

Lapolla Industries, Inc.

15402 Vantage Parkway East, Suite 322
Houston
Texas 77032
USA

Tel: + 011-281-219-4100 Fax: + 011-281-219-4106
e-mail: info@lapolla.com
website: www.lapolla.com



Agrément Certificate
13/4990
Product Sheet 1

LAPOLLA SPRAY APPLIED OPEN CELL INSULATION

LAPOLLA ATOC

This Agrément Certificate Product Sheet⁽¹⁾ relates to Lapolla ATOC, for use as in-situ thermal insulation system for lofts spaces and in combination with a dry lining system on the internal surface of walls and ceilings of dwellings and basements of masonry and timber-framed constructions.

(1) Hereinafter referred to as 'Certificate'.

CERTIFICATION INCLUDES:

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



KEY FACTORS ASSESSED

Thermal performance — the product has a thermal conductivity ($\lambda_{90/90}$) value of $0.037 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$ (see section 6).

Condensation risk — the product has a water vapour resistance factor, μ of less than 5 but the risk of interstitial condensation will depend on the roof and wall constructions and should, therefore, be assessed for each project. A vapour control layer (VCL) should also be used (see section 7).

Behaviour in relation to fire — the product has a Class E classification to BS EN 13501-1 : 2007 but as it is confined behind the plasterboard it may be used in suitable loft and wall constructions as an insulated dry lining (see section 8).

Durability — the product will have a life equivalent to that of the structure in which it is incorporated (see section 12).

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

John Albon — Head of Approvals
Energy and Ventilation

Greg Cooper
Chief Executive

Date of First issue: 1 May 2013

The BBA is a UKAS accredited certification body — Number 113. The schedule of the current scope of accreditation for product certification is available in pdf format via the UKAS link on the BBA website at www.bbacerts.co.uk

Readers are advised to check the validity and latest issue number of this Agrément Certificate by either referring to the BBA website or contacting the BBA direct.

British Board of Agrément
Bucknalls Lane
Watford
Herts WD25 9BA

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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, Lapolla ATOC, if installed, used and maintained in accordance with this Certificate, will meet or contribute to meeting the relevant requirements of the following Building Regulations (the presence of a UK map indicates that the subject is related to the Building Regulations in the region or regions of the UK depicted):



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

Requirement:	C2(c)	Resistance to moisture
Comment:		The product can contribute to meeting this Requirement. See sections 7.1 and 7.10 of this Certificate.
Requirement:	L1(a)(i)	Conservation of fuel and power
Comment:		The product can contribute to meeting this Requirement. See sections 6.1 and 6.3 of this Certificate.
Regulation:	7	Materials and workmanship
Comment:		The product is an acceptable material. See section 12 and the <i>Installation</i> part of this Certificate.
Regulation:	26	CO ₂ emission rates for new buildings
Comment:		The product can contribute to meeting this Regulation. See sections 6.1 and 6.3 of this Certificate.



The Building (Scotland) Regulations 2004 (as amended)

Regulation:	8(1)	Fitness and durability of materials and workmanship
Comment:		The product is acceptable. See section 12 and the <i>Installation</i> part of this Certificate.
Regulation:	9	Building standards applicable to construction
Standard:	3.15	Condensation
Comment:		The product can contribute to meeting this Standard, with reference to clauses 3.15.1 ⁽¹⁾⁽²⁾ , 3.15.3 ⁽¹⁾⁽²⁾ , 3.15.4 ⁽¹⁾⁽²⁾ , 3.15.5 ⁽¹⁾⁽²⁾ and 3.15.7 ⁽¹⁾⁽²⁾ . See sections 7.1 and 7.11 of this Certificate.
Standard:	6.1(b)	Carbon dioxide emissions
Standard:	6.2	Building insulation envelope
Comment:		The product can contribute to meeting these Standards, with reference to clauses, or parts of, 6.1.2 ⁽¹⁾⁽²⁾ , 6.1.6 ⁽¹⁾ , 6.2.1 ⁽¹⁾⁽²⁾ , 6.2.3 ⁽¹⁾ , 6.2.4 ⁽¹⁾⁽²⁾ , 6.2.5 ⁽¹⁾⁽²⁾ , 6.2.6 ⁽²⁾ , 6.2.7 ⁽¹⁾ , 6.2.8 ⁽²⁾ , 6.2.9 ⁽¹⁾ , 6.2.10 ⁽¹⁾⁽²⁾ , 6.2.11 ⁽¹⁾⁽²⁾ and 6.2.12 ⁽²⁾ . See sections 6.1 and 6.3 of this Certificate.
Standard:	7.1(a)(b)	Statement of sustainability
Comment:		The product can contribute to meeting the relevant requirements of Regulation 9, Standards 1 to 6 and therefore will contribute to a construction meeting a bronze level of sustainability as defined in this Standard. In addition, the product can contribute to a construction meeting a higher level of sustainability as defined in this Standard, with reference to clauses 7.1.4 ⁽¹⁾⁽²⁾ [Aspects 1 ⁽¹⁾⁽²⁾ and 2 ⁽¹⁾], 7.1.6 ⁽¹⁾⁽²⁾ [Aspects 1 ⁽¹⁾⁽²⁾ and 2 ⁽¹⁾] and 7.1.7 ⁽¹⁾⁽²⁾ [Aspect 1 ⁽¹⁾⁽²⁾]. See section 6.1 of this Certificate.
Regulation:	12	Building standards applicable to conversions
Comment:		All comments given for this product under Regulation 9, Standards 1 to 6 also apply to this Regulation, with reference to clause 0.12.1 ⁽¹⁾⁽²⁾ and Schedule 6 ⁽¹⁾⁽²⁾ . (1) Technical Handbook (Domestic). (2) Technical Handbook (Non-Domestic).



The Building Regulations (Northern Ireland) 2012

Regulation:	23	Fitness of materials and workmanship
Comment:		The product is acceptable. See section 12 and the <i>Installation</i> part of this Certificate.
Regulation:	29	Condensation
Comment:		The product can contribute to meeting this Regulation. See section 7.1 of this Certificate.
Regulation:	39(a)(i)	Conservation measures
Regulation:	40(2)	Target carbon dioxide emission rate
Comment:		The product can contribute to meeting these Regulations. See sections 6.1 and 6.3 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* (3.2 and 3.3) and 13.1 to 13.4 of this Certificate.

Additional Information

NHBC Standards 2013

NHBC accepts the use of Lapolla ATOC provided it is installed, used and maintained in accordance with this Certificate, in relation to *NHBC Standards*, Chapter 6.1 *External masonry walls*, Chapter 6.2 *External timber framed walls* and Chapter 7.2 *Pitched roofs*.

Technical Specification

1 Description

- 1.1 Lapolla ATOC is a spray applied open cell (low density) urethane foam insulation.
- 1.2 The product is available to a single specification, is yellowish in colour and is sprayed with one type of machine.
- 1.3 The product can be applied in a range of thickness between 50 mm to 375 mm depending on the application.
- 1.4 The product, when used in habited spaces must be covered with a conventional plasterboard, manufactured in accordance with BS EN 520 : 2004 that is fire resistant.
- 1.5 Ancillary items used with this product, but outside the scope of this Certificate (which have not be assessed) are:
 - rafter slide
 - non breathable and breathable roof underlays
 - gypsum plaster board
 - spray equipment.

2 Manufacture

- 2.1 The two components of the product are manufactured in conventional batch blending process, and mixed via a spray-gun which provides mixing to create a spray applied urethane, open cell, insulating material.
- 2.2 As part of the assessment and ongoing surveillance of product quality, the BBA has:
 - agreed with the manufacturer the quality control procedures and product testing to be undertaken
 - assessed and agreed the quality control operated over batches of incoming materials
 - monitored the production process and verified that it is in accordance with the documented process
 - evaluated the process for management of nonconformities
 - checked that equipment has been properly tested and calibrated
 - undertaken to carry out the above measures on a regular basis through a surveillance process, to verify that the specifications and quality control operated by the manufacturer are being maintained.

3 Delivery and site handling

- 3.1 The product needs to be stored at temperature greater than 15°C and less than 30°C.
- 3.2 The product must be stored in an area with positive ventilation.
- 3.3 The polyol (a component contained in the resin) is classified as 'harmful' and 'irritant' under *The Chemicals (Hazard Information and Packaging for Supply) Regulations 2009 (CHIP4)/Classification, Labelling and Packaging of Substances and Mixtures (CLP Regulation) 2009*, and the packaging must bear the appropriate hazard warning labels.

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on Lapolla ATOC.

