

## IKO PLC

Appley Lane North  
Appley Bridge  
Wigan  
Lancashire WN6 9AB

Tel: 01257 256 864

e-mail: [technical@ikogroup.co.uk](mailto:technical@ikogroup.co.uk)

website: [www.ikogroup.co.uk](http://www.ikogroup.co.uk)



**Agrement Certificate**

**00/3760**

Product Sheet 1

## IKO MACH TWO SINGLE LAYER WATERPROOFING SYSTEMS

### IKO MACH TWO

This Agrément Certificate Product Sheet<sup>(1)</sup> relates to IKO Mach Two for use as a mechanically fastened or adhered polymer-modified bitumen waterproofing membrane 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 product, including joints, will resist the passage of moisture to the interior of a building (see section 6).

**Properties in relation to fire** — the product is restricted in some cases under the national Building Regulations (see section 7).

**Resistance to wind uplift** — when correctly specified, the product will resist the effects of any likely wind suction acting on the roof (see section 8).

**Resistance to mechanical damage** — the product will accept, without damage, the limited foot traffic and loads associated with the installation and maintenance (see section 9).

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



The BBA has awarded this Certificate to the company named above for the product described herein. This product has been assessed by the BBA as being fit for its intended use provided it is installed, used and maintained as set out in this Certificate.

On behalf of the British Board of Agrément

Date of Seventh issue: 13 August 2020

Originally certificated on 17 November 2000

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](http://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

©2020

tel: 01923 665300  
[clientservices@bbacerts.co.uk](mailto:clientservices@bbacerts.co.uk)  
[www.bbacerts.co.uk](http://www.bbacerts.co.uk)

## Regulations

In the opinion of the BBA, IKO Mach Two, 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)

<b>Requirement:</b>	<b>B4(1)</b>	<b>External fire spread</b> The use of the product may be restricted under this Requirement. See section 7.5 of this Certificate.
<b>Requirement:</b>	<b>B4(2)</b>	<b>External fire spread</b> On suitable substructures, the use of the product can enable a roof to be unrestricted under this Requirement. See section 7.1, 7.2, 7.3 (Wales only) and 7.4 of this Certificate.
<b>Requirement:</b>	<b>C2(b)</b>	<b>Resistance to moisture</b> The product, including joints, will enable a roof to satisfy this Requirement. See section 6.1 of this Certificate.
<b>Requirement:</b>	<b>7(1)</b>	<b>Materials and workmanship</b> The product is acceptable. See section 11.1 and the <i>Installation</i> part of this Certificate.



### The Building (Scotland) Regulations 2004 (as amended)

<b>Regulation:</b>	<b>8(1)(2)</b>	<b>Durability, workmanship and fitness of materials</b> The use of the product satisfies the requirements of this Regulation. See sections 10.1 and 11.1 and the <i>Installation</i> part of this Certificate.
<b>Regulation:</b>	<b>9</b>	<b>Building standards applicable to construction</b>
<b>Standard:</b>	<b>2.8</b>	<b>Spread from neighbouring buildings</b> The product, when applied to a suitable substructure, can achieve low vulnerability under this Standard with reference to clause 2.8.1 <sup>(1)(2)</sup> . See sections 7.1, 7.2 and 7.4 of this Certificate.
<b>Standard:</b>	<b>3.10</b>	<b>Precipitation</b> The product, including joints, will enable a roof to satisfy the requirements of this Standard, with reference to clauses 3.10.1 <sup>(1)(2)</sup> and 3.10.7 <sup>(1)(2)</sup> . See section 6.1 of this Certificate.
<b>Standard:</b>	<b>7.1(a)</b>	<b>Statement of sustainability</b> The product 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.
<b>Regulation:</b>	<b>12</b>	<b>Building standards applicable to conversions</b> Comments in relation to the product under Regulation 9, Standards 1 to 6 also apply to this Regulation, with reference to clause 0.12.1 <sup>(1)(2)</sup> and Schedule 6 <sup>(1)(2)</sup> .

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).



### The Building Regulations (Northern Ireland) 2012 (as amended)

<b>Regulation:</b>	<b>23(a)(i)</b>	<b>Fitness of materials and workmanship</b>
<b>Comment:</b>	<b>(iii)(b)(i)</b>	The product is acceptable. See section 11.1 and the <i>Installation</i> part of this Certificate.

<b>Regulation:</b>	<b>28(b)</b>	<b>Resistance to moisture and weather</b>
Comment:		The product, including joints, will enable a roof to satisfy the requirements of this Regulation. See section 6.1 of this Certificate.
<b>Regulation:</b>	<b>36(b)</b>	<b>External fire spread</b>
Comment:		On a suitable substructure, the use of the product can be unrestricted under this Regulation. See section 7 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 3 *Delivery and site handling* (3.3) of this Certificate

### Additional Information

#### NHBC Standards 2020

In the opinion of the BBA, IKO Mach Two, 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*.

#### CE marking

The Certificate holder has taken the responsibility of CE marking the product in accordance with harmonised European Standard BS EN 13707 : 2013.

### Technical Specification

#### 1 Description

1.1 IKO Mach Two is a membrane comprising styrene-butadiene-styrene (SBS)-modified bitumen with added fire retardant for improved fire resistance and a glass fibre/polyester composite reinforcement (330 g·m<sup>-2</sup>). The membrane is finished with a polypropylene fleece on the underside (15 g·m<sup>-2</sup>) and a mineral finish (green, black or brown) on the top face.

1.2 The product is manufactured to the following nominal characteristics:

Width (m)	1
Length (m) <sup>(1)</sup>	7.5
Roll weight (kg)	40.5
Mass per unit area (kg·m <sup>-2</sup> )	5.4
Watertightness (1 m)	pass
Tensile strength (N per 50 mm)	
longitudinal direction	≥ 950
transverse direction	≥ 950
Elongation (%)	
longitudinal direction	≥ 30
transverse direction	≥ 40
Resistance to tear- nail (N)	
longitudinal direction	≥ 300
transverse direction	≥ 300
Static loading (kg)	20

Low temperature flexibility (°C)	
upper face	-15
lower face	-15.

(1) Other lengths are available to order.

1.3 Products that may be used with IKO Mach Two, and which are within the scope of this Certificate, include:

- IKO Enertherm PIR MG Insulation — a polyurethane insulation board, faced on both sides with a perforated glass tissue
- IKO Enertherm Gold Insulation Boards — rigid polyisocyanurate (PIR) insulation boards with a composite foil-facing on both sides (BBA Certificate 15/5283)
- IKO Enertherm ALU Insulation Boards — rigid polyisocyanurate (PIR) insulation boards with a composite foil-facing on both sides (BBA Certificate 15/5283)
- IKO Enertherm MW Multifix — a dual density stone wool insulation board, fleece faced on both sides
- IKO Enertherm Surefix Insulation Boards — polyisocyanurate insulation boards including an integral galvanized steel channel, for the mechanical fixing of the waterproofing on concrete, timber or woodwool decks
- IKO Systems Torch-on and IKO Systems S-A Air and Vapour Control Layers (BBA Certificate 86/1640) — modified bitumen products, reinforced with polyester and containing an aluminium foil core, for use as air and vapour control layers
- IKO Systems H-A Detailing Underlay and IKO Systems T-F Detailing Underlay — modified bitumen products reinforced with polyester, for use as detailing underlays
- IKO Safestick PrevENT Capsheet (BBA Certificate 18/5580) — used to form upstands and other roof edge details
- IKOpro Sprayfast MPP — multipurpose bitumen primer or IKOpro Systems Bonding Agent for self-adhesive membranes
- IKOpro Sprayfast IBA — a single-part, moisture-curing, spray-applied polyurethane adhesive used for bonding insulation boards to air and vapour control layers
- IKOpro Sprayfast BMA — a single-part, moisture-curing, spray-applied polyurethane adhesive used for bonding bituminous roofing membranes to a wide range of insulation boards
- IKO Pre-formed Bituminous Details — manufactured from a galvanized steel sheet with an SBS modified product adhered to it, for use at perimeters. The range includes drips, kerbs and upstand profiles, with non-standard units available to order
- a range of mechanical fasteners and an 80 by 40 mm pressure plate — for use with IKO Mach One and Surefix Insulation.

1.4 An ancillary item for use with the product, but which is outside the scope of this Certificate, is a liquid-applied, moisture-cured polyurethane to provide waterproofing around complex detailing.

## 2 Manufacture

2.1 The product is manufactured by saturating the base with bitumen and coating with a fire-enhanced SBS elastomeric coating containing mineral filler and laminating the bottom face with a polyester fleece. The surface is finished with an application of mineral.

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 : 2015 by BSI (Certificate Q 05233).

### 3 Delivery and site handling

3.1 The product is delivered to site in rolls, with paper wrappings or tapes bearing the Certificate holder's name, product name, product code, product dimensions and the BBA logo incorporating the number of this Certificate.

3.2 Rolls should be stored on end on a clean, level surface, away from excessive heat and kept under cover.

3.3 The Certificate holder has taken the responsibility of classifying and labelling the product 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 IKO Mach Two.

### Design Considerations

#### 4 General

4.1 IKO Mach Two is satisfactory for use as a single-ply waterproofing membrane on flat and pitched roofs with limited access in:

- mechanically fastened systems
- bonded systems using the appropriate polyurethane adhesive.

4.2 Decks to which the membrane is to be applied must comply with the relevant requirements of either BS 6229 : 2018 or BS 8217 : 2005 and, where appropriate, *NHBC Standards 2020*, Chapter 7.1.

4.3 Limited access roofs are defined for the purpose of this Certificate as those 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).

4.4 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 and direction of falls, etc.

4.5 Pitched roofs are defined for the purpose of this Certificate as those having a fall greater than 1:6.

4.6 Insulation materials to be used in conjunction with the membrane 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.

#### 5 Practicability of installation

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

#### 6 Weathertightness



6.1 The product, including joints, when completely sealed and consolidated, will adequately resist the passage of moisture to the interior of a building and enable a roof to comply with the requirements of the national Building Regulations.

6.2 The product is impervious to water and will achieve a weathertight roof capable of accepting minor structural movements.

## 7 Properties in relation to fire



7.1 A system comprising 18 mm thick hardwood plywood, a fully adhered layer of IKO Systems S-A Air and Vapour Control Layer, a 120 mm thick board of IKO Enertherm Gold PIR insulation adhered to the vapour control layer with IKOpro Sprayfast PU adhesive and an adhered layer of IKO Mach Two capsheet adhered to the insulation board with IKOpro Sprayfast PU adhesive, when tested in accordance with CEN/TS 1187 : 2012, Test 4, achieved a classification of B<sub>ROOF</sub>(t4) in accordance with BS EN 13501-5 : 2016<sup>(1)(2)</sup>.

(1) Test Report 19675A by Warringtonfire, available from the Certificate holder.

(2) Classification Report 19675H by Warringtonfire, available from the Certificate holder.

7.2 When protected by an inorganic covering (eg gravel or paving slabs) listed in the Annex of Commission Decision 2000/553/EC, the product is considered to achieve a B<sub>ROOF</sub>(t4) classification and so is unrestricted by the national Building Regulations.



7.3 When used on flat roofs with one of the surface finishes defined in The Building Regulations (Wales), Appendix A, Table A5, Part iii, or The Building Regulations (Northern Ireland), Table 5.6, Part IV (and listed below), the roof is deemed to be of classification B<sub>ROOF</sub> (t4):

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



7.4 The designation of other specifications should be confirmed by reference to the requirements of the documents supporting the national Building Regulations.



7.5 The product, when used in pitches of greater than 70°, excluding upstands, 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.

## 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 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 by a suitably qualified and experienced individual, using a maximum permissible load of 0.4 kN per fixing.

8.3 The adhesion of the adhered systems to the decking is sufficient to resist the effects of wind suction, thermal cycling or other minor structural movement likely to occur in service.

## 9 Resistance to mechanical damage

The membrane can withstand the limited foot traffic and light concentrated loads associated with installation and maintenance. Where traffic in excess of this is envisaged, additional protection to the membrane in accordance with the Certificate holder's instructions must be provided. In all applications, care must be taken to avoid puncture by sharp objects or concentrated loads.

## 10 Maintenance



10.1 The product should be the subject of six month inspections and maintenance in accordance with BS 6229 : 2018, Chapter 7, to ensure continued performance.

10.2 Any damage should be repaired in accordance with section 14 and the Certificate holder's instructions.

## 11 Durability



11.1 Under normal conditions, the product will have a service life in excess of 35 years.

11.2 Some localised loss of the mineral surfacing may occur in areas of complex detailing of the roof, eg upstands.

## Installation

### 12 General

12.1 Installation of IKO Mach Two must be carried out by installers trained and approved by the Certificate holder in accordance with the relevant clauses of BS 8000-0 : 2014, BS 8000-4 : 1989 and BS 8217 : 2005, the Certificate holder's instructions and this Certificate.

12.2 Installation of the insulation boards should be carried out in accordance with the insulation manufacturer's installation instructions.

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

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

12.5 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 8.19 and 9.2 of the Code of Practice must be used.

12.6 The membrane has a mineral surface finish, and when used on roofs with limited access, requires no further surface protection.

12.7 IKO Safestick PrevENT Capsheet is used in all detailing work, for example upstands and protrusions, in accordance with the Certificate holder's instructions.

## 13 Procedure

13.1 For all applications, the product must be laid out and installed in accordance with the Certificate holder's instructions.

13.2 Side and end laps are adhered using heat welding and should be a minimum of 120 mm. An uninterrupted bitumen bead of approximately 5 mm should exude from all laps to indicate a satisfactory seal.

13.3 For mechanically fastened systems, the type of mechanical fixings used for IKO Mach Two will vary according to the type of deck and insulation used. The Certificate holder must be consulted for advice.

13.4 The membrane is fixed to the deck (through insulation boards, where appropriate) in the joint overlaps with the fixing screws positioned at least 80 mm from the edge, prior to welding the joint. The fixings must be installed at centres calculated from the average wind force in that location.

13.5 For adhered systems, the appropriate polyurethane adhesive is applied in accordance with the Certificate holder's installation instructions.

## 14 Repair

In the event of damage, the membrane can be effectively repaired after cleaning the surrounding area, with pieces of the membrane bonded to the damaged area in accordance with the Certificate holder's instructions.

## Technical Investigations

## 15 Tests

15.1 Tests were carried out and the results assessed to determine:

- water vapour transmission
- tensile strength and elongation at break
- nail tear resistance at 23, 40 and -10°C
- dimensional stability
- low temperature flexibility
- static indentation
- dynamic indentation
- heat resistance
- wind uplift load per fixing for mechanically fixed specifications
- tensile strength of joints
- peel strength of joints
- tensile strength of joints after water soak for 7 days immersion at 60°C
- tensile strength of joints after heat ageing for 28 days at 70°C.

15.2 Resistance to wind uplift of an adhered system was assessed incorporating a self-adhesive vapour control layer and adhesively adhered insulation boards and capsheet.

## 16 Investigations

16.1 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.

16.2 Fire test data were assessed.



## Bibliography

BS 6229 : 2018 *Flat roofs with continuously supported flexible waterproof covering — 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 *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 13707 : 2013 *Flexible sheets for waterproofing — Reinforced bitumen sheets for roof waterproofing — Definitions and characteristics*

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

CEN/TS 1187 : 2012 *Test methods for external fire exposure to roofs*

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

### 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.