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To:	Construction Chemicals	Email:	bsmith@constructionchemicals.com.au
Attention:	Ben Larsen-Smith		
Reference:	J2327 Floor Impact Noise Tests - 16 Duporth Ave, Maroochydore (Rev 1)		

16 Duporth Avenue, Maroochydore, Qld, 4558

"Alpha / New Haven"

FLOOR IMPACT SOUND INSULATION ACOUSTIC TESTING

Apartment 702 (empty room)

to

Apartment 602 (empty room)

Date: 17 September, 2019
Number of Pages: 16 (inc)

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DOCUMENT CONTROL

Revision No	Issue Date	Revision Description	Author	Review
0	13/09/2019	Noise Report	MF	MF
1	17/09/2019	Include airborne test results of slab	MF	MF

DISCLAIMER

This Report by Alpha Acoustics Pty Ltd is prepared for a particular Client and is based on the agreed objective, scope, conditions and limitations as may be stated in the Executive summary. The Report presents only the information that Alpha Acoustics Pty Ltd believes, in its professional opinion, is relevant and necessary to describe the issues involved. The Report should not be used for anything other than the intended purpose and should not be reproduced, presented or reviewed except in full. The intellectual property of this Report remains with Alpha Acoustics Pty Ltd. The Client is authorised, upon payment to Alpha Acoustics Pty Ltd of the agreed Report preparation fee, to provide this Report in full to any third party.

Recommendations made in this report are intended to resolve acoustical problems only. We make no claim of expertise in other areas and draw your attention to the possibility that our recommendations may not meet the structural, fire, thermal, or other aspects of building construction

We encourage clients to check with us before using materials or equipment that are alternative to those specified in our Acoustical Report.

The integrity of acoustic structures is very dependent on installation techniques. For example, a small crack between the top of a wall and a ceiling can reduce the effective sound transmission loss of a wall from R_w 50 to R_w 40. Therefore the use of contractors that are experienced in acoustic construction is encouraged. Furthermore, two insulation products may have the same thermal R rating but the sound absorption of one may be entirely deficient, therefore the use of materials and equipment that are supported by acoustic laboratory test data is encouraged.

1. CONSULTING BRIEF

Alpha Acoustics Pty Ltd was engaged by Construction Chemicals to determine the floor impact sound insulation performance of a series of tiled floors over various acoustic underlays at 16 Duporth Avenue, Maroochydore Qld, 4558.

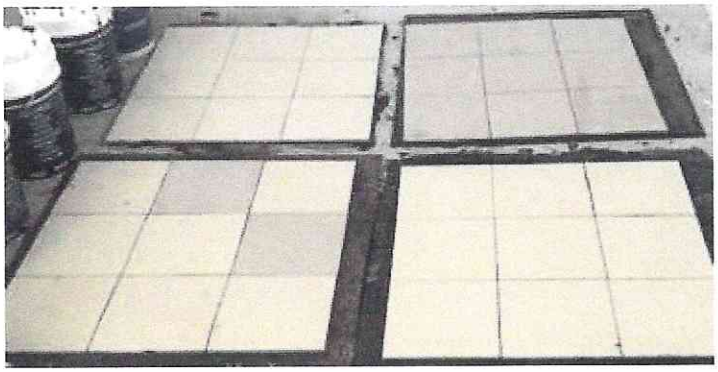
2. SITE SURVEY AND FLOOR DESCRIPTION

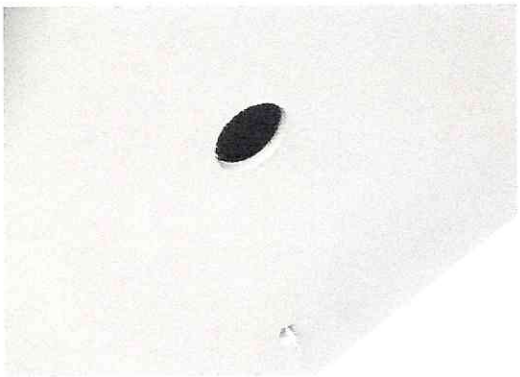
Field floor impact sound insulation tests were conducted by Alpha Acoustics on Thursday 12th September 2019. The tests were conducted between the empty room of Apt 702 and the empty room of Apt 602.

It is understood the floor systems construction being tested comprised:

Test No.	Test Type	Floor System
A	Floor Sample	• 10mm thick ceramic tiles • **3mm thick Acoustibond tile glue** • **6mm thick Acoustifloor tile underlay** • 200mm thick concrete slab • 150mm cavity (no insulation) • 13mm thick plasterboard
B	Floor Sample	• 10mm thick ceramic tiles • **3mm thick Acoustibond tile glue** • **6mm thick Acoustiscreed tile underlay** • 200mm thick concrete slab • 150mm cavity (no insulation) • 13mm thick plasterboard
C	Floor Sample	• 10mm thick ceramic tiles • **3mm thick monoflex tile glue** • **6mm thick Acoustiscreed tile underlay** • 200mm thick concrete slab • 150mm cavity (no insulation) • 13mm thick plasterboard
D	Floor Sample	• 10mm thick ceramic tiles • **3mm thick Acoustibond tile glue** • 200mm thick concrete slab • 150mm cavity (no insulation) • 13mm thick plasterboard
E	Floor Sample	• 10mm thick ceramic tiles • **3mm thick Acoustibond tile glue** • **4.5mm regupol tile underlay** • 200mm thick concrete slab • 150mm cavity (no insulation) • 13mm thick plasterboard
F	Control	• 200mm thick concrete slab • 150mm cavity (no insulation) • 13mm thick plasterboard

Figure 2.1 – Floor impact test setup





3. NOISE SURVEY INSTRUMENTATION

All instrument systems had been laboratory calibrated using instrumentation traceable to Australian National Standards and certified within the last two years thus conforming to Australian Standards. The measurement system was also calibrated prior to and after the noise survey. Calibration drift was found to be less than 0.1 dB during attended measurements. No adjustments for instrument drift during the measurement period were warranted.

Table 3.1 Noise Instrumentation

Description	Model No.	Serial No.
Modular Precision Sound Analyser	B&K 2260	245 9227
Condenser Microphone 0.5" diameter	B&K 4189	245 8107
Acoustical Calibrator	B&K 4231	267 1553
Microphone Windscreen	Acoustically transparent foam	
Tapping Machine	EM 50	TM 14142

The Bruel & Kjaer 2260 Sound Analyser is a real-time precision integrating sound level meter with octave and third octave filters that samples noise at a rate of 10 samples per second.

4. FLOOR IMPACT SOUND INSULATION TEST PROCEDURE

The field measurement of the impact sound insulation of the subject floor was made in 1/3 octave bands in accordance with ISO140-7: *Field measurements of impact sound insulation of floors* and rated in accordance with AS/ISO 717.2: 2004 *Acoustics - Rating of sound insulation in buildings and of building elements*.

The "tapping machine" was placed in 4 different orientations over the test floor. The average sound pressure level was obtained in receiving rooms. Four measurements were conducted in the receiver room using a sweeping motion with each measurement covering a number of traverses, and an averaging time of 60 seconds per sweep. The sound pressure levels were measured using one-third octave band pass filters from 50 Hz to 10 KHz.

Reverberation time was measured in the receiving room generally according to AS 1045 "Acoustics - Measurement of sound absorption in a reverberation room."

The impact isolation of the specimen was then calculated using the following relationship;

$$L_{nT} = L_i + 10 \log (T/To)$$

Where;

L_i = Impact Sound Pressure Level receiver room dB

T = Measured reverberation time of the receiving room (sec)

To = Reference reverberation time (0.5 sec)

The Weighted Standardised Impact Sound Pressure Level $L_{nT,w}$ and the adaptation term C_I were determined in accordance with ISO 717-2.

5. FLANKING TRANSMISSION

No adjustment for flanking noise was made when testing and no flanking noise was detected.

6. FLOOR IMPACT NOISE CRITERIA

Building Code of Australia

The Building Code of Australia is the National Construction Code (NCC). This code is updated each year in April. The code applicable to a residential apartment building is based on the date of the construction certificate (in Qld).

The current National Construction Code states the floor impact noise performance may be tested on site by:

"a weighted standardised impact sound pressure level with spectrum adaptation term ($L_{nT,w}$) not more than 62 when determined under AS/ISO 712.2".

7. MEASUREMENT OF FLOOR IMPACT SOUND INSULATION

The overall test result from the floor impact sound insulation tests are shown in the table below. The graphical results from the field floor impact sound insulation tests are summarised in the Appendices.

Table 7.1 Floor Impact Test Summary

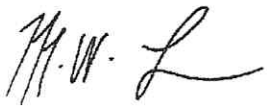
Test No.	Test Type	Floor System	Measured $L_{nT,w}$ (dB)	Status
A	Floor Sample	• 10mm thick ceramic tiles • **3mm thick Acoustibond tile glue** • **6mm thick Acoustifloor tile underlay** • 200mm thick concrete slab • 150mm cavity (no insulation) • 13mm thick plasterboard	44	Pass
B	Floor Sample	• 10mm thick ceramic tiles • **3mm thick Acoustibond tile glue** • **6mm thick Acoustiscreed tile underlay** • 200mm thick concrete slab • 150mm cavity (no insulation) • 13mm thick plasterboard	45	Pass
C	Floor Sample	• 10mm thick ceramic tiles • **3mm thick monoflex tile glue** • **6mm thick Acoustiscreed tile underlay** • 200mm thick concrete slab • 150mm cavity (no insulation) • 13mm thick plasterboard	55	Pass
D	Floor Sample	• 10mm thick ceramic tiles • **3mm thick Acoustibond tile glue** • 200mm thick concrete slab • 150mm cavity (no insulation) • 13mm thick plasterboard	48	Pass
E	Floor Sample	• 10mm thick ceramic tiles • **3mm thick Acoustibond tile glue** • **4.5mm regupol tile underlay** • 200mm thick concrete slab • 150mm cavity (no insulation) • 13mm thick plasterboard	46	Pass
F	Control	• 200mm thick concrete slab • 150mm cavity (no insulation) • 13mm thick plasterboard	60	Pass

Note: The Airborne Sound transmission loss of the floor ceiling system consisting mainly a bare slab and the 5 test samples was measured to be Dntw + Ctr 50.

8. CONCLUSION

Alpha Acoustics Pty Ltd was engaged by Construction Chemicals to determine the floor impact sound insulation performance of a series of tiled floors over various acoustic underlays at 16 Duporth Avenue, Maroochydore Qld, 4558.

The floor impact sound insulation performance ($L'_{nT,w}$) of all tested systems (Section 7 above) meet the minimum requirements of the BCA.



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ENGINEERS AUSTRALIA

APPENDIX A – FLOOR PERFORMANCE RESULTS

Standardized Impact Sound Pressure Level according to ISO 140-7

Field measurements of impact sound insulation of floors

Client:

Date of test: 12/09/2019

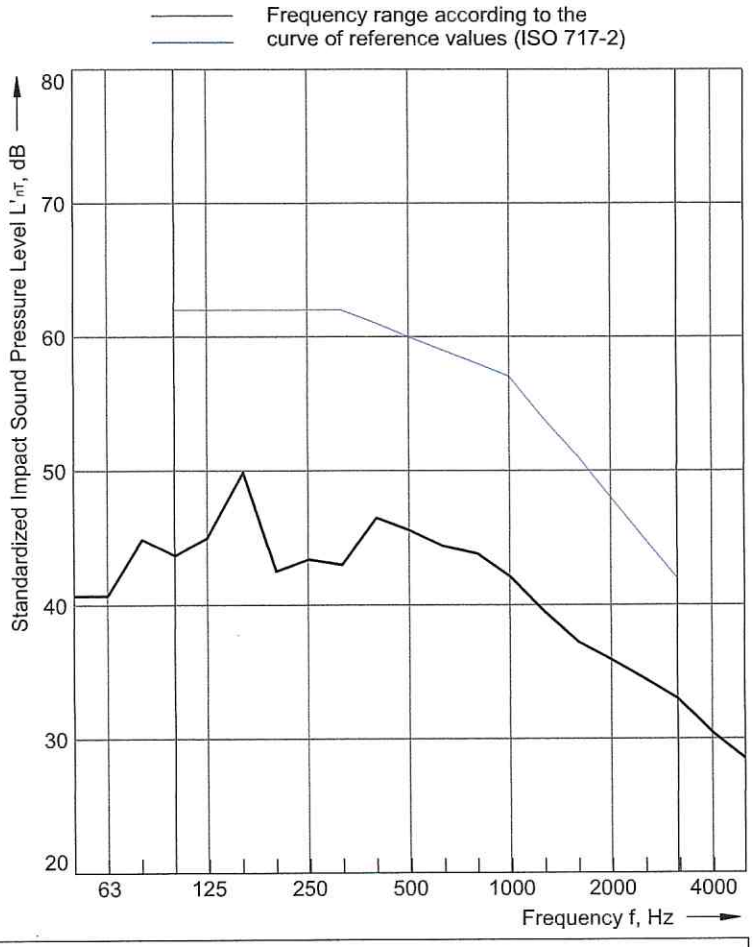
Description and identification of the building construction and test arrangement:

Sample A

10mm thick ceramic tiles
3mm thick Acoustibond tile glue
6mm thick Acoustifloor tile underlay
200mm thick concrete slab
150mm cavity (no insulation)

Receiving room volume V: 57.10 m³

Frequency f Hz	L'_{nT} 1/3 Octave dB
50	40.7
63	40.7
80	44.9
100	43.7
125	45.0
160	49.9
200	42.5
250	43.4
315	43.0
400	46.5
500	45.6
630	44.4
800	43.8
1000	42.1
1250	39.6
1600	37.2
2000	35.9
2500	34.5
3150	33.0
4000	30.4
5000	28.5



Rating according to ISO 717-2

$L'_{nT,w}(C_i)$ = 44 (-3) dB $C_{i,50\text{-}2500}$ = -3 dB

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

No. of test report: J2327

Name of test institute: Alpha Acoustics Pty Ltd

Date: 13/09/2019

Signature: Matthew Fishburn RPEQ

Standardized Impact Sound Pressure Level according to ISO 140-7

Field measurements of impact sound insulation of floors

Client:

Date of test: 12/09/2019

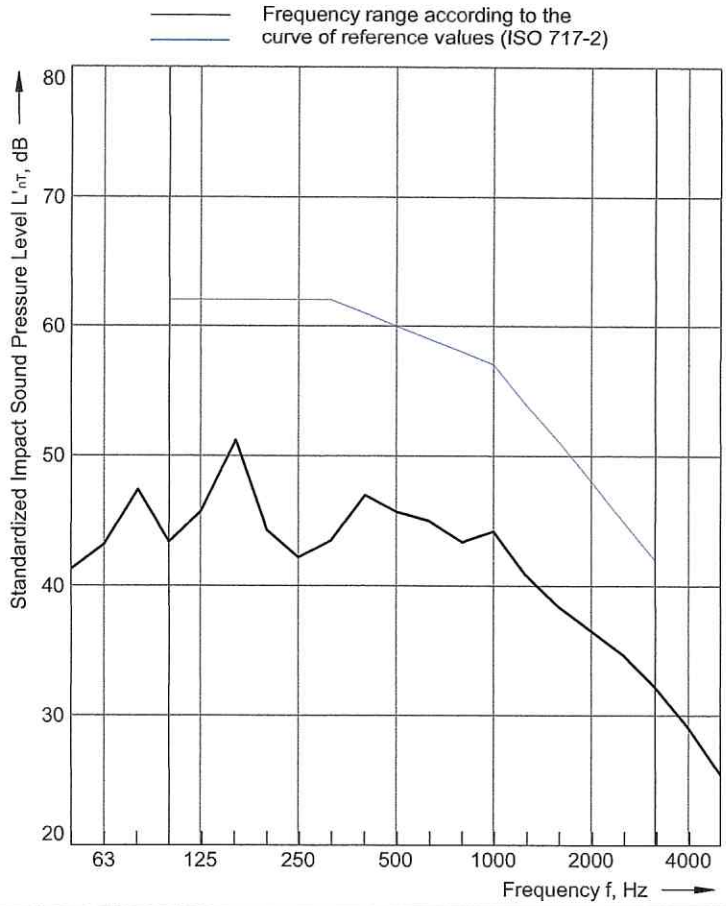
Description and identification of the building construction and test arrangement:

Sample B

10mm thick ceramic tiles
3mm thick Acoustibond tile glue
6mm thick Acoustiscreed tile underlay
200mm thick concrete slab
150mm cavity (no insulation)

Receiving room volume V: 57.10 m³

Frequency f Hz	L'_{nT} 1/3 Octave dB
50	41.3
63	43.2
80	47.4
100	43.4
125	45.7
160	51.2
200	44.3
250	42.2
315	43.5
400	47.0
500	45.7
630	45.0
800	43.4
1000	44.2
1250	40.9
1600	38.3
2000	36.5
2500	34.7
3150	32.2
4000	29.0
5000	25.4



Rating according to ISO 717-2

$L'_{nT,w}(C_i)$ = 45 (-3) dB $C_{i,50\text{-}2500}$ = -3 dB

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

No. of test report: J2327

Name of test institute: Alpha Acoustics Pty Ltd

Date: 13/09/2019

Signature: Matthew Fishburn RPEQ

Standardized Impact Sound Pressure Level according to ISO 140-7

Field measurements of impact sound insulation of floors

Client:

Date of test: 12/09/2019

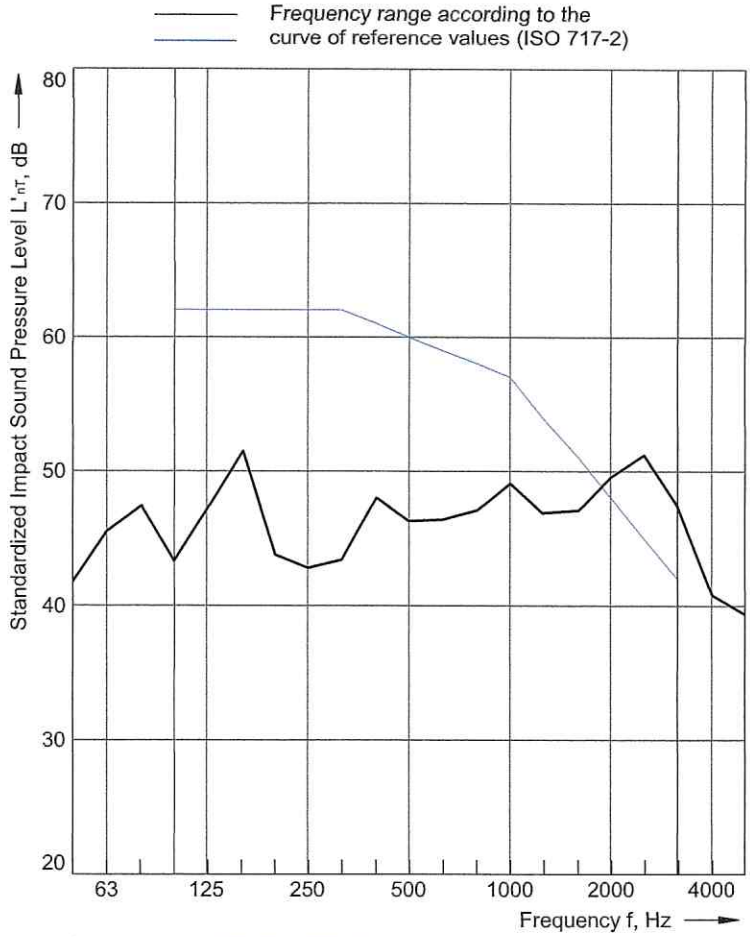
Description and identification of the building construction and test arrangement:

Sample C

10mm thick ceramic tiles
3mm thick monoflex tile glue
6mm thick Acoustiscreed tile underlay
200mm thick concrete slab
150mm cavity (no insulation)

Receiving room volume V: 57.10 m³

Frequency f Hz	L'_{nT} 1/3 Octave dB
50	41.8
63	45.5
80	47.4
100	43.3
125	47.1
160	51.5
200	43.8
250	42.8
315	43.4
400	48.0
500	46.3
630	46.4
800	47.1
1000	49.1
1250	46.9
1600	47.1
2000	49.6
2500	51.2
3150	47.4
4000	40.8
5000	39.4



Rating according to ISO 717-2

$L'_{nT,w}(C_i)$ = 55 (-11) dB $\quad C_{i,50\text{-}2500}$ = -10 dB

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

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Standardized Impact Sound Pressure Level according to ISO 140-7

Field measurements of impact sound insulation of floors

Client:

Date of test: 12/09/2019

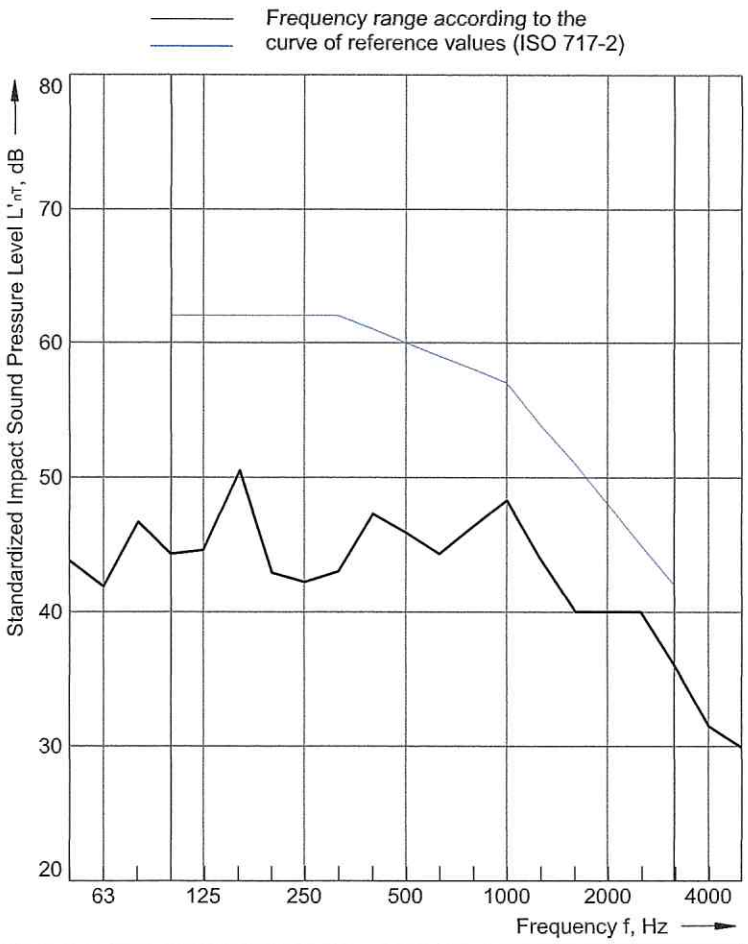
Description and identification of the building construction and test arrangement:

Sample D

10mm thick ceramic tiles
3mm thick Acoustibond tile glue
200mm thick concrete slab
150mm cavity (no insulation)
13mm thick plasterboard

Receiving room volume V: 57.10 m³

Frequency f Hz	L'_{nT} 1/3 Octave dB
50	43.8
63	41.9
80	46.7
100	44.3
125	44.6
160	50.5
200	42.9
250	42.2
315	43.0
400	47.3
500	45.9
630	44.3
800	46.4
1000	48.3
1250	44.1
1600	40.0
2000	40.0
2500	40.0
3150	36.0
4000	31.5
5000	29.9



Rating according to ISO 717-2

$L'_{nT,w}(C_i)$ = 48 (-6) dB $C_{i,50\text{-}2500}$ = -5 dB

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

No. of test report: J2327

Name of test institute: Alpha Acoustics Pty Ltd

Date: 13/09/2019

Signature: Matthew Fishburn RPEQ

Standardized Impact Sound Pressure Level according to ISO 140-7

Field measurements of impact sound insulation of floors

Client:

Date of test: 12/09/2019

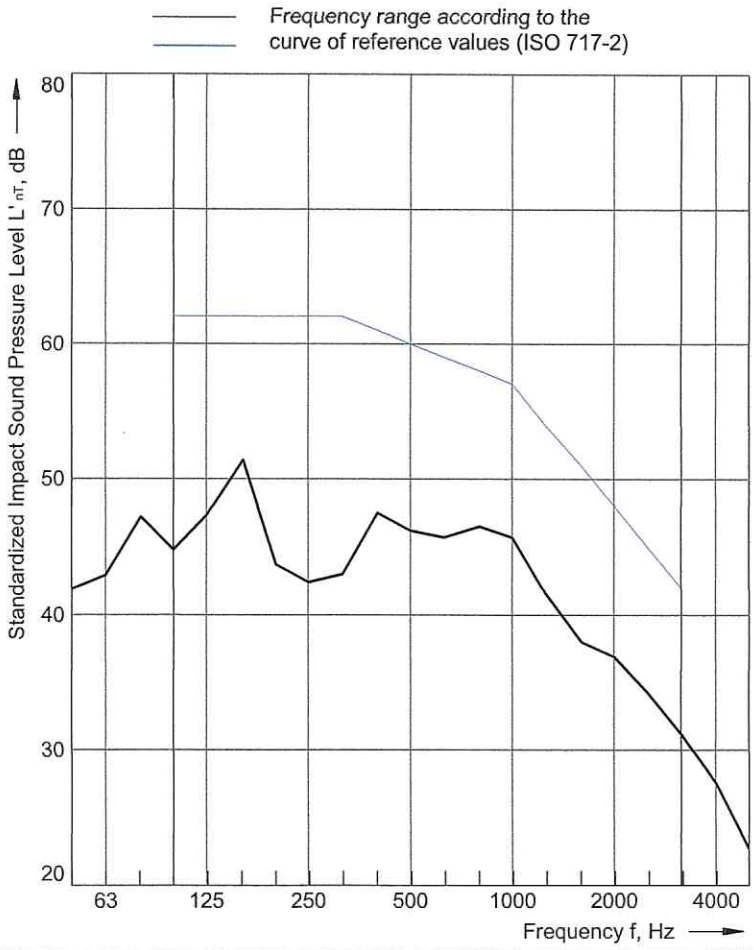
Description and identification of the building construction and test arrangement:

Sample E

10mm thick ceramic tiles
3mm thick Acoustibond tile glue
4.5mm regupol tile underlay
200mm thick concrete slab
150mm cavity (no insulation)

Receiving room volume V: 57.10 m³

Frequency f Hz	L'_{nT} 1/3 Octave dB
50	41.9
63	42.9
80	47.2
100	44.8
125	47.3
160	51.4
200	43.7
250	42.4
315	43.0
400	47.5
500	46.2
630	45.7
800	46.5
1000	45.7
1250	41.6
1600	38.0
2000	36.9
2500	34.3
3150	31.2
4000	27.5
5000	22.7



Rating according to ISO 717-2

$L'_{nT,w}(C_i)$ = 46 (-4) dB $C_{i,50\text{-}2500}$ = -3 dB

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

No. of test report: J2327

Name of test institute: Alpha Acoustics Pty Ltd

Date: 13/09/2019

Signature: Matthew Fishburn RPEQ

Standardized Impact Sound Pressure Level according to ISO 140-7

Field measurements of impact sound insulation of floors

Client:

Date of test: 12/09/2019

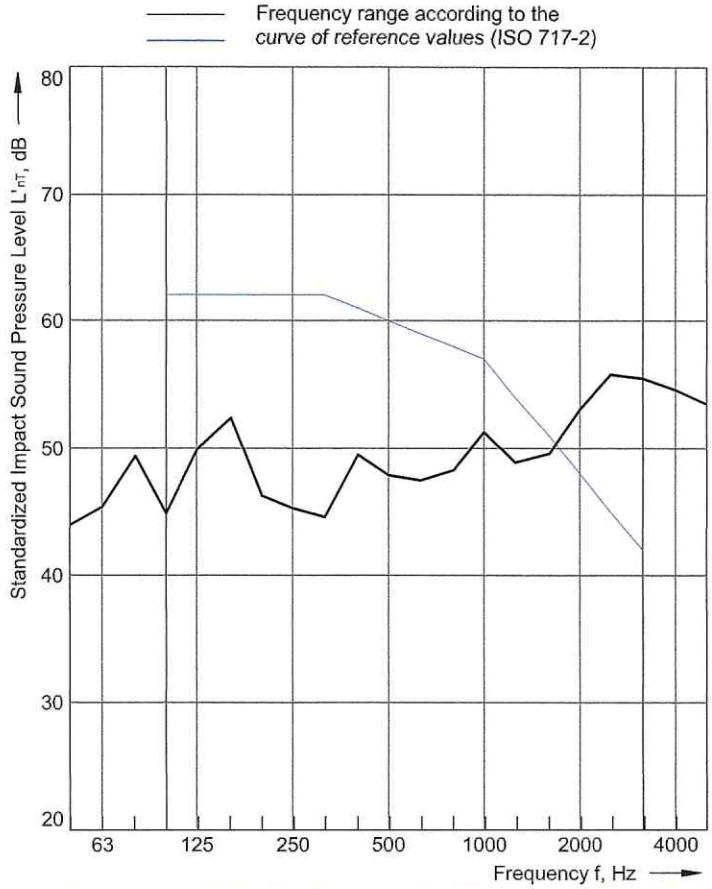
Description and identification of the building construction and test arrangement:

Sample F

200mm thick concrete slab
150mm cavity (no insulation)
13mm thick plasterboard

Receiving room volume V: 57.10 m³

Frequency f Hz	L'_{nT} 1/3 Octave dB
50	44.0
63	45.4
80	49.4
100	44.9
125	49.9
160	52.4
200	46.3
250	45.3
315	44.6
400	49.5
500	47.9
630	47.5
800	48.3
1000	51.3
1250	48.9
1600	49.6
2000	53.1
2500	55.8
3150	55.5
4000	54.6
5000	53.5



Rating according to ISO 717-2

$L'_{nT,w}(C_i)$ = 60 (-13) dB $C_{i,50\text{-}2500}$ = -13 dB

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

No. of test report: J2327

Name of test institute: Alpha Acoustics Pty Ltd

Date: 13/09/2019

Signature: Matthew Fishburn RPEQ