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Testing body recognized by the DIBT for the issue of general building authority test certificates
VMPA-recognized sound insulation testing body in accordance with DIN 4109
Test point in accordance with Section 26 BImSchG [German Federal Immission Control Act] for noises and vibrations

TEST REPORT

F-TRONIC POWER SOCKETS
TYPE SOUND INSULATION SP3700
INSTALLED IN A LIGHTWEIGHT WALL, D = 100 MM

MEASUREMENT OF THE AIRBORNE SOUND INSULATION
IN ACCORDANCE WITH EN ISO 10 140

0121.16 – P 60/16

CONTRACTOR:

F-TRONIC GMBH
ZUM GERLEN 21-25
66131 ENSHEIM

2016-06-29
kü/ko

TEST REPORT 0121.16 – P 60/16

f-tronic power sockets, type sound insulation SP3700
Lightweight wall d = 100 mm, cladding 2 x 12,5 mm plasterboard Rigips DH
Measurement of the airborne sound reduction in accordance with EN ISO 140

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1. PURPOSE OF THE MEASUREMENTS

Testing had to be carried out whether the airborne sound insulation is impaired when opposing f-tronic power sockets (cavity wall sockets), type sound insulation SP3700, are installed in a lightweight wall ((metal stud frame with plasterboard cladding, d = 100 mm) 5 sound insulation sockets with switches/sockets and blind frames each were installed. Measurements of the airborne sound insulation of the lightweight wall with and without power sockets were carried out to determine the values

2. DATE OF MEASUREMENT

Installation: 2016-05-19/20, lightweight wall
2016-05-24, power sockets
Measurement: 2016-05-23, lightweight wall
2016-05-24, wall with power sockets

3. TEST SET-UP

Lightweight wall, thickness 100 mm:

Cladding: 2 x 12.5 mm plasterboard Rigips DH (Rigips Die Harte),
Surface-related mass: m' = 12.9 kg/m^2,
Screwed connection using Rigips drywall screw 3.5 x 25 / 3.5 x 35
1. position every 500 mm, position every 170 mm
Filling the boards with Rigips Vario joint filler

Profiles: UW 50 x 40 x 0.6, CW 50 x 50 x 06, into which the following are inserted:
40 mm rock wool Rockwool Sonorock, length-related flow resistance ≥ 6 kPa x s/m²

Arrangement of the power sockets, type sound insulation SP3700, in the lightweight wall:

Quantity: 5 power sockets, of which are 2 equipped with empty conduits, arranged under each other (see photos),
Source room 3 x switches and 2 x sockets,
Receiving room 4 x switches and 1 x socket

Spacing: offset arrangement, spacing 500 mm (see Appendixes 2 to 5)

The technical data sheet of the sound insulation socket is included in Appendix 5.

4. TEST ARRANGEMENT

The delivery and the installation of the lightweight wall in the wall test bench P-W1 with suppressed flanking transmission took place through a drywall construction company appointed by the contractor. The sound insulation sockets were installed in the light-weight wall by the contractor.

The test stand sketch with schematic representation of the wall is shown in Appendix 1. The maximum sound reduction index of the test bench was determined by the installation of the lightweight wall in accordance with EN ISO 10 140-1 [1].

The maximum weighted sound reduction index of the test bench referenced to the test area of 13.42 m^2 amounts to

$$R'_{w,max} = 69 \text{ dB}.$$

5. MEASURING METHOD

5.1 Applied standards

[1] EN ISO 10 140:2010-05 "Measurement of the noise insulation of building parts in test bench"
2014-09, Part 1 "Application rules for specific products"
2010-12, Part 2 "Measurement of the airborne sound insulation"
2010-12, Part 4 "Measuring methods and requirements"
2014-09, Part 5 "Requirements at test benches and test devices"

[2] EN ISO 3382:2008-09 "Acoustics - Measurement of room acoustics parameters"

[3] EN ISO 717:2013-06 "Rating of sound insulation in buildings and of building elements"
Part 1 "Airborne sound insulation"

[4] EN ISO 12 999-1:2014-09 "Acoustics – Determination and application of the measurement uncertainties in building acoustics – part 1: Sound insulation".

