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Acoustic Opinion

LVT Ultimate Flooring Systems

REPORT No
6577-1.1R

DATE ISSUED
10 September 2018

Prepared For:
Tarkett Australia Pty Ltd
3 Columbia Court
Baulkham Hills NSW 2153

Attention: Mr Reza Karani

Revision History

Report	Date	Prepared	Checked	Comment
Draft	04/09/2018	Stephen Gauld	William Wang	By email, for client review
Final	10/09/2018	Stephen Gauld	William Wang	

Document R\6577-1.1r, 9 pages plus attachments

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1.0 CONSULTING BRIEF

Day Design Pty Ltd was engaged by Tarkett Australia Pty Ltd to provide Acoustic Opinions on the $L'_{nT,w}$ ratings for a range of their LVT Ultimate Flooring systems. The objective is to provide acoustical data useful to building designers for inclusion in Tarkett technical publications.

Scope of Work:

- Review the results of floor systems tested on site at Peakhurst.
- Model plasterboard structures using acoustic modelling software.
- Compare the $L'_{nT,w}$ predictions with test results.
- Provide Acoustic Opinions on the $L'_{nT,w}$ ratings for a range of Flooring systems.
- Prepare an Acoustical Opinion Report.

2.0 PREDICTION OF $L'_{nT,w}$

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 of impact noise levels 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 against a set of reference values between one-third-octave band centre frequency ranges of 100 Hz to 3150 Hz, as specified in AS/NZS ISO 717.2:2004.

The Acoustic Opinions expressed in this report are based firstly on calculations made using Insul software and secondly by comparison with Impact Sound Insulation tests for similar constructions. Acoustic opinions are then provided in the light of our general acoustic experience. Factors taken into account in our calculations include: the surface mass of the plasterboard, cavity depth, Young's Modulus, the critical frequency and speed of sound in wall lining materials, the effect of air cavities and acoustic insulation between furring channels.

We are of the opinion that using Insul modelling software and making corrections based on comparison with test results, is that our prediction accuracy is in the order of ± 2 dB.

Because of the complexity of such calculations, approved laboratory test results (in accordance with Australian Standard ISO 140.7:2006 and ISO 717.2:2004) are always preferred.

3.0 MATERIALS USED FOR SOUND REDUCTION

3.1 Plasterboard Ceilings

This schedule of $L'_{nT,w}$ ratings includes various ceiling constructions from plasterboard. The density of the plasterboard used in the testing and in this report is shown in Table 1 below.

Table 1 Material Densities

Product Name	Thickness (mm)	Bulk Density (kg/m^3)
Standard plasterboard	10	590
Standard plasterboard	13	808

3.2 Insulation

Acoustic insulation specified is Glasswool insulation with bulk density as follows:

Table 2 Insulation Densities

Product Name	Thickness (mm)	Bulk Density (kg/m^3)
Glasswool R1.1	35 mm	11

3.3 Furring Channels

Furring channels nominated in this report are 28 mm deep and 38 mm wide as offered by a number of manufacturers.

Deeper furring channels or other fixing structures that provide a greater cavity will provide equal or better impact sound insulation.

4.0 ACOUSTIC OPINIONS

Tarkett has developed a range of floor and ceiling systems that include options for 4 different concrete slab thicknesses and 4 different ceiling configurations. Several systems were tested in a dedicated site testing facility at Day Design's office in Peakhurst, NSW. The acoustic opinions below are based on these comparable tests, Insul software as well as our own experience.

4.1 System #1

LVT Ultimate Flooring
Concrete slab, as per table below
No ceiling or insulation

System	Ceiling Lining	Concrete thickness, mm	Insulation	$L'_{nT,w}$
#1	No Ceiling	120	Nil	58
		150	Nil	57
		180	Nil	55
		200	Nil	54
		230	Nil	53*

* Tested on site – 24/8/2018 (ref: A007)

4.2 System #2

LVT Ultimate Flooring
Concrete slab, as per table below
Insulation R1.1 Glasswool, thickness as per table below
1 layer of 10 mm plasterboard on 28 mm furring channels

System	Ceiling Lining	Concrete thickness, mm	Insulation	$L'_{nT,w}$
#2	1 layer of 10 mm Plasterboard	120	35 mm	54
		150	35 mm	52
		180	35 mm	51
		200	35 mm	51
		230	35 mm	50

4.3 System #3

LVT Ultimate Flooring
Concrete slab, as per table below
Insulation R1.1 Glasswool, thickness as per table below
1 layer of 13 mm plasterboard on 28 mm furring channels

System	Ceiling Lining	Concrete thickness, mm	Insulation	$L'_{nT,w}$
#3	1 layer of 13 mm Plasterboard	120	35 mm	53
		150	35 mm	52
		180	35 mm	50
		200	35 mm	50
		230	35 mm	49*

* Tested on site – 23/8/2018 (ref: A003)

4.4 System #4

LVT Ultimate Flooring
Concrete slab, as per table below
Insulation R1.1 Glasswool, thickness as per table below
2 layers of 13 mm plasterboard on 28 mm furring channels

System	Ceiling Lining	Concrete thickness, mm	Insulation	$L'_{nT,w}$
#4	2 layers of 13 mm Plasterboard	120	35 mm	53
		150	35 mm	51
		180	35 mm	50
		200	35 mm	50
		230	35 mm	49*

* Tested on site – 23/8/2018 (ref: A006)

5.0 STATEMENT OF ACOUSTIC OPINION

We are confident that provided the floor systems are built of the materials specified in a workmanlike manner in accordance with the manufacturer's instructions, they will provide the impact sound insulation ratings listed in the Acoustic Opinions section of this report.

Stephen Gauld, BE(Mech), MEngSc (Noise and Vibration), MIEAust, MAAS

Principal Acoustical Consultant

for and on behalf of Day Design Pty Ltd

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

Appendices

- A007 – Test System #1, 230 mm concrete
- A003 – Test System #3, 230 mm concrete
- A006 – Test System #4, 230 mm concrete

Standardized Impact Sound Pressure Level according to ISO 140-7

Field measurements of impact sound insulation of floors

Client: Tarkett Australia Pty Ltd

Date of test: 24/08/18

Description and identification of the building construction and test arrangement:

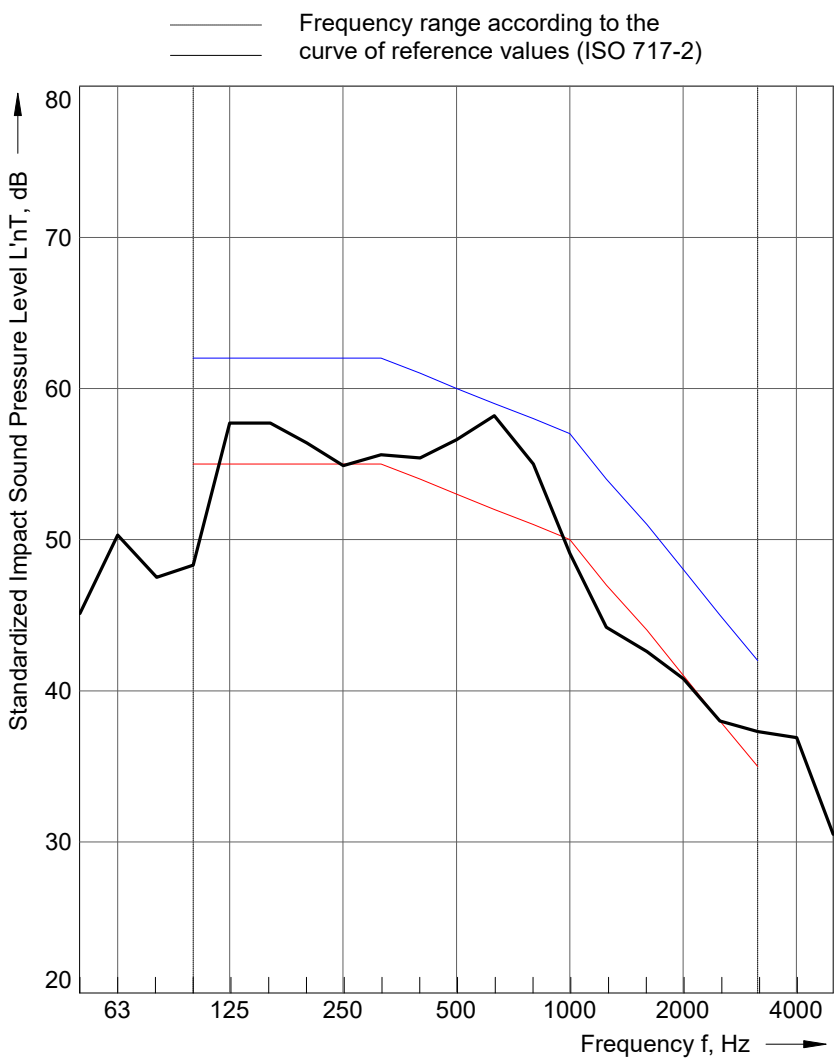
Floor impact test from Day Design to Unit below.

