Humidity & Temp Meter Serial No: V2910014

The acoustic measuring equipment has been calibrated by an independent NATA registered laboratory and is in current calibration.

5. RESULTS

Results: The results for the sample tested are set out in the attached Data Sheet. The mean Reverberation Time at each frequency for the empty room, and the room with the sample installed are provided. Also shown in the Data Sheet is the sound absorption coefficient of the sample with centre frequencies from 100 Hz to 5000 Hz. The *Weighted Sound Absorption Coefficient* (α_w) and the *Noise Reduction Coefficient* (NRC) have been calculated at:

Weighted Sound Absorption Coefficient (α_w): 0.60

Noise Reduction Coefficient (NRC) 0.60

***Weighted Sound Absorption Coefficient* (α_w):** The Weighted Sound Absorption Coefficient was determined in accordance with the procedure in the International Standard ISO11654 *Acoustics – Sound absorbers for use in buildings – Rating of sound absorption*

***Noise Reduction Coefficient* (NRC):** The Noise Reduction Coefficient was determined in accordance with ASTM C423-09a: “*Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method*”

Calculated Sound Absorption Co-efficient in Octave Bands

Frequency (Hz)	125	250	500	1k	2k	4k
Sound Absorption Co-efficient	0.46	0.61	0.63	0.58	0.53	0.59



N Gabriels B Arch, FAAS
Test and Report by

30 May 14

Date



K Hearne B.Arch, MAAS
Checked by

If copied, this report must be reproduced in full

**SOUND ABSORPTION COEFFICIENT**

Unit 3/2 Hardy Street

South Perth 6151

Tel: 9474 4477

Fax: 9474 5977

ALA Test No.: ALA 14-084-1
Manufacturer: RoomTMove
Sample: Enduropanel 40/10 perf

Description of Sample:

18mm thick slotted ply with acoustic fabric backing
 Slots in ply 11mm deep x 10mm wide at 50mm centres
 10mm Diam holes in slots at 25mm centres along slot
 6.2% open area. Acoustic fabric backing to slotted ply
 50mm Bradford glass wool insulation @32 Kg/m3
 Insulation enclosed within timber box -

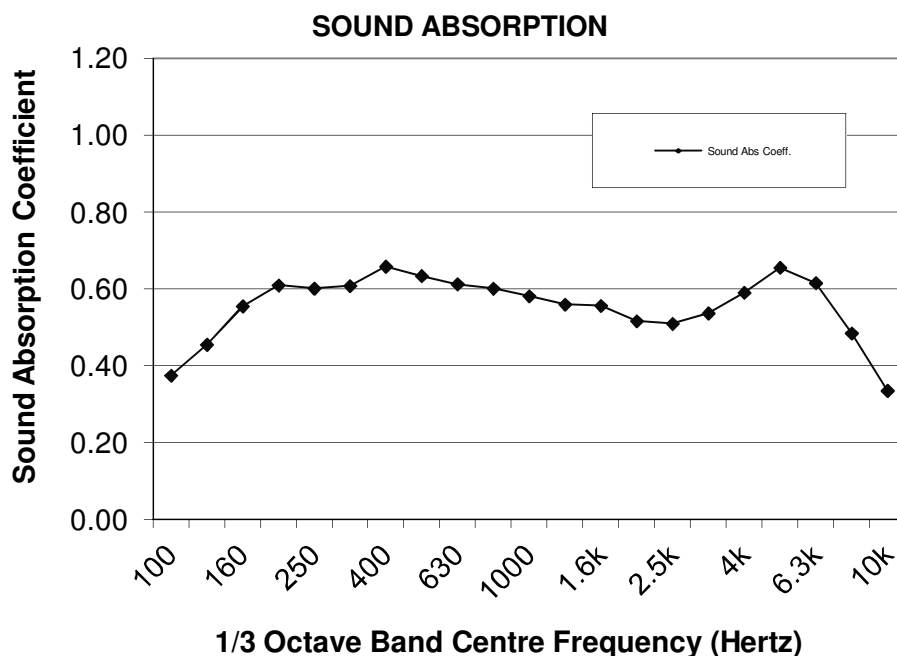
Tested To: AS ISO 354**Meas. Date:** 20-May-14**Sample size:** 10.8 m2**Test Specimen Mounting:** Type: A**Air Gap behind sample:** 0 mm**Location of sample:** Floor - central**Shape of Reverb Chamber:** 7m x 6m x 5m**Volume of Reverb Chamber:** 208 m3**Area of Diffusers:** 46.1 m2

1/3 Octave Centre Frequency	RT for Empty Room	RT for room with Sample	Sound Absorption Coefficient
Hz	Sec.	Sec.	

	Sample in Room	Empty Room	
Temp:	20	24	C
RH:	71	53	%
Bar.Press:	1015.6	1010.5	hPa

Weighted Sound Absorption Coefficient: α_w **0.60** * * *
Noise Reduction coefficient: **NRC:** **0.60**

100	4.5	2.9	0.37
125	5.3	3.0	0.45
160	7.6	3.2	0.55
200	9.0	3.3	0.61
250	9.5	3.3	0.60
315	9.3	3.3	0.61
400	8.9	3.1	0.66
500	8.3	3.1	0.63
630	7.3	3.0	0.61
800	6.1	2.8	0.60
1k	4.8	2.5	0.58
1.25k	4.3	2.4	0.56
1.6k	4.1	2.4	0.56
2k	3.8	2.3	0.52
2.5k	3.6	2.3	0.51
3.15k	3.3	2.1	0.54
4k	2.9	1.9	0.59
5k	2.4	1.6	0.66
6.3k	1.9	1.4	0.62
8k	1.4	1.2	0.48
10k	1.1	1.0	0.33



Signatory:...

.....

Date

Tester: N Gabriels B.Arch, FAAS

24-May-14

Checked: K Hearne B.Arch, MAAS



Slotted / Perforated Panel - Boxed Insulation backing



Slotted / Perforated Panel