

**FIELD IMPACT INSULATION TESTS - DECOLINE**

**U80 GEMINI COURT, 45 HAYLE ST, BURLEIGH HEADS**



**TEST REPORT**

<b>Commissioned by:</b>	Decoline
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**TITLE** Field Impact Insulation Tests  
U80 Gemini Court,  
45 Hayle St,  
Burleigh Heads,  
QLD 4220.  
Test Report

**TESTS BY** Hasitha Gallage  
Acoustic Engineer - Palmer Acoustics (Australia) Pty Ltd

**REPORT DATE** 26 August 2019

**TEST DATE** 26 August 2019

**TEST LOCATION** Level 5 Unit 80 Living area  
to Level 4 Unit 76 Living area

**FOR** Decoline

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## 1.0 INTRODUCTION

Palmer Acoustics were engaged by Decoline to perform field impact insulation tests in Unit 80 Gemini Court Burleigh Heads. The test was conducted on a hybrid flooring sample installed in the living area of Unit 80. The measurements were conducted in the living area of Unit 76 – directly beneath the living area of Unit 80. Floor systems tested:

- Test 1: Bare concrete slab
- Test 2: Natural SPC Hybrid flooring sample

## 2.0 EQUIPMENT AND PROCEDURES

### 2.1 Measurement Procedures

Testing was conducted in conformance with ISO 16283-2:2015 “Field measurement of impact sound insulation of floors”. The evaluation of the results, to derive the single figure  $L'_{nT,w}$  rating, was conducted to ISO 717-2:2013 “Rating of insulation in buildings and of building elements – Part 2 Impact Sound Insulation”.

The hybrid flooring sample installed in the living area were tapped in two (2) different orientations with the receiving space’s sound measurements averaged over 2 x 30 seconds periods - per test orientation.

Ambient sound levels were measured before the testing with the results included in the assessment as per standard.

Receiving room reverberation measurements were performed, utilising RT Software in the Norsonics 140 analyser, at four locations throughout the space in each room, with the results arithmetically averaged.

### 2.2 Instrumentation

The following instruments were used in the tests.

- Norsonics 140 Sound level meter (serial number 1403252)
- Look Line tapping machine EM50 (serial number TM.14031)
- B & K 4230 Calibrator (serial number 1638750)

The sound level measuring equipment was field calibrated before and after each measurement session and was found to be within 0.2dB of the reference signal. All instrumentation used in this assessment holds a current calibration certificate from a certified NATA calibration laboratory.

### 3.0 DESCRIPTION OF ROOMS

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

**Concrete slab:** 150mm concrete slab

#### Transmitting Room

Test Floor: Hybrid flooring sample;  
Walls: Plasterboard;  
Enclosure: Windows and all doors were closed;  
Room finish: Furnished.

#### Receiving Room

Floor: Carpet;  
Ceiling: Exposed concrete Slab;  
Walls: Plasterboard;  
Enclosure: Windows and all doors were closed;  
Room finish: Furnished.

### 4.0 RESULTS

Our tests gave the following results:

Test System	L'nT,w
Test 1: Bare concrete slab	74
Test 2: Natural SPC Hybrid flooring sample	51

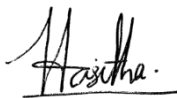
**Table 1:** Test Results Summary – impact tests

Test certificates detailing the  $\frac{1}{3}$  octave band results are provided in Appendix B to this report in terms of L'nT,w in accordance with ISO 717 - 2: 2013.

L'nT,w is a term used in the Building Code of Australia (BCA), see also Appendix A. It should be noted that L'nT,w is a weighted room noise level and that a lower number represents better performance.

Author:

Approved by:



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Engineer



**ROGER HAWKINS** RPEQ 6022  
Senior 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 "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 normalized;
- $L'_{nT,w}$  – 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 Normalized 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<sup>2</sup> 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  $L'_{nTw}$ .
- **Field Impact Insulation Class (FIIC)** – a single-number rating derived from measured values of normalized one-third octave band impact sound pressure levels in accordance with Eq 4 and the reference contours in Classification E 989. It provides an estimate of the sound insulating performance of a floor-ceiling assembly and associated support structures under tapping machine excitation.
- **Impact Insulation Class (IIC)** – This classification covers the determination of a single-figure rating that can be used for comparing floor-ceiling assemblies for general building design purposes.
- **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 room with a reference reverberation time of 0.5 seconds.
- $L'_n$  – **Normalized Impact Sound Pressure Level** – the impact sound pressure level normalized 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
- **ASTM Classification E 1007 – 97**  
Standard Test Method for Field Measurement of Tapping Machine Impact Sound Transmission through Floor-Ceiling Assemblies and Associated Support Structures
- **ASTM Classification E 989 – 89**  
Standard Classification for Determination of Impact Insulation Class (IIC)



