

SINTEF confirms that

## Derbigum SP FR single-layer bituminous waterproofing 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

Derbigum Norge AS  
 Breivikbråteveien 9  
 1555 Son

### 2. Product description

Derbigum SP FR is a bituminous roof waterproofing membrane with a double reinforcement felt positioned in the top layer of the membrane. The reinforcement consists of a 150 g/m<sup>2</sup> polyester felt and a 55 g/m<sup>2</sup> glass felt with longitudinal glass fibres. Both layers are impregnated with APP polymer bitumen during the manufacturing process, at the same time as the bottom layer is given the specified thickness. Measures and tolerances are stated in Table 1.

Derbigum SP FR is manufactured in several surface colours. The underside is black and coated with talc.

Table 1  
 Derbigum SP FR's measures and tolerances

Property	Derbigum SP FR	Tolerance
Thickness	4,0 mm	± 5 %
Weight	4,5 kg/m <sup>2</sup>	± 10 %
Width	1,1 m	± 1 %
Roll length	7,27 m / 175 m	-0/+2 %
Weight of reinforcement	Min.200 g/m <sup>2</sup>	

The adherent Derbibond S is part of the membrane system "Cold-bonded Derbigum SP FR". Derbibond S consists of bitumen, solvent (hydrocarbon) and mineral additives. Derbibond S is soluble in white spirit.

### 3. Fields of application

Derbigum SP FR is used as a single-layer bituminous waterproofing membrane on sloping and flat roofs. The system is specially designed to be used as mechanically fastened single layer roofing, see Fig. 1.

Derbigum SP FR may also be used as ballasted roofing with gravel or concrete tiles.

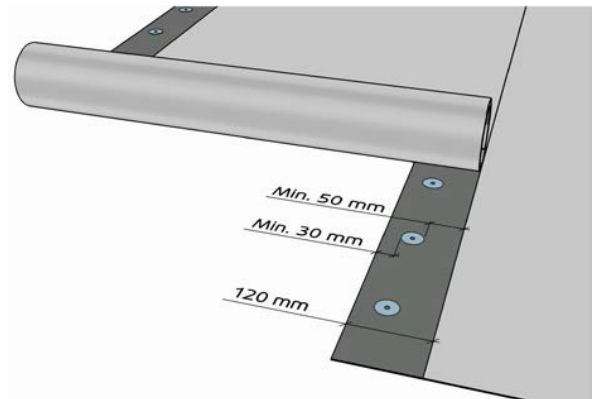


Fig. 1  
 Derbigum SP FR single-layer bituminous roof waterproofing membrane mechanically fastened with min. 120 mm overlaps

For reroofing on old bitumen membranes, and as the top layer in double layer roofing, Derbigum SP FR may be cold-bonded to the substrate using Derbibond S as adherent.

Derbigum SP FR may also be used as a water pressure membrane under certain conditions, see clause 6.

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

The properties of fresh material are stated in Table 2.

#### Safety in case of fire

Derbigum SP FR fulfils the requirements of class B<sub>ROOF</sub> (t2) according to EN 13501-5 for all underlays, as shown in table 3. The testing is performed according to CEN/TS 1187.

Table 2

Product properties for fresh material of Derbigum SP FR single-layer bituminous roof waterproofing membrane

Property	Test method EN	DoP <sup>1)</sup>	Control limit <sup>2)</sup>	SINTEF's recommended minimum performance <sup>3)</sup>	Unit
Dimensional stability (L/T)	1107-1:1999	-	≤ ±0.2	≤ ±0.6	%
Flexibility at low temperature Top side out/ Underside out	1109-1:2013	- -15	- ≤ -15	≤ -15	°C
Flow resistance at elevated temperature	1110:2010 <sup>4)</sup>	-	≥ 140	≥ 90	°C
Water tightness 10 kPa/24 h	1928:2000 (A)	Tight	Tight	Tight	-
Water pressure tightness	1928:2000 (B)	-	Tight	-	-
Resistance to tearing, nail shank (L/T)	12310-1:2000	200 / 200 ± 25 %	≥ 150 / 150	≥ 150	N
Tensile strength (L/T)	12311-1:2000	700 / 650 ± 20 %	≥ 560 / 520	≥ 600	N/50 mm
Elongation (L/T)	12311-1:2000	45 / 45 ± 15	≥ 30 / 30	≥ 10	%
Average peel resistance of joints	12316-1:2000	65 ± 20 %	≥ 50	≥ 50	N/50 mm
Shear resistance of joints	12317-1:2000	625 ± 20 %	≥ 500	≥ 600	N/50 mm
Resistance to puncturing Impact +23 °C	12691:2006 (A)	1250	≥ 1250	≥ 500	mm
Impact -10 °C	12691:2001	-	≤ 30	≤ 30	mm diam
Static load	12730:2001 (A)	20	≥ 20	≥ 20	kg
Watertightness after stretching at low temp - 10 °C	13897:2005	-	≥ 5/ Tight	≥ 10/ Tight	%

<sup>1)</sup> Manufacturers Declaration of Performance, DoP

<sup>2)</sup> The stated values are control limits existing for internal control at the producer and by supervising control.

<sup>3)</sup> The control limits are consistent with the lowest range of variation for the manufacturer's declared value in DoP.

<sup>4)</sup> SINTEF's recommended minimum performance in SINTEF Technical Approval for single layer bituminous waterproofing membrane

Table 3

Derbigum SP FR single-layer bituminous roof waterproofing membrane achieves reaction-to-fire classification class BROOF (t2) on the following substrates

Type of sub construction	Derbigum SP FR waterproofing membrane
EPS	Yes
Rockwool	Yes
Wooden sheeting	Yes
Concrete	Yes
Reroofing on old membrane on EPS	Yes
Reroofing on old membrane on stone wool	Yes
Reroofing on old membrane on wooden sheeting	Yes
Reroofing on old membrane on concrete substrate	Yes

#### Calculation of mechanical fasteners

Load capacities for fastening the roofing membrane with various types of fasteners are shown in Table 4. The capacities relate to the fastening of the membrane itself. The strength of the hold to weak underlay may limit the overall capacity of the fixing points.

Calculation of fastener spacing is carried out according to SINTEF Building Research Design Sheet 544.206 and "TPF Informs No. 5". The capacities apply to Norwegian conditions.

Table 4

Design load capacities at ultimate limit state for fastening Derbigum SP FR single-layer roof waterproofing membrane

Type of fastener, fixed in welded overlaps	Capacity, N/per fastener	
	120 mm overlap	150 mm overlap
Teleskop 42 fastener	900	900
Iso-Tak 45 fastener	900	900
Teleskop 40 washer	1100	1100
Sjong 40 washer	1100	1100
SFS IT-C 40 x 82 washer with casing	1200	1600

#### Durability

Derbigum SP FR and the system "Cold-bonded Derbigum SP FR" have been assessed on the basis of field investigations and laboratory testing to have acceptable durability for their intended use.

## 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 ground water.

### *Waste treatment/recycling*

The product 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 the product.

## 6. Special conditions for use and installation

### *Installation of mechanical fasteners*

The membrane must be mechanically fastened at minimum 120 mm overlaps which are entirely welded after being unrolled, see Fig. 1. The bonding width shall be minimum 30 mm on the inside and minimum 50 mm on the outside of the fastener.

When a new membrane is installed on top of an existing bituminous roofing membrane, the new membrane must be unrolled with a 120mm overlap and simultaneously welded along the centre-line. The total width of the overlap is then welded over the mechanical fasteners.

Transverse joints must have a 150 mm overlap, with the underlying corners cut at an angle.

A second overlapping layer must be used to reinforce joints between horizontal and vertical areas, areas around gullies or outlets, and in gutters, see Fig. 2.

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

Steel washers with recess or plastic washers must be used on underlays with compressible strength of 80 kPa (EPS 20 kg/m<sup>3</sup>).

Fasteners with good telescopic effect must be used on underlays made of rockwool.

### *Cold-bonding*

Cold-bonding of Derbigum SP FR must only be done on top of an existing bituminous roofing membrane, or as the top layer in double layer roofing. Cold bonding may also be used on substrates of concrete and wooden sheathing. The substrate must be even, clean and dry, and holes or damages that may affect the airtightness must be repaired.

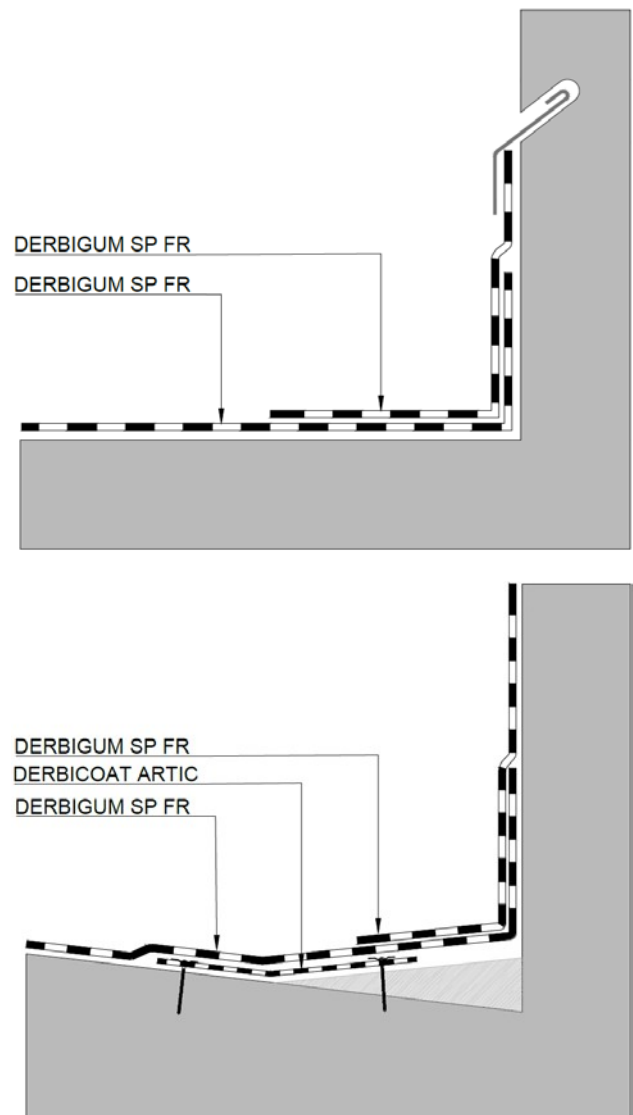


Fig. 2

The membrane must be reinforced with an extra layer at edge joints, gutters and water outlets

The adherent Derbibond S is evenly applied, using approx. 1 kg/m<sup>2</sup>. Overlaps in the new membrane are torched welded. Resistance against wind up-lift depends on the fastening of the old roofing, which must be checked.

### *Ballast*

A 50 mm thick layer of gravel (16 – 32 mm) may be used for a design wind speed  $q_d \leq 3.0$  kN/m<sup>2</sup> as ballast to secure resistance against wind up-lift. 50 mm thick concrete slabs may be used for a design wind speed  $q_d \leq 5.0$  kN/m<sup>2</sup>.

### *Welding the overlaps*

Derbigum SP FR must be heated before being unrolled at temperatures below – 5°C.

Contact welding to flashings and in other places where the joint cannot be covered with a separate protection must be carried out with special care. The substrate must be clean and dry, and the use of a primer may afford extra security

If the membrane is installed 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.

#### *Application as water pressure membrane*

Derbigum SP FR may be used as a water pressure membrane, f.ex. in applications like green roofs, culverts etc., providing the membrane is torched or bonded to a firm and stable substrate.

#### *Installation in general*

The roofing membrane, shall otherwise, be installed in accordance with SINTEF Building Design Sheets 544.203, 544.204 and 544.206, together with the manufacturer's installation instructions.

#### *Traffic on the roof*

If the roof is expected to have more traffic than required for inspection and maintenance purposes, special precautionary measures should be taken to protect the roofing membrane.

#### *Storage*

Derbigum SP FR shall be stored standing upright on pallets.

### **7. Factory production control**

The product is produced by Imperbel SA, B-1360 Perwez, Belgium.

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

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

The manufacturer Imperbel SA-NV is certified by Bureau Veritas Certification in compliance with ISO 9001, certificate n° BE009216-1, ISO 14001, certificate n° BE008801-1 and OHSAS 18001, certificate n° BE009916-1.

### **8. Basis for the approval**

The material properties have been determined by type testing and control tests carried out by the Norwegian Building Research Institute since 1986. Fitness for use has also been confirmed by four field investigations conducted in Norway and Spitsbergen. These are documented in the following NBI/ SINTEF reports:

- Report O 3651 dated 10.03.1992
- Report O 8178 dated 01.11.1996
- Report O 10114 dated 01.03.2001
- Report 3D1244 dated 13 January 2012

The property resistance to impact is tested by SINTEF according to EN 12691:2006 (A):

- Report 3D126201 dated 21.10.2011

Assessment of the system "Cold-bonded Derbigum SP FR" is based on verification of properties documented in the following NBI reports:

- Report O 14177 dated 10.11.2003 (windload test)
- Report O 14177-B dated 05.02.2003 (fiels investigation)
- Report O 14177-C dated 16.02.2003 (durability)

Fastener capacities stated in Table 4 are based on a system test in accordance with NT BUILD 307, supplemented by comparable results from simplified tests in accordance with test method NBI 163/91.

Fire classification is documented by Swedish type approval from SITAC:

- Certificate no. 0034/06", dated 22.05.2007

### **9. Marking**

All rolls are marked on their packaging with manufacturer, the manufacturer's product description and the manufacturing date. The approval mark for SINTEF Technical Approval No. 2055 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

*Marius Kvalvik*

Marius Kvalvik  
Approval Manager