

FIELD IMPACT INSULATION TEST - SAMPLE TESTING
GOLDEN ELITE GROUP

U7310 55 FORBES ST WEST END QLD 4101



TEST REPORT

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TITLE Field Impact Insulation Tests
U7310
55 Forbes St,
West End,
QLD 4101.
Test Report

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

REPORT DATE 17 September 2019

TEST DATE 13 September 2019

TEST LOCATION Level 3 Unit 7310 Living area
to Level 2 Unit 7209 Living area

FOR Golden Elite Group

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1.0 INTRODUCTION

Palmer Acoustics have been engaged by Golden Elite Group to perform a field impact insulation test in Unit 7310, 55 Forbes St West End. The test was conducted on flooring samples installed in the living area of Unit 7310. The measurements were conducted in the living area of Unit 7209 – directly beneath the living area of Unit 7310. Floor system tested:

- Test 1: Bare concrete slab
- Test 2: 8.5mm SPT Hybrid Timber flooring sample
- Test 3: 5mm Luxury Vinyl Plank flooring sample
- Test 4: 8mm Laminate flooring sample + 2mm Premium underlay
- Test 5: 7mm SPC Hybrid Vinyl flooring sample
- Test 6: 8mm SPB Hybrid Bamboo flooring sample

2.0 PROCEDURES AND EQUIPMENT

2.1 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 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 (4) locations throughout the space, with the results arithmetically averaged.

2.2 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 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 room and receiving room.

Transmitting Room (living area of Unit 7310)

Test Floor: Flooring samples;
Walls: Plasterboard;
Enclosure: Windows and all doors were closed;
Room finish: Partially furnished.

Receiving Room (living area of Unit 7209)

Ceiling: Plasterboard;
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	FIIC
Test 1: Bare concrete slab	67	32
Test 2: 8.5mm SPT Hybrid Timber flooring sample	52	53
Test 3: 5mm Luxury Vinyl Plank flooring sample	59	47
Test 4: 8mm Laminate flooring sample + 2mm Premium underlay	49	53
Test 5: 7mm SPC Hybrid Vinyl flooring sample	52	51
Test 6: 8mm SPB Hybrid Bamboo flooring sample	51	54

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 FIIC spectrum adaptation terms in accordance with ISO 717 - 2: 2013 and ASTM E1007-97 & E989-89.

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

National Construction Code (NCC) 2019 – Guide to NCC Volume one: Building Code of Australia (BCA) Class 2 to Class 9 Buildings states that compliance with the performance requirements for sound transmission through floors are achieved;

“when tested on site the floor must have a weighted standardised impact sound pressure level with spectrum adaption term ($L_{nT,w}$) not more than 62”

Under the Association of Australian Acoustics Consultants (AAAC) “Guideline for Apartment and Townhouse Acoustic Rating” (re: www.aaac.org.au) a $L'_{nT,w}$ rating of 55 represents a 3-star level of quality, $L'_{nT,w}$ 50 represents 4-star and $L'_{nT,w}$ 45 represents 5-star performance.


6.0 CONCLUSION

In our experience, test samples are similar in performance to a fully laid floor \pm 2dB.

The flooring system must be laid strictly in accordance with the suppliers recommended procedures.

Author:

Approved by:



HASITHA GALLAGE PhD, MIEAust
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 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 (6)

FIELD IMPACT SOUND INSULATION - TEST CERTIFICATE

Test 1 of 6

Bare concrete slab

PROJECT: PN4754 U7310 55 Forbes St West EndLNT **Meas. Date:** 13-Sep-19
Test Location: Level 3 U7310 Living area to Level 2 U7209 Living area **Meas. Parameter:** LLeq
Test Surface: Bare concrete slab **Tapping Machine:** Look Line EM50
Client: Golden Elite Group **Receiving Room Volume:** 69 m³
Test Performed: Hasitha Gallage

DESCRIPTION OF FLOOR AND SPECIMEN

Unit: Bare concrete slab **No. of Source posn:** 2
 Product: **Mic. posn:** 2 sweeps
 Adhesive: **RT meas:** 4 Imp.
 Ceiling: Plasterboard **SLM:** Nor 140
 Slab: Concrete

