palmer acoustics AU, TH & VN

Acoustics and Audio Visual – Consulting Engineers

FIELD FLOOR IMPACT INSULATION TESTS REPORT

U1504 THE HUDSON ON ALBION HILL, 50 HUDSON RD, ALBION

Commissioned by:	Larry Mujaj
Date:	27 October 2021
Project number:	5372
Version:	V.0
Author:	Hasitha Gallage

DOCUMENT INFORMATION	
Author: Hasitha Gallage **Date**: 27 October 2021	**Approved by**: Ross Palmer **Date**: 27 October 2021

VERSION HISTORY				
Version	**Description**	**Date**	**Author**	**Approved by**
V.0	Final	27-10-2021	Hasitha Gallage	Ross Palmer
V.1				

DOCUMENT DISTRIBUTION			
Copy	**Name/Company**	**Hard Copy**	**Electronic Copy**
01	Larry Mujaj	☐	☑
02		☐	☐
03		☐	☐
04		☐	☐
05		☐	☐

TITLE	Field Floor Impact Insulation Tests U1504 The Hudson on Albion Hill, 50 Hudson Rd, Albion, QLD 4010. Test Report
TESTS BY	Hasitha Gallage Acoustic Engineer - Palmer Acoustics (Australia) Pty Ltd
REPORT DATE	27 October 2021
TEST DATE	27 October 2021
TEST LOCATION	Level 15 Unit 1504 Living Room
FOR	Larry Mujaj

CONTENTS

1.0 INTRODUCTION 1

2.0 EQUIPMENT AND PROCEDURES 1

2.1 Measurement Procedures 1
2.2 Instrumentation 1

3.0 DESCRIPTION OF ROOMS 2

4.0 RESULTS 2

5.0 CRITERIA 3

6.0 CONCLUSION 3

7.0 NOTES 3

APPENDIX A 4

APPENDIX B 6

APPENDIX C 7

1.0 INTRODUCTION

Larry Mujaj has engaged Palmer Acoustics to perform field impact insulation tests at U1504 The Hudson on Albion Hill, 50 Hudson Rd, Albion. For these tests, we use an ISO 140 standard tapping machine (per ISO 16283-2: 2020(E)).

Floor systems tested:

Test 1 - Bare Concrete Slab - U1504 Living Room to U1412 Living Room
Test 2 - Bare Concrete Slab - U1504 Living Room to U1412 Bedroom
Test 3 - 6.5mm Pallas Hybrid flooring sample - U1504 Living Room to U1412 Living Room
Test 4 - 6.5mm Pallas Hybrid flooring sample - U1504 Living Room to U1412 Bedroom
Test 5 - 9mm Pallas Hybrid flooring sample - U1504 Living Room to U1412 Living Room
Test 6 - 9mm Pallas Hybrid flooring sample - U1504 Living Room to U1412 Bedroom

2.0 EQUIPMENT AND PROCEDURES

2.1 Measurement Procedures

Testing conformed to ISO 16283-2:2020 "*Field measurement of impact sound insulation of floors*". Evaluation of the results to derive the single figure L'nT,w rating was conducted to ISO 717-2 2020 "*Rating of insulation in buildings and of building elements – Part 2 Impact Sound Insulation*".

Ambient sound levels were measured before testing.

The receiving room reverberation times were measured at various locations throughout the space, using the balloon-burst impulse test method, with the results averaged.

The Receiving room tapping sound levels were measured for 30 seconds at various locations throughout the space, with the results averaged.

Test results were analysed per ISO 16283 and ISO 717.

2.2 Instrumentation

The following instruments were used:

- Norsonics Nor140 Sound Analyser (serial number 1403252)
- Look Line tapping machine EM50 (serial number TM.14031)
- B & K 4231 Calibrator (serial number 2153030)

Before and after each measurement session, the equipment was field calibrated and was within 0.2dB of the reference signal. All instruments hold a current calibration certificate from a NATA accredited calibration laboratory.

3.0 DESCRIPTION OF ROOMS

All windows and doors were closed in the source and receiving rooms.

Transmitting Room (Living room of Unit 1504 on Level 15)

Walls:	Plasterboard;
Floor:	6.5mm and 9mm Pallas Hybrid flooring samples;
Room finish:	Not furnished.

Receiving Room (Living Room and Bedroom of Unit 1412 on Level 14)

Slab	255mm Concrete;
Ceiling:	90mm Cavity + Plasterboard;
Floor:	Timber;
Walls:	Plasterboard;
Room finish:	Furnished.

Figure 1: Testing at U1504 The Hudson on Albion Hill, 50 Hudson Rd, Albion.

4.0 RESULTS

Our tests produced the following results:

Table 1: Test Result Summary – Floor impact tests

	Test System	L'nT,w
1.	Bare Concrete Slab - U1504 Living Room to U1412 Living Room	58
2.	Bare Concrete Slab - U1504 Living Room to U1412 Bedroom	62
3.	6.5mm Pallas Hybrid flooring sample - U1504 Living Room to U1412 Living Room	39
4.	6.5mm Pallas Hybrid flooring sample - U1504 Living Room to U1412 Bedroom	40
5.	9mm Pallas Hybrid flooring sample - U1504 Living Room to U1412 Living Room	41
6.	9mm Pallas Hybrid flooring sample - U1504 Living Room to U1412 Bedroom	41

Appendix C contains the Test Certificates detailing the 1/3 octave band results for this report in terms of L'nT,w following ISO 717 - 2: 2020.

