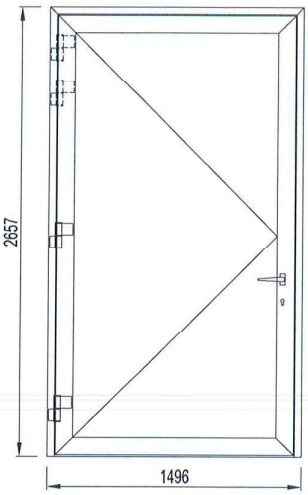
quality in construction

Building Research Institute

BUILDING STRUCTURES DEPARTMENT

GROUP OF TESTING LABORATORIES
BUILDING STRUCTURES LABORATORY



CLASSIFICATION
Nº 01-00948/15/R84NK

PRODUCER: **Reynaers Polska Sp. z o.o.**
ul. Okulickiego 12,
05-500 Piaseczno -
Poland

Reynaers Aluminium NV
Oude Liersebaan 266
B-2570 Duffel, Belgium

PRODUCT: **Outside opening single door made of thermally insulated aluminium profiles in CS 77 system**

SYSTEM: **REYNAERS CS77**
external dimensions (width/height) – SxH=1496x2658 mm

BUILDING STRUCTURES ITB DEPARTMENT / BUILDING STRUCTURES LABORATORY confirms ITT external door test results in accordance with the product standard PN-EN 14351-1+A1:2010 clouse 4.2, 4.5, 4.14

Range of tests		Classification	Classification standard
Properties	**Test method**		
Air permeability	PN-EN 1026:2001	**Class 4**	PN-EN 12207:2001
Watertightness	PN-EN 1027:2001	**Class 9A (600Pa)**	PN-EN 12208:2001
Resistance to wind load - deflection	PN-EN12211:2001	**Class C2 (800Pa)**	PN-EN 12210:2001
Safety test		**+/- 1200 Pa**	

The test results are in accordance with the test report No. LK01-00948/15/R84NK. These results refer to tested properties can be used for CE marking, in accordance with the rules specified in the product standard PN-EN 14351-1+A1:2010 - Annexes A,E and F.

Responsible for the tests: Mcs. eng. Marzena Jakimowicz

Authorizing Person
Msc. eng. Marzena Jakimowicz

ITB Structural and Building Elements
Department Head, Laboratory Head
dr eng. Artur Piekarczuk

Warsaw 23.07.2015*

* The validity of this Classification expires in case of change of manufactured assortment, components and/or technology. **Classification specified above should be confirmed in FPC.**

BUILDING STRUCTURES DEPARTMENT

BUILDING STRUCTURES LABORATORY

REPORT OF THE TESTS AND ASSESSMENT OF THE PERFORMANCE Nº LK01-00948/15/R84NK

Client:	**Reynaers Polska Sp. z o.o.**	**Reynaers Aluminium NV**
Client address:	ul. Gen. Okulickiego 12 05-500 Piaseczno – Poland	Oude Liersebaan 266 B-2570 Duffel, Belgium

INFORMATION ABOUT PRODUCT

Manufacturer (name and address):	**Reynaers Polska Sp. z o.o.** ul. Gen. Okulickiego 12 05-500 Piaseczno – Poland
Name and address of factory:	**Reynaers Polska Sp. z o.o.** ul. Gen. Okulickiego 12 05-500 Piaseczno – Poland
Product:	External single door, open to the outside, made of thermally insulated aluminium profiles in **REYNAERS CS77** system
Harmonised standard:	**PN-EN 14351-1+A1:2010**
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 REPORT OF THE TESTS AND ASSESSMENT OF THE PERFORMANCE
Date of receipt/sampling:	Date of receipt of the samples by the laboratory: 27.03.2015 Sampling date by the customer: 26.03.2015 Date of receipt of the complete technical documentation of the product: 22.06.2015
Receipt/sampling procedure:	PZ ZLB 18 - the procedure of receipt sample by the laboratory LK PN-EN 14351-1+A1:2010 – the procedure selection of sample by the customer (System Provider)
№ of receipt/sampling protocol:	LK00-00948/15/R84NK – protocol № of receipt testing sample by the laboratory LK 00948/15/R84NK № sampling protocol by the customer
Further information about test item:	Exterior single door, open to the outside, made of thermally insulated aluminium profiles in **REYNAERS CS77** – fig. 1÷3; external dimensions (width/height) – SxH = 1496x2658 mm; insulating unit glass 6/15/6

