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FIELD IMPACT INSULATION TESTS

U905 SKYRING APARTMENTS, 30 FESTIVAL PL, NEWSTEAD

TEST REPORT

Commissioned by:	Golden Elite Group
Date:	11 March 2021
Project number:	5174
Version:	V.0
Author:	Hasitha Gallage

24 Mexicanus Drive PO Box 790 Park Ridge Queensland 4125 Australia p. +61 7 3802 2155 hasitha@palmeracoustics.com www.palmeracoustics.com

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04		☐	☐
05		☐	☐

TITLE	Field Impact Insulation Tests U905 Skyring Apartments, 30 Festival Pl, Newstead, QLD 4006 Test Report
TESTS BY	Hasitha Gallage Acoustic Engineer - Palmer Acoustics (Australia) Pty Ltd
REPORT DATE	11 March 2021
TEST DATE	11 March 2021
TEST LOCATION	Level 9 Unit 905 Living Room to Level 8 Unit 805 Living Room
FOR	Golden Elite Group

CONTENTS

1.0 INTRODUCTION

Golden Elite Group has engaged Palmer Acoustics to perform field impact insulation tests at U905 Skyring Apartments, 30 Festival Pl, Newstead. A standard tapping machine was positioned on the flooring samples installed in the living room of Unit 905 on level 9. Receiving room noise levels were measured in the living room of Unit 805 on level 8.

Floor systems tested:

Test 1 - Bare Concrete Slab
Test 2 - 6mm SPC Hybrid Fiesta flooring sample (loose laid)
Test 3 - 6mm SPC Hybrid Fiesta flooring sample (loose laid) + 4mm Damtec underlay (loose laid)
Test 4 - 8mm SPC Hybrid Native flooring sample (loose laid)
Test 5 - 8mm SPC Hybrid Native flooring sample (loose laid) + 4mm Damtec underlay (loose laid)

2.0 EQUIPMENT AND PROCEDURES

2.1 Measurement Procedures

Testing was 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".

Each flooring sample installed in the living room of Unit 905 was tapped in two (2) different orientations, with the receiving space's sound measurements averaged over 2 x 30 seconds periods - per test position.

The ambient sound levels were measured before testing, with the results assessed as per standard.

The receiving room reverberation measurements were taken with a Norsonics Sound Analyser Nor140, at six (6) different locations throughout the space, with the results arithmetically averaged.

2.2 Instrumentation

The following instruments were used in the evaluation.

- Norsonics Nor140 Sound Analyser (serial number 1403252)
- Look Line tapping machine EM50 (serial number TM.14031)
- B & K 4230 Calibrator #3 (serial number 1638750)

The sound level measuring equipment was field calibrated before and after each measurement session and was within 0.2dB of the reference signal. All instrumentation used in this

