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BBA APPROVAL INSPECTION TESTING CERTIFICATION
TECHNICAL APPROVALS FOR CONSTRUCTION

Agrément Certificate
10/4808
Product Sheet 1

RENOLIT ROOF WATERPROOFING MEMBRANES

ALKORPLAN ROOF WATERPROOFING MEMBRANES

This Agrément Certificate Product Sheet[1] relates to Alkorplan Roof Waterproofing Membranes, a range of single-layer PVC membranes for use as mechanically 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.

(1) Hereinafter referred to as 'Certificate'.

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 6).

Properties in relation to fire — tests indicate that the membranes will enable a roof to be unrestricted under the Building Regulations (see section 7).

Resistance to wind uplift — the membranes will resist the effects of any likely wind suction acting on the roof (see section 8).

Resistance to foot traffic — the membranes will accept the limited foot traffic and loads associated with installation and maintenance (see section 9).

Resistance to penetration of roots — the Alkorplan 35177 membrane will resist the penetration of roots (see section 10).

Durability — under normal service conditions the membranes will provide a durable roof waterproofing with a service life in excess of 35 years (see section 12).

The BBA has awarded this 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

Date of Second issue: 11 March 2013
Originally certificated on 15 February 2011

Simon Wroe
Head of Approvals — Materials

Greg Cooper
Chief Executive

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 installed, used and maintained in accordance with this Certificate, will meet or contribute to meeting the relevant requirements of the following Building Regulations (the presence of a UK map indicates that the subject is related to the Building Regulations in the region or regions of the UK depicted):

The Building Regulations 2010 (England and Wales) (as amended)

Requirement:	B4(2)	External fire spread
Comment:		On a suitable substructure, the use of the membranes will enable a roof to be unrestricted under this Requirement. See sections 7.1 to 7.5 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 6.1 of this Certificate.
Requirement:	Regulation 7	Materials and workmanship
Comment:		The membranes are acceptable. See sections 12.1, 12.2 and the *Installation* 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 11.1, 11.2, 12.1, 12.2 and the *Installation* part of this Certificate.
Regulation:	9	Building standards applicable to construction
Standard:	2.8	Spread from neighbouring buildings
Comment:		When applied to a suitable substructure, the membranes are regarded as having low vulnerability under clause 2.8.1[(1)(2)] of this Standard. See sections 7.1 to 7.5 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 6.1 of this Certificate.
Standard:	7.1(a)	Statement of sustainability
Comment:		The products can contribute to meeting the relevant requirements of Regulation 9, Standards 1 to 6 and therefore will contribute to a construction meeting a bronze level of sustainability as defined in this Standard.
Regulation:	12	Building standards applicable to conversions
Comment:		All comments given for the products under Regulation 9, Standards 1 to 6 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) 2012

Regulation:	23(a)(i)(iii)b(i)	Fitness of materials and workmanship
Comment:		The membranes are acceptable. See sections 12.1, 12.2 and the *Installation* part of this Certificate.
Regulation:	28	Resistance to moisture and weather
Comment:		Data for water resistance indicate that the membranes, including joints, will meet the requirements of this Regulation. See section 6.1 of this Certificate.
Regulation:	36(b)	External fire spread
Comment:		On a suitable substructure, the use of the membranes will enable a roof to be unrestricted under this Regulation. See sections 7.1 to 7.5 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 3 *Delivery and site handling* (3.3) of this Certificate.

Additional Information

NHBC Standards 2013

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

CE marking

The Certificate holder has taken the responsibility of CE marking the products in accordance with harmonised European Standard BS EN 13956 : 2005 and ETAG 006 for the mechanically fastened systems. An asterisk(*) appearing in this Certificate indicates that data shown is given in the manufacturer's Declaration of Performance.

Technical Specification

1 Description

1.1 The Alkorplan Roof Waterproofing membranes included in 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 — glassfibre reinforced, PVC membranes for loose-laid and ballasted systems, green roofs and roof gardens
- Alkorplan 35179 and 35279 — PVC membranes, backed with a polyester fleece for adhered systems.

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

Table 1 Nominal characteristics

Characteristic (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 ($kg \cdot m^{-2}$)	1.95	1.45*	1.85*	1.45*	1.85*	1.57	1.96	1.86	2.25	1.86	2.25
Resistance to water head*	pass	pass		pass		pass		pass		pass	
Tensile strength* ($N \cdot mm^{-2}$)	⩾15	–		–		–		–		–	
Tensile strength* (N per 50 mm)	–	⩾1000		⩾1000		⩾500		⩾650		⩾650	
Elongation* (%)	⩾250	⩾15		⩾15		⩾2		⩾40		⩾40	
Resistance to tear* ($N \cdot mm^{-1}$)	⩾80	⩾180		⩾180		⩾100		⩾150		⩾150	
Low temperature foldability* (°C)	⩽–25	⩽–25		⩽–25		⩽–25		⩽–25		⩽–30	
Impact resistance* (mm)	⩾300	⩾300		⩾300		⩾300		⩾300		⩾300	
Static indentation* (kg)	⩾20	⩾20		⩾20		⩾20		⩾20		⩾20	
Dimensional stability* (%)	⩽2.0	⩽0.3		⩽0.3		⩽0.2		⩽1.0		⩽1.0	
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.

1.3 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 $g \cdot m^{-2}$ glassfibre fleece, for use as a filter layer in inverted roof specifications
- Alkorplus 81005 — a 300 $g \cdot m^{-2}$ polyester fleece, for use as a protective underlay
- Alkorplus 81008 — a 180 $g \cdot m^{-2}$ 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 heavily trafficked areas
- Alkorplus 81069 — adhesive applicator.

2 Manufacture

2.1 Alkorplan membranes are manufactured by extruding and calendering plasticised PVC, and heat laminating with or without a reinforcing scrim in between. The product is then cut to length and reeled onto a cardboard or PVC core.

2.2 As part of the assessment and ongoing surveillance of product quality, the BBA has:

- agreed with the manufacturer the quality control procedures and product testing to be undertaken
- assessed and agreed the quality control operated over batches of incoming materials
- monitored the production process and verified that it is in accordance with the documented process
- evaluated the process for management of nonconformities
- checked that equipment has been properly tested and calibrated
- undertaken to carry out the above measures on a regular basis through a surveillance process, to verify that the specifications and quality control operated by the manufacturer are being maintained.

2.3 The management system of the manufacturer Renolit Belgium NV has been assessed and registered as meeting the requirements of BS EN ISO 9001 : 2008 by AIB-Vinçotte International Ltd (Certificate 93 133eR1).

3 Delivery and site handling

3.1 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.

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

3.3 Ancillary items classified under *The Chemicals (Hazard Information and Packaging for Supply) Regulations 2009* (CHIP4)/*Classification, Labelling and Packaging of Substances and Mixtures (CPL Regulations) 2009* 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) These components must be stored in accordance with the *Dangerous Substances and Explosive Atmospheres Regulations 2002*.

Assessment and Technical Investigations

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

Design Considerations

4 General

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

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

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

4.4 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 9).

4.5 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.

4.6 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 2013*, Chapter 7.1 *Flat roofs and balconies* and Chapter 7.2 *Pitched roofs*.

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

4.8 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 respective National Annexes.

4.9 The drainage system for the green roof or roof garden must be correctly designed, and provision 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.

4.10 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.

4.11 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 must be interposed before installing the waterproofing sheet. Where doubt arises, the advice of the Certificate holder must be sought.

5 Practicability of installation

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

6 Weathertightness

6.1 Results of test 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:

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 28(b).

6.2 The membranes are impervious to water and will achieve a weathertight roof capable of accepting minor structural movement.

7 Properties in relation to fire

7.1 The following systems will be unrestricted:

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

7.2 When classified in accordance with BS EN 13501-5 : 2005 + A1 : 2009, the following systems are designated B_{ROOF} (t4):

- a sloped roof comprising an 18 mm oriented strand board, Alkorplus 81012 VCL, 80 mm foil-faced polyurethane insulation board and 1.2 mm Alkorplan 35176, mechanically fastened
- a flat roof comprising a 0.7 mm steel deck, Alkorplus 81012 VCL, 80 mm foil-faced polyurethane insulation board and 1.5 mm Alkorplan 35170, mechanically fastened.

7.3 Alkorplan 35177, when used in a loose-laid and ballasted specification, including an inorganic covering listed in the Annex of Commission Decision 2000/553/EC, can be considered to be unrestricted under the national Requirements.

7.4 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 36(b).

7.5 The designation of other specifications must 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.

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

8 Resistance to wind uplift

8.1 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.

8.2 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 with hot-air welded joints	0.7.

8.3 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.

8.4 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.

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

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

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

9 Resistance to foot traffic

Results of test data indicate that the membranes can accept the limited foot traffic and light concentrated loads associated with installation and maintenance. Care must 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 must be provided, for example, using concrete slabs supported on bearing pads.

10 Resistance to penetration of roots

Results of test data on Alkorplan 35177 indicate that it is suitable for use as a root-resistant membrane.

11 Maintenance

11.1 Roofs must be the subject of annual inspections and maintenance to ensure continued performance. Any exposed membrane must be free from the build-up of silt and other debris, and unwanted vegetation must be cleared.

11.2 Any damage must be repaired in accordance with section 17 and the Certificate holder's instructions.

11.3 Green roofs and roof gardens must be regularly inspected, particularly in autumn after leaf fall and in the spring, to ensure unwanted vegetation and other debris are cleared from the roof and drainage outlets. Guidance is available within *The GRO Green Roof Code — Green Roof Code of Best Practice for the UK 2011*.

12 Durability

12.1 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.

12.2 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.

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

13 Re-use and recyclability

The products comprise polyvinyl chloride, polyester and glass, which can be recycled.

Installation

14 General

14.1 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.

14.2 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.

14.3 Installation must 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.

14.4 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 must be given to the use of an isolating layer, and the advice of the Certificate holder sought.

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

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

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

15 Procedure

Alkorplan 35177

15.1 The membrane is unrolled onto the substrate without folds or ripples, with a 50 mm overlap, and mechanically fixed and fully adhered at details and perimeters. Flashing and lap jointing must be carried out as described in section 16.

15.2 A suitable protection layer must be laid over the membrane prior to the application of the ballast.

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

15.4 Loose-laid applications must 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).

15.5 In green roof and roof garden specifications subsequent layers, (eg separation layers, drainage layers, growing medium), are installed in accordance with the Certificate holder's installation instructions.

Alkorplan 35170, 35176 and 35276

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

15.7 The membrane is unrolled onto the substrate, without folds or ripples, with 100 mm overlaps. Flashing and lap jointing must be carried out as described in section 16.

15.8 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 must be installed at centres calculated from the average wind force in that location.

15.9 A minimum distance of 150 mm between fasteners must 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

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

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

15.12 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.

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

15.14 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 a 200 mm wide strip of Alkorplan 35171 welded onto the joint and tape.

16 Jointing procedure

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

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

Solvent welding

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

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

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

16.6 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

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

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

16.9 The seam is then tested and sealed as described in sections 16.4 and 16.5.

Flashing procedure

16.10 Flashings are formed in accordance with the Certificate holder's instructions.

17 Repair

In the event of accidental damage, repairs are carried out by cleaning the area around the damage and applying a patch of the appropriate Alkorplan membrane as described in section 16.

Technical Investigations

18 Tests

18.1 An assessment was made of data to BS EN 13956 : 2005 in relation to:

- thickness*
- tensile strength*
- static indentation*
- resistance to root penetration*.
- peel resistance of joints*
- elongation at break*
- dimensional stability*
- shear resistance of joints*
- dynamic indentation*
- low temperature foldability*

18.2 An assessment was made of data to ETAG 006 : 2000 on the mechanically fastened system in relation to:

- full scale resistance to wind uplift
- small scale resistance to wind uplift.

18.3 Tests on the membranes were conducted and the results assessed to determine:

- nail tear
- plasticiser content
- plasticiser loss after UV ageing and water soak
- weight loss on heat ageing
- peel from substrates (control, heat aged and water soak)
- the effect of heat ageing

to assess:

- robustness during service
- effectiveness of adhesive bond to substrate
- durability.

18.4 Samples of the membrane were obtained from the Certificate holder and from an existing site installed in 1980 for comparative testing. The samples from the existing site also had additional UV ageing, equivalent to 10 years natural ageing.

19 Investigations

19.1 Existing data on fire performance of the product were evaluated.

19.2 Data from a previous assessment on a visit to a site in progress were used to assess the method of application.

19.3 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 evaluated.

19.4 A user survey was carried out to assess the performance in use.

Bibliography

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 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 13501-5 : 2005 + Amendment 1 : 2009 *Fire classification of construction products and building elements — Classification using data from external fire exposure to roofs tests*

BS EN 13956 : 2005 *Flexible sheet for waterproofing — Plastic and rubber sheets for roof waterproofing — Definitions and characteristics*

BS EN ISO 9001 : 2008 *Quality management systems — Requirements*

ETAG 006 : 2000 *Guideline for European Technical Approval of Systems of Mechanically Fastened Flexible Roof Waterproofing Membranes*

20 Conditions

20.1 This Certificate:

- relates only to the product/system that is named and described on the front page
- is issued only to the company, firm, organisation or person named on the front page — no other company, firm, organisation or person may hold or claim that this Certificate has been issued to them
- 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.

20.2 Publications, documents, specifications, legislation, regulations, standards and the like referenced in this Certificate are those that were current and/or deemed relevant by the BBA at the date of issue or reissue of this Certificate.

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

- are maintained at or above the levels which have been assessed and found to be satisfactory by the BBA
- continue to be checked as and when deemed appropriate by the BBA under arrangements that it will determine
- are reviewed by the BBA as and when it considers appropriate.

20.4 The BBA has used due skill, care and diligence in preparing this Certificate, but no warranty is provided.

20.5 In issuing this Certificate, the BBA is not responsible and is excluded from any liability to any company, firm, organisation or person, for any matters arising directly or indirectly from:

- 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
- actual installations of the product/system, including their nature, design, methods, performance, workmanship and maintenance
- any works and constructions in which the product/system is installed, including their nature, design, methods, performance, workmanship and maintenance
- any loss or damage, including personal injury, howsoever caused by the product/system, including its manufacture, supply, installation, use, maintenance and removal
- any claims by the manufacturer relating to CE marking.

20.6 Any information relating to the manufacture, supply, installation, use, maintenance and removal 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, maintained and removed. It does not purport in any way to restate the requirements of the Health and Safety at Work etc. Act 1974, or of any other statutory, common law or other duty which may exist at the date of issue or reissue 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.

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