

CONSTRUCTION ELEMENTS ENGINEERING DEPARTMENT
BUILDING ELEMENTS LABORATORY

REPORT OF THE TESTS AND ASSESSMENT OF THE PERFORMANCE

N° LZE03-06016/16/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: Window 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: 10.06.2016
Sampling date by the customer: 10.05.2016
Date of receipt of the complete technical documentation of the product: 10.05.2016

Receipt / sampling procedure: PZ ZLB 18

N° of receipt / sampling protocol: LK00-06016/16/R11NK

Further information about test item: Window system **EURO** fig. 1; dimensions WxH = 1788x1988 mm; glass unit 4/16/4.

Information about tests:

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Test commencement date: 04.07.2016

Test completion date: 04.07.2016

Further information about tests: ---

Test methods:

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

PN-EN 1026:2001 Windows and doors – Air permeability – Test method

PN-EN 1027:2001 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-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 Płonski, MSc.

Daniel Kuna, 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: Window system **EURO** fig. 1; external dimensions WxH = 1788x1988 mm; glass unit 4/16/4.

Date of sampling: May 2016,

Date of production: May 2016.

Used components

Unit function and description: Side Hung (with espagnolette+brake) window

Material: Wood (Pine laminated finger joint)

Module size M. w. x h

- Min.: 378x468mm
- Max: 873x1668mm
- Max. Casement measurement: 809x1604mm

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 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

Hardware:

Model: 700*700mm				
	Qty.	Location	Material	Surface treatment
Hinges – butt window hinges KEPT	2	Frame/sash	Steel	Corrosion treated
Handle - Hoppe Mini Tokyo	1	Sash	Aluminium	Corrosion treated
Fastening points – keepers JASA COMPANY 1BESTS50	2	Frame	Steel	Corrosion treated
Fastening system – espagnolette FIX S2111	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

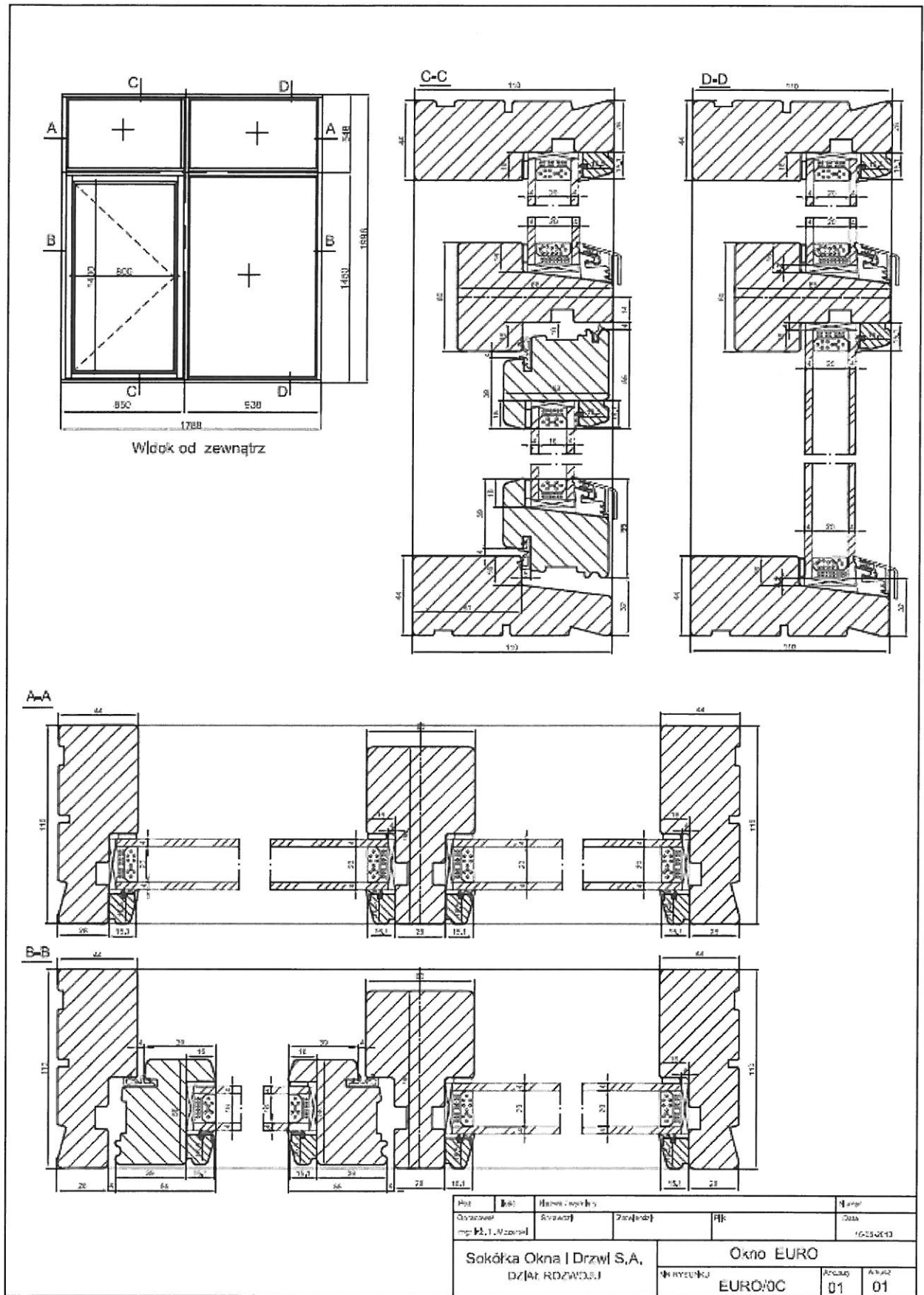


Fig 1 The cross sections of the window

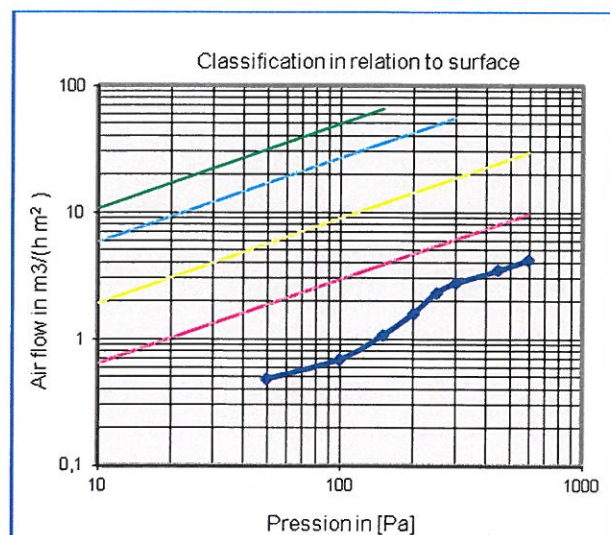
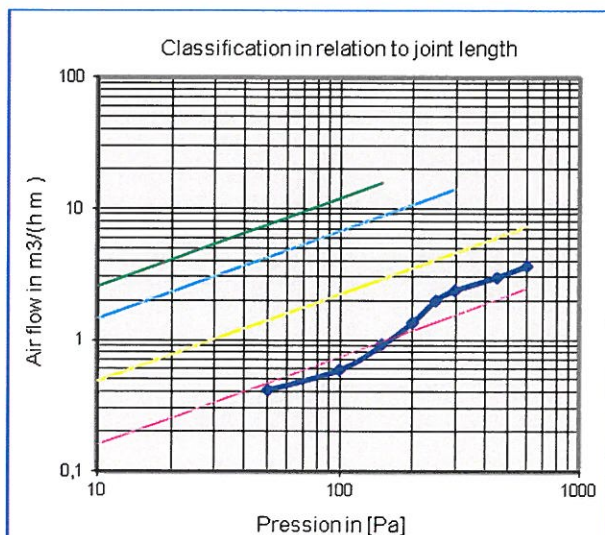
3. The methods and results

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

The test was carried out in accordance with the PN-EN 1026:2001.

Test results are shown in table N^o 1.

Air permeability						Table 1			
specimen area	3,6 m ²	joint length	4,2 m	temp	25 °C	humidity	45 %	atm. press	1002 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	1,80	2,50	3,80	5,50	7,90	8,80	11,00	12,60
in relation to joint length	m ³ /hm	0,43	0,60	0,90	1,31	1,88	2,10	2,62	3,00
in relation to surface	m ³ /hm ²	0,50	0,69	1,06	1,53	2,19	2,44	3,06	3,50
air inf. coefficient , a	m ³ /(mhdaPa) ^{2/3}	0,15	0,13	0,15	0,18	0,22	0,22	0,21	0,20
negative test pressure									
Air flow		Value of air permeability at pressure, Pa							
		50	100	150	200	250	300	450	600
overall	m ³ /h	1,70	2,50	3,90	5,90	8,80	11,00	13,50	17,60
in relation to joint length	m ³ /hm	0,40	0,60	0,93	1,40	2,10	2,62	3,21	4,19
in relation to surface	m ³ /hm ²	0,47	0,69	1,08	1,64	2,44	3,06	3,75	4,89
air inf. coefficient , a	m ³ /(mhdaPa) ^{2/3}	0,14	0,13	0,15	0,19	0,25	0,27	0,25	0,27
numerical average									
Air flow		Value of air permeability at pressure, Pa							
		50	100	150	200	250	300	450	600
overall	m ³ /h	1,75	2,50	3,85	5,70	8,35	9,90	12,25	15,10
in relation to joint length	m ³ /hm	0,42	0,60	0,92	1,36	1,99	2,36	2,92	3,60
in relation to surface	m ³ /hm ²	0,49	0,69	1,07	1,58	2,32	2,75	3,40	4,19
air inf. coefficient , a	m ³ /(mhdaPa) ^{2/3}	0,17						-	-



Requirement	Standard	Result
$Q_{lmax} < 2,25 \text{ m}^3/\text{hm}$ under 300 Pa	PN-EN 12207:2001	$Q_{lmax} = 1,09 \text{ m}^3/(\text{hm})$ (class 3)
$Q_{pmax} < 3,0 \text{ m}^3/\text{hm}^2$ under 600 Pa	PN-EN 12207:2001	$Q_{pmax} = 1,27 \text{ m}^3/(\text{hm}^2)$ (class 4)
In accordance with p. 4.6 of PN-EN 12207:2001	PN-EN 12207:2001	class 4
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 $\pm 5\%$. The confidence level of 95% for $k = 2$		

3.2. Watertightness

The test was carried out in accordance with the PN-EN 1027:2001, method 1A.

Test results are shown in table N° 2. The view 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	no leakage
900	5	no leakage
1050	5	no leakage
1200	2	leakage

Requirement	Standard	Result
no leakage	PN-EN 12208:2001	Class E1050

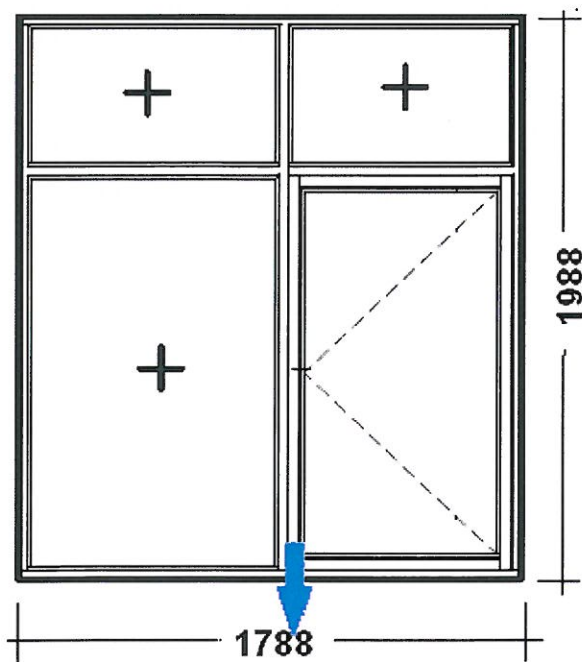


Fig 2 Scheme of the window

3.3. Resistance to wind load

The test was carried out in accordance with the PN-EN 12211:20016.

Measurement of deflection with P1. Test results are shown in table N° 3a ÷ 3b.

Measurement of deflection mulion [mm]				Table 3a
Point of measurement	Positive test pressure [width 1900 mm] - Load [Pa]			
	400	800	1200	0
Point 1	0,3	0,6	1,0	0,1
Point 2	2,1	3,5	5,7	0,2
Point 3	0,2	0,7	1,1	0,1
Displacement, mm	1,9	2,9	4,7	---
Deflection 1/	1047	686	423	---
Point of measurement	Negative test pressure [width 1900 mm] - Load [Pa]			
	400	800	1200	0
Point 1	0,3	0,4	1,0	0,1
Point 2	0,4	3,6	5,9	0,2
Point 3	0,2	0,7	1,1	0,1
Displacement, mm	0,2	3,1	4,9	---
Deflection 1/	9950	642	406	---
Measurement uncertainty of ±1N. The confidence level of 95% for k = 2				

Measurement of deflection transom [mm]				Table 3b
Point of measurement	Positive test pressure [width 800 mm] - Load [Pa]			
	400	800	1200	0
Point 4	0,3	0,6	1,0	0,1
Point 5	1,4	2,6	3,8	0,2
Point 6	1,4	3,0	5,0	0,2
Displacement, mm	0,6	0,8	0,8	---
Deflection 1/	1333	1000	1000	---
Point of measurement	Negative test pressure [width 800 mm] - Load [Pa]			
	400	800	1200	0
Point 4	0,3	0,6	1,0	0,1
Point 5	1,3	2,5	3,7	0,3
Point 6	1,3	2,5	5,3	0,2
Displacement, mm	0,5	1,0	0,6	---
Deflection 1/	1600	800	333	---
Measurement uncertainty of ±1N. The confidence level of 95% for k = 2				

Requirement	Standard	Result
$f \leq L/300$	PN-EN 12210:2001	Class C3 (1200 Pa)

Repeated load P2 Number of cycles: 50,
Positive pressure: 600 Pa, Negative pressure: 600 Pa
Test result: no visible changes were observed.

Safety test P3 Positive pressure: 1800 Pa, Negative pressure: 1800 Pa
Test result: no visible changes were observed.

