

bre

**The laboratory airborne  
sound insulation of a  
twin leaf stud wall with  
and without double  
sockets with fischer  
fixings intumescent  
Putty Pads**

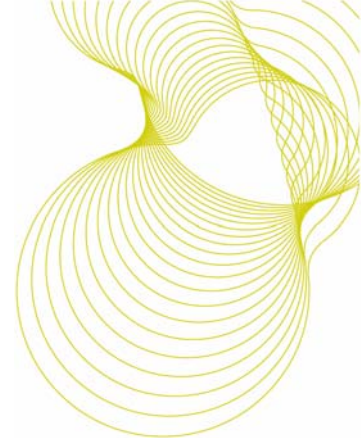
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27 August 2009

Test report number 255905



0578



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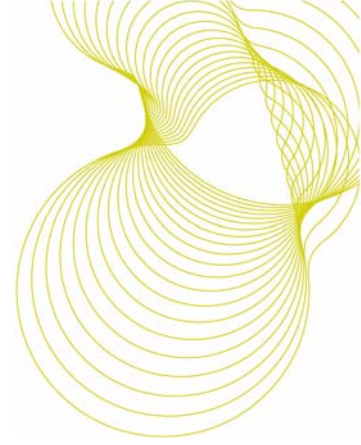
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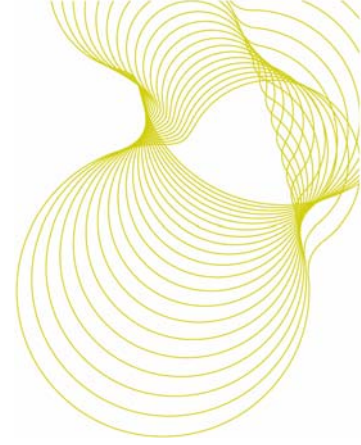
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## **1 Introduction**

BRE Acoustics was commissioned to produce this report on behalf of fischer fixings UK Ltd. It contains the results of airborne sound insulation measurements in the BRE horizontal transmission suite (Building 9), BRE, Garston, Watford, Hertfordshire, WD25 9XX.

This report details the testing outlined in BRE proposal 8053 - 123417. The data in this report were first issued in BRE report 248426

## **2 Testing details**

### **2.1 Test dates and personnel**

The measurements detailed in this report were made on 14 October 2008, 15 October 2008 and 16 October 2008 by Dr R Hall of BRE Acoustics.

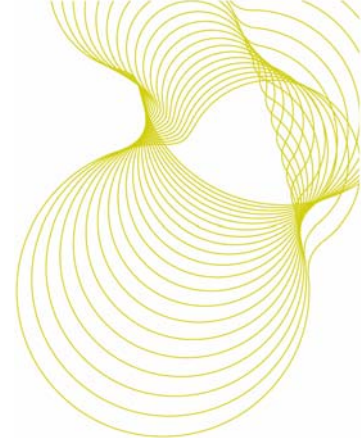
### **2.2 Test method and applicable standards**

Measurement of airborne sound insulation was made in accordance with BS EN ISO 140-3:1995. Single number quantities were calculated in accordance with BS EN ISO 717-1:1997.

BRE Acoustics holds UKAS accreditation for the measurement of sound insulation in the field and the laboratory. The measurements were conducted using the procedures accredited by UKAS.

### **2.3 Test element installation**

The stud wall was installed by BRE. The socket boxes and Putty Pads were installed by Stampol Limited, 45 Bevoir Road, Leytonstone, E11 1DE.



## 2.4 Instrumentation

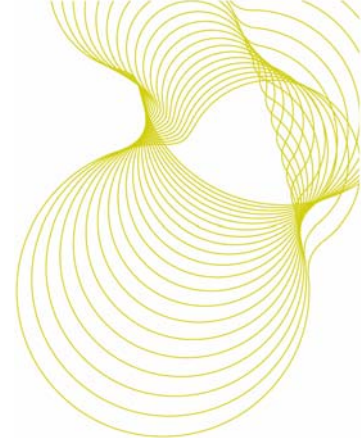
The equipment used to conduct the tests is identified in Table 1.

**Table 1** Equipment list

Equipment description	Manufacturer	Type	UKAS identification number
Microphone Calibrator	NOR	1253	01/008
Microphone	GRAS	40AE	02/304, 02/305
Microphone Preamplifier	GRAS	26CA	04/304, 04/305
Microphone Adapter	NOR	1449	06/107, 06/108
Graphic Equaliser	Phonic	PEQ3300	10/002
Amplifier	NOR	260H	11/013
Real Time Analyser	NOR	840	13/003
Microphone Rotating Boom	NOR	212NA	14/004, 14/005
Loudspeaker	B&K	4224	11/006

The gain of the real time analyser was adjusted to give a reading of 124.0 dB at 250 kHz using the NOR type 1253 calibrator.

All equipment is calibrated in accordance with BRE procedures, using reference equipment calibrated by a UKAS accredited laboratory.

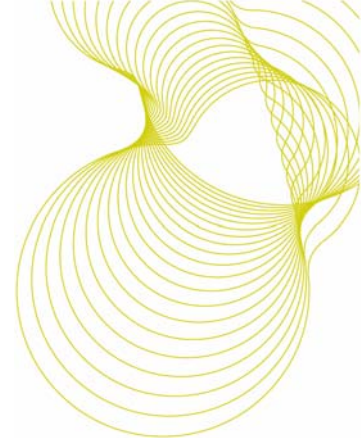


## 2.5 Test numbers

Table 2 lists each test element along with its corresponding test number. The construction details for each test element can be found from Table 3 by referring to the test number.

**Table 2** Test numbers

<b>Test number</b>	<b>Test element</b>	<b>Source room volume (m<sup>3</sup>)</b>	<b>Receive room volume (m<sup>3</sup>)</b>	<b>Common area (m<sup>2</sup>)</b>
L108-078	Wall	130	115	9.8
L108-079	Wall	130	115	9.8
L108-080	Wall	130	115	9.8



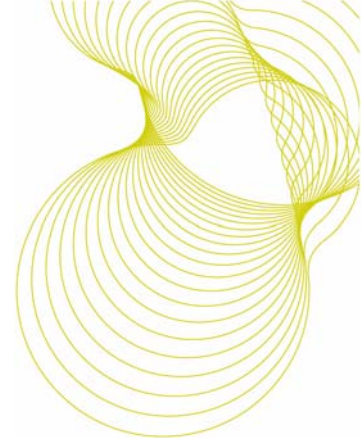
## 2.6 Construction details with test numbers

The construction details are shown in Table 3. When construction details are provided by a third party, they are checked by BRE where possible.

**Table 3** Construction details

Test element	Test number	Construction details
Wall	L108-078	<ul style="list-style-type: none"> <li>• Twin leaf timber stud (100 mm x 50 mm) filler wall with four layers of wallboard (combination of 12.5 mm cement particle board, 14.5 kg/m<sup>2</sup>, and 15 mm plasterboard, 12.5 kg/m<sup>2</sup>)</li> <li>• Filler wall completely filled with glass wool (10 kg/m<sup>3</sup>)</li> <li>• Aperture in filler wall (1.75 m wide x 2.08 m high) filled with twin leaf timber stud (100 mm x 50 mm) wall with two layers of 15 mm plasterboard (total 26 kg/m<sup>2</sup>) on each side of wall</li> <li>• 100 mm glass wool (10 kg/m<sup>2</sup>) between studs in each leaf</li> </ul>
	L108-079	<ul style="list-style-type: none"> <li>• As test L108-078 but with two double electrical sockets with FiPP/I-D fischer intumescent putty pads installed in each side of wall</li> <li>• Putty pads fitted inside socket boxes</li> </ul>
	L108-080	<ul style="list-style-type: none"> <li>• As test L108-078 but with two double sockets with FiPP/E-D fischer intumescent putty pads installed in each side of wall</li> <li>• Putty pads fitted behind socket boxes (on cavity side of wall leaves)</li> </ul>

The laboratory airborne sound insulation of a twin leaf stud wall with and without double sockets with fischer fixings intumescent Putty Pads



## 2.7 Sound insulation test results

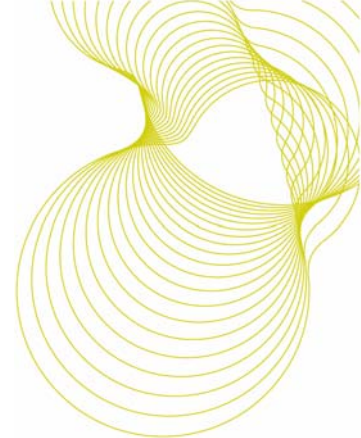
The single number quantities for the sound insulation tests are shown in Table 4. The UKAS test result sheets are included in the appendices.

**Table 4** Test results

Test number	$R_w (C; C_{tr})$ (dB)
L108-078	67 (-2;-7)
L108-079	67 (-2;-7)
L108-080	67 (-2;-7)

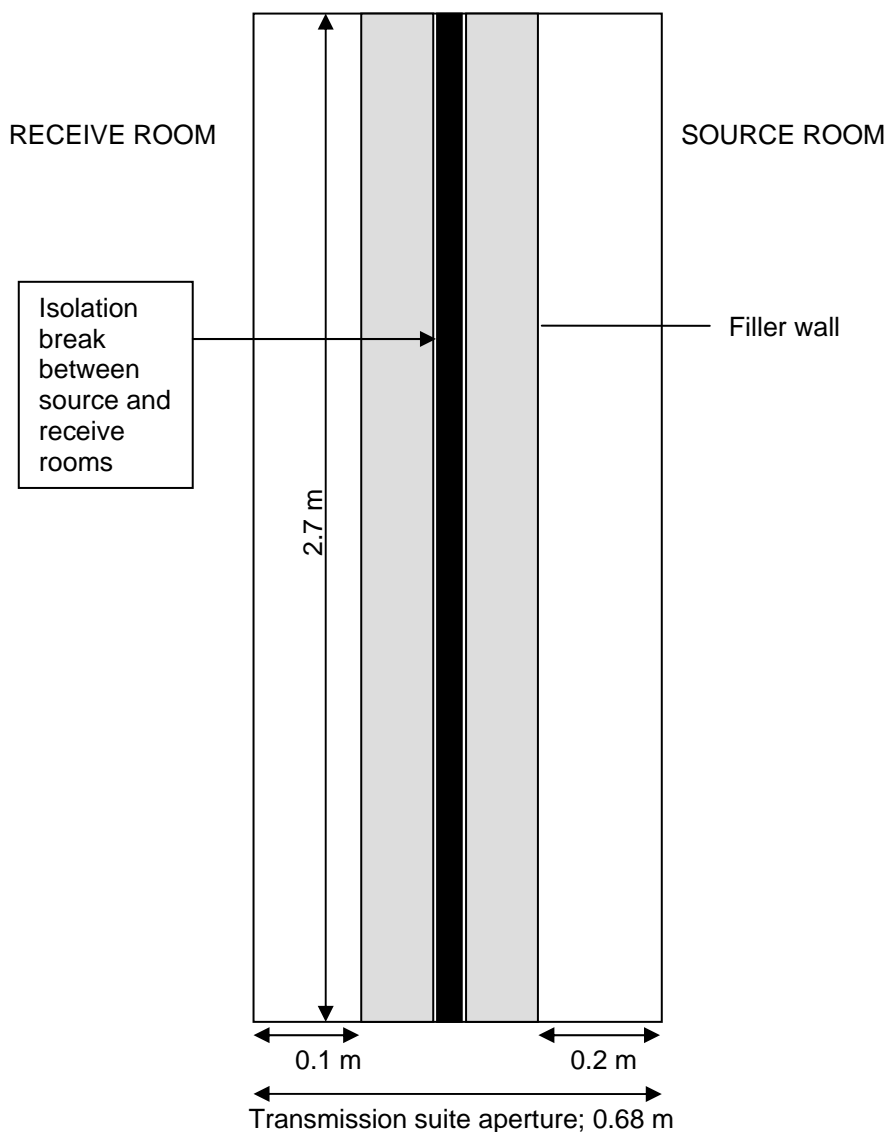
For all the tests, measurements were made in individual 1/3 octave frequency bands from 500 Hz to 5,000 Hz.





