Instytut Techniki Budowlanej (ITB)
European Notified Body No. 1488
Group of Testing Laboratories
accredited by the Polish Centre for Accreditation
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REPORT OF THE TESTS AND ASSESSMENT OF THE PERFORMANCE LZE01-00948/24/R199NZE/EN

Product manufacturer / System provider / Client:	REYNAERS ALUMINIUM Sp. z o.o. ul. Inwestycyjna 142, Przeszkoda 96-321 Żabia Wola – Poland
Product name: **(as specified by the Client)**	Outward opening Reynaers CS77 system tilt window
Date of issue:	December 10, 2024

Building Elements Laboratory (LZE)
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1. Information on the tests

Product manufacturer / System provider / Client: As on page 1.

Basis for the report: Regulation (EU) No. 305/2011 of the European Parliament and of the Council of 9 March 2011 laying down harmonised conditions for the marketing of construction products and repealing Council Directive 89/106/EEC.

Test start date: 27-09-2024

Test completion date: 27-09-2024

Other information about the tests:

Test methods:

PN-EN 1026:2016-04	Windows and door - Air permeability - Test method.
PN-EN 1027:2016-04	Windows and door - Water tightness - Test method.
PN-EN 12211:2016-04	Windows and door - Resistance to wind load - Test method.

Related documents:

PN-EN 14351-1+A2:2016-10	Windows and door - Product standard, performance characteristics - Part 1: Windows and external pedestrian doorsets.
PN-EN 12207:2001 (2017-01)	Windows and door – Air permeability – Classification.
PN-EN 12208:2001	Windows and door – Watertightness – Classification.
PN-EN 12210:2016-05	Windows and door – Resistance to wind load – Classification.

The scope of tests constituting the task of the notified body covered the verification of:

- air permeability,
- watertightness before resistance to wind load test,
- resistance to wind load,
- watertightness after resistance to wind load test.

Personnel executing the test:

- Paweł Kantor - Building Research Institute, Buildings Elements Laboratory.

Manufacturer's representative observing the tests:

- Ireneusz Jodłowski– REYNAERS ALUMINIUM Sp. z o.o. ul. Inwestycyjna 142, Przeszkoda, 96-321 Żabia Wola – Poland.

The tests were carried out using the equipment with the current calibration status meeting the requirements of PN-EN 14351-1+A2:2016-10.

Tab. 1. List of used devices, apparatus and measuring means

Device	Number of device	Component	Validity period	Range of activity
Test chamber	KS5060/65 PC/1750	100 Bi-12VPP-24VDC	22.11.2023 – 22.11.2026	Airflow
		9002.2151 KH05470	23.11.2023 – 23.11.2026	Positive and negative pressure
		CD SD PLUS 1521036058	19.10.2023 – 19.10.2026	Spraying water
Sensors	LL- 195	1P	22.08.2024 – 22.08.2026	Displacement
Termohigrobarometer	LZE-087	1P	05.07.2024 – 07.05.2027	Climatic conditions at the test site
		2P	05.07.2024 – 30.04.2027	
Linear ruler	LL-112	-	18.05.2022 – 18.05.2025	Linear measurements
Stop watch	LL-185	-	28.07.2022 – 30.05.2025	Time measurement
Adjustable rule	LL-251	-	05.04.2022 – 05.04.2025	Angle setting of sprinklers for testing
Termometer	LL-137	-	09.10.2023 – 09.10.2026	Water temperature measurement
The devices meet the metrological requirements of test method standards and the product standard PN-EN 14351-1+A2:2016-10.				

Test location:

Pursuant to Article 46 of Regulation 305/2011, the tests were carried out in the Client's laboratory REYNAERS ALUMINIUM Sp. z o. o. ul. Inwestycyjna 142, Przeszkoda, 96-321 Żabia Wola – Poland.

2. Product

2.1. Information provided by the Client

Number of the relevant harmonized product standard: PN-EN 14351-1+A2:2016-10

Product: Outward opening tilt window

Declared range of application (in accordance with the harmonized standard): In residential, public and industrial buildings.

Other product information (based on the technical documentation received on September 27, 2024):

Outward opening Reynaers CS77 system tilt window with external dimensions (width x height): 898 x 1860 mm, sash dimensions (width x height): 762 x 1724 mm with a door infill in the form of 4/20/44.1 insulating glass.

A detailed list of components used is given in Table 2. The view and cross-sections through the tested sample with the marking of the sections and gaskets used and the documentation of the fittings used are presented in Annex 1 to this report on testing and assessment of the product's performance.

Tab. 2. List of components

Code	Description	Material	Producer
PROFILES			
008.3052.XX	Window Vent Outward Opening	Aluminium	Reynaers
008.3183.XX	Outer Frame	Aluminium	Reynaers
008.4001.XX	Changeover Profile Outside Glazing	Aluminium	Reynaers
030.3614.XX	Glazing Bead	Aluminium	Reynaers
ACCESORIES			
060.8723.--	Rebate Support	Aluminium	Reynaers
068.7771.00	Crimp Corner Cleats	Aluminium	Reynaers
068.7853.00	Crimp Corner Cleat	Aluminium	Reynaers
068.7952.00	Corner Cleat	Aluminium	Reynaers
069.8748.04	Glass Support	Plastic	Reynaers
080.8442.04	Acoustic Gasket	EPDM	Reynaers
080.9114.04	Outer Glazing Gasket	EPDM	Reynaers
080.9125.04	Inner Glazing Gasket	EPDM	Reynaers
080.9381.04	Gasket	EPDM	Reynaers
080.9467.04	Vulcanized Central Gasket	EPDM	Reynaers
080.9657.04	Central Gasket	EPDM	Reynaers
FITTINGS			
060.6008.04	Adjustment rod	PA6	Sobinco
060.6065.--	Clip Hinge Side	C06-Zamac	Sobinco
060.6308.--	Central Closure	C06-Zamac	Sobinco
060.6456.17	Touch Handle	Zamac5, steel, Alu	Sobinco
060.7255.--	Drive Plate set Outward Opening	Zamac5, stainless steel,	Sobinco
060.8565.--	Disconnectable Ventilation Restrictor	Stainless Steel	Sobinco
060.8842.--	Top Hung Friction Stay	Stainless Steel	Sobinco
060.9048.--	Handle Side	Stainless Steel	Sobinco
060.6014.04	Connecting Rod	PA6	Sobinco
FILLING			
	Compared Glass 4/20/44.1	Glass	

3. Test item, sample

3.1. Information provided by the Client

Manufacturing plant: REYNAERS ALUMINIUM Sp. z o.o. ul. Inwestycyjna 142, Przeszkoda, 96-321 Żabia Wola – Poland

Information on sampling by the Client:

Number of sampling protocol: LZE01-00948/24/R199NZE

Date and place of sampling: 27-09-2024, Przeszkoda

Production line, batch, date of manufacture: prototype, 1, 06-2024

Test sample selected by the Manufacturer (prototype).

3.2. Information obtained based on visual inspection in the Laboratory

Acceptance of the test item into the laboratory:

Date: 27-09-2024

Acceptance protocol: LZE01-00948/24/R199NZE

Condition of the test item:
A sample was provided in a condition and quantity suitable for testing.

The test samples were mounted was assembled and mounted in an expanding frame, simulating a building opening, by the Client - REYNAERS ALUMINIUM Sp. z o.o. ul. Inwestycyjna 142, Przeszkoda, 96-321 Żabia Wola – Poland, in a way that allows the test to be performed according to the standard.

Marking of the test item:
The manufacturer did not put the marking on the delivered test sample.

Description of the test item:
The tests were performed on a Reynaers CS77 outward opening tilt window with external dimensions (width x height): 898 x 1860 mm, sash dimensions (width x height): 762 x 1724 mm with a door infill in the form of a glazed unit.

The view of the sample and details of its construction are presented in the photographic documentation prepared by the LZE Laboratory, presented below in photos 1 ÷ 3.

Photographic documentation
(made by the LZE Laboratory)

Photog. 1. View of the handle, frame drainage and locking points

Photog. 2. View of a tested sample (from the inside)

Photog. 3. View of the door in open position

4. Test results – tasks of the notified body

The test results with their uncertainty refer only to the tested samples. The value of uncertainty cannot be assigned directly to the level of performances of a tested product, because the laboratory does not have knowledge about the variability of its population, but only about the one tested sample. Uncertainty of quantitative results was determined based on available information including data on the accuracy of the measurement system which were used.

Before the start of the tests on 27-09-2024 the samples were conditioned for a period of 4 hours under the following ambient conditions:

- temperature: 21°C (requirement of test standards: temperature in the range 10÷30°C),
- humidity: 50% (requirement of test standards: humidity in the range 25÷75%).

The tests were carried out under the following ambient conditions:

- temperature: 21°C (requirement of test standards: temperature in the range 10÷30°C),
- humidity: 50% (requirement of test standards: humidity in the range 25÷75%),
- atm. pressure: 99 kPa.

The expanded measurement uncertainty Up (related to the accuracy of the devices used) with a coverage probability of approximately 95% and a coverage factor of k = 2 is:
- Up of temperature: 1°C,
- Up of humidity: 5%,
- Up of atmospheric pressure: 1kPa.

The test sample tested for air permeability, watertightness and wind load resistance was closed and locked [1].

4.1. Air permeability test (before the test of resistance to wind load)

4.1.1. Test method

PN-EN 1026:2016-04

The implementation of the test, the environmental conditions and the accuracy of the measuring equipment used complies with the requirements of the above-mentioned standards.

Principle of the test is application of a defined series of test pressures (positive and negative) and at each pressure measurement of the air permeability with a suitable test device.

Air permeability of test chamber was determined in accordance with point 7.2.3 of the above-mentioned standard.

A diagram illustrating the test method is presented in Figure no. 1.

[1] Closed and locked sample according to PN-EN 1026: 2016-04, PN-EN 1027: 2016-04, PN-EN 12211: 2016-04 (type of closure): closure - the movable part is inserted or adheres to the fixed part in a way that allows it to be blocked, including position (snap-fit and / or locking); locking - the movable part is locked in at least one point in the closed position by performing additional actions (e.g. with a handle, key, automatic or electronic systems) causing the built-in locking element (e.g. bolt or bolt) to slide over, which affects the performance of the product.

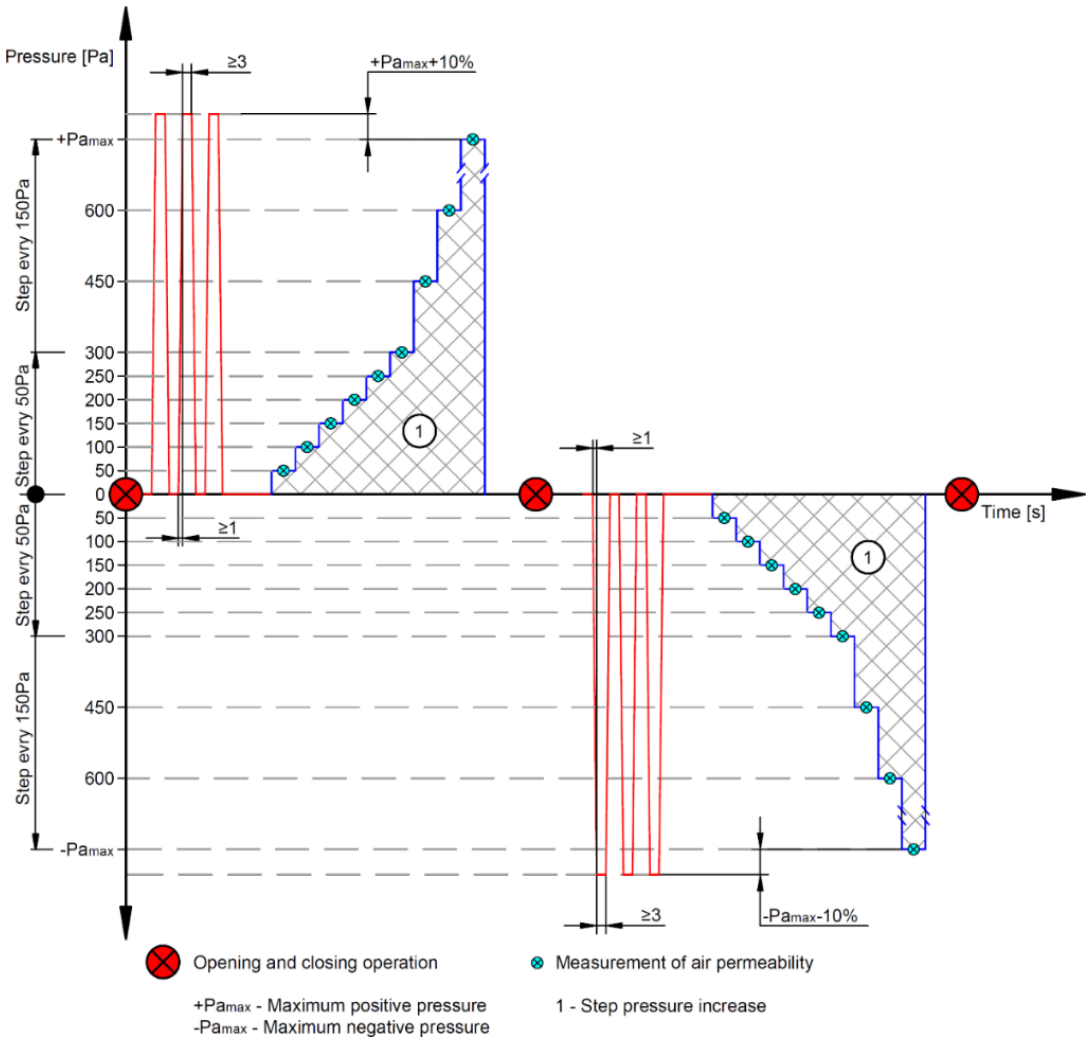


Fig. 1. Test pressure sequence according to PN-EN 1026:2016-04

4.1.2. Test results

Test results are presented in tables no. 3÷5.

specimen area	1,7 m²	joint length	4,7 m	temp.	21 °C	relative humidity	50 %	atmospheric pressure	99 kPa

Tab. 3. Air permeability – before the test of resistance to wind load - positive pressure

Air flow		Value of air permeability at test pressure, Pa							
		50	100	150	200	250	300	450	600
overall	m³/h	0,1	1,8	2,7	3,4	4,3	5,3	7,4	9,4
related to joint length	m³/hm	0,02	0,38	0,58	0,72	0,91	1,11	1,57	1,98
related to surface	m³/hm²	0,06	1,09	1,65	2,07	2,60	3,19	4,49	5,67
air flow coefficient, a	m³/(mhdaPa)²/³	0,01	0,08	0,09	0,10	0,11	0,12	0,12	0,13

Tab. 4. Air permeability – before the test of resistance to wind load - negative pressure

Air flow		Value of air permeability at test pressure, Pa							
		50	100	150	200	250	300	450	600
overall	m³/h	0,0	0,9	2,1	3,5	4,2	5,2	7,2	8,5
related to joint length	m³/hm	0,00	0,19	0,44	0,74	0,89	1,09	1,53	1,80
related to surface	m³/hm²	0,00	0,53	1,27	2,13	2,54	3,13	4,37	5,14
air flow coefficient, a	m³/(mhdaPa)²/³	0,00	0,04	0,07	0,10	0,10	0,11	0,12	0,12

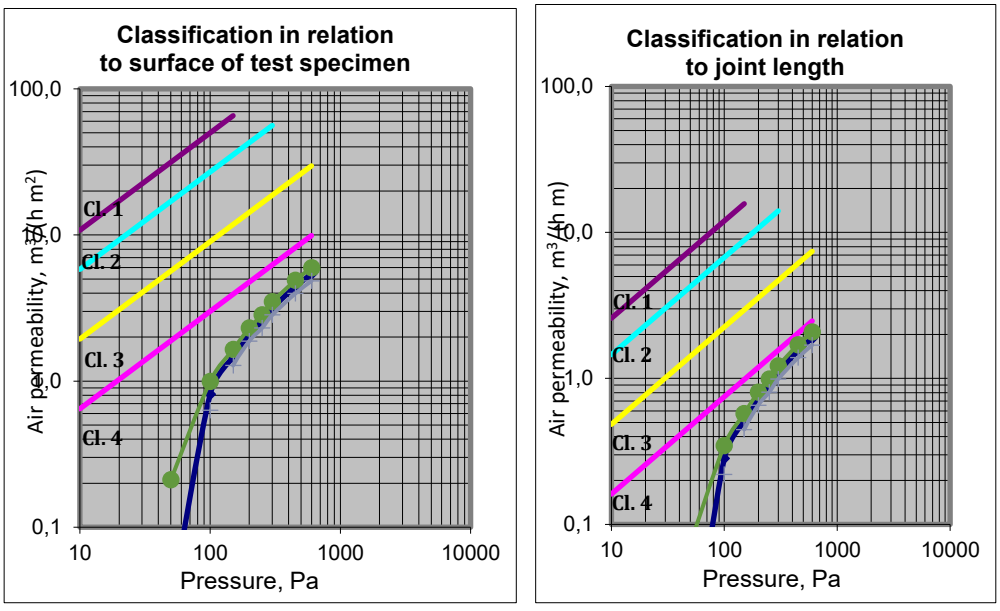
Tab. 5. Air permeability – before the test of resistance to wind load - average values

Air flow		Value of air permeability at test pressure, Pa							
		50	100	150	200	250	300	450	600
overall	m^3/h	0,0	1,3	2,4	3,5	4,2	5,2	7,3	8,9
related to joint length	m^3/hm	0,01	0,28	0,51	0,73	0,90	1,10	1,55	1,89
upper limit of class – related to joint length	m^3/hm	0,5	0,8	1,0	1,2	1,4	1,6	2,0	2,5
related to surface	m^3/hm^2	0,03	0,81	1,46	2,10	2,57	3,16	4,43	5,40
upper limit of class – related to overall area	m^3/hm^2	1,9	3,0	3,9	4,8	5,5	6,2	8,2	9,9
air flow coefficient, a	$m^3/(mhdaPa)^{2/3}$	0,08							
class for which the requirements are met related to joint length acc to PN-EN 12207:2001 (PN-EN 12207:2017)		4	4	4	4	4	4	4	4
class for which the requirements are met related to joint length acc to PN-EN 12207:2001 (PN-EN 12207:2017)		**4**							
class for which the requirements are met related to overall area acc to PN-EN 12207:2001 (PN-EN 12207:2017)		4	4	4	4	4	4	4	4
class for which the requirements are met related to overall area acc to PN-EN 12207:2001 (PN-EN 12207:2017)		**4**							

The expanded measurement uncertainty Up (related to the accuracy of the devices used) with a coverage probability of approximately 95% and a coverage factor of k = 2 is:
- Up of linear dimensions: 1mm,
- Up of time: 0.04s,
- Up of flow > 1 m^3/h: 5%; ≤ 1 m^3/h: 0.05 m^3/h; ≤ 3 m^3/h: 0.30 m^3/h, otherwise: 10%,
- Up of pressure: 5%,
- Up of temperature: 3°C,
- Up of humidity: 5%,
- Up of atmospheric pressure: 1kPa.

The uncertainty of the test result may be affected by additional factors unknown to the laboratory, which are related to the uncertainty of the test method. The uncertainty level of the test method is not specified in the PN-EN 1026:2016-04 standard.

The obtained results of the air permeability are shown in the pressure diagram (Pa) as a function of air permeability in relation to total surface (m^3/hm^2) and in relation to joint length (m^3/hm) in accordance with PN-EN 12207:2001 (PN-EN 12207:2017-01).



Airflow volume
Airflow volume with positive uncertainty
Airflow volume with negative uncertainty

Requirement	Standard	Result
A specimen belongs to a specified class if the measured air permeability does not exceed the upper limit at any pressure step in that class [1)]	PN-EN 12207:2001 (PN-EN 12207:2017-01)	Pass for class 4

1) The limit values of air permeability related to overall area and opening joint length at 100 Pa are presented in the table 6.

Tab. 6. Reference air permeability related to overall area and opening joint length and maximum test pressure for classed 1÷4 according to PN-EN 12207:2001 (PN-EN 12207:2017-01) standards

Class	Air permeability at 100Pa		Maximum test pressure, Pa
	related to overall area, m^3/hm^2	related to opening joint length, m^3/hm	
1	50	12,50	150
2	27	6,75	300
3	9	2,25	600
4	3	0,75	600

4.2. Watertightness before resistance to wind load test

4.2.1. Test method

PN-EN 1027:2016-04, method 1A

The implementation of the test, the environmental conditions and the accuracy of the measuring equipment used complies with the requirements of the above-mentioned standards.

Principle of test is constant spraying of a specified quantity of water onto the external surface of the test specimen while increments of positive test pressure are applied at regular intervals during which details are recorded of test pressure and location of water penetration.

In the tested element, the fittings were in a neutral position during the tests.

A diagram illustrating the test method is presented in Figure no. 2.

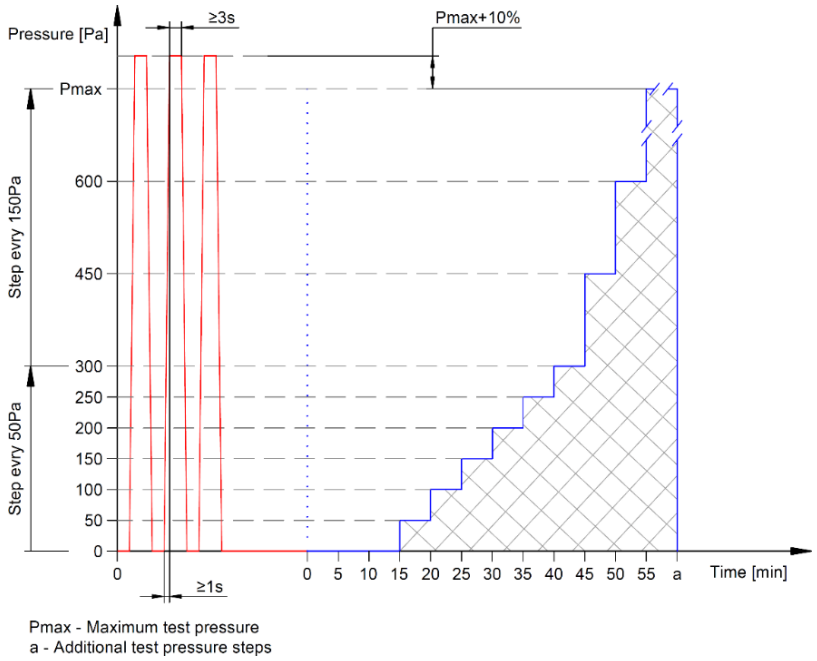


Fig. 2. Watertightness test sequence according to PN-EN 1027:2016-04

The temperature of the sprayed water was:

- at the beginning of the test: 21°C,
- after the test: 21°C.

The expanded measurement uncertainty Up (related to the accuracy of the devices used) with a coverage probability of approximately 95% and a coverage factor of k = 2 is:
- Up of temperature: 1°C.

According to the PN-EN 1027:2016-04 standard, the temperature of the sprayed water should be 10°C÷30°C°.

4.2.2. Test results

Test results are presented in table no. 7.

Tab. 7. Watertightness test results

Pressure, Pa	Test time, min	Remarks and observations
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	5	no leakage
---*	---	---

*- no further studies have been conducted
The expanded measurement uncertainty (related to the accuracy of the devices used) with a coverage probability of approximately 95% and a coverage factor of k = 2 is:
- Up linear measurement: 1 mm,
- Up time: 0.04s,
- Up of the water meter: 10%,
- Up pressure: 5%.
Due to the qualitative nature of the test result, measurement uncertainty cannot be attributed to the test result. The uncertainty of the test result may be affected by additional factors not known to the laboratory, which are related to the uncertainty of the test method. The uncertainty level of the test method is not specified in the PN-EN 1027:2016-04 standard.

Requirement	Standard	Result
no leakage	PN-EN 12208:2001	Pass for class E1200 (1200Pa)

4.3. Wind load resistance test – deflection test and repeated pressure test

4.3.1. Test method

PN-EN 12211:2016-04

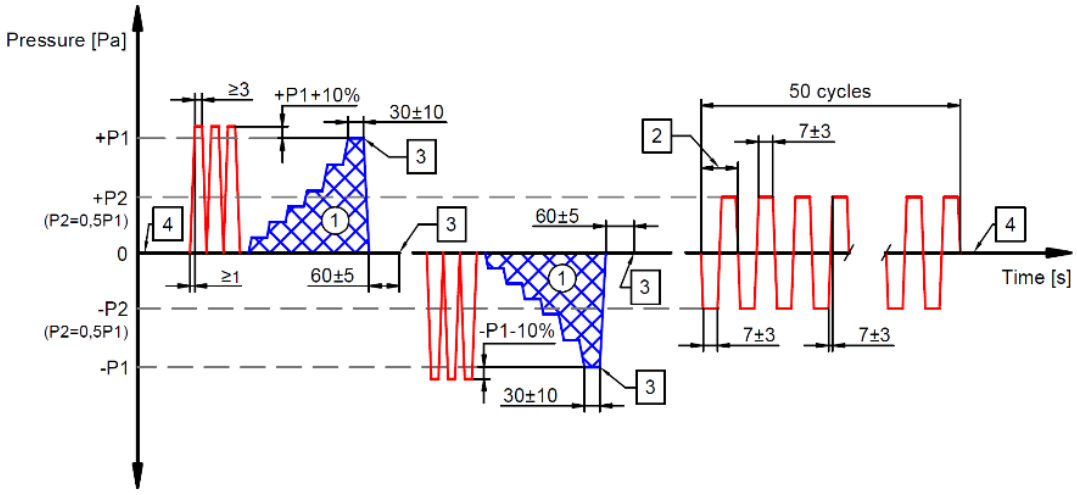
The implementation of the test, the environmental conditions and the accuracy of the measuring equipment used complies with the requirements of the above-mentioned standards.

Principle of test is the application of a defined series of pressures (positive and negative) at which measurements and inspections are made to assess relative frontal deflection and resistance to damage from wind loads.

For the purpose of the test, three sets of test pressure were defined:

- P1 applied to measure deflections of parts of the test specimen;
- P2 pulsating pressure applied for 50 cycles to assess performance under repeated wind loads;
- P3 applied to assess the safety of the test specimen under extreme conditions.

The values of P1, P2, P3 are related as follows: P2 = 0,5P1 and P3 = 1,5P1.
The test was performed for class 3 according to PN-EN 12210:2016-04, i.e.: P1 = 2000Pa, P2 = 1000Pa, P3 = 3000Pa.
A diagram illustrating the test method is presented in Figure no. 3.



1 - Increments or continuous rate not exceeding 100Pa/s
2 - Cycle, negative and positive pressure
3 - Frontal displacement or residual frontal deflection
4 - Air permeability test

+P - Positive pressure
-P - Negative pressure
P1 - Pressure to measure the deflections of the test sample elements
P2 - Pressure to evaluate performance under repeated wind loads (50 cycles)

Fig. 3. Wind load resistance test sequence according to PN-EN 12211:2016-04

4.3.2. Deflection test – test pressure P1

PN-EN 12211:2016-04, point 7.2.

The implementation of the test, the environmental conditions and the accuracy of the measuring equipment used complies with the requirements of the above-mentioned standards.

The spacing of measurement points is presented on photography 4.

Dimensions:

L 1-3	1660 mm

A_p – frontal deflection at the top at pressure P1
M_p – face deflection in the middle at pressure P1
B_p – frontal deflection at the bottom at P1 pressure
L – distance

Photog. 4. Arrangement of measurement points

4.3.2.1. Test results

Test results are presented in tables no. 8 and 9.

Tab. 8. Positive pressure – test results

Test pressure, Pa	2000	0
B_p, mm	1,6	0,0
M_p, mm	2,2	0,1
A_p, mm	0,9	0,1
Frontal deflection, mm	0,9	---
Relative frontal deflection, 1/	1844	---

Tab. 9. Negative pressure – test results

Test pressure, Pa	2000	0
B_p, mm	0,8	0,0
M_p, mm	1,7	0,0
A_p, mm	0,9	0,1
Frontal deflection, mm	0,9	---
Relative frontal deflection, 1/	1844	---

The expanded measurement uncertainty Up (related to the accuracy of the devices used) with a coverage probability of approximately 95% and a coverage factor of k = 2 is:
- Up of linear measurement: 1 mm,
- Up of time: 0,04s,
- Up of displacement: 0,1mm,
- Up of pressure: 5%.

Due to the qualitative nature of the test result, measurement uncertainty cannot be attributed to the test result. The uncertainty of the test result may be affected by additional factors not known to the laboratory, which are related to the uncertainty of the test method. The uncertainty level of the test method is not specified in the PN-EN 12211:2016-04 standard.

Requirement	Standard	Test result – relative frontal deflection	
		Positive pressure	Negative pressure
F_{rp} ≤ 1/300 for the class C	PN-EN 12210:2016-05	1/1844 at a pressure of + 2000Pa	1/1844 at a pressure of + 2000Pa
F_{rp} ≤ L/200 for the class B		1/1844 at a pressure of + 2000Pa	1/1844 at a pressure of + 2000Pa
F_{rp} – ugięcie czołowe względne			

4.3.3. Repeated pressure test – test pressure P2

PN-EN 12211:2016-04, point. 7.3.

The implementation of the test, the environmental conditions and the accuracy of the measuring equipment used complies with the requirements of the above-mentioned standards.

The door sample was subjected to 50 cycles including negative and positive pressures of: +/- 1000Pa (test pressure P2).

4.3.3.1. Test results

Requirement	Standard	Result
No visible failures (e.g. opening of the test specimen, loosening of the sash/casement or leaf, separation of hardware or glazing beads) when viewed by normal or corrected vision at a distance of 1 m in natural and/or artificial light. The test specimen shall remain functional.	PN-EN 12210:2016	Pass for the test pressure of +/- 1000Pa

The expanded measurement uncertainty Up (related to the accuracy of the devices used) with a coverage probability of approximately 95% and a coverage factor of k = 2 is:
- Up of pressure: 5%.
Due to the qualitative nature of the test result, measurement uncertainty cannot be attributed to the test result. The uncertainty of the test result may be affected by additional factors not known to the laboratory, which are related to the uncertainty of the test method. The uncertainty level of the test method is not specified in the PN-EN 12211:2016-04 standard.

4.4. Air permeability test (after the test of resistance to wind load)

4.4.1. Test method

PN-EN 1026:2016-04

The implementation of the test, the environmental conditions and the accuracy of the measuring equipment used complies with the requirements of the above-mentioned standards.

The description of the applied method is presented in point 4.1.1.

4.4.2. Test results

Test results are presented in tables no. 10÷12.

specimen area	1,7 m²	joint length	4,7 m	temp.	21 °C	relative humidity	50 %	atmospheric pressure	99 kPa

Tab. 10. Air permeability – before the test of resistance to wind load - positive pressure

Air flow		Value of air permeability at test pressure, Pa							
		50	100	150	200	250	300	450	600
overall	m³/h	0,0	1,9	2,7	3,6	4,5	5,1	7,1	8,6
related to joint length	m³/hm	0,00	0,39	0,58	0,76	0,95	1,07	1,51	1,82
related to surface	m³/hm²	0,00	1,12	1,65	2,18	2,72	3,07	4,31	5,19
air flow coefficient, a	m³/(mhdaPa)²/³	0,00	0,08	0,09	0,10	0,11	0,11	0,12	0,12

Tab. 11. Air permeability – before the test of resistance to wind load - negative pressure

Air flow		Value of air permeability at test pressure, Pa							
		50	100	150	200	250	300	450	600
overall	m³/h	0,0	0,1	2,6	3,7	4,6	5,3	7,2	8,8
related to joint length	m³/hm	0,00	0,02	0,56	0,78	0,97	1,11	1,53	1,86
related to surface	m³/hm²	0,00	0,06	1,59	2,24	2,77	3,19	4,37	5,31
air flow coefficient, a	m³/(mhdaPa)²/³	0,00	0,00	0,09	0,11	0,11	0,12	0,12	0,12

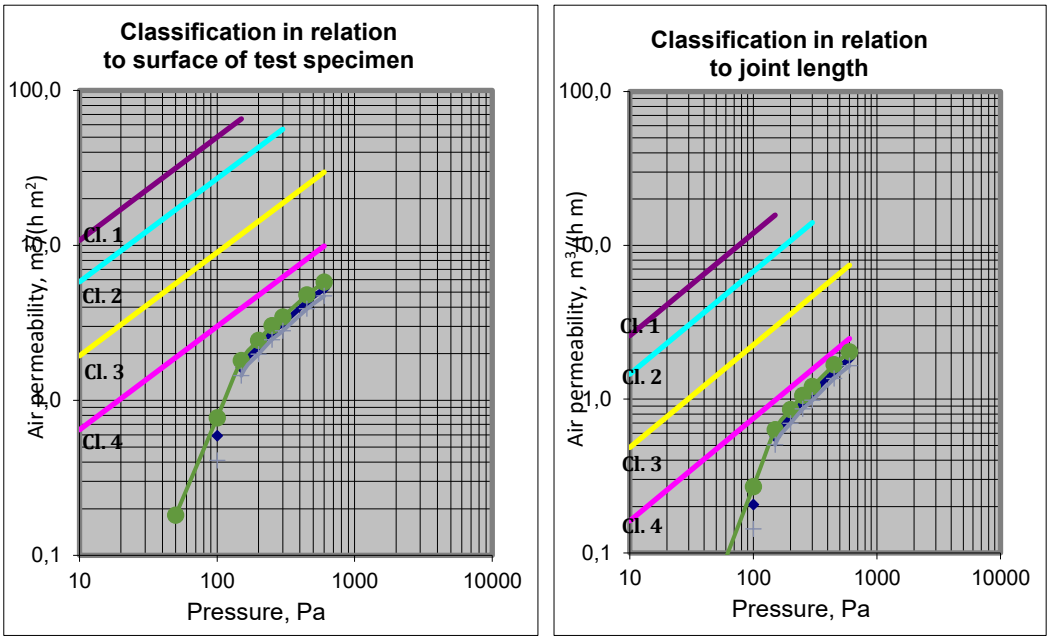
Tab. 12. Air permeability – before the test of resistance to wind load - average values

Air flow		Value of air permeability at test pressure, Pa							
		50	100	150	200	250	300	450	600
overall	m³/h	0,0	1,0	2,7	3,7	4,5	5,2	7,2	8,7
related to joint length	m³/hm	0,00	0,21	0,57	0,77	0,96	1,09	1,52	1,84
upper limit of class – related to joint length	m³/hm	0,5	0,8	1,0	1,2	1,4	1,6	2,0	2,5
the admissible value in the class increased by 20% - to the length of the contact line - to be filled in when changing the class	m³/hm	0,56	0,90	1,18	1,43	1,66	1,87	2,45	2,98

Air flow		Value of air permeability at test pressure, Pa							
		50	100	150	200	250	300	450	600
related to surface	m^3/hm^2	0,00	0,59	1,62	2,21	2,74	3,13	4,34	5,25
upper limit of class – related to overall area	m^3/hm^2	1,9	3,0	3,9	4,8	5,5	6,2	8,2	9,9
the permissible value in the class increased by 20% - to the area - to be filled in when changing the class	m^3/hm^2	2,27	3,60	4,72	5,71	6,64	7,49	9,82	11,89
air flow coefficient, a	$m^3/(mhdaPa)^{2/3}$	0,08							
class for which the requirements are met related to joint length acc to PN-EN 12207:2001 (PN-EN 12207:2017)		4	4	4	4	4	4	4	4
class for which the requirements are met related to joint length acc to PN-EN 12207:2001 (PN-EN 12207:2017)		**4**							
class for which the requirements are met related to overall area acc to PN-EN 12207:2001 (PN-EN 12207:2017)		4	4	4	4	4	4	4	4
class for which the requirements are met related to overall area acc to PN-EN 12207:2001 (PN-EN 12207:2017)		**4**							

The expanded measurement uncertainty (related to the accuracy of the devices used) with a coverage probability of approximately 95% and a coverage factor of k = 2 is:
- Up of linear dimensions: 1mm,
- Up time: 0.04s,
- Up flow > 1 m^3/h: 5%; ≤ 1 m^3/h: 0.05 m^3/h; ≤ 3 m^3/h: 0.30 m^3/h, otherwise: 10%,
- Up pressure: 5%,
- Up temperature: 3°C,
- Up humidity: 5%,
- Up atmospheric pressure: 1kPa.
The uncertainty of the test result may be affected by additional factors unknown to the laboratory, which are related to the uncertainty of the test method. The uncertainty level of the test method is not specified in the PN-EN 1026:2016-04 standard.

The obtained results of the air permeability are shown in the pressure diagram (Pa) as a function of air permeability in relation to total surface (m^3/hm^2) and in relation to joint length (m^3/hm) in accordance with PN-EN 12207:2001 (PN-EN 12207:2017-01).



Airflow volume
Airflow volume with positive uncertainty
Airflow volume with negative uncertainty

Requirement	Standard	Result
A specimen belongs to a specified class if the measured air permeability does not exceed the upper limit at any pressure step in that class 1)	PN-EN 12207:2001 (PN-EN 12207:2017-01)	Pass for class 4

1) The limit values of air permeability related to overall area and opening joint length at 100 Pa are presented in the table 13.

Tab. 13. Reference air permeability related to overall area and opening joint length and maximum test pressure for classed 1÷4 according to PN-EN 12207:2001 (PN-EN 12207:2017-01) standards

Class	Air permeability at 100Pa		Maximum test pressure, Pa
	related to overall area, m^3/hm^2	related to opening joint length, m^3/hm	
1	50	12,50	150
2	27	6,75	300
3	9	2,25	600
4	3	0,75	600

After the deflection test and repeated pressure test according to PN-EN 12211:2016-04, the air permeability class has not changed (class 4 according to PN-EN 12207:2001 (2017-01)) - the result meets the requirements of PN-EN 12210:2016-05, point 6.2.

4.5. Watertightness after resistance to wind load test

4.5.1. Test method

PN-EN 1027:2016-04, method 1A

The implementation of the test, the environmental conditions and the accuracy of the measuring equipment used complies with the requirements of the above-mentioned standards.

The description of the applied method is presented in point 4.2.1.

The temperature of the sprayed water was:

- at the beginning of the test: 21°C,
- after the test: 21°C.

The expanded measurement uncertainty Up (related to the accuracy of the devices used) with a coverage probability of approximately 95% and a coverage factor of k = 2 is:
- Up of temperature: 1°C.

According to the PN-EN 1027:2016-04 standard, the temperature of the sprayed water should be 10°C÷30°C°.

4.5.2. Test results

Test results are presented in table no. 14.

Tab. 14. Watertightness test results

Pressure, Pa	Test time, min	Remarks and observations
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	5	no leakage
---*	---	---

*- no further studies have been conducted

The expanded measurement uncertainty (related to the accuracy of the devices used) with a coverage probability of approximately 95% and a coverage factor of k = 2 is:
- Up linear measurement: 1 mm,
- Up time: 0.04s,
- Up of the water meter: 10%,
- Up pressure: 5%.
Due to the qualitative nature of the test result, measurement uncertainty cannot be attributed to the test result. The uncertainty of the test result may be affected by additional factors not known to the laboratory, which are related to the uncertainty of the test method. The uncertainty level of the test method is not specified in the PN-EN 1027:2016-04 standard.

Requirement	Standard	Result
no leakage	PN-EN 12208:2001	Pass for class E1200 (1200Pa)

4.6. Safety test - test pressure P3

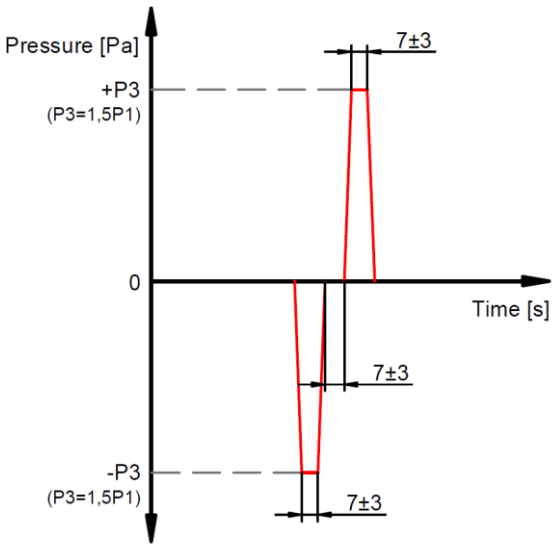
4.6.1.1. Test method

PN-EN 12211:2016-04 pkt. 7.4.

The implementation of the test, the environmental conditions and the accuracy of the measuring equipment used complies with the requirements of the above-mentioned standards.

The door was subjected to a brief safety test pressure and suction of: +/- 3000Pa (test pressure P3).

A diagram illustrating the test method is presented in Figure no. 4.



+P - Positive pressure
-P - Negative pressure
P1 - Pressure to measure the deflections of the test sample elements
P3 - Pressure to assess the safety of the test sample

Fig. 4. Safety test sequence according to PN-EN 12211:2016-04

4.6.1.2. Test results

Requirement	Standard	Test result
Failures such as bending and/or twisting of any building hardware and splitting or cracking of framing members shall be permitted provided that no parts become detached and the test specimen remains closed.	PN-EN 12210:2016-05	Pass for the load of +/- 3000Pa

The expanded measurement uncertainty Up (related to the accuracy of the devices used) with a coverage probability of approximately 95% and a coverage factor of k = 2 is:
- Up of pressure: 5%.
Due to the qualitative nature of the test result, measurement uncertainty cannot be attributed to the test result. The uncertainty of the test result may be affected by additional factors not known to the laboratory, which are related to the uncertainty of the test method. The uncertainty level of the test method is not specified in the PN-EN 12211:2016-04 standard.

Classification of resistance to wind load according to PN-EN 12210:2016-05

Product performance	Classification standard	Test result / Class
Resistance to wind load	PN-EN 12210:2016-05	Class C5 (2000Pa)
		Class B5 (2000Pa)
Safety test		+/- 3000Pa

5. Assessment of product performance

Tab. 15. Assessment results

Essential characteristics	Test method	Test results	Performance	Standard according to which the assessment was carried out	
				Classification standard	Reference document
Air permeability	PN-EN 1026:2016-04	In accordance with point 4.1.2 and point 4.4.2 of this report	Pass for a class 4	PN-EN 12207:2001	PN-EN 14351-1+A2:2016-10
				PN-EN 12207:2017-01	
Watertightness before resistance to wind load test	PN-EN 1027:2016-04	In accordance with point 4.2.2 of this report	Pass for a class E1200 (1200Pa)	PN-EN 12208:2001	
Watertightness after resistance to wind load test		In accordance with point 4.5.2 of this report	Pass for a class E1200 (1200Pa)		
Resistance to wind load	PN-EN 12211:2016-04	In accordance with point 4.3.2.1 and 4.3.3.1 of this report	Pass for a class C5 (2000Pa) class B5 (2000Pa)	PN-EN 12210:2016-05	
		In accordance with point 3.6.2 of this report	The load of +/- 3000Pa (safety test)		
*) The parties agreed that in assessing the performance, according to standard PN-EN 14351-1+A2:2016-10, the simple acceptance rule is applied. This means that the acceptance limits are equal to the tolerance limits shown in the above-mentioned document.					
Note: The declared performance of the product according to EN 14351-1+A2:2016-10 should be suitable for the declared scope of use and in accordance with the regulations of the country in which the product is introduced					

Factors influencing the risk associated with the performance assessment carried out:

- the uncertainty of measurement as presented in section 4 of this report,
- the uncertainty of the test method not presented in the test standard,
- the level of representativeness of the sample tested by the laboratory related to the product population – knowledge of the variability of the product population and the representativeness of the sample provided to the laboratory is held by the manufacturer.

6. Disclaimers

The Testing Laboratory declares that the test results relate only to the sample received.

The Test Report cannot be reproduced in any other form than as a whole without written permission of the Laboratory.

The Test Report does not replace documents required for placing construction products on the market or making them available.

This report has been issued in electronic form, with qualified electronic signatures of the responsible persons. The printout of this report is not an original document.

7. Annexes:

1. Technical documentation of tested samples based on the technical documentation provided by the Principal received on: September 27, 2024.

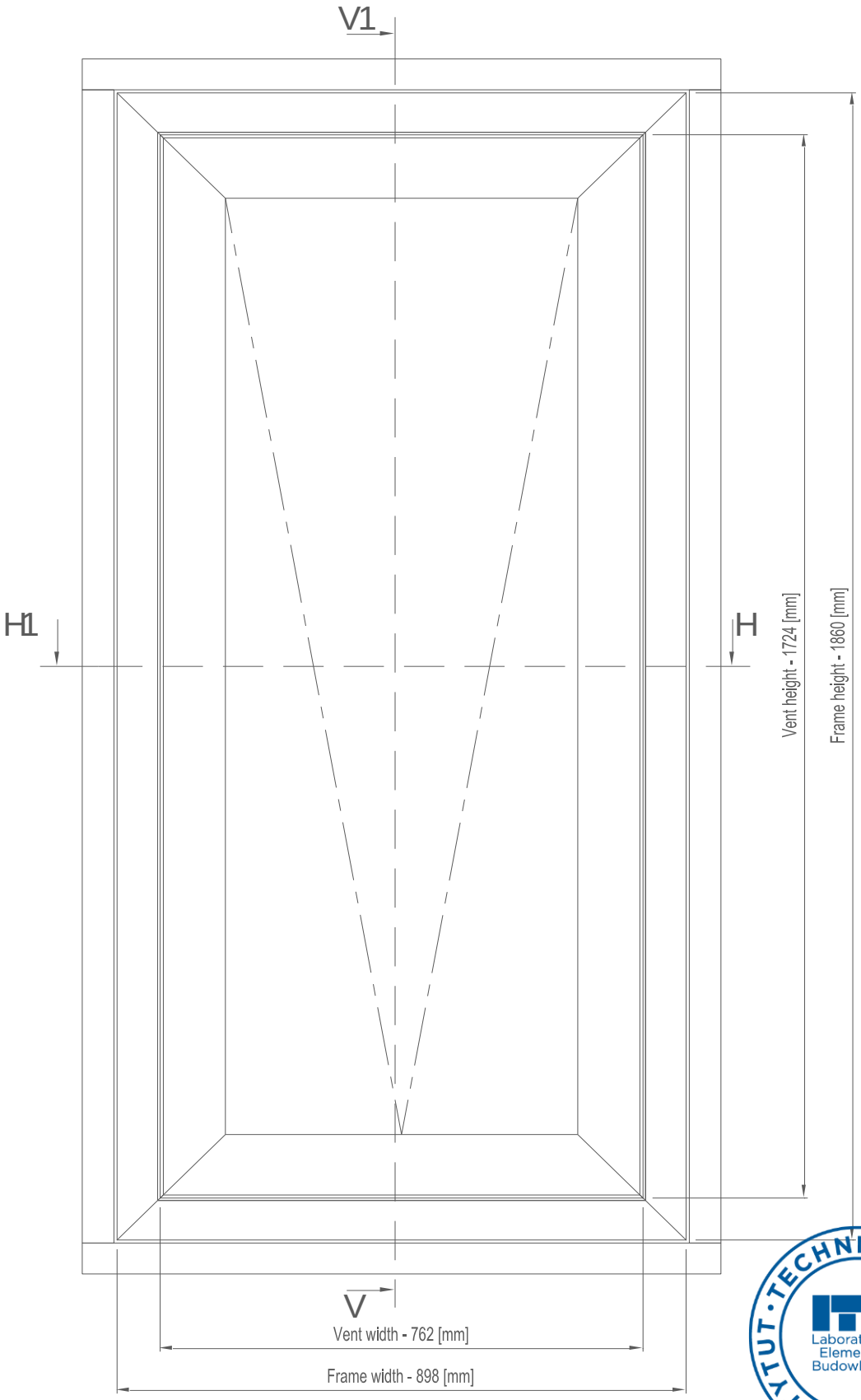


Fig. 5. General view of the sample

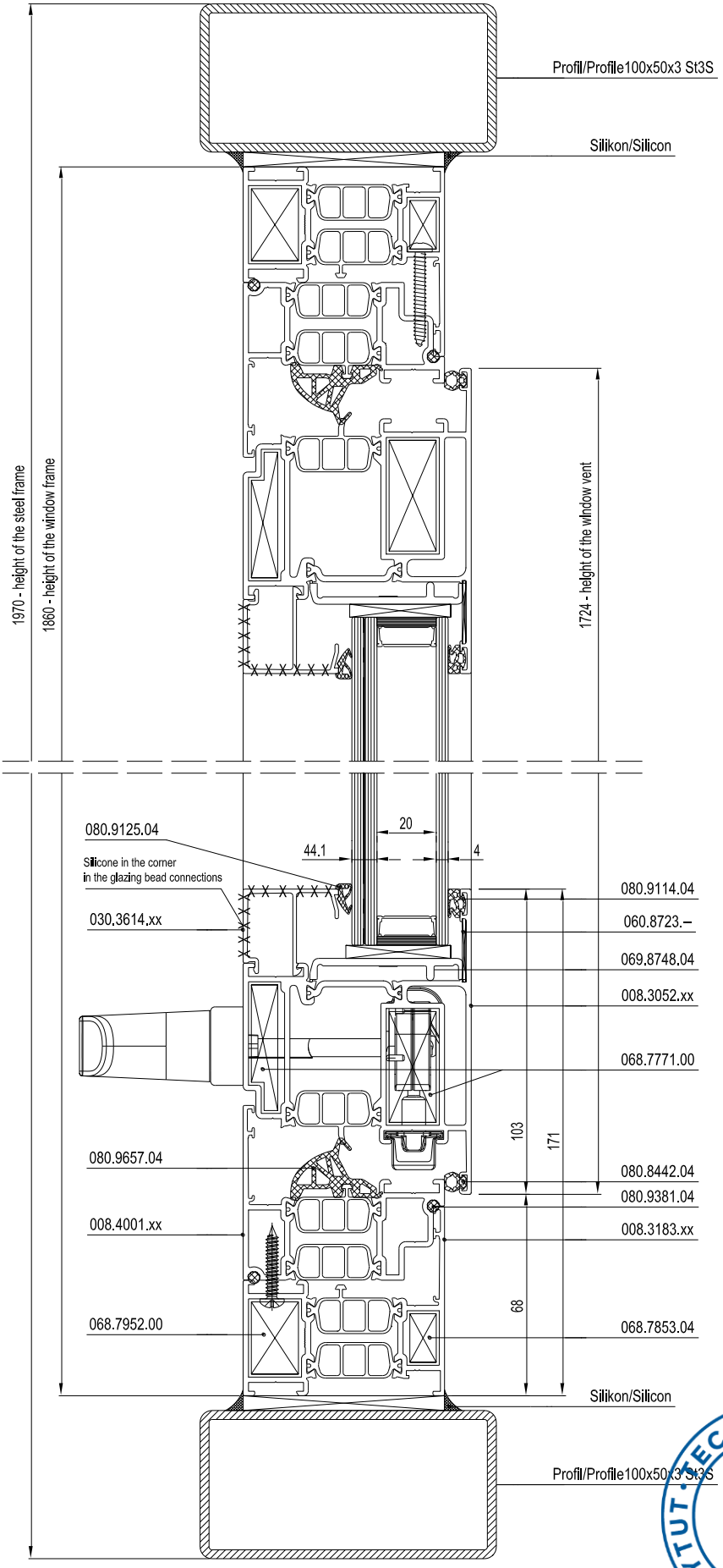


Fig. 6. Cross-section V1-V

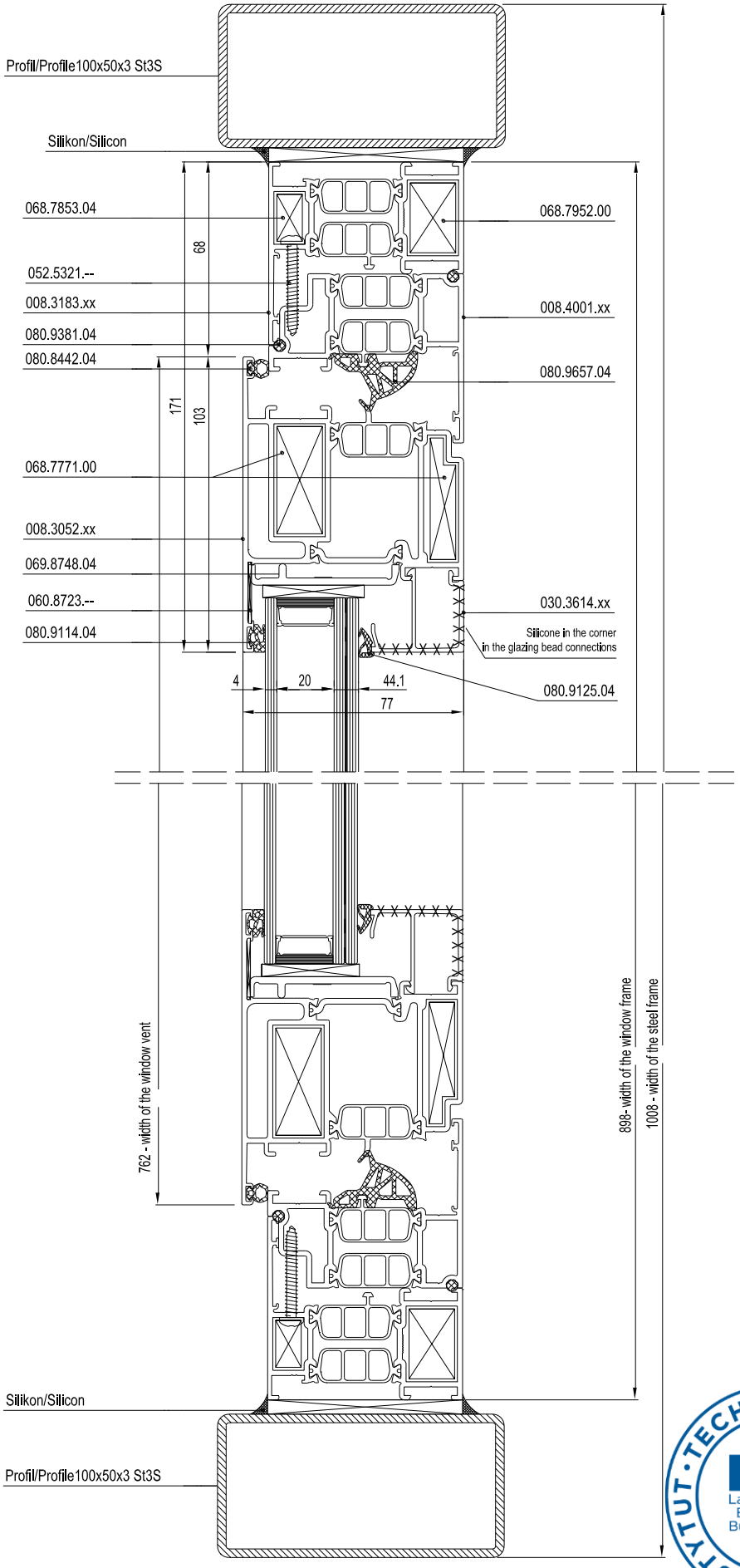
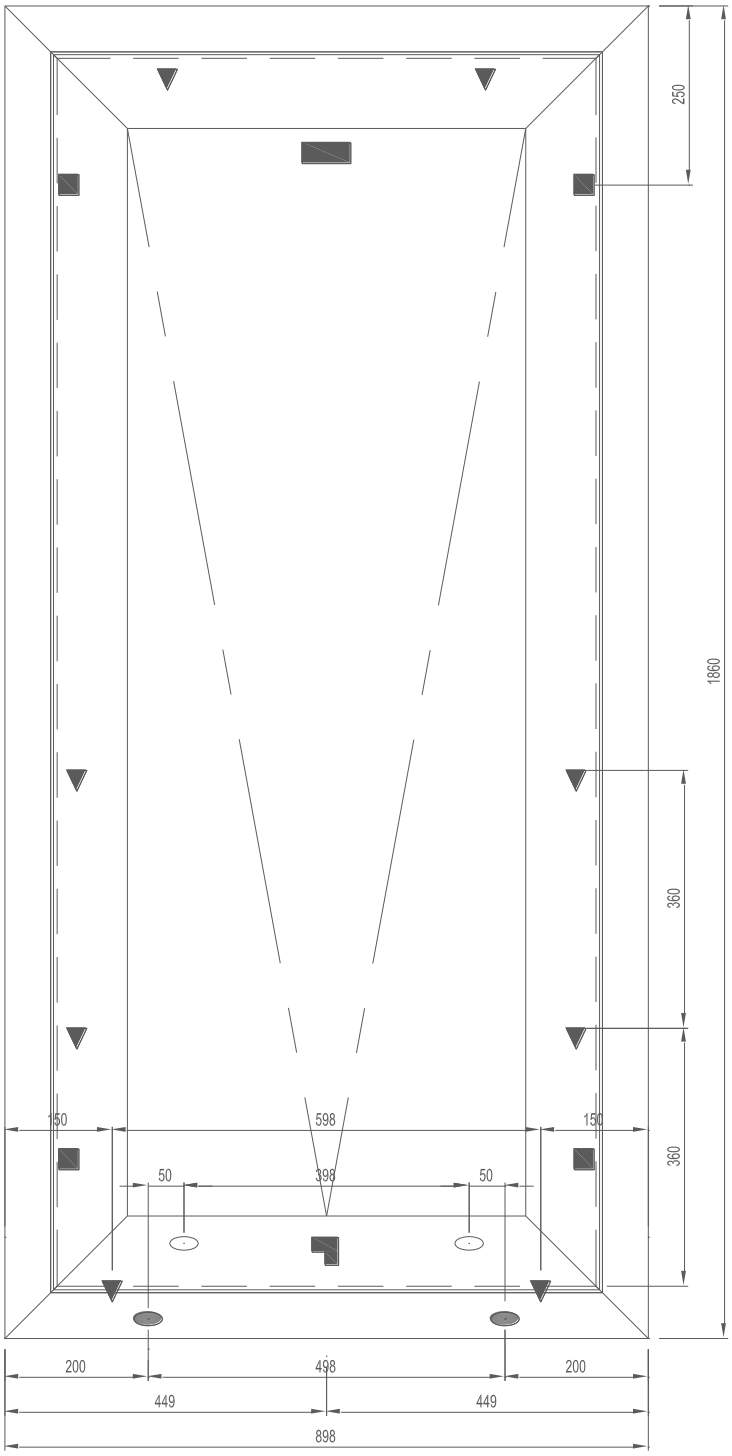


Fig. 7. Cross-section H1-H



Decompression in vent Ø5mm	Dekompresja w skrzydle Ø5mm
Decompression D=50mm (gasket)	Dekompresja D=50mm (uszczelka)
Drainage vent profile slot 15 x 5mm	Odwodnienie skrzydła 15 x 5mm
Drainage outer frame slot 6x34mm	Odwodnienie ramy 6x34mm
Drainage changeover profile Ø5mm	Profil odwadniający Ø5mm
Locking points	Punkty ryglujące
Handle 0606456.17	Klamka 0606456.17
Friction stays 0608842.--	Friction stays 0608842.–
Glass type: 4/20/44.1	Typ szkła: 4/20/44.1
Mark/Type accessories: SOBINCO CHRONO	Producent/Typ okuć: SOBINCO CHRONO

