Stauf Australia Pty Ltd

Stauf SMP-960 Glue

In-Situ Impact Sound Insulation Test Report

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Document No.
30U-12-0052-TRP-302053-0

14 Sep 2012

DOCUMENT CONTROL

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DOCUMENT NO.:
30U-12-0052-TRP-302053-0

LIBRARY CODE:

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REVISION HISTORY:

Revision No.	Date Issued	Reason/Comments
0	14 Sep 2012	Initial Issue

DISTRIBUTION:

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2	Original

KEYWORDS:

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1. INTRODUCTION

Vipac was engaged by Stauf Australia Pty Ltd to conduct Impact Sound Insulation measurements on a typical timber flooring system which had been installed using Stauf SMP-960 glue. Testing was conducted in-situ at 15 Collins Street on 5 September 2012.

2. REFERENCE STANDARDS

- AS ISO 140.7: *Acoustics - Measurement of sound insulation in buildings and of building elements - Field measurements of impact sound insulation of floors*
- ISO 354: Acoustics - Measurement of sound absorption in a reverberation room
- ISO 717-2: Acoustics - Rating of sound insulation in buildings and of building elements - Impact sound insulation
- AS ISO 140.4: Acoustics - Measurement of sound insulation in buildings and of building elements - Field measurements of airborne sound insulation between rooms
- AS/NZS ISO 717-1: Acoustics - Rating of sound insulation in buildings and of building elements - Airborne sound insulation

3. INSTRUMENTATION USED

Table 3: *Equipment used for this test*

Item	Brand & Model	Serial Number	Last Calibration
Sound Level Meter	Bruel &Kjaer 2250 Type 1 Integrating Sound Level Meter	2690200	9th November 2011
Microphone Calibrator	Bruel &Kjaer 4230	860700	10th November 2011
Tapping Machine	Bruel &Kjaer Type 3207	02672510	N.A.
Loudspeaker	Skytec Model 170316	541394105706	N.A.

4. TEST SITE CONDITIONS

4.1. General

Testing was conducted on Wednesday 5 September 2012 at 15 Collins Street. Melbourne. The source room (Volume: 118 m^3) was located in Unit 1902 (level 19) and the Receiving room (Volume: 118 m^3) in Unit 1802 (level 18).

The floor-ceiling system between the 2 units consisted of

- a concrete slab with 5mm screed and paint finish to the underside
- 16mm thick compressed fibre ceiling tiles suspended on an aluminium frame 130mm below the slab. There was no insulation in the ceiling cavity.

Stauf reported to Vipac that the floor slab was 200mm thick concrete.

Note: Airborne sound insulation measurements were conducted in accordance to AS ISO 140.4. A Weighted Standardised Level Difference D_{nTw} of 59 dB and Spectrum Adaptation Term C_{tr}= -5 dB were measured ($D_{nTw}+C_{tr}$ = 54 dB). These values are given for reference only since they are representative of the airborne sound insulation of the existing slab-ceiling -ceiling construction not inclusive of the flooring system tested for impact sound insulation.

4.2. Test specimen

The floor covering system consisted of 21mm thick oak tongue & groove flooring (including 6mm top layer) adhered to the existing concrete slab using Stauf SMP-960 glue (approx. 4mm thick).

The test specimen was installed over a 1.45m x 1.91 rectangular area in unit 1902, six days prior the test, following rigorously the glue manufacturer instructions.

5. TEST PROCEDURE

Measurements of the Impact Sound Insulation was conducted in accordance to the procedures of AS ISO 140.7. A standard tapping machine was placed at four different locations on the timber flooring area in the source room (unit 1902) at an angle of 45^{o} with the floor board joints. (See **Figure 1**).

Impact Sound Pressure Levels were measured in 1/3 Octave bands in the receiving room (unit 1802).

Measurements of the background noise sound pressure levels were conducted in the receiving room (unit 1802), followed by measurements of the reverberation time in the receiving room (unit 1802) were conducted in 1/3 Octave bands, following the procedures of AS ISO 140.7 and ISO 354 (interrupted method).

Figure 1: Tapping machine in-situ

6. TEST RESULTS

6.1. Background noise correction

In frequency bands where the measured Impact Sound Pressure Level L_i was found to be within 10 dB of the background noise sound pressure level L_{BN} (but not less than 6 dB above the background noise), it was corrected, in accordance to AS ISO 140.7:

$$L_{i,corr} = 10\log_{10}\left(10^{L_i/10} - 10^{L_{BN}/10}\right) \quad \text{dB}$$

Note: Where the Impact Sound Pressure Level is less than 6 dB above the background noise sound pressure level, the standard specifies that a generic correction of –1.3 dB be used and that the report highlights that the limit of measurement has been reached for the considered frequency band. For this test, Impact Sound Pressure Levels were found to be at least 6 dB above the background noise in all the frequency bands of measurement.

6.2. Standardized Impact Sound Pressure Level L'_{nT}

The Standardized Impact Sound Pressure Level L'_{nT} is defined as the average Impact Sound Pressure Level L_i (dB) in the receiving room corrected using a term relating to the reverberation time T of the receiving room in the considered frequency band.

$$L'_{nT} = L_i + 10\log_{10}\left(\frac{T}{T_0}\right) \quad \text{dB}$$

where T_0 = 0.5 second

6.3. Single number value

6.3.1. Weighted Standardized Impact Sound Pressure Level $L'_{nT,w}$

The Weighted Standardized Impact Sound Pressure Level $L'_{nT,w}$ is a single number index for the impact sound insulation performance of the tested system. It is determined following the procedures of AS ISO 717.2, the value is reached through comparison of the Standardized Impact Sound Pressure Level L'_{nTw} in 1/3 octave bands from 100 Hz to 3.15 kHz with a reference curve.

While expressed in decibels (dB), $L'_{nT,w}$ is not a measure of the Impact Sound Level or of a noise reduction. It is an index intended to allow comparison between the performances of different systems.

6.3.2. Spectrum adaptation term C_i

The Spectrum adaptation term C_i is a value to be added to the single number value (here $L'_{nT,w}$) to account for the characteristics of typical walking noise spectra over the frequency range 100 Hz to 2000 Hz. It is determined following the procedures of AS ISO 717.2.

While expressed in decibels (dB), $L'_{nT,w}+C_i$ is not a measure of the Impact Sound Level or of a noise reduction. It is a rating index intended to allow comparison between the performances of different systems.

6.4. Test results

The measured Standardized Impact Sound Pressure Level for the configuration tested between unit 1902 and 1802 at 15 Collins Street, Melbourne, on 5 September 2012 is summarised in **Table 2** and presented graphically in **Figure 2**.

The tested construction was:

- 21mm oak flooring adhere using 4mm thick Stauf SMP-960 glue (approx. 4mm thick) installed on
- a concrete slab [thickness reported by Stauf: 200mm] with 5mm screed
- Ceiling below: 16mm thick compressed fibre ceiling tiles suspended 130mm from the slab by an aluminium frame)

Table 2 & Figure 2: *Measurement results*

1/3 octave mid-band frequency	Standardized Impact Sound Pressure Level L'nT (dB)
100 Hz	47.7
125 Hz	48.3
160 Hz	48.7
200 Hz	49.1
250 Hz	49.8
315 Hz	49.1
400 Hz	48.3
500 Hz	49.5
630 Hz	47.7
800 Hz	51.8
1 kHz	47.3
1.25 kHz	47
1.6 kHz	42.4
2 kHz	37.7
2.5 kHz	36.1
3.15 kHz	31.7
4 kHz	26.1
5 kHz	22.5
Single number value	
$L'_{nT,w}$ = 48 dB C_I = -3 dB **$L'_{nT,w}+C_I$ = 45 dB**