M F P A L e i p z i g G m b H

Anerkannte Prüfstelle für Baustoffe, Bauteile und Bauarten

PÜZ-Stelle nach Landesbauordnung (SAC 02), Bauproduktengesetz (NB 0800)

Deutscher Akkreditierungs Rat

DAP-PL-4077.00

Durch die DAP GmbH nach DIN EN ISO/IEC 17025 akkreditiertes Prüflaboratorium. Die Akkreditierung gilt für die in der Urkunde aufgeführten Prüfverfahren.

Department IV - Building physics

Department Manager: Prof. Dr.-Ing. Peter Bauer

Sound insulation work group

VMPA – sound test site acc. to DIN 4109

Test report

P 4.2/08-157-1

Dated 12.08.2008 1. copy

Subject matter:	Laboratory measurement of sound insulation in accordance with DIN EN ISO 140-3 of a wall with gypsum blocks "Multigips R.max" and sound-uncoupled stripes "Multigips AkustikBit 1000, 3 mm"
Client:	VG-ORTH GmbH & Co. KG Holeburgweg 24 37627 Stadtoldendorf
Order of date:	20.03.2008
Sample receipt:	23.04.2008
Test of date:	30.04.2008
Responsible for preparation:	Dr.-Ing. H.-J. Teichert Dipl.-Ing.(FH) S. Böhmer

This test report covers 6 sheets and 3 Annexes.

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1 Task specification

Laboratory measurement of sound insulation for a wall composed of gypsum blocks shall be measured in accordance with DIN EN ISO 140-8 by order of the manufacturer

VG-ORTH GmbH & Co. KG
Holeburgweg 24
37627 Stadtoldendorf

in testing rooms of the MFPA Leipzig GmbH with no flanking transmission.

2 Test object and test specimen

The materials;

high gross density app. 1.200 kg/m³

- MultiGips gypsum blocks "R.max", high fross density (120kg/m²) according to DIN EN 12859, height 500 x breadth 500 x thickness 100 mm
- MultiGips „FG 70"
- MultiGips adhesive „SuperWeiss 120"
- MultiGips smoothing cement „CasoFill Uni"

MultiGips SG 90 Uni
smoothing plaster

- MultiGips sound-uncoupled stripes „AkustikBit 1000, 3 mm"

were delivered on 23.04.2008. The wall was installed in the test aperture of the MFPA Leipzig by applicant from 29.04. to 30.04.2008 and tested on 30.04.2008.

The test specimen is a single-leaf wall composed of gypsum blocks "R.max" (120kg/m²), constructed in bond. The blocks have groove and tongue and were stuck together with adhesive „SuperWeiss 120". The top row was chamfered, to assure the complete filling of the top groove with "FG 70". The thickness of the groove was from 1.5 to 3 cm. Finally the surface was smoothing with „CasoFill Uni" on both sides.

The connections to the frame of the test aperture are constructed elastically by appr. 3 mm thick edge stripes. The edge stripes were fixed with onesided foil-clad adhesiv layer directly on the frame of the test aperture. After smoothing the surface the interior plaster separated from partition wall using trowel cut.

The measurement was carried out one day after mounting the wall.

Test specimen:

- 0.1-1 mm Smoothing cement „CasoFill Uni“ MultiGips SG 90 Uni smoothing plaster
- 100 mm Gypsum blocks “R.max”, high fross density (120kg/m²) according to DIN EN 12859, height 500 x breadth 500 x thickness 100 mm, manufacturer: Multigips, VG Orth high gross density app. 1.200 kg/m³
- 0.1-1 mm Smoothing cement „CasoFill Uni“ MultiGips SG 90 Uni smoothing plaster

Connection: MultiGips „AkustikBit 1000, 3 mm” sound-uncoupled stripes, glued along the periphery

Size of the test specimen: 10,1 m²

The following dimensions and area-related masses were found:

Table 1: Dimensions and area-related masses

Bezeichnung	Lenght mm	Breath mm	Thickness mm	Area-related mass kg/m²	Density kg/m³
Gypsum blocks “R.max”	500.5	501	100.5	126.4	1258
MultiGips „AkustikBit 1000, 3 mm” sound-uncoupled stripes	999.5	100,5	3.25	3.24	997

