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BBA APPROVAL INSPECTION TESTING CERTIFICATION
TECHNICAL APPROVALS FOR CONSTRUCTION

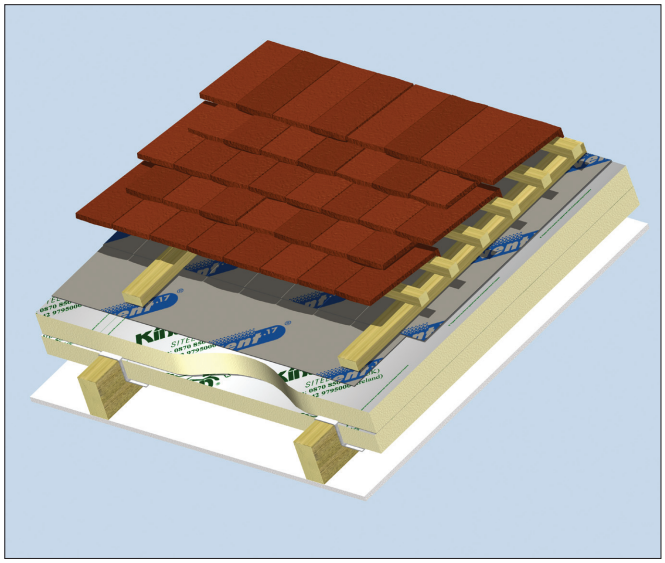
Agrément Certificate
95/3126
Product Sheet 1

KINGSPAN INSULATION BOARD

KINGSPAN THERMAPITCH TP10

PRODUCT SCOPE AND SUMMARY OF CERTIFICATE

This Certificate relates to Kingspan Thermapitch TP10 board, a warm roof insulation system, using rigid polyisocyanurate (PIR) board, faced on both sides with aluminium foil for use in pitched roofs in new and existing domestic and non-domestic buildings.



AGRÉMENT 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 investigation
- design considerations
- installation guidance
- regular surveillance of production
- formal three-yearly review.

KEY FACTORS ASSESSED

Thermal performance — subject to the selection of an appropriate board thickness, the construction can improve on the elemental U value. The product can maintain, or contribute to maintaining, continuity of thermal insulation at junctions between the roof and other building elements (see section 5).

Condensation — the risk of interstitial condensation will be minimal under normal conditions of use (see section 6).

Behaviour in relation to fire — the product will not contribute to the development stages of a fire or present a smoke or toxic hazard. When tested to BS 476-7 : 1987, the product achieved a Class 1 rating (see section 7).

Resistance to moisture — the product will not be adversely affected by rain showers during installation, nor by wind-driven snow or rain penetrating the tiling in service (see section 10).

Durability — the product will have a life equivalent to that of the roof structure in which it is incorporated (see section 12).

The BBA has awarded this Agrément 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: 30 January 2009
Originally certificated on 15 March 2005

Chris Hunt
Head of Approvals — Physics

Greg Cooper
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, for use in pitched roofs, if used in accordance with the provisions of this Certificate will meet or contribute to meeting the relevant requirements of the following Building Regulations:

The Building Regulations 2000 (as amended) (England and Wales)

Requirement:	C2(c)	Resistance to moisture
Comment:		The product can enable or contribute to enabling a roof to meet this Requirement. See sections 6.1 and 6.5 of this Certificate.
Requirement:	L1(a)(i)	Conservation of fuel and power
Comment:		The product is acceptable. See sections 5.2 to 5.5 of this Certificate.
Requirement:	Regulation 7	Materials and workmanship
Comment:		The product is acceptable. See section 12 and the *Installation* part of this Certificate.

In addition to the contribution which the product can make to meeting the relevant Requirements, the following comments should be noted:

Requirement:	B3(2)	Internal fire spread (structure)
Comment:		Junctions between roofs and fire-resisting walls must be fire-stopped. See section 7.2 of this Certificate.
Requirement:	B3(4)	Internal fire spread (structure)
Comment:		Cavities extending over 20 m, in the assembled roof, must be sub-divided. See section 7.3 of this Certificate.
Requirement:	B4(2)	External fire spread
Comment:		The use of the product will not affect the external exposure performance of a tiled or slated roof.

