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Agrément Certificate
10/4808
Product Sheet 1

RENOLIT ROOF WATERPROOFING MEMBRANES

ALKORPLAN ROOF WATERPROOFING MEMBRANES

PRODUCT SCOPE AND SUMMARY OF CERTIFICATE

This Certificate relates to Alkorplan Roof Waterproofing Membranes, a range of single-layer PVC membranes for use as mechanical fastened, fully adhered and green roof waterproofing on flat or pitched roofs or as loose-laid and ballasted and roof garden waterproofing on flat roofs.

AGRÉMENT CERTIFICATION INCLUDES:

- factors relating to compliance with Building Regulations where applicable
- factors relating to additional non-regulatory information where applicable
- independently verified technical specification
- assessment criteria and technical investigations
- design considerations
- installation guidance
- regular surveillance of production
- formal three-yearly review.



KEY FACTORS ASSESSED

Weathertightness — the membranes will resist the passage of moisture into the building (see section 5).

Properties in relation to fire — tests indicate that the membranes will enable a roof to be unrestricted under the Building Regulations (see section 6).

Resistance to wind uplift — the system will resist the effects of any likely wind suction acting on the roof (see section 7).

Resistance to foot traffic — the membranes will accept the limited foot traffic and loads associated with installation and maintenance (see section 8).

Resistance to penetration of roots — the Alkorplan 35177 membrane will resist the penetration of roots (see section 9).

Durability — under normal service conditions the membranes will provide a durable roof waterproofing with a service life in excess of 35 years (see section 11).

The BBA has awarded this Agrément Certificate to the company named above for the products described herein. These products have been assessed by the BBA as being fit for their intended use provided they are installed, used and maintained as set out in this Certificate.

On behalf of the British Board of Agrément

Stuart Sadler
Head of Approvals — Materials

Greg Cooper
Chief Executive

Date of First issue: 15 February 2011

The BBA is a UKAS accredited certification body — Number 113. The schedule of the current scope of accreditation for product certification is available in pdf format via the UKAS link on the BBA website at www.bbacerts.co.uk

Readers are advised to check the validity and latest issue number of this Agrément Certificate by either referring to the BBA website or contacting the BBA direct.

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Regulations

In the opinion of the BBA, Alkorplan Roof Waterproofing Membranes, if used in accordance with the provisions of this Certificate, will meet or contribute to meeting the relevant requirements of the following Building Regulations:



The Building Regulations 2010 (England and Wales)

Requirement:	B4(2)	External fire spread
Comment:		Tests to BS 476-3 : 2004 indicate that on a suitable substructure, the use of the membranes will enable a roof to be unrestricted under this Requirement. See sections 6.1 to 6.4 and 6.6 of this Certificate.
Requirement:	C2(b)	Resistance to moisture
Comment:		Data for water resistance, indicate that the membranes, including joints, meet this Requirement. See section 5.1 of this Certificate.
Requirement:	Regulation 7	Materials and workmanship
Comment:		The membranes are acceptable. See sections 11.1 and 11.2 and the <i>Installation</i> part of this Certificate.



The Building (Scotland) Regulations 2004 (as amended)

Regulation:	8(1)(2)	Fitness and durability of materials and workmanship
Comment:		The use of the membranes satisfies the requirements of this Regulation. See sections 10.1, 10.2, 11.1, 11.2 and the <i>Installation</i> part of this Certificate.
Regulation:	9	Building standards – construction
Standard:	2.8	Spread from neighbouring buildings
Comment:		Tests to BS 476-3 : 2004 indicate that the membranes when applied to a suitable substructure are regarded as having low vulnerability under clause 2.8.1 ⁽¹⁾⁽²⁾ of this Standard. See sections 6.1 to 6.4 and 6.6 of this Certificate.
Standard:	3.10	Precipitation
Comment:		Data for water resistance indicate that the use of the membranes, including joints, will enable a roof to satisfy the requirements of this Standard, with reference to clauses 3.10.1 ⁽¹⁾⁽²⁾ and 3.10.7 ⁽¹⁾⁽²⁾ . See section 5.1 of this Certificate.
Regulation:	12	Building standards – conversions
Comment:		All comments given for the products under Regulation 9, also apply to this Regulation, with reference to clause 0.12.1 ⁽¹⁾⁽²⁾ and Schedule 6 ⁽¹⁾⁽²⁾ . (1) Technical Handbook (Domestic). (2) Technical Handbook (Non-Domestic).



The Building Regulations (Northern Ireland) 2000 (as amended)

Regulation:	B2	Fitness of materials and workmanship
Comment:		The membranes are acceptable. See sections 11.1, 11.2 and the <i>Installation</i> part of this Certificate.
Regulation:	B3(2)	Suitability of certain materials
Comment:		The membranes are acceptable. See sections 10.1 and 10.2 of this Certificate.
Regulation:	C4(b)	Resistance to ground moisture and weather
Comment:		Data for water resistance indicate that the membranes, including joints, meet the requirements of this Regulation. See section 5.1 of this Certificate.
Regulation:	E5(b)	External fire spread
Comment:		Tests to BS 476-3 : 2004 indicate that on a suitable substructure, the use of the membranes will enable a roof to be unrestricted under this Regulation. See sections 6.1 to 6.4 and 6.6 of this Certificate.

Construction (Design and Management) Regulations 2007

Construction (Design and Management) Regulations (Northern Ireland) 2007

Information in this Certificate may assist the client, CDM co-ordinator, designer and contractors to address their obligations under these Regulations.

See sections: 1 *Description* (1.2) and 2 *Delivery and site handling* (2.3) of this Certificate.

Non-regulatory Information

NHBC Standards 2011

NHBC accepts the use of Alkorplan Roof Waterproofing Membranes, when installed and used in accordance with this Certificate, in relation to *NHBC Standards*, Chapter 7.1, *Flat roofs and balconies* and Chapter 7.2 *Pitched roofs*.

General

This Certificate is a Confirmation of Belgian Agréments 07/1474, 07/1707 and 08/1866 issued by Union Belge pour l'Agrément Technique dans la construction (UBAtc) to Renolit Belgium NV, Industriepark De Bruwaan 9, B-9700, Belgium.

Technical Specification

1 Description

1.1 The Alkorplan Roof Waterproofing membranes covered by this Certificate are:

- Alkorplan 35170 — non-reinforced, PVC membrane for mechanically fixed systems
- Alkorplan 35176 and 35276 — polyester, reinforced PVC membranes for mechanically fixed systems
- Alkorplan 35177 — glass fibre, fleece-reinforced, PVC membranes for loose-laid and ballasted systems, green roofs and roof gardens
- Alkorplan 35179 and 35279 — PVC membrane, backed with a polyester fleece for adhered systems.

1.2 Alkorplan membranes are manufactured by calendaring plasticised PVC into sheets. Three sheets are then heat laminated together with a reinforcing scrim in between if appropriate. The product is then cut to length and reeled onto a cardboard or PVC core.

1.3 Alkorplan membranes are manufactured to the nominal characteristics given in Table 1.

Table 1 Nominal characteristics

Dimensions (units)	Membrane										
	35170		35176		35276		35177		35179		35279
Thickness (mm)	1.5	1.2	1.5	1.2	1.5	1.2	1.5	1.2 ⁽¹⁾	1.5 ⁽²⁾	1.2 ⁽¹⁾	1.5 ⁽²⁾
Roll width (m)	1.05	1.05	1.60	1.05	1.60	2.05	2.05	2.10	2.10	2.10	2.10
Roll length (m)	20	25	20	25	20	20	15	15	15	15	15
Mass per unit area (kg·m ⁻²)	1.95	1.53	1.85	1.53	1.85	1.57	1.96	1.86	2.25	1.86	2.25
Colours	lead grey	lead grey metallic copper metallic silver terracotta copper green charcoal		bright white		light grey		lead grey		bright white	

(1) Thickness including fleece is 3.2 mm.

(2) Thickness including fleece is 3.7 mm.

1.4 Ancillary items for use with the membranes include:

- Alkorplan 81170/81171 — 0.6 mm thick, galvanized steel sheets laminated with 0.8 mm PVC, for use in producing profiles for perimeter flashings
- Alkorplan 81060/81061/81062 — preformed corners in PVC membrane
- Alkorplan 81038 — seam sealing mastic
- Alkorplus 81025 — a THF-based welding fluid for cold welded seams
- Alkorplus 81001 — a 120 g·m⁻² glass fibre fleece, for use as a filter layer in inverted roof specifications
- Alkorplus 81005 — a 300 g·m⁻² polyester fleece, for use as a protective underlay
- Alkorplus 81008 — a 180 g·m⁻² polyester fleece overlay, for use as a separation layer
- Alkorplan 35171/35X71 — a 1.5 mm PVC membrane, for use in detailing
- Alkorplus 81040 — a solvent-based, nitrile rubber contact adhesive for bonding membranes to fixing elements
- Alkorplus 81044 — a cleaner for joint areas
- Alkorplus 81068 — polyurethane adhesive for use with Alkorplan 35179
- Alkorplus 81012 — low-density, polyethylene vapour control layers
- Alkorplus 81057 — a seam tape for the low-density, polyethylene vapour control layers
- Alkorplan 35X76 Walkway — a PVC walkway for trafficked areas
- Alkorplus 81192 — an aluminium tape for use in butt jointing
- Alkorplan 35121 — a combined PVC/polyester fleece laminate for use under round washed ballast, paving slabs or timber decking in terraced or heavy trafficked areas.

1.5 Quality control checks are carried out during production and on the finished product.

2 Delivery and site handling

2.1 Alkorplan membranes are delivered to site in wrapped rolls packaged on pallets. The labels bear the Certificate holder's name, product identification, batch number and the BBA identification mark incorporating the number of this Certificate.

2.2 Rolls should be stored on their side, on a clean, level surface, and kept under cover.

2.3 Ancillary items classified under *The Chemicals (Hazard Information and Packaging for Supply) Regulations 2009* (CHIP4) are given in Table 2 together with flashpoints. These products bear the appropriate hazard warning.

Table 2 Flashpoint and hazard classification

Materials	Flashpoint (°C)	Classification
Alkorplus 81025 ⁽¹⁾	-21	Highly flammable, Irritant
Alkorplan 81038 ⁽¹⁾	-21	Highly flammable, Irritant
Alkorplus 81040 ⁽¹⁾	-4	Highly flammable, Irritant
Alkorplus 81044 ⁽¹⁾	-4	Highly flammable, Irritant
Alkorplus 81068 ⁽¹⁾	<0	Highly flammable, Harmful, Dangerous for the environment

(1) Stored in accordance with the *Highly Flammable Liquids and Liquefied Petroleum Gases Regulations 1972*.

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on Alkorplan Roof Waterproofing Membranes.

Design Considerations

3 General

3.1 Alkorplan 35170, 35176 and 35276 membranes are satisfactory for use as mechanically fastened waterproofing on flat or pitched roofs with limited access.

3.2 Alkorplan 35177 is satisfactory for use as a loose-laid and ballasted with limited access or roof garden waterproofing layer for flat roofs and as a green roof waterproofing layer on flat or pitched roofs with limited access.

3.3 Alkorplan 35179 and 35279 are satisfactory for use as a fully bonded waterproofing layer on flat or pitched roofs with limited access.

3.4 Limited access roofs are defined for the purpose of this Certificate as those roofs subjected only to pedestrian traffic for maintenance of the roof covering and cleaning of gutters, etc. Where traffic in excess of this is envisaged, additional protection to the membrane must be provided (see section 8).

3.5 Flat roofs are defined for the purpose of this Certificate as those roofs having a minimum finished fall of 1:80. For design purposes, twice the minimum finished fall should be assumed, unless a detailed analysis of the roof is available, including overall and local deflection, direction of falls, etc. Pitched roofs are defined for the purpose of this Certificate as those having falls greater than 1:6.

3.6 Decks to which the membranes are to be applied must comply with the relevant requirements of either BS 6229 : 2003 or BS 8217 : 2005 and, where appropriate, *NHBC Standards*, Chapter 7.1 *Flat roofs and balconies* and Chapter 7.2 *Pitched roofs*.

3.7 For green roof and roof gardens, structural decks to which Alkorplan 35177 membrane is to be applied must be suitable to transmit the dead and imposed loads experienced in service.

3.8 Imposed loads, dead loading and wind loads for green roof and roof garden specifications are calculated in accordance with BS EN 1991-1-1 : 2002, BS EN 1991-1-3 : 2003, BS EN 1991-1-4 : 2005 and their National Annexes respectively.

3.9 The drainage system for the green roof or roof garden must be correctly designed, and provision is made for access for maintenance purposes. Dead loads for green roof and roof gardens can increase if the drains become partially or completely blocked causing waterlogging of the drainage layer.

3.10 Insulation materials used in conjunction with the membranes must be in accordance with the manufacturer's instructions and be either:

- as described in the relevant Clauses of BS 8217 : 2005, or
- the subject of a current BBA Certificate and be used in accordance with, and within the scope of that Certificate.

3.11 Contact with bituminous, coal tar and oil-based products must be avoided as the membrane is not compatible with lower grades of bitumen. If contact with such products is likely, a separating layer should be interposed before installing the waterproofing sheet. Where doubt arises, the advice of the Certificate holder should be sought.

4 Practicability of installation

The membranes should only be installed by installers trained and approved by the Certificate holder.

5 Weathertightness



5.1 Data confirm that the membranes, including joints, when completely sealed and consolidated, will adequately resist the passage of moisture into the building and enable a roof to comply with the requirements of the national Building Regulations (see section 16, Table for *Physical properties — general*):

England and Wales — Approved Document C, Requirement C2(b), Section 6

Scotland — Mandatory Standard 3.10, clauses 3.10.1 and 3.10.7

Northern Ireland — Regulation C4(b).

5.2 The membranes are impervious to water and will achieve a weathertight roof capable of accepting minor structural movement (see section 16, Table for *Physical properties — general* and *Physical properties — durability*).

6 Properties in relation to fire



6.1 When tested in accordance with BS 476-3 : 1958, a system comprising:

- a 0.75 mm profiled metal deck, a low-density, polyethylene vapour control layer, a 50 mm layer of phenolic foam insulation board, covered by 1.5 mm thick Alkorplan 35170, achieved an EXT.F.AB rating
- a 0.75 mm profiled metal deck, a low-density, polyethylene vapour control layer, a 50 mm layer of polyurethane foam insulation board, covered by 1.2 mm thick Alkorplan 35176, achieved an EXT.F.AB rating
- a 22 mm plywood deck, a bitumen vapour control layer, a 60 mm polyurethane insulation board, covered with two layers of felt, bonded with 95/25 bitumen, covered by Alkorplan 35179 partially bonded with Alkorplus 81066 achieved an EXT.F.AB rating
- an 18 mm OSB roof deck, Alkorplus 81012 VCL, a 170 mm Rockwool Duorock, Alkorplan 35176, 1.5 mm thick achieved an EXT.S.AB rating
- an 18 mm OSB roof deck, Alkorplus 81012 VCL, a 130 mm thick PIR foil-faced insulation, Alkorplan 35176, 1.5 mm thick achieved an EXT.S.AB rating.

6.2 When tested in accordance with BS 476-3 : 2004 a system comprising:

- a 18 mm oriented strand board, Alkorplus 81012 vapour control layer, 80 mm foil-faced polyurethane insulation board and 1.2 mm Alkorplan 35176, mechanically fastened, achieved a rating of EXT.S.AB
- a 0.7 mm steel deck, Alkorplus 81012 vapour control layer, 80 mm foil-faced polyurethane insulation board and 1.5 mm Alkorplan 35170, mechanically fastened, achieved a rating of EXT.F.AB.

6.3 Alkorplan 35177 when used in a loose-laid and ballasted specification, including a minimum depth of 50 mm of aggregate, shall be deemed to satisfy BS 476-3 : 2004 designation AA.

6.4 In the opinion of the BBA, when used in irrigated roof gardens or green roofs, the use of Alkorplan 35177 will be unrestricted under the national Requirements:

England and Wales — Approved document B, Requirement B4(2)

Scotland — Mandatory Standard 2.8, clause 2.8.1

Northern Ireland — Regulation E5(b).

6.5 If allowed to dry, the plants used may allow flame spread across the roof. This should be taken into consideration when selecting suitable plants for the roof. Appropriate planting irrigation and/or protection should be applied to ensure the overall fire-rating of the roof is not compromised.



6.6 The designation of other specifications should be confirmed by:

England and Wales — Test or assessment in accordance with Approved Document B, Appendix A, Clause A1

Scotland — Test to conform to Mandatory Standard 2.8, clause 2.8.1

Northern Ireland — Test or assessment by a UKAS accredited laboratory, or an independent consultant with appropriate experience.

7 Resistance to wind uplift

7.1 The resistance to wind uplift of a mechanically-fastened waterproofing layer is provided by the fasteners passing through the membrane into the substrate. The number and position of fixings will depend on a number of factors including:

- wind uplift forces to be restrained
- pull-out strength of the fasteners
- tensile properties of the membrane
- appropriate calculation of safety factors.

7.2 The wind uplift forces are calculated in accordance with BS EN 1991-1-4 : 2005 and the UK National Annex. On this basis, the number of fixings required should be established using a maximum permissible load (kN) of:

Alkorplan 35170 with hot-air welded joints	0.4
Alkorplan 35170 with solvent-welded joints	0.4
Alkorplan 35176 and 35276 in 1.6 m widths used Ejot, SFS Intec, Mage or Iso-tak mechanical fixings	0.5

7.3 When Alkorplan 35179 and 35279 are bonded to a decking, or bituminous felt, it is sufficient to resist the effect of wind suction, thermal cycling or other minor structural movements likely to occur in service (see section 16, Table for *Physical properties — general*).

7.4 When Alkorplan 35179 and 35279 are bonded to insulation boards the resistance to wind uplift will be dependent on the cohesive strength of the insulation and the method by which it is secured to the roof deck. This must be taken into account when selecting suitable insulation material.

7.5 The ballast requirements for loose-laid systems using Alkorplan 35177 membrane should be calculated in accordance with the relevant parts of BS EN 1991-1-4 : 2005 and the UK National Annex. The membrane should always be ballasted with a minimum depth of 50 mm of aggregate. In areas of high-wind exposure, the advice of the Certificate holder should be sought. Alternatively, concrete slabs on suitable supports can be used.

7.6 The soil used in roof gardens should not be of a type that will be removed, or become delocalised due to wind scour experienced on the roof.

7.7 It should be recognised that the type of plants used in roof gardens could significantly affect the expected wind loads experienced in service.

8 Resistance to foot traffic

Data indicate that the membranes can accept the limited foot traffic and light concentrated loads associated with the installation and maintenance operations. Reasonable care should be taken to avoid puncture by sharp objects or concentrated loads. On limited access roofs where excessive traffic is envisaged, such as maintenance of lift equipment, a walkway should be provided, for example, using concrete slabs supported on bearing pads (see section 16, Table for *Physical properties — general* and *Physical properties — durability*).

9 Resistance to penetration by roots

Tests for Alkorplan 35177 indicates that it is suitable for use as a root-resistant membrane.

10 Maintenance



10.1 Roofs covered with the membranes must be the subject of annual inspections to ensure continued performance.

Green roofs and roof gardens

10.2 Roofs must be inspected at least bi-annually; in autumn after leaf fall and in the spring to ensure unwanted vegetation and other debris are cleared from the roof and drainage outlets cleared (see also section 3.9). Guidance is available within the latest edition of *Guidelines to Green Roofing* The Green Roof Organisation (GRO).

11 Durability



11.1 The durability of all roofing materials is dependent on the roof design, installation, immediate environment, maintenance and use. Other specific factors assessed by the BBA relating to the durability of individual products include; formulation and thickness.

11.2 Accelerated weathering tests and evidence from existing installations confirm that satisfactory retention of physical properties is achieved. Available evidence indicates that the membranes will have a service life in excess of 35 years.

11.3 In environments where the membranes are in contact with organic solvents, the life expectancy of the membranes may be reduced. In cases of doubt the advice of the Certificate holder should be sought.

Installation

12 General

12.1 Installation of Alkorplan Roof Waterproofing Membranes must be carried out by installers trained and approved by the Certificate holder in accordance with the relevant Clauses of the Certificate holder's instructions, BS 8000-4 : 1989 and this Certificate.

12.2 Substrates to which the membranes are applied must be sound, dry, clean and free from sharp projections such as nail heads and concrete nibs. When used over a rough substrate, a suitable protection layer must be placed over the substrate.

12.3 Installation should not be carried out during inclement weather (eg rain, fog, snow). When the temperature is below 5°C suitable precautions against surface condensation must be taken.

12.4 Where contact with coal tar or oil-based products is likely, an isolating layer must be interposed between the product and the substrate. Where contact with bituminous products is likely, consideration should be given to the use of an isolating layer, and the advice of the Certificate holder should be sought.

12.5 The products should not come into contact with unfaced polyurethane or polystyrene insulation boards. A suitable separation layer should be used if either of these types of board are used.

12.6 Soil or other bulk material should not be stored on one area of the roof prior to installation, to ensure localised overloading does not occur.

12.7 Detailing must be formed in accordance with the Certificate holder's instructions.

13 Procedure

Alkorplan 35177

13.1 The membrane is unrolled onto the substrate without folds or ripples, with a 50 mm overlap, and is mechanically fixed and fully adhered at details and perimeters. Flashing and lap jointing must be carried out as described in section 14.

13.2 A suitable protection layer should be laid over the membrane prior to the application of the ballast.

13.3 When used in an inverted roof specification a filter layer of Alkorplus 81001 should be installed on top of the insulation.

13.4 Loose-laid applications should be covered by at least a 50 mm depth of well-rounded gravel. In areas of high-wind exposure, paving slabs set on a suitable support may be considered (eg pads).

13.5 In green roof and roof garden specifications subsequent layers, such as separation layers, drainage layers, growing medium, are installed in accordance with the Certificate holder's installation instructions.

Alkorplan 35170, 35176 and 35276

13.6 The membranes should be secured by corrosion-resistant plates and mechanical fixings manufactured by either Ejot, SFS Intec, Mage or Iso-tak.

13.7 The membrane should be unrolled onto the substrate, without folds or ripples, with 100 mm overlaps. Flashing and lap jointing must be carried out as described in section 14.

13.8 The membrane is fixed to the deck (through insulation boards, where appropriate) in the joint overlaps positioned 30 mm from the edge, prior to welding of the joint, in accordance with the Certificate holder's instructions. The fixings should be installed at centres calculated from the average wind force in that location.

13.9 A minimum distance of 150 mm between fasteners should be observed at all times. This may require the use of narrower membranes to obtain the correct number of fasteners per square metre.

Alkorplan 35179 and 35279

13.10 The membrane is fully unrolled and straightened without tension and then re-rolled for half of its length.

13.11 Adhesive is applied to substrate either by Alkorplus 81069 applicator or by hand in accordance with the Certificate holder's instructions. Any concentration of adhesive must be avoided.

13.12 Immediately following the application of the adhesive the membrane is rolled into the adhesive and suitable pressure applied to ensure satisfactory bonding of the fleece.

13.13 The procedure is repeated for the second half of the roll and subsequent rolls.

13.14 Overlaps in the membranes must remain free of adhesive. The adjoining transverse seams of the roofing membranes must be butt jointed. The butt joint is covered by a 50 mm wide strip of Alkorplus 81192, with 200 mm wide strip of Alkorplan 35171 welded on to the joint and tape.

14 Jointing procedure

14.1 Joints must be made using either solvent or hot-air welding techniques in accordance with the manufacturer's instructions.

14.2 If the lap area is contaminated, the lap joint area on both sheets must be cleaned using Alkorplus 81044 cleaner.

Solvent welding

14.3 Both surfaces must be coated with Alkorplus 81025, to a minimum width of 30 mm from the edge and bonded together. The joints must be ballasted, until dry, to ensure an even bond.

14.4 The seams must be tested with a metal probe at least 15 minutes after welding, to highlight poorly welded areas. Any such areas should be made good.

14.5 The seam is sealed on the exposed edge using Alkorplan 81038 seam sealing mastic.

14.6 The solvent used has a low flashpoint and must be kept away from sources of ignition during installation. Where it is to be used in enclosed spaces, adequate ventilation must be provided.

Hot-air welding

14.7 Hot-air welding is conducted by using either an automatic or hand-operated machine, with a temperature set in accordance with the Certificate holder's instructions.

14.8 The lap joint must be a minimum width of 20 mm for an automatic machine, and 30 mm for a hand-held machine.

14.9 The seam is then tested and sealed as described in sections 14.4 and 14.5.

Flashing procedure

14.10 Flashings should be formed in accordance with the Certificate holder's instructions.

15 Repair

In the event of accidental damage, repairs can be carried out by cleaning the area around the damage and applying a patch of the appropriate Alkorplan membrane as described in section 14.

Technical Investigations

16 Tests

16.1 Technical data from tests carried out on behalf of UBAtc, leading to the issue of ATGs 07/1474, 07/1707 and 08/1866 were evaluated in context of UK roofing practice and Building Regulations and are summarised in Table 3 and section 16.2.

Table 3 Physical properties — general

Test (units)	Mean results				Method
	35170	35176/35276	35177	35179/35279	
Static indentation					EN 12730
concrete	L ₂₀	L ₂₀	L ₂₀	L ₂₀	
EPS 100	L ₂₀	L ₂₀	L ₂₀	L ₂₀	
Dynamic indentation	I ₁₀	I ₁₀	I ₁₀	I ₁₀	MOAT 65 : 4.3.9
Low temperature flexibility (°C)					EN 495-5
unaged	≤ -20	≤ -20	≤ -20	≤ -20	
heat aged ⁽¹⁾	≤ -20	≤ -20	≤ -20	≤ -20	

(1) Heat aged 168 days at 70°C.

16.2 The following tests were also successfully carried out:

- thickness
- tensile strength and elongation, control and heat aged
- tear strength
- nail tear
- plasticiser content
- plasticiser loss after UV ageing and water soak
- dimensional stability
- weight loss on heat ageing
- tensile strength of joints
- peel strength of joints
- peel from substrates, control, heat aged and water soak
- wind uplift of mechanically fastened systems
- root resistance.

16.3 Samples of the membranes were obtained from the Certificate holder and from an existing site installed in 1980 for testing. The results of the tests carried out by the BBA are summarised in Table 4.

Table 4 Physical properties – durability

Test (units)	Mean results	Method
Tensile strength (N per 50 mm)		BS EN 12311-2
Alkorplan 35176 from site		
longitudinal	1521	
transverse	1403	
Elongation at maximum load (%)		BS EN 12311-2
Alkorplan 35176 from site		
longitudinal	16	
transverse	17	
Dynamic indentation		MOAT 65 : 4.3.9
unaged	I_{10}	
from site	I_{10}	
from site with additional UV ageing ⁽¹⁾	I_{10}	
Low temperature foldability ⁽²⁾ (°C)		BS EN 495-5
unaged	-35	
from site	-10	
from site with additional UV ageing ⁽¹⁾	-10	

(1) Samples taken from site and exposed to an additional UV exposure of 400 MJ·m⁻² at 60°C to EOTA TR-010 using UVA lamps.

(2) Results for the upper face of membrane.

17 Investigations

- 17.1 Existing data on fire performance to BS 476-3 : 1958 and BS 476-3 : 2004 of the product were examined.
- 17.2 Data for resistance to penetration by roofs to EN 13948 was examined.
- 17.3 The manufacturing processes were examined, including methods of quality control. Details were also obtained of the quality and composition of the materials used.
- 17.4 Data from a previous assessment on a visit to a site in progress were used to assess the method of application.
- 17.5 A visit to a site installed in 1980 was carried out to assess the durability performance of the Alkorplan membranes. Data on tests carried out by an independent test body on material taken from the same site and a second long-term site, were examined.
- 17.6 A user survey was carried out to assess the performance in use.

Bibliography

- BS 476-3 : 1958 *Fire tests on building materials and structures — External fire exposure roof test*
- BS 476-3 : 2004 *Fire tests on building materials and structures — Classification and method of test for external fire exposure to roofs*
- BS 6229 : 2003 *Flat roofs with continuously supported coverings — Code of practice*
- BS 8000-4 : 1989 *Workmanship on building sites — Code of practice for waterproofing*
- BS 8217 : 2005 *Reinforced bitumen membranes for roofing — Code of practice*
- BS EN 495-5 : 2001 *Flexible sheets for waterproofing — Determination of foldability at low temperature — Plastic and rubbers sheets for roof waterproofing*
- BS EN 1991-1-1 : 2002 *Eurocode 1 : Actions on structures — General actions— Densities, self-weight, imposed loads for buildings*
- NA to BS EN 1991-1-1 : 2002 *UK National Annex to Eurocode 1 : Actions on structures — General actions— Densities, self-weight, imposed loads for buildings*
- BS EN 1991-1-3 : 2003 *Eurocode 1 : Actions on structures — General actions — Snow loads*
- NA to BS EN 1991-1-3 : 2003 *UK National Annex to Eurocode 1 : Actions on structures — General actions — Snow loads*
- BS EN 1991-1-4 : 2005 *Eurocode 1 : Actions on structures — General actions — Wind actions*
- NA to BS EN 1991-1-4 : 2008 *UK National Annex to Eurocode 1 : Actions on structures — General actions — Wind actions*
- BS EN 12311-2 : 2000 *Flexible sheets for waterproofing — Determination of tensile properties — Plastic and rubber sheets for roof waterproofing*
- EN 495-5 : 2000 *Flexible sheets for waterproofing — Determination of foldability at low temperature — Plastic and rubber sheet for roof waterproofing*
- EN 12730 : 2001 *Flexible sheets for waterproofing — Bitumen, plastic and rubber sheets for roof waterproofing — Determination of resistance to static loading*
- EN 13948 : 2007 *Flexible sheets for waterproofing — Bitumen, plastic and rubber sheets for roof waterproofing — Determination of resistance to root penetration*
- EOTA Technical Report TR 010 (May 2004), *Exposure procedure for artificial weathering [Liquid Applied Roof Waterproofing Kits (LARVVK)]*
- MOAT No 65 : 2001 *UEAtc Technical Guide for the Assessment of Non-Reinforced, Reinforced and/or Backed Roof Waterproofing Systems made of PVC*

18 Conditions

18.1 This Certificate:

- relates only to the product/system that is named and described on the front page
- is granted only to the company, firm or person named on the front page — no other company, firm or person may hold or claim any entitlement to this Certificate
- is valid only within the UK
- has to be read, considered and used as a whole document — it may be misleading and will be incomplete to be selective
- is copyright of the BBA
- is subject to English law.

18.2 Publications and documents referred to in this Certificate are those that the BBA deems to be relevant at the date of issue or re-issue of this Certificate and include any: Act of Parliament; Statutory Instrument; Directive; Regulation; British, European or International Standard; Code of Practice; manufacturers' instructions; or any other publication or document similar or related to the aforementioned.

18.3 This Certificate will remain valid for an unlimited period provided that the product/system and the manufacture and/or fabrication including all related and relevant processes thereof:

- are maintained at or above the levels which have been assessed and found to be satisfactory by the BBA
- remain covered by a valid Belgian Agrément; and
- are reviewed by the BBA as and when it considers appropriate.

18.4 In granting this Certificate, the BBA is not responsible for:

- the presence or absence of any patent, intellectual property or similar rights subsisting in the product/system or any other product/system
- the right of the Certificate holder to manufacture, supply, install, maintain or market the product/system
- individual installations of the product/system, including the nature, design, methods and workmanship of or related to the installation
- the actual works in which the product/system is installed, used and maintained, including the nature, design, methods and workmanship of such works.

18.5 Any information relating to the manufacture, supply, installation, use and maintenance of this product/system which is contained or referred to in this Certificate is the minimum required to be met when the product/system is manufactured, supplied, installed, used and maintained. It does not purport in any way to restate the requirements of the Health & Safety at Work etc Act 1974, or of any other statutory, common law or other duty which may exist at the date of this Certificate; nor is conformity with such information to be taken as satisfying the requirements of the 1974 Act or of any statutory, common law or other duty of care. In granting this Certificate, the BBA does not accept responsibility to any person or body for any loss or damage, including personal injury, arising as a direct or indirect result of the manufacture, supply, installation, use and maintenance of this product/system.

