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 Vital Decosterstraat 67A – bus 1
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 VAT: BE 0454.276.239
www.daidalospeutz.be



N° 451-TEST
 NBN EN ISO 17025:2017
 EA MLA signatory

NOISE LAB
REPORT Number A-2021LAB-116-1-44541_E

Customer : Texdecor
 Rue d'Hem 2
 59780 Willems
 France

Contacts : **Client :** Max Olivier Loubert
Noise lab : Els Meulemans

Tests : Measurement of sound absorption in the reverberation room

Product name : Texdecor - Moulure 3D / Rivoli

Normative references:
NBN EN ISO 354:2003

Acoustics - Measurement of sound absorption in a reverberation room

NBN EN ISO 11654:1997
 NBN ISO 9613-1:1996

Acoustics - Sound absorbers for use in buildings - Rating of sound absorption
 Acoustics - Attenuation of sound during propagation outdoors -
 part 1 : Calculation of the absorption of sound by the atmosphere

ISO 12999-2:2020

Acoustics - Determination and application of measurement uncertainties in building acoustics
 Part 2: Sound absorption

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Date and reference of the request:	19/10/2021	2021LAB-116
Date of receipt of the specimen(s):	24/11/2021	1
Date of construction:	11/12/2021	
Date of tests:	11/12/2021	
Date of preparation of the report:	13/01/2022	

This test report together with its annexes contains : 9 pages and must be multiplied only in its entirety

Technical Manager,

Paul Mees

Laboratory Engineer,

Gert-Jan Loobuyck

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MEASURING EQUIPMENT

Signal

Brüel & Kjaer - 4292 : Omni Power Sound Source

Microphone system:

Brüel & Kjaer - 4189-L-001 : 1/2" free field microphone prepolarized, inclusive 2669L TEDS
 Brüel & Kjaer - 4189 : 1/2" free field microphone, 6Hz to 20kHz, prepolarized
 Brüel & Kjaer - 2669 : 1/2" microphone preamplifier
 Brüel & Kjaer - 4231 : Sound calibrator 94&114dB SPL-1000Hz, Fulfills IEC 60942(2003)Class1

Number of source positions:	2	(Different sound source positions at least 3m apart.
Number of microphone positions for each source position:	8	The measurements shall be made with different microphone positions
Number of measured decays curves:	3	which are at least 1,5m apart, 2m from any sound source and 1m from
Total number of measurements with different positions for microphone & source:	16	any room surface and the test specimen.)

Signal processing

Brüel & Kjaer - 2716C : Power amplifier
 Brüel & Kjaer - 3050-A-6/0: Signal generator, 6-ch. Inputmodule LAN-XI
 Brüel & Kjaer - 3160-A-042: Signal generator, 4/2-ch. Input/output module LAN-XI
 Brüel & Kjaer : PULSE Labshop Version 13.5
 A PC with all necessary software

Reverberation room

Dimensions of the room:	Total volume :	298,3 m ³
	Length:	9,99 m
	Width	4,97 m
	Height	5,98 m
	Volume door opening :	1,32 m ³
	Total area:	279,9 m ²
	$l_{max} = 12,65 \text{ m} < 1,9 \text{ V}^{1/3}$	

In order to improve the diffusivity, the use of diffusers is necessary

The test specimen shall have a maximum area of 15,62 m², which depends on the room volume

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TEST METHOD

The tests were conducted in accordance with the provisions of the test method EN ISO354:2003. A detailed description of the test set up has been given in the figures of annex 1 of this report.

The measurement method can be simply described as follows:

Essence of the test is in measuring of the reverberation time in the empty reflecting room and in the same room with the test sample inside it.

The sound-absorption properties of a material depend on how the material is mounted during the test. Annex B of ISO 354:2003 specifies several different standard mountings that shall be used during a test for sound absorption. Normally a test specimen is tested using only one of the specified mountings.

From these reverberation times, the equivalent sound absorption area of the test specimen, is calculated by using Sabine's equation. Measurement is carried out in ranges of 1/3 octave and interval from 100Hz to 5000Hz.

The equivalent sound absorption area of the empty reverberation room, A_1 , in square metres, shall be calculated using the formula (1) :

$$A_1 = 55,3 V / (c_1 T_1) - 4V m_1 \quad [m^2] \quad (1)$$

The equivalent sound absorption area of the reverberation room containing a test specimen, A_2 , in square metres, shall be calculated using the formula (2) :

$$A_2 = 55,3 V / (c_2 T_2) - 4V m_2 \quad [m^2] \quad (2)$$

The equivalent sound absorption area of the test specimen, A_T , in square metres, shall be calculated using the formula (3) :

$$A_T = A_2 - A_1 = 55,3 V (1/c_2 T_2 - 1/c_1 T_1) - 4V(m_2 - m_1) \quad [m^2] \quad (3)$$

The sound absorption coefficient of a plane absorber or a specified array of test objects shall be calculated using the formula (4):

$$\alpha_s = A_T / S \quad (4)$$

whereas: A_1	=	<i>The equivalent sound absorption area of the empty reverberation room in square metres</i>
A_2	=	<i>The equivalent sound absorption area of the reverberation room containing a test specimen in square metres</i>
V	=	volume , in cubic metres, of the empty reverberation room [m^3]
c_1, c_2	=	the propagation speed of sound in air, in [m/s], calculated using the formula (in function of the temperature in the room during the test) $c = 331 + 0,6 t$ with $t =$ the air temperature in degrees Celsius for temperatures in the range of 15°C to 30°C
T_1	=	<i>the reverberation time, in seconds, of the empty reverberation room</i>
T_2	=	<i>the reverberation time, in seconds, of the reverberation room after the test specimen has been introduced</i>
m_1, m_2	=	<i>the power attenuation coefficient, in reciprocal metres, calculated according to ISO 9613-1:1993</i>
A_T	=	<i>The equivalent sound absorption area of the test specimen in square metres</i>
S	=	<i>the area, in square metres, covered by the test specimen</i>
α_s	=	<i>the sound absorption coefficient</i>

SPECIAL MEASUREMENT CONDITIONS

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n/a

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RATING OF SOUND ABSORPTION

α_p PRACTICAL SOUND ABSORPTION COEFFICIENT

Frequency-dependent value of the sound absorption coefficient which is based on measurements on one-third-octave bands in accordance with ISO 354 and which is calculated in octave bands in accordance with the standard ISO 11654:1997.

The practical sound absorption coefficient, α_{pi} , for each octave band i , is calculated from the arithmetic mean value of the three one-third octave sound absorption coefficients within the octave. The mean value is calculated to the second decimal and rounded in steps of 0,05 and maximized to 1,00 for rounded mean values $> 1,00$

α_w WEIGHTED SOUND ABSORPTION COEFFICIENT

The weighted sound absorption coefficient is determined as a single number value from the practical sound absorption coefficients from 250 Hz to 4000 Hz. The practical sound absorption coefficient is calculated according to ISO 11654:1997.

Single-number frequency-independent value which equals the value of the reference curve at 500 Hz after shifting is as specified in the standard ISO 11654:1997.

SHAPE INDICATORS, L,M,H

Whenever a practical sound absorption coefficient α_{pi} exceeds the value of the shifted reference curve by 0,25 or more, one or more shape indicators shall be added, in parantheses, to the α_w value.

If the excess absorption occurs at 250 Hz, use the notation L.

If the excess absorption occurs at 500 Hz or 1000 Hz, use the notation M.

If the excess absorption occurs at 2000 Hz or 4000 Hz, use the notation H.

NRC NOISE REDUCTION COEFFICIENT

The NRC is a single-number index determined in a lab test and used for rating how absorptive a particular material is. This industry standard ranges from zero (perfectly reflective) to 1 (perfectly absorptive). It is simply the average of the mid-frequency sound absorption coefficients (250, 500, 1000 and 2000 Hertz) rounded to the nearest 5%.

SAA SOUND ABSORPTION AVERAGE

NRC is being replaced by the Sound Absorption Average (SAA), which is described in the current ASTM C423-09a. The SAA is a single-number rating of sound absorption properties of a material similar to NRC, except that the sound absorption values employed in the averaging are taken at the twelve one-third octave bands from 200 Hz to 2500 Hz, inclusive, and rounding is to the nearest multiple of 0.01.

The NRC and SAA results are not within the scope of the accreditation.

Test results related to tested object only. The test results should not be considered as material constants, the absorption depends not only on the material itself. The method of construction, the size of the material surface and its place in the room, affect the sound absorption characteristics of the test element.

ACCURACY

The accuracy of the absorption coefficients as calculated can be expressed in terms of repeatability of measured reverberation times (tests within one laboratory) and reproducibility (between various laboratories)

The expanded uncertainty under reproducibility conditions, U , is calculated in accordance to the standard ISO 12999-2 for the confidence level of 95%, used the coverage factor $k=2$

$$U = u \cdot k$$

met u = uncertainty under reproducibility conditions
 k = coverage factor ($k=2$ for a confidence level of 95%)
 U = expanded uncertainty under reproducibility conditions

This standard specifies how to calculate :

- the uncertainty of sound absorption coefficients and equivalent sound absorption areas measured according to ISO 354
- the uncertainty of the practical and weighted sound absorption coefficients determined according to ISO 11654

The numbers given are derived from inter-laboratory measurements with different types of test specimens including suspended ceilings, mineral wool, foams.

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 α_s

SOUND ABSORPTION COEFFICIENT

EN ISO 354:2003

Acoustics - Measurement of sound absorption in a reverberation room

EN ISO 11654:1997

Acoustics - Sound absorbers for use in buildings - Rating of sound absorption

Identification number of test element: 1

Test date: 11/12/2021

Reverberation room:

V = 298,3 m³S_{tot} = 279,9 m²

Room conditions during measurements:

Empty room

With testelement

Temperature:

T = 19,2

18,1 °C

Atmospheric pressure:

p = 101,5

101,2 kPa

Relative humidity :

h_r = 52

54 %

Type of test element:

Plane absorber

Construction characteristics:

Mounting type in line with ISO354 Annex B: Type B mounting (glued directly to a hard surface)

Area of test element:

11,16 m²

Total thickness:

12.5 + (9 / 14) mm

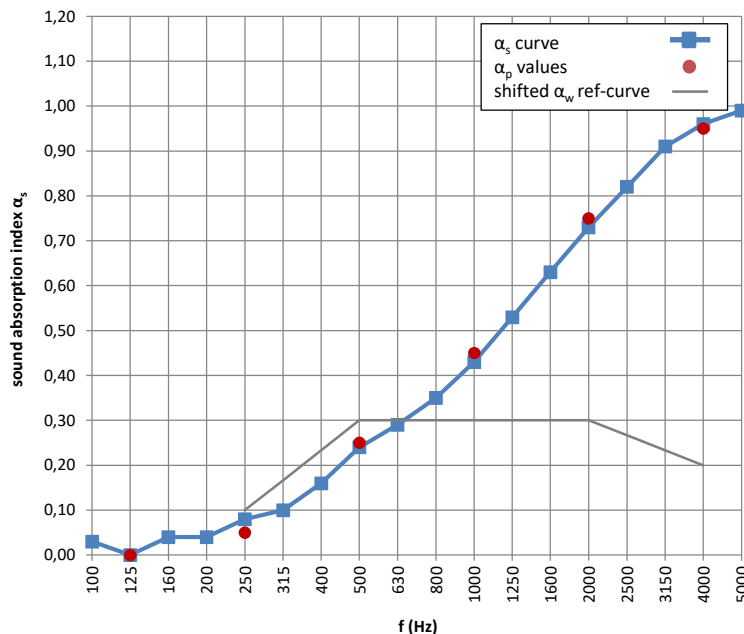
Number of layers including air spaces:

2

Connection of layers: glued

f(Hz)	T ₁ (s)	T ₂ (s)	α_s	$\pm U$ (k=2)
50				
63				
80				
100	10,24	9,50	0,03	$\pm 0,04$
125	9,30	9,24		$\pm 0,03$
160	8,75	8,06	0,04	$\pm 0,04$
200	9,01	8,28	0,04	$\pm 0,04$
250	9,85	8,38	0,08	$\pm 0,04$
315	9,53	7,87	0,10	$\pm 0,05$
400	8,94	6,77	0,16	$\pm 0,05$
500	9,03	6,06	0,24	$\pm 0,05$
630	9,27	5,76	0,29	$\pm 0,06$
800	9,21	5,26	0,35	$\pm 0,06$
1000	9,19	4,81	0,43	$\pm 0,06$
1250	8,45	4,16	0,53	$\pm 0,07$
1600	7,37	3,55	0,63	$\pm 0,08$
2000	6,45	3,09	0,73	$\pm 0,08$
2500	5,38	2,66	0,82	$\pm 0,08$
3150	4,34	2,26	0,91	$\pm 0,08$
4000	3,46	1,95	0,96	$\pm 0,09$
5000	2,67	1,64	0,99	$\pm 0,08$

f(Hz)	α_p	$\pm U$ (k=2)
125	0,00	
250	0,05	$\pm 0,04$
500	0,25	$\pm 0,08$
1000	0,45	$\pm 0,08$
2000	0,75	$\pm 0,08$
4000	0,95	$\pm 0,10$



$\alpha_w = 0,30$ (H)* $\pm 0,07$ (k=2)
 Sound absorption class: D

NRC = 0,4 **
 SAA = 0,37 **

Requested by: Texdecor, Rue d'Hem 2,59780 Willems

TESTELEMANT: (product name, for details see Annex 2)

Texdecor - Moulure 3D / Rivoli

* It is strongly recommended to use this single-number rating in combination with the complete sound absorption coefficient curve
 ** These results are not within the scope of the accreditation

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ANNEX 1: Description test items by manufacturer

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

Moulure 3D / Rivoli
 manufacturer: Texdecor
 type: Felt wallcovering
 composition: Polyester made from recycled plastic bottles
 felt density: 2 kg/m²
 dimensions of one Felt wallcovering panel: 1200 x 800 mm
 surface pattern per panel: 2 reliefs. A combination of felt panels with thickness 9 mm and felt panels thickness 9 mm with a air cavity of 5 mm.

The wall covering is tested on:
 A Gypsum board BA13, thickness 12.5 mm. The felt wallcovering panels are glued by the manufacturer with Metylan Ovalit TM directly to the Gypsum boards.

total thickness of the test setup: 12.5 mm + (9 mm and 14 mm)

Technical drawing: 3 felt panels with Moulure 3D / Rivoli patterns

- Felt panel thickness 9 mm, directly glued to gypsum board
- Felt panel height 14 mm (9 mm felt panel with a airspace of 5 mm)

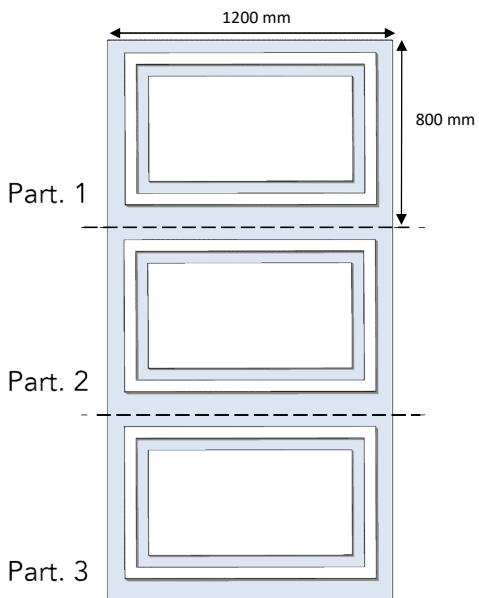


photo: Section view of the felt wallcovering glued to a gypsum board



photo: front side



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ANNEX 2: Technical datasheet

The test sample description given by manufacturer is checked visually as good as possible by the laboratory.
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More information can be obtained from Texdecor

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ANNEX 3: photographs of the test element or the test arrangement

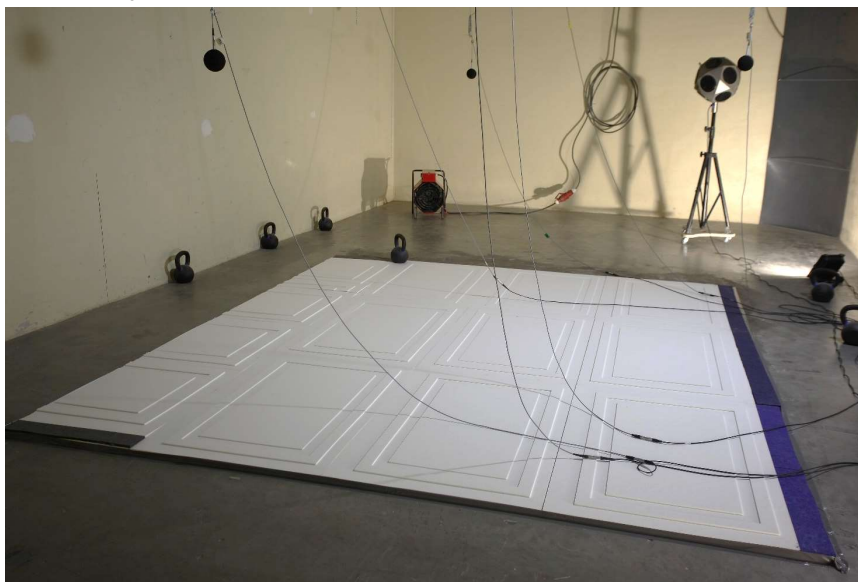
Description of the assembly or drawing or photo

The test specimen was installed as a type B mounting specified in Annex B of ISO 354:2003.

Beforehand, the wallcovering was glued on the gypsum boards by the manufacturer with wall covering adhesive Metylan Ovalit TM. Multiple gypsum boards with Moulure 3D / Rivoli wallcovering were laid side by side, and were laid directly on the floor of the reverberation room.

To prevent the side edges from absorbing sound, the perimeter of the sample is covered with a non sound absorbing tape. The test specimen measures 3.597 m x 3.102 m, surface area 11.16 m², ratio of width:length 1:0.86.

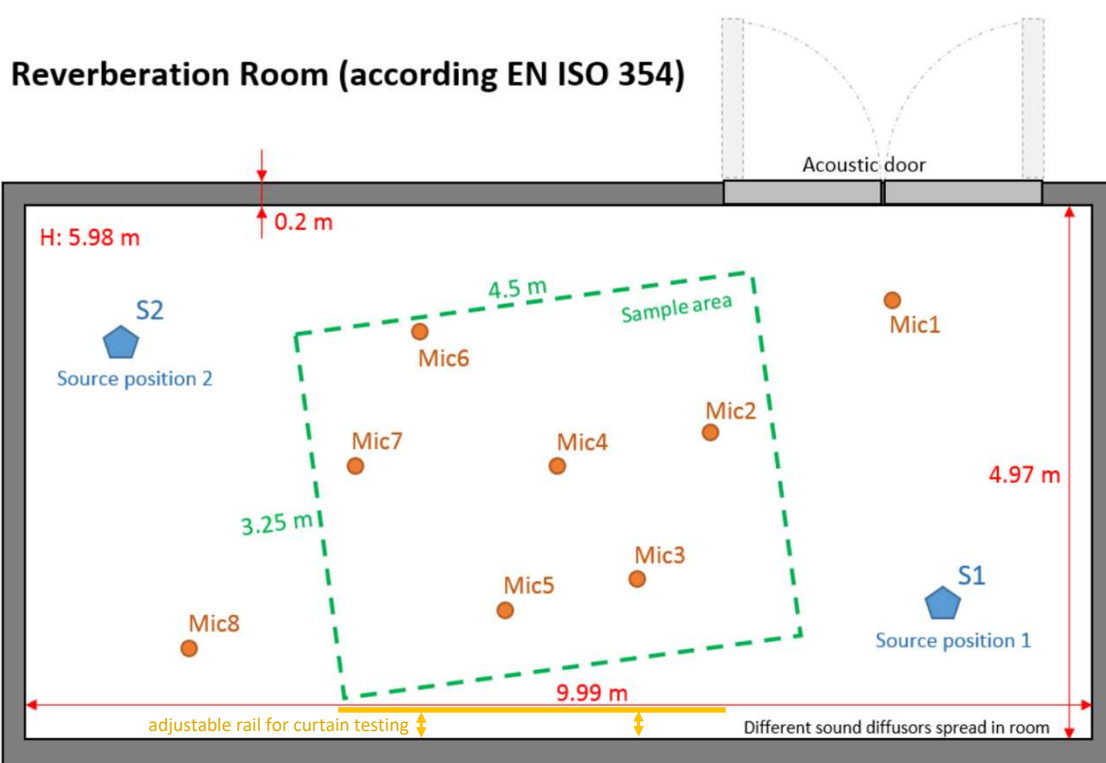
Photo de la configuration de test totale :



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ANNEX 4: Sketch of the test room

The test room was built and finished according ISO 354.



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Customer : Texdecor
 Rue d'Hem 2
 59780 Willems
 France

Contacts : **Client :** Max Olivier Loubert
Noise lab : Els Meulemans

Tests : Measurement of sound absorption in the reverberation room

Product name : Texdecor - Moulure 2D / Haussmann

Normative references:
NBN EN ISO 354:2003

Acoustics - Measurement of sound absorption in a reverberation room

NBN EN ISO 11654:1997
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Acoustics - Sound absorbers for use in buildings - Rating of sound absorption
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ISO 12999-2:2020

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Microphone system:

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Brüel & Kjaer - 2669 : 1/2" microphone preamplifier

Brüel & Kjaer - 4231 : Sound calibrator 94&114dB SPL-1000Hz, Fulfills IEC 60942(2003)Class1

Number of source positions:	2	(Different sound source positions at least 3m apart.
Number of microphone positions for each source position:	8	The measurements shall be made with different microphone positions
Number of measured decays curves:	3	which are at least 1,5m apart, 2m from any sound source and 1m from
Total number of measurements with different positions for microphone & source:	16	any room surface and the test specimen.)

Signal processing

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Brüel & Kjaer - 3050-A-6/0: Signal generator, 6-ch. Inputmodule LAN-XI

Brüel & Kjaer - 3160-A-042: Signal generator, 4/2-ch. Input/output module LAN-XI

Brüel & Kjaer : PULSE Labshop Version 13.5

A PC with all necessary software

Reverberation room

Dimensions of the room:	Total volume :	298,3 m ³
	Length:	9,99 m
	Width	4,97 m
	Height	5,98 m
	Volume door opening :	1,32 m ³
	Total area:	279,9 m ²
	$l_{max} = 12,65 \text{ m} < 1,9 \text{ V}^{1/3}$	

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Essence of the test is in measuring of the reverberation time in the empty reflecting room and in the same room with the test sample inside it.

The sound-absorption properties of a material depend on how the material is mounted during the test. Annex B of ISO 354:2003 specifies several different standard mountings that shall be used during a test for sound absorption. Normally a test specimen is tested using only one of the specified mountings.

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The equivalent sound absorption area of the empty reverberation room, A_1 , in square metres, shall be calculated using the formula (1) :

$$A_1 = 55,3 V / (c_1 T_1) - 4V m_1 \quad [m^2] \quad (1)$$

The equivalent sound absorption area of the reverberation room containing a test specimen, A_2 , in square metres, shall be calculated using the formula (2) :

$$A_2 = 55,3 V / (c_2 T_2) - 4V m_2 \quad [m^2] \quad (2)$$

The equivalent sound absorption area of the test specimen, A_T , in square metres, shall be calculated using the formula (3) :

$$A_T = A_2 - A_1 = 55,3 V (1/c_2 T_2 - 1/c_1 T_1) - 4V(m_2 - m_1) \quad [m^2] \quad (3)$$

The sound absorption coefficient of a plane absorber or a specified array of test objects shall be calculated using the formula (4):

$$\alpha_s = A_T / S \quad (4)$$

whereas: A_1	=	<i>The equivalent sound absorption area of the empty reverberation room in square metres</i>
A_2	=	<i>The equivalent sound absorption area of the reverberation room containing a test specimen in square metres</i>
V	=	volume , in cubic metres, of the empty reverberation room [m^3]
c_1, c_2	=	the propagation speed of sound in air, in [m/s], calculated using the formula (in function of the temperature in the room during the test) $c = 331 + 0,6 t$ with $t =$ the air temperature in degrees Celsius for temperatures in the range of 15°C to 30°C
T_1	=	<i>the reverberation time, in seconds, of the empty reverberation room</i>
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m_1, m_2	=	<i>the power attenuation coefficient, in reciprocal metres, calculated according to ISO 9613-1:1993</i>
A_T	=	<i>The equivalent sound absorption area of the test specimen in square metres</i>
S	=	<i>the area, in square metres, covered by the test specimen</i>
α_s	=	<i>the sound absorption coefficient</i>

SPECIAL MEASUREMENT CONDITIONS

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Single-number frequency-independent value which equals the value of the reference curve at 500 Hz after shifting is as specified in the standard ISO 11654:1997.

SHAPE INDICATORS, L,M,H

Whenever a practical sound absorption coefficient α_{pi} exceeds the value of the shifted reference curve by 0,25 or more, one or more shape indicators shall be added, in parantheses, to the α_w value.

If the excess absorption occurs at 250 Hz, use the notation L.

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The NRC and SAA results are not within the scope of the accreditation.

Test results related to tested object only. The test results should not be considered as material constants, the absorption depends not only on the material itself. The method of construction, the size of the material surface and its place in the room, affect the sound absorption characteristics of the test element.

ACCURACY

The accuracy of the absorption coefficients as calculated can be expressed in terms of repeatability of measured reverberation times (tests within one laboratory) and reproducibility (between various laboratories)

The expanded uncertainty under reproducibility conditions, U , is calculated in accordance to the standard ISO 12999-2 for the confidence level of 95%, used the coverage factor $k=2$

$$U = u \cdot k$$

met u = uncertainty under reproducibility conditions
 k = coverage factor ($k=2$ for a confidence level of 95%)
 U = expanded uncertainty under reproducibility conditions

This standard specifies how to calculate :

- the uncertainty of sound absorption coefficients and equivalent sound absorption areas measured according to ISO 354
- the uncertainty of the practical and weighted sound absorption coefficients determined according to ISO 11654

The numbers given are derived from inter-laboratory measurements with different types of test specimens including suspended ceilings, mineral wool, foams.

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N° 451-TEST
 NBN EN ISO 17025:2017
 EA MLA signatory

NOISE LAB REPORT Number A-2021LAB-116-2-44541_E

 α_s

SOUND ABSORPTION COEFFICIENT

EN ISO 354:2003

Acoustics - Measurement of sound absorption in a reverberation room

EN ISO 11654:1997

Acoustics - Sound absorbers for use in buildings - Rating of sound absorption

Identification number of test element: **2**

Test date: 11/12/2021

Reverberation room:

V = 298,3 m³S_{tot} = 279,9 m²

Room conditions during measurements:

Empty room

With testelement

Temperature:

T = 19,2

19,8 °C

Atmospheric pressure:

p = 101,5

101,4 kPa

Relative humidity :

h_r = 52

50 %

Type of test element:

Plane absorber

Construction characteristics:

Mounting type in line with ISO354 Annex B: Type B mounting (glued directly to a hard surface)

Area of test element:

11,15 m²

Total thickness:

12.5 + (9 / 14) mm

Number of layers including air spaces:

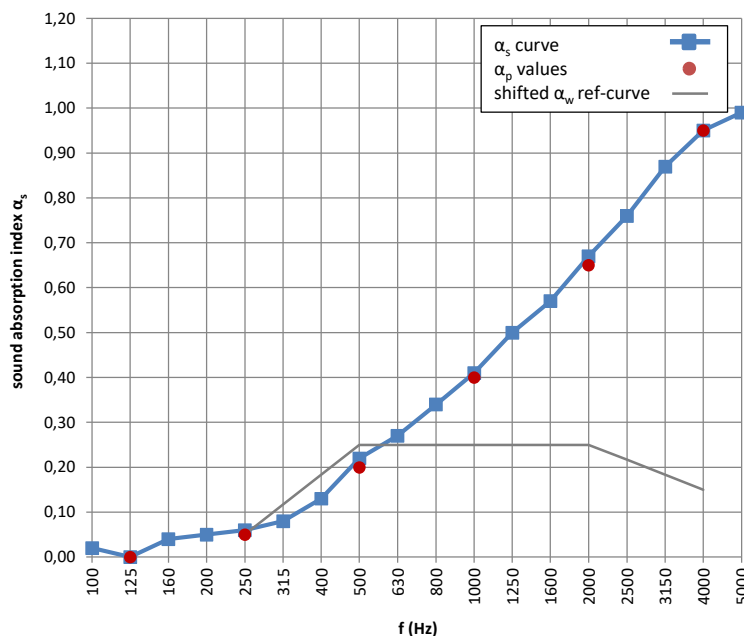
2

Connection of layers:

glued

f(Hz)	T ₁ (s)	T ₂ (s)	α_s	$\pm U (k=2)$
50				
63				
80				
100	10,24	9,69	0,02	$\pm 0,04$
125	9,30	9,20		$\pm 0,03$
160	8,75	8,13	0,04	$\pm 0,04$
200	9,01	8,20	0,05	$\pm 0,04$
250	9,85	8,61	0,06	$\pm 0,04$
315	9,53	8,02	0,08	$\pm 0,04$
400	8,94	7,05	0,13	$\pm 0,05$
500	9,03	6,13	0,22	$\pm 0,05$
630	9,27	5,82	0,27	$\pm 0,05$
800	9,21	5,36	0,34	$\pm 0,06$
1000	9,19	4,89	0,41	$\pm 0,06$
1250	8,45	4,26	0,50	$\pm 0,07$
1600	7,37	3,71	0,57	$\pm 0,07$
2000	6,45	3,21	0,67	$\pm 0,08$
2500	5,38	2,75	0,76	$\pm 0,08$
3150	4,34	2,31	0,87	$\pm 0,08$
4000	3,46	1,96	0,95	$\pm 0,09$
5000	2,67	1,65	0,99	$\pm 0,08$

f(Hz)	α_p	$\pm U (k=2)$
125	0,00	
250	0,05	$\pm 0,04$
500	0,20	$\pm 0,08$
1000	0,40	$\pm 0,08$
2000	0,65	$\pm 0,08$
4000	0,95	$\pm 0,10$



$\alpha_w = 0,25$ (H)* $\pm 0,07$ (k=2)
 Sound absorption class: E

NRC = 0,35 **
 SAA = 0,34 **

Requested by: Texdecor, Rue d'Hem 2,59780 Willems

TESTELEMANT: (product name, for details see Annex 2)

Texdecor - Moulure 2D / Haussmann

* It is strongly recommended to use this single-number rating in combination with the complete sound absorption coefficient curve
 ** These results are not within the scope of the accreditation

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ANNEX 1: Description test items by manufacturer

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

Moulure 2D / Haussmann



manufacturer: Texdecor
 type: Felt wallcovering
 composition: Polyester made from recycled plastic bottles
 felt density: 2 kg/m²
 dimensions of one Felt wallcovering panel: 1200 x 800 mm
 surface pattern per panel: 2 reliefs. A combination of felt panels with thickness 9 mm and felt panels thickness 9 mm with a air cavity of 5 mm.

The wall covering is tested on:

A Gypsum board BA13, thickness 12.5 mm. The felt wallcovering panels are glued by the manufacturer with Metylan Ovalit TM directly to the Gypsum boards.

total thickness of the test setup: 12.5 mm + (9 mm and 14 mm)

Technical drawing: 3 felt panels with Moulure 2D / Haussmann

- Felt panel thickness 9 mm,
 directly glued to gypsum board 
- Felt panel height 14 mm
 (9 mm felt panel with a airspace of 5 mm) 

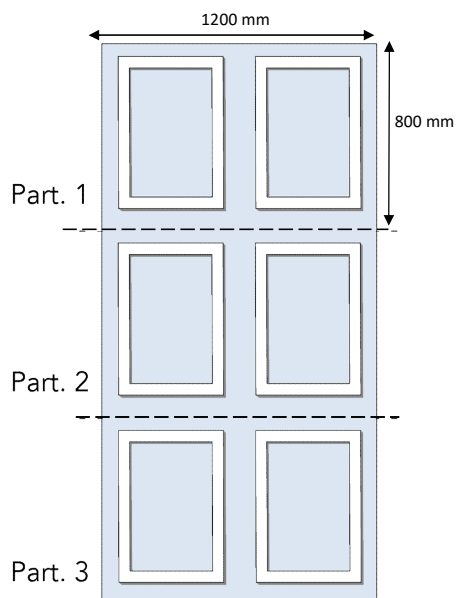


photo: Section view of the felt wallcovering glued to a gypsum board

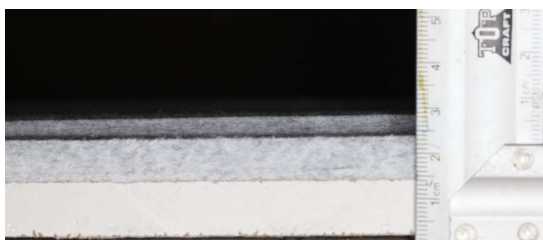


photo: front side



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REPORT Number A-2021LAB-116-2-44541_E

ANNEX 2: Technical datasheet

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 Texdecor

NOISE LAB
REPORT Number A-2021LAB-116-2-44541_E

ANNEX 3: photographs of the test element or the test arrangement

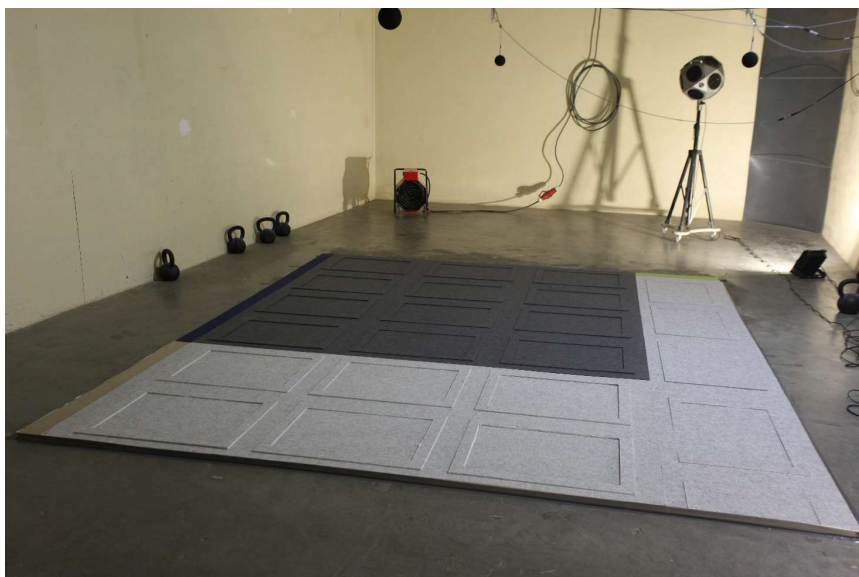
Description of the assembly or drawing or photo

The test specimen was installed as a type B mounting specified in Annex B of ISO 354:2003.

Beforehand, the wallcovering was glued on the gypsum boards by the manufacturer with wall covering adhesive Metylan Ovalit TM. Multiple gypsum boards with Moulure 2D / Haussmann wallcovering were laid side by side, and were laid directly on the floor of the reverberation room.

To prevent the side edges from absorbing sound, the perimeter of the sample is covered with a non sound absorbing tape. The test specimen measures 3.598 m x 3.100 m, surface area 11.15 m², ratio of width:length 1:0.86.

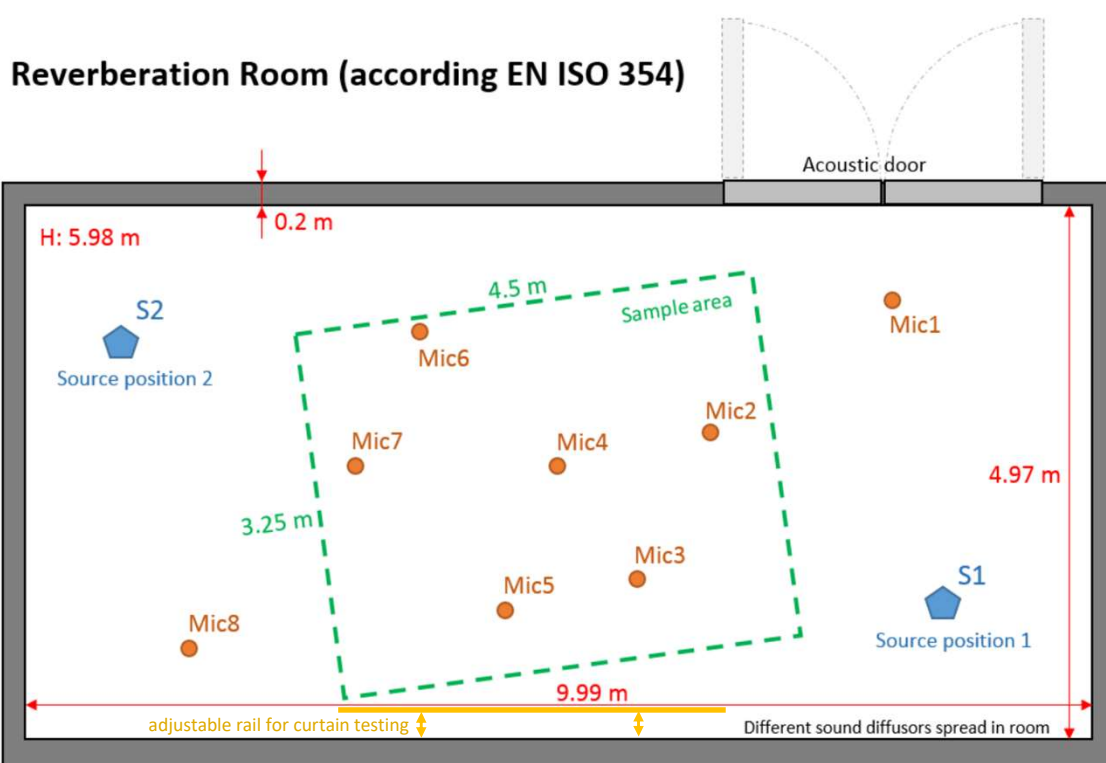
Photo de la configuration de test totale :



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ANNEX 4: Sketch of the test room

The test room was built and finished according ISO 354.



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NOISE LAB
REPORT Number A-2021LAB-116-3-44541_E

Customer : Texdecor
 Rue d'Hem 2
 59780 Willems
 France

Contacts : **Client :** Max Olivier Loubert
Noise lab : Els Meulemans

Tests : Measurement of sound absorption in the reverberation room

Product name : Texdecor - Moulure 3D / Versailles

Normative references:
NBN EN ISO 354:2003

Acoustics - Measurement of sound absorption in a reverberation room

NBN EN ISO 11654:1997
 NBN ISO 9613-1:1996

Acoustics - Sound absorbers for use in buildings - Rating of sound absorption
 Acoustics - Attenuation of sound during propagation outdoors -
 part 1 : Calculation of the absorption of sound by the atmosphere

ISO 12999-2:2020

Acoustics - Determination and application of measurement uncertainties in building acoustics
 Part 2: Sound absorption

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:	19/10/2021	2021LAB-116
Date of receipt of the specimen(s):	24/11/2021	3
Date of construction:	11/12/2021	
Date of tests:	11/12/2021	
Date of preparation of the report:	13/01/2022	

This test report together with its annexes contains : 9 pages and must be multiplied only in its entirety

Technical Manager,

Paul Mees

Laboratory Engineer,

Gert-Jan Loobuyck

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NOISE LAB
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MEASURING EQUIPMENT

Signal

Brüel & Kjaer - 4292 : Omni Power Sound Source

Microphone system:

Brüel & Kjaer - 4189-L-001 : 1/2" free field microphone prepolarized, inclusive 2669L TEDS

Brüel & Kjaer - 4189 : 1/2" free field microphone, 6Hz to 20kHz, prepolarized

Brüel & Kjaer - 2669 : 1/2" microphone preamplifier

Brüel & Kjaer - 4231 : Sound calibrator 94&114dB SPL-1000Hz, Fulfills IEC 60942(2003)Class1

Number of source positions:	2	(Different sound source positions at least 3m apart.
Number of microphone positions for each source position:	8	The measurements shall be made with different microphone positions
Number of measured decays curves:	3	which are at least 1,5m apart, 2m from any sound source and 1m from
Total number of measurements with different positions for microphone & source:	16	any room surface and the test specimen.)

Signal processing

Brüel & Kjaer - 2716C : Power amplifier

Brüel & Kjaer - 3050-A-6/0: Signal generator, 6-ch. Inputmodule LAN-XI

Brüel & Kjaer - 3160-A-042: Signal generator, 4/2-ch. Input/output module LAN-XI

Brüel & Kjaer : PULSE Labshop Version 13.5

A PC with all necessary software

Reverberation room

Dimensions of the room:	Total volume :	298,3 m ³
	Length:	9,99 m
	Width	4,97 m
	Height	5,98 m
	Volume door opening :	1,32 m ³
	Total area:	279,9 m ²
	$l_{max} = 12,65 \text{ m} < 1,9 \text{ V}^{1/3}$	

In order to improve the diffusivity, the use of diffusers is necessary

The test specimen shall have a maximum area of 15,62 m², which depends on the room volume

NOISE LAB

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TEST METHOD

The tests were conducted in accordance with the provisions of the test method EN ISO354:2003. A detailed description of the test set up has been given in the figures of annex 1 of this report.

The measurement method can be simply described as follows:

Essence of the test is in measuring of the reverberation time in the empty reflecting room and in the same room with the test sample inside it.

The sound-absorption properties of a material depend on how the material is mounted during the test. Annex B of ISO 354:2003 specifies several different standard mountings that shall be used during a test for sound absorption. Normally a test specimen is tested using only one of the specified mountings.

From these reverberation times, the equivalent sound absorption area of the test specimen, is calculated by using Sabine's equation. Measurement is carried out in ranges of 1/3 octave and interval from 100Hz to 5000Hz.

The equivalent sound absorption area of the empty reverberation room, A_1 , in square metres, shall be calculated using the formula (1) :

$$A_1 = 55,3 V / (c_1 T_1) - 4V m_1 \quad [m^2] \quad (1)$$

The equivalent sound absorption area of the reverberation room containing a test specimen, A_2 , in square metres, shall be calculated using the formula (2) :

$$A_2 = 55,3 V / (c_2 T_2) - 4V m_2 \quad [m^2] \quad (2)$$

The equivalent sound absorption area of the test specimen, A_T , in square metres, shall be calculated using the formula (3) :

$$A_T = A_2 - A_1 = 55,3 V (1/c_2 T_2 - 1/c_1 T_1) - 4V(m_2 - m_1) \quad [m^2] \quad (3)$$

The sound absorption coefficient of a plane absorber or a specified array of test objects shall be calculated using the formula (4):

$$\alpha_s = A_T / S \quad (4)$$

whereas: A_1	=	<i>The equivalent sound absorption area of the empty reverberation room in square metres</i>
A_2	=	<i>The equivalent sound absorption area of the reverberation room containing a test specimen in square metres</i>
V	=	volume , in cubic metres, of the empty reverberation room [m^3]
c_1, c_2	=	the propagation speed of sound in air, in [m/s], calculated using the formula (in function of the temperature in the room during the test) $c = 331 + 0,6 t$ with $t =$ the air temperature in degrees Celsius for temperatures in the range of 15°C to 30°C
T_1	=	<i>the reverberation time, in seconds, of the empty reverberation room</i>
T_2	=	<i>the reverberation time, in seconds, of the reverberation room after the test specimen has been introduced</i>
m_1, m_2	=	<i>the power attenuation coefficient, in reciprocal metres, calculated according to ISO 9613-1:1993</i>
A_T	=	<i>The equivalent sound absorption area of the test specimen in square metres</i>
S	=	<i>the area, in square metres, covered by the test specimen</i>
α_s	=	<i>the sound absorption coefficient</i>

SPECIAL MEASUREMENT CONDITIONS

-
-
-
-
-

n/a

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NOISE LAB

REPORT Number A-2021LAB-116-3-44541_E

RATING OF SOUND ABSORPTION

α_p PRACTICAL SOUND ABSORPTION COEFFICIENT

Frequency-dependent value of the sound absorption coefficient which is based on measurements on one-third-octave bands in accordance with ISO 354 and which is calculated in octave bands in accordance with the standard ISO 11654:1997.

The practical sound absorption coefficient, α_{pi} , for each octave band i , is calculated from the arithmetic mean value of the three one-third octave sound absorption coefficients within the octave. The mean value is calculated to the second decimal and rounded in steps of 0,05 and maximized to 1,00 for rounded mean values $> 1,00$

α_w WEIGHTED SOUND ABSORPTION COEFFICIENT

The weighted sound absorption coefficient is determined as a single number value from the practical sound absorption coefficients from 250 Hz to 4000 Hz. The practical sound absorption coefficient is calculated according to ISO 11654:1997.

Single-number frequency-independent value which equals the value of the reference curve at 500 Hz after shifting is as specified in the standard ISO 11654:1997.

SHAPE INDICATORS, L,M,H

Whenever a practical sound absorption coefficient α_{pi} exceeds the value of the shifted reference curve by 0,25 or more, one or more shape indicators shall be added, in parantheses, to the α_w value.

If the excess absorption occurs at 250 Hz, use the notation L.

If the excess absorption occurs at 500 Hz or 1000 Hz, use the notation M.

If the excess absorption occurs at 2000 Hz or 4000 Hz, use the notation H.

NRC NOISE REDUCTION COEFFICIENT

The NRC is a single-number index determined in a lab test and used for rating how absorptive a particular material is. This industry standard ranges from zero (perfectly reflective) to 1 (perfectly absorptive). It is simply the average of the mid-frequency sound absorption coefficients (250, 500, 1000 and 2000 Hertz) rounded to the nearest 5%.

SAA SOUND ABSORPTION AVERAGE

NRC is being replaced by the Sound Absorption Average (SAA), which is described in the current ASTM C423-09a. The SAA is a single-number rating of sound absorption properties of a material similar to NRC, except that the sound absorption values employed in the averaging are taken at the twelve one-third octave bands from 200 Hz to 2500 Hz, inclusive, and rounding is to the nearest multiple of 0.01.

The NRC and SAA results are not within the scope of the accreditation.

Test results related to tested object only. The test results should not be considered as material constants, the absorption depends not only on the material itself. The method of construction, the size of the material surface and its place in the room, affect the sound absorption characteristics of the test element.

ACCURACY

The accuracy of the absorption coefficients as calculated can be expressed in terms of repeatability of measured reverberation times (tests within one laboratory) and reproducibility (between various laboratories)

The expanded uncertainty under reproducibility conditions, U , is calculated in accordance to the standard ISO 12999-2 for the confidence level of 95%, used the coverage factor $k=2$

$$U = u \cdot k$$

met u = uncertainty under reproducibility conditions
 k = coverage factor ($k=2$ for a confidence level of 95%)
 U = expanded uncertainty under reproducibility conditions

This standard specifies how to calculate :

- the uncertainty of sound absorption coefficients and equivalent sound absorption areas measured according to ISO 354
- the uncertainty of the practical and weighted sound absorption coefficients determined according to ISO 11654

The numbers given are derived from inter-laboratory measurements with different types of test specimens including suspended ceilings, mineral wool, foams.

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NOISE LAB REPORT Number A-2021LAB-116-3-44541_E

 α_s

SOUND ABSORPTION COEFFICIENT

EN ISO 354:2003

Acoustics - Measurement of sound absorption in a reverberation room

EN ISO 11654:1997

Acoustics - Sound absorbers for use in buildings - Rating of sound absorption

Identification number of test element: **3**

Test date: 11/12/2021

Reverberation room:

V = 298,3 m³S_{tot} = 279,9 m²

Room conditions during measurements:

Empty room

With testelement

Temperature:

T = 19,2

19,3 °C

Atmospheric pressure:

p = 101,5

101,4 kPa

Relative humidity :

h_r = 52

52 %

Type of test element:

Plane absorber

Construction characteristics:

Mounting type in line with ISO354 Annex B: Type B mounting (glued directly to a hard surface)

Area of test element:

11,15 m²

Total thickness:

12.5 + (9 / 14) mm

Number of layers including air spaces:

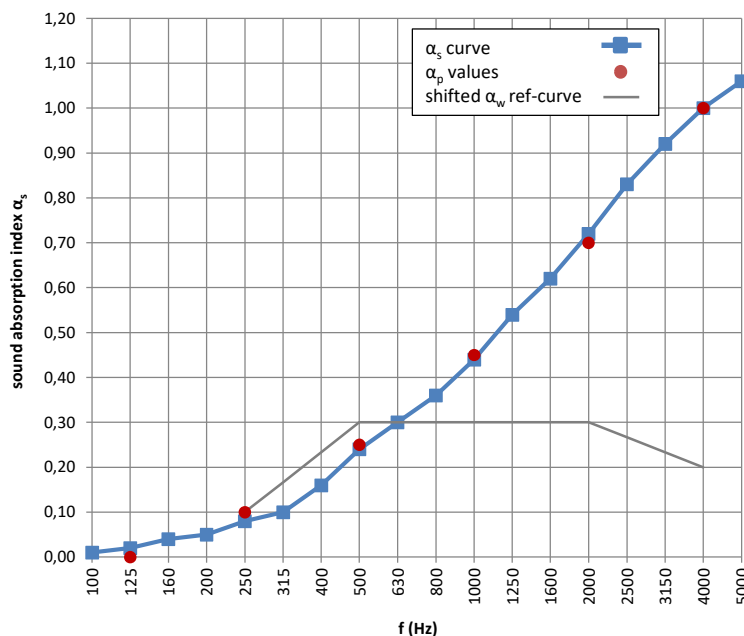
2

Connection of layers:

glued

f(Hz)	T ₁ (s)	T ₂ (s)	α_s	$\pm U$ (k=2)
50				
63				
80				
100	10,24	9,97	0,01	± 0,03
125	9,30	8,90	0,02	± 0,04
160	8,75	8,05	0,04	± 0,04
200	9,01	8,11	0,05	± 0,04
250	9,85	8,33	0,08	± 0,04
315	9,53	7,81	0,10	± 0,05
400	8,94	6,75	0,16	± 0,05
500	9,03	5,99	0,24	± 0,05
630	9,27	5,65	0,30	± 0,06
800	9,21	5,19	0,36	± 0,06
1000	9,19	4,77	0,44	± 0,07
1250	8,45	4,13	0,54	± 0,07
1600	7,37	3,58	0,62	± 0,08
2000	6,45	3,11	0,72	± 0,08
2500	5,38	2,65	0,83	± 0,08
3150	4,34	2,25	0,92	± 0,09
4000	3,46	1,92	1,00	± 0,09
5000	2,67	1,62	1,06	± 0,09

f(Hz)	α_p	$\pm U$ (k=2)
125	0,00	
250	0,10	± 0,04
500	0,25	± 0,08
1000	0,45	± 0,08
2000	0,70	± 0,08
4000	1,00	± 0,10



$\alpha_w = 0,30$ (H)* $\pm 0,07$ (k=2)
 Sound absorption class: D

NRC = 0,4 **
 SAA = 0,37 **

Requested by: Texdecor, Rue d'Hem 2, 59780 Willems

TESTELEMANT: (product name, for details see Annex 2)

Texdecor - Moulure 3D / Versailles

* It is strongly recommended to use this single-number rating in combination with the complete sound absorption coefficient curve
 ** These results are not within the scope of the accreditation

NOISE LAB
REPORT Number A-2021LAB-116-3-44541_E

ANNEX 1: Description test items by manufacturer

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

Moulure 3D / Versailles



manufacturer: Texdecor
 type: Felt wallcovering
 composition: Polyester made from recycled plastic bottles
 felt density: 2 kg/m²
 dimensions of one Felt wallcovering panel: 1200 x 800 mm
 surface pattern per panel: 2 reliefs. A combination of felt panels with thickness 9 mm and felt panels thickness 9 mm with a air cavity of 5 mm.

