Euroform Products Ltd
The Heliport
Lyncastle Road
Off Barley Castle Lane
Appleton
Warrington
Lancashire WA4 4SN
Tel: 01925 860 999 Fax: 01925 860 066
e-mail: info@euroform.co.uk
website: www.euroform.co.uk

BBA BRITISH BOARD OF AGRÉMENT
TECHNICAL APPROVALS FOR CONSTRUCTION

Agrément Certificate
No 08/4543

PRODUCT SHEET 1 — GEN X MULTIFOIL INSULATION

PRODUCT SCOPE AND SUMMARY OF CERTIFICATE

This Certificate relates to Gen X Multifoil Insulation, 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 — when combined with other types of insulation, the product can contribute in meeting the U value requirement for a roof (see section 4).

Condensation risk — the performance of the product with regard to interstitial and surface condensation has been considered (see section 5).

Behaviour in relation to fire — a roof system using this product can be designed to meet the UK requirements (see section 6).

Durability — the durability of the product is satisfactory and will have a life equivalent to that of the structure in which it is incorporated (see section 11).

The BBA has awarded this Agrément Certificate for Gen X Multifoil Insulation to Euroform Products Ltd as fit for its intended use provided it is installed, used and maintained as set out in this Agrément Certificate.

On behalf of the British Board of Agrément

Head of Approvals — Physics

Chief Executive

Date of First issue: 21 May 2008

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, Gen X Multifoil Insulation, 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:	B3(4)	Internal fire spread (structure)
Comment:		Junctions between roofs and compartment walls must be fire stopped. See sections 7.1 and 7.3 of this Certificate.
Requirement:	C2(c)	Resistance to moisture
Comment:		The product can contribute to a roof meeting this Requirement. See sections 6.1 and 6.7 of this Certificate.
Requirement:	L1(a)(i)	Conservation of fuel and power
Comment:		Roofs incorporating the product can contribute to a building meeting its Target Emission Rate. See sections 5.1 to 5.4 of this Certificate.
Requirement:	Regulation 7	Materials and workmanship
Comment:		The product is acceptable. See section 12 and the *Installation* part 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 satisfying this Regulation. See sections 11 and 12 and the *Installation* part of this Certificate.
Regulation:	9	Building standards — construction
Standard:	2.2	Separation
Comment:		The product must not penetrate the separating wall junction with the roof to ensure that the fire-resistant integrity of the separating wall is maintained in accordance with clause 2.2.10[1]. See sections 7.1 and 7.3 of this Certificate.
Standard:	3.15	Condensation
Comment:		The product can contribute to a roof satisfying the requirements of clauses 3.15.1[1] to 3.15.5[1] and 3.15.7[1] of this Standard. See sections 6.1 and 6.8 of this Certificate.
Standard:	6.1 (a)(b)	Carbon dioxide emissions
Standard:	6.2	Building insulation envelope
Comment:		The product can contribute to a roof satisfying the requirements of these Standards, with reference to clauses or parts of 6.1.2[1], 6.1.6[1], 6.2.1[1], 6.2.3[1], 6.2.4[1] and 6.2.5[1]. See sections 5.1 to 5.4 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].

(1) Technical Handbook (Domestic).

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

Regulation:	B2	Fitness of materials and workmanship
Comment:		The product is acceptable. See section 12 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 can contribute to a roof satisfying the requirements of this Regulation. See section 6.1 of this Certificate.
Regulation:	E5(b)	External fire spread
Comment:		The product will not affect the external fire rating of a tiled or slated roof in which it is installed. See sections 7.1 and 7.3 of this Certificate.
Regulation:	F2(a)(i)	Conservation measures
Regulation	F3(2)	Target carbon dioxide Emissions Rate
Comment:		The product can contribute to a building satisfying its Target Emission Rate. See sections 5.1 to 5.4 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 section:	2 *Delivery and site handling* (2.2).

Non-regulatory Information

NHBC Standards 2007

NHBC accepts the use of Gen X Multifoil Insulation, 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, Gen X Multifoil Insulation, 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 Gen X Multifoil Insulation and is for use as an insulation above or below rafters in tiled or slated pitched roofs designed and constructed in accordance with the relevant clauses of BS 5534 : 2003.

Technical Specification

1 Description

1.1 Gen X Multifoil Insulation is an insulation material comprising outer layers of coated metallised film, laminated to a polymer fabric enclosing the core and stitched and taped along both long edges. The core of the product consists of three layers of polyester fibre wadding (white colour) separated by two metallised film layers.

1.2 The product is available in the following sizes:

- length (mm) 12.5
- width (mm) 1.2
- thickness (mm) 33.0

1.3 Ancillary items used with the product are:

- Gen X tape (aluminized self adhesive tape), width 76mm
- vapour control layer(1)
- pre treated counter battens, softwood battens and tiling laths(1)
- additional insulation where required(1).
- 14mm galvanized staples or nails(1)
- roof tile underlay(1)
- roofing slates or tiles(1)

(1) Outside the scope of this Certificate.

2 Delivery and site handling

2.1 The product is delivered to site on rolls packed in a protective, branded bag sealed with an end label. Installation instructions are provided on the bag.

2.2 The rolls should be stored in clean, dry conditions not exposed to sunlight. The product must be protected from being dropped or crushed by objects. Care must be exercised when storing large quantities on site. The product must not be exposed to open flame or other ignition sources and must be stored away from flammable material such as paint and solvents.

2.3 On site, to ensure maximum performance of the product when installed, precautions must be taken to protect it from mud and dirt.

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on Gen X Multifoil Insulation.

Design Considerations

3 Use

3.1 Gen X Multifoil Insulation is a flexible insulation used in conjunction with other insulation materials to reduce the U value (thermal transmittance) in new or existing pitched roofs. The product is for use above and below rafters. When installed under the rafters, the product performs as a vapour control layer in the roof system (see section 6).

3.2 The product is for use in constructions where the ceiling follows the pitch of the roof and encloses a habitable space.

3.3 The product must be used in conjunction with an appropriate roof tile underlay. Care must be taken to ensure that the product is covered after installation, as it must not be exposed to rain, showers or wind-driven rain.

3.4 Care must be taken to ensure the product does not come into contact with heat sources greater than 80°C.

4 Practicability of installation

The product can be installed simply by following the instructions supplied.

5 Thermal performance

5.1 The ultimate thermal performance of the product will depend on the construction of the roof on which it is installed and the combination of it with other insulation products is necessary to achieve the following design U values:

England and Wales and Northern Ireland

- 0.16 Wm^2K^{-1} required for 'notional' dwellings in SAP 2005
- 0.25 $Wm^{-2}K^{-1}$ limit average value specified in Approved Document L1A (Table 2) and Technical Booklet F1 (Table 2.2)
- 0.35 $Wm^{-2}K^{-1}$ limit for an individual element specified in Approved Document L1A (Table 2) and Technical Booklet F1 (Table 2.2).

Scotland

- 0.16 $Wm^{-2}K^{-1}$ for a 'notional' domestic roof required for all fuel packages in Mandatory Standard 6.1, clauses 6.1.6(1) and 6.1.2(1)
- 0.20 $Wm^{-2}K^{-1}$ maximum average specified in Mandatory Standard 6.2, clause 6.2.1(1)
- 0.35 $Wm^{-2}K^{-1}$ maximum value for an individual roof element specified in Mandatory Standard 6.2, clause 6.2.1(1)
- 0.20 $Wm^{-2}K^{-1}$ for extensions as described in Mandatory Standard 6.2, clause 6.2.9(1).

(1) Technical Handbook (Domestic).

5.2 Where a proposed roof U value is higher than the relevant 'notional' value specified in section 5.1, additional energy saving measures will be required in the building envelope and/or services in order to achieve the required overall carbon dioxide emission rate reduction of about 20% in dwellings and 18% to 25% for dwellings in Scotland.

5.3 Compliance with the guidance referred to in section 5.4 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 use 'simplified approach' for Scotland).

5.4 The product can maintain or contribute to maintaining continuity of thermal insulation at junctions between the external wall 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).

5.5 Calculations of the thermal transmittance (U value) of specific roof constructions incorporating the product 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 following values:

- emissivity of outer layers 0.17
- core thermal resistance 0.97
- thermal resistance of insulation with minimum air layer either side 1.9

5.6 For constructions incorporating a number of non-ventilated cavities and a low overall U value, convective and radiative heat transfer across cavities can be less than those predicted by the 'simplified' method in BS EN ISO 6946 : 1997. This can be seen in the results of guarded hot box testing or by detailed calculations, for example using ISO 15099 : 2003. Such values are, however, construction specific and cannot be transferred between one construction to another.

6 Condensation risk

Interstitial condensation

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

6.2 The risk of interstitial condensation is greatest when the building is drying out after construction. Guidance on preventing condensation from this and other sources is given in BRE Digest 369 *Interstitial condensation and fabric degradation* and BRE report (BR 262 : 2002) *Thermal insulation: avoiding risks*.

6.3 The product has a high water vapour resistance with a measured value in excess of 6000 $MNsg^{-1}$.

6.4 When installed in accordance with section 13 and in a continuous layer, the product will provide a convection free envelope of high vapour resistance.

6.5 The product will perform as a vapour control layer and should be used in conjunction with a vapour permeable roof tile underlay.

6.6 In all cases, where high vapour resistance roof tile underlays are used, ventilation to the air space should be in accordance with the recommendations of BS 5250 : 2002 or relevant BBA Certificate for the roof tile underlay. When installed in conjunction with other insulation materials, the water vapour resistance and installation instructions of the additional insulation should be taken into consideration.

Surface condensation

6.7 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 TSO 2002 or BRE Information Paper IP 1/06.

6.8 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 be obtained from Section 8 of BS 5250 : 2002 and BRE report (BR 262 : 2002).

7 Behaviour in relation to fire

7.1 The Certificate holder has declared that the product when tested for reaction to fire to BS EN ISO 11925-2 : 2002, achieved a Class E rating in accordance with BS EN 13501-1 : 2007.

7.2 When installed with an internal lining board, eg 12.5 mm thick plasterboard, 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 insulation 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, Sections 5.11 to 5.12

Scotland — Mandatory Standard 2.2, clause 2.2.10(1)

(1) Technical Handbook (Domestic).

Northern Ireland — Technical Booklet E, paragraph 3.21.

7.4 The use of the product will not affect the fire rating obtained by tiled or slated roofs when evaluated by assessment or test to BS 476-3 : 1958.

7.5 When installed with other additional insulation materials, the fire properties of these materials must be taken into consideration.

8 Proximity of flues and appliances

When the product is installed in close proximity to certain flue pipes and/or heat-producing appliances, for buildings subject to national Building Regulations the relevant provisions and guidance given below should be met:

England and Wales — Approved Document J

Scotland — Mandatory Standard 3.19, clause 3.19.4(1)

(1) Technical Handbook (Domestic).

Northern Ireland — Technical Booklet L.

9 Air leakage

9.1 The insulation was tested to BS EN 12114 : 2000 with positive pressure of 50 Pa and 100 Pa. The leakage rate was 0.1 $m^3h^{-1}m^{-2}$ and 0.4 $m^3h^{-1}m^{-2}$ respectively.

9.2 When the product is used as a vapour control layer and an air barrier, the airtightness of the system is reliant on the careful sealing of the insulation and is dependent on maintaining the integrity of seal throughout. In addition to sealing at all joints, the insulation must be suitably sealed at the perimeter and all penetrations. Details of sealing at eaves, ridges, hips, valleys and penetrations must be in accordance with the Certificate holder's instructions.

9.3 The airtightness of the building will also be dependent on the performance of the other building elements. Provided these also incorporate appropriate design details and building techniques, air infiltration through the building fabric should be minimal and the building reasonably airtight.

10 De-rating of electrical cables

As with other insulation products, it may be necessary in some cases to de-rate electrical cables buried in insulation. In BS 7671 : 2001 it is suggested that where wiring is completely surrounded by insulation, it may need to be de-rated to as low as half its free air current carrying capacity. Guidance should be sought from a qualified electrician.

11 Maintenance

Once installed, the product does not require any maintenance. Small holes, rips or punctures in the outer layers should be repaired with Gen X tape.

12 Durability

The product is rot-proof, does not tear easily and when installed as specified, will have a life equivalent to that of the roof structure in which it is incorporated.

Installation

13 General

13.1 Installation of Gen X Multifoil Insulation and additional insulation products should be in accordance with the Certificate holder's instructions and current good building practice.

13.2 During construction, care must be taken to ensure the product is not damaged during installation. Should damage occur by tearing, the product should be repaired with tape or replaced.

13.3 The product is attached to the rafters by using staples or nails of at least 14 mm length.

13.4 The product must have overlap joints of at least 50 mm and be taped along the entire length of the joint with Gen X tape.

13.5 When the product is cut to fit around openings, eg the roof perimeter, care should be taken to minimise gaps.

13.6 The product can be cut easily by using sharp scissors or a knife.

13.7 Any exposed cut edges of the product should be sealed with Gen X adhesive tape.

13.8 Prior to fixing the product, sufficient time must be allowed for the dispersion of solvents contained in some wood preservatives and damp-proofing treatments where applied. Backgrounds should be allowed to dry out before fixing the system.

14 Procedure

Above rafter installation (see Figure 1)

14.1 Installation starts from eaves and the insulation is unrolled parallel to the eaves.

14.2 As the product is unrolled across the rafters it is fixed using nails or staples of at least 14 mm length.

14.3 The next roll must overlap the preceding layer by at least 50 mm, and the overlap should be sealed along the entire length using Gen X tape.

14.4 The product should be permanently fixed in place using wooden counter battens 32 mm by 25 mm parallel to the rafters, held in place with nails.

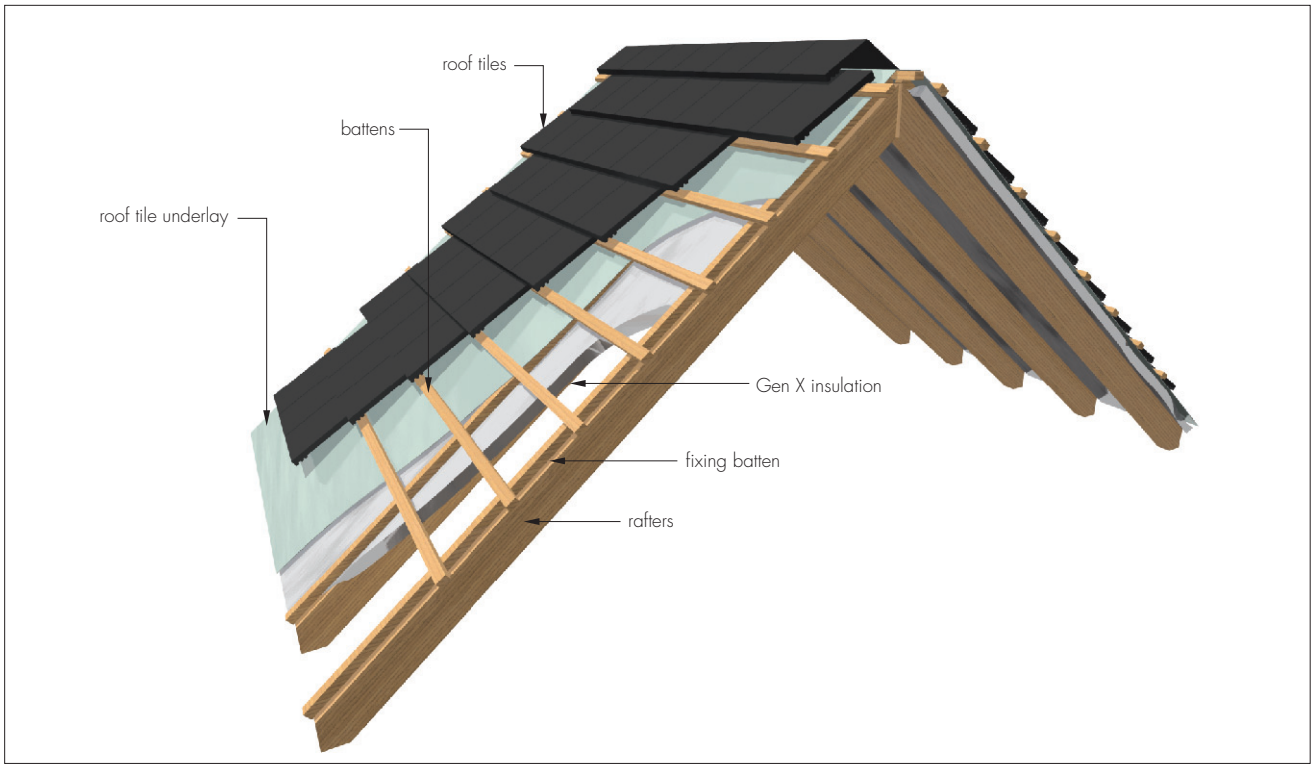
14.5 When the top layer has been counter battened, any excess material may folded over the ridge and counter battened on completion of the opposite pitch.

14.6 A breathable roofing membrane (ie roof tile underlay) should be installed on the counter battens and tiling battens attached perpendicular to the rafters.

14.7 Roof tiles or slates are installed in accordance with BS 5534 : 2003.

14.8 When applying roof tiles or slates to a warm roof construction the recommendations of the tile/slate manufacturer should be followed.

Figure 1 Installing Gen X above rafters



Below rafters installation (see Figure 2)

14.9 Installation starts from the ridge with the product being unrolled parallel to the eaves.

14.10 As the product is unrolled across the rafters, it is fixed in place using nails or staples of at least 14 mm depth.

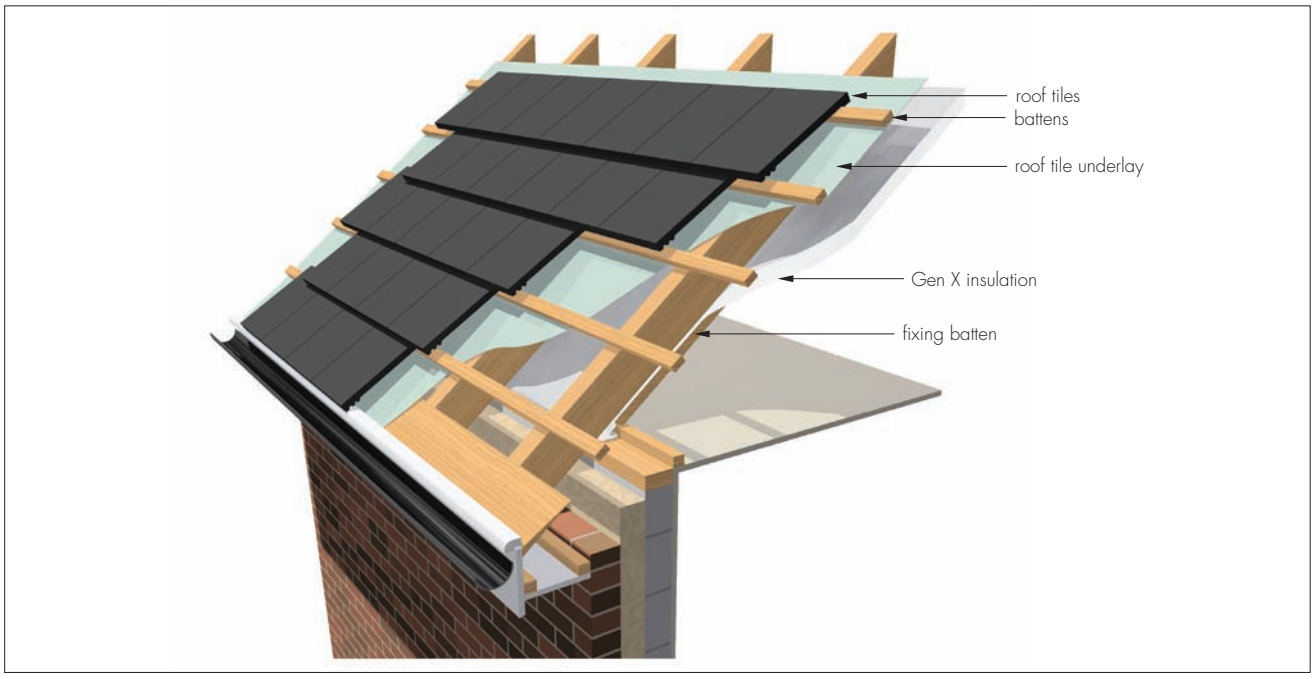
14.11 The next roll must overlap the preceding layer by at least 50 mm, and the overlap should be sealed along the entire length using tape (see section 1.3).

14.12 The product should be permanently held in place using wooden battens fixed with nails. Battens may run perpendicular to the rafters.

14.13 When the bottom layer has been battened, any excess material may be cut by running a sharp knife along the edge parallel to floor level.

14.14 Any exposed cut edges of the product should be sealed with a suitable adhesive tape. Any tears or holes in the outer layer should be repaired with Gen X tape.

Figure 2 Installing Gen X below rafters



14.15 A plasterboard is fixed to the battens. The batten size should be at least 32 mm by 25 mm, and fixed with sufficient fixings. This batten size should be sufficient to ensure a 20 mm air gap between the product and the plasterboard.

Additional insulation

14.16 When used with other additional insulation materials, care should be taken to ensure that all gaps are maintained in accordance with the manufacturer's instructions for their products, and advice should be sought from the Certificate holder.

14.17 Rigid polyurethane (PUR) or rigid polyisocyanurate (PIR) products can be placed with a 25 mm gap above and below the Gen X insulation between rafters. Suitable fixings such as wooden battens nailed to the sides of the rafters or clips should be used in accordance with the manufacturer's instructions.

Technical Investigations

15 Tests

Tests were carried out on Gen X Multifoil Insulation to determine the core thermal resistance, the emissivity and durability of the outer foil, air infiltration properties and water vapour transmission.

16 Investigations

16.1 Thermal resistance (R-values) were calculated iteratively in accordance with ISO 15099 : 2003 for specific constructions, and supported by measurements in a heat flow meter (see section 5.6).

16.2 An assessment of the risk of interstitial condensation in typical constructions was made.

Bibliography

BS 476-3 : 1958 *Fire tests on building materials and structures — External fire exposure roof test*

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

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

BS 7671 : 2001 *Requirements for electrical installations. IEE Wiring Regulations. Sixteenth Edition*

BS EN 12114 : 2000 *Thermal performance of buildings — Air permeability of building components and building elements – Laboratory test method*

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

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

BS EN ISO 11925-2 : 2002 *Reaction to fire tests — Ignitability of building products subjected to direct impingement of flame — Single-flame source test*

ISO 15099 : 2003 *Thermal performance of windows, doors and shading devices — Detailed calculations*

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.

Blank Page

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