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# **CERTIFICATE OF PERFORMANCE**

IMPACT SOUND INSULATION

HOMELY FLOORING 6MM HYBRID FLOORING

Issue Date: Monday, 31 October 2022

Our File Reference: 5568C20221028jtHomelyFlooring\_HybridFlooring.docx

# **DOCUMENT CONTROL**

Certificate of Performance

**Project Title** 

		Impact Sound I Homely Floorin		d Flooring	
Project Nu	ımber	5568			
Document	t Reference	5568C20221028jtHomelyFlooring_HybridFlooring.docx			
Version	Date	Author	Review	Notes	
V1 31/10/202		022 JT NK		Report version 1 available for issue	

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Date: Monday, 31 October 2022

File Reference: 5568C20221028itHol

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**Certificate of Performance:** Impact sound insulation – Homely Flooring – 6mm Hybrid Flooring



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# **IMPACT SOUND INSULATION**

# **HOMELY FLOORING 6MM HYBRID FLOORING**

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1.0 CONSULTANT'S BRIEF

Koikas Acoustics was requested by Homely Flooring to conduct impact noise tests of the following

floor systems:

Test 01: Ho

Homely Flooring 6mm Hybrid Flooring

A total of one (1) test was conducted which included the base ceiling/floor system of a concrete slab

and suspended ceiling.

The purpose of undertaking these impact noise tests was to quantify the acoustic performance of

the flooring systems.

Test results were compared to the acoustic requirements of Part F5 of BCA (Building Codes of

Australia) and the standards prescribed by the Association of Australasian Acoustical Consultants

(AAAC).

All measurements were carried out as per the guidelines and procedures outlined in:

AS/NZS ISO 140.7:2006 "Field measurements of impact sound insulation of floors"

The rating was determined as per

• AS ISO 717.2-2004 "Rating of sound insulation in buildings and of building elements".

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## 2.0 IMPACT NOISE COMPLIANCE TESTING

#### 2.1 PARTITION SYSTEM

Koikas Acoustics has been advised that the ceiling/floor system between the residential units is constructed with the following building materials:

- Approximately 180-200 mm thick concrete slab, and
- Unknown ceiling finish.

Hereafter referred to as the "existing ceiling/floor system" (ECFS).

The tests were conducted with the following floor covering in conjunction with the selected flooring over the ECFS:

• Test 00: Bare concrete floor (ECFS only) – for comparison purposes only

• Test 01: Homely Flooring 6mm Hybrid Flooring + ECFS

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# 2.2 IMPACT NOISE REQUIREMENTS

## 2.2.1 BCA REQUIREMENT

For verification of the impact noise rating for floors, Part FV5.1 (b) of the latest update of the Building Code of Australia (BCA) 2019 states:

Impact: a weighted standardised impact sound pressure level  $(L_{nT,w})$  not more than 62 when determine under AS ISO 717.2.

## 2.2.2 AAAC STAR RATING PERFORMANCE REQUIREMENTS

Reproduced from the Association of Australasian Acoustical Consultants (AAAC) Guideline for Apartment and Townhouse Acoustic Ratings, the following Table (Section C) describes the acoustic ratings regarding the Star Rating System.

Table 1. Star Rating requirements for Inter-tenancy Activities – Published by the AAAC						
INTER-TENANCY ACTIVITIES		3 Star	4 Star	5 Star	6 Star	
(c) Impact isolation of floors						
- Between tenancies LnTw ≤	65	55	50	45	40	
- Between all other spaces & tenancies LnTw ≤	65	55	50	45	40	

Note, Koikas Acoustics is of the understanding that the impact noise ratings in Table 1 infer  $L'_{nTw}$  and not  $L_{nTw}$ .  $L_{nTw}$  is an impact noise rating derived from tests undertaken in a laboratory and  $L'_{nTw}$  is derived from field tests.

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3.0 ASSESSMENT/TESTING PROCEDURES

3.1 PARTITION TESTING

3.1.1 Generation of the sound field in the source room

The sound field was generated by a Cesva MI006 tapping machine situated in the source room on

the specific floor under test. Several measurement positions on each floor were tested as required

by the standard.

3.1.2 Receiving space measurement

Impact noise levels were recorded in the receiving space with an NTi Audio XL2 spectrum analyser

sound level meter. The spatial-averaging method of measurement was employed for impact noise

tests with relevant traverse durations and minimum distances to reflectors and boundary walls

observed.

3.1.3 Reverberation time and background noise

Additional measurements were taken of the background noise (Lb) and reverberation time (T). The

background noise measurement was used to ensure that existing ambient noise did not influence

the internal noise measurement. The reverberation time was used to calculate the amount of

absorption (A) in the receiving room so that the measurement can be standardised to a reference

reverberation time of 0.5 seconds.

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#### 4.0 MEASURED RESULTS AND ANALYSIS

The results of the acoustic tests are tabulated below. Comprehensive measurement and analysis data are presented as an Appendix to this report.

Table 2. Summary of impact noise test results					
Flooring Sample	L'nT,w	AAAC Star Rating	FIIC		
<b>Test 00</b> : Bare concrete floor (ECFS only) – for comparison purposes only	55	3	50		
<b>Test 01</b> : Homely Flooring 6mm Hybrid Flooring + ECFS	40	6	69		

Detailed calculations of the partition system impact noise insulation (ceiling/floor) are attached as **Appendix A**.

The following are also noted:

- All tests were undertaken with the existing ceiling/floor system consisting of between 180-200 mm thick concrete sub-base with an unknown ceiling.
- 2. The tested flooring system as listed in Table 2 (Test 01) has achieved both the BCA 2019 minimum requirement ( $L_{nT,w} \le 62$ ) and the AAAC Star rating of 6 for impact noise insulation.
- 3. The lower the  $L'_{nT,w}$  rating the better the impact insulation.
- 4. The relation between Field Impact Insulation Class (FIIC) and Impact Insulation Class (IIC) can be described by the formula FIIC +  $5 \approx IIC$ .
- 5. The higher the IIC and FIIC the better the impact insulation.
- 6. The higher the AAAC Star Rating the better the impact insulation.
- 7. The information contained herein should not be reproduced except in full.

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8. The information provided in this report relates to acoustic matters only. Supplementary

advice should be sought for other matters relating to flooring installation, construction,

design, structural, fire-rating, waterproofing and the like.

9. Product installation details and methodologies must be sought from the product supplier,

installer or other experts. Koikas Acoustics is not liable for any product defects.

10. The acoustic ratings provided in this report are indicative of a 1 m<sup>2</sup> sample and should be

used for comparative purposes only. Acoustic ratings will vary depending on:

the testing environment/conditions,

- materials/structures of the existing ceiling/floor system,

- room volume,

- internal layout and

- workmanship.

Even with the same testing environment, acoustic ratings can vary from room to room and

between buildings as no two buildings are identical. A fully laid flooring system typically

presents a lower acoustical rating, i.e. up to 3 rating points less. For example, where the test

results are compared against a 1 m<sup>2</sup> sample flooring system resulting in L'<sub>nTw</sub> 40, the same

flooring laid from wall to wall could result in an acoustical rating of up to L'nTw 43 or more,

which is a reduction in the acoustical performance rating.

11. Floor covering must not make contact with any walls or joineries (kitchen benches,

cupboards etc). During the installation of any hard floor coverings, temporary spaces of

5~10mm should be used to isolate the floor covering from walls and/or joineries and the

resulting gaps should be filled with a suitable mastic type sealant or off-cut of underlay or

the equivalent where available. The acoustic integrity could be degraded if the above

precautions and treatments are not implemented. Refer to Figures 1 and 2 below for details

of the proper installation of flooring materials.

Certificate of Performance: Impact sound insulation – Homely Flooring – 6mm Hybrid Flooring



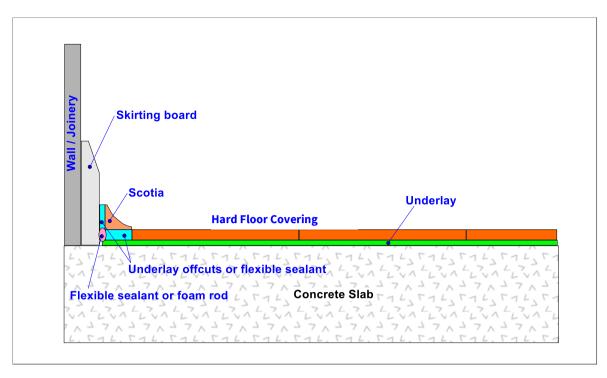


Figure 1. Wall / Joinery details (skirting board & scotia)

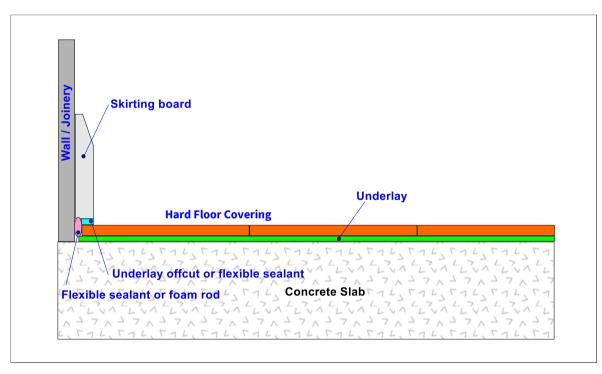


Figure 2. Wall / Joinery details (skirting board)

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5.0 CONCLUSION

Koikas Acoustics was requested by Homely Flooring to undertake impact noise tests of the various

flooring systems. The acoustic performances of various ceiling/floor configurations were calculated

and compared against the acoustic requirements of the current BCA and AAAC Star Ratings that are

commonly used in Australia.

The calculated acoustic rating of the tested flooring system is summarised and presented in

**Table 2** of this report. A detailed test certificate is provided in **Appendix A**.

The acoustic ratings provided in this report are indicative and should be used for comparative

purposes only. Acoustical ratings will vary depending on several factors:

• the testing environment/conditions

materials/structures of the existing ceiling/floor system,

room volume,

internal layout and

workmanship.

Even with the same testing environment/conditions, acoustic ratings would still vary from building

to building.

It is recommended that in-situ testing be conducted before any full fit-out as the sub-base

ceiling/floor system and the wall junctions could impact the noise transfer to the unit below.

This report should be reproduced in full including the attached Appendix.

Floor covering must not make contact with any walls or joineries (kitchen benches, cupboards etc).

During the installation of any hard floor coverings, temporary spaces of 5~10 mm should be used to

isolate the floor covering from walls and/or joineries and the resulting gaps should be filled with a

suitable mastic type sealant or off-cut of underlay or the equivalent where available. The acoustic

integrity could be degraded if the above precautions and treatments are not implemented.

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# APPENDIX A

APPENDIX

A

**APPENDIX** 

## FIELD MEASUREMENTS OF IMPACT SOUND INSULATION OF FLOORS

Date of Test : Monday, 10 October 2022

Project No.: 5568

Testing Company: **Koikas Acoustics** Checked by: Nick Koikas

Place of Test: Residential apartment in St Leonards

Client Homely Flooring Pty Ltd

Client Address

Thickness (mm) Density (SI) Description Homely Hybrid Flooring 6 Floor Concrete ----Suspended plasterboard ceiling System

Room Floor Length: 8.4 m Dimensions 33.6 m<sup>2</sup> Area: Sample Width: m Dimensions Length: m Area:  $m^2$ 

Width ·

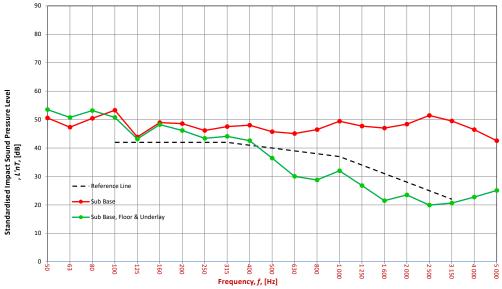
4

	Location	Width	Length	Area	Height	Volume
Receiver Rm	Residential unit - KDL	4	8.4	33.6	2.7	90.7

	Room Surfaces	
Walls	Floor	Ceiling
Plasterboard	Carpet/Tile	Plasterboard

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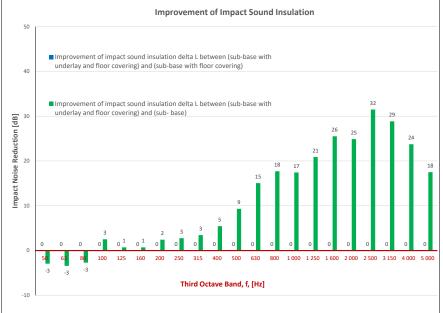
Frequency	L'nT (one-third octave) dB				
f Hz	Sub Base	Sub Base Floor	Sub Base Floor Underlay		
50 63 80 100 125 160 200	50.6 47.3 50.5 53.3 43.9 49.0	N/A N/A N/A N/A N/A N/A	53.5 50.8 53.2 50.8 43.2 48.3 46.2		
250	46.2	N/A	43.4		
315	47.5	N/A	44.1		
400	48.0	N/A	42.6		
500	45.7	N/A	36.4		
630	45.1	N/A	30.0		
800	46.5	N/A	28.8		
1 000	49.4	N/A	32.0		
1 250	47.7	N/A	26.8		
1 600	47.0	N/A	21.5		
2 000	48.4	N/A	23.5		
2 500	51.4	N/A	19.9		
3 150	49.5	N/A	20.6		
4 000	46.5	N/A	22.7		
5 000	42.6	N/A	25.1		



Sub Base							
L'nT,w	55	AS ISO 717.2 - 2004					
Ci	-10	AS ISO 717.2 - 2004					
Ci(50-2500)	-9	AS ISO 717.2 - 2004					
Ci(63-2000)	-10	AS ISO 717.2 - 2004					
AAAC ★	3 Star	AAAC Guidleline					
FIIC	50	ASTM E1007-14					







#### **Definitions of Noise Metrics**

Field Impact Insulation Class is a single-number rating of how well a floor system attenuates impact type sounds, such as footsteps. Calculated from third-octave band normalised impact sound pressure level data and referenced to 10 m<sup>2</sup> as described in ASTM E989. The higher the single-number rating, the better its impact insulation performance.

#### L'nT.w:

The Weighted Standardised Impact Sound Pressure Level when measured in situ referenced to a reverberation time (RT60) of 0.5 seconds. Used by the AAAC to determine their respective Star Rating.

#### Ci:

Spectrum adaption term is a low frequency correction factor. Typically for massive floors such as concrete, the values are about zero while for timber joist floors Ci is positive because of the low resonant frequencies. Considers frequency range between 100 -and 2500 Hz.

#### Ci(50-2500):

Same as above, but for the frequency range 50 -2500 Hz.

#### Ci(125-2000):

Same as above, but for the frequency range 125 -2000 Hz.

AAAC Star R.	2	3	4	5	6
L'nT,w	65	55	50	45	40
FIIC	45	55	60	65	70
Comments	Below BCA 62	Clearly Audible	Audible	Barely Inaudible	Normally Inaudible