

Client: National Flooring Distributors Pty Ltd (NFD)
58 Blanck Street, Ormeau, Qld 4208

Measurement Type: Impact Sound Insulation (Floor)

AS ISO 140.6:2006 and ISO 10140 Part 3 (2010): *Laboratory measurement of impact sound insulation of floors.*
AS ISO 717.2 (2004): *Acoustics – Rating of sound insulation in buildings and of building elements. Part 2: Impact sound insulation.*

Test Specimen (Area of concrete test floor: 10.8 m² [3.6 x 3.0 m])

Description: NFD Hybrid Flooring 5.0 mm WPC planks with integral resilient backing, resting on a 200 mm thick concrete subfloor.

Materials:

- a) Flooring planks:-
- Product designation: NFD Hybrid Flooring 5.0 mm WPC.
 - Appearance: 6 different aesthetic designs were included in the test specimen (Domain Oak, Ridge Oak, Seasoned Oak, Whitewash Oak, Winter Oak, and Natural Blackbutt).
 - Form: Planks, 1220 x 180 mm (x 5.0 thick) with mating interlocking edge profiles.
 - Construction: rigid wood/polymer composite core, with a decorative film on top printed with a timber image, protected with a clear wear layer embossed with a woodgrain texture, and backed with a 1 mm layer of resilient foam.
 - Three planks were weighed: av 1846.5 g, corresponding to 8.4 kg/m².
- b) Concrete slab subfloor (of the laboratory), 200 mm thick, 480 kg/m² approx.

Installation details:

- The concrete subfloor [item b] was scraped and cleaned in preparation for flooring installation.
- Flooring planks [item a] were laid directly on top of the concrete subfloor, and secured together using their mating click-locking edge profiles. Three plank-lengths were used to cover the 3.0 m dimension of the test floor, the excess length enabling joints to be staggered half a plank between adjacent rows with the excess being allowed to overhang and rest on the surrounding concrete. Twenty rows of planks were used to fully cover the 3.6 m dimension of the test floor.
- The six different aesthetic designs supplied were mixed as they were installed, on the basis of the printed image being acoustically irrelevant.
- Installation was carried out by the laboratory staff.



Close up of flooring, showing top/bottom and edge of flooring.

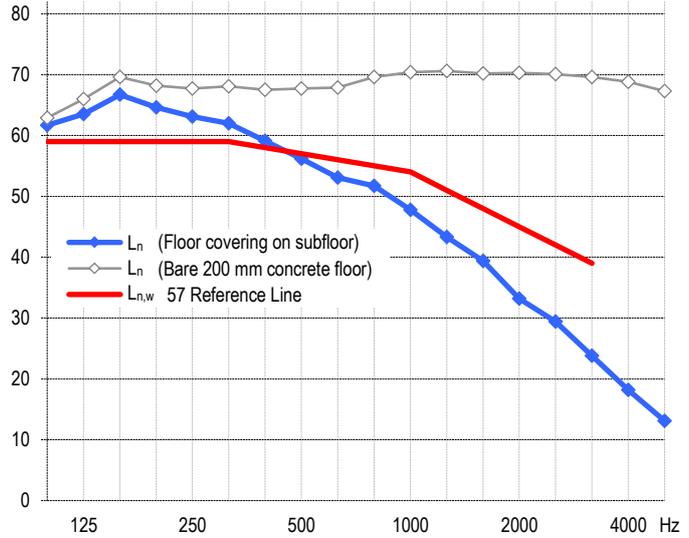


Test specimen installed in laboratory for test.

Measurement Details & Results^{1,2,4}

Freq. (Hz)	Specimen Floor	Bare Concrete ³
	L _n (dB)	Floor L _{n,0} (dB)
100	61.7	62.9
125	63.5	66.0
160	66.7	69.6
200	64.6	68.2
250	63.1	67.7
315	62.0	68.1
400	59.1	67.5
500	56.2	67.7
630	53.1	67.9
800	51.7	69.6
1000	47.8	70.4
1250	43.3	70.6
1600	39.4	70.2
2000	33.2	70.3
2500	29.4	70.1
3150	23.8	69.6
4000	18.2	68.8
5000	13.1	67.3

The concrete test floor, being 200 mm thick, is not suitable for testing in accordance with AS ISO 140.8; hence ΔL values are not reported. Impact noise figures for the bare concrete floor are included for information only.



Performance Index Numbers (laboratory method)

L_{n,w} (C_i) = 57 (0) dB ie L_{n,w} = 57 dB
IIC⁵ = 53 dB

The tapping machine was placed diagonally in eight different locations across the test floor area; sound levels in the room below were measured over a whole microphone rotation (33 sec) at each location, and the results averaged.

Measurement Conditions	With Floor Covering	Bare Concrete Floor
Date of measurement:	17 November 2020	17 November 2020
On top of floor:	22 °C, 45 % R.H.	22 °C, 63 % R.H.
Chamber underneath floor:	21 °C, 47 % R.H.	21 °C, 48 % R.H.
Atmospheric pressure:	1010 mBar	1010 mBar

Notes, Deviations etc

1. ≤ signifies results, if any, where measurement was limited by proximity to background level.
2. L_n = dB re 20 μPa.
3. Bare slab indices: L_{n,w} (C_i) = 76 (-10) dB, IIC = 30 dB.
4. L_n results represent noise levels; i.e. lower = quieter. For IIC results, higher = quieter.
5. IIC is calculated as per ASTM E989-89 but from measurements as per AS ISO 140.6 & ISO 10140 part 3.
6. Testing was carried out unloaded; the weight of the

7. Physical characteristics given for materials may be as per supplier's advice; not necessarily verified by CSIRO.
8. The test specimen material suffered no visible damage during the course of the test.

Issuing Authority

Signed:
Date: 24 November 2020

Acoustic Instrumentation

Real time analyser: • Brüel & Kjær PULSE LAN-XI type 3160-A-4/2
Microphone/preamp: • GRAS 46AR microphone/preamp set, rotating continuously with 33 sec period about 1.32 m radius.
Noise source: • Norsonic Nor277 tapping machine (complies with ISO 140)
Calibration: • Brüel & Kjær type 4231 Calibrator: Aug 2020 (NATA cal)
• Analyser: Jul 2018 (NATA cal) • Mic/Preamp: Oct 2020 (NATA cal)
• Sensitivity of measurement system was calibrated against the calibrator at the time of measurement.

Laboratory Construction

Chambers: • 300 mm thick concrete • parallelepiped with dimensional proportions 1:1.3:1.6 for uniform distribution of room modes
• room volume approx 200 m³ • room surface area approx 212 m².
Diffusers: • 20 stationary diffusers (approx 40 m²).
Test floor: • The roof area of the reverberation chamber was constructed with a 200 mm thick area (3.60 x 3.00 m) for use as a floor test area. The test floor and the surrounding concrete roof of the chamber form a single monolithic structure.