The wall covering is tested on:

A Gypsum board BA13, thickness 12.5 mm. The felt wallcovering panels are glued by the manufacturer with Metylan Ovalit TM directly to the Gypsum boards.

total thickness of the test setup: 12.5 mm + (9 mm and 14 mm)

Technical drawing: 3 felt panels with Moulure 3D / Versailles

- Felt panel thickness 9 mm,
 directly glued to gypsum board 
- Felt panel height 14 mm
 (9 mm felt panel with a airspace of 5 mm) 

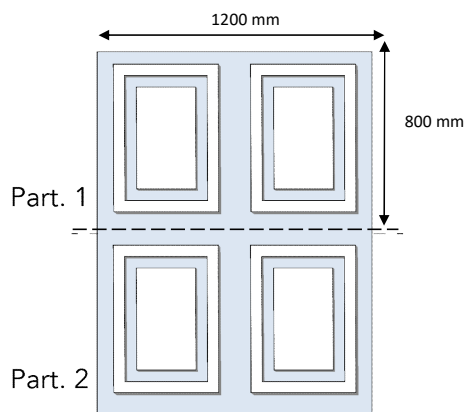
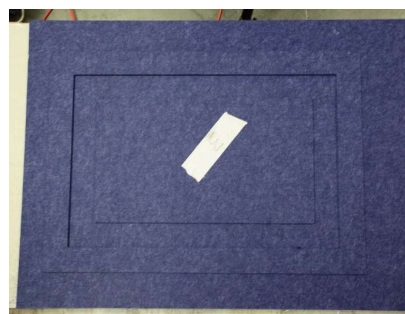


photo: Section view of the felt wallcovering glued to a gypsum board



photo: front side



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EA MLA signatory

NOISE LAB
REPORT Number A-2021LAB-116-3-44541_E

ANNEX 2: Technical datasheet

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 Texdecor

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ANNEX 3: photographs of the test element or the test arrangement

Description of the assembly or drawing or photo

The test specimen was installed as a type B mounting specified in Annex B of ISO 354:2003.

Beforehand, the wallcovering was glued on the gypsum boards by the manufacturer with wall covering adhesive Metylan Ovalit TM. Multiple gypsum boards with Moulure 3D / Versailles wallcovering were laid side by side, and were laid directly on the floor of the reverberation room.

To prevent the side edges from absorbing sound, the perimeter of the sample is covered with a non sound absorbing tape. The test specimen measures 3.600 m x 3.098 m, surface area 11.15 m², ratio of width:length 1:0.86.

Photo de la configuration de test totale :

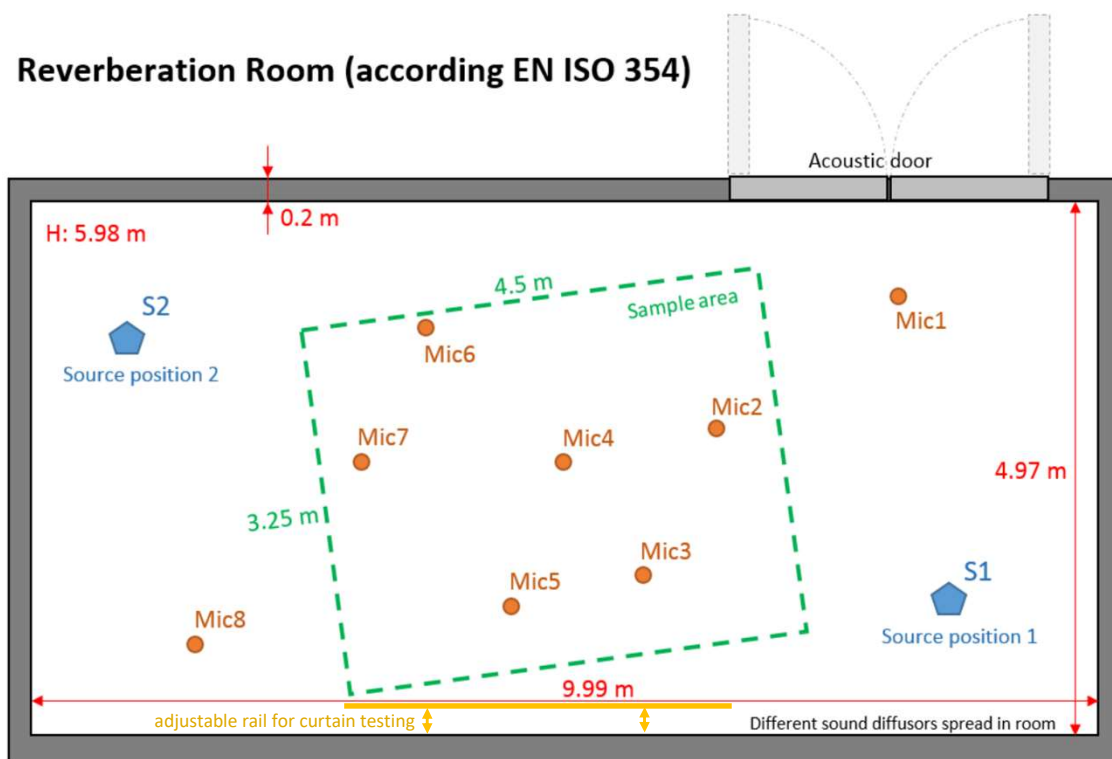


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ANNEX 4: Sketch of the test room

The test room was built and finished according ISO 354.

Reverberation Room (according EN ISO 354)



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N° 451-TEST
 NBN EN ISO 17025:2017
 EA MLA signatory

NOISE LAB
REPORT Number A-2021LAB-116-4-44541_E

Customer : Texdecor
 Rue d'Hem 2
 59780 Willems
 France

Contacts : **Client :** Max Olivier Loubert
Noise lab : Els Meulemans

Tests : Measurement of sound absorption in the reverberation room

Product name : Texdecor - Parement / Minneapolis

Normative references:
NBN EN ISO 354:2003

Acoustics - Measurement of sound absorption in a reverberation room

NBN EN ISO 11654:1997
 NBN ISO 9613-1:1996

Acoustics - Sound absorbers for use in buildings - Rating of sound absorption
 Acoustics - Attenuation of sound during propagation outdoors -
 part 1 : Calculation of the absorption of sound by the atmosphere

ISO 12999-2:2020

Acoustics - Determination and application of measurement uncertainties in building acoustics
 Part 2: Sound absorption

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Date and reference of the request:	19/10/2021	2021LAB-116
Date of receipt of the specimen(s):	24/11/2021	4
Date of construction:	11/12/2021	
Date of tests:	11/12/2021	
Date of preparation of the report:	13/01/2022	

This test report together with its annexes contains : 9 pages and must be multiplied only in its entirety

Technical Manager,

Paul Mees

Laboratory Engineer,

Gert-Jan Loobuyck

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N° 451-TEST
 NBN EN ISO 17025:2017
 EA MLA signatory

NOISE LAB

REPORT Number A-2021LAB-116-4-44541_E

MEASURING EQUIPMENT

Signal

Brüel & Kjaer - 4292 : Omni Power Sound Source

Microphone system:

Brüel & Kjaer - 4189-L-001 : 1/2" free field microphone prepolarized, inclusive 2669L TEDS

Brüel & Kjaer - 4189 : 1/2" free field microphone, 6Hz to 20kHz, prepolarized

Brüel & Kjaer - 2669 : 1/2" microphone preamplifier

Brüel & Kjaer - 4231 : Sound calibrator 94&114dB SPL-1000Hz, Fulfills IEC 60942(2003)Class1

Number of source positions:	2	(Different sound source positions at least 3m apart.
Number of microphone positions for each source position:	8	The measurements shall be made with different microphone positions
Number of measured decays curves:	3	which are at least 1,5m apart, 2m from any sound source and 1m from
Total number of measurements with different positions for microphone & source:	16	any room surface and the test specimen.)

Signal processing

Brüel & Kjaer - 2716C : Power amplifier

Brüel & Kjaer - 3050-A-6/0: Signal generator, 6-ch. Inputmodule LAN-XI

Brüel & Kjaer - 3160-A-042: Signal generator, 4/2-ch. Input/output module LAN-XI

Brüel & Kjaer : PULSE Labshop Version 13.5

A PC with all necessary software

Reverberation room

Dimensions of the room:	Total volume :	298,3 m ³
	Length:	9,99 m
	Width	4,97 m
	Height	5,98 m
	Volume door opening :	1,32 m ³
	Total area:	279,9 m ²
	$l_{max} = 12,65 \text{ m} < 1,9 \text{ V}^{1/3}$	

In order to improve the diffusivity, the use of diffusers is necessary

The test specimen shall have a maximum area of 15,62 m², which depends on the room volume

NOISE LAB

REPORT Number A-2021LAB-116-4-44541_E

TEST METHOD

The tests were conducted in accordance with the provisions of the test method EN ISO354:2003. A detailed description of the test set up has been given in the figures of annex 1 of this report.

The measurement method can be simply described as follows:

Essence of the test is in measuring of the reverberation time in the empty reflecting room and in the same room with the test sample inside it.

The sound-absorption properties of a material depend on how the material is mounted during the test. Annex B of ISO 354:2003 specifies several different standard mountings that shall be used during a test for sound absorption. Normally a test specimen is tested using only one of the specified mountings.

From these reverberation times, the equivalent sound absorption area of the test specimen, is calculated by using Sabine's equation. Measurement is carried out in ranges of 1/3 octave and interval from 100Hz to 5000Hz.

The equivalent sound absorption area of the empty reverberation room, A_1 , in square metres, shall be calculated using the formula (1) :

$$A_1 = 55,3 V / (c_1 T_1) - 4V m_1 \quad [m^2] \quad (1)$$

The equivalent sound absorption area of the reverberation room containing a test specimen, A_2 , in square metres, shall be calculated using the formula (2) :

$$A_2 = 55,3 V / (c_2 T_2) - 4V m_2 \quad [m^2] \quad (2)$$

The equivalent sound absorption area of the test specimen, A_T , in square metres, shall be calculated using the formula (3) :

$$A_T = A_2 - A_1 = 55,3 V (1/c_2 T_2 - 1/c_1 T_1) - 4V(m_2 - m_1) \quad [m^2] \quad (3)$$

The sound absorption coefficient of a plane absorber or a specified array of test objects shall be calculated using the formula (4):

$$\alpha_s = A_T / S \quad (4)$$

whereas: A_1	=	<i>The equivalent sound absorption area of the empty reverberation room in square metres</i>
A_2	=	<i>The equivalent sound absorption area of the reverberation room containing a test specimen in square metres</i>
V	=	volume , in cubic metres, of the empty reverberation room [m^3]
c_1, c_2	=	the propagation speed of sound in air, in [m/s], calculated using the formula (in function of the temperature in the room during the test) $c = 331 + 0,6 t$ with $t =$ the air temperature in degrees Celsius for temperatures in the range of 15°C to 30°C
T_1	=	<i>the reverberation time, in seconds, of the empty reverberation room</i>
T_2	=	<i>the reverberation time, in seconds, of the reverberation room after the test specimen has been introduced</i>
m_1, m_2	=	<i>the power attenuation coefficient, in reciprocal metres, calculated according to ISO 9613-1:1993</i>
A_T	=	<i>The equivalent sound absorption area of the test specimen in square metres</i>
S	=	<i>the area, in square metres, covered by the test specimen</i>
α_s	=	<i>the sound absorption coefficient</i>

SPECIAL MEASUREMENT CONDITIONS

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n/a

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RATING OF SOUND ABSORPTION

α_p PRACTICAL SOUND ABSORPTION COEFFICIENT

Frequency-dependent value of the sound absorption coefficient which is based on measurements on one-third-octave bands in accordance with ISO 354 and which is calculated in octave bands in accordance with the standard ISO 11654:1997.

The practical sound absorption coefficient, α_{pi} , for each octave band i , is calculated from the arithmetic mean value of the three one-third octave sound absorption coefficients within the octave. The mean value is calculated to the second decimal and rounded in steps of 0,05 and maximized to 1,00 for rounded mean values $> 1,00$

α_w WEIGHTED SOUND ABSORPTION COEFFICIENT

The weighted sound absorption coefficient is determined as a single number value from the practical sound absorption coefficients from 250 Hz to 4000 Hz. The practical sound absorption coefficient is calculated according to ISO 11654:1997.

Single-number frequency-independent value which equals the value of the reference curve at 500 Hz after shifting is as specified in the standard ISO 11654:1997.

SHAPE INDICATORS, L,M,H

Whenever a practical sound absorption coefficient α_{pi} exceeds the value of the shifted reference curve by 0,25 or more, one or more shape indicators shall be added, in parantheses, to the α_w value.

If the excess absorption occurs at 250 Hz, use the notation L.

If the excess absorption occurs at 500 Hz or 1000 Hz, use the notation M.

If the excess absorption occurs at 2000 Hz or 4000 Hz, use the notation H.

NRC NOISE REDUCTION COEFFICIENT

The NRC is a single-number index determined in a lab test and used for rating how absorptive a particular material is. This industry standard ranges from zero (perfectly reflective) to 1 (perfectly absorptive). It is simply the average of the mid-frequency sound absorption coefficients (250, 500, 1000 and 2000 Hertz) rounded to the nearest 5%.

SAA SOUND ABSORPTION AVERAGE

NRC is being replaced by the Sound Absorption Average (SAA), which is described in the current ASTM C423-09a. The SAA is a single-number rating of sound absorption properties of a material similar to NRC, except that the sound absorption values employed in the averaging are taken at the twelve one-third octave bands from 200 Hz to 2500 Hz, inclusive, and rounding is to the nearest multiple of 0.01.

The NRC and SAA results are not within the scope of the accreditation.

Test results related to tested object only. The test results should not be considered as material constants, the absorption depends not only on the material itself. The method of construction, the size of the material surface and its place in the room, affect the sound absorption characteristics of the test element.

ACCURACY

The accuracy of the absorption coefficients as calculated can be expressed in terms of repeatability of measured reverberation times (tests within one laboratory) and reproducibility (between various laboratories)

The expanded uncertainty under reproducibility conditions, U , is calculated in accordance to the standard ISO 12999-2 for the confidence level of 95%, used the coverage factor $k=2$

$$U = u \cdot k$$

met u = uncertainty under reproducibility conditions
 k = coverage factor ($k=2$ for a confidence level of 95%)
 U = expanded uncertainty under reproducibility conditions

This standard specifies how to calculate :

- the uncertainty of sound absorption coefficients and equivalent sound absorption areas measured according to ISO 354
- the uncertainty of the practical and weighted sound absorption coefficients determined according to ISO 11654

The numbers given are derived from inter-laboratory measurements with different types of test specimens including suspended ceilings, mineral wool, foams.