Design Considerations

4 Use

- 4.1 Lapolla ATOC is for use in reducing the thermal transmittance (U value) of walls, roofs, and lofts of dwellings or buildings of similar occupancy.
- 4.2 The product can be used:
 - between or, between and over ceiling joists in a uninhabited roof (loft space)
 - between timber rafters in habitable loft space with necessary ventilation gap where required
 - between the studs of conventional timber-frame external wall constructions
 - between the void created by timber battens on the internal face of external masonry walls which are to be lined with plasterboard.

4.3 In all applications the product must be covered by suitable internal lining boards, except when used in uninhabited loft space, where it is not necessary.

4.4 New constructions must be designed in accordance with the relevant recommendations of:

- BS 5250 : 2011
- BS 5534 : 2010
- BS 6229 : 2003
- BS 8000-3 : 2001
- BS 8103-3 : 2009
- BS EN 1995-1-1 : 2004
- BS EN 1996-1-1 : 2005
- BS EN 1996-1-2 : 2005
- BS EN 1996-2 : 2006
- BS EN 1996-3 : 2006.

4.5 Existing constructions must be in a good state of repair with no evidence of rain penetration or damp. Defects must be made good prior to installation.

4.6 It is essential that construction elements are designed and constructed to incorporate normal precautions against moisture ingress before the application of the product.

4.7 If present, any mould or fungal growth must be treated prior to the application of the product.

4.8 The product must not come into direct contact with flue pipes, chimneys or other heat producing appliances (see section 9).

4.9 The product must not come into contact with zinc or zinc-plated elements, as under certain environmental conditions, the foam will accelerate the corrosion of such elements. Zinc or zinc-plated elements are used as fixing for timber and extensively in prefabricated roof truss construction. In all situations when foam could come in contact with zinc, the zinc must be separated from the foam by covering the zinc-plate with a suitable protective coating. The Certificate holder can advise on an appropriate coating for a particular application. The performance of such coating is outside the scope of this Certificate.

4.10 The product forms a strong bond with clean, dry substrates. This should be taken into account when specifying the product or anticipating future alterations.

4.11 To satisfy the requirements of NHBC, a VCL of a type specified in their Standards must be applied behind the plasterboard lining in roof and wall applications, and the product must only be applied to a pitched roof construction incorporating a breathable roof tile underlay.

Pitched roofs, including tiled or slated to BS 5534 : 2010

4.12 The product can be applied directly to breathable roof tile underlays or timber slide boards between the rafters. The slides create a ventilation gap between the product and the non-breathable roof tile underlay. Counter battens must be used below the tile battens when applying the product to breathable roof tile underlays.

4.13 Care must be taken to ensure the integrity of the roof tile underlay drape, when spraying the product.

4.14 Pitched roofs are defined for the purpose of this Certificate as those roofs having a pitch in excess of 15°.

External masonry walls (insulated dry lining)

4.15 Insulated dry lining systems require careful detailing during installation 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. New work must be designed to accommodate the thickness of the dry lining, particularly at reveals, heads, sills and in relation to ceiling height. Where the dimensions of fixtures are critical (eg bathrooms) these should be checked before beginning installation.

4.16 It is recommended that services which penetrate the dry lining, eg, light switches, power outlets, are kept to a minimum to limit damage to vapour checks.

External walls (timber-frame)

4.17 Constructions incorporating a masonry outer leaf, see section 4.4, should also have a designed minimum 50 mm residual cavity.

4.18 Any penetrations should be either enclosed in plasterboard or stone mineral wool or suitably tested proprietary fire-rated systems in order to preserve the fire resistance of the wall.

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

5 Practicability of installation

The product must only be installed by installers who have been trained and approved by the Certificate holder, in accordance with the Certificate holder's Installation Manual (see also section 13).

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 declared thermal conductivity ($\lambda_{90/90}$) value of 0.037 W·m⁻²·K⁻¹.


6.2 Example U values are shown in Table 1.

Table 1 Example U values for masonry and timber-framed walls

U value (W·m ⁻² ·K ⁻¹)	Insulation thickness (mm)				
	Masonry wall	Timber-framed wall	Uninhabited loft space (between 150 mm joists and above)	Habitable loft space: Existing sloping roof with 1F felt (150 mm rafters plus 25 mm battens)	Habitable Loft space: New sloping roof with low resistance roof tile underlay
0.35 (wall)	100	110	—	—	—
0.30 (wall)	125	135	—	—	—
0.28 (wall)	135	145	—	—	—
0.25 (wall and roof)	150	165	150+20	150+25	170 ⁽¹⁾
0.20 (roof)	—	—	150+50	—	200 ⁽¹⁾
0.19 (wall)	210	225	—	—	—
0.18 (roof)	—	—	150+70	—	230 ⁽¹⁾
0.16 (roof)	—	—	150+100	—	200+50 ⁽²⁾
0.15 (roof)	—	—	150+110	—	220+50 ⁽²⁾
0.13 (roof)	—	—	150+150	—	—

(1) Rafters depth same as insulation depth.

(2) Rafters plus additional battens equal insulation depth.

 6.3 The product can maintain, or contribute to maintaining, continuity of thermal insulation at junctions between elements and openings. Default psi values in BRE Information Paper IP 1/06 *Assessing the effects of thermal bridging at junctions and around openings*, 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 and the *iSBEM User Manual* for new-build

Scotland — Accredited Construction Details (Scotland)

Northern Ireland — Accredited Construction Details (version 1.0).

7 Condensation risk

Interstitial condensation

 7.1 Lofts (pitched roof with insulation at ceiling level), uninhabitable loft space (pitched roof with insulation at sloping level) and walls should be designed and constructed in accordance with the relevant parts of BS 5250 : 2011, Annexes D and F to H, and BRE Report BR 262 : 2002 for roofs and floors in England and Wales, including a well-sealed ceiling or BS EN 15026 : 2007, using a μ value of less than 5 for the product. A VCL maybe required on the warm side of the insulation for certain types of constructions unless an assessment to BS 5250 : 2011 can demonstrate otherwise.

7.2 Care should be taken to provide adequate ventilation, particularly in rooms expected to experience high humidities, and to ensure the integrity of VCL's (where installed) and linings, against vapour ingress.

7.3 It is essential that roof design, construction and maintenance not only limits opportunities for vapour migration by diffusion but also by convection through gaps, cracks and laps in air and or VCL's and through penetrations. This is particularly important when the design includes layers of high resistance to vapour diffusion on both sides of the insulation layer.

7.4 Dynamic simulations to BS EN 15026 : 2007 indicate that a VCL with a resistance of 250 MN·s·g⁻¹ (with sealed laps) is acceptable in roofs with no penetrations. The suitability of other constructions may be assessed by using an appropriate dynamic modelling package,

Loft application (insulation at ceiling level of the pitched roof)

7.5 It is important to seal existing service penetrations in the ceiling and to provide draught proofing to any loft hatches to reduce inflow of warm air and moisture. Any new loft insulation should be kept sufficiently clear of the eaves so that any adventitious ventilation is not reduced.

7.6 Insulation material placed at ceiling level will considerably reduce the temperature of an unheated roof structure and, if moist air passes into the roof space, condensation on cold surfaces is likely to be enhanced. Roof structures incorporating the insulation at ceiling level must have provision for adequate permanent ventilation of the space above the insulation to minimise the formation of condensation in the roof space.

7.7 Permanent ventilation of the roof structure should be provided by continuous openings or regularly spaced vents of equivalent area situated along two opposite sides of the roof at eaves level, and at a high level when required. The size and position of ventilation openings for pitched roofs, should be in accordance with Clause H.4.4 of BS 5250 : 2011 (see Table 2). Further information and guidance is given in BRE Report BR 262 : 2002.

Table 2 Minimum low level loft space ventilation openings

Pitch	Underlay	Ceilings	Vents with area equivalent to (mm)
10° to 15°	HR ⁽¹⁾	Any	25 x longest horizontal dimension of roof
>15° and <75°	HR ⁽¹⁾	Any	10 x longest horizontal dimension of roof
10° to <75°	LR	Normal	7 x longest horizontal dimension of roof
10° to <75°	LR	Well-sealed	3 x longest horizontal dimension of roof ⁽²⁾

(1) An additional high level vent 5 mm by longest horizontal dimension of roof should be provided where:

- the pitch exceeds 35°; or
- the span exceeds 10 m; or
- the roof is a lean-to or monopitch.


(2) Alternatively, high level vent 5 mm vent by longest horizontal dimension of roof should be provided.


7.8 Ventilation openings should be arranged to prevent the ingress of rain, snow, birds and small mammals and the risk of subsequent blockage by other building operations.

Masonry external walls (insulated dry lining)

7.9 The risk of summer condensation on the VCL must be considered for solid masonry walls, orientated from East South East through south to West South West, in accordance with section 3.10 of BRE Report BR 262 : 2002.

