

SG-Bauakustik

Institut für schalltechnische Produktoptimierung

Test Report

No. 1286-002-10 of 15.10.2010

**Airborne Sound Insulation of
folding sliding system SF 75 in Laboratory**

Customer: Sunflex Aluminiumsysteme GmbH
Im Ruttenberge 12
57482 Wenden

Test item: Folding Sliding System
Make Sunflex, Type SF 75

Task: Determination of the Airborne Sound Insulation acc. to
DIN EN ISO 140-3 in the Test Stand

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1. Test and General Information

1.1 Test

Sunflex Aluminiumsysteme GmbH, Wenden, manufactures and sells folding sliding systems, which can be used as partitions in the interior of buildings but also for closing off heated living quarters from the outside area. The system to be tested, type SF 75, which is a folding wall made of highly thermally insulated aluminium profiles, which is equipped with insulation glass units having a thickness of $d = 28$ mm. The triple wing wall is equipped with ceiling and floor rail tracks flushed with the system and with vertical seals at the wing joints as well as horizontal seals at the top and beneath the ceiling and floor rail tracks.

The System SF 75 was installed in the test stand and tested in respect for airborne sound insulation. For this purpose, the construction had to be installed in the test opening with the dimensions width x height = 2.650 mm x 2.450 mm with suppressed flanking transmission acc. to DIN EN ISO 140-1.

The measured sound reduction index of the test item, manufactured by the Customer, is determined by functional conditions acc. to DIN EN ISO 140-3.

1.2 Measuring Standard

The measurements were established according to the following standards and directives:

- DIN EN ISO 140-3 „Acoustics – Measurement of the Sound Insulation in Buildings and Components – Part 3: Measurement of the Airborne Sound Insulation of Components in Laboratory“ (ISO 140-3:1995 + AM 1:2004); German version EN 20 140-3:1995 + A1:2004
- DIN EN ISO 140-1 „Acoustics – Measurement of the Sound Insulation in Buildings and Components – Part 1: Requirements for Laboratory with suppressed Flanking Transmission“ (ISO 140-1:1997 + AM 1:2004); German version EN ISO 140-1:1997 + A1:2004
- DIN EN ISO 717-1 „Acoustics – Evaluation of the Sound Insulation in Buildings and Components – Part 1: Airborne Sound Insulation (ISO 717-1:1996)“; German version EN ISO 717-1:1996

1.3 Manufacturer of the Test Arrangement

Sunflex Aluminiumsysteme GmbH
 Im Ruttenberge 12
 57482 Wenden

1.4 Customer of the Test

Sunflex Aluminiumsysteme GmbH
 Im Ruttenberge 12
 57482 Wenden

2. Test Item Setup and Test Arrangement

2.1 Laboratory

The specified element was installed by the fitters of the manufacturer for the determination of the airborne sound insulation in the test stand belonging to the institute with suppressed flanking transmission according to

DIN EN ISO 140-1.

The maximum sound reduction index R_{max} of the test stand with installation of a lightweight wall acc. to DIN EN ISO 140-1, Appendix A.2.1 is:

f_{Terz} in Hz	50	63	80	100	125	160	200	250	315	400	500
R_{max} in dB	29,2	40,8	34,6	44,1	44,3	49,6	55,7	59,6	61,6	63,8	68,1

f_{Terz} in Hz	630	800	1000	1250	1600	2000	2500	3150	4000	5000
R_{max} in dB	70,6	72,0	75,1	74,6	73,2	73,3	78,7	83,0	86,2	90,5

The weighted sound reduction index is:

$$R_{w, max} = 68 \text{ dB.}$$

The surrounding wall of the folding sliding system was installed by skilled personnel of the testing institute. In order to achieve an adequate high sound insulation, the wall panels, approx. $d = 500$ mm overall wall thickness, were installed with separate metal stands on both sides of the joint.

2.2 Test Setup

The tested element was an aluminium folding sliding system made of profiles having a thickness of 75 mm and floor and ceiling track rails as well as side profiles and 3 wings equipped with insulated glass units having a thickness of 28 mm. The folding sliding wings were connected with one another. A carriage system (which was adjustable in height) was guided in a ceiling track rail and a floor track rail. The side wall connection was a vertical connection profile. The dimensions of the complete element is approx. width x height = 2.650 mm x 2.450 mm. The surface area is approx. 6,49 m².

The glazing units indicate the following design features:

Assembly: Float, $d = 6$ mm
 SZR 18 mm
 LE Premium, $d = 4$ mm

The following constructional systems were tested:

Folding Sliding System SF 75

The detailed setup of the construction is evident from the drawings of the manufacturer, Annexes 1 thru 8.

The joints between the ceiling rail and the floor rail and the test opening were sealed with silicon mass.

Annexes 9 and 10 include a photo documentation of the setup in the Laboratory. Annex 11 shows a principle diagram of the test arrangement.

3. Measurement and Measurement Implementation

The measurement of the weighted sound reduction index of the folding sliding system R_w in dB was carried out in accordance with the specifications of the standard

- DIN EN ISO 140-3
„Measurement of the Airborne Sound Insulation in Buildings and Components“
Part 3: „Measurement of the Airborne Sound Insulation of Components in Laboratory“

The setup of the measurement, as well as a measurement description, is evident from Annex 12 of this Test Report.

4. Measurement Results


The weighted sound reduction index of the setup tested on 13.10.2010 being installed in functional condition was determined without influence of the flanking components as follows:

Test Item	Weighted Sound Reduction Index R_w in dB
Folding Sliding System SF 75, setup see section 2.2 and Annexes 1 thru 8	36

The frequency dependent curve progression of the sound reduction index is evident from Annex 13.

The measurement results show test stand values. In case of plane application a derivative margin of 2 dB should be taken into account.

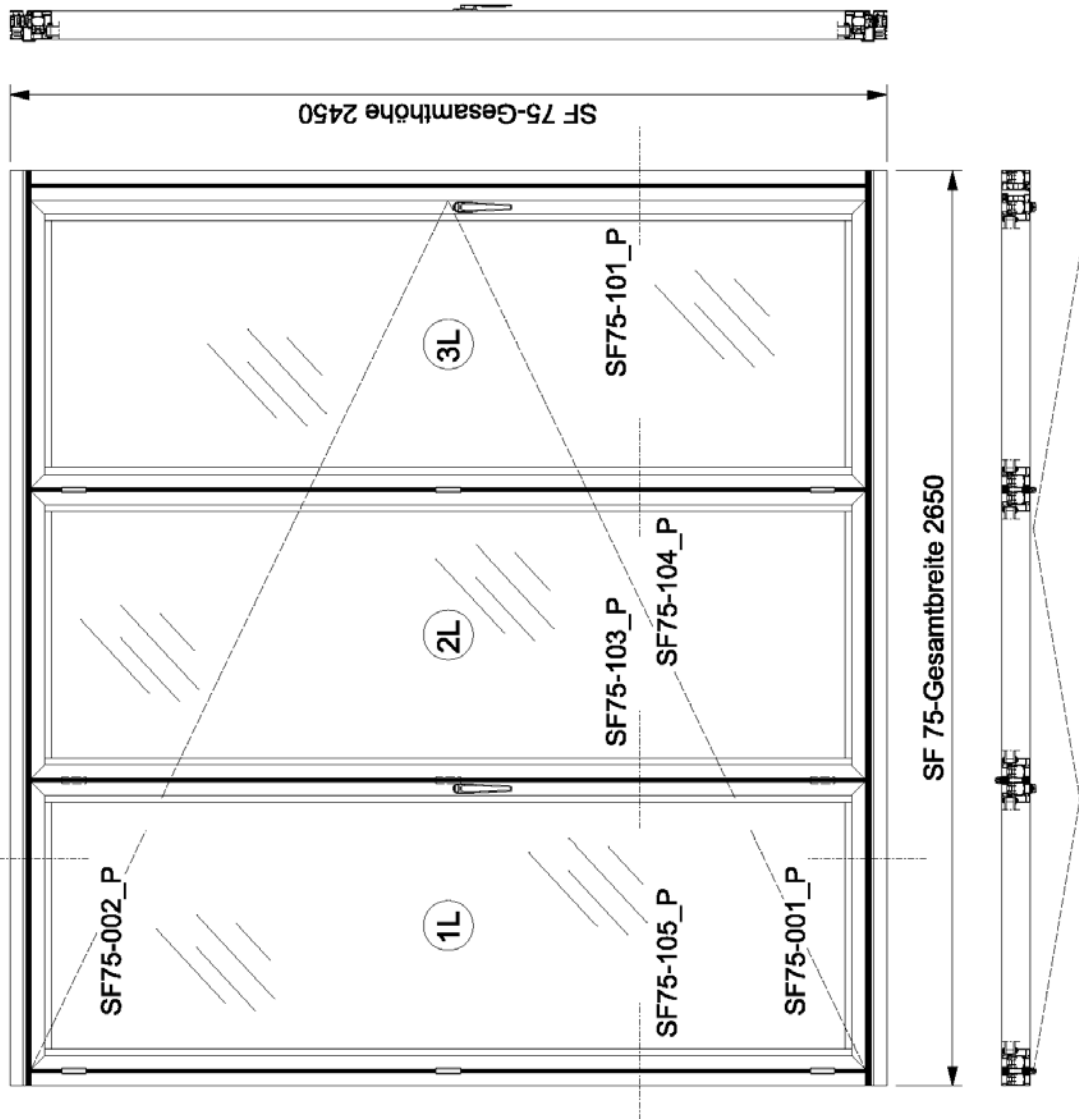
Mülheim an der Ruhr, 15.10.2010



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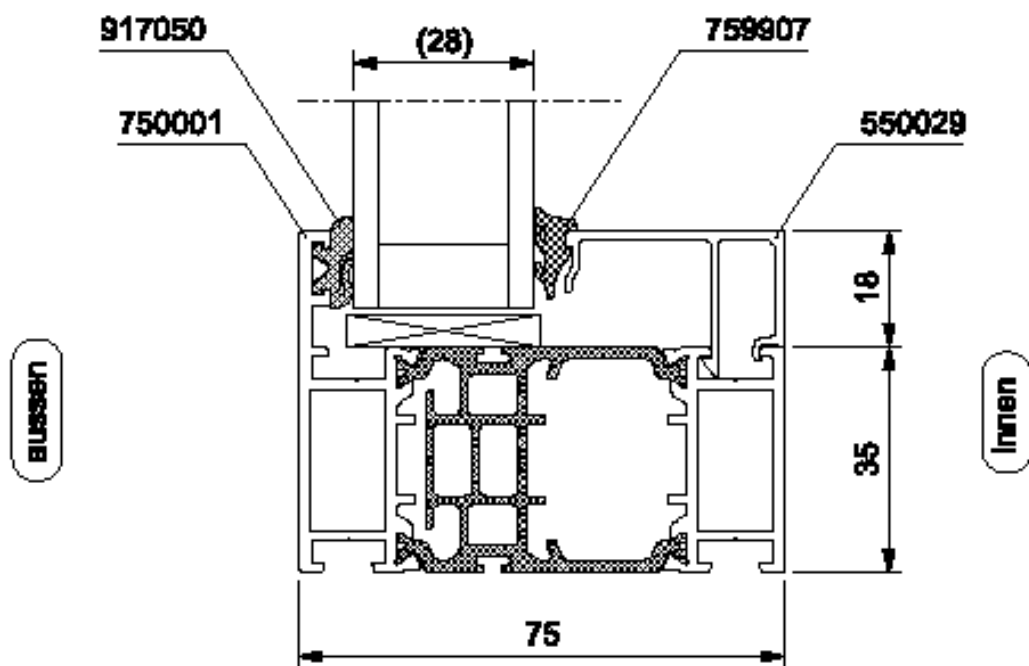
System SF 75 - 3L / Typ I - Luftschalldämmung

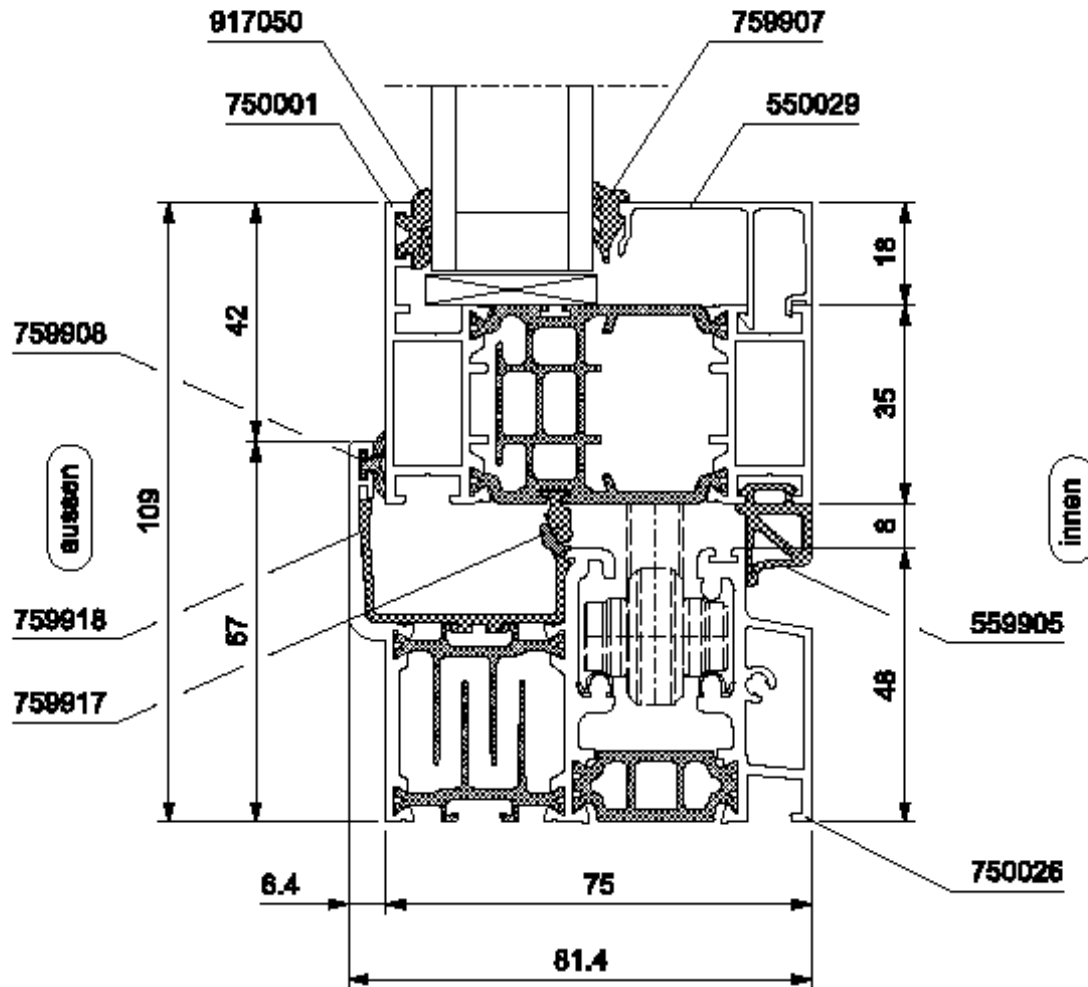
Innenansicht



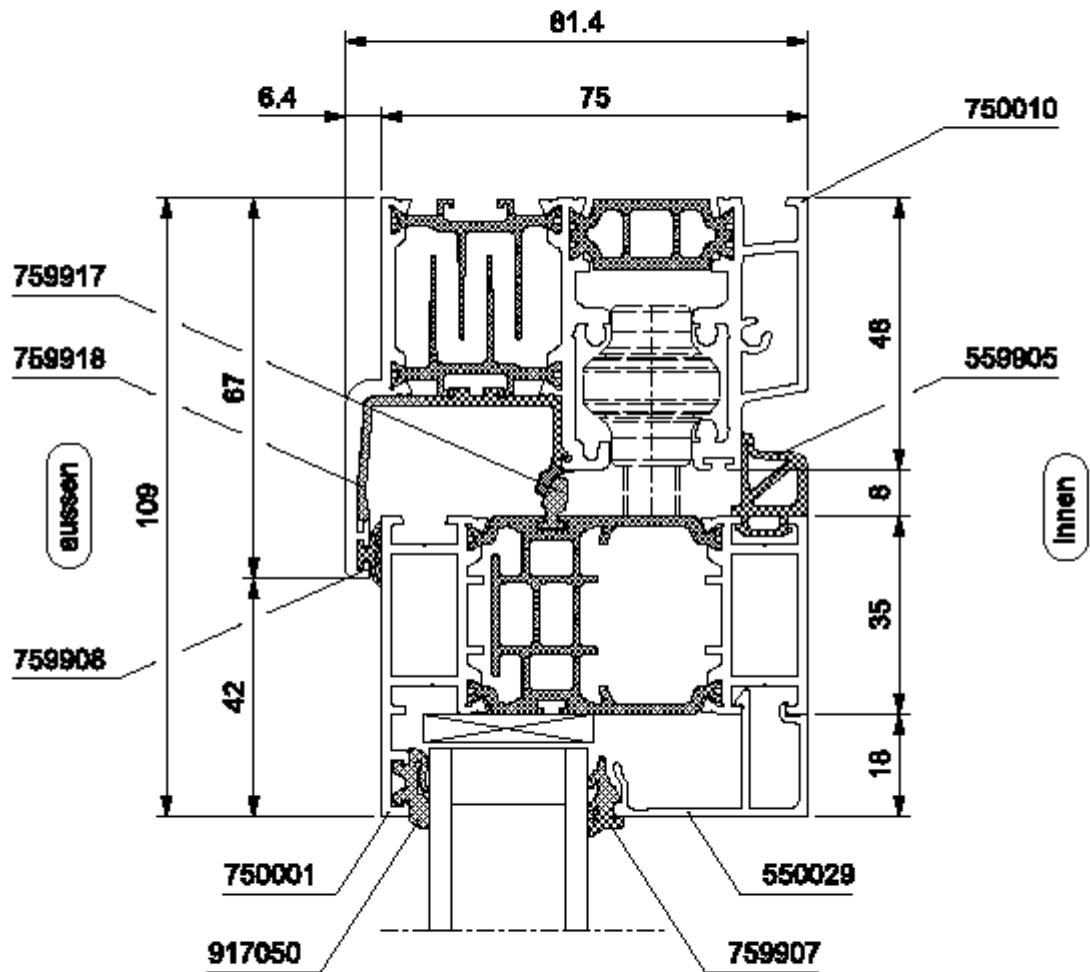
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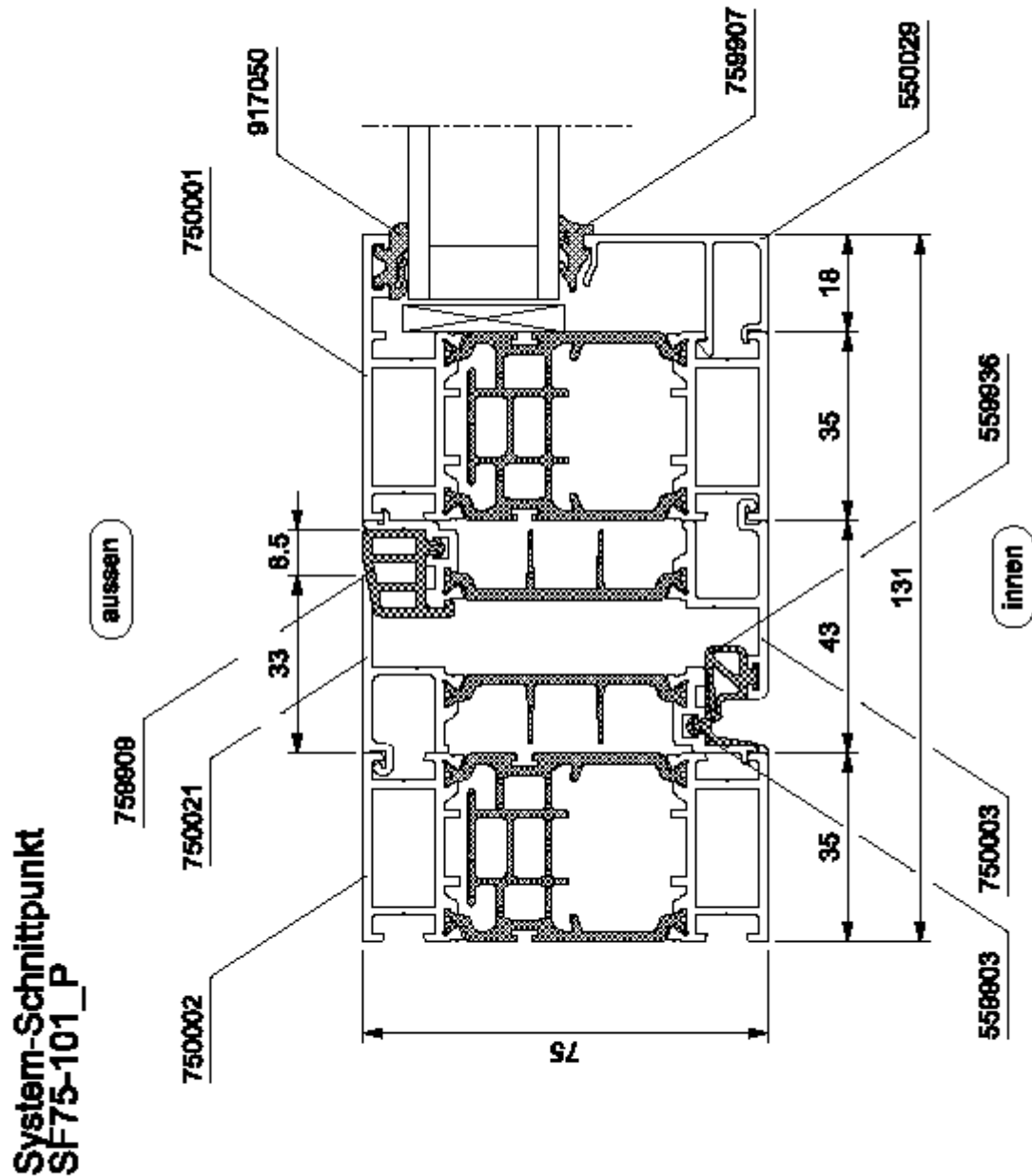
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**System-Schnittpunkt
SF75-000_P**

**System-Schnittpunkt
SF75-001_P**

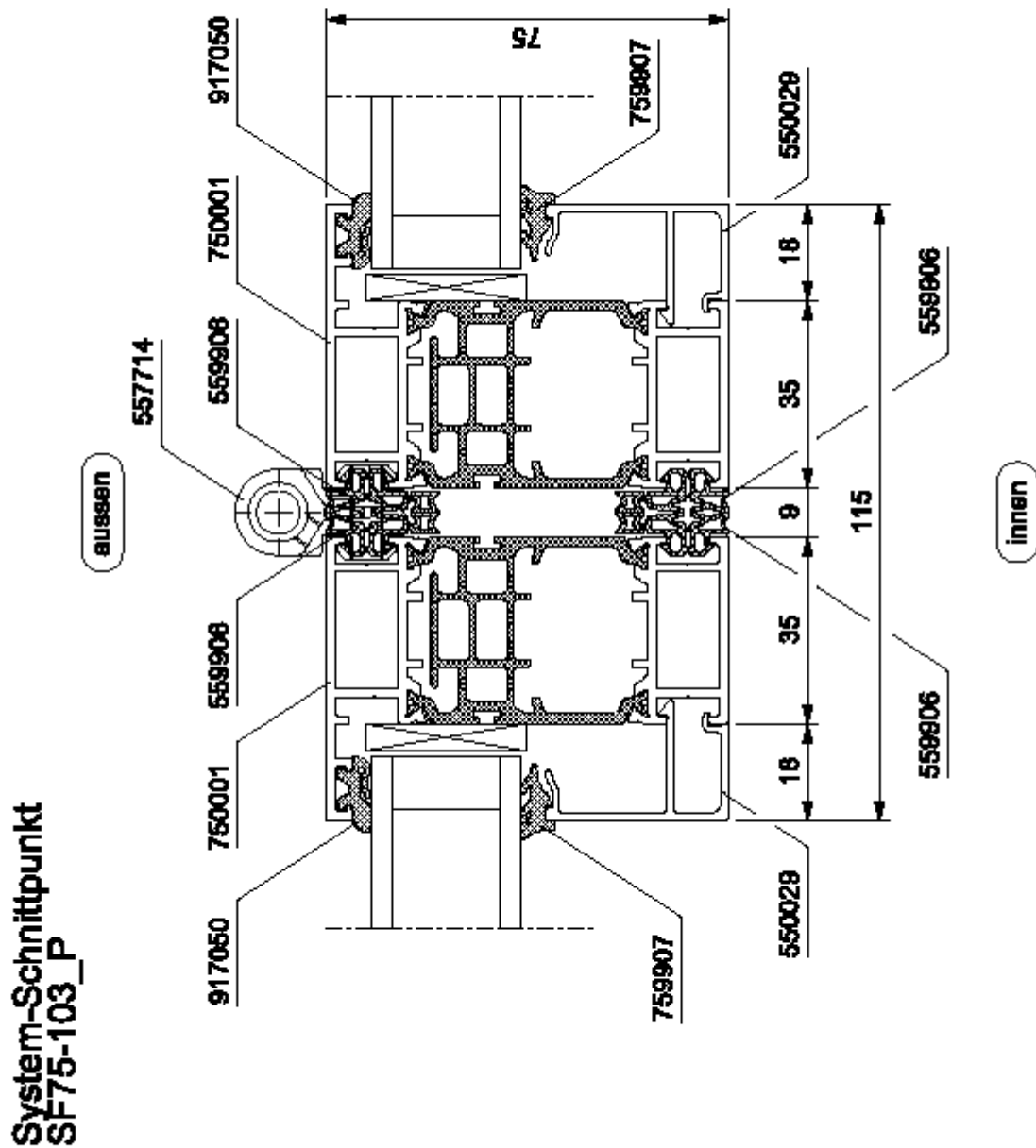
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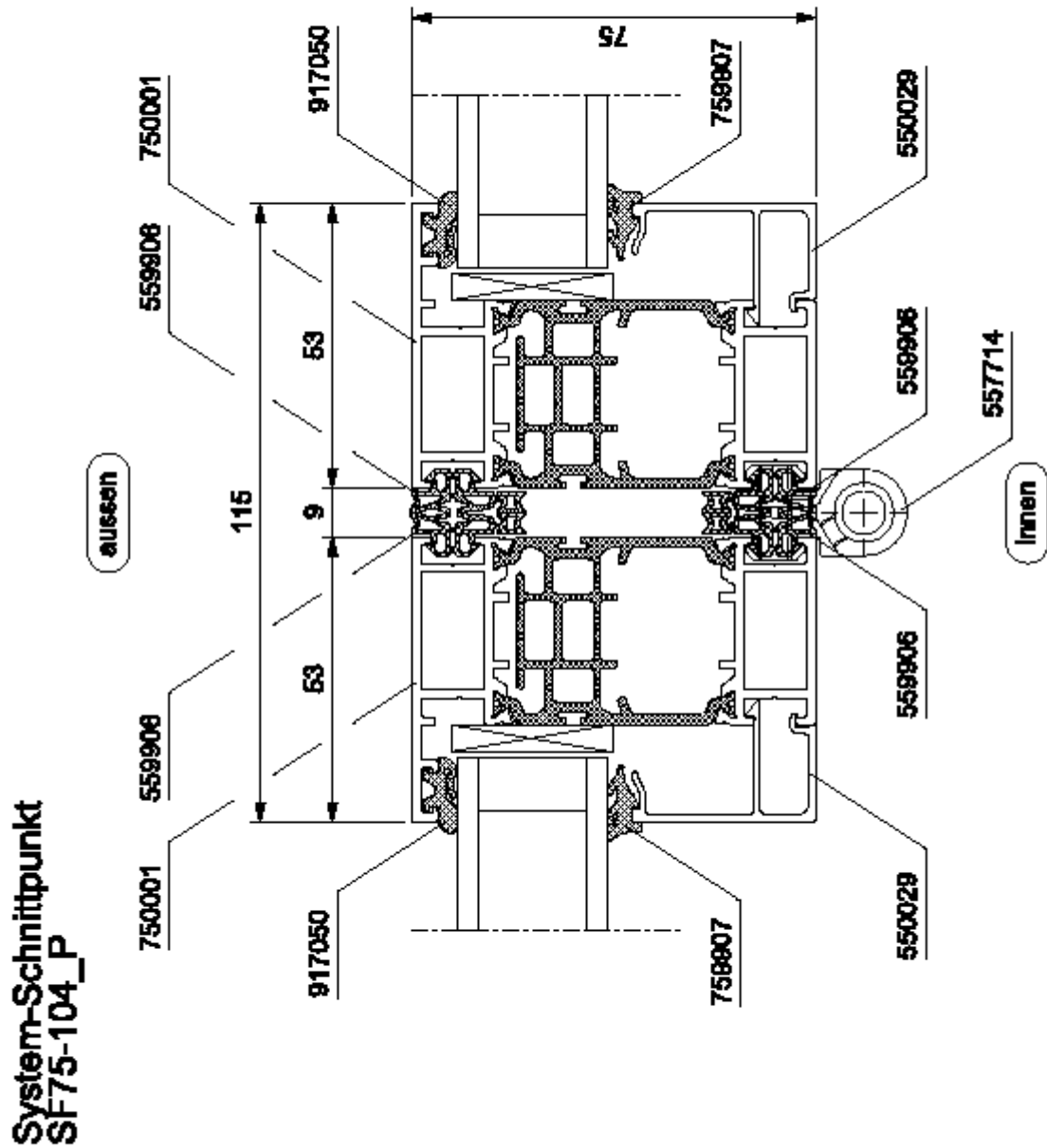




