Evidence of Performance

Airborne sound insulation of building elements

Test report
No. 11-001899-PR01
(PB-Z04-A01-04-en-01)

Client	Arbor Ahsap Yapi Elemanlari Atatürk bulvari Köstemir yolu Istanbul Turkey
Product	Single-leaf single window
System designation	68s
External Dimensions (W x H)	1230 mm × 1480 mm
Frame material	Wood profile
Type of opening	Tilt and turn
Rebate seals	1 Central seal, 1 Internal seal
Infill panel	Insulating glass unit, 8LG/16/6, Interlayer with 0.38 mm acoustic film , Gas filling in cavity : Argon
Special features	-

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

$$R_w\ (C;\ C_{tr}) = 39\ (-1;\ -4)\ \text{dB}$$

ift Rosenheim
14 September 2011

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Basis

EN ISO 10140-1: 2010
EN ISO 10140-2: 2010
EN ISO 717-1: 1996+A1: 2006

This test report is a translation of test report no 11-001899-PR01 (PB-Z04-A01-04-en-01) dated 05 August 2011.

Representation

Instructions for use

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

Applicable for Germany:

- $R_{w,R}$ as per DIN 4109: (R_w corresponds to $R_{w,P}$, $R_{w,R} = R_{w,P} - 2$ dB)
- $R_{w,R}$ for "Bauregelliste"

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 structure 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 abstract.

Contents

The test report contains a total of 9 pages:

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Sachverständige Prüfstelle Gruppe I
für Eignungs- und Güteprüfung DIN 4109

1 Object

1.1 Description of test specimen

Product	Single-leaf single window
Product designation	68s
Type of opening	Tilt and turn
Opening direction	DIN right
Mass of total element	65 kg
Area related mass	36 kg/m²
Frame member	
Material	Wood profile
Frame member size (W × H)	1230 mm × 1480 mm
Profile section (W x D)	79 mm × 78 mm, at bottom: 73 mm × 78 mm plus drainage channel
Drainage channel	Aluminium profile with rebate seal (Gutmann, Spree 24 OF)
Casement member	
Material	Wood profile
Casement member size (W × H)	1151 mm × 1386 mm
Profile section (W x D)	77 mm × 78 mm
Rebate design	
Rebate seal	1 Central seal, 1 Internal seal
Central seal (type/position)	1 Sealing profile of EPDM with foam plastic core in rebate of casement member
manufacturer, designation	Schlegel, Art. No.: Q-Lon QL-3053
Internal seal (type/position)	1 Sealing profile of EPDM with foam plastic core in overlap of casement
manufacturer, designation	Schlegel, Art. No.: Q-Lon QL-3063
Rebate drainage	Drainage channel
Infill panel	Insulating glass unit
manufacturer, designation	Yıldız Cam San. Tic. A.Ş.
Configuration (from outside to inside)	8LG/16/6
Configuration of laminated glass	4 mm Float/0.38 mm acoustic film /4 mm Float
Type / manufacturer of interlayer	Trosifol, Art.No. 39209100
Thickness	30 mm (0 mm deflection in the middle of pane)
Glass size (W × H)	1020 mm × 1255 mm
Visible size (W x H)	997 mm × 1232 mm
Gas filling in cavity	Argon (acc. to declaration by the manufacturer)
Mounting of infill panel	
Glazing beads (type, position)	Wood strips on the inside
Sealing system	Wed glazing on both sides
Pressure equalization / Ventilation	2 frame millings each (5 mm × 10 mm) at top and bottom

Fittings

Type/ manufacturer	Tilt and turn fitting, MACO
Hinges / pivots	1 Corner pivot, 1 Tilt mechanism pivot
Lockings	3 locking plates on lock side, 2 each at top and on hinge side, 1 lock plate at bottom
Closing force	Actuating torque ≤ 10 Nm

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

1.2 Mounting in test rig

Test rig	Window test rig „Z“ with suppressed flanking transmission acc. to EN ISO 10140-5: 2010; the test rig includes a mounting frame with a continuous acoustic break which is sealed in the test opening with elastic sealant.
Mounting of test specimen	Test specimen mounted by employees of **ift** Laboratory for Building Acoustics.
Mounting conditions	Element butt-mounted in test opening and fixed by wedges. Connecting joints filled with foam and sealed with plastic sealants on both sides.
Mounting position	Ratio 1 to 2 in test opening.
Opening direction	Towards receiving room.
Preparation	The window was opened and closed repeatedly.

1.3 Representation of test specimen

The structural details were examined solely on the basis of the characteristics to be classified. The illustrations are based on unchanged documentation provided by the client.

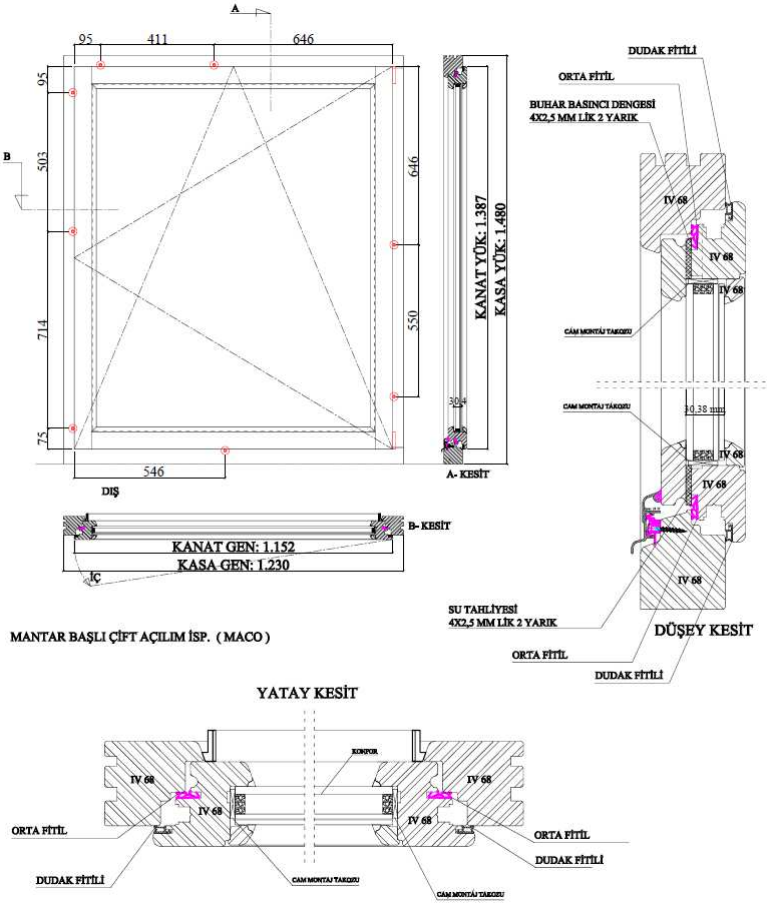


Fig. 1 Elevation of unit and sectional drawings

Fig. 2 Photos of the tested element (taken by **ift** Centre for Acoustics)

2 Procedure

2.1 Sampling

Sampling	The samples were selected by the client
Quantity	1
Manufacturer	Selectron Elektrokimya San.Ve Tic. Ltd Şti. Arbor Ahşap Yapı Elemanları
Site of manufacturing	Atatürk bulvarı köstemir cad. no 74 Silivri / İst / Türkiye
Date of manufacture / date of sampling	June 2011
Production line	Not specified
Responsible for sampling	Abdullah Seyfi
Delivery at **ift**	30.06.2011 by the client via forwarding agency
ift registration number	30574/02

2.2 Process

Basis

EN ISO 10140-1: 2010	Acoustics; Laboratory measurement of sound insulation of building elements - Part 1: Application rules for specific products (ISO 10140-1: 2010)
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: 1996 + A1: 2006	Acoustics; Rating of sound insulation in buildings and of building elements - Part 1: Airborne sound insulation

Corresponds to the national German versions:

DIN EN ISO 10140-1: 2010-12, DIN EN ISO 10140-2: 2010-12 und
DIN EN ISO 717-1: 2006-11

The processing and volume of the test is according to the principles of the "Arbeitskreis der bauaufsichtlich anerkannten Schallprüfstellen" in agreement with NA 005-55-75-AA (UA 1 to DIN 4109).

Boundary conditions	As required in the standard.
Deviations	There are no deviations from the test procedure and test conditions.
Test noise	Pink noise
Measuring filter	One-third-octave band filter
Measurement limits	
Background noise level	The background noise level in the receiving room with reference to the evaluation-relevant frequency range was at least 15 dB below the test noise level. There was no correction by calculation.
Maximum sound insulation	The Maximum sound insulation of the test rig is 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 of 12 independent measurements from 2 loudspeaker positions and ea. 6 microphone positions.
Measurement equation A	$A = 0{,}16 \cdot \frac{V}{T}$ m²
Measurement of sound level 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 m²
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 m³
S	Testing area of the specimen in m²

2.3 Test equipment

Device	Type	Manufacturer
Integrating sound meter	Type Nortronic 830	Norsonic-Tippkemper
Microphone preamplifiers	Type 1201	Norsonic-Tippkemper
Microphone units	Type 1220	Norsonic-Tippkemper
Calibrator	Type 1251	Norsonic-Tippkemper
Dodecahedron loudspeakers	Own design	-
Amplifier	Type E120	FG Elektronik
Rotating microphone boom	Own design / Type 231-N-360	Norsonic-Tippkemper

The **ift** Centre for Acoustics participates in comparative measurements at the Physikalisch-Technische Bundesanstalt (PTB) in Braunschweig every three years, the last one was in April 2010. The sound level meter used, Series No. 17956, was calibrated by the Dortmund Eichamt (calibration agency) on 16 September 2009. The calibration is valid until 31 December 2011.

2.4 Testing

Date	25 July 2011
Test engineer	Johann Baume

3 Detailed results

The measured data were used to calculate the sound reduction index of the testing element. The frequency-dependent values are plotted and tabled in the data sheets enclosed.

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:

$$\mathbf{R_w\ (C;\ C_{tr}) = 39\ (-1;\ -4)\ dB}$$

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

$C_{50\text{-}3150}$	=	- dB	$C_{100\text{-}5000}$	=	0 dB	$C_{50\text{-}5000}$	=	- dB
$C_{tr,50\text{-}3150}$	=	- dB	$C_{tr,100\text{-}5000}$	=	-4 dB	$C_{tr,50\text{-}5000}$	=	- dB

4 Instructions for use

4.1 Safety margin according to DIN 4109

Basis

DIN 4109: 1989-11 Sound insulation in buildings; requirements and verifications

For verification of sound insulation according to DIN 4109: 1989-11 (Suitability Test I) the weighted sound reduction index R_w corresponds to the test value $R_{w,P}$. Including safety margin of 2 dB, the following value $R_{w,R}$ is obtained by calculation

$$\mathbf{R_{w,R} = 37\ dB}$$

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, until the respective date, applicable parts of the standards series EN ISO 140 which describe laboratory tests. According to the two standard series, the test methods are identical.

ift Rosenheim
Laboratory for Building Acoustics
14 September 2011

Sound reduction index according to ISO 10140 - 2

Laboratory measurements of airborne sound insulation of building elements

Client: Arbor Ahsap Yapi Elemanlar, Istanbul (Turkey)

Product designation 68s

Testing element	Single-leaf single **window**
Dimensions	1230 mm × 1480 mm (W × H, overall frame dimensions)
Frame material	Wood profile
Type of opening	Tilt and turn
Rebate seals	1 Central seal, 1 Internal seal
Infill panel	Insulating glass unit
Pane configuration	8LG/16/6
Interlayer	0.38 mm acoustic film
Gas filling in cavity	Argon
Remark	-

Test date	25 July 2011
Test surface S	1,25 m × 1,50 m = 1,88 m^2
Test rig	as per EN ISO 10140-5
Partition wall frame	Double-leaf concrete wall, insert
Test noise	pink noise
Volumes of test rooms	V_S = 104 m^3 V_E = 67.5 m^3

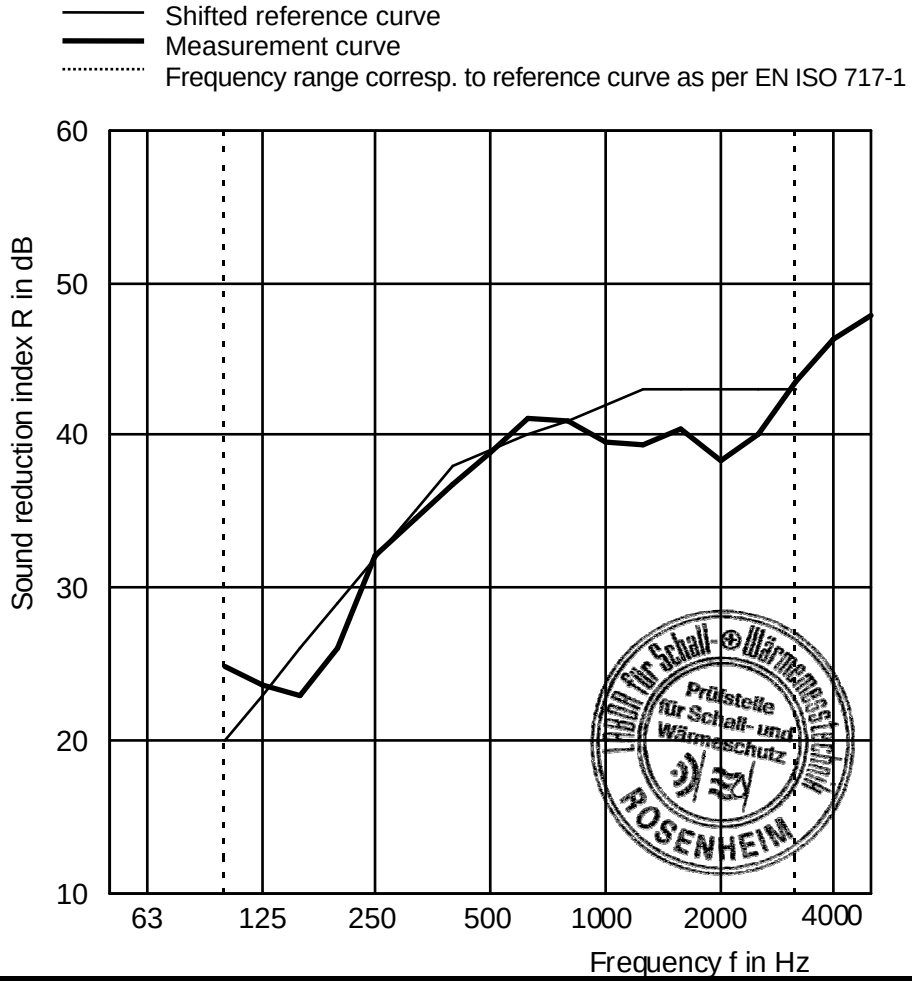
Maximum sound reduction index
$R_{w,max}$ = 62 dB (related to test surface)

Mounting conditions Element butt-mounted in test opening and fixed by wedges. Connecting joints filled with foam and sealed with plastic sealants on both sides.

Climate in test rooms 20℃ / 55% RF

Static air pressure 956 hPa

f in Hz	R in dB
50	-
63	-
80	-
100	24.9
125	23.7
160	23.0
200	26.0
250	32.2
315	34.5
400	36.8
500	38.9
630	41.1
800	41.0
1000	39.5
1250	39.4
1600	40.4
2000	38.4
2500	40.1
3150	43.6
4000	46.3
5000	47.8



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

R_w (C; C_{tr}) = 39 (-1; -4) dB $C_{50\text{-}3150}$ = - dB; $C_{100\text{-}5000}$ = 0 dB; $C_{50\text{-}5000}$ = - dB

$C_{tr,50\text{-}3150}$ = - dB; $C_{tr,100\text{-}5000}$ = -4 dB; $C_{tr,50\text{-}5000}$ = - dB

ift Rosenheim
Laboratory Building Acoustics
14 September 2011

Johann Baume, Dipl.-Ing. (FH)
Test engineer