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Agrément Certificate
06/4379
Product Sheet 1

MULTIFOIL INSULATION

TLX SILVER AND TLX SILVER FB FOR PITCHED ROOFS

PRODUCT SCOPE AND SUMMARY OF CERTIFICATE

This Certificate relates to TLX Silver and TLX Silver FB for Pitched Roofs, reflective insulation materials for use above and/or below rafters in slated or tiled roofs designed in accordance with BS 5534 : 2003 in domestic applications and existing buildings. The products can also be used in dormer cheeks and dwarf wall applications in the 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 products can contribute to meeting the U value requirement for a roof (see section 5).

Condensation risk — the products have a water vapour resistance in excess of $1200 \text{ MN}\cdot\text{s}\cdot\text{g}^{-1}$ (see section 6).

Durability — the durability of the products is satisfactory and will have a life equivalent to that of the roof structure in which it is incorporated (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

Simon Wroe
Head of Approvals — Physics

Greg Cooper
Chief Executive

Date of Third issue: 21 April 2011

Originally certificated on 27 October 2006

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, TLX Silver and TLX Silver FB for 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 2010 (England and Wales)

| | | |
|--------------|----------|---|
| Requirement: | C2(c) | Condensation |
| Comment: | | The products can contribute to a roof meeting this Requirement. See sections 6.1 and 6.5 of this Certificate. |
| Requirement: | L1(a)(i) | Conservation of fuel and power |
| Comment: | | The products can contribute to meeting this Requirement. See section 5.3 of this Certificate. |
| Requirement: | 7 | Materials and workmanship |
| Comment: | | The products are acceptable. See section 11 and the <i>Installation</i> part of this Certificate. |



The Building (Scotland) Regulations 2004 (as amended)

| | | |
|-------------|--------|---|
| Regulation: | 8(1) | Fitness and durability of materials and workmanship |
| Comment: | | The products can contribute to a construction satisfying this Regulation. See section 11 and the <i>Installation</i> part of this Certificate. |
| Regulation: | 9 | Building Standards – construction |
| Standard: | 3.15 | Condensation |
| Comment: | | The products can contribute to satisfying this Standard, with reference to clauses 3.15.1 ⁽¹⁾ , 3.15.3 ⁽¹⁾ to 3.15.5 ⁽¹⁾ and 3.15.7 ⁽¹⁾ . See sections 6.1 and 6.6 of this Certificate. |
| Standard: | 6.1(b) | Carbon dioxide emissions |
| Standard: | 6.2 | Building insulation envelope |
| Comment: | | The products can contribute to satisfying clauses, or parts of 6.1.1 ⁽¹⁾ , 6.1.3 ⁽¹⁾ , 6.1.6 ⁽¹⁾ , 6.2.1 ⁽¹⁾ , 6.2.3 ⁽¹⁾ , 6.2.4 ⁽¹⁾ , 6.2.6 ⁽¹⁾ , 6.2.7 ⁽¹⁾ , 6.2.9 ⁽¹⁾ to 6.2.11 ⁽¹⁾ and 6.2.13 ⁽¹⁾ of these Standards. See section 5.3 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⁾ 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 products are acceptable. See section 11 and the <i>Installation</i> part of this Certificate. |
| Regulation: | C5 | Condensation |
| Comment: | | The products can contribute to a roof satisfying this Regulation. See section 6.1 of this Certificate. |
| Regulation: | F2(a)(i) | Conservation measures |
| Regulation: | F3(2) | Target carbon dioxide Emissions Rate |
| Comment: | | The products can contribute to meeting these Regulations. See section 5.3 of this Certificate. |

Construction (Design and Management) Regulations 2007

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

In the opinion of the BBA, there is no information in this Certificate which relates to the obligations of the client, CDM co-ordinator, designer or contractors under these regulations.

Non-regulatory Information

NHBC Standards 2011

NHBC accepts the use of TLX Silver and TLX Silver FB for Pitched Roofs, when installed and used in accordance with this Certificate, in relation to *NHBC Standards*, Chapter 7.2 *Pitched roofs*, Design Standard 7.2, Clause D10-D11.

Technical Specification

1 Description

1.1 TLX Silver and TLX Silver FB for Pitched Roofs are insulation materials comprising outer layers of coated metallised film, laminated to a nonwoven polypropylene fabric enclosing the core and welded along both long edges. The core of the products consists of five layers of polyester fibre wadding separated by four metallised film layers.

1.2 The products are available in rolls with the dimensions shown in Table 1.

Table 1 Product dimensions

| | Width (m) | Length (m) | Thickness (mm) |
|---------------|------------------------------|---------------|-------------------|
| TLX Silver | 0.4, 0.6, 1.2, 2.4, 2.7, 3.0 | 10 | 30 |
| TLX Silver FB | 0.4, 0.6, 1.2, 2.4, 2.7, 3.0 | 8 | 50 |

1.3 Ancillary items used with the products which are outside the scope of this Certificate include:

- 50 mm duct tape (silver)
- TLX tape, foil-backed tape with acrylic adhesive, width 50 mm, 75 mm or 100 mm
- 14 mm staples or nails
- vapour control layer
- roof tile underlay
- pre-treated counter battens, softwood battens and tiling laths
- roofing slates or tiles
- additional insulation.

2 Delivery and site handling

2.1 The products are delivered to site in rolls packed in a protective, branded bag, sealed with an end label. Fitting instructions are placed in the bag.

2.2 The rolls should be stored in clean, dry conditions not exposed to sunlight. The products must be protected from being dropped or crushed by objects. Care must be exercised when storing large quantities on site. The products 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 products when installed, precautions must be taken to protect them from mud and dirt.

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on TLX Silver and TLX Silver FB for Pitched Roofs.

Design Considerations

3 General

3.1 TLX Silver and TLX Silver FB for Pitched Roofs are suitable for use as flexible insulations used in conjunction with other insulation materials to reduce the thermal transmittance (U value) in new or existing pitched roofs. When installed under the rafters, the products perform as a vapour control layer in the roof system (see section 6).

3.2 The products are for use in constructions where the ceiling follows the pitch of the roof and encloses a habitable space. The products can also be used in dormer cheeks and dwarf walls.

3.3 Care must be taken to ensure that the products are covered after installation, as they must not be exposed to rain, showers or wind-driven rain.

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

4 Practicability of installation

The products are designed to be installed by a competent general builder, or a contractor, experienced with these types of products.

5 Thermal Performance

5.1 Calculations of thermal transmittance (U value) should be carried out in accordance with BS EN ISO 6946 : 2007 and BRE Report (BR 443 : 2006) *Conventions for U-value calculations* using the following values:

- 0.91 m²·K·W⁻¹ R value for TLX Silver (30 mm thick)
- 1.43 m²·K·W⁻¹ R value for TLX Silver FB (50 mm thick)
- 0.06 m²·K·W⁻¹ R value of products when compressed between battens and rafters, to a nominal 2 mm thickness
- 0.05 outer surface emissivity for TLX Silver and TLX Silver FB
- 0.45⁽¹⁾ m²·K·W⁻¹ R value of an air cavity adjacent to the product ≥13 mm thick (upward heat flow)
- 0.66⁽¹⁾ m²·K·W⁻¹ R value of an air cavity adjacent to the product ≥20 mm thick (horizontal heat flow)
- 30%/70% percentage⁽²⁾ of Multi-Foil thickness in rafter and plasterboard-batten cavities, respectively, for roof applications

- 50%/50% percentage of Multi-Foil thickness in stud and plasterboard-batten cavities, respectively, for dormer cheek and dwarfwall applications
 - 0%/100% percentage of Multi-Foil thickness in stud/rafter and plasterboard-batten cavities, respectively, when rafter or stud depth is fully filled with insulation.
- (1) Unventilated cavity with a width and length at least 10 times the thickness and one high emissivity surface.
 (2) For guidance on U value calculations refer to the BBA Information Bulletin No 3 *Reflective foil insulation — Conventions for U value calculations*.

5.2 The U value of a completed element will depend largely on the thickness and conductivity of the additional insulation used and the extent and arrangement of timber bridging. Example roof constructions are shown in Figure 1 and resulting U values in Table 2.

Figure 1 Example roof constructions

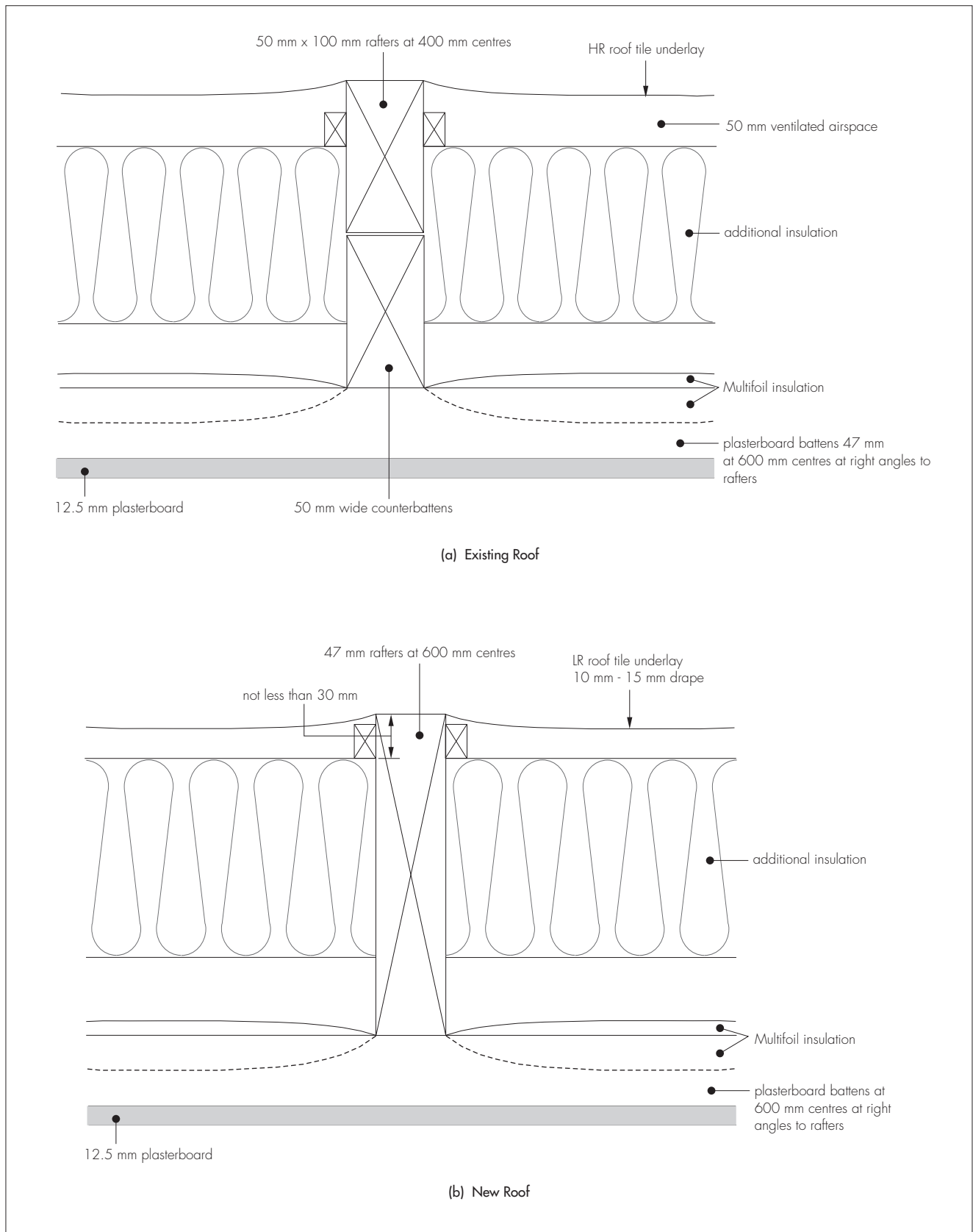



Table 2 U values for specific constructions as detailed

| Construction | Multi-foil | Rafter depth (mm) | Batten depth (mm) | Additional insulation thickness ⁽¹⁾ (mm) | U value [$W \cdot m^{-2} \cdot K^{-1}$] ⁽²⁾ |
|------------------|---------------|-------------------|-------------------|---|--|
| Refurbished roof | TLX Silver | 200 | 38 | 115 | 0.18 |
| Figure 1 (a) | TLX Silver FB | 180 | 50 | 100 | 0.18 |
| New roof | TLX Silver | 200 | 38 | 130 | 0.14 |
| Figure 1 (b) | TLX Silver FB | 200 | 50 | 120 | 0.14 |

(1) PUR Insulation (conductivity $0.022 W \cdot m^{-1} \cdot K^{-1}$ and emissivity 0.2, thickness rounded to nearest 5 mm.

(2) Assumes $\Delta U_g = 0$, ie no gaps exceeding 5 mm width penetration the insulation layer.

 5.3 The products can contribute to maintaining continuity of thermal insulation at junctions between elements and openings. For Accredited Construction Details the corresponding psi values in BRE Information Paper IP1/06 *Assessing the effects of thermal bridging at junctions and around openings*, Table 3 may be used in carbon emission calculations in Scotland and Northern Ireland. Detailed guidance for other junctions and on limiting heat loss by air infiltration can be found in:

England and Wales — Approved Documents to Part L and for new thermal elements to existing buildings, Accredited Construction Details (version 1.0). See also SAP 2009 Appendix K and the *iSBEM User Manual* for new-build

Scotland — Accredited Construction Details (Scotland)

Northern Ireland — Accredited Construction Details (version 1.0).

6 Condensation risk

Interstitial condensation


 6.1 Roofs incorporating the products 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 products have a vapour resistance in excess of $1200 MN \cdot s \cdot g^{-1}$. 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 also be taken into consideration.

6.4 When using this type of product, due consideration must be taken of the overall installation to minimise perforations by services, eg light switches and power outlets and the joints at ceiling and skirting level must be well sealed.

Surface condensation

 6.5 Roofs will adequately limit the risk of surface condensation when the thermal transmittance (U value) does not exceed $0.35 W \cdot m^{-2} \cdot K^{-1}$ at any point and the junctions with 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 $1.2 W \cdot m^{-2} \cdot K^{-1}$ at any point. Guidance may be obtained from BS 5250 : 2002, Section 8, and BRE Report (BR 262 : 2002).

7 Behaviour in relation to fire

7.1 The Certificate holder has declared that the products, 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 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 and 5.12

Scotland — Mandatory Standard 2.2, clause 2.2.10⁽¹⁾

(1) Technical Handbook (Domestic).

Northern Ireland — Technical Booklet E, paragraph 3.21.

7.3 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 stage of a fire or present a smoke or toxic hazard.

7.4 The use of the products will not affect the fire rating obtained by tile 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.

7.6 The products will melt and shrink away from heat, but will burn in the presence of a naked flame.

7.7 When the products are used unsupported, there is a risk that fire can spread if it is accidentally ignited during maintenance works, eg by a roofer's or plumber's torch. Care should be taken during building and maintenance to avoid the material becoming ignited.

8 Proximity of flues and appliances

When the products are 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, paragraph 2.15

Scotland — Mandatory Standard 3.19, clauses 3.19.1⁽¹⁾ and 3.19.4⁽¹⁾

(1) Technical Handbook (Domestic).

Northern Ireland — Technical Booklet L, paragraph 2.9.

9 Air leakage

9.1 When tested to BS EN 12114 : 2000 with positive pressure of 50 Pa, the products achieved a leakage rate of $0.19 \text{ m}^3 \cdot \text{h}^{-1} \cdot \text{m}^{-2}$.

9.2 When used as a vapour control layer and an air barrier, the products' effectiveness is reliant on the careful sealing of the laps, joints, perimeters and penetrations, 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.

10 Maintenance

As the products are confined within a roof structure and have suitable durability (see section 11), maintenance is not required.

11 Durability



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

Installation

12 General

12.1 Installation of the products and additional insulation products should be in accordance with the Certificate holder's instructions and current good building practice.

12.2 During construction, care must be taken to ensure the product is not damaged during installation. Should damage occur by tearing, the products should be repaired by covering the holes with tape (see also section 13.14) or replaced.

12.3 The products are attached to the rafters by using staples or nails of at least 14 mm length. Double-sided tape and glue can also be used.

12.4 The products must have overlap joints of at least 50 mm and be taped along the entire length of the joint with tape (see section 1.3).

12.5 When the products are cut to fit around openings, eg the roof perimeter, care should be taken to minimise gaps.

12.6 The products can be cut using sharp scissors or a knife.

12.7 Any exposed cut edges of the products should be sealed with the TLX adhesive tape.

13 Procedure

Above rafters installation

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

13.2 As the products are unrolled across the rafters they are fixed using nails or staples of at least 14 mm length.

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

13.4 The products should be permanently fixed in place using wooden battens parallel or perpendicular to the rafters, held in place with nails.

13.5 When the top layer has been battened, any excess material may be cut by running a sharp knife along the edge of the batten.

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

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

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

Below rafters installation

13.9 Installation starts from the ridge with the products being unrolled parallel to the eaves.

13.10 As the products are unrolled across the rafters, they are fixed in place using glue, double-sided tape, nails or staples of at least 14 mm depth.

13.11 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).

13.12 The products should be permanently held in place using wooden battens fixed with nails. Battens may run either parallel or perpendicular to the rafters.

13.13 When the bottom layer has been battened, any excess material may be cut by running a sharp knife along the edge of the batten.

13.14 Any exposed cut edges of the products should be sealed with a suitable adhesive tape. Any tears or holes in the outer layer should be repaired with heat-reflective tape.

13.15 Plasterboard is fixed to the battens. The batten size should be at least 38 mm by 50 mm, with the fixings at either 150 mm spacing for nails or 230 mm for screws. This batten size should be sufficient to ensure a 20 mm air gap between the product and the plasterboard.

Additional insulation

13.16 When installing with other additional insulation materials, care should be taken to ensure that all gaps are maintained in accordance with the Certificate holder's instructions for their products.

13.17 When the products are installed below the rafters, mineral wool products can be placed directly on top of the products between the rafters without an air space. When the products are installed above the rafters, mineral wool can rest on the vapour control layer and plasterboard without an air space.

13.18 Rigid polyurethane (PIR) products can be placed with a gap above and below the 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

14 Tests

Tests were carried out on TLX Silver and TLX Silver FB for Pitched Roofs and the results assessed to determine the emissivity and durability of the outer foil. The thickness and the resistance of the core material of TLX Silver FB were also tested.

15 Investigations

15.1 A re-examination was made of the data on which the first issue of Certificate 06/4379 was based and the original conclusions remain valid.

15.2 Thermal transmittance (U values) were measured according to BS EN ISO 8990 : 1996 with 30 mm thickness of TLX, installed in a representative roof section. The U value of the roof structure with TLX installed above rafters was $0.53 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$ and $0.29 \text{ W}\cdot\text{m}^{-2}\cdot\text{K}^{-1}$ when installed under and above the rafters.

15.3 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 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 : 2007 *Building components and building elements — Thermal resistance and thermal transmittance — Calculation method*

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 Publications and documents referred to in this Certificate are those that the BBA deems to be relevant at the date of issue or re-issue of this Certificate and include any: Act of Parliament; Statutory Instrument; Directive; Regulation; British, European or International Standard; Code of Practice; manufacturers' instructions; or any other publication or document similar or related to the aforementioned.

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.