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Test Report :

Rytons Aircore® wall ventilator - sound insulation tests

Test report number 208491

Prepared for :

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8 May 2002

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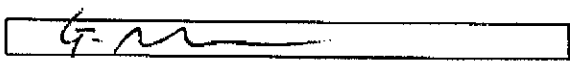
Tested by

Signature	
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Date	8 May 2002

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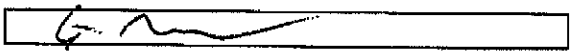
Signature	
Name	Geoff McCann
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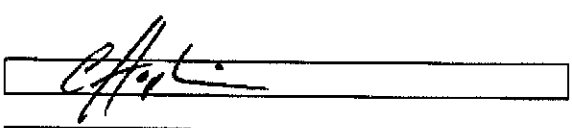
Signature	
Name	Dr Carl Hopkins
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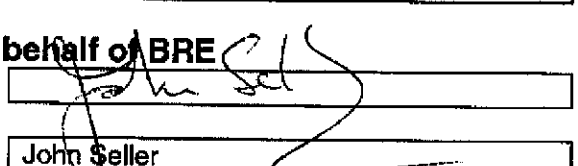
Approved on behalf of BRE

Signature	
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1 Introduction

This report details the results of laboratory airborne sound insulation measurements undertaken at BRE's Garston site on a through wall ventilator carried out on behalf of Rytons Building Products Ltd. The objective of the tests was to measure the acoustic performance of the Rytons 125mm diameter Aircore® ventilation set comprising a Rytons '6x6' internal louvre, 125mm diameter circular wall liner, with Rytons '6x6' louvre or Rytons 125mm diameter round louvre fitted externally. Further tests were carried out to assess the effect of inserting a supplied circular cylinder of 25mm thick absorbent foam throughout the fitted length of circular wall liner.

2 Details of tests carried out

The tests were carried out by Mr G. McCann during April 2002 in the Building 68 test facility at the BRE Garston site.

Applicable Standards

BRE has UKAS accreditation for the laboratory testing of sound insulation and measurements were made in accordance with UKAS approved procedures.

The measurement of the airborne sound insulation was made in accordance with BS EN 20140-Part 10: (1992) 'Laboratory measurement of airborne sound insulation of small building elements'. The single number quantities were calculated in accordance with BS EN ISO 717 Part 1 (1997) 'Rating of sound insulation in buildings and of building elements'

Instrumentation

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

The gain of the real time analyser was adjusted to give a level of 94.0 dB at 1 kHz using the B&K type 4231 calibrator. All equipment is calibrated following BRE procedures, using reference equipment calibrated by a UKAS accredited laboratory.

Table 1 - Equipment list

Equipment description	Manufacturer	Type	UKAS identification no.
Real Time Analyser	NEAS	840	13/02
Microphone calibrator	B & K	4231	01/03
Condenser microphone	B & K	4165	02/01 02/03
Microphone preamplifier	B & K	2619	04/01 04/03
Microphone power supply	B & K	2806	06/02 06/06
Microphone rotating boom	B & K	3923	14/01 14/03

3 Test methodology

The ventilator unit was mounted in the centre of a separating test partition comprised of 9" brickwork plastered on both sides.

A ventilation set comprising a rigid 125mm diameter wall liner, '6x6' 166mm x 160mm square louvre and 125mm diameter round louvre plus 25mm thick absorbent foam was supplied by Rytons Building Products Ltd.

The ventilator was tested as follows:

L02-300, '6x6' square louvre fitted internally with '6x6' square louvre fitted externally without absorbent lining.

L02-301, '6x6' square louvre fitted internally with '6x6' square louvre fitted externally with absorbent lining.

L02-302, '6x6' square louvre fitted internally with 125mm round louvre fitted externally without absorbent lining.

L02-303, '6x6' square louvre fitted internally with 125mm round louvre fitted externally with absorbent lining.

Measurements were undertaken using three reflective planes as described in BS EN 20140-10. The results have been averaged to give third octave band values from 100Hz to 5000Hz.

Where necessary, results have been corrected for background noise and flanking transmission to obtain the normalised level difference ($D_{n,e}$) value in each third octave band. The weighted single number quantity for the element-normalised difference ($D_{n,e,w}$) was then determined. This provides a single value that can be used to compare acoustic performance, the higher the value the better the performance.

