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Impact Sound Insulation Measurement

Airstep Flooring Pty Ltd
'Eucalyptus Steps XL' Flooring with 'AcoustiStep' Underlay

REPORT No
6913-2.1R

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Prepared For:

Airstep Flooring Pty Ltd
20 South Gippsland Highway
Dandenong South VIC 3175

Attention: Mr James Ross



Impact Sound Insulation Measurement**Revision History**

Status	Date	Prepared	Checked	Comment
Final	25/02/2020	Ricky Thom	Stephen Gauld	

Document 6913-2.1R, 10 pages plus attachments

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Impact Sound Insulation Measurement

1.0 CONSULTING BRIEF

Day Design was commissioned by Airstep Flooring Pty Ltd to measure the impact sound insulation of a flooring system incorporating their 3 mm 'AcoustiStep' reconstituted rubber underlay product installed beneath their 12 mm 'Eucalyptus Steps XL' timber laminate flooring product.

The measurements were conducted on site in accordance with Australian Standard AS/NZS ISO 140.7:2006 "*Acoustics – Measurements of sound insulation in buildings and of building elements – Part 7: Field measurements of impact sound insulation of floors*".

The test specimen was rated in accordance with AS ISO 717.2:2004 "*Acoustics – Rating of sound insulation in buildings and of building elements – Part 2: Impact sound insulation*".

2.0 TESTING SPECIFICATIONS

Location:	Concrete slab floor between Unit 18 and Unit 11 of 808 Forest Road, Peakhurst
Base Floor Construction:	270 mm thick concrete slab 35 mm furring channel No insulation within cavity 10 mm standard plasterboard
Receiving Room Dimensions:	Unit 11, 808 Forest Road, Peakhurst Room Shape: Rectangular Length: 12.3 m Width: 5.6 m Height: 2.7 m
Test Sample:	3 mm 'AcoustiStep' rubber underlay; laid beneath 12 mm 'Eucalyptus Steps XL' timber laminate floorboards
Sample size:	'AcoustiStep' – 1,700 mm x 1,000 mm x 3 mm 'Eucalyptus Steps XL' – 2,290 mm x 203 mm x 12 mm (4 planks)
Test date:	Thursday 20 February 2020



Impact Sound Insulation Measurement

3.0 MEASUREMENT PROCEDURE

The impact sound insulation of a floor/ceiling system is determined by using a standard tapping machine¹ on the floor to generate impact noise and measuring the level of impact noise in the receiving room below.

The tapping machine is placed in 4 orientations as shown in Figure 1 below.

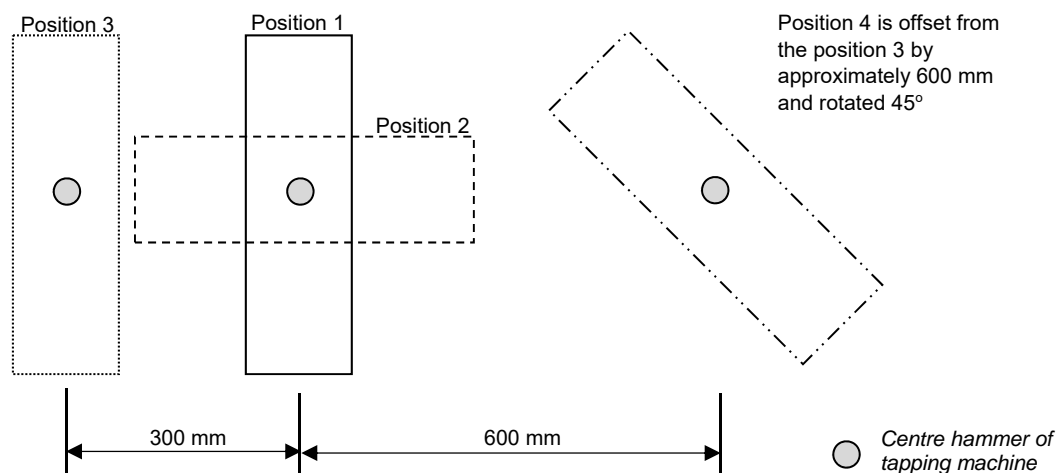


Figure 1. Tapping machine test orientations

Impact noise levels in the receiving room are measured using the microphone sweep method for a period of 30 seconds per tapping machine orientation.

A background noise level measurement is carried out to account for any noise contributions from the environment and to apply appropriate corrections if required.

