

bre

**Laboratory airborne
sound insulation testing
of Rytons Building
Products Ltd ventilator
systems**

Prepared for: Karen Jolley

Rytons Building Products Ltd

20 August 2007

Test report number 238655

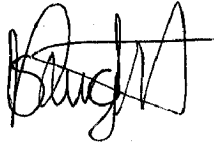


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building a better world

Tested by

Name Mr S Dwight
Position Technician
Date 20 August 2007
Signature



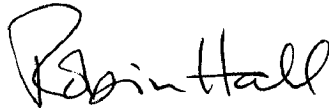
Prepared by

Name Mr A Heath
Position Consultant
Date 20 August 2007
Signature



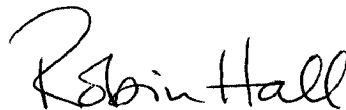
Checked by

Name ~~Mr~~ Mr G McCann
Position Senior Consultant
Date 20 August 2007
Signature



Approved on behalf of BRE

Name Dr R Hall
Position Principal Consultant
Date 20 August 2007
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0578

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1 Introduction

BRE Acoustics was commissioned by Rytons Building Products Ltd to carry out 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 7020 - 120272.

2 Testing details

2.1 Test dates and personnel

The measurements detailed in this report were made between 18 July 2007 and 26 July 2007 by Mr A Heath, Mr S Dwight and Mr K Jaitly of BRE Acoustics.

2.2 Test method and applicable standards

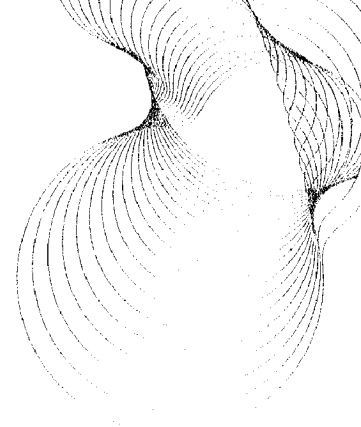
Measurement of airborne sound insulation was made in accordance with BS EN 20140-10:1992 and BS EN ISO 140-3:1995. First the airborne sound insulation of the filler wall was measured. After this, the airborne sound insulation of the filler wall with the different ventilator systems was measured.

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 filler wall was installed by BRE. The ventilator systems tested were supplied by Rytons Building Products Ltd and installed in the filler wall by BRE. Ventilators were installed with a simulated edge in the receive room in accordance with 6.2 and 6.3.1.2 of BS EN 20140-10:1992.



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	01/006
Microphone	GRAS	40AE	02/302, 02/305
Microphone Preamplifier	GRAS	26CA	04/302, 04/305
Microphone Adapter	NOR	1449	06/105, 06/106
Graphic Equaliser	Phonic	PEQ3300	10/001
Real Time Analyser	NOR	840	13/003, 13/005
Microphone Rotating Boom	B & K	3923	14/001, 14/002
Loudspeaker	B&K	4224	11/006
Loudspeaker	NOR	270H	11/014, 11/016
Amplifier	NOR	260 H	11/013

The gain of the real time analyser was adjusted to give a reading of 124.0 dB at 250 Hz 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.

