CI/SfB (21.9) Rn7 (M2)

BBA BRITISH BOARD OF AGRÉMENT
TECHNICAL APPROVALS FOR CONSTRUCTION

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Agrément Certificate No 00/3766

Designated by Government to issue European Technical Approvals

ISPOTHERM EXTERNAL WALL INSULATION SYSTEMS, A-PLUG

Système d'isolation pour murs extérieurs
Wärmedämmung für Außen-wand

Product

Express Holiday Inn, Glasgow International Airport

Architect: Young & Gault, Glasgow

- *THIS CERTIFICATE RELATES TO ISPOTHERM EXTERNAL WALL INSULATION SYSTEMS, A-PLUG.*
- *The systems comprise insulation material with reinforcement and render or marble finishes 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 Alumasc Exterior Building Products Ltd.*

continued

Regulations – Detail Sheet 1

1 The Building Regulations 2000 (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, the Ispotherm External Wall Insulation Systems, A-Plug, 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:		Data obtained by the BBA show that the systems are classified Class 0 and therefore meet this Requirement. See the marked sections of the appropriate accompanying Detail Sheets.
Requirement:	C4	Resistance to weather and ground moisture
Comment:		Tests by the BBA indicate that 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.

continued

- *The systems are marketed by Alumasc Exterior Building Products Ltd.*
- *All materials and components for use in the systems are approved by the BBA and must be obtained from the Certificate holder.*

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

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

In the opinion of the BBA, the Ispotherm External Wall Insulation Systems, A-Plug, if used in accordance with the provisions of this Certificate, will satisfy or contribute to satisfying the various Regulations and related 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.
Standard:	D6.8	External wall claddings
Comment:		The systems have a Class 0 surface and are unrestricted by this Standard. See the marked sections of the appropriate accompanying Detail Sheets.
Regulation:	**17**	Preparation of sites and resistance to moisture
Standard:	G3.1	Resistance to precipitation
Comment:		Tests by the BBA indicate that walls insulated with the systems will satisfy this Standard. See the marked sections of the appropriate accompanying Detail Sheets.
Regulation:	**22**	Conservation of fuel and power, The building fabric
Standard:	J2.1	Standards for buildings in purpose group 1
Comment:		The system will enable, or contribute to enabling, a wall to satisfy the requirement 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 system 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.

3 The Building Regulations (Northern Ireland) 1994 (as amended 1995)

In the opinion of the BBA, the Ispotherm External Wall Insulation Systems, A-Plug, 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, The Building Fabric
Comment:		The system 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

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 Details Sheets.

Design Data

5 General

5.1 The Ispotherm External Wall Insulation Systems, A Plug, 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 system.

5.2 The systems will improve the weather resistance of a wall and provide a decorative finish. They may, however, be installed only where there are no signs of dampness on the inner surface of the wall other than those caused solely by condensation.

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

5.4 New buildings subject to national Building Regulations should be constructed in accordance with the relevant recommendations of BS 5628-3 : 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 5628-3 : 1985 and/or BS 5390 : 1976(1984).

6 Moisture penetration

Tests and site examinations show 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 adverse 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, care must be taken in the design of the rooms 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 system, particularly at joints, to ensure that ingress of water does not occur. Necessary repairs should be effected immediately.

8.2 Damaged areas must be repaired using the appropriate components and procedures detailed in the Certificate holder's instructions.

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 movement joints
areas where flexible sealants must 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 must 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 includes 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.

11 Health and safety

11.1 The fibres as used in MRS renders may irritate the skin. Protective clothing should be worn to avoid contact with both dry, unmixed material and with wet mortar. Great care must be taken to avoid contact with eyes.

11.2 When mixing MR adhesives and renders, a filter respirator should be worn.

11.3 Where excessive concentrations of dust may accumulate, the contractor should make an assessment of the risk, in accordance with the Control of Substances Hazardous to Health Regulations 1994.

Additional Information

The management systems of Alumasc Exterior Building Products Limited have been assessed and registered as meeting the requirements of BS EN ISO 9001 : 1994 by the British Standards Institution Quality Assurance.

Bibliography

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

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

BS EN ISO 9001 : 1994 *Quality systems. Model for quality assurance in design, development, production, installation and servicing*

Conditions of Certification

12 Conditions

12.1 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.

12.2 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.

12.3 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.

12.4 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.

12.5 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.

BBA BRITISH BOARD OF AGRÉMENT
TECHNICAL APPROVALS FOR CONSTRUCTION

In the opinion of the British Board of Agrément, Ispotherm External Wall Insulation Systems, A-Plug are fit for their intended use provided they are installed, used and maintained as set out in this Certificate. Certificate No 00/3766 is accordingly awarded to Alumasc Exterior Building Products Ltd.

On behalf of the British Board of Agrément

Date of issue: 5th March 2001

Chief Executive

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CI/SfB (21.9) Rn7 (M2)

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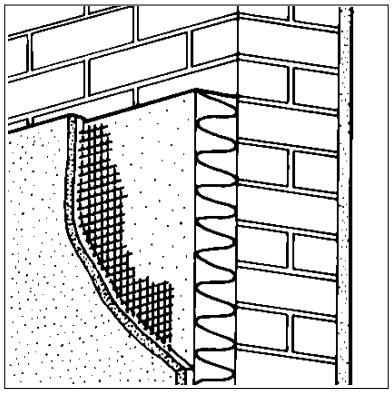
Certificate No 00/3766

DETAIL SHEET 2

ISPOTHERM EXTERNAL WALL INSULATION SYSTEM, A-PLUG (THICK COAT)

Product



- *THIS DETAIL SHEET RELATES TO THE ISPOTHERM EXTERNAL WALL INSULATION SYSTEM, A-PLUG (THICK COAT), A SYSTEM EMPLOYING MINERAL WOOL INSULATION, WITH A GLASS-FIBRE REINFORCING MESH AND RENDER FINISHES.*
- *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 Ispotherm External Wall Insulation System A-Plug (Thick Coat) (see Figure 1) comprises:

(1) Ispo No 1 Composite mortar — a mixture of white Portland cement, quartz sand and other additives supplied as a powder to which clean water is added.

(2) Mineral wool insulation slabs — 1200 mm by 600 mm in a range of thicknesses between 30 mm and 200 mm, with a nominal density of 140 kgm^{-3} and a minimum cross-breaking strength of 25 kNm^{-2}. The slabs are manufactured using conventional techniques and incorporate a phenolic resin binder and a mineral oil water repellent.

(3) Mechanical fixings — polypropylene mechanical fixings, approved by the BBA and Alumasc Exterior Building Products Ltd.

(4) Ispo SL540 Reinforcing Lightweight Render — a mixture of white Portland cement, quartz sand and other additives supplied as a powder to which clean water is added.

(5) Ispotherm Uni-Reinforcing Mesh — a one metre wide mesh of multi-stranded glass fibres with a polymer coating and a nominal weight of 160 gm^{-2}.

(6) Ispo Primer — an emulsion primer containing fine quartz grains used as a bonding aid.

(7) Ispo Lightweight Render (K and R) — a mixture of white Portland cement, quartz sand, marble aggregate (2 mm, 3 mm and 4 mm) and other additives supplied as a powder to which clean water is added.

(8) Isposil — a micro-porous silicone-based façade paint used as a decorative finish.

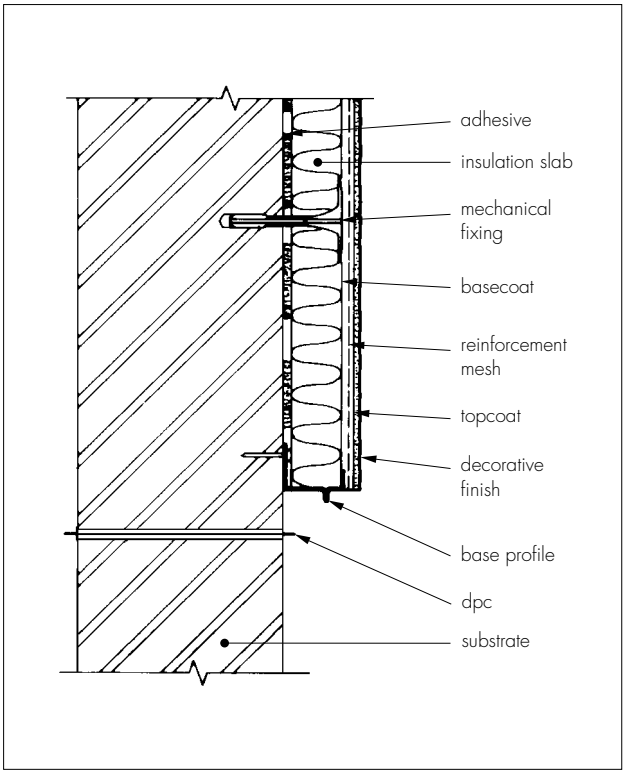
(9) Ancillary materials:

Ispotherm Base Profile — a metal trimming strip with a recessed water drip used as the base profile

Ispotherm Edge Profile — a galvanized sheet steel corner strip incorporating PVC-U nosing used as reinforcement for external corners and edges

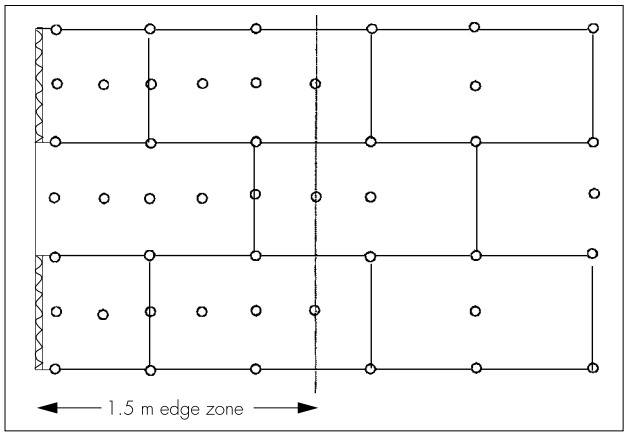
Ispotherm Sealing Tape — a self-adhesive compressed PVC-U foam tape.

Figure 1 Typical section at base level



1.2 The insulation slabs are bonded to the external surfaces of walls using the adhesive and secured with mechanical fixings (see Figure 2). The basecoat is trowel applied to a minimum thickness of 5 mm and a maximum thickness of 10 mm. The reinforcing mesh is embedded immediately. Allowing sufficient drying time for the basecoat, Ispo Primer is applied in the same colour shade as the topcoat and allowed to dry before applying the topcoat by trowel to a thickness of approximately 2 mm, 3 mm or 4 mm. The topcoat is rubbed down using a wooden or plastic float to receive the finish. When the topcoat is dry a decorative finish of Isposil paint is applied.

Figure 2 Insulation boards fixing pattern



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

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 bags and quantities as listed in Table 1. Each bag carries the product identification, manufacturer's batch number and the BBA identification mark incorporating the number of this Certificate.

Table 1 Component supply details

Component	Quantity and package
Ispo No 1 Composite mortar	25 kg bag
Ispo SL540 Reinforcing Lightweight Render	25 kg bag
Ispo Lightweight Render (K and R)	30 kg bag
Ispo Primer	7.5 and 17.5 kg plastic container
Isposil	12.5 litre container
Reinforcement mesh	1.0 metre wide 50 metre rolls
Mechanical fixings	boxed by manufacturer

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 renders must be stored in dry conditions, off the ground, and be protected from moisture.

2.5 The Isposil paint should be stored in a safe area, under cover, and protected from excessive heat and frost at all times.

Design Data

3 Strength and stability

3.1 The Ispotherm External Wall Insulation System, A-Plug (Thick Coat) has adequate resistance to impact and abrasion where walls are exposed and have some protection, eg walls of private dwellings and walls of communal dwellings above ground-floor level. Where the system may be exposed to severe impact, eg mechanical or malicious, precautions may be required to reduce the risk of damage. Further guidance may be obtained from the Certificate holder, BRE Current Paper CP 6 : 81 *Assessment of External Walls — Hard Body Impact Resistance* and *BRE Good Building Guide GBG 31 Insulated External Cladding Systems*.

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-2 : 1972 or BS 6399-2 : 1997 to withstand the increased wind loads associated with tall buildings (greater than 12 m) 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

Approved Document B, Appendix A, paragraph 12

Scotland

Technical Standards, Part E, *Provisions deemed to satisfy*, E6.1, Table 2

Northern Ireland

Technical Booklet E, paragraph 2.4.

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.

5 Proximity of flues

With this system there are no provisions to be met.

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 0.036 $Wm^{-1}K^{-1}$.

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

England and Wales

Approved Document L1

Scotland

Technical Standards, Part J

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 insulation slabs have 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 on external plumbing fitments to identify leakage of rainwater into the system, enabling steps to be taken to correct the defects.

7.2 The finishes may become soiled in time, the rate depending on locality.

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 less noticeable on lighter colours.

Installation

8 Procedure

General

8.1 Application is carried out in accordance with Alumasc Exterior Building Products Ltd's current installation instructions.

8.2 The adhesive, render and coating must not be applied in rain or mist, at temperatures below 5°C or above 30°C, if exposure to frost is likely to occur during drying, or if the boards or background are already wet or frostbound.

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

8.4 Ispotherm adhesives and renders are mixed using a paddle mixer. Conventional concrete mixers are unsuitable.

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 500 mm centres.

8.6 The adhesive is prepared for use by mixing the contents of each 25 kg bag with approximately 6.5 litres of water using an electrically driven paddle mixer. The material is left to stand for approximately five minutes and mixed again with, if required, a small addition of water to give a smooth, workable consistency. Care should be taken not to over-mix.

8.7 The adhesive is applied to the back of the slabs by either a comb to achieve a full bond, or as dabs for an uneven background.

8.8 The insulation slabs should be pressed firmly to the substrate immediately after application of the adhesive. Any delay may result in a weak bond.

8.9 The first run of insulation is positioned on the base profile. Holes are drilled into the substrate to a minimum depth of 50 mm through the insulation at the corners of each slab and at positions which will allow a minimum of eight fixings per square metre at edge zones and four fixings per square metre in the main area of the wall (see Figure 2). The mechanical fixings are inserted and tapped firmly into place, securing the insulation to the substrate. Subsequent rows of slabs are positioned so that the vertical board joints are staggered and overlapped at the building corners and so that the board joints do not occur within 200 mm of the corners of openings.

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

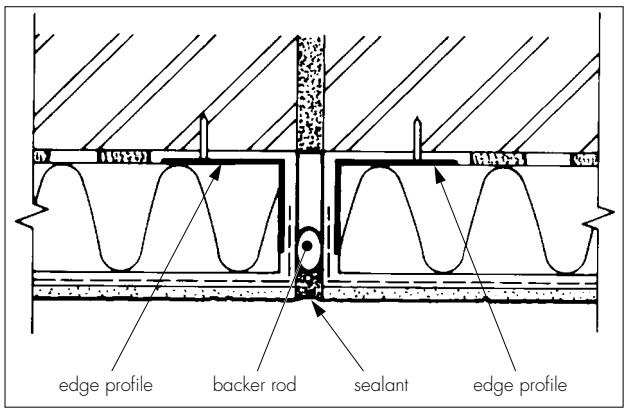
8.11 To fit around details such as doors and windows, insulation slabs may be cut with a sharp knife or a fine-tooth saw. If required, purpose-made window sills are fitted. They are designed to prevent water ingress and incorporate drips to shed water clear of the system.

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

Movement joints

8.13 Movement joints in the substrate must be continued through the system. The joint detail using purpose-made metal trims is illustrated in Figure 3.

Figure 3 Vertical movement joint

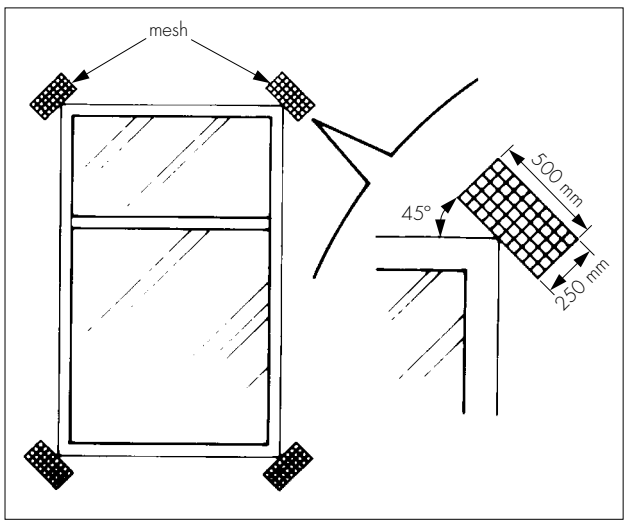


Reinforcing

8.14 The basecoat is prepared by mixing the contents of each 25 kg bag with 6 to 7 litres of clean water using the same method as for the adhesive.

8.15 The basecoat render is trowel applied to the surface of the dry insulation to a minimum thickness of 5 mm and a maximum thickness of 10 mm. The mesh is bedded immediately into the basecoat with 100 mm laps at joints and should be in the upper third of the basecoat render. Additional pieces of reinforcing mesh are used diagonally at the corners of openings, as shown in Figure 4.

Figure 4 Additional 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.

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

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

Rendering and finishing

8.19 The drying period of any render will depend on the applied thickness and weather conditions; however, the basecoat must be left to harden for five to ten days and any grease chalking, etc removed before the Ispo Primer is applied by roller or brush. The Ispo Primer is allowed to dry before application of the topcoat.

8.20 The topcoat is prepared by mixing the contents of each 30 kg bag with approximately 5.5 litres of cold, clean water, using the same method as for the adhesive. The topcoat is trowel applied to grain size thicknesses of 2 mm, 3 mm or 4 mm.

8.21 To prevent the render from drying too rapidly it should not be applied in direct sunlight and, continuous surfaces should be completed without a break.

8.22 Depending on weather conditions, the topcoat should be allowed to dry for approximately ten days before application of Isposil decorative finish.

8.23 The decorative finish should not be applied in wet weather at temperatures below 5°C or when frost is expected. Freshly coated work should be protected from rain.

8.24 At the tops of walls the system should be protected by an adequate overhang or by an adequately sealed purpose-made flashing (see Figure 5).

8.25 Care should be taken in the detailing of the system around openings and projections (see Figures 6, 7, 8 and 9).

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

Figure 5 Roof eaves detail

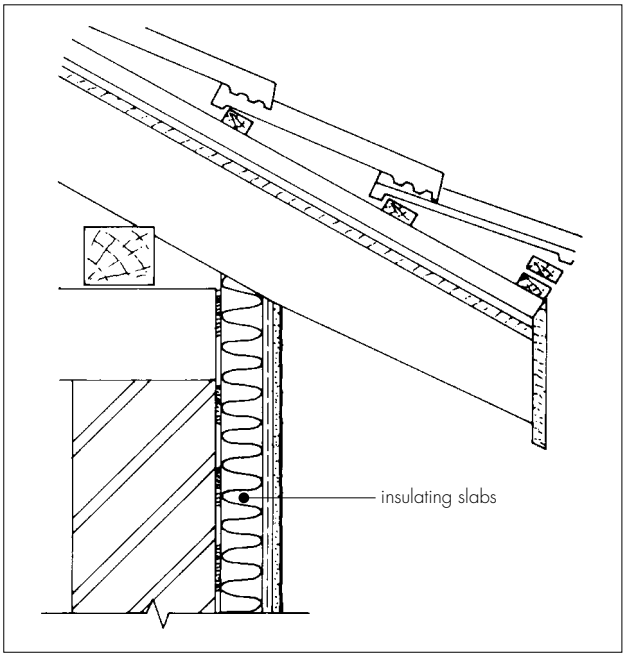


Figure 6 Insulated window detail

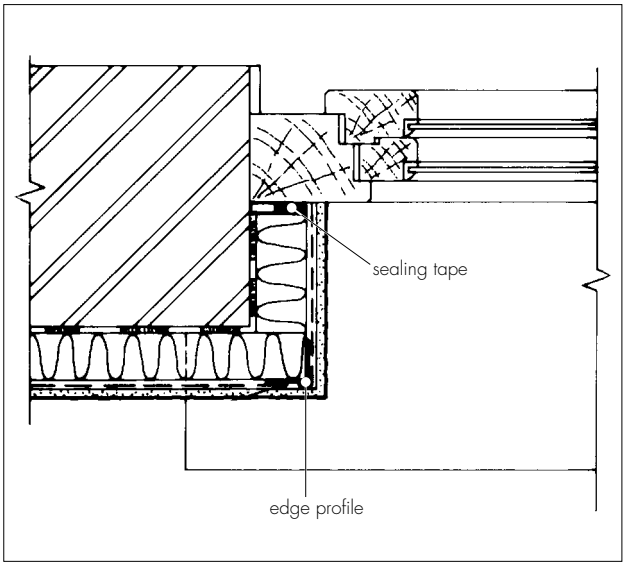


Figure 7 Uninsulated window reveal detail

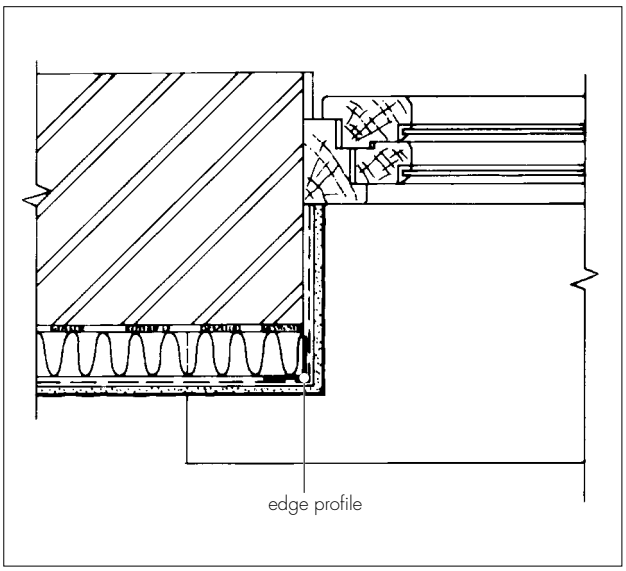


Figure 8 Window head detail

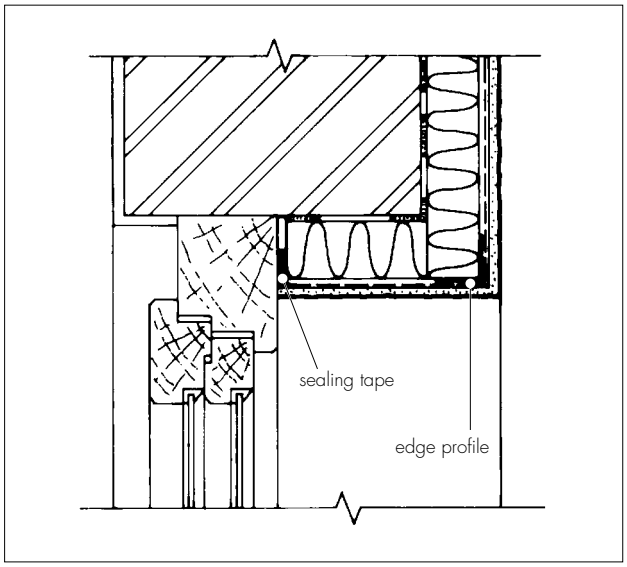
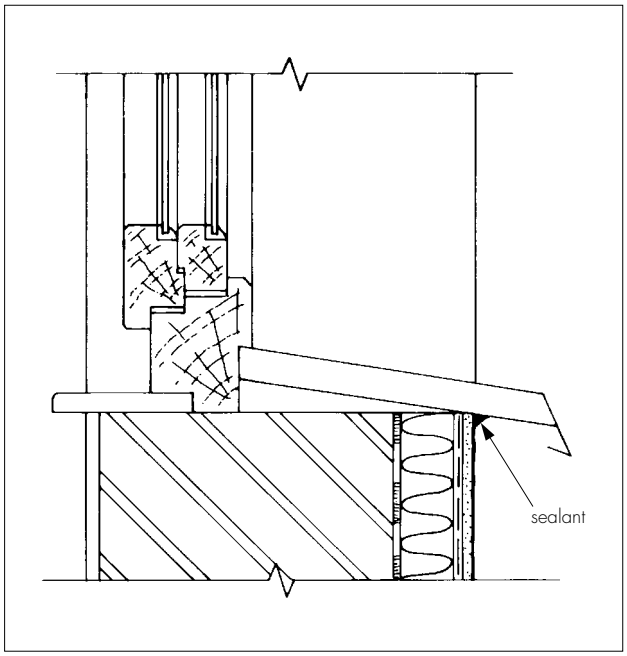


Figure 9 Window sill detail



Technical Investigations

The following is a summary of the technical investigations carried out on Ispotherm External Wall Insulation System, A-Plug (Thick Coat).

9 Tests

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

component characterisation
flexural and compressive strength of renders
density of slab
heat/spray cycling
resistance to freeze/thaw
impact resistance
water absorption of render
water vapour permeability.

9.2 An examination was made of data relating to:

non-combustibility tests to BS 476-4 : 1970(1984)
fire propagation tests to BS 476-6 : 1989
surface spread of flame tests to BS 476-7 : 1987
pull-out strength of fixings
durability of finish
thermal conductivity to BS 874-2.1 : 1986.

10 Other investigations

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

10.2 An assessment of the risk of interstitial condensation was undertaken.

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

10.4 Visits were made to existing sites to assess the performance of the product in use.

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BBA BRITISH BOARD OF AGRÉMENT
TECHNICAL APPROVALS FOR CONSTRUCTION

On behalf of the British Board of Agrément

Date of issue: 5th March 2001

Chief Executive

Appendix — System summary — Ispotherm External Wall Insulation System, A-Plug (Thick Coat)

1 System

Insulation	Mineral wool insulation slabs — 1200 mm by 600 mm in a range of thicknesses between 30 mm and 200 mm, with a nominal density of 140 kgm^{-3}.
Ispo No 1 Composite mortar	Adhesive comprising white Portland cement, quartz sand and other additives.
Mechanical fixings	Mechanical fixings approved by the BBA and Alumasc Exterior Building Products Ltd.
Ispotherm Uni-Reinforcing Mesh	A one metre wide mesh of multi-stranded glass fibres with a polymer coating and nominal weight of 160 gm^{-2}.
Ispo SL540 Reinforcing Lightweight Render	A mixture of white Portland cement, marble sand, and other additives supplied as a powder to which clean water is added.
Ispo Primer	An emulsion containing fine quartz grains used as a bonding aid and pre-coat.
Ispo Lightweight Render (K and R)	A mixture of white Portland cement, quartz sand, quartz aggregate (2 mm, 3 mm and 4 mm) and other additives supplied as a powder to which clean water is added.
Isposil	A micro-porous silicone-based façade paint used as a decorative finish.

2 Thermal properties

Thermal conductivity of insulation slabs: 0.036 $Wm^{-1}K^{-1}$

U values: Using values given in Table A15 of Approved Document L1 (1995 edition) to the Building Regulations 2000 (England and Wales), the thermal insulation values for a typical 225 mm brick external wall (density 1700 kgm^{-3}) with 10 mm plasterboard:

Insulation thickness (mm)	U value ($Wm^{-2}K^{-1}$)
30	0.68
40	0.57
50	0.50
60	0.44
75	0.37
100	0.29

3 Impact resistance

The system is suitable for use where walls are exposed but have some protection, eg walls of private dwellings and walls of communal dwellings above ground-floor level. Where the system may be exposed to severe impact, eg mechanical or malicious damage, precautions may be required to reduce the risk of damage.

4 Properties in relation to fire

The system is not non-combustible to fire to BS 476-4 : 1970(1984).

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-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 $V_s = 44\ ms^{-1}$ and k = const = 0.613

$\therefore q = 1187\ Nm^{-2}$

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

$$F = (-1.4)\ 1187 \times 1\ N$$

$$= -1661\ N\ (suction)$$

Typical pull-out strength for Ispotherm Mechanical fixings in sound substrate is taken as 1000 N.

Using a fixing density average of eight fixings per square metre for the edge zone of the wall, the total pull-out strength for this specification is:

$$1000 \times 8\ N$$

Safety factor is:

$$1000 \times 8 \div 1661 = 4.8$$

Typical pull-out strength for Ispotherm Mechanical fixings in sound substrate is taken as 1000 N.

Using a fixing density average of four fixings per square metre for the main area of the wall, the total pull-out strength for the specification is:

$$1000 \times 4\ N$$

Safety factor is:

$$1000 \times 4 \div 1661 = 2.4$$

It should be noted that the system also incorporates an adhesive between the insulation and the substrate which will additionally increase the resistance to wind suction.

(1) BS 6399-2 : 1997 may also be used to generate design calculations.

6 Durability

Age of oldest installation seen by BBA	10 years.
Age of oldest installation	15 years.
Assessed life	At least 30 years (with normal maintenance).

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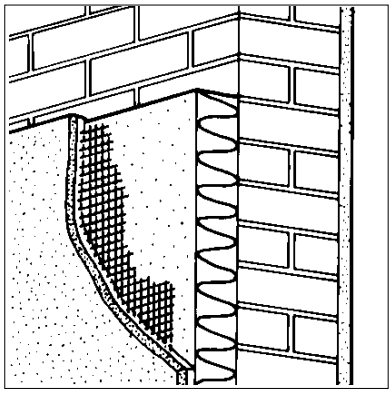
BBA BRITISH BOARD OF AGRÉMENT
TECHNICAL APPROVALS FOR CONSTRUCTION

Certificate No 00/3766

DETAIL SHEET 3

ISPOTHERM EXTERNAL WALL INSULATION SYSTEM, A-PLUG (THIN COAT MINERAL RENDER FINISH)

Product



- *THIS DETAIL SHEET RELATES TO THE ISPOTHERM EXTERNAL WALL INSULATION SYSTEM, A-PLUG (THIN COAT MINERAL RENDER FINISH), A SYSTEM EMPLOYING MINERAL WOOL INSULATION, WITH A GLASS-FIBRE REINFORCING MESH AND RENDER FINISHES.*
- *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 Ispotherm External Wall Insulation System, A-Plug (Thin Coat Mineral Render Finish) (see Figure 1) comprises:

(1) Ispo No 1 Composite mortar — a mixture of white Portland cement, quartz sand and other additives supplied as a powder to which clean water is added. The mortar is used as the adhesive and basecoat.

(2) Mineral wool insulation slabs — 1200 mm by 600 mm in a range of thicknesses between 30 mm and 200 mm, with a nominal density of 140 kgm^{-3} and a minimum cross-breaking strength of 25 kNm^{-2}. The slabs are manufactured using conventional techniques and incorporate a phenolic resin binder and a mineral oil water repellent.

(3) Mechanical fixings — polypropylene mechanical fixings, approved by the BBA and Alumasc Exterior Building Products Ltd.

(4) Ispotherm Reinforcement Mesh — a one metre wide mesh of multi-stranded glass fibres with a polymer coating and a nominal weight of 160 gm^{-2}.

(5) Ispo Primer — an acrylic resin emulsion containing fine quartz grains used as a bonding aid and pre-coat.

(6) Ispo Lightweight Render (K and R) — a mixture of white Portland cement, quartz sand, marble aggregate (2 mm, 3 mm and 4 mm) and other additives supplied as a powder to which clean water is added.

(7) Isposil — a micro-porous silicone-based façade paint used as a decorative finish.

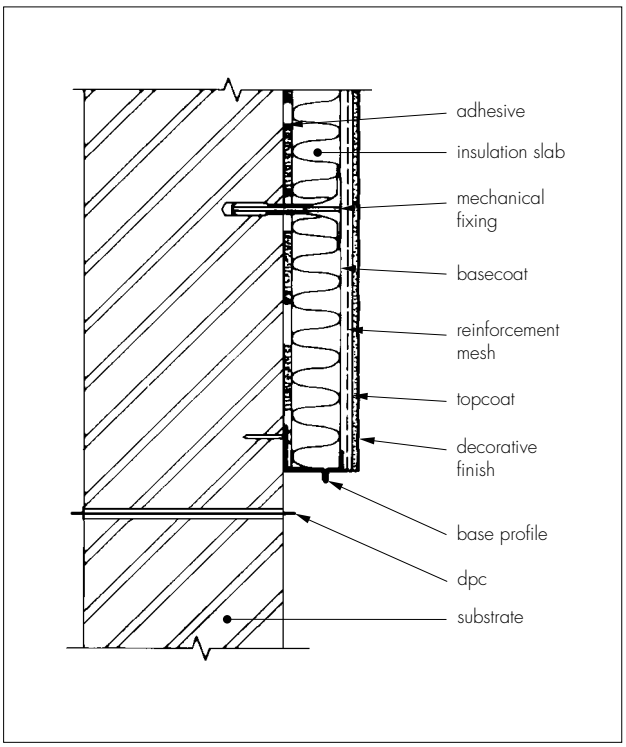
(8) Ancillary materials:

Ispotherm Base Profile — a metal trimming strip with a recessed water drip used as the base profile.

Ispotherm Corner Profile — a stainless sheet steel corner strip used as reinforcement for external corners and edges.

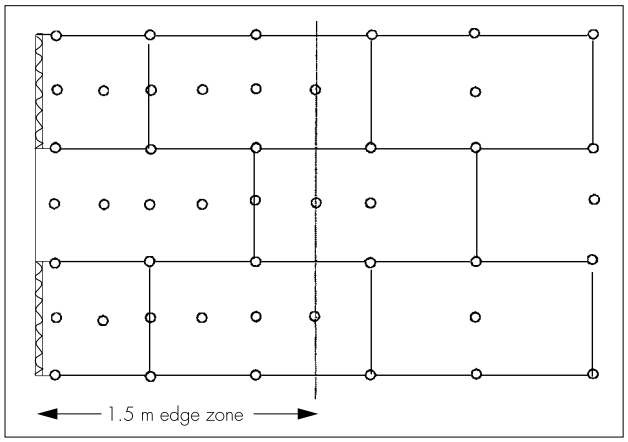
Ispotherm Sealing Tape — a self-adhesive compressed PVC-U foam tape.

Figure 1 Typical section at base level



1.2 The insulation slabs are bonded to the external surfaces of walls using the adhesive and secured with mechanical fixings (see Figure 2). The basecoat is trowel applied to the insulation to a thickness of approximately 3 mm to 5 mm and the reinforcement mesh is embedded immediately. Allowing sufficient drying time for the basecoat, Ispo Primer is applied in the same colour and shade as the topcoat and allowed to dry before applying the topcoat by trowel to a thickness of approximately 2 mm, 3 mm or 4 mm. The topcoat is rubbed down using a wooden or plastic float to receive the finish. When the topcoat is dry a decorative finish of Isposil paint is applied.

Figure 2 Insulation boards fixing pattern



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

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 bags and quantities as listed in Table 1. Each bag carries the product identification, manufacturer's batch number and the BBA identification mark incorporating the number of this Certificate.

Table 1 Component supply details

Component	Quantity and package
Ispo No 1 Composite mortar	25 kg bag
Ispo Lightweight Render (K and R)	30 kg bag
Ispo Primer	7.5 kg and 17.5 kg plastic container
Isposil	12.5 litre container
Reinforcement mesh	1.0 metre wide 50 metre rolls
Mechanical fixings	boxed by manufacturer

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 renders must be stored in dry conditions, off the ground, and be protected from moisture.

2.5 The Isposil paint should be stored in a safe area, under cover, and protected from excessive heat and frost at all times.

Design Data

3 Strength and stability

3.1 The Ispotherm External Wall Insulation System, A-Plug (Thin Coat Mineral Render Finish) has adequate resistance to impact and abrasion where walls are exposed and have some protection, eg walls of private dwellings and walls of communal dwellings above ground-floor level. Where the system may be exposed to severe impact, eg mechanical or malicious, precautions may be required to reduce the risk of damage. Further guidance may be obtained from the Certificate holder, BRE Current Paper CP 6 : 81 *Assessment of External Walls — Hard Body Impact Resistance* and *BRE Good Building Guide GBG 31 Insulated External Cladding Systems*.

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-2 : 1972 or BS 6399-2 : 1997 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

Approved Document B, Appendix A, paragraph 12

Scotland

Technical Standards, Part E, *Provisions deemed to satisfy*, E6.1, Table 2

Northern Ireland

Technical Booklet E, paragraph 2.4.

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.

5 Proximity of flues

With this system there are no provisions to be met.

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 0.036 $Wm^{-1}K^{-1}$.

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

England and Wales

Approved Document L1

Scotland

Technical Standards, Part J.

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 insulation slabs have 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 on external plumbing fitments to identify leakage of rainwater into the system, enabling steps to be taken to correct the defects.

7.2 The finishes may become soiled in time, the rate depending on locality.

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 less noticeable in lighter colours.

Installation

8 Procedure

General

8.1 Application is carried out in accordance with Alumasc Exterior Building Products Ltd's current installation instructions.

8.2 The adhesive, render and coating must not be applied in rain or mist, at temperatures below 5°C or above 30°C, if exposure to frost is likely to occur during drying, or if the boards or background are already wet or frostbound.

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

8.4 Ispotherm adhesive and renders are mixed using a paddle mixer. Conventional concrete mixers are unsuitable.

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 500 mm centres.

8.6 The adhesive is prepared for use by mixing the contents of each 25 kg bag with approximately 6.5 litres of water using an electrically driven paddle mixer. The material is left to stand for approximately five minutes and mixed again with, if required, a small addition of water to give a smooth, workable consistency. Care should be taken not to over-mix.

8.7 The adhesive is applied to the back of the slabs by either a comb to achieve a full bond, or as dabs for an uneven background.

8.8 The insulation slabs should be pressed firmly to the substrate immediately after application of the adhesive. Any delay may result in a weak bond.

8.9 The first run of insulation is positioned on the base profile. Holes are drilled into the substrate to a minimum depth of 50 mm through the insulation at the corners of each slab and at positions which will allow a minimum of eight fixings per square metre at the edge zone and four fixings per square metre in the main wall area (see Figure 2). The mechanical fixings are inserted and tapped firmly into place, securing the insulation to the substrate. Subsequent rows of slabs are positioned so that the vertical board joints are staggered and overlapped at the building corners and so that the board joints do not occur within 200 mm of the corners of openings.

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

8.11 To fit around details such as doors and windows, insulation slabs may be cut with a sharp

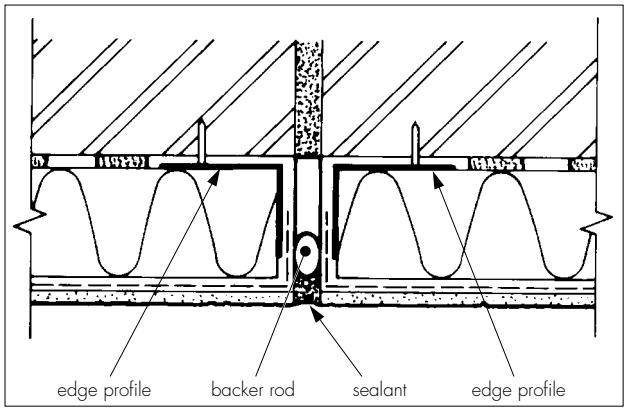
knife or a fine-tooth saw. If required, purpose-made window sills are fitted. They are designed to prevent water ingress and incorporate drips to shed water clear of the system.

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

Movement joints

8.13 Movement joints in the substrate must be continued through the system. The joint detail using purpose-made metal trims is illustrated in Figure 3.

Figure 3 Vertical movement joint

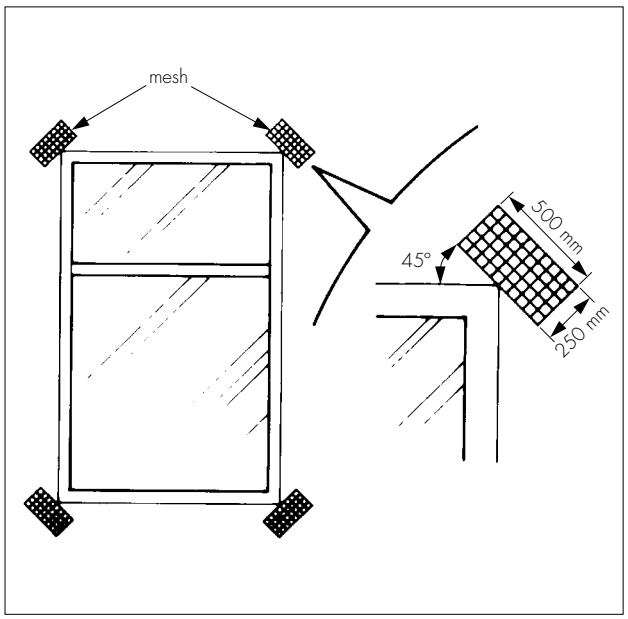


Reinforcing

8.14 The basecoat is prepared by mixing the contents of each 25 kg bag with approximately 6 litres of clean water using the same method as for the adhesive.

8.15 The basecoat render is trowel applied to the surface of the dry insulation initially to an approximate thickness of between 3 mm and 5 mm. The mesh is bedded immediately into the basecoat with 100 mm laps at joints and should be in the upper third of the basecoat render. Additional pieces of reinforcing mesh are used diagonally at the corners of openings, as shown in Figure 4.

Figure 4 Additional 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.

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

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

Rendering and finishing

8.19 The drying period of any render will depend on the applied thickness and weather conditions; however, the basecoat must be left to harden for three to five days before the Ispo Primer is applied by roller or brush. The Ispo Primer is allowed to dry before application of the topcoat.

8.20 The topcoat is prepared by mixing the contents of each 30 kg bag with approximately 5.5 litres of cold, clean water, using the same method as for the adhesive. The topcoat is trowel applied to grain size thicknesses of 3 mm to 4 mm.

8.21 To prevent the render from drying too rapidly it should not be applied in direct sunlight and, continuous surfaces should be completed without a break.

8.22 Depending on weather conditions, the topcoat should be allowed to dry for approximately five days before application of Isposil decorative finish.

8.23 The decorative finish should not be applied in wet weather at temperatures below 5°C, or when frost is expected. Freshly coated work should be protected from rain.

8.24 At the tops of walls the system should be protected by an adequate overhang or by an adequately sealed purpose-made flashing (see Figure 5).

8.25 Care should be taken in the detailing of the system around openings and projections (see Figures 6, 7, 8 and 9).

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

Figure 5 Roof eaves detail

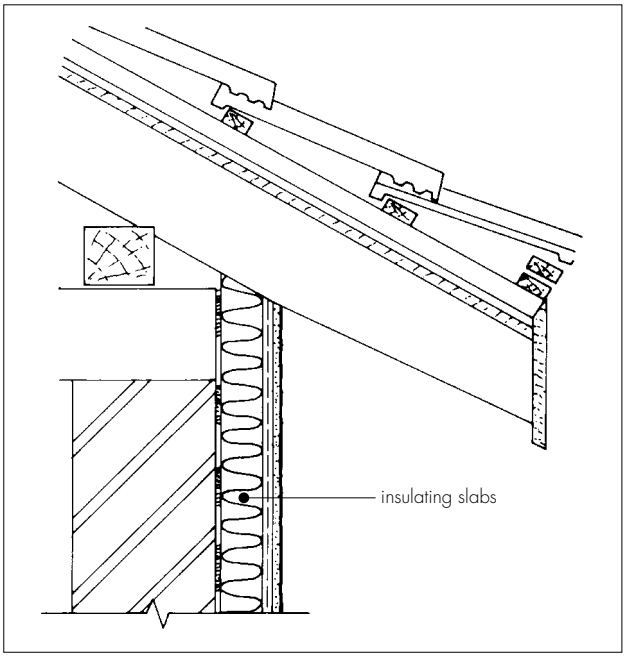


Figure 6 Insulated window detail

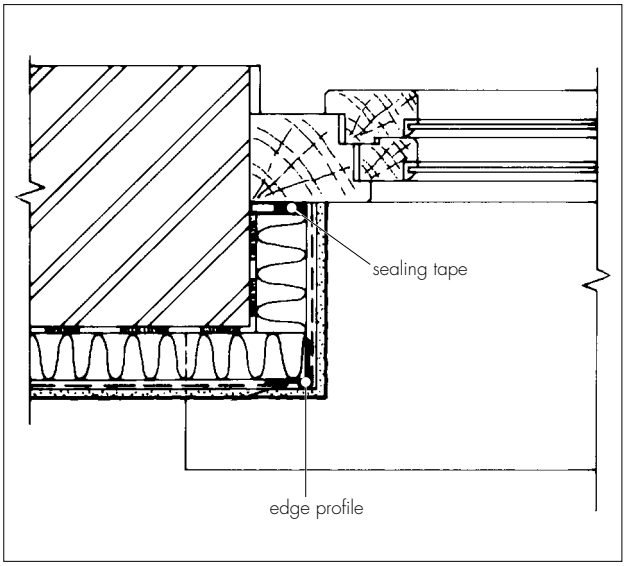


Figure 7 Uninsulated window reveal detail

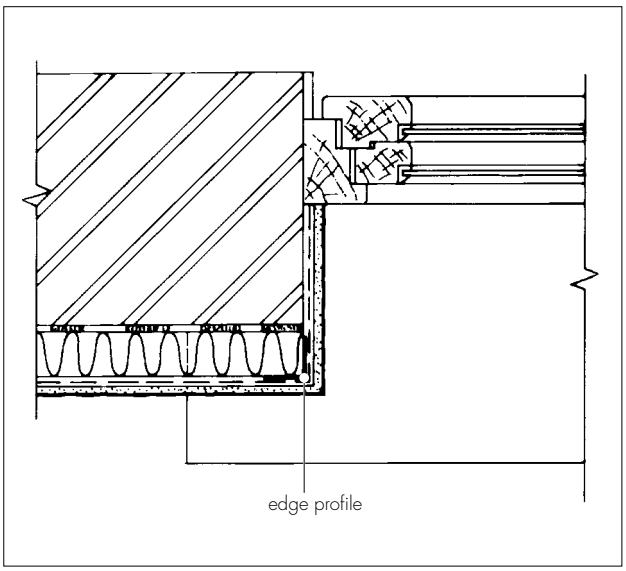


Figure 8 Window head detail

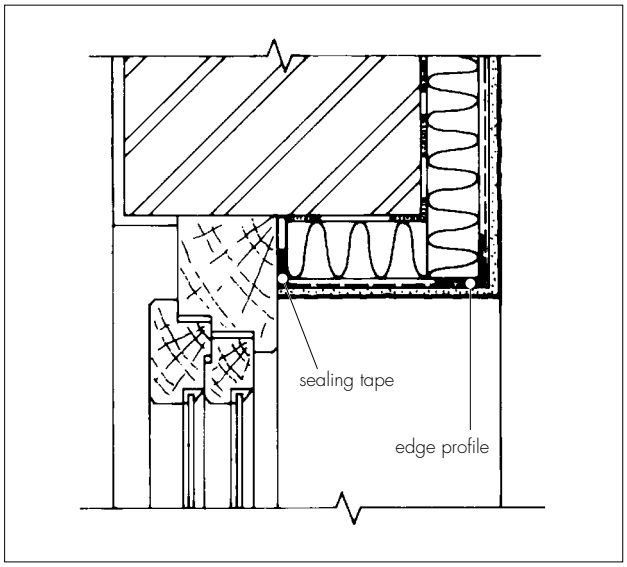
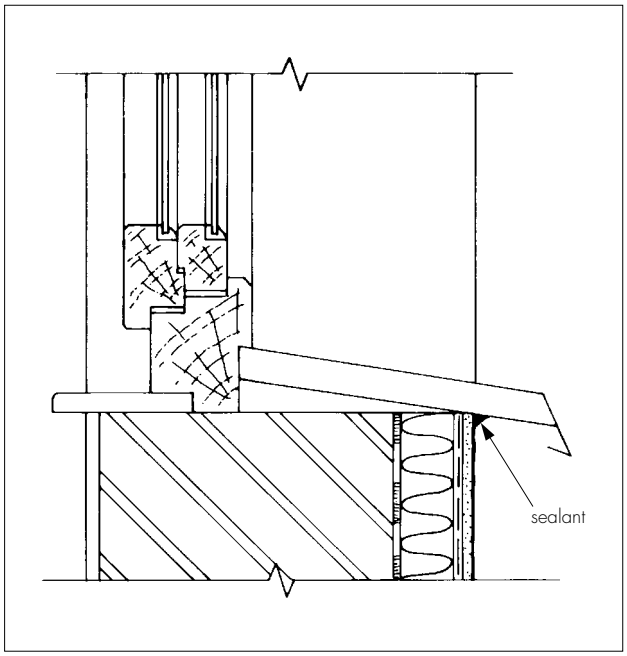


Figure 9 Window sill detail



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water absorption of render
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pull-out strength of fixings
durability of finish
thermal conductivity to BS 874-2.1 : 1986.

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

10.2 An assessment of the risk of interstitial condensation was undertaken.

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

10.4 Visits were made to existing sites to assess the performance of the product in use.

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BBA BRITISH BOARD OF AGRÉMENT
TECHNICAL APPROVALS FOR CONSTRUCTION

On behalf of the British Board of Agrément

Date of issue: 5th March 2001

Chief Executive

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Ispo No 1 Composite mortar	A mortar used as the adhesive and basecoat, comprising white Portland cement, quartz sand and other additives.
Mechanical fixings	Mechanical fixings approved by the BBA and Alumasc Exterior Building Products Ltd.
Ispotherm B Reinforcement Mesh	A one metre wide mesh of multi-stranded glass fibres with a polymer coating and nominal weight of 160 gm^{-2}.
Ispo Primer	An emulsion containing fine quartz grains used as a bonding aid and pre-coat.
Ispo Lightweight Render (K and R)	A mixture of white Portland cement, quartz sand, marble aggregate (2 mm, 3 mm and 4 mm) and other additives supplied as a powder to which clean water is added.
Isposil	A micro-porous silicone-based façade paint used as a decorative finish.

2 Thermal properties

Thermal conductivity of insulation slabs: 0.036 $Wm^{-1}K^{-1}$

U values: Using values given in Table A15 of Approved Document L1 (1995 edition) to the Building Regulations 2000 (England and Wales), the thermal insulation values for a typical 225 mm brick external wall (density 1700 kgm^{-3}) with 10 mm plasterboard:

Insulation thickness (mm)	U value ($Wm^{-2}K^{-1}$)
30	0.68
40	0.57
50	0.50
60	0.44
75	0.37
100	0.29

3 Impact resistance

The system is suitable for use where walls are exposed but have some protection, eg walls of private dwellings and walls of communal dwellings above ground-floor level. Where the system may be exposed to severe impact, eg mechanical or malicious damage, precautions may be required to reduce the risk of damage.

4 Properties in relation to fire

The system is not non-combustible to fire to BS 476-4 : 1970(1984).

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-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 $V_s = 44\ ms^{-1}$ and k = const = 0.613

$\therefore q = 1187\ Nm^{-2}$

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

$$F = (-1.4)\ 1187 \times 1\ N$$

$$= -1661\ N\ (suction)$$

Typical pull-out strength for Ispotherm Mechanical fixings in sound substrate is taken as 1000 N.

Using a fixing density average of eight fixings per square metre for the edge zone of the wall, the total pull-out strength for this specification is:

$$1000 \times 8\ N$$

Safety factor is:

$$1000 \times 8 \div 1661 = 4.8$$

Typical pull-out strength for Ispotherm Mechanical fixings in sound substrate is taken as 1000 N.

Using a fixing density average of four fixings per square metre for the main area of the wall, the total pull-out strength for this specification is:

$$1000 \times 4\ N$$

Safety factor is:

$$1000 \times 4 \div 1661 = 2.4$$

It should be noted that the system also incorporates an adhesive between the insulation and the substrate which will additionally increase the resistance to wind suction.

(1) BS 6399-2 : 1997 may also be used to generate design calculations.

6 Durability

Age of oldest installation seen by BBA	10 years.
Age of oldest installation	19 years.
Assessed life	At least 30 years (with normal maintenance).

CI/SfB (21.9) Rn7 (M2)

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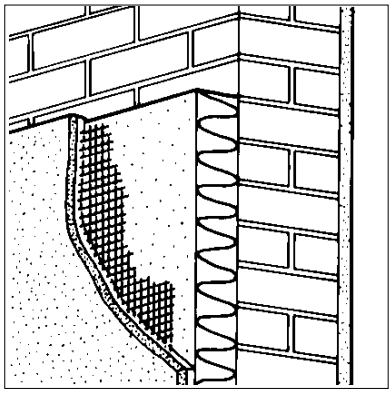
e-mail: info@alumasc-exteriors.co.uk

Certificate No 00/3766

DETAIL SHEET 4

ISPOTHERM EXTERNAL WALL INSULATION SYSTEM, A-PLUG (THIN COAT SILICONE FINISH)

Product



- *THIS DETAIL SHEET RELATES TO THE ISPOTHERM EXTERNAL WALL INSULATION SYSTEM, A-PLUG (THIN COAT SILICONE FINISH), A SYSTEM EMPLOYING MINERAL WOOL INSULATION, WITH A GLASS-FIBRE REINFORCING MESH AND RENDER FINISHES.*
- *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 Ispotherm External Wall Insulation System, A-Plug (Thin Coat Silicone Finish) (see Figure 1) comprises:

(1) Ispo No 1 Composite mortar — a mixture of white Portland cement, quartz sand and other additives supplied as a powder to which clean water is added. The mortar is used as the adhesive and basecoat.

(2) Mineral wool insulation slabs — 1200 mm by 600 mm in a range of thicknesses between 30 mm and 200 mm, with a nominal density of 140 kgm^{-3} and a minimum cross-breaking strength of 25 kNm^{-2}. The slabs are manufactured using conventional techniques and incorporate a phenolic resin binder and a mineral oil water repellent.

(3) Mechanical fixings — polypropylene mechanical fixings, approved by the BBA and Alumasc Exterior Building Products Ltd.

(4) Ispotherm Reinforcement Mesh — a one metre wide mesh of multi-stranded glass fibres with a polymer coating and a nominal weight of 160 gm^{-2}.

(5) Ispo Primer — an acrylic resin emulsion containing fine quartz grains used as a bonding aid and pre-coat.

(6) Ispotherm Silkolit and Silkorill finishes — a silicone bonded textured plaster supplied as a paste. Silkolit is available in three grades, coarse 1.5 mm, 2.5 mm or 3.5 mm grain size. Silkorill is available in 2.0 mm and 3.0 mm grain size. It is available in a range of light colours: contact the BBA for a list of approved colours.

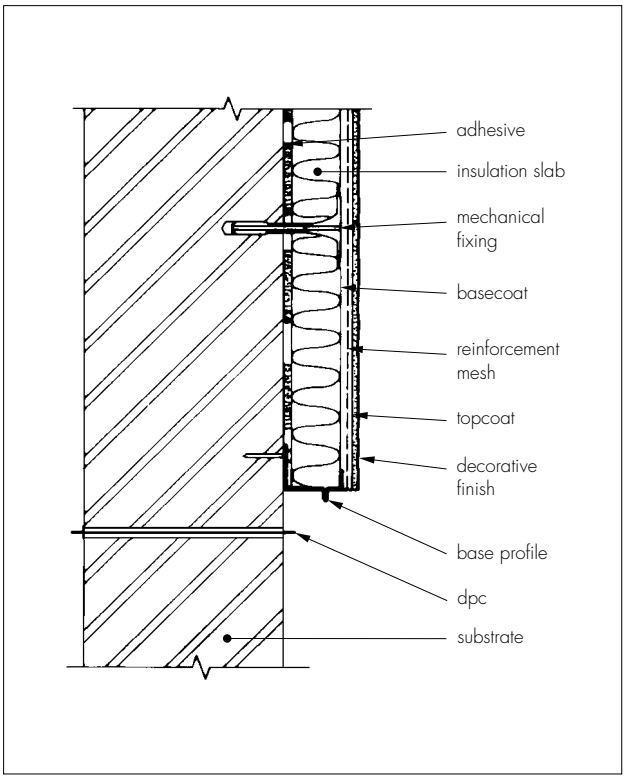
(7) Ancillary materials:

Ispotherm Base Profile — a metal trimming strip with a recessed water drip used as the base profile.

Ispotherm Edge Profile — a stainless sheet steel corner strip used as reinforcement for external corners and edges.

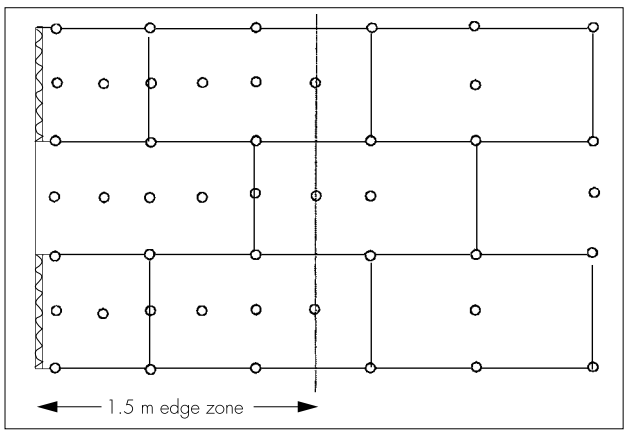
Ispotherm Sealing Tape — a self-adhesive compressed PVC-U foam tape.

Figure 1 Typical section at base level



1.2 The insulation slabs are bonded to the external surfaces of walls using the adhesive and secured with mechanical fixings (see Figure 2). The basecoat is trowel applied to the insulation to a thickness of approximately 3 mm to 5 mm and the reinforcement mesh is embedded immediately. Allowing sufficient drying time for the basecoat, Ispo Primer is applied in the same colour shade as the topcoat and allowed to dry before applying the topcoat by trowel to a thickness equivalent to the grain size. The topcoat is finished using the purpose designed Ispo plastic float.

Figure 2 Insulation boards fixing pattern



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

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 bags and quantities as listed in Table 1. Each bag carries the product identification, manufacturer's batch number and the BBA identification mark incorporating the number of this Certificate.

Table 1 Component supply details

Component	Quantity and package
Ispo No 1 Composite mortar	25 kg bag
Silkolit and Silkorill	25 kg plastic container
Ispo Primer	7.5 kg and 17.5 kg plastic container
Reinforcement mesh	1.0 metre wide 50 metre rolls
Mechanical fixings	boxed by manufacturer

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 renders must be stored in dry conditions, off the ground, and be protected from moisture.

2.5 The Ispotherm Finish and Isposil paint should be stored in a safe area, under cover, and protected from excessive heat and frost at all times.

Design Data

3 Strength and stability

3.1 The Ispotherm External Wall Insulation System, A-Plug (Thin Coat Silicone Finish) has adequate resistance to impact and abrasion where walls are exposed and have some protection, eg walls of private dwellings and walls of communal dwellings above ground-floor level. Where the system may be exposed to severe impact, eg mechanical or malicious, precautions may be required to reduce the risk of damage. Further guidance may be obtained from the Certificate holder Current BRE Comment Paper CP 6 : 81 *Assessment of External Walls — Hard Body Impact Resistance* and *BRE Good Building Guide GBG 31 Insulated External Cladding Systems*.

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-2 : 1972 or BS 6399-2 : 1997 to withstand the increased wind loads associated with tall buildings (greater than 12 m) 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

Approved Document B, Appendix A, paragraph 12

Scotland

Technical Standards, Part E, *Provisions deemed to satisfy*, E6.1, Table 2

Northern Ireland

Technical Booklet E, paragraph 2.4.

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.

5 Proximity of flues

With this system there are no provisions to be met.

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 0.036 $Wm^{-1}K^{-1}$.

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

England and Wales

Approved Document L1

Scotland

Technical Standards, Part J

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 insulation slabs have 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 on external plumbing fitments to identify leakage of rainwater into the system, enabling steps to be taken to correct the defects.

7.2 The finishes may become soiled in time, the rate depending on locality.

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 less noticeable on lighter colours.

Installation

8 Procedure

General

8.1 Application is carried out in accordance with Alumasc Exterior Building Products Ltd's current installation instructions.

8.2 The adhesive, render and coating must not be applied in rain or mist, at temperatures below 5°C or above 30°C, if exposure to frost is likely to occur during drying, or if the boards or background are already wet or frostbound.

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

8.4 Ispotherm adhesive and renders are mixed using a paddle mixer. Conventional concrete mixers are unsuitable.

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 500 mm centres.

8.6 The adhesive is prepared for use by mixing the contents of each 25 kg bag with approximately 6 litres of water using an electrically driven paddle mixer. The material is left to stand for approximately five minutes and mixed again with, if required, a small addition of water to give a smooth, workable consistency. Care should be taken not to over-mix.

8.7 The adhesive is applied to the back of the slabs by either a comb to achieve a full bond, or as dabs for an uneven background.

8.8 The insulation slabs should be pressed firmly to the substrate immediately after application of the adhesive. Any delay may result in a weak bond.

8.9 The first run of insulation is positioned on the base profile. Holes are drilled into the substrate to a minimum depth of 50 mm through the insulation at the corners of each slab and at positions which will allow a minimum of eight fixings per square metre at the edge zone and four fixings per square metre in the main wall area (see Figure 2). The mechanical fixings are inserted and tapped firmly into place, securing the insulation to the substrate. Subsequent rows of slabs are positioned so that the vertical board joints are staggered and overlapped at the building corners and so that the board joints do not occur within 200 mm of the corners of openings.

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

8.11 To fit around details such as doors and windows, insulation slabs may be cut with a sharp knife or a fine-tooth saw. If required, purpose-made window sills are fitted. They are designed to

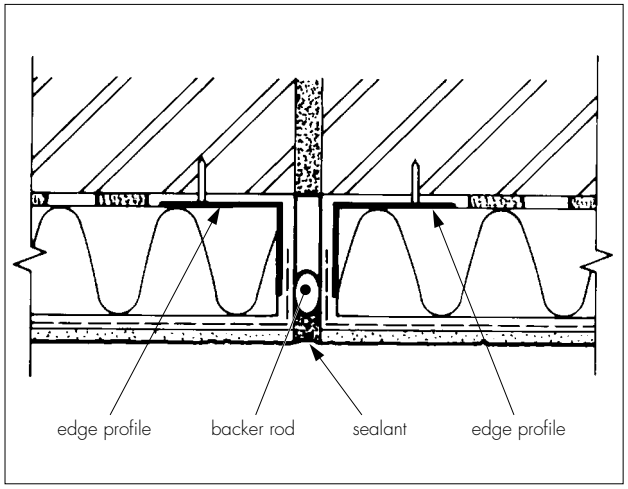
prevent water ingress and incorporate drips to shed water clear of the system.

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

Movement joints

8.13 Movement joints in the substrate must be continued through the system. The joint detail using purpose-made metal trims is illustrated in Figure 3.

Figure 3 Vertical movement joint

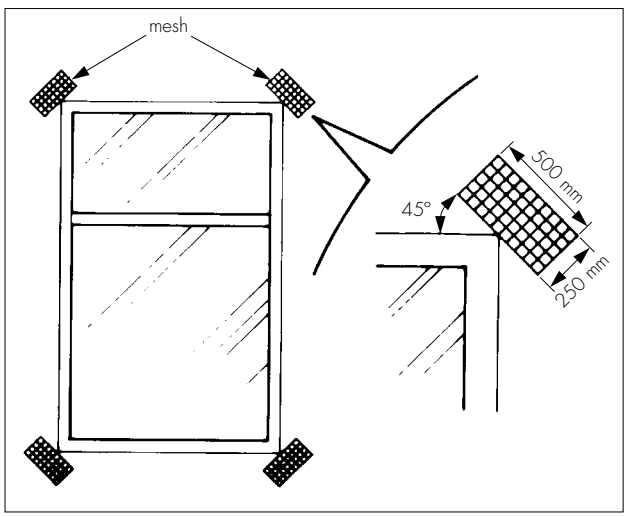


Reinforcing

8.14 The basecoat is prepared by mixing the contents of each 25 kg bag with approximately 6 litres of clean water using the same method as for the adhesive.

8.15 The basecoat render is trowel applied to the surface of the dry insulation initially to an approximate thickness of between 3 mm and 5 mm. The mesh is bedded immediately into the basecoat with 100 mm laps at joints and should be in the upper third of the basecoat render. Additional pieces of reinforcing mesh are used diagonally at the corners of openings, as shown in Figure 4.

Figure 4 Additional 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.

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

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

Rendering and finishing

8.19 The drying period of any render will depend on the applied thickness and weather conditions; however, the basecoat must be left to harden for three to five days before the Iso Primer is applied by roller or brush. The Iso Primer is allowed to dry before application of the topcoat.

8.20 The topcoat is prepared by mixing the paste in the plastic container with an electric paddle mixer. A small quantity of water may be added, if required, to achieve a workable consistence. The topcoat is trowel applied to the grain size thickness. A short time after the initial application the topcoat is re-worked with an Ispo plastic float trowel to give the surface a textured appearance.

8.21 To prevent the finish from drying too rapidly it should not be applied in direct sunlight and, continuous surfaces should be completed without a break.

8.22 The decorative finish should not be applied in wet weather, at temperatures below 5°C or when frost is expected. Freshly coated work should be protected from rain.

8.23 At the tops of walls the system should be protected by an adequate overhang or by an adequately sealed purpose-made flashing (see Figure 5).

