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**Agrement
Certificate
No 99/3564**

Designated by Government
to issue
European Technical
Approvals

THERMALOC EXTERNAL WALL INSULATION SYSTEMS

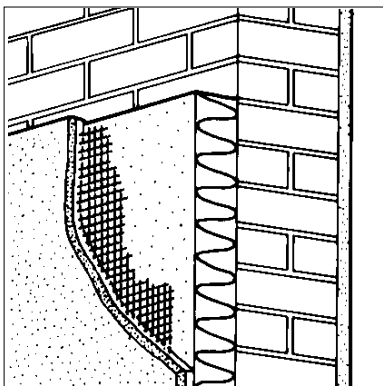
Système d'isolation pour murs extérieurs
Wärmedämmung für Außenwand

Product

• THIS CERTIFICATE RELATES TO THERMALOC EXTERNAL WALL INSULATION SYSTEMS.


- The systems comprise insulation material with reinforcement and renders as described in the accompanying Detail Sheets.
- The systems are applied to the outside of external walls of masonry or dense concrete construction and are suitable for use on new or existing buildings.
- Application and maintenance must be carried out strictly in accordance with the Design Data and Installation parts of the Detail Sheets and the marketing company's instructions by operatives trained and approved by Wetherby Building Systems Limited.
- The systems are marketed by Wetherby Building Systems Limited.
- All materials and components for use in the system are approved by the BBA and must be obtained from the Certificate holder.

These Front Sheets must be read in conjunction with the relevant accompanying Detail Sheets, which provide information specific to insulation systems.




Regulations

1 The Building Regulations 1991 (as amended) (England and Wales)

 The Secretary of State has agreed with the British Board of Agrément the aspects of performance to be used by the BBA in assessing the compliance of external wall insulation with the Building Regulations. In the opinion of the BBA, Thermaloc External Wall Insulation Systems, if used in accordance with the provisions of this Certificate, will meet or contribute to meeting the relevant requirements.

Requirement: B4(1)	External fire spread
Comment:	The systems have a Class 0 surface and therefore meet this Requirement. See the marked sections of the appropriate accompanying Detail Sheets.
Requirement: C4	Resistance to weather and ground moisture
Comment:	Walls insulated with the systems will meet this Requirement. See the marked sections of the appropriate accompanying Detail Sheets.
Requirement: L1	Conservation of fuel and power
Comment:	The systems will enable, or contribute towards enabling, a wall to meet the U value requirement. See the marked sections of the appropriate accompanying Detail Sheets.
Requirement: Regulation 7	Materials and workmanship
Comment:	The systems are acceptable. See the marked sections of the appropriate accompanying Detail Sheets.

2 The Building Standards (Scotland) Regulations 1990 (as amended)

 In the opinion of the BBA, Thermaloc External Wall Insulation Systems, if used in accordance with the provisions of this Certificate, will satisfy or contribute to satisfying the various Regulations and Technical Standards as listed below.

Regulation: 10	Fitness of materials
Standard: B2.2	Selection and use of materials, fittings, components and other manufactured products
Comment:	The systems are acceptable.
Regulation: 12	Structural fire precautions
Standard: D2.2	Non-combustibility
Comment:	The use of the systems may be restricted by this Standard in some instances but see the marked sections of the appropriate accompanying Detail Sheets. The systems have a Class 0 surface, as defined in Table 2 to Standard E6.1.
Regulation: 17	Preparation of sites and resistance to moisture
Standard: G3.1	Resistance to precipitation
Comment:	The systems can be used in a construction which satisfies this Standard. See the marked sections of the appropriate accompanying Detail Sheets.
Regulation: 22	Conservation of fuel and power
Standard: J2.1	Standards for buildings in purpose group 1
Comment:	The systems will enable, or contribute to enabling, a wall to satisfy the requirements of this Standard. See the marked sections of the appropriate accompanying Detail Sheets.
Standard: J3.1	Standards for buildings in purpose groups 2 to 7
Comment:	The systems will enable, or contribute to enabling, a wall to satisfy the requirements of the Standard. See the marked sections of the appropriate accompanying Detail Sheets.

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3 The Building Regulations (Northern Ireland) 1994 (as amended)



In the opinion of the BBA, Thermaloc External Wall Insulation Systems, if used in accordance with the provisions of this Certificate, will satisfy or contribute to satisfying the various Building Regulations as listed below.

Regulation:	B2	Fitness of materials and workmanship
Comment:		The systems are acceptable. See the marked sections of the appropriate accompanying Detail Sheets.
Regulation:	C5	Resistance to ground moisture and weather
Comment:		Walls insulated with the systems will satisfy this Regulation. See the marked sections of the appropriate accompanying Detail Sheets.
Regulation:	E8	External fire spread
Comment:		The systems have a Class 0 surface and can satisfy this Regulation. See the marked sections of the appropriate accompanying Detail Sheets.
Regulation:	F2	Conservation of fuel and power
Comment:		The systems will enable, or contribute towards enabling, a wall to meet this Regulation. See the marked sections of the appropriate accompanying Detail Sheets.

4 Construction (Design and Management) Regulations 1994

Information in this Certificate may assist the client, planning supervisor, designer and contractors to address their obligations under these Regulations.

See section: 2 *Delivery and site storage* of the accompanying Detail Sheets.

Design Data

5 General

5.1 Thermaloc External Wall Insulation Systems, when installed in accordance with this Certificate, are effective in reducing the thermal transmittance (U value) of the walls of new and existing buildings. It is essential that the detailing techniques specified in this Certificate are carried out to a high standard if the ingress of water into the insulation is to be avoided and the full thermal benefit obtained from treatment with the systems.

5.2 The systems will improve the weather resistance of the wall itself and provide a decorative finish. However, they may be installed only where other routes for moisture penetration have been dealt with separately. The systems can be used to overcome condensation associated with the internal wall surface.

5.3 Existing buildings subject to the national Building Regulations should have wall surfaces in accordance with the relevant sections of the Detail Sheets.

5.4 New buildings subject to the national Building Regulations should be constructed in accordance with the relevant recommendations of BS 5628 : Part 3 : 1985. In particular Clause 21 *Exclusion of*

moisture, of the Code of Practice should be followed in that the designer should select a construction appropriate to the local wind-driven rain index, paying due regard to the design detailing, workmanship and materials to be used. The relevant recommendation of Section 3 of BS 5390 : 1976(1984) should be followed where the walls incorporate stone or cast stone.

5.5 Other new buildings, not subject to any of the previous requirements, should also be built in accordance with BS 5628 : Part 3 : 1985 and/or BS 5390 : 1976(1984).

6 Moisture penetration

The assessment has shown that the systems will resist the passage of moisture.

7 Risk of interstitial condensation

7.1 The relevant components of the systems have a water vapour resistance such that, under the conditions likely to be found in dwellings in the United Kingdom, interstitial condensation should not occur within the insulation.

7.2 If a system is to be used on the external walls of rooms expected to have continuous high humidities, additional measures may need to be taken to avoid possible problems from the formation of interstitial condensation in the wall.

8 Maintenance

8.1 Regular checks should be made on the installed systems, particularly at joints, to ensure that ingress of water does not occur. Necessary repairs should be effected immediately.

8.2 Damaged areas should be repaired using the appropriate components and the procedures detailed in the installation instructions of Wetherby Building Systems Limited.

Installation

9 Site survey and preliminary work

9.1 A pre-installation survey of the property is carried out to determine suitability for treatment and any repairs necessary to the building structure before application of a system. A specification is prepared for each elevation of the building indicating:

the position of beads
detailing around windows, doors and at eaves
dpc level
exact position of expansion joints
areas where flexible sealants are to be used
any alterations to external plumbing
where required, the position of fire barriers.

9.2 The survey should include tests conducted on the walls of the building by the Certificate holder or their approved suppliers to determine the pull-out resistance of the proposed mechanical fixings. An assessment and recommendation is made on the type and number of fixings required to withstand the building's expected wind loading based on calculations using the test data, the relevant wind speed data for the site, and in the absence of a formal requirement a safety factor of 3 should be used.

9.3 All necessary repairs to the building structure are completed before installation of the system is started.

9.4 Surfaces should be sound, clean, and free from loose material. The flatness of surfaces must be checked; this may be achieved using a straight edge spanning the storey height. Any excessive irregularities, ie greater than 10 mm, must be made good prior to installation to ensure that the insulation boards are installed with a smooth, in-plane finished surface.

9.5 Where surfaces are covered with an existing rendering it is essential that the bond between the background and the render is adequate. All loose areas should be hacked off and reinstated.

9.6 On existing buildings, purpose-made sills should be fitted to extend beyond the finished face of the system. New buildings should incorporate suitably deep sills.

9.7 It is recommended that external plumbing be removed and alterations made to underground drainage, where appropriate, to accommodate repositioning on the finished face of the systems.

9.8 New buildings should be of sound masonry or dense concrete construction.

9.9 Internal wet work, eg screeding or plastering, should be completed and allowed to dry prior to the application of a system.

10 Approved installers

10.1 Application of the systems, within the context of this Certificate, is carried out by approved installers, an approved installer being a firm which:

- (1) is employing operatives who have been trained and approved by the Certificate holder to install the systems and who have been issued with appropriate training cards by the Certificate holder
- (2) has undertaken to comply with the Certificate holder's application procedure, which contains the requirement for each application team to include at least one member with a training card, and
- (3) is monitored by the Certificate holder. This may include unannounced site inspections.

10.2 Firms may also be approved to install the systems under the BBA's Assessment and Surveillance Scheme for Installers of External Wall Insulation Systems. In addition to the requirements given in section 10.1, these installers will be subject to site and office inspections by the BBA prior to approval and while they remain approved.

Bibliography

BS 5390 : 1976(1984) *Code of practice for stone masonry*

BS 5628 *Code of practice for use of masonry*
Part 3 : 1985 *Materials and components, design and workmanship*

Conditions of Certification

11 Conditions

11.1 This Certificate:

- (a) relates only to the product that is described, installed, used and maintained as set out in this Certificate;
- (b) is granted only to the company, firm or person identified on the front cover — no other company, firm or person may hold or claim any entitlement to this Certificate;
- (c) has to be read, considered and used as a whole document — it may be misleading and will be incomplete to be selective;
- (d) is copyright of the BBA.

11.2 References in this Certificate to any Act of Parliament, Regulation made thereunder, Directive or Regulation of the European Union, Statutory Instrument, Code of Practice, British Standard, manufacturers' instructions or similar publication, shall be construed as references to such publication in the form in which it was current at the date of this Certificate.

11.3 This Certificate will remain valid for an unlimited period provided that the product and the manufacture and/or fabricating process(es) thereof:

- (a) are maintained at or above the levels which have been assessed and found to be satisfactory by the BBA;

(b) continue to be checked by the BBA or its agents; and

(c) are reviewed by the BBA as and when it considers appropriate.

11.4 In granting this Certificate, the BBA makes no representation as to:

- (a) the presence or absence of any patent or similar rights subsisting in the product or any other product;
- (b) the right of the Certificate holder to market, supply, install or maintain the product; and
- (c) the nature of individual installations of the product, including methods and workmanship.

11.5 Any recommendations relating to the use or installation of this product which are contained or referred to in this Certificate are the minimum standards required to be met when the product is used. They do not purport in any way to restate the requirements of the Health & Safety at Work etc Act 1974, or of any other statutory, common law or other duty which may exist at the date of this Certificate or in the future; nor is conformity with such recommendations to be taken as satisfying the requirements of the 1974 Act or of any present or future statutory, common law or other duty of care. In granting this Certificate, the BBA does not accept responsibility to any person or body for any loss or damage, including personal injury, arising as a direct or indirect result of the installation and use of this product.



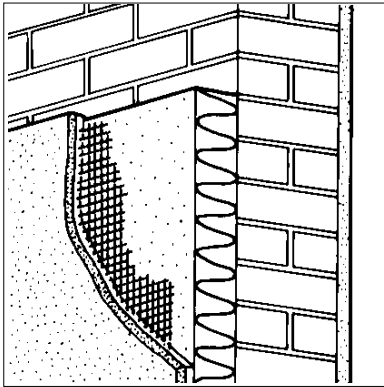
In the opinion of the British Board of Agrément, Thermaloc External Wall Insulation Systems are fit for their intended use provided they are installed, used and maintained as set out in this Certificate. Certificate No 99/3564 is accordingly awarded to Wetherby Building Systems Limited.

On behalf of the British Board of Agrément

Date of issue: 27th January 1999

Director

Product



- THIS DETAIL SHEET RELATES TO THE THERMALOC EXTERNAL WALL INSULATION SYSTEM, A SYSTEM EMPLOYING PHENOLIC OR PIR-MODIFIED URETHANE INSULATION, WITH A GLASS-FIBRE REINFORCING MESH AND A SPAR-DASH RENDER FINISH.
- The system is applied to the outside of external walls of masonry or dense concrete construction and is suitable for new or existing buildings.
- It is essential that the system is installed and maintained in accordance with the conditions set out in the Design Data and Installation parts of this Detail Sheet.
- See the Appendix for system summary.

This Detail Sheet must be read in conjunction with the Front Sheets, which give the system's position regarding the Building Regulations, general information relating to the product, and the Conditions of Certification.

Technical Specification

1 Description

1.1 The Thermaloc External Wall Insulation System (see Figure 1) comprises:

- (1) Phenolic insulation boards — 1200 mm by 600 mm in a range of thicknesses between 20 mm and 80 mm, with a nominal density of 40 kgm^{-3} and a minimum compressive strength of 150 kNm^{-2} . Boards of 15 mm thickness are also available for use in window reveals.
- (2) PIR-modified urethane insulation boards — 1200 mm by 600 mm in a range of thicknesses between 20 mm and 70 mm, with a nominal density of 32 kgm^{-3} and a minimum compressive strength of 150 kNm^{-2} . Boards of 15 mm thickness are also available for use in window reveals.
- (3) Mechanical fixings — approved by the BBA and Wetherby Building Systems Limited.
- (4) Wetherbuild Scrim Adhesive — a polymer modified, cement-based render supplied as a powder to which clean water is added.
- (5) Reinforcement mesh — a one metre wide mesh of multi-stranded, alkali-resistant glass fibres, having a polymer coating and a nominal weight of 157 gm^{-2} .
- (6) Wetherbuild Dashing Render — a polymer modified, cement-based render supplied as a powder to which clean water is added.

(7) Wetherbuild mineral aggregate — mineral aggregates available in a range of colours.

(8) Ancillary materials:

Profiles — a range of standard profiles for wall base, end stop, corner mesh, expansion joint, etc. Profiles are available in organic polyester powder coated galvanized steel or stainless steel and are provided to the specifier's requirements and approved by the BBA and Wetherby Building Systems Limited.

Profile fixings — hammer screws with plastic expansion sleeves as approved by the BBA and Wetherby Building Systems Limited.

Sealant — silicone mastic as approved by the BBA and Wetherby Building Systems Limited.

