

SINTEF Technical Approval

TG 00000

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Provided listed on
www.sintefcertification.no

SINTEF confirms that

IKO powerflex and IKO base double-layer bituminous roofing systems

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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BELGIUM
www.be.iko.com

2. Product description

IKO powerflex and IKO base are double-layer bituminous roofing systems. In the IKO powerflex system the underlay is mechanically fastened through thermal insulation into the load bearing construction. See figure 1. In the IKO base system the underlay is fully glued to the load bearing construction with hot bitumen. The top layer of both systems is respectively either fully welded or fully glued to the underlay.

IKO powerflex consists of:

Underlay: IKO base P3000 SBS T/F N (mech.fastened)
Top layer: IKO powerflex 5000 AD/F N (fully welded)

IKO base consists of:

Underlay: IKO base P3000 SBS T/T NF (fully glued)
Top layer: IKO base P3000 SBS T/T NF (fully glued)

Measures and tolerances for the membranes are given in table 1.

Table 1

Measures and tolerances for IKO powerflex and IKO base according to EN 1848-1 and EN 1849-1

Property	Powerflex		Base	Unit
	Base P3000 SBS T/F N	5000 AD/F N	Base P3000 SBS T/T NF	
Thickness	2.4	3.9	2.4	mm
Area weight	3.0 -0.2/+0.6	5.0 -0.25/+0.75	3.0 -0.2/+0.6	kg/m ²
Width	1 -0.002 / +0	1 -0.002 / +0	1 -0.002 / +0	m
Length of roll	10 -0 / +0.1	8 -0 / +0.1	10 -0 / +0.1	m
Weight of reinforcement	170	170	170	g/m ²

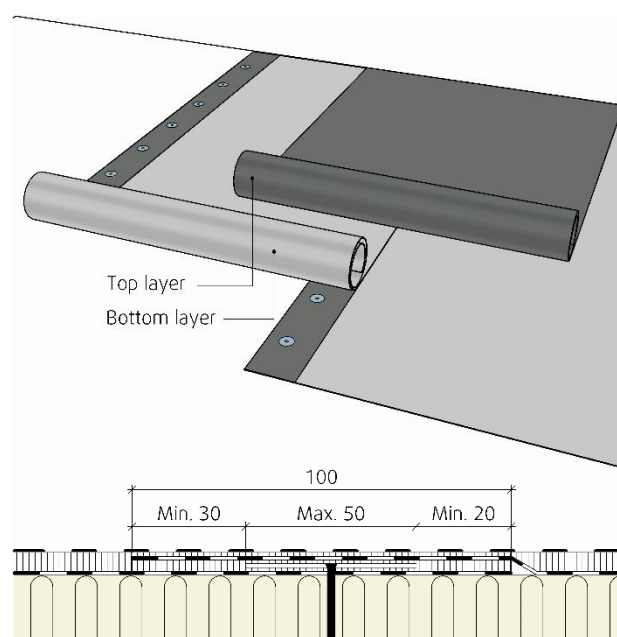


Fig. 1
IKO powerflex double-layer bituminous roofing membrane. The underlay is mechanically fastened and the top layer is fully bonded to the underlay by welding.

IKO powerflex 5000 AD/F N has a reinforcement of polyester felt. The reinforcement is coated with SBS modified bitumen on both sides. The top surface is covered with mineral granules, while the bottom surface is covered with a thin plastic film. The mineral granules are available in four different colours.

IKO base P3000 SBS T/F N has a reinforcement of polyester felt. The reinforcement is coated with SBS modified bitumen on both sides. The top surface is covered with fine-grained sand, while the bottom surface is covered with a thin plastic film.

IKO base P3000 SBS T/T NF has a reinforcement of polyester felt. The reinforcement is coated with SBS modified bitumen on both sides. The top and bottom surfaces are covered with fine-grained sand.

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 the membranes in IKO powerflex and IKO base double layer roofing system

Property		Test method EN	Powerflex				Base		SINTEF's recommended minimum performance ³⁾	Unit
			IKO powerflex 5000 AD/F N		IKO base P3000 SBS T/F N		IKO base P3000 SBS T/T NF			
			DoP ¹⁾	Control limits ²⁾	DoP ¹⁾	Control limits ²⁾	DoP ¹⁾	Control limits ²⁾		
Dimensional stability		1107-1	-	± 0.3	-	± 0.6	-	± 0.6	± 0.6	%
Flexibility at low temperature	- upper face - lower face	1109-1	≤ -15 -	≤ -15 -	≤ -15 ≤ -15	≤ -15 ≤ -15	≤ -15 ≤ -15	≤ -15 ≤ -15	≤ -15 - ≤ -15 ≤ -15	°C
Flow resistance at elevated temperature		1110	-	≥ 90	-	≥ 90	-	≥ 90	≥ 90	°C
Watertightness 10 kPa/24 h		1928 (A)	Pass	Pass ⁵⁾	Pass	Pass ⁵⁾	Pass	Pass ⁵⁾	Pass	-
Adhesion of granules ⁴⁾		12039	-	≤ 2.5 ⁴⁾	-	-	-	-	≤ 2.5 ⁴⁾ -	g ⁴⁾
Resistance to tearing (nail shank)	L/T	12310-1	200 -0/+200	-	150 -0/+200	≥ 150	150 -0/+200	≥ 150	- ≥ 150	N
Tensile strength L T		12311-1	600 ± 20 % 480 ± 20 %	≥ 480 ≥ 384	720 ± 20 % 480 ± 20 %	≥ 576 ≥ 384	750 ± 20 % 500 ± 20 %	≥ 600 ≥ 400	≥ 400	N/50 mm
Elongation at max load L T		12311-1	35 ± 15	≥ 20	35 ± 15 45 ± 15	≥ 20 ≥ 30	40 ± 15	≥ 25	≥ 10	%
Average peel resistance of joints Sidelap/Endlap		12316-1	NPD	-	50 -0 / +200	≥ 50	50 -0/+200	≥ 50	- ≥ 50	N/50 mm
Shear resistance of joints Sidelap Endlap		12317-1	600 -0/+200 400 -0/+200	-	600 -0/+200 400 -0/+200	≥ 600 ≥ 400	600 -0/+200 400 -0/+200	≥ 600 ≥ 400	- ≥ 400	N/50 mm
Resistance to	- Impact +23 °C - Static loading	12691 (A) 12730 (A)	≥ 1000 ≥ 20	≥ 1000 ≥ 20	≥ 500 ≥ 15	≥ 500 ≥ 15	≥ 500 ≥ 15	≥ 500 ≥ 15	≥ 500 ≥ 15	mm kg

¹⁾ The manufacturers Declaration of performance, DoP.²⁾ Control limits show values that the product has to satisfy during internal factory production control and audit testing.³⁾ SINTEF's recommended minimum performance in SINTEF Technical Approval for top and underlay in double-layer system⁴⁾ Modified to give the result of weight loss of granules in gram.⁵⁾ Result from type-testing

L = Longitudinal

T = Transversal

3. Fields of application

IKO powerflex can be used on sloped and flat roofs. The system is designed for mechanically fastened roofing.

IKO base can be used on flat roofs. *IKO base* must be ballasted and covered. The roofing system is fully glued to the underlay with hot bitumen.

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.

Properties related to fire

IKO powerflex 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.

Table 3

IKO powerflex double-layer system has fire classification B_{ROOF} (t2) on following substrates

Type of substrate	IKO powerflex
EPS	No
Stone wool	Yes
Wood particle board	Yes
Concrete / silicate plate	Yes
Old roofing membrane on EPS	No
Old roofing membrane on stone wool	Yes
Old roofing membrane on particle board	Yes
Old roofing membrane on concrete or calcium silicate board	Yes

IKO base is not classified as B_{ROOF} (t2) according to EN 13501-5 regarding external fire performance for the substrates described in this document. To achieve satisfying fire resistance a suitable ballast, approved for the required fire resistance, should be used for buildings where such requirements are given, see clause 6.2.2 *Ballast*.

Durability

The products in the two double layer systems have shown satisfying properties after artificial ageing

Fastening capacity - IKO powerflex double-layer system

The design capacity for tested fastener for IKO powerflex 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.

Table 4

Design capacity at ultimate limit state for the attachment of IKO powerflex double-layer system

Fastener/Fastening system Fastening in 100 mm overlap, or in the middle of the field	Design capacity N / fastener
Afast Guardian RP45-090 KOMBI plastic washer and Afast BS-4,8 screws Tested on soft substrate, attachment in steel plate Distance between fasteners: c/c 240 mm	600 ¹⁾

¹⁾ Measured according to method EN 16002, safety factor $\gamma_m=1.5$ 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 $\gamma_m=1.3$.

5. Environmental aspects

Substances hazardous to health and environment

IKO powerflex and IKO base 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 IKO powerflex and IKO base are evaluated to have no negative effects on soil or water.

Waste treatment/recycling

IKO powerflex and IKO base shall be sorted as residual waste. The product shall be delivered to an authorized waste treatment plant for energy recycling.

Environmental declaration

No environmental declaration (EPD) has been worked out for IKO powerflex and IKO base.

6. Special conditions for use and installation

6.1 IKO powerflex

6.1.1 Installation

The underlay IKO base P3000 SBS T/F N shall be mechanically fastened to the substrate with fasteners in the longitudinal overlap. The overlaps, with 100 mm width, shall be fully welded with gas flame or hot air. Minimum 20 mm bonding on the inside and minimum 30 mm bonding on the outside of the fastener is required. See figure 1.

As an alternative the fasteners can be fastened in the middle of the field and covered with a 100 mm wide patch or strip of roofing membrane. See figure 2.

The top layer IKO powerflex 5000 AD/F N is fully welded to the underlay IKO base P3000 SBS T/F N.

6.1.2 Fasteners

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

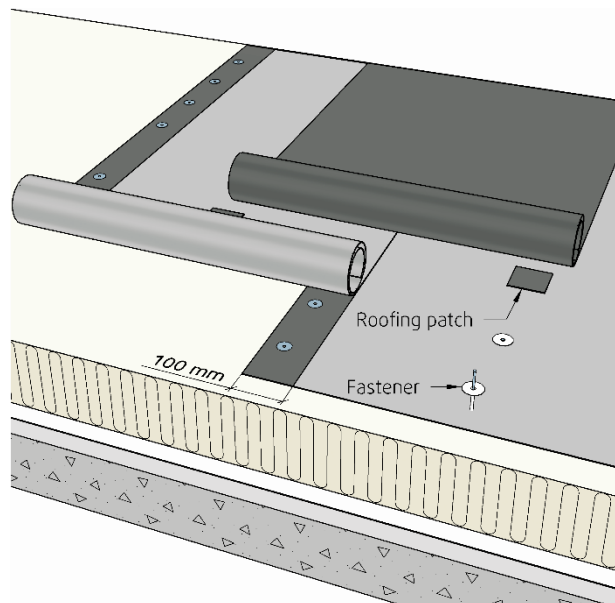


Fig. 2

Alternative mechanically fastening through the membrane, outside the overlap, with patches or strips over the fixing.

On substrates of thermal insulation with compressive strength $\geq 80 \text{ kN/m}^2$ (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.

Calculation of fasteners' spacing is carried out according to SINTEF Building Research Design Guide 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.

6.1.3 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*.

6.2 IKO base

6.2.1 Installation

The first layer IKO base P3000 SBS T/T NF is fully glued to the underlay with hot bitumen. The top layer IKO base P3000 SBS T/T NF is fully glued to the underlay with hot bitumen.

6.2.2 Ballast

Necessary ballast must be calculated according to SINTEF Building Research Design Guide 544.202 *Asfalttakbelegg. Egenskaper og tekking* and "TPF informerer nr. 5 Innfesting av fleksible takbelegg, dimensjonering og utførelse", clause 6.1 *Ballast*.

As ballast on IKO base a 50 mm thick layer of gravel (16-32 mm) can be used for design wind loads smaller than 3.75 kN/m^2 . In areas with design wind loads smaller than 5.0 kN/m^2 concrete slabs of 50 mm thickness can be used.

Where a fire technical class is required IKO base must be covered with incombustible material, such as concrete slabs or gravel, which provides satisfactory fire protection for the relevant substrate.

6.3 General – for both IKO powerflex and IKO base roofing systems

6.3.1 Installation

Generally, the roofing membrane shall be installed in accordance with the principles shown in SINTEF Building Research Design Guide 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* and "TPF informerer nr. 5" published by Takprodusentenes Forskningsgruppe (TPF).

6.3.2 Transverse joints

Transverse joints must have an overlap of minimum 150 mm for both underlay and top layer. 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.

6.3.3 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.

6.3.4 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.

6.3.5 Storage

IKO powerflex and IKO base rolls must be stored upright on pallets.

7. Factory production control

IKO powerflex and IKO base are produced by IKO nv, D'Herbouvillekaai 80; B-2020 Antwerpen; Belgium.

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

The manufacturing of IKO powerflex and IKO base is subject to continuous surveillance of the factory production control in accordance with the contract regarding SINTEF Technical Approval.

The manufacturer IKO nv. 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 and IKO base 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

Each roll of the products is marked with the manufacturer's name, product description and production date.

IKO powerflex and IKO base are CE marked in accordance with EN 13707.

The approval mark for SINTEF Technical Approval TG 20090 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

Susanne Skjervø
Approval Manager