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Institut für Baustoffe, Massivbau und Brandschutz | Materialprüfanstalt für das Bauwesen

Expert opinion

-TRANSLATION-

Document number:	(1204/358/23) – eHe dated 22/10/2023
Client:	Gefinex GmbH Jakobsdorfer Straße 1 16928 Pritzwalk, Germany
Order date:	08/08/2023
Order received:	08/08/2023
Subject of the order:	Expert opinion on the usability of a plastic waterproofing sheet in accordance with DIN EN 13967 for construction waterproofing on the basis of building authority provisions; here: Waterproofing sheet **"GEFITAS®-RS"**
Reason:	Change to the building authority provisions for the use of waterproofing sheets for construction waterproofing (BA) **on floor slabs with water exposures of class W1-E**, which deviate from the requirements of DIN SPEC 20000-202.
Basis for assessment:	See Section 1 and determined properties, listed in the general building authority test certificate No. P- 5141/822/11 MPA BS dated 22/10/2018 by MPA Braunschweig

This expert opinion consists of 6 pages, including the cover sheet and 3 annexes.

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1 Subject, usability and field of application

1.1 Subject

The construction product "GEFITAS® RS" is a plastic waterproofing sheet (moisture barrier type T) with the following structure (from top to bottom):

- Aluminium composite carrier film (sealing layer; PE film with integrated aluminium foil); thickness approx. 150 µm; width approx. 130 cm; colour "blue" or "black".
- PE foam lamination (protective layer); thickness approx. 3.0 mm; width of foam backing approx. 125 cm; colour "transparent".

The unlaminated lengthwise edge of the sheet is fitted on one side with an approx. 15 mm wide butyl self-adhesive strip on the underside of the foam.

The sealing function is performed by the aluminium composite carrier film.

- GEFITAS® system connection strip R300: Structure same as "GEFITAS® RS"; but surface layer thickness 300 µm PE; width 20 cm with approx. 15 mm wide butyl self-adhesive strips on both sides of the lengthwise edge of the sheet (foam underside)
- GEFITAS® system connection strip R300 Plus: Structure same as GEFITAS® system connection strip R300 with film base
- GEFITAS® fixing tape: approx. 10 cm wide, butyl-based elastic fixing tape with transparent PE film as carrier material
- GEFITAS® sealing tape approx. 15 mm wide butyl self-adhesive strip
- GEFITAS® sealant and adhesive: Bitumen-based sealant in a cartridge

1.2 Usability and field of application

The sheet corresponds to the harmonised material standard EN 13967[1], which was published in the Official Journal of the European Union (issue 09/03/2018) dated 01/03/2013 in version 2012 under reference C092/06 and must be taken into account for the sealing of structures in Germany[2].
On the basis of Annex ZA to DIN EN 13967, the manufacturer has declared the sheet's conformity by means of a declaration of performance and has provided the sheet with a CE marking. The product data sheet containing the declared properties is included as Annex 1.

[1] DIN EN 13967:2012-07; Flexible sheets for waterproofing – Plastic and rubber damp proof sheets including plastic and rubber basement tanking sheet – Definitions and characteristics (09/03/2018 2018/C 092/06)
[2] hEN list: List published by DIBt (German Institute for Construction Technology) dated 04 June 2019 of the harmonised standards published in the Official Journal of the European Union.

In accordance with the Model Administrative Provisions - Technical Building Rules[3], Section B 2.2.5.5 for construction waterproofing made of plastic and elastomer sheets against ground moisture and water, it requires compliance with the provisions of the national application standard DIN SPEC 20000-202[4], Section 5.3 "Plastic and elastomer sheets in accordance with DIN EN 13967 and DIN EN 14909." If the waterproofing sheets deviate from the provisions mentioned there, the following building authority provisions shall apply for the application of the sheets, depending on the water exposure classes in accordance with DIN 18533-1[5] and DIN 18533-2[6] and depending on the fields of application:

a) In conjunction with the water exposure classes

- W1.1-E and W1.2-E – field of application walls in contact with soil
- W2.1-E and W2.2-E – field of application walls and floor slabs
- W3-E – field of application earth-covered ceiling surfaces
- W4-E – field of application in and under walls

