

Xtratherm Ltd

Liscarton Industrial Estate
Kells Road
Navan
Co Meath
Ireland

Tel: 00 353 46 906 6000 Fax: 00 353 46 805 6090

e-mail: info@xtratherm.com

website: www.xtratherm.com



Agrément Certificate

12/4956

Product Sheet 4

XTRATHERM XTROLINER (XO)

XTRATHERM XTROLINER FRAMING BOARD (XO/FB)

This Agrément Certificate Product Sheet⁽¹⁾ relates to Xtratherm XtroLiner Framing Board (XO/FB), comprising polyisocyanurate (PIR) foam boards with an aluminium foil facing on both sides. The product is for use as thermal insulation between internal studding and/or against the external face of the sheathing board or steel studs of walls of conventional timber- or steel-frame buildings with either an external masonry leaf or a weathertight ventilated cladding system. The product is for use on domestic and non-domestic buildings up to 18 metres in height.

(1) Hereinafter referred to as 'Certificate'.

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 a declared thermal conductivity (λ_D) of $0.021 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$ (see section 6).

Condensation risk — the product can contribute to limiting the risk of condensation (see section 7).

Behaviour in relation to fire — the product has a reaction to fire classification of C-s2, d0 to BS EN 13501-1 : 2007 (see section 8).

Durability — the product is durable and sufficiently stable to remain effective for the life of the building (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 Second issue: 12 September 2017

John Albon – Head of Approvals
Construction Products

Claire Curtis-Thomas
Chief Executive

Originally certificated on 28 August 2013

Certificate amended on 12 April 2019 to include Regulation 7(2) for England and associated text.

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.*

Any photographs are for illustrative purposes only, do not constitute advice and should not be relied upon.

British Board of Agrément

Bucknalls Lane
Watford
Herts WD25 9BA

©2017

Page 1 of 12

tel: 01923 665300
clientservices@bbacerts.co.uk
www.bbacerts.co.uk

Regulations

In the opinion of the BBA, Xtratherm XtroLiner Framing Board (XO/FB), 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:	B3(1)(4)	Internal fire spread (structure)
Comment:		The product is restricted by this Requirement. See sections 8.1 to 8.3 and 8.5 of this Certificate.
Requirement:	B4(1)	External fire spread
Comment:		The product is restricted by this Requirement. See sections 8.2 and 8.3 of this Certificate.
Requirement:	C2(c)	Resistance to moisture
Comment:		The product can contribute to satisfying this Requirement. See sections 7.1 and 7.4 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 (applicable to Wales only)
Regulation:	7(1)	Materials and workmanship (applicable to England only)
Comment:		The product is acceptable. See section 14 and the <i>Installation</i> part of this Certificate.
Regulation:	7(2)	Materials and workmanship (applicable to England only)
Comment:		This product is restricted by this Regulation. See section 8.2 and 8.5 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. 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 is acceptable. See section 14 and the <i>Installation</i> part of this Certificate.
Regulation:	9	Building standards applicable to construction
Standard:	2.4	Cavities
Comment:		The product can contribute to satisfying this Standard, with reference to clause 2.4.2 ⁽¹⁾ . See sections 8.1, 8.4 and 8.5 of this Certificate.
Standard:	2.6	Spread to neighbouring buildings
Comment:		The product is restricted by this Standard, with reference to clause 2.6.1 ⁽¹⁾ . See sections 8.1, 8.4 and 8.5 of this Certificate.
Standard:	2.7	Spread on external walls
Comment:		The product is restricted by this Standard with respect to clause 2.7.2 ⁽²⁾ . See sections 8.4 and 8.5 of this Certificate.

Standard:	3.15	Condensation
Comment:		The product can contribute to satisfying this Standard, with reference to clauses 3.15.1 ⁽¹⁾⁽²⁾ , 3.15.4 ⁽¹⁾⁽²⁾ and 3.15.5 ⁽¹⁾⁽²⁾ . See sections 7.1 and 7.5 of this Certificate.
Standard:	6.1(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⁾ , 6.1.3 ⁽²⁾ , 6.1.5 ⁽²⁾ , 6.1.6 ⁽¹⁾ , 6.2.1 ⁽¹⁾ , 6.2.3 ⁽¹⁾ , 6.2.4 ⁽¹⁾ , 6.2.5 ⁽¹⁾⁽²⁾ and 6.2.10 ⁽²⁾ . See section 6 of this Certificate.
Standard:	7.1(a)(b)	Statement of sustainability
Comment:		The product can contribute to meeting 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⁾⁽²⁾ [Aspects 1 ⁽¹⁾⁽²⁾ and 2 ⁽¹⁾], 7.1.6 ⁽¹⁾⁽²⁾ [Aspects 1 ⁽¹⁾⁽²⁾ and 2 ⁽¹⁾] and 7.1.7 ⁽¹⁾⁽²⁾ [Aspect 1 ⁽¹⁾⁽²⁾]. See section 6.1 of this Certificate.
Regulation:	12	Building standards applicable to conversions
Comment:		All Comments in relation to the 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:	29	Condensation
Comment:		The product can contribute to satisfying this Regulation. See section 7.1 of this Certificate.
Regulation:	35(1)(4)	Internal fire spread – structure
Comment:		The product is restricted by this Regulation. See sections 8.1, 8.3 and 8.5 of this Certificate.
Regulation:	39(a)(i)	Conservation measures
Regulation:	40(2)	Target carbon dioxide emission rate
Comment:		The product can contribute to a building satisfying these Regulations. See section 6 of this Certificate.

Construction (Design and Management) Regulations 2015

Construction (Design and Management) Regulations (Northern Ireland) 2016

Information in this Certificate may assist the client, designer (including Principal Designer) and contractor (including Principal Contractor) to address their obligations under these Regulations.

See section: 3 *Delivery and site handling* (3.4) of this Certificate.

Additional Information

NHBC Standards 2017

In the opinion of the BBA, Xtratherm XtroLiner Framing Board (XO/FB), if installed, used and maintained in accordance with this Certificate, can satisfy or contribute to satisfying the relevant requirements in relation to *NHBC Standards*, Chapters 6.2 *External timber framed walls* and 6.10 *Light steel framed walls and floors*.

CE marking

The Certificate holder has taken the responsibility of CE marking the product in accordance with harmonised European Standard BS EN 13165-1 : 2012. 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 Xtratherm XtroLiner Framing Board (XO/FB) comprises rigid polyisocyanurate (PIR) foam board, faced with an aluminium foil-facing on both sides. The board has the nominal characteristics shown in Table 1.

Table 1 Nominal characteristics

Characteristic (unit)	Value
Length* (mm)	2400
Width* (mm)	1200
Thickness* (mm)	25 to 160 (in 5 mm increments)
Minimum compressive strength at 10% compression* (kPa)	120
Declared tensile strength perpendicular to faces (kPa)	40

1.2 Ancillary items for use with the product, but outside the scope of this Certificate, include:

- timber frame
- steel frame
- rainscreen cladding and insulation fasteners/fixings
- vapour control layer (VCL) and plasterboard in accordance with BS EN 520 : 2004
- breather membrane.

2 Manufacture

2.1 Raw materials are injected onto the lower foil-facer on a conveyor belt. The exothermic reaction expands the foam, which then comes into contact with the upper foil-facer. An automated process cures the product and cuts it to the required size.

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 being operated by the manufacturer are being maintained.

2.3 The management system of Xtratherm Ltd has been assessed and registered as meeting the requirements of BS EN ISO 9001 : 2015 and BS EN ISO 14001 : 2015 by the Loss Prevention Certification Board (Certificates 851 and 851-EMS respectively).

3 Delivery and site handling

3.1 The product is delivered to site in polythene-wrapped packs. Each pack contains a label with the Certificate holder's name, board dimensions and the BBA logo incorporating the number of this Certificate.

3.2 The boards must be protected from prolonged exposure to sunlight, and stored dry, flat and raised above ground level (to avoid contact with ground moisture). Where possible, packs should be stored inside. If stored outside, they should be under cover, or protected with opaque polythene sheeting.

3.3 The product is light and easy to handle; care should be taken when handling individual items to avoid crushing the edges or corners. If damaged, the product should be discarded.

3.4 The product must not be exposed to open flame or other ignition sources.

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on Xtratherm XtroLiner Framing Board (XO/FB).

Design Considerations

4 Use

4.1 Xtratherm XtroLiner Framing Board (XO/FB) is satisfactory for use as insulation between the studding and/or over the sheathing over walls of normal timber- or steel-frame buildings of up to 18 metres in height with either an external masonry leaf or a weathertight ventilated cladding system and a ventilated and drained cavity between the outer leaf and the frame. It is essential that walls are designed and constructed to incorporate the normal precautions against moisture ingress, including a breather membrane where appropriate.

4.2 The product must not be relied on to provide any structural contribution, eg racking strength.

4.3 Buildings subject to the national Building Regulations should be designed and constructed in accordance with the relevant recommendations of:

- BS EN 1996-1-1 : 2005, BS EN 1996-1-2 : 2005, BS EN 1996-2 : 2006 and BS EN 1996-3 : 2006, and their respective UK National Annexes
- BS EN 351-1 : 2007
- BS EN 845-1 : 2013
- BS 8000-3 : 2001
- BS EN 1995-1-1 : 2004
- BS EN 1993-1-2 : 2005.

4.4 New buildings not subject to these Regulations should also be built in accordance with the Standards given in section 4.3 of this Certificate.

4.5 Where needed, cavity wall ties with insulation-retaining fixings and, if required, any additional ties to BS EN 845-1 : 2013, should be used for structural stability in accordance with BS EN 1996-1-1 : 2005, BS EN 1996-2 : 2006 and BS EN 1996-3 : 2006.

4.6 Services which penetrate the dry lining (eg light switches or power outlets) must be kept to a minimum to limit damage to vapour checks. In addition, to preserve the fire resistance of the wall, any penetrations should be enclosed in plasterboard, stone mineral wool or a suitably tested proprietary fire-rated system.

4.7 A VCL, which should be a minimum thickness of 0.125 mm (500 gauge) polyethylene or plasterboard, and backed with a vapour control membrane or similar, should be installed behind the internal finish.

4.8 Installation must not be carried out until the moisture content of the timber frame is less than 20%.

4.9 The product is for use in any exposure zone provided that a clear residual cavity width of at least 50 mm is maintained for cladding panels with open joints, and 38 mm for panels with baffled or rebated joints.

4.10 The construction should be made weathertight as soon as practically possible to ensure maximum protection of the product.

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 the thermal transmittance (U value) of the product should be carried out in accordance with BS EN ISO 6946 : 2007 and BRE Report BR 443 : 2006 using the thermal conductivity* (λ_D) value of $0.021 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$ and a foil surface aged emissivity (ϵ) of 0.03.

6.2 The U value of a completed wall will depend on the selected insulation thickness, number and type of fixings, the insulating value of the substrate and its internal finish. Calculated U values for example constructions are given in Table 2.

Table 2 Example U values⁽¹⁾

U value ($\text{W}\cdot\text{m}^{-2}\cdot\text{K}^{-1}$)	Insulation thickness (mm) between 140 mm timber-frame studs ⁽²⁾ and thickness over the sheathing board	Insulation thickness (mm) between 90 mm deep steel studs ⁽³⁾ and thickness over the sheathing board
0.18	105 + 25	90 + 75
0.19	100 + 25	90 + 70
0.25	105	85 + 50
0.26	100	80 + 50
0.27	95	80 + 50
0.28	90	75 + 50
0.30	80	75 + 50
0.35	60	65 + 50

(1) Construction (external to internal) comprises:

Ventilated airspaces – section 4.8.6 of BR 443

$R_{se} = 0.29$ from BR443 for Low E surface – wall applications – horizontal heat flow.

$R_{se} = 0.13$ from BR443 for High E surface – wall applications – horizontal heat flow.

100 mm marble – no thermal value

50 mm ventilated air space – no thermal value.

(2) Insulation against breather membrane against a 9 mm thick OSB sheathing board ($\lambda = 0.13 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$) for the timber-frame construction ($\lambda = 0.13 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$). 15% timber fraction for 140 mm timber-frame stud depth (any remaining space will be a bridged low emissivity cavity). Fixing correction for the insulation board fixed back to the frame, based upon 5.2 galvanized steel fixings per metre square (8.8 mm^2 cross-sectional area, $\lambda = 50 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$). Polythene VCL and a 12.5 mm thick plasterboard ($\lambda = 0.25 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$).

(3) Insulation against a 9 mm thick magnesium silicate board ($\lambda = 0.090 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$) over the front of the 90 mm deep steel-frame construction ($\lambda = 50 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$). 0.4% steel fraction for steel frame (flange width not exceeding 50 mm). Fixing correction for the insulation board fixed back to the frame, based upon 2.8 galvanized steel fixings per metre square (15.9 mm^2 cross-sectional area, $\lambda = 50 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$). Polythene VCL and a 12.5 mm thick plasterboard ($\lambda = 0.25 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$).

Junctions



6.3 The product can contribute to maintaining continuity of thermal insulation at junctions with other elements and 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 Walls will adequately limit the risk of interstitial condensation when they are designed and constructed in accordance with BS 5250 : 2011, Annexes D and G. A VCL should be used in steel and timber constructions.

7.2 The insulation core vapour resistivity may be taken as approximately $300 \text{ MN}\cdot\text{s}\cdot\text{g}^{-1}\cdot\text{m}^{-1}$, with a resistance value of $7000 \text{ MN}\cdot\text{s}\cdot\text{g}^{-1}$ for each individual foil-facing.

7.3 If the product is to be used in the external walls of rooms expected to have high humidity, care must be taken to provide adequate permanent ventilation to avoid possible problems from the formation of interstitial condensation in the internal wall leaf.

Surface condensation



7.4 Walls will adequately limit the risk of surface condensation when the thermal transmittance (U value) does not exceed $0.7 \text{ W}\cdot\text{m}^{-2}\cdot\text{K}^{-1}$ at any point, and the junctions with other elements are designed in accordance with the guidance referred in section 6.3 of this Certificate.



7.5 Walls will adequately limit the risk of surface condensation when the thermal transmittance (U value) does not exceed $1.2 \text{ W}\cdot\text{m}^{-2}\cdot\text{K}^{-1}$ at any point, and the junctions with other elements are designed in accordance with the guidance referred to in BS 5250 : 2011, Annex G. Further guidance may be obtained from BRE Report BR 262 : 2002 and section 6.3 of this Certificate.

8 Behaviour in relation to fire



8.1 The product has a C-s2, d0 reaction to fire classification to BS EN 13501-1: 2007⁽¹⁾. It is not classified as non-combustible or of limited combustibility.

(1) Report issued by: IZOLACJA, COBR, PIB. Report number: 111/11, Report date: 13/12/2011.



8.2 In England, the product should not be used on buildings with a storey 18 m or more above ground level that contains; one or more dwellings, an institution, a room for residential purposes (excluding any room in a hostel, hotel or boarding house), student accommodation, care homes, sheltered housing, hospitals or dormitories in boarding schools.



8.3 In England, Wales and Northern Ireland, the product is unrestricted in terms of proximity to a boundary and, for constructions complying with section 8.5, is unrestricted in terms of height, other than those described in section 8.2. For other constructions, the product should not be used in buildings with a floor more than 18 m above the ground.



8.4 In Scotland, the product may be used without restriction on height or proximity to a relevant boundary, provided it is installed in a cavity that is between two leaves of masonry at least 75 mm thick, and which has a cavity barrier around all openings in the wall and at the top of the wall head. For other constructions, the product should not be used 1 m or less from a boundary or in a building with a floor more than 18 m above the ground.



8.5 Cavity barriers are required in accordance with the relevant provisions of the national Building Regulations, unless the construction complies with:

England and Wales — Approved Document B, Volume 1, Diagram 13, or Volume 2, Diagram 34

Northern Ireland — Technical Booklet E, Diagram 4.5

Scotland — Technical Handbook – Domestic – Clauses 2.4.1, 2.4.2 and 2.4.7, or Technical Handbook – Non-Domestic – Clauses 2.4.1 and 2.4.2.

8.6 Designers should refer to the relevant national Building Regulations and guidance for detailed conditions of use, particularly in respect of requirements for substrate fire performance, cavity closers and barriers, fire stopping of service penetrations and combustibility limitations for other materials and components used in the overall wall construction.

9 Water resistance

9.1 Constructions incorporating the product, and built in accordance with the Standards listed in section 4.3, will resist the transfer of precipitation to the inner leaf and satisfy the national Building Regulations:

England and Wales — Approved Document C, Section 5, and Volume 2, Section 8

Scotland — Mandatory Standard 3.10, clauses 3.10.1⁽¹⁾⁽²⁾, 3.10.3⁽¹⁾⁽²⁾ and 3.10.5⁽¹⁾⁽²⁾

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).

Northern Ireland — Technical Booklet C, section 6.

9.2 In all situations, it is particularly important to ensure during installation that:

- wall ties are installed correctly and are thoroughly clean
- excess mortar is cleaned from the cavity face of the leading leaf and any debris removed from the cavity
- mortar droppings are cleaned from the exposed edges of installed slabs
- insulation boards are properly installed and butt-jointed
- installation is carried out to the highest level on each wall, or the top edge of the insulation is protected by a cavity tray
- at lintel level, a cavity tray, stop ends and weep holes are provided
- cavity battens and/or boards are used during construction to prevent bridging by mortar droppings
- damp-proof courses (dpc) at ground level do not project into the cavity as they can form a trap for mortar bridging
- raked or recessed mortar joints are avoided in very severe exposure areas.

10 Proximity of flues and appliances

When installing the product in close proximity to certain flue pipes and/or heat-producing appliances, the following provisions of the national Building Regulations are applicable:

England and Wales — Approved Document J, sections 1 to 4

Scotland — Mandatory Standard 3.19, clauses 3.19.1⁽¹⁾⁽²⁾ to 3.19.9⁽¹⁾⁽²⁾

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).

Northern Ireland — Technical Booklet L, sections 2 to 5.

11 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 : 2008, it is recommended 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.

12 Infestation

Use of the product does not in itself promote infestation. The creation of voids within the structure (for example, gaps between the wall lining and the boards) may provide habitation for insects or vermin in areas already infested. Care should be taken to ensure that, wherever possible, all voids are sealed, as any infestation may be difficult to eradicate. There is no food value in the materials used.

13 Maintenance

As the product is confined behind the wall lining and has suitable durability (see section 14), maintenance is not required.

14 Durability



The product is unaffected by the normal conditions in a wall and is durable, rot-proof, water-resistant and sufficiently stable to remain effective as insulation for the life of the building.

Installation

15 General

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

15.2 The product is light to handle and can be cut easily using a fine-toothed saw. Care must be taken in handling to prevent damage, particularly at edges. Damaged boards should not be used; small areas of damaged faces may be repaired with self-adhesive aluminium foil-tape.

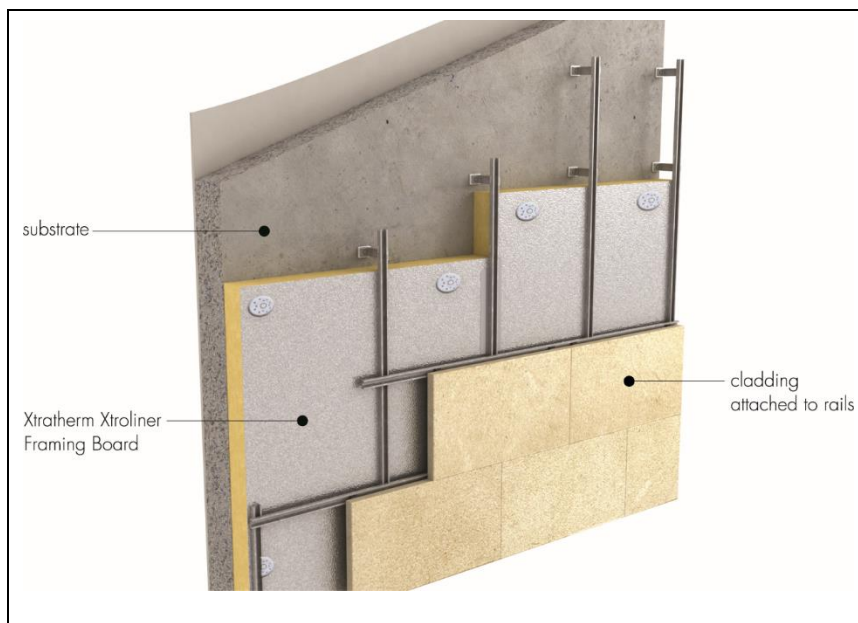
15.3 It is important that the product is accurately trimmed in order to achieve close butting joints and continuity of insulation.

16 Procedure

Masonry walls

16.1 The product is installed fully restrained against the wall in a brick-bond pattern with suitable proprietary insulation fasteners (see Figure 1).

Figure 1 Example installation



Between studs and on the external face of sheathing/studs — external to internal

16.2 The Xtratherm Xtroliner Framing Board (XO/FB) is fixed to the outside of the sheathing board (when installed) or to the outside face of steel studs using suitable proprietary insulation fasteners.

16.3 The product is closely butted and joints are staggered.

16.4 The product should be cut to fit tightly between the timber studding/steel studding and positioned against the inner face of the sheathing board or level with the external face of steel studs. Any gaps should be filled with expanding insulation foam (outside the scope of this Certificate). In timber-frame constructions, the product should be held in place by nails or timber battens to the warm side of the insulation.

16.5 The void created by the space between the inner surface of the product and the dry lining can be utilised as an insulated service duct. It is recommended that services which penetrate the VCL, such as light switches and power outlets, are kept to a minimum to limit damage to the VCL. In addition, any penetrations should be adequately sealed to preserve the VCL integrity.

16.6 A sealed polythene VCL, with lapped and sealed joints, is placed over the stud face before applying the internal finish.

Technical Investigations

17 Tests

Tests were carried out to determine:

- dimensional stability
- compressive strength
- thermal conductivity
- tensile strength
- bending strength.

18 Investigations

18.1 Results of test data were assessed in relation to:

- dimensions
- declared thermal conductivity value
- behaviour in relation to fire.

18.2 An assessment of the risk of interstitial condensation was made.

18.3 A calculation of example U values was carried out.

18.4 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

- BRE Report BR 262 : 2002 *Thermal insulation: avoiding risks*
- BRE Report BR 443 : 2006 *Conventions for U-value calculations*
- BS 845-1 : 2013 + A1 : 2016 *Specification for ancillary components for masonry — Wall ties, tension straps, hangers and brackets*
- BS 5250 : 2011 + A1 : 2016 *Code of practice for control of condensation in buildings*
- BS 8000-3 : 2001 *Workmanship on building sites — Code of practice for masonry*
- BS EN 351-1 : 2007 *Durability of wood and wood-based products — Preservative-treated solid wood — Classification of preservative penetration and retention*
- BS EN 520 : 2004 + A1 : 2009 *Gypsum plasterboards — Definitions, requirements and test methods*
- BS EN 1365-1 : 2012 *Fire resistance tests for loadbearing elements — Walls*
- BS EN 1993-1-2 : 2005 *Eurocode 3 — Design of steel structures — General rules*
- BS EN 1995-1-1 : 2004 + A1 : 2014 *Eurocode 5 — Design of timber structures — General — Common rules and rules for buildings*
- BS EN 1996-1-1 : 2005 + A1 : 2012 *Eurocode 6 — Design of masonry structures — General rules for reinforced and unreinforced masonry structures*
- NA to BS EN 1996-1-1 : 2005+ A1 : 2012 *UK National Annex to Eurocode 6 — Design of masonry structures — General rules for reinforced and unreinforced masonry structures*
- BS EN 1996-1-2 : 2005 *Eurocode 6 — Design of masonry structures — General rules — Structural fire design*
- NA to BS EN 1996-1-2 : 2005 *UK National Annex to Eurocode 6 — Design of masonry structures — General rules — Structural fire design*
- BS EN 1996-2 : 2006 *Eurocode 6 — Design of masonry structures — Design considerations, selection of materials and execution of masonry*
- NA to BS EN 1996-2 : 2006 *UK National Annex to Eurocode 6 — Design of masonry structures — Design considerations, selection of materials and execution of masonry*
- BS EN 1996-3 : 2006 *Eurocode 6 — Design of masonry structures — Simplified calculation methods for unreinforced masonry structures*
- NA + A1 : 2014 to BS EN 1996-3 : 2006 *UK National Annex to Eurocode 6 — Design of masonry structures — Simplified calculation methods for unreinforced masonry structures*
- BS EN 13165 : 2012 + A2 : 2016 *Thermal insulation products for buildings — Factory made rigid polyurethane foam (PUR) products — Specification*
- BS EN 13501-1 : 2007 + A1 : 2009 *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*
- BS EN ISO 9001 : 2015 *Quality management systems — Requirements*
- BS EN ISO 14001 : 2015 *Environmental Management systems — Requirements with guidance for use*

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.