The thickness was determined according to DIN EN 823, the Breath according to DIN EN 822 and the density according to DIN EN 1602.
The following area-related mass and mass-related humidity were determined from the construction waste after testing:

area-related mass: m'' = 121.4 kg/m² (determined from the construction waste)
mass-related humidity of the wall: 1.2 Gew.-%

3 Test rooms

The test set-up complies with the requirements imposed by DIN EN ISO 140-1. It consists of an emission room (V = 59.1 m³), a reception room (V = 55.3 m³) and a centre piece used as a mounting frame (V = 6.1 m³) with the dimensions: Height 2.97 m x Width 3.43 m x Depth 0.6 m. Slope transmission of the test set-up is avoided by means of kerfs with a width a 50 mm and filled with mineral wool, located between the mounting frame and the rooms connected to it. Maximum attenuation of the test set-up is 89 dB. The wall was located within the mounting frame, at a distance of about 15 cm next to the kerf of the emission room side.

The following conditions prevailed in the testing rooms during the measurements:

Room temperatur: 19.1 °C

Relative humidity: 57 %

4 Test method

4.1 Sound insulation

The air-borne sound insulation was measured in compliance with:

- DIN EN ISO 140-3, March 2005 issue

Air-borne sound insulation was calculated in compliance with:

- DIN EN ISO 717-1, November 2006 issue

The sound insulation measure R was determined by third octave band noise for each average frequency of 50 – 5000 Hz across the test area provided.

The sound insulation measures R result from the following equation:

$$R = L_1 - L_2 + 10 \lg S/A \text{ in dB}$$

Where:

L_1 mean sound pressure level in transmitting room in dB

L_2 mean sound pressure level in receiving room in dB

S area of the component common for transmitting and receiving room in m²

A equivalent absorption area in receiving room in m², determined from measurements of the reverberation period and the volume of the receiving room

The procedur and the volume the measurements are in accordance with the principles from the research group of the building authorized acoustic noise laboratories in adjustment with "NaBau"- subcommittee 00.71.02.

4.2 Total loss factor

Moreover, the total loss factor η_{total} as specified by DIN EN ISO 140-3, appendix E, version of 03-2005 and/or DIN EN ISO 10848-1, version of 08-2006 has been determined in connection with the „Measurement instructions for the determination of the loss factor" as provided by PTB. The analysis comprised 12 decay curves of the structure-borne noise reverberation time TS, calculated by means of reverse integration from the quadratic pulse response and measured in third-octaves of 50 Hz to 5000 Hz, the result being shown in appendix 2. The wall has been subject to excitation in three different positions using an electrodynamic vibration exciter and MLS noise (procedure of maximum-length-related sequences), measurement of the vibration acceleration was carried out using a piezoelectric acceleration sensor in two pick-up positions per excitation. The total loss factor η_{total} is calculated by following equation:

$$\eta_{total} = 2.2 / f \cdot T_S \qquad \text{with f = One-third octave band mid-frequency}$$

5 Measurement

Vor der Messung wurde eine Sichtkontrolle der Randanschlüsse der Wand durchgeführt. Es wurden keine Risse festgestellt.

5.1 Measuring instruments

The following measuring instruments were used:

Table 2: measuring instruments

Gerät	Typ	Hersteller
Real time analyser with noise generator	840	Norsonic
Free field microphone	1220	Norsonic
Pre-amplifier	1201	Norsonic
Calibration unit	4231	B & K
Output amplifier	235	Norsonic
Loudspeaker combination (Dodecahedron)	229	Norsonic
Mikrophone- horizontal gyro unit	231-N-360	Norsonic
Accelerometer	1270	Norsonic
Integrator	1449	Norsonic
Mini Shaker	4810	B & K

The measuring instruments are calibrated at regular intervals and the measuring chain is calibrated prior to and after each measuring.

The test labor participates regularly at the reference measurements for test boards of group I (suitability test boards) of *Physikalisch Technische Bundesanstalt (PTB) Brunswick* and has been registered as test board in the "List of test, monitoring and certification boards in accordance with the regional building regulations" of *Deutsches Institut für Bautechnik DIBT* under number "SAC 02" .

5.2 Measuring results

For the wall construction, the sound insulation measures R_w in accordance with DIN EN ISO 717-1 determined and evaluated is given for the frequency range from 100 to 3150 Hz including the spectrum adaptation values C and C_{tr} following:

Table 3: Test results

test specimen	Evaluated sound insulation value	spectrum adaptation values						s. Annex
	Test result $R_{w,P}$ (C; C_{tr}) [dB]	$C_{50-3150}$	$C_{50-5000}$	$C_{100-5000}$	$C_{tr,50-3150}$	$C_{tr,50-5000}$	$C_{tr,100-5000}$	
wall with gypsum blocks "R.max", sound-uncoupled stripes "MultiGips AkustikBit 1000, 3 mm"	46 (-2;-6)	-2	-1	-1	-7	-7	-6	1

For the graphic representation of the R values vs. frequency refer to Annex 1.

5.3 Information to test results

The measuring results are obtained under laboratory conditions. They refer exclusively to the objects tested in Annex 1.

Leipzig, 12.08.2008

Dr.-Ing. H.-J. Teichert
Head of the test laboratory

MFPA Leipzig GmbH IV
SAC 02
NB 0800

Dipl.-Ing.(FH) Simon Böhmer
Responsible for preparation

Sound reduction ISO 140-3:1995

Laboratory measurements of airborne sound insulation of building elements

Manufacturer: VG Orth GmbH & Co.KG, Holeburgweg 24, 37627 Stadtoldendorf Date of test: 30.04.2008

Client: manufacturer Test room identification: Source-/Receiving room

Test specimen mounted by: Client Product identification: MultiGips gypsum blocks "R.max", high fross density 120 kg/m²

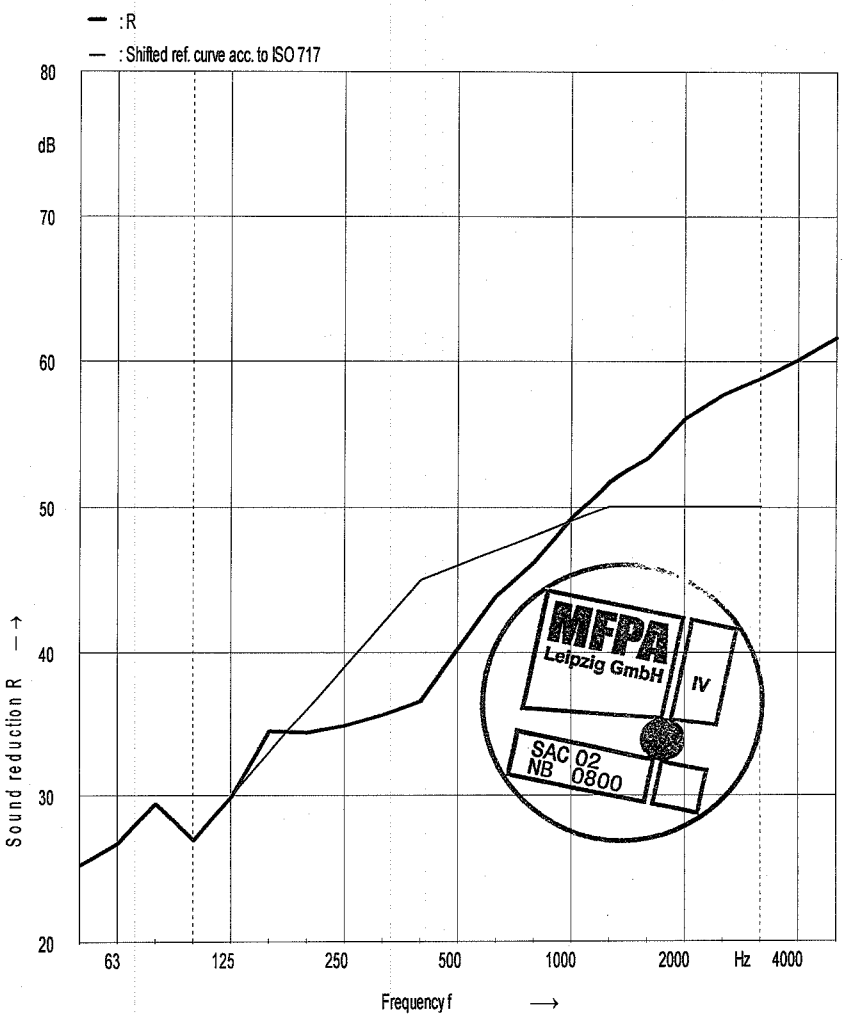
Description of the specimen: MultiGips sound uncoupled stripes "AkustikBit 1000, 3 mm"

- 0,1-1 mm Smoothing cement "CasoFill Uni"
- 100 mm Gypsum blocks "R.max", height 500 mm x breath 500 mm x thickness 100 mm
- 0,1-1 mm Smoothing cement "CasoFill Uni"

Connection: MultiGips sound-uncoupled stripes "AkustikBit 100, 3 mm", glued along the periphery

Size: 10,1 m²
Mass per unit: 121 kg/m²
Temperature [°C]: 19,1
Humidity [%]: 57
Source room Volume: 60,6 m³
Receiving room Volume: 58,7 m³

Frequency [Hz]	R 1/3 oct. [dB]
50	25,2
63	26,7
80	29,4
100	26,9
125	29,9
160	34,4
200	34,3
250	34,8
315	35,6
400	36,6
500	40,3
630	43,9
800	46,2
1000	49,2
1250	51,7
1600	53,3
2000	56,1
2500	57,7
3150	58,8
4000	60,1
5000	61,6



Rating according to ISO 717-1

$R_w(C,C_{tr})$ = 46 (-2; -6) dB

$C_{50\text{-}3150}$: -2 dB $C_{50\text{-}5000}$: -1 dB $C_{100\text{-}5000}$: -1 dB

$C_{tr,50\text{-}3150}$: -7 dB $C_{tr,50\text{-}5000}$: -7 dB $C_{tr,100\text{-}5000}$: -6 dB

Evaluation based on laboratory measurement results obtained by an engineering method

MFPA Leipzig GmbH

No. of test report: P 4.2/08-157-1

Leipzig, 14.08.2008

Signature: Teichert

MFPA Bereich Schallschutz
Hans-Weigel-Str. 2b
04319 Leipzig
Tel. 0341- 6582115

Total loss factor ISO 140 part 3

Object:

Wall composed of MultiGips gypsum blocks "R.max", high fross density 120 kg/m²

Manufacturer: VG Orth GmbH & Co.KG, Holeburgweg 24, 37627 Stadtoldendorf

Description of the specimen:

- 0,1-1 mm Smoothing cement "CasoFill Uni"
- 100 mm Gypsum blocks "R.max", height 500 mm x breath 500 mm x thickness 100 mm
- 0,1-1 mm Smoothing cement "CasoFill Uni"

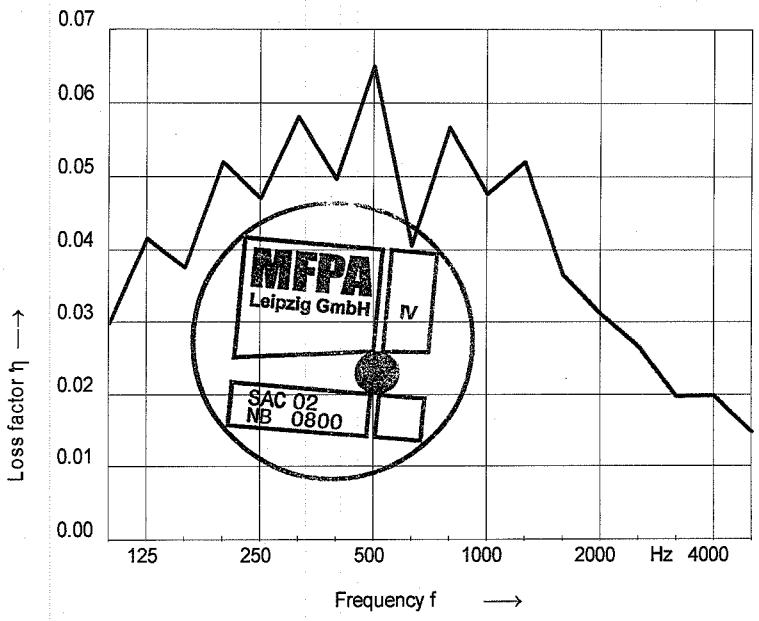
Connection: MultiGips "AkustikBit 100, 3 mm", sound-uncoupled stripes, glued along the periphery

