Fenster
Türen
Fassaden
Werkstoffe
Zubehör

ROSENHEIM

Test report

No. 167 23021/2 e

Date of report	10 July 2000
Customer	ELTON B.V. An der Autobahn 35a 28871 Oyten
Order	Determination of the joint sound insulation of a floor seal with reference to DIN 52210 (Type testing)
Specimen	Lowerable floor seal with product description "ELLEN-MATIC UNIVERSAL RD/BR, double-sided"

Contents

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1 Definition of task

The ift Rosenheim was charged by ELTON B.V., 28871 Oyten, to determine the joint sound reduction of the floor seal with the product description "ELLEN-MATIC UNIVERSAL RD/BR, double-sided" with reference to DIN 52210.

The measurement of the joint seal sound reduction index R_{ST}, in the following referred to as sound reduction index of seals, was carried out using a mobile joint-measuring arrangement, as shown in figs. 1 and 2.

The test method is described in the following. The test conditions and test variations applicable are shown in table 1 and in the measurement sheets.

1.1 Measuring arrangement

This mobile measuring apparatus comprises a highly sound-insulating element made of metal profiles and a Bondal-sheet with a cassette to be inserted (Fig. 1).

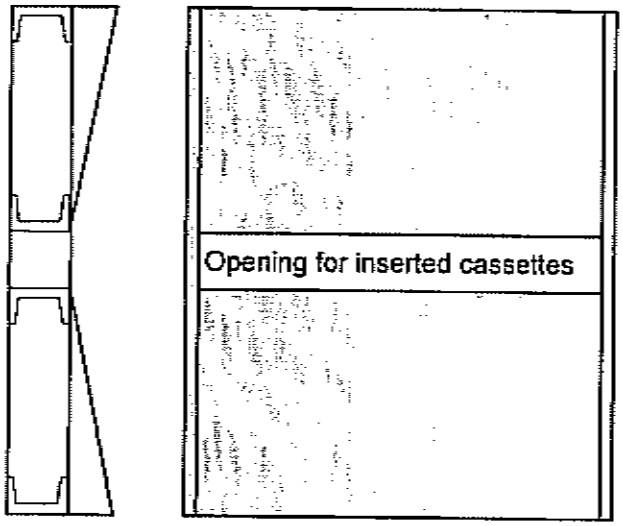

Fig. 1 Highly sound-insulating element

The cassette consists of a door section faced with a heavy, flexible foil with metal splinters, and of the groove for receiving the floor seal. This door section is fixed to a receiving device which is adjustable in height. The sealant seals to an aluminium threshold which simulates the floor.

In this appraratus the joint geometry of the floor seal in a doorway can be simulated. In the cassette the air gap beneath the door, in the following known as air gap b, can be varied (fig. 2). The test was carried out for an air gap of b = 7 mm according to DIN 18101.

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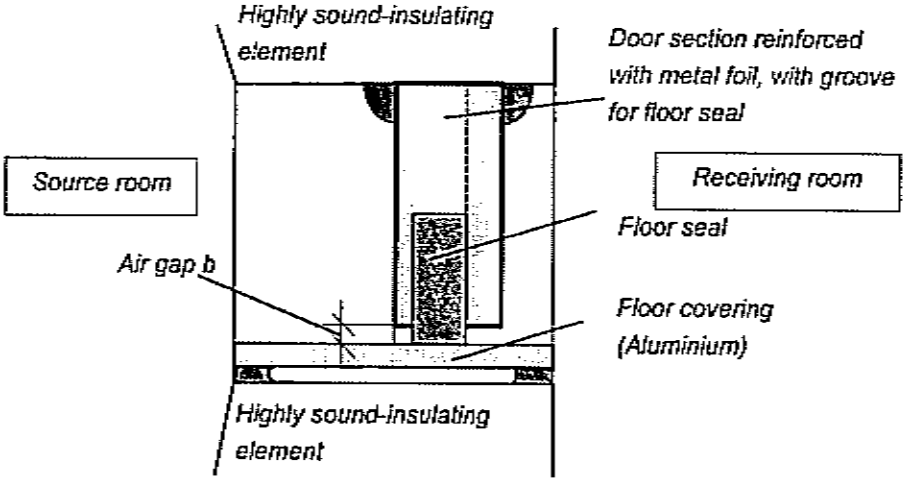
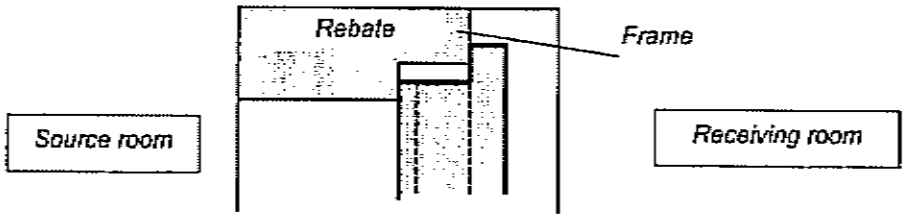


Vertical section



Horizontal section

Bild 2 Cassette (sketch of principle)

Geometric data:
Joint length: l = 960 mm
Air gap: b = variable
Joint depth: t ≈ 50 mm
Task: Sound reduction index of seals R_{ST}

The cassette is mounted into the highly sound-insulating frame (fig. 1), which in turn is installed in the standard window testing apparatus which corresponds to DIN 52210-P-F.

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2 Test procedure

The measurements were carried out on the basis of DIN 52210 using measurement equations for the sound insulation of joints [1], which are not defined in a standard. They give, however, good results for the sound insulation of windows.

The sound reduction index of seals is determined from the sound level difference between the both test rooms. Two measuring equations can be used for that:

1. Reference area S_0

$$R_{S_s} = L_1 - L_2 + 10\log\frac{So}{A}\,dB \qquad (1)$$

where:

R_{So} = Sound reduction index of seal
L_1 = Sound level in the source room
L_2 = Sound level in the receiving room
A = Equivalent sound absorption area of the receiving room, determined by means of measurement of the reverberation time and of the volume of the receiving room
S_O = Reference area = $h_o \cdot l$
where h_o = standard height
l = length of joints

2. Sound receiving area S_N, sound radiating length of joints l_N

$$R_{ST} = L_1 - L_2 + 10\log\frac{S_N l}{A l_N}\,dB \qquad (2)$$

Both measuring equations correspond, if it is fixed:

ho = 1 m
l_N = 1 m
S_N = 1 m²

Then the measuring equation for the sound reduction index of joints is:

$$R_{S_s} = R_{ST} = L_1 - L_2 + 10\log\frac{1l}{A1}\,dB \qquad (3)$$

This sound reduction index of seals is comparable to the sound reduction index of an element which has a defined area where an area of 1 m² relates to a joint of 1 m length. The sound is exclusively transmitted via the joint with seal.

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If the seal is combined with a building component (e.g. doors with a surface S_1 and the sound reduction index R_1) and assuming the building component's surface S_1 >> than the surface of the seal S (= b · l, b = width of joint), then the resulting figure for the sound reduction index is:

$$R_{res} = -10\log\left(10^{-R_1/10} + \frac{S_N \cdot l}{S_1 \cdot l_N} 10^{-R_{ST}/10}\right) dB \qquad (4)$$

or, with the standard area or length

S_N =1 m²

l_N =1 m

$$R_{res} = -10\log\left(10^{-R_1/10} + \frac{l}{S_1} 10^{-R_{ST}/10}\right) dB \qquad (5)$$

Literature:

[1] H. Ertel and F. P. Mechel, Research report Nr. BS 35/79, IBP Stuttgart (1979)

3 Test results

The values of the sound reduction index R_{ST} of the examined floor seal are shown as a function of the frequency drawn-up in a diagram (annex 2). On the basis of this the weighted sound reduction index of seals $R_{ST,w}$, can be calculated in relation to the length of joints l = 0,96 m according to DIN 52210 part 4 (issue 1984).

The limiting sound insulation of the measuring arrangement (related to l = 0,96 m) was also drawn-up in the curve diagram using a weighted maximum sound reduction index

$$R_{ST,w\,max} = 55 \text{ dB}$$

The weighted sound reduction indices of seals as a function of the air gap are given in table 1 and drawn-up in diagram 1.

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Table 1 Measuring results, test arrangement for floor seal ELLEN-MATIC UNIVERSAL RD/BR, double-sided release on an aluminium base.

Annex No.	Weighted sound reduction index of seals $R_{ST,w}$ in dB	Measures taken, notes
2	55	Maximum sound insulation
2	44	Air gap 7 mm

For the nominal measure of b_3 = 7 mm for the lower air gap according to DIN 18101 (1.1985) the result is a

nominal weighted sound reduction index for floor seals $R_{ST,w,0}$ = 44 dB

4 Conclusions

For use in practice, i.e. the combination of the weighted sound reduction of a door with the weighted sound reduction of a defined floor joint, annex 1 is to be observed. The measured sound reduction indices of joints are applicable for solid, flat bases. The indices cannot be extended to uneven bases or to carpets.

5 Information for use of ift test reports

Regulations for the use of test reports are given in the enclosed information sheet „Conditions and information for use of ift test reports for publication and commercial purposes".

ift Rosenheim
10 July 2000

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Dr. Helmut Hohenstein

Dept. Sound insulation
Dr. Rolf Schumacher

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Determination of the resulting weighted sound reduction index of a door in combination with the tested floor seal ELLEN-MATIC UNIVERSAL RD/BR, double-sided.

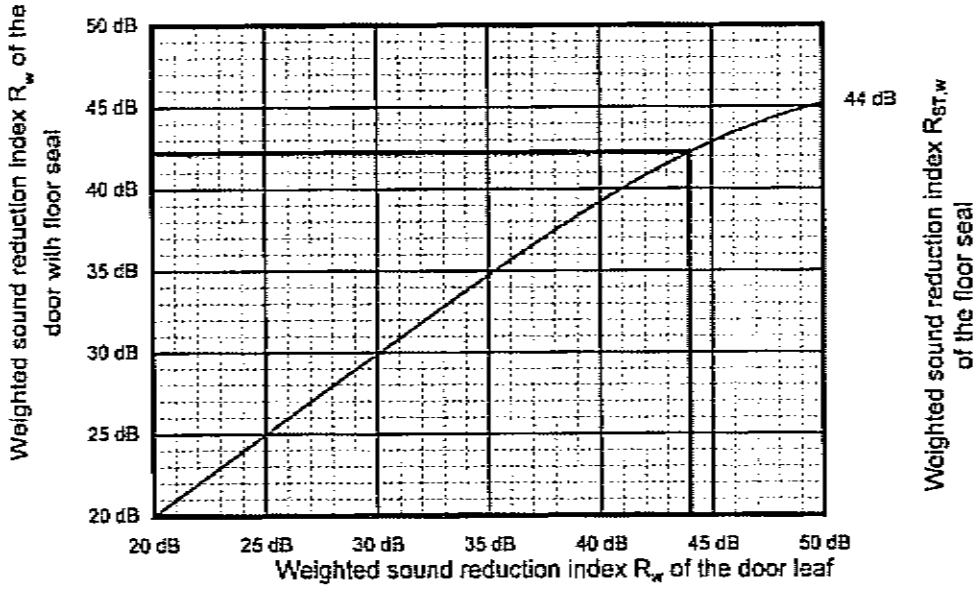


Diagram 2 Graphic representation of the weighted sound reduction index of a door

Diagram 2 shows a graphic method to determine the weighted sound reduction index of a door using the weighted sound reduction index of a door leaf and the weighted sound reduction index of the floor seal. The calculation of resulting weighted sound reduction indices (5) with S_1 = 2 m² and l = 1 m forms the basis of the diagram.

Procedure:
Taking the weighted sound reduction index of the floor seal, at an air gap of b = 7 mm, and the weighted sound reduction of the door leaf, the resulting weighted sound insulation index can be determined from diagram 1.

Example:

Weighted sound reduction index of the door leaf	R_w = 44 dB
Weighted sound reduction index of the floor seal	$R_{ST,w}$ = 44 dB
Resulting weighted sound reduction index of the door	R_w = 42 dB

Without the seal (empty joint with 7 mm air gap, $R_{ST,w} \approx$ 20 dB) the weighted sound reduction index of the ready-to-use door is at 2 R_w = 22 dB according to the diagram.

Sound reduction index following DIN 52210

Customer: ELTON B.V., 28871 Oyten

Type testing
Annex 2

Test specimen:

Floor seal

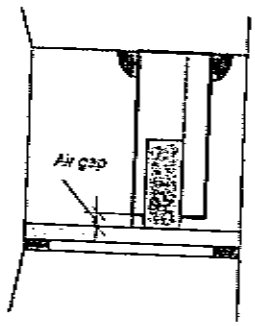
ELLEN-MATIC UNIVERSAL RD/BR, double-sided, fixed at the sides, acting to both sides

Geometry of the joint:

Length:	960mm
Depth:	≈ 50 mm
Rebate:	simple

Test arrangement

Profile



Drawing of the test arrangement
(no true to scale)

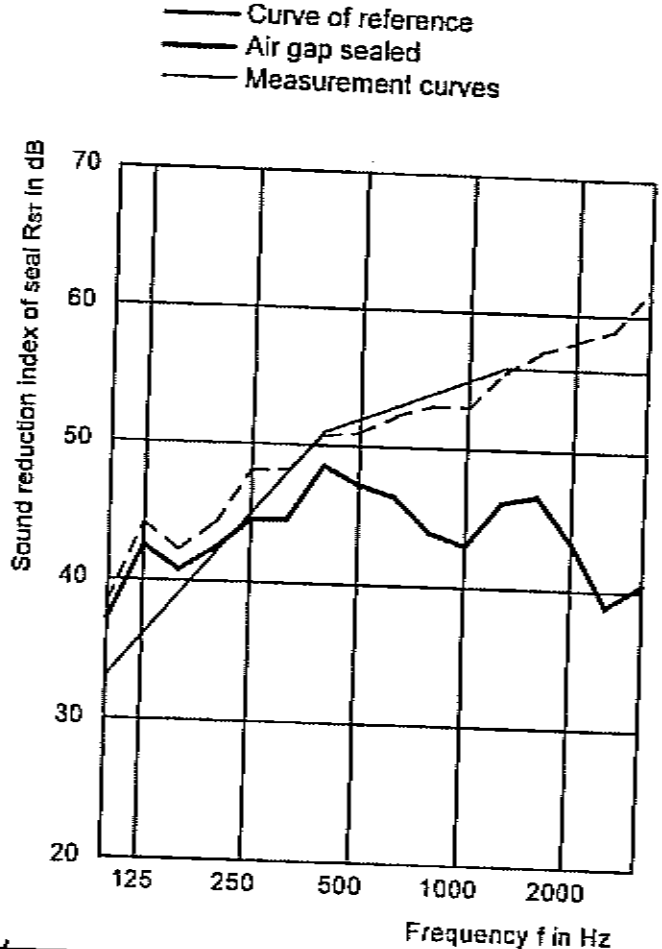
Test date	21 June 2000
Test length	0,96 m

Laboratory partition wall
Two-leaf concrete wall, DIN 52210 part 2 (1984)

Volumes of test rooms
V_S = 109,9 m³
V_E = 101,3 m³

Maximum weighted sound reduction index
$R_{w,max}$ = 55 dB (related to test length)

Mounting conditions
Insertion of cassette into highly sound insulating element.



$R_{ST,w}$ from diagram R(f)

Weighted sound reduction index of seals

Floor joint sealed $R_{ST,w}$ = 55 dB

Air gap 7 mm $R_{ST,w}$ = 44 dB

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