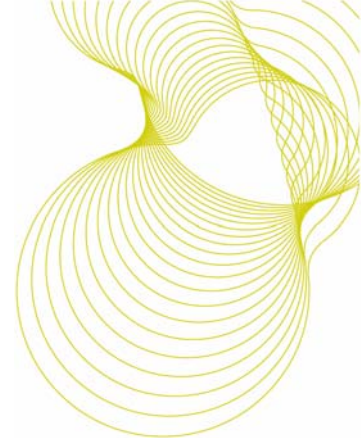
## 2.8 Plans

The position of the twin leaf filler wall in the transmission suite aperture is indicated in Figure 1.



**Figure 1** Section through elevation showing the position of the twin leaf stud filler wall in the transmission suite aperture. One leaf of the wall was on the source room side of the acoustic break and the other leaf on the receive room side of the acoustic break.

The laboratory airborne sound insulation of a twin leaf stud wall with and without double sockets with fischer fixings intumescent Putty Pads



## 2.9 Photographs



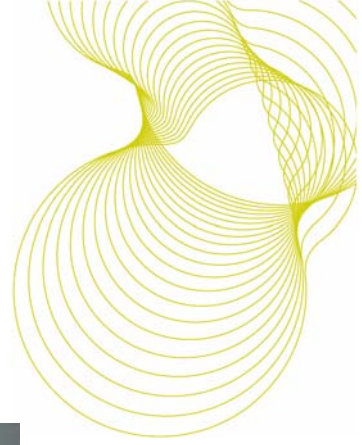
**Figure 2** Sockets in wall

In the source room the sockets were installed 500 mm above the base of the laboratory aperture and separated by a horizontal distance of 500 mm. In the receive room the sockets were installed at the same height but were off-set from the sockets in the source room by 150 mm. All dimensions are approximate.



**Figure 3** Switch box before installation of Putty Pad

The laboratory airborne sound insulation of a twin leaf stud wall with and without double sockets with fischer fixings intumescent Putty Pads

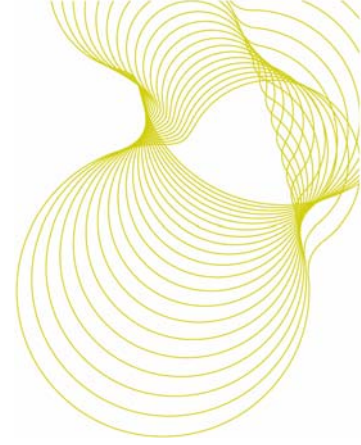


**Figure 4** Putty Pad installed inside switch box



**Figure 5** Putty Pad installed outside switch box

The laboratory airborne sound insulation of a twin leaf stud wall with and without double sockets with fischer fixings intumescent Putty Pads



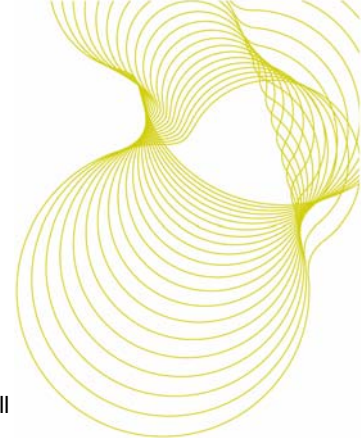
### **3 Appendices**

#### **3.1 UKAS test result sheets**

Page number	Test number
13	L108-078
15	L108-079
17	L108-080



The laboratory airborne sound insulation of a twin leaf stud wall with and without double sockets with fischer fixings intumescent Putty Pads



