MFPA Leipzig GmbH

Leipzig Institute for Materials Research and Testing

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

Business Division IV:
Building Physics
Head of Division:
Dr.-Ing. Stephan Reichel
Tel.: +49 (0) 341-6582-190
Fax: +49 (0) 341-6582-181
reichel@mfpa-leipzig.de

Work Group 4.2
Sound Insulation

Contact Person:
Jonas Richter, B. Eng.
Tel.: +49 (0) 341-6582-162
j.richter@mfpa-leipzig.de

Dipl.-Phys. Dietmar Sprinz
Tel.: +49 (0) 341-6582-115
d.sprinz@mfpa-leipzig.de

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 4.2/25-009-1

March 3rd 2025
No. Copy: 1

Subject matter: Laboratory measurement of impact sound reduction (IS) of an impact sound insulating underlay named *Acoustic Silence 360* under 3.8 mm vinyl flooring according to EN 16354 in conjunction with DIN EN ISO 10140 (all parts)

Client: Scan Underlay
Ursusvej 16
DK-8464 Galten

Date of order: 30-01-2025

Date of test: 14-02-2025

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

This document consists of 8 pages and 2 annexes.

1 Task Specification

The impact sound reduction (IS) of an impact sound insulating underlay named *Acoustic Silence 360*, under 3.8 mm vinyl flooring, shall be measured according to actual EN 16354 in conjunction with DIN EN ISO 10140 (all parts) by order of the manufacturer

Scan Underlay
Ursusvej 16
DK-8464 Galten

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 following components of the test object

- vinyl flooring (make *B!design, SPC – Sunny Pinie*, 3.8 mm thickness)
- impact sound insulating underlay *Acoustic Silence 360* in the form of long webs, supplied in rolls, with a width of 1000 mm and a thickness of 1 mm

were delivered by the client on 06 February 2025.

The test object was installed by craftsmen of the MFPA Leipzig GmbH in the testing laboratory of the MFPA Leipzig GmbH on 14 February 2025.

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

3 Test Object

The test object as described in the following was tested.
Pictures of the test object can be seen in annex 2.

The test was carried out with a weight load of approx. 22 kg² on the vinyl flooring according to the standard EN 16354 in conjunction with DIN EN ISO 10140 (all parts).

Test object (from top to bottom)

- 3.8 mm vinyl flooring
- 1 mm impact sound insulating underlay *Acoustic Silence 360*
- 140 mm reinforced concrete floor of testing room

Assembly

The insulating underlay was laid on the reinforced concrete floor (1 layer, edges butt jointed). The vinyl flooring was laid on the top side of the insulating underlay. Parallel rows of the vinyl pieces were mounted in offset to one another. Finally, the weight load, realized with bricks, was applied on the vinyl flooring.

Size of the test object: 10.0 m² (vinyl flooring)

The following dimensions and mass per unit area were found by the testing institute.

Table 1: dimensions and mass per unit area

Description	Length [mm]	Width [mm]	Thickness [mm]	Mass per unit area [kg/m²]
vinyl flooring	1220	180	3.8	7.79
insulating underlay	1000	997	1	0.38

4 Testing Room

The testing room complies with the requirements by DIN EN ISO 10140-5. It consists of a source room B F.01 and a receiving room below the ceiling B T.01.
The ceiling area between the source room and the receiving room is 18.3 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. Additionally, a floating screed is mounted in the receiving room for the reduction of flanking transmission.
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

In standard

- EN 16354:2018, *Laminate floor coverings – Underlays – Specification, requirements and test methods*

it is expelled that the procedure of DIN EN ISO 10140 has to be applied for measurements of the impact sound reduction – on a heavyweight standard floor (reinforced concrete ceiling) with a thickness of 140 mm in accordance with DIN EN ISO 10140-5, section C.2.

The measurements were carried out according to EN 16354 in conjunction with

- 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 – 4, issue September 2021; part 5, issue December 2010)

and on a heavyweight standard floor as mentioned above in the laboratory of the MFPA Leipzig GmbH.

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 12 positions of a standard tapping machine on the standard concrete floor and with 12 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 m², 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 m²)

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:

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

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

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 supporting tests for the characterization of the test object were not ordered by the client.

6 Measuring Instruments

The following listed measuring devices were used.

Table 2: 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

The rated impact sound reduction ΔL_w and normalized impact sound levels without and with test specimen are listed in the following table.

Table 3: Test results

test object	test results	spectrum values C_I	see annex
140 mm standard concrete floor without test specimen	$L_{n,0,w}$ = 76 dB	$C_{I,0}$ = -12 dB	-
140 mm standard concrete floor with test specimen	$L_{n,r,w}$ = 56 dB	$C_{I,r}$ = 0 dB	
	ΔL_w = 22 dB ΔL_{lin} = 11 dB	$C_{I,\Delta}$ = -11 dB	1

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-valuated 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:

ΔL_w = 21.7 dB ± 1.1 dB

Measurement uncertainty is the mean standard deviation of the test bench measurement acc. to DIN EN ISO 12999-1:2021-04.

For the product declaration, the integer value of the rated impact sound reduction according to Table 3 of this test report shall be used.

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, March 3rd 2025

Dr.-Ing. S. Reichel
Head of Business Division

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

MFPA Leipzig GmbH IV SAC 02 NB 0800

J. Richter, B. Eng.
Testing Engineer

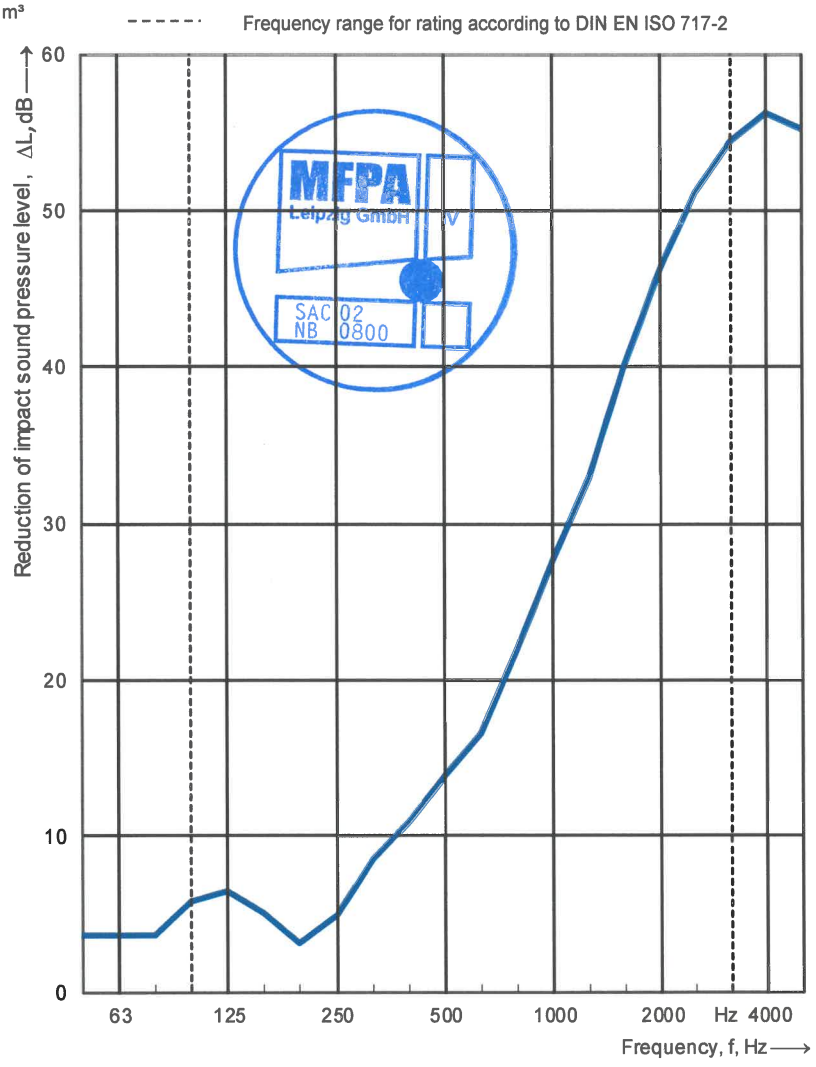
Reduction of impact sound pressure level according to DIN EN ISO 10140 (all parts)

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: 14-02-2025
Manufacturer	Client	
Test room identification:	Source room B F.01 (SR) / Receiving room B T.01 (RR)	
Test specimen mounted by:	MFPA Leipzig GmbH	
Product identification:	impact sound insulating underlay named *Acoustic Silence 360* under 3.8 mm vinyl flooring	
Description of the specimen	- 3.8 mm vinyl flooring (mass per unit area 7.8 kg/m²) - 1 mm impact sound insulating underlay Acoustic Silence *360* - 140 mm reinforced concrete floor of testing room	

size of test object:	10.0	m²
mass per unit area:	8,2	kg/m²
air temperature SR / RR:	19 / 19	°C
rel. air humidity SR / RR:	38 / 36	%
static pressure:	100	kPa
volume SR / RR:	57.9 / 58.9	m³

Frequency f [Hz]	$L_{n,0}$ 1/3 oct. [dB]	ΔL 1/3 oct. [dB]
50	60,7	3,7
63	64,5	3,6
80	59,7	3,6
100	60,9	5,8
125	66,6	6,4
160	63,4	5,0
200	63,8	3,1
250	65,1	4,9
315	65,7	8,5
400	66,1	10,9
500	66,9	13,9
630	67,3	16,5
800	68,4	21,9
1000	68,9	27,7
1250	69,1	32,9
1600	69,6	40,1
2000	69,7	46,3
2500	70,4	51,1
3150	70,5	54,4
4000	69,1	56,2
5000	66,4	55,2



Rating according to ISO 717-2

ΔL_w = **22 dB** $C_{I,\Delta}$ = -11 dB $C_{I,r}$ = 0 dB

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

Signature:

MFPA Bereich Schallschutz
Hans-Weigel-Str. 2b
04319 Leipzig
Tel. 0341-6582115

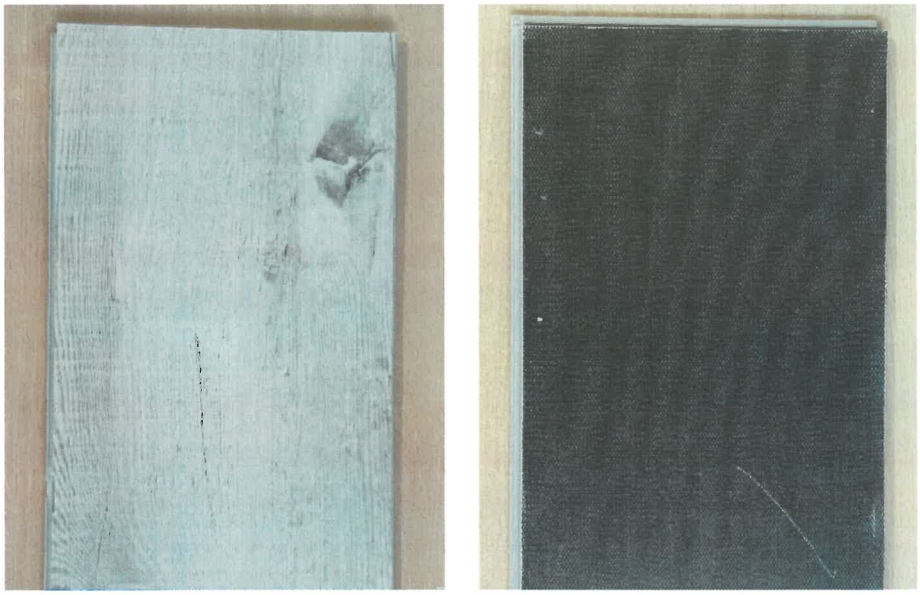


Figure 1: vinyl flooring close up

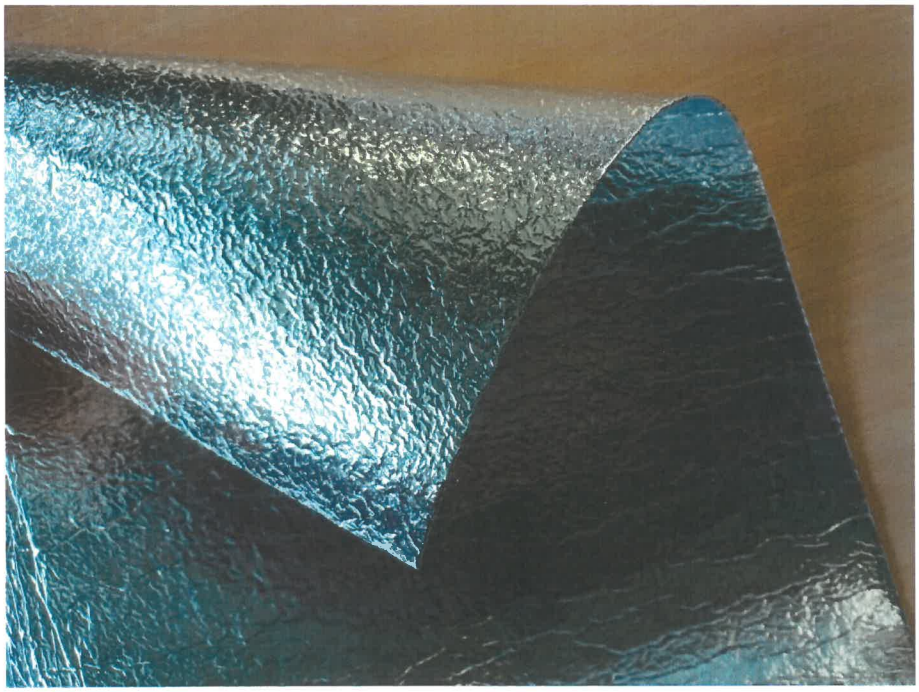


Figure 2: insulating underlay close up

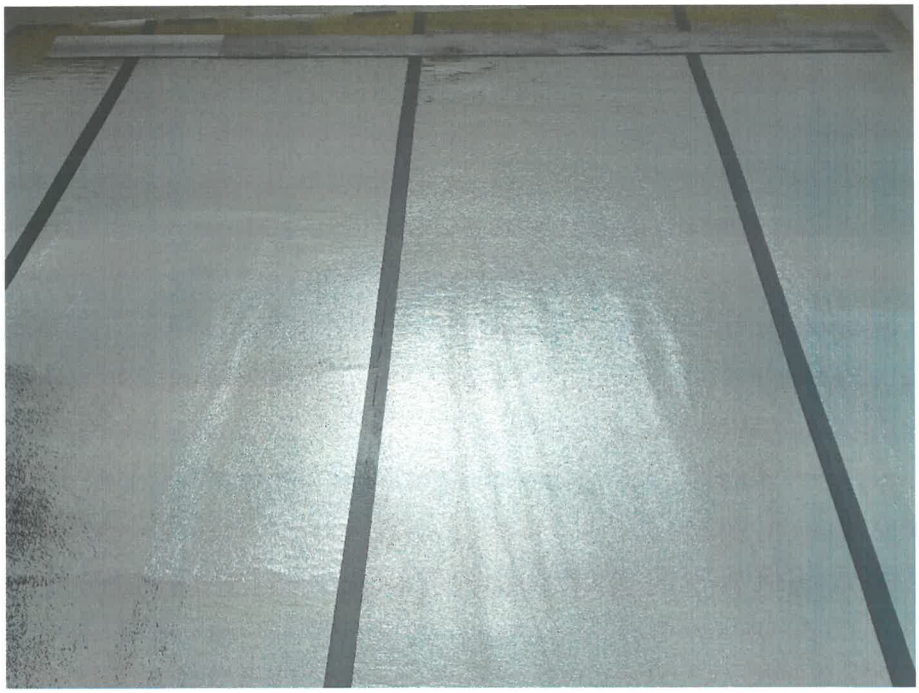


Figure 3: mounting situation of insulating underlay

Figure 4: completed floor with weight load (situation during test)