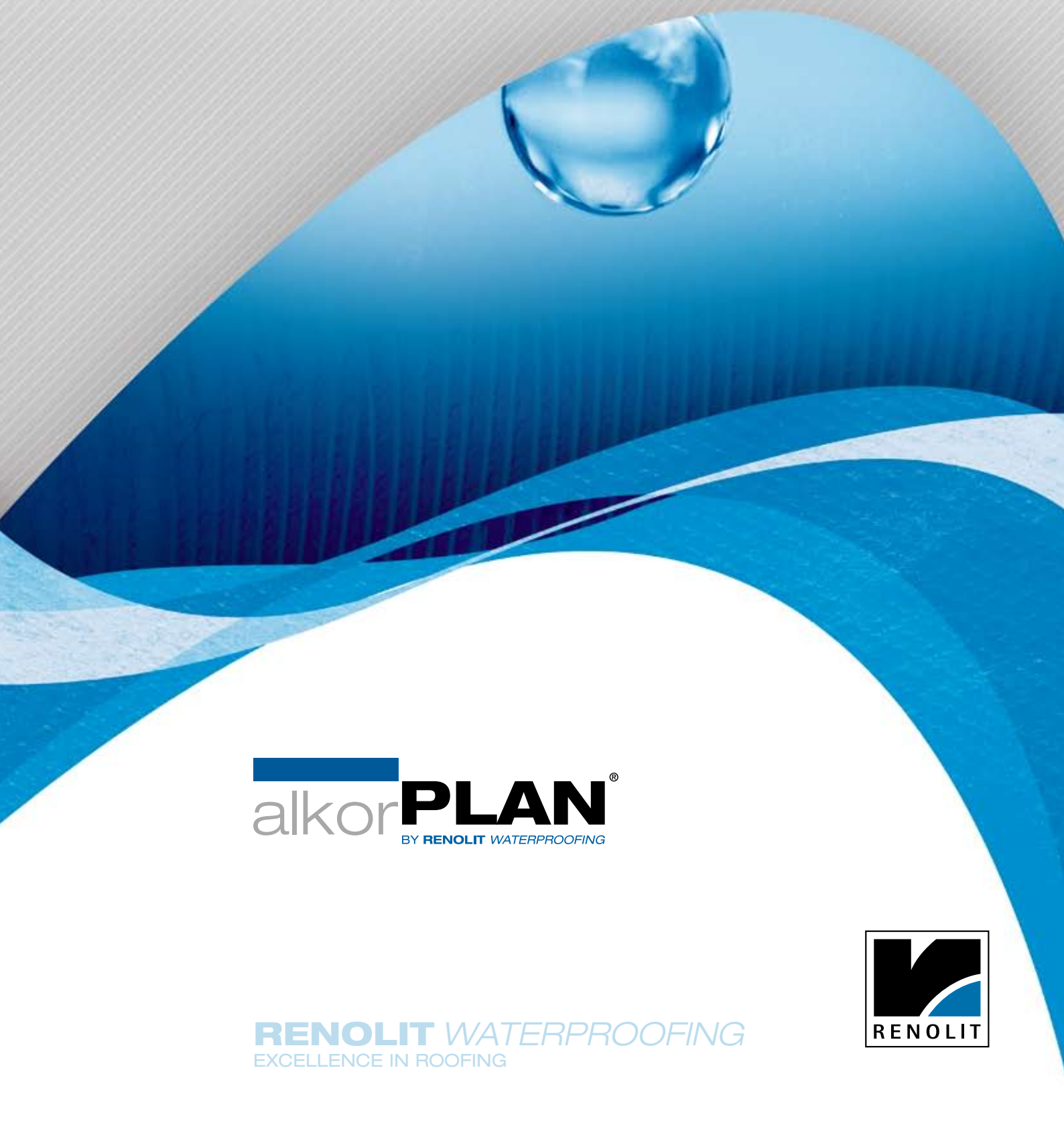
L LOOSE LAID & BALLASTED SYSTEM



alkorPLAN®
BY RENOLIT WATERPROOFING

RENOLIT

RENOLIT WATERPROOFING
EXCELLENCE IN ROOFING

PRODUCT INFORMATION

alkorPLAN® L $_{35177}$
Calendered/laminated flexible PVC with laminated glass fleece reinforcing conforms to UEAtc guidelines.

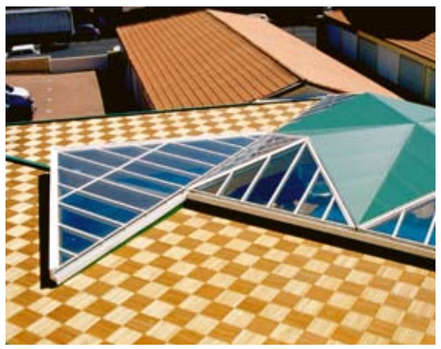
Application
As waterproofing membrane within loose laid ballasted systems.

Product data	Method	Require-ments according to UEAtc	alkorPLAN® L $_{35177}$ 1.2 mm	alkorPLAN® L $_{35177}$ 1.5 mm	Units
Tensile strength	EN 12311-2 (A)	L ≥ 500	644	768	N/50 mm
		T ≥ 500	615	739	N/50 mm
Elongation at break	EN 12311-2 (A)	L ≥ 2	229	231	%
		T ≥ 2	222	225	%
Dimensional stability (6h at 80 °C)	EN 1107-2	L	-0.02	-0.02	%
		T	+0.02	+0.02	%
Cold track temperature (-20 °C)	EN 495-5	no cracks	no cracks	no cracks	-
Tear strength	EN 12310-1	L ≥ 150	200	244	N
		T ≥ 150	195	240	N
Lamination strength	EN 12316-2	≥ 80	164	160	N/50 mm
Vapour diffusion resistance (µ)	EN 1931		20 000 (calc. val.)	20 000 (calc. val.)	-
Resistance to static perforation	EN 12730	-	20	20	kg

Size/Weight	Thickness	Width	Weight	Roll length	Roll weight
alkorPLAN® L $_{35177}$	1.2 mm	2.05 m	1.57 kg/m²	20 mts	ca. 64 kg
	1.5 mm	2.05 m	1.96 kg/m²	15 mts	ca. 60 kg

Standard conditions of sale are included in price lists, all sales of **RENOLIT** products are made under these conditions. alkorPLAN® is delivered in rolls. Every delivery may contain up to 10 % of short rolls (minimum length: 8 m).

Storage
Store dry. Rolls to be parallel and in original packing where possible, do not stack in cross form or under pressure.



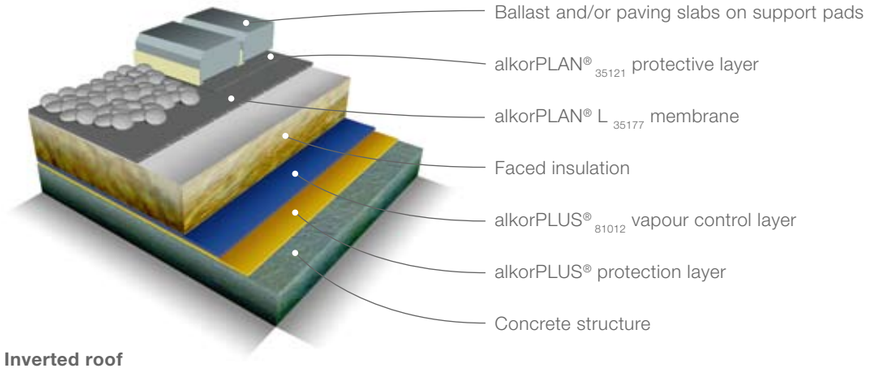
Restaurant Deleuil (France)

Hotel Kalidria (Italy)

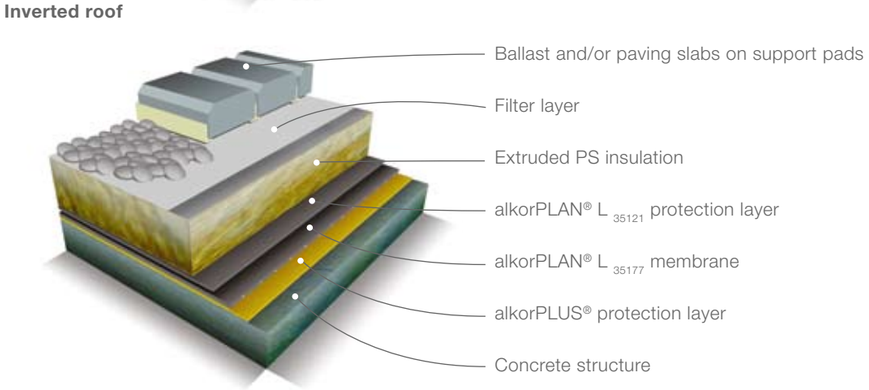
RENOLIT *WATERPROOFING*
LOOSE LAID & BALLASTED SYSTEM

Application instructions for alkorPLAN® membrane, loose laid with ballast.

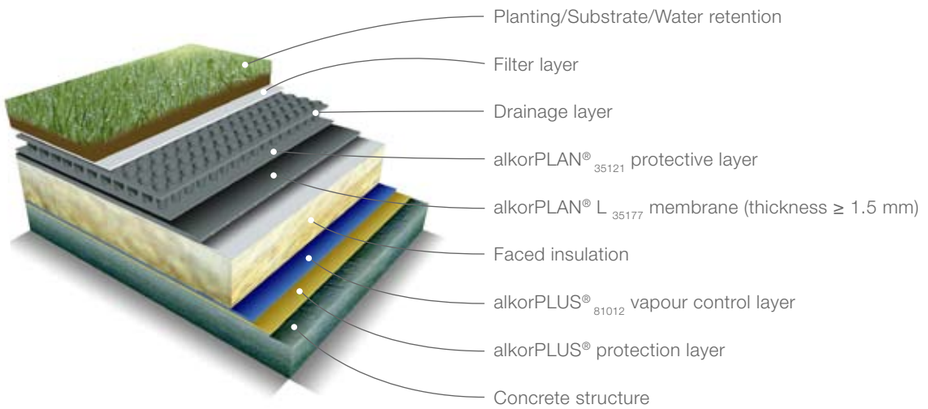
Warm roof



Inverted roof



Garden roof (warm roof)



ROOF CONSTRUCTION

Structure
Before the waterproofing membrane is installed, the roof deck has to be free of irregularities, water, frost, ice and debris such as screws, metal off-cuts, etc.

- Timber structure
  The minimum thickness of the supporting structure will be:
  - wood: 25 mm (tongued and grooved)
  - plywood (exterior quality): 19 mm (preferably 22 mm) this must conform to the relevant requirements of BS En 636 and BS 5268.
  - OSB 3: 18 mm according to BS En 300.

Any treatment should be compatible with the components and the chosen method of attachment of the insulation or single ply membrane. The supporting elements are installed and fixed to obtain a closed deck surface where all vertical movement is excluded. Height or thickness tolerances between panels must not exceed 3 mm. The installation of the supporting timber structure must comply with the local building regulations.

- Concrete roof deck
  A concrete supporting structure should comply with the minimum quality BS 8110 part I 1985 and I.S.326:1995. The surface is to be smooth without protrusions or irregularities over 2 mm (ideally power floated).

WARM ROOF

Protection layer
On rough surfaces or wooden structures, an alkorPLUS® protective layer is used to ensure that damage does not occur to the vapour control layer. Protective layers are loosely laid with a 50 mm overlap. Refer to table 1.

Vapour control layer
Condensation can occur on the underside of the membrane during cold periods. If high humidity exists in a building, there may be a build up of condensation in the construction which will not be fully removed in the drying periods. Depending on the predicted interior climate in the building and the hygrometric characteristics of the roofing materials, a vapour control layer will be required. The alkorPLUS® $_{81012}$ LDPE vapour control layer is available in the standard version. The vapour control layer is laid with an overlap of 100 mm and taped with alkorPLUS® $_{81057}$ adhesive tape. The joint should be fully supported and be hand rolled to secure to the tape. The vapour control layer is taken up and sealed to details in accordance with Part L1 of the UK Building Regulations.

Insulation
Insulation boards must be approved by the respective manufacturer for use with alkorPLAN® membranes. The insulation is installed in accordance with the manufacturers' guidelines. The insulation must resist to the designed dead and live loads. The compressive strength must be at least 0.06 N/mm² at 10 % compression (according to BS EN 826).

Separation layer
If alkorPLAN® membranes are laid over unfaced polystyrene or polyurethane, an alkorPLUS® separation layer (glass fleece 120 g/m² or polyester fleece 180 g/m²) must be employed. (See table 1) On a bituminous surface, an alkorPLUS® $_{81005}$ polyester fleece 300 g/m² is always required. The separation layers are loose laid with a 50 mm overlap. When using an insulation board with a facing of aluminium foil, the alkorPLUS® separation layer is not required. If in doubt, please refer to the **RENOLIT** technical department for further advice.

Application as:	Separation layer	Protective Layer
alkorPLUS® $_{81001}$ glass fleece, 120 g/m²	on unfaced PUR or PS insulation	-
alkorPLUS® $_{81005}$ fleece PES, 300 g/m²	on bitumen, unfaced PUR or PS insulation	on rough surfaces
alkorPLUS® $_{81008}$ fleece PES, 180 g/m²	on unfaced PUR or PS insulation	-

table 1: alkorPLUS® separation and protective layers

WARM ROOF

alkorPLAN® membrane
The alkorPLAN® membrane is rolled out, free of tension, on top of the protection or separation layer. The adjoining sheet is aligned to the first one with an overlap of 50mm. A line is printed on one side of the membrane to facilitate this. A test weld must be carried out prior to welding the roofing sheet, to confirm adequate weld strength and performance. The alkorPLAN® membrane is welded preferably by hot air, or by solvent, using alkorPLUS® $_{81025}$ welding fluid. The welded area must be continuous and extend a minimum of 30mm from the membrane edge. End laps must be staggered by 250mm, thus preventing a situation where 4 roll ends coincide. Where 3 membranes overlap, the centre sheet must be chamfered. After completion of the welding, weld security is verified by pulling a metal probe along the joint in a firm but non destructive way. To ensure satisfactory adhesion of the liquid alkorPLUS® $_{81038}$ this operation must be carried out as work progresses.

alkorPLAN® protection layer
On top of the alkorPLAN® membrane, the alkorPLAN® $_{35121}$ protection layer is installed to protect the waterproofing membrane from mechanical damage either during or after construction work.

Ballast
Immediately after the installation of the alkorPLAN® protection membrane on the surface, a sufficient layer of ballast is put in place to avoid movement of the membranes by wind forces. The quantity of ballast is determined according to existing guidelines (calculation according to UK standards BS 6399-2), with a minimum of 50 mm aggregate.

INVERTED ROOF

Protection layer
In all cases, a protective layer is used to ensure that no damage occurs to the alkorPLAN® membrane. Therefore, a protective alkorPLUS® polyester fleece (300 g/m²) should be used. (Refer to Table 1) The alkorPLUS® protective layers are loose laid with a 50 mm overlap.

alkorPLAN® membrane
The alkorPLAN® membrane is rolled out, free of tension, on top of the insulation or separation layer. The adjoining sheet is aligned to the first one with an overlap of 50mm. A line is printed on one side of the membrane to facilitate this. A test weld must be carried out prior to welding the roofing sheet, to confirm adequate weld strength and performance. alkorPLAN® membrane is welded preferably by hot air, or by solvent, using alkorPLUS® $_{81025}$ welding fluid. The welded area must be continuous and extend a minimum of 30mm from the membrane edge. End laps must be staggered by 250mm, thus preventing a situation where 4 roll ends coincide. Where 3 membranes overlap, the centre sheet must be chamfered. After completion of the welding, weld security is verified by drawing a metal probe along the joint in a firm but non destructive way. To ensure satisfactory adhesion of the liquid alkorPLUS® $_{81038}$, this operation must be carried out as work progresses.

alkorPLAN® protection layer
On top of the alkorPLAN® membrane, the alkorPLAN® $_{35121}$ protection layer is installed to protect the waterproofing membrane from mechanical damage either during or after construction work.

Thermal insulation
XPS insulation boards must be BBA approved by the respective manufacturer for use with alkorPLAN® membranes. The insulation is installed in accordance with the manufacturers' guidelines.

Ballast and filter layer
After the installation of insulation boards, a filter layer alkorPLUS® $_{81008}$ polyester fleece 180 g/m² is installed, prior to the ballast being installed:

- rounded, washed gravel (min. 16/32 mm Ø)
- paving slabs on support pads.

The required ballast load must be defined in accordance with the technical approval of the insulation boards and UK wind load standards BS 6399-2, with a minimum of 50 mm aggregate.

GARDEN ROOF (WARM ROOF)

A fundamental distinction is made between extensive and intensive planting:

- extensive: regular or little upkeep needed, not accessible, height > 70 mm, load = 40 to 200 kg/m²
- intensive: demands a lot of upkeep (plants), accessible, height > 200 mm, load > 200 kg/m²
- Special care must be taken for light weight extensive green roofs to prevent wind uplifting. UK wind load standards BS 6399-2 must be considered.

Structure
The slope towards water outlets must be at least 20 mm/m. The structure must be capable of withstanding the anticipated loads.

Protective layer
In all cases a protective layer is used to ensure that damage does not occur to the vapour control layer. Therefore, an alkorPLUS®$_{81005}$ polyester fleece (min. 300 g/m²) is used. Refer to Table 1. The alkorPLUS® protective layer is loose laid with a 50 mm overlap.

Vapour control layer
Condensation can occur on the underside of the membrane during cold periods. If high humidity exists in a building, there may be a build up of condensation in the construction which will not be fully removed in the drying periods. Depending on the predicted interior climate in the building and the hygrometric characteristics of the roofing materials, a vapour control layer will be required. The alkorPLUS®$_{81012}$ LDPE vapour control layer is available in the standard version. The vapour control layer is laid with an overlap of 100 mm and taped with alkorPLUS®$_{81057}$ adhesive tape. The joint should be fully supported and be hand rolled to secure to the tape. The vapour control layer is taken up and sealed to details and penetrations in accordance with Part L1 of the UK Building Regulations.

Insulation
Insulation boards must be approved by the respective manufacturer for use with alkorPLAN® membranes. The insulation is installed in accordance with the manufacturers' guidelines. The insulation must resist to the designed dead and live loads. The compressive strength must be at least 0.06 N/mm² at 10 % compression (according to BS EN 826).

Separation layer
If alkorPLAN® membranes are laid over unfaced polystyrene or polyurethane, an alkorPLUS® separation layer (glass fleece 120 g/m² or polyester fleece 180 g/m²) must be employed. (See Table 1) On a bituminous surface, an alkorPLUS®$_{81005}$ polyester fleece 300 g/m² is always required. The separation layers are loose laid with a 50 mm overlap. When using an insulation board with a facing of aluminium foil, the alkorPLUS® separation layer is not required. If in doubt, please refer to the **RENOLIT** Technical Department for further advice.

alkorPLAN® membrane
The alkorPLAN® membrane of minimum thickness 1.5mm, is rolled out, free of tension, on top of the insulation or separation layer. The adjoining sheet is aligned to the first one with an overlap of 50mm. A line is printed on one side of the membrane to facilitate this. A test weld must be carried out prior to welding the roofing sheet, to confirm adequate weld strength and performance. The alkorPLAN® membrane is welded preferably by hot air, or by solvent, using alkorPLUS®$_{81025}$ welding fluid. The welded area must be continuous and extend a minimum of 30mm from the membrane edge. End laps must be staggered by 250mm, thus preventing a situation where 4 roll ends coincide. Where 3 membranes overlap, the centre sheet must be chamfered.

After completion of the welding, weld security is verified by pulling a metal probe along the joint in a firm but non destructive way. In case of garden roofs, liquid alkorPLUS®$_{81038}$ seam sealer is always applied to the edges of the welded seams. To ensure satisfactory adhesion of the liquid alkorPLUS®$_{81038}$, this operation must be carried out as work progresses.It is strongly advised to check the water tightness of the sealed membrane, by means of a water test or other approved method.

Protection layer
Due to the expected mechanical load (e.g. during planting, maintenance or other use of the roof), an alkorPLAN®$_{35121}$ protective layer must be included. The alkorPLAN® protective layer is laid immediately after the waterproofing membrane is sealed. It is loose laid with the polyester facing downwards and the fleece-free border is welded to the following protective layer (not to the alkorPLAN® waterproofing membrane). The protective layer must also be laid on those areas of the roof where vegetation is not employed (i.e. ballasted borders).

Drainage and filter layer
The drainage layer may be formed by a light weight cuspated drainage board with an integrated geo-textile. These boards are available in varying grades to suit the type of application. The filter layer prevents the underlying drainage layer from silting up. The drainage layer may also be formed by clay granulates, rounded washed gravel. Rot resistant PES or PP fleeces with a high tear strength and perforation resistance are suitable as filter layer.

Substrate, vegetation and water retention layer
These layers must be adapted to the various climate conditions.

Details and connections
Water outlets must be suitable for the applied system and must remain accessible for regular maintenance. Around the outlets a zone of 1 m is kept vegetation-free. Around larger outlets and parapets a 50 cm wide ballast

RENOLIT *WATERPROOFING*
GARDEN ROOF (WARM ROOF)

layer is required. The roof perimeter must be wind tight. To protect the alkorPLAN® membrane against mechanical damage during or after construction work, it is advisable to cover the alkorPLAN® membrane at the parapets with either alkorPLUS®$_{81170 / 81171}$ metal sheet, timber or concrete slabs. See drawings in Design Manual.

Supplementary fixing for loose laid and ballasted system
Edge restraint is installed along the perimeter of the roof and around all penetrations. Special attention is paid to the wind-tight installation of parapets.

Edge restraint
alkorPLUS®$_{81170 \text{ or } 81171}$ metal sheet is preformed to obtain a minimum width of 70 x 70 mm for an L-shaped profile. (See Fig. 3) These profiles are pre-fixed to the supporting deck. The maximum distance between fixings is 250 mm with fixings on one face only of the alkorPLUS® metal sheet and in zig-zag formation to resist a continual tensile load of 2.7 kN/lm. If alkorPLUS® metal profiles are fixed in the vertical leg, fasteners will be at 200mm distance. Should the roof have valleys which have angles less than 174°, it will be necessary to include Alkormetal sections of 140 mm girth, fixed at 250 mm centrers.

Windtight installation to parapets details

- With an alkorPLUS®$_{81058}$ compressive foam strip underneath the alkorPLUS® metal sheet trim, the parapet top is sealed against wind pressure. The alkorPLAN® membrane is protected from an abrasive up-stand surface by an alkorPLUS®$_{81008}$ protective layer (min. 180 g/m²). Where the parapet height exceeds 500 mm, intermediate support with a continuous alkorPLUS® metal sheet (50 mm wide) is required.
- Parapets can also be adhered to obtain a wind-tight finish. Here, the alkorPLUS®$_{81040}$ contact glue is applied to the entire surface of both membrane and up-stand with a minimum consumption of 2 x150 g/m². The parapet will still be finished with a metalsheet trim, but compressive foam and intermediate fastening can be omitted.

Execution of details
See Design Manual.

Fig. 3: Edge restraint with alkorPLUS®$_{81170}$ metalsheet

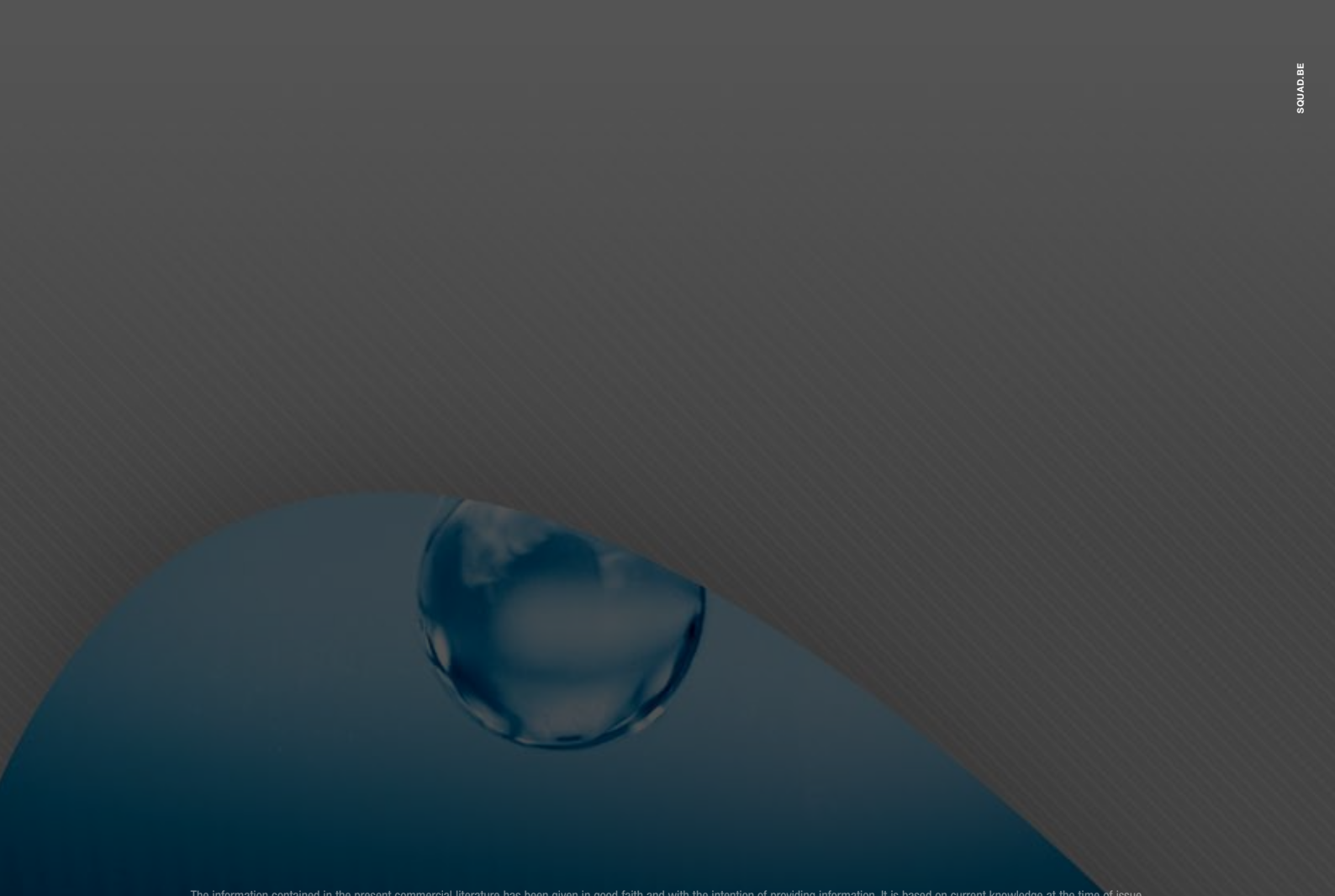
GENERAL REMARKS

Slope
BS 6229 states that a minimum finished fall at any point of 1:80 should be achieved. Cut-to-falls systems are often produced to a 1:60 fall or 1:40 fall.

Compatibility
Contamination of alkorPLAN® membranes by oil, petrol and other solvents, hot or cold bituminous products, tar, etc. must be avoided as these will attack the PVC polymer, damage the appearance and reduce the life expectancy of the products. For a list of chemical resistance with a number of substances, a summary table is available. (See brochure «Chemical stability»). alkorPLAN® membranes must not be brought into contact with alkorFLEX® or other membranes. Wood in contact with alkorPLAN® membranes should only be treated with salt-based products to avoid adverse effects. Under no circumstances should solvent-based preservatives be used.

Other remarks
The following rules and regulations must be respected at all times:

- BBA, UEAtc, IAB
- Irish Building regulations 1997 to 2002
- BS 6229 1982 flat roofs with continuous supported coverings.
- The Building Act 1984 and its Building regulations 2000
- SPrA design guide for single ply roofing.
- All other current norms and directives.
- The product information and instructions for execution of particular details issued by **RENOLIT** concerning alkorPLAN® and alkorPLUS® products.
- The installation and safety instructions issued by manufacturers or suppliers of associated materials and accessories used in the construction of the roof.
- Water outlets and other details are duly fixed to the structure.



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The British Board of Agrément have assessed the life expectancy of alkorPLAN® to be in excess of 30 years.

alkorPLAN® roofing products and Systems have a standard guarantee of 10 years, and are installed by approved contractors and installers who are trained and assessed by **RENOLIT**.

All **RENOLIT** waterproofing membranes for roofing are part of the RoofCollect® collection and recycling programme.

The **RENOLIT** division responsible for the roofing activity has been approved to EN ISO 9001:2000.

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