

DEFINITIVE HYBRID FLOORING

Floor Impact Sound Insulation Testing

19 February 2019

Australian Hardwood Timber Flooring

MC844-01F01 Definitive Hybrid Flooring - Floor Impact Sound Insulation Testing (r2)

Document details

Detail	Reference
Doc reference:	MC844-01F01 Definitive Hybrid Flooring - Floor Impact Sound Insulation Testing (r2)
Prepared for:	Australian Hardwood Timber Flooring
Address:	103 / 91 Murphy Street, Richmond VIC 3121
Attention:	Tony Carroll

Document control

Date	Revision history	Non-issued revision	Issued revision	Prepared	Instructed	Authorised
14.02.2019	Draft	0		G.Rowe		
15.02.2019	Review		1	G.Rowe		O.Kostov
19.02.2019	Review		2	G.Rowe		G.Rowe

Important Disclaimer:

The work presented in this document was carried out in accordance with the Renzo Tonin & Associates Quality Assurance System, which is based on Australian Standard / NZS ISO 9001.

This document is issued subject to review and authorisation by the Team Leader noted by the initials printed in the last column above. If no initials appear, this document shall be considered as preliminary or draft only and no reliance shall be placed upon it other than for information to be verified later.

This document is prepared for the particular requirements of our Client referred to above in the 'Document details' which are based on a specific brief with limitations as agreed to with the Client. It is not intended for and should not be relied upon by a third party and no responsibility is undertaken to any third party without prior consent provided by Renzo Tonin & Associates. The information herein should not be reproduced, presented or reviewed except in full. Prior to passing on to a third party, the Client is to fully inform the third party of the specific brief and limitations associated with the commission.

In preparing this report, we have relied upon, and presumed accurate, any information (or confirmation of the absence thereof) provided by the Client and/or from other sources. Except as otherwise stated in the report, we have not attempted to verify the accuracy or completeness of any such information. If the information is subsequently determined to be false, inaccurate or incomplete then it is possible that our observations and conclusions as expressed in this report may change.

We have derived data in this report from information sourced from the Client (if any) and/or available in the public domain at the time or times outlined in this report. The passage of time, manifestation of latent conditions or impacts of future events may require further examination and re-evaluation of the data, findings, observations and conclusions expressed in this report.

We have prepared this report in accordance with the usual care and thoroughness of the consulting profession, for the sole purpose described above and by reference to applicable standards, guidelines, procedures and practices at the date of issue of this report. For the reasons outlined above, however, no other warranty or guarantee, whether expressed or implied, is made as to the data, observations and findings expressed in this report, to the extent permitted by law.

The information contained herein is for the purpose of acoustics 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 engineering including and not limited to structural integrity, fire rating, architectural buildability and fit-for-purpose, waterproofing and the like. Supplementary professional advice should be sought in respect of these issues.

Summary of Impact Sound Insulation Test Results

Renzo Tonin & Associates was engaged by Australian Hardwood Timber Flooring to conduct floor impact sound insulation testing of 'Definitive Hybrid Flooring.' The testing was conducted at 61-71 Wellington Street and 37-39 Langridge Street, Collingwood on the 11th February 2019.

Table 1 presents the test result in of the floor finish tested. Appendix A presents the test report and Appendix B presents the test methodology.

Table 1: Test result summary

Floor/ceiling construction summary	Test result	$L'_{nT,w} \leq 62$
1500x900mm sample of 6.5mm thick (including 1.5mm IXPE) 'Definitive Hybrid Flooring', floating over a 200mm concrete slab with no ceiling suspended from the slab soffit.	$L'_{nT,w}$ 49 dB	✓
1500x900mm sample of 6.5mm thick (including 1.5mm IXPE) 'Definitive Hybrid Flooring', floating over a 200mm, with 13mm standard plasterboard suspended from the slab soffit to form a 210mm ceiling void. No insulation present in the cavity.	$L'_{nT,w}$ 41 dB	✓

As such 'Definitive Hybrid Flooring' atop a typical floor/ceiling construction met the minimum requirement of $L'_{nT,w} \leq 62$, per National Construction Code F5.3.

