

NO. 19 WILBERFORCE ROAD COXHEATH, MAIDSTONE, KENT ME17 4HD

SOUND INSULATION TESTING

On behalf of: Oscar Acoustics

Report No. MRL/100/093c.1v1 November 2011

Report No. MRL/100/093c.1v1 November 2011

NO. 19 WILBERFORCE ROAD COXHEATH, MAIDSTONE, KENT ME17 4HD

SOUND INSULATION TESTING

Report prepared by:
MRL Acoustics Ltd
2 Kestrel Close
Kingsnorth
Ashford
Kent
TN23 3RB

On behalf of: Oscar Acoustics Michaels Lane Ash Kent TN15 7HT

Report prepared by:

Matthew Lawrence MSc MIOA – Principal Consultant

M Lowrence

On behalf of:

Roger De Haan Charitable TrustPlayFootball Ltd

CONTENTS

		Page
1.0	SITE & TESTING DETAILS	1
2.0	ASSESSMENT OF MEASURED SOUND INSULATION PERFORMANCE	3
APPE	NDIX I – GLOSSARY OF TERMS	5
APPE	NDIX II – TESTING METHODOLOGY	7
APPE	NDIX III – SOUND INSULATION TEST SHEETS	11

1.0 **SITE & TESTING DETAILS**

1.1 MRL Acoustics Limited is registered under the Association of Noise Consultants' Registration Scheme to carry out pre-completion sound insulation testing (ANC Registered Organisation No. 187). The testing was carried out by Mr M. Lawrence who is an approved tester (No. 187/1).

Site Details

1.2 The details of the development at which the sound insulation testing was carried out are as follows:

Site address: No. 19 Wilberforce Road, Coxheath, Maidstone, Kent

ME17 4HD

Development type: Sound Insulation Treatment Testing

No. of dwellings: 1

Testing Details

1.3 The test details are as follows:

> Test Date(s): 12th May 2011

No. separating walls tested: 0

2 No. of separating floors tested:

Yes - Occupied House Cupboards, wardrobes etc:

Intermittent road traffic Background noise due to:

Furnishings: Yes – Occupied House

Floor coverings: Carpets pulled back for Impact Tests

- 1.4 Details of the constructions, test rooms and room volumes are given on the charts in Appendix III. The construction details are based on information provided by the client.
- 1.5 The tests detailed in this report have been carried out in full accordance with ISO 140-4 and ISO 140-7. All the relevant procedures described in Annex B of Approved Document E (2003) of the Building Regulations have been followed.
- 1.6 A glossary of the technical terms used in this report is provided in Appendix I. Testing methodology is described in Appendix II.

Equipment

1.7 Details of the equipment used during the sound insulation tests are shown in Table 1.Current calibration certificates for the equipment can be provided if required.

Table 1: Details of Equipment Used During Sound Insulation Tests

Equipment Description	Manufacturer	Type Number	Serial Number	Date of Expiration of Calibration	Calibration Certification Number
Sound Level Meter	Rion	Type NA-28	01291241	02/02/2012	CONF021002
Calibrator	Rion	Type NC-74	35094450	02/02/2012	CONF021001
Tapping Machine	ANV	Type TM01	TM01008	04/02/2012	CONF021004
Power Amplifier	Stage Line Foldback Speaker	MAK-12P 12" 180W 248740	ОВЈН0489	-	-
Sound Source	Minirator Noise Generator	MR2	681869- 061010459	-	-

e-mail: <u>matt.lawrence@mrl-acoustics.co.uk</u>

Tel: 07534 734347

Page 2 of 17

2.0 ASSESSMENT OF MEASURED SOUND INSULATION PERFORMANCE

Sound Insulation Test Results

2.1 The results of the sound insulation tests are detailed in Appendix III and are summarised in Tables 2 - 3.

Table 2: Testing Prior to Oscar Iso-Mount & Celbar Installation
(Tested 1 x Bedroom only: Both are same construction)

Test No.	Source Room	Receiver Room	Test Type & Required Sound Insulation	Measured Sound Insulation	Pass/Fail
1	First Floor Bedroom 2 (28m³)	Ground Floor Dining Room (28m³)	Airborne Floor 43 dB D _{nT,w} + C _{tr} (minimum)	24 dB D _{nT,w} + C _{tr}	Fail
2	First Floor Bedroom 2 (28m³)	Ground Floor Dining Room (28m³)	Impact Floor 64 dB L'nT,w (maximum)	82 dB L'nT,w	Fail

e-mail: matt.lawrence@mrl-acoustics.co.uk
Tel: 07534 734347
Report No: MRL/100/093c.1v1
Page 3 of 17

