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Agrément Certificate

15/5283

Product Sheet 3

IKO INSULATIONS

IKO ENERTHERM INSULATION BOARDS FOR FLAT ROOFS

This Agrément Certificate Product Sheet⁽¹⁾ relates to IKO enertherm 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. They are for use in conjunction with a vapour control layer and adhesively or mechanically fixed roof waterproofing systems in domestic and non-domestic buildings.

(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 value (λ_D) of $0.022 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$ (see section 6).

Condensation — 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 Third issue: 16 August 2022

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
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 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)

Requirement:	A1	Loading
Comment:		The products can contribute to satisfying this Requirement. See sections 8.1 and 8.2 of this Certificate.
Requirement:	B4(2)	External fire spread
Comment:		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 of this Certificate.
Requirement:	C2(c)	Resistance to moisture
Comment:		The products can contribute to satisfying this Requirement. See sections 7.1, 7.2 and 7.4 of this Certificate.
Requirement:	L1(a)(i)	Conservation of fuel and power
Comment:		The products can contribute to satisfying this Requirement. See sections 6.1 and 6.2 of this Certificate.
Regulation:	7(1)	Materials and workmanship
Comment:		The products are acceptable. See section 11 and the <i>Installation</i> 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)
Regulation:	26C	Target primary energy rates for new buildings (applicable to England only)
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)

Regulation:	8(1)	Durability, workmanship and fitness of materials
Comment:		The products are acceptable. See section 11 and the <i>Installation</i> part of this Certificate.
Regulation:	9	Building standards applicable to construction
Standard:	1.1	Structure
Comment:		The products can contribute to satisfying this Standard, with reference to clauses 1.1.1 ⁽¹⁾⁽²⁾ , 1.1.2 ⁽¹⁾⁽²⁾ and 1.1.3 ⁽¹⁾⁽²⁾ . See sections 8.1 and 8.2 of this Certificate.
Standard:	2.8	Spread from neighbouring buildings
Comment:		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 of this Certificate.
Standard:	3.15	Condensation
Comment:		The products can contribute to a roof satisfying this Standard, with reference to clauses 3.15.1 ⁽¹⁾⁽²⁾ , 3.15.3 ⁽¹⁾⁽²⁾ , 3.15.4 ⁽¹⁾⁽²⁾ , 3.15.5 ⁽¹⁾⁽²⁾ and 3.15.6 ⁽¹⁾⁽²⁾ . See sections 7.1, 7.2 and 7.5 of this Certificate.

Standard:	6.1(b)	Carbon dioxide emissions
Standard:	6.2	Building insulation envelope
Comment:		The products can contribute to satisfying these Standards, with reference to clauses, or parts of, 6.1.1 ⁽¹⁾ , 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 6.1 and 6.2 of this Certificate.
Standard:	7.1(a)(b)	Statement of sustainability
Comment:		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 ⁽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 section 6.1 of this Certificate.
Regulation:	12	Building standards applicable to conversions
Comment:		Comments made in relation to the products under Regulation 9, Standards 1 to 6, also apply to this Regulation, with reference to clause 0.12.1 ⁽¹⁾⁽²⁾ and Schedule 6 ⁽¹⁾⁽²⁾ .
		(1) Technical Handbook (Domestic). (2) Technical Handbook (Non-Domestic).



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

Regulation:	23(1)	Fitness of materials and workmanship
Comment:		The products are acceptable. See section 11 and the <i>Installation</i> part of this Certificate.
Regulation:	29	Condensation
Comment:		The products can contribute to satisfying this Regulation. See sections 7.1 and 7.2 of this Certificate.
Regulation:	30	Stability
Comment:		The products can contribute to satisfying this Regulation. See sections 8.1 and 8.2 of this Certificate.
Regulation:	36(b)	External fire spread
Comment:		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 of this Certificate.
Regulation:	39(a)(i)	Conservation measures
Comment:		Roofs incorporating the products can satisfy this Regulation. See sections 6.1 and 6.2 of this Certificate.
Regulation:	40(2)	Target carbon dioxide emission rate
	43B	Nearly zero-energy requirements for new buildings
Comment:		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 2022

In the opinion of the BBA, IKO enertherm 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 Insulation Boards for Flat Roofs comprise a range of rigid polyisocyanurate (PIR) boards with composite foil-facings on both sides. The range consists of three available products including flat boards: enertherm ALU and enertherm GOLD, and a tapered board: enertherm ALU TAP.