Weighted Standardized Impact SPL

Results standardized to a RT of 0.5 seconds

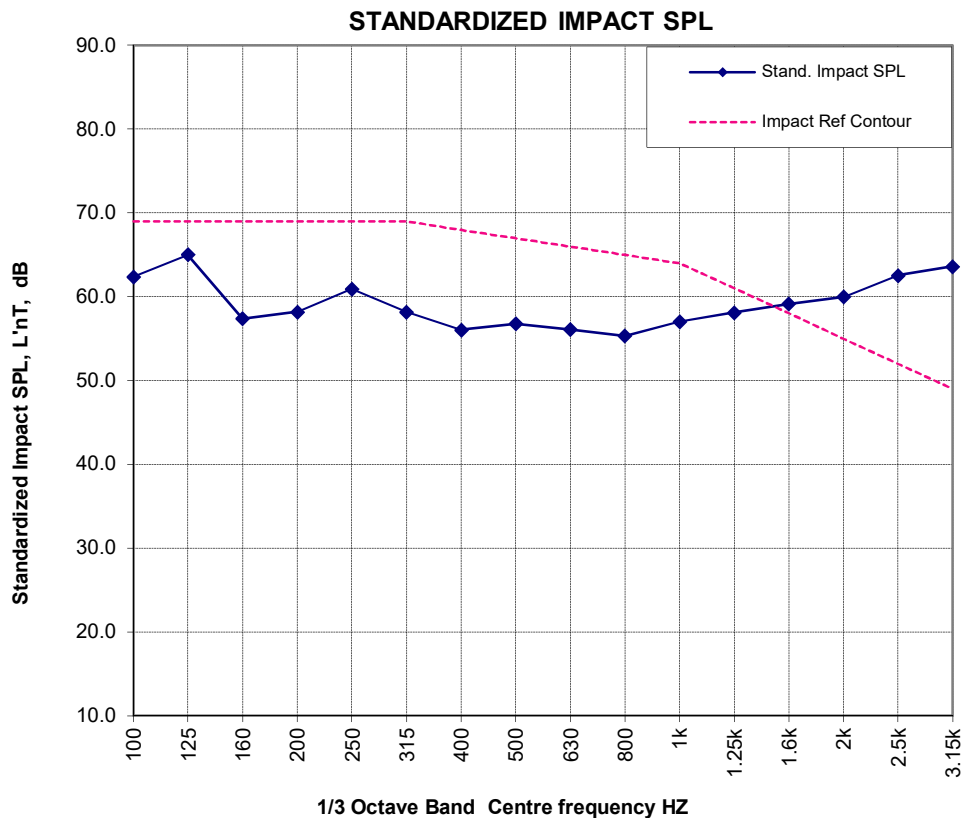
L'nT,w 67

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

FIC 32

ASTM E1007-97 & E989-89

Centre Frequency Hz	Stand. Impact SPL dB	Impact Ref Contour dB	Deficiencies dB
100	62.4	69	
125	65.0	69	
160	57.4	69	
200	58.2	69	
250	60.9	69	
315	58.2	69	
400	56.0	68	
500	56.8	67	
630	56.1	66	
800	55.3	65	
1k	57.0	64	
1.25k	58.1	61	
1.6k	59.1	58	1.1
2k	60.0	55	5.0
2.5k	62.5	52	10.5
3.15k	63.6	49	14.6
Total			



L'nT,w 67 31.2

FIELD IMPACT SOUND INSULATION - TEST CERTIFICATE

Test 2 of 6

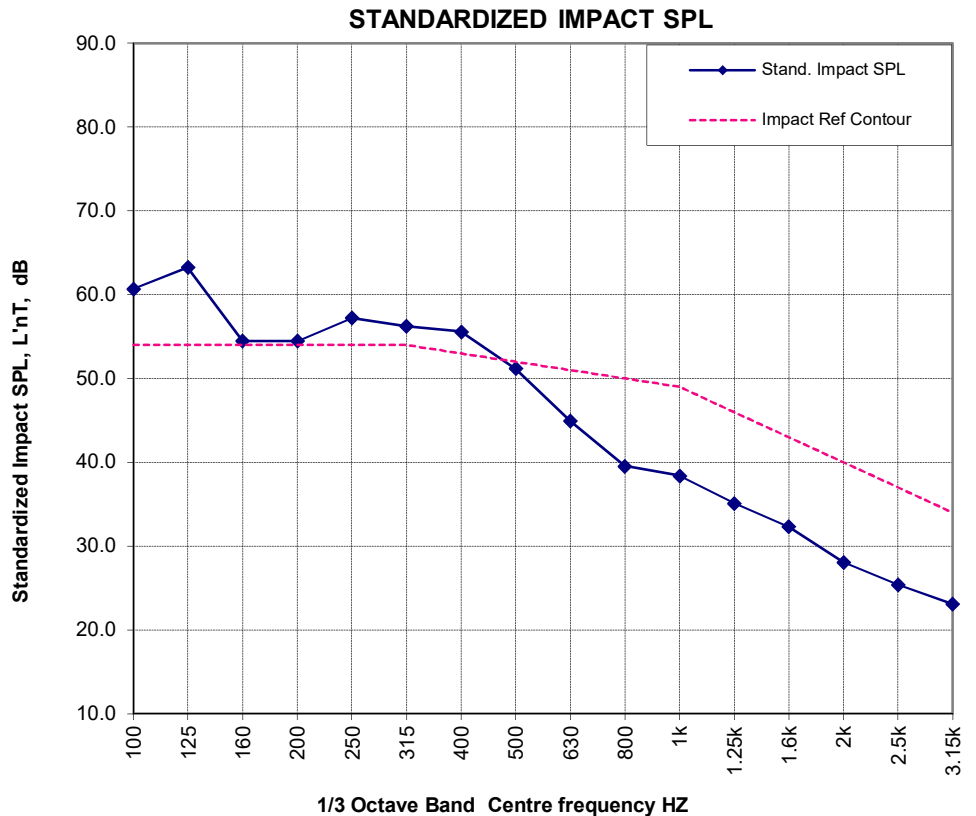
8.5mm SPT Hybrid Timber flooring sample

PROJECT:	PN4754 U7310 55 Forbes St West EndLNT	Meas. Date:	13-Sep-19
Test Location:	Level 3 U7310 Living area to Level 2 U7209 Living area	Meas. Parameter:	LLeq
Test Surface:	8.5mm SPT Hybrid Timber flooring sample	Tapping Machine:	Look Line EM50
Client:	Golden Elite Group	Receiving Room Volume:	69 m ³
Test Performed:	Hasitha Gallage		

DESCRIPTION OF FLOOR AND SPECIMEN	No. of Source posn:	2
Unit: 8.5mm SPT Hybrid Timber flooring sample	Mic. posn:	2 sweeps
Product:	RT meas:	4 Imp.
Adhesive: Loose laid	SLM:	Nor 140
Ceiling: Plasterboard		
Slab: Concrete		

Weighted Standardized Impact SPL	L'nT,w	52	ISO 16283-2:2015 & 717-2:2013
Results standardized to a RT of 0.5 seconds			
	FIC	53	ASTM E1007-97 & E989-89

Centre Frequency Hz	Stand. Impact SPL dB	Impact Ref Contour dB	Deficiencies dB
100	60.7	54	6.7
125	63.2	54	9.2
160	54.5	54	0.5
200	54.5	54	0.5
250	57.2	54	3.2
315	56.2	54	2.2
400	55.6	53	2.6
500	51.2	52	
630	44.9	51	
800	39.5	50	
1k	38.4	49	
1.25k	35.1	46	
1.6k	32.3	43	
2k	28.1	40	
2.5k	25.4	37	
3.15k	23.1	34	
Total			24.9



L'nT,w 52 24.9

FIELD IMPACT SOUND INSULATION - TEST CERTIFICATE

Test 3 of 6

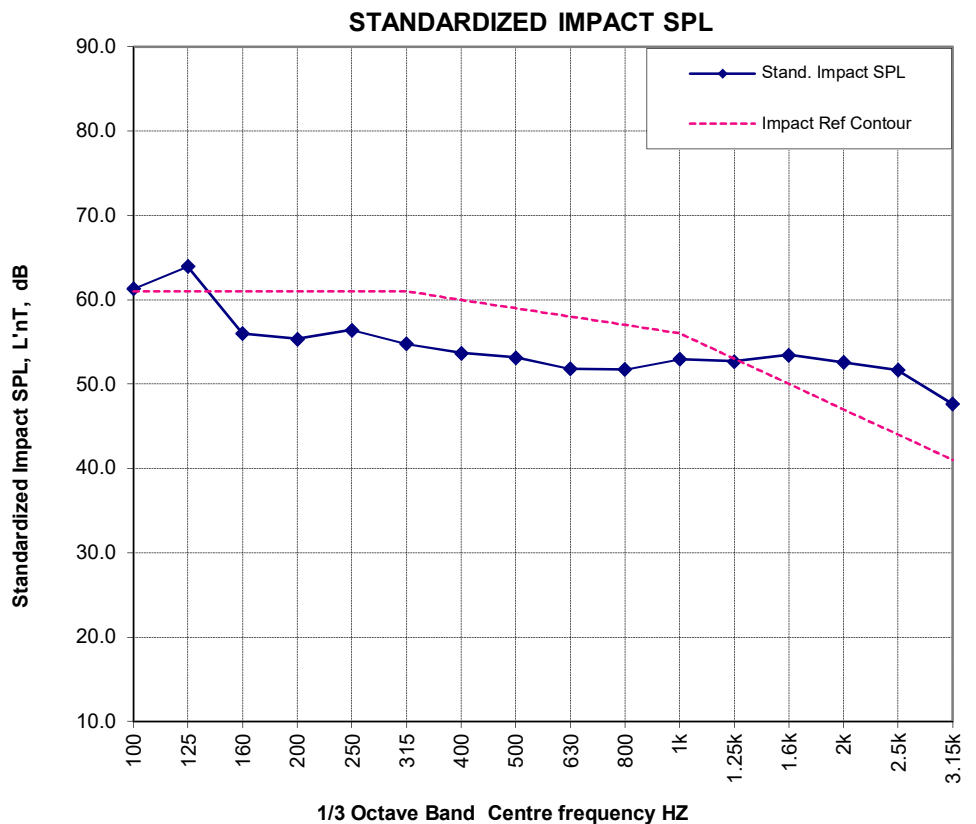
5mm Luxury Vinyl Plank flooring sample

PROJECT: PN4754 U7310 55 Forbes St West EndLNT **Meas. Date:** 13-Sep-19
Test Location: Level 3 U7310 Living area to Level 2 U7209 Living area **Meas. Parameter:** LLeq
Test Surface: 5mm Luxury Vinyl Plank flooring sample **Tapping Machine:** Look Line EM50
Client: Golden Elite Group **Receiving Room Volume:** 69 m³
Test Performed: Hasitha Gallage

DESCRIPTION OF FLOOR AND SPECIMEN **No. of Source posn:** 2
Unit: 5mm Luxury Vinyl Plank flooring sample **Mic. posn:** 2 sweeps
Product: **RT meas:** 4 Imp.
Adhesive: Loose laid **SLM:** Nor 140
Ceiling: Plasterboard
Slab: Concrete

Weighted Standardized Impact SPL	L'nT,w 59	ISO 16283-2:2015 & 717-2:2013
Results standardized to a RT of 0.5 seconds	FIIC 47	ASTM E1007-97 & E989-89

Centre Frequency	Stand. Impact SPL	Impact Ref Contour	Deficiencies
Hz	dB	dB	dB
100	61.3	61	0.3
125	63.9	61	2.9
160	56.0	61	
200	55.3	61	
250	56.4	61	
315	54.8	61	
400	53.6	60	
500	53.1	59	
630	51.8	58	
800	51.7	57	
1k	52.9	56	
1.25k	52.7	53	
1.6k	53.4	50	3.4
2k	52.6	47	5.6
2.5k	51.6	44	7.6
3.15k	47.6	41	6.6
Total			



L'nT,w 59 26.4

FIELD IMPACT SOUND INSULATION - TEST CERTIFICATE

Test 4 of 6

8mm Laminate flooring sample

2mm Premium underlay

PROJECT: PN4754 U7310 55 Forbes St West EndLNT **Meas. Date:** 13-Sep-19
Test Location: Level 3 U7310 Living area to Level 2 U7209 Living area **Meas. Parameter:** LLeq
Test Surface: 8mm Laminate flooring sample **Tapping Machine:** Look Line EM50
Client: Golden Elite Group **Receiving Room Volume:** 69 m³
Test Performed: Hasitha Gallage

DESCRIPTION OF FLOOR AND SPECIMEN

Unit: 8mm Laminate flooring sample
Product: 2mm Premium underlay
Adhesive: Loose laid
Ceiling: Plasterboard
Slab: Concrete

No. of Source posn: 2
Mic. posn: 2 sweeps
RT meas: 4 Imp.
SLM: Nor 140

Weighted Standardized Impact SPL

Results standardized to a RT of 0.5 seconds

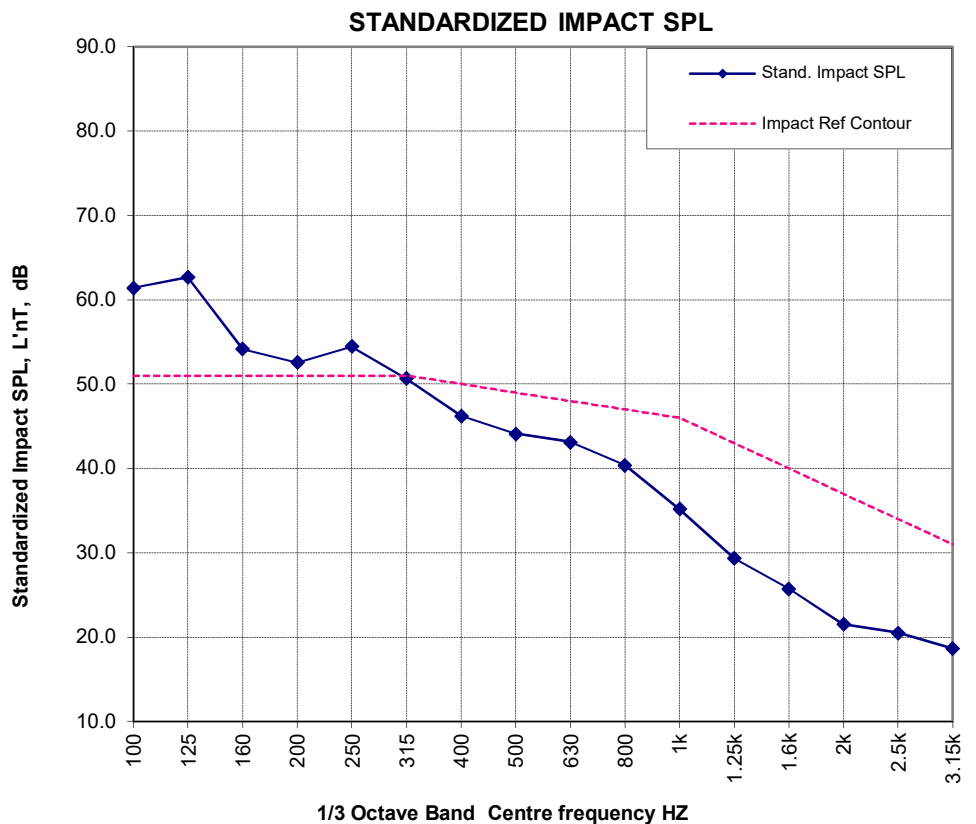
L'nT,w 49

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

FIC 53

ASTM E1007-97 & E989-89

Centre Frequency	Stand. Impact SPL	Impact Ref Contour	Deficiencies
Hz	dB	dB	dB
100	61.4	51	10.4
125	62.7	51	11.7
160	54.1	51	3.1
200	52.6	51	1.6
250	54.5	51	3.5
315	50.6	51	
400	46.2	50	
500	44.1	49	
630	43.1	48	
800	40.4	47	
1k	35.2	46	
1.25k	29.3	43	
1.6k	25.7	40	
2k	21.5	37	
2.5k	20.5	34	
3.15k	18.6	31	
Total			



L'nT,w 49 30.2

FIELD IMPACT SOUND INSULATION - TEST CERTIFICATE

Test 5 of 6

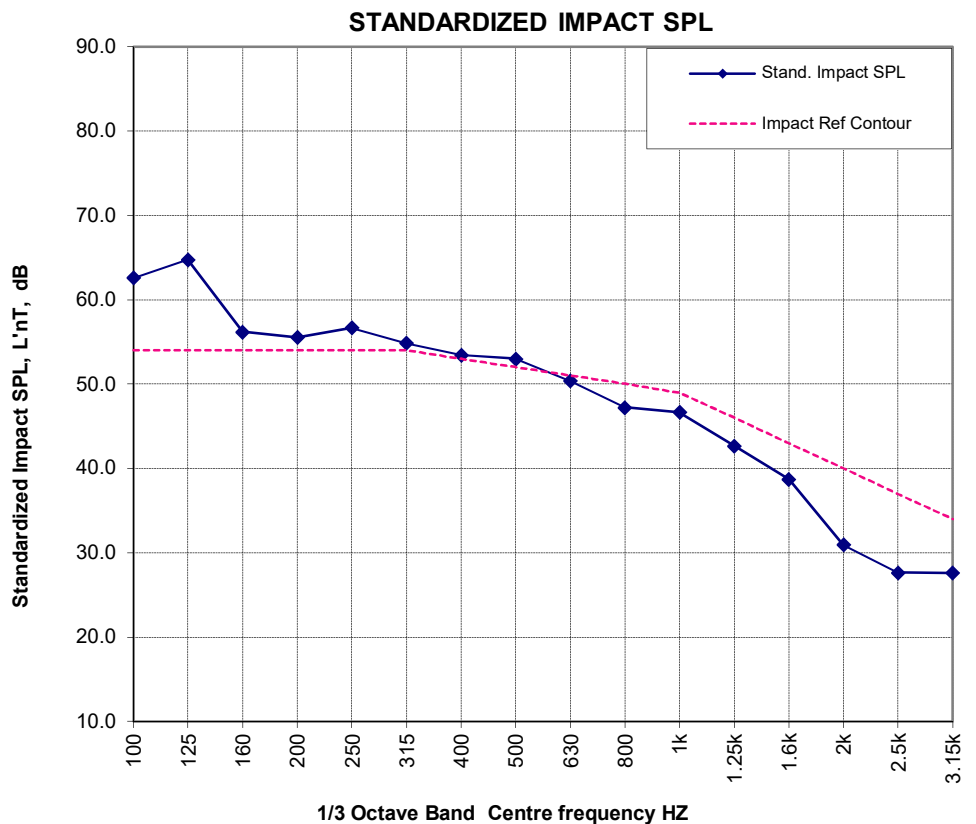
7mm SPC Hybrid Vinyl flooring sample

PROJECT: PN4754 U7310 55 Forbes St West EndLNT **Meas. Date:** 13-Sep-19
Test Location: Level 3 U7310 Living area to Level 2 U7209 Living area **Meas. Parameter:** LLeq
Test Surface: 7mm SPC Hybrid Vinyl flooring sample **Tapping Machine:** Look Line EM50
Client: Golden Elite Group **Receiving Room Volume:** 69 m³
Test Performed: Hasitha Gallage

DESCRIPTION OF FLOOR AND SPECIMEN **No. of Source posn:** 2
Unit: 7mm SPC Hybrid Vinyl flooring sample **Mic. posn:** 2 sweeps
Product: **RT meas:** 4 Imp.
Adhesive: Loose laid **SLM:** Nor 140
Ceiling: Plasterboard
Slab: Concrete

Weighted Standardized Impact SPL **L'nT,w** **52** ISO 16283-2:2015 & 717-2:2013
 Results standardized to a RT of 0.5 seconds
FIC **51** ASTM E1007-97 & E989-89

Centre Frequency	Stand. Impact SPL	Impact Ref Contour	Deficiencies
Hz	dB	dB	dB
100	62.5	54	8.5
125	64.7	54	10.7
160	56.2	54	2.2
200	55.5	54	1.5
250	56.7	54	2.7
315	54.8	54	0.8
400	53.4	53	0.4
500	53.0	52	1.0
630	50.3	51	
800	47.2	50	
1k	46.6	49	
1.25k	42.7	46	
1.6k	38.7	43	
2k	30.9	40	
2.5k	27.6	37	
3.15k	27.6	34	
Total			27.8



L'nT,w 52 27.8

FIELD IMPACT SOUND INSULATION - TEST CERTIFICATE

Test 6 of 6

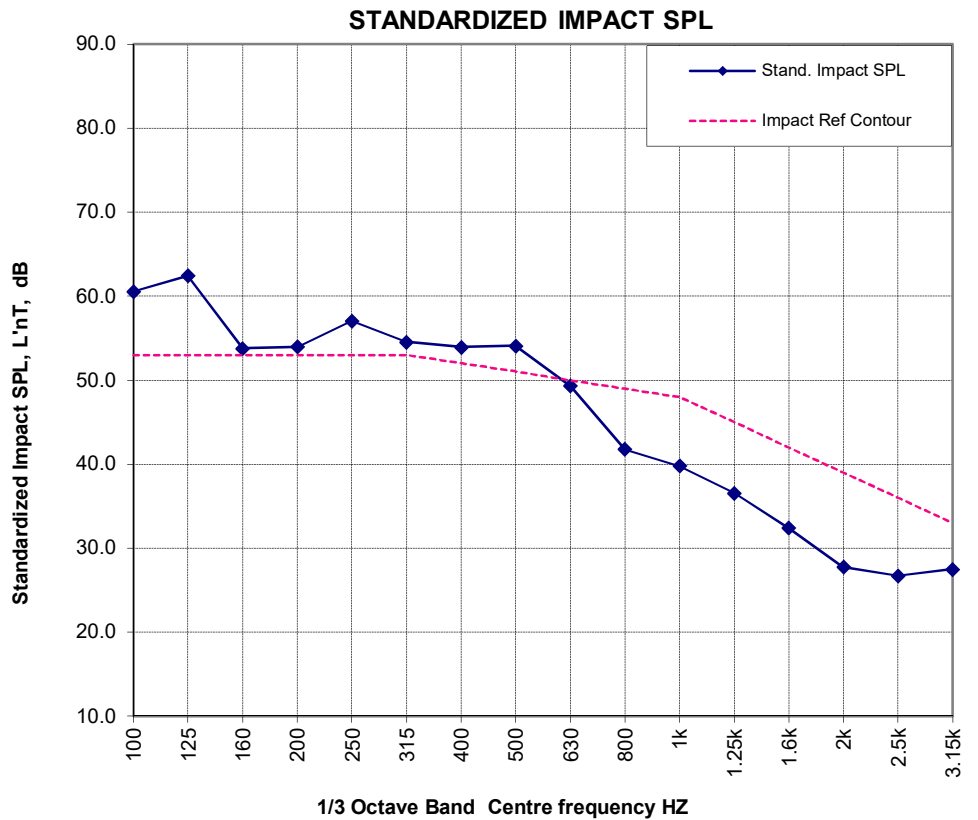
8mm SPB Hybrid Bamboo flooring sample

PROJECT: PN4754 U7310 55 Forbes St West EndLNT **Meas. Date:** 13-Sep-19
Test Location: Level 3 U7310 Living area to Level 2 U7209 Living area **Meas. Parameter:** LLeq
Test Surface: 8mm SPB Hybrid Bamboo flooring sample **Tapping Machine:** Look Line EM50
Client: Golden Elite Group **Receiving Room Volume:** 69 m³
Test Performed: Hasitha Gallage

DESCRIPTION OF FLOOR AND SPECIMEN **No. of Source posn:** 2
Unit: 8mm SPB Hybrid Bamboo flooring sample **Mic. posn:** 2 sweeps
Product: **RT meas:** 4 Imp.
Adhesive: Loose laid **SLM:** Nor 140
Ceiling: Plasterboard
Slab: Concrete

Weighted Standardized Impact SPL **L'nT,w** **51** ISO 16283-2:2015 & 717-2:2013
 Results standardized to a RT of 0.5 seconds
FIC **54** ASTM E1007-97 & E989-89

Centre Frequency Hz	Stand. Impact SPL dB	Impact Ref Contour dB	Deficiencies dB
100	60.5	53	7.5
125	62.4	53	9.4
160	53.8	53	0.8
200	54.0	53	1.0
250	57.1	53	4.1
315	54.5	53	1.5
400	53.9	52	1.9
500	54.1	51	3.1
630	49.3	50	
800	41.8	49	
1k	39.8	48	
1.25k	36.5	45	
1.6k	32.4	42	
2k	27.7	39	
2.5k	26.7	36	
3.15k	27.5	33	
Total			



L'nT,w 51 29.3