Table 3: Oscar Iso-Mount & Celbar Sound Insulation Test Results Part E Material Change of Use

Test No.	Source Room	Receiver Room	Test Type & Required Sound Insulation	Measured Sound Insulation	Pass/Fail
3	First Floor Bedroom 2 (28m³)	Ground Floor Dining Room (28m³)	Airborne Floor 43 dB D _{nT,w} + C _{tr} (minimum)	47 dB D _{nT,w} + C _{tr}	Pass
4	First Floor Bedroom 1 (28m³)	Ground Floor Lounge (28m³)	Airborne Floor 43 dB D _{nT,w} + C _{tr} (minimum)	46 dB D _{nT,w} + C _{tr}	Pass
5	First Floor Bedroom 2 (28m³)	Ground Floor Dining Room (28m³)	Impact Floor 64 dB L'nT,w (maximum)	58 dB L'nt,w	Pass
6	First Floor Bedroom 1 (28m³)	Ground Floor Lounge (28m³)	Impact Floor 64 dB L'nT,w (maximum)	58 dB L'nt,w	Pass

Conclusion

2.2 The results in Table 3 show that both of the tested party floors met the minimum requirements for sound insulation as specified in Approved Document E (2003) of the Building Regulations for flats formed by material change of use. The results of these tests have not been registered for certification under the Association of Noise Consultants' Registration Scheme as the testing was carried out for Oscar Acoustics product testing and not for the purpose of demonstrating compliance with a Building Regulation Application.

e-mail: matt.lawrence@mrl-acoustics.co.uk Report No: MRL/100/093c.1v1 Tel: 07534 734347 Page 4 of 17

APPENDIX I - GLOSSARY OF TERMS

 L_{eq} This is the 'equivalent continuous noise level' which is an average of the total sound energy measured over a specified time period. In other words, Leq is the level of a continuous noise which has the same total energy as the real fluctuating noise, measured over the same time period.

RT Measured reverberation time in receiver room in seconds.

 RT_0 Standard reverberation time of 0.5 seconds

Airborne Sound Insulation Testing

D Level difference, effectively D = source level - (receiver level corrected for background level)

 D_{nT} Standardised level difference, standardised to a receiver room reverberation time of 0.5 seconds, $D_{nT} = D + 10 \log (RT/RT_0)$

Weighted standardised level difference, a single figure generated by comparing $D_{nT,w}$ the D_{nT} with a reference curve. The reference curve is shifted in 1dB steps until the sum of adverse deviation of the test curve, compared to the reference curve, is as large as possible, but no more than 32.0 dB. The value of the shifted reference curve at 500Hz is taken as the D_{nT,w}. N.B. As D_{nT,w} for airborne transmission represents a level difference, an improvement generates a larger figure.

 $C_{\rm tr}$ A 'spectrum adaptation term' used to correct the DnT,w in order to reflect low frequency performance of the wall or floor tested.

e-mail: matt.lawrence@mrl-acoustics.co.uk Report No: MRL/100/093c.1v1 Tel: 07534 734347 Page 5 of 17

Impact Sound Insulation Testing

- L Level, effectively L = receiver level corrected for background level
- L'_{nT} Standardised level, standardised to a receiver room reverberation time of 0.5 seconds, $L'_{nT} = L - 10 \log (RT/RT_0)$
- $L'_{nT,w}$ Weighted standardised level, a single figure generated by comparing the L'nT with a reference curve. The reference curve is shifted in 1dB steps until the sum of adverse deviation of the test curve, compared to the reference curve, is as large as possible, but no more than 32.0 dB. The value of the shifted reference curve at 500Hz is taken as the $L'_{nT,w}$. N.B. As $L'_{nT,w}$ for impact transmission represents an absolute level, an improvement generates a smaller figure.

e-mail: matt.lawrence@mrl-acoustics.co.uk Report No: MRL/100/093c.1v1 Tel: 07534 734347 Page 6 of 17

Report No: MRL/100/093c.1v1

Oscar Acoustics

APPENDIX II - TESTING METHODOLOGY

Testing was carried out in accordance with the relevant sections of the methodology

detailed below.

Airborne Sound Insulation Tests

Airborne sound insulation measurements involve generating a high noise level on one

side of the test sample (source room) and then measuring the difference in noise levels

between the source and receiver rooms. The testing was carried out in full accordance

with the requirements of the BS EN ISO 140-4:1998: "Field Measurements of Airborne

Sound Insulation between Rooms". All the relevant procedures described in Annex B

of Approved Document E of the Building Regulations have been followed.