L'nT,w is a term used in the Building Code of Australia (BCA - see Appendix A) and represents a corrected room noise level, with a lower number showing better performance.

5.0 CRITERIA

The Body Corporate By-Laws of The Hudson on Albion Hill requires that any installed floor system provide a corrected floor impact sound level of L'nT,w ≤ 45.

6.0 CONCLUSION

The 6.5mm and 9mm Pallas Hybrid floor installed in the living room of U1504 achieved L'nT,w ≤ 41,. This complies with the Body Corporate limit of L'nT,w ≤ 45.

7.0 NOTES

i). In our experience, test samples are similar in performance to an entirely laid floor (± 2dB).

ii). The impact layer **must be installed strictly following the manufacturer's recommended procedures** to achieve the specified rating. There must be a minimum of 5mm clearance around the floor's perimeter to avoid pressure on walls and adjacent surfaces. Fill the gap with a resilient sealant.

Author:

HASITHA GALLAGE PhD, BSc Eng(Hons)
Engineer

Approved by:

ROSS H. PALMER CPEng RPEQ 3534
Principal Engineer

APPENDIX A

GLOSSARY

IMPACT MEASUREMENT AND ASSESSMENT DESCRIPTORS

- $L_{Aeq,T}$ – Time average A-weighted sound pressure level is the average energy equivalent level of the A-weighted sound over a period "T".

- L_{Aeq} – Equivalent Continuous Noise Level. The noise level in dB(A) which, if present for the entire measurement period, would produce the same sound energy to be received as was actually received as a result of a signal which varied with time. Normally abbreviated to "L_{eq}" or "L_{Aeq}", often followed by a specification of the time period (such as 1 hour or 8 hours) indicating the period of time to which the measured value has been normalised;

- $L'_{nT,w}$ – Weighted Standardised impact sound pressure level; a measurement of impact sound transmission between rooms. Lower values denote better performance. The single figure measure is derived by adapting a standard response curve to measured 1/3 octave band sound pressure levels. Measured results are adjusted based upon a reverberation time of 0.5 sec in receiving room. Normally derived from a field test.

- $L'_{n,w}$ – Weighted Normalised impact sound pressure level; a laboratory measurement of impact sound transmission between rooms. Lower values denote better performance. The single figure measure is derived by adapting a standard response curve to measured 1/3 octave band sound pressure level measurements. Measured results are adjusted based on the absorption of 10m^2 in the receiving room. Normally derived from a laboratory test.

- C_I – A spectrum adaptation term compensating for the effect of floor coverings when applied to bare floors under test. The usually negative value, in decibels, is added to the single-number quantity, L'_{nw} or L'_{nTw}.

- ***Impact Sound Pressure Level (L)*** – the average sound pressure level in a specified frequency band produced in the receiving room by the operation of the standard tapping machine on the floor assembly, averaged over each of the specified machine positions.

- L'_{nT} – ***Standardised Impact Sound Pressure Level*** – the impact sound pressure level standardised to a room with a reference reverberation time of 0.5 seconds.

- L'_n – ***Normalized Impact Sound Pressure Level*** – the impact sound pressure level normalised to reference absorption area of 10 metric sabins (108 sabins).

- ***Receiving Room*** – a room below or adjacent to the floor specimen under test in which the impact sound pressure levels are measured.

- ***Source Room*** – the room containing the tapping machine.

STANDARDS

- ***ISO 16283 – 2***
  Acoustics – Field measurement of sound insulation in buildings and of building elements – Part 7: Default procedure for sound pressure level measurement

- ***ISO 717 – 2***
  Acoustics – Rating of sound insulation in building and of building elements – Part 2: Impact sound insulation

- ***ISO 3382-2:2008***
  Acoustics – Measurement of room acoustic parameters — Part 2: Reverberation time in ordinary rooms.

APPENDIX B

CALCULATION METHODOLOGY - L'nT,w

Correction to the signal level for background noise – ISO 16283-2:2015

If $(L_{sb}- L_b) > 10$, then $L = L_{sb}$

If $10 > (L_{sb}- L_b) > 6$, then $L = 10 \log \left(10^{\frac{L_{sb}}{10}} - 10^{\frac{L_b}{10}}\right)$

If $6 > (L_{sb}- L_b)$, then $L = L_{sb} - 1.3$

L is the adjusted signal level, in decibels;
L_{sb} is the level of signal and background noise combined, in decibels;
L_b is the background noise level, in decibels.

Standardised impact sound pressure level – ISO 16283-2:2015

$$L'_{nT} = L_i - 10 \log \left(\frac{T}{T_0}\right)$$

L'_{nT} is the standardised impact sound pressure level;
L_i is the impact sound pressure level;
T is the reverberation time in the receiving room;
T_0 is the reference reverberation time in the receiving room; for dwellings, T_0 = 0.5 s.

Method of comparison – ISO 717-2:2013

To evaluate the results of a measurement of L'_{nT} in one-third-octave bands, the reference curve is shifted in increments of 1 dB towards the L'_{nT} curve until the sum of unfavourable deviations is as large as possible but not more than 32.0 dB.

An unfavourable deviation at a particular frequency occurs when the results of measurements exceed the reference value. Only the unfavourable deviations are taken into account.

The value, in decibels, of the reference curve at 500 Hz, after shifting in accordance with this procedure is $L'_{nT,w}$.

APPENDIX C

Test certificates (6)

palmer acoustics AU, TH & VN
Acoustics and Audio Visual – Consulting Engineers

Member Firm: AAAC
Association of Australasian Acoustical Consultants

FIELD IMPACT SOUND INSULATION - TEST CERTIFICATE

Test 1 of 6

Bare Concrete Slab

PROJECT:	PN5372 U1504 The Hudson on Albion Hill, 50 Hudson Rd, Albion LNT			
Test Location:	Level 15 U1504 Living Room to Level 14 U1412 Living Room	**Meas. Date:**	27-Oct-2021	
		Meas. Parameter:	LLeq	
Client:	Larry Mujaj	**Tapping Machine:**	Look Line EM50	
Test Performed:	Hasitha Gallage	**Receiving Room Volume:**	57	m^3

DESCRIPTION OF FLOOR AND SPECIMEN

Test Surface:	Bare Concrete Slab	**No. of Source posn:**	2	
		Mic. posn:	2	sweeps
		RT meas:	5	Imp.
Underlay:		**SLM:**	Nor 140	
Adhesive:				
Ceiling:	Plasterboard			
Slab:	Concrete			

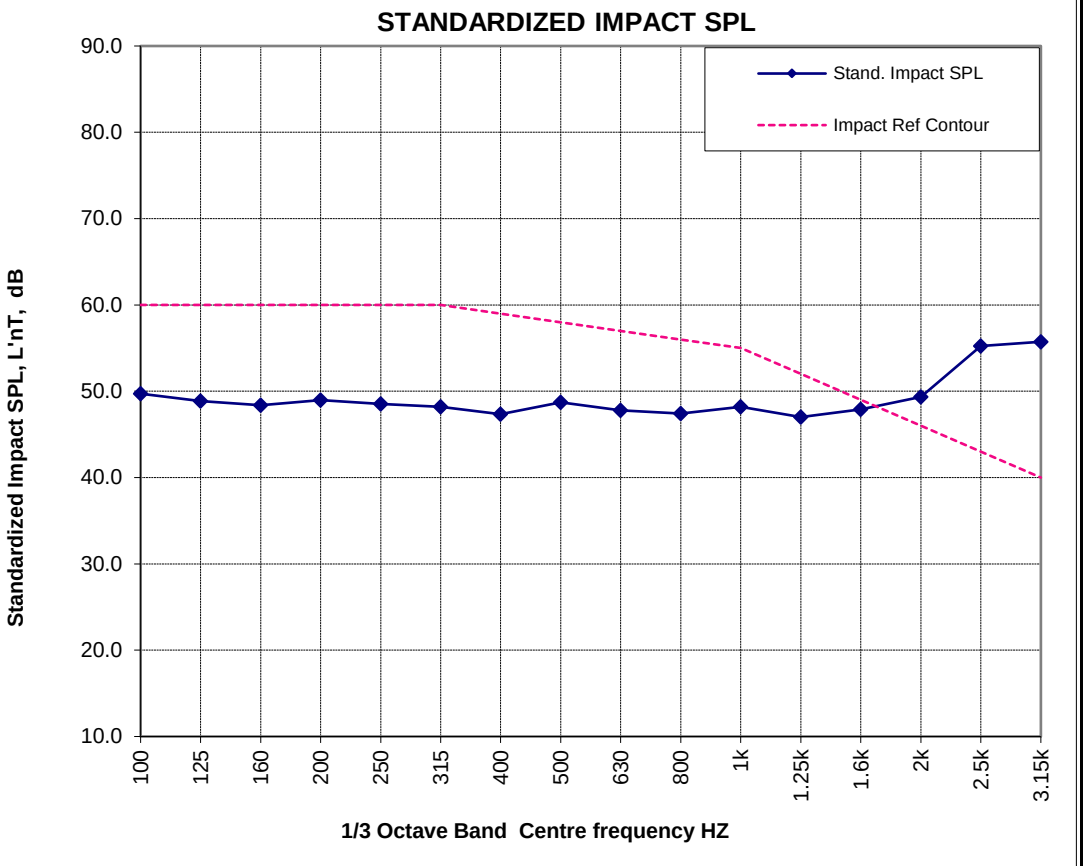
Weighted Standardized Impact SPL

Results standardized to a RT of 0.5 seconds

L'nT,w 58

ISO 16283-2:2015 & 717-2:2013

Centre Frequency	Stand. Impact SPL	Impact Ref Contour	Deficiencies
Hz	dB	dB	dB
100	49.7	60	
125	48.9	60	
160	48.4	60	
200	49.0	60	
250	48.5	60	
315	48.2	60	
400	47.3	59	
500	48.7	58	
630	47.8	57	
800	47.4	56	
1k	48.2	55	
1.25k	47.0	52	
1.6k	47.9	49	
2k	49.4	46	3.4
2.5k	55.2	43	12.2
3.15k	55.7	40	15.7
			Total
L'nT,w	58		31.3



