Instytut Techniki Budowlanej
ZESPÓŁ LABORATORIÓW BADAWCZYCH
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certyfikat akredytacji
nr AB 023

AB 023

DEPARTMENT OF BUILDING MATERIALS ENGINEERING
LABORATORY OF BUILDING MATERIALS

TEST REPORT N° LZM00-02259/20/Z00NZM

This report was issued in triplicate, two of which was received by the Client and one remained at the ITB.

Client:	***Walraven Sp. z o.o.***
Client address:	***Isep 3, 31-588 Kraków, Poland***
INFORMATION ABOUT PRODUCT	
Manufacturer (name and addree):	*J. van Walraven Holding B.V* *Industrieweg 5, 93641 RK Mijdrecht 5447* *THE NETHERLANDS*
Product:	*Roof supports BIS Yeti*
Information about product and intended use:	*Roof support for installation on flat roofs as part of the Walraven fixing system*
Identification code of the product-type:	*Yeti 335, Yeti 480, Yeti 280, Yeti 130*
Information about test iteam	
Research object: **name, description, identification**	*Plastic material for the BIS Yeti roof support* *Test samples:* *- black plastic plates, dimensions: 100x100 mm, thickness 5-6 mm* *- yellow plastic plates, dimensions 100x100 mm, thickness 5-6 mm* *- green plastic tiles, dimensions 100x100 mm, thickness 5-6 mm*
Date of receipt:	*08.07.2020*
N° of receipt protocol:	*LZM00-02259/20/Z00NZM*
Receipt procedure:	*Procedure PZ ZLB 18*
Information about tests	
Test commencement date:	*18.09.2020*
Test completion date:	*21.12.2020*

Further information about tests:

Uncertaity was determined based on the available date, including the accuracy of the measurement system used and the standard deviation of the current results. The uncertainty estimated in thisway also includes the component related to the heterogeneity of the tested sample. In the case of qualitative research, with the current level of knowledge, there is no possibility of uncertainty in relations to the presented results.

TESTS RESULTS:

1. Light resistance

The light resistance test was performed according to PN-EN ISO 16474-3:2014-02. Evaluation of color change was performed according to PN-EN ISO 4628-1:2016-03, in the daylight from a distance of about 0.5 m.

Test conditions:

- Method: A, cycle 1
- Type of lamps: UVA−340
- Radiation intensity: 0.83 W/m^2
- Exposure conditions: 4 hours irradiation (60±3°C) and 4 hours water condensation (50±3°C)
- Duration of the test – 2000 hours.

Test samples:

- Plastic plates in black, yellow and green with dimensions of 100x100 mm and thickness of 5-6 mm.

The results of the assessment of changes in appearance are presented in Table 1.1.

Table 1.1. Ligh resistance test results

Test object	Assessment of appearance changes by: PN-EN ISO 4628-1:2016-03
Black plastic plates samples 1 ÷ 6	A change in the color of the material was observed: - intensity of change 1 (very slight, just perceptible change)
Yellow plastic plates samples 1 ÷ 6	A change in the color of the material was observed: - intensity of change 5 (severe, intense change)
Green plastic plates samples 1 ÷ 6	A change in the color of the material was observed: - intensity of change 5 (severe, intense change)

2. Flexural strength

The determination of the flexural strength was carried out in accordance with PN-EN ISO 178: 2011 + A1: 2013-06, method A, on samples cut from the delivered tiles. The test was carried out on a testing machine with accuracy class 1.

Test conditions:

- sample dimensions: length 100 mm, width 10 mm, thickness from 5.30 to 5.98 mm
- support spacing: 80 mm
- support radius and thrust: 5 mm
- the speed of the measuring: 5 mm/min.

The test results are presented in Tables 2.1÷2.6.

Table 2.1. Flexural strength test results for BIS Yeti Roof Support Plastics **(yellow) - witnesses**

Sample No.	Flexural strength, MPa
1	79,9
2	73,9
3	78,8
4	87,2
5	82,5
6	75,1
Average value:	**79,6**
Standard deviation:	4,9
Destruction type:	Deflection under pressure

Extended measurement ubcertainty (related to the accuracy of the devices used) at the 95% and with an extension factor of k=2, Up=1,5 MPa

Table 2.2. Flexural strength test results for BIS Yeti Roof Support Plastics **(yellow) – after aging**

Sample No.	Flexural strength, MPa
1	43,8
2	39,1
3	46,0
4	42,5
5	46,2
6	48,7
Average value:	**44,4**
Standard deviation:	3,4
Destruction type:	Deflection under pressure

Extended measurement ubcertainty (related to the accuracy of the devices used) at the 95% and with an extension factor of k=2, Up=1,5 MPa

Table 2.3. Flexural strength test results for BIS Yeti Roof Support Plastics **(black) - witnesses**

Sample No.	Flexural strength, MPa
1	41,4
2	41,4
3	42,3
4	42,1
5	43,2
6	41,2
Average value:	**42,0**
Standard deviation:	0,7
Destruction type:	Fracture under pressure

Extended measurement ubcertainty (related to the accuracy of the devices used) at the 95% and with an extension factor of k=2, Up=1,5 MPa

Table 2.4. Flexural strength test results for BIS Yeti Roof Support Plastics **(black) – after aging**

Sample No.	Flexural strength, MPa
1	42,1
2	43,6
3	41,4
4	42,1
5	43,0
6	40,0
Average value:	**42,0**
Standard deviation:	1,2
Destruction type:	Fracture under pressure

Extended measurement ubcertainty (related to the accuracy of the devices used) at the 95% and with an extension factor of k=2, Up=1,5 MPa

Table 2.5. Flexural strength test results for BIS Yeti Roof Support Plastics **(green) - witnesses**

Sample No.	Flexural strength, MPa
1	159,4
2	148,8
3	147,7
4	148,5
5	144,9
6	140,6
Average value:	**148,3**
Standard deviation:	6,2
Destruction type:	Fracture under pressure: samples no 1-2 Deflection under pressure: samples no 3-6

Extended measurement ubcertainty (related to the accuracy of the devices used) at the 95% and with an extension factor of k=2, Up=1,5 MPa

Table 2.6. Flexural strength test results for BIS Yeti Roof Support Plastics **(green) – after aging**

Sample No.	Flexural strength, MPa
1	104,5
2	107,1
3	116,2
4	104,4
5	110,7
6	122,2
Average value:	**110,8**
Standard deviation:	7,1
Destruction type:	Deflection under pressure

Extended measurement ubcertainty (related to the accuracy of the devices used) at the 95% and with an extension factor of k=2, Up=1,5 MPa

Photographic documentation of samples after light exposure:

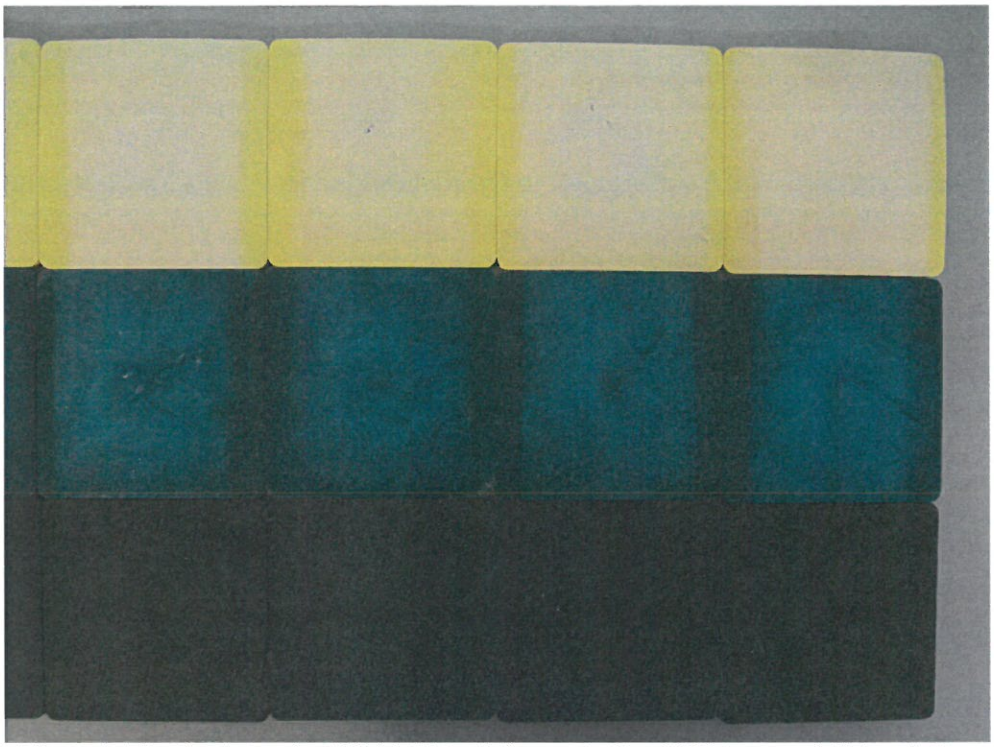

Photo 1: Plastic plates for BIS Yeti Roof Support after 2000 hours of UV radiation

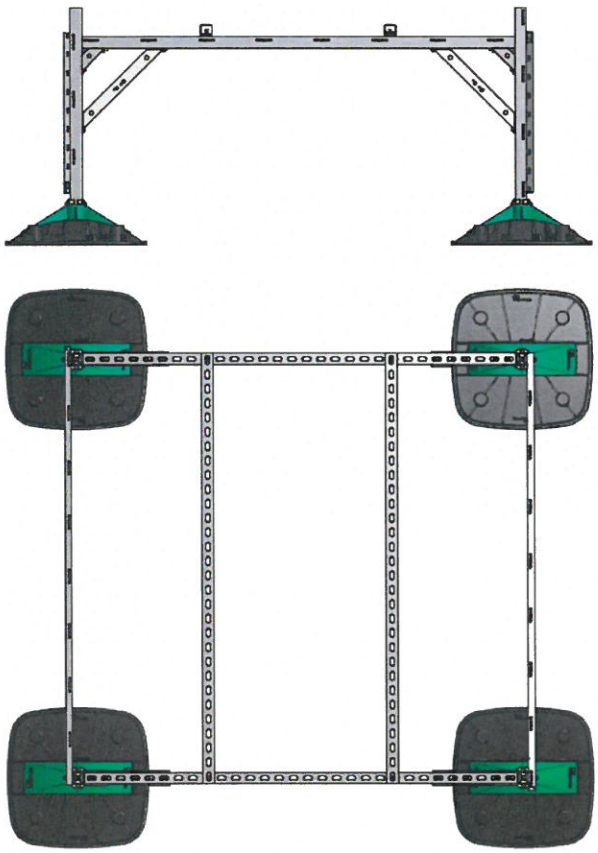

Fig 1. BIS Yeti Roof Supports

Opinion on the test results (outside the scope of accreditation)

1. Subject of testing and evaluation

Plastic for making the BIS Yeti Roof Support in the following colors: black, yellow, green.

2. Research objective

Assessment of the influence of UV radiation on the mechanical properties of plastic in bending.

3. Review of the research results

The plastic samples for the BIS Yeti roof support were subjected to exposure to light by PN-EN ISO 16474-3:2014-02 (method A, cycle 1). After the exposure, the assessment of changes in appearance according to PN-EN ISO 4628-1:2016-03 and flexural strength tests according to PN-EN ISO 178:2011+A1:2013-06 were carried out.

The black plastic samples showed barely discernible color changes after UV exposure (2000 hours). The yellow and green plastic samples showed very pronounced color changes. Flexural strength tests showed that the flexural strength of the black samples did not change after UV exposure - an average of 42 MPa. For the yellow samples, a decrease in flexural strength of about 45% (from 80 MPa to 44 MPa) was found after UV exposure. For the green samples, a decrease in flexural strength of about 25% (from 148 MPa to 111 MPa) was noted.

Based on the tests performed, it was found that:

- the flexural strength of the plastic in black (42 MPa) did not change after UV irradiation,

- flexural strength of plastic in yellow and green decreased after UV irradiation by about 45% and 25%, respectively, compared to the non-aged samples,

- the yellow and green plastics showed a higher flexural strength (44 MPa and 111 MPa) after UV exposure compared to the black plastic (42 MPa).

4. Conclusions

The BIS Yeti roof supports according to Figure 1, made of plastic in black, yellow and green, showed sufficient resistance to UV exposure according to PN-EN ISO 16474-3:2014-02 (method A, cycle 1).

Responsible for the test according to point 1
M.SC.eng. Adrian Strąk

Title, Name and Surname

signature

Responsible for the test according to point 2
M.SC.eng. Cezary Strąk

Title, Name and Surname

signature

Authorizing person
M.SC.eng. Dagmara Warsicka

Title, Name and Surname

signature

Head of the Laboratory
PhD.eng. Ewa Sudoł

Title, Name and Surname

signature

Warsaw, 18.03.2021

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