14 June 2023
TL238-03F02 Carpet Floor Impact Test - Knit Range Sample (r1)

Inspired Floorcoverings
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Inspired Floorcoverings - Field Impact Sound Insulation Test Report - Knit Range Carpet Tile

1 Introduction

Renzo Tonin & Associates was engaged by Inspired Floorcoverings to conduct acoustic testing of a sample of the Knit Range carpet tile at 20 Pelican Street, Surry Hills to determine its impact sound insulation performance. The test results will be compared to the sound insulation requirements of the National Construction Code (NCC) Part F7.

The work documented in this report was carried out in accordance with the Renzo Tonin & Associates Quality Assurance System, which is based on Australian Standard / NZS ISO 9001.

2 Acoustic Requirements

Inter-tenancy floors of Class 2 and Class 3 buildings shall comply with the National Construction Code of Australia 2022 (formally Building Code of Australia). Relevant sections of the NCC are reproduced below:

"F7V1 Sound transmission through floors [F7P1]

[2019: FV5.1]

Compliance with F7P1 to avoid the transmission of airborne and impact generated sound through floors is verified when it is measured in-situ that the separating floor has—

(a) airborne: a weighted standardised level difference with spectrum adaptation term (DnT,w +Ctr) not less than 45 when determined under AS/NZS ISO 717.1; and

***(b) impact: a weighted standardised impact sound pressure level ($L_{nT,w}$) not more than 62 when determined under AS ISO 717.2**."*

As per Clause (b) of Part F7V1 of the NCC, the impact sound insulation rating ($L_{nT,w}$) of an floor/ceiling system separating of Class 2 sole-occupancy unit from parts of a different classification (University Classroom) when measured in-situ is required to be no greater than 62 ie. $\mathbf{L_{nT,w} \leq 62}$.

3 Methodology

The floor impact test was conducted in the living/dining area of Unit 420 on Level 3 on 13/06/2023. The original carpet and underly was removed in the living/dining area to allow installation of a sample of the Knit Range carpet tile over the existing concrete slab floor for the purpose of acoustic testing. The transmitted impact sound pressure levels were measured in a classroom at the Charles Sturt University located on the floor immediately below.

The impact sound insulation tests were conducted in accordance with the following International Standards:

- ISO 16283-2 "Acoustics — Field measurement of sound insulation in buildings and of building elements — Part 2: Impact sound insulation"
- ISO 717-2 "Acoustics – Rating of sound insulation in buildings and of building elements – Part 2: Impact sound insulation".
- ISO 3382-2 "Acoustics — Measurement of room acoustic parameters — Part 2: Reverberation time in ordinary rooms"

4 Test Procedure

4.1 Floor Impact Test

Floor impact sound insulation test was conducted according to the following procedure:

1. A tapping machine was operated in different positions on the sample floor in accordance with ISO Standard indicated above in Section 3.
2. Noise levels were recorded in a minimum of two manually scanned microphone positions for each tapping machine position in receiver room with an averaging time of 30 seconds for each measurement.
3. The reverberation time of the receiver room was measured in accordance with ISO 3382-2 referenced above.

4.2 Instrumentation

The average sound pressure level was obtained by using a Bruel & Kjaer Type 2250 Sound Level Meter. The measured noise levels were filtered simultaneously in all one-third octave frequency bands in real time. These values were recorded and subsequently statistically analysed to determine the average sound pressure levels for each room and to indicate the precision of the measurements.

The Sound Level Meter has current NATA certification and was checked before and after the measurement for calibration using a Bruel and Kjaer Type 4231 Calibrator. The sound level meter conforms to a Type 1 instrument as defined in IEC 651 - 1979 'Sound Level Meters'. No significant drift in calibration was noted.

5 Test Results

The results the impact test and comparison with the corresponding acoustic requirements of the NCC are presented in Table 1 below.

Table 1. Summary of test results and comparison with NCC

Test No.	Floor/Ceiling System Tested	Measured Sound Insulation Ratings	NCC Sound Insulation Requirement	Comply with NCC?
Impact Sound Insulation Tests				
1	Floor finish in Living/dining area of Unit 420: A sample of Inspired Floorcoverings Knit Range carpet tile laid over existing concrete slab floor. The Knit Range specification are: *Yarn System: 100% Solution Dyed Yarn* *Construction: High Low Loop* *Pile Weight: 20 Oz (567gram)* *Pile Height: 5.5mm* *Total Thickness: 9mm* *Gauge: 1/12* Ceiling beneath in University Classroom: Mineral fibre ceiling tiles suspended beneath slab soffit.	$L_{nT,w}$ = 37 and FIIC[1] = 58	$L_{nT,w} \leq 62$	Yes
AAAC Star Rating of Tested Floor System [2]		★★★★★★ **(6 Stars)**		

Notes:

1. Field Impact Isolation Class (FIIC) determined in accordance with ASTM E989-89 "Determination of Impact Insulation Class (IIC)"
2. Association of Australasian Acoustical Consultants AAAC (Maximum of 6 Stars)

6 Conclusion

Renzo Tonin & Associates have completed acoustic testing of a sample of the Knit Range carpet tile at 20 Pelican Street, Surry Hills. The test results have shown the carpet tile to comply with the impact sound insulation requirement of the Part F7 of National Construction Code. The Knit Range carpet tile achieved an impact sound insulation rating $L_{nT,w}$ of 37 which is equivalent to a 6 Star AAAC rating.

