

FIELD IMPACT INSULATION TESTS

RIVER PLACE APARTMENTS, BRISBANE



TEST REPORT

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TITLE Field Impact Insulation Test
DecoLine Pty Ltd product tests,
Unit 286 – River Place Apartments
82, Boundary Street,
Brisbane City
Test Report

TESTS BY Muhammad Ali
Acoustic Engineer - Palmer Acoustics (Australia) Pty Ltd

REPORT DATE 25 July 2018

TEST DATE 21 June 2018

TEST LOCATION Level 32 Unit 286 Living/ dining area
to Level 31 Unit 278 Living/dining area

FOR DecoLine Pty Ltd

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1.0 INTRODUCTION

Palmer Acoustics have been engaged by DecoLine Pty Ltd to perform field impact insulation tests at level 32 Unit 286, River Place Apartments, Brisbane. The tests were conducted on loose laid vinyl plank flooring samples installed in the living area of level 32 Unit 286. The measurements were conducted in the living area of level 31 Unit 278 – directly beneath Unit 286 in level 32. Floor Systems tested:

- Test 1: 200mm Concrete slab with plasterboard ceiling
- Test 2: 5mm Decoline SkyLine vinyl plank
- Test 3: 5mm Decoline SkyLine vinyl plank + 3mm Dunlop Advantage 3

2.0 EQUIPMENT AND PROCEDURES

2.1 Instrumentation

The following instruments were used in the evaluation.

- 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 operation of 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 16283-2 “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 loose lay vinyl plank samples in the living area were tapped in two (2) different orientations with the receiving spaces sound measurements averaged over a 2x30-seconds 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 six locations throughout the spaces with the results arithmetically averaged.

3.0 DESCRIPTION OF ROOMS

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

Transmitting Room

Test Floor: DecoLine Vinyl Planks;
Walls: Plasterboard;
Enclosure: Windows and all doors were closed;
Room finish: Furnished.

Receiving Room

Floor: Concrete Slab;
Ceiling: Plasterboard ceiling;
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 – Concrete slab with plasterboard ceiling	68
Test 2 – 5mm Decoline SkyLine vinyl plank	61
Test 3 – 5mm Decoline SkyLine vinyl plank + 3mm Dunlop Advantage 3	53

Table 1: Test Result 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: 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.

5.0 DISCUSSION

The following table shows the vinyl plank samples' impact insulation rating reduction from the bare concrete slab (with plasterboard ceiling):

Flooring types	$\Delta L'nT,w$ Reduction
1. 5mm Decoline SkyLine vinyl plank	7
2. 5mm Decoline SkyLine vinyl plank + 3mm Dunlop Advantage 3	15

Author:



RASIKA CHANDRASEKARA BSc Eng
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 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} .
- **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 (3)

FIELD IMPACT SOUND INSULATION - TEST CERTIFICATE

Test 1 of 3

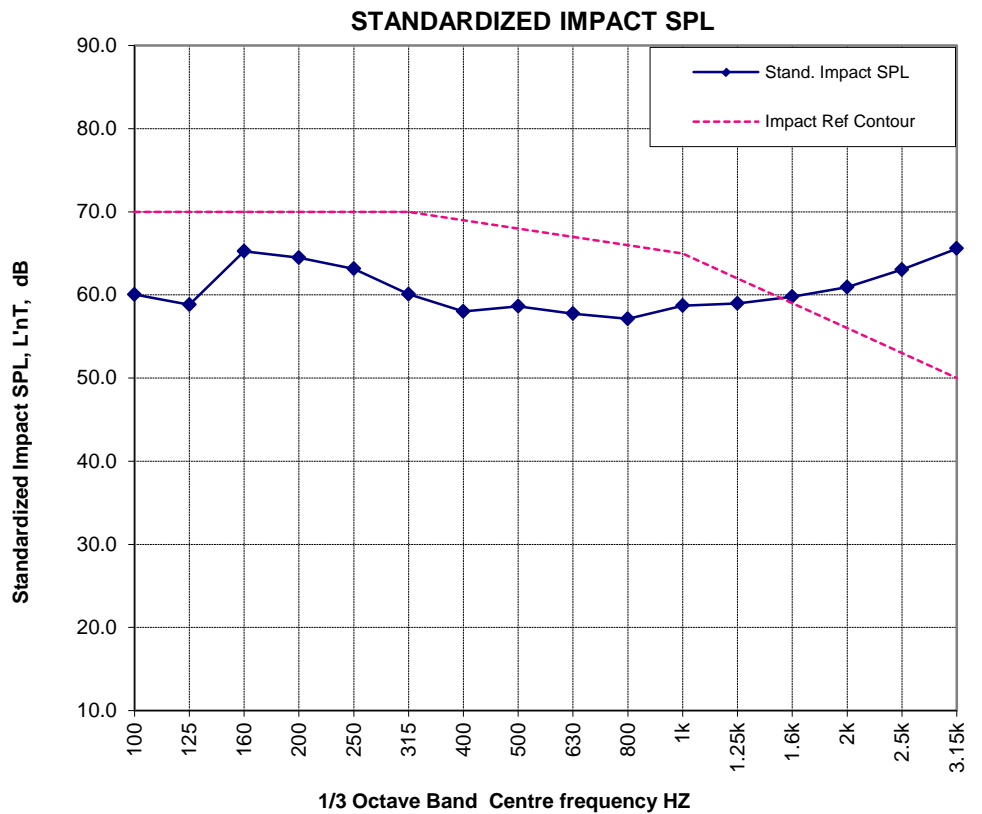
Bare Concrete Slab

PROJECT:	PN4443 U286 River Place Apartments LNT	Meas. Date:	21-Jun-18
Test Location:	U286 living area to U278 living area	Meas. Parameter:	LLeq
Test Surface:	Bare Concrete Slab	Tapping Machine:	Look Line EM50
Client:	DecoLine Pty Ltd	Receiving Room Volume:	58 m ³
Test Performed:	Ali		

DESCRIPTION OF FLOOR AND SPECIMEN	No. of Source posn:	4
Floor: Bare Concrete Slab	Mic. posn:	4 sweeps
Product:	RT meas:	6 Imp.
Adhesive:	SLM:	Nor 140
Ceiling: Plasterboard		
Slab: 200mm Concrete slab		

Weighted Standardized Impact SPL	L'nT,w	68	ISO 16283-2:2015 & 717-2:1996
Results standardized to a RT of 0.5 seconds			
Impact Insulation Class			ASTM E1007-97 & E989-89

Centre Frequency Hz	Stand. Impact SPL dB	Impact Ref Contour dB	Deficiencies dB
100	60.1	70	
125	58.8	70	
160	65.3	70	
200	64.5	70	
250	63.1	70	
315	60.1	70	
400	58.0	69	
500	58.6	68	
630	57.8	67	
800	57.1	66	
1k	58.7	65	
1.25k	59.0	62	
1.6k	59.8	59	0.8
2k	60.9	56	4.9
2.5k	63.1	53	10.1
3.15k	65.6	50	15.6
Total			



L'nT,w	68	31.4
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FIELD IMPACT SOUND INSULATION - TEST CERTIFICATE

