SINTEF Technical Approval

TG 2055

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Provided listed on
www.sintefcertification.no

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
Kløvningsten 11
1739 Borgenhaugen
Norway

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 polyester felt and a 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.

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.

Table 1
Measures and tolerances for Derbigum SP FR
according to EN 1848-1 and EN 1849-1

Property	Measure	Unit	Tolerance
Thickness	4.0	mm	± 5 %
Area weight	4.5	kg/m²	± 10 %
Width	1.1	m	± 1 %
Length of roll	7.27 / 175	m	-0/+2 %
Total weight of reinforcement	205	g/m²	± 15 %
Weight of polyester reinforcement	150	g/m²	± 15 %
Weight of glass felt reinforcement	55	g/m²	± 15 %

3. Fields of application

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

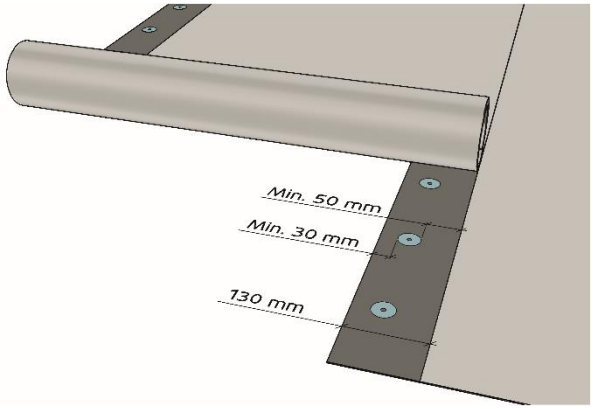

Fig. 1
Derbigum SP FR single-layer bituminous roof waterproofing membrane mechanically fastened with min. 130 mm overlap.

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

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 for fresh material are shown in table 2.

Properties related to fire
Derbigum SP FR 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 2
Product properties for fresh material of Derbigum SP FR

Property	Test method EN	DoP [1]	Control limits [2]	SINTEF's recommended minimum performance [3]	Unit
Dimensional stability	1107-1	-	≤ ±0.2	± 0.6	%
Flexibility at low temperature - upper face - lower face	1109-1	- -15	- ≤ -15	≤ -15	°C
Flow resistance at elevated temperature	1110	-	≥ 140	≥ 90	°C
Watertightness 10 kPa/24 h	1928 (A)	Tight	Tight [5]	Pass	-
Watertightness 150 kPa/1 h	1928 (B)	-	Tight [4] [5]	-	
Resistance to tearing (nail shank) L/T	12310-1	200 ± 25 %	≥ 150	≥ 150	N
Tensile strength L T	12311-1	700 ± 20 % 650 ± 20 %	≥ 560 ≥ 520	≥ 600	N/50 mm
Elongation at max load L/T	12311-1	45 ± 15	≥ 30	≥ 10	%
Average peel resistance of joints Sidelap/Endlap	12316-1	65 ± 20 %	≥ 50	≥ 50	N/50 mm
Shear resistance of joints Sidelap/Endlap	12317-1	625 ± 20 %	≥ 500	≥ 600	N/50 mm
Resistance to - Impact +23 °C - Impact -10 °C - Static loading	12691 (A) 12691:2001 12730 (A)	1250 - 20	≥ 1250 ≤ 30 [5] ≥ 20	≥ 500 ≤ 30 ≥ 20	mm mm diam. kg
Watertightness after stretching at low temperature (10% elongation at -10 °C)	13897	-	-	Pass	-
Watertightness after stretching at low temperature (5 % elongation at -10 °C)	13897	-	Pass [5]	-	-
Root resistance	13948	NPD	- [4] [6]	Pass	-

[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 single-layer bituminous waterproofing.
[4] Requirement for water-pressure membranes
[5] Result from type-testing
[6] Root resistance is not tested. If the membrane is used in connection with soil cover and planting the root resistance must be ensured by a separate root barrier to protect the membrane from plant roots.

L = Longitudinal T = Transversal

Table 3
Derbigum SP FR has fire classification B_{ROOF} (t2) on following substrates

Type of substrate	Derbigum SP FR
EPS *	Yes
Stone wool	Yes
Wood particle board	Yes
Concrete / silicate plate	Yes
Old roofing membrane on EPS *	Yes
Old roofing membrane on stone wool	Yes
Old roofing membrane on particle board	Yes
Old roofing membrane on concrete or silicate plate	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
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.

Fastening capacity
The design capacity for the fastening of the membrane with different fasteners and premises 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 Derbigum SP FR single-layer roof waterproofing membrane with different fastening systems

Fastener/Fastening system Fastening in 130 mm welded joint	Design capacity N / fastener
Guardian RBS50 plastic washer and Guardian BS-4,8 screw Tested on soft substrate, attachment in steel plate Distance between fasteners: C/C 320 mm	800 [1)]
SFS RP50 plastic washer and SFS BS-4,8 screw Tested on soft substrate, attachment in steel plate Distance between fasteners: C/C 320 mm	800 [1)]
Guardian R48 plastic washer and Guardian BS-4,8 screw Tested on soft substrate, attachment in steel plate Distance between fasteners: C/C 320 mm	800 [1)]

[1)] Measured according to method EN 16002 and the safety factor γ_m=1.5.

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 .

5. Environmental aspects

Substances hazardous to health and environment
Derbigum SP FR 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 Derbigum SP FR are evaluated to have no negative effects on soil or ground water.

Waste treatment/recycling
Derbigum SP FR can be sorted as separate waste fraction by end-of-life and be delivered to material recovery.

Environmental declaration
No environmental declaration (EPD) has been worked out for Derbigum SP FR.

6. Special conditions for use and installation

Installation in general
The roofing membrane shall be installed in accordance with the vendor's installation manual and the principles shown in SINTEF Building Research Design Guide 544.203 *Asfalttakbelegg. Egenskaper og tekking*, 544.204 *Tekking med asfalttakbelegg eller takfolie. Detaljløsninger* and 544.206 *Mekanisk innfesting av asfalttakbelegg og takfolie på skrå og flate tak,* plus "TPF informerer nr. 5" published by Takprodusentenes Forskningsgruppe (TPF), see www.tpf-info.org.

Installation of mechanical fasteners
The membrane must be mechanically fastened at minimum 130 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 130 mm overlap and simultaneously welded along the centreline. The total width of the overlap is then welded over the mechanical fasteners.

Transverse joints must have an overlap of minimum 150 mm. 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.

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.

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

On substrates of thermal insulation with compressive strength ≥ 80 kN/m^2 (level CS(10)80 according to EN 13162/13163) steel washers with deep collars or plastic washers should be used.

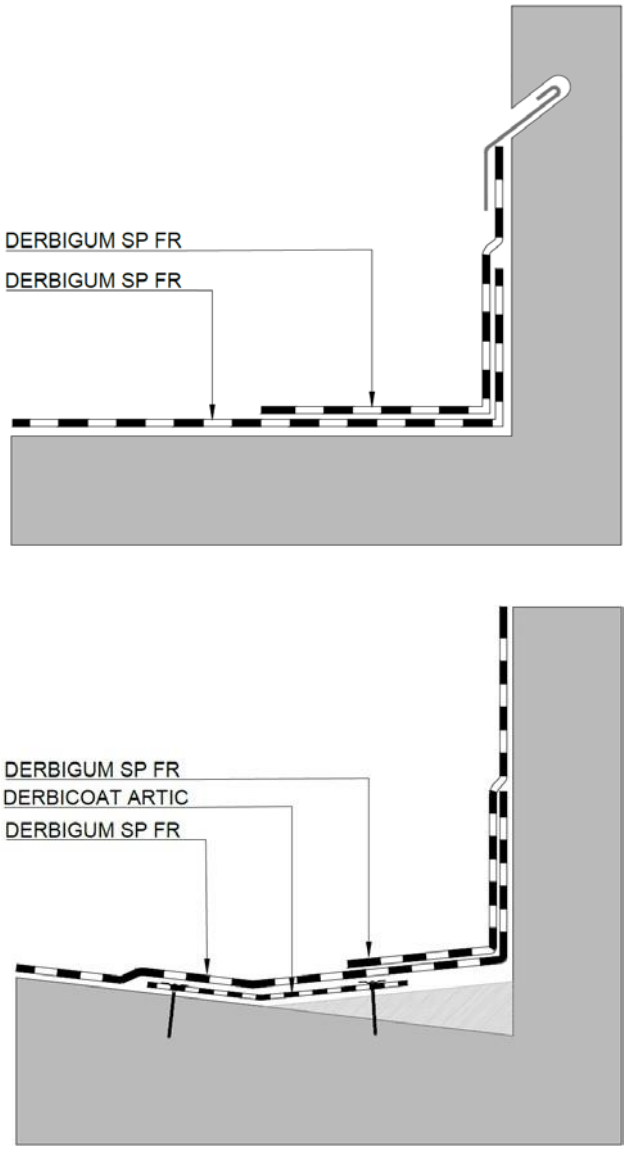

Fig. 2
The membrane must be reinforced with an extra layer at edge joints, gutters and water outlets

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.

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.

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 sheeting. The substrate must be even, clean and dry, and holes or damages that may affect the airtightness must be repaired.

Resistance against wind up-lift depends on the fastening of the old roofing, which must be checked.

The adherent Derbibond S is evenly applied, using approximately 1 kg/m². Overlaps in the new membrane are torch welded.

Ballast
For a design wind speed qd ≤ 3.0 kN/m² a 50 mm thick layer of gravel (16 – 32 mm) may be used as ballast to secure resistance against wind up-lift. For a design wind speed qd ≤ 5.0 kN/m² 50 mm thick concrete slabs may be used.

Application as water pressure membrane
Derbigum SP FR may be used as a water pressure membrane, for instance in applications like green roofs, culverts etc., provided that the membrane is torched or bonded to a firm and stable substrate. If the membrane is used in connection with soil cover and planting the root resistance must be ensured by a separate root barrier to protect the membrane from plant roots.

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 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 SINTEF Building Research Design Guide no. 525.207 *Kompakte tak* and 520.339 *Bruk av brennbar isolasjon i bygninger*, plus "TPF informerer nr. 6 *Brannteknisk kostruksjoner 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, in accordance with the manufacturer's guidelines.

Storage
Derbigum SP FR must be stored upright on pallets.

7. Factory production control

Derbigum SP FR 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 Derbigum SP FR is produced in accordance with the preconditions applying to this approval.

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

The manufacturer Imperbel SA 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 Derbigum SP FR 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 are marked on their packaging with manufacturer, the manufacturer's product description and the manufacturing date.

Derbigum SP FR is CE-marked in accordance with EN 13707.

The approval mark for SINTEF Technical Approval TG 2055 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

Susanne Skjervø
Approval Manager