Construction consisting of:
Tarkett Starfloor click ultimate luxury vinyl tiles, timber floorboards;
230 mm Concrete Slab
No Insulation
No Ceiling

Receiving room volume V: 46.00 m³

Frequency f Hz	L'nT 1/3 Octave dB
50	45.1 B
63	50.3
80	47.5
100	48.3
125	57.7
160	57.7
200	56.4
250	54.9
315	55.6
400	55.4
500	56.6
630	58.2
800	55.0
1000	49.1
1250	44.2
1600	42.6
2000	40.8
2500	38.0
3150	37.3
4000	36.9
5000	30.5

B: L'nT =< value shown



Rating according to ISO 717-2

$L'_{nT,w}(C_i)$ = 53 (-2) dB $C_{i,50\text{-}2500}$ = -1 dB

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

No. of test report: 6577-1 A007

Name of test institute:

Date: 24/08/18

Signature:

Standardized Impact Sound Pressure Level according to ISO 140-7

Field measurements of impact sound insulation of floors

Client: Tarkett Australia Pty Ltd

Date of test: 23/08/18

Description and identification of the building construction and test arrangement:

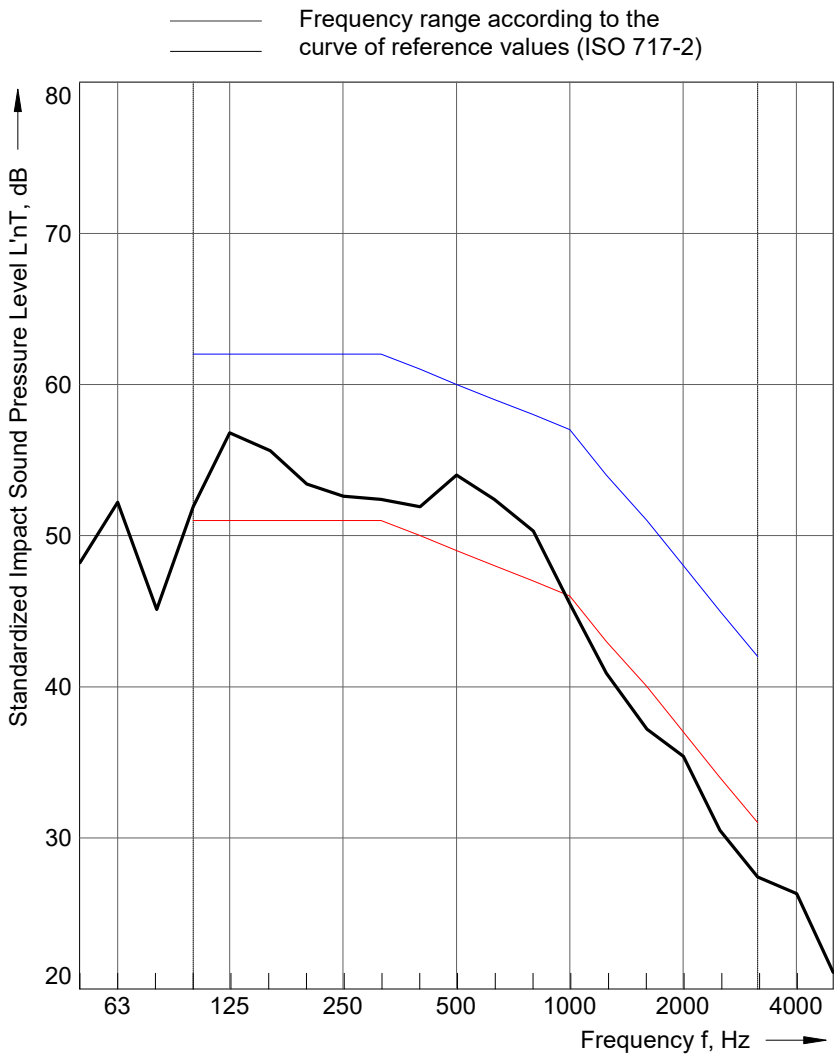
Floor impact test from Day Design to Unit below.

Construction consisting of:
Tarkett Starfloor click ultimate luxury vinyl tiles, timber floorboards
230 mm Concrete Slab
35 mm Glasswool Insulation (Density 11kg/m3)
13 mm plasterboard ceiling on 28 mm furring channel

Receiving room volume V: 46.00 m³

Frequency f Hz	L'nT 1/3 Octave dB
50	48.2 B
63	52.2 B
80	45.1 B
100	51.9
125	56.8
160	55.6
200	53.4
250	52.6
315	52.4
400	51.9
500	54.0
630	52.4
800	50.3
1000	45.5
1250	40.9
1600	37.2
2000	35.4
2500	30.5
3150	27.4
4000	26.3
5000	21.1

B: L'nT =< value shown



Rating according to ISO 717-2

$L'_{nT,w}(C_i)$ = 49 (0) dB $C_{i,50\text{-}2500}$ = 0 dB

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

No. of test report: 6577-1 A003

Name of test institute:

Date: 24/08/18

Signature:

Standardized Impact Sound Pressure Level according to ISO 140-7

Field measurements of impact sound insulation of floors

Client: Tarkett Australia Pty Ltd

Date of test: 23/08/18

Description and identification of the building construction and test arrangement:

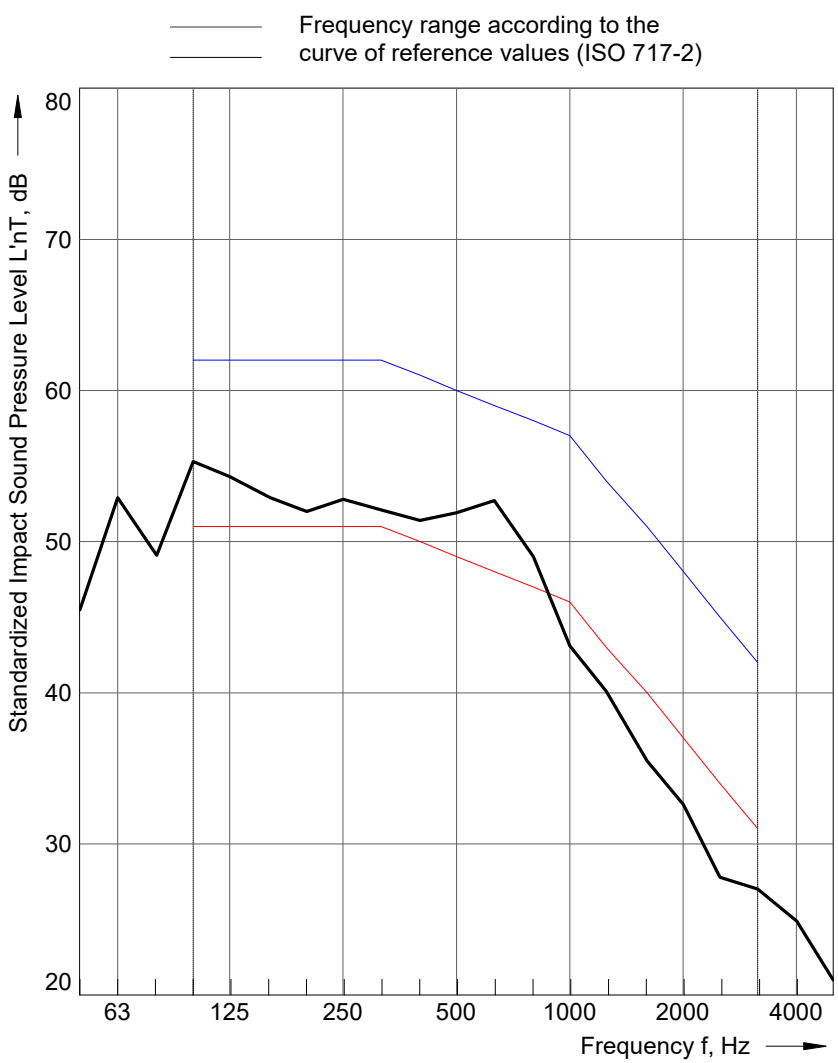
Floor impact test from Day Design to Unit below.

Construction consisting of:
Tarkett Starfloor click ultimate luxury vinyl tiles, timber floorboards;
230 mm Concrete Slab
35 mm Glasswool Insulation (Density 11kg/m3)
2 x 13 mm plasterboard ceiling on 28 mm furring channel

Receiving room volume V: 46.00 m³

Frequency f Hz	L'nT 1/3 Octave dB
50	45.5 B
63	52.9 B
80	49.1 B
100	55.3
125	54.3
160	52.9
200	52.0
250	52.8
315	52.1
400	51.4
500	51.9
630	52.7
800	49.0
1000	43.1
1250	40.1
1600	35.5
2000	32.6
2500	27.8
3150	27.0
4000	24.9
5000	21.0

B: L'nT =< value shown



Rating according to ISO 717-2

$L'_{nT,w}(C_i)$ = 49 (-1) dB $C_{i,50\text{-}2500}$ = -1 dB

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

No. of test report: 6577-1 A006

Name of test institute:

Date: 24/08/18

Signature: