WALL TRANSMISSION LOSS TESTS
BENEX MASONRY BLOCKS
INCORPORATING QUIETWAVE

ACOUSTICS AND AIR

REPORT NO. 09123
VERSION A

WILKINSON MURRAY

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PREPARED FOR

BENEX TECHNOLOGIES
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APPENDIX A – Noise Measurement Results

1 INTRODUCTION

Field Sound Transmission Loss testing using sound intensity was conducted on a sample of Benex solid core 200 mm block wall at the Acoustica Factory at Penrith, NSW. The purpose of the testing was to determine a comparison between the Sound Transmission Loss of a core filled wall along with the addition of plasterboard installed on 25 mm battens incorporating "Quietwave".

In addition, the testing was conducted to establish a wall construction that would achieve an acoustic rating of at least Rw+Ctr of 50.

The following sections detail the testing methodology and results.

2 INSTRUMENTATION

Testing was conducted using the following equipment:

- Bruel & Kjaer Investigator Sound Level Meter — Type 2260
- Sound Intensity Software Type — BZ7205
- Sound Intensity Probe Kit for 2260 — Type 3595
- Sound Intensity Calibrator — Type 3541
- RCF Powered Speaker Type 310A
- Neutrik Minirator Noise Generator Type MR1

2.1 Testing Methodology

Testing was conducted utilising the Bruel and Kjaer intensity software to determine sound reduction index based on the procedures of ISO 140 -5 and ISO 717-1.

Intensity testing has been used as an alternative to a pressure-based measurement of the apparent sound insulation index. This measurement system allows the intensity sound reduction index, $R_{I,c}$ to be measured.

This enables the contribution of various flanking and leakage transmissions to be removed from the measurement. In a traditional pressure based measurement you may get an apparent sound insulation index R' which takes every type of transmission into account. This allows measurement of a particular segment of any given partition or surface. Accordingly, the respective corrected intensity sound reduction index, $R_{I,c}$ can be determined.

The single-number weighted and corrected intensity sound reduction index, $R_{I,cw}$ is automatically calculated for each segment and the whole surface by the test equipment. In this case, given that the test is from indoors to outdoors, the $R_{I,c}$ can be expressed by the formula.

$$R_{I,c} = L_{p1}\text{-}6\text{-}L_{I,n}$$

Where L_{p1} is the average sound pressure level in the source room and $L_{I,n}$ is the intensity level normal to the measurement surface on the receiver side.

Field testing using intensity was conducted at the Acoustica Factory located at Penrth. An existing room, with an existing door frame to outside was used. The wall construction consisted of double brick and included a glass window which was treated with insulation and noise barrier to eliminate noise transmission by this path.

Testing consisted of:

- Installing the test specimen in the door frame (Specimen Dimensions 1980 x 810 mm).
- Generating "pink" noise in the source room and measuring noise levels within the room.

- Conducting 2 microphone sweeps over a plane 100mm from the outside surface of the door sample.
- Measurement of external ambient noise levels with the source noise turned off.
- Calculation of sound transmission loss of each test sample.

3 WALL SAMPLES TESTED

The following wall types detailed in Table 3-1 were tested in the field test room.

Table 3-1 Wall Constructions Tested

Test	Block Cavity	Cavity	Plasterboard	Quietwave between Plasterboard Sheets
B1	200 mm Benex Block Core filled	None	None	None
B2	200 mm Benex Block Core filled	25 mm	2 x 10 mm (Standard)	Yes
B3	200 mm Benex Block Core filled	25 mm	2 x 13 mm (Standard)	Yes

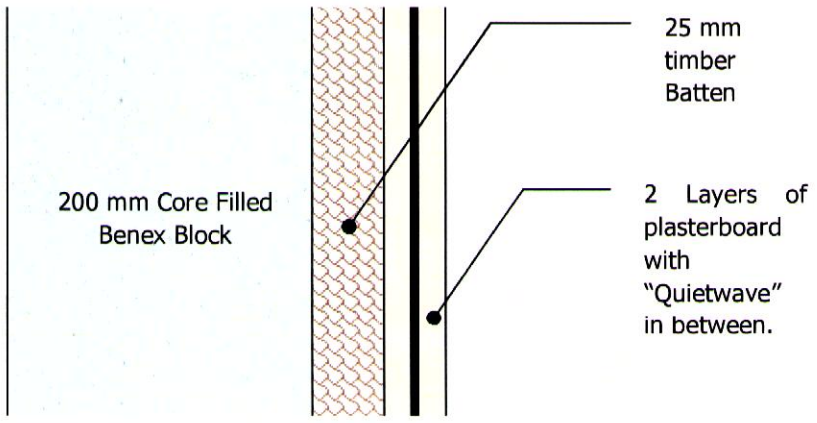
The Benex block (Size 600 x 200 x 200 mm weighing 13 kg per block) were core filled with concrete. Following the initial test 25 mm timber battens, 600 mm apart, were glued to the block wall.

Two layers of plasterboard were screw fixed to the timber batters with "Quietwave" inserted between the layers of plasterboard. The "Quitewave" was hung from the first plasterboard sheet and the second sheet was then screwed fixed to the first thereby constraining the "Quietwave between the sheets.

The plasterboard sheeting was cut to a tight tolerance and gaps were sealed with silicone sealant.

A section of the test wall is shown in Figure 3-1.

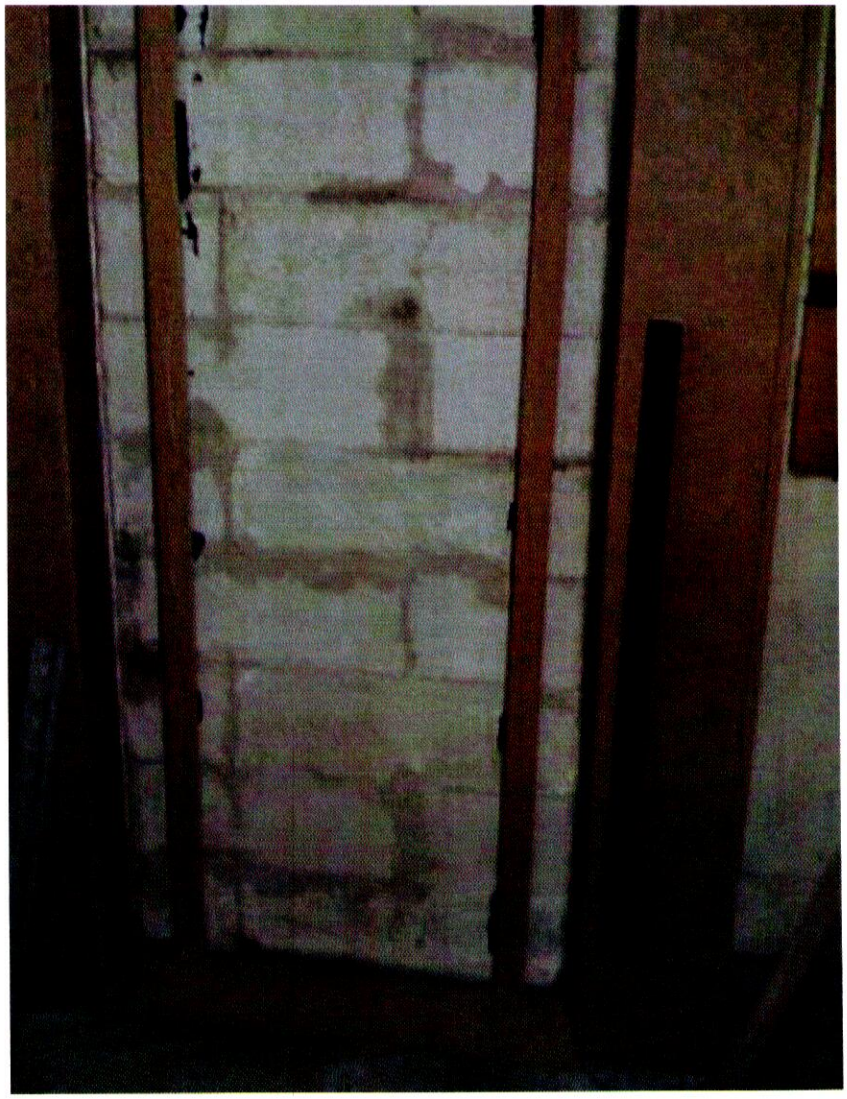
Figure 3-1 Section of Test Wall



Test Wall Section

The following figure shows a test sample with battens spaced 600 mm installed prior to installation of plasterboard and "Quietwave".

Figure 3-2 Wall with Battens



4 TESTS RESULTS

The following section presents the result of wall testing.

