

Technical Report

81890-SRL-RP-XT-001-PI

Project

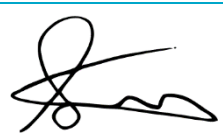
The Laboratory Measurement of The
Airborne and Impact Sound Insulation of
Various Timber Floor Constructions

Prepared for

AMC Mekanocaucho

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1.0 Description of Test

Tests have been done in SRL's Laboratory at Holbrook House, Sudbury, Suffolk, to determine the sound reduction index and impact sound transmission of various timber floor constructions in accordance with BS EN ISO 10140-2:2021 and BS EN ISO 10140-3:2021.

For the sound reduction index tests the results are given in 1/3rd octave bands over the frequency range 50Hz to 10kHz, which is beyond that required by the test standard.

For the impact sound transmission tests the results are given in 1/3rd octave bands over the frequency range 50Hz to 5kHz, which is beyond that required by the test standard.

Measurements outside the standard frequency range are not UKAS accredited.

1.1 Description of Sample

Various timber floor constructions were installed in our East Laboratory and tested. For more details and descriptions of floors tested, see Section 2.0, Data Sheets 1 to 12 and Drawings 1 to 4.

Sampling plan:	Enough for tests only
Sample condition:	New
Details supplied by:	AMC Mecanocaucho
Sample installed by:	SRL Technical Services Ltd

1.2 Sample Delivery Dates

21 and 23 May 2024

1.3 Test Procedures

The sample was mounted/located and tested in accordance with the relevant standard. The details of measurements are given in Appendix A. The method and procedure are described in Appendix B and D. The measurement uncertainty is given in Appendix C & E.

2.0 Results

The results of the measurements and subsequent analysis are given in Data Sheets 1 to 12 and summarised below.

Results relate only to the items as received and tested.

SRL Test No.	Description in Brief	R_w (C;C _{tr}) dB	$L_{n,w}$ (C _I) dB
1 & 2	1x18mm OSB Board, 235x50mm Solid Timber Joists at 450mm Centres, 100mm Knauf Earthwool, 2x15mm Knauf Soundshield Plus	44 (-2;-6)	76(1)
3 & 4	1x18mm OSB Board, 235x50mm Solid Timber Joists at 450mm Centres, 100mm Knauf Earthwool, Libra Resilient Bar at Nominally 400mm Centres, 2x15mm Knauf Soundshield Plus	61 (-2;-7)	59(-1)
5 & 6	1x18mm OSB Board, 235x50mm Solid Timber Joists at 450mm Centres, 100mm Knauf Earthwool, AMC Channel Clips at 450mm Centres, MF5 Ceiling Channel at Nominally 1200mm Centres, 2x15mm Knauf Soundshield Plus	63 (-1;-7)	56(0)
7 & 8	1x18mm OSB Board, 235x50mm Solid Timber Joists at 450mm Centres, 100mm Knauf Earthwool, AMC Channel Clips at 450mm Centres, MF5 Ceiling Channel at Nominally 1200mm Centres, 1x15mm Knauf Soundshield Plus	59 (-3;-9)	61(0)
9 & 10	1x18mm OSB Board, 235x50mm Solid Timber Joists at 450mm Centres, 100mm Knauf Earthwool, AMC Channel Clips Supported by AMC L Brackets at 450mm Centres, MF5 Ceiling Channel at Nominally 1200mm Centres, 2x15mm Knauf Soundshield Plus	63 (-2;-7)	57(0)
11 & 12	1x18mm OSB Board, 235x50mm Solid Timber Joists at 450mm Centres, 100mm Knauf Earthwool, AMC Channel Clips Supported by AMC L Brackets at 450mm Centres, MF5 Ceiling Channel at Nominally 1200mm Centres, 1x15mm Knauf Soundshield Plus	61 (-3;-10)	60(1)

Data Sheet I

Laboratory Measurement of Sound Reduction Index to BS EN ISO 10140-2:2021

Test Number:	I	Test Room:	Source	Receiving
Client:	AMC Mecanocaucho	Air Temperature:	17.1 °C	16.8 °C
Test Date:	23/05/2024	Air Humidity:	70 %	68 %
Sample Height:	4.29 m	Volume:	67.2 m³	52 m³
Sample Width:	4.30 m	Air Pressure:	1005 mbar	
Sample Weight:	37.1 kg/m²			

Product 1x18mm OSB Board, 235x50mm Solid Timber Joists at 450mm Centres, 100mm Knauf Earthwool, 2x15mm
Identification: Knauf Soundshield Plus

Frequency Hz	Sound Reduction Index, dB	
	1/3 Oct	Octave
50+	26.4	24.8
63+	24.6	
80+	23.9	
100	26.4	25.0
125	22.8	
160	27.1	
200	29.7	33.2
250	36.5	
315	38.2	
400	39.1	41.4
500	41.8	
630	45.4	
800	46.3	47.6
1000	48.3	
1250	48.5	
1600	47.3	46.2
2000	45.2	
2500	46.5	
3150	51.8	54.8
4000	56.1	
5000	61.0	
6300+	66.0	68.5
8000+	69.1 *	
10000+	72.7 >	
Average 100-3150	40.1	SRL Version 3

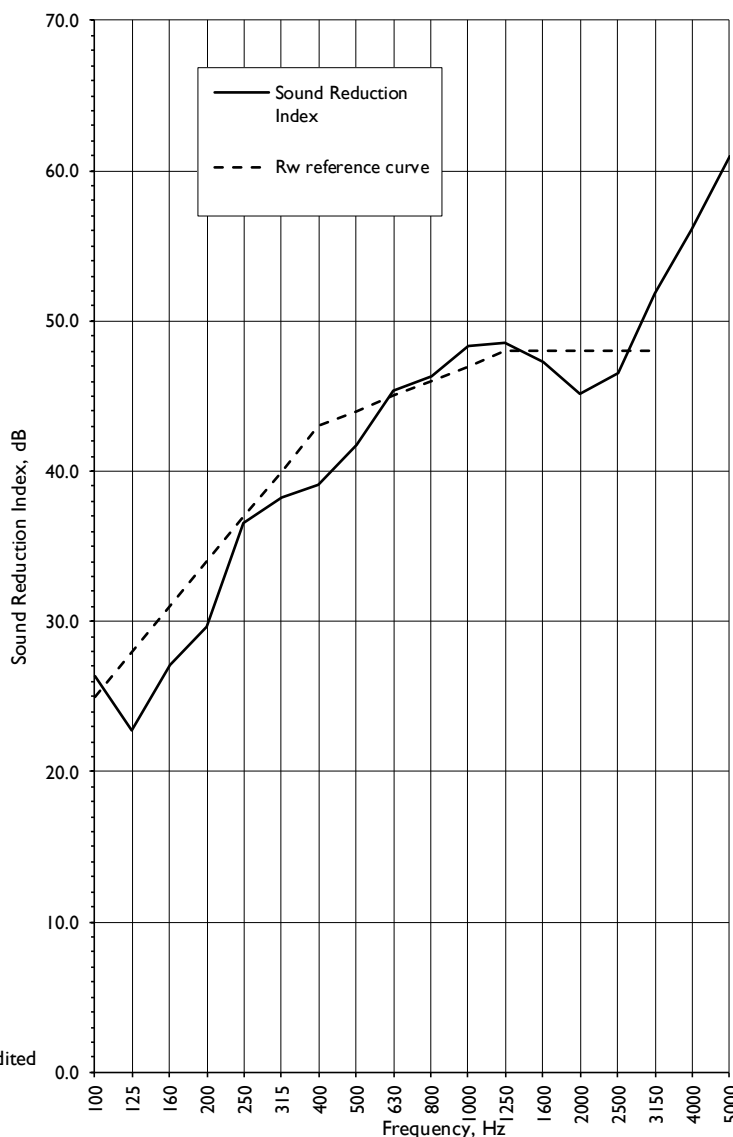
* shows measurement corrected for background

> shows measurement limited by background

+ shows Frequency beyond standard and not UKAS accredited

Rating according to BS EN ISO 717-1:2020

R_w(C;C_{tr})= 44 (-2;-6) dB

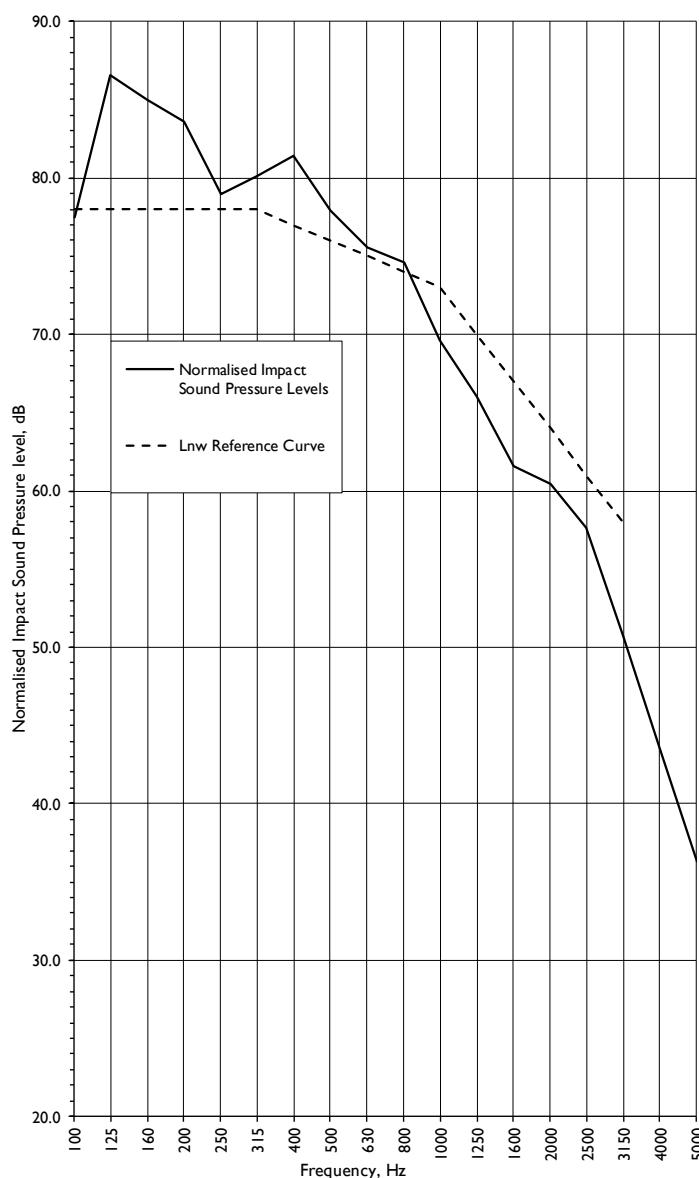


Data Sheet 2

Laboratory Measurement of Normalised Impact Sound Pressure Levels to BS EN ISO 10140-3:2021

Test Number:	2	Test Room:	Source	Receiving
Client:	AMC Mecanocaicho	Air Temperature:	17.1 °C	16.8 °C
Test Date:	23/05/2024	Air Humidity:	70 %	68 %
Sample Height:	4.29 m	Volume:	67.2 m ³	52 m ³
Sample Width:	4.30 m	Air Pressure:	1005 mbar	
Sample Weight:	37.1 kg/m ²			
Product Identification:	1x18mm OSB Board, 235x50mm Solid Timber Joists at 450mm Centres, 100mm Knauf Earthwool, 2x15mm Knauf Soundshield Plus			

Frequency, f Hz	Normalised Impact Sound Pressure Levels, dB	
	⅓ Oct	Octave
50+	67.6	78.2
63+	67.4	
80+	77.4	
100	77.5	89.2
125	86.6	
160	85.0	
200	83.6	86.1
250	79.0	
315	80.1	
400	81.4	83.7
500	77.9	
630	75.6	
800	74.6	76.2
1000	69.6	
1250	66.0	
1600	61.6	64.9
2000	60.4	
2500	57.6	
3150	50.7	51.6
4000	43.5	
5000	36.3	
Rating according to BS EN ISO 717-2:2020		
L _{n,w} (C _i)= 76(1) dB		
* shows measurement corrected for background		
> shows measurement limited by background		
+ shows Frequency beyond standard and not UKAS accredited		
v 1.1		



Data Sheet 3

Laboratory Measurement of Sound Reduction Index to BS EN ISO 10140-2:2021

Test Number:	3	Test Room:	Source	Receiving
Client:	AMC Mecanocaucho	Air Temperature:	17.1 °C	16.8 °C
Test Date:	23/05/2024	Air Humidity:	70 %	68 %
Sample Height:	4.29 m	Volume:	67.2 m³	52 m³
Sample Width:	4.30 m	Air Pressure:	1005 mbar	
Sample Weight:	37.1 kg/m²			

Product 1x18mm OSB Board, 235x50mm Solid Timber Joists at 450mm Centres, 100mm Knauf Earthwool, Libra
Identification: Resilient Bar at Nominally 400mm Centres, 2x15mm Knauf Soundshield Plus

Frequency Hz	Sound Reduction Index, dB	
	½ Oct	Octave
50+	29.5	26.6
63+	23.0	
80+	33.0	
100	37.8	41.5
125	45.6	
160	47.3	
200	45.6	49.0
250	52.1	
315	54.1	
400	58.6	59.7
500	59.4	
630	61.6	
800	64.8	64.6
1000	64.8	
1250	64.1	
1600	62.6	61.1
2000	60.6	
2500	60.3	
3150	64.8	68.0
4000	69.8	
5000	74.4 *	
6300+	78.2 *	77.8
8000+	79.9 >	
10000+	76.1 >	
Average 100-3150	56.5	SRL Version 3

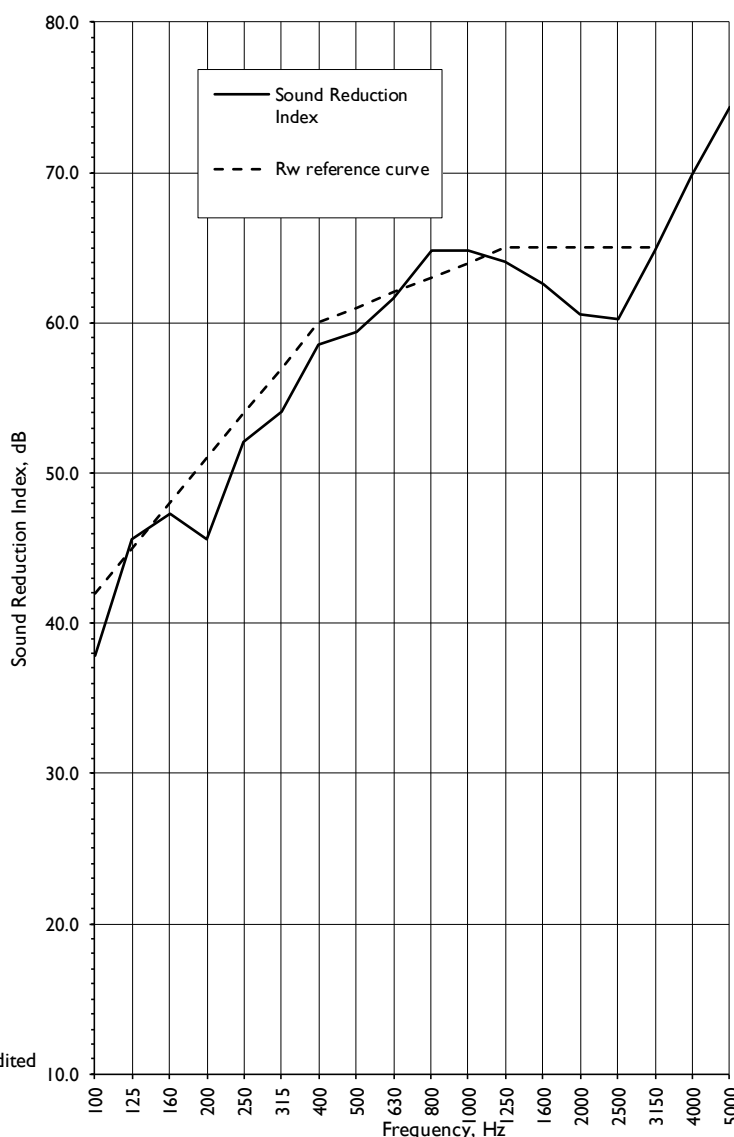
* shows measurement corrected for background

> shows measurement limited by background

+ shows Frequency beyond standard and not UKAS accredited

Rating according to BS EN ISO 717-1:2020

R_w(C;C_{tr})= 61 (-2;-7) dB

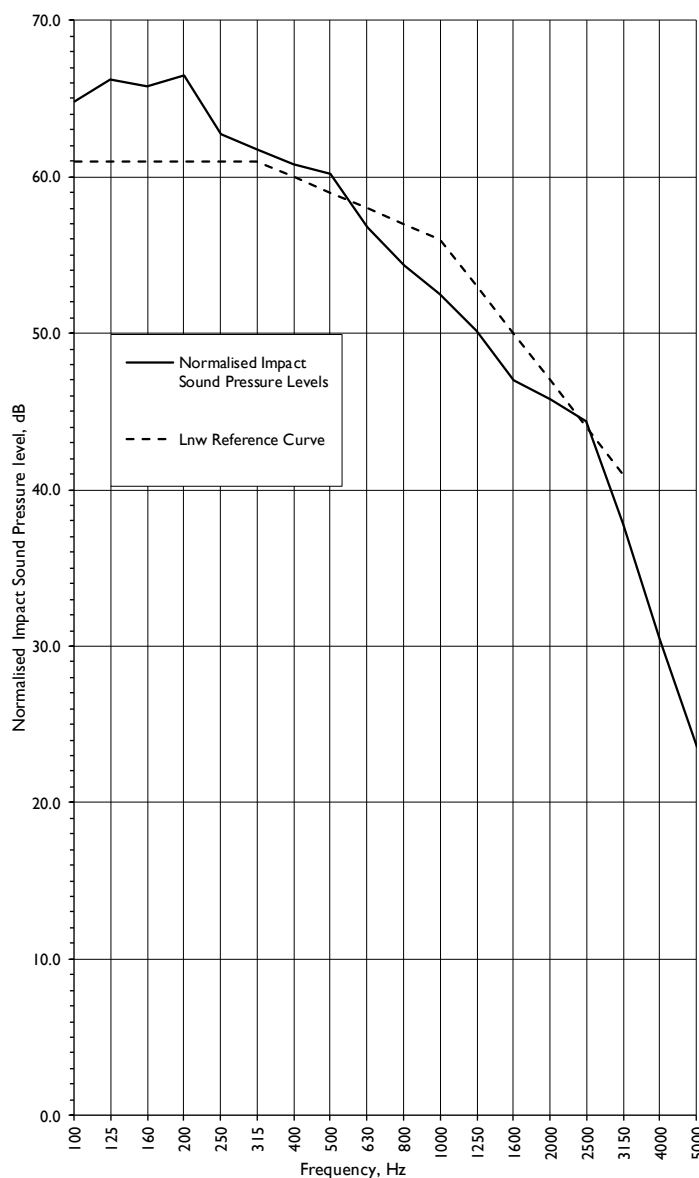


Data Sheet 4

Laboratory Measurement of Normalised Impact Sound Pressure Levels to BS EN ISO 10140-3:2021

