

SINTEF confirms that

Rhenofol CV, mechanical fastened roofing membranes

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 Flachdach Technologie GmbH
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 Germany
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2. Product description

Rhenofol CV are roofing membranes, made of PVC-P, with a core of synthetic polyester fabric. Stabilizer and plasticizer have been added to make the PVC coating resistant to UV radiation as well as to high and low temperatures. The products can be applied in different colours with a dark grey bottom side.

Measures and tolerances are shown in table 1.

Table 1
 Measures and tolerances for Rhenofol CV roofing membranes¹⁾

Property	CV 1,5	CV 1,8	CV 2,0	Unit	Tolerance
Thickness	1,5	1,8	2,0	mm	+10%/-5%
Area weight	1,85	2,25	2,48	kg/m ²	+10%/-5%
Width	2,05 1,50 1,03 0,68 0,50	2,05 1,50 1,03	1,50	m	+1%/-0,5%
Length of roll	20/15	15	15	m	+5%/-0%
Weight, core	ca.100	ca.100	ca.100	g/m ²	-

¹⁾ Measured according EN 1848-2 and EN 1849-2.

3. Fields of application

Rhenofol CV products are intended for use as exposed, mechanically fastened roofing membranes on flat and pitched roofs, see Fig. 2.

Roofs must have adequate slope to drain water from rain and melting snow. SINTEF Building and Infrastructure recommends that all roofs have an inclination of minimum 1:40.

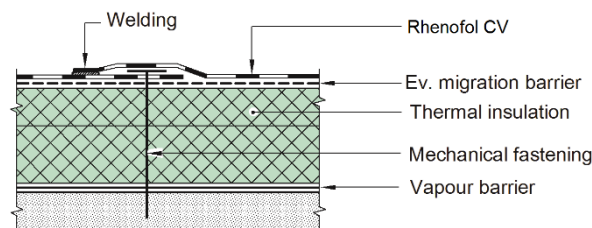


Fig. 1
 Rhenofol CV, mechanically fastened in a straight roof construction.

4. Properties

Material properties

Product properties for fresh material are shown in table 2.

Safety in case of fire

Rhenofol CV products fulfil the requirements of class B_{ROOF} (t2) according to EN 13501-5 on substrates, shown in table 3. Tests are performed according CEN/TS 1187-test 2.

Calculation of fasteners

Load capacities for fastening the roofing membrane with approved types of fasteners are shown in Table 4. The capacities relate to the fastening of the membrane itself.

The strength of the hold to weak underlay may limit the overall capacity of the fixing points. The lowest value for membrane/foundation must always be used.

Calculation of fastener spacing is carried out according to SINTEF Building Research Design Sheet 544.206 *Mekanisk feste av asfalttakbelegg og takfolie på flate tak* and "TPF Informs No. 5" published by Takprodusentenes Forskningsgruppe.

Durability

The products have shown satisfying properties after artificial ageing associated with type- and annual control testing.

Table 2
Product properties for fresh material of Rhenofol CV roofing membranes

Property	Test-method EN	CV 1,5		CV 1,8		CV 2,0		SINTEFs recommended minimum values	Unit
		DoP ¹⁾	Control-limit ²⁾	DoP ¹⁾	Control-limit ²⁾	DoP ¹⁾	Control-limit ²⁾		
Foldability at low temperature	495-5	≤ -30	≤ -30	≤ -30	≤ -30	≤ -30	≤ -30	≤ -25	°C
Dimensional stability	1107-2	± 0,2	± 0,2	± 0,2	± 0,2	± 0,2	± 0,2	± 0,5	%
Water tightness (10 kPa)	1928 (A)	-	Tight	-	Tight	-	Tight	Tight	-
Tear resistance	L T 12310-2	≥ 180 ≥ 180	≥ 180 ≥ 180	≥ 180 ≥ 180	≥ 180 ≥ 180	≥ 180 ≥ 180	≥ 180 ≥ 180	≥ 180	N
Tensile strength	L T 12311-2 (A)	≥ 1000 ≥ 1000	≥ 1000 ≥ 1000	≥ 1000 ≥ 1000	≥ 1000 ≥ 1000	≥ 1000 ≥ 1000	≥ 1000 ≥ 1000	≥ 600	N/50mm
Elongation	L T 12311-2 (A)	≥ 15 ≥ 15	≥ 15 ≥ 15	≥ 15 ≥ 15	≥ 15 ≥ 15	≥ 15 ≥ 15	≥ 15 ≥ 15	≥ 10	%
Average T-peel resistance	12316-2	≥ 250	≥ 250	≥ 250	≥ 250	≥ 250	≥ 250	≥ 150	N/50mm
Shear resistance / joints	12317-2	≥ 900	≥ 900	≥ 900	≥ 900	≥ 900	≥ 900	≥ 600	N/50mm
Puncturing									
-Impact v/+23 °C	12691 (A)	≥ 500	≥ 500	≥ 500	≥ 500	≥ 500	≥ 500	≥ 400	mm
-Impact v/ -10 °C	12691:2001	-	≤ 15	-	≤ 15	-	≤ 15	≤ 15	mm/diam
-Static load	12730 (A)	-	≥ 20	-	≥ 20	-	≥ 20	≥ 20	kg

¹⁾ Manufacturers Declaration of Performance, DoP.

²⁾ Control limit shows the values the product has to satisfy during internal factory production control and audit testing

Table 3
Rhenofol CV has fire classification B_{ROOF} (t2) on following substrates

Type substrate	Rhenofol CV
EPS	No
EPS + min. 120g/m ² glass fleece	Yes
Stone wool	Yes
Particle boards	No
Particle boards + min. 120g/m ² glass fleece	Yes
Concrete / silicate plates	Yes
Old roofing membrane on EPS	No
Old roofing membrane on EPS + min. 120g/m ² glass fleece	Yes
Old roofing membrane on stone wool	Yes
Old roofing membrane on particle board	No
Old roofing membrane on particle board + min. 120g/m ² glass fleece	Yes
Old roofing membrane on concrete / silicate plates	Yes

Table 4
Design capacities at ultimate limit state for mechanical fasteners in Rhenofol CV roofing membrane

Fastening system/Fastener	Capacity, N per fastener
EJOT Ecotek 50 x L	680

5. Environmental aspects

Substances hazardous to health and environment

The product 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 the product are evaluated to have no negative effects on soil or ground water.

Waste treatment/recycling

The product shall be sorted as residual waste on the building/demolition site. 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 Rhenofol CV and Rhenofol CG. For complete documentation see EPD no. EPD-FDT-20180020-IAA1-DE, <https://ibu-epd.com/>.

6. Special conditions for use and installation

Design considerations for fasteners

Fastening with normal steel washer in longitudinal overlap joints can be used for solid substructures such as wood-based roof sheathing or on concrete.

On thermal insulation with compressive strength ≥ 80 kPa (class CS (10) 80 according to EN 13162/13163), plastic fasteners with integrated sleeve are preferably used.

When roofing membranes are installed on insulation material with lower compression strength, the tightening of the fasteners must be controlled and fasteners with good telescopic action must be used.

Installation

The joints of Rhenofol CV are welded by use of hot air, and the membranes shall be installed by specialized trained craftsmen in accordance with the manufacturer's instructions. The products shall also be used in accordance with the principles shown in SINTEF Building Research Design Sheet:

- 544.202 Takfolie. Egenskaper og tekking
- 544.204 Tekking med asfalttakbelegg eller takfolie. Detaljløsninger
- 544.206 Mekanisk feste av asfalttakbelegg og takfolie på flate tak,

as well as in "TPF Informs No. 5".

Underlay

When a fire classification is required the underlay must be in accordance with the provisions stated in table 3 regarding "Safety in case of fire".

When the roofing is installed directly on aged PVC, or on insulation of EPS or XPS insulation a separate migration barrier of glass felt, minimum 120 g/m² must be used.

When the membrane is installed on old asphalt roofing a separate migration barrier, minimum 150 g/m², shall be used.

Inspections and maintenance

The roofing membranes must be cleaned locally before starting any welding of joints as a part of repair work.

Roof traffic

When roof traffic is expected to exceed the traffic required for normal inspection visits and maintenance, special precaution should be taken to protect the roofing membrane.

Transport and storage

Rhenofol CG should be stored on dry places or protected by wrapping. The rolls can be placed horizontally or vertically on pallets at the building site.

7. Factory production control

The product is produced by FDT Flachdach Technologie GmbH, Eisenbahnstrasse 6-8, 68199 Mannheim, Germany

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

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

The manufacturer FDT Flachdach Technologie GmbH has a quality system which is certified by TÜV SÜD Management System GmbH, according to EN ISO 9001, certificate no. 12 100 22279 TMS.

8. Basis for the approval

Material- and design data has been verified by type testing, and are documented in the following reports:

- SINTEF, report 2018:00162, dated 31.01.2018, Material properties
- SP Sweden, report 5P09194, dated 17.12.2015, Fire resistance
- SP Sweden, report 5P09194-1rev1, dated 28.12.2015, Fire classification.
- MPA Darmstadt, report K 15 1541.7, dated 26.10.2015, Material properties
- MPA Darmstadt, report K 15 0262.11, dated 22.04.2015, Material properties
- Institut Bauen und Umwelt e.V., report EPD-FDT-20180020-IAA1-DE, dated 26.02.2018, EPD
- MPA Stuttgart, report 902 1441 000-2, dated 23.09.2014, Fire classification

9. Marking

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

The product is CE marked in accordance with EN 13956.

The approval mark for SINTEF Technical Approval No. 20602 may also be used.



Approval mark

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
Approval Manager