The Building (Scotland) Regulations 2004 (as amended)

Regulation:	8(1)(2)	Fitness and durability of materials and workmanship
Comment:		The product can contribute to a construction meeting this Regulation. See sections 11 and 12 and the *Installation* part of this Certificate.
Standard:	3.15	Condensation
Comment:		When used in conjunction with an appropriate vapour control layer the product will be unrestricted under this Standard, with reference to clauses 3.15.1[1][2] and 3.15.4[1][2]. See sections 6.1 and 6.6 of this Certificate.
Standard:	6.1(a)(b)	Carbon dioxide emissions
Standard:	6.2	Building insulation envelope
Comment:		The product can contribute to satisfying 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[1][2], 6.2.5[1][2] and 6.2.6[2] of these Standards. See sections 5.2 to 5.5 of this Certificate.
Regulation:	12	Building standards — conversions
Comment:		All comments given for this product under Regulation 9, also apply to this Regulation, with reference to clause 0.12.1[1] and Schedule 6[1].

In addition to the contribution which the product can make to meeting the relevant Standards, the following comments should be noted:

Regulation:	9	Building standards — construction
Standard:	2.2	Separation
Comment:		Junctions between roofs and fire-resisting walls must be fire-stopped, with reference to clause 2.2.7[2], 2.1.16[2] and 2.2.10[1]. See section 7.1 of this Certificate.
Standard:	2.4	Cavities
Comment:		Cavities extending over 10 m, in the assembled roof, must be sub-divided, with reference to clause 2.4.2[1][2] See section 7.3 of this Certificate.
Standard:	2.8	Spread from neighbouring buildings
Comment:		The use of the product will not affect the external exposure performance of a tiled or slated roof.

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).

The Building Regulations (Northern Ireland) 2000 (as amended)

Regulation:	B2	Fitness of materials and workmanship
Comment:		The product is acceptable. See section 12 and the *Installation* part of this Certificate.
Regulation:	B3(2)	Suitability of certain materials
Comment:		The product is acceptable. See section 11 of this Certificate.
Regulation:	C5	Condensation
Comment:		The product is acceptable. See section 6.1 of this Certificate.
Regulation:	F2(a)(i)	Conservation measures
Comment:		The product is acceptable. See sections 5.2 to 5.5 of this Certificate.
Regulation:	F3	Target carbon dioxide Emissions Rate
Comment:		Roofs incorporating the product can satisfy or contribute to satisfying this Regulation. See section 5.2 of this Certificate.

In addition to the contribution which the product can make to meeting the relevant Regulations, the following comments should be noted:

Regulation:	E4(2)	Internal fire spread — Structure
Comment:		Junctions between roofs and fire-resisting walls must be fire-stopped. See section 7.2 of this Certificate.
Regulation:	E4(4)	Internal fire spread — Structure
Comment:		Cavities extending over 20 m, in the assembled roof, must be sub-divided. See section 7.3 of this Certificate.
Regulation:	E5(b)	External fire spread
Comment:		The use of the product will not affect the external exposure performance of a tiled or slated roof.

Construction (Design and Management) Regulations 2007
Construction (Design and Management) Regulations (Northern Ireland) 2007

Information in this Certificate may assist the client, CDM co-ordinator, designer and contractors to address their obligations under these Regulations.

See sections: 2 *Delivery and site handling* (2.4) and 13 *General* (13.1 and 13.2).

Non-regulatory Information

NHBC Standards 2008

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

Zurich Building Guarantee Technical Manual 2007

In the opinion of the BBA, Kingspan Thermapitch TP10, when installed and used in accordance with this Certificate, satisfies the requirements of the *Zurich Building Guarantee Technical Manual*, Section 4 *Superstructure*, Sub-section *Pitched roofs*.

General

This Certificate relates to Kingspan Thermapitch TP10, for use as a thermal insulation sarking board above and between rafters or under and between rafter for tiled or slated pitched roofs, designed and constructed in accordance with the relevant Clauses of BS 5534 : 2003.

Technical Specification

1 Description

1.1 Kingspan Thermapitch TP10 is a rigid polyisocyanurate (PIR) board, manufactured without the use of CFC's or HCFC's, 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)	25–140
Core density (kgm^{-3})	32
Edge detail	plain
Compressive strength (kPa)	>140
Water vapour resistance ($MNsg^{-1}$)	>100

(1) Other board dimensions available on request within the values shown above

1.2 The product is suitable for use over or under the rafters; however, 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 are:

- vapour permeable roof tile underlay
- nailable sarking clips
- fixing
- aluminium tape
- nails and treated battens.

1.4 Proprietary fixings approved by the BBA can be used with the product. Names and addresses of suppliers of approved fixings are available from the Certificate holder and from the BBA.

2 Delivery and site handling

2.1 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 identification mark incorporating the number of this Certificate.

2.2 Packs should be stored off the ground on a clean, level surface under cover to protect them from moisture and mechanical damage.

2.3 The product should not be stored in direct sunlight or in areas subjected to elevated temperatures.

2.4 Care must be exercised in handling individual boards to avoid crushing the edges and corners.

2.5 The product must not be exposed to open flame or to other ignition sources. Care must be taken to prevent contact with solvents and bitumen products.

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on Kingspan Thermapitch TP10.

Design Considerations

3 General

3.1 Kingspan Thermapitch TP10 is satisfactory for use between, under and over roof rafters in conjunction with approved 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 : 2003 for dwellings or other buildings with similar temperature and humidity conditions.

3.2 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.

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

3.4 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.

3.5 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.

3.6 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.

3.7 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 utilised (see section 6.3).

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

3.9 Junctions between roofs and separating walls should be designed and constructed to minimize flanking sound transmission. The product (minimum 60 mm thick) may be used between rafters in roof junctions with masonry separating walls as described in *Robust details part E Resistance to the passage of sound*.

3.10 Laboratory test were carried out on the 50 mm and 70 mm thickness of Thermapitch TP10 in isolation, in accordance with BS EN ISO 140-3 : 1995 and these results provided an R_w sound reduction index of 15 dB and 16 dB respectively.

4 Practicability of installation

The product can be readily installed by operatives experienced with this type of product.

5 Thermal performance

5.1 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[1] report (BR 443 : 2006). For the purpose of U value calculations to determine if the requirements of the Building (or other statutory) Regulations are met, the thermal conductivity of the board may be taken as 0.022 $Wm^{-1}K^{-1}$ and the foil facing emissivity as 0.06. Examples of the U value calculation are shown in Table 2.

(1) Building Research Establishment.

Table 2 Examples of U value calculation ($Wm^{-2}K^{-1}$)

Insulation thickness (mm)	Over and between rafters ($Wm^{-2}K^{-1}$)	Under and between rafters ($Wm^{-2}K^{-1}$)
20+20	0.43	0.43
25+25	0.37	0.37
25+30	0.34	0.34
30+30	0.32	0.32
40+40	0.26	0.25
40+45	0.24	0.24
50+50	0.21	0.21
50+60	0.20	0.20
60+65	0.18	0.18
70+70	0.16	0.16
70+75	0.16	0.15
75+75	0.15	0.15

5.2 The product can contribute to a roof system achieving the following design U values as outlined in the national Building Regulations thus:

England and Wales and Northern Ireland

The product must be used in conjunction with additional insulation to achieve the following U values:

- 0.16 $Wm^{-2}K^{-1}$ required for 'notional' dwellings in SAP 2005 (see also section 6.3)
- 0.25 $Wm^{-2}K^{-1}$ limit average specified in Approved Documents; L1A (Table2), L2A (Table 4), Technical Booklets F1 (Table 2.2) and F2 (Table 2.4)
- 0.35 $Wm^{-2}K^{-1}$ limit for an individual element specified in Approved Document L1A (Table 2), L2A (Table 4), Technical Booklets F1 (Table 2.2) and F2 (Table 2.4).

Scotland

- 0.16 $Wm^{-2}K^{-1}$ required for the 'simplified approach' – packages 1 to 6 'notional' dwellings in Mandatory Standard 6.1, clause 6.1.6[1] (see also section 7.3)
- 0.20 $Wm^{-2}K^{-1}$ limit average specified in Mandatory Standard 6.2, clause 6.2.1[1][2] (see also section 7.3)
- 0.35 $Wm^{-2}K^{-1}$ limit for an individual element specified in Mandatory Standard 6.2, clause 6.2.1[1][2].

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).

5.3 Roofs with U values lower than (or the same as for Scottish dwellings) the relevant 'notional' value above will contribute to a building meeting its target overall reduction in carbon dioxide emissions of about 20% (or 18% to 25% in Scotland) for dwellings and 23% to 28% for buildings other than dwellings. Roofs with higher U values will require additional energy saving measures in the building envelope and/or services.

5.4 Compliance with the guidance referred to in section 7.2 will allow the use of the default psi values from Table 3 of BRE Information Paper IP 1/06 *Assessing the effects of thermal bridging at junctions and around openings* and Table K1 of *The Government's Standard Assessment Procedure for Energy Rating of Dwellings* (SAP 2005), in Target Emission Rate calculations to SAP 2005 or the Simplified Building Energy Model (SBEM) (use 'simplified approach' for Scotland).

5.5 The product can maintain or contribute to maintaining continuity of thermal insulation at junctions between the roof and the other building elements. Guidance in this respect, and on limiting heat loss by air infiltration, can be found in:

England and Wales — *Limiting thermal bridging and air leakage: Robust construction details for dwellings and similar buildings* TSO 2002

Scotland — Accredited Construction Details (Scotland)

Northern Ireland — Accredited Construction Details (version 1.0).

6 Condensation

Interstitial condensation

6.1 Roofs will adequately limit the risk of interstitial condensation when they are designed and constructed in accordance with BS 5250 : 2002, Section 8.4 and Appendix D.

6.2 The risk of interstitial condensation will be minimal under normal conditions of use. The product has an intrinsically high vapour resistance and, when installed with tightly butted joints, filled/sealed gaps and joints, will provide a continuous convection-free envelope of high vapour resistance. Therefore, a suitable vapour-permeable, roof tile underlay may be laid over the insulation boards without ventilated air space. When using a high resistance (type HR) underlay, the space below it must be ventilated in accordance with BS 5250 : 2002, section 8.4.

6.3 Where the product is installed in a roof with either a horizontal or sloping ceiling (ie room in the roof), a 'warm roof' space is created and no ventilation is required. However, any insulation in a horizontal ceiling should be removed.

6.4 Where high humidity may be expected, a vapour control layer should also be used unless a condensation risk analysis in accordance with BS 5250 : 2002 shows that it is not necessary.

Surface condensation

6.5 Roofs will adequately limit the risk of surface condensation when the thermal transmittance (U value) does not exceed 0.35 $Wm^{-2}K^{-1}$ at any point and the junctions with walls are designed in accordance with the relevant requirements of *Limiting thermal bridging and air leakage : Robust construction details for dwellings and similar buildings*, TSO 2002, or BRE Information Paper IP 1/06.

6.6 Roofs will adequately limit the risk of surface condensation when the thermal transmittance (U value) does not exceed 1.2 $Wm^{-2}K^{-1}$ at any point. Guidance may by obtained from BS 5250 : 2002, Section 8, and BRE report (BR 262 : 2002) *Thermal insulation: avoiding risks*.

7 Behaviour in relation to fire

7.1 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.

7.2 The product must not be carried over junctions between roofs and walls required to provide a minimum period of fire resistance. The continuity of fire resistance must be maintained, for example as described in:

England and Wales — Approved Document B Volume 1 — Dwelling houses, paragraphs 5.11 and 5.12. Approved Document B Volume 2 — Buildings other than Dwelling houses, Diagram 30.

Scotland — Mandatory Standard 2.2, clauses 2.2.7[2] and 2.2.10[1]

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).

Northern Ireland — Technical Booklet E, paragraph 3.21.

7.3 When tested for surface spread of flame to BS 476-7 : 1987 the product achieved a class 1 rating.

8 Strength

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

9 Structural stability

9.1 Wind uplift will depend largely on the building geometry and its geographical location and should be calculated in accordance with BS 6399-2 : 1997. Snow loadings should be calculated in accordance with BS 6399-3 : 1988.

9.2 When calculating the fixing spacing required to resist the calculated loadings, the requirements of BS 5268-2 : 2002 should be followed where possible. Further guidance can be obtained from the Certificate holder. The Certificate holder and fixing manufacture must advise on the use of the correct proprietary fixings and improved nails and fixing capacity in accordance with BS 5268-2 : 2002.

10 Resistance to moisture

The product will not be adversely affected by rain during installation, nor by wind-driven snow or rain penetrating the tiling in service. Water absorption is low and its influence on the λ value is minimal.

11 Maintenance

Damaged boards can be replaced before the installation of counter battens, or timber sarking.

12 Durability

The product will have a life equivalent to that of the roof structure in which they are incorporate.

Installation

13 General

13.1 Installation of Kingspan Thermapitch TP10 must be in accordance with the relevant Clauses of BS 5534 : 2003 and the manufacturer's instructions, and can be carried out in all conditions normal to roof work, but in windy conditions handling difficulties may be experienced.

13.2 Where a flat ceiling is used, greater thicknesses of insulation are required.

13.3 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.

13.4 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.

13.5 Where the product is installed in traditional and timber-frame construction, cavity barriers at the junction of external wall and roof space should be provided.

13.6 Roof tiles or slates are installed in accordance with the relevant Clauses of BS 5534 : 2003.

14 Procedure

Over rafter insulation (single layer system)

14.1 The product is laid on to rafters starting at the stop rail and working towards the ridge so they cover the whole roof area. They 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.

14.2 Treated counter battens (eg 38 mm by 38 mm, to suit fixing manufacturers 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.

14.3 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. Gaps, for example, at abutments, hips and penetrations, must be avoided.

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

14.5 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 to support the underlay bellow the lowest row of tiles is recommended.

14.6 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)

14.7 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.

14.8 Above-rafters, the product is then laid to cover the whole roof area as given in sections 14.1 to 14.6.

Finishing

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

14.10 Roof tiles or slates are installed in accordance with the relevant Clauses of BS 5534 : 2003.

14.11 Internal lining panels appropriate to the application and required decoration are installed.

Technical Investigations

15 Investigations

15.1 The manufacturing process of Kingspan Thermapitch TP10 was examined, including the methods adopted for quality control, and details were obtained of the quality and composition of the materials used.

15.2 An examination was made of data relating to:

- compressive strength
- density
- thermal conductivity (fresh and aged)
- dimensional stability with temperature.
- fire behaviour

Bibliography

BS 476-7 : 1987 *Fire tests on building materials and structures — Method for classification of the surface spread of flame of products*

BS 5250 : 2002 *Code of practice for control of condensation in buildings*

BS 5268-2 : 2002 *Structural use of timber — Code of practice for permissible stress design, materials and workmanship*

BS 5534 : 2003 *Code of practice for slating and tiling (including shingles)*

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

BS 6399-3 : 1988 *Loading for buildings — Code of practice for imposed roof loads*

Conditions of Certification

16 Conditions

16.1 This Certificate:

- relates only to the product/system that is named and described on the front page
- is granted only to the company, firm or person named on the front page — no other company, firm or person may hold or claim any entitlement to this Certificate
- 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 References in this Certificate to any Act of Parliament, Statutory Instrument, Directive or Regulation of the European Union, British, European or International Standard, Code of Practice, manufacturers' instructions or similar publication, are references to such publication in the form in which it was current at the date of this Certificate.

16.3 This Certificate will remain valid for an unlimited period provided that the product/system and the manufacture and/or fabrication including all related and relevant 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 In granting this Certificate, the BBA is not responsible for:

- 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
- individual installations of the product/system, including the nature, design, methods and workmanship of or related to the installation
- the actual works in which the product/system is installed, used and maintained, including the nature, design, methods and workmanship of such works.

16.5 Any information relating to the manufacture, supply, installation, use and maintenance 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 and maintained. It does not purport in any way to restate the requirements of the Health & Safety at Work etc Act 1974, or of any other statutory, common law or other duty which may exist at the date 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. In granting this Certificate, the BBA does not accept responsibility to any person or body for any loss or damage, including personal injury, arising as a direct or indirect result of the manufacture, supply, installation, use and maintenance of this product/system.

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