

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 140.8 (2006): Laboratory measurement of reduction of transmitted impact noise by floor coverings on a heavyweight standard floor.
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 150 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), 150 mm thick, 360 kg/m² approx.

Installation details:

- The concrete subfloor [item b] was scraped and swept 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 floor of the chamber. 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.



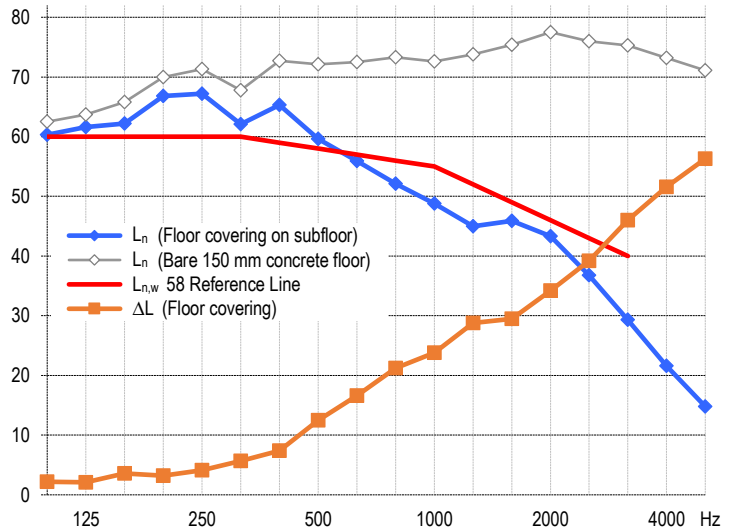
Close up of flooring, showing top/bottom and edge of flooring.



Test specimen installed in laboratory for test.

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

Freq. (Hz)	Specimen Floor		Improvement ΔL (dB)
	L_n (dB)	Bare Concrete ³ Floor $L_{n,0}$ (dB)	
100	60.3	62.5	2.2
125	61.6	63.7	2.1
160	62.2	65.8	3.6
200	66.8	70.0	3.2
250	67.2	71.3	4.1
315	62.1	67.8	5.7
400	65.3	72.7	7.4
500	59.6	72.1	12.5
630	55.9	72.5	16.6
800	52.1	73.3	21.2
1000	48.8	72.6	23.8
1250	45.0	73.8	28.8
1600	45.9	75.4	29.5
2000	43.3	77.5	34.2
2500	36.8	76.0	39.2
3150	29.3	75.3	46.0
4000	21.6	73.2	51.6
5000	14.8	71.1	56.3



Performance Index Numbers (laboratory method)

$L_{n,w}(C_1) = 58$ (0) dB ie $L_{n,w} = 58$ dB
IIC⁵ = 52 dB
 $\Delta L_w = 19$ dB
 $\Delta L_{lin} = 9$ 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:	20 °C, 53 % R.H.	20 °C, 49 % R.H.
Chamber underneath floor:	18 °C, 56 % R.H.	18 °C, 57 % R.H.
Atmospheric pressure:	1011 mBar	1010 mBar

Notes, Deviations etc

1. \leq and \geq signify results, if any, where measurement was limited by proximity to background level.
2. $L_n = \text{dB re } 20 \mu\text{Pa}$, $\Delta L = \text{dB re bare floor}$.
3. Bare slab indices: $L_{n,w}(C_1) = 82$ (-12) dB, IIC = 25 dB.
4. L_n results represent noise levels; i.e. lower = quieter. For ΔL and 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 tapping machine being the only load on top of the floor.
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: David Truett
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
• source room (upper): 200 m³ vol, 212 m² surface area (approx.)
• receiving room (lower): 105 m³ vol, 135 m² surface area (approx.).
Diffusers: • 200 m³ room: 20 diffusers (approx 40 m²) • 100 m³ room: none.
Test floor: • Homogeneous heavyweight concrete slab, 150 mm thick, 3.58 x 2.98 m, resting on a 10 mm thick rubber seal on a full perimeter support ledge in the upper chamber; the perimeter gap filled with sand, with backing rod on top.