REPORT

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Testing

Essve Produkter AB
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Sound insulation of joint sealant

(1 appendix)

Client

Essve Produkter AB

Test object

An acrylic based joint sealant combined with 16 mm PE-based backer rod. The name of the product is “Byggfog Akustik” (acoustic building sealant). The sealant was delivered in 300 ml-tubes.

Arrival of test object

Just before the test

Date of test

2017-04-24

Result

A summary of the test results is given in table 1. Complete results can be seen in the enclosures.

Higher values on ”$R_{s,w}$” means better sound insulation.

The results are valid for the tested items only.

Table 1 – Results.

Test object	**$R_{s,w}$ (dB)**	**Appendix**
“Byggfog Akustik” (acoustic building sealant), one-sided sealing with backing rod.	52	1

The maximum joint sound reduction index, with optimal laboratory sealing was measured to be $R_{s,max,w}$ = 56 dB.

The values which are evaluated can be used directly to compare products (e.g. joint sealants) or for the determination of the sound insulation of composite elements, taking to account the appropriate length of joints.

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Measurement method

The measurements have been carried out according to international standard ISO 10140-2:2010 and ISO 10140-1:2016, which SP is accredited for. The method is valid as European standard according to EN ISO 10140-2 and as Swedish standard according to SS-EN 10140-2.

The sound reduction index R_s has been determined according to:

$R_s = L_1 - L_2 + 10\ lg\ (S_n l/Al_n)$

where

L_1 is the average sound pressure level in the source room (dB),

L_2 is the average sound pressure level in the receiving room (dB),

l is the length of the joint (m),

S_n is the reference area (S_n = 1 m^2),

l_n is the reference length (l_n = 1 m),

A is the equivalent absorption area of the receiving room (m^2).

The average sound pressure levels have been determined using a rotating microphone boom (radius >1,1 m) and a digital frequency analyser. A continuously moving loudspeaker has been used in the source room. During the measurement time of 128 s, the loudspeaker has moved up and down along a line across the room.

Evaluation

The results have been evaluated regarding the weighted sound reduction index, $R_{s,w}$, according to international standard ISO 717-1:1996, which is equivalent to EN ISO 717-1 and SS-EN ISO 717-1.

In the enclosures, $R_{s,w}$ and the additional spectrum adaptation terms (C; C_{tr}), ($C_{50\text{-}3150}$;$C_{tr\ 50\text{-}3150}$) and ($C_{50\text{-}5000}$;$C_{tr\ 50\text{-}5000}$) according to SS-EN ISO 717-1 are given. The spectrum adaptations terms are calculated in the 1/3 octave-bands 100-3150 Hz, 50-3150 and 50-5000 respectively and shall be added to the $R_{s,w}$ values to obtain a summary value based on other noise spectra. C is relevant for spectrum of A-weighted pink noise and C_{tr} is relevant for spectrum of A-weighted urban traffic noise.

Measurement uncertainty

The measurement uncertainty U with respect to *reproducibility* according to ISO 12999-1 is given in the table 2. The reproducibility refers to the spread in measurement data during comparison tests between different laboratories with different measurement rooms, equipment, personnel, etc. The repeatability for measurements in the same laboratory is normally considerably better, that is the spread in results is smaller.

The table gives the measurement uncertainty U at coverage factor k=1,96 (corresponding to a 95 % confidence level).

Table 2 – Measurement uncertainty U.

1/3 octave-band centre frequency (Hz)	Uncertainty U (dB)
50	13,3
63	9,0
80	7,4
100	5,9
125	5,3
160	4,7
200	4,1
250	3,5
315	3,5
400	3,5
500	3,5
630	3,5
800	3,5
1000	3,5
1250	3,5
1600	3,5
2000	3,5
2500	3,7
3150	3,9
4000	4,7
5000	5,5

Test room

The airborne sound reduction laboratory for door and windows, where the volumes of the source and receiving rooms are 106 m^3 and 129 m^3 respectively, was used as test room. The distance of the test opening to the floor was 0,9 m. The laboratory opening had the module measurements M12 x M12 (1200 x 1200 mm).

Mounting

The mounting was carried out by creating a joint gap in the laboratory wall, in accordance with ISO 10140-1:2016, annex J.

A 12 cm thick steel window (with considerably high sound insulation) was mounted into the laboratory opening. The size of the steel window was such that the gap between it and the test opening was 12-14 mm wide. The gap width corresponds to the nominal gap when mounting windows or doors into module sized openings. The total joint length around the window was 4,72 m. The steel window was placed 30 mm deep into the opening. The total width of the surrounding wall was 395 mm (two room mounting).

The backing rod was mounted 8 mm deep into the gap in accordance with the provided mounting instructions. The sealant was applied with a spatula and soap water. The sealant was cured during 10 days. The resulting sealing was inspected for cracks, but deemed fit for measurement. This was the test object being measured, i.e. a one-sided sealing having no mineral wool packing or sealant on the other side.

The result of the measurement was compared with a measurement with the laboratory ”optimal sealing”, i.e. double sided sealing with mineral wool packing (maximum joint sound reduction index $R_{s,max,w}$).
This measurement was conducted by adding mineral wool packing, tape and clay to the other side of the gap, keeping the test object sealant and the backing rod on one side.

Instrumentation

Instrument	Manufacturer	Type.	Serial no.	
Microphone	Brüel & Kjær	4166	1011605	(source room)
Microphone	Brüel & Kjær	4166	1072010	(receiving room)
Microphone preamplifier	Brüel & Kjær	2619	970951	(source room)
Microphone preamplifier	Brüel & Kjær	2619	726782	(receiving room)
Microphone power supply	Brüel & Kjær	2801	618956	(source room)
Microphone power supply	Brüel & Kjær	2804	815268	(receiving room)
Microphone boom	Brüel & Kjær	3923	761963	(source room)
Microphone boom	Brüel & Kjær	3923	912304	(receiving room)
Real time analyzer	Norsonic	830	10765	
Calibrator	Brüel & Kjær	4230	1410946	
Software	SP	Ver 2.0.8		
Loudspeaker	HGT4			
Power amplifier	Labgruppen	LAB 2000		

Pictures of the test object

Figure 1 – The receiving room.

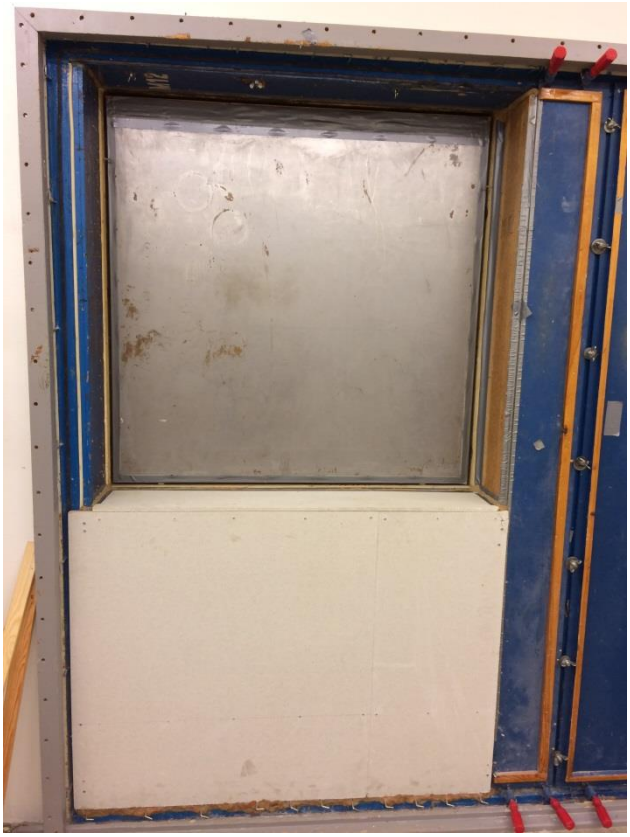

Figure 2 - The sender room.

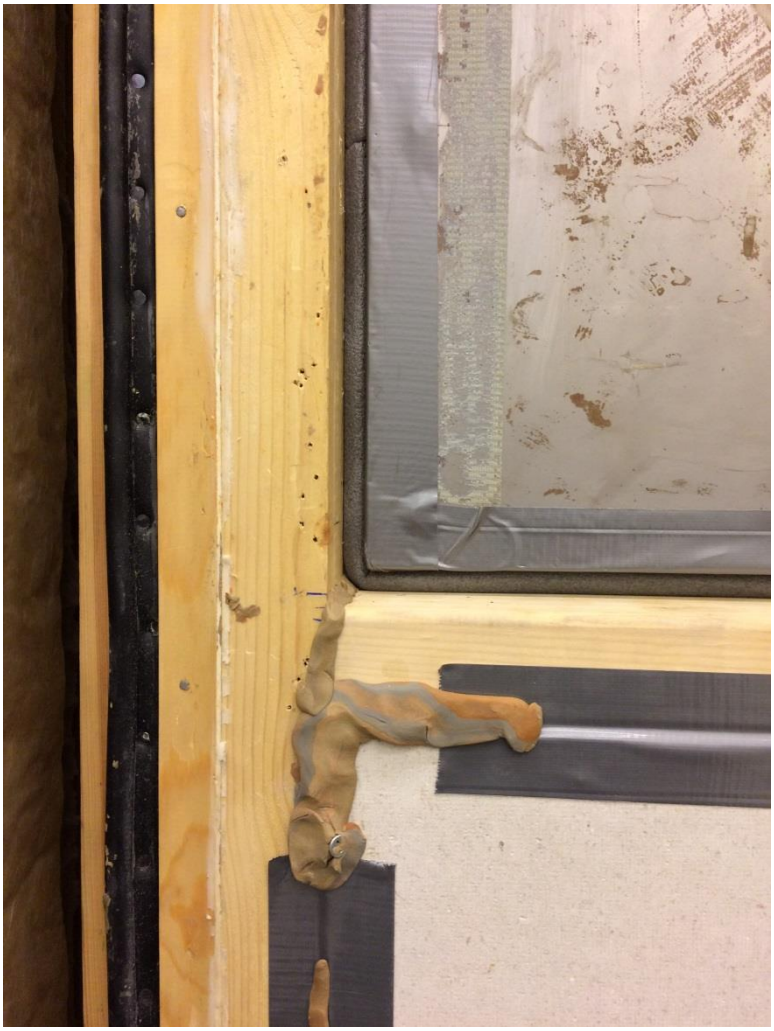

Figure 3 - the backing rod applied to the gap.

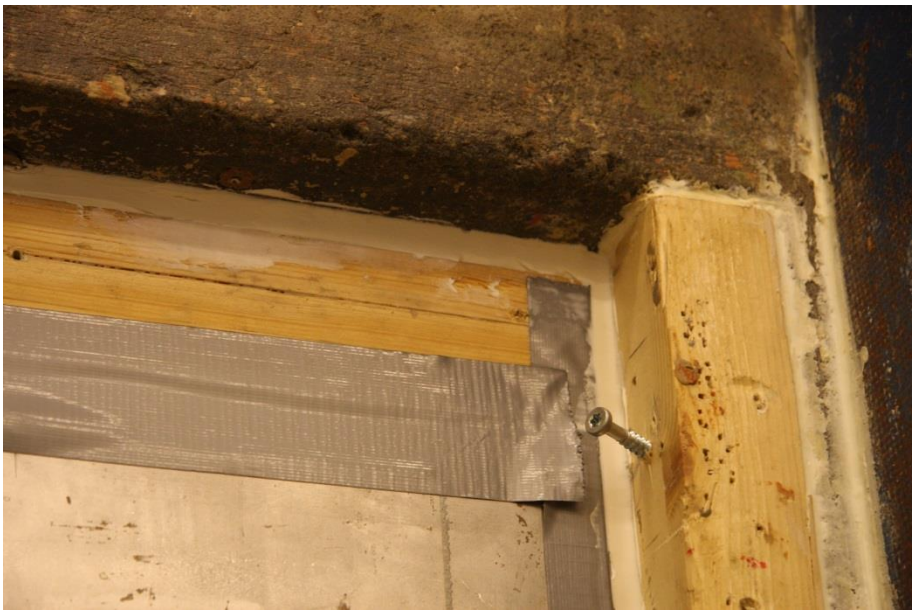

Figure 4 - The sealant applied to the gap.

RISE Research Institutes of Sweden AB
Building Technology - Sound and vibration

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Appendix

Appendix 1

Sound reduction index of joints according to SS EN ISO 10140

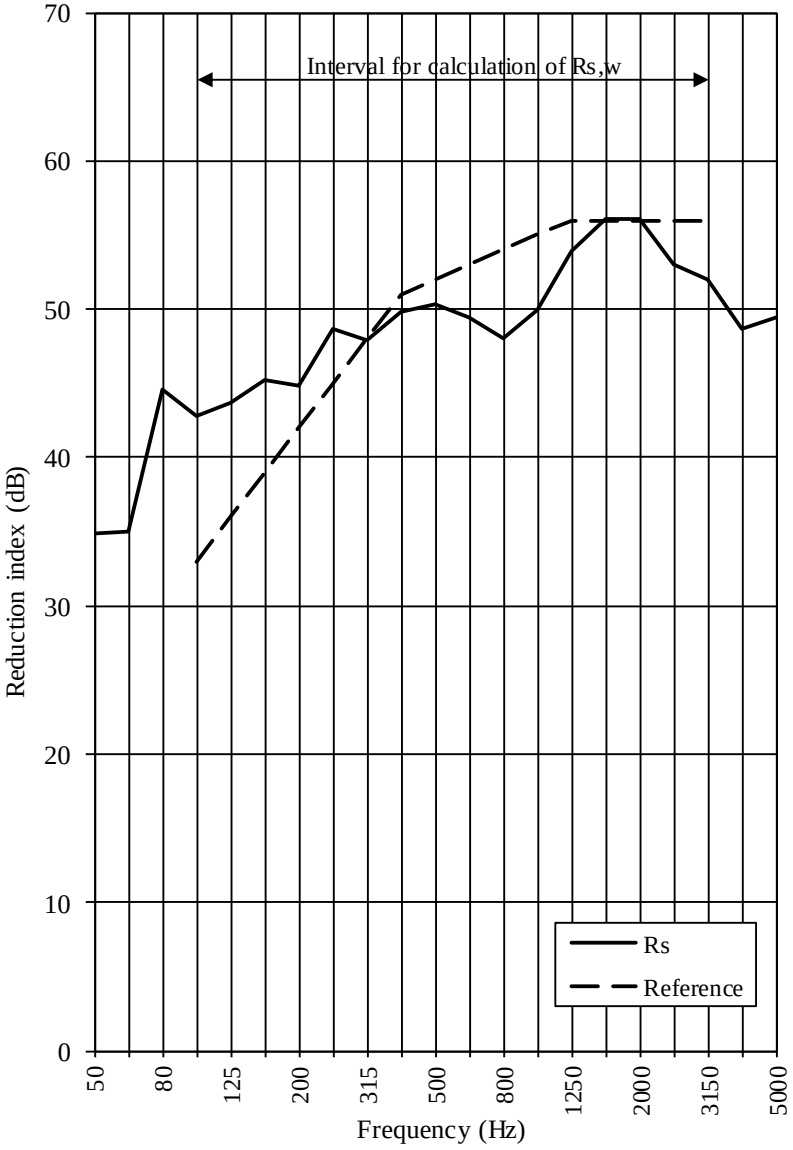
Client: Essve Produkter AB

Test object: Acrylic-based one-sided joint sealant combined with 16 mm PE-based backer rod ("Byggfog Akustik"). Nominal joint width, 12-13 mm.

Measurement date: 2017-04-24

Rec. room volume:	129 m3
Joint length *l:*	4,72 m
Maximum joint sound reduction index $R_{s,max,w}$:	56 dB

Result: Weighted sound level reduction, $R_{s,w}$ and correction values.



Frequency (Hz)	R_s (dB)
50	≥ 34,8
63	≥ 35,0
80	≥ 44,6
100	≥ 42,8
125	≥ 43,7
160	≥ 45,2
200	≥ 44,8
250	≥ 48,7
315	≥ 47,9
400	≥ 49,8
500	50,4
630	49,5
800	48,0
1000	49,9
1250	53,9
1600	56,0
2000	56,1
2500	53,1
3150	52,0
4000	48,7
5000	49,5

$R_{s,w}$ (C; Ctr)	**52** (-1;-2)
50-3150	(-1;-3)
50-5000	(-1;-3)
R_{mean}	49,5
Sum. dev.	26,5
Max. dev.	6,0
Frequency	800