5.2 Determination of the sound insulation

The tests were performed in accordance with EN ISO 10 140 "Measurement of the sound insulation of building parts in the test bench", Part 2 "Measurement of the airborne sound insulation".

The sound insulation index R' was determined in accordance with the following equations:

$$R'_i = D_i + 10 \log \frac{S}{A} \text{ in dB} \qquad [1]$$

$$R' = -10 \log \frac{1}{m} \sum_{j=1}^{m} 10^{-R'j/10} \text{ in dB} \qquad [2]$$

Whereby the following applies:

R'_i = Sound reduction index for speaker position j

D_i = Level difference of the energetically determined sound pressure levels between source and receiving room in dB for speaker position j

S = Area of the joint partition component in m^2

A = Equivalent absorption area of the receiving room in m^2

m = Number of speaker positions.

The determination of the sound pressure level took place at fifteen microphone positions for three loudspeaker positions. The energetically taken mean of the sound pressure level

was determined from the results. The integration time per measuring position amounted to 20 s respectively.

The basic noise level was sufficiently low, so that no corresponding correction in accordance with EN ISO 10 140-4 was required.

The equivalent absorption area was determined from a reverberation measurement in accordance with the relationship

$$A = 0.16 \frac{V}{T} \text{ in } m^2.$$

Whereby the following applies:

V = Volume of the receiving room in m^3, in the present case V = 51.1 m^3

T = Reverberation time in s.

The reverberation time was determined in accordance with the specifications of EN ISO 10 140-4, Section 4.6.2 "Measurement of the reverberation time". This references ISO 3382-2 "Reverberation time in ordinary rooms".

The procedure with switched off noise was used. Two reverberation times each were recorded at the microphone individual positions. The arithmetic mean was formed from the individual measured values.

The weighted sound insulation index R_w as well as the spectrum adjustment values C and C_{tr} were determined in accordance with ISO 717-1, German version DIN EN ISO 717-1 "Evaluation of the sound insulation in buildings and parts", Part 1 "Airborne sound insulation".

With regard to the repeatability standard deviation σ_r and the reproducibility standard deviation σ_R, reference is made to Tables 2 and 3 of EN ISO 12 999-1 "Measuring the sound insulation index in buildings and building elements".

The results in the frequency range of 50 Hz to 80 Hz are influenced by the geometrical circumstances of the test bench. The display of these measured values is for information purposes only.

6. MEASURING DEVICES

Designation	Type	Serial Number
Two-channel real time analyzer (calibrated up to and including 2016)	Norsonic 840	18670
in combination with:		
Condenser microphone (channel 1)	Norsonic 1220	16595
Microphone preamplifier (channel 1)	Norsonic 1201	19101
Condenser microphone (channel 2)	Norsonic 1220	27616
Microphone preamplifier (channel 2)	Norsonic 1201	19102
Pistonphone	B+K 4220	1297614
Speaker combination (dodecahedron)	Norsonic 229	26861
Power amplifier	Norsonic 235	17668
Thermal hygrometer	Lambrecht 202	

The measuring devices were calibrated before and after the measurements. There were no deviations.

7. MEASURING RESULTS

The results are displayed as a graphic in Appendix 6 and 7 and as a comparison in Appendix 8. The following table contains the weighted sound reduction index $R_{w,P}$ (test bench value).

Table: Weighted sound reduction index $R_{w,P}$ (test bench value)

App. No.	Test set-up	Weighted sound reduction index $R_{w,P}$ in dB
6	Lightweight wall, d = 100 mm Without power sockets	55 (55.4)
7	Lightweight wall with 5 power sockets each, type sound insulation SP3700, arranged offset in source and receiving room, spacing 500 mm	55 (55.2)

The determined single digit specifications show that no significant deterioration occurs in the sound insulation dimension through the installation of 5 noise insulation sockets offset to each other by 500 mm.

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8. GENERAL REMARKS

The results reference solely the tested objects.

THIS REPORT ENCOMPASSES 10 PAGES AND 8 APPENDIXES.

WIESBADEN, ON 2016-06-29

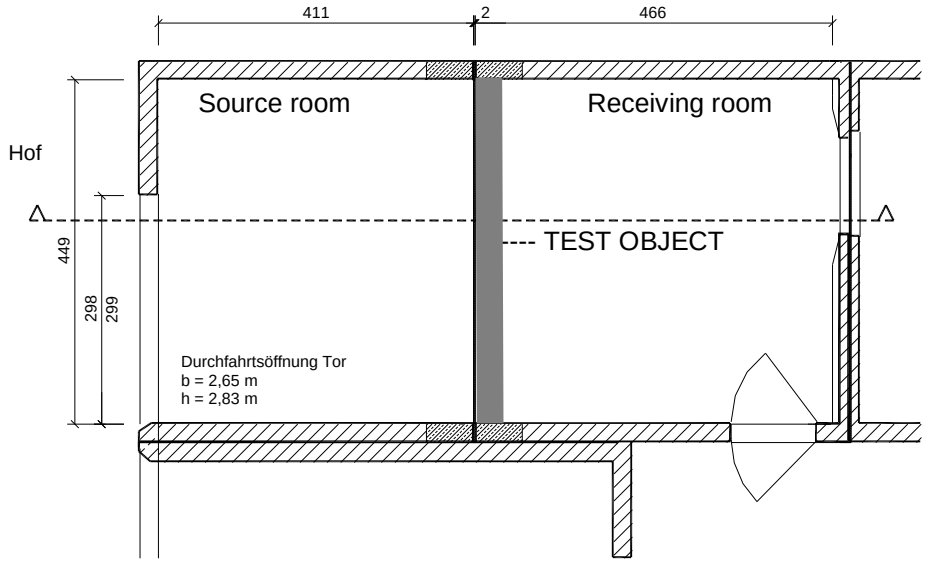
ITA INGENIEURGESELLSCHAFT
FÜR TECHNISCHE AKUSTIK MBH

Eßer Kühn

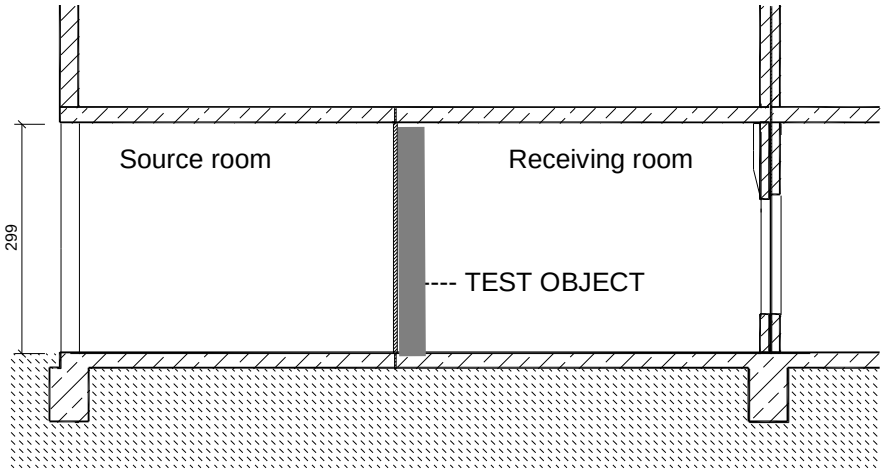
WALL TEST BENCH IN ACCORDANCE WITH EN ISO 10140 - PW1

INSTALLATION OF THE TEST OBJECT SCHEMATIC

GRUNDRISS



SCHNITT

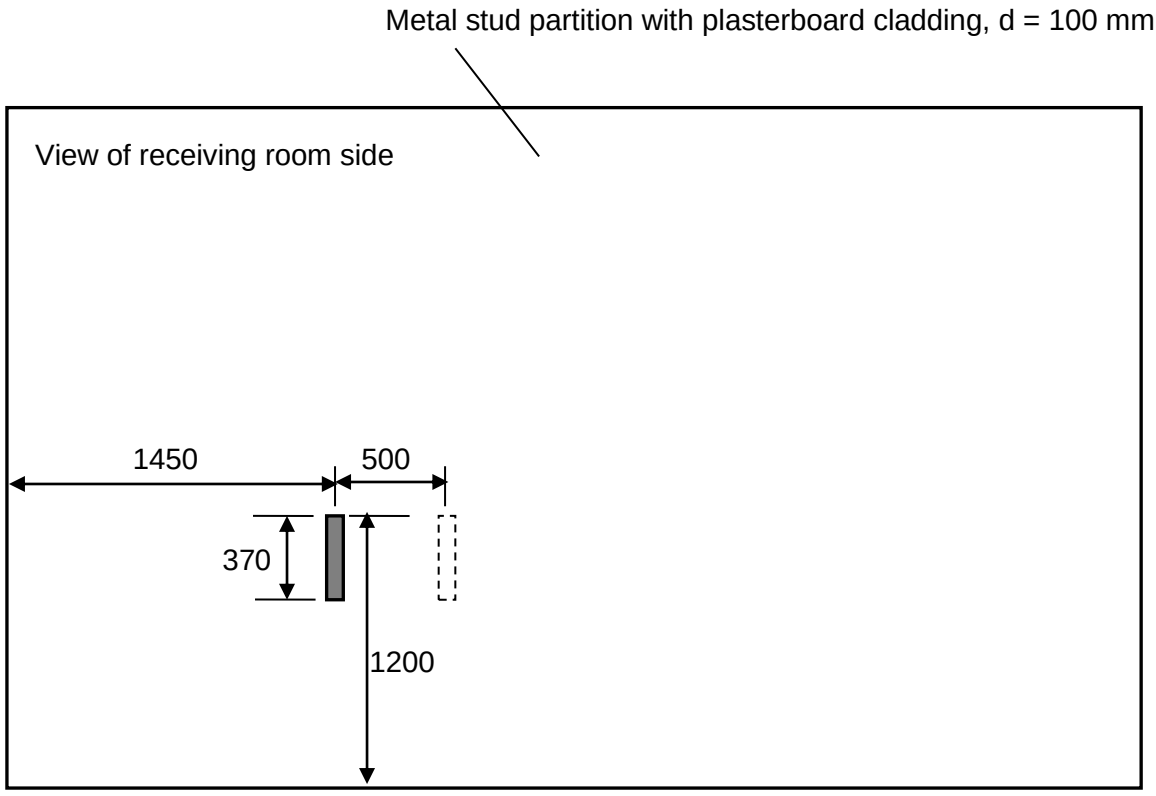


ACOUSTIC LABORATORIES

f-tronic power sockets, type sound insulation SP3700

Contractor: f-tronic GmbH
Zum Gerlen 21-25, 66131 Ensheim

Arrangement of the power sockets, type sound insulation SP3700, in a lightweight wall
Quantity: Source room with 3 x switches and 2 x sockets,
Receiving room with 4 x switches and 1 x socket
Spacing: 500 mm



Dimensions specified in mm

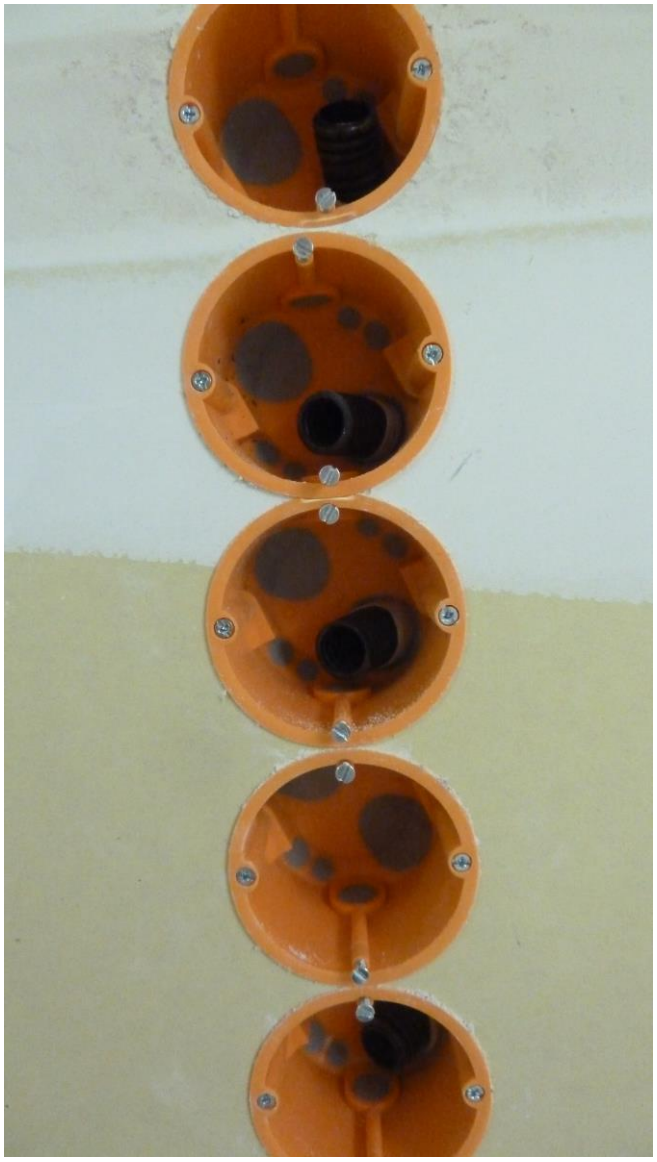
Installation of the sound insulation sockets with switches, sockets and frames, installed with offset on the source room side, spacing 500 mm

ACOUSTIC LABORATORIES

f-tronic power sockets, type sound insulation SP3700

Contractor: f-tronic GmbH
Zum Gerlen 21-25, 66131 Ensheim

Arrangement of the sound insulation sockets in the source room

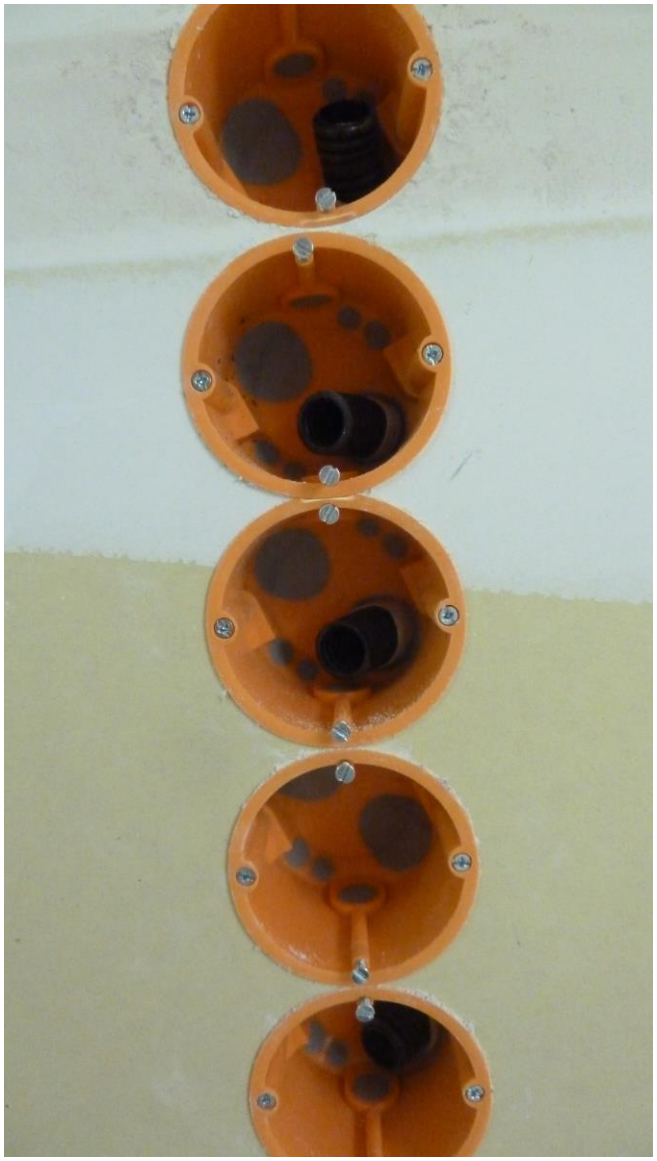


ACOUSTIC LABORATORIES

f-tronic power sockets, type sound insulation SP3700

Contractor: f-tronic GmbH
Zum Gerlen 21-25, 66131 Ensheim

Arrangement of the sound insulation sockets in the receiving room



ACOUSTIC LABORATORIES

f-tronic power sockets, type sound insulation SP3700

Contractor: f-tronic GmbH
Zum Gerlen 21-25, 66131 Ensheim

System drawing of the contractor