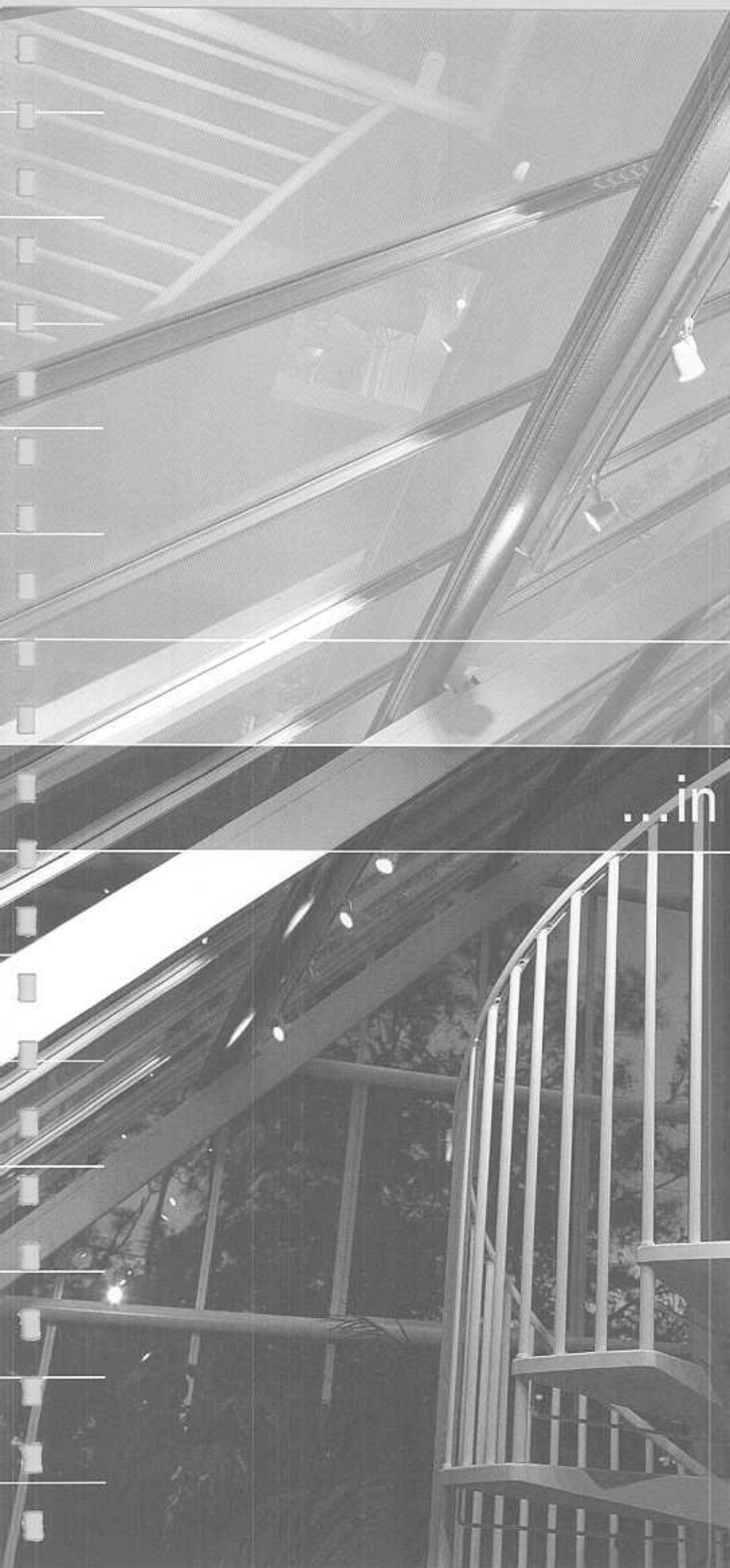




Test Report :

Laboratory sound insulation of
metal access panels with and
without Xetal/E-coustiquilt

Test report number 218510



...in partnership

Prepared for :

Exitile Ltd

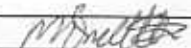
14 July 2004



0578

Tested by

Signature



Name

Mr M Burdett

Position

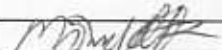
Consultant

Date

14 July 2004

Prepared by

Signature



Name

Mr M Burdett

Position

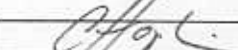
Consultant

Date

14 July 2004

Checked by

Signature



Name

Dr C Hopkins

Position

Principal Consultant

Date

14 July 2004

Approved on behalf of BRE

Signature



Name

Mr J Seller

Position

Head of Acoustics

Date

14 July 2004



0578

BRE is not UKAS accredited to make opinions and interpretation. Any opinions and interpretations included as part of this report are clearly marked as such.

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1 Introduction

BRE Acoustics was commissioned by Exitile Ltd, 49-61 Jodrell Street, Nuneaton, Warwickshire, CV11 5EG to issue this report which is based on airborne sound insulation measurements carried out in the BRE horizontal transmission suite (Building 9), BRE, Garston, Watford, Hertfordshire, WD25 9XX. The measurement data were previously published in BRE report number 215403.

2 Testing details

2.1 Test dates and personnel

The measurements detailed in this report were made on 19 November 2003 and 25 November 2003 by Mr M Burdett and 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 test elements for tests L103-024, L103-025 and L103-026 were installed in a filler wall by Xetal Consultants Ltd.

The filler wall (see test L103-032) was installed by BRE.



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
Real time analyser	NEAS	840	13/003
Microphone calibrator	B & K	4231	01/002
Condenser microphone	B & K	4165	02/005, 02/001, 02/003
Microphone pre-amplifier	B & K	2619	04/005, 04/001, 04/003
Microphone rotating boom	NEAS	212NA	14/004, 14/005
Graphic equaliser	Phonic	PEQ 3300	10/001
Loudspeaker	B & K	4224	11/007

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 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

Test number	Test element	Source room volume (m ³)	Receive room volume (m ³)	Common area (m ²)
L103-024	Access hatch	130	115	1.1
L103-025	Access hatch	130	115	1.1
L103-026	Access hatch	130	115	1.1
L103-032	Wall	130	115	9.9

2.6 Construction details with test numbers

The construction details are shown in Table 3.

Table 3 Construction details

Test element	Test number	Construction details
Access hatch	L103-024	• Acoustic access panel (37 kg/m ²) with Xetal/E-coustiquilt
	L103-025	• Acoustic access panel (37 kg/m ²) with Xetal/E-coustiquilt with 45 mm x 35 mm timber batten frame butted to inner frame
	L103-026	• Standard fire rated access panel (30 kg/m ²)
Wall	L103-032	• 2 x 15 mm Knauf Soundshield wallboard (14 kg/m²) screwed to • 45 mm x 70 mm independent timber studs at 400 mm centres • 100 mm cavity with 100 mm Knauf Crown combi-roll (10 kg/m³) between studs • 215 mm Tarmac Topcrete dense aggregate block wall (430 kg/m²) painted with two coats of high quality masonry paint on each side • 100 mm cavity with 100 mm Knauf Crown combi-roll (10 kg/m³) between • 45 mm x 70 mm independent timber studs at 400 mm centres • 2 x 15 mm Knauf Soundshield wallboard (14 kg/m²) screwed to studs

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)
L103-024	40 (-2;-7)
L103-025	40 (-2;-6)
L103-026	26 (-1;-4)
L103-032	73 (-3;-9)

2.8 Plans

The positioning of the test element and filler wall construction in the transmission suite aperture is indicated in Figure 1.

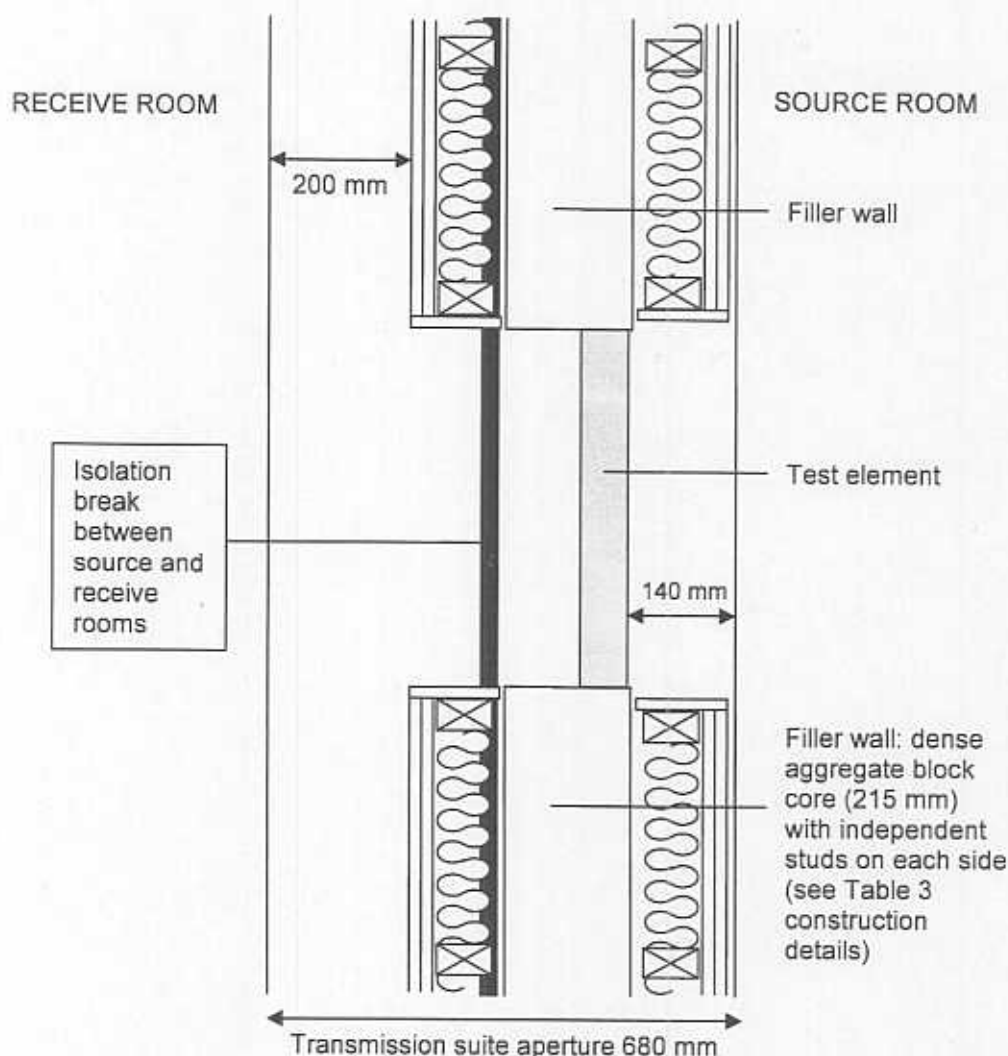


Figure 1 Plan view of the test construction and filler wall in the transmission suite aperture

2.9 Manufacturer's product information and drawings

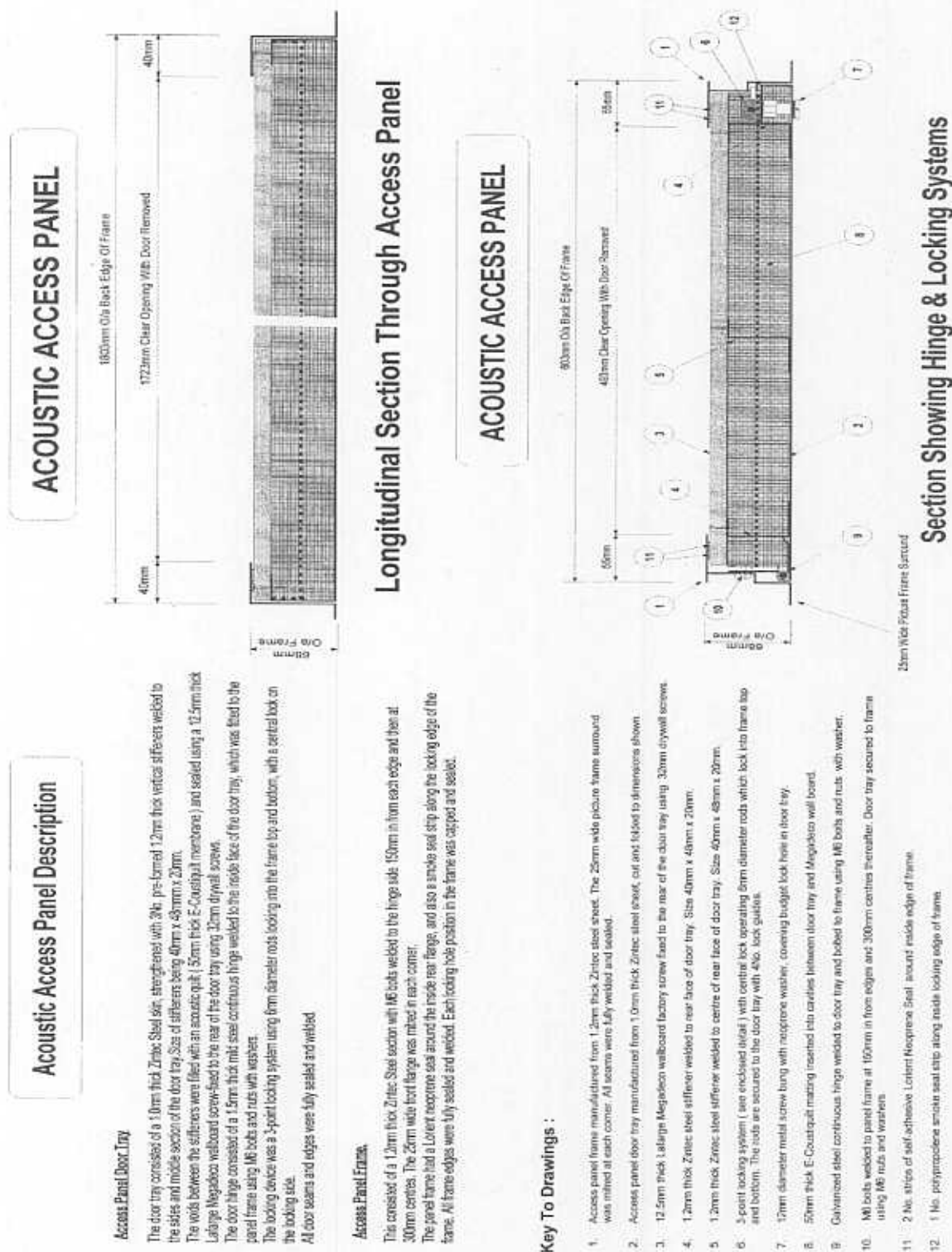


Figure 2 Acoustic access panel product information and drawings

3 Appendices

3.1 UKAS test result sheets

Page number	Test number
13	L103-024
15	L103-025
17	L103-026
19	L103-032



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: Exitile Ltd

Test date: 19/11/2003

Test number: L103-024

Test element: Access hatch



Test element area: 1.1 m²

Mass per unit area:

37 kg/m²

0578

Description:

Acoustic access panel (37 kg/m²) with Xetal/E-coustiquilt

Source room volume: 130 m³

Air temperature:

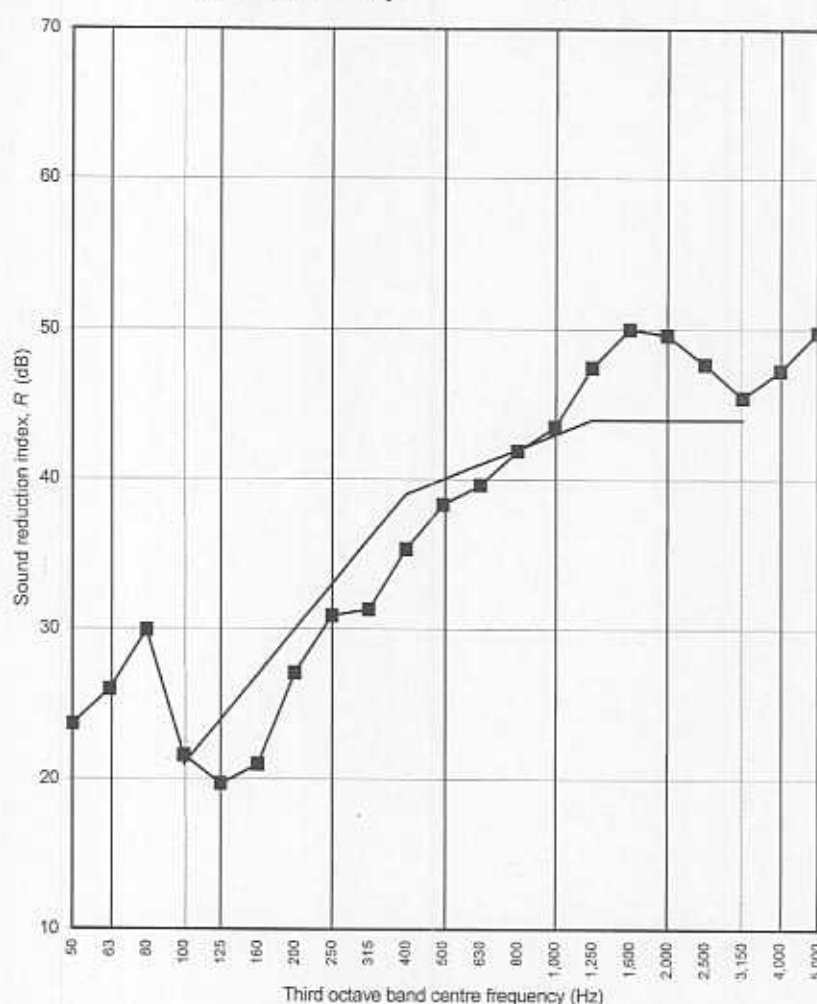
17 °C

Receive room volume: 115 m³

Air relative humidity:

65 %

Frequency (Hz)	R One-third octave (dB)
50	23.7
63	26.0
80	29.9
100	21.6
125	19.7
160	21.0
200	27.1
250	30.9
315	31.3
400	35.3
500	38.3
630	39.6
800	41.9
1,000	43.5
1,250	47.5
1,600	50.0
2,000	49.6
2,500	47.7
3,150	45.5
4,000	47.3
5,000	49.8



x R adjusted for filler wall

Rating according to BS EN ISO 717-1:1997

$R_w (C; C_{tr}) = 40 (-2; -7) \text{ dB}$	$C_{50-3150} = -2 \text{ dB}$	$C_{50-5000} = -1 \text{ dB}$	$C_{100-5000} = -1 \text{ dB}$
	$C_{tr, 50-3150} = -7 \text{ dB}$	$C_{tr, 50-5000} = -7 \text{ dB}$	$C_{tr, 100-5000} = -7 \text{ dB}$

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 $\pm 1 \text{ dB}$ for the single-number quantity (R_w) 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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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: Exitile Ltd

Test date: 19/11/2003

Test number: L103-024

Test element: Access hatch



Test element area: 1.1 m²

Mass per unit area: 37 kg/m²

0578

Description:

Acoustic access panel (37 kg/m²) with Xetal/E-coustiquit

Source room volume: 130 m³

Air temperature: 17 °C

Receive room volume: 115 m³

Air relative humidity: 65 %

Frequency (Hz)	Reverberation time (s)	Background level (dB)	Source level (dB)	Receive level (dB)	R (dB)
50	3.80	27.3	84.1	54.2	23.7
63	3.63	25.5	90.9	58.2	26.0
80	2.88	19.8	92.6	55.1	29.9
100	1.86	28.1	92.1	61.0	21.6
125	1.69	20.2	95.4	65.7	19.7
160	1.73	11.9	94.6	63.7	21.0
200	1.62	9.0	95.1	57.8	27.1
250	1.48	7.2	94.9	53.5	30.9
315	1.39	7.1	96.8	54.7	31.3
400	1.37	12.6	98.0	51.8	35.3
500	1.31	13.0	98.7	49.3	38.3
630	1.26	14.0	99.4	48.5	39.6
800	1.30	7.2	98.9	46.0	41.9
1,000	1.27	9.1	95.6	41.0	43.5
1,250	1.34	9.2	94.5	36.0	47.5
1,600	1.41	7.5	98.1	37.4	50.0
2,000	1.41	5.0	98.5	38.2	49.6
2,500	1.42	5.1	96.7	38.3	47.7
3,150	1.42	5.5	92.3	36.1	45.5
4,000	1.32	5.9	91.9	33.6	47.3
5,000	1.22	6.1	87.8	26.6	49.8

x R adjusted for filler wall

Rating according to BS EN ISO 717-1:1997

$R_w(C;C_{tr}) = 40 (-2;-7)$ dB
 $C_{50-3150} = -2$ dB $C_{50-5000} = -1$ dB $C_{100-5000} = -1$ dB
 $C_{tr,50-3150} = -7$ dB $C_{tr,50-5000} = -7$ dB $C_{tr,100-5000} = -7$ 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_w) 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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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: Exitile Ltd

Test date: 19/11/2003

Test number: L103-025

Test element: Access hatch



Test element area: 1.1 m²

Mass per unit area: 37 kg/m²

0578

Description:

Acoustic access panel (37 kg/m²) with Xetal/E-coustiquit
with 45 mm x 35 mm timber batten frame butted to inner frame

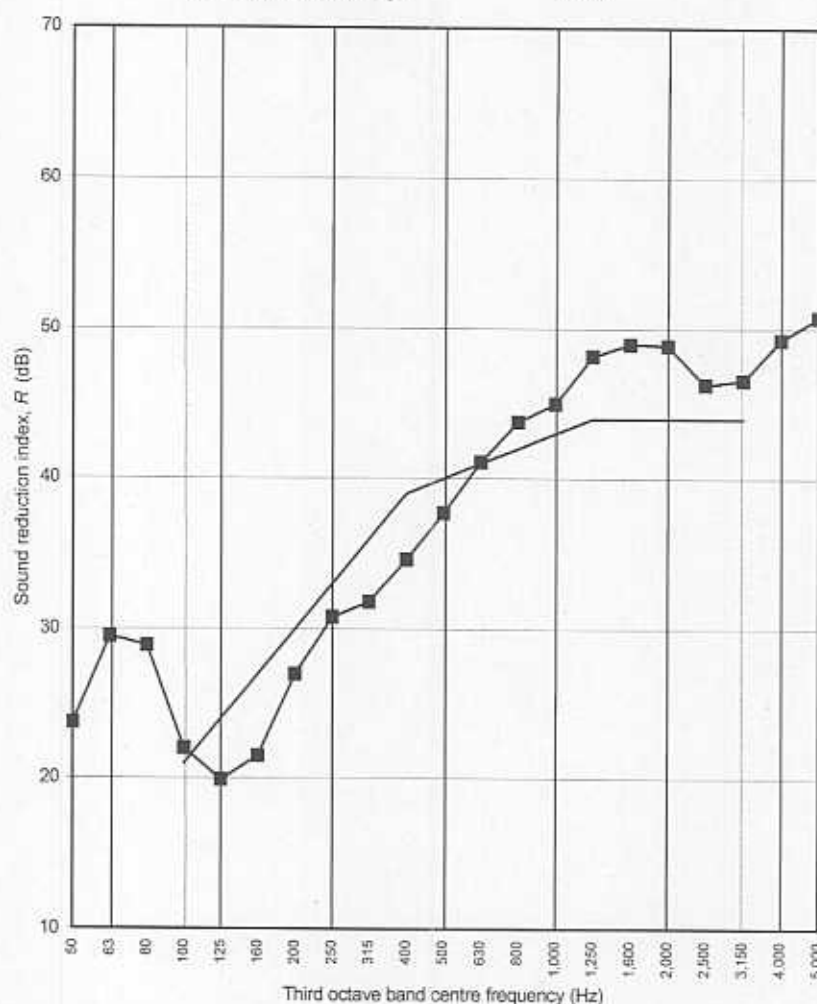
Source room volume: 130 m³

Air temperature: 17 °C

Receive room volume: 115 m³

Air relative humidity: 64 %

Frequency (Hz)	R One-third octave (dB)
50	23.7
63	29.5
80	28.9
100	22.0
125	19.9
160	21.5
200	27.0
250	30.8
315	31.8
400	34.6
500	37.7
630	41.1
800	43.8
1,000	45.0
1,250	48.2
1,600	49.0
2,000	48.9
2,500	46.3
3,150	46.6
4,000	49.3
5,000	50.8



x R adjusted for filler wall

Rating according to BS EN ISO 717-1:1997

$R_w (C; C_{tr}) = 40 (-2; -6) \text{ dB}$	$C_{50-3150} = -2 \text{ dB}$	$C_{50-5000} = -1 \text{ dB}$	$C_{100-5000} = -1 \text{ dB}$
	$C_{tr, 50-3150} = -7 \text{ dB}$	$C_{tr, 50-5000} = -7 \text{ dB}$	$C_{tr, 100-5000} = -6 \text{ dB}$

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 $\pm 1 \text{ dB}$ for the single-number quantity (R_w) 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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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: Exitile Ltd

Test date: 19/11/2003

Test number: L103-025

Test element: Access hatch



Test element area: 1.1 m²

Mass per unit area:

37 kg/m²

0578

Description:

Acoustic access panel (37 kg/m²) with Xetal/E-coustiquit
with 45 mm x 35 mm timber batten frame butted to inner frame

