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

UKAS TESTING

0578

building a better world

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

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 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
Signature	

BRE
Garston
WD25 9XX
T + 44 (0) 1923 664000
F + 44 (0) 1923 664010
E enquiries@bre.co.uk
www.bre.co.uk

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.

UKAS TESTING
0578

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.

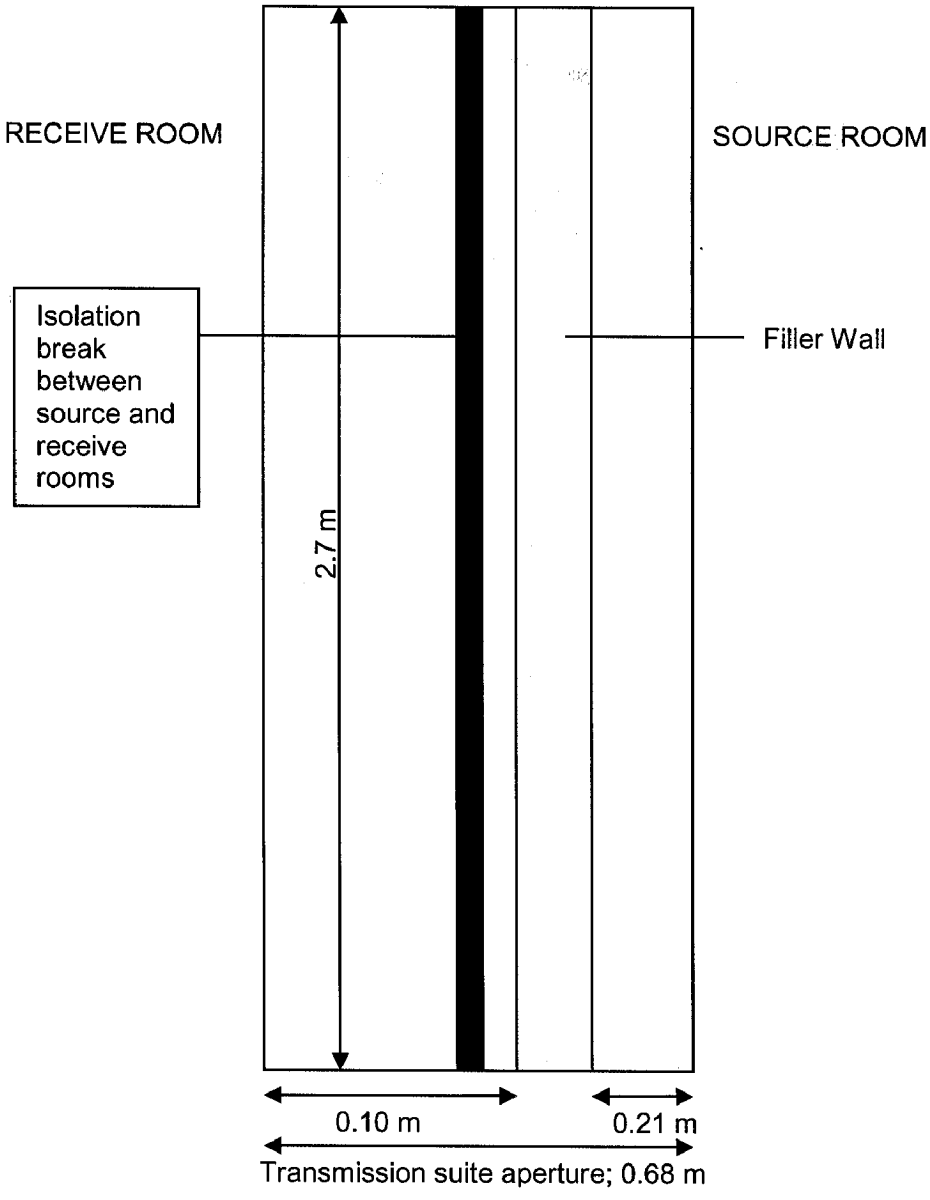


Figure 1 Section through elevation showing the position of the filler wall in the transmission suite aperture

0578

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

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** $C_{50\text{-}3150}$ = -6 dB $C_{50\text{-}5000}$ = -5 dB $C_{100\text{-}5000}$ = -2 dB
$C_{tr,50\text{-}3150}$ = -17 dB $C_{tr,50\text{-}5000}$ = -17 dB $C_{tr,100\text{-}5000}$ = -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)

0578

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

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

Description:

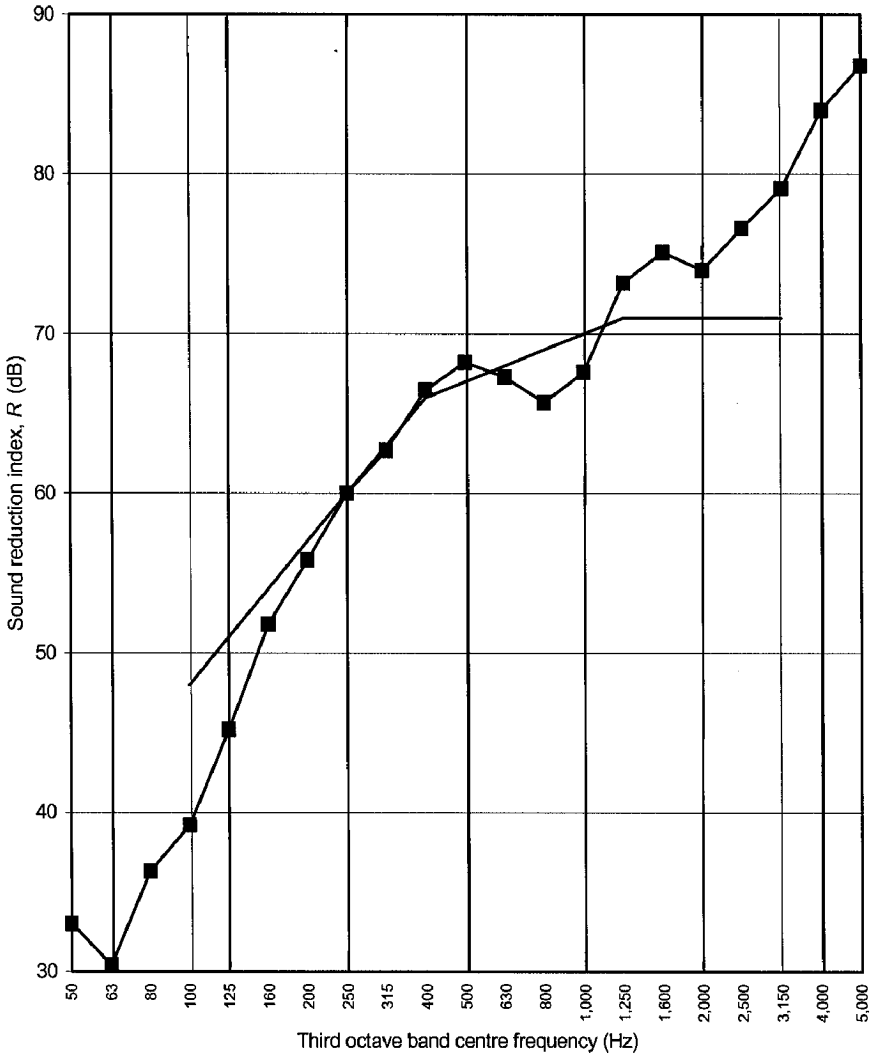
2x15 mm Standard Wallboard (10.0 kg/m²) screwed to, 50 mm x 100 mm timber studs at 600 mm centres
300 mm cavity between studs fully filled with isowool (mineral fibre),
50 mm x 100 mm timber studs at 600 mm centres
2x15 mm Standard Wallboard (10.0 kg/m²) screwed to studs.

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	$C_{50\text{-}3150}$	= -6 dB	$C_{50\text{-}5000}$	= -5 dB	$C_{100\text{-}5000}$	= -2 dB
		$C_{tr,50\text{-}3150}$	= -17 dB	$C_{tr,50\text{-}5000}$	= -17 dB	$C_{tr,100\text{-}5000}$	= -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)

0578

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:** L107-159 **Test element:** Ventilator

Filler wall area: 9.8 m²
Description:
TALSET ventilator assembly;
x1 MFAB96, TAL8000 AirLiner, LF147 Internal

Source room volume: 130 m³ **Air temperature:** 19 °C
Receive room volume: 115 m³ **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	28.5	91.7	59.4	35.9	o
63	2.21	18.0	100.7	68.5	34.3	o
80	1.83	15.8	99.5	63.7	37.0	o
100	1.67	16.2	99.8	60.7	40.0	o
125	2.03	8.6	102.8	66.8	37.0	x
160	1.87	15.4	102.1	64.6	37.5	
200	1.87	31.0	102.3	64.2	38.1	
250	1.72	11.1	100.1	65.7	34.1	
315	1.68	13.4	99.9	69.6	29.9	
400	1.61	23.7	99.5	68.2	30.7	
500	1.66	9.1	98.9	66.7	31.7	
630	1.60	10.8	98.4	60.1	37.6	
800	1.47	9.8	97.5	57.1	39.4	
1,000	1.45	16.3	96.3	55.7	39.5	
1,250	1.51	13.6	98.1	53.8	43.5	
1,600	1.48	5.9	98.9	55.0	42.9	
2,000	1.52	6.0	97.4	49.1	47.5	
2,500	1.50	6.7	97.8	44.9	51.9	
3,150	1.45	7.6	97.9	43.2	53.7	
4,000	1.38	8.0	98.8	44.2	53.3	
5,000	1.26	9.3	95.8	39.7	54.5	

