

Technical Report

C/23770/T01

Project

The Laboratory Measurement of Airborne
Sound Insulation of Magply Boards

Prepared for

IPP Black Mountain

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Published

22 June 2017

Quality Assurance	
Project Title	The Laboratory Measurement of Airborne Sound Insulation of Magply Boards
Document Title	Technical Report
Client	IPP Black Mountain
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Report Number	C/23770/T01

Summary

Tests have been done in SRL's Laboratory at Holbrook House, Sudbury, Suffolk, to determine the sound reduction index of Magply boards in accordance with BS EN ISO 10140-2:2010.

From these measurements, the required results have been derived and are presented in both tabular and graphic form in Data Sheets 1 to 4.

The results are given in 1/3rd octave bands over the frequency range 50Hz to 10kHz, which is beyond that required by the test standard. Measurements outside the standard frequency range are not UKAS accredited.



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Tester

For and on behalf of

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1.0 Details of Measurements

1.1 Location

Sound Research Laboratories
Holbrook House
Little Waldingfield
Sudbury
Suffolk
CO10 0TF

1.2 Test Date

3 May 2017

1.3 Tester

Richard Calvert of SRL Technical Services Limited

1.4 Instrumentation and Apparatus Used

Make	Description	Type
E D I	Microphone Multiplexer	
	Microphone Power Supply Unit	

Norwegian Electronics	Real Time Analyser	830
	Rotating Microphone Boom	231
Brüel & Kjaer	Windshields	UA0237
	Pre Amplifiers	2669C
	Microphone Calibrator	4231
	Omnipower Sound Source	4296
Larson Davis	12mm Condenser Microphone	2560
SRL	Loudspeakers	100w
Oregon Scientific	Temperature & Humidity & Probe	THGR810
TOA	Graphic Equalizer	E-1231
QSC Audio	Power Amplifier	RMX 1450

1.5 References

BS EN ISO 717-1:2013	Rating of sound insulation in buildings and of building elements. Airborne Sound Insulation.
BS EN ISO 10140-2:2010	Laboratory measurement of sound insulation for building elements – Part 2: Measurement of airborne sound insulation.

2.0 Description of Test

2.1 Description of Sample

4 different thickness of Magply board were tested. See Section 3 and Drawing I for further details.

Sampling plan: Enough for test

Sample condition: New

Details supplied by: IPP Black Mountain

Sample installed by: SRL Technical Services Ltd

2.2 Sample Delivery date

29 April 2017

2.3 Test Procedures

The sample was mounted/located and tested in accordance with the relevant standard. The method and procedure is described in Appendix A. The measurement uncertainty is given in Appendix B.

3.0 Results

The results of the measurements and subsequent analysis are given in Data Sheets 1 to 4 and summarised below.

Results relate only to the items tested.

SRL Test No.	Description in Brief	$R_w (C;C_{tr})$ dB
2	6mm Magply board	28 (-1;-4)
3	9mm Magply board	28 (-1;-2)
4	12mm Magply board	29 (-2;-2)
5	20mm Magply board	31 (-2;-2)

Data Sheet I

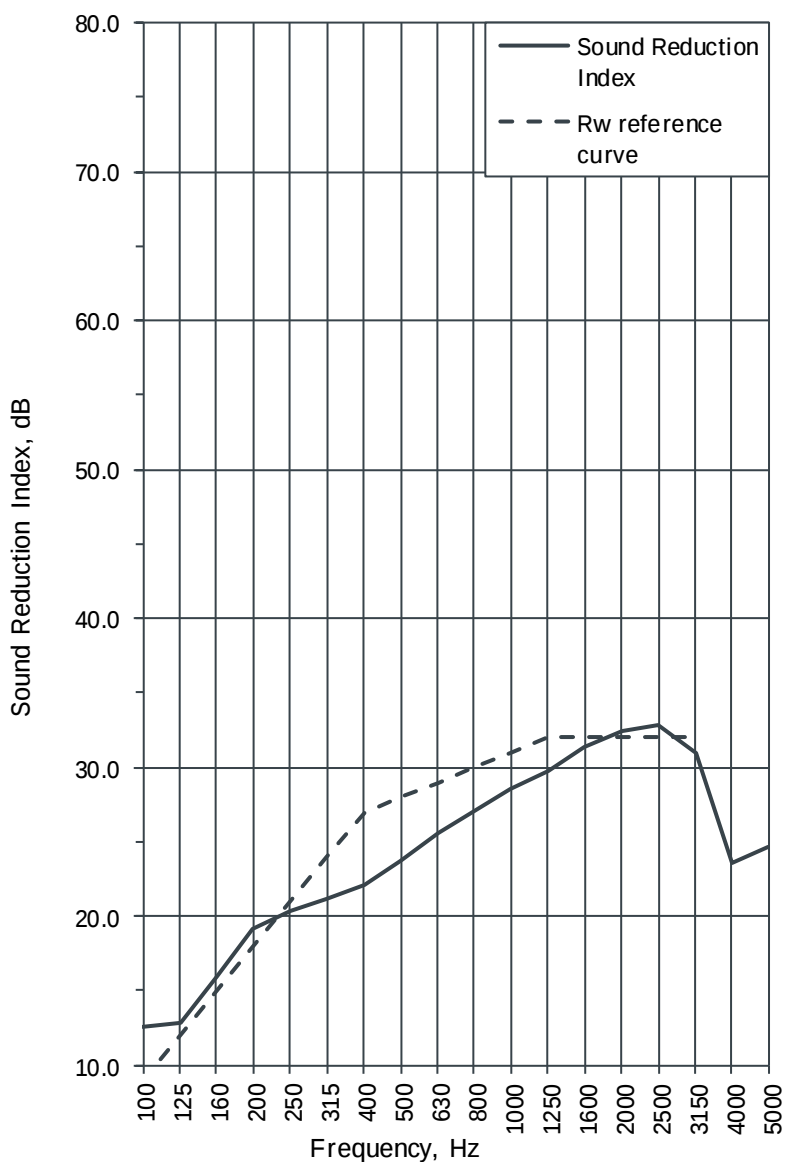
Test Number: 2
Client: IPP Black Mountain
Test Date: 03/05/2017
Sample Height: 2.2 m
Sample Width: 2 m
Sample Weight: 6.18 kg/m²

Test Room:
Air Temperature: 12.7 °C
Air Humidity: 65 %
Volume: 55 m³
Air Pressure: 1013 mbar

Product

Identification: 6mm Magply board

Freq, f Hz	Sound Reduction Index, dB	
	1/3 Oct	Octave
50+	12.4	9.2
63+	8.1	
80+	8.3	
100	12.6	13.6
125	12.9	
160	16.0	
200	19.1	20.1
250	20.4	
315	21.2	
400	22.1	23.6
500	23.7	
630	25.6	
800	27.1	28.3
1000	28.5	
1250	29.8	
1600	31.3	32.2
2000	32.5	
2500	32.8	
3150	30.9	25.4
4000	23.6	
5000	24.6	
6300+	29.7	31.8
8000+	31.5	
10000+	36.4	
Average 100-3150	24.2	Version v3.0



