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Agrément Certificate
No 07/4490

PRODUCT SHEET 1 — WALLREFORM II EXTERNAL WALL INSULATION SYSTEM

PRODUCT SCOPE AND SUMMARY OF CERTIFICATE

This Certificate relates to the Wallreform II External Wall Insulation System, an external wall insulation system, employing rigid urethane insulation board and Wallreform basecoat with a textured finish.

THIS CERTIFICATE INCLUDES:

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



KEY FACTORS ASSESSED

Thermal performance — the system can be used to improve the thermal performance of an external wall (see section 4).

Strength and stability — the system can be designed to resist wind loading and thermal stress conditions normally experienced in the UK (see section 5) and the impacts associated with installation in the areas outlined in section 12.

Behaviour in relation to fire — the system can be designed to meet the UK requirements concerning fire performance (see section 6).

Condensation — the performance of the system with regard to interstitial and surface condensations has been considered (see section 9).

Durability — the design life of the system under typical conditions has been considered as part of this assessment (see section 11).

The BBA has awarded this Agrément Certificate for the Wallreform II External Wall Insulation System to Walltransform Ltd as fit for its intended use provided it is installed, used and maintained as set out in this Agrément Certificate.

On behalf of the British Board of Agrément

Date of First issue: 1 November 2007

Greg Cooper: Chief Executive

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

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

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Regulations

In the opinion of the BBA, the Wallreform II External Wall Insulation System, if used in accordance with the provisions of this Certificate, will meet or contribute to meeting the relevant requirements of the following Building Regulations:



The Building Regulations 2000 (as amended) (England and Wales)

Requirement:	B4(1)	External fire spread
Comment:		The system is classified Class 0 and therefore can meet this Requirement. See sections 6.1 to 6.7 of this Certificate.
Requirement:	C2(a)(b)(c)	Resistance to moisture
Comment:		Walls insulated with the system will meet this Requirement. See sections 3.4, 8, 9.1, and 9.3 of this Certificate.
Requirement:	L1(a)(i)	Conservation of fuel and power
Comment:		The system can contribute to enabling a wall to meet the Target Emission Rate. See sections 4.2 to 4.5 of this Certificate.
Requirement:	Regulation 7	Materials and workmanship
Comment:		The system is acceptable. See section 11.1 of this Certificate.



The Building (Scotland) Regulations 2004 (as amended)

Regulation:	8	Fitness and durability of materials and workmanship
Regulation:	8(1)	Fitness and durability of materials and workmanship
Comment:		The system can contribute to a construction meeting this Regulation. See section 11.1 of this Certificate.
Regulation:	9	Building standards — construction
Standard:	2.4	Cavities
Comment:		Cavities within the system must comply with this Standard, with reference to clauses 2.4.1 ⁽¹⁾⁽²⁾ , 2.4.2 ⁽¹⁾⁽²⁾ , 2.4.7 ⁽¹⁾ and 2.4.9 ⁽²⁾ . See sections 6.1 to 6.6 of this Certificate.
Standard:	2.6	Spread to neighbouring buildings
Comment:		The system has a 'low risk' surface classification. The system incorporates materials which would not be classed as 'non-combustible'. Completed walls, therefore, would be regarded as unprotected areas as defined in this Standard, with reference to clauses 2.6.1 ⁽¹⁾⁽²⁾ , 2.6.2 ⁽¹⁾⁽²⁾ , 2.6.4 ⁽¹⁾⁽²⁾ , 2.6.5 ⁽¹⁾ and 2.6.6 ⁽²⁾ . See sections 6.1 to 6.6 of this Certificate.
Standard:	2.7	Spread on external walls
Comment:		The system incorporates materials which would not be classed as 'non-combustible' as defined in this Standard, with reference to clauses 2.7.1 ⁽¹⁾⁽²⁾ and 2.7.2 ⁽²⁾ and, therefore, should not be used on walls one metre or less from a boundary. See sections 6.1 to 6.7 of this Certificate.
Standard:	3.10	Precipitation
Comment:		Walls insulated with the system will contribute to a construction satisfying this Standard, with reference to clause 3.10.1 ⁽¹⁾⁽²⁾ . See sections 3.4, 3.6 and 8 of this Certificate.
Standard:	3.15	Condensation
Comment:		Walls insulated with the system will satisfy the requirements of this Standard, with reference to clauses 3.15.1 ⁽¹⁾ , 3.15.4 ⁽¹⁾ and 3.15.5 ⁽¹⁾ . See sections 9.2 and 9.3 of this Certificate.
Standard:	6.1(a)(b)	Carbon dioxide emissions
Standard:	6.2	Buildings insulation envelope
Comment:		The system can contribute to satisfying these Standards, with reference to clauses (or parts of) 6.1.1 ⁽¹⁾ , 6.1.2 ⁽¹⁾⁽²⁾ , 6.1.3 ⁽²⁾ , 6.1.5 ⁽²⁾ , 6.1.6 ⁽¹⁾ , 6.2.1 ⁽¹⁾ , 6.2.3 ⁽¹⁾ , 6.2.4 ⁽¹⁾ , 6.2.5 ⁽¹⁾⁽²⁾ and 6.2.10 ⁽²⁾ . See sections 4.2 to 4.5 of this Certificate. (1) Technical Handbook (Domestic). (2) Technical Handbook (Non-Domestic).



The Building Regulations (Northern Ireland) 2000 (as amended)

Regulation:	B2	Fitness of materials and workmanship
Comment:		The system is acceptable. See section 11.1 of this Certificate.
Regulation:	C4	Resistance to ground moisture and weather
Comment:		Walls insulated with the system will satisfy this Regulation. See sections 3.4, 3.6 and 8 of this Certificate.
Regulation:	C5	Condensation
Comment:		Walls insulated with the system will satisfy the requirements of this Regulation. See section 9.3 of this Certificate.
Regulation:	E5	External fire spread
Comment:		The system has a Class 0 surface and can satisfy this Regulation. See sections 6.1 to 6.7 of this Certificate.
Regulation:	F2(a)(i)	Conservation measures
Comment:		The system will enable a wall to meet the requirements of this Regulation. See sections 4.2 to 4.5 of this Certificate.

Information in this Certificate may assist the client, CDM co-ordinator, designer and contractors to address their obligations under these Regulations.

See section: 2 Delivery and site storage (2.2).

Non-regulatory Information

NHBC Standards 2007

NHBC accepts the use of the Wallreform II External Wall Insulation System, when installed and used in accordance with this Certificate, in relation to NHBC Standards, Chapter 6.9 *Curtain walling and cladding*.

Zurich Building Guarantee Technical Manual 2007

In the opinion of the BBA, the Wallreform II External Wall Insulation System, when installed and used in accordance with this Certificate, satisfies the requirements of the *Zurich Building Guarantee Technical Manual*, Section 4 *Superstructure*, Sub-section *External walls – render, curtain walling/cladding*.

General

This Certificate relates to the Wallreform II External Wall Insulation System which comprises insulation board with basecoat and decorative finishes.

The system is applied to the outside of external walls of masonry, dense or no-fines concrete construction and is suitable for use on new or existing buildings.

Technical Specification

1 Description

The Wallreform II External Wall Insulation System comprises:

- Kingspan EWB insulation 1200 mm by 600 mm in a range of thicknesses between 20 mm and 100 mm, with a nominal density of 50 kgm⁻³ and a minimum compressive strength of 150 kPa. Boards are manufactured to comply with the requirements of BS EN 13166 : 2001. Thinner insulation boards should be considered for use around window or door reveals in order to minimise the effect of thermal movement causing cracks and to minimise the effects of thermal bridging
- Wallreform adhesive and 50 mm wide scrim tape to cover joints and provide an acceptable surface for the basecoat, EVA basecoat primer to ensure adhesion
- Wallreform basecoat, Agrément Certificate No 02/3951 – an insulating render consisting of cement, expanded polystyrene beads and other additives
- High Build masonry coating or plastic rendering covered by an Agrément Certificate
- ancillary materials:
 - a range of standard profiles for such details as wall base, end stop and corner mesh produced from polymeric material and approved by the Certificate holder
 - nailable fixings for profile fixing – Tapcon self-tapping anchors, size ref 3F57
 - Spit Iso fixings of required length to ETA-04/0076
 - sealant – as approved by the Certificate holder.

2 Delivery and site storage

2.1 The insulation is delivered to site shrink-wrapped in polythene packs which carry the manufacturer's and product identification marks and batch numbers.

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

Table 1 Component supply details

Component	Quantity and package
Wallreform basecoat	12.24 kg bag
EVA primer	5 litre
Wallreform adhesive	15 kg plastic pail
Tapcon nailable fixings	boxed by manufacturer
Spit Iso fixings	boxed by manufacturer
Base, stop, corner, horizontal drip and movement beads	2.5 or 3 m lengths

2.3 The insulation boards should be stored on a firm, clean, level base, off the ground and must be protected from prolonged exposure to sunlight either by storing opened packs under cover in dry conditions or re-covering with opaque polythene sheeting.

2.4 Care must be taken when handling the insulation boards to avoid both damage and contact with solvents or bitumen products. The boards must not be exposed to open flame or other ignition sources.

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

2.6 The primer and texture synthetic coatings should be stored in a safe area, under cover, and be protected from excessive heat and frost at all times.

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on the Wallreform II External Wall Insulation System.


Design Considerations

3 General

3.1 The Wallreform II External Wall Insulation System, when installed in accordance with this Certificate, is 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.


3.2 The system will improve the weather resistance of a wall and provide a decorative finish. However, it may be installed only where other routes for moisture penetration have been dealt with separately and where there are no signs of dampness on the inner surface of the wall, other than those caused solely by condensation. The system can be used to overcome condensation associated with the internal wall surface.

3.3 Existing buildings subject to national Building Regulations should have wall surfaces in accordance with the *Site survey and preliminary work* section of this Certificate.

 3.4 New buildings subject to national Building Regulations should be constructed in accordance with the relevant recommendations of:

- BS 5628-3 : 2005. In particular Clause 5.5.2 *Rain penetration*, 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
- BS 8000-3 : 2001.

3.5 Other new buildings, not subject to any of the previous requirements, should also be built in accordance with BS 5628-3 : 2005.

 3.6 When using the system, consideration must be given to the overall design to minimise the risk of condensation and the recommendations of BS 5250 : 2002 should be followed.


4 Thermal performance

4.1 Calculations of the thermal transmittance (U value) of a specific wall construction should be carried out in accordance with BS EN ISO 6946 : 1997 and BRE report (BR 443 : 2006) *Conventions for U-value calculations*, using the declared insulation thermal conductivity⁽¹⁾ ($\lambda_{90/90}$ value) of 0.024 Wm⁻¹K⁻¹ and a Wallreform thermal conductivity of 0.055 Wm⁻¹K⁻¹. The U value of a typical wall construction will depend on the insulating value of the wall and its finish. Example U values are given in Table 2.

(1) Not assessed by the BBA.

Table 2 Example U values for Wallreform systems

Thickness of insulation (mm)	U value (Wm ⁻² K ⁻¹)
20	0.60
40	0.40
60	0.29
80	0.23
100	0.19

 4.2 Subject to the selection of an appropriate insulation thickness and construction, the system can contribute to a wall construction achieving the following design U values:

England and Wales and Northern Ireland

- 0.30 Wm⁻²K⁻¹ standard for new thermal elements such as those constructed as part of an extension specified in Approved Documents; L1B (Table 4), L2B (Table 6)
- 0.35 Wm⁻²K⁻¹ thermal elements constructed as replacements for existing elements as specified in Approved Documents; L1B (Table 4), L2B (Table 6)
- 0.35 Wm⁻²K⁻¹ required for 'notional' dwellings in SAP 2005 and buildings other than dwellings in SBEM
- 0.35 Wm⁻²K⁻¹ limit average specified in Approved Documents; L1A (Table 2), L2A (Table 4), Technical Booklets F1 (Table 2.2) and F2 (Table 2.4)
- 0.70 Wm⁻²K⁻¹ limit for an individual element specified in Approved Document L1A (Table 2), L2A (Table 4), Technical Booklets F1 (Table 2.2) and F2 (Table 2.4).

