SINTEF Technical Approval

TG 20385

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Provided listed on
www.sintefcertification.no

SINTEF confirms that

IKO powerflex 5500 AD/F SN, IKO powerflex 5500 GRB/F and IKO Carrara Tecno SN single layer 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

IKO nv
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2. Product description

IKO powerflex 5500 AD/F SN, IKO powerflex 5500 GRB/F SN and IKO Carrara Tecno SN single layer bituminous roofing membranes are made of SBS modified bitumen and reinforced with a felt of polyester. The membranes are based on a welding overlapping system, see fig.1.

The upper face of IKO powerflex 5500 AD/F SN is covered with different colour of slate granules, while IKO powerflex 5500 GRB/F SN and IKO Carrara Tecno SN is covered by black and white mineral granules respectively; otherwise the products are identical. The lower face and the overlaps are protected by a thin plastic foil which melts by welding.

IKO powerflex 5500 AD/F SN can be supplied with different colour of granules.

- Dark grey: IKO Powerflex 5500 AD/F SN
- Light grey: IKO Powerflex 5500 AR/F SN
- White: IKO Powerflex 5500 AW/F SN

Measures and tolerances are given in table 1.

3. Fields of application

IKO powerflex 5500 AD/F SN, IKO powerflex 5500 GRB/F SN and IKO Carrara Tecno SN can be used for covering of sloped and flat roofs.

IKO powerflex 5500 AD/F SN, IKO powerflex 5500 GRB/F SN and IKO Carrara Tecno SN is designed for mechanically fastened single membrane roofing, see fig. 1. The system can be used for new roofing or rehabilitation.

IKO powerflex 5500 AD/F SN, IKO powerflex 5500 GRB/F SN and IKO Carrara Tecno SN can also be used as a loosely laid, ballasted or built-in membrane. Relevant applications are shingle and mulch ballasted constructions, parking decks with concrete and culverts.

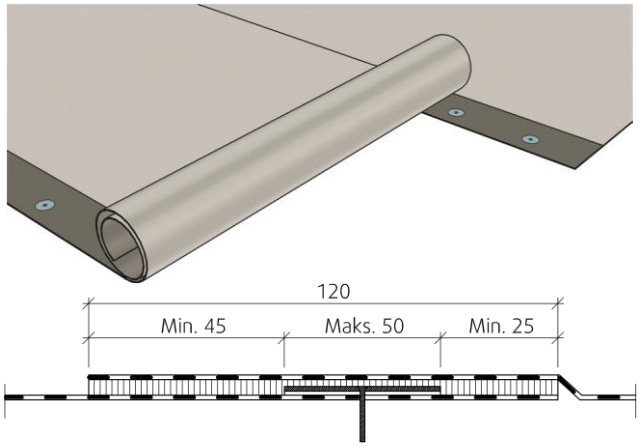

Fig. 1
IKO powerflex 5500 AD/F SN, IKO powerflex 5500 GRB/F SN and IKO Carrara Tecno SN mechanically fixed in a 120mm welded side overlap.

Table 1
Measures and tolerances for IKO powerflex 5500 AD/F SN, IKO powerflex 5500 GRB/F SN and IKO Carrara Tecno SN according to EN 1848-1and EN 1849-1

Property	IKO powerflex 5500 AD/F SN Measure	IKO powerflex 5500 GRB/F Measure	IKO Carrara Tecno SN Measure	Tolerance	Unit
Thickness (indicative)[1)]	3.8 / 4.5	3.5 / 4.5	4.5 / 5.3	-	mm
Weight	5.5	5.8	6.5	- 0.2 / + 0.8	kg/m²
Width	1 m	1 m	1 m	- 0 / + 0.005	m
Roll length	7.5 m	7.5 m	7.5 m	- 0 / + 0.01	m
Weight of reinforcement	ca. 230	Ca 230	ca 230	-	g/m²

Measured on selvegde / granulate

Table 2
Product characteristics fresh material of IKO powerflex 5500 AD/F SN, IKO powerflex 5500 GRB/F and IKO Carrara Tecno SN single layer roofing membrane

Property		Test method EN	DoP [1]	Control limits [2]	SINTEF's recommended minimum performance [3]	Unit
Dimensional stability		1107-1	-	≤ ± 0.3	≤± 0.6	%
Flexibility at low temperature	upper face: lower face:	1109-1	≤ -20 ≤ - 15	≤ -20 ≤ - 15	≤ -15	°C
Flow resistance at elevated temperature		1110	≥ 90	≥ 90	≥ 90	°C
Watertightness	10 kPa/24 h	1928 (A)	Tight	Tight	Tight	-
Adhesion of granules [4]		12039	-	≤ 2.5	≤ 2.5	g 4)
Resistance to tearing (nail shank)	L T	12310-1	≥ 200 ≥ 250	≥ 200 ≥ 250	≥ 150	N
Tensile strength	L T	12311-1	1000 ± 20% 800± 20%	≥ 800 ≥ 640	≥ 600	N/50 mm
Elongation	L T	12311-1	35 ± 15 35 ± 15	≥ 20 ≥ 20	≥ 10	%
Average peel resistance of joints	Sidelap Endlap	12316-1	≥ 100 ≥ 100	≥ 100 ≥ 100	≥ 50	N/50 mm
Shear resistance of joints	Sidelap/Endlap	12317-1	≥ 600	≥ 600	≥ 600	N/50 mm
Resistance to	Impact +23 °C Static loading	12691 (A) 12730 (A)	≥ 1000 ≥ 20	≥ 1000 ≥ 20	≥ 500 ≥ 20	mm kg
Watertightness after stretching at low temperature (10% elongation at -10 °C)		13897	-	Tight	Tight	-

[1] The manufacturers Declaration of performance, DoP
[2] Control limits show values that the product has to satisfy both during internal factory production control and audit testing.
[3] SINTEF's recommended minimum performance in SINTEF Technical Approval for single layer bituminous waterproofing
[4] Modified to give the result of weight loss of granules in gram
[5] Result from type-testing

L = Longitudinal T = Transversal

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. Product performance

Material properties
Product properties for fresh material are shown in table 2.

Properties related to fire
IKO powerflex 5500 AD/F SN, IKO powerflex 5500 GRB/F and IKO Carrara Tecno SN fulfils the requirements of class B_{ROOF} (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.

For more information regarding fire property requirements for the roofing, see TPF informerer no. 6 *Branntekniske løsninger for kompakte tak og terrasser* published by Takprodusentenes Forskningsgruppe (TPF), see www.tpf-info.org.

Durability
The products have 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.

Fastening to weaker substrates than given in Table 4 may limit capacity and must be specifically documented

Calculation of fasteners' 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 *Innfesting av fleksible takbelegg, dimensjonering og utførelse* published by Takprodusentenes Forskningsgruppe (TPF), see www.tpf-info.org.

It is not possible to assume increased wind load capacity with shorter distance between the fasteners then what was tested; due to uncertainty in the type of failure, ref. EAD 030351-00-0402 Annex 1. The fastener capacity can be reduced if the distance between the fastener rows is increased and/or if the difference between the row distance and the fastener distance is increased. The lowest capacity for attachment in the membrane / substrate must always be used for the calculation.

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 water.

Waste treatment/recycling

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

Table 3

IKO powerflex 5500, IKO powerflex 5500 GRB/F and IKO Carrara Tecno SN has fire classification BROOF (t2) on following substrates

Type of substrate	IKO powerflex 5500 and IKO powerflex 5500 GRB/F	IKO Carrara Tecno SN
EPS	No	No
EPS + min. 120 g/m^2 glass felt	No	No
PIR [4) 5)]	Yes	No
Mineral wool [1)]	Yes	Yes
Wood particle board [2)]	Yes	Yes
Concrete / calcium silicate board [4)]	Yes	Yes
Old roofing membrane on EPS	No	No
Old roofing membrane on EPS + min. 120 g/m^2 glass felt	No	No
Old roofing membrane on PIR [4) 5)]	Yes	No
Old roofing membrane on mineral wool [1)]	Yes	Yes
Old roofing membrane on wood particle board [2)]	Yes	Yes
Old roofing membrane on concrete / calcium silicate board [3)]	Yes	Yes

[1)] Fire class BROOF(t2) on mineral wool applies to non-combustible substrates with density ≥ 111 kg/m^3.

[2)] Fire class BROOF(t2) on wood particle board applies to combustible substrates with density ≥ 486 kg/m^3.

[3)] Fire class BROOF(t2) on calcium silicate board applies to non-combustible substrates with density ≥ 484 kg/m^3.

[4)] In case of roofing on combustible insulation (e.g. EPS or PIR): See clause 6 Special conditions for use and installation, section Substrate, regarding requirements for replacement of combustible insulation to non-combustible around passages and against adjacent structures.

[5)] Fire technical classification on PIR applies only to the tested PIR product "Iko Enertherm ALU", with density ≥ 27 kg/m^3.

Table 4

Design capacity at ultimate limit state for the fastening of IKO powerflex 5500, IKO powerflex 5500 GRB/F SN and IKO Carrara Tecno SN roofing membrane

Fastener/Fastening system Fastening in 120 mm welded joint	Design capacity N/fastener
- Guardian BS-4.8 self drilling screw - Guardian R50 plastic-washer with integrated sleeve Tested on soft substrate, fastened to 0.72 mm steel plate, f_y = 360 N/mm^2 Distance between fasteners: C/C 240 mm Row distance: C/C 880 mm	800 [1)]

[1)] Measured according to method EN 16002, safety factor γm=1.5 according to EAD 030351-00-0402. During a transitional period until January 1, 2028, designers may choose to use wind load capacities recalculated with a partial factor of γm=1.3.

6. Conditions of use

General

The roofing membrane shall be installed in accordance with the manufacturer'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*
- 544.206 *Mekanisk innfesting av asfalttakbelegg og takfolie på skrå og flate tak*
- 525.207 *Kompakte tak*
- 525.304 *Terrasse på etasjeskiller av betong for lett eller moderat trafikk*

plus information sheets issued by Takprodusentenes Forskningsgruppe (TPF), see www.tpf-info.org:

- TPF informerer nr. 5 *Innfesting av fleksible takbelegg, dimensjonering og utførelse*
- TPF informerer nr. 6 *Branntekniske løsninger for kompakte tak og terrasser*
- TPF informerer nr. 13 *Tak under oppføring – forholdsregler og tiltak ved bruk*

Installation

Mechanical fasteners shall be placed at welded overlaps with a minimum width of 120 mm. 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, see fig. 1.

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.

IKO powerflex 5500 AD/F SN, IKO powerflex 5500 GRB/F and IKO Carrara Tecno SN can be torched or hot air welded.

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.

TPF informerer no. 6 *Branntekniske løsninger for kompakte tak og terrasser* describes which roofing methods can be used on various roof structures. When roofing with hot air or open flame all combustible insulation must in principle be protected with non-combustible insulation. However, TPF informerer no. 6 describes exceptions for hot air welding of roofing membranes with fire class B_{ROOF} (t2).

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 ≥ 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.

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, such as EPS or PIR, must be covered or divided into areas, and replaced with non-combustible insulation around bushings and adjacent constructions, such as parapets and walls, according to pre-accepted performances given in the guidance to *Forskrift om tekniske krav til byggverk § 11-9* and in TPF informerer nr. 6 *Branntekniske løsninger for kompakte tak og terrasser*.

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 vendor's installation manual.

Transport and storage
IKO powerflex 5500 AD/F SN, IKO powerflex 5500 GRB/F and IKO Carrara Tecno SN must be transported in a manner that does not damage the product and stored upright on pallets.

7. Product and factory production control

IKO powerflex 5500 AD/F SN, IKO powerflex 5500 GRB/F and IKO Carrara Tecno SN is produced by IKO nv, D'Herbouvillekaai 80, B-2020 Antwerpen, BELGIUM

The holder of the approval is responsible for maintaining the factory production control to ensure that the products are manufactured in compliance with the preconditions upon which this approval is based.

The manufacturing of the products and the manufacturer's system for factory production control (FPC) is subject to continuous surveillance in accordance with the contract regarding SINTEF Technical Approval.

The manufacturer has a quality management 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 IKO powerflex 5500 AD/F SN, IKO powerflex 5500 GRB/F and IKO Carrara Tecno SN 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

Material wrapping shall be marked with producer, product description and production date.

The products are CE-marked accordance with EN 13707

The approval mark for SINTEF Technical Approval TG 20385 may also be used.

10. Liability

The holder/manufacturer has sole product liability according to current law. Claims can only be made against SINTEF under general law or other special grounds.

for SINTEF

Ola Asphaug

Ola Asphaug
Approval Manager