

SINTEF Building and Infrastructure 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

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### 2. Manufacturer

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### 3. 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 bottom layer by welding. The roofing system consists of a Bauder ULS 30 bottom layer and a Bauder PRO 40 top layer. Measures and tolerances are shown in Table 1.

Table 1  
 Measures and tolerances for Bauder double-layer system according to EN 1848-1 and EN 1849-1

| Designation               | Underlay                 | Top layer               | Tolerance |
|---------------------------|--------------------------|-------------------------|-----------|
|                           | ULS 30                   | PRO 40                  |           |
| Thickness                 | 3,0 mm                   | 4,2 mm                  | ± 0,1mm   |
| Weight                    | 3,5 kg/m <sup>2</sup>    | 5,0 kg/m <sup>2</sup>   | +10/-5 %  |
| Width                     | 1,0 m                    | 1,0 m                   | + 1/-0 %  |
| Roll length               | 10 m                     | 8 m                     | +2/-0 %   |
| Weight o of reinforcement | Ca. 140 g/m <sup>2</sup> | Ca. 250g/m <sup>2</sup> | -         |

*Bauder ULS 30* bottom layer 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.

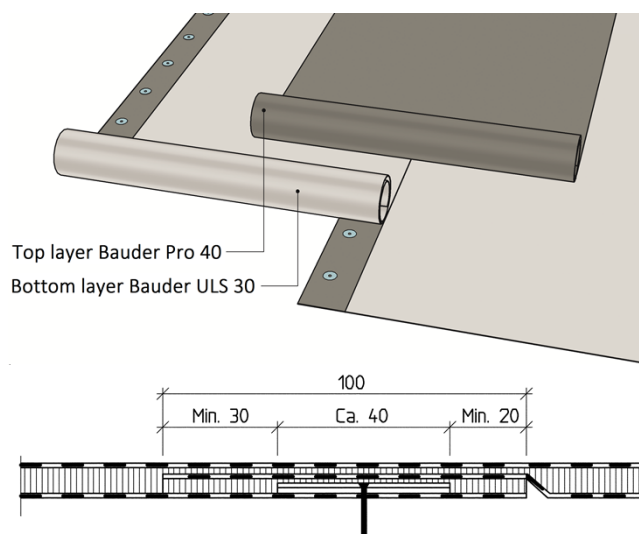


Fig. 1  
 Bauder double-layer bituminous roofing membrane, the top layer is fully bonded to the bottom layer by welding. The bottom layer is fixed with mechanically fasteners.

*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 bottom layer. The membrane can be supplied in different colours

The products are CE marked according to EN 13707.

### 4. 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.

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

Table 2

Product properties of fresh material for products in Bauder double-layer bituminous roof waterproofing membrane

