INSTITUTE OF ARCHITECTURE AND CONSTRUCTION OF KAUNAS UNIVERSITY OF TECHNOLOGY
BUILDING PHYSICS LABORATORY

Notified Body number: 2018

NACIONALINIS AKREDITACIJOS BIURAS
Bandymai / tyrimai ISO/IEC 17025
Nr. LA.01.031

TEST REPORT No. 109 SF/24 OVA en
30th of April 2024

Window air permeability, water tightness and resistance to wind load measurement

(designation of the test)

Test methods: LST EN 1026:2016 Windows and doors- Air permeability. LST EN 1027:2016 Windows and doors – Water tightness. LST EN 12211:2016 Windows and doors – Resistance to wind load.

(number of normative document)

Specimen description: inward opening wooden window with external aluminium cladding. Sample dimensions: width 1230 mm, height 1480 mm. Product frame/sash material: wooden (pine). Filling the product sash /frame: glass. System: ARKA lux. Type of opening: inward opening turn & tilt. Fittings: UNI JET (Gretsch-Unitas). Locks / handles: GreenteQ stainless steel. Fastening: 9 points. Gaskets: Schlegel QL-3091; Stemeseder AD 1432. Other details: no another details. Glazing: triple glass 3k4LowE1.0+4+4LowE1.0-20SW9005;18SW9005. Producer and date of the glazing unit: SIA „Stiklu Centrs“ 24.11.2023. Date of production of sample: 15.12.2023.

(name, description and identification details of a specimen; information submitted by the customer)

Customer: SIA “ARKA lux”, Vecā ostmala 10, Liepāja, LV-3401, Latvia

(the name and address)

Manufacturer: SIA „ARKA lux“, „Pori“, Virgas pag., Dienvidkurzemes nov., LV-3433

(the name and address)

Results of test:

Name of the indicator and unit	Method reference no.	Test result
Air permeability, class	LST EN 12207:2017	**4**
Water tightness, class	LST EN 12208:2002	**AE1650**
Resistance to wind load, test pressure, class	LST EN 12210:2016	**5**
Resistance to wind load, frame deflection, class	LST EN 12210:2016	**C**
Note. 1) The testing are carried out in purpose for conformity assessment of the product according to LST EN 14351-1:2006+A2:2016; 2) Conformity of test results is evaluated using the decision rule in accordance with ILAC-G8: 09/2019 point 4.2.1.		

Place of test: Building Physics Laboratory, Institute of Architecture and Construction, KTU

(name of the test laboratory)

Specimen delivery date: 15/4/2024 Date of test: 29/4/2024

Sampling: The test specimen sampled by customer, task No. 109/24, 4/4/2024

Additions information: Application 4/4/2024, drawings

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

Annex: 1– Test photos, 2– schematical view of the test rig, 3– measurement results (+11 pages)

(the numbers of the annexes should be pointed out)

Technical manager: _____ J. Ramanauskas
(approves the test report) (signature) (n., surname)

Test performed by: _____ R. Rauckis
(responsible for testing and results) (signature) (n., surname)

S.P.

Installation of the sample

Sample has been installed into test rig KS 3035/650 PC Nr.P2130 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 ^{0}C to 30 ^{0}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 *test method* standard.

Test rig KS 3035/650 PC 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 – 2400 mm, height – 2350 mm,
2. Max developed test pressure: ± 3000 Pa,
3. Ranges of measurement: I – (0,5…50) m^3/h II – (0,5…300) m^3/h,
4. Range of displacement sensors +/- 25 mm.

Test rig KS 3035/650 PC No. P2130 tried LEI No. 83/22-D; 84/22-D 2022-10-20; 92/22-B 2022-10-21; 162/22-S 2022-10-21 and Nordic Metrology Science No.106698-3-1 2022-11-21.

Sources: [1] *LST EN 1027:2016 Windows and doors – Water tightness – Test method.*
[2] *LST EN 12208:2002 Windows and doors – Water tightness - Classification.*
[3] *LST EN 1026:2016 Windows and doors- Air permeability – Test method*
[4] *LST EN 12207:2017 Windows and doors- Air permeability – Classification.*
[5] *LST EN 12211:2016 Windows and doors – Resistance to wind load – Test method.*
[6] *LST EN 12210:2016 Windows and doors – Resistance to wind load – Classification.*
[7] *LST EN 14351-1:2006+A2:2016 Windows and doors - Product standard, performance characteristics - Part 1: Windows and external pedestrian doorsets.*

Distribution: Customer — Original
Laboratory of Building Physics,
Institute of Architecture and Construction of Kaunas
University of Technology — Copy

Designation of the product tested:
inward opening wooden window with external aluminium cladding. Sample dimensions: width 1230 mm, height 1480 mm. Product frame/sash material: wooden (pine). Filling the product sash /frame: glass. System: ARKA lux. Type of opening: inward opening turn & tilt. Fittings: UNI JET (Gretsch-Unitas). Locks / handles: GreenteQ stainless steel. Fastening: 9 points. Gaskets: Schlegel QL-3091; Stemeseder AD 1432. Other details: no another details. Glazing: triple glass 3k4LowE1.0+4+4LowE1.0-20SW9005;18SW9005. Producer and date of the glazing unit: SIA „Stiklu Centrs" 24.11.2023. Date of production of sample: 15.12.2023.

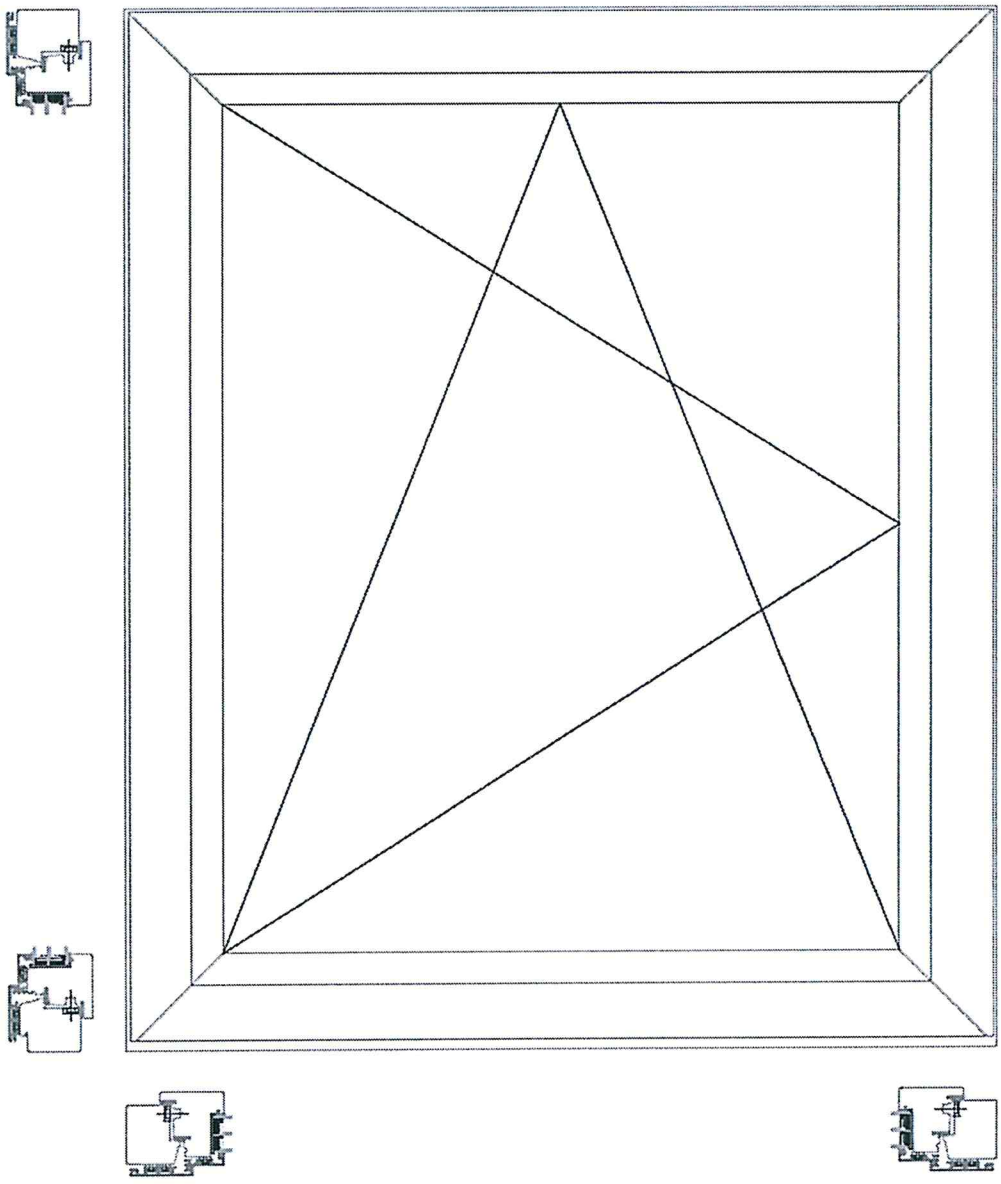

Fig.1 Drawing of the sample (information submitted by the customer)

1 Annex. Test photos

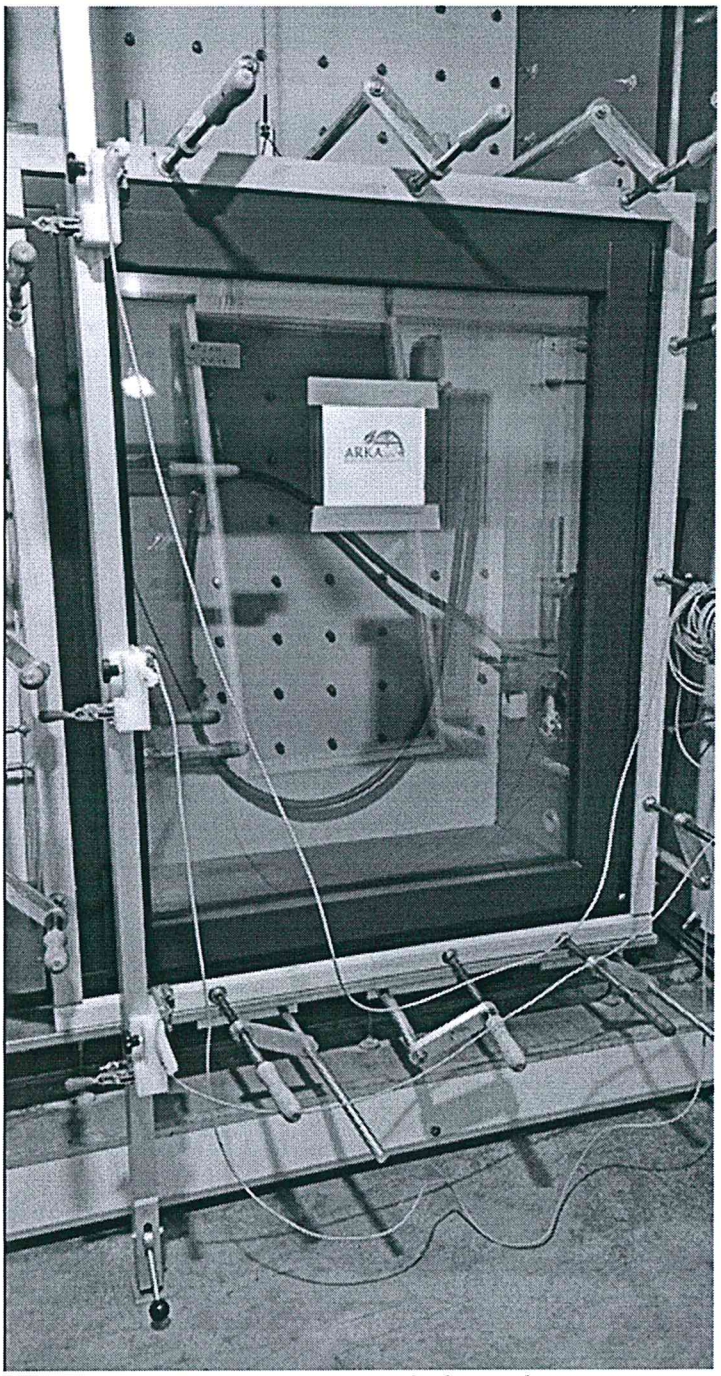

Fig 2. Photos of the sample during the test

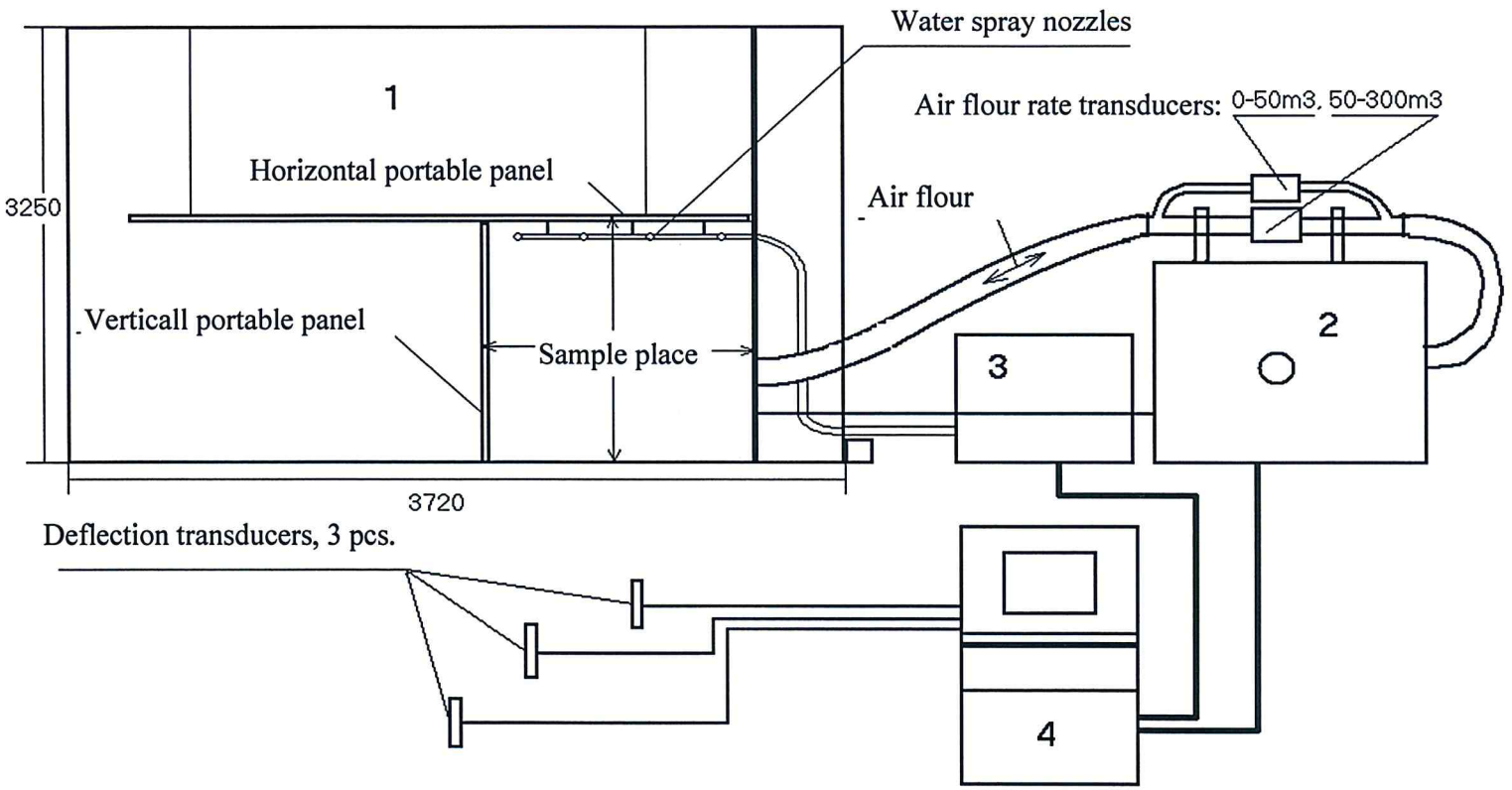

Fig 3. Equipment for window, door, roof window, industrial door and screen wall air permeability, rain water resistance and resistance to wind load measurements scheme: 1 – test measurement wall, 2 – air flow control and regulation block, 3 – water spray device, 4 – indicator and control equipment

Test protocol

KTU Architekturos ir statybos institutas
Statybines fizikos laboratorija
Tunelio g. 60, Kaunas
Lietuva

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Client : Order 127 109/24 OV
Test number: 01 Date: 29.04.2024
Examiner : R.Rauckis

Course of tests:
1.) Air Permeabitity: EN 12207 in accordance with BS EN 1026
2.) Watertightness: EN 12208

Characteristics of element
Type of element : Langas
Opening type : Atidaromas i vidu
Measurument of the element (W x H) : 1.230 x 1.480 m Area : 1.820 m2
Measurements of the sash (W x H) : 1.140 x 1.390 m Area : 1.584 m2
Seal length : 5.060 m

Reference of Profiles

Frame	:	Sill Detail	:
Sash	:	Transom	:
Mullion	:	Glazing bead	:
Sealing	:	Drip Bar	:
Hardware	:	Other	:
Material	:	Locking	:
Finish	:	Hinges	:

Glazing

Type	:	Filling	:
Filling	:	Glas area	:
Glass Dimensions	:	Other	:

Classification

Air permeability EN 12207	Target Class 4	Actual Class 4
Water tightness EN 12208	Target Class AE1650	Actual Class AE1650
Wind resistance EN 12210	Target Class 0-	Actual Class 0-

Temperature: 20 Celsius Humidity: 49 Air pressure: 1017.1 HPa

Remark:

Place:..... Date:29.04.2024 Tester:.....

Test protocol

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Air Permeabitity: EN 12207 in accordance with BS EN 1026

Window surface: 1.820 m2 Seal length: 5.060 m

1. Air Permeabitity pressure / Air Permeabitity suction

3 Pressure bump 651 Pa durchgeführt
3 Pressure bump -652 Pa durchgeführt

Pressure Pa Nominal	Real	Qc m³/h	Qtc m³/h	Window surface m³/h/m³	class	Joints length m³/h/m	class
+							
50	49	0.00	0.24	0.13	4	0.04	4
100	100	0.00	0.83	0.45	4	0.16	4
150	150	0.00	1.29	0.71	4	0.25	4
200	199	0.00	1.77	0.97	4	0.35	4
250	250	0.00	2.18	1.19	4	0.43	4
300	299	0.00	2.63	1.44	4	0.52	4
450	450	0.00	3.95	2.17	4	0.78	4
600	601	0.00	5.77	3.17	4	1.14	4
-							
-50	-49	0.00	0.00	0.00	4	0.00	4
-100	-99	0.00	0.69	0.38	4	0.13	4
-150	-150	0.00	1.11	0.61	4	0.22	4
-200	-199	0.00	1.42	0.78	4	0.28	4
-250	-251	0.00	1.67	0.91	4	0.33	4
-300	-299	0.00	1.86	1.02	4	0.36	4
-450	-450	0.00	2.53	1.39	4	0.50	4
-600	-599	0.00	3.04	1.67	4	0.60	4
Average							
50	49	0.00	0.12	0.06	4	0.02	4
100	99	0.00	0.76	0.42	4	0.15	4
150	150	0.00	1.20	0.66	4	0.23	4
200	199	0.00	1.59	0.87	4	0.31	4
250	250	0.00	1.92	1.05	4	0.38	4
300	299	0.00	2.24	1.23	4	0.44	4
450	450	0.00	3.24	1.78	4	0.64	4
600	600	0.00	4.40	2.42	4	0.87	4

Pressure: 4 Suction: 4 Average value: 4

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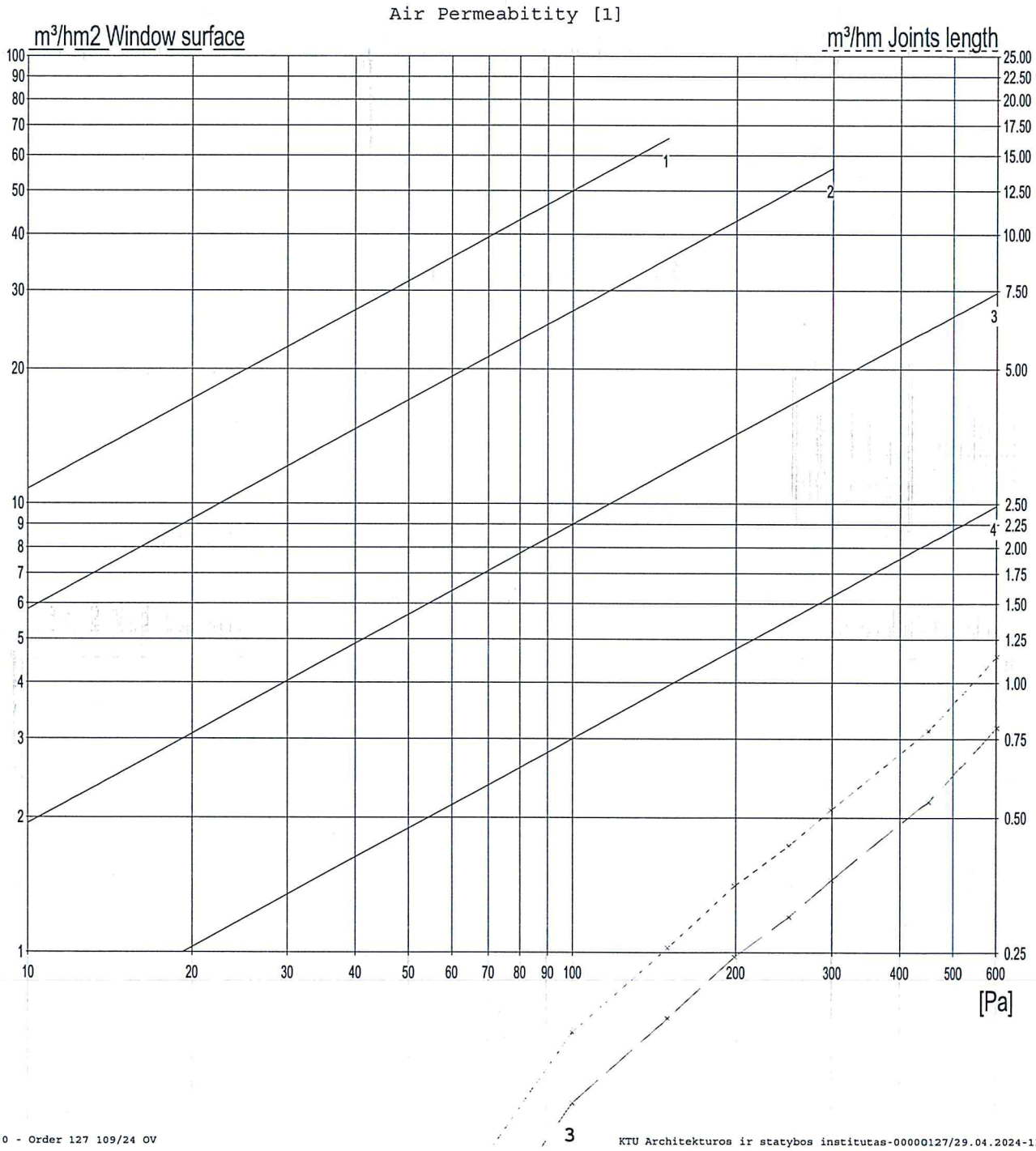
Air Permeabitity pressure:



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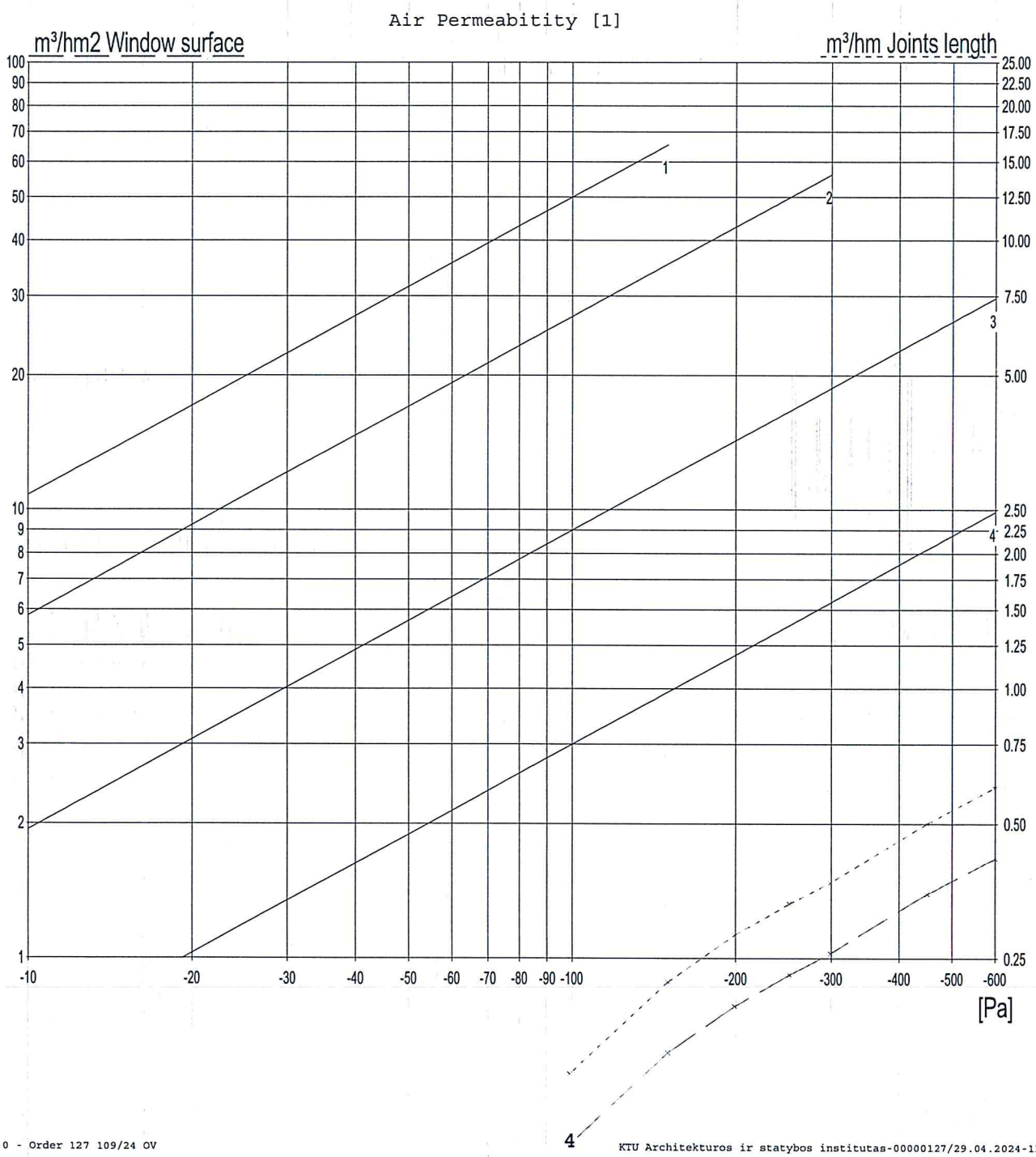
Air Permeabitity suction:



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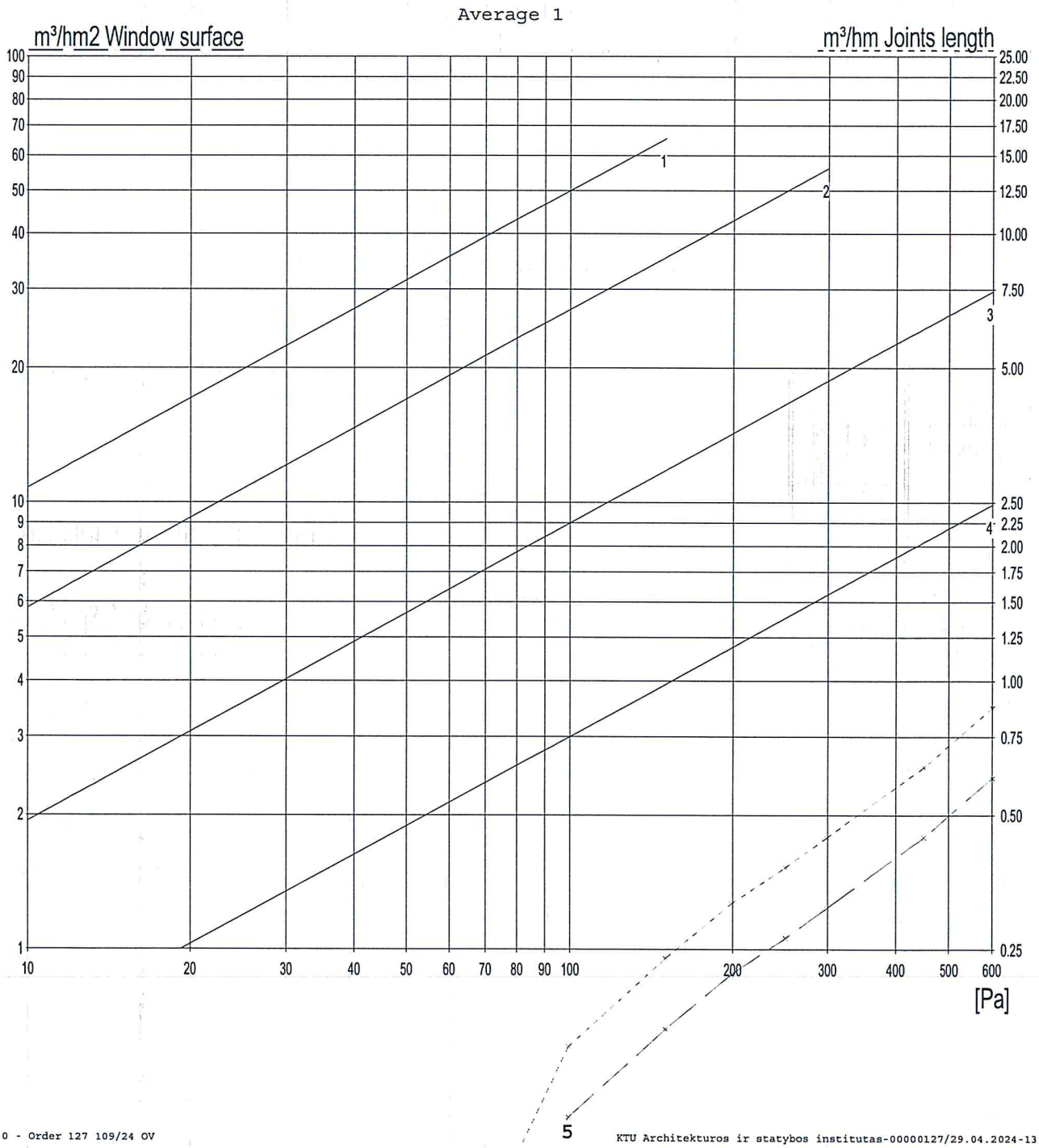
Air Permeabitity Average:



Test protocol

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Watertightness: EN 12208 -

Spaying method A Number of nozzles: 3 Vol. Water: 360.0 litre/hour
Spaying angle:24 Degree : 6.0 litre/minute
Add. spraying pipe Number of nozzles: 0 Vol. Water: 0.0 litre/hour
(0.0 litre/nozzle) : 0.0 litre/minute

1. Watertightness pressure

Pressure Pa		Time	Remark
Nominal	Real		
0	0	00:15:00	OK
50	50	00:05:00	OK
100	100	00:05:00	OK
150	150	00:05:00	OK
200	201	00:05:00	OK
250	251	00:05:00	OK
300	301	00:05:00	OK
450	453	00:05:00	OK
600	601	00:05:00	OK
750	753	00:05:00	OK
900	901	00:05:00	OK
1050	1053	00:05:00	OK
1200	1203	00:05:00	OK
1350	1354	00:05:00	OK
1500	1508	00:05:00	OK
1650	1660	00:05:00	OK

Watertightness Class: AE1650

Point of water ingress :

Probable cause of leakage :

Test protocol

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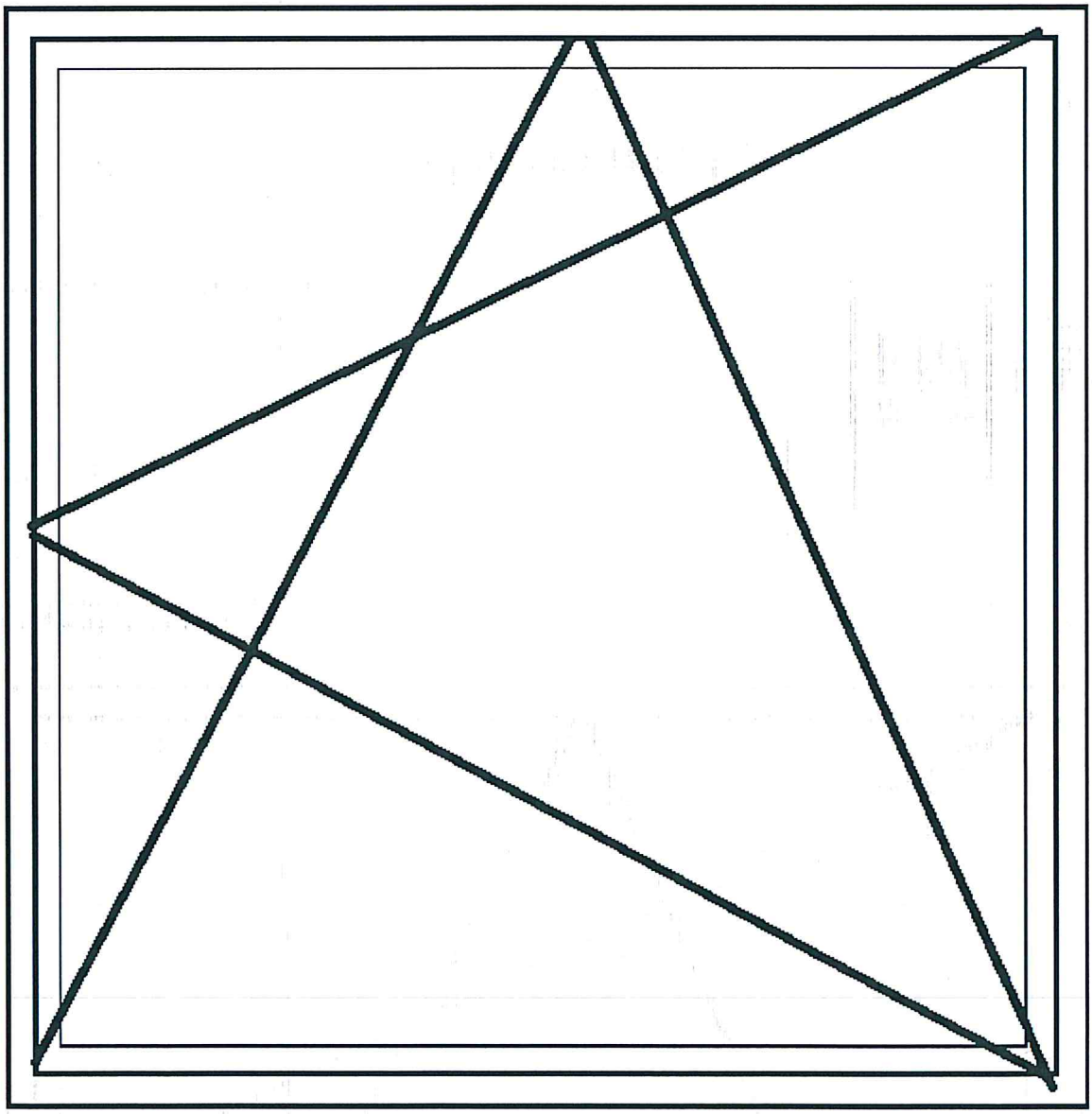
Window sketch:

Dimensions (W x H) : 1.230 m x 1.480 m
Joints length: 5.060 m
Window surface: 1.820 m2
Sash surface: 1.584 m²



Test protocol

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Statybines fizikos laboratorija
Tunelio g. 60, Kaunas
Lietuva

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Client : Order 129 109/24 A
Test number: 01 Date: 29.04.2024
Examiner : R.Rauckis

Course of tests:
1.) Wind Resistance: EN 12210
2.) Safety test

Characteristics of element
Type of element : Langas
Opening type : Atidaromas i vidu
Measurument of the element (W x H) : 1.230 x 1.480 m Area : 1.820 m2
Measurements of the sash (W x H) : 1.140 x 1.390 m Area : 1.584 m2
Seal length : 5.060 m

Reference of Profiles

Frame	:	Sill Detail	:
Sash	:	Transom	:
Mullion	:	Glazing bead	:
Sealing	:	Drip Bar	:
Hardware	:	Other	:
Material	:	Locking	:
Finish	:	Hinges	:

Glazing

Type	:	Filling	:
Filling	:	Glas area	:
Glass Dimensions	:	Other	:

Classification

Air permeability EN 12207	Target Class 0	Actual Class 0
Water tightness EN 12208	Target Class A0	Actual Class A0
Wind resistance EN 12210	Target Class 5A	Actual Class 5C

Temperature: 21 Celsius Humidity: 44 Air pressure: 1017.7 HPa

Remark:

Place:..... Date:29.04.2024 Tester:.....

Test protocol

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Wind Resistance: EN 12210

Temperature: 21 Celsius Humidity: 44 % Air pressure: 1017.7 HPa

Wind Resistance: EN 12210		
P1 for deflection	2000	-2000
P2 for cycles	-1000	1000
P3 for safety test	-3000	3000

Deflection:

Distance between the way transducers

a01 <-> c03 = 1470 mm

A = 1/150 B = 1/200 C = 1/300

Wind Resistance P1 pressure

3 Pressure pulses 2200 Pa implemented

Pressure Desired	Pressure Actual	Distortion Absolute						Distortion Relative		Distortion class
2000	2009	a01=	-1.49	b02=	-1.67	c03=	-0.55	f01=	-0.55	C (1/>999)
0	0	a01=	0.00	b02=	0.00	c03=	0.00	f01=	0.00	

Class: 5

Wind Resistance P1 suction

3 Pressure pulses -2200 Pa implemented

Pressure Desired	Pressure Actual	Distortion Absolute						Distortion Relative		Distortion class
-2000	-1999	a01=	2.46	b02=	2.39	c03=	1.52	f01=	0.40	C (1/>999)
0	0	a01=	0.00	b02=	0.00	c03=	0.00	f01=	0.00	

Class: 5

Pressure pulses

50 Cycles -1000 Pa / 1000 Pa implemented

Remark :

Class: 5C

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Safety test

P3 = Pa Des/Est: -3000 / -2996 : 0 / 0
Remark Suction :

P3 = Pa Des/Est: 3000 / 3058 : 0 / 0
Remark Pressure :

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Window sketch:

Dimensions (W x H) : 1.230 m x 1.480 m
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Window surface: 1.820 m2
Sash surface: 1.584 m²