

Evidence of Performance

Airborne sound insulation of building components

Test Report
No. 16-001979-PR01
(PB 1-H01-04-en-02)



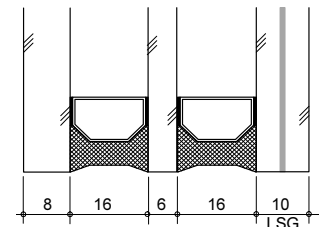
Client **PRESS GLASS SA**
Nowa Wies
Kopalniana 9
42-262 Poczesna
Poland

Product	Insulating glass unit
Designation	IGU intended to be used in buildings and construction works
Overall dimension (w x h)	1,230 mm × 1,480 mm
Construction	10 LSG Acoustic 16/6/16/8
Gas filling	Argon
Area related weight	60.2 kg/m ²
Specials	-/-

Basis

EN ISO 10140-1: 2010
+A1: 2012 + A2:2014
EN ISO 10140-2: 2010
EN ISO 717-1: 2013
ASTM E 90-09
ASTM E 413-10
ASTM E 1332-10a
Replaces test report no 16-001979-PR01 (PB 1-H01-04-en-01) dated 29.06.2016

Representation



Instructions for use

This test report serves to demonstrate the airborne sound insulation of a building component.

Applicable for Germany

R_w corresponds to R_{w,F} for DIN 4109 Annex 1 Table 40

Validity

The data and results given relate solely to the tested and described specimen.

Testing the sound insulation does not allow any statement to be made on any further characteristics of the present construction regarding performance and quality.

Notes on publication

The ift Guidance Sheet "Conditions and Guidance for the Use of ift Test Documents" applies.

The cover sheet can be used as an abstract.

Contents

The test report contains a total of 8 pages:

- 1 Object
 - 2 Procedure
 - 3 Detailed results
 - 4 Instructions for use
- Data sheet (1 page)

Weighted sound reduction index R_w
Spectrum adaptation terms C and C_{tr}



$$R_w (C; C_{tr}) = 45 (-2; -7) \text{ dB}$$

ift Rosenheim
04.07.2016

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Airborne sound insulation of building components

Test Report 16-001979-PR01 (PB 1-H01-04-en-02) dated 04.07.2016

Client **PRESS GLASS SA**
Nowa Wies, 42-262 Poczesna (Poland)

1 Object

1.1 Description of test specimen (All dimensions in mm)

Component	Insulating glass unit
Product designation	IGU intended to be used in buildings and construction works
Overall dimensions (w x h)	1,230 mm × 1,480 mm
Visible size (w x h)	1,208 mm × 1,458 mm
Total thickness	
On the edge	57 mm
In the middle of pane	58 mm
Area related mass kg/m ²	60.2 kg/m ²
Construction	10 LSG Acoustic 16/6/16/8
Construction of laminated glass sheet	55.2: 5 Float / 0.76 mm PVB-acoustic / 5 Float
Type / Manufacturer of interlayer	PVB Acoustic QS41 / Saflex (Solutia)
Pane temperature in °C	23°C
Spacer	
Material	Aluminium
Manufacturer	Alu-Pro
Edge seals	Two planes, total width 10-11 mm
External type	PU GD 677 NA
Manufacturer	Kömmerling
Internal type	Butylver GD 115
Manufacturer	Kömmerling
Edge cover	2-3 mm
Gas filling in cavity	According to analysis at ift
Type of gas	Argon
Volume in %	Cavity I: 99 %; Cavity II 98 %
Gas filling in cavity	According to manufacturer
Type of gas	Argon
Volume in %	90 (+10/-5) %

The description is based on inspection of the test specimen at **ift** Laboratory for Building Acoustics. Item designations / numbers as well as material specifications were provided by the client.

1.2 Mounting to test rig

Test rig	Window test rig with suppressed flanking transmission acc. to EN ISO 10140-5+A1:2014; the test rig includes a 5 cm continuous acoustic break which is sealed in the test opening with closed-cell permanently resilient sealant.
Mounting of test specimen	Test specimen mounted by ift Laboratory for Building Acoustics.

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Mounting conditions	The unit was fitted at a distance of 5 mm into a wooden frame of 25 mm x 25 mm cross section. The cavity between test rig and glazing beads was completely filled with elastic sealant type Perennator 2001 S grey.
Mounting position	According to EN ISO 10140-1:2010+A1:2012+A2:2014 Annex D
Preparation	Storage of the glazing one day before testing in the test rig for conditioning.

2 Procedure**2.1 Sampling**

Sampling	The samples were selected by the client
Quantity	1
Manufacturer	PRESS GLASS SA Nowa Wies ul. Kopalniana 9 42-262 Poczesna
Manufacturing plant	PRESS GLASS SA The Division in Radomsko 97-500 Radomsko, ul. Geodetow 4
Date of manufacture / Date of sampling	9 th of June 2016
Production line	No 7
Responsible for sampling	Mr. Milosz Majewski
Delivery at ift	14 th of June 2016 by the client via forwarder
ift registration number	41595/01

2.2 Process**Basis**

EN ISO 10140-1: 2010 + A1: 2012 + A2: 2014	Acoustics; Laboratory measurement of sound insulation of building elements - Part 1: Application rules for specific products (ISO 10140-1: 2010+Amd. 1: 2012+Amd. 2: 2014)
EN ISO 10140-2:2010	Acoustics; Laboratory measurement of sound insulation of building elements - Part 2: Measurement of airborne sound insulation (ISO 10140-2:2010)
EN ISO 717-1: 2013	Acoustics; Rating of sound insulation in buildings and of building elements - Part 1: Airborne sound insulation

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Client **PRESS GLASS SA**
Nowa Wies, 42-262 Poczesna (Poland)

Corresponds to the national German standard/s:

DIN EN ISO 10140-1: 2014-09, DIN EN ISO 10140-2:2010-12 and DIN EN ISO 717-1 : 2013-06

Procedure and scope of measurement are in conformity with the principles of the Working Group of sound insulation testing bodies approved by the national building control authorities in cooperation with the standardization committee NA 005-55-75-AA (subcommittee UA 1 - DIN 4109).

Additional basis

ASTM E 90-09	Standard test method for laboratory measurement of airborne sound transmission loss of building partitions and elements
ASTM E 413-10	Classification for rating sound insulation
ASTM E 1332-10a	Standard Classification for Determination of Outdoor-Indoor Transmission Class

Boundary conditions As specified by the standard.

Deviation There are no deviations from the test method/s and/or test conditions acc. to EN ISO 10140.

Test noise Pink noise

Measuring filter One-third-octave band filter

Measurement limits

Low frequencies The dimensions of the receiving room full fills the recommended size for testing in the frequency range from 50 Hz to 80 Hz as per EN ISO 10140-4:2010 Annex A (informative). A moving loudspeaker was used.

Background noise level The background noise level in the receiving room was determined during measurement and the receiving room level L_2 corrected by calculation as per EN ISO 10140-4: 2010 Clause 4.3.

Maximum sound insulation The maximum sound insulation of the test set-up was at least 15 dB higher than the measured sound reduction index of the test specimen.
Not corrected by calculation.

Measurement of

reverberation time Arithmetical mean: two measurements each of 2 loudspeaker and 3 microphone positions (a total of 12 independent measurements).

Measurement equation A $A = 0,16 \cdot \frac{V}{T} \text{ m}^2$

Measurement of sound level

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difference Minimum of 2 loudspeaker positions and rotating microphones.

Measurement equation R $R = L_1 - L_2 + 10 \cdot \lg \frac{S}{A}$ in dB

KEY

A	Equivalent absorption area in m ²
L ₁	Sound pressure level source room in dB
L ₂	Sound pressure level receiving room in dB
R	Sound reduction index in dB
T	Reverberation time in s
V	Volume of receiving room in m ³
S	Testing area of the specimen in m ²

2.3 Test apparatus

Device	Type	Manufacturer
Integrating sound meter	Type Nortronic 840	Norsonic-Tippkemper
Microphone preamplifiers	Type 1201	Norsonic-Tippkemper
Microphone unit	Type 1220	Norsonic-Tippkemper
Calibrator	Type 1251	Norsonic-Tippkemper
Dodecahedron loudspeakers	Type 229, 96 Ohm	Norsonic-Tippkemper
Amplifier	Type 235, 100 W	Norsonic-Tippkemper
Rotating microphone boom	Type 231-N-360	Norsonic-Tippkemper

The **ift** Laboratory for Building Acoustics participates in comparative measurements at the Physikalisch-Technische Bundesanstalt (PTB) in Braunschweig every three years, the last one was in April 2016. The sound level meter used, Series No. 17848, was calibrated by the Dortmund Eichamt (calibration agency) on 12th of March 2015. The calibration is valid until 31st of December 2017. LBME NW (Eichamt Dortmund) meets the requirements for measurement traceability in connection with DIN EN ISO/IEC 17025.

2.4 Testing

Date 17th of June 2016
Operating Testing Officer Mr. Stefan Bacher

3 Detailed results

The values of the measured sound reduction index of the tested Insulating glass unit are plotted as a function of frequency in the annexed data sheet and tabled.

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Client **PRESS GLASS SA**
Nowa Wies, 42-262 Poczesna (Poland)

As per EN ISO 717-1 the weighted sound reduction index R_w and the spectrum adaptation terms C and C_{tr} for the frequency range 100 Hz to 3150 Hz obtained by calculation are as follows:

$$R_w (C; C_{tr}) = 45 (-2; -7) \text{ dB}$$

According to EN ISO 717-1 the following additional spectrum adaptation terms are obtained

$$\begin{array}{lll} C_{50-3,150} = -2 \text{ dB} & C_{100-5,000} = -1 \text{ dB} & C_{50-5,000} = -1 \text{ dB} \\ C_{tr,50-3,150} = -7 \text{ dB} & C_{tr,100-5,000} = -7 \text{ dB} & C_{tr,50-5,000} = -7 \text{ dB} \end{array}$$

Additional to the rating according to EN ISO 717-1 an assessment according to ASTM E 413-10 and ASTM E 1332-10a was carried out. The sound transmission class STC according to ASTM E 413-10 for the frequency range from 125 Hz up to 4000 Hz was calculated to

STC 45

The Outdoor-Indoor transmission class OITC according to ASTM E 1332-10a for the frequency range from 80 Hz up to 4000 Hz was calculated to

OITC 36

4 Instruction for use

4.1 Test value

Basis

- DIN 4109:1989-11 Sound insulation in buildings, requirements and verifications
- DIN 4109 Bb1/A1:2003-09 Sound insulation in buildings, examples and calculation methods correction A1

For verification of sound insulation according to DIN 4109, Annex 1 : A1:2003-09, Table 40 the weighted sound reduction index R_w corresponds to the test value $R_{w,P, GLASS}$

$$R_{w,P, GLASS} = 45 \text{ dB}$$

4.2 Laminated glass

The sound reduction of laminated glass depends on the temperature of the environment. If the temperature is lower than the test temperature the sound reduction index may be reduced.

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Client **PRESS GLASS SA**
Nowa Wies, 42-262 Poczesna (Poland)**4.3 Test standards**

The standard series EN ISO 10140:2010 supersedes those parts of the standard series EN ISO 140 that were applicable until the respective date and describe laboratory tests. According to the two standard series, the test methods are identical.

Assessments as per ASTM E 413-10 and E 1332-10a were based on sound insulation testing as per EN ISO 10140-2 (previous EN ISO 140-3). For some details there are deviations from test standard ASTM E 90-09, in particular as regards the required room volume (min. 80 m³).

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Laboratory for Building Acoustics
04.07.2016

Sound reduction index according to ISO 10140 - 2

Laboratory measurements of airborne sound insulation of building components



Client: **PRESS GLASS SA**

Nowa Wies, 42-262 Poczesna (Poland)

Product designation IGU intended to be used in buildings and construction works

Design of test specimen

Insulating glass unit

Overall dimensions 1,230 mm × 1,480 mm

Pane construction 10 LSG Acoustic 16/6/16/8

Filling in cavity Argon

Area related mass 60.2 kg/m²

Pane temperature 23°C

Test date 17th of June 2016

Test surface S 1.25 m × 1.50 m = 1.88 m²

Test rig as per EN ISO 10140-5

Partition wall Double-leaf concrete wall

Test noise pink noise

Volumes of test rooms V_S = 109.9 m³

V_R = 101.3 m³

Maximum sound reduction index

R_{w,max} = 62 dB (related to test area)

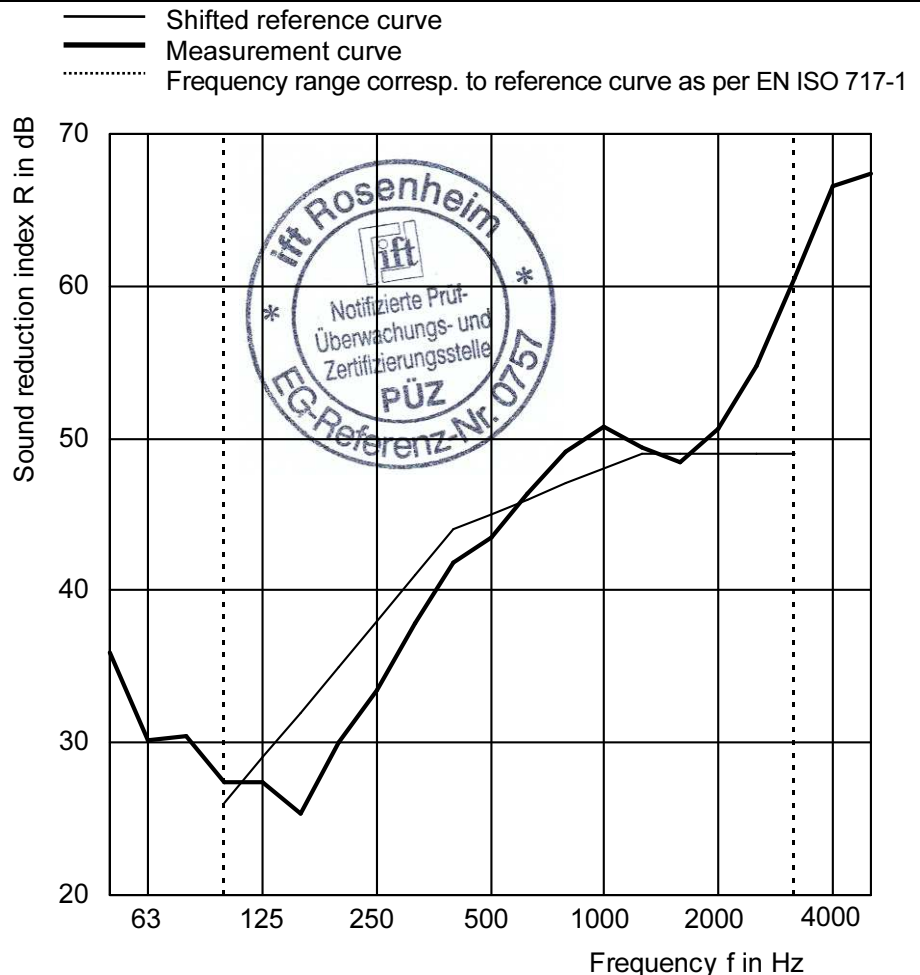
Mounting conditions

Glass mounted in test opening and held on both sides by glazing beads (25 mm x 25 mm); glass edge sealed on both sides with plastic sealant.

Climate in test rooms 23 °C / 38 % RH

Static air pressure 955 hPa

f in Hz	R in dB
50	35.9
63	30.2
80	30.5
100	27.4
125	27.4
160	25.4
200	30.0
250	33.4
315	37.8
400	41.9
500	43.5
630	46.4
800	49.1
1,000	50.8
1,250	49.4
1,600	48.5
2,000	50.6
2,500	54.7
3,150	60.5
4,000	66.6
5,000	67.4



Rating acc. to EN ISO 717-1 (in third-octave bands):

R_w (C; C_{tr}) = 45 (-2;-7) dB

C_{50-3,150} = -2 dB; C_{100-5,000} = -1 dB; C_{50-5,000} = -1 dB

C_{tr,50-3,150} = -7 dB; C_{tr,100-5,000} = -7 dB; C_{tr,50-5,000} = -7 dB

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Laboratory for Building Acoustics

04.07.2016

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Dipl. Ing. (FH) Mr. Stefan Bacher
 Operating Testing Officer