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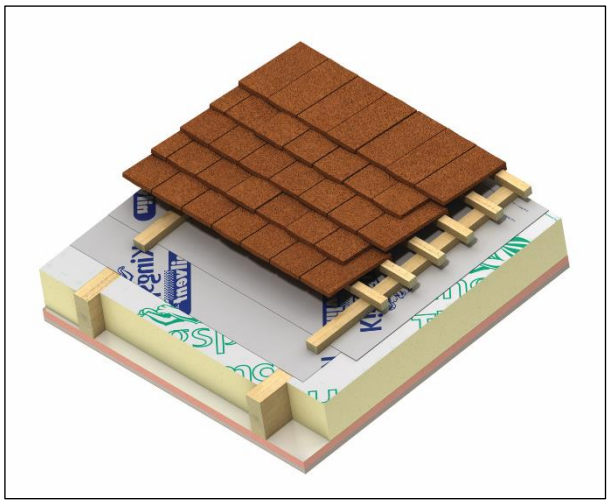
Agrément Certificate
14/5133
Product Sheet 5

KINGSPAN THERMA STRUCTURAL APPLICATIONS

KINGSPAN THERMAPITCH TP10

This Agrément Certificate Product Sheet(1) relates to Kingspan Thermapitch TP10, a rigid polyisocyanurate (PIR) board, faced on both sides with aluminium foil, for use in new and existing domestic and non-domestic pitched roof constructions where the ceiling follows the pitch of the roof and encloses a habitable space or where the ceiling is horizontal and encloses a loft space.

(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 product has a declared thermal conductivity (λ_D) of 0.022 $W \cdot m^{-1} \cdot K^{-1}$ and an aged emissivity value of 0.05 (see section 6)

Condensation risk — the product will contribute to limiting the risk of condensation (see section 7).

Behaviour in relation to fire — the product is classified as Class E to BS EN 13501-1 : 2007 (see section 8).

Durability — the product will have a life equivalent to that of the roof structure in which it is incorporated (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 First issue: 18 May 2017

John Albon – Head of Approvals Construction Products

Claire Curtis-Thomas
Chief Executive

The BBA is a UKAS accredited certification body – Number 113.

The schedule of the current scope of accreditation for product certification is available in pdf format via the UKAS link on the BBA website at www.bbacerts.co.uk

Readers are advised to check the validity and latest issue number of this Agrément Certificate by either referring to the BBA website or contacting the BBA direct.

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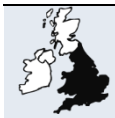
Regulations

In the opinion of the BBA, Kingspan Thermapitch TP10, 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:	**C2(c)**	**Resistance to moisture**
Comment:		The product can contribute to satisfying this Requirement. See sections 7.1 and 7.4 of this Certificate.
Requirement:	**L1(a)(i)**	**Conservation of fuel and power**
Comment:		The product can contribute to satisfying this Requirement. See section 6 of this Certificate.
Regulation:	**7**	**Materials and workmanship**
Comment:		The product is acceptable. See section 11 and the *Installation* part of this Certificate
Regulation:	26	**CO2 emission rates for new buildings**
Regulation:	26A	**Fabric energy efficiency rates for new dwellings (applicable to England only)**
Regulation:	26A	**Primary energy consumption rates for new buildings (applicable to Wales only)**
Regulation:	26B	**Fabric performance values for new dwellings (applicable to Wales only)**
Comment:		The product can contribute to satisfying these Regulations. See section 6 of this Certificate.

The Building (Scotland) Regulations 2004 (as amended)

Regulation:	**8(1)**	**Durability, workmanship and fitness of materials**
Comment:		The product is acceptable. See section 11 and the *Installation* part of this Certificate
Regulation:	9	**Building standards applicable to construction**
Standard:	3.15	Condensation
Comment:		The product can contribute to satisfying this Standard, with reference to clauses 3.15.1(1), 3.15.3(1), 3.15.4(1), 3.15.5(1) and 3.15.7(1). See sections 7.1 and 7.5 of this Certificate.
Standard:	6.1(b)	Carbon dioxide emissions
Standard:	6.2	Building insulation envelope
Comment:		The product can contribute to satisfying clauses, or parts of, 6.1.2(1), 6.1.3(2), 6.1.6(1), 6.2.1(1)(2), 6.2.3(1)(2), 6.2.4(2), 6.2.6(1), 6.2.7(2), 6.2.9(1)(2) to 6.2.12(1)(2) and 6.2.13(1) of these Standards. See section 6 of this Certificate.
Standard:	7.1(a)(b)	Statement of sustainability
Comment:		The product 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 product can contribute to a construction meeting a higher level of sustainability as defined in this Standard, with reference to clauses 7.1.4(1) [Aspects 1(1) and 2(1)], 7.1.6(1) [Aspects 1(1) and 2(1)] and 7.1.7(1) [Aspect 1(1)]. See section 6.1 of this Certificate.

(1) Technical Handbook (Domestic).
(2) Technical Handbook (Non-Domestic).

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

Regulation:	**23**	**Fitness of materials and workmanship**
Comment:		The product is acceptable. See section 11 and the *Installation* part of this Certificate.

Regulation:	**29**	**Condensation**
Comment:		The product can contribute to satisfying this Regulation. See section 7.1 of this Certificate.
Regulation:	**39(a)(i)**	**Conservation measures**
Regulation:	**40(2)**	**Target carbon dioxide emission rates**
Comment:		The product can contribute to satisfying these Regulations. See section 6 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: 3 *Delivery and site handling* (3.3) and 12 *General* of this Certificate.

Additional Information

NHBC Standards 2017

NHBC accepts the use of Kingspan Thermapitch TP10, provided it is installed, used and maintained in accordance with this Certificate, in relation to *NHBC Standards*, Chapter 7.2 *Pitched roofs.*

CE marking

The Certificate holder has taken the responsibility of CE marking the Kingspan Thermapitch TP10 in accordance with harmonised European Standard BS EN 13165 : 2012. An asterisk (*) appearing in this Certificate indicates that data shown are given in the manufacturer's Declaration of Performance.

Technical Specification

1 Description

1.1 Kingspan Thermapitch TP10 is a rigid polyisocyanurate foam (PIR) board, faced with aluminium foil/kraft/foil tri-laminate on both sides. The nominal properties of the product are given in Table 1.

Table 1 Nominal properties(1)

Description	Value
Length* (mm)	2400
Width* (mm)	1200
Thickness *(mm)	20 to 140
Core density (kgm^{-3})	32
Edge detail	plain
Compressive strength* (kPa)	>140

(1) Other board dimensions available on request.

1.2 The product is suitable for use over or under the rafters in tiled and slated pitched roofs designed and constructed in accordance with the relevant clauses of BS 5534 : 2014. An additional insulation layer can be installed between the rafters with the aid of nailable sarking clips.

1.3 Ancillary products used with the board but outside the scope of the Certificate include:

- vapour permeable roof tile underlay installed draped, or fully supported with counter battens (see section 4.5)
- nailable sarking clips
- helical fixings

- aluminium tape
- galvanized slab nails
- nails and treated timber battens.

2 Manufacture

2.1 Raw materials are injected onto the lower foil-facer on a conveyor belt. The exothermic reaction expands the foam, which then comes into contact with the upper foil-facer. An automated process cures and cuts the product to the required 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 being operated by the manufacturer are being maintained.

2.3 The management system of Kingspan Insulation Ltd has been assessed and registered as meeting the requirements of BS EN ISO 9001 : 2008 by the Loss Prevention Certification Board (LPCB) (Certificate 388).

3 Delivery and site handling

3.1 The product is delivered shrink-wrapped in polythene on non-returnable pallets, each pack including a label detailing the manufacturer's trade name, product name, grade and the BBA logo incorporating the number of this Certificate.

3.2 Ideally, boards should be stored inside. If outside storage cannot be avoided, boards should be stacked clear of the ground and covered with an opaque polythene sheet or weatherproof tarpaulin. They must be protected from rain, snow and prolonged exposure to sunlight. Boards that have been allowed to get wet or that are damaged must not be used. Nothing should be stored on top of the boards.

3.3 The boards must not be exposed to a naked 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 Kingspan Thermapitch TP10.

Design Considerations

4 General

4.1 Kingspan Thermapitch TP10 is satisfactory for use between, under and over roof rafters in conjunction with permeable (LR) roof tile underlays or conventional HR underlays, timber counter battens and tiling battens in tiled or slated pitched roofs, designed and constructed in accordance with the relevant clauses of BS 5534 : 2014 for domestic and non-domestic buildings.

4.2 The product is for use in pitched roof constructions where the ceiling follows the pitch of the roof and encloses a habitable space or where the ceiling is horizontal and encloses a loft space.

4.3 Although the product will contribute to the buckling and racking strength of the roof, normal cross-bracing is required.

4.4 When installing over rafters, the product must not be walked on except over supporting roof timbers. The boards have insufficient nail-holding ability to be considered as an alternative to timber sarking.

4.5 Vapour permeable roof tile underlays used in conjunction with the product must be the subject of a current BBA Certificate and be used in accordance with, and within the limitations of, that Certificate.

4.6 Detailing and jointing of the board should avoid cold bridging, gaps should be filled and flue pipes passing through the insulation should be suitably sleeved.

4.7 If the product is to be installed flush with the internal face of the rafters, a ventilated air space of minimum depth 50 mm may be required between the underside of the roof tile underlay and the upper face of the board, dependent on the specification of roof tile underlay used (see section 7.3).

4.8 The requirements/provisions of fire stops should be considered with regard to national Building Regulations.

4.9 Junctions between roofs and separating walls should be designed and constructed to minimize flanking sound transmission, as detailed in Robust Details part E *Resistance to the passage of sound*.

5 Practicability of installation

The product is designed to be installed by a competent general builder, or a contractor, experienced with this type of product.

6 Thermal performance

6.1 Calculations of the thermal transmittance (U value) of a specific roof construction should be carried out in accordance with BS EN ISO 6946 : 2007 and BRE Report BR 443 : 2006, using the declared thermal conductivity (λ_D) of 0.022 $W \cdot m^{-1} \cdot K^{-1}$ for the board, and the foil facing emissivity of 0.05. Example U value calculations are shown in Table 2.

Table 2 Examples of U value calculations ($W \cdot m^{-2} \cdot K^{-1}$)

U values ($W \cdot m^{-2} \cdot K^{-1}$)	Insulation thickness (mm)	
	Over and between rafters ($W \cdot m^{-2} \cdot K^{-1}$)	Under and between rafters ($W \cdot m^{-2} \cdot K^{-1}$)
0.13	90 + 80	85 + 100
0.15	75 + 75	65 + 100
0.16	70 + 75	140
0.18	135	135
0.20	110	110
0.25	90	80

6.2 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, Annex H.

7.2 The insulation core of the product has a water vapour resistivity exceeding 52 $MN \cdot s \cdot g^{-1} \cdot m^{-1}$. Each foil-facing has a water vapour resistance of 111 $MN \cdot s \cdot g^{-1}$.

7.3 The insulation product joints are not sealed, and the product must be used in conjunction with a vapour check plasterboard internal lining. A separate continuous vapour control layer should be considered unless a site-specific dynamic analysis to BS EN 15026 : 2007 indicates otherwise.

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 6.2 of this Certificate.

7.5 Roofs will limit the risk of surface condensation adequately when the thermal transmittance (U value) does not exceed 1.2 $W \cdot m^{-2} \cdot K^{-1}$ at any point and the junctions with other elements are designed in accordance with the guidance in BS 5250 : 2011, Annex G. Further guidance may be obtained from BRE Report BR 262 : 2002 and section 6.2 of this Certificate.

8 Behaviour in relation to fire

8.1 The product has a reaction to fire classification* of Class E to BS EN 13501-1 : 2007.

8.2 The product must not be carried over junctions between roofs and walls that are required to provide a minimum period of fire resistance. The continuity of fire resistance must be maintained, as described in the documents supporting the relevant national Building Regulations.

8.2 When installed between, under or over rafters the product will be contained between the roof and internal lining board until one is destroyed. Therefore, the insulation will not contribute to the development stages of a fire or present a smoke or toxic hazard.

9 Strength and stability (with product over the rafters)

9.1 The product, when installed in accordance with the manufacturer's instructions and this Certificate, will resist the loads likely to be met during installation and in service.

9.2 The resistance to wind uplift and likely dead loads depends upon factors specific to each project (eg roof geometry, geographical location) and should be determined by a suitably experienced and competent individual.

9.3 When calculating the fixing spacing required to resist the calculated loadings, the requirements of BS EN 1995-1-1 : 2004 and its UK National Annex should be followed where possible. The Certificate holder can advise on the use of the correct proprietary fixings, such as helical fixings and nails, in accordance with these requirements.

9.4 Tiling battens of 25 mm by 50 mm or 38 mm by 50 mm dimensions must be installed on rafters at no more than 600 mm centres, depending on the requirement following the calculations referred to in section 8.3 of this Certificate. See also Table 3 from BS 5534 : 2014.

10 Maintenance

The product, once installed, does not require any maintenance.

11 Durability

The product will have a life equivalent to that of the roof structure in which it is incorporated.

Installation

12 General

12.1 Installation of Kingspan Thermapitch TP10 must be in accordance with the relevant clauses of BS 5534 : 2014 and the manufacturer's instructions, and can be carried out in all conditions normal to roof work.

12.2 The product is light to handle, but some handling difficulties may be experienced in windy conditions. Since the product will not support the weight of operatives, appropriate care must be taken during installation and tiling.

12.3 The product can be cut easily, but care must be taken to prevent damage, particularly on edges. Damaged boards should not be used; small areas of damaged facer may be repaired with self-adhesive aluminium foil tape.

12.4 Cutting should be carried out either by using a fine-toothed saw, or by scoring with a sharp knife, snapping the product over a straight edge and then cutting the facing on the other side.

13 Procedure

Over rafter insulation (single layer system)

13.1 The product is laid onto rafters starting at the stop rail and working towards the ridge so it covers the whole roof area. The boards should be tightly butted and fixed in a staggered pattern. Board joints should be butted over rafters, not mid-span. It is important to ensure a tight fit between boards, boards and rafters, and other detailed elements. At ridges and verges, boards should be cut to achieve a close butt joint.

13.2 Treated counter battens (eg 38 mm by 38 mm, to suit the fixing manufacturer's specification) should be fixed using helical fixings. These fixings should pass through the counter batten and the insulation and penetrate the supporting timber by a minimum of 37 mm. Short lengths of counter batten should be tightly butted.

13.3 It is important to ensure a tight fit between boards, boards and rafters and other detailed elements. Gaps (for example, at abutments, hips and penetrations) must be avoided.

13.4 Badly butted board joints, for example at ridges, eaves, abutments and unsupported board edges, should be filled with expanding filler.

13.5 Roof tile underlay should be installed in the appropriate manner, ie fully supported or over counter battens, depending on the type of underlay and in accordance with the appropriate Agrément Certificate. The underlay should allow drainage of water over the fascia board and into the gutter at eaves. A continuous timber fillet should be used to support the underlay below the lowest row of tiles.

13.6 If the thickness required for the single-layer application is considered excessive, the double-layer insulation should be considered. Where this necessitates two different board thicknesses, the greatest depth should be placed over the rafter.

Over and between rafters insulation (double-layer system)

13.7 The product is cut to coincide with the space between the joists. Sarking clips are nailed into the upper surface of each rafter at one-metre intervals up the roof slope so that the panels will be flush with the top face of the rafter.

13.8 Above rafters, the product is then laid to cover the whole roof area, as described in sections 13.1 to 13.6.

Finishing

13.9 The roof tile underlay should be installed in accordance with the manufacturer's instructions and, if applicable, the appropriate BBA Certificate.

13.10 Roof tiles or slates are installed in accordance with the relevant clauses of BS 5534 : 2014.

13.11 Internal lining panels are installed, as appropriate to the application and required decoration.

Technical Investigations

14 Investigations

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

14.2 An examination was made of data relating to:

- compressive stress/strength
- thermal conductivity (initial and aged)
- fire behaviour
- density
- dimensional stability with temperature.
- emissivity

Bibliography

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

BS 5534 : 2014 *Code of practice for slating and tiling (including shingles)*

BS EN 1995-1-1 : 2004 + A2 : 2014 *Eurocode 5 : Design of timber structures — General — Common rules and rules for buildings*

BS EN 13165 : 2012 *Thermal insulation products for buildings — Factory made rigid polyurethane foam (PUR) 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 15026 : 2007 *Hygrothermal performance of building components and building elements — Assessment of moisture transfer by numerical simulation*

BS EN ISO 6946 : 2007 *Building components and building elements — Thermal resistance and thermal transmittance — Calculation method*

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

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

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

15 Conditions

15.1 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 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.

15.2 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.

15.3 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.

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

15.5 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.

15.6 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.

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