

FIELD FLOOR IMPACT INSULATION TEST REPORT

U1509, 12 CUNNINGHAM STREET, NEWSTEAD



Commissioned by:	Flooring Distributors of Australia (FDA)
Date:	13 June 2023
Project number:	5835
Version:	V.0
Author:	Eric Huang

DOCUMENT INFORMATION				
Author: Eric Huang		Approved by: Ross H. Palmer		
Date: 13 June 2023		Date: 13 June 2023		
VERSION HISTORY				
Version	Description	Date	Author	Approved by
V.0	Final	13-06-2023	Eric Huang	Ross H. Palmer
DOCUMENT DISTRIBUTION				
Copy	Name/Company	Hard Copy	Electronic Copy	
01	Flooring Distributors of Australia (FDA)	☐	☒	
02		☐	☐	
03		☐	☐	
04		☐	☐	
05		☐	☐	

TITLE	Field Floor Impact Insulation Test U1509, 12 Cunningham Street, Newstead, QLD 4006 Test Report
TESTS BY	Eric Huang Senior Engineer - Palmer Acoustics (Australia) Pty Ltd
TEST DATE	12 June 2023
REPORT DATE	13 June 2023
TEST LOCATION	Level 15 U1509 Living area to Level 14 U1409 Living area
FOR	Flooring Distributors of Australia (FDA)

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1.0 INTRODUCTION

Flooring Distributors of Australia (FDA) has engaged Palmer Acoustics to perform a field impact insulation test at U1509, 12 Cunningham Street, Newstead. For this test, we use an ISO 140 standard tapping machine (per ISO 16283-2: 2020(E)).

Floor systems tested:

- Test 1 - Concrete Slab – U1509 Living Area to U1409 Living Area
- Test 2 - Comfort Stone 4.5mm loose laid – U1509 Living Area to U1409 Living Area
- Test 3 - Comfort Stone 4.5mm + Regupol Multi Sonus 3mm – U1509 Living Area to U1409 Living Area

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)
- B & K Tapping machine Type 3207 (serial number 2574503)
- 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 (Level 15 U1509 Living area)

Walls: Plasterboard;
Floor: Concrete slab with Carpet and test sample;
Room finish: Furnished.

Receiving Room (Level 14 U1409 Living area)

Slab: Concrete;
Walls: Plasterboard;
Ceiling: Suspende Plasterboard;
Floor: Carpet/Tiles;
Room finish: Furnished.



Figure 1: Testing at U1509, 12 Cunningham Street, Newstead.

4.0 RESULTS

Our tests give the following results:

Table 1: Test Result Summary – Floor impact tests

	Test System	L'nT,w
1.	Bare slab – U1509 Living Area to U1409 Living Area	63
2.	Comfort Stone 4.5mm loose laid – U1509 Living Area to U1409 Living Area	58
3.	Comfort Stone 4.5mm + Regupol Multi Sonus 3mm – U1509 Living Area to U1409 Living Area	46

Appendix C contains the Test Certificates detailing the $\frac{1}{3}$ 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.

Qualification

The test results above are specific to this test and cannot be directly applied to any other location or flooring system. When applied to another floor, Palmer Acoustics can advise on the possible performance, but this must be in consultation with our office.

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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 "Leq" 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 10m² 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 (3)

FIELD IMPACT SOUND INSULATION - TEST CERTIFICATE

Test 1 of 3

Bare Slab

PROJECT: PN5835 U1509 Cunningham Street, Newstead
Test Location: Level 15 U1509 Living to Level 14 U1409 Living
Client: Flooring Distributors of Australia (FDA)
Test Performed: Eric Huang

Meas. Date: 12-Jun-2023
Meas. Parameter: LLeq
Tapping Machine: B&K, Type 3207
Receiving Room Volume: 103 m³

DESCRIPTION OF FLOOR AND SPECIMEN

Test Surface: Bare Slab

Underlay:

Adhesive:

Ceiling: Suspended plasterboard

Slab: Concrete

No. of Source posn: 2
Mic. posn: 2 sweeps
RT meas: 6 Imp.
SLM: Nor 140

Weighted Standardized Impact SPL

Results standardized to a RT of 0.5 seconds

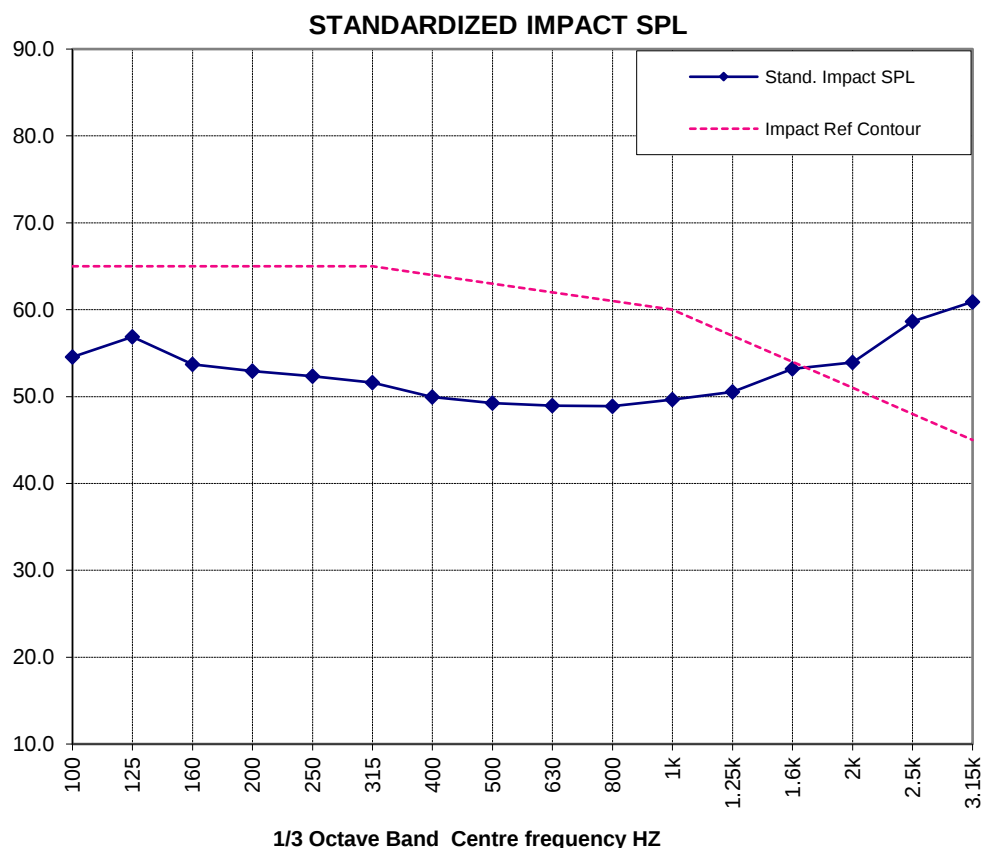
L'nT,w

63

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

Centre Frequency	Stand. Impact SPL	Impact Ref Contour	Deficiencies
Hz	dB	dB	dB
100	54.6	65	
125	56.9	65	
160	53.7	65	
200	52.9	65	
250	52.3	65	
315	51.6	65	
400	50.0	64	
500	49.2	63	
630	49.0	62	
800	48.9	61	
1k	49.7	60	
1.25k	50.5	57	
1.6k	53.2	54	
2k	53.9	51	2.9
2.5k	58.7	48	10.7
3.15k	60.9	45	15.9
Total			

Standardized Impact SPL, L'nT, dB



L'nT,w 63 29.5

FIELD IMPACT SOUND INSULATION - TEST CERTIFICATE

Test 2 of 3

Comfort Stone 4.5mm loose laid

PROJECT: PN5835 U1509 Cunningham Street, Newstead
Test Location: Level 15 U1509 Living to Level 14 U1409 Living
Client: Flooring Distributors of Australia (FDA)
Test Performed: Eric Huang

Meas. Date: 12-Jun-2023
Meas. Parameter: LLeq
Tapping Machine: B&K, Type 3207
Receiving Room Volume: 103 m³

