

bre

**Laboratory airborne
sound insulation testing
of Rytons Building
Products Ltd ventilator
systems, Jun 2006**

Prepared for:

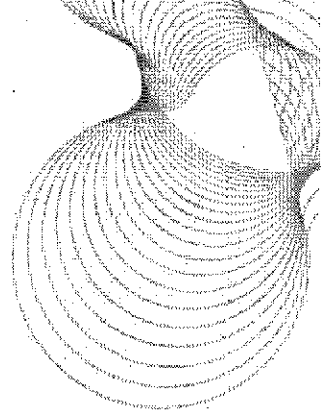
Rytons Building Products Ltd

07 July 2006

Test report number 230822



0578



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Date 07 July 2006
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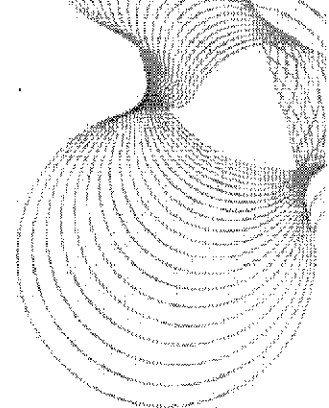
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1 Introduction

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 5207 - 117344.

2 Testing details

2.1 Test dates and personnel

The measurements detailed in this report were made on 20 June 2006, 23 June 2006, 26 June 2006, 27 June 2006, 29 June 2006 and 28 June 2006 by Mr J Woodcock, Mr A Heath and Mr P Guy of BRE Acoustics.

2.2 Test method and applicable standards

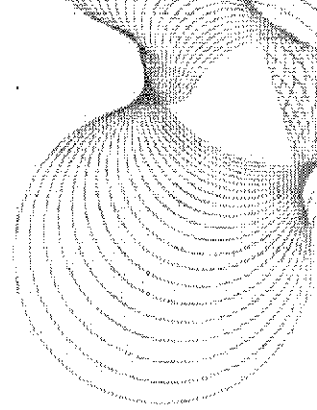
Measurement of airborne sound insulation was made in accordance with BS EN 20140-10:1992. Single number quantities were calculated in accordance with BS EN ISO 717-1:1997.

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.

The sound insulation of the filler wall was measured first, then the circular ventilator systems were tested. Following this the circular hole used for the tests was covered by two layers of 15 mm plasterboard on both sides of the filler wall and well sealed. The rectangular ventilator systems were then tested. Following these tests the rectangular hole was covered as the circular hole had been. The sound insulation of the filler wall was then measured again and these values were used to determine the sound insulation of the rectangular vents.

2.3 Test element installation

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



2.4 Instrumentation

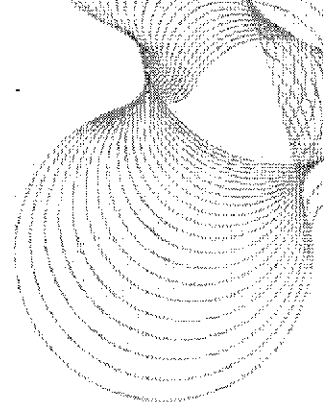
The equipment used to conduct the tests is identified in Table 1.

Table 1 Equipment list

Equipment description	Manufacturer	Type	UKAS identification number
Microphone Calibrator	B & K	4231	01/002
Microphone	GRAS	40AE	02/307, 02/308
Microphone Preamplifier	GRAS	26CA	04/307, 04/308
Microphone Adapter	NOR	1449	06/105, 06/106
Graphic Equaliser	Phonic	PEQ3300	10/001
Loudspeaker	B & K	4224	11/006
Amplifier	NOR	260H	11/013
Loudspeaker	NOR	270H	11/014, 11/016
Real Time Analyser	NOR	840	13/003
Microphone Rotating Boom	B & K	3923	14/001, 14/002

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.



2.8 Plans

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

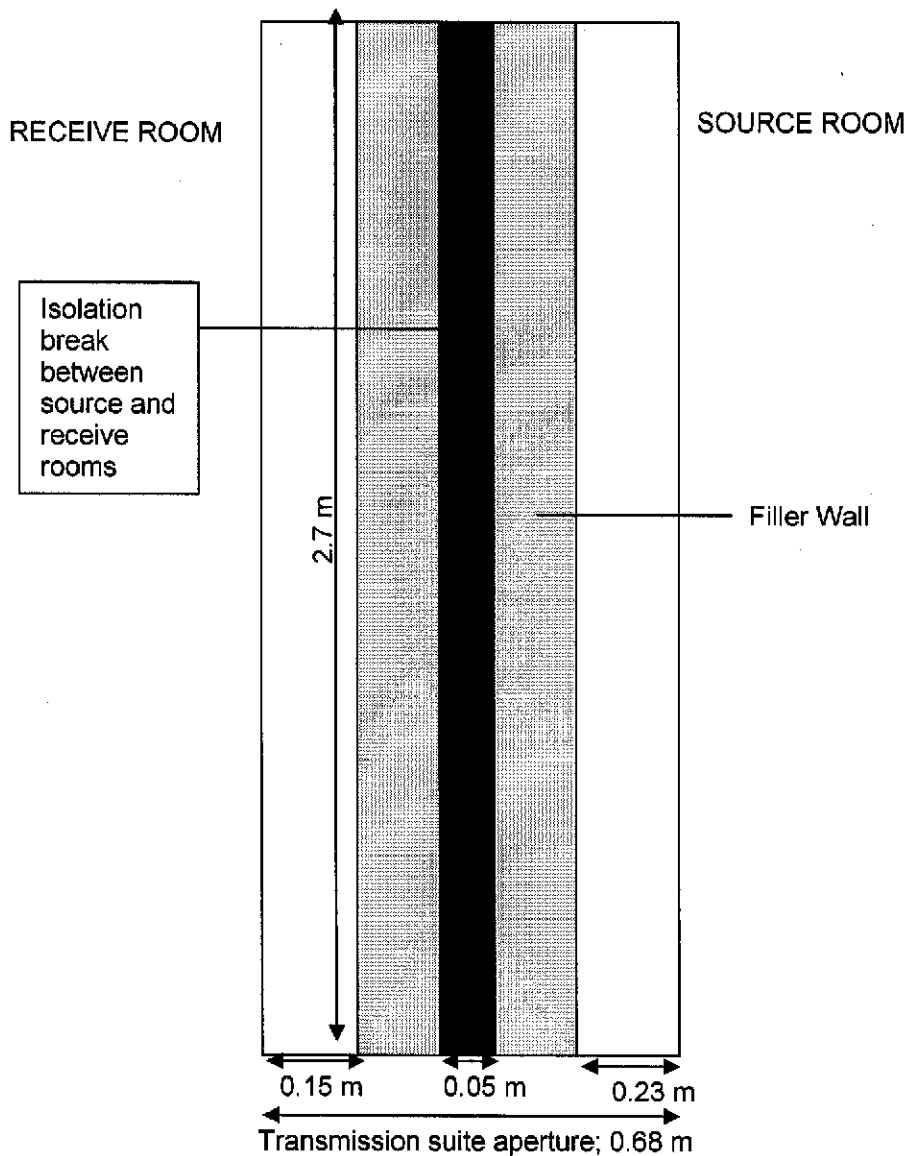
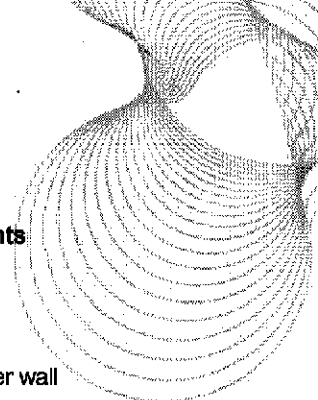


Figure 1 Section through elevation showing the position of the filler wall in the transmission suite aperture



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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: 20/06/2006 **Test number:** L106-096 **Test element:** Filler wall

Filler wall area: 9.9 m²

Description:

2 x 15 mm Lafarge Standard Wallboard (10.2 kg/m²) screwed to, 50 mm x 100 mm timber studs at 600 mm centres
 100 mm full-fill cavity and full-fill cavity between studs (mineral fibre)

50 mm x 100 mm timber studs at 600 mm centres

2 x 15 mm Lafarge Standard Wallboard (10.2 kg/m²) screwed to studs

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

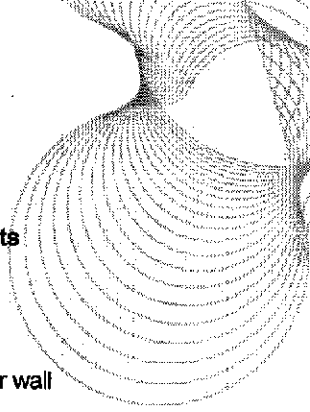
Receive room volume: 115 m³ **Air relative humidity:** 64 %

Frequency (Hz)	Reverberation time (s)	Background level (dB)	Source level (dB)	Receive level (dB)	$D_{n,e}$ (dB)
50	2.37	30.5	81.8	49.9	33.0
63	3.23	20.2	85.0	58.7	28.7
80	2.83	22.2	86.2	52.2	35.8
100	1.41	15.9	89.2	47.6	40.4
125	1.92	8.5	92.0	46.0	46.2
160	1.85	4.6	91.9	39.6	52.3
200	1.90	15.6	97.0	39.9	57.3
250	1.93	3.9	95.2	36.1	59.2
315	1.67	6.6	94.1	30.6	63.1
400	1.64	14.1	104.6	35.3	68.8
500	1.57	13.7	108.2	36.5	71.0
630	1.61	6.6	110.6	36.0	74.0
800	1.49	4.2	107.8	28.8	78.1
1,000	1.47	12.0	108.2	25.1	82.1
1,250	1.44	4.7	109.4	22.7	85.7
1,600	1.52	2.8	110.4	22.1	87.5
2,000	1.57	3.5	109.0	22.0	86.3
2,500	1.52	4.0	108.3	21.3	86.1
3,150	1.51	6.0	105.5	13.0	91.7
4,000	1.39	7.7	100.0	6.1	92.7
5,000	1.27	5.9	90.9	4.4	84.9

+ Receiving room level adjusted for background

* Receiving room level within 6 dB of background

Rating according to BS EN ISO 717-1:1997					
$D_{n,e,w}(C;C_{tr}) = 69 (-3;-10)$ dB	$C_{50-3150} = -8$ dB	$C_{50-5000} = -7$ dB	$C_{100-5000} = -2$ dB		
	$C_{tr,50-3150} = -20$ dB	$C_{tr,50-5000} = -20$ 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 ($D_{n,e,w}$) and should not exceed the values in Table A1 of BS EN 20140-2:1993 for the data in the individual third octaves ($D_{n,e,w}$)					



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: 20/06/2006 Test number: L106-096 Test element: Filler wall

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Filler wall area: 9.9 m²

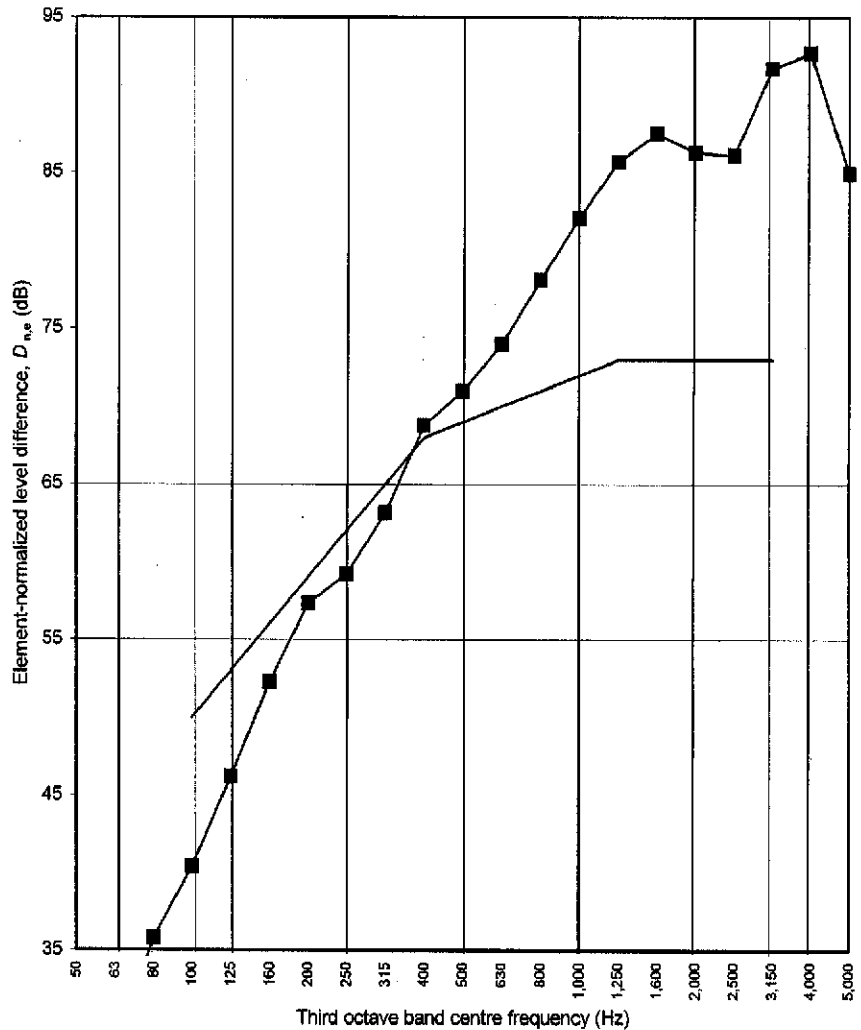
Description:

2 x 15 mm Lafarge Standard Wallboard (10.2 kg/m²) screwed to, 50 mm x 100 mm timber studs at 600 mm centres
 100 mm full-fill cavity and full-fill cavity between studs (mineral fibre)
 50 mm x 100 mm timber studs at 600 mm centres
 2 x 15 mm Lafarge Standard Wallboard (10.2 kg/m²) screwed to studs

Source room volume: 130 m³ Air temperature: 19 °C
 Receive room volume: 115 m³ Air relative humidity: 64 %

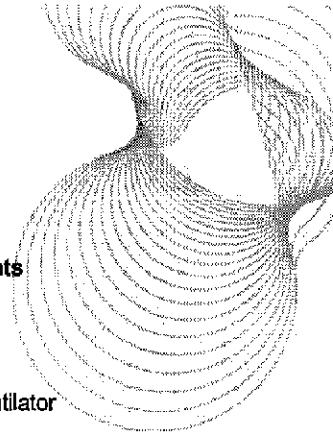
Frequency (Hz)	$D_{n,e}$ One-third octave (dB)
50	33.0
63	28.7
80	35.8
100	40.4
125	46.2
160	52.3
200	57.3
250	59.2
315	63.1
400	68.8
500	71.0
630	74.0
800	78.1
1,000	82.1
1,250	85.7
1,600	87.5
2,000	86.3
2,500	86.1
3,150	91.7
4,000	92.7
5,000	84.9

+ Receiving room level adjusted for background
 * Receiving room level within 6 dB of background



Rating according to BS EN ISO 717-1:1997			
$D_{n,e,w}(C;C_{tr}) = 69 (-3;-10)$ dB	$C_{50-3150} = -8$ dB	$C_{50-5000} = -7$ dB	$C_{100-5000} = -2$ dB
	$C_{tr,50-3150} = -20$ dB	$C_{tr,50-5000} = -20$ 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 ($D_{n,e,w}$) and should not exceed the values in Table A1 of BS EN 20140-2:1993 for the data in the individual third octaves ($D_{n,e,w}$)			

Laboratory airborne sound insulation testing of Rytons Building Products Ltd ventilator systems, Jun 2006



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: 27/06/2006

Test number: L106-104

Test element: Ventilator

Filler wall area: 9.9 m²

Description:

AAC6i ventilator assembly;
RD6LV, AAC6TUBEi, RD6LV

Rytons 150mm Acoustic AirCore® (36 dB)
Code: AAC625

Source room volume: 130 m³

Air temperature: 19 °C

Receive room volume: 115 m³

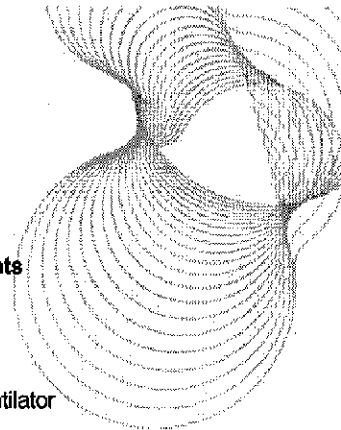
Air relative humidity: 76 %

Frequency (Hz)	Reverberation time (s)	Background level (dB)	Source level (dB)	Receive level (dB)	D _{n,e} (dB)
50	1.81	20.5	90.7	60.2	31.7
63	3.04	18.0	88.8	61.5	30.8
80	2.22	22.9	88.7	54.8	36.0
100	1.35	19.6	92.2	51.6	40.6
125	1.94	12.6	95.0	54.4	42.2
160	1.70	4.2	95.5	55.5	39.6
200	1.64	8.4	98.6	62.1	36.0
250	1.68	2.8	95.4	64.0	31.0
315	1.59	7.3	94.3	66.3	27.4
400	1.72	12.1	93.4	63.4	29.6
500	1.69	10.2	91.2	60.9	29.9
630	1.61	5.0	91.2	60.5	30.2
800	1.51	2.8	90.0	55.4	33.7
1,000	1.50	10.0	90.4	46.0	43.5
1,250	1.48	4.8	90.5	40.0	49.6
1,600	1.53	2.8	90.9	39.1	51.0
2,000	1.56	3.0	90.1	39.4	49.9
2,500	1.51	3.6	89.9	34.5	54.6
3,150	1.48	5.3	88.7	30.3	57.4
4,000	1.41	7.2	86.4	26.5	58.7
5,000	1.27	6.2	84.2	25.0	57.7

o Correction = 1.3 dB

Rating according to BS EN ISO 717-1:1997					
D_{n,e,w}(C;C_{tr}) = 36 (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,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,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: 27/06/2006

Test number: L106-104

Test element: Ventilator

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Filler wall area: 9.9 m²

Description:

AAC6i ventilator assembly;
RD6LV, AAC6TUBEI, RD6LV

Rytons 150mm Acoustic AirCore[®] (36 dB)

Code: AAC625

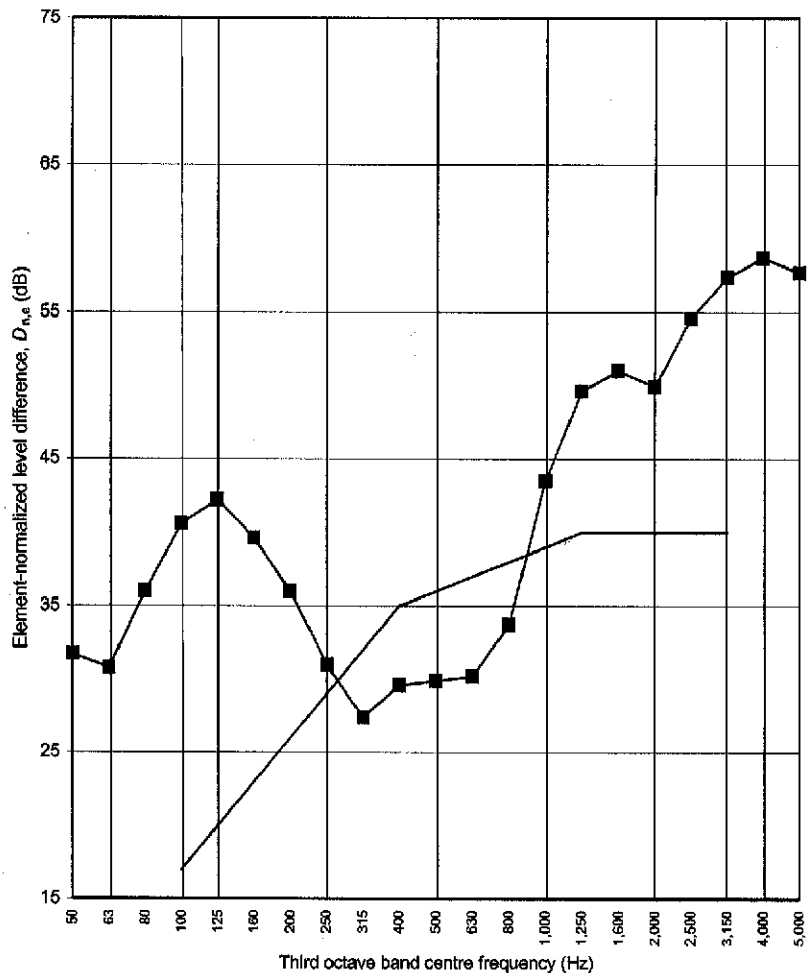
Source room volume: 130 m³

Air temperature: 19 °C

Receive room volume: 115 m³

Air relative humidity: 76 %

Frequency (Hz)	$D_{n,e}$ One-third octave (dB)
50	31.7
63	30.8
80	36.0
100	40.6
125	42.2
160	39.6
200	36.0
250	31.0
315	27.4
400	29.6
500	29.9
630	30.2
800	33.7
1,000	43.5
1,250	49.6
1,600	51.0
2,000	49.9
2,500	54.6
3,150	57.4
4,000	58.7
5,000	57.7