**APPENDIX B**

Test certificates (2)

**FIELD IMPACT SOUND INSULATION - TEST CERTIFICATE**

Test 1 of 2

**Bare concrete slab**

<b>PROJECT:</b>	U80 Gemini Court, 45 Hayle St, Burleigh Heads LNT	<b>Meas. Date:</b>	26-Aug-19
<b>Test Location:</b>	Level 5 U80 Living Area to Level 4 U76 Living Area	<b>Meas. Parameter:</b>	LLeq
<b>Test Surface:</b>	Bare concrete slab	<b>Tapping Machine:</b>	Look Line EM50
<b>Client:</b>	Decoline	<b>Receiving Room Volume:</b>	112 m <sup>3</sup>
<b>Test Performed:</b>	Hasitha Gallage		

**DESCRIPTION OF FLOOR AND SPECIMEN**

<b>Unit:</b>	Bare concrete slab	<b>No. of Source posn:</b>	2
<b>Product:</b>		<b>Mic. posn:</b>	2 sweeps
<b>Adhesive:</b>		<b>RT meas:</b>	6 Imp.
<b>Ceiling:</b>	Exposed concrete slab	<b>SLM:</b>	Nor 140
<b>Slab:</b>	150mm concrete slab		

**Weighted Standardized Impact SPL**

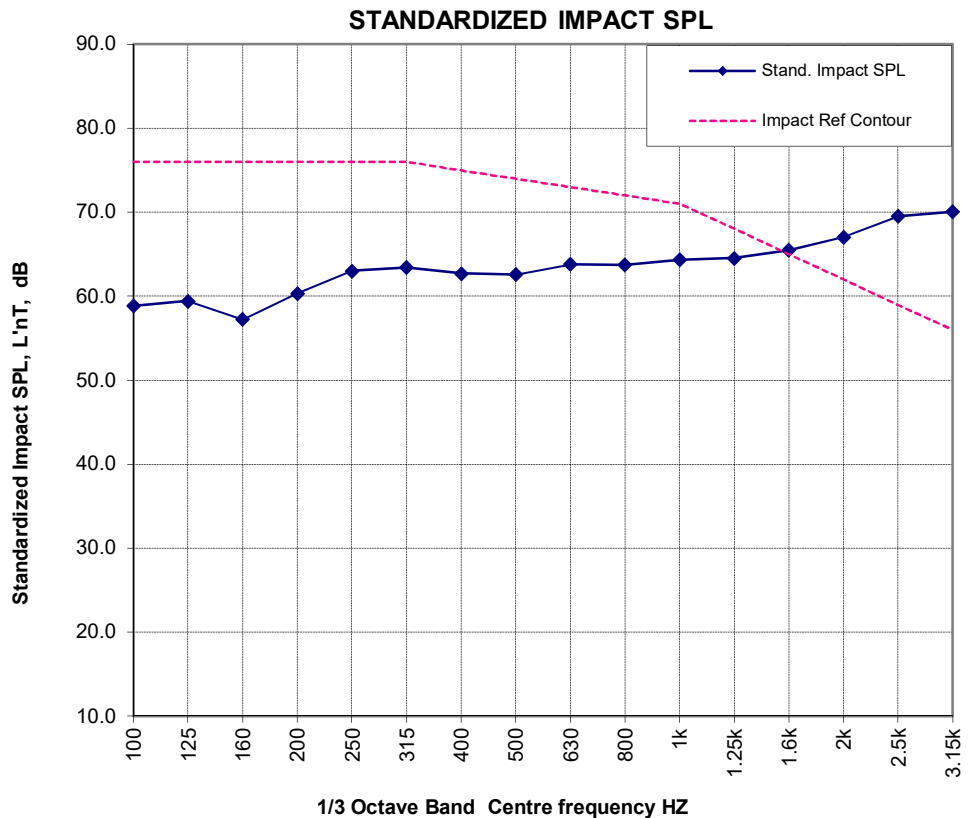
**L'nT,w**

**74**

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

Results standardized to a RT of 0.5 seconds

Centre Frequency Hz	Stand. Impact SPL dB	Impact Ref Contour dB	Deficiencies dB
100	58.8	76	
125	59.4	76	
160	57.2	76	
200	60.3	76	
250	63.0	76	
315	63.4	76	
400	62.7	75	
500	62.6	74	
630	63.8	73	
800	63.7	72	
1k	64.3	71	
1.25k	64.5	68	
1.6k	65.5	65	0.5
2k	67.0	62	5.0
2.5k	69.5	59	10.5
3.15k	70.1	56	14.1
<b>Total</b>			