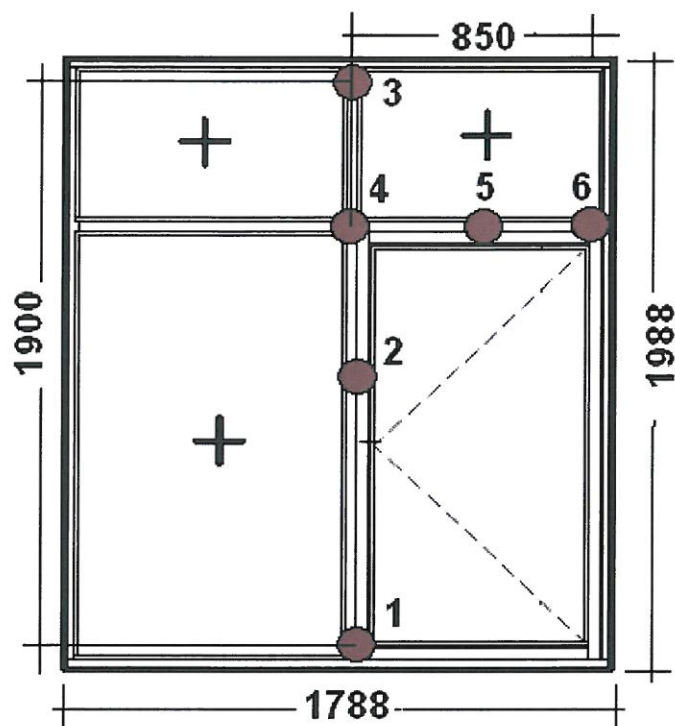


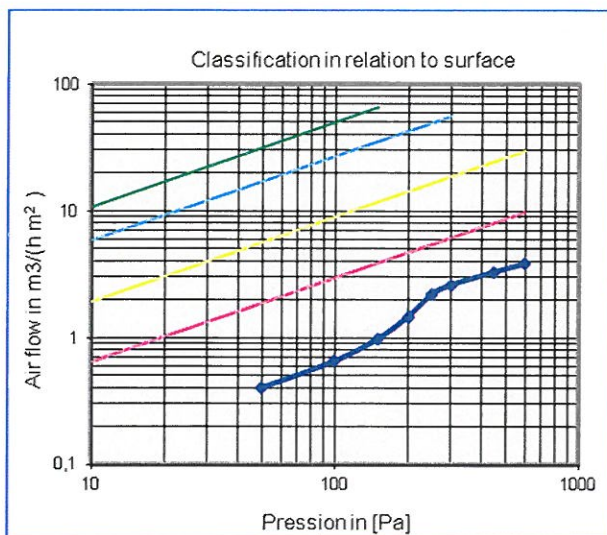
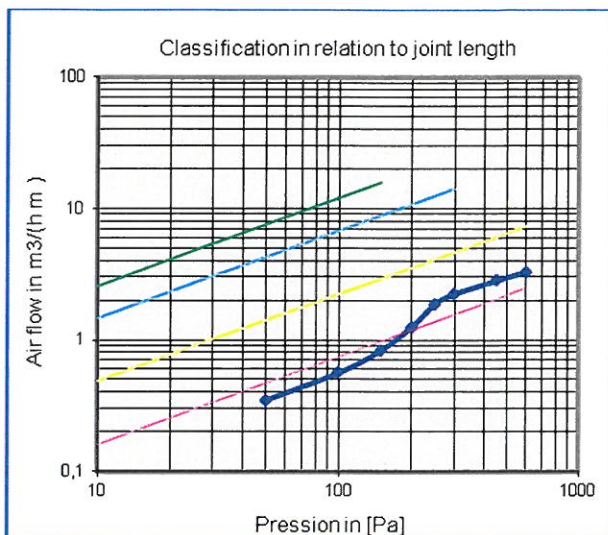
Fig 3 The positions of measurement points

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

The test was carried out in accordance with the PN-EN 1026:2001.

Test results are shown in table N^o 4.

Air permeability						Table 4			
specimen area	3,6 m ²	joint length	4,2 m	temp	25 °C	humidity	45 %	atm. press	1002 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	1,40	2,40	3,60	5,40	7,70	8,50	11,10	12,00
in relation to joint length	m ³ /hm	0,33	0,57	0,86	1,29	1,83	2,02	2,64	2,86
in relation to surface	m ³ /hm ²	0,39	0,67	1,00	1,50	2,14	2,36	3,08	3,33
air inf. coefficient , a	m ³ /(mhdaPa) ^{2/3}	0,11	0,12	0,14	0,17	0,21	0,21	0,21	0,19
negative test pressure									
Air flow		Value of air permeability at pressure, Pa							
		50	100	150	200	250	300	450	600
overall	m ³ /h	1,50	2,30	3,40	5,10	8,00	10,20	12,50	15,50
in relation to joint length	m ³ /hm	0,36	0,55	0,81	1,21	1,90	2,43	2,98	3,69
in relation to surface	m ³ /hm ²	0,42	0,64	0,94	1,42	2,22	2,83	3,47	4,31
air inf. coefficient , a	m ³ /(mhdaPa) ^{2/3}	0,12	0,12	0,13	0,16	0,22	0,25	0,24	0,24
numerical average									
Air flow		Value of air permeability at pressure, Pa							
		50	100	150	200	250	300	450	600
overall	m ³ /h	1,45	2,35	3,50	5,25	7,85	9,35	11,80	13,75
in relation to joint length	m ³ /hm	0,35	0,56	0,83	1,25	1,87	2,23	2,81	3,27
in relation to surface	m ³ /hm ²	0,40	0,65	0,97	1,46	2,18	2,60	3,28	3,82
air inf. coefficient , a	m ³ /(mhdaPa) ^{2/3}	0,16							



Requirement	Standard	Result
$Q_{lmax} < 2,25 \text{ m}^3/\text{hm}$ under 300 Pa	PN-EN 12207:2001	$Q_{lmax} = 0,99 \text{ m}^3/(\text{hm})$ (class 3)
$Q_{pmax} < 3,0 \text{ m}^3/\text{hm}^2$ under 600 Pa	PN-EN 12207:2001	$Q_{pmax} = 1,16 \text{ m}^3/(\text{hm}^2)$ (class 4)
In accordance with p. 4.6 of PN-EN 12207:2001	PN-EN 12207:2001	class 4
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 $\pm 5\%$. 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.

Side Hung Window system EURO		Table 5
Property	Classification	Classification standard
Air permeability	class 4	PN-EN 12207:2001
Watertightness	class E1050	PN-EN 12208:2001
Resistance to wind load	class C3	PN-EN 12210:2001
Safety test	+1800 Pa / -1800 Pa	

Responsible for the test

Jerzy Płoński, Msc.

Authorizing person

Oleksij Kopyłow, PhD

Warsaw.....

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