2.8 Plans

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

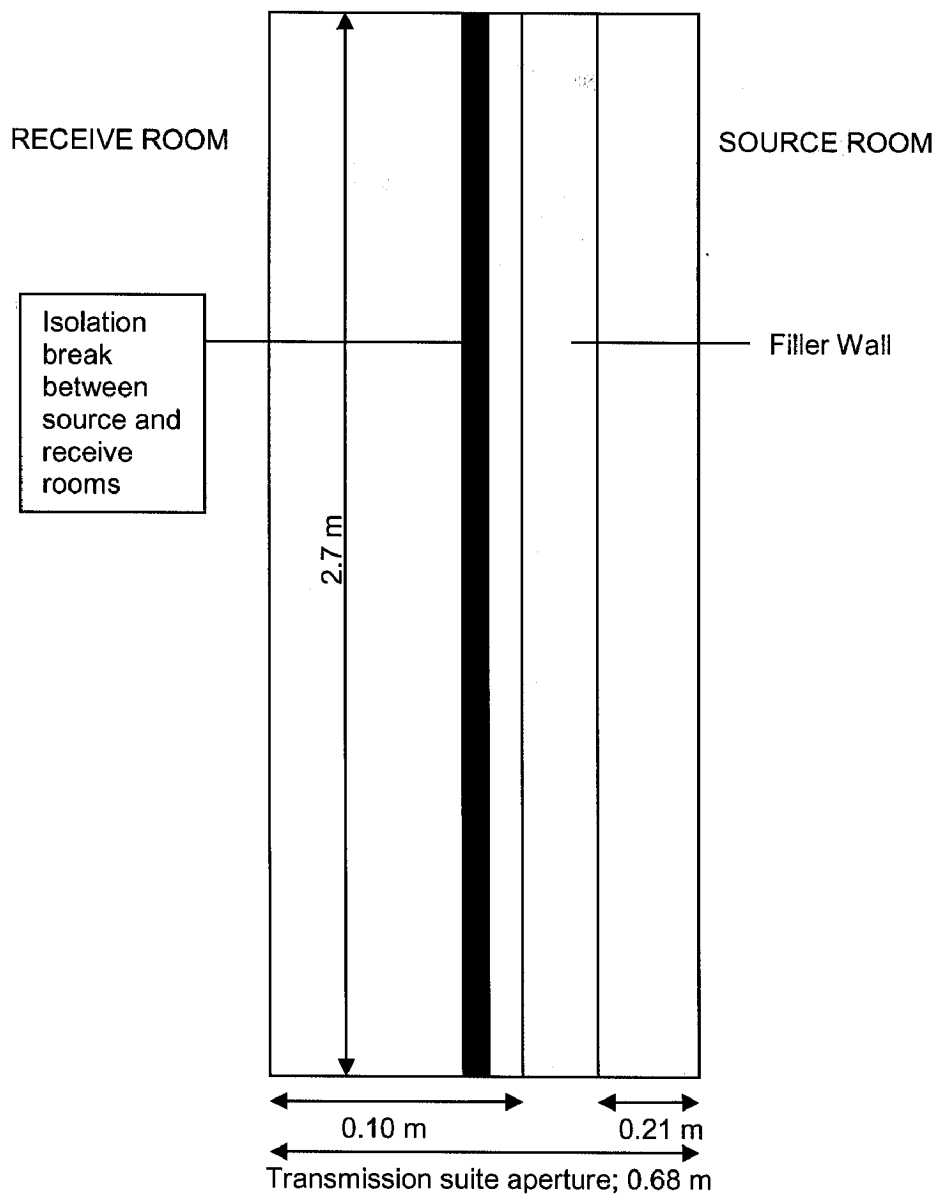


Figure 1 Section through elevation showing the position of the filler wall in the transmission suite aperture

Laboratory airborne sound insulation testing of Rytons Building Products Ltd ventilator systems



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: Rytons Building Products Ltd

Test date: 18/07/2007

Test number: L107-131

Test element: Filler wall

0578

Test element area: 9.8 m² Mass per unit area: 52 kg/m²

Description:

2x15 mm Standard Wallboard (10.0 kg/m²) screwed to, 50 mm x 100 mm timber studs at 600 mm centres
300 mm cavity between studs fully filled with isowool (mineral fibre),

50 mm x 100 mm timber studs at 600 mm centres

2x15 mm Standard Wallboard (10.0 kg/m²) screwed to studs.

Source room volume: 130 m³ Air temperature: 19 °C

Receive room volume: 115 m³ Air relative humidity: 75 %

Frequency (Hz)	Reverberation time (s)	Background level (dB)	Source level (dB)	Receive level (dB)	R (dB)
50	2.90	26.0	88.1	57.0	33.0
63	2.88	19.2	97.3	68.7	30.4
80	1.69	17.3	98.0	61.2	36.3
100	1.45	12.3	98.7	58.4	39.2
125	1.94	9.1	101.0	55.9	45.2
160	1.79	7.9	101.6	49.5	51.8
200	1.79	20.0	102.8	46.8	55.8
250	1.77	8.2	98.5	38.3	60.0
315	1.71	11.8	101.9	38.8	62.7
400	1.71	18.3	102.4	35.5	66.5
500	1.64	10.5	101.5	32.7	68.2
630	1.59	10.0	99.1	31.1	67.3
800	1.62	9.0	97.4	31.1	65.7
1,000	1.53	14.6	104.4	35.9	67.6
1,250	1.53	13.5	107.2	33.1	73.2
1,600	1.58	5.4	109.3	33.4	75.1
2,000	1.60	6.1	107.7	33.0	74.0
2,500	1.59	6.4	106.5	29.1	76.6
3,150	1.53	6.9	105.3	25.3	79.1
4,000	1.49	7.5	104.3	19.3	84.0
5,000	1.35	8.8	101.1	12.9	86.8

