

# TFI Report 20-000649-01

## Impact Sound Insulation

### Customer

Forbo Flooring B.V.  
Industrieweg 12  
1566 JP Assendelft  
THE NETHERLANDS

### Product

resilient floor covering  
Marmoleum Decibel (Batch 91199 rol 158, dessin: 2621)

This report includes 2 pages and 1 annex

### Responsible at TFI

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### Aachen, 31.07.2020

Dr.-Ing. Andreas Zoëga  
- Head of the testing laboratory -



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This report only applies to the tested samples and has been established to the best of our knowledge. Only the entire report shall be reproduced. Under no circumstances, extracts shall be used. Furthermore, we apply the "General Terms and Conditions for the Execution of Contracts" of the TFI Aachen GmbH, also with regard to the order execution.

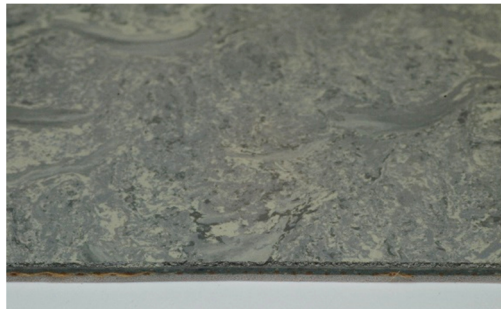
## 1 Transaction

Test order	impact sound insulation according to EN ISO 10140
Order date	02.07.2020
Your reference	Wouter Hogervorst
Sampling performed by	Customer
Product designation	Marmoleum Decibel (Batch 91199 rol 158, dessin: 2621)
TFI sample number	2001046

## 2 Product Specification

Use surface	linoleum
Construction	heterogeneous
Structure	marbled
Pattern	tonal effect without pattern
Colour of the use surface	grey, light grey

View



Thickness [mm]	3.5*
Area density [g/m <sup>2</sup> ]	-*
Type of delivery	sheet
	*customer information

## 3 Results

Impact sound insulation  $\Delta L_w = 18$  dB

The measurement results are evaluated without consideration of the measurement uncertainty with reference to compliance with limit values, unless otherwise specified by the test standard.

## 4 Annexes

Impact sound insulation TS 20-000649-01<sup>a</sup>

The annexes marked <sup>a</sup> are based on tests accredited in accordance with EN ISO/IEC 17025.

# Annex TS - Impact Sound Insulation

## 1 Test Method / Requirements

EN ISO 10140-1:2016	Acoustics - Laboratory measurement of sound insulation of building elements - Part 1: Application rules for certain products
EN ISO 10140-2:2010	Acoustics - Laboratory measurement of sound insulation of building elements - Part 2: Measurement of airborne sound insulation
EN ISO 10140-3:2015	Acoustics - Laboratory measurement of sound insulation of building elements - Part 3: Measurement of impact sound reduction
EN ISO 10140-4:2010	Acoustics - Laboratory measurement of sound insulation of building elements - Part 4: Measurement procedures and requirements
EN ISO 10140-5:2014	Acoustics - Laboratory measurement of sound insulation of building elements - Part 5: Requirements for test facilities and equipment
EN ISO 717-1:2013	Acoustics - Rating of sound insulation in buildings and of building elements - Part 1: Airborne sound insulation
EN ISO 717-2:2013	Acoustics - Rating of sound insulation in buildings and of building elements - Part 2: Impact sound reduction
EN ISO 12999-1:2014	Acoustics - Determination and application of measurement uncertainties in building acoustics - Part 1: Sound insulation

## 2 Remarks

The test was performed by a subcontractor accredited according to EN ISO/IEC 17025.