| Property   | Test method<br>EN                              | Bauder ULS 30     |                                | SINTEF's<br>recommended<br>minimum<br>performance <sup>3)</sup> | Bauder PRO 40     |                                | SINTEF's<br>recommended<br>minimum<br>performance <sup>4)</sup> | Unit                 |
|--|--|-------------------|--------------------------------|---|-------------------|--------------------------------|---|----------------------|
|  |  | DoP <sup>1)</sup> | Control<br>limit <sup>2)</sup> |   | DoP <sup>1)</sup> | Control<br>limit <sup>2)</sup> |   |                      |
| Dimensional stability                                      | 1107-1:1999                                    | -                 | ± 0,5                          | ± 0,6   | -                 | ± 0,5                          | ± 0,6   | %                    |
| Flexibility at low temperature                             | 1109-1:1999                                    | ≤ -20             | ≤ -20                          | ≤ -15   | ≤ -20             | ≤ -20                          | ≤ -15   | °C                   |
| Flow resistance at elevated temperature                    | 1110:1999                                      | -                 | ≥ 90                           | ≥ 90  | -                 | ≥ 90                           | ≥ 90  | °C                   |
| Watertightness 10 kPa/24 h                                 | 1928:2000 (A)                                  | Tight             | Tight                          | Tight   | Tight             | Tight                          | Tight   | -                    |
| Adhesion of granules <sup>5)</sup>                         | 12039:2000                                     | -                 | -                              | -   | -                 | ≤ 2,5                          | ≤ 2,5   | g                    |
| Resistance to tearing (nail shank)                         | 12310-1:2000                                   | -                 | ≥ 150                          | ≥ 150   | -                 | ≥ 250                          | ≥   | N                    |
| Tensile strength   | L<br>T<br>12311-1:2000                         | 450 ± 50          | ≥ 400                          | ≥ 400   | 850 ± 50          | ≥ 800                          | ≥ 400   | N/50 mm              |
|  |  | 450 ± 50          | ≥ 400                          | ≥ 400   | 850 ± 50          | ≥ 800                          | ≥ 400   |                      |
| Elongation   | L<br>T<br>12311-1:2000                         | 35 ± 5            | ≥ 30                           | ≥ 10  | 35 ± 5            | ≥ 30                           | ≥ 10  | %                    |
|  |  | 35 ± 5            | ≥ 30                           | ≥ 10  | 35 ± 5            | ≥ 30                           | ≥ 10  |                      |
| Average peel resistance of joints                          | L<br>T<br>12316-1:2000                         | -                 | ≥ 150                          | ≥ 50  | -                 | ≥ 50                           | ≥   | N/50 mm              |
|  |  | -                 | ≥ 100                          | ≥ 50  | -                 | ≥ 50                           | ≥   |                      |
| Shear resistance of joints                                 | 12317-1:2000                                   | -                 | ≥ 400                          | ≥ 400   | -                 | ≥ 600                          | ≥   | N/50 mm              |
| Resistance to:   | 12691:2006 (A)<br>12691:2001<br>12730:2001 (A) | -                 | ≥ 800                          | ≥ 500   | -                 | ≥ 800                          | ≥   | mm<br>mm diam.<br>kg |
| Impact +23 °C  |  | -                 | -                              | -   | -                 | ≥ 30                           | -   |                      |
| Impact -10 °C  |  | -                 | ≥ 15                           | ≥ 15  | -                 | ≥ 20                           | ≥   |                      |
| Static loading   |  |                   |                                |   |                   |                                |   |                      |
| Watertightness after 10 % stretching at low temp. (-10 °C) | 13897:2005                                     | -                 | Tett                           | -   | -                 | Tett                           | -   | -                    |

<sup>1)</sup> The manufacturers Declaration of performance, DoP

<sup>2)</sup> Control limit shows values the product has to satisfy during internal factory production control and audit testing.

<sup>3)</sup> SINTEF's recommended minimum performance in SINTEF Technical Approval for the bottom layer in two layer system

<sup>4)</sup> SINTEF's recommended minimum performance in SINTEF Technical Approval for the top layer in two layer system

<sup>5)</sup> Modified to only give the result of weight loss of granules in gram.

## 5. Properties

### Material properties

Product properties for fresh material are shown in Table 2.

### Safety in case of fire

Bauder double-layer bituminous roofing membrane fulfills the requirements of class B<sub>ROOF</sub> (t2) according to EN 13501-5 on substrates shown in Table 3. The testing is performed according to CEN/TS 1187-2.

Table 3

Bauder double layer bituminous roofing membrane achieves reaction-to-fire classification class B<sub>ROOF</sub> (t2) on following substrates

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

|                                       |     |
|---------------------------------------|-----|
| Reroofing on old membrane on concrete | Yes |
|---------------------------------------|-----|

### Durability

Bauder double-layer bituminous roofing membrane has shown satisfying properties after artificially ageing performed at SINTEF Building and Infrastructure, both as type testing and as annual control testing.

### Calculation of fasteners

The capacity for anchoring the membrane with SFS intec BS-4,8xL roofing screw and SFS ISO-TAK R45xL plastic-washer with integrated sleeve is 600 N per fastener. This capacity applies to the connection between the membrane and the fastener according to EN 16002.

For weak underlays the connection between the underlay and the fastener might limit the capacity. This must be considered. The lowest value for membrane/underlay must always be used.

Calculation of fastener spacing is carried out according to SINTEF Building Design Guide 544.206 and "TPF Informs No. 5".

## 6. Environmental aspects

### *Substances hazardous to health and environment*

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

### *Waste treatment/recycling*

Bauder double-layer bituminous roofing membrane shall be sorted as residual waste on the building/demolition site. The product shall be delivered to an authorized waste treatment plant for energy recovery.

### *Environmental declaration*

No environmental declaration (EPD) has been worked out for Bauder double-layer bituminous roofing membrane.

## 7. Special conditions for use and installation

### *Installation*

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

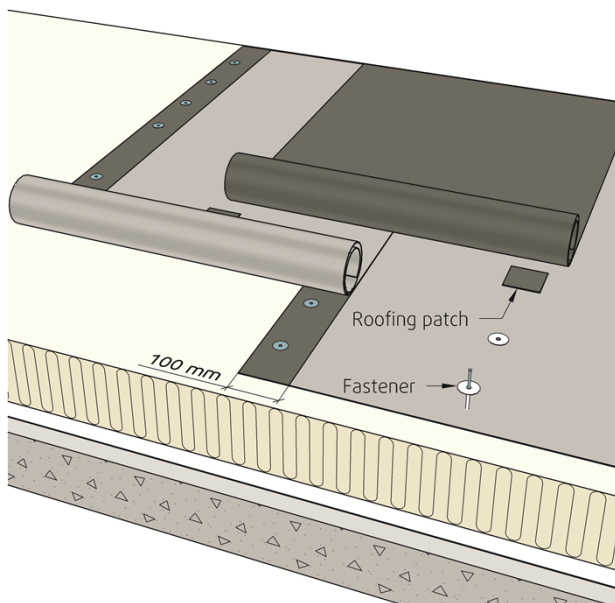


Fig. 2

If necessary the Bauder double-layer bituminous roofing membrane can be alternatively mechanically fastened through the membrane outside the overlap with patches or strips over the fixing.

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

The roofing membrane shall otherwise be installed in accordance with the principles shown in SINTEF Building Design Guide 544.203, 544.204 and 544.206 and “TPF Informs No. 5”.

### *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 underlays of thermal insulation with compressive strength  $\geq 80$  kN/m<sup>2</sup> (level CS(10)80 according to EN 13162/13163) uses steel washers with recess or plastic washers.

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 be specially checked.

### *Underlay*

When a fire classification is required the underlay must be in accordance with the provisions stated in section.

### *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.

### *Storage*

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

## 8. Factory production control

Bauder ULS 30 and Bauder PRO 40 are subject to supervisory factory production and product control according to contract between SINTEF Building and Infrastructure and Paul Bauder GmbH & Co. KG concerning Technical Approval

The quality system at Paul Bauder GmbH & Co. KG is certified by German Institute of Certification (DQS), according to ISO 9001:2008, certificate no. 002735 QM08.

### 9. Basis for the approval

Material- and design data has been verified by type testing, and are documented in the following reports:

- Norwegian Building Research Institute. Report O-14133-2 dated 18.02.2003 Material properties Bauder PRO 40
- Hersfelder Labor für Strasse und Abdichtung GmbH Report Ba\_01/08, dated 08.05.2008, Fire properties
- SINTEF Building and Infrastructure. Report 3D0434.02, dated 18.08.2009 Wind load testing
- SINTEF Building and Infrastructure. Report 3D0434.02, dated 28.08.2009, Material properties Bauder ULS 30
- SINTEF Building and Infrastructure. Report 102000920-2-1, dated 05.02.2015, Testing according NS-EN 1109

### 10. Marking

All rolls shall be marked with the manufacturer's product code, product name and date of production. The approval mark for SINTEF Technical Approval No. 20025 may also be used.



Approval mark

### 11. 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.

### 12. Technical management

Project manager for this approval is Knut Noreng at SINTEF Building and Infrastructure, dep. Materials and structures, Trondheim.

for SINTEF Building and Infrastructure

Marius Kvalvik  
Approval Manager