CI/SfB
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BBA BRITISH BOARD OF AGRÉMENT
TECHNICAL APPROVALS FOR CONSTRUCTION

Designated by Government to issue European Technical Approvals

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