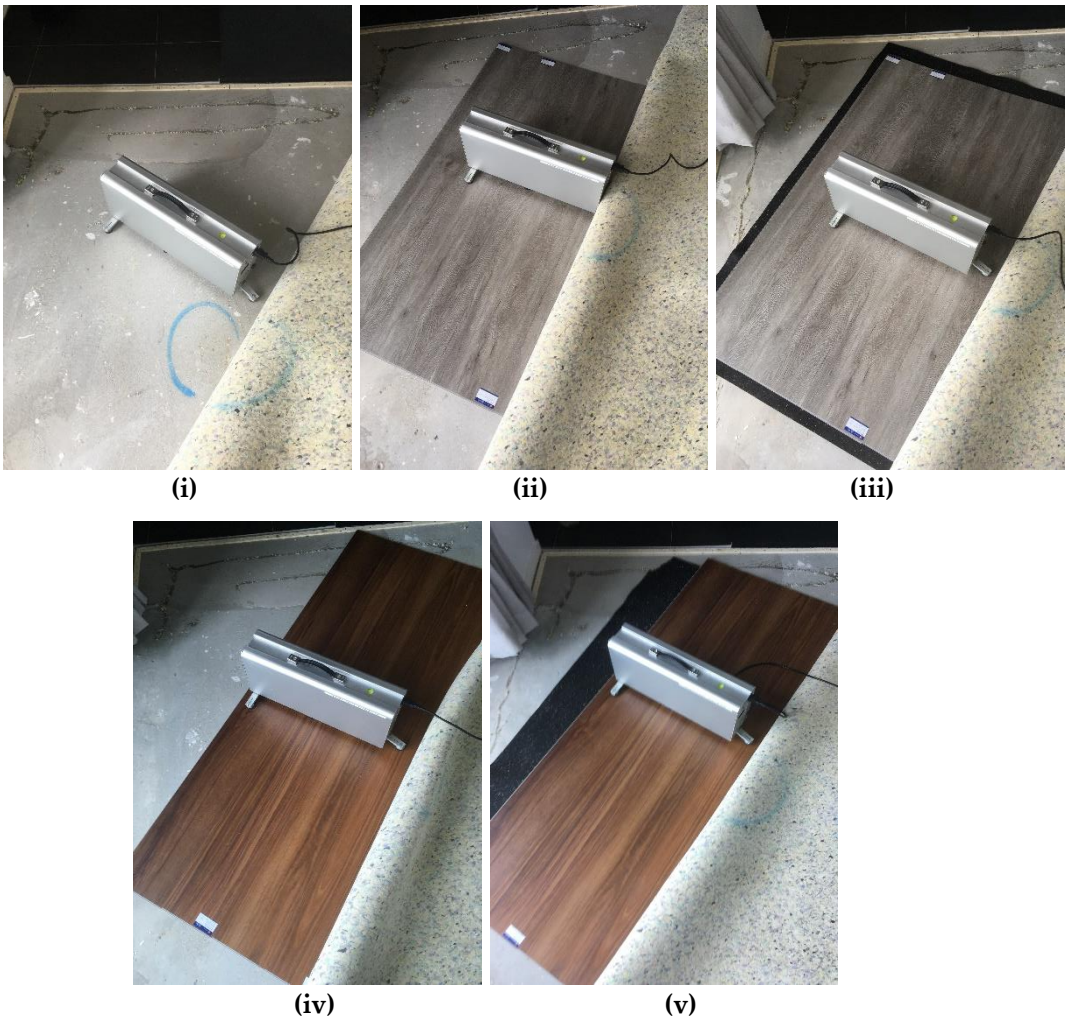
assessment holds a current calibration certificate from a NATA accredited calibration laboratory.

3.0 DESCRIPTION OF ROOMS

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

Transmitting Room (Living Room of Unit 905 on Level 9)
Test Floor: Flooring samples;
Walls: Plasterboard
Room finish: Furnished.

Receiving Room (Living Room of Unit 805 on Level 8)
Ceiling: Plasterboard;
Floor: Tile;
Walls: Plasterboard;
Room finish: Furnished.



(i) **(ii)** **(iii)**

(iv) **(v)**

Figure 1: (i) Test 1, **(ii)** Test 2, **(iii)** Test 3, **(iv)** Test 4, and **(v)** Test 5

4.0 RESULTS

Our tests gave the following results:

Table 1: Test Result Summary – Floor impact tests

	Test System	L'nT,w	FIIC
1.	Bare Concrete Slab	61	37
2.	6mm SPC Hybrid Fiesta flooring sample (loose laid)	44	60
3.	6mm SPC Hybrid Fiesta flooring sample (loose laid) + 4mm Damtec underlay (loose laid)	43	57
4.	8mm SPC Hybrid Native flooring sample (loose laid)	46	58
5.	8mm SPC Hybrid Native flooring sample (loose laid) + 4mm Damtec underlay (loose laid)	45	60

Test Certificates detailing the 1/3 octave band results are provided in Appendix C to this report in terms of L'nT,w following ISO 717 - 2: 2013.

The L'nT,w term is 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.

FIIC is an ASTM term which represents a floor/ceiling assembly's ability to resist the transmission of impact noise. A higher value represents greater performance.

5.0 CRITERIA

The Skyring Apartments Newstead Body Corporate by-laws state that an installed floor surface must provide a level of floor isolation of FIIC ≥ 55.

6.0 CONCLUSION

The flooring samples installed in the living area of Unit 908 achieved FIIC ≥ 57, which complies with the body corporate limit of FIIC ≥ 55.

