

# SINTEF Technical Approval

## TG 20729

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 Provided listed on  
[www.sintefcertification.no](http://www.sintefcertification.no)

SINTEF confirms that

## Rhepanol® hfk roofing membrane

has been found to be fit for use in Norway and to meet the provisions regarding product documentation given in the regulation relating to the marketing of products for construction works (DOK) and regulations on technical requirements for building works (TEK), with the properties, fields of application and conditions for use as stated in this document.



### 1. Holder of the approval

FDT FlachdachTechnologie GmbH  
 Eisenbahnstrasse 6-8  
 68199 Mannheim  
 Germany  
[www.fdt.de](http://www.fdt.de)

### 2. Product description

Rhepanol® hfk is a roofing membrane of polyisobutylene (PIB), which is compatible with bitumen and free of plasticizers. The membrane has an integrated polyester fleece backing. The edges are unbacked to allow jointing by hot air welding. The product's upper side is grey while the underside is white, due to the fleece backing.

Measures and tolerances are shown in table 1.

Table 1  
 Measures and tolerances for Rhepanol® hfk  
 according to EN 1848-2 and EN 1849-2

Property	Measure	Unit	Tolerance
Thickness waterproofing layer	1.5	mm	+10 /-5 %
Total thickness (Waterproofing layer + fleece backing)	2.3	mm	+10 /-5 %
Area weight	1.920	kg/m²	+10 /-5 %
Width	0.5 / 1.0 / 1.5 / 2.05	m	+1 /-0,5 %
Length of roll	15	m	+5 /-0 %
Weight of polyester fleece backing	ca. 190	g/m²	+10 /-5 %

### 3. Fields of application

Rhepanol® hfk is intended for use for ballasted roof constructions on flat roofs. The product is loose-laid and ballasted with gravel, concrete tiles on pads or tilework of concrete. Rhepanol® hfk can also be used in extensive or intensive green roofs. Examples of use are shown in fig. 1 – 4.

The membrane cannot be used in mechanically fastened applications.

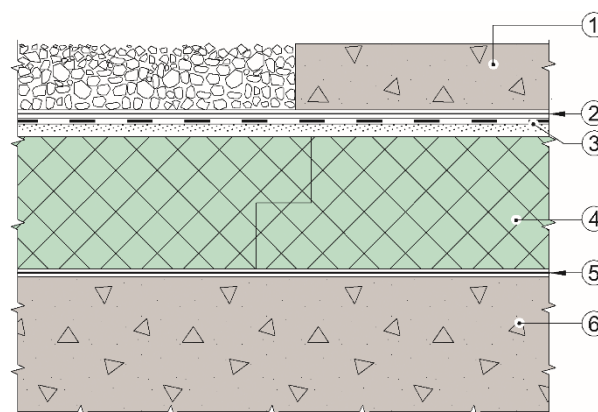


Fig. 1

Example of Rhepanol® hfk used as roofing with ballast on top.

- 1: Gravel, slabs of lightweight aggregate or concrete etc.
- 2: Protection layer of geotextile (e.g. FDT Kunststoffvlies 300g or FDT Schutzbahn)
- 3: Rhepanol® hfk
- 4: Thermal insulation
- 5: Vapour barrier (e.g. FDT Dampfsperre Rhepanol)
- 6: Supporting structure

Roofs must have adequate slope to drain water from rain and melted snow. SINTEF recommends in general a minimum slope of 1:40 for all roofs.

### 4. Properties

#### Product properties

Product characteristics for fresh material are shown in table 2.

#### Properties related to fire

Rhepanol® hfk is not classified as B<sub>ROOF</sub> (t2) according to EN 13501-5 regarding external fire performance for the substrates described in this document. To achieve satisfying fire resistance a suitable ballast, approved for the required fire resistance, should be used for buildings where such requirements are given, see clause 6, *Loose laying with ballast*.

#### Durability

The products has shown satisfying properties after artificial ageing.

SINTEF is the Norwegian member of European Organisation for Technical Assessment, EOTA, and European Union of Agrément, UEAtc

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**SINTEF AS**  
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 Enterprise register: NO 919 303 808 MVA

Table 2

Product characteristics for fresh material of Rhepanol® hfk

Property	Test method EN	Rhepanol® hfk		Unit
		DoP <sup>1)</sup>	Control limit <sup>2)</sup>	
Foldability at low temperature	495-5	≤ -40	≤ -40	°C
Dimensional stability	L T 1107-2	-1.0 +0.5	-1.0 +0.5	%
Water tightness (10 kPa / 24 h)	1928 (A)	-	Tight <sup>3)</sup>	-
Water tightness (10 kPa / 24h)	1928 (B)	Tight	-	-
Tear resistance	L/T 12310-2	≥ 150	≥ 150	N
Tensile strength	L T 12311-2 (A)	≥ 500 ≥ 450	≥ 500 ≥ 450	N/50mm
Elongation at max load L/T	12311-2 (A)	≥ 80	≥ 80	%
Elongation at break	L/T 12311-2 (A)	-	≥ 500	%
Average peel resistance	12316-2	≥ 180	-	N/50mm
Shear resistance joints	12317-2	≥ 250	≥ 250	N/50mm
Resistance to puncture by				
- Impact at +23°C	12691 (A)	≥ 700	≥ 700	mm
- Impact at -10°C	12691:2001	-	10 <sup>3)</sup>	mm diameter
- Static load	12730 (A)	20	≥ 20	kg
- Static load	12730 (B)	20	-	kg
Resistance to root penetration	FLL-method	Passed	Passed <sup>3) 4)</sup>	-

<sup>1)</sup> The manufacturers Declaration of performance, DoP<sup>2)</sup> Control limit shows values the product has to satisfy during internal factory production control and audit testing.<sup>3)</sup> Result from type testing<sup>4)</sup> Requirement when the membrane is used in connection with soil cover and planting

L = Longitudinal

T = Transversal

## 5. Environmental aspects

### Substances hazardous to health and environment

Rhepanol® hfk contains no hazardous substances with priority in quantities that pose any increased risk for human health and environment. Chemicals with priority include CMR, PBT or vPvB substances.

### Effect on soil, surface water and ground water

The leaching properties of Rhepanol® hfk are evaluated to have no negative effects on soil or water.

### Waste treatment/recycling

Rhepanol® hfk shall be sorted as residual waste. The product shall be delivered to an authorized waste treatment plant for energy recovery.

### Environmental declaration

An environmental declaration (EPD) has been worked out according to EN 15804 for Rhepanol® hfk. For complete documentation see EPD no. EPD nr. EPD-FDT-20200119-IAA1-DE, [www.ibu-epd.com](http://www.ibu-epd.com).

## 6. Special conditions for use and installation

### Installation

Rhepanol® hfk shall be installed by specialized trained craftsmen in accordance with the manufacturer's guidelines. Special attention must be given to protect any combustible materials on the roof during hot works.

Rhepanol® hfk is loosely laid with a seam overlap of min. 50 mm (minimum 80 mm when using EPS insulation on a warm roof construction), and the membrane seams are securely joined by hot air welding. At all flashings and trims, built-in details etc., linear perimeter fixing with at least 4 fasteners/m is required.

The substrate shall be thoroughly cleaned before installation, without sharp edges that may puncture the membrane. Particularly it should be checked that the membrane is not damaged by impacts from sharp objects, or objects being tramped into the membrane during installation.

The roofing membrane shall generally be installed in accordance with the manufacturer's guidelines and the principles shown in SINTEF Building Research Design Guide no. 544.202 *Takfolie. Egenskaper og tekking* and 544.204 *Tekking med asfalttakbelegg eller takfolie. Detaljløsninger*, plus "TPF informerer nr. 5 Innfesting av fleksible takbelegg, dimensjonering og utførelse" published by Takprodusentenes Forskningsgruppe (TPF), see [www.tpf-info.org](http://www.tpf-info.org).

### Loose laying with ballast

The membrane is laid loosely with a ballast weight. Necessary ballast must be calculated according to SINTEF Building Research Design Guide no. 544.202 *Takfolie. Egenskaper og tekking* and "TPF informerer nr. 5 Innfesting av fleksible takbelegg, dimensjonering og utførelse", clause 6.1 *Ballast*.

After welding the ballast must be applied immediately on the loose-laid roofing membrane to secure its position against wind uplift. The ballast can either be gravel, concrete tiles on pads, tilework of concrete, or soil and sedum vegetation for green roofs.

See fig. 1 – 4.

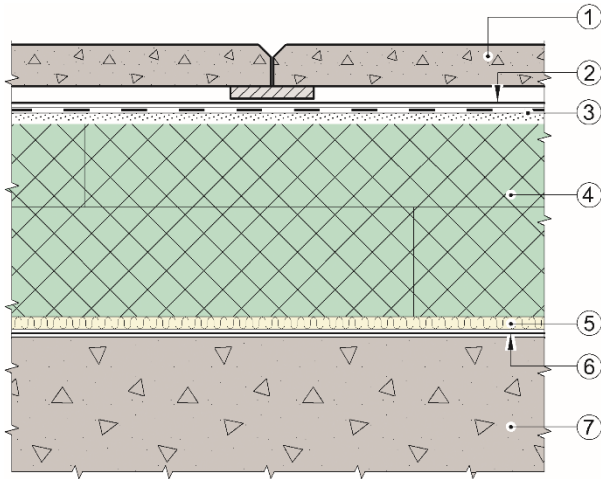


Fig. 2  
Example of Rhepanol® hfk used as roofing with concrete slabs on top.

- 1: Concrete slabs on bricks
- 2: Protection layer geotextile (e.g. FDT Kunststoffvlies 300g)
- 3: Rhepanol® hfk
- 4: Thermal insulation
- 5: Optional acoustic underlay
- 6: Vapour barrier (e.g. FDT Dampfsperre Rhepanol)
- 7: Supporting structure

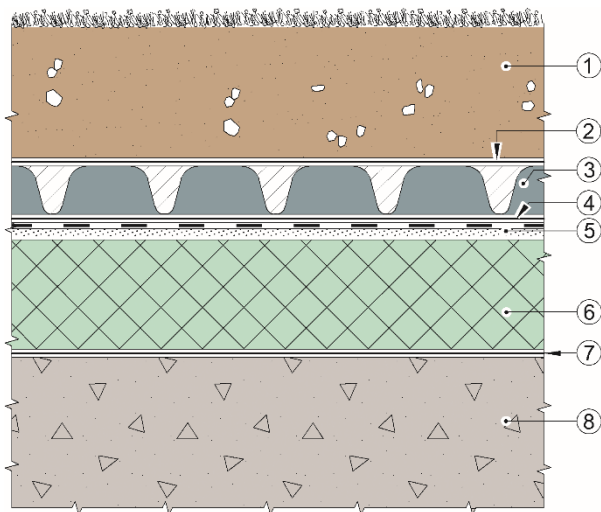


Fig. 3  
Example of Rhepanol® hfk used in an intensive green roof

- 1: Soil
- 2: Filtering layer geotextile (e.g. FDT Kunststoffvlies 300g)
- 3: Drainage layer
- 4: Optional protection layer geotextile
- 5: Rhepanol® hfk
- 6: Thermal insulation
- 7: Vapour barrier (e.g. FDT Dampfsperre Rhepanol)
- 8: Supporting structure

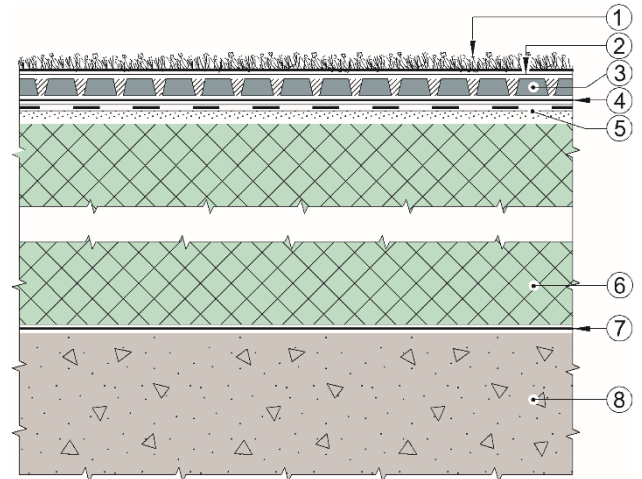


Fig. 4  
Example of Rhepanol® hfk used in an extensive green roof

- 1: Sedum Vegetation
- 2: Optional filtering layer geotextile
- 3: Drainage layer
- 4: Optional protection layer geotextile (e.g. FDT Kunststoffvlies 300g)
- 5: Rhepanol® hfk
- 6: Thermal insulation
- 7: Vapour barrier (e.g. FDT Dampfsperre Rhepanol)
- 8: Supporting structure

Adequate covering or ballast on the roofing membrane for fire protection are;

- 40-60 mm gravel
- Slabs of concrete without any spacing

Any other ballast or coverings must be documented to give the required fire resistance of the roof with the actual substrates.

The roof slope should not exceed 3° to prevent the ballast slipping off. In case of steeper roof slopes, application is to be agreed with the FDT Technical Department.

#### Substrate

When a fire classification is required the substrate must be in accordance with the provisions stated in clause 4 regarding *Properties related to fire*.

Substrates of combustible insulation such as EPS, XPS or PIR must be covered or divided, and also replaced with non-combustible insulation around bushings and adjacent constructions according to regulations in "Veiledning om tekniske krav til byggverk" § 11-9 and further description in "TPF informerer nr. 6 Brann tekniske konstruksjoner for tak", published by Takprodusentenes Forskningsgruppe (TPF), see [www.tpf-info.org](http://www.tpf-info.org).

Combustible insulation can normally only be used on uncombustible roof constructions with the required loadbearing capacity and measures must be taken to protect the insulation. For guidance on use of combustible insulation on roofs see SINTEF Building Research Design Guide no. 520.339 *Bruk av brennbar isolasjon i bygninger*.

For use of the product on green roofs there are special requirements and limitations, see "TPF informerer nr. 10 Bygningmessige aspekter ved prosjektering og bygging av grønne tak", published by Takprodusentenes Forskningsgruppe ([www.tpf-info.org](http://www.tpf-info.org)).

### Gripfix system

The Gripfix system is a supplementary, optional system that can be used to fasten the membrane to the substrate. The Gripfix system consists of a hook and loop tape that is mechanically fastened to the substrate and positioned transversally to the longitudinal direction of the membrane's underside, on which the membrane's fleece backing is attached. See fig. 5 and 6.

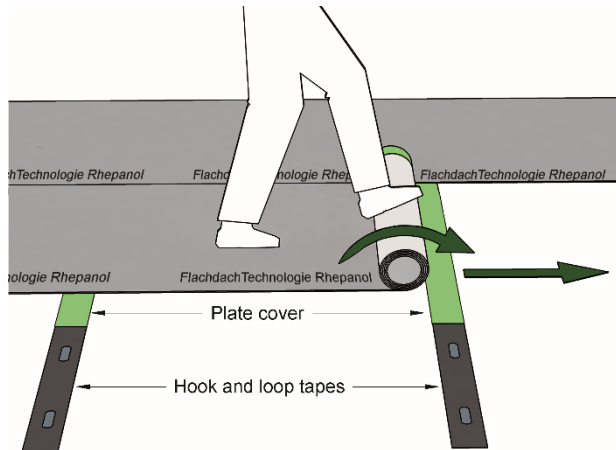


Fig. 5

Illustration of Rhepanol® hfk used with Rhepanol Gripfix System. Rhepanol® hfk is rolled out transversally across the Rhepanol Gripfix hook and loop tapes. During installation of the roofing the hook and loop tapes are covered with plates. Once the roofing membrane is aligned the plates are removed to allow the membrane's fleece backing to attach to the hook and loop tapes.

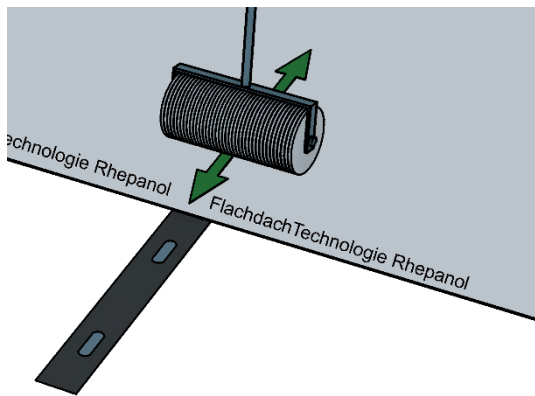


Fig. 6

Illustration of Rhepanol® hfk used with Rhepanol Gripfix System. After removal of the plate covering Rhepanol® hfk is fastened to the Rhepanol Gripfix hook and loop tape by rolling the FDT Universal roll on top of the membrane at least twice along the hook and loop tape.

### Traffic on the roof

Special precautionary measures should be taken to protect the roofing membrane if the roof is expected to have more traffic than is necessary for inspection and maintenance purposes only.

### Cleaning and maintenance

Before starting any welding, as a part of repair work, the roofing membrane must be cleaned locally, in accordance with the manufacturer's guidelines.

### Transport and storage

Rhepanol® hfk shall be stored in a dry location, placed on pallets and protected at the building site.

### 7. Factory production control

Rhepanol® hfk is produced by FDT FlachdachTechnologie GmbH, Eisenbahnstrasse 6-8, 68199 Mannheim, Germany.

The holder of the approval is responsible for the factory production control in order to ensure that Rhepanol® hfk is produced in accordance with the preconditions applying to this approval.

The manufacturing of Rhepanol® hfk is subject to continuous surveillance of the factory production control in accordance with the contract regarding SINTEF Technical Approval.

The manufacturer FDT FlachdachTechnologie GmbH has a quality system which is certified according to EN ISO 9001.

### 8. Basis for the approval

The evaluation of Rhepanol® hfk is based on reports owned by the holder of the approval.

The evaluation of design and technical solutions are based on recommendations given in SINTEF Building Research Design Guides.

### 9. Marking

All rolls shall be marked on their packaging with name of manufacturer, product name, batch number and/or manufacturing date.

Rhepanol® hfk is CE-marked in accordance with EN 13956.

The approval mark for SINTEF Technical Approval TG 20729 may also be used.

### 10. Liability

The holder/manufacturer has sole product responsibility according to existing law. Claims resulting from the use of the product cannot be brought against SINTEF beyond the provisions of Norwegian Standard NS 8402

for SINTEF

*Hans Boye Skogstad*

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Approval Manager