

bre

**Improvement of impact  
sound insulation of an  
ISO 140-8 heavyweight  
standard floor with a  
Courtcraft Ltd Logic  
Floor Leveling System  
with 22 mm Tarkett  
Expert Flooring**

Prepared for:

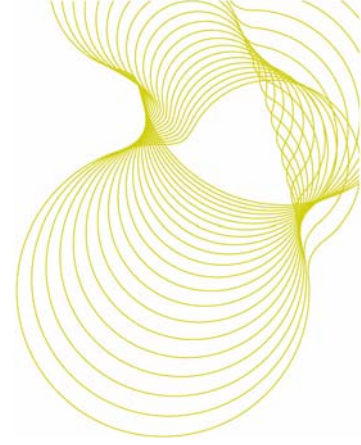
Courtcraft Ltd

24 April 2006

Test report number 229483



0578



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Position Technician

Date 24 April 2006

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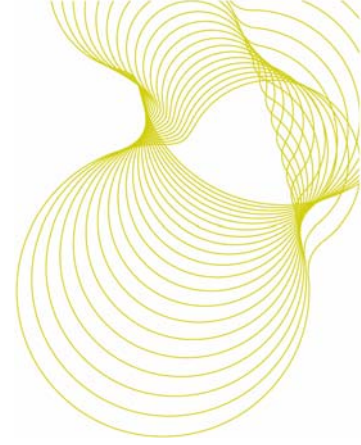
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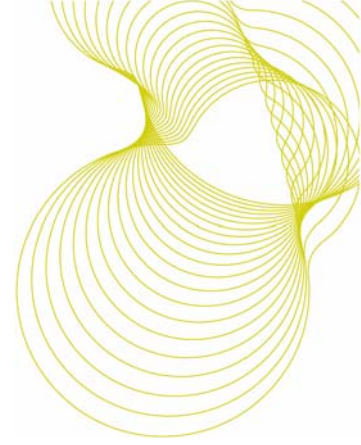
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## **1 Introduction**

BRE Acoustics was commissioned by Courtcraft Ltd to determine the reduction of impact sound pressure level of on a standard heavyweight floor. The measurements were conducted in the BRE ISO 140-8 floor laboratory (Building 9), BRE, Garston, Watford, Hertfordshire, WD25 9XX.

This report details the testing outlined in BRE proposal 5205 - 117312.

## **2 Testing details**

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

The measurements detailed in this report were made on 19 April 2006 by Mr J Woodcock, Mr A Heath and Mr P Guy of BRE Acoustics.

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

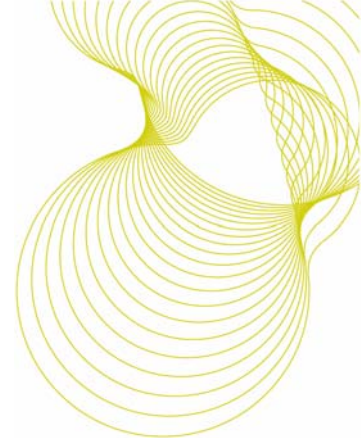
Measurements were made in accordance with BS EN ISO 140-6:1998. The reduction of impact sound pressure level,  $\Delta L$ , was calculated in accordance with BS EN ISO 140-8:1998. Single number quantities were calculated in accordance with BS EN ISO 717-2:1997.

Category II specimens, as defined in BS EN ISO 140-8:1998 were tested.

BRE Acoustics holds UKAS accreditation for the measurement of the reduction of impact sound pressure level in accordance with BS EN ISO 140-8:1998.

### **2.3 Test element installation**

The test constructions were installed by Courtcraft Ltd.



## 2.4 BRE ISO 140-8 laboratory

The BRE ISO 140-8 laboratory receive room is a cuboid with the following dimensions:

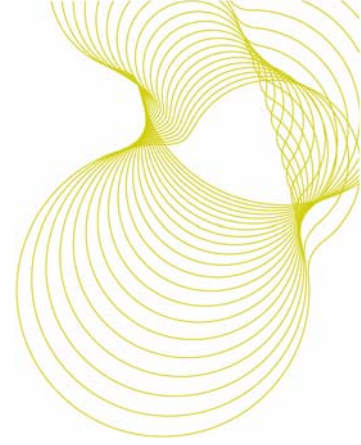
- width 3.33 m
- length 3.93 m
- height 3.93 m

The construction of the laboratory receive room is as follows:

- 215 mm dense aggregate block wall (2000 kg/m<sup>3</sup>)
- 50 mm x 75 mm independent timber frame with studs at 400 mm centres
- 100 mm clear cavity
- 2 x 15 mm Lafarge plasterboard (10 kg/m<sup>2</sup>)

The BS EN ISO 140-8 heavyweight standard floor in the laboratory is a 4.2 m x 3.6 m x 0.14 m homogeneous steel reinforced concrete floor ( $\approx$  350 kg/m<sup>2</sup>).

The BS EN ISO 140-8 heavyweight standard floor is flat to  $\pm$  1 mm in a horizontal distance of 200 mm as required by BS EN ISO 140-8.



## 2.5 Instrumentation

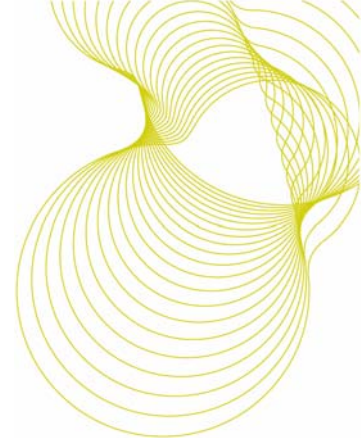
The equipment used to conduct the tests is identified in Table 1.

**Table 1** Equipment list

Equipment description	Manufacturer	Type	UKAS identification number
Microphone Calibrator	B & K	4231	01/002
Microphone	GRAS	40AE	02/306
Microphone Preamplifier	GRAS	26CA	04/306
Microphone Adapter	NOR	1449	06/106
Tapping Machine	NOR	211	11/002
Loudspeaker	B & K	4224	11/006
Real Time Analyser	NOR	840	13/003

The gain of the real time analyser was adjusted to give a reading of 94.0 dB at 1 kHz using the B&K type 4231 calibrator.

All equipment is calibrated according to BRE procedures, using reference equipment calibrated by a UKAS accredited laboratory.

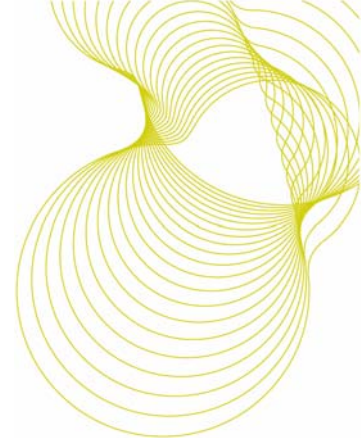


## 2.6 Test numbers

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>
L306-002	Floating floor	53	51	15.1
L306-003	Floating floor	53	51	15.1



## 2.7 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. The dimensions and densities given in Table 3 are those provided by Courtcraft Ltd.

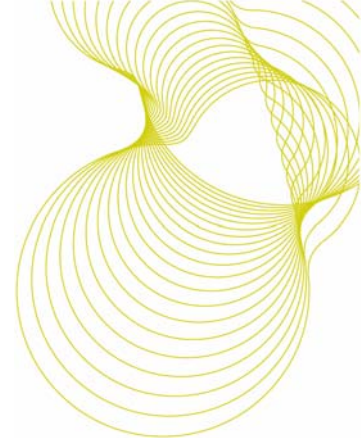
**Table 3** Construction details

Test element	Test number	Construction details
Floating floor	L306-002 L306-003	<ul style="list-style-type: none"><li>• Logic Floor Leveling System with 22 mm Tarkett Expert Flooring:</li><li>• 22 mm Tarkett Expert boards (10.6 kg/m<sup>2</sup>) nailed to</li><li>• 48 mm x 45 mm softwood battens at 420 mm centres*</li><li>• Recycled ABS cradles supported on 10 mm low density foam pads at 600 mm centres</li></ul>

\*battens laid on 48 mm face

## 2.8 Loading

For test number L306-002, the floating floor was tested unloaded. For test number L306-003, the same floor was tested with a uniform load of 22 kg/m<sup>2</sup> applied in accordance with BS EN ISO 140-8:1998.

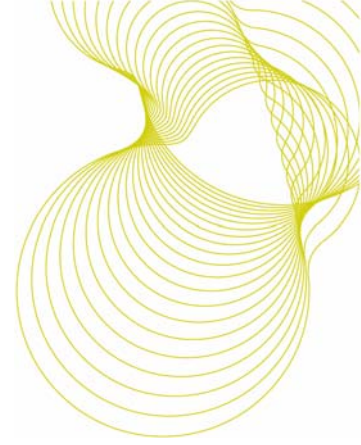


## 2.9 Sound insulation test results

The single number quantities for the reduction of impact sound pressure level and the condition of the products after testing are shown in Table 4. The UKAS test result sheets are included in the appendices.

**Table 4** Test Results

Test number	$\Delta L_w (C_{i,\Delta})$ (dB)	Condition after test
L306-002	24 (-13)	No visible damage
L306-003	20 (-15)	No visible damage

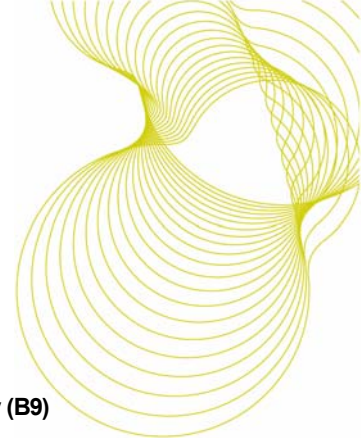


### **3 Appendices**

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

Page number	Test number
11	L306-002
13	L306-003

Improvement of impact sound insulation of an ISO 140-8 heavyweight standard floor with a Courtcraft Ltd Logic Floor Leveling System with 22 mm Tarkett Expert Flooring



**Laboratory measurements of the reduction of transmitted impact noise by floor coverings on a heavyweight standard floor**

**Reduction of impact sound pressure level according to BS EN ISO 140-8:1998**

**Client:** Courtcraft Ltd

**Test date:** 19/04/2006 **Test number:** L306-002 **BRE ISO 140-8 floor laboratory (B9)**

0578

**Test element:** Floating floor

**Test element area:** 15.1 m<sup>2</sup>

**Floating floor description:**

Logic Floor Leveling System with 22 mm Tarkett Expert Flooring:

22 mm Tarkett Expert boards (10.6 kg/m<sup>2</sup>) nailed to

48 mm x 45 mm softwood battens at 420 mm centres

Recycled ABS cradles supported on 10 mm low density foam pads at 600 mm centres

**Load:** 0 kg/m<sup>2</sup>

**Source room volume:** 53 m<sup>3</sup>

**Source room air temperature:**

17 °C

**Receive room volume:** 51 m<sup>3</sup>

**Source room air relative humidity:**

59 %

Frequency (Hz)	$L_{n,0}$ (dB)	$L_n$ (dB)	$\Delta L$ (dB)
50	56.5	47.8	8.7
63	53.9	51.0	2.9
80	61.4	60.8	0.6
100	61.3	61.8	-0.5
125	64.5	64.5	0.0
160	67.3	60.4	6.9
200	70.6	58.2	12.4
250	67.4	53.4	14.0
315	66.9	50.3	16.6
400	67.9	47.9	20.0
500	69.7	47.0	22.7
630	70.5	41.6	28.9
800	69.6	39.0	30.6
1,000	70.2	35.9	34.3
1,250	71.2	34.1	37.1
1,600	71.6	28.8	42.8
2,000	72.1	25.8	46.3
2,500	73.3	24.8	48.5
3,150	72.9	19.0	53.9
4,000	72.6	9.2	63.4
5,000	71.2	7.1	64.1

+ Receiving room level adjusted for background

\* Receiving room level within 6 dB of background

Rating according to BS EN ISO 717-2:1997

$L_{n,0,w} = 78$  dB

$C_{l,0} = -11$  dB

$\Delta L_w = 24$  dB

$L_{n,r,w} = 54$  dB

$C_{l,\Delta} = -13$  dB

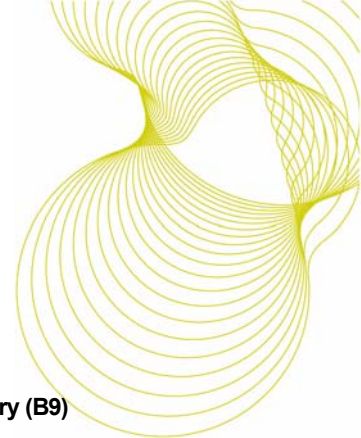
$C_{l,r} = 2$  dB

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  $\pm 1$  dB for the single-number quantity ( $\Delta L_w$ ) and should not exceed the values in Table A1 of BS EN 20140-2:1993 for the data in the individual third octaves ( $\Delta L$ )