7.0 NOTES

- In our experience, test samples are similar in performance to an entirely laid floor ± 2dB.
- Achieving the maximum impact rating requires that the impact layer be laid strictly following the manufacturer's recommended procedures.

Author:

HASITHA GALLAGE PhD, BSc Eng(Hons)
Engineer

Approved 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 is 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 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 measure 1/3 octave band sound pressure levels. Measured results are adjusted based upon a reverberation time of 0.5 sec in the 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 measure 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 $L'_{nT,w}$.

- L'_{nT} – ***Standardised Impact Sound Pressure Level*** – the impact sound pressure level is 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).

- ***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.

- ***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.

- ***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

CALCULATION METHODOLOGY - L'nT,w

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

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

L'_{nT} is the standardized 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 unfavorable deviations is as large as possible but not more than 32 dB.

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

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

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.

APPENDIX C

Test certificates (5)

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FIELD IMPACT SOUND INSULATION - TEST CERTIFICATE

Test 1 of 5

Bare Concrete Slab

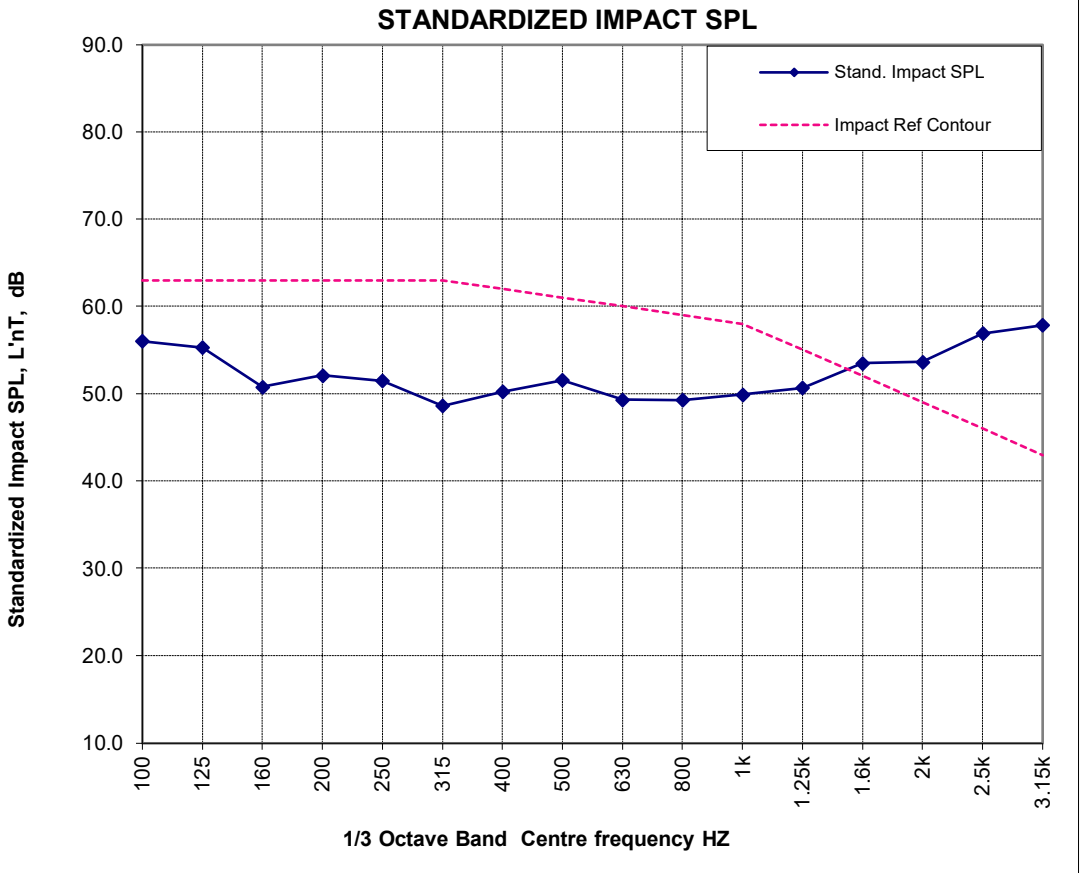
PROJECT:	PN5174 U905 Skyring Apartments, 30 Festival Pl, Newstead		
Test Location:	Level 9 U905 Living room to Level 8 U805 Living room	**Meas. Date:**	11-Mar-2021
		Meas. Parameter:	LLeq
Client:	Golden Elite Group	**Tapping Machine:**	Look Line EM50
Test Performed:	Hasitha Gallage	**Receiving Room Volume:**	98 m^3

DESCRIPTION OF FLOOR AND SPECIMEN

Test Surface:	Bare Concrete Slab	**No. of Source posn:**	2
		Mic. posn:	2 sweeps
		RT meas:	6 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**	**61**	ISO 16283-2:2015 & 717-2:2013
Impact Insulation Class	**FIIC**	**37**	ASTM E1007-97 & E989-89

Centre Frequency	Stand. Impact SPL	Impact Ref Contour	Deficiencies
Hz	dB	dB	dB
100	56.0	63	
125	55.3	63	
160	50.8	63	
200	52.1	63	
250	51.5	63	
315	48.7	63	
400	50.2	62	
500	51.5	61	
630	49.3	60	
800	49.2	59	
1k	49.9	58	
1.25k	50.6	55	
1.6k	53.5	52	1.5
2k	53.6	49	4.6
2.5k	56.9	46	10.9
3.15k	57.8	43	14.8
			Total
L'nT,w	61		31.8



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

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FIELD IMPACT SOUND INSULATION - TEST CERTIFICATE

Test 2 of 5

6mm SPC Hybrid Fiesta flooring sample

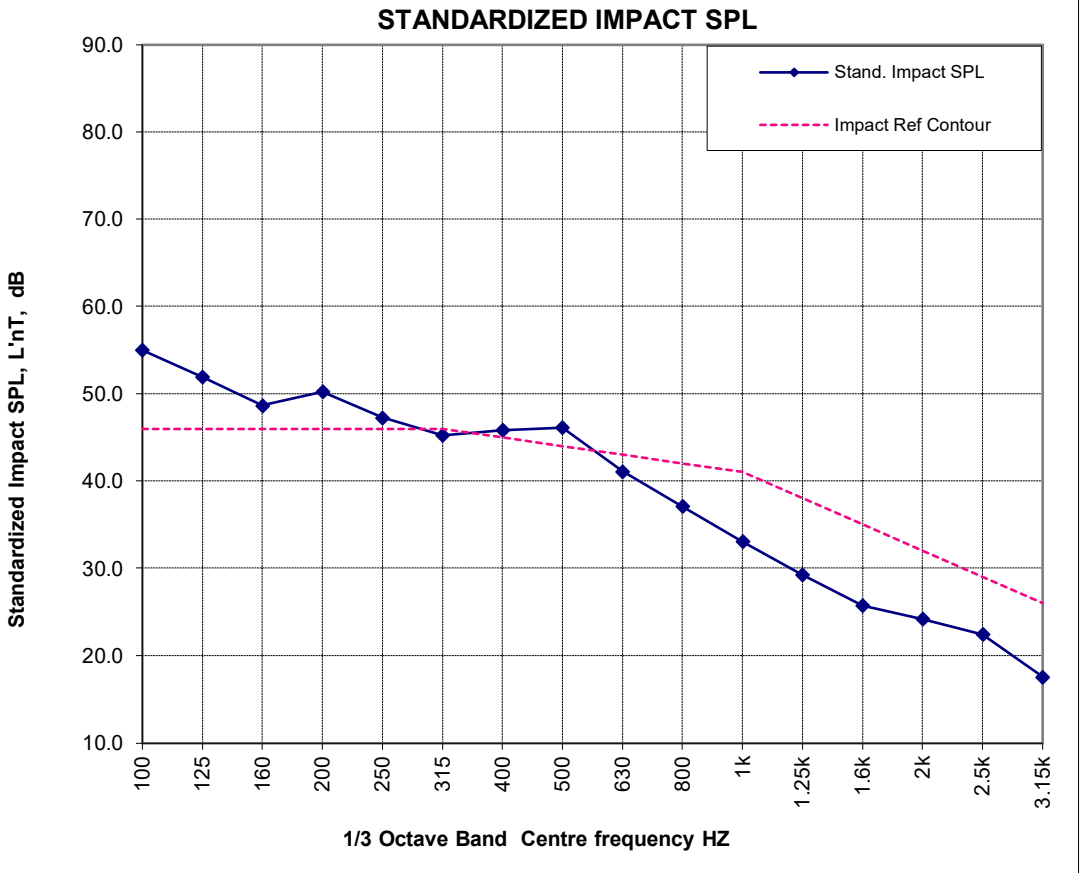
PROJECT:	PN5174 U905 Skyring Apartments, 30 Festival Pl, Newstead			
Test Location:	Level 9 U905 Living room to Level 8 U805 Living room	**Meas. Date:**	11-Mar-2021	
		Meas. Parameter:	LLeq	
Client:	Golden Elite Group	**Tapping Machine:**	Look Line EM50	
Test Performed:	Hasitha Gallage	**Receiving Room Volume:**	98	m^3

DESCRIPTION OF FLOOR AND SPECIMEN

Test Surface:	6mm SPC Hybrid Fiesta flooring sample	**No. of Source posn:**	2	
		Mic. posn:	2	sweeps
		RT meas:	6	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**	**44**	ISO 16283-2:2015 & 717-2:2013
Impact Insulation Class	**FIIC**	**60**	ASTM E1007-97 & E989-89

Centre Frequency		Stand. Impact SPL	Impact Ref Contour	Deficiencies
Hz		dB	dB	dB
100		55.0	46	9.0
125		51.9	46	5.9
160		48.7	46	2.7
200		50.2	46	4.2
250		47.2	46	1.2
315		45.2	46	
400		45.8	45	0.8
500		46.1	44	2.1
630		41.1	43	
800		37.1	42	
1k	<	33.0	41	
1.25k	<	29.2	38	
1.6k	<	25.7	35	
2k	<	24.2	32	
2.5k	<	22.4	29	
3.15k	<	17.6	26	
				Total
L'nT,w		44		25.9



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FIELD IMPACT SOUND INSULATION - TEST CERTIFICATE

Test 3 of 5

6mm SPC Hybrid Fiesta flooring sample

4mm Damtec underlay

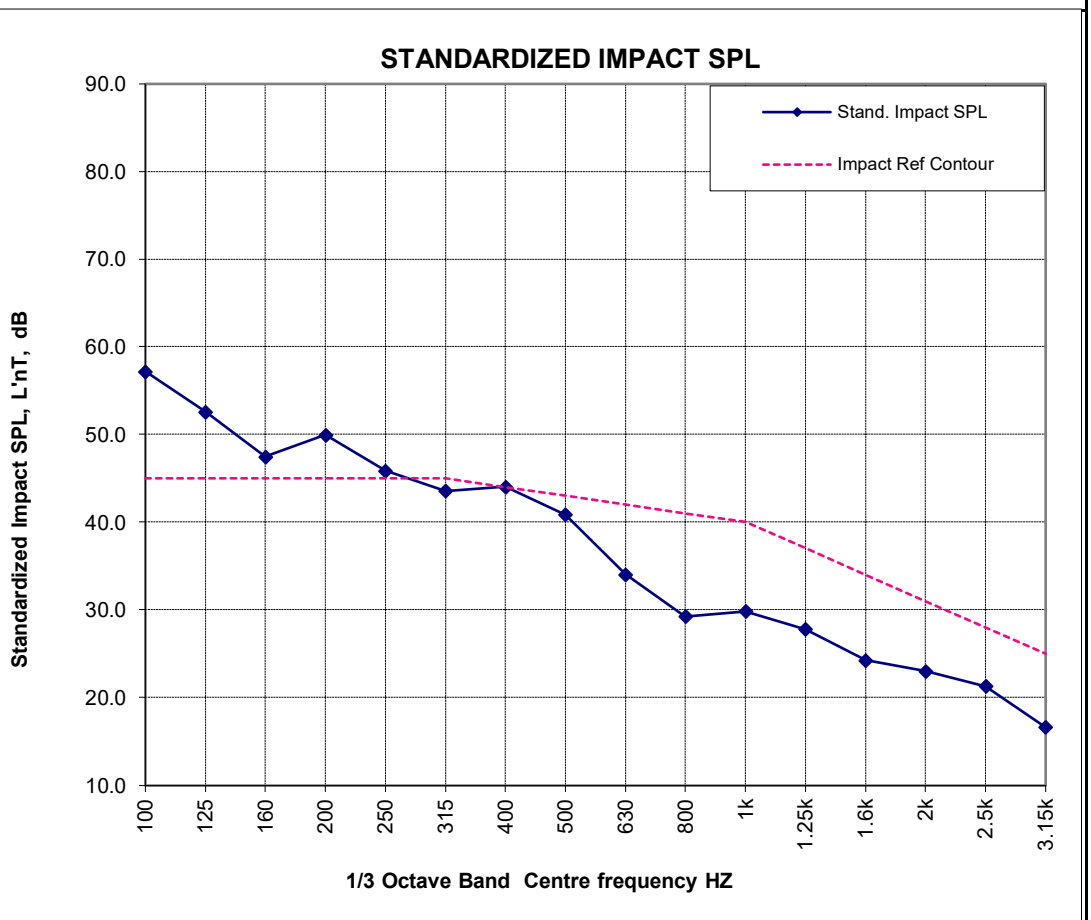
PROJECT:	PN5174 U905 Skyring Apartments, 30 Festival Pl, Newstead		
Test Location:	Level 9 U905 Living room to Level 8 U805 Living room	**Meas. Date:**	11-Mar-2021
		Meas. Parameter:	LLeq
Client:	Golden Elite Group	**Tapping Machine:**	Look Line EM50
Test Performed:	Hasitha Gallage	**Receiving Room Volume:**	98 m^3

DESCRIPTION OF FLOOR AND SPECIMEN

Test Surface:	6mm SPC Hybrid Fiesta flooring sample	**No. of Source posn:**	2
		Mic. posn:	2 sweeps
		RT meas:	6 Imp.
Underlay:	4mm Damtec 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**	**43**	ISO 16283-2:2015 & 717-2:2013
Impact Insulation Class	**FIIC**	**57**	ASTM E1007-97 & E989-89

Centre Frequency		Stand. Impact SPL	Impact Ref Contour	Deficiencies
Hz		dB	dB	dB
100		57.2	45	12.2
125		52.6	45	7.6
160	<	47.5	45	2.5
200		49.9	45	4.9
250		45.9	45	0.9
315		43.6	45	
400		44.0	44	0.0
500		40.9	43	
630		34.0	42	
800	<	29.2	41	
1k	<	29.8	40	
1.25k	<	27.8	37	
1.6k	<	24.2	34	
2k	<	23.0	31	
2.5k	<	21.3	28	
3.15k	<	16.6	25	
				Total
L'nT,w		43		28.0



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FIELD IMPACT SOUND INSULATION - TEST CERTIFICATE

Test 4 of 5

8mm SPC Hybrid Native flooring sample

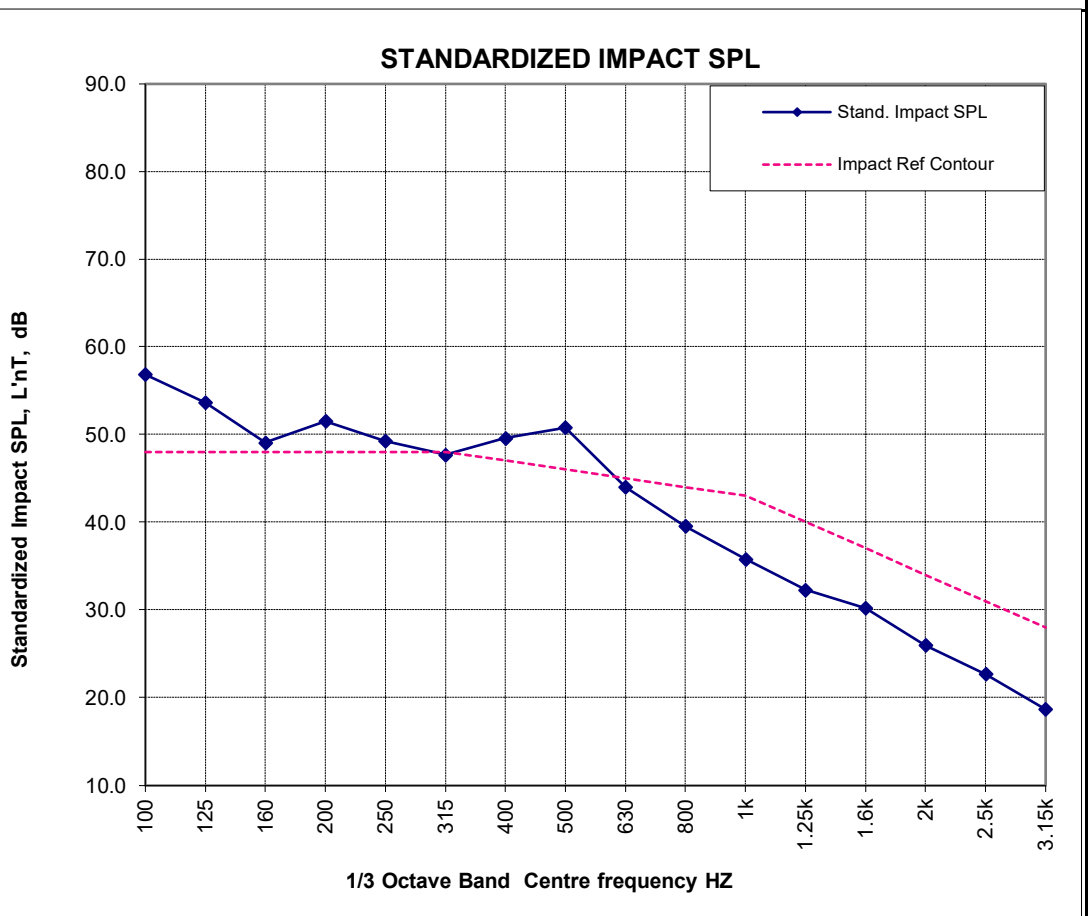
PROJECT:	PN5174 U905 Skyring Apartments, 30 Festival Pl, Newstead		
Test Location:	Level 9 U905 Living room to Level 8 U805 Living room	**Meas. Date:**	11-Mar-2021
		Meas. Parameter:	LLeq
Client:	Golden Elite Group	**Tapping Machine:**	Look Line EM50
Test Performed:	Hasitha Gallage	**Receiving Room Volume:**	98 m^3

DESCRIPTION OF FLOOR AND SPECIMEN

Test Surface:	8mm SPC Hybrid Native flooring sample	**No. of Source posn:**	2
		Mic. posn:	2 sweeps
Underlay:		**RT meas:**	6 Imp.
Adhesive:	Loose laid	**SLM:**	Nor 140
Ceiling:	Plasterboard		
Slab:	Concrete		

Weighted Standardized Impact SPL Results standardized to a RT of 0.5 seconds	**L'nT,w**	**46**	ISO 16283-2:2015 & 717-2:2013
Impact Insulation Class	**FIIC**	**58**	ASTM E1007-97 & E989-89

Centre Frequency		Stand. Impact SPL	Impact Ref Contour	Deficiencies
Hz		dB	dB	dB
100		56.8	48	8.8
125		53.6	48	5.6
160		49.0	48	1.0
200		51.5	48	3.5
250		49.2	48	1.2
315		47.7	48	
400		49.6	47	2.6
500		50.8	46	4.8
630		44.0	45	
800		39.5	44	
1k		35.8	43	
1.25k	<	32.3	40	
1.6k		30.2	37	
2k	<	25.9	34	
2.5k	<	22.7	31	
3.15k	<	18.7	28	
				Total
L'nT,w		46		27.6



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FIELD IMPACT SOUND INSULATION - TEST CERTIFICATE

Test 5 of 5

8mm SPC Hybrid Native flooring sample

4mm Damtec underlay

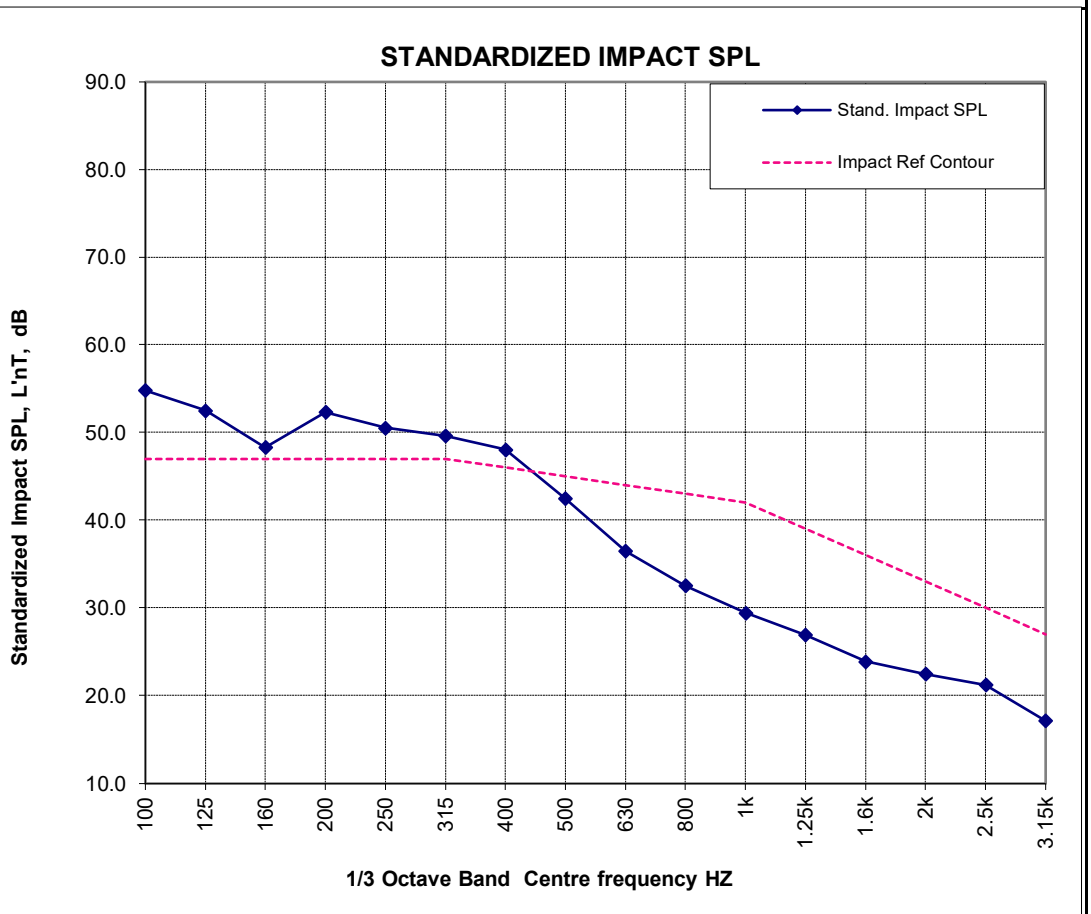
PROJECT:	PN5174 U905 Skyring Apartments, 30 Festival Pl, Newstead		
Test Location:	Level 9 U905 Living room to Level 8 U805 Living room	**Meas. Date:**	11-Mar-2021
		Meas. Parameter:	LLeq
Client:	Golden Elite Group	**Tapping Machine:**	Look Line EM50
Test Performed:	Hasitha Gallage	**Receiving Room Volume:**	98 m^3

DESCRIPTION OF FLOOR AND SPECIMEN

Test Surface:	8mm SPC Hybrid Native flooring sample	**No. of Source posn:**	2
		Mic. posn:	2 sweeps
		RT meas:	6 Imp.
Underlay:	4mm Damtec 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**	**45**	ISO 16283-2:2015 & 717-2:2013
Impact Insulation Class	**FIIC**	**60**	ASTM E1007-97 & E989-89

Centre Frequency		Stand. Impact SPL	Impact Ref Contour	Deficiencies
Hz		dB	dB	dB
100		54.8	47	7.8
125		52.5	47	5.5
160	<	48.3	47	1.3
200		52.3	47	5.3
250		50.5	47	3.5
315		49.6	47	2.6
400		48.0	46	2.0
500		42.5	45	
630		36.5	44	
800		32.5	43	
1k	<	29.4	42	
1.25k	<	26.9	39	
1.6k	<	23.9	36	
2k	<	22.4	33	
2.5k	<	21.2	30	
3.15k	<	17.1	27	
				Total
L'nT,w		45		28.1



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