24 Mexicanus Drive Park Ridge QLD 4125
Ph (61 7) 3802 2155 www.palmeracoustics.com

palmer acoustics AU, TH & VN
Acoustics and Audio Visual – Consulting Engineers

palmer acoustics AU, TH & VN
Acoustics and Audio Visual – Consulting Engineers

Member Firm: AAAC
Association of Australasian Acoustical Consultants

FIELD IMPACT SOUND INSULATION - TEST CERTIFICATE

Test 2 of 6

Bare Concrete Slab

PROJECT:	PN5372 U1504 The Hudson on Albion Hill, 50 Hudson Rd, Albion LNT			
Test Location:	Level 15 U1504 Living Room to Level 14 U1412 Bedroom	**Meas. Date:**	27-Oct-2021	
		Meas. Parameter:	LLeq	
Client:	Larry Mujaj	**Tapping Machine:**	Look Line EM50	
Test Performed:	Hasitha Gallage	**Receiving Room Volume:**	23	m^3

DESCRIPTION OF FLOOR AND SPECIMEN

Test Surface:	Bare Concrete Slab	**No. of Source posn:**	2	
		Mic. posn:	2	sweeps
		RT meas:	4	Imp.
Underlay:		**SLM:**	Nor 140	
Adhesive:				
Ceiling:	Plasterboard			
Slab:	Concrete			

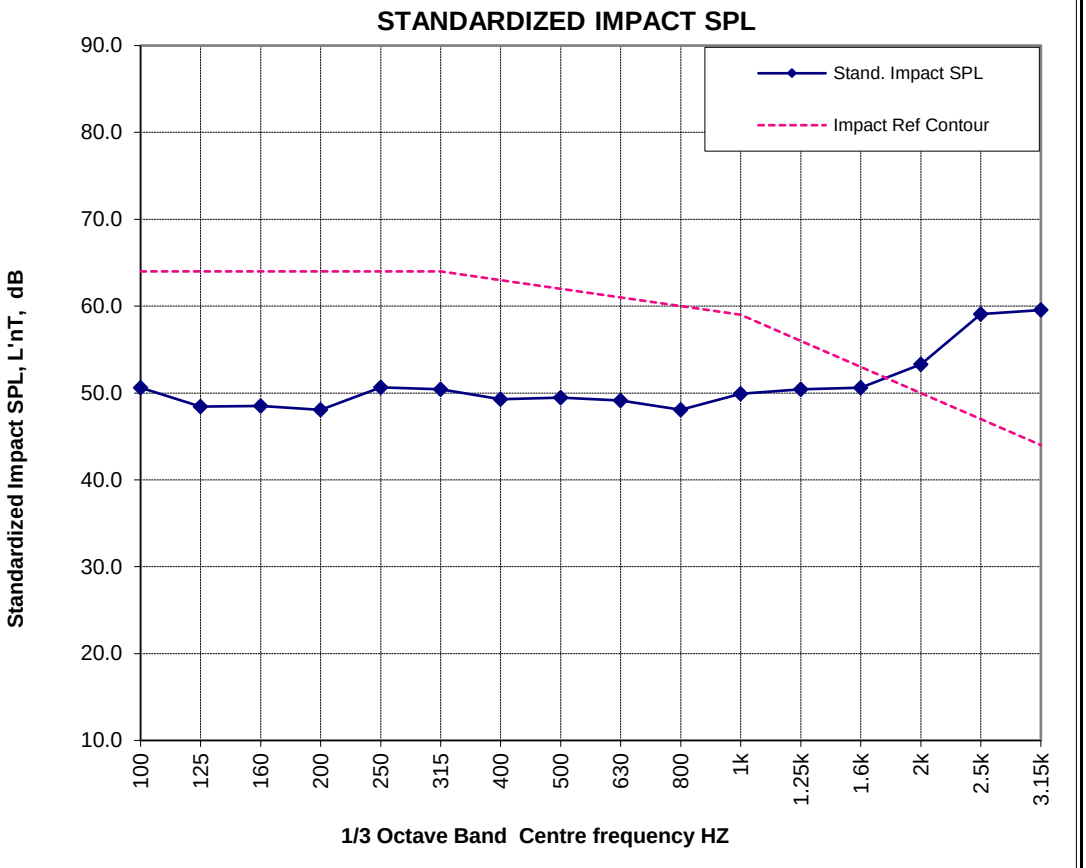
Weighted Standardized Impact SPL

Results standardized to a RT of 0.5 seconds

L'nT,w 62

ISO 16283-2:2015 & 717-2:2013

Centre Frequency		Stand. Impact SPL	Impact Ref Contour	Deficiencies
Hz		dB	dB	dB
100	<	50.6	64	
125	<	48.4	64	
160		48.5	64	
200		48.1	64	
250		50.6	64	
315		50.4	64	
400		49.3	63	
500		49.5	62	
630		49.1	61	
800		48.1	60	
1k		49.9	59	
1.25k		50.4	56	
1.6k		50.6	53	
2k		53.3	50	3.3
2.5k		59.1	47	12.1
3.15k		59.5	44	15.5
				Total
L'nT,w		62		30.9



