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Agrément Certificate
07/4487
Product Sheet 1

ECOTHERM ROOFING BOARDS

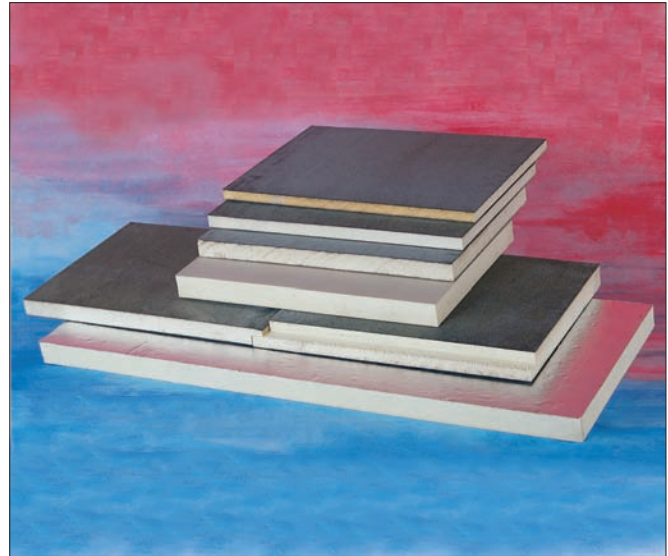
ECOTHERM RANGE OF POLYURETHANE ROOFING BOARDS

PRODUCT SCOPE AND SUMMARY OF CERTIFICATE

This Certificate replaces Certificates Nos 98/3484 and 99/3588 and relates to the EcoTherm Range of Polyurethane Roofing Boards, with a variety of facings, for use on flat roofs.

THIS CERTIFICATE INCLUDES:

- factors relating to compliance with UK 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 can be used to improve the thermal performance of a flat roof (see section 5).

Condensation risk — roofs incorporating the products will adequately limit the risk of interstitial and surface condensation (see section 6).

Resistance to wind uplift — wind loads should be calculated in accordance with BS 6399-2 : 1997 and BS EN 1991-1-4 : 2005 (see section 8).

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

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

The BBA has awarded this Agrément 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: 5 December 2008

Chris Hunt
Head of Approvals — Physics

Greg Cooper
Chief Executive

Originally certificated on 9 October 2007

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, the EcoTherm Range of Polyurethane Roofing Boards, 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:	A1	Loading
Comment:		The products are acceptable. See sections 7.3, 8.1 and 8.2 of this Certificate.
Requirement:	B4(2)	External fire spread
Comment:		Roofs incorporating the products can meet this Requirement. See sections 9.2 to 9.4 of this Certificate.
Requirement:	C2(c)	Resistance to moisture
Comment:		The products will contribute to a roof meeting this Requirement. See sections 6.1 and 6.2 of this Certificate.
Requirement:	L1(a)(i)	Conservation of fuel and power
Comment:		The products can contribute to satisfying this Requirement. See sections 5.2 to 5.5 of this Certificate.
Requirement:	Regulation 7	Materials and workmanship
Comment:		The products are acceptable materials. See section 11 and the <i>Installation</i> part of this Certificate.



The Building (Scotland) Regulations 2004 (as amended)

Regulation:	8(1)(2)	Fitness and durability of materials and workmanship
Comment:		The products can contribute to a construction satisfying this Regulation. See sections 10 and 11 and the <i>Installation</i> part of this Certificate.
Regulation:	9	Building standards – construction
Standard:	1.1	Structure
Comment:		The products are acceptable, with reference to clauses 1.1.1 ⁽¹⁾⁽²⁾ to 1.1.3 ⁽¹⁾⁽²⁾ . See sections 7.3, 8.1 and 8.2 of this Certificate.
Standard:	2.8	Spread from neighbouring buildings
Comment:		When used in roofs, the products can contribute to satisfying this Standard, with reference to clauses 2.8.1 ⁽¹⁾⁽²⁾ and 2.8.2 ⁽¹⁾⁽²⁾ . See sections 9.2 to 9.4 of this Certificate.
Standard:	3.15	Condensation
Comment:		When used in conjunction with an appropriate vapour control layer, the products will contribute to a roof meeting this Standard, with reference to clause 3.5.1 ⁽¹⁾⁽²⁾ to 3.5.4 ⁽¹⁾⁽²⁾ . See sections 6.1 and 6.3 of this Certificate.
Standard:	6.1(a)(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⁾⁽²⁾ , 6.1.2 ⁽¹⁾ , 6.1.3 ⁽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⁾ . See sections 5.2 to 5.5 of this Certificate.
Regulation:	12	Building standards – conversions
Comment:		All comments given for these products under Regulation 9, 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) 2000 (as amended)

Regulation:	B2	Fitness of materials and workmanship
Comment:		The products are acceptable materials. See section 11 of this Certificate.
Regulation:	B3(2)	Suitability of certain materials
Comment:		The products can meet this Regulation. See section 10 of this Certificate.
Regulation:	D1	Stability
Comment:		The products are acceptable. See sections 7.3, 8.1 and 8.2 of this Certificate.
Regulation:	C5	Condensation
Comment:		When used in conjunction with an appropriate vapour control layer, the products will be unrestricted under this Regulation. See section 6.1 of this Certificate.
Regulation:	E4	Internal fire spread – Structure
Comment:		When used in roofs, the products will be unrestricted by the requirements of this Regulation. See sections 9.2 to 9.4 of this Certificate.
Regulation:	F2(a)(i)	Conservation measures
Comment:		The products will enable a roof to satisfy the Elemental Method of limiting heat loss. See sections 5.2 to 5.5 of this Certificate.
Regulation:	F3	Target carbon dioxide Emissions Rate
Comment:		The products can contribute to a building meeting its Target Emission Rate. See sections 5.2 to 5.5 of this Certificate.

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: 1 *Description* (1.2) and 2 *Delivery and site handling* (2.4).

Non-regulatory Information

NHBC Standards 2008

NHBC accepts the use of the EcoTherm Range of Polyurethane Roofing Boards, when installed and used in accordance with this Certificate, in relation to NHBC Standards, Chapters 7.1 *Flat roofs and balconies*.

Zurich Building Guarantee Technical Manual 2007

In the opinion of the BBA, the EcoTherm Range of Polyurethane Roofing Boards, when installed and used in accordance with this Certificate, satisfy the requirements of the *Zurich Building Guarantee Technical Manual*, Section 4 *Superstructure*, Sub-sections *Pitched roofs* and *Flat roofs*.

General

The EcoTherm Range of Polyurethane Roofing Boards are for use as a thermal insulation layer for adhesively bonded and/or mechanically fixed single ply roofing systems. The boards are for use on flat roofs (including cut-to-falls) with limited access on suitably designed concrete, timber, metal or other structural decks, and are compatible with a wide range of waterproofing systems.

Technical Specification

1 Description

1.1 The EcoTherm Range of Polyurethane Roofing Boards are manufactured using HCFC-free materials, incorporating a polyurethane core with facings applied to the top and lower surfaces. The raw materials for the core are accurately metered, mixed in the correct proportions and placed onto the lower facing and fed into a continuous laminator where the top facing is applied. The facings are autohesively bonded to the foam core.

1.2 The dimensions of boards and facing types covered by this Certificate are detailed in Table 1.

Table 1 Board characteristics and dimensions

Board name	Facings	Dimensions (mm)	Thicknesses ⁽¹⁾ (mm)
EcoTherm Multi-Therm	Bitumen coated glassfibre/ plain glassfibre	1200 × 600	30 to 120
EcoTherm Bitu-Therm	Bituminous glassfibre on both sides	1200 × 600	30 to 120
EcoTherm Glass-Therm	Upper facing – clay filled glass tissue Lower facing – clay filled glass tissue	600 to 3000 x 1200	30 to 120
EcoTherm Eco-Metre	Bitumen coated mineral/ bitumen coated polypropylene	1200 × 834	50 to 120
EcoTherm Foil-Therm	Aluminium foil-kraft/ Tri laminate	2400 × 1200	25 to 120
EcoTherm Eco-Taper	Can be supplied with any of the facings listed above	1200 × 1200	20 to 100
EcoTherm Eco-Deck	Upper facing – plywood lower facing – foil	2400 × 1200	96 to 156

(1) The boards are available in 5 mm increments in the range given here. Other thicknesses, lengths and widths are available to order.

1.3 The polyurethane core has nominal physical characteristics of:

compressive strength (kNm⁻²) 140
density (kgm⁻³) 30

1.4 Tapered boards give roofs a surface finished fall of 1:60 and 1:80. Various falls can be manufactured on request.

1.5 Quality control checks are carried out during the manufacturing process and on the finished boards.

2 Delivery and site handling

- 2.1 The boards are delivered to site shrink- wrapped. Each pack carries a label bearing the company's name, product code, batch number.
- 2.2 Boards should be stored off the ground and under cover to protect them from precipitation.
- 2.3 The boards must be protected from prolonged exposure to sunlight and should be stored either under cover or covered with opaque polyethylene sheets.
- 2.4 The boards must not be exposed to naked flame or other ignition sources.

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on the Ecotherm Range of Polyurethane Roofing Boards.

Design Considerations

3 Use

- 3.1 The Ecotherm Range of Polyurethane Roofing Boards are suitable for use as a thermal insulation layer on limited access flat roofs with concrete, timber, metal or other structural decks.
- 3.2 Decks should be designed in accordance with the relevant clauses of BS 8217 : 2005, BS 6229 : 2003, BS 8218 : 1998 and, where appropriate, NHBC Standards 2008, Chapter 7.1, and the *Zurich Building Guarantee Technical Manual 2007, Section 4 Superstructure*.
- 3.3 The roofs should incorporate an effective vapour control layer.
- 3.4 The boards are for use with one of the following waterproofing specifications:
- built-up bitumen felt⁽¹⁾ to BS 8747 : 2007 laid in accordance with BS 8217 : 2005
 - mastic asphalt laid in accordance with BS 8218 : 1998⁽¹⁾
 - other waterproofing systems which are the subject of a current Agrément Certificate laid in accordance with, and within the limitations imposed by, that Certificate
 - single layer, non-bituminous waterproofing that are subject of a current Agrément Certificate laid in accordance with and within the limitations imposed by that Certificate⁽²⁾.
- (1) Not to be used with foil-faced board.
- (2) Foil-faced and glassfibre board.
- 3.5 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 and cleaning of gutters, etc. Where traffic in excess of this is envisaged, special precautions, such as additional protection to the membrane, must be taken.
- 3.6 Flat roofs are defined for the purpose of this Certificate as those roofs having a minimum finished fall of 1:80. Tapered roofs are defined as those having falls in excess of 1:60.
- 3.7 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 deflection and direction of falls.
- 3.8 Tapered board may be used where appropriate to establish the minimum finished falls required.

4 Practicability of installation

The products can be installed easily by operatives experienced with these types of products.

5 Thermal performance

5.1 Calculations of the thermal transmittance (U value), a specific roof construction should be carried out in accordance with BS EN ISO 6946 : 1997 and BRE report (BR 443 : 2006) *Conventions for U-value calculations*, using the declared thermal conductivity ($\lambda_{90/90}$ value) given in Table 2. Examples U values are given in Table 3.

Product name	Board thickness (mm)		
	$d_N < 80$	$80 \leq d_N < 120$	$d_N \geq 120$
Non-foil facing			
EcoTherm Multi-Therm	0.028	0.027	0.026
EcoTherm Bitu-Therm	0.028	0.027	0.026
EcoTherm Eco-Taper	0.028	0.027	—
EcoTherm Glass-Therm	0.028	0.027	0.026
EcoTherm Eco-Metre	0.028	0.027	0.026
Foil-facings			
EcoTherm Foil-Therm	0.023	0.023	0.023

Insulation board type/ Thickness (mm)	λ value ($Wm^{-1}K^{-1}$)	Deck construction		
		Concrete	Timber	Metal
PUR non-foil-faced/ <80	0.028	0.32	0.31	0.35
PUR non-foil-faced/ 80-119	0.027	0.24	0.24	0.26
PUR non-foil-faced/ 120	0.026	0.20	0.19	0.21
PUR foil-faced/ 100	0.023	0.21	0.20	0.22
PUR foil-faced/ 120	0.023	0.18	0.17	0.19



5.2 The roof system contributes to meeting the requirements of the national Building Regulations thus:

England and Wales and Northern Ireland

- 0.16 Wm⁻²K⁻¹ required for ‘notional’ dwellings in SAP 2005 (see section 4.3)
- 0.25 Wm⁻²K⁻¹ required for buildings other than dwellings in SBEM
- 0.25 Wm⁻²K⁻¹ limit average U value specified in Approved Documents; L1A (Table 2), L2A (Table 4), Technical Booklets F1 (Table 2.2) and F2 (Table 2.4)

Scotland

- 0.16 Wm⁻²K⁻¹ U value required for the ‘notional’ dwellings in SAP 2005 and the ‘simplified approach — all fuel packages’ in Mandatory Standard 6.1, clause 6.1.6⁽¹⁾ (see section 4.3)
- 0.20 Wm⁻²K⁻¹ maximum average U value specified Mandatory Standard 6.2, in clause 6.2.1⁽¹⁾ (see section 4.3)
- 0.25 Wm⁻²K⁻¹ U value required for ‘notional’ building in SBEM in Mandatory Standard 6.1, clause 6.1.3⁽²⁾
- 0.25 Wm⁻²K⁻¹ maximum U value specified for the insulation and 0.35 Wm⁻²K⁻¹ limit value for the individual elements as per Mandatory Standard 6.2, clause 6.2.1⁽¹⁾⁽²⁾
- 0.35 Wm⁻²K⁻¹ limit value for the individual elements as per 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 4.5 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 boards can maintain, or contribute to maintaining, continuity of thermal insulation at junctions between roof and 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 risk

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.

Surface condensation



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



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

7 Strength and stability

7.1 The substrate roof deck to which the boards are fixed should be structurally sound and constructed in accordance with the requirements of the relevant Building Regulations, Codes and Standards.

7.2 The roofing boards should be fully supported, i.e. the substrate deck should have sufficient strength and stability, to resist all dead, imposed and racking loads, on its own. For maximum permissible spans, see Table 4.

Spanning distance (mm)	Insulation thickness (mm)
75	25
100	40 minimum
140	50 and above



7.3 For design purposes, the boards may be assumed to have an allowable compressive stress of 70 kPa.

7.4 The boards are not suitable for supporting permanent loads. Such loads should be supported directly from the substrate deck structure.

7.5 To prevent damage to the waterproofing system, high concentrated loads should be avoided. Where such loads are expected, suitable protection for the waterproofing system should be provided.

8 Resistance to wind uplift



8.1 A 96 mm thick Eco-deck board, fixed to a substrate with 5 mm dome headed screws (head diameter 11 mm) at 600 mm by 250 mm centres, when tested for wind uplift, achieved a minimum negative pressure resistance of 4.0 kPa.

8.2 As a consequence of section 8.1, Eco-deck boards with thickness equal to or greater than 96 mm, similarly fixed to a timber roof deck as described above, should resist wind uplift forces normally encountered in the UK.

8.3 Wind loads should be calculated in accordance with BS 6399-2 : 1997 and BS EN 1991-1-4 : 2005. Any design checks should be carried out by a suitably qualified chartered engineer.

8.4 In general, the suitability of the substrate deck to accept an adhesive bond or mechanical fixing should be checked before installation. Also, depending on conditions, a combination of the two fixing methods may need to be considered. For these, the advice of the Certificate holder should be sought.

9 Behaviour in relation to fire

9.1 The fire rating of any roof containing the boards will depend heavily on the type of deck and the nature of the roof waterproof covering.



9.2 The designation of the roof covering must meet or satisfy the requirements of the national Building Regulations, thus:

England and Wales — Section 10 of Approved Document B. Notional designations of some common roof coverings are given in Appendix A, Table A5, of the Approved Document

Scotland — Mandatory Standards 2.1, clause 2.1.6⁽²⁾; 2.4, clause 2.4.6⁽¹⁾⁽²⁾; clause 2.A.1⁽¹⁾⁽²⁾ and 2.B.1, clause 2.B.1⁽¹⁾⁽²⁾

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).

Northern Ireland — Regulation E4 of Technical Booklet E. If, on flat roofs, the waterproof covering is protected by one of the surface finishes defined in Part IV of Table 4.6 of Technical Booklet E, the roof is deemed to be of designation AA.

9.3 Single-ply roof waterproofing membranes covered by an Agrément Certificate will contribute to meeting or satisfying the requirements of the national Building Regulations and Standards with regard to designation.

9.4 The designation of other specifications, eg when used on combustible substrates, should be confirmed by:

England and Wales — Test or assessment in accordance with Clause A1 of Appendix A of Approved Document B

Scotland — Test to conform to Mandatory Standard 2.8, clause 2.8.1⁽¹⁾⁽²⁾

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).

Northern Ireland — Test or assessment by a UKAS accredited laboratory, or an independent consultant with appropriate experience.

10 Maintenance



No maintenance of the insulation layer will be required provided the roof waterproof covering remains intact.

11 Durability



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

12 General

- 12.1 The EcoTherm Range of Polyurethane Roofing Boards must be installed in accordance with the Certificate holder's instructions and BS 8218 : 1998 or BS 8217 : 2005, or the relevant Agrément Certificate, depending on the waterproofing to be applied.
- 12.2 The decks to which the vapour control layer is to be applied must be dry, sound, and if bonded, free from dust and grease.
- 12.3 The boards must be kept dry at all times, boards wetted accidentally must be replaced or allowed to dry fully before application of the waterproof layer.
- 12.4 The boards should be installed only when the ambient temperature is above 5°C to prevent condensation.
- 12.5 The boards can be cut with a sharp knife to fit around projections through the roof.
- 12.6 To prevent moisture being trapped on, or in the insulation it is essential to protect the boards during laying, before the application of the roof waterproofing, or to lay the roof covering at the same time as laying the boards.
- 12.7 On tall buildings or in areas subject to high wind loads, additional mechanical fixings may be required and the advice of the Certificate holder should be sought.
- 12.8 For both mechanically and adhesively fixed systems, the suitability of the substrate to accept and retain mechanical fixings must be checked prior to the work commencing.
- 12.9 Where the specified vapour control layer is other than a bituminised felt or bitumen coated foil, eg polyethylene, any fixings that penetrate the vapour control layer should be of the self-sealing type. Advice may be sought from the Certificate holder.
- 12.10 EcoTherm Glass-Therm boards are for use with adhesively bonded and/or mechanically fixed single-layer non-bituminous waterproofing that is subject of a current Agrément Certificate, laid in accordance with, and within the limitations imposed by, that Certificate.
- 12.11 The mechanical fixing rate and pattern should be predetermined in accordance with the Certificate holder's instructions and the relevant clauses of BS 6399-2 : 1997. Each fixing should incorporate a minimum 50 mm diameter countersunk washer, which must not restrain more than one board.
- 12.12 Once installed, access to the roof should be restricted in accordance with section 7.
- 12.13 Tapered boards will allow for a fall to outlets of 1 : 60 and 1 : 80. The Certificate holder will provide specific design schemes to suit a roof or an individual roof area, if required.
- 12.14 If tapered boards are to be effective in providing a uniform fall it is essential that the structural deck is true and even. Any hollows, depressions, backfalls, found in the roof deck, eg must be rectified prior to laying the insulation.
- 12.15 EcoTherm Eco-Deck is screwed to joists (of timber deck only), set at 600 mm maximum centres with the plywood side uppermost and the board laid with the long edge running along the joist.
- 12.16 Noggings should be used to support all edges of EcoTherm Eco-Deck.
- 12.17 An overall vapour control layer is required. This should be achieved by applying a continuous strip of mastic tape to the upper surface of all supporting timber, which coincides with the edge of the panels. EcoTherm Eco-Deck should be laid onto the mastic sealant and screwed at 150 mm centres down the line of each joist and nogging.
- 12.18 The screws should be long enough to allow a minimum 35 mm penetration of the supporting timber and be positioned not less than 10 mm from the edge of the board, or 50 mm from the corner.
- 12.19 EcoTherm Eco-Deck composite roof deck is suitable for use with bitumen-based felt waterproofing systems and mastic asphalt roof finishes.
- 12.20 EcoTherm Eco-Deck should always be under drawn with a 12.5 mm plasterboard ceiling.

13 Procedure

General (bitumen bonded roof waterproofing)

- 13.1 The deck joints should be taped and the deck coated with bitumen primer to BS 3416 : 1991 when the vapour control layer is to be bitumen bonded to the substrate. It is recommended that whatever laying pattern is employed, joints are always brick-bonded.
- 13.2 A bitumen felt vapour control layer should always be installed as described in the appropriate part of BS 8217 : 2005. Care should be taken to ensure continuity at joints, upstands and roof penetrations.
- 13.3 It is important to seal any exposed edges of the board, eg at such details as roof vents and upstands, with waterproofing and hot bitumen in accordance with normal practice.
- 13.4 The boards cut and handle easily and provide surfaces suitable for effective bitumen bonding (see also section 13.9).
- 13.5 It is recommended that whatever layer pattern is employed, the board joints should always be taped.

Timber deck (eg tongue-and-groove boards)

13.6 The vapour control layer is nailed to the deck, in accordance with BS 8217 : 2005.

13.7 Hot bitumen is mopped over the vapour control layer and the boards are bedded into it as work proceeds. The boards should be laid broken bond (ie staggered). Only sufficient boards should be laid that can be waterproofed in the same working period.

13.8 On woodwool decks, timber decks, care should be taken to ensure that the board joints do not coincide with those of the deck.

13.9 The waterproofing must be built-up bitumen felt specifications laid fully bonded directly on the boards in accordance with BS 8217 : 2005.

Concrete and screeded concrete decks

13.10 The decks should be dry and clean and free from large projections.

13.11 The vapour control layer and insulation boards are both fully bonded with hot bitumen and waterproofed as described in section 13.9.

Metal decks

13.12 The vapour control layer is bitumen bonded over the metal deck and the laps are sealed. Boards are laid with the long axis at right angles to the corrugations and are bonded with hot bitumen. Boards may be used on decks having a clear span between corrugations as shown in Table 4. Board ends must be cut so that they are supported by the decking.

13.13 On tall buildings or in areas subject to high wind speeds, additional mechanical fixings may be required, using appropriate fixings at the ratio per board specified in the Certificate holder's instructions.

Other roof waterproofing systems

13.14 Other waterproofing layers should be installed in accordance with the Certificate holder's instructions and the relevant Agrément Certificate. Only sufficient boards should be laid that can be waterproofed in the same working period.

Technical Investigations

14 Tests

Tests were carried out by the BBA to determine:

- behaviour under variations in temperature (unrestrained)
- resistance to peel
- behaviour under distributed load and increased temperature
- effect of concentrated load on cantilevered parts
- roll and pour test (BS 4841-3 : 1994)
- bowing under the effect of a thermal gradient
- behaviour on exposure to moisture
- behaviour under concentrated loads in the middle of a free span
- resistance to wind uplift.

15 Investigations

An examination was made of data relating to:

- density
- dimensional stability with temperature
- water vapour permeability
- resistance to wind uplift
- dimensional changes due to variations in humidity
- effect of concentrated load under a free span
- fire rating
- compressive strength
- thermal conductivity (fresh and aged)
- dimensional accuracy
- dimensional variations in unrestrained panels
- behaviour under distributed load and increased temperature
- effect of immersion and heat ageing on compressive and tensile strength.

Additional Information

The management systems of Ecotherm Insulation UK Ltd have been assessed and registered as meeting the requirements of BS EN ISO 9001 : 2000 by the British Standards Institution Quality Assurance (Certificate No Q 05508).

Bibliography

- BS 3416 : 1991 *Specification for bitumen-based coatings for cold application, suitable for use in contact with potable water*
- BS 4841-3 : 1994 *Rigid polyurethane (PUR) and polyisocyanurate (PIR) foam for building applications — Specification for two types of laminated board (roofboards) with auto-adhesively bonded reinforcing facings for use as roofboard thermal insulation for built-up roofs*
- BS 5250 : 2002 *Code of practice for control of condensation in buildings*
- BS 6229 : 2003 *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 8218 : 1998 *Code of practice for mastic asphalt roofing*
- BS 8747 : 2007 *Reinforced bitumen membranes (RBMs) for roofing — Guide to selection and specification*
- BS EN 1991-1-4 : 2005 *Eurocode 1 : Actions on structures — General actions — Wind actions*
- BS EN ISO 6946 : 1997 *Building components and building elements — Thermal resistance and thermal transmittance — Calculation method*
- BS EN ISO 9001 : 2000 *Quality Management Systems — Requirements*

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.

