

**Client:** National Flooring Distributors Pty. Ltd.  
11 Josephine Street, Loganholme, Queensland 4129 Australia

**Measurement Type: Impact Sound Insulation (Floor)**

AS ISO 140.6-2006 "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 m<sup>2</sup> [3.6 x 3.0 m])

**Description:** National Flooring Distributors (NFD) 'Expressive' Hybrid flooring plank laid without adhesives, directly on:

- 200 mm thick concrete slab floor (approx. 480 kg/m<sup>2</sup>, no ceiling below).

**NFD 'Expressive' Hybrid plank details:**

- NFD 'Expressive' Hybrid plank is a waterproof hybrid flooring plank of stone/plastic composite of heterogeneous construction consisting of a solid polyvinyl chloride (PVC) and limestone core with physically cross-linked polyethylene (IXPE) resilient acoustic backing, topped with a photographic layer carrying the plank's timber appearance and a Polyurethane (PU) wear layer with woodgrain texture.
- Individual Plank size: 1524 x 228 mm
- Thickness: 5.5 mm
- Wear layer: 0.55 mm PU coating
- Backing: 1 mm IXPE
- Surface Texture: Embossed-in-register
- Surface density (meas.): 9.3kg/m<sup>2</sup>
- Core composition: 70% limestone, 30% PVC by mass
- Pattern: Embossed-in-register woodgrain pattern with colour designations comprising the test specimen including 'American Oak', 'Dark Oak', 'Highland Silver Oak', 'Natural Oak'. All of the planks are identical except for the woodgrain print.

**Installation details:**

- The concrete test floor of the laboratory was scraped, swept and vacuumed.
- A total of 32 planks comprised the test specimen.
- The specimen flooring planks were laid directly on the concrete test floor with 50 mm stagger between adjacent rows (nom), and carefully mated together with their interlocking edge profile fully engaged.
- The specimen flooring planks covered the entire 200 mm thick concrete test floor area.
- Tapping machine locations were kept at least 0.5 m from the edges of the 200 mm thick test area, and not in the immediate vicinity of the edges of the floor covering.
- Installation was carried out by the client.



Close up of flooring: top and bottom faces, and edge profile.

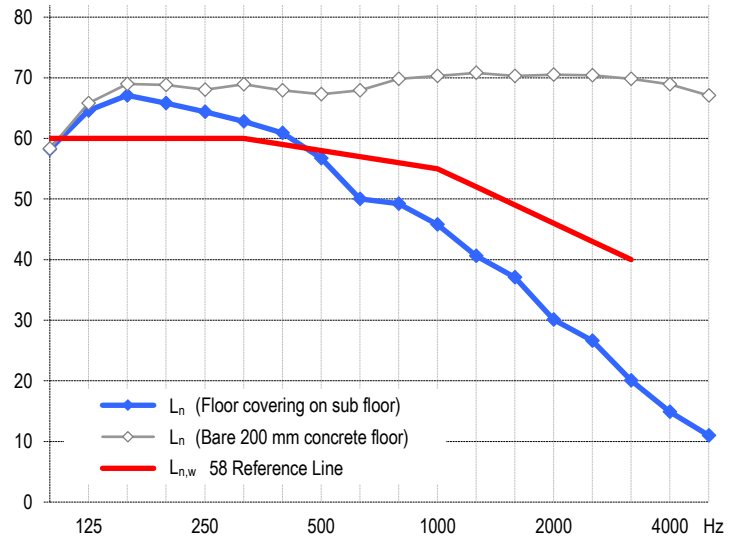


Test specimen installed on the test floor for testing.

**Measurement Details & Results**<sup>1,2,4</sup>

Freq (Hz)	Specimen Floor	Bare Concrete <sup>3</sup>
	L <sub>n</sub> (dB)	Floor L <sub>n,0</sub> (dB)
100	58.2	58.3
125	64.6	65.8
160	67.1	69.0
200	65.8	68.8
250	64.4	68.0
315	62.8	68.9
400	60.9	67.9
500	56.7	67.3
630	50.0	67.9
800	49.2	69.8
1000	45.8	70.3
1250	40.6	70.8
1600	37.1	70.3
2000	30.1	70.5
2500	26.6	70.4
3150	20.1	69.8
4000	14.9	68.9
5000	≤ 11.0	67.1

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<sub>n,w</sub> (C<sub>i</sub>) = 58 (0) ie L<sub>n,w</sub> = 58  
IIC<sup>5</sup> = 52

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:	1 March 2019	1 March 2019
On top of floor:	37 °C, 19 % R.H.	35 °C, 22 % R.H.
Chamber underneath floor:	29 °C, 32 % R.H.	29 °C, 35 % R.H.
Atmospheric pressure:	1006 mBar	1006 mBar

**Notes, Deviations etc**

1. ≤ signifies results, if any, where measurement was limited by proximity to background level.
2. L<sub>n</sub> = dB re 20 μPa.
3. Bare floor indices: L<sub>n,w</sub> (C<sub>i</sub>) = 76 (-10), IIC = 30.
4. For L<sub>n</sub> results, lower = quieter; for IIC, higher = quieter.
5. IIC is as per ASTM E989-89; laboratory requirements for which may differ from those of AS ISO 140.6.
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: John Watson  
Date: 4 April 2019

**Acoustic Instrumentation**

- Real time analyser: • Brüel & Kjær PULSE LAN-XI type 3160-A-4/2
- Microphone/preamp: • GRAS 40AP microphone on Brüel & Kjær 2669 preamp, 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: July 2018 (NATA cal)
- Analyser: July 2018 (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 m<sup>3</sup> • room surface area approx. 212 m<sup>2</sup>.
- Diffusers: • 20 stationary diffusers, approx 40 m<sup>2</sup> (combined area of both sides).
- 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 test floor area. The test floor and the surrounding concrete lid of the chamber form a single monolithic structure.