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Consulting Acoustical & Vibration Engineers

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28 August 2006

Laboratory Acoustical Testing of
Wall System containing Expanded Polystyrene Foam

Test Reference: GC/06/5809.tst

Test Objectives:

(a) Measurement of airborne Sound Reduction Indices (R) of sample wall system in accordance with AS1191-2002 *Acoustics - Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Elements.*

(b) Determination of Weighted Sound Reduction Indices (R_w) and Spectrum Adaption Terms (C_{tr}) in accordance with AS/NZS ISO 717.1:2004: *Acoustics - Rating of sound insulation in buildings and of building elements - Airborne sound insulation.*

Client:

NRG Greenboard
PO Box 2129
Burleigh MDC Qld 4220

Attention: Scott Lehn

Test Date: 23rd August 2006

Test Location

Acran Acoustic Testing laboratory
Cnr. Fulcrum & Bandara Streets
Richlands, Brisbane
Australia 4077

Description of Test Specimens:

Side 1: 6mm concrete render applied to 60mm thick expanded polystyrene foam. The polystyrene applied with sheet lengths vertical.
Framing: 90mm timber studs at 450mm centres
Side 2: 10mm Plasterboard applied with sheet lengths vertical. Joints not set, some visible gaps up to 8mm wide. Edges caulked with expanding polyurethane foam.

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Description of Test Facilities:

The tests were carried out in a purpose-designed transmission loss suite, comprising two adjoining reverberant rooms, designed in accordance with AS1191-1985.

Room construction: Solid concrete; independent construction for source and receiving rooms with separate foundations.

Room shape: Rectangular parallelepiped for both rooms; aspect ratios 1.6:1.3:1 for both rooms.

Room volume: Source room 100m^3; receiving room 170m^3.

Average Absorption Coefficient: less than 0.06 at all frequencies.

Diffusers: Receiving room diffuser area 30.7m^2 compared with largest surface (floor/ceiling) of 40m^2; ratio 0.75.

Test Aperture: 3.16m x 3.16m (Nom). In this instance, craft wood jamb linings were fitted to the test aperture. These reduced the effective aperture area to 9.98m^2.

Instrumentation:

- Precision sound level meter, Rion NA-27 (S/N 00380650),
- Acoustical calibrator, Bruel & Kjaer Type 4231 S/N 1897734,
- Sound source, custom made pink noise generator, 150W power amplifier and a stereo two-way loudspeaker system.

Test Procedures:

Sound Source and location:

Broad band pink noise located in the rear trihedral corners of the source room.

Space and time average:

- Continuous moving path
- repeated three times
- path length approx 15m
- averaging time 120 sec.

Equivalent Absorption:

Was determined by reverberation time measurement using the built-in software within the Rion NA-27 sound level meter. The sound source was used to excite the room. Two source locations were used each with three microphone locations to comply with the Code.

Measurement Precision:

Each measurement was repeated three times. Repeatability was better than 1dB in every frequency band.

Test Results:

The test results are appended with a summary provided in Table 1 and complete 1/3 Octave data provided in Table 2.

Table 1: Summary of Test Results

Description	Acoustical Performance
Side 1: 6mm concrete render applied to 60mm thick expanded polystyrene foam. The polystyrene applied with sheet lengths vertical. Framing: 90mm timber studs at 450mm centres Side 2: 10mm Plasterboard applied with sheet lengths vertical. Vertical joints not set, some visible gaps up to 8mm wide. Edges caulked with expanding polyurethane foam.	R_W 35, C_{tr} -6

Table 2 – 1/3 Octave Sound Reduction Indicies

	Frequency in 1/3rd Octave Bands															
	100	**125**	**160**	**200**	**250**	**315**	**400**	**500**	**630**	**800**	**1k**	**1.2k**	**1.6k**	**2k**	**2.5k**	**3.15k**
R (dB)	17.5	20.2	17.7	20.0	20.7	25.3	29.8	31.9	35.2	39.4	41.6	44.8	47.5	49.1	51.0	49.5

Glen Copelin

Weighted Sound Reduction Index (R_W)
6mm Render, 60mm ESP on 90mm timber studs at 450mm centres, with 10mm plasterboard
(Plasterboard joints not set, edges cauled with expandable polyurathane foam)