

22-L-0237/1

12 December 2022

Test report

Allshield Blue 2C coating + Unifilo® 500 serie, type U500 reinforcement /
Eco Prim Grip primer + additive of magnesium hydroxide and sand fraction /
Varyflex 370K24 / Eurofast DVP-EF-8040N + EDS-S-48180 /
Unidek Platinum Kameleon / trapezoidal steel deck



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Date of order

18 May 2022

Project number

22-L-0237/1

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Subject

resistance to dynamic wind load

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1 Introduction

By order of Allshield Coating B.V., Kiwa BDA Testing B.V. has determined the resistance to dynamic wind load of the following buildup:

- substructure of a **trapezoidal steel deck VD 106R/750**;
- mechanically fastened insulation, **Unidek Platinum Kameleon** in combination with a **Eurofast® EDS 48160 + DVP-EF7005N5** fastening system;
- mechanically fastened two-layer roof waterproofing system with a top layer of **Allshield Blue 2C coating + Unifilo® 500 serie, type U500 reinforcement** and a mechanically fastened underlayer of **Varyflex 370K24** roof waterproofing sheet treated with an **Eco Prim Grip primer + additive of magnesium hydroxide and sand fraction**, in combination with a **Eurofast DVP-EF-8040N + EDS-S-48180** fastening system.

The suppliers and the delivery dates of the products used are mentioned below.

Table 1 – Specifications of the products used

Product	Supplier		Delivery date
	company	person	
Substructure	Kiwa BDA Testing B.V.	-	14-06-2022
Thermal insulation	Kingspan Unidek B.V.	-	13-06-2022
Fastening system (thermal insulation)	Kiwa BDA Testing B.V.	-	14-06-2022
Fastening system (roof waterproofing sheet)	Dakbedekkingsbedrijf Elro	Y. van Dijk	30-08-2022
Roof waterproofing sheet (underlayer)	Allshield® Coating B.V.	G.D. Souter	22-08-2022
Primer	Allshield® Coating B.V.	G.D. Souter	30-08-2022
Coating (top layer)	Allshield® Coating B.V.	G.D. Souter	31-08-2022

See annex V for photos of the products and further package data.

2 Investigation

The investigation into the resistance to dynamical wind forces has been performed on one test specimen according to EN 16002:2018 – Flexible sheets for waterproofing – Determination of the resistance to wind load of mechanically fastened flexible sheets for roof waterproofing.

The testing equipment used to determine the resistance to wind load has been a BDA Wind Uplift Tester.

The last calibration date of the equipment has been 11 March 2019.

The pitch of the test specimen during testing has been set at 0° (horizontally).

In contravention to the prescription in EN 16002 the insulation used consisted of Unidek Platinum Kameleon Insulation boards with the following specifications:

- a. thickness of 100 mm with a thickness tolerance of T2;
- b. compressibility level CS(10) 80;

instead of mineral wool insulation boards with the specifications:

- a. thickness of 100 mm with a thickness tolerance of T2;
- b. compressibility level between CS(10)50 and CS(10)70;
- c. point load level between PL(5)500 and PL(5)700.

Therefore the result of the determination of the resistance to wind load is only valid for the insulation / system as mentioned in chapter 3 of this report.

The test result of the wind uplift test has been interpreted according to the European Assessment Document EAD 030351-00-0402:2019 – Systems of mechanically fastened flexible roof waterproofing sheets¹, and according to the Dutch national standard NEN 6707:2011 – Bevestiging van dakbedekkingen – Eisen en bepalingsmethoden².

The apparent mass and thickness of the reinforcement, have indicatively been determined by Kiwa BDA Testing B.V.

During and after the test the Allshield Blue 2C coating has been visually (naked eye) inspected on cracks in the surface.

After the test specimen has been removed from the test equipment, the thickness of the coating has been measured at six random chosen positions of the test specimen.

The investigation has been performed in the period of week 24 up to and including week 39, 2022.

See annex III for the test schedule.

¹ EAD 030351-00-0402:2019 supersedes ETAG 006:2000/Amended:2012 – Guideline for the European Technical Approval of systems of mechanically fastened flexible roof waterproofing membranes.

² Fixing of roof coverings – Requirements and determination methods.

3 Construction of the test specimen

The construction data for the test specimen are mentioned in the table below.
The various layers are mentioned from the bottom up.
The specifications of the used products are mentioned underneath the table.

Table 2 – Construction data

Layer	Construction		Date
	company	person	
Substructure	Kiwa BDA Testing B.V.	A.R. Hameete	14-06-2022
Thermal insulation	Kiwa BDA Testing B.V.	A.R. Hameete	14-06-2022
Fastening system (thermal insulation)	Kiwa BDA Testing B.V.	A.R. Hameete	14-06-2022
Fastening system (roof waterproofing sheet)	Dakbedekkingsbedrijf Elro	Y. van Dijk	30-08-2022
Roof waterproofing sheet (underlayer)	Dakbedekkingsbedrijf Elro	Y. van Dijk	30-08-2022
Primer	Allshield® Coating B.V.	G.D. Souter	30-08-2022
Coating (top layer)	Allshield® Coating B.V.	G.D. Souter	31-08-2022
		K.D.K. Leendertse	
		M. Buizer	
		R. Gilhuis	

The construction of the test specimen has been supervised by Mr A.R. Hameete of Kiwa BDA Testing B.V.

The specimen has the effective test dimensions of 5000 mm × 2800 mm and has been built up according to the prescription of the principal from the bottom up.

Substructure

- Trapezoidal steel deck, VD 106R/750, mass 9,81 kg.m⁻², steel quality S320GD; measured overall thickness: 0,75 mm.

Thermal insulation

- Unidek Platinum Kameleon, production code: 22050070, insulation boards made of EPS, dimensions: 1200 mm × 1000 mm, thickness: 150 mm, mechanically fastened with one fastener per board.

Fastening system insulation boards

- Roofing screw: Eurofast® EDS-S-48160, production code: 0838-047-160.
- Metal washer: Eurofast® DVP-EF7005N5, production code: 944867.

Roof waterproofing sheet (underlayer)

- Varyflex 370K24, a polyester/glass reinforced SBS roof waterproofing sheet, thickness: 4 mm, width of the sheet: 1000 mm, production code: 11/03/2022 12:16.
- The spacing between the individual fasteners has been set at 0,25 m.
- The spacing between the rows of fasteners has been set at 0,90 m.
- The joint has been welded with by torching.
- The nominal width of the overlap is 100 mm.

Fastening system roof waterproofing sheet

- Roofing screw: Eurofast® EDS-B-48180, production code: K53129.
- Metal washer: Eurofast® DVP-EF-8040N, production code: 559148.

Primer

- Eco Prim Grip primer, production code: 2C1945183 with an additive of 20% (*m/m*) of magnesium hydroxide and 40% (*m/m*) of sand fraction.
- The primer has been applied with a paint roller.

Coating (top layer)

- Allshield Blue 2C coating, production code: 22-08-2022 + Unifilo® 500 serie, type U500 reinforcement.
- The coating has been applied with a paint roller.

The apparent mass and thickness of the reinforcement, have indicatively been determined by Kiwa BDA Testing B.V.

The fixation at the perimeter has been realized using wooden planks, with dimensions of 120 mm × 18 mm, whereby the roof waterproofing sheet has been welded around the planks (see annex IV). The mutual spacing between the fasteners at the perimeter fixation has been set at 0,25 m.

According to the prescription of the principal after the buildup and before testing the test specimen needs been stored in the laboratory for a period of at least fourteen days. The effective storing period in the laboratory after the buildup and before the start of the test has been 28 days.

A photo report of the construction of the test specimen has been given in annex I.

4 Results

4.1 Resistance to dynamical wind forces

At the first 90% step of the cycle of $\Delta W_{\max 100\%} = 800$ N (theoretical load) per fastener the test specimen has failed by tearing of the roof waterproofing sheet at the position of the fastening system.

The coating did not show any visual cracks (naked eye) during and or after the test.

See also the photos in annex II.

According to EN 16002:2018 and NEN 6707:2011 the test result is the peak load of the cycle preceding the cycle of failure.

Therefore the test result is 700 N (theoretical load) per fastener.

According to EAD 030351-00-0402:2019 the admissible (design) load for the wind uplift resistance is 467 N per fastener (see paragraph 5.1: Design load according to EAD 030351-00-0402).

According to NEN 6707:2011 the admissible (design) load for the wind uplift resistance is 467 N per fastener (see paragraph 5.2: Design load according to NEN 6707).

4.2 Thickness measurements coating

Table 3 – Thickness

Measurement	Thickness [mm]
1	2,34
2	2,79
3	3,07
4	3,74
5	2,21
6	2,72
Mean	2,8

4.3 Thickness and mass measurements reinforcement

Table 3 – Thickness

Measurement	Thickness [mm]	Mass [g.m ⁻²]
1	0,56	234
2	0,59	205
3	0,53	-
4	0,62	-
Mean	0,6	220