8.24 Care should be taken in the detailing of the system around openings and projections (see Figures 6, 7, 8 and 9).

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

Figure 5 Roof eaves detail

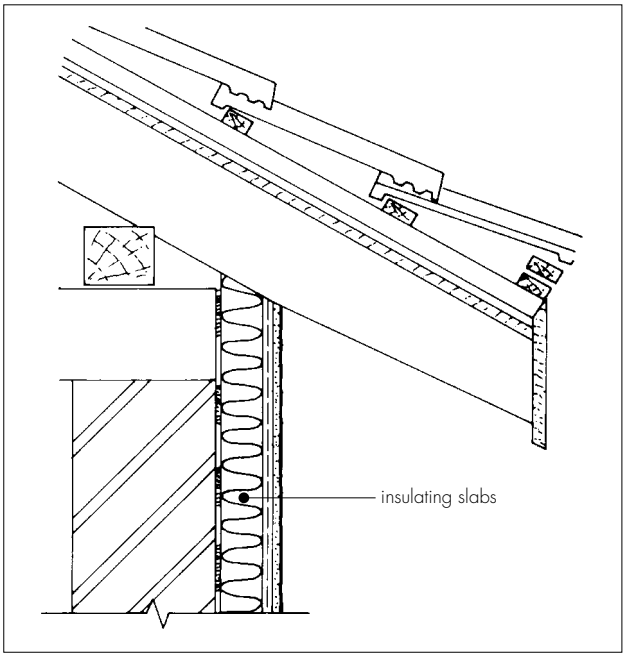


Figure 6 Insulated window detail

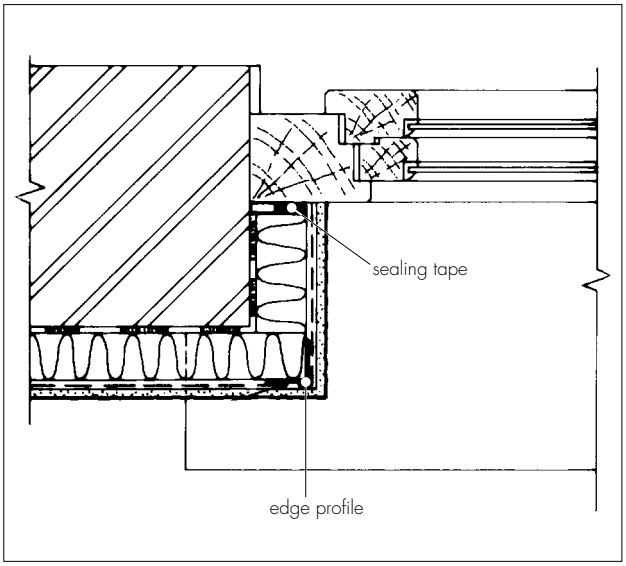


Figure 7 Uninsulated window reveal detail

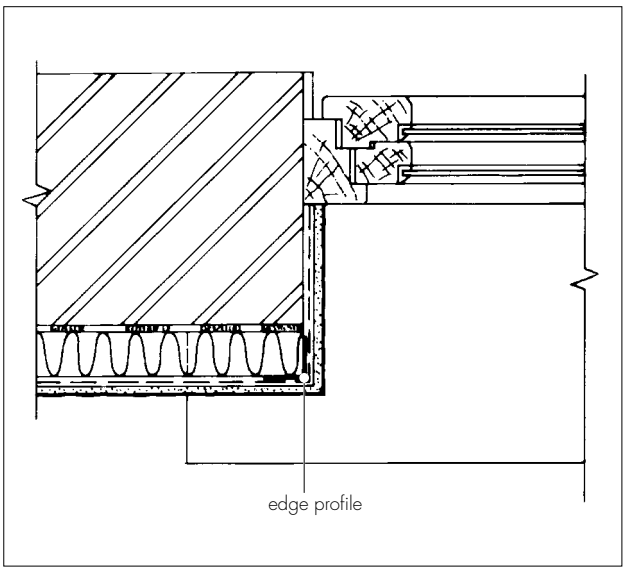


Figure 8 Window head detail

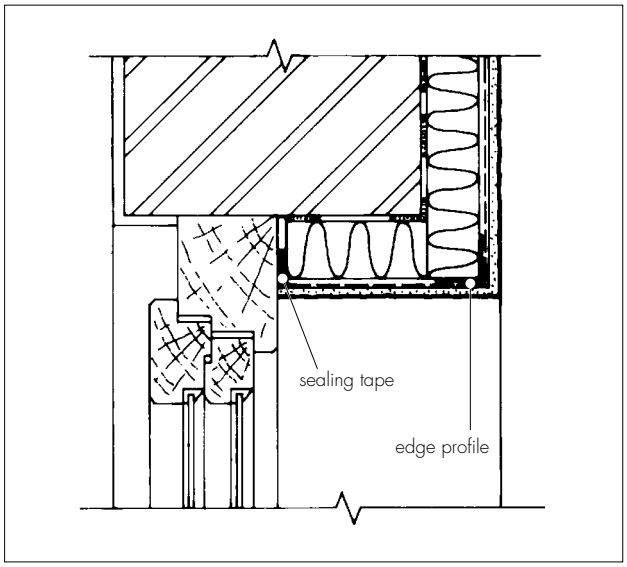
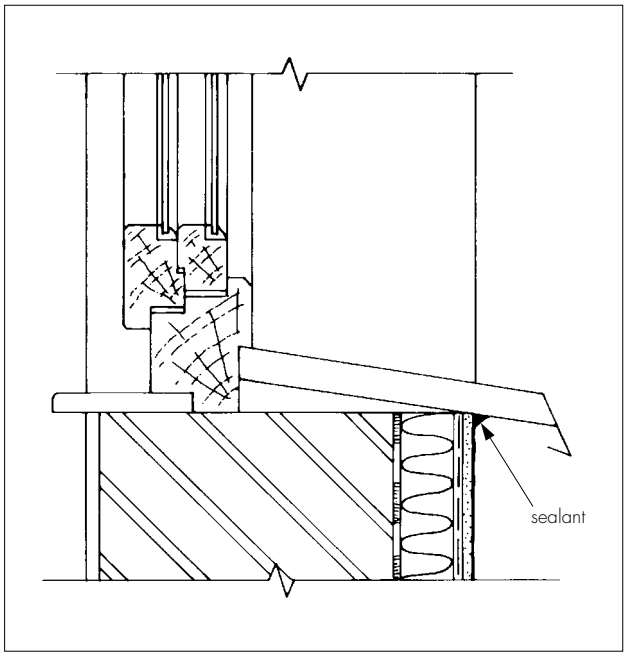


Figure 9 Window sill detail



Technical Investigations

The following is a summary of the technical investigations carried out on Ispotherm External Wall Insulation System, A-Plug (Thin Coat Silicone Finish).

9 Tests

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

component characterisation
flexural and compressive strength of renders
density of slab
heat/spray cycling
resistance to freeze/thaw
impact resistance
water absorption of render
water vapour permeability.

9.2 An examination was made of data relating to:

non-combustibility tests to BS 476-4 : 1970(1984)
fire propagation tests to BS 476-6 : 1989
surface spread of flame tests to BS 476-7 : 1987
pull-out strength of fixings
durability of finish
thermal conductivity to BS 874-2.1 : 1986.

10 Other investigations

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

10.2 An assessment of the risk of interstitial condensation was undertaken.

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

10.4 Visits were made to existing sites to assess the performance of the product in use.

Bibliography

BS 476 *Fire tests on building materials and structures*
BS 476-4 : 1970(1984) *Non-combustibility test for materials*
BS 476-6 : 1989 *Method of test for fire propagation for products*
BS 476-7 : 1987 *Method for classification of the surface spread of flame of products*

BS 874 *Methods for determining thermal insulating properties*
BS 874-2 *Tests for thermal conductivity and related properties*
BS 874-2.1 : 1986 *Guarded hot-plate method*

BS 5262 : 1991 *Code of practice for external renderings*

BS 6399 *Loading for buildings*
BS 6399-2 : 1995 *Code of practice for wind loads*

BS 8000 *Workmanship on building sites*
BS 8000-10 : 1995 *Code of practice for plastering and rendering*

CP 3 *Code of basic data for the design of buildings*
CP 3 : Chapter V *Loadings*
CP 3 : Chapter V-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)*

BBA BRITISH BOARD OF AGRÉMENT
TECHNICAL APPROVALS FOR CONSTRUCTION

On behalf of the British Board of Agrément

Date of issue: 5th March 2001

Chief Executive

Appendix — System summary — Ispotherm External Wall Insulation System, A-Plug (Thin Coat Silicone Finish)

1 System

Insulation	Mineral wool insulation slabs — 1200 mm by 600 mm in a range of thicknesses between 30 mm and 200 mm, with a nominal density of 140 kgm^{-3}.
Ispo No 1 Composite mortar	A mortar used as the adhesive and basecoat, comprising white Portland cement, quartz sand and other additives.
Mechanical fixings	Mechanical fixings approved by the BBA and Alumasc Exterior Building Products Ltd.
Ispotherm Reinforcement Mesh	A one metre wide mesh of multi-stranded glass fibres with a polymer coating and nominal weight of 160 gm^{-2}.
Ispo Primer	An emulsion containing fine quartz grains used as a bonding aid and pre-coat.
Ispotherm Silkolit and Silkorill finishes	A silicone bonded textured plaster in paste form and available in a range of light colours.
Isposil	A micro-porous silicone-based façade paint used as a decorative finish.

2 Thermal properties

Thermal conductivity of insulation slabs: 0.036 $Wm^{-1}K^{-1}$

U values: Using values given in Table A15 of Approved Document L1 (1995 edition) to the Building Regulations 2000 (England and Wales), the thermal insulation values for a typical 225 mm brick external wall (density 1700 kgm^{-3}) with 10 mm plasterboard:

Insulation thickness (mm)	U value ($Wm^{-2}K^{-1}$)
30	0.68
40	0.57
50	0.50
60	0.44
75	0.37
100	0.29

3 Impact resistance

The system is suitable for use where walls are exposed but have some protection, eg walls of private dwellings and walls of communal dwellings above ground-floor level. Where the system may be exposed to severe impact, eg mechanical or malicious damage, precautions may be required to reduce the risk of damage.

4 Properties in relation to fire

The system is not non-combustible to fire to BS 476-4 : 1970(1984).

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-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 $V_s = 44\ ms^{-1}$ and k = const = 0.613

$\therefore q = 1187\ Nm^{-2}$

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

$$F = (-1.4)\ 1187 \times 1\ N$$

$$= -1661\ N\ (suction)$$

Typical pull-out strength for Ispotherm Mechanical fixings in sound substrate is taken as 1000 N.

Using a fixing density average of eight fixings per square metre for the edge zone of the wall, the total pull-out strength for this specification is:

$$1000 \times 8\ N$$

Safety factor is:

$$1000 \times 8 \div 1661 = 4.8$$

Typical pull-out strength for Ispotherm Mechanical fixings in sound substrate is taken as 1000 N.

Using a fixing density average of four fixings per square metre for the main area of the wall, the total pull-out strength for this specification is:

$$1000 \times 4\ N$$

Safety factor is:

$$1000 \times 8 \div 1661 = 2.4$$

It should be noted that the system also incorporates an adhesive between the insulation and the substrate which will additionally increase the resistance to wind suction.

(1) BS 6399-2 : 1997 may also be used to generate design calculations.

6 Durability

Age of oldest installation seen by BBA	5 years.
Age of oldest installation	14 years.
Assessed life	At least 30 years (with normal maintenance).

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