

# SINTEF Technical Approval

## TG 20727

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SINTEF confirms that

## e-ST-180 TT combined roofing underlay and wind barrier

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

Elements SRL  
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 31048 San Biagio Di Callalta Tv  
 ITALY

### 2. Product description

E-ST-180 TT combined roofing underlay and wind barrier is made of a diffusion open membrane which is sandwiched between two layers of non-woven polypropylene. The product has a light grey colour on both sides.

The product has a 65 mm wide adhesive strip along the underside of one edge, and a 65 mm wide adhesive strip along the upper side of the opposite edge.

Measures and tolerances are stated in table 1.

Table 1  
 Measures and tolerances for E-ST-180 TT

Property	Measurement	Unit	Tolerance
Width	1.30 / 1.50	m	±5 mm
Length	50	m	-0/+1m
Area weight	180	g/m <sup>2</sup>	± 5 %

### 3. Fields of application

E-ST-180 TT is used as combined roofing underlay and wind barrier in thermal insulated, pitched wooden roofs with ventilated roofing and external drainage.

The product is particularly suitable for roofs with continuous thermal insulation from eaves to roof ridge, see Fig. 3, but are also suitable for cold, unventilated roofs with thermal insulation in the ceiling. The product can be mounted both parallel with the rafters, see Fig. 1, and perpendicular with the rafters, see Fig. 2.

The product can be used as combined roofing underlay and wind barrier on roofs in buildings in hazard class 1-6 and fire class 1, 2 and 3 with exception for roofs in fire class 3 where pre-accepted performance states that all components must satisfy minimum class A2-s1,d0.

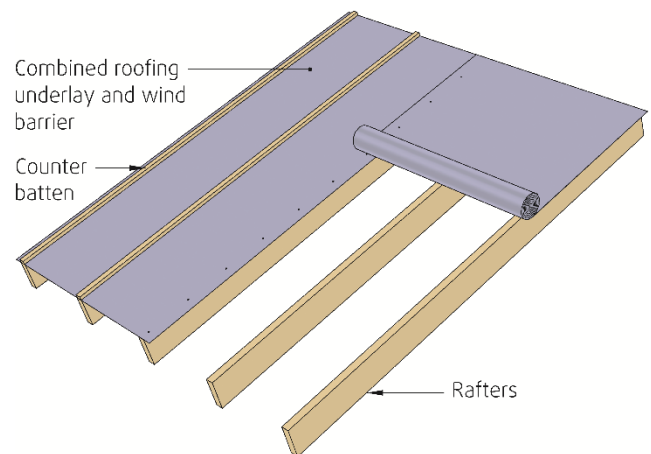


Fig. 1  
 E-ST-180 TT mounted parallel with the rafters.

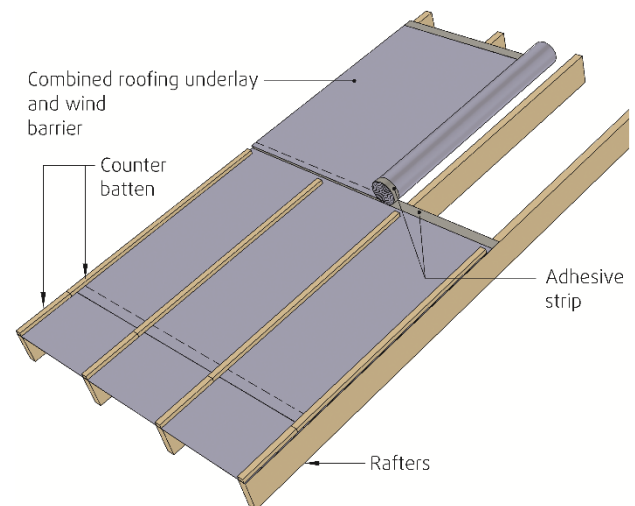


Fig. 2  
 E-ST-180 TT mounted perpendicular to the rafters

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Table 2  
Product properties

Property	Test method EN or other method	Declaration of performance <sup>1)</sup>	Control limit <sup>2)</sup>	Unit
Dimensional stability Longitudinal Transversal	1107-2	-	-0.4 <sup>3)</sup> 0.1 <sup>3)</sup>	%
Water tightness	1928	W1	Tight	-
Air tightness, material	12114	-	≤ 0.1 <sup>3)</sup>	m <sup>3</sup> /m <sup>2</sup> h50Pa
Air tightness, construction	12114	-	≤ 0.15 <sup>3)</sup>	m <sup>3</sup> /m <sup>2</sup> h50Pa
Rain tightness, construction	NT Build 421	-	Tight at 600 Pa pressure difference at 15° slope	-
Water vapour resistance, $s_d$ -value	ISO 12572	≤ 0.03	≤ 0.03	m
Tear resistance (nail shank) Longitudinal / Transversal	12310-1 / 13859-1	≥ 150	≥ 150	N
Tensile strength Longitudinal Transversal	12311-1 / 13859-1	≥ 330 ≥ 230	≥ 330 ≥ 230	N/50 mm
Elongation at max load Longitudinal Transversal	12311-1 / 13859-1	≥ 20 ≥ 20	≥ 20 ≥ 20	N/50 mm

<sup>1)</sup> Manufacturers Declaration of Performance, DoP

<sup>2)</sup> Control limit is the value the product must satisfy during internal factory production control and audit testing

<sup>3)</sup> Result from type testing

#### 4. Properties

##### *Product properties*

Product properties for fresh material are shown in table 2.

##### *Properties related to fire*

Reaction to fire performance for the product has not been determined.

##### *Durability*

E-ST-180 TT combined roofing underlays and wind barrier is considered to have satisfactory durability based on laboratory testing before- and after accelerated artificial climate ageing. The product must be protected against direct exposure to UV radiation in the final construction. The product must be covered as soon as possible after installation without unnecessary delay.

##### *Resistance against tread trough*

Resistance against tread through is not evaluated for E-ST-180 TT combined roofing underlay and wind barrier.

##### *Air tightness*

The airtightness of the wind barrier makes it possible to fulfil any requirements regarding airtightness ( $n_{50}$ ) given in the building regulations, and in the Norwegian passive house standards, before the vapour barrier is installed.

#### 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.

##### *Waste treatment/recycling*

The product shall be sorted as plastic. The product shall be delivered to an authorized waste treatment plant for material recycling or energy recycling.

##### *Environmental declaration*

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

#### 6. Special conditions for use and installation

##### *Design considerations*

Combined roofing underlay and wind barrier should not be used at especially exposed places where experience shows that drifting snow often may be packed between the roofing and the roofing underlay, e.g., valleys and saddle areas.

The roofing should be laid as soon as possible after the product is installed, to prevent that the underlay is exposed for a longer period of time. Thermal insulation, vapour barrier and ceiling should not be installed until the roofing has been laid and the underlay is checked to be properly mounted.

To minimize the pressure at the overlaps due to shrinkage of the rafters the moisture content of the rafters should be less than 20 % when mounting the roofing underlay.

The product is recommended for roofs with a pitch not less than 15°.

**Installation**

E-ST-180 TT combined roofing underlay and wind barrier shall be mounted in a way that makes the product form a waterproof and windproof layer. The use shall follow the principles in Byggeforskerien 525.101 *Skrå, luftede tretak med isolerte takflater*, 525.107 *Skrå tretak med oppholdsrom på deler av loftet* og 525.866 *Undertak*.

E-ST-180 TT combined roofing underlay and wind barrier can be mounted both parallel and perpendicular to the rafters with hot dip galvanized felt nails or staples (20 x 2.8, 20 x 2.5, or rapid staples 140/10) to fix the product.

When mounted parallel with the rafters, E-ST-180 TT is mounted continuously from roof ridge to eaves with no horizontal joints, see Fig. 1. Overlapping joints must be clamped to the rafters with counter battens to ensure that the product is made wind- and watertight.

When mounting E-ST-180 TT perpendicular to the rafters, the product is mounted continuously from gable to gable, see Fig. 2. The start of mounting shall always start at the eaves. The product must be mounted tight to avoid folds, and the adhesive strips must adhere to each other continuously along the edges. If there are vertical joints, the overlaps must be clamped to the rafters using counter battens.

When mounting E-ST-180 TT the adhesive strips must not be exposed directly to moisture.

**Connections to other components and structures**

E-ST-180 TT shall be installed with airtight connections to the wind barrier of exterior walls, and with airtight joints at the ridge and valley gutters. In addition, it is important that penetrations through the roof (chimney, roof windows, canals etc.) are water- and airtight.

Construction details for combined roofing underlays and wind barriers are shown in Building Research Design Guide 525.101 *Skrå, luftede tretak med isolerte takflater* and 525.866 *Undertak*. Fig. 3 shows an example of how to seal around a chimney penetrating the roofing underlay.

**Battens and air ventilation**

The roof shall be ventilated above the combined wind barrier and roofing underlay according to Table 3.

Table 3

Roof pitch	Recommended height of the counter battens (mm)		
	Length of rafter (m) <sup>1)</sup>		
	≤ 7.5	10	15
≤ 30°	36	36 + 36	48 + 48 <sup>2)</sup>
31 - 40°	30	36	36 + 23
≥ 41°	23	36	36 + 23

<sup>1)</sup> Measured along the pitched roof, from roof ridge to eave  
<sup>2)</sup> For large roofs and low-pitched roofs, it is most practical to use 48 mm counter battens. These counter battens must be fastened with screws to achieve good tightness

For larger roofs, the distance between roofing underlay and battens should be increased, see Building Research Design Guide 525.101 *Skrå, luftede tretak med isolerte takflater*. The counter battens must be mounted so they provide tight joints. It is recommended that the counter battens which are used to clamp overlap joints for the roofing underlay is not thicker than 36 mm. The counter battens are screwed with a maximum distance of 300 mm.

The screws are recommended to have no threads on the part that goes through the counter batten.

When mounting E-ST-180 TT perpendicular to the rafters, the counter battens must be cut in lengths reaching the lower edge of the adhesive strip and mounted gradually as the product is installed.

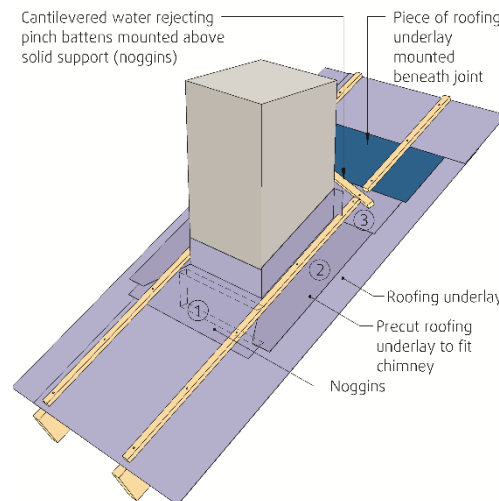


Fig. 3a Sealing around a chimney that penetrates the roofing underlay. Sleeves are mounted to ensure water and air tightness. These sleeves are made of E-ST-180 TT or prefabricated sleeves. Jointing paste is applied between the chimney and the sleeves. If tape products are used, the tape must be chemical compatible with the roofing underlay.

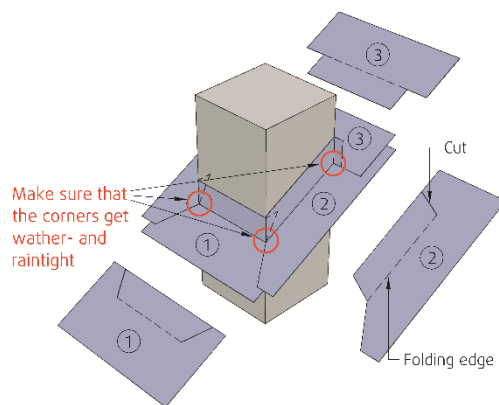


Fig. 3b Detail showing the folding and cutting solution around a chimney. Continuous lines are to be cut; discontinuous lines are to be folded. Jointing paste is applied in all joints.

**Roofs with attics**

E-ST-180 TT has sufficiently low vapour resistance to be used as roofing underlay in non-ventilated attic spaces as shown in Building Research Design Guide 525.107 *Skrå tretak med oppholdsrom på deler av loftet*.

**Combination with sarking board**

The product may be applied as roofing underlay in combination with wooden board sheathing, e.g., in constructions where thermal insulation is placed directly under the sarking boards, provided that the aggregated water vapour resistance is less than 0.5 m (s<sub>a</sub>-value). When reconstructing old roofs, the old roofing must be removed before the new, vapour open underlay, counter battens, and new roofing are installed.

A batten under the counter batten is used to obtain a tight joint and to reduce the possibility for leakage along a screw or nail. This batten is important when the sarking boards are not levelled, and the joints are across the sarking boards.

OSB sheets or plywood must have documented water vapour resistance if they are used as roof sheathing. Total water vapour resistance for all layers in the roofing underlay must be less than  $s_d = 0.5$  m.

#### *Transport and storage*

The product should be stored dry on a levelled, clean surface in its packaging and protected from sunlight.

#### **7. Factory production control**

The product is produced Elements SRL in Italy.

The holder of the approval is responsible for the factory production control to ensure that E-ST-180 TT combined roofing underlay and wind barrier 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 quality assurance system at the manufacturer is certified by DNV according to ISO 9001.

#### **8. Basis for the approval**

The evaluation of E-ST-180 TT combined roofing underlay and wind barrier is based on reports owned by the holder of the approval.

#### **9. Marking**

The packaging is marked with product name and vendor, and a code for production traceability. This code is also printed on the product.

The product is CE marked in accordance with EN 13859-1.

The approval mark for SINTEF Technical Approval TG 20727 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



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