



**Report ALA 09-090-2**

**Determination of the Airborne Sound Insulation of  
90-70-90 Cavity Brick Wall with No Ties**

**Tested to AS1191**

**BRIKMAKERS**  
Lot 4 Stirling Crescent,  
HAZELMERE WA 6055

**19 October 2009**

## 1. TEST OBJECTIVE

Brikmakers commissioned the Acoustic Laboratories Australia to measure the acoustic performance of a 90-70-90 cavity brick wall with **no** ties, rendered on both sides.

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<sup>2</sup>.

Description:

- o 90-70-90 rendered cavity brick wall with **no** ties

Consisting of

- o 13mm render with 2mm plaster set
- o 90mm Verticlay Acoustic brick (305 x 90 x 162h) at 5.7 kg/brick
- o 70mm cavity with **no** ties
- o 90mm Verticlay Acoustic brick (305 x 90 x 162h) at 5.7 kg/brick
- o 13mm render with 2mm plaster set

### 2.2 Installation of the Sample:

*Specimen Mounting:*

- o The 90-70 90 was installed within the opening frame with the structural break located in the cavity
- o Perimeter of sample was sealed with mortar between bricks and frame.
- o Bricks were laid with full bed and perpend joints

*Time of Installation and Test*

- o Bricks were installed Friday of 9 October 2009
- o Render was applied Tuesday 13 October 2009
- o Plaster set Tuesday 13 October 2009
- o Test was carried out Thursday Evening 15 October 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<sup>3</sup> and a reverberant receiver room volume of 208m<sup>3</sup>. 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<sup>2</sup>.

*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<sup>2</sup> each, and 7 panels of 2.88m<sup>2</sup> each. Total area (two sided) of panels is 51.8 m<sup>2</sup>. 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<sup>2</sup>. Total area (two sided) of panels is 17.3m<sup>2</sup>; 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:  $R_{w,(C, C_{tr})}$  61 (-1, -5)  
**Resultant  $R_w$  61** **Resultant  $R_w + C_{tr}$  56**

*Weighted Sound Reduction Index  $R_w$ :* 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  $R_w$  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.

---

---

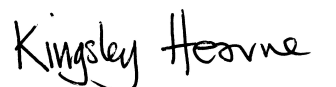
<b>f.Hz</b>	<b>δ dB</b>	<b>Upper Limit AS1191</b>	<b>f.Hz</b>	<b>δ dB</b>	<b>Upper Limit AS1191</b>
<b>100</b>	2.7	3.7	<b>630</b>	0.5	1.1
<b>125</b>	1.9	3.5	<b>800</b>	0.5	1.1
<b>160</b>	1.6	3.3	<b>1k</b>	0.6	1.1
<b>200</b>	1.0	3.0	<b>1.25k</b>	0.4	1.1
<b>250</b>	1.3	2.5	<b>1.6k</b>	0.5	1.1
<b>315</b>	1.0	2.0	<b>2k</b>	0.3	1.1
<b>400</b>	0.7	1.6	<b>2.5k</b>	0.4	1.1
<b>500</b>	0.7	1.3	<b>3.15k</b>	0.3	1.1

---

**95% Confidence Interval, δ dB**



19 Oct. 09



---

N Gabriels B Arch, MAAS  
Test and Report by

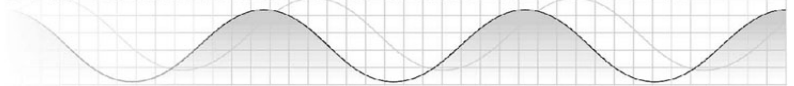
---

Date

---

K Hearne B.Arch, MAAS  
Checked by

If copied, this report must be reproduced in full



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

**AIRBORNE SOUND TRANSMISSION LOSS**

**ALA Test No.:** 09-090-2  
**Project:** Brikmakers  
**Specimen:** 90-70-90 Verticlay Acoustic

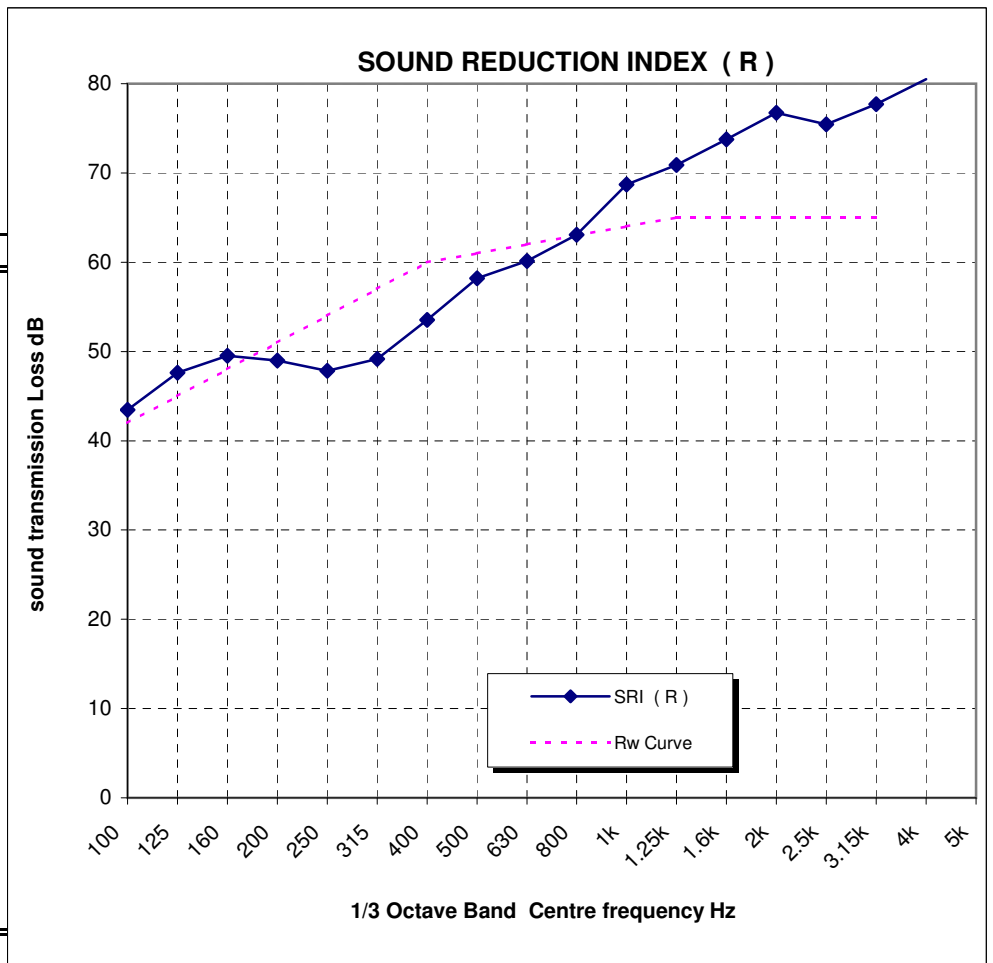
**Description of Specimen:**

**Meas. Date:** 2009 Oct 15

13mm render + 2mm plaster set  
 90mm Verticlay Acoustic brick, @ 5.7 kg / brick  
 70mm cavity with No Ties  
 90mm Verticlay Acoustic brick, @ 5.7 kg / brick

**Weighted Sound Reduction Index**      **Rw**      **C**      **Ctr**      **Tested to**  
 61      -1      -5      AS1191

Centre Frequency Hz	SRI ( R ) dB	Rw Curve dB	Deficiencies dB
100	43	42	
125	48	45	
160	50	48	
200	49	51	2.0
250	48	54	6.2
315	49	57	7.8
400	54	60	6.5
500	58	61	2.8
630	60	62	1.9
800	63	63	
1k	69	64	
1.25k	71	65	
1.6k	74	65	
2k	77	65	
2.5k	75	65	
3.15k	78	65	
4k	80		
5k			
<b>Total</b>			
<b>Rw</b>	<b>61</b>		<b>27.2</b>



Signatory:.. *N Gabriels*  
 Tester: N Gabriels B.Arch, MAAS

..... Date: 19/10/2009

*Kingsley Hearne*  
 Checked: K Hearns B.Arch, MAAS