Copy of the acoustic test certificate is attached in APPENDIX A.

Document control

Date	Revision history	Non-issued revision	Issued revision	Prepared	Authorised
14.06.2023	Prepare test report & certificate	-	0	T. Wong	T. Wong

File Path: R:\AssocSydProjects\TL201-TL250\TL238 tw Inspired Floorcovering, Glenmore Park\T3 Manly Test 2\1 Docs\TL238-03F02 Carpet Floor Impact Test - Knit Range Sample (r1).docx

APPENDIX A Field Test Certificate

Standardized impact sound pressure levels, L'nT, in accordance with ISO 16283-2
Field measurements of impact sound insulation of floors using the tapping machine

Client: Inspired Floorcoverings

Date of test: 13/06/2023

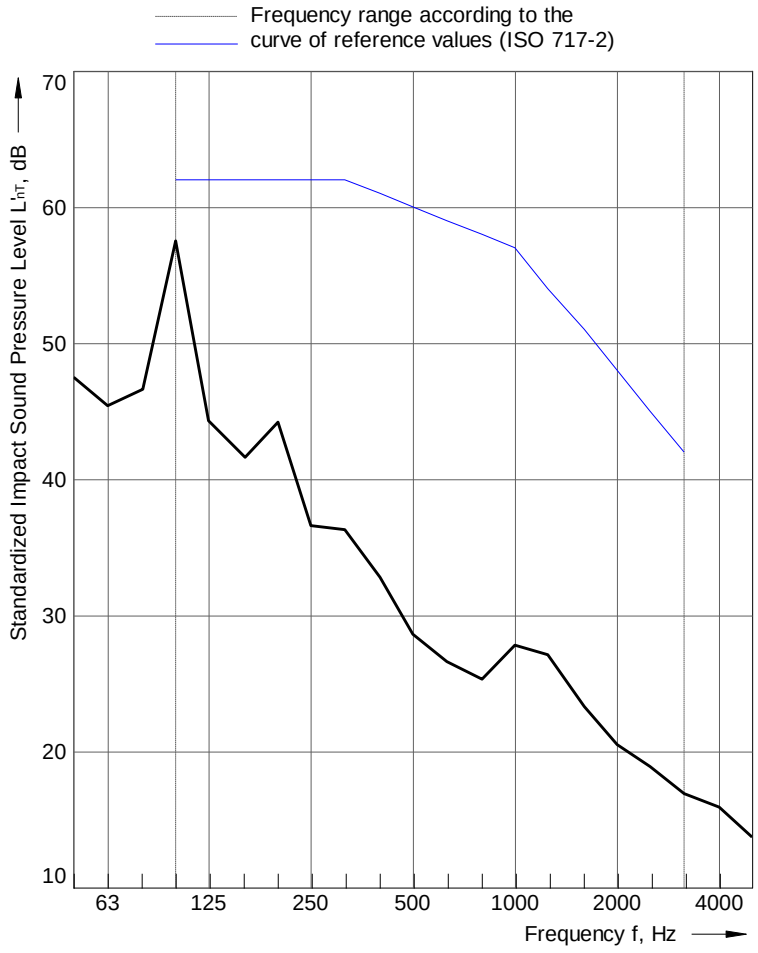
Description and identification of the building construction and test arrangement, direction of measurement etc.:

Floor finish in Living/dining area of U420:
A sample of Knit Range carpet tile laid over existing concrete slab floor. The Knit Range specification are:
Yarn System: 100% Solution Dyed Yarn
Construction: High Low Loop
Pile Weight: 20 Oz (567gram)
Pile Height: 5.5mm
Total Thickness: 9mm
Gauge: 1/12
Ceiling beneath in University Classroom:
Mineral fibre ceiling tiles suspended beneath slab

Receiving room volume: 119.10 m³

Frequency f Hz	L'_{nT} 1/3 Octave dB
50	47.5 B
63	45.4 B
80	46.6 B
100	57.5 B
125	44.3 B
160	41.6 B
200	44.2 B
250	36.6 B
315	36.3 B
400	32.8 B
500	28.6 B
630	26.6 B
800	25.3 B
1000	27.8 B
1250	27.1 B
1600	23.3 B
2000	20.5 B
2500	18.9
3150	16.9
4000	15.9
5000	13.7

B: L'_{nT} =< value shown



Rating according to ISO 717-2
$L'_{nT,w}(C_i)$ = 37 (6) dB $C_{i,50\text{-}2500}$ = 7 dB

Evaluation based on field measurement results obtained in one-third-octave bands by an engineering method

No. of test report:
Date: 14/06/2023

Name of test institute: Renzo Tonin & Associates
Signature: