SINTEF

SINTEF Certification

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Technical Approval

SINTEF confirms that

Elevate RubberGard EPDM LSFR 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

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2. Product description

The Elevate RubberGard EPDM LSFR Roofing Membrane is manufactured on the basis of a copolymer of ethylene, propylene and dienic (unsaturated) compounds; oils, carbon black, fillers, supplements and vulcanising agents. This compound is calendered, followed by vulcanisation.

The Elevate RubberGard EPDM LSFR Roofing Membrane is unreinforced and available in two thicknesses. The membrane's measures are given in Table 1. The standard colour is black.

Table 1
Measures and tolerances of Elevate RubberGard EPDM LSFR Roofing Membrane according to EN 1848-2 and EN 1849-2

Property	Value		Tolerance
Thickness	1.1 mm	1.5 mm	-5% +10%
Surface weight	1.35 kg/m²	1.85 kg/m²	-5% +10%
Width	3.05 m, 5.08 m, 6.10 m, 7.62 m, 9.15 m, 12.20 m, 15.25 m	3.05 m, 5.08 m, 6.10 m, 7.62 m, 9.15 m, 12.20 m, 15.25 m	-0.5% +1%
Roll length	30.50 m	30.50 m	-0% +5%

Other roll sizes available on demand.

For installation of the membrane the following supplementary Elevate products can be delivered:
- Quickseam RMA strips
- Metal Batten Bar
- AP Fastener
- QuickPrime LVOC primer
- QuickSeam Batten Cover

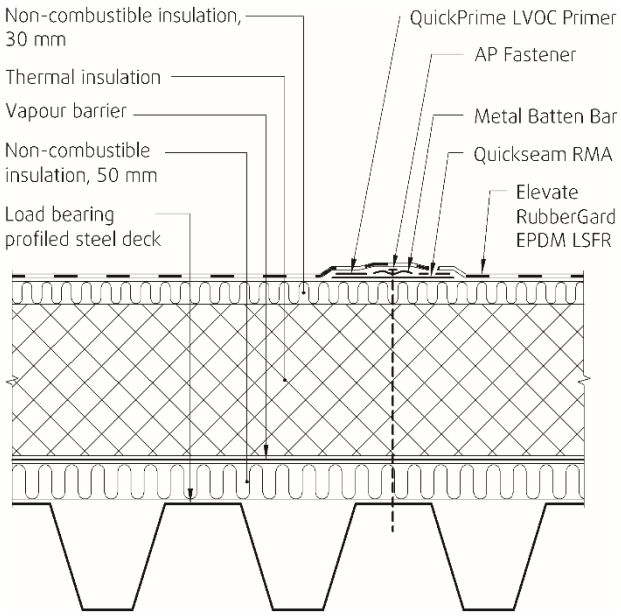

Fig. 1
Example of roof construction with mechanically attached Elevate RubberGard EPDM LSFR Roofing Membrane

3. Fields of application

Elevate RubberGard EPDM LSFR roofing membrane is used as an exposed, mechanically attached roofing membrane on flat and sloping roofs, as given in Fig. 1. The product cannot be used as an exposed, mechanically attached roofing when B_{ROOF} (t2) fire classification is required.

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

The membrane may also be used under turf roofing with roof slope higher than 6°, see Fig 2 and 3. The membrane can also be used for the turf roofing "Rockwool Torvtak" compact solution with Rockwool RockTorv® insulation as shown in SINTEF Technical Approval No. 2488.

Elevate RubberGard EPDM LSFR Roofing Membrane can be used as roofing on all types of underlay, but needs a separate levelling layer on rough substrates and aluminium.

Table 2
Product characteristics for fresh material of Elevate RubberGard EPDM LSFR Roofing Membrane, thickness 1.1 and 1.5 mm

Property	Test method EN	DoP [1]	Control limit [2]	Unit
Foldability at low temperature	495-5	≤ -45	≤ -45	°C
Dimensional stability	1107-2		≤ 0.5	%
Water tightness (10 kPa)	1928 (A)	Pass	Pass	-
Tear resistance (Trapezoidal) L/T	12310-2	≥ 40	≥ 40	N
Tensile strength (L/T)	12311-2 (B)	≥ 7	≥ 7	N/mm²
Elongation (L/T)	12311-2 (B)	≥ 300	≥ 300	%
Peel resistance of joint, average [5]	12316-2	≥ 50	≥ 50	N/50mm
Shear resistance of joint [5]	12317-2	≥ 200	≥ 200	N/50mm
Resistance to impact - wooden substrate – without felt - wooden substrate – with felt - aluminium substrate – without felt - aluminium substrate – with felt	12691 (A)	≥200 (1.1 mm)	≥1500 [4] ≥1500 [4] ≥200 (1.1 mm) ≥300 (1.5 mm)	mm
Resistance to impact – soft substrate	12691 (B)	≥ 1700 (1.1 mm) ≥ 2000 (1.5 mm)	≥ 1700 (1.1 mm) ≥ 2000 (1.5 mm)	mm
Resistance to static load – hard substrate	12730 (B)	≥ 20	≥ 20	kg
Resistance to static load – soft substrate	12730 (A)		≥ 15	kg
Water absorption [3]	UEAtc MOAT 66 §4.3.13		≤ 2	%
Root Resistance [3]	13948	Pass	Pass	-

[1] Manufacturer's Declaration of Performance, DoP
[2] The stated values are control limits existing for internal control at the producer and by supervising control.
[3] Results from type testing
[4] Modified to substrate on wood material
[5] Peel-/Shear resistance between Elevate RubberGard EPDM LSFR Roofing Membrane treated with QuickPrime LVOC Primer and QuickSeam Batten Cover strip

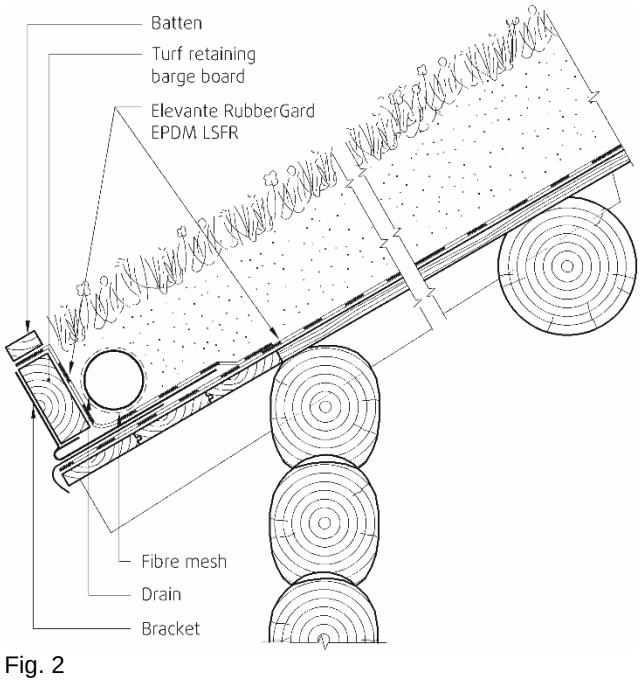

Fig. 2
Example of the use of Elevate RubberGard EPDM LSFR Roofing Membrane as waterproofing membrane in a non-insulated turf roof with internal gutter. Un-insulated turf roofs can be used over unheated buildings.

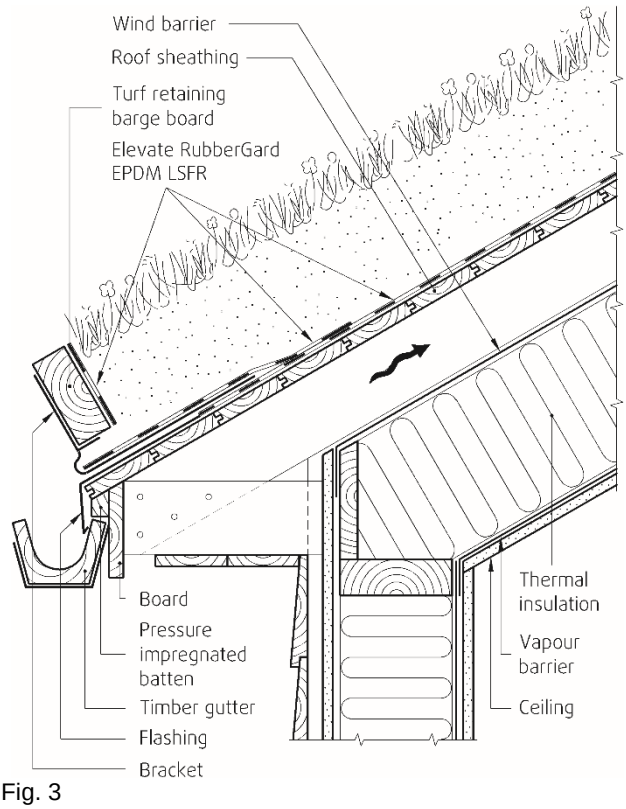

Fig. 3
Example of the use of Elevate RubberGard EPDM LSFR Roofing Membrane as waterproofing membrane in an insulated turf roof with external gutter

4. Properties

Product characteristics for fresh material are shown in table 2.

Safety in case of fire

Elevate RubberGard EPDM LSFR Roofing Membrane has a B_{ROOF} (t1) classification on several substrates regarding spread of flames according to EN 13501-5

Elevate RubberGard EPDM LSFR is classified as class E according to EN 13501-1.

Durability

The membrane has shown satisfying properties based on testing after artificial ageing in laboratory.

The membrane is assessed to have satisfying durability against root penetration in green roof.

5. Environmental aspects

Chemicals 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 water.

Waste treatment/recycling

The product shall be sorted as metal and residual waste. The product shall be delivered to an authorized waste treatment plant for metal and energy recovery.

Environmental declaration

No environmental declaration (EPD) has been worked out for the product.

6. Special conditions for use and installation

Transport and storage

At the site Elevate RubberGard EPDM LSFR Roofing Membrane must be stored flat on a clean smooth substrate without sharp objects and be protected against unfavourable weather conditions.

6.1 Exposed mechanically attached membrane

Safety in case of fire

The product cannot be used as an exposed, mechanically attached roofing when B_{ROOF} (t2) fire classification is required.

Installation

The Elevate RubberGard EPDM LSFR Roofing Membrane can only be installed by companies that are authorized by Holcim Solutions and Products EMEA BV.

The QuickSeam R.M.A. strips are first placed on the substrate, and mechanically attached with Metal Batten Bars or approved washers and fasteners. The membrane is then rolled out on the substrate without tension and adhered to the mechanically attached self-adhesive QuickSeam R.M.A. strips using QuickPrime LVOC primer. The intermediate distance between the QuickSeam RMA attachment strips depends on the acting wind forces.

In order to prepare the seams, the adjacent membranes must be placed flush, the seaming surface should be treated with QuickPrime LVOC Primer and afterwards the QuickSeam Batten Cover strip has to be applied.

Fastening with AP Fastener and Metal Batten Bar can be used to attach the QuickSeam RMA strips on rigid underlay, i.e. on wood based roof sheeting, concrete or steel deck with an insulation material with good compression strength (> 100 kPa).

The membrane shall further be used in accordance with the principles shown in SINTEF Building Research Design Guides 544.202 *Takfolie. Egenskaper og tekking* and 544.204 *Tekking med asfalttakbelegg eller takfolie. Detaljløsninger.*

Calculation of fasteners

Load capacities for fastening the roofing membrane with various types of acceptable fasteners are shown in Table 3. The given capacities are related to fastening of the membrane itself onto a steel deck with minimum thickness of 0.75 mm. When fixing to weaker substrates, the load capacity of the fastener can be limited. The lowest value for membrane/foundation must always be used. See technical approvals of the relevant fasteners and substrates for capacity control for other combinations.

Calculation of fastener spacing is carried out according to SINTEF Building Research Design Guides 544.206 *Mekanisk feste av asfalttakbelegg og takfolie på flate tak* and "TPF Informerer Nr. 5" published by Takprodusentenes Forskningsgruppe.

Cleaning and maintenance

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

Roof traffic

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

Table 3
Design capacity at ultimate limit state for the attachment of the Elevate RubberGard EPDM LSFR Roofing Membrane in combination with the QuickSeam RMA strip, mechanically attached to steel deck substrate with thickness ≥ 0.75mm

Fastener/Fastening system	Design capacity N / fastener
- with Metal Batten Bars and AP Fastener Ø 6.1 mm	1130 [1)] / (900 [2)])
- with Metal Batten Bars and SFS IR2 steel screw	1050 [1)]
- with SFS Intec IR 32x40 and SFS Intec IR2 steel screw	750 [2)]
- with SFS Iso-Tak TFP and SFS Intec BS4.8 steel screw	675 [2)]
- with Ejot HTK 2G and Dabo TRK/TKE 4.8 fastener	593 [2)]
- with Guardian SPA 82x40 and DBTA 4.8 fastener	850 [3)]
- with Guardian RBS 50 and BS 4.8 fastener	915 [3)]
- with Guardian R(P) 45 and BS 4.8 fastener	719 [3)]
- with Eurofast DVP-EF-8040N and EDS B 4.8 fastener	850 [3)]

[1)] Measured according to the Nordtest method NT BUILD 307.
[2)] Measured according to method EOTA ETAG 006 and the safety factor γ_m=1.5
[3)] Measured according to method EN 16002 and the safety factor used in Norway γ_m=1.3.

6.2 Turf Roofing

Roof constructions

Elevate RubberGard EPDM LSFR Roofing Membrane can be installed on roof constructions that are intended for the applied turf and shall be performed according to the principles as outlined in the SINTEF Building Research Design Guides 544.803 regarding the slope, insulation, strength, ventilation etc.

Underlay

The Elevate RubberGard EPDM LSFR Roofing Membrane shall be installed on roof substrates made from boards or wood based panels. The substrate shall be smooth and free of sharp objects which could damage the membrane. On rough roof substrates, a protection fleece should be used between the membrane and the substrate.

Installation

The membrane can be installed along or across the slope of the roof, and joints shall have a minimum overlap of 100 mm. The joints between the membranes are performed using self-adhesive tape and primer.

Attachment

The membrane needs to be sufficiently mechanically attached so that the membrane remains in place and is not torn off the roof during the period between installation of the membrane and installation of the turf ballast.

If turf brackets for the turf retaining barge board are not to be mounted, mechanical attachment of the membrane along the bottom roof edge should be provided. Also, any termination should be mechanically attached.

Termination at gutter

The turf retaining barge board can be mounted by use of turf brackets which shall be mechanically attached to load bearing element. It is recommended to use screws down into the timber rafter/joist.

General installation details

Details such as corners, roof penetrations, drains etc shall be performed in accordance with the principles of SINTEF Building Research Design Guides 544.202 *Takfolie. Egenskaper og tekking*.

Installation of the turf

The turf can be directly laid over the Elevate RubberGard EPDM LSFR Roofing Membrane. The turf shall be installed in accordance with the instructions of the supplier and with SINTEF Building Research Design Guides 544.803 *Torvtak.*

7. Factory production control

The product is produced by Holcim Solutions and Products US LLC in Prescott, Arkansas, USA.

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 has a quality system which is certified by Lloyd's Register according to ISO 9001, certificate no. 10516231.

8. Basis for the approval

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

- Belgian Building Research Institute. Report no DE651XI190-1 10_261-1 (2011)
- Belgian Building Research Institute. Report no DE651XI182 10_253-1 (2011)
- Belgian Building Research Institute. Report no DE651XI182 10_253-2 (2011)
- Belgian Building Research Institute. Report no DE651XE756 (2005)
- BDA Keuringsinstituut Report no 0369-L-10/14 (2011)
- BDA Keuringsinstituut Report no 0369-L-10/15 (2011)
- BDA Keuringsinstituut Report no 0369-L-10/16 (2011)
- BDA Keuringsinstituut Report no 0369-L-10/17 (2011)
- BDA Keuringsinstituut Report no 0369-L-10/18 (2011)
- BDA Keuringsinstituut Report no 0369-L-10/20 (2011)
- BDA Keuringsinstituut Report no 0369-L-10/21 (2011)
- BDA Keuringsinstituut Report no 0369-L-10/22 (2011)
- BDA Keuringsinstituut Report no 0369-L-10/23 (2011)
- BDA Keuringsinstituut Report no 0369-L-10/24 (2011)
- LGAI (Laboratori General d'Assaigs i Investigació) Technological Center. Report no. 11-2431-388 (2011)
- LGAI (Laboratori General d'Assaigs i Investigació) Technological Center. Report no.09_32300483 (2009)
- LGAI (Laboratori General d'Assaigs i Investigació) Technological Center. Report no. 11-2431-398 (2011)
- SINTEF Byggforsk. Test report O20540, dated 18.12.2006
- SINTEF Byggforsk, Test report 3D036001 (A), dated 28.03.2011, and 3D036001 (B), dated 12.04.2011
- IFI (Institut für Industrieaerodynamic GmbH). Report no. 23/2014 (2014)
- Constructech. Report no. 201309091530390001-8A (2013)
- Constructech. Report no. 201309091530390001-11 (2013)
- Constructech. Report no. 201309091530390001-12B (2013)
- Constructech. Report no. 201309091530390001-14B (2013)
- Belgian Building Research Institute. Report no. DE651XD857 DUB 2157/1 (2003)
- Belgian Building Research Institute. Report no. DE651XD857 DUB 2157/2 (2003)
- Belgian Building Research Institute. Report no. DE651XF401 CAR6126/1 (2006)
- BDA Keuringsinstituut Report no. 0303-L-09/2 (2011-12-22), durability against humus and roots

9. Marking

All rolls/packages shall be marked with the manufacturer, manufacturer's production code, product name and date of production.

The product is CE marked in accordance with EN 13956.

The approval mark for SINTEF Technical Approval No. 2565 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