

**FIELD IMPACT INSULATION TESTS**

**U302 93 BAINES ST KANGAROO POINT**



**TEST REPORT**

<b>Commissioned by:</b>	Kenbrock Flooring
<b>Date:</b>	7 June 2016
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**TITLE** Field Impact Insulation Tests  
U302/93 Baines St Kangaroo Point  
Test Report

**TESTS BY** Max Thomson  
Acoustic Engineer - Palmer Acoustics (Australia) Pty Ltd

**REPORT DATE** 7 June 2016

**TEST DATE** 31 May 2016

**TEST LOCATION** Level 3 Unit 302 Living area  
to Level 2 Unit 202 Living area

**FOR** Kenbrock Flooring

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## 1.0 INTRODUCTION

Palmer Acoustics were engaged by Kenbrock Flooring to perform field impact insulation tests at U302/93 Baines St, Kangaroo Point. The details of the tests are as follows;

- Test 1 – 5mm Zenith Modular Plank on 2mm Damtec Kroma Underlay
- Test 2 – Bare concrete slab
- Test 3 – 5mm Zenith Modular Plank on bare concrete slab

## 2.0 EQUIPMENT AND PROCEDURES

### 2.1 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 4231 Calibrator (serial number 2095146)

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.

### 2.2 Measurement Procedures

Testing was conducted in conformance with ISO 140/VII “Field measurement of impact sound insulation of floors”. The evaluation of the results to derive the single figure rating  $L'_{nT,w}$  rating was conducted to ISO 717-2 1996 “Rating of insulation in buildings and of building elements – Part 2 Impact Sound Insulation”.

Each sample in the living area was tapped in two (2) different orientations with the receiving space’s sound measurements averaged over a 1-minute period per test orientation.

Ambient sound levels were measured before and after 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 five locations throughout the space, with the results arithmetically averaged.

### 3.0 DESCRIPTION OF ROOMS

All windows and doors were closed in the source and receiving rooms. Unit 202's (level 2) living area is directly beneath Unit 302's (level 3) living area.

#### Transmitting Room

Test Floor: Vinyl and WPC sample;  
Walls: Plasterboard;  
Enclosure: Windows and all doors were closed;  
Room finish: Not finished.

#### Receiving Room

Floor: Carpet;  
Ceiling: 13mm plasterboard ceiling with 165mm air gap;  
Walls: Plasterboard;  
Enclosure: Windows and all doors were closed;  
Room finish: Not finished.



### 4.0 RESULTS

Our tests gave the following results:

Test System	L'nT,w	CI
5mm Zenith Modular Plank on 2mm Damtec Kroma Underlay	43	-1
Bare concrete slab	62	-12
5mm Zenith Modular Plank on bare concrete slab	53	-9

**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, and related spectrum adaptation terms in accordance with ISO 717 - 2: 1996

L'nT,w and C<sub>I</sub> are terms 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.

## 5.0 CRITERIA

The installed floor impact system is required to comply with the BCA (2016) and therefore provide an isolation rating of  $L'nT,w \leq 62$ .

## 6.0 CONCLUSION AND RECOMMENDATION

Both flooring samples, separating the living rooms of Units 302 and 202, achieved a rating of  $L'nT,w \leq 62$ . Both of the samples tested comply with the BCA.

Note:

- This test result applies to a loose laid construction only.
- The flooring system must be laid strictly in accordance with the suppliers recommended procedures and with a minimum 5mm clearance around the perimeter of the floor. This clearance is to be sealed with a resilient sealing compound.
- It is our experience that test samples perform close to  $\pm 2$  points compared to a fully laid floor.

Author:



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Engineer

Reviewed by:



**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 140 – 6**  
Acoustics – Measurement of sound Insulation in buildings and of building elements – Part 6: Laboratory measurements of impact sound insulation of floors
- **ISO 140 – 7**  
Acoustics – Measurement of sound Insulation in buildings and of building elements – Part 7: Field measurements of impact sound insulation of floors
- **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 (3)

