

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

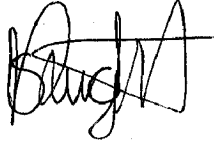


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building a better world

**Tested by**

Name Mr S Dwight  
Position Technician  
Date 20 August 2007  
Signature



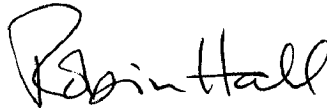
**Prepared by**

Name Mr A Heath  
Position Consultant  
Date 20 August 2007  
Signature



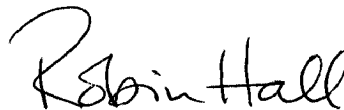
**Checked by**

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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## **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**

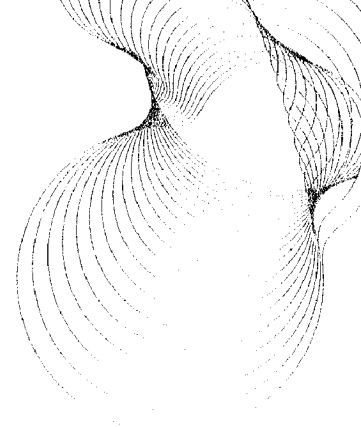
Measurement of airborne sound insulation was made in accordance with BS EN 20140-10:1992 and BS EN ISO 140-3:1995. First the airborne sound insulation of the filler wall was measured. After this, the airborne sound insulation of the filler wall with the different ventilator systems was measured.

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

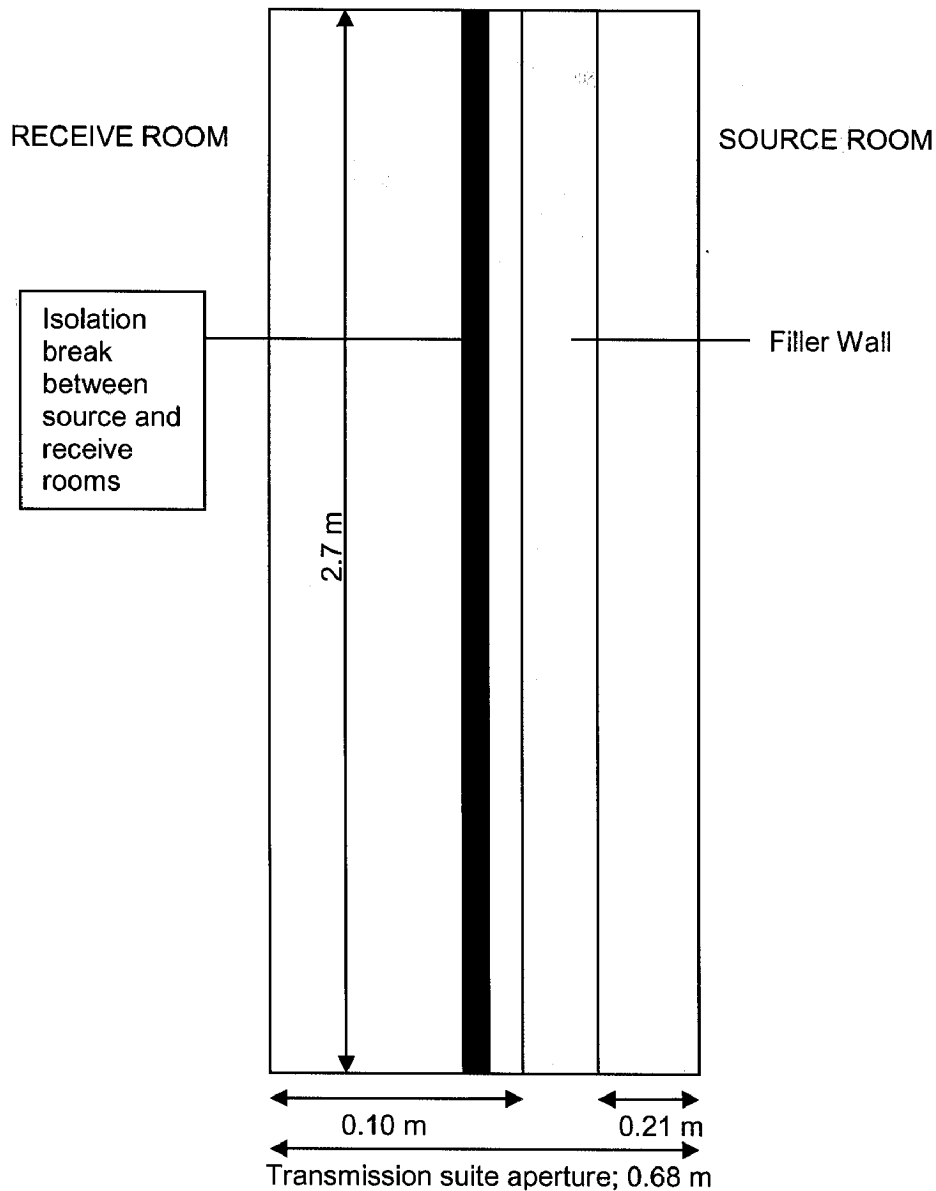
Equipment description	Manufacturer	Type	UKAS identification number
Microphone Calibrator	NOR	1253	01/006
Microphone	GRAS	40AE	02/302, 02/305
Microphone Preamplifier	GRAS	26CA	04/302, 04/305
Microphone Adapter	NOR	1449	06/105, 06/106
Graphic Equaliser	Phonic	PEQ3300	10/001
Real Time Analyser	NOR	840	13/003, 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

