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### trading as Celotex

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## Agrément Certificate

16/5357

Product Sheet 3

### CELOTEX INSULATION

### CELOTEX PL4000 PIR PLASTERBOARD THERMAL LAMINATE

This Agrément Certificate Product Sheet<sup>(1)</sup> relates to Celotex PL4000 PIR Plasterboard Thermal Laminate, comprising a rigid polyisocyanurate (PIR) foam board bonded to plasterboard. The product is for use, with height restrictions in some cases, as an insulated dry lining for internal walls and ceiling applications in existing domestic and non-domestic buildings.

(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 insulation component of the product has a declared thermal conductivity value ( $\lambda_D$ ) of  $0.022 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$  (see section 6).

**Condensation** — the product can contribute to limiting the risk of surface condensation; however, the risk of interstitial condensation should be assessed for each case (see section 7).

**Behaviour in relation to fire** — the plasterboard face of the product has a reaction to fire classification of Class B-s1, d0 to BS EN 13501-1 : 2018 and its use is restricted in some cases (see section 8).

**Durability** — the product is durable, rot proof and sufficiently stable to remain effective for the life of the building in which it is installed (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: 20 July 2021

Originally certificated on 20 November 2018

Hardy Giesler  
Chief Executive Officer

*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](http://www.bbacerts.co.uk)*

*Readers MUST check the validity and latest issue number of this Agrément Certificate by either referring to the BBA website or contacting the BBA directly.*

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



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## Regulations

In the opinion of the BBA, Celotex PL4000 PIR Plasterboard Thermal Laminate, 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)

<b>Requirement:</b>	<b>B2(1)</b>	<b>Internal fire spread (linings)</b>
Comment:		The product is unrestricted under this Requirement. See section 8.1 of this Certificate.
<b>Requirement:</b>	<b>B3(4)</b>	<b>Internal fire spread (structure)</b>
Comment:		The product can contribute to satisfying this Requirement. See section 8.2 of this Certificate.
<b>Requirement:</b>	<b>B4(1)</b>	<b>External fire spread</b>
Comment:		The product is restricted by this Requirement. See sections 8.1 and 8.3 of this Certificate.
<b>Requirement:</b>	<b>C2(c)</b>	<b>Resistance to moisture</b>
Comment:		The product can contribute to satisfying this Requirement. See sections 7.1 and 7.6 of this Certificate.
<b>Requirement:</b>	<b>L1(a)(i)</b>	<b>Conservation of fuel and power</b>
Comment:		The product can contribute to satisfying this Requirement. See sections 6.1 and 6.2 of this Certificate.
<b>Regulation:</b>	<b>7(1)</b>	<b>Materials and workmanship</b>
Comment:		The product is acceptable. See section 14 and the <i>Installation</i> part of this Certificate.
<b>Regulation:</b>	<b>7(2)</b>	<b>Materials and workmanship</b>
Comment:		The product is restricted under this Regulation. See sections 8.1 and 8.3 of this Certificate.



### The Building (Scotland) Regulations 2004 (as amended)

<b>Regulation:</b>	<b>8(1)</b>	<b>Durability, workmanship and fitness of materials</b>
Comment:		The product is acceptable. See section 14 and the <i>Installation</i> part of this Certificate.
<b>Regulation:</b>	<b>9</b>	<b>Building standards applicable to construction</b>
Standard:	2.4	Cavities
Comment:		The product can contribute to satisfying this Standard, with reference to clause 2.4.2 <sup>(1)(2)</sup> . See section 8.2 of this Certificate.
Standard:	2.5	Internal linings
Comment:		The product is unrestricted by this Standard, with reference to clause 2.5.1 <sup>(1)(2)</sup> . See sections 8.1 and 8.4 of this Certificate.
Standard:	3.15	Condensation
Comment:		The product can contribute to satisfying this Standard, with reference to clauses 3.15.1 <sup>(1)(2)</sup> , 3.15.4 <sup>(1)(2)</sup> and 3.15.5 <sup>(1)(2)</sup> . See sections 7.1 and 7.7 of this Certificate.
Standard:	6.1(b)	Carbon dioxide emissions
Comment:		The product can contribute to satisfying clauses, or parts of, 6.1.1 <sup>(1)</sup> , 6.1.2 <sup>(2)</sup> , 6.1.3 <sup>(1)</sup> , 6.1.4 <sup>(1)</sup> , 6.1.6 <sup>(1)(2)</sup> and 6.1.8 <sup>(2)</sup> of this Standard, but compensating fabric and/or service measures may need to be taken. See sections 6.1 and 6.2 of this Certificate.

<b>Standard:</b>	<b>6.2</b>	<b>Building insulation envelope</b>
<b>Comment:</b>		The product can contribute to satisfying clauses, or parts of, 6.2.1 <sup>(1)(2)</sup> , 6.2.3 <sup>(1)</sup> , 6.2.4 <sup>(2)</sup> , 6.2.5 <sup>(2)</sup> , 6.2.6 <sup>(1)</sup> , 6.2.7 <sup>(1)</sup> , 6.2.8 <sup>(2)</sup> , 6.2.9 <sup>(1)(2)</sup> , 6.2.10 <sup>(1)</sup> , 6.2.11 <sup>(1)(2)</sup> , 6.2.12 <sup>(2)</sup> and 6.2.13 <sup>(1)(2)</sup> of this Standard, but compensating fabric and/or service measures may need to be taken. See sections 6.1 and 6.2 of this Certificate.
<b>Standard:</b>	<b>7.1(a)(b)</b>	<b>Statement of sustainability</b>
<b>Comment:</b>		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 <sup>(1)(2)</sup> [Aspects 1 <sup>(1)(2)</sup> and 2 <sup>(1)</sup> ], 7.1.6 <sup>(1)(2)</sup> [Aspects 1 <sup>(1)(2)</sup> and 2 <sup>(1)</sup> ] and 7.1.7 [Aspects <sup>(1)(2)</sup> ]. See section 6.1 of this Certificate.
<b>Regulation:</b>	<b>12</b>	<b>Building standards applicable to conversions</b>
<b>Comment:</b>		All comments given for the product under Regulation 9, Standards 1 to 6, also apply to this Regulation, with reference to clause 0.12.1 <sup>(1)(2)</sup> and Schedule 6 <sup>(1)(2)</sup> .
		(1) Technical Handbook (Domestic). (2) Technical Handbook (Non-Domestic).



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

<b>Regulation:</b>	<b>23</b>	<b>Fitness of materials and workmanship</b>
<b>Comment:</b>		The product is acceptable. See section 14 and the <i>Installation</i> part of this Certificate.
<b>Regulation:</b>	<b>29</b>	<b>Condensation</b>
<b>Comment:</b>		The product can contribute to satisfying this Regulation. See section 7.1 of this Certificate.
<b>Regulation:</b>	<b>34</b>	<b>Internal fire spread — Linings</b>
<b>Comment:</b>		The product is unrestricted by this Regulation. See section 8.1 of this Certificate.
<b>Regulation:</b>	<b>35(4)</b>	<b>Internal fire spread - structure</b>
<b>Comment:</b>		The product can contribute to satisfying this Regulation. See sections 8.2 and 8.4 of this Certificate.
<b>Regulation:</b>	<b>39(a)(i)</b>	<b>Conservation measures</b>
<b>Comment:</b>		The product is acceptable. See sections 6.1 and 6.2 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 sections: 3 *Delivery and site handling* (3.3) and 16 *General* (16.8) of this Certificate.

## Additional Information

### NHBC Standards 2021

In the opinion of the BBA, Celotex PL4000 PIR Plasterboard Thermal Laminate, if installed, used and maintained in accordance with this Certificate, and provided the bonded plasterboard facing is a minimum of 12.5 mm thick with the product mechanically fixed back to the structure, can satisfy or contribute to satisfying the relevant requirements in relation to *NHBC Standards*, Chapters 6.1 *External masonry walls* and 9.2 *Wall and ceiling finishes*.

## CE marking

The Certificate holder has taken the responsibility of CE marking the product in accordance with harmonised European Standard BS EN 13950 : 2014.

## Technical Specification

### 1 Description

1.1 Celotex PL4000 PIR Plasterboard Thermal Laminate consists of PIR insulation<sup>(1)</sup> with composite foil/kraft paper-facings, bonded to plasterboard<sup>(2)</sup>, as listed in Table 1.

(1) Manufactured to comply with BS EN 13165 : 2012.

(2) Manufactured to comply with BS EN 520 : 2004.

Table 1 Product summary

Product	Board size (mm)	Plasterboard thickness (mm)	PIR insulation thickness (mm)	Board facings	Fixing method
Celotex PL4000	1200 x 2400	12.5	25 to 65	Composite foil/kraft paper-facing both sides (inner facing unprinted and bonded to plasterboard, outer facing printed)	Direct bonding (adhesive) or mechanical fixing

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

- gypsum-based dry lining adhesive compound (plaster dabs) to BS EN 14496 : 2017
- metal component furring systems to BS EN 14195 : 2014
- mechanical fasteners including dry wall screws, plasterboard nails and nailable plugs to BS EN 14566 : 2008
- metal edge and corner beads to BS EN 14353 : 2017
- jointing materials including scrim tape and jointing compound to BS EN 13963 : 2014
- softwood timber battens.

### 2 Manufacture

2.1 The insulation component of Celotex PL4000 is manufactured by a lamination process whereby the board is formed between a composite foil/kraft paper-facing that is adhered in a continuous laminator, where the 'adhesive' is a mixture of two primary chemicals, polyol and MDI. An added blowing agent causes the adhesive to expand into foam that sets, which is then cut to its finished board size. The board is bonded to plasterboard.

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 Celotex has been assessed and registered as meeting the requirements of BS EN ISO 9001 : 2015 and BS EN ISO 14001 : 2015 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 bearing 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 moisture and should be stored inside, under cover and protected with opaque polythene sheeting. The boards should be stacked flat, and raised above ground level (to avoid contact with ground moisture).

3.3 Care must be taken when handling the boards to avoid crushing the edges or corners. The boards must not be exposed to open flame or other ignition sources, or solvents or other chemicals. If damaged, the product should be discarded.

## Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on Celotex PL4000 PIR Plasterboard Thermal Laminate.

## Design Considerations

### 4 Use

4.1 Celotex PL4000 PIR Plasterboard Thermal Laminate is satisfactory for use as an insulating dry lining to improve the thermal insulation of solid or cavity masonry walls, or horizontal or sloped roof ceilings, of existing domestic and non-domestic buildings, with height restrictions in some cases (see section 8). Celotex PL4000 has composite foil/kraft paper-facings allowing it to be installed by direct bonding to the wall using plaster adhesive dabs, or by mechanical fixing either directly to the wall or onto timber battens or metal furring systems (see the *Installation* part of this Certificate). The boards should be installed in accordance with the Certificate holder's instructions.

4.2 The boards may be installed on masonry construction including clay and calcium silicate bricks, concrete blocks, and natural and reconstituted stone blocks. It is essential that such walls are constructed taking account of the local wind-driven rain index.

4.3 The product is not intended to offer resistance to rain penetration; walls, therefore, must already be rain resistant and show no signs of water ingress, rain penetration or damp from ground moisture, and must be at least two bricks or 200 mm in thickness.

4.4 It is essential that the boards are butted as close as possible to minimise any gaps between them (see section 17 of this Certificate).

4.5 Services which penetrate the dry lining, eg light switches and power outlets, should be kept to a minimum to limit damage to vapour checks. All perimeters of the board, around service penetrations, openings, junctions and around the perimeter of suspended timber floors must be sealed with a suitable sealant.

4.6 It is essential that proper care and attention is given to maintaining the integrity/continuity of the insulation and facings.

4.7 With installations that form a void of 20 mm or more (ie timber batten or metal furring systems), services can be incorporated behind the dry lining, making the chasing of the wall unnecessary. Where the services have a greater depth than the void, the wall should be chased rather than the insulation. Suitable isolation methods, such as conduit or capping, must be used to ensure cables do not come into contact with the insulation.

4.8 The installation of the product requires careful detailing around doors and windows to achieve a satisfactory surface for finishing. In addition, every attempt should be made to minimise the risk of thermal bridging at reveals and where heavy separating walls are attached to the external wall. Thinner boards should be selected to suit site-specific door and window reveal conditions. All work must be designed to accommodate the thickness of the dry lining, particularly at reveals, heads and sills and in relation to ceiling height. Where the dimensions of fixtures are critical (eg bathrooms), these should be checked before installation.

4.9 If present, mould or fungal growth should be treated prior to the application 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 thermal transmittance (U value) of a specific construction using insulated dry lining should be carried out in accordance with BS EN ISO 6946 : 2017 and BRE Report BR 443 : 2019, using the declared thermal conductivity ( $\lambda_D$ ) for the insulation component of  $0.022 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$ , a design value of  $0.21 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$  for the plasterboard, and aged emissivity ( $\epsilon$ ) (to BS EN 15976 : 2011) of 0.9 for the printed composite foil/kraft paper-facing.

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

Table 2 Example U values — solid brickwork wall<sup>(1)</sup>

Target U value ( $\text{W}\cdot\text{m}^{-2}\cdot\text{K}^{-1}$ )	Celotex PL4000 Thickness of insulation <sup>(2)</sup> (mm), as dry lining	
	Direct bond (plaster dabs) <sup>(3)</sup>	Mechanical fixing direct to wall <sup>(4)</sup>
0.26	-	-
0.30	60	65

(1) 215 mm thick existing solid brickwork wall ( $\lambda = 0.77 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$ ).

(2) Thickness of insulation specified excludes plasterboard thickness of 12.5 mm ( $\lambda = 0.21 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$ ).

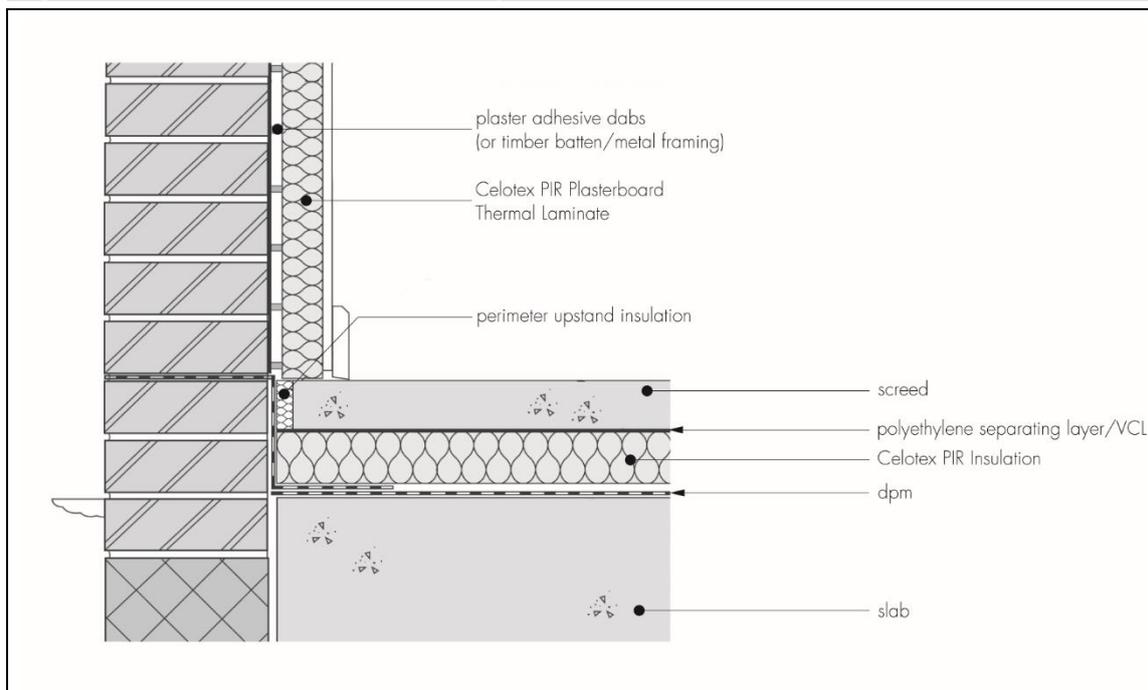
(3) Direct bonding with 15 mm plaster adhesive dabs (15 mm air cavity). Boards adhesively fixed in addition to 0.69 (per square metre) fully penetrating steel fixings ( $\lambda = 50 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$ ) with a cross-sectional area of  $18.2 \text{ mm}^2$  (minimum of two nailable fixings, at midpoint of the board, 25 mm from board edge).

(4) Mechanical fixing direct to wall using 4.16 (per square metre) fully penetrating stainless steel fixings ( $\lambda = 17 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$ ) with a cross-sectional area of  $9 \text{ mm}^2$  (stainless steel fixings at 300 mm centres from the vertical and horizontal board edges, with a minimum of 12 fixings per board).

### Junctions

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. An example of an acceptable junction detail is shown in Figure 1.

Figure 1 Junction between the wall and the floor



## 7 Condensation

### Interstitial condensation



7.1 Walls incorporating the product will adequately limit the risk of interstitial condensation when they are designed and constructed in accordance with BS 5250 : 2011, Annexes D and G.

7.2 For condensation risk analysis, the water vapour transmission factors for each component given in Table 3 must be used.

Table 3 Water vapour transmission factors

Material	Water vapour resistance ( $MN \cdot s \cdot g^{-1}$ )	Water vapour resistivity ( $MN \cdot s \cdot g^{-1} \cdot m^{-1}$ )
Plasterboard	—	50
PIR foam insulation	—	300
Composite foil/kraft paper-facing	1000	—

7.3 The risk of summer condensation on the foil component must be considered for solid masonry walls orientated from ESE through south to WSW, in accordance with BRE Report BR 262 : 2002, section 3.10.

7.4 Where calculations to Annex D of BS 5250 : 2011 indicate a risk of persistent condensation, a site-specific dynamic analysis to BS EN 15026 : 2007 should be considered.

7.5 All joints between the product must be sealed (see section 4.4 and the *Installation* part of this Certificate) in accordance with the Certificate holder's instructions.

### Surface condensation



7.6 Walls incorporating the product 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 to in section 6.3 of this Certificate.



7.7 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. Guidance may be obtained from Annex G of BS 5250 : 2011 and BRE Report BR 262 : 2002.

## 8 Behaviour in relation to fire



8.1 The plasterboard face of the product has a reaction to fire classification<sup>(1)</sup> of B-s1, d0 to BS EN 13501-1 : 2018.

(1) WarringtonFire Classification Reports WF424283 Iss1 and WF421862 Iss3. Copies may be obtained from the Certificate holder.

8.2 The Certificate holder has not declared a reaction to fire classification for the reverse side and so where this forms the face of an internal cavity, the cavity should be subdivided with cavity barriers in accordance with the requirements of the documents supporting the national Building Regulations.



8.3 In England and Wales, the product should not be used on buildings with a storey more than 18 m above the ground but may be used on buildings at any proximity to a boundary.



8.4 In Scotland and Northern Ireland, the use of the product is unrestricted by the national Building Regulations in terms of height and proximity to a boundary.

## 9 Proximity of flues and appliances

Detailed guidance can be found in the documents supporting the national Building Regulations for the provisions that are applicable when the product is installed in close proximity to certain flue pipes and/or heat-producing appliances.

## 10 Materials in contact — wiring installations

10.1 As with any form of insulation, de-rating of electrical cables should be considered where the insulation restricts the air cooling of cables.

10.2 Electrical cables likely to come into contact with the insulation component of the thermal liner are required to be protected by a suitable conduit or PVC-U trunking. The installation of electrical services must be carried out in accordance with BS 7671 : 2018.

## 11 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 product) 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.

## 12 Wall-mounted fittings

The recommendations of the Certificate holder must be followed. Any objects fixed to the wall, other than lightweight items, are outside the scope of this Certificate.

## 13 Maintenance

If the product is damaged during use, it can be readily removed and replaced.

## 14 Durability



The durability of the product is satisfactory. Provided the product is fixed to a satisfactory, stable and durable substrate, it will have a life equal to the building in which it is installed. Under normal conditions of occupancy it is unlikely to suffer damage, but if damage does occur, repairs are easily carried out.

## Installation

### 15 Pre-installation survey

15.1 The Certificate holder's instructions must be followed.

15.2 A detailed survey of the property should be carried out before work starts. The walls must be made good if required, and must be dry and structurally sound with no evidence of damp, contamination or frost damage before the product and its ancillary items are installed.

15.3 The survey should include a detailed examination of the internal and external fabric of the building, ensuring that any leaking external pipework and blocked gutters are made good. The efficiency, type and continuity of existing damp-proof course (dpc) materials (if any) should be checked. For existing buildings where there is no dpc, the requirement for one, must be determined.

15.4 The suitability of projecting window sills, verge and eaves overhangs should be checked. Mortar joints should also be examined and repointed, if required.

15.5 The existing ventilation provision should be assessed and updated if necessary.

15.6 There should be no gaps at the perimeter (such as floors and ceilings) or junctions (such as internal corners), or around openings or service penetrations. Existing gaps should be sealed before installation commences.

15.7 A detailed inspection of existing timbers (eg the timber floor joists) for dry or wet rot and insect attack should also be carried out. Existing metal studs or joists should be inspected for corrosion. Decayed timbers or corroded metal must be replaced before installation commences.

## 16 General

16.1 A qualified plumber is required to make alterations to heating systems. A qualified electrician must be used to make good the electrical wirings and services.

16.2 The building should be examined for the following:

- suitability of substrate
- detailing around windows and doors
- position and number of electrical sockets and switches
- wall fittings and fixtures – including coving and skirting
- areas where flexible sealants must be used
- ventilation plates.

16.3 Before starting to fit the product, the position of all main service cable and pipe runs must be clearly marked on the walls to avoid damage. All plaster coving, skirting board and laminate floor angle beads must be removed.

16.4 Before fixing the product, sufficient time must be allowed for damp-proofing treatments, where applied, to dry out (see BS 6576 : 2005 for dry-lining in conjunction with a chemical dpc application).

16.5 Care must be taken when exposing electrical cables (see section 10).

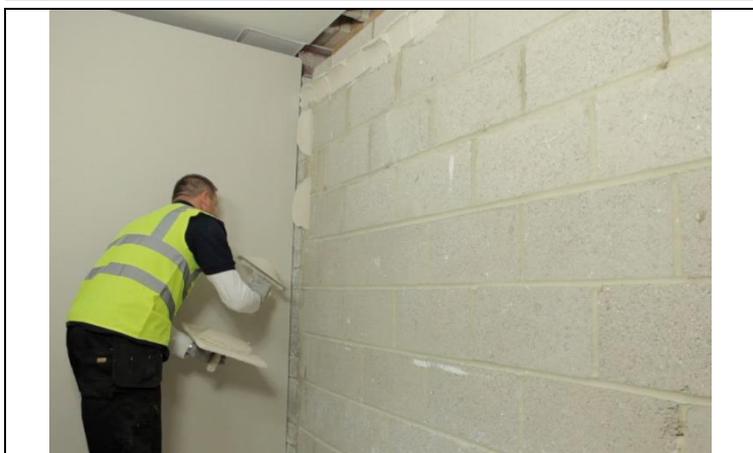
16.6 All insulated dry lining installations require careful planning and setting out. Installation should start from an internal corner or a window or door reveal, and vertical chalk guidelines should be marked on the wall at 1200 mm centres to indicate the positioning of the boards. Installation should be in accordance with BS 8212 : 1995, good dry lining practice and the Certificate holder's instructions. Typical installation methods are shown in Figures 2 and 3.

16.7 Additional consideration should also be given to the fixing of such features as cupboards and radiators.

16.8 The boards can be cut using a fine-toothed saw. Appropriate Personal Protective Equipment (PPE) must be used when cutting the boards, and cutting should be done in a ventilated space, outside or in an area with dust extraction.

16.9 Boards are cut to fit around windows, doors and air bricks. Care must be taken when trimming the insulation of the product to ensure the foil is not damaged. It is essential that cut pieces completely fill the spaces for which they are intended and are adequately secured. A 400 mm return is suggested on the internal / external wall junction. Suitable provisions will also need to be adopted at junctions and other details such as separating floors. Further guidance can be obtained from BRE Report BR 262 : 2002 (see Figure 4).

*Figure 2 Direct bonding to wall*



*Figure 3 Mechanically fixed to timber battens or metal furrings*



*Figure 4 Window reveal installation*



## **17 Procedure**

### **Direct bonding using plaster adhesive dabs**

17.1 A continuous bed of adhesive should be applied around the perimeter of the wall as well as around any services or other openings. This is especially important when considering the airtightness of the building. All conduits and piping should be installed prior to commencement of all works. The insulating backing of the laminate must not be removed to accommodate services.

17.2 Adhesive dabs (each approximately 75 by 250 mm) should be applied in three rows. Intermediate dabs at ceiling level should be applied and individual dabs should not bridge boards. The dabs should cover at least 20% of the board area.

17.3 The board should be cut approximately 15 mm short of the floor to ceiling height and positioned with the bottom edge resting on packing strips. The boards are tapped into position with a straight-edge, and alignment checked with the chalk guidelines.

17.4 Once positioned, the board should be lifted to the ceiling edge using a floor lifter and supported until the adhesive has set. Once set, a minimum of two nailable fixings should be applied at the mid-point of the board and approximately 25 mm from the board edge. Nailable plugs should penetrate the background through the dab by at least 40 mm.