**FIELD IMPACT SOUND INSULATION - TEST CERTIFICATE**

Test 1 of 3

5mm Zenith Modular Plank

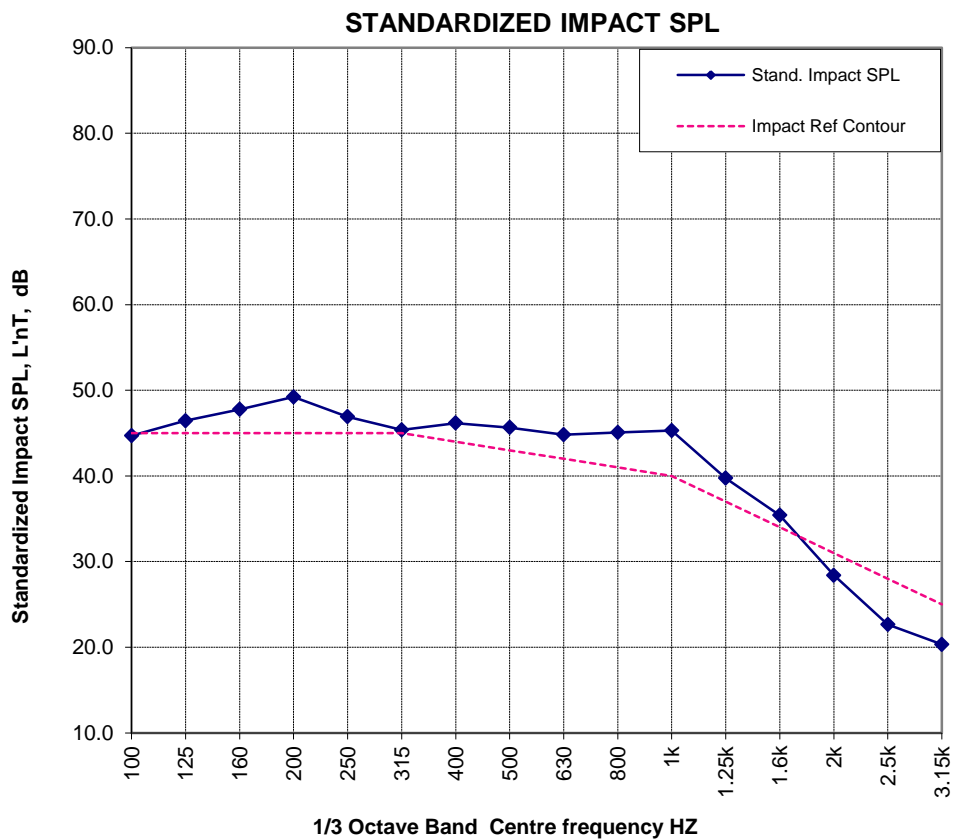
2mm Damtec Kroma Underlay

<b>PROJECT:</b>	PN4023 93 Baines St Kangaroo Point LNT	<b>Meas. Date:</b>	31-May-16
<b>Test Location:</b>	U302 living to U202 living	<b>Meas. Parameter:</b>	LLeq
<b>Test Surface:</b>	Vinyl Sample	<b>Tapping Machine:</b>	Look Line EM50
<b>Client:</b>	Kenbrock Flooring	<b>Receiving Room Volume:</b>	84 m <sup>3</sup>
<b>Test Performed:</b>	Eric Huang		

<b>DESCRIPTION OF FLOOR AND SPECIMEN</b>		<b>No. of Source posn:</b>	2
Unit:	5mm Zenith Modular Plank	<b>Mic. posn:</b>	2 sweeps
Product:	2mm Damtec Kroma Underlay	<b>RT meas:</b>	4 Imp.
Adhesive:	-	<b>SLM:</b>	Nor 140
Ceiling:	13mm thick plasterboard with 165mm air gap		
Slab:	180mm slab		

<b>Weighted Standardized Impact SPL</b>	<b>L'nT,w</b>	<b>43</b>	ISO 140-7:1998 & 717-2:1996
Results standardized to a RT of 0.5 seconds	<b>CI (L'nT,w)</b>	<b>-1</b>	ISO 140-7:1998 & 717-2:1996

Centre Frequency Hz	Stand. Impact SPL dB	Impact Ref Contour dB	Deficiencies dB
100	44.7	45	
125	46.4	45	1.4
160	47.8	45	2.8
200	49.2	45	4.2
250	46.9	45	1.9
315	45.4	45	0.4
400	46.2	44	2.2
500	45.7	43	2.7
630	44.8	42	2.8
800	45.1	41	4.1
1k	45.3	40	5.3
1.25k	39.7	37	2.7
1.6k	35.4	34	1.4
2k	< 28.4	31	
2.5k	22.7	28	
3.15k	< 20.3	25	
<b>Total</b>			



L'nT,w	43	31.9
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**FIELD IMPACT SOUND INSULATION - TEST CERTIFICATE**

