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Bauaufsichtlich anerkannte Stelle
für Prüfung, Überwachung und
Zertifizierung
Zulassung neuer Baustoffe, Bauteile
und Bauarten
Forschung, Entwicklung,
Demonstration und Beratung auf
den Gebieten der Bauphysik

Institutsleitung
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Test report P-BA 222/2004e

Sound insulation of a double glazed window pane acc. to DIN EN 20 140-3: 1995

Client:
INTERPANE GLAS INDUSTRIE AG
Sohnreystraße 21
37697 Lauenförde

Stuttgart,
September 22, 2004

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1. Date and place of the measurements

The measurements have been carried out on July 12, 2004 in the test facilities of the Fraunhofer Institute for Building Physics in Stuttgart.

2. Test object

Double glazed window pane type: " iplus S/ipaphon 52/46 SF-1.4" (test specimen S 9431-02) consisting of:

SF 13 mm laminated safety glass pane (6/0.76 foil/6) mm, information about foil manufacturer and type are deposited in the test laboratory
16 mm space
SF 17 mm laminated safety glass pane (8/0.76 foil/8) mm with IR-reflecting layer. Information about foil manufacturer and type are deposited in the test laboratory.

The filling gas inside the space is unknown (according to specification of manufacturer: air).

Spacer consists of metal hollow profile
Sealed at the spacer with butyl, at the edge with polysulfide

Total thickness in the middle of the pane:	45.0 mm
Total thickness at the rim of the pane:	45.0 mm
Size of the pane:	1230 mm x 1480 mm
Mass per unit area:	70.9 kg/m².

3. Sampling procedure

The test specimen was delivered by the client on July 7, 2004 and built into the test opening on July 12, 2004 by an authorized company.

4. Test procedure

The measurements have been carried out according to DIN EN 20 140-3: 1995 in a window test facility according to DIN EN ISO 140-1: 1998. The weighted sound reduction index and the spectrum adaption terms have been calculated acc. to DIN EN ISO 717-1: 1997. The test signal was pink noise, filtered by 1/3 octave band pass filters. The averaged sound pressure levels in the source and receiving room were obtained by moving the microphones along inclined circular paths. The sound reduction index was evaluated as follows:

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

with

R	=	sound reduction index
L_1	=	sound pressure level in the source room
L_2	=	sound pressure level in the receiving room
S	=	test area (area of the test opening)
A	=	equivalent sound absorbing area in the receiving room, evaluated by measurements of the reverberation time.

5. Test conditions

Dimensions of the test rooms:	
source room (L x W x H):	5.74 m x 3.75 m x 3.11 m; V = 67 m³
receiving room (L x W x H):	4.85 m x 3.74 m x 3.11 m; V = 57 m³
test opening (W x H):	1.25 m x 1.50 m; S = 1.875 m²
air temperature:	20 °C
relative humidity of the air:	56 %
measuring equipment:	
microphones:	Brüel & Kjær 4190
preamplifier:	Brüel & Kjær 2639
analyzer:	Norsonic 840
amplifier:	Klein & Hummel AK 120
loudspeaker:	Lanny MLS 82

6. Test results

The measured sound reduction indices as a function of frequency are represented numerically in table 1 and graphically in figure 1. The weighted sound reduction index and the spectrum adaption terms amount to

$$R_w\,(C;\, C_{tr};\, C_{100\text{-}5000};\, C_{tr,\,100\text{-}5000}) = 52\,(-1;\, -5;\, 0;\, -5)\ \text{dB}.$$

The test has been carried out in an IBP test laboratory accredited in conformity with DIN EN 45 001 by the DAP with the No. DAP-PL-2135.17.

This test report contains 3 pages, 1 table and 1 figure. The given results refer only to the tested specimen. Any publication of extracts is subject to written authorization from the IBP.

Stuttgart, September 22, 2004
DB/Be

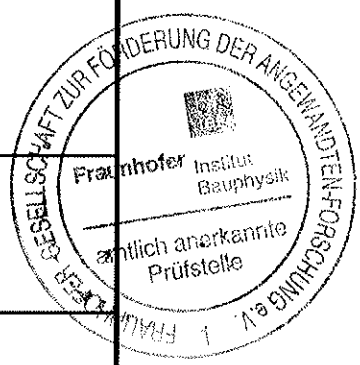
Test engineer: Head of the test laboratory:

Dipl.-Ing. D. Brandstetter Dr. rer.nat. L. Weber

FRAUNHOFER GESELLSCHAFT ZUR FÖRDERUNG DER ANGEWANDTEN FORSCHUNG e.V. 1
Fraunhofer Institut Bauphysik
amtlich anerkannte Prüfstelle

Table 1 Numerical values for the diagramm in figure 1

1/3 octave band center frequency f [Hz]	sound reduction index R [dB]
100	33.0
125	38.0
160	39.3
200	41.7
250	44.3
315	45.7
400	46.7
500	47.8
630	49.4
800	51.4
1000	51.7
1250	51.8
1600	52.4
2000	55.8
2500	60.3
3150	65.5
4000	70.0
5000	73.9



The test has been carried out in an IBP test laboratory accredited in conformity with DIN EN ISO/IEC 17025 by the DAP with the No. DAP-PL-2135.17.

Sound insulation acc. to DIN EN 20 140-3

P-BA 222/2004e

Figure 1

Applicant: INTERPANE GLAS INDUSTRIE AG
37697 Lauenförde

Test object:
Double glazed window pane type: "iplus S/ipaphon 52/46 SF-1.4" (test specimen S 9431-02) consisting of:
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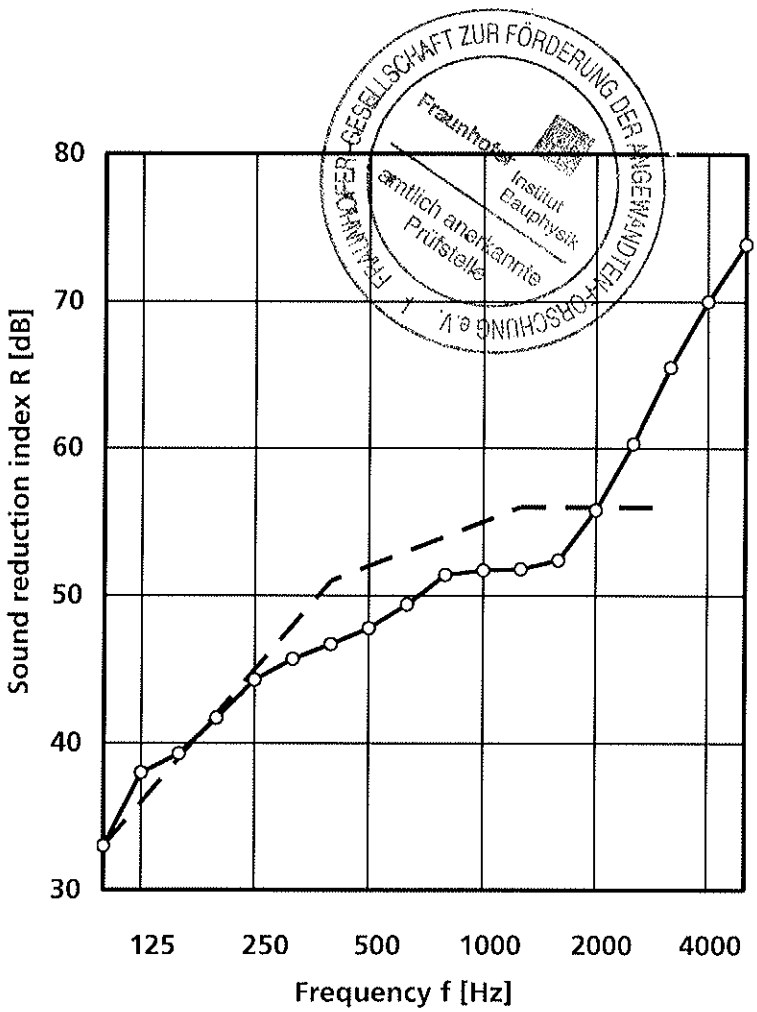
Total thickness in the middle of the pane:	45.0 mm
Total thickness at the rim of the pane:	45.0 mm
Size of the pane:	1230 mm x 1480 mm
Mass per unit area:	70.9 kg/m².

Test area:	1.875 m²
Test rooms:	
Volumes:	V_S = 67 m³
	V_R = 57 m³
Type:	Test facility
Condition:	empty
Upper limit of sound insulation:	
	$R'_{max,w}$ = 72 dB
Test conditions:	
Air temperature:	20 °C
rel. humidity:	56 %
Test noise:	pink noise
Test date:	July 12, 2004



Weighted sound reduction index and spectrum adaption terms acc. to DIN EN ISO 717-1
R_w (C; C_{tr}; $C_{100\text{-}5000}$; $C_{tr,100\text{-}5000}$) =
52 (-1; -5; 0; -5) dB

Fraunhofer IBP

The test has been carried out in an IBP test laboratory accredited in conformity with DIN EN ISO/IEC 17025 by the DAP with the No. DAP-PL-2135.17.
Stuttgart, September 21, 2004
Head of the test laboratory: