Laboratory for Acoustics

TESTING
RvA L 334

Determination of the improvement of impact sound insulation of a flooring system type
0,16 mm moisture barrier – Solidbase SD 1,5 mm –
Montinique Hebeta 6 mm click PVC + 1 mm cork

Report number A 4662-2E-RA-001 d.d. 28 March 2025

Laboratory for Acoustics

Determination of the improvement of impact sound insulation of a flooring system type 0,16 mm moisture barrier – Solidbase SD 1,5 mm – Montinique Hebeta 6 mm click PVC + 1 mm cork

Principal:	Estillon B.V. Linie 25 5405 AR UDEN The Netherlands
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1 Introduction

At the request of Estillon B.V. based in UDEN (The Netherlands) sound measurements have been carried out in order to determine the reduction of transmitted impact noise of:

0,16 mm moisture barrier
Solidbase SD 1,5 mm
Montinique Hebeta 6 mm click PVC + 1 mm cork

The measurements were performed in the Laboratory for Acoustics of Peutz bv, situated at Lindenlaan 41, 6584 AC in Molenhoek (the Netherlands). See Appendix 2 for a plan of the laboratory.

2 Standards and guidelines

The measurements have been carried out according to the Quality Manual of the Laboratory for Acoustics as well as:

EN-ISO 10140-1:2021	Acoustics – Laboratory measurements of sound insulation of building elements – Part 1: Application rules for specific products
EN-ISO 10140-3:2021[1]	Acoustics – Laboratory measurements of sound insulation of building elements – Part 3: Measurement of impact sound insulation
EN-ISO 10140-4:2021	Acoustics – Laboratory measurements of sound insulation of building elements – Part 4: Measurement procedures and requirements
EN-ISO 10140-5:2021	Acoustics – Laboratory measurements of sound insulation of building elements – Part 5: Requirements for test facilities and equipment
EN-ISO 717-2:2020[1]	Acoustics – Rating of sound insulation in buildings and of building elements – Part 2: Impact sound insulation
EN-ISO 12999-1:2020	Acoustics – Determination and application of measurement uncertainties in building acoustics – Part 1: Sound insulation
TÜV :2017	Rheinland Testprotocol of the impact sound insulation

[1] For these type of measurements the Laboratory for Acoustics has been accredited by the Dutch Accrediatation Council (RvA).

The RvA is member of the EA MLA (**EA MLA**: **E**uropean **A**ccreditation Organisation **M**ulti **L**ateral **A**greement: http://www.european-accreditation.org).

EA: "Certifates and reports issued by bodies accredited by MLA and MRA members are considered to have the same degree of credibility, and are accepted in MLA and MRA countries."

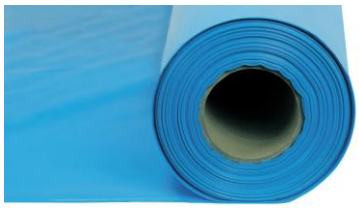
3 Tested flooring

The values mentioned are the nominal values as given by the client, unless otherwise stated (MV, measured value).

The next floor covering is investigated:

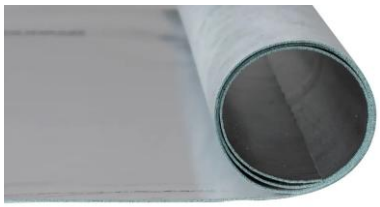
Moisture barrier

thickness:	0,16 mm
mass:	0,160 kg/m^2
material:	PE regenerated foil
manufacturer:	Estillon B.V.



SolidBase SD 1,5 mm

thickness:	1,5 mm
mass:	1,6 kg/m^2 (MV)
material:	PU and mineral fillers
manufacturer:	Estillon B.V.



Montinique Hebeta Click PVC

thickness:	7 mm
	6 mm PVC + 1 mm cork
dimensions (w x l):	1522 x 240 mm
mass:	12,6 kg/m^2 (MV)
manufacturer:	Hebeta
collection:	Quality design
serie:	Charente

The following variant was measured (construction bottom → top):

- 0,16 mm moisture barrier
- SolidBase SD 1,5 mm
- Montinique Hebeta 6 mm click PVC + 1 mm cork

Peutz was not involved in the selection of the test specimen (or of its materials). The laboratory cannot make any declaration about the representativeness of the provided specimen and the samples made available. The results as presented here relate only to the tested items and laboratory conditions as described in this report. The test report ahead is valid as long as the tested constructions and/or materials are unchanged.

4 Measurements

4.1 Meetresultaten

In appendix 3 the normalized impact sound level of the standard laboratory floor with its related single number ratings are presented. The result of the measurement of the floor covering under test is presented in table 4.1 and in appendix 4 of this report.

In this table as well as in the graph the calculated values are presented in 1/3 octave bands. From those values the following single number rating has been calculated and presented:

- the "weighted reduction of impact sound pressure level ΔL_w" according to EN-ISO 717-2:2020;
- the "single number reduction based on the unweighted linear impact sound pressure level ΔL_{lin}" according to EN-ISO 717-2:2020, Annex A.

t 4.1 summery of the measurement results (indicated measurement uncertainty is under reproducibility conditions)

construction bottom → top		**ΔL_{lin}** [dB]	**ΔL_w** [dB]	ΔL_w ± U (k=2) [dB]	Record nr.	appendix nr.
0,16 mm moisture barrier – Solidbase SD 1,5 mm – Montinique Hebeta 6 mm click PVC + 1 mm cork	Without load	**7**	**17**	17,3 ± 2,2	#85	4.1
	With load	**7**	**18**	17,8 ± 2,2	#84	4.2

This result was obtained using a tapping machine with steel hammers and under laboratory conditions. The reduction of transmitted impact noise is depending on the floor on which this covering will be installed. If that situation differs from the laboratory conditions, different results may be expected.

4.2 Method

The tests were conducted in accordance with the provisions of the test method EN-ISO 10140-3:2021. A detailed description of the test set up has been given in appendix 2 of this report. For the tested material (see chapter 3) a sample with dimensions of c. 10 m^2 is used.

Two vertically adjacent rooms are used, the upper one being designated the "source room" and the lower one the "receiving room". The rooms are separated by a so called "heavyweight standard floor" on which the covering under test is installed. This floor is a 140 mm thick concrete floor.

By means of an "impact sound generator" as defined in EN-ISO 10140-5:2021, Annex E (also called "tapping machine") the impact sound is generated. This tapping machine has five steel hammers which continuously and in turn fall on the floor in such a way that the floor is excited with a frequency of 10 strokes per second. The impact sound generator's mass is about 12 kg and it is supported by three points resting on the floor or on the covering under test.

The tapping machine is positioned at 8 different positions on the standard floor as well as on the covering under test in accordance with the **TÜV** Test protocol.

The floor structure to be examined has been measured with and without extra load. For the load, 20 weights of 11 kg each were applied and mounted in fixed positions in accordance with the **TÜV** Test protocol.

In the receiving room the resulting sound pressure level is measured by means of a microphone on a continuously rotating boom, so the (time- and space-) averaged sound pressure level in this room is determined.

The reverberation time of the receiving room is also measured.

4.3 Calculations

The measurements as well as the calculations are made with a 1/3-octave bandwidth from 50 to 5000 Hz. Where applicable octave-band values are calculated from those 1/3-octave bands.

4.3.1 Normalized impact sound level

The normalized impact sound level L_n is calculated according to:

$$L_n = L_i + 10 \lg \frac{A}{A_0} \qquad (4.1)$$

in which:

L_n	the normalized impact sound level	[dB]
L_i	the average sound pressure level in the receiving rooom as a result of the impact sound generator on 6 positions	[dB]
A_0	the reference sound absorption (= 10 m^2)	
A	the equivalent sound absorption of the receiving room	[m^2]

From the reverberation measurements the equivalent sound absorption A (per frequency-band) is determined (and expressed in m^2) according to the next equation:

$$A = \frac{0{,}16\,V}{T} \tag{4.2}$$

in which:

V	the volume of the receiving room	[m^3]
T	the reverbaration time in the receiving room	[s]

4.4 reduction of transmitted impact noise

By comparison of the normalized impact sound level of the bare standard floor and of the standard floor with the covering under test the relative reduction in transmitted impact noise can be determined. This procedure will result in the frequency dependent reduction of transmitted impact noise ΔL. The calculations are made according to:

$$\Delta L = L_{n1} - L_{n2} \tag{4.3}$$

in which:

ΔL	the reduction of transmitted impact noise	
L_{n1}	the normalized impact sound level in the receiving room while the tapping machine is on the standard floor	[dB]
L_{n2}	the normalized impact sound level in the receiving room while the tapping machine is on the covering under test applied on top of the standard floor	[dB]

4.5 Accuracy

The accuracy of the impact sound insulation as calculated can be expressed in terms of repeatability (tests within one laboratory) and reproducibility (between various laboratories).

4.5.1 Repeatability r

The repeatability describes when: - two tests are performed on identical test material - within a short period of time - by the same person or team - using the same instrumentation - under unchanged environmental conditions - the difference between the two test results.

As stated in the EN-ISO 12999-1:2020 standard, the repeatability with regard to the single number value $L_{n,w}$ ± 1,0 dB. See appendix 1 of this report for a further explanation.

4.5.2 Reproducibility R

The reproducibility describes when: - two tests are performed on identical test material - in different laboratories - by different person(s) - under different environmental conditions - the difference between the two test results.

As stated in the EN-ISO 12999-1:2020 standard, the reproducibility with regard to the single number value ΔL_w ± 2,2 dB. See appendix 1 of this report for a further explanation.

4.6 Environmental conditions during the measurements

Table t 4.2 below shows the environmental conditions measured at the time of the sound insulation measurements.

t 4.2 Enviromental conditions at February 17 th, 2025.

measuring room	temperature [°C]	relative humidity [%]
1	18	46
9	19	41

Mook,

R.T. Allan
Laboratory Supervisor

dr. ir. M.L.S. Vercammen
Manager

This report contains 10 pages and 4 appendices

appendix 1	Standard uncertainty	(1 page)
appendix 2	Plans and Sections	(2 pages)
appendix 3	Measurement result heavyweight standard floor	(1 page)
appendix 4	Measurement results	(2 pages)

Appendix 1
Standard uncertainty

In table I.1 the general standard uncertainties for the single number quantities are given as mentioned in the standard EN-ISO 12999-1:2020, Chapter 7. At present, there are no results available of impact sound insulation at reproducibility conditions. The results presented are estimated values.

Standard Uncertainties (partly taken from table 5 of the EN ISO 12999-1)

Single Number	repeatability **Standard Uncertainty σ_r[dB]**	reproducibility **Standard Uncertainty σ_R[dB]**
$L_{n,w}$	0,5	1,5[a]
$L_{n,w} + C_I = L_{n,A}$	0,6	1,5[a]

[a] The indicated values are estimates.

In table I.2 the general standard uncertainties for the single number quantities for reduction of impact sound are given as mentioned in the standard EN-ISO 12999-1:2020. At present, there are no results available of reduction of impact sound insulation at repeatability conditions.

standard Uncertainties (partly taken from table 7 of the EN ISO 12999-1)

Single Number	repeatability **Standard Uncertainty σ_r[dB]**	reproducibility **Standard Uncertainty σ_R[dB]**
ΔL_w	-	1,1

For measurements obtained in accordance with the ISO 10140 series, the expanded uncertainty U shall be calculated by:

$$U = ku \qquad (1.1)$$

in which:

- u The standard uncertainty see table I.1 or I.2
- k The coverage factor

A measurement result shall be read as follows:

$$Y = y \pm U \qquad (1.2)$$

in which:

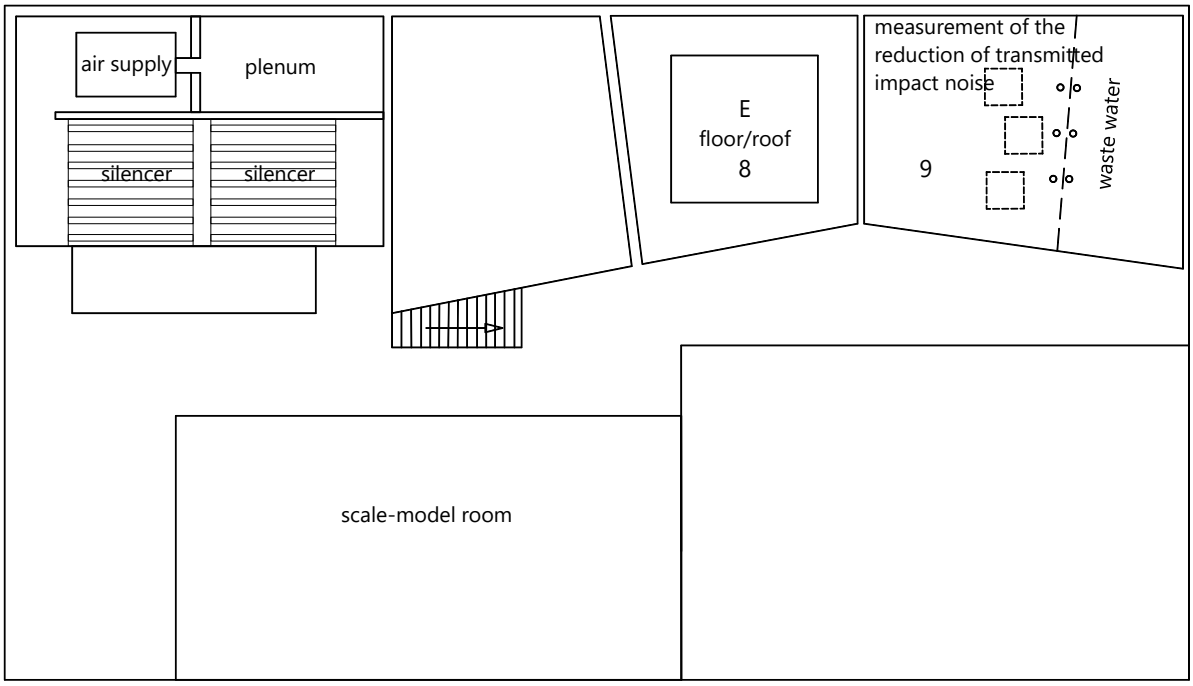
- Y the measurand, y the best estimate found by the measurement; and
- U the expanded uncertainty calculated for a given confidence level. For a normal distribution of measured values, there is a 95% confidence that the true value lies within the range (y-U) to (y+U). This corresponds to a coverage factor of k=2

EXAMPLE
The reduction of transmitted impact noise will be designated as: ΔL_w = 18,2 ± 2,2 dB (k = 2, two sided).

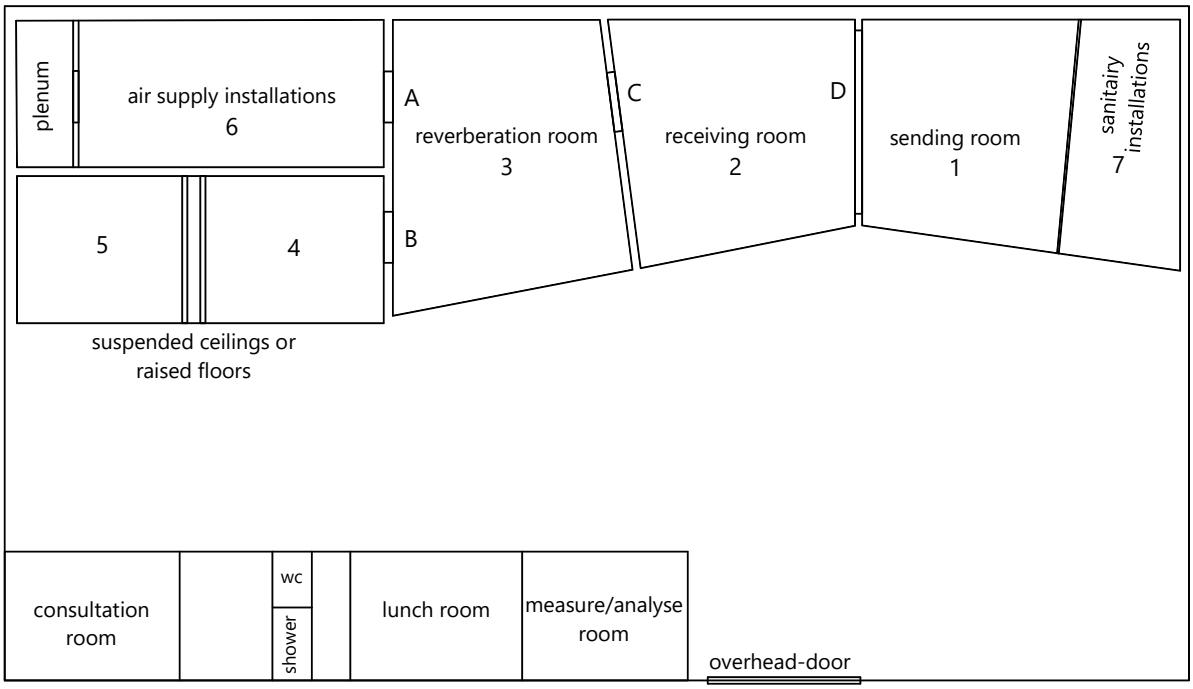
Peutz bv
Lindenlaan 41, NL-6584 AC MOLENHOEK (LB), THE NETHERLANDS

OVERVIEW

Story



Ground level



TEST OPENINGS (w x h):
A: 1300 x 1905 mm
B: 1100 x 2450 mm
C: 1500 x 1250 mm
D: 4300 x 2800 mm
E: 4000 x 4000 mm

0 1 2 3 4 5 m
scale

LABORATORY FOR ACOUSTICS

PEUTZ bv
Lindenlaan 41, 6584 AC MOLENHOEK (LB), NETHERLANDS

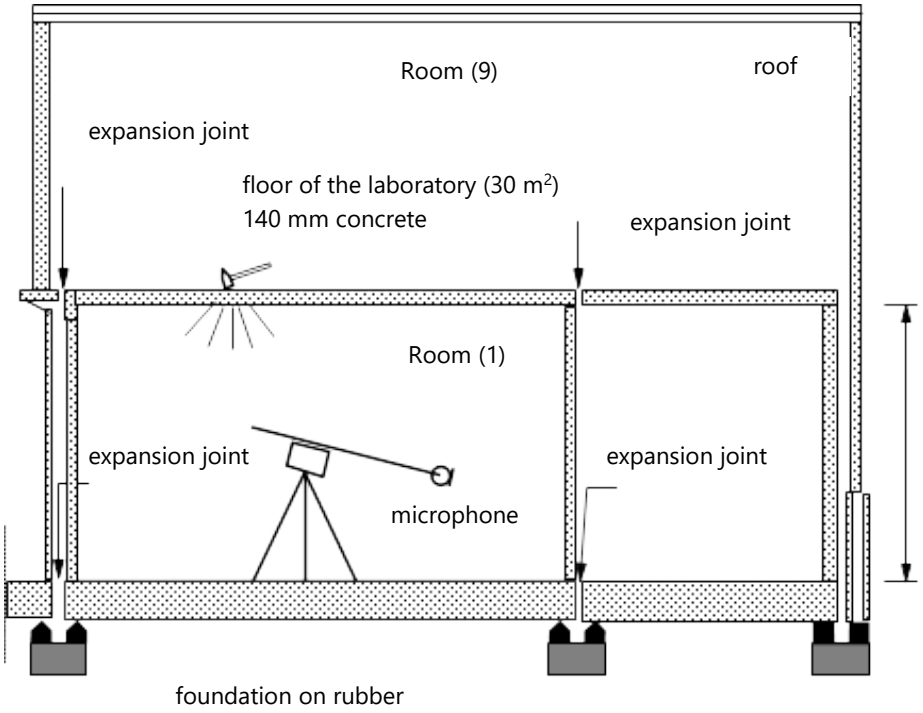
DETERMINATION OF THE REDUCTION OF TRANSMITTED IMPACT NOISE

The testrooms meet the requirements ISO 10140

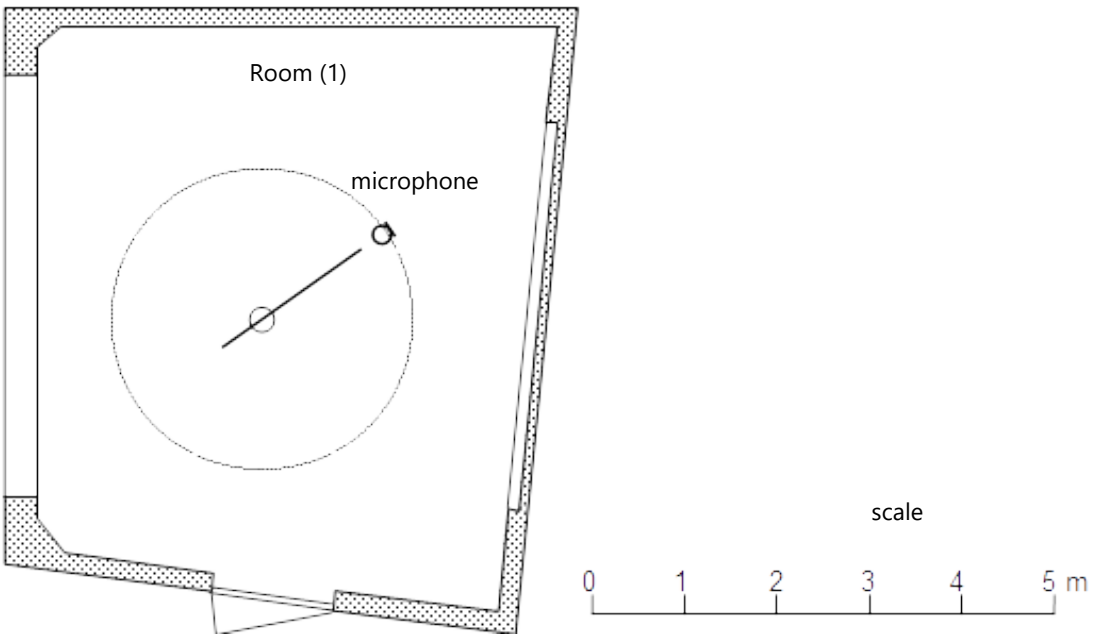
Additional data:
volume of room (1): 94 m^3
Reverberation times of room (1) measured at 17-02-2025

frequency (1/1 oct)	125	250	500	1000	2000	4000	Hz
reverberation time	2,33	2,13	2,48	2,51	1,98	1,34	sec.

Vertical section



Plan



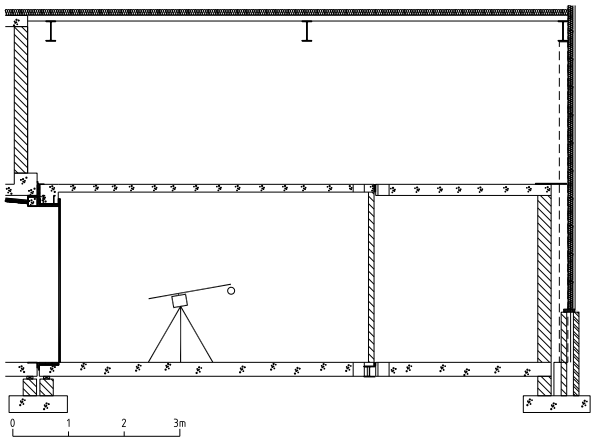
LABORATORY FOR ACOUSTICS

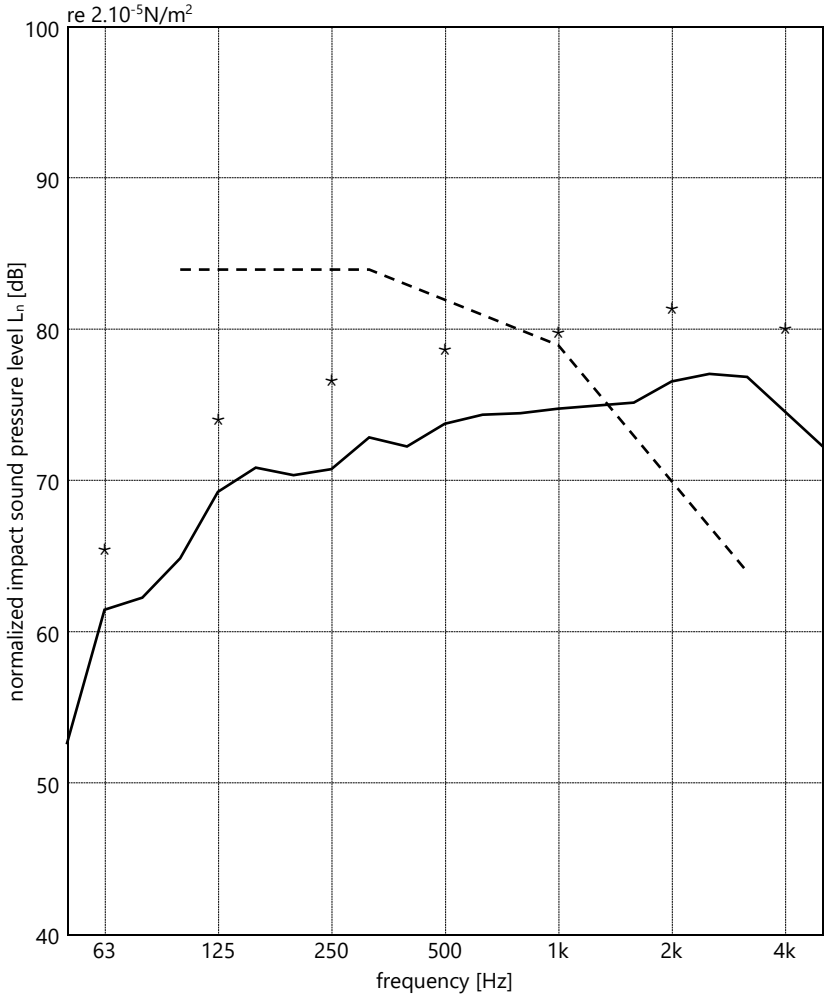
THE NORMALIZED IMPACT SOUND PRESSURE LEVEL L_n OF A FLOOR ACCORDING TO ISO 10140-3:2021

principal: Estillon B.V.

TESTING RvA L 334

construction tested: bare laboratory standard floor





volume measuring room
94 m^3

surface area floor
30 m^2

measured at
Peutz Laboratory for Acoustics

signal
tapping machine

bandwidth
1/3 octave

A_0
10,0 m^2

ISO 717-2:2020
$L_{n,w}(C_I)$ = 82(-11) dB

	52,6	64,9	70,4	72,3	74,5	75,2	76,9	
1/3 oct.	61,5	69,3	70,8	73,8	74,8	76,6	74,6	dB
	62,3	70,9	72,9	74,4	75,0	77,1	72,3	
1/1 oct.	**65,2**	**73,8**	**76,3**	**78,4**	**79,5**	**81,1**	**79,8**	**dB**

——— 1/3 oct.
* 1/1 oct.
– – – – – ref. curve (ISO 717)

Mook, measured at 17-02-2025

LABORATORY FOR ACOUSTICS

DETERMINING THE REDUCTION OF TRANSMITTED IMPACT NOISE BY FLOOR COVERINGS ACCORDING TO ISO 10140-3:2021

principal: Estillon

TESTING RvA L 334

construction tested:
0,16 mm moisture barrier – Solidbase SD 1,5 mm – Montinique Hebeta 6 mm click PVC + 1 mm cork; without load

volume measuring room
94 m^3

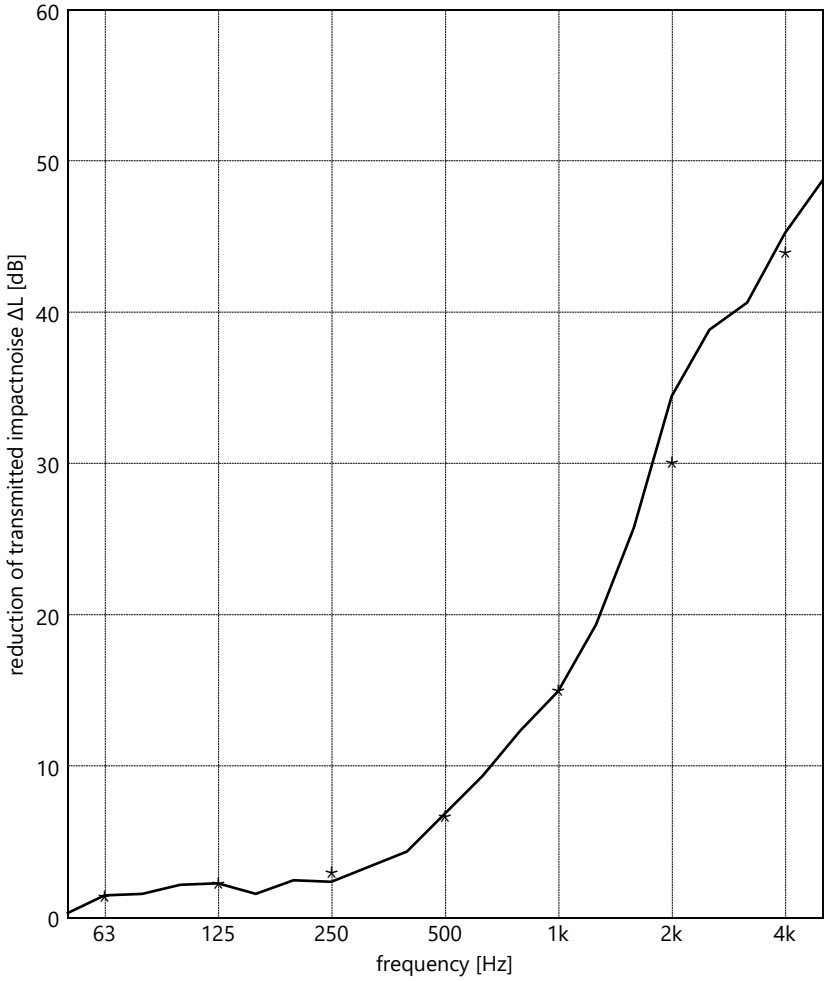
surface area floor
10 m^2

measured at
Peutz Laboratory for Acoustics

signal
tapping machine

bandwidth
1/3 octave

ISO 717-2:2020
ΔL_{lin} = 7 dB
ΔL_w = 17 dB



	63	125	250	500	1k	2k	4k	
	0,3	2,2	2,5	4,4	12,4	25,8	40,7	
1/3 oct.	1,5	2,3	2,4	6,9	15,0	34,5	45,3	dB
	1,6	1,6	3,4	9,4	19,4	38,9	48,8	
1/1 oct.	**1,1**	**2,0**	**2,7**	**6,4**	**14,7**	**29,8**	**43,7**	**dB**

——— 1/3 oct.
* 1/1 oct.

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RA

Mook, measured at 17-02-2025

LABORATORY FOR ACOUSTICS

DETERMINING THE REDUCTION OF TRANSMITTED IMPACT NOISE BY FLOOR COVERINGS ACCORDING TO ISO 10140-3:2021

principal: Estillon

TESTING RvA L 334

construction tested:
0,16 mm moisture barrier – Solidbase SD 1,5 mm – Montinique Hebeta 6 mm click PVC + 1 mm cork; with load

volume measuring room
94 m³

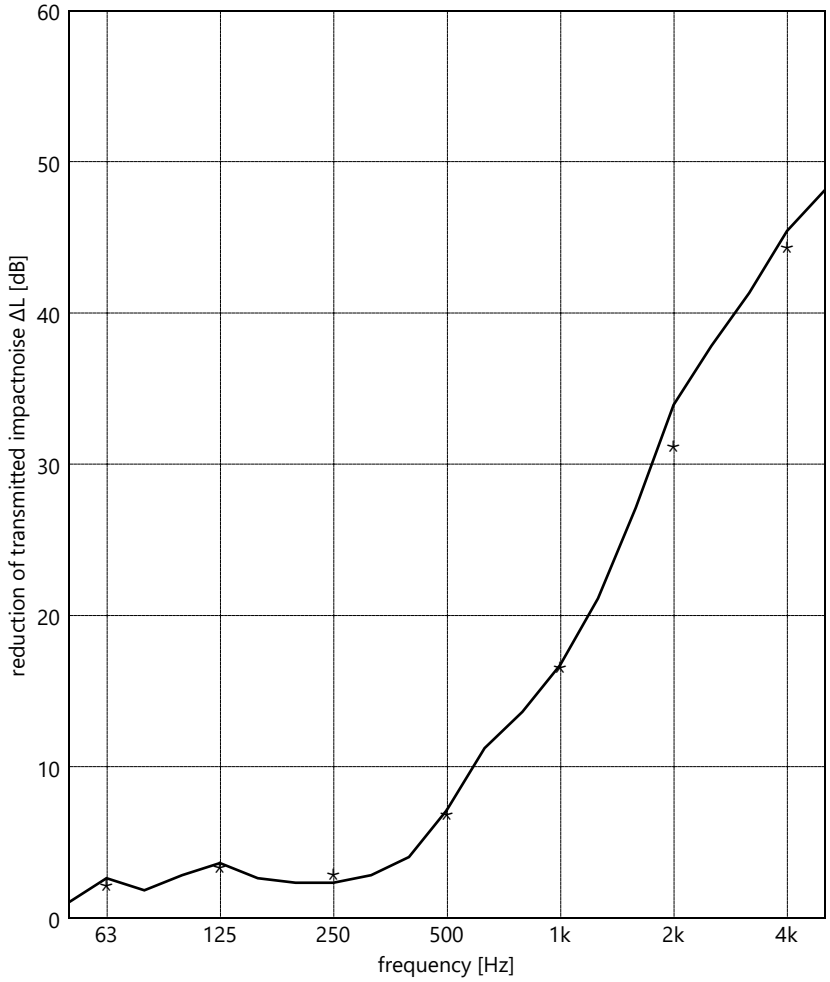
surface area floor
10 m²

measured at
Peutz Laboratory for Acoustics

signal
tapping machine

bandwidth
1/3 octave

ISO 717-2:2020
ΔL_{lin} = 7 dB
ΔL_w = 18 dB



	63	125	250	500	1k	2k	4k	
	1,1	2,9	2,4	4,1	13,7	27,2	41,4	
1/3 oct.	2,7	3,7	2,4	7,2	16,8	34,0	45,5	dB
	1,9	2,7	2,9	11,3	21,2	37,9	48,2	
1/1 oct.	**1,9**	**3,1**	**2,6**	**6,6**	**16,3**	**30,9**	**44,1**	**dB**

——— 1/3 oct.
* 1/1 oct.

publication is permitted for the entire page only

Mook, measured at 17-02-2025