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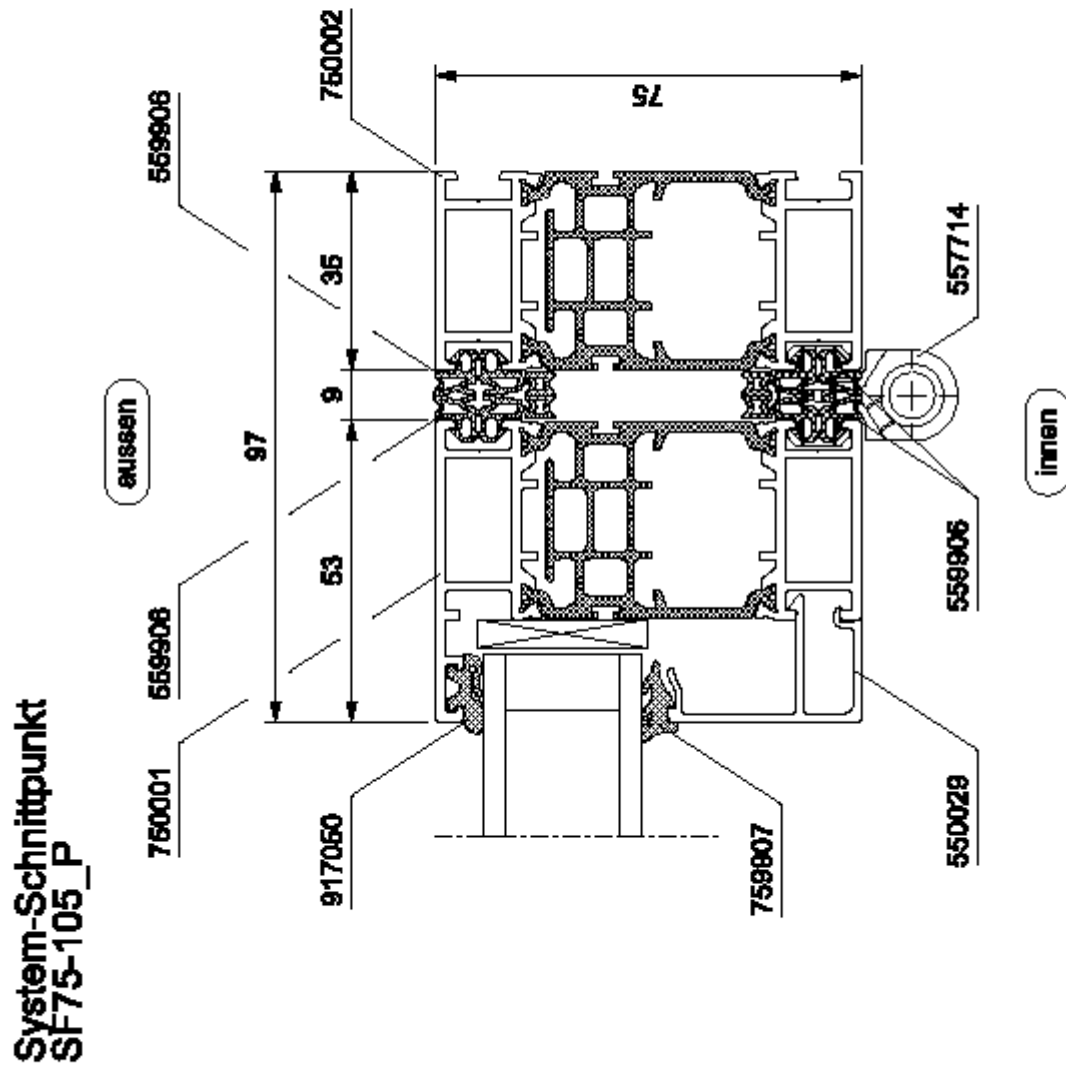


Fig. 1: View Transmission Room



Fig. 2: View Transmission Room, Detail connection ceiling



Folding Sliding System Sunflex, Type SF 75

Fig. 3: View Receiving Room

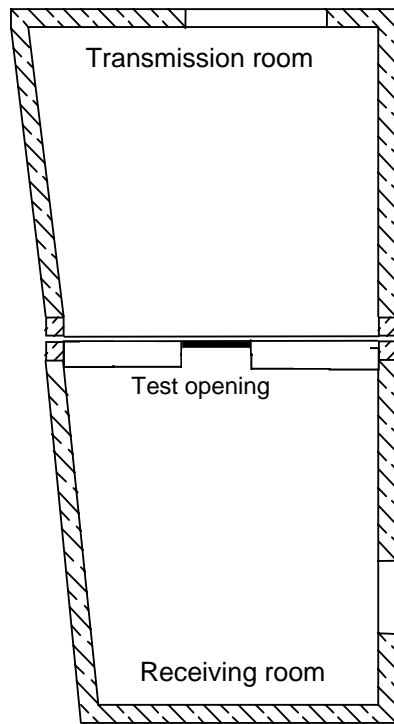


Fig. 4: View Receiving Room, Detail connection floor

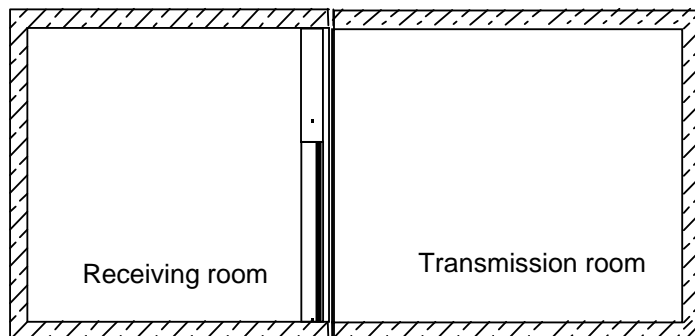


Principle Diagram

Ground view



Vertical Section



- Mountings:**
- Ceiling - Reinforced concrete ceiling $d = 14 \text{ cm}$, spaces with latex paint, Site-specific mass $m_F = 322 \text{ kg/m}^2$
 - Floor - Reinforced concrete plate $d = 20 \text{ cm}$, straightened, Site-specific mass $m_F = 460 \text{ kg/m}^2$
 - Walls - Masonry $d = 24 \text{ cm}$, site-specific mass $m_F = 384 \text{ kg/m}^2$

- Ambient air:** Ambient air conditions during the measurement on 13.10.2010
- Air temperature $T_L = 19,2^\circ\text{C}$
 - Relative humidity $r_F = 58,3\%$

Room Conditions		Receiving Room	Transmission Room
Breadth	[m]	4.10 – 4.70	4.70 – 5.32
Length	[m]	4.48	4.38
Height	[m]	3.76	3.76
Volume V	[m ³]	72.5	81.1
Rev. time	T_m [s]	1.19	1.34

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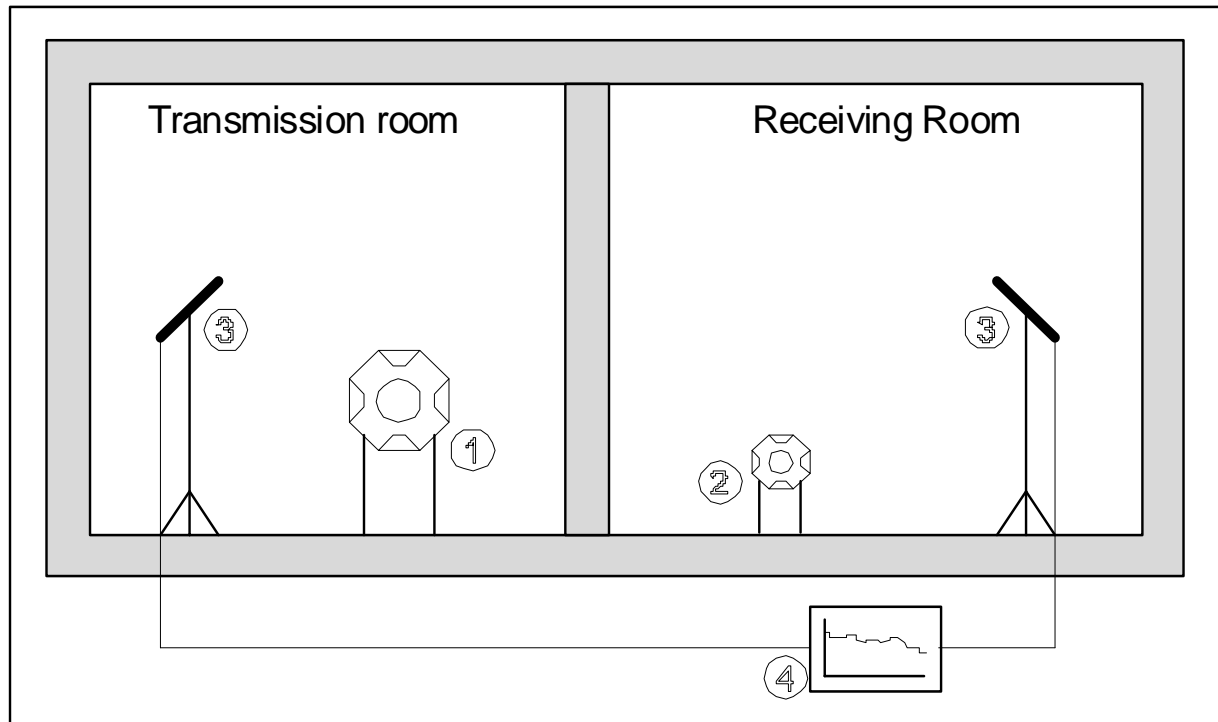
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Description of the Implementation of an Airborne Sound Measurement, evaluated through a Measuring Device with Process Computer

Customer: Sunflex Aluminiumsysteme GmbH, Im Ruttenberge 12, 57482 Wenden

Object: Folding Sliding System Sunflex, Type SF 75

1. Measuring Setup



	Unit Designation/ Type	Series number	Date of last check/calibrated until	Last calibration
1	Dodecahedron loudspeakers for radiation of third octave band noise	DL 1	04.06.2009/-	-
2	Dodecahedron loudspeakers for radiation of third octave band noise	DL 2	-	-
3	Condenser microphones: M1: Norsonic, Type 1220 V1: Norsonic, Type 1201 M2: Norsonic, Type 1220 V2: Norsonic, Type 1201	14761 17598 38648 20062	20.01.2010/31.12.2012 20.01.2010/31.12.2012 20.01.2010/31.12.2012 20.01.2010/31.12.2012	13.10.2010 13.10.2010 13.10.2010 13.10.2010
4	Sound level analyzer: Norsonic, Type 121	29837	20.01.2010/31.12.2012	13.10.2010

2. Measurement Implementation

For the determination of the airborne sound insulation, electroacoustic generated third octave band noise is radiated in the transmission room via a dodecahedron loudspeaker. In the frequency range between 50 Hz and 5.000 Hz the margin values generated, are simultaneously measured and recorded in two channels in the transmission and receiving room, via two condenser microphones in third octave band steps. From these values and the rev. time, the sound insulation margins, in the individual frequency bands, are determined according to DIN EN ISO 717. The weighted sound reduction index R_w is determined as an individual value, with the integrated process computer of the sound level analyzer.

Airborne Sound Measurement according to DIN EN ISO 140-3

Annex 13

Determination of the Airborne Sound Insulation in Laboratory

Manufacturer: Sunflex Aluminiumsysteme GmbH
 Customer: Sunflex Aluminiumsysteme GmbH
 Test item installed by: Customer

Product designation: Folding Wall SF 75
 Test rooms: Laboratory
 Test date: 13.10.2010

Description of the test item:

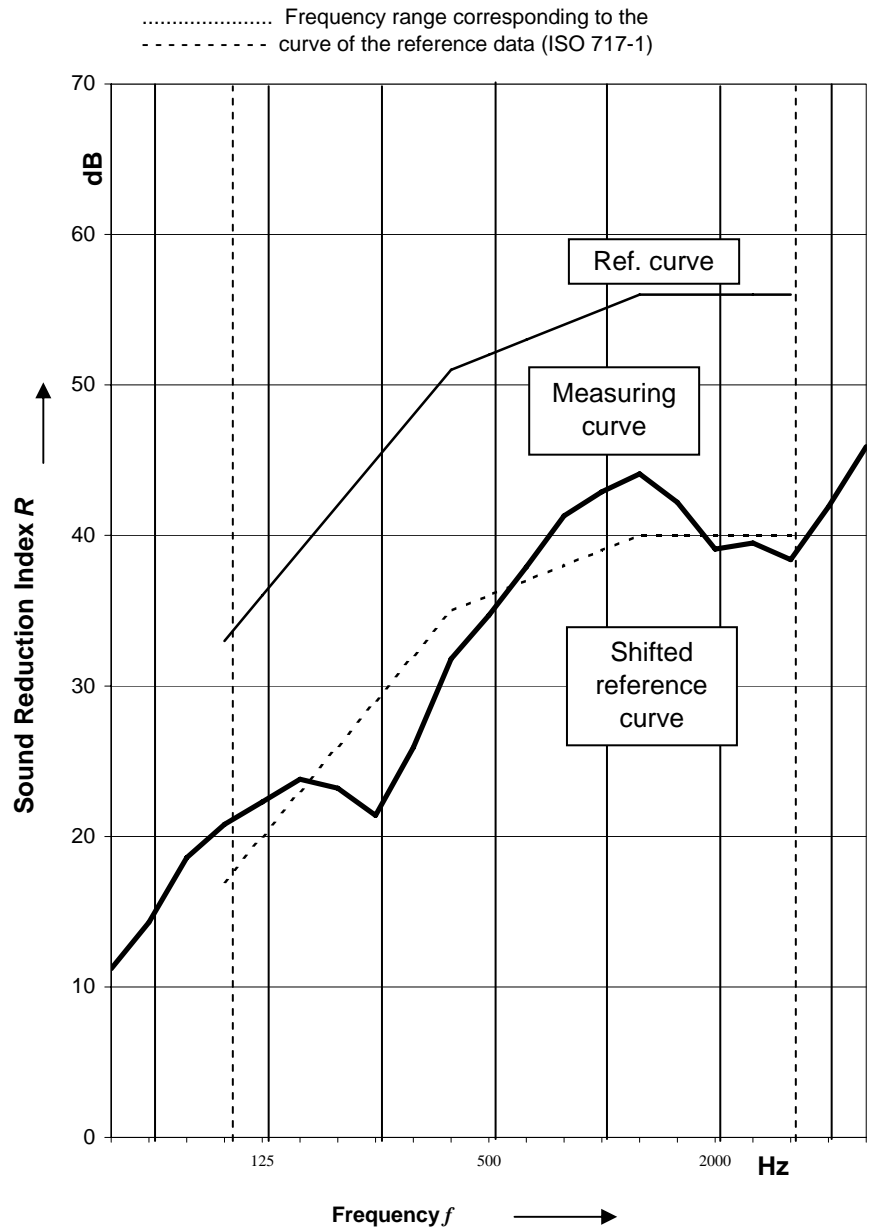
Folding Sliding System Sunflex, Type SF 75, folding wall made of highly thermally insulated aluminium profiles, $d = 75$ mm, with insulated glass units Float 6 mm, SZR 18 mm, LE Premium 4 mm, 3 wings with seal system, installed in opening width x height = 2.650 mm x 2.450 mm, $S = 6,49$ m², detailed construction see section 2.2 as well as Annex 1 thru 8 of the test report

Sound Transmission Class:

STC Rating = 36 dB

Area S test item: 6,5 m²
 Site-specific mass:
 Air temp. in test rooms: 19,2 °C
 Humidity in test rooms: 58,3 %
 Volume transmission room: 81,1 m³
 Volume receiving room: 74,5 m³

Frequency Hz	R Terz dB
50	11,2
63	14,3
80	18,6
100	20,8
125	22,3
160	23,8
200	23,2
250	21,4
315	25,9
400	31,8
500	34,7
630	37,9
800	41,3
1000	42,9
1250	44,1
1600	42,2
2000	39,1
2500	39,5
3150	38,4
4000	41,9
5000	45,9



Evaluation acc. to ISO 717-1:

$R_w(C; C_{tr}) = 36 \quad -(1; -5) \text{ dB}$

$C_{50-3150} = -2 \text{ dB} \quad C_{50-5000} = -1 \text{ dB} \quad C_{100-5000} = 6 \text{ dB}$

The determination is based on measurement results which were measured in third octave bands.

$C_{tr50-3150} = -7 \text{ dB} \quad C_{tr50-5000} = -7 \text{ dB} \quad C_{tr100-5000} = -1 \text{ dB}$

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