Reverberation time measurements are carried out in the receiving room. The reverberation time, T_{60} , is the time it takes for a noise source to decay by 60 dB after the stimuli is switched off. A “live” room, such as a reverberation room which consists of only hard surfaces, will typically have a long reverberation time. A “dead” room, such as an anechoic chamber, which consists of highly absorptive surfaces, will have a much shorter reverberation time.

Measurement of the reverberation time in the receiving room allows the measured sound insulation to be adjusted to account for the sound energy absorbed by the room.

Impact sound insulation measurements were carried out for the base floor and the base floor with the test sample to determine the improvement the test sample had on the existing floor/ceiling system.

¹ Brüel and Kjær Tapping Machine Type 3207



Impact Sound Insulation Measurement

4.0 IMPACT SOUND INSULATION DESCRIPTORS**4.1 Australian / ISO Standard**

The impact sound insulation performance of a system is denoted by a single value descriptor, the weighted impact sound insulation $L_{n,w}$ (for laboratory tested rating) or $L'_{nT,w}$ (for field tested rating). The single value descriptor allows for easy comparisons between different systems. The lower the number, the better the impact sound insulation performance.

The rating of the system is determined by comparing the measured noise levels in the receiving room against a set of reference values between one-third-octave band centre frequency ranges of 100 Hz to 3,150 Hz, as specified in AS/NZS ISO 717.2:2004.

4.2 Estimation of ΔL_w

The measurement procedure used to determine the reduction of transmitted impact noise is specified in AS/ISO 140.8: *Acoustics – Measurement of sound insulation in buildings and of building elements – part 8: Laboratory measurements of the reduction of transmitted impact noise by floor coverings on a heavyweight standard floor*. The impact noise reduction ΔL_w therefore cannot be calculated according to the standard, using field measurements.

However, we have calculated the reduction in impact sound pressure level (ΔL) and the weighted reduction of impact sound pressure level (ΔL_w) for this field measurement using the same method recommended for laboratory measurements in AS/ISO 140.8 and AS/ISO 717.2 and therefore is indicative only.



Impact Sound Insulation Measurement**5.0 TEST SAMPLE DESCRIPTION AND RESULTS**

The base floor (see Section 2.0) was tested to establish a reference performance of the floor/ceiling system from which the proposed test sample will be compared to. Measurements of the base floor and the test sample can be seen in Table 1.

The test sample of 12 mm 'Eucalyptus Steps XL' timber laminate flooring atop 3 mm 'AcoustiStep' rubber underlay was installed on top of the base concrete floor, as shown in Figure 2.

