

**Expertise of the Fulfilment of the
Requirements as a Waterproofing Membrane in Conjunction
with Fresh Concrete and on the Material in accordance with
DIN/TS 20000-202:2020-11, DIN EN 13967:2012-07 and in ac-
cordance with EAD 030378-01-0605**

No. E-11560-002/2021

Subject Matter	“DualProof A” Waterproofing membrane based on FPO with a fresh concrete composite layer in accordance with DIN/TS 20000-202:2020-11, DIN EN 13967:2017-08, EAD 030378-01-0605 and taking into account the requirements of the DBV (German Concrete and Construction Technology Association) Booklet 44.
Applicant	BPA GmbH Behringsstraße 12 71083 Herrenberg Germany
Date of Issue	15 th of December 2021
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This assessment contains 3 pages and 1 Annex of 4 pages

The test results refer exclusively to the test items mentioned. The test report may not be reproduced in part without the written permission of the testing laboratory.

Managing Directors: Prof. Dr. Roland Hüttl, Dr. Gero Schönwaßer

District Court Hamburg, HRB 130568 (Commercial Register No.), Tax No: 46/736/03268

1 Subject Matter and Scope of Application

1.1 Subject Matter

The DualProof A construction product is a one-side nonwoven laminated waterproofing membrane with the following structure:

- Lamination on a nonwoven basis
- Base film on the basis of FPO, coloured, plastic waterproofing membrane (PWM) 0.8 mm

The sealing function is carried out by the FPO waterproofing membrane (PWM).

For production as waterproofing, the construction product is processed with the following components:

Sealing tape:	PWM with a self-adhesive layer (Example basis: butyl rubber) width: ≥ 100 mm
Inside and outside corners:	Base film (FPO) with a self-adhesive layer (Example basis: butyl rubber) Leg length: min. 100 mm
Moulded parts according to:	PWM / plastic membrane without and with project requirements a self-adhesive layer, for example, on the basis of butyl rubber.
Inside and repair tape:	On the basis of a self-adhesive layer with nonwoven lamination

1.2 Scope of Application

The waterproofing membrane is used – processed in combination with fresh concrete - for the production of single-layer structural waterproofing against pressurised and non-pressurised water in the following areas:

- External waterproofing of ground-contacting floor slabs and of external wall surfaces in concrete against soil moisture and non-accumulating and accumulating seepage water up to an immersion depth of 69 m water column
- As waterproofing for construction joints and crack control joints but not as the sole waterproofing over expansion joints.
- The overlap joints that may be required for this can be created using various methods (bonding, thermal welding, thermal bonding, using the existing self-adhesive strips, etc.).

2 Requirements on the Construction Product

2.1 Properties and Characteristic Values

The testable properties and characteristic values were determined on samples from the supplied DualProof A plastic waterproofing membrane and are presented in Annex 1.

3 Manufacture, Storage and Transport

3.1 Manufacture

The waterproofing membrane is manufactured in the factory.

3.2 Transport and Storage

The rolls of the "DualProof A" waterproofing membrane must be transported and stored in a cool, dry place and be protected from damage and sunlight (storage temperature: +5°C to +30°C) in the manufacturer's original packaging. Stressing through point and / or linear load effects as well as through solvent vapours must be prevented. Furthermore, the general instructions and the manufacturer's processing instructions shall apply.

3.3 Labelling

The product is CE marked in accordance with DIN EN 13967.

4 General Information

- 4.1 The content of the assessment can be subsequently supplemented and modified.
- 4.2 The assessment does not replace the permits, approvals and certificates required by law for the implementation of construction projects.
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Greven, 2nd of February 2022


Dr.-Ing. Melanie Strutz
Kiwa GmbH - TBU Greven

Details of the Waterproofing Membrane

Manufacturer: BPA GmbH
 Behringstraße 12
 71083 Herrenberg
 Germany

Construction Product: “DualProof A”
 One-sided nonwoven-laminated waterproofing membrane

Scope of Application: DIN/TS 20000-202:2016-03, Table 28
 DIN EN 13967:2012-07
 in accordance with EAD 030378-01-0605

Properties and Characteristic Values of the Waterproofing Membrane DualProof A

Values in accordance with DIN EN 13967			
Property	Test Procedure	Unit / Type of Result	Finding
Visible defects	DIN EN 1850-2	[-]	No visible defects
Straightness	DIN EN 1848-2	[mm/10 m]	≤ 75
Mass per unit area	DIN EN 1849-2	[g/m ²]	895
Watertightness	DIN EN 1928 Procedure B	[-]	Sealed at 500 kPa / 72h passed
Watertightness	ASTM D 5385	[-]	Sealed at 690 kPa passed
Resistance to impact loads	DIN EN 12691 Procedure B	[mm]	Procedure A: 250 mm, sealed Procedure B: 900 mm, sealed
Durability against artificial ageing	DIN EN 1296 DIN EN 1928	[-]	Sealed at 60 kPa passed
Tear resistance (nail shank)	DIN EN 12310-1	[N]	MD = 370 CMD = 382
Resistance to static loads	DIN EN 12730 Procedure B	[kg]	Procedure B applied load 20kg sealed
Fire behaviour	DIN EN 13501-1	[-]	Class E
Water vapour permeability	DIN EN 1931	[m] and [kg/m ² *s]	d: 0.83 mm (composite structure) g: 6.23*10 ⁻⁹ (kg/m ² *s) μ: 79000 s _d :65m



Compatibility with bitumen	DIN EN 1847 DIN EN 1928	[-] passed	Sealed against 60 kPa passed
Tensile behaviour	DIN EN 12311-2	[N/50mm]	Maximum tensile strength [N/50mm] MD = 403 CMD = 342 Elongation at maximum tensile strength [%] MD = 90 CMD = 122
Durability against chemicals	DIN EN 1847 DIN EN 1928	[-]	Sealed at 60 kPa passed
Shear resistance of the joint seams	DIN EN 12317-2	[N/50mm]	Longitudinal edge (self-adhesive strip) 199 N/50mm Shearing off of the joint seam

x = arithmetic mean

n.r. = no requirement

Properties and Characteristic Values of the Waterproofing Membrane DualProof A in accordance with supplementary tests

Property	Test Procedure	Unit / Type of Result	Finding
Watertightness	DIN EN 1928, Procedure B 500 kPa, 72 h	[-]	Sealed
Watertightness	ASTM D 5385	[-]	Sealed up to 69 m water column or 6.9 bar
Watertightness of the joint or bonded seams against water	In accordance with DIN EN 1928 Procedure A, arrangement of the joint or bonded seam centrally under the pressure cylinder - 100 kPa over 72h	Sealed	T-joint: Sealed Longitudinal seam: Sealed Cross seam: Sealed
Watertightness of the joint or bonded seams against water	ASTM D 5385	Sealed	T-joint, longitudinal seam and cross seam: sealed up to 69 m water column or 6.9 bar
Shear resistance of the joint seams after water ageing	DIN EN 12317 Specimen: 50 mm x 360 mm V = 100mm/min L = 200 mm Seam width: 100 mm Test climate: DIN EN ISO 291-23/50-2 Storage temperature: 50°C Storage time: 28d 24h conditioning 23/50	[N/50mm]	Longitudinal edge (self-adhesive seam) x = 218 shear off in the bonded seam Butt joint (made with sealing tape) x = 143 shear off in the bonded seam
Shear resistance of the joint seams in the as-delivered condition	DIN EN 12317-2 Specimen: 50 mm x 360 mm V = 100mm/min L = 200 mm Seam width: 100 mm Test climate: DIN EN ISO 291-23/50-2	[N/50mm]	Longitudinal edge (self-adhesive seam) x = 174 shear off in the bonded seam Butt joint (made with sealing tape) x = 111 shear off in the bonded seam



Testing of rear running water safety in the event of damage	Rear running water safety in the event of damage in accordance with DIN EN 12390-8:2019-10 with increasing water pressure Testing on the composite body Substrate: Concrete C20/25 (28d) Test procedure: 1. Pressurisation: 24h with 0.5 bar 2. Pressure increase by 0.5 bar each time and 1h holding time, up to max. water pressure of 5 bar 3. Holding pressure: 5 bar for 7d 4. Increase to 6 bar for 21d	Sealed	Watertight no lateral water ingress into the boundary layer
Tensile adhesion strength membrane / concrete - reference sample	DIN EN 1348:2007-11 Substrate: C20/25 Storage temp.: 23°C Sample age: 7d	[N/mm ²]	x = 0.8 N/mm ² Fracture type: 100% cohesion nonwoven
Tensile adhesion strength membrane / concrete	DIN EN 1348:2007-11 Substrate: C20/25 Storage temp.: 23°C Sample age: 28d	[N/mm ²]	x = 1.1 N/mm ² Fracture type: 100% cohesion nonwoven
Tensile adhesion strength membrane / concrete after heat ageing	DIN EN 1348:2007-11 Substrate: C20/25 Storage temp.: 50°C Sample age: 28d	[N/mm ²]	x = 0.6 N/mm ² Fracture type: 71 % cohesion nonwoven / concrete
Functional test for joint bridging - watertightness	In accordance with the PG-FBB (Test Principles for Joint Waterproofing in Concrete Building Components) Test pressure: 5 bar over 28d Joint expansion: 1mm Test perpendicular to the joint with: - Arranged self-adhesive seam (overlap seam) - Arranged seam with seam securing (membranes butted)	Sealed	Sealed no water leakage from the joint area, no visible damp spots on the concrete surface

x = arithmetic mean s = smallest value l = largest value

Determination of resistance to hydrostatic pressure * = failure in the transition area between concrete slurry in the nonwoven area and concrete. Crack bridging capacity	EN 14224 Substrate: C20/25 (28d) Test climate: DIN EN ISO 291-23/50-2 Crack generation: 0.2 mm Crack widening: 0.2 mm - 2.0 mm in 60s Holding time: 24h Stressing in accordance with ASTM D 5385 at 5 bar, crack widening: 3.2 mm	Crack-bridging Sealed	No tearing or cracking; crack-bridging Sealed against 5 bar
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