

SRL Technical Report



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Project

The Laboratory Determination of
The Reduction of Transmitted
Impact Noise of a Silentfloor Plus
Underlay

Prepared for

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By

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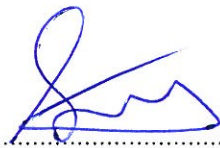
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1.0 Summary

Tests have been done in SRL's Laboratory at Holbrook House, Sudbury, Suffolk, to determine the reduction of transmitted impact sound of a Silentfloor Plus underlay in accordance with BS EN ISO 140-8:1998

From these measurements the required results have been derived and are presented in both tabular and graphic form in Data Sheet 1.

The results are given in 1/3rd octave bands over the frequency range 100Hz to 5kHz.



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For and on behalf of
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2.0 Details of Measurements

2.1 Location

Sound Research Laboratories Ltd
 Holbrook House
 Little Waldingfield
 Sudbury
 Suffolk
 CO10 0TH

2.2 Test Date

1 September 2006

2.3 Instrumentation and Apparatus Used

| Make | Description | Type |
|--------------------------|--------------------------------------------------------------------------------------|--------------------------------|
| E D I | Microphone Multiplexer Microphone Power Supply Unit | |
| Norwegian Electronics | Tapping Machine Real Time Analyser | 211 830 |
| Brüel & Kjaer | 12mm Condenser Microphones Windshields Pre Amplifiers Microphone Calibrator | 4166 UA0237 2639 4231 |
| Larson Davis | 12mm Condenser Microphone | 2560 |
| SRL | Power Amplifiers | |
| Celestion | Loudspeakers | 100w |

| | | |
|--------------|------------------------------|--------|
| Thermo Hygro | Temperature & Humidity Probe | |
| TOA | Graphic Equalizer | E-1231 |

2.4 References

- | | |
|----------------------|-------------------------------------------------------------------------------------------------------------------------|
| BS EN ISO 140-8:1998 | Laboratory measurements of the reduction of transmitted impact noise by floor coverings on a heavyweight standard floor |
| BS EN ISO 717-1:1997 | Rating of sound insulation in buildings and of building elements. Airborne Sound Insulation. |

3.0 Description of Test

3.1 Description of Sample

Silentfloor Plus underlay.

Sampling plan: none, enough for test only.

Sample condition: new.

Details supplied by Intefloor.

Sample installed by SRL.

3.2 Sample Delivery date

30 August 2006

3.3 Test Procedures

The sample was mounted/located and tested in accordance with the relevant standard. The method and procedure is described in Appendix 1.

4.0 Results

The results of the measurements and subsequent analysis are given in Data Sheet 1 and summarised below.

Results relate only to the items tested.

| SRL Test No. | Description in Brief | ΔL_w |
|--------------|---------------------------|--------------|
| A9 | Silentfloor Plus underlay | 23 |

————— *End of Text* —————

Data Sheet 1

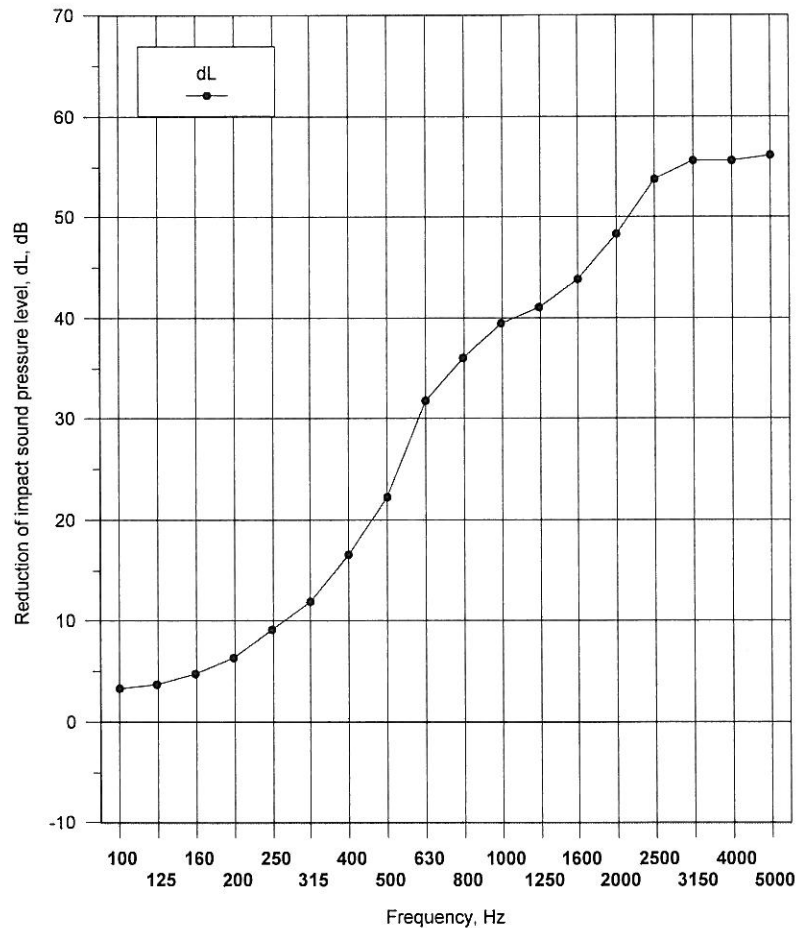
Reduction of impact sound pressure level according to BS EN ISO 140-8 : 1998

Laboratory measurements of the reduction of transmitted impact noise by floor coverings on a heavyweight standard floor

| | | | |
|---------------------|----------------|----------------------------------------------------------|------------|
| Test Number: | A9 | Air temp. in the source room: | 19.7 deg.C |
| Test Date: | 01/09/2006 | Air humidity in the source room: | 75 % |
| Client: | Interfloor Ltd | Receiving room volume: | 300 m3 |
| Method of mounting: | Loose laid | Sample mass: | 3 kg/m2 |
| | | Thickness: | 5 mm |
| | | The sample did not suffer visible damage during the test | |

Production identification: Silentfloor Plus

| Freq f Hz | Ln,0 Third octave dB | dL Third octave dB |
|-----------------|-------------------------------|-----------------------------|
| 100 | 67.4 | 3.3 |
| 125 | 68.6 | 3.7 |
| 160 | 69.7 | 4.8 |
| 200 | 69.2 | 6.3 |
| 250 | 71.1 | 9.1 |
| 315 | 71.3 | 11.9 |
| 400 | 72.6 | 16.5 |
| 500 | 72.4 | 22.3 |
| 630 | 72.8 | 31.8 |
| 800 | 73.3 | 36.0 |
| 1000 | 73.5 | 39.5 |
| 1250 | 74.0 | 41.0 |
| 1600 | 74.9 | 43.8 |
| 2000 | 75.2 | 48.3 |
| 2500 | 76.0 | 53.8 |
| 3150 | 76.0 | 55.6 * |
| 4000 | 75.7 | 55.6 * |
| 5000 | 73.4 | 56.2 * |



Ln,0 : Is the normalised impact sound pressure level of the bare heavyweight test floor.

dL : Is the reduction of impact sound pressure level resulting from the installation of the test floor covering.

* Denotes results corrected for background

Denotes results at background

Rating according to BS EN ISO 717-2:1997

Weighted reduction of impact sound pressure level of sample and (spectrum adaptation term) =

dLw (Cld) = 23 (-11) dB

Weighted normalised impact sound pressure level of bare reference floor and (spectrum adaptation term) =

Ln,r,0,w (Cl,r,0) = 78 (-11) dB

Weighted normalised impact sound pressure level of reference floor with sample and (spectrum adaptation term) =

Ln,r,w (Cl,r) = 55 (0) dB

These results are based on a test made with an artificial source under laboratory conditions (engineering method).

v1.7

Appendix 1

Test Procedure

Measurement of impact sound reduction of a floor covering in accordance with BS EN ISO 140-8: 1998 - Category 1 (Small Samples) - TP13

In the laboratory, impact sound reduction is determined from the difference a sample floor covering makes to the sound pressure levels generated by a standard impact machine. The impact machine, known as a tapping machine, is operated standing first on a concrete slab and then on the test sample installed on that slab. The test sample is installed on top of the roof of a reverberation room, which is acoustically "live", and the sound pressure levels are measured in that room. The test is done under conditions which restrict the transmission of sound other than directly through the sample and test slab. The measured sound pressure levels are corrected for the amount of sound absorption in the reverberation room.

The reverberation room, which has a volume of 300 cubic metres, is constructed from 215mm brick which is internally plastered with a reinforced concrete roof and floor. The room is isolated from the surrounding structure by resilient mountings and seals, ensuring good acoustic isolation. Reverberation time measurements are done to calibrate the reverberation room.

At least three test samples are installed at predetermined positions. The tapping machine is placed in turn immediately either side of the first test sample/position and operated on the bare concrete roof slab. With the tapping machine operating on the bare slab, the resulting sound pressure levels in the room are sampled using a spaced array of microphones connected to a real time analyser. The signal is filtered into one-third octave bandwidths, integrated and averaged. Six microphones are used with minimum separating distances as follows:

- 0.7m between microphone positions
- 0.7m between any microphone position and room boundaries or diffusers
- 1.0m between any microphone position and the upper floor being excited by the tapping machine

The procedure is then repeated on the bare concrete slab immediately either side of each of the other sample positions. The individual values for the different positions are arithmetically averaged to give the impact sound pressure level ($L_{i,o}$). This is corrected to a reference room absorption, referred to as normalising, to give the normalised impact sound pressure levels ($L_{n,o}$) for the bare concrete slab.

$$L_{n,o} = L_{i,o} + 10 \log \frac{A}{A_{ref}} \text{ in decibels}$$

Where A is the actual absorption of the test chamber A_{ref} is the reference room absorption of $10m^2$.

The whole procedure is then repeated in turn on each of the samples to obtain the normalised impact sound pressure levels with covering (L_i) and the corresponding normalised levels (L_n).

The reduction of impact sound pressure level (improvement of impact sound insulation) ΔL , for a given frequency band is determined as follows:

$$\Delta L = L_{n0} - L_n$$

The Weighted Impact Sound Improvement Index ΔL_w , is a single figure rating of impact sound reduction and is calculated in accordance with BS EN ISO 717-2:1997.

The impact sound pressure levels for the test floor with test sample, depend to small extent on the particular test floor itself. To standardise these levels they are adjusted by calculation to what they would be if the bare concrete slab were replaced by a reference floor. The impact sound pressure levels that would be produced on the bare reference floor ($L_{n,o}$) are defined in BS EN ISO 717-2:1997. Using these, the impact sound pressure levels for the sample on the reference floor ($L_{n,r}$) and the corresponding weighted level ($L_{n,w,r}$) are calculated in accordance with the same standard.

Appendix 2

Measurement Uncertainty BS EN ISO 140-8:1998 - TP13

The following values of uncertainty are based on a standard uncertainty multiplied by a coverage factor of $k = 2$, which provides a level of confidence of approximately 95%.

| Frequency, Hz | Uncertainty, \pm dB |
|---------------|-----------------------|
| 100 | 1 |
| 125 | 1 |
| 160 | 1 |
| 200 | 1 |
| 250 | 1 |
| 315 | 0.7 |
| 400 | 0.7 |
| 500 | 0.7 |
| 630 | 0.7 |
| 800 | 1 |
| 1000 | 1 |
| 1250 | 1 |
| 1600 | 1.2 |
| 2000 | 1.8 |
| 2500 | 1.8 |
| 3150 | 1.8 |