o Correction = 1.3 dB

Rating according to BS EN ISO 717-1:1997

$D_{n,e,w}(C;C_{tr}) = 36 (0;-2) \text{ dB}$

$C_{50-3150} = 0 \text{ dB}$

$C_{50-5000} = 1 \text{ dB}$

$C_{100-5000} = 1 \text{ dB}$

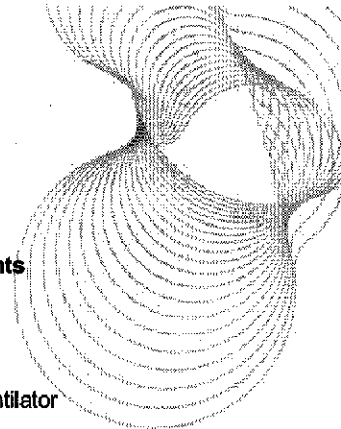
$C_{tr,50-3150} = -2 \text{ dB}$

$C_{tr,50-5000} = -2 \text{ dB}$

$C_{tr,100-5000} = -2 \text{ dB}$

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 ($D_{n,e,w}$)



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: 27/06/2006

Test number: L106-103

Test element: Ventilator

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Filler wall area: 9.9 m²

Description:

AAC6CWLl ventilator assembly;
ABC150, RD6LV, AAC6TUBEi, RD6LV

Rytons Cowled 150mm Acoustic AirCore® (38 dB)

Code: AAC625CW

Source room volume: 130 m³

Air temperature: 19 °C

Receive room volume: 115 m³

Air relative humidity: 67 %

Frequency (Hz)	Reverberation time (s)	Background level (dB)	Source level (dB)	Receive level (dB)	$D_{n,e}$ (dB)
50	1.97	21.5	90.4	60.1	31.8
63	2.96	18.2	87.9	61.7	29.6
80	2.30	20.9	88.7	54.5	36.5
100	1.29	16.9	91.9	51.0	40.7
125	1.93	9.1	95.1	54.9	41.7
160	1.77	3.0	95.3	57.5	37.6
200	1.54	9.6	98.4	65.9	31.7
250	1.69	3.8	95.2	67.0	27.8
315	1.66	7.5	94.3	64.4	29.4
400	1.66	12.2	93.3	62.4	30.5
500	1.71	10.3	91.0	60.1	30.6
630	1.66	5.1	91.1	56.5	34.1
800	1.58	2.7	89.9	51.8	37.4
1,000	1.53	9.9	90.4	43.2	46.4
1,250	1.51	4.8	90.5	32.7	57.0
1,600	1.52	2.8	91.0	31.9	58.2
2,000	1.55	3.2	90.1	31.5	57.9
2,500	1.53	3.6	90.0	31.9	57.3
3,150	1.49	4.9	88.8	25.2	62.7
4,000	1.41	7.0	86.2	22.3	62.7
5,000	1.26	6.0	83.6	21.9	60.0

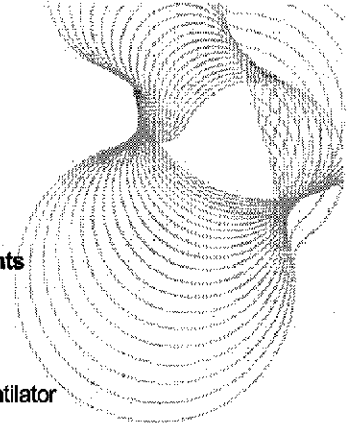
o Correction = 1.3 dB

Rating according to BS EN ISO 717-1:1997

$D_{n,e,w}(C;C_{tr}) = 38 (0;-2)$ dB $C_{50-3150} = 0$ dB $C_{50-5000} = 1$ dB $C_{100-5000} = 1$ dB
 $C_{tr,50-3150} = -3$ dB $C_{tr,50-5000} = -3$ 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 ($D_{n,e,w}$)



