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Acoustics and Audio Visual – Consulting Engineers

FIELD FLOOR IMPACT INSULATION TEST REPORT

Golden Elite Group 14/3mm Engineered Timber

Commissioned by:	Golden Elite Group
Date:	09 November 2022
Project number:	5673
Version:	V.0
Author:	Kazi Riffat Hossain

DOCUMENT INFORMATION	
Author: Kazi Riffat Hossain **Date**: 09 November 2022	**Approved by**: Ross H. Palmer **Date**: 09 November 2022

VERSION HISTORY				
Version	**Description**	**Date**	**Author**	**Approved by**
V.0	Final	09-11-2022	Kazi Riffat Hossain	Ross H. Palmer

DOCUMENT DISTRIBUTION			
Copy	**Name/Company**	**Hard Copy**	**Electronic Copy**
01	Golden Elite Group	☐	☑
02		☐	☐
03		☐	☐
04		☐	☐
05		☐	☐

TITLE	Field Floor Impact Insulation Test U8701, 222 Margaret Street, Brisbane, QLD 4000 Test Report
TESTS BY	Kazi Riffat Hossain Engineering Technologist - Palmer Acoustics (Australia) Pty Ltd
TEST DATE	01 November 2022
REPORT DATE	09 November 2022
TEST LOCATION	Unit 8701 Living area
FOR	Golden Elite Group

CONTENTS

1.0 INTRODUCTION

Golden Elite Group has engaged Palmer Acoustics to perform a field impact insulation test at U8701, 222 Margaret Street, Brisbane. For this test, we use an ISO 140 standard tapping machine (per ISO 16283-2: 2020(E)).

Floor systems tested:

Test 1 - 14/3mm Golden Elite Group Noble Engineered timber sample with 3mm Damtec underlay (glued) – U8701 Living area to U8609 Bedroom

2.0 EQUIPMENT AND PROCEDURES

2.1 Measurement Procedures

The testing conformed to ISO 16283-2:2020 "*Field measurement of impact sound insulation of floors*". Evaluation of the results to derive the single figure L'nT,w rating was conducted to ISO 717-2 2020 "*Rating of insulation in buildings and of building elements – Part 2 Impact Sound Insulation*".

Ambient sound levels were measured before the test.

The receiving room reverberation times were measured at various locations throughout the space, using the balloon-burst impulse test method, with the results averaged.

The receiving room tapping sound levels were measured for 30 seconds at various locations throughout the space, with the results averaged.

Test results were analysed per ISO 16283 and ISO 717.

2.2 Instrumentation

The following instruments were used:

- Norsonics Nor140 Sound Analyser (serial number 1403252)
- B & K Tapping machine Type 3207 (serial number 2574503)
- B & K 4231 Calibrator (serial number 2153030)

Before and after each measurement session, the equipment was field calibrated and was within 0.2dB of the reference signal. All instruments hold a current calibration certificate from a NATA accredited calibration laboratory.

3.0 DESCRIPTION OF ROOMS

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

Transmitting Room (Level 87 U8701 Living area)

Walls:	Plasterboard;
Floor:	Bare concrete slab under test sample;
Room finish:	Unfurnished.

Receiving Room (Level 86 U8609 Bedroom)

Slab	Concrete;
Walls:	Plasterboard;
Ceiling:	Plasterboard;
Floor:	Concrete;
Room finish:	Unfurnished.

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Figure 1: Testing at U8701, 222 Margaret Street, Brisbane.

4.0 RESULTS

Our tests give the following results:

Table 1: Test Result Summary – Floor impact tests

	Test System	L'nT,w
1.	14/3mm Golden Elite Group Noble Engineered timber sample with 3mm Damtec underlay (glued) – U8701 Living area to U8609 Bedroom	43

Appendix C contains the Test Certificates detailing the 1/3 octave band results for this report in terms of L'nT,w following ISO 717 - 2: 2020.

L'nT,w is a term used in the Building Code of Australia (BCA - see Appendix A) and represents a corrected room noise level, with a lower number showing better performance.

5.0 CONCLUSIONS

The 14/3mm Golden Elite Group Noble Engineered timber sample with Damtec 3mm (glued) installed in the bedroom of U3801 has achieved an L'nT,w rating 43.

Qualification

The test results above are specific to this test and cannot be directly applied to any other location or flooring system. When applied to another floor, Palmer Acoustics can advise on the possible performance, but this must be in consultation with our office.

Author:

KAZI RIFFAT HOSSAIN
Engineering Technologist

Approved by:

ROSS H. PALMER CPEng RPEQ 3534
Principal 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 "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 normalised;

- $L'_{nT,w}$ – 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 Normalised 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}.

- ***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 a room with a reference reverberation time of 0.5 seconds.

- L'_n – ***Normalized Impact Sound Pressure Level*** – the impact sound pressure level normalised 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

- ***ISO 3382-2:2008***
  Acoustics – Measurement of room acoustic parameters — Part 2: Reverberation time in ordinary rooms.

APPENDIX B

CALCULATION METHODOLOGY - 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.

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

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

L'_{nT} is the standardised 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 unfavourable deviations is as large as possible but not more than 32.0 dB.

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

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

APPENDIX C

Test certificates (1)

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Member Firm: AAAC
Association of Australasian Acoustical Consultants

FIELD IMPACT SOUND INSULATION - TEST CERTIFICATE

Test 3 of 3

Golden Elite Group Noble Engineered Timber (glued)

3mm Damtec underlay (glued)

PROJECT:	PN5673 U8701, 222 Margaret St, Brisbane LNT		
Test Location:	Level 87 U8701 Living Room to Level 86 U8609 Bedroom	**Meas. Date:**	1-Nov-2022
		Meas. Parameter:	LLeq
Client:	Golden Elite Group	**Tapping Machine:**	Look Line EM50
Test Performed:	Kazi Riffat Hossain	**Receiving Room Volume:**	100 m^3

DESCRIPTION OF FLOOR AND SPECIMEN

Test Surface:	Golden Elite Group Noble Engineered Timber (glued)	**No. of Source posn:**	2
		Mic. posn:	2 sweeps
		RT meas:	4 Imp.
Underlay:	3mm Damtec underlay (glued)	**SLM:**	Nor 140
Adhesive:			
Ceiling:	Concrete		
Slab:	Concrete		

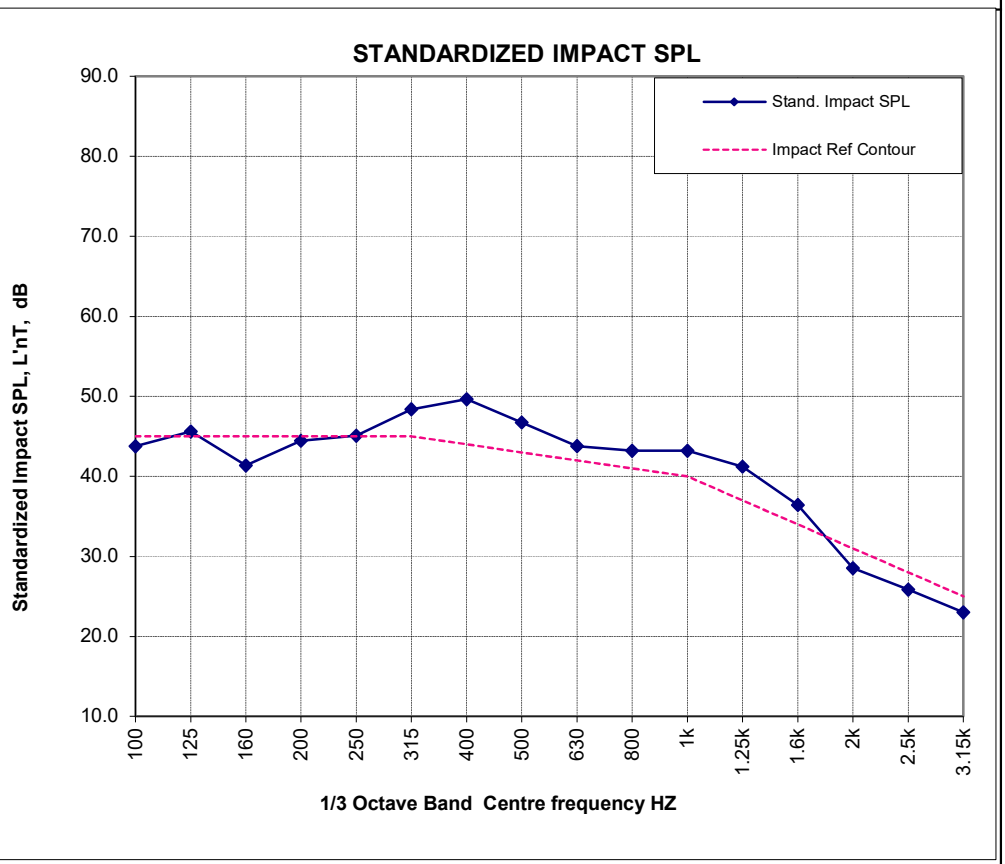
Weighted Standardized Impact SPL

Results standardized to a RT of 0.5 seconds

L'nT,w 43

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

Centre Frequency		Stand. Impact SPL	Impact Ref Contour	Deficiencies
Hz		dB	dB	dB
100		43.8	45	
125		45.6	45	0.6
160	<	41.4	45	
200		44.5	45	
250		45.1	45	0.1
315		48.4	45	3.4
400		49.6	44	5.6
500		46.7	43	3.7
630		43.8	42	1.8
800		43.2	41	2.2
1k		43.2	40	3.2
1.25k		41.2	37	4.2
1.6k		36.4	34	2.4
2k		28.5	31	
2.5k		25.8	28	
3.15k		23.0	25	
				Total
L'nT,w		43		27.3



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