



Instytut Techniki Budowlanej

BUILDING RESEARCH INSTITUTE

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BUILDING ELEMENTS ENGINEERING DEPARTMENT

BUILDING ELEMENTS LABORATORY

REPORT OF THE TESTS AND ASSESSMENT OF THE PERFORMANCE N° LZE00-06016/18/R13NZE/EN

This research report has been released in three copies, the two has the client, and one remained in ITB.

Client: Inwido Production S.A.
Client address: 16-100 Sokółka, ul. Lotników Lewoniewskich 1

INFORMATION ABOUT PRODUCT

Manufacturer (name and address): Inwido Production S.A.,
16-100 Sokółka, ul. Lotników Lewoniewskich 1

Name and address of factory: Inwido Production S.A.,
16-100 Sokółka, ul. Lotników Lewoniewskich 1

Product: External wooden lift&slide doors THERMO 80 ECO PASS - information in point "Further information about test item"

Harmonised standard: PN EN 14351-1+A2:2016

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 TEST REPORT AND ASSESSMENT OF THE PERFORMANCE

Date of receipt /sampling: Date of receipt of the samples by the laboratory: 02.07.2018
Sampling date by the customer: 02.07.2018
Date of receipt of the complete technical documentation of the product: 10.07.2018

Receipt /sampling procedure PZ ZLB 18

N° of receipt /sampling protocol 06016/18/R13NZE – N° the sampling of protocol by the producer
LZE-06016/18/R13NZE – N° the adoption of protocol testing laboratory by object LZE

Further information about test item: External wooden lift&slide doors THERMO 80 ECO PASS made of glued laminated timber, frame dim. - $W_p \times H_f = 1900 \times 2120$ mm, , insulated glass unit 4/16/4, hardware SIEGENIA-AUBI

Information about tests

Test commencement date: 10.07.2018

Test completion date: 10.07.2018

Further information about tests: ---

Test methods: The test equipment used comply with the above-mentioned standards with PN-EN 14351-1+A2:2016

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Type Testing [ITT] – AoC system 3 PN-EN 14351-1+A2:2016

PN-EN 1026:2016	Windows and doors. Air permeability. Test method.
PN-EN 1027:2016	Windows and doors. Watertightness. Test method.
PN-EN 12211:2016	Windows and doors. Resistance to wind load. Test method.

1. The scope of tests

The scope of Type Testing constituting the task of the notified body covered the verification of:

- air permeability,
- watertightness,
- resistance to wind load.

Personnel executing the test:

- Msc Daniel Kuna - Building Research Institute, 00-611 Warszawa, ul. Filtrowa 1, Building Elements Engineering Department, Building Elements Laboratory - LZE, 02-656 Warszawa, ul. Ksawerów 21.

The tests were carried at the Building Elements Laboratory - LZE, 02-656 Warszawa, ul. Ksawerów 21; using the SCHULTEN KS 6050/65 PC tightness and durability testing rig for curtain walls, windows and doors. The test equipment has current calibration certification and complies with the requirements of PN-EN 14351-1+A2:2016.

Uncertainty has been determined on the basis of available data, including the accuracy of the measurement system used. Due to the nature of the research, the object of research and the lack of literature data, no information is available regarding the precision of the method.

The value of the uncertainty relates to the individual test results. The value of the uncertainty cannot be attributed directly to the level of the characteristics of the product, because the laboratory has no knowledge of the variability of its population, and only on the test sample

Used apparatus - measuring devices and test equipment - table 1

- pressure measuring device,
- air flow measuring device,
- positive and negative pressure generating device,
- water spraying device,
- sensors,
- ruler,
- thermohigrobarometr.

test equipment used during the test			Table 1
Device	Number of device	Component	Range of activity
Chamber SCHULTEN KS	LL-063	4P	Airflow
		3P	Positive and negative Pressure
		2P	Spraying water
		1P	Deflection
thermohigrobarometr	LK-014	-	Pression, temperature, humidity
ruler	LL-112	-	Dimensions

The test equipment used complies with the standard PN-EN 14351-1+A2:2016.

2. Test specimen (identification)

Producent: Inwido Production S.A., 16-100 Sokółka, ul. Lotników Lewoniewskich 1

Miejsce pobrania: Inwido Production S.A., 16-100 Sokółka, ul. Lotników Lewoniewskich 1

Określenie próbki:

External wooden doors THERMO 80 ECO PASS made of glued laminated timber, lift&slide sash, frame dimension - $W_{fr} \times H_{fr} = 1900 \times 2120$ mm, insulated glass unit 4/16/4, hardware GU.

The view of the doors are shown in Fig. 1, the cross-sections in Fig. 2 ÷ 7.

External wooden lift&slide doors THERMO 80 ECO PASS Hardware specification			Table 2
L.p	Name/function	Ref.No	Supplier/Producer
1	Top rail	130865	Siegenia-Aubi
2	Threshold EP B171 (ECO PASS)	PPBB1600-524011	Siegenia-Aubi
3	Espagnolette HS-PORTAL 200-PZ dormass 27,5mm	PGKB0050-524011	Siegenia-Aubi
4	Basic set HS 300-H	PMKB0030-100011	Siegenia-Aubi
5	Additional set HS-H KH0130-01	PMKB0120-1E6010	Siegenia-Aubi
6	Bottom rail M/15 gr.350 L=3500	PPLB5120-524010	Siegenia-Aubi
7	Handle Si-line HS 300	PMHB0010-524011	Siegenia-Aubi

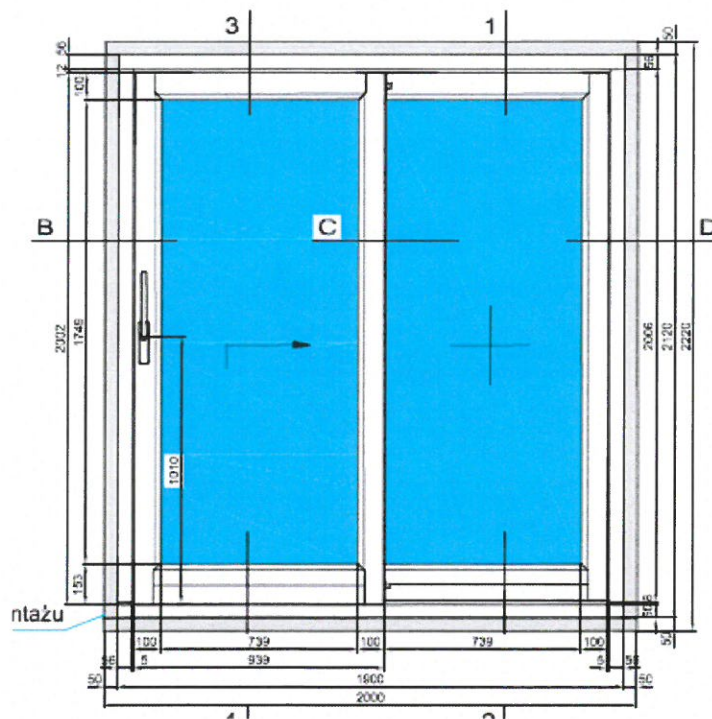


Fig. 1 The view of the doors

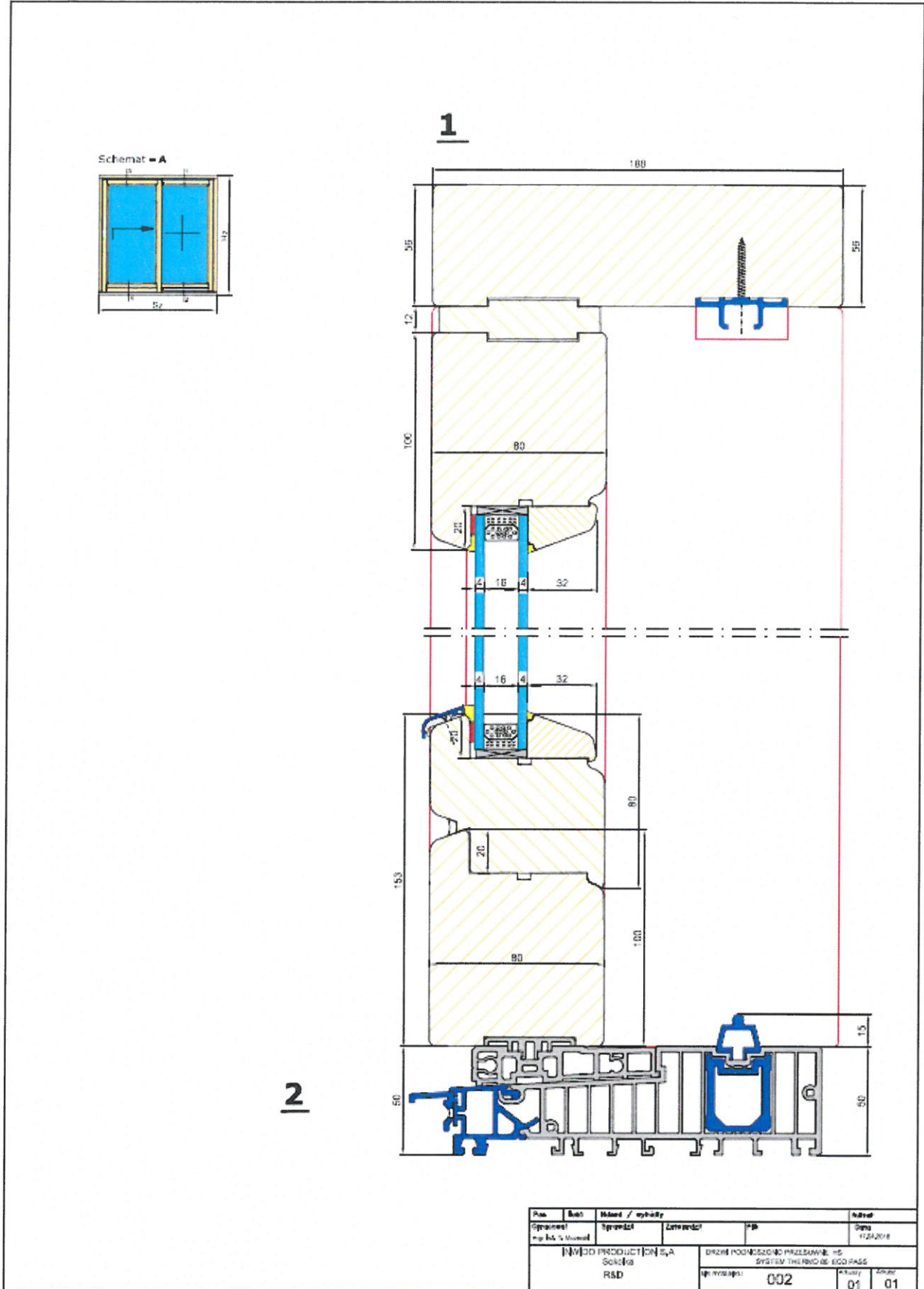


Fig. 2 Cross-section vertical 1-2

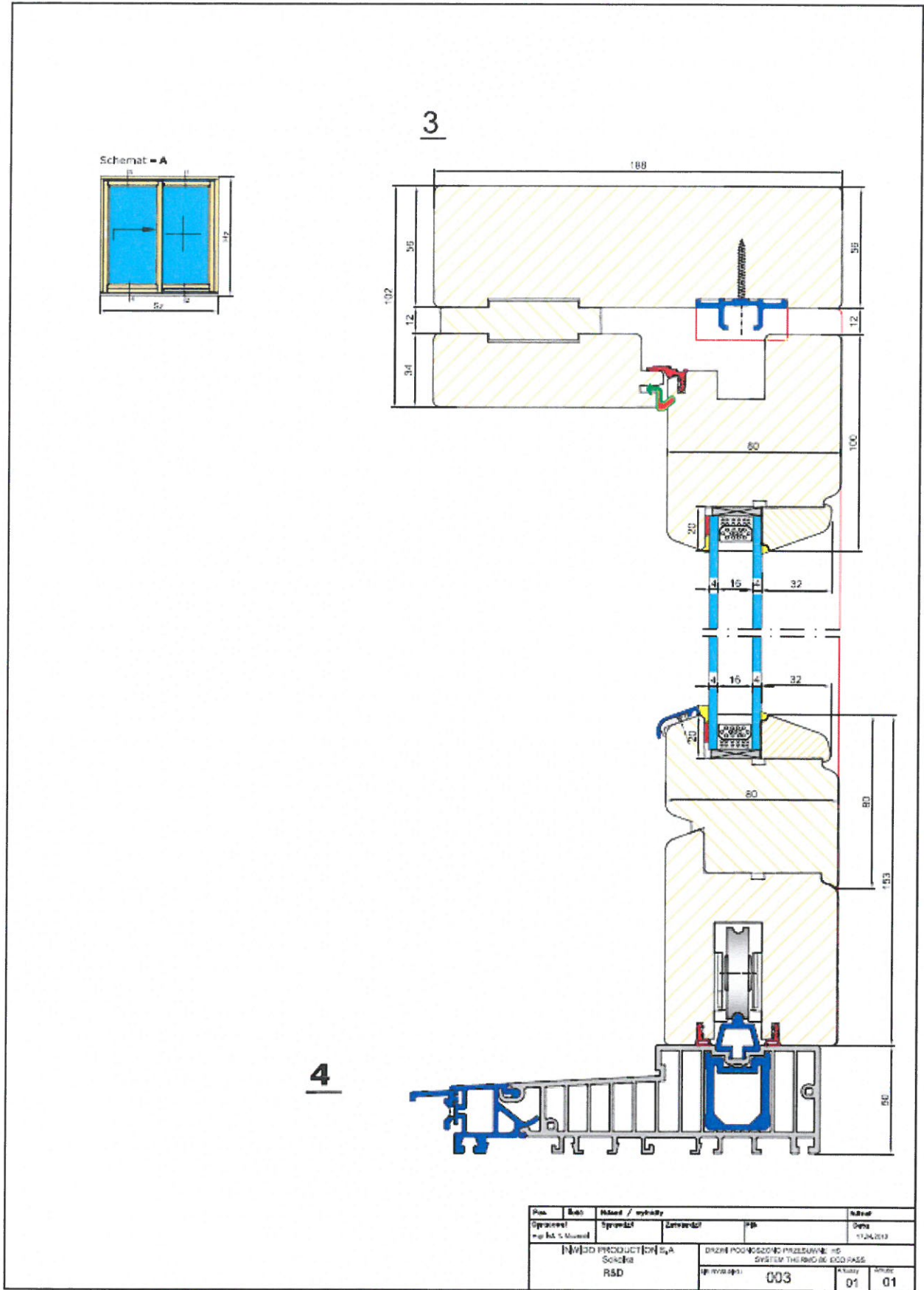
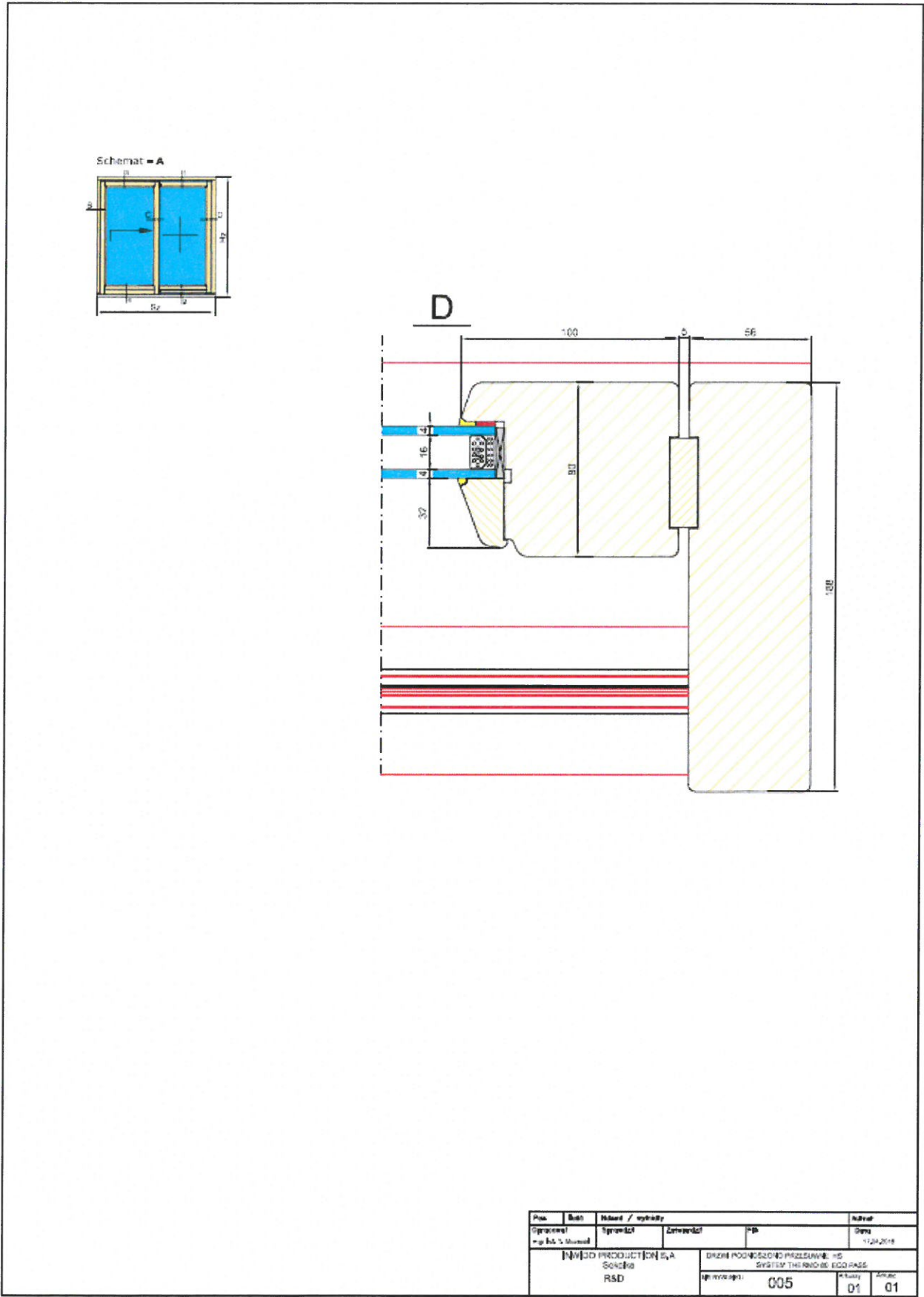


Fig. 3 Cross-section vertical 3-4



Pos.	Sub	Misc / egyéb	Szerelő	Épít	Dátum
					12.2018
INVED PRODUCTIONS S.A. Sonda RSD			DRZWI PODCIŚCZONE PRZEJAWIĄCIE SIĘ SYSTEM THERMO-BE EDO PASS Wariant: 005		
					01
					01

Fig. 5 Cross-section horizontal D

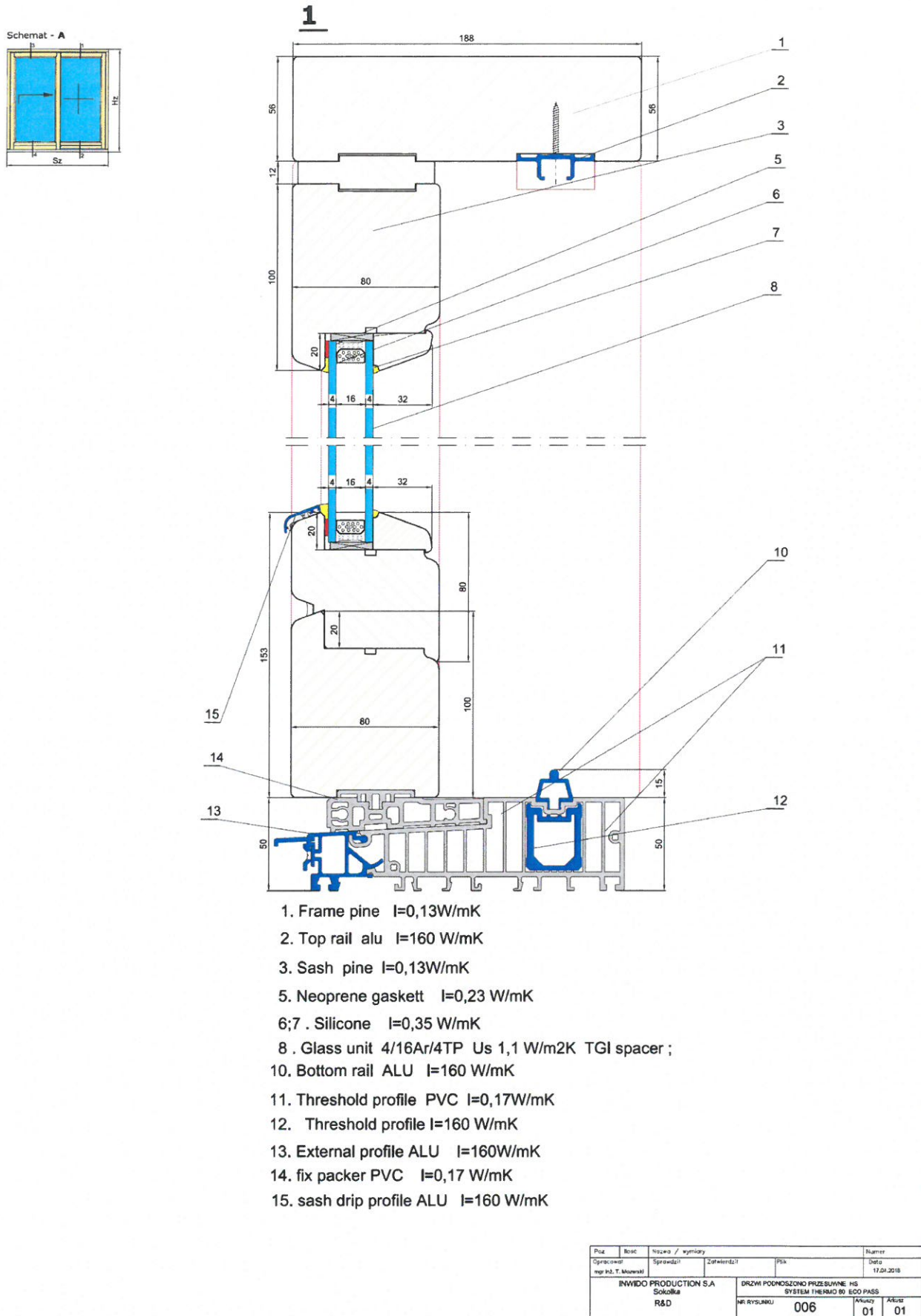
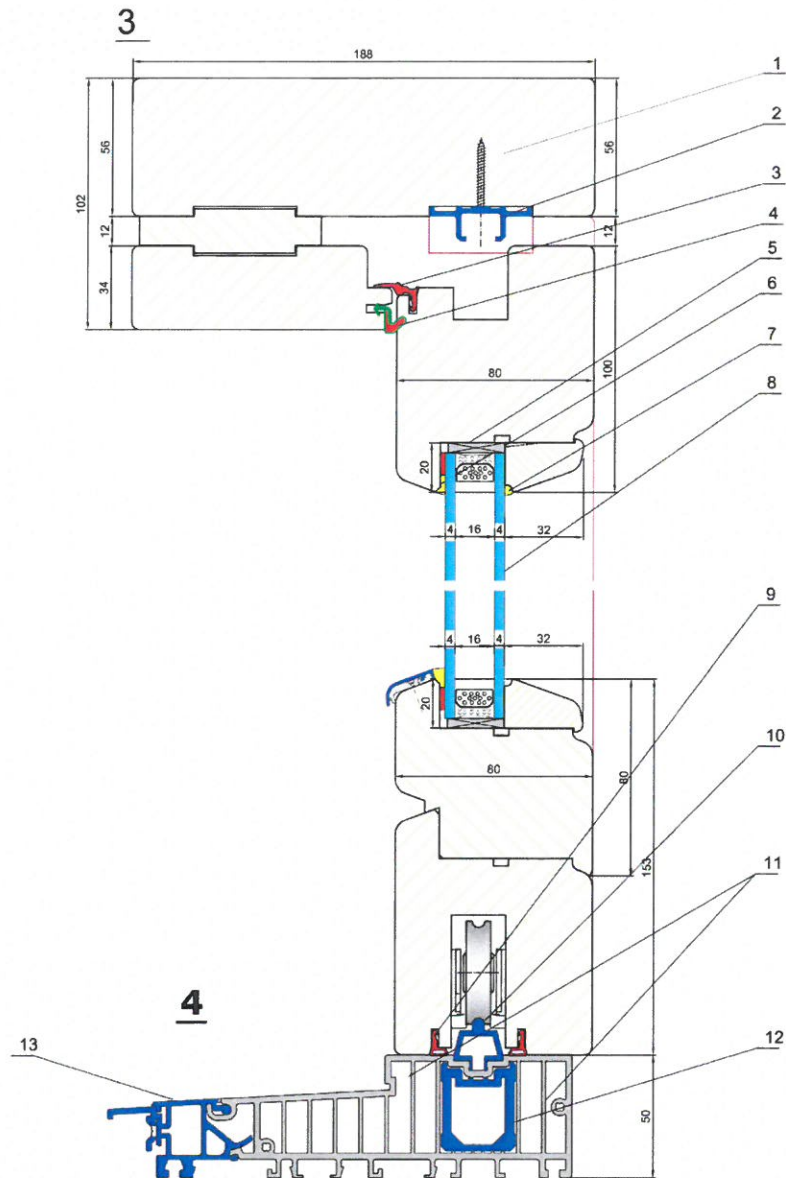
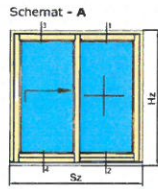


Fig. 6 Construction of the doors 1-2



- 1. Frame pine $\lambda=0,13\text{W/mK}$
- 2. Top rail alu $\lambda=160\text{ W/mK}$
- 3. top gaskett TPE $\lambda=0,26\text{ W/mK}$
- 4. gaskett Qlon Schlegel $\lambda=0,06\text{ W/mK}$
- 5. Neoprene gaskett $\lambda=0,23\text{ W/mK}$
- 6;7 . Silicone $\lambda=0,35\text{ W/mK}$
- 8 . Glass unit 4/16Ar/4TP Us $1,1\text{ W/m}^2\text{K}$ TGI spacer;
- 9. bottom gaskett TPE $\lambda=0,26\text{ W/mK}$
- 10. Bottom rail Alu $\lambda=160\text{ W/mK}$
- 11. Threshold profile PVC $\lambda=0,17\text{W/mK}$
- 12. Threshold profile Alu $\lambda=160\text{ W/mK}$
- 13. External profile Alu $\lambda=160\text{ W/mK}$

Posz	Rece	Nazwa / wymiary	Numer	
Opracował mgr inż. I. Matuszyn	Sprawił	Zatwierdził	Plak	Data
INWIDO PRODUCTION S.A. Białystok		DZKWI PODNOSZĄCY PRZEJAZDOWY SYSTEM THERMO BY ECO PASS		17.04.2018
R&D		NR RYSUNKU	007	01 01

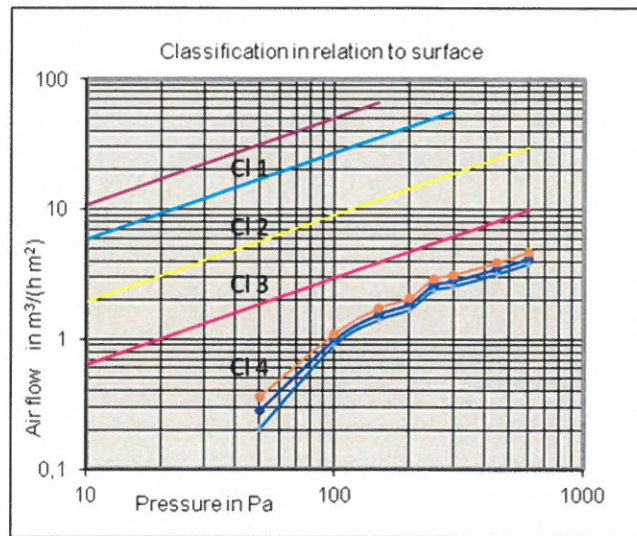
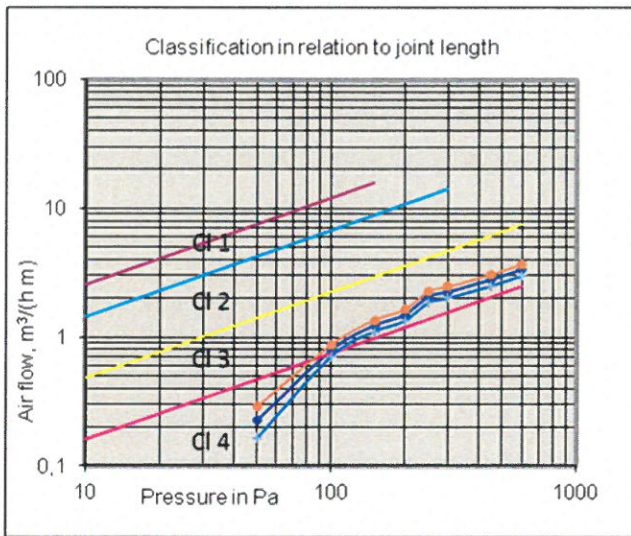
Fig. 7 Construction of the doors 3-4

3. The test methods and results

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

The test was carried out in accordance with PN-EN 1026:2016. Test results are shown in table N° 3. The doors in closed position and locked.

Air permeability			Table 3						
positive test pressure									
Air flow		Value of air permeability at pressure, Pa							
		50	100	150	200	250	300	450	600
overall	m ³ /h	1,78	4,35	8,10	9,59	10,77	11,46	15,61	19,76
in relation to joint length	m ³ /hm	0,37	0,91	1,69	2,00	2,24	2,39	3,25	4,12
in relation to surface	m ³ /hm ²	0,47	1,14	2,13	2,52	2,83	3,02	4,11	5,20
air inf. coefficient , a	m ³ /(mhdaPa ^{2/3})	0,13	0,20	0,28	0,27	0,26	0,25	---	---
negative test pressure									
Air flow		Value of air permeability at pressure, Pa							
		50	100	150	200	250	300	450	600
overall	m ³ /h	0,40	3,26	3,75	4,74	9,19	10,08	11,17	12,25
in relation to joint length	m ³ /hm	0,08	0,68	0,78	0,99	1,91	2,10	2,33	2,55
in relation to surface	m ³ /hm ²	0,10	0,86	0,99	1,25	2,42	2,65	2,94	3,22
air inf. coefficient , a	m ³ /(mhdaPa ^{2/3})	0,03	0,15	0,13	0,13	0,22	0,22	---	---
numerical average									
Air flow		Value of air permeability at pressure, Pa							
		50	100	150	200	250	300	450	600
overall	m ³ /h	1,09	3,80	5,93	7,16	9,98	10,77	13,39	16,01
in relation to joint length	m ³ /hm	0,23	0,79	1,24	1,49	2,08	2,24	2,79	3,34
in relation to surface	m ³ /hm ²	0,29	1,00	1,56	1,89	2,63	2,83	3,52	4,21
air inf. coefficient , a	m ³ /(mhdaPa ^{2/3})	0,19							
specimen area [m ²]	3,8	joint length [m]	4,8	humidity [%]	47	atm. press [hPa]	1001	temp.	20



Legend:

- Orange color** - air volume flow of positive uncertainty
- Navy Blue color** - air volume flow under normal conditions, T0 = 283°K, P0 = 101,3 kPa.
- Color blue** - air volume flow of negative uncertainty

Requirement	Standard	Result	
Q _{lmax} < 0,75 m ³ /hm at 600 Pa	PN-EN 12207:2001 PN-EN 12207:2017	Q _{lmax} = 1,01	Class 3
Q _{pmax} < 3,0 m ³ /hm ² at 600 Pa	PN-EN 12207:2001 PN-EN 12207:2017	Q _{pmax} = 1,28	Class 4
In accordance with p. 4.6 of PN-EN 12207:2001	PN-EN 12207:2001 PN-EN 12207:2017	Class 4	

Q_{lmax} – the maximum value of air flow in relation to joint length and 100 Pa

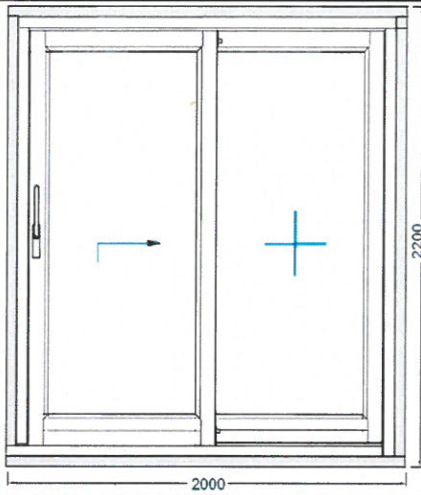
Q_{pmax} - the maximum value of air flow in relation to surface and 100 Pa

Expanded uncertainty at 95% confidence level and the expansion coefficient k = 2, U: linear dimensions: 1 mm, air flow > 1 m³ / h: 5%, ≤ 1 m³ / h: 0,05 m³ / h; pressure: 5%. The accuracy of flow measurement ≤ 3 m³ / h: 0,30 m³ / h, in the other cases: 10%.

3.2. Watertightness

The test was carried out in accordance with PN-EN 1027:2016, method 1A.

Test results are shown in table N° 4. The tested window is presented in Fig. N° 8.

Watertightness			Table 4
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	Fig. 8. The tested doors

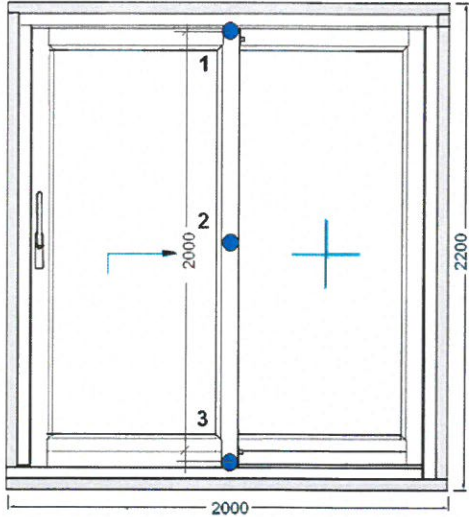
Expanded uncertainty at 95% confidence level and the expansion coefficient $k = 2$, U: linear dimensions: 1 mm, water flow: 10%, pressure: 5%.

Requirement	Standard	Result
no leakage	PN-EN 12208:2001	Class E900

3.3. Resistance to wind load - testing whole element

The test was carried out in accordance with PN-EN 12211:2016.

Measurement of deflection with P1. Test results are shown in table N° 5. The positions of measurement points is presented in Fig. N° 9.

Measurement of deflection [mm]							Table 5
Point of measurement	Positive wind pressure [Pa]						
	400	800	1200	1600	2000	0	
Point 1	1,31	2,18	2,76	3,34	3,89	1,39	
Point 2	1,65	2,04	2,95	3,83	4,68	0,80	
Point 3	0,47	0,89	1,35	1,83	2,29	0,42	
Displacement, mm	0,76	0,50	0,86	1,25	1,59	---	
Deflection 1/	2630	4000	2325	1600	1260	---	
Point of measurement	Ssanie - ciśnienie [Pa]						
	200	400	600	800	1000	0	
Point 1	0,50	0,92	1,32	1,53	2,10	0,57	
Point 2	0,67	1,44	2,22	3,06	3,84	0,40	
Point 3	0,30	0,66	0,99	1,39	1,47	0,27	
Displacement, mm	0,27	0,65	1,07	1,60	2,05	---	
Deflection 1/	7410	3080	1870	1250	975	---	
No damages, no significant deformation							

Expanded uncertainty at 95% confidence level and the expansion coefficient $k = 2$, U: displacement: 5%; pressure: 5%.

Requirement	Standard	Result
$f \leq L/300$	PN-EN 12210:2016	Class C5 [2000 Pa]

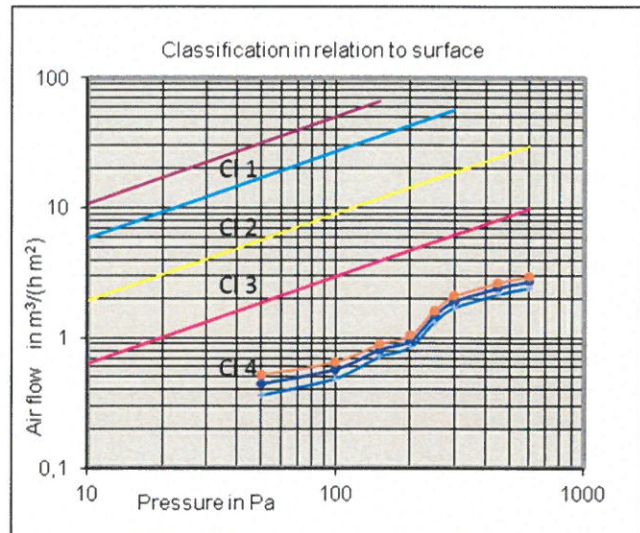
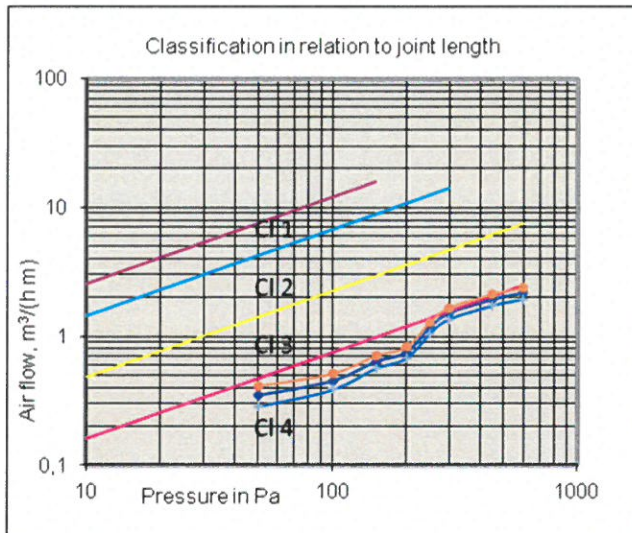
Repeated load with P2 Number of cycles: 50, Pressure: +/- 1000 Pa. Test result: no damages.

Safety test with P3 Pressure: +/- 3000 Pa. Test result: no damages.

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

The test was carried out in accordance with PN-EN 1026:2016. Test results are shown in table N° 6. The doors in closed position and locked.

Air permeability			Table 6						
positive test pressure									
Air flow		Value of air permeability at pressure, Pa							
		50	100	150	200	250	300	450	600
overall	m ³ /h	0,99	1,19	2,37	2,96	5,73	7,81	8,79	10,47
in relation to joint length	m ³ /hm	0,21	0,25	0,49	0,62	1,19	1,63	1,83	2,18
in relation to surface	m ³ /hm ²	0,26	0,31	0,62	0,78	1,51	2,05	2,31	2,76
air inf. coefficient , a	m ³ /(mhdaPa ^{2/3})	0,07	0,05	0,08	0,08	0,14	0,17	---	---
negative test pressure									
Air flow		Value of air permeability at pressure, Pa							
		50	100	150	200	250	300	450	600
overall	m ³ /h	2,37	3,16	3,75	4,25	5,53	6,72	9,68	10,28
in relation to joint length	m ³ /hm	0,49	0,66	0,78	0,89	1,15	1,40	2,02	2,14
in relation to surface	m ³ /hm ²	0,62	0,83	0,99	1,12	1,46	1,77	2,55	2,70
air inf. coefficient , a	m ³ /(mhdaPa ^{2/3})	0,17	0,14	0,13	0,12	0,13	0,14	---	---
numerical average									
Air flow		Value of air permeability at pressure, Pa							
		50	100	150	200	250	300	450	600
overall	m ³ /h	1,68	2,17	3,06	3,61	5,63	7,26	9,24	10,38
in relation to joint length	m ³ /hm	0,35	0,45	0,64	0,75	1,17	1,51	1,92	2,16
in relation to surface	m ³ /hm ²	0,44	0,57	0,81	0,95	1,48	1,91	2,43	2,73
air inf. coefficient , a	m ³ /(mhdaPa ^{2/3})	0,12							
specimen area [m ²]	3,8	joint length [m]	4,8	humidity [%]	47	atm. press [hPa]	1001	temp.	20



Legend:
 Orange color - air volume flow of positive uncertainty
 Navy Blue color - air volume flow under normal conditions, T0 = 283°K, P0 = 101,3 kPa.
 Color blue - air volume flow of negative uncertainty

Requirement	Standard	Result
Q _{lmax} < 0,75 m ³ /hm at 600 Pa	PN-EN 12207:2001 PN-EN 12207:2017	Q _{lmax} = 0,65 m ³ /(hm) Class 4
Q _{pmax} < 3,0 m ³ /hm ² at 600 Pa	PN-EN 12207:2001 PN-EN 12207:2017	Q _{pmax} = 0,83 m ³ /(hm ²) Class 4
In accordance with p. 4.6 of PN-EN 12207:2001	PN-EN 12207:2001 PN-EN 12207:2017	Class 4

Q_{lmax} – the maximum value of air flow in relation to joint length and 100 Pa

Q_{pmax} - the maximum value of air flow in relation to surface and 100 Pa

Expanded uncertainty at 95% confidence level and the expansion coefficient k = 2, U: linear dimensions: 1 mm, air flow > 1 m³ / h: 5%, ≤ 1 m³ / h: 0,05 m³ / h; pressure: 5%. The accuracy of flow measurement ≤ 3 m³ / h: 0,30 m³ / h, in the other cases: 10%.

4. Assessment of performance

On the basis of test results for the external wooden lift&slide doors THERMO 80 ECO PASS, the following assessment of the performance was for the above product was made.

A summary of the results obtained for individual properties is given in table N° 7.

The essential characteristics		The test result	Classification standards
Classification of the external wooden lift&slide doors THERMO 80 ECO PASS made of glued laminated timber, sliding opened, frame dim. - WxH = 1900 x 2120 mm, insulated glass unit 4/16/4, hardware SIEGENIA-AUBI			
ITT test that are a task of notified body			
Air permeability		Class 4	PN-EN 12207:2001 PN-EN 12207:2017
Watertightness		E900 [900 Pa]	PN-EN 12208:2001
Resistance to wind load	Deflection	Class C5 [2000 Pa]	PN-EN 12210:2016
	Safety test	+3000 Pa / -3000 Pa	

Responsible for the test and assessment
of the performance

Jerzy Płoński, Msc

Płoński

Authorizing person

Oleksij Kopyłow, PhD

Kopyłow

Warsaw *05.08.2018*

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Head of Testing Laboratory LZE

Marzena Jakimowicz, Msc

Jakimowicz

THE END