, the usability based on the model building code[7] must be verified using a "general construction technique permit" from DIBt (German Institute for Construction Technology), which is the approval body for construction products and construction methods.

b) In conjunction with the water exposure classes

- W1.1-E and W1.2-E – field of application on the floor slab
- W4-E - field of application wall bases exposed to splash water

, a proof of usability is not required in case of a deviation from DIN SPEC 20000-202 on the basis of the technical regulations of the MVV TB under Section D 2.2.2.11 "Waterproofing materials against moderate or low exposure to non-pressing water."

[3] Model Administrative Provisions – Technical Building Rules (MVV TB), issue 2021/1, published on 17/01/2022 by Deutsches Institut für Bautechnik, Kolonnenstraße 30 B, 10829 Berlin, Germany
[4] DIN SPEC 20000-202:2016-03; Application of construction products in structures – Part 202: Application standard for flexible sheets for waterproofing according to European standards for the use as waterproofing of elements in contact with soil, of indoor applications and of tanks and pools
[5] DIN 18533-1:2017-07; Waterproofing of elements in contact with soil – Part 1: Requirements and principles for design and execution
[6] DIN 18533-2:2017-07; Waterproofing of elements in contact with soil – Part 2: Waterproofing with waterproofing materials in sheet form
[7] Model building code -MB= version November 2002 last changed by resolution of the Conference of Ministers of Construction dated 22/02/2019

1.3 Classification of the waterproofing sheet and tolerances

From an expert perspective, the product "GEFITAS® RS" can be classified in Table 2, No. 4 (FPO) with regard to its material type, and in Table 3, No. 7 (sheets with lamination) application type EB of DIN V 20000-202 with regard to its product structure and intended application. The building authority application provisions for sheets in accordance with DIN EN 13967 are taken from MVV TB, Section B 2.2.5.5 "Construction waterproofing against ground moisture and water made from plastic and elastomer sheets." The properties in accordance with DIN SPEC 20000-202, Section 5.3.5, Table 30 (PE plastic sheets with foam lamination for waterproofing on floor slabs against ground moisture [EB]) are used to determine the specified classification of the sheet. The values declared for the sheet in accordance with Annex 1 deviate from the requirements prescribed with regard to thickness and elongation at break as follows:

Values in accordance with DIN EN 13967			**Requirement in accordance with DIN SPEC 20000-202; Table 30 (EB)**
Property	**Test procedure**	**Declaration in accordance with Annex 1**	
Thickness	EN 1849-2	Surface layer d_{eff} x = 0.100 mm (+ 0.030 mm / - 0.015 mm)	≥ 0.3 mm (thickness without lamination and/or self-adhesive coating)
Tensile properties - elongation at break	DIN EN 12311-2 Procedure A	Elongation at break % lengthwise > 15 across > 10	 ≥ 30 ≥ 30

The sheet deviates with regard to its structure as follows:

- Aluminium composite carrier film (sealing layer; PE film with integrated aluminium foil) as opposed to a PR plastic sheet

2 Properties and application provisions

2.1 Properties and characteristics of the sheet

The verifiable properties and characteristics in accordance with DIN EN 13967 were established by MPA Braunschweig (NDS01) on samples from a supplied "GEFITAS® RS" plastic waterproofing sheet. The results are given in Annex 2.

Additional tests were carried out by the testing laboratory, taking into account the construction method. The type of tests and the results are compiled in Annex 3.

2.2 Application recommendations for producing the surface waterproofing

On the basis of the properties determined in accordance with Section 2.1, the waterproofing sheet "GEFITAS® RS" may, from an expert perspective, be used as a sheet in accordance with DIN V 20000-202 Table 3, No. 9 (application type EB) for construction waterproofing. In this respect, the following special application recommendations shall apply:

Substrate

- The substrate shall be resistant to pressure, level, free of cavities, burrs and free of contamination which can damage the sheet.

Waterproofing of floor slabs

- When applied horizontally on the floor slab, at least a single layer of the waterproofing sheet must always be installed so it is protected, either between the floor slab and directly applied screed, between the floor slab and directly applied insulation (floating screed), or between a height-adjustment (e.g. levelling screed, bonded fill) and supported insulation (floating screed), or between the insulation and the directly applied screed.
- The waterproofing sheet must be loosely laid, with the foam lamination facing downwards on the substrate and a sheet overlap of at least 5 cm. The integrated butyl self-adhesive tape is used for waterproofing the lengthwise overlap.
- End joins shall be implemented with an overlap of 5 cm using the system accessory "GEFITAS® sealing tape" with self-adhesive butyl strips or the bitumen-based "GEFITAS® sealant and adhesive (cartridge)".
- Connections of the moisture barrier to penetrations and rising components shall be created using the GEFITAS® system accessories ("GEFITAS® R300 connection strips", "GEFITAS® R300 Plus connection strips", "GEFITAS® fixing tape", "GEFITAS® sealing tape" or "GEFITAS® sealant and adhesive), with an overlap of 5 cm in each case.
- The GEFITAS® waterproofing sheet shall be placed against the damp proof course or bonded to it in such a way that moisture bridges are prevented, in particular in the area of rendered surfaces.

Visual inspection

- Before additional layers are created, a thorough visual inspection shall be carried out on the "GEFITAS® RS" waterproofing sheet and any damage shall be eliminated in accordance with the manufacturer's recommendations. Installation of additional layers shall take place immediately after approval.

The application recommendations specified above shall apply with regard to the design and dimensioning of construction waterproofing. Furthermore, the basic details of DIN 18533 Part 1 and 2 as well as the manufacturer's general information and laying and processing instructions shall also apply.

3 Expert evaluation of the field of application

On the basis of the existing technical regulations (see Section 1.2), it can be confirmed that the "GEFITAS® RS" waterproofing sheet, marked in accordance with DIN EN 13967 CE, with the properties listed under Section 2 as well as Annex 2 and Annex 3, complies with the building control requirements of MVV TB, Section B 2.2.5.5 and is suitable for use in the relevant fields of application listed below without a separate building authority proof of usability (general building authority test certificate (abP) in accordance with the old regulation (BRL) and general construction technique permit (aBG) in accordance with the new, current regulation):

- Waterproofing on floor slabs in contact with the ground against ground moisture (DIN 18533 Part 1 and 2: W1.1-E and W1.2-E)

This document is the translated version of the expert opinion no 1204/358/23 eHe dated 22/10/2023. The legally binding text is the aforementioned German expert opinion.

Braunschweig, 22/10/2023

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Annex 1: Manufacturer's product data sheet with declared values