17.5 Other boards should be installed closely butted together using the same technique.

### **Mechanically fixed to timber battens or metal furrings**

17.6 Using suitable mechanical fixings, treated softwood timber battens (minimum 25 mm thick by 47 mm wide) or proprietary metal furrings are installed vertically at a maximum of 600 mm centres, along with horizontal battens at the top and bottom of the installation area. Additional lengths of timber batten or metal furring should be installed to

coincide with horizontal board joints and around services, doors and windows. The framing must provide a minimum of 20 mm bearing to each system at joints and must be of sufficient depth to accommodate the fixings for the system. Metal furring systems can also be bonded to the wall in accordance with the manufacturer's recommendations, and the same preparation and setting out procedure should be used. The adhesive dabs (approximately 75 by 200 mm) should be applied at centres suitable for the product, typically from 450 to 600 mm.

17.7 The board should be cut approximately 15 mm short of the floor to ceiling height and positioned with the bottom edge resting on packing strips. The boards are placed onto the timber or metal frame, and alignment checked with the position of the timber batten or metal furring and chalk guidelines on the floor and ceiling.

17.8 Once positioned, the board should be lifted to the ceiling edge using a floor lifter and supported with additional packing at the base of the board. The board is fixed to the timber battens or metal frame using appropriate dry wall screws. Fixings should be installed at 300 mm centres across the horizontal and vertical elements of the frame.

17.9 Other boards should be installed closely butted together using the same technique.

#### **Mechanically fixed direct to wall**

17.10 The board should be cut approximately 15 mm short of the floor to ceiling height and positioned with the bottom edge resting on packing strips. The boards are placed into position, and alignment checked with the chalk guidelines on the floor and ceiling.

17.11 Once positioned, the board should be lifted to the ceiling edge using a floor lifter and supported with additional packing at the base of the board. The board should be fixed to the wall using suitable stainless steel mechanical fixings at 300 mm centres from the vertical and horizontal board edges, with a minimum of 12 fixings per board.

17.12 Other boards should be installed closely butted together using the same technique.

#### **Ceilings**

17.13 The product can be used to line horizontal or sloped ceilings. All four edges of the board should be supported by rafters, joists or battens by at least 20 mm.

17.14 Boards should be fixed using suitable plasterboard nails or drywall screws, at a minimum of 250 mm centres with fixings at least 12 mm from the edge of the board.

## **18 Finishing**

18.1 Jointing and finishing of the plasterboard lining are carried out in the appropriate manner in accordance with BS EN 13914-2 : 2016, applying plasterer's tape to all joints. A finishing skim coat of 2 mm of plaster should be applied to complete the installation.

18.2 Any gaps between the ceiling and the wall must be filled.

## **Technical Investigations**

### **19 Tests**

Results of tests were assessed to determine:

- thermal conductivity
- vapour resistance
- inter-laminate bond strength
- dimensional accuracy
- hard and soft body impact.

### **20 Investigations**

20.1 Data on durability and properties in relation to fire were evaluated.

20.2 A calculation was undertaken to confirm the declared thermal conductivity ( $\lambda_D$ ) values.

20.3 A condensation risk analysis was carried out.

20.4 A series of U value calculations was carried out.

20.5 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

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

BRE Report BR 443 : 2019 *Conventions for U-value calculations*

BS 5250 : 2011 + A1 : 2016 *Code of practice for control of condensation in buildings*

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BS 8212 : 1995 *Code of practice for dry lining and partitioning using gypsum plasterboard*

BS EN 520 : 2004 + A1 : 2009 *Gypsum plasterboards — Definitions, requirements and test methods*

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BS EN 13914-2 : 2016 *Design, preparation and application of external rendering and internal plastering — Design considerations and essential principles for internal plastering*

BS EN 13950 : 2014 *Gypsum plasterboard thermal/acoustic insulation composite panels — Definitions, requirements and test methods*

BS EN 13963 : 2014 *Jointing materials for gypsum plasterboards — Definitions, requirements and test methods*

BS EN 14195 : 2014 *Metal framing components for gypsum plasterboard systems — Definitions, requirements and test methods*

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BS EN 15026 : 2007 *Hygrothermal performance of building components and building elements — Assessment of moisture transfer by numerical simulation*

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

BS EN ISO 6946 : 2017 *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*

### 21 Conditions

#### 21.1 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.

21.2 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.

21.3 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.

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

21.5 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.

21.6 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.