
ACOUSTIC
ACOUSTIC FLOORING GUIDE
HYBRID, VINYL TILES & PLANKS
Signature

Acoustic Wood, Mallee Spotted Gum

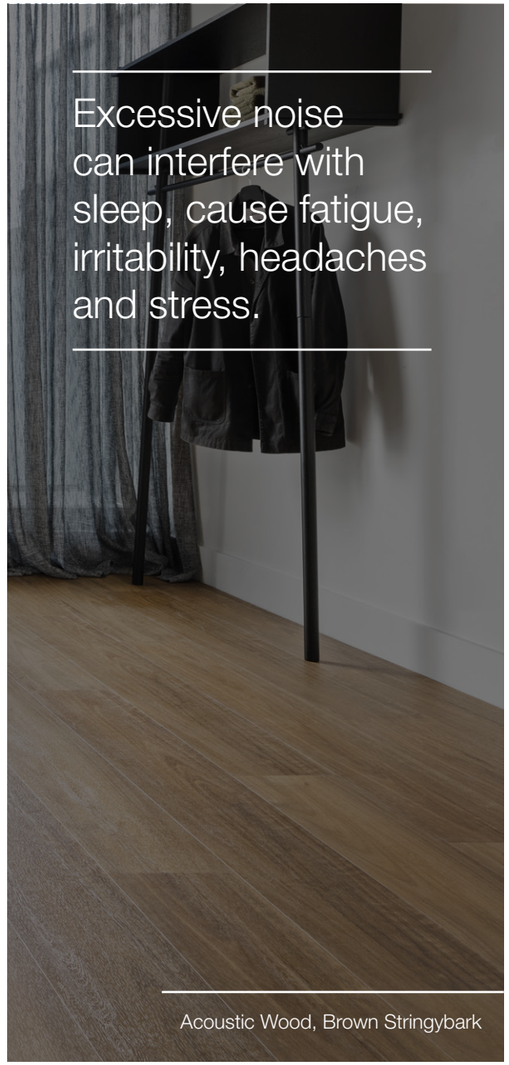
Contents

The health impacts of residential acoustics

Flooring acoustics are an extremely important consideration in multi-residential building design and construction. In developed countries, people spend 80-90% of their time indoors. Because of this, comfort and health related effects are directly linked to the characteristics of the building. Recognising the importance of acoustics during building design and construction can help to minimise the impact of noise on residents health and wellbeing.

Surveys have shown that noise is an important environmental concern for most Australians. A systematic review by the World Health Organisation found that sleep restrictions and chronically disturbed sleep is associated with numerous negative health outcomes, and therefore noise-induced sleep disturbance is considered one of the most important effects of environmental noise exposure.

Through considered architectural acoustics and proper selection of flooring during the planning stage, we can help to create a positive experience for residents and enhance a building's function and improve the quality of your living environments.



Excessive noise can interfere with sleep, cause fatigue, irritability, headaches and stress.

Acoustic Wood, Brown Stringybark

New builds

There are specific requirements for acoustics specified in the National Construction Code (NCC). The NCC ensures that the materials used in these projects conform to strict standards which ensure safety, health, well being and comfort of the end occupants.

These requirements apply to Class 2, 3 and 9c buildings:

- Class 2 Building – Medium to high rise residential apartments
- Class 3 Building – Residential buildings other than Class 1 or Class 2. Boarding house, guest house, backpackers accommodation and hostel (above 300m^2), student accommodation
- Class 9c Building – Aged care

These NCC requirements **do not apply to Office, Education, Hospitality** and other commercial buildings.

Wood 4.5, Sunset Oak

Scenic, Tamborine Oak

Check NCC regulations for wet areas by state.

Refurbishments

General refurbishments that are not governed by the National Construction Code (NCC), are often overseen by body corporate organisations. Each body corporate sets its own requirements for acoustic performance, and many follow the Association of Australian Acoustical Consultants Guidelines (AAAC).