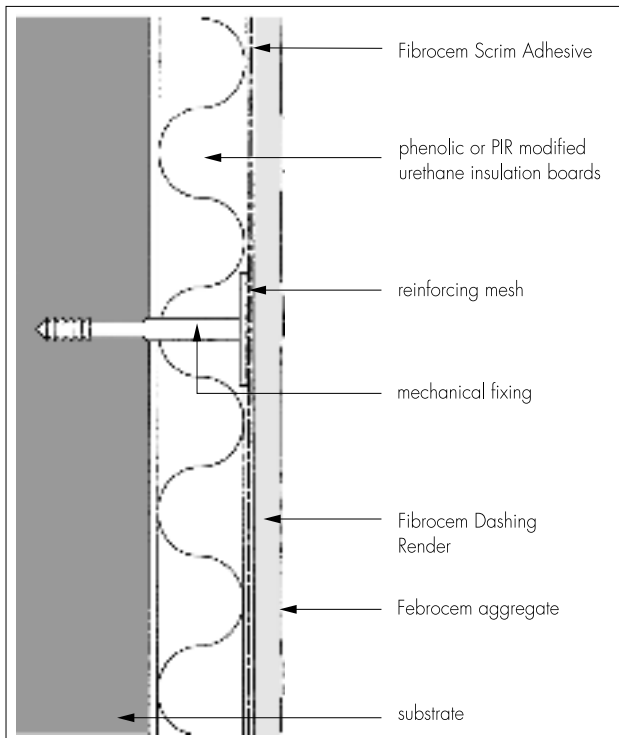
Weatherbuild fungicidal wash.

Wetherbuild stabilising wash.

1.2 The insulation boards are mechanically fastened to the external surfaces of walls. When all of the boards have been secured to the wall, the Wetherbuild Scrim Adhesive is trowel applied to the insulation to a minimum thickness of 3 mm, and the reinforcing mesh is embedded. Allowing sufficient drying time, the Wetherbuild Dashing Render is trowel applied to a minimum thickness of 8 mm and dry-dashed.

1.3 All components are subject to routine in-factory quality control.

Figure 1 The Thermaloc External Wall Insulation System



2 Delivery and site storage

2.1 The insulation is delivered to site wrapped in polythene. Each pack carries the product identification and batch numbers.

2.2 Components are delivered to site in the packages and quantities as listed in Table 1. Each package carries the product identification, manufacturer's batch number, and the BBA identification mark incorporating the number of this Certificate.

2.3 The insulation should be stored on a firm, clean, level base, off the ground and under cover until required for use. Care must be taken when handling the insulation to avoid damage.

2.4 The insulation should be protected from prolonged exposure to sunlight either by storing opened packs under cover or re-covering with opaque polythene sheeting. The boards should not be exposed to open flame or other ignition sources.

2.5 The render should be stored in dry conditions, off the ground, and be protected from frost at all times.

Table 1 Component supply details

Component	Quantity and packaging
Reinforcing mesh	1.0 metre wide rolls, 50 metre length
Render	25 kg bag
Mechanical fixings	boxed by manufacturer

Design Data

3 Strength and stability

3.1 The external wall insulation system has adequate resistance to impact and abrasion where walls are exposed and have some protection, for example, walls of private dwellings and walls of communal dwellings above ground-floor level. Where the system may be exposed to severe impact, eg walls of public buildings at ground-floor level, precautions may be required to reduce the risk of damage. Further information may be obtained from the Certificate holder and BRE Current Paper CP 6 : 81 *Assessment of external walls — Hard Body Impact Resistance*.

3.2 The system as specified in this Detail Sheet can be designed to withstand the thermal stresses and wind pressures (including suction) normally experienced in the United Kingdom. The system can also be designed in accordance with CP 3 : Chapter V : Part 2 : 1972 or BS 6399 : Part 2 : 1995 to withstand the increased wind loads associated with tall buildings (greater than 12 metres) and areas of high exposure. This may require the use of a greater number of fixings per unit area (see section 9.2 of the Front Sheets and section 5 of the Appendix).

4 Properties in relation to fire



4.1 In the opinion of the BBA, the use of the system will not introduce any additional hazard in respect of behaviour in fire when compared with a system using traditional sand/cement render finishes.

4.2 The system is classified Class 0 as described in the national Building Regulations:

England and Wales

Paragraph A12 of Approved Document B.

Scotland

Table 2 of E6.1 in the *Provisions deemed to satisfy* in Part E of the Technical Standards.

Northern Ireland

Paragraph 2.4 of Technical Booklet E.

4.3 The behaviour in fire of external wall insulation systems is the subject of recommendations by the Building Research Establishment which, for this system, makes no restriction on the height of building to be treated provided that:

- fire barriers, eg mineral fibre 100 mm high and of the same thickness as the insulation, are included at every floor level from the third storey
- the reinforcing mesh and surface coating mortar is returned to the masonry at each fire barrier and fixed to restrict possible detachment.

5 Proximity of flues

When the system is installed in close proximity to certain flue pipes the relevant provisions of the national Building Regulations should be met:

England and Wales

Approved Document J.

Scotland

Part F of the Technical Standards.


Northern Ireland

Technical Booklet L.

6 Thermal insulation

6.1 For the purpose of U value calculations to determine if the requirements of the Building (or other statutory) Regulations are met, the thermal conductivity (λ value) of the insulation may be taken as listed in Table 2.

