**Vencel Resil Limited**
Infinity House
Anderson Way
Belvedere
Kent DA17 6BG
Tel: 020 8320 9100 Fax: 020 8320 9110
e-mail: technical@vencel.co.uk
website: www.vencel.co.uk

BBA APPROVAL INSPECTION TESTING CERTIFICATION
TECHNICAL APPROVALS FOR CONSTRUCTION

Agrément Certificate
**96/3299**
**Product Sheet 1**

# VR ROOF INSULATION BOARD

# JABROOF PANEL

## PRODUCT SCOPE AND SUMMARY OF CERTIFICATE

This Certificate relates to Jabroof Panel, a warm roof insulation board, using expanded polystyrene beadboard for use in pitched roofs.

### 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 investigations
- 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 insulation will not contribute to the development stages of a fire or present a smoke or toxic hazard. The boards are classified as class E fire in accordance to EN 13501-1 : 2007, containing a flame-retardant additive (see section 7).

**Resistance to moisture** — the boards 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 boards 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: 8 October 2008
Originally certificated on 19 November 1996

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.*

British Board of Agrément
Bucknalls Lane
Garston, Watford
Herts WD25 9BA



tel: 01923 665300
fax: 01923 665301
e-mail: mail@bba.star.co.uk
website: www.bbacerts.co.uk

# Regulations

In the opinion of the BBA, Jabroof Panel, 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 meet the relevant requirements, the following comments should be noted:

| | | |
|---|---|---|
| Requirement: | B3(4) | Internal fire spread (structure) |
| Comment: | | Junctions between roofs and fire-resisting walls must be fire-stopped. See section 7.1 of this Certificate. |

## 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] 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 meet the relevant requirements, the following comments should be noted:

| | | |
|---|---|---|
| Regulation: | 9 | Building standards — construction |
| Standard: | 2.1 | Compartmentation |
| 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. |

(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 does not normally require maintenance. 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 meet the relevant requirements, the following comments should be noted:

| | | |
|---|---|---|
| Regulation: | E4(4) | Internal fire spread — Structure |
| Comment: | | The product will not affect the external fire rating of a tiled or slated roof in which it is incorporated. See section 7.1 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: 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 Jabroof Panel, 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, Jabroof Panel, 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 Jabroof Panel, which is satisfactory for use as a thermal insulation sarking board above and between rafters for tiled and slated pitched roofs, designed and constructed in accordance with the relevant Clauses of BS 5534 : 2003.

# Technical Specification

## 1 Description

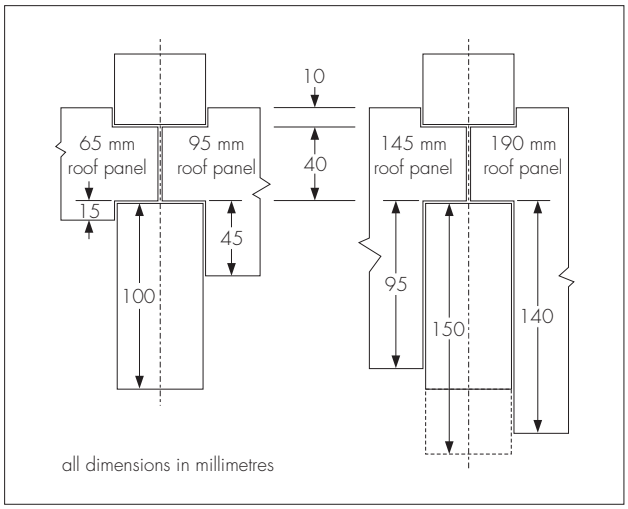
1.1 Jabroof Panel is EPS 100 board, manufactured in accordance with BS EN 13163 : 2001.

1.2 The product is manufactured using CFC-free EPS and has nominal characteristics of:

| | |
|---|---|
| length (mm) | 1200 |
| width (mm) | to suit 600, 450 and 400 rafter centres |
| thickness (mm)(1) | 65, 95, 145 and 190 |
| declared overall thermal conductivity ($Wm^{-1}K^{-1}$) | 0.036 |
| nominal density ($kgm^{-3}$) | 20 |
| vapour resistivity ($MNsg^{-1}m^{-1}$) | 200 |
| edge detail | rebated to suit nominal 38 mm or 50 mm wide rafters and double rafters (see Figure 1). |

(1) Other thicknesses are available to order.

*Figure 1 Panel body dimensions*




1.3 Ancillary products used with the boards are:

- vapour permeable roof tile supported
- aluminium tape
- Helical fixings
- galvanized slab nails
- nailable sarking clips
- nails and treated battens.

## 2 Delivery and site handling

2.1 The boards are delivered to site in polyethylene shrink-wrapped packs containing a label bearing the manufacturer's trade name, product description, and the BBA identification mark incorporating the numbers of this Certificate.

2.2 Care must be taken to avoid damaging corners and edges.

2.3 The boards 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 stored outside, the product should be stacked flat and raised above ground level, and not in contact with ground moisture.

2.4 The boards must not be exposed to open flame or to other ignition sources nor allowed to come onto contact with solvents or bitumen products.

# Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on Jabroof Panel.

## Design Considerations

### 3 General

3.1 Jabroof Panel will improve the thermal insulation of new pitched roofs and is satisfactory for use over and between roof rafters in conjunction with internal lining board, roof tile underlay, 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 boards are for use in pitched roofs where the ceiling follows the pitched of the roof and encloses a habitable space, or where the ceiling is horizontal and encloses a loft space.

3.3 Although the boards will contribute to the buckling and racking strength of the roof, normal cross-bracing must be incorporated.

3.4 During installation, care should be exercised to ensure that the insulation boards are not subjected to any construction, or foot traffic loads. Roof timbers of adequate strength should be used to support such loads.

3.5 It is essential that detailing and jointing of the boards achieves a convection-free envelope of high vapour resistance. Any gaps should be filled, and/or taped. Ridges, abutments and penetrations should also be sealed. Flue pipes passing through the insulation should be suitable sleeved.

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

### 4 Practicability of installation

The boards can be installed easily 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 : 1997 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 boards may be taken as 0.036 $Wm^{-1}K^{-1}$. Example of the U value calculation is shown in Table 1.

*Table 1 U value $Wm^{-2}K^{-1}$*

| Insulation thickness | U value $Wm^{-2}K^{-1}$ |
|---|---|
| 65 | 0.43 |
| 95 | 0.33 |
| 145 | 0.24 |
| 190 | 0.19 |

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 5.3)
- 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 5.3)
- 0.20 $Wm^{-2}K^{-1}$ limit average specified in Mandatory Standard 6.2, clause 6.2.1[1][2] (see also section 5.3)
- 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 5.2 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 boards have 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.

6.3 Where the boards are 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 The boards 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, paragraphs 5.11 and 5.12

*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.

7.2 When installed between or under the rafters the insulation 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.

7.3 The product has a classification of Class E for reaction to fire, containing a flame-retardant additive, in accordance with EN 13501-1 : 2007.

7.4 The use of the boards will not affect the fire rating obtained by tiled or slated roofs when evaluated by assessment or test to BS 476-3 : 2004.

## 8 Strength

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

## 11 Maintenance

As the product is contained within a roof space and has suitable durability (see section 12) maintenance is not required. Damaged boards can be replaced before the installation of counter battens, or timber sarking.

## 12 Durability

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

# Installation

## 13 General

13.1 Installation of Jabroof Panel 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 The boards are light to handle and can be cut easily but care must be taken to prevent damage, particularly edge damage. Since the product will not support the weight of operatives, appropriate care must be taken during installation and tiling.

13.3 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.

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

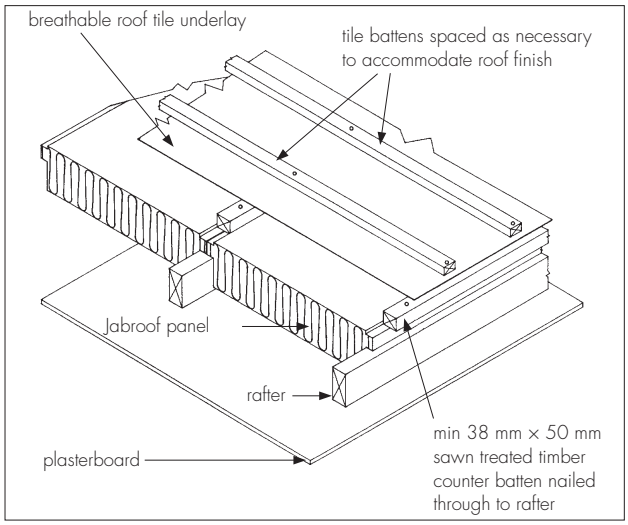
## 14 Procedure

14.1 Installation of the boards into the first rafter run is commenced at the ridge. The first panel in each rafter run is splay cut at the leading edge to an angle dictated by the rafter pitch. The rafter run is then completed to the eaves, the last boards being cut to length if necessary and splayed to the required angle.

14.2 A 38 mm by 50 mm wide treated timber stop end is fixed to the rafters at eaves, abutting the last board in a rafter run.

14.3 The boards are fixed to the rafters by minimum 38 mm by 50 mm sawn treated timber counter battens positioned in the recess over the board lips (see Figure 2).

*Figure 2 Roof Panel*



14.4 Fixing of the counter batten into the rafter is by minimum 115 mm by 5 mm diameter nails (for use with 50 mm rafters only) at 300 mm centres in accordance with BS 5534 : 2003 or by proprietary fastenings, details of which can be obtained from the Certificate holder's Technical Department. The end of the counter batten should overlap and be fixed to the timber stop end.

14.5 The next run of boards is installed between adjacent rafters and fixed in the same manner. This sequence is continued along the roof.

14.6 Badly butted board joints, eg at ridges, eaves, abutments and unsupported board edges, should be filled with an expanding foam filler.

14.7 The roof tile underlay as specified by the Certificate holder should be installed over the counter battens in the normal manner and detailed at eaves, gables, valleys, etc in accordance with appropriate manufacturer's installation instructions.

### Finishing

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

## Technical Investigations

### 15 Tests

The tests were carried out in accordance with BS EN 13163 : 2001.

### 16 Investigations

16.1 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.

16.2 An examination was made of data relating to:

- compressive strength
- flexural strength
- proprietary fixings
- ignitability
- water absorption
- dimensional accuracy
- thermal conductivity
- density.
- fire propagation
- surface spread of flame
- dimensional stability with temperature

16.3 An assessment of the thermal and hygrothermal properties of the system was made including condensation risk calculations for typical constructions.

16.4 A test was also conducted to establish the behaviour of the system under a thermal gradient.

16.5 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.

## Bibliography


BS 476-3 : 2004 *Fire tests on building materials and structures — Classification and method of test for external fire exposure to roofs*

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*

BS EN ISO 6946 : 1997 *Building components and building elements — Thermal resistance and thermal transmittance — Calculation method*

BS EN 13163 : 2001 *Thermal insulation products for buildings — Factory made products of expanded polystyrene (EPS) — Specification*

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

## 17 Conditions

17.1 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.

17.2 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.

17.3 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.

17.4 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.

17.5 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.

British Board of Agrément
Bucknalls Lane
Garston, Watford
Herts WD25 9BA



tel: 01923 665300
fax: 01923 665301
e-mail: mail@bba.star.co.uk
website: www.bbacerts.co.uk