**Laboratory measurement of airborne sound insulation of building elements**  
**Sound reduction index according to BS EN ISO 140-3:1995**  
**BRE horizontal transmission suite (B9 051-053)**

**Client:** Fischer fixings UK Ltd.  
**Test date:** 14/10/2008 **Test number:** L108-078 **Test element:** Wall

0578

**Test element area:** 9.8 m<sup>2</sup>

**Description:**

Twin leaf timber stud (100 mm x 50 mm) filler wall with four layers of wallboard (combination of 12.5 mm cement particle b  
 Filler wall completely filled with glass wool (10 kg/m<sup>3</sup>)

Aperture in filler wall (1.75 m wide x 2.08 m high) filled with twin leaf timber stud (100 mm x 50 mm) wall with two layers of  
 100 mm glass wool (10 kg/m<sup>2</sup>) between studs in each leaf

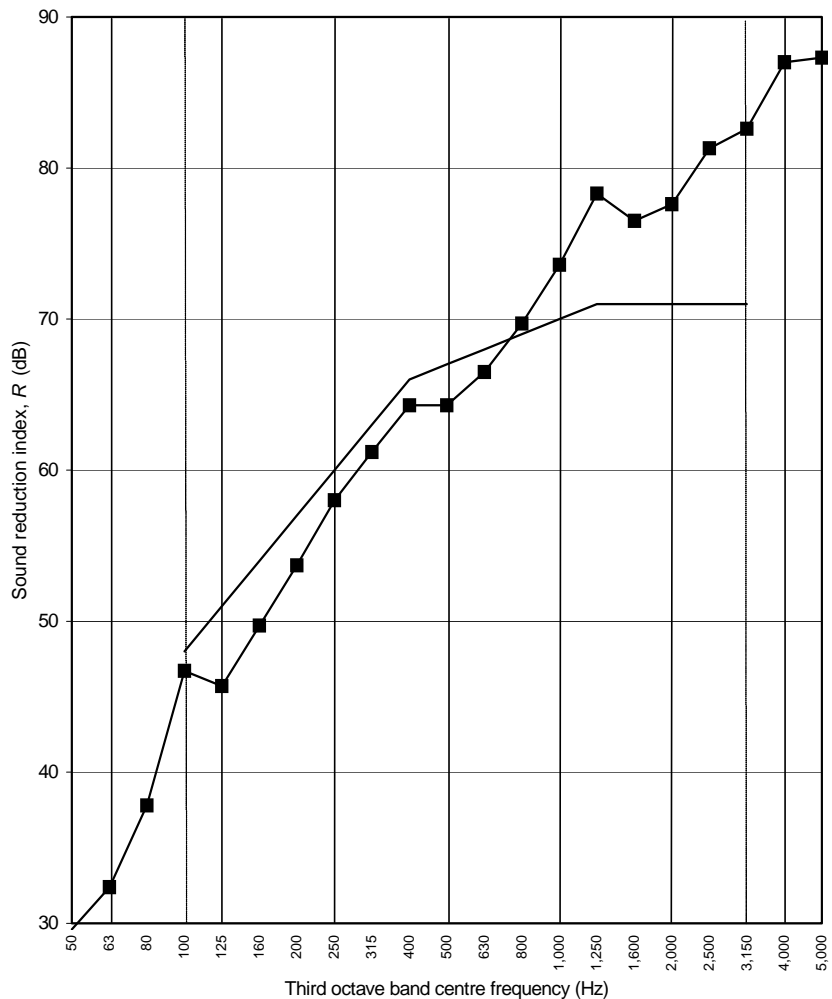
**Source room volume:** 130 m<sup>3</sup> **Air temperature:** 16 °C

**Receive room volume:** 115 m<sup>3</sup> **Air relative humidity:** 75 %

Frequency (Hz)	R One-third octave (dB)
50	29.6
63	32.4
80	37.8
100	46.7
125	45.7
160	49.7
200	53.7
250	58.0
315	61.2
400	64.3
500	64.3
630	66.5
800	69.7
1,000	73.6
1,250	78.3
1,600	76.5
2,000	77.6
2,500	81.3
3,150	82.6
4,000	87.0
5,000	87.3