Surface condensation

 7.10 Roofs (insulation at ceiling level) and walls will adequately limit the risk of surface condensation where the thermal transmittance (U value) does not exceed 0.7 W·m⁻²·K⁻¹ for walls and 0.35 W·m⁻²·K⁻¹ for roofs at any point and the junctions are designed in accordance with *Limiting thermal bridging and air leakage : Robust construction details for dwellings and similar buildings* TSO 2002, BRE Information Paper IP 1/06 or section 6.2 of this Certificate.

 7.11 Roofs (insulation at ceiling level) and walls designed to BS 5250 : 2011, Annexes F to H, will adequately limit the risk of surface condensation where the thermal transmittance (U value) does not exceed 1.2 W·m⁻²·K⁻¹ at any point. Guidance may be obtained from, BRE Report BR 262 : 2002 and section 6.2 of this Certificate.

8 Behaviour in relation to fire

8.1 The product has a fire classification of class E in accordance with BS EN 13501 : 2007 and hence is combustible and must be protected from naked flames and other ignition sources during and after installation.

8.2 Once installed, except for the unoccupied loft application the product must be contained by a suitable lining board, eg 12.5 mm plasterboard, with joints fully sealed and supported by studs. Therefore, the product will not contribute to the development stages of a fire.

External timber-frame walls

8.3 The product can be added to the void between studwork and enclosed between the OSB board and plasterboard, timber-framed wall provided that:

- the outer leaf is masonry, and
- the existing inner leaf system has been shown to satisfy the loadbearing capacity performance criterion of BS 476-21 : 1987 or BS EN 1365-1 : 1999 for the required fire resistance period.

8.4 The suitability of constructions other than those described in section 8.5 should be demonstrated by an appropriate test or assessment (outside the scope of this Certificate).

9 Proximity of flues and appliances

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

England and Wales — Approved Document J

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

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).

Northern Ireland — Technical Booklet L.

9.2 The product must not be installed within 50 mm of heat emitting devices, where the temperature is in excess of 93°C.

10 Materials in contact — wiring installations

10.1 The product is compatible with pvc materials in contact.

10.2 De-rating of electric cables should be considered in areas where the product restricts the flow of air. The use of suitable conduit or trunking is recommended.

10.3 Where recessed lighting is used, provision should be made to prevent the fitting overheating, or a ventilated fittings must be used.

11 Maintenance

The product, once installed does not require any regular maintenance and has suitable durability (see section 12), provided the waterproof layers are inspected and maintained at regular intervals.

12 Durability



The durability of the product is satisfactory and will have a life equivalent to that of the structure in which it is incorporated.

Installation

13 General

13.1 To comply with the requirements of Section 4 of the *Health and Safety at Work Act 1974*, it is essential that there is an exchange of information between the client and the installer before spray operations commence on any site. Existing health hazards and those brought into the premises by the installer should be discussed and measures agreed to deal with them effectively.

13.2 When applying the product use of protective clothing including boots, chemical resistant gloves, a full faced supplied air respirator and protective suite.

13.3 The following PPI must be used when installing the spray foam product:

1. safety glasses
2. goggles
3. disposable gloves
4. rubber gloves
5. cotton gloves
6. eye wash station
7. MSDS and Technical Data Sheets for all chemicals in the truck or on the jobsite.

13.4 The worksite must be well ventilated during the application of the spray foam.

13.5 Building elements to be insulated must be assessed for suitability and any necessary repairs carried out. Elements must be weather tight before the application of the product. The positioning and access to services should also be considered.

13.6 Passes over concrete and masonry block walls should be no more than 60 cm wide or the foam could separate from the wall.

13.7 The ATOC product should be applied to wood-framed walls and ceilings by applying the foam to the back face of each joist and stud bay and along the sides of each joist and stud. This ensures complete coverage with no gaps.

13.8 The ATOC product must be sprayed onto a surface in long continuous strokes. The nozzle of the spray gun should be held a minimum of 60 cm from and pointed directly at the surface to be coated. Application depth is determined by the speed at which the spray is passed over the surface and experienced applicators can create the desired depth very accurately.

13.9 Access boards and lighting should be positioned in the roof void.

13.10 The product should be stored, handled and applied in accordance with the Certificate holder's instructions and this Certificate.

14 Procedure

14.1 The product should be spray applied to clean and dry substrates and built up in layers up to the required thickness.

Pitched roof with insulation at ceiling level: loft application — uninhabited space

14.2 All removable obstructions should first be cleared from the loft space and any holes in the ceiling, such as around pipes, should be sealed. Water tanks should be covered and any sources of moisture eg vent pipes for central heating, should be arranged to avoid water vapour entering the loft space.

14.3 To reduce the risk of frost damage due to ceiling insulation, the pipes and tank in the loft space should be lagged before installing the product. The area directly below cold water tanks when resting at joist level must not be insulated to avoid the risk of the stored water freezing in cold weather.

14.4 During installation it is essential that all ventilation points, for example eaves gaps and air bricks at gable ends, are kept clear of insulant so that the air flow is maintained. Suitable proprietary eaves ventilators must be used (see also section 7.7).

14.5 Over spray is of prime concern when installing any spray applied insulation system. To minimise the hazards of over spray, the following points should be observed:

- applicator must wear appropriate protective gear, including: a full-face NIOSH-approved fresh air respirator, protective overalls, gloves and boots
- other than the applicator, everyone must be kept away from the application area. No unprotected individuals should be in the structure where the application is being conducted
- the spray gun should never be left unattended
- the spray gun should only be pointed at the surface, or when not in use, at the floor.
- the product should not be installed if wind is a concern, use tarpaulins or other measures to block it
- cleaning the spray gun requires use of a solvent to breakdown and for removal of the reacted components. To prevent exposure to the components and the solvent, proper protection should be worn.

Timber frame walls

14.6 The product is sprayed into the cavity formed by the studs and the sheathing board. When cured, if the cavity is fully-filled, the excess foam is trimmed flush with the studs and the lining board installed with a VCL with lapped and sealed joints.

Masonry external walls

14.7 Installation should be in accordance with good dry lining practice and the relevant parts of the Certificate holder's literature.

14.8 Before applying the product, sufficient time must be allowed for damp-proofing treatments, where applied, to dry out in the wall (see also, BS 6576 : 2005 for dry lining in conjunction with a chemical damp-proof course application).

14.9 Timber studs are mechanically fixed to the wall substrate at maximum 600 mm centres.

14.10 The product is sprayed into the cavity formed by the studs. Any excess foam is trimmed flush and then the plasterboard is installed with a VCL with lapped and joints sealed.

Technical Investigations

15 Tests

An adhesion test was carried between the spray foam and the substrate.

16 Investigations

16.1 An investigation of the following properties of the spray foam was carried out:

- thermal conductivity
- density
- reaction to fire and fire resistance
- water absorption
- water vapour permeability
- release of dangerous substances
- tensile strength
- compressive strength
- dimensional stability.

16.2 An opinion was sought from a UKAS-accredited fire authority concerning the fire resistance of the product when used between studs in a conventional timber-frame construction.

16.3 The manufacturing process was evaluated, including methods of quality control. Details were also 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 5534 : 2010 *Code of practice for slating and tiling (including shingles)*
- BS 6229 : 2003 *Flat roofs with continuously supported coverings — Code of practice*
- BS 6576 : 2005 *Code of practice for diagnosis of rising damp in walls of buildings and installation of chemical damp-proof courses*
- BS 8000-3 : 2001 *Workmanship on building sites — Code of practice for masonry*
- BS 8103-3 : 2009 *Structural design of low-rise buildings — Code of practice for timber floors and roofs for housing*
- BS EN 520 : 2004 *Gypsum plasterboards — Definitions, requirements and test methods*
- BS EN 1365-1 : 1999 *Fire resistance tests for loadbearing elements — Walls*
- BS EN 1995-1-1 : 2004 *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*
- BS EN 1996-1-2 : 2005 *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*
- BS EN 1996-3 : 2006 *Eurocode 6 : Design of masonry structures : Simplified calculation methods for unreinforced masonry structures*
- BS EN 13501-1 : 2007 *Fire classification of construction products and building elements — Classification using test data from reaction to fire tests*
- BS EN 15026 : 2007 *Hygrothermal performance of building components and building elements — Assessment of moisture transfer by numerical simulation*
- BS EN ISO 6946 : 2007 *Building components and building elements — Thermal resistance and thermal transmittance — Calculation method*
- 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*

17 Conditions

17.1 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.

17.2 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.

17.3 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.

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

17.5 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.

17.6 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.