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**Test element area:** 9.8 m<sup>2</sup>

**Mass per unit area:** 52 kg/m<sup>2</sup>

**Description:**

2x15 mm Standard Wallboard (10.0 kg/m<sup>2</sup>) 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/m<sup>2</sup>) screwed to studs.

**Source room volume:** 130 m<sup>3</sup>

**Air temperature:** 19 °C

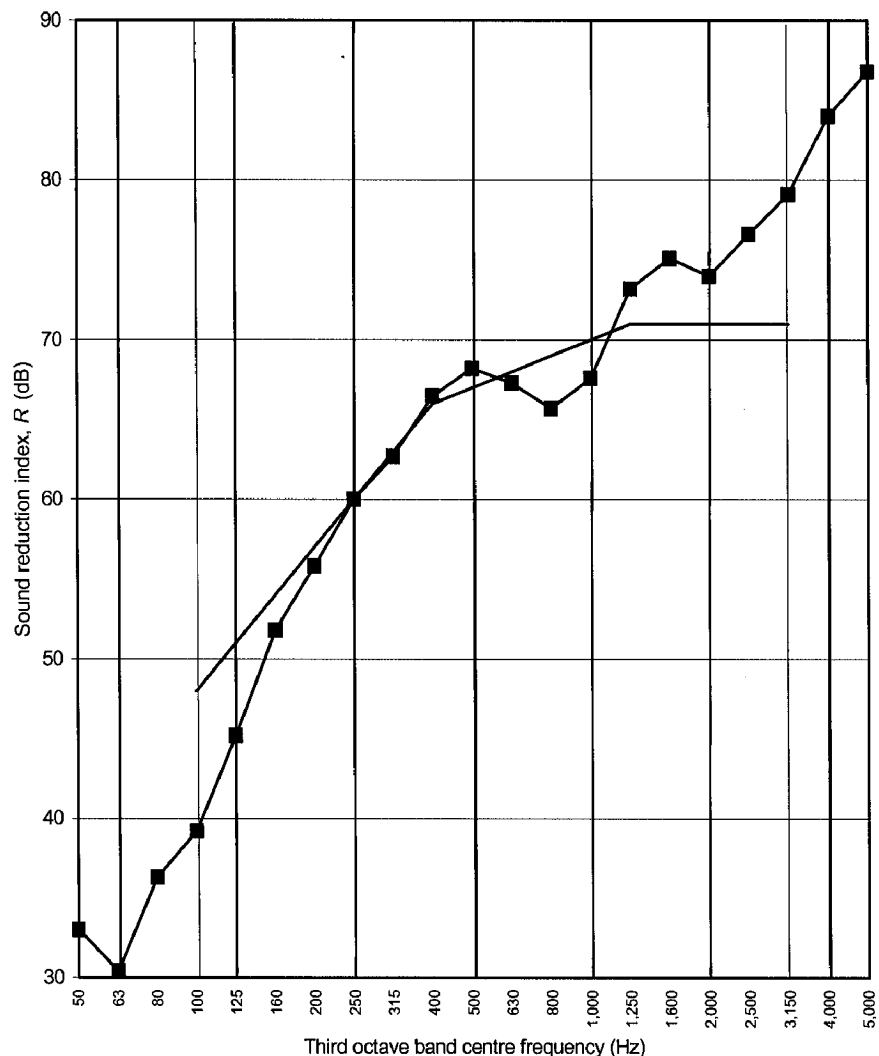
**Receive room volume:** 115 m<sup>3</sup>

**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<sub>w</sub> (C; C<sub>tr</sub>) = 67 (-3; -10) dB**

C <sub>50-3150</sub> = -6 dB	C <sub>50-5000</sub> = -5 dB	C <sub>100-5000</sub> = -2 dB
C <sub>tr,50-3150</sub> = -17 dB	C <sub>tr,50-5000</sub> = -17 dB	C <sub>tr,100-5000</sub> = -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<sub>w</sub>) 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: 23/07/2007

Test number: L107-155

Test element: Ventilator

0578

Filler wall area: 9.8 m<sup>2</sup>

Description:

TALH&M ventilator assembly;  
x1 MFAB96, TAL8000 AirLiner, HM85F Internal (OPEN)

Source room volume: 130 m<sup>3</sup>

Air temperature: 19 °C

Receive room volume: 115 m<sup>3</sup>

Air relative humidity: 74 %

Frequency (Hz)	Reverberation time (s)	Background level (dB)	Source level (dB)	Receive level (dB)	$D_{n,e}$ (dB)
50	3.14	26.4	92.3	59.4	36.6
63	2.21	20.6	100.1	68.1	34.1
80	1.83	15.3	99.7	64.6	36.4
100	1.67	13.4	100.5	61.3	40.1
125	2.03	12.2	103.1	67.0	37.1
160	1.87	19.4	102.2	64.6	37.6
200	1.87	34.8	102.2	63.4	38.9
250	1.72	13.7	100.1	65.4	34.4
315	1.68	12.8	100.2	69.4	30.3
400	1.61	23.9	99.7	68.3	30.8
500	1.66	9.9	99.0	66.8	31.7
630	1.60	10.3	98.6	60.4	37.6
800	1.47	9.8	97.7	57.4	39.3
1,000	1.45	15.6	96.5	56.0	39.5
1,250	1.51	12.4	98.3	54.0	43.4
1,600	1.48	6.2	98.9	54.9	43.1
2,000	1.52	6.4	97.5	49.1	47.6
2,500	1.50	7.0	97.8	44.8	52.1
3,150	1.45	7.6	97.8	42.6	54.2
4,000	1.38	8.0	98.5	43.8	53.4
5,000	1.26	9.8	95.6	39.8	54.2

x Adjusted for flanking transmission

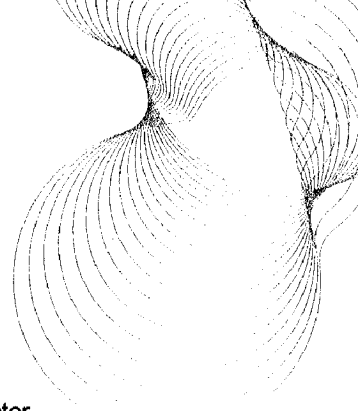
o Correction = 1.3 dB

Rating according to BS EN ISO 717-1:1997					
$D_{n,e,w}(C;C_{tr}) = 39 (0;-2) \text{ dB}$	$C_{50-3150} = 0 \text{ dB}$	$C_{50-5000} = 1 \text{ dB}$	$C_{100-5000} = 1 \text{ dB}$		
	$C_{tr,50-3150} = -2 \text{ dB}$	$C_{tr,50-5000} = -2 \text{ dB}$	$C_{tr,100-5000} = -2 \text{ dB}$		
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 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: 23/07/2007 Test number: L107-155 Test element: Ventilator

0578

Filler wall area: 9.8 m<sup>2</sup>

Description:

TALH&M ventilator assembly;  
 x1 MFAB96, TAL8000 AirLiner, HM85F Internal (OPEN)

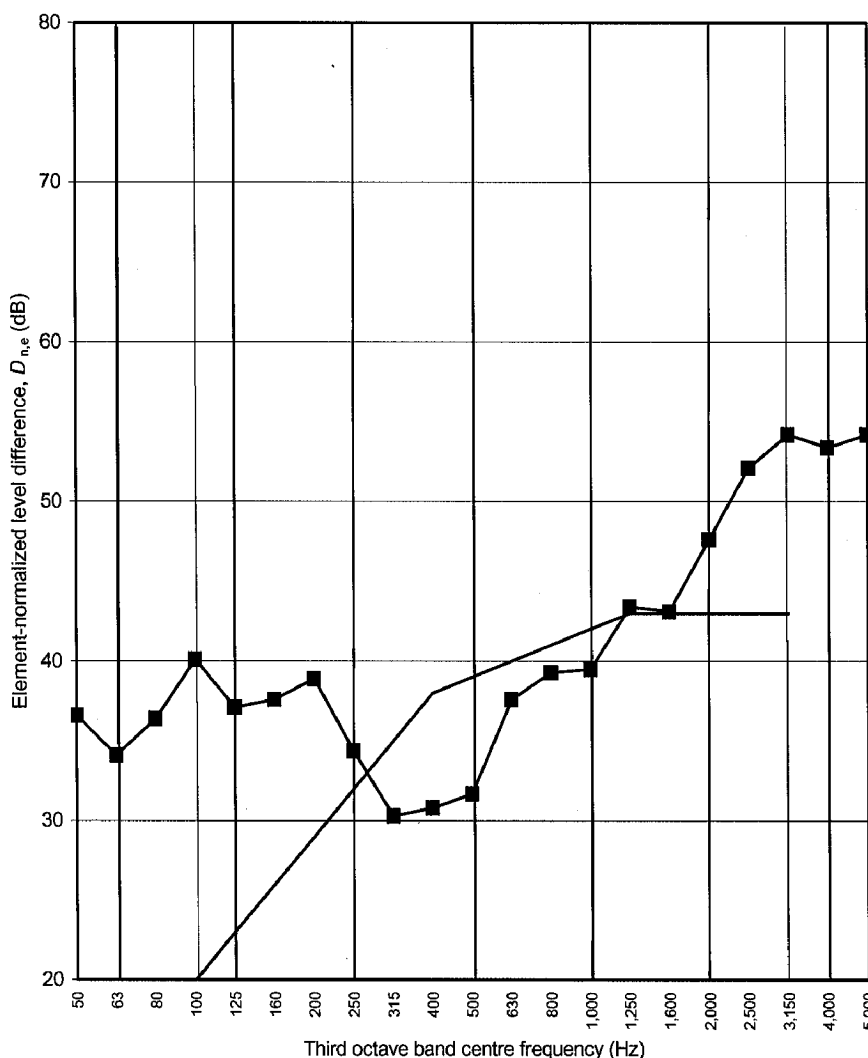
Source room volume: 130 m<sup>3</sup>

Air temperature: 19 °C

Receive room volume: 115 m<sup>3</sup>

Air relative humidity: 74 %

Frequency (Hz)	$D_{n,e}$ One-third octave (dB)
50	36.6
63	34.1
80	36.4
100	40.1
125	37.1
160	37.6
200	38.9
250	34.4
315	30.3
400	30.8
500	31.7
630	37.6
800	39.3
1,000	39.5
1,250	43.4
1,600	43.1
2,000	47.6
2,500	52.1
3,150	54.2
4,000	53.4
5,000	54.2



x Adjusted for flanking transmission

o Correction = 1.3 dB

Rating according to BS EN ISO 717-1:1997

$D_{n,e,w}(C;C_{tr}) = 39 (0;-2) \text{ dB}$   $C_{50-3150} = 0 \text{ dB}$   $C_{50-5000} = 1 \text{ dB}$   $C_{100-5000} = 1 \text{ dB}$   
 $C_{tr,50-3150} = -2 \text{ dB}$   $C_{tr,50-5000} = -2 \text{ dB}$   $C_{tr,100-5000} = -2 \text{ dB}$

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 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: 23/07/2007

Test number: L107-156

Test element: Ventilator

0578

Filler wall area: 9.8 m<sup>2</sup>

Description:

TALH&M ventilator assembly;  
x1 MFAB96, TAL8000 AirLiner, HM85F Internal (CLOSED)

Source room volume: 130 m<sup>3</sup>

Air temperature: 19 °C

Receive room volume: 115 m<sup>3</sup>

Air relative humidity: 74 %

Frequency (Hz)	Reverberation time (s)	Background level (dB)	Source level (dB)	Receive level (dB)	$D_{n,e}$ (dB)
50	3.14	22.3	91.7	58.9	36.4
63	2.21	15.5	100.0	67.8	34.3
80	1.83	13.3	99.7	63.5	37.4
100	1.67	13.7	100.1	60.7	40.3
125	2.03	10.7	103.0	66.8	37.3
160	1.87	20.1	102.3	64.4	38.0
200	1.87	35.3	102.4	63.3	39.2
250	1.72	13.7	100.0	65.2	34.6
315	1.68	12.6	100.1	69.1	30.5
400	1.61	22.1	99.7	68.1	31.0
500	1.66	9.3	99.0	66.4	32.1
630	1.60	9.3	98.6	59.8	38.2
800	1.47	10.5	97.6	56.9	39.7
1,000	1.45	16.1	96.4	55.7	39.6
1,250	1.51	11.6	98.2	54.2	43.1
1,600	1.48	5.8	98.9	54.9	43.1
2,000	1.52	6.1	97.4	48.8	47.8
2,500	1.50	6.7	97.8	43.7	53.2
3,150	1.45	7.8	97.9	41.4	55.5
4,000	1.38	8.4	98.6	40.9	56.5
5,000	1.26	8.7	95.7	36.3	57.8

o  
o  
o  
o  
x

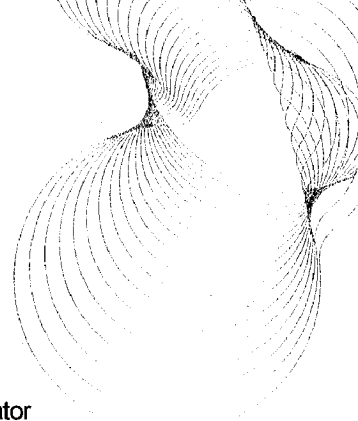
x Adjusted for flanking transmission

o Correction = 1.3 dB

Rating according to BS EN ISO 717-1:1997					
$D_{n,e,w}(C;C_{tr}) = 40 (-1;-3) \text{ dB}$	$C_{50-3150} = -1 \text{ dB}$	$C_{50-5000} = 0 \text{ dB}$	$C_{100-5000} = 0 \text{ dB}$	$C_{tr,50-3150} = -3 \text{ dB}$	$C_{tr,100-5000} = -3 \text{ dB}$
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: 23/07/2007

Test number: L107-156

Test element: Ventilator

0578

Filler wall area: 9.8 m<sup>2</sup>

Description:

TALH&M ventilator assembly;  
 x1 MFAB96, TAL8000 AirLiner, HM85F Internal (CLOSED)

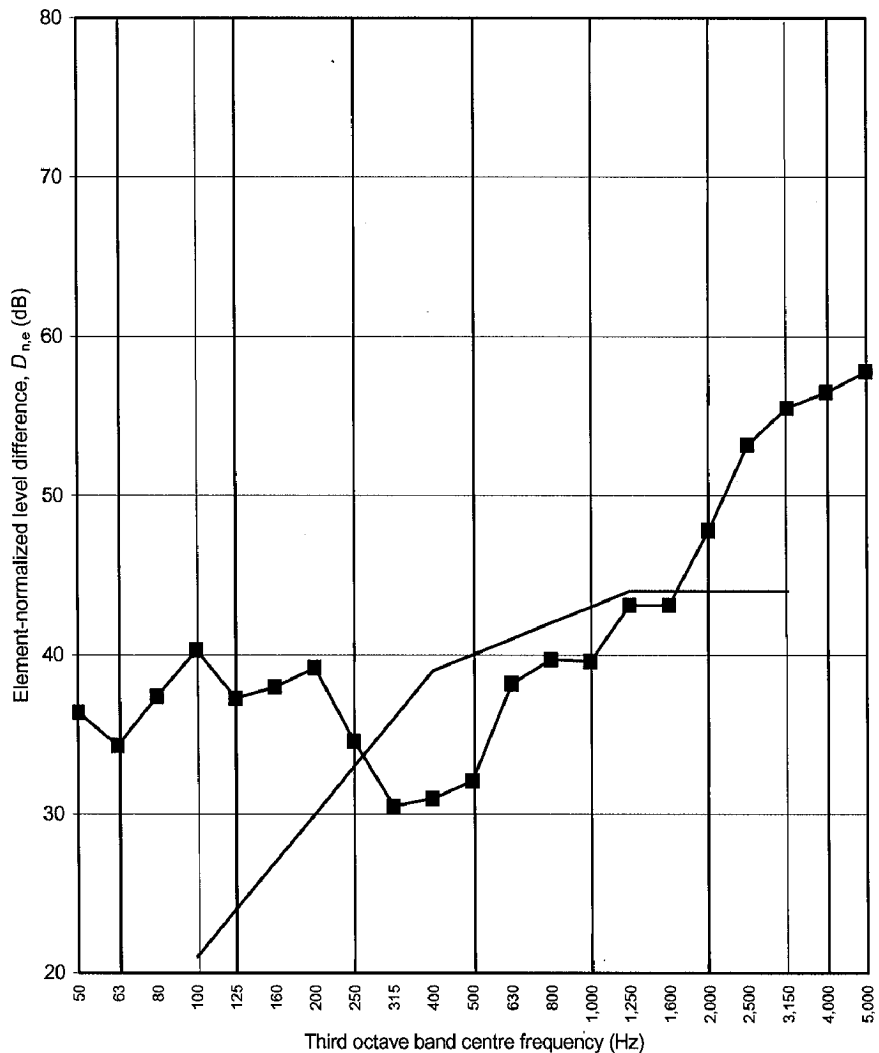
Source room volume: 130 m<sup>3</sup>

Air temperature: 19 °C

Receive room volume: 115 m<sup>3</sup>

Air relative humidity: 74 %

Frequency (Hz)	$D_{n,e}$ One-third octave (dB)
50	36.4
63	34.3
80	37.4
100	40.3
125	37.3
160	38.0
200	39.2
250	34.6
315	30.5
400	31.0
500	32.1
630	38.2
800	39.7
1,000	39.6
1,250	43.1
1,600	43.1
2,000	47.8
2,500	53.2
3,150	55.5
4,000	56.5
5,000	57.8



x Adjusted for flanking transmission

o Correction = 1.3 dB

Rating according to BS EN ISO 717-1:1997

$D_{n,e,w}(C; C_{tr}) = 40 (-1; -3)$  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  $\pm 1$  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:** 23/07/2007

**Test number:** L107-157

**Test element:** Ventilator

0578

**Filler wall area:** 9.8 m<sup>2</sup>

**Description:**

TALHMCW ventilator assembly;

x1 MFAB96, TAL8000 AirLiner, HM85F Internal (OPEN), ABC6 Cowl

**Source room volume:** 130 m<sup>3</sup>

**Air temperature:** 19 °C

**Receive room volume:** 115 m<sup>3</sup>

**Air relative humidity:** 74 %

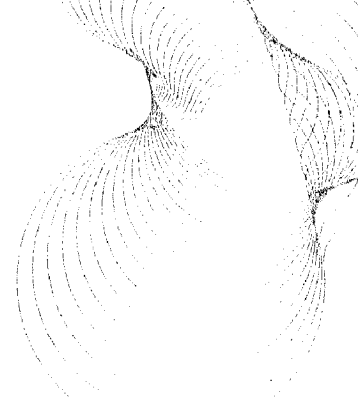
Frequency (Hz)	Reverberation time (s)	Background level (dB)	Source level (dB)	Receive level (dB)	$D_{n,e}$ (dB)
50	3.14	24.8	92.4	59.2	36.8
63	2.21	16.1	100.4	67.9	34.5
80	1.83	13.4	99.4	64.0	36.7
100	1.67	14.4	100.1	60.6	40.4
125	2.03	10.9	102.9	66.4	37.6
160	1.87	20.7	102.2	62.9	39.4
200	1.87	36.1	102.2	63.9	38.3
250	1.72	14.3	100.1	64.9	34.8
315	1.68	12.6	100.0	66.1	33.4
400	1.61	20.7	99.6	64.2	34.8
500	1.66	8.9	98.9	63.8	34.6
630	1.60	9.6	98.5	59.8	38.0
800	1.47	9.9	97.5	58.8	37.7
1,000	1.45	16.9	96.3	51.1	44.2
1,250	1.51	12.6	98.2	51.3	46.1
1,600	1.48	5.8	98.9	50.1	47.8
2,000	1.52	6.2	97.4	46.4	50.1
2,500	1.50	6.9	97.8	42.2	54.6
3,150	1.45	8.5	97.9	38.1	58.7
4,000	1.38	10.1	98.7	40.2	57.2
5,000	1.26	8.3	95.7	36.1	58.0

x Adjusted for flanking transmission

o Correction = 1.3 dB

Rating according to BS EN ISO 717-1:1997					
$D_{n,e,w}(C;C_{tr}) = 42 (-1;-3) \text{ dB}$	$C_{50-3150} = -1 \text{ dB}$	$C_{50-5000} = 0 \text{ dB}$	$C_{100-5000} = 0 \text{ dB}$	$C_{tr,50-3150} = -3 \text{ dB}$	$C_{tr,100-5000} = -3 \text{ dB}$
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 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:** 23/07/2007

**Test number:** L107-157

**Test element:** Ventilator

0578

**Filler wall area:** 9.8 m<sup>2</sup>

**Description:**

TALHMCW ventilator assembly;  
 x1 MFAB96, TAL8000 AirLiner, HM85F Internal (OPEN), ABC6 Cowl

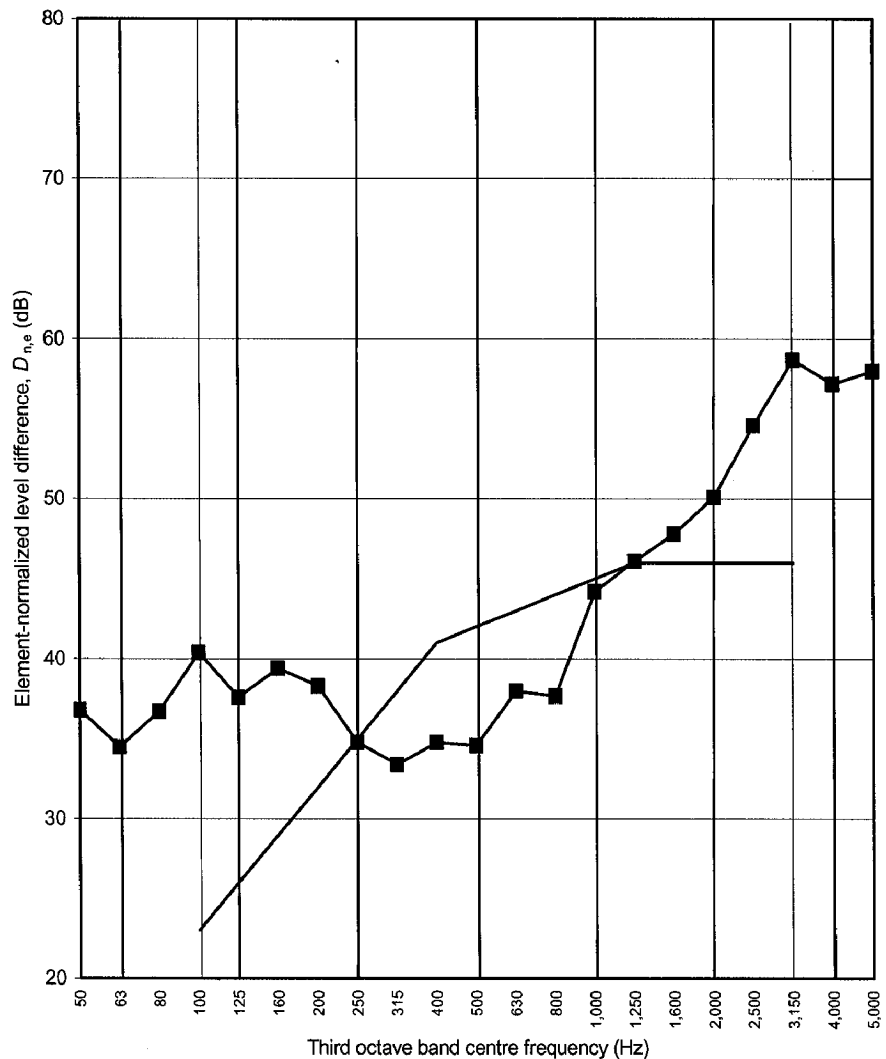
**Source room volume:** 130 m<sup>3</sup>

**Air temperature:** 19 °C

**Receive room volume:** 115 m<sup>3</sup>

**Air relative humidity:** 74 %

Frequency (Hz)	$D_{n,e}$ One-third octave (dB)
50	36.8
63	34.5
80	36.7
100	40.4
125	37.6
160	39.4
200	38.3
250	34.8
315	33.4
400	34.8
500	34.6
630	38.0
800	37.7
1,000	44.2
1,250	46.1
1,600	47.8
2,000	50.1
2,500	54.6
3,150	58.7
4,000	57.2
5,000	58.0



x Adjusted for flanking transmission

o Correction = 1.3 dB

Rating according to BS EN ISO 717-1:1997

$D_{n,e,w}(C; C_{tr}) = 42 (-1; -3) \text{ dB}$	$C_{50-3150} = -1 \text{ dB}$	$C_{50-5000} = 0 \text{ dB}$	$C_{100-5000} = 0 \text{ dB}$
	$C_{tr,50-3150} = -3 \text{ dB}$	$C_{tr,50-5000} = -3 \text{ dB}$	$C_{tr,100-5000} = -3 \text{ dB}$

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 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:** 23/07/2007      **Test number:** L107-158      **Test element:** Ventilator

0578

**Filler wall area:** 9.8 m<sup>2</sup>

**Description:**

TALHMCW ventilator assembly;  
 x1 MFAB96, TAL8000 AirLiner, HM85F Internal (CLOSED), ABC6 Cowl

**Source room volume:** 130 m<sup>3</sup>

**Air temperature:** 19 °C

**Receive room volume:** 115 m<sup>3</sup>

**Air relative humidity:** 74 %

Frequency (Hz)	Reverberation time (s)	Background level (dB)	Source level (dB)	Receive level (dB)	$D_{n,e}$ (dB)
50	3.14	23.9	91.5	58.8	36.3
63	2.21	16.5	99.8	68.2	33.6
80	1.83	13.2	99.4	64.1	36.6
100	1.67	14.4	100.1	60.7	40.3
125	2.03	10.5	102.9	66.3	37.7
160	1.87	20.2	102.2	62.7	39.6
200	1.87	35.7	102.2	63.8	38.4
250	1.72	14.3	100.0	64.6	35.2
315	1.68	12.6	100.1	66.0	33.7
400	1.61	21.3	99.6	64.2	34.9
500	1.66	9.2	98.9	63.3	35.1
630	1.60	9.5	98.5	59.2	38.7
800	1.47	9.9	97.5	58.3	38.2
1,000	1.45	16.7	96.4	51.1	44.3
1,250	1.51	13.0	98.2	51.7	45.7
1,600	1.48	5.8	98.9	50.2	47.8
2,000	1.52	6.2	97.4	46.2	50.3
2,500	1.50	6.9	97.8	41.4	55.4
3,150	1.45	8.4	97.9	36.9	60.0
4,000	1.38	10.0	98.6	36.7	60.6
5,000	1.26	8.4	95.7	32.3	61.8

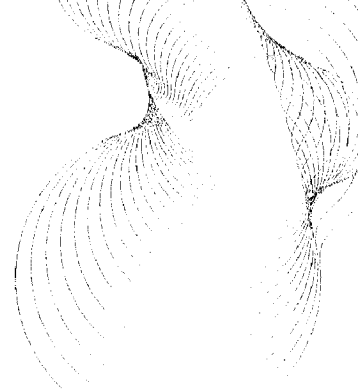
x Adjusted for flanking transmission

o Correction = 1.3 dB

Rating according to BS EN ISO 717-1:1997					
$D_{n,e,w}(C;C_{tr}) = 42 (-1;-2) \text{ dB}$	$C_{50-3150} = -1 \text{ dB}$	$C_{50-5000} = 0 \text{ dB}$	$C_{100-5000} = 0 \text{ dB}$	$C_{tr,50-3150} = -3 \text{ dB}$	$C_{tr,50-5000} = -3 \text{ dB}$
				$C_{tr,100-5000} = -2 \text{ dB}$	
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 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: 23/07/2007 Test number: L107-158 Test element: Ventilator

0578

Filler wall area: 9.8 m<sup>2</sup>

Description:

TALHMCW ventilator assembly;  
 x1 MFAB96, TAL8000 AirLiner, HM85F Internal (CLOSED), ABC6 Cowl

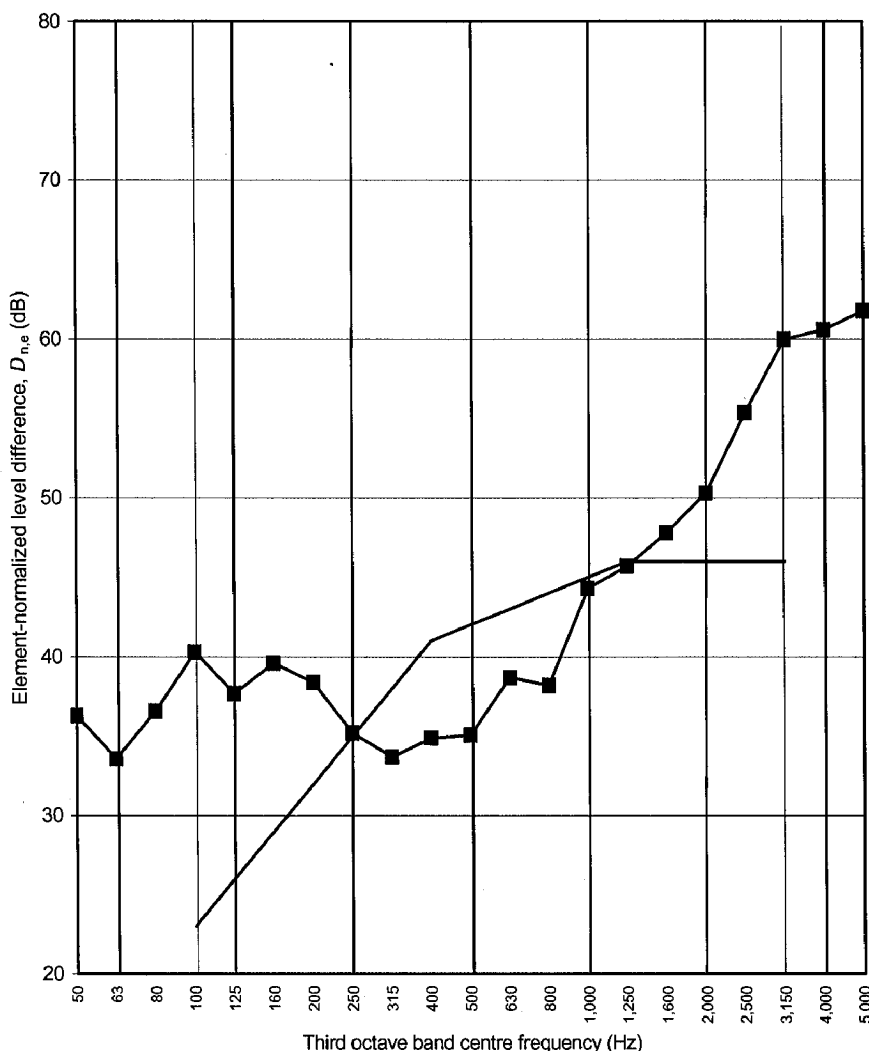
Source room volume: 130 m<sup>3</sup>

Air temperature: 19 °C

Receive room volume: 115 m<sup>3</sup>

Air relative humidity: 74 %

Frequency (Hz)	$D_{n,e}$ One-third octave (dB)
50	36.3
63	33.6
80	36.6
100	40.3
125	37.7
160	39.6
200	38.4
250	35.2
315	33.7
400	34.9
500	35.1
630	38.7
800	38.2
1,000	44.3
1,250	45.7
1,600	47.8
2,000	50.3
2,500	55.4
3,150	60.0
4,000	60.6
5,000	61.8



x Adjusted for flanking transmission

o Correction = 1.3 dB

Rating according to BS EN ISO 717-1:1997

$D_{n,e,w}(C; C_{tr}) = 42 (-1; -2)$  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  $C_{tr,100-5000} = -2$  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 ( $D_{n,e,w}$ ) 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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