



## **Laboratory for Acoustics**

*Determination of the sound insulation of a steel-stud partition wall provided with electrical mounting boxes manufacturer Attema*



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|                |                                                                            |
|----------------|----------------------------------------------------------------------------|
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## Table of contents

|                                                      |           |
|------------------------------------------------------|-----------|
| <b>1 Introduction</b>                                | <b>4</b>  |
| <b>2 Standards and guidelines</b>                    | <b>5</b>  |
| <b>3 Tested construction</b>                         | <b>6</b>  |
| <b>4 Measurements</b>                                | <b>10</b> |
| 4.1 Method                                           | 10        |
| 4.2 Accuracy                                         | 10        |
| 4.2.1 Repeatability r                                | 10        |
| 4.2.2 Reproducibility R                              | 11        |
| 4.3 Environmental conditions during the measurements | 11        |
| 4.4 Results                                          | 11        |

## 1 Introduction

At the request of Attema based at Gorinchem (the Netherlands) sound insulation measurements have been carried out on:

**a steel-stud partition wall provided with  
electrical mounting boxes  
manufacturer Attema**

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



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: European Accreditation Organisation MultiLateral Agreement**: <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  
N.B.                      The standard ISO 10140-2 is in all countries of the EU accepted as European Standard EN ISO 10140-2:2010

Various other related norms:

ISO 10140-1:2016      Acoustics - Laboratory measurements of sound insulation of building elements – Part 1: Application rules for specific products  
N.B.                      The standard ISO 10140-1 is in all countries of the EU accepted as European Standard EN ISO 10140-1:2016

ISO 10140-4:2010      Acoustics - Laboratory measurements of sound insulation of building elements – Part 4: Measurement procedures and requirements  
N.B.                      The standard ISO 10140-4 is in all countries of the EU accepted as European Standard EN ISO 10140-4:2010

ISO 10140-5:2010/A1:2014  
N.B.                      Acoustics - Laboratory measurements of sound insulation of building elements – Part 5: Requirements for test facilities and equipment  
The standard ISO 10140-5 is in all countries of the EU accepted as European Standard EN ISO 10140-5:2010

ISO 140-2:1991/Cor 1:1993  
N.B.                      Acoustics - Measurement of sound insulation of building elements - Part 2: Determination, verification and application of precision data  
The standard ISO 140-2 is accepted as European Standard EN 20140-2:1993 in all countries of the EG

ISO 717-1:2013              Acoustics - Rating of sound insulation in buildings and of building elements - Part 1: Airborne sound insulation  
N.B.                      The standard ISO 717-1:2013 is in all countries of the EU accepted as European Standard EN ISO 717-1:2013

### 3 Tested construction

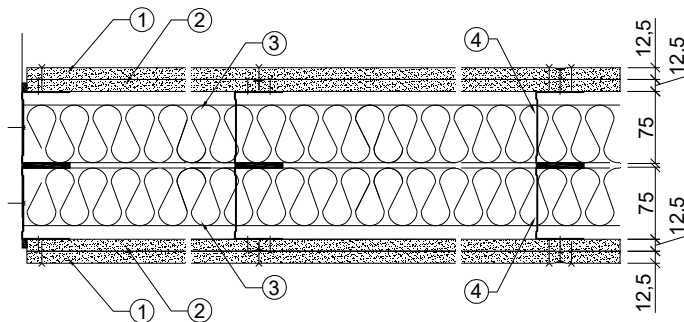
The following data have been provided by the principal, supplemented by observations in the laboratory where applicable.

In the test opening D (c. 4300 x 2800 mm) between testing rooms 1 and 2 a double frame gypsum partition wall is build. Built-up (see also figure 1, page 6);

- 1 x 12,5 mm Duragyp; manufacturer Gyproc; mass approximately 12,0 kg/m<sup>2</sup>;
- 1 x 12,5 mm A-plate; manufacturer Gyproc; mass approximately 9,4 kg/m<sup>2</sup>;
- CW 75 mm metal studs c.t.c. 600 mm foresee with 60 mm mineral wool;
- approximately 10 mm air gap;
- CW 75 mm metal studs c.t.c. 600 mm foresee with 60 mm mineral wool;
- 1 x 12,5 mm A-plate; manufacturer Gyproc; mass approximately 9,4 kg/m<sup>2</sup>;
- 1 x 12,5 mm Duragyp; manufacturer Gyproc; mass approximately 12,0 kg/m<sup>2</sup>;

The joints between the wall boards and the perimeter is sealed with an acrylic sealant. See figure 1 (page 6)

f1 built-up partition wall



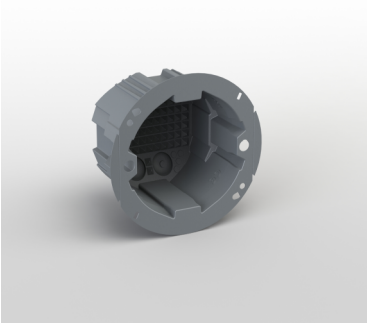
Both sides of the wall is foresee with a removable panel. Each panel is provided with 10 electrical mounting boxes. These boxes are assembled with plug points. See figure 2 (page 7).

f2 images of tested mounting boxes in the partition wall.



The following mounting boxes were tested:

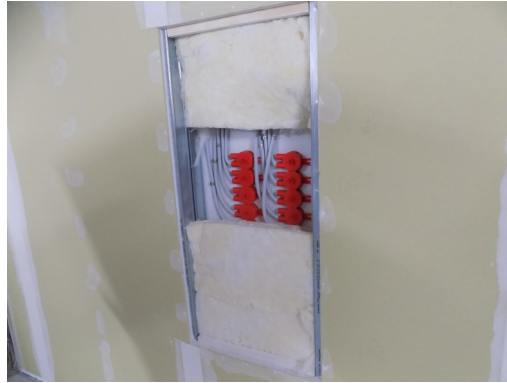
|                                                                             |  |
|-----------------------------------------------------------------------------|--|
| <p>mounting box (red):<br/>type HWD50L-BW</p> <p>+ insertion part (red)</p> |  |
| <p>mounting box (red):<br/>type UHW50-BW</p> <p>+ insertion part (red)</p>  |  |
| <p>mounting box (gray):<br/>type HWD50L</p>                                 |  |

|                                      |                                                                                     |
|--------------------------------------|-------------------------------------------------------------------------------------|
| insertion part (dark gray)           |    |
| mounting box (green):<br>type HWD50L |   |
| mounting box (green):<br>type UHW50  |  |

With the mentioned mounting boxes different tests were carried out. In addition, two installation variables have been examined (see also figure 3, page 9), namely:

- built-in boxes mounted back to back / built-in boxes staggered mounted
- mineral wool continuous behind the boxes / no mineral wool behind the built-in boxes.

f3 mineral wool continuous behind the boxes / no mineral wool behind the built-in boxes



t3.1 tested variants

| test nr. | mounting box         | fire resistant pad | insertion part  | positioning  | mineral wool | remark          |
|----------|----------------------|--------------------|-----------------|--------------|--------------|-----------------|
| 0        | none                 | -                  | -               | -            | continuously | reference       |
| 1        | 10 x UHW50-BW (red)  | yes                | yes (red)       | back to back | continuously | -               |
| 2        | 10 x UHW50 (green)   | no                 | yes (dark gray) | back to back | continuously | -               |
| 2a       | 10 x UHW50 (green)   | no                 | yes (dark gray) | back to back | continuously | open spouts     |
| 3        | 10 x UHW50 (green)   | no                 | no              | back to back | continuously | -               |
| 3a       | 10 x UHW50 (green)   | no                 | no              | back to back | interrupted  | -               |
| 4        | 10 x HWD50L-BW (red) | yes                | yes (red)       | back to back | continuously | -               |
| 4a       | 10 x HWD50L-BW (red) | yes                | yes (red)       | staggered    | continuously | -               |
| 4b       | 10 x HWD50L-BW (red) | yes                | yes (red)       | back to back | interrupted  | -               |
| 4c       | 10 x HWD50L-BW (red) | yes                | yes (red)       | back to back | interrupted  | all boxes wired |
| 5        | 10 x HWD50L (gray)   | no                 | yes (dark gray) | back to back | continuously | -               |
| 5a       | 10 x HWD50L (gray)   | no                 | no              | back to back | continuously | -               |

*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 Method

The tests were conducted in accordance with the provisions of the test method ISO 10140-2 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.

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.

In ISO 10140-2 the airborne sound insulation of an object is defined as the "sound reduction index R" to be evaluated according to formula 1 and expressed in dB:

$$R = L_1 - L_2 + 10 \log \left( \frac{S}{A} \right) \quad (1)$$

in which:

$L_1$  = sound pressure level in the sending room [dB]

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

$S$  = area of the object to be tested [m<sup>2</sup>]

$A$  = equivalent sound absorption [m<sup>2</sup>] in the receiving room according to:

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

in which:

$V$  = volume of the receiving room [m<sup>3</sup>]

$T$  = reverberation time in the receiving room [s]

### 4.2 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).

#### 4.2.1 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  $R_w$  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  $R_w$ -value.

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

#### 4.2.2 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  $R_w$  is about 3 dB.

#### 4.3 Environmental conditions during the measurements

##### t4.1 *Environmental conditions during the measurements, date 13-10-2017*

| Measuring room | temperature<br>[°C] | relative humidity<br>[%] |
|----------------|---------------------|--------------------------|
| 1              | 17,5                | 69                       |
| 2              | 17,5                | 72                       |

#### 4.4 Results

The results of the measurements are given in the tables 4.2 up to and including 4.4 and in the figures 3 up to and including 14. 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  $R_w$  according to ISO 717-1 including the spectrum adaptation terms  $C$  and  $C_{tr}$  have been calculated and stated.

t4.2 measuring results (based on the total wall area of 12 m<sup>2</sup>)

