PEUTZ

Laboratory for Acoustics

TESTING
RvA L 334

Determination of the sound insulation of different sealants made by Bostik

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Laboratory for Acoustics

Determination of the sound insulation of different sealants made by Bostik

Principal	Bostik B.V. P.O. Box 303 NL 5201 AH 'S HERTOGENBOSCH The Netherlands
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Table of contents

1 Introduction 4

2 Standards and guidelines 5

3 Tested sealants 6

4 Measurements 8

4.1 Measurement setup 8
4.2 Method 8
4.3 Accuracy 9
4.3.1 Repeatability r 9
4.3.2 Reproducibility R 10
4.4 Environmental conditions during the measurements 10
4.5 Results 10

1 Introduction

At the request of Bostik B.V. based at 's-Hertogenbosch (the Netherlands) sound insulation measurements have been carried out on different types of:

sealants,
manufactured by Bostik

in the Laboratory for Acoustics of Peutz bv, at Mook, the Netherlands (see figure 1).

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RvA L 334

For these type of measurements the Laboratory for Acoustics has been accredited by the Dutch Accreditation Council (RvA).

The RvA is member of the EA MLA (**EA MLA**: **E**uropean **A**ccreditation Organisation **M**ulti**L**ateral **A**greement: http://www.european-accreditation.org).

EA: "Certificates and reports issued by bodies accredited by MLA and MRA members are considered to have the same degree of credibility, and are accepted in MLA and MRA countries."

2 Standards and guidelines

The measurements have been carried out according to the Quality Manual of the Laboratory for Acoustics as well as:

ISO 10140-2:2010	Acoustics - Laboratory measurements of sound insulation of building elements – Part 2: Measurement of airborne sound insulation
ISO 10140-1:2016	Acoustics - Laboratory measurements of sound insulation of building elements – Part 1: Application rules for specific products Annex J Guidelines for the determination of sound reduction index of joints filled with fillers and/or seals

Various other related standards:

ISO 10140-4:2010	Acoustics - Laboratory measurements of sound insulation of building elements – Part 4: Measurement procedures and requirements
ISO 10140-5:2010-A1(2014)	Acoustics - Laboratory measurements of sound insulation of building elements – Part 5: Requirements for test facilities and equipment
ISO 140-2:1991	Acoustics - Measurement of sound insulation of building elements - Part 2: Determination, verification and application of precision data
ISO 717-1:2013	Acoustics - Rating of sound insulation in buildings and of building elements - Part 1: Airborne sound insulation

3 Tested sealants

The following data have been provided by the principal, supplemented by observations in the laboratory where applicable.

The following sealants were tested:

Bostik FP 401
FP Acrylic Sealant
mass: 1547 kg/m^3

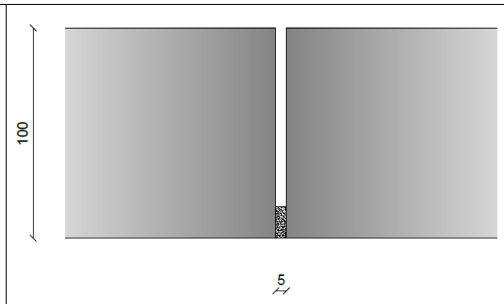
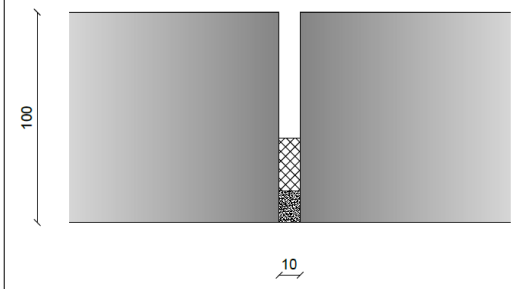
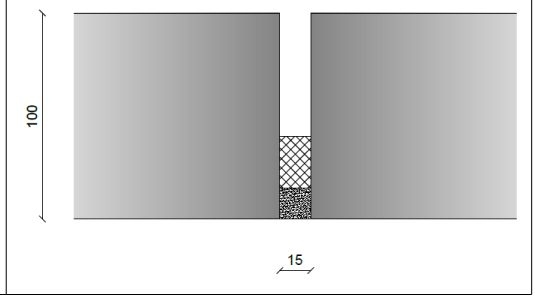
Bostik FP 402
FP Silicone Sealant
mass: 1239 kg/m^3

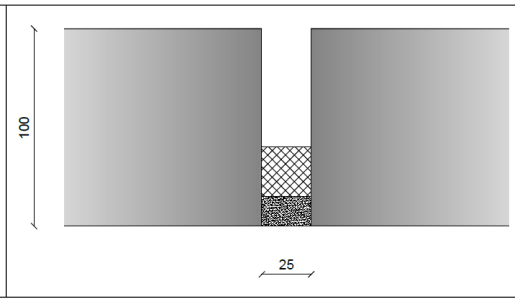
Bostik FP 403
FP Hybrid Sealant
mass: 1435 kg/m^3

PU backerod
used as backing material
for the sealants

mounting of the sealant

The depth of the joint for all measurements was 100 mm. All the sealants were tested for a single layer mounted at a PU backerod. The length of the joint was 2200 mm.
The measurements have been carried out for the following joint widths:

Joint Width = 5 mm	
Joint Width = 10 mm	
Joint Width = 15 mm	

Joint Width = 25 mm	

The results as presented here relate only to the tested items and laboratory conditions as described in this report. The laboratory can make no judgement about the representativity of the tested samples. The test report ahead is valid as long as the tested constructions and/or materials are unchanged.

4 Measurements

4.1 Measurement setup

For the purpose of this measurement a lightweight twin leaf wall construction has been build into the test opening between measuring rooms (3) and (4) (figure 1 en 2). The wall construction exists out of a separate frame covered on each side with two panels of 12,5 mm gypsum board. The twin leaf partition is mounted across the acoustic break of the laboratory. The wall cavity is filled with stonewool. All seams and chinks are carefully sealed.

4.2 Method

The tests were conducted in accordance with the provisions of the test method ISO 10140 in the Laboratory for Acoustics of Peutz bv in Mook. A detailed description of the test set up has been given in figures 1 and 2 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) loudspeakers generate broadband noise. 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 instruments and the method used meet the requirements of ISO 10140-5.

As allowed by the test method the test procedure is repeated reversing the sending and receiving rooms. The reported value of each sound insulation is the arithmetic average of the two results.

There are several quantities to express the element performance of filled joints
In this document the sound reduction index R_s per meter is chosen as the prime quantity to be estimated

In ISO 10140-1:2010 Annex J the sound reduction index of joints filled with fillers and/or seals is defined as the "sound reduction index of joints, R_s per meter" to be evaluated according to formula 1 and expressed in dB:

$$R_s = L_1 - L_2 + 10\ lg\left(\frac{(S_n l)}{(A l_n)}\right) \quad (1)$$

in which:

L_1 = the energy average sound pressure level in the source room [dB]

L_2 = the energy average sound pressure level in the receiving room [dB]

l = the length of the joint (l = 2,187 m) in the used measurement set up [m]
l_n = reference length (l_n = 1 m) [m]
S_n = reference area (S_n= 1 m^2) [m^2]
A = equivalent absorption area in the receiving room according to:

$$A = \frac{0{,}16V}{T} \quad (2)$$

in which:
V = volume of the receiving room [m^3]
T = reverberation time in the receiving room [s]

Based on the quantity R_s the following other quantities can be deduced:
- the sound reduction R based on the area (S_S) of the separating element
- the element normalized level difference $D_{n,e}$ (used when the sound transmission is only due to a small building element)

4.3 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).

4.3.1 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.

In order to evaluate the repeatability r for the sound insulation measurements performed in the laboratories of Peutz bv in Mook eight series of measurements have been carried out according to ISO 140-2. From the results of those measurements the repeatability r has been calculated. It was found that for the frequency range from 100 to 250 Hz the repeatability r is 2,0 dB as a maximum. For the frequency range 315 to 3150 Hz the repeatability r is 1,3 dB as a maximum.

The repeatability r regarding the single-figure rating $R_{s,w}$ is 0,7 dB as a maximum. As ISO 717-1 prescribes rounding of the R_w-values to the nearest dB repeatability r of 1 dB is applicable for the $R_{s,w}$-value.

From these results it may be concluded that the repeatability r as found satisfies the demands of ISO 140-2.

4.3.2 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 140-2 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 $R_{s,w}$ is about 3 dB.

4.4 Environmental conditions during the measurements

t4.1 *Environmental conditions during the measurements in test room 4 at November 23th, 2018*

temperature	relative humidity
[°C]	[%]
17,1	47

4.5 Results

The results of the measurements are given in the tables 4.2 up to and including 4.5 and in the figures 3 up to and including 15. In the tables and graphs the values of the insulation found are presented in 1/3 octave bands. From these values the weighted sound reduction index $R_{s,w}$ according to ISO 717-1 including the spectrum adaptation terms C and C_{tr} have been calculated and stated.

The calculation results of the other single number quantities (R_w and $D_{n,e,w}$) are given in appendix I to this report.

t4.2 Measurements results

	airborne sound insulation R_s [dB]					
joint width	5 mm		5 mm		5 mm	
sealant	FP401		FP402		FP403	
record nr.	#115		#122		#105	
see figure	3		4		5	
frequency [Hz]	1/3 oct.	1/1 oct.	1/3 oct.	1/1 oct.	1/3 oct.	1/1 oct.
50	26,4		26,9		25,4	
63	28,3	28,1	30,2	28,7	28,7	27,7
80	30,5		29,8		30,5	
100	38,2		37,1		37,6	
125	41,2	40,3	40,9	39,6	40,9	39,9
160	43,0		42,8		42,7	
200	42,7		43,4		42,5	
250	45,2	44,4	45,0	44,7	44,4	44,1
315	46,0		46,3		46,1	
400	48,7		49,5		48,8	
500	50,3	50,2	50,6	50,2	50,3	50,2
630	52,4		50,6		52,2	
800	50,7		43,4		51,7	
1000	48,2	49,8	39,9	41,4	50,6	51,6
1250	51,0		41,5		52,8	
1600	55,0		44,5		56,3	
2000	57,6	56,1	48,5	47,4	58,1	56,5
2500	56,2		52,8		55,4	
3150	56,3		54,8		57,7	
4000	60,6	58,8	57,4	57,2	62,2	60,3
5000	61,2		61,9		63,1	
$R_{s,w}(C;C_{tr})$	52(-1;-3) dB		46(-1;-2) dB		53(-1;-4) dB	
$C_{100\text{-}5000};C_{tr,100\text{-}5000}$	(0;-3) dB		(0;-2) dB		(0;-4) dB	
$C_{50\text{-}3150};C_{tr,50\text{-}3150}$	(-1;-7) dB		(-1;-4) dB		(-2;-8) dB	
$C_{50\text{-}5000};C_{tr,50\text{-}5000}$	(0;-7) dB		(0;-4) dB		(-1;-8) dB	

