

Celotex Limited

Lady Lane Industrial Estate
Hadleigh
Ipswich
Suffolk IP7 6BA

Tel: 01473 822093 Fax: 01473 820880
e-mail: technical@celotex.co.uk
website: www.celotex.co.uk



Agrément Certificate
09/4667
Product Sheet 1

CELOTEX INSULATION

CELOTEX RANGE OF PIR INSULATION BOARDS FOR TIMBER-FRAME DWELLINGS

This Agrément Certificate Product Sheet⁽¹⁾ relates to the Celotex Range of PIR Insulation Boards for Timber-Frame Dwellings, foil-faced rigid polyisocyanurate (PIR) foam boards for use as insulation in walls of conventional timber-frame dwellings. The products may be installed between studding, or used as an insulated lining or insulated sheathing, or as part of a system incorporating any combination of these options.

(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 products have a Declared thermal conductivity (λ_D)* of 0.022 W·m⁻¹·K⁻¹ (Celotex TB4000, Celotex GA4000 and Celotex XR4000) and 0.021 W·m⁻¹·K⁻¹ (Celotex FR5000) (see section 6).

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

Behaviour in relation to fire — walls incorporating the products have been tested to BS 476-21 : 1987 (see section 8).

Durability — the products will have a life equivalent to that of the wall in which they are incorporated (see section 14).



The BBA has awarded this 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

John Albon — Head of Approvals
Energy and Ventilation

Claire Curtis-Thomas
Chief Executive

Date of Third issue: 8 July 2014

Originally certificated on 6 September 2009

The BBA is a UKAS accredited certification body — Number 1113. 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

©2014

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, the Celotex Range of PIR Insulation Boards for Timber-Frame Dwellings, 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 products can contribute to satisfying this Requirement. See sections 8.1 and 8.2 of this Certificate.
Requirement:	C2(c)	Resistance to moisture
Comment:		The products can contribute to satisfying this Requirement. See sections 7.1 and 7.3 of this Certificate.
Requirement:	L1(a)(i)	Conservation of fuel and power
Comment:		The products can contribute to satisfying this Requirement. See section 6 of this Certificate.
Regulation:	7	Materials and workmanship
Comment:		The products are acceptable. See section 14 and the <i>Installation</i> part of this Certificate.
Regulation:	26	CO ₂ emission rates for new buildings
Regulation:	26A	Fabric energy efficiency rates for new dwellings (applicable to England only)
Comment:		The products 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 products are 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:		Use of the products is restricted under this Standard, with reference to clause 2.4.2 ⁽¹⁾ . See section 8.3 of this Certificate.
Standard:	2.6	Spread to neighbouring buildings
Comment:		Walls incorporating the products can satisfy this Standard, with reference to clause 2.6.1 ⁽¹⁾ . See sections 8.1 and 8.2 of this Certificate.
Standard:	3.15	Condensation
Comment:		The products can contribute to satisfying this Standard, with reference to clauses 3.15.1 ⁽¹⁾ , 3.15.4 ⁽¹⁾ and 3.15.5 ⁽¹⁾ . See sections 7.2 and 7.3 of this Certificate.
Standard:	6.1(b)	Carbon dioxide emissions
Standard:	6.2	Building insulation envelope
Comment:		The products can contribute to satisfying this Standard, with reference to clauses, or parts of clauses, 6.1.6 ⁽¹⁾ , 6.2.1 ⁽¹⁾ , 6.2.3 ⁽¹⁾ , 6.2.9 ⁽¹⁾ and 6.2.11 ⁽¹⁾ . See section 6 of this Certificate.
Standard:	7.1(a)	Statement of sustainability
Comment:		The products 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 products 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 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) 2012

Regulation:	23	Fitness of materials and workmanship
Comment:		The products are acceptable. See section 14 and the <i>Installation</i> part of this Certificate.
Regulation:	29	Condensation
Comment:		The products can contribute to satisfying this Regulation. See section 7.3 of this Certificate.
Regulation:	35(1)(4)	Internal fire spread – Structure
Comment:		Walls incorporating the products can satisfy this Regulation. See sections 8.1 and 8.2 of this Certificate.
Regulation:	39(a)(i)	Conservation measures
Regulation:	40(2)	Target carbon dioxide emission rate
Comment:		The products can contribute to satisfying these Regulations. See section 6 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: 3 *Delivery and site handling* (3.4) of this Certificate.

