



Acoustic Engineering

Acoustic Test Report

Impact Sound Insulation Testing - GCH Flooring by Golden Cherry Home

Project No: 206173-A
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Project: Impact Sound Insulation Testing – GCH Flooring by Golden Cherry Home

Project No: 206173-A

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Revision History

Doc.	Rev.	Date	Purpose	Author	Reviewer
ATR	0	18/03/2024	Draft for comment	A Horng	T Chong
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Executive Summary

DDEG has been appointed by Golden Cherry Home Pty Ltd to undertake impact sound insulation testing of a 7 mm thick hybrid flooring product to verify compliance with the impact sound insulation requirements of the Building Code of Australia.

Testing of impact sound insulation was performed on a floor / ceiling assembly featuring the subject hybrid flooring product between a second floor and first floor apartment in Moonee Ponds, VIC on 14 March 2024. The results of the testing are presented in the table below:

Test No.	Test Type	Description	Measured Sound Insulation Rating, dB	BCA Verification Criterion and Compliance	AAAC Guidelines Rating
1	Impact Sound	Apartment 207 to Apartment 107	$L'_{nT,w} = 43$	$L'_{nT,w} \leq 62$ ✓	5 Stars

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1 Introduction

1.1 Purpose

DDEG has been appointed by Golden Cherry Home Pty Ltd to undertake impact sound insulation testing of a 7 mm thick hybrid flooring product.

This document presents the methodology and results of testing conducted at an apartment building in Moonee Ponds, VIC to verify compliance with the sound insulation performance requirements of the Building Code of Australia 2019 (BCA) Volume One Amendment 1 (ABCB, 2020).

A glossary of the acoustic nomenclature used in this document is presented in Appendix A.

1.2 Reference Documentation

This document is based on information contained in the following documents and drawings:

Table 1 Reference Documentation

Document	Prepared by	Issue
Architectural Drawings; Project No.151382; Drawing No. A852, Revision No. 2	MAP Architecture & Design Pty Ltd	01/07/2022
Email To: Alex Horng Subject: RE: 206173 - Golden Cherry Home - Sound Insulation Testing	Sheyda; Golden Cherry Home	Fri 15/03/2024 4:58 PM

1.3 Document Limitations

The following limitations are applicable with respect to the acoustic advice presented in this document:

- DDEG has prepared this document for the sole use of the relevant stakeholders and approval authorities and for the specific purpose expressly stated in the document. No other party should rely on this document without the prior written consent of DDEG. DDEG undertakes no duty, nor accepts any responsibility, to any third party who may rely upon or use this document.
- The information contained in this document provides advice in relation to acoustics and vibration only. No claims are made and no liability is accepted in respect of design and construction issues falling outside of the specialist field of acoustics and vibration engineering including and not limited to structural integrity, fire rating, architectural buildability and fitness-for-purpose, waterproofing and the like. Supplementary professional advice should be sought in respect of these issues.
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- Subject to the above conditions, this document may be transmitted, reproduced or disseminated only in its entirety.

2 Impact Sound Insulation Criteria

2.1 Building Code of Australia (BCA)

BCA Clause FV5.1 prescribes the methods to be used to verify compliance of floors with the sound insulation performance requirements of the BCA.

Compliance with BCA Clauses FP5.1 and FP5.3, to avoid the transmission of impact generated sound through floors, is verified when it is measured in-situ that the separating floor has a Weighted Standardised Impact Sound Pressure Level ($L_{nT,w}$) not more than 62 when determined in accordance with AS ISO 717.2 (Standards Australia, 2004).

2.2 AAAC Guidelines

Guidance from the *Association of Australasian Acoustical Consultants Guideline for Apartment and Townhouse Acoustic Rating* (AAAC Guideline) (AAAC, 2017) will be used to assess sound insulation performance exceeding those of the BCA DTS Performance Requirements.

Table 2 presents the sound insulation performance ratings for impact sound insulation of floors in accordance AAAC Guidelines.

Table 2 AAAC Guideline for Floor / Ceiling Assemblies

Space Type in Sole-Occupancy Unit	Space Type in Adjoining Part of Building	Sound Insulation Parameter	AAAC Star Rating			
			3 Star	4 Star	5 Star	6 Star
Any room	Sole-Occupancy Unit (any room)	Impact	$L_{n,w} \leq 55$	$L_{n,w} \leq 50$	$L_{n,w} \leq 45$	$L_{n,w} \leq 40$

3 Test Procedure

3.1 Methodology

The impact sound insulation was measured in accordance with the procedure prescribed by AS ISO 140.7:2006 (Standards Australia, 2006).