Scotland

- 0.20 Wm⁻²K⁻¹ required for the 'simplified approach — solid fuel package 6' 'notional' dwelling in Mandatory Standard 6.1, clause 6.1.6⁽¹⁾
- 0.25 Wm⁻²K⁻¹ required for 'notional' dwellings in SAP 2005 (for Scotland) and the 'simplified approach — packages 1 to 5' in Mandatory Standard 6.1, clause 6.1.6⁽¹⁾
- 0.27 Wm⁻²K⁻¹ maximum U value for building elements of the insulation envelope for extensions or reconstruction of elements, in Mandatory Standard 6.2, clauses 6.2.9⁽¹⁾, 6.2.11⁽¹⁾, 6.2.10⁽²⁾ and 6.2.12⁽²⁾
- 0.30 Wm⁻²K⁻¹ limit average specified in Mandatory Standard 6.2, clause 6.2.1⁽¹⁾⁽²⁾
- 0.70 Wm⁻²K⁻¹ limit for an individual element specified in Mandatory Standard 6.2, clauses 6.2.1⁽¹⁾⁽²⁾, 6.2.9⁽¹⁾ and 6.2.10⁽²⁾.

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).

4.3 Walls with U values lower than (or the same as, in Scotland) the relevant 'notional' value specified in section 4.2, will contribute to a dwelling meeting its target of an overall reduction in carbon dioxide emissions of about 20% (or 18% to 25% in Scotland). Walls with higher U values will require additional energy saving measures in the building envelope and/or services.

4.4 The junction details shown in sections 14.18, 14.22 and 14.23 will allow the use of the default psi values from Table 3 of BRE Information Paper IP 1/06 *Assessing the effects of thermal bridging at junctions and around openings* and Table K1 of *The Government's Standard Assessment Procedure for Energy Rating of Dwellings* (SAP 2005), in Target Emission Rate calculations to SAP 2005 or the Simplified Building Energy Model (SBEM) (use 'simplified approach' for Scotland).

4.5 The system can maintain, or contribute to maintaining, continuity of thermal insulation at junctions between external wall and other building elements. Guidance in this respect and on limiting heat loss by air infiltration, can be found in:

England and Wales — *Limiting thermal bridging and air leakage : Robust construction details for dwellings and similar buildings* TSO 2002

Scotland — Accredited Construction Details (Scotland)

Northern Ireland — Accredited Construction Details (version 1.0).

5 Strength and stability

5.1 The system 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 mechanical or malicious impact, eg walls of public buildings at ground-floor level, precautions such as supplementary reinforcement, may be required to reduce the risk of damage. Guidance may be obtained from the Certificate holder or BS 8200 : 1985.

5.2 Assessment of structural performance should be carried out by a suitably qualified engineer or other appropriately qualified person.

5.3 The supporting wall should be designed and constructed to resist all dead, imposed and wind loads on its own in accordance with the relevant national Codes and Standards. Any contribution from the insulation system in this regard must be ignored.

5.4 Design of the insulation system will require consideration of both the panel and the fixings. For panel flexure, a simplified and conservative 'beam' approach, based on the most highly loaded span between two fixings, may be adopted. Alternatively, Finite Element Analysis methods may be used.

5.5 The maximum load due to wind suction on the most highly loaded fixing should be determined. This load should not exceed the lesser of:

- the allowable pull-through value, taken to be 200 N, or
- the allowable pull-out value obtained by applying a minimum safety factor of 3.0 on the mean of at least five site-determined, ultimate pull-out values.

5.6 The fixing-to-panel-edge distance should not be less than 100 mm.

5.7 Wind loads should be calculated in accordance with BS 6399-2 : 1997, BS 8200 : 1985 and BS EN 1991-1-4 : 2005.

6 Behaviour in relation to fire



6.1 The external surfaces of the system are classified as Class 0 or 'low risk' as defined in the documents supporting the national Building Regulations. The system, therefore, may be used in accordance with the provisions of:

England and Wales — Approved Document B, paragraph 8.4, Volume 1 and paragraphs 12.5 and 12.6, Volume 2 (see also Diagram 40)

Scotland — Mandatory Standards 2.6 and 2.7, clauses 2.6.1⁽¹⁾⁽²⁾ to 2.6.6⁽¹⁾⁽²⁾, 2.6.7⁽²⁾, 2.7.1⁽¹⁾⁽²⁾ and 2.7.2⁽²⁾ respectively and Annexes 2.C⁽¹⁾ and 2.E⁽²⁾

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).

Northern Ireland — Technical Booklet E, paragraph 4.3 (see also Diagram 4.1).

6.2 To limit the risk of fire spread between floors in buildings subject to the Building Regulations in England and Wales, Scotland and Northern Ireland, fire barriers should be installed at each floor level above the first-floor level (ie starting with the second storey) as detailed in BRE report (BR 135) : 2003 *Fire Performance of External Insulation for Walls of Multi-storey Buildings*.

6.3 In buildings not subject to the Building Regulations, it is recommended that designers should consider the use of the guidance given in section 6.2.

6.4 The documents listed in section 6.1 give full details of permissible heights and boundary conditions of domestic and non-domestic buildings and the relevant guidance with regard to external wall claddings of external wall insulation systems with render surfaces. However, the following information is for guidance purposes:

England and Wales

- for buildings one metre or more from a boundary, the system is acceptable
- for buildings less than one metre from a boundary, the system is acceptable provided the wall meets the fire resistance requirements in Tables A1 and A2, from both sides
- the system is acceptable, subject to the aforementioned conditions, for use on a building which has a floor up to and over 18 m above the ground level.

Scotland — Domestic and Non-Domestic use

- for buildings more than one metre from a boundary and up to 18 m above ground level, the system is acceptable. The system is not classified as 'non-combustible', therefore, calculations for unprotected areas apply⁽¹⁾.

(1) Combustible cladding need not be included in the calculation for unprotected area where:

- the combustible cladding is attached to the structure of the building and the external wall contains no openings other than the small openings described in Mandatory Standard 2.6, clause 2.6.2b; and the wall behind the cladding has the appropriate fire-resistance duration from the inside
- Mandatory Standard 2.6, clause 2.6.2b describes an area of not more than 0.1 m², which are at least 1.5 m from any other unprotected area in the same wall.

Northern Ireland

- for buildings one metre or more from a boundary, the system is acceptable
- for buildings less than one metre from a boundary, the system is acceptable provided the wall meets the fire resistance requirements in Tables 3.1 and 3.2, from both sides
- the system is acceptable, subject to the aforementioned conditions, for use on a building which has a storey, the floor of which is up to 18 m above the ground level. For a building which has a storey the floor of which is 18 m or more above the ground level, there is an additional condition that the insulation component must be a material of limited combustibility.

6.5 Any incidental cavities present within the system, such as those formed between the external wall insulation system and the substrate must have appropriate fire barrier in accordance with the relevant clauses or section of:

England and Wales — Approved Document B, Volume 1, Section 6 and Volume 2, Section 9

Scotland — Mandatory Standards 2.4, 2.6 and 2.7, clauses 2.4.1⁽¹⁾⁽²⁾, 2.4.2⁽¹⁾⁽²⁾, 2.4.7⁽¹⁾, 2.4.9⁽²⁾, 2.6.1⁽¹⁾⁽²⁾ to 2.6.6⁽¹⁾⁽²⁾, 2.6.7⁽²⁾, 2.7.1⁽¹⁾⁽²⁾ and 2.7.2⁽²⁾ respectively and Annex 2.A⁽¹⁾

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).

Northern Ireland — Technical Booklet E, Section 3, paragraphs 3.35 to 3.39 and Section 4.

6.6 The classifications stated in section 6.1 were achieved on light-coloured render. However, the classification of darker colours should be confirmed by:

England and Wales — Test or assessment in accordance with Approved Document B, Appendix A, Clause 1

Scotland — Test to conform with Table to Annex 2.C⁽¹⁾ and 2.E⁽²⁾ of Regulation 9

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).

Northern Ireland — Test or assessment by a UKAS accredited laboratory or an independent consultant with appropriate experience.

6.7 High build coatings or plastic renderings covered by Agrément Certification and themselves having the required rating, should be selected to maintain the ratings stated in section 6.1.

7 Proximity of flues and appliances

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 — Mandatory Standard 3.19, clause 3.19.4⁽¹⁾⁽²⁾

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).

Northern Ireland — Technical Booklet L.

8 Moisture penetration



Tests and site examinations show that the system will resist the passage of moisture.

9 Condensation

Surface condensation



9.1 Walls will limit the risk of surface condensation adequately when the thermal transmittance (U value) does not exceed $0.7 \text{ Wm}^{-2}\text{K}^{-1}$ at any point and the junctions with other elements are designed in accordance with the relevant requirements of the publications referred to in section 4.



9.2 Walls and ceilings will adequately limit the risk of surface condensation when the thermal transmittance (U value) does not exceed $1.2 \text{ Wm}^{-2}\text{K}^{-1}$ at any point. Guidance may be obtained from Section 8 of BS 5250 : 2002 and BRE report (BR 262 : 2002) *Thermal insulation: avoiding risks*.

Interstitial condensation



9.3 Walls incorporating the systems will adequately limit the risk of interstitial condensation when they are designed and constructed in accordance with BS 5250 : 2002 (Section 8 and Annex D).

10 Maintenance

10.1 Regular checks should be made on the installed system, particularly at joints and on external plumbing fittings, to ensure that ingress of water does not occur. Necessary repairs should be effected immediately.

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

11 Durability



11.1 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.

11.2 The textured finishes may also become soiled in time, the rate depending on locality. The appearance may be restored by a suitable powerwash or, if required, by the application of a compatible paint; however, great care should be taken not to adversely affect the water vapour transmission or fire characteristics of the system. The advice of the Certificate holder should be sought.

Installation

12 Site survey and preliminary work

12.1 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 the Wallreform II External Wall Insulation System. A specification is prepared for each elevation of the building indicating:

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

12.2 The survey should include tests conducted on the walls of the building by the Certificate holder or their approved applicators to determine the pull-out resistance of the proposed mechanical fixings for the appropriate substrate.

12.3 For no-fines concrete substrates, mechanical fixings are always required. Where it is specified that mechanical fixings are used to secure the systems, trial tests are conducted on the wall 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. At least one fixing per insulation board should be of a non-combustible type to resist the increased duty that may be required in a fire.

12.4 All modifications, such as provision for cavity barriers and fire stopping (see section 6) and necessary repairs to the building are completed before installation commences.

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

12.6 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 or 20 mm in 1 metre, must be made good prior to installation to ensure that the insulation boards are installed with a smooth, in-plane finished surface.

12.7 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.

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

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

12.10 New buildings should be of sound masonry, dense or no-fines concrete construction.

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

13 Approved installers

13.1 The Certificate holder operates an Approved Installer Scheme for the system, under which installers are trained, approved and regularly reviewed by the Certificate holder, to demonstrate that they are competent to carry out installation of the system in accordance with this Certificate. Details of approved installers are available from the Certificate holder.

13.2 The Certificate holder's records relating to the ongoing maintenance of their Approved Installer Scheme are audited by the BBA as part of its regular programme of surveillance.

14 Procedure

General

14.1 Application is carried out in accordance with the current installation instructions of the Certificate holder.

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

14.3 All rendering should be in accordance with the relevant recommendations of BS EN 13914-1 : 2005.

Positioning and securing insulation boards

14.4 The base profile is secured to the external wall above the damp-proof course using approved profile fixings at 400 mm maximum centres.

14.5 The first run of insulation boards is positioned on the base profile. The boards are pressed firmly against the wall.

14.6 Holes are drilled into the substrate through the insulation board and mechanical fixings are inserted and tapped firmly home to secure the boards at the specified minimum rate of eight fixings per board.

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

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

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

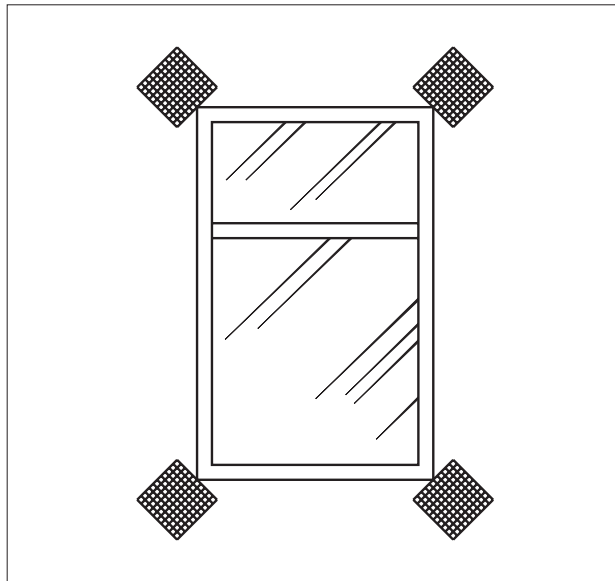
Movement joints

14.10 Movement joints have not been assessed as part of this system and advice should be sought from the Certificate holder as to how existing movement joints within the substrate may be accommodated as part of the system.

