SOLFLEX
Schalldämmgehäuse
www.solflex.eu

Messbericht

Schalldämm-Maß

Schallabsorptionsgrad

SDW 90

Solflex GmbH
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ATU 65324348
FN 337206t

Grundsätzlich sind einschlägige Normen, sowie örtliche, nationale und internationalen Vorschriften zu befolgen.

Inhaltsverzeichnis

1.Messergebnisse

SCHALLDÄMM-MASS SDW 90mm

gemessen nach EN ISO 10140-2:2010

Bewertung gemäß EN ISO 717-1:1996

R_w = 27 dB
$R_w(C_{tr,\ 50\text{-}5000})$ = 23 dB

Frequenz (Hz)	63	125	250	500	1000	2000	4000
Schalldämmung dB	12,3	13,9	19,9	29,1	26,1	26,8	27,9

ABSORPTIONSGRAD SDW 90mm

gemessen nach EN ISO 354:2003

Bewertung gemäß EN ISO 11654:1997

Schallabsorptionsgrad α_w = 1,00
Schallabsorptionsklasse = A
NRC = 1
SAA = 1,01

Frequenz (Hz)	125	250	500	1000	2000	4000
Absorptionsgrad α(p)	0,70	1,00	1,00	0,95	1,00	0,95

2.Schalldämm-Maß

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daidalos peutz
laboratory of acoustics

BELAC
N° 451-TEST
NBN EN ISO 17025:2005

NOISE LAB
REPORT Number A-2019LAB-104-I538-43846_E

Customer : **Solflex GmbH**
Am Feuerstein 282
2392 Wienerwald
Austria

Contacts : Client : Tom Bogaerts
Noise lab : Els Meulemans

Tests : Laboratory measurement of airborne sound insulation of building elements
Product name : **Noise barrier SDW 90**

Reference norm :

NBN EN ISO 10140-2:2010	Acoustics - Laboratory measurement of sound insulation of building elements - Part 2: Measurement of airborne sound insulation

Various other related norms:

NBN EN ISO 10140-1:2010	Acoustics - Laboratory measurement of sound insulation of building elements - Part 1: Application rules for specific products
NBN EN ISO 10140-4:2010	Acoustics - Laboratory measurement of sound insulation of building elements - Part 4: Measurement procedures and requirements
NBN EN ISO 10140-5:2010	Acoustics - Laboratory measurement of sound insulation of building elements - Part 5: Requirements for test facilities and equipment
NBN EN 20140-2:1995	Acoustics - Measurement of sound insulation in buildings and of building elements - Part 2: Determination, verification and application of precision data (ISO 140-2:1991)
NBN EN ISO 717-1: 1996	Acoustics - Rating of sound insulation in buildings and of building elements - Part 1: Airborne sound insulation

To perform the above measurements, the laboratory of Daidalos Peutz is accredited by BELAC "The Belgian Accreditation Body"
BELAC is a signatory of all existing MLAs (multilateral agreements) and MRAs (multilateral recognition agreements) of EA (European co-operation for Accreditation), ILAC (International Laboratory Accreditation Cooperation) and IAF (International Accreditation Forum).
In this way, reports and certificates issued by BELAC accredited bodies are internationally accredited.

Date and reference of the request:	7/01/2020	2019LAB-104
Date of receipt of the specimen (s):	16/01/2020	SONI538
Date of tests:	16/01/2020	
Date of preparation of the report:	12/02/2020	

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

Technical Manager,

Paul Mees

Laboratory Engineer,

Els Meulemans

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MEASURING EQUIPMENT

Sound Sources
Brüel & Kjaer - 4292 : Omni Power Sound Source (+ Brüel & Kjaer - 2716: Power amplifier)

Microphone and data acquisition system:
Brüel & Kjaer - 4189 : 1/2" free field microphone, 6Hz to 20kHz, prepolarized
Brüel & Kjaer - ZC-0032 : 1/2" microphone preamplifier
Brüel & Kjaer - JP 1041 : dual 10-pole adaptor JP-1041
Brüel & Kjear - 3923 : rotating microphone boom
Brüel & Kjaer - 4231 : Sound calibrator 94&114dB SPL-1000Hz, Fulfils IEC 60942(2003)Class1
Brüel & Kjaer - 2270 : Sound level meter - dual channel instrument (measuring both channels simultaneously)
Conforms with IEC 61672-1 (2002-05) Class 1

Two rotating microphone systems, one in the receiving room, one in the source room

Number of source positions:	3
Minimum 3m between the different source positions	
Number of microphone positions for each source position:	3
Microphone position with a rotating microphone	
Number of rotations:	3
Rotation speed:	16 s/tr
Minimum rotation time:	30 s
Just not a rotation angle <10 ° to the chamber surfaces	

Data processing
Brüel & Kjaer - BZ-5503 : utility software for hand-held analyzers
Brüel & Kjaer - BZ-7229 : dual-channel building acoustics software
Brüel & Kjaer - 7830 :Qualifier Software for reporting of results
A computer with proprietary software

Averaging Time per measurement:	48 s
Number of reverberation time measurements (with graphic control):	27 measurements

Test chambers

Volume source room:	100,16	m³
Volume receiving room:	90,84	m³
Total partition wall area:	10,00	m²
Surface test opening:	9,95	m²

There are diffusers and absorption material applied

Partition wall
n/a

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STANDARD METHOD

Airborne sound insulation measurement

The tests were conducted in accordance with the provisions of the test method ISO 10140-2. A detailed description of the test set up has been given in the figures of annex 1 of this report.

The construction to be tested is placed into a test opening between two measuring rooms. In one of the rooms (the so-called sending room) broad band noise is generated by loud-speakers. The test rooms meet the requirements of ISO 10140-5
Both rooms are isolated for vibrations by using a so-called room-in-room construction.

In this sending room as well as in the adjacent room (the "receiving room") the resulting sound pressure level is measured by means of a continuous rotating boom, so the (time- and space-) averaged sound pressure level is determined.

The reverberation time of the receiving room is also measured. The measurement of the reverberation time in the receiving room allows to determined the sound absorption per octave band using the formula Sabine as in the norm ISO 10140-4 and in accordance with ISO 354
The equivalent sound absorption (m²) in the receiving room according to : A = 0,16 V/T in which :

V = volume of the receiving room in cubic meter
T = reverberation time in the receiving room in sec

In ISO 10140-2 the airborne sound insulation of an object is defined as the "sound reduction index R" to be evaluated according to the formula

$$R = L_1 - L_2 + 10 \log (S/A) \quad [dB]$$

met L_1 = sound pressure level in the sending room, in dB (ref 20µPa)
L_2 = sound pressure level in the receiving room, in dB (ref 20µPa)
S = area of the object to be tested, in square metre
A = equivalent sound absorption in the receiving room, in square metre

The above parameters are determined at least in the 1/3 octave bands 100 Hz to 5000 Hz
The environmental conditions in the test rooms (temperature, relative humidity) are measured during the tests

Single-rating number : R_w ($C;C_{tr}$)

The values of the measured airborne sound reduction index of the tested element are drawn-up in the diagram of the annexed data sheet as a function of the frequency (in 1/3 octave bands) and are given in a table.
According to EN ISO 717-1 the weighted sound reduction index Rw and the spectrum adaptation terms C and Ctr for the frequency range from 100 Hz to 3150 Hz can be calculated.

R_w = de 'weighted sound reduction index'
$R_w + C$ = characterize in one number the insulation of the test element against NON-dominant low-frequency noise
$R_w + C_{tr}$ = characterize in one number the insulation of the test element against dominant low-frequency noise

Optionally, these two terms are supplemented by additional adjustment terms (if necessary and measured data are available) on a wider frequency range between 50 Hz and 5000 Hz

Optionally and according other international standards, other single-figure ratings have been calculated and stated.

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SPECIAL MEASUREMENT CONDITIONS

n/a

ACCURACY

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

Repeatability [r]
When: - two tests are performed on identical test material - within a short period of time - by the same person or team - using the same instrumentation - under unchanged environmental conditions - the probability will be 95% that the difference between the two test results will be less than or equal to r

Reproducibility [R]
When: - two tests are performed on identical test material - in different laboratories - by different person(s) - under different environmental conditions - the probability will be 95% that the difference between the two test results will be less than or equal to R

In ISO 20140-2 there is a statement on the reproducibility R to be expected, based on the results of various inter-laboratory tests.
The reproducibility of the single figure rating Rw is about 3 dB.

The specific value of uncertainty is available on request

ENVIRONMENTAL CONDITIONS during the tests

		Source room	*Receiving room*
Temperature :	T =	19,1 °C	17,8 °C
Atmospheric pressure :	p =	1014,6 hPa	1015 hPa
Relative humidity :	h_r =	61,1 %	66,4 %

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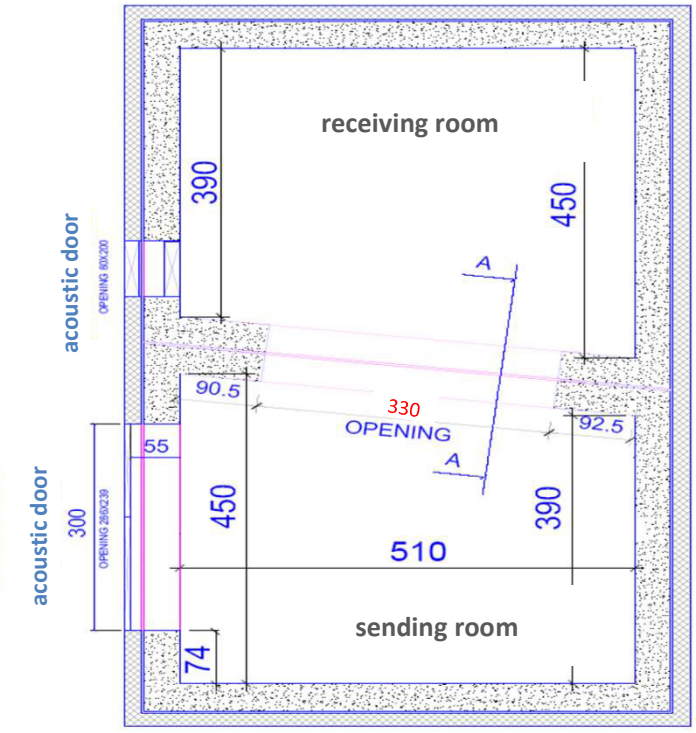
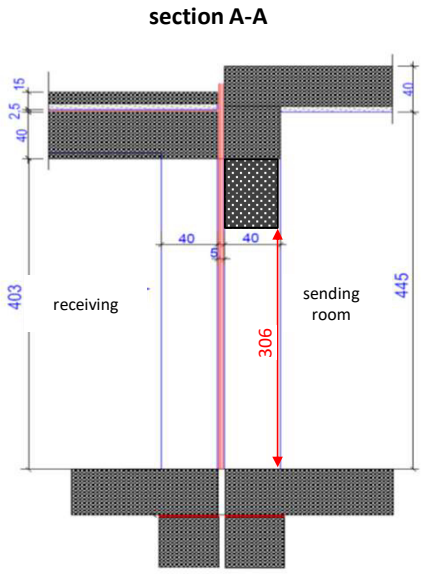
ANNEX 1 : Sound insulation test facilities

The test rooms meet the requirements of ISO 10140-5
Both rooms are isolated for vibrations by using a so called room-in-room construction.





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ANNEX 2: 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

Description of the test element as a layered structure

	Thickness (mm)	ρ (kg/m³)	m'' (kg/m²)	Description of the layer
1	90			Noise barrier SDW 90
2				
3				
4				
5				
6				
7				
8				
9				
10				

Total thickness = 90 mm

Noise barrier SDW 90

rear end of the noise barrier : full galvanised steel plate
filling : layer of 90mm non-combustible glass fibre insulation with resistant and water-repellent coating
front end of the noise barrier : perforated galvanised steel plate - mesh size 50 x 50mm - a flat edge of 22mm on the side
total thickness : 90mm

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ANNEX 3: Technical sheet

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

Please request at supplier

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ANNEX 4: photographs of the test element or the test arrangement

Description of the assembly and/or drawing and/or image

Six noise barrier panels where placed in the opening between the transmission rooms, with the mesh side of the panels facing the source room
The panels were stacked loosly on top of each other.
In the middle, the panels were mounted into a galvanised steel I-profile
Along the side walls, the panels were mounted into a galvanised U-profile
At the ground, the panels were placed on a rubber strip
The gaps between the measuring room and the mounting profiles were sealed with an elastic sealant.
The remaining opening (+/- 30mm) at the top was filled with a wooden beam and sealed with the same elastic sealant.

front side in the transmission room

rear wall in the receiving room

detail 1: I-profile at the location of the vertical joint between the 2 columns of noise barriers

detail 2: U-profile on the side walls between the walls of the transmission room and panels

detail 3: different layers of the noise barrier
100mm non-combustible glass fibre insulation with resistant and water-repellent coating

detail 4: detail on the top of the noise barrier. The opening was filled with a wooden beam and sealed with flexibel mastic tixotrophe

detail 5: detail at the cross section between the noise barriers

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R

SOUND REDUCTION INDEX according to ISO 10140-2
Laboratory measurement of airborne sound insulation between rooms

Client: **Solflex GmbH** Date of test: 16/01/2020

Description of the test setup:
Noise barrier SDW 90

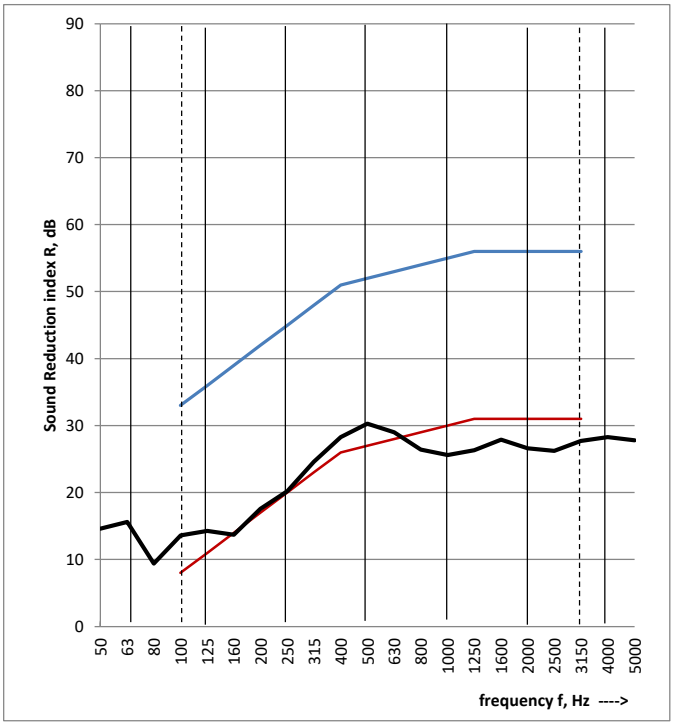
Area S of separating element: 9,95 m²

Receiving room volume: 90,84 m³
Source room volume: 100,16 m³

measured values of Sound Reduction Index R
reference values (according ISO 717-1)
shifted reference values (according ISO 717-1)

frequency Hz	R one third octave dB	(*)	(**)	R octave dB
50	14,6			
63	15,6			12,3
80	9,4			
100	13,6			
125	**14,3**			**13,9**
160	13,7			
200	17,6			
250	**20,2**			**19,9**
315	24,6			
400	28,3			
500	**30,3**			**29,1**
630	29,0			
800	26,4			
1000	**25,6**			**26,1**
1250	26,3			
1600	27,9			
2000	**26,6**			**26,8**
2500	26,2			
3150	27,7			
4000	**28,3**			**27,9**
5000	27,8			

B or M : R >= value shown
(*) b : background noise correction used
B : Maximum background noise correction used
(**) m : flanking transmission correction used
M : Maximum flanking transmission correction used



Rating in accordance with ISO 717-1:

R_w (C;C_{tr}) = **27** (**-1** ; **-3**) **dB**

$C_{50\text{-}3150}$= -1 dB; $C_{50\text{-}5000}$= -1 dB; $C_{100\text{-}5000}$= -1 dB

Evaluation based on laboratory measurement-results obtained by an engineering method:

$C_{tr,50\text{-}3150}$= -4 dB; $C_{tr,50\text{-}5000}$= -4 dB; $C_{tr,100\text{-}5000}$= -3 dB

Measurement no.: SONI538
Date of test report: 12/02/2020

Test institute: Daidalos Peutz
Lab-engineer: Els Meulemans

3.Schallabsorptionsgrad

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NOISE LAB
REPORT Number A-2019LAB-104-7-43846_E

Customer :	Solflex GmbH Am Feuerstein 282 2392 Wienerwald Austria
Contacts :	**Client :** Tom Bogaerts **Noise lab :** Els Meulemans
Tests :	Measurement of sound absorption in the reverberation room
Product name :	**Noise barrier SDW 90**

Normative references:

NBN EN ISO 354:2003	**Acoustics - Measurement of sound absorption in a reverberation room**
NBN EN ISO 11654:1997	Acoustics - Sound absorbers for use in buildings - Rating of sound absorption
NBN ISO 9613-1:1996	Acoustics - Attenuation of sound during propagation outdoors - part 1 : Calculation of the absorption of sound by the atmosphere

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Technical Manager,

Paul Mees

Laboratory Engineer,

Els Meulemans

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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, Fulfils 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:	Volume :	296,9 m³
	Length:	9,99 m
	Width	4,97 m
	Height	5,98 m
	Volume :	297 m³
	Total area:	278 m²
	l_{max} = 12,65 m < 1,9 $V^{⅓}$	

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 descibed 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, A1, in square metres, shall be calculated using the formula (1) :

$$A_1 = 55{,}3\ V / (c_1 T_1) - 4Vm_1 \quad [m^2] \quad (1)$$

The equivalent sound absorption area of the reverberation room containing a test specimen, A2, in square metres, shall be calculated using the formula (2) :

$$A_2 = 55{,}3\ V / (c_2 T_2) - 4Vm_2 \quad [m^2] \quad (2)$$

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

$$A_T = A_2 - A_1 = 55{,}3\ V\ (1/c_2T_2 - 1/c_1T_1) - 4V(m_2 - m_1) \quad [m^2] \quad (3)$$

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:

A1	=	*The equivalent sound absorption area of the empty reverberation room in square metres*	
A2	=	*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 [m³]	
c1,c2	=	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
T1	=	*the reverberation time, in seconds, of the empty reverberation room*	
T2	=	*the reverberation time, in seconds, of the reverberation room after the test specimen has been introduced*	
m1,m2	=	*the power attenuation coefficient, in reciprocal metres, calculated according to ISO 9613-1:1993*	
AT	=	*The equivalent sound absorption area of the test specimen in square metres*	
S	=	*the area, in square metres, covered by the test specimen*	
αs	=	*the sound absorption coefficient*	

SPECIAL MEASUREMENT CONDITIONS

- the surface of the test sample is too small, minimum surface > 10 m²!
-
-
-
-

The surface of the test sample was just too small, since the same samples were also used for other tests
No problem for the results due to the high absorption properties.

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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, api, 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 api 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 aw 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 relative standard deviation of the reverberation time T20, evaluated over a 20dB decay range, can be estimated by the following formula (see 8.2.2. van ISO 354:2003)
These relative standard deviations of the reverberation time T20 were calculated and illustrated in annex 1.

The reproducibility of absorption coefficient measurement is still under investigation

The specific value of uncertainty is available on request

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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: 7 **Test date:** 16/01/2020

Reverberation room: V = 296,9 m³ S_{tot} = 278,2 m²

Room conditions during measurements:		Empty room	With testelement	
Temperature:	T =	18,2	19,5	°C
Atmospheric pressure:	p =	102,1	102,0	kPa
Relative humidity :	h_r =	51	54	%

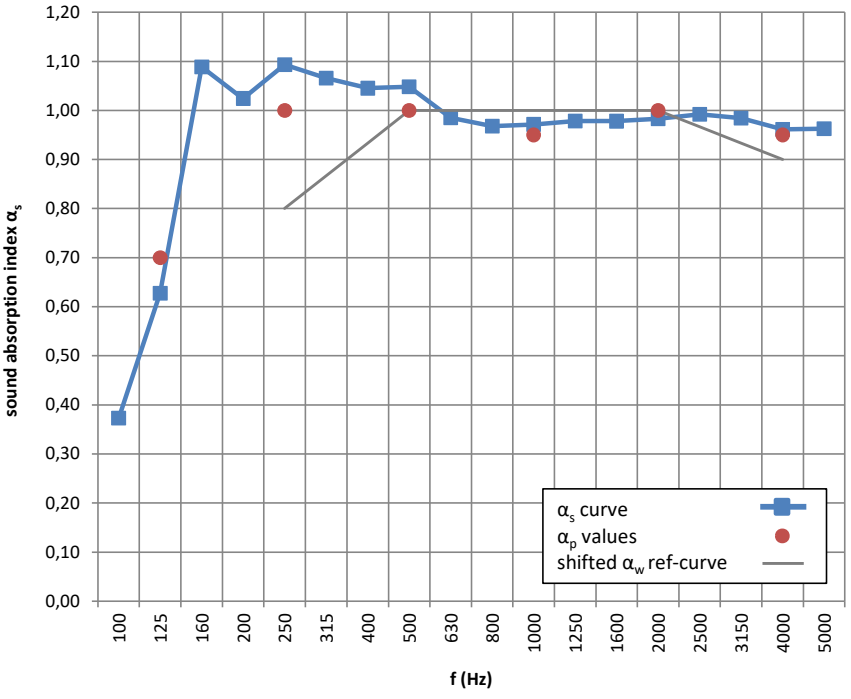
Type of test element: **Plane absorber**

Construction characteristics:

* using plane absorber:	Area of test element:	9,81 m²
	Total thickness:	90 mm
	Number of layers,including air spaces:	4
	Connection of layers:	loose
* using baffles (Type J mounting):	Dimensions (L x W x H):	-
	Distance between baffle rows:	-
* using discrete objects:	Number of tested objects:	-

f(Hz)	T1 (s)	T2 (s)	α_s
50			
63			
80			
100	10,28	5,76	0,37
125	**9,01**	**4,17**	**0,63**
160	9,83	3,08	1,09
200	10,09	3,24	1,02
250	**9,28**	**3,02**	**1,09**
315	9,54	3,10	1,07
400	9,06	3,08	1,04
500	**9,10**	**3,08**	**1,05**
630	9,54	3,26	0,98
800	9,49	3,30	0,97
1000	**9,28**	**3,27**	**0,97**
1250	8,49	3,15	0,98
1600	7,40	3,00	0,98
2000	**6,28**	**2,80**	**0,98**
2500	5,20	2,57	0,99
3150	4,18	2,32	0,98
4000	**3,21**	**2,03**	**0,96**
5000	2,50	1,75	0,96

f(Hz)	α_p
125	0,70
250	1,00
500	1,00
1000	0,95
2000	1,00
4000	0,95



α_w = 1,00 ( ) *
acoustical absorption class: A

NRC = 1 **
SAA = 1,01 **

* 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: Solflex GmbH,Am Feuerstein 282,2392 Wienerwald
TESTELEMENT: (product name, for details see Annex 2)
Noise barrier SDW 90

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ANNEX 1 : PRECISION

The relative standard deviation of the reverberation time T20

f	T_1 (s)	ε_{20} (s)	T_2 (s)	ε_{20} (s)
50	0	0	0	0
63	0	0	0	0
80	0	0	0	0
100	10,28	0,52	5,76	0,39
125	9,01	0,44	4,17	0,30
160	9,83	0,40	3,08	0,23
200	10,09	0,37	3,24	0,21
250	9,28	0,31	3,02	0,18
315	9,54	0,28	3,10	0,16
400	9,06	0,24	3,08	0,14
500	9,10	0,22	3,08	0,13
630	9,54	0,20	3,26	0,12
800	9,49	0,18	3,30	0,10
1000	9,28	0,16	3,27	0,09
1250	8,49	0,13	3,15	0,08
1600	7,40	0,11	3,00	0,07
2000	6,28	0,09	2,80	0,06
2500	5,20	0,07	2,57	0,05
3150	4,18	0,06	2,32	0,04
4000	3,21	0,05	2,03	0,04
5000	2,50	0,04	1,75	0,03

ε_{20} = The relative standard deviation of the reverberation time T20, evaluated over a 20dB decay range, can be estimated by the following formula (see 8.2.2. van ISO 354:2003)

$$\varepsilon_{20}(T) = T\sqrt{\frac{2{,}42 + {}^{3{,}59}/_{N}}{f\,T}}$$

T_1 (s) = reverberation time of the empty room
T_2 (s) = reverberation time of the reverberation room after with the test specimen
f (Hz) = centre frequency of the one-third-octave band
N = number of decay curves evaluated

The relative standard deviation of the sound absorption coefficient

f	αs	ε_α	δ_{95} (α)
50	0,00	0,00	0,00
63	0,00	0,00	0,00
80	0,00	0,00	0,00
100	0,37	0,06	0,03
125	0,63	0,09	0,04
160	1,09	0,12	0,06
200	1,02	0,10	0,05
250	1,09	0,10	0,05
315	1,07	0,08	0,04
400	1,04	0,07	0,04
500	1,05	0,07	0,03
630	0,98	0,05	0,03
800	0,97	0,05	0,02
1000	0,97	0,04	0,02
1250	0,98	0,04	0,02
1600	0,98	0,04	0,02
2000	0,98	0,04	0,02
2500	0,99	0,04	0,02
3150	0,98	0,04	0,02
4000	0,96	0,05	0,02
5000	0,96	0,06	0,03

$\varepsilon(\alpha)$ = The relative standard deviation of the sound absorption coefficient

$$\varepsilon(\alpha) = \frac{55{,}3\,V}{c\,S}\sqrt{\left(\frac{\varepsilon_{20}(T_2)}{T_2^2}\right)^2 + \left(\frac{\varepsilon_{20}(T_1)}{T_1^2}\right)^2}$$

δ_{95} (α) = 95% confidence interval

$$\delta_{95}(\alpha) = \frac{1{,}96\,\varepsilon(\alpha)}{\sqrt{N}}$$

T_1 (s) = reverberation time of the empty room
T_2 (s) = reverberation time of the reverberation room after with the test specimen
V = Volume of the reverberation room
c = the propagation speed of sound in air

S = number of decay curves evaluated
N = the area, in square metres, covered by the test specimen

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ANNEX 2: 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

Noise barrier SDW 90

rear end of the noise barrier : full galvanised steel plate
filling : layer of 90mm non-combustible glass fibre insulation (ca 30 kg/m³) with resistant and water-repellent coating front end of the noise barrier : perforated galvanised steel plate - mesh size 50 x 50mm - a flat edge of 22mm on the side total thickness : 90mm

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ANNEX 3: Technical datasheet

The test sample description given by manufacturer is checked visually as good as possible by the laboratory.
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Please request at supplier.

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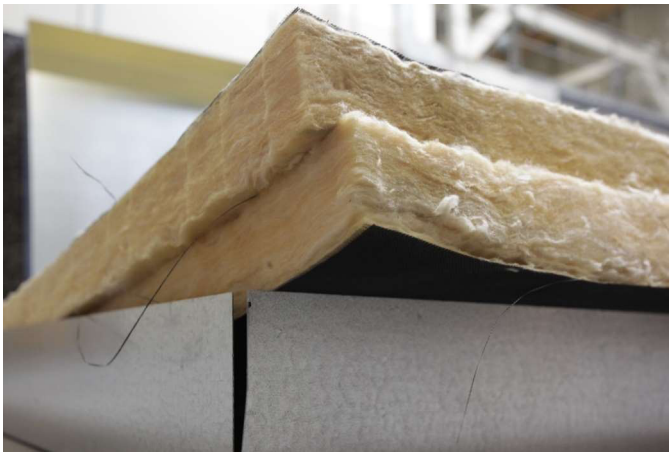
ANNEX 4: photographs of the test element or the test arrangement

Description of the assembly or drawing or photo

Six noise barrier panels where placed loosly against each other on the floor of the reverberation room
The joint in the middle of the sample, at the short edges of the adjacent panels, was covered with an galvanised steel profile with a thickness of 1,5mm
The joints between the perimeter of the sample and the floor of the reverberation room was sealed with a tape



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ANNEX 5: Sketch of the test room

The test room was built and finished according ISO 354.