Based on the measurement results, the Weighted Standardised Impact Sound Pressure Level ($L_{nT,w}$) was calculated in accordance with AS ISO 717.2:2004 (Standards Australia, 2004).

3.2 Instrumentation

All acoustic instrumentation used for the measurements held a current certificate of calibration from a National Association of Testing Authorities (NATA) accredited laboratory or from the manufacturer at the time of the measurements.

A field check to confirm correct calibration of the instrumentation was performed at the beginning and end of the measurement period using a laboratory calibrated portable Sound Level Calibrator. At the time of each check the instrumentation was found to be reading correctly and the deviation between consecutive checks was found to be less than 1 dB.

Details of the acoustic instrumentation used for measurements are presented in Table 3. **Table**

3 Acoustic Instrumentation Details

Instrument Description	Serial No.	Date of Last Laboratory Calibration*
Svantek 977 Class 1 Sound Level Meter	45763	22/03/2023
Svantek SV35A Portable Sound Level Calibrator	58054	4/07/2023
QSources Qtap Tapping Machine	1107 A	N/A

* In accordance with AS 1055.1-1997 and National Association of Testing Authorities Guidelines, Sound Level Meters and Environmental Noise Loggers are required to have comprehensive laboratory calibration checks carried out at intervals not exceeding two years. Sound Level Calibrators require calibration annually.

3.3 Building Elements Tested

Table 4 presents details of the building elements tested:

Table 4 Details of Building Elements Tested

Test No.	Test Type	Description	Construction (As Advised)	BCA Verification Criterion, dB
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1	Impact Sound	Apartment 207 to Apartment 107	□ Golden Cherry Home 7 mm hybrid flooring; □ Two layers of 19 mm UBIQ 'INEX' floor substrate; □ Approx. 130 mm depth Megajoint timber joists; □ Insulation batts; □ Two layers of 16 mm Gyprock Fyrchek plasterboard fixed to timber joists via resiliently mounted furring channels.	$L'_{nT,w} \leq 62$
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4 Results

Table 5 presents a summary of the test results. Detailed results are presented in Appendix B.

Table 5 Summary of Sound Insulation Test Results

Test No.	Test Type	Description	Measured Sound Insulation Rating, dB	BCA Verification Criterion and Compliance	AAAC Guidelines Rating
1	Impact Sound	Apartment 207 to Apartment 107	$L'_{nT,w} = 43$	$L'_{nT,w} \leq 62$ ✓	5 Star

The results presented in Table 5 indicate that the floor / ceiling assembly detailed in Table 4 satisfies the DTS requirements of the BCA for impact sound insulation and AAAC Guidelines 5 Star rating.

5 Conclusion

This report has presented the methodology and results of sound insulation testing performed of a Golden Cherry Home 7 mm thick hybrid flooring product to verify compliance with the Deemed-to-Satisfy (DTS) sound insulation provisions of the Building Code of Australia.

The results verify compliance of the tested assembly with the Deemed-To-Satisfy Impact Sound Insulation requirements of the BCA and AAAC Guidelines 5 Star rating.

6 References

AAAC. (2017, June). Association of Australasian Acoustical Consultants Guideline for Apartment and Townhouse Acoustic Rating Version 1.0.

ABCB. (2020). *National Construction Code 2019 Volume One Amendment 1 - Building Code of Australia - Class 2 to 9 Buildings*. Canberra: Australian Building Codes Board.

Standards Australia. (2004). AS/NZS ISO 717.2:2004 Acoustics - Rating of Sound Insulation in Buildings and of Building Elements - Part 2: Impact Sound Insulation.

Standards Australia. (2006, February). AS ISO 140.7:2006 Acoustics - Measurement of Sound Insulation in Buildings and of Building Elements - Part 7: Field Measurements of Impact Sound Insulation of Floors (ISO 140-7:1998, MOD).

