Instytut Techniki Budowlanej
BUILDING RESEARCH INSTITUTE
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CONSTRUCTION ELEMENTS ENGINEERING DEPARTMENT
BUILDING ELEMENTS LABORATORY

REPORT OF THE TESTS
AND ASSESSMENT OF THE PERFORMANCE
Nº LZE05-06016/16/R11NK - EN

Client:	SOKÓŁKA Okna i Drzwi S.A.
Client address:	16-100 Sokółka, ul. Lotników Lewoniewskich 1

INFORMATION ABOUT PRODUCT	
Manufacturer (name and address):	SOKÓŁKA Okna i Drzwi S.A. 16-100 Sokółka, ul. Lotników Lewoniewskich 1
Name and address of factory:	SOKÓŁKA Okna i Drzwi S.A. 16-100 Sokółka, ul. Lotników Lewoniewskich 1
Product:	Balcony door outward openable system **EURO**
Harmonised standard:	PN-EN 14351-1+A1:2010
Information about product, intended use and the number of the applicable system of assessment and verification of constancy of performance:	The construction product without resistance to fire and/or smoke leakage characteristics. System 3.
Unique identification code of the product-type:	Information about unique identification code of the product-type has not been provided by client

Information about test item	
Test item: name, description, condition, identification:	The information contained in paragraph 2 of this REPORT OF THE TESTS AND ASSESSMENT OF THE PERFORMANCE
Date of receipt /sampling:	Date of receipt of the samples by the laboratory: 23.08.2016 Sampling date by the customer: 23.08.2016 Date of receipt of the complete technical documentation of the product: 23.08.2016
Receipt pling procedure:	PZ ZLB 18
Nº of receipt / sampling protocol:	LZE02-06016/16/R11NK
Further information about test item:	Balcony door outward openable system **EURO** - fig. 1; dimensions WxH = 900x2100 mm; glass unit 4,16/4.

Information about tests:	
Test commencement date:	24.08.2016
Test completion date:	25.08.2016
Further information about tests:	---

Test methods:

Initial type testing (ITT) – AoC system 3 PN-EN 14351-1+A1:2010

PN-EN 1026:2016	Windows and doors – Air permeability – Test method
PN-EN 1027:2016	Windows and doors – Watertightness – Test method
PN-EN 12211:2016	Windows and doors – Resistance to wind load – Test method
PN-EN 14351-1+A1:2010	Windows and doors – Product standard, performance characteristics – Part 1: Windows and external pedestrian doorsets without resistance to fire and/or smoke leakage characteristics

Devices, apparatus and means of measuring:

Chamber for testing tightness and strength no LL-063 in the:

- ➤ subassembly no 1 – LK-046-1 - sensors of movements,
- ➤ subassembly no 2 – LK-046-2 - the flow of water,
- ➤ subassembly no 3 – the blowers [pressure range],
- ➤ subassembly no 4 – the blowers [airflow range],
- ➤ termohigrobarometr no – LK-014,
- ➤ measuring tape no – LL-112, LL-113.

1. The scope of tests

The scope of initial type testing covered the verification of:

- – air permeability,
- – watertightness,
- – resistance to wind load.

Personnel executing the test:

Jerzy Płoński, MSc.
Piotr Niedbalski, BSc.

2. Test specimen (identification)

Manufacturer: SOKÓŁKA Okna i Drzwi S.A., 16-100 Sokółka, ul. Lotników Lewoniewskich

Place of sampling: SOKÓŁKA Okna i Drzwi S.A., 16-100 Sokółka, ul. Lotników Lewoniewskich 1.