APPENDIX A **Impact Sound Isulation Test Report**

Standardised impact sound pressure levels L'_{nT} , in accordance with ISO 16283-2 Field Measurements of impact sound insulation of floors using tapping machine			
Report reference:	MC844-01F01 Definitive Hybrid Flooring - Floor Impact Sound Insulation Testing (r2)		
Test reference:	MC844-01F01-01		
Test site address:	61-71 Wellington Street and 37-39 Langridge Street, Collingwood		
Client:	Australian Hardwood Timber Flooring	Date of test:	11 th February 2019
Source room:	3.14	Receiver room:	2.13
Understood construction:	<u>Floor finish in the source room:</u> • Nil (bare slab) <u>Existing substrate:</u> • 200mm concrete slab <u>Ceiling beneath in the receiving room:</u> • Nil		

Frequency f Hz	L'_{nT} 1/3 Octave dB
50	51.5
63	49.6
80	50.8 B
100	52.6
125	57.6
160	56.0
200	56.4
250	56.6
315	57.2
400	58.7
500	60.0
630	61.8
800	62.6
1000	64.2
1250	64.8
1600	65.4
2000	65.6
2500	66.6
3150	66.9
4000	66.5
5000	65.6

B: $L'_{nT} \leq$ value shown

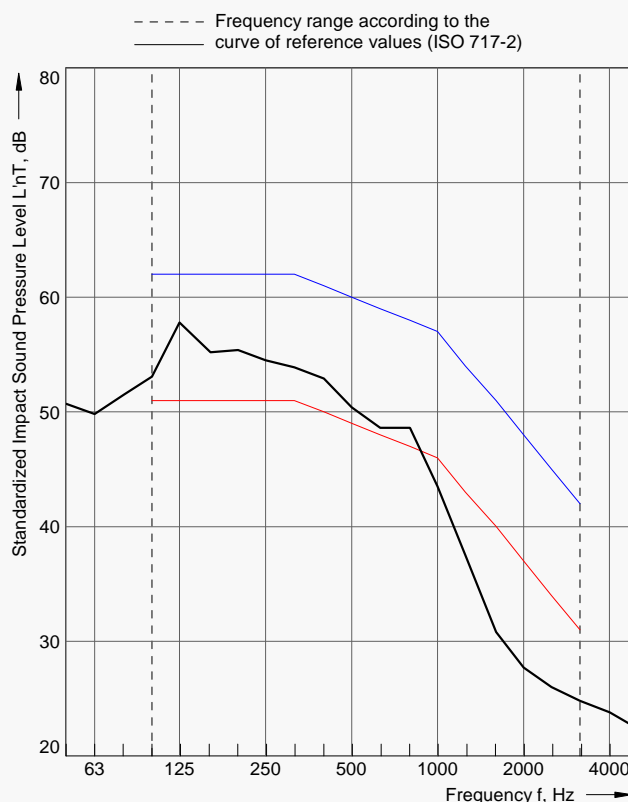
Rating according to ISO 717-2
 $L'_{nT,w}(C_i) = 72 (-13) \text{ dB}$ $C_{i,50-2500} = -13 \text{ dB}$
 Evaluation based on field measurement results obtained in one-third-octave bands by an engineering method

Note: Measurements conducted in accordance with ISO 16283-2:2018 'Acoustics – Field measurement of sound insulation in buildings and of building elements – Part 2: Impact sound insulation'; and AS/NZS ISO 717-2:2013 'Acoustics – Rating of sound insulation in buildings and of building elements – Part 2: Impact sound insulation'. Measurements and procedures documented in this report have been carried out in accordance with the Renzo Tonin & Associates Quality Assurance System. This quality system is based on AS/NZS ISO 9001:2016.

Standardised impact sound pressure levels L'_{nT} , in accordance with ISO 16283-2
Field Measurements of impact sound insulation of floors using tapping machine

Report reference:	MC844-01F01 Definitive Hybrid Flooring - Floor Impact Sound Insulation Testing (r2)		
Test reference:	MC844-01F01-02		
Test site address:	61-71 Wellington Street and 37-39 Langridge Street, Collingwood		
Client:	Australian Hardwood Timber Flooring	Date of test:	11 th February 2019
Source room:	3.14	Receiver room:	2.13
Understood construction:	<u>Floor finish in the source room:</u> <ul style="list-style-type: none"> 1500x900mm sample of 6.5mm thick (including 1.5mm IXPE) 'Definitive Hybrid Flooring', floating over 		
	<u>Existing substrate:</u> <ul style="list-style-type: none"> 200mm concrete slab 		
	<u>Ceiling beneath in the receiving room:</u> <ul style="list-style-type: none"> Nil 		

Frequency f Hz	L'_{nT} 1/3 Octave dB
50	50.7
63	49.8
80	51.5
100	53.1
125	57.8
160	55.2
200	55.4
250	54.5
315	53.9
400	52.9
500	50.4
630	48.6
800	48.6
1000	43.5
1250	37.5
1600	30.8
2000	27.7
2500	26.0
3150	24.8
4000	23.8
5000	22.4



Rating according to ISO 717-2

$$L'_{nT,w}(C_i) = 49 (0) \text{ dB}$$

$$C_{i,50-2500} = 1 \text{ dB}$$

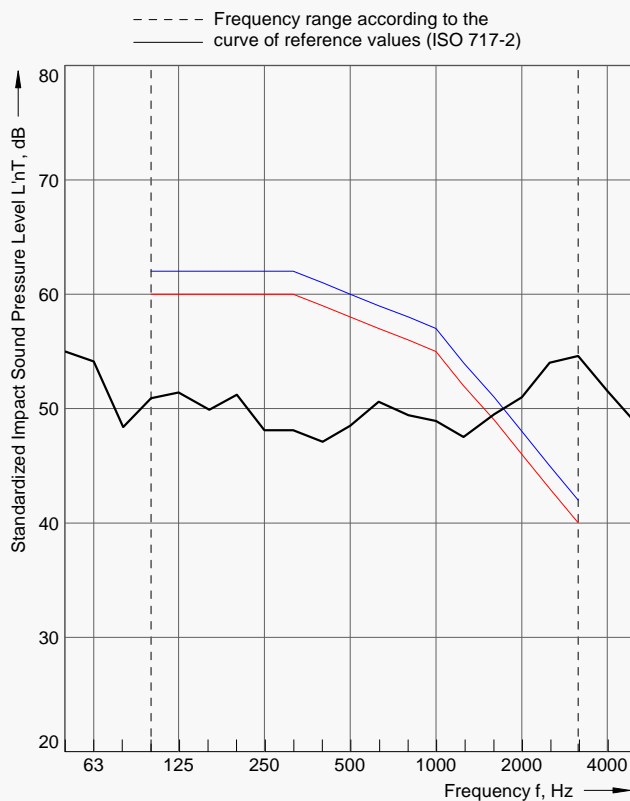
Evaluation based on field measurement results obtained in one-third-octave bands by an engineering method

Note: Measurements conducted in accordance with ISO 16283-2:2018 'Acoustics – Field measurement of sound insulation in buildings and of building elements – Part 2: Impact sound insulation'; and AS/NZS ISO 717-2:2013 'Acoustics – Rating of sound insulation in buildings and of building elements – Part 2: Impact sound insulation'. Measurements and procedures documented in this report have been carried out in accordance with the Renzo Tonin & Associates Quality Assurance System. This quality system is based on AS/NZS ISO 9001:2016.

Standardised impact sound pressure levels L'_{nT} , in accordance with ISO 16283-2
Field Measurements of impact sound insulation of floors using tapping machine

Report reference:	MC844-01F01 Definitive Hybrid Flooring - Floor Impact Sound Insulation Testing (r2)		
Test reference:	MC844-01F01-03		
Test site address:	61-71 Wellington Street and 37-39 Langridge Street, Collingwood		
Client:	Australian Hardwood Timber Flooring	Date of test:	11 th February 2019
Source room:	2.03	Receiver room:	1.03
Understood construction:	<u>Floor finish in the source room:</u> <ul style="list-style-type: none"> • Nil (bare slab) 		
	<u>Existing substrate:</u> <ul style="list-style-type: none"> • 200mm concrete slab, with 		
	<u>Ceiling beneath in the receiving room:</u> <ul style="list-style-type: none"> • 13mm standard plasterboard ceiling suspended from the slab soffit to form a 210mm ceiling void. No insulation present in the cavity. 		