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Improvement of impact sound insulation of an ISO 140-8 heavyweight standard floor with a Courtcraft Ltd Logic Floor Leveling System with 22 mm Tarkett Expert Flooring



**Laboratory measurements of the reduction of transmitted impact noise by floor coverings on a heavyweight standard floor**

**Reduction of impact sound pressure level according to BS EN ISO 140-8:1998**

**Client:** Courtcraft Ltd

**Test date:** 19/04/2006 **Test number:** L306-002 **BRE ISO 140-8 floor laboratory (B9)**

0578

**Test element:** Floating floor

**Test element area:** 15.1 m<sup>2</sup>

**Floating floor description:**

Logic Floor Leveling System with 22 mm Tarkett Expert Flooring:

22 mm Tarkett Expert boards (10.6 kg/m<sup>2</sup>) nailed to

48 mm x 45 mm softwood battens at 420 mm centres

Recycled ABS cradles supported on 10 mm low density foam pads at 600 mm centres

**Load:** 0 kg/m<sup>2</sup>

**Source room volume:** 53 m<sup>3</sup>

**Source room air temperature:**

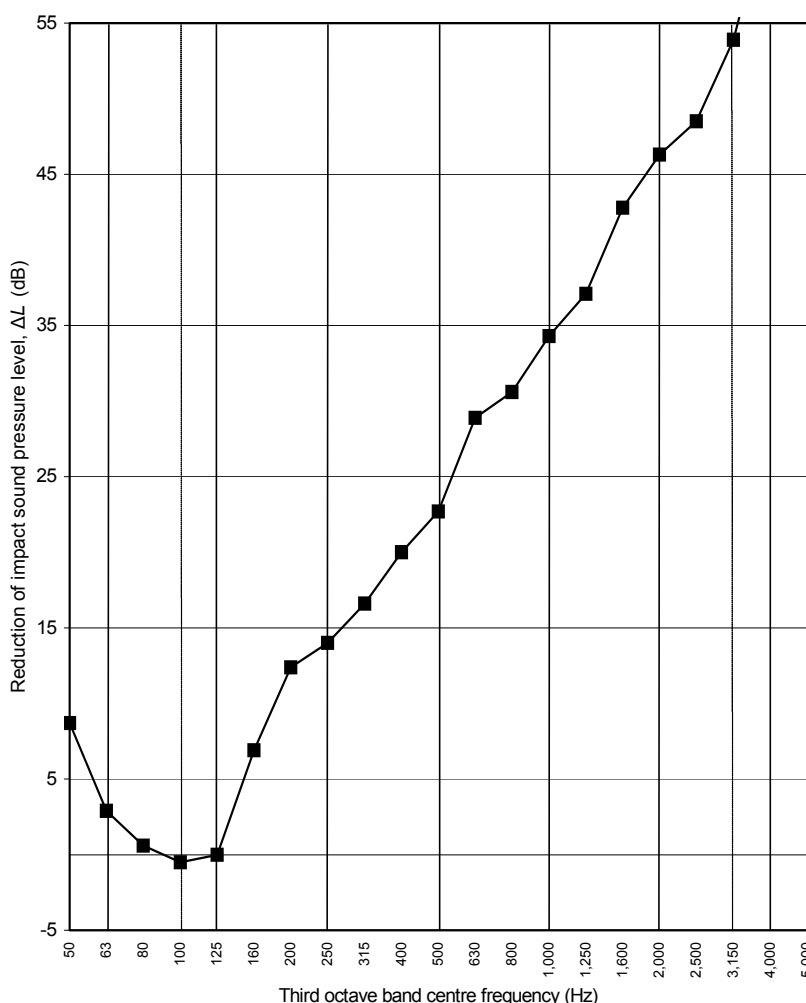
17 °C

**Receive room volume:** 51 m<sup>3</sup>

**Source room air relative humidity:**

59 %

Frequency (Hz)	$\Delta L$ One-third octave (dB)
50	8.7
63	2.9
80	0.6
100	-0.5
125	0.0
160	6.9
200	12.4
250	14.0
315	16.6
400	20.0
500	22.7
630	28.9
800	30.6
1,000	34.3
1,250	37.1
1,600	42.8
2,000	46.3
2,500	48.5
3,150	53.9
4,000	63.4
5,000	64.1



