

TFI Report 481754-02

Impact Sound Insulation

Customer

Unifloor Underlay Systems
Arnsbergstraat 4
7418 EZ Deventer
NETHERLANDS

Product

floor covering on underlay
Douwes Dekker Ambient rigid multilayer tegel 7,0 mm, Bluefloor 2,0 mm

This report includes 2 pages and 1 annex(es)

Responsible at TFI

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Aachen, 05.11.2018

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- Head of the testing laboratory -

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1 Transaction

Test order	impact sound insulation according to EN ISO 10140
Order date	12.10.2018
Your reference	F. Vousten
Sampling performed by	Customer
Product designation	Douwes Dekker Ambient rigid multilayer tegel 7,0 mm, Bluefloor 2,0 mm
TFI sample number	18-10-0192, 18-10-0194

2 Product Specification

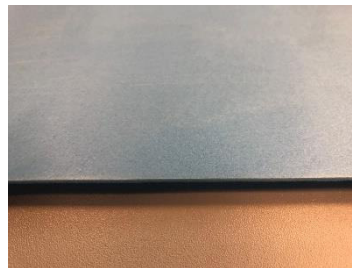
Thickness:	Construction: (from top to bottom)	TFI sample number:
7,0 mm*	Douwes Dekker Ambient rigid multilayer tegel 7,0 mm	18-10-0192
2,0 mm*	Bluefloor 2,0 mm	18-10-0194

* customer information

18-10-0192



18-10-0194



3 Results

Impact sound insulation $\Delta L_w = 21$ dB $\Delta L_{lin} = 10$ dB

4 Annexes

Impact sound insulation TS 481754-02^a

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

Annex TS - Impact Sound Insulation

1 Transaction

Product designation	Douwes Dekker Ambient rigid multilayer tegel 7,0 mm, Bluefloor 2,0 mm
TFI sample number	18-10-0192, 18-10-0194
Testing period	12.10.2018

2 Test Method / Requirements

EN ISO 10140-1:2014	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

3 Remarks

None

4 Measuring Operation

Measurement of the impact sound pressure level:	Using 4 fixed microphone positions, with 1 tapping machine position for each microphone position (The single results of the one-third-octave-bands were averaged on an energy basis)
Test surface:	~ 10 m ²
Category:	I
Connection with the floor:	loose laid

Damage to the sample: None
 Corrections: None, since
 - background noise corrections not relevant
 - airborne sound corrections not relevant

5 Laboratories

Test rooms: Laboratories of the TFI Aachen GmbH, Hauptstrasse 133, 52477 Alsdorf, Germany
 Sending room (1.04): $V = 52.1 \text{ m}^3$ (with diffusers)
 Receiving room (0.01): $4.05 \text{ m} \times 3.95 \text{ m} \times 3.33 \text{ m} + 2.00 \text{ m} \times 0.98 \text{ m} \times 0.18 \text{ m}$; $V = 53.6 \text{ m}^3$ (cuboid room, with diffusers)
 Reference floor: $4.27 \text{ m} \times 4.46 \text{ m}$; $S = 19.04 \text{ m}^2$
 14 cm concrete slab floor with an area-related mass of $m' \sim 322 \text{ kg/m}^2$
 Flanking walls: Lime sand brick walls with light wall facings (facing shell $d = 12 \text{ cm}$) with an average area-related mass of $m' \sim 330 \text{ kg/m}^2$

6 Measuring Devices

Real time analyser: Norsonic Nor140, SN: 1406926
 Microphone: Norsonic Type 1209/21134
 Tapping machine: NORSONIC, Type 211, SN: 502
 (standard tapping machine with 3 feet and 5 hammers according to ISO 10140)

7 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 ΔL_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 ΔL_{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

8 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.

Impact sound insulation according ISO 10140-1

TS 481754-02

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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TFI sample number: 18-10-0192, 18-10-0194 Testing period: 12.10.2018

Product name: Douwes Dekker Ambient rigid multilayer tegel 7,0 mm Bluefloor 2,0 mm

Installed by: Customer

Construction: Douwes Dekker Ambient rigid multilayer tegel 7,0mm 18-10-0192
(from top to bottom) Bluefloor 2,0 mm 18-10-0194

Receiving room:

Source room:

Volume: 53,6 m³

Volume: 52,1 m³

Air temperature: 23,1 °C

Air temperature: 23,4 °C

Relative air humidity: 64,5 %

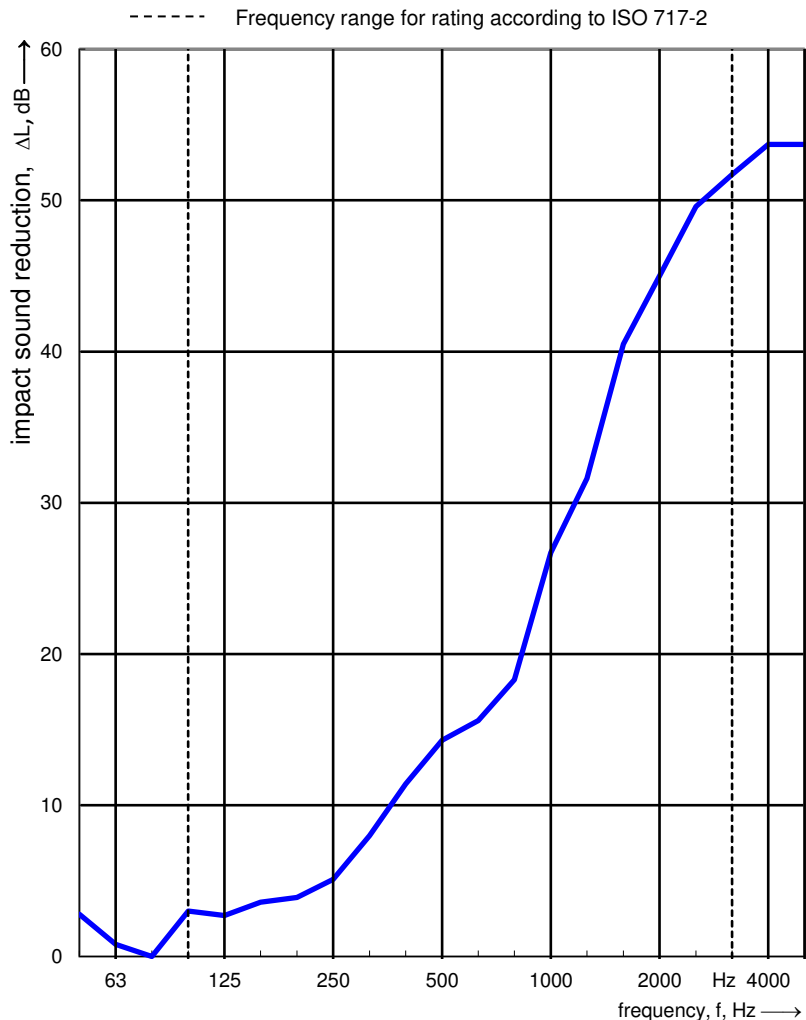
Relative air humidity: 50,8 %

Static pressure: 100,1 kPa

Type of reference floor: Heavyweight

Frequency f [Hz]	L _{n,0} 1/3 oct. [dB]	ΔL 1/3 oct. [dB]
50	61,9	2,8
63	63,9	0,8
80	62,7	0,0
100	59,1	3,0
125	64,7	2,7
160	59,8	3,6
200	63,0	3,9
250	67,6	5,1
315	63,1	8,0
400	64,4	11,4
500	64,8	14,3
630	64,7	15,6
800	66,0	18,3
1000	67,3	26,7
1250	67,8	31,6
1600	68,0	40,5
2000	67,9	45,0
2500	67,1	49,6
3150	67,6	51,7
4000	66,5	53,7
5000	62,2	53,7 ¹

¹ too high



Evaluation according to ISO 717-2

ΔL_w = 21 dB

C_{l,Δ} = -11 dB

C_{r,r} = 0 dB

ΔL_{lin} = 10 dB

The results are based on measurements, which were performed under laboratory conditions with artificial excitation (standard procedure).



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

$$\Delta L_w = 21 \text{ dB}$$

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

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

The results are based on measurements, which were performed under laboratory conditions with artificial excitation (standard procedure).

Weighted normalized impact sound pressure level $L_{n,0,w} = 74 \text{ dB}$ Weighted normalized impact sound pressure level $L_{n,w} = 52 \text{ dB}$ Weighted normalized impact sound pressure level $L_{n,r,w} = 57 \text{ dB}$

Frequency [Hz]	ΔL [dB]	$L_{n,0}$ [dB]	L_n [dB]	$L_{n,r}$ [dB]
50	2,8	61,9	59,1	
63	0,8	63,9	63,1	
80	0,0	62,7	62,7	
100	3,0	59,1	56,1	64,0
125	2,7	64,7	62,0	64,8
160	3,6	59,8	56,2	64,4
200	3,9	63,0	59,1	64,6
250	5,1	67,6	62,5	63,9
315	8,0	63,1	55,1	61,5
400	11,4	64,4	53,0	58,6
500	14,3	64,8	50,5	56,2
630	15,6	64,7	49,1	55,4
800	18,3	66,0	47,7	53,2
1000	26,7	67,3	40,6	45,3
1250	31,6	67,8	36,2	40,4
1600	40,5	68,0	27,5	31,5
2000	45,0	67,9	22,9	27,0
2500	49,6	67,1	17,5	22,4
3150	51,7	67,6	15,9	20,3
4000	53,7	66,5	12,8	
5000	53,7	62,2	8,5	

Receiving room:

Volume: 53,6 m³

Air temperature: 23,1 °C

Relative air humidity: 64,50 %

Static pressure: 100,1 kPa

Source room:

Volume: 52,1 m³

Air temperature: 23,4 °C

Relative air humidity: 50,8 %

Type of reference floor: Heavyweight