Rating according to BS EN ISO 717-1:2013

R_w(C;C_{tr})= 28 (-1 ; -4) dB

* shows measurement corrected for background

> shows measurement limited by background

+ shows Frequency beyond standard and not UKAS accredited

Data Sheet 2

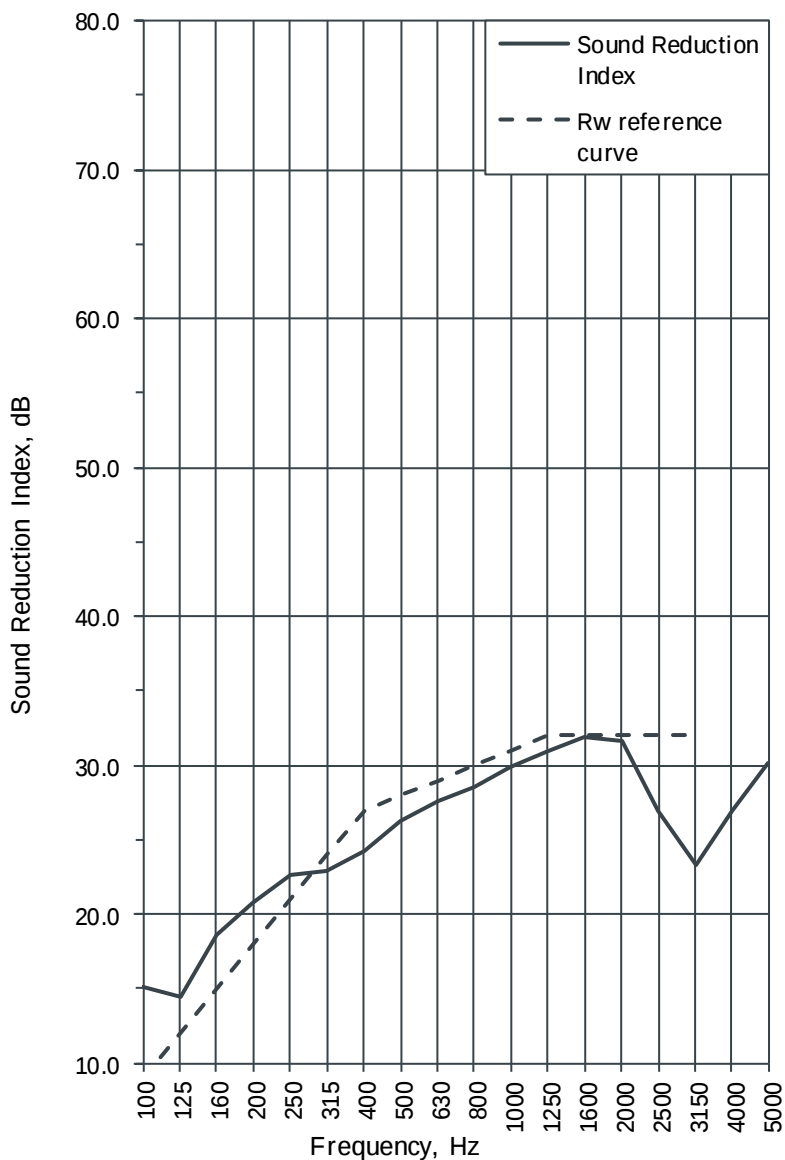
Test Number: 3
Client: IPP Black Mountain
Test Date: 03/05/2017
Sample Height: 2.2 m
Sample Width: 2 m
Sample Weight: 9.24 kg/m²

Test Room:
Air Temperature: 13 °C
Air Humidity: 65 %
Volume: 55 m³
Receiving
13.6 °C
63 %
300 m³
Air Pressure: 1014 mbar

Product

Identification: 9mm Magply board

Freq, f Hz	Sound Reduction Index, dB	
	1/3 Oct	Octave
50+	12.5	11.0
63+	13.8	
80+	8.6	
100	15.2	15.7
125	14.4	
160	18.6	
200	20.8	22.0
250	22.7	
315	22.9	
400	24.2	25.8
500	26.3	
630	27.6	
800	28.6	29.8
1000	29.9	
1250	31.0	
1600	31.9	29.5
2000	31.6	
2500	26.9	
3150	23.3	25.9
4000	27.0	
5000	30.1	
6300+	34.5	36.0
8000+	35.6	
10000+	39.0	
Average 100-3150	24.7	Version v3.0



Rating according to BS EN ISO 717-1:2013

R_w(C;C_{tr})= 28 (-1 ; -2) dB

* shows measurement corrected for background

> shows measurement limited by background

+ shows Frequency beyond standard and not UKAS accredited

Data Sheet 3

Test Number: 4
Client: IPP Black Mountain
Test Date: 03/05/2017
Sample Height: 2.2 m
Sample Width: 2 m
Sample Weight: 12.36 kg/m²

