

IKO PLC

Coney Green Road
Clay Cross
Chesterfield S45 9HZ

Tel: 01257 488000 Fax: 01246 868035
e-mail: technical@ikosingleply.co.uk
website: www.ikogroup.co.uk



Agrément Certificate
05/4287
Product Sheet 1

IKO WATERPROOFING SYSTEMS

ARMOURPLAN SM ROOF WATERPROOFING SYSTEMS

This Agrément Certificate Product Sheet⁽¹⁾ relates to Armourplan SM Roof Waterproofing Systems, polyester-reinforced single-ply PVC membranes for use in mechanically-fastened and loose-laid and ballasted waterproofing systems on flat or pitched roofs with limited access.

(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 systems will resist the passage of moisture into a building (see section 6).

Behaviour in relation to fire — the systems will enable a roof to be unrestricted under Building Regulations (see section 7).

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

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

Durability — under normal service conditions the systems will provide a durable roof waterproofing with a service life of in excess of 30 years (see section 11).



The BBA has awarded this Certificate to the company named above for the systems described herein. These systems 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

A handwritten signature in black ink, appearing to read 'John Albon'.

Date of Fourth issue: 12 February 2015

John Albon — Head of Approvals

A handwritten signature in black ink, appearing to read 'Claire Curtis-Thomas'.

Originally certificated on 16 December 2005

Construction Products

Claire Curtis-Thomas

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.

British Board of Agrément
Bucknalls Lane
Watford
Herts WD25 9BA

tel: 01923 665300
fax: 01923 665301
clientservices@bba.star.co.uk
www.bbacerts.co.uk

©2015

Regulations

In the opinion of the BBA, Armourplan SM Roof Waterproofing Systems, if installed, used and maintained in accordance with this Certificate, can satisfy or contribute to satisfying 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 suitable non-combustible substructures the use of the systems will enable a roof to be unrestricted under this Requirement. See section 7 of this Certificate.
Regulation:	C2(b)	Resistance to moisture
Comment:		The membranes, including joints, will enable a roof to meet this Requirement. See section 6.1 of this Certificate.
Regulation:	7	Materials and workmanship
Comment:		The systems are acceptable. See section 11 and the <i>Installation</i> part of this Certificate.



The Building (Scotland) Regulations 2004 (as amended)

Regulation:	8(1)(2)	Durability, workmanship and fitness of materials
Comment:		Use of the systems satisfies the requirements of this Regulation. See sections 10 and 11 and the <i>Installation</i> part of this Certificate.
Regulation:	9	Building standards applicable to construction
Standard:	2.8	Spread from neighbouring buildings
Comment:		The systems, when applied to a suitable substructure, are classified as having low vulnerability and will enable a roof to be unrestricted under this Standard, with reference to clause 2.8.1 ⁽¹⁾⁽²⁾ . See section 7 of this Certificate.
Standard:	3.10	Precipitation
Comment:		The systems, including joints, will enable a roof to meet 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 systems 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 these systems 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 systems are acceptable. See section 11 and the <i>Installation</i> part of this Certificate.
Regulation:	28(b)	Resistance to moisture and weather
Comment:		The systems, including joints, will enable a roof to meet the requirements of this Regulation. See section 6.1 of this Certificate.
Regulation:	34(b)	External fire spread
Comment:		On a suitable substructure, the use of the systems will enable a roof to be unrestricted under the requirements of this Regulation. See section 7 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 2014

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

CE marking

The Certificate holder has taken the responsibility of CE marking the systems, in accordance with harmonised European Standard BS EN 13956 : 2012. An asterisk (*) appearing in this Certificate indicates that data shown are given in the manufacturer's Declaration of Performance.

Technical Specification

1 Description

1.1 Armourplan SM Roof Waterproofing Systems consist of polyester (92 g·m⁻²) reinforced flexible polyvinyl chloride (PVC) single-ply roof waterproofing membranes, available in SM120 and SM150 grades.

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

Characteristic (unit)	SM120	SM150
Thickness* (mm)	1.2	1.5
Roll width* (mm)	1060, 1500, 2120	
Roll length (m)	20	
Weight per unit area* (g·m)	1600	2000
Tensile strength* (N·50 mm ⁻¹)	1250	
Elongation* (%)	25	
Tear resistance* (N)	≥150	
Dimensional stability* (%)	≤0.5	
Foldability at low temperature* (°C)	-30	
Standard colour ⁽¹⁾	mid-grey, light grey and slate grey	
Plasticiser type	phthalate	

(1) Other colours are available on request.

1.3 Ancillary items necessary for installation of the systems and included in this assessment are:

- Armourplan PVC Contact Adhesive — ready-to-use contact adhesive for adhering PVC roofing membranes onto various substrates
- IKOfix fixing range — mechanical fixings and pressure plates for attachment of membranes and insulation boards
- Toothed Flatbar — steel fixing strips for membrane anchorage on mechanically-fastened, inverted and ballasted systems
- Armourplan Membrane Coated Metal — 0.6 mm galvanized steel sheet, coated with 0.6 mm of Armourplan PVC membrane, for use in detailing
- Spectravap — a polyethylene vapour control layer
- Systems T-O Underlay — a torch-on vapour control layer suitable for metal decks (IKOpro Fast Dry Primer, the subject of a BBA Certificate, is required)
- Systems S-A Underlay — a self-adhesive vapour control layer (IKOpro Systems Bonding Agent, the subject of a BBA Certificate, is required)
- Polimar UV Detailing Liquid — a liquid-applied system for complex detailing (subject of BBA Certificate).

1.4 Other items or components which may be used with the system, but which are outside the scope of this Certificate, are:

- Armourplan Coated Metal — pre-coated flat metal sheet, 0.6 mm steel with 0.6 mm Armourplan membrane
- Armourplan Detailing Membrane — homogeneous or glass tissue reinforced PVC membrane for complex detailing
- Armourplan Walkway — PVC membrane with slip-resisting surface for use on walkway areas
- Armourplan Cover Strips — glass tissue and polyester scrim reinforced membrane cover strips for jointing coated metals and detailing
- Armourplan Pre-formed Corners — pre-formed internal and external corners
- Armourplan Outlet Pipes
- Armourplan Seam Cleaner — preparation solvent for cleaning PVC roofing membranes as required (eg prior to welding)
- Armourplan PVC Standing Seam Profile — pre-formed PVC profile used to simulate a metal standing seam roof
- Armourflow Coated Metal — pre-coated flat metal sheet for fabrication of gutters, 1.2 mm thick steel with 1.2 mm thick Armourplan membrane
- Armourplan Drip Details — prefabricated drip details
- Armourplan Chase Termination Details — prefabricated chase termination details
- Membrane Pipe & Post Details — prefabricated bespoke details formed using Armourplan detailing membrane

- Armourprep — acetone-based preparation solution for PVC roofing membranes with heavy moisture contamination
- IKO PVC refurbishment primer — primer used in conjunction with Spectrabond Low Foaming PU adhesive or IKOpro High Performance PU Adhesive when overlaying existing adhered PVC membrane roofs
- IKOpro High Performance PU Adhesive — high-performance PU adhesive for bonding PIR insulation boards to substrate
- IKOfix Aluminium Clamping Strips — aluminium clamping strip for upstand termination
- IKO Glass Universal Underlay — torch-on VCL suitable for use on concrete decks (IKOpro Fast Dry Primer required)
- Systems T-O VCL — torch-applied, metal-lined vapour barrier (IKOpro Fast Dry Primer required)
- Systems S-A VCL — self-adhesive, metal-lined vapour barrier (IKOpro Systems Bonding Agent required)
- Challenger Polyester 180 Sand vapour control layer — suitable for pour-and-roll application (IKOpro Fast Dry Primer may be required)
- Spectravap — polyethylene vapour control layer
- IKOpro Systems Bonding Agent — self-adhesive vapour control layer primer
- IKOpro Quick Dry Bitumen Primer — bituminous primer for torch-on and pour-and-roll vapour control layer applications
- Armourplan PVC Sealant — for sealing detail terminations
- Spectratex Separation Layer — polyester separation and protection layer
- IKO Enertherm PIR — polyisocyanurate board with mineral glass tissue facings on both sides, or alternatively coated on both sides with a tri-ply gastight aluminium multi-layer complex.

2 Manufacture

2.1 The membranes are manufactured by an extrusion/calendering process.

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 IKO plc has been assessed and registered as meeting the requirements of BS EN ISO 9001 : 2008 by BSI (Certificate Fm45901).

3 Delivery and site handling

3.1 The membranes are delivered to site in rolls wrapped in plastic bearing the product name, Certificate holder's name, product dimensions, article number and batch number.

3.2 Rolls should be stored horizontally, undercover and on a clean, level surface.

3.3 The contact adhesive for PVC has a flashpoint of <math><0^{\circ}\text{C}</math> and is classified 'extremely flammable' under *The Chemicals (Hazard Information and Packaging for Supply) Regulations 2009 (CHIP4)/Classification, Labelling and Packaging of Substances and Mixtures (CLP Regulation) 2009*. It carries the appropriate hazard warning and should be stored in a well-ventilated area in accordance with *The Dangerous Substances and Explosives Atmospheres Regulations 2002*.

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on Armourplan SM Roof Waterproofing Systems.

Design Considerations

4 Use

4.1 Armourplan SM Roof Waterproofing Systems are satisfactory for use as roof waterproofing membranes in mechanically-fastened and loose-laid and ballasted installations on flat and pitched roofs with limited access.

4.2 Limited access roofs are defined for the purpose of this Certificate as those subjected only to pedestrian traffic for maintenance of the roof covering, cleaning of gutters, etc. Where traffic in excess of this is envisaged, additional protection to the membrane must be provided (see section 9).

4.3 Flat roofs are defined for the purpose of this Certificate as those 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 a fall greater than 1:6.

4.4 Decks to which the systems are to be applied must comply with the relevant requirements of BS 6229 : 2003 or BS 8217 : 2005 and, where appropriate, *NHBC Standards 2014*, Chapter 7.1.

4.5 Insulation materials to be used in conjunction with the membranes must be in accordance with the Certificate holder's instructions and be either:

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

4.6 Contact with bituminous, coal tar and oil-based products or polystyrene insulation boards 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 should be sought.

5 Practicability of installation

Installation must be carried out only by installers trained and approved by the Certificate holder.

6 Weathertightness



6.1 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 Behaviour in relation to fire



7.1 A system comprising a trapezoidal steel deck, a polythene vapour control layer, 150 mm thick mineral wool insulation and a layer of Armourplan SM120 1.2 mm membrane, mechanically fastened, is unrestricted.

7.2 A system comprising a profiled metal deck, a polypropylene vapour control layer, 100 mm thick polyisocyanurate insulation and a layer of Armourplan SM120 1.2 mm membrane, mechanically fastened, is unrestricted.

7.3 The membrane, when used in protected specifications, 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 The designation of other specifications (eg when used on combustible substrates) should be confirmed by:

England and Wales — test or assessment in accordance with Approved Document B, Appendix A, Clause 1

Scotland — test to confirm Mandatory Standard 2.8, clause 2.8.1 and Annex 2.C

Northern Ireland — test or assessment carried out by a UKAS accredited laboratory or an independent consultant with appropriate experience.

8 Resistance to wind uplift

8.1 The precise ballast requirement should be calculated in accordance with BS EN 1991-1-4 : 2005 and its UK National Annex, but should not be below a minimum thickness of 50 mm. The use of concrete slabs on suitable protective supports should be considered in areas of high design wind loads.

8.2 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.

8.3 The wind uplift forces are calculated in accordance with BS EN 1991-1-4 : 2005 and its UK National Annex. On this basis, the number of fixings required should be established using a maximum permissible load of 0.6 kN per fixing.

9 Resistance to foot traffic

Results of tests indicate that the systems can accept the limited foot traffic and light concentrated loads associated with installation and maintenance. Reasonable care should be taken to avoid puncture by sharp objects or concentrated loads. Where traffic in excess of this is envisaged, such as for maintenance of lift equipment, a walkway should be provided: for example, using concrete slabs supported on bearing pads.

10 Maintenance



10.1 The systems must be the subject of annual inspection and maintenance to ensure continued performance.

10.2 Maintenance should include checks and operations to ensure the following:

- exposed membrane is free from the build-up of silt and other debris.
- integrity of the joints in the membrane
- integrity of the detailing
- adequate ballast is in place and evenly distributed over the membrane
- protection layers are in good condition.

10.3 Where damage has occurred it should be repaired in accordance with section 14 and the Certificate holder's instructions.

11 Durability



11.1 Accelerated weathering tests and evidence from existing installations confirm that satisfactory retention of physical properties is achieved. Under normal service conditions, the systems will provide a durable roof waterproofing with a service life in excess of 30 years.

11.2 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 Armourplan SM Roof Waterproofing Systems must be carried out 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 systems 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 or snow). When the temperature is below 0°C suitable precautions against surface condensation must be taken in accordance with the Certificate holder's instructions.

12.4 When used over bitumen, bitumen-bound insulation products, coal tar, pitch or oil-based products, a separation layer must be interposed between the substrate and the membrane. In cases of doubt, the advice of the Certificate holder should be sought.

13 Procedure

Mechanically-fastened applications

13.1 The membrane should be unrolled onto the substrate without undulations, with 110 mm minimum side laps and 60 mm minimum end laps.

13.2 The membrane is fixed to the deck (through insulation boards, where appropriate) in the joint overlaps prior to welding seams in accordance with the Certificate holder's instructions.

13.3 The membrane should be fixed at the edges either by mechanically fastening using IKO Flatbar or by hot-air welding to mechanically-fastened flashings of Armourplan Membrane Coated Metal.

Loose-laid and ballasted applications

13.4 The membrane is loose-laid over the substrate allowing for a minimum 60 mm overlap to subsequent sheets at the sides and ends.

13.5 The membrane should be fixed at the edges with IKOfix Toothed i or hot-air welded to mechanically-fastened flashings of Armourplan Coated Metal.

13.6 A layer of Spectratex protection fleece should be installed over the completed area of membrane roof, and ballasted with suitable concrete paving slabs on proprietary support pads or a 50 mm depth of well-rounded gravel.

Hot-air welding

13.7 Joints are made using either automatic or hand-operated machines with the temperature set in accordance with the Certificate holder's instructions.

13.8 The lap area must be dry and clean. If the membrane in the weld area has become contaminated, it must be cleaned in accordance with the Certificate holder's instructions.

13.9 The welded width of the joint must be a minimum of 30 mm when welded with an automatic welding machine, and a 40 mm final weld with a hand-operated machine. On completion of the weld, the seam should be tested with a suitable metal probe, and any weakness repaired immediately.

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

13.11 The seam is tested with a metal probe to highlight poorly-welded areas. Any such areas should be made good using hot-air welding.

14 Repair

In the event of damage, repairs can be carried out by cleaning the area around the damage and applying a patch of the appropriate membrane in accordance with the Certificate holder's instructions.

Technical Investigations

15 Tests

15.1 An assessment was made on data to EN 13956 : 2012 in relation to:

- dimensions*
- dimensional stability*
- resistance to static load*
- resistance to artificial ageing*
- mass per unit area*
- resistance to tear*
- resistance to impact*
- joint peel resistance*
- tensile strength and elongation*
- low temperature foldability*
- watertightness*
- joint shear resistance.

15.2 Tests were carried out by the BBA and the results assessed to determine:

- water vapour permeability
- resistance to wind uplift

to assess:

- effect of moisture/vapour
- properties when installed.

16 Investigations

16.1 Existing data on fire performance of the membranes to BS 476-3 : 2004 were assessed.

16.2 Visits to existing sites installed during 1969 and 1981 were carried out and samples were taken to assess the durability of the product under normal service conditions.

16.3 The manufacturing process was evaluated, including the methods adopted for quality control, and details were obtained of the quality and composition of materials used.

Bibliography

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 1991-1-4 : 2005 *Eurocode 1 : Actions on structures — General actions — Wind actions*

NA to BS EN 1991-1-4 : 2005 *UK National Annex to Eurocode 1 : Actions on structures — General actions — Wind actions*

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

EN 13956 : 2012 *Flexible sheet for waterproofing — Plastic and rubber sheets for roof waterproofing — Definitions and characteristics*

17 Conditions

17.1 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.

17.2 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.

17.3 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.

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

17.5 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.

17.6 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.