L'nT,w 74 30.1

**FIELD IMPACT SOUND INSULATION - TEST CERTIFICATE**

Test 2 of 2

**Natural SPC Hybrid flooring sample**

<b>PROJECT:</b>	U80 Gemini Court, 45 Hayle St, Burleigh Heads LNT	<b>Meas. Date:</b>	26-Aug-19
<b>Test Location:</b>	Level 5 U80 Living Area to Level 4 U76 Living Area	<b>Meas. Parameter:</b>	LLeq
<b>Test Surface:</b>	Natural SPC Hybrid flooring sample	<b>Tapping Machine:</b>	Look Line EM50
<b>Client:</b>	Decoline	<b>Receiving Room Volume:</b>	112 m <sup>3</sup>
<b>Test Performed:</b>	Hasitha Gallage		

**DESCRIPTION OF FLOOR AND SPECIMEN**

<b>Unit:</b>	Natural SPC Hybrid flooring sample	<b>No. of Source posn:</b>	2
<b>Product:</b>		<b>Mic. posn:</b>	2 sweeps
<b>Adhesive:</b>	Loose laid	<b>RT meas:</b>	6 Imp.
<b>Ceiling:</b>	Exposed concrete slab	<b>SLM:</b>	Nor 140
<b>Slab:</b>	150mm concrete clab		

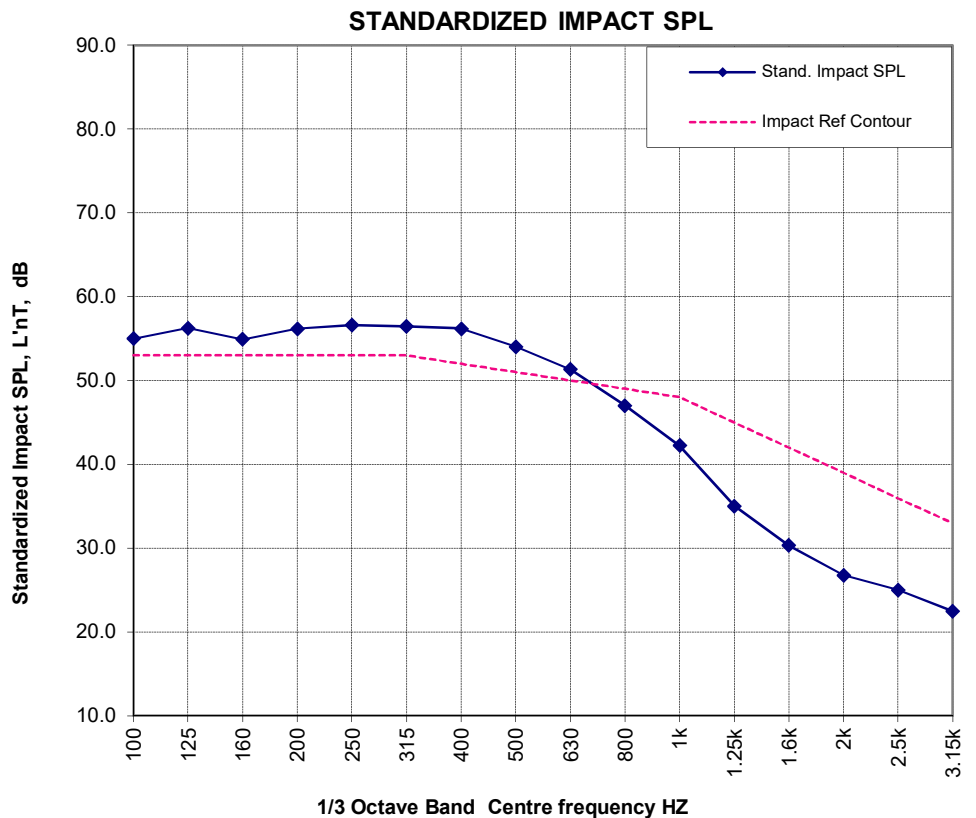
**Weighted Standardized Impact SPL**

**L'nT,w 51**

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	55.0	53	2.0
125	56.3	53	3.3
160	54.9	53	1.9
200	56.2	53	3.2
250	56.6	53	3.6
315	56.4	53	3.4
400	56.2	52	4.2
500	54.0	51	3.0
630	51.3	50	1.3
800	47.0	49	
1k	42.2	48	
1.25k	35.0	45	
1.6k	30.3	42	
2k	< 26.8	39	
2.5k	25.0	36	
3.15k	22.5	33	
<b>Total</b>			



L'nT,w 51 26.0