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

Table 1 Nominal characteristics

Characteristic (unit)	enertherm ALU (flat board)	enertherm ALU TAP (tapered board)	enertherm GOLD (flat board)
Length and width (mm)	1200 x 600 1200 x 1200 1200 x 2400	1200 x 1200	1200 x 1200 1200 x 2400
Thickness (mm)	30 to 200 (in 5 mm increments)	<u>1:80 fall</u> 30/45, 45/60, 60/75, 75/90, 90/105, 105/120	40 to 160 (in 5 mm increments)
Edge profile	Straight edge	<u>1:60 fall</u> 40/60, 60/80, 80/100, 100/120 Straight edge	Straight edge
Foil-facings	Silver-coloured printed composite foil-facing both sides	Silver-coloured printed composite foil-facing both sides	Gold-coloured printed composite foil-facing both sides
Minimum compressive stress at 10% deformation (kPa)	175	175	175

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 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.

2.3 The environmental management system of IKO Insulations UK Ltd has been assessed and registered as meeting the requirements of BS EN ISO 14001 : 2015 by Lucideon (Certificate 24884).

3 Delivery and site handling

3.1 The products are delivered to site in polythene shrink-wrapped packs, including 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 Insulation Boards for Flat Roofs.

Design Considerations

4 Use

4.1 IKO enertherm 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 8.12), in conjunction with a suitable roof waterproofing membrane system (see section 4.5), with limited access only (see section 4.6). They are for use in conjunction with a vcl and adhesively or mechanically fixed roof waterproofing systems in domestic and non-domestic buildings (see section 8.2). The application of enertherm ALU and enertherm ALU TAP on adhered roofs is restricted to insulation board thickness up to and including 140 mm thickness overall.

4.2 enertherm TAP tapered insulation boards may be used where appropriate to achieve the minimum finished falls required. If using the tapered insulation board, it is likely that a fall of 1: 60 will be acceptable to achieve at least 1:80 post construction fall.

4.3 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 2022*, Chapter 7.1.

4.4 Roofs should incorporate an effective vcl below the products which is compatible with both the products and the waterproofing system. Advice should be sought from the Certificate holder. The compatibility of the waterproofing fixing system needs to be determined and acknowledged by the respective manufacturer.

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

- built-up specifications including reinforced bitumen membranes in accordance with the recommendations of BS 8747 : 2007, Table 5, and installed to the relevant clauses of BS 8217 : 2005

- single ply membranes, which are the subject of a current BBA 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 BBA Certificate, laid in accordance with, and within the limitations imposed by, that Certificate.

4.6 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.

4.7 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.

4.8 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 : 2019, using the declared thermal conductivity (λ_D) of 0.022 W·m⁻¹·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·m ⁻² ·K ⁻¹)	Insulation thickness ⁽¹⁾ (mm)		
	Concrete ⁽²⁾	Timber ⁽³⁾	Metal ⁽⁴⁾
0.11	190 ⁽⁵⁾	180 ⁽⁵⁾	190 ⁽⁵⁾
0.13	160	155	160
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) Thermally broken tube fixings installed – therefore no fixing correction applied.

(2) 150 mm concrete deck ($\lambda = 1.33$ W·m⁻¹·K⁻¹), vcl, insulation, mechanically fixed single-ply waterproofing membrane.

(3) 12.5 mm plasterboard ($\lambda = 0.25$ W·m⁻¹·K⁻¹), 150 mm timber joists (12.5%)/air cavity (87.5%), 18 mm plywood decking ($\lambda = 0.17$ W·m⁻¹·K⁻¹), vcl, insulation, mechanically fixed single-ply waterproofing membrane.

(4) Metal deck ($\lambda = 50$ W·m⁻¹·K⁻¹), vcl, insulation, mechanically fixed single-ply waterproofing membrane.

(5) enertherm ALU as 1 layer or enertherm GOLD as 2 layers.

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

Interstitial condensation



7.1 Roofs will adequately limit the risk of interstitial condensation when they are designed and constructed in accordance with BS 5250 : 2021 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 $1000 \text{ MN}\cdot\text{s}\cdot\text{g}^{-1}$ and the water vapour resistivity of the core may be taken as $300 \text{ MN}\cdot\text{s}\cdot\text{g}^{-1}\cdot\text{m}^{-1}$.

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 In England and Wales, roofs will adequately limit the risk of surface condensation when the thermal transmittance (U value) does not exceed $0.35 \text{ W}\cdot\text{m}^{-2}\cdot\text{K}^{-1}$ 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 $1.2 \text{ W}\cdot\text{m}^{-2}\cdot\text{K}^{-1}$ at any point. Guidance may be obtained from BS 5250 : 2021. 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. For adhesively fixed systems the use of enertherm ALU and enertherm ALU TAP is restricted to a maximum thickness of 140 mm overall.

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 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 fixing method, and if necessary, the number and type of mechanical fixings required will vary depending on the geographical location of the building, the topographical data, the height and width of building and the roof construction; 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 12.9 and 13.3).

8.6 All design analysis must be in accordance with British or European Standards relevant to the construction. All calculations for fixings to suit the wind uplift requirements for the particular site should be assessed in accordance with BS EN 1991-1-4 : 2005. All calculations should be approved by a suitably competent and experienced individual.

8.7 Each fixing must incorporate a thermally broken tube washer, which must not retain more than one board, see 13.6 and 13.7.

8.8 For adhesive fixing applications, the substrate must be dry and free of dust, and installation should be in accordance with the instructions of the adhesive manufacturer. The surface of the substrate must have sufficient cohesive strength to resist the calculated wind load acting upon the structure.

8.9 Roof waterproofing systems (see section 4.5 for suitable types) must be applied in accordance with the relevant Agrément Certificates and manufacturer’s instructions.

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

8.11 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.

8.12 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).

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

8.13 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 the following reaction to fire classifications :

- the Certificate holder has not declared a reaction to fire classification to BS EN 13501-1 : 2018 for enertherm ALU
- enertherm ALU TAP and enertherm GOLD have a reaction to fire classification of Class E to BS EN 13501-1 : 2018⁽¹⁾.

(1) Warringtonfire report 20678B 08.02.2021. 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 and permissible areas of use 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 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 or the relevant BBA Certificate, depending on the waterproofing to be applied.

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 For tapered boards to be effective in providing a uniform fall, it is essential that the structural deck is true and even. 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 level, clean, dry and sound, and free from dust, grease and other defects which may impair the restraint of the insulation boards (ie adhering and/or mechanically fixing). For adhered systems, all deck joints must be taped and, where necessary, the deck coated with bitumen primer to BS 3416 : 1991.

12.6 The vcl should be turned up around the insulation and sealed to the waterproof finish at all edges and penetrations such as rooflights for linking to the waterproofing.

12.7 Where the specified vcl is other than a reinforced bitumen membrane or bitumen coated foil, any fixings that penetrate the vcl should be of the self-sealing type. Advice should be sought from the Certificate holder.

12.8 On multi-storey buildings or in areas subject to high wind loads, additional mechanical fixings may be required and 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.

12.9 The mechanical fixing frequency and pattern should be predetermined in accordance with the Certificate holder's instructions and the relevant clauses of BS 6399-2 : 1997 or BS EN 1991-1-4 : 2005. Each fixing should incorporate a square or circular plate countersunk washer (see sections 13.6 and 13.7), which must not restrain more than one board.

12.10 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.

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

12.12 The boards should be installed in a break-bonded pattern. Multiple insulation layers should be installed where possible in a staggered pattern.

12.13 Once installed, access to the roof should be restricted in accordance with section 4.6.

13 Procedure

General

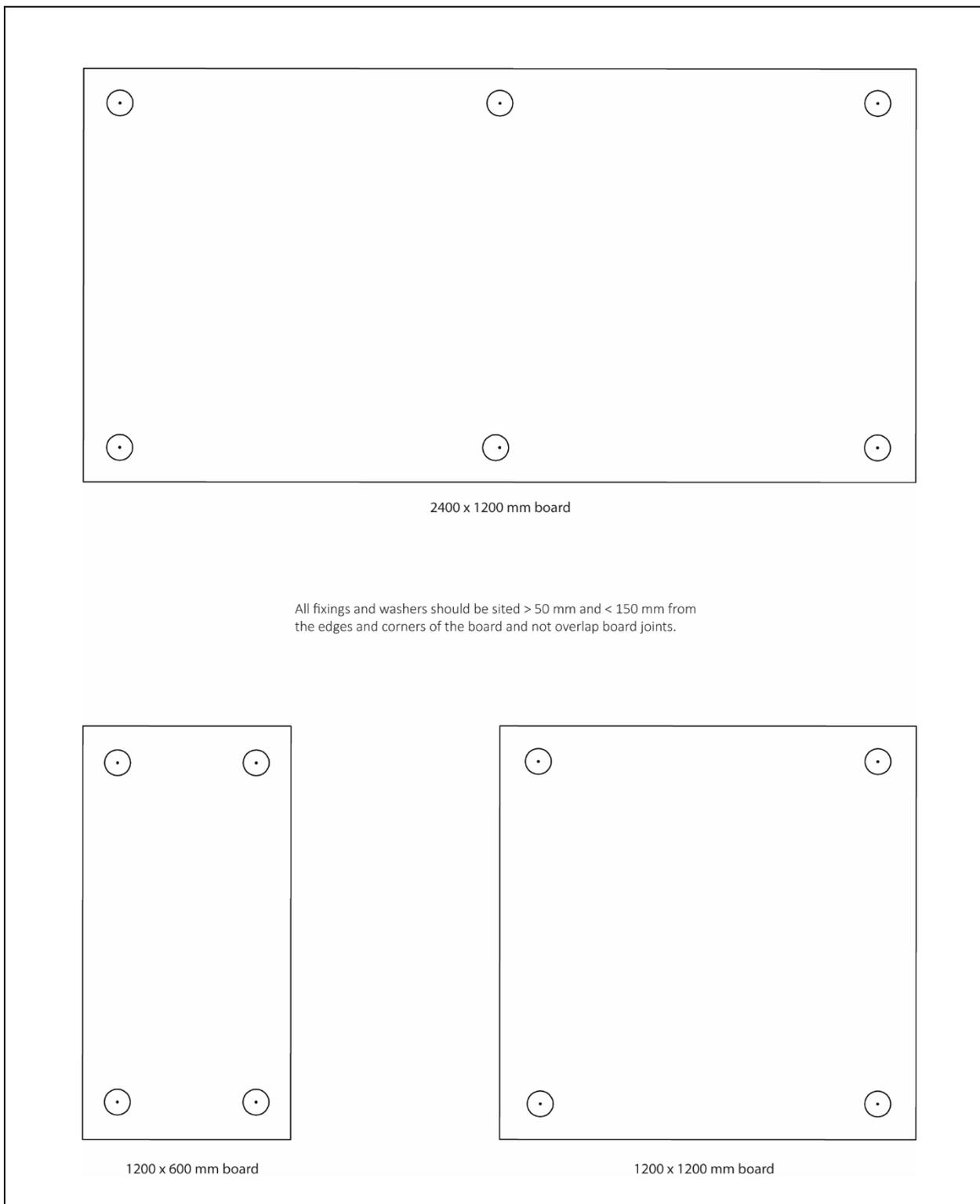
13.1 IKO enertherm insulation boards for flat roofs are installed on concrete, metal or timber decks in accordance with the following procedures.

Mechanically fastened insulation boards

13.2 A vcl should be installed in accordance with the manufacturer's instructions. Further advice may be sought from the Certificate holder.

13.3 IKO enertherm insulation boards for flat roofs are mechanically fixed to the deck in a break-bonded pattern with the minimum number of mechanical fixings placed within the individual board area as shown in Figure 1. In the case of profiled metal decks, the long edges of the board should be laid at right angles to the deck sheets, and all board ends must be fully supported on a crown. The requirement for an additional number of fixings should be assessed in accordance with BS EN 1991-1-4 : 2005. Fixings and washers should not overlap board joints.

Figure 1 Minimum fixing layout for the different board sizes



13.4 The waterproofing membrane (polymeric or bituminous) is fixed with joints overlapped prior to sealing of the joint, in accordance with the manufacturer's instructions and the relevant BBA Certificate.

13.5 For mechanically fixed insulation in combination with a mechanically fixed waterproofing membrane, a thermally broken sleeve with a minimum 50 mm diameter washer or a square stress plate of minimum dimension of 50 x 50 mm should be used in combination with a fastener suitable for the board thickness and deck type.

13.6 For mechanically fixed insulation in combination with an adhered waterproofing membrane, a thermally broken sleeve with a minimum 75 mm diameter washer or a square stress plate of minimum dimension 70x70 mm should be used in combination with a fastener suitable for the board thickness and deck type.

13.7 In the case where both the waterproofing layer and the insulation layer are both to be mechanically fixed, the mechanical fixing pattern for the waterproofing layers should be determined separately from the fixing pattern for the insulation boards. IKO enertherm Insulation Boards for Flat Roofs must be fixed in accordance with the minimum number of fixings and fixing pattern shown in Figure 1, followed by the mechanical fixing of the waterproofing according to the applicable design loads and in accordance with the manufacturer's guidelines.

Adhered insulation boards

13.8 The application of enertherm ALU on adhered roofs is restricted to a maximum insulation board thickness of 140 mm.

13.9 A vcl should be laid and bonded to the substrate. In the case of single-ply roofing membranes, the recommendations of the SPRA design guide should be followed. Advice may be sought from the Certificate holder.

13.10 IKO enertherm Insulation Boards for Flat Roofs are to be laid over the vcl in a break-bonded pattern. In case of profiled metal decks, the long edges of the board should be laid at right angles to the deck sheets, and all board ends must be fully supported on a crown. Boards are secured by the use of a high-performance roofing insulation bonding adhesive in accordance with the Certificate holder's recommendations.

13.11 A cold applied waterproofing membrane is then partially 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 BBA Certificate.

Loose laid insulation boards

13.12 A vcl is applied in accordance with the manufacturer's instructions.

13.13 IKO enertherm Insulation Boards for Flat Roofs are to be installed in a break bond pattern, loose laid and tightly butted together. They should be waterproofed at the end of each work period and temporarily ballasted to resist wind uplift if necessary (see Figures 2 to 4)

Figure 2 Bitumen waterproofing (left hand image) and bitumen waterproofing - single ply (right hand image)

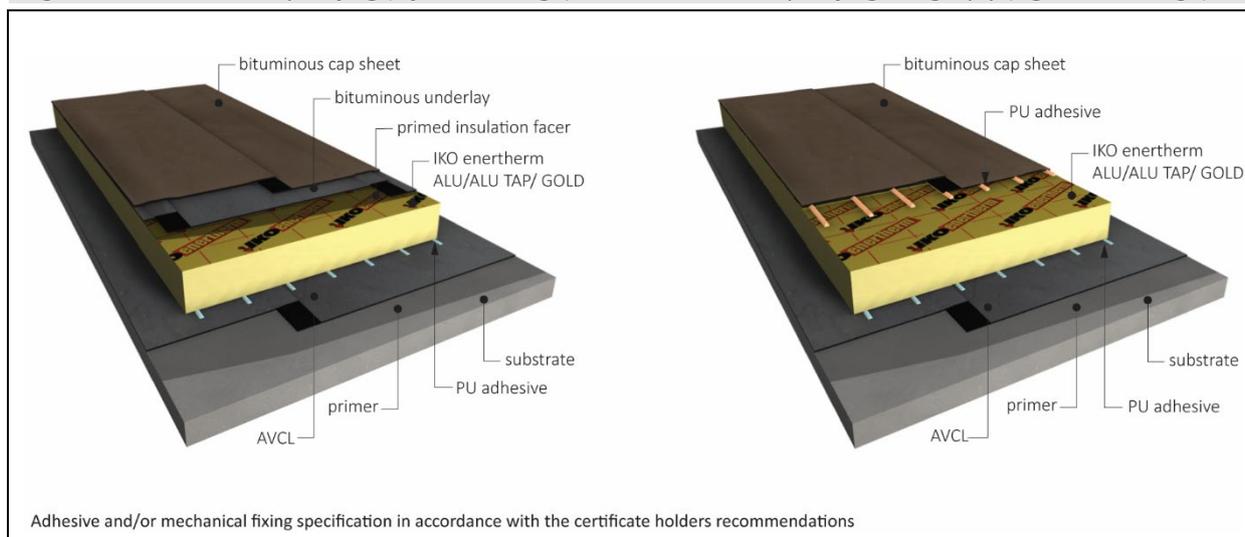


Figure 3 Single-ply waterproofing

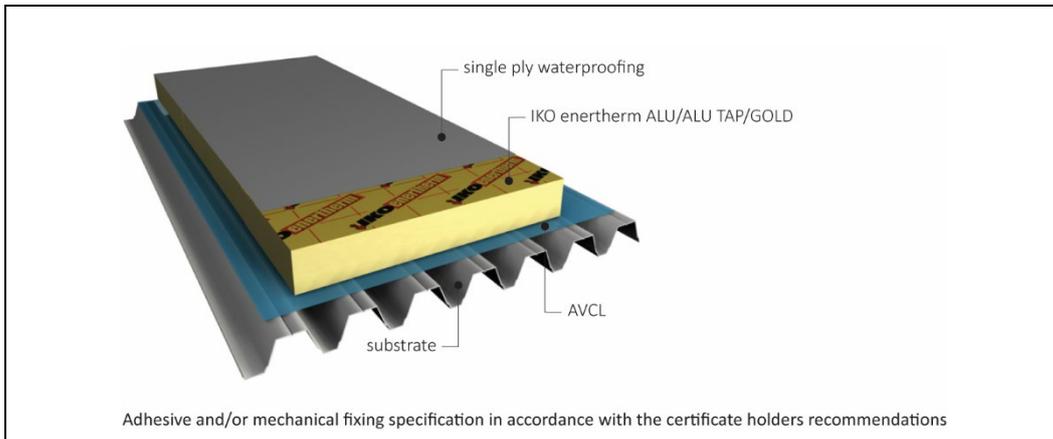
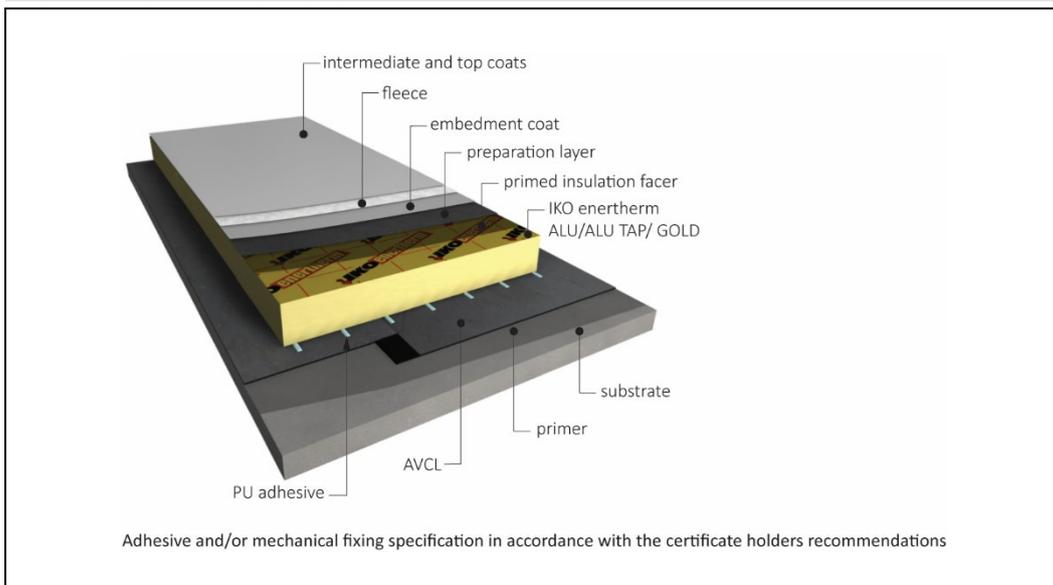


Figure 4 Liquid waterproofing



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.

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 (λ_D).

15.3 A series of U value calculations were 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.

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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
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- continue to be checked as and when deemed appropriate by the BBA under arrangements that it will determine
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