Technical Report

INVESTOR IN PEOPLE

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Project

The Laboratory Determination of the Airborne Sound Transmission of a Plasterboard Partition Sealed with One Type of Everflex Sealant

Prepared for

Everbuild Building Products Ltd
Site 41
Knowsthorpe Way
Cross Green Industrial Estate
Leeds
LS9 0SW

By

Allen Smalls

UKAS TESTING
0444

Sound Research Laboratories Limited
Consultants in Noise & Vibration
Head Office & Laboratory: Holbrook House, Little Waldingfield
Sudbury, Suffolk CO10 0TH
Telephone (01787) 247595 Fax (01787) 248420
e-mail:srl@soundresearch.co.uk

1.0 Summary

Tests have been done in SRL's Laboratory at Holbrook House, Sudbury, Suffolk, to determine the sound reduction index of a plasterboard partition sealed with one type of Everflex sealant in accordance with BS EN ISO 140-3:1995.

From these measurements the required results have been derived and are presented in both tabular and graphic form in Data Sheets 1 and 2.

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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Allen Smalls
Laboratory Manager
Quality Manager

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Tom Gardner
Head of Testing

For and on behalf of
Sound Research Laboratories Ltd

SRL

Contents

2.0 Details of Measurements

2.1 Location

Sound Research Laboratories Ltd
Holbrook House
Little Waldingfield
Sudbury
Suffolk
CO10 OTH

2.2 Test Dates

7 and 8 May 2009

2.3 Instrumentation and Apparatus Used

Make	Description	Type
E D I	Microphone Multiplexer	
	Microphone Power Supply Unit	
Norwegian	Tapping Machine	211
Electronics	Real Time Analyser	830
	Rotating Microphone Boom	231
Brüel & Kjaer	12mm Condenser Microphones	4166
	Windshields	UA0237
	Pre Amplifiers	2639, 2669C
	Microphone Calibrator	4231
	Omnipower Sound Source	4296
	Power Amplifier	2716
Larson Davis	12mm Condenser Microphone	2560
Celestion	Loudspeakers	100w

Douglas Curtis	Rotating Microphone Boom	
Thermo Hygro	Temperature & Humidity Probe	
TOA	Graphic Equalizer	E-1231

2.4 References

BS EN ISO 140-3:1995	Laboratory measurement of airborne sound insulation of building elements
BS EN ISO 717-1:1997	Rating of sound insulation in buildings and of building elements. Airborne Sound Insulation.

2.5 Personnel Present

Andrew Scanlon	Everbuild Building Products Ltd

3.0 Description of Test

3.1 Description of Sample

Test 2: An unsealed partition of one layer of 12.5mm Lafarge Wallboard Plasterboard each side of 100mm x 50mm timber studword with two "straight through" gaps 2.2m high by 20mm wide, and unsealed perimeter. See diagram 1 for details.

Test 4: As test 2, partition sealed at perimeter both sides and both "straight through" gaps sealed both sides with Everflex Pyromate and Everflex Fireseal 400 Silicone Sealant. See diagram 2 for details.

Note: Sealants left at least 24 hours before testing.

See also photographs 1 to 3.

Sampling plan: Samples selected at random

Sample condition: New

Details supplied by: Sealant details supplied by Everbuild

Sample installed by: SRL and Everbuild

3.2 Sample Delivery date

7 May 2009

3.3 Test Procedures

The sample was mounted/located and tested in accordance with the relevant standard. The method and procedure is described in Appendix 1. The measurement uncertainty is given in Appendix 2.

4.0 Results

The results of the measurements and subsequent analysis are given in Data Sheets 1 and 2 and summarised below.

Results relate only to the items tested.

SRL Test No.	Description in Brief	$R_w(C;C_{tr})$, dB
2	Partition unsealed	12 (0;1
4	Partition sealed with Everflex Pyromate and Everflex Fireseal 400 Silicone Sealant	38(-2;-9)

End of Text

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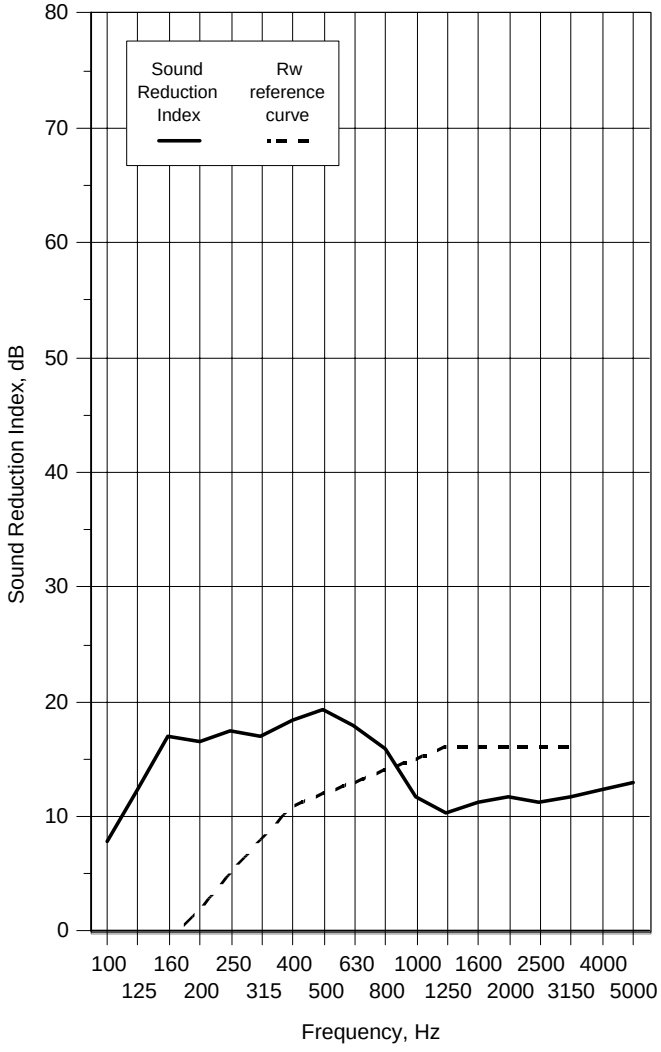
Data Sheet 1

Test Number :	2	**Air temperature:**	16.4 °C
Client:	Everbuild Building Products	**Air humidity:**	54 %
Test Date:	07/05/2009	**Receiving room volume**	300 m3
Sample height:	2.2 m	**Source room volume:**	115 m3
Sample width:	2 m	**Sample weight:**	7.97 kg/m2
Product Identification:	Partition unsealed		

Freq f Hz	Sound Reduction Index, dB 1/3 Oct	1/1 Oct
50+	8.9	4.8
63+	7.1	
80+	1.7	
100	7.9	11.0
125	12.4	
160	17.0	
200	16.5	17.0
250	17.5	
315	17.0	
400	18.4	18.5
500	19.4	
630	17.9	
800	15.9	12.1
1000	11.8	
1250	10.4	
1600	11.3	11.4
2000	11.7	
2500	11.3	
3150	11.8	12.3
4000	12.3	
5000	13.0	
6300+	14.7	15.2
8000+	14.8	
10000+	16.2	
Average 100-3150	14.3	



Rating according to BS EN ISO 717-1:1997

Rw(C;Ctr)= **12 (0; 1)** dB

Notes * designates measurement corrected for background

\# designates limit of measurement due to background

\+ designates frequency beyond standard and not UKAS accredited

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Tel: 01787 247595

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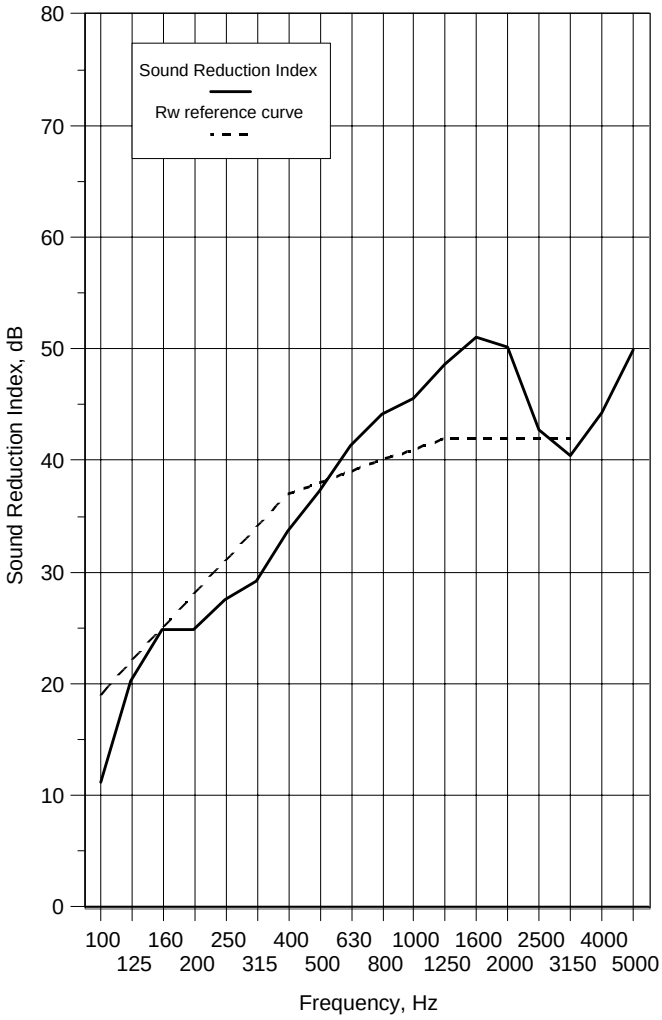
Data Sheet 2

Test Number :	4	**Air temperature:**	16.3 °C
Client:	Everbuild Building Products	**Air humidity:**	50 %
Test Date:	08/05/2009	**Receiving room volume:**	300 m3
Sample height:	2.2 m	**Source room volume:**	115 m3
Sample width:	2 m	**Sample weight:**	7.97 kg/m2
Product Identification:	Partition sealed with Everflex Pyromate and Everflex Fireseal 400 Silicone Sealant		

Freq f Hz	Sound Reduction Index, dB 1/3 Oct	1/1 Oct
50+	19.5	
63+	18.0	8.6
80+	4.1	
100	11.2	
125	20.3	15.3
160	24.8	
200	24.9	
250	27.6	26.9
315	29.2	
400	33.7	
500	37.2	36.4
630	41.4	
800	44.1	
1000	45.6	45.7
1250	48.6	
1600	51.1	
2000	50.2	46.3
2500	42.7	
3150	40.5	
4000	44.3	43.4
5000	49.9	
6300+	56.7	
8000+	55.9	57.2
10000+	59.8 *	
Average 100-3150	35.8	



Rating according to BS EN ISO 717-1:1997

Rw(C;Ctr)= **38 (-2;-9)** dB

Notes :* designates measurement corrected for background

designates limit of measurement due to background

+ designates frequency beyond standard and not UKAS accredited

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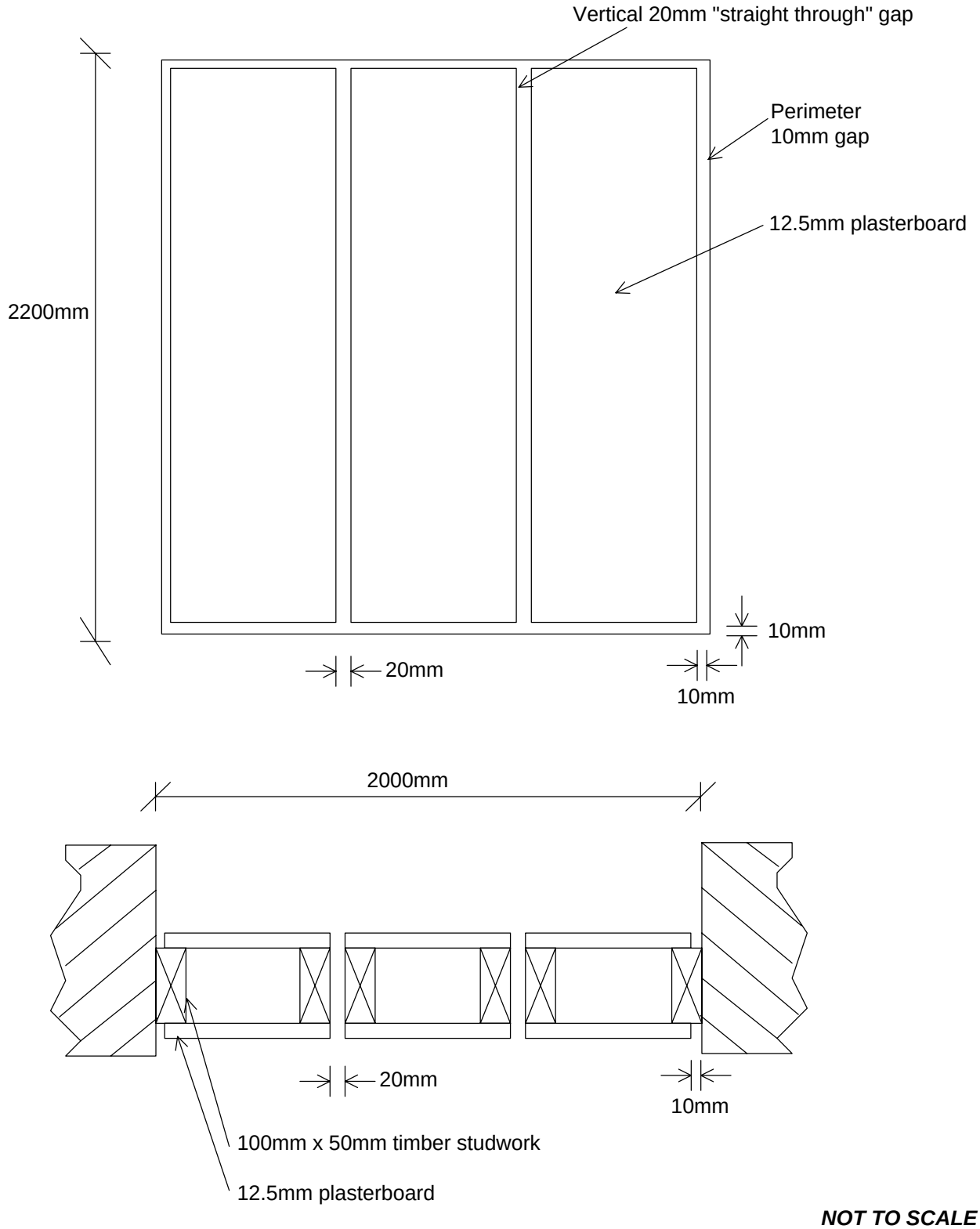
Photograph 1: Unsealed Partition

Photograph 2: Unsealed Partition Close-Up

Photograph 3: Fully Sealed Partition Close-Up

Diagram 1: Partition Unsealed

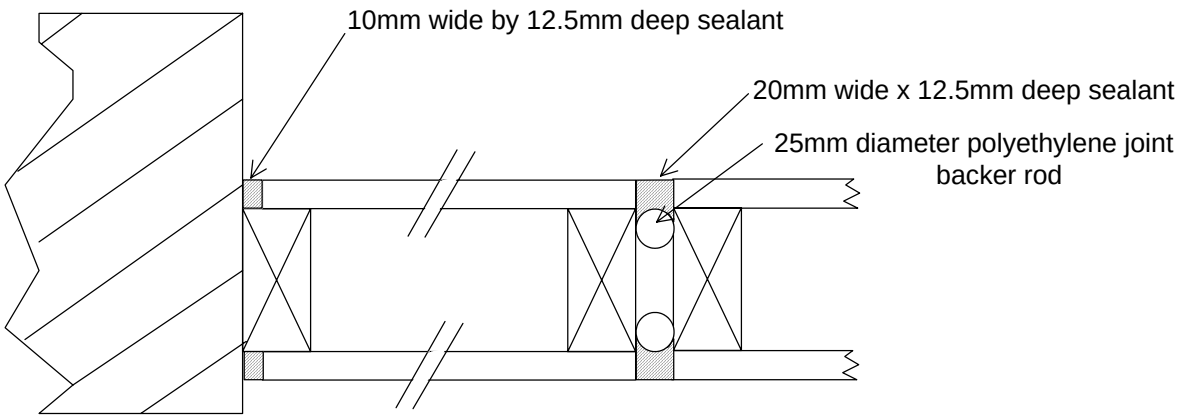


NOT TO SCALE

Diagram 2: Partition Sealed

As diagram 1, with perimeter and “straight through” gaps sealed as below.

Perimeter



NOT TO SCALE

Appendix 1

Measurement of Sound Transmission in accordance with BS EN ISO 140-3 : 1995 - TP15

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 115 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 using a microphone mounted on an oscillating boom and connected to a real time analyser. The signal is filtered into one third octave band widths, integrated and averaged. The value obtained at each frequency is known as the average sound pressure level for either the source or the receiving room. The change in level across the test sample is termed the sound pressure level difference, i.e.

$$D = L_1 - L_2$$

where

D is the equivalent Sound Pressure level difference in dB

L_1 is the equivalent Sound Pressure level in the source room in dB

L_2 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:

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

where

S is the area of the sample

A is the total absorption in the receiving room

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 an example of this construction is installed on site, the sound insulation obtained will depend upon its surface area, as well as the absorption in the receiving room. The larger the area the greater the sound energy transmitted. Also, the overall sound insulation is affected by the sound transmission through other building elements, some of which may have an inferior performance to the sample tested. In practice, therefore, the potential sound reduction index of a construction is not fully realised on site. Furthermore, the sound reduction index of a particular sample of that construction can only be measured accurately in a laboratory, because only under such controlled conditions can the sound transmission path be limited to the sample under test.

R_{aw} is a single figure rating of sound insulation and is calculated in accordance with the relevant section of BS EN ISO 717-1:1997.

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Appendix 2

Measurement Uncertainty
BS EN ISO 140-3:1995 - TP15

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, ± dB
100	2.6
125	2.4
160	2.1
200	2.1
250	1.5
315	1.5
400	1.2
500	1.2
800	1.0
1000	1.0
1250	1.0
1600	1.0
2000	1.0
2500	1.0
3150	1.0