+ Receiving room level adjusted for background

* Receiving room level within 6 dB of background

Rating according to BS EN ISO 717-1:1997

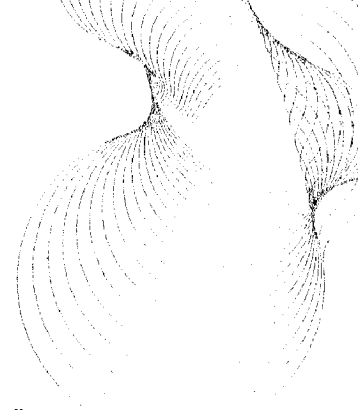
$R_w(C;C_{tr}) = 67 (-3;-10)$ dB $C_{50-3150} = -6$ dB $C_{50-5000} = -5$ dB $C_{100-5000} = -2$ dB
 $C_{tr,50-3150} = -17$ dB $C_{tr,50-5000} = -17$ dB $C_{tr,100-5000} = -10$ dB

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 airborne sound insulation testing of Rytons Building Products Ltd ventilator systems



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: Rytons Building Products Ltd

Test date: 18/07/2007

Test number: L107-131

Test element: Filler wall

0578

Test element area: 9.8 m²

Mass per unit area: 52 kg/m²

Description:

2x15 mm Standard Wallboard (10.0 kg/m²) screwed to, 50 mm x 100 mm timber studs at 600 mm centres

300 mm cavity between studs fully filled with isowool (mineral fibre),

50 mm x 100 mm timber studs at 600 mm centres

2x15 mm Standard Wallboard (10.0 kg/m²) screwed to studs.

