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laboratory test report

# LABORATORY TEST REPORT
# WEIGHTED SOUND REDUCTION INDEX
# SOUND TRANSMISSION LOSS

| | | |
|---|---|---|
| **Reference Number:** | TD062-01F06 (rev 1) 90mm Tontine R2.0 batts.doc | |
| **Detailed Test Report Reference:** | TD062-01S05 (rev 1) Wall Test 5.xls | |
| **Date of Test:** | 17 July, 2006 | |
| **Specimen Description** | 1 layer of 10mm thick Boral plasterboard screw fixed to both sides of 90x45mm timber studs at 450mm centres with timber noggings. Timber noggings were located horizontally at 1200mm from the base of the wall and 1200mm from the top of the wall.<br>90mm thick Tontine R2.0 polyester insulation in the cavity. | |
| **Wall Thickness** | 110mm | |
| **Measured Weighted Sound Reduction Index:** | **Rw (C;Ctr)** | **40 (-3;-9)** |
| **Measured Sound transmission Class:** | **STC** | **39** |

Measurements conducted in accordance with Australian Standard AS1191-1985 “Acoustics - Method for laboratory measurement of airborne sound transmission loss of building partitions”, AS1191-2002 “Acoustics - Method for laboratory measurement of airborne sound insulation of building elements”, AS1276 – 1979 “Methods For The Determination Of Sound Transmission Class And Noise Isolation Class Of Building Partitions” and AS1276 – 1999 “Acoustics - Rating of sound insulation in buildings and of building elements – Airborne sound insulation”. Measurements and procedures documented in this report have been carried out in accordance with the Renzo Tonin & Associates Quality Assurance System. This quality system is based on AS/NZS ISO 9001:1994

| **Field Engineer** | **Checked By** |
|---|---|
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20 YEARS
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# LABORATORY TEST REPORT - WEIGHTED SOUND REDUCTION INDEX and SOUND TRANSMISSION LOSS

| File Name: | | | | TD062-01S05 (rev 1) Wall Test 5.xls |
|---|---|---|---|---|
| **Source Room Volume** | 119 | $m^3$ | Test Date: | 17/07/2007 |
| **Receiver Room Volume** | 211.8 | $m^3$ | Test Eng: | CP |
| **Test Area** | 10.08 | $m^2$ | Chk Eng: | NT |
| **Humidity** | 67 | % | Project No: | TD062-01 |
| **Temperature** | 16 | $^o$ C | Location | Boral Lab Prospect |
| **Receiver Room Surface Area** | 223 | $m^2$ | Master File: | QTT-02 (rev 20) |

Measurements & calculations done in accordance with AS 1191 - 2002 "Acoustics - Method for Laboratory Measurement of Airborne Sound Insulation of Building Elements" & AS 1276.1 - 1999 "Acoustics - rating of sound insulation in buildings and of building elements"

| | |
|---|---|
| **Weighted Sound Reduction Index $R_w$ ($C;C_{tr}$)** | **40 (-3;-9)** |
| **Sound Transmission Class STC** | **39** |