Additional Information

NHBC Standards 2014

Subject to a 50 mm minimum residual cavity being maintained, NHBC accepts the use of Celotex Range of PIR Insulation Boards for Timber-Frame Insulation, provided they are installed, used and maintained in accordance with this Certificate, in relation to *NHBC Standards, Chapter 6.2 External timber framed walls*.

CE marking

The Certificate holder has taken the responsibility of CE marking the products in accordance with harmonised European Standard BS EN 13165 : 2012. An asterisk (*) appearing in this Certificate indicates that data shown is given in the manufacturer's Declaration of Performance.

Technical Specification

1 Description

The Celotex Range of PIR Insulation Boards for Timber-Frame Dwellings includes Celotex TB4000, Celotex GA4000, Celotex XR4000 and Celotex FR5000, foil-faced rigid polyisocyanurate (PIR) foam boards manufactured to comply with BS EN 13165 : 2012, with the nominal characteristics given in Table 1 of this Certificate.

Table 1 Nominal characteristics

Product	Board size (mm)	Thickness range (mm)	Edge profile
Celotex TB4000 ⁽¹⁾	1200 x 2400	12 to 45	square edge
Celotex GA4000	1200 x 2400	50 to 100	square edge
Celotex XR4000	1200 x 2400	110 to 200	square edge
Celotex FR5000 ⁽²⁾	1200 x 2400	25 to 150	square edge

(1) Used as lining only.

(2) Thickness 25–40 mm, used as lining only.

2 Manufacture

2.1 Celotex PIR insulation is manufactured by a lamination process, formed between aluminium foil-facings that are glued together in a continuous laminator, where the 'adhesive' is a mixture of two primary chemicals Polyol and MDI. An added blowing agent causes this adhesive to expand into foam that hardens which is then cut to its finished board size and packed.

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

- agreed with the Certificate holder/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 non conformities
- 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.

2.3 The management system of Celotex Ltd has been assessed and registered as meeting the requirements of BS EN ISO 9001 : 2008 and BS EN ISO 14001 : 2004 by SGS UK Ltd (Certificates GB91/504 and GB11/83526 respectively).

3 Delivery and site handling

3.1 The boards are delivered to site in polythene-wrapped packs. Each pack contains a label with the manufacturer'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 products are light and easy to handle; care should be taken when handling individual items to avoid crushing the edges or corners. If damaged, the products should be discarded.

3.4 The products 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 the Celotex Range of PIR Insulation Boards for Timber-Frame Dwellings.

Design Considerations

4 Use

4.1 The Celotex Range of PIR Insulation Boards for Timber-Frame Dwellings, is satisfactory for use as insulation fixed between the timber studding, or as a dry lining or as insulated sheathing facing the cavity and is effective in reducing the thermal transmittance (U value) of external walls of timber-frame dwellings. It is essential that such walls are designed and constructed to incorporate the precautions in this Certificate to prevent moisture penetration, including a breather membrane over the timber sheathing.

4.2 New buildings subject to the national Building Regulations should be designed and constructed in accordance with the relevant recommendations of:

- BS EN 1995-1-1 : 2004 and its UK National Annex
- BS EN 1996-1-1 : 2005 and its UK National Annex
- BS EN 1996-2 : 2006 and its UK National Annex
- BS EN 351-1 : 2007.

4.3 Other new buildings not subject to these Regulations should also be built in accordance with the Standards given in section 4.2 of this Certificate.

4.4 Wall ties and fixings to BS EN 845-1 : 2013 should be used for structural stability in accordance with BS EN 1995-1-1 : 2004, BS EN 1996-1-1 : 2005 and BS EN 1996-2 : 2006.

4.5 Services which penetrate the dry lining (eg light switches, 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.

4.6 This application requires a vapour control layer (VCL) behind the internal finish, which should be a minimum thickness of 0.125 mm (500 gauge) polyethylene or plasterboard, backed with a vapour control membrane or similar.

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

4.8 When used as insulated sheathing, the products will not contribute to the structural performance of the timber frame.

4.9 For optimum thermal performance, boards with printed foil-facings must be installed with the correct orientation (see section 1.5.4).

5 Practicability of installation

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

6 Thermal performance



6.1 Calculations of the 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:

Celotex TB4000, Celotex GA4000 and Celotex XR4000

- PIR insulation core — Declared thermal conductivity (λ_p)* of 0.022 W·m⁻¹·K⁻¹
- outer foil-facer — aged emissivity (ϵ_p) (to BS EN 15976 : 2011) of 0.05.

Celotex FR5000

- PIR insulation core — Declared thermal conductivity (λ_p)* of 0.021 W·m⁻¹·K⁻¹
- outer foil-facer — aged emissivity (ϵ_p) (to BS EN 15976 : 2011) of 0.03.

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

Table 2 Example U values – New-build timber-framed external cavity wall⁽¹⁾

Target U value (W·m ⁻² ·K ⁻¹)	Insulation thickness (mm)									
	Inter studs (140 mm)		Inter studs and dry-lining ⁽²⁾ (140 mm or 89 mm studs)		Sheathing ⁽³⁾ (140 mm or 89 mm studs)		Inter studs and sheathing ⁽³⁾ (140 mm or 89 mm studs)		Dry-lining ⁽²⁾ and sheathing (140 mm or 89 mm studs)	
	(System 1)		(System 2)		(System 3)		(System 4)		(System 5)	
	Celotex GA4000	Celotex FR5000	Celotex TB4000, Celotex GA4000, Celotex XR4000	Celotex FR5000	Celotex GA4000, Celotex XR4000	Celotex FR5000	Celotex GA4000, Celotex XR4000	Celotex FR5000	Celotex TB4000, Celotex GA4000	Celotex FR5000
0.13	–	–	60+105 ⁽⁴⁾	–	165	–	60+105	60+95	45+95	40+95
0.15	–	–	60+80 ⁽²⁾	100+40 ⁽⁵⁾	140	135	60+80	60+70	45+70	40+70
0.18	–	–	65+45	65+40 ⁽⁵⁾	115	110	60+50	60+50	35+50	30+50
0.19	–	–	60+45	60+40	105	100	60+50	60+50	30+50	25+50
0.25	95	90	60+12	60+25	75	70	60+50	60+50	12+50	25+50
0.26	90	85	60+12	60+25	70	65	60+50	60+50	12+50	25+50
0.27	85	80	60+12	60+25	65	60	60+50	60+50	12+50	25+50
0.30	70	65	60+12	60+25	55	55	60+50	60+50	12+50	25+50
0.35	60 ⁽⁶⁾	60 ⁽⁶⁾	60+12	60+25	50	50	60+50	60+50	12+50	25+50

(1) For system construction details, see Table 3 of this Certificate.

(2) Fixings for dry-lining assumed to be 11 fully penetrating steel ($\lambda = 50 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$) fixings per square metre (150 mm centres) with a cross-sectional area of 13.2 mm² (screw diameter 4.1 mm).

(3) Fixing for sheathing assumed to be 5.6 fully penetrating steel ($\lambda = 50 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$) fixings per square metre (300 mm centres) with a cross-sectional area of 9.6 mm² (3.5 mm diameter) and wall ties 18 mm² and 3.7 m⁻² ($\lambda = 50 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$).

(4) Celotex GA4000 only for dry lining.

(5) Only 140 mm studs.

(6) Also valid for 89 mm studs.

6.3 The products can maintain, or contribute to maintaining, continuity of thermal insulation at junctions between elements and openings. For Accredited Construction Details, the corresponding ψ -values (psi) in BRE Information Paper IP 1/06, 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


Scotland – Accredited Construction Details (Scotland)

Northern Ireland – Accredited Construction Details (version 1.0).

7 Condensation

Surface condensation

 7.1 Walls will adequately limit the risk of surface condensation when the thermal transmittance (U value) does not exceed 0.7 W·m⁻²·K⁻¹ at any point, and the junctions with other elements are designed in accordance with section 6.3 of this Certificate.

 7.2 For buildings in Scotland, walls will adequately limit the risk of surface condensation when the thermal transmittance (U value) does not exceed 1.2 W·m⁻²·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.

Interstitial condensation

 7.3 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, and the relevant guidance.

7.4 The foil-facings have a water vapour resistance exceeding 70 MN·s·g⁻¹ and the insulation core has a water vapour resistivity of 300 MN·s·g⁻¹·m⁻¹ and, therefore, will provide a significant resistance to water vapour transmission. Joints between boards are taped for over-stud applications.

7.5 When used as insulated sheathing, the joints between the boards must not be taped.

7.6 If the products are 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.

8 Behaviour in relation to fire



8.1 The products have a reaction to fire classification of Class F* to BS EN 13501-1 : 2007.

8.2 A fire-resistance test was carried out in accordance with BS 476-21 : 1987 on a loadbearing, timber stud wall system. An assessment considered the likely fire-resistance of all systems (see Table 3 of this Certificate) as if they had been tested to BS 476-21 : 1987. The main points of the assessment highlighted that:

- all systems are suitable for applications where a fire resistance of up to 30 minutes is required against the loadbearing capacity, integrity and insulation criteria of BS 476-21 : 1987 (for fire exposure from the inside, when subject to a total imposed load of 60 kN (10 kN load per stud)⁽¹⁾
- for loads greater than this, a qualified structural engineer can utilise the BS 476-21 : 1987 fire-resistance test report and its accompanying assessment, to alter the design of the timber frame to ensure that the residual timber after 30 minutes will be adequate. The Certificate holder should be contacted for these reports
- openings for doors and windows should be framed out and any exposed timber covered with at least one layer of plasterboard (see also section 4.5).

(1) Relates only to walls with a masonry outer leaf. Other weather-resistant claddings should be demonstrated by an appropriate test or assessment.

Table 3 System construction details

Component	Description	System				
		1	2	3	4	5
		Inter stud	Inter stud and dry-lining	Sheathing	Inter stud and sheathing	Dry-lining and sheathing
Plasterboard	12.5 mm ($\lambda = 0.25 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$)	yes	yes	yes	yes	yes
Batten	25 mm x 50 mm	–	yes	–	–	yes
Celotex Insulation	Minimum 12 mm	–	yes	–	–	yes
Vapour control layer (VCL)*	500 gauge polythene (or plasterboard backed with a vapour control membrane – 0.15 mm) Systems 2* and 5* – foil tape over joints of foil-facing to lining boards in place of separate VCL	yes	no*	yes	yes	no*
Timber frame	140 mm or 89 mm by 38 mm timber studs at maximum 600 mm centres, with cross noggings at 1200 mm centres, staggered by 600 mm between bays ($\lambda = 0.13 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$ – 15% default fraction)	yes	yes	yes	yes	yes
Celotex Insulation	Minimum 60 mm between studs	yes	yes	–	yes	–
Structural sheathing	9 mm OSB or plywood ($\lambda = 0.13 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$)	yes	yes	yes	yes	yes
Celotex Insulation	Minimum 50 mm	–	–	yes	yes	yes
Breather membrane		yes	yes	no	no	no
Cavity	50 mm	yes	yes	yes	yes	yes
Brick	102.5 mm ($\lambda = 0.77 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$)	yes	yes	yes	yes	yes