Frequency f Hz	L'_{nT} 1/3 Octave dB
50	55.0
63	54.1
80	48.4
100	50.9
125	51.4
160	49.9
200	51.2
250	48.1
315	48.1
400	47.1
500	48.5
630	50.6
800	49.4
1000	48.9
1250	47.5
1600	49.5
2000	51.0
2500	54.0
3150	54.6
4000	51.5
5000	48.8



Rating according to ISO 717-2

$L'_{nT,w}(C_i) = 58 (-11)$ dB

$C_{i,50-2500} = -10$ dB

Evaluation based on field measurement results obtained in one-third-octave bands by an engineering method

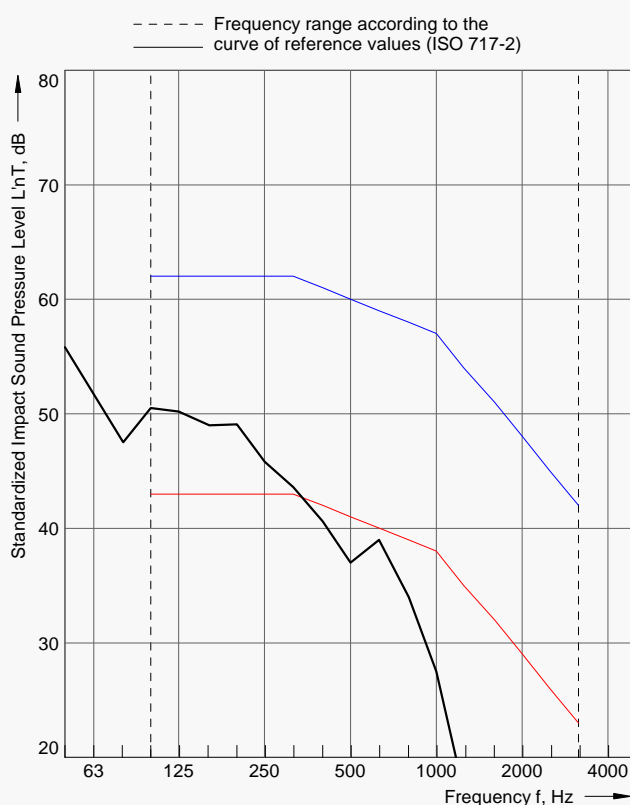
Note: Measurements conducted in accordance with ISO 16283-2:2018 'Acoustics – Field measurement of sound insulation in buildings and of building elements – Part 2: Impact sound insulation'; and AS/NZS ISO 717-2:2013 'Acoustics – Rating of sound insulation in buildings and of building elements – Part 2: Impact sound insulation'. Measurements and procedures documented in this report have been carried out in accordance with the Renzo Tonin & Associates Quality Assurance System. This quality system is based on AS/NZS ISO 9001:2016.

Standardised impact sound pressure levels L'nT, in accordance with ISO 16283-2
Field Measurements of impact sound insulation of floors using tapping machine

Report reference:	MC844-01F01 Definitive Hybrid Flooring - Floor Impact Sound Insulation Testing (r2)		
Test reference:	MC844-01F01-04		
Test site address:	61-71 Wellington Street and 37-39 Langridge Street, Collingwood		
Client:	Australian Hardwood Timber Flooring	Date of test:	11 th February 2019
Source room:	2.03	Receiver room:	1.03
Understood construction:	<p><u>Floor finish in the source room:</u></p> <ul style="list-style-type: none"> 1500x900mm sample of 6.5mm thick (including 1.5mm IXPE) 'Definitive Hybrid Flooring', floating over <p><u>Existing substrate:</u></p> <ul style="list-style-type: none"> 200mm concrete slab <p><u>Ceiling beneath in the receiving room:</u></p> <ul style="list-style-type: none"> 13mm standard plasterboard ceiling suspended from the slab soffit to form a 210mm ceiling void. No insulation present in the cavity. 		

Frequency f Hz	L'nT 1/3 Octave dB
50	55.8
63	51.7
80	47.5
100	50.5
125	50.2
160	49.0
200	49.1
250	45.8
315	43.6
400	40.6
500	37.0
630	39.0
800	34.0
1000	27.5
1250	17.0 B
1600	13.1 B
2000	12.2 B
2500	10.7 B
3150	9.4 B
4000	8.4 B
5000	8.4 B

B: L'nT ≤ value shown



Rating according to ISO 717-2

$$L'_{nT,w}(C_i) = 41 (1) \text{ dB}$$

$$C_{i,50-2500} = 4 \text{ dB}$$

Evaluation based on field measurement results obtained in one-third-octave bands by an engineering method

Note: Measurements conducted in accordance with ISO 16283-2:2018 'Acoustics – Field measurement of sound insulation in buildings and of building elements – Part 2: Impact sound insulation'; and AS/NZS ISO 717-2:2013 'Acoustics – Rating of sound insulation in buildings and of building elements – Part 2: Impact sound insulation'. Measurements and procedures documented in this report have been carried out in accordance with the Renzo Tonin & Associates Quality Assurance System. This quality system is based on AS/NZS ISO 9001:2016.

APPENDIX B Impact Sound Insulation Test Methodology

B.1 Introduction

This report provides results of sound transmission loss tests conducted in general accordance with the following Australian and International Standards:

- ISO 16283-2:2018 'Acoustics – Field measurement of sound insulation in buildings and of building elements – Part 2: Impact sound insulation'
- ISO 717-2:2013 'Acoustics – Rating of sound insulation in buildings 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'

B.2 Test Procedure

The test procedure has been carried out in general accordance with ISO 16283-2:2018 as follows:

The field measurement of impact sound insulation of building partitions was conducted in one-third octave bands. The values for impact sound insulation, which are frequency dependent, have been calculated at all frequencies of measurement to provide the L'_{nT} (standardised impact sound pressure level). The one-third octave L'_{nT} values were converted into a single number quantity $L'_{nT,w}$ (weighted standardised impact sound pressure level), in accordance with the procedure defined in ISO 717-2:2013.

The standardised impact sound pressure level is defined in ISO 16283-2:2018, equation (1).

$$L'_{nT} = L_i - 10 \lg \frac{T}{T_0}$$

Where:

- L_i = the average sound pressure level in the receiving room, in decibels
- T = the reverberation time in the receiving room
- T_0 = the reference reverberation time, for dwellings, $T_0 = 0.5s$

A tapping machine was placed in four (4) different positions randomly distributed on the floor (sample) in general accordance with Standards indicated above.

Whilst this tapping machine was operating, noise levels were recorded at four (4) locations in the receiver room with the average time of 10 seconds at each position, for each tapping machine position using a Bruel & Kjaer 2250 sound level meter. The measured noise level was filtered simultaneously in all one-third octave frequency bands in real time. These values were recorded and subsequently statistically analysed to determine the average sound pressure levels for each room and to indicate the precision of the measurements.

The average sound pressure level was obtained by using a Bruel & Kjaer Type 2250 Investigator Sound Level Meter. The Sound Level Meter has current NATA certification and was checked before and after the measurement for calibration using a Bruel and Kjaer Type 4231 Calibrator. The sound level meter is classified as a Class 1 instrument as defined in *AS IEC 61672.1 'Electroacoustics - Sound Level Meters'*. No significant drift in calibration was noted.

The reverberation time in the receiving room was measured using impulse response method (balloon burst) in accordance to ISO 3382-2:2008. Six (6) microphone and impulse source positions were used for the reverberation time calculation, with one decay measured for each position.

The Weighted Standardised Impact Sound Pressure Level $L'_{nT,w}$ and Spectrum Adaptation Term C_1 were calculated in accordance with ISO 717-2:2013.

B.3 Flanking Transmission

Flanking sound transmission was not corrected for.

B.4 Test Signals and Frequencies

The range of frequencies tested was from 50Hz - 5000Hz.