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) dB

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

0578

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:** L107-159 **Test element:** Ventilator

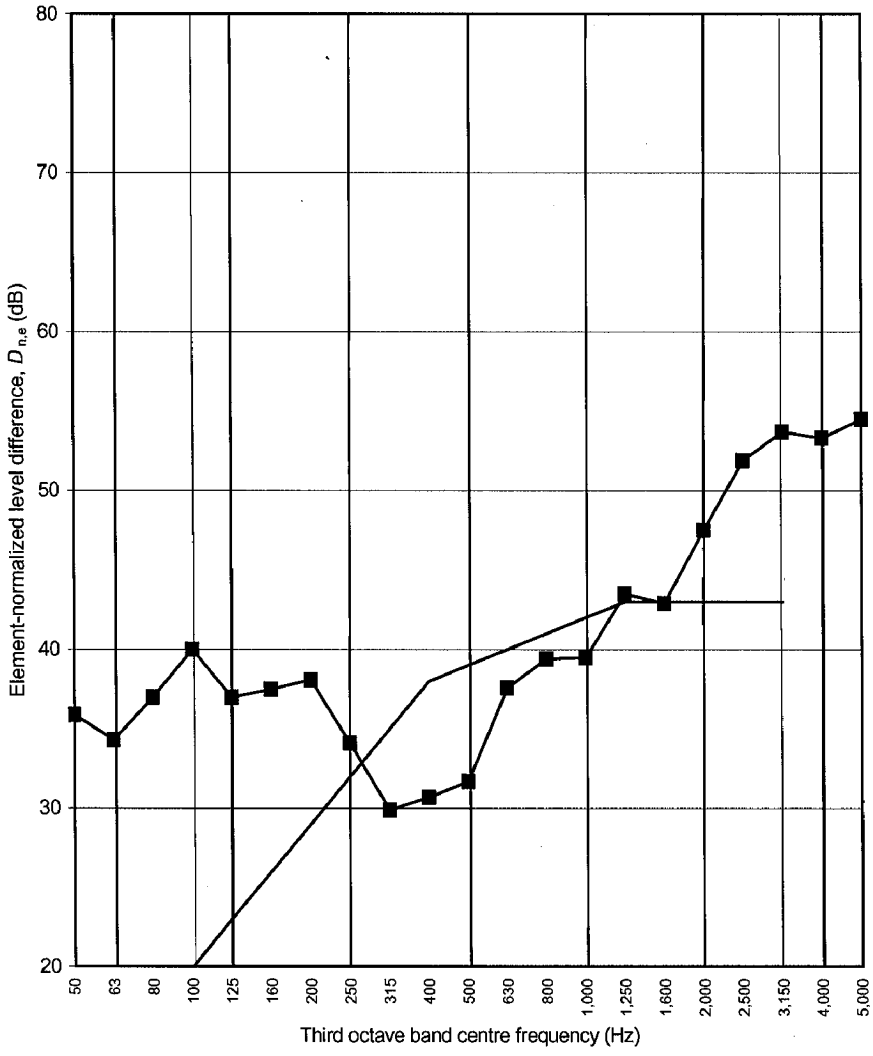
Filler wall area: 9.8 m²

Description:

TALSET ventilator assembly;
x1 MFAB96, TAL8000 AirLiner, LF147 Internal

Source room volume: 130 m³
Receive room volume: 115 m³
Air temperature: 19 °C
Air relative humidity: 74 %

Frequency (Hz)	$D_{n,e}$ One-third octave (dB)	
50	35.9	o
63	34.3	o
80	37.0	o
100	40.0	o
125	37.0	x
160	37.5	
200	38.1	
250	34.1	
315	29.9	
400	30.7	
500	31.7	
630	37.6	
800	39.4	
1,000	39.5	
1,250	43.5	
1,600	42.9	
2,000	47.5	
2,500	51.9	
3,150	53.7	
4,000	53.3	
5,000	54.5	



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) dB

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

UKAS TESTING
0578

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:** L107-160 **Test element:** Ventilator

Filler wall area: 9.8 m²
Description:
TALCWL ventilator assembly;
x1 MFAB96, TAL8000 AirLiner, LF147 Internal, ABC6 Cowl

Source room volume: 130 m³ **Air temperature:** 19 °C
Receive room volume: 115 m³ **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	24.4	91.8	58.3	37.1	o
63	2.21	16.9	100.1	67.9	34.4	o
80	1.83	15.6	99.3	63.9	36.7	o
100	1.67	19.2	100.2	60.9	40.2	o
125	2.03	11.4	102.8	66.6	37.2	x
160	1.87	20.0	102.0	63.1	38.9	
200	1.87	35.8	102.2	64.2	38.0	
250	1.72	14.8	99.9	65.2	34.4	
315	1.68	14.6	99.9	66.3	33.2	
400	1.61	20.6	99.5	64.1	34.9	
500	1.66	9.8	98.8	63.6	34.7	
630	1.60	12.6	98.4	59.6	38.2	
800	1.47	11.3	97.4	58.5	37.9	
1,000	1.45	17.0	96.3	51.0	44.2	
1,250	1.51	12.7	98.1	51.3	45.9	
1,600	1.48	7.1	98.9	50.3	47.6	
2,000	1.52	8.7	97.5	46.4	50.2	
2,500	1.50	9.8	97.8	42.3	54.6	
3,150	1.45	9.0	97.9	38.4	58.5	
4,000	1.38	9.8	98.7	40.6	56.8	
5,000	1.26	9.6	95.8	36.2	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) dB**

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

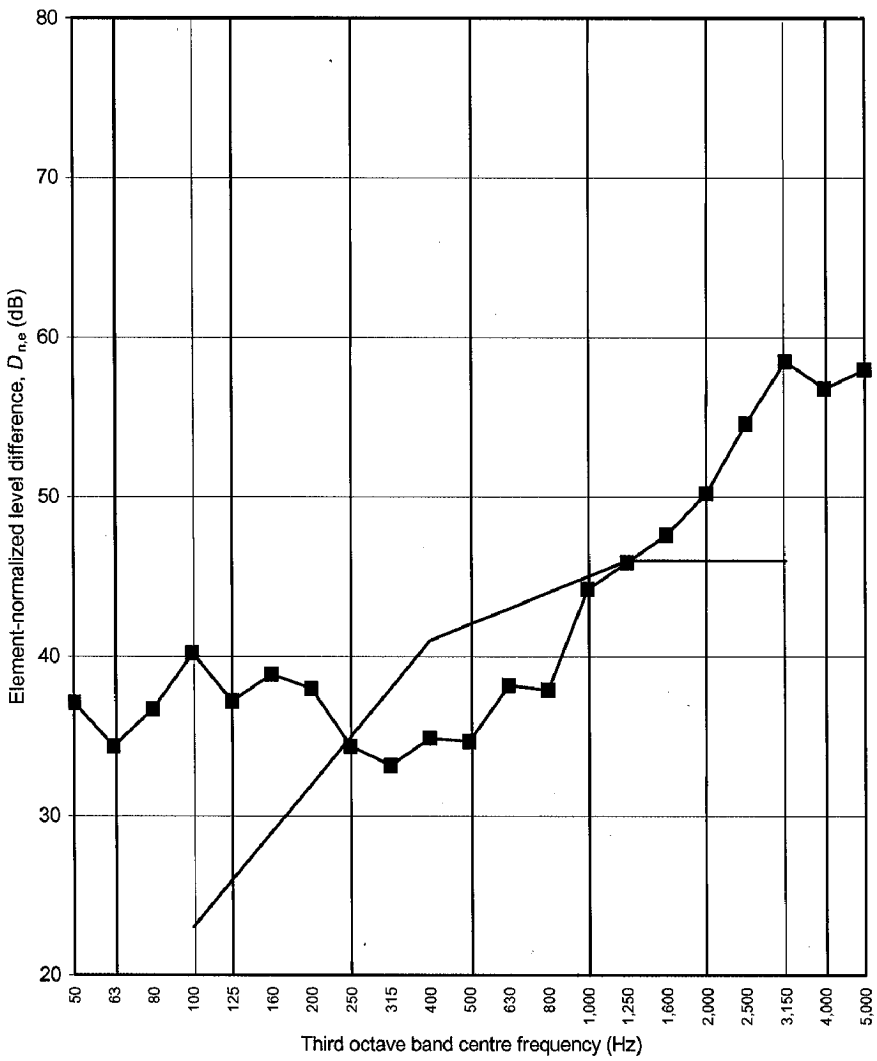
0578

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:** L107-160 **Test element:** Ventilator

Filler wall area: 9.8 m²
Description:
TALCWL ventilator assembly;
x1 MFAB96, TAL8000 AirLiner, LF147 Internal, ABC6 Cowl

Source room volume: 130 m³ **Air temperature:** 19 °C
Receive room volume: 115 m³ **Air relative humidity:** 74 %

Frequency (Hz)	$D_{n,e}$ One-third octave (dB)	
50	37.1	o
63	34.4	o
80	36.7	o
100	40.2	o
125	37.2	x
160	38.9	
200	38.0	
250	34.4	
315	33.2	
400	34.9	
500	34.7	
630	38.2	
800	37.9	
1,000	44.2	
1,250	45.9	
1,600	47.6	
2,000	50.2	
2,500	54.6	
3,150	58.5	
4,000	56.8	
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) dB**

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