General notes about fixings:

- plasterboard: Systems 1, 3 and 4 – 50 mm by 3.5 mm drywall screws at nominal 150 mm centres
- plasterboard: Systems 2 and 5 – 110 mm by 4.1 mm drywall screws at nominal 150 mm centres to a fixing depth of 40 mm
- OSB: Systems 1, 2, 3, 4 and 5 – 25 mm by 3.5 mm cross-head screws at nominal 600 mm centres
- Celotex PIR insulation sheathing : Systems 3, 4 and 5 – 3.5 mm cross head screws at nominal 300 mm centres to a fixing depth of 40 mm into the studs, with clips on wall ties (minimum of three ties per square metre)
- timber battens: Systems 2 and 5 – 4.1 mm cross-head screws at nominal 300 mm centres to a fixing depth of 40 mm into the studs
- wall ties: timber-frame ties should be used in line with fixing manufacturer's instructions. Typical values: $\lambda = 50 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$, cross-section 18 mm² and 3.7 fixings per m².



8.3 For buildings in Scotland, cavity barriers must be provided to comply with:

Mandatory Standard 2.4, clauses 2.4.1⁽¹⁾, 2.4.2⁽¹⁾ and 2.4.7⁽¹⁾.

(1) Technical Handbook (Domestic).

8.4 Cavity barriers must be provided to comply with:

England and Wales — Approved Document B, Volume 1, Section 6

Northern Ireland — Technical Booklet E, paragraphs 4.36 to 4.39.

9 Proximity of flues and appliances

When installing the products in close proximity to certain flue pipes and/or heat-producing appliances, the following provisions to 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⁾ to 3.19.9⁽¹⁾

⁽¹⁾ Technical Handbook (Domestic).

Northern Ireland — Technical Booklet L, section 2.

10 Water resistance

10.1 Constructions incorporating the products and built in accordance with the Standards listed in section 4.2, will resist the transfer of precipitation to the inner leaf and satisfy the national Building Regulations:

England and Wales — Approved Document C, section 5

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

⁽¹⁾ Technical Handbook (Domestic).

Northern Ireland — Technical Booklet C, section 6.

10.2 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 brick leaf and any debris removed from the cavity
- 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
- raked or recessed mortar joints are avoided in very severe exposure areas.

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 products does not in itself promote infestation. The creation of voids within the structure, ie 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, wherever possible, that 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 products are confined behind the wall lining and have suitable durability (see section 14), maintenance is not required.

14 Durability



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

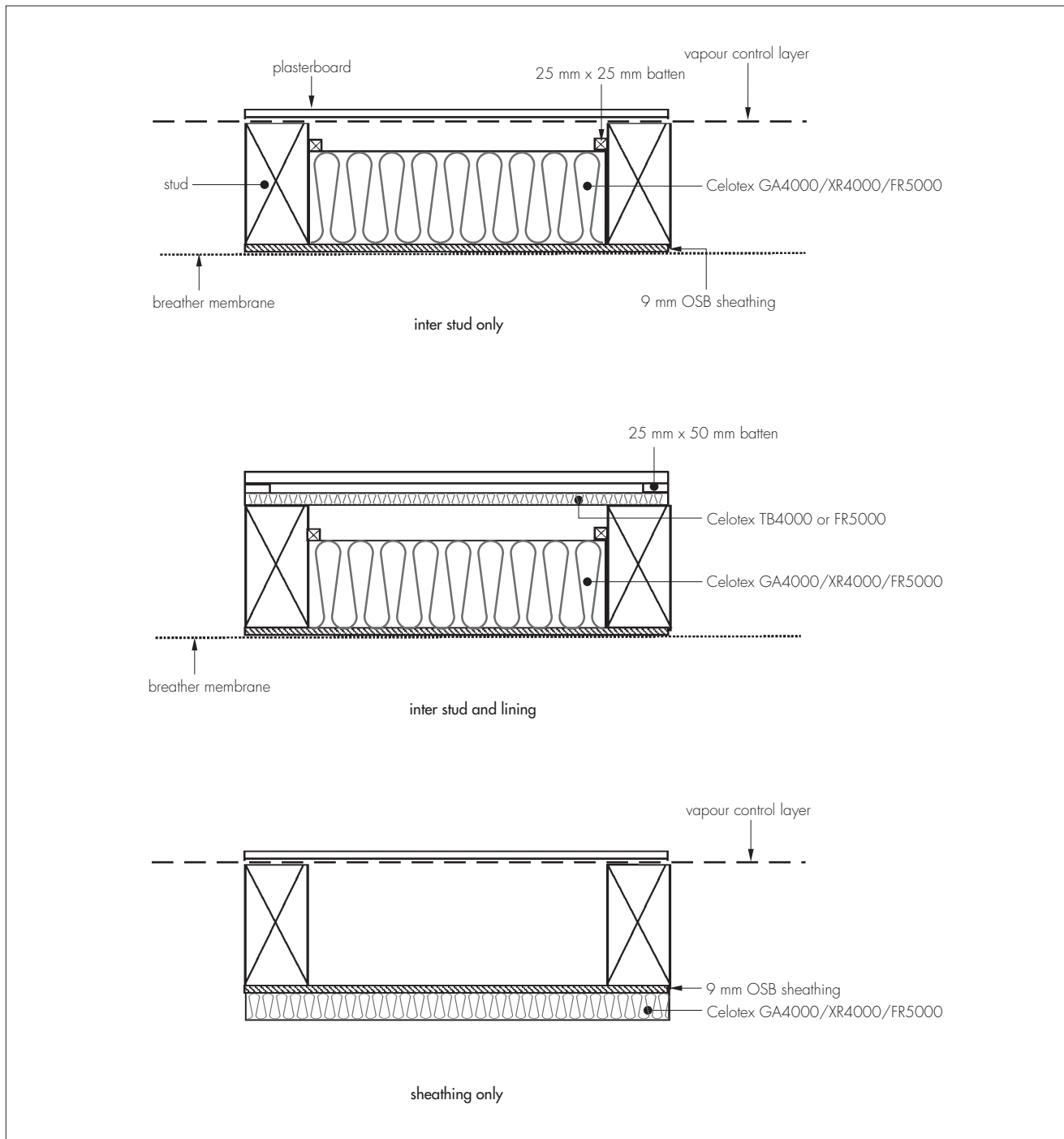
Installation

15 General

15.1 Installation of the Celotex Range of PIR Insulation Boards for Timber-Frame Dwellings must be in accordance with the relevant clauses of the Standards noted in section 4.2 of this Certificate and the Certificate holder's instructions.

15.2 The boards may be installed in between the timber studs (inter stud), as an internal lining, as an outer sheathing, and also as a combination of these (see Table 3 for construction details of the five systems). Typical installation details are shown in Figure 1.

Figure 1 Typical installation details



15.3 The products are light to handle and can be cut easily using a fine-toothed saw, and 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.

15.4 Celotex TB4000, Celotex GA4000 and Celotex XR4000 boards have printed logos applied to the outer foil-facing on one side only. To ensure optimum thermal performance, these boards must be installed with the unprinted foil-face always facing the cavity side. This does not apply to Celotex FR5000 as it does not have any printed logo applied to its foil-facings.

16 Procedure

Inter studs

16.1 The products should be cut to fit tightly between the timber studding and positioned against the inner face of sheathing board. Any gaps should be filled with expanding insulation foam. The insulation should be held in place by nails or timber battens to the warm side of the insulation.

16.2 The void created by space between the inner surface of the products and the dry lining can be utilised as an insulated service duct.

16.3 A sealed polyethylene VCL with a minimum thickness of 0.125 mm (500 gauge) with lapped and sealed joints is placed over the stud face before applying the internal finish.

Lining

16.4 Insulation boards should be butted tightly against each other to prevent gaps. To satisfy the requirements of *NHBC Standards 2014*, a VCL should be placed on the warm side of the wall insulation. However, where a foil-faced lining board is used, taping the joints with aluminium foil/reinforced tape provides an effective VCL and air permeability barrier, and a separate VCL may be omitted. To achieve an adequate bond, the boards should be thoroughly clean and free from any contamination. The insulation is sealed at all service penetrations.

16.5 The insulation boards are temporarily fixed to the inner face of the timber studding, ensuring that the insulation makes contact or overlaps with ceiling and floor insulation.

16.6 The line of the timber studs is marked on the insulation boards to allow fixing of plasterboard.

16.7 The plasterboard is fixed over the board on battens and secured with conventional nails or drywall screws at nominal 150 mm centres, and finished as normal.

Sheathing

16.8 The insulation boards should be installed on the outside of any wood, OSB or board sheathing, closely butted with joints staggered and restrained using galvanized clout nails or screws at 300 mm centres around the board perimeters and at 400 mm centres for intermediate timbers within the board area.

16.9 It is essential that nails locate the studs; this can be achieved by either using a plumb line from the top of the studs or by marking the stud positions on the boards (or substrate timber sheathing) as the boards are being offered into position.

16.10 The use of self-adhesive foil-tape is not recommended.

16.11 A sealed vapour control layer VCL with a minimum thickness of 0.125 mm (500 gauge) with lapped and sealed joints is placed between the plasterboard and the timber frame.

16.12 Ties securing the external leaf are fixed through the insulation board to the studs and the sheathing is held in place by the retaining discs on the wall ties.

16.13 Internal finishes are applied as normal.

Technical Investigations

17 Investigations

17.1 An examination was made of test data relating to:

- water vapour resistance
- density
- thermal conductivity
- compressive strength
- dimensional accuracy
- dimensional stability with temperature and humidity
- condensation risk.

17.2 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.

Bibliography

BS 476-21 : 1987 *Fire tests on building materials and structures — Methods for determination of the fire resistance of loadbearing elements of construction*

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

BS 7671 : 2008 *Requirements for electrical installations — IEE Wiring Regulations. Seventeenth Edition*

BS EN 15976 : 2011 *Flexible sheets for waterproofing — Determination of emissivity*

BS EN 351-1 : 2007 *Durability of wood and wood-based products — Preservative-treated solid wood — Classification of preservative penetration and retention*

BS EN 845-1 : 2013 *Specification for ancillary components for masonry — Wall ties, tension straps, hangers and brackets*

BS EN 1995-1-1 : 2004 *Eurocode 5 : Design of timber structures — General — Common rules and rules for buildings*

NA to BS EN 1995-1-1 : 2004 UK National Annex to *Eurocode 5 : Design of timber structures — General — Common rules and rules for buildings*

BS EN 1996-1-1 : 2005 *Eurocode 6 : Design of masonry structures — General rules for reinforced and unreinforced masonry structures*

NA to BS EN 1996-1-1 : 2005 UK National Annex to *Eurocode 6 : Design of masonry structures — General rules for reinforced and unreinforced masonry structures*

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 13165 : 2012 *Thermal insulation products for buildings — Factory made rigid polyurethane foam (PU) products — Specification*
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*
BS EN ISO 9001 : 2008 *Quality management systems — Requirements*
BS EN ISO 14001 : 2004 *Environmental Management systems — Requirements with guidance for use*
BRE Information Paper IP 1/06 *Assessing the effects of thermal bridging at junctions and around openings*
BRE Report (BR 262 : 2002) *Thermal insulation: avoiding risks*
BRE Report (BR 443 : 2006) *Conventions for U-value calculations*

Conditions of Certification

18 Conditions

18.1 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.

18.2 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.

18.3 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.

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

18.5 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.

18.6 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.