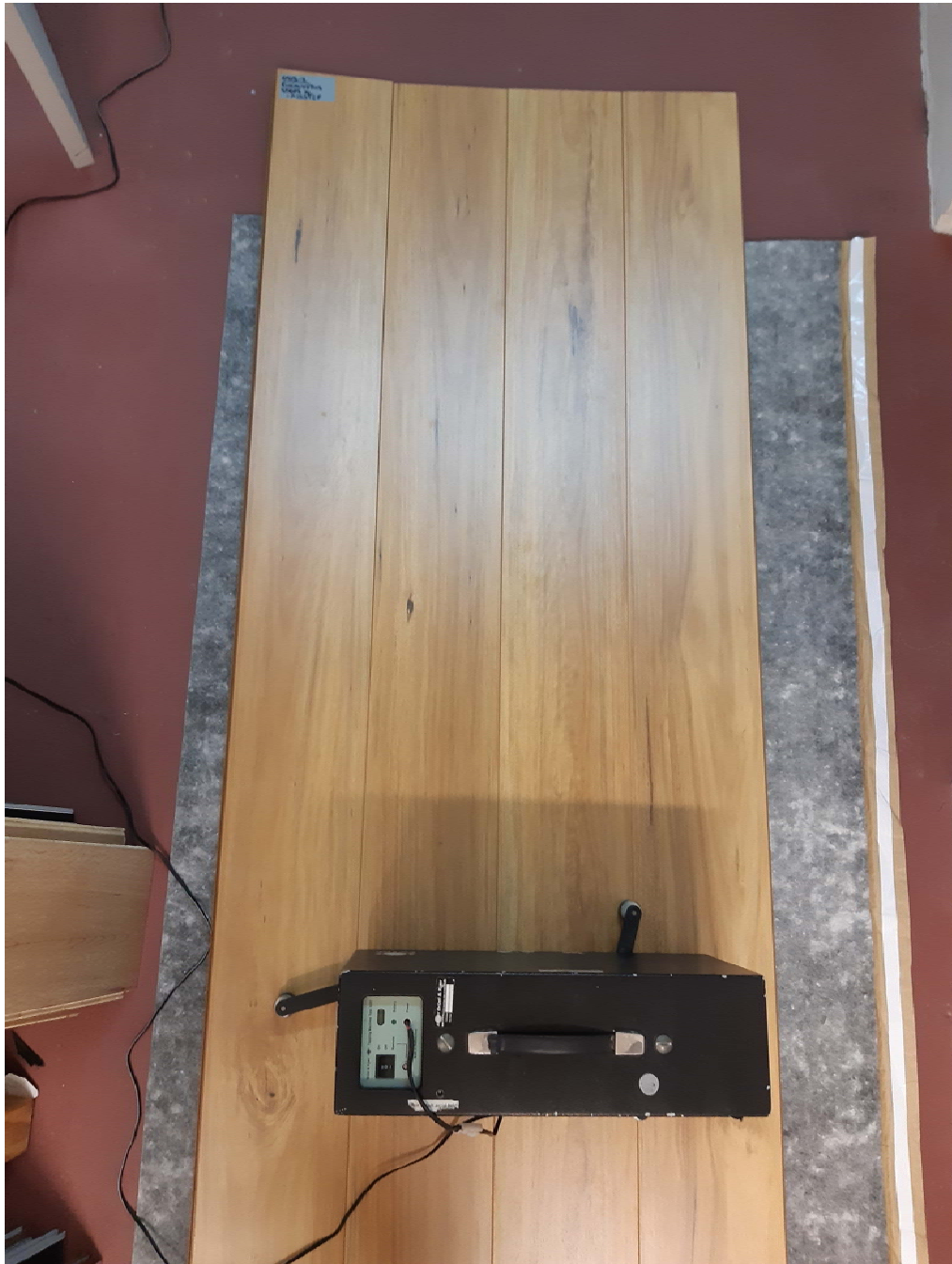


Figure 2. 12 mm 'Eucalyptus Steps XL' timber laminate flooring product with 3 mm 'AcoustiStep' rubber underlay on top of base floor



Impact Sound Insulation Measurement

The measured impact sound pressure levels (rounded to the nearest one-tenth decibel) are tabulated for each one-third-octave band measured and are presented below in Table 1.

Table 1 Measured Impact Sound Pressure Levels- 12 mm 'Eucalyptus Steps XL' with 3 mm 'AcoustiStep' Underlay

1/3 Octave Band Centre Frequency (Hz)	Standardised Impact Sound Pressure Level L'_{nT} (dB)		ΔL (dB)
	Base Floor	Test Sample	Test Sample
100	53.6	51.1	2.5
125	56.8	55.0	1.8
160	58.3	56.1	2.2
200	59.1	57.6	1.5
250	56.6	56.0	0.6
315	55.4	54.5	0.9
400	56.1	56.0	0.1
500	57.2	54.7	2.6
630	58.1	49.2	8.9
800	58.0	42.1	15.9
1000	58.9	38.5	20.4
1250	59.7	33.6	26.1
1600	59.2	30.1	29.1
2000	58.8	27.1	31.8
2500	57.5	25.0	32.5
3150	60.4	22.5	37.9
4000	62.3	20.1	42.2
5000	58.7	17.1	41.6
	$L'_{nT,w} = 65$	$L'_{nT,w} = 50$	$\Delta L_w = 16$ dB

The test certificates for both the base concrete floor and the test sample are presented in **Appendix B** as 6913-2.1R A001 and 6913-2.1R A002 respectively.



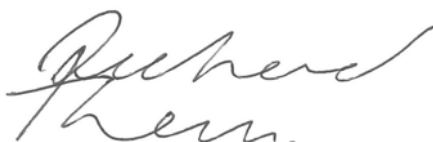
Impact Sound Insulation Measurement

6.0 STATEMENT OF EFFECT

Day Design was commissioned by Airstep Flooring Pty Ltd to measure the impact sound insulation of a flooring system incorporating their 12 mm 'Eucalyptus Step XL' timber laminate flooring product, installed on top of their 3 mm 'AcoustiStep' reconstituted rubber underlay product.

The floor/ceiling system consisting of 12 mm 'Eucalyptus Step XL' timber laminate flooring product laid atop the 3 mm 'AcoustiStep' rubber underlay, installed on top of the base floor construction consisting of a 270 mm thick concrete slab, achieved a weighted standardized impact sound insulation rating of $L'_{nT,w}$ 50 and a weighted impact sound improvement index of ΔL_w 16 dB.

Test measurements and calculations were conducted by the undersigned.



Ricky Thom, BA, BE(Hons)(Mech)

Acoustical Engineer

for and on behalf of Day Design Pty Ltd

AAAC MEMBERSHIP

Day Design Pty Ltd is a member company of the Association of Australasian Acoustical Consultants, and the work herein reported has been performed in accordance with the terms of membership.