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: 27/06/2006 **Test number:** L106-103 **Test element:** Ventilator

Filler wall area: 9.9 m²

Description:
 AAC6CWLi ventilator assembly;
 ABC150, RD6LV, AAC8TUBEi, RD6LV

Rytons Cowled 150mm Acoustic AirCore® (38 dB)
Code: AAC625CW

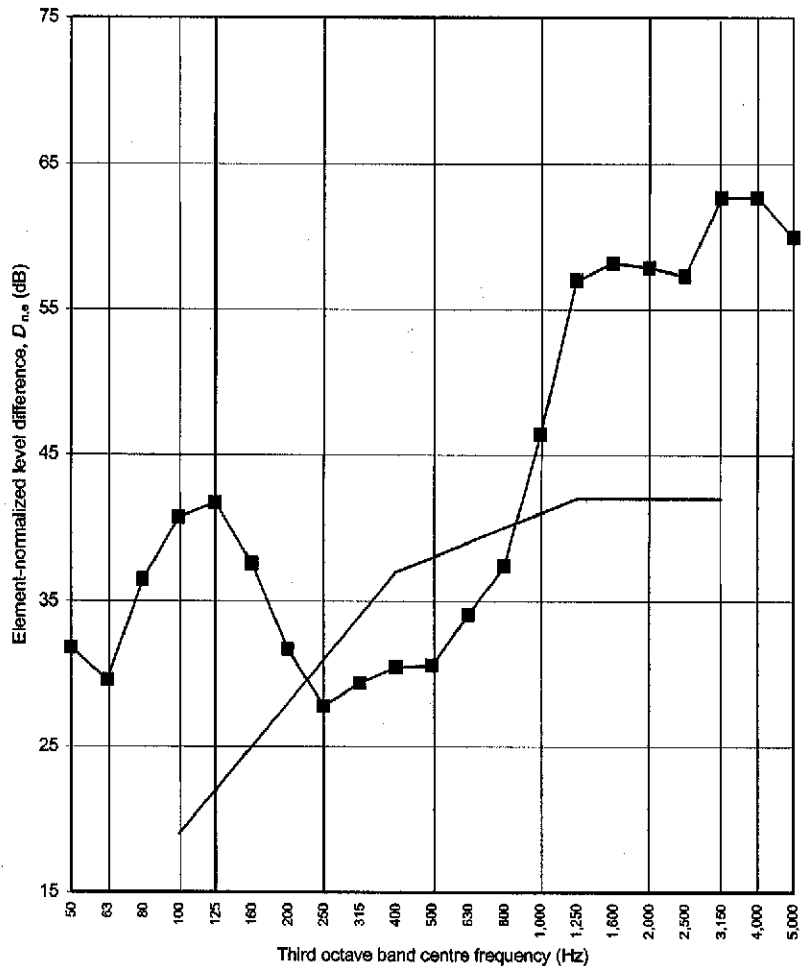
Source room volume: 130 m³

Air temperature: 19 °C

Receive room volume: 115 m³

Air relative humidity: 67 %

Frequency (Hz)	$D_{n,e}$ One-third octave (dB)
50	31.8
63	29.6
80	36.5
100	40.7
125	41.7
160	37.6
200	31.7
250	27.8
315	29.4
400	30.5
500	30.6
630	34.1
800	37.4
1,000	46.4
1,250	57.0
1,600	58.2
2,000	57.9
2,500	57.3
3,150	62.7
4,000	62.7
5,000	60.0



α Correction = 1.3 dB

Rating according to BS EN ISO 717-1:1997

$D_{n,e,w}(C;C_{tr}) = 38 (0;-2) \text{ dB}$ $C_{50-3150} = 0 \text{ dB}$ $C_{50-5000} = 1 \text{ dB}$ $C_{100-5000} = 1 \text{ dB}$
 $C_{tr,50-3150} = -3 \text{ dB}$ $C_{tr,50-5000} = -3 \text{ dB}$ $C_{tr,100-5000} = -2 \text{ dB}$

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 ($D_{n,e,w}$)