t4.3 Measurements results

	airborne sound insulation R_S[dB]					
joint width	10 mm		10 mm		10 mm	
sealant	FP401		FP402		FP403	
record nr.	#136		#129		#143	
see figure	6		7		8	
frequency [Hz]	1/3 oct.	1/1 oct.	1/3 oct.	1/1 oct.	1/3 oct.	1/1 oct.
50	26,6		25,9		27,2	
63	30,9	29,2	30,3	28,6	30,7	29,0
80	32,2		31,8		29,8	
100	38,1		36,7		37,6	
125	40,5	40,0	40,2	39,2	41,2	40,0
160	42,7		42,6		43,1	
200	42,2		42,4		43,0	
250	43,6	43,6	43,2	43,4	45,1	44,6
315	45,9		45,1		46,6	
400	48,7		45,5		48,4	
500	50,2	50,1	42,9	42,2	49,9	49,7
630	52,0		40,0		51,4	
800	51,5		37,7		51,3	
1000	52,0	52,0	40,9	40,6	52,0	51,6
1250	52,7		49,2		51,5	
1600	56,2		50,4		53,9	
2000	59,1	57,8	51,6	51,9	56,9	56,2
2500	58,6		55,0		59,9	
3150	60,5		57,9		62,6	
4000	62,4	62,1	59,2	59,7	64,3	64,6
5000	64,4		63,7		69,2	
$R_{s,w}(C;C_{tr})$	53(-1;-4) dB		46(-2;-4) dB		53(-1;-4) dB	
$C_{100\text{-}5000};C_{tr,100\text{-}5000}$	(0;-4) dB		(-1;-4) dB		(0;-4) dB	
$C_{50\text{-}3150};C_{tr,50\text{-}3150}$	(-1;-7) dB		(-2;-5) dB		(-2;-8) dB	
$C_{50\text{-}5000};C_{tr,50\text{-}5000}$	(0;-7) dB		(-1;-5) dB		(-1;-8) dB	

t4.4 Measurements results

	airborne sound insulation R_s [dB]					
joint width	15 mm		15 mm		15 mm	
sealant	FP401		FP402		FP403	
record nr.	#150		#164		#157	
see figure	9		10		11	
frequency [Hz]	1/3 oct.	1/1 oct.	1/3 oct.	1/1 oct.	1/3 oct.	1/1 oct.
50	26,7		26,8		26,6	28,8
63	31,3	29,2	30,5	29,1	30,5	
80	31,6		31,5		30,8	
100	39,4		38,2		38,0	40,1
125	41,5	41,2	40,5	40,1	40,6	
160	43,7		43,0		43,1	
200	43,7		43,0		43,6	44,7
250	45,5	45,2	44,5	44,2	44,8	
315	47,0		45,5		46,1	
400	48,8		44,5		48,2	48,5
500	49,0	49,1	42,2	40,7	48,6	
630	49,7		38,0		48,7	
800	50,1		42,3		47,9	48,6
1000	51,7	51,4	49,5	46,0	48,3	
1250	52,8		52,2		49,8	
1600	55,9		54,1		54,4	55,9
2000	58,4	57,6	54,6	55,0	56,3	
2500	59,4		56,6		57,5	
3150	61,4		58,7		61,0	63,3
4000	63,8	63,7	61,3	60,8	63,4	
5000	68,2		64,1		68,5	
$R_{s,w}(C;C_{tr})$	53(-1;-3) dB		48(-2;-3) dB		51(-1;-3) dB	
$C_{100\text{-}5000};C_{tr,100\text{-}5000}$	(0;-3) dB		(-1;-3) dB		(0;-3) dB	
$C_{50\text{-}3150};C_{tr,50\text{-}3150}$	(-1;-7) dB		(-2;-5) dB		(-1;-6) dB	
$C_{50\text{-}5000};C_{tr,50\text{-}5000}$	(0;-7) dB		(-1;-5) dB		(0;-6) dB	

t4.5 Measurements results

	airborne sound insulation R_s [dB]							
joint width	25 mm		25 mm		25 mm		0 mm	
sealant	FP401		FP402		FP403		max measurement set-up	
record nr.	#185		#171		#178		#108	
see figure	12		13		14		15	
frequency [Hz]	1/3 oct.	1/1 oct.	1/3 oct.	1/1 oct.	1/3 oct.	1/1 oct.	1/3 oct.	1/1 oct.
50	26,2		25,4		25,2		23,3	
63	29,5	27,4	28,7	27,9	30,5	28,4	28,9	26,6
80	27,2		32,2		33,4		32,7	
100	35,1		37,3		37,6		37,1	
125	40,6	38,0	39,0	39,1	40,5	39,8	42,0	40,0
160	41,1		42,5		43,0		43,5	
200	41,4		40,1		43,1		42,9	
250	43,1	42,9	43,2	41,9	45,4	44,8	43,9	44,0
315	44,7		43,1		46,5		45,5	
400	46,8		40,9		48,0		48,7	
500	48,2	47,8	45,7	43,2	47,2	47,2	51,2	50,7
630	48,7		44,5		46,4		53,3	
800	45,7		45,2		48,4		54,8	
1000	42,4	43,6	46,8	46,6	50,9	50,5	55,2	54,9
1250	43,3		48,6		53,9		54,6	
1600	49,3		50,5		56,3		54,6	
2000	54,8	52,7	50,9	51,2	57,7	57,8	55,0	55,1
2500	60,3		52,3		60,1		55,8	
3150	63,8		55,1		63,6		57,5	
4000	64,9	64,7	56,0	56,5	64,9	65,4	59,9	59,9
5000	65,7		59,6		69,4		66,0	
$R_{s,w}(C;C_{tr})$	49(-2;-4) dB		48(-1;-3) dB		52(-1;-4) dB		53(0;-3) dB	
$C_{100\text{-}5000};C_{tr,100\text{-}5000}$	(-1;-4) dB		(0;-3) dB		(0;-4) dB		(0;-3) dB	
$C_{50\text{-}3150};C_{tr,50\text{-}3150}$	(-2;-7) dB		(-1;-5) dB		(-1;-7) dB		(-1;-9) dB	
$C_{50\text{-}5000};C_{tr,50\text{-}5000}$	(-1;-7) dB		(0;-5) dB		(0;-7) dB		(0;-9) dB	

The results as presented here are based on a testing area of 2,2 x 0,05 m. In situations where different dimensions and/or method of mounting differ from the ones tested, different results may be found.

Mook,

Th. Scheers
Laboratory Supervisor

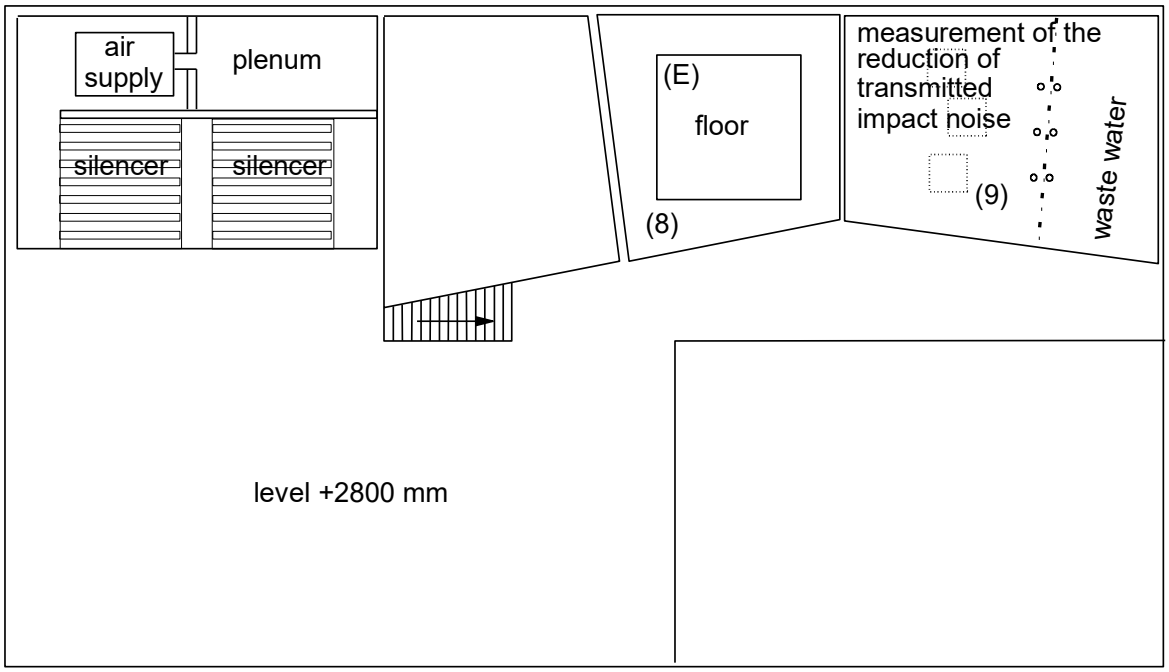
dr. ir. M.L.S. Vercammen
Manager

This report contains 16 pages, 15 figures and 1 Appendix.

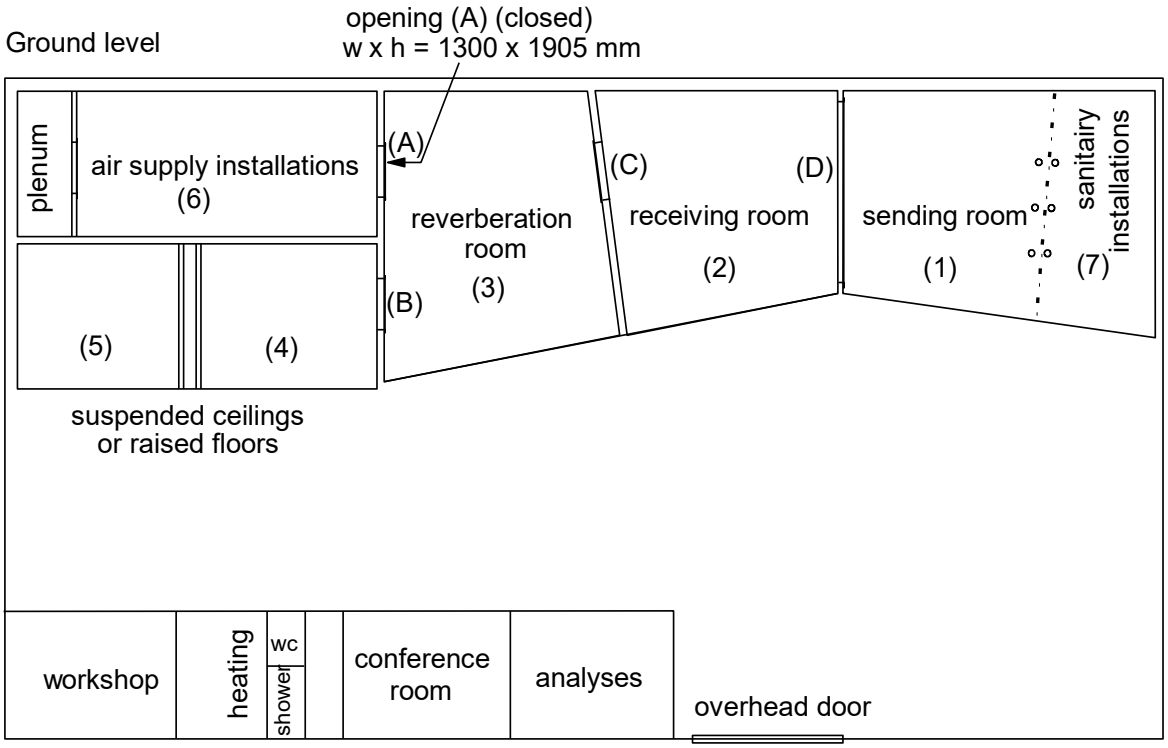
PEUTZ bv
Lindenlaan 41, NL-6584 AC MOLENHOEK (LB), THE NETHERLANDS

OVERVIEW

Story



Ground level



TEST OPENINGS (w x h in mm)
(B) 1000 x 2200
(C) 1500 x 1250
(D) 4300 x 2800
(E) 4000 x 4000

