

TEST REPORT

Number:

1994-CPR-RP2772

Issuing date:

14st December 2023

Applicant:

**ZAHIT ALUMINYUM Sanayi Ticaret A.S.
Adana Haci Sabanci Organize Sanayi
Bölgesi Oguz Kagan Koksall Cad N5 TU**

Tested product:

**Balcony door, sliding folding, with three casements,
trade name
“FW77+”
(see description)**

Executed tests:

**Air permeability EN 1026:2016
Watertightness EN 1027:2016
Resistance to wind load EN 12211:2016**

Normative references:

Harmonised product standard EN 14351-1:2006+A2:2016

The results in the test report relate only to the tested samples identified in this Test Report. The sample was tested as received. The test results relate to the behavior of the tested samples under specific test conditions. They are not intended to be the only criteria for assessing safety in use and environmental performance. Under real conditions, the behavior of the product may differ from the performance analyzed under the standard test conditions. The test report is not intended as a certificate of product conformity and the laboratory is not responsible for the conformity of production with the tested sample.

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1 Description of the tested sample

The tested sample is a balcony door, sliding folding, with three casements, belonging to the series commercially named by the applicant “FW77+” and identified by the applicant with the code “PB3AF-ZAHIT-FW77+”.

Identification code assigned: **192023**.

The description and technical drawings below, referring to the received and tested sample, have been provided by the applicant under his own responsibility. These data influence the result and as they cannot be technically verified, IRCCOS declines any responsibility for the validity of the results. It is not possible for IRCCOS to check the conformity of the sample with the technical drawings, so this conformity remains the responsibility of the applicant.

PRODUCT DESCRIPTION PROVIDED BY THE CUSTOMER

- **Typology:** balcony door, sliding folding, with three casements
- **Material:** extruded thermal break aluminum alloy profiles EN AW 6060-T5
- **Profiles:** Design condition T5 according to EN 12020-2:2002
Thermal break aluminum profiles:
 - frame profile item FW77+15.101,
 - variable frame profile item FW77+15.103,
 - sash profile item FW77+15.301,
 - lock adapter profile item FW77+15.401,
 - sash adapter profile item FW77+15.404,
 - glazing bead of 35 mm item LS55435,
 all supplied by company Zahit Aluminyum Sanayi Ticaret, TU
- **Corner joints:**
 - extruded aluminium corner item LS55442,
 - alignment corner for sash item FW77609,
 - die-cast aluminium corner item FW77608,
 all supplied by company Zahit Aluminyum Sanayi Ticaret, TU
- **Glazing:** double glazing consisting of stratified external glass of 33.1 mm, cavity of 12 mm, stratified inner glass of 33.1 mm,
all supplied by company ARTVETRO, Castellana Grotte (BA), Italy
- **Glazing gaskets:**
 - internal glass gasket item LS55502,
 - external glass gasket item LS55501,
 all supplied by company Zahit Aluminyum Sanayi Ticaret, TU
- **Thermal break:** realized by the insertion of polyamide bars
- **Sealing gaskets:**
 - frame perimeter gasket item FW77501,
 - sash gasket plugs item FW77601,
 - sash perimeter gasket item FW77501,
 - cover gasket item FW77503,
 - rebate gasket item W55.501,
 all supplied by company Zahit Aluminyum Sanayi Ticaret, TU

<ul style="list-style-type: none"> Water drainage system: 	<p>consisting of n. 4 drainage slots</p> <ul style="list-style-type: none"> - water drain cover cap - drainage valve <p>all supplied by company Zahit Alüminyum Sanayi Ticaret, TU</p>	<p>item FW77602, item FW77603,</p>
<ul style="list-style-type: none"> Accessories: 	<p>locking system including 5 locking points:</p> <ul style="list-style-type: none"> - n°1 reduced handle - n°1 double handle - n°1 roller kit for odd-numbered sash - n°1 upper roller kit for odd-numbered sash - n°10 hinges - n°1 two-way movement - n°1 lock - n°1 lock cylinder (45+45) 90 - n°2 threaded stem kit L=2mt, joint heads and rod guide - n°6 sash stopper - n°5 frame mullion adjusters - n°12 glass support - n°2 steel rail <p>all supplied by company Zahit Alüminyum Sanayi Ticaret, TU</p>	<p>item FW77.716, item FW77.717, item FW77.702, item FW77.701, item FW77.705, item FW77.708, item FW77.710, item FW77.784, item FW77.714, item FW77605, item FW77604, item FW77610, item LS55616,</p>
<ul style="list-style-type: none"> Declared nominal dimensions: 	<p>see attached technical drawings</p>	

PRODUCT TECHNICAL DRAWINGS PROVIDED BY THE CUSTOMER

INTERNAL VIEW

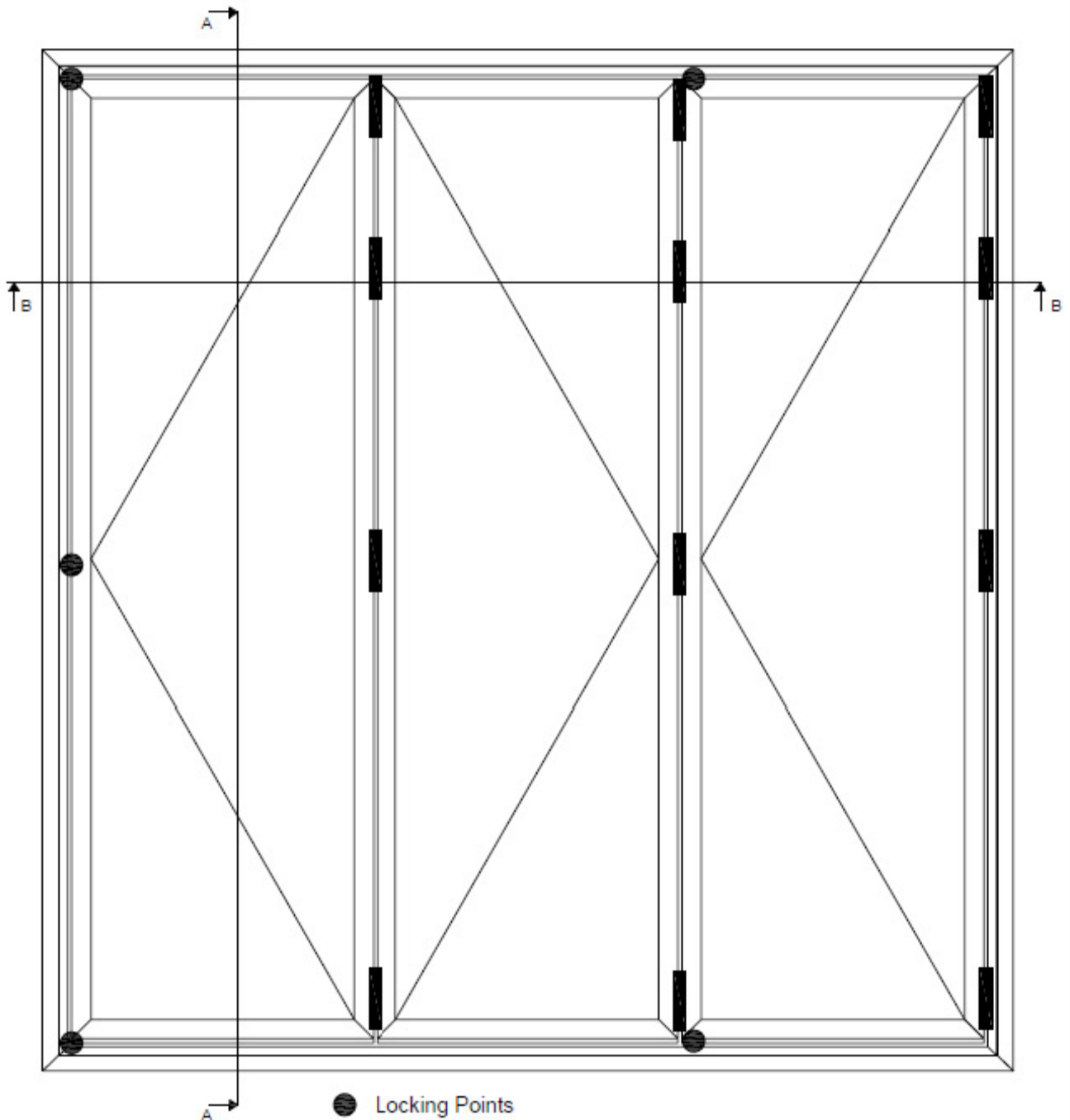


Fig. 1. Front view of the received and tested sample, positioning scheme of locking device: front view

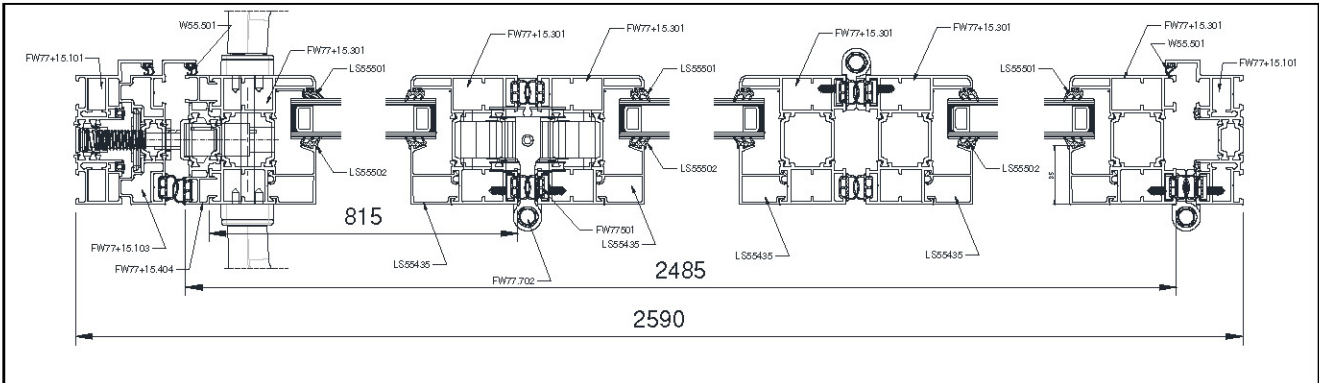


Fig. 2. Horizontal section BB of the tested sample
(declared nominal dimensions in mm)

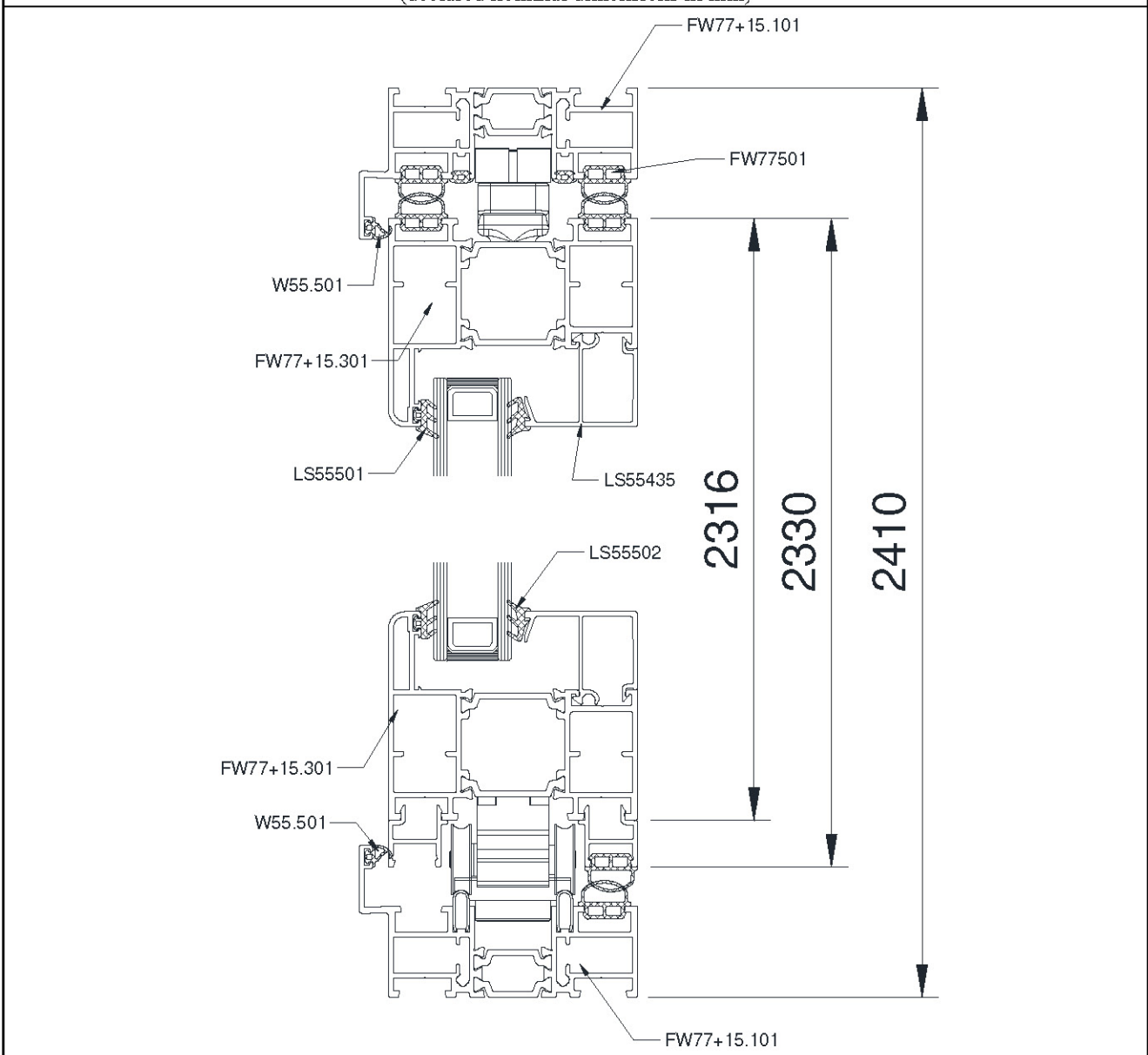


Fig. 3. Vertical section AA of the tested sample
(declared nominal dimensions in mm)

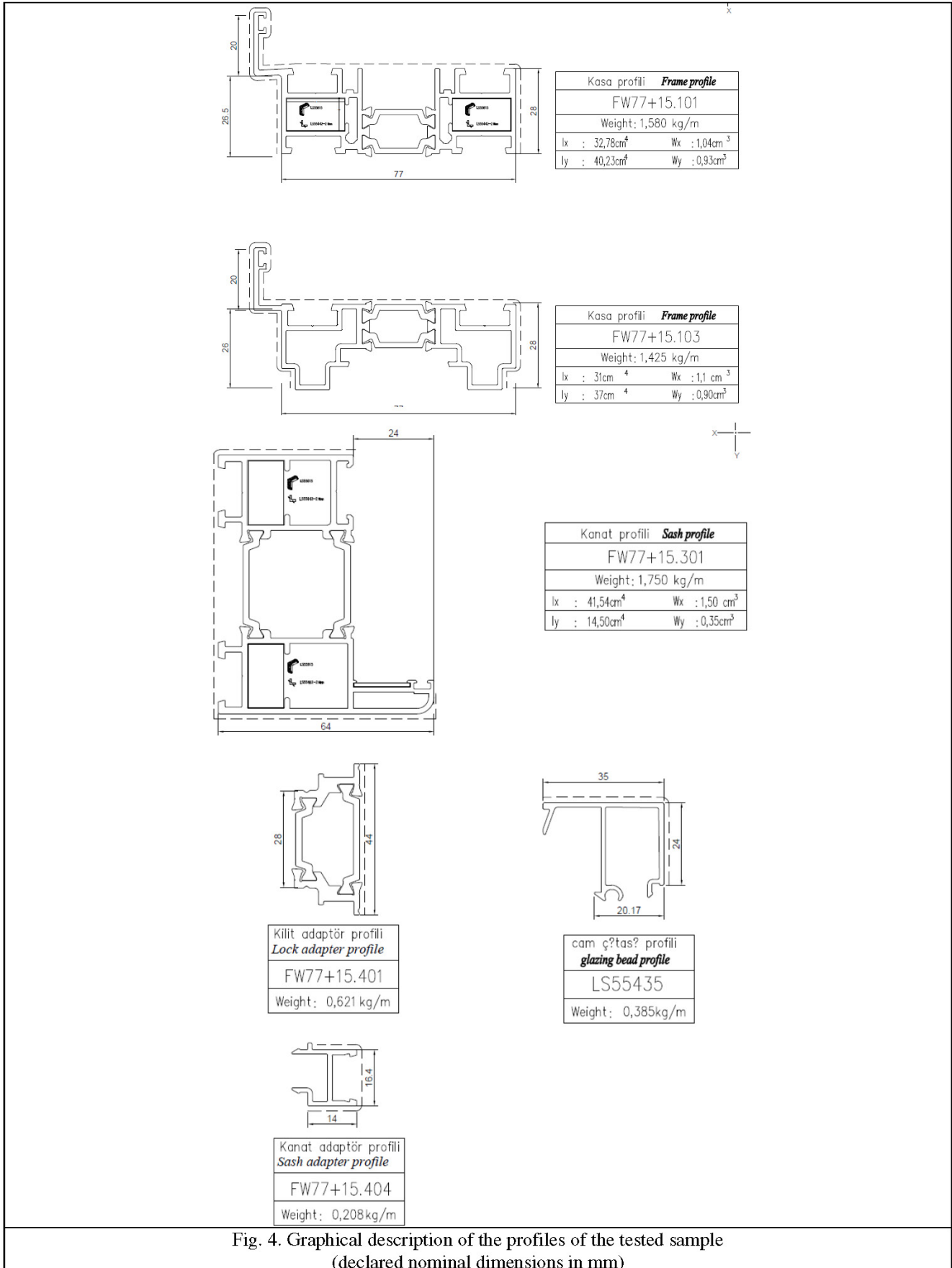


Fig. 4. Graphical description of the profiles of the tested sample (declared nominal dimensions in mm)



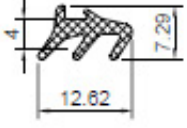

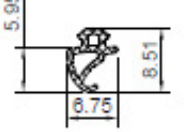

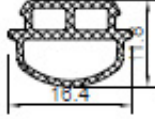

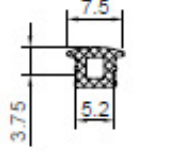

LS55501		epdm cam dış fitil <i>glazing gasket outside</i>	51 gr/m	15 kg	285 m	
LS55502		epdm cam iç fitil <i>glazing gasket inside</i>	50 gr/m	15 kg	300 m	
W55.501		epdm cam iç fitil <i>glazing gasket inside</i>	25 gr/m	15 kg	590 m	
FW77501		epdm fitil <i>epdm gasket</i>	97 gr/m	10 kg	103 m	
FW77503		epdm fitil <i>epdm gasket</i>	28 gr/m	12 kg	428 m	

Fig. 5. Graphical description of the gaskets of the tested sample
(declared nominal dimensions in mm)

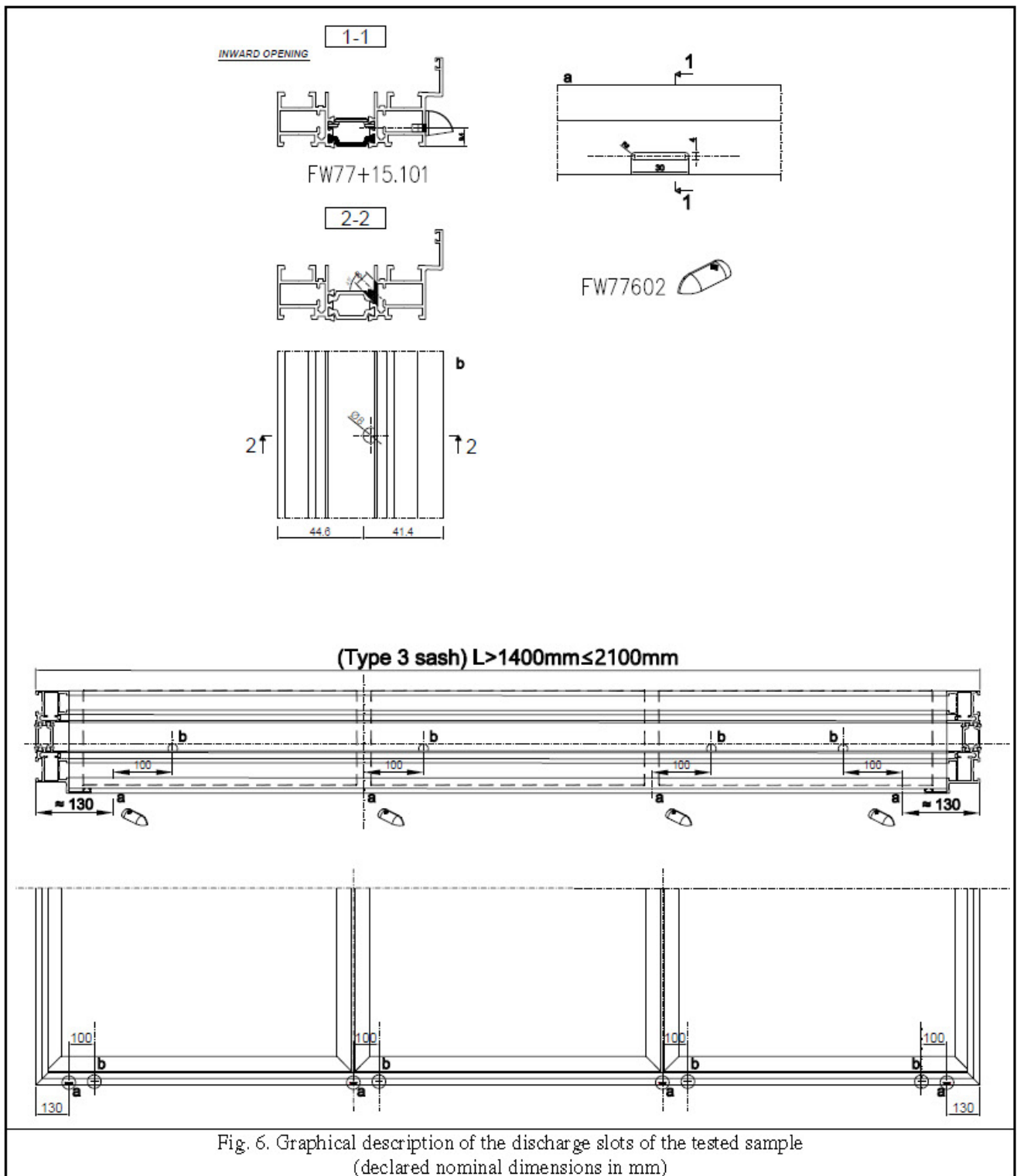


Fig. 6. Graphical description of the discharge slots of the tested sample
(declared nominal dimensions in mm)

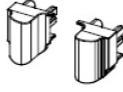
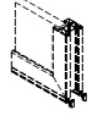





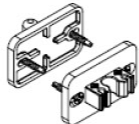
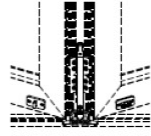

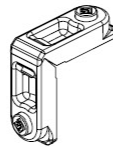
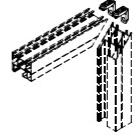
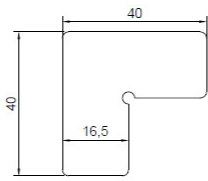
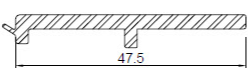
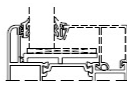
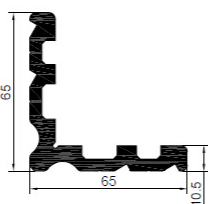
FW77601		vulkanize kö?e fitili <i>vulcanised corner gasket</i>	
FW77602		su tahliye kapa?? <i>water drainage plug</i>	
FW77603		bini profili pvc kapak <i>water drainage plug</i>	
FW77604		kasa ayar plakası <i>Frame adjusting plate</i>	
FW77605		kanat durdurucu <i>sash stopper</i>	
LS55616		paslanmaz çelik ray pr. <i>stainless steel rail profile</i>	6,0 m 4 pcs
FW77608		kanat ve kasa kö?e ba?lantı <i>sash and frame corner connection</i>	
FW77609		kö?e onba?? <i>corner cleat for sash</i>	200 pcs/pk
FW77610		pvc cam destek takoz <i>pvc glazing support cleat</i>	
		kasa-kanat kö?e takoz profili <i>frame-sash corner cleat profile</i>	
		LS55442 Weight: 2,345kg/m LS55442-2 18mm	

Fig. 7. Graphical description of the hardware of the tested sample
(declared nominal dimensions in mm)

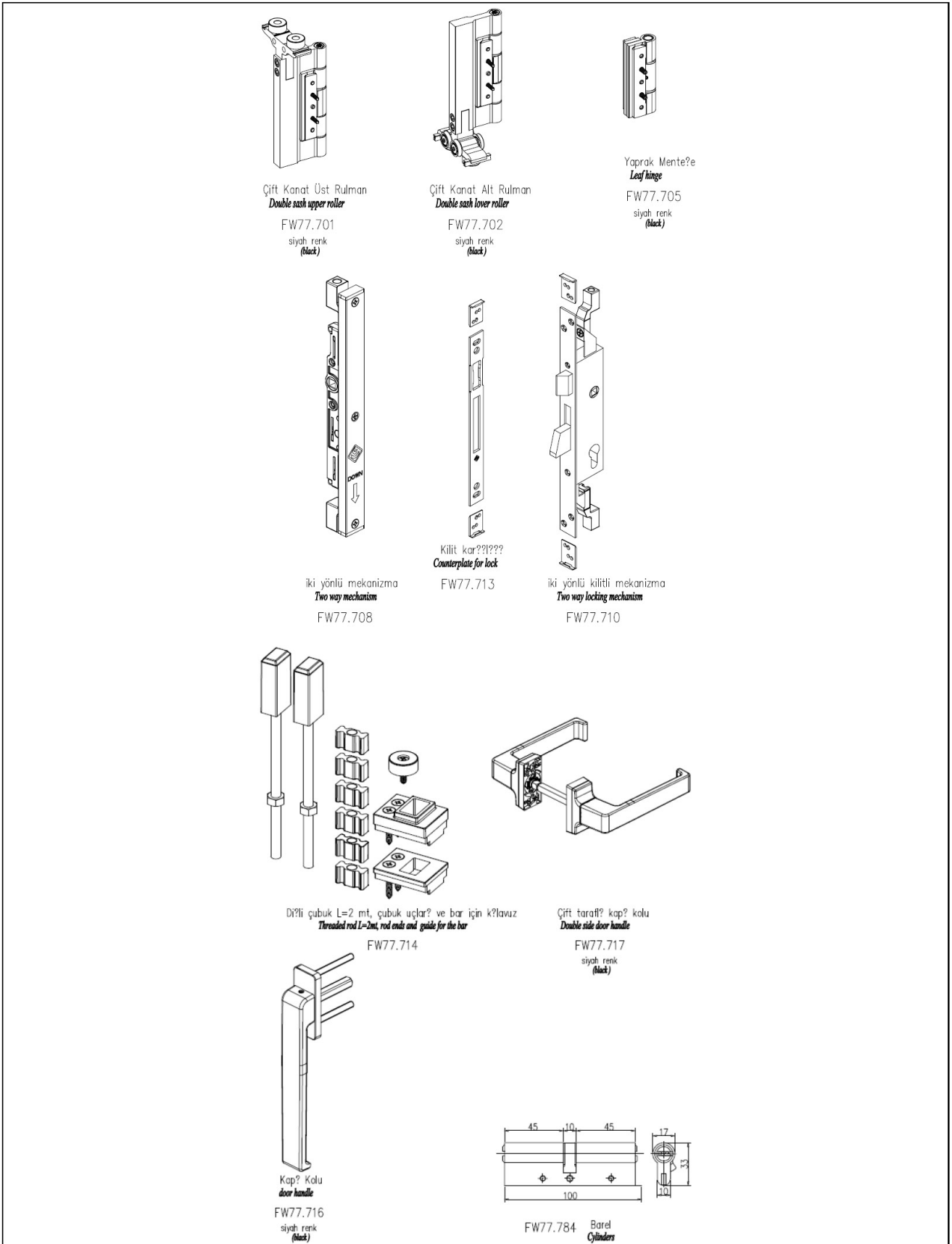


Fig. 8. Graphical description of the hardware of the tested sample (declared nominal dimensions in mm)

2 Collection, delivery, and acceptance of the sample

The sample collection was carried out by the customer and the results refer to the sample as received at acceptance. The sample assembly, construction and preparation were carried out directly by the customer or his agent following the assembly instructions, without any variations.

The sample was installed by the customer in a support frame sufficiently rigid to withstand the test pressures, fixed as intended in use and free from twisting or bending influencing the test results, in accordance with the standard requirements EN 1026:2016, EN 1027:2016 and EN 12211:2016.

3 Test equipment and instruments

The equipment, instrumentation and competence of staff are subject to annual verification by IRCCOS S.r.l.

The test instrumentation used in measuring the following data is as follows:

- a wall with an open side to house the test sample;
- a device allowing to create a controlled pressure difference between the sample's faces;
- a device allowing to obtain a quick and controlled variation of pressure difference within specified limits;
- an instrument to measure the incoming and outgoing air-flow through the airtight chamber ;
- an instrument to measure pressure difference between the sample's faces;
- an instrument that measures the temperature inside the airtight chamber;
- an instrument that measures the temperature and relative humidity of the environment;
- an instrument that measures the atmospheric pressure of the environment;
- a device projecting water and allowing to create a continuous film of water all over the test surface by means of circular full-cone nozzles with the following features: $(120_{-10}^{\circ})^{\circ}$ delivery angle and a 2 liter min/m^2 water flow rate;
- an instrument to control the amount of projected water;
- an instrument that measures water temperature;
- instruments that measure displacements;

a device allowing to fix the measuring instruments and to ensure their stability during the test.

4 Test method

Tests performed and described were carried out in ref. to Art. 46 of Regulation (EU) CPR No. 305/2011 at the test laboratory of MasterLab, located in Conversano (BA), S.P.37 Conversano - Castiglione Km. 0,570 Z.I., directly by an operator of the same, P.I. Nicola Dentamaro, under the instructions and in the presence of laboratory technician, Damiano Zizza, of IRCCOS S.r.l. (NB1994). Tests started on 2023-08-08.

- The Air permeability test was performed in accordance with the standard EN 1026:2016 and with the reference to product standard EN 14351-1:2006+A2:2016.
- The Watertightness test was performed in accordance with the standard EN 1027:2016 and with the reference to product standard EN 14351-1:2006+A2:2016. The water was projected through of a row of nozzles with interaxis spacing of $400 \text{ mm} \pm 10 \text{ mm}$ and each average flow rate equal to 2 l/min, to

obtain an amount of water on the sample equal to 2 l/min.m². The axis of the rows of nozzles was inclined with respect to the horizontal line of (24^{±2})°, in accordance with the method 1A.

- The Resistance to wind load test was performed in accordance with the standard EN 12211:2016 and with the reference to product standard EN 14351-1:2006+A2:2016.

5 Elaboration of results

The sample was classified according to the following criteria:

- The sample was classified for the Air Permeability test according to the standard EN 12207:1999.
- The sample was classified for the Watertightness test according to the standard EN 12208:1999.
- The sample was classified for the Resistance to wind load test according to the standard EN 12210:2016.

6 Results

6.1 Conditioning and Control of the Sample

Before testing, the sample was conditioned for more than 4 hours at a temperature and relative humidity controlled within the limits prescribed by the standards:

- Temperature between 10°C and 30°C
- Relative humidity between 25% and 75%

SAMPLE DIMENSIONS					Sample closure condition
Measures	width (m)	height (m)	surface (m ²)	opening joints length (m)	
Whole sample	2,590	2,410	6,242	-	Closed
Opening part	2,484	2,315	5,750	14,228	
Exposed side	Internal				
Opening direction	Inwards				

Tab. 1

6.2 Air permeability test

IRCCOS TECHNICIAN	DATE OF TEST	TEST START TIME	LABORATORY ENVIRONMENTAL PARAMETERS		
			Temperature (°C)	Relative humidity (%)	Atmospheric pressure (kPa)
Damiano Zizza	2023-08-08	08:32	T _x = 28,4	U _{rel} = 54,2	P _x = 99,2

Tab. 2

Pressure Pa	Sample air permeability (positive pressure)		
	m ³ /h	m ³ /hm ²	m ³ /hm
50	0,86	0,14	0,06
100	1,33	0,21	0,09
150	1,81	0,29	0,13
200	3,33	0,53	0,23
250	5,23	0,84	0,37
300	6,94	1,11	0,49
450	13,98	2,24	0,98
600	18,73	3,00	1,32

Tab. 3

Pressure Pa	Sample air permeability (negative pressure)		
	m ³ /h	m ³ /hm ²	m ³ /hm
50	0,86	0,14	0,06
100	0,95	0,15	0,07
150	1,81	0,29	0,13
200	2,47	0,40	0,17
250	3,71	0,59	0,26
300	4,85	0,78	0,34
450	8,75	1,40	0,61
600	12,83	2,06	0,90

Tab. 4

Pressure Pa	Sample air permeability (arithmetic average of the two tests)		
	m ³ /h	m ³ /hm ²	m ³ /hm
50	0,86	0,14	0,06
100	1,14	0,18	0,08
150	1,81	0,29	0,13
200	2,90	0,46	0,20
250	4,47	0,72	0,31
300	5,89	0,94	0,41
450	11,36	1,82	0,80
600	15,78	2,53	1,11

Tab. 5

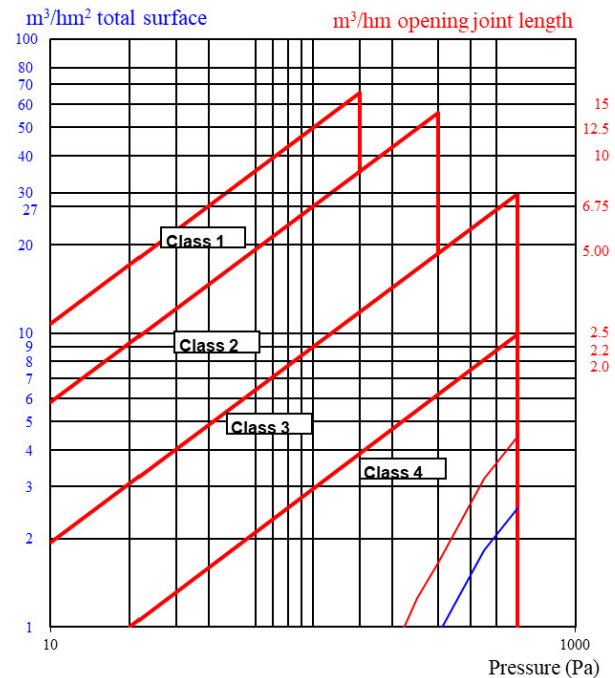


Diagram 1

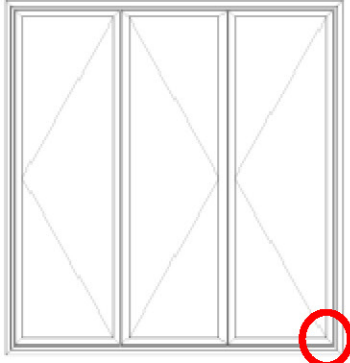
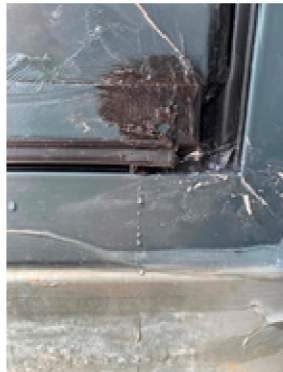
6.2.1 Classification of the sample

The sample subjected to air permeability test under positive and negative pressures was classified in **class 4** with reference to the standard EN 12207:1999.

6.3 Watertightness test

IRCCOS TECHNICIAN	DATE OF TEST	TEST START TIME	LABORATORY ENVIRONMENTAL PARAMETERS		
			Temperature (°C)	Relative humidity (%)	Atmospheric pressure (kPa)
Damiano Zizza	2023-08-08	09:29	T _x = 29,5	U _{rel} = 27,5	P _x = 99,1

Tab. 6

Pressure (Pa)	Duration (min)	Remarks
0	15	No water seepage
50	5	
100	5	
150	5	
200	5	
250	5	
300	5	
450	1'00''	 Infiltration at the bottom of the sash 

Tab. 7

6.3.1 Classification of the sample

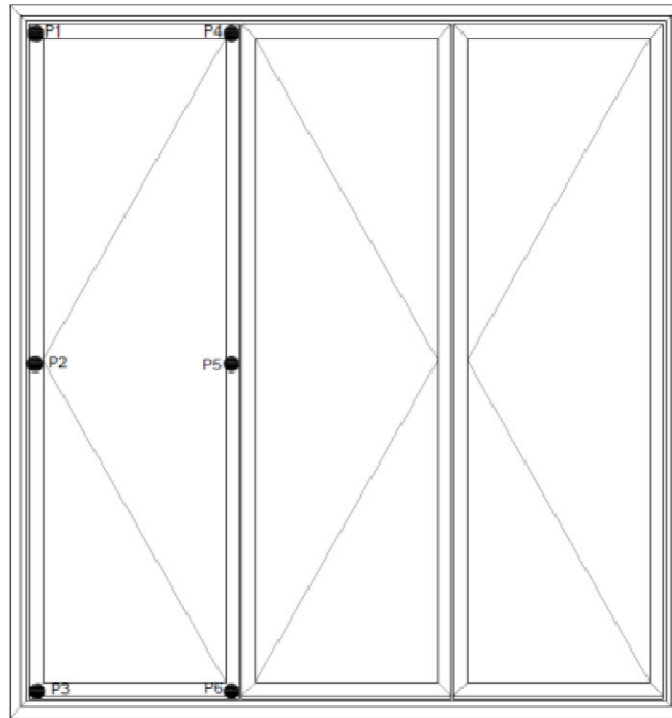
The sample subjected to watertightness test was classified in **class 7A** with reference to the standard EN 12208:1999.

6.4 Resistance to wind load test

6.4.1 Deformation test (under positive and negative pressure)

IRCCOS TECHNICIAN	DATE OF TEST	TEST START TIME	LABORATORY ENVIRONMENTAL PARAMETERS		
			Temperature (°C)	Relative humidity (%)	Atmospheric pressure (kPa)
Damiano Zizza	2023-08-08	11:06	T _x = 29,9	U _{rel} = 54,4	P _x = 99,2

Tab. 8



Legend:
1, 2, 3 Lateral Mullion
4, 5, 6 Central Mullion

Fig. 9. Experimental set-up wind load test internal view: transducers positioning scheme - placed on the inner side

Distance between transducers (mm)	Lateral Mullion	Central Mullion
		2290

Tab. 9

Positive pressure (Pa)	p. 1 (mm)	p. 2 (mm)	p. 3 (mm)	p. 4 (mm)	p. 5 (mm)	p. 6 (mm)
800	1,10	2,90	1,42	4,18	7,95	2,22
1200	1,63	4,12	2,06	6,09	11,97	3,62
0	0,04	0,15	0,11	0,13	0,29	0,12
Negative pressure (Pa)	p. 1 (mm)	p. 2 (mm)	p. 3 (mm)	p. 4 (mm)	p. 5 (mm)	p. 6 (mm)
800	1,93	4,00	2,30	5,50	10,51	3,56
1200	2,79	5,57	3,09	6,94	15,17	4,91
0	0,50	1,46	0,79	1,92	4,43	1,69

Tab. 10. Frontal displacement of measured characteristic points at test pressures

Lateral Mullion	Positive pressure (Pa)	Frontal displacements (mm)			Frontal deflection (mm)	Relative frontal deflection
		p.1 (upper)	p.2 (central)	p.3 (lower)		
	800	1,10	2,90	1,42	1,64	1/1396
	1200	1,63	4,12	2,06	2,28	1/1007
		Residual Deformation (mm)			Frontal residual def. (mm)	
	0	0,04	0,15	0,11		0,08
	Negative pressure (Pa)	Frontal displacements (mm)			Frontal deflection (mm)	Relative frontal deflection
		p.1 (upper)	p.2 (central)	p.3 (lower)		
	800	1,93	4,00	2,30	1,89	1/1210
	1200	2,79	5,57	3,09	2,63	1/867
	Residual Deformation (mm)			Frontal residual def. (mm)		
0	0,50	1,46	0,79		0,82	

Tab. 11. Frontal deflections and residual deformations of lateral mullion of the tested sample

Central Mullion	Positive pressure (Pa)	Frontal displacements (mm)			Frontal deflection (mm)	Relative frontal deflection
		p.4 (upper)	p.5 (central)	p.6 (lower)		
	800	4,18	7,95	2,22	4,75	1/480
	1200	6,09	11,97	3,62	7,12	1/320
		Residual Deformation (mm)			Frontal residual def. (mm)	
	0	0,13	0,29	0,12		0,17
	Negative pressure (Pa)	Frontal displacements (mm)			Frontal deflection (mm)	Relative frontal deflection
		p.4 (upper)	p.5 (central)	p.6 (lower)		
	800	5,50	10,51	3,56	5,98	1/381
	1200	6,94	15,17	4,91	9,25	1/247
	Residual Deformation (mm)			Frontal residual def. (mm)		
0	1,92	4,43	1,69		2,63	

Tab. 12. Frontal deflections and residual deformations of central mullion of the tested sample

6.4.1.1 Remarks on results

At the end of the deformation test, no visible defect was observed during a check carried out by normal and corrected visual observation at 1 m, and the sample remained in a satisfactory condition. The relative frontal deflection of the most deformed element of the tested sample is $< 1/300$ for 800 Pa and $< 1/200$ for 1200 Pa.

6.4.2 Repeated pressure test

The sample was subjected to 50 cycles including negative and positive pressures at ± 600 Pa.

6.4.2.1 Remarks on results

At the end of the repeated pressure test, no visible defect was observed during a check carried out by normal and corrected visual observation at 1 m, and the sample remained in a satisfactory condition.

6.4.3 Verification of air permeability

IRCCOS TECHNICIAN	DATE OF TEST	TEST START TIME	LABORATORY ENVIRONMENTAL PARAMETERS		
			Temperature (°C)	Relative humidity (%)	Atmospheric pressure (kPa)
Damiano Zizza	2023-08-08	12:07	$T_x = 29,5$	$U_{rel} = 54,2$	$P_x = 98,9$

Tab. 13

Pressure Pa	Sample air permeability (positive pressure)		
	m^3/h	m^3/hm^2	m^3/hm
50	0,66	0,11	0,05
100	1,23	0,20	0,09
150	1,80	0,29	0,13
200	3,12	0,50	0,22
250	5,39	0,86	0,38
300	6,90	1,11	0,49
450	13,62	2,18	0,96
600	19,86	3,18	1,40

Tab. 14

Pressure Pa	Sample air permeability (negative pressure)		
	m^3/h	m^3/hm^2	m^3/hm
50	0,57	0,09	0,04
100	0,47	0,08	0,03
150	1,32	0,21	0,09
200	2,08	0,33	0,15
250	3,22	0,52	0,23
300	4,26	0,68	0,30
450	8,70	1,39	0,61
600	12,96	2,08	0,91

Tab. 15

Pressure Pa	Sample air permeability (arithmetic average of the two tests)		
	m^3/h	m^3/hm^2	m^3/hm
50	0,61	0,10	0,04
100	0,85	0,14	0,06
150	1,56	0,25	0,11
200	2,60	0,42	0,18
250	4,30	0,69	0,30
300	5,58	0,89	0,39
450	11,16	1,79	0,78
600	16,41	2,63	1,15

Tab. 16

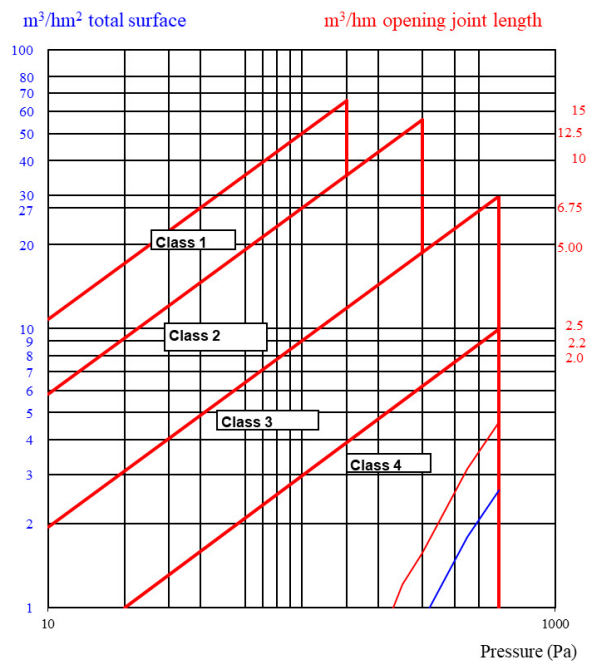


Diagram 2

The requirement to limit the maximum increase detected in air permeability to within 20% of the maximum allowable air permeability for the class previously obtained is achieved.

The sample tested for air permeability after the wind load resistance test confirmed the class previously achieved.

6.4.4 Safety test

IRCCOS TECHNICIAN	DATE OF TEST	TEST START TIME	LABORATORY ENVIRONMENTAL PARAMETERS		
			Temperature (°C)	Relative humidity (%)	Atmospheric pressure (kPa)
Damiano Zizza	2023-08-08	12:40	T _x = 29,5	U _{rel} = 54,2	P _x = 98,9

Tab. 17

	Observed structural damages or degradations
n° 1 gust at + 1800 Pa	none
n° 1 gust at – 1800 Pa	none

Tab. 18

6.4.4.1 Remarks on results

At the end of the safety test, no detachment or functional degradation was found in the sample and the sample remained closed.

6.4.5 Classification of sample

The sample subjected to resistance to wind load test was classified in **class class B3/C2** with reference to the standard EN 12210:2016.

7 Photos of the test sample and experimental set-up



Photo 1: Tested sample in the experimental setup



Photo 2: Sample under wind load tests

- 8 Resume of classes assigned based on the results of the tested sample of balcony door, sliding folding, with three casements, with trade name given by the applicant “FW77+”, according to TR No. 1994-CPR-RP2772, issued on 14st December 2023 to ZAHIT ALUMINYUM, referred to in full.

Test	Test standard	Classification standard	Obtained Class
Air permeability	EN 1026:2016	EN 12207:1999	class 4
Watertightness	EN 1027:2016	EN 12208:1999	class 7A
Resistance to wind load	EN 12211:2016	EN 12210:2016	class B3/C2

Laboratory technician
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----- End of the Test Report n. 1994-CPR-RP2772 -----