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**Agrément Certificate**

**15/5283**

Product Sheet 3

## IKO INSULATIONS

### IKO ENERTHERM ALU AND ENERTHERM GOLD INSULATION BOARDS FOR FLAT ROOFS

This Agrément Certificate Product Sheet<sup>(1)</sup> relates to IKO enertherm ALU and enertherm GOLD Insulation Boards for Flat Roofs, comprising rigid polyisocyanurate (PIR) foam board with composite foil-facings. The products are for use as a thermal insulation layer on limited access concrete, metal or timber flat roof decks in domestic and non-domestic buildings. They are for use in conjunction with a vapour control layer and mechanically or adhesively fixed roof waterproofing systems.

(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

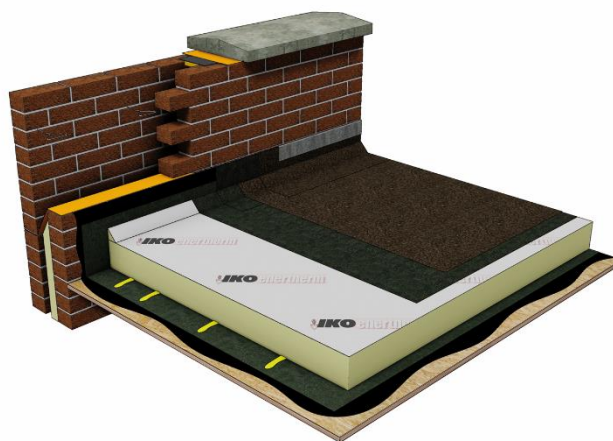
**Thermal performance** — the products have a declared thermal conductivity ( $\lambda_D$ ) of  $0.022 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$  (see section 6).

**Condensation risk** — the products can contribute to limiting the risk of condensation (see section 7).

**Strength and stability** — when installed on suitable substrates using appropriate fixing methods, the products can adequately transfer maintenance traffic loads and wind loads to the roof deck (see section 8).

**Behaviour in relation to fire** — the overall fire rating of any roof containing the products will depend on the type of deck and the nature of the roof waterproofing (see section 9).

**Durability** — the products, when used as thermal insulation in the roof systems described in this Certificate, will have a life at least as long as that of the roof waterproof covering (see section 11).



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: 28 April 2020

Originally certificated on 4 March 2016

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.*

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## Regulations

In the opinion of the BBA, IKO enertherm ALU and enertherm GOLD Insulation Boards for Flat Roofs, 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>A1</b>	<b>Loading</b>
Comment:		The products can contribute to satisfying this Requirement. See sections 8.1 and 8.2 of this Certificate.
<b>Requirement:</b>	<b>B4(2)</b>	<b>External fire spread</b>
Comment:		Roofs incorporating the products can satisfy this Requirement. See section 9 of this Certificate.
<b>Requirement:</b>	<b>C2(c)</b>	<b>Resistance to moisture</b>
Comment:		The products can contribute to satisfying this Requirement. See sections 7.1 and 7.4 of this Certificate.
<b>Requirement:</b>	<b>L1(a)(i)</b>	<b>Conservation of fuel and power</b>
Comment:		The products can contribute to satisfying this Requirement. See sections 6.1 and 6.2 of this Certificate.
<b>Regulation:</b>	<b>7(1)</b>	<b>Materials and workmanship</b>
Comment:		The products are acceptable. See section 11 and the <i>Installation</i> part of this Certificate.
<b>Regulation:</b>	<b>26</b>	<b>CO<sub>2</sub> emission rates for new buildings</b>
<b>Regulation:</b>	<b>26A</b>	<b>Fabric energy efficiency rates for new dwellings (applicable to England only)</b>
<b>Regulation:</b>	<b>26A</b>	<b>Primary energy consumption rates for new buildings (applicable to Wales only)</b>
<b>Regulation:</b>	<b>26B</b>	<b>Fabric performance values for new dwellings (applicable to Wales only)</b>
Comment:		The products can contribute to satisfying these Regulations. See sections 6.1 and 6.2 of this Certificate.



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

<b>Regulation:</b>	<b>8(1)</b>	<b>Durability, workmanship and fitness of materials</b>
Comment:		The products are acceptable. See section 11 and the <i>Installation</i> part of this Certificate.
<b>Regulation:</b>	<b>9</b>	<b>Building standards applicable to construction</b>
Standard:	<b>1.1</b>	<b>Structure</b>
Comment:		The products can contribute to satisfying this Standard, with reference to clauses 1.1.1 <sup>(1)(2)</sup> , 1.1.2 <sup>(1)(2)</sup> and 1.1.3 <sup>(1)(2)</sup> . See sections 8.1 and 8.2 of this Certificate.
Standard:	<b>2.8</b>	<b>Spread from neighbouring buildings</b>
Comment:		Roofs incorporating the products can satisfy this Standard, with reference to clause 2.8.1 <sup>(1)(2)</sup> . See section 9 of this Certificate.
Standard:	<b>3.15</b>	<b>Condensation</b>
Comment:		The products can contribute to a roof satisfying this Standard, with reference to clauses 3.15.1 <sup>(1)(2)</sup> , 3.15.3 <sup>(1)(2)</sup> , 3.15.4 <sup>(1)(2)</sup> , 3.15.5 <sup>(1)(2)</sup> and 3.15.6 <sup>(1)(2)</sup> . See sections 7.1 and 7.5 of this Certificate.
Standard:	<b>6.1(b)</b>	<b>Carbon dioxide emissions</b>
Standard:	<b>6.2</b>	<b>Building insulation envelope</b>
Comment:		The products can contribute to satisfying these Standards, with reference to clauses, or parts of, 6.1.1 <sup>(1)</sup> , 6.1.2 <sup>(2)</sup> , 6.1.6 <sup>(1)</sup> , 6.2.1 <sup>(1)(2)</sup> , 6.2.3 <sup>(1)</sup> , 6.2.4 <sup>(2)</sup> , 6.2.5 <sup>(2)</sup> , 6.2.6 <sup>(1)</sup> , 6.2.7 <sup>(1)</sup> ,

		6.2.8 <sup>(1)(2)</sup> , 6.2.9 <sup>(1)(2)</sup> , 6.2.10 <sup>(1)(2)</sup> , 6.2.11 <sup>(1)(2)</sup> , 6.2.12 <sup>(2)</sup> and 6.2.13 <sup>(1)(2)</sup> . See sections 6.1 and 6.2 of this Certificate.
<b>Standard:</b>	<b>7.1(a)(b)</b>	<b>Statement of sustainability</b>
<b>Comment:</b>		The products can contribute to satisfying 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 products can contribute to a construction meeting a higher level of sustainability as defined in this Standard, with reference to clauses 7.1.4 <sup>(1)(2)</sup> [Aspects 1 <sup>(1)(2)</sup> and 2 <sup>(1)</sup> ], 7.1.6 <sup>(1)(2)</sup> [Aspects 1 <sup>(1)(2)</sup> and 2 <sup>(1)</sup> ] and 7.1.7 <sup>(1)(2)</sup> [Aspect 1 <sup>(1)(2)</sup> ]. See section 6.1 of this Certificate.
<b>Regulation:</b>	<b>12</b>	<b>Building standards applicable to conversions</b>
<b>Comment:</b>		Comments made in relation to these products 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</b>	<b>Fitness of materials and workmanship</b>
<b>Comment:</b>		The products are acceptable. See section 11 and the <i>Installation</i> part of this Certificate.
<b>Regulation:</b>	<b>29</b>	<b>Condensation</b>
<b>Comment:</b>		The products can contribute to satisfying this Regulation. See section 7.1 of this Certificate.
<b>Regulation:</b>	<b>30</b>	<b>Stability</b>
<b>Comment:</b>		The products can contribute to satisfying this Regulation. See sections 8.1 and 8.2 of this Certificate.
<b>Regulation:</b>	<b>36(b)</b>	<b>External fire spread</b>
<b>Comment:</b>		Roofs incorporating the products can satisfy this Regulation. See section 9 of this Certificate.
<b>Regulation:</b>	<b>39(a)(i)</b>	<b>Conservation measures</b>
<b>Regulation:</b>	<b>40(2)</b>	<b>Target carbon dioxide emission rate</b>
<b>Comment:</b>		Roofs incorporating the products can satisfy these Regulations. See sections 6.1 and 6.2 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 section: **3 Delivery and site handling (3.4)** of this Certificate.

## Additional Information

### NHBC Standards 2020

In the opinion of the BBA, IKO enertherm ALU and enertherm GOLD Insulation Boards for Flat Roofs, 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 products in accordance with harmonised European Standard BS EN 13165 : 2012.

## Technical Specification

### 1 Description

1.1 IKO enertherm ALU and enertherm GOLD Insulation Boards for Flat Roofs comprise rigid polyisocyanurate (PIR) boards with composite foil-facings on both sides.

1.2 The products have the nominal characteristics given in Table 1.

*Table 1 Nominal characteristics*

Size (mm)	1200 x 600 1200 x 1000 1200 x 1200 1200 x 2400
Thickness (mm)	30 to 140 (in 5 mm increments)
Edge detail	Square
Minimum compressive stress at 10% deformation (kPa)	175
Foil-facings :	enertherm ALU enertherm GOLD
	Silver-coloured printed composite foil-facing both sides Gold-coloured printed composite foil-facing both sides

1.3 The products are installed as part of a flat roof system in conjunction with the following items (which are outside the scope of this Certificate):

- waterproofing membrane/system
- vapour control layer (VCL)
- mechanical and adhesive fixing systems.

### 2 Manufacture

2.1 IKO enertherm ALU and enertherm GOLD Insulation Boards for Flat Roofs 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.

2.2 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.

### 3 Delivery and site handling

3.1 The products are delivered to site in polythene shrink-wrapped packs, incorporating a label with the Certificate holder's trade name, product description and characteristics, and the BBA logo incorporating the number of this Certificate.

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

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

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

## Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on IKO enertherm ALU and enertherm GOLD Insulation Boards for Flat Roofs.

## Design Considerations

### 4 Use

4.1 IKO enertherm ALU and enertherm GOLD Insulation Boards for Flat Roofs are suitable for use as a fully supported thermal insulation layer on flat roofs with concrete, timber and profiled metal roof decks (see section 8.11), in conjunction with a suitable roof waterproofing membrane system (see section 4.4), with limited access only (see section 4.5).

4.2 Decks should be designed in accordance with the relevant clauses of either BS 6229 : 2018 or BS EN 13956 : 2012 and, where appropriate, the *NHBC Standards*, Chapter 7.1.

4.3 Roofs should incorporate a VCL below the products which is compatible with both the products and the waterproofing system. Advice should be sought from the Certificate holder.

4.4 The products are for use with one of the following waterproofing specifications:

- built-up specifications including reinforced bitumen membranes to BS 8747 : 2007 in accordance with the recommendations of Table 5, and installed to the relevant clauses of BS 8217 : 2005
- single ply membranes, which are the subject of a current Agrément Certificate, laid in accordance with the requirements of that Certificate, and the manufacturer's recommendations
- other waterproofing systems, including liquid-applied waterproofing, which are the subject of a current Agrément Certificate, laid in accordance with, and within the limitations imposed by, that Certificate.

4.5 Limited access roofs are defined for the purpose of this Certificate as those roofs subject only to pedestrian traffic for maintenance of the roof covering, cleaning of gutters, etc.

4.6 Flat roofs are defined for the purpose of this Certificate as those roofs having a minimum finished fall of 1:80 and a maximum 1:6 as defined in BS 6229 : 2018.

4.7 For design purposes on flat roofs, twice the minimum finished fall should be assumed, unless a detailed analysis of the roof is available, including overall and local deflections, direction of falls etc.

### 5 Practicability of installation

The products are designed to be installed by a competent general builder, or a contractor, experienced with these types of products.

### 6 Thermal performance



6.1 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 ( $\lambda_D$ ) of  $0.022 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$  for the insulation.

6.2 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 other roof components/layers. Example U values of roofs incorporating the products are shown in Table 2.

Table 2 Example U values – flat roofs

U value ( $W \cdot m^{-2} \cdot K^{-1}$ )	Insulation thickness <sup>(1)</sup> (mm)		
	Concrete <sup>(2)(5)</sup>	Timber <sup>(3)(5)</sup>	Metal <sup>(4)(5)</sup>
0.13	160 (80 + 80)	155 (80 + 75)	160 (80 + 80)
0.15	140	135	140
0.16	130	125	135
0.18	115	110	120
0.20	105	100	105
0.25	85	75	85

(1) Nearest available thickness.

(2) 150 mm concrete deck —  $1.33 W \cdot m^{-1} \cdot K^{-1}$ , VCL, insulation, mechanically fixed single-ply waterproofing membrane.

(3) 12.5 mm plasterboard, 150 mm timber joists (12.5%)/air cavity (87.5%), 18 mm plywood decking, VCL, insulation, mechanically fixed single-ply waterproofing membrane.

(4) Metal deck, VCL, insulation, mechanically fixed single-ply waterproofing membrane.

(5) Thermally broken tube fixings installed – therefore no fixing correction applied.

## Junctions

6.3 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.

## 7 Condensation risk

### Interstitial condensation



7.1 Roofs will adequately limit the risk of interstitial condensation when they are designed and constructed in accordance with BS 5250 : 2011, Annexes D and H and the relevant guidance.

7.2 For the purposes of assessing the risk of interstitial condensation, the water vapour resistance of the foil facings may be taken as  $1000 MN \cdot s \cdot g^{-1}$  and the water vapour resistivity of the core may be taken as  $183 MN \cdot s \cdot g^{-1} \cdot m^{-1}$ . The products, therefore, will provide a significant resistance to water vapour transmission.

7.3 To minimise moisture entering the roof, a VCL should be used with sealed and lapped joints and be turned up around the insulation and bonded to the waterproofing finish. In the case of single ply membranes, the recommendations of the SPRA Design Guide should be followed.

### Surface condensation



7.4 Roofs will adequately limit the risk of surface condensation when the thermal transmittance (U value) does not exceed  $0.35 W \cdot m^{-2} \cdot K^{-1}$  at any point, and the junctions with other elements are designed in accordance with the guidance referred to in section 6.3 of this Certificate.



7.5 In Scotland, roofs will adequately limit the risk of surface condensation when the thermal transmittance (U value) does not exceed  $1.2 W \cdot m^{-2} \cdot K^{-1}$  at any point. Guidance may be obtained from BS 5250 : 2011 Annex H. Further guidance may be obtained from BRE Report BR 262 : 2002 and section 6.3 of this Certificate.

## 8 Strength and stability



8.1 When installed on suitable flat roof decks, using appropriate fixing methods, the products can adequately transfer maintenance traffic loads and negative and positive (suction and pressure) wind loads to the roof deck.

8.2 When adhesively fixed, adhesion between the insulation board component and 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 fixing 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 where a calculation is required for a specific building project.

8.3 The roof construction or immediate substrate to which the boards are fixed must be structurally sound and have sufficient strength and stability to resist all dead, imposed and wind loads. It must also have adequate resistance to the pull-out forces created by the wind forces acting on the specified fixings used.

8.4 The suitability of the roof construction, and in the immediate substrate, for any specified mechanical fixings or adhesive bond must be checked before installation. Mechanical fixings must be checked before installation by carrying out in-situ pull-out or pull-through testing to determine the maximum safe working load the fixings can resist. The advice of the Certificate holder should be sought with respect to suitable mechanical fixings.

8.5 The type and number of fixings will depend on the roof construction and location; the Certificate holder's advice should be sought in this respect. The Certificate holder recommends a minimum number of fixings per board size (see sections 12.7 and 13.2).

8.6 All design analysis must be in accordance with British or European Standards relevant to the construction. All calculations should be carried out by a suitably competent and experienced individual.

8.7 Each fixing must incorporate a minimum 75 mm diameter thermally broken tube washer, which must not retain more than one board.

8.8 Roof waterproofing systems (see section 4.4 for suitable types) must be applied in accordance with the relevant Agrément Certificates and manufacturer's instructions.

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

8.10 The products have not been assessed for use with permanent distributed or concentrated loads, such as air conditioning units, mechanical plants, water tanks, etc. Such loads should be supported directly on the roof construction. The products are not suitable for use when permanent roof access is required.

8.11 When profiled decking is used, the products will need to span across the ribs. Maximum permissible spans between ribs for the different product thicknesses are given in Table B1 of BS 4841-1 : 2006 (reproduced in Table 3 of this Certificate).

*Table 3 Maximum clear span*

Maximum clear span (mm)		Minimum roofboard 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

8.12 When maintenance of the roof waterproofing is required, protective boarding should be laid over the roof surface to avoid concentrations of load.

## 9 Behaviour in relation to fire



9.1 The products have a reaction to fire classification of Class E in accordance with BS EN 13501-1 : 2007<sup>(1)</sup>.

(1) Warringtonfire report 19358D 20.09.2019. Copies can be obtained from the Certificate holder

9.2 The resistance to fire exposure of a built-up roofing system will be dependent on the fire performance of the combined individual components and cannot be predicted from the classification of the insulation alone. The classification of a specific roof system must be confirmed by reference to the requirements of the documents supporting the national Building Regulations.

## 10 Maintenance

The products, once installed, do not require any regular maintenance of the insulation layer and have suitable durability provided the roof waterproofing is inspected and maintained at regular intervals (see section 11).

## 11 Durability



The products, when used as thermal insulation in the roof systems described in this Certificate, will have a life at least as long as that of the roof waterproof covering.

## Installation

### 12 General

12.1 IKO enertherm ALU and enertherm GOLD Insulation Boards for Flat Roofs must be installed in accordance with the Certificate holder's instructions, BS 6229 : 2018, BS 8217 : 2005, BS EN 13956 : 2012 and the relevant Agrément Certificate.

12.2 Care should be taken to ensure the deck is graded to the correct falls, and is dry, clean and free from any projections or gaps.

12.3 Any hollows, depressions or backfalls found in the roof deck must be rectified prior to laying the insulation.

12.4 The suitability of the substrate deck to accept adhesive bond or mechanical fixings must be checked prior to the work commencing.

12.5 The deck to which the VCL is to be applied must be even, dry, sound, and free from dust, grease and other defects which may impair the bond. All deck joints must be taped.

12.6 In areas where high wind speeds can be expected, additional mechanical fixings should be considered; the advice of a suitably qualified and experienced individual should be sought as to the method of fixing or defined in the relevant clauses of BS EN 1991-1-4 : 2005 and its UK National Annex.

12.7 The mechanical fixing frequency and pattern should be predetermined in accordance with the Certificate holder's instructions and the relevant clauses of BS EN 1991-1-4 : 2005. Each fixing should incorporate a square or circular plate countersunk washer (see section 8.7), which must not restrain more than one board.

12.8 To prevent moisture being trapped on or in the insulation, it is essential to:

- protect the products during laying, before the application of the roof waterproofing, or lay the roof covering at the same time as laying the products. If the products are accidentally wetted, they must be replaced
- install the products only when the ambient temperature is above 5°C, to prevent condensation.

12.9 The products can be cut with a sharp knife or fine-toothed saw, to fit around projections through the roof.

12.10 Once installed, access to the roof should be restricted in accordance with section 4.5.



## 13 Procedure

### General

13.1 The number of mechanical fixings required to fix the products will vary depending on the geographical location of the building, the topographical data, and height and width of the roof concerned.

13.2 The requirement for an additional number of fixings above those specified in section 12.7 should be assessed in accordance with BS 6399-2 : 1997 or BS EN 1991-1-4 : 2005.

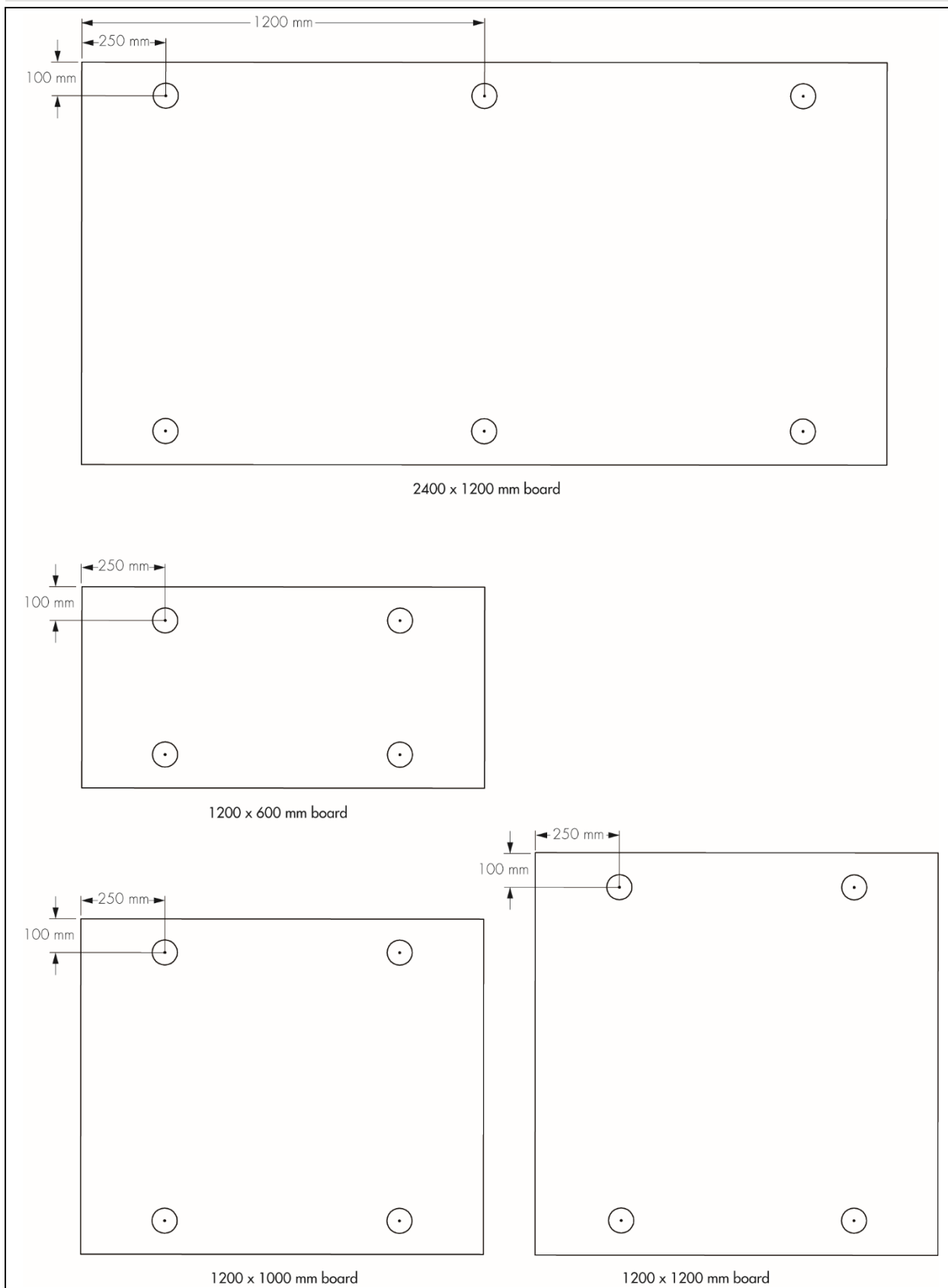
### Mechanically fastened roofing system applications

13.3 A 0.25 mm (minimum) thick polyethylene VCL should be laid, with 80 mm (minimum) sealed laps. The VCL should be turned up around the insulation and sealed to the waterproof finish at all edges and penetrations such as rooflights. Advice may be sought from the Certificate holder.

13.4 The products are laid over the VCL in a break-bonded pattern. On profiled metal decks, the long edges of the board should be laid at right angles to the ribs, and all board ends must be fully supported on a rib. Boards are secured to the deck with a minimum of four mechanical fixings for 1200 by 1200 mm, 1200 by 1000 mm and 1200 by 600 mm boards, or six mechanical fixings for 2400 by 1200 mm boards. See Figure 1 for minimum fixing layout.

13.5 The waterproofing membrane (polymeric or bituminous) is mechanically fixed to the deck through the board, with joints overlapped prior to sealing of the joint, in accordance with the manufacturer's instructions and the relevant Agrément Certificate.

Figure 1 Minimum fixing layout for the different board sizes



### Adhered roofing system applications

13.6 A bonded bituminous VCL should be laid, with 75 mm minimum sealed laps. The VCL should be turned up around the insulation and sealed to the waterproof finish at all edges and penetrations such as rooflights. Advice may be sought from the Certificate holder.

13.7 The products are laid over the VCL in a break-bonded pattern. On profiled metal decks, the long edges of the board should be laid at right angles to the ribs, and all board ends must be fully supported on a rib. Boards are secured by the use of a high performance roofing insulation bonding adhesive in accordance with the Certificate holder's recommendations.

13.8 A cold applied waterproofing membrane is then adhered or bonded to the insulation, or mechanically fastened through the insulation into the deck, with joints overlapped prior to the sealing of the joint, in accordance with the manufacturer's instructions and the relevant Agrément Certificate.

Figure 2 Concrete deck

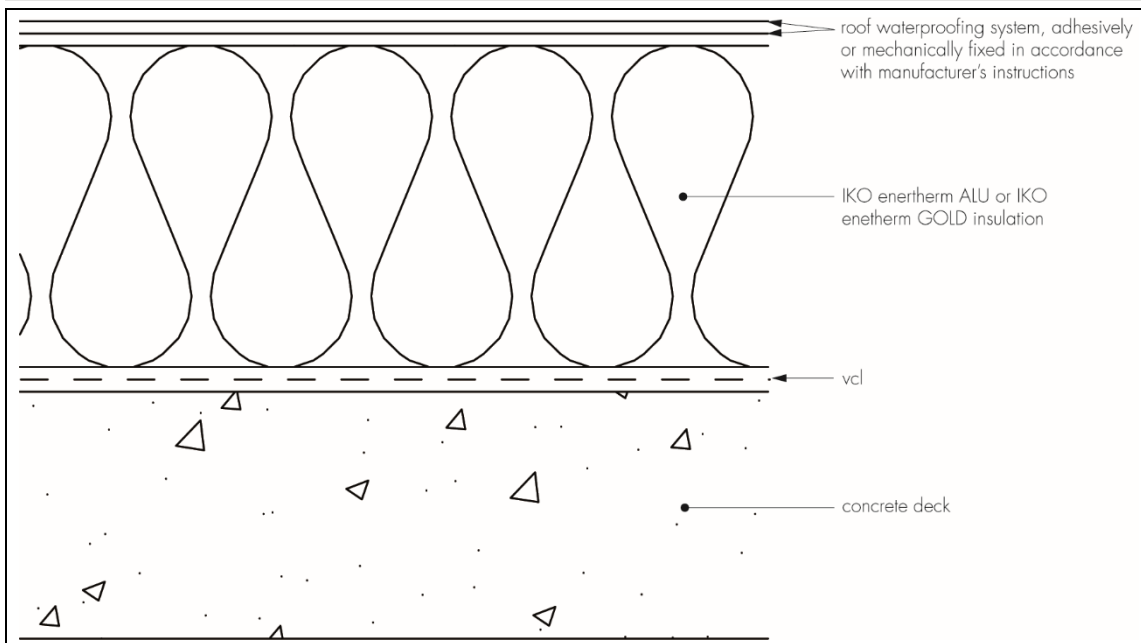


Figure 3 Metal deck

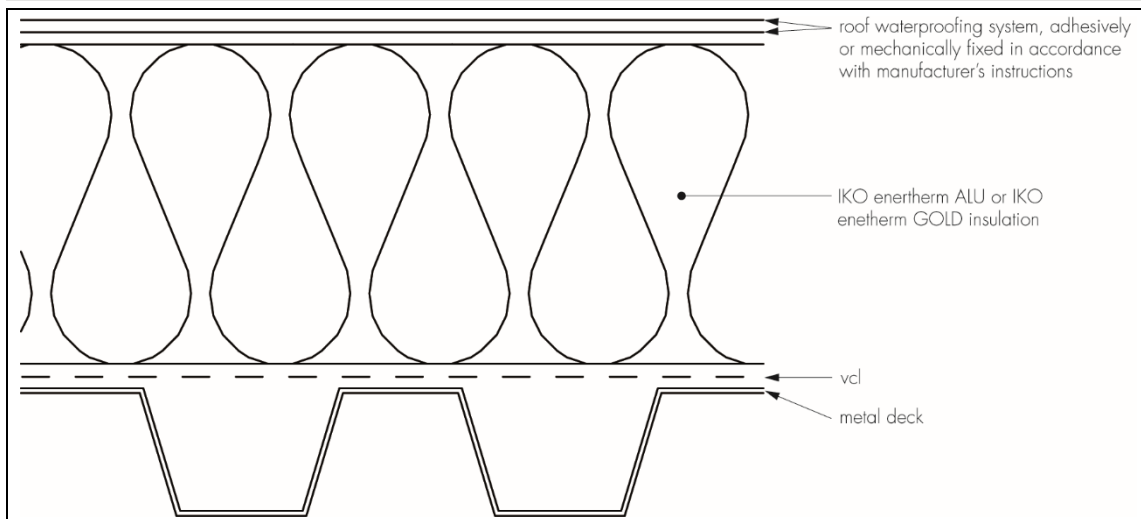
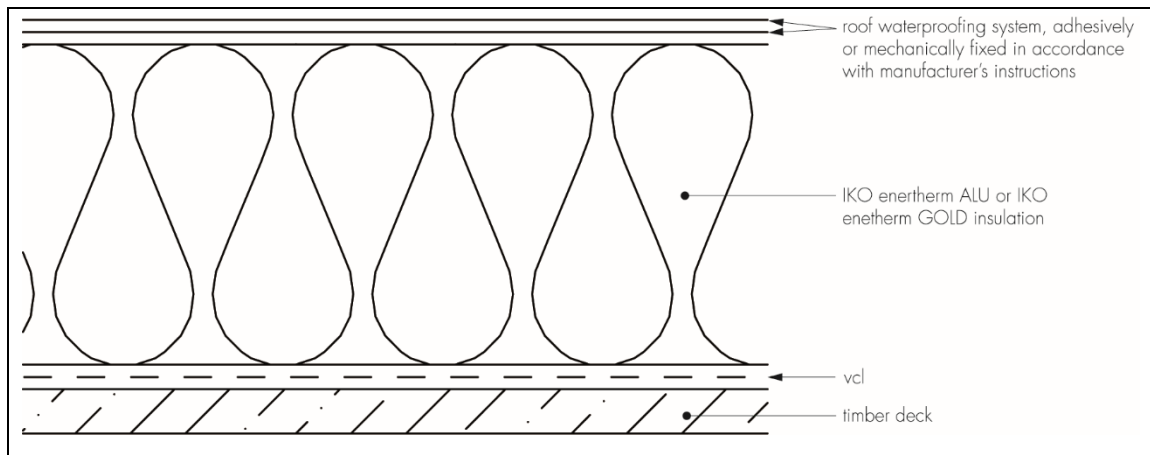


Figure 4 Timber deck



## Technical Investigations

### 14 Tests

Results of tests were assessed to determine :

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

### 15 Investigations

15.1 Existing data on durability and properties in relation to fire were evaluated.

15.2 A calculation was undertaken to confirm the declared thermal conductivity ( $\lambda_D$ ).

15.3 A series of U value calculations was carried out.

15.4 A condensation risk analysis was carried out.

15.5 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.

## Bibliography

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 6399-2 : 1997 *Loading for buildings – Code of practice for wind loads*

BS 8217 : 2005 *Reinforced bitumen membranes for roofing — Code of practice.*

BS 8747 : 2007 *Reinforced bitumen membranes (RBMs) for roofing — Guide to selection and specification*

BS EN 1991-1-4 : 2005 + A1 : 2010 *Eurocode 1 — Actions on structures — General actions — Wind actions*

NA to BS EN 1991-1-4 : 2005 + A1 : 2010 – *UK National Annex to Eurocode 1. Actions on structures. General actions.*

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

BS EN 13501-1 : 2007 + A1 : 2009 *Fire classification of construction products and building elements — Classification using test data from reaction to fire tests*

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

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

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

BRE Report (BR 443 : 2006) *U-value conventions in practice*

### 16 Conditions

16.1 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.

16.2 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.

16.3 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.

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

16.5 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.

16.6 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.