Source room volume: 130 m³

Air temperature:

17 °C

Receive room volume: 115 m³

Air relative humidity:

64 %

Frequency (Hz)	Reverberation time (s)	Background level (dB)	Source level (dB)	Receive level (dB)	R (dB)	
50	3.86	26.6	85.2	55.3	23.7	x
63	3.79	25.8	90.4	54.7	29.5	x
80	2.86	20.5	92.5	56.0	28.9	
100	1.67	28.3	92.6	60.6	22.0	
125	1.66	17.7	95.5	65.6	19.9	
160	1.68	12.5	94.3	62.8	21.5	
200	1.64	9.0	94.9	57.8	27.0	
250	1.47	8.4	95.1	53.7	30.8	
315	1.42	11.7	96.7	54.1	31.8	
400	1.31	12.3	97.9	52.2	34.6	
500	1.29	12.9	98.8	50.0	37.7	
630	1.30	16.8	99.5	47.2	41.1	
800	1.29	13.6	98.9	43.9	43.8	
1,000	1.31	13.2	95.7	39.7	45.0	
1,250	1.36	13.2	94.6	35.5	48.2	
1,600	1.37	12.3	98.1	38.2	49.0	
2,000	1.38	7.5	98.5	38.7	48.9	
2,500	1.44	6.6	96.8	39.8	46.3	
3,150	1.41	6.0	92.4	35.0	46.6	
4,000	1.34	6.4	91.9	31.7	49.3	
5,000	1.23	6.4	87.8	25.7	50.8	

x R adjusted for filler wall

Rating according to BS EN ISO 717-1:1997

$R_w(C;C_{tr}) = 40 (-2;-6)$ dB $C_{50-3150} = -2$ dB $C_{50-5000} = -1$ dB $C_{100-5000} = -1$ dB
 $C_{tr,50-3150} = -7$ dB $C_{tr,50-5000} = -7$ dB $C_{tr,100-5000} = -6$ 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_w) 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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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: Exitile Ltd

Test date: 19/11/2003

Test number: L103-026

Test element: Access hatch



Test element area: 1.1 m²

Mass per unit area:

30 kg/m²

0578

Description:

Standard fire rated access panel (30 kg/m²)

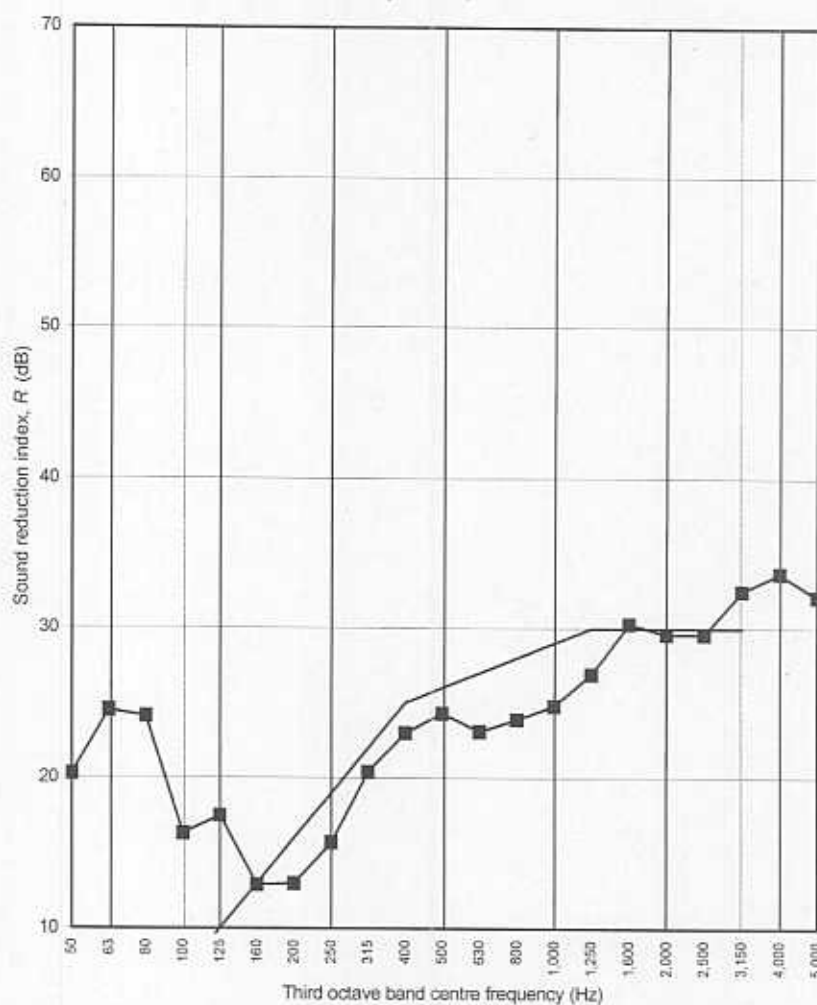
Source room volume: 130 m³

Air temperature: 17 °C

Receive room volume: 115 m³

Air relative humidity: 67 %

Frequency (Hz)	R One-third octave (dB)
50	20.3
63	24.5
80	24.1
100	16.3
125	17.5
160	12.9
200	13.0
250	15.7
315	20.4
400	23.0
500	24.3
630	23.1
800	23.9
1,000	24.8
1,250	26.9
1,600	30.3
2,000	29.6
2,500	29.6
3,150	32.5
4,000	33.7
5,000	32.1



Rating according to BS EN ISO 717-1:1997

$R_w(C;C_{tr}) = 26 (-1;-4)$ dB $C_{50-3150} = -1$ dB $C_{50-5000} = 0$ dB $C_{100-5000} = 0$ dB
 $C_{tr,50-3150} = -4$ dB $C_{tr,50-5000} = -4$ dB $C_{tr,100-5000} = -4$ 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 ± 1 dB for the single-number quantity (R_w) 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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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: Exitile Ltd

Test date: 19/11/2003

Test number: L103-026

Test element: Access hatch



Test element area: 1.1 m²

Mass per unit area:

30 kg/m²

0578

Description:

Standard fire rated access panel (30 kg/m²)

Source room volume: 130 m³

Air temperature:

17 °C

Receive room volume: 115 m³

Air relative humidity:

67 %

Frequency (Hz)	Reverberation time (s)	Background level (dB)	Source level (dB)	Receive level (dB)	R (dB)
50	3.71	27.0	84.2	57.4	20.3
63	3.74	25.4	90.8	59.8	24.5
80	2.92	21.8	92.2	60.6	24.1
100	1.82	28.8	93.0	67.1	16.3
125	1.68	19.8	95.5	68.0	17.5
160	1.78	14.8	94.4	71.8	12.9
200	1.74	8.8	94.5	71.7	13.0
250	1.42	6.6	94.9	68.5	15.7
315	1.46	6.7	96.5	65.5	20.4
400	1.39	9.5	97.8	64.0	23.0
500	1.35	11.4	98.6	63.4	24.3
630	1.31	13.4	99.0	64.8	23.1
800	1.26	7.4	98.4	63.2	23.9
1,000	1.27	8.2	95.2	59.2	24.8
1,250	1.31	10.3	93.9	56.0	26.9
1,600	1.39	8.2	97.3	56.2	30.3
2,000	1.37	4.9	97.6	57.1	29.6
2,500	1.43	5.1	96.5	56.2	29.6
3,150	1.41	5.4	93.4	50.1	32.5
4,000	1.35	5.8	92.5	47.8	33.7
5,000	1.23	6.1	88.9	45.4	32.1

Rating according to BS EN ISO 717-1:1997

$R_w (C; C_{tr}) = 26 (-1; -4)$ dB
 $C_{50-3150} = -1$ dB $C_{50-5000} = 0$ dB $C_{100-5000} = 0$ dB
 $C_{tr, 50-3150} = -4$ dB $C_{tr, 50-5000} = -4$ dB $C_{tr, 100-5000} = -4$ 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 ± 1 dB for the single-number quantity (R_w) 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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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: Exitile Ltd

Test date: 25/11/2003

Test number: L103-032

Test element: Wall



Test element area: 9.9 m²

Mass per unit area:

497 kg/m²

0578

Description:

2 x 15 mm Knauf Soundshield (14 kg/m²) screwed to 45 mm x 70 mm independent timber studs at 400 mm centres
100 mm cavity with 100 mm Knauf Crown combi-roll (10 kg/m³) between studs, 215 mm Tarmac dense aggregate
block wall (430 kg/m³) painted with two coats of masonry paint on each side, 100 mm cavity with 100 mm Knauf combi-roll
between 45 mm x 70 mm independent timber studs at 400 mm centres, 2 x 15 mm Knauf Soundshield screwed to studs

Source room volume: 130 m³

Air temperature:

16 °C

Receive room volume: 115 m³

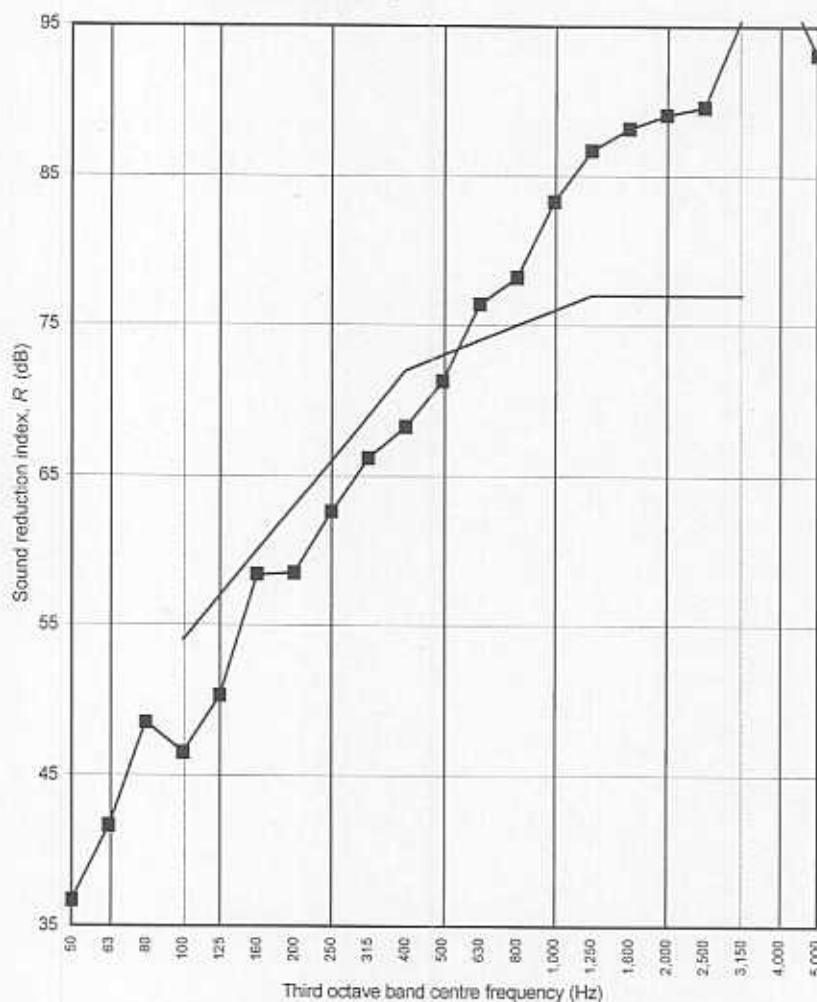
Air relative humidity:

62 %

Frequency (Hz)	R One-third octave (dB)
50	36.7
63	41.7
80	48.5
100	46.5
125	50.3
160	58.4
200	58.5
250	62.6
315	66.2
400	68.3
500	71.3
630	76.4
800	78.2
1,000	83.3
1,250	86.7
1,600	88.2
2,000	89.1
2,500	89.6
3,150	95.6
4,000	98.3
5,000	93.1

* Receiving room level adjusted for background

* Receiving room level within 6 dB of background



Rating according to BS EN ISO 717-1:1997

$R_w (C; C_{tr}) = 73 (-3; -9) \text{ dB}$ $C_{50-3150} = -4 \text{ dB}$ $C_{50-5000} = -3 \text{ dB}$ $C_{100-5000} = -2 \text{ dB}$
 $C_{tr, 50-3150} = -15 \text{ dB}$ $C_{tr, 50-5000} = -15 \text{ dB}$ $C_{tr, 100-5000} = -9 \text{ dB}$

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 $\pm 1 \text{ dB}$ for the single-number quantity (R_w) 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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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: Exitile Ltd

Test date: 25/11/2003

Test number: L103-032

Test element: Wall



Test element area: 9.9 m²

Mass per unit area: 497 kg/m²

0578

Description:

2 x 15 mm Knauf Soundshield (14 kg/m²) screwed to 45 mm x 70 mm independent timber studs at 400 mm centres
100 mm cavity with 100 mm Knauf Crown combi-roll (10 kg/m²) between studs, 215 mm Tarmac dense aggregate
block wall (430 kg/m²) painted with two coats of masonry paint on each side, 100 mm cavity with 100 mm Knauf combi-roll
between 45 mm x 70 mm independent timber studs at 400 mm centres, 2 x 15 mm Knauf Soundshield screwed to studs

Source room volume: 130 m³

Air temperature: 16 °C

Receive room volume: 115 m³

Air relative humidity: 62 %

Frequency (Hz)	Reverberation time (s)	Background level (dB)	Source level (dB)	Receive level (dB)	R (dB)
50	3.96	30.0	95.5	62.1	36.7
63	3.32	25.8	101.3	62.1	41.7
80	2.95	24.0	102.5	56.1	48.5
100	1.76	32.0	103.8	57.1	46.5
125	1.64	24.9	102.7	51.8	50.3
160	1.79	19.4	103.2	44.7	58.4
200	1.75	15.1	105.3	46.5	58.5
250	1.45	11.0	105.7	42.1	62.6
315	1.45	13.4	107.1	39.8	66.2
400	1.33	17.1	107.6	37.8	68.3
500	1.32	15.5	108.0	35.2	71.3
630	1.30	14.8	108.6	30.6	76.4
800	1.28	10.1	108.6	28.8	78.2
1,000	1.32	7.6	105.6	20.8	83.3
1,250	1.33	7.7	105.2	17.0	86.7
1,600	1.33	4.3	108.6	19.0	88.2
2,000	1.39	4.3	109.9	19.6	89.1
2,500	1.41	4.7	109.5	18.7	89.6
3,150	1.37	5.2	106.3	9.5	95.6
4,000	1.30	5.6	106.8	6.9	98.3
5,000	1.20	6.0	100.0	5.1	93.1

+ Receiving room level adjusted for background

* Receiving room level within 5 dB of background

Rating according to BS EN ISO 717-1:1997

$R_w (C; C_{tr}) = 73 (-3; -9) \text{ dB}$ $C_{50-3150} = -4 \text{ dB}$ $C_{50-5000} = -3 \text{ dB}$ $C_{100-5000} = -2 \text{ dB}$
 $C_{tr, 50-3150} = -15 \text{ dB}$ $C_{tr, 50-5000} = -15 \text{ dB}$ $C_{tr, 100-5000} = -9 \text{ dB}$

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 $\pm 1 \text{ dB}$ for the single-number quantity (R_w) 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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=====REPORT ENDS=====