Date of test: 07.05.2008

Temperature [°C]: 20,1

Humidity [%]: 50

Frequency [Hz]	η
100	0,03
125	0,04
160	0,04
200	0,05
250	0,05
315	0,06
400	0,05
500	0,06
630	0,04
800	0,06
1000	0,05
1250	0,05
1600	0,04
2000	0,03
2500	0,03
3150	0,02
4000	0,02
5000	0,01



MFPA Leipzig GmbH

No. of test report: P 4.2/08-157-1 Leipzig, 14.08.2008

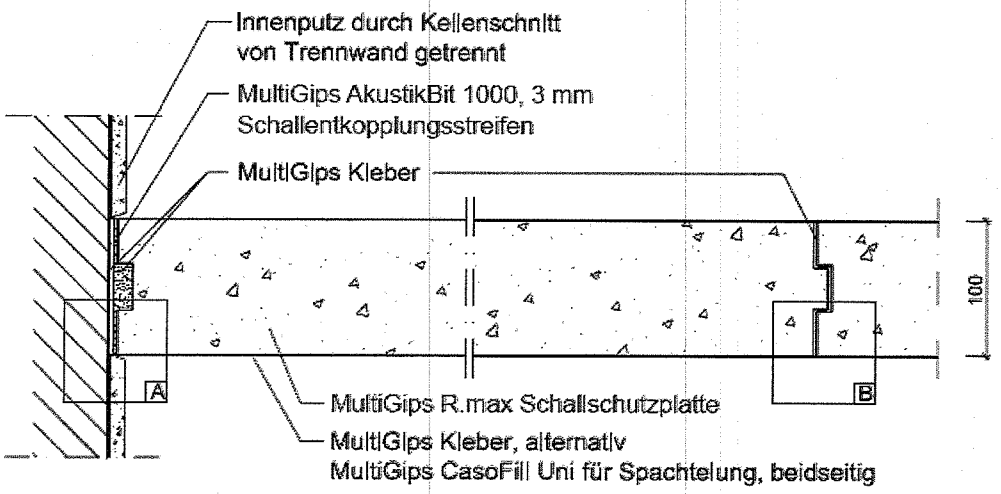
Client: VG Orth GmbH & Co.KG, Holeburgweg 24, 37627 Stadtoldendorf

Signature:

MFPA Bereich Schallschutz
Hans-Weigel-Str. 2b
04319 Leipzig
Tel. 0341-6582115

MultiGips

Plattenformat:
100 x 500 x 500 mm
Rohdichte nach DIN EN 12859
Hohe Rohdichte, ca. 1.200 kg/m³ (R.max)



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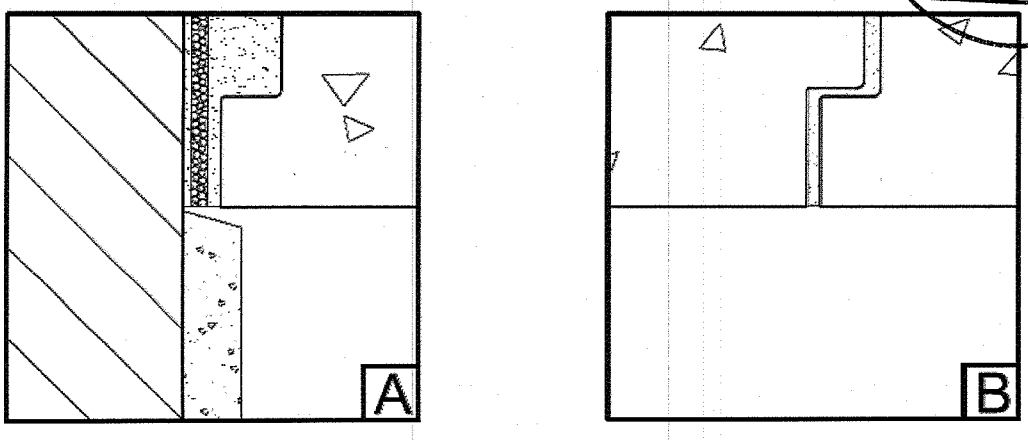

Wandsystem aus MultiGips R.max Schallschutzplatte, Wanddicke 100 mm

Bauteil:			
Nichttragende innere Trennwand, Gips-Wandbauplatten nach DIN EN 12859			
Detail:			
Elastischer Wandanschluss			
Zu-Nr.: 113d	System-Nr.:	Maßstab: 1:5 / 1:1	Stand: 08/2008

VG ORTH

Drawing by client