

Fraunhofer Institute for Building Physics

Head of Institute: Karl A. Gertis Prof. Dr. B/Eng

Officially recognised test station for the approval of new building materials, building parts and building methods.

Research · Development · Testing · Demonstration · Consultancy

Airborne sound absorption of an outer wall in accordance with DIN standard 52 210

Applicant: EUROMAC 2
Carreau de la mine B.P. 22
F – 57730 Folschviller
France

1. Place and Date of Measurement

The measurement was carried out on Oct.15.1993 in the Schreer family home in Rosbruck.

2. Test Matter

Outer wall without window (see figure 1)

Assembly of the outer wall (from outside in):

18mm	Base plaster
45 mm	Polystyrene hard foam (Gross density unknown)
160 mm	Reinforced concrete
45 mm	Polystyrene hard foam (Gross density unknown)
18 mm	Gypsum plaster (cement plaster)
	Flagstone casing

Area related mass approx. 420 kg/m²

3. Test Benches

The bathroom, (throughout the test, referred to as the reception room) used for the reading, had a volume of approx. 24m³. The wall for testing had an area of 10m².

Accompanying Building Parts

Outer wall:	As tested outer wall
Inner wall:	As outer wall
Floor:	Flagstone casing
	45 mm Cement coating

50 mm	Pressure plate made from reinforced concrete with steel mat padding
160 mm	Polystyrene hard foam hollow components EUROMAC 2 Individual width 0.6 m, in between, reinforcement beams and bracing, filled with concrete as far as the lower edge of the pressure plate
10 mm	Plasterboard

Ceiling: As floor

4. Test Method

The measurement was carried out in accordance with DIN standard 52 210, pt.1, Edit.1984 and pt. 5, Edit. 1985.

The calculation of the airborne sound absorption was carried out in accordance with DIN standard 52 210, pt.4, Edit. 1984

Test sounds were third sounds. A box with directed sound irradiation was used as a loudspeaker. The loudspeaker box was placed at a distance of about 5m away at an angle of 45° to the outer wall area — standing normally.

The distance of the microphone from the external side of the outer wall was 1cm. With a microphone and a third octave band filter connected, the spatial and temporal sound pressure levels were taken, at different measuring points in the room. The airborne sound measurement was calculated in the following way.

$$R'_{\zeta} = L_1 - L_2 + 101g \frac{S \cdot \cos \alpha}{A} \text{ dB}$$

Where these symbols are equal to:

R'_{ζ}	=	Airborne Sound Measurement
L_1	=	Sound level on the surface of the test object
L_2	=	Sound level in room
S	=	Area of the test object
A	=	Equivalent sound absorption area in room, determined from Reverberation period measurements
ζ	=	Sound angle of incidence

5. Measurement Results

The values of the sound absorption measurement are dependant on the frequency illustrated in figure 2. The estimated sound absorption measurement amounted to:

$$R'_{\zeta w} = 44 \text{ dB}$$

The test report consists of 4 pages and 2 figures. Publication of extracts is only permitted with written approval from the Fraunhofer Institute for Building Physics.

Stuttgart, 15\03\1994

Originator

Test Centre and Department Manager

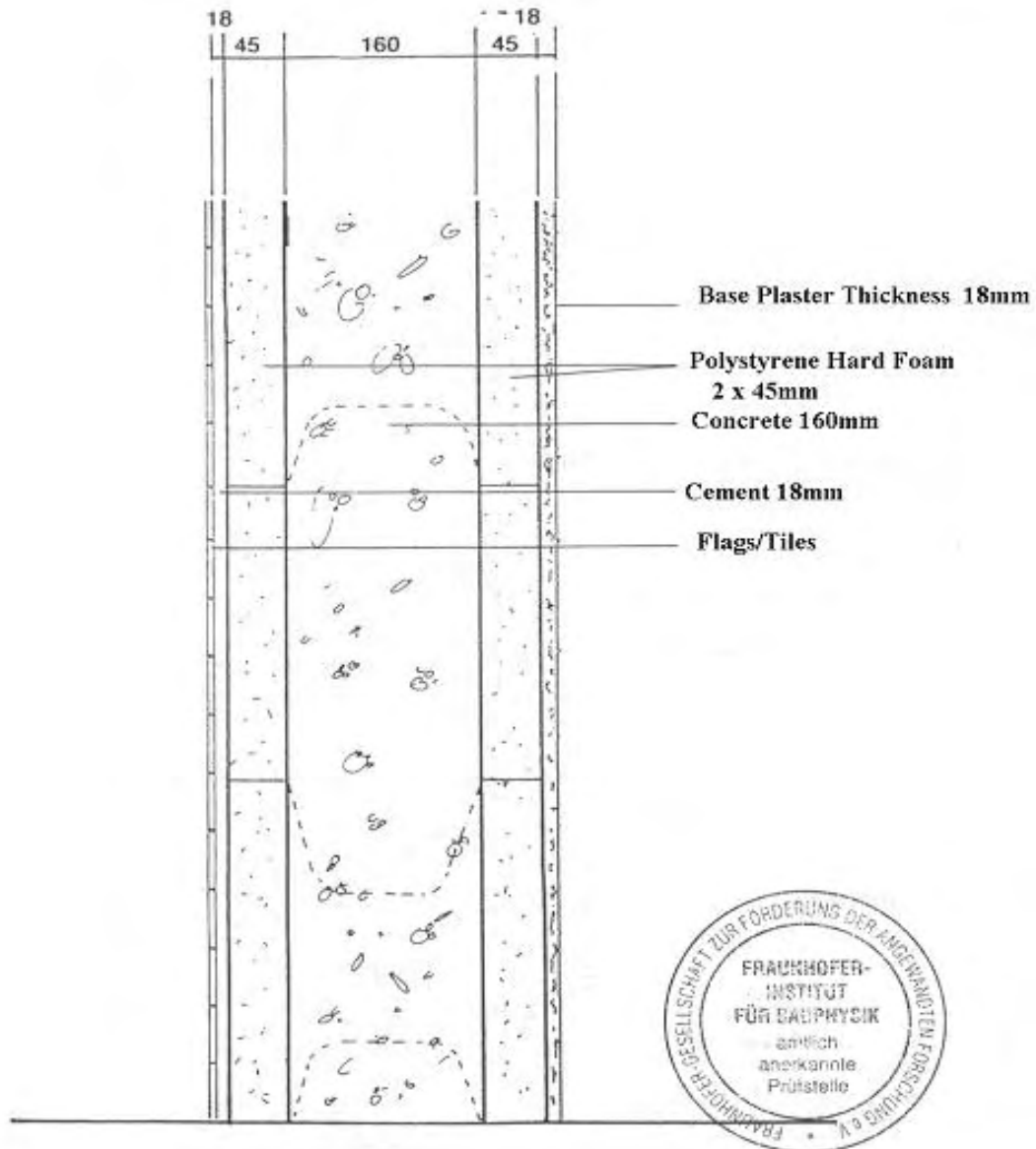


Figure 1 Section of tested outer wall (Applicant's drawing)

Sound Absorption Measure according to DIN 52 210 Section 5

P-BA 55/1994
Figure 2

Applicant: EUROMAC 2 F - 57 730 Folschviller

Quality Testing

Test Object:

Outer wall without window (See Figure 1)

Assembly of outer wall (from outside in)

18mm Base Plaster
45mm Polystyrene Hard Foam (Gross Density Unknown)
160mm Reinforced Concrete
45mm Polystyrene Hard Foam (Gross Density Unknown)
18mm Cement Plaster
Flagstone Casing / Tiling
Area Related Mass approx. 420kg/m²

Test Area: 10.00 m²

Test Room

Volume: $V_s = \text{--- m}^3$
 $V_e = 24 \text{ m}^3$

Type: Bathroom

Condition: Furnished

Test Sound: Third Sounds

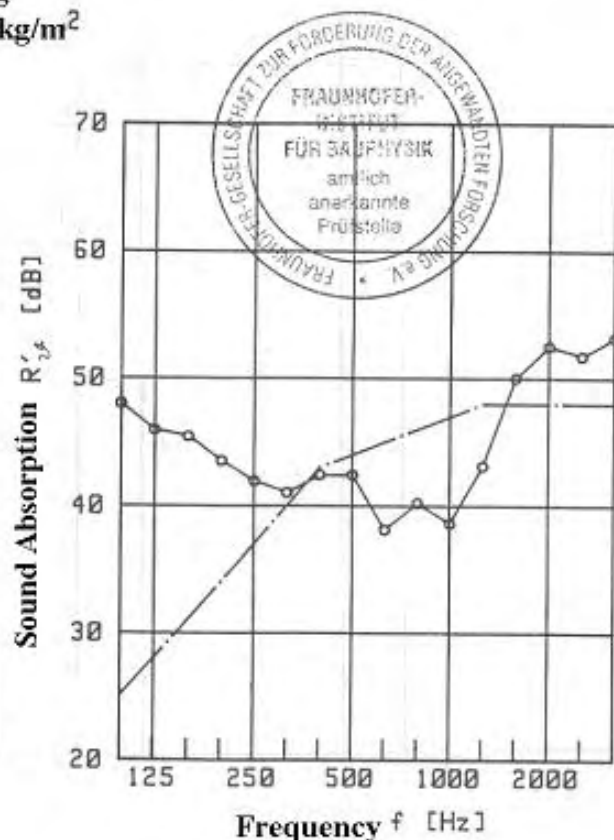
Test Method

DIN 52 210-05-LA-N

Test Date: Oct. 15. 1993

Assessed Sound Absorption

$$R'_{\alpha, w} = 44 \text{ dB}$$



Stuttgart
May.15.1994

Fraunhofer Institute for Building Physics

Test Centre Manager: *iv. Gföschl*

