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daidalos peutz
 laboratory of acoustics



N° 451-TEST

NBN EN ISO 17025:2017
 EA MLA signatory



NOISE LAB
TEST REPORT Number A-2025LAB-039-K028-K030-45761_E-v2

Customer : Gerflor
 50, Cours de la République
 69627 Villeurbanne Cedex
 France

Contacts : Client : Sébastien Metayer
 Noise lab : Gert-Jan Loobuyck

Tests : Laboratory measurement of walking noise on floors
Product name : Gerflor - LVT floor: CREATION 55 CLIC ACOUSTIC

Normative references:
NBN EN 16205:2020 Laboratory measurement of walking noise on floors

Other standards referred to in this report:

EN ISO 10140-series:2021	Acoustics - Laboratory measurement of sound insulation of building elements
EN ISO 717-2:2021	Acoustics - Rating of sound insulation in buildings and of building elements — Part 2: Impact sound insulation
ISO 3382-2:2008	Acoustics - Measurement of room acoustic parameters -- Part 2: Reverberation time in ordinary rooms
ISO 532-1:2021	Acoustics - Method for calculating loudness level.
DIN 45631:2010	Calculation of the volume level and loudness from the sound spectrum; Method according to E. Zwicker
EN 61672-1:2013	Electroacoustics. Sound level meters. Part 1- Specifications

To perform the above measurements, the laboratory of Daidalos Peutz is accredited by BELAC "The Belgian Accreditation Body", under the certificate nr N°451-TEST. The activities covered by this accreditation certificate are covered by the EA MLA. BELAC is a signatory of all existing multilateral agreements and recognition agreements of international Laboratory Accreditation Cooperation (ILAC). In this way, reports issued by BELAC accredited bodies are internationally accredited.

Date and reference of the request:	25/02/2025	Project reference: 2025LAB-039
Date of receipt of the specimen (s):	10/04/2025	Measurement data reference: SONK028 - SONK030
Date of construction:	14/04/2025	
Date of tests:	14/04/2025	
Date of preparation of the test report:	16/04/2025	
Sampling by:	Sébastien Metayer	
Test setup installed by:	Noise lab	

The measurements were carried out at Daidalos Peutz Laboratory for Acoustics at Hooglede, see appendix 1
 This test report together with its annexes contains 10 pages and must be multiplied only in its entirety

Technical Manager,

Paul Mees

Laboratory Engineer,

Els Meulemans

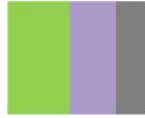
Amendments to the test report

This test report with the reference number: A-2025LAB-039-K028-K030-45761_E-v2

replaces the previous test report with number: A-2025LAB-039-K028-K030-45761_E

Reason for amendment of test report:

Technical data from the manufacturer's datasheet has been added to the report.



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EQUIPMENT USED

Source signal

Brüel & Kjaer - 4292 : Omni Power Sound Source
 Brüel & Kjaer - 2716 : Power amplifier
 Norsonic Nor277 : Tapping machine conform ISO 10140-5 Annex E

Microphone and data acquisition system:

Brüel & Kjaer - 4189 : 1/2" free field microphone, 6Hz to 20kHz, prepolarized
 Brüel & Kjaer - ZC-0032 : 1/2" microphone preamplifier
 Brüel & Kjaer - 4231 : Sound calibrator 94&114dB SPL-1000Hz, Fulfils IEC 60942 Class1
 Brüel & Kjaer - JP 1041 : dual 10-pole adaptor JP-1041
 Brüel & Kjaer - 2270 : Sound level meter - dual channel instrument (measuring both channels simultaneously)
 Conforms with IEC 61672-1 Class 1
 Brüel & Kjaer - 3923 : rotating microphone boom

One rotating microphone system in the receiving room

<i>Number of tapping machine positions:</i>	4
<i>Minimum 0,7m between the different source positions</i>	
<i>Distances to the board of the floor at least 0.5 m</i>	
<i>Random positions and orientation of the tapping machine.</i>	
<i>Number of microphone positions for each tapping machine position:</i>	3
<i>Microphone position with a rotating microphone</i>	
<i>Number of rotations:</i>	3
<i>Rotation speed:</i>	16 s/tr
<i>Minimum rotation time:</i>	30 s
<i>Just not a rotation angle <10 ° to the chamber surfaces</i>	

Data processing

Brüel & Kjaer - BZ-5503 : utility software for hand-held analyzers
 Brüel & Kjaer - BZ-7229 : dual-channel building acoustics software
 Brüel & Kjaer - 7830 :Qualifier Software for reporting results
 A computer with proprietary software

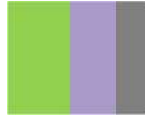
<i>Averaging Time per measurement:</i>	48 s
<i>Number of reverberation time measurements (with graphic control):</i>	27

Test chambers

Volume receiving room:	53,44 m ³
Volume source room:	120,10 m ³
Reference floor area:	12,00 m ²
Surface test floor :	10,27 m ²
There are diffusers and absorption material applied in the receiving room.	

Standard floor

The base floor used is a 140 mm thick solid reinforced concrete slab.
 According to ISO 10140-5 Annex C this is the "heavyweight standard floor".



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TEST METHOD

For this test method a floor test facility according to EN ISO 10140 for impact and airborne sound measurements is used.

It consists of two medium sized and medium damped rooms above each other, separated by a standard homogeneous concrete floor.

As a walking noise source, a standard tapping machine according to EN ISO 10140 is applied.

Several average sound pressure level measurements in third-octave bands are made in the upper and lower rooms in following conditions:

- * the uncovered bare reference floor
- * the bare reference floor covered with pads of the tested flooring
- * the bare reference floor covered with a sufficiently large "full-size" specimens of the tested flooring

In the upper room the reverberation times with large specimens and with merely pads present shall be determined.

The walking sound pressure level is then calculated according following formula (dependent on situation A or B):

$$\text{if } L_{i,\text{with}} < \left(L_{i,\text{pads}} + 10 \cdot \log \left(\frac{T_{i,\text{upper,with}}}{T_{i,\text{upper,pads}}} \right) \right) \quad L_{n,\text{walk},i} = L_{i,\text{ref},b} + L_{i,\text{FL},c} - L_{i,\text{FL},b} \quad (1A)$$

$$\text{else} \quad L_{n,\text{walk},i} = 10 \log_{10} \left(\underbrace{\frac{0,16 \cdot V_{\text{upper}}}{A_0}}_{\text{term (*)}} \left(\frac{10^{\frac{L_{i,\text{with}}}{10}}}{T_{i,\text{upper,with}}} - \frac{10^{\frac{L_{i,\text{pads}}}{10}}}{T_{i,\text{upper,pads}}} \right) + 10^{\frac{L_{i,\text{ref},b} + L_{i,\text{FL},c} - L_{i,\text{FL},b}}{10}} \right) \quad (1B)$$

The total sound pressure level consists of both sound powers (1: direct radiated from the tested flooring and 2: from the bare floor underneath the tested floorcovering) which are radiated to the upper test room.

In Formula (1) the radiation from the bare floor through the floor covering is corrected for deviations of the actual laboratory floor from the reference spectrum in Annex B. Furthermore, the tapping machine self noise theoretically cancels out and therefore is not needed explicitly. However, because of the uncertainty of the measured quantities, the resulting walking sound pressure level in the second line in Formula (1) may become very uncertain and even complex, in particular when a loud tapping machine is used and the flooring doesn't radiate much itself. Complex values are avoided by setting the inner bracket to zero as a minimum (first line in Formula (1)). To detect unreliable results, the uncertainty of $L_{n,\text{walk}}$ shall be calculated for each third octave band and stated in the test report.

All details like test facility requirements, tapping machine characteristics, positioning of tapping machine and microphones, averaging etc. are kept as close as possible to the requirements of laboratory measurements of impact noise as given in EN ISO 10140.

The measurement shall run in third-octave bands from 50 Hz to 5 000 Hz.

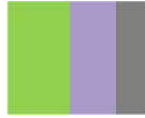
The A-weighted sound pressure level $L_{n,\text{walk},A}$ is calculated from the individual values of $L_{n,\text{walk},i}$ according to:

$$L_{n,\text{walk},A} = 10 \cdot \lg \sum_{i=1}^{21} 10^{(L_{n,\text{walk},i} + C_i)/10}$$

with correction values C_i according to EN 61672-1

The result of the A-weighted walking noise $L_{n,\text{walk},A}$ is presented in two ways:

- * rounded to 1 dB(A)
- * rounded to 0.1 dB(A) including the uncertainty



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SPECIAL MEASUREMENT CONDITIONS

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ACCURACY

It is assumed, that in Formula (1) essentially only the four measured levels and the reverberation times are uncertain.
 The uncertainty of the walking noise level of a third-octave band i , $u_{\text{walk},i}$, then results from Formula (3).

$$u_{\text{walk},i} = 10^{-L_{n,\text{walk},i}/10} \cdot \sqrt{2 \cdot 10^{(L_{i,\text{Fl},c} + L_{i,\text{ref},b} - L_{i,\text{Fl},b})/5} \cdot u_L^2 + \left(\frac{0,16 V_{\text{upper}}}{A_0}\right)^2 \left[\left(\frac{10^{L_{i,\text{pads}}/10}}{T_{i,\text{upper},\text{pads}}}\right)^2 + \left(\frac{10^{L_{i,\text{with}}/10}}{T_{i,\text{upper},\text{with}}}\right)^2 \right] \cdot (u_L^2 + u_{LT}^2)}$$

with u_L : is the uncertainty of the measured levels, in decibels (= 0.4 dB; see EN 16205:2020 paragraph 8.)
 u_{LT} : is the uncertainty of the reverberation time levels, in decibels (= 0.5 dB; see EN 16205:2020 paragraph 8.)

The uncertainty of the A-weighted walking sound pressure level $u_{\text{walk,A}}$ results from:

$$u_{\text{walk,A}} = \frac{1}{\sum_{j=1}^{21} 10^{(L_{n,\text{walk},j} + C_j)/10}} \cdot \sqrt{\sum_{i=1}^{21} \left[10^{(L_{n,\text{walk},i} + C_i)/10} \cdot u_{\text{walk},i} \right]^2}$$

C_i, C_j : A-wegings coefficienten in 1/3 octaafbanden i resp. j .

Repeatability r

When a sound insulation measurement is performed twice in quick succession using the same method on an identical measurement object under constant circumstances, the probability is 95% that the difference between the two measurements is up to a maximum of r .

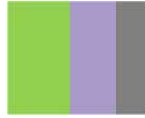
Reproducibility R

If a noise insulation measurement is performed twice with the same method on an identical measurement object in different laboratories under different circumstances, the probability is 95% that the difference between the two measurements is at most R .

Other type of materials can have different results.

ROOM CONDITIONS during the measurements

	<i>in sending room</i>	<i>in receiving room</i>
Air temperature:	T = 18,9 °C	18,2 °C
Static air pressure:	p = 1005,8 hPa	1005 hPa
Relative humidity:	h_r = 55,7 %RH	51,8 %RH



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Overview of measurement results: table of sound pressure levels and measurement uncertainty

Client: Gerflor

Date of tests: 14/04/2025

Description of the test setup:

±6 mm LVT with attached underlay: CREATION 55 CLIC ACOUSTIC (under load of 21.0 kg/m²)
 140 mm heavyweight standard floor = solid reinforced concrete slab

f 1/3 octave frequency in Hz	L _{i,FI,b} SPL receiving r. on ref. floor in dB	L _{i,pads} SPL sending room on pads in dB	L _{i,with} SPL sending room on full-size in dB	L _{i,FI,c} SPL receiving r. on full-size in dB	L _{i,ref,b} SPL reference values on reference floor in dB	L _{n,walk,i} walking-SPL sending room normalized in dB	U _{walk,i} uncertainty of the walking noise in dB
50	42,0	58,6	59,2	41,2	65,5	65,0	0,7
63	61,6	59,8	59,6	58,5	66,0	63,0	1,1
80	62,2	58,4	57,0	60,8	66,5	65,1	0,7
100	59,3	60,6	57,4	56,1	67,0	63,8	0,9
125	64,2	63,2	61,2	62,2	67,5	65,5	1,1
160	62,9	64,1	63,0	61,5	68,0	66,6	1,1
200	65,3	62,8	62,9	63,9	68,5	67,3	0,8
250	66,0	63,6	64,4	63,2	69,0	67,6	0,9
315	65,3	65,8	67,2	61,0	69,5	67,8	1,4
400	66,3	66,8	69,5	59,2	70,0	69,6	1,2
500	67,4	71,1	72,6	55,9	70,5	69,4	2,5
630	68,7	69,2	72,1	50,6	71,0	71,0	1,4
800	70,2	69,3	75,2	49,4	71,5	75,6	0,9
1000	71,1	68,3	73,7	47,1	72,0	74,3	0,9
1250	72,6	68,0	73,7	47,5	72,0	74,4	0,9
1600	72,5	66,0	71,1	42,1	72,0	71,5	1,0
2000	70,3	64,4	68,2	35,4	72,0	67,9	1,2
2500	70,1	63,4	65,1	27,5	72,0	62,6	2,2
3150	70,0	64,5	65,0	21,4 <i>b</i>	72,0	55,2	13,3
4000	68,1	64,3	62,2	16,2 <i>b</i>	72,0	20,1	33722,3
5000	65,1	61,7	60,0	10,9 <i>B</i>	72,0	17,8	35617,1

SPL: sound pressure level

b : if correction for background noise according to ISO 10140-4 was applied in the room of measurement

B : if the maximum correction for background noise according to ISO 10140-4 was applied in the room of measurement

A-weighted walking noise according EN 16205

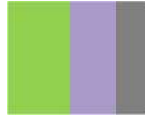
$$L_{n,walk,A} = \mathbf{81 \text{ dB(A)}} \quad (\mathbf{81,3 \text{ dB(A)} \pm 0,4 \text{ dB(A)}}) \quad (1)$$

(1) The calculation of perceived walking loudness, RWS (in sone), for floor coverings (as per informative Annex E of NBN EN 16205:2020) is available upon request from the laboratory.

Measurement Nr.: SONK028 - SONK030
 Date test report: 16/04/2025

Name of test institute: Daidalos Peutz Laboratory of Acoustics, Hooglede, Belgium
 Signature: Gert-Jan Loobuyck

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Overview of measurement results: walking noise spectrum

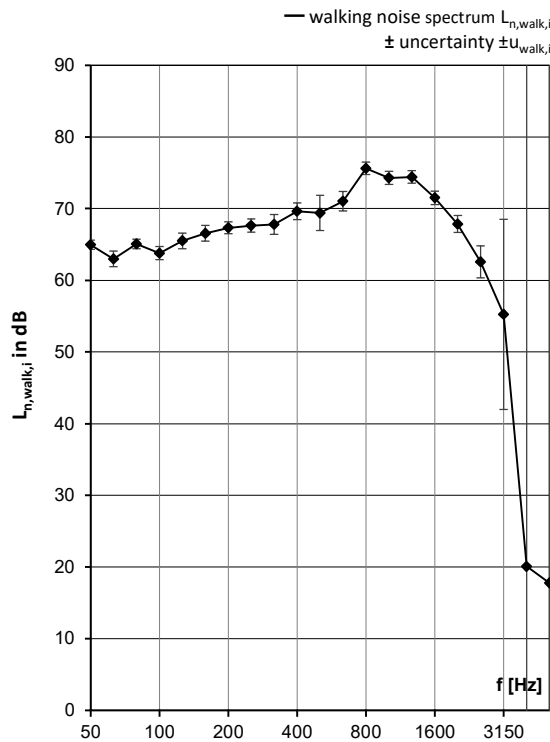
Client: Gerflor

Date of tests: 14/04/2025

Description of the test setup:

±6 mm LVT with attached underlay: CREATION 55 CLIC ACOUSTIC (under load of 21.0 kg/m²)
 140 mm heavyweight standard floor = solid reinforced concrete slab

f 1/3 octave frequency in Hz	L_{n,walk,i} walking-SPL sending room normalized in dB	U_{walk,i} uncertainty of the walking noise in dB
50	65,0	0,7
63	63,0	1,1
80	65,1	0,7
100	63,8	0,9
125	65,5	1,1
160	66,6	1,1
200	67,3	0,8
250	67,6	0,9
315	67,8	1,4
400	69,6	1,2
500	69,4	2,5
630	71,0	1,4
800	75,6	0,9
1000	74,3	0,9
1250	74,4	0,9
1600	71,5	1,0
2000	67,9	1,2
2500	62,6	2,2
3150	55,2	13,3
4000	20,1	33722,3
5000	17,8	35617,1



A-weighted walking noise according EN 16205

$L_{n,walk,A} = \mathbf{81 \text{ dB(A)}} \quad (\mathbf{81,3 \text{ dB(A)} \pm 0,4 \text{ dB(A)})} \quad (1)$

(1) The calculation of perceived walking loudness, RWS (in sone), for floor coverings (as per informative Annex E of NBN EN 16205:2020) is available upon request from the laboratory.

Measurement Nr.: SONK028 - SONK030
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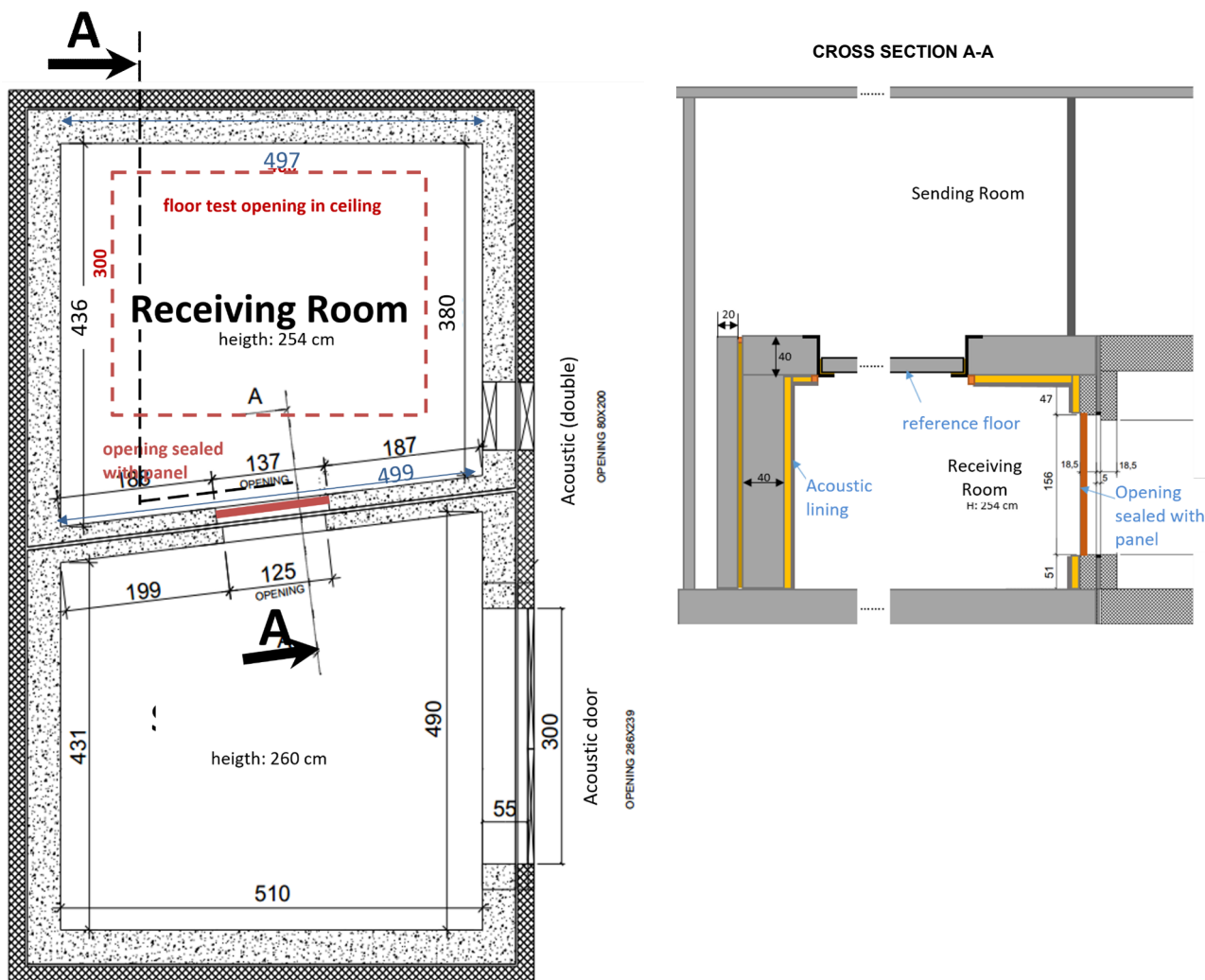


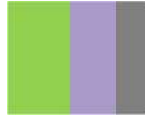
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Annex 1 : sketches of the test chambers at Daidalos Peutz Laboratory of Acoustics

Daidalos Peutz Laboratory of Acoustics, Diksmuidesteenweg 17B/1, B-8830 Hooglede, Belgium

The test rooms of the acoustic lab were built according EN ISO 10140-5 and are conform the specifications in this standard. Both room are acoustically decoupled from each other and from the ground. Additionally in the receiving room there is an acoustic lining installed (to the walls and parts of the ceiling) to suppress flanking transmissions. See sketches below for the ground plan and cross section of the test rooms.





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ANNEX 2: detailed description of test object by the supplier

*The test sample description given by manufacturer is checked visually as good as possible by the laboratory.
 The correspondence between the test element and the commercialized product is the sole responsibility of the manufacturer*

Description of the test element as a layered structure

layer	thickness (mm)	ρ (kg/m ³)	m'' (kg/m ²)	Discription of the layer
1	±6		±7,89	LVT with attached underlay: CREATION 55 CLIC ACOUSTIC (under load of 21.0 kg/m ²) heavyweight standard floor = solid reinforced concrete slab
2	140	2300	322	
3				
4				
5				
6				
7				
8				
9				
10				

Gerflor - LVT floor: CREATION 55 CLIC ACOUSTIC (under load of 21.0 kg/m²)

Technical description (from manufacturer datasheet):

Total thickness (EN ISO 24346): 6 mm
 Wear layer thickness (EN ISO 24340): 0.55 mm
 Plank size (EN ISO 24342): 212 x 1238.8 mm

thickness of the factory-attached underlay (indicative measurement in the laboratory): ±1.0 mm
 surface mass density (indicative measurement in the laboratory): ±7.89 kg/m²

Installation :

The installation in the laboratory was performed according to the installation instructions of the product.
 The floorcovering was clicked together and laid loosely on the bare concrete floor of the laboratory without the use of adhesives.

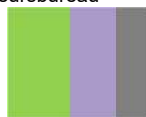
Frontside and backside of the LVT plank



Section view of the LVT plank



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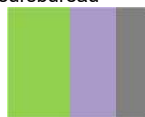
NOISE LAB

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ANNEX 3: Technical datasheet of test object

*The test sample description given by manufacturer is checked visually as good as possible by the laboratory.
The correspondence between the test element and the commercialized product is the sole responsibility of the manufacturer*

More information can be obtained from **Gerflor**



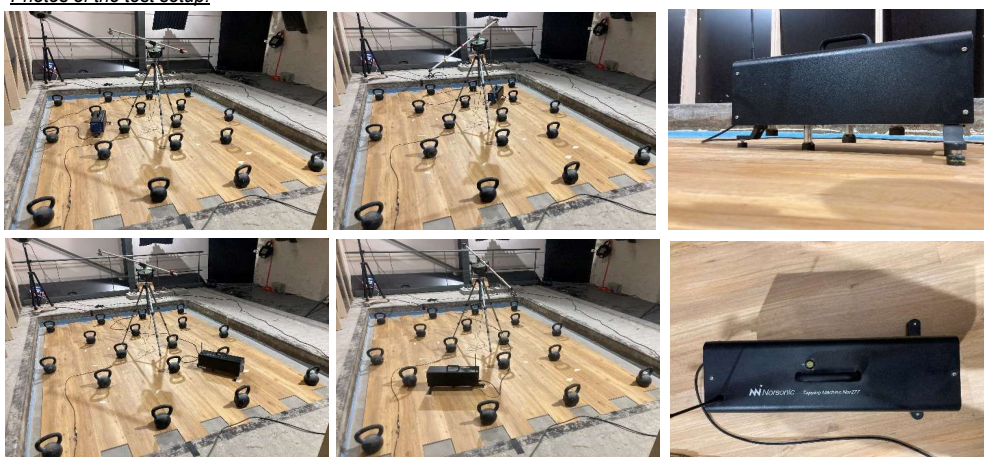
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ANNEX 4: picture or sketches of the test object and/or test setup

Description of the installation and/or sketches and/or pictures

The floor covering and corresponding pads were mounted according to the instructions of NBN EN 16205:2020 with reference to NBN EN ISO 10140-1:2021.
Test floor measurements on a large surface (10.27 m²) with total width of 2.76 m and a total length of 3.72 m.
 The LVT was clicked together and laid loosely on the bare concrete floor of the laboratory without the use of adhesives.
 The tapping machine was placed on the large test floor, in 4 different positions.
Tests on small samples (pads):
 Small quadratic sections of the floorcovering were cut and mounted in the designated rubber mat, arranged according to Annex C of NBN EN 16205:2020.
 The hammers of the tapping machine were placed on the pads of the test floor, in 4 different positions.

Photos of the test setup:



Photos of the pads measurement:

