

SINTEF Technical Approval

TG 20025

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SINTEF confirms that

Bauder double layer bituminous roofing membrane

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

Bauder AS
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 2016 Frogner
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2. Product description

Bauder double-layer bituminous roofing membrane is made of SBS modified bitumen and reinforced with polyester glass felt. The top layer is fully bonded to the underlay by welding. The roofing system consists of a Bauder ULS 30 G underlay and a Bauder PRO 40 top layer. Measures and tolerances are shown in Table 1 and 2.

Table 1
 Measures and tolerances for top layer Bauder PRO 40
 according to EN 1848-1 and EN 1849-1

Property	Measure	Unit	Tolerance
Thickness	4.2	mm	+15/-5 %
Area weight	5.0	kg/m ²	+20/-5 %
Width	1	m	+1/-0 %
Length of roll	7,5	m	+2/-0 %
Weight of core	ca. 250	g/m ²	

Table 2
 Measures and tolerances for underlay Bauder ULS 30 G
 according to EN 1848-1 and EN 1849-1

Property	Measure	Unit	Tolerance
Thickness	3	mm	± 0.1
Area weight	3.5	kg/m ²	-5 %
Width	1	m	+1/-0 %
Length of roll	10	m	+2/-0 %
Weight of core	ca. 190	g/m ²	

Bauder ULS 30 G underlay has a reinforcement base of polyester glass felt. The reinforcement, impregnated with bitumen, is coated with SBS modified bitumen on both sides. The top surface can be delivered either coated with fine-grained sand or covered with a thin plastic film. The underside is covered with a thin plastic film.

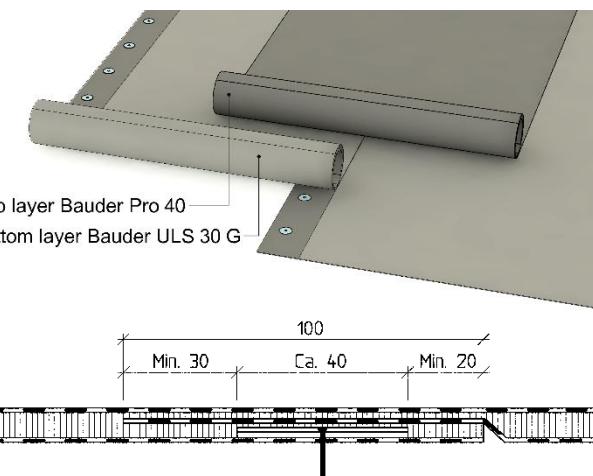


Fig. 1

Bauder double-layer bituminous roofing membrane. The underlay is fixed mechanically with fasteners. The top layer is fully bonded to the underlay by welding.

Bauder PRO 40 top layer has a reinforcement base of polyester glass felt. The reinforcement is impregnated with bitumen and coated with SBS modified bitumen on both sides. The product is covered on the upper face by mineral granules and with a thin plastic film melting during welding to the underlay. The membrane can be supplied in different colours.

3. Fields of application

Bauder double-layer bituminous roofing membrane can be used on sloping and flat roofs. The system is specially designed for mechanically fastened roofing.

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 3.

Table 3

Product properties for fresh material of Bauder ULS 30 G underlay and Bauder PRO 40 top layer in Bauder double-layer system

Property	Test method EN	Bauder ULS 30 G		SINTEF's recommended minimum performance ³⁾	Bauder PRO 40		SINTEF's recommended minimum performance ⁴⁾	Unit
		DoP ¹⁾	Control limit ²⁾		DoP ¹⁾	Control limit ²⁾		
Dimensional stability	1107-1	-	± 0.5	± 0.6	-	± 0.5	± 0.6	%
Flexibility at low temperature	1109-1	Surface out Surface in	≤ -15	≤ -15	≤ -15	≤ -25	≤ -25	≤ -15
Flow resistance at elevated temperature	1110	-	≥ 90	≥ 90	-	≥ 90	≥ 90	°C
Watertightness 10 kPa/24 h	1928 (A)	-	Tight	Tight	Passed	Tight	Tight	-
Adhesion of granules ⁵⁾	12039	-	-	-	-	≤ 2.5	≤ 2.5	g
Resistance to tearing (nail shank)	L/T	12310-1	-	≥ 150	≥ 150	-	≥ 250	-
Tensile strength	L T	12311-1	600 ±20 % 500 ±20 %	≥ 480 ≥ 400	≥ 400 ≥ 400	800 ±10 % 700 ±10 %	≥ 720 ≥ 630	≥ 400 ≥ 400
Elongation at max. load	L T	12311-1	≥ 20 ≥ 20	≥ 20 ≥ 20	≥ 10 ≥ 10	35 (-5/+10) 45 (-5/+10)	≥ 30 ≥ 40	≥ 10 ≥ 10
Average peel resistance of joints								
Sidelap		12316-1	-	≥ 150	≥ 50	-	≥ 50	-
Endlap				≥ 100			≥ 50	N/50 mm
Shear resistance of joints		12317-1	-	≥ 400	≥ 400	-	≥ 600	-
Sidelap/Endlap								N/50 mm
Resistance to	Impact +23 °C Impact -10 °C Static loading	12691 (A) 12691:2001 12730 (A)	- - -	≥ 800 - ≥ 15	≥ 500 - ≥ 15	- -- 20	≥ 800 ≥ 30 ≥ 20	≥ 500 - ≥ 15
Watertightness after stretching at low temperature (10% elongation at -10 °C)		13897	-	Tight	-	-	Tight	-

¹⁾ The manufacturers Declaration of performance, DoP²⁾ Control limit shows values the product has to satisfy during internal factory production control and audit testing.³⁾ SINTEF's recommended minimum performance in SINTEF Technical Approval for the underlay in two layer system⁴⁾ SINTEF's recommended minimum performance in SINTEF Technical Approval for the top layer in two layer system⁵⁾ Modified to only give the result of weight loss of granules in gram.

L = Longitudinal T = Transversal

Safety in case of fire

Bauder double-layer bituminous roofing membrane fulfils the requirements of class B_{ROOF} (t2) according to EN 13501-5 on substrates shown in Table 4. The testing is performed according to CEN/TS 1187, test 2.

Table 4

Bauder double layer bituminous roofing membrane has fire classification B_{ROOF} (t2) on following substrates

Type of substrate	Bauder double layer system
EPS*	No
Rock wool	Yes
Wooden sheeting	No
Concrete	Yes
Reroofing on old membrane on EPS*	No
Reroofing on old membrane on rock wool	Yes
Reroofing on old membrane on wooden sheeting	No
Reroofing on old membrane on concrete	Yes

*) In case of roofing on lightweight combustible insulation (eg EPS, XPS 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.

Durability

Bauder double-layer bituminous roofing membrane has shown satisfying properties after artificial ageing performed at SINTEF

Fastening capacity

The design capacity for tested fasteners is given in table 5. The capacity applies to the connection between the membrane and the fasteners. For weak substrates the connection between the substrate and the fastener might limit the capacity. This must be considered, and only the lowest capacity for membrane or substrate underlays must always be used.

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

Table 5

Design capacity at ultimate limit state for fastening of Bauder double layer system

Fastener/Fastening system	Design capacity N / fastener
SFS ISO-TAK R45xL plastic-washer with integrated sleeve	600 ¹⁾

¹⁾ Measured according to the Nordtest method NT BUILD 307.

5. Environmental aspects

Substances hazardous to health and environment

Bauder double-layer bituminous roofing membrane 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 products are evaluated to have no negative effects on soil or water.

Waste treatment/recycling

Bauder double-layer bituminous roofing membrane 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 the products in Bauder double-layer bituminous roofing membrane.

6. Special conditions for use and installation

Installation

Bauder ULS 30 G underlay shall be mechanically fastened with 100 mm overlaps which are entirely welded over the width, see fig. 1. The fasteners shall be placed ca. 50 mm from the edge of the sheet. Minimum 20 mm bonding on the inside and minimum 30 mm bonding on the outside of the fastener is required.

Alternatively the underlay can be mechanically fastened through the membrane, outside the overlap, with minimum 100 mm wide patches or strips of Bauder ULS 30 G over the fixing as shown in fig. 2.

Bauder PRO 40 top layer shall be installed with 120 mm welded overlaps, and the sheets shall be fully welded to the underlay. Endlap joints are normally performed with 150 mm overlaps for both the underlay and top layer.

The roofing membrane shall otherwise be installed in accordance with the principles shown in SINTEF Building Design Guide no. 544.203, 544.204 and 544.206 and "TPF Informs No. 5" published by Takprodusentenes Forskningsgruppe.

Welding of overlaps

Before welding of overlaps the membrane shall be rolled out, positioned and rolled back. This is not applicable when using a welding machine.

If the membrane is to be laid directly on a combustible material, such as polystyrene, the overlaps must either be welded without the use of an open flame or a protective layer must be placed under the joints.

Fasteners

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

On substrates of thermal insulation with compressive strength ≥ 80 kN/m² (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.

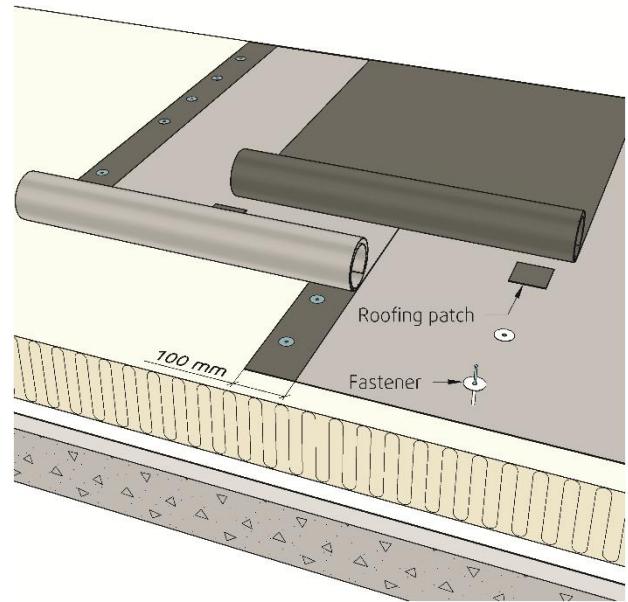


Fig. 2

Alternative method for mechanical fastening of Bauder double-layer bituminous roofing membrane through the membrane outside the overlap with patches or strips over the fixing.

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 as EPS, XPS or PIR must be covered or divided, and also replaced with non-combustible insulation around bushings and adjacent constructions according to regulations in "Veileddning om tekniske krav til byggvirk" § 11-9 and further description in "TPF informerer nr. 6" *Branntekniske konstruksjoner for tak* published by Takprodusentenes Forskningsgruppe.

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.

Transport and storage

Bauder ULS 30 G and Bauder PRO 40 must be stored upright on pallets.

7. Factory production control

Bauder double-layer bituminous roofing membrane is produced by Paul Bauder GmbH & Co. KG, Zeppelinstrasse 1, 28832 Achim, Germany.

The holder of the approval is responsible for the factory production control in order to ensure that Bauder ULS 30 G and Bauder Pro 40 are produced in accordance with the preconditions applying to this approval.

The manufacturing of Bauder ULS 30 G and Bauder Pro 40 are subject to continuous surveillance of the factory production control in accordance with the contract regarding SINTEF Technical Approval.

The quality system at the producer is certified by German Institute of Certification (DQS), according to EN ISO 9001, certificate no. 002735 QM08.

8. Basis for the approval

The evaluation of Bauder ULS 30 G and Bauder Pro 40 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

All rolls shall be marked with the manufacturer's name, product code, product name and date of production.

Bauder ULS 30 G and Bauder Pro 40 are CE marked according to EN 13707.

The approval mark for SINTEF Technical Approval TG 20025 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



Hans Boye Skogstad
Approval Manager