+ Receiving room level adjusted for background

\* Receiving room level within 6 dB of background



Rating according to BS EN ISO 717-1:1997

**R<sub>w</sub> (C; C<sub>tr</sub>) = 67 (-2; -7) dB**    C<sub>50-3150</sub> = -5 dB    C<sub>50-5000</sub> = -4 dB    C<sub>100-5000</sub> = -1 dB  
 C<sub>tr,50-3150</sub> = -16 dB    C<sub>tr,50-5000</sub> = -16 dB    C<sub>tr,100-5000</sub> = -7 dB

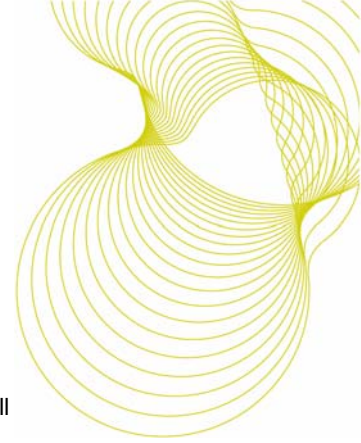
Evaluation based on laboratory measurement results obtained by an engineering method

Based on the data provided in BS EN 20140-2:1993 it is estimated that the measurement uncertainty should not exceed ±1 dB for the single-number quantity (R<sub>w</sub>) and should not exceed the values in Table A1 of BS EN 20140-2:1993 for the data in the individual third octaves (R)

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The laboratory airborne sound insulation of a twin leaf stud wall with and without double sockets with fischer fixings intumescent Putty Pads



**Laboratory measurement of airborne sound insulation of building elements**  
**Sound reduction index according to BS EN ISO 140-3:1995**  
**BRE horizontal transmission suite (B9 051-053)**

**Client:** Fischer fixings UK Ltd.  
**Test date:** 15/10/2008 **Test number:** L108-079 **Test element:** Wall

0578

**Test element area:** 9.8 m<sup>2</sup>

**Description:**

As test L108-078 but with two double electrical sockets with FiPP/I-D fischer intumescent putty pads installed in each side of wall.  
 Putty pads fitted inside socket boxes

**Source room volume:** 130 m<sup>3</sup>

**Air temperature:** 16 °C

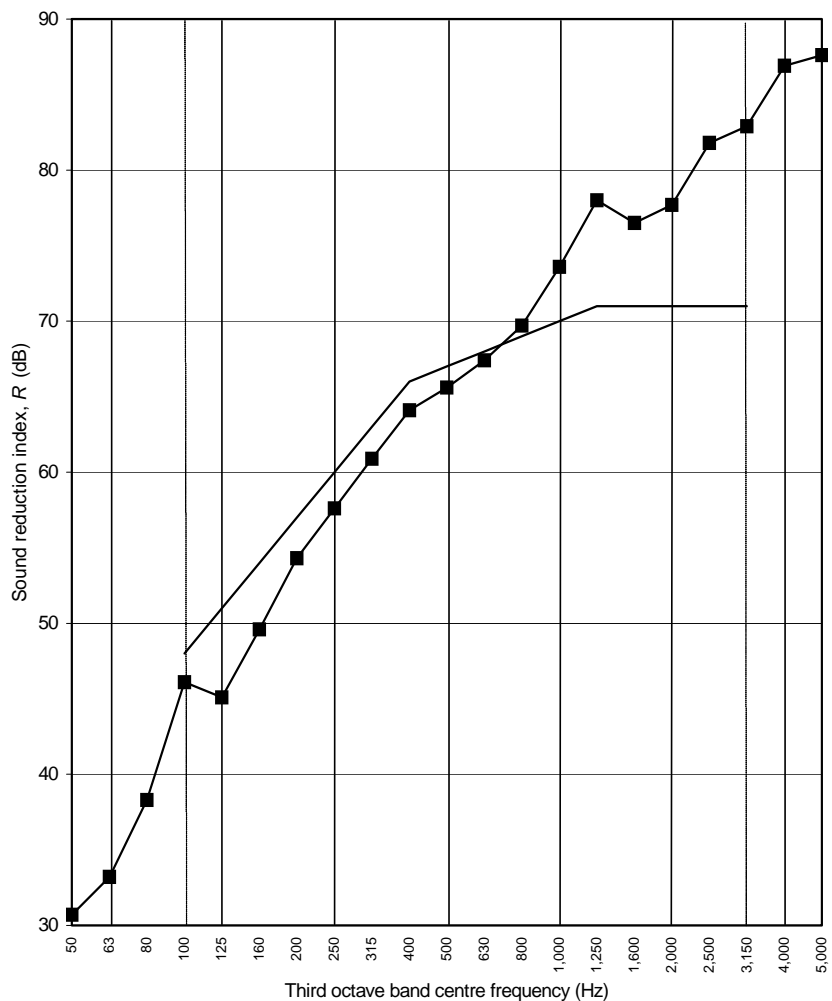
**Receive room volume:** 115 m<sup>3</sup>