24 Mexicanus Drive Park Ridge QLD 4125
Ph (61 7) 3802 2155 www.palmeracoustics.com

palmer acoustics AU, TH & VN
Acoustics and Audio Visual – Consulting Engineers

palmer acoustics AU, TH & VN
Acoustics and Audio Visual – Consulting Engineers

Member Firm: AAAC
Association of Australasian Acoustical Consultants

FIELD IMPACT SOUND INSULATION - TEST CERTIFICATE

Test 3 of 6

6.5mm Pallas Hybrid flooring sample

PROJECT:	PN5372 U1504 The Hudson on Albion Hill, 50 Hudson Rd, Albion LNT			
Test Location:	Level 15 U1504 Living Room to Level 14 U1412 Living Room	**Meas. Date:**	27-Oct-2021	
		Meas. Parameter:	LLeq	
Client:	Larry Mujaj	**Tapping Machine:**	Look Line EM50	
Test Performed:	Hasitha Gallage	**Receiving Room Volume:**	57	m^3

DESCRIPTION OF FLOOR AND SPECIMEN

Test Surface:	6.5mm Pallas Hybrid flooring sample	**No. of Source posn:**	2	
		Mic. posn:	2	sweeps
		RT meas:	5	Imp.
Underlay:		**SLM:**	Nor 140	
Adhesive:	Loose laid			
Ceiling:	Plasterboard			
Slab:	Concrete			

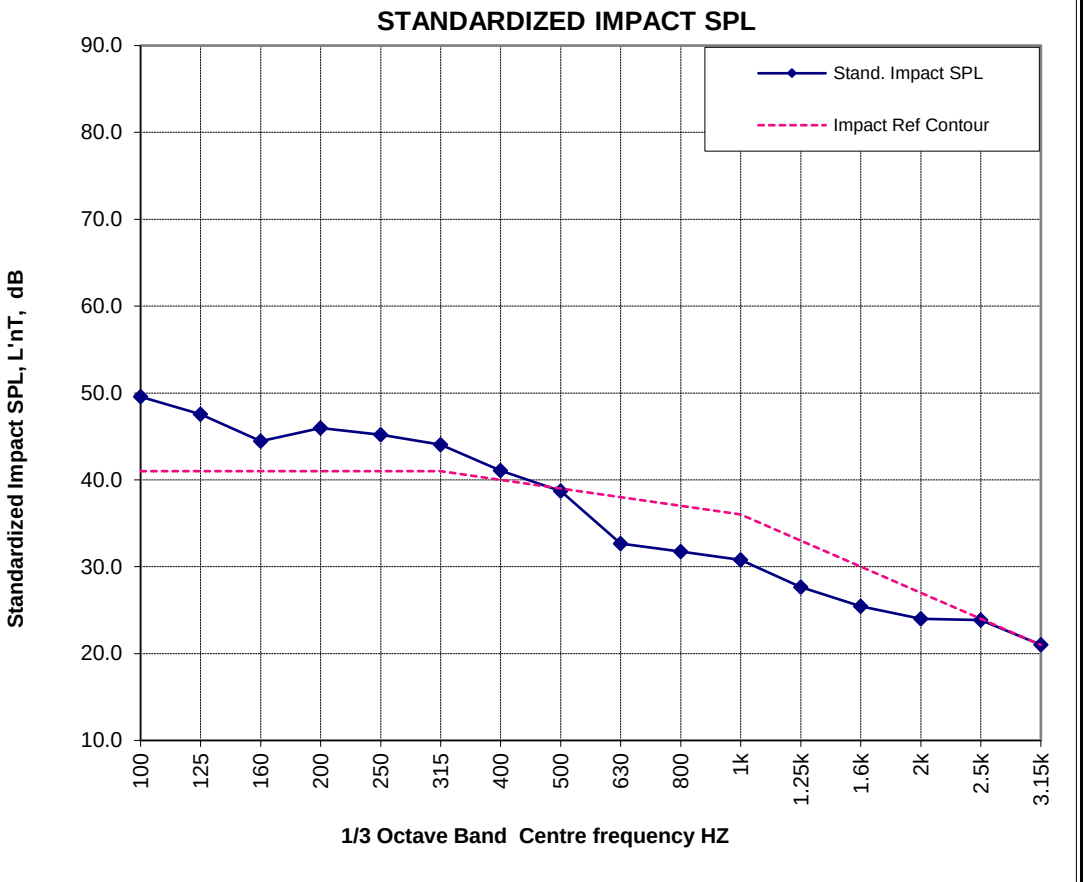
Weighted Standardized Impact SPL

Results standardized to a RT of 0.5 seconds

L'nT,w 39

ISO 16283-2:2015 & 717-2:2013

Centre Frequency Hz		Stand. Impact SPL dB	Impact Ref Contour dB	Deficiencies dB
100		49.6	41	8.6
125	<	47.5	41	6.5
160	<	44.4	41	3.4
200		46.0	41	5.0
250		45.2	41	4.2
315		44.1	41	3.1
400		41.1	40	1.1
500		38.7	39	
630	<	32.7	38	
800	<	31.7	37	
1k	<	30.8	36	
1.25k	<	27.7	33	
1.6k	<	25.4	30	
2k	<	24.0	27	
2.5k	<	23.8	24	
3.15k	<	21.0	21	0.0
				Total
L'nT,w		39		31.9



