SINTEF

SINTEF Certification

No. 2594

Technical Approval

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Valid until: 01.05.2025

Provided listed on www.sintefcertification.no

SINTEF confirms that

Derbigum GC bituminous 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
Bernt Ankers gate 17,
NO-1534 Moss
www.derbigum.no

2. Product description

Derbigum GC is a bituminous waterproofing membrane with a double reinforcement felt positioned in the top layer of the membrane. The reinforcement consists of a 250 g/m² polyester felt and a 56 g/m² glass felt with longitudinal glass yarns. 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. Derbigum GC is coated with fine grained talcum on the underside. Measures and tolerances are stated in Table 1. Derbigum GC can also be delivered as a big roll up to about 130 m.

Derbigum GC AR is the Anti-Root version of Derbigum GC.

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

Property	Measure	Unit	Tolerance
Thickness	5.0	mm	± 5 %
Area weight	5.6	kg/m²	± 10 %
Width	1.1	m	± 1 %
Length of roll	7.27	m	+50 / -0 mm
Weight of polyester reinforcement	250	g/m²	± 15 %
Weight of glass felt reinforcement	56	g/m²	± 15 %

Supplementary products for applications other than bridge, and places where there are no horizontal forces:
- Derbiprimer GC primer
- Derbibond S and Derbibond NT adhesive.

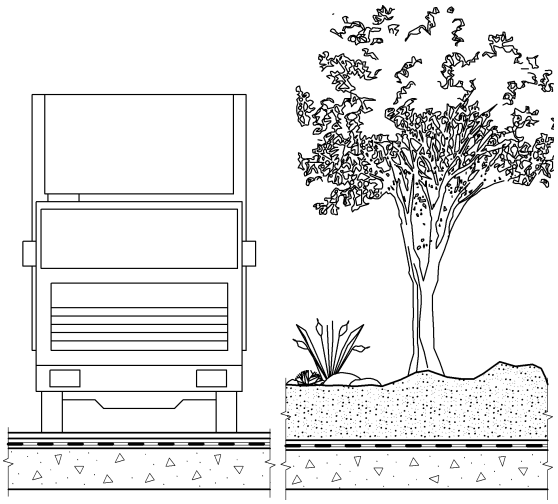

Fig. 1
Example of use of Derbigum GC (AR) as a ballasted membrane

3. Fields of application

Derbigum GC is used as a single-layer bituminous waterproofing membrane. The intended use of Derbigum GC is for bridges, tunnel openings, aqueducts, basins, parking decks and roof terraces. For roof gardens Derbigum GC AR shall be applied instead of Derbigum GC.

Structures such as parking decks and terraces must have adequate slope to drain water from rain and melted snow. The membrane can be laid horizontally when integrally casted wear layers have a slope towards gutter and drain of at least 1:100.

For bridges, according to Norwegian Public Roads Administration's *Håndbok N100 Veg- og gateutforming,* chapter *C.2 Generelle utformingskrav* and table *C.3 Oppsummering av standardkrav for ulike dimensjoneringsklasser,* the driving lanes should have a minimum resultant slope of 2 %. There should be no standing water on the membrane, since standing water and possibly freezing can result in reduced adhesion to the substrate.

Table 2
Product properties for fresh material of Derbigum GC bituminous waterproofing membrane

Propterty		Test method EN	DoP[1)]	Control limits[2)]	SINTEF's recommended minimum performance [3)]	Unit
Dimensional stability		1107-1	-	± 0.2	0.6	%
Flexibiltiy at low temperature - Upper face out - Bottom face out		1109	- ≤ –15	- [7)] ≤ –15	-15	°C
Flow resistance at elevated temperature		1110	-	≥ 150	90	°C
Water tightness (10 kPa)		1928 (A)	Tight	Tight	Tight	-
Water tightness (150 kPa)		1928 (B)	Tight	Tight	Tight	-
Tensile strength (L/T)		12311-1	1200 ± 20 %	≥ 960	600	N/50 mm
Elongation (L/T)		12311-1	50 ± 15	≥ 35	10	%
Shear resistance of joints		12317-1	800 ± 20 %	≥ 640	600	N/50 mm
Punchture resistance	impact at +23 °C	12691 (A)	1750	≥ 1750	500	mm
	impact at -10 °C	12691:2001	-	≤ 30	30	mm diam.
	static loading	12730 (A)	20	≥ 20	20	kg
Bond strength - to concrete - asphalt		13596:2005	≥ 0.7 ≥ 0.4	≥ 0.7 ≥ 0.4	0.7	N/mm²
Shear strength [4)]		13653:2004	≥ 0.2	≥ 0.20	0.2	N/mm²
Resistance to root penetration (only Derbigum GC AR) [4)]		13948:2007	Passed	Passed	Passed [6)]	-
Water absorption [4)]		14223:2005	< 1	< 1.0	[5)]	% by weight
Determination of crack bridging ability [4)]		14224: modified	Pass at -10°C	Passed	[5)]	-
Compatibility by heat conditioning		14691:2005	> 150	> 150	[5)]	%
Determination of resistance to compaction of an asphalt layer [4)]		14692:2005	Pass	Passed	[5)]	-
Determination of the behaviour of polymer bitumen sheets during application of mastic asphalt [4)]		14693:2006	-	Inclusions ≤ 6 Black spots ≤ 50 % Lowering thickness ≤ 1mm	[5)]	-
Determination of resistance to dynamic water pressure after damage by pre-treatment [4)]		14694:2005	-	Tight	[5)]	-
Dimension stability at 160 °C		14695:2010 Annex B	-	± 0.4	[5)]	%

[1)] The manufacturer's Declaration of performance, DoP.
[2)] Control limit shows 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 bituminous membranes for bridges according to EN 13707 and EN 14695
[4)] Result from type testing
[5)] SINTEF has not recommended a minimum performance
[6)] If the root resistance has not been tested (in soil covered structures) the root resistance must be ensured by a separate root barrier to protect the membrane from plant roots.
[7)] In the case of sheets with the same bituminous compound on both sides and where the reinforcement is placed in the cross section visually closer to the upper surface, as with Derbigum GC, the test is performed on the bottom face only

L = Longitudinal T = Transversal

4. Properties

Product properties

The properties for fresh material are shown in Table 2.

Properties related to fire

Derbigum GC fulfils the requirements of class E according to EN 13501-1 regarding reaction to fire.

Durability

Derbigum GC has been assessed to have acceptable durability for its intended use.

5. Environmental aspects

Substances hazardous to health and environment

Derbigum GC 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.

Non dry/hardened primer and adhesive is defined as hazardous waste (according to the Norwegian Waste Regulation (Avfallsforskriften)). The product must be sorted as hazardous waste on the building site, and be delivered to an authorized treatment plant for hazardous waste. The dried product is not hazardous waste.

Effect on soil, surface water and ground water

The leaching properties of Derbigum GC are evaluated to have no negative effects on soil or ground water.

Waste treatment/recycling

Derbigum GC 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 Derbigum GC.

6. Special conditions for use and installation

General

Derbigum GC shall be installed in accordance with the manufacturer's guidelines, "TPF informerer nr. 5" published by Takprodusentenes Forskningsgruppe, see www.tpf-info.org, and the principles shown in SINTEF Building Research Design Guide no.

- 525.304 *Terrasse på etasjeskiller av betong for lett eller moderat trafikk*
- 525.306 *Takterrasser med beplantning*
- 525.307 *Tak for biltrafikk og parkering*
- 544.203 *Asfalttakbelegg. Egenskaper og tekking*
- 544.204 *Tekking med asfalttakbelegg eller takfolie. Detaljløsninger.*

Substrate

The substrate must be dry and clean and have a smoothness corresponding to float-finished concrete. Concrete elements must be connected to each other, and the joints between the elements must be casted. Gaps larger than 2-3 mm between the elements must be filled in.

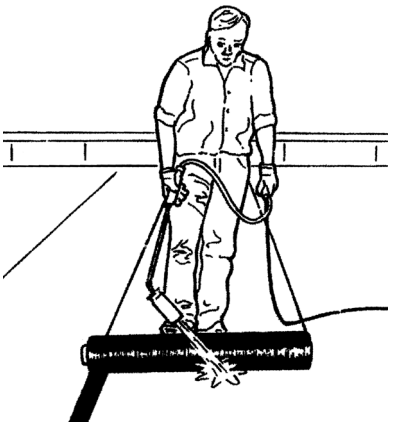

Fig. 2
Welding of Derbigum GC to primed concrete substrate

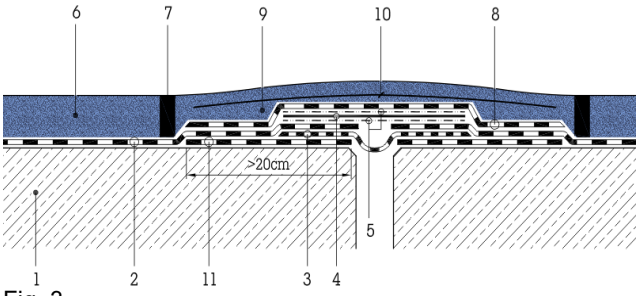

Fig. 3
Principal drawing of performance of movement joint
(This performance does not apply to bridges)

1. Concrete deck primed with Derbiprimer GC
2. Waterproofing Derbigum, welded
3. Derbigum GC with expansion joint
4. Metal plate, thickness 2 mm
5. Separator layer in fibre glass
6. Asphalt layer
7. Rejointing
8. Derbigum GC protection strip, welded with min. 10 cm overlap at each side
9. Asphalt layer above the expansion joint
10. Reinforcement
11. Derbigum GC preparation strip

Installed as contact membrane

On surfaces with heavy traffic like bridges and some parking-decks, Derbigum GC shall be installed fully welded to the substrate, see Fig. 2.

The substrate must be primed with Derbiprimer GC to prevent blistering (quantity = 150 to 300 g/m^2). The substrate must be dry. The roughness of the substrate must not be more than 1.5 mm.

Derbigum GC must be laid with 100 mm welded side laps. End laps shall be carried out with 150 mm overlap and the underlying corners shall be cut in an angle.

Installed as cold applied contact membrane

On surfaces other than those with heavy traffic, Derbigum GC can be installed fully bonded to the substrate with Derbibond S or NT cold adhesive. The substrate can be primed with Derbiprimer GC (quantity= 150 to 300 g/m²) in order to reduce the consumption of cold adhesive.

The roughness of the substrate shall not exceed 2.5 mm.

Protection and tightness test

The membrane must be protected immediately after installation and should be tested for leaks before it is built into the construction. The membrane must be protected against impact from sharp objects and from objects that can be trampled down in the membrane during the construction process.

For roof gardens Derbigum GC AR shall be applied, instead of Derbigum GC, for protection against root penetration.
If Derbigum GC is used as a waterproofing membrane on roof gardens, the membrane must be covered with a protective layer to avoid root penetration.

Movement in joints in the substrate

Derbigum GC must be installed in such way that movements in the substrate can be absorbed. For contact-membranes this means that the membrane must be laid loosely over the joints in a width sufficient to the extent of the movement in the substrate, see Fig. 3. The joint shown in Fig. 3 is separated from the general protection layer and is removable to allow repairs without damaging the rest of the roof. The principal drawing in Fig. 3 does not apply to bridges.

Repairs

Repairs of the membrane are performed by cleaning the damaged area and then fully weld a considerably bigger patch over it resulting with sufficient overlap in all directions.

Storage

Derbigum GC shall be stored upright on pallets.

7. Factory production control

Derbigum GC is produced by IMPERBEL SA, Chaussée de Wavre 67, 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 Derbigum GC 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 in accordance with EN ISO 9001.

The manufacturer Imperbel SA has an environmental management system in accordance with EN ISO 14001.

8. Basis for the approval

Product properties for Derbigum GC have been determined by type testing and are documented in the following reports:

- SINTEF Building and Infrastructure. Report Testing of properties on Derbigum GC dated 02.09.08 (various properties)
- Laboratoire de materiaux de construction. Report LMC/05/194 dated 25.01.06
- Centre scientifique et technique de la contruction. Report CSTC DE651xE984 dated 21.10.05 (cold bending)
- Laboratoire de materiaux de construction. Report LMC N°57.241 dated 14.04.95 (Crack bridging ability)
- Laboratoire de materiaux de construction. Report LMC N°5/67.026 dated 09.11.04 (cold bending)
- Laboratoire de materiaux de construction. Report LMC N°5/66.726 dated 08.12.03 (various properties)
- Laboratoire de materiaux de construction. Report LMC N°5/66.017 dated 28.02.02 (various properties)
- Laboratoire de materiaux de construction. Report LMC/06/192 dated 04.12.06 (dynamic water tightness)
- Centre scientifique et technique de la contruction. Report CSTC DE651xE364 dated 02.11.04 (Root Penetration)
- Warrington Firegent. Reaction to fire classification report No 12455B dated 2006-10-18
- Research Road Institute in Belgium. Report BAC/3379 dated 04.08.2008 (shear strength)
- Tecnotest AG. Report A4194-01 dated 13.09.2013. Membrane properties for "Waterproofing Systems and Bituminous Layers on Concrete Bridge Decks".
- Centre scientifique et technique de la contruction. Report CSTC DE651xP135 dated 2018-10-08 (Derbigum GC AR, dimensional stability)
- Centre scientifique et technique de la contruction. Report CSTC DE651xN496 dated 2016-11-10 (Derbigum GC, flow resistance and dimensional stability)
- Centre scientifique et technique de la contruction. Report CSTC DE651xN497 dated 2016-11-10 (Derbigum GC AR, flow resistance)

Derbigum GC is by Statens Vegvesen, Vegdirektoratet evaluated to be suitable as prefabricated waterproofing membrane for use on bridges.

9. Marking

All rolls are marked on their packaging with the manufacturer, manufacturer's product description and the manufacturing date.

Derbigum GC is CE marked in accordance with EN 13707 and EN 14695.

The approval mark for SINTEF Technical Approval No. 2594 may also be used.

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