

bre

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

Prepared for:

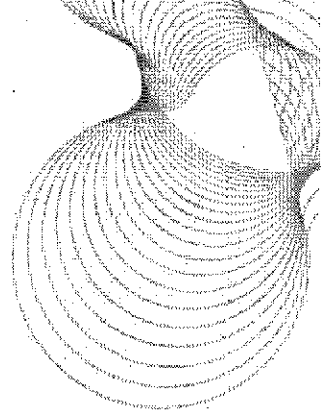
Rytons Building Products Ltd

07 July 2006

Test report number 230822



0578



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Date 07 July 2006
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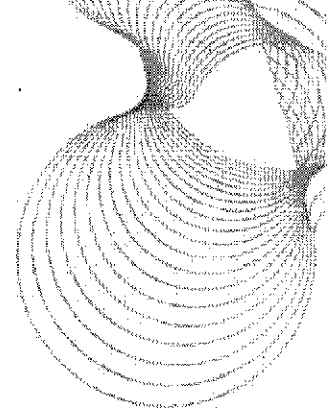
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1 Introduction

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

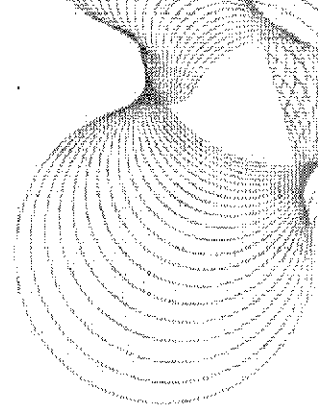
Measurement of airborne sound insulation was made in accordance with BS EN 20140-10:1992. Single number quantities were calculated in accordance with BS EN ISO 717-1:1997.

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

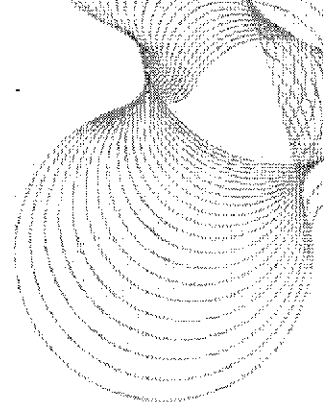
The equipment used to conduct the tests is identified in Table 1.

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.

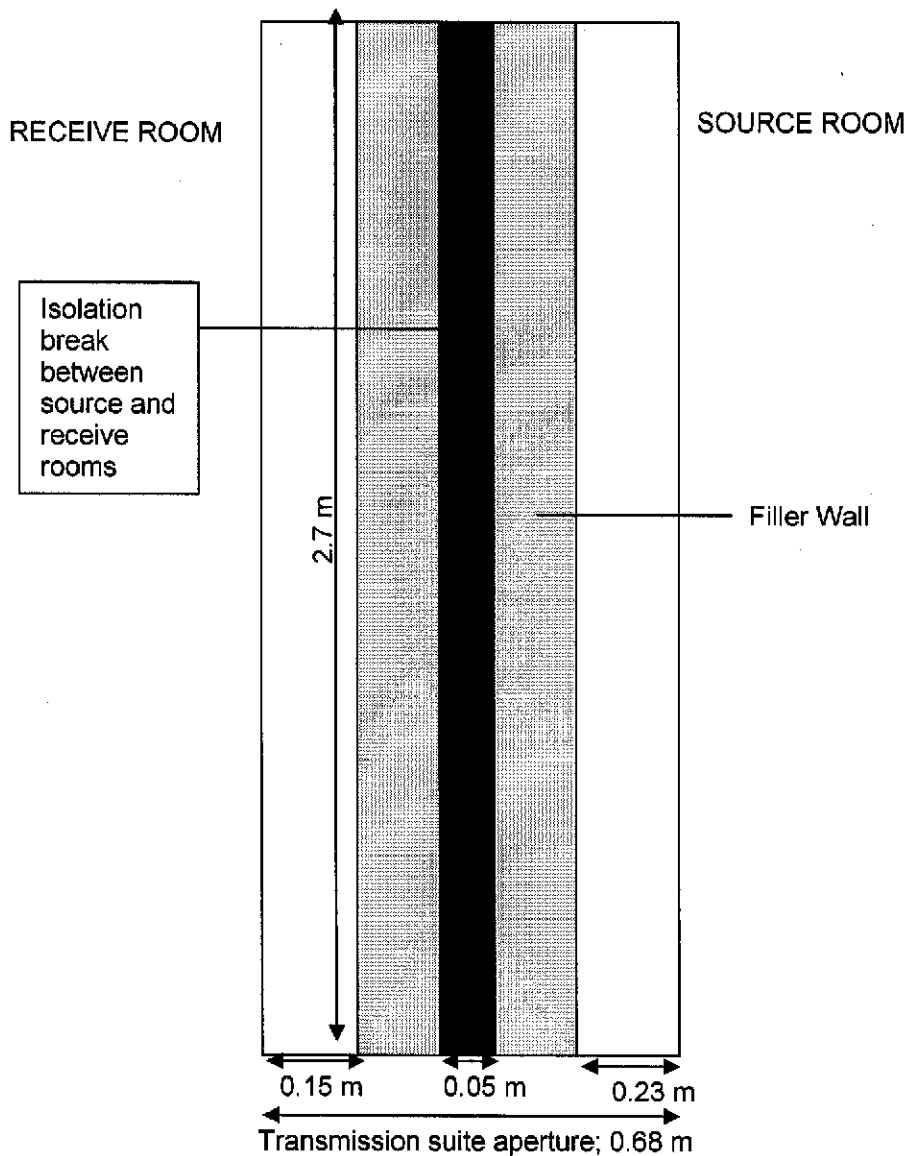
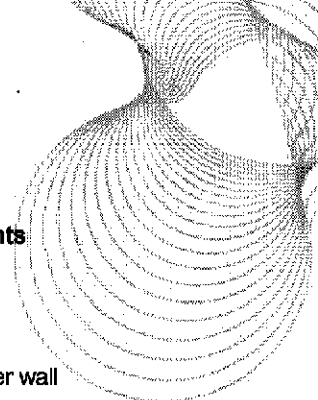


Figure 1 Section through elevation showing the position of the filler wall in the transmission suite aperture



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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

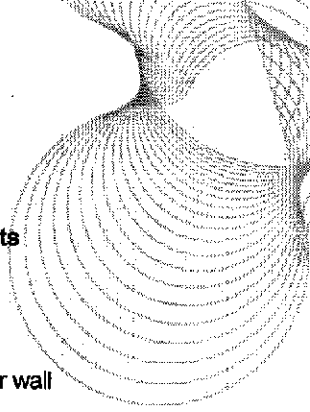
* Receiving room level within 6 dB of background

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:

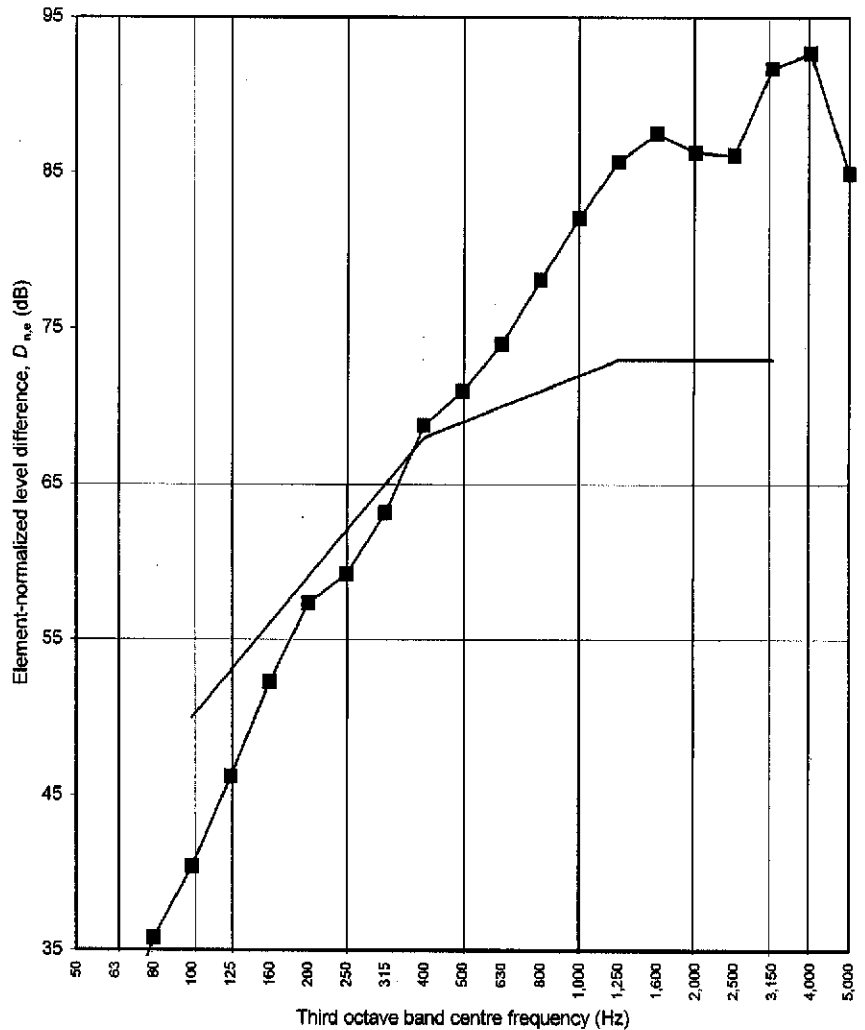
2 x 15 mm Lafarge Standard Wallboard (10.2 kg/m²) screwed to, 50 mm x 100 mm timber studs at 600 mm centres
 100 mm full-fill cavity and full-fill cavity between studs (mineral fibre)
 50 mm x 100 mm timber studs at 600 mm centres
 2 x 15 mm Lafarge Standard Wallboard (10.2 kg/m²) screwed to studs

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 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: L106-105

Test element: Ventilator

0578

Filler wall area: 9.9 m²

Description:

AAC6HMii ventilator assembly;
 RD6LV, AAC6TUBEii, HMBACK150

**Rytons 150mm Acoustic AirCore® with
 Hit & Miss (41 dB)
 Code: AAC635HM**

Source room volume: 130 m³

Air temperature: 19 °C

Receive room volume: 115 m³

Air relative humidity: 65 %

Frequency (Hz)	Reverberation time (s)	Background level (dB)	Source level (dB)	Receive level (dB)	$D_{n,e}$ (dB)
50	1.79	20.1	90.3	59.5	32.0
63	2.87	17.8	89.0	61.5	30.7
80	2.10	22.8	88.1	54.5	36.5
100	1.30	17.7	92.0	51.2	40.6
125	1.92	9.4	95.1	53.3	43.3
160	1.67	3.4	95.3	54.4	40.5
200	1.59	8.5	98.3	60.1	37.6
250	1.69	3.7	95.1	61.2	33.5
315	1.57	5.6	94.3	63.9	29.7
400	1.71	12.5	93.5	61.1	32.0
500	1.67	12.7	91.3	58.9	32.0
630	1.62	6.6	91.4	52.6	38.3
800	1.53	3.6	90.1	45.3	44.0
1,000	1.53	13.0	90.6	37.1	52.7
1,250	1.54	4.8	90.7	34.5	55.4
1,600	1.53	2.9	91.2	36.9	53.5
2,000	1.54	3.3	90.4	34.5	55.1
2,500	1.53	4.2	90.1	27.1	62.3
3,150	1.48	6.0	88.8	22.7	65.1
4,000	1.37	7.5	86.3	20.0	65.0
5,000	1.28	6.0	83.8	17.5	64.7

+ Receiving room level adjusted for background

o Correction = 1.3 dB

Rating according to BS EN ISO 717-1:1997

$D_{n,e,w}(C;C_{tr}) = 41 (-1;-3) \text{ dB}$ $C_{50-3150} = -1 \text{ dB}$ $C_{50-5000} = 0 \text{ dB}$ $C_{100-5000} = 0 \text{ dB}$
 $C_{tr,50-3150} = -3 \text{ dB}$ $C_{tr,50-5000} = -3 \text{ dB}$ $C_{tr,100-5000} = -3 \text{ dB}$

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



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: L106-105 Test element: Ventilator

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Filler wall area: 9.9 m²
 Description:
 AAC6HMii ventilator assembly;
 RD6LV, AAC6TUBEii, HMBACK150

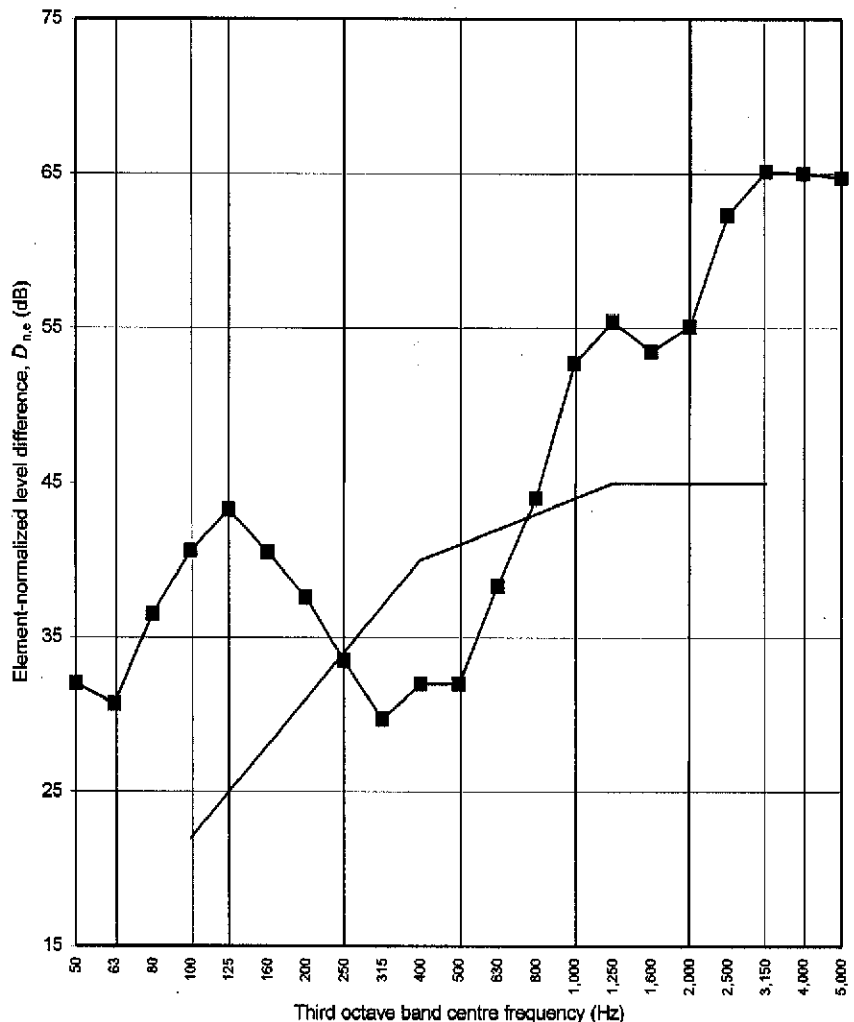
**Rytons 150mm Acoustic AirCore[®] with
 Hit & Miss (41 dB)
 Code: AAC635HM**

Source room volume: 130 m³
 Receive room volume: 115 m³

Air temperature: 19 °C
 Air relative humidity: 65 %

Frequency (Hz)	$D_{n,e}$ One-third octave (dB)
50	32.0
63	30.7
80	36.5
100	40.6
125	43.3
160	40.5
200	37.6
250	33.5
315	29.7
400	32.0
500	32.0
630	38.3
800	44.0
1,000	52.7
1,250	55.4
1,600	53.5
2,000	55.1
2,500	62.3
3,150	65.1
4,000	65.0
5,000	64.7

+ Receiving room level adjusted for background



o Correction = 1.3 dB

Rating according to BS EN ISO 717-1:1997

$D_{n,e,w}(C;C_{tr}) = 41 (-1;-3) \text{ dB}$ $C_{50-3150} = -1 \text{ dB}$ $C_{50-5000} = 0 \text{ dB}$ $C_{100-5000} = 0 \text{ dB}$
 $C_{tr,50-3150} = -3 \text{ dB}$ $C_{tr,50-5000} = -3 \text{ dB}$ $C_{tr,100-5000} = -3 \text{ dB}$

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



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: L106-106

Test element: Ventilator

0578

Filler wall area: 9.9 m²

Description:

AAC6HMCWii ventilator assembly;
 ABC150, RD6LV, AAC6TUBEii, HMBACK150

Rytons Cowled 150mm Acoustic AirCore®
 with Hit & Miss (42 dB)

Code: AAC635HMCW

Source room volume: 130 m³

Air temperature: 19 °C

Receive room volume: 115 m³

Air relative humidity: 66 %

Frequency (Hz)	Reverberation time (s)	Background level (dB)	Source level (dB)	Receive level (dB)	$D_{n,s}$ (dB)
50	1.86	19.6	89.8	59.5	31.6
63	2.83	17.2	88.4	61.5	30.1
80	2.11	19.9	88.6	54.1	36.4
100	1.38	14.1	91.5	50.7	40.9
125	1.93	7.3	94.4	53.5	42.4
160	1.69	2.8	94.8	55.6	38.9
200	1.62	9.8	97.6	62.1	35.0
250	1.68	4.7	94.5	62.8	31.4
315	1.64	7.1	93.7	62.6	30.6
400	1.70	12.8	93.0	62.6	30.0
500	1.73	12.9	90.8	56.3	34.2
630	1.60	6.8	90.9	48.0	42.3
800	1.56	3.5	89.6	39.5	49.4
1,000	1.50	13.5	90.1	33.1	56.1
1,250	1.48	5.0	90.6	29.9	59.7
1,600	1.52	3.5	91.7	31.6	59.3
2,000	1.56	3.7	91.8	27.3	63.8
2,500	1.54	4.5	93.4	27.8	64.8
3,150	1.48	6.2	93.9	24.0	68.9
4,000	1.39	7.4	90.6	21.4	67.9
5,000	1.28	5.8	85.1	15.5	67.9

+ Receiving room level adjusted for background

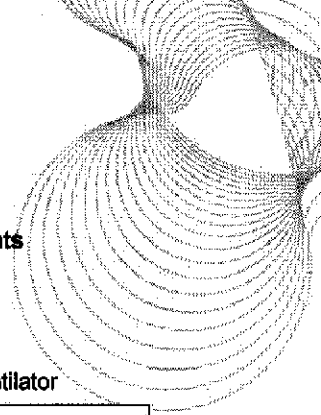
o Correction = 1.3 dB

Rating according to BS EN ISO 717-1:1997

$D_{n,e,w}(C;C_{tr}) = 42 (-1;-4) \text{ dB}$ $C_{50-3150} = -1 \text{ dB}$ $C_{50-5000} = 0 \text{ dB}$ $C_{100-5000} = 0 \text{ dB}$
 $C_{tr,50-3150} = -4 \text{ dB}$ $C_{tr,50-5000} = -4 \text{ dB}$ $C_{tr,100-5000} = -4 \text{ dB}$

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



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: L106-106 Test element: Ventilator

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Filler wall area: 9.9 m²
 Description:
 AAC6HMCW/ii ventilator assembly;
 ABC150, RD6LV, AAC6TUBEii, HMBACK150

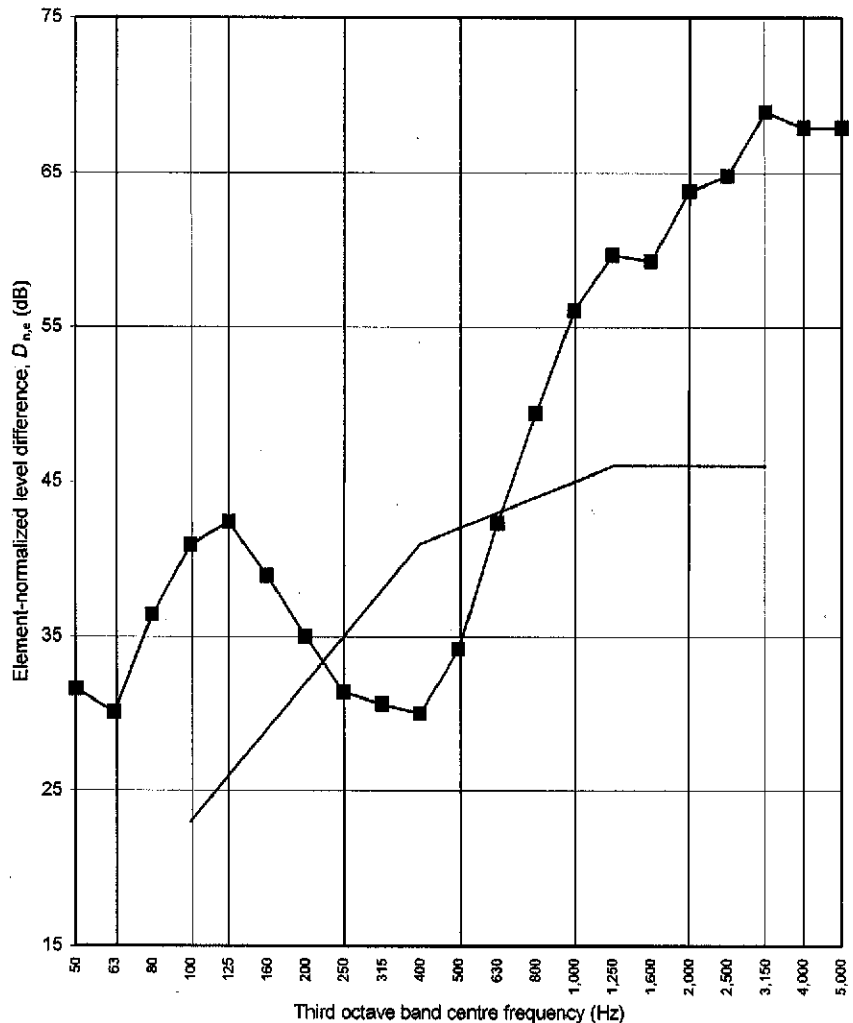
Rytons Cowled 150mm Acoustic AirCore[®]
with Hit & Miss (42 dB)
Code: AAC635HMCW

Source room volume: 130 m³
 Receive room volume: 115 m³

Air temperature: 19 °C
 Air relative humidity: 66 %

Frequency (Hz)	$D_{n,e}$ One-third octave (dB)
50	31.6
63	30.1
80	36.4
100	40.9
125	42.4
160	38.9
200	35.0
250	31.4
315	30.6
400	30.0
500	34.2
630	42.3
800	49.4
1,000	56.1
1,250	59.7
1,600	59.3
2,000	63.8
2,500	64.8
3,150	68.9
4,000	67.9
5,000	67.9

+ Receiving room level adjusted for background



o Correction = 1.3 dB

Rating according to BS EN ISO 717-1:1997

$D_{n,e,w}(C;C_{tr}) = 42 (-1;-4)$ 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 ($D_{n,e,w}$) and should not exceed the values in Table A1 of BS EN 20140-2:1993 for the data in the individual third octaves ($D_{n,e}$)