Test Room:
Air Temperature: 13.3 °C
Air Humidity: 66 %
Volume: 55 m³

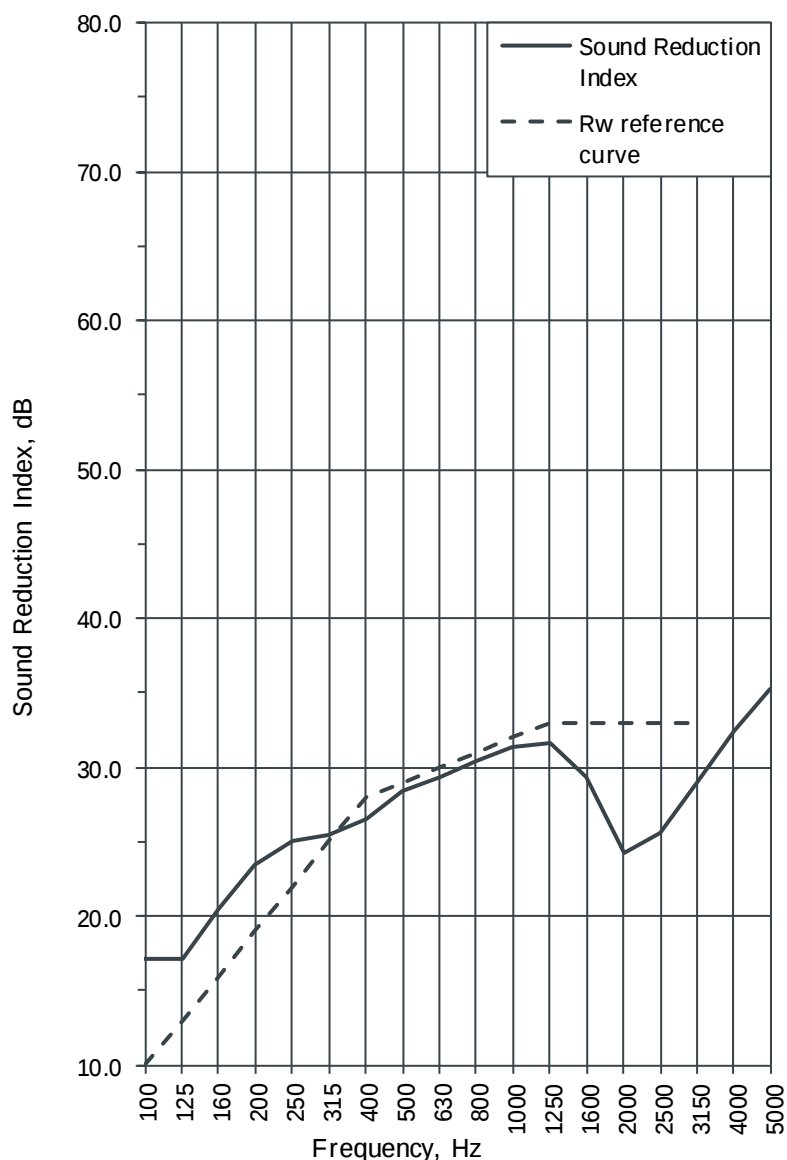
Receiving
Air Temperature: 13.5 °C
Air Humidity: 65 %
Volume: 300 m³

Air Pressure: 1014 mbar

Product

Identification: 12mm Magply board

Freq, f Hz	Sound Reduction Index, dB	
	1/3 Oct	Octave
50+	14.6	13.6
63+	13.2	
80+	13.3	
100	17.2	18.0
125	17.1	
160	20.5	
200	23.5	24.6
250	25.1	
315	25.4	
400	26.5	27.9
500	28.4	
630	29.4	
800	30.4	31.1
1000	31.4	
1250	31.6	
1600	29.3	25.9
2000	24.3	
2500	25.6	
3150	29.1	31.6
4000	32.5	
5000	35.2	
6300+	39.1	40.3
8000+	39.9	
10000+	42.5	
Average 100-3150	25.9	Version v3.0



Rating according to BS EN ISO 717-1:2013

R_w(C;C_{tr})= 29 (-2 ; -2) dB

* shows measurement corrected for background

> shows measurement limited by background

+ shows Frequency beyond standard and not UKAS accredited

Data Sheet 4

Test Number: 5
Client: IPP Black Mountain
Test Date: 03/05/2017
Sample Height: 2.2 m
Sample Width: 2 m
Sample Weight: 20.83 kg/m²

Test Room:
Air Temperature: 13.1 °C
Air Humidity: 67 %
Volume: 55 m³

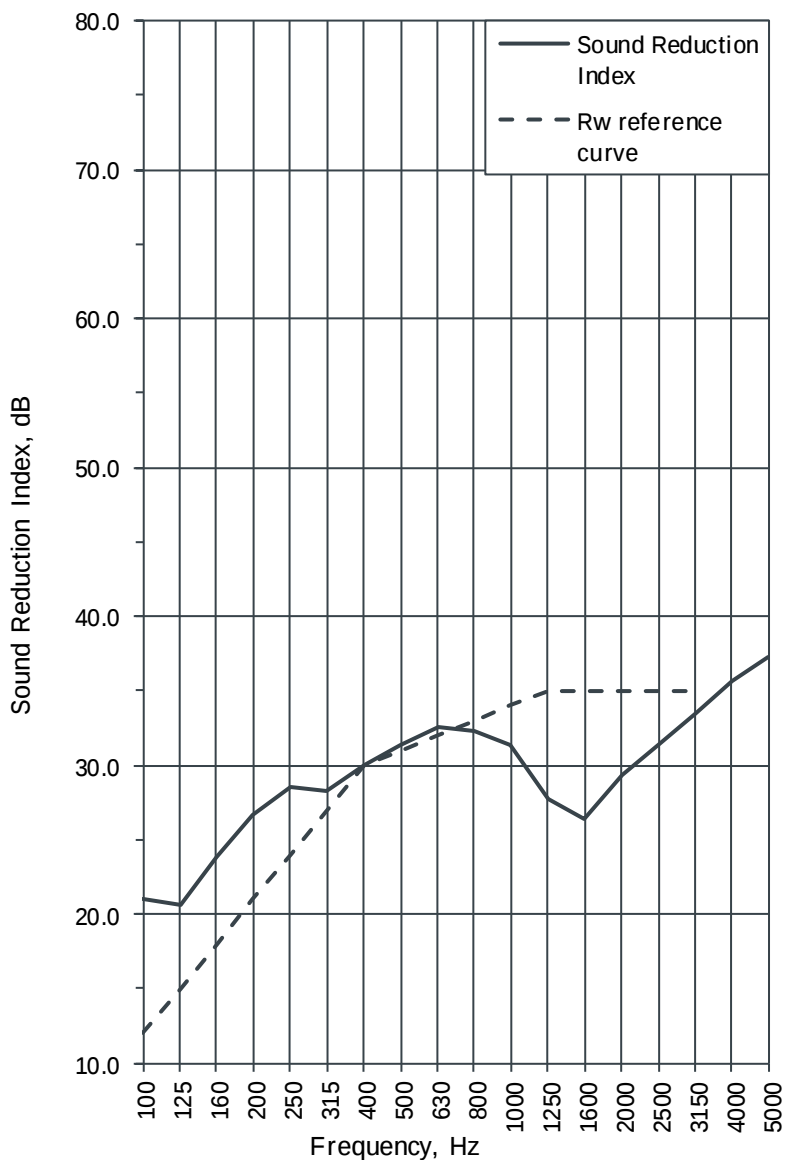
Receiving
Air Temperature: 13.5 °C
Air Humidity: 66 %
Volume: 300 m³

Air Pressure: 1014 mbar

Product

Identification: 20mm Magply board

Freq, f Hz	Sound Reduction Index, dB	
	1/3 Oct	Octave
50+	18.4	16.3
63+	15.6	
80+	15.4	
100	21.0	21.6
125	20.7	
160	23.9	
200	26.7	27.8
250	28.6	
315	28.3	
400	30.0	31.2
500	31.3	
630	32.6	
800	32.3	30.0
1000	31.4	
1250	27.7	
1600	26.4	28.6
2000	29.4	
2500	31.4	
3150	33.5	35.2
4000	35.6	
5000	37.3	
6300+	39.1	38.8
8000+	38.1	
10000+	39.2	
Average 100-3150	28.5	Version v3.0



Rating according to BS EN ISO 717-1:2013

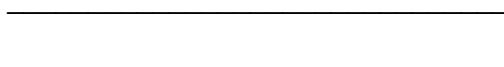
R_w(C;C_{tr})= 31 (-2 ; -2) dB

* shows measurement corrected for background

> shows measurement limited by background

+ shows Frequency beyond standard and not UKAS accredited

Drawing 1



Single sheet of Magply Board
(various thickness)

Appendix A – Test Procedure

Measurement of Sound Transmission in accordance with BS EN ISO 10140-2: 2010 – TP33

In the laboratory, airborne sound transmission is determined from the difference in sound pressure levels measured across a test sample installed between two reverberant rooms. The difference in measured sound pressure levels is corrected for the amount of absorption in the receiving room. The test is done under conditions which restrict the transmission of sound by paths other than directly through the sample. The source sound field is randomly incident on the sample.

The test sample is located and sealed in an aperture within the brick dividing wall between the two rectangular reverberant (i.e. acoustically "live") room, both of which are constructed from 215mm brick with reinforced concrete floors and roofs. The brick wall has dimensions of 4.8m wide x 3.1m high and 550mm nominal thickness and forms the whole of the common area between the two rooms.

One of the rooms is used as the receiving room and has a volume of 300 cubic metres. It is isolated from the surrounding structure and the adjoining room by the use of resilient mountings and seals ensuring good acoustic isolation. The adjoining source room has a volume of 55 cubic metres

Broad band noise is produced in the source room from an electronic generator, power amplifier and loudspeaker. The resulting sound pressure levels in both rooms are sampled, filtered into one third octave band widths, integrated and averaged by means of a Real Time Analyser using a microphone on an oscillating microphone boom. The value obtained at any particular frequency is known as the equivalent sound pressure level for either source or receiving rooms. The change in level across the test sample is termed the equivalent sound pressure level difference, i.e.

$$D = L_1 - L_2$$

where

- D is the equivalent sound pressure level difference in dB
- L1 is the equivalent sound pressure level in the source room in dB
- L2 is the equivalent sound pressure level in the receiving room in dB

The Sound Reduction Index (R), also known by the American terminology Sound Transmission Loss, is defined as the number of decibels by which sound energy randomly incident on the test sample is reduced in transmitting through it and is given by the formula:

$$R = D + 10 \log_{10} \frac{S}{A} \dots\dots\dots \text{in decibels}$$

Where

S is the area of the sample (m²)

A is the total absorption in the receiving room (m²)

both dimensions being in consistent units

The Sound Reduction Index is an expression of the laboratory sound transmission performance of a particular element or construction. It is a function of the mass, thickness, sealing, method of mounting etc., and is independent of the overall area of the sample.

However, when a sample is installed on site and forms part of an enclosure of building, the sound insulation obtained will be dependent upon its surface area, the larger the area the greater the sound energy transmitted, as well as the absorption in the receiving area. In addition, the overall sound insulation of an enclosure is also determined by the sound transmission through other building elements, some of which may have an inferior performance to the sample. Because of this the potential Sound Reduction Index of a sample is not always fully realised in practice. A further consequence is that the Sound Reduction Index of a particular sample can only successfully be measured in a laboratory because only under such controlled conditions can the sound transmission path be limited to the sample under test.

R_w, C and C_{tr} have been calculated in accordance with the relevant section of

BS EN ISO 717-1:2013 from the results of laboratory tests carried out in accordance with

BS EN ISO 10140-2:2010.

Appendix B – Measurement Uncertainty

Measurement Uncertainty

BS EN ISO 10140-2: 2010 – TP33

The following values of uncertainty are based on a standard uncertainty multiplied by a coverage factor of $k = 2$, which provides a level of confidence of approximately 95%.

Frequency, Hz	Uncertainty, $\pm$ dB
100	3.2
125	2.9
160	2.5
200	2.5
250	1.8
315	1.8
400	1.5
500	1.5
630	1.2
800	1.2
1000	1.2
1250	1.2
1600	1.2
2000	1.2
2500	1.2
3150	1.2

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