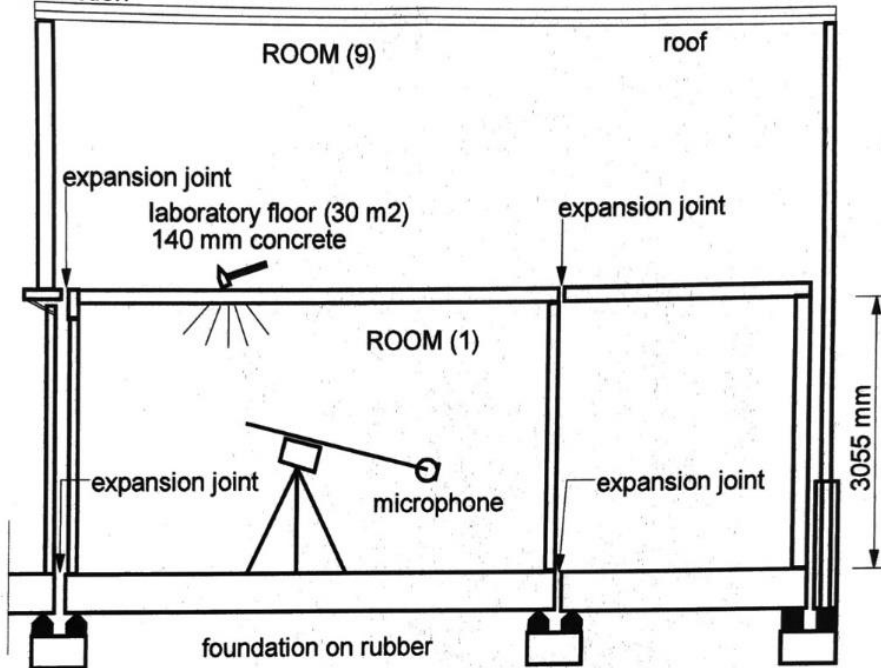
## 3 Measuring Operation

Impact sound pressure level:	continuous measurement via a rotating microphone arm, with 6 different tapping machine positions
Airborne sound correction:	not relevant

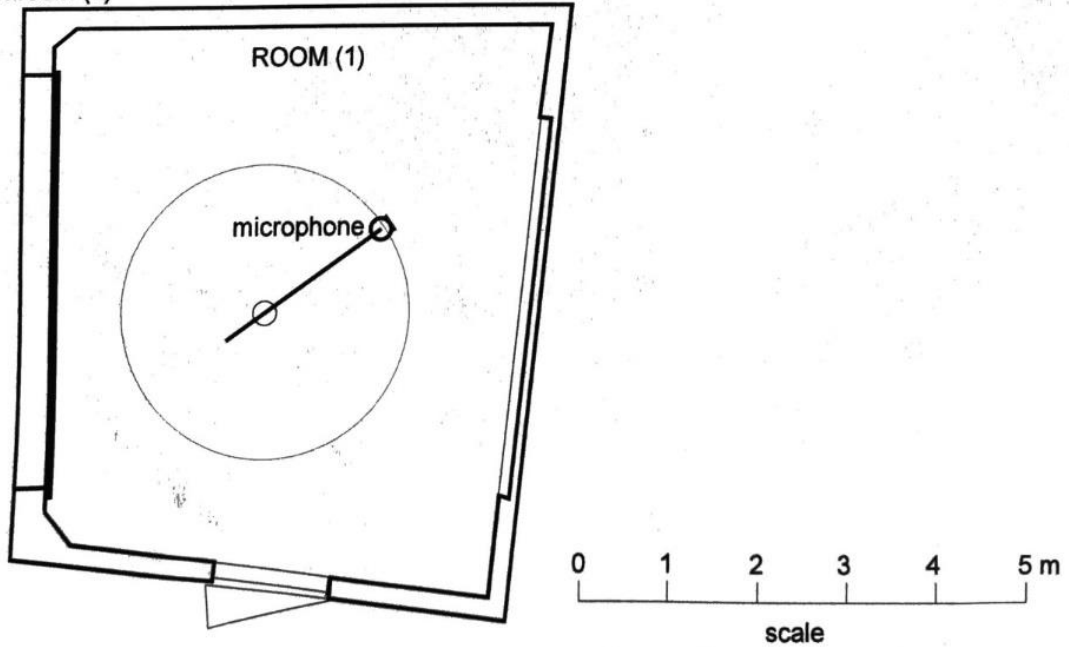
## 4 Laboratories

Test rooms:	Lindenlaan 41, 6584 AC Molenhoek (LB), The Netherlands
Sending room (9):	cuboid room with high sound absorption
Receiving room (1):	trapezoidal room $V = 94 \text{ m}^3$
Reference floor:	$S = 30 \text{ m}^2$ 14 cm concrete slab floor with an area-related mass of $m' \sim 325 \text{ kg/m}^2$
Flanking walls:	Lime sand brick walls with light wall facings (facing shell $d = 12 \text{ cm}$ ) with an average area-related mass of $m' \sim 330 \text{ kg/m}^2$

vertical section



plan of room (1)



## 5 Evaluation

The impact sound pressure level generated by the standard tapping machine is measured in the receiving room under a bare heavy floor with and without a floor covering. The impact sound reduction is determined on the basis of the measured values as follows:

$$\Delta L = L_{n,0} - L_n \text{ (dB)}$$

$L_{n,0}$  Impact sound pressure level without a floor covering (dB)

$L_n$  Impact sound pressure level with a floor covering (dB)

For the evaluation of the weighted reduction in impact sound pressure level  $\Delta L_w$ , the relevant reference curve is shifted in increments of 1 dB towards the measured curve until the sum of unfavourable deviations is as large as possible, but not more than 32 dB.

The linear impact sound level  $\Delta L_{lin}$  is determined according to the following equation:

$$\Delta L_{lin} = L_{n,r,0,w} + C_{l,r,0} - (L_{n,r,w} + C_{l,r}) = \Delta L_w + C_{l,\Delta}$$

$L_{n,r,w}$  is the calculated weighted normalized impact sound pressure level of the reference floor with the floor covering under test

$L_{n,r,0,w}$  78 dB, calculated from  $L_{n,r,0}$  according to Section 4.3.1 of DIN EN ISO 717-2: 2013

$C_{l,r}$  Spectrum adaptation term for the reference floor with the floor covering to be tested

$C_{l,r,0}$  -11 dB, spectrum adaptation term for the reference floor with  $L_{n,r,0}$  determined according to Annex A, Section A.2.1 of DIN EN ISO 717-2:2013

## 6 Note

The results are based on measurements performed under laboratory conditions with artificial excitation (standard procedure). The test results are applicable in due consideration of the national provisions and the local circumstances and/or constructions.



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

Annex TS – Impact sound insulation

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Evaluation according to ISO 717-2

$$\Delta L_w = 18 \text{ dB}$$

$$C_{i,\Delta} = -11 \text{ dB}$$

$$C_{i,r} = 0 \text{ dB}$$

The results are based on measurements, which were performed under laboratory conditions with artificial excitation (standard procedure).  
Measurements in one-third octaves.

Weighted normalized impact sound pressure level  $L_{n,0,w} = 82 \text{ dB}$ Weighted normalized impact sound pressure level  $L_{n,w} = 61 \text{ dB}$ 

Frequency [Hz]	$\Delta L$ [dB]	$L_{n,0}$ [dB]	$L_n$ [dB]
50	2,4	56,1	53,7
63	1,6	65,3	63,7
80	2,3	63,1	60,8
100	2,9	60,6	57,7
125	-1,3	68,9	70,2
160	3,3	70,0	66,7
200	1,7	68,9	67,2
250	3,1	70,0	66,9
315	5,2	72,8	67,6
400	7,5	72,5	65,0
500	10,5	72,9	62,4
630	14,5	73,6	59,1
800	17,6	73,8	56,2
1000	20,9	73,8	52,9
1250	25,5	74,6	49,1
1600	29,6	74,7	45,1
2000	35,2	76,0	40,8
2500	40,4	76,6	36,2
3150	47,5	76,2	28,7
4000	52,2	74,0	21,8
5000	55,1	71,2	16,1

Receiving room:

Volume: 94,0 m<sup>3</sup>

Air temperature: 20,1 °C

Relative air humidity: 52,0 %

Type of reference floor: Heavyweight

Area density: 325,0 kg/m<sup>2</sup>