24 Mexicanus Drive Park Ridge QLD 4125
Ph (61 7) 3802 2155 www.palmeracoustics.com

palmer acoustics AU, TH & VN
Acoustics and Audio Visual – Consulting Engineers

palmer acoustics AU, TH & VN
Acoustics and Audio Visual – Consulting Engineers

Member Firm: AAAC
Association of Australasian Acoustical Consultants

FIELD IMPACT SOUND INSULATION - TEST CERTIFICATE

Test 4 of 6

6.5mm Pallas Hybrid flooring sample

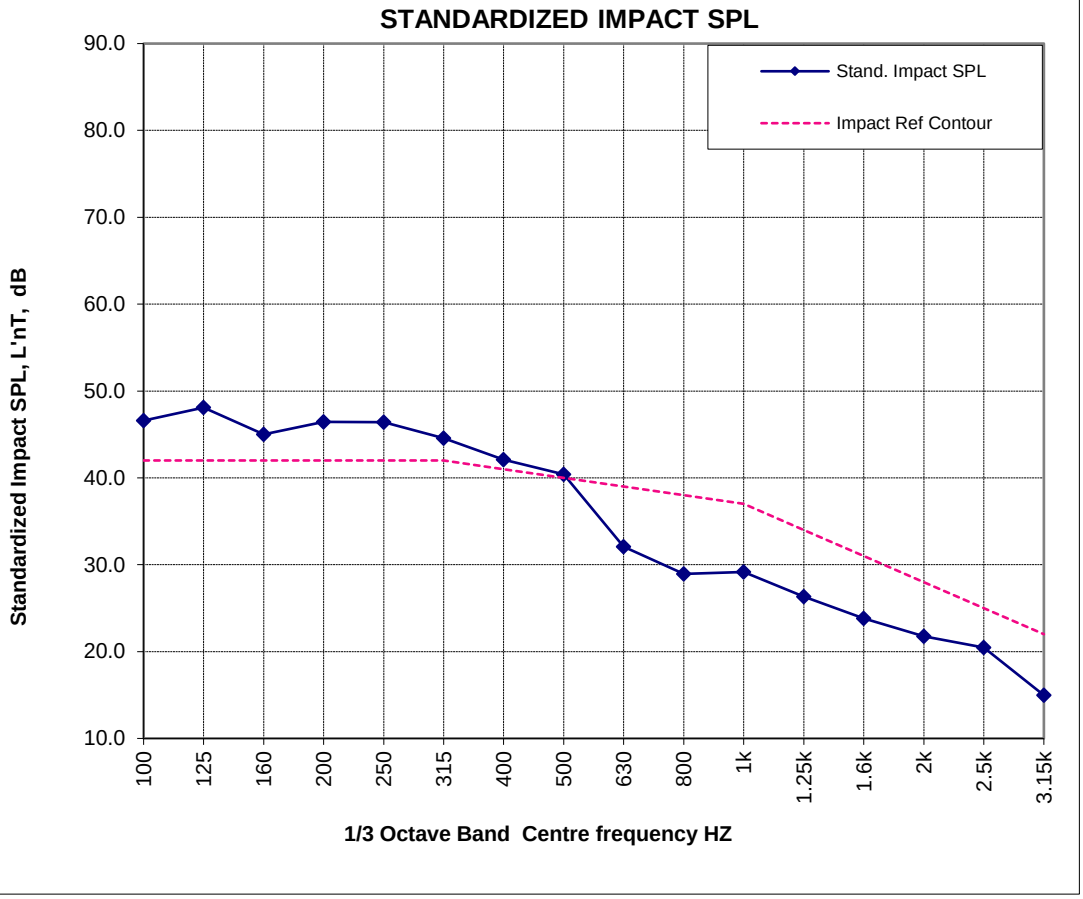
PROJECT:	PN5372 U1504 The Hudson on Albion Hill, 50 Hudson Rd, Albion LNT			
Test Location:	Level 15 U1504 Living Room to Level 14 U1412 Bedroom	**Meas. Date:**	27-Oct-2021	
		Meas. Parameter:	LLeq	
Client:	Larry Mujaj	**Tapping Machine:**	Look Line EM50	
Test Performed:	Hasitha Gallage	**Receiving Room Volume:**	23	m^3

DESCRIPTION OF FLOOR AND SPECIMEN

		No. of Source posn:	2	
Test Surface:	6.5mm Pallas Hybrid flooring sample	**Mic. posn:**	2	sweeps
		RT meas:	4	Imp.
Underlay:		**SLM:**	Nor 140	
Adhesive:	Loose laid			
Ceiling:	Plasterboard			
Slab:	Concrete			

Weighted Standardized Impact SPL	**L'nT,w**	**40**	ISO 16283-2:2015 & 717-2:2013
Results standardized to a RT of 0.5 seconds			

Centre Frequency		Stand. Impact SPL	Impact Ref Contour	Deficiencies
Hz		dB	dB	dB
100	<	46.6	42	4.6
125	<	48.1	42	6.1
160	<	45.0	42	3.0
200		46.4	42	4.4
250		46.4	42	4.4
315		44.6	42	2.6
400	<	42.1	41	1.1
500		40.4	40	0.4
630	<	32.1	39	
800	<	28.9	38	
1k	<	29.2	37	
1.25k	<	26.3	34	
1.6k	<	23.8	31	
2k	<	21.7	28	
2.5k	<	20.5	25	
3.15k	<	15.0	22	
				Total
L'nT,w		40		26.6



24 Mexicanus Drive Park Ridge QLD 4125
Ph (61 7) 3802 2155 www.palmeracoustics.com

palmer acoustics AU, TH & VN
Acoustics and Audio Visual – Consulting Engineers

palmer acoustics AU, TH & VN
Acoustics and Audio Visual – Consulting Engineers

Member Firm: AAAC
Association of Australasian Acoustical Consultants

FIELD IMPACT SOUND INSULATION - TEST CERTIFICATE

Test 5 of 6

9mm Pallas Hybrid flooring sample

PROJECT:	PN5372 U1504 The Hudson on Albion Hill, 50 Hudson Rd, Albion LNT			
Test Location:	Level 15 U1504 Living Room to Level 14 U1412 Living Room	**Meas. Date:**	27-Oct-2021	
		Meas. Parameter:	LLeq	
Client:	Larry Mujaj	**Tapping Machine:**	Look Line EM50	
Test Performed:	Hasitha Gallage	**Receiving Room Volume:**	57	m^3

DESCRIPTION OF FLOOR AND SPECIMEN

Test Surface:	9mm Pallas Hybrid flooring sample	**No. of Source posn:**	2	
		Mic. posn:	2	sweeps
		RT meas:	5	Imp.
Underlay:		**SLM:**	Nor 140	
Adhesive:	Loose laid			
Ceiling:	Plasterboard			
Slab:	Concrete			

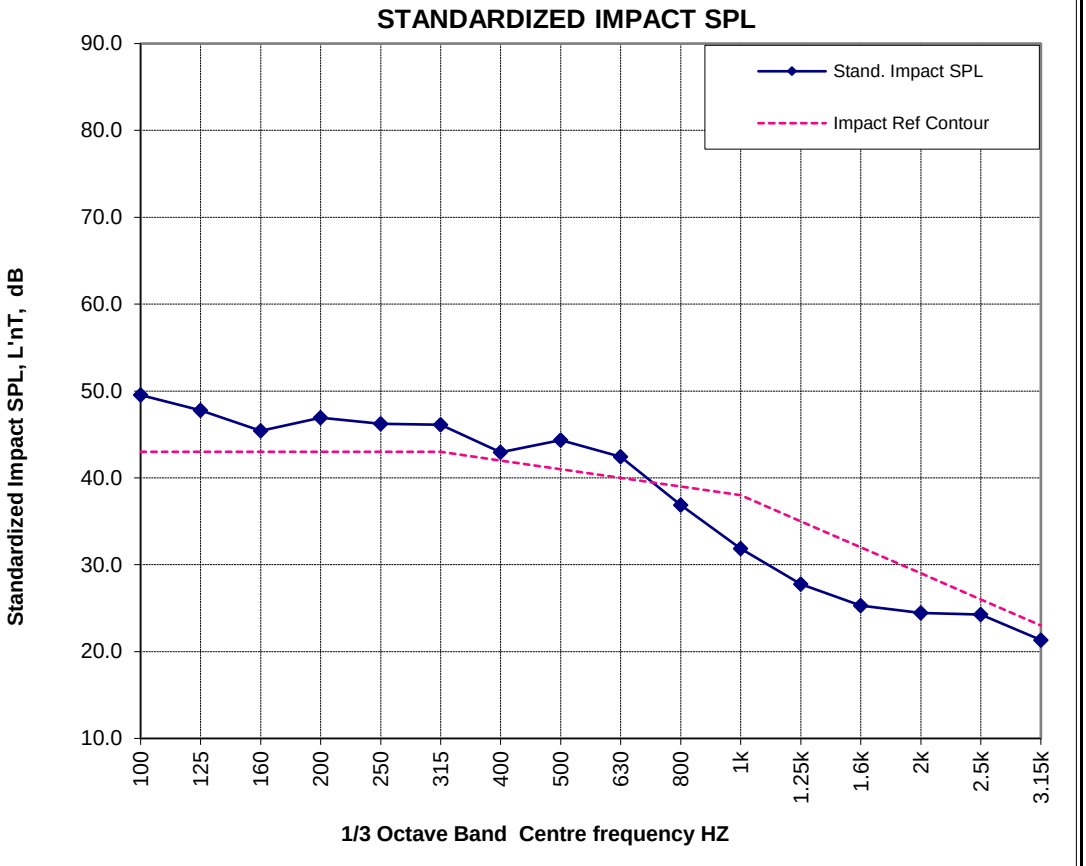
Weighted Standardized Impact SPL

Results standardized to a RT of 0.5 seconds

L'nT,w 41

ISO 16283-2:2015 & 717-2:2013

Centre Frequency		Stand. Impact SPL	Impact Ref Contour	Deficiencies
Hz		dB	dB	dB
100		49.5	43	6.5
125	<	47.8	43	4.8
160	<	45.4	43	2.4
200		46.9	43	3.9
250		46.2	43	3.2
315		46.1	43	3.1
400		42.9	42	0.9
500		44.3	41	3.3
630		42.4	40	2.4
800	<	36.9	39	
1k	<	31.9	38	
1.25k	<	27.8	35	
1.6k	<	25.3	32	
2k	<	24.4	29	
2.5k	<	24.3	26	
3.15k	<	21.3	23	
				Total
L'nT,w		41		30.7



24 Mexicanus Drive Park Ridge QLD 4125
Ph (61 7) 3802 2155 www.palmeracoustics.com

palmer acoustics AU, TH & VN
Acoustics and Audio Visual – Consulting Engineers

palmer acoustics AU, TH & VN
Acoustics and Audio Visual – Consulting Engineers

Member Firm: AAAC
Association of Australasian Acoustical Consultants

FIELD IMPACT SOUND INSULATION - TEST CERTIFICATE

Test 6 of 6

6.5mm Pallas Hybrid flooring sample

PROJECT:	PN5372 U1504 The Hudson on Albion Hill, 50 Hudson Rd, Albion LNT			
Test Location:	Level 15 U1504 Living Room to Level 14 U1412 Bedroom	**Meas. Date:**	27-Oct-2021	
		Meas. Parameter:	LLeq	
Client:	Larry Mujaj	**Tapping Machine:**	Look Line EM50	
Test Performed:	Hasitha Gallage	**Receiving Room Volume:**	23	m^3

DESCRIPTION OF FLOOR AND SPECIMEN

Test Surface:	6.5mm Pallas Hybrid flooring sample	**No. of Source posn:**	2	
		Mic. posn:	2	sweeps
		RT meas:	4	Imp.
Underlay:		**SLM:**	Nor 140	
Adhesive:	Loose laid			
Ceiling:	Plasterboard			
Slab:	Concrete			

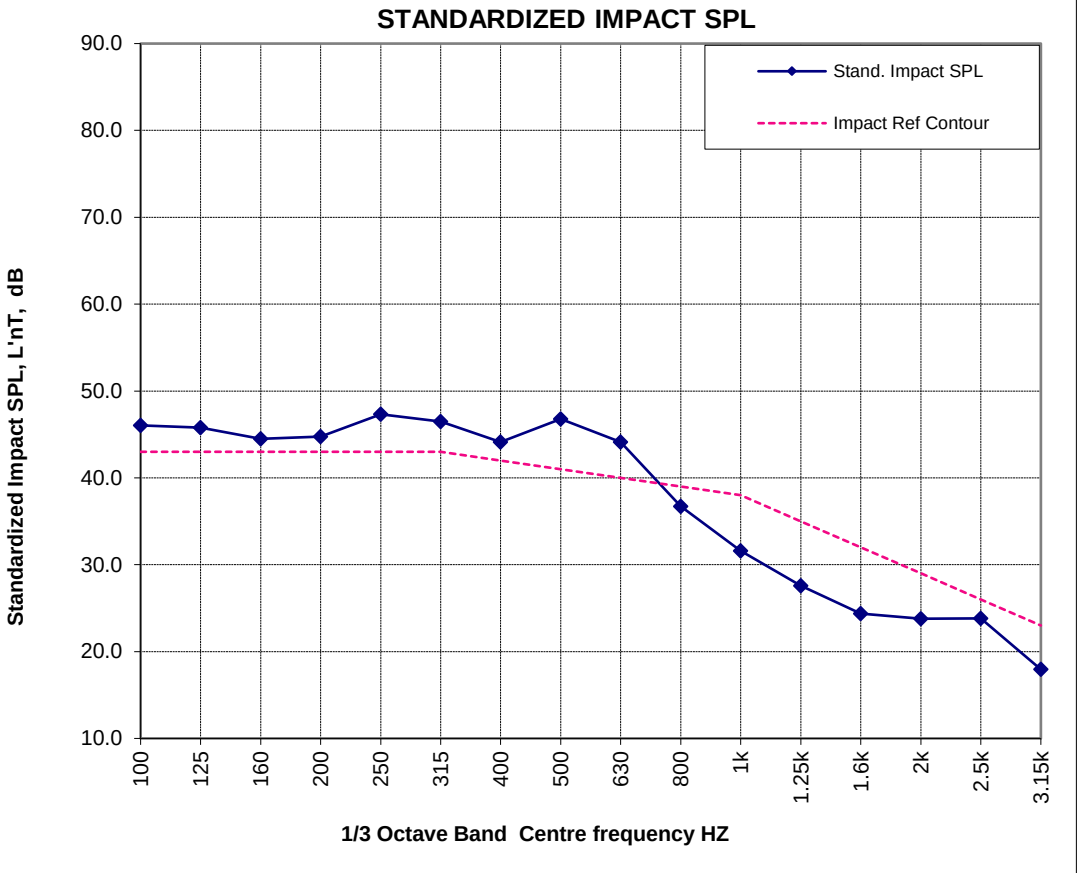
Weighted Standardized Impact SPL

Results standardized to a RT of 0.5 seconds

L'nT,w 41

ISO 16283-2:2015 & 717-2:2013

Centre Frequency		Stand. Impact SPL	Impact Ref Contour	Deficiencies
Hz		dB	dB	dB
100	<	46.1	43	3.1
125	<	45.8	43	2.8
160	<	44.5	43	1.5
200		44.7	43	1.7
250		47.3	43	4.3
315		46.5	43	3.5
400		44.1	42	2.1
500		46.8	41	5.8
630		44.1	40	4.1
800	<	36.7	39	
1k	<	31.6	38	
1.25k	<	27.6	35	
1.6k	<	24.4	32	
2k	<	23.8	29	
2.5k	<	23.8	26	
3.15k	<	17.9	23	
				Total
L'nT,w		41		28.9



24 Mexicanus Drive Park Ridge QLD 4125
Ph (61 7) 3802 2155 www.palmeracoustics.com

palmer acoustics AU, TH & VN
Acoustics and Audio Visual – Consulting Engineers