Number of samples: 1

Description of the sample:	Balcony door outward openable system **EURO** fig. 1; external dimensions WxH = 900x2100 mm; glass unit 4/16/4.
Date of sampling:	August 2016,
Date of production:	August 2016.
Company name:	Inwido/Sokółka Okna i Drzwi S.A

Unit function and description:	Balcony Door outward openable, 1-sash
Material:	Wood

Module size M. w. x h

- • WxH: 900 mm x 2100 mm

Corner joints, jointed using:

- • Adhesive - make and type: KESTOKOL D4000 waterproof glue for timber EN204/D4 class
- • Welding system: Frame press
- • Corner plates - make and type: Frame, sash – tenon corner connections

Weather seals:
- Make and type:

Function	Winpro code	Supplier	Supplier name/code
Tape under the glass unit	USZ-1TAK10X40	KISO	Kronliste 10x4mm
Glazing bead gasket	USZ-5982-0002-49	PRIMO	5982-0002-49
Bottom bead alu alu glazing gasket	USZ-6103-2001-49	PRIMO	6103-2001-49
Main sash gasket	USZ-713139100	TRELLEBORG	713139100
Tape for bars	USZ-3M-24-5MM	3M	VG708B24
Frame gaskett		SCHLEGEL	DX 1372

- Fixing   Dry, no glue

Hardware:

Model: 900*2100mm				
	Qty.	Location	Material	Surface treatment
Hinges – butt door hinges KEPT	3	Frame/sash	Steel	Corrosion treated
Handle - Hoppe Mini Tokyo	1	Sash	Aluminium	Corrosion treated
Fastening points – keepers:				
For 1-sash door - FIXC888	3	Frame	Steel	Corrosion treated
Fastening system – espagnolette FIX+extension	1+1	Sash	Steel	Corrosion treated

Glazing units:
- Make and type: Press-Glass EN 1279
- Installation system/materials: Installation instructions from the glass industry.

Wood treatment:
- Method and product description:

| Finish steps	Application method	No of layers	Product	Supplier
Impregnation	Flow-coating	1	TEKNOL AQUA 1410-01	TEKNOS
Grounding/base coat	Spraying by gun	1	ANTI STAIN AQUA 5200-00	TEKNOS
Sealing joints-fugue	Gun for fugue	1	GORI 691-32 FLEX	TEKNOS
Top Coat	Spraying	1	AQUA TOP 2600-73	TEKNOS

Fig 1 The cross sections of the door

3. The methods and results

3.1. Air permeability - before of the resistance to wind load

The test was carried out in accordance with the PN-EN 1026:2016.
Test results are shown in table N° 1.

Air permeability									Table 1	
specimen area 1,9 m^2	joint length 5,6 m	temp 24 °C	humidity 59 %			atm. press 1008 hPa				
positive test pressure										
Air flow		Value of air permeability at pressure, Pa								
		50	100	150	200	250	300	450	600	
overall	m^3/h	2,40	3,60	4,70	5,70	6,50	7,20	8,20	11,90	
in relation to joint length	m^3/hm	0,43	0,64	0,84	1,02	1,16	1,29	1,46	2,13	
in relation to surface	m^3/hm^2	1,26	1,89	2,47	3,00	3,42	3,79	4,32	6,26	
air inf. coefficient , a	m^3/(mhdaPa)$^{2/3}$	0,15	0,14	0,14	0,14	0,14	0,13	---	---	
negative test pressure										
Air flow		Value of air permeability at pressure, Pa								
		50	100	150	200	250	300	450	600	
overall	m^3/h	2,10	4,20	7,90	10,20	13,40	15,10	28,10	44,10	
in relation to joint length	m^3/hm	0,38	0,75	1,41	1,82	2,39	2,70	5,02	7,88	
in relation to surface	m^3/hm^2	1,11	2,21	4,16	5,37	7,05	7,95	14,79	23,21	
air inf. coefficient , a	m^3/(mhdaPa)$^{2/3}$	0,13	0,16	0,23	0,25	0,28	0,28	---	---	
numerical average										
Air flow		Value of air permeability at pressure, Pa								
		50	100	150	200	250	300	450	600	
overall	m^3/h	2,25	3,90	6,30	7,95	9,95	11,15	18,15	28,00	
in relation to joint length	m^3/hm	0,40	0,70	1,13	1,42	1,78	1,99	3,24	5,00	
in relation to surface	m^3/hm^2	1,18	2,05	3,32	4,18	5,24	5,87	9,55	14,74	
air inf. coefficient , a	m^3/(mhdaPa)$^{2/3}$	0, 14						---	---	

Classification in relation to joint length

Classification in relation to surface
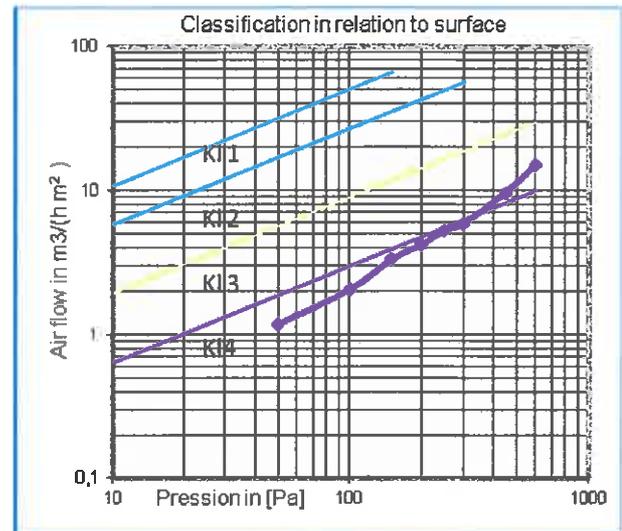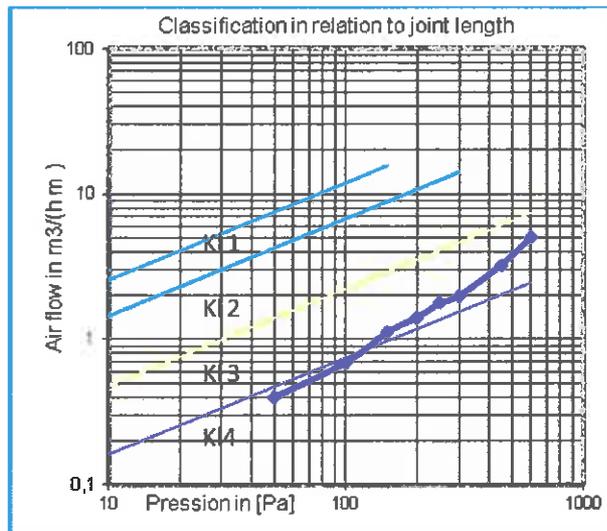
Requirement	Standard	Result
Q_{lmax} < 2,25 m^3/hm under 300 Pa	PN-EN 12207:2001	Q_{lmax} = 1,51 m^3/(hm) (class 3)
Q_{pmax} < 9,0 m^3/hm^2 under 300 Pa	PN-EN 12207:2001	Q_{pmax} = 4,46 m^3/(hm^2) (class 3)
In accordance with p. 4.6 of PN-EN 12207:2001	PN-EN 12207:2001	**class 3**
Q_{lmax} – the maximum value of air flow in relation to joint length Q_{pmax} - the maximum value of air flow in relation to surface		
Measurement uncertainty of ±5%. The confidence level of 95% for k = 2		

3.2. Watertightness

The test was carried out in accordance with the PN-EN 1027:2016, method 1A.

Test results are shown in table N° 2. The wiew of the window - fig 2.

Watertightness		Table 2
Pressure, Pa	Testing time, min	Notes
0	15	no leakage
50	5	no leakage
100	5	no leakage
150	5	no leakage
200	5	no leakage
250	5	no leakage
300	5	no leakage
450	5	no leakage
600	5	no leakage
750	5	leakage

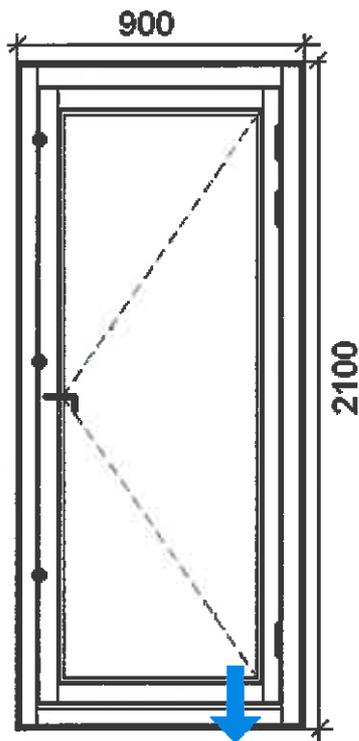| Requirement	Standard	Result
no leakage	PN-EN 12208:2001	Class 9A

Fig 2 Scheme of the window

3.3. Resistance to wind load

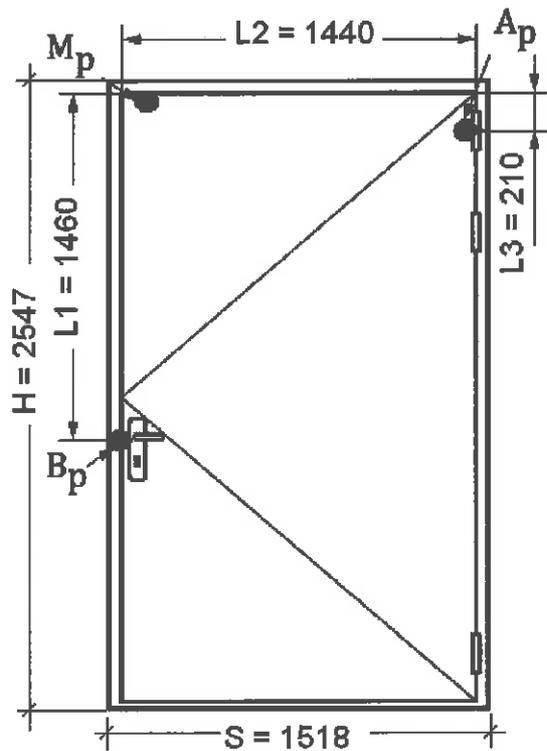The test was carried out in accordance with the PN-EN 12211:2016.
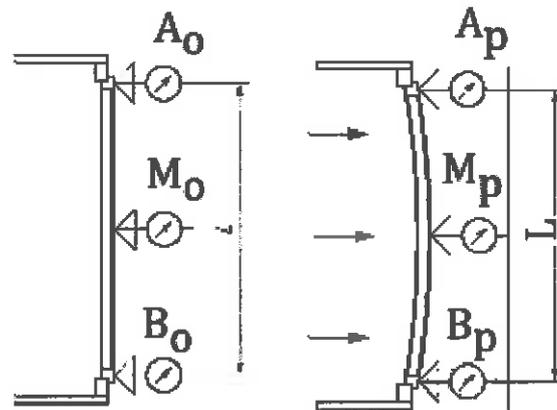

Fig 3a Measuring points

Fig 3b Deflection measuring

Description of the measuring points:

A_p frontal deflection at hinge at test pressure P1

A_o frontal deflection at hinge at test pressure 0 Pa

B_p frontal deflection at door lock at test przessure P1

B_o frontal deflection at door lock at test presure 0 Pa

M_p frontal deflection at corner at test pressure P1

M_o frontal deflection at corner at test pressure 0 Pa

L_1, L_2, L_3 distance between the measuring points

The methodology of calculation of the deflection:

Frontal deflection
$$F_p = (M_p - M_o) - \frac{(A_p - A_o) + (B_p - B_o)}{2}$$

Relative frontal deflection
$$F_{rp} = \frac{F_p}{L_1 + L_2 + L_3}$$

Measurement of deflection with P1.

Test results are shown in table N° 3

Measurement of deflection [mm]								Table 3
Point of measurement	Positive test pressure - Load [Pa]							
	200	400	600	800	1000	1200	1600	0
Point Bp	0,37	0,79	1,15	1,54	1,89	2,20	2,72	0,3
Point Mp	1,08	1,44	1,70	1,89	2,02	2,12	2,30	0,2
Point Ap	0,16	0,32	0,47	0,66	0,82	0,90	1,27	0,4
Displacement, mm Fp	0,80	0,90	0,90	0,80	0,70	0,60	0,40	---
Displacement relative Frp [L1+L2+L3 = 2000 mm]	0,0004	0,00045	0,00045	0,0004	0,00035	0,0003	0,0002	---
Deflection L/(Bp-Mp)	2500	2222	2222	2500	2857	3333	5000	---
Point of measurement	Negative test pressure [width 1900 mm] - Load [Pa]							
	200	400	600	800	1000	1200	1600	0
Point Bp	0,38	0,63	0,88	1,12	1,38	1,64	2,25	0,1
Point Mp	1,01	1,07	1,15	1,23	1,30	1,39	1,52	0,3
Point Ap	0,18	0,34	0,50	0,65	0,84	1,04	1,34	0,3
Displacement, mm Fp	0,70	0,60	0,50	0,30	0,20	0,10	0,10	---
Displacement relative Frp [L1+L2+L3 = 2000 mm]	0,00035	0,0003	0,00025	0,00015	0,0001	0,00005	0,00005	---
Deflection L/(Bp-Mp)	2857	3333	4000	6667	10000	20000	20000	---
Measurement uncertainty of ±1N. The confidence level of 95% for k = 2								

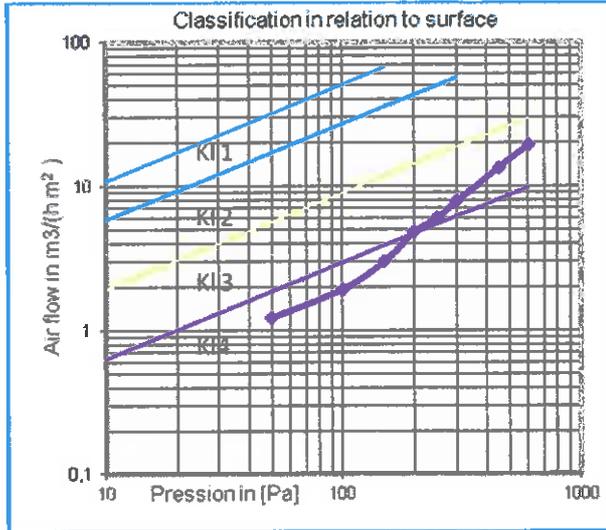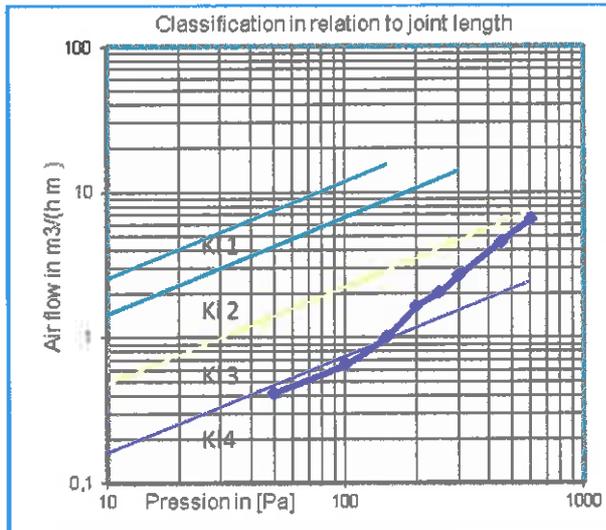| Requirement	Standard	Result
f ≤ L/300	PN-EN 12210:2001	**Class C4 (1600 Pa)**

Repeated load P2 Number of cycles: 50,
Positive pressure: 800 Pa, Negative pressure: 800 Pa
Test result: no visible changes were observed.

Safety test P3 Positive pressure: 2400 Pa, Negative pressure: 2400 Pa
Test result: no visible changes were observed.

3.4. Air permeability – after of the resistance to wind load

The test was carried out in accordance with the PN-EN 1026:2016.
Test results are shown in table N° 4.

Air permeability										Table 4	
specimen area	1,9 m^2	joint length	5,6 m	temp	24 °C	humidity	56 %	atm. press		1008 hPa	
positive test pressure											
Air flow			Value of air permeability at pressure, Pa								
		50	100	150	200	250	300	450	600		
overall	m^3/h	2,40	3,60	4,70	5,90	6,50	7,30	8,20	10,90		
in relation to joint length	m^3/hm	0,43	0,64	0,84	1,05	1,16	1,30	1,46	1,95		
in relation to surface	m^3/hm^2	1,26	1,89	2,47	3,11	3,42	3,84	4,32	5,74		
air inf. coefficient , a	m^3/(mhdaPa)$^{2/3}$	0,15	0,14	0,14	0,14	0,14	0,14	---	---		
negative test pressure											
Air flow			Value of air permeability at pressure, Pa								
		50	100	150	200	250	300	450	600		
overall	m^3/h	2,30	3,80	6,80	12,50	16,60	22,50	42,90	62,50		
in relation to joint length	m^3/hm	0,41	0,68	1,21	2,23	2,96	4,02	7,66	11,16		
in relation to surface	m^3/hm^2	1,21	2,00	3,58	6,58	8,74	11,84	22,58	32,89		
air inf. coefficient , a	m^3/(mhdaPa)$^{2/3}$	0,14	0,15	0,20	0,30	0,35	0,42	---	---		
numerical average											
Air flow			Value of air permeability at pressure, Pa								
		50	100	150	200	250	300	450	600		
overall	m^3/h	2,35	3,70	5,75	9,20	11,55	14,90	25,55	36,70		
in relation to joint length	m^3/hm	0,42	0,66	1,03	1,64	2,06	2,66	4,56	6,55		
in relation to surface	m^3/hm^2	1,24	1,95	3,03	4,84	6,08	7,84	13,45	19,32		
air inf. coefficient , a	m^3/(mhdaPa)$^{2/3}$	0,14						---	---		

Classification in relation to joint length

Classification in relation to surface

Requirement	Standard	Result
$Q_{lmax} < 2,25$ m^3/hm under 300 Pa	PN-EN 12207:2001	$Q_{lmax} = 1,98$ m^3/(hm) (class 3)
$Q_{pmax} < 9,0$ m^3/hm^2 under 300 Pa	PN-EN 12207:2001	$Q_{pmax} = 5,85$ m^3/(hm^2) (class 3)
In accordance with p. 4.6 of PN-EN 12207:2001	PN-EN 12207:2001	**class 3**
Q_{lmax} – the maximum value of air flow in relation to joint length Q_{pmax} - the maximum value of air flow in relation to surface		
Measurement uncertainty of ±5%. The confidence level of 95% for k = 2		

4. Classification

On the base of test results ITT the classification is presented in table no. 5.

Balcony door outward opening system **EURO**		Table 5
Property	Classification	Classification standard
Air permeability	**class 3**	PN-EN 12207:2001
Watertightness	**class 9A**	PN-EN 12208:2001
Resistance to wind load	**class C4**	PN-EN 12210:2001
Safety test	**+2400 Pa / -2400 Pa**	

Responsible for the test

Jerzy Płoński, Msc.

Authorizing person

Ołeksij Kopyłow, PhD

Warsaw...09.09.2016

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Head of Testing Laboratory

Marzena Jakimowicz, Msc.