



Mfpa Leipzig GmbH

Leipzig Institute for Materials Research and Testing

Testing, Inspection and Certification Authority for Construction Products and Construction Types

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Sound Insulation

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Testing laboratory accredited by DAkkS GmbH according to DIN EN ISO/IEC 17025. Recognized Testing Laboratory by the VMPA

Acoustic Testing VMPA-SPG-129-97-SN

Test Report No. PB 2.3/24-044-2

July 3rd 2024

No. Copy: 1

Subject matter: Laboratory measurement of impact sound reduction of an impact sound insulating material named *Acoustic Silence 1050 - 5* under 50 mm floating cement screed according to DIN EN ISO 10140 (all parts)

Client: Scan Underlay
Ursusvej 16
DK-8464 Galten

Date of order: 18-04-2024

Date of test: 12-06-2024

Person in charge: J. Richter, B. Eng.
Dipl.-Phys. D. Sprinz

This document consists of 9 pages and 2 annexes.

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1 Task Specification

The impact sound reduction of an impact sound insulating material named *Acoustic Silence 1050 - 5*, under 50 mm floating cement screed, shall be measured according to DIN EN ISO 10140 (all parts) by order of the client

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on a standard heavyweight concrete floor (140 mm reinforced concrete ceiling) in the test bench of MFPA Leipzig GmbH and evaluated according to DIN EN ISO 717-2.

2 Sampling, Location and Date of Measurement

The material to be tested

- impact sound insulating material *Acoustic Silence 1050 - 5* supplied in rolls

was delivered to the MFPA Leipzig GmbH on April 18th 2024. The floating screed with the material to be tested was installed in the test stand by skilled workers on behalf of the MFPA Leipzig GmbH on May 21th 2024.

The date of test is revealed on the cover sheet of this report.

3 Test Object

Acoustic Silence 1050 - 5 is an impact sound insulation material with a one sided aluminum lamination. The test object as described in the following was tested.

3.1 Test Specimen Structure

(from top to bottom)

- 50 mm¹ cement screed – screed DIN 18560-CT-F4 (CT-C25-F4 acc. to EN 13813)
- PE-foil
- 5 mm impact sound insulating material *Acoustic Silence 1050 - 5*, aluminum lamination facing down
- 140 mm reinforced concrete floor of testing room

The mass per unit area of the impact sound insulation material is 1,1 kg/m², determined by the testing institute.

3.2 Installation in the Test Stand (see Annex 2)

The assembly of the test object was full faced on reinforced concrete floor. One layer of impact sound insulating material *Acoustic Silence 1050 - 5* was laid out, with 10 cm joint overlapping, sealed with duct tape on top for fixing of position. On flanking walls, the edge insulation strips consisting of one layer 20 mm mineral wool was installed. In addition, the impact sound insulating material was pulled up on the edge of the of the insulation strip. The top of the impact sound insulating material was covered by PE-foil. Finally, the screed was mounted.

Size of the test object: 24,6 m²

Curing time: 22 days

¹ measured thickness (arithmetic mean) see point 7.2

4 Testing Room

The testing room complies with the requirements by DIN EN ISO 10140-5. It consists of a source room B F.02 and a receiving room below the ceiling B T.02.

The ceiling area between the source room and the receiving room is 24.6 m².

The ground plan of the source room has one rectangular angle and three oblique angles. The masonry walls are made of sand-lime bricks, raw density class 2.0, 24 mm thickness. For the reduction of flanking transmission, the walls are cased with highly insulating plasterboard and mineral wool in the source- and receiving room.

The room volumes of the source- and receiving room, the air temperatures, the relative humidities and the static pressure at the time of the measurement are shown in annex 1.

5 Test Method

The measurements were carried out on a heavyweight standard floor (reinforced ceiling) with a thickness of 140 mm in accordance to DIN EN ISO 10140-5, section C.2 in the laboratory of the MFA Leipzig GmbH. The measurements of the impact sound reduction were carried out according to category II (large test specimen) of:

- DIN EN ISO 10140-1, Acoustics, Laboratory measurement of sound insulation of building elements – Part 1: Application rules for specific products, issue September 2021 in connection with other parts of DIN EN ISO 10140 (part 2 – 5, issue September 2021)

The calculation of the rated impact sound reduction based on these measurements was according to:

- DIN EN ISO 717-2, Acoustics, Rating of sound insulation in buildings and of building elements – Part 2: Impact sound insulation, issue May 2021

The impact sound level was measured by a rotating microphone in the receiving room with 8 positions of a standard tapping machine on the standard concrete floor and with 8 positions of the standard concrete floor with the test specimen. The measurement was carried out on 1/3rd octave band frequencies of 50 – 5000 Hz. The normalized impact sound level results from the equation:

$$L_n = L_i + 10 \lg \left(\frac{A}{A_0} \right)$$

where:

L_n	normalized impact sound level
L_i	impact sound level
A	equivalent absorption area in the receiving room in m ² , determined from the measurement of the reverberation period and the volume of the receiving room
A_0	reference absorption area (A_0 is defined to 10 m ²)

The impact sound reduction was determined from the difference of the normalized impact sound level of the standard concrete floor without the test specimen and of the standard concrete floor with the test specimen in accordance to the following equation:

$$\Delta L = L_{n,0} - L_n$$

where:

- ΔL impact sound reduction
- $L_{n,0}$ normalized impact sound level of the standard concrete floor without the test specimen
- L_n normalized impact sound level of the standard concrete floor with the test specimen

The rated impact sound reduction ΔL_w was calculated according to the following equations:

$$L_{n,r} = L_{n,r,0} - \Delta L$$

$$\Delta L_w = 78 \text{ dB} - L_{n,r,w}$$

where:

- $L_{n,r}$ calculated normalized impact sound level of reference floor with the test specimen to be tested
- $L_{n,r,0}$ given normalized impact sound level of reference floor acc. to DIN EN ISO 717-2
- $L_{n,r,w}$ rated normalized impact sound level of the reference floor with the floor covering to be tested
- ΔL_w rated impact sound reduction of the floor covering

Procedure and volume of measurements are in accordance with the principles of the research group of the building authorized acoustic noise laboratories. Acoustical tests for the length-related flow resistance of the built in impact sound insulating material were not ordered.

6 Measuring Instruments

The following listed measuring devices were used.

Table 1: Measuring devices

Device	Type	Manufacturer
Sound level meter	140	Norsonic
Free field microphone	1225	Norsonic
Preamplifier	1209	Norsonic
Calibrator	1251	Norsonic
Power amplifier	260	Norsonic
Speaker combination (Dodecahedron)	229	Norsonic
Microphone panning system	265	Norsonic
Standard tapping machine	211	Norsonic

The measuring instruments are calibrated regularly and the measurement chain is calibrated before and after each measurement.

The MFPA Leipzig GmbH regularly takes part in the comparative measurements group 1 testing laboratories (qualification testing laboratories) of the Physikalisch Technische Bundesanstalt PTB (German national metrology institute) Braunschweig (the last one being in 2022) and is registered as a testing laboratory in the “List of testing, monitoring and certifying laboratories in accordance with the state building codes” of the Deutsches Institut für Bautechnik DIBt (German Institute for Construction Technology) under the code number “SAC 02”.

The MFPA Leipzig GmbH is a testing laboratory accredited by the DAkkS GmbH according to DIN EN ISO/IEC 17025.

7 Measuring Results

7.1 Impact Sound Reduction

The test results are listed in the following table.

Table 2: Test resultsy

test object	test results	spectrum values C_I	see annex
140 mm standard concrete floor without test specimen	$L_{n,0,w} = 75 \text{ dB}$	$C_{I,0} = -11 \text{ dB}$	-
140 mm standard concrete floor with test specimen	$L_{n,r,w} = 56 \text{ dB}$	$C_{I,r} = 1 \text{ dB}$	1
	$\Delta L_w = 22 \text{ dB}$ $\Delta L_{lin} = 10 \text{ dB}$	$C_{I,\Delta} = -12 \text{ dB}$	

Where:

- $L_{n,0,w}$ rated normalized impact sound level of the heavyweight standard floor
- $L_{n,r,w}$ calculated rated normalized impact sound level of a reference floor with the floor covering to be tested
- ΔL_w rated impact sound reduction
- ΔL_{lin} non-valuationed linear impact sound level $\Delta L_{lin} = \Delta L_w + C_{I,\Delta}$
- $C_{I,0}$ spectrum value for the normalized impact sound level of the heavyweight standard floor
- $C_{I,r}$ spectrum value for the reference floor with the tested floor covering
- $C_{I,\Delta}$ spectrum value for the impact sound reduction of the floor covering

For graphical and tabular representation of the ΔL values on the frequency please refer to annex 1.

The rated impact sound reduction ΔL_w , in the test laboratory determined according to DIN EN ISO 717-2 and DIN 4109-4 (in 1/10 dB with measurement uncertainty), is:

$$\Delta L_w = 21.6 \text{ dB} \pm 1.1 \text{ dB}$$

Measurement uncertainty is the mean standard deviation of the test bench measurement according to DIN EN ISO 12999-1.

For the product declaration, the integer value of the rated impact sound reduction according to Table 2 of this test report shall be used.

7.2 Thickness and Mass per Unit Area of the Screed

The average thickness was determined on 10 sample areas of the screed (distributed evenly over the area) during demolition of the screed. The mass per unit area of the screed was determined by weighting of the total demolition material.


- average thickness: 54 mm
- mass per unit area: 107 kg/m²


8 Notes on the Test Results

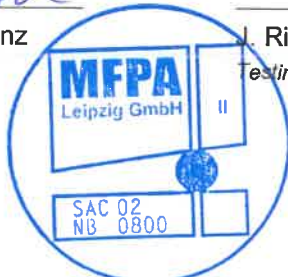
The results are values determined in the laboratory.

The results of the tests exclusively relate to the items tested. This document does not replace a certificate of conformity or suitability according to national and European building codes.

Leipzig, July 3rd 2024


Dipl.-Phys. D. Sprinz
Head of Work Group


J. Richter, B. Eng.
Testing Engineer



Reduction of impact sound pressure level according to DIN EN ISO 10140 (all parts)

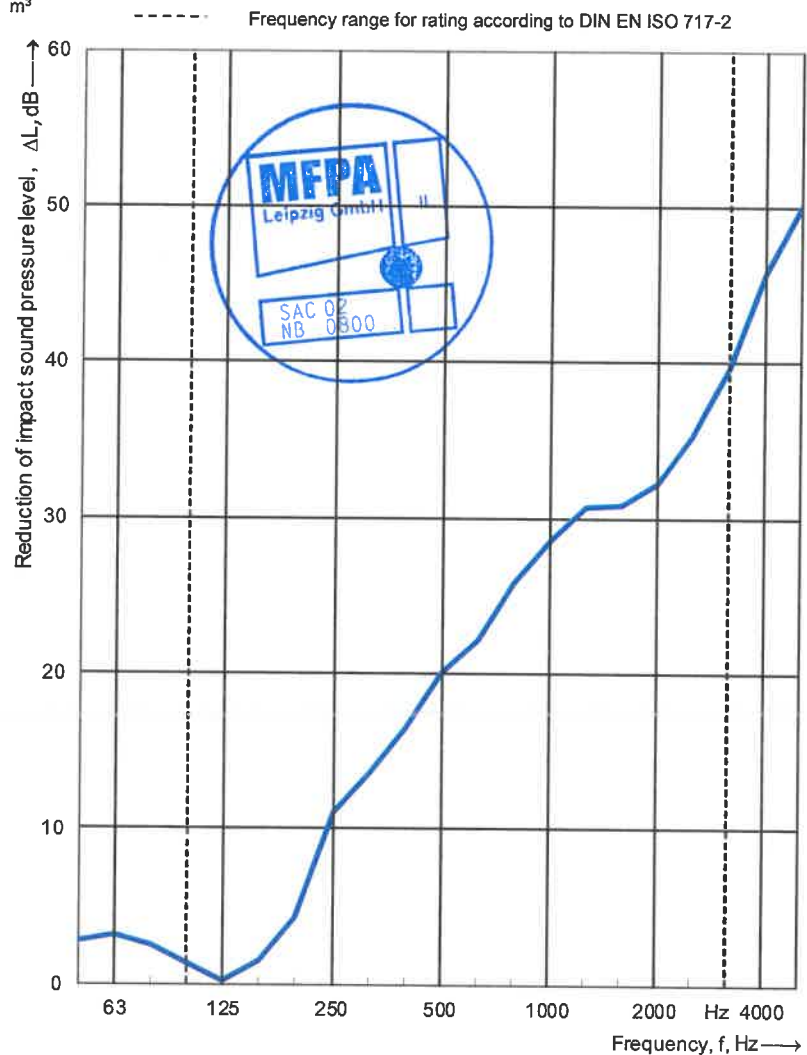
Laboratory measurements of the reduction of transmitted impact noise by floor coverings on a heavyweight reference floor

Client: Scan Underlay
Ursusvej 16
DK-8464 Galten
Date of test: 12-06-2024

Manufacturer: Client
Test room identification: Source room B F.02 (SR) / Receiving room B T.02 (RR)
Test specimen mounted by: MFPA Leipzig GmbH
Product identification: impact sound insulating material named *Acoustic Silence 1050 - 5*, under 50 mm floating cement screed
Description of the specimen: -50 mm cement screed – screed DIN 18560-CT-F4 (CT-C25-F4 acc. to EN 13813)
- PE-foil
- 5 mm impact sound insulating material *Acoustic Silence 1050 - 5* aluminum lamination facing down
- 140 mm reinforced concrete floor of testing room

mass per unit area: 107 kg/m²
curing time: 22 days
air temperature SR / RR: 21 / 21 °C
rel. air humidity SR / RR: 59 / 58 %
static pressure: 100 kPa
volume SR / RR: 78.5 / 70.7 m³

Frequency f [Hz]	L _{n,0} 1/3 oct. [dB]	ΔL 1/3 oct. [dB]
50	60,6	2,7
63	62,1	3,1
80	63,5	2,5
100	65,1	1,3
125	68,1	0,2
160	66,1	1,5
200	66,6	4,3
250	67,4	11,0
315	66,2	13,6
400	66,5	16,5
500	67,2	20,1
630	67,4	22,2
800	68,2	25,9
1000	68,0	28,5
1250	68,1	30,7
1600	68,1	30,8
2000	68,5	32,2
2500	68,7	35,3
3150	68,8	39,7
4000	68,0	45,8
5000	65,1	50,1



Rating according to ISO 717-2

$\Delta L_w = 22 \text{ dB}$

$C_{i,\Delta} = -12 \text{ dB}$

$C_{i,r} = 1 \text{ dB}$

The results are based on a test performed with an artificial source under laboratory conditions (engineering method) with the specified reference floor.

Signature:

i. A. Brand



Figure 1: installation situation of impact sound insulating material and edge insulation strips, overlaps with duct tape



Figure 2: installation situation of floating cement screed

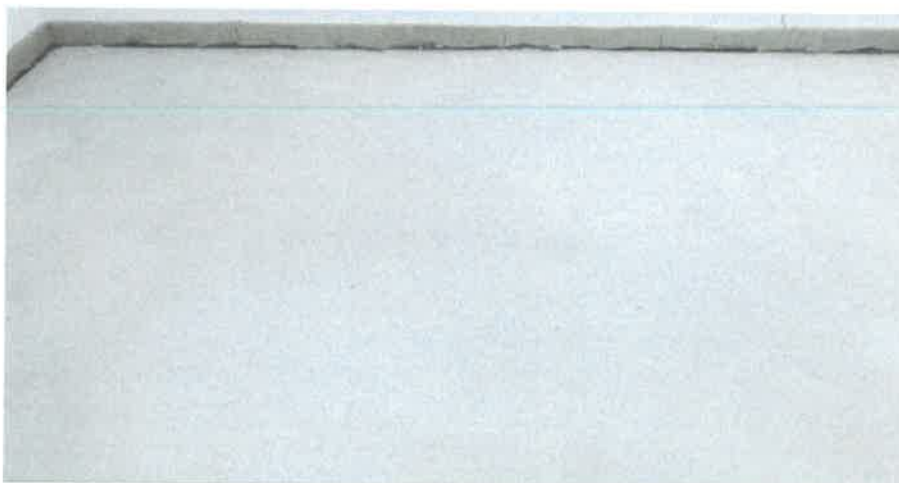


Figure 3: Testing situation of floating cement screed