SRL

UKAS TESTING 0444

Technical Report

C/23426/T02a
Supersedes C/23426/T02
Dated 14 July 2016

Project

The Laboratory Measurement of Airborne Sound Insulation of a Plasterboard Partition Sealed with Sikaflex AT Connection

Prepared for

Sika Services AG

By

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Quality Assurance	
Project Title	The Laboratory Measurement of Airborne Sound Insulation of a Plasterboard Partition Sealed with Sikaflex AT Connection
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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 Sikaflex AT Connection sealant 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 and 2.

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

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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 Dates

16 & 29 June 2016

1.3 Tester

George Thomson 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	12mm Condenser Microphones	4166
	Windshields	UA0237
	Pre Amplifiers	2639, 2669C
	Microphone Calibrator	4231
	Omnipower Sound Source	4296
Larson Davis	12mm Condenser Microphone	2560
Celestion	Loudspeakers	100w
SRL	Voltage controller	
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

Test 9

An unsealed partition of one layer of 12.5mm wallboard plasterboard each side of 100mm x 50mm timber studwork with two "straight through" gaps 1.2m high by 20mm wide, and unsealed perimeter. See drawing 1 for details.

Test 11

As test 9, partition sealed at perimeter both sides and both "straight through" gaps sealed both sides with Sikaflex AT Connection sealant. See drawing 2 for details.

Sampling plan:	Enough for test
Sample condition:	New
Details supplied by:	Sika Services AG
Sample installed by:	SRL Technical Services

2.2 Sample Delivery date

9 May 2016

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 and 2 and summarised below.

Results relate only to the items tested.

SRL Test No.	Description in Brief	R_w (C;C_{tr})
9	Partition Unsealed	14 (0;0)
11	Partition sealed with Sikaflex AT Connection	38 (-2;-6)

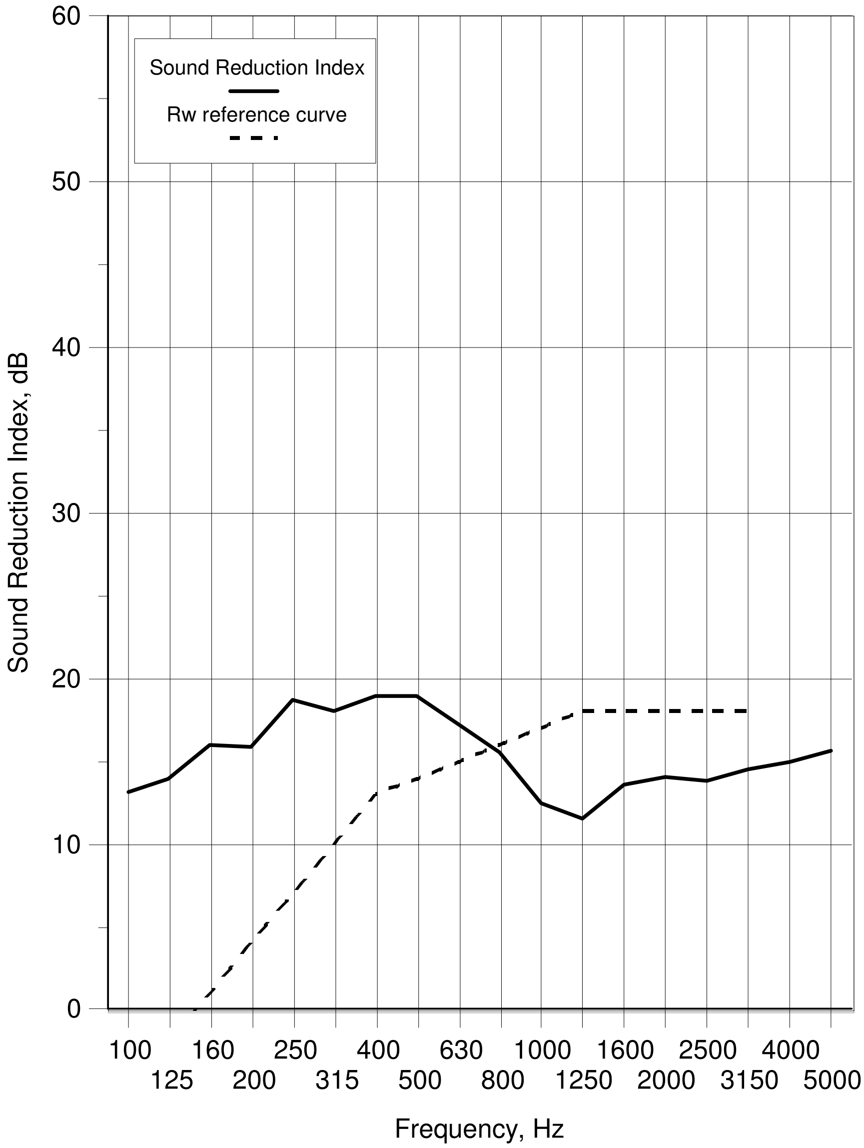
Data Sheet 1

Test Number : 9
Client: Sika Services AG
Test Date: 16/06/2016
Sample height: 1.2 m
Sample width: 2 m
Sample weight: 17 kg/m2
Product Identification: Bare Wall consisting of 1 layer of 12.5mm wallboard plasterboard either side of 100mm x 50mm timber studs with two straight through gaps and perimeter unsealed - see drawing 1 for details

Test Room:	**Source**	**Receiving**
Air temperature:	18.1 °C	18 °C
Air humidity:	68 %	69 %
Volume:	115 m3	300 m3

Air Pressure: 993 mbar

Freq f Hz	Sound Reduction Index, dB 1/3 Oct	1/1 Oct
50+	15.6	
63+	13.0	11.5
80+	8.8	
100	13.1	
125	13.9	14.2
160	16.0	
200	15.9	
250	18.7	17.4
315	18.0	
400	19.0	
500	18.9	18.3
630	17.2	
800	15.5	
1000	12.5	12.9
1250	11.6	
1600	13.6	
2000	14.1	13.8
2500	13.8	
3150	14.5	
4000	15.0	15.0
5000	15.6	
6300+	17.1	
8000+	17.3	17.7
10000+	18.9	
Average 100-3150	15.4	Version v2.1



Rating according to BS EN ISO 717-1:2013

Rw(C;Ctr)= **14 (0; 0) dB**

* shows measurement corrected for background

\+ shows frequency beyond standard and not UKAS accredited

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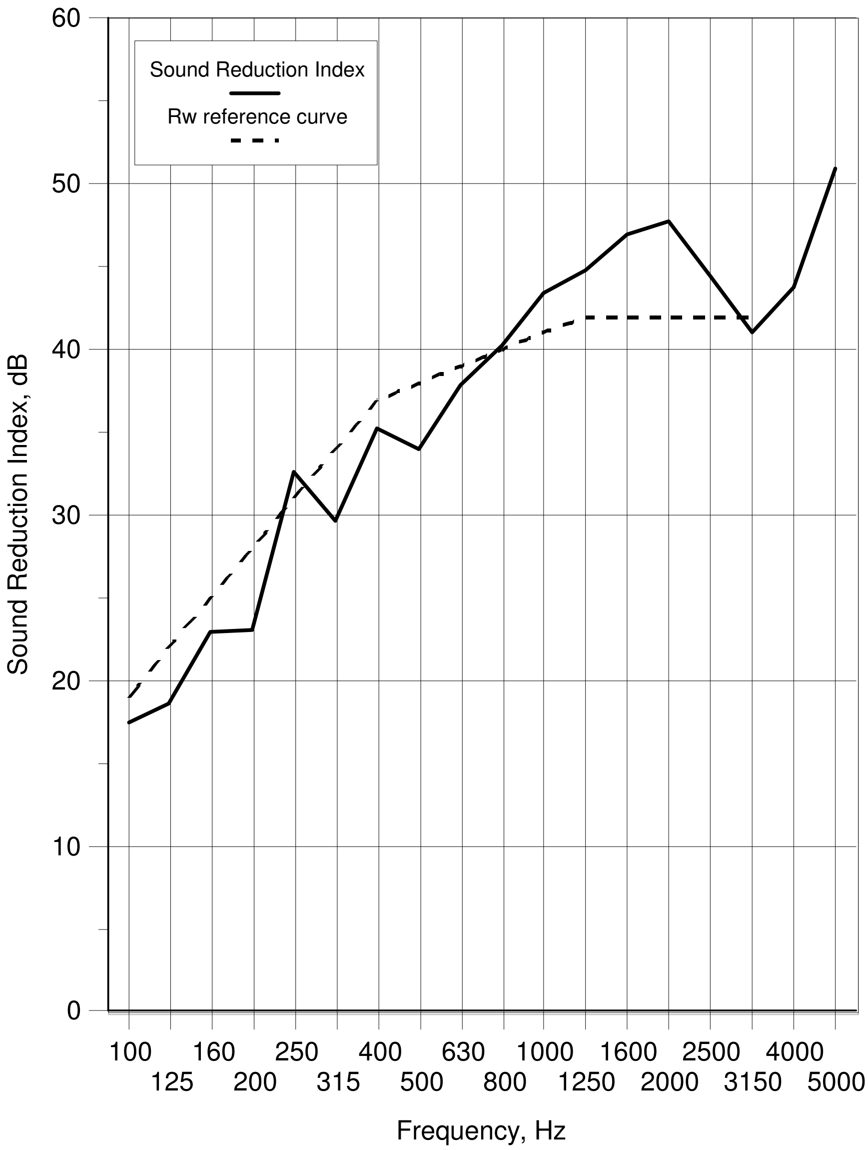
Data Sheet 2

Test Number :	11	**Test Room:**	**Source**	**Receiving**
Client:	Sika Services AG	**Air temperature:**	17.9 °C	18.6 °C
Test Date:	29/06/2016	**Air humidity:**	67 %	69 %
Sample height:	1.2 m	**Volume:**	115 m3	300 m3
Sample width:	2 m			
Sample weight:	17 kg/m2	**Air Pressure:**	1001 mbar	

Product Identification: As test 9 with all gaps filled both sides with Sikaflex AT Connection
See drawing 2 for details

Freq f Hz	Sound Reduction Index, dB 1/3 Oct	1/1 Oct
50+	19.3	
63+	17.0	13.6
80+	10.1	
100	17.5	
125	18.6	19.1
160	22.9	
200	23.1	
250	32.6	26.6
315	29.7	
400	35.2	
500	34.0	35.4
630	37.8	
800	40.3	
1000	43.4	42.4
1250	44.8	
1600	47.0	
2000	47.8	46.2
2500	44.5	
3150	41.0	
4000	43.8	43.7
5000	50.9	
6300+	56.8	
8000+	56.2 *	54.3
10000+	51.7 *	
Average 100-3150	35.0	Version v2.1



Rating according to BS EN ISO 717-1:2013

Rw(C;Ctr)= **38 (-2;-6) dB**

* shows measurement corrected for background

+ shows frequency beyond standard and not UKAS accredited

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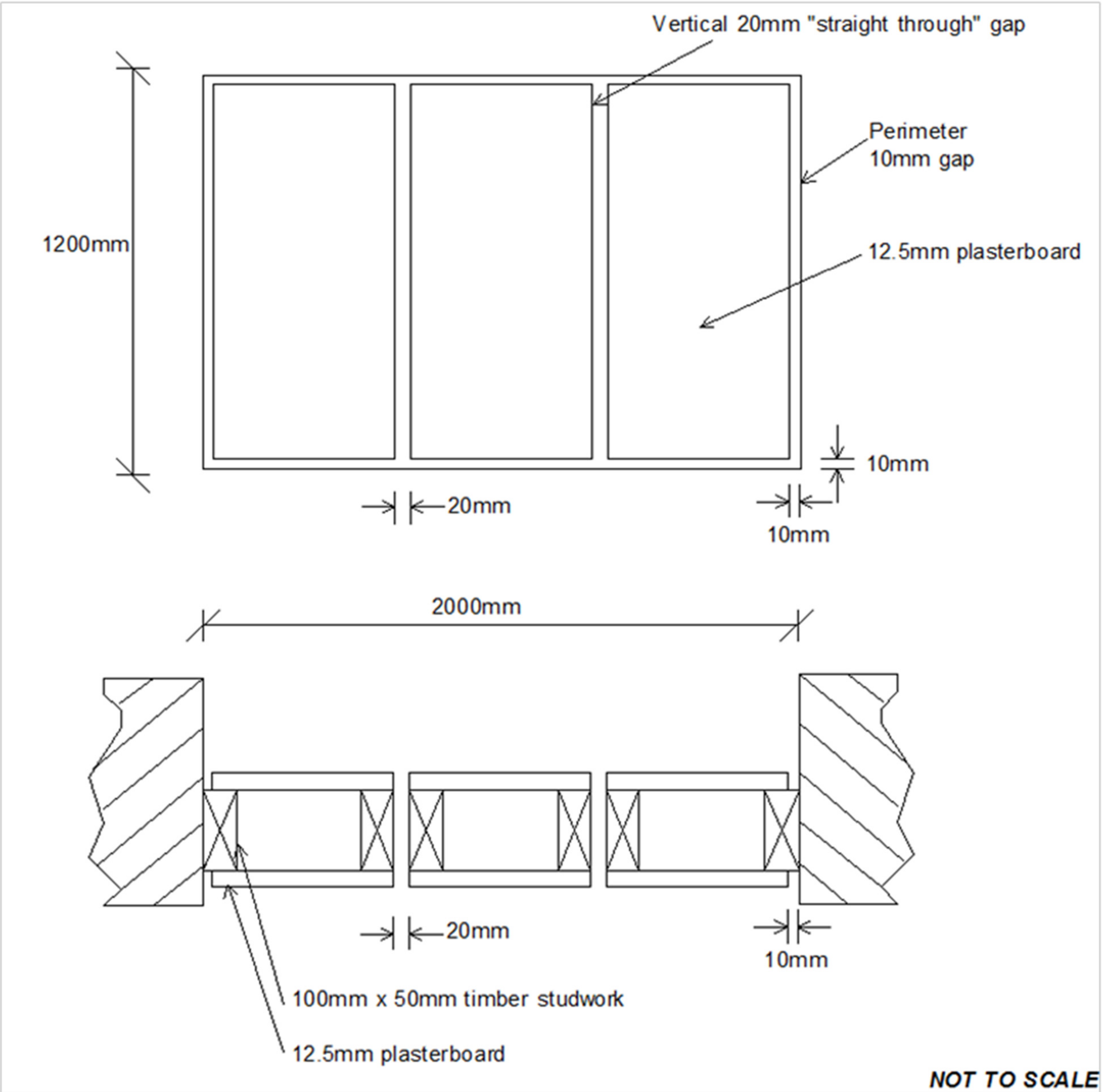
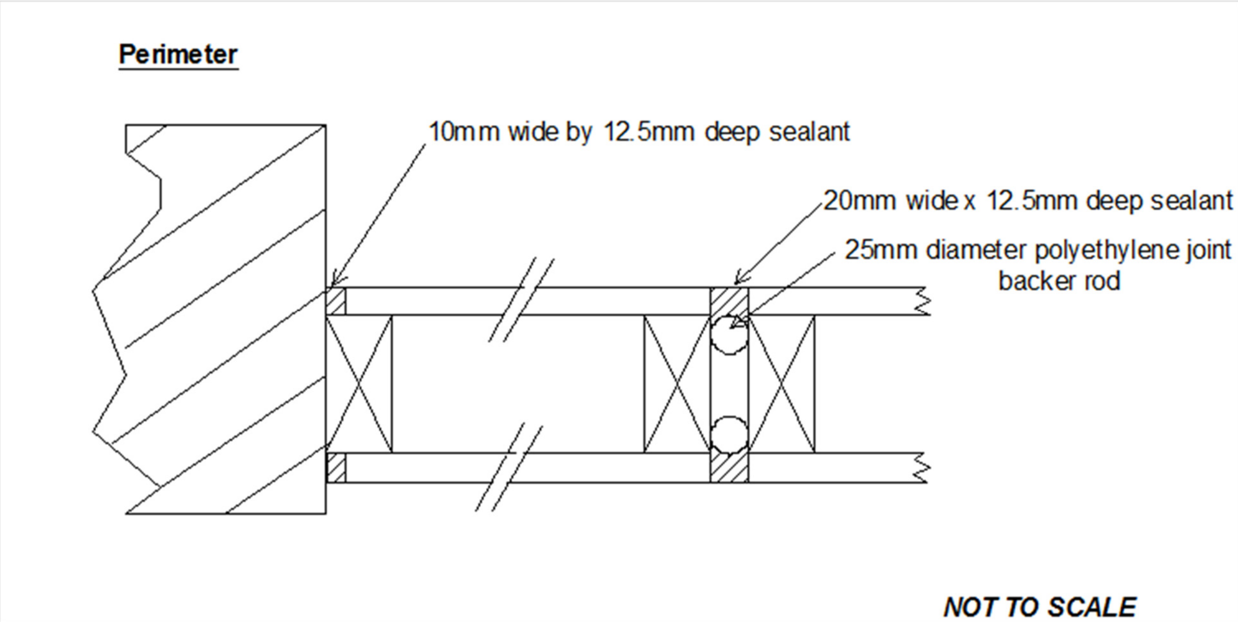
Drawing 1



Drawing 2


Perimeter
10mm wide by 12.5mm deep sealant
20mm wide x 12.5mm deep sealant
25mm diameter polyethylene joint backer rod
NOT TO SCALE

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 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:

$R = D + 10\log_{10} \frac{S}{A}$...... 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_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, ± 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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