0 1 2 3 4 5 m
scale

PEUTZ bv
Lindenlaan 41, NL-6584 AC MOLENHOEK (LB), THE NETHERLANDS

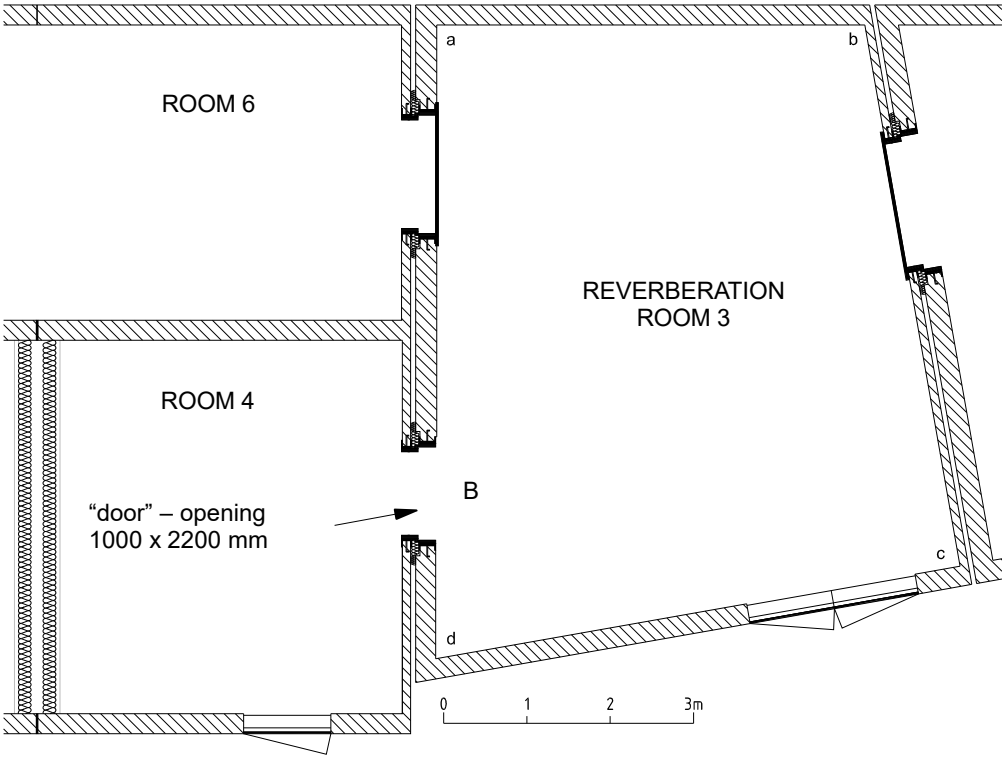
SOUND INSULATION TEST FACILITIES: DOOROPENING

the test rooms meet the requirements of ISO 10140-5.

additional data :

- volume of room (4) 68 m^3
- volume of the reverberation room (3) 214 m^3
- area of the test specimen 2.2 m^2

Both rooms are isolated for vibrations by using so called room-in-room construction.
Flanking transmission is thus minimised.



Vieuw from room 4

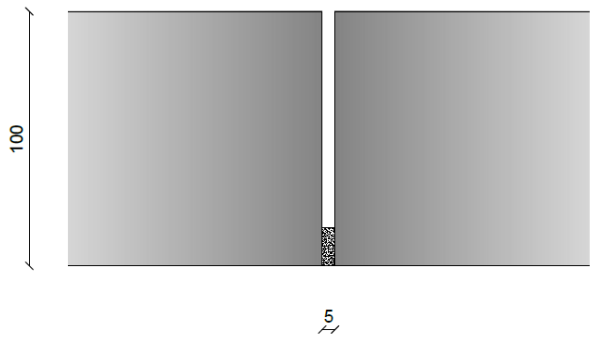
View from room 3

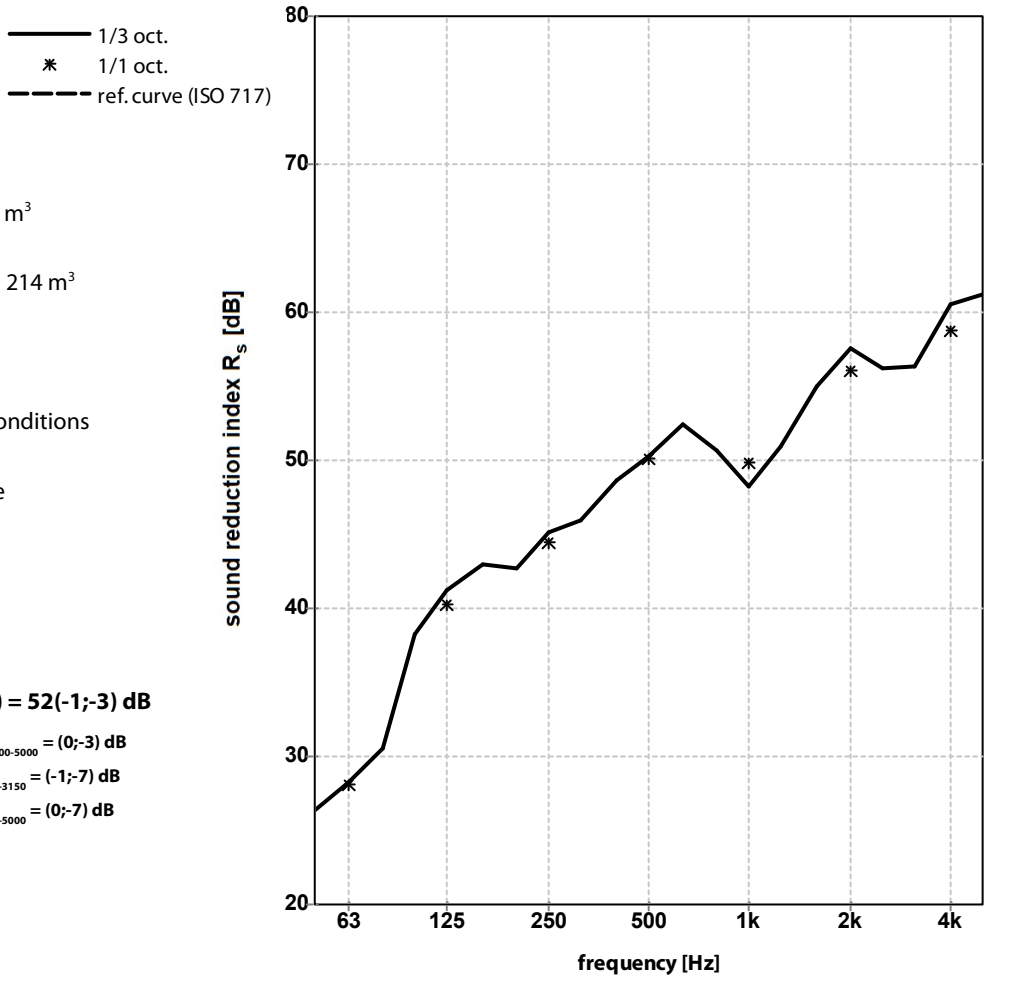
MEASUREMENT OF THE SOUND REDUCTION INDEX OF JOINTS
ACCORDING TO ISO 10140-1:2012

principal: Bostik B.V.

construction tested:

Joint Width = 5 mm
Bostik FP 401 sealant





volume source room: 54 m³

volume receiving room: 214 m³

length of joint: 2,2 m

measured at: practical conditions

signal: broad-band noise

bandwidth: 1/3 octave

ISO 717-1:2013

$R_{s,w}(C;C_{tr}) = 52(-1;-3)$ dB

$C_{100\text{-}5000};C_{tr,100\text{-}5000} = (0;-3)$ dB

$C_{50\text{-}3150};C_{tr,50\text{-}3150} = (-1;-7)$ dB

$C_{50\text{-}5000};C_{tr,50\text{-}5000} = (0;-7)$ dB

	63	125	250	500	1k	2k	4k	
1/1 oct.	28,1	40,3	44,4	50,2	49,8	56,1	58,8	dB

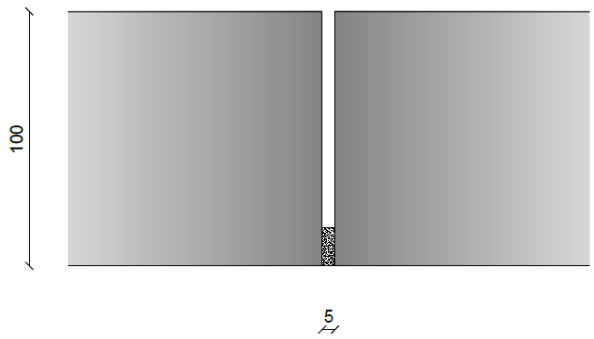
26-11-2018

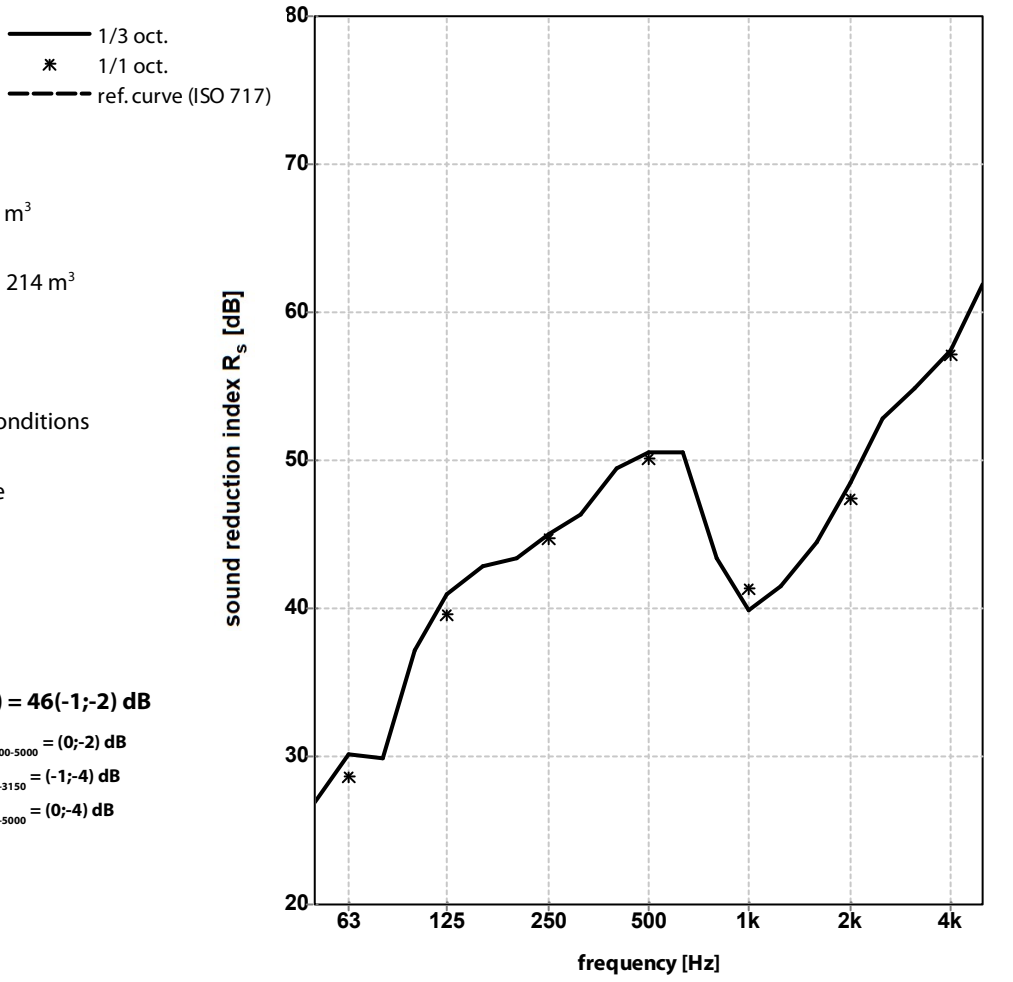
MEASUREMENT OF THE SOUND REDUCTION INDEX OF JOINTS
ACCORDING TO ISO 10140-1:2012

principal: Bostik B.V.