The AAAC are a not for profit industry organisation that provides guidelines to acoustic engineers. They have developed a guideline star rating system to rank the performance of flooring products for impact isolation between floors.

They rate acoustic performance out of 6 stars.

	2 Star ★★	3 Star ★★★	4 Star ★★★★	5 Star ★★★★★	6 Star ★★★★★★
$L_{nT,w} \leq$	65 dB	55 dB	50 dB	45 dB	40 dB
NCC Pass/Fail	Fail	Pass	Pass	Pass	Pass
Normal Speech	Audible	Just Audible	Not Audible	Not Audible	Not Audible

$L_{nT,w}$ is the commonly used index for in situ measurements.
“T” indicates that the testing is done in situ and not in a lab.
Source: AAAC Guideline for Apartment and Townhouse Acoustic Rating.

How is sound measured?

Loudness
is most often measured in decibels (dB), it refers to the amount of sound energy present.

Frequency
refers to the number of cycles per second of a sound wave – lower frequencies have larger (or longer) waves, higher frequencies have shorter waves.

Stone 2.5, Dolomite Noir

Impact sound insulation

Impact sound insulation is a measurement of impact sound energy that is transferred to the room below.

It is important when determining how every day activities such as footsteps and dragging chairs will impact on the inhabitants below.

Impact sound insulation is tested in a lab by using a tapping machine on the top floor and a receiver in the floor below.

The noise in the receiving room is then measured and calculated in dB using ISO 717.2 as $L_{n,w}$.

The lower the result the better the acoustic performance, because less decibels are being transferred to the floor below.

NCC requirements for impact sound insulation

Product Compliance

This test is the product manufacturers responsibility, lab tests should be provided in order to be considered on a project.

Impact Sound Insulation Testing (F5.3 NCC)

$L_{n,w}$ no more than 62 dB
ISO10140.3 Lab Test Method
ISO717.2 Measurement of Results

Building Compliance

This test is the builders responsibility on completion of the project, it is an on site test, which needs to be provided in order to earn a certificate of occupancy.

Impact Sound Insulation Testing (FV5.1 NCC)

$L_{nT,w}$ no more than 62 dB ($L_{nT,w}$ is the commonly used index for in situ measurements)
ISO140.7 On Site Test Method
ISO 717.2 Measurement of Results

Signature Floors has engaged the support of Marshall Day Acoustics to analyse prediction reports in alliance with the Association of Australian Acoustical Consultants (AAAC).

Acoustic Stone, Urban Grey

Airborne sound insulation

Airborne sound insulation measures the airborne sound reduction of flooring to the room below.

Examples of airborne noise are sounds generated within a space such as conversations, televisions and music.

The outcome of this measurement is mostly impacted by the structural wall and floor construction and therefore must be tested on site taking into account all building materials.

Whilst the floorcovering can effect the result, its impact is minimal so floor products are not typically tested alone.

Airborne sound insulation is tested in a lab by playing a loud noise in top room with a receiver measuring the sound transmission reduction in the room below.

The test method used for measurement is calculated in decibels using ISO 717.1 as $R_w + C_{tr.}$

The higher the result the better the acoustic performance, as it indicates a higher reduction in sound transfer.

Sound absorption

Sound absorption is a measurement of how much sound energy is absorbed by the flooring product. These properties are important when considering individual room acoustics because they can limit the stress caused by noise in an environment such as conversations, phones ringing and televisions. The sound absorption properties of flooring are tested in a lab by directing sound at the flooring and measuring how much sound is reflected back.

There are three measurements that indicate the level of sound absorption:

α_w **(Alpha w)**:	**SAA**:	**NRC**:
Measurement AS ISO 354-2006	ASTM C423	ATSM C423

All three tests measure sound absorption however each test measures slightly different frequencies. The results are expressed by a figure ranging from 0 to 1. A result of 0 means 0% sound is absorbed and a result of 1 means 100% sound absorption.

In general, vinyl tiles and planks offer less sound absorption than carpet as they are inherently more reflective. In comparison our Comfi Bak carpet tiles can offer approximately 30% sound absorption when compared to vinyl planks and tiles at approximately 2-5% absorption. Hence we do not typically test vinyl plank and tiles for their absorption properties as other factors in the space will have a great effect on sound absorption.

However, vinyl planks and tiles do offer better sound absorbing qualities than polished concrete (0-5%) and can contribute to improving the acoustic qualities of a space when combined with other acoustic materials.

Acoustic 6mm Hybrid Tile & Plank

built-in underlay

Impact Noise Reduction ΔL_w
19 dB
NCC Impact Sound Insulation $L_{n,w}$ (≤ 62 dB)
58 dB

Applicable ranges: Quattro, Distinct, Acoustic Wood, Acoustic Stone

Acoustic Wood, Mallee Spotted Gum

5mm Vinyl Tile & Plank

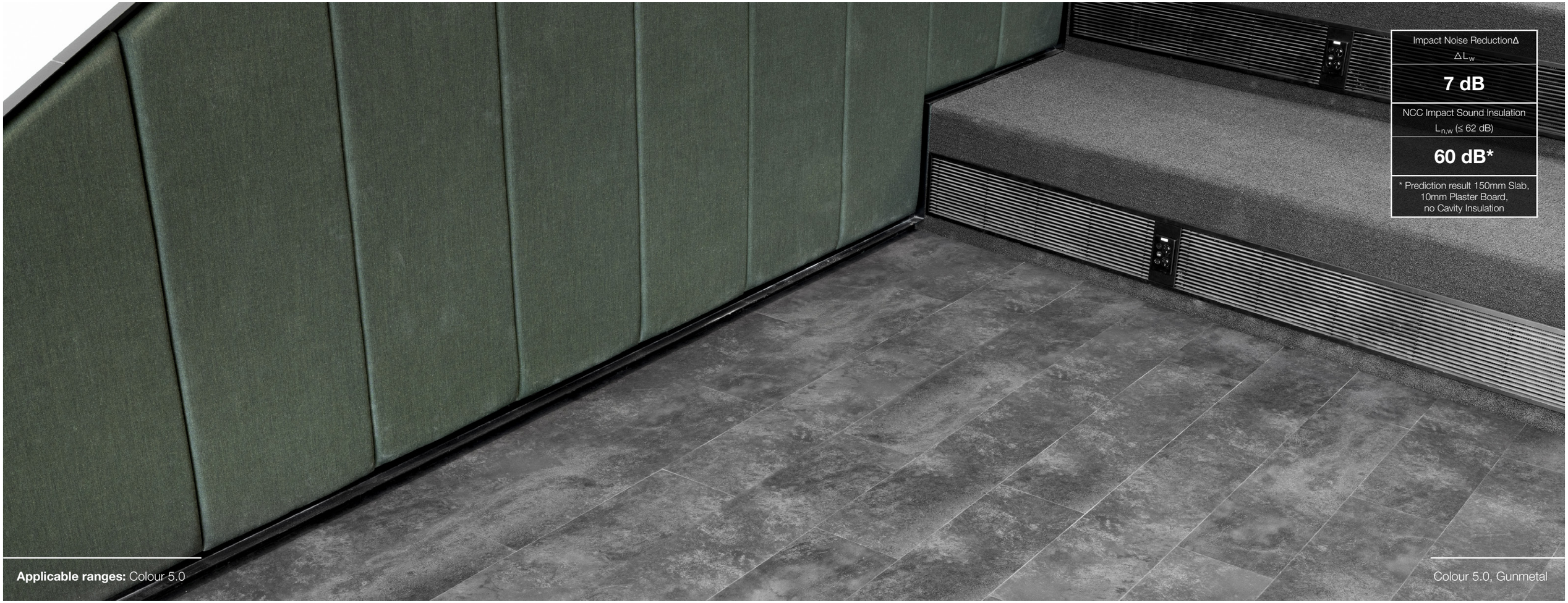
2mm Damtec underlay

Applicable ranges: Colour 5.0

Colour 5.0, Forest

5mm Vinyl Tile & Plank

no underlay



Applicable ranges: Colour 5.0

Colour 5.0, Gunmetal

4.5mm Vinyl Tile & Plank

2mm Damtec underlay

Impact Noise Reduction Δ ΔL_w
18 dB
NCC Impact Sound Insulation $L_{n,w}$ (≤ 62 dB)
60 dB

Applicable ranges: Wood 4.5, Stone 4.5, Panaroma, Deluxe, Multilay, Eyre, Purity, Mosman, Scenic

Wood 4.5, Tyrrell Oak

4.5mm Vinyl Tile & Plank

no underlay

Impact Noise Reduction Δ ΔL_w
8 dB
NCC Impact Sound Insulation $L_{n,w}$ (≤ 62 dB)
60 dB*
* Prediction result 150mm Slab, 10mm Plaster Board, no Cavity Insulation

Applicable ranges: Wood 4.5, Stone 4.5, Panaroma, Deluxe, Multilay, Purity, Eyre, Mosman, Scenic

Stone 4.5, Concrete Stone Sea Spray

2.5mm Vinyl Tile & Plank

2mm Damtec underlay

Applicable ranges: Wood 2.5, Stone 2.5, Timbarra, Zenith

Wood 2.5, Manor Oak

Acoustic 6mm Hybrid Tile & Plank

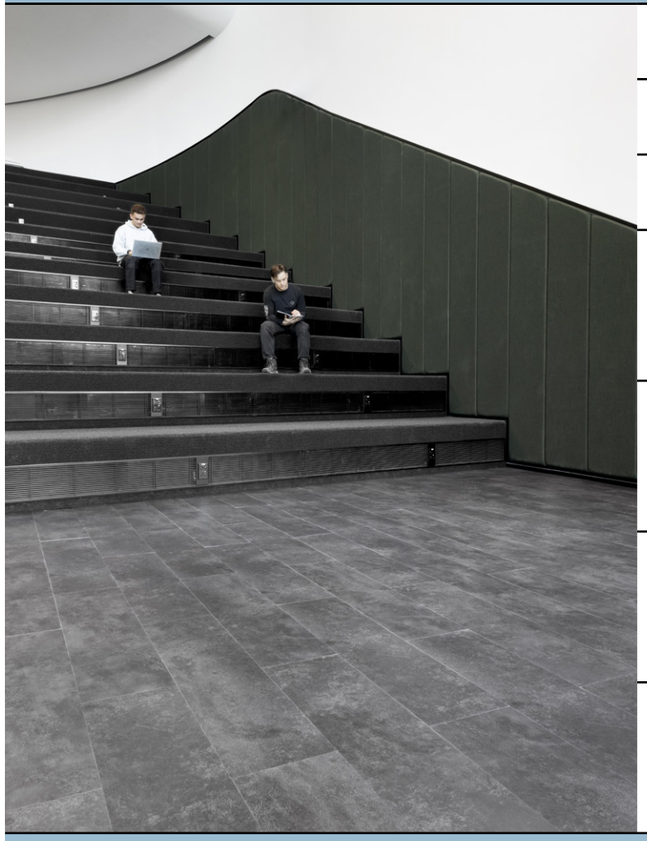
built-in underlay

Ceiling Thickness/Layers	Cavity Insulation Present	120mm Concrete $L_{n,w}$ Star Rating	150mm Concrete $L_{n,w}$ Star Rating	180mm Concrete $L_{n,w}$ Star Rating	200mm Concrete $L_{n,w}$ Star Rating
No Plaster Board	N/A	60 dB ★★	58 dB ★★	56 dB ★★	55 dB ★★★
1 x 10mm Plaster Board (100mm cavity suspended light steel grid with 450mm spacing)	No	59 dB ★★	56 dB ★★	54 dB ★★★	53 dB ★★★
	Yes	48 dB ★★★★	47 dB ★★★★	45 dB ★★★★★	44 dB ★★★★★
1 x 13mm Plaster Board (100mm cavity suspended light steel grid with 450mm spacing)	No	58 dB ★★	55 dB ★★★	53 dB ★★★	52 dB ★★★
	Yes	47 dB ★★★★	45 dB ★★★★★	43 dB ★★★★★	43 dB ★★★★★
1 x 13mm Plaster Board (200mm cavity suspended light steel grid with 450mm spacing)	No	56 dB ★★	53 dB ★★★	50 dB ★★★★	49 dB ★★★★★
	Yes	43 dB ★★★★★	41 dB ★★★★★	39 dB ★★★★★★	38 dB ★★★★★★
2 x 13mm Plaster Board (200mm cavity suspended light steel grid with 450mm spacing)	No	52 dB ★★★	49 dB ★★★★★	47 dB ★★★★	46 dB ★★★★
	Yes	40 dB ★★★★★★	38 dB ★★★★★★	36 dB ★★★★★★	35 dB ★★★★★★

Fails standard Meets standard Exceeds standard

5mm Vinyl Tile & Plank

2mm Damtec underlay

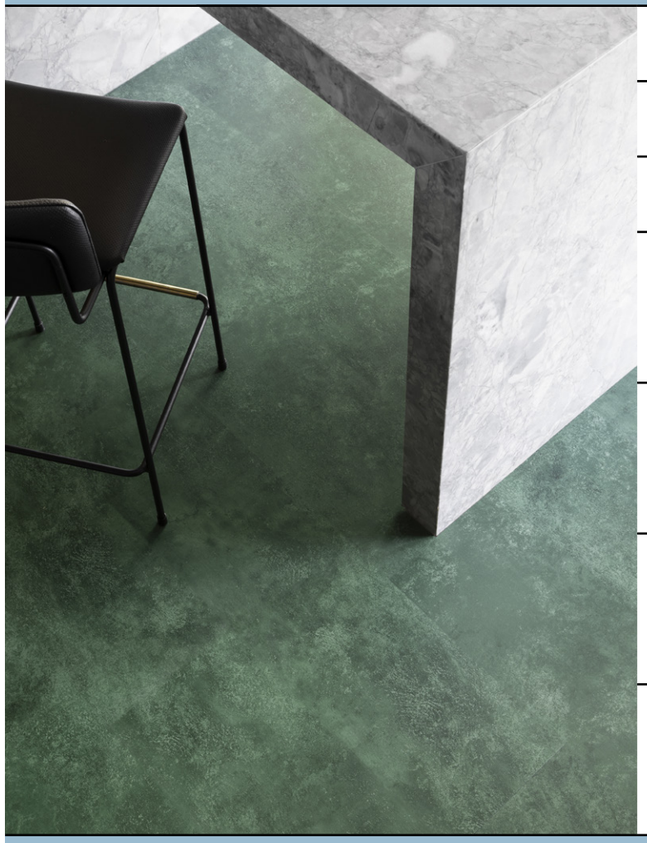


Ceiling Thickness/Layers	Cavity Insulation Present	120mm Concrete $L_{n,w}$ Star Rating	150mm Concrete $L_{n,w}$ Star Rating	180mm Concrete $L_{n,w}$ Star Rating	200mm Concrete $L_{n,w}$ Star Rating
No Plaster Board	N/A	61 dB ★★	59 dB ★★	57 dB ★★	56 dB ★★
1 x 10mm Plaster Board (100mm cavity suspended light steel grid with 450mm spacing)	No	59 dB ★★	56 dB ★★	53 dB ★★★	53 dB ★★★
	Yes	48 dB ★★★★	46 dB ★★★★	44 dB ★★★★★	44 dB ★★★★★
1 x 13mm Plaster Board (100mm cavity suspended light steel grid with 450mm spacing)	No	58 dB ★★	55 dB ★★★	53 dB ★★★	52 dB ★★★
	Yes	46 dB ★★★★	45 dB ★★★★★	43 dB ★★★★★	42 dB ★★★★★
1 x 13mm Plaster Board (200mm cavity suspended light steel grid with 450mm spacing)	No	55 dB ★★★	52 dB ★★★	50 dB ★★★★	49 dB ★★★★
	Yes	42 dB ★★★★★	40 dB ★★★★★★	38 dB ★★★★★★	37 dB ★★★★★★
2 x 13mm Plaster Board (200mm cavity suspended light steel grid with 450mm spacing)	No	52 dB ★★★	49 dB ★★★★	46 dB ★★★★	45 dB ★★★★★
	Yes	40 dB ★★★★★★	38 dB ★★★★★★	36 dB ★★★★★★	35 dB ★★★★★★

Fails standard | Meets standard | Exceeds standard

5mm Vinyl Tile & Plank

no underlay

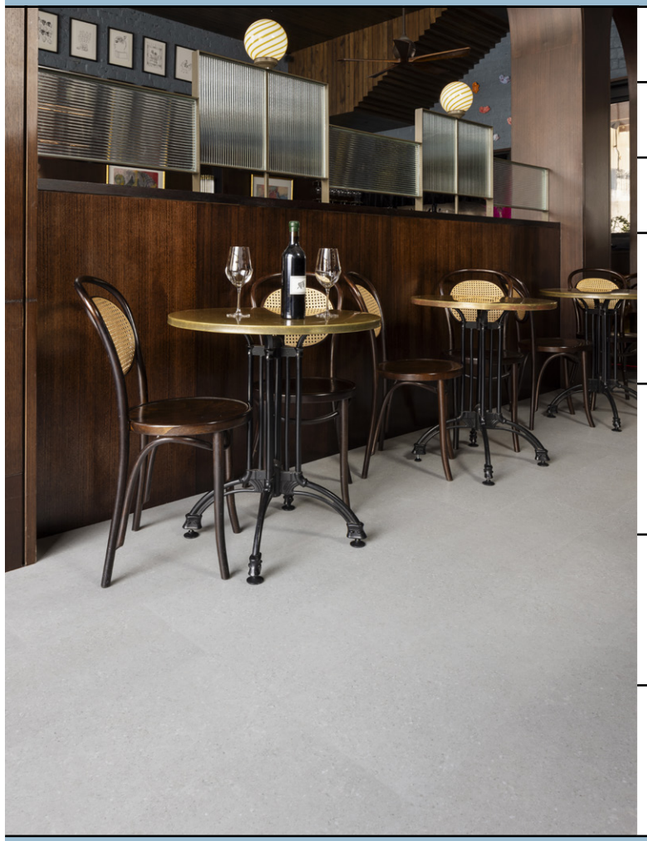


Ceiling Thickness/Layers	Cavity Insulation Present	120mm Concrete $L_{n,w}$ Star Rating	150mm Concrete $L_{n,w}$ Star Rating	180mm Concrete $L_{n,w}$ Star Rating	200mm Concrete $L_{n,w}$ Star Rating
No Plaster Board	N/A	79 dB ★★	75 dB ★★	73 dB ★★	71 dB ★★
1 x 10mm Plaster Board (100mm cavity suspended light steel grid with 450mm spacing)	No	63 dB ★★	60 dB ★★	58 dB ★★	58 dB ★★
	Yes	57 dB ★★	53 dB ★★★	52 dB ★★★	51 dB ★★★
1 x 13mm Plaster Board (100mm cavity suspended light steel grid with 450mm spacing)	No	64 dB ★★	61 dB ★★	59 dB ★★	59 dB ★★
	Yes	58 dB ★★	54 dB ★★★	53 dB ★★★	52 dB ★★★
1 x 13mm Plaster Board (200mm cavity suspended light steel grid with 450mm spacing)	No	62 dB ★★	58 dB ★★	56 dB ★★	55 dB ★★★
	Yes	58 dB ★★	54 dB ★★★	52 dB ★★★	51 dB ★★★
2 x 13mm Plaster Board (200mm cavity suspended light steel grid with 450mm spacing)	No	59 dB ★★	56 dB ★★	54 dB ★★★	53 dB ★★★
	Yes	57 dB ★★	54 dB ★★★	51 dB ★★★	50 dB ★★★★

Fails standard | Meets standard | Exceeds standard

4.5mm Vinyl Tile & Plank

2mm Damtec underlay



Ceiling Thickness/Layers	Cavity Insulation Present	120mm Concrete $L_{n,w}$ Star Rating	150mm Concrete $L_{n,w}$ Star Rating	180mm Concrete $L_{n,w}$ Star Rating	200mm Concrete $L_{n,w}$ Star Rating
No Plaster Board	N/A	61 dB ★★	60 dB ★★	57 dB ★★	56 dB ★★
1 x 10mm Plaster Board (100mm cavity suspended light steel grid with 450mm spacing)	No	59 dB ★★	57 dB ★★	54 dB ★★★	53 dB ★★★
	Yes	48 dB ★★★★	47 dB ★★★★	44 dB ★★★★★	44 dB ★★★★★
1 x 13mm Plaster Board (100mm cavity suspended light steel grid with 450mm spacing)	No	58 dB ★★	56 dB ★★	53 dB ★★★	52 dB ★★★
	Yes	47 dB ★★★★	45 dB ★★★★★	43 dB ★★★★★	42 dB ★★★★★
1 x 13mm Plaster Board (200mm cavity suspended light steel grid with 450mm spacing)	No	55 dB ★★★	53 dB ★★★	50 dB ★★★★	49 dB ★★★★
	Yes	43 dB ★★★★★	42 dB ★★★★★	38 dB ★★★★★★	37 dB ★★★★★★
2 x 13mm Plaster Board (200mm cavity suspended light steel grid with 450mm spacing)	No	52 dB ★★★	49 dB ★★★★	46 dB ★★★★	45 dB ★★★★★
	Yes	41 dB ★★★★★	39 dB ★★★★★★	36 dB ★★★★★★	35 dB ★★★★★★

Fails standard Meets standard Exceeds standard

4.5mm Vinyl Tile & Plank

no underlay

Ceiling Thickness/Layers	Cavity Insulation Present	120mm Concrete $L_{n,w}$ Star Rating	150mm Concrete $L_{n,w}$ Star Rating	180mm Concrete $L_{n,w}$ Star Rating	200mm Concrete $L_{n,w}$ Star Rating
No Plaster Board	N/A	77 dB ★★	73 dB ★★	71 dB ★★	69 dB ★★
1 x 10mm Plaster Board (100mm cavity suspended light steel grid with 450mm spacing)	No	62 dB ★★	60 dB ★★	57 dB ★★	56 dB ★★
	Yes	55 dB ★★★	52 dB ★★★	50 dB ★★★★	49 dB ★★★★
1 x 13mm Plaster Board (100mm cavity suspended light steel grid with 450mm spacing)	No	63 dB ★★	60 dB ★★	57 dB ★★	57 dB ★★
	Yes	56 dB ★★	53 dB ★★★	51 dB ★★★	50 dB ★★★★
1 x 13mm Plaster Board (200mm cavity suspended light steel grid with 450mm spacing)	No	60 dB ★★	57 dB ★★	54 dB ★★★	54 dB ★★★
	Yes	55 dB ★★★	52 dB ★★★	50 dB ★★★★	49 dB ★★★★
2 x 13mm Plaster Board (200mm cavity suspended light steel grid with 450mm spacing)	No	58 dB ★★	55 dB ★★★	52 dB ★★★	51 dB ★★★
	Yes	55 dB ★★★	52 dB ★★★	49 dB ★★★★	48 dB ★★★★

Fails standard Meets standard Exceeds standard

2.5mm Vinyl Tile & Plank

2mm Damtec underlay

Ceiling Thickness/Layers	Cavity Insulation Present	120mm Concrete $L_{n,w}$ Star Rating	150mm Concrete $L_{n,w}$ Star Rating	180mm Concrete $L_{n,w}$ Star Rating	200mm Concrete $L_{n,w}$ Star Rating
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Fails standard | Meets standard | Exceeds standard

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