Appendix A Glossary of Acoustic Terms

dB / dB(A) Decibels or 'A'-weighted Decibels, the units of Sound Pressure Level and Sound Power Level. 'A'-weighting adjusts the levels of frequencies within the sound spectrum to better reflect the sensitivity of the human ear to different frequencies at Sound Pressure Levels typical of everyday sounds. [Unit: dB / dB(A)]

The following are examples of the decibel readings of everyday sounds;

- 0 dB The faintest sound we can hear
- 30 dB A quiet library or in a quiet location in the country
- 45 dB Typical office space. Ambience in the city at night
- 60 dB The sound of a vacuum cleaner in a typical lounge room
- 70 dB The sound of a car passing on the street
- 80 dB Loud music played at home
- 90 dB The sound of a truck passing on the street
- 100 dB The sound of a rock band
- 120 dB Deafening

$L_{nT,w}$ The Weighted Standardized Impact Sound Pressure Level. It is a single number rating of the impact sound insulation of a floor / ceiling assembly determined using a standard 'tapping' machine. A lower value indicates better impact sound insulation. [Unit: dB]

Sound Pressure Level A measure of the magnitude of a sound wave. Mathematically, it is twenty times the logarithm to the base ten of the ratio of the root mean square sound pressure at a point in a sound field, to the reference sound pressure; where sound pressure is defined as the alternating component of the pressure (Pa) at the point, and the reference sound pressure is 2×10^{-5} Pa. [Unit: dB]

Appendix B Detailed Test Results

**Standardised Impact Sound Pressure Levels According to AS ISO 140-7:2006
Field Measurements of Impact Sound Insulation of Floors**

Project: Golden Cherry Home
Impact Sound Insulation Test

Client: Golden Cherry Home
48/2 Cobham Street
Reservoir VIC 3073

SLM Type: Svantek 977 Class I

SLM Serial No: 45763

Sound Source: Qsources QTAP
Tapping Machine

Date of Test: 14/03/2024

Description: Apartment Building, Moonee Ponds - Apartment 207 to Apartment 107

Construction: Golden Cherry Home 7 mm hybrid flooring + two layers of 19 mm UBIQ 'INEX' floor substrate + Megajoints timber structure + insulation batts + two layers of fire-rated plasterboard fixed via resiliently mounted furring channels

Source Room Volume:

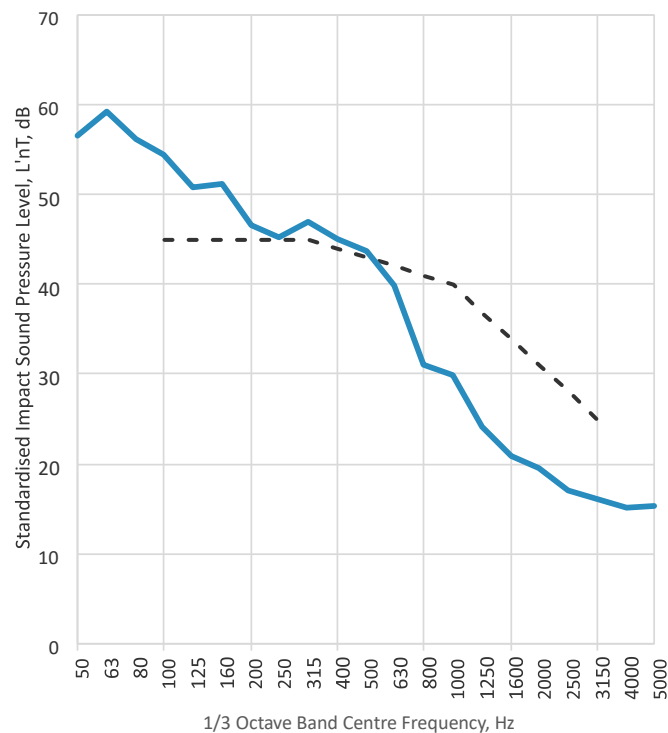
16 m³

Receiving Room Volume:

16 m³

-- -- Reference Curve — Measured L'nT

Frequency f Hz	L' _{nT} 1/3 Oct dB
50	56.5
63	59.2
80	56.3
100	54.5
125	50.9
160	51.3
200	46.6
250	45.3
315	47.0
400	45.0
500	43.8
630	39.9
800	31.0
1000	29.9
1250	< 24.2
1600	20.9
2000	< 19.5
2500	< 17
3150	< 16.1
4000	15.2
5000	15.4



Rating according to AS ISO 717-2:2004:

Evaluation based on field measurement results obtained by an engineering method.

L'_{nT,w} (C_i) = 43 (1) dB C_{i,50-2500} = 6 dB

Test No:	206173-ATR-01	Testing Officer: A.Horng
Date:	8/04/2024	Signature:

