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REF051 LVP_4mm_NoUnderlay_T 20170519.docx

DUNLOP LVP (NO UNDERLAY) - REF051
Estimated Airborne and Impact Sound Ratings of 4 mm Vinyl Plank Floors with Ceilings

Dunlop Flooring commissioned an impact sound insulation test on a floor incorporating 4 mm thick Vinyl Plank (no underlay) at CSIRO in March 2015. A description of the floor and the test results are provided in **Table 1**.

Table 1 Test System and Results, CSIRO INR 196-02[1]

	System component	Thickness
(a)	Vinyl plank flooring	4 mm
(b)	Concrete slab	150 mm
	$L_{n,w}$ (Weighted normalised impact sound pressure level)	74 dB
	C_i (Spectrum adaptation term for impact sound level)	-10
	$L_{n,w} + C_i$	64 dB
	ΔL (delta L)	5 dB
	IIC (Impact insulation class)	33

The required acoustic ratings for floor/ceilings separating apartments, and separating apartments from other uses, are provided in the *National Construction Code 2016 Building Code of Australia* (BCA) and are reproduced in **Table 2**.

Table 2 BCA Requirements for Floor / Ceiling Systems

Construction	BCA 2016	
	Laboratory Rating (Deemed to Satisfy)	**Verification Method Requirements**
Floors between sole-occupancy units or between a sole-occupancy unit and a plant room, lift shaft, stairway, public corridor, public lobby or the like, or parts of a different classification.	$R_w + C_{tr}$ not < 50 dB $L_{n,w}$[2]. not > 62 dB	$D_{nT,w} + C_{tr}$ not < 45 dB $L'_{nT,w}$[3]. not > 62 dB

The BCA impact sound ratings do not provide for a high level of acoustic amenity and for this reason the Association of Australian Acoustical Consultants (AAAC) recommend higher standards in their Guideline for Apartment and Townhouse Acoustic Rating (September 2010). The AAAC star rating guide for impact sound is provided in **Table 3**. A four star rating corresponds to 'medium' quality.

[1] The test was conducted in accordance with the method specified in *AS ISO 140.6-2006 Acoustics – Measurement of sound insulation in buildings and of building elements, Part 6: Laboratory measurements of impact sound insulation of floors*.

[2] The impact sound requirements of the BCA changed in 2016 from Ln,w+Ci to Ln,w.

[3] As above.

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Table 3 AAAC Star Rating Guide for Impact Sound, $L_{nT,w}$

	2 Star	3 Star	4 Star	5 Star	6 Star
Between Tenancies	65	55	50	45	40

Acoustic estimations for the impact and airborne sound ratings of the floor system installed with a range of ceilings are provided in **Table 4** and presented graphically in **Figure 1**. Estimations are based on laboratory tests conducted on similar floor/ceiling systems and on prediction.

The tested floor system installed with a ceiling and fibrous insulation is predicted to achieve ratings of a higher quality than the minimum airborne and impact sound standards required by the BCA.

Table 4 Acoustic Estimations[4]

COMPONENT	FLOOR								
(a) Floor topping:	4 mm thick vinyl plank flooring								
(b) Underlay:	None								
	System 1			System 2			System 3		
(c) Plasterboard:	1 x 10 mm			1 x 10 mm			1 x 13 mm		
(d) Mounting:	Suspended on hangers			Suspended on hangers			Suspended with res. mounts		
(e) Overall cavity:	150 mm			150 mm			150 mm		
(f) Fibrous insulation:	None			14 kg/m^3, 50 mm thick			14 kg/m^3, 75 mm thick		
(g) Slab thickness (mm):	150	180	200	150	180	200	150	180	200
$L_{n,w}$, dB (lower rating = better quality)	65	64	63	57	56	55	51	50	49
C_i, dB (correction term)	-7	-7	-7	-5	-5	-5	-2	-2	-2
$L_{n,w} + C_i$, dB	58	57	56	52	51	50	49	48	47
IIC (higher rating = better quality)	42	43	44	49	50	51	56	57	58
Rw, dB (higher rating = better quality)	59	61	62	64	66	67	66	68	69
Rw+Ctr, dB (higher rating = better quality)	51	53	54	59	61	62	61	63	64

[4] The expected tolerance is ±2dB for the $L_{n,w}$ and $L_{n,w}+C_I$. This allows for variations in the test method, the difference between laboratories and the accuracy of the estimating techniques. The expected tolerance is ±2dB for the $R_{,w}$ and ±2dB R_w+C_{tr}. This allows for variations in the test method, the difference between laboratories and the accuracy of the estimating techniques.

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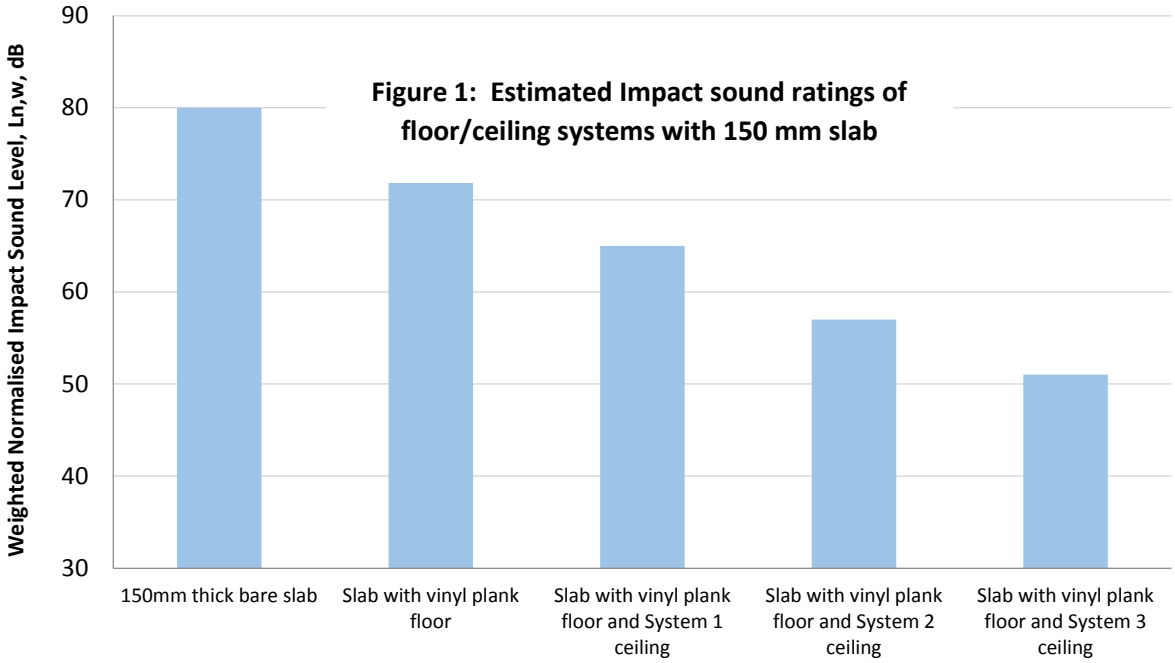

Note: A 10 dB change in level is generally perceived as a doubling or halving of the sound level. For example, impact sound via a floor with an Ln,w rating of 60 dB will subjectively be perceived as being twice as loud as impact sound via a floor with an Ln,w rating of 50 dB.