

TFI Report 480781-01

Sound Absorption Impact Sound Insulation

Customer

egetaeppe a/s
Industrivej Nord 25
7400 Herning
DENMARK

Product

textile floor covering
ege tuft 650 ECT350

This report includes 2 pages and 2 annex(es)

Responsible at TFI

-Senior Engineer-
Dr.-Ing. Heike Kempf
Tel: +49 241 9679 171
h.kempf@tfi-aachen.de

Aachen, 22.05.2018

Dr. Alexander Siebel

- Head of the testing laboratory -

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1 Transaction

Test order	sound absorption according to EN ISO 354 sound insulation according to EN ISO 10140
Order date	16.04.2018
Your reference	L. Ormstrup
Product designation	ege tuft 650 ECT350
TFI sample number	18-04-0284

2 Product Specification

Type of manufacture	tufted
Type of surface	loop pile
Backing	textile fleece backing
Pattern	tonal effect without pattern
Colour	dark green, dark grey, grey

View



Thickness [mm]	8.0*
Area density [g/m ²]	2950*
Type of delivery	tiles

*customer information

3 Results

Sound absorption	$\alpha_w = 0,25$
	$\Delta L_w = 25 \text{ dB}$

4 Annexes

Sound absorption	SA 480781-01 ^a
Impact sound insulation	TS 480781-01 ^a

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

Annex SA - Sound Absorption Coefficient

1 Transaction

Product designation	ege tuft 650 ECT350
TFI sample number	18-04-0284
Testing period	08.05.2018

2 Test Method / Requirements

EN ISO 354:2003	Measurement of sound absorption in a reverberation room
EN ISO 11654:1997	Sound absorbers for use in buildings – Rating of sound absorption
Deviation from the standard	None

3 Remarks

None

4 Measuring Operation

Test noise:	broadband pink noise
Receive filter:	third octave band filter
Measurement:	2 loudspeaker positions 6 microphone positions

5 Laboratories

Test rooms:	laboratory of the TFI Aachen GmbH, Hauptstr. 133, 52477 Alsdorf, Germany
Test method:	reverberation room method
Volume:	211 m ³
Total surface:	213 m ²
Floor plan:	trapezoidal
Reflectors:	6 aluminium plates 1.0 m x 2.0 m 7 plywood boards 1.5 m x 1.3 m 1 aluminium plate 1.8 m x 0.9 m

6 Measuring Devices

Real time analyser:	Norsonic Nor140, SN: 1406926
Microphone:	Norsonic Type 1209/21134
Loudspeaker:	2 dodecahedrons

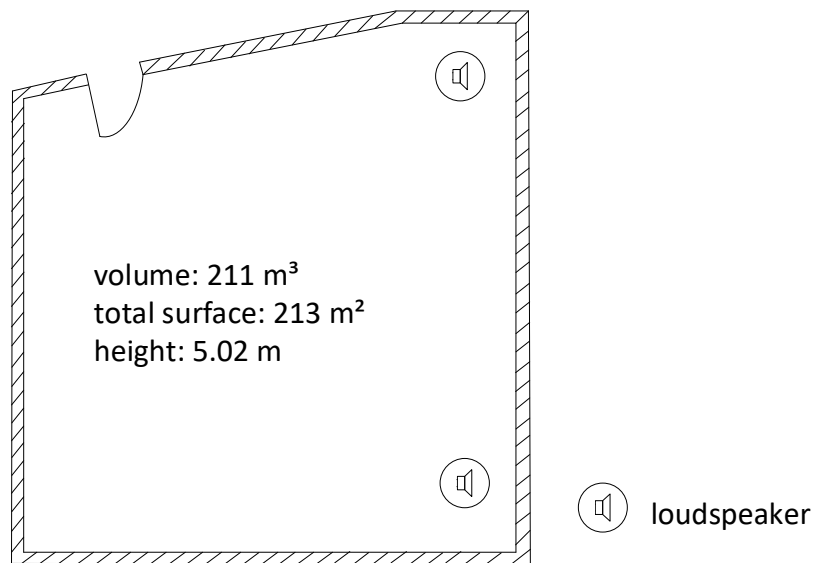
7 Evaluation

The decay curves are determined using the interrupted noise method. Several decay curves measured at one microphone and/or loudspeaker position are averaged in order to reach a sufficient reproducibility. The reverberation time of the room is expressed by the arithmetic mean derived from the total number of all reverberation time measurements in each frequency band.

The equivalent sound absorption area of the test specimen A_T is calculated as the difference between the equivalent sound absorption area of the reverberation room with test specimen A_2 and the equivalent sound absorption area of the empty reverberation room A_1 without test specimen.

The equivalent sound absorption coefficient α_s describes the ratio of the equivalent sound absorption area A_T of a test specimen divided by the area of the test specimen.

The evaluated sound absorption coefficient α_w is a single-number frequency-independent value which equals the value of the reference curve at 500 Hz after shifting it.



Drawing reverberation room

Measurement of sound absorption coefficient in a reverberation room

Annex SA – Sound absorption

TFI sample no.: 18-04-0284

Testing period: 08.05.2018

Construction: -
(from top to bottom)

Product name: ege tuft 650 ECT350

Reverberation room / without

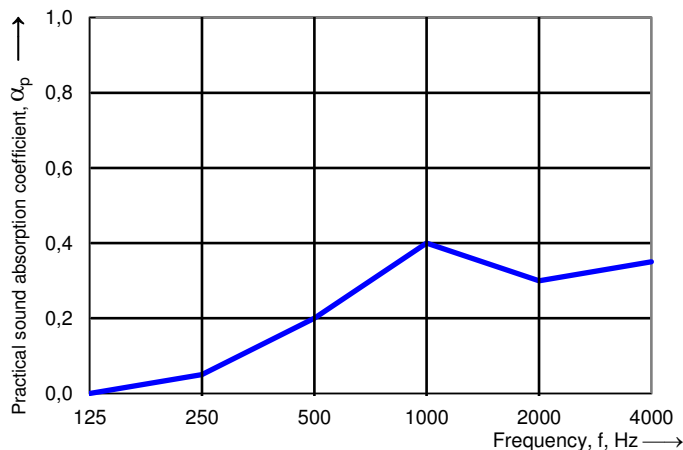
Relative humidity: 52,8 %
Temperature: 20,2 °C
Barometric pressure: 99,5 kPa

Reverberation room / with sample

Relative humidity: 52,8 %
Temperature: 20,2 °C
Barometric pressure: 99,5 kPa

Surface area: 12,49 m²
Room volume: 211,0 m³
Total room area St: 213 m²

Frequency f [Hz]	α_p Oktave
100 125 160	0,00
200 250 315	0,05
400 500 630	0,20
800 1000 1250	0,40
1600 2000 2500	0,30
3150 4000 5000	0,35



Weighted sound absorption coefficient according to ISO 11654

$\alpha_w = 0,25$



Sound absorption according ISO 354

SA 480781-01

Measurement of sound absorption coefficient in a reverberation room

Annex SA – Sound absorption

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Weighted sound absorption coefficient according to ISO 11654

$$\alpha_w = 0,25$$

Surface area: 12,49 m²
Room volume: 211,0 m³
Total room area St: 213,0 m²

Frequency [Hz]	α_p	α_s	A [m ²]	T1 [s]	T2 [s]
50		-0,02	-0,3	7,73	8,30
63	0,00	0,02	0,2	7,92	7,57
80		0,03	0,4	9,53	8,62
100		0,02	0,3	10,21	9,34
125	0,00	0,00	-0,1	6,60	6,68
160		-0,01	-0,1	6,07	6,23
200		0,00	0,0	6,76	6,79
250	0,05	0,03	0,4	6,48	6,04
315		0,08	1,0	5,83	4,98
400		0,11	1,3	5,88	4,78
500	0,20	0,17	2,2	5,93	4,29
630		0,34	4,2	5,81	3,38
800		0,53	6,7	5,64	2,68
1000	0,40	0,35	4,3	5,52	3,24
1250		0,27	3,4	5,51	3,55
1600		0,27	3,4	5,22	3,43
2000	0,30	0,27	3,4	4,82	3,27
2500		0,31	3,8	4,16	2,83
3150		0,31	3,9	3,51	2,51
4000	0,35	0,34	4,3	2,82	2,09
5000		0,38	4,8	2,17	1,67

Reverberation room / without sample:

Relative humidity: 52,8 %
Temperature: 20,2 °C
Barometric pressure: 99,5 kPa

Reverberation room / with sample:

Relative humidity: 52,8 %
Temperature: 20,2 °C
Barometric pressure: 99,5 kPa

TFI sample number: 18-04-0284



Annex TS - Impact Sound Insulation

1 Transaction

Product designation	ege tuft 650 ECT350
TFI sample number	18-04-0284
Testing period	14.05.2018

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

3 Remarks

None

4 Measuring Operation

Measurement of the impact sound pressure level:	Using with 4 tapping machine position. (The single results of the one-third-octave-bands were averaged on an energy basis)
Test surface:	~1m ²
Category:	I
Connection with the floor:	loose laid
Damage to the sample:	None

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: 1406927 Norsonic Nor140, SN: 1406926
Microphone:	Norsonic Type 1209/21135 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 480781-01

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: 18-04-0284 Testing period: 14.05.2018

Product name: ege tuft 650 ECT350

Installed by: TFI

Construction:
(from top to bottom)

Receiving room:

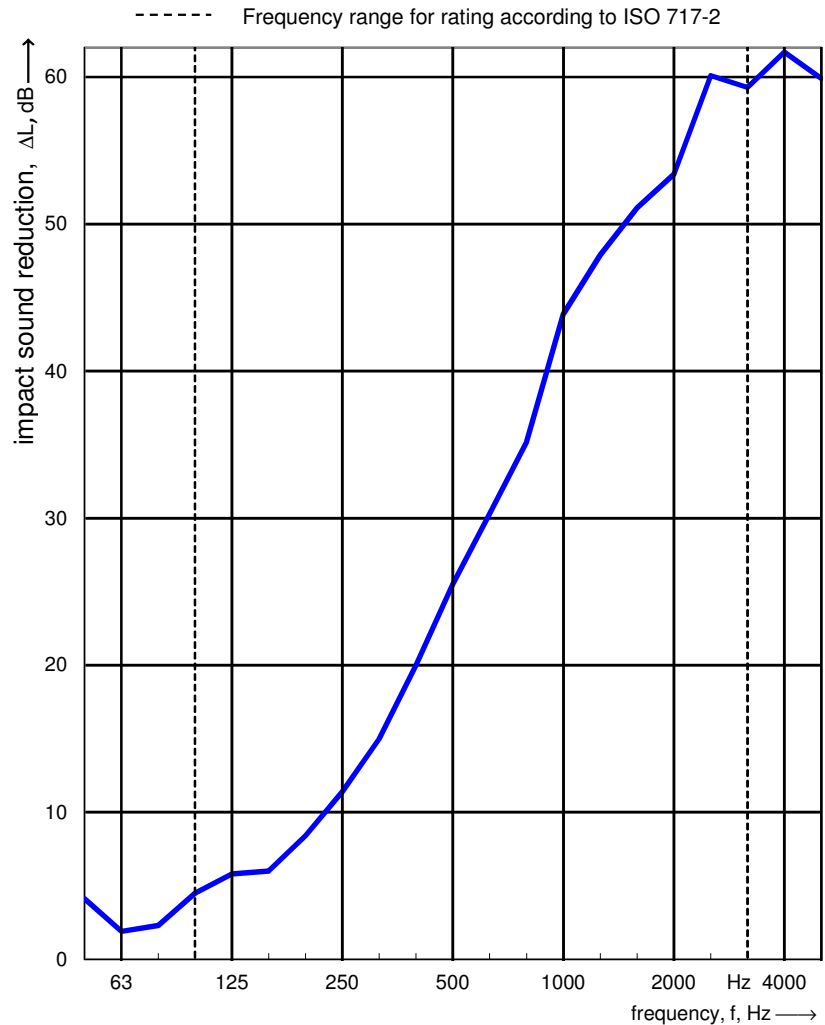
Volume: 53,6 m³
Air temperature: 21,6 °C
Relative air humidity: 68,8 %
Static pressure: 99,5 kPa

Source room:

Volume: 52,1 m³
Air temperature: 22,4 °C
Relative air humidity: 55,4 %
Type of reference floor: Heavyweight

Frequency f [Hz]	L _{n,0} 1/3 oct. [dB]	ΔL 1/3 oct. [dB]
50	58,9	4,1 ¹
63	61,5	1,9
80	58,3	2,3
100	58,7	4,5
125	65,4	5,8
160	61,0	6,0
200	63,7	8,4
250	67,5	11,4
315	63,5	15,0
400	65,6	20,0
500	64,9	25,5
630	65,3	30,3
800	66,3	35,2
1000	67,0	43,9
1250	67,2	47,9
1600	67,9	51,1
2000	68,4	53,4
2500	67,7	60,1
3150	68,9	59,3
4000	67,3	61,7 ¹
5000	63,9	59,9 ¹

¹ to high



Evaluation according to ISO 717-2

ΔL_w = 25 dB

C_{i,Δ} = -11 dB

C_{i,r} = 0 dB

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



Impact sound insulation according ISO 10140-1

TS 480781-01

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

Annex TS – Impact sound insulation

Page 2 of 2

Evaluation according to ISO 717-2

$\Delta L_w = 25$ dB

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

$C_{i,r} = 0$ dB

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

Weighted normalized impact sound pressure level $L_{n,0,w} = 74$ dB

Weighted normalized impact sound pressure level $L_{n,w} = 48$ dB

Weighted normalized impact sound pressure level $L_{n,r,w} = 53$ dB

Frequency [Hz]	ΔL [dB]	$L_{n,0}$ [dB]	L_n [dB]	$L_{n,r}$ [dB]
50	4,1	58,9	54,8	
63	1,9	61,5	59,6	
80	2,3	58,3	56,0	
100	4,5	58,7	54,2	62,5
125	5,8	65,4	59,6	61,7
160	6,0	61,0	55,0	62,0
200	8,4	63,7	55,3	60,1
250	11,4	67,5	56,1	57,6
315	15,0	63,5	48,5	54,5
400	20,0	65,6	45,6	50,0
500	25,5	64,9	39,4	45,0
630	30,3	65,3	35,0	40,7
800	35,2	66,3	31,1	36,3
1000	43,9	67,0	23,1	28,1
1250	47,9	67,2	19,3	24,1
1600	51,1	67,9	16,8	20,9
2000	53,4	68,4	15,0	18,6
2500	60,1	67,7	7,6	11,9
3150	59,3	68,9	9,6	12,7
4000	61,7	67,3	5,6	
5000	59,9	63,9	4,0	

Receiving room:

Volumen: 53,6 m³

Air temperature: 21,6 °C

Relative air humidity: 68,80 %

Static pressure: 99,5 kPa

Source room:

Volumen: 52,1 m³

Air temperature: 22,4 °C

Relative air humidity: 55,4 %

Type of reference floor: Heavyweight



TFI sample number:

18-04-0284