**Air relative humidity:** 79 %

Frequency (Hz)	R One-third octave (dB)
50	30.7
63	33.2
80	38.3
100	46.1
125	45.1
160	49.6
200	54.3
250	57.6
315	60.9
400	64.1
500	65.6
630	67.4
800	69.7
1,000	73.6
1,250	78.0
1,600	76.5
2,000	77.7
2,500	81.8
3,150	82.9
4,000	86.9
5,000	87.6

+ Receiving room level adjusted for background

\* Receiving room level within 6 dB of background



Rating according to BS EN ISO 717-1:1997

**R<sub>w</sub> (C; C<sub>tr</sub>) = 67 (-2; -7) dB**

C <sub>50-3150</sub>	= -5 dB	C <sub>50-5000</sub>	= -4 dB	C <sub>100-5000</sub>	= -1 dB
C <sub>tr,50-3150</sub>	= -16 dB	C <sub>tr,50-5000</sub>	= -16 dB	C <sub>tr,100-5000</sub>	= -7 dB

Evaluation based on laboratory measurement results obtained by an engineering method

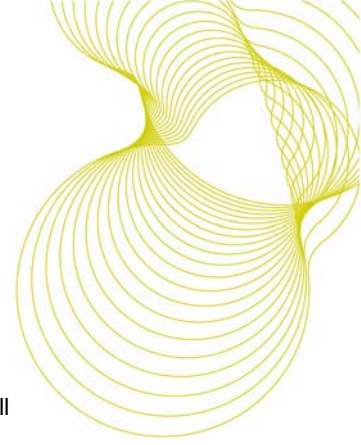
Based on the data provided in BS EN 20140-2:1993 it is estimated that the measurement uncertainty should not exceed ±1 dB for the single-number quantity (R<sub>w</sub>) and should not exceed the values in Table A1 of BS EN 20140-2:1993 for the data in the individual third octaves (R)

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The laboratory airborne sound insulation of a twin leaf stud wall with and without double sockets with fischer fixings intumescent Putty Pads



**Laboratory measurement of airborne sound insulation of building elements**  
**Sound reduction index according to BS EN ISO 140-3:1995**  
**BRE horizontal transmission suite (B9 051-053)**

**Client:** Fischer fixings UK Ltd.  
**Test date:** 16/10/2008 **Test number:** L108-080 **Test element:** Wall

0578

**Test element area:** 9.8 m<sup>2</sup>

**Description:**

As test L108-078 but with two double sockets with FiPP/E-D fischer intumescent putty pads installed in each side of wall.  
 Putty pads fitted behind socket boxes (on cavity side of wall leaves)

**Source room volume:** 130 m<sup>3</sup>

**Air temperature:** 15 °C

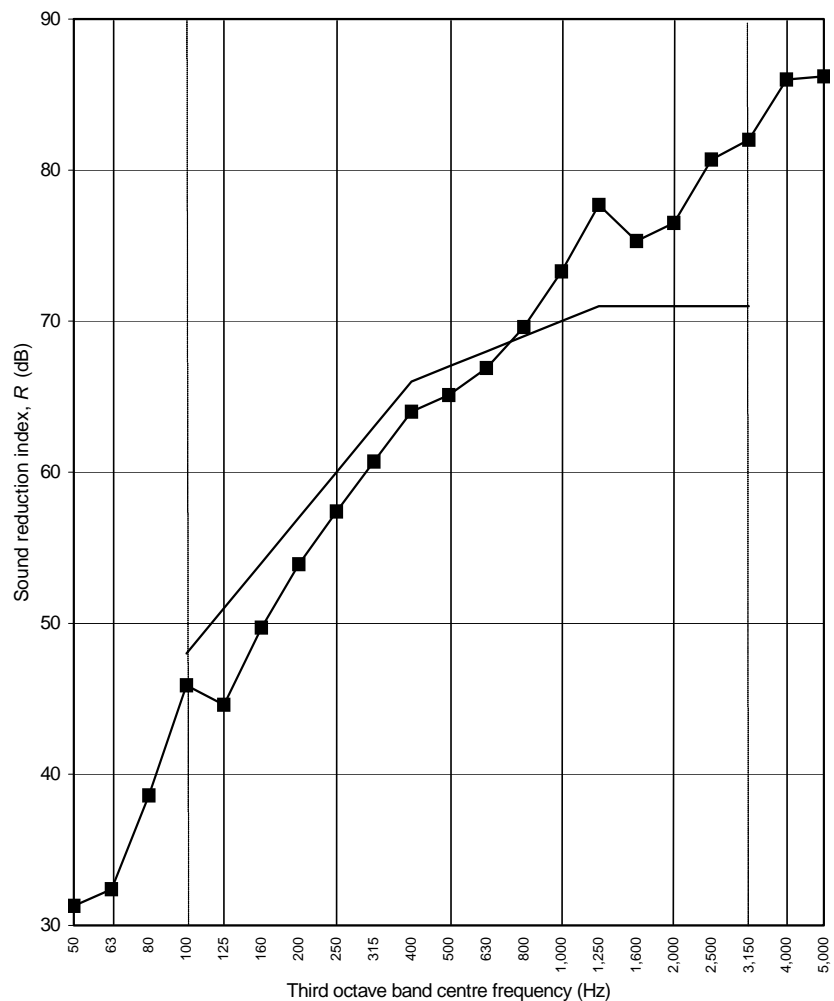
**Receive room volume:** 115 m<sup>3</sup>

**Air relative humidity:** 67 %

Frequency (Hz)	R One-third octave (dB)
50	31.3
63	32.4
80	38.6
100	45.9
125	44.6
160	49.7
200	53.9
250	57.4
315	60.7
400	64.0
500	65.1
630	66.9
800	69.6
1,000	73.3
1,250	77.7
1,600	75.3
2,000	76.5
2,500	80.7
3,150	82.0
4,000	86.0
5,000	86.2

+ Receiving room level adjusted for background

\* Receiving room level within 6 dB of background



Rating according to BS EN ISO 717-1:1997

**R<sub>w</sub> (C; C<sub>tr</sub>) = 67 (-2;-7) dB**    C<sub>50-3150</sub> = -5 dB    C<sub>50-5000</sub> = -4 dB    C<sub>100-5000</sub> = -1 dB  
 C<sub>tr,50-3150</sub> = -16 dB    C<sub>tr,50-5000</sub> = -16 dB    C<sub>tr,100-5000</sub> = -7 dB

Evaluation based on laboratory measurement results obtained by an engineering method

Based on the data provided in BS EN 20140-2:1993 it is estimated that the measurement uncertainty should not exceed ±1 dB for the single-number quantity (R<sub>w</sub>) and should not exceed the values in Table A1 of BS EN 20140-2:1993 for the data in the individual third octaves (R)

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