Reinforcing

14.11 The joints of the insulation are covered with reinforcing scrim tape and Wallreform No Nails adhesive. Additional pieces of reinforcing mesh are used diagonally at the corners of openings, as shown in Figure 1.

Figure 1 Additional reinforcement at openings



14.12 Care should be taken at window reveals if insulation has been omitted from the reveal due to space limitations as movement may cause cracks at changes of material. EVA primer is applied evenly to the insulation surface to enable a secure bond of insulation to basecoat. Additional reinforcing mesh should be used at window reveals.

14.13 The Wallreform is prepared and trowel applied to the insulation to an appropriate thickness of approximately 15 mm thick.

14.14 Care should be taken with the Wallreform basecoat under details such as window sills. The surface of the basecoat should be allowed to cure for between 12 and 24 hours before surface irregularities are smoothed out using a rasping tool (40 grit paper attached to plastering trowel).

Beads

14.15 Expansion beads should be fixed in accordance with the Certificate holder's advice.

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

14.17 Where required, angle beads are fixed to all building corners and to door and window heads and jambs.

Render finishing

14.18 The Wallreform basecoat must be left to cure for at least 24 hours depending on weather conditions before application of the finish.

14.19 Prior to the render coat, a bead of clear silicone sealant 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.

14.20 The finish coating should be trowel- or roller-applied to give the appropriate texture effect.

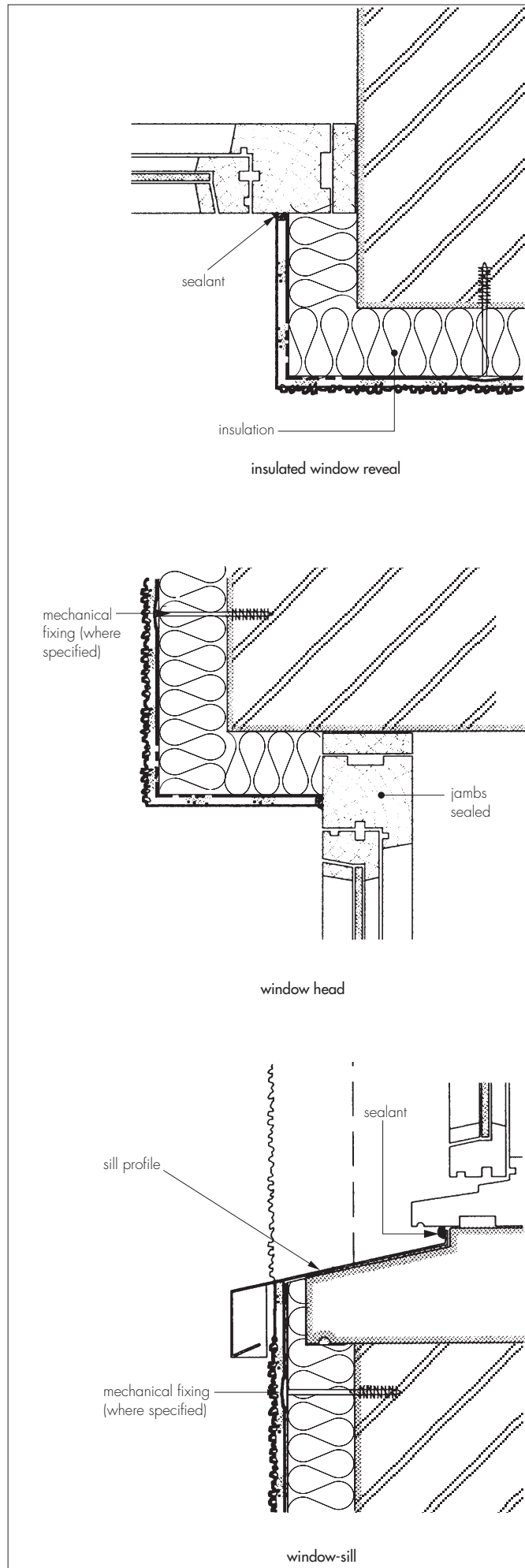
14.21 To prevent the finish from drying too rapidly, it should not be applied in direct sunlight. The finished render surface should be protected from rain and frost until the material is dry and hard, approximately 24 hours in favourable conditions, although in winter, this may take at least 48 hours. Continuous surfaces must be completed without a break.

14.22 At the tops of walls the system must be protected by an adequate overhang or by an adequately sealed, purpose-made flashing.

14.23 Care must be taken in the detailing of the system around openings and projections (see Figure 2).

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

Figure 2 Window details



15 Tests

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

- component characterisation
- resistance to freeze/thaw
- heat/spray cycling
- impact resistance
- pull-out strength of fixings

15.2 An examination was made of data relating to:

- water vapour permeability
- water permeability
- fire propagation tests to BS 476-6 : 1989
- surface spread of flame tests to BS 476-7 : 1997
- durability of finish coatings.

16 Investigations

16.1 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.

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

Bibliography

- BS 476-6 : 1989 *Fire tests on building materials and structures — Method of test for fire propagation for products*
- BS 476-7 : 1997 *Fire tests on building materials and structures — Method of test to determine the classification of the surface spread of flame of products*
- BS 5250 : 2002 *Code of practice for control of condensation in buildings*
- BS 5628-3 : 2005 *Code of practice for the use of masonry — Materials and components, design and workmanship*
- BS 6399-2 : 1997 *Loading for buildings — Code of practice for wind loads*
- BS 8000-3 : 2001 *Workmanship on building sites — Code of practice for masonry*
- BS 8200 : 1985 *Code of practice for design of non-loadbearing external vertical enclosures of buildings*
- BS EN 1991-1-4 : 2005 *Eurocode 1 : Actions on structures — General actions — Wind actions*
- BS EN 13166 : 2001 *Thermal insulation products for buildings — Factory made products of phenolic foam (PF) — Specification*
- BS EN 13914-1 : 2005 *Design, preparation and application of external rendering and internal plastering — External rendering*
- BS EN ISO 6946 : 1997 *Building components and building elements — Thermal resistance and thermal transmittance — Calculation method*
- MOAT No 22 : 1988 *UEAtc Directives for the Assessment of External Insulation Systems for Walls (Expanded Polystyrene Insulation Faced with a Thin Rendering)*

17 Conditions

17.1 This Certificate:

- relates only to the product/system that is named and described on the front page
- is granted only to the company, firm or person named on the front page — no other company, firm or person may hold or claim any entitlement to this Certificate
- is valid only within the UK
- has to be read, considered and used as a whole document — it may be misleading and will be incomplete to be selective
- is copyright of the BBA
- is subject to English law.

17.2 References in this Certificate to any Act of Parliament, Statutory Instrument, Directive or Regulation of the European Union, British, European or International Standard, Code of Practice, manufacturers' instructions or similar publication, are references to such publication in the form in which it was current at the date of this Certificate.

17.3 This Certificate will remain valid for an unlimited period provided that the product/system and the manufacture and/or fabrication including all related and relevant processes thereof:

- are maintained at or above the levels which have been assessed and found to be satisfactory by the BBA
- continue to be checked as and when deemed appropriate by the BBA under arrangements that it will determine
- are reviewed by the BBA as and when it considers appropriate.

17.4 In granting this Certificate, the BBA is not responsible for:

- the presence or absence of any patent, intellectual property or similar rights subsisting in the product/system or any other product/system
- the right of the Certificate holder to manufacture, supply, install, maintain or market the product/system
- individual installations of the product/system, including the nature, design, methods and workmanship of or related to the installation
- the actual works in which the product/system is installed, used and maintained, including the nature, design, methods and workmanship of such works.

17.5 Any information relating to the manufacture, supply, installation, use and maintenance of this product/system which is contained or referred to in this Certificate is the minimum required to be met when the product/system is manufactured, supplied, installed, used and maintained. It does 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; nor is conformity with such information to be taken as satisfying the requirements of the 1974 Act or of any statutory, common law or other duty of care. 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 manufacture, supply, installation, use and maintenance of this product/system.