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BRE Test Report

Glazpart Limited Laboratory Airborne Sound Insulation of 2,500 & 5,000 Window Ventilators in the Horizontal Transmission Suite to BS EN ISO 10140-1 and BS EN ISO 10140-2

Prepared for:	Glazpart Limited	
Date:	23 rd February 2017	
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Date 23rd February 2018

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1 Introduction

BRE Acoustics was commissioned by Glazpart Limited 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 P107674.

2 Testing details

2.1 Test dates and personnel

The measurements detailed in this report were made on 16th and 22nd February 2017 by Ian West of BRE Acoustics.

2.2 Test methods and applicable standards

Measurement of airborne sound insulation was made in accordance with BS EN ISO 10140-1:2016 Annex E and BS EN ISO 10140-2:2010. Single number quantities were calculated in accordance with BS EN ISO 717-1:2013

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 ventilators were installed by Glazpart Limited.

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2.4 Instrumentation

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

Equipment description	Manufacturer	Туре	serial number
Microphone Calibrator	B&K	4231	2175848
Microphone	GRAS	40AE	37071, 117036
Microphone Preamplifier	GRAS	26CA	13085, 13142
Real Time Analyser	NOR	850	8501142
Loudspeaker	B&K	4224	1126060
Graphic Equaliser	Phonic	PEQ3300	SA107416
Dodec Loudspeaker	Norsonic	Nor 270H	26257, 26258
Rotating Boom	Norsonic	Nor-265	29412
Rotating Boom	Norsonic	212NA	10418

Table 1Equipment list

The gain of the real time analyser was adjusted to give a reading 93.9dB at 1kHz 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.

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2.5 Test Numbers

Table 1 lists each test element along with its corresponding test number. The construction details for each test element can be found from Table 2 by referring to the test number.

Test number	Test element	Source room volume (m³)	Receive room volume (m ³)	Common area (m²)
L116-099	Filler Wall	130	115	9.8
L116-100	Ventilator	130	115	9.8
L116-101	Ventilator	130	115	9.8
L116-102	Ventilator	130	115	9.8
L116-103	Ventilator	130	115	9.8

Table 1 Test numbers

2.6 Construction details, test numbers and sound insulation test results

The construction details and single number quantities for the sound insulation tests are shown in Table 2. When construction details are provided by a third party, they are checked by BRE where possible. The UKAS test result sheets are included in the appendices with the octave and third octave band results.

Test element	Test number	Construction details	D _{n,e,,w} (C;C _{tr}) (dB)
Filler wall	L116-099	Twin 50mm stud (2.0kg/m ²) at 600mm centres with 2x15mm gypsum based board (25.2kg/m ²) either side, (joints taped and sealed, perimeter sealed screwed to stud, 170mm air gap, cavity filled with 100mm insulation (10kg/m ³), 1.2m x 1.7m (1.9m ²) reduced opening with 3x15mm gypsum based board (37.8kg/m ²), 20mm cavity and 2x15mm gypsum based board (25.2kg/m ²)	*58(-2;-7)
Ventilator	L116-100	Glazpart Limited 2500 link trickle ventilator closed	51(-1;-2)
	L116-101	Glazpart Limited 2500 link trickle ventilator open	38(0;1)
	L116-103	Glazpart Limited 5000 link trickle ventilator closed	43(0;0)
	L116-102	Glazpart Limited 5000 link trickle ventilator open	35(0;1)

 Table 2
 Construction details

*This is equivalent to $D_{n,e,F,w}$. $D_{n,e,F,w}$ is defined in BS EN ISO 10140-2:2010.

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3 Installation Details

3.1 Filler wall construction

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



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3.2 Drawings provided by client

Drawings have not been supplied by the client.

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3.3 Photograph



Photograph 1 Glazpart ventilator viewed from the source room in the BRE horizontal transmission suite



4 Appendices

4.1 UKAS test results sheets

Page number	Test number
10	L116-099
12	L116-100
14	L116-101
16	L116-103
18	L116-102

4.2 Octave and third-octave band data

Page number	Test number
20	L116-100
21	L116-101
22	L116-103
23	L116-102

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~*~	Laboratory	/ measurement of a	airborne sound insulation of	building elements
_ 💥 _	Level diffe	rence according to	BS EN ISO 10140-2	
[(≯≮)]	BRE horizo	ontal transmission	suite (B9)	
	Client:	Glazpart Limited		
U K A S TESTING	Test date:	16/02/2017	Test number: L116-099	Test element: wall
0578				
Filler wall a	rea:	9.8 m²		
Description:				
Twin 50mm s	tud (2.0kg/m	n ²) at 600mm centres	with 2x15mm gypsum based	board (25.2kg/m ²)

(g/m²) either side, (joints taped and sealed, perimeter sealed screwed to stud, 170mm air gap, cavity filled with 100mm insulation (10kg/m³), 1.2m x 1.7m (1.9m²) reduced opening with 3x15mm gypsum based board (37.8kg/m²), 20mm cavity and 2x15mm gypsum based board (25.2kg/m²) Source room volume: 130 m³ 16 °C Receive room volume: 115 m³ 52 %

Static pressure

volume.	110	
:	103	kPa

-	Air temperature:	
	Air relative humidity:	

Г	Frequency	Reverberation	Background	Source	Receive	D _{n,e}	7
		time	level	level	level		
	(Hz)	(s)	(dB)	(dB)	(dB)	(dB)	
	50	2.25	24.6	94.4	63.5	31.8	
	63	1.86	24.0	100.3	69.8	30.6	
	80	1.22	15.1	100.1	63.0	35.3	
	100	1.23	14.2	98.6	63.6	33.3	
	125	1.30	25.2	100.2	58.7	40.0	
	160	1.41	13.3	100.9	56.5	43.2	
	200	1.68	8.8	102.4	51.8	50.2	
	250	1.69	7.9	101.3	49.8	51.1	
	315	1.49	7.6	99.4	46.6	51.9	
	400	1.51	11.1	96.9	43.5	52.5	
	500	1.54	12.8	97.3	40.6	55.9	
	630	1.62	10.5	97.1	38.1	58.5	
	800	1.59	10.6	94.9	34.7	59.6	
	1,000	1.56	6.8	93.2	31.6	60.9	
	1,250	1.59	8.2	94.8	31.9	62.3	
	1,600	1.55	6.4	96.0	34.4	60.9	
	2,000	1.56	8.5	94.5	33.1	60.7	
	2,500	1.56	7.5	93.7	31.5	61.5	
	3,150	1.46	6.4	94.0	28.0	65.0	
	4,000	1.37	7.4	96.4	28.6	66.5	
	5,000	1.15	7.0	96.4	26.7	67.7	
Rating according to	BS EN ISO 717-1:	1997					
$D_{n,e,w}(C;C_{tr}) =$	58 (-2;-7) dB	C ₅₀₋₃₁₅₀	= -2 dB	C 50-5000	= -2 dB	C ₁₀₀₋₅₀₀₀	= -
		C _{tr,50-3150}	= -10 dB	C _{tr,50-5000}	= -10 dB	C _{tr,100-5000}	= -
Evaluation based on labor	atory measurement result	sobtained by an enginee	ring 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 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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dB dB

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Laboratory measurement of airborne sound insulation of small building elements Element-normalized level difference according to BS EN ISO 10140-2 BRE horizontal transmission suite (B9) Client: Glazpart Limited

0578

Test number: L116-100

Test element: vent

Filler wall area: 9.8 m²

Description: Glazpart Limited 2500 link trickle ventilator closed

		Baromteric pressure	100.9 kPa
Source room volume:	130 m³	Air temperature:	17 °C
Receive room volume:	115 m³	Air relative humidity:	56 %

Frequency	Reverberation	Background	Source	Receive	D _{n,e}	
	time	level	level	level		
(Hz)	(s)	(dB)	(dB)	(dB)	(dB)	
50	1.97	26.5	93.7	62.8	32.5	0
63	1.84	21.2	99.5	68.3	32.5	0
80	1.42	17.8	99.9	64.1	36.0	0
100	1.28	14.2	98.1	64.0	33.8	0
125	1.31	16.1	99.9	57.7	42.0	0
160	1.45	11.0	100.8	56.9	44.2	0
200	1.56	12.9	102.4	52.5	50.5	0
250	1.68	17.6	101.2	49.5	52.6	0
315	1.56	18.0	98.8	47.2	52.2	0
400	1.59	19.2	96.9	44.1	53.5	0
500	1.58	20.5	97.2	41.5	56.3	0
630	1.60	22.4	97.0	41.1	56.6	0
800	1.59	16.6	94.6	38.8	56.5	0
1,000	1.54	12.7	92.9	38.3	54.7	x
1,250	1.53	13.3	94.6	41.5	52.3	
1,600	1.59	12.1	95.7	47.2	47.9	
2,000	1.65	14.0	94.3	45.3	48.5	
2,500	1.62	13.6	93.4	44.6	48.3	
3,150	1.53	10.6	93.8	42.2	50.8	
4,000	1.38	10.7	95.8	40.6	54.0	
5,000	1.20	9.2	96.1	38.6	55.6	
x Adjusted for flanking tr o Correction = 1.3 dB	ansmission					
ating according to BS EN ISO 717-	1:2013					
P _{n,e,w} (C;C _{tr}) = 51 (-1;-2) dB	$C_{50-3150} = -1$	dB	$C_{50-5000} = 0$	dB	$C_{100-5000} = 0$	dB
	$C_{\rm tr,50-3150} = -4$	dВ	$C_{\rm tr,50-5000} = -4$	dB	$C_{\rm tr,100-5000} = -2$	dB
valuation based on laboratory measurement res	ults obtained by an enginee	ring method				
ased on the data provided in BS E	N 20140-2:1993 it is	estimated that th	e measurement ur	ncertainty should	not exceed ±1 dB	for the s
<i>uantity</i> ($D_{n,e,w}$) and should not exc	eed the values in Ta	ble A1 of BS EN 2	20140-2:1993 for ti	he data in the ind	ividual third octave	s (D _{n,e,v}

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Laboratory measurement of airborne sound insulation of small building elements Element-normalized level difference according to BS EN ISO 10140-2 BRE horizontal transmission suite (B9) Client: Glazpart Limited

0578

Client:Glazpart LimitedTest date:22/02/2017Test number:L116-101

Test element: vent

Filler wall area: 9.8 m²

Description: Glazpart Limited 2500 link trickle ventilator open

		Baromteric pressure 1	00.9 kF	Ра
Source room volume:	130 m³	Air temperature:	17 °C)
Receive room volume:	115 m³	Air relative humidity:	56 %	,

Frequency	Reverberation	Background	Source	Receive	D _{n,e}]
	time	level	level	level		
(Hz)	(s)	(dB)	(dB)	(dB)	(dB)	
50	1.97	26.5	93.7	64.3	30.8	0
63	1.84	21.2	99.5	68.9	31.6	0
80	1.42	17.8	99.9	64.6	35.4	0
100	1.28	14.2	98.1	66.4	31.7	0
125	1.31	16.1	99.9	60.9	39.1	0
160	1.45	11.0	100.8	57.7	43.5	0
200	1.56	12.9	102.4	53.8	49.2	0
250	1.68	17.6	101.2	52.6	49.6	0
315	1.56	18.0	98.8	50.0	49.5	0
400	1.59	19.2	96.9	47.9	49.7	0
500	1.58	20.5	97.2	47.1	50.5	х
630	1.60	22.4	97.0	47.2	49.7	x
800	1.59	16.6	94.6	46.5	47.3	
1,000	1.54	12.7	92.9	48.4	43.6	
1,250	1.53	13.3	94.6	54.8	39.0	
1,600	1.59	12.1	95.7	59.3	35.7	
2,000	1.65	14.0	94.3	59.1	34.7	
2,500	1.62	13.6	93.4	57.3	35.6	
3,150	1.53	10.6	93.8	57.5	35.5	
4,000	1.38	10.7	95.8	58.4	36.2	
5,000	1.20	9.2	96.1	57.1	37.1	
x Adjusted for flanking o Correction = 1.3 dB	1.20	9.2	96.1	57.1	37.1	J
Rating according to BS EN ISO 717	-1:2013					
$D_{n.e.w}(C;C_{tr}) = 38 (0;1) dB$	$C_{50-3150} = 0$	dB	$C_{50-5000} = -1$	dB	$C_{100-5000} = -1$	dB
	$C_{tr.50-3150} = 1$	dB	$C_{tr.50-5000} = 1$	dB	$C_{\text{tr.100-5000}} = 1$	dB
valuation based on laboratory measurement re	esults obtained by an enginee	ring method			.,	
Based on the data provided in BS	EN 20140-2:1993 it is	estimated that th	ne measurement ur	ncertainty should	not exceed ±1 dB	for th
juantity (D , , , , ,) and should not ex	ceed the values in Ta	able A1 of BS EN	20140-2:1993 for ti	he data in the ind	ividual third octave	s (D

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Laboratory measurement of airborne sound insulation of small building elements Element-normalized level difference according to BS EN ISO 10140-2 BRE horizontal transmission suite (B9) Client: Glazpart Limited

0578

Test date: 22/02/2017

Test number: L116-103 Test element: vent

Filler wall area: 9.8 m²

Description: Glazpart Limited 5000 link trickle ventilator closed

		Baromteric pressure	100.9 kPa
Source room volume:	130 m³	Air temperature:	17 °C
Receive room volume:	115 m³	Air relative humidity:	56 %

Frequency	Reverberation	Background	Source	Receive	D _{n,e}	
	time	level	level	level		
(Hz)	(s)	(dB)	(dB)	(dB)	(dB)	
50	1.97	26.5	93.6	61.7	33.5	0
63	1.84	21.2	99.4	68.0	32.7	0
80	1.42	17.8	99.7	65.2	34.7	0
100	1.28	14.2	98.3	64.2	33.8	0
125	1.31	16.1	99.2	59.2	39.8	0
160	1.45	11.0	100.4	55.7	45.0	0
200	1.56	12.9	102.1	53.6	49.1	0
250	1.68	17.6	101.2	54.1	48.0	0
315	1.56	18.0	98.6	52.0	47.2	х
400	1.59	19.2	96.6	48.9	48.4	0
500	1.58	20.5	96.9	48.7	48.2	x
630	1.60	22.4	96.6	49.6	46.4	
800	1.59	16.6	94.1	48.7	44.8	
1,000	1.54	12.7	92.5	46.4	45.3	
1,250	1.53	13.3	94.4	50.1	43.5	
1,600	1.59	12.1	95.4	54.4	40.4	
2,000	1.65	14.0	94.2	52.3	41.4	
2,500	1.62	13.6	93.3	51.4	41.4	
3,150	1.53	10.6	93.6	50.2	42.6	
4,000	1.38	10.7	95.7	50.5	44.0	
5,000	1.20	9.2	96.3	48.7	45.7	
x Adjusted for flanking tra	ansmission					
o Correction = 1.3 dB						
Rating according to BS EN ISO 717-	1:2013					
$D_{n,e,w}(C;C_{tr}) = 43 (0;0) dB$	$C_{50-3150} = 0$	dB	$C_{50-5000} = 0$	dB	$C_{100-5000} = 0$	dB
	$C_{\text{tr},50-3150} = 0$	dB	$C_{\rm tr,50-5000} = 0$	dB	$C_{\rm tr, 100-5000} = 0$	dB
Evaluation based on laboratory measurement res	ults obtained by an enginee	ring method				
Based on the data provided in BS E	N 20140-2:1993 it is	estimated that th	e measurement un	ncertainty should	not exceed ± 1 dB	for the sin
$(D_{n,e,w})$ 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 ISO 10140-2 BRE horizontal transmission suite (B9) Client: Glazpart Limited

Test number: L116-102

Test element: vent

Test date: 22/02/2017 0578

Filler wall area: 9.8 m²

Description: Glazpart Limited 5000 link trickle ventilator open

		Baromteric pressure	100.9 kPa
Source room volume:	130 m³	Air temperature:	17 °C
Receive room volume:	115 m³	Air relative humidity:	56 %

Frequency	Reverberation	Background	Source	Receive	D _{n,e}	
	time	level	level	level		
(Hz)	(s)	(dB)	(dB)	(dB)	(dB)	
50	1.97	26.5	93.8	66.7	28.7	0
63	1.84	21.2	99.5	70.3	30.5	0
80	1.42	17.8	100.5	64.7	36.0	0
100	1.28	14.2	99.5	70.2	29.0	0
125	1.31	16.1	94.9	56.8	37.9	0
160	1.45	11.0	99.2	61.8	37.4	х
200	1.56	12.9	101.4	55.8	46.2	0
250	1.68	17.6	101.1	56.9	44.7	х
315	1.56	18.0	98.9	53.6	45.5	х
400	1.59	19.2	96.2	50.7	45.7	х
500	1.58	20.5	96.7	51.5	44.5	
630	1.60	22.4	96.8	51.8	44.4	
800	1.59	16.6	93.5	54.7	38.2	
1,000	1.54	12.7	92.5	55.5	36.2	
1,250	1.53	13.3	93.9	58.2	34.9	
1,600	1.59	12.1	94.8	61.3	32.9	
2,000	1.65	14.0	94.1	60.4	33.2	
2,500	1.62	13.6	92.5	58.6	33.4	
3,150	1.53	10.6	92.6	58.2	33.6	
4,000	1.38	10.7	95.2	59.8	34.2	
5,000	1.20	9.2	95.1	58.7	34.5	
x Adjusted for flanking o Correction = 1.3 dB	transmission					
Rating according to BS EN ISO 717	7-1:2013					
$D_{n,e,w}(C;C_{tr}) = 35 (0;1) dB$	$C_{50-3150} = 0$	dB	$C_{50-5000} = 0$	dB	$C_{100-5000} = 0$	dB
	$C_{\rm tr,50-3150} = 1$	dB	$C_{\rm tr, 50-5000} = 1$	dB	$C_{\rm tr, 100-5000} = 1$	dB
Evaluation based on laboratory measurement r	esults obtained by an enginee	ring method				
Based on the data provided in BS	EN 20140-2:1993 it is	estimated that th	e measurement ur	ncertainty should	not exceed ±1 dB i	for the s
quantity (D _{n.e.w}) and should not ex	ceed the values in Ta	able A1 of BS EN	20140-2:1993 for ti	he data in the indi	ividual third octaves	s (D _{n,e.w}

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4.2 Octave and third-octave band data

L116-100 Glazpart Limited 2500 link trickle ventilator closed				
<i>f</i> (Hz)	Dn,e (dB)	D _{n,e,oct} (dB)		
50	32.5			
63	32.5	33.4		
80	36.0			
100	33.8			
125	42.0	37.6		
160	44.2			
200	50.5			
250	52.6	51.7		
315	52.2			
400	53.5			
500	56.3	55.2		
630	56.6			
800	56.5			
1000	54.7	54.2		
1250	52.3			
1600	47.9			
2000	48.5	48.2		
2500	48.3			
3150	50.8			
4000	54.0	53.0		
5000	55.6			

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L116-101 Glazpart Limited 2500 link trickle ventilator open				
<i>f</i> (Hz)	Dn,e (dB)	D _{n,e,oct} (dB)		
50	30.8			
63	31.6	32.2		
80	35.4			
100	31.7			
125	39.1	35.5		
160	43.5			
200	49.2			
250	49.6	49.4		
315	49.5			
400	49.7			
500	50.5	50.0		
630	49.7			
800	47.3			
1000	43.6	42.0		
1250	39.0			
1600	35.7			
2000	34.7	35.3		
2500	35.6			
3150	35.5			
4000	36.2	36.2		
5000	37.1			

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L116-103 Glazpart Limited 5000 link trickle ventilator closed

<i>f</i> (Hz)	Dn,e (dB)	D _{n,e,oct} (dB)
50	33.5	
63	32.7	33.6
80	34.7	
100	33.8	
125	39.8	37.3
160	45.0	
200	49.1	
250	48.0	48.0
315	47.2	
400	48.4	
500	48.2	47.6
630	46.4	
800	44.8	
1000	45.3	44.5
1250	43.5	
1600	0.4	
2000	41.4	41.0
2500	41.4	
3150	42.6	
4000	44.0	43.9
5000	45.7	

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L116-102 Glazpart Limited 5000 link trickle ventilator open

<i>f</i> (Hz)	Dn,e (dB)	D _{n,e,oct} (dB)
50	28.7	
63	30.5	30.8
80	36.0	
100	29.0	
125	37.9	32.7
160	37.4	
200	46.2	
250	44.7	45.4
315	45.5	
400	45.7	
500	44.5	44.8
630	44.4	
800	38.2	
1000	36.2	36.2
1250	34.9	
1600	32.9	
2000	33.2	33.2
2500	33.4	
3150	33.6	
4000	34.2	34.1
5000	34.5	

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