Test 2 of 3

5mm DecoLine Vinyl Sample

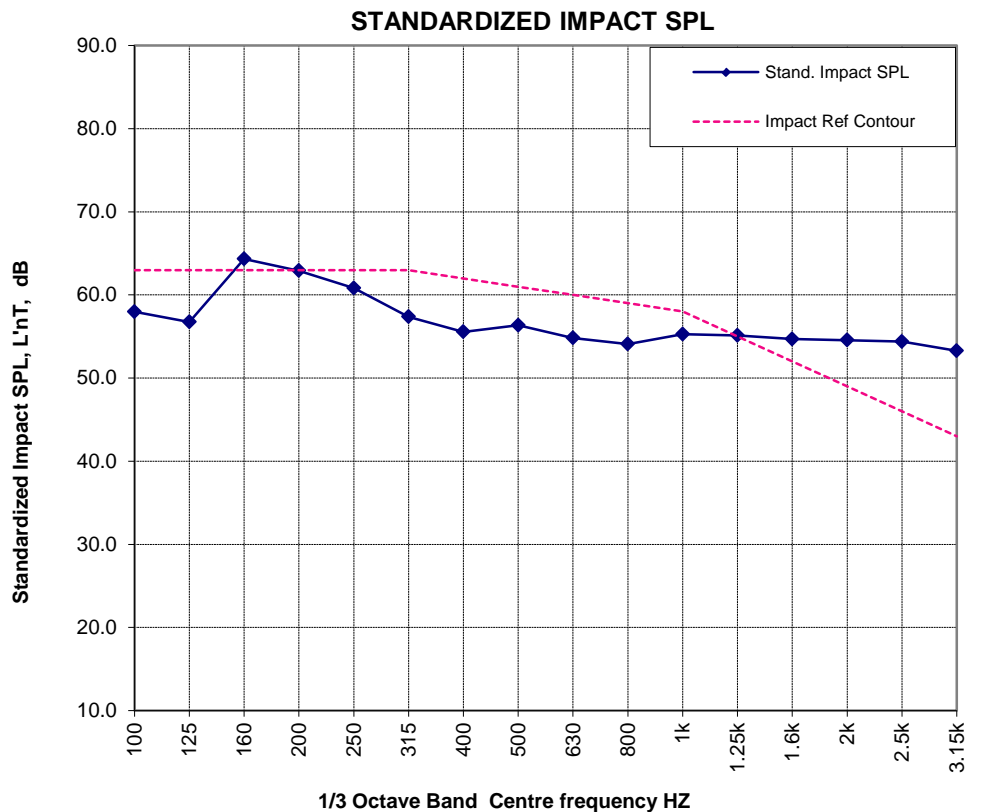
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Test Location:	U286 living area to U278 living area	Meas. Parameter:	LLeq
Test Surface:	5mm DecoLine Vinyl Sample	Tapping Machine:	Look Line EM50
Client:	DecoLine Pty Ltd	Receiving Room Volume:	58 m ³
Test Performed:	Ali		

DESCRIPTION OF FLOOR AND SPECIMEN	No. of Source posn:	4
Floor: 5mm DecoLine Vinyl Sample	Mic. posn:	4 sweeps
Product:	RT meas:	6 Imp.
Adhesive: Loose laid	SLM:	Nor 140
Ceiling: Plasterboard		
Slab: 200mm Concrete slab		

Weighted Standardized Impact SPL	L'nT,w	61	ISO 16283-2:2015 & 717-2:1996
Results standardized to a RT of 0.5 seconds			

Impact Insulation Class ASTM E1007-97 & E989-89

Centre Frequency Hz	Stand. Impact SPL dB	Impact Ref Contour dB	Deficiencies dB
100	58.0	63	
125	56.8	63	
160	64.3	63	1.3
200	62.9	63	
250	60.8	63	
315	57.4	63	
400	55.6	62	
500	56.4	61	
630	54.8	60	
800	54.1	59	
1k	55.3	58	
1.25k	55.1	55	0.1
1.6k	54.7	52	2.7
2k	54.6	49	5.6
2.5k	54.4	46	8.4
3.15k	53.3	43	10.3
Total			



L'nT,w 61 28.4

FIELD IMPACT SOUND INSULATION - TEST CERTIFICATE

Test 3 of 3

5mm DecoLine Vinyl Sample

3mm Dunlop Advantage 3 underlay

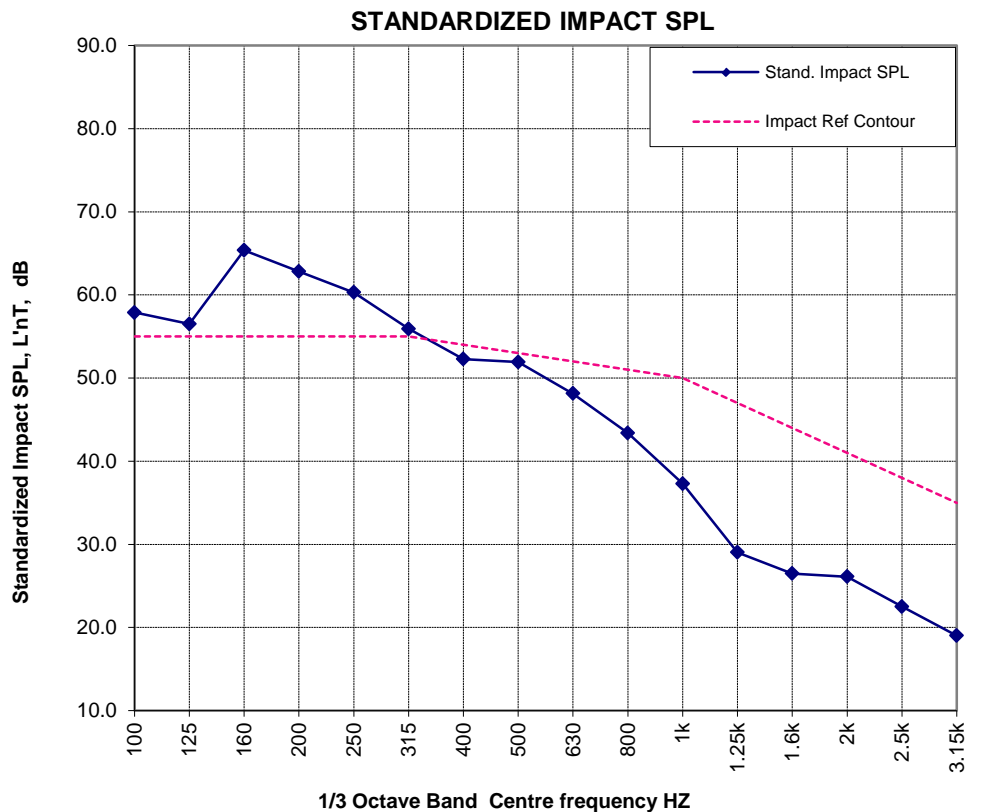
PROJECT:	PN4443 U286 River Place Apartments LNT	Meas. Date:	21-Jun-18
Test Location:	U286 living area to U278 living area	Meas. Parameter:	LLeq
Test Surface:	5mm DecoLine Vinyl Sample	Tapping Machine:	Look Line EM50
Client:	DecoLine Pty Ltd	Receiving Room Volume:	58 m ³
Test Performed:	Ali		

DESCRIPTION OF FLOOR AND SPECIMEN	No. of Source posn:	2	
Floor:	5mm DecoLine Vinyl Sample	Mic. posn:	2 sweeps
Product:	3mm Dunlop Advantage 3 underlay	RT meas:	6 Imp.
Adhesive:	Loose laid	SLM:	Nor 140
Ceiling:	Plasterboard		
Slab:	200mm Concrete slab		

Weighted Standardized Impact SPL	L'nT,w	53	ISO 16283-2:2015 & 717-2:1996
Results standardized to a RT of 0.5 seconds			

Impact Insulation Class ASTM E1007-97 & E989-89

Centre Frequency Hz	Stand. Impact SPL dB	Impact Ref Contour dB	Deficiencies dB
100	57.9	55	2.9
125	56.5	55	1.5
160	65.4	55	10.4
200	62.8	55	7.8
250	60.3	55	5.3
315	55.9	55	0.9
400	52.3	54	
500	51.9	53	
630	48.1	52	
800	43.4	51	
1k	37.3	50	
1.25k	<	47	
1.6k	<	44	
2k	<	41	
2.5k	<	38	
3.15k	<	35	
Total			



L'nT,w 53 28.8