Insulation	λ value ($\text{Wm}^{-1}\text{K}^{-1}$)
phenolic	0.018
PIR-modified urethane	0.025

 6.2 The requirement for limiting the heat loss through the building fabric will be satisfied if the U values of the building elements do not exceed the maximum values in the relevant Elemental Approach given in the national Building Regulations:

England and Wales

Approved Document L1. The effect of thermal bridges should be taken into account.

Scotland

Part J of the Technical Standards. The effect of thermal bridges should be taken into account.

Northern Ireland


Technical Booklet F.

6.3 Guidance is also given in these documents on selecting the thickness of insulation required to enable a wall to achieve the desired U value. Alternative approaches are also described which allow for some flexibility in design of U values for individual constructional elements.

6.4 Where the insulation has not been continued into window or door reveals due to a lack of clearance there will be a risk of cold bridging at these points. Where door and window frames are to be replaced it is recommended that their size be adjusted to permit the reveals to be insulated.

6.5 Depending on constructional details, cold bridging can also occur at the eaves and at ground-floor level, and care should be taken to minimise this, eg roof or loft insulation should continue over the wall head, ensuring that ventilation openings are not obstructed.

7 Durability

 7.1 The results of accelerated ageing tests in accordance with MOAT No 22 : 1988 indicate that the system is durable. The system should remain effective for at least 30 years, provided any damage to the surface finish is repaired immediately, and regular maintenance is undertaken including checks on joints in the system and external plumbing fittings to prevent leakage of rainwater into the system, enabling steps to be taken to correct the defects.

7.2 The spar-dash finish will break up the flow of water on the surface and reduce the risk of discolouration by water runs. The finish may become discoloured with time, the rate depending on the initial colour, the degree of exposure and atmospheric pollution, as well as the design and detailing of the wall. In common with traditional renders, discolouration by algae and lichens may occur in wet areas.

7.3 Render containing Portland cement may be subject to lime bloom. The occurrence of this may be reduced by avoiding application in adverse weather conditions. The effect is transient and is less noticeable on lighter colours.

Installation

8 Procedure

General

8.1 Application is carried out in accordance with Wetherby Building Systems Limited's current installation instructions.

8.2 Application of coating materials must not be carried out at temperatures below 5°C or above 30°C, nor if exposure to frost is likely, and the coating must be protected from rapid drying. Weather conditions should therefore be monitored to ensure correct curing conditions.

8.3 All rendering should be in accordance with the relevant recommendations of BS 5262 : 1991 and BS 8000 : Part 10 : 1995.

8.4 One coat of fungicidal wash, followed, if required, by one coat of stabilising solution, is applied in accordance with the installation instructions of Wetherby Building Systems Limited.

Positioning and securing insulation boards

8.5 The base profile is secured to the external wall above the damp-proof course using the approved profile fixings at approximately 300 mm centres.

8.6 The first run of insulation boards is positioned on the base profile (see Figure 2). Holes are drilled into the substrate to a minimum depth of 50 mm through the centre and corner of each board. The mechanical fixings are inserted and tapped firmly into place, securing the insulation board to the

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substrate. This is the minimum fixing density (see section 3.2 and Figure 3). Subsequent rows of boards are positioned so that the joints are staggered and overlapped at the building corners.

Figure 2 Typical section at base level

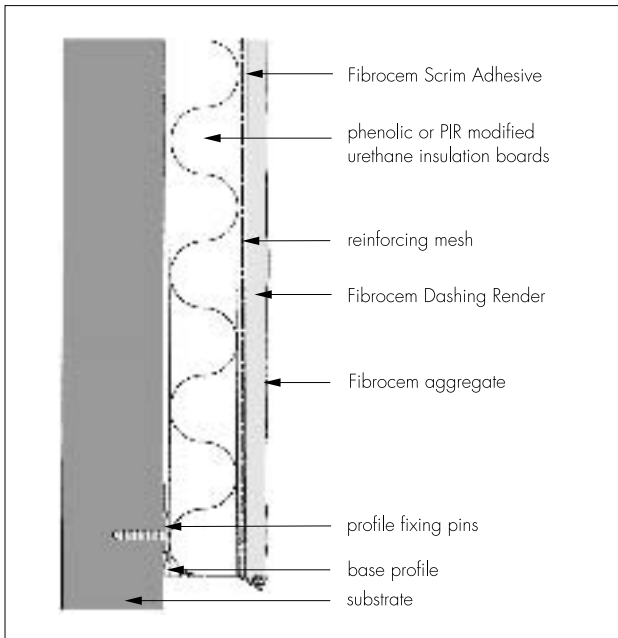
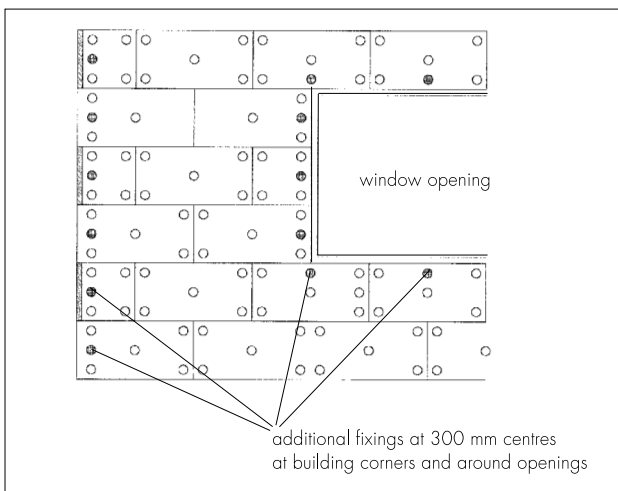


Figure 3 Arrangement of insulation boards



8.7 Care must be taken to ensure that all board edges are butted tightly together, and alignment should be checked as work proceeds.

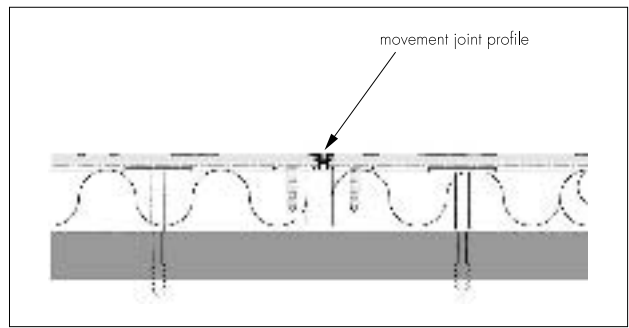
8.8 To fit around details such as doors and windows, insulation boards may be cut with a sharp knife or a fine-tooth saw. If required, purpose-made window sills are fitted. They are designed to prevent water ingress and incorporate drips to shed water clear of the system.

8.9 Installation continues until the whole wall is completely covered including, where appropriate, the building soffits.

Movement joints

8.10 Movement joints in the substrate should be continued through the system. The joint detail using purpose-made metal trims is illustrated in Figure 4.

Figure 4 Vertical movement joint



Reinforcing

8.11 Angle beads are fixed to all building corners and to door and window heads and jambs.

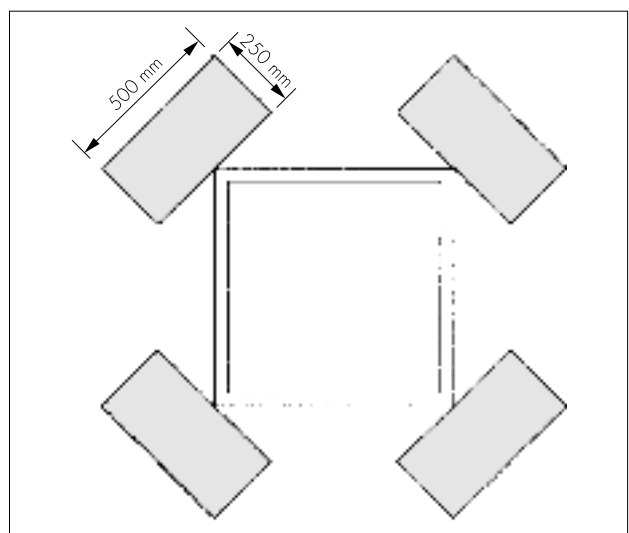
8.12 Expansion beads are fixed vertically in agreed positions. These beads are positioned at approximately seven metre centres along a building, the centres depending on the individual requirements of each job.

8.13 Stop beads are positioned vertically, eg at party wall positions where the adjoining house does not require treatment.

8.14 The Wetherbuild Scrim Adhesive is prepared by mixing the contents of each 25 kg bag with approximately 3 litres of cold, clean water. An electrically driven paddle mixer is used for a minimum of five minutes until a smooth, workable consistency is achieved.

8.15 The render is trowel applied to the surface of dry insulation boards to a minimum thickness of 3 mm. The mesh is bedded into the adhesive with 75 mm laps at joints. Extra mesh is used around openings (see Figure 5).

Figure 5 Extra reinforcement at openings



8.16 Prior to the render coat, a bead of clear silicone rubber mastic is gun applied at window and door frames, overhanging eaves, gas and electric meter boxes, wall vents or where the render abuts any other building material or surface.

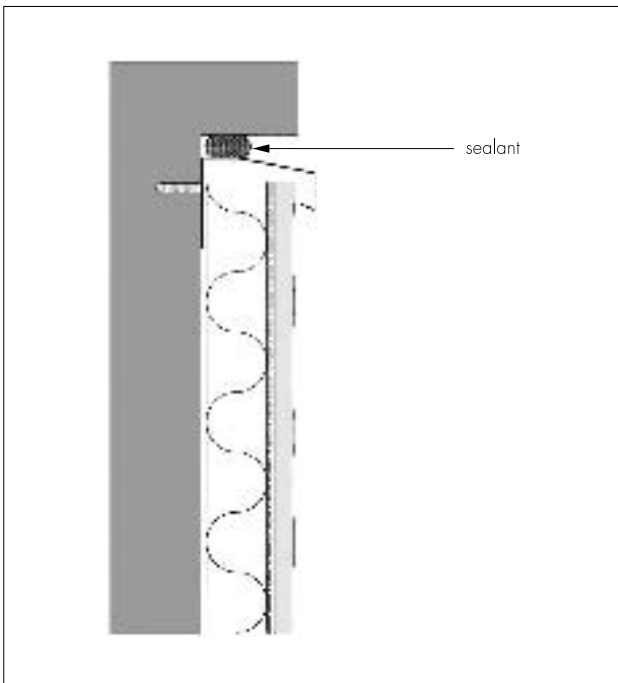
Rendering and finishing

8.17 The drying period of any render will depend on weather conditions; however, the base coat must be left to harden for at least one day before application of the top coat.

8.18 The top coat is prepared using the same procedure as for the scrim adhesive (see section 8.14) by mixing the content of each 25 kg bag with approximately 3.5 litres of water. The render is trowel applied to a minimum thickness of 8 mm. While the render is still soft, selected clean spar aggregate is thrown or sprayed onto the surface. On completion, the surface should be checked to ensure an even coverage of spar-dash has been achieved. Where necessary the aggregate should be lightly tamped to ensure that a good bond is achieved.

8.19 At the tops of walls the system should be protected by an adequate overhang or by an adequately sealed purpose-made flashing (see Figure 6).

Figure 6 Roof eaves detail



8.20 Care should be taken in the detailing of the system around openings and projections (see Figures 7, 8 and 9).

8.21 On completion of the installation, external fittings, eg rainwater goods, are re-fixed through the system into the substrate.

8.22 Continuous surfaces should be completed without a break.

Figure 7 Insulated window detail

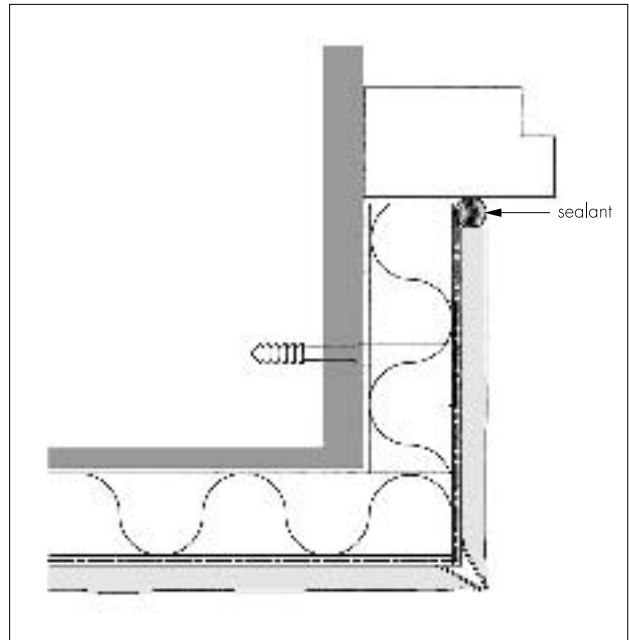


Figure 8 Window head detail

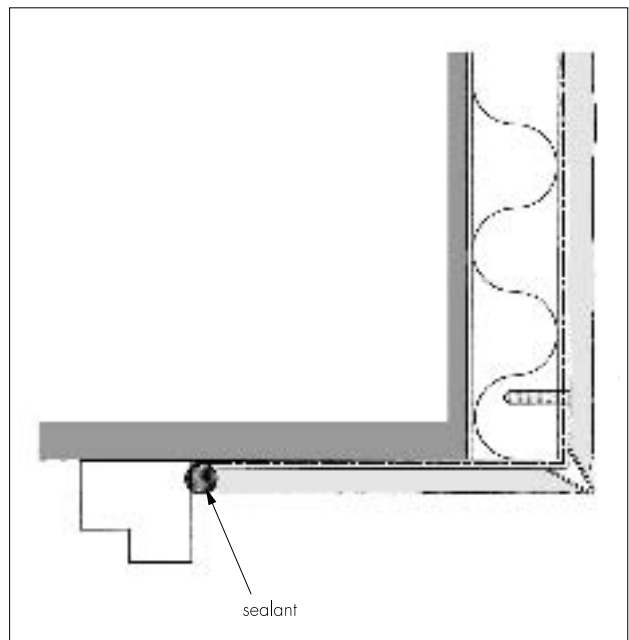
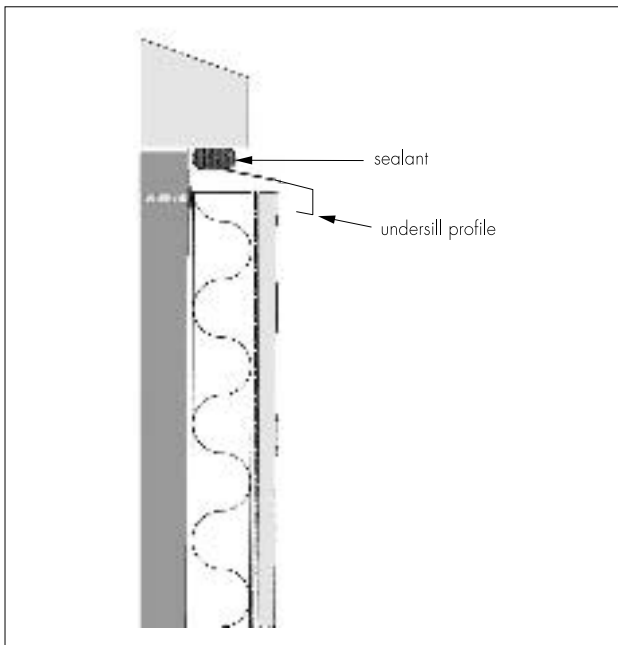


Figure 9 Window sill detail



Technical Investigations

The following is a summary of the technical investigations carried out on the Thermaloc External Wall Insulation System.