Test 2 of 3

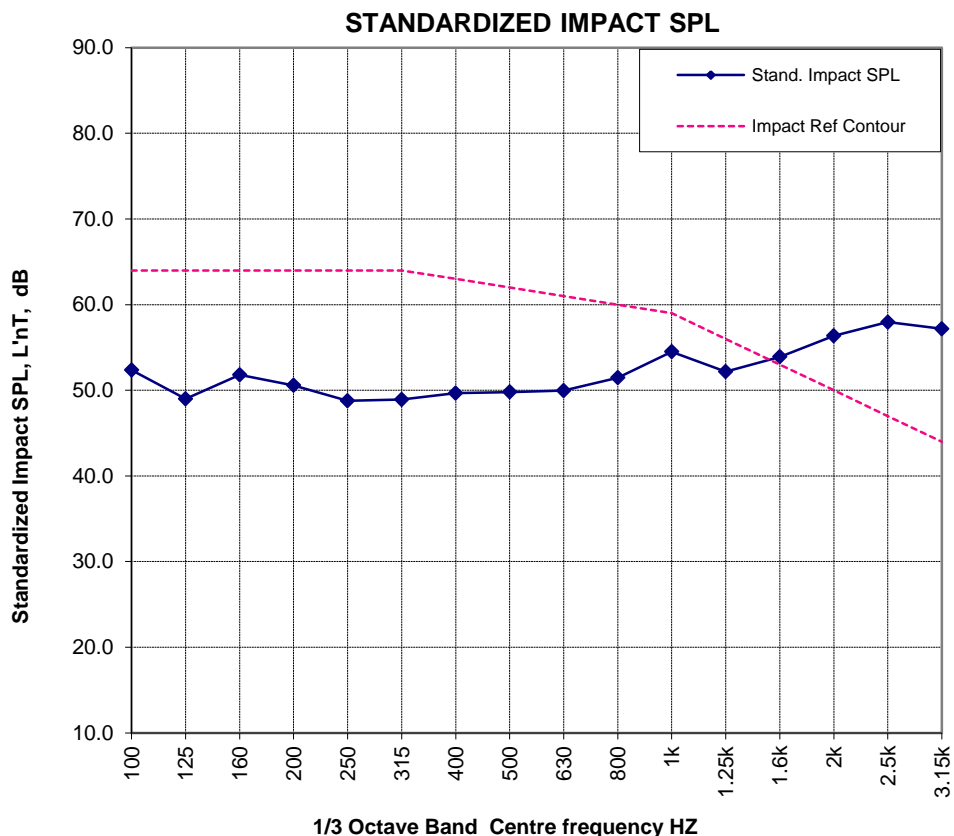
**Concrete Slab**

<b>PROJECT:</b>	PN4023 93 Baines St Kangaroo Point LNT	<b>Meas. Date:</b>	31-May-16
<b>Test Location:</b>	U302 living to U202 living	<b>Meas. Parameter:</b>	LLeq
<b>Test Surface:</b>	Concrete Slab	<b>Tapping Machine:</b>	Look Line EM50
<b>Client:</b>	Kenbrock Flooring	<b>Receiving Room Volume:</b>	84 m <sup>3</sup>
<b>Test Performed:</b>	Eric Huang		

<b>DESCRIPTION OF FLOOR AND SPECIMEN</b>	<b>No. of Source posn:</b>	2
Unit: Concrete Slab	<b>Mic. posn:</b>	2 sweeps
Product:	<b>RT meas:</b>	4 Imp.
Adhesive: -	<b>SLM:</b>	Nor 140
Ceiling: 13mm thick plasterboard with 165mm air gap		
Slab: 180mm slab		

<b>Weighted Standardized Impact SPL</b>	<b>L'nT,w</b>	<b>62</b>	ISO 140-7:1998 & 717-2:1996
Results standardized to a RT of 0.5 seconds	<b>CI (L'nT,w)</b>	<b>-12</b>	ISO 140-7:1998 & 717-2:1996

Centre Frequency Hz	Stand. Impact SPL dB	Impact Ref Contour dB	Deficiencies dB
100	52.4	64	
125	49.0	64	
160	51.8	64	
200	50.6	64	
250	48.8	64	
315	48.9	64	
400	49.7	63	
500	49.8	62	
630	50.0	61	
800	51.5	60	
1k	54.5	59	
1.25k	52.2	56	
1.6k	53.9	53	0.9
2k	56.4	50	6.4
2.5k	58.0	47	11.0
3.15k	57.2	44	13.2
<b>Total</b>			



L'nT,w 62 31.4

**FIELD IMPACT SOUND INSULATION - TEST CERTIFICATE**

Test 3 of 3

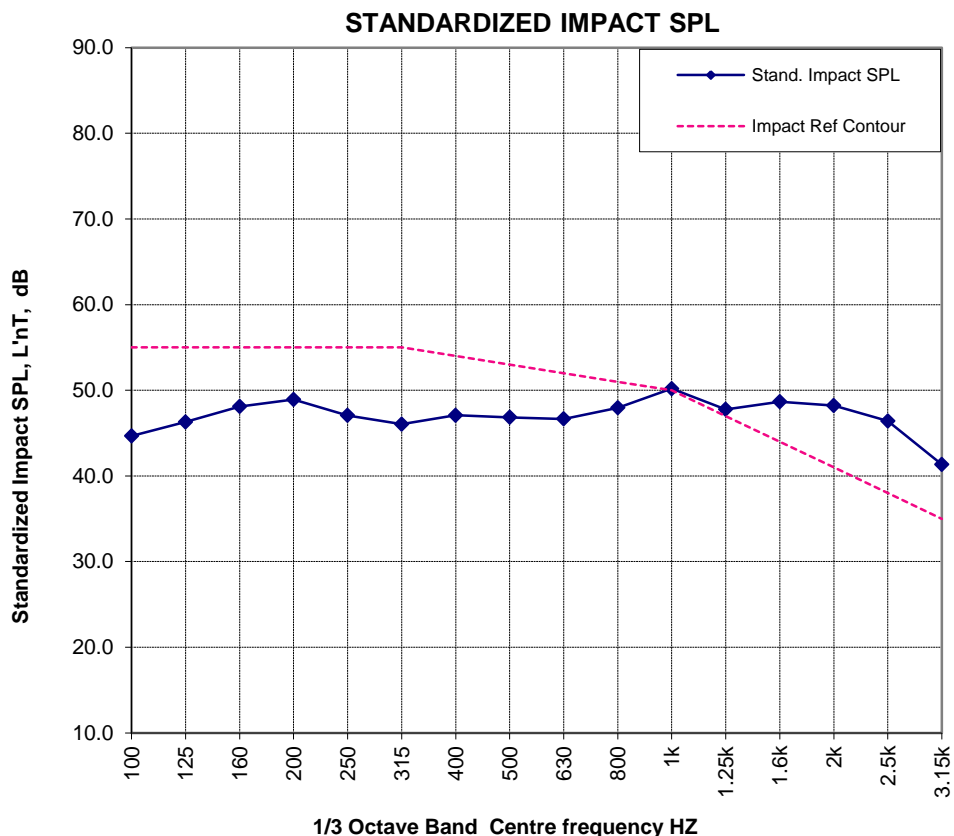
**5mm Zenith Modular Plank**

<b>PROJECT:</b>	PN4023 93 Baines St Kangaroo Point LNT	<b>Meas. Date:</b>	31-May-16
<b>Test Location:</b>	U302 living to U202 living	<b>Meas. Parameter:</b>	LLeq
<b>Test Surface:</b>	Vinyl Sample	<b>Tapping Machine:</b>	Look Line EM50
<b>Client:</b>	Kenbrock Flooring	<b>Receiving Room Volume:</b>	84 m <sup>3</sup>
<b>Test Performed:</b>	Eric Huang		

<b>DESCRIPTION OF FLOOR AND SPECIMEN</b>		<b>No. of Source posn:</b>	2
Unit:	5mm Zenith Modular Plank	<b>Mic. posn:</b>	2 sweeps
Product:		<b>RT meas:</b>	4 Imp.
Adhesive:	-	<b>SLM:</b>	Nor 140
Ceiling:	13mm thick plasterboard with 165mm air gap		
Slab:	180mm slab		

<b>Weighted Standardized Impact SPL</b>	<b>L'nT,w</b>	<b>53</b>	ISO 140-7:1998 & 717-2:1996
Results standardized to a RT of 0.5 seconds	<b>CI (L'nT,w)</b>	<b>-9</b>	ISO 140-7:1998 & 717-2:1996

Centre Frequency Hz	Stand. Impact SPL dB	Impact Ref Contour dB	Deficiencies dB
100	44.7	55	
125	46.3	55	
160	48.1	55	
200	48.9	55	
250	47.1	55	
315	46.0	55	
400	47.1	54	
500	46.9	53	
630	46.7	52	
800	48.0	51	
1k	50.2	50	0.2
1.25k	47.8	47	0.8
1.6k	48.7	44	4.7
2k	48.2	41	7.2
2.5k	46.4	38	8.4
3.15k	41.3	35	6.3
<b>Total</b>			



<b>L'nT,w</b>	<b>53</b>	<b>27.6</b>
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