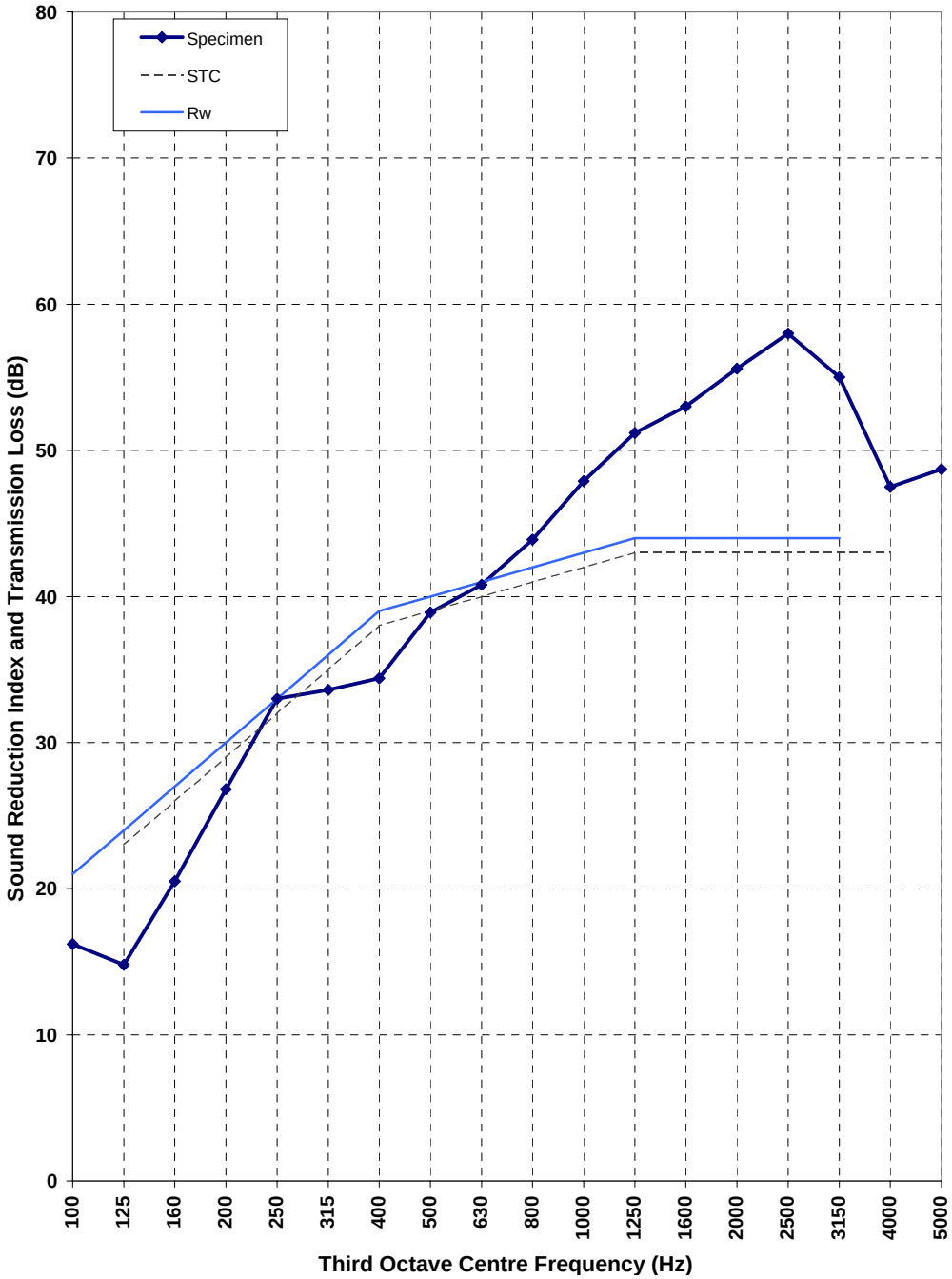
**Specimen Description**

**1 layer of 10mm thick Boral plasterboard screw fixed to both sides of 90x45mm timber studs at 450mm centres with timber noggings. Timber noggings were located horizontally at 1200mm from the base of the wall and 1200mm from the top of the wall.**

**90mm thick Tontine R2.0 polyester insulation in the cavity.**

| Centre Frequency | Measured Ri | | STC Curve | Deficiencies | Rw Curve | Deficiencies | Combined Std. Dev | 95% Confidence | Confidence Goal | Exceed |
|---|---|---|---|---|---|---|---|---|---|---|
| 50 | 22.7 | * | | | | | | | | |
| 63 | 16.8 | * | | | | | | | | |
| 80 | 16.9 | * | | | | | | | | |
| 100 | **16.2** | * | | | 21 | 4.8 | 2.8 | 2.3 | 3.7 | |
| 125 | **14.8** | | 23 | 8 | 24 | 9.2 | 1.9 | 1.6 | 3.5 | |
| 160 | **20.5** | | 26 | 5 | 27 | 6.5 | 1.9 | 1.6 | 3.3 | |
| 200 | **26.8** | | 29 | 2 | 30 | 3.2 | 2.5 | 2.1 | 3.0 | |
| 250 | **33.0** | | 32 | | 33 | | 1.0 | 0.8 | 2.5 | |
| 315 | **33.6** | | 35 | 1 | 36 | 2.4 | 1.6 | 1.3 | 2.0 | |
| 400 | **34.4** | | 38 | 4 | 39 | 4.6 | 1.3 | 1.1 | 1.6 | |
| 500 | **38.9** | | 39 | | 40 | 1.1 | 1.3 | 1.1 | 1.3 | |
| 630 | **40.8** | | 40 | | 41 | 0.2 | 0.9 | 0.7 | 1.1 | |
| 800 | **43.9** | | 41 | | 42 | | 0.6 | 0.5 | 1.1 | |
| 1000 | **47.9** | | 42 | | 43 | | 0.8 | 0.7 | 1.1 | |
| 1250 | **51.2** | | 43 | | 44 | | 0.9 | 0.7 | 1.1 | |
| 1600 | **53.0** | | 43 | | 44 | | 1.0 | 0.8 | 1.1 | |
| 2000 | **55.6** | | 43 | | 44 | | 1.2 | 1.0 | 1.1 | |
| 2500 | **58.0** | | 43 | | 44 | | 0.8 | 0.7 | 1.1 | |
| 3150 | **55.0** | | 43 | | 44 | | 0.8 | 0.7 | 1.1 | |
| 4000 | **47.5** | | 43 | | | | 0.9 | 0.8 | 1.1 | |
| 5000 | **48.7** | | | | | | 0.9 | 0.8 | 1.1 | |
| | | | Total | 20 | Total | 32.0 | | | | |
| | | | **STC** | **39** | **Rw** | **40** | **C =** | **-3** | **$C_{tr}$=** | **-9** |