DESCRIPTION OF FLOOR AND SPECIMEN

Test Surface: Comfort Stone 4.5mm loose laid
Underlay:
Adhesive: Loose laid
Ceiling: Suspended plasterboard
Slab: Concrete

No. of Source posn: 2
Mic. posn: 2 sweeps
RT meas: 6 Imp.
SLM: Nor 140

Weighted Standardized Impact SPL

Results standardized to a RT of 0.5 seconds

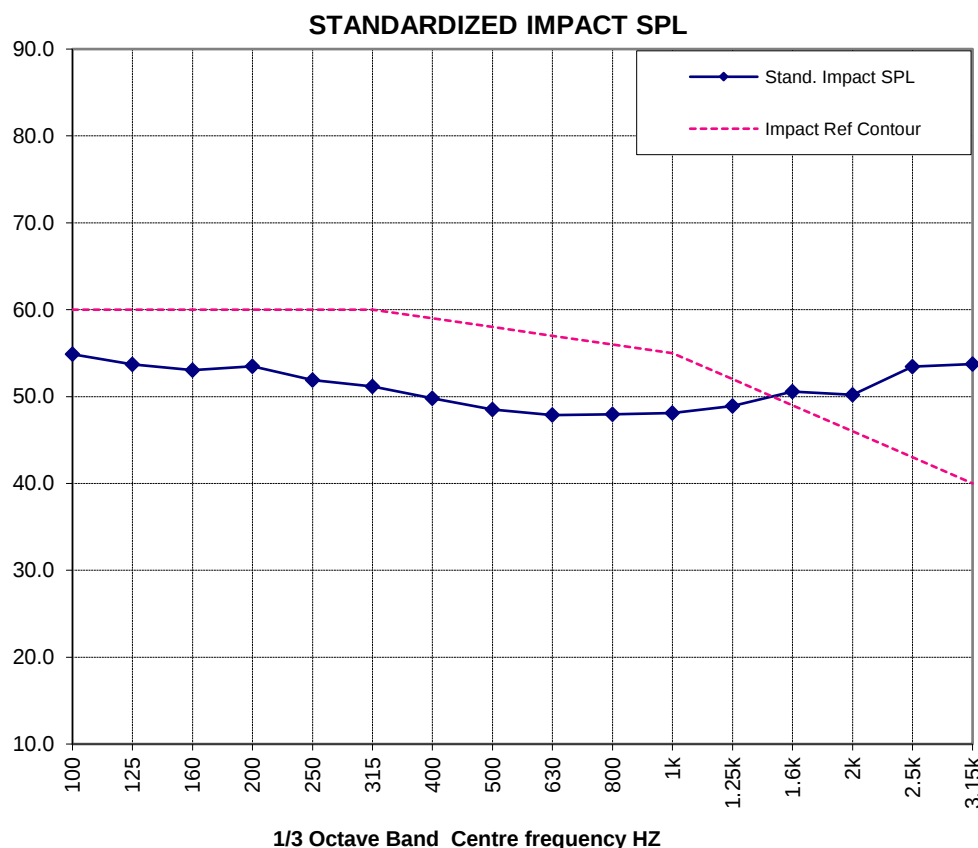
L'nT,w

58

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

Centre Frequency	Stand. Impact SPL	Impact Ref Contour	Deficiencies
Hz	dB	dB	dB
100	54.9	60	
125	53.7	60	
160	53.0	60	
200	53.5	60	
250	51.9	60	
315	51.2	60	
400	49.8	59	
500	48.5	58	
630	47.9	57	
800	47.9	56	
1k	48.1	55	
1.25k	48.9	52	
1.6k	50.6	49	1.6
2k	50.2	46	4.2
2.5k	53.5	43	10.5
3.15k	53.8	40	13.8
Total			

Standardized Impact SPL, L'nT, dB



L'nT,w 58 30.0

FIELD IMPACT SOUND INSULATION - TEST CERTIFICATE

Test 3 of 3

Comfort Stone 4.5mm

Regupol Souns Multi 3mm

PROJECT: PN5835 U1509 Cunningham Street, Newstead
Test Location: Level 15 U1509 Living to Level 14 U1409 Living

Meas. Date: 12-Jun-2023

Meas. Parameter: LLeq

Client: Flooring Distributors of Australia (FDA)

Tapping Machine: B&K, Type 3207

Test Performed: Eric Huang

Receiving Room Volume: 103 m³

DESCRIPTION OF FLOOR AND SPECIMEN

Test Surface: Comfort Stone 4.5mm
Underlay: Regupol Souns Multi 3mm
Adhesive: Loose laid
Ceiling: Suspended plasterboard
Slab: Concrete

No. of Source posn: 2
Mic. posn: 2 sweeps
RT meas: 6 Imp.
SLM: Nor 140

Weighted Standardized Impact SPL

Results standardized to a RT of 0.5 seconds

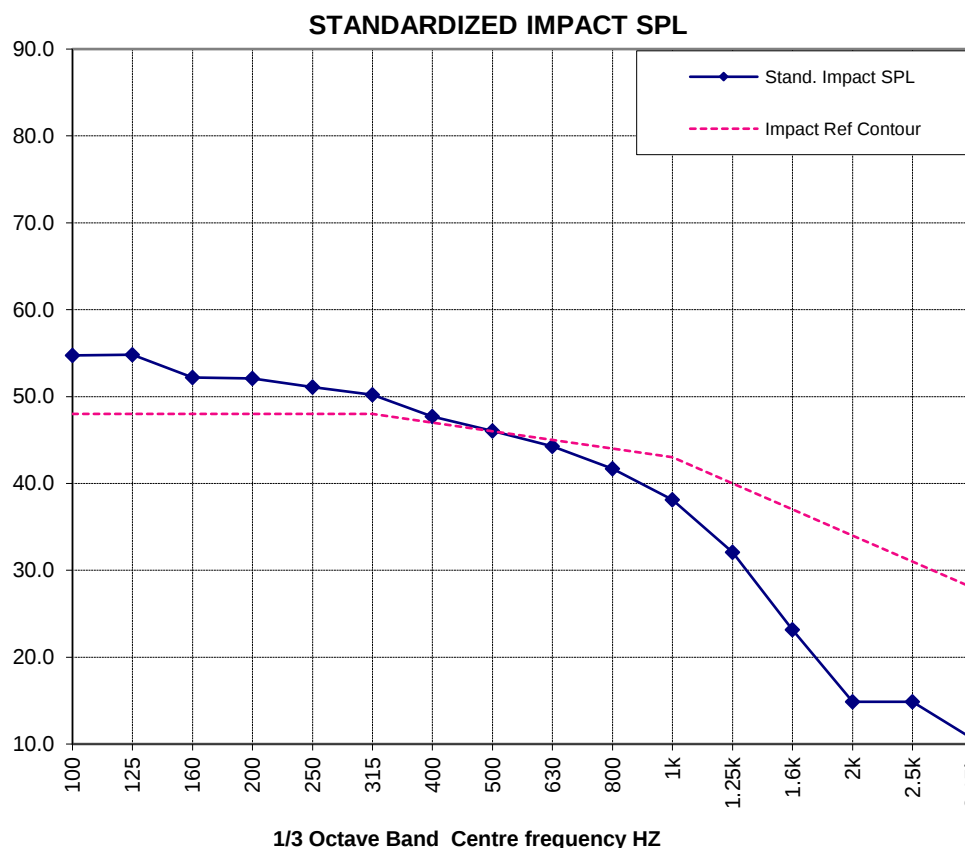
L'nT,w

46

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

Centre Frequency	Stand. Impact SPL	Impact Ref Contour	Deficiencies
Hz	dB	dB	dB
100	54.7	48	6.7
125	54.8	48	6.8
160	52.2	48	4.2
200	52.1	48	4.1
250	51.1	48	3.1
315	50.2	48	2.2
400	47.7	47	0.7
500	46.0	46	0.0
630	44.3	45	
800	41.7	44	
1k	38.1	43	
1.25k	32.1	40	
1.6k	23.2	37	
2k	< 14.9	34	
2.5k	< 14.9	31	
3.15k	< 10.6	28	
Total			

Standardized Impact SPL, L'nT, dB



L'nT,w 46 27.9