Source room volume: 130 m³

Air temperature: 19 °C

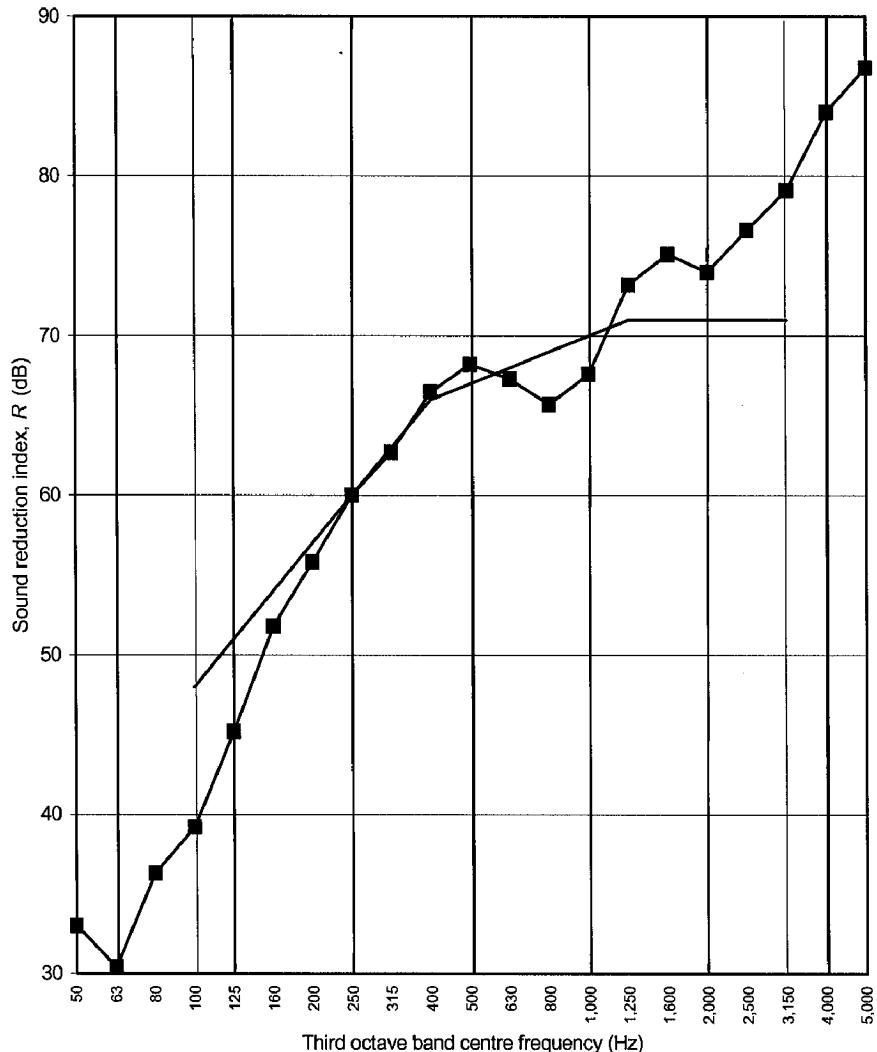
Receive room volume: 115 m³

Air relative humidity: 75 %

Frequency (Hz)	R One-third octave (dB)
50	33.0
63	30.4
80	36.3
100	39.2
125	45.2
160	51.8
200	55.8
250	60.0
315	62.7
400	66.5
500	68.2
630	67.3
800	65.7
1,000	67.6
1,250	73.2
1,600	75.1
2,000	74.0
2,500	76.6
3,150	79.1
4,000	84.0
5,000	86.8

+ 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}) = 67 (-3; -10) dB

C ₅₀₋₃₁₅₀ = -6 dB	C ₅₀₋₅₀₀₀ = -5 dB	C ₁₀₀₋₅₀₀₀ = -2 dB
C _{tr,50-3150} = -17 dB	C _{tr,50-5000} = -17 dB	C _{tr,100-5000} = -10 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 airborne sound insulation testing of Rytons Building Products Ltd ventilator systems



Laboratory measurement of airborne sound insulation of small building elements
 Element-normalized level difference according to BS EN 20140-10:1992
 BRE horizontal transmission suite (B9 051-053)

Client: Rytons Building Products Ltd

Test date: 19/07/2007

Test number: L107-141

Test element: Ventilator

0578

Filler wall area: 9.8 m²

Description:

AAC625HM ventilator assembly;

LV120+LVBACK150, 150 mm Acoustic AirCore Tube 25 mm, HM51F Internal+HMBACK150 (OPEN)

Source room volume: 130 m³

Air temperature: 19 °C

Receive room volume: 115 m³

Air relative humidity: 76 %

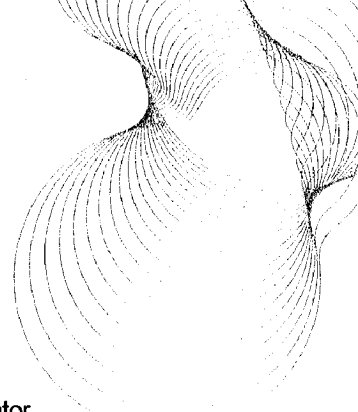
Frequency (Hz)	Reverberation time (s)	Background level (dB)	Source level (dB)	Receive level (dB)	$D_{n,e}$ (dB)
50	3.00	24.4	92.1	63.4	32.1
63	2.46	18.0	100.7	73.4	29.9
80	1.79	18.6	100.3	63.9	37.6
100	1.40	18.9	100.6	60.9	39.8
125	2.05	9.0	103.3	62.6	42.5
160	1.85	18.6	102.7	62.7	40.1
200	1.93	28.9	102.7	67.3	35.6
250	1.88	11.0	100.7	71.7	29.1
315	1.69	14.7	100.7	73.3	27.0
400	1.62	18.7	100.3	70.4	29.3
500	1.63	16.7	99.7	70.9	28.3
630	1.62	8.0	99.1	69.0	29.5
800	1.49	8.3	98.2	65.0	32.3
1,000	1.51	14.9	97.1	56.0	40.2
1,250	1.44	10.0	98.9	49.4	48.4
1,600	1.49	5.3	99.8	42.5	56.4
2,000	1.53	5.7	98.4	45.1	52.4
2,500	1.53	6.4	98.6	45.1	52.8
3,150	1.50	6.8	98.8	40.5	57.4
4,000	1.41	7.4	99.4	38.4	59.9
5,000	1.29	8.7	96.8	33.7	61.6

o Correction = 1.3 dB

Rating according to BS EN ISO 717-1:1997					
$D_{n,e,w}(C; C_{tr}) = 36 (-1; -3) \text{ dB}$	$C_{50-3150} = -1 \text{ dB}$	$C_{50-5000} = 0 \text{ dB}$	$C_{100-5000} = 0 \text{ dB}$	$C_{tr,50-3150} = -3 \text{ dB}$	$C_{tr,50-5000} = -3 \text{ dB}$
				$C_{tr,100-5000} = -3 \text{ dB}$	
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 ($D_{n,e,w}$) and should not exceed the values in Table A1 of BS EN 20140-2:1993 for the data in the individual third octaves ($D_{n,e,w}$)					

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Laboratory airborne sound insulation testing of Rytons Building Products Ltd ventilator systems



Laboratory measurement of airborne sound insulation of small building elements
 Element-normalized level difference according to BS EN 20140-10:1992
 BRE horizontal transmission suite (B9 051-053)

Client: Rytons Building Products Ltd
 Test date: 19/07/2007 Test number: L107-141 Test element: Ventilator

0578

Filler wall area: 9.8 m²

Description:

AAC625HM ventilator assembly;
 LV120+LVBACK150, 150 mm Acoustic AirCore Tube 25 mm, HM51F Internal+HMBACK150 (OPEN)

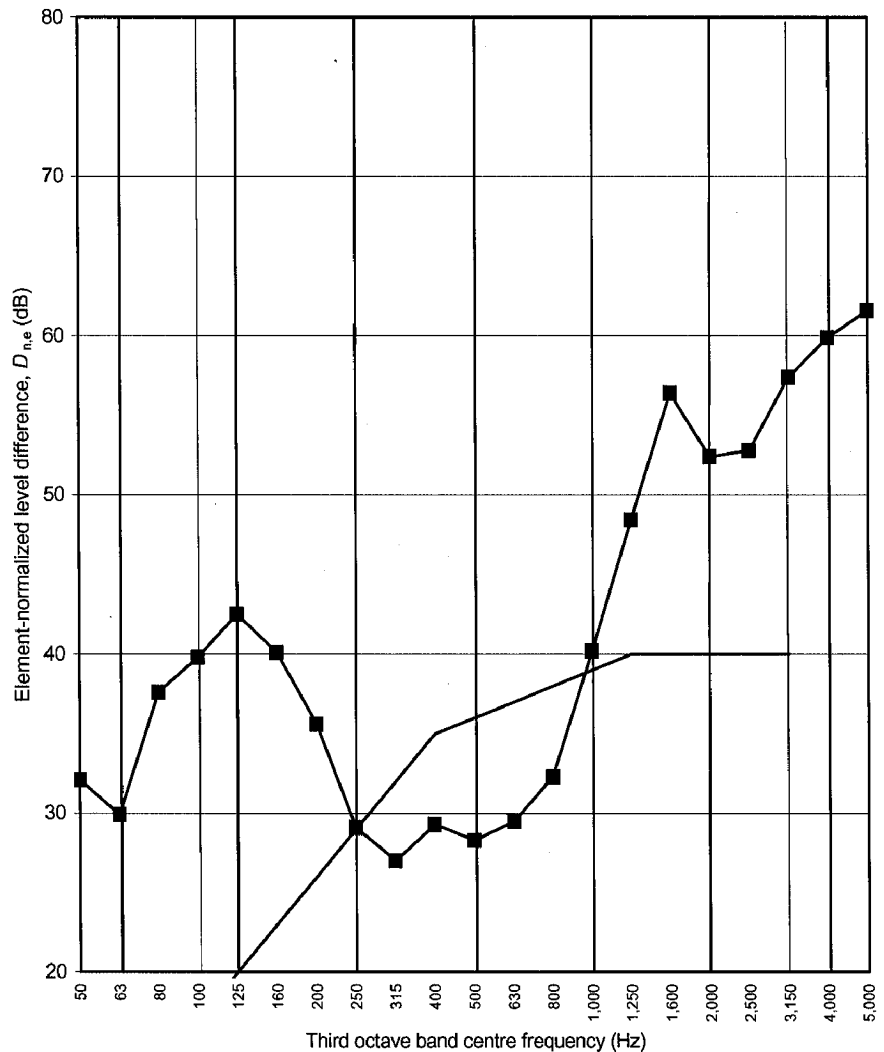
Source room volume: 130 m³

Air temperature: 19 °C

Receive room volume: 115 m³

Air relative humidity: 76 %

Frequency (Hz)	$D_{n,e}$ One-third octave (dB)
50	32.1
63	29.9
80	37.6
100	39.8
125	42.5
160	40.1
200	35.6
250	29.1
315	27.0
400	29.3
500	28.3
630	29.5
800	32.3
1,000	40.2
1,250	48.4
1,600	56.4
2,000	52.4
2,500	52.8
3,150	57.4
4,000	59.9
5,000	61.6



o Correction = 1.3 dB

Rating according to BS EN ISO 717-1:1997

$D_{n,e,w}(C;C_{tr}) = 36 (-1;-3)$ dB $C_{50-3150} = -1$ dB $C_{50-5000} = 0$ dB $C_{100-5000} = 0$ dB
 $C_{tr,50-3150} = -3$ dB $C_{tr,50-5000} = -3$ dB $C_{tr,100-5000} = -3$ 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 ($D_{n,e,w}$) and should not exceed the values in Table A1 of BS EN 20140-2:1993 for the data in the individual third octaves ($D_{n,e,w}$)

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Laboratory airborne sound insulation testing of Rytons Building Products Ltd ventilator systems



Laboratory measurement of airborne sound insulation of small building elements
Element-normalized level difference according to BS EN 20140-10:1992
BRE horizontal transmission suite (B9 051-053)

Client: Rytons Building Products Ltd

Test date: 19/07/2007

Test number: L107-142

Test element: Ventilator

0578

Filler wall area: 9.8 m²

Description:

AAC625HM ventilator assembly;

LV120+LVBACK150, 150 mm Acoustic AirCore Tube 25 mm, HM51F Internal+HMBACK150 (CLOSED)

Source room volume: 130 m³

Air temperature: 19 °C

Receive room volume: 115 m³

Air relative humidity: 76 %

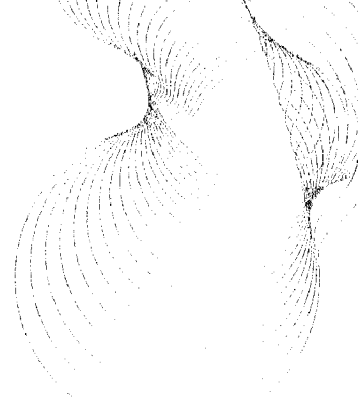
Frequency (Hz)	Reverberation time (s)	Background level (dB)	Source level (dB)	Receive level (dB)	$D_{n,e}$ (dB)
50	3.00	23.8	92.1	62.3	33.2
63	2.46	17.9	100.1	74.8	27.8
80	1.79	19.7	99.3	63.6	37.0
100	1.40	18.9	100.0	60.5	39.7
125	2.05	9.2	103.1	62.3	42.6
160	1.85	19.2	102.9	63.5	39.5
200	1.93	31.9	102.7	68.2	34.7
250	1.88	13.8	100.6	71.9	28.7
315	1.69	18.5	100.6	71.3	28.8
400	1.62	19.3	100.2	68.5	31.1
500	1.63	17.2	99.6	69.7	29.3
630	1.62	10.3	98.9	65.9	32.4
800	1.49	9.1	98.1	62.1	35.1
1,000	1.51	14.7	96.8	52.1	43.9
1,250	1.44	10.1	98.7	45.7	52.0
1,600	1.49	5.2	99.5	39.2	59.4
2,000	1.53	5.8	98.2	41.5	55.9
2,500	1.53	6.7	98.5	40.8	56.9
3,150	1.50	7.1	98.9	37.3	60.6
4,000	1.41	7.9	99.5	33.6	64.7
5,000	1.29	8.2	96.7	28.9	66.3

o Correction = 1.3 dB

Rating according to BS EN ISO 717-1:1997					
$D_{n,e,w}(C;C_{tr}) = 37 (0;-2) \text{ dB}$	$C_{50-3150} = 0 \text{ dB}$	$C_{50-5000} = 1 \text{ dB}$	$C_{100-5000} = 1 \text{ dB}$		
	$C_{tr,50-3150} = -2 \text{ dB}$	$C_{tr,50-5000} = -2 \text{ dB}$	$C_{tr,100-5000} = -2 \text{ dB}$		
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 ($D_{n,e,w}$) and should not exceed the values in Table A1 of BS EN 20140-2:1993 for the data in the individual third octaves ($D_{n,e,w}$)					

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Laboratory measurement of airborne sound insulation of small building elements
 Element-normalized level difference according to BS EN 20140-10:1992
 BRE horizontal transmission suite (B9 051-053)

Client: Rytons Building Products Ltd
 Test date: 19/07/2007 Test number: L107-142 Test element: Ventilator

0578

Filler wall area: 9.8 m²

Description:

AAC625HM ventilator assembly;
 LV120+LVBACK150, 150 mm Acoustic AirCore Tube 25 mm, HM51F Internal+HMBACK150 (CLOSED)

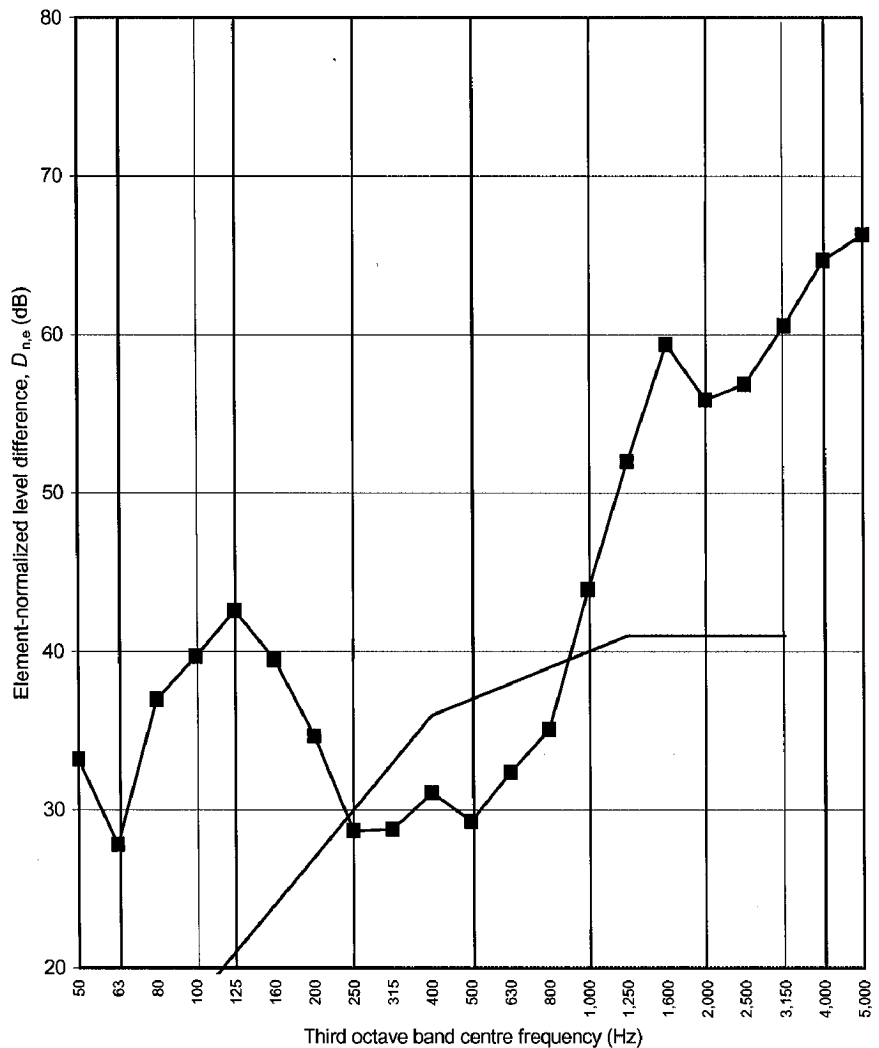
Source room volume: 130 m³

Air temperature: 19 °C

Receive room volume: 115 m³

Air relative humidity: 76 %

Frequency (Hz)	$D_{n,e}$ One-third octave (dB)
50	33.2
63	27.8
80	37.0
100	39.7
125	42.6
160	39.5
200	34.7
250	28.7
315	28.8
400	31.1
500	29.3
630	32.4
800	35.1
1,000	43.9
1,250	52.0
1,600	59.4
2,000	55.9
2,500	56.9
3,150	60.6
4,000	64.7
5,000	66.3



o Correction = 1.3 dB

Rating according to BS EN ISO 717-1:1997

$D_{n,e,w}(C; C_{tr}) = 37 (0; -2)$ dB $C_{50-3150} = 0$ dB $C_{50-5000} = 1$ dB $C_{100-5000} = 1$ dB
 $C_{tr,50-3150} = -2$ dB $C_{tr,50-5000} = -2$ dB $C_{tr,100-5000} = -2$ 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 ± 1 dB for the single-number quantity ($D_{n,e,w}$) and should not exceed the values in Table A1 of BS EN 20140-2:1993 for the data in the individual third octaves ($D_{n,e}$)

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