9 Tests

9.1 Tests were carried out in accordance with MOAT No 22 : 1988 to determine:

component characterisation
heat/spray cycling
resistance to freeze/thaw
impact resistance.

9.2 An examination was made of data relating to:

water vapour permeability
fire propagation tests to BS 476 : Part 6 : 1989
surface spread of flame tests to BS 476 : Part 7 :
1997

adequacy of fixing system

thermal conductivity to BS 874 : Part 2 :

Section 2.1 : 1986

risk of interstitial condensation.

10 Other investigations

10.1 The manufacturing process, the methods adopted for quality control of manufacture and bought-in components and details of the quality and composition of the materials used, were examined.

10.2 The practicability of installation and the effectiveness of detailing techniques were examined.

Bibliography

- BS 476 *Fire tests on building materials and structures*
Part 6 : 1989 *Method of test for fire propagation for products*
Part 7 : 1997 *Method for classification of the surface spread of flame of products*
- BS 874 *Methods for determining thermal insulating properties*
Part 2 *Tests for thermal conductivity and related properties*
Section 2.1 : 1986 *Guarded hot-plate method*
- BS 5262 : 1991 *Code of practice for external renderings*

- BS 6399 *Loading for buildings*
Part 2 : 1995 *Code of practice for wind loads*
- BS 8000 *Workmanship on building sites*
Part 10 : 1995 *Code of practice for plastering and rendering*
- CP 3 *Code of basic data for the design of buildings*
Chapter V *Loadings*
Part 2 : 1972 *Wind loads*
- MOAT No 22 : 1988 *Directives for the Assessment of External Insulation Systems for Walls (Expanded Polystyrene Insulation Faced with a Thin Rendering)*



On behalf of the British Board of Agrément

Date of issue: 27th January 1999

Director

1 System

Insulation	Phenolic insulation boards — 1200 mm by 600 mm in a range of thicknesses between 20 mm and 80 mm, with a nominal density of 40 kgm^{-3} and a minimum compressive strength of 150 kNm^{-2} . PIR-modified urethane insulation boards — 1200 mm by 600 mm in a range of thicknesses between 20 mm and 70 mm with a nominal density of 32 kgm^{-3} and a minimum compressive strength of 150 kNm^{-2} .
Fixings	Mechanical fixings — approved by the BBA and Wetherby Building Systems Limited.
Wetherbuild Scrim Adhesive	A polymer modified, cement-based render supplied as a powder to which clean water is added.
Reinforcing mesh	A one metre wide mesh of multi-stranded, alkali-resistant glass fibres, having a polymer coating and a nominal weight of 157 gm^{-2} .
Wetherbuild Dashing Render	A polymer modified, cement-based render supplied as a powder to which clean water is added.

2 Thermal properties

Thermal conductivity of insulation	The thermal conductivity values for phenolic and PIR-modified urethane insulation can be taken as $0.018 \text{ Wm}^{-1}\text{K}^{-1}$ and $0.025 \text{ Wm}^{-1}\text{K}^{-1}$, respectively.
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3 Impact resistance

The external wall insulation system has adequate resistance to impact and abrasion where walls are exposed and have some protection, for example walls of private dwellings and walls of communal dwellings above ground-floor level. Where the system may be exposed to severe impact, e.g. walls of public buildings at ground-floor level, precautions may be required to reduce the risk of damage.

4 Properties in relation to fire

The system is classified Class 0 as defined in the appropriate Building Regulations.

5 Design wind loading and resistance to suction⁽¹⁾

Using CP 3 : Chapter V : Part 2 : 1972 for a typical case if all wind speed factors S_1 , S_2 and S_3 are taken as unity, then design wind speed is equal to basic wind speed.

Now, dynamic pressure $q = KV_s^2$
for $V_s = 44 \text{ ms}^{-1}$ and $k = \text{const} = 0.613$
 $\therefore q = 1187 \text{ Nm}^{-2}$

Now, load on panel, $F = (C_{pe} - C_{pi}) qA$ (see section 7 of the Code)

With external pressure coefficient C_{pe} of -0.8 and internal pressure coefficient C_{pi} of $+0.6$ and for unit area

$$F = (-1.4) 1187 \times 1 \text{ N} \\ = -1661 \text{ N (suction)}$$

Typical pull-out strength for stainless steel fixings in sound substrate is taken as 1000 N

Using a fixing density average of 7 fixings per square metre, total pull-out strength for this specification is:

$$1000 \times 7 \text{ N}$$

Safety factor is:

$$1000 \times 7 \div 1661 = 4.2$$

The system has adequate strength to withstand the wind suction load of 1661 N.

(1) BS 6399 : Part 2 : 1995 may also be used to generate design calculations.

6 Durability

Assessed life	At least 30 years (with normal maintenance).
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