

# SINTEF Technical Approval

## TG 20617

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

SINTEF confirms that

## Norbit Solo single-layer bitumen 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

Protan AS  
 P.O. Box 420 Brakerøya  
 3002 Drammen  
[www.protan.no](http://www.protan.no)

### 2. Product description

Norbit Solo is a single-layer bituminous roofing membrane with polyester felt reinforcement. The reinforcement is impregnated with SBS modified bitumen. The upper face is coated with SBS modified bitumen and slate granulate. The underside is coated with SBS modified bitumen and a thin Polyethylene foil. The product can be delivered with different colours on the upper face.

Standard measures and tolerances are given in table 1.

Table 1  
 Measures and tolerances for Norbit Solo according to 1848-1 og 1849-1

Property	Value	Unit	Tolerance
Thickness	4.4	mm	
Weight	5.5	kg/m <sup>2</sup>	±10 %
Width	1	m	+1/ -0 %
Roll length	8	m	+3 / -0 %
Weight of reinforcement	ca. 200	g/m <sup>2</sup>	

### 3. Fields of application

Norbit Solo is used as a single-layer bituminous roofing membrane on sloped and flat roofs. The roofing membrane is intended used as a mechanically fastened single-layer roofing membrane as shown in fig. 1, but can also be used as a ballasted roofing membrane.

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 properties for fresh material are shown in table 2.

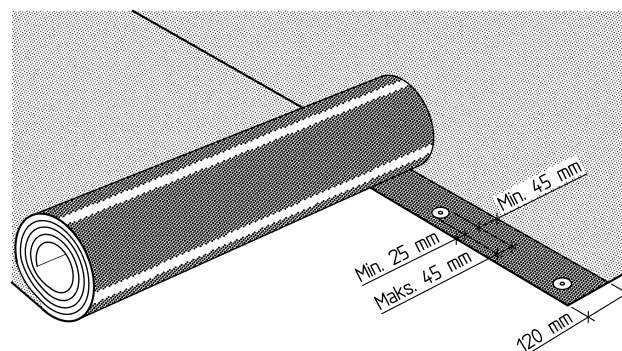


Fig. 1  
 Norbit Solo single-layer bitumen roofing membrane is installed with minimum 120mm welded overlap.

#### Properties related to fire

Norbit Solo fulfils the requirements of class B<sub>ROOF</sub> (t2) according to EN 13501-5 regarding external fire performance on substrates shown in table 3. Testing is performed according to CEN/TS 1187, test 2.

#### Durability

Norbit Solo has shown satisfying properties after artificial ageing in connection with type-testing and audit testing performed by SINTEF.

#### Fastening capacity

The design capacity for the fastening of the membrane with different fasteners and premises is given in table 4. The capacity applies to the connection between the membrane and the fasteners and is determined in form of a system test according to EN 16002.

For weak substrates the connection between the substrate and the fastener might limit the capacity. This must be considered. The lowest value for the fastening in membrane/substrate must always be used.

Calculation of fastener spacing is carried out according to SINTEF Building Research Design Guide no. 544.206 *Mekanisk innfesting av asfalttakbelegg og takfolie på skrå og flate tak* and "TPF Informerer nr. 5" published by Takprodusentenes Forskningsgruppe (TPF), see [www.tpf-info.org](http://www.tpf-info.org).

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

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Table 2.

Product properties for fresh material of Norbit Solo

Property	Test method EN	Norbit Solo		SINTEF's recommended minimum performance <sup>3)</sup>	Unit
		DoP <sup>1)</sup>	Control limit <sup>2)</sup>		
Dimensional stability	1107-1	-	Max. $\pm 0.3$	$\pm 0.6$	%
Flexibility at low temperature	1109	$\leq -20$	$\leq -20$	-15	°C
Upper face					
Lower face			$\leq -20$	-15	
Flow resistance at elevated temperature	1110	-	110	90	°C
Water tightness 10 kPa/24 h	1928 (A)	Tight	Tight <sup>5)</sup>	Tight	-
Adhesion of granules <sup>4)</sup>	12039	-	$\leq 2.5$	2.5	g
Resistance to tearing L/T (nail shank)	12310-1	200 -0/+50 %	$\geq 200$	150	N
Tensile strength	12311-1	950 $\pm 20$ %	$\geq 760$	600	N/50 mm
L		750 $\pm 20$ %	$\geq 600$		
T					
Elongation L/T	12311-1	35 $\pm 15$	$\geq 20$	10	%
Average peel resistance of joints	12316-1	160 $\pm 25$ %	$\geq 120$	50	N/50 mm
Shear resistance of joints	12317-1	800 $\pm 25$ %	$\geq 600$	600	N/50 mm
Resistance to:	12691 (A) 12691:2001 12730 (A)	$\geq 1000$ - $\geq 20$	$\geq 1000$ $\leq 30$ <sup>5)</sup> $\geq 20$	500 30 20	mm mm diam. kg
Impact +23 °C					
Impact -10 °C					
Static loading					
Watertightness after stretching at low temperature (10% elongation at -10 °C)	13897	-	Tight <sup>5)</sup>	Tight	-

<sup>1)</sup> The manufacturer's Declaration of performance, DoP<sup>2)</sup> Control limit shows values the product must satisfy during internal factory production control and audit testing.<sup>3)</sup> SINTEF's recommended minimum performance in SINTEF Technical Approval for single-layer bituminous roofing membrane<sup>4)</sup> Modified to only give the result of weight loss of granules in gram acc. to EN 544<sup>5)</sup> Result from type testing

Table 3

Norbit Solo has fire classification B<sub>ROOF</sub> (t2) on following substrates

Type of substrate	Norbit Solo
EPS <sup>1)</sup>	No
Mineral wool <sup>1)</sup>	Yes
Wood particle board	Yes
Concrete / calcium silicate	Yes
Old roofing membrane on EPS	No
Old roofing membrane on mineral wool	Yes
Old roofing membrane on wood particle board	Yes
Old roofing membrane on concrete or calcium silicate plates	Yes

<sup>1)</sup> Standard substrates according to CEN/TS 1187, test 2.

Table 4

Design capacity at ultimate limit state for the attachment of Norbit Solo with different fastening systems

Fastening system, Fastening in 120 mm welded joint	Design capacity N/fastener.
Guardian RBS-50 plastic washer and Guardian BS-4,8 screw Tested on soft substrate, attachment in steel plate Distance between fasteners: C/C 237 mm	829 <sup>1)</sup>
Guardian R45 plastic washer and Guardian BS-4,8 screw Tested on soft substrate, attachment in steel plate Distance between fasteners: C/C 320 mm	769 <sup>1)</sup>
Guardian SP40 metal pressure plate and Guardian TS 5,2 x 35 screw Tested on firm substrate, attachment in plywood board Distance between fasteners: C/C 320 mm	846 <sup>1)</sup>
SFS RP-45 plastic washer SFS BS-4,8 screw Tested on soft substrate, attachment in steel plate Distance between fasteners: C/C 320 mm	846 <sup>1)</sup>
SFS MW-40-FH steel washer and SFS IWF-T-B40 5,2x35 screw Tested on firm substrate, attachment in plywood board Distance between fasteners: C/C 320 mm	923 <sup>1)</sup>

<sup>1)</sup> Tested according to EN 16002. Design capacity calculated with the safety factor used in Norway;  $\gamma_m=1.3$

## 5. Environmental aspects

### *Substances hazardous to health and environment*

Norbit Solo 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*

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

### *Environmental declaration*

No environmental declaration (EPD) has been worked out for Norbit Solo.

## 6. Special conditions for use and installation

### *Installation*

The membrane shall be mechanically fastened with minimum 120 mm welded overlap with steel or plastic washers, see fig. 1. The fasteners must be positioned at a distance from the membrane edges that provides minimum 25 mm bonding on the inside and minimum 45 mm bonding on the outside of the fastener. Transverse joints must have an overlap of minimum 150 mm. The underlying corner is fastened, and the overlying corner is cut at an angle. A good result is achieved by 'drowning' the granules of the surface in bitumen before the joint is fully welded.

The roofing membrane shall generally be installed in accordance with the vendor's installation manual and the principles shown in SINTEF Building Research Design Guide no. 544.203 *Asfalttakbelegg. Egenskaper og tekking*, 544.204 *Tekking med asfalttakbelegg eller takfolie. Detaljløsninger* og 544.206 *Mekanisk innfesting av asfalttakbelegg og takfolie på skrå og flate tak*, plus "TPF informerer nr. 5" published by Takprodusentenes Forskningsgruppe (TPF), see [www.tpf-info-org](http://www.tpf-info-org).

### *Fasteners*

Normal steel washers may be used in longitudinal overlapping joints on firm substrates such as wood-based roof sheathing or concrete.

On substrates of thermal insulation with compressive strength  $\geq 80$  kPa (level CS(10)80 according to EN 13162/13163) steel washers with deep collars or plastic washers should be used.

Washers with integrated sleeves and good telescopic function must be used for installation on thermal insulation with lower compression strength, and the tightening of the fasteners must particularly be checked.

On substrates of mineral wool insulation washers with telescopic function of at least 30 mm must be used. Steel washers with deep collars can be used on mineral wool insulation with thickness up to 50 mm. Tightening of the fasteners must be adjusted to the substrate.

### *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 as EPS 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 SINTEF Building Research Design Guide no. 525.207 *Kompakte tak* and 520.339 *Bruk av brennbar isolasjon i bygninger*, plus "TPF informerer nr. 6" *Branntekniske konstruksjoner for tak* published by Takprodusentenes Forskningsgruppe.

### *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*

The rolls must be stored upright on pallets.

## 7. Factory production control

Norbit Solo is produced in Belgium and Poland for Protan AS.

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 certified according to EN ISO 9001 and an environmental management system certified according to EN ISO 14001.

## 8. Basis for the approval

The evaluation of Norbit Solo 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 with the name of the manufacturer, product name and the date of the production.

Norbit Solo is CE marked in accordance with EN 13707.

The approval mark for SINTEF Technical Approval No. 20617 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

A handwritten signature in blue ink, reading "Hans Boye Skogstad". The signature is written in a cursive style with a large, stylized 'H' and 'S'.

Hans Boye Skogstad  
Approval Manager