| SOUND INSULATION R [dB]                         |                     |          |                     |          |                     |          |                     |          |
|-------------------------------------------------|---------------------|----------|---------------------|----------|---------------------|----------|---------------------|----------|
| test nr.                                        | 0                   |          | 1                   |          | 2                   |          | 2a                  |          |
| record nr.                                      | #34                 |          | #76                 |          | #83                 |          | #97                 |          |
| mounting box type                               | -                   |          | 10 x UHW50-BW (red) |          | 10 x UHW50 (green)  |          | 10 x UHW50 (green)  |          |
| fire resistant pad                              | -                   |          | yes                 |          | no                  |          | no                  |          |
| insertion part                                  | -                   |          | yes (red)           |          | yes (dark gray)     |          | yes (dark gray)     |          |
| positioning                                     | -                   |          | back to back        |          | back to back        |          | back to back        |          |
| mineral wool                                    | continuously        |          | continuously        |          | continuously        |          | continuously        |          |
| remark                                          | reference           |          | -                   |          | -                   |          | open spouts         |          |
| see figure                                      | 3                   |          | 4                   |          | 5                   |          | 6                   |          |
| 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                                              | 27,0                |          | 25,8                |          | 26,1                |          | 25,8                |          |
| 63                                              | 29,4                | 29,6     | 28,7                | 28,6     | 28,3                | 28,7     | 28,7                | 28,6     |
| 80                                              | 38,7                |          | 38,9                |          | 38,3                |          | 38,4                |          |
| 100                                             | 43,8                |          | 43,8                |          | 43,3                |          | 43,8                |          |
| 125                                             | 45,4                | 45,4     | 45,3                | 45,3     | 45,4                | 45,1     | 45,0                | 45,2     |
| 160                                             | 47,7                |          | 47,5                |          | 47,6                |          | 47,8                |          |
| 200                                             | 50,9                |          | 50,6                |          | 50,4                |          | 50,8                |          |
| 250                                             | 55,8                | 53,8     | 56,1                | 53,6     | 55,5                | 53,3     | 55,7                | 53,6     |
| 315                                             | 57,7                |          | 57,0                |          | 56,9                |          | 56,7                |          |
| 400                                             | 62,0                |          | 61,5                |          | 61,2                |          | 61,3                |          |
| 500                                             | 64,4                | 63,6     | 63,7                | 63,0     | 63,4                | 62,7     | 63,5                | 62,8     |
| 630                                             | 65,1                |          | 64,4                |          | 64,2                |          | 64,1                |          |
| 800                                             | 67,0                |          | 65,8                |          | 64,7                |          | 64,1                |          |
| 1000                                            | 70,5                | 69,4     | 69,4                | 68,4     | 68,7                | 67,5     | 68,2                | 66,9     |
| 1250                                            | 72,7                |          | 72,2                |          | 71,9                |          | 71,1                |          |
| 1600                                            | 73,1                |          | 73,0                |          | 73,1                |          | 72,8                |          |
| 2000                                            | 71,3                | 69,0     | 71,4                | 69,1     | 71,2                | 69,0     | 71,0                | 68,8     |
| 2500                                            | 65,9                |          | 66,1                |          | 66,0                |          | 65,8                |          |
| 3150                                            | 65,0                |          | 65,1                |          | 65,2                |          | 65,1                |          |
| 4000                                            | 64,8                | 65,4     | 65,1                | 65,6     | 65,2                | 65,7     | 65,2                | 65,7     |
| 5000                                            | 66,5                |          | 66,9                |          | 66,9                |          | 66,9                |          |
| <b>R<sub>w</sub>(C;C<sub>tr</sub>)</b>          | <b>65(-2;-7) dB</b> |          | <b>64(-1;-6) dB</b> |          | <b>64(-2;-6) dB</b> |          | <b>64(-2;-6) dB</b> |          |
| C <sub>100-5000</sub> ;C <sub>tr,100-5000</sub> | (-2;-7) dB          |          | (-1;-6) dB          |          | (-1;-6) dB          |          | (-1;-6) dB          |          |
| C <sub>50-3150</sub> ;C <sub>tr,50-3150</sub>   | (-5;-17) dB         |          | (-5;-16) dB         |          | (-5;-16) dB         |          | (-5;-16) dB         |          |
| C <sub>50-5000</sub> ;C <sub>tr,50-5000</sub>   | (-5;-17) dB         |          | (-4;-16) dB         |          | (-4;-17) dB         |          | (-4;-16) dB         |          |

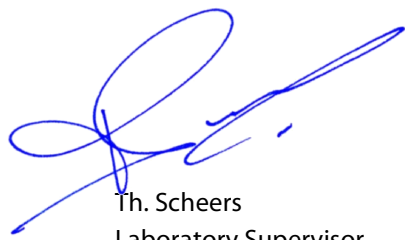
t4.3 measuring results (based on the total wall area of 12 m<sup>2</sup>)

| SOUND INSULATION R [dB]                         |                     |          |                     |          |                      |          |                      |          |
|-------------------------------------------------|---------------------|----------|---------------------|----------|----------------------|----------|----------------------|----------|
| test nr.                                        | 3                   |          | 3a                  |          | 4                    |          | 4a                   |          |
| record nr.                                      | #69                 |          | #111                |          | #41                  |          | #48                  |          |
| mounting box type                               | 10 x UHW50 (green)  |          | 10 x UHW50 (green)  |          | 10 x HWD50L-BW (red) |          | 10 x HWD50L-BW (red) |          |
| fire resistant pad                              | no                  |          | no                  |          | yes                  |          | yes                  |          |
| insertion part                                  | no                  |          | no                  |          | yes (red)            |          | yes (red)            |          |
| positioning                                     | back to back        |          | back to back        |          | back to back         |          | staggered            |          |
| mineral wool                                    | continuously        |          | interrupted         |          | continuously         |          | continuously         |          |
| remark                                          | -                   |          | -                   |          | -                    |          | -                    |          |
| see figure                                      | 7                   |          | 8                   |          | 9                    |          | 10                   |          |
| 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                                              | 25,1                |          | 24,5                |          | 25,5                 |          | 26,2                 |          |
| 63                                              | 27,2                | 27,6     | 26,9                | 27,1     | 28,4                 | 28,3     | 28,3                 | 28,7     |
| 80                                              | 37,1                |          | 35,7                |          | 38,5                 |          | 37,8                 |          |
| 100                                             | 42,7                |          | 41,6                |          | 43,8                 |          | 43,2                 |          |
| 125                                             | 42,5                | 42,9     | 42,4                | 42,4     | 45,3                 | 45,3     | 45,2                 | 45,0     |
| 160                                             | 43,6                |          | 43,2                |          | 47,7                 |          | 47,5                 |          |
| 200                                             | 44,7                |          | 45,4                |          | 50,8                 |          | 50,8                 |          |
| 250                                             | 47,0                | 46,4     | 47,0                | 46,4     | 55,8                 | 53,7     | 56,0                 | 53,8     |
| 315                                             | 48,1                |          | 46,9                |          | 57,1                 |          | 57,4                 |          |
| 400                                             | 50,3                |          | 49,8                |          | 61,0                 |          | 61,0                 |          |
| 500                                             | 51,6                | 51,5     | 49,6                | 48,7     | 60,9                 | 61,6     | 61,0                 | 61,5     |
| 630                                             | 53,1                |          | 47,3                |          | 63,2                 |          | 62,9                 |          |
| 800                                             | 52,1                |          | 41,6                |          | 66,6                 |          | 66,4                 |          |
| 1000                                            | 51,9                | 53,2     | 38,3                | 40,9     | 70,6                 | 69,2     | 70,3                 | 69,0     |
| 1250                                            | 57,7                |          | 45,5                |          | 72,6                 |          | 72,4                 |          |
| 1600                                            | 65,9                |          | 53,0                |          | 73,1                 |          | 73,1                 |          |
| 2000                                            | 69,5                | 66,8     | 57,1                | 55,7     | 71,2                 | 69,0     | 71,2                 | 69,0     |
| 2500                                            | 65,9                |          | 59,3                |          | 66,0                 |          | 65,9                 |          |
| 3150                                            | 65,0                |          | 60,1                |          | 65,1                 |          | 65,1                 |          |
| 4000                                            | 65,0                | 65,5     | 62,2                | 62,0     | 64,9                 | 65,5     | 65,0                 | 65,5     |
| 5000                                            | 66,7                |          | 65,1                |          | 66,7                 |          | 66,7                 |          |
| <b>R<sub>w</sub>(C;C<sub>tr</sub>)</b>          | <b>55(-1;-4) dB</b> |          | <b>48(-2;-4) dB</b> |          | <b>64(-1;-6) dB</b>  |          | <b>64(-2;-6) dB</b>  |          |
| C <sub>100-5000</sub> ;C <sub>tr,100-5000</sub> | (0;-4) dB           |          | (-2;-4) dB          |          | (-1;-6) dB           |          | (-1;-6) dB           |          |
| C <sub>50-3150</sub> ;C <sub>tr,50-3150</sub>   | (-2;-9) dB          |          | (-3;-6) dB          |          | (-5;-17) dB          |          | (-5;-16) dB          |          |
| C <sub>50-5000</sub> ;C <sub>tr,50-5000</sub>   | (-1;-9) dB          |          | (-2;-6) dB          |          | (-4;-17) dB          |          | (-4;-16) dB          |          |

t4.4measuring results (based on the total wall area of 12 m<sup>2</sup>)

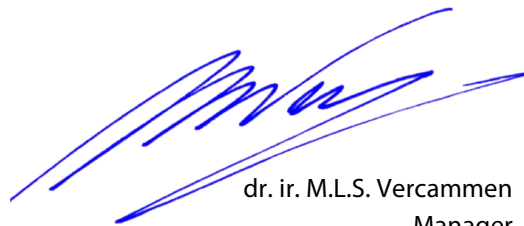
| SOUND INSULATION R [dB]                         |                      |          |                      |          |                     |          |                     |          |
|-------------------------------------------------|----------------------|----------|----------------------|----------|---------------------|----------|---------------------|----------|
| test nr.                                        | 4b                   |          | 4c                   |          | 5                   |          | 5a                  |          |
| record nr.                                      | #55                  |          | #62                  |          | #90                 |          | #104                |          |
| mounting box type                               | 10 x HWD50L-BW (red) |          | 10 x HWD50L-BW (red) |          | 10 x HWD50L (gray)  |          | 10 x HWD50L (gray)  |          |
| fire resistant pad                              | yes                  |          | yes                  |          | no                  |          | no                  |          |
| insertion part                                  | yes (red)            |          | yes (red)            |          | yes (dark gray)     |          | no                  |          |
| positioning                                     | back to back         |          | back to back         |          | back to back        |          | back to back        |          |
| mineral wool                                    | interrupted          |          | interrupted          |          | continuously        |          | continuously        |          |
| remark                                          | -                    |          | all boxes wired      |          | -                   |          | -                   |          |
| see figure                                      | 11                   |          | 12                   |          | 13                  |          | 14                  |          |
| 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                                              | 26,0                 |          | 25,7                 |          | 24,8                |          | 25,1                |          |
| 63                                              | 28,1                 | 28,5     | 27,8                 | 28,2     | 30,6                | 28,4     | 27,0                | 27,5     |
| 80                                              | 38,1                 |          | 38,0                 |          | 38,1                |          | 36,9                |          |
| 100                                             | 44,1                 |          | 43,4                 |          | 45,0                |          | 42,9                |          |
| 125                                             | 45,3                 | 45,3     | 45,5                 | 45,1     | 46,3                | 46,2     | 44,3                | 44,2     |
| 160                                             | 47,1                 |          | 47,5                 |          | 47,7                |          | 45,8                |          |
| 200                                             | 50,7                 |          | 50,7                 |          | 51,0                |          | 49,1                |          |
| 250                                             | 55,3                 | 53,5     | 55,4                 | 53,5     | 55,4                | 53,7     | 52,6                | 51,2     |
| 315                                             | 57,1                 |          | 57,0                 |          | 57,1                |          | 53,0                |          |
| 400                                             | 60,6                 |          | 61,1                 |          | 60,7                |          | 54,7                |          |
| 500                                             | 59,1                 | 60,2     | 61,4                 | 61,6     | 60,2                | 58,8     | 51,4                | 51,4     |
| 630                                             | 61,1                 |          | 62,4                 |          | 56,7                |          | 49,5                |          |
| 800                                             | 65,9                 |          | 65,6                 |          | 64,1                |          | 59,3                |          |
| 1000                                            | 69,9                 | 68,5     | 70,0                 | 68,4     | 70,4                | 67,5     | 69,4                | 63,5     |
| 1250                                            | 72,1                 |          | 72,2                 |          | 73,1                |          | 72,3                |          |
| 1600                                            | 72,8                 |          | 72,8                 |          | 73,6                |          | 73,1                |          |
| 2000                                            | 70,9                 | 68,6     | 71,1                 | 68,7     | 71,6                | 69,4     | 71,2                | 69,1     |
| 2500                                            | 65,5                 |          | 65,6                 |          | 66,4                |          | 66,1                |          |
| 3150                                            | 64,7                 |          | 64,7                 |          | 65,3                |          | 65,2                |          |
| 4000                                            | 64,8                 | 65,3     | 64,8                 | 65,3     | 65,0                | 65,4     | 65,2                | 65,7     |
| 5000                                            | 66,6                 |          | 66,6                 |          | 66,1                |          | 67,0                |          |
| <b>R<sub>w</sub>(C;C<sub>tr</sub>)</b>          | <b>63(-1;-5) dB</b>  |          | <b>64(-2;-6) dB</b>  |          | <b>63(-1;-5) dB</b> |          | <b>59(-2;-5) dB</b> |          |
| C <sub>100-5000</sub> ;C <sub>tr,100-5000</sub> | (0;-5) dB            |          | (-1;-6) dB           |          | (-1;-5) dB          |          | (-1;-5) dB          |          |
| C <sub>50-3150</sub> ;C <sub>tr,50-3150</sub>   | (-4;-16) dB          |          | (-5;-17) dB          |          | (-4;-15) dB         |          | (-3;-13) dB         |          |
| C <sub>50-5000</sub> ;C <sub>tr,50-5000</sub>   | (-3;-16) dB          |          | (-4;-17) dB          |          | (-3;-15) dB         |          | (-3;-13) dB         |          |

The results as presented here are based on a testing area of 12 m<sup>2</sup>. In situations where different dimensions and/or method of mounting differ from the ones tested, different results may be found.