Attachments:

Appendix A – Instrumentation List

Appendix B – Impact Sound Insulation Performance Certificates



APPENDIX A

INSTRUMENTATION LIST

Description	Model No	Serial No
Modular Precision Sound Analyser	B&K 2270	2644584
Condenser Microphone 0.5" diameter	B&K 4189	2638722
Acoustical Calibrator	B&K 4231	3021796
Tapping Machine	B&K 3207	2439141

All acoustic instrument systems have been laboratory calibrated using instrumentation traceable to Australian National Standards and certified within the last two years thus conforming to Australian Standards. The acoustic measurement system was also calibrated prior to and after the noise level measurements. Calibration drift was found to be less than 0.5 dB during the measurements.

No adjustments for instrument drift during the measurement period were warranted.



BARE SLAB

IMPACT SOUND INSULATION TEST CERTIFICATE

6913-2.1R A001

Client:

Airstep Flooring Pty Ltd

Test Specimen:

Bare Slab

Building Construction

270 mm concrete slab
35 mm furring channel
No Insulation
10 mm standard plasterboard

Australian Standards:

Measured according to AS/NZS ISO 140.7:2006
Rated to AS ISO 717.2:2004

Test Specimen Dimensions:

N/A

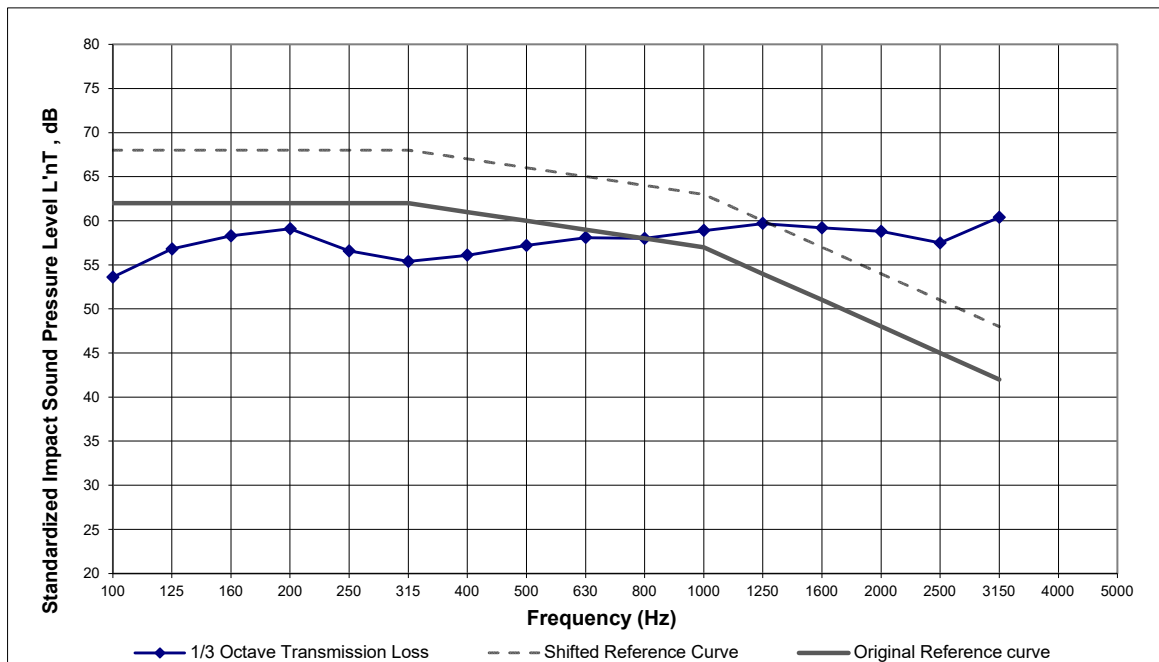
Test Location:

Unit 18 to Unit 11 below
Day Design Pty Ltd
Suite 17, 808 Forest Road, Peakhurst, NSW

Instrumentation:

Brüel and Kjær Sound Level Meter type 2270
Brüel and Kjær Microphone type 4189
Brüel and Kjær Acoustical Calibrator type 4231
Brüel and Kjær Tapping Machine type 3207

Frequency - Hz	L'nT 1/3 Octave dB
100	53.6
125	56.8
160	58.3
200	59.1
250	56.6
315	55.4
400	56.1
500	57.2
630	58.1
800	58.0
1000	58.9
1250	59.7
1600	59.2
2000	58.8
2500	57.5
3150	60.4
4000	62.3
5000	58.7
L'nT,w	65



