

SINTEF confirms that

BIIG 4mm, BIIG 4mm HP, BIIG 5mm and BIIG 5mm HP

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

IIGO Srl.
 Strada di Pietrara 54a
 05100 Terni (TR)
 Italy
www.iigo.eu

2. Product description

BIIG 4mm, BIIG 4mm HP, BIIG 5mm and BIIG 5mm HP are single sheet roofing membranes made of APP modified bitumen, reinforced with composite polyester stabilised with longitudinal glass fibres. BIIG 4mm and 5mm are produced with 55 g/m² glass fibres and 150 g/m² polyester reinforcement. BIIG 4mm HP and 5mm HP are produced with 55 g/m² glass fibres and 250 g/m² polyester reinforcement. The lower face has a sanded surface or thin plastic film which melts off when the joints are welded. Measures and tolerances for the membranes are shown in table 1.

Table 1
 Dimensions and tolerances for BIIG 4mm, 4mm HP, 5mm and 5mm HP according to EN 1848-1 and 1849-1

Property	BIIG				Unit	Tolerance
	4mm	4 HP	5mm	5 HP		
Thickness	4	4	5	5	mm	± 5 %
Weight	4.25	4.9	5.7	5.9	kg/m ²	± 5 %
Width	1.1	1.1	1.1	1.1	m	± 1 %
Roll length	7.27	7.27	7.27	7.27	m	-0/+2 %
Weight reinforcement	205	305	205	305	g/m ²	-0/+2 %

3. Fields of application

BIIG 4mm, BIIG 4mm HP, BIIG 5mm and BIIG 5mm HP flexible roofing membranes are used as single layer membranes for covering sloping and flat roofs. The systems are designed especially for use as mechanically fixed single layer roofing membranes. See fig. 1.

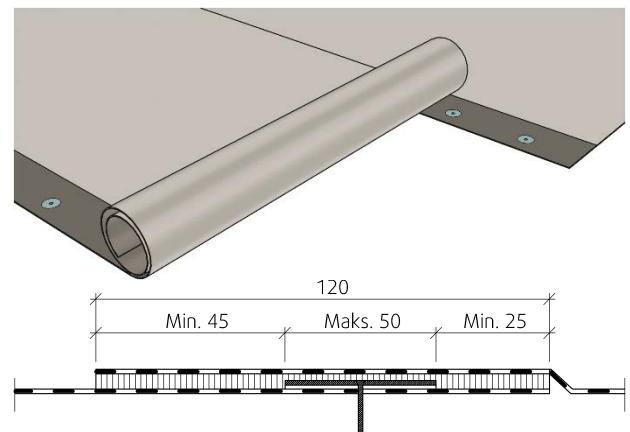


Fig. 1
 BIIG 4mm, BIIG 4mm HP, BIIG 5mm and BIIG 5mm HP mechanically fastened in a 120mm welded overlap

The slope of the roof must be sufficient to allow rain and melting water to drain away. SINTEF recommends a slope of at least 1:40 for all roofs.

In general, BIIG 4mm, BIIG 4mm HP, BIIG 5mm and BIIG 5mm HP flexible roofing membranes can be used for accessible and non-accessible roofs, green roofs, terrace roofs and parking roofs. For green roofs, terrace roofs and parking decks the HP version is recommended

4. Properties

Material properties

Product properties for fresh material are shown in Table 2.

Properties related to fire

BIIG 4mm, BIIG 4mm HP, BIIG 5mm and BIIG 5mm HP fulfils the requirements of class B_{ROOF} (t2) according to EN 13501-5 as shown in table 3. The products have been tested in accordance with CEN/TS 1187 test 2.

Table 2

Product characteristics for fresh material of BIIG 4mm, 4mm HP, 5mm and 5mm HP single layer bituminous roofing membranes

Property	Test method	BIIG 4		BIIG 4 HP		BIIG 5		BIIG 5 HP		SINTEF's recommended minimum performance ³⁾	Unit
	EN	DoP ¹⁾	Control limits ²⁾	DoP ¹⁾	Control limits ²⁾	DoP ¹⁾	Control limits ²⁾	DoP ¹⁾	Control limits ²⁾		
Dimensional stability	1107-1	-	± 0.25	-	± 0.25	-	± 0.25	-	± 0.25	± 0.6	%
Flexibility at low temperature	1109	≤ -15	≤ -15	≤ -15	≤ -15	≤ -15	≤ -15	≤ -15	≤ -15	≤ -15	°C
Flow resistance at elevated temp.	1110	≥ 140	≥ 140	≥ 140	≥ 140	≥ 140	≥ 140	≥ 140	≥ 140	≥ 90	°C
Water tightness 10 kPa/24 h	1928 (A)	Tight	Tight	Tight	Tight	Tight	Tight	Tight	Tight	Tight	-
Adhesion of granules	12039	no granules used on these products								2,5	g
Resistance to tearing, nail shank L/T	12310-1	≥ 200	≥ 200	≥ 250	≥ 250	≥ 200	≥ 200	≥ 250	≥ 250	≥ 150	N
Tensile strength L/T	12311-1	750 ±20%	≥ 600	1000 ±20%	≥ 800	750 ±20%	≥ 600	1000 ±20%	≥ 800	≥ 600	N/50 mm
Elongation L/T	12311-1	50 ±15%	≥ 35	55 ±15%	≥ 40	50 ±15%	≥ 35	55 ±15%	≥ 40	≥ 10	%
Average peel resistance of joints L/T	12316-1	70 -20	≥ 50	70 -20	≥ 50	70 -20	≥ 50	70 -20	≥ 50	≥ 50	N/50 mm
Shear resistance of joints L/T	12317-1	750 ±20%	≥ 600	750 ±20%	≥ 600	750 ±20%	≥ 600	750 ±20%	≥ 600	≥ 600	N/50 mm
Resistance to puncturing											
Impact +23 °C	12691 (A)	≥ 1250	≥ 1250	≥ 1500	≥ 1500	≥ 1250	≥ 1250	≥ 1500	≥ 1500	≥ 500	mm
Impact -10 °C	12691	-	≤ 30	-	≤ 30	-	≤ 30	-	≤ 30	≤ 30	mm diam.
Static load	12730 (A)	≥ 20	≥ 20	≥ 25	≥ 25	≥ 20	≥ 20	≥ 25	≥ 25	≥ 20	kg
Watertightness after stretching at low temp., 10% at -10 °C	13897	-	Tight	-	Tight	-	Tight	-	Tight	Tight	-

¹⁾ The manufacturers Declaration of Performance, DoP

²⁾ Control limit shows values the product must satisfy during internal factory production control and audit testing

³⁾ SINTEF's recommended minimum performance in SINTEF Technical Approval for single layer bituminous waterproofing membrane
L = Longitudinal T = Transversal

Table 3

BIIG single sheet roofing membranes has fire classification B_{ROOF} (t2) on the following substrates

0	BIIG single sheet
EPS ¹⁾	Yes
Rock wool	Yes
Wooden sheeting	Yes
Concrete	Yes
Reroofing on old membrane on EPS	Yes
Reroofing on old membrane on rock wool	Yes
Reroofing on old membrane on wooden sheeting	Yes
Reroofing on old membrane on concrete	Yes

¹⁾ In case of roofing on lightweight combustible insulation (eg EPS, XPS): See section 6 Condition for use, in section on substrates, on the requirements for replacement of flammable insulation for non-combustible around passages and against adjacent structures.

Durability

BIIG 4mm, BIIG 4mm HP, BIIG 5mm and BIIG 5mm HP has shown satisfying properties after artificially ageing. Since the product has no granules on top it is also tested for long-time UV-radiation ageing for 5 000 hours according to EN ISO 4892-2 with satisfactory result.

Fastening capacity

The design capacity for fasteners is given in table 4 and applies to the connection between the membrane and the fastener according to ETAG 0006 and EN 16002.

For weak substrates the connection between the substrate and the fastener might limit the capacity. This must be considered and the lowest capacity for membrane or substrate must be used.

Calculation of fasteners' spacing is carried out according to SINTEF Building Research Design Guide no. 544.206 *Mekanisk feste av asfalttakbelegg og takfolie på flate tak* and "TPF Informs No. 5".

Table 4 Design capacities at ultimate limit state for attachment of BIIG single sheet membranes shown in fig. 1

Fastener / screw	Capacity (N/pcs.)
Eurofast DVP-EF-5010N / Eurofast EDS-S-48120	550 ¹⁾
Eurofast DVP-EF 8040D / Eurofast EDS-S-48120	680 ²⁾
Guardian RP-45 / Guardian BS-4,8	900 ²⁾
SFS intec RP-45 / SFS intec BS-4,8	900 ²⁾

¹⁾ Measured according to method EOTA ETAG 0006 and the safety factor for use in Norway, $\gamma_m=1.3$.

²⁾ Measured according to method EN 16002 and the safety factor for use in Norway, $\gamma_m=1.3$.

5. Environmental aspects

Substances hazardous to health and environment

BIIG 4mm, BIIG 4mm HP, BIIG 5mm and BIIG 5mm HP are containing 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 products are evaluated to have no negative effects on soil or ground water.

Waste treatment/recycling

BIIG 4mm, BIIG 4mm HP, BIIG 5mm and BIIG 5mm HP shall be sorted as mixed waste on the building/demolition site. The products shall be delivered to an authorized waste treatment plant for energy recovery.

Environmental declaration

No environmental declaration (EPD) has been worked out for BIIG 4mm, BIIG 4mm HP, BIIG 5mm and BIIG 5mm HP.

6. Special conditions for use and installation

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.

The joints of BIIG 4mm, BIIG 4mm HP, BIIG 5mm and BIIG 5mm HP are torched or hot air welded and shall be installed in accordance with the vendor's installation manual and the principles shown in SINTEF Building Research Design Guides 544.203 *Asfalttakbelegg. Egenskaper og tekking*, 544.204 *Tekking med asfalttakbelegg eller takfolie. Detaljløsninger* and 544.206 *Mekanisk feste av asfalttakbelegg og takfolie på flate tak* and in "TPF informs No. 5" published by Takprodusentenes Forskningsgruppe, see www.tpf-info.org.

Transverse joints must have a 150 mm overlap. The underlying corner is fastened, and the overlying corner is cut at an angle. A good result is achieved by 'drowning' the surfaces in bitumen before the joint is fully welded.

Fasteners

Fastening with ordinary steel washers in longitudinal overlaps may be used on firm substrates such as wood-based sheathing or concrete.

On substrates of thermal insulation with good compression strength, such as expanded polystyrene (EPS) with compression strength of at least 80 kN/m² (level CS (10) 80 according to EN 13162/13163), steel washers with deep collars or plastic washers should be used.

Fasteners with integrated sleeves and good telescopic effect must be used when the membrane is installed on thermal insulation materials with lower compressive strength. The tightening of the fasteners must be checked particularly.

Substrate

When a fire classification is required the substrate must be in accordance with the provisions stated in section 4 "Properties related to fire".

Substrate of combustible insulation as EPS or XPS 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 "TPF informerer nr. 6" *Branntekniske konstruksjoner for tak* published by Takprodusentenes Forskningsgruppe, see www.tpf-info.org.

For re-roofing on old roofing that contains softeners, as for example PVC, a separate migration barrier of approximately 150 g/m² polyester felt shall be used.

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.

Maintenance

Before repairing the roofing membrane, the surfaces must be cleaned before any welding starts.

Storage

BIIG 4mm, BIIG 4mm HP, BIIG 5mm and BIIG 5mm HP must be stored in an upright position.

7. Factory production control

The product is produced by MATCO S.r.l., Via Quadrelli 69, 37055 Ronco all'Adige (VR), Italy.

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

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

MATCO S.r.l. has a quality management system which is certified according to ISO 9001.

MATCO S.r.l. is also certified according to ISO 14001 and OHSAS 18001.

8. Basis for the approval

Product properties have been determined by initial type testing on fresh and aged material, audit testing under annual control, documented in following reports:

- VTT Finland, Report VTT-S-337-07, dated 2007-01-15, Fire test.
- KIWA Netherlands, Report K14350/03, dated 2007-04-01, Type testing
- MFPA L Germany, Report P-SAC02/5.1/08-222, dated 2010-02-11, Type testing
- MFPA L Germany, Report P-SAC02/5.1/08-223, dated 2010-02-11, Type testing
- MFPA L Germany, Report 02/5.1/08-224, dated 2010-02-26, Type testing
- SINTEF Norway, Report 3D1088.02, dated 2011-08-26, Resistance to puncturing, impact at -10°C
- BDA Keur Netherlands, Report 0368-L-12/1, dated 2012-11-05, Testing of wind resistance
- CONSTRUCTECH Sweden, Report 20140429-18-1, dated 02.05.2014, Testing of wind resistance
- CONSTRUCTECH Sweden, Report 201404229-18-12, dated 02.05.2014, Testing of wind resistance

9. Marking

Material wrapping shall be marked with product description and production date. The approval mark for SINTEF Technical Approval No. 20142 may also be used.

The product is CE marked in accordance with EN 13707.



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