Th. Scheers  
Laboratory Supervisor

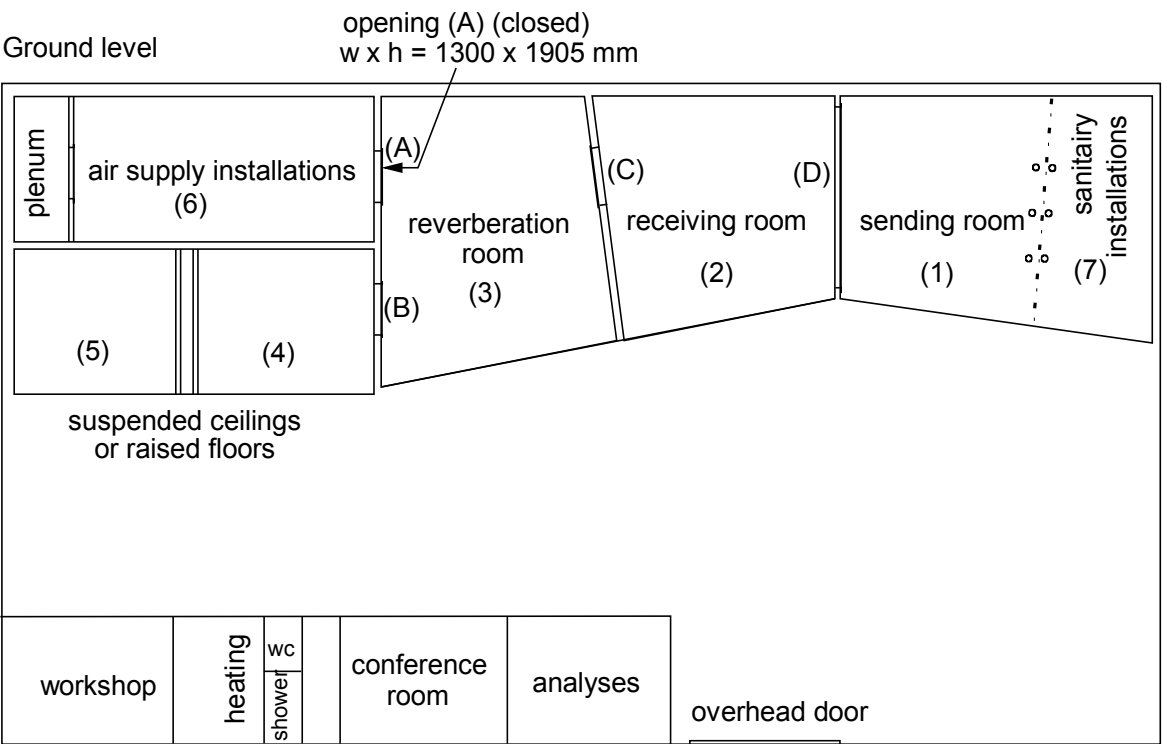
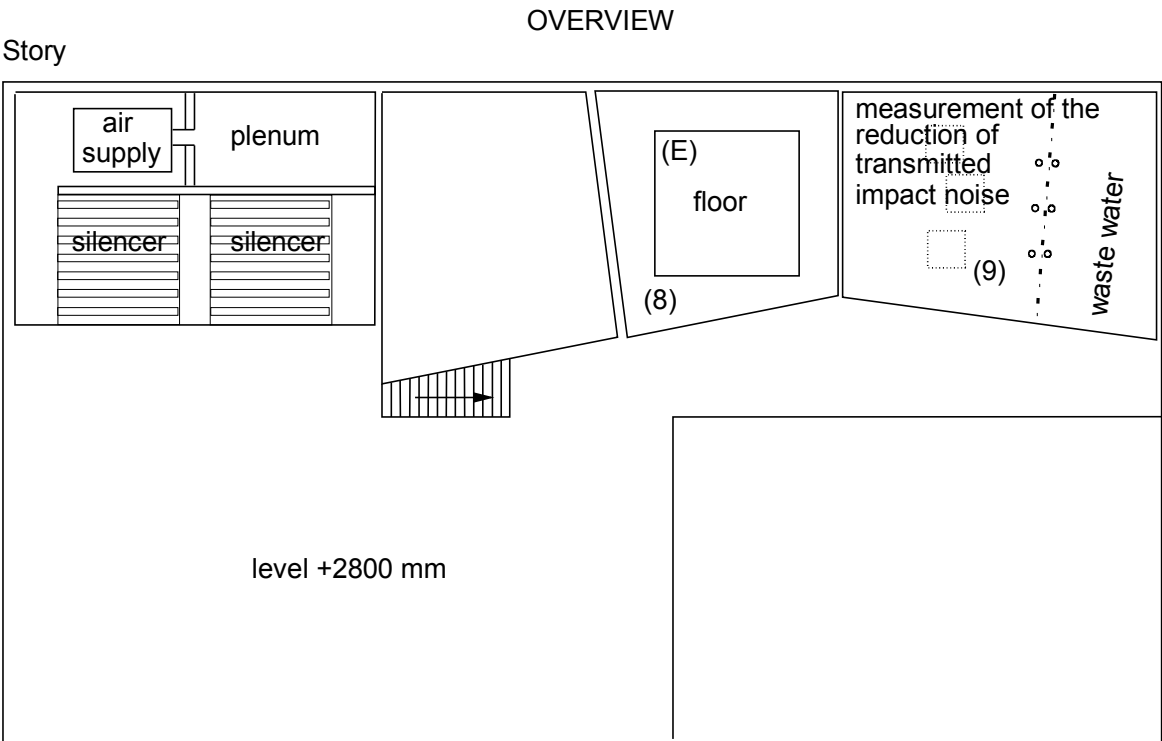
Mook,



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

This report contains 15 pages and 14 figures.

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



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, 6584 AC MOLENHOEK (LB), THE NETHERLANDS

## SOUND INSULATION TEST FACILITIES

The testrooms meet the requirements of ISO 10140-5.

Additional data:

- volume of the receiving room: 111 m<sup>3</sup>
- volume of the source room: 94 m<sup>3</sup>
- area of the test specimen: 12,0 m<sup>2</sup>

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

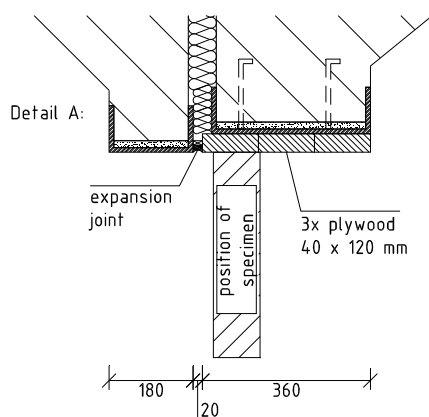
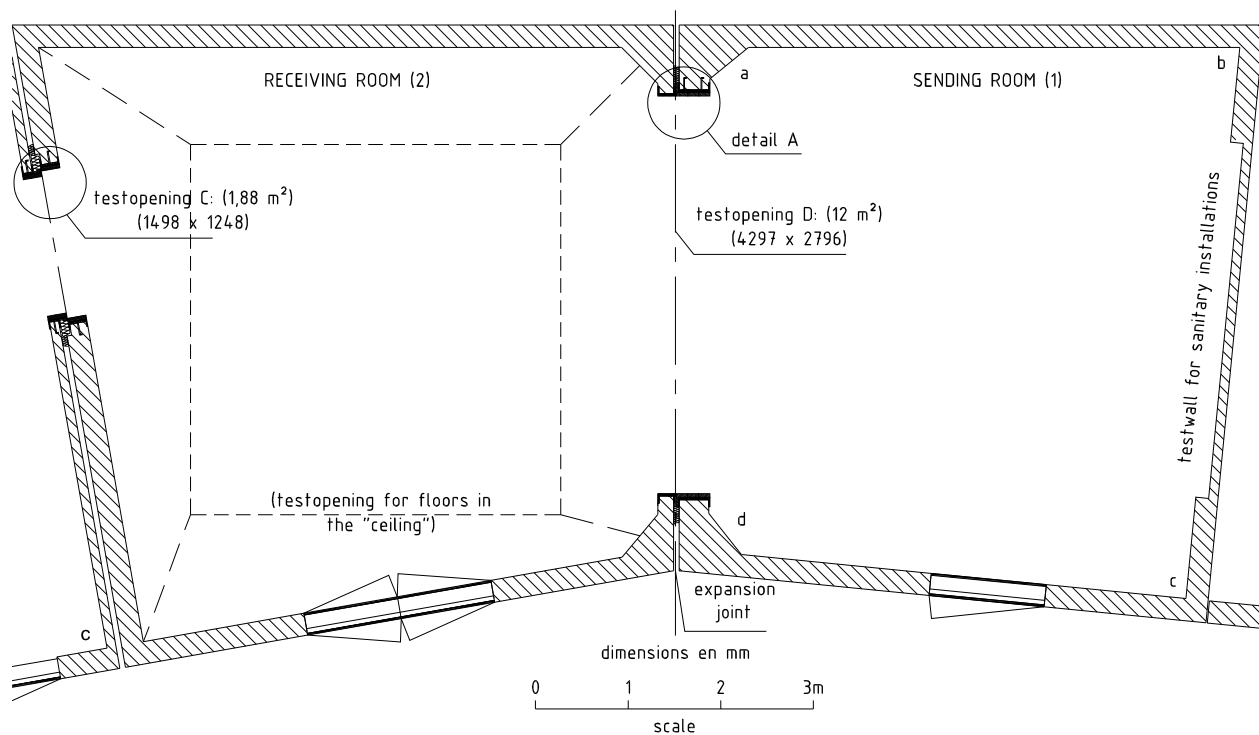
height: along the walls 2840 mm increasing  
to 2920 mm at the perimeter of the  
testopening for floors

height at a: 3055 mm

height at b: 3058 mm

height at c: 3052 mm

height at d: 3062 mm



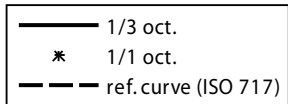
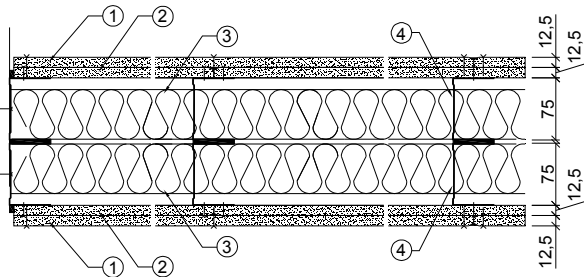
MEASUREMENT OF THE SOUND INSULATION ACCORDING TO ISO 10140-2:2010



principal: Attema

double frame gypsum partition wall  
test 0 / closed wall / reference

1 = 12,5 mm Duragyp; manufacturer Gyproc  
2 = 12,5 mm A-plate; manufacturer Gyproc  
4 = CW 75 mm metal studs c.t.c. 600 mm foresee with 60 mm mineral wool (3)  
approximately 10 mm air gap;  
4 = CW 75 mm metal studs c.t.c. 600 mm foresee with 60 mm mineral wool (3)  
2 = 12,5 mm A-plate; manufacturer Gyproc  
1 = 12,5 mm Duragyp; manufacturer Gyproc



volume measuring room: 111 m<sup>3</sup>

volume measuring room: 94 m<sup>3</sup>

surface area tested partition: 12 m<sup>2</sup>

measured at:  
Peutz Laboratory for Acoustics

signal: broad-band noise

bandwidth: 1/3 octave

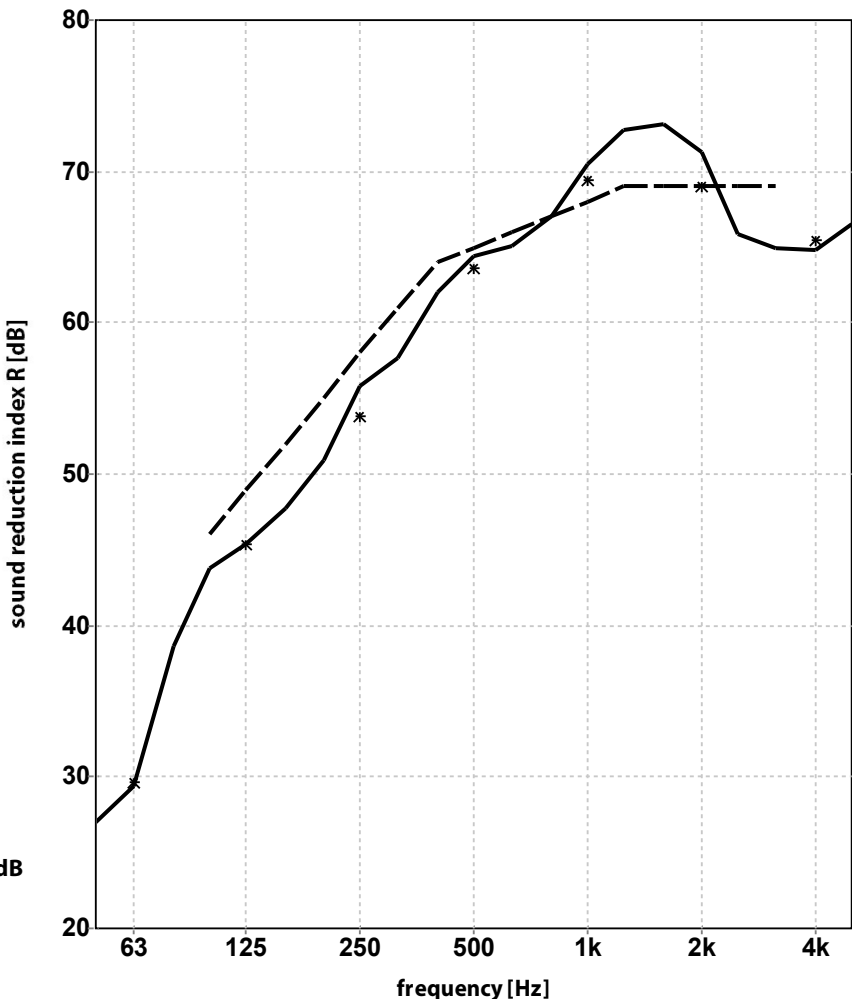
ISO 717-1:2013

**$R_w(C;C_{tr}) = 65(-2;-7) \text{ dB}$**

$C_{100-5000}; C_{tr,100-5000} = (-2;-7) \text{ dB}$

$C_{50-3150}; C_{tr,50-3150} = (-5;-17) \text{ dB}$

$C_{50-5000}; C_{tr,50-5000} = (-5;-17) \text{ dB}$



|          |      |      |      |      |      |      |         |
|----------|------|------|------|------|------|------|---------|
|          | 27,0 | 43,8 | 50,9 | 62,0 | 67,0 | 73,1 | 65,0    |
| 1/3 oct. | 29,4 | 45,4 | 55,8 | 64,4 | 70,5 | 71,3 | 64,8 dB |
|          | 38,7 | 47,7 | 57,7 | 65,1 | 72,7 | 65,9 | 66,5    |
| 1/1 oct. | 29,6 | 45,4 | 53,8 | 63,6 | 69,4 | 69,0 | 65,4 dB |

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MEASUREMENT OF THE SOUND INSULATION ACCORDING TO ISO 10140-2:2010



principal: Attema

test 1

1 = 10 x UHW50-BW (red)

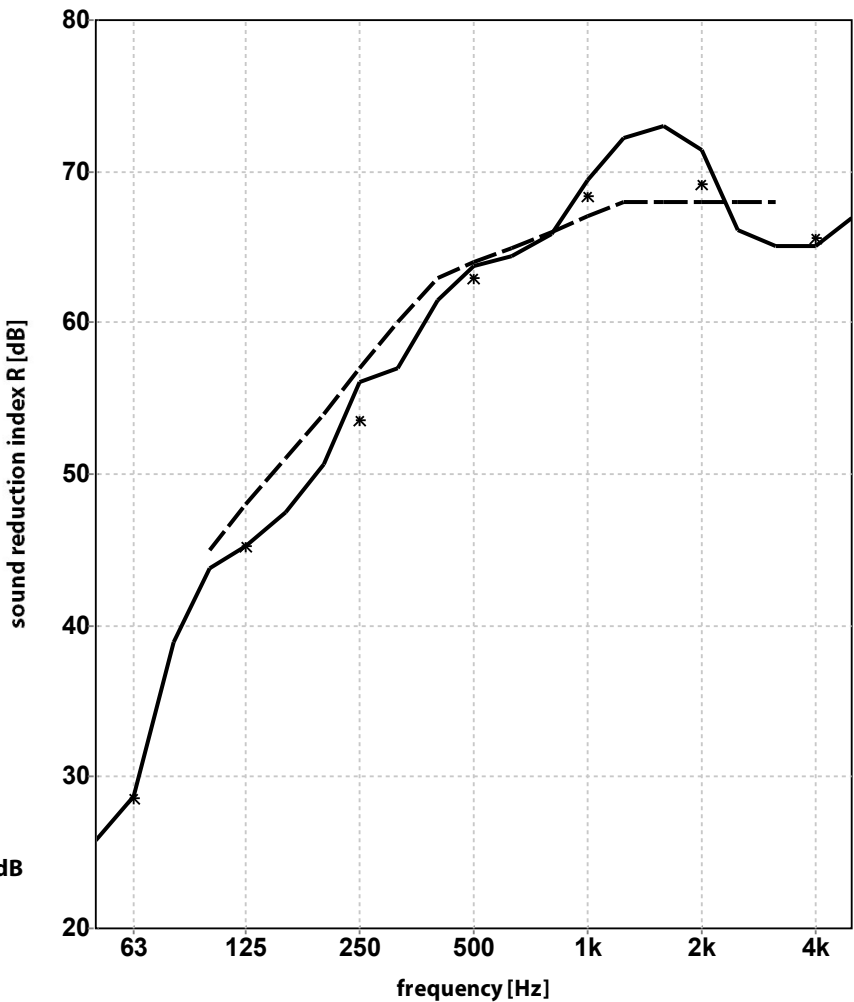
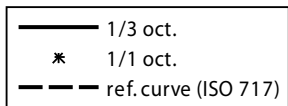
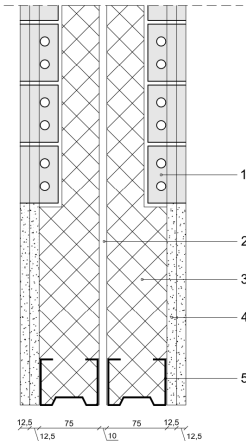
- with fire resistant pad
- with insertion part (red)
- positioning back to back
- mineral wool continuously behind the boxes

2 = 10 mm cavity

3 = 60 mm mineral wool

4 = 2 x 12,5 mm gypsum board

5 = dubble frame (2 x 75 mm)



volume measuring room: 111 m<sup>3</sup>

volume measuring room: 94 m<sup>3</sup>

surface area tested partition: 12 m<sup>2</sup>

measured at:

Peutz Laboratory for Acoustics

signal: broad-band noise

bandwidth: 1/3 octave

ISO 717-1:2013

$$R_w(C;C_{tr}) = 64(-1;-6) \text{ dB}$$

$$C_{100-5000};C_{tr,100-5000} = (-1;-6) \text{ dB}$$

$$C_{50-3150};C_{tr,50-3150} = (-5;-16) \text{ dB}$$

$$C_{50-5000};C_{tr,50-5000} = (-4;-16) \text{ dB}$$

|          |                      |                      |                      |                      |                      |                      |                      |
|----------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
|          | 63                   | 125                  | 250                  | 500                  | 1k                   | 2k                   | 4k                   |
| 1/3 oct. | 25,8<br>28,7<br>38,9 | 43,8<br>45,3<br>47,5 | 50,6<br>56,1<br>57,0 | 61,5<br>63,7<br>64,4 | 65,8<br>69,4<br>72,2 | 73,0<br>71,4<br>66,1 | 65,1<br>65,1<br>66,9 |
| 1/1 oct. | 28,6                 | 45,3                 | 53,6                 | 63,0                 | 68,4                 | 69,1                 | 65,6                 |

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MEASUREMENT OF THE SOUND INSULATION ACCORDING TO ISO 10140-2:2010



principal: Attema

test 2

1 = 10 x UHW50 (green)

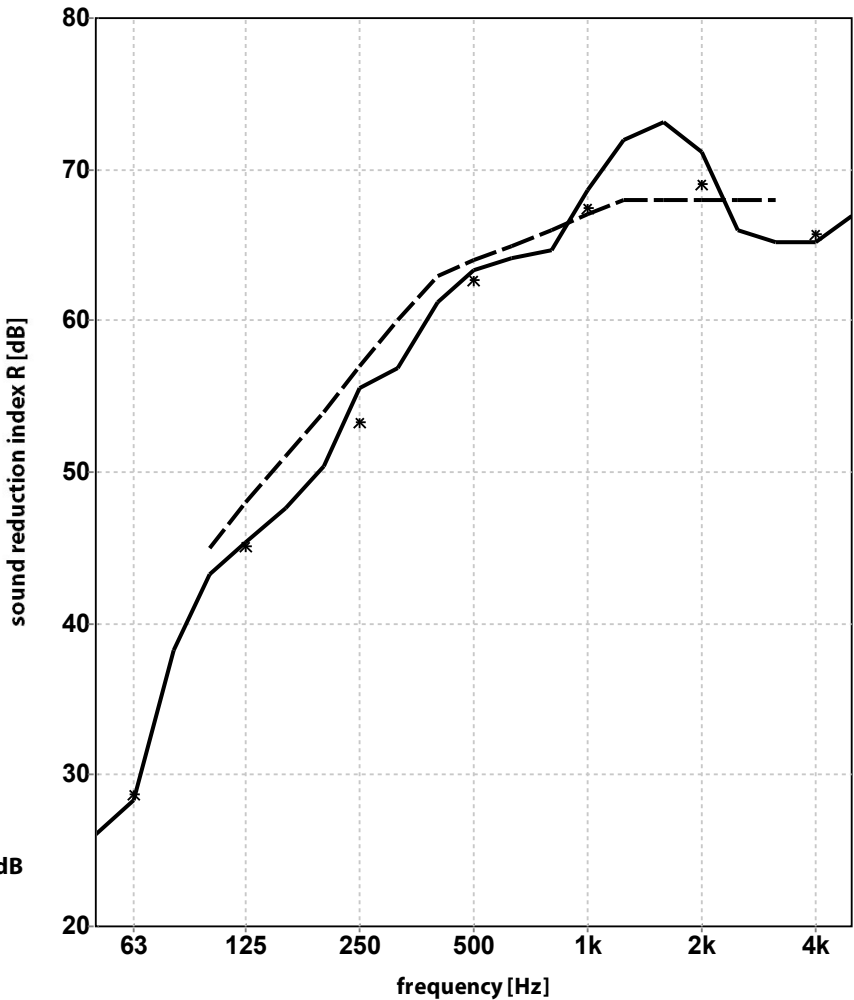
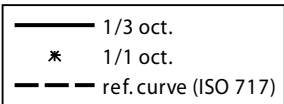
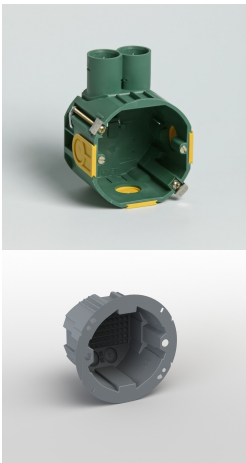
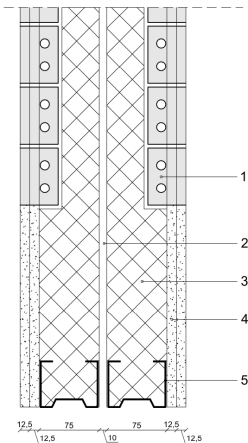
- no fire resistant pad
- with insertion part (dark gray)
- positioning back to back
- mineral wool continuously behind the boxes

