

IKO PLC

Appley Lane North
Appley Bridge
Wigan

Tel: 01257 256864 Fax: 01257 252514

e-mail: technical@ikogroup.co.uk

website: www.ikogroup.co.uk



Agrément Certificate

20/5778

Product Sheet 1

IKO WATERPROOFING SYSTEMS

IKO PERMAGUARD M SELF-ADHESIVE WATERPROOFING SYSTEM

This Agrément Certificate Product Sheet⁽¹⁾ relates to the IKO Permaguard M Self-Adhesive Waterproofing System, comprising polymer-modified, self-adhesive bitumen waterproofing membranes, insulation boards and an air and vapour control layer (A&VCL), for use on flat and 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 system will resist the passage of moisture to the interior of the building (see section 6).

Thermal performance — the system can be used to improve the thermal performance of a roof (see section 7).

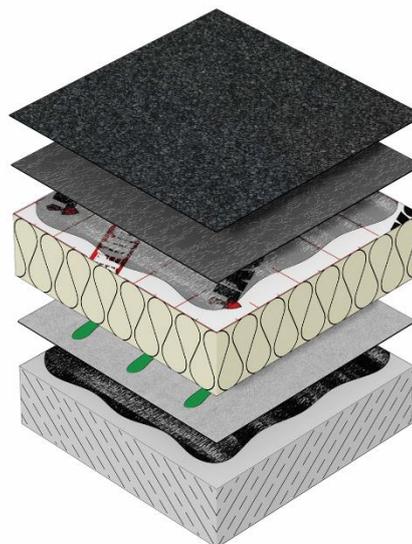
Condensation risk — roofs incorporating the system will adequately limit the risk of interstitial and surface condensation (see section 8).

Properties in relation to fire — the system is restricted in some cases under the national Building Regulations (see section 9)

Resistance to wind uplift — the system will enable a roof to be unrestricted under the national Building Regulations (see section 10).

Resistance to mechanical damage — the system will accept, without damage, the limited foot traffic and loads associated with installation and maintenance (see section 11).

Durability — under normal service conditions, the system will provide a durable waterproof covering with a service life in excess of 20 years (see section 13).



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

Date of First issue: 29 October 2020

Hardy Giesler
Chief Executive Officer

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 MUST check the validity and latest issue number of this Agrément Certificate by either referring to the BBA website or contacting the BBA directly.

Any photographs are for illustrative purposes only, do not constitute advice and should not be relied upon.

British Board of Agrément

Bucknalls Lane
Watford
Herts WD25 9BA

tel: 01923 665300
clientservices@bbacerts.co.uk
www.bbacerts.co.uk

©2020

Regulations

In the opinion of the BBA, the IKO Permaguard M Self-Adhesive Waterproofing System, 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(1) | External fire spread |
| Comment: | | The system is restricted under this Requirement unless specific conditions are satisfied. See section 9.4 of this Certificate. |
| Requirement: | B4(2) | External fire spread |
| Comment: | | On a suitable substructure, the use of the system can enable a roof to be unrestricted under this Requirement. See section 9 of this Certificate. |
| Requirement: | C2(b) | Resistance to moisture |
| Comment: | | The system, including joints, will enable a roof to satisfy this Requirement. See section 6.1 of this Certificate. |
| Requirement: | C2(c) | Resistance to moisture |
| Comment: | | The system can contribute to enabling a roof to satisfy this Requirement. See sections 8.1 and 8.2 of this Certificate. |
| Requirement: | L1(a)(i) | Conservation of fuel and power |
| Comment: | | The system can contribute to satisfying this Requirement. See sections 7.2 and 7.3 of this Certificate. |
| Requirement: | 7(1) | Materials and workmanship |
| Comment: | | The system is acceptable. See section 13.1 and the Installation part of this Certificate. |
| Regulation: | 26 | CO2 emission rates for new buildings |
| Regulation: | 26A | Fabric energy efficiency rates for new dwellings (applicable to England only) |
| Regulation: | 26A | Primary energy consumption rates for new buildings (applicable to Wales only) |
| Regulation: | 26B | Fabric performance values for new dwellings (applicable to Wales only) |
| Comment: | | The system can contribute to satisfying these Regulations; however, compensating fabric/services measures may be required. See sections 7.2 and 7.3 of this Certificate. |



The Building (Scotland) Regulations 2004 (as amended)

| | | |
|--------------------|----------------|--|
| Regulation: | 8(1)(2) | Durability, workmanship and fitness of materials |
| Comment: | | The use of the system satisfies the requirements of this Regulation. See sections 12.1 and 13.1 and the <i>Installation</i> part of this Certificate. |
| Regulation: | 9 | Building standards applicable to construction |
| Standard: | 28 | Spread from neighbouring buildings |
| Comment: | | The system, when applied to a suitable substructure, is regarded as having low vulnerability under clause 2.8.1 ⁽¹⁾⁽²⁾ of this Standard. See sections 9.1 and 9.3 of this Certificate. |
| Standard: | 3.10 | Precipitation |
| Comment: | | The use of the system, 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: Comment: | 3.15 | Condensation The system will enable a roof to satisfy this Standard, with reference to clauses 3.15.1 ⁽¹⁾ , 3.15.3 ⁽¹⁾ , 3.15.5 ⁽¹⁾ and 3.15.6 ⁽¹⁾ . See sections 8.1 and 8.3 of this Certificate. |
| Standard: Standard: Comment: | 6.1(b) 6.2 | Carbon dioxide emissions Building insulation envelope The system can contribute to satisfying the requirements of these Standards, with reference to clauses, or parts of, 6.1.2 ⁽²⁾ , 6.1.6 ⁽¹⁾ , 6.2.1 ⁽¹⁾⁽²⁾ , 6.2.3 ⁽¹⁾ , 6.2.4 ⁽²⁾ , 6.2.5 ⁽²⁾ , 6.2.6 ⁽¹⁾ , 6.2.7 ⁽¹⁾ , 6.2.8 ⁽¹⁾⁽²⁾ , 6.2.9 ⁽¹⁾⁽²⁾ , 6.2.10 ⁽¹⁾⁽²⁾ , 6.2.11 ⁽¹⁾⁽²⁾ , 6.2.12 ⁽²⁾ and 6.2.13 ⁽¹⁾⁽²⁾ . See sections 7.2 and 7.3 of this Certificate. |
| Standard: Comment: | 7.1(a)(b) | Statement of sustainability The system 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. In addition, the system can contribute to a construction meeting a higher level of sustainability as defined in this Standard, with reference to clauses 7.1.4 ⁽¹⁾⁽²⁾ [Aspects 1 ⁽¹⁾⁽²⁾ and 2 ⁽¹⁾], 7.1.6 ⁽¹⁾⁽²⁾ [Aspects 1 ⁽¹⁾⁽²⁾ and 2 ⁽¹⁾] and 7.1.7 ⁽¹⁾⁽²⁾ [Aspect 1 ⁽¹⁾⁽²⁾]. See sections 7.2 and 7.3 of this Certificate. |
| Regulation: Comment: | 12 | Building standards applicable to conversions Comments in relation to the system 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 (as amended)

| | | |
|--|---------------------------------------|---|
| Regulation: Comment: | 23(a)(i) (iii)(b)(i) | Fitness of materials and workmanship The system is acceptable. See section 13.1 and the <i>Installation</i> part of this Certificate. |
| Regulation: Comment: | 28(b) | Resistance to moisture and weather The system, including joints, satisfies the requirements of this Regulation. See section 6.1 of this Certificate. |
| Regulation: Comment: | 29 | Condensation The system can contribute to a roof satisfying this Regulation. See section 8.1 of this Certificate. |
| Regulation: Comment: | 36(b) | External fire On suitable substructures, the use of the system can enable a roof to be unrestricted under the requirements of this Regulation. See sections 9.1 to 9.3 of this Certificate. |
| Regulation: Regulation: Comment: | 39(a)(i) 40(2) | Conservation measures Target carbon dioxide emissions rate The system can satisfy or contribute to satisfying these Regulations. See sections 7.2 and 7.3 of this Certificate. |

Construction (Design and Management) Regulations 2015

Construction (Design and Management) Regulations (Northern Ireland) 2016

Information in this Certificate may assist the client, designer (including Principal Designer) and contractor (including Principal Contractor) to address their obligations under these Regulations.

See sections: 1 *Description* (1.2 and 1.3) and 3 *Delivery and site handling* (3.6 and 3.7) of this Certificate.

Additional Information

NHBC Standards 2020

In the opinion of the BBA, the IKO Permaguard M Self-Adhesive Waterproofing System, if installed, used and maintained in accordance with this Certificate, can satisfy or contribute to satisfying the relevant requirements in relation to *NHBC Standards*, Chapter 7.1 *Flat roofs and balconies*.

The NHBC Standards do not cover the use of the system in the refurbishment of existing roofs.

CE marking

The Certificate holder has taken the responsibility of CE marking the system, in accordance with harmonised European Standards BS EN 13165 : 2012, BS EN 13707 : 2013 and BS EN 13970 : 2004.

Technical Specification

1 Description

1.1 The IKO Permaguard M Self-Adhesive Waterproofing System consists of:

- IKO Permaguard M Self-Adhesive Cap Sheet — an SBS modified bitumen, self-adhesive membrane, reinforced with a graphite treated, non-woven polyester ($230 \text{ g}\cdot\text{m}^{-2}$) with a slate finish on the upper surface and a release film on both the lower surface and the selvedge area on the upper surface. The slate surface is available in black, brown or green
- IKO Systems T-F Detailing Underlay — an SBS modified bitumen, self-adhesive membrane, reinforced with a nonwoven polyester ($175 \text{ g}\cdot\text{m}^{-2}$) with a sand finish on the upper surface and a release film on both the lower surface and the selvedge area on the upper surface
- IKO enertherm ALU Insulation Boards — rigid polyisocyanurate (PIR) insulation boards with composite foil-facings on both sides
- IKO Systems S-A Air & Vapour Control Layer (A&VCL)— a self-adhesive membrane reinforced with a non-woven polyester, aluminium foil, selvedge and a release film on the lower surface.

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

Table 1 Nominal characteristics — membranes

| Characteristic | Membrane | | |
|---|---|------------------------------------|--|
| | IKO Permaguard M Self-Adhesive Capsheet | IKO Systems T-F Detailing Underlay | IKO Systems S-A Air & Vapour Control Layer |
| Standard CE marked against | EN 13707 | EN 13707 | EN13970 |
| Length (m) | 8 | 16 | 15 |
| Width (m) | 1 | 1 | 1 |
| Mass per unit area (kg·m ⁻²) | 3.8 | 2.5 | 2.4 |
| Roll weight (kg) | 30.5 | 40 | 36.0 |
| Watertightness | Pass | Pass | Pass |
| Equivalent air layer thickness (Sd) (m) | NPD | NPD | 2436 |
| Tensile strength (N per 50 mm ⁻¹) | | | |
| longitudinal | ≥750 | ≥500 | ≥500 |
| transverse | ≥750 | ≥400 | ≥400 |
| Elongation at break (%) | | | |
| longitudinal | ≥30 | ≥20 | ≥20 |
| transverse | ≥40 | ≥30 | ≥30 |
| Nail tear (N) | | | |
| longitudinal | ≥180 | ≥175 | ≥250 |
| transverse | ≥180 | ≥175 | ≥300 |
| Static indentation (kg) substrate A | 20 | 20 | NPD |
| Low Temperature Flexibility | ≤-15 | ≤-15 | ≤-10 |

1.3 The insulation boards are supplied to site with the nominal characteristics shown in Table 2.

Table 2 Nominal characteristics — insulation boards

| Characteristic (unit) | Value |
|--|---|
| Standard CE marked against | EN 13165 |
| Length (mm) | 2400, 1000 and 600 |
| Width (mm) | 1200 |
| Thickness (mm) | 30, 40, 50, 60, 70, 75, 80, 90, 100, 110, 120 and 140 |
| Compressive strength at 10% compression (kPa) | 175 |
| Density (kg·m ⁻³) | 32 |
| Thermal conductivity (W·m ⁻¹ ·K ⁻¹) | 0.022 |

1.4 Ancillary products for use with the system are:

- IKOpro Bonding Agent — a solvent based primer for use on synthetic rubber and resins
- IKOpro Sprayfast MPP — a solvent based primer, in spray form, for use on synthetic rubber and resins
- IKOpro Insulation Adhesive — a moisture curing, single part polyurethane adhesive.

2 Manufacture

2.1 The membranes are manufactured by saturating the bases with bitumen and a fire-retardant SBS elastomeric coating containing mineral filler.

2.2 IKO enertherm ALU Insulation Boards are manufactured by blending together polyol and MDI in a continuous foaming process aided by a blowing agent, and sandwiched between two composite foil-facings. After formation, the boards are left to cure and are cut to size.

2.3 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.

2.4 The management system of IKO PLC has been assessed and registered as meeting the requirements of BS EN ISO 9001 : 2015 by BSI (Certificate Q 05233).

3 Delivery and site handling

3.1 The membranes are delivered to site in rolls within paper wrappings bearing the Certificate holder's name and the BBA logo incorporating the number of this Certificate.

3.2 Rolls should be stored on end on a clean, level surface and not exposed to excessive heat.

3.3 The boards are delivered to site in packs, wrapped in polythene. Each pack contains a label with the manufacturer's trade name, product description, board dimensions and the BBA logo incorporating the number of this Certificate.

3.4 The boards must be protected from prolonged exposure to sunlight and should be stored under cover or protected with opaque polythene sheeting. Where possible, packs should be stored inside. If stored outside, the boards should be stacked flat, raised above ground level and not in contact with ground moisture.

3.5 The boards are light and easy to handle, and care should be exercised to avoid crushing the edges or corners. If damaged, the boards should be discarded.

3.6 The boards must not be exposed to open flame or other ignition sources, or to solvents or other chemicals.

3.7 The Certificate holder has taken the responsibility of classifying and labelling the system components under the *CLP Regulation (EC) No 1272/2008 on the classification, labelling and packaging of substances and mixtures*. Users must refer to the relevant Safety Data Sheet(s).

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on the Permaguard M Self-Adhesive Waterproofing System.

Design Considerations

4 Use

4.1 The IKO Permaguard M Self-Adhesive Waterproofing System is satisfactory for use a total roof waterproofing and insulation system on flat and pitched roofs with limited access in bonded applications.

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, such as pedestrian access roofs, additional protection must be provided (see sections 11 and 14.6 and the relevant clauses of the Certificate holder's installation instructions).

4.3 Flat roofs are defined for the purpose of this Certificate as those having a minimum finished fall of 1:80. Pitched roofs are defined for the purpose of this Certificate as those having falls greater than 1:6. When designing flat roofs,

twice the minimum finished fall should be assumed, unless a detailed analysis of the roof is available including, for example, overall and local deflection and direction of falls.

4.4 Structural decks to which the system is to be applied must comply with the relevant requirements, BS 8217 : 2005, the relevant British Standards listed in BS 6229 : 2018, Clause 5.3, and where appropriate, *NHBC Standards 2020*, Chapter 7.1.

5 Practicability of installation

The system must only be installed by contractors who have been 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 to the inside of the building and so satisfy the requirements of the national Building Regulations.

6.2 The membranes are impervious to water and will give a weathertight roofing capable of accepting minor structural movements without damage.

7 Thermal performance

7.1 Calculations of thermal transmittance (U value) should be carried out in accordance with BS EN ISO 6946 : 2017 and BRE Report BR 443 : 2006, using the declared thermal conductivity (λ_D) of $0.022 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$ for the insulation boards.



7.2 The U value of a completed roof will depend on the thickness of insulation used, the number and type of fixings and the insulating value of the other roof components/layers. Example U values of roofs incorporating the system are shown in Table 3.

Table 3 Example U values

| U value ($\text{W}\cdot\text{m}^{-2}\cdot\text{K}^{-1}$) | Insulation Thickness (mm) ⁽¹⁾ | | |
|--|--|-----------------------|----------------------|
| | Concrete ⁽²⁾ | Timber ⁽³⁾ | Metal ⁽⁴⁾ |
| 0.13 | — | — | — |
| 0.15 | 140 | 140 | 140 |
| 0.16 | 140 | 120 | 140 |
| 0.18 | 120 | 110 | 120 |
| 0.20 | 110 | 100 | 110 |
| 0.25 | 90 | 75 | 90 |

(1) Nearest available thickness.

(2) 150 mm concrete deck — $1.7 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$, felt vcl, insulation and 10 mm bitumen felt finish.

(3) 12.5 mm plasterboard, vcl, 150 mm timber joists (12.5%)/air cavity (87.5%), 18 mm plywood decking, felt VCL, insulation and 10 mm bitumen felt finish.

(4) Metal deck, felt vcl, insulation and 10 mm bitumen felt.

Junctions



7.3 Care must be taken in the overall design and construction of junctions with other elements and openings to minimise thermal bridges and air infiltration. Detailed guidance can be found in the documents supporting the national Building Regulations

8 Condensation risk

Interstitial condensation



8.1 The system will adequately reduce the risk of interstitial condensation when designed and constructed in accordance with BS 5250 : 2011 Appendix D and Appendix H Section H9, and BRE Report BR 262 : 2002, in England and Wales. When carrying out condensation risk analysis calculations to BS 5250 : 2011, the following vapour resistance values should be used:

- | | |
|--|-----------------------------|
| • vcl | 12180 MN·s·g ⁻¹ |
| • individual foil layers of the boards | 1000 MN·s·g ⁻¹ |
| • insulation core of the boards | 183 MN·s·g ⁻¹ |
| • underlay | 750 MN·s·g ⁻¹ |
| • capsheet | 1000 MN·s·g ⁻¹ . |

Surface condensation



8.2 Roofs will adequately limit the risk of surface condensation when the thermal transmittance (U value) does not exceed 0.35 W·m⁻²·K⁻¹ at any point and the junctions with walls are designed in accordance with section 7.3.



8.3 For buildings in Scotland, constructions will be acceptable where the thermal transmittance (U value) does not exceed 1.2 W·m⁻²·K⁻¹ at any point, and the junctions with other elements are designed in accordance with the guidance referred to in BS 5250 : 2011, Annex H. Further guidance may be obtained from BRE Report BR 262 : 2002 and section 6.3 of this Certificate.

9 Properties in relation to fire



9.1 When tested and classified in accordance with BS EN 13501-5 : 2016, a system comprising of an 18 mm exterior plywood substrate primed with IKOpro Bonding Agent with a layer of IKO Systems S-A Air & Vapour Control Layer, a 30 mm thick IKO enertherm ALU Insulation Board bonded with IKOpro Insulation Adhesive and top surface primed with IKOpro Bonding Agent with a layer of IKO Systems T-F Detailing Underlay and IKO Permaguard M Self-adhesive Cap Sheet achieved a B_{ROOF}(t4) rating.



9.2 When used on flat roofs with one of the surface finishes defined in The Building Regulations (Wales), Part iii, Appendix A, Table A5, or The Building Regulations (Northern Ireland), Technical Booklet E, Table 5.6, Part IV (and listed below), the roof is deemed to be of designation B_{ROOF}(t4):

- bitumen-bedded stone chippings covering the whole surface to a depth of not less than 12.5 mm
- bitumen-bedded tiles of a non-combustible material
- sand and cement screed
- macadam.



9.3 The designation of other specifications should be confirmed by:

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

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.



9.4 The system when used in pitches of greater than 70°, should not be used on buildings in England and Wales that have a storey at least 18 m above ground level and contain: one or more dwellings, an institution, a room for residential purposes (excluding any room in a hostel, hotel or boarding house), student accommodation, care homes, sheltered housing, hospitals or dormitories in boarding schools.

10 Resistance to wind uplift

10.1 The adhesion of the bonded membranes is sufficient to resist the effects of wind suction, elevated temperature and thermal shock conditions likely to occur in practice.

10.2 Adhesion between the boards and the A&VCL, and between the boards and overlay, is adequate to resist the effects of wind suction and thermal cycling likely to be experienced under normal conditions. Metal deck profiles should give a bonding area of at least 33% of the total projected surface area. In areas where high wind speeds can be expected, mechanical fixings should be considered, and the advice of the Certificate holder should be sought as to the method of fixing. Reference should be made to BS EN 1991-1-4 : 2005, and a calculation carried out by a suitably experienced and competent individual where required for a specific building project.

11 Resistance to mechanical damage

11.1 The system can accept the limited foot traffic and light concentrated loads associated with installation and maintenance. Where traffic in excess of this is envisaged, such as for maintenance of lift equipment, a walkway must be provided (for example, using concrete slabs supported on bearing pads or manufacturer’s walkway sheets). Reasonable care must be taken to avoid puncture of the membranes by sharp objects or concentrated loads.

11.2 For design purposes, the boards may be assumed to have an allowable compressive strength of 175 kPa at 10% compression.

11.3 The boards have not been assessed for use with permanent distributed or concentrated loads, such as air conditioning units, mechanical plants, water tanks, etc. Such loads must be supported directly on the roof construction or design support system.

11.4 When profiled decking is used, boards will need to span ribs. Maximum permissible spans between ribs for various board thicknesses are shown in Table 4.

Table 4 Maximum clear span

| Maximum clear span (mm) | Minimum board thickness (mm) |
|-------------------------|------------------------------|
| < 75 | 25 |
| > 75 ≤ 100 | 30 |
| > 100 ≤ 125 | 35 |
| > 125 ≤ 150 | 40 |
| > 150 ≤ 175 | 45 |
| > 175 ≤ 200 | 50 |
| > 200 ≤ 225 | 55 |
| >225 ≤ 250 | 60 |

12 Maintenance



12.1 The system must be the subject of 6 monthly inspections and maintenance to ensure continued performance.

12.2 Where damage has occurred to the waterproof layer, it should be repaired in accordance with section 16 and the Certificate holder’s instructions.

12.3 The other system components, once installed, do not require any regular maintenance and have suitable durability, provided the roof waterproofing layers are maintained as described in section 12.2.

13 Durability



13.1 Under normal conditions of use, the system will have a service life in excess of 20 years.

13.2 When using the mineral-finished membrane, some localised loss of mineral surfacing may occur after some years in areas where complex detailing of the roof design is incorporated.

Installation

14 General

14.1 Installation of the IKO Permaguard M Self-Adhesive Waterproofing System must be carried out by installers approved by the Certificate holder in accordance with the relevant clauses of BS 8000-0 : 2014, BS 8000-4 : 1989, BS 8217 : 2005, the Certificate holder's or appointed agent's instructions, and this Certificate.

14.2 Substrates to which the system is to be applied must be sound, dry, clean and free from sharp projections such as nail heads and concrete nibs. Wet boards must not be used. Any hollows, depressions or backfalls found in the roof deck must be rectified prior to laying the insulation.

14.3 Installation must not be carried out during inclement weather (eg rain, fog or snow).

14.4 It is recommended that the membranes, including A&VCL, should be installed at temperatures above 10°C. When site ambient temperatures are below 10°C, it is recommended that the membranes are stored in a warm environment for 24 hours prior to use. If it is necessary to carry out installation at lower temperatures, a hot-air gun can be used to warm the adhesive surface (to activate the adhesive and promote bonding).

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

14.6 If the roof is likely to be subjected to uncontrolled pedestrian access, the substructure must satisfy the requirements of BS 8217 : 2005, and to prevent damage to the roof covering, one of the appropriate surface finishes referred to in Clause 6.12 of this Standard must be used.

14.7 At falls in excess of 1:11, the provision for mechanical fixings as required by BS 8217 : 2005 should be observed.

14.8 The membranes may also have a surface finish applied in accordance with BS 8217 : 2005, Clause 8.19, including:

- stone aggregate in dressing compound
- precast concrete paving slabs
- proprietary tiles on bonding compound.

14.9 The boards can be cut to fit around projections through the roof, using either a sharp knife or a fine-toothed saw.

15 Procedure

A&VCL

15.1 Most surfaces are primed with IKO Bonding Agent, and the A&VCL is fully bonded to the primed deck using the recommended bonding method. For metal decks the upper profile of the decking is primed and the A&VCL bonded to the primed upper profile of the metal deck using the recommended bonding method.

Plywood, OSB particle board and wood wool decks

15.2 Joints in the boards are taped with loose-laid strips of polyester reinforced membranes.

15.3 The A&VCL is bonded to the substrate using the appropriate bonding method recommended by the Certificate holder.

Insulation

15.4 The boards are installed in a close-butted break-bonded pattern.

15.5 On metal decks, the boards are laid either with the long axis at right angles to the corrugations of the metal deck or diagonally across the corrugations of the deck, ensuring that all end joints and corners are sufficiently supported on the crown flats of the decking. The thickness of the board to be used is dependent on the width of the trough openings of the metal deck as indicated in Table 4.

15.6 The boards are bonded to the A&VCL using either IKOpro Insulation Adhesive or IKOpro Sprayfast MPP. A bead of adhesive is applied in a snaking pattern, using a 30 mm bead width at 200 to 300 mm centres.

Membrane

15.7 The top surface of the insulation must be primed using the IKOpro Bonding Agent and allowed to dry. The waterproofing underlay must be applied once the primer is dry and on same working day.

15.8 The first strip of IKO Systems T-F Detailing Underlay is laid out in the correct position on the roof deck. The underlay is rolled back towards the centre revealing the release paper underneath. At a point close to the centre of the roll, the release paper is carefully cut across the width of the roll without cutting through the underlay.

15.9 The underlay is bonded to the substrate in accordance with the Certificate holder's instructions.

15.10 Overlaps for the underlay must be a minimum of 75 mm, both for side laps and end laps.

15.11 IKO Permaguard M Self-Adhesive Capsheet is installed as described in sections 15.8 to 15.10, ensuring that the end laps and side joints do not coincide with those of the underlay.

16 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 membrane as described in the Certificate holder's instructions.

Technical Investigations

17 Tests

17.1 An examination was made of data on the IKO Permaguard M Self-Adhesive Waterproofing System relating to wind uplift from a plywood substrate.

17.2 An assessment was made of test data on a membrane using the same coating mass and lighter reinforcement to determine:

- dynamic indentation
- heat resistance
- sliding resistance
- water vapour permeability
- tensile strength of joints
- effect of heat ageing
- effect of water immersion.

17.3 An examination was made of data on IKO enertherm ALU Insulation Boards relating to:

- fire rating
- thermal conductivity

- compressive stress at 10% deformation
- dimensional accuracy
- diffusion tight property of facings
- water vapour resistance
- wind uplift.

17.4 An assessment was made of test data on IKO Systems S-A Vapour Control Layer to determine:

- tensile strength
- elongation at break
- dimensional stability
- water vapour properties
- static indentation
- dynamic indentation
- low temperature flexibility
- peel strength from substrate
- effect of heat ageing.

18 Investigations

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

18.2 Existing data on fire performance of the membranes were evaluated.

18.3 A condensation risk analysis was carried out.

18.4 A series of U value calculations were carried out.

18.5 An assessment was made of the methods of installation.

Bibliography

BRE Report BR 262 : 2002 *Thermal insulation : avoiding risks*

BRE Report BR 443 : 2006 *Conventions for U-value calculations*

BS 5250 : 2011 + A1 : 2016 *Code of practice for control of condensation in buildings*

BS 6229 : 2018 *Flat roofs with continuously supported coverings — Code of practice*

BS 8000-0 : 2014 *Workmanship on construction sites — Introduction and general principles*

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 + A1 : 2010 *Eurocode 1 — Actions on structures — General actions — Wind actions*

BS EN ISO 9001 : 2015 *Quality management systems — Requirements*

BS EN 13501-5 : 2016 *Fire classification of construction products and building elements — Classification using data from external fire exposure to roof tests*

BS EN 13165 : 2012 + A2 : 2016 *Thermal insulation products for buildings — Factory made rigid polyurethane foam (PU) products — Specification*

BS EN 13707 : 2013 *Flexible sheets for waterproofing — Reinforced bitumen sheets for roof waterproofing — Definitions and characteristics*

BS EN 13970 : 2004 *Flexible sheets for waterproofing — Bitumen water vapour control layers — Definitions and characteristics*

BS EN ISO 6946 : 2017 *Building components and building elements — Thermal resistance and thermal transmittance — Calculation method*

19 Conditions

19.1 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.

19.2 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.

19.3 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.

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

19.5 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.

19.6 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.