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Accredited Test Laboratory
D-PL-17774-01-00 and notified
Product Certification Body 1368 in
accordance with the CPR

Test report 03 / 2018

Test of the resistance to wind uplift according to ETAG 006, the Guideline for European technical approval of systems of mechanically fastened flexible roof waterproofing membranes, chapter 5.1.4.1 (Edition November 2012)

Client: Koelner Rawlplug IP Sp. z o.o.
Kwidzynska 6
51-416 Wroclaw
Poland

Tests in accordance with
ETAG Nr. 006

Note
This test report consists of 5 pages. It shall only be copied and published unabbreviated

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Aachen, 22.02.2018

Chief of control and testing: Technician:

Dipl.-Ing. Jorge Gomez Bernd Poick

1. General conditions

The indicated test data are valid under test conditions only. A successful application under other than the reported test conditions is not proven with this test report. This report is the intellectual property of I.F.I. Institut für Industrieaerodynamik GmbH and must be copied as a whole only. It is only allowed to be published with I.F.I. written permission

2. Construction of the test specimen

2.1 Tested System

Profiled metal sheeting

Type:	E 106
Thickness:	0.75 mm

Thermal insulation

Type:	Hardrock 040
Thickness:	100 mm
Manufacturer:	DEUTSCHE ROCKWOOL GmbH & Co. OHG Rockwool Straße 37-41 45966 Gladbeck Germany

Roof membrane

Type:	Plastfoil ECO
Thickness:	1.5 mm
Sheet width:	2100 mm
Overlap:	120 mm
Joining technology:	heat-welded
Manufacturer:	Penoplex Spb Limited 191014 Saint Petersburg Russia

Type of fastening

Type:	Plate: GOK-085-Ø 50 mm Screw: WX – 4.8 T060
Manufacturer:	Koelner Rawlplug IP Sp. z o.o. Kwidzynska 6 51-416 Wroclaw Poland
Distance between fasteners:	a: 1980 mm
Distance between fasteners:	b: 250 mm
Area of influence A_i:	0.50 m²
Fastener density A^{-1}:	2.02 fastener / m^{-2}

2.2 Assembly of the test specimen

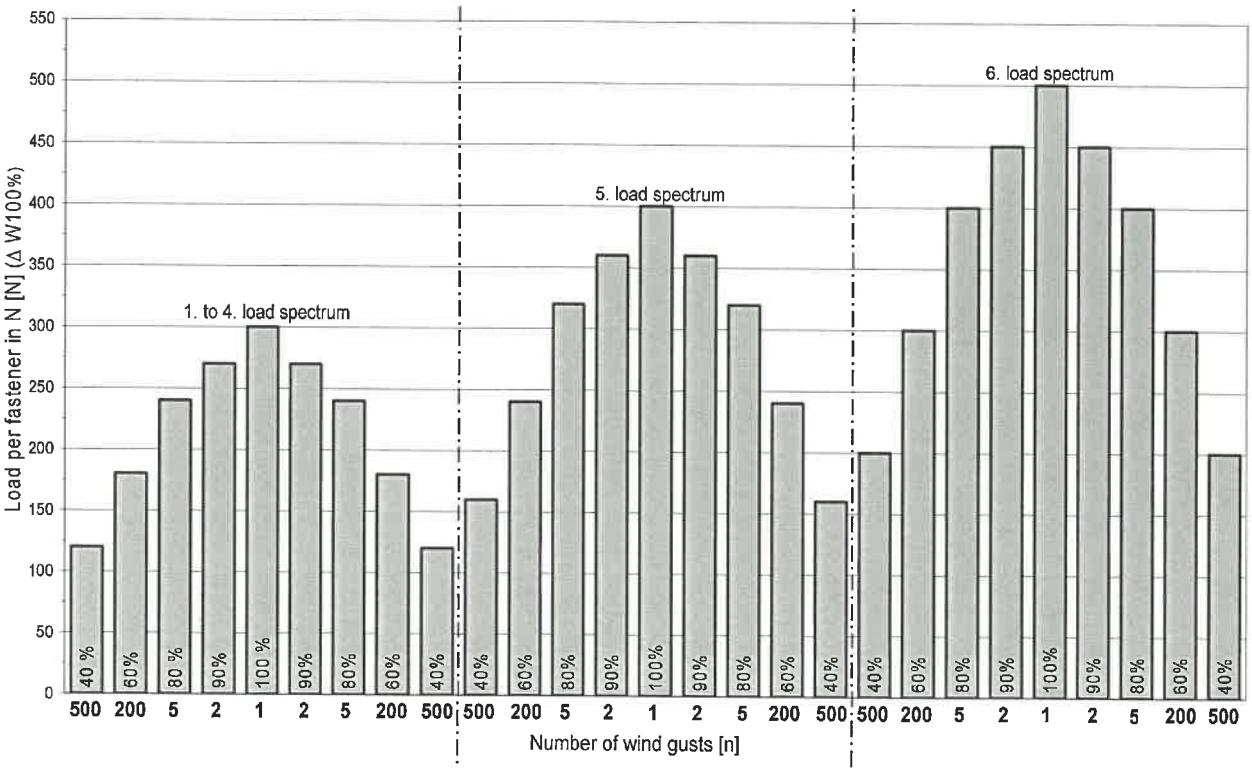
On the profile metal sheets of type with dimensions B = 1400 mm x L = 6000 mm, the thermal insulation of the type Hardrock 040 was applied to the upper flanges of the profile metal sheets and mechanically fastened. The roof membrane was attached to the 100 mm thick mineral wool. The roof membrane was installed perpendicular to the upper flanges of the profile sheets with an overlap of 120 mm and in each upper flange mechanically attached. The overlaps were heat-welded.

3. Applied load cycles

Number of Cycles	Load per fastener in N ($\Delta W_{100\%}$)
4	300
1	400
1	500
1	600
1	700
1	800
1	900
1	1000
1	1100
1	1200

Number of Cycles	Load per fastener in N ($\Delta W_{100\%}$)
1	1300
1	1400
1	1500
1	1600
1	1700
1	1800
1	1900
1	2000
1	2100
1	2200
1	2300

4. Load spectrum ETAG Nr.006



5. Test results

For the calculation of the test result based on the following values:

W_{test} = 2300 N / fastener	applied test pressure of the specimen
C_a = 0.51	geometric correction factor
C_d = 0.90	statistical correction factor
γ_m = 1.5	coefficient of safety

Failure of test specimen:

The failure of the specimen occurred at the load cycle $\Delta w_{100\,\%}$ = 2400 N / fastener.

The maximum load before failure is:

$$W_{test} = 2300 \text{ N / fastener}$$

Failure probability:

corrected in accordance with the statistical probability of failure C_d and the dimensions of the test facility C_a, maximum load:

$$W_{corr} = W_{test} \cdot C_a \cdot C_d$$
$$W_{corr} = 2300 \text{ N / fastener} \cdot 0.51 \cdot 0.90$$
$$W_{corr} = 1056 \text{ N / fastener}$$

Admissible load per fastener not considering the temperature influence:

$$W_{adm} = W_{corr} / \gamma_m$$
$$W_{adm} = 1056 \text{ N / fastener} / 1.5$$
$$\mathbf{W_{adm} = 704 \text{ N / fastener}}$$

6. Note

The test has been carried out at an ambient temperature of 19 °C. The distance between fasteners and the edge of the roof membrane was 10 mm. The test was started ten days after the installation of the test specimen.

7. Analysis

The failure of the specimen occurred at the load cycle $\Delta w_{100\,\%}$ = 2400 N / fastener.

Damage observed:

- The fasteners B2, B3, and B4 have been pulled out of the high flute of the sheet metal deck. (c. f. figures 1 and 2)

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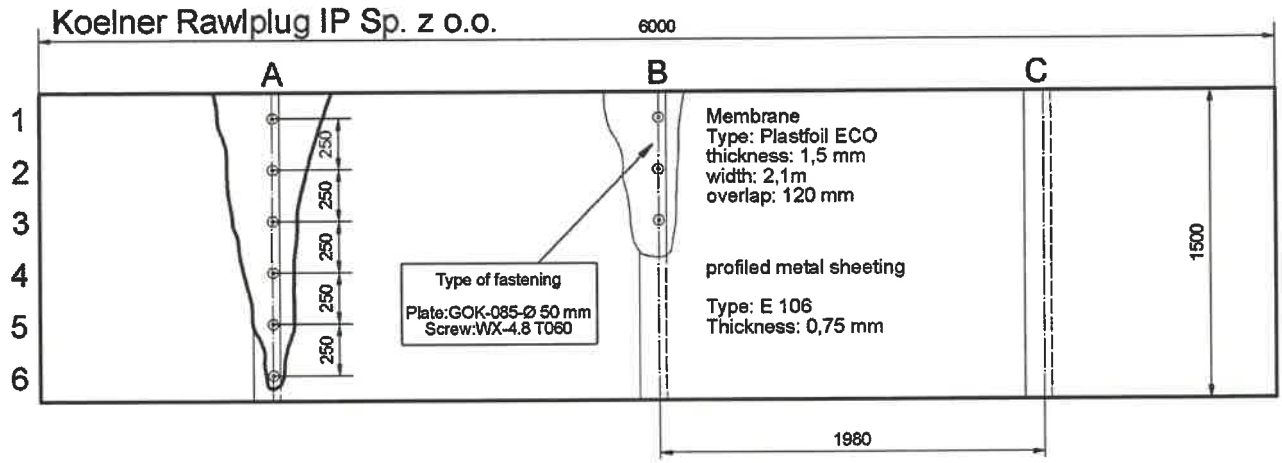
7.1 Drawing of test specimen



7.2 Pictures of test specimen

Fig.1

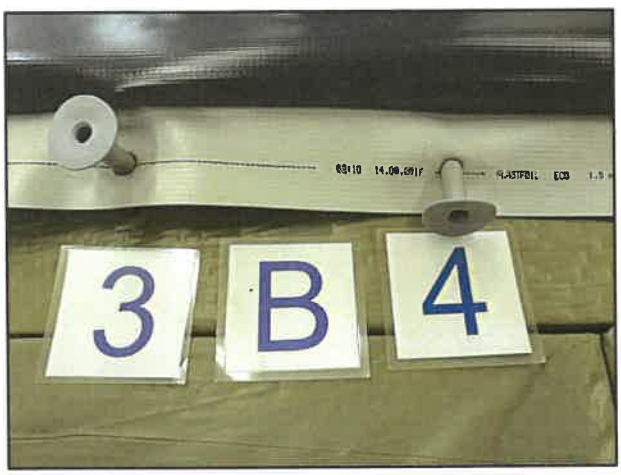


Fig.2