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 α_s

SOUND ABSORPTION COEFFICIENT

EN ISO 354:2003

Acoustics - Measurement of sound absorption in a reverberation room

EN ISO 11654:1997

Acoustics - Sound absorbers for use in buildings - Rating of sound absorption

Identification number of test element:

4

Test date: 11/12/2021**Reverberation room:**V = 298,3 m³S_{tot} = 279,9 m²**Room conditions during measurements:**

Empty room

With testelement

Temperature:

T = 19,2

20,2 °C

Atmospheric pressure:

p = 101,5

101,4 kPa

Relative humidity :h_r = 52

49 %

Type of test element:

Plane absorber

Construction characteristics:

Mounting type in line with ISO354 Annex B: Type B mounting (glued directly to a hard surface)

Area of test element:

11,16 m²

Total thickness:

12.5 + (9 / 14) mm

Number of layers including air spaces:

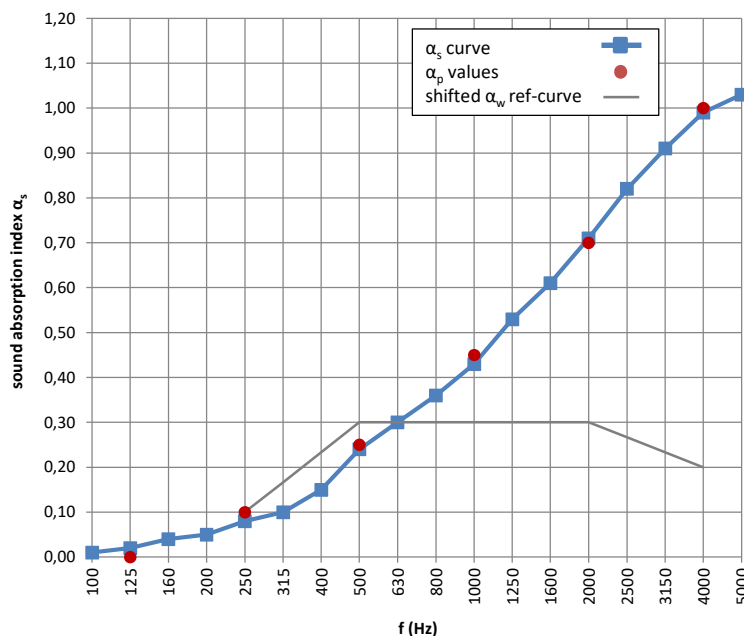
2

Connection of layers:

glued

f(Hz)	T ₁ (s)	T ₂ (s)	α_s	$\pm U$ (k=2)
50				
63				
80				
100	10,24	9,97	0,01	± 0,03
125	9,30	8,90	0,02	± 0,04
160	8,75	8,05	0,04	± 0,04
200	9,01	8,11	0,05	± 0,04
250	9,85	8,33	0,08	± 0,04
315	9,53	7,81	0,10	± 0,05
400	8,94	6,75	0,15	± 0,05
500	9,03	5,99	0,24	± 0,05
630	9,27	5,65	0,30	± 0,06
800	9,21	5,19	0,36	± 0,06
1000	9,19	4,77	0,43	± 0,06
1250	8,45	4,13	0,53	± 0,07
1600	7,37	3,58	0,61	± 0,08
2000	6,45	3,11	0,71	± 0,08
2500	5,38	2,65	0,82	± 0,08
3150	4,34	2,25	0,91	± 0,08
4000	3,46	1,92	0,99	± 0,09
5000	2,67	1,62	1,03	± 0,08

f(Hz)	α_p	$\pm U$ (k=2)
125	0,00	
250	0,10	± 0,04
500	0,25	± 0,08
1000	0,45	± 0,08
2000	0,70	± 0,08
4000	1,00	± 0,10



$\alpha_w = 0,30$ (H)* $\pm 0,07$ (k=2)
 Sound absorption class: D

NRC = 0,4 **
 SAA = 0,37 **

Requested by: Texdecor, Rue d'Hem 2,59780 Willems**TESTELEMANT:** (product name, for details see Annex 2)**Texdecor - Parement / Minneapolis**

* It is strongly recommended to use this single-number rating in combination with the complete sound absorption coefficient curve
 ** These results are not within the scope of the accreditation

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NOISE LAB REPORT Number A-2021LAB-116-4-44541_E

ANNEX 1: Description test items by manufacturer

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

Parement / Minneapolis



manufacturer: Texdecor
 type: Felt wallcovering
 composition: Polyester made from recycled plastic bottles
 felt density: 2 kg/m²
 dimensions of one Felt wallcovering panel: 1200 x 600 mm
 surface pattern per panel: 2 reliefs. A combination of felt panels with thickness 9 mm and felt panels thickness 9 mm with a air cavity of 5 mm.

The wall covering is tested on:

A Gypsum board BA13, thickness 12.5 mm. The felt wallcovering panels are glued by the manufacturer with Metylan Ovalit TM directly to the Gypsum boards.

total thickness of the test setup: 12.5 mm + (9 mm and 14 mm)

Technical drawing: 3 felt panels with Parement / Minneapolis

- Felt panel thickness 9 mm,
 directly glued to gypsum board 
- Felt panel height 14 mm
 (9 mm felt panel with a airspace of 5 mm) 

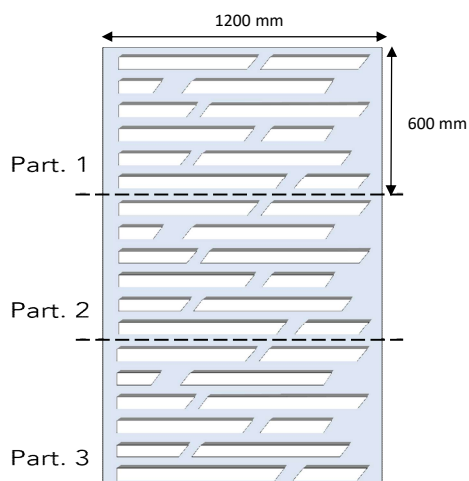


photo: Section view of the felt wallcovering glued to a gypsum board

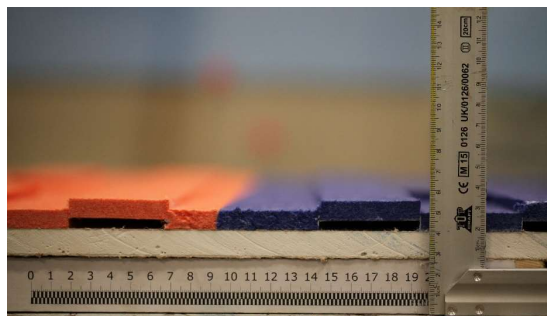
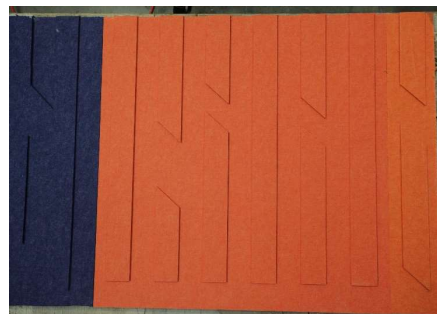


photo: front side



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ANNEX 2: Technical datasheet

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More information can be obtained from Texdecor

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ANNEX 3: photographs of the test element or the test arrangement

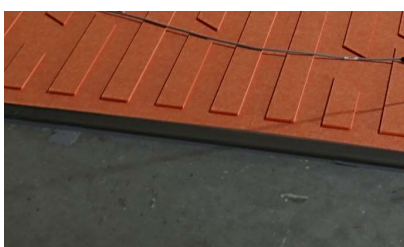
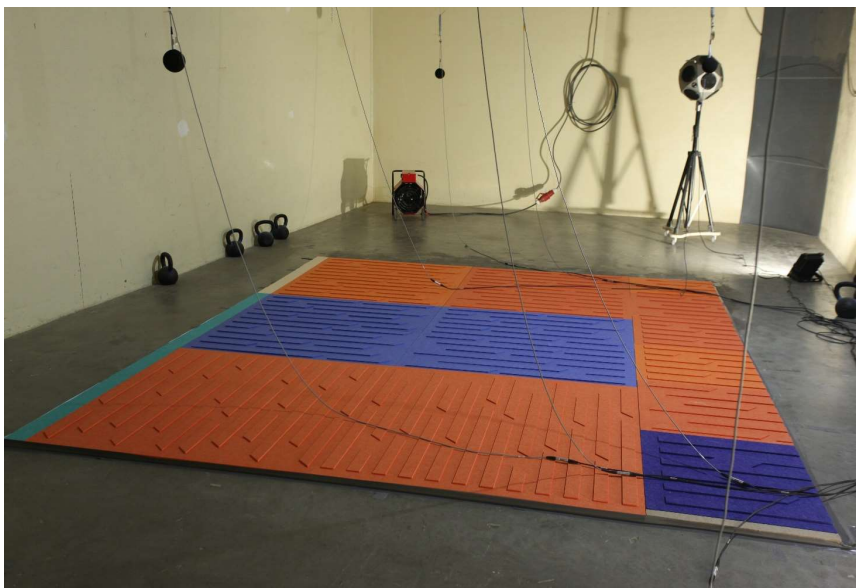
Description of the assembly or drawing or photo

The test specimen was installed as a type B mounting specified in Annex B of ISO 354:2003.

Beforehand, the wallcovering was glued on the gypsum boards by the manufacturer with wall covering adhesive Metylan Ovalit TM. Multiple gypsum boards with Parement / Minneapolis wallcovering were laid side by side, and were laid directly on the floor of the reverberation room.

To prevent the side edges from absorbing sound, the perimeter of the sample is covered with a non sound absorbing tape. The test specimen measures 3.603 m x 3.098 m, surface area 11.16 m², ratio of width:length 1:0.86.

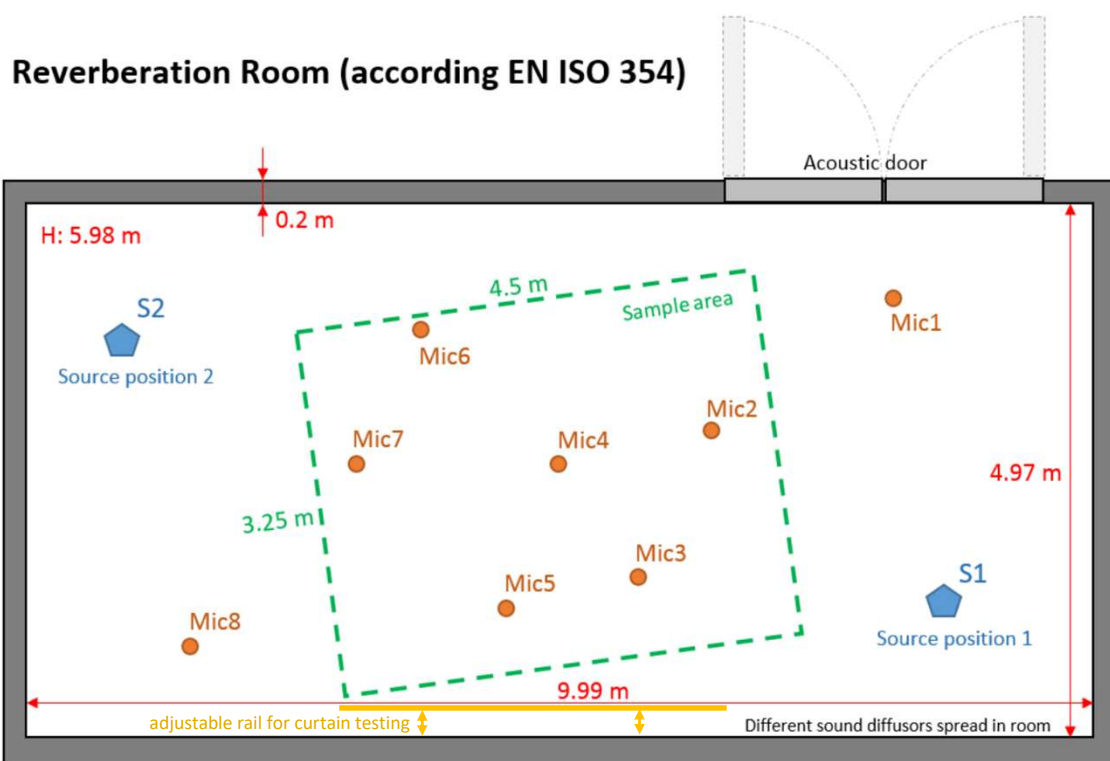
Photo de la configuration de test totale :



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ANNEX 4: Sketch of the test room

The test room was built and finished according ISO 354.



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NOISE LAB
REPORT Number A-2021LAB-116-5-44541_E

Customer : Texdecor
 Rue d'Hem 2
 59780 Willems
 France

Contacts : **Client :** Max Olivier Loubert
Noise lab : Els Meulemans

Tests : Measurement of sound absorption in the reverberation room

Product name : Texdecor - Parement / Chicago

Normative references:
NBN EN ISO 354:2003

Acoustics - Measurement of sound absorption in a reverberation room

NBN EN ISO 11654:1997
 NBN ISO 9613-1:1996

Acoustics - Sound absorbers for use in buildings - Rating of sound absorption
 Acoustics - Attenuation of sound during propagation outdoors -
 part 1 : Calculation of the absorption of sound by the atmosphere

ISO 12999-2:2020

Acoustics - Determination and application of measurement uncertainties in building acoustics
 Part 2: Sound absorption

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Brüel & Kjaer - 2669 : 1/2" microphone preamplifier

Brüel & Kjaer - 4231 : Sound calibrator 94&114dB SPL-1000Hz, Fulfills IEC 60942(2003)Class1

Number of source positions:	2	(Different sound source positions at least 3m apart.
Number of microphone positions for each source position:	8	The measurements shall be made with different microphone positions
Number of measured decays curves:	3	which are at least 1,5m apart, 2m from any sound source and 1m from
Total number of measurements with different positions for microphone & source:	16	any room surface and the test specimen.)

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Brüel & Kjaer - 3160-A-042: Signal generator, 4/2-ch. Input/output module LAN-XI

Brüel & Kjaer : PULSE Labshop Version 13.5

A PC with all necessary software

Reverberation room

Dimensions of the room:	Total volume :	298,3 m ³
	Length:	9,99 m
	Width	4,97 m
	Height	5,98 m
	Volume door opening :	1,32 m ³
	Total area:	279,9 m ²
	$l_{max} = 12,65 \text{ m} < 1,9 \text{ V}^{1/3}$	

In order to improve the diffusivity, the use of diffusers is necessary

The test specimen shall have a maximum area of 15,62 m², which depends on the room volume

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Essence of the test is in measuring of the reverberation time in the empty reflecting room and in the same room with the test sample inside it.

The sound-absorption properties of a material depend on how the material is mounted during the test. Annex B of ISO 354:2003 specifies several different standard mountings that shall be used during a test for sound absorption. Normally a test specimen is tested using only one of the specified mountings.

From these reverberation times, the equivalent sound absorption area of the test specimen, is calculated by using Sabine's equation. Measurement is carried out in ranges of 1/3 octave and interval from 100Hz to 5000Hz.

The equivalent sound absorption area of the empty reverberation room, A_1 , in square metres, shall be calculated using the formula (1) :

$$A_1 = 55,3 V / (c_1 T_1) - 4V m_1 \quad [m^2] \quad (1)$$

The equivalent sound absorption area of the reverberation room containing a test specimen, A_2 , in square metres, shall be calculated using the formula (2) :

$$A_2 = 55,3 V / (c_2 T_2) - 4V m_2 \quad [m^2] \quad (2)$$

The equivalent sound absorption area of the test specimen, A_T , in square metres, shall be calculated using the formula (3) :

$$A_T = A_2 - A_1 = 55,3 V (1/c_2 T_2 - 1/c_1 T_1) - 4V(m_2 - m_1) \quad [m^2] \quad (3)$$

The sound absorption coefficient of a plane absorber or a specified array of test objects shall be calculated using the formula (4):

$$\alpha_s = A_T / S \quad (4)$$

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V	=	volume , in cubic metres, of the empty reverberation room [m^3]
c_1, c_2	=	the propagation speed of sound in air, in [m/s], calculated using the formula (in function of the temperature in the room during the test) $c = 331 + 0,6 t$ with $t =$ the air temperature in degrees Celsius for temperatures in the range of 15°C to 30°C
T_1	=	<i>the reverberation time, in seconds, of the empty reverberation room</i>
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A_T	=	<i>The equivalent sound absorption area of the test specimen in square metres</i>
S	=	<i>the area, in square metres, covered by the test specimen</i>
α_s	=	<i>the sound absorption coefficient</i>

SPECIAL MEASUREMENT CONDITIONS

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n/a

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NOISE LAB

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The weighted sound absorption coefficient is determined as a single number value from the practical sound absorption coefficients from 250 Hz to 4000 Hz. The practical sound absorption coefficient is calculated according to ISO 11654:1997.

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$$U = u \cdot k$$

met u = uncertainty under reproducibility conditions
 k = coverage factor ($k=2$ for a confidence level of 95%)
 U = expanded uncertainty under reproducibility conditions

This standard specifies how to calculate :

- the uncertainty of sound absorption coefficients and equivalent sound absorption areas measured according to ISO 354
- the uncertainty of the practical and weighted sound absorption coefficients determined according to ISO 11654

The numbers given are derived from inter-laboratory measurements with different types of test specimens including suspended ceilings, mineral wool, foams.

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www.daidalospeutz.be



N° 451-TEST
NBN EN ISO 17025:2017
EA MLA signatory

NOISE LAB
REPORT Number A-2021LAB-116-5-44541_E

 α_s **SOUND ABSORPTION COEFFICIENT**

EN ISO 354:2003

Acoustics - Measurement of sound absorption in a reverberation room

EN ISO 11654:1997

Acoustics - Sound absorbers for use in buildings - Rating of sound absorption

Identification number of test element:**5****Test date:** 11/12/2021**Reverberation room:**V = 298,3 m³S_{tot} = 279,9 m²**Room conditions during measurements:**

Empty room

With testelement

Temperature:

T = 19,2

19,1 °C

Atmospheric pressure:

p = 101,5

101,4 kPa

Relative humidity :h_r = 52

52 %

Type of test element:**Plane absorber****Construction characteristics:**

Mounting type in line with ISO354 Annex B: Type B mounting (glued directly to a hard surface)

Area of test element:

11,17 m²

Total thickness:

12.5 + (9 / 14 / 18) mm

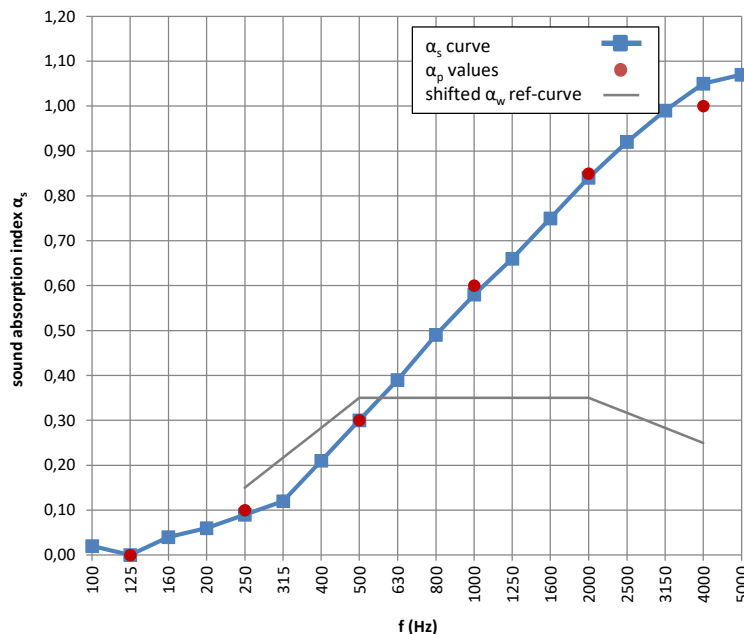
Number of layers including air spaces:

3

Connection of layers: glued

f(Hz)	T ₁ (s)	T ₂ (s)	α_s	$\pm U$ (k=2)
50				
63				
80				
100	10,24	9,82	0,02	$\pm 0,04$
125	9,30	9,25		$\pm 0,03$
160	8,75	8,06	0,04	$\pm 0,04$
200	9,01	8,00	0,06	$\pm 0,04$
250	9,85	8,20	0,09	$\pm 0,05$
315	9,53	7,49	0,12	$\pm 0,05$
400	8,94	6,22	0,21	$\pm 0,06$
500	9,03	5,51	0,30	$\pm 0,06$
630	9,27	5,02	0,39	$\pm 0,07$
800	9,21	4,48	0,49	$\pm 0,07$
1000	9,19	4,12	0,58	$\pm 0,08$
1250	8,45	3,68	0,66	$\pm 0,08$
1600	7,37	3,22	0,75	$\pm 0,09$
2000	6,45	2,85	0,84	$\pm 0,09$
2500	5,38	2,50	0,92	$\pm 0,09$
3150	4,34	2,18	0,99	$\pm 0,09$
4000	3,46	1,88	1,05	$\pm 0,09$
5000	2,67	1,60	1,07	$\pm 0,09$

f(Hz)	α_p	$\pm U$ (k=2)
125	0,00	
250	0,10	$\pm 0,04$
500	0,30	$\pm 0,08$
1000	0,60	$\pm 0,08$
2000	0,85	$\pm 0,08$
4000	1,00	$\pm 0,10$



$\alpha_w = 0,35$ (MH)* $\pm 0,07$ (k=2)
 Sound absorption class: D

NRC = 0,45 **
SAA = 0,45 **

Requested by: Texdecor, Rue d'Hem 2,59780 Willems**TESTELEMANT:** (product name, for details see Annex 2)**Texdecor - Parement / Chicago**

* It is strongly recommended to use this single-number rating in combination with the complete sound absorption coefficient curve
 ** These results are not within the scope of the accreditation

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NOISE LAB REPORT Number A-2021LAB-116-5-44541_E

ANNEX 1: Description test items by manufacturer

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

Parement / Chicago

manufacturer: Texdecor
 type: Felt wallcovering
 composition: Polyester made from recycled plastic bottles
 felt density: 2 kg/m²
 dimensions of one Felt wallcovering panel: 800 x 400 mm
 surface pattern per panel: 3 alternating layers. A combination of
 layer 1: felt panels thickness 9 mm
 layer 2: double layer of 9 mm felt panels (18 mm)
 layer 3: felt panels 9 mm with a air cavity of 5 mm (14 mm)
 The wall covering is tested on:
 A Gypsum board BA13, thickness 12.5 mm. The felt wallcovering panels are glued by the manufacturer with Metylan Ovalit TM directly to the Gypsum boards.
 total height of the test setup: 12.5 mm + (9 mm, 14 mm and 18 mm).
 The occupied area (in %) of each layers on a felt panel with surface area 140 x 40 mm, was checked in the lab:
 felt panels thickness 9 mm = 45,5% of the total surface
 double layer of 9 mm felt panels (18 mm) = 33,9%
 felt panels 9 mm with a air cavity of 5 mm = 20,5%

Technical drawing: felt panels with Parement / Chicago

- Felt panel thickness 9 mm,
directly glued to gypsum board
- Felt panel height 14 mm
(9 mm felt panel with a airspace of 5 mm)
- Felt panel height 18 mm
(double layer of 9 mm felt panel
directly glued to gypsum board)

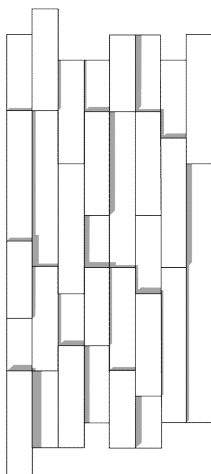


photo: Section view of the felt wallcovering glued to a gypsum board

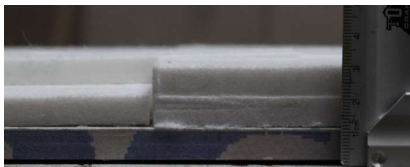


photo: front side



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EA MLA signatory

NOISE LAB
REPORT Number A-2021LAB-116-5-44541_E

ANNEX 2: Technical datasheet

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 Texdecor

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N° 451-TEST
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NOISE LAB REPORT Number A-2021LAB-116-5-44541_E

ANNEX 3: photographs of the test element or the test arrangement

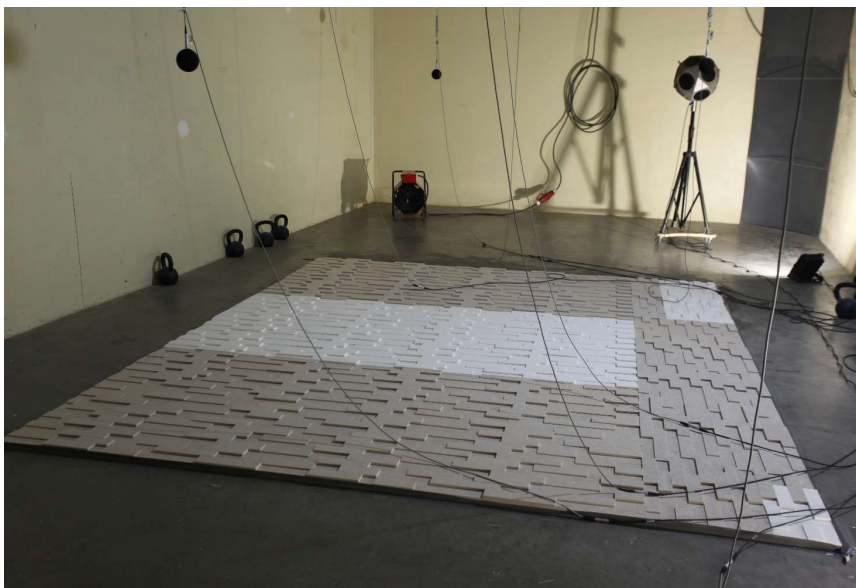
Description of the assembly or drawing or photo

The test specimen was installed as a type B mounting specified in Annex B of ISO 354:2003.

Beforehand, the wallcovering was glued on the gypsum boards by the manufacturer with wall covering adhesive Metylan Ovalit TM. Multiple gypsum boards with Parement / Chicago wallcovering were laid side by side, and were laid directly on the floor of the reverberation room.

To prevent the side edges from absorbing sound, the perimeter of the sample is covered with a non sound absorbing tape. The test specimen measures 3.604 m x 3.099 m, surface area 11.17 m², ratio of width:length 1:0.86.

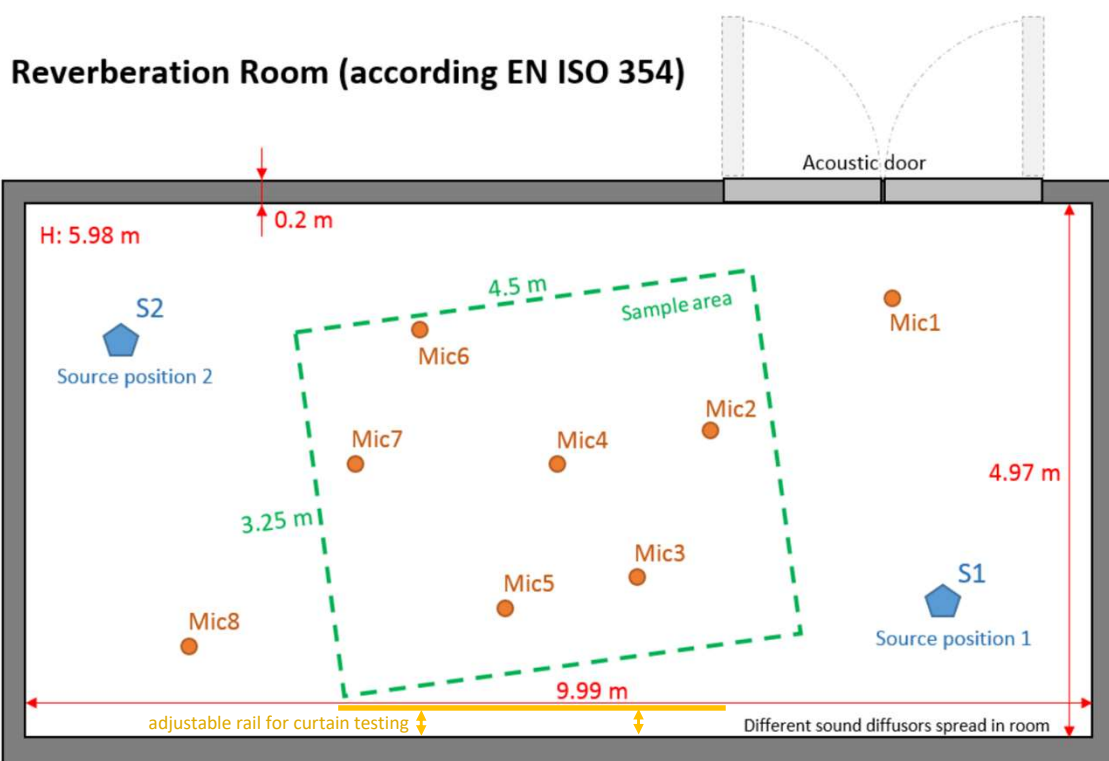
Photo de la configuration de test totale :



NOISE LAB
REPORT Number A-2021LAB-116-5-44541_E

ANNEX 4: Sketch of the test room

The test room was built and finished according ISO 354.



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N° 451-TEST
 NBN EN ISO 17025:2017
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NOISE LAB
TEST REPORT Number A-2022LAB-020-1-44685_E

Customer : Texdecor
 Rue d'Hem, 2
 59780 Willems
 France

Contacts : **Client :** Julie Truquet
Noise lab : Els Meulemans

Tests : Measurement of sound absorption in the reverberation room

Product name : Texdecor - SlimWall Panelling - Amsterdam

Normative references:
NBN EN ISO 354:2003

Acoustics - Measurement of sound absorption in a reverberation room

NBN EN ISO 11654:1997
 NBN ISO 9613-1:1996

Acoustics - Sound absorbers for use in buildings - Rating of sound absorption

Acoustics - Attenuation of sound during propagation outdoors -
 part 1 : Calculation of the absorption of sound by the atmosphere

ISO 12999-2:2020

Acoustics - Determination and application of measurement uncertainties in building acoustics
 Part 2: Sound absorption

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:	21/02/2022	2022LAB-020
Date of receipt of the specimen(s):	4/05/2022	1
Date of construction:	4/05/2022	
Date of tests:	4/05/2022	
Date of preparation of the test report:	13/05/2022	

The measurements were carried out at Daidalos Peutz Laboratory for Acoustics at Hooglede, see appendix 1
 This test report together with its annexes contains : 9 pages and must be multiplied only in its entirety

Technical Manager,

Paul Mees

Laboratory Engineer,

Els Meulemans

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NOISE LAB TEST REPORT Number A-2022LAB-020-1-44685_E

MEASURING EQUIPMENT

Signal

Brüel & Kjaer - 4292 : Omni Power Sound Source

Microphone system:

Brüel & Kjaer - 4189-L-001 : 1/2" free field microphone prepolarized, inclusive 2669L TEDS
 Brüel & Kjaer - 4189 : 1/2" free field microphone, 6Hz to 20kHz, prepolarized
 Brüel & Kjaer - 2669 : 1/2" microphone preamplifier
 Brüel & Kjaer - 4231 : Sound calibrator 94&114dB SPL-1000Hz, Fulfills IEC 60942(2003)Class1

Number of source positions:	2	(Different sound source positions at least 3m apart.
Number of microphone positions for each source position:	8	The measurements shall be made with different microphone positions
Number of measured decays curves:	3	which are at least 1,5m apart, 2m from any sound source and 1m from
Total number of measurements with different positions for microphone & source:	16	any room surface and the test specimen.)

Signal processing

Brüel & Kjaer - 2716C : Power amplifier
 Brüel & Kjaer - 3050-A-6/0: Signal generator, 6-ch. Inputmodule LAN-XI
 Brüel & Kjaer - 3160-A-042: Signal generator, 4/2-ch. Input/output module LAN-XI
 Brüel & Kjaer : PULSE Labshop Version 13.5
 A PC with all necessary software

Reverberation room

Dimensions of the room:	Total volume :	298,3 m ³
	Length:	9,99 m
	Width	4,97 m
	Height	5,98 m
	Volume door opening :	1,32 m ³
	Total area:	279,9 m ²
	$l_{\max} = 12,65 \text{ m} < 1,9 V^{1/3}$	

In order to improve the diffusivity, the use of diffusers is necessary
 The test specimen shall have a maximum area of 15,62 m², which depends on the room volume

NOISE LAB

TEST REPORT Number A-2022LAB-020-1-44685_E

TEST METHOD

The tests were conducted in accordance with the provisions of the test method EN ISO354:2003. A detailed description of the test set up has been given in the figures of annex 1 of this report.

The measurement method can be simply described as follows:

Essence of the test is in measuring of the reverberation time in the empty reflecting room and in the same room with the test sample inside it. The sound-absorption properties of a material depend on how the material is mounted during the test. Annex B of ISO 354:2003 specifies several different standard mountings that shall be used during a test for sound absorption. Normally a test specimen is tested using only one of the specified mountings.

From these reverberation times, the equivalent sound absorption area of the test specimen, is calculated by using Sabine's equation. Measurement is carried out in ranges of 1/3 octave and interval from 100Hz to 5000Hz.

The equivalent sound absorption area of the empty reverberation room, A_1 , in square metres, shall be calculated using the formula (1) :

$$A_1 = 55,3 V / (c_1 T_1) - 4V m_1 \quad [m^2] \quad (1)$$

The equivalent sound absorption area of the reverberation room containing a test specimen, A_2 , in square metres, shall be calculated using the formula (2) :

$$A_2 = 55,3 V / (c_2 T_2) - 4V m_2 \quad [m^2] \quad (2)$$

The equivalent sound absorption area of the test specimen, A_T , in square metres, shall be calculated using the formula (3) :

$$A_T = A_2 - A_1 = 55,3 V (1/c_2 T_2 - 1/c_1 T_1) - 4V(m_2 - m_1) \quad [m^2] \quad (3)$$

The sound absorption coefficient of a plane absorber or a specified array of test objects shall be calculated using the formula (4):

$$\alpha_s = A_T / S \quad (4)$$

whereas: A_1	=	<i>The equivalent sound absorption area of the empty reverberation room in square metres</i>
A_2	=	<i>The equivalent sound absorption area of the reverberation room containing a test specimen in square metres</i>
V	=	volume, in cubic metres, of the empty reverberation room [m^3]
c_1, c_2	=	the propagation speed of sound in air, in [m/s], calculated using the formula (in function of the temperature in the room during the test) $c = 331 + 0,6 t$ with $t =$ the air temperature in degrees Celsius for temperatures in the range of 15°C to 30°C
T_1	=	<i>the reverberation time, in seconds, of the empty reverberation room</i>
T_2	=	<i>the reverberation time, in seconds, of the reverberation room after the test specimen has been introduced</i>
m_1, m_2	=	<i>the power attenuation coefficient, in reciprocal metres, calculated according to ISO 9613-1:1993</i>
A_T	=	<i>The equivalent sound absorption area of the test specimen in square metres</i>
S	=	<i>the area, in square metres, covered by the test specimen</i>
α_s	=	<i>the sound absorption coefficient</i>

SPECIAL MEASUREMENT CONDITIONS

-
-
-
-
-

n/a

NOISE LAB
TEST REPORT Number A-2022LAB-020-1-44685_E

RATING OF SOUND ABSORPTION

α_p PRACTICAL SOUND ABSORPTION COEFFICIENT

Frequency-dependent value of the sound absorption coefficient which is based on measurements on one-third-octave bands in accordance with ISO 354 and which is calculated in octave bands in accordance with the standard ISO 11654:1997.

The practical sound absorption coefficient, α_{pi} , for each octave band i , is calculated from the arithmetic mean value of the three one-third octave sound absorption coefficients within the octave. The mean value is calculated to the second decimal and rounded in steps of 0,05 and maximized to 1,00 for rounded mean values > 1,00

α_w WEIGHTED SOUND ABSORPTION COEFFICIENT

The weighted sound absorption coefficient is determined as a single number value from the practical sound absorption coefficients from 250 Hz to 4000 Hz. The practical sound absorption coefficient is calculated according to ISO 11654:1997.

Single-number frequency-independent value which equals the value of the reference curve at 500 Hz after shifting is as specified in the standard ISO 11654:1997.

SHAPE INDICATORS, L,M,H

Whenever a practical sound absorption coefficient α_{pi} exceeds the value of the shifted reference curve by 0,25 or more, one or more shape indicators shall be added, in parantheses, to the α_w value.

If the excess absorption occurs at 250 Hz, use the notation L.

If the excess absorption occurs at 500 Hz or 1000 Hz, use the notation M.

If the excess absorption occurs at 2000 Hz or 4000 Hz, use the notation H.

NRC NOISE REDUCTION COEFFICIENT

The NRC is a single-number index determined in a lab test and used for rating how absorptive a particular material is. This industry standard ranges from zero (perfectly reflective) to 1 (perfectly absorptive). It is simply the average of the mid-frequency sound absorption coefficients (250, 500, 1000 and 2000 Hertz) rounded to the nearest 5%.

SAA SOUND ABSORPTION AVERAGE

NRC is being replaced by the Sound Absorption Average (SAA), which is described in the current ASTM C423-17. The SAA is a single-number rating of sound absorption properties of a material similar to NRC, except that the sound absorption values employed in the averaging are taken at the twelve one-third octave bands from 200 Hz to 2500 Hz, inclusive, and rounding is to the nearest multiple of 0.01.

The NRC and SAA results are not within the scope of the accreditation.

Test results related to tested object only. The test results should not be considered as material constants, the absorption depends not only on the material itself. The method of construction, the size of the material surface and its place in the room, affect the sound absorption characteristics of the test element.

ACCURACY

The accuracy of the absorption coefficients as calculated can be expressed in terms of repeatability of measured reverberation times (tests within one laboratory) and reproducibility (between various laboratories)

The expanded uncertainty under reproducibility conditions, U , is calculated in accordance to the standard ISO 12999-2 for the confidence level of 95%, used the coverage factor $k=2$

$$U = u \cdot k$$

met

u = uncertainty under reproducibility conditions

k = coverage factor ($k=2$ for a confidence level of 95%)

U = expanded uncertainty under reproducibility conditions

This standard specifies how to calculate :

- the uncertainty of sound absorption coefficients and equivalent sound absorption areas measured according to ISO 354

- the uncertainty of the practical and weighted sound absorption coefficients determined according to ISO 11654

The numbers given are derived from inter-laboratory measurements with different types of test specimens including suspended ceilings, mineral wool, foams.

NOISE LAB
TEST REPORT Number A-2022LAB-020-1-44685_E

α_s

SOUND ABSORPTION COEFFICIENT

EN ISO 354:2003 Acoustics - Measurement of sound absorption in a reverberation room
 EN ISO 11654:1997 Acoustics - Sound absorbers for use in buildings - Rating of sound absorption
 ISO 12999-2:2020 Acoustics - Determination and application of measurement uncertainties in building acoustics - Part 2: sound absorption

Identification number of test element: 1 **Test date:** 4/05/2022

Name of test institute: Daidalos Peutz Laboratory of Acoustics, Hooglede, Belgium

Reverberation room: V = 298,3 m³ S_{tot} = 279,9 m²

Room conditions during measurements:

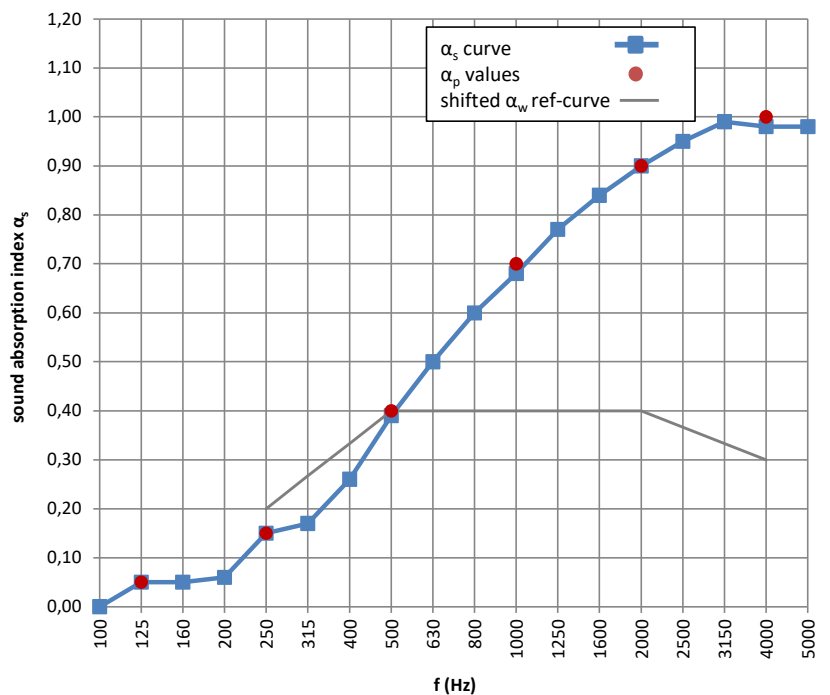
	Empty room	With testelement
Temperature:	T = 19,0	18,5 °C
Atmospheric pressure:	p = 101,7	101,7 kPa
Relative humidity:	h _r = 51	49 %

Type of test element: Plane absorber

Construction characteristics: Mounting type in line with ISO354 Annex B: Type B mounting (glued directly to a hard surface)
 Area of test element: 11,16 m²
 Total thickness: 12.5 + (9 / 14 / 18 / 23) mm
 Number of layers, including air spaces: 4
 Connection of layers: glued

f(Hz)	T ₁ (s)	T ₂ (s)	α_s	$\pm U$ (k=2)
50				
63				
80				
100	9,85	9,74		± 0,03
125	8,36	7,66	0,05	± 0,05
160	7,82	7,21	0,05	± 0,04
200	8,58	7,68	0,06	± 0,04
250	9,53	7,15	0,15	± 0,06
315	9,19	6,73	0,17	± 0,06
400	8,65	5,68	0,26	± 0,06
500	8,64	4,86	0,39	± 0,07
630	9,10	4,42	0,50	± 0,08
800	9,02	4,02	0,60	± 0,08
1000	8,88	3,71	0,68	± 0,08
1250	8,32	3,33	0,77	± 0,09
1600	7,34	3,00	0,84	± 0,09
2000	6,43	2,73	0,90	± 0,09
2500	5,34	2,43	0,95	± 0,09
3150	4,35	2,15	0,99	± 0,09
4000	3,39	1,88	0,98	± 0,09
5000	2,65	1,60	0,98	± 0,08

f(Hz)	α_p	$\pm U$ (k=2)
125	0,05	
250	0,15	± 0,05
500	0,40	± 0,08
1000	0,70	± 0,08
2000	0,90	± 0,08
4000	1,00	± 0,10



$\alpha_w = 0,40$ (MH)* $\pm 0,07$ (k=2)
 Sound absorption class: D

NRC = 0,55 **
 SAA = 0,52 **

* It is strongly recommended to use this single-number rating in combination with the complete sound absorption coefficient curve
 ** These results are not within the scope of the accreditation

Requested by: Texdecor, Rue d'Hem, 2,59780 Willems

TESTELEMANT: (product name, for details see Annex 2)

Texdecor - SlimWall Panelling - Amsterdam

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N° 451-TEST
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NOISE LAB
TEST REPORT Number A-2022LAB-020-1-44685_E

ANNEX 1: Description test items by manufacturer

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

Texdecor - SlimWall Panelling - Amsterdam

manufacturer: Texdecor
 type: Felt wallcovering
 composition: Panels made from 9 mm Pet compact felt boards
 felt density: 2 kg/m²
 dimensions of one Felt wallcovering panel: 800 x 400 mm
 surface pattern per panel: 4 alternating layers. A combination of
 layer 1: felt panels thickness 9 mm
 layer 2: double layer of 9 mm felt panels (18 mm)
 layer 3: felt panels 9 mm with a air cavity of 5 mm (14 mm)
 layer 4: double layer of 9 mm felt panels (18 mm) with a air cavity of 5 mm (23 mm)
 The wall covering is tested on:
 A Gypsum board BA13, thickness 12.5 mm. The felt wallcovering panels are glued by the manufacturer
 total height of the test setup: 12.5 mm + (9 mm, 14 mm, 18 mm and 23 mm)

Technical drawing: felt panels SlimWall Amsterdam

- Felt panel thickness 9 mm,
directly glued to gypsum board
- Felt panel height 14 mm
(9 mm felt panel with a airspace of 5 mm)
- Felt panel height 18 mm
(double layer of 9 mm felt panel
directly glued to gypsum board)
- Felt panel height 23 mm
(double layer of 9 mm felt panel with a airspace of 5 mm)

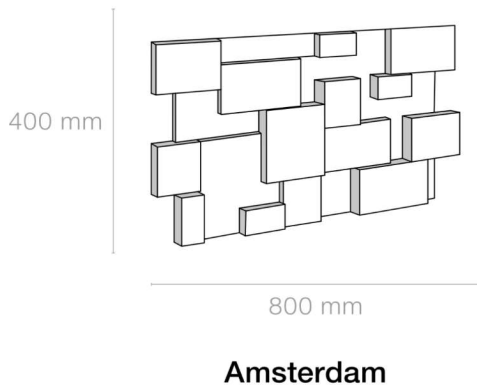


photo: Section view of 4 felt wallcovering panels glued to a gypsum board

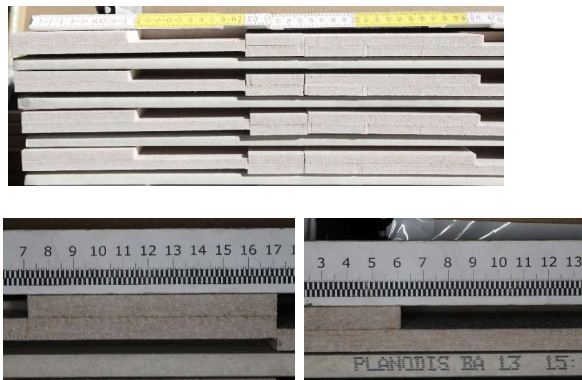


photo: front side



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EA MLA signatory

NOISE LAB
TEST REPORT Number A-2022LAB-020-1-44685_E

ANNEX 2: Technical datasheet

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 Texdecor

NOISE LAB
TEST REPORT Number A-2022LAB-020-1-44685_E

ANNEX 3: photographs of the test element or the test arrangement

Description of the assembly or drawing or photo

The test specimen was installed as a type B mounting specified in Annex B of ISO 354:2003.

Beforehand, the wallcovering was glued on the gypsum boards by the manufacturer.

Multiple gypsum boards with SlimWall - Amsterdam wallcovering were laid side by side, and were laid directly on the floor of the reverberation room.

To prevent the side edges from absorbing sound, the perimeter of the sample is covered with a non sound absorbing tape.

The test specimen measures 3.60 m x 3.10 m, surface area 11.16 m², ratio of width:length 1:0.86.

Photo of the testsetup in the reverberation room:



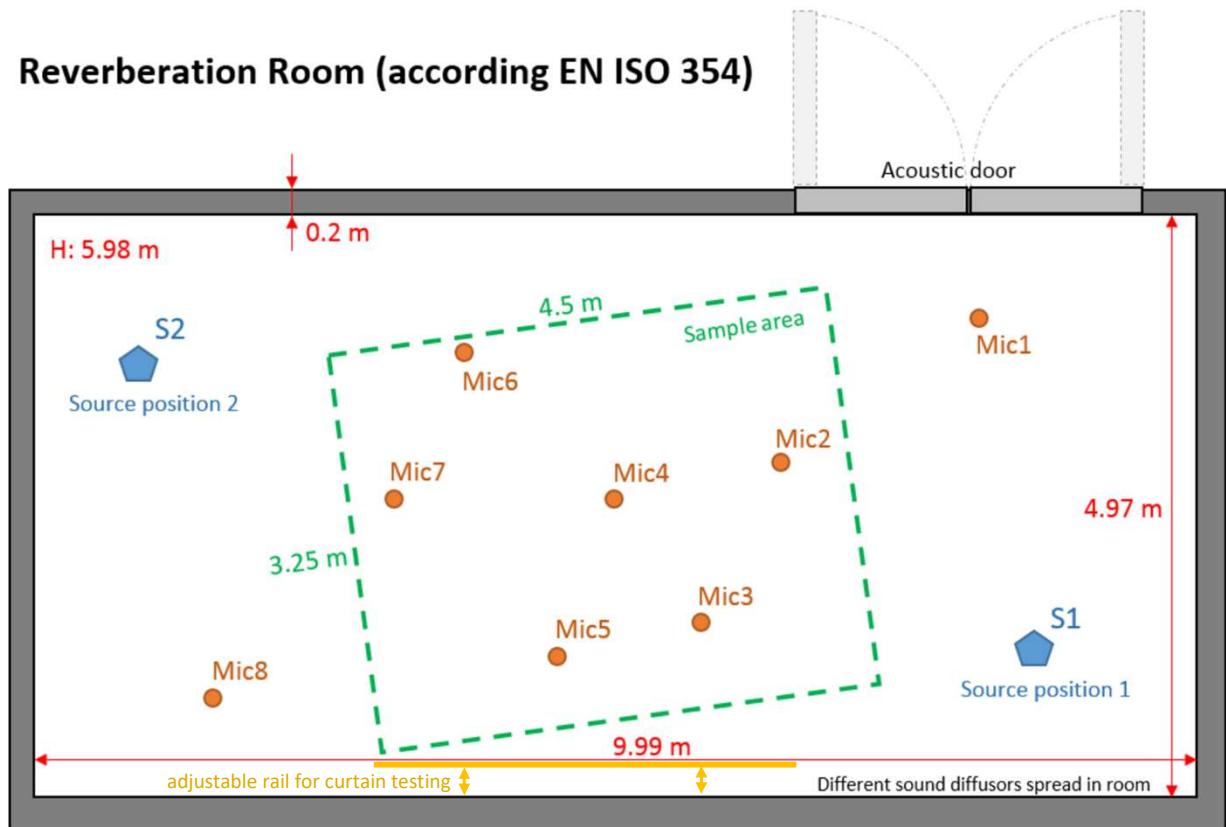
NOISE LAB
TEST REPORT Number A-2022LAB-020-1-44685_E

ANNEX 4: Sketch of the test room

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

The test room was built and finished according ISO 354.

Reverberation Room (according EN ISO 354)



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N° 451-TEST
 NBN EN ISO 17025:2017
 EA MLA signatory

NOISE LAB
TEST REPORT Number A-2022LAB-020-3-44685_E

Customer : Texdecor
 Rue d'Hem, 2
 59780 Willems
 France

Contacts : **Client :** Julie Truquet
Noise lab : Els Meulemans

Tests : Measurement of sound absorption in the reverberation room

Product name : Texdecor - SlimWall Panelling - London

Normative references:
NBN EN ISO 354:2003

Acoustics - Measurement of sound absorption in a reverberation room

NBN EN ISO 11654:1997
 NBN ISO 9613-1:1996

Acoustics - Sound absorbers for use in buildings - Rating of sound absorption

Acoustics - Attenuation of sound during propagation outdoors -
 part 1 : Calculation of the absorption of sound by the atmosphere

ISO 12999-2:2020

Acoustics - Determination and application of measurement uncertainties in building acoustics
 Part 2: Sound absorption

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:	21/02/2022	2022LAB-020
Date of receipt of the specimen(s):	4/05/2022	3
Date of construction:	4/05/2022	
Date of tests:	4/05/2022	
Date of preparation of the test report:	13/05/2022	

The measurements were carried out at Daidalos Peutz Laboratory for Acoustics at Hooglede, see appendix 1
 This test report together with its annexes contains : 9 pages and must be multiplied only in its entirety

Technical Manager,

Paul Mees

Laboratory Engineer,

Els Meulemans

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N° 451-TEST
 NBN EN ISO 17025:2017
 EA MLA signatory

NOISE LAB TEST REPORT Number A-2022LAB-020-3-44685_E

MEASURING EQUIPMENT

Signal

Brüel & Kjaer - 4292 : Omni Power Sound Source

Microphone system:

Brüel & Kjaer - 4189-L-001 : 1/2" free field microphone prepolarized, inclusive 2669L TEDS

Brüel & Kjaer - 4189 : 1/2" free field microphone, 6Hz to 20kHz, prepolarized

Brüel & Kjaer - 2669 : 1/2" microphone preamplifier

Brüel & Kjaer - 4231 : Sound calibrator 94&114dB SPL-1000Hz, Fulfills IEC 60942(2003)Class1

Number of source positions:	2	(Different sound source positions at least 3m apart.
Number of microphone positions for each source position:	8	The measurements shall be made with different microphone positions
Number of measured decays curves:	3	which are at least 1,5m apart, 2m from any sound source and 1m from
Total number of measurements with different positions for microphone & source:	16	any room surface and the test specimen.)

Signal processing

Brüel & Kjaer - 2716C : Power amplifier

Brüel & Kjaer - 3050-A-6/0: Signal generator, 6-ch. Inputmodule LAN-XI

Brüel & Kjaer - 3160-A-042: Signal generator, 4/2-ch. Input/output module LAN-XI

Brüel & Kjaer : PULSE Labshop Version 13.5

A PC with all necessary software

Reverberation room

Dimensions of the room:	Total volume :	298,3 m ³
	Length:	9,99 m
	Width	4,97 m
	Height	5,98 m
	Volume door opening :	1,32 m ³
	Total area:	279,9 m ²
	$l_{max} = 12,65 \text{ m} < 1,9 V^{1/3}$	

In order to improve the diffusivity, the use of diffusers is necessary

The test specimen shall have a maximum area of 15,62 m², which depends on the room volume

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TEST METHOD

The tests were conducted in accordance with the provisions of the test method EN ISO354:2003. A detailed description of the test set up has been given in the figures of annex 1 of this report.

The measurement method can be simply described as follows:

Essence of the test is in measuring of the reverberation time in the empty reflecting room and in the same room with the test sample inside it. The sound-absorption properties of a material depend on how the material is mounted during the test. Annex B of ISO 354:2003 specifies several different standard mountings that shall be used during a test for sound absorption. Normally a test specimen is tested using only one of the specified mountings.

From these reverberation times, the equivalent sound absorption area of the test specimen, is calculated by using Sabine's equation. Measurement is carried out in ranges of 1/3 octave and interval from 100Hz to 5000Hz.

The equivalent sound absorption area of the empty reverberation room, A_1 , in square metres, shall be calculated using the formula (1) :

$$A_1 = 55,3 V / (c_1 T_1) - 4V m_1 \quad [m^2] \quad (1)$$

The equivalent sound absorption area of the reverberation room containing a test specimen, A_2 , in square metres, shall be calculated using the formula (2) :

$$A_2 = 55,3 V / (c_2 T_2) - 4V m_2 \quad [m^2] \quad (2)$$

The equivalent sound absorption area of the test specimen, A_T , in square metres, shall be calculated using the formula (3) :

$$A_T = A_2 - A_1 = 55,3 V (1/c_2 T_2 - 1/c_1 T_1) - 4V(m_2 - m_1) \quad [m^2] \quad (3)$$

The sound absorption coefficient of a plane absorber or a specified array of test objects shall be calculated using the formula (4):

$$\alpha_s = A_T / S \quad (4)$$

whereas: A_1	=	The equivalent sound absorption area of the empty reverberation room in square metres
A_2	=	The equivalent sound absorption area of the reverberation room containing a test specimen in square metres
V	=	volume, in cubic metres, of the empty reverberation room [m^3]
c_1, c_2	=	the propagation speed of sound in air, in [m/s], calculated using the formula (in function of the temperature in the room during the test) $c = 331 + 0,6 t$ with $t =$ the air temperature in degrees Celsius for temperatures in the range of 15°C to 30°C
T_1	=	the reverberation time, in seconds, of the empty reverberation room
T_2	=	the reverberation time, in seconds, of the reverberation room after the test specimen has been introduced
m_1, m_2	=	the power attenuation coefficient, in reciprocal metres, calculated according to ISO 9613-1:1993
A_T	=	The equivalent sound absorption area of the test specimen in square metres
S	=	the area, in square metres, covered by the test specimen
α_s	=	the sound absorption coefficient

SPECIAL MEASUREMENT CONDITIONS

-
-
-
-
-

n/a

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RATING OF SOUND ABSORPTION

α_p PRACTICAL SOUND ABSORPTION COEFFICIENT

Frequency-dependent value of the sound absorption coefficient which is based on measurements on one-third-octave bands in accordance with ISO 354 and which is calculated in octave bands in accordance with the standard ISO 11654:1997.

The practical sound absorption coefficient, α_{pi} , for each octave band i , is calculated from the arithmetic mean value of the three one-third octave sound absorption coefficients within the octave. The mean value is calculated to the second decimal and rounded in steps of 0,05 and maximized to 1,00 for rounded mean values > 1,00

α_w WEIGHTED SOUND ABSORPTION COEFFICIENT

The weighted sound absorption coefficient is determined as a single number value from the practical sound absorption coefficients from 250 Hz to 4000 Hz. The practical sound absorption coefficient is calculated according to ISO 11654:1997.

Single-number frequency-independent value which equals the value of the reference curve at 500 Hz after shifting is as specified in the standard ISO 11654:1997.

SHAPE INDICATORS, L,M,H

Whenever a practical sound absorption coefficient α_{pi} exceeds the value of the shifted reference curve by 0,25 or more, one or more shape indicators shall be added, in parantheses, to the α_w value.

If the excess absorption occurs at 250 Hz, use the notation L.

If the excess absorption occurs at 500 Hz or 1000 Hz, use the notation M.

If the excess absorption occurs at 2000 Hz or 4000 Hz, use the notation H.

NRC NOISE REDUCTION COEFFICIENT

The NRC is a single-number index determined in a lab test and used for rating how absorptive a particular material is. This industry standard ranges from zero (perfectly reflective) to 1 (perfectly absorptive). It is simply the average of the mid-frequency sound absorption coefficients (250, 500, 1000 and 2000 Hertz) rounded to the nearest 5%.

SAA SOUND ABSORPTION AVERAGE

NRC is being replaced by the Sound Absorption Average (SAA), which is described in the current ASTM C423-17. The SAA is a single-number rating of sound absorption properties of a material similar to NRC, except that the sound absorption values employed in the averaging are taken at the twelve one-third octave bands from 200 Hz to 2500 Hz, inclusive, and rounding is to the nearest multiple of 0.01.

The NRC and SAA results are not within the scope of the accreditation.

Test results related to tested object only. The test results should not be considered as material constants, the absorption depends not only on the material itself. The method of construction, the size of the material surface and its place in the room, affect the sound absorption characteristics of the test element.

ACCURACY

The accuracy of the absorption coefficients as calculated can be expressed in terms of repeatability of measured reverberation times (tests within one laboratory) and reproducibility (between various laboratories)

The expanded uncertainty under reproducibility conditions, U , is calculated in accordance to the standard ISO 12999-2 for the confidence level of 95%, used the coverage factor $k=2$

$$U = u \cdot k$$

met

u = uncertainty under reproducibility conditions

k = coverage factor ($k=2$ for a confidence level of 95%)

U = expanded uncertainty under reproducibility conditions

This standard specifies how to calculate :

- the uncertainty of sound absorption coefficients and equivalent sound absorption areas measured according to ISO 354

- the uncertainty of the practical and weighted sound absorption coefficients determined according to ISO 11654

The numbers given are derived from inter-laboratory measurements with different types of test specimens including suspended ceilings, mineral wool, foams.

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α_s

SOUND ABSORPTION COEFFICIENT

EN ISO 354:2003 Acoustics - Measurement of sound absorption in a reverberation room
 EN ISO 11654:1997 Acoustics - Sound absorbers for use in buildings - Rating of sound absorption
 ISO 12999-2:2020 Acoustics - Determination and application of measurement uncertainties in building acoustics - Part 2: sound absorption

Identification number of test element: **3** **Test date:** 4/05/2022

Name of test institute: Daidalos Peutz Laboratory of Acoustics, Hooglede, Belgium

Reverberation room: V = 298,3 m³ S_{tot} = 279,9 m²

Room conditions during measurements:

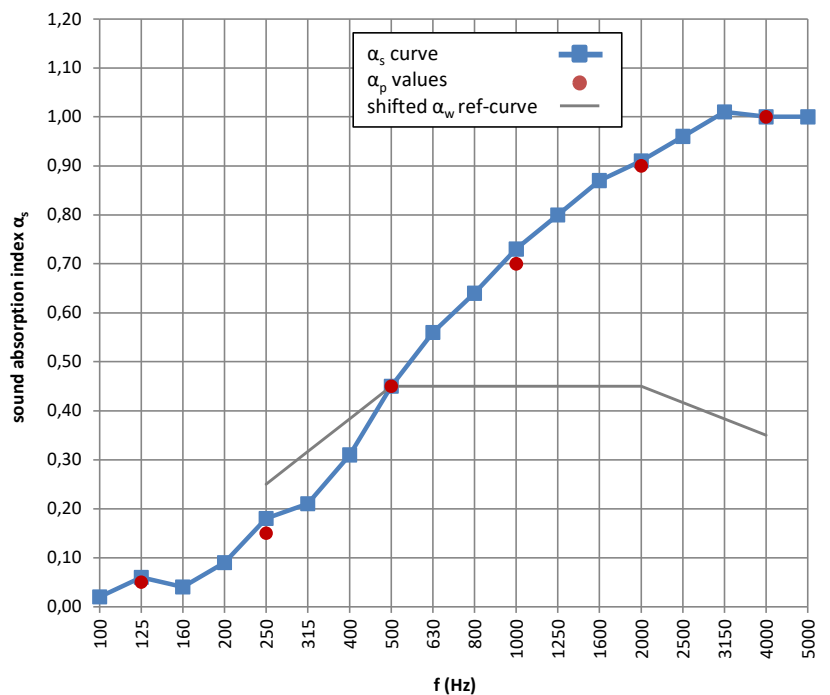
	Empty room	With testelement
Temperature:	T = 19,0	18,9 °C
Atmospheric pressure:	p = 101,7	101,7 kPa
Relative humidity:	h _r = 51	50 %

Type of test element: Plane absorber

Construction characteristics: Mounting type in line with ISO354 Annex B: Type B mounting (glued directly to a hard surface)
 Area of test element: 11,14 m²
 Total thickness: 12.5 + (9 / 14 / 18 / 23 / 27) mm
 Number of layers, including air spaces: 5
 Connection of layers: glued

f(Hz)	T ₁ (s)	T ₂ (s)	α_s	$\pm U$ (k=2)
50				
63				
80				
100	9,85	9,46	0,02	$\pm 0,04$
125	8,36	7,51	0,06	$\pm 0,05$
160	7,82	7,26	0,04	$\pm 0,04$
200	8,58	7,33	0,09	$\pm 0,05$
250	9,53	6,82	0,18	$\pm 0,06$
315	9,19	6,38	0,21	$\pm 0,06$
400	8,65	5,35	0,31	$\pm 0,07$
500	8,64	4,57	0,45	$\pm 0,08$
630	9,10	4,17	0,56	$\pm 0,08$
800	9,02	3,86	0,64	$\pm 0,08$
1000	8,88	3,55	0,73	$\pm 0,09$
1250	8,32	3,26	0,80	$\pm 0,09$
1600	7,34	2,95	0,87	$\pm 0,09$
2000	6,43	2,72	0,91	$\pm 0,09$
2500	5,34	2,43	0,96	$\pm 0,09$
3150	4,35	2,14	1,01	$\pm 0,09$
4000	3,39	1,88	1,00	$\pm 0,09$
5000	2,65	1,62	1,00	$\pm 0,08$

f(Hz)	α_p	$\pm U$ (k=2)
125	0,05	
250	0,15	$\pm 0,05$
500	0,45	$\pm 0,08$
1000	0,70	$\pm 0,08$
2000	0,90	$\pm 0,08$
4000	1,00	$\pm 0,10$



$\alpha_w = 0,45$ (MH)* $\pm 0,07$ (k=2)
 Sound absorption class: D

NRC = 0,55 **
 SAA = 0,56 **

* It is strongly recommended to use this single-number rating in combination with the complete sound absorption coefficient curve
 ** These results are not within the scope of the accreditation

Requested by: Texdecor, Rue d'Hem, 2,59780 Willems

TESTELEMANT: (product name, for details see Annex 2)

Texdecor - SlimWall Panelling - London

Daidalos Peutz bouwfysisch ingenieursbureau
 Vital Decosterstraat 67A – bus 1
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ANNEX 1: Description test items by manufacturer

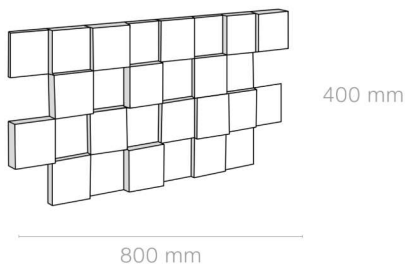
The test sample description given by manufacturer is checked visually as good as possible by the laboratory.
 The correspondence between the test element and the commercialized product is the sole responsibility of the manufacturer

Texdecor - SlimWall Panelling - London

manufacturer: Texdecor
 type: Felt wallcovering
 composition: Panels made from 9 mm Pet compact felt boards
 felt density: 2 kg/m²
 dimensions of one Felt wallcovering panel: 800 x 400 mm
 surface pattern per panel: 5 alternating layers. A combination of
 layer 1: felt panels thickness 9 mm
 layer 2: double layer of 9 mm felt panels (18 mm)
 layer 3: felt panels 9 mm with a air cavity of 5 mm (14 mm)
 layer 4: double layer of 9 mm felt panels (18 mm) with a air cavity of 5 mm (23 mm)
 layer 5: triple layer of 9 mm felt panels (27 mm)
 The wall covering is tested on:
 A Gypsum board BA13, thickness 12.5 mm. The felt wallcovering panels are glued by the manufacturer
 total height of the test setup: 12.5 mm + (9 mm, 14 mm, 18 mm, 23 mm et 27 mm)

Technical drawing: felt panels SlimWall London

- Felt panel thickness 9 mm,
directly glued to gypsum board
- Felt panel height 14 mm
(9 mm felt panel with a airspace of 5 mm)
- Felt panel height 18 mm
(double layer of 9 mm felt panel
directly glued to gypsum board)
- Felt panel height 23 mm
(double layer of 9 mm felt panel with a airspace of 5 mm)
- Felt panel height 27 mm
(triple layer of 9 mm felt panel
directly glued to gypsum board)



London

photo: Section view of the wallcovering panel glued to a gypsum board

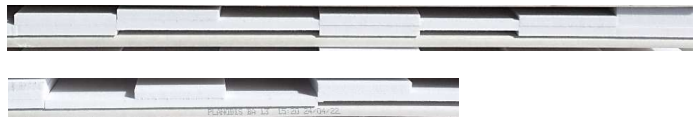
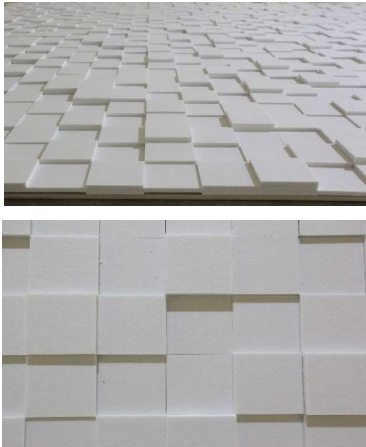


photo : face avant



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ANNEX 2: Technical datasheet

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 Texdecor

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ANNEX 3: photographs of the test element or the test arrangement

Description of the assembly or drawing or photo

The test specimen was installed as a type B mounting specified in Annex B of ISO 354:2003.

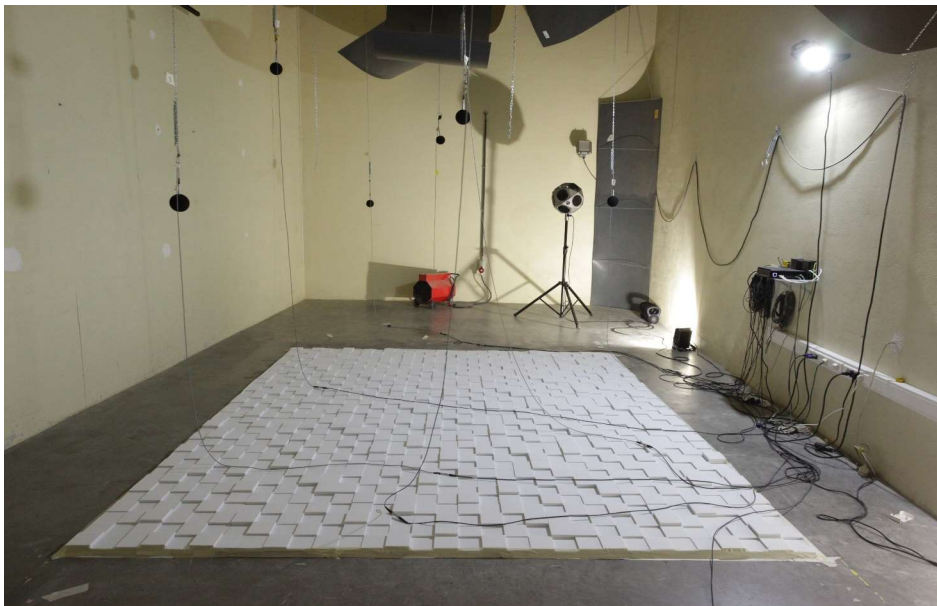
Beforehand, the wallcovering was glued on the gypsum boards by the manufacturer.

Multiple gypsum boards with SlimWall - Amsterdam wallcovering were laid side by side, and were laid directly on the floor of the reverberation room.

To prevent the side edges from absorbing sound, the perimeter of the sample is covered with a non sound absorbing tape.

The test specimen measures 3.600 m x 3.095 m, surface area 11.14 m², ratio of width:length 1:0.86.

Photo of the testsetup in the reverberation room:



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ANNEX 4: Sketch of the test room

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

The test room was built and finished according ISO 354.

Reverberation Room (according EN ISO 354)

