



PRODUCT PERFORMANCE ASSESSMENT
PPA 22-001/01/A



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Leadax Roov



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DESCRIPTION

Leadax Roov (hereafter to be referred to as product) is a white single-ply PVB- (polyvinyl butyral) roofing membrane without reinforcement, made of recycled PVB-film with a width of 1000 mm and a thickness of 1.5 mm which is adhered to mechanically fastened reinforced fixing strips (Leadax Reinforced Strip / LRS).

A liquid welding system is used for the overlap connection and the adhesion on the fixing strips. The welding fluid used is Leadax Roov Bio Bind.
The effective welding width is 100 mm.

APPLICATION

The product is to be applied as roofing of flat roofs in the Netherlands.

ASSESSMENT ASPECTS

In accordance with the assessment of the Kiwa BDA Expert Centre, the product has been assessed for the aspects listed in Chapter 3.

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CONTENTS

This Product Performance Assessment includes the following sections:

- 1 Conditions of application
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1 Conditions of application

1.1 Assessment aspects and research

The assessment aspects (see section 3) of the product were determined in advance in consultation with Leadax Circular Roofing B.V. (hereafter referred to as supplier). These assessment aspects were assessed and verified by Kiwa BDA Expert Centre by using (test) reports from Kiwa BDA Testing B.V. and NIBE.

1.2 Installation

It is recommended that the quality of the installation and workmanship of the installation party are verified by an experienced inspector. This inspector may be a qualified employee of the supplier or a qualified employee of a consulting engineering firm.

1.3 Period of validity

This document is valid for a maximum of three years after the issue date, after which the period of validity may be extended for another three years after a positive re-evaluation.



2 References

- 1 Kiwa BDA test report 22-L-0377/1 REV 01: Leadax RooV 1.5 mm FR / Leadax Roov Bio bind (new formula), determination of product characteristics, Kiwa BDA Testing B.V., December 9, 2022
- 2 Kiwa BDA test report 0534-L-20/5: Leadax RooV, determination of product characteristics, Kiwa BDA Testing B.V., April 30, 2021
- 3 Kiwa BDA test report 0101-L-21/1: Leadax RooV / Leadax Reinforced Strip (LRS) / Eurofast EDS-B-55090 + TRP-45-L060-250 / MWR / trapezoidal steel deck, resistance to dynamic wind load, Kiwa BDA Testing B.V., April 30, 2021
- 4 Kiwa BDA test report 0534-L-20/1: Leadax RooV / glass fleece 100 g.m² / EPS 100 SE / trapezoidal steel deck, test on external fire exposure to roofs according to CEN/TS 1187, test 1, Kiwa BDA Testing B.V., February 3, 2021
- 5 Kiwa BDA classification report 0534-L-20/2, Classification report for roof coverings exposed to external fire, Leadax RooV / glass fleece 100 g.m² / EPS 100 SE / trapezoidal steel deck, classification using test data from external fire exposure to roofs tests, Kiwa BDA Testing B.V., February 3, 2021
- 6 Kiwa BDA rapportage praktijkbezoek 21-E-0120 Leadax B.V. – PVB-dakbanen, Kiwa BDA Dak- en Geveladvies B.V., 16-11-2021
- 7 Notitie LCA Leadax Roov 2022, NIBE, 28 juni 2022
- 8 EN 12316-2:2013 Flexibele banen voor waterafdichtingen - Bepaling van de weerstand tegen pellen van verbindingen - Deel 2: Kunststof en rubber dakbanen voor waterafdichtingen
- 9 EN 1296:2000 Flexibele banen voor waterafdichtingen - Bitumen, kunststof en rubber dakbanen - Methode van kunstmatige veroudering door langdurige blootstelling aan verhoogde temperatuur
- 10 EN 1847:2009 Flexibele banen voor waterafdichtingen - Kunststof en rubber banen voor waterafdichtingen voor daken - Methoden voor de blootstelling aan vloeibare chemicaliën, inclusief water
- 11 UEAtc M.O.A.T. No 27:1983 - General Directive for the Assessment of Roof Waterproofing Systems, § 5.2.1 - Tests - Additional tests for single layer waterproofing systems - Test for resistance to leakage at joints
- 12 EN 12730:2001 Flexibele banen voor waterafdichtingen - Bitumen, kunststof en rubber dakbanen voor waterafdichtingen - Bepaling van de weerstand tegen statische belasting
- 13 EN 16002:2018 Flexibele banen voor waterafdichtingen - Bepaling van de weerstand tegen windbelasting van mechanisch bevestigde flexibele dakbanen voor waterafdichting
- 14 EAD 030351-00-0402:2019 - Systems of mechanically fastened flexible roof waterproofing sheets
- 15 NEN 6707:2011 – Bevestiging van dakbedekkingen - Eisen en bepalingsmethoden
- 16 NPR 6708:2019 – Bevestiging van dakbedekkingen - Richtlijnen
- 17 CEN/TS 1187:2012 Beproevingmethoden voor het brandgevaarlijk zijn van daken
- 18 BRL 1511:2015/ Wijzigingsblad 2021 – Baanvormige dakbedekkingssystemen – Deel 1: Algemene bepalingen
- 19 NEN 6063:2019 – Bepaling van het brandgevaarlijk zijn van daken
- 20 EN 13501-5:2016 Brandclassificatie van bouwproducten en bouwdelen - Deel 5: Classificatie op grond van resultaten van beproeving van het brandgevaarlijk zijn van daken
- 21 BRL 1511 Baanvormige dakbedekkingssystemen. Deel 4: Specifieke bepalingen voor kunststof en rubber dakbanen

Note:

In this document, these sources are referenced by the relevant reference number in superscript.



3 Assessment aspects

3.1 Assessment aspects, methods of determination and results determined

The product assessment aspects included in this document were determined in advance in consultation with the supplier. A summary of these assessment aspects, determination methods and independently determined results are listed in table 1. Chapter 4 explains each assessment aspect in more detail.

Table 1 - Assessment aspects, methods of determination and results determined

Assessment aspects	Determination methods	Result	Paragraph
1. Peel resistance longitudinal overlap ¹ - initial - after thermal ageing - after ageing in water	EN 12316-2 ⁸	210 [N/50 mm]	4.2
	EN 1296 ⁹	229 [N/50 mm]	
	EN 1847 ¹⁰	183 [N/50 mm]	
2. Life Cycle Analysis ⁷	artificial UV-aging test	30 [years]	4.3
3. Watertightness overlap ²	UEAtc M.O.A.T. No. 27 ¹¹ / EN 12730 ¹²	10 [kPa]	4.4
4. Resistance to dynamic wind load ³	EAD 030351-00-0402 ¹⁴ NEN 6707 ¹⁵	667 [N] ^{*1)} 667 [N] ^{*1)}	4.5
5. Fire hazard/ external fire exposure ^{4,5}	CEN/TS 1187 ¹⁷ EN 13501-5 ²⁰	B _{ROOF} (t1)	4.6

*1) per fastener



4 Independently determined results

4.1 General

The assessment aspects were assessed by Kiwa BDA Expert Centre through laboratory testing and verified against reports from Kiwa BDA Testing B.V. and NIBE.

4.2 Peel resistance longitudinal overlap¹

The investigation of the peel resistance of the welded joint (longitudinal overlap) is carried out according to EN 12316-2⁸. The peel resistance is tested initially, after thermal ageing of 28 days at 80°C (according to EN 1296⁹) and after 168 hours of ageing in water at 60°C (according to EN 1847¹⁰).

The welding fluid used is Leadax Roov Bio Bind (iso-propanol / ethanol 99.8%). The effective width of the longitudinal overlap was determined between 135 mm – 180 mm.

The results of the peel resistance of the longitudinal overlap (force in transverse direction) are as follows, see also table 1:

– initial	210	[N/50 mm]
– after thermal ageing	229	[N/50 mm]
– after ageing in water	183	[N/50 mm]

The failure pattern for all specimens is the same; peeling occurs at the weld joint. The specimens aged in water also show fractures outside the weld joint.

According to BRL 1511 Part 4²¹, the following requirements apply:

- peel strength initial: fracture outside weld joint or ≥ 150 N/50 mm
- peel strength after aging: fracture outside the welded joint or deterioration $\leq 20\%$

The requirements are met.

4.3 Life cycle analysis⁷

NIBE prepared a life cycle assessment (LCA) for the product. To perform the LCA calculation, an expected lifespan of 30 years was assumed. The supplier provided information about an artificial UV-aging test performed. The results of this artificial UV-aging test are enclosed in the LCA file.

Assumptions for life cycle analysis for the expected lifetime from the artificial UV-aging test, are shown in table 1.



4.4 Watertightness²

One test piece has been made with a T-overlap. The top of this test piece was covered with a soap solution and it was subjected to an air pressure differential of 10 kPa for a period of 30 minutes. No air bubbles were observed during this test. At 10 kPa, the piece is watertight.

The result for the watertightness is shown in table 1.

4.5 Resistance to dynamic wind loads³

Testing the resistance to dynamic wind load has been performed according to EN 16002¹³. The test results are interpreted according to EAD 030351-00-0402¹⁴, NEN 6707¹⁵ and NPR 6708¹⁶.

The tested piece has effective dimensions of 2800 mm by 3000 mm. The center-to-center distance of the rows of fasteners is 500 mm and the center-to-center distance between fasteners is 250 mm. For the structure and composition of the test piece, please refer to the test report 0101-L-21/1³.

The results for the permissible (design) load for resistance to dynamic wind load per fastener is 667 N. The material factor γ_m assumed = 1.5. See also table 1.

4.6 Fire hazard/external fire exposure^{4,5}

The product is tested in combination with a roofing construction in accordance with NEN 6063¹⁹ and has the following class for the assessment aspect of external fire exposure:

- B_{ROOF} (t1).

The test work is performed according to CEN/TS 1187¹⁷ and the test pieces are constructed according to BRL 1511¹⁸ and according to the standard insulated roof construction according to NEN 6063¹⁹.

The structure of the test pieces is described in test report 0534-L-20/1⁴.

The result obtained applies only to proven roofing structures.

The result for external fire exposure is B_{ROOF} (t1), see also table 1.

5 Principle details

Figure 1 - Fixation with mechanically attached reinforced fixing strips (LRS strips)

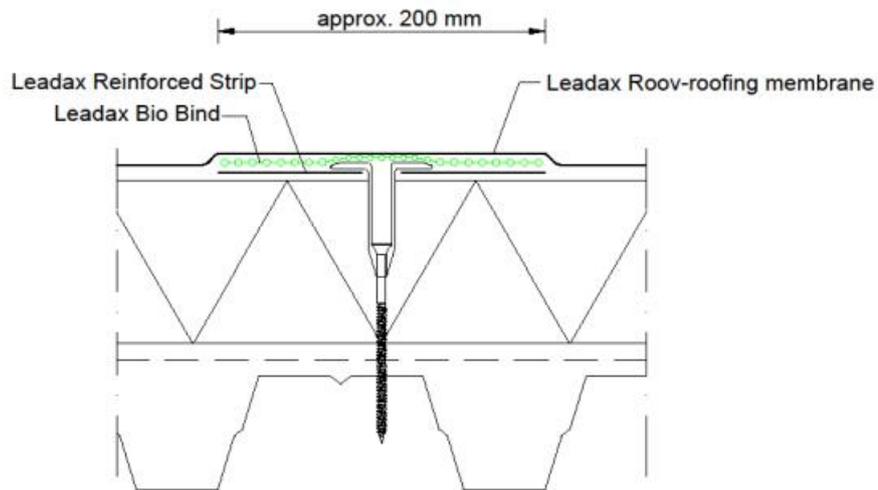
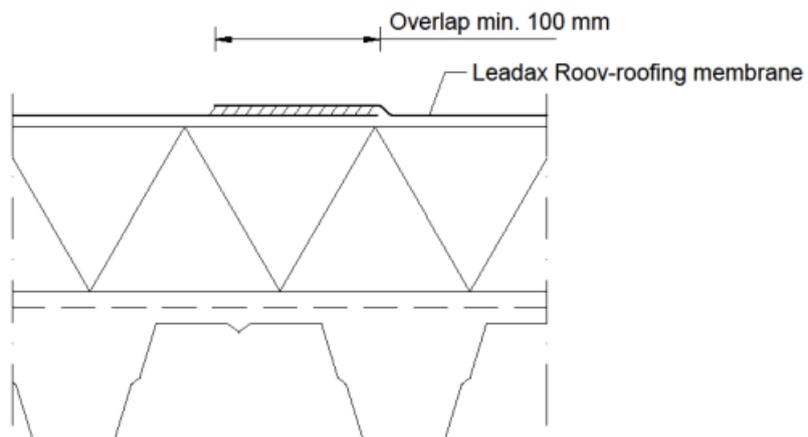


Figure 2 - Overlap connection roofing membrane



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Figure 3 - Edge fixation, roofing membranes capped

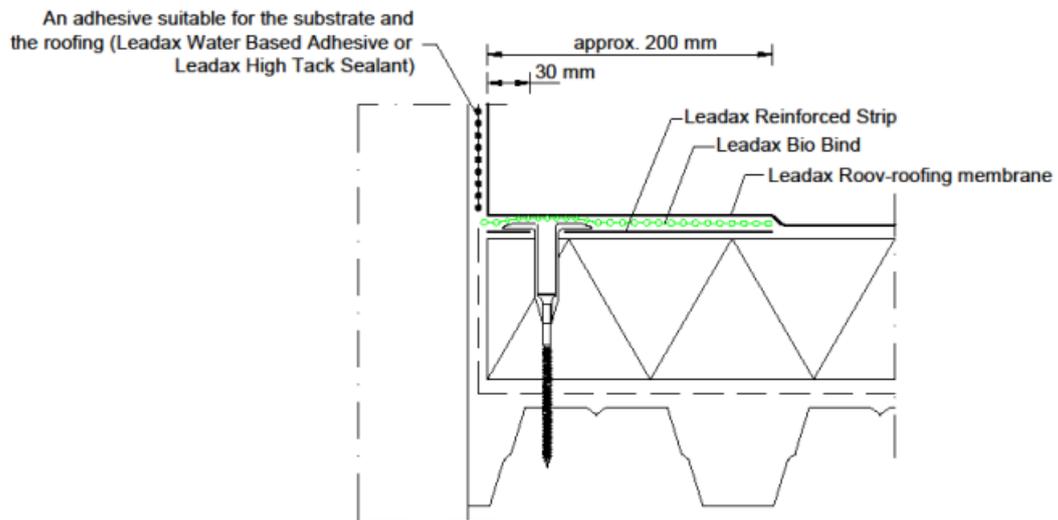


Figure 4 - Edge fixation, with edge strips

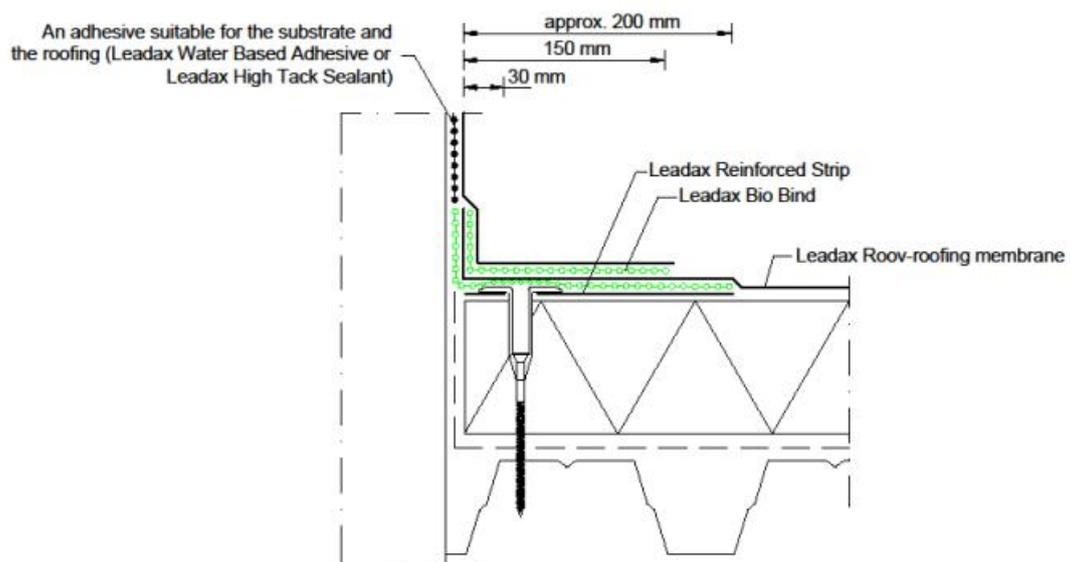


Figure 5 - Roof upstand

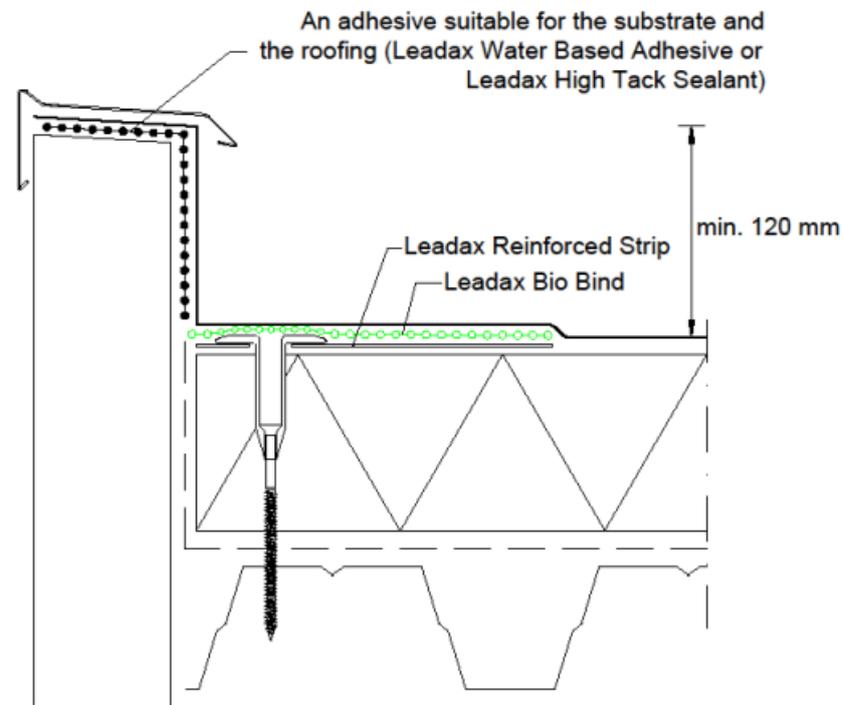


Figure 6 - Raised sections