2 = 10 mm cavity

3 = 60 mm mineral wool

4 = 2 x 12,5 mm gypsum board

5 = dubble frame (2 x 75 mm)



volume measuring room: 111 m<sup>3</sup>

volume measuring room: 94 m<sup>3</sup>

surface area tested partition: 12 m<sup>2</sup>

measured at:  
Peutz Laboratory for Acoustics

signal: broad-band noise

bandwidth: 1/3 octave

ISO 717-1:2013

$R_w(C;C_{tr}) = 64(-2;-6) \text{ dB}$

$C_{100-5000};C_{tr,100-5000} = (-1;-6) \text{ dB}$

$C_{50-3150};C_{tr,50-3150} = (-5;-16) \text{ dB}$

$C_{50-5000};C_{tr,50-5000} = (-4;-17) \text{ dB}$

|          |                      |                      |                      |                      |                      |                      |                      |
|----------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
|          | 63                   | 125                  | 250                  | 500                  | 1k                   | 2k                   | 4k                   |
| 1/3 oct. | 26,1<br>28,3<br>38,3 | 43,3<br>45,4<br>47,6 | 50,4<br>55,5<br>56,9 | 61,2<br>63,4<br>64,2 | 64,7<br>68,7<br>71,9 | 73,1<br>71,2<br>66,0 | 65,2<br>65,2<br>66,9 |
| 1/1 oct. | 28,7                 | 45,1                 | 53,3                 | 62,7                 | 67,5                 | 69,0                 | 65,7                 |

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MEASUREMENT OF THE SOUND INSULATION ACCORDING TO ISO 10140-2:2010



principal: Attema

test 2a

1 = 10 x UHW50 (green)

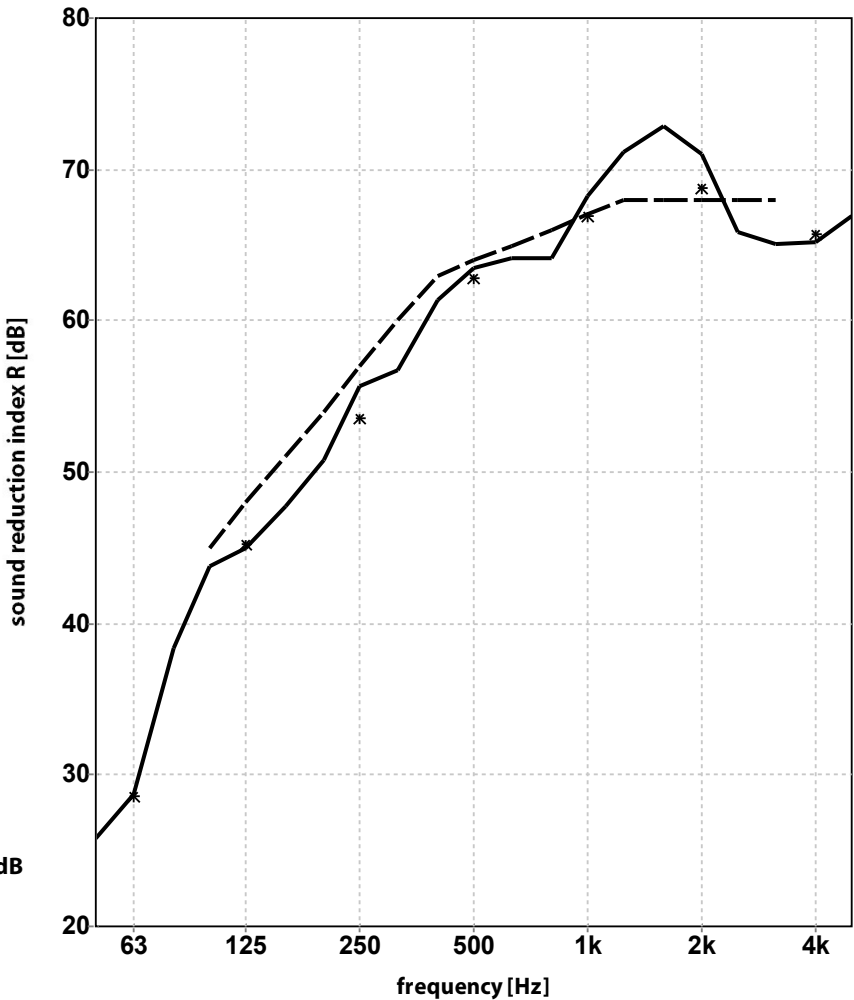
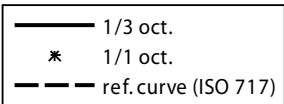
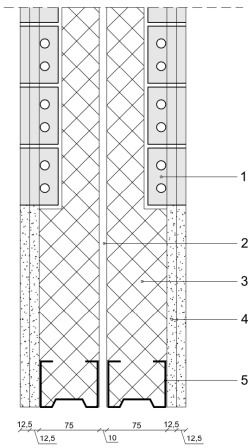
- no fire resistant pad
- with insertion part (gray)
- positioning back to back
- mineral wool continuously behind the boxes
- open spouts

2 = 10 mm cavity

3 = 60 mm mineral wool

4 = 2 x 12,5 mm gypsum board

5 = dubbele frame (2 x 75 mm)



volume measuring room: 111 m<sup>3</sup>

volume measuring room: 94 m<sup>3</sup>

surface area tested partition: 12 m<sup>2</sup>

measured at:  
Peutz Laboratory for Acoustics

signal: broad-band noise

bandwidth: 1/3 octave

ISO 717-1:2013

**$R_w(C;C_{tr}) = 64(-2;-6)$  dB**

$C_{100-5000};C_{tr,100-5000} = (-1;-6)$  dB

$C_{50-3150};C_{tr,50-3150} = (-5;-16)$  dB

$C_{50-5000};C_{tr,50-5000} = (-4;-16)$  dB

|          |                      |                      |                      |                      |                      |                      |                      |
|----------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
|          | 63                   | 125                  | 250                  | 500                  | 1k                   | 2k                   | 4k                   |
| 1/3 oct. | 25,8<br>28,7<br>38,4 | 43,8<br>45,0<br>47,8 | 50,8<br>55,7<br>56,7 | 61,3<br>63,5<br>64,1 | 64,1<br>68,2<br>71,1 | 72,8<br>71,0<br>65,8 | 65,1<br>65,2<br>66,9 |
| 1/1 oct. | 28,6                 | 45,2                 | 53,6                 | 62,8                 | 66,9                 | 68,8                 | 65,7                 |

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figure 6

MEASUREMENT OF THE SOUND INSULATION ACCORDING TO ISO 10140-2:2010



principal: Attema

test 3

1 = 10 x UHW50 (green)

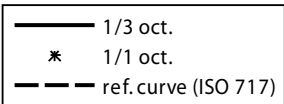
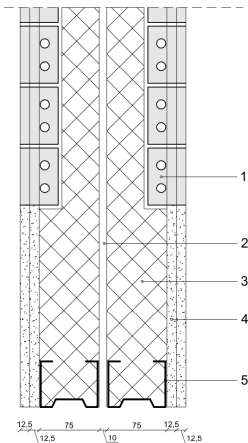
- no fire resistant pad
- no insertion part
- positioning back to back
- mineral wool continuously behind the boxes

2 = 10 mm cavity

3 = 60 mm mineral wool

4 = 2 x 12,5 mm gypsum board

5 = dubble frame (2 x 75 mm)



volume measuring room: 111 m<sup>3</sup>

volume measuring room: 94 m<sup>3</sup>

surface area tested partition: 12 m<sup>2</sup>

measured at:  
Peutz Laboratory for Acoustics

signal: broad-band noise

bandwidth: 1/3 octave

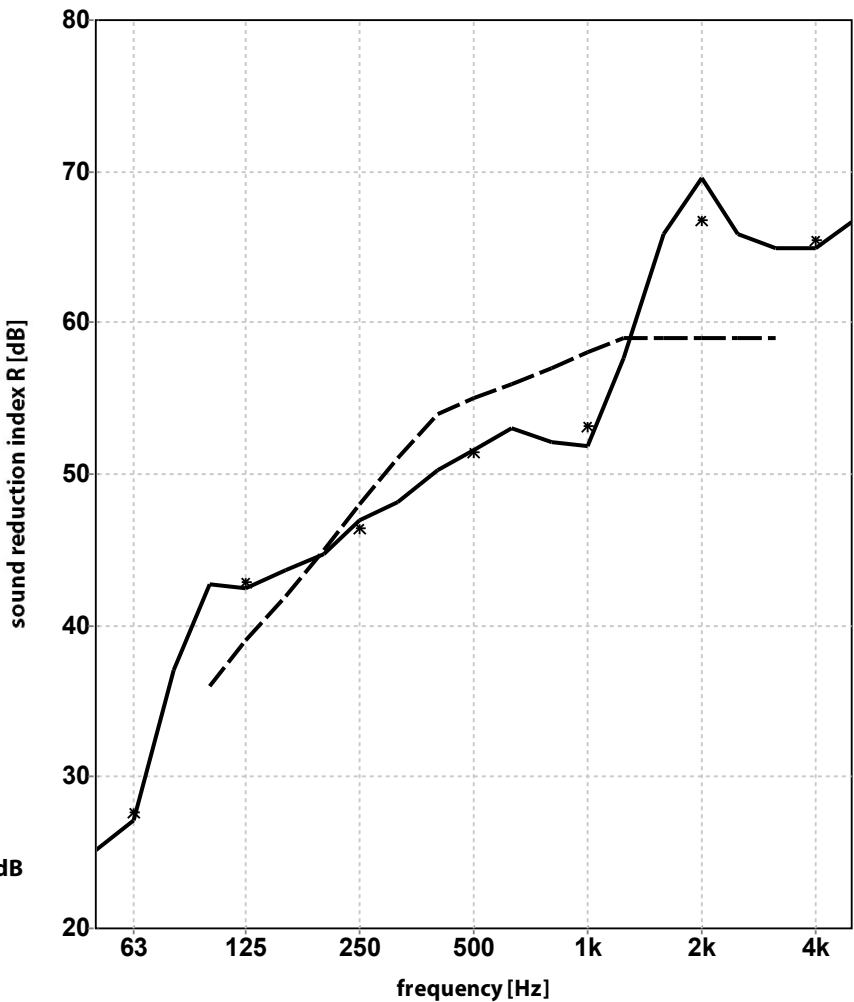
ISO 717-1:2013

**$R_w(C;C_{tr}) = 55(-1;-4)$  dB**

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

$C_{50-3150};C_{tr,50-3150} = (-2;-9)$  dB

$C_{50-5000};C_{tr,50-5000} = (-1;-9)$  dB



|          |      |      |      |      |      |      |         |
|----------|------|------|------|------|------|------|---------|
|          | 25,1 | 42,7 | 44,7 | 50,3 | 52,1 | 65,9 | 65,0    |
| 1/3 oct. | 27,2 | 42,5 | 47,0 | 51,6 | 51,9 | 69,5 | 65,0 dB |
|          | 37,1 | 43,6 | 48,1 | 53,1 | 57,7 | 65,9 | 66,7    |
| 1/1 oct. | 27,6 | 42,9 | 46,4 | 51,5 | 53,2 | 66,8 | 65,5 dB |

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figure 7

## MEASUREMENT OF THE SOUND INSULATION ACCORDING TO ISO 10140-2:2010

principal: Attema



test 3a

1 = 10 x UHW50 (green)

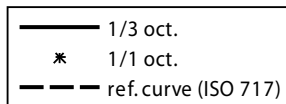
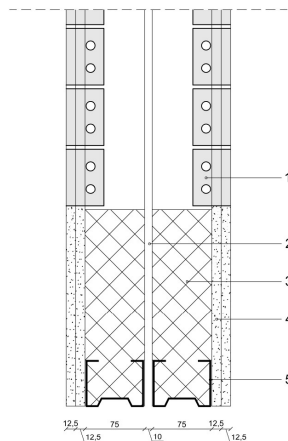
- no fire resistant pad
- no insertion part
- positioning back to back
- mineral wool interrupted behind the boxes

2 = 10 mm cavity

3 = 60 mm mineral wool

4 = 2 x 12,5 mm gypsum board

5 = dubble frame (2 x 75 mm)



volume measuring room: 111 m<sup>3</sup>

volume measuring room: 94 m<sup>3</sup>

surface area tested partition: 12 m<sup>2</sup>

measured at:  
Peutz Laboratory for Acoustics

signal: broad-band noise

bandwidth: 1/3 octave

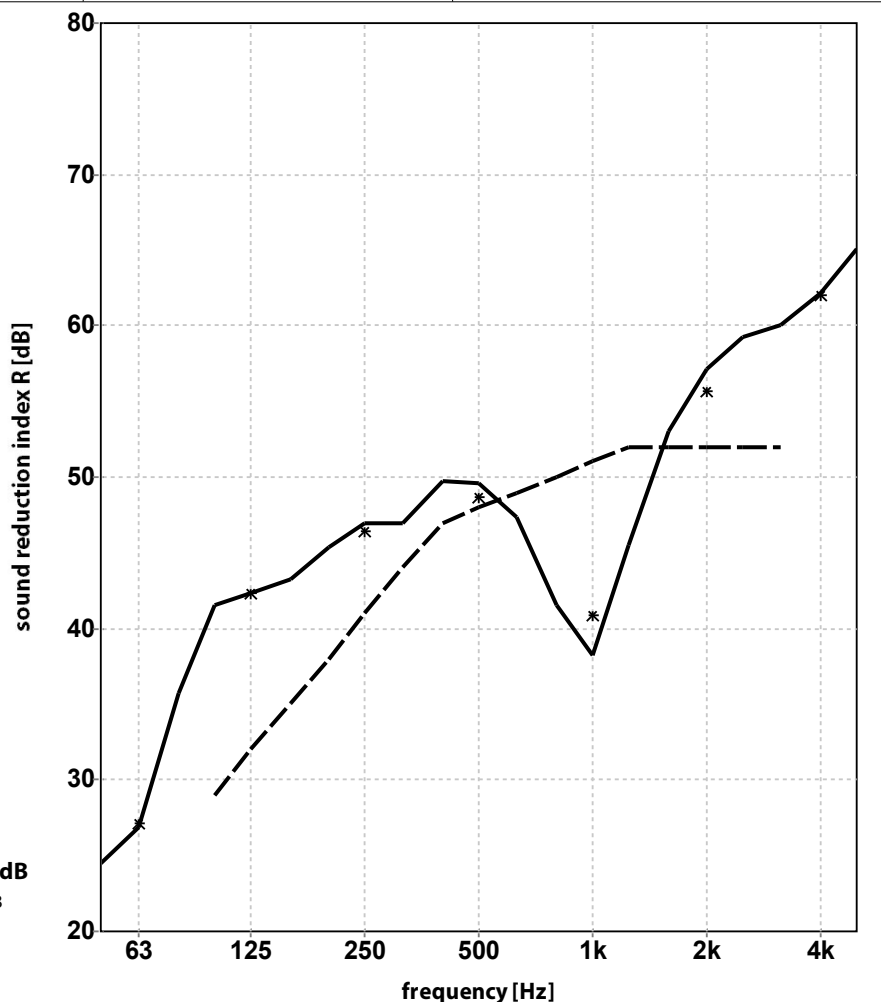
ISO 717-1:2013

**$R_w(C;C_{tr}) = 48(-2;-4)$  dB**

$C_{100-5000}/C_{tr,100-5000} = (-2;-4)$  dB

$C_{50-3150}/C_{tr,50-3150} = (-3;-6)$  dB

$C_{50-5000}/C_{tr,50-5000} = (-2;-6)$  dB



|          |      |      |      |      |      |      |      |
|----------|------|------|------|------|------|------|------|
|          | 24,5 | 41,6 | 45,4 | 49,8 | 41,6 | 53,0 | 60,1 |
| 1/3 oct. | 26,9 | 42,4 | 47,0 | 49,6 | 38,3 | 57,1 | 62,2 |
|          | 35,7 | 43,2 | 46,9 | 47,3 | 45,5 | 59,3 | 65,1 |
| 1/1 oct. | 27,1 | 42,4 | 46,4 | 48,7 | 40,9 | 55,7 | 62,0 |

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MEASUREMENT OF THE SOUND INSULATION ACCORDING TO ISO 10140-2:2010



principal: Attema

test 4

1 = 10 x HWD50L-BW (red)

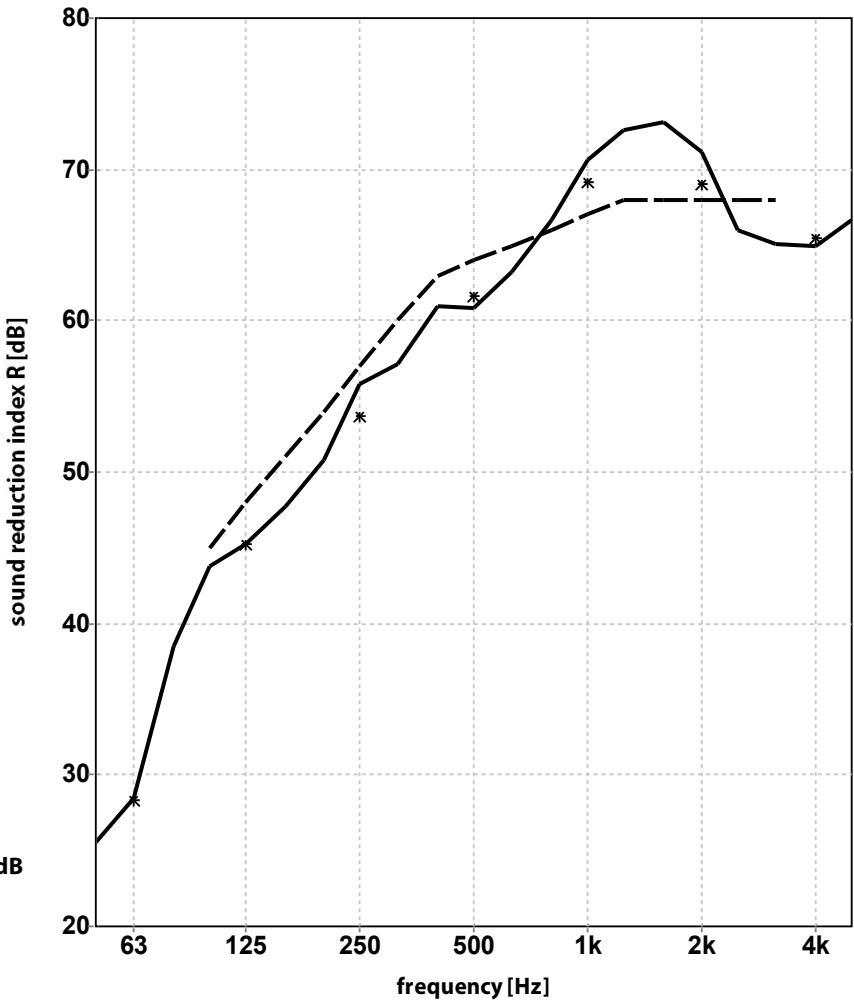
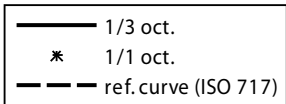
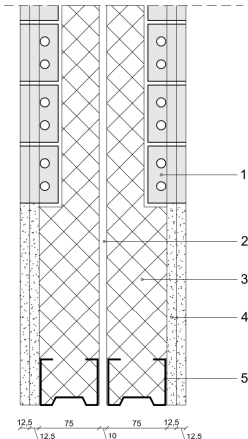
- with fire resistant pad
- with insertion part (red)
- positioning back to back
- mineral wool continuously behind the boxes

2 = 10 mm cavity

3 = 60 mm mineral wool

4 = 2 x 12,5 mm gypsum board

5 = dubble frame (2 x 75 mm)



volume measuring room: 111 m<sup>3</sup>

volume measuring room: 94 m<sup>3</sup>

surface area tested partition: 12 m<sup>2</sup>

measured at:  
Peutz Laboratory for Acoustics

signal: broad-band noise

bandwidth: 1/3 octave

ISO 717-1:2013

$R_w(C;C_{tr}) = 64(-1;-6) \text{ dB}$

$C_{100-5000};C_{tr,100-5000} = (-1;-6) \text{ dB}$

$C_{50-3150};C_{tr,50-3150} = (-5;-17) \text{ dB}$

$C_{50-5000};C_{tr,50-5000} = (-4;-17) \text{ dB}$

|          |                      |                      |                      |                      |                      |                      |                      |
|----------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
|          | 63                   | 125                  | 250                  | 500                  | 1k                   | 2k                   | 4k                   |
| 1/3 oct. | 25,5<br>28,4<br>38,5 | 43,8<br>45,3<br>47,7 | 50,8<br>55,8<br>57,1 | 61,0<br>60,9<br>63,2 | 66,6<br>70,6<br>72,6 | 73,1<br>71,2<br>66,0 | 65,1<br>64,9<br>66,7 |
| 1/1 oct. | 28,3                 | 45,3                 | 53,7                 | 61,6                 | 69,2                 | 69,0                 | 65,5                 |

dB

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figure 9

MEASUREMENT OF THE SOUND INSULATION ACCORDING TO ISO 10140-2:2010



principal: Attema

test 4a

1 = 10 x HWD50L-BW (red)

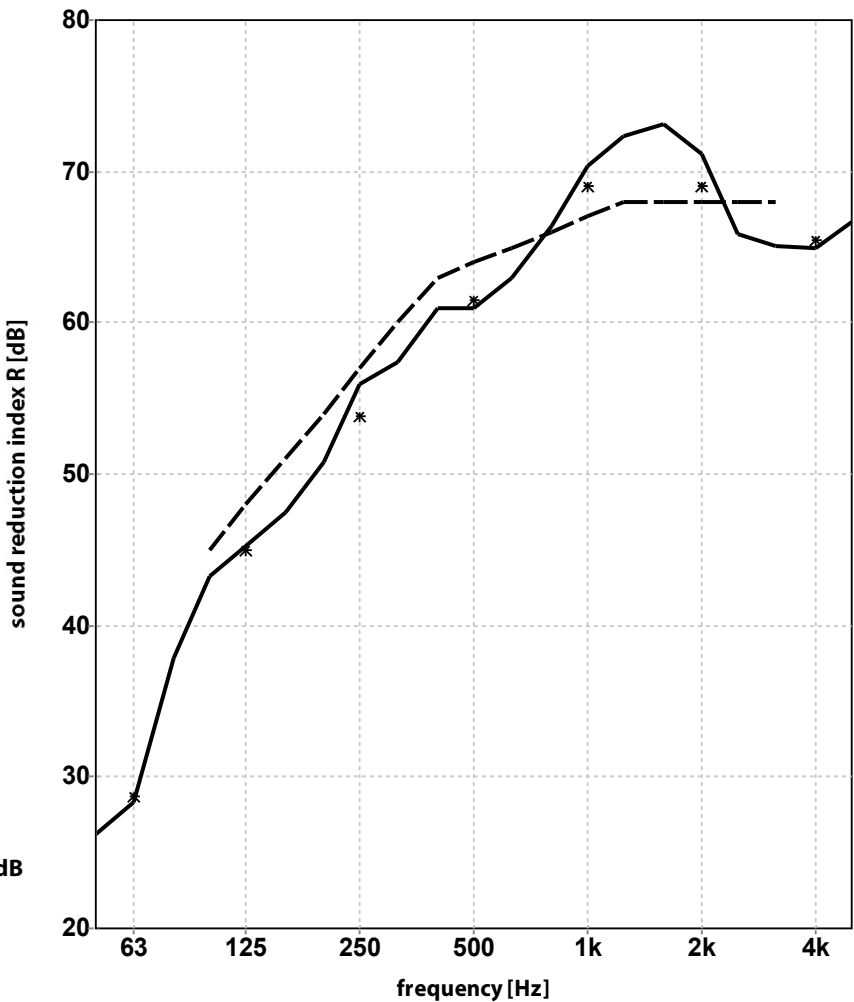
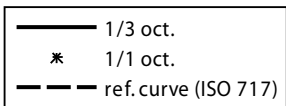
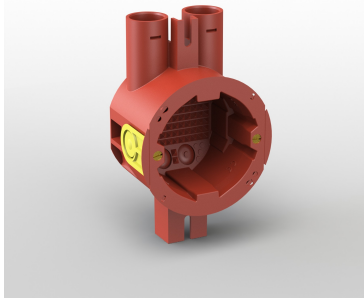
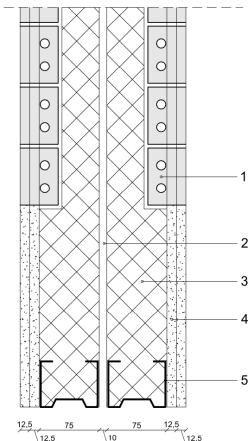
- with fire resistant pad
- with insertion part (red)
- positioning: staggered
- mineral wool continuously behind the boxes

2 = 10 mm cavity

3 = 60 mm mineral wool

4 = 2 x 12,5 mm gypsum board

5 = dubble frame (2 x 75 mm)



volume measuring room: 111 m<sup>3</sup>

volume measuring room: 94 m<sup>3</sup>

surface area tested partition: 12 m<sup>2</sup>

measured at:  
Peutz Laboratory for Acoustics

signal: broad-band noise

bandwidth: 1/3 octave

ISO 717-1:2013

**$R_w(C;C_{tr}) = 64(-2;-6)$  dB**

$C_{100-5000}; C_{tr,100-5000} = (-1;-6)$  dB

$C_{50-3150}; C_{tr,50-3150} = (-5;-16)$  dB

$C_{50-5000}; C_{tr,50-5000} = (-4;-16)$  dB

|          |                      |                      |                      |                      |                      |                      |                      |
|----------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
|          | 63                   | 125                  | 250                  | 500                  | 1k                   | 2k                   | 4k                   |
| 1/3 oct. | 26,2<br>28,3<br>37,8 | 43,2<br>45,2<br>47,5 | 50,8<br>56,0<br>57,4 | 61,0<br>61,0<br>62,9 | 66,4<br>70,3<br>72,4 | 73,1<br>71,2<br>65,9 | 65,1<br>65,0<br>66,7 |
| 1/1 oct. | 28,7                 | 45,0                 | 53,8                 | 61,5                 | 69,0                 | 69,0                 | 65,5                 |

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## MEASUREMENT OF THE SOUND INSULATION ACCORDING TO ISO 10140-2:2010

principal: Attema



test 4b

1 = 10 x HWD50L-BW (red)

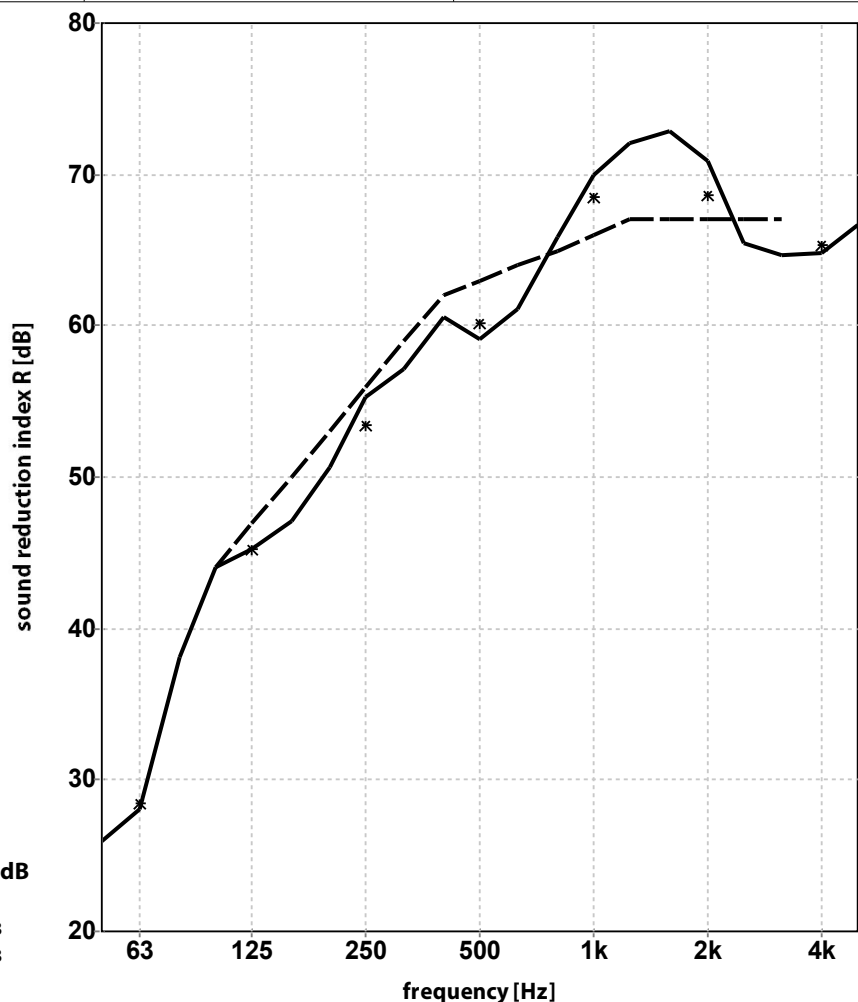
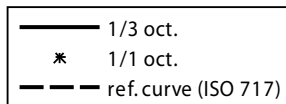
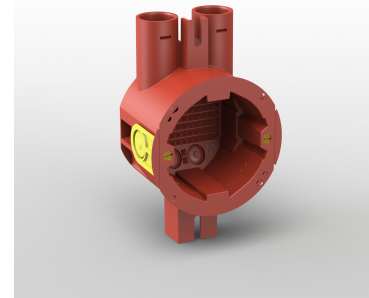
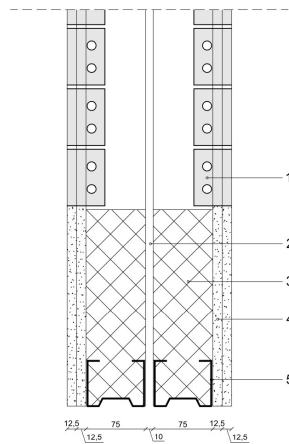
- with fire resistant pad
- with insertion part (red)
- positioning back to back
- mineral wool interrupted behind the boxes

2 = 10 mm cavity

3 = 60 mm mineral wool

4 = 2 x 12,5 mm gypsum board

5 = dubble frame (2 x 75 mm)



volume measuring room: 111 m<sup>3</sup>

volume measuring room: 94 m<sup>3</sup>

surface area tested partition: 12 m<sup>2</sup>

measured at:  
Peutz Laboratory for Acoustics

signal: broad-band noise

bandwidth: 1/3 octave

ISO 717-1:2013

**$R_w(C;C_{tr}) = 63(-1;-5)$  dB**

$C_{100-5000}; C_{tr,100-5000} = (0;-5)$  dB

$C_{50-3150}; C_{tr,50-3150} = (-4;-16)$  dB

$C_{50-5000}; C_{tr,50-5000} = (-3;-16)$  dB

|          |      |      |      |      |      |      |      |
|----------|------|------|------|------|------|------|------|
|          | 26,0 | 44,1 | 50,7 | 60,6 | 65,9 | 72,8 | 64,7 |
| 1/3 oct. | 28,1 | 45,3 | 55,3 | 59,1 | 69,9 | 70,9 | 64,8 |
|          | 38,1 | 47,1 | 57,1 | 61,1 | 72,1 | 65,5 | 66,6 |
| 1/1 oct. | 28,5 | 45,3 | 53,5 | 60,2 | 68,5 | 68,6 | 65,3 |
|          |      |      |      |      |      |      | dB   |

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Mook, 13-10-2017

MEASUREMENT OF THE SOUND INSULATION ACCORDING TO ISO 10140-2:2010



principal: Attema

test 4c

1 = 10 x HWD50L-BW (red)

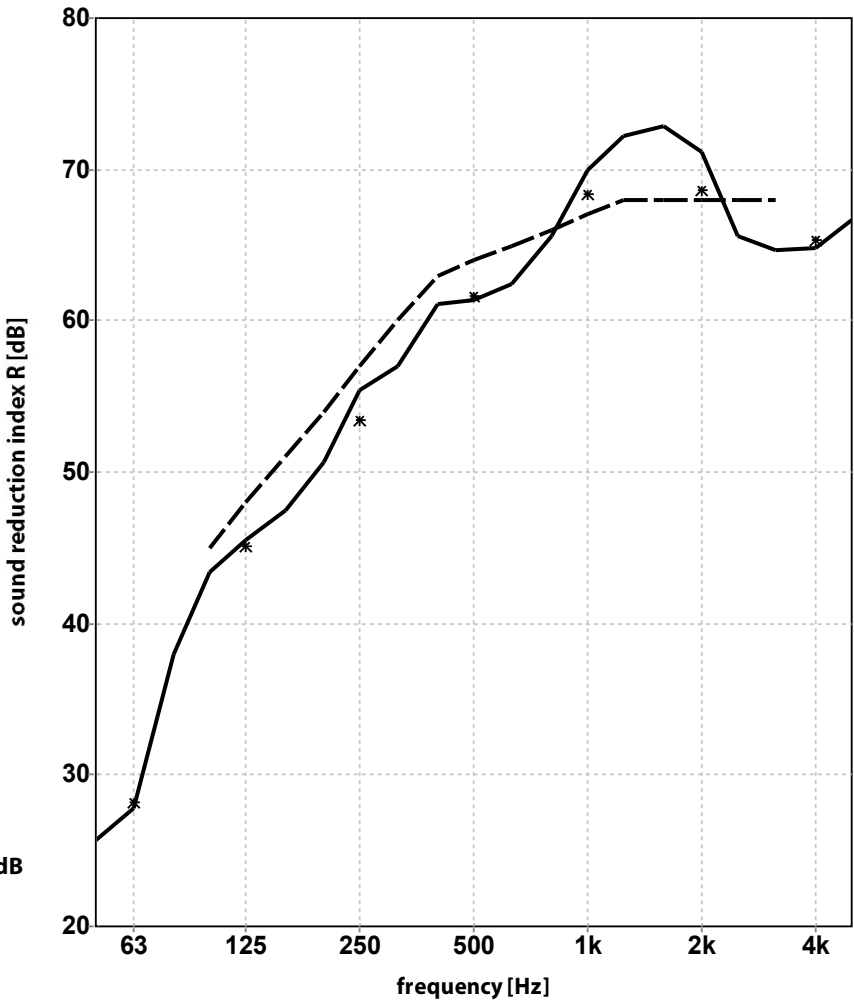
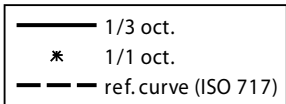
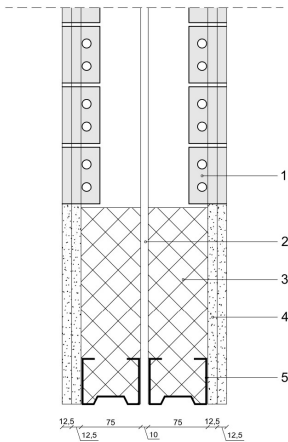
- with fire resistant pad
- with insertion part (red)
- positioning back to back
- mineral wool interrupted behind the boxes
- al boxes wired

2 = 10 mm cavity

3 = 60 mm mineral wool

4 = 2 x 12,5 mm gypsum board

5 = dubble frame (2 x 75 mm)



volume measuring room: 111 m<sup>3</sup>

volume measuring room: 94 m<sup>3</sup>

surface area tested partition: 12 m<sup>2</sup>

measured at:  
Peutz Laboratory for Acoustics

signal: broad-band noise

bandwidth: 1/3 octave

ISO 717-1:2013

**$R_w(C;C_{tr}) = 64(-2;-6)$  dB**

$C_{100-5000};C_{tr,100-5000} = (-1;-6)$  dB

$C_{50-3150};C_{tr,50-3150} = (-5;-17)$  dB

$C_{50-5000};C_{tr,50-5000} = (-4;-17)$  dB

|          |      |      |      |      |      |      |      |
|----------|------|------|------|------|------|------|------|
|          | 25,7 | 43,4 | 50,7 | 61,1 | 65,6 | 72,8 | 64,7 |
| 1/3 oct. | 27,8 | 45,5 | 55,4 | 61,4 | 70,0 | 71,1 | 64,8 |
|          | 38,0 | 47,5 | 57,0 | 62,4 | 72,2 | 65,6 | 66,6 |
| 1/1 oct. | 28,2 | 45,1 | 53,5 | 61,6 | 68,4 | 68,7 | 65,3 |

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Mook, 13-10-2017

MEASUREMENT OF THE SOUND INSULATION ACCORDING TO ISO 10140-2:2010



principal: Attema

test 5

1 = 10 x HWD50L (gray)

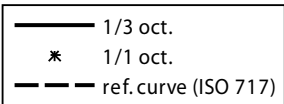
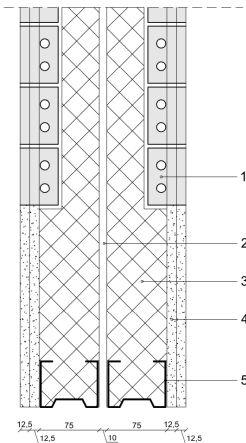
- no fire resistant pad
- with insertion part (dark gray)
- positioning back to back
- mineral wool continuously behind the boxes

2 = 10 mm cavity

3 = 60 mm mineral wool

4 = 2 x 12,5 mm gypsum board

5 = dubble frame (2 x 75 mm)



volume measuring room: 111 m<sup>3</sup>

volume measuring room: 94 m<sup>3</sup>

surface area tested partition: 12 m<sup>2</sup>

measured at:  
Peutz Laboratory for Acoustics

signal: broad-band noise

bandwidth: 1/3 octave

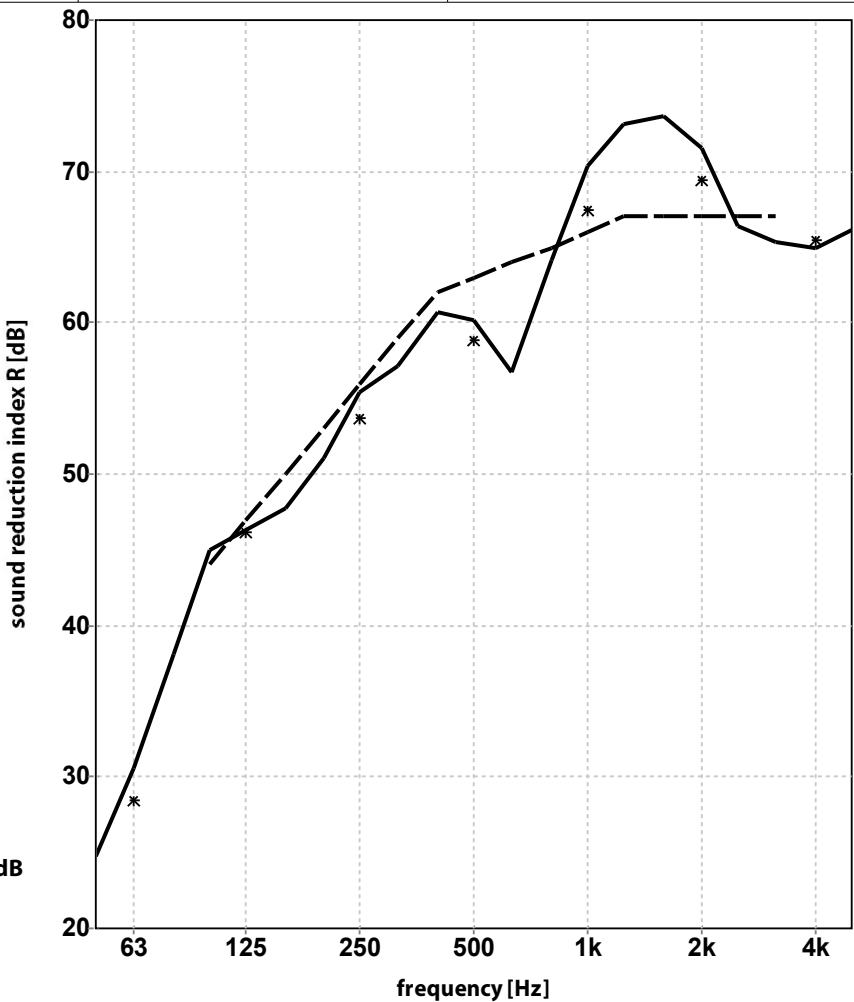
ISO 717-1:2013

**$R_w(C;C_{tr}) = 63(-1;-5)$  dB**

$C_{100-5000}; C_{tr,100-5000} = (-1;-5)$  dB

$C_{50-3150}; C_{tr,50-3150} = (-4;-15)$  dB

$C_{50-5000}; C_{tr,50-5000} = (-3;-15)$  dB



|          |      |      |      |      |      |      |      |
|----------|------|------|------|------|------|------|------|
|          | 24,8 | 45,0 | 51,0 | 60,7 | 64,1 | 73,6 | 65,3 |
| 1/3 oct. | 30,6 | 46,3 | 55,4 | 60,2 | 70,4 | 71,6 | 65,0 |
|          | 38,1 | 47,7 | 57,1 | 56,7 | 73,1 | 66,4 | 66,1 |
| 1/1 oct. | 28,4 | 46,2 | 53,7 | 58,8 | 67,5 | 69,4 | 65,4 |

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Mook, 13-10-2017

figure 13

MEASUREMENT OF THE SOUND INSULATION ACCORDING TO ISO 10140-2:2010



principal: Attema

test 5a

1 = 10 x HWD50L (gray)

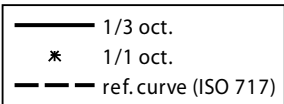
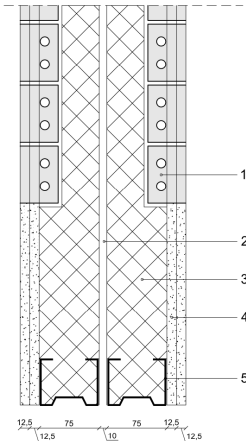
- no fire resistant pad
- no insertion part
- positioning back to back
- mineral wool continuously behind the boxes

2 = 10 mm cavity

3 = 60 mm mineral wool

4 = 2 x 12,5 mm gypsum board

5 = dubble frame (2 x 75 mm)



volume measuring room: 111 m<sup>3</sup>

volume measuring room: 94 m<sup>3</sup>

surface area tested partition: 12 m<sup>2</sup>

measured at:  
Peutz Laboratory for Acoustics

signal: broad-band noise

bandwidth: 1/3 octave

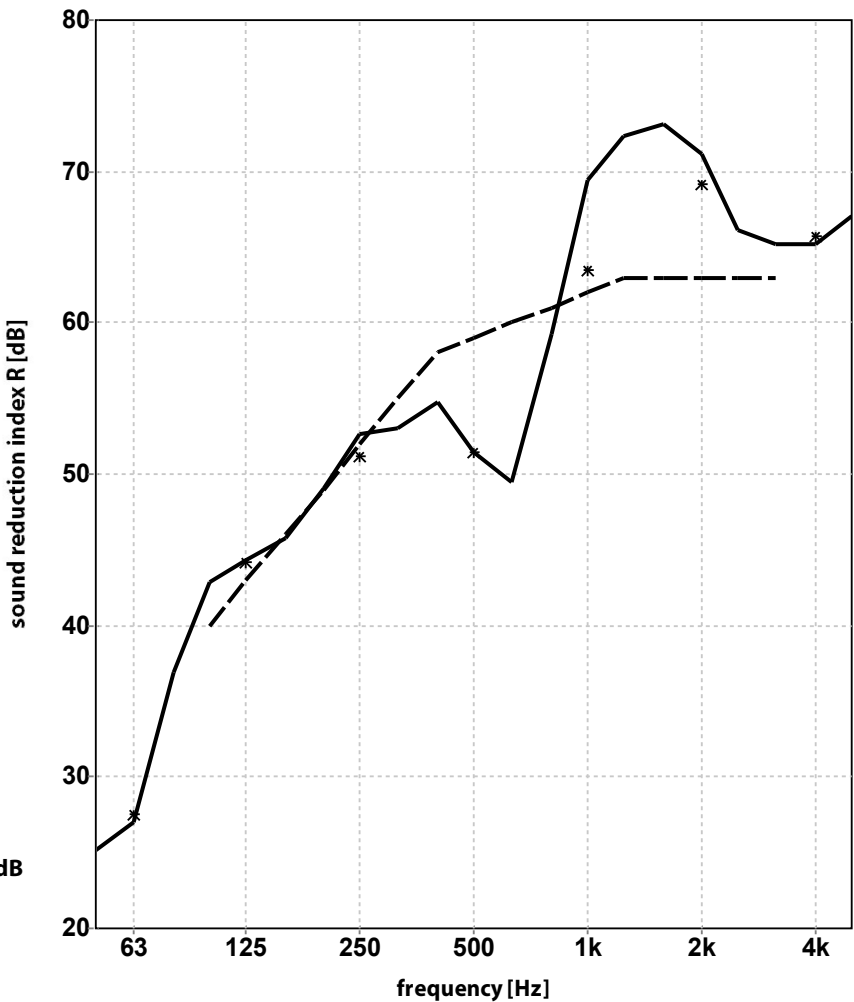
ISO 717-1:2013

**$R_w(C;C_{tr}) = 59(-2;-5)$  dB**

$C_{100-5000};C_{tr,100-5000} = (-1;-5)$  dB

$C_{50-3150};C_{tr,50-3150} = (-3;-13)$  dB

$C_{50-5000};C_{tr,50-5000} = (-3;-13)$  dB



|          |      |      |      |      |      |      |      |
|----------|------|------|------|------|------|------|------|
|          | 25,1 | 42,9 | 49,1 | 54,7 | 59,3 | 73,1 | 65,2 |
| 1/3 oct. | 27,0 | 44,3 | 52,6 | 51,4 | 69,4 | 71,2 | 65,2 |
|          | 36,9 | 45,8 | 53,0 | 49,5 | 72,3 | 66,1 | 67,0 |
| 1/1 oct. | 27,5 | 44,2 | 51,2 | 51,4 | 63,5 | 69,1 | 65,7 |

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Mook, 13-10-2017

figure 14