



BUILDING RESEARCH INSTITUTE



AB 023

**GROUP OF TESTING LABORATORIES
accredited
by Polish Center for Accreditation**

accreditation certificate
№ AB 023

LK

TEST REPORT № LK-03762/09/1a

Page 1/10

This report includes test results which are covered by range of accreditation and test results which are not accredited. Test results which are not accredited are sign – out of accreditation

Structures and Building Elements Laboratory

Address: 02-656 Warszawa, ul. Ksawerów 21 tel. 0 22 56-64-260 fax. 0 22 56-64-215

Customer

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

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

Object of tests

Glassed roof (skylight)
made of aluminum profiles Reynaers CW50 RA

Accepted for testing

09.12.2009 with the protocol LK-03762/09
in accordance with the procedure no. 18

Test period

09.12.2009 to 14.12.2009

Test methods:

PN-EN 12153:2004	Curtain walling – Air permeability – Test method
PN-EN 12155:2004	Curtain walling – Watertightness – Laboratory test under static pressure
PN-EN 12179:2004	Curtain walling – Resistance to wind load – Test method
PN-EN 1873:2009	Prefabricated accessories for roofing – Individual roof lights of plastics – Product specification and test methods – <i>out of accreditation</i>

The test equipment used comply with the above-mentioned standards.

1 The scope of tests

The scope of tests covered the verification of:

- air permeability,
- watertightness,
- resistance to wind load,
- resistance to upward loads,
- resistance to downward loads,
- impact resistance.

Personnel executing the tests:

Łukasz Pietrzykowski

2 Test specimen

Sample: glassed roof (skylight) CW 50RA
with dimension S x H = 2966 x 1976 mm
the glass are fastened by pressure plates

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

Production place: Reynaers Polska Training Centre, 05-500 Piaseczno,
ul. Okulickiego 12

Number of samples: 1

Date: December 2009

Used materials

The scheme of the tested element and components (profiles, weather stripping) are shown on figures 1, 2 (type A) and 3.

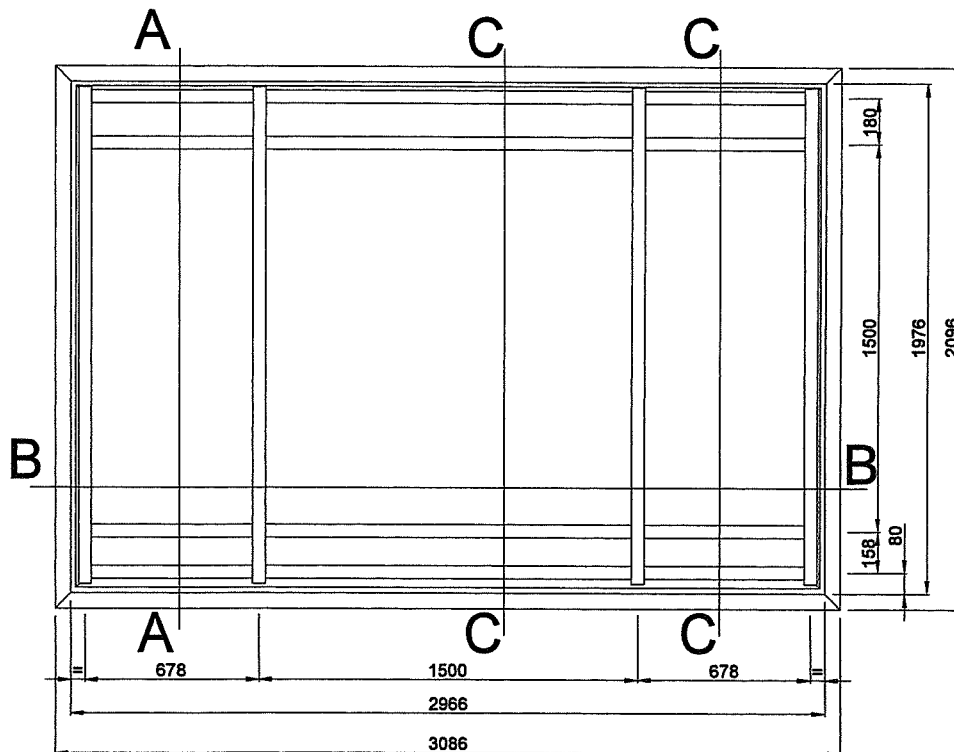


Fig. 1 Scheme of tested element

A - A

C - C

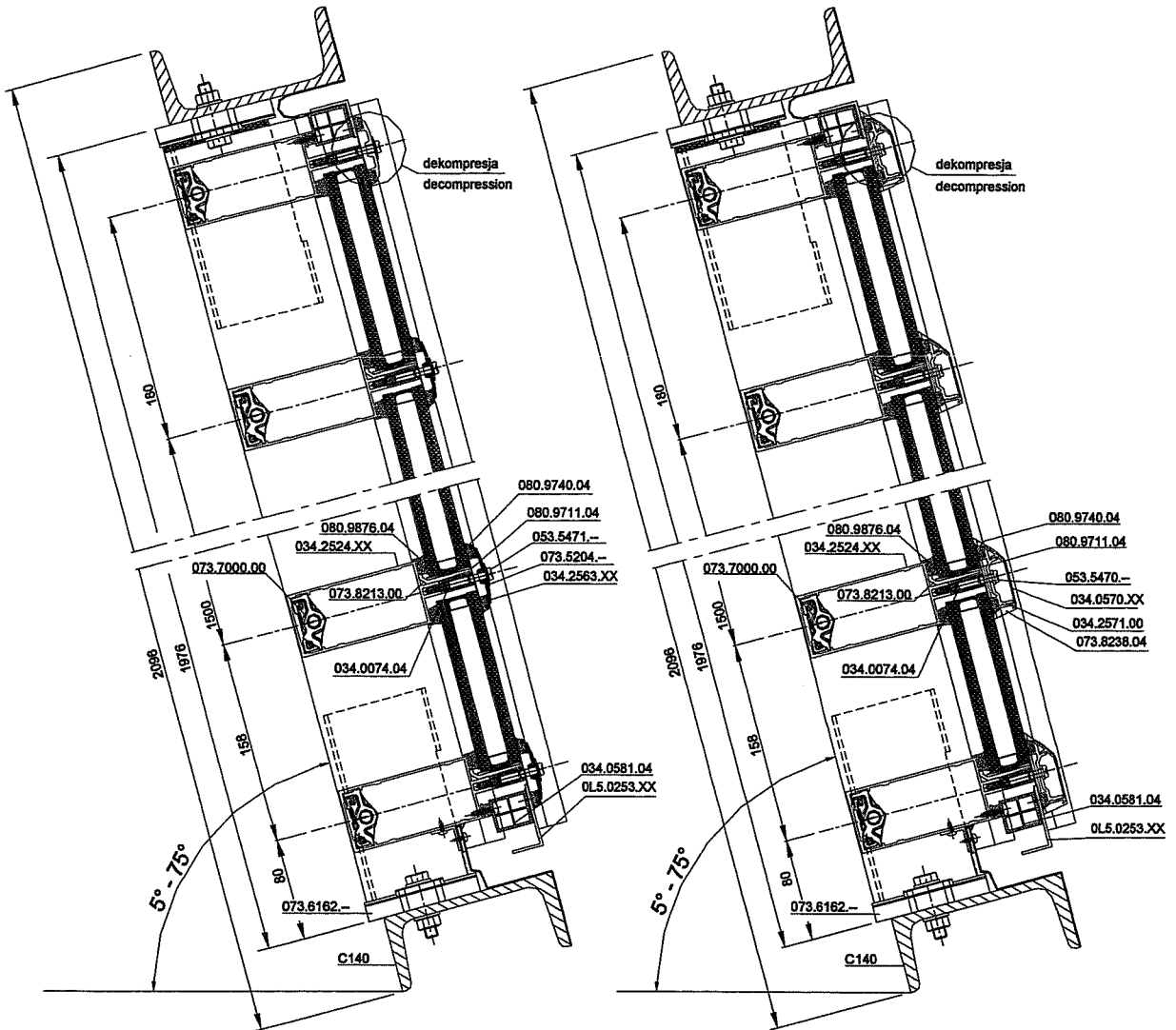


Fig. 2 Section A-A and C-C

B - B

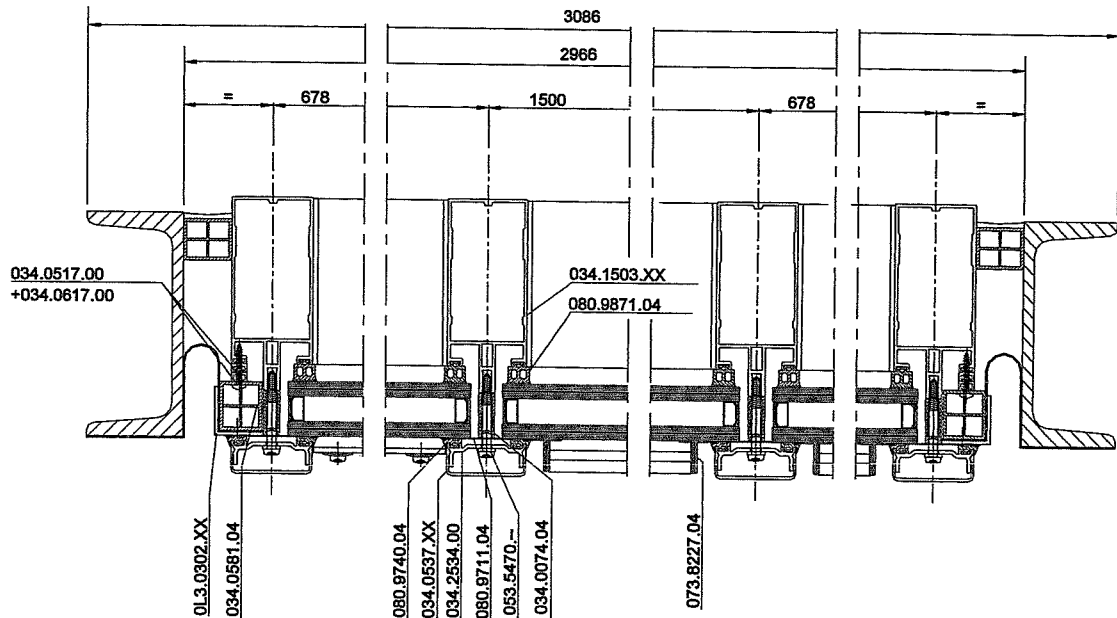


Fig. 3 Section B-B

3 The methods and results

3.1 Air permeability

The test was carried out in accordance with the PN-EN 12153:2004.

Air permeability was measured at positive and negative test pressure, before and after test of resistance to wind load. The test results are shown in tables no. 1 ÷ 4.

Before the test of resistance to wind load

Tab. 1 Air permeability before wind load test

Pressure	Air permeability – positive test pressure				
	Q	Q	Q _{top}	Q	Q _{top}
Pa	m ³ /h	m ³ /(h·m)	m ³ /(h·m)	m ³ /(h·m ²)	m ³ /(h·m ²)
50	0,0	0,00	0,06	0,00	0,18
100	0,0	0,00	0,10	0,00	0,29
150	1,1	0,04	0,13	0,19	0,38
200	1,2	0,05	0,15	0,21	0,45
250	1,6	0,06	0,18	0,28	0,53
300	1,8	0,07	0,20	0,31	0,60
450	2,8	0,11	0,26	0,49	0,78
600	4,2	0,16	0,31	0,73	0,94
750	4,2	0,16	0,37	0,73	1,10
900	4,2	0,16	0,41	0,73	1,24
1050	5,6	0,21	0,46	0,97	1,37
1200	6,7	0,25	0,50	1,17	1,50

PN-EN 12152:2004 classification

class AE 1200

Tab. 2 Air permeability before wind load test

Pressure	Air permeability – negative test pressure				
	Q	Q	Q _{dop}	Q	Q _{dop}
Pa	m ³ /h	m ³ /(h m)	m ³ /(h m)	m ³ /(h m ²)	m ³ /(h m ²)
50	0,0	0,00	0,06	0,00	0,18
100	0,0	0,00	0,10	0,00	0,29
150	0,3	0,01	0,13	0,05	0,38
200	1,0	0,04	0,15	0,17	0,45
250	1,5	0,06	0,18	0,26	0,53
300	2,1	0,08	0,20	0,37	0,60
450	2,7	0,10	0,26	0,47	0,78
600	2,6	0,10	0,31	0,45	0,94
700	3,8	0,14	0,35	0,66	1,05
900	5,3	0,20	0,41	0,92	1,24
1050	5,2	0,20	0,46	0,90	1,37
1200	6,0	0,23	0,50	1,04	1,50

PN-EN 12152:2004 classification

class AE 1200

After the test of resistance to wind load**Tab. 3 Air permeability after wind load test**

Pressure	Air permeability – positive test pressure				
	Q	Q	Q _{dop}	Q	Q _{dop}
Pa	m ³ /h	m ³ /(h m)	m ³ /(h m)	m ³ /(h m ²)	m ³ /(h m ²)
50	0	0,00	0,06	0,00	0,18
100	0,3	0,01	0,10	0,05	0,29
150	0,8	0,03	0,13	0,14	0,38
200	0,8	0,03	0,15	0,14	0,45
250	1,40	0,05	0,18	0,24	0,53
300	2,4	0,09	0,20	0,42	0,60
450	2,2	0,08	0,26	0,38	0,78
600	3,6	0,14	0,31	0,63	0,94
750	4,6	0,17	0,37	0,80	1,10
900	4,5	0,17	0,41	0,78	1,24
1050	6,7	0,25	0,46	1,17	1,37
1200	7,8	0,30	0,50	1,36	1,50

PN-EN 12152:2004 classification

class AE 1200

Tab. 4 Air permeability after wind load test

Pressure Pa	Air permeability – negative test pressure				
	Q	Q	Q _{dep}	Q	Q _{dep}
	m ³ /h	m ³ /(h·m)	m ³ /(h·m)	m ³ /(h·m ²)	m ³ /(h·m ²)
50	0,00	0,00	0,06	0,00	0,18
100	0,30	0,01	0,10	0,05	0,29
150	0,70	0,03	0,13	0,12	0,38
200	1,10	0,04	0,15	0,19	0,45
250	1,70	0,06	0,18	0,30	0,53
300	1,80	0,07	0,20	0,31	0,60
450	2,90	0,11	0,26	0,50	0,78
600	3,90	0,15	0,31	0,68	0,94
750	4,60	0,17	0,37	0,80	1,10
900	4,30	0,16	0,41	0,75	1,24
1050	5,40	0,20	0,46	0,94	1,37
1200	5,60	0,21	0,50	0,97	1,50

PN-EN 12152:2004 classification

class AE 1200

3.2 Watertightness

The test was carried out in accordance with PN-EN 12155:2004. The watertightness was tested at two position of the roof light 75° and 5° to horizontal.

The test results are shown in tables no. 5÷8.

The angle of inclination 75°

Tab. 5 Watertightness – before wind load (75°)

Pressure, Pa	Testing 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

PN-EN 12154:2004 classification

class RE 1200

Tab. 6 Watertightness – after wind load (75°)

Pressure, Pa	Testing 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

PN-EN 12154:2004 classification

class RE 1200

The angle of inclination 5°

Tab. 7 Watertightness – before wind load (5°)

Pressure, Pa	Testing 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

PN-EN 12154:2004 classification

class RE 1200

Tab. 8 Watertightness – after wind load (5°)

Pressure, Pa	Testing 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	single drops ¹⁾
900	5	single drops
1050	5	single drops
1200	5	single drops

¹⁾ Single drops appeared on the connection of the bottom beam with the mullion. The intensity of leakage was not greater at increasing pressures. The appearance of drops was caused by the connection of the skylight with the test chamber - not constructional solutions.

PN-EN 12154:2004 classification

class RE 1200

3.3 Resistance to wind load

The test was carried out in accordance with PN-EN 12179:2004.

Calculated load: 2400 Pa

The spacing of measurement points is presented in figure no. 4.

Measurement of deflection with P1

Tab. 9	skylight CW50 RA				1	pressure
Load, Pa	600	1200	1800	2400	0	
Punkt 1	0,6	1,1	1,6	2,1	0,2	
Punkt 2	1,9	3,7	5,7	7,7	0,4	
Punkt 3	1,7	2,9	4,2	5,5	0,2	
displacement, mm	0,8	1,7	2,8	3,9		
deflection	1/2533	1/1118	1/679	1/487		
Punkt 4	1,9	3,4	4,9	6,6	0,4	
Punkt 5	2,0	3,7	5,6	7,5	0,4	
Punkt 6	1,7	3,2	4,9	6,5	0,4	
displacement, mm	0,2	0,4	0,7	1,0		
deflection	1/7250	1/3625	1/2071	1/1526		

Requirement: deflection not bigger than 1/200 and not bigger than 15 mm

Tab. 10	skylight CW50 RA				1	suction
Load, Pa	600	1200	1800	2400	0	
Punkt 1	0,4	0,9	1,6	2,2	0,2	
Punkt 2	1,5	3,3	5,2	7,0	0,4	
Punkt 3	1,1	2,0	2,9	3,6	0,2	
displacement, mm	0,8	1,9	3,0	4,1		
deflection	1/2533	1/1027	1/644	1/463		
Punkt 4	1,4	2,8	4,3	5,5	0,3	
Punkt 5	1,8	3,4	5,3	6,8	0,3	
Punkt 6	1,7	3,3	4,9	6,4	0,2	
displacement, mm	0,3	0,4	0,7	0,9		
deflection	1/5800	1/4143	1/2071	1/1706		

Requirement: deflection not bigger than 1/200 and not bigger than 15 mm

Safety test P3

The skylight was subjected to a brief safety test pressure (upward loads) of 3600 Pa and suction (downward loads) of 3600 Pa.

After test no visible changes were observed.

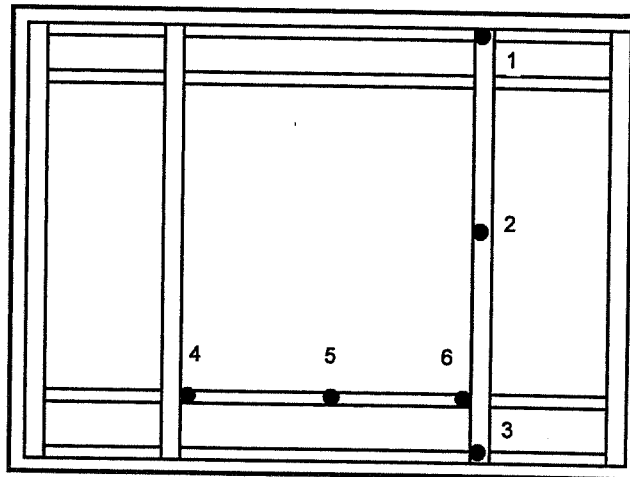


Fig. 4 Spacing of measurement points

3.4 Impact resistance

The test was carried out in accordance with PN-EN 1873:2009 – *out of accreditation*. The skylight's infilling consists of safety glass units 44.2/16/44.2.

Test condition:

- impact body: 50 kg sack
- drop height: 2450 mm
- impact energy: 1200 J
- roof light with the angle of inclination 5°
- impact place: central part of glass units


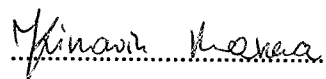
Test result: no damage was observed.

4 Classification

On the base of test results the classification for glassed roof CW50 RA is presented in tables no. 11.

Tab. 11 Classification of the tested roof light

Properties	Classification		Classification standards
	pressure	class	
Air permeability	pressure	class AE 1200	PN-EN 12152:2004
	suction	class AE 1200	
Watertightness	class RE 1200		PN-EN 12154:2004
Resistance to wind load	2400 Pa		PN-EN 13116:2004
Safety test	3600 Pa		PN-EN 13116:2004
Upward loads	3000 N/m ²		PN-EN 1873:2009
Downward loads	2500 N/m ²		PN-EN 1873:2009
Impact resistance	1200 J		PN-EN 1873:2009

Responsible for the test dr eng. Krzysztof Kuczyński 	Authorizing Person Marzena Jakimowicz Msc eng. 
Warsaw 17.02.2010	
Testing Laboratory declares that test results relate only to the object under test. Test Report should not be reproduced without a written permission of Testing Laboratory in any other form than as a whole. Test Report is not the document admitting object to trade and general application in building industry.	

Head of Testing Laboratory
 dr eng. Paweł Sulik