Asterisk * next to Ri indicates test room volume for specified frequency not in accordance with Sect A3.1.2, AS1191



# TEST AND ANALYSIS METHODOLOGY

## 1. INTRODUCTION

This report provides results of sound transmission loss testing conducted at the Boral Besser testing laboratory. The testing was conducted in order to measure the sound transmission loss of the referenced wall system.

Testing was conducted in accordance with the following standards:

- AS1191-1985 "Acoustics - Method for laboratory measurement of airborne sound transmission loss of building partitions"
- AS1191-2002 "Acoustics - Method for laboratory measurement of airborne sound insulation of building elements"
- AS1276 – 1979 "Methods for the determination of sound transmission class and noise isolation class of building partitions"
- AS1276 - 1999 "Acoustics - Rating of sound insulation in buildings and of building elements – Airborne sound insulation".

## 2. DESCRIPTION OF TEST FACILITY AND SPECIMEN PREPARATION

Testing was conducted at the Boral Besser acoustic test facility located in Prospect, west of Sydney. The facility consists of two reverberation rooms located below ground level. The room used as the "source" room has a volume of 135m$^3$ and the room used as the "receiver" room has a volume of 218m$^3$. The volumes of both rooms permit measurement of sound transmission classes down to 100Hz as defined in appendix A, item A3.1 of AS 1191-1985 and item 5.2 of AS 1191-2002.

All surfaces within the rooms are constructed from concrete of 200mm thickness. Diffusers were located in the Receiving room to minimise standing waves.

An aperture measuring (2810mm x 3610mm) 10.1m$^2$ is constructed between the two rooms and spans the full width of the source room. The wall was constructed the full width of the aperture unless otherwise specified. All gaps around the sides of the wall were filled full depth with a high-density mastic sealant. Walls are left for one day to dry before testing.

The construction of the laboratory ensures flanking noise transmission is minimised and that wall with a high Sound Transmission Class exceeding Rw/STC 60 can be tested.

## 3. MEASUREMENT AND ANALYSIS PROCEDURE

Testing was done in accordance with AS1191 and ISO140-3 and followed the following procedure.

1. A high powered amplifier and speaker unit was connected to a broad band pink noise generator and positioned in the far corner of the source room.
2. Noise levels were recorded in 8 positions in the source room and receiving room using a CEL 593 Sound Level Meter. The measured noise level was filtered simultaneously in one-third octave frequency bands in real time. The measured values were recorded and subsequently



statistically analysed to determine the average sound pressure levels for each room and to indicate the precision of the measurements.

3. The reverberation time of the receiving room was then measured in accordance with AS 1045.

The sound reduction index of the specimen was then calculated using the following relationship.

$$R = L_{1s} - L_{2R} + 10\ Log_{10}\left[\frac{S}{A}\right]$$

Where;

$L_{s1}$ = Sound Pressure Level source room dB

$L_{r2}$ = Background Corrected Sound Pressure Level receiver room dB

S= Area of test specimen $m^2$

A= equivalent sound absorption area (metric Sabines) $m^2$

The Weighted Sound Reduction Index Rw was determined in accordance with AS1276.1-1999 “Acoustics – Rating of sound insulation in buildings and of building elements”. The Sound Transmission Class STC was determined in accordance with AS1276 – 1979.

The sound level meter has been calibrated to Australian Standards by a certified NATA laboratory. A reference calibration check was conducted prior to and subsequent to the measurements using a Bruel & Kjaer Type 4231 Acoustic calibrator. The sound level meter conforms to a Type 1 instrument as defined in AS 1259 - 1990 “Sound Level Meters”.

