

Client: Sunstar Timber Flooring
Warehouse 4, 94-98 Kirkham Road West, Keysborough, Vic 3173

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:

- Sunstar Naturals Range 14 mm engineered timber flooring planks
 - on Sunstar 2 mm IXPE underlay
 - resting on a 150 mm thick concrete subfloor.

Materials:

- a) Sunstar Naturals Range engineered timber planks:-
 - Stock code: HG104 (*Spotted Gum*)
 - 14 mm engineered hardwood planks, inc 3 mm veneer
 - Dimensions: 1900 x 190 mm (30% nested)
 - With 5G Click-lock mating system
 - Mass per unit area: 11.1 kg/m²
- b) Sunstar 2 mm IXPE foam underlay, with clear moisture barrier film; supplied on a roll (1000 mm width, plus 105 mm selvedge), 129 gsm (meas).
- c) Concrete slab subfloor (of the laboratory), 150 mm thick, 360 kg/m² approx.

Installation details:

- The concrete subfloor [item c] was swept in preparation for flooring installation.
- Underlay [item b] was cut to length and laid (film up) on the concrete subfloor. 3 pieces of underlay were joined together using the selvedge and pre-applied pressure sensitive tape, covering the entire area of the concrete subfloor (excess allowed to overhang), resting on the surrounding floor. The underlay was not adhered to the concrete subfloor.
- Flooring planks [item a] were laid on top of the underlay (no adhesive) mated together via their click-lock mating system. A combination of full and part-length planks was used to fully cover the concrete subfloor with plank joints staggered from row to row. Excess flooring was allowed to overhang and rest on the surrounding floor of the chamber, level with the test-floor.
- Installation was carried out by laboratory staff.



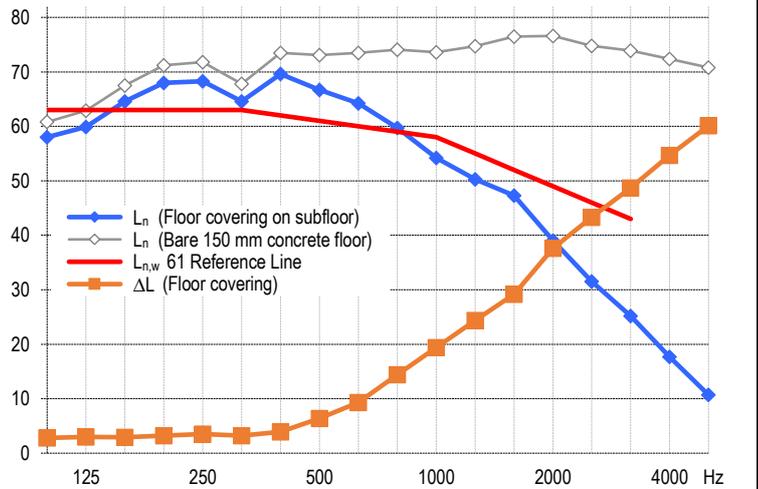
Close-up of flooring materials



Test specimen installed in laboratory for test

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

Freq. (Hz)	Specimen Floor	Bare Concrete ³	Improvement
	L _n (dB)	Floor L _{n,0} (dB)	ΔL (dB)
100	58.0	60.8	2.8
125	59.9	62.9	3.0
160	64.6	67.5	2.9
200	68.0	71.2	3.2
250	68.3	71.8	3.5
315	64.6	67.8	3.2
400	69.6	73.5	3.9
500	66.7	73.1	6.4
630	64.2	73.5	9.3
800	59.7	74.1	14.4
1000	54.2	73.6	19.4
1250	50.3	74.7	24.4
1600	47.3	76.5	29.2
2000	39.0	76.6	37.6
2500	31.5	74.8	43.3
3150	25.2	73.9	48.7
4000	17.7	72.4	54.7
5000	10.7	70.8	60.1



Performance Index Numbers (laboratory method)

L_{n,w} (C_i) = 61 (0) dB
IIC⁵ = 48 dB
ΔL_w = 18 dB
ΔL_{im} = 8 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:	5 January 2024	5 January 2024
On top of floor:	22 °C, 77 % R.H.	22 °C, 75 % R.H.
Chamber underneath floor:	19 °C, 82 % R.H.	19 °C, 82 % R.H.
Atmospheric pressure:	1007 mBar	1007 mBar

Notes, Deviations etc

1. ≤ and ≥ signify results, if any, where measurement was limited by proximity to background level.
2. L_n = dB re 20 μPa, ΔL = dB re bare floor.
3. Bare slab indices: L_{n,w} (C_i) = 81 (-11) dB, IIC = 26 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. Material details stated are as per client advice; unless identified as (meas), indicating measured by CSIRO.
8. The test specimen material suffered no visible damage during the course of the test.

Issuing Authority

Signed:
Date: 7 February 2024

Acoustic Instrumentation

Real time analyser: • Brüel & Kjær PULSE LAN-XI type 3160-A-4/2
Microphone/preamp: • GRAS 46AQ 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: Jan 2023 (NATA cal)
• Analyser: Sep 2021 (NATA cal) • Mic/Preamp: Aug 2022 (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 full perimeter support ledge in the upper chamber; the perimeter gap filled with sand, with foam backing rod on top.