BBA 14/5118 (1)

EPD S-P-00691

ETE 10/0054

FM Approvals
PR473752
RR251969

DANOPOL+ HS 1.5

Single Ply PVC-p 1.5 mm membrane. Mechanically Fixed.

1.5 mm PVC-P single ply membrane, reinforced with polyester net carrier. The DANOPOL "+" range has an enhanced formula with improved weather and UV radiation resistance properties. This formula also integrates a biocide that keeps the membrane protected against a wide range of harmful microorganisms.

Presentation

- Length (cm): 1500
- Length measurement standard: EN 1848-2
- Width (cm): 180
- Width measurement standard: EN 1848-2
- Thickness (mm): 1,5
- Colour: Anthracite
- Product code: 210049

Technical Data

Concept	Value	Standard
Mass per unit area (nominal) (kg/m²)	1.9	-
Density (kg/m³)	1266	-
Longitudinal elongation at break (%)	> 100	-
Transversal elongation at break (%)	> 110	-
Elongation at maximum force, longitudinal (%)	> 20	EN 12311-2 Método A
Elongation at maximum force, transverse (%)	> 20	EN 12311-2 Método A
External fire behaviour	Broof (t1) - Broof (t3) - Broof (t4)	EN 13501-5
Longitudinal & transversal dimensional stability	< 0.3	EN 1107-2
Water vapour permeability (μ)	47.000 ± 30%	EN 1931
Flexibility at low temperature (ºC)	< -30	EN 495-5
Reaction to fire	E	EN 13501-1
Resistance to static loading (kg)	> 55	EN 12730 Método B
Resistance to root penetration	Pasa	EN 13948
Longitudinal & transversal tensile strength (N/5cm)	> 1100 / 1000	EN 12311-2 Método A
Longitudinal resistance to tearing (nail shank) (N)	> 250	EN 12310-2
Transversal resistance to tearing (nail shank) (N)	> 250	EN 12310-2
Resistance to impact, A (mm)	> 700	EN 12691
Overlaps resistance (Shear of overlaps) (N/50mm)	> 950	EN 12317-2
Overlaps resistance (Peeling of overlap) (N/50mm)	> 250	EN 12316-2
Hazardous substances	PND	-
Emissivity	0,86±0,02	ASTM C1371-04a(2010)e1

Addtitional Technical Data

Concept	Value	Standard
Visible defects	Pasa	EN 1850-2
Nominal minimum thickness	1.5 (-5%; +10%)	EN 1849-2
Mass (kg/m²)	1,9 (-5%; +10%)	EN 1849-2
Loss of elongation at break (UV 5000 h)	< 10< 10	EN 1297, EN 12311-2EN 1297, EN 12311-2
Loss of plasticizers (mass change at 30 days) (%)	< 4.5	EN ISO 177
Flatness (mm)	< 10	EN 1848-2
Straightness (mm)	< 50	EN 1848-2
Hail resistance (soft Support) (m/s)	50	EN 13583
Hail resistance (hard support) (m/s)	28	EN 13583-2012
Resistance to static punching (N)	> 1200	UNE 104416 (b)

Environmental Information

Concept	Value	Standard
Post-consumer recycled content (%)	NDP	-
Pre-Consumer recycled content (%)	NDP	-
Manufactured in	Fontanar - Guadalajara (España)	-

Standards and Certification

- In accordance with the UNE-EN 13491 standard 'Geosynthetic barriers - Characteristics required for use in the construction of tunnels and associated underground structures'
- In accordance with the UNE-EN 104416 standard for synthetic materials. Roof waterproofing systems made with waterproofing membranes formed with flexible synthetic sheets. Instructions, control, use and maintenance.
- In accordance with the UNE-EN 13361 standard for geosynthetic barriers. Requirements for use in the construction of reservoirs and dams.
- In accordance with the UNE-EN 13362 standard on Geosynthetic Barriers. Requirements for use in canal construction.
- In accordance with the UNE-EN 13956 standard for flexible sheets for waterproofing. Plastic and rubber sheets for waterproofing roofs.
- Conforms to UNE-EN 13967 of plastic and rubber anti-capillary sheets, including plastic and rubber sheets used for sealing buried structures.
- It has an Environmental Declaration of Product DAP No. S-P-00691.
- ETE 10/0054 "DANOPOL HS FM".

Scope

- Channel waterproofing (EN 13362).
- Mechanically fastened roof waterproofing systems (EN 13956).
- Waterproofing of reservoirs and dams (EN 13361).
- Waterproofing of buried structures (EN 13967).
- Waterproofing against fluids in the construction of tunnels and underground structures (EN 13491).

Advantages & Benefits

- It absorbs structural movements efficiently , resisting the stresses resulting from large spans and the high expansions of deck roofs.
- High tensile strength.
- High resistance to piercing.
- Limits deformations and stresses in the waterproofing membrane due to the high temperatures and thermal jumps to which flat roofs are subjected.
- Very high durability with respect to possible degradation due to chemical causes.
- Very good resistance to micro-organisms, rot, mechanical impact, natural ageing and swelling.

Instruction for Use

Preparation of the substrate:

- The surface of the base substrate shall be resistant, uniform, smooth, clean, dry and free of foreign bodies. In the case of thermal insulation, the boards shall be laid in a grid and without gaps of more than 1 mm between boards.
- Polyester geotextiles, type Danofelt PY 300 or higher, shall be used as a separating or protective layer.
- Before the membrane is laid out, laminated profiles shall be mechanically fastened both in the horizontal plane and on the vertical face. If the membrane has a dimensional stability variation of 0.09%, anchoring to the horizontal plane is not necessary.
- The horizontal plane profile shall be installed as close as possible to the angle and shall never be located at a distance of more than 20 cm from the junction. In the vertical plane the profile is fixed so that the membrane rises a minimum of 20 cm above the surface of the pavement. The membrane is welded to the profile in the horizontal plane. A strip of sheeting is then welded to the profile of the vertical facing and overlapped and welded to the membrane in the horizontal plane. In this solution, the sheeting that goes up the vertical face must have the same characteristics as that of the horizontal plane.
- The joint between the profile fixed to the facing and the masonry facing is always sealed with an elastic and rot-proof mastic.

Singular points:

- Where the roof meets vertical faces and elements that pass through the membrane, the membrane must rise at least 20 cm above the finished roof level, or a greater height if necessary, so that the upper edge of the membrane is always above the maximum foreseeable water level on the roof. To improve the aesthetics of the finish at these points, an adhesive, GLUE-DAN PVC, can be used to adhere the sheet to the vertical facing.
- When the height of the parapet does not exceed 20 cm, or there is no perimeter parapet, the delivery to these parapets or edges of the slab, can be made by means of a laminated sheet profile in the form of an angle, C-laminated profile (angle with drip cap) that hangs on the outside of the facing in the form of a drip cap. This profile shall be fixed to the facing by its horizontal flange, which shall be wider than 6 cm, by means of anchors located at a distance of less than 25 cm from each

other. The membrane shall be welded to the laminated sheet metal profile in such a way that the head of the screws is concealed.

Laying of the waterproofing membrane:

- The membrane shall be laid perpendicular to the line of maximum slope of the roof. The anchoring to the structural support must be carried out by means of mechanical fastening. The joint between sheets shall be made by thermoplastic welding with a hot air welder. The overlaps shall be at least 10 cm to cover the mechanical fixing and the welding of the lower sheet with the upper one shall be at least 4 cm. Immediately after welding, the joint shall be pressed with a roller, thus ensuring a homogeneous joint. To check the joints, a blunt metal needle (with a rounded tip with a radius between 1 mm and 3 mm) shall be used to physically check the joints by passing it along the edge of the joint.
- The rolls are laid loosely on the waterproofing substrate (thermal insulation or old waterproofing, in the case of renovation), starting at the lowest point of the roof slope and perpendicular to the line of maximum slope of the roof, forming a row of sheeting.
- During installation, the screen-printed side of the film must remain in the open.
- It is mechanically fixed in the longitudinal overlap area that will later be covered by the next row of sheeting (highest part of the roof). The distance from the edge of the fixing washer to the edge of the sheet shall be greater than 1 cm.
- The roll of the next row is laid out, welding the overlap where the fasteners are located. The sheets shall be laid in such a way that no transverse overlap of each row is aligned with any of those of the adjoining rows.
- The roll of the next row is mechanically fixed on the other edge, with the same premises as described above. No anchoring line should be more than 2 metres away from the adjoining lines.
- In the mechanical fastening, together with the waterproofing membrane, the underlay layers, such as vapour barrier, thermal insulation, etc., are fastened individually or simultaneously.
- The sheet fixings at the perimeter of the roof must be aligned parallel to the perimeter of the roof.
- No more than three sheets shall be joined at any one point.
- At T-joints (three sheets intersecting at one point) the bottom sheet shall be chamfered to prevent capillary leakage or be reworked with the hot air welder.
- The apex of the angle formed by the transverse and longitudinal edges of the top piece shall be cut into a curve.

Indications and Important Recommendations

- Anchorage where two planes meet: anchorage shall be linear. The attachment line shall be installed as close as possible to the angle and shall never be located closer than 20 cm from the junction or meeting.
- Anchoring to the parapet: in the case of membranes fastened with strips or profiles, these must be installed leaving a gap at the junction points so that the sheet can absorb movements due to thermal effects. These gaps shall be covered by a strip of the waterproofing sheet, which shall be loose over the groove.
- When the filler is made by means of laminated profiles fixed on the upper edge of the strip going up the wall, they must be provided with a flap, at least on their upper part, which serves as a base for an elastic and rot-proof bead or seal with Elastydan PU 40 Grey, which covers the groove between the profile and the wall. If there is no flap on the underside, the edge must be completely rounded to prevent damage to the sheet.
- The anchoring of the plates or profiles to the skirt shall be carried out by lag bolts, when the base support is made of stone materials, or by self-tapping screws, in the case of wooden or sheet metal supports. Rivets can also be used in the latter case. The dowels, screws or rivets fixing these profiles shall never be more than 20 cm apart and shall withstand a permissible shear load of 480 N per anchorage point. Where it is not possible to fix the plates to a soft support (insulating panels,

aerated concrete, etc.), the perimeter anchorage may be made by means of angle profiles fixed to the wall. In this case the fixings will have to be spaced less than 10 cm apart to compensate for the stress which becomes tensile rather than sharp.
- The fastening element must be suitable for the material of which the support is made. The tensile strength of the fastener to the load-bearing support shall be checked to ensure proper mechanical attachment. The fasteners must withstand a permissible tensile load greater than 600 N per anchorage point. As the membrane is the outermost element of the waterproofing system, its stability against dynamic wind pressure must be calculated according to the shape of the building, its height above ground, its topographical situation, and the specific roof area.
- In renovation projects on old waterproofing, it may be necessary to remove existing materials or to use suitable separating layers.
- A range of ancillary products is available for use with the membrane (Elastydan PU 40 Grey sealant, DANOPOL ADHESIVE adhesive, laminated profiles, corners, corners, corners, cups, pipe penetrations, etc.).
- The weldability and quality of the weld depend on atmospheric conditions (temperature, dampness), welding conditions (temperature, speed, pressure, pre-cleaning) and on the surface condition of the membrane (cleanliness, dampness). Therefore, the hot air machine must be adjusted to obtain a correct assembly.
- To avoid chemical incompatibilities, a DANOFELT PY 300 or higher geotextile separating layer shall be placed between the membrane and the geotextile: Bituminous products, synthetic TPO/FPO and EPDM, extruded (XPS) or expanded (EPS) polystyrene-based products, rigid or foamed PU, etc.
- After the surface has cooled down, the welds shall be carefully checked by means of a punch. If any irregularity is detected in a hot air weld, it shall be reworked with the same procedure as described above.
- Appropriate safety measures must be taken as welding work can give off fumes which can be irritating.

Handling, storage and preservation

- The product must be stored in a dry place protected from rain, sun, heat and low temperatures.
- Easy to cut to adapt the dimensions to the work.
- No welding work should be carried out when the ambient temperature is lower than -5ºC for hot air welding, nor lower than + 5ºC for welding with THF or with Adhesives.
- It shall be kept in its original packaging, in a horizontal position and all rolls parallel (never crossed), on a flat and smooth support.

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