

27 March 2019

REF070 LVP_2mm_Advantage 3_O 20190326.docx

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DUNLOP ADVANTAGE 3 UNDERLAY – REF70

Estimated Airborne and Impact Sound Ratings of 2 mm thick Vinyl Plank Floors with Ceilings

Dunlop Flooring commissioned an impact sound insulation test on a 2 mm thick vinyl plank floor with Advantage 3 underlay at CSIRO in May 2017. A description of the floor and the estimated rating of the base system with 2 mm thick flooring is provided in **Table 1**.

Table 1 Estimation of Base System Performance

	System component	Thickness
(a)	Vinyl plank flooring	2 mm
(b)	Dunlop Advantage 3 underlay	3 mm
(c)	Concrete slab	150 mm
	$L_{n,w}$ (Weighted normalised impact sound pressure level)	58 dB
	C_i (Spectrum adaptation term form impact sound level)	-1
	$L_{n,w} + C_i$	57 dB
	ΔL (delta L)	18 dB
	IIC (Impact insulation class)	52

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 $L_{n,w}^1$ not > 62 dB	$D_{nT,w} + C_{tr}$ not < 45 dB $L'_{nT,w}^2$ 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.

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.

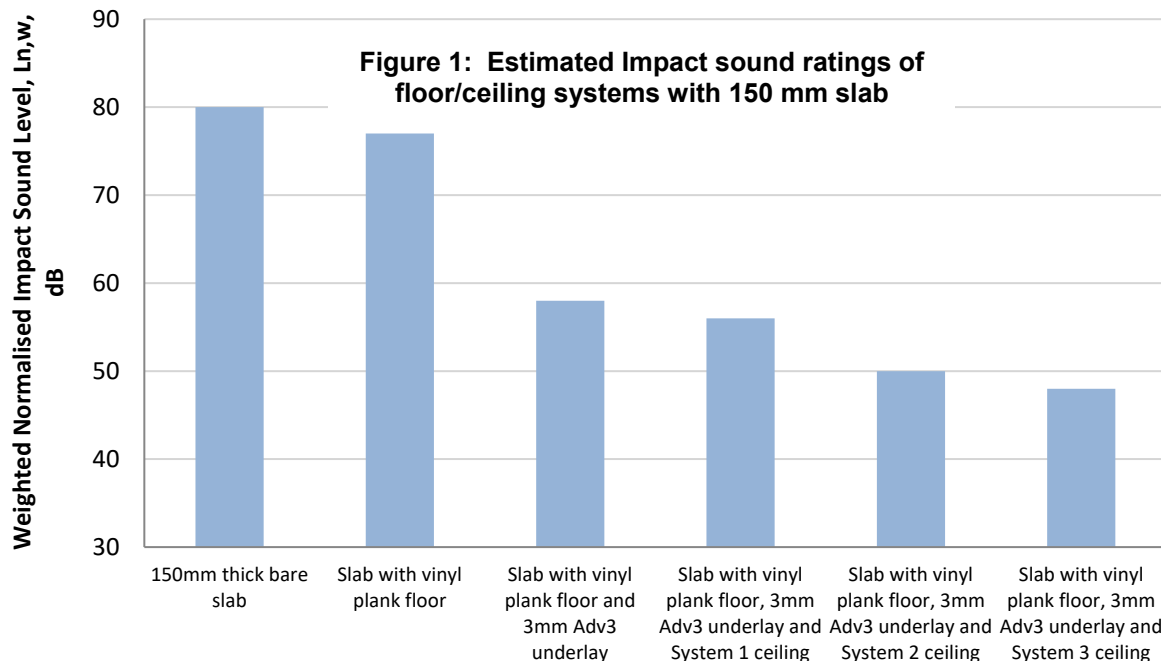
¹ The impact sound requirements of the BCA changed in 2016 from $L_{n,w} + C_i$ to $L_{n,w}$.

² As above.

The tested floor system installed with the ceilings described in **Table 4** are predicted to achieve ratings of a higher quality than the minimum airborne and impact sound standards required by the BCA.

Table 4 Acoustic Estimations³

COMPONENT	FLOOR								
	(a) Floor topping:	2 mm thick Vinyl Plank flooring							
(b) Underlay:	3 mm thick Dunlop Advantage 3 underlay								
	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
Ln,w, dB (lower rating = better quality)	56	55	54	50	49	48	48	47	46
Ci, dB (correction term)	2	2	2	2	2	2	2	2	2
Ln,w + Ci, dB	58	57	56	52	51	50	50	49	48
IIC (higher rating = better quality)	48	49	50	57	58	59	58	59	60
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



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.

³ The expected tolerance is ± 2 dB for the Ln,w and Ln,w+Ci. This allows for variations in the test method, the difference between laboratories and the accuracy of the estimating techniques. The expected tolerance is ± 2 dB for the Rw and ± 2 dB Rw+Ctr. This allows for variations in the test method, the difference between laboratories and the accuracy of the estimating techniques.