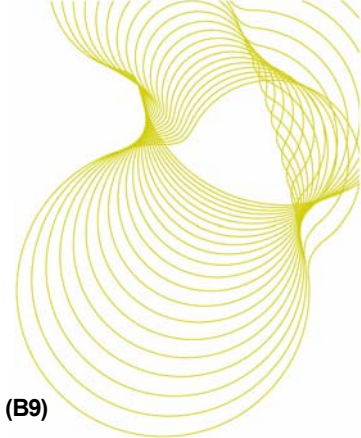
+ Receiving room level adjusted for background

\* Receiving room level within 6 dB of background

Rating according to BS EN ISO 717-2:1997	$\Delta L_w = 24$ dB	$C_{1,\Delta} = -13$ 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 $\pm 1$ dB for the single-number quantity ( $\Delta L_w$ ) and should not exceed the values in Table A1 of BS EN 20140-2:1993 for the data in the individual third octaves ( $\Delta L$ )		

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Improvement of impact sound insulation of an ISO 140-8 heavyweight standard floor with a Courtcraft Ltd Logic Floor Leveling System with 22 mm Tarkett Expert Flooring



**Laboratory measurements of the reduction of transmitted impact noise by floor coverings on a heavyweight standard floor**

**Reduction of impact sound pressure level according to BS EN ISO 140-8:1998**

**Client:** Courtcraft

**Test date:** 19/04/2006 **Test number:** L306-003 **BRE ISO 140-8 floor laboratory (B9)**

0578

**Test element:** Floating floor

**Test element area:** 15.1 m<sup>2</sup>

**Floating floor description:**

Logic Floor Leveling System with 22 mm Tarkett Expert Flooring:

22 mm Tarkett Expert boards (10.6 kg/m<sup>2</sup>) nailed to

48 mm x 45 mm softwood battens at 420 mm centres

Recycled ABS cradles supported on 10 mm low density foam pads at 600 mm centres

**Load:** 22 kg/m<sup>2</sup>

**Source room volume:** 53 m<sup>3</sup>

**Source room air temperature:**

17 °C

**Receive room volume:** 51 m<sup>3</sup>

**Source room air relative humidity:**

59 %

Frequency (Hz)	$L_{n,0}$ (dB)	$L_n$ (dB)	$\Delta L$ (dB)
50	56.5	51.6	4.9
63	53.9	57.4	-3.5
80	61.4	67.0	-5.6
100	61.3	69.0	-7.7
125	64.5	66.7	-2.2
160	67.3	65.5	1.8
200	70.6	63.0	7.6
250	67.4	57.4	10.0
315	66.9	50.8	16.1
400	67.9	47.3	20.6
500	69.7	48.7	21.0
630	70.5	42.2	28.3
800	69.6	38.4	31.2
1,000	70.2	35.7	34.5
1,250	71.2	32.8	38.4
1,600	71.6	28.3	43.3
2,000	72.1	24.5	47.6
2,500	73.3	22.8	50.5
3,150	72.9	16.8	56.1
4,000	72.6	7.1	65.5
5,000	71.2	5.3	65.9

+ Receiving room level adjusted for background

\* Receiving room level within 6 dB of background

Rating according to BS EN ISO 717-2:1997

$L_{n,0,w} = 78$  dB

$C_{1,0} = -11$  dB

$\Delta L_w = 20$  dB

$L_{n,r,w} = 58$  dB

$C_{1,\Delta} = -15$  dB

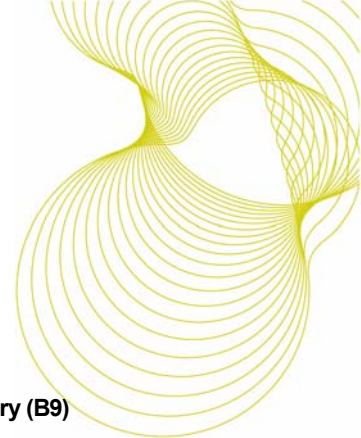
$C_{1,r} = 4$  dB

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  $\pm 1$  dB for the single-number quantity ( $\Delta L_w$ ) and should not exceed the values in Table A1 of BS EN 20140-2:1993 for the data in the individual third octaves ( $\Delta L$ )

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Improvement of impact sound insulation of an ISO 140-8 heavyweight standard floor with a Courtcraft Ltd Logic Floor Leveling System with 22 mm Tarkett Expert Flooring



**Laboratory measurements of the reduction of transmitted impact noise by floor coverings on a heavyweight standard floor**

**Reduction of impact sound pressure level according to BS EN ISO 140-8:1998**

**Client:** Courtcraft

**Test date:** 19/04/2006 **Test number:** L306-003 **BRE ISO 140-8 floor laboratory (B9)**

0578

**Test element:** Floating floor

**Test element area:** 15.1 m<sup>2</sup>

**Floating floor description:**

Logic Floor Leveling System with 22 mm Tarkett Expert Flooring:

22 mm Tarkett Expert boards (10.6 kg/m<sup>2</sup>) nailed to

48 mm x 45 mm softwood battens at 420 mm centres

Recycled ABS cradles supported on 10 mm low density foam pads at 600 mm centres

**Load:** 22 kg/m<sup>2</sup>

**Source room volume:** 53 m<sup>3</sup>

**Source room air temperature:**

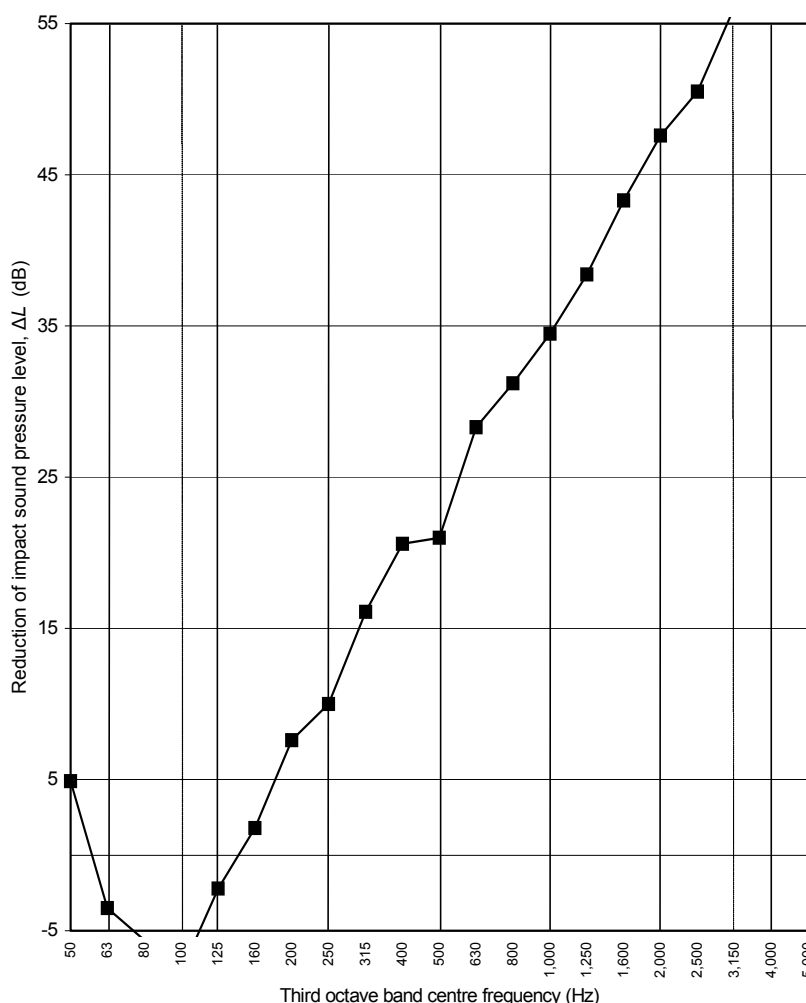
17 °C

**Receive room volume:** 51 m<sup>3</sup>

**Source room air relative humidity:**

59 %

Frequency (Hz)	$\Delta L$ One-third octave (dB)
50	4.9
63	-3.5
80	-5.6
100	-7.7
125	-2.2
160	1.8
200	7.6
250	10.0
315	16.1
400	20.6
500	21.0
630	28.3
800	31.2
1,000	34.5
1,250	38.4
1,600	43.3
2,000	47.6
2,500	50.5
3,150	56.1
4,000	65.5
5,000	65.9



+ Receiving room level adjusted for background

\* Receiving room level within 6 dB of background

Rating according to BS EN ISO 717-2:1997	$\Delta L_w = 20$ dB	$C_{1,\Delta} = -15$ 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 $\pm 1$ dB for the single-number quantity ( $\Delta L_w$ ) and should not exceed the values in Table A1 of BS EN 20140-2:1993 for the data in the individual third octaves ( $\Delta L$ )		

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