Information about test:	
Test commencement date:	27.03.2015
Test completion date:	27.03.2015
Further information about tests:	The tests was conducted in the laboratory Customer, ul. Gen. Okulickiego 12; 05-500 Piaseczno – Poland; Equipment: Schulten KS 5060/650 with valid status of calibration according to PN-EN 14351-1+A1:2010.
Test methods:	

Initial type testing (ITT) – AoC system 3 PN-EN 14351-1+A1:2010

PN-EN 1026:2001	Windows and doors – Air permeability – Test method
PN-EN 1027:2001	Windows and doors – Watertightness – Test method
PN-EN 12211:2001	Windows and doors – Resistance to wind load – Test method

1 The scope of tests

The scope of initial type testing covered the verification of:

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

Personel executing the test:
dr eng. Krzysztof Kuczyński - Instytut Techniki Budowlanej, Laboratorium Konstrukcji i Elementów Budowlanych ZLB, ul. Ksawerów 21, 02-656 Warszawa.
Observer - Ireneusz Jodłowski – REYNAERS Polska Sp. z o.o., ul. Gen. Okulickiego 12, 05-500 Piaseczno - Poland.

Equipment: Schulten KS 5060/650
The test equipment used comply with the above-mentioned test method standard .

2 Test specimen (identification)

The object of the tests was the exterior single door, open to the outside, made of thermally insulated aluminium profiles in **REYNAERS CS77** system; external dimensions (width/height) – SxH = 1496x2658 mm – 1 element, assembled in March 2015.

The information about sampling of the specimen by right of Reynaers Polska Sp. z o.o., ul. Gen. Okulickiego 12, 05-500 Piaseczno and sampling report:

Manufacturer: Reynaers Polska Sp. z o.o., ul. Gen. Okulickiego 12, 05-500 Piaseczno - Poland,

Place of sampling: Reynaers Polska Sp. z o.o., ul. Gen. Okulickiego 12, 05-500 Piaseczno - Poland,

Number of samples: 1

Description of the sample: Exterior single door, open to the outside, made thermally insulated aluminium profiles in **REYNAERS CS77** system; external dimensions (width/height) – SxH = 1496x2658 mm,

Date of sampling: March 2015,

Date of production: March 2015.

Used components

The scheme and cross-sections of the door are shown on figure 1÷5.

IGU-insulated glass unit – 6/15/6

Hardware

Lock: 3-point Fuhr lock (061.8135.ZC)

Handle:Fapim (061.7229.XX)

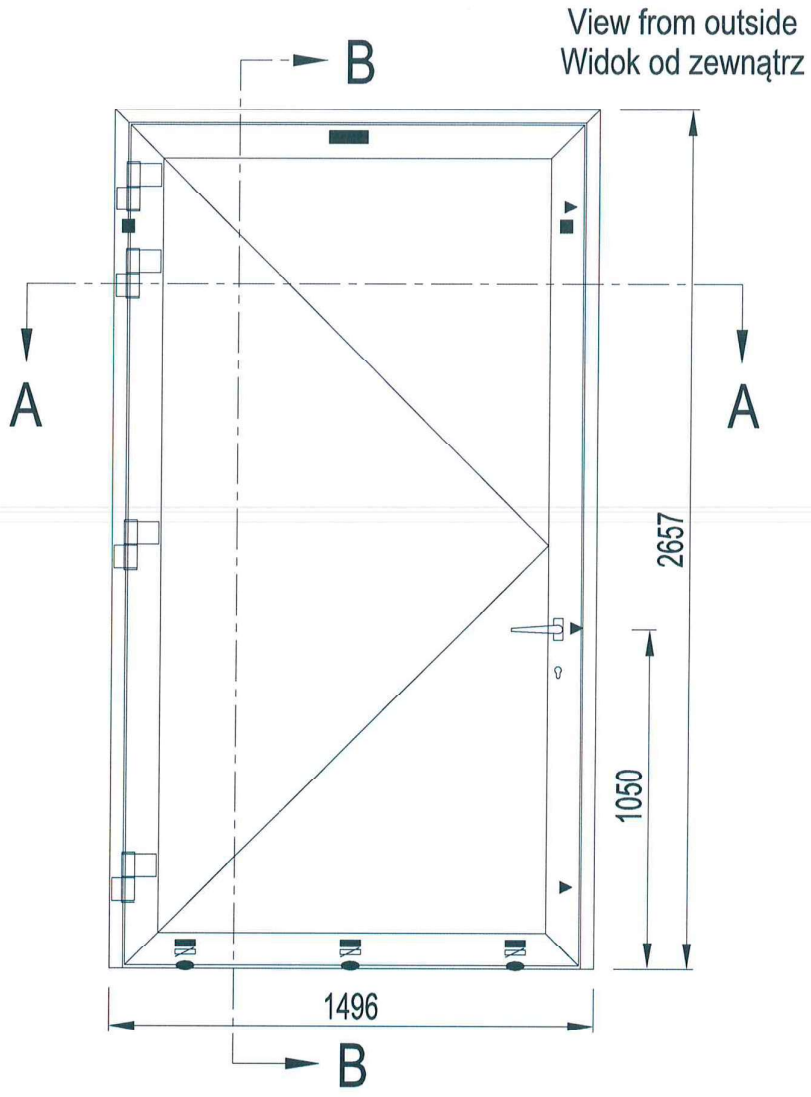
Hinges:4x2 part DR Hahn hinges (065.6656.XX)

Drainage

3x(5x25 mm) / tershold

Vent

3x(8x34 mm) / door leaf



Dekompresja (usunięta zewn. uszczelka) 80mm	Decompression (removed outside gasket) 80mm
Dekompresja w skrzydle Ø6mm	Decompression in vent Ø6mm
Drenaż progu drzwi - otwór 5x25mm	Drainage of threshold - hole 5x25mm
Drenaż skrzydła Ø8x34mm Zaślepka otw. drenażowego 069.6831.04	Drainage vent Ø8x34mm Weep hole cover 069.6831.04
Punkty ryglujące	Locking points
typ szkła: 6 / 15 / 6 (27mm) Zawiasy: 065.6656.XX Zamek 3 punktowy: 061.8136.ZC Klamka: 061.7229.XX	glass type: 6 / 15 / 6 (27mm) Hinges: 065.6656.XX 3 point lock: 061.8136.ZC Handle: 061.7229.XX

Fig. 1. Scheme of the tested exterior single door - **REYNAERS CS77** system

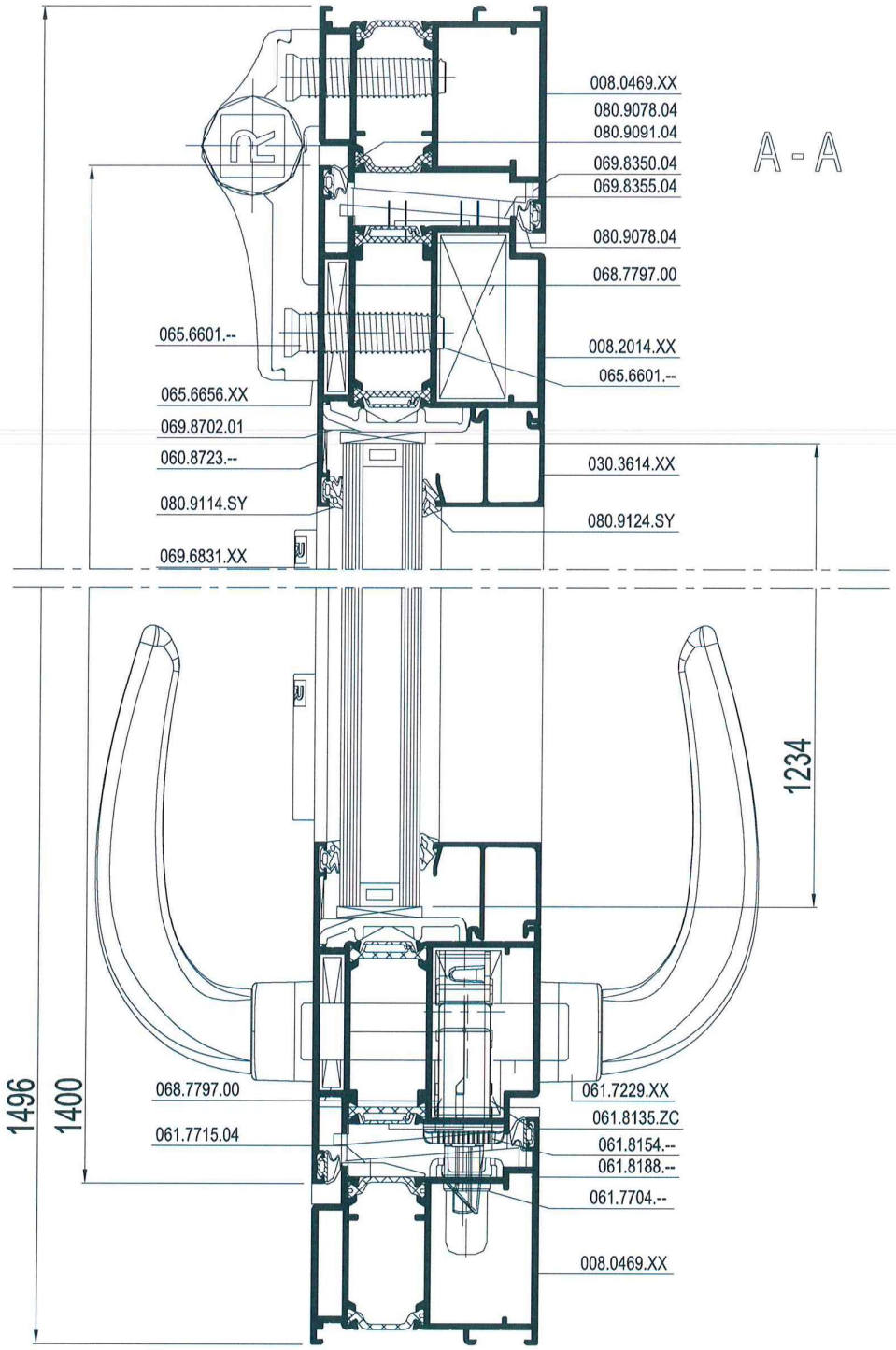


Fig. 2. Horizontal section A-A of the tested exterior single door - **REYNAERS CS77** system

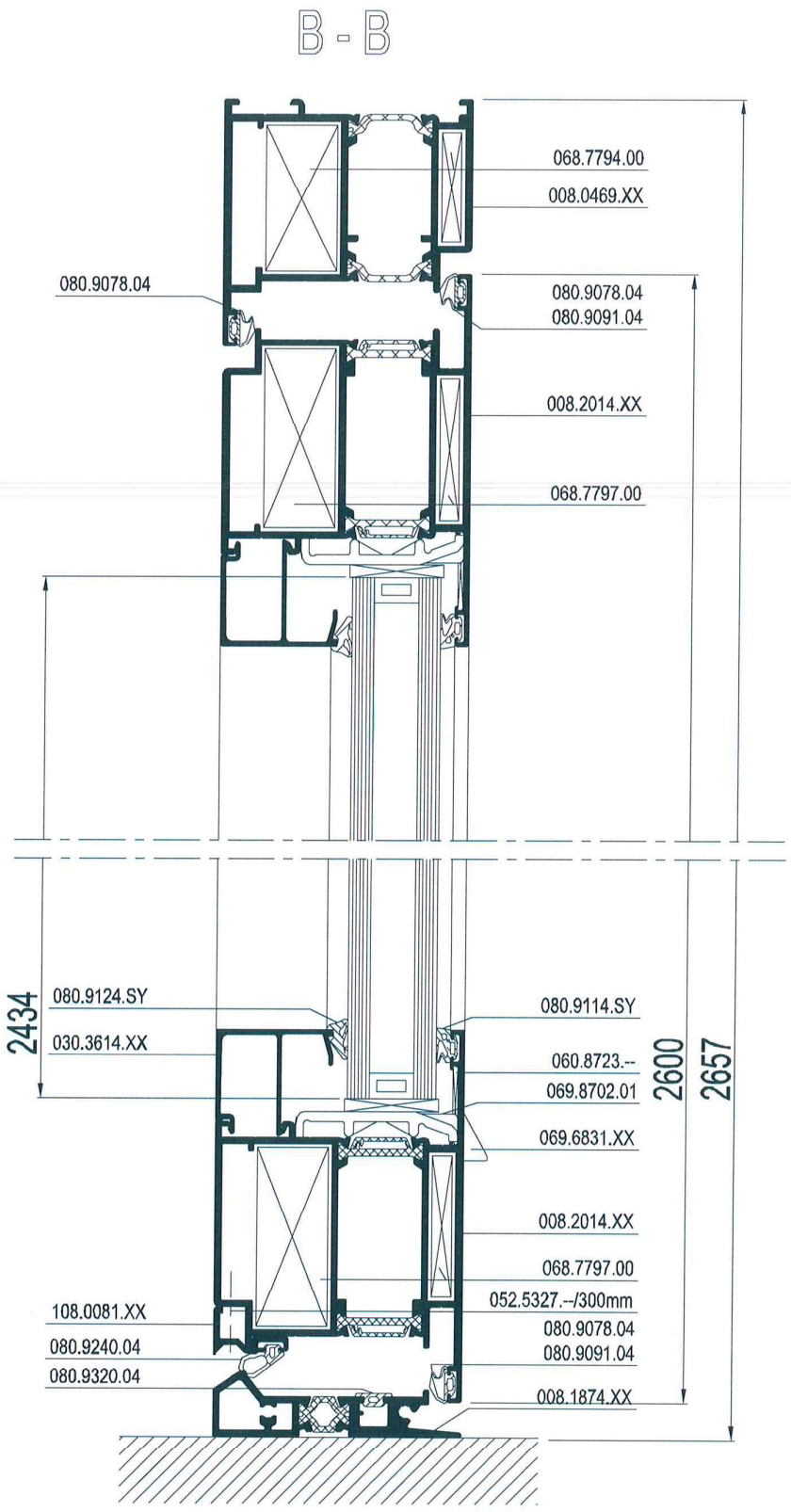
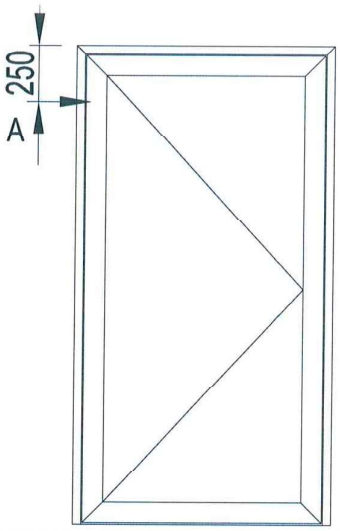
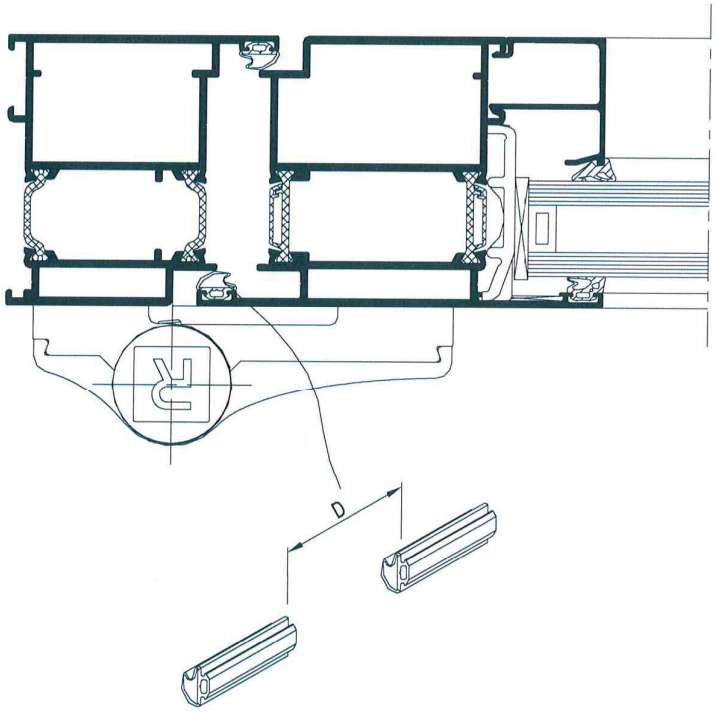


Fig. 3. Vertical section B-B of the tested exterior single door - **REYNAERS CS77** system





DECOMPRESSION/ DEKOMPRESJA TYPE / TYP	DIMENSION/ WYMIAR
A	D = 80mm

Fig. 4. Detail – decompression

3 The methods and results

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

The test was carried out in accordance with PN-EN 1026:2001.

Test results are shown in table no. 1÷3.

specimen area 4,0 m^2	joint length 8,0 m	temp. 20 °C	humidity 21%	atm. pressure 991 hPa

Tab. 1 air permeability exterior single door REYNAERS CS77 positive test pressure

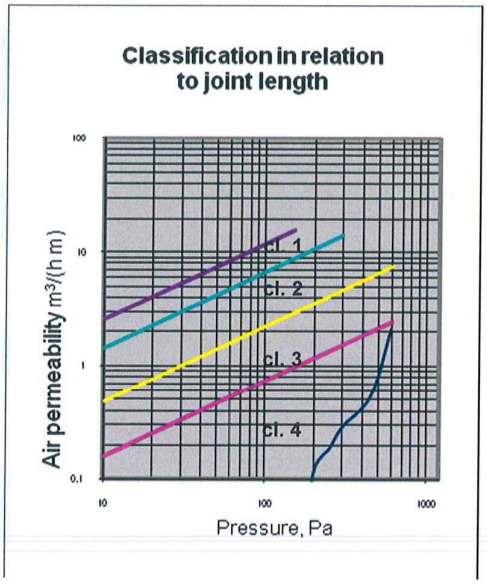
Air flow		Value of air permeability at pressure, Pa							
		50	100	150	200	250	300	450	600
overall	m^3/h	0,00	0,00	0,00	1,50	2,00	2,80	5,10	7,20
in relation to joint length	m^3/hm	0,00	0,00	0,00	0,18	0,25	0,35	0,63	0,89
in relation to surface	m^3/hm^2	0,01	0,01	0,01	0,37	0,50	0,70	1,28	1,80
air infiltration coefficient, a	$m^3/(mhdaPa)^{2/3}$	0,00	0,00	0,00	0,02	0,03	0,04		

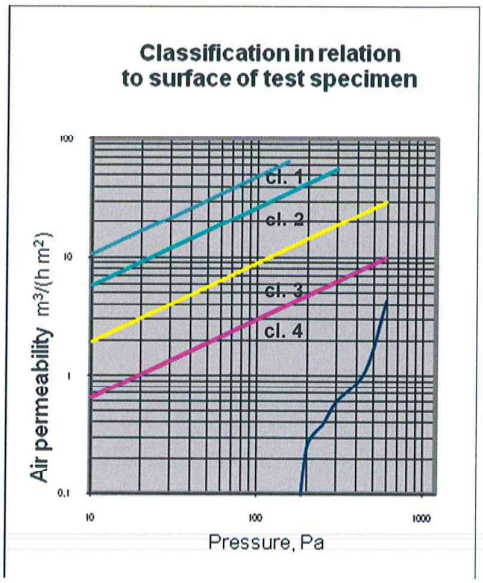
Tab. 2 air permeability exterior single door REYNAERS CS77 negative test pressure

Air flow		Value of air permeability at pressure, Pa							
		50	100	150	200	250	300	450	600
overall	m^3/h	0,00	0,00	0,00	0,50	1,10	1,90	3,70	27,20
in relation to joint length	m^3/hm	0,00	0,00	0,00	0,06	0,13	0,24	0,46	3,40
in relation to surface	m^3/hm^2	0,01	0,01	0,01	0,12	0,27	0,49	0,93	6,85
air infiltration coefficient, a	$m^3/(mhdaPa)^{2/3}$	0,00	0,00	0,00	0,01	0,02	0,02		

Tab. 3 air permeability exterior single door REYNAERS CS77 numerical average

Air flow		Value of air permeability at pressure, Pa							
		50	100	150	200	250	300	450	600
overall	m^3/h	0,00	0,00	0,00	1,00	1,50	2,30	4,40	17,20
in relation to joint length	m^3/hm	0,00	0,00	0,00	0,12	0,19	0,29	0,55	2,15
in relation to surface	m^3/hm^2	0,01	0,01	0,01	0,24	0,38	0,59	1,11	4,33
air infiltration coefficient, a	$m^3/(mhdaPa)^{2/3}$	0,01							





Requirement	Standard	Result
Q_{lmax} < 0,75 m^3/hm at 600 Pa	PN-EN 12207:2001	Q_{lmax} = 0,65 m^3/(hm) (class 4)
Q_{pmax} < 3 m^3/hm^2 at 600 Pa	PN-EN 12207:2001	Q_{pmax} = 1,31 $m^3/(hm^2)$ (class 4)
In accordance with p. 4.6 of PN-EN 12207:2001	PN-EN 12207:2001	**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		

Measurement uncertainty of ±5%. The confidence level of 95% for k = 2.

3.2 Watertightness (before the test of resistance to wind load)

The test was carried out in accordance with PN-EN 1027:2001, method 2A.
Test results are shown in table no. 4.

Tab. 4 Watertightness

Pressure, Pa	Testing time, min	Remarks and observation
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	*---	*---

*--- they weren't carrying out further test

Requirement	Standard	Result
no leakage	PN-EN 12208:2001	600 Pa (**class 9A**)

3.3 Resistance to wind load

The test was carried out in accordance with PN-EN 12211:2001.

Measurement of deflection with P1

The spacing of measurement points is presented on figure no. 6.
Test results are shown in tables no. 5 and 6.

Tab. 5. Exterior single door REYNAERS CS77

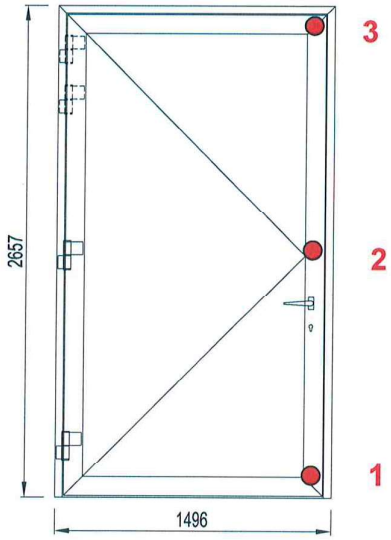
Load, Pa	200	400	600	800	**pressure** 0
Point 1	1,2	2,1	2,4	2,7	0,2
Point 2	1,1	2,2	2,9	3,5	0,2
Point 3	0,1	0,9	1,5	2,0	0,2
Displacement, mm	0,4	0,7	0,9	1,1	---
Deflection 1/	6275	3586	2789	2282	---

Tab. 6. Exterior single door REYNAERS CS77

Load, Pa	200	400	600	800	**suction** 0
Point 1	0,2	0,5	0,8	1,3	0,2
Point 2	0,3	0,9	1,4	2,0	0,2
Point 3	0,0	0,3	0,7	1,3	0,3
Displacement, mm	0,2	0,5	0,6	0,8	---
Deflection 1/	12550	5020	4183	3138	---

Measurement uncertainty of ±0,1 mm. The confidence level of 95% for k = 2.

Requirement	Standard	Result
f ≤ L/300	PN-EN 12210:2001	800 Pa (**class C2**)



● measuring points
1-2-3 L = 2510 mm

Fig. 6. Spacing of measurement points

Repeated load P2

The door was loaded with 50 pressure/suction cycles at ±400 Pa.
After test no visible changes were observed.

Safety test P3

The door was subjected to a brief safety test pressure of 1200 Pa and suction of 1200 Pa.
After test no visible changes were observed.

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

The test was carried out in accordance with PN-EN 1026:2001.

Test results are shown in tables no. 7÷9.

specimen area	4,0 m^2	joint length	8,0 m	temp.	22 °C	humidity 52 %	atm. pressure 991 hPa

Tab. 7 air permeability exterior single door REYNAERS CS77 positive test pressure

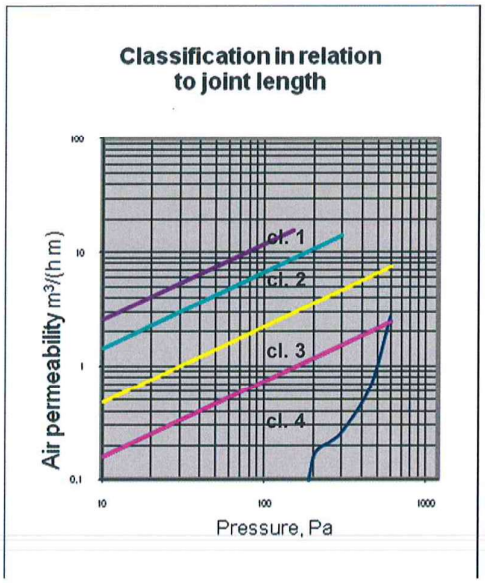
Air flow		Value of air permeability at pressure, Pa							
		50	100	150	200	250	300	450	600
overall	m^3/h	0,00	0,00	0,20	1,50	2,00	2,70	4,80	6,90
in relation to joint length	m^3/hm	0,00	0,00	0,02	0,19	0,26	0,34	0,60	0,86
in relation to surface	m^3/hm^2	0,01	0,01	0,04	0,38	0,51	0,68	1,21	1,74
air infiltration coefficient, a	$m^3/(mhdaPa)^{2/3}$	0,00	0,00	0,00	0,03	0,03	0,03		

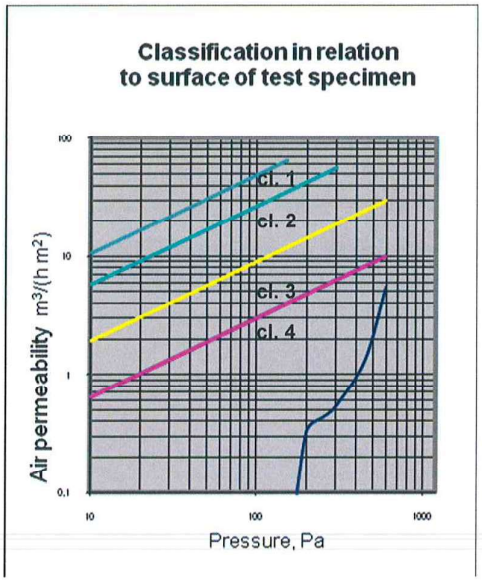
Tab. 8 air permeability exterior single door REYNAERS CS77 negative test pressure

Air flow		Value of air permeability at pressure, Pa							
		50	100	150	200	250	300	450	600
overall	m^3/h	0,00	0,00	0,00	1,10	1,40	1,60	5,80	37,10
in relation to joint length	m^3/hm	0,00	0,00	0,00	0,13	0,18	0,20	0,73	4,64
in relation to surface	m^3/hm^2	0,00	0,00	0,00	0,27	0,35	0,40	1,46	9,34
air infiltration coefficient, a	$m^3/(mhdaPa)^{2/3}$	0,00	0,00	0,00	0,02	0,02	0,02		

Tab. 9 air permeability exterior single door REYNAERS CS77 numerical average

Air flow		Value of air permeability at pressure, Pa							
		50	100	150	200	250	300	450	600
overall	m^3/h	0,0	0,0	0,1	1,3	1,7	2,1	5,3	22,0
in relation to joint length	m^3/hm	0,00	0,00	0,01	0,16	0,22	0,27	0,66	2,75
in relation to surface	m^3/hm^2	0,01	0,01	0,02	0,33	0,43	0,54	1,34	5,54
air infiltration coefficient, a	$m^3/(mhdaPa)^{2/3}$	0,01							





Requirement	Standard	Result
Q_{lmax} < 2,25 m^3/hm at 600 Pa	PN-EN 12207:2001	Q_{lmax} = 0,83 m^3/(hm) (class 3)
Q_{pmax} < 3 m^3/hm^2 at 600 Pa	PN-EN 12207:2001	Q_{pmax} = 1,68 $m^3/(hm^2)$ (class 4)
In accordance with p. 4.6 of PN-EN 12207:2001	PN-EN 12207:2001	**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		

4 Classification

On the base of test results the classification is presented in table no. 10.

Tab. 10. Classification of the exterior single door, open to the outside, made of thermally insulated aluminium profiles in **REYNAERS CS77** system

Property	Classification	Classification standard
Air permeability	class **4**	PN-EN 12207:2001
Watertightness	class **9A** (600 Pa)	PN-EN 12208:2001
Resistance to wind load	class **C2** (800 Pa)	PN-EN 12210:2001
Safety test	+1200 Pa -1200 Pa	

Responsible for the test

msc eng. Marzena Jakimowicz

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Authorizing person

dr eng. Artur Piekarczuk

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Warsaw, 23.07.2015

Head of Testing Laboratory
dr eng. Artur Piekarczuk

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