

TLX Insulation Ltd

Moss Lane
Blackrod
Bolton
Lancashire BL6 5JB
Tel: 01204 695666 Fax: 01204 695333
e-mail: tlx@tlxinsulation.co.uk
website: www.tlxinsulation.co.uk



Agrément Certificate
06/4379
Product Sheet 4

MULTIFOIL INSULATION

TLX GOLD INSULATING BREATHER MEMBRANE FOR PITCHED ROOFS

This Agrément Certificate Product Sheet⁽¹⁾ relates to TLX Gold Insulating Breather Membrane for Pitched Roofs⁽²⁾, a breathable roofing membrane and insulation with a breathable reflective layer, for use above rafters in slated or tiled roofs designed in accordance with BS 5534 : 2014 in new and existing domestic buildings.

(1) Hereinafter referred to as 'Certificate'.

(2) Hereinafter referred to as TLX Gold.

CERTIFICATION INCLUDES:

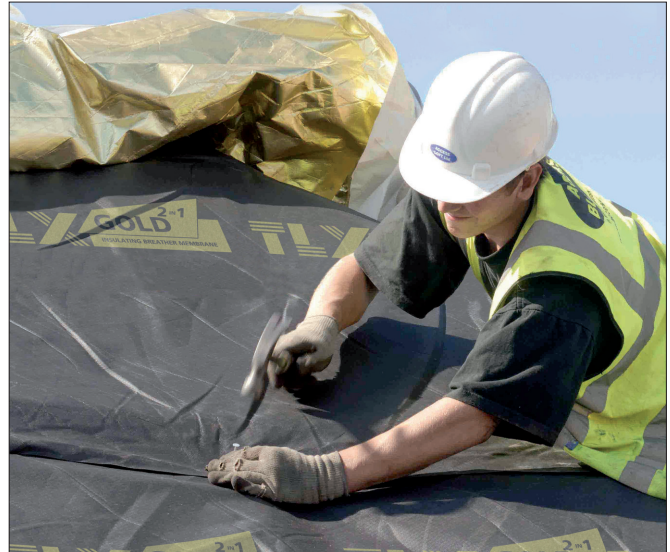
- factors relating to compliance with Building Regulations where applicable
- factors relating to additional non-regulatory information where applicable
- independently verified technical specification
- assessment criteria and technical investigations
- design considerations
- installation guidance
- regular surveillance of production
- formal three-yearly review.

KEY FACTORS ASSESSED

Thermal performance — the product has an emissivity of 0.16 for the outer foil and a declared (R_p) thermal resistance of $0.85 \text{ m}^2 \cdot \text{K} \cdot \text{W}^{-1}$ (see section 6).

Condensation risk — the product can provide effective control for the passage of water vapour (see section 7).

Durability — under normal conditions, the product will have a life equivalent to that of the roof structure in which it is incorporated (see section 14).



The BBA has awarded this Certificate to the company named above for the product described herein. This product has been assessed by the BBA as being fit for its intended use provided it is installed, used and maintained as set out in this Certificate.

On behalf of the British Board of Agrément

Date of First issue: 30 November 2015

John Albon — Head of Approvals
Construction Products

Claire Curtis-Thomas
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
Watford
Herts WD25 9BA

tel: 01923 665300
fax: 01923 665301
clientservices@bba.star.co.uk
www.bbacerts.co.uk

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Regulations

In the opinion of the BBA, TLX Gold, if installed, used and maintained in accordance with this Certificate, can satisfy or contribute to satisfying the relevant requirements of the following Building Regulations (the presence of a UK map indicates that the subject is related to the Building Regulations in the region or regions of the UK depicted):



The Building Regulations 2010 (England and Wales) (as amended)

Requirement:	C2(b)	Resistance to moisture
Comment:		The product can contribute to a roof satisfying this Requirement. See sections 7.1 and 7.5 of this Certificate.
Requirement:	C2(c)	Resistance to moisture
Comment:		The product can contribute to satisfying this Requirement. See sections 7.1 and 7.5 of this Certificate.
Requirement:	L1(a)(i)	Conservation of fuel and power
Comment:		The product can contribute to satisfying this Requirement. See section 6 of this Certificate.
Regulation:	7	Materials and workmanship
Comment:		The product is acceptable. See section 14 and the <i>Installation</i> part of this Certificate.
Regulation:	26	CO₂ emission rates for new buildings
Regulation:	26A	Fabric energy efficiency rates for new dwellings (applicable to England only)
Regulation:	26A	Primary energy consumption rates for new buildings (applicable to Wales only)
Regulation:	26B	Fabric performance values for new dwellings (applicable to Wales only)
Comment:		The product can contribute to satisfying these Regulations when appropriate compensating fabric/services measures are taken. See section 6 of this Certificate.



The Building (Scotland) Regulations 2004 (as amended)

Regulation:	8(1)	Durability, workmanship and fitness of materials
Comment:		The product can contribute to satisfying this Regulation. See section 14 and the <i>Installation</i> part of this Certificate.
Regulation:	9	Building Standards applicable to construction
Standard:	3.10	Precipitation
Comment:		The product will contribute to a roof satisfying clauses 3.10.1 ⁽¹⁾⁽²⁾ and 3.10.8 ⁽¹⁾⁽²⁾ of this Standard. See section 7.1 of this Certificate.
Standard:	3.15	Condensation
Comment:		The product 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 7.1 and 7.6 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 ⁽¹⁾ , 6.1.3 ⁽¹⁾ , 6.1.6 ⁽¹⁾ , 6.2.1 ⁽¹⁾ , 6.2.3 ⁽¹⁾ to 6.2.7 ⁽¹⁾ , 6.2.9 ⁽¹⁾ , 6.2.10 ⁽¹⁾ , 6.2.11 ⁽¹⁾ and 6.2.13 ⁽¹⁾ of these Standards. See section 6 of this Certificate.
Standard:	7.1(a)	Statement of sustainability
Comment:		The product can contribute to satisfying the relevant requirements of Regulation 9, Standards 1 to 6, and therefore will contribute to a construction meeting a bronze level of sustainability as defined in this Standard. In addition, the product can contribute to a construction meeting a higher level of sustainability as defined in this Standard, with reference to clauses 7.1.4 ⁽¹⁾ [Aspects 1 ⁽¹⁾ and 2 ⁽¹⁾], 7.1.6 ⁽¹⁾ [Aspects 1 ⁽¹⁾ and 2 ⁽¹⁾] and 7.1.7 ⁽¹⁾ [Aspect 1 ⁽¹⁾]. See section 6 of this Certificate.
Regulation:	12	Building standards applicable to conversions
Comment:		All comments given for this product under Regulation 9, Standards 1 to 6, also apply to this Regulation, with reference to clause 0.12.1 ⁽¹⁾ and Schedule 6 ⁽¹⁾ . (1) Technical Handbook (Domestic). (2) Technical Handbook (Non-Domestic).



The Building Regulations (Northern Ireland) 2012 (as amended)

Regulation:	23	Fitness of materials and workmanship
Comment:		The product is acceptable. See section 14 and the <i>Installation</i> part of this Certificate.
Regulation:	28(b)	Resistance to moisture and weather
Comment:		The product will contribute to a roof satisfying this Regulation. See section 7.1 of this Certificate.
Regulation:	29	Condensation
Comment:		The product can contribute to satisfying this Regulation. See section 7.1 of this Certificate.
Regulation:	39(a)(i)	Conservation measures
Regulation:	40(2)	Target carbon dioxide emission rate
Comment:		The product can contribute to satisfying these Regulations. See section 6 of this Certificate.

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

See sections: 3 *Delivery and site handling* (3.2) and 10 *Properties in relation to fire* (10.2) of this Certificate.

Additional Information

NHBC Standards 2014

NHBC accepts the use of TLX Gold, provided it is installed and used in accordance with this Certificate, in relation to *NHBC Standards*, Chapter 7.2 *Pitched Roofs*.

CE marking

The Certificate holder has taken the responsibility of CE marking the product, in accordance with harmonised European Standard BS EN 13859-1 : 2014. An asterisk (*) appearing in this Certificate indicates that data shown are given in the manufacturer's Declaration of Performance.

Technical Specification

1 Description

1.1 TLX Gold is a breathable multi-foil insulation material comprising a seven-layer composite structure, consisting of a top layer breather membrane, a core of PET wadding interleaved with reflective films, and a bottom layer of gold-coloured reflective film.

1.2 The product is available in rolls with the dimensions shown in Table 1.

Product name	Width (m)	Length (m)	Thickness (mm)
TLX Gold	1.2	10	33

1.3 Ancillary items used with the product, but outside the scope of this Certificate, include:

- 14 mm stainless steel staples
- nails
- pre-treated counter battens, softwood battens and tiling laths
- additional insulation
- 50 mm wide waterproof tape
- roofing slates or tiles.

2 Manufacture

2.1 The top layer of the product is a polypropylene composite material (TLX UV25).

The lower layer is a breathable film protected by a gold-coloured, reflective PU coating.

2.2 As part of the assessment and ongoing surveillance of product quality, the BBA has:

- agreed with the manufacturer the quality control procedures and product testing to be undertaken
- assessed and agreed the quality control operated over batches of incoming materials
- monitored the production process and verified that it is in accordance with the documented process
- evaluated the process for management of nonconformities
- checked that equipment has been properly tested and calibrated
- undertaken to carry out the above measures on a regular basis through a surveillance process, to verify that the specifications and quality control operated by the manufacturer are being maintained.

3 Delivery and site handling

3.1 The product is delivered to site in rolls packed in a protective, branded bag along with fitting instructions, and sealed with an end label.

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

3.3 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 TLX Gold.

Design Considerations

4 General

4.1 The product is suitable for use as a flexible insulation used in conjunction with other insulation materials to reduce the thermal transmittance (U value) in new or existing domestic pitched roofs. When installed over the rafters, the product can perform as a breather membrane in the roof system (see section 7).

4.2 The product must be installed gold side facing inwards.

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

4.4 Care must be taken to ensure that the product is covered as soon as possible after installation.

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

5 Practicability of installation

The product is designed to be installed by a competent general builder or a contractor experienced with this type of product.

6 Thermal performance

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

- 0.16 outer surface emissivity
- $0.85 \text{ m}^2 \cdot \text{K} \cdot \text{W}^{-1}$ R_D value calculated from a 90/90 value.
- $0.363^{(1)(2)} \text{ m}^2 \cdot \text{K} \cdot \text{W}^{-1}$ R value of an air cavity adjacent to the product >13 mm thick (upward heat flow).

(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, reference should be made to the BBA Information Bulletin No 3 (see BBA website).

6.2 The U value of a completed element will depend largely on the thickness and conductivity of the additional insulation used, together with the extent and arrangement of timber bridging.

Example roof constructions are shown in Figures 1 and 2, and the resulting U values in Table 2.

Figure 1 TLX Gold, draped over rafters — example roof construction

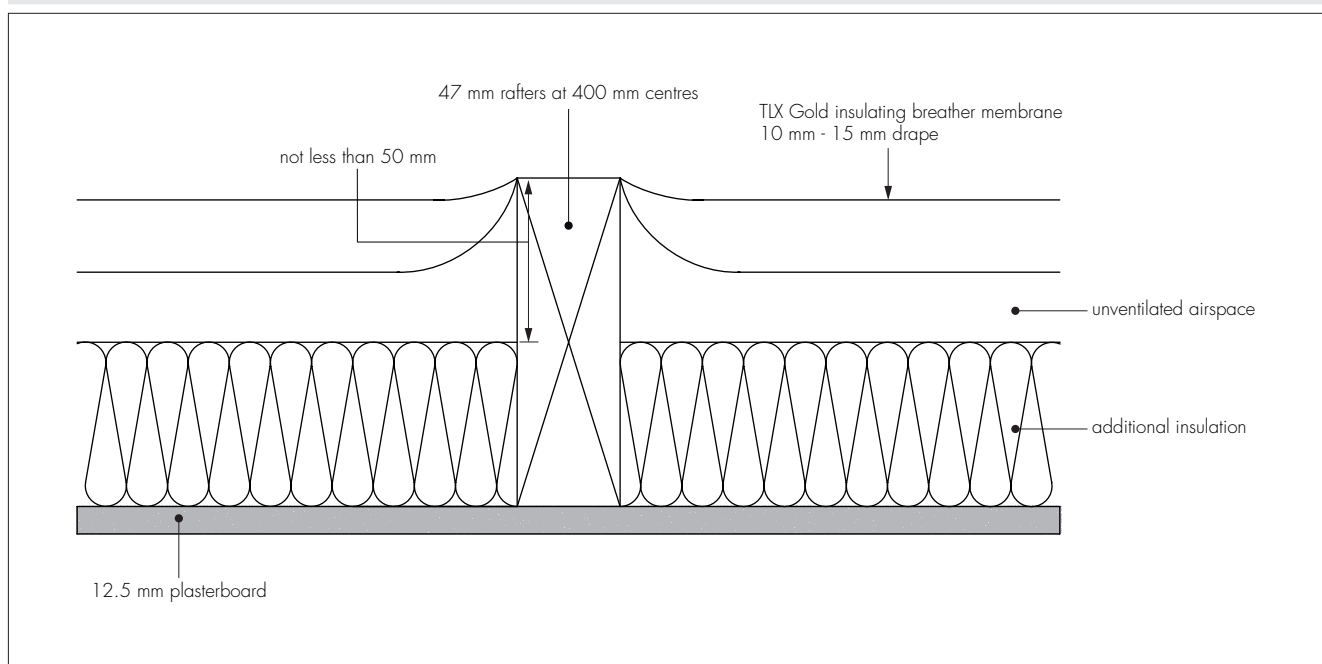


Figure 2 TLX Gold, taut and counter batted — example roof construction

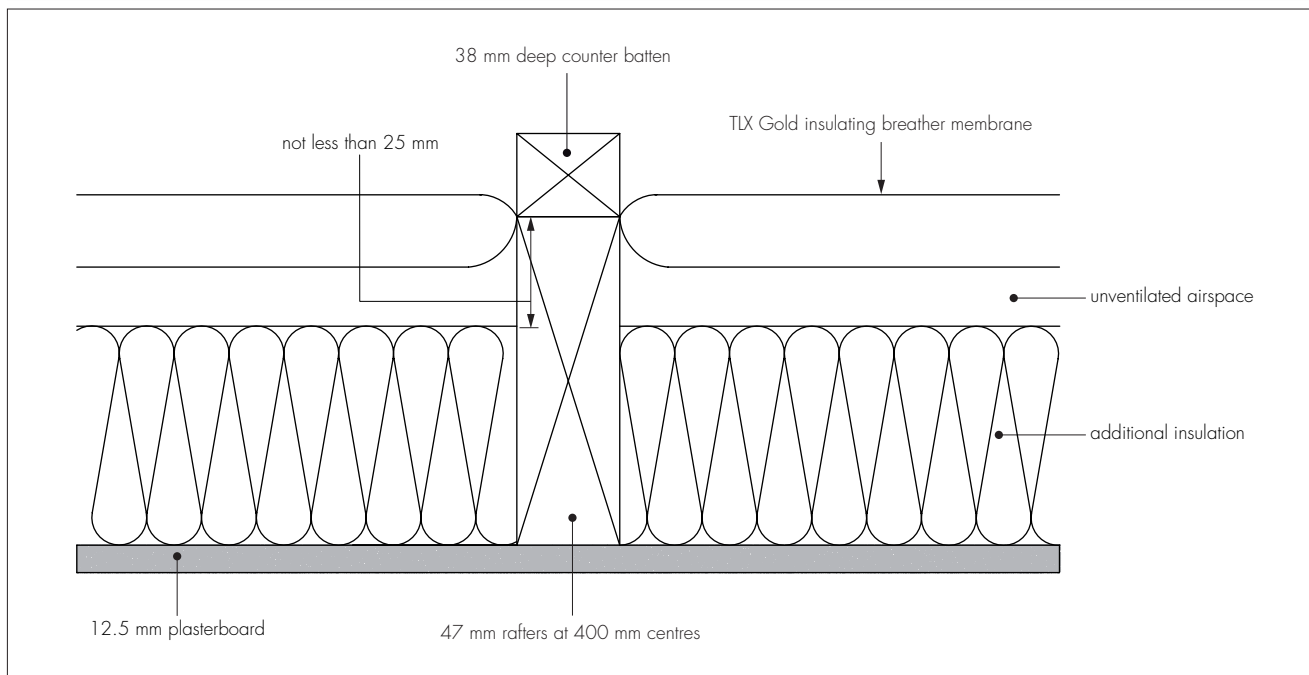


Table 2 U values for pitched roof constructions


Construction	Total rafter depth (mm)	Additional insulation thickness ⁽¹⁾ (mm)	U value ($W \cdot m^{-2} \cdot K^{-1}$) ⁽²⁾
TLX Gold, draped over rafters	150	80	0.25
	200	110	0.20
	200	130	0.18
TLX Gold, taut and counter-batted ⁽³⁾	150	85	0.25
	200	115	0.20
	200	135	0.18
	200	160	0.16

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

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


(3) Battens parallel to rafters.

(4) Rafters 47 mm wide at 400 mm centres.

 6.3 Care must be taken in the overall design and construction of junctions with other elements and openings to minimise thermal bridges and air infiltration. Detailed guidance can be found in the documents supporting the national Building Regulations.

7 Condensation risk

Interstitial condensation


 7.1 Pitched roofs incorporating the product will adequately limit the risk of interstitial condensation when designed and constructed in accordance with BS 5250 : 2011.


7.2 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 : 1992 and BRE Report BR 262 : 2002.

7.3 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.

7.4 When using this type of product, due consideration must be given to the overall installation, to minimise perforations by services (eg light switches and power outlets).

Surface condensation

 7.5 Roofs incorporating the product 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 junctions with walls are designed in accordance with the guidance referred to in section 6.3 of this Certificate.

 7.6 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 : 2011, Annex H, and BRE Report BR 262 : 2002.

8 Wind loading

8.1 Project design wind speeds for the roof in which the product is installed should be determined and wind uplift forces calculated, in accordance with BS EN 1991-1-4 : 2005 and its National Annex.

Unsupported

8.2 The product is satisfactory for use in unsupported systems, in the geographical wind zones given in Table 3, where a well-sealed ceiling is present and the roof has a ridge height ≤ 15 m, a pitch between 12.5° and 75° and a site altitude ≤ 100 m, and where topography is not significant.

For all other cases, the required uplift resistance should be determined using BS 5534 : 2014 and the Certificate holder's declared wind uplift resistances given in Table 4 of this Certificate.

Table 3 Geographical wind zones

Product	≤ 345 mm batten gauge with battened laps	≤ 250 mm batten gauge with battened laps
TLX Gold	Zones 1 to 5	Zones 1 to 5 ⁽¹⁾

(1) This classification has been assumed and is based on test evidence at 345 mm batten gauge.

Table 4 Declared wind uplift resistance Pa

Product	≤ 345 mm batten gauge with battened laps ⁽¹⁾	≤ 250 mm batten gauge with battened laps ⁽¹⁾⁽²⁾
TLX Gold	3335	>3335 ⁽³⁾

(1) Mean of test results.

(2) Underlays with a wind uplift resistance at a 250 mm batten gauge that meet the minimum design wind pressure of 820 Pa for Zone 1 are deemed to satisfy the requirements for use at 100 mm batten gauge in all wind zones.

(3) This classification has not been tested and is based on test evidence at 345 mm batten gauge.

Supported

8.3 The product, when fully supported, has adequate resistance to wind uplift forces.

8.4 The product may be used at any batten gauge in all wind zones when laid over normally air-tight sheet sarking (for example OSB, plywood, chipboard and insulation) for warm-roof design.

8.5 Sarking boards, such as square-edged butt-jointed planks, are not considered to be air-tight and the underlay is treated as unsupported.

9 Strength

The product will resist the loads associated with installation of the roof.

10 Properties in relation to fire

10.1 The product will melt and shrink away from heat, but will burn in the presence of a naked flame. The product is classified in accordance with BS EN 13501-1 : 2007 as a Class E* material.

10.2 When the product is used unsupported, there is a risk that fire can spread if it is accidentally ignited during maintenance works, such as by a roofer's torch. As with all types of underlay, care should be taken during building and maintenance to avoid ignition.

10.3 When the product is used in a fully-supported situation, the fire performance will be determined by the support.

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

England and Wales — Approved Document B, Volume 1, 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 4.21.

10.5 When installed with an internal lining board (eg a 12.5 mm thick plasterboard), the product will be contained between the roof and internal lining board, until one is destroyed. Therefore, the product will not contribute to the development stages of a fire, or present a smoke or toxic hazard.

10.6 The use of this product will not affect the fire rating obtained by tiled or slated roofs.

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

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

11 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, 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 3.9.

12 Air leakage

12.1 When tested to BS EN 13859-1 : 2014 with a positive pressure of 50 Pa, the product achieved an air permeability of 0 m³·h⁻¹·m⁻².

12.2 When used as an air barrier, the product's effectiveness is reliant on the careful sealing of the laps, joints, perimeters and penetrations, in accordance with the Certificate holder's instructions.

12.3 The airtightness of the building will also depend on the performance of the other building elements.

13 Maintenance

As the product is confined within a roof structure and has suitable durability (see section 14), maintenance is not required.

14 Durability



TLX Gold will have a life equivalent to that of the roof structure in which it is incorporated.

Installation

15 General

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

15.2 During construction, care must be taken to ensure the product is not damaged during installation. Should damage occur by tearing, the membrane should be repaired by covering the small tear/hole with tape, or the membrane should be replaced.

15.3 The product should be fixed across the top of the rafters using nails or staples of at least 14 mm length.

15.4 The product can be cut using large sharp scissors.

15.5 When the membrane is cut to fit around openings (eg rooflights), care should be taken to minimise gaps.

15.6 Any exposed cut edges of the membrane should be sealed with adhesive tape and stapled/battened as soon as possible and not left unsecured.

16 Procedure

TLX Gold draped over rafters

16.1 Installation starts from the bottom of the roof and the product is unrolled across the rafters.

16.2 As the product is unrolled it should drape into the rafters by 10 mm.

16.3 The next roll must overlap the preceding layer by at least 150 mm, and the overlap should be sealed along the entire length using the integral double-sided tape.

16.4 The product is fixed to each rafter using nails or staples of at least 14 mm length.

16.5 Vertical joints at the end of runs are created by separating the breather membrane layer from the rest of the product. The insulation layers are cut back to the centre of the last rafter that the material has crossed. A new roll then butts up to the cut back material. The created membrane flap then laps onto the new roll and is sealed using a 50 mm wide waterproof tape.

16.6 Horizontal joints should be created so that the insulation layers are butt jointed. The built-in overlap flap laps onto the lower layer of material and is sealed using the integral tape.

16.7 The product is permanently held in place with tile battens and roof tiles or slates are then installed in accordance with BS 5534 : 2014.

TLX Gold taut over rafters and counter battened

16.8 Installation starts from the bottom of the roof and the product is unrolled across the rafters.

16.9 The product is installed tight over the rafters and fixed to each rafter using nails or staples of at least 14 mm length.

16.10 Vertical joints at the end of runs are created by separating the breather membrane layer from the rest of the product. The insulation layers are cut back to the centre of the last rafter that the material has crossed. A new roll then butts up to the cut back material. The created membrane flap then laps onto the new roll and is sealed with the 50 mm wide waterproof tape.

16.11 Horizontal joints should be created so that the insulation layers are butt jointed. The built-in overlap flap laps onto the lower layer of material and is sealed using the integral tape.

16.12 The product is permanently held in place with minimum 38 mm deep timber counter battens fitted in line with the rafters.

16.13 Tile battens and roof tiles or slates are then installed in accordance with BS 5534 : 2014.

Technical Investigations

17 Tests

The following tests were carried out on TLX Gold and the results assessed:

- water resistance
- wind suction
- streaming water
- air infiltration
- dimensional stability.

18 Investigations

18.1 The manufacturing process was evaluated, including the methods adopted for quality control, and details were obtained of the quality and composition of the materials used.

18.2 An assessment was made of data relating to:

- length
- width
- thickness
- mass per unit area
- thermal resistance
- tensile strength
- resistance to tearing
- reaction to fire
- dimensional stability
- water vapour permeability
- emissivity
- peel/adhesive strength of the adhesive tape.

Bibliography

BS 5250 : 2011 *Code of practice for control of condensation in buildings*

BS 5534 : 2014 *Code of practice re slating and tiling for pitched roofs and vertical cladding*

BS EN 1991-1-4 : 2005 *Eurocode 1 : Actions on structures — General actions — Wind actions*

NA BS EN 1991-1-4 : 2005 UK National Annex to *Eurocode 1 : Actions on structures — General actions — Wind actions*

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

BS EN 13859-1 : 2014 *Flexible sheets for waterproofing — Definitions and characteristics of underlays — Underlays for discontinuous roofing*

BS EN ISO 6946 : 2007 *Building components and building elements — Thermal resistance and thermal transmittance — Calculation method*

BBA Information Bulletin No 3 *Reflective foil insulation — Conventions for U value calculations*

BBA Policy No. 12 — *Enhanced Emissivity Values*

BRE Digest 369 : 1992 *Interstitial condensation and fabric degradation*

BRE Report (BR 262 : 2002) *Thermal insulation: avoiding risks*

BRE Report (BR 443 : 2006) *Conventions for U-value calculations*

19 Conditions

19.1 This Certificate:

- relates only to the product/system that is named and described on the front page
- is issued only to the company, firm, organisation or person named on the front page — no other company, firm, organisation or person may hold or claim that this Certificate has been issued to them
- 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.

19.2 Publications, documents, specifications, legislation, regulations, standards and the like referenced in this Certificate are those that were current and/or deemed relevant by the BBA at the date of issue or reissue of this Certificate.

19.3 This Certificate will remain valid for an unlimited period provided that the product/system and its manufacture and/or fabrication, including all related and relevant parts and 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.

19.4 The BBA has used due skill, care and diligence in preparing this Certificate, but no warranty is provided.

19.5 In issuing this Certificate, the BBA is not responsible and is excluded from any liability to any company, firm, organisation or person, for any matters arising directly or indirectly from:

- 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
- actual installations of the product/system, including their nature, design, methods, performance, workmanship and maintenance
- any works and constructions in which the product/system is installed, including their nature, design, methods, performance, workmanship and maintenance
- any loss or damage, including personal injury, howsoever caused by the product/system, including its manufacture, supply, installation, use, maintenance and removal
- any claims by the manufacturer relating to CE marking.

19.6 Any information relating to the manufacture, supply, installation, use, maintenance and removal 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, maintained and removed. It does not purport in any way to restate the requirements of the Health and Safety at Work etc. Act 1974, or of any other statutory, common law or other duty which may exist at the date of issue or reissue 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.