SINTEF

SINTEF Certification

No. 2165

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Provided listed on www.sintefcertification.no

Technical Approval

SINTEF confirms that

Steni panels

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

Steni AS
Lågendalsveien 2633
NO-3277 Steinsholt
www.steni.no

2. Product description

Steni panels are stone composite panels made up of a core of crushed mineral stone covered on each side with a layer of fibreglass reinforced polyester resin containing a fire-retarding filler of aluminium hydroxide. The panels are produced in three different versions: *Steni Colour, Steni Nature* and *Steni Vision.*

Steni Colour comes with electroncured acrylic colours in three different colour glosses: mat surface with a microstructure, semi-gloss and high gloss with a smooth finish.

Steni Vision has a printed motive/design which is applied before the surface lacquering

Steni Nature has a surface of crushed natural materials set in a resin composite.

Steni panels are delivered in many colours. The panels have straight edges. The backside is smooth and unfinished.

Table 1 shows dimensions, tolerances and weight.

Supplementary products
Aluminium profiles with alloy 6060F22, EPDM foil for installations and Steni fasteners (screws). The fasteners are made of stainless steel A4 according to EN ISO 3506 with a polyester powder coating on the head. The screws are used for fastening panels to wood or metal profiles.

When plates are installed on wooden battens, with conditions described (reaction to fire) in table 3, EPDM foil must be used between plate and battens

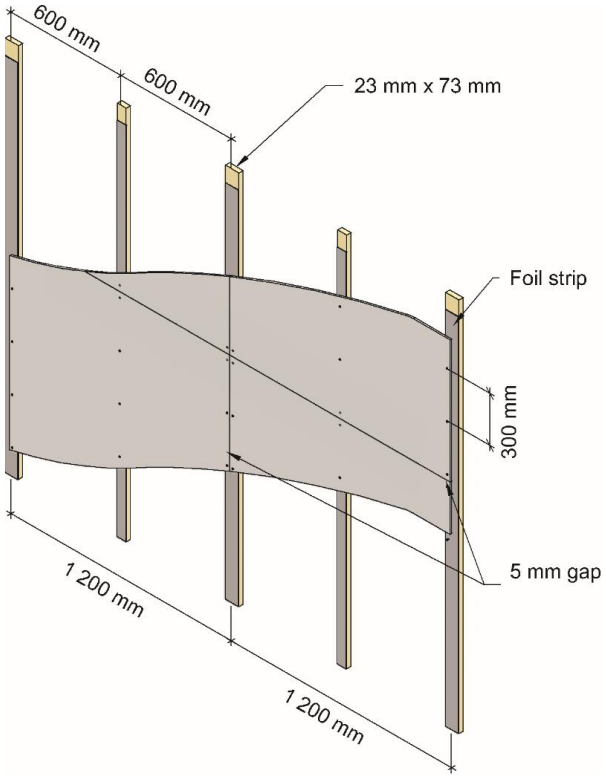


Fig. 1
Principle for vertical installation of Steni panels as fasade cladding on wood battens.

3. Fields of application

Steni Colour, Steni Vision and Steni Nature panels can be used as facade panels in ventilated exterior claddings in buildings in Risk classes 1-6 in Fire classes 1-3.

4. Properties

Strength and stiffness
Strength and stiffness properties for the panels are shown in Table 2. When 6 mm thick panels are installed on facades according to cl. 6 the wind load resistance based on testing with EN 438-2:2005 is equal to $q_{kast} = 2{,}9$ kN/m^2.

Reaction to fire
Steni panels have reaction to fire classification according to EN 13501-1 as shown in Table 3.

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Table1 Steni panels. Dimensions, tolerances and weight

Property	Value
Width and length, stock panels	1195 x 2995 ± 2 mm
Width by orders	≤ 1195 ± 2 mm
Length by orders	≤ 3500 ± 2 mm
Edge straightness (against ruler)	± 1 mm
Squareness (diagonal deviation)	≤ 3 mm
Density	1960 ± 3 % kg/m³
Thickness Steni Colour and Steni Vision	6,0 ± 0,6 mm
Thickness Steni Nature: Type FM Type F Type M and type M with glass Type C	ca. 5,5 mm ca. 6,5 mm ca. 8 mm ca. 14 mm
Weight Steni Colour and Steni Vision	ca.12 kg/m²
Weight Steni Nature: Type FM Type F Type M and type M with glass Type C	11 ± 10 %kg/m² 12 ± 10 % kg/m² 15 ± 10 % kg/m² 19 ± 10 % kg/m²

Table 2 Material properties for STENI panels

Property	Value	Test method
Bending strength	≥ 30 N/mm²	CSTB
E-module in bending	≥ 5000 N/mm²	EN ISO 178
Water absorption	< 1,5 %	ISO/R 62-178
Water vapour resistance, S_d (eqv. Air layer thickness)	Ca. 60 m	ASTM E 96-66
Temperature expansion	0,021 - 0,026 mm/(mK)	NBI [1)]
Heat resistance R	R ca. 0,01 m²K/W for ca. 6 mm plate	NBI-26:1983
Hard body impact resistance	Category I	EAD-090062 [2)]
Surface hardness; - Ball impression at 250 N - Permanent impression	 0,14mm 0,03 mm	 NT Build 059 NT Build 059
Impact strength Steni Colour og Steni Vision:	≥ 20 kJ/m²	ISO 179-82
Impact strength Steni Nature	≥ 17 kJ/m²	ISO 179-82
Tensile strength Steni Colour og Steni Vision:	≥ 15 N/mm²	ISO/R 527-66
Tensile strength Steni Nature	≥ 13 N/mm²	ISO/R 527-66
Humidity expansion	0,0015 mm/(m·%) [3)]	EN 438-2:2005, Part 18
Screw pull out resistance from panel	1,8 kN	EN 320
Design screw pull out capacity from structural wood C18	341 N/skrue	EN 1382

[1)] Self-developed method, NBI Report O 3437, September 1989
[2)] Tested with ETAG 034 which is now replaced by EAD-090062. No visible deterioration from hard body impacts at 10 J.
[3)] Mean change in dimension at 32-90 % relative humidity.

Table 3 Reaction to fire for Steni panels.[1)]

Product	Classification (EN 13501)
Steni Nature G	A2-s1,d0
Steni Nature (type F, M and FM)	B-s1,d0
Steni Colour	
Steni Vision	

[1)] The classification applies to all types of mounting profiles with fire class A1 and A2-s1,d0, with density of at least 652 kg/m^3 and at least 9 mm thickness.

Durability
Results from freeze/thaw testing and testing in accelerated aging apparatus show that Steni Colour has good frost resistance and durability when exposed to external climate.

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.

Dust mask should be used when cutting panels, and vacuum dust extractor should be used when extensive cutting.

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 material recovery and disposal.

Environmental declaration
An environmental declaration (EPD) has been worked out according to EN 15804 for Steni Colour, Steni Nature and Steni Vision. For complete documentation see EPD no. NEPD 2581-1309, NEPD 2580-1307 and NEPD-2657-1361, http://epd-norge.no/.

6. Special conditions for use and installation

Installation
Steni Colour, Steni Vision and *Steni Nature* are installed vertically or horizontally on wooden or metal battens spaced maximum c/c 600 mm as shown in fig. 1. Battens are also used for panel edge support at horizontal joints and at edges along roof eaves, windows, foundations etc.

Wooden battens can be in white or impregnated wood (max RH 15–20 %). The recommended maximum batten thickness is 28 mm. The battens should have a width of at least 45 mm under the panels and at least 70 mm at the joints. Before mounting the panels, the batten must be covered with STENI EPDM foil, which is attached using a staple gun. The EPDM foil should be wider than the batten and fixed so that the entire batten is covered. A 10–20 mm overlap is recommended on each side of the beam.

The panels are installed with a 5 mm open gap both vertically and horizontally. Vertical joints must be continuously supported. Horizontal joints shall be made tight against driving rain in places with severe climate exposure, such as for tall buildings, and when gaps between panels are more than 5 mm. Horizontal joints may be made rain tight with surface treated joint steel or aluminium profiles spanning between the battens. The gap between panels is 8 – 10 mm when joint profiles are applied.

The panels shall be fixed with Steni screws in predrilled holes with diameter up to 6 mm as shown in figure 1.

Fire safety
Panels used in accordance with fire classification in table 3, installed on wooden beams, must use width-adapted Steni EPDM foil between panel and beam.

Design considerations
Most Steni panels are designed and delivered with special dimensions, custom made for each individual building project. This reduce cutting at the building site. In other projects panels standard dimensions are delivered and cut on site by the purchaser.

Steni Nature type M with glass has a rough surface of crushed, trembled glass. Small parts may break off and give sharp edges. Steni Nature type M with glass should not be used in areas where the public is close to the surface, such as ground floor in schools, kindergartens, entrance-areas, stairs etc. This is due to the risk of injuries to skin and clothes.

Maintenance/cleaning
Depending on the climate exposure and surface pollution it is recommended to clean facade panels with a facade cleaning agent and rinse with a high-pressure cleaner. Graffiti may be removed with solvents and chemicals without damaging the panel surface of Steni Colour or Steni Nature. Best effect is obtained by using warm water. It is recommended to use professional cleaning agencies who follow the panel manufacturer's instruction.

Transport and storage
The panels shall be transported and stored dry, protected by a cover, and placed on a level support.

The panels are lifted vertically from the pallet to avoid surface scratching and is carried on edge. The panels shall always be strapped when transported on the building site.

7. Factory production control

Steni panels are produced by:
Steni AS, 3277 Steinsholt, Norway.

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

The manufacturing of the panels is subject to continuous surveillance of the factory production control in accordance with the contract regarding SINTEF Technical Approval and the fire properties is controlled by RISE.

Steni AS has a management quality system certified by Lloyd's Register Quality Assurance Limited (LRQA) according to ISO 9001:2015; certificate number ISO 9001 – 00010800.

8. Basis for the approval

The evaluation of Steni panels is based on reports owned by the holder of the approval.

The approval is also based on the following Building Research Design Guides from SINTEF:

- Byggdetaljer 542.502 *Utvendig kledning med plane plater*
- Byggdetaljer 543.505 *Våtromsvegger med overflate av vinyl, baderomspanel eller maling*

9. Marking

Each panel is marked with product name and date of production. A pallet label shows the relevant certificates.

The approval mark for SINTEF Technical Approval No. 2165 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