

# Evidence of Performance

## Airborne sound insulation of building components



### Test Report

No. 14-002633-PR01

(PB 9-H01-04-en-01)

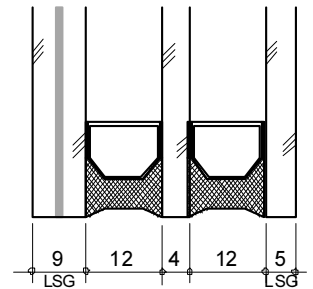
Client **SAINT-GOBAIN POLSKA Sp.Z.o.o.**  
**ODDZIAL GLASSOLUTIONS**  
ul. Kolejowa 1  
32-312 Jaroszewiec  
Poland

#### Basis

EN ISO 10140-1: 2010  
+A1: 2012  
EN ISO 10140-2: 2010  
EN ISO 717-1: 2013

Product	Insulating glass unit
Designation	SGG Climatop Protect
Dimensions (w x h)	1,230 mm x 1,480 mm
Construction	9 LSG/12/4/12/5LSG
Gas filling	Argon
Are related mass	42.0 kg/m <sup>2</sup>
Special features	-/-

#### 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  $R_{w,P}$  for DIN 4109, Annex 1, Table 40

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



$$R_w (C; C_{tr}) = 40 (-2; -6) \text{ dB}$$

#### 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 further characteristics of the present construction regarding performance and quality.

ift Rosenheim  
07.11.2014

#### 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 abstract.

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#### Contents

The test report contains a total of 7 pages:

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

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Client SAINT-GOBAIN POLSKA Sp.Z.o.o.  
ODDZIAŁ GLASSOLUTIONS, 32-312 Jaroszewiec (Poland)**1 Object****1.1 Description of test specimen (All dimensions in mm)**

<b>Component</b>	Insulating glass unit
Product designation	SGG Climatop Protect
External dimensions (W x H)	1,230 mm × 1,480 mm
Visible size (W x H)	1,200 mm × 1,450 mm
Total thickness	
On the edge	42.7 mm
In the middle of pane	43.1 mm
Area related mass kg/m <sup>2</sup>	42.0 kg/m <sup>2</sup>
Construction	9 LSG/12/4/12/5LSG
Configuration of laminated glass	4 mm Float, 1.52 mm PVB-film, 4 mm Float 2 mm Float, 0.76 mm PVB-film, 2 mm Float
Type, manufacturer of interlayer	SGG Stadip Protect 44.4 (manufacturer specifications) SGG Stadip 22.1
Pane temperature in °C	22°C
Spacer	
Material	Aluminium
Manufacturer	ALU-PRO
Edge seals	Two planes, total width 11-12 mm
External type	Poliver
Manufacturer	Fenzi
Internal type	PIB
Manufacturer	Fenzi
Edge cover	Edge cover 5-6 mm
Gas filling in cavity	According to analysis at <b>ift</b>
Type of gas	Argon
Volume in %	Cavity 1: 95% / Cavity 2: 90%

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.

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ODDZIAŁ GLASSOLUTIONS, 32-312 Jaroszewiec (Poland)**1.2 Mounting in test rig**

Test rig	Window test rig with suppressed flanking transmission acc. to EN ISO 10140-5: 2010; 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 <b>ift</b> Laboratory for Building Acoustics
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 plastic sealant type Perennator 2001 S grey.
Mounting position	According to EN ISO 10140-1:2010+A1:2012 Annex D
Preparation	Storage of the glazing one day before testing in the test rig for conditioning.

**2 Procedure****2.1 Sampling**

Sampling	The test specimen were selected by the client
Quantity	1
Manufacturer	Saint-Gobain Polska Sp z o.o. Oddzial GLASSOLUTIONS in Jaroszewiec Ul. Szklanych Domow 1 42-530 Dabrowa Gornicza
Manufacturing plant , Site of manufacturing	Ul. Kolejowa 1 32-312 Jaroszewiec
Date of manufacture / date of sampling	15 <sup>th</sup> to 30 <sup>th</sup> September 2014, Position 12
Responsible for sampling	Mrs. Anna Pustul
Delivery at <b>ift</b>	13 <sup>th</sup> October 2014 by the client via forwarding agency
<b>ift</b> Registration Number	37966/9

**2.2 Process****Basis**

EN ISO 10140-1:2010 + A1 : 2012 Acoustics; Laboratory measurement of sound insulation of building elements - Part 1: Application rules for specific products (ISO 10140-1:2010+Amd.1:2012)

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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

Corresponds to the national German standard:

DIN EN ISO 10140-1:2012-05, 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 supervisory authorities in cooperation with the standardization committee NA 005-55-75-AA (subcommittee UA 1 - DIN 4109).

Boundary conditions	As required in the standard.
Deviation	There are no deviations from the test procedure and/or test conditions.
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 difference	Minimum of 2 loudspeaker positions and rotating microphones.

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

**KEY**

A	Equivalent absorption area in m <sup>2</sup>
L <sub>1</sub>	Sound pressure level source room in dB
L <sub>2</sub>	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 <sup>3</sup>
S	Testing area of the specimen in m <sup>2</sup>

**2.3 Test equipment**

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 2013. The sound level meter used, Series No. 17848, was calibrated by the Dortmund Eichamt (calibration agency) on 19 January 2012. The calibration is valid until 31 December 2014. The sound level meter used was DKD calibrated by the company Norsonic Tippkemper (DKD - Deutscher Kalibrierdienst "German Calibration\_Service") on 25 March 2013.

**2.4 Testing**

Date 14th of October 2014

Operating Testing Officer Mr. Bernd Saß

**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.

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:

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$$R_w (C; C_{tr}) = 40 (-2; -6) \text{ dB}$$

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

$C_{50-3,150} = -2 \text{ dB}$	$C_{100-5,000} = -1 \text{ dB}$	$C_{50-5,000} = -1 \text{ dB}$
$C_{tr,50-3,150} = -6 \text{ dB}$	$C_{tr,100-5,000} = -6 \text{ dB}$	$C_{tr,50-5,000} = -6 \text{ dB}$

## 4 Instructions for use

### 4.1 Test value

Basis

DIN 4109:1989-11

Sound insulation in buildings, requirements and verifications

DIN 4109 Bb11/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  $R_{w,P, GLASS}$

$$R_{w,P, GLASS} = 40 \text{ dB}$$

### 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.

### 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.

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Laboratory for Building Acoustics

07.11.2014

# Sound reduction index according to ISO 10140 - 2

Laboratory measurements of airborne sound insulation of building elements



Client: **SAINT-GOBAIN POLSKA Sp.Z.o.o.**  
**ODDZIAL GLASSOLUTIONS**, 32-312 Jaroszowiec (Poland)

Product designation SGG Climatop Protect

## Design of test specimen

Insulating glass unit  
 External dimensions 1,230 mm × 1,480 mm  
 Pane configuration 9 LSG/12/4/12/5LSG  
 Gas filling in cavity Argon  
 Area related mass 42.0 kg/m<sup>2</sup>  
 Pane temperature 22°C

Test date 14th of October 2014  
 Test surface S 1.25 m × 1.50 m = 1.88 m<sup>2</sup>  
 Test rig as per EN ISO 10140-5  
 Partition wall Double-leaf concrete wall  
 Test noise pink noise  
 Volumes of test rooms V<sub>S</sub> = 109.9 m<sup>3</sup>  
 V<sub>R</sub> = 101.3 m<sup>3</sup>

Maximum sound reduction index  
 R<sub>w,max</sub> = 62 dB (related to test surface)

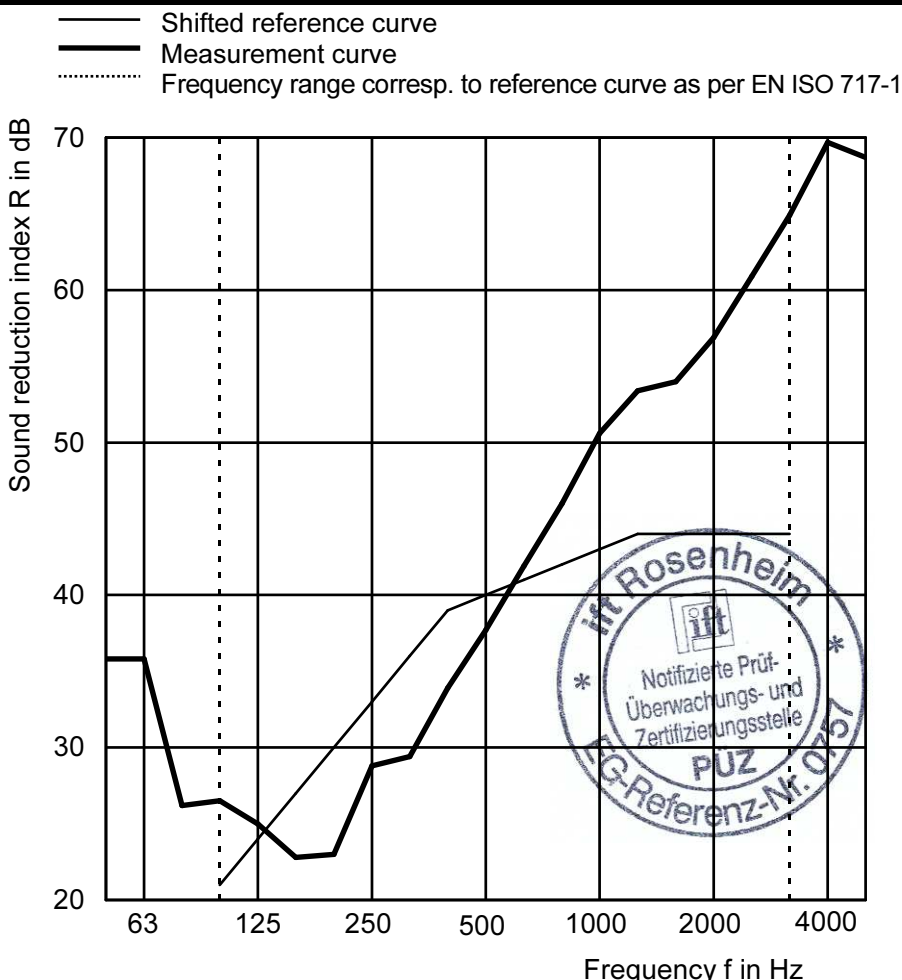
### Mounting conditions

Glass mounted in test opening and held on both sides by glazing beads (25 mm × 25 mm); gap between test rig, glazing and glazing beads was completely filled with plastic sealant

Climate in test rooms 21 °C / 61 % RH

Static air pressure 958 hPa

f in Hz	R in dB
50	35.8
63	35.8
80	26.2
100	26.5
125	25.0
160	22.8
200	23.0
250	28.8
315	29.4
400	33.9
500	37.7
630	41.9
800	46.0
1,000	50.6
1,250	53.4
1,600	54.0
2,000	56.9
2,500	60.9
3,150	64.9
4,000	69.7
5,000	68.7



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

**R<sub>w</sub> (C; C<sub>tr</sub>) = 40 (-2;-6) dB**    C<sub>50-3,150</sub> = -2 dB; C<sub>100-5,000</sub> = -1 dB; C<sub>50-5,000</sub> = -1 dB  
 C<sub>tr,50-3,150</sub> = -6 dB; C<sub>tr,100-5,000</sub> = -6 dB; C<sub>tr,50-5,000</sub> = -6 dB

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 Laboratory for Building Acoustics  
 7. November 2014

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 Operating Testing Officer