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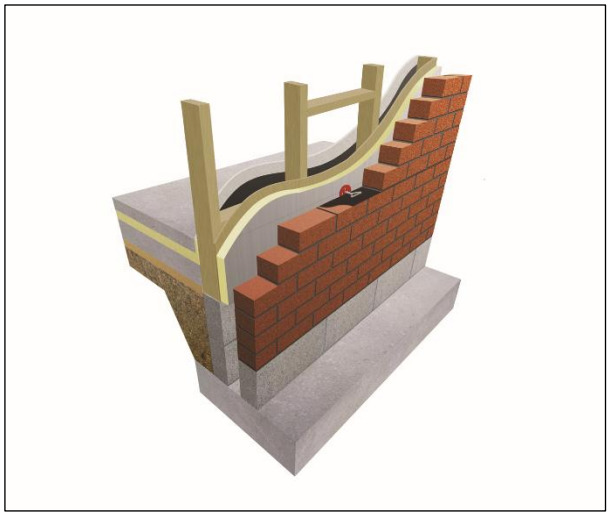
Agrément Certificate
25/7329
Product Sheet 1 Issue 1

CELOTEX INSULATION

CELOTEX TB4000, GA4000 AND XR4000 PIR INSULATION BOARDS FOR TIMBER-FRAME DWELLINGS

This Agrément Certificate Product Sheet(1) relates to Celotex TB4000, GA4000 and XR4000 PIR Insulation Boards for Timber-Frame Dwellings, composite foil-faced rigid polyisocyanurate (PIR) foam boards for use as insulation in new and existing external cavity walls of conventional timber-frame dwellings, with a masonry outer leaf, with height restrictions. The products may be installed between studding, and as a dry-lining, or as insulated sheathing.

(1) Hereinafter referred to as 'Certificate'.



The assessment includes

Product factors:

- compliance with Building Regulations
- compliance with additional regulatory or non-regulatory information where applicable
- evaluation against technical specifications
- assessment criteria and technical investigations
- uses and design considerations

Process factors:

- compliance with Scheme requirements
- installation, delivery, handling and storage
- production and quality controls
- maintenance and repair

Ongoing contractual Scheme elements†:

- regular assessment of production
- formal 3-yearly review

KEY FACTORS ASSESSED

Section 1. Mechanical resistance and stability
Section 2. Safety in case of fire
Section 3. Hygiene, health and the environment
Section 4. Safety and accessibility in use
Section 5. Protection against noise
Section 6. Energy economy and heat retention
Section 7. Sustainable use of natural resources
Section 8. Durability

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

Date of issue: 24 January 2025

Hardy Giesler
Chief Executive Officer

This BBA Agrément Certificate is issued under the BBA's Inspection Body accreditation to ISO/IEC 17020. Sections marked with † are not issued under accreditation.

The BBA is a UKAS accredited Inspection Body (No. 4345), Certification Body (No. 0113) and Testing Laboratory (No. 0357).

Readers MUST check that this is the latest issue of this Agrément Certificate by either referring to the BBA website or contacting the BBA directly.

The Certificate should be read in full as it may be misleading to read clauses in isolation.

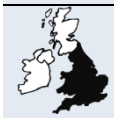
Any photographs are for illustrative purposes only, do not constitute advice and should not be relied upon.

SUMMARY OF ASSESSMENT AND COMPLIANCE

This section provides a summary of the assessment conclusions; readers should refer to the later sections of this Certificate for information about the assessments carried out.

Compliance with Regulations

Having assessed the key factors, the opinion of the BBA is that Celotex TB4000, GA4000 and XR4000 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 Building Regulations 2010 (England and Wales) (as amended)

Requirement:	**B3(4)**	**Internal fire spread (structure)**
Comment:		The products can contribute to satisfy this Requirement. See Section 2 of this Certificate.
Requirement:	**B4(1)**	**External fire spread**
Comment:		The products are restricted by this Requirement. See Section 2 of this Certificate.
Requirement:	**C2(c)**	**Resistance to moisture**
Comment:		The products can contribute to satisfying this Requirement. See section 3 of this Certificate.
Requirement:	**L1(a)(i)**	**Conservation of fuel and power**
Comment:		The products can contribute to satisfying this Requirement; however, compensating fabric measures may be required. See section 6 of this Certificate.
Regulation:	**7(1)**	**Materials and workmanship**
Comment:		The products are acceptable. See sections 8 and 9 of this Certificate.
Regulation:	**7(2)**	**Materials and workmanship**
Comment:		The products are restricted by this Regulation. See section 2 of this Certificate.
Regulation:	**25B**	**Nearly zero-energy requirements for new buildings**
Regulation:	**26**	**CO_2 emission rates for new buildings**
Regulation:	**26A**	**Fabric energy efficiency rates for new dwellings (applicable to England only)**
Regulation:	**26A**	**Primary energy efficiency rates for new buildings (applicable to Wales only)**
Regulation:	**26B**	**Fabric performance values for new dwellings (applicable to Wales only)**
Regulation:	**26C**	**Target primary energy rates for new buildings (applicable to England only)**
Regulation:	**26C**	**Energy efficiency rating (applicable to Wales only)**
Comment:		The products can contribute to satisfying these Regulations; however, compensating fabric/service measures may be required. See section 6 of this Certificate.

The Building (Scotland) Regulations 2004 (as amended)

Regulation:	**8(1)**	**Fitness and durability of materials and workmanship**
Comment:		The products are acceptable. See sections 8 and 9 of this Certificate.
Regulation:	**8(3)**	**Fitness and durability of materials and workmanship**
Comment:		The products are restricted by this Regulation. See section 2 of this Certificate.
Regulation:	**9**	**Building standards - construction**
Standard:	2.4	Cavities
Comment:		The products can contribute to satisfying this Standard, with reference to clauses 2.4.2[(1)] and 2.4.4[(1)]. See section 2 of this Certificate.

Standard:	2.6	Spread to neighbouring buildings
Comment:		The products are restricted by this Standard, in some cases, with reference to clause 2.6.5(1). See section 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). however, compensating fabric/service measures may be required. See section 3 of this Certificate.
Standard:	6.1(b)(c)	Energy demand
Comment:		The products can contribute to satisfying this Standard, with reference to clause 6.1.1(1), however, compensating fabric/service measures may be required. See section 6 of this Certificate.
Standard:	6.2	Building insulation envelope
Comment:		The products can contribute to satisfying this Standard with reference to clauses 6.2.1(1), 6.2.3(1), 6.2.6(1), 6.2.8(1), 6.2.9(1), 6.2.10(1) and 6.2.12(1) however, compensating fabric measures may be required. See section 6 of this Certificate.
Standard:	7.1(a)(b)	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 at least a bronze level of sustainability as defined in this Standard. In addition, they can contribute to a construction meeting a higher level of sustainability as defined in this Standard, with reference to clauses 7.1.4(1), 7.1.6(1) and 7.1.7(1). See section 6 of this Certificate.
Regulation:	**12**	**Building standards - conversion**
Comment:		All comments given for the products 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).

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

Regulation:	**23(1)(a)(i) (iii)(b)(i)(ii)**	**Fitness of materials and workmanship**
Comment:		The products are acceptable. See sections 8 and 9 of this Certificate.
Regulation:	**23(2)**	**Fitness of materials and workmanship**
Comment:		The products are restricted by this Regulation. See section 2 of this Certificate.
Regulation:	**29**	**Condensation**
Comment:		The products can contribute to satisfying this Regulation. See section 3 of this Certificate.
Regulation:	**35(4)**	**Internal fire spread — Structure**
Comment:		The products can contribute to satisfying this Regulation. See section 2 of this Certificate.
Regulation:	**36(a)**	**External fire spread**
Comment:		The products are restricted by this Regulation. See section 2 of this Certificate.
Regulation:	**39(a)(i)**	**Conservation measures**
Comment:		The products can contribute to satisfying this Regulation; however, compensating fabric measures may be required. See section 6 of this Certificate.

Regulation:	**40(2)**	**Target carbon dioxide emission rate**
Regulation:	**43(1)(2)**	**Renovation of thermal element**
Regulation:	**43B**	**Nearly zero-energy requirements for new buildings**
Comment:		The products can contribute to satisfying these Regulations; however, compensating fabric/service measures may be required. See section 6 of this Certificate.

Additional Information

NHBC Standards 2025

In the opinion of the BBA, Celotex TB4000, GA4000 and XR4000 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 in relation to *NHBC Standards*, Chapter 6.2 *External timber framed walls*.

Fulfilment of Requirements

The BBA has judged Celotex TB4000, GA4000 and XR4000 PIR Insulation Boards for Timber-Frame Dwellings to be satisfactory for use as described in this Certificate. The products have been assessed for use as thermal insulation in external cavity walls of conventional timber-frame dwellings, with a masonry outer leaf, with height restrictions.

ASSESSMENT

Product description and intended use

The Certificate holder provided the following description for the products under assessment. Celotex TB4000, GA4000 and XR4000 PIR Insulation Boards for Timber-Frame Dwellings comprise rigid PIR foam boards with composite foil-facings on both sides, printed on one side only.

The products have the nominal characteristics given in Table 1.

Table 1 Nominal characteristics

Characteristic (unit)	Products		
	Celotex TB4000	Celotex GA4000	Celotex XR4000
Length (mm)	2400	2400	2400
Width (mm)	1200	1200	1200
Thickness (mm)	20 to 45	50 to 100	110 to 200
Edge profile	Square	Square	Square

Ancillary items

The Certificate holder recommends the following ancillary items for use with the products, but these materials have not been assessed by the BBA and are outside the scope of this Certificate.

- timber-frame cavity wall ties with insulation retaining fixings to BS EN 845-1 : 2013
- air and vapour control layer (AVCL)
- gypsum plasterboard internal lining board
- OSB3 sheathing board
- breather membrane.

Applications

The products are intended for use as insulation for timber-frame external cavity walls of new and existing dwellings with a masonry outer leaf and may be installed:

- between the inner leaf studs of conventional timber-frame cavity walls, with a clear cavity and a masonry outer skin
- as insulated sheathing over walls of conventional timber-frame buildings, with a clear cavity and a masonry outer skin
- as a dry lining.

Product assessment – key factors

The products were assessed for the following key factors, and the outcome of the assessments is shown below. Conclusions relating to the Building Regulations apply to the whole of the UK unless otherwise stated.

1 Mechanical resistance and stability

Not applicable.

2 Safety in case of fire

Data were assessed for the following characteristics.

2.1 Reaction to fire

2.1.1 The Certificate holder has declared a reaction to fire classification as given in Table 2.

Table 2 Reaction to fire classification

Products assessed	Assessment method	Requirement	Result
TB4000 GA4000 XR4000	BS EN 13165 : 2012	Declared value	Class F

2.1.2 On the basis of data assessed, the products will be restricted in use by the documents supporting the national Building Regulations in some cases.

2.1.3 In England, the products must not be used on residential buildings with a storey 11 m or more in height or on other buildings with a storey 18 m or more in height.

2.1.4 In Wales and Northern Ireland, the products must not be used on buildings with a storey 18 m or more in height.

2.1.5 In Scotland, the products must not be used on buildings that have a storey 11 m or more in height, or within 1 m of a relevant boundary.

2.1.6 The products must be contained by a fire resistant lining board manufactured in accordance with BS EN 520 : 2004, with joints fully sealed and supported by timber studs or battens.

2.1.7 Designers must 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.

2.2 Resistance to fire

2.2.1 Fire-resistance tests(1) were carried out in accordance with BS EN 1365-1 : 2012 on loadbearing timber stud wall systems and an assessment was carried out by the fire laboratory(2). The component layers of the timber- frames incorporating the products, that were tested/assessed for fire resistance are given in Table 3 of this Certificate.

(1) The Building Test Centre fire resistance test reports in accordance with BS EN 1365-1 : 2012 : BTC 22251F dated 9 March 2023, BTC 22272F dated 3 November 2022, BTC 22279F dated 28 April 2023, BTC 22299F dated 07 November 2022.
(2) The Building Test Centre assessment report BTC 22176FA, dated 28 April 2023.

Table 3 Timber-frame construction details (as tested/assessed for fire resistance)

Component	Description	Tested system		
		Inter-stud	Inter-stud and lining	Sheathing only
		Insulation between timber studs	Insulation between timber studs, and as dry lining on internal side of timber-frame	Insulation as outer sheathing over timber-frame
Plasterboard(1)	12.5 mm thick Gyproc Wallboard	Yes	Yes	Yes
Timber batten(1)	25 x 50 mm (minimum)	—	Yes	—
Celotex insulation as dry lining	Celotex TB4000 (Minimum 20 mm thickness)	—	Yes	—
AVCL(1)	DuPont Tyvek AirGuard Reflective (or plasterboard backed with a vapour control membrane – 0.15 mm)	Yes	No(2)	Yes
Timber-frame(1)	89 (minimum) x 38 mm timber studs (C24 minimum) at maximum 600 mm centres, with cross noggings at 1200 mm centres, staggered by 600 mm between bays, with 25 x 25 mm (minimum) timber battens in stud cavity to retain insulation	Yes	Yes	Yes (insulation retaining battens in stud cavity not required)
Celotex insulation between studs	Celotex GA4000 or XR4000 (Minimum 50 mm thickness)	Yes	Yes	—
Structural outer sheathing(1)	9 mm OSB	Yes	Yes	Yes
Celotex insulation applied to outer sheathing	Celotex GA4000 or XR4000 (Minimum 50 mm thickness)	—	—	Yes
Breather membrane(1)	DuPont Tyvek Housewrap	Yes	Yes	Yes
Cavity	50 mm	Yes	Yes	Yes
Brick(1)	102.5 mm	Yes	Yes	Yes

(1) These components are outside the scope of this Certificate
(2) For inter-stud and lining system only – foil tape over joints of foil-facing to lining boards in place of separate AVCL.

2.2.2 The fire test assessment concluded that the three tested timber-frame 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 EN 1365-1 : 2012 (for fire exposure from the inside, when subject to a total imposed load of 60 kN, ie 12 kN load per timber stud)(1)(2).

(1) Copies of the reports are available from the Certificate holder on request.
(2) Relates only to walls with a masonry outer leaf.

2.2.3 For other constructions, or where other loads or periods of fire resistance are required by the documents supporting the national Building Regulations, the fire resistance must be established by a suitably experienced and competent individual.

3 Hygiene, health and the environment

Data were assessed for the following characteristics.

3.1 Water vapour permeability

For the purposes of assessing the risk of interstitial condensation, the water vapour resistivity/resistance values may be taken as stated in Table 4.

Table 4 Water vapour resistivity/resistance

Material	Assessment method	Requirement	Result
PIR insulation	BS EN ISO 10456 : 2007	Value achieved	300 $MN \cdot s \cdot g^{-1} \cdot m^{-1}$
Composite foil facer	BS 5250 : 2021		1000 $MN \cdot s \cdot g^{-1}$

4 Safety and accessibility in use

Not applicable.

5 Protection against noise

Not applicable.

6 Energy economy and heat retention

Data were assessed for the following characteristics.

6.1 Thermal conductivity

The products were tested for thermal conductivity and the results are given in Table 5.

Table 5 Thermal conductivity

Products assessed	Insulation thickness	Assessment method	Requirement	Result
TB4000	20 to 45 mm	BS EN 13165 : 2012	Declared value (λ_D)	0.022 $W \cdot m^{-1} \cdot K^{-1}$
GA4000	50 to 100 mm			
XR4000	110 to 200 mm			

6.2 Thermal performance

The foil facing was tested for emissivity and the result is given in Table 6.

Table 6 Aged emissivity of the foil facing

Material	Assessment method	Requirement	Result
Foil facing	BS EN 15976 : 2011	Declared value	0.05

6.3 Conservation of fuel and power

6.3.1 The U value of a completed wall will depend on the insulation thickness, its structure and its internal finish. Example U values are given in Table 7.

Table 7 Example U values

U value ($W \cdot m^{-2} \cdot K^{-1}$)	Celotex TB4000, GA4000 and XR4000 insulation thickness (mm)		
	Between studs[4]	Between studs and as internal lining[5]	As external sheathing[6]
0.13	—[7]	120[3] + 60[2]	90[2]
0.15	—[7]	120[3] + 40[1]	70[2]
0.17	—[7]	120[3] + 20[1]	50[2]
0.18	—[7]	110[3] + 20[1]	50[2]
0.21	—[7]	50[2] + 20[1]	50[2]
0.26	90[2]	50[2] + 20[1]	50[2]
0.28	75[2]	50[21] + 20[1]	50[2]
0.30	70[2]	50[2] + 20[1]	50[2]

(1) Celotex TB4000.
(2) Celotex GA4000.
(3) Celotex XR4000.
(4) Wall construction — 102.5 mm thick external brickwork (λ = 0.77 $W \cdot m^{-1} \cdot K^{-1}$); 50 mm clear cavity; breather membrane; 11 mm OSB sheathing board (λ = 0.13 $W \cdot m^{-1} \cdot K^{-1}$); 140 mm thick timber-frame bridging at 600 mm centres (15%, λ = 0.13 $W \cdot m^{-1} \cdot K^{-1}$) with variable thickness of Celotex insulation facing into a residual low emissivity (0.05) airspace; AVCL; and 12.5 mm plasterboard (λ = 0.21 $W \cdot m^{-1} \cdot K^{-1}$).
(5) Wall construction — 102.5 mm thick external brickwork (λ = 0.77 $W \cdot m^{-1} \cdot K^{-1}$); 50 mm clear cavity; breather membrane; 11 mm OSB sheathing board (λ = 0.13 $W \cdot m^{-1} \cdot K^{-1}$); 140 mm thick timber-frame bridging at 600 mm centres (15%, λ = 0.13 $W \cdot m^{-1} \cdot K^{-1}$) with variable thickness of Celotex insulation facing into a residual low emissivity (0.05) airspace; variable thickness of Celotex insulation as internal lining; AVCL; additional 25 mm airspace bridged by timber battens (11.8 %, λ = 0.13 $W \cdot m^{-1} \cdot K^{-1}$); and 12.5 mm plasterboard (λ = 0.21 $W \cdot m^{-1} \cdot K^{-1}$).
(6) Wall construction — 102.5 mm thick external brickwork (λ = 0.77 $W \cdot m^{-1} \cdot K^{-1}$); 50 mm low emissivity (0.05) cavity; variable thickness of Celotex insulation as external sheathing, affixed using 5.6 fully penetrating steel (λ = 50 $W \cdot m^{-1} \cdot K^{-1}$) fixings per square metre with a cross-sectional area of 9.6 mm^2 (screw diameter 3.5 mm); breather membrane; 11 mm OSB sheathing board (λ = 0.13 $W \cdot m^{-1} \cdot K^{-1}$); 140 mm thick timber-frame bridging at 600 mm centres (15%, λ = 0.13 $W \cdot m^{-1} \cdot K^{-1}$) fully filled with mineral wool insulation (λ = 0.040 $W \cdot m^{-1} \cdot K^{-1}$); AVCL; and 12.5 mm plasterboard (λ = 0.21 $W \cdot m^{-1} \cdot K^{-1}$).
(7) See section 6.3.3.

6.3.2 The products can contribute towards a construction satisfying the national Building Regulations in respect of energy economy and heat retention.

6.3.3 For improved energy or carbon savings, designers must consider appropriate fabric/service measures.

7 Sustainable use of natural resources

Not applicable.

8 Durability

8.1 The potential mechanisms for degradation and the known performance characteristics of the materials in the products were assessed.

8.2 Specific test data were assessed, as given in Table 8.

Table 8 Dimensional stability

Products assessed	Assessment method	Requirement	Result
TB4000, GA4000 and XR4000	Dimensional stability to BS EN 1604 : 2013 (70°C and 90-100% RH for 48 hours)	Length and width ≤ 2% change Thickness ≤ 6% change	Pass
	Dimensional stability to BS EN 1604 : 2013 (-20°C for 48 hours)	Length and width ≤ 1% change Thickness ≤ 2% change	Pass

8.3 Service life

Under normal service conditions, the products will have a life equivalent to the structure in which they are incorporated, provided they are designed, installed and maintained in accordance with this Certificate and the Certificate holder's instructions.

PROCESS ASSESSMENT

Information provided by the Certificate holder was assessed for the following factors:

9 Design, installation, workmanship and maintenance

9.1 Design

9.1.1 The design process was assessed by the BBA , and the following requirements apply in order to satisfy the performance assessed in this Certificate.

9.1.2 External timber-framed cavity walls must be designed and constructed in accordance with the relevant recommendations of:

- BS 5250 : 2021
- BS 8000-3 : 2001
- BS EN 351-1 : 2023
- BS EN 845-1 : 2013
- BS EN 1995-1-1 : 2004 and its UK National Annex
- BS EN 1996-1-1 : 2005 and its UK National Annex
- BS EN 1996-1-2 : 2005 and its UK National Annex
- BS EN 1996-2 : 2006 and its UK National Annex
- BS EN 1996-3 : 2006 and its UK National Annex.

9.1.3 As with other forms of cavity wall insulation, where buildings need to comply with the *NHBC Standards* 2025, specifiers must observe the requirements of that document.

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

9.1.5 Timber-frame cavity wall ties with insulation-retaining fixings and, if required, any additional ties to BS EN 845-1 : 2013 must 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, and their UK National Annexes.

9.1.6 Care must be taken in the overall design and construction of walls incorporating the products to ensure the provision of appropriate:

- cavity trays and damp proof courses (DPCs)
- cavity barriers
- resistance to the ingress of precipitation, moisture and dangerous gases from the ground
- resistance to sound transmission when flanking separating walls and floors.

9.1.7 It is essential that external masonry cavity walls are designed and constructed to incorporate the precautions in this Certificate to prevent moisture penetration.

9.1.8 Window and door opening reveals must be constructed incorporating a cavity barrier/closer/DPC, as required.

9.1.9 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 product.

9.1.10 As with any form of insulation, de-rating of electrical cables should be considered where the insulation restricts the air cooling of cables. BS 7671 : 2018 recommends that where wiring is completely surrounded by insulation it may need to be derated to as low as half its free air-current-carrying capacity. Guidance should be sought from a suitably experienced and competent electrician.

9.1.11 The detailed provisions given in the documents supporting the national Building Regulations when the products are installed in close proximity to certain flue pipes and/or heat-producing appliances must be followed.

9.1.12 It is essential that the boards are butted as close as possible to minimise any gaps between them.

9.1.13 Calculations of the thermal transmittance (U value) of a wall must be carried out in accordance with BS EN ISO 6946 : 2017 and BRE Report BR 443 : 2019.

9.1.14 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.

Interstitial condensation

9.1.15 Walls will adequately limit the risk of interstitial condensation when they are designed and constructed in accordance with BS 5250 : 2021.

9.1.16 The products require the use of an AVCL with a minimum S_d value of 50 m, behind the internal finish.

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

9.1.18 If the products are to be used in the external wall of rooms expected to have high humidity, care must be taken to provide adequate permanent ventilation.

Surface condensation

9.1.19 In England and Wales, walls will adequately limit the risk of surface condensation when the thermal transmittance (U value) does not exceed 0.7 $W \cdot m^{-2} \cdot K^{-1}$ at any point, and the junctions with other elements are designed in accordance with the guidance referred to in section 9.1.14 of this Certificate.

9.1.20 For buildings in Scotland, wall constructions will be acceptable when the thermal transmittance (U value) does not exceed 1.2 $W \cdot m^{-2} \cdot K^{-1}$ at any point, and the junctions with other elements are designed in accordance with the guidance referred to in BS 5250 : 2021. Further guidance may be obtained from BRE Report BR 262 : 2002 and section 9.1.14 of this Certificate.

9.1.21 The residual cavity width to be maintained during construction is 50 mm. This may reduce to 25 mm in isolated areas due to individual construction features [a minimum of 50 mm residual cavity width is required by the NHBC(1)]. This may be achieved by designing a cavity width which considers the dimensional tolerances of the components which make up the wall (by reference to the British Standards relating to the bricks, blocks and slabs), or by using the data from the respective manufacturers. Allowances may need to be made for the quality of the building operatives and the degree of site supervision or control available, or the limitations in respect of exposure of the proposed buildings as set out in Table 9 of this Certificate which must also be observed.

(1) The NHBC requirement for a residual cavity width is increased to 75 mm in areas of very severe exposure where the outer leaf is fair-faced masonry.

Table 9 Maximum allowable exposure index E(1)

Construction	Maximum allowable exposure index *E*(1)
All external masonry walls protected by: rendering (to BS EN 13914-1 : 2016), tile/slate hanging, or timber, plastic or metal weatherboarding or cladding	No restriction
One or more external masonry walls constructed from facing clay brickwork or natural stone, the porosity of which exceeds 20% by volume. Mortar joints must be flush-pointed or weather struck	100
One or more external masonry walls constructed from calcium silicate bricks, concrete blocks, reconstituted stone or natural stone, the porosity of which is less than 20% by volume, or any material with raked mortar joints	88

(1) To BS 5618 : 1985.

9.1.22 From ground level, the maximum height of continuous cavity walls must not exceed 12 m; above 12 m, the maximum height of continuous cavity walls must not exceed 7 m. In both cases, breaks must be in the form of continuous horizontal cavity trays and weepholes discharging to the outside.

9.1.23 An external render coat or other suitable finish must be applied in locations where such an application would be normal practice; care should be taken to ensure that the residual cavity is not bridged by mortar.

9.2 Installation

9.2.1 Installation instructions provided by the Certificate holder were assessed and judged to be appropriate and adequate.

9.2.2 Installation must be carried out in accordance with this Certificate and the Certificate holder's instructions. A summary of instructions and guidance is provided in Annex A of this Certificate.

9.2.3 For timber-frame constructions, installation must not be carried out until the moisture content of the frame is less than 20%.

9.2.4 When used on the outside of a timber-frame with a masonry outer leaf, it is particularly important to ensure during installation that:

- installation is carried out to the highest level on each wall, or the top edge of the insulation is protected by a cavity tray
- cavity trays are used with appropriate stop ends and weepholes at lintel level
- cavity battens and/or boards are used during construction to prevent bridging by mortar droppings
- 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 boards
- insulation boards are properly installed and either butt jointed, or interlocked using the tongue and groove or rebated edges
- the DPC at ground level does not project into the cavity, as it can form a trap for mortar bridging
- raked or recessed mortar joints are avoided in very severe exposure areas.

9.3 Workmanship

Practicability of installation was assessed by the BBA, on the basis of Certificate holder's information. To achieve the performance described in this Certificate, installation of the products must be carried out by a competent general builder, or a contractor, experienced with these types of products.

9.4 Maintenance and repair

As the products are confined within the wall cavity and have suitable durability, maintenance is not required.

10 Manufacture

10.1 The production processes for the products have been assessed, and provide assurance that the quality controls are satisfactory according to the following factors:

10.1.1 The manufacturer has provided documented information on the materials, processes, testing and control factors.

10.1.2 The quality control operated over batches of incoming materials has been assessed and deemed appropriate and adequate.

10.1.3 The quality control procedures and product testing to be undertaken have been assessed and deemed appropriate and adequate.

10.1.4 The process for management of non-conformities has been assessed and deemed appropriate and adequate.

10.1.5 An audit of each production location was undertaken, and it was confirmed that the production process was in accordance with the documented process, and that equipment has been properly tested and calibrated.

† 10.2 The BBA has undertaken to review 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.

11 Delivery and site handling

11.1 The Certificate holder stated that the products are delivered to site in packaging bearing the product name, the Certificate holder's name, batch number and the BBA logo incorporating the number of this Certificate.

11.2 Delivery and site handing must be performed in accordance with the Certificate holder's instructions and this Certificate, including:

11.2.1 The products must be protected from prolonged exposure to sunlight and must be stored under cover or protected with opaque polythene sheeting. Where possible, packs should be stored inside. If stored outside, the products must be stacked flat, and raised above ground level to avoid contact with ground moisture.

11.2.2 Care must be taken when handling the products to avoid crushing the edges or corners.

11.2.3 The products must not be exposed to naked flame or other ignition sources. Care must be taken to avoid contact with solvents and with materials containing volatile organic compounds. If damaged, the products must be discarded.

ANNEX A – SUPPLEMENTARY INFORMATION †

Supporting information in this Annex is relevant to the products but has not formed part of the material assessed for the 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.

UKCA marking

The Certificate holder has taken the responsibility of UKCA marking the products in accordance with Designated Standard EN 13165 : 2012.

Management Systems Certification for production

The management system of the manufacturer has been assessed and registered as meeting the requirements of BS EN ISO 9001 : 2015 by BSI Assurance UK Ltd (Certificate FM 803590).

Additional information on installation

Installation must be in accordance with the Certificate holder's instructions and this Certificate. A summary of the procedure is provided below:

Procedure

A.1 The products are light to handle and can be cut using a fine-toothed saw, but care must be taken in handling to prevent damage, particularly at edges.

Between timber studs

A.2 The products should be cut to fit tightly between the timber studding and positioned against the inner face of sheathing board. Any small 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.

A.3 The cavity created by the space between the products and the dry lining can be utilised as an insulated service duct.

A.4 A sealed polyethylene AVCL with a minimum thickness of 0.125 mm (500 gauge) with lapped and sealed joints must be placed over the stud face before applying the internal finish.

Dry lining

A.5 To satisfy the requirements of the NHBC Standards, a AVCL 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 AVCL and air permeability barrier, and a separate AVCL 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.

A.6 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.

A.7 The line of the timber studs is marked on the insulation boards to allow fixing of plasterboard.

A.8 The plasterboard is fixed over the board on battens and secured with drywall screws at nominal 150 mm centres and finished as normal.

Outer sheathing

A.9 The boards should be installed on the outside of 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.

A.10 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.

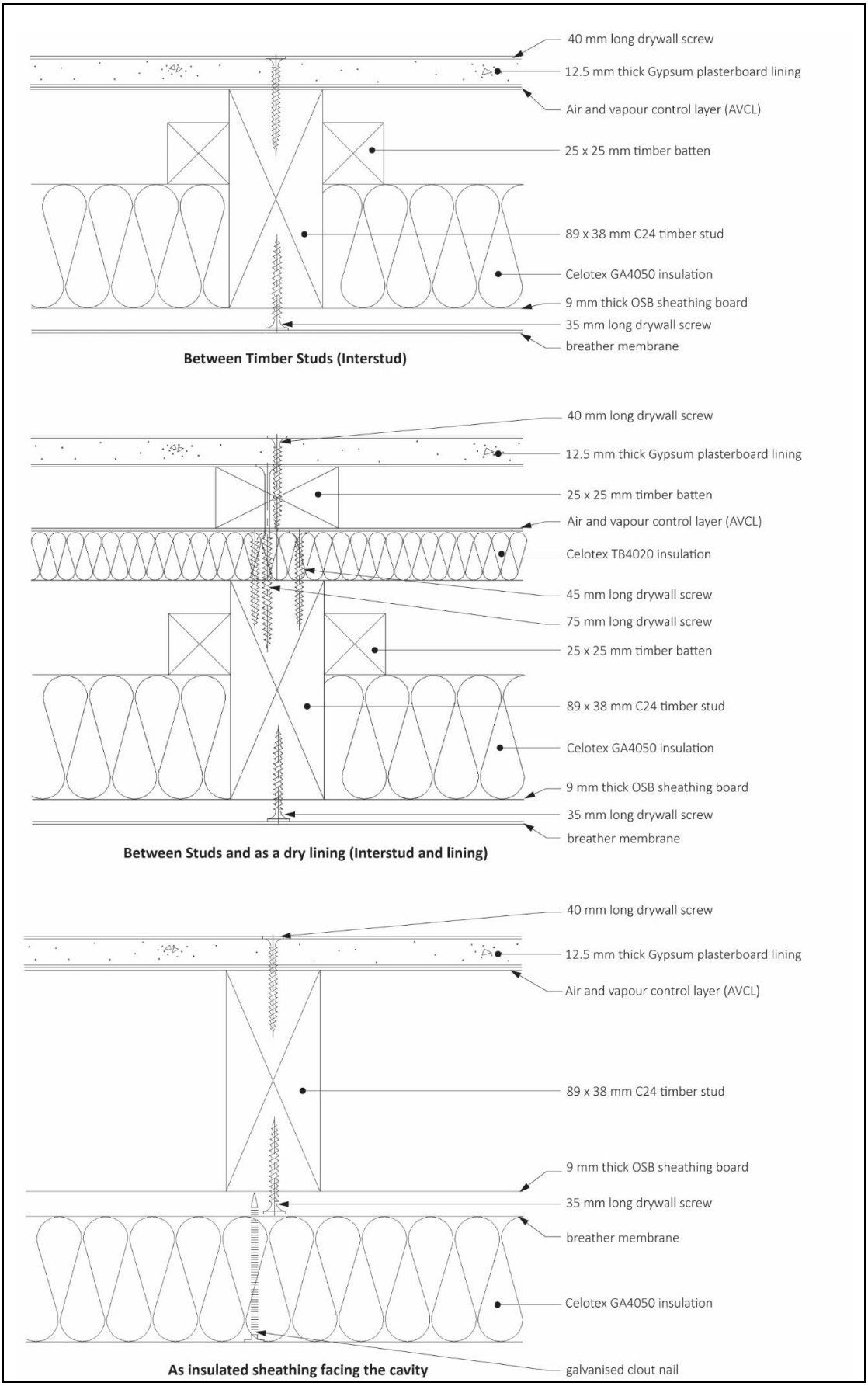
A.11 Self-adhesive foil-tape should not be used.

A.12 A sealed AVCL with lapped and sealed joints is placed between the plasterboard and the timber-frame.

A.13 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.

A.14 Internal finishes are applied as normal but are outside the scope of this Certificate.

Figure 1 Typical installation details



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BS 5250 : 2021 *Management of moisture in buildings. Code of practice.*

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BS EN 1995-1-1 : 2004 + A2 :2014 *Eurocode 5 : Design of timber structures — General — Common rules and rules for buildings*
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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*
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BS EN ISO 9001 : 2015 *Quality management systems — Requirements*

BS EN ISO 10456 : 2007 *Building materials and products — Hygrothermal properties — Tabulated design values and procedures for determining declared and design thermal values*

Conditions

1 This Certificate:

- relates only to the product 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
- and any matter arising out of or in connection with it or its subject matter (including non-contractual disputes or claims) is governed by and construed in accordance with the law of England and Wales.
- the courts of England and Wales shall have exclusive jurisdiction to settle any matter arising out of or in connection with this Certificate or its subject matter (including non-contractual disputes or claims).

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.

3 This Certificate will be displayed on the BBA website, and the Certificate Holder is entitled to use the Certificate and Certificate logo, provided that the product 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.

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

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

6 Any information relating to the manufacture, supply, installation, use, maintenance and removal of this product which is contained or referred to in this Certificate is the minimum required to be met when the product 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.

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