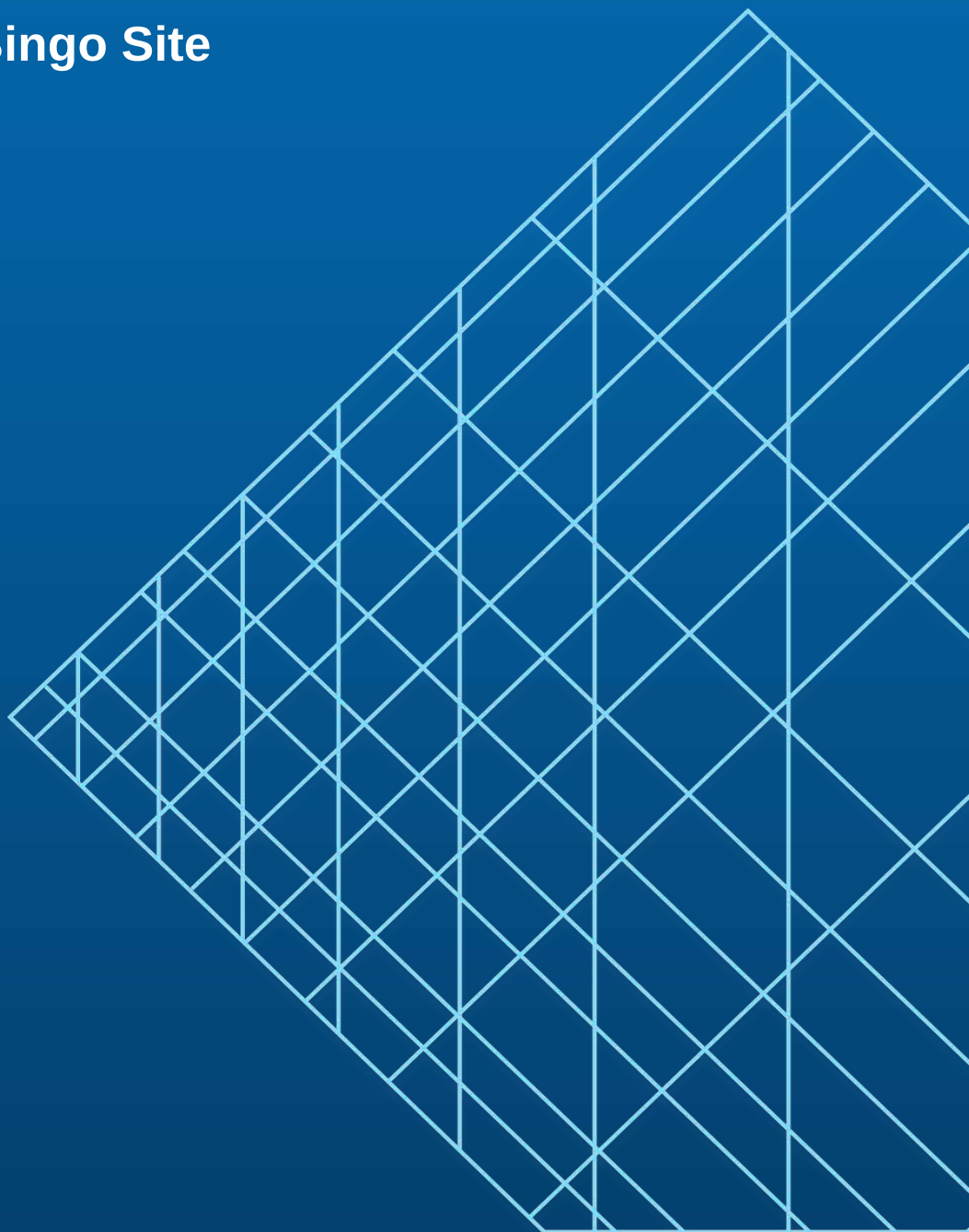
Hunter ACOUSTICS

Independent Acoustic Consultancy Practice

Building Regulations Sound Insulation Test Report

Former Riva Bingo Site
Cardiff

7132/SI1



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Building Regulations Sound Insulation Test Report

Project:	**Former Riva Bingo Site**
Site Address:	Agate Street Adamsdown Cardiff CF24 1PF
HA Reference:	7132/SI1
ANC Report No:	130/97551
ANC Password:	G9EFP2
Date:	05/01/2024
Client:	Interstrand Ltd 19 Windsor Place Cardiff CF10 3BY
Contact:	tony@interstrand.co.uk

ISSUE / REVISION

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			Prepared by:	**Checked by:**
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1. INTRODUCTION

This report is an Association of Noise Consultants (ANC) registered report with the unique registration number 130/97551.

Hunter Acoustics has been commissioned to carry out Building Regulations sound insulation tests at Former Riva Bingo Site, Agate Street, Adamsdown, Cardiff, CF24 1PF.

This report details results of airborne sound insulation tests carried out across 8no separating walls and airborne and impact sound insulation tests carried out across 8no separating floors to determine their sound insulation performances. They are then assessed in line with the requirements of Building Regulations Approved Document E 2003 Edition (ADE2003) Requirement E1 “Protection against sound from other parts of the building and adjoining building”.

It is understood that Building Regulations performance standards for "Purpose built dwelling-houses and flats" apply. The performance standards are given in Section 2 and sound insulation test results are compared against them as appropriate in Section 6.

Tests were carried out in completed but unfurnished rooms and all cupboards in kitchens were open during testing.

Acoustic terminology and test forms are given in Appendix A and Appendix C respectively.

2. BUILDING REGULATIONS REQUIREMENTS

Building Regulations ADE2003 separating wall and floor sound insulation performance requirements for "Purpose built dwelling-houses and flats" are quoted below.

Table 2.1 - Building Regulations Part E Performance Requirements

Separating Construction	Airborne Sound Insulation Minimum Performance Requirement $D_{nT,w} + C_{tr}$ (dB)	Impact Sound Insulation Maximum Performance Requirement $L'_{nT,w}$ (dB)
Wall	45	-
Floor	45	62

Therefore, the above quoted minimum airborne and maximum impact sound insulation performance values must be met to satisfy the requirements of ADE2003.

3. PERSONNEL & EQUIPMENT

Personnel present: Meirion Townsend of Hunter Acoustics
Matthew Hunter of Hunter Acoustics

Note: All testers were on the ANC register at the time of testing.

Test date: 08 December 2023
04 January 2024

The following test equipment was used during our sound insulation tests;

Table 3.1 – Equipment List

Make	Description	Model	Serial Number	Last Calibrated	Certificate No.
Norsonic AS	Type 1 - Integrating - averaging Sound Level Meter	140	1403003	26 October 2023	U45770
	Preamplifier	1209	12403	26 October 2023	Included
	Microphone	1225	91797	26 October 2023	45769
Norsonic AS	Calibrator (114.06dB @ 999.54)	1251	31429	09 March 2023	U43629
Sennheiser	Bodypack Transmitter 606-648 MHz	SK100	1427385553	-	-
Sennheiser	Bodypack Receiver 606-648 MHz	EK100	1427312753	-	-
RCF	Amplifier & Loudspeaker	ART310A			
	Loudspeaker Tripod				
Lieca	Laser Measure	DISTO D2	1282650627	01 July 2018	1282650627
DeWALT	Laser Measure	DWHT77100-XJ	79018	-	-
Sound Solutions	Standard Tapping Machine	-	TP02032	15 February 2023	TP02032/02/23

Equipment calibration certificates are included in Appendix D.

4. DETAILS OF SEPARATING CONSTRUCTIONS

4.1 Separating Wall Construction Details

RSD E-WT-2: 12.5mm plasterboard, 19mm plank on 89mm timber studs with 60mm rock fibre insulation between, 9mm OSB board, cavity, 9mm OSB board, 89mm timber studs with 60mm rock fibre insulation, 19mm plank, 12.5mm plasterboard

4.2 Separating Floor Construction Details

RSD E-FT-5: Cellecta Screedboard 28 on 18mm wood based board on 235mm timber joists with 100mm mineral wall between. 2no layers of 15mm plasterboard on resilient bars, MF ceiling with 1no layer 12.5mm plasterboard and 150mm clear void

Third floor apartments had carpets laid on top of floor, vinyl was laid at first floor during 04 January 2024 visit

Note: There was a 1.5m horizontal stagger at 3rd floor between T04 & T05

5. PROCEDURE

The tests detailed in this report have been carried out in full accordance with ISO140-4 and/or ISO140-7. All the procedures in Annex B of the Approved Document to the Building Regulations have been followed, with exception of;

Table 5.1 - Table of Non-Compliance

Section of Annex B	Annex B Requirement	Reason for Non-Compliance	Procedure Carried Out
B2.13	Impact sound insulation tests should be conducted on a floor without a soft covering (e.g. carpet, foam backed vinyl etc.) except in the case of (a) separating floor type 1, as described in the Approved Document, or (b) a concrete structural floor base which has a soft covering as an integral part of the floor.	Flats at the third floor were carpeted at the time of testing.	Impact tests at 3rd floor conducted on soft floor covering. Impact tests at all other floor levels conducted on vinyl which provides a level of the floor performance without carpet.
B2.14	If a soft floor covering has been installed on any other type of floor, it should be taken up. If that is not possible, at least half of the floor should be exposed and the tapping machine should be placed only on the exposed part of the floor		

5.1 Airborne Sound Insulation

Airborne sound insulation tests were carried out in full accordance with the requirements of BS EN ISO140 (1998): "Acoustics – Measurements of sound insulation in buildings and of building elements" - Part 4: "Field measurements of airborne sound insulation between rooms".

Broadband pink noise was generated in the source room using a pink noise generator and a high performance amplifier/loudspeaker system. Two loudspeaker positions were used. Loudspeaker was placed on tripod – two different heights were used. 1/3-octave band sound pressure levels were measured in both the source (L_1) and receiver (L_2) rooms between 100Hz and 3150Hz. Sound levels were measured across 10 positions in each room (5 positions for each loudspeaker position – 6s measurement period at each position). The sound level meter is paused between each measurement and moved to the next location. All five measurements for each loudspeaker position are stored in the sound level meter which calculates an overall $L_{eq,30secs}$ value of all five measurement periods.

Reverberation times at six microphone positions in the receiver room were measured using steady state noise excitation from one loudspeaker position.
Reverberation times were measured employing interrupted noise method (refs. BS EN ISO 3382-2:2008 "Acoustics — Measurement of room acoustic parameters — Part 2: Reverberation time in ordinary rooms" and BS EN ISO 140-7: 1998 "Acoustics – Measurement of sound insulation in buildings and of building elements").

Background noise levels were measured in the receiver room (5 positions, 6s measurement period at each position). The sound level meter is paused between each measurement and moved to the next location. All five measurements are stored in the sound level meter which calculates an overall $L_{eq,30secs}$ value of all five measurement periods. Background noise was controlled by distant road traffic noise.

The measured 1/3-octave band sound pressure levels (incl. source, receive and background levels) and reverberation times were then analysed following the guidance given in BS EN ISO717 (1997) "Acoustics – Rating of sound insulation in buildings and of building elements" – Part 1: "Airborne sound insulation" as follows:

i). Level difference 'D' across the separating partition ($D = L_1 - L_2$) is calculated.

ii). Measured receive room noise levels are corrected for the background noise as follows;

a). Where the difference between the signal level and background is 10dB or higher, the effect on the signal level is considered insignificant and no correction is required. Therefore:

$$L = L_{s\ b}$$

b). Where the difference between the signal level and background is less than 10dB but more than 6dB, the signal level is calculated by subtracting the background noise level on an energy basis. Therefore:

$$L = 10\log(10^{L_{s\ b}/10} - 10^{L_b/10})\ \text{dB}$$

c). Where the difference between the signal level and background is less than or equal to 6 dB, the measurement is not considered reliable and is deemed to be 'the limit of measurement' so the signal level is estimated by applying a fixed correction of -1.3dB. Therefore:

$$L = L_{s\ b} - 1.3$$

Where L is the background-corrected receiver room level, L_b is the background noise level and L_{sb} is the receiver room level, as measured, *including* the background noise.

iii). Standardised level difference D_{nT} corresponding to a reference value of the reverberation time in the receiver room is calculated from;

$$E_{nT} = E + 10\log\left(\frac{T}{T_0}\right)\ \text{where;}$$

T is the measured reverberation time in the receiver room
The calculation is based on the T_{20}
T_0 is the reference reverberation time (for habitable rooms, T_0 = 0.5 s)

iv). 1/3-octave D_{nT} levels are converted to a single 'weighted standardised level difference' figure $D_{nT,w}$.

v). Spectrum adaptation curve No.2 is applied to obtain C_{tr} value as follows:

$$D_{tr} = \{-10\log\textstyle\sum(10^{(L_i - D_{nT,i})/10})\} - E_{nT,w}\ [d\ \ ]C\quad \text{where;}$$

L_i is the corresponding values for BS EN ISO 717: Part1, No.2 spectrum;
$D_{nT,i}$ is the corresponding 1/3 octave band standardised level difference;
$D_{nT,w}$ is the single number 'weighted standardised level difference';

vi). Finally, $D_{nT,w}+C_{tr}$ dB value is obtained by adding calculated $D_{nT,w}$ (dB) and C_{tr} (dB) values.

Other acoustic terminology is included in Appendix A.

5.2 Impact Sound Insulation

Tests were carried out in line with the requirements of BS EN ISO140 (1998) "Acoustics – measurement of sound insulation in buildings and of building elements" - Part 7: "Field measurement of impact sound insulation of floors."

i) A standard tapping machine is placed at four different positions on the floor above;

ii). 1/3-octave L_{eq} sound pressure levels between 100Hz and 3150Hz are measured across the receive room below and the results are averaged; Sound levels were measured at two different positions for each tapping machine position. For each tapping machine position 12 seconds sample time was used (corresponding to 6 seconds at each measurement position). The sound level meter is paused between each measurement and moved to the next location. Both measurements for each tapping machine position are stored in the sound level meter which calculates an overall $L_{eq,12secs}$ value of both measurement periods.

iii). 1/3-octave band background levels are measured in the receiver room (5 positions, 6s measurement period at each position). The sound level meter is paused between each measurement and moved to the next location. All five measurements are stored in the sound level meter which calculates an overall $L_{eq,30secs}$ value of all five measurement periods.

iv). 1/3-octave band receive room sound pressure levels are corrected for the background noise (L') as follows;

a). Where the difference between the signal level and background is 10dB or higher, the effect on the signal level is considered insignificant and no correction is required. Therefore:

$$L = L_{s\ b}$$

b). Where the difference between the signal level and background is less than 10dB but more than 6dB, the signal level is calculated by subtracting the background noise level on an energy basis. Therefore:

$$L = 10\log(10^{L_{s\ b}/10} - 10^{L_b/10})\ \text{dB}$$

c). Where the difference between the signal level and background is less than or equal to 6 dB, the measurement is not considered reliable and is deemed to be 'the limit of measurement' so the signal level is estimated by applying a fixed correction of -1.3dB. Therefore:

$$L = L_{s\ b} - 1.3$$

Where L is the background-corrected receiver room level, L_b is the background noise level and L_{sb} is the receiver room level, as measured, *including* the background noise.

Background noise levels were controlled by rain noise.

v). 1/3-octave band reverberation time levels are measured using steady state noise excitation at six microphone positions and one loudspeaker position.

vi). Standardised impact sound pressure level L'_{nT} corresponding to a reference value of the reverberation time in the receive room is calculated from:

$$L'_{nT} = L' + 10 \log \left(\frac{T}{T_0}\right)$$ where;

T is the measured reverberation time in the receive room
The calculation is based on the T_{20}
T_0 is the reference reverberation time (for dwellings, T_0 = 0.5 seconds)

vii). 1/3-octave L'_{nT} levels are converted to a single 'weighted standardised level $L'_{nT,w}$ following the procedure defined in BS EN ISO 717 (1997) "Acoustics – Rating of sound insulation in buildings and of building elements" – Part 2: "Impact sound insulation."

Other acoustic terminology is included in Appendix A.

6. RESULTS

The following table summarises test results and compares them with the airborne and impact sound insulation performance requirements of Building Regulations (ADE2003) for "Purpose built dwelling-houses and flats" as appropriate. Appendix C includes test forms.

Table 6.1 - Summary of Sound Insulation Test Results

ANC Test Reference	Partition Test	Room	Description	Approx Vol. (m^3)	Measured	Criteria	Result
97551/01	Wall Airborne 01	Source Receiver	T04 Kitchen / Dining Room T03 Kitchen / Dining Room	56 51	51 dB $D_{nT,w}+C_{tr}$	≥ 45 dB $D_{nT,w}+C_{tr}$	PASS
97551/02	Wall Airborne 02	Source Receiver	T04 Bedroom T05 Bedroom	30 30	57 dB $D_{nT,w}+C_{tr}$	≥ 45 dB $D_{nT,w}+C_{tr}$	PASS
97551/03	Floor Airborne 01	Source Receiver	T04 Kitchen / Dining Room S05 Kitchen / Dining Room	56 56	53 dB $D_{nT,w}+C_{tr}$	≥ 45 dB $D_{nT,w}+C_{tr}$	PASS
97551/04	Floor Airborne 02	Source Receiver	T04 Bedroom S05 Bedroom	30 30	55 dB $D_{nT,w}+C_{tr}$	≥ 45 dB $D_{nT,w}+C_{tr}$	PASS
97551/05	Floor Impact 01	Source Receiver	T04 Kitchen / Dining Room S05 Kitchen / Dining Room	56 56	53 dB $L'_{nT,w}$	≤ 62 dB $L'_{nT,w}$	PASS
97551/06	Floor Impact 02	Source Receiver	T04 Bedroom S05 Bedroom	30 30	53 dB $L'_{nT,w}$	≤ 62 dB $L'_{nT,w}$	PASS
97551/07	Wall Airborne 03	Source Receiver	S02 Living Room / Kitchen S03 Bedroom	56 30	51 dB $D_{nT,w}+C_{tr}$	≥ 45 dB $D_{nT,w}+C_{tr}$	PASS
97551/08	Wall Airborne 04	Source Receiver	S02 Bedroom S01 Bedroom	30 30	59 dB $D_{nT,w}+C_{tr}$	≥ 45 dB $D_{nT,w}+C_{tr}$	PASS
97551/09	Floor Airborne 03	Source Receiver	S02 Living Room / Kitchen F02 Living Room / Kitchen	56 56	52 dB $D_{nT,w}+C_{tr}$	≥ 45 dB $D_{nT,w}+C_{tr}$	PASS
97551/10	Floor Airborne 04	Source Receiver	S02 Bedroom F02 Bedroom	30 30	53 dB $D_{nT,w}+C_{tr}$	≥ 45 dB $D_{nT,w}+C_{tr}$	PASS

ANC Test Reference	Partition Test	Room	Description	Approx Vol. (m^3)	Measured	Criteria	Result
97551/11	Floor Impact 03	Source Receiver	S02 Living Room / Kitchen F02 Living Room / Kitchen	56 56	54 dB $L'_{nT,w}$	≤ 62 dB $L'_{nT,w}$	PASS
97551/12	Floor Impact 04	Source Receiver	S02 Bedroom F02 Bedroom	30 30	55 dB $L'_{nT,w}$	≤ 62 dB $L'_{nT,w}$	PASS
97551/13	Wall Airborne 05	Source Receiver	F08 Bedroom 1 F07 Bedroom 1	30 30	55 dB $D_{nT,w}+C_{tr}$	≥ 45 dB $D_{nT,w}+C_{tr}$	PASS
97551/14	Wall Airborne 06	Source Receiver	F02 Bedroom 1 F01 Bedroom 1	30 30	54 dB $D_{nT,w}+C_{tr}$	≥ 45 dB $D_{nT,w}+C_{tr}$	PASS
97551/15	Floor Airborne 05	Source Receiver	F08 Lounge/Kitchen G07 Lounge/Kitchen	56 56	53 dB $D_{nT,w}+C_{tr}$	≥ 45 dB $D_{nT,w}+C_{tr}$	PASS
97551/16	Floor Airborne 06	Source Receiver	F08 Bedroom 1 G07 Bedroom 1	30 30	52 dB $D_{nT,w}+C_{tr}$	≥ 45 dB $D_{nT,w}+C_{tr}$	PASS
97551/17	Floor Impact 05	Source Receiver	F08 Lounge/Kitchen G07 Lounge/Kitchen	56 56	54 dB $L'_{nT,w}$	≤ 62 dB $L'_{nT,w}$	PASS
97551/18	Floor Impact 06	Source Receiver	F08 Bedroom 1 G07 Bedroom 1	30 30	56 dB $L'_{nT,w}$	≤ 62 dB $L'_{nT,w}$	PASS
97551/19	Wall Airborne 07	Source Receiver	G09 Lounge/Kitchen G08 Lounge/Kitchen	56 56	54 dB $D_{nT,w}+C_{tr}$	≥ 45 dB $D_{nT,w}+C_{tr}$	PASS
97551/20	Wall Airborne 08	Source Receiver	G03 Lounge/Kitchen G04 Lounge/Kitchen	56 56	50 dB $D_{nT,w}+C_{tr}$	≥ 45 dB $D_{nT,w}+C_{tr}$	PASS
97551/21	Floor Airborne 07	Source Receiver	F02 Bedroom 1 G01 Bedroom 1	30 30	52 dB $D_{nT,w}+C_{tr}$	≥ 45 dB $D_{nT,w}+C_{tr}$	PASS
97551/22	Floor Airborne 08	Source Receiver	F02 Lounge/Kitchen G01 Lounge/Kitchen	56 56	53 dB $D_{nT,w}+C_{tr}$	≥ 45 dB $D_{nT,w}+C_{tr}$	PASS
97551/23	Floor Impact 07	Source Receiver	F02 Bedroom 1 G01 Bedroom 1	30 30	56 dB $L'_{nT,w}$	≤ 62 dB $L'_{nT,w}$	PASS
97551/24	Floor Impact 08	Source Receiver	F02 Lounge/Kitchen G01 Lounge/Kitchen	56 56	53 dB $L'_{nT,w}$	≤ 62 dB $L'_{nT,w}$	PASS

Partition areas are given on the forms in Appendix C.

7. DISCUSSION

Results of our airborne sound insulation tests carried out across separating walls have achieved between 51dB $D_{nT,w}+C_{tr}$ and 59dB $D_{nT,w}+C_{tr}$ compared with 45dB $D_{nT,w}+C_{tr}$ Building Regulations minimum performance requirement.

Results of our airborne sound insulation tests carried out across separating floors have achieved between 52dB $D_{nT,w}+C_{tr}$ and 55dB $D_{nT,w}+C_{tr}$ compared with 45dB $D_{nT,w}+C_{tr}$ Building Regulations minimum performance requirement.

Results of our impact sound insulation tests carried out across separating floors have achieved between 53dB $L'_{nT,w}$ and 56dB $L'_{nT,w}$ compared with 62dB $L'_{nT,w}$ Building Regulations maximum performance requirement.

Note: The limit of measurement was reached due to background noise levels on tests 01, 02, 03, 07, 08, 11, 12, 13, 14, 19 & 20

8. CONCLUSION

Airborne and impact sound insulation tests have been carried out across 8no separating walls and 8no separating floors at Former Riva Bingo Site, Agate Street, Adamsdown, Cardiff, CF24 1PF in accordance with the requirements of Building Regulations Approved Document E 2000 ‘2003 Edition’ (ADE2003) and relevant standards. Tests were carried out on 08 December 2023 & 04 January 2024.

Separating walls and floors are covered under "Purpose built dwelling-houses and flats" of Building Regulations ADE2003.

Results of wall airborne, floor airborne and floor impact sound insulation tests have satisfied “Requirement E1” of Building Regulations ADE2003.

Appendix A gives acoustic terminology. Sound insulation forms are given in Appendix C. Test equipment calibration certificates are given in Appendix D.

APPENDIX A - ACOUSTIC TERMINOLOGY

Human response to noise depends on a number of factors including loudness, frequency content and variations in level with time. Various frequency weightings and statistical indices have been developed in order to objectively quantify 'annoyance'.

The following units have been used in this report:

dB(A)	The sound pressure level A-weighted to correspond with the frequency response of the human ear and therefore a persons' subjective response to frequency content.
L_{eq}	The equivalent continuous sound level is a notional steady state level which over a quoted time period would have the same acoustic energy content as the actual fluctuating noise measured over that period.
D_{nT}	Standardised level difference corresponding to a reference value of the reverberation time in a receiver room.
$D_{nT,w}$	Single number 'weighted standardised level difference'.
C_{tr}	Correction factor used in level difference calculation to take into account low frequency sounds.
R_w	Weighted Sound Reduction Index. R_w is a single number (dB) referring to the ability of a wall or other building structure to provide sound insulation. The higher the number, the better the sound insulation. R_w refers to sound insulation achieved in an acoustic testing laboratory.
$L'_{nT,w}$	Single number 'weighted standardised impact sound pressure level'.
T_{60}	Reverberation time - the time taken for a steady state sound to drop by 60 dB. A reference reverberation time of T_0 = 0.5 second is used during sound insulation calculations representing average room reverberation time.

APPENDIX B - ANC CERTIFICATION OF TEST RESULTS

Notice to Building Control Officer

Certification of Test Results

The ANC operates an online, secure, paperless certification system for sound insulation tests.

The online verification (certification) system means that Building Control Bodies will need to follow the steps below to verify the results quoted in the relevant test report:

1. Go to the ANC secure server at www.theanc.co.uk

2. Navigate to the ADvANCE page which links to the ANC site available for use by BCOs.

3. Enter the following in the spaces provided:

   Task Number: 97551 Task Password: G9EFP2

4. Select role “Building Control Officer” and press “Login”

5. You will then see a summary list of results of all the Tests undertaken to date for this project (Task) as held on the secure primary server and you can print this table for your records.

APPENDIX C - SOUND INSULATION TEST FORMS

C.1 Wall Airborne Sound Insulation Test Results

Standardized level difference according to ISO 140: Part 4 - 1998; Rating according to ISO 717: Part 1 - 1997
Field measurement of airborne sound insulation between rooms

Client: Interstrand | Date of Test: 08/12/2023 | Source room volume: 56 m^3
Project: Former Riva Bingo Site | Receiving room volume: 51 m^3
Test Description: T04 Kitchen / Dining Room to T03 Kitchen / Dining Room | Partition area: 17 m^2

Details of Construction: RSD E-WT-2: 12.5mm plasterboard, 19mm plank on 89mm timber studs with 60mm rock fibre insulation between, 9mm OSB board, cavity, 9mm OSB board, 89mm timber studs with 60mm rock fibre insulation, 19mm plank, 12.5mm plasterboard

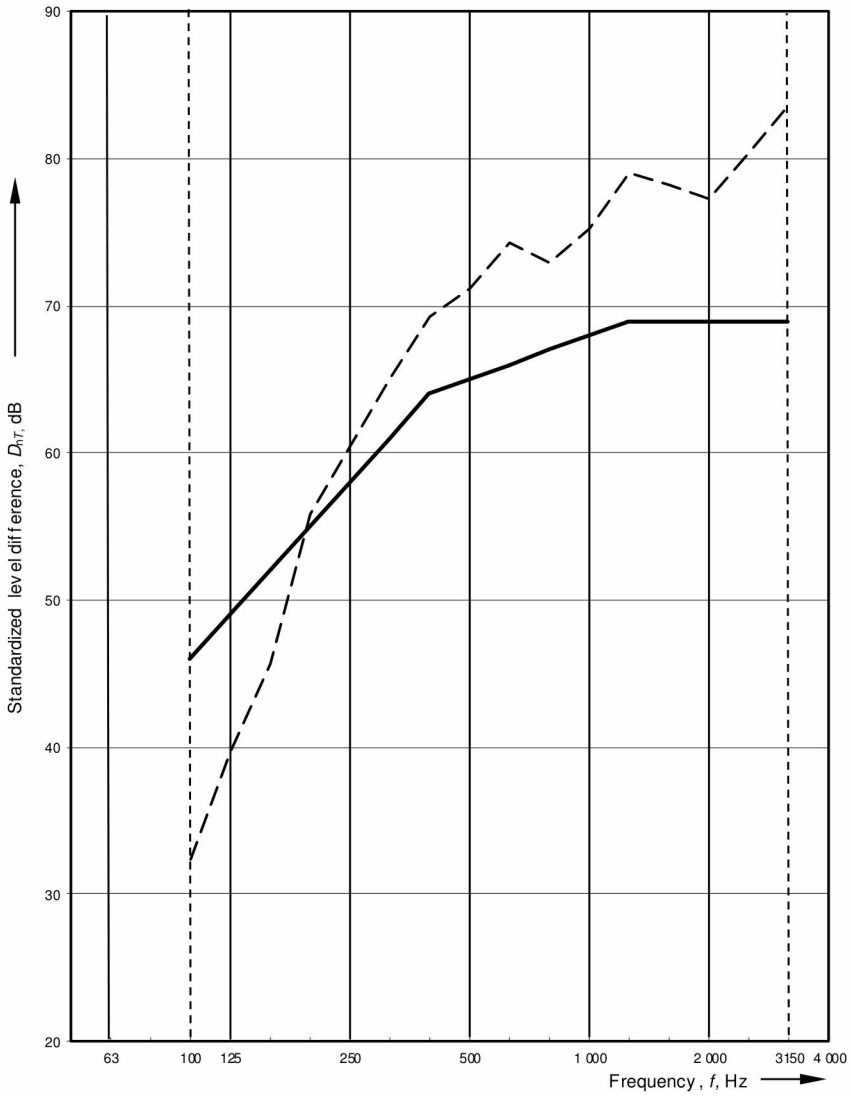
Figure: 130/97551/01_Wall Airborne 01

----- Frequency range according to the
——— curve of reference values (ISO 717: Part 1)

$D_{nT,w}+C_{tr}$ = 51dB

Frequency f Hz	D_{nT} (one-third octave) dB	
50		
63		
80		
100	32.3	
125	39.7	
160	45.7	
200	55.8	
250	60.4	
315	65.1	
400	69.3	
500	71.2	
630	≥74.3	*
800	73.0	
1 000	≥75.2	*
1 250	≥79	*
1 600	≥78.2	*
2 000	≥77.3	*
2 500	≥80.4	*
3 150	≥83.7	*
4 000		
5 000		

* indicates the limit of measurement due to background noise.



Rating according to ISO 717 : Part 1 - 1997

$D_{nT,w}(C;C_{tr})$ = 65 (-6 ; -14)dB; | Total Deviation = 29.3

Evaluation based on field measurement results obtained by engineering method | Maximum Deviation = 13.7

No. of test report: 130/97551/01_Wall Airborne 01 | Hunter Acoustics
Date: 08 December 2023 | Signature: [redacted]

Standardized level difference according to ISO 140: Part 4 - 1998; Rating according to ISO 717: Part 1 - 1997
Field measurement of airborne sound insulation between rooms

Client: Interstrand | Date of Test: 08/12/2023 | Source room volume: 30 m^3

Project: Former Riva Bingo Site | Receiving room volume: 30 m^3

Test Description: T04 Bedroom to T05 Bedroom | Partition area: 8 m^2

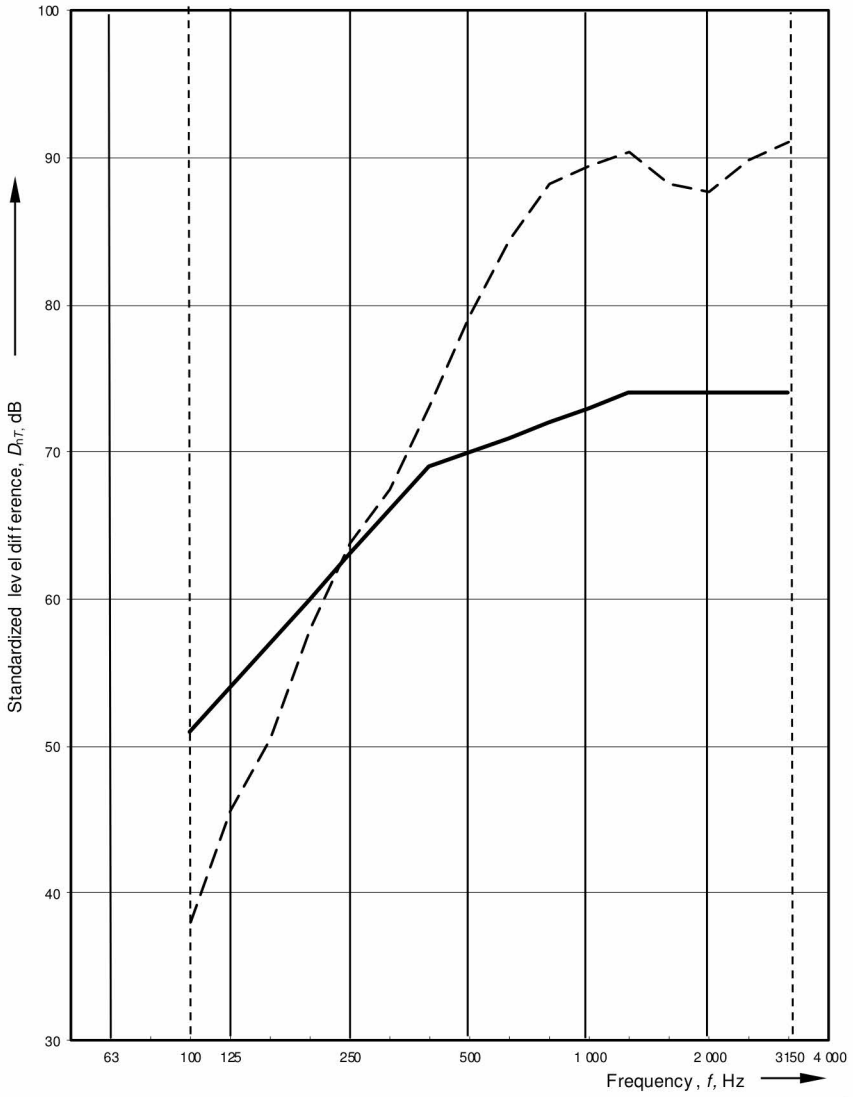
Details of Construction: RSD E-WT-2: 12.5mm plasterboard, 19mm plank on 89mm timber studs with 60mm rock fibre insulation between, 9mm OSB board, cavity, 9mm OSB board, 89mm timber studs with 60mm rock fibre insulation, 19mm plank, 12.5mm plasterboard

Figure: 130/97551/02_Wall Airborne 02

$D_{nT,w}+C_{tr}$ = 57dB

Frequency f Hz	D_{nT} (one-third octave) dB
50	
63	
80	
100	38.0
125	45.6
160	50.5
200	58.0
250	63.8
315	67.5
400	73.2
500	79.3
630	84.4
800	88.3
1 000	89.5
1 250	90.4
1 600	88.3
2 000	87.7
2 500	89.9
3 150	≥91.1 *
4 000	
5 000	

* indicates the limit of measurement due to background noise.



Rating according to ISO 717 : Part 1 - 1997

$D_{nT,w}(C;C_{tr})$ = 70 (-5 ; -13)dB; | Total Deviation = 29.9

Evaluation based on field measurement results obtained by engineering method | Maximum Deviation = 13

No. of test report: 130/97551/02_Wall Airborne 02 | Hunter Acoustics

Date: 08 December 2023 | Signature: [redacted]

Standardized level difference according to ISO 140: Part 4 - 1998; Rating according to ISO 717: Part 1 - 1997
Field measurement of airborne sound insulation between rooms

Client: Interstrand | Date of Test: 08/12/2023 | Source room volume: 56 m^3

Project: Former Riva Bingo Site | Receiving room volume: 30 m^3

Test Description: S02 Living Room / Kitchen to S03 Bedroom | Partition area: 12 m^2

Details of Construction: RSD E-WT-2: 12.5mm plasterboard, 19mm plank on 89mm timber studs with 60mm rock fibre insulation between, 9mm OSB board, cavity, 9mm OSB board, 89mm timber studs with 60mm rock fibre insulation, 19mm plank, 12.5mm plasterboard

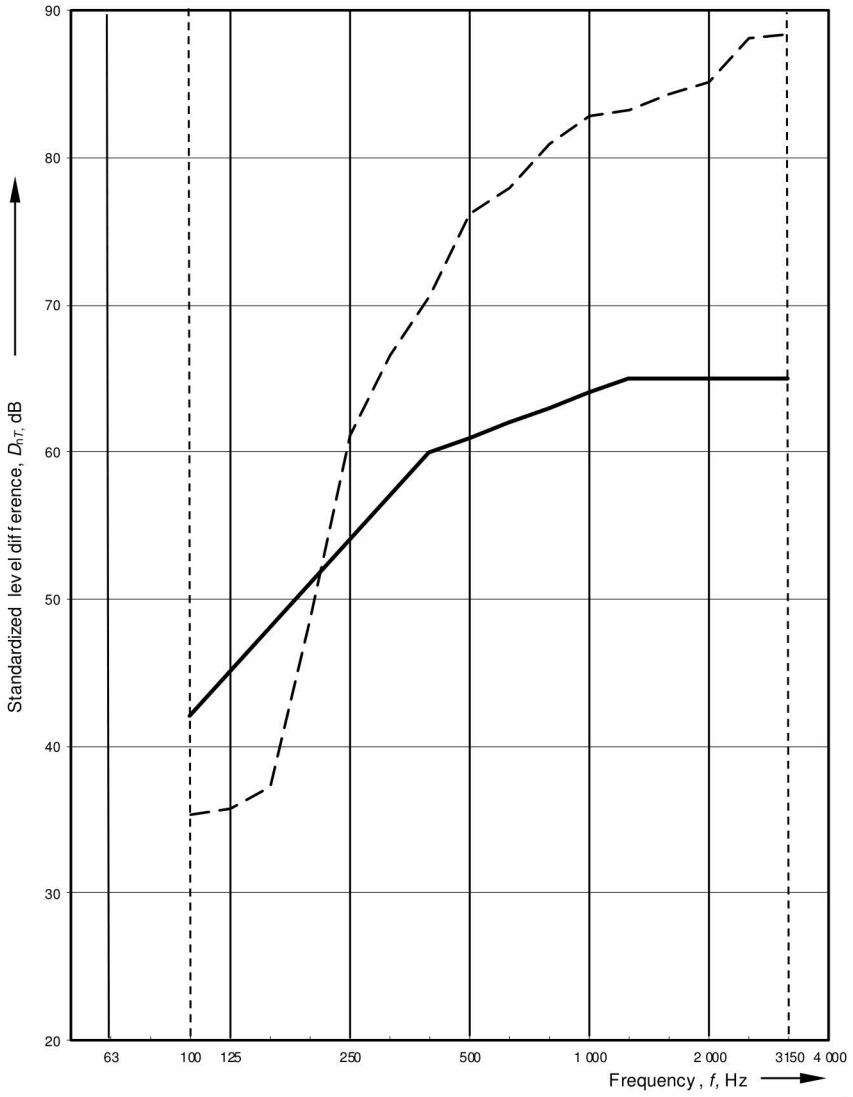
Figure: 130/97551/07_Wall Airborne 03

----- Frequency range according to the
——— curve of reference values (ISO 717: Part 1)

$D_{nT,w}+C_{tr}$ = **51dB**

Frequency f Hz	D_{nT} (one-third octave) dB	
50		
63		
80		
100	35.4	
125	35.8	
160	37.3	
200	48.7	
250	61.2	
315	66.5	
400	70.7	
500	76.2	
630	78.0	
800	81.0	
1 000	82.8	
1 250	83.3	
1 600	84.4	
2 000	85.1	
2 500	≥88.1	*
3 150	≥88.4	*
4 000		
5 000		

* indicates the limit of measurement due to background noise.



Rating according to ISO 717 : Part 1 - 1997

$D_{nT,w}(C;C_{tr})$ = 61 (-4 ; -10)dB; | Total Deviation = 28.8

Evaluation based on field measurement results obtained by engineering method | Maximum Deviation = 10.7

No. of test report:	130/97551/07_Wall Airborne 03	Hunter Acoustics	
Date:	08 December 2023	Signature:	[redacted]

Standardized level difference according to ISO 140: Part 4 - 1998; Rating according to ISO 717: Part 1 - 1997
Field measurement of airborne sound insulation between rooms

Client: Interstrand | Date of Test: 08/12/2023 | Source room volume: 30 m^3

Project: Former Riva Bingo Site | Receiving room volume: 30 m^3

Test Description: S02 Bedroom to S01 Bedroom | Partition area: 12 m^2

Details of Construction: RSD E-WT-2: 12.5mm plasterboard, 19mm plank on 89mm timber studs with 60mm rock fibre insulation between, 9mm OSB board, cavity, 9mm OSB board, 89mm timber studs with 60mm rock fibre insulation, 19mm plank, 12.5mm plasterboard

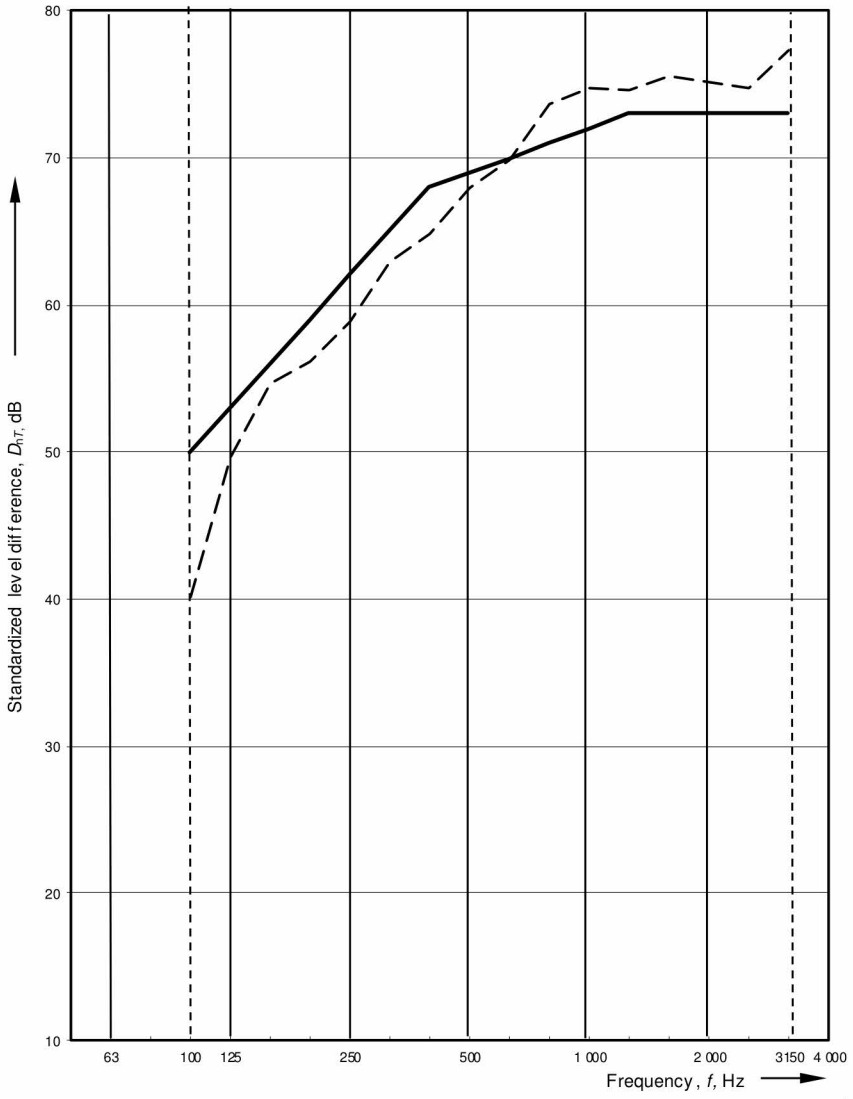
Figure: 130/97551/08_Wall Airborne 04

----- Frequency range according to the
——— curve of reference values (ISO 717: Part 1)

$D_{nT,w}+C_{tr}$ = **59dB**

Frequency *f* Hz	D_{nT} (one-third octave) dB	
50		
63		
80		
100	40.2	
125	49.6	
160	54.7	
200	56.2	
250	58.9	
315	62.9	
400	64.9	
500	68.0	
630	69.9	
800	73.7	
1 000	74.8	
1 250	74.6	
1 600	≥75.6	*
2 000	≥75.1	*
2 500	≥74.8	*
3 150	≥77.3	*
4 000		
5 000		

* indicates the limit of measurement due to background noise.



Rating according to ISO 717 : Part 1 - 1997

$D_{nT,w}(C;C_{tr})$ = 69 (-3 ; -10)dB; | Total Deviation = 26.7

Evaluation based on field measurement results obtained by engineering method | Maximum Deviation = 9.8

No. of test report: 130/97551/08_Wall Airborne 04 | Hunter Acoustics

Date: 08 December 2023 | Signature: [redacted]

Standardized level difference according to ISO 140: Part 4 - 1998; Rating according to ISO 717: Part 1 - 1997
Field measurement of airborne sound insulation between rooms

Client: Interstrand | Date of Test: 04/01/2024 | Source room volume: 30 m^3

Project: Former Riva Bingo Site | Receiving room volume: 30 m^3

Test Description: F08 Bedroom 1 to F07 Bedroom 1 | Partition area: 12 m^2

Details of Construction: RSD E-WT-2: 12.5mm plasterboard, 19mm plank on 89mm timber studs with 60mm rock fibre insulation between, 9mm OSB board, cavity, 9mm OSB board, 89mm timber studs with 60mm rock fibre insulation, 19mm plank, 12.5mm plasterboard

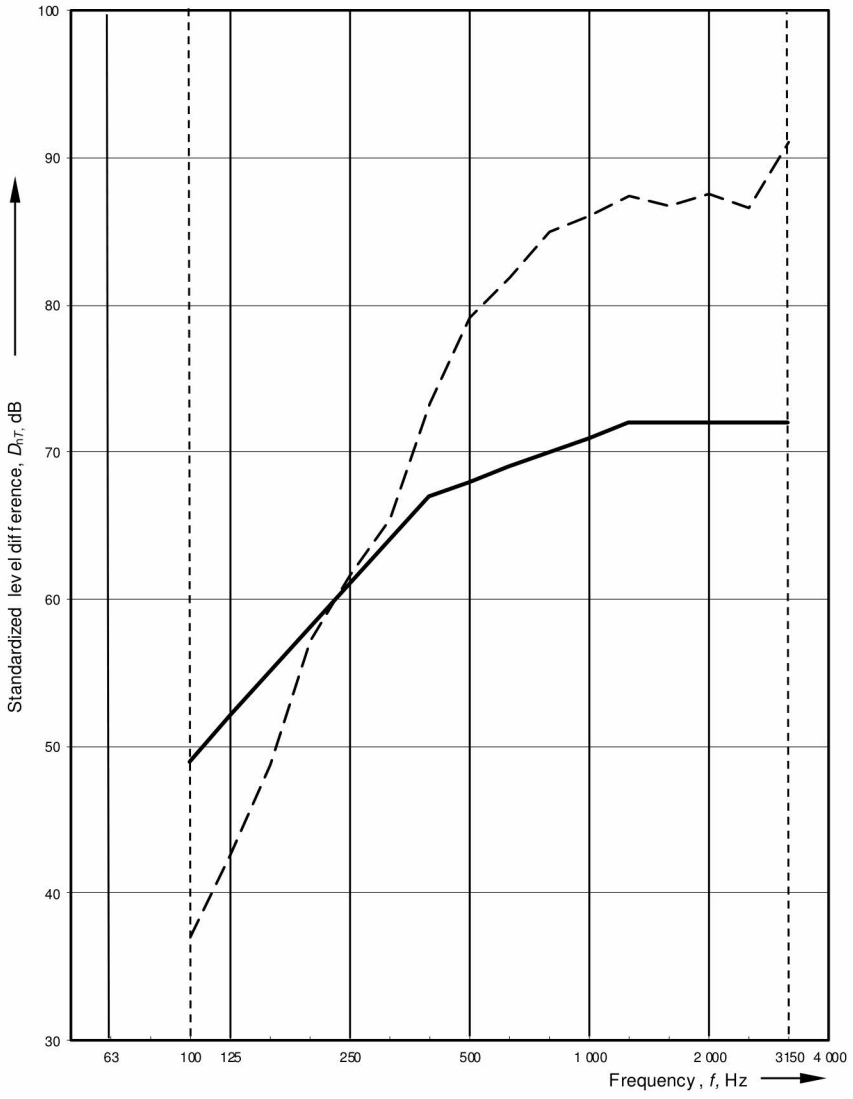
Figure: 130/97551/13_Wall Airborne 05

----- Frequency range according to the
——— curve of reference values (ISO 717: Part 1)

$D_{nT,w}+C_{tr}$ = 55dB

Frequency f Hz	D_{nT} (one-third octave) dB	
50		
63		
80		
100	37.0	
125	42.6	
160	48.8	
200	57.2	
250	61.6	
315	65.5	
400	73.3	
500	79.1	
630	81.9	
800	85.0	
1 000	86.1	
1 250	87.4	
1 600	≥86.7	*
2 000	87.6	
2 500	86.6	
3 150	≥91.1	*
4 000		
5 000		

* indicates the limit of measurement due to background noise.



Rating according to ISO 717 : Part 1 - 1997

$D_{nT,w}(C;C_{tr})$ = 68 (-5 ; -13)dB; | Total Deviation = 28.4

Evaluation based on field measurement results obtained by engineering method | Maximum Deviation = 12

No. of test report:	130/97551/13_Wall Airborne 05	Hunter Acoustics	
Date:	04 January 2024	Signature:	[redacted]

Standardized level difference according to ISO 140: Part 4 - 1998; Rating according to ISO 717: Part 1 - 1997
Field measurement of airborne sound insulation between rooms

Client: Interstrand | Date of Test: 04/01/2024 | Source room volume: 30 m^3

Project: Former Riva Bingo Site | Receiving room volume: 30 m^3

Test Description: F02 Bedroom 1 to F01 Bedroom 1 | Partition area: 12 m^2

Details of Construction: RSD E-WT-2: 12.5mm plasterboard, 19mm plank on 89mm timber studs with 60mm rock fibre insulation between, 9mm OSB board, cavity, 9mm OSB board, 89mm timber studs with 60mm rock fibre insulation, 19mm plank, 12.5mm plasterboard

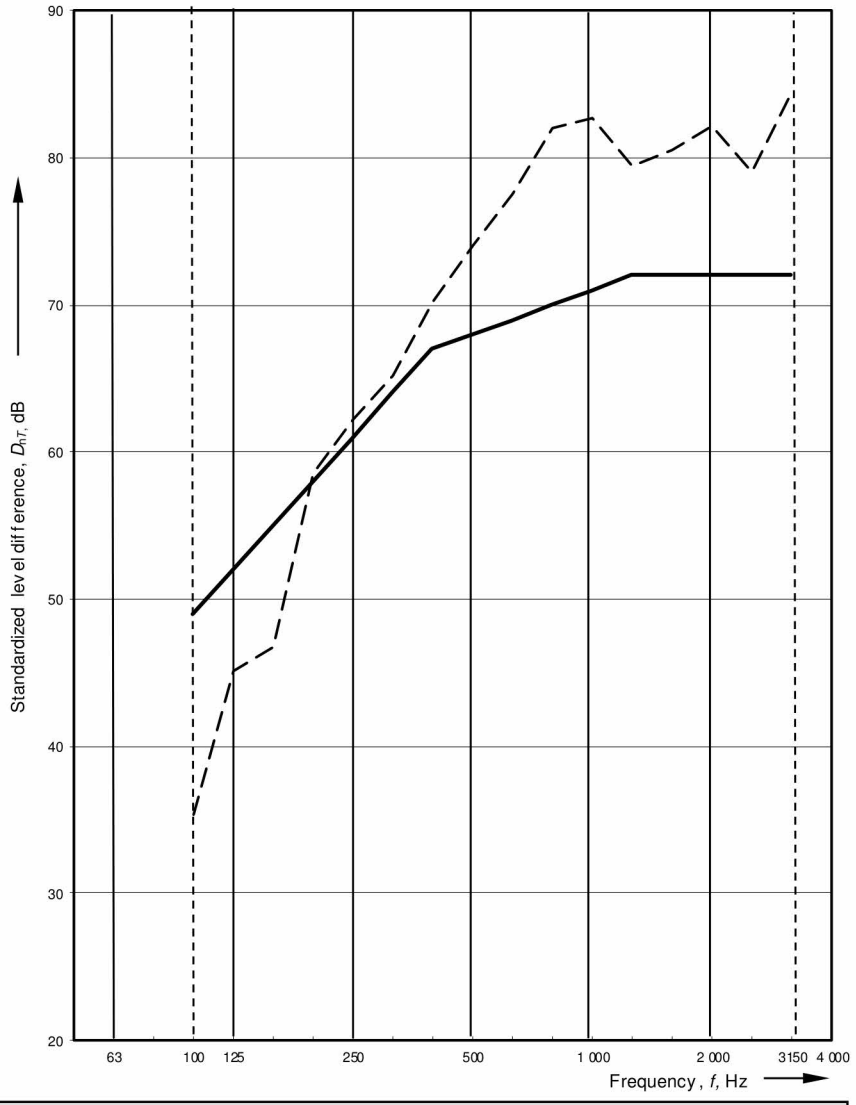
Figure: 130/97551/14_Wall Airborne 06

----- Frequency range according to the
——— curve of reference values (ISO 717: Part 1)

$D_{nT,w}+C_{tr}$ = **54dB**

Frequency f Hz	D_{nT} (one-third octave) dB	
50		
63		
80		
100	35.3	
125	45.1	
160	46.7	
200	58.6	
250	62.2	
315	65.2	
400	70.2	
500	74.0	
630	77.6	
800	82.1	
1 000	82.7	
1 250	79.4	
1 600	80.6	
2 000	≥82.2	*
2 500	79.1	
3 150	84.5	
4 000		
5 000		

* indicates the limit of measurement due to background noise.



Rating according to ISO 717 : Part 1 - 1997

$D_{nT,w}(C;C_{tr})$ = 68 (-6 ; -14)dB; | Total Deviation = 28.9

Evaluation based on field measurement results obtained by engineering method | Maximum Deviation = 13.7

No. of test report: 130/97551/14_Wall Airborne 06 | Hunter Acoustics

Date: 04 January 2024 | Signature: [redacted]

Standardized level difference according to ISO 140: Part 4 - 1998; Rating according to ISO 717: Part 1 - 1997
Field measurement of airborne sound insulation between rooms

Client: Interstrand | Date of Test: 04/01/2024 | Source room volume: 56 m^3

Project: Former Riva Bingo Site | Receiving room volume: 56 m^3

Test Description: G09 Lounge/Kitchen to G08 Lounge/Kitchen | Partition area: 17 m^2

Details of Construction: RSD E-WT-2: 12.5mm plasterboard, 19mm plank on 89mm timber studs with 60mm rock fibre insulation between, 9mm OSB board, cavity, 9mm OSB board, 89mm timber studs with 60mm rock fibre insulation, 19mm plank, 12.5mm plasterboard

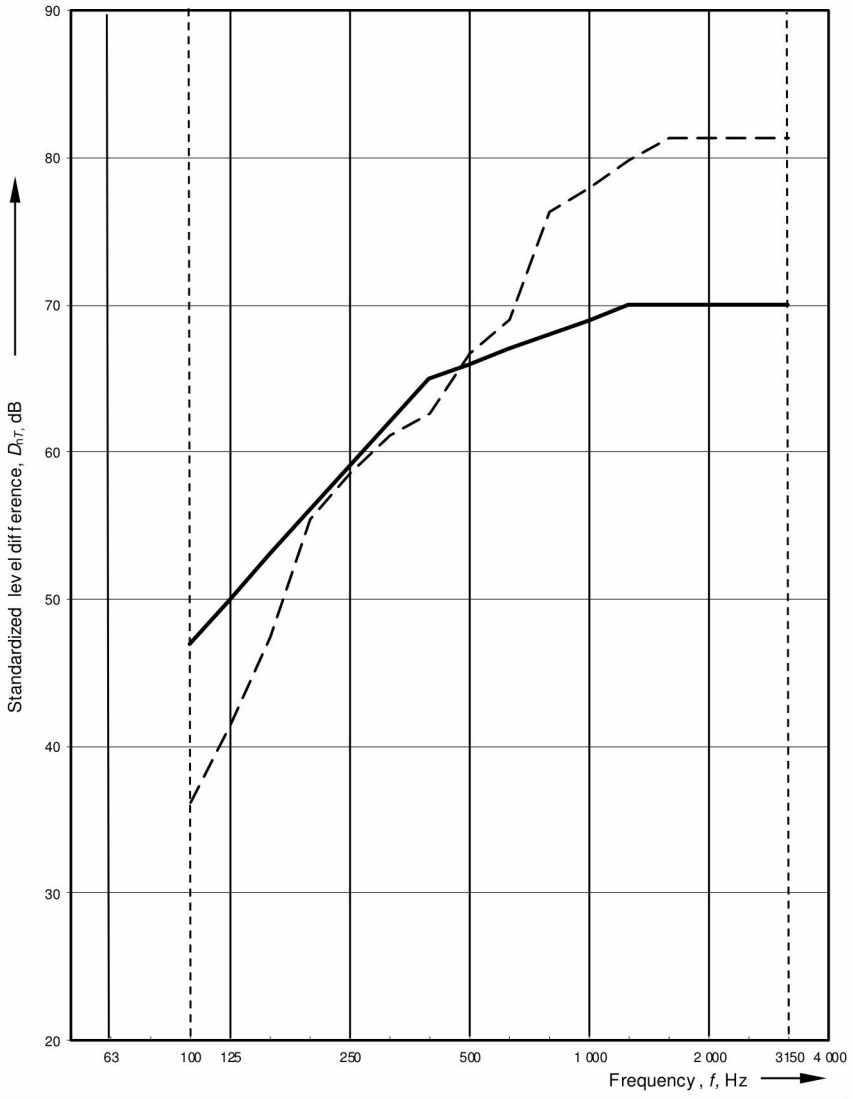
Figure: 130/97551/19_Wall Airborne 07

----- Frequency range according to the
——— curve of reference values (ISO 717: Part 1)

$D_{nT,w}+C_{tr}$ = **54dB**

Frequency f Hz	D_{nT} (one-third octave) dB	
50		
63		
80		
100	36.1	
125	41.4	
160	47.4	
200	55.5	
250	58.6	
315	61.1	
400	62.6	
500	66.7	
630	69.0	
800	76.3	
1 000	≥78	*
1 250	≥79.9	*
1 600	≥81.4	*
2 000	≥81.4	*
2 500	≥81.3	*
3 150	≥81.4	*
4 000		
5 000		

* indicates the limit of measurement due to background noise.



Rating according to ISO 717 : Part 1 - 1997

$D_{nT,w}(C;C_{tr})$ = 66 (-4 ; -12)dB; | Total Deviation = 29.3

Evaluation based on field measurement results obtained by engineering method | Maximum Deviation = 10.9

No. of test report: 130/97551/19_Wall Airborne 07 | Hunter Acoustics

Date: 04 January 2024 | Signature: [redacted]

Standardized level difference according to ISO 140: Part 4 - 1998; Rating according to ISO 717: Part 1 - 1997
Field measurement of airborne sound insulation between rooms

Client: Interstrand | Date of Test: 04/01/2024 | Source room volume: 56 m^3

Project: Former Riva Bingo Site | Receiving room volume: 56 m^3

Test Description: G03 Lounge/Kitchen to G04 Lounge/Kitchen | Partition area: 17 m^2

Details of Construction: RSD E-WT-2: 12.5mm plasterboard, 19mm plank on 89mm timber studs with 60mm rock fibre insulation between, 9mm OSB board, cavity, 9mm OSB board, 89mm timber studs with 60mm rock fibre insulation, 19mm plank, 12.5mm plasterboard

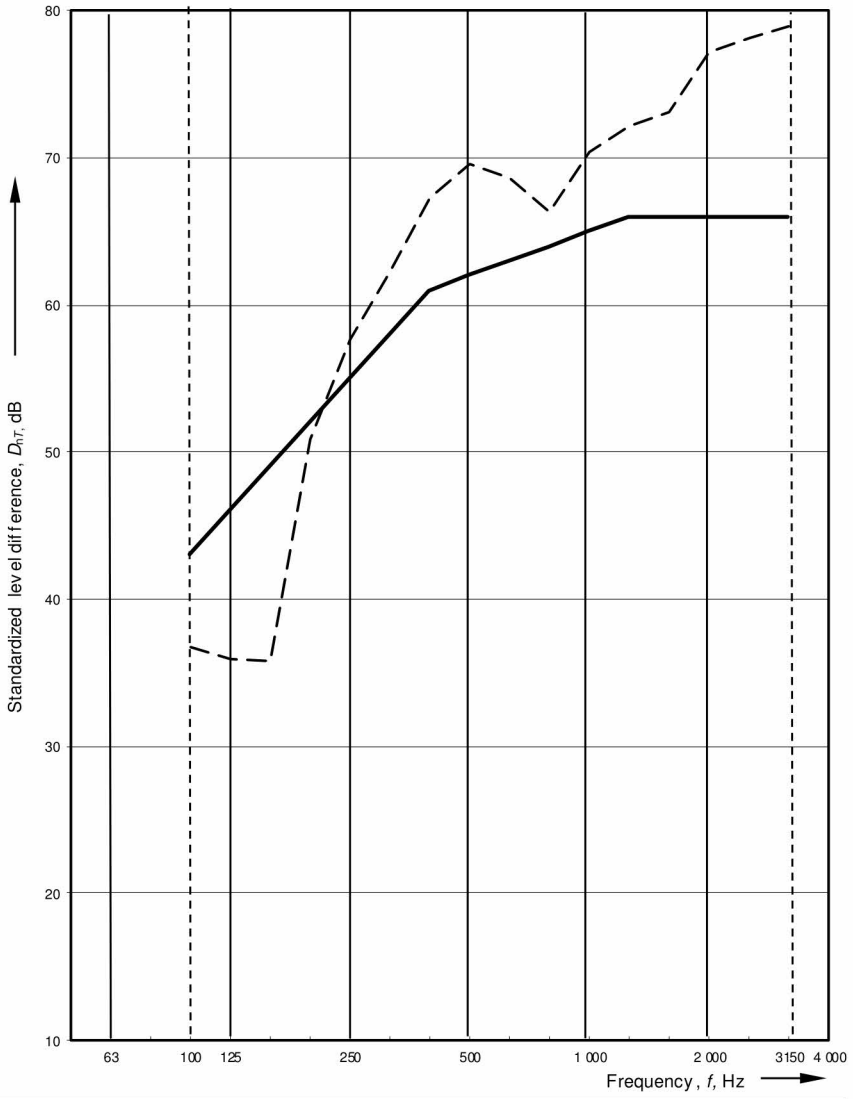
Figure: 130/97551/20_Wall Airborne 08

----- Frequency range according to the
——— curve of reference values (ISO 717: Part 1)

$D_{nT,w}+C_{tr}$ = 50dB

Frequency f Hz	D_{nT} (one-third octave) dB	
50		
63		
80		
100	36.8	
125	35.9	
160	35.8	
200	50.9	
250	57.6	
315	62.3	
400	67.3	
500	69.6	
630	68.6	
800	66.4	
1 000	70.4	
1 250	72.2	
1 600	73.1	
2 000	77.2	
2 500	78.1	
3 150	≥79	*
4 000		
5 000		

* indicates the limit of measurement due to background noise.



Rating according to ISO 717 : Part 1 - 1997

$D_{nT,w}(C;C_{tr})$ = 62 (-6 ; -12)dB; | Total Deviation = 30.6

Evaluation based on field measurement results obtained by engineering method | Maximum Deviation = 13.2

No. of test report: 130/97551/20_Wall Airborne 08 | Hunter Acoustics

Date: 04 January 2024 | Signature: [redacted]

C.2 Floor Airborne Sound Insulation Test Results

Standardized level difference according to ISO 140: Part 4 - 1998; Rating according to ISO 717: Part 1 - 1997
Field measurement of airborne sound insulation between rooms

Client: Interstrand	Date of Test: 08/12/2023	Source room volume:	56 m^3
Project: Former Riva Bingo Site		Receiving room volume:	56 m^3
Test Description: T04 Kitchen / Dining Room to S05 Kitchen / Dining Room		Partition area:	23 m^2

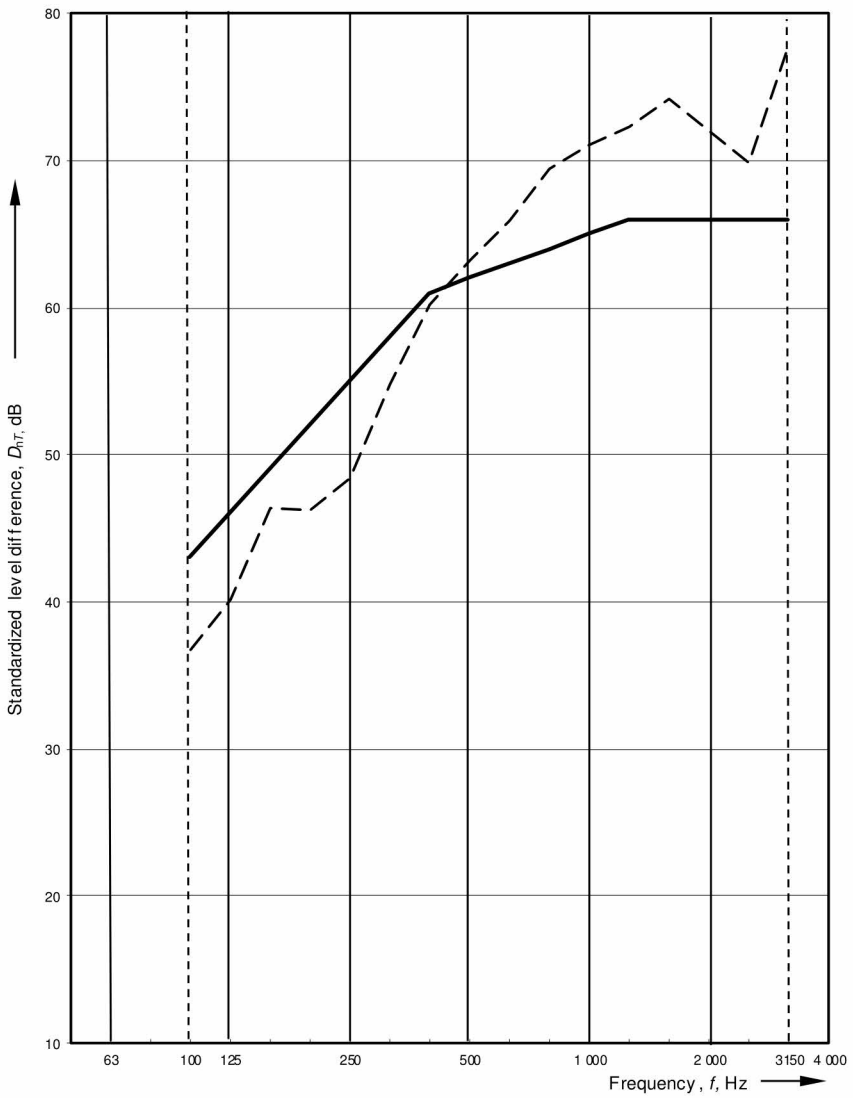
Details of Construction: RSD E-FT-5: Carpet on Cellecta Screedboard 28 on 18mm wood based board on 235mm timber joists with 100mm mineral wall between. 2no layers of 15mm plasterboard on resilient bars, MF ceiling with 1no layer 12.5mm plasterboard and 150mm clear void

Figure: 130/97551/03_Floor Airborne 01

$D_{nT,w}+C_{tr}$ = **53dB**

Frequency f Hz	D_{nT} (one-third octave) dB	
50		
63		
80		
100	36.7	
125	40.1	
160	46.4	
200	46.2	
250	48.4	
315	54.8	
400	60.2	
500	63.2	
630	66.0	
800	69.4	
1 000	71.1	
1 250	72.3	
1 600	≥74.2	*
2 000	≥72	*
2 500	69.9	
3 150	≥77.9	*
4 000		
5 000		

* indicates the limit of measurement due to background noise.



Rating according to ISO 717 : Part 1 - 1997

$D_{nT,w}(C;C_{tr})$ = 62 (-3 ; -9)dB;

Total Deviation = 31.2

Evaluation based on field measurement results obtained by engineering method

Maximum Deviation = 6.6

No. of test report:	130/97551/03_Floor Airborne 01	Hunter Acoustics	
Date:	08 December 2023	Signature:	

Standardized level difference according to ISO 140: Part 4 - 1998; Rating according to ISO 717: Part 1 - 1997
Field measurement of airborne sound insulation between rooms

Client: Interstrand | Date of Test: 08/12/2023 | Source room volume: 30 m^3

Project: Former Riva Bingo Site | Receiving room volume: 30 m^3

Test Description: T04 Bedroom to S05 Bedroom | Partition area: 13 m^2

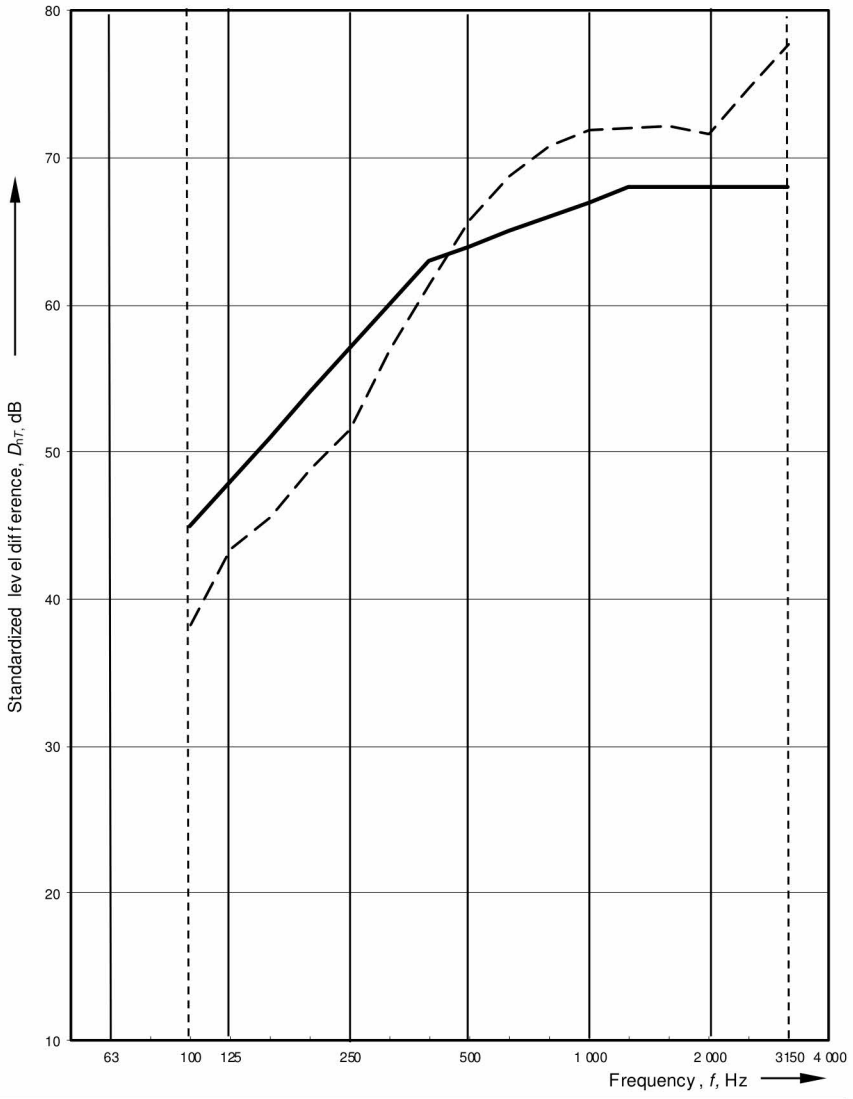
Details of Construction: RSD E-FT-5: Carpet on Cellecta Screedboard 28 on 18mm wood based board on 235mm timber joists with 100mm mineral wall between. 2no layers of 15mm plasterboard on resilient bars, MF ceiling with 1no layer 12.5mm plasterboard and 150mm clear void

Figure: 130/97551/04_Floor Airborne 02

----- Frequency range according to the
——— curve of reference values (ISO 717: Part 1)

$D_{nT,w}+C_{tr}$ = 55dB

Frequency f Hz	D_{nT} (one-third octave) dB
50	
63	
80	
100	38.3
125	43.4
160	45.6
200	48.8
250	51.6
315	57.0
400	61.5
500	65.8
630	68.8
800	70.8
1 000	71.9
1 250	72.1
1 600	72.2
2 000	71.7
2 500	74.8
3 150	77.8
4 000	
5 000	



Rating according to ISO 717 : Part 1 - 1997

$D_{nT,w}(C;C_{tr})$ = 64 (-3 ; -9)dB; | Total Deviation = 31.8

Evaluation based on field measurement results obtained by engineering method | Maximum Deviation = 6.7

No. of test report:	130/97551/04_Floor Airborne 02	Hunter Acoustics	[redacted]
Date:	08 December 2023	Signature:	

Standardized level difference according to ISO 140: Part 4 - 1998; Rating according to ISO 717: Part 1 - 1997
Field measurement of airborne sound insulation between rooms

Client: Interstrand | Date of Test: 08/12/2023 | Source room volume: 56 m^3

Project: Former Riva Bingo Site | Receiving room volume: 56 m^3

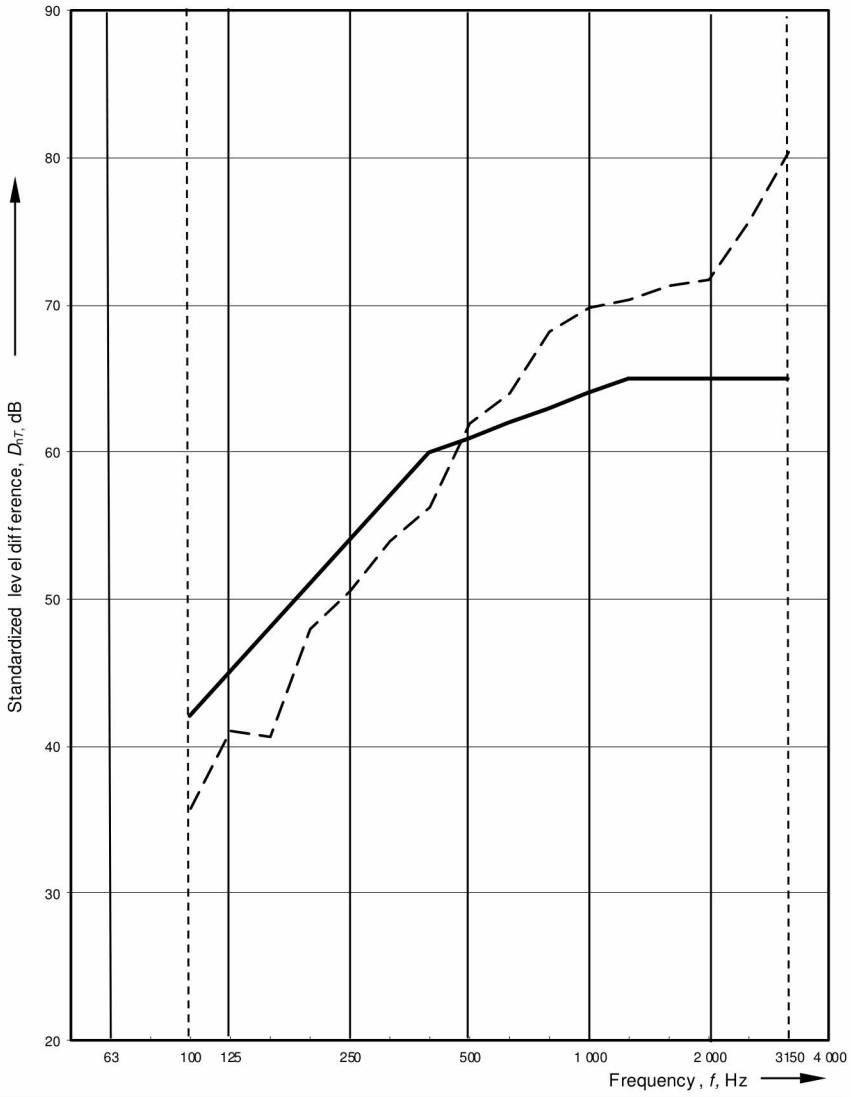
Test Description: S02 Living Room / Kitchen to F02 Living Room / Kitchen | Partition area: 23 m^2

Details of Construction: RSD E-FT-5: Cellecta Screedboard 28 on 18mm wood based board on 235mm timber joists with 100mm mineral wall between. 2no layers of 15mm plasterboard on resilient bars, MF ceiling with 1no layer 12.5mm plasterboard and 150mm clear void

Figure: 130/97551/09_Floor Airborne 03

$D_{nT,w}+C_{tr}$ = **52dB**

Frequency f Hz	D_{nT} (one-third octave) dB
50	
63	
80	
100	35.8
125	41.0
160	40.6
200	48.0
250	50.5
315	54.0
400	56.3
500	62.0
630	64.0
800	68.2
1 000	69.8
1 250	70.4
1 600	71.3
2 000	71.7
2 500	75.6
3 150	80.4
4 000	
5 000	



Rating according to ISO 717 : Part 1 - 1997

$D_{nT,w}(C;C_{tr})$ = 61 (-3 ; -9)dB; | Total Deviation = 30.8

Evaluation based on field measurement results obtained by engineering method | Maximum Deviation = 7.4

No. of test report: 130/97551/09_Floor Airborne 03 | Hunter Acoustics

Date: 08 December 2023 | Signature: [redacted]

Standardized level difference according to ISO 140: Part 4 - 1998; Rating according to ISO 717: Part 1 - 1997
Field measurement of airborne sound insulation between rooms

Client: Interstrand | Date of Test: 08/12/2023 | Source room volume: 30 m^3

Project: Former Riva Bingo Site | Receiving room volume: 30 m^3

Test Description: S02 Bedroom to F02 Bedroom | Partition area: 13 m^2

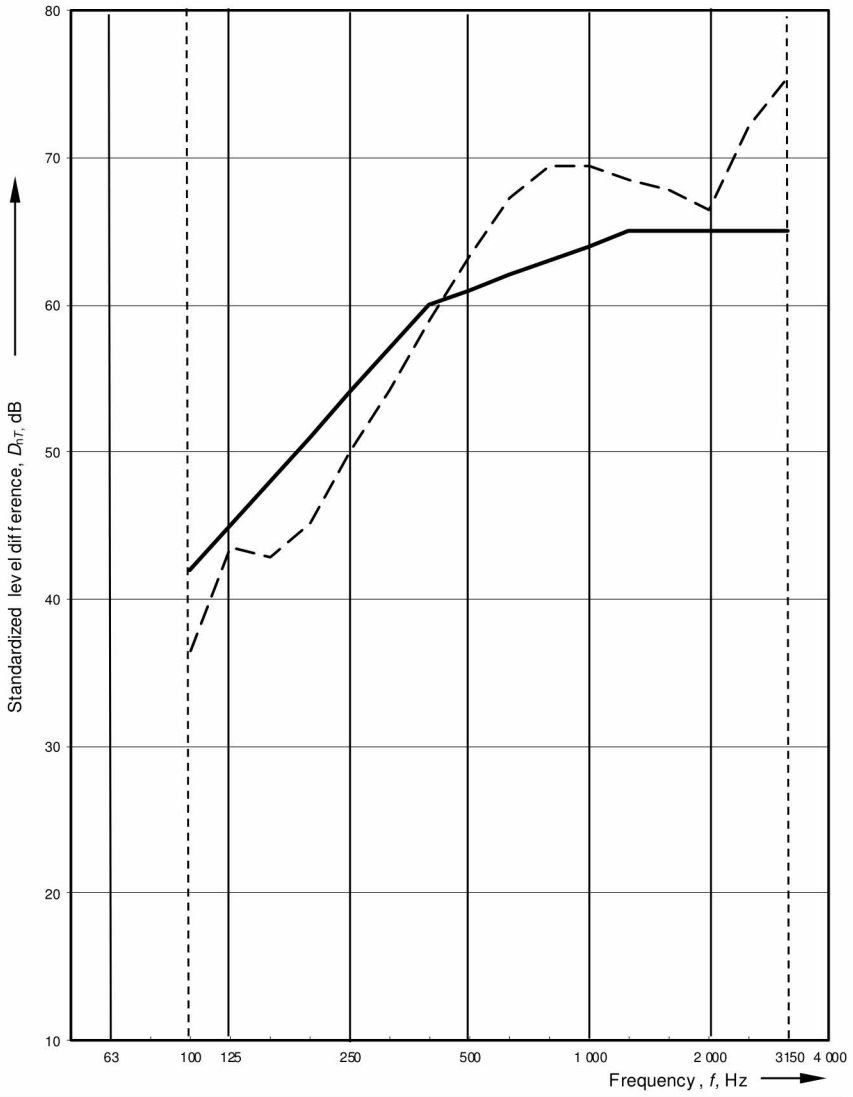
Details of Construction: RSD E-FT-5: Cellecta Screedboard 28 on 18mm wood based board on 235mm timber joists with 100mm mineral wall between. 2no layers of 15mm plasterboard on resilient bars, MF ceiling with 1no layer 12.5mm plasterboard and 150mm clear void

Figure: 130/97551/10_Floor Airborne 04

----- Frequency range according to the curve of reference values (ISO 717: Part 1)

$D_{nT,w}+C_{tr}$ = **53dB**

Frequency f Hz	D_{nT} (one-third octave) dB
50	
63	
80	
100	36.5
125	43.5
160	42.9
200	45.1
250	50.0
315	54.3
400	59.0
500	63.3
630	67.3
800	69.5
1 000	69.5
1 250	68.5
1 600	67.9
2 000	66.5
2 500	72.2
3 150	75.6
4 000	
5 000	



Rating according to ISO 717 : Part 1 - 1997

$D_{nT,w}(C;C_{tr})$ = 61 (-2 ; -8)dB; | Total Deviation = 25.7

Evaluation based on field measurement results obtained by engineering method | Maximum Deviation = 5.9

No. of test report: 130/97551/10_Floor Airborne 04 | Hunter Acoustics [redacted]

Date: 08 December 2023 | Signature:

Standardized level difference according to ISO 140: Part 4 - 1998; Rating according to ISO 717: Part 1 - 1997
Field measurement of airborne sound insulation between rooms

Client: Interstrand | Date of Test: 04/01/2024 | Source room volume: 56 m^3

Project: Former Riva Bingo Site | Receiving room volume: 56 m^3

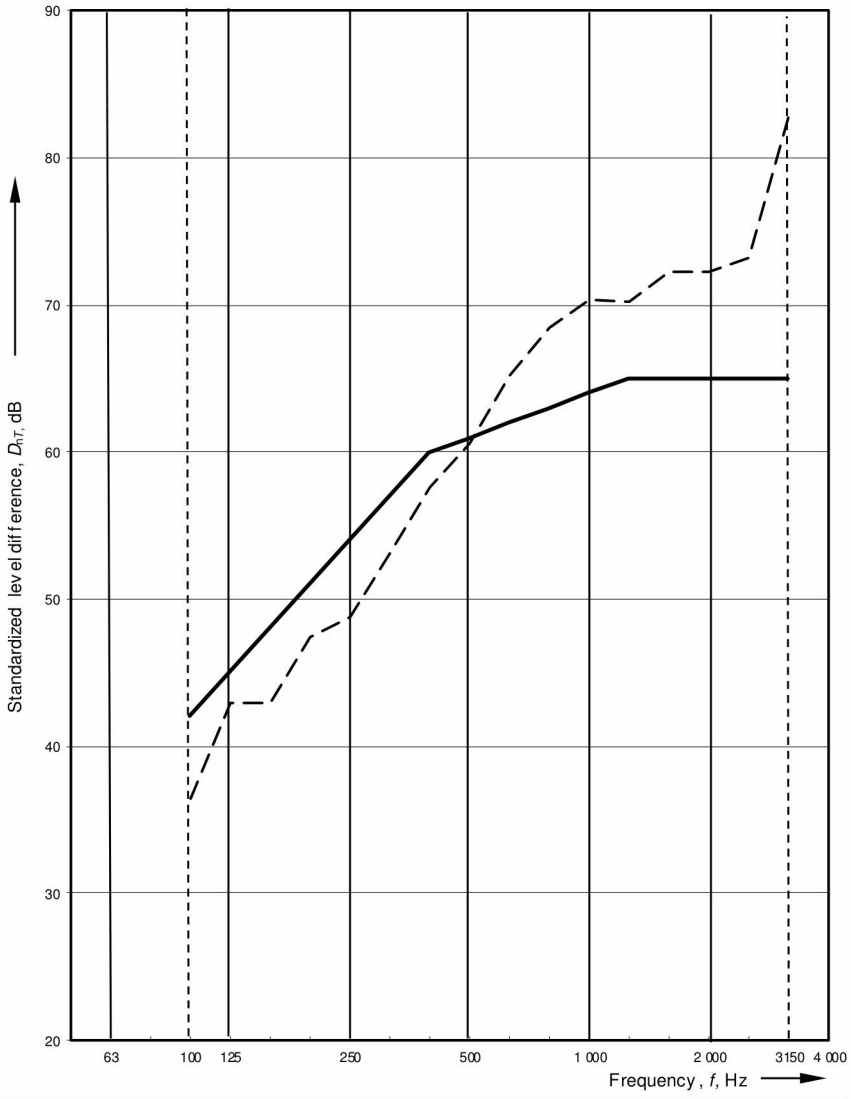
Test Description: F08 Lounge/Kitchen to G07 Lounge/Kitchen | Partition area: 23 m^2

Details of Construction: RSD E-FT-5: Cellecta Screedboard 28 on 18mm wood based board on 235mm timber joists with 100mm mineral wall between. 2no layers of 15mm plasterboard on resilient bars, MF ceiling with 1no layer 12.5mm plasterboard and 150mm clear void

Figure: 130/97551/15_Floor Airborne 05

$D_{nT,w}+C_{tr}$ = **53dB**

Frequency f Hz	D_{nT} (one-third octave) dB
50	
63	
80	
100	36.4
125	43.0
160	42.9
200	47.4
250	48.8
315	53.1
400	57.6
500	60.6
630	65.2
800	68.5
1 000	70.4
1 250	70.2
1 600	72.3
2 000	72.3
2 500	73.2
3 150	82.9
4 000	
5 000	



Rating according to ISO 717 : Part 1 - 1997

$D_{nT,w}(C;C_{tr})$ = 61 (-2 ; -8)dB; | Total Deviation = 28.2

Evaluation based on field measurement results obtained by engineering method | Maximum Deviation = 5.6

No. of test report: 130/97551/15_Floor Airborne 05 | Hunter Acoustics

Date: 04 January 2024 | Signature: [redacted]

Standardized level difference according to ISO 140: Part 4 - 1998; Rating according to ISO 717: Part 1 - 1997
Field measurement of airborne sound insulation between rooms

Client: Interstrand | Date of Test: 04/01/2024 | Source room volume: 30 m^3

Project: Former Riva Bingo Site | Receiving room volume: 30 m^3

Test Description: F08 Bedroom 1 to G07 Bedroom 1 | Partition area: 13 m^2

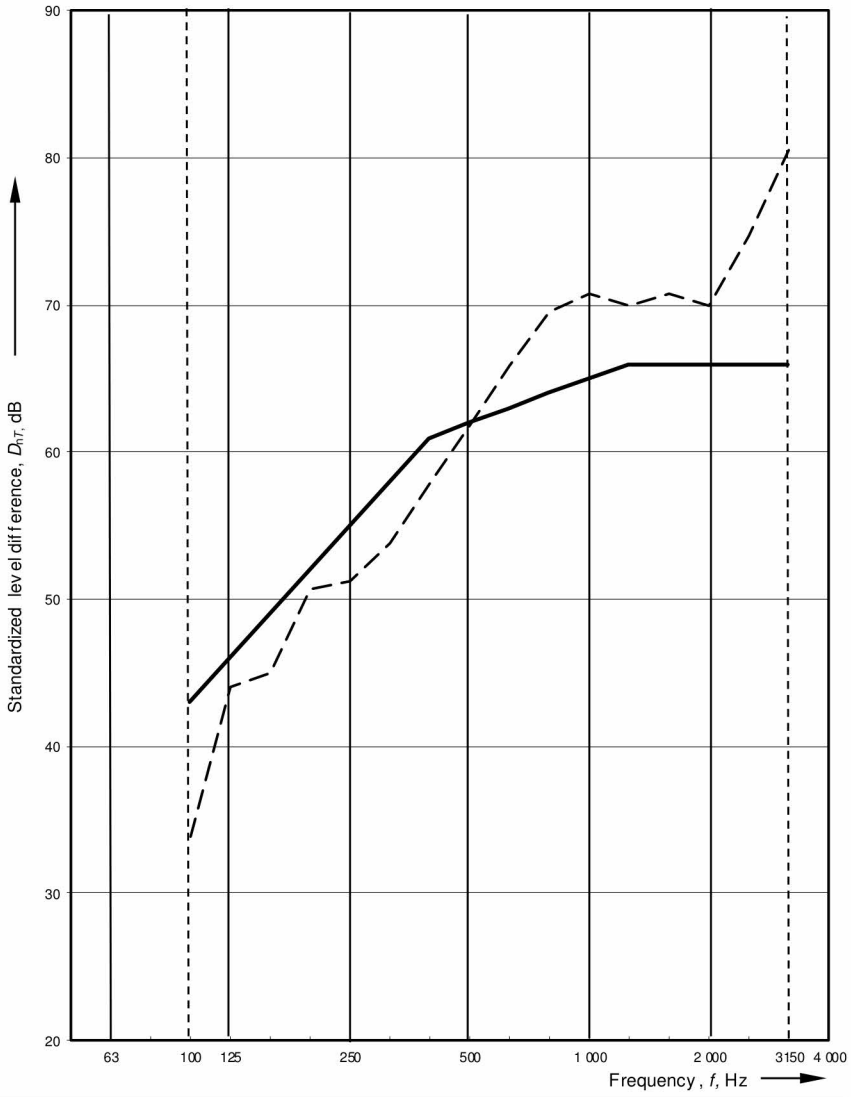
Details of Construction: RSD E-FT-5: Cellecta Screedboard 28 on 18mm wood based board on 235mm timber joists with 100mm mineral wall between. 2no layers of 15mm plasterboard on resilient bars, MF ceiling with 1no layer 12.5mm plasterboard and 150mm clear void

Figure: 130/97551/16_Floor Airborne 06

----- Frequency range according to the
——— curve of reference values (ISO 717: Part 1)

$D_{nT,w}+C_{tr}$ = **52dB**

Frequency f Hz	D_{nT} (one-third octave) dB
50	
63	
80	
100	33.9
125	44.0
160	45.0
200	50.7
250	51.2
315	53.8
400	57.9
500	61.8
630	65.9
800	69.5
1 000	70.8
1 250	70.0
1 600	70.8
2 000	69.9
2 500	74.7
3 150	80.6
4 000	
5 000	



Rating according to ISO 717 : Part 1 - 1997

$D_{nT,w}(C;C_{tr})$ = 62 (-3 ; -10)dB; | Total Deviation = 27.7

Evaluation based on field measurement results obtained by engineering method | Maximum Deviation = 9.1

No. of test report: 130/97551/16_Floor Airborne 06 | Hunter Acoustics

Date: 04 January 2024 | Signature: [redacted]

Standardized level difference according to ISO 140: Part 4 - 1998; Rating according to ISO 717: Part 1 - 1997
Field measurement of airborne sound insulation between rooms

Client: Interstrand | Date of Test: 04/01/2024 | Source room volume: 30 m^3

Project: Former Riva Bingo Site | Receiving room volume: 30 m^3

Test Description: F02 Bedroom 1 to G01 Bedroom 1 | Partition area: 13 m^2

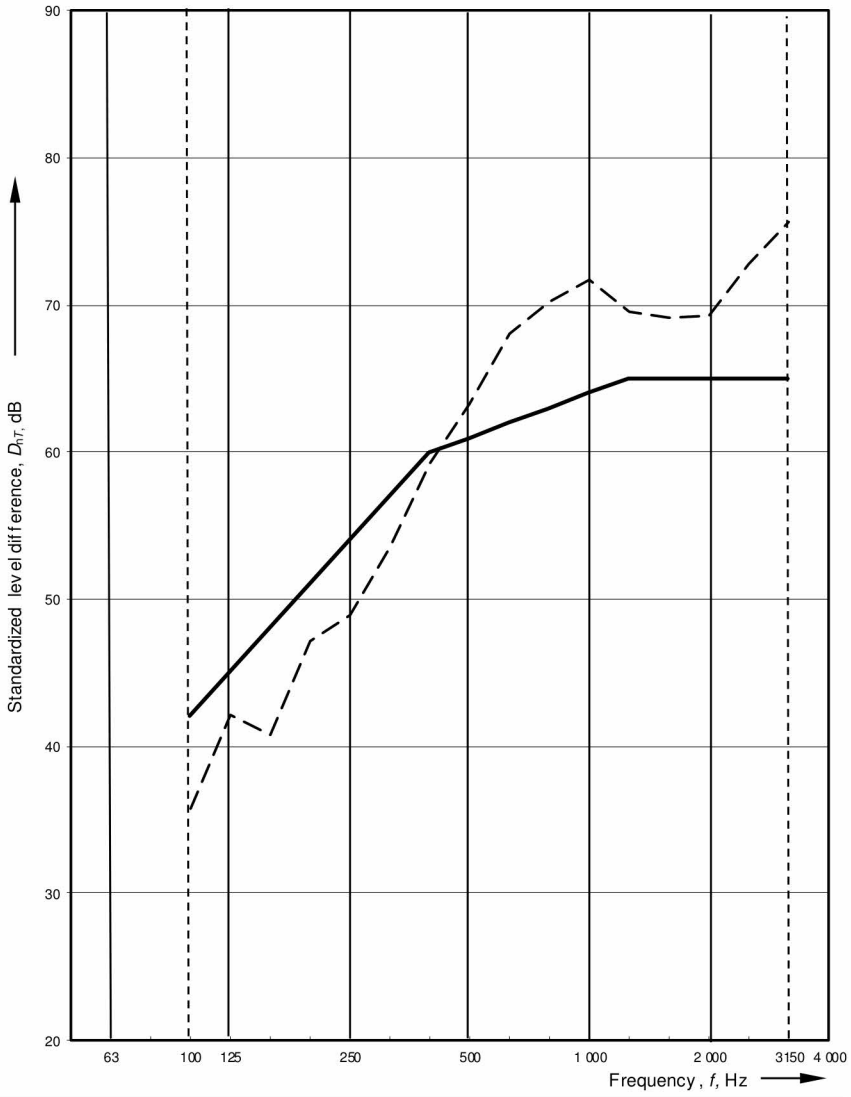
Details of Construction: RSD E-FT-5: Cellecta Screedboard 28 on 18mm wood based board on 235mm timber joists with 100mm mineral wall between. 2no layers of 15mm plasterboard on resilient bars, MF ceiling with 1no layer 12.5mm plasterboard and 150mm clear void

Figure: 130/97551/21_Floor Airborne 07

----- Frequency range according to the curve of reference values (ISO 717: Part 1)

$D_{nT,w}+C_{tr}$ = **52dB**

Frequency f Hz	D_{nT} (one-third octave) dB
50	
63	
80	
100	35.7
125	42.1
160	40.8
200	47.2
250	48.9
315	53.6
400	59.3
500	63.3
630	68.0
800	70.3
1 000	71.7
1 250	69.6
1 600	69.1
2 000	69.3
2 500	72.8
3 150	75.6
4 000	
5 000	



Rating according to ISO 717 : Part 1 - 1997

$D_{nT,w}(C;C_{tr})$ = 61 (-3 ; -9)dB; | Total Deviation = 29.4

Evaluation based on field measurement results obtained by engineering method | Maximum Deviation = 7.2

No. of test report: 130/97551/21_Floor Airborne 07 | Hunter Acoustics

Date: 04 January 2024 | Signature: [redacted]

Standardized level difference according to ISO 140: Part 4 - 1998; Rating according to ISO 717: Part 1 - 1997
Field measurement of airborne sound insulation between rooms

Client: Interstrand | Date of Test: 04/01/2024 | Source room volume: 56 m^3

Project: Former Riva Bingo Site | Receiving room volume: 56 m^3

Test Description: F02 Lounge/Kitchen to G01 Lounge/Kitchen | Partition area: 23 m^2

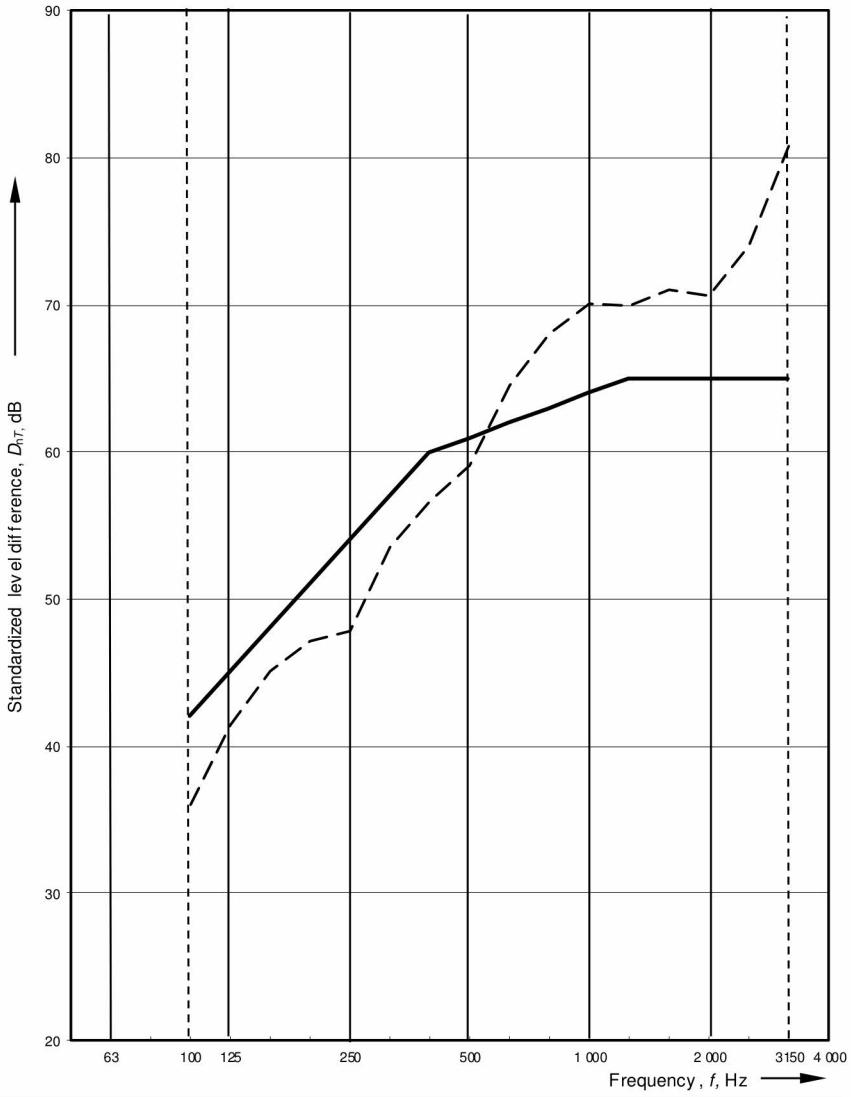
Details of Construction: RSD E-FT-5: Cellecta Screedboard 28 on 18mm wood based board on 235mm timber joists with 100mm mineral wall between. 2no layers of 15mm plasterboard on resilient bars, MF ceiling with 1no layer 12.5mm plasterboard and 150mm clear void

Figure: 130/97551/22_Floor Airborne 08

----- Frequency range according to the
——— curve of reference values (ISO 717: Part 1)

$D_{nT,w}+C_{tr}$ = **53dB**

Frequency f Hz	D_{nT} (one-third octave) dB
50	
63	
80	
100	36.0
125	41.5
160	45.1
200	47.1
250	47.9
315	53.5
400	56.6
500	59.1
630	64.5
800	68.1
1 000	70.1
1 250	69.9
1 600	71.0
2 000	70.7
2 500	74.0
3 150	80.8
4 000	
5 000	



Rating according to ISO 717 : Part 1 - 1997

$D_{nT,w}(C;C_{tr})$ = 61 (-2 ; -8)dB; | Total Deviation = 31.2

Evaluation based on field measurement results obtained by engineering method | Maximum Deviation = 6.1

No. of test report: 130/97551/22_Floor Airborne 08 | Hunter Acoustics

Date: 04 January 2024 | Signature: [redacted]

C.3 Floor Impact Sound Insulation Test Results

Standardized impact sound pressure levels according to ISO 140 : Part 7 - 1998
Field measurements of impact sound insulation of floors

Client: Interstrand | Date of Test: 08/12/2023 | Source room volume: 56 m^3
Project: Former Riva Bingo Site | Receiving room volume: 56 m^3
Test Description: T04 Kitchen / Dining Room to S05 Kitchen / Dining Room | Partition Area: 23 m^2

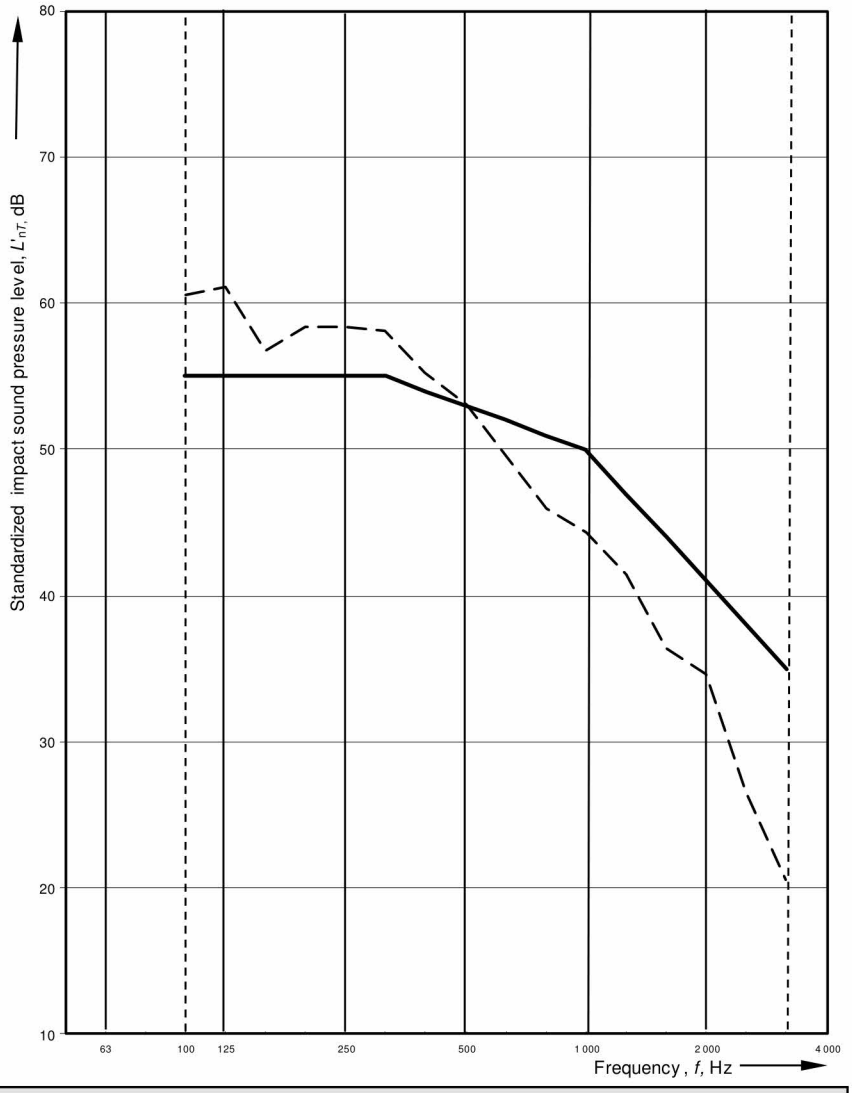
Details of Construction: RSD E-FT-5: Carpet on Cellecta Screedboard 28 on 18mm wood based board on 235mm timber joists with 100mm mineral wall between. 2no layers of 15mm plasterboard on resilient bars, MF ceiling with 1no layer 12.5mm plasterboard and 150mm clear void

Figure: 130/97551/05_Floor Impact 01

------ Frequency range according to the
——— curve of reference values (ISO 717: Part 2)

$L'_{nT,w}$ = 53 dB

Frequency f Hz	L'_{nT} (one-third octave) dB
50	
63	
80	
100	60.6
125	61.1
160	56.8
200	58.4
250	58.4
315	58.1
400	55.3
500	53.0
630	49.5
800	46.0
1 000	44.3
1 250	41.5
1 600	36.4
2 000	34.6
2 500	26.6
3 150	20.6
4 000	
5 000	



Rating according to ISO 717: Part 2 - 1997

$L'_{nT,w}$ = 53 dB

Evaluation based on field measurement results obtained in one-third octave bands by an engineering method

Maximum deviation = 6.1

No. of test report:	130/97551/05_Floor Impact 01	Hunter Acoustics	
Date:	08 December 2023	Signature:	[redacted]

Standardized impact sound pressure levels according to ISO 140 : Part 7 - 1998
Field measurements of impact sound insulation of floors

Client: Interstrand | Date of Test: 08/12/2023 | Source room volume: 30 m^3

Project: Former Riva Bingo Site | Receiving room volume: 30 m^3

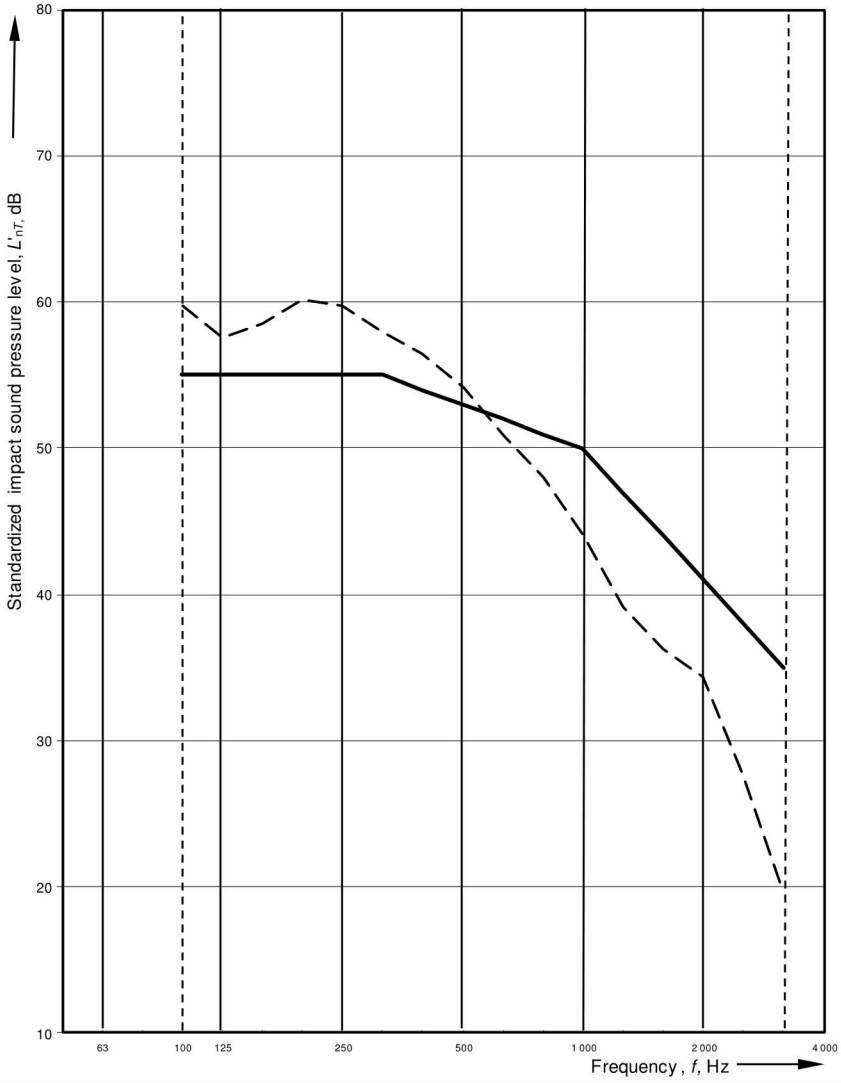
Test Description: T04 Bedroom to S05 Bedroom | Partition Area: 13 m^2

Details of Construction: RSD E-FT-5: Carpet on Cellecta Screedboard 28 on 18mm w ood based board on 235mm timber joists w ith 100mm mineral w all betw een. 2no layers of 15mm plasterboard on resilient bars, MF ceiling w ith 1no layer 12.5mm plasterboard and 150mm clear void

Figure: 130/97551/06_Floor Impact 02

$L'_{nT,w}$ = **53 dB**

Frequency f Hz	L'_{nT} (one-third octave) dB
50	
63	
80	
100	59.8
125	57.5
160	58.5
200	60.1
250	59.7
315	58.0
400	56.5
500	54.2
630	50.9
800	48.0
1 000	44.1
1 250	39.1
1 600	36.3
2 000	34.3
2 500	27.7
3 150	19.8
4 000	
5 000	



Rating according to ISO 717: Part 2 - 1997

$L'_{nT,w}$ = 53 dB

Evaluation based on field measurement results obtained in one-third octave bands by an engineering method

Maximum deviation = 5.1

No. of test report:	130/97551/06_Floor Impact 02	Hunter Acoustics	[redacted]
Date:	08 December 2023	Signature:	

Standardized impact sound pressure levels according to ISO 140 : Part 7 - 1998
Field measurements of impact sound insulation of floors

Client: Interstrand | Date of Test: 08/12/2023 | Source room volume: 56 m^3

Project: Former Riva Bingo Site | Receiving room volume: 56 m^3

Test Description: S02 Living Room / Kitchen to F02 Living Room / Kitchen | Partition Area: 23 m^2

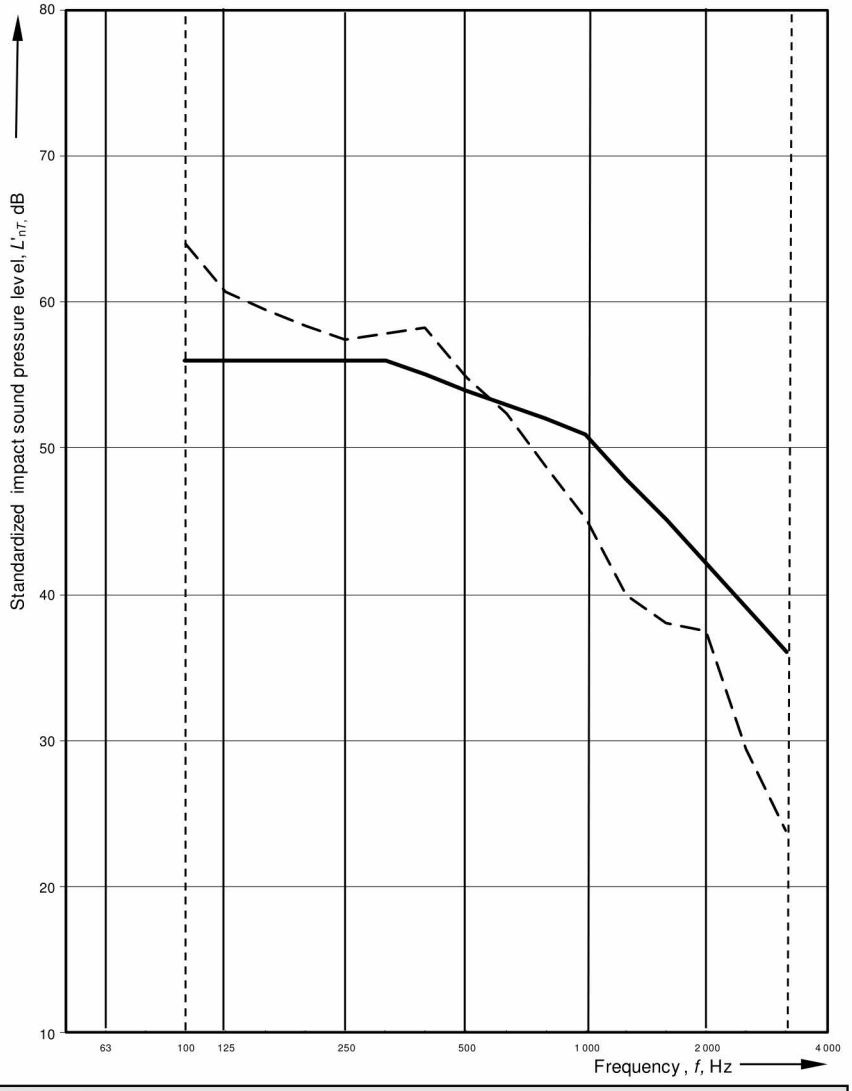
Details of Construction: RSD E-FT-5: Cellecta Screedboard 28 on 18mm wood based board on 235mm timber joists with 100mm mineral wall between. 2no layers of 15mm plasterboard on resilient bars, MF ceiling with 1no layer 12.5mm plasterboard and 150mm clear void

Figure: 130/97551/11_Floor Impact 03

$L'_{nT,w}$ = **54 dB**

Frequency f Hz	L'_{nT} (one-third octave) dB
50	
63	
80	
100	64.0
125	60.7
160	59.5
200	58.4
250	57.4
315	57.8
400	58.2
500	54.8
630	52.4
800	48.7
1 000	45.1
1 250	40.0
1 600	38.1
2 000	37.5
2 500	29.5
3 150	23.8 *
4 000	
5 000	

* indicates the limit of measurement due to background noise.



Rating according to ISO 717: Part 2 - 1997

$L'_{nT,w}$ = 54 dB

Evaluation based on field measurement results obtained in one-third octave bands by an engineering method

Maximum deviation = 8.0

No. of test report:	130/97551/11_Floor Impact 03	Hunter Acoustics	[redacted]
Date:	08 December 2023	Signature:	

Standardized impact sound pressure levels according to ISO 140 : Part 7 - 1998
Field measurements of impact sound insulation of floors

Client: Interstrand | Date of Test: 08/12/2023 | Source room volume: 30 m^3

Project: Former Riva Bingo Site | Receiving room volume: 30 m^3

Test Description: S02 Bedroom to F02 Bedroom | Partition Area: 13 m^2

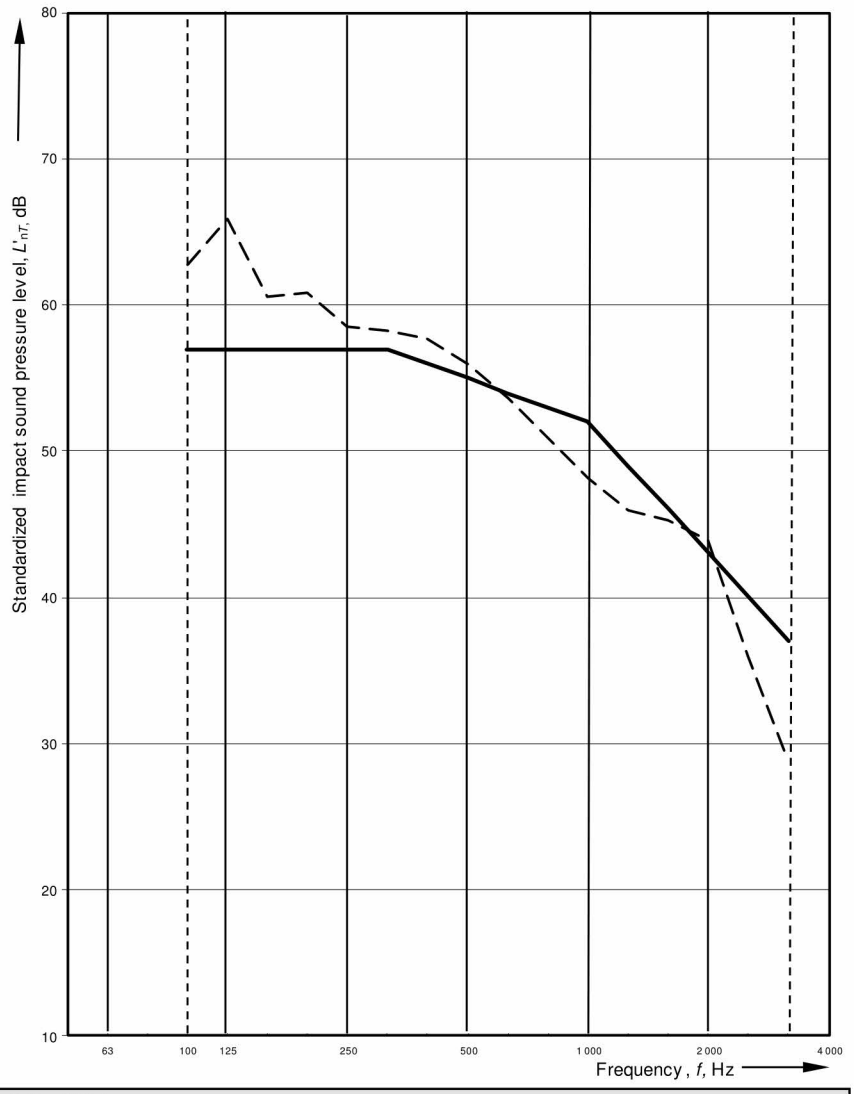
Details of Construction: RSD E-FT-5: Cellecta Screedboard 28 on 18mm wood based board on 235mm timber joists with 100mm mineral wall between. 2no layers of 15mm plasterboard on resilient bars, MF ceiling with 1no layer 12.5mm plasterboard and 150mm clear void

Figure: 130/97551/12_Floor Impact 04

$L'_{nT,w}$ = **55 dB**

Frequency f Hz	L'_{nT} (one-third octave) dB
50	
63	
80	
100	62.8
125	65.9
160	60.5
200	60.8
250	58.5
315	58.3
400	57.7
500	55.9
630	53.6
800	50.9
1 000	48.2
1 250	46.0
1 600	45.3
2 000	43.9
2 500	36.0
3 150	28.9 *
4 000	
5 000	

* indicates the limit of measurement due to background noise.



Rating according to ISO 717: Part 2 - 1997

$L'_{nT,w}$ = 55 dB

Evaluation based on field measurement results obtained in one-third octave bands by an engineering method

Maximum deviation = 8.9

No. of test report:	130/97551/12_Floor Impact 04	Hunter Acoustics	[redacted]
Date:	08 December 2023	Signature:	

Standardized impact sound pressure levels according to ISO 140 : Part 7 - 1998
Field measurements of impact sound insulation of floors

Client: Interstrand | Date of Test: 04/01/2024 | Source room volume: 56 m^3

Project: Former Riva Bingo Site | Receiving room volume: 56 m^3

Test Description: F08 Lounge/Kitchen to G07 Lounge/Kitchen | Partition Area: 23 m^2

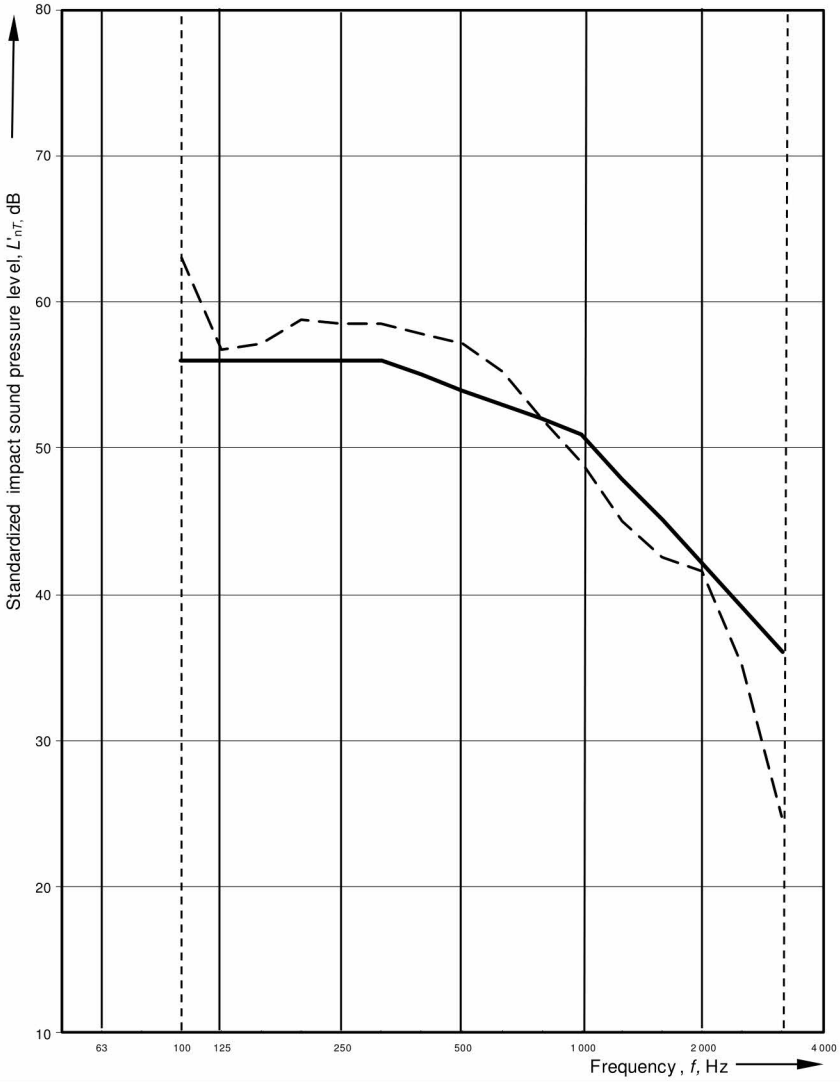
Details of Construction: RSD E-FT-5: Cellecta Screedboard 28 on 18mm wood based board on 235mm timber joists with 100mm mineral wall between. 2no layers of 15mm plasterboard on resilient bars, MF ceiling with 1no layer 12.5mm plasterboard and 150mm clear void

Figure: 130/97551/17_Floor Impact 05

------ Frequency range according to the
——— curve of reference values (ISO 717: Part 2)

$L'_{nT,w}$ = 54 dB

Frequency f Hz	L'_{nT} (one-third octave) dB
50	
63	
80	
100	63.0
125	56.7
160	57.1
200	58.8
250	58.5
315	58.5
400	57.8
500	57.2
630	55.2
800	51.9
1 000	49.0
1 250	45.0
1 600	42.5
2 000	41.6
2 500	35.2
3 150	24.8
4 000	
5 000	



Rating according to ISO 717: Part 2 - 1997

$L'_{nT,w}$ = 54 dB

Evaluation based on field measurement results obtained in one-third octave bands by an engineering method | Maximum deviation = 7.0

No. of test report:	130/97551/17_Floor Impact 05	Hunter Acoustics	[redacted]
Date:	04 January 2024	Signature:	

Standardized impact sound pressure levels according to ISO 140 : Part 7 - 1998
Field measurements of impact sound insulation of floors

Client: Interstrand | Date of Test: 04/01/2024 | Source room volume: 30 m^3

Project: Former Riva Bingo Site | Receiving room volume: 30 m^3

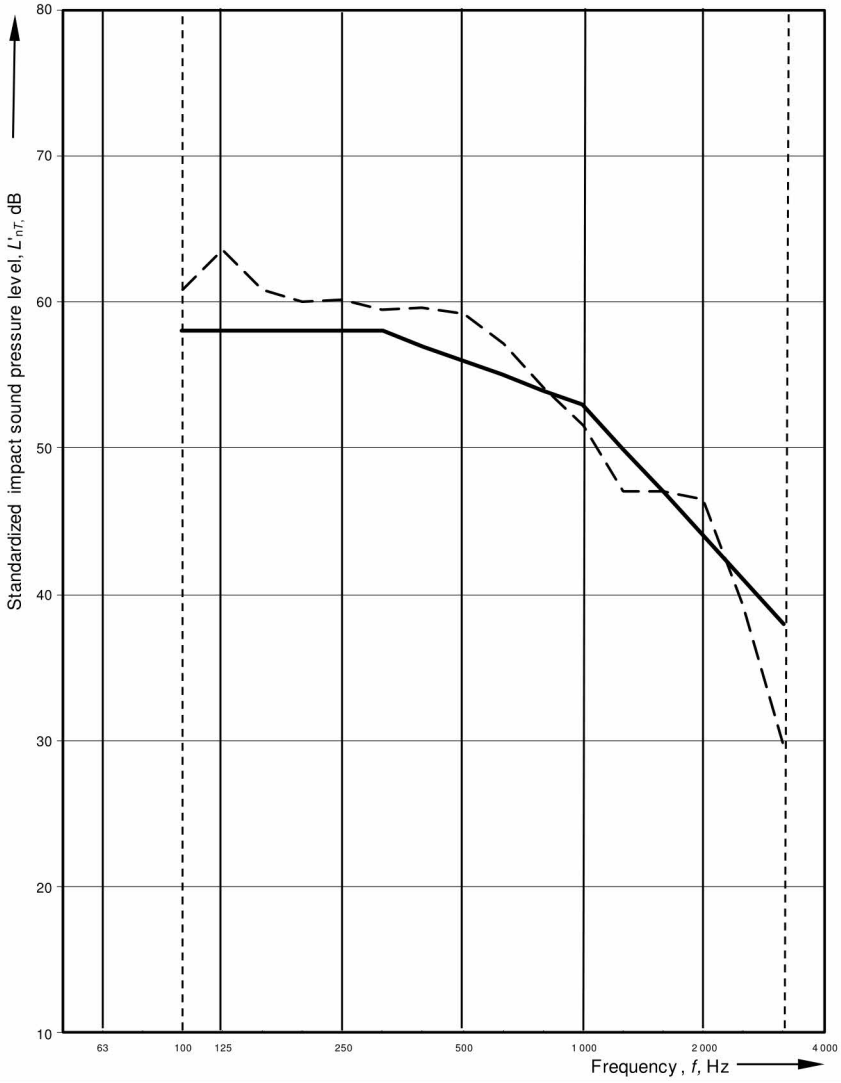
Test Description: F08 Bedroom 1 to G07 Bedroom 1 | Partition Area: 13 m^2

Details of Construction: RSD E-FT-5: Cellecta Screedboard 28 on 18mm wood based board on 235mm timber joists with 100mm mineral wall between. 2no layers of 15mm plasterboard on resilient bars, MF ceiling with 1no layer 12.5mm plasterboard and 150mm clear void

Figure: 130/97551/18_Floor Impact 06

$L'_{nT,w}$ = **56 dB**

Frequency f Hz	L'_{nT} (one-third octave) dB
50	
63	
80	
100	60.8
125	63.6
160	60.8
200	60.0
250	60.1
315	59.5
400	59.6
500	59.2
630	57.2
800	54.1
1 000	51.6
1 250	47.1
1 600	47.0
2 000	46.5
2 500	39.2
3 150	29.8
4 000	
5 000	



Rating according to ISO 717: Part 2 - 1997

$L'_{nT,w}$ = 56 dB

Evaluation based on field measurement results obtained in one-third octave bands by an engineering method

Maximum deviation = 5.6

No. of test report:	130/97551/18_Floor Impact 06	Hunter Acoustics	[redacted]
Date:	04 January 2024	Signature:	

Standardized impact sound pressure levels according to ISO 140 : Part 7 - 1998
Field measurements of impact sound insulation of floors

Client: Interstrand | Date of Test: 04/01/2024 | Source room volume: 30 m^3

Project: Former Riva Bingo Site | Receiving room volume: 30 m^3

Test Description: F02 Bedroom 1 to G01 Bedroom 1 | Partition Area: 13 m^2

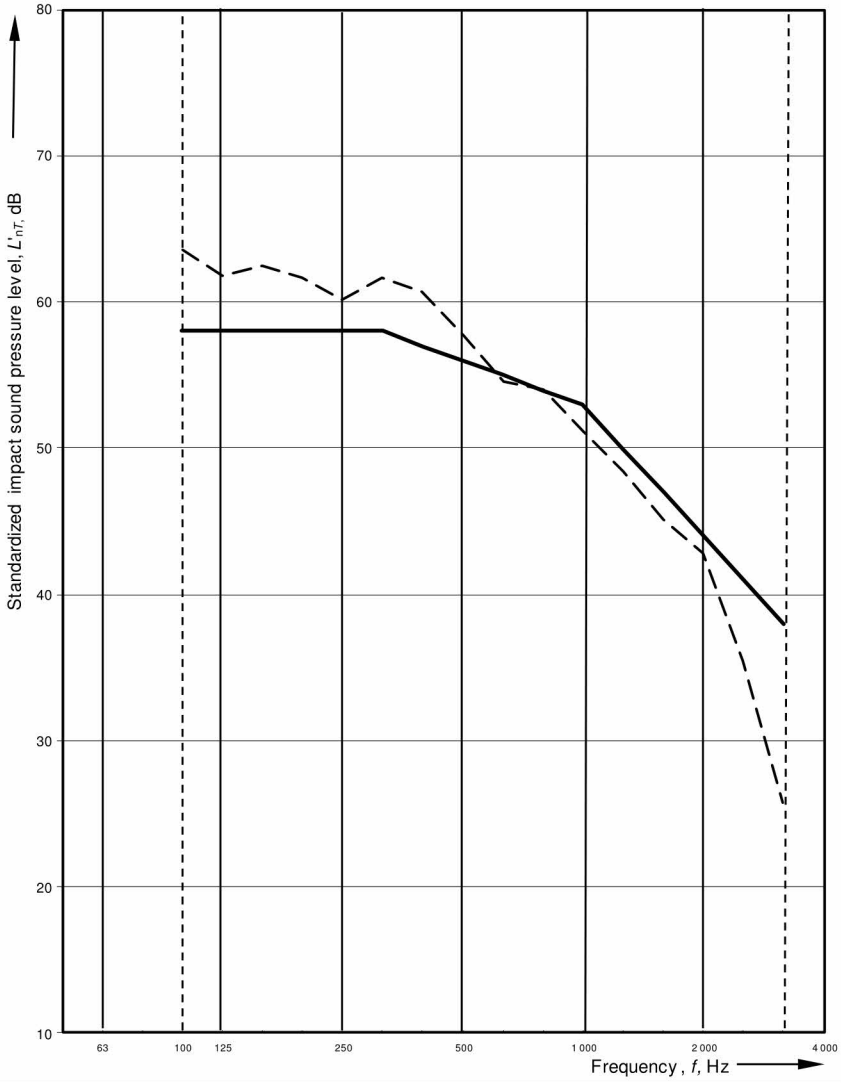
Details of Construction: RSD E-FT-5: Cellecta Screedboard 28 on 18mm wood based board on 235mm timber joists with 100mm mineral wall between. 2no layers of 15mm plasterboard on resilient bars, MF ceiling with 1no layer 12.5mm plasterboard and 150mm clear void

Figure: 130/97551/23_Floor Impact 07

------ Frequency range according to the curve of reference values (ISO 717: Part 2)

$L'_{nT,w}$ = **56 dB**

Frequency f Hz	L'_{nT} (one-third octave) dB
50	
63	
80	
100	63.5
125	61.8
160	62.5
200	61.7
250	60.1
315	61.6
400	60.7
500	57.7
630	54.5
800	54.0
1 000	51.2
1 250	48.4
1 600	45.1
2 000	42.8
2 500	35.5
3 150	25.8
4 000	
5 000	



Rating according to ISO 717: Part 2 - 1997

$L'_{nT,w}$ = 56 dB

Evaluation based on field measurement results obtained in one-third octave bands by an engineering method | Maximum deviation = 5.5

No. of test report:	130/97551/23_Floor Impact 07	Hunter Acoustics	
Date:	04 January 2024	Signature:	[redacted]

Standardized impact sound pressure levels according to ISO 140 : Part 7 - 1998
Field measurements of impact sound insulation of floors

Client: Interstrand | Date of Test: 04/01/2024 | Source room volume: 56 m^3

Project: Former Riva Bingo Site | Receiving room volume: 56 m^3

Test Description: F02 Lounge/Kitchen to G01 Lounge/Kitchen | Partition Area: 23 m^2

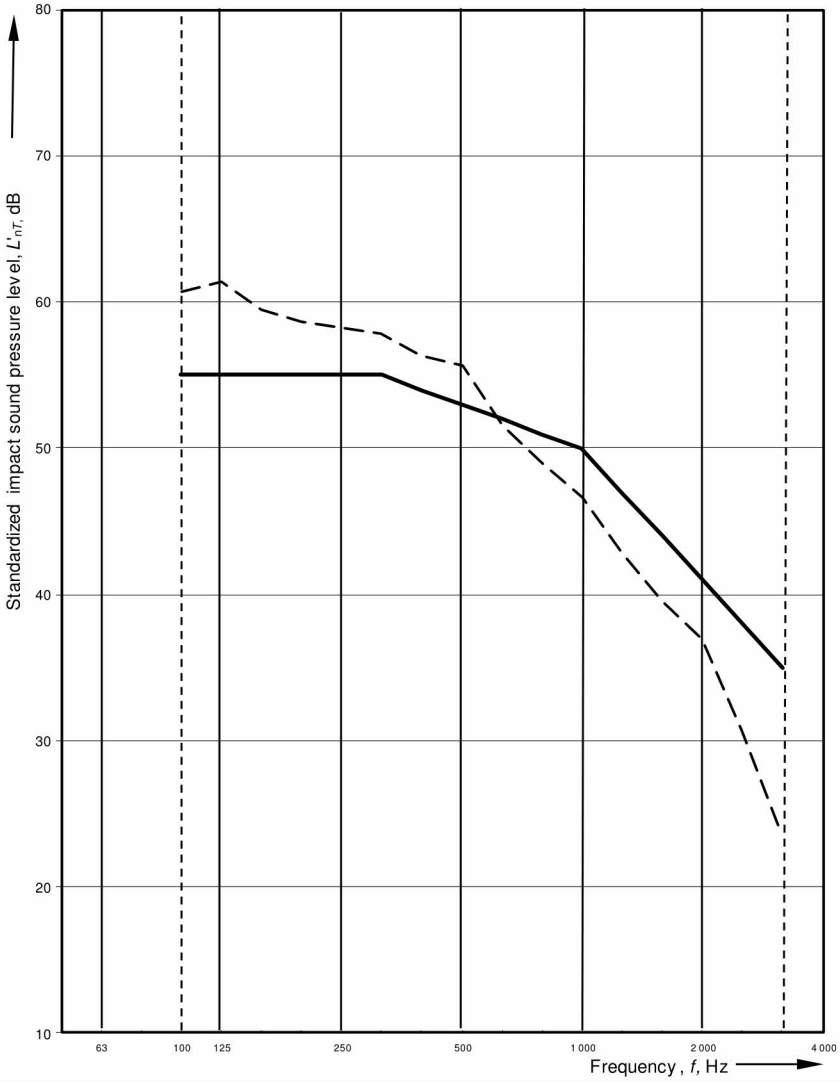
Details of Construction: RSD E-FT-5: Cellecta Screedboard 28 on 18mm wood based board on 235mm timber joists with 100mm mineral wall between. 2no layers of 15mm plasterboard on resilient bars, MF ceiling with 1no layer 12.5mm plasterboard and 150mm clear void

Figure: 130/97551/24_Floor Impact 08

------ Frequency range according to the
——— curve of reference values (ISO 717: Part 2)

$L'_{nT,w}$ = **53 dB**

Frequency f Hz	L'_{nT} (one-third octave) dB
50	
63	
80	
100	60.7
125	61.4
160	59.5
200	58.7
250	58.2
315	57.8
400	56.3
500	55.7
630	51.5
800	48.9
1 000	46.7
1 250	42.8
1 600	39.5
2 000	36.9
2 500	30.7
3 150	23.6
4 000	
5 000	



Rating according to ISO 717: Part 2 - 1997

$L'_{nT,w}$ = 53 dB

Evaluation based on field measurement results obtained in one-third octave bands by an engineering method

Maximum deviation = 6.4

No. of test report:	130/97551/24_Floor Impact 08	Hunter Acoustics	
Date:	04 January 2024	Signature:	[redacted]

APPENDIX D - TEST EQUIPMENT CALIBRATION CERTIFICATES

Figure 1 – Norsonic 140 SLM Calibration Certificate (serial no. 1403003)

Laboratory Location

Campbell Associates Ltd
5b Chelmsford Road Industrial Estate
GREAT DUNMOW, Essex, GB-CM6 1HD
Phone 01371 871030

0789

Certificate of Calibration and Conformance

Certificate number: **U45770**

Test Object:	**Sound Level Meter, BS EN IEC 61672-1:2003 Class 1** **Associated Frequency Analyser to BS EN IEC 61260:1996 Class 1**
Producer:	**Norsonic AS.**
Type:	**140**
Serial number:	**1403003**
Customer:	**Hunter Acoustics**
Address:	**Henstaff Court Business Centre,** **Llantrisant Road, Pontyclun, Cardiff. CF72 8NG.**
Contact Person:	**Matthew Hunter**
Order No:	**HUN001**

Introduction:
Calibration has been performed as set out in CA Technical Procedures which are based on the procedures for periodic verification of sound level meters as per the **Test Object** listed above. Results and conformance statement are overleaf and detailed results, where appropriate, are provided in the attached Measurement Report.

Tested:	*Producer*	*Type*	*Serial No*	*Certificate No*
Microphone	Norsonic	1225	91797	45769
Calibrator*	Norsonic	1251	30873	U43256
Preamplifier	Norsonic	1209	12403	Included

* The calibrator was complete with any required coupler for the microphone specified.

Additional items that have also been submitted for verification:

Wind shield	Norsonic	Nor1451 (60mm)
Attenuator	N/A	
Extension cable	N/A	

These items have been taken into account wherever appropriate.

Instruction Manual: Im140_1Ed8R0En Firmware Version: v2.1.670 The test object is a single channel instrument.

Conditions	*Pressure kPa*	*Temperature °C*	*Humidity %RH*
Reference conditions	101.325	23	50
Measurement conditions	98.42 ±0.02	22.08 ±0.45	52.60 ±2.9

Calibration Dates:

Received date:	18/10/2023	Reviewed date:	27/10/2023
Calibration date:	26/10/2023	Issued date:	27/10/2023

Technicians: (Electronic certificate)

Calibrated by: *Palaniwel Marappan B.Eng (Hons), M.Sc*

Reviewed by: *Jenny Crawford*

This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

Doc ref: SIm-Cert-Master-V3-07

Figure 2 – Norsonic 1251 Calibrator Calibration Certificate (serial no. 31429)

Laboratory Location

Campbell Associates Ltd
5b Chelmsford Road Industrial Estate
GREAT DUNMOW, Essex, GB-CM6 1HD
Phone 01371 871030

ilac-MRA UKAS CALIBRATION 0789 CALIBRATION

Certificate of Calibration and Conformance

Certificate number: **U43629**

Test Object: **Sound Calibrator**

Producer: **Norsonic AS.**
Type: **1251**
Serial number: **31429**
Customer: **Hunter Acoustics**
Address: **Henstaffe Court Business Centre, Llantrisant Road, Pontyclun, Cardiff, CF72 8NG**
Contact Person: **Jane Griffiths**
Order No: **2023/MT01**

Measurement Results	Level dB	Level Stability dB	Frequency Hz	Distortion %
Measurement 1	114.06	0.05	999.54	0.35
Measurement 2	114.05	0.05	999.54	0.35
Measurement 3	114.06	0.05	999.53	0.35
Result (Average):	**114.06**	**0.05**	**999.54**	**0.35**
Expanded Uncertainty:	0.1	0.02	1	0.1
Degree of Freedom:	>100	>100	>100	>100
Coverage Factor:	2	2	2	2

The stated level is relative to 20µPa. The level is traceable to National Standards. The stated level is valid at reference conditions. The following correction factors have been applied during the measurement
Pres:0.0005 dB/kPa Temp:0.003 dB/°C Humi:0 dB/%RH Load volume: 0.0003 dB/mm3

Conditions	*Pressure kPa*	*Temperature °C*	*Humidity %RH*
Reference conditions	101.325	23	50
Measurement conditions	98.814 ±0.045	23 ±0.1	35.5 ±0.9

The reported expanded uncertainty of measurements is based on a standard uncertainty multiplied by the coverage factor of k=2, providing a level of confidence of approximately 95%. Where the degrees of freedom are insufficient to maintain this confidence level, the coverage factor is increased to maintain this confidence level. The uncertainty has been determined in accordance with UKAS requirements.

Records: K:\C A\Calibration\Nor-1504\Nor-1018 CalCal\Current Year\NOR1251_31429_M1.nmf

Preconditioning
The equipment was preconditioned for more than 4 hours in the specified calibration environment.

Method
Calibration has been performed as set out in the current version of CA Technical procedure TP01

Calibration Dates:

Received date:	03/03/2023	Reviewed date:	09/03/2023
Calibration date:	09/03/2023	Issued date:	09/03/2023

Technicians: (Electronic certificate)
Calibrated by: *Katie Brown*
Reviewed by: *Jenny Crawford*

This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

Doc ref: Calb-Cert-Master-V3-05

Figure 3 – Tapping Machine Calibration Certificate (serial no. TP02032)

Sound | Solutions
Products Limited

MANUFACTURER'S CERTIFICATE OF CONFORMANCE RENEWAL

Tapping Machine

Certificate No: TP02032/02/23

Serial No: TP02032

This is to certify that the tapping machine, identified above, has been tested before dispatch and conforms to the requirements of the following Standards:

BS EN ISO 140-7:1998
BS EN ISO 140-8:1998

The results of the above test are retained on file and can be inspected upon request.
The following items were checked for conformance with the requirements of the Standards:

Mass of hammers	*complies*
Strike velocity of hammers	*complies*
Diameter of hammer heads	*complies*
Radius of curvature of hammer heads	*complies*
Falling direction of hammers	*complies*
Strike rate of hammers	*complies*
Time between successive hammer impacts	*complies*
Average time between impacts	*complies*

Equipment supplied by: Sound Solutions Products Ltd.

Test carried out by: Simon Barrett

Signature: [redacted]

Date of Test: 15/02/2023

Sound Solutions Products Ltd, 8 Highdown House, Shoreham Airport, West Sussex BN43 5PB
Tel: 01273 455074 Fax: 01273 455075 e-mail: info@aasussex.co.uk
Company Registration No. 5299317