4.1 Block Wall Tests

The results are summarised in Table 4-1 as follows:

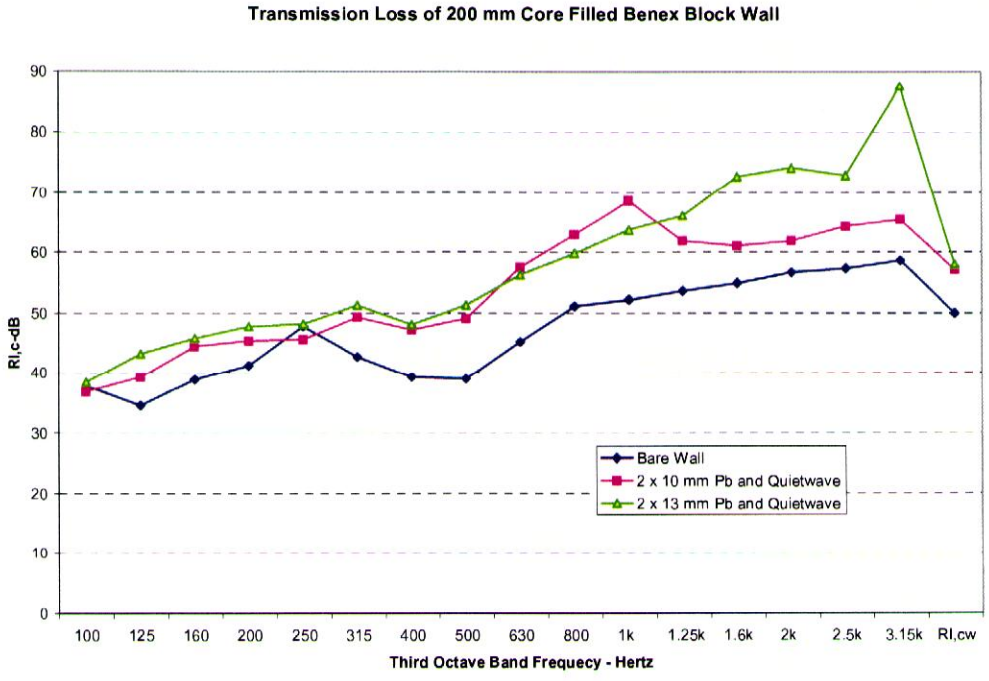
Table 4-1 Solid Core Door Results*

Test	Wall Sample Type	*RI,wc*	*Ctr*
B1	Core Filled Benex Block	50	-5
B2	Core Filled Benex Block + 2 x 10 mm Standard Plasterboard +Quietwave	57	-6
B3	Core Filled Block + 2 x 13 mm Standard Plasterboard +Quietwave	58	-5

*Detailed results are presented in Appendix A.

The results of tests are summarised in Figure 4-1, 4-2 and 4-3 as follows:

Figure 4-1 Tests Results for 200 mm Core Filled Benex Block



It is noted that in the tests with 10 mm plasterboard the background noise levels affected results above 1250 Hertz. In reality, a higher acoustic performance can be expected however this could not be measured on site.

It is noted that the test sample is smaller than the standard 10 m^2 test sample used in laboratory tests. However we do not consider that there acoustic performance of this wall would not alter to any significant degree and therefore expect that the performance achieved by this test is indicative of that which would be achieved a larger wall.

5 DISCUSSION AND CONCLUSION

Based on a review of the results of testing the installation of "Quitewave" in combination with 2 layers plasterboard applied on 25 mm battens to a core filled 200 mm Benex block wall resulted in a significant improvement in the sound transmission loss of the wall panels.

Based on the results of this testing the use of "Quietwave" in the wall sample will result in an acoustic performance exceeding Rw+Ctr of 50.

Note
All materials specified by Wilkinson Murray Pty Limited have been selected solely on the basis of acoustic performance. Any other properties of these materials, such as fire rating, chemical properties etc. should be checked with the suppliers or other specialised bodies for fitness for a given purpose.

Quality Assurance
We are committed to and have implemented AS/NZS ISO 9001:2000 "Quality Management Systems – Requirements". This management system has been externally certified and Licence No. QEC 13457 has been issued.

AAAC
This firm is a member firm of the Association of Australian Acoustical Consultants and the work here reported has been carried out in accordance with the terms of that membership.

Version	Status	Date	Prepared by	Checked by
A	Final	20 April 2009	Brian Clarke	Sebastian Giglio

APPENDIX A

Result of Measurements

Its

Centre Frequency (Hz) / Corrected Intensity Sound Reduction Index, $R_{I,c}$ - dB																
100	**125**	**160**	**200**	**250**	**315**	**400**	**500**	**630**	**800**	**1k**	**1.25k**	**1.6k**	**2k**	**2.5k**	**3.15k**	$R_{I,cw}$
38	35	39	41	48	43	39	39	45	51	52	54	55	57	57	59	50
37	39	44	45	46	49	47	49	58	63	69	*62**	*61**	*62**	*65**	*66**	57
38	43	46	48	48	51	48	51	56	60	64	66	73	74	73	88	58

affected by background noise levels at the time of measurements.