Date of Test: Thursday, 20 February 2020

Test Engineer:

Project Number: 6913-2.1 A001

For and on behalf of Day Design Pty Ltd



**TIMBER LAMINATE
FLOORING SYSTEM**
**IMPACT SOUND INSULATION
TEST CERTIFICATE**

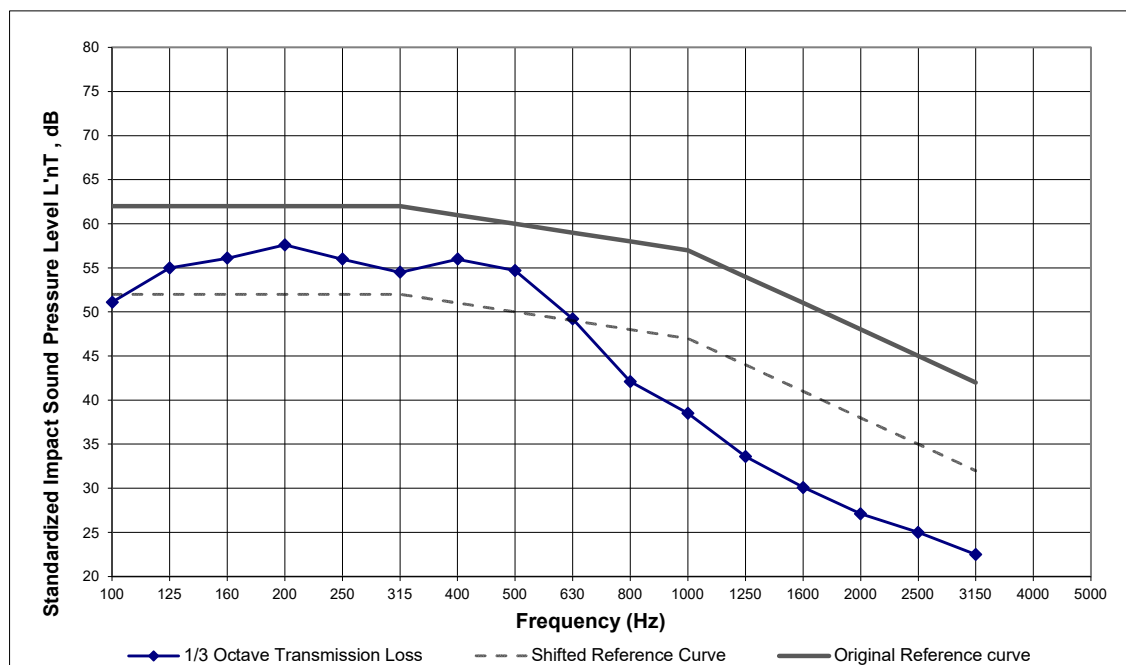
6913-2.1R A002

Client:

Airstep Flooring Pty Ltd

Test Specimen:
**12 mm 'Eucalyptus Steps XL' Timber Laminate
with 3 mm 'AcoustiStep' underlay**
Building Construction
 12 mm 'Eucalyptus Steps XL' Timber Laminate Flooring
 3 mm 'AcoustiStep' underlay
 270 mm concrete slab
 35 mm furring channel
 No Insulation
 10 mm standard plasterboard
Australian Standards:
 Measured according to AS/NZS ISO 140.7:2006
 Rated to AS ISO 717.2:2004
Test Specimen Dimensions:
 'Eucalyptus Steps XL' 2.29 m (L) x 0.203 m (W)
 'AcoustiStep Underlay' 1.70 m (L) x 1.00 m (W)
Test Location:
 Unit 18 to Unit 11 below
 Day Design Pty Ltd
 Suite 17, 808 Forest Road, Peakhurst, NSW
Instrumentation:
 Brüel and Kjær Sound Level Meter type 2270
 Brüel and Kjær Microphone type 4189
 Brüel and Kjær Acoustical Calibrator type 4231
 Brüel and Kjær Tapping Machine type 3207

Frequency - Hz	L'nT 1/3 Octave dB
100	51.1
125	55.0
160	56.1
200	57.6
250	56.0
315	54.5
400	56.0
500	54.7
630	49.2
800	42.1
1000	38.5
1250	33.6
1600	30.1
2000	27.1
2500	25.0
3150	22.5
4000	20.1
5000	17.1
L'nT,w	50



Date of Test: Thursday, 20 February 2020

Test Engineer:

Project Number: 6913-2.1R A002

For and on behalf of Day Design Pty Ltd