Test Number:	4	Test Room:	Source	Receiving
Client:	AMC Mecanocaucho	Air Temperature:	17.1 °C	16.8 °C
Test Date:	23/05/2024	Air Humidity:	70 %	68 %
Sample Height:	4.29 m	Volume:	67.2 m³	52 m³
Sample Width:	4.30 m	Air Pressure:	1005 mbar	
Sample Weight:	37.1 kg/m²			
Product	1x18mm OSB Board, 235x50mm Solid Timber Joists at 450mm Centres, 100mm Knauf Earthwool, Libra Resilient Bar at			
Identification:	Nominally 400mm Centres, 2x15mm Knauf Soundshield Plus			

Frequency, f Hz	Normalised Impact Sound Pressure Levels, dB	
	½ Oct	Octave
50+	62.4	73.6
63+	71.0	
80+	69.3	
100	64.8	70.4
125	66.2	
160	65.8	
200	66.5	68.9
250	62.7	
315	61.8	
400	60.8	64.4
500	60.2	
630	56.8	
800	54.3	57.4
1000	52.5	
1250	50.1	
1600	47.0	50.6
2000	45.8	
2500	44.4	
3150	37.8	38.7
4000	30.4	
5000	23.6	
Rating according to BS EN ISO 717-2:2020		
L _{n,w} (C ₁)= 59(-1) dB		
* shows measurement corrected for background		
> shows measurement limited by background		
+ shows Frequency beyond standard and not UKAS accredited		
v 1.1		



Data Sheet 5

Laboratory Measurement of Sound Reduction Index to BS EN ISO 10140-2:2021

Test Number:	5	Test Room:	Source	Receiving
Client:	AMC Mecanocauchó	Air Temperature:	17.3 °C	17 °C
Test Date:	23/05/2024	Air Humidity:	72 %	70 %
Sample Height:	4.29 m	Volume:	67.2 m ³	52 m ³
Sample Width:	4.30 m	Air Pressure:	1007 mbar	
Sample Weight:	37.1 kg/m ²			
Product Identification:	1x18mm OSB Board, 235x50mm Solid Timber Joists at 450mm Centres, 100mm Knauf Earthwool, AMC Channel Clips at 450mm Centres, MF5 Ceiling Channel at Nominally 1200mm Centres, 2x15mm Knauf Soundshield Plus			

Frequency Hz	Sound Reduction Index, dB	
	1/3 Oct	Octave
50+	31.8	29.7
63+	26.3	
80+	37.6	
100	38.2	42.3
125	49.0	
160	48.7	
200	48.8	51.7
250	53.3	
315	56.1	
400	59.0	60.4
500	60.3	
630	62.5	
800	67.2	68.8
1000	69.2	
1250	70.9	
1600	71.4	69.8
2000	69.7	
2500	68.8	
3150	73.7	77.1
4000	79.3 *	
5000	84.4 >	
6300+	86.5 >	80.7
8000+	83.1 >	
10000+	77.4 >	
Average 100-3150	60.4	SRL Version 3

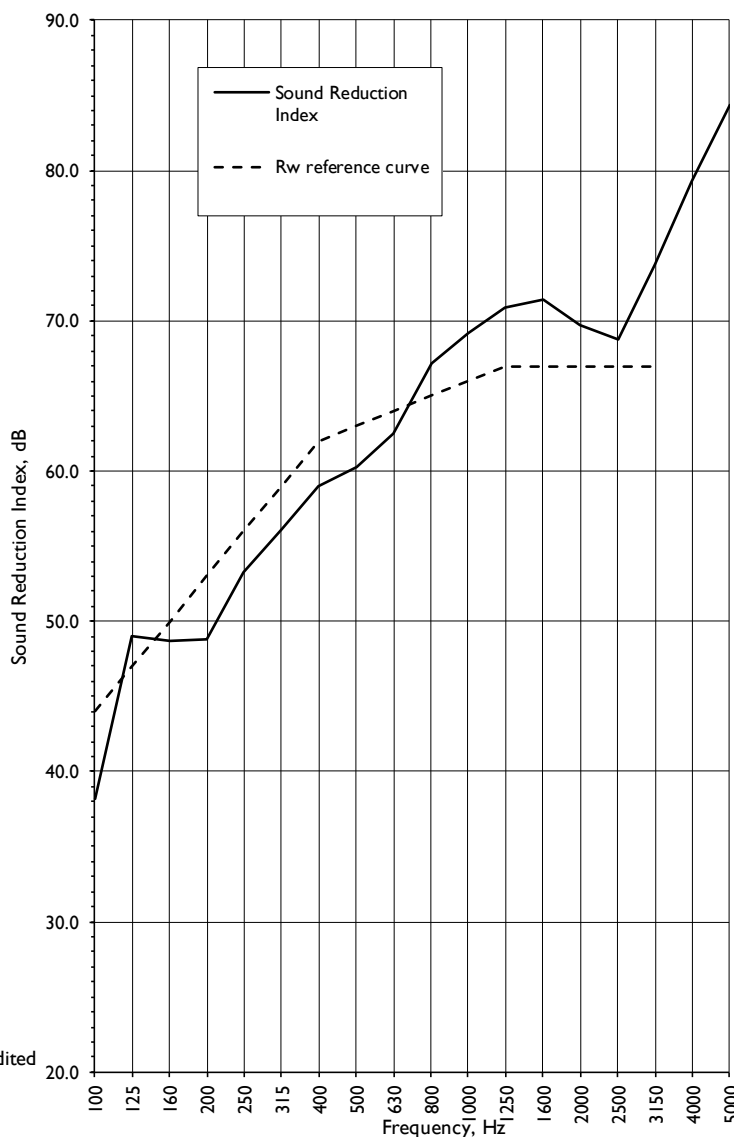
* shows measurement corrected for background

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+ shows Frequency beyond standard and not UKAS accredited

Rating according to BS EN ISO 717-1:2020

R_w(C;C_{tr})= 63 (-1;-7) dB

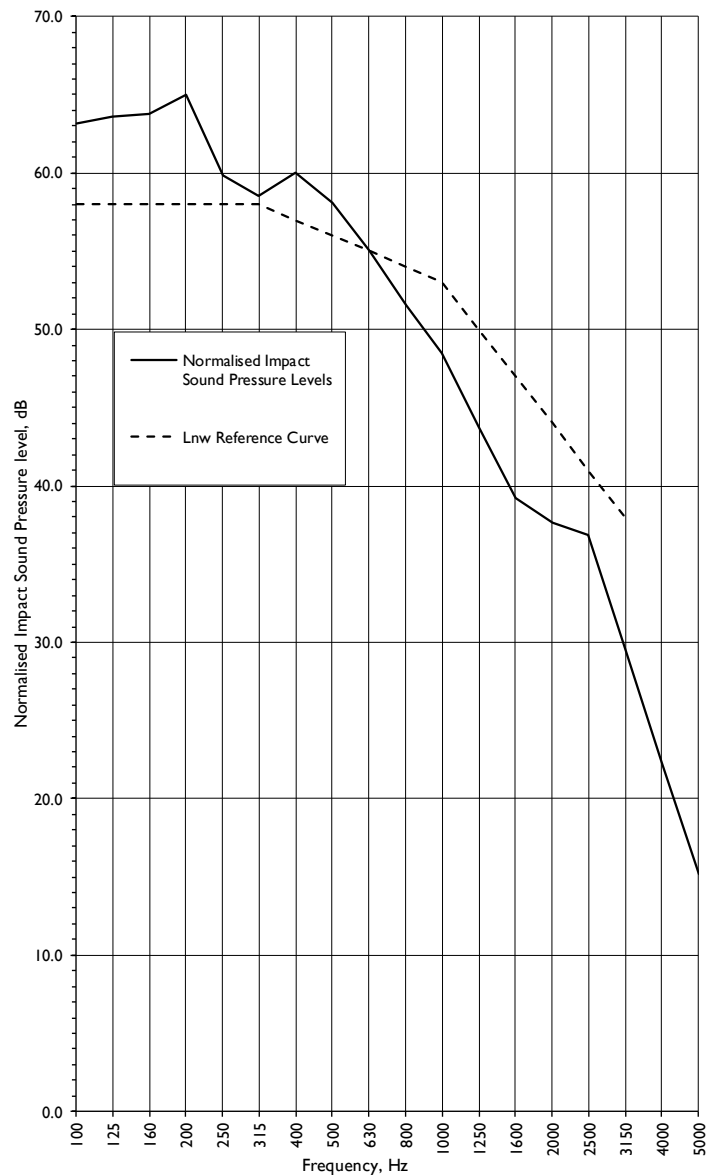


Data Sheet 6

Laboratory Measurement of Normalised Impact Sound Pressure Levels to BS EN ISO 10140-3:2021

Test Number:	6	Test Room:	Source	Receiving
Client:	AMC Mecanocaicho	Air Temperature:	17.3 °C	17 °C
Test Date:	23/05/2024	Air Humidity:	72 %	70 %
Sample Height:	4.29 m	Volume:	67.2 m ³	52 m ³
Sample Width:	4.30 m	Air Pressure:	1007 mbar	
Sample Weight:	37.1 kg/m ²			
Product	1x18mm OSB Board, 235x50mm Solid Timber Joists at 450mm Centres, 100mm Knauf Earthwool, AMC Channel Clips at			
Identification:	450mm Centres, MF5 Ceiling Channel at Nominally 1200mm Centres, 2x15mm Knauf Soundshield Plus			

Frequency, f Hz	Normalised Impact Sound Pressure Levels, dB	
	½ Oct	Octave
50+	61.4	69.0
63+	64.4	
80+	65.8	
100	63.2	68.3
125	63.6	
160	63.8	
200	65.0	66.8
250	59.8	
315	58.5	
400	60.0	62.9
500	58.1	
630	55.0	
800	51.5	53.7
1000	48.5	
1250	43.8	
1600	39.2	42.8
2000	37.6	
2500	36.9	
3150	29.6	30.5
4000	22.3	
5000	15.2 *	
Rating according to BS EN ISO 717-2:2020		
L _{n,w} (C _i)= 56(0) dB		
* shows measurement corrected for background		
> shows measurement limited by background		
+ shows Frequency beyond standard and not UKAS accredited		
v 1.1		



Data Sheet 7

Laboratory Measurement of Sound Reduction Index to BS EN ISO 10140-2:2021

Test Number:	7	Test Room:	Source	Receiving
Client:	AMC Mecanocaucho	Air Temperature:	17 °C	16.8 °C
Test Date:	24/05/2024	Air Humidity:	68 %	66 %
Sample Height:	4.29 m	Volume:	67.2 m ³	52 m ³
Sample Width:	4.30 m	Air Pressure:	1012 mbar	
Sample Weight:	24.0 kg/m ²			
Product Identification:	1x18mm OSB Board, 235x50mm Solid Timber Joists at 450mm Centres, 100mm Knauf Earthwool, AMC Channel Clips at 450mm Centres, MF5 Ceiling Channel at Nominally 1200mm Centres, 1x15mm Knauf Soundshield Plus			

Frequency Hz	Sound Reduction Index, dB	
	1/3 Oct	Octave
50+	25.0	24.4
63+	21.9	
80+	29.0	
100	32.0	36.0
125	42.7	
160	41.5	
200	42.6	45.7
250	47.1	
315	52.4	
400	57.4	58.9
500	58.8	
630	61.5	
800	65.8	67.1
1000	67.6	
1250	68.1	
1600	68.1	64.6
2000	65.0	
2500	62.4	
3150	67.6	71.1
4000	73.3	
5000	78.5	
6300+	81.7 *	79.3
8000+	81.8 >	
10000+	76.6 >	
Average 100-3150	56.3	SRL Version 3

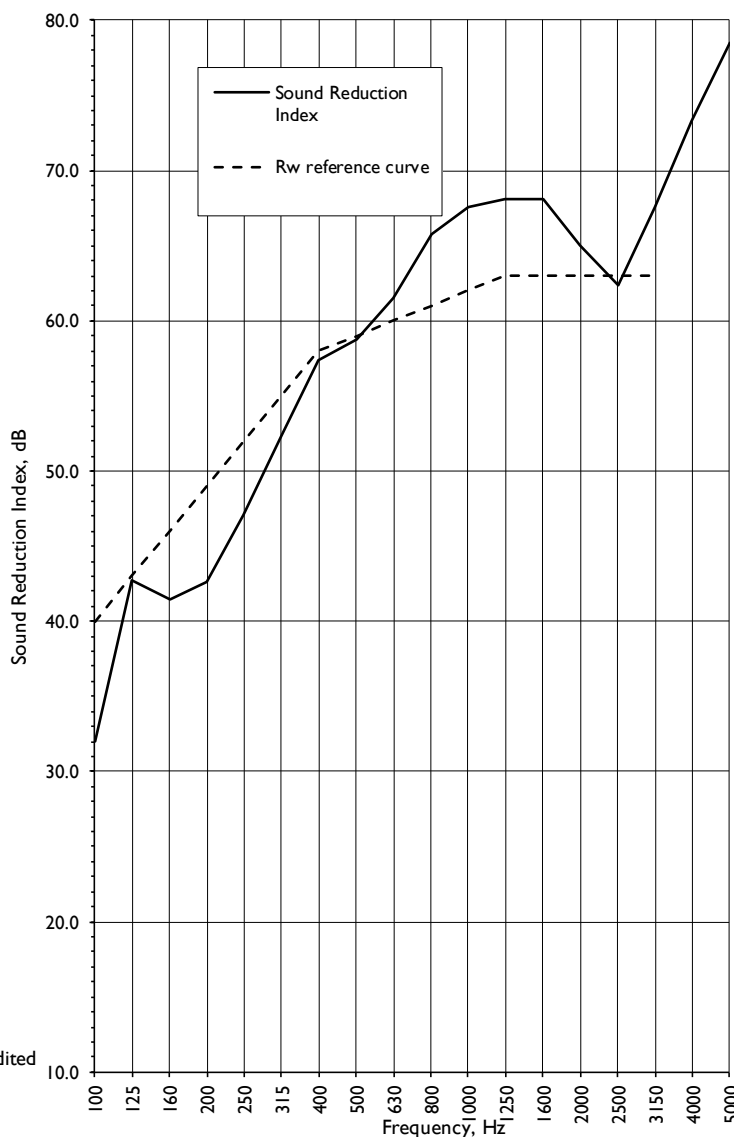
* shows measurement corrected for background

> shows measurement limited by background

+ shows Frequency beyond standard and not UKAS accredited

Rating according to BS EN ISO 717-1:2020

R_w(C;C_{tr})= 59 (-3;-9) dB

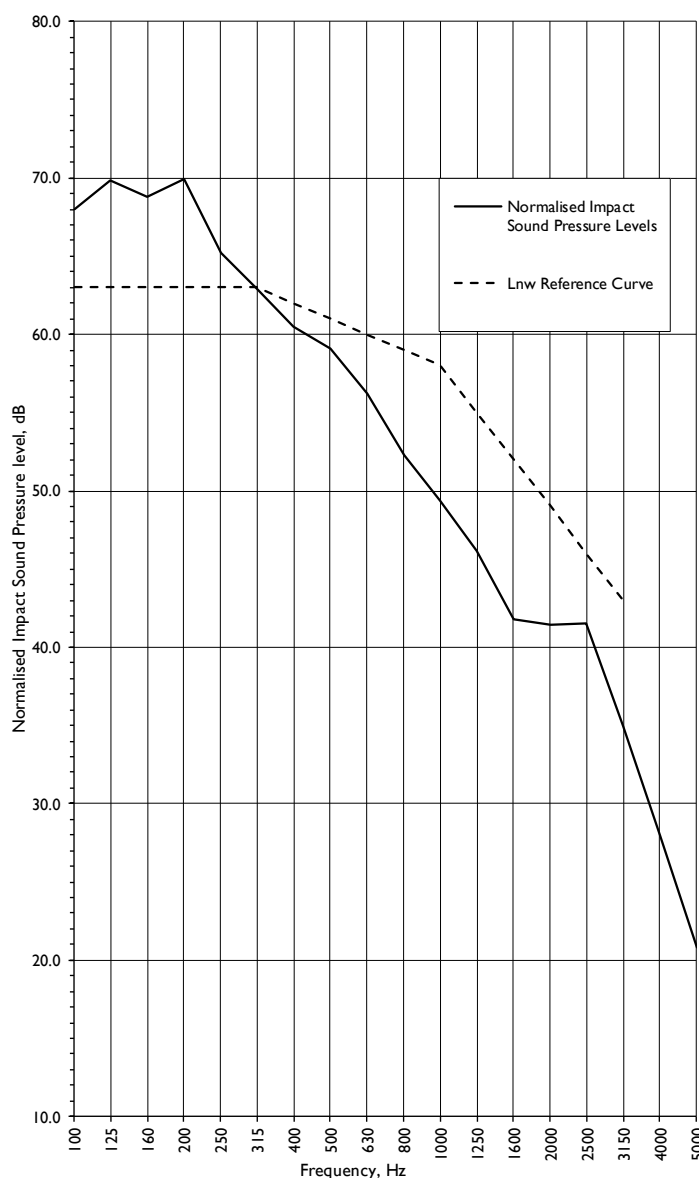


Data Sheet 8

Laboratory Measurement of Normalised Impact Sound Pressure Levels to BS EN ISO 10140-3:2021

Test Number:	8	Test Room:	Source	Receiving
Client:	AMC Mecanocaucho	Air Temperature:	17 °C	16.8 °C
Test Date:	24/05/2024	Air Humidity:	68 %	66 %
Sample Height:	4.29 m	Volume:	67.2 m ³	52 m ³
Sample Width:	4.30 m	Air Pressure:	1012 mbar	
Sample Weight:	24.0 kg/m ²			
Product	1x18mm OSB Board, 235x50mm Solid Timber Joists at 450mm Centres, 100mm Knauf Earthwool, AMC Channel Clips at			
Identification:	450mm Centres, MF5 Ceiling Channel at Nominally 1200mm Centres, 1x15mm Knauf Soundshield Plus			

Frequency, f Hz	Normalised Impact Sound Pressure Levels, dB	
	⅓ Oct	Octave
50+	67.5	74.6
63+	69.6	
80+	71.4	
100	68.0	73.7
125	69.8	
160	68.8	
200	69.9	71.8
250	65.2	
315	62.9	
400	60.5	63.7
500	59.1	
630	56.2	
800	52.3	54.8
1000	49.4	
1250	46.2	
1600	41.8	46.3
2000	41.4	
2500	41.5	
3150	35.0	35.9
4000	28.0	
5000	20.8	
Rating according to BS EN ISO 717-2:2020		
L _{n,w} (C _i)= 61(0) dB		
* shows measurement corrected for background		
> shows measurement limited by background		
+ shows Frequency beyond standard and not UKAS accredited		
v 1.1		



Data Sheet 9

Laboratory Measurement of Sound Reduction Index to BS EN ISO 10140-2:2021

Test Number:	9	Test Room:	Source	Receiving
Client:	AMC Mecanocauchó	Air Temperature:	16.7 °C	16.5 °C
Test Date:	24/05/2024	Air Humidity:	67 %	67 %
Sample Height:	4.29 m	Volume:	67.2 m³	52 m³
Sample Width:	4.30 m	Air Pressure:	1013 mbar	
Sample Weight:	37.1 kg/m²			
Product Identification:	1x18mm OSB Board, 235x50mm Solid Timber Joists at 450mm Centres, 100mm Knauf Earthwool, AMC Channel Clips Supported by AMC L Brackets at 450mm Centres, MF5 Ceiling Channel at Nominally 1200mm Centres, 2x15mm Knauf Soundshield Plus			

Frequency Hz	Sound Reduction Index, dB	
	½ Oct	Octave
50+	32.9	32.0
63+	29.6	
80+	35.6	
100	38.7	42.4
125	47.5	
160	46.8	
200	48.7	51.6
250	53.2	
315	56.4	
400	57.6	59.2
500	59.6	
630	61.3	
800	65.6	67.5
1000	67.9	
1250	70.0	
1600	69.8	68.8
2000	68.8	
2500	68.1	
3150	72.3	75.6
4000	77.3	
5000	82.6 *	
6300+	85.2 *	80.2
8000+	83.8 >	
10000+	76.8 >	
Average 100-3150	59.5	SRL Version 3

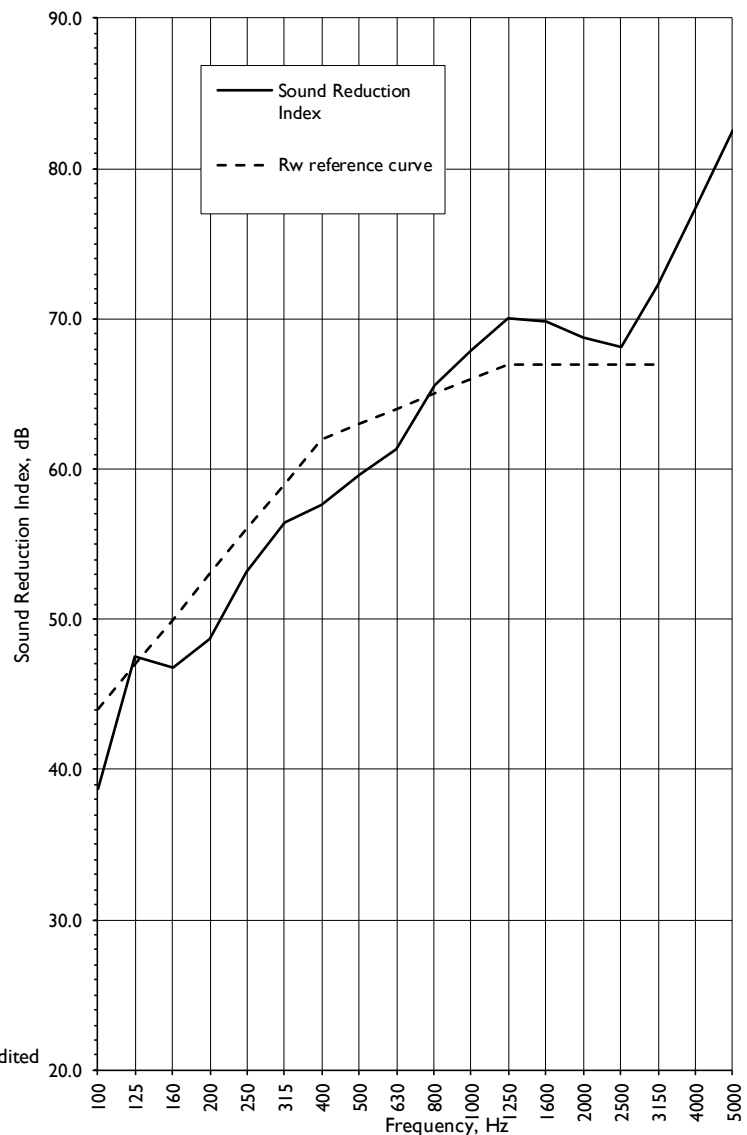
* shows measurement corrected for background

> shows measurement limited by background

+ shows Frequency beyond standard and not UKAS accredited

Rating according to BS EN ISO 717-1:2020

R_w(C;C_{tr})= 63 (-2;-7) dB

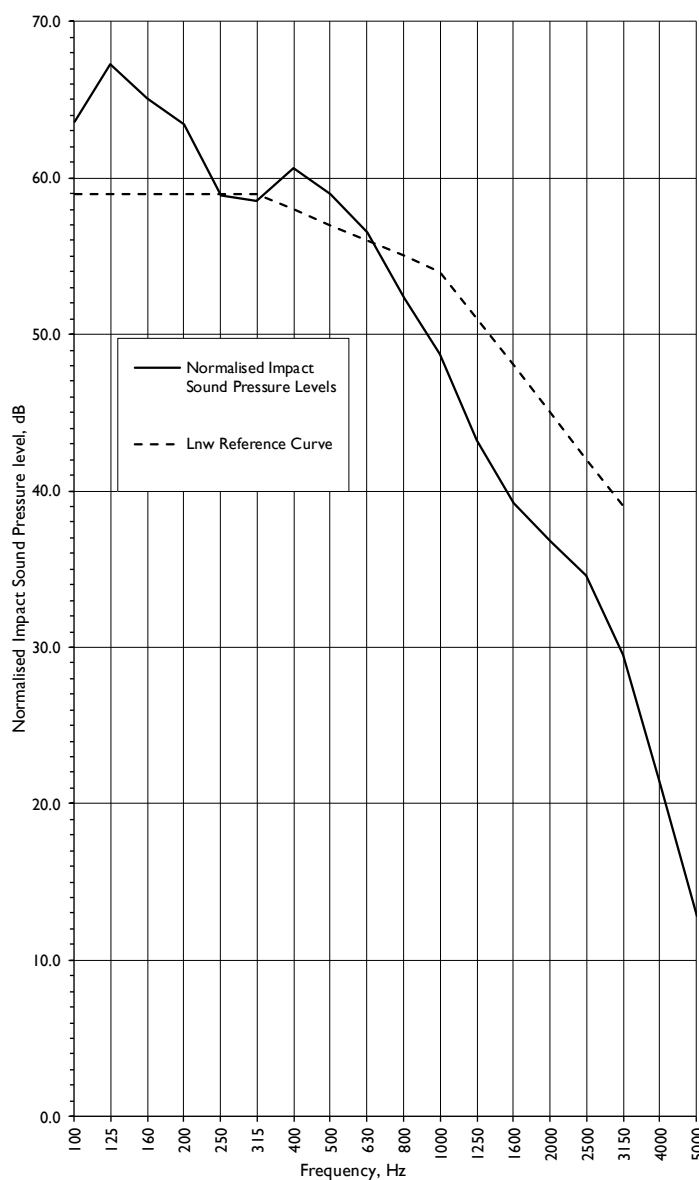


Data Sheet 10

Laboratory Measurement of Normalised Impact Sound Pressure Levels to BS EN ISO 10140-3:2021

Test Number:	10	Test Room:	Source	Receiving
Client:	AMC Mecanocaicho	Air Temperature:	16.7 °C	16.5 °C
Test Date:	24/05/2024	Air Humidity:	67 %	67 %
Sample Height:	4.29 m	Volume:	67.2 m ³	52 m ³
Sample Width:	4.30 m	Air Pressure:	1013 mbar	
Sample Weight:	37.1 kg/m ²			
Product	1x18mm OSB Board, 235x50mm Solid Timber Joists at 450mm Centres, 100mm Knauf Earthwool, AMC Channel Clips			
Identification:	Supported by AMC L Brackets at 450mm Centres, MF5 Ceiling Channel at Nominally 1200mm Centres, 2x15mm Knauf Soundshield Plus			

Frequency, f Hz	Normalised Impact Sound Pressure Levels, dB	
	½ Oct	Octave
50+	61.1	68.8
63+	63.7	
80+	65.9	
100	63.6	70.4
125	67.3	
160	65.1	
200	63.4	65.6
250	58.9	
315	58.5	
400	60.6	63.8
500	59.0	
630	56.5	
800	52.3	54.2
1000	48.7	
1250	43.2	
1600	39.2	42.0
2000	36.8	
2500	34.6	
3150	29.5	30.2
4000	21.3	
5000	12.8 *	
Rating according to BS EN ISO 717-2:2020		
L _{n,w} (C _i)= 57(0) dB		
* shows measurement corrected for background		
> shows measurement limited by background		
+ shows Frequency beyond standard and not UKAS accredited		
v 1.1		



Data Sheet II

Laboratory Measurement of Sound Reduction Index to BS EN ISO 10140-2:2021

Test Number:	11	Test Room:	Source	Receiving
Client:	AMC Mecanocauchó	Air Temperature:	16.7 °C	16.5 °C
Test Date:	24/05/2024	Air Humidity:	67 %	67 %
Sample Height:	4.29 m	Volume:	67.2 m ³	52 m ³
Sample Width:	4.30 m	Air Pressure:	1013 mbar	
Sample Weight:	24.0 kg/m ²			
Product Identification:	1x18mm OSB Board, 235x50mm Solid Timber Joists at 450mm Centres, 100mm Knauf Earthwool, AMC Channel Clips Supported by AMC L Brackets at 450mm Centres, MF5 Ceiling Channel at Nominally 1200mm Centres, 1x15mm Knauf Soundshield Plus			

Frequency Hz	Sound Reduction Index, dB	
	1/3 Oct	Octave
50+	26.3	26.0
63+	23.7	
80+	30.2	
100	33.3	37.3
125	42.4	
160	44.1	
200	44.7	48.0
250	50.0	
315	54.0	
400	58.9	60.6
500	60.8	
630	63.1	
800	66.7	68.4
1000	69.1	
1250	70.0	
1600	69.9	65.6
2000	66.0	
2500	63.3	
3150	68.3	71.8
4000	74.0	
5000	79.1 *	
6300+	83.6 *	79.7
8000+	83.2 >	
10000+	76.3 >	
Average 100-3150	57.8	SRL Version 3

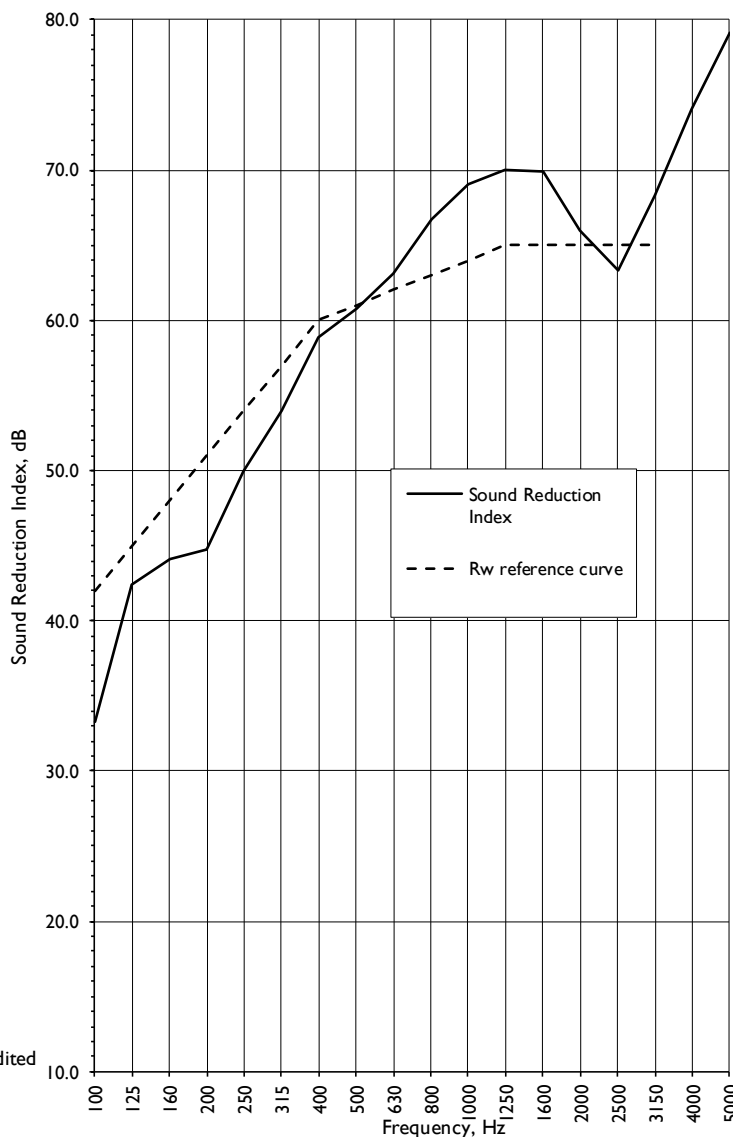
* shows measurement corrected for background

> shows measurement limited by background

+ shows Frequency beyond standard and not UKAS accredited

Rating according to BS EN ISO 717-1:2020

R_w(C;C_{tr})= 61 (-3;-10) dB

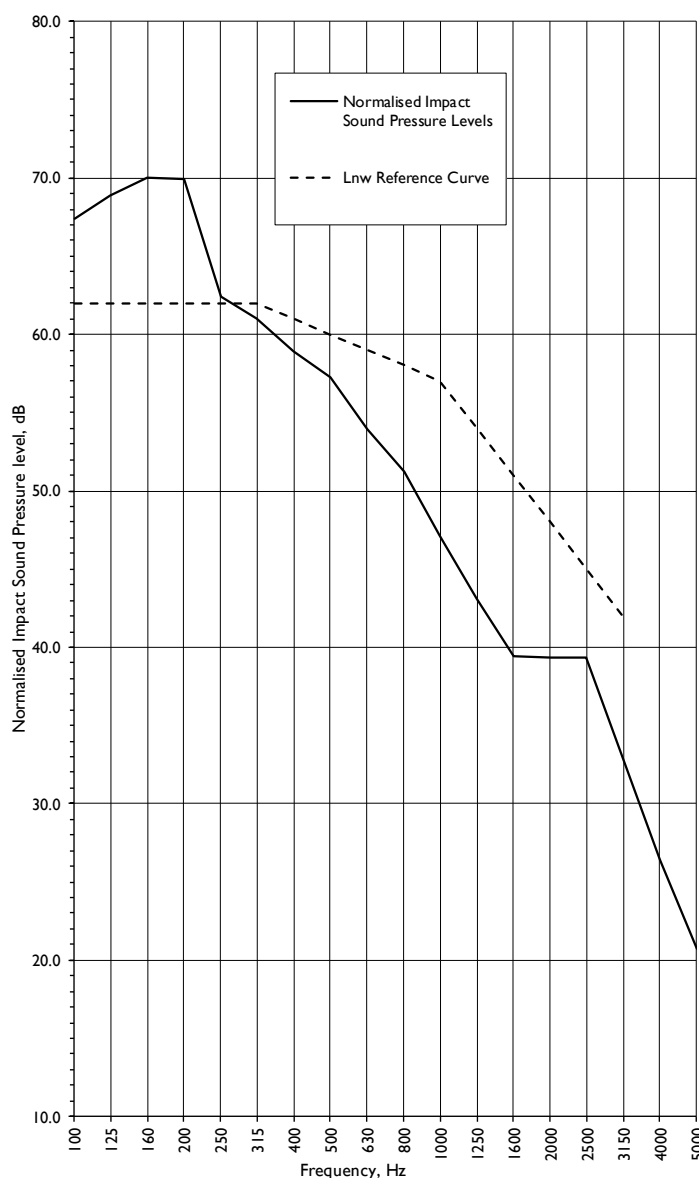


Data Sheet 12

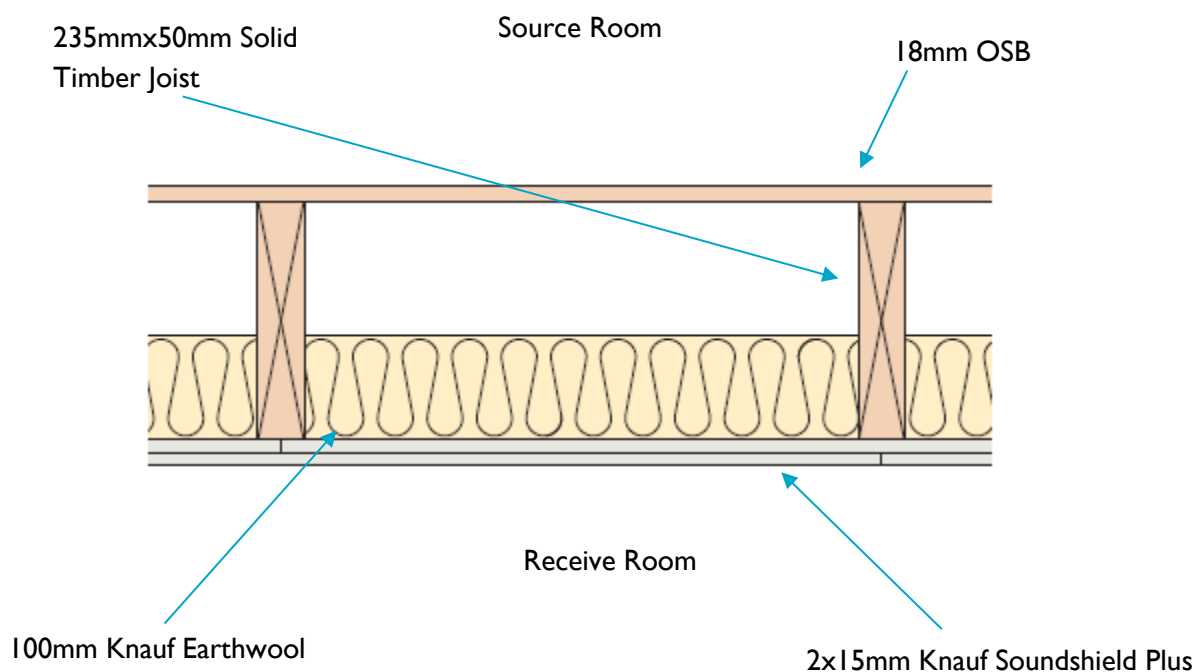
Laboratory Measurement of Normalised Impact Sound Pressure Levels to BS EN ISO 10140-3:2021

Test Number:	12	Test Room:	Source	Receiving
Client:	AMC Mecanocaicho	Air Temperature:	16.7 °C	16.5 °C
Test Date:	24/05/2024	Air Humidity:	67 %	67 %
Sample Height:	4.29 m	Volume:	67.2 m ³	52 m ³
Sample Width:	4.30 m	Air Pressure:	1013 mbar	
Sample Weight:	24.0 kg/m ²			
Product	1x18mm OSB Board, 235x50mm Solid Timber Joists at 450mm Centres, 100mm Knauf Earthwool, AMC Channel Clips			
Identification:	Supported by AMC L Brackets at 450mm Centres, MF5 Ceiling Channel at Nominally 1200mm Centres, 1x15mm Knauf Soundshield Plus			

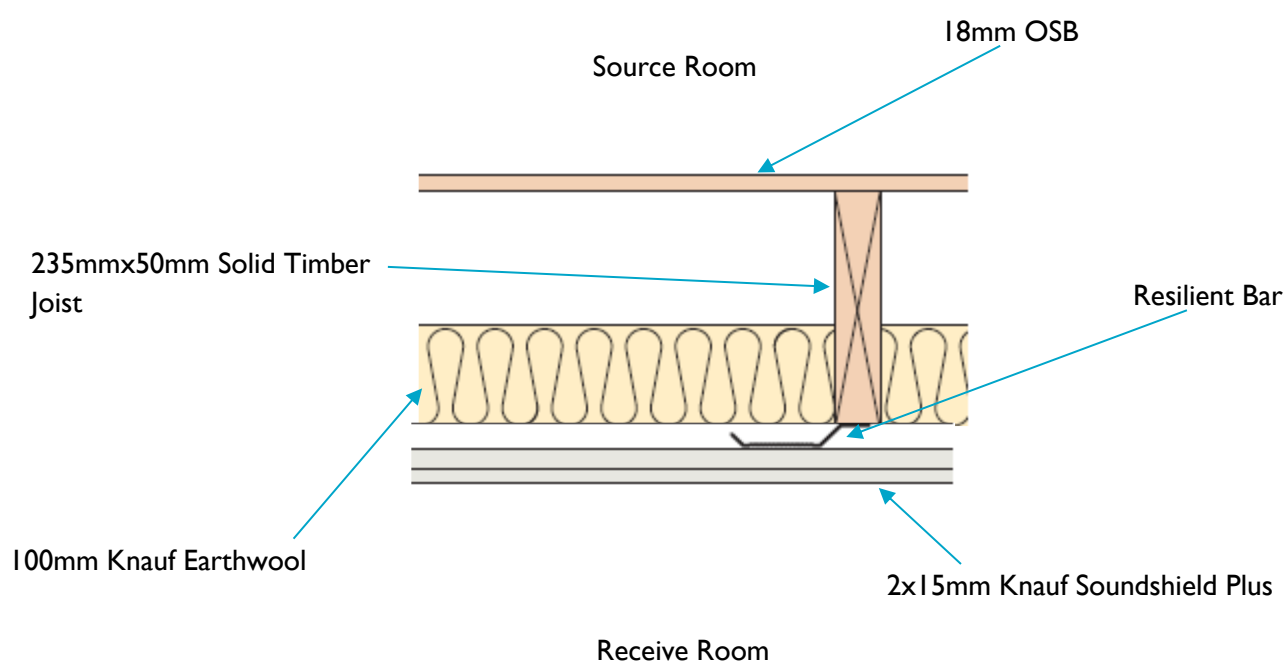
Frequency, f Hz	Normalised Impact Sound Pressure Levels, dB	
	½ Oct	Octave
50+	66.3	73.1
63+	67.7	
80+	70.1	
100	67.4	73.7
125	68.9	
160	70.0	
200	69.9	71.1
250	62.4	
315	61.0	
400	58.9	61.9
500	57.3	
630	53.9	
800	51.2	53.1
1000	47.1	
1250	43.1	
1600	39.4	44.1
2000	39.3	
2500	39.3	
3150	32.9	34.0
4000	26.4	
5000	20.7	
Rating according to BS EN ISO 717-2:2020		
L _{n,w} (C _i)= 60(1) dB		
* shows measurement corrected for background		
> shows measurement limited by background		
+ shows Frequency beyond standard and not UKAS accredited		
v 1.1		



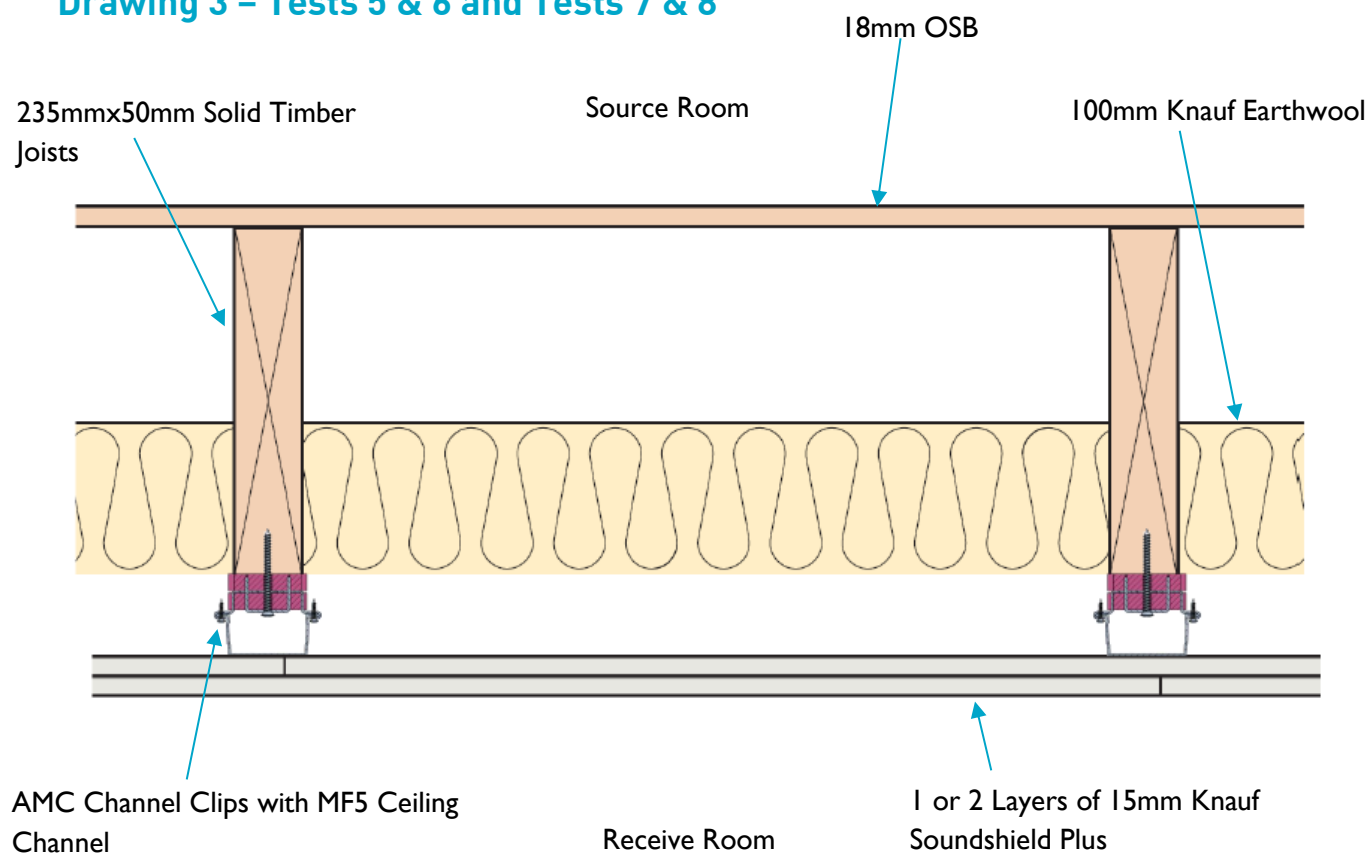
Drawing 1 – Tests 1 & 2



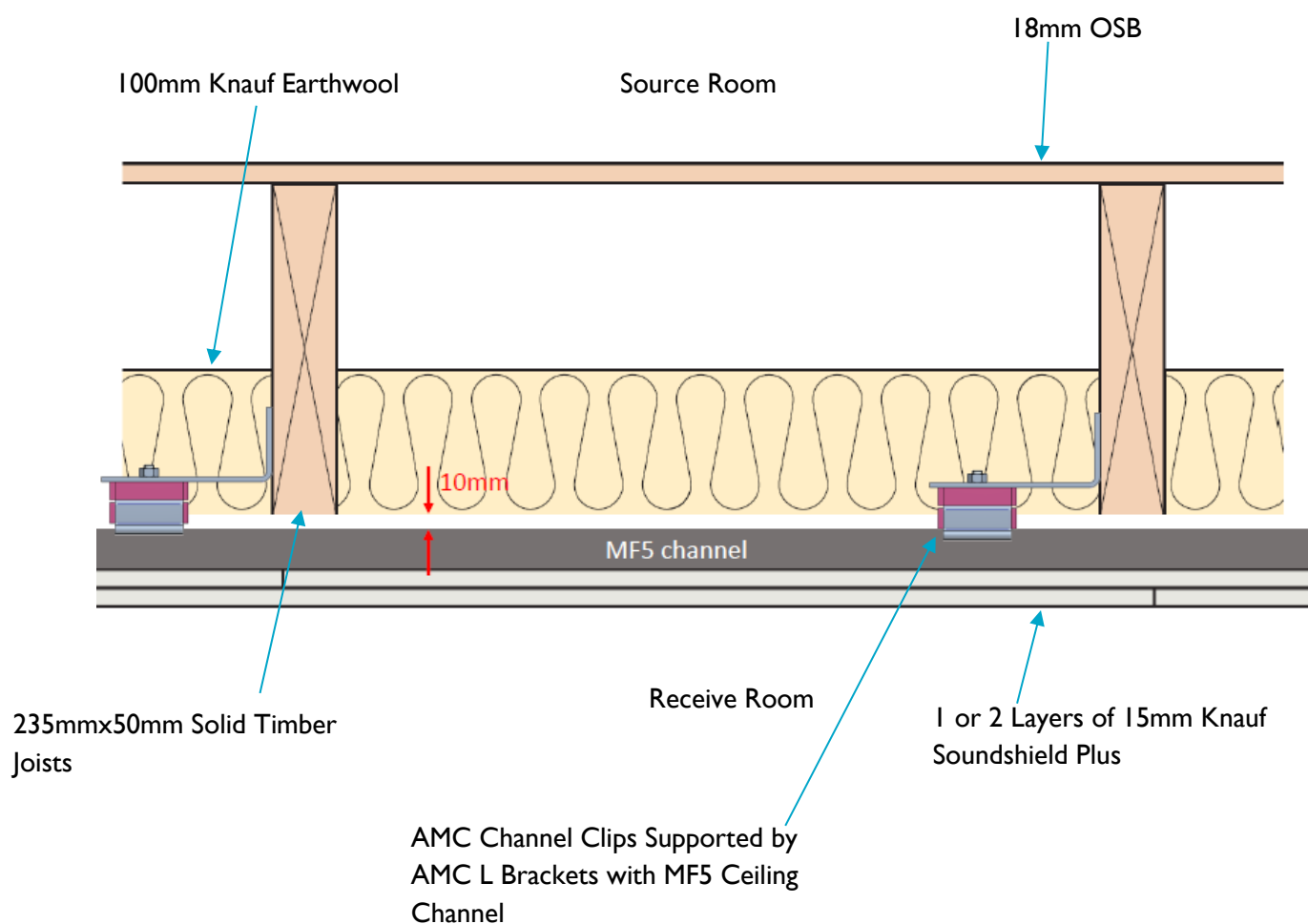
Drawing 2 – Tests 3 & 4



Drawing 3 – Tests 5 & 6 and Tests 7 & 8



Drawing 4 – Tests 9 & 10 and Tests 11 & 12



Appendix A - Details of Measurements

A1. Location

SRL Technical Services (Sound Research Laboratories)
Holbrook House
Little Waldingfield
Sudbury
Suffolk
CO10 0TF
Tel: 01787 247595

A2. Test Dates

23 & 24 May 2024

A3. Tester

Kieron Farrow of SRL Technical Services Limited

A4. Instrumentation and Apparatus Used

Make	Description	Type
Norsonic	Multichannel Sound Level Meter	Nor850
Norsonic	Rotating microphone boom	Nor265-A
Norsonic	Tapping Machine	Nor277
G.R.A.S	Microphone Pre-Amp	26AK

Make	Description	Type
G.R.A.S	Calibrator	42AB
G.R.A.S	Microphone	40AR
dbx	Graphic Equaliser	131s
Crown	Class D Amplifier	XLS 1502
ntek	Rotating microphone boom	MB01
Bruel & Kjaer	Omni directional loud speaker	4296
Bresser	Temperature & Humidity Probe	N/A
Testo	Barometer	511

A5. References

BS EN ISO 717-1:2020	Rating of sound insulation in buildings and of building elements. Airborne Sound Insulation.
BS EN ISO 717-2:2020	Rating of sound insulation in buildings and of building elements. Impact Sound Insulation.
BS EN ISO 10140-2:2021	Laboratory measurement of sound insulation for building elements – Part 2: Measurement of airborne sound insulation.
BS EN ISO 10140-3:2021	Laboratory measurement of sound insulation of building elements – Part 3: Measurement of impact sound insulation.

Appendix B – Test Procedure – Airborne Sound

TP33 - Measurement of Sound Transmission in accordance with BS EN ISO 10140-2

In the laboratory, airborne sound transmission is determined from the difference in sound pressure levels measured across a test sample installed between two reverberant rooms. The difference in measured sound pressure levels is corrected for the amount of absorption in the receiving room. The test is done under conditions which restrict the transmission of sound by paths other than directly through the sample. The source sound field is randomly incident on the sample.

The test sample is constructed in the floor aperture between the two rectangular reverberant (i.e. acoustically "live") rooms, both of which are constructed from dense masonry blocks. The test sample floor area is 4.30m x 4.29m.

The upper room, termed the source room, has a nominal volume of 67m³ and is isolated by the surrounding structure by the use of resilient mountings. The lower or receiving room has a nominal volume of 52m³. Reverberation time measurements are done in the receiving room to calibrate it.

Broad band pink noise is produced in the source room from an electronic generator and power amplifier. The resulting sound pressure levels in both rooms are sampled using a microphone mounted on an oscillating boom and connected to a real time analyser. The signal is filtered into one third octave band widths, integrated and averaged. The value obtained at each frequency is known as the average sound pressure level for either the source or the receiving room. The change in level across the test sample is termed the sound pressure level difference, i.e.

$$D = L_1 - L_2$$

where

- D is the sound pressure level difference in dB
- L₁ is the average sound pressure level in the source room in dB
- L₂ is the average sound pressure level in the receiving room in dB

The sound reduction index (R) is also known by the American term “sound transmission loss”. It is defined as the number of decibels by which sound energy randomly incident on the test sample is reduced in transmitting through it and is given by the formula:

$$R = D + 10 \log \frac{S}{A} \text{ in decibels}$$

where

S is the area of the sample (m²)

A is the total absorption in the receiving room (m²)

The sound reduction index is an expression of the laboratory sound transmission performance of a particular element or construction. It is a function of the mass, thickness, sealing and method of mounting, but is independent of the overall area of the sample.

However, when an example of this construction is installed on site, the sound insulation obtained will depend upon its surface area, as well as the absorption in the receiving room. The larger the area the greater the sound energy transmitted. Also, the overall sound insulation of a construction is affected by the sound transmission through other building elements, some of which may have an inferior performance to the sample. In practice, therefore, the potential sound reduction index of a sample is not fully realised on site. Furthermore, the sound reduction index of a particular sample construction can only be measured accurately in a laboratory, because only under such controlled conditions can the sound transmission path be limited to the sample under test.

R_w, C and C_{tr} have been calculated in accordance with the relevant section of BS EN ISO 717-1 from the results of laboratory tests carried out in accordance with BS EN ISO 10140-2.

Appendix C – Measurement Uncertainty – Airborne Sound

TP33 - Measurement Uncertainty BS EN ISO 10140-2

The following values of uncertainty are based on a standard uncertainty multiplied by a coverage factor of $k = 2$, which provides a level of confidence of approximately 95%.

Frequency, Hz	Uncertainty, $\pm$ dB
100	3.2
125	2.9
160	2.5
200	2.5
250	1.8
315	1.8
400	1.5
500	1.5
630	1.2
800	1.2
1000	1.2
1250	1.2
1600	1.2
2000	1.2
2500	1.2
3150	1.2

Appendix D – Test Procedure - Impact Sound

TP31 - Measurement of Impact Sound Transmission in accordance with BS EN ISO 10140-3

In the laboratory, impact sound transmission is determined from the sound pressure levels generated by a standard impact machine operating on the test sample installed above a reverberant room. The sound pressure levels are measured in that room. The test is done under conditions which restrict the transmission of sound other than directly through the sample.

The test sample is constructed in the floor aperture between the two rectangular reverberant (i.e. acoustically "live") rooms, both of which are constructed from dense masonry blocks. The test sample floor area is 4.30m x 4.29m.

The upper room, termed the source room, has a nominal volume of 67m³ and is isolated by the surrounding structure by the use of resilient mountings. The lower or receiving room has a nominal volume of 52m³. Reverberation time measurements are done in the receiving room to calibrate it.

The impact machine is a standard tapping machine which is placed on top of the test sample at the first of a number of positions.

With the tapping machine operating on the test sample the resulting sound pressure levels in the room are sampled using a microphone mounted on an oscillating boom and connected to a real time analyser. The signal is filtered into one-third octave bandwidths, integrated and averaged. The value obtained at any particular frequency is known as the impact sound pressure level (L_i). This is corrected to a reference room absorption, referred to as normalising, to give the normalised impact sound pressure level (L_n).

$$L_n = L_i + 10 \log \frac{A}{A_{ref}} \text{ in decibels}$$

where

A is the actual absorption of the test chamber in m²

A_{ref} is the reference room absorption of 10m²

The procedure is then repeated for at least five other impact source positions. The individual values for the different positions are arithmetically averaged to provide a final result for the normalised impact sound pressure level at each frequency.

$L_{n,w}$ and C_i have been calculated in accordance with the relevant section of BS EN ISO 717-2 from the results of laboratory tests carried out in accordance with BS EN ISO 10140-3.

Appendix E -Measurement Uncertainty – Impact Sound

TP31 - Measurement Uncertainty BS EN ISO 10140-3

The following values of uncertainty are based on a standard uncertainty multiplied by a coverage factor of $k = 2$, which provides a level of confidence of approximately 95%.

Frequency, Hz	Uncertainty, $\pm$ dB
100	2.2
125	1.8
160	1.5
200	1.5
250	1.5
315	1.5
400	1.5
500	1.2
630	1.2
800	1.2
1000	1.2
1250	1.2
1600	1.2
2000	1.2
2500	1.2
3150	1.2

The services listed below are services which SRL can offer. They are not covered by our UKAS accreditation except for some of our Lab and site testing. For further details please contact us directly.

Acoustics

Since 1967, our team of acoustic consultants has played a key role in major projects where noise or vibration is an issue, in the UK and across the globe – whether it's planning, performance prediction, design, inspection, troubleshooting, measurement or commissioning.

Air Quality

We offer a comprehensive service to model, monitor and analyse air quality, delivering assessments for a broad range of projects and purposes, for both private and public sector clients.

Carbon & Net Zero

Top of the agenda is tackling energy and carbon reduction to limit the impact of climate change. Our team of consultants will help you to achieve your sustainability objectives.

Lab & Site Testing

Design based on test data will always achieve the best results – and that's why we offer a wide range of acoustic testing at our independently accredited laboratories, as well as on-site testing to support live projects.

Monitoring

Our specialist services to monitor and assess noise, vibration, dust, air quality and odour employ the latest technology to provide remote access to data, helping to address issues quickly and to protect our clients.

Noise & Vibration

Ensuring noise and vibration does not exceed agreed levels is an important part of our environmental management services, using state-of-the-art technology to access real-time data remotely, to enable swift remedial action if required.

Odour & Dust

As part of our portfolio of environmental monitoring services, we offer specialist advice on the adverse impact of dust and odour across a range of projects including construction, waste handling and mineral extraction.

Sustainability

Minimising the impact on the environment is at the centre of today's business objectives. Our specialist services help our clients to fulfil their obligations, whether it's a BREEAM assessment, Energy Carbon Reduction or Net Zero.