Produktdatenblatt

Eigenschaften	Prüfverfahren	Einheit	Art der Ergebnisse	Wert oder Festlegung
Beschreibung	Abdichtungsbahn aus Kunststoff für die Bauwerksabdichtung gegen Bodenfeuchte nach DIN EN 13967; Typ A und Typ T. Dicht gegen Radongas aus dem Erdreich			
Produkt	GEFITAS® RS			
Aufbau	Verbundfolie PE-Alu-PE mit integrierter rückseitiger Schutzlage aus PE-Schaum und Kautschukkleberand			
Artikelnummer	15393			
Hersteller	Gefinex GmbH, Jakobsdorfer Str. 1, 16928 Pritzwalk			
Wasserdichtheit	EN 1928, Verf. A: 60 kPa / 24 h	-	bestanden	bestanden
Zugfestigkeit:	EN 12311-2, Verf. A			
• maximale Zugkraft		N/ 50 mm	MLV	l ≥ 140; q ≥ 100
• Dehnungsverhalten		%	MLV	l ≥ 15; q ≥ 10
Dauerhaftigkeit nach künstlicher Alterung	EN 1296 EN 1928	-	bestanden	bestanden
Dauerhaftigkeit gegenüber Chemikalien (Alkalilösung)	EN 1928 EN 1847	-	bestanden	bestanden
Bitumenverträglichkeit	EN 1548 EN 1928	-	bestanden	bestanden
Weiterreißwiderstand	EN12310-1	N	MLV	l ≥ 80; q ≥ 70
Widerstand gegen Stoßbelastung	EN 12691 Verf. A, Fallhöhe 100 mm	-	dicht	dicht
	EN 12691 Verf. B, Fallhöhe 100 mm	-	dicht	dicht
Scherwiderstand der Nähte	EN12317-2	N/ 50 mm	MLV	≥ 25
Widerstand gegen statische Belastung	EN 12730, Verf. B (20 kg; Beton)	kg	dicht	dicht
Wasserdampfdurchlässig- keit	EN 1931	m	MDV	≥ 1500
		kg/m²/s		1 Exp-10 (± 30%)
Brandverhalten	EN ISO 11925-2 EN13501-1	-	Euroklasse	Klasse E
Länge	EN 1848-2	m	MDV	40 (± 0,4)
Breite	EN 1848-2	mm	MDV	1300 (± 20)
Dicke				
• Deckschicht auf Alu	EN 1849-2	µm	MDV	100 (+30,- 15)
• Schaum	EN 1849-2	mm	MDV	3,0 (± 0,5)
Masse	EN 1849-2	g/m²	MDV	280 (± 30)
Geradheit	EN 1848-2	mm	MLV	≤ 50
Sichtbare Mängel	EN 1850-2	-	Sichtbare Mängel	keine
Besondere Hinweise	Innerhalb von 6 Monaten verarbeiten. Verarbeitungstemperatur +5°C bis 30°C; Lagertemperatur max. 30°C; nicht bei intensiver Sonneneinstrahlung verarbeiten. Rollen können stehend oder liegend transprotiert werden. Rollen dürfen nicht gestapelt werden			

Annex 2: Identified properties and characteristics of the GEFITAS® RS waterproofing sheet in accordance with DIN EN 13967

Values in accordance with DIN EN 13967				Requirement in accordance with DIN SPEC 20000-202; Table 30 (EB)
Property	**Test procedure**	**Unit Type of result**	**Findings**	
Watertight against water in liquid phase	DIN EN 1928 procedure B	[-] passed	tight to 2 kPa ⇒ passed	tight to 2 kPa ⇒ passed
Resistance to static loads	EN 12730 procedure B	[kg]	Procedure B imposed load 20 kg tight	≥ 15 kg
Tensile properties - Tensile strength = maximum tensile force *) - Elongation at break = Elongation at maximum tensile force. *)	EN 12311-2	[N/50 mm] [%]	Tear resistance [N/50 mm] lengthwise x = 201 s = 8.00 across x = 195 s = 4.30 Elongation at break [%] lengthwise x = 24.0 s = 1.64 across x = 14.3 s = 0.60	≥ 80 N/50 mm ≥ 80 N/50 mm ≥ 30% ≥ 30%
Durability of water tightness against artificial ageing	EN 1296 and EN 1928 procedure A	[-] passed	after stress tight to 2 kPa	n/ req.
Durability of water tightness against chemicals (alkali resistance)	EN 1847 and EN 1928 procedure A	[-] passed	after stress tight to 2 kPa	passed
Tear resistance – nail shank –	EN 12310-1	[N]	Lengthwise x = 161 s = ±8.97 across x = 154 s = ±4.13	≥ 50 N ≥ 50 N
Resistance to impact	EN 12691	[mm]	Procedure A 1500 mm drop height watertight Procedure B 150 mm drop height watertight	≥ 100 n/ req.
Shear resistance of the joint seams	EN 12317-2	[N/50mm]	Adhesive seam (lengthwise edge) x = 33.0 N/50 mmss = ±2.68 Shearing in the adhesive seam	n/ req.

*) Failure of lamination

Continued on next page

Annex 2: Continuation of table
Identified properties and characteristics of the GEFITAS® RS in accordance with DIN EN 13967

Values in accordance with DIN EN 13967				Requirement in accordance with DIN SPEC 20000-202; Table 30 (EB)
Property	**Test procedure**	**Unit Type of result**	**Findings**	
Water vapour permeability	EN 1931	[m] and [kg/m²·s]	g: 2.96 ·10^{-10} (kg/m² s) s_D : ≥ 1500 m	n/ req.
Compatibility with bitumen	EN 1847 and EN 1928	[-] passed	tight to 2 kPa ⇒ passed	passed
Reaction to fire	EN 13501-1	[-] Class E	Class E	Class E
Length	EN 1848-2	[m]	x = 40 m	n/ req.
Width	EN 1848-2	[mm]	Surface layer/sealing layer x =1297 mm	n/ req.
Thickness	EN 1849-2	[mm]	Surface layer/sealing layer x = 117 µm Foam thickness x = 2.85 mm	≥ 0.3 mm
Mass	EN 1849-2	[g/m²]	x = 310 g/m²	n/ req.
Straightness	EN 1848-2	[mm] ≤ 75 passed	x = 3 mm/10 m ⇒ passed	≤ 75 mm passed
Visible defects	EN 1850-2	no visible defects	no visible defects	no visible defects

n/ req.: no requirement
x = mean value
g = density of moisture flow rate, sd = diffusion-equivalent air layer thickness

Annex 3: Identified properties and characteristics of the GEFITAS® RS waterproofing sheet in accordance with additional tests by MPA Braunschweig

Property	Test procedure	Findings
Water tightness of the sheet against water in liquid phase	DIN EN 1928 procedure B with 400 kPa over 72 hrs.	tight to 400 kPa
Shear resistance of the joint seams	DIN EN 12317-2 Test specimen 50 mm x 360 mm v = 100 mm/min Free clamping length: 200 mm Test climate: DIN EN ISO 291-23/50-2	**Adhesive bonding of waterproofing sheet "GEFITAS® RS" with:** "GEFITAS® sealing tape" [1] Shear resistance [N/50 mm] x = 58 s = ± 1.8 Failure in the adhesive seam "GEFITAS® sealant and adhesive" [2] Shear resistance [N/50 mm] x = 24 s = ± 5.7 Failure in the adhesive seam "GEFITAS®-fixing tape" [3] Shear resistance [N/50 mm] x = 14 s = ± 0.3 Failure in the adhesive seam "GEFITAS® R300 connecting strip" or "GEFITAS® R300 PLUS connecting strip" [4] [5] Shear resistance [N/50 mm] x = 23 s = ± 1.4 Failure in the adhesive seam
Durability against thermal ageing	DIN EN 1296 and DIN EN 1928 procedure B	after stress watertight to 60 kPa
Durability against chemicals	DIN EN 1847 (saturated lime water solution) and EN 1928 procedure B	after stress watertight to 60 kPa
Compatibility with bitumen	EN 1548 and EN 1928 procedure B	after stress watertight to 60 kPa

1) "GEFITAS® sealing tape" approx. 15 mm wide butyl self-adhesive strip
2) "GEFITAS® sealant and adhesive": Bitumen-based sealant in a cartridge
3) "GEFITAS® fixing tape": approx. 10 cm wide, elastic fixing tape on butyl basis with transparent PE film as carrier material
4) "GEFITAS® R 300 connecting strip": Structure same as "GEFITAS®PE 3/300"; width 20 cm with approx. 15 mm wide butyl self-adhesive strips on both sides of the lengthwise edge of the sheet (foam underside).
5) "GEFITAS® R 300 PLUS connecting strip": Structure same as "GEFITAS®PE 3/300"; width 20 cm with approx. 15 mm wide butyl self-adhesive strips with film base on both sides of the lengthwise edge of the sheet (foam underside)