Any airborne tests were carried out using a Rion NA-28 Type 1 Sound Level Meter

loaded with the Rion NX-28BA Building Acoustics Program Card. A calibration check

was carried out before and after the noise measurements and there was no variation in

the calibration level.

Pink noise was produced at high volume in the source room and the resultant diffuse

sound field was measured at five locations in the source room and the transmitted

sound was measured at five locations in the receiver room. The source was then

moved to a new position and a further five source room and receiver room

measurements were taken. Therefore a total number of ten source room and ten

receiver room measurements were collected. Measurements were taken for a

minimum of ten seconds at each position in the source and receiver rooms. Testing

was carried out with all source room and receiver room doors and windows closed.

Tel: 07534 734347 Page 7 of 17

Report No: MRL/100/093c.1v1

Oscar Acoustics

Background Leq noise levels were recorded in the receiver room without the sound

source operating. Where applicable, corrections for background noise have been made

in accordance with BS EN ISO 140-4, Para 6.6.

Receiver room reverberation time (RT) calculations were made using the interrupted

noise method by means of a Minirator MR2 pink noise generator and RT calculation

algorithms within the Rion NA-28 sound level meter. A total of six RT measurements

were made comprising three measurements at two different microphone positions.

The results of the measurements in each room were averaged to establish the RT of the

room.

All of the above measurements were made over sixteen third-octave bands 100 Hz to

3150 Hz inclusive.

Impact Sound Insulation Tests

Impact sound insulation measurements involve running a specialised tapping machine

on a floor in the source room and measuring the resultant noise level in the receiving

room below. The testing of party floors was carried out in full accordance with the

requirements of the BS EN ISO 140-7:1998: "Field Measurements of Impact Sound

Insulation of Floors". All the relevant procedures described in Annex B of Approved

Document E of the Building Regulations have been followed.

Any impact tests were carried out using a Rion NA-28 Type 1 Sound Level Meter

loaded with the Rion NX-28BA Building Acoustics Program Card. A calibration check

was carried out before and after the noise measurements and there was no variation in

the calibration level.

Tel: 07534 734347 Page 8 of 17

Report No: MRL/100/093c.1v1

Oscar Acoustics

An ANV Type TM01 tapping machine was used as the source for the impact testing.

For the tests, the tapping machine was placed in four positions in the source room.

Measurements of the impact sound pressure level generated by the tapping machine

were measured at a total of eight microphone positions in the receiver room.

Measurements were taken for a minimum of 10 seconds at each position in the source

room. Testing was carried out with all source room and receiver room doors and

windows closed.

Background Leq noise levels were recorded in the receiver room without the tapping

machine operating. Where applicable, corrections for background noise have been

made in accordance with BS EN ISO 140-7, Para 5.6.

Receiver room reverberation time (RT) calculations were made using the interrupted

noise method by means of a Minirator MR2 pink noise generator and RT calculation

algorithms within the Rion NA-28 sound level meter. A total of six RT measurements

were made comprising three measurements at two different microphone positions.

The results of the measurements in each room were averaged to establish the RT of the

room.

All of the above measurements were made over sixteen third-octave bands 100 Hz to

3150 Hz inclusive.

Sound Insulation Test Results Calculation and Rating

The results of any airborne sound insulation tests have been standardised and rated in

accordance with the requirements of EN ISO 717 Part 1: 1997 "Rating of sound

insulation in buildings and of building elements - Field measurement of airborne

sound insulation between rooms".

Tel: 07534 734347 Page 9 of 17

Page 10 of 17

Oscar Acoustics

The results of any impact sound insulation tests have been standardised and rated in

accordance with the requirements of EN ISO 717 Part 4: 1997 "Rating of sound

insulation in buildings and of building elements - Field measurement of impact sound

insulation of floors".

The single number indices for $D_{nT,w}$, C_{tr} and $L'_{nT,w}$ have been calculated using in-house

spreadsheets to ensure that the level differences obtained from each source position

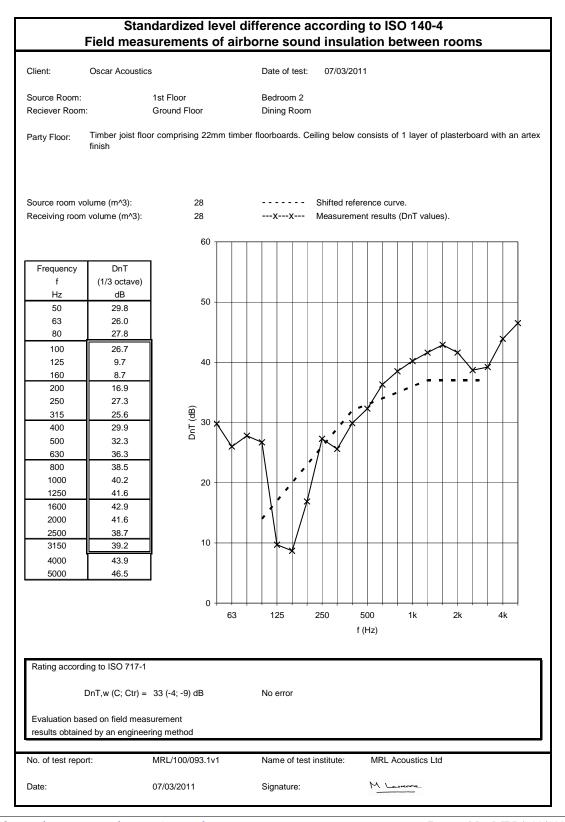
have been arithmetically averaged as required in Annex B, Paragraph B2.6 of

Approved Document E (2003).

e-mail: matt.lawrence@mrl-acoustics.co.uk Report No: MRL/100/093c.1v1

APPENDIX III - SOUND INSULATION TEST SHEETS

e-mail: matt.lawrence@mrl-acoustics.co.uk
Tel: 07534 734347
Report No: MRL/100/093c.1v1
Page 11 of 17



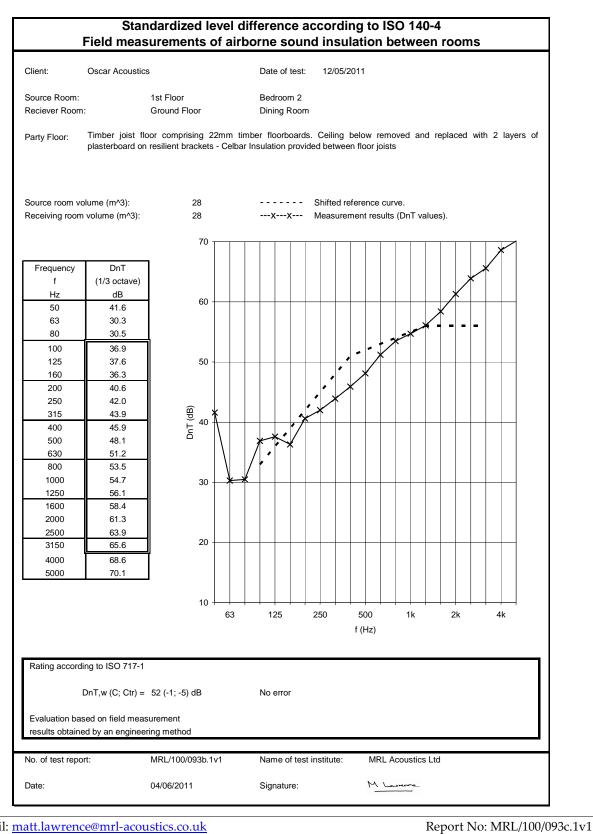
e-mail: matt.lawrence@mrl-acoustics.co.uk

Tel: 07534 734347 Page 12 of 17

Standardized impact sound pressure levels according to ISO 140-7 Field measurements of impact sound insulation of floors Oscar Acoustics Date of test: 07/03/2011 Client: Source Room: 1st Floor Bedroom 2 Reciever Room: Ground Floor Dining Room Timber joist floor comprising 22mm timber floorboards. Ceiling below consists of 1 layer of plasterboard with an artex Party Floor: Receiving room volume (m^3): Shifted reference curve. Measurement results (L'nT values). 100 Frequency L'nT (1/3 octave) 90 50 74.7 82 4 63 80 77.9 100 75.1 125 88.8 80 160 87.7 81.3 200 250 79.6 L'nT (dB) 315 90.8 400 85.9 500 82.2 630 79.5 800 73.2 1000 71.7 60 1250 72.1 68.4 1600 2000 68.1 2500 72.2 50 3150 68.3 4000 61.5 5000 53.7 40 63 125 250 500 1k 2k 4k f (Hz) Rating according to ISO 717-2 L'nT,w (CI) = 82 (-2) dB No error Evaluation based on field measurement results obtained in one-third-octave bands by an engineering method MRL/100/093.1v1 No. of test report: Name of test institute: MRL Acoustics Ltd M Lawrence Date: 07/03/2011 Signature:

e-mail: matt.lawrence@mrl-acoustics.co.uk

Report No: MRL/100/093c.1v1 Tel: 07534 734347 Page 13 of 17



e-mail: matt.lawrence@mrl-acoustics.co.uk

Tel: 07534 734347 Page 14 of 17

Standardized level difference according to ISO 140-4 Field measurements of airborne sound insulation between rooms Oscar Acoustics 12/05/2011 Client: Date of test: Source Room: 1st Floor Bedroom 1 Reciever Room: Ground Floor Lounge Timber joist floor comprising 22mm timber floorboards. Ceiling below removed and replaced with 2 layers of Party Floor: plasterboard on resilient brackets - Floor void filled with Celbar Insulation Source room volume (m^3): Shifted reference curve. Receiving room volume (m^3): 28 Measurement results (DnT values). Frequency DnT (1/3 octave) dΒ Hz 50 24.1 63 28.1 80 100 26.9 125 36.1 50 160 34.8 37.6 200 38.6 250 315 43.3 400 48.4 53.1 500 630 54.4 800 56.3 1000 57.8 30 1250 60.5 1600 61.9 2000 63.0 2500 66.4 20 3150 68.4 4000 72 2 5000 74.1 10 125 250 500 f (Hz) Rating according to ISO 717-1 DnT,w(C;Ctr) = 52(-2;-6)dBNo error Evaluation based on field measurement results obtained by an engineering method MRL/100/093b.1v1 No. of test report: Name of test institute: MRL Acoustics Ltd 04/06/2011 M Lawrence Date: Signature:

e-mail: matt.lawrence@mrl-acoustics.co.uk

Tel: 07534 734347

Standardized impact sound pressure levels according to ISO 140-7 Field measurements of impact sound insulation of floors Oscar Acoustics Date of test: 12/05/2011 Client: Source Room: 1st Floor Bedroom 2 Reciever Room: Ground Floor Dining Room Timber joist floor comprising 22mm timber floorboards. Ceiling below removed and replaced with 2 layers of Party Floor: plasterboard on resilient brackets - Celbar Insulation provided between floor joists Source room volume (m^3): Shifted reference curve. Measurement results (DnT values). Receiving room volume (m^3): 28 80 Frequency L'nT (1/3 octave) dΒ Hz 70 50 71.0 76.4 63 80 100 61.6 125 61.5 60 160 67.4 67.6 200 250 65.8 315 62.3 400 61.0 58.9 500 56.8 630 800 52.1 1000 51.9 40 1250 48.4 1600 43.9 2000 41.9 2500 40.0 3150 37.0 30 4000 29.3 5000 23.5 20 63 125 250 500 1k 2k f (Hz) Rating according to ISO 717-2 L'nT,w (CI) = 58 (1) dB No error Evaluation based on field measurement results obtained in one-third-octave bands by an engineering method MRL/100/093b.1v1 MRL Acoustics Ltd No. of test report: Name of test institute: 04/06/2011 M Lawrence Date: Signature:

e-mail: matt.lawrence@mrl-acoustics.co.uk

Report No: MRL/100/093c.1v1 Tel: 07534 734347 Page 16 of 17

Standardized impact sound pressure levels according to ISO 140-7 Field measurements of impact sound insulation of floors Oscar Acoustics Date of test: 12/05/2011 Client: Source Room: 1st Floor Bedroom 1 Reciever Room: Ground Floor Lounge Timber joist floor comprising 22mm timber floorboards. Ceiling below removed and replaced with 2 layers of Party Floor: plasterboard on resilient brackets - Floor void filled with Celbar Insulation Source room volume (m^3): Shifted reference curve. Measurement results (DnT values). Receiving room volume (m^3): 28 80 Frequency L'nT (1/3 octave) dΒ Hz 70 50 66.9 63 60.0 80 56.6 100 62.0 125 61.2 60 160 65.1 200 65.1 250 63.9 315 61.2 400 56.8 60.1 500 60.9 630 800 58.5 1000 53.4 40 1250 51.0 1600 48.1 2000 44.3 2500 42.0 3150 35.8 30 4000 33 1 5000 31.3 20 63 125 2k 250 500 1k 4k f (Hz) Rating according to ISO 717-2 L'nT,w(CI) = 58(-1) dBNo error Evaluation based on field measurement results obtained in one-third-octave bands by an engineering method MRL/100/093b.1v1 MRL Acoustics Ltd No. of test report: Name of test institute: 04/06/2011 M Lawrence Date: Signature:

e-mail: matt.lawrence@mrl-acoustics.co.uk

Tel: 07534 734347

Page 17 of 17