



TEST REPORT Nr. 103 SF/14 VN OS en

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20 of June 2014

1 (6)

Window air permeability and watertightness measurements

(designation of the test)

Test performed: In accordance to watertightness LST EN 1027:2004, air permeability LST EN 1026:2004 measurements

(number of normative document)

Product: Wooden window, covered aluminium. Measurements: width – 1480 mm, height – 1230 mm; System type: GAMA 78 – S4000. Opening: opens inwards, right hand. Hardware: ROTO. Fixing: 7 points in perimeter. Gaskets: SCHLEGEL of foam rubber two contours. Glazing: glass 42 mm, 4-16Ar-4-16Ar-4 (two glasses selective coated, spaces filled argon gases, spacers bars - aluminium).

(name, description and identification details of a specimen)

Client: UAB „Langu gama“ Liepkalnio str. 160D, LT-02121 Vilnius

(the name and address)

Producer: UAB „Langu gama“ Liepkalnio str. 160D, LT-02121 Vilnius

(the name and address)

Results of test:

Name of the indicator and unit	Test method reference no.	Test result
Watertightness, class	LST EN 1027:2004	9A
Air permeability, class	LST EN 1026:2004	4

Note. The testing are carried out in purpose for conformity assessment of the product according to LST EN 14351-1:2006+A1:2010

Place of test: Laboratory of Building Physics, Institute of Architecture and Construction of Kaunas University of Technology

(name of the test laboratory)

Product delivered: 2014-06-06 Date of test: 2014-06-20

Sample selected: by customer. Sampling Report N₀ 103/14, 2014-06-25

Other information: Application 2014-01-02 drawing

(other deviations, other tests and any information related to the test)

Annex: 1 – measurement results, 2 – schematical view of the test rig

(the numbers of the annexes should be pointed out)

Technical manager:

(approving test results)

J. Ramanauskas

(n., surname)

Test performed by:

(person responsible for a test)

(signature)

R. Rauckis

(n., surname)

S.P.

Validity – the named data and results refer exclusively to the tested and described specimens.
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Installation of the sample

Sample has been installed into test rig „KS 3025/45 ASD SPS Touch“ opening by workers of the laboratory. An opening of the test rig was adjusted that it size would meet the dimensions of the sample.

The ambient temperature and humidity close to the specimen shall be within the range 10 °C to 30 °C and 25 % to 75 % RH and the specimen shall be conditioned thus for at least 4 h immediately before test.

Methods and equipment

Air permeability has been tested in accordance with requirements of [2], [4].

Test rig „KS 3025/45 ASD SPS Touch“ includes:

1. Test wall,
2. Air flow control block,
3. Water sprinkling system,
4. Indication and control equipment,
5. Deflection sensors.

Technical data of test rig:

1. Max size of the sample should be tested: width – 3000 mm, height – 2500 mm,
2. Max developed test pressure: ± 3000 Pa,
3. Ranges of measurement: I – (0,5...50) m³/h II – (0,5...300) m³/h,
4. Range of displacement sensors ± 25 mm.
5. Electronic anemometer for air flow measurement VTS Nr. 00100173, Calibration certificate No EMA04271024139 (date of calibration: 27-10-2004)

Test rig „KS 3025/45 ASD SPS Touch“ tried LEI Nr. 43/09-D, 2009-03-06

- Sources**
- [1] *LST EN 1027:2004 Windows and doors - Watertightness – Test method.*
 - [2] *LST EN 12208:2002 Windows and doors - Watertightness - Classification.*
 - [3] *LST EN 12207:2002 Windows and doors- Air permeability – Classification.*
 - [4] *LST EN 1026:2004 Windows and doors- Air permeability – Test method.*
 - [5] *LST EN 14351-1:2006+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*

Distribution: Client Original
Laboratory of Building Physics,
Institute of Architecture and Construction of Kaunas
University of Technology Original

Contact person: Romas Rauckis, tel. +370 37 350779

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Designation of the product tested:

Wooden window, covered aluminium. Measurements: width – 1480 mm, height – 1230 mm; System type: GAMA 78 – S4000. Opening: opens inwards, right hand. Hardware: ROTO. Fixing: 7 points in perimeter. Gaskets: SCHLEGEL of foam rubber two contours. Glazing: glass 42 mm, 4-16Ar-4-16Ar-4 (two glasses selective coated, spaces filled argon gases, spacers bars - aluminum).

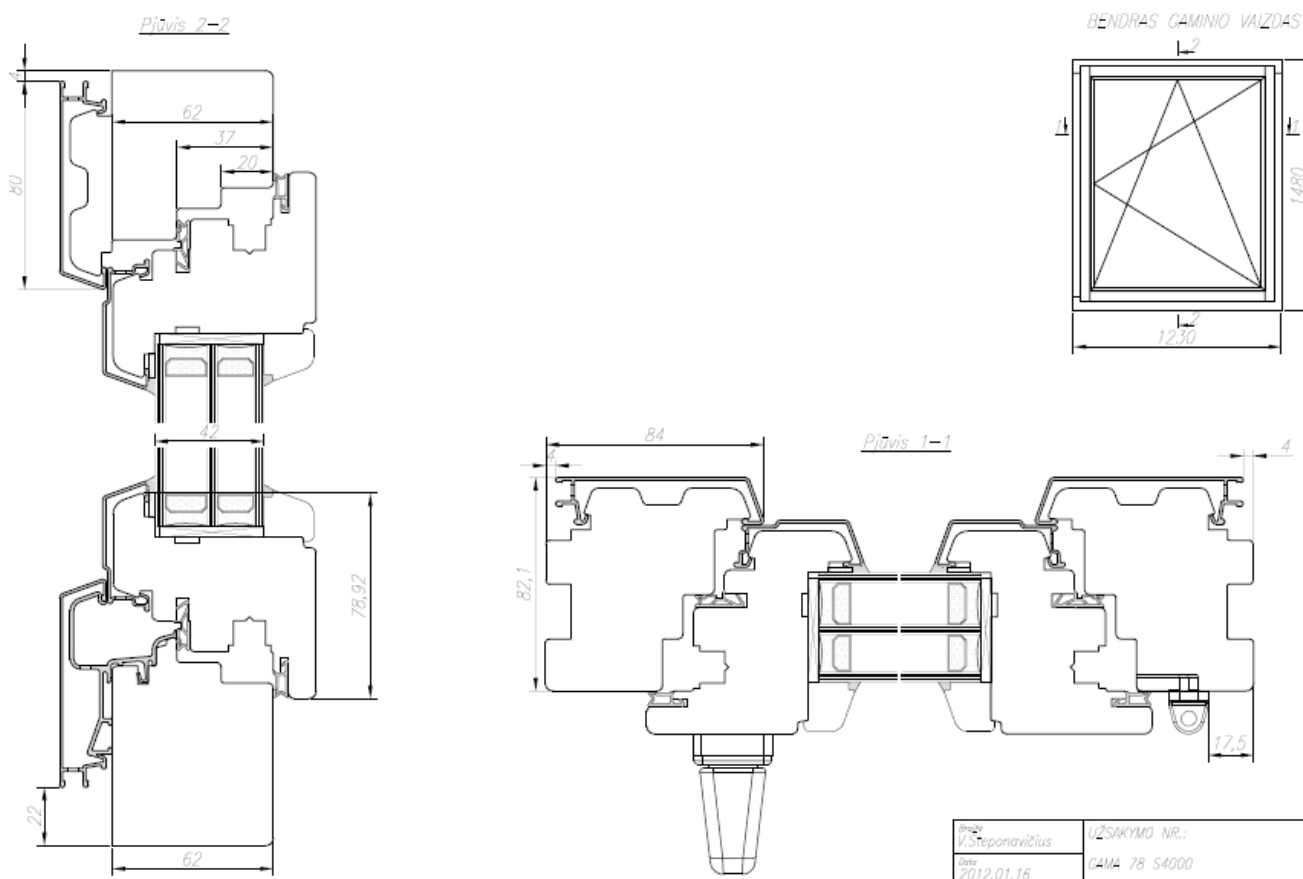


Fig.1 Cross section of the window (by the customer submitted information)

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Test date: 2014-06-20

Description of test conditions:

Size of the sample, $H_T = 1,48$ m; $B_T = 1,23$ m; $H_0 = 1,39$ m; $B_0 = 1,15$ m.

Air temperature, 21,0 °C

Relative humidity of the air, 49,0 %

Atmospheric pressure, 100,64 kPa

Number of water spray nozzles 4 vnt.

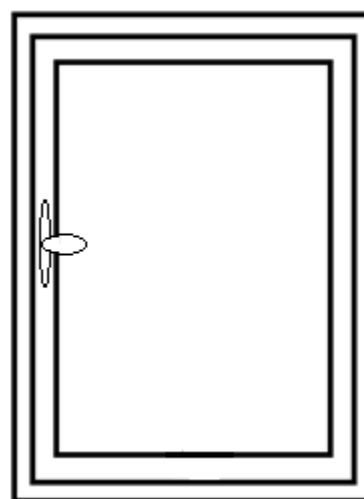
Flow rate/ water spray nozzles 2 l/min.

Test method A

Water watertightness detection results

Classification of watertightness

P, Pa	time, min.	S, NS
0	15	S
50	5	S
100	5	S
150	5	S
200	5	S
250	5	S
300	5	S
450	5	S
600	5	S



*Fig 2. Picture of window.
Arrows shows point of water penetration*

Note: Letter **S** mean water not penetration at this pressure. Letter **NS** means water penetration at this pressure.
Water not penetrated at the positive test pressure **600 Pa** after 5 minutes. Watertightness class **9A** according to LST EN 12208:2002.

Evaluated in accordance with test results.

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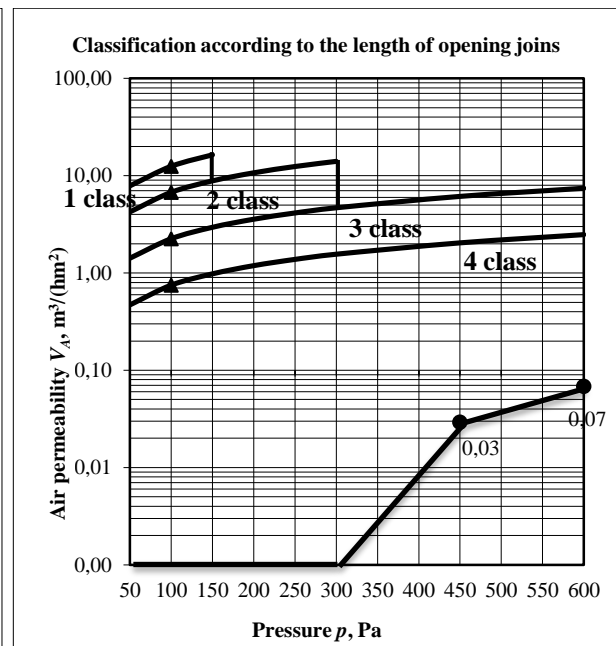
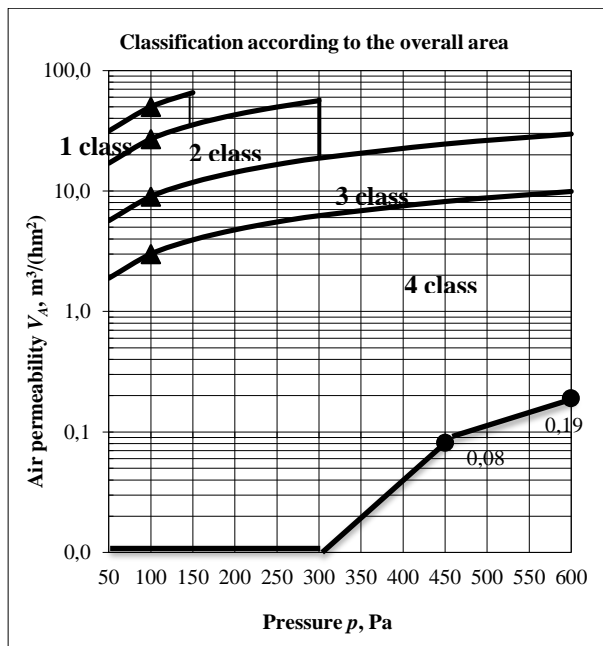
The results of air permeability measurements:

Table 1. Air permeability at the normal conditions $t = 21\text{ }^{\circ}\text{C}$, $P_{atm} = 100,64\text{ kPa}$

P, Pa	V_{0t} , m^3/h	V_{0n} , m^3/h	V_{0vid} , m^3/h	V_A , $\text{m}^3/\text{h}\cdot\text{m}^2$	V_L , $\text{m}^3/\text{h}\cdot\text{m}$	The standard air permeability of all over the area V_A , $\text{m}^3/\text{h}\cdot\text{m}^2$				The standard air permeability to the length of opening joints V_L , $\text{m}^3/\text{h}\cdot\text{m}$			
						Class 1	Class 2	Class 3	Class 4	Class 1	Class 2	Class 3	Class 4
50	0,0	0,0	0,0	0,00	0,00	31,5	17,01	5,67	1,89	7,87	4,25	1,42	0,47
100	0,0	0,0	0,0	0,00	0,00	50	27	9	3	12,5	6,75	2,25	0,75
150	0,0	0,0	0,0	0,00	0,00	65,52	35,38	11,79	3,93	16,38	8,85	2,95	0,98
200	0,0	0,0	0,0	0,00	0,00		42,86	14,29	4,76		10,71	3,57	1,19
250	0,0	0,0	0,0	0,00	0,00		49,73	16,58	5,53		12,43	4,14	1,38
300	0,0	0,0	0,0	0,00	0,00		56,16	18,72	6,24		14,04	4,68	1,56
450	0,0	0,0	0,0	0,00	0,00			24,53	8,18			6,13	2,04
600	0,0	0,0	0,0	0,00	0,00			29,72	9,91			7,43	2,48

V_{0t} – air permeability at the positive test pressure;
 V_{0n} – air permeability at the negative test pressure;
 V_{0vid} – average of the two air permeability values;
 V_A – air permeability to the overall area;
 V_L – air permeability to the length of opening joints.

Air permeability dependence on an overall area and length of opening, graphic expression of the calculated air average values:



The tested specimen, after comparison of V_A and V_L result values with the adequate values in table 2 and also in accordance with classification rules in LST EN 12207:2002, is classified to:

- the overall area – **4 class**;
- the length of opening joints – **4 class**;
- the final classification of the specimen – **4 class**.
- Evaluated in accordance with test results.

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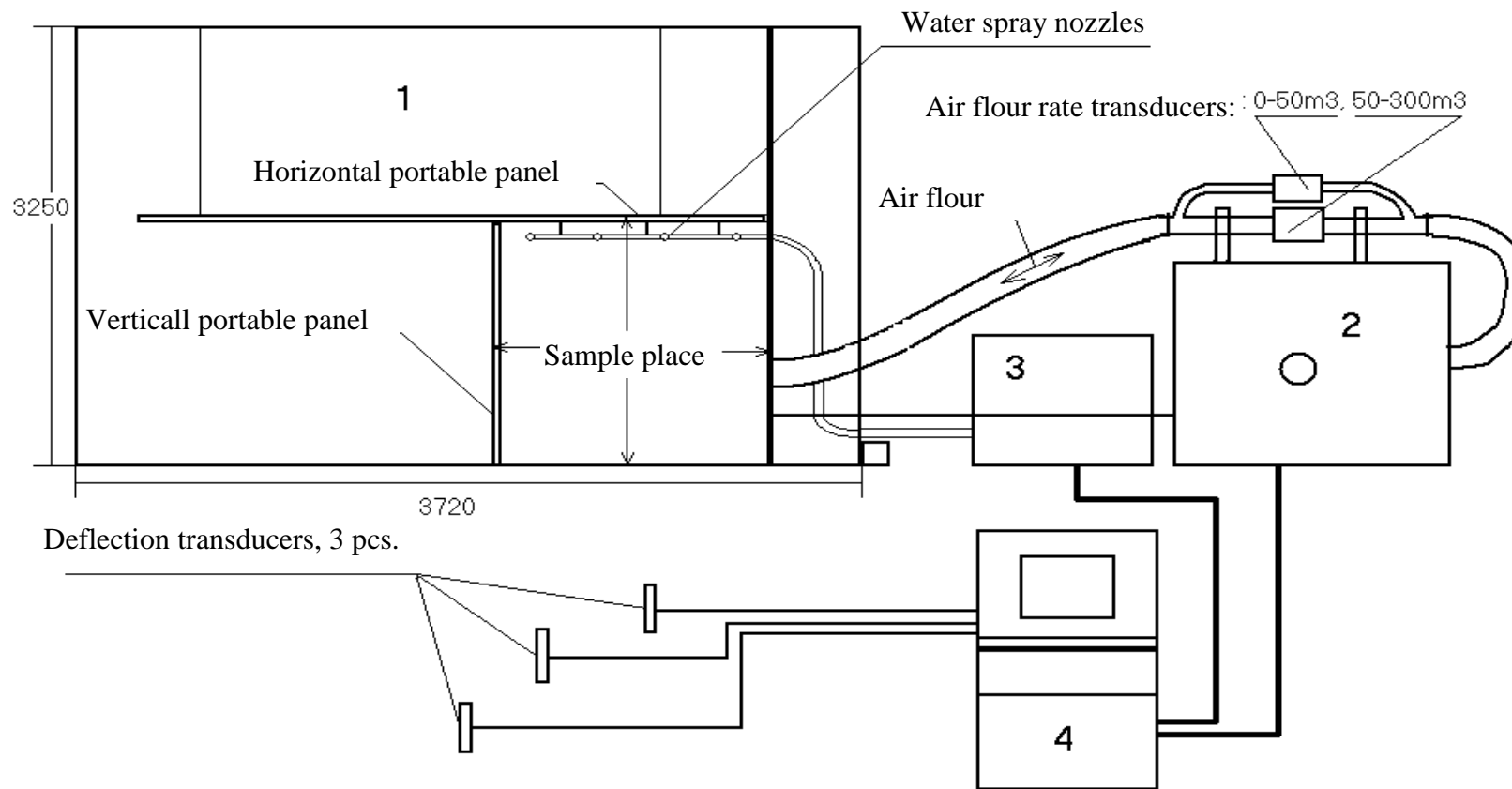


Fig 1. Equipment for window, door, roof window, industrial door and screen wall air permeability, rain water resistance and resistance to wind load measurements scheme: 1 – test measurement wall, 2 – air flow control and regulation block, 3 – water spray device, 4 – indicator and control equipment