

Determination of airborne sound reduction index of Bostik A990 PREMIUM ACRYLIC

Requested by	Bostik Benelux BV Robbert van Beers 4903 RC Oosterhout NETHERLANDS
Order	VWZ0PT230110-01
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Assignment	Determination of airborne sound reduction index of Bostik A990 PREMIUM ACRYLIC
Specimen	The sample was delivered to the laboratory on 2.11.2023 and were marked with a code 235-2023-00516001. Sample consisted of Bostik A990 PREMIUM ACRYLIC cartridges and 16 mm PE backer rod.
Date and place of testing	Senior Technician Ville Joensuu from Eurofins Expert Services Oy tested the sample on 17.11.2023 at Eurofins Expert Services Oy research hall 1. (address: Tekniikantie 15 A, 02150 Espoo).
Installation and measuring	<p>Acrylic mass was installed between two cassettes, so that there was 1100 x 15 x 8mm of acrylic mass. The cassettes were then installed into test element with high sound insulation ($R_{s,max}$ 54 dB) as described in <i>EN ISO 10140-1:2021 [1], Annex J</i>. This was then repeated so that there was 16 mm thick backer rod behind the acrylic mass. The curing time of the mass before testing was approximately 48 hours. The test element (1200 x 1200 mm) was installed between two reverberation rooms.</p> <p>The airborne sound reduction index of the sample was determined by means of two-channel sound pressure level measurement with two fixed sources and rounding microphones.</p>
Method and equipment	<p>The sound reduction index R_s was measured in accordance with <i>EN ISO 10140-2:2022 [2]</i> and the weighted sound reduction index $R_{s,w}$ and spectrum adaptation terms C and C_{tr} were determined in accordance with <i>EN ISO 717-1:2020 [3]</i>.</p> <p>Reverberation room dimensions and measuring equipment are presented in Appendix 3.</p>

Result The results of the measurements are presented in Table 1

Table 1. The weighted sound reduction index $R_{s,w}$ of the Bostik A990 PREMIUM ACRYLIC. The values $R_{s,w} + C$ and $R_{s,w} + C_{tr}$ are also presented.

A990 PREMIUM ACRYLIC				
No.	Sample	$R_{s,w}$ dB	$R_{s,w} + C$ dB	$R_{s,w} + C_{tr}$ dB
1.	A990 PREMIUM ACRYLIC 1100 x 15 x 8mm	52	50	47
2.	A990 PREMIUM ACRYLIC 1100 x 15 x 8mm + 16mm backer rod	52	50	47

Measured values are close to the maximum sound reduction values of the test element so the results can be considered minimum values.

According to EN ISO 717-1:2020 Annex A the single-number sound insulation quantity $R_{s,w} + C_{tr}$ is regarded suitable for example in the case of the urban road traffic noise and $R_{s,w} + C$ for the noise of the jet aircraft (short distance). The sound reduction index R_s by 1/3-octaves is presented in Appendix 1.

According to standard EN ISO 12999-1:2020 [4] standard uncertainties U for single-number values, when measurements are repeated in the same laboratory with same equipment and personnel is 1dB when coverage factor $k = 2,58$.

Espoo, 20.12.2023

Mika Lojander
Expert

The report is electronically signed.

Eurofins Expert Services Oy is notified body No. NB 0809

FINAS Finnish Accreditation Service has accredited our laboratory (T001, Eurofins Expert Services Oy) to perform measurements according to EN ISO 10140-1:2021, EN ISO 10140-2:2022 and EN ISO 717-1:2020.

References

- [1] EN ISO 10140-1:2021 Acoustics - Laboratory measurement of sound insulation of building elements - Part 1: Application rules for specific products
- [2] EN ISO 10140-2:2022 Acoustics - Measurement of sound insulation in buildings and of building elements - Part 2: Laboratory measurements of airborne sound insulation of building elements
- [3] EN ISO 717-1:2020 Acoustics - Rating of sound insulation in buildings and of building elements – Part 1: Airborne sound insulation
- [4] EN ISO 12999-1:2020 Acoustics-Determination and application of measurement uncertainties in building acoustics-Part 1: Sound insulation (ISO 12999-1:2020)

Appendices

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Distribution

Customer , electronically approved



The results are only valid for the tested sample(s).

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Client: Bostik Benelux BV

Product identification: Bostik A990 PREMIUM ACRYLIC

Test specimen mounted by: EES Oy

Test gap: 1100 x 15 x 100 mm

Date of test: 17.11.2023

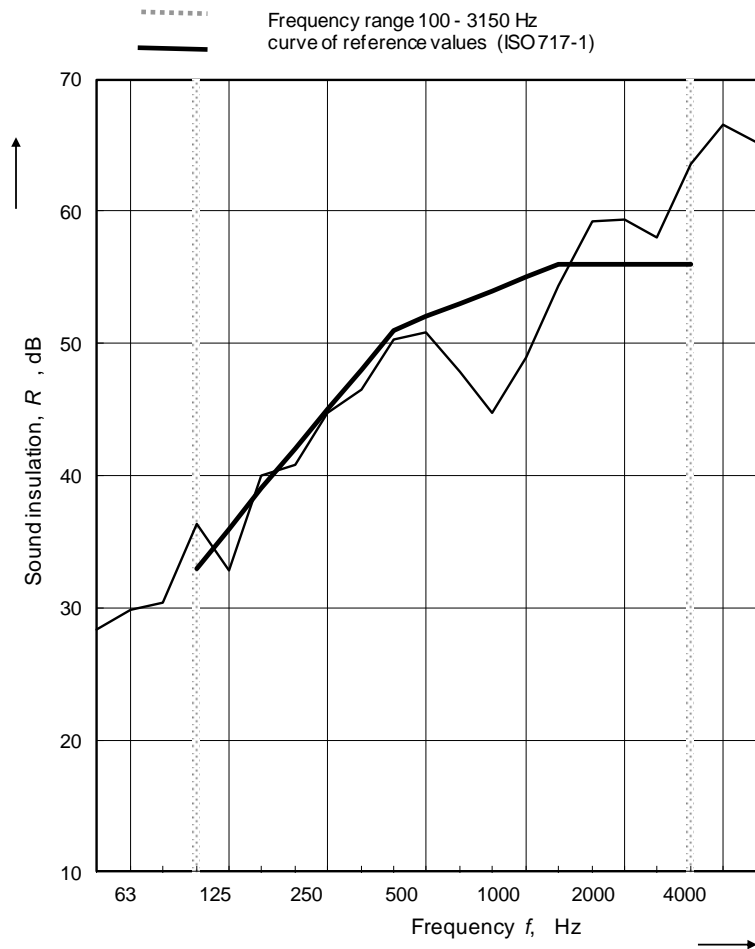
Mounting: Bostik A990 PREMIUM ACRYLIC was installed approx. 8mm deep in the test gap with full height 15mm

Description of test specimen and test conditions:

Test length l: 1,1 m
 Air temp. in the test rooms: 19,6 °C
 Air humidity in the test rooms: 32 %
 Barometric pressure: 103 kPa
 Source room volume: 102 m³
 Receiving room volume: 131 m³
 Curing time: 48 h

Maximum joint sound reduction index $R_{s,max,w}$: 54dB

f Frequency Hz	R_s One-third octave dB
50	≥27,7
63	≥29,1
80	≥29,6
100	≥35,6
125	≥32,5
160	≥39,4
200	≥40,1
250	≥44,2
315	≥45,9
400	≥49,8
500	≥50,1
630	47,6
800	44,6
1000	48,5
1250	53,8
1600	58,8
2000	58,9
2500	57,8
3150	63,3
4000	66,0
5000	≥64,2



Rating according to ISO 717-1:

$R_{s,w}(C;C_{tr}) = 52 (-2; -5) \text{ dB};$

$C_{50-3150} = -2 \text{ dB};$

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

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

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

$C_{tr,50-3150} = -8 \text{ dB};$

$C_{tr,50-5000} = -8 \text{ dB};$

$C_{tr,100-5000} = -5 \text{ dB};$

Client: Bostik Benelux BV

Product identification: Bostik A990 PREMIUM ACRYLIC
with 16 mm backer rod

Test specimen mounted by: EES Oy

Test gap: 1100 x 15 x 100 mm

Date of test: 17.11.2023

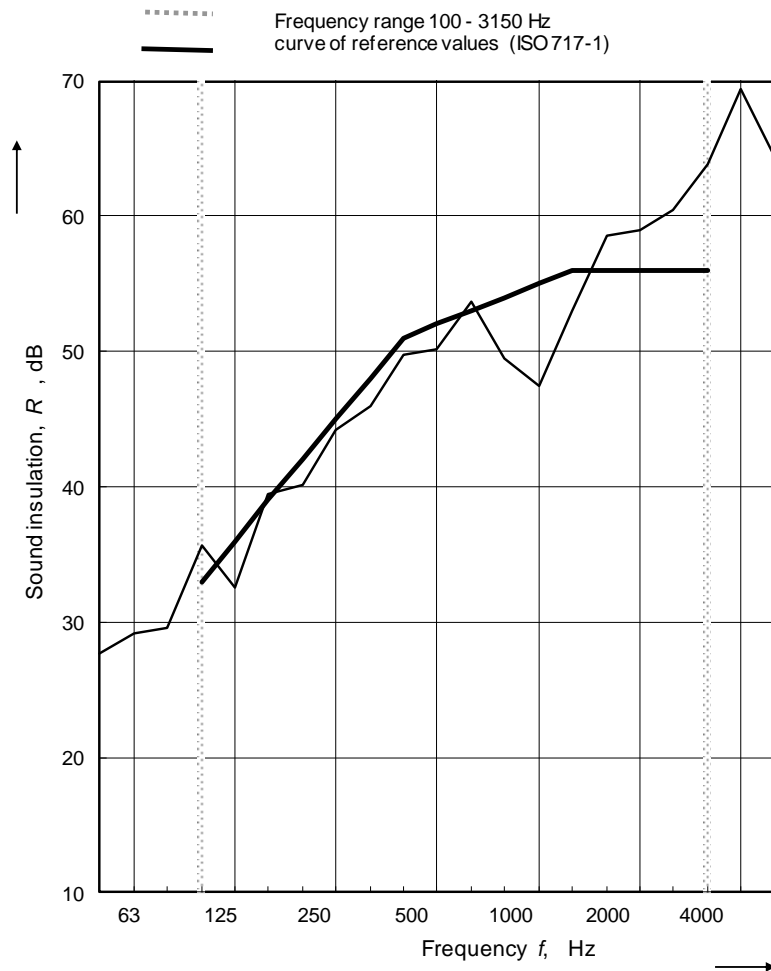
Mounting: 16mm PE-backer rod installed 8mm deep
in the test gap. Remaining gap filled with
Bostik A990 PREMIUM ACRYLIC

Description of test specimen and test conditions:

Test length l: 1,1 m
Air temp. in the test rooms: 19,6 °C
Air humidity in the test rooms: 32 %
Barometric pressure: 103 kPa
Source room volume: 102 m³
Receiving room volume: 131 m³
Curing time: 48 h

Maximum joint sound reduction index $R_{s,max,w}$: 54dB

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400	≥49,8
500	≥50,1
630	53,7
800	49,5
1000	47,4
1250	53,0
1600	58,6
2000	59,0
2500	60,4
3150	63,8
4000	69,4
5000	≥64,2



Rating according to ISO 717-1:							
$R_{s,w} (C; C_{tr})$	= 52 (-2; -5) dB;	$C_{50-3150}$	= -2 dB;	$C_{50-5000}$	= -1 dB;	$C_{100-5000}$	= -1 dB;
Evaluation based on laboratory measurement results obtained by an engineering method:		$C_{tr,50-3150}$	= -8 dB;	$C_{tr,50-5000}$	= -8 dB;	$C_{tr,100-5000}$	= -5 dB;

Technical Specifications

100 % modulu	DIN 53504	0,67 MPa
Application rate		2055 g/ml
Application temperature		+5°C to +40°C
Base		Acrylic dispersion
Density	ISO 1183-1	1,56 g/ml
Elongation at break		500%
Flow		0 mm
Frost resistance during transportation		Up to -15°C
Shorea hardness	DIN 53505 / ISO 868	60
Skin formation	DBTM 16	8 minutes @ +23°C/50% RH
Temperature resistance		-20°C to +75°C
Tensile strength		0,68 (DIN 53504)

These are typical values



Picture 1. Backer rod installed to the test gap



Picture 2. Cartridge of the sample



Picture 3. Test element installed to the test wall opening

Measuring equipment and reverberation room dimensions

Measuring equipment	Name	Serial No.
Condenser microphone	B&K (Brüel&Kjær) 4134	2415044
Condenser microphone	B&K (Brüel&Kjær) 4134	2527717
Microphone preamplifier	B&K 2639	2025241
Microphone preamplifier	B&K 2639	2554550
Rotating microphone boom	B&K 3923	1678216
Rotating microphone boom	B&K 3923	2630663
Power amplifier	Yamaha MX-1000	
Loudspeakers	Sinmarc V121L	
Real-time analyser	Norsonic 121	31429
Sound calibrator	B&K 4228	1704462

Reverberation room dimensions	Floor	Height	Volume
Source room	4.7 m x 5.8 m	3.7 m	102 m ³
Receiving room	5.0 m x 6.5 m	4.0 m	131 m ³

Thickness of the concrete walls, floors and ceilings of the reverberation rooms is 0.25 m