construction tested:

Joint Width = 5 mm
Bostik FP402 sealant





volume source room: 54 m^3

volume receiving room: 214 m^3

length of joint: 2,2 m

measured at: practical conditions

signal: broad-band noise

bandwidth: 1/3 octave

ISO 717-1:2013

$R_{s,w}(C;C_{tr}) = 46(-1;-2)$ dB

$C_{100\text{-}5000};C_{tr,100\text{-}5000} = (0;-2)$ dB

$C_{50\text{-}3150};C_{tr,50\text{-}3150} = (-1;-4)$ dB

$C_{50\text{-}5000};C_{tr,50\text{-}5000} = (0;-4)$ dB

	63	125	250	500	1k	2k	4k	
1/1 oct.	28,7	39,6	44,7	50,2	41,4	47,4	57,2	dB

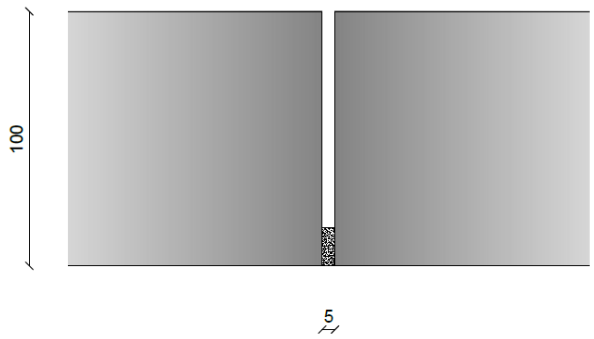
26-11-2018

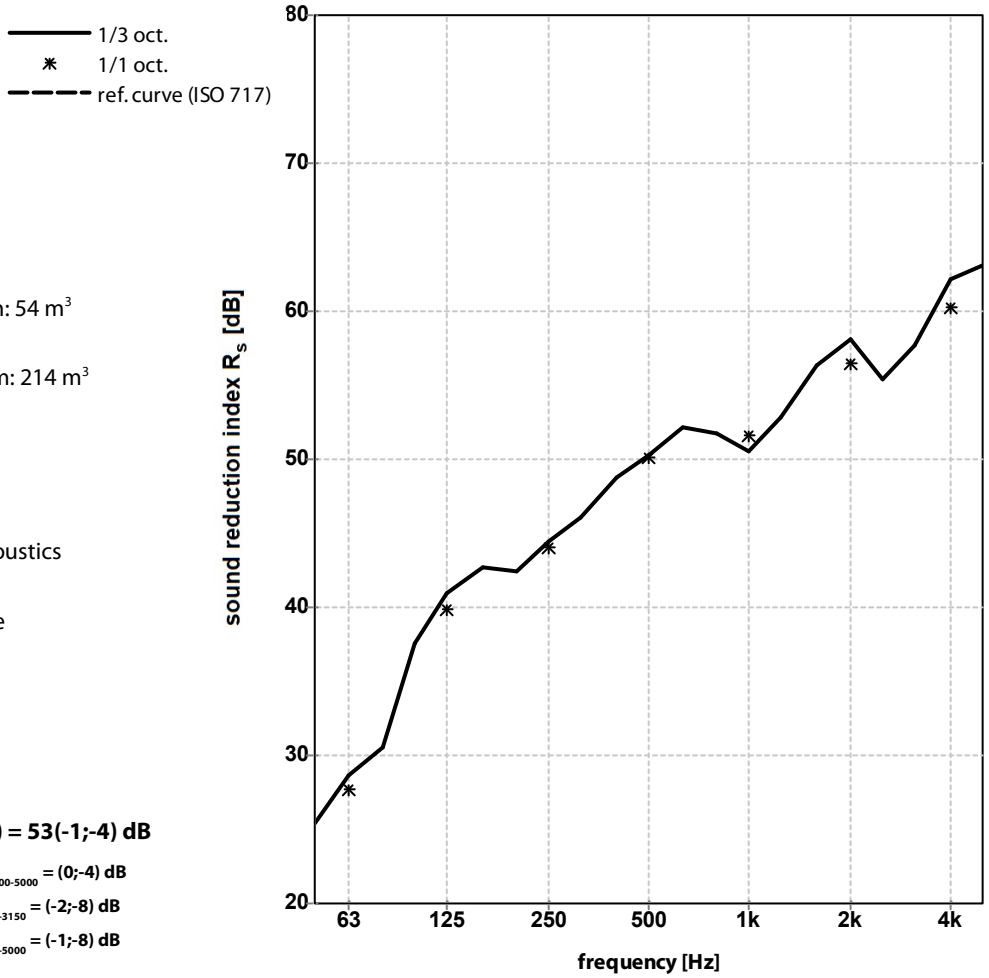
MEASUREMENT OF THE SOUND REDUCTION INDEX OF JOINTS
ACCORDING TO ISO 10140-1:2012

principal: Bostik B.V.

construction tested:

Joint Width = 5 mm
Bostik FP403 sealant





volume measuring room: 54 m³

volume measuring room: 214 m³

length of joint: 2,2 m

measured at:
Peutz Laboratory for Acoustics

signal: broad-band noise

bandwidth: 1/3 octave

ISO 717-1:2013

$R_{s,w}(C;C_{tr}) = 53(-1;-4)$ dB

$C_{100\text{-}5000};C_{tr,100\text{-}5000} = (0;-4)$ dB

$C_{50\text{-}3150};C_{tr,50\text{-}3150} = (-2;-8)$ dB

$C_{50\text{-}5000};C_{tr,50\text{-}5000} = (-1;-8)$ dB

	25,4	37,6	42,5	48,8	51,7	56,3	57,7
1/3 oct.	28,7	40,9	44,4	50,3	50,6	58,1	62,2 dB
	30,5	42,7	46,1	52,2	52,8	55,4	63,1
1/1 oct.	**27,7**	**39,9**	**44,1**	**50,2**	**51,6**	**56,5**	**60,3 dB**

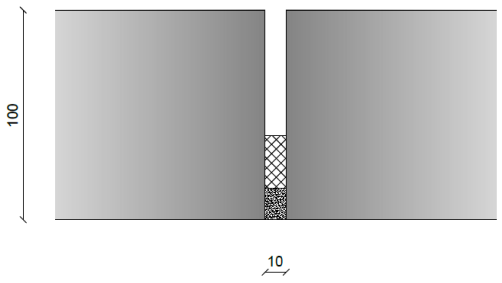
Mook, 26-11-2013

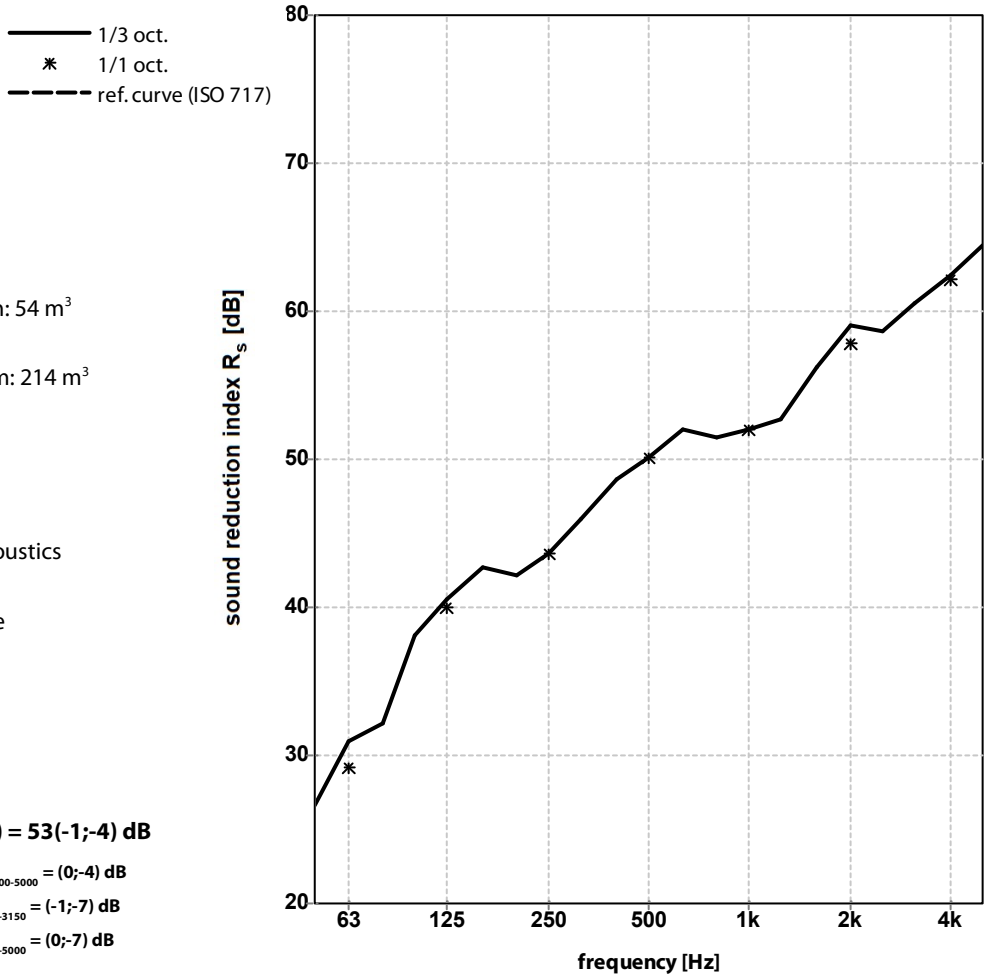
MEASUREMENT OF THE SOUND REDUCTION INDEX OF JOINTS
ACCORDING TO ISO 10140-1:2012

principal: Bostik B.V.

construction tested:

Joint Width = 10 mm
Bostik FP401 sealant





volume measuring room: 54 m³

volume measuring room: 214 m³

length of joint: 2,2 m

measured at:
Peutz Laboratory for Acoustics

signal: broad-band noise

bandwidth: 1/3 octave

ISO 717-1:2013

$R_{s,w}(C;C_{tr}) = 53(-1;-4)$ dB

$C_{100\text{-}5000};C_{tr,100\text{-}5000} = (0;-4)$ dB

$C_{50\text{-}3150};C_{tr,50\text{-}3150} = (-1;-7)$ dB

$C_{50\text{-}5000};C_{tr,50\text{-}5000} = (0;-7)$ dB

	26,6	38,1	42,2	48,7	51,5	56,2	60,5
1/3 oct.	30,9	40,5	43,6	50,2	52,0	59,1	62,4 dB
	32,2	42,7	45,9	52,0	52,7	58,6	64,4
1/1 oct.	**29,2**	**40,0**	**43,6**	**50,1**	**52,0**	**57,8**	**62,1 dB**

publication is permitted for the entire page only

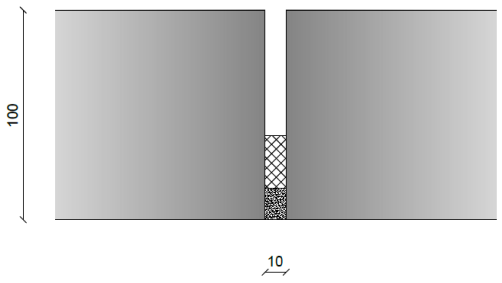
Mook, 26-11-2018

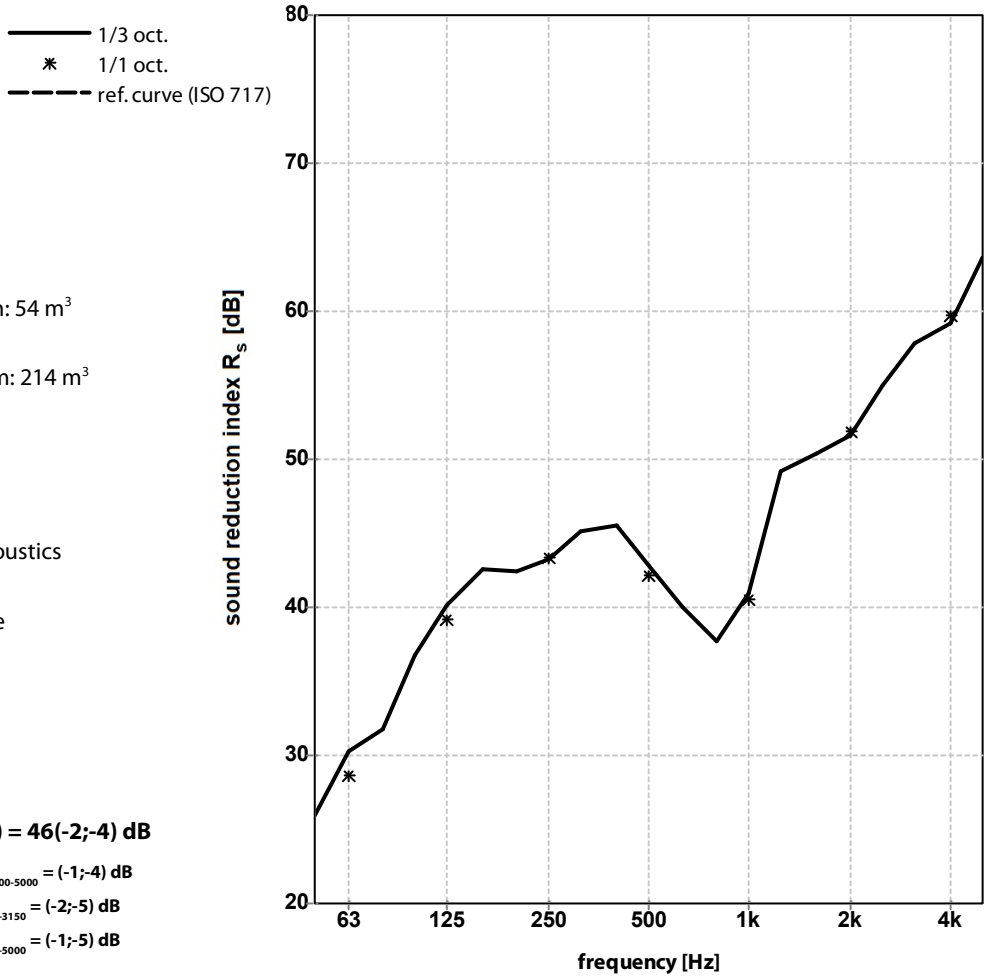
MEASUREMENT OF THE SOUND REDUCTION INDEX OF JOINTS
ACCORDING TO ISO 10140-1:2012

principal: Bostik B.V.

construction tested:

Joint Width = 10 mm
Bostik FP402 sealant





volume measuring room: 54 m³

volume measuring room: 214 m³

length of joint: 2,2 m

measured at:
Peutz Laboratory for Acoustics

signal: broad-band noise

bandwidth: 1/3 octave

ISO 717-1:2013

$R_{s,w}(C;C_{tr}) = 46(-2;-4)$ dB

$C_{100\text{-}5000};C_{tr,100\text{-}5000} = (-1;-4)$ dB

$C_{50\text{-}3150};C_{tr,50\text{-}3150} = (-2;-5)$ dB

$C_{50\text{-}5000};C_{tr,50\text{-}5000} = (-1;-5)$ dB

	25,9	36,7	42,4	45,5	37,7	50,4	57,9
1/3 oct.	30,3	40,2	43,2	42,9	40,9	51,6	59,2 dB
	31,8	42,6	45,1	40,0	49,2	55,0	63,7
1/1 oct.	**28,6**	**39,2**	**43,4**	**42,2**	**40,6**	**51,9**	**59,7 dB**

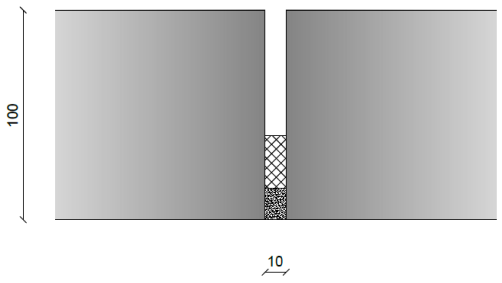
Mook, 26-11-2018

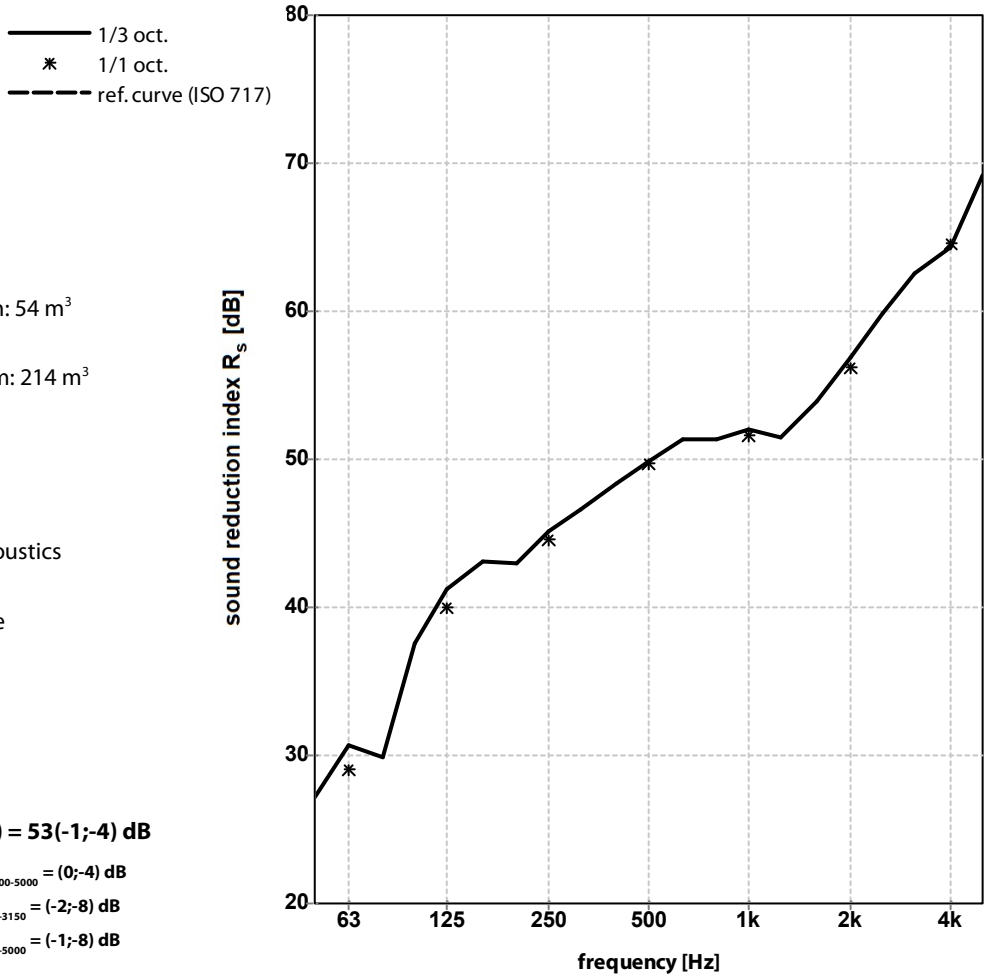
MEASUREMENT OF THE SOUND REDUCTION INDEX OF JOINTS
ACCORDING TO ISO 10140-1:2012

principal: Bostik B.V.

construction tested:

Joint Width = 10 mm
Bostik FP403 sealant





volume measuring room: 54 m³

volume measuring room: 214 m³

length of joint: 2,2 m

measured at:
Peutz Laboratory for Acoustics

signal: broad-band noise

bandwidth: 1/3 octave

ISO 717-1:2013

$R_{s,w}(C;C_{tr}) = 53(-1;-4)$ dB

$C_{100\text{-}5000};C_{tr,100\text{-}5000} = (0;-4)$ dB

$C_{50\text{-}3150};C_{tr,50\text{-}3150} = (-2;-8)$ dB

$C_{50\text{-}5000};C_{tr,50\text{-}5000} = (-1;-8)$ dB

	27,2	37,6	43,0	48,4	51,3	53,9	62,6
1/3 oct.	30,7	41,2	45,1	49,9	52,0	56,9	64,3 dB
	29,8	43,1	46,6	51,4	51,5	59,9	69,2
1/1 oct.	**29,0**	**40,0**	**44,6**	**49,7**	**51,6**	**56,2**	**64,6 dB**

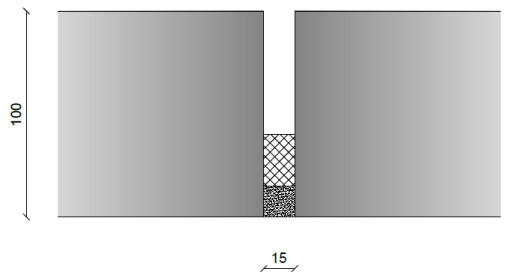
Mook, 26-11-2018

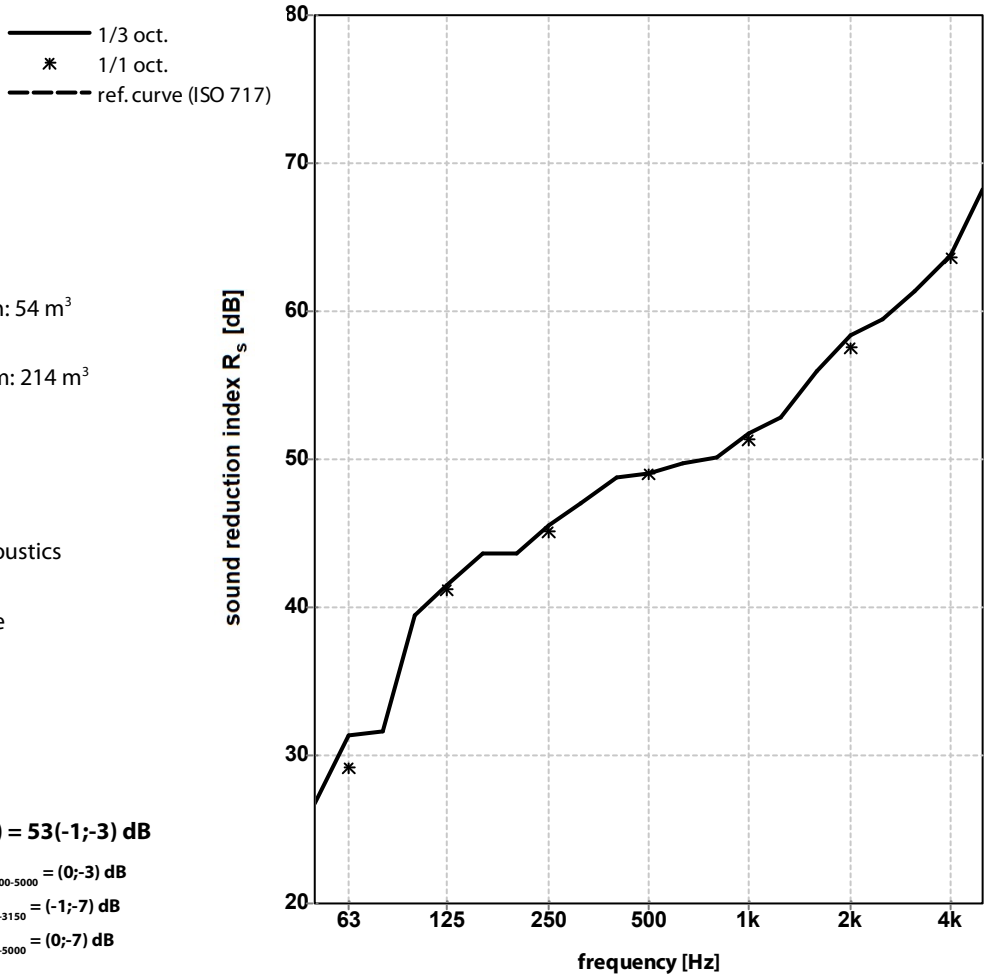
MEASUREMENT OF THE SOUND REDUCTION INDEX OF JOINTS
ACCORDING TO ISO 10140-1:2012

principal: Bostik B.V.

construction tested:

Joint Width = 15 mm
Bostik FP401 sealant





volume measuring room: 54 m³

volume measuring room: 214 m³

length of joint: 2,2 m

measured at:
Peutz Laboratory for Acoustics

signal: broad-band noise

bandwidth: 1/3 octave

ISO 717-1:2013

$R_{s,w}(C;C_{tr}) = 53(-1;-3)$ dB

$C_{100\text{-}5000};C_{tr,100\text{-}5000} = (0;-3)$ dB

$C_{50\text{-}3150};C_{tr,50\text{-}3150} = (-1;-7)$ dB

$C_{50\text{-}5000};C_{tr,50\text{-}5000} = (0;-7)$ dB

	26,7	39,4	43,7	48,8	50,1	55,9	61,4
1/3 oct.	31,3	41,5	45,5	49,0	51,7	58,4	63,8 dB
	31,6	43,7	47,0	49,7	52,8	59,4	68,2
1/1 oct.	**29,2**	**41,2**	**45,2**	**49,1**	**51,4**	**57,6**	**63,7 dB**

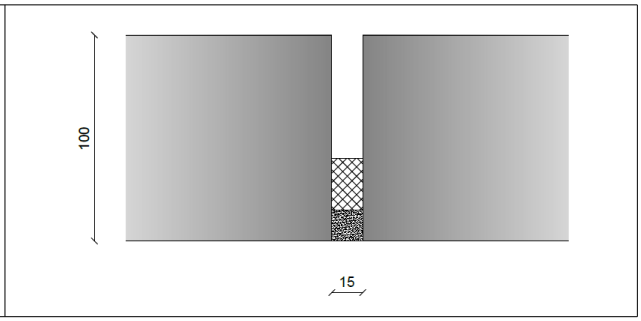
Mook, 26-11-2018

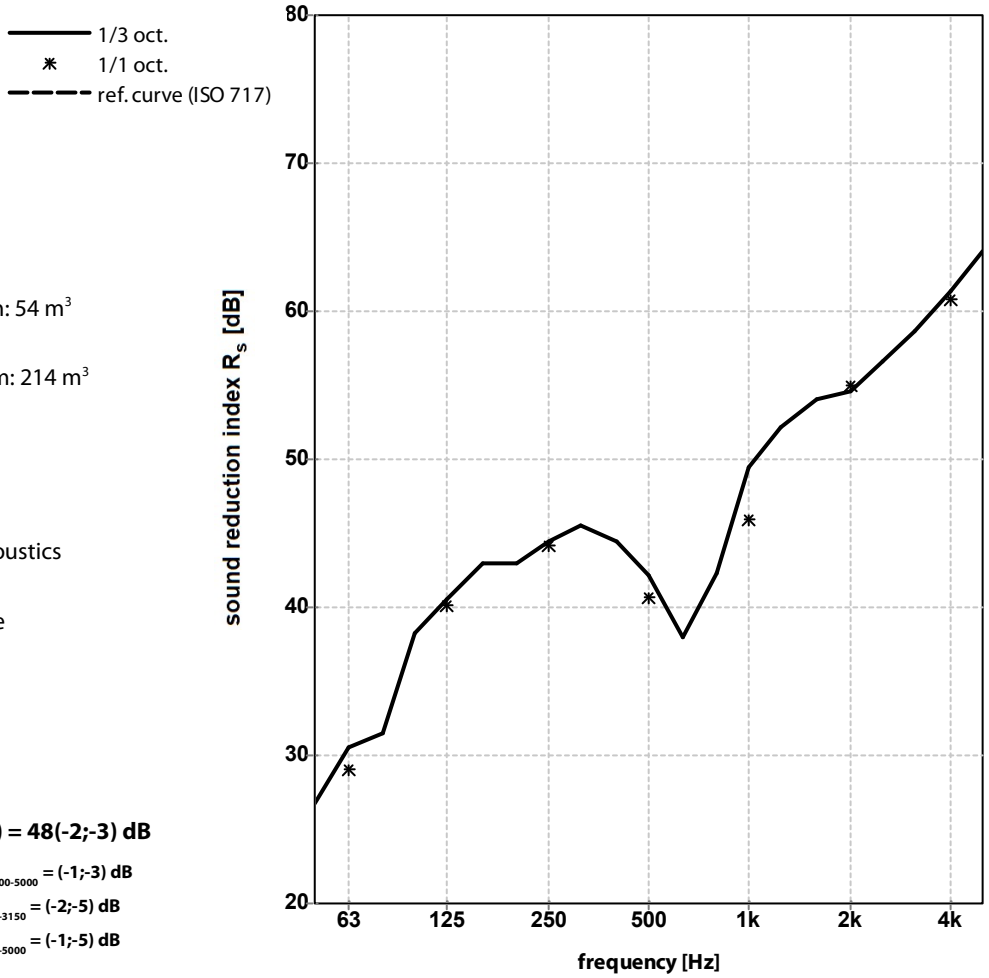
MEASUREMENT OF THE SOUND REDUCTION INDEX OF JOINTS
ACCORDING TO ISO 10140-1:2012

principal: Bostik B.V.

construction tested:

Joint Width = 15 mm
Bostik FP402 sealant





volume measuring room: 54 m³

volume measuring room: 214 m³

length of joint: 2,2 m

measured at:
Peutz Laboratory for Acoustics

signal: broad-band noise

bandwidth: 1/3 octave

ISO 717-1:2013

$R_{s,w}(C;C_{tr}) = 48(-2;-3)$ dB

$C_{100\text{-}5000};C_{tr,100\text{-}5000} = (-1;-3)$ dB

$C_{50\text{-}3150};C_{tr,50\text{-}3150} = (-2;-5)$ dB

$C_{50\text{-}5000};C_{tr,50\text{-}5000} = (-1;-5)$ dB

	26,8	38,2	43,0	44,5	42,3	54,1	58,7
1/3 oct.	30,5	40,5	44,5	42,2	49,5	54,6	61,3 dB
	31,5	43,0	45,5	38,0	52,2	56,6	64,1
1/1 oct.	**29,1**	**40,1**	**44,2**	**40,7**	**46,0**	**55,0**	**60,8 dB**

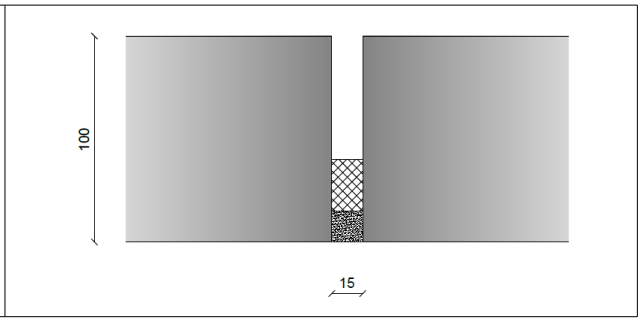
Mook, 26-11-2018

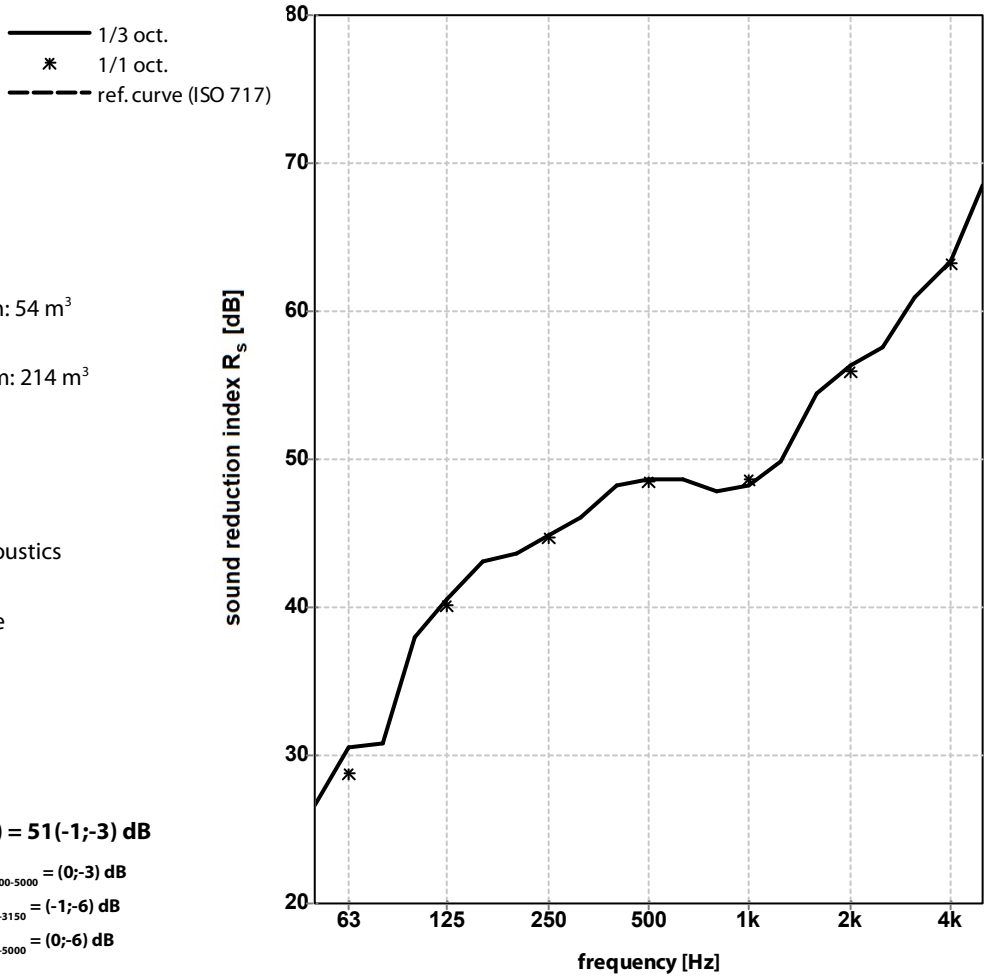
MEASUREMENT OF THE SOUND REDUCTION INDEX OF JOINTS
ACCORDING TO ISO 10140-1:2012

principal: Bostik B.V.

construction tested:

Joint Width = 15 mm
Bostik FP403 sealant





volume measuring room: 54 m³

volume measuring room: 214 m³

length of joint: 2,2 m

measured at:
Peutz Laboratory for Acoustics

signal: broad-band noise

bandwidth: 1/3 octave

ISO 717-1:2013

$R_{s,w}(C;C_{tr}) = 51(-1;-3)$ dB

$C_{100\text{-}5000};C_{tr,100\text{-}5000} = (0;-3)$ dB

$C_{50\text{-}3150};C_{tr,50\text{-}3150} = (-1;-6)$ dB

$C_{50\text{-}5000};C_{tr,50\text{-}5000} = (0;-6)$ dB

	26,6	38,0	43,6	48,2	47,9	54,4	61,0
1/3 oct.	30,5	40,6	44,8	48,6	48,3	56,3	63,4 dB
	30,8	43,1	46,1	48,7	49,8	57,5	68,5
1/1 oct.	**28,8**	**40,1**	**44,7**	**48,5**	**48,6**	**55,9**	**63,3 dB**

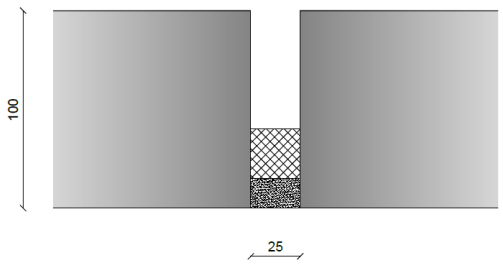
Mook, 26-11-2018

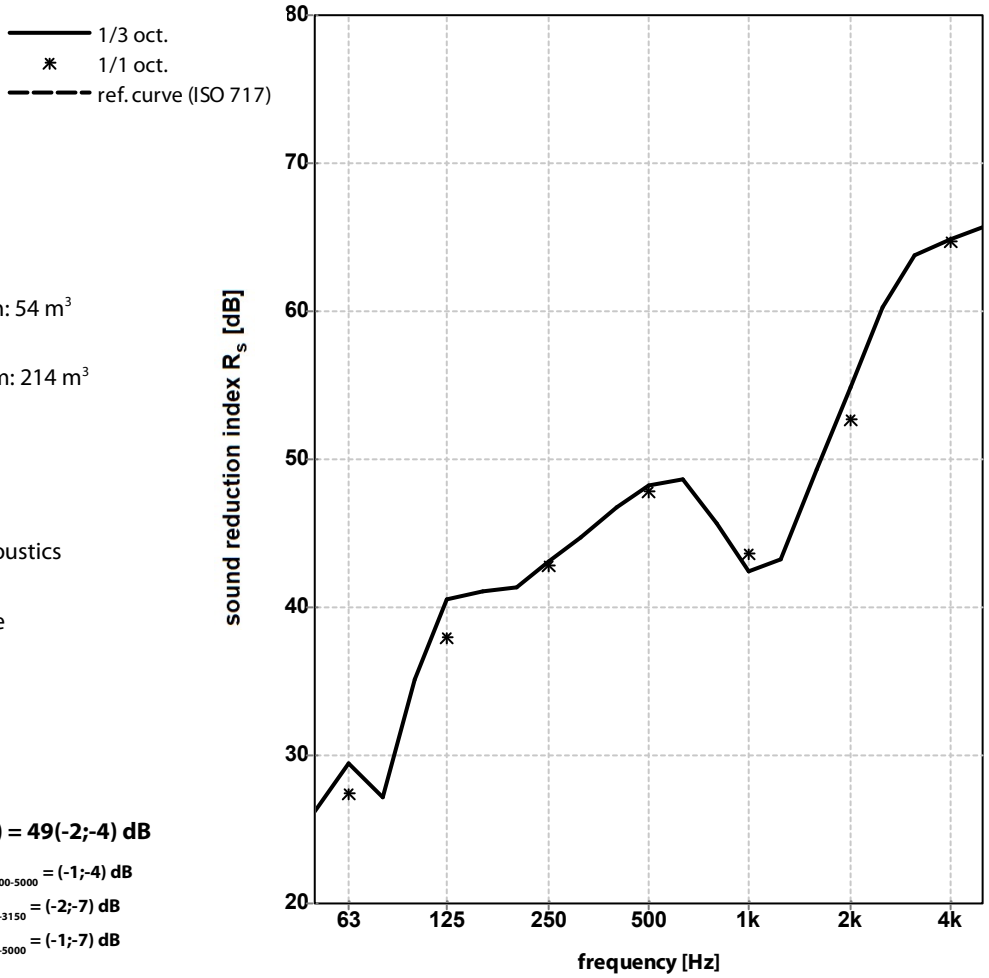
MEASUREMENT OF THE SOUND REDUCTION INDEX OF JOINTS
ACCORDING TO ISO 10140-1:2012

principal: Bostik B.V.

construction tested:

Joint Width = 25 mm
Bostik FP401 sealant





volume measuring room: 54 m³

volume measuring room: 214 m³

length of joint: 2,2 m

measured at:
Peutz Laboratory for Acoustics

signal: broad-band noise

bandwidth: 1/3 octave

ISO 717-1:2013

$R_{s,w}(C;C_{tr}) = 49(-2;-4)$ dB

$C_{100\text{-}5000};C_{tr,100\text{-}5000} = (-1;-4)$ dB

$C_{50\text{-}3150};C_{tr,50\text{-}3150} = (-2;-7)$ dB

$C_{50\text{-}5000};C_{tr,50\text{-}5000} = (-1;-7)$ dB

	26,2	35,1	41,4	46,8	45,7	49,3	63,8
1/3 oct.	29,5	40,6	43,1	48,2	42,4	54,8	64,9 dB
	27,2	41,1	44,7	48,7	43,3	60,3	65,7
1/1 oct.	**27,4**	**38,0**	**42,9**	**47,8**	**43,6**	**52,7**	**64,7 dB**

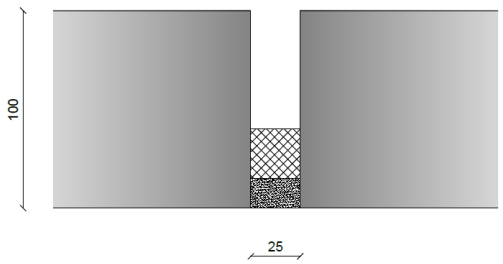
Mook, 26-11-2018

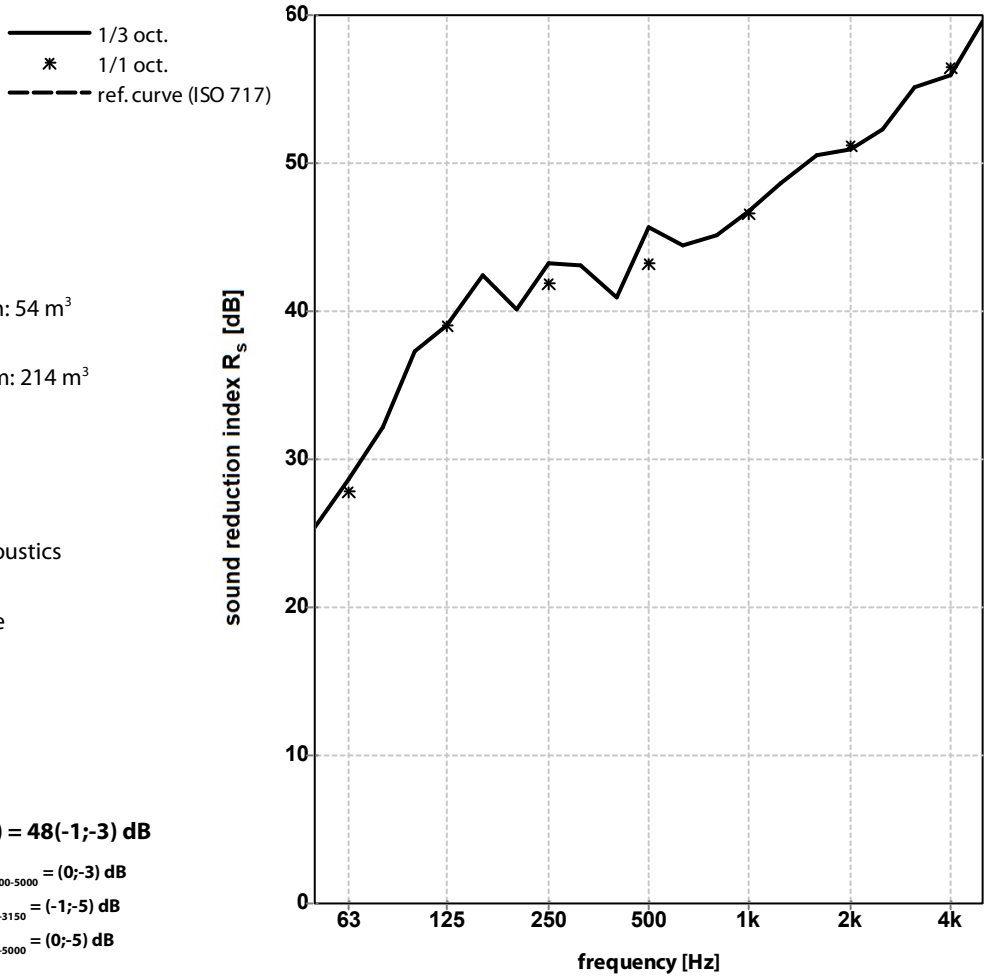
MEASUREMENT OF THE SOUND REDUCTION INDEX OF JOINTS
ACCORDING TO ISO 10140-1:2012

principal: Bostik B.V.

construction tested:

Joint Width = 25 mm
Bostik FP402 sealant





volume measuring room: 54 m³

volume measuring room: 214 m³

length of joint: 2,2 m

measured at:
Peutz Laboratory for Acoustics

signal: broad-band noise

bandwidth: 1/3 octave

ISO 717-1:2013

$R_{s,w}(C;C_{tr}) = 48(-1;-3)$ dB

$C_{100\text{-}5000};C_{tr,100\text{-}5000} = (0;-3)$ dB

$C_{50\text{-}3150};C_{tr,50\text{-}3150} = (-1;-5)$ dB

$C_{50\text{-}5000};C_{tr,50\text{-}5000} = (0;-5)$ dB

	25,4	37,3	40,1	40,9	45,2	50,5	55,1	
1/3 oct.	28,7	39,0	43,2	45,7	46,8	50,9	56,0	dB
	32,2	42,5	43,1	44,5	48,6	52,3	59,6	
1/1 oct.	**27,9**	**39,1**	**41,9**	**43,2**	**46,6**	**51,2**	**56,5**	**dB**

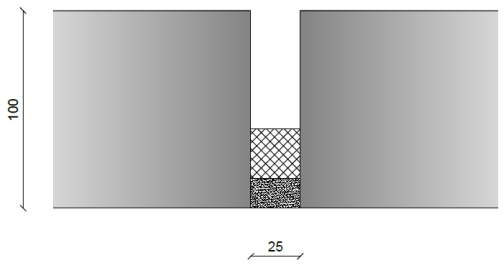
Mook, 26-11-2018

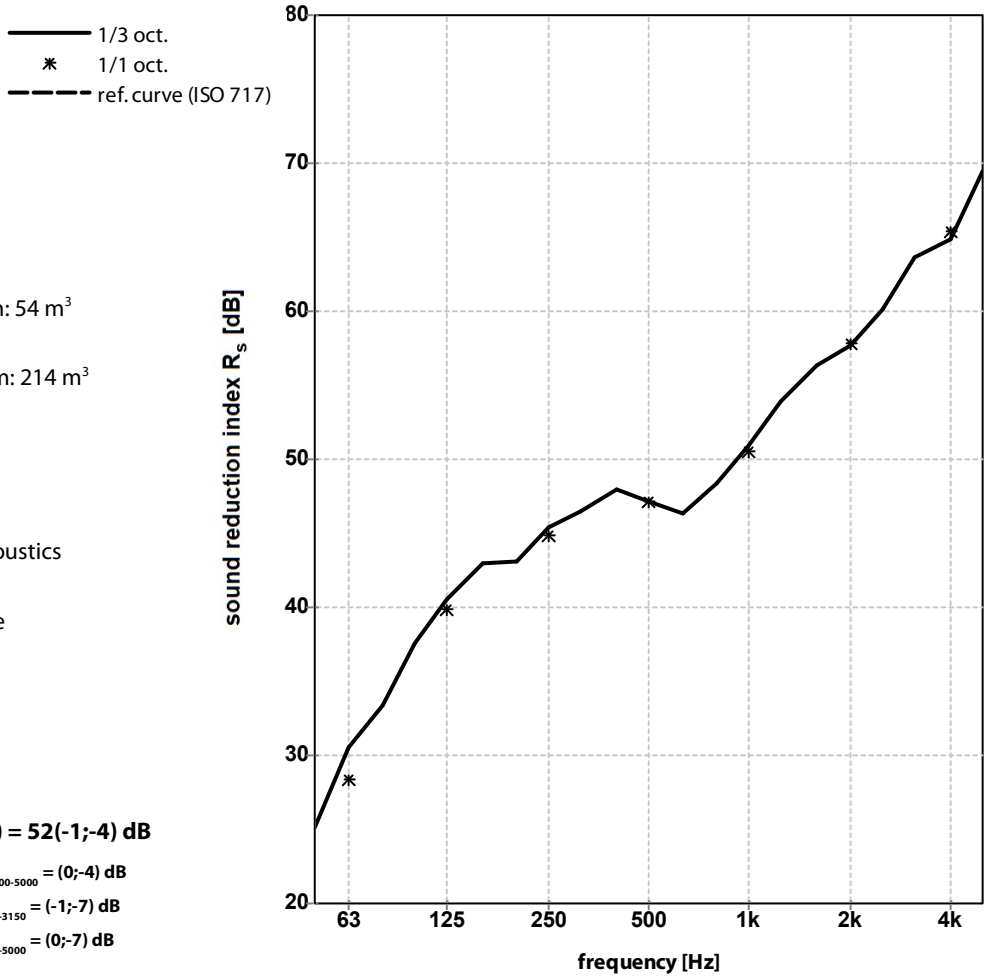
MEASUREMENT OF THE SOUND REDUCTION INDEX OF JOINTS
ACCORDING TO ISO 10140-1:2012

principal: Bostik B.V.

construction tested:

Joint Width = 25 mm
Bostik FP403 sealant





volume measuring room: 54 m³

volume measuring room: 214 m³

length of joint: 2,2 m

measured at:
Peutz Laboratory for Acoustics

signal: broad-band noise

bandwidth: 1/3 octave

ISO 717-1:2013

$R_{s,w}(C;C_{tr}) = 52(-1;-4)$ dB

$C_{100\text{-}5000};C_{tr,100\text{-}5000} = (0;-4)$ dB

$C_{50\text{-}3150};C_{tr,50\text{-}3150} = (-1;-7)$ dB

$C_{50\text{-}5000};C_{tr,50\text{-}5000} = (0;-7)$ dB

	25,2	37,6	43,1	48,0	48,4	56,3	63,6
1/3 oct.	30,5	40,5	45,4	47,2	50,9	57,7	64,9 dB
	33,4	43,0	46,5	46,4	53,9	60,1	69,4
1/1 oct.	**28,4**	**39,8**	**44,8**	**47,2**	**50,5**	**57,8**	**65,4 dB**

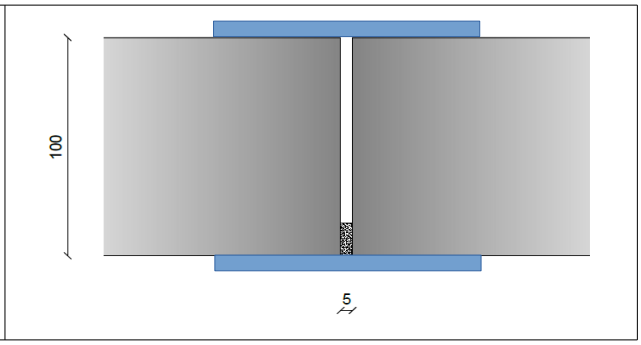
Mook, 26-11-2018

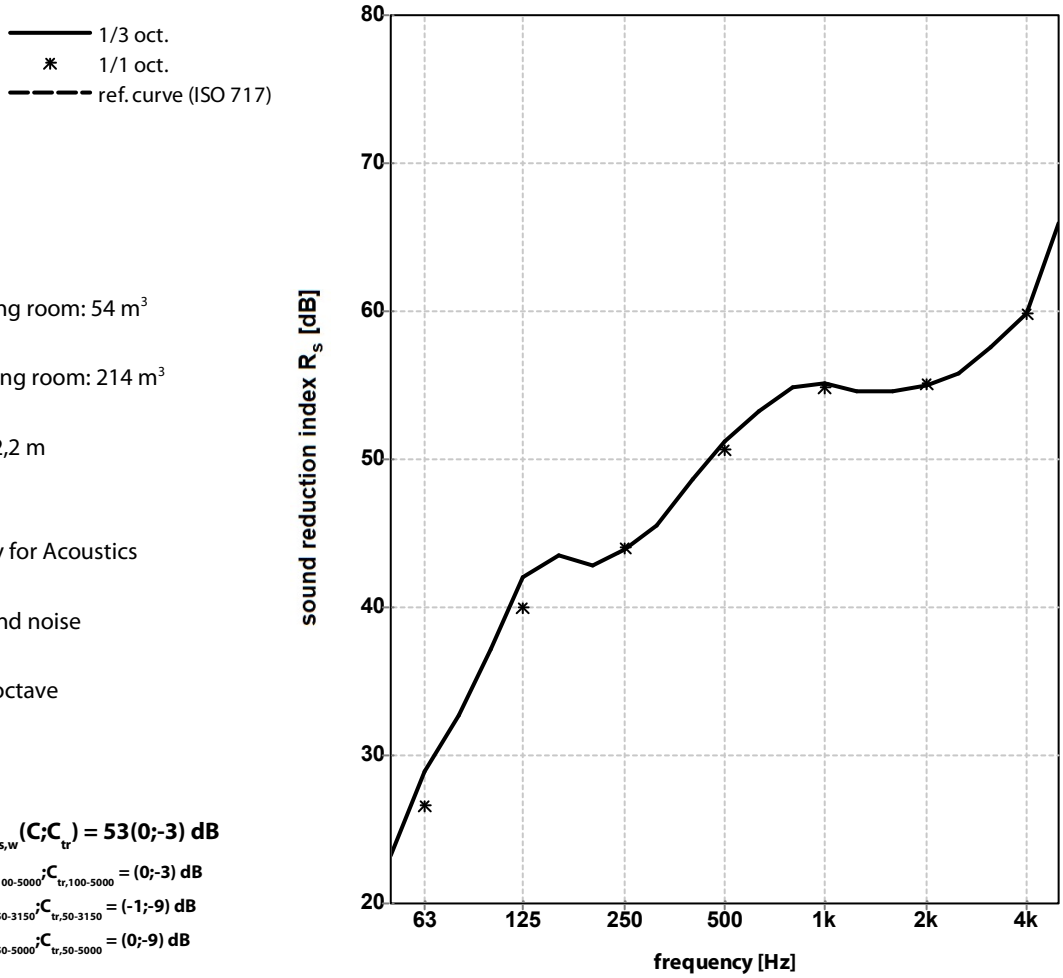
MEASUREMENT OF THE SOUND REDUCTION INDEX OF JOINTS
ACCORDING TO ISO 10140-1:2012

principal: Bostik B.V.

construction tested: Maximum sound isnlation of the measurements set-up

Joint Width = 0 mm





volume measuring room: 54 m³

volume measuring room: 214 m³

length of joint: 2,2 m

measured at:
Peutz Laboratory for Acoustics

signal: broad-band noise

bandwidth: 1/3 octave

ISO 717-1:2013

$R_{s,w}(C;C_{tr}) = 53(0;-3)$ dB

$C_{100\text{-}5000};C_{tr,100\text{-}5000} = (0;-3)$ dB

$C_{50\text{-}3150};C_{tr,50\text{-}3150} = (-1;-9)$ dB

$C_{50\text{-}5000};C_{tr,50\text{-}5000} = (0;-9)$ dB

	23,3	37,1	42,9	48,7	54,8	54,6	57,5
1/3 oct.	28,9	42,0	43,9	51,2	55,2	55,0	59,9 dB
	32,7	43,5	45,5	53,3	54,6	55,8	66,0
1/1 oct.	**26,6**	**40,0**	**44,0**	**50,7**	**54,9**	**55,1**	**59,9 dB**

Mook, 23-11-2018

Appendix

Quantities

The determined prime quantity is the sound reduction index of joints, R_s per metre of a sealed gap or joint. This quantity is evaluated from Equation (J.1) of Annex J of ISO 10140-1:2016.

$$R_s = L_1 - L_2 + 10\ lg\left(\frac{(S_n l)}{(A l_n)}\right) \quad \text{(J.1)}$$

where :

L_1 = the energy average sound pressure level in the source room [dB]
L_2 = the energy average sound pressure level in the receiving room [dB]
l = the length of the joint (l = 2,2 m) in the used measurement set up [m]
l_n = reference length (l_n = 1 m) [m]
S_n = reference area (S_n= 1 m^2) [m^2]
A = equivalent absorption area in the receiving room [m^2]

The single number ratings ($R_{S,w}$) are determined in accordance with ISO 717-1. The results are summarized in Table 1. In this table some additional single-number values are given, first being the element-normalized level difference $D_{n,e,w}$ which is often used for sound transmission through small technical elements evaluated from Equation (5) from ISO 10140-2:2010

$$D_{n,e} = L_1 - L_2 + 10\ lg\left(\frac{A_0}{A}\right) \quad \text{(5)}$$

where :

L_1, L_2 and A are the same as in equation (J.1)
A_0 = the reference absorption area (here A_0 = 10 m^2)

Further the sound reduction index R_w is given in table 1 , evaluated from Equation (2) from ISO 10140-2:2010

$$R = L_1 - L_2 + 10\ lg\left(\frac{S}{A}\right) \quad \text{(2)}$$

where :

L_1, L_2 and A are the same as in equation (J.1)
S = the free area of the joint (width x length) in which the tested joint filler is installed

Results

t1 Measurement / calculation results

variant	width of the joint	tested sealant	$R_{s,w}$	$D_{n,e,w}$	R_W
1	5 mm	FP 401	52 dB	59 dB	29 dB
2	5 mm	FP 402	46 dB	53 dB	23 dB
3	5 mm	FP 403	53 dB	60 dB	30 dB
4	10 mm	FP 401	53 dB	60 dB	33 dB
5	10 mm	FP 402	46 dB	53 dB	26 dB
6	10 mm	FP 403	53 dB	60 dB	33 dB
7	15 mm	FP 401	53 dB	60 dB	35 dB
8	15 mm	FP 402	48 dB	55 dB	30 dB
9	15 mm	FP 403	51 dB	58 dB	33 dB
10	25 mm	FP 401	49 dB	56 dB	33 dB
11	25 mm	FP 402	48 dB	55 dB	32 dB
12	25 mm	FP 403	52 dB	59 dB	36 dB
0	-	maximum	53 dB	60 dB	-