Fig. 8. Location of drainage, decompression and equipment points

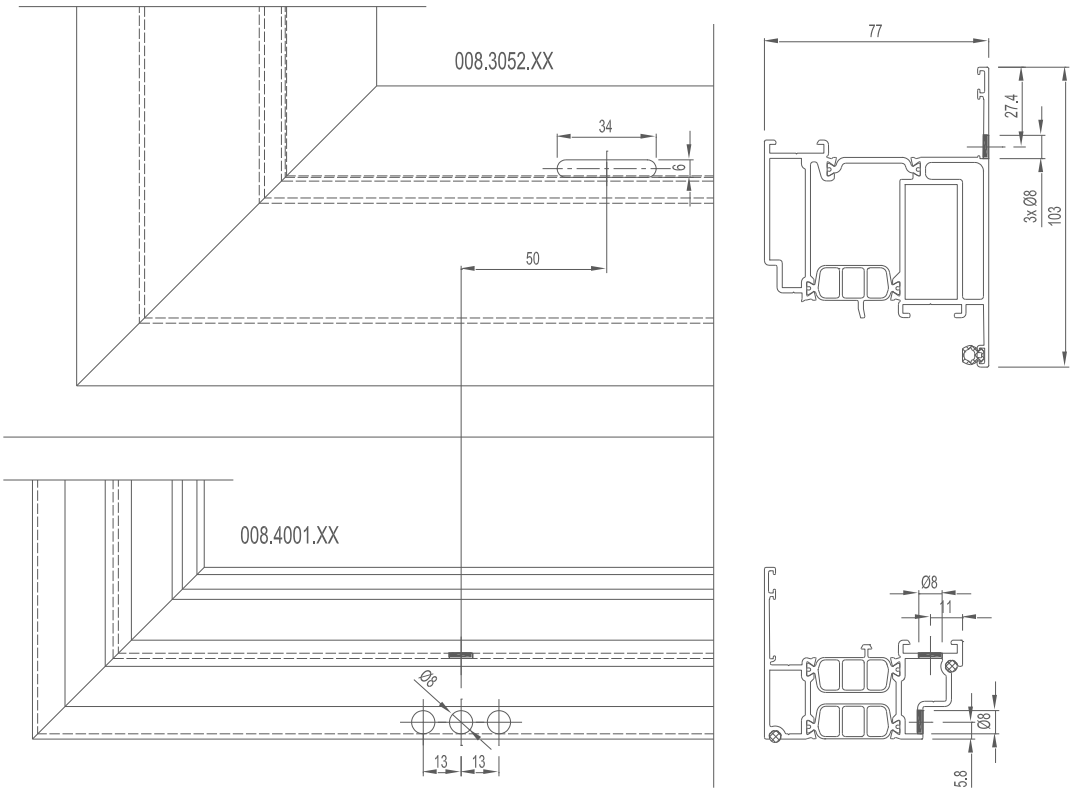


Fig. 9. Drainage in the changeover profile outside glazing

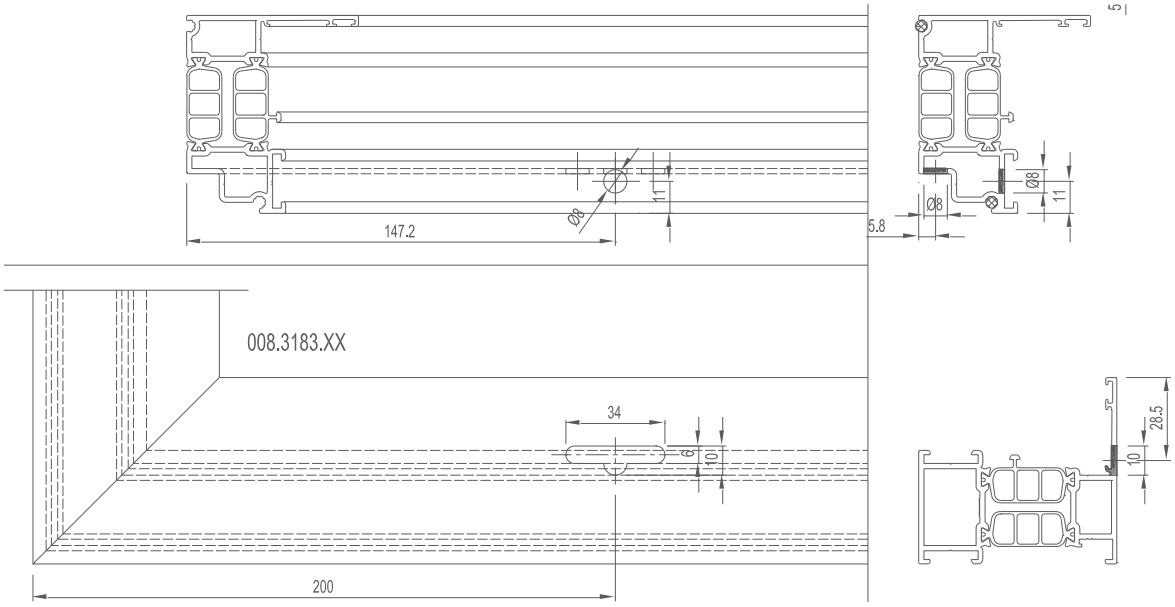


Fig. 10. Drainage in the frame

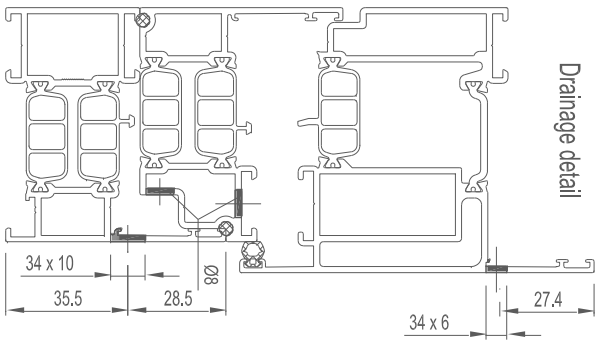


Fig. 11. Details of drainage holes

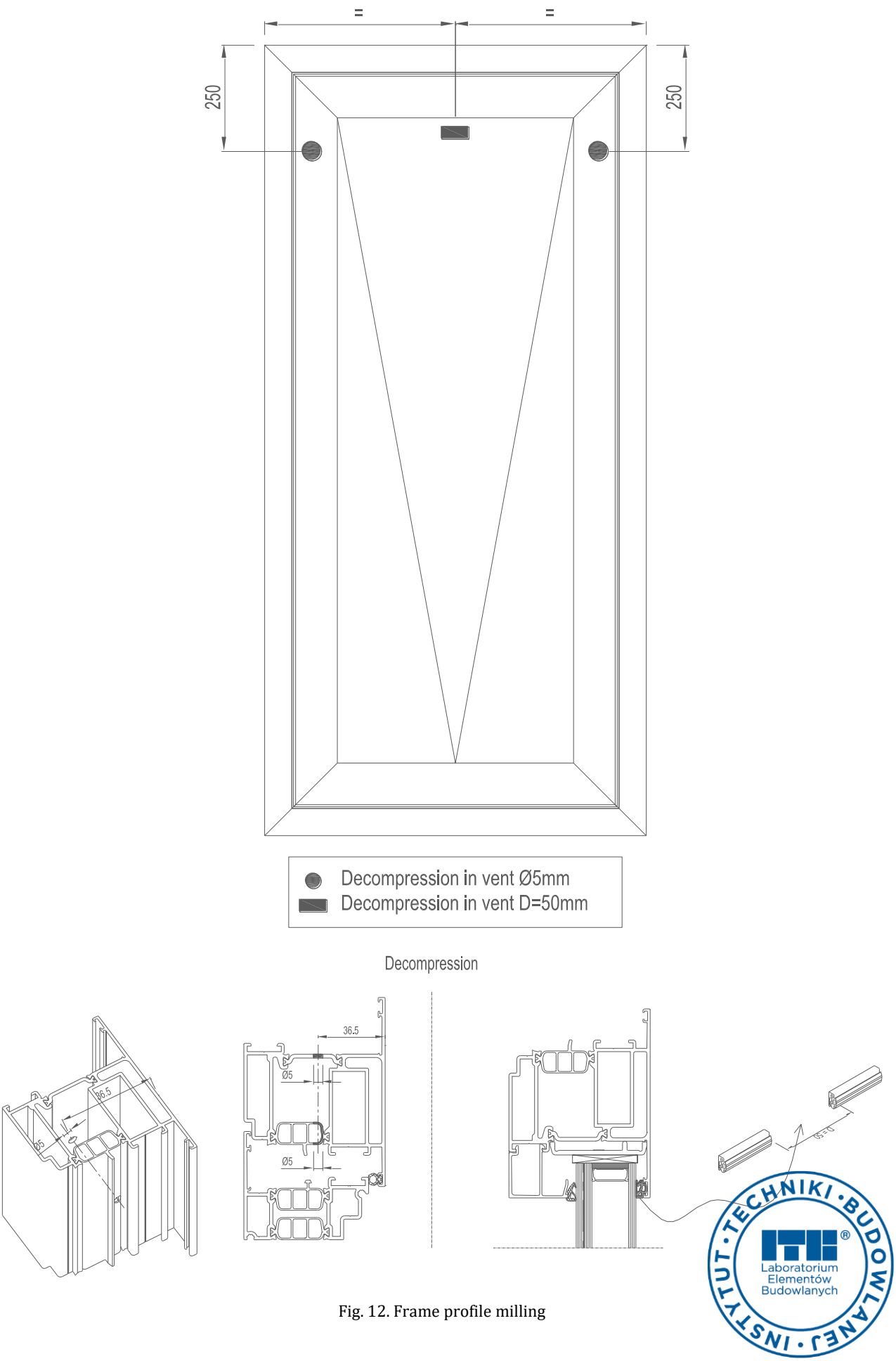


Fig. 12. Frame profile milling

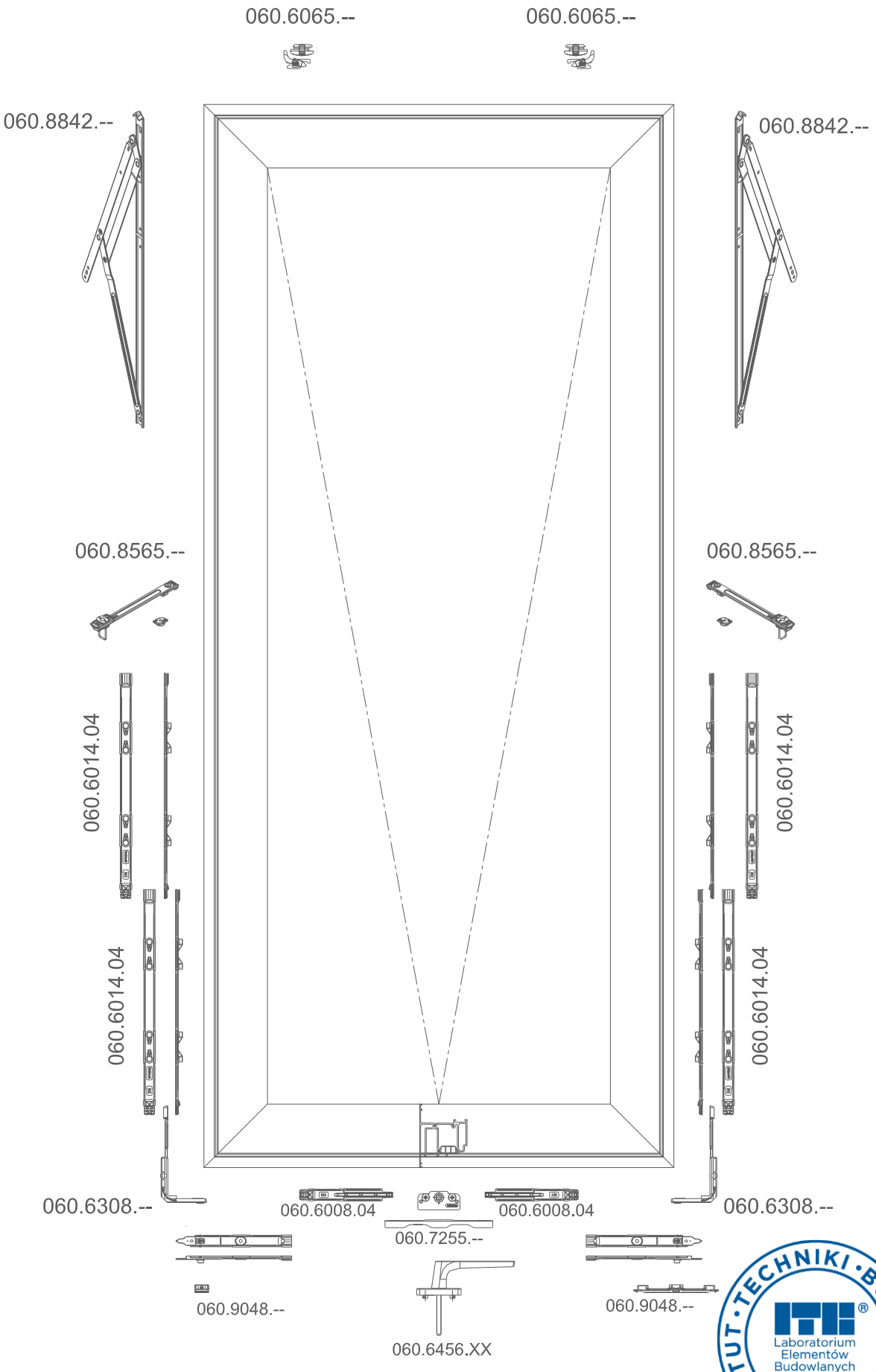


Fig. 13. Fitting schema

Marzena Jakimowicz Msc
Person responsible for tests
/ qualified electronic signature /

Marzena Jakimowicz Msc
Person responsible for performance assessment
/ qualified electronic signature /

Agnieszka Gorycka Msc
Person authorising the report
/ qualified electronic signature /

Marzena Jakimowicz Msc
Head of the Laboratory LZE
/ qualified electronic signature /

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END OF THE REPORT