The air flow performance of a ventilator can be variously described in terms of free area (also known as open area or free air space), equivalent area or the effective area (the latter two being generally considered identical terms determined by airflow testing). Airflow tests were not carried out as part of this project brief thus an approximation of the available free area has been estimated using measurements or manufacturers data. However it should be noted that the free area is not necessarily the same as the equivalent area.

4 Test results

The single number quantities ($D_{n,e,w}$) for the tests carried out using the supplied ventilator set are summarised in Table 2. These results represent the average performance from tests carried out with one, two and three reflecting planes to simulate different ventilator mounting positions.

Table 2 - Summary of ventilator acoustic performance*

Test No.	Components tested	Silencing treatment	Estimated maximum free area (mm^2)	$D_{n,e,w}$ (dB)	Type of test
L02-300	'6x6' square internal louvre Aircore® liner '6x6' square external louvre	None	10,300	30	Three reflecting planes
L02-301	'6x6' square internal louvre Aircore® liner '6x6' square external louvre	25mm foam cylinder	4,400	41	Three reflecting planes
L02-302	'6x6' square internal louvre Aircore® liner 125mm round external louvre	None	8,300	31	Three reflecting planes
L02-303	'6x6' square internal louvre Aircore® liner 125mm round external louvre	25mm foam cylinder	4,400	41	Three reflecting planes

* (results averaged from 3 configurations of reflecting planes)

Sound reduction index according to BS EN 20140-10
Laboratory measurement of the airborne sound insulation of small building elements
Horizontal Transmission Suite (B68)

Test Date: 19/04/02 **Test Number:** L02-303

Client: Rytons Building Products Ltd

Rytons 125mm Acoustic High Rise AirCore®
Code: AAH5

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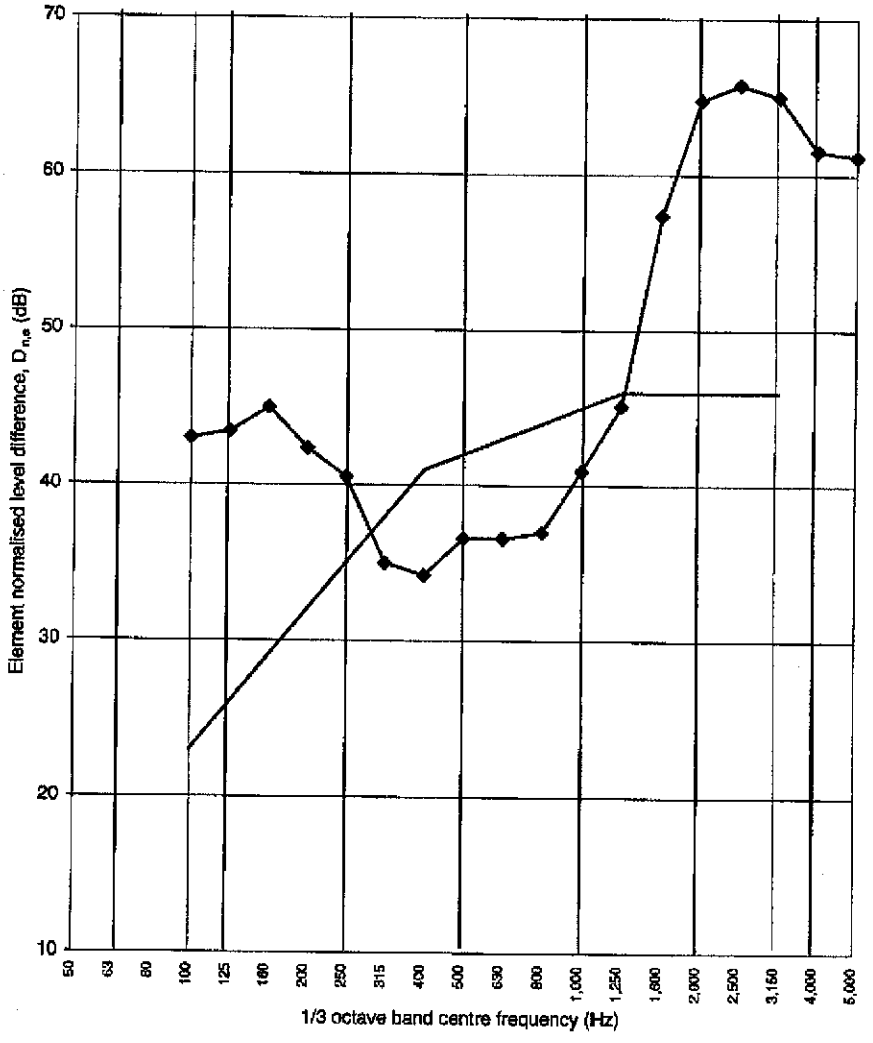
Test Element: Wall Vent
Description: Aircore 125mm diameter vent
Square internal louvre, round external louvre, absorbent lining
Three reflecting planes

Source room volume: 51.0 m^3
Receive room volume: 50.0 m^3
Free area of vent: 4,400 mm^2

Air temperature: 12 °C
Air relative humidity: 71 %

Frequency (Hz)	$D_{n,e}$ One-third octave (dB)		
50	-		
63	-		
80	-		
100	43.0	*	+
125	43.4	*	+
160	45.0	*	
200	42.4	*	
250	40.5	*	
315	35.0	^	
400	34.2		
500	36.6		
630	36.6		
800	37.0		
1,000	40.9		+
1,250	45.1		+
1,600	57.4	*	
2,000	64.8	*	
2,500	65.8	*	
3,150	65.0	*	+
4,000	61.6	*	
5,000	61.2	*	+



^ Receiving room level adjusted for flanking

* Within 8dB of flanking level

+ Receiving room level adjusted for background

Rating according to BS EN ISO 717-1 :

$D_{n,e,w}(C;C_{tr})$ = **41 (0 ;-1) dB**

$C_{50\text{-}3150}$	=N/A	$C_{50\text{-}5000}$	=N/A	$C_{100\text{-}5000}$	=1 dB
$C_{tr,50\text{-}3150}$	=N/A	$C_{tr,50\text{-}5000}$	=N/A	$C_{tr,100\text{-}5000}$	=-1 dB

Evaluation based on field measurement results obtained by an engineering method

Based on the data provided in ISO 140-2 and tests undertaken at BRE it is estimated that the measurement uncertainty shall not exceed ±1 dB for both the single number quantity ($D_{n,e,w}$) and the values in the individual third octaves ($D_{n,e}$) over the range 100 Hz to 5kHz.

Sound reduction index according to BS EN 20140-10
Laboratory measurement of the airborne sound insulation of small building elements
Horizontal Transmission Suite (B68)

Test Date: 19/04/02 **Test Number:** L02-303
Client: Rytons Building Products Ltd
Test Element: Aircore 125mm diameter vent
Description: Square internal louvre, round external louvre, absorbent lining
Three reflecting planes

UKAS TESTING
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Source room volume: 51.0 m^3
Receive room volume: 50.0 m^3
Free area of vent: 4,400 mm^2

Air temperature: 12 °C
Air relative humidity: 71 %

Rytons 125mm Acoustic High Rise AirCore®
Code: AAH5

Frequency (Hz)	Reverb. Time (s)	Background Level (dB)	Source Level (dB)	Receive Level (dB)	$D_{n,e}$ (dB)		
50	-	-	-	-	-		
63	-	-	-	-	-		
80	-	-	-	-	-		
100	1.7	29.2	84.9	46.5	43.0	*	+
125	1.9	27.5	89.5	51.2	43.4	*	+
160	2.0	25.6	93.8	54.1	45.0	*	
200	2.2	24.8	95.0	58.2	42.4	*	
250	2.2	21.0	96.1	61.3	40.5	*	
315	2.2	20.6	98.2	68.2	35.0	^	
400	2.4	20.6	100.4	70.9	34.2		
500	2.4	20.5	101.3	69.4	36.6		
630	2.4	21.3	101.7	69.9	36.6		
800	2.3	21.4	101.3	68.9	37.0		
1,000	2.2	20.6	98.1	61.6	40.9		+
1,250	2.2	17.7	97.5	56.7	45.1		+
1,600	2.1	14.6	98.4	46.6	57.4	*	
2,000	2.0	12.9	100.1	40.6	64.8	*	
2,500	2.0	12.2	98.6	38.1	65.8	*	
3,150	1.9	11.0	93.4	33.5	65.0	*	+
4,000	1.8	11.5	93.1	36.4	61.6	*	
5,000	1.8	10.3	83.1	26.6	61.2	*	+

^ Receiving room level adjusted for flanking

+ Receiving room level adjusted for background

Rating according to BS EN ISO 717-1 :

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

$C_{tr,50\text{-}3150}$ =N/A $C_{tr,50\text{-}5000}$ =N/A $C_{tr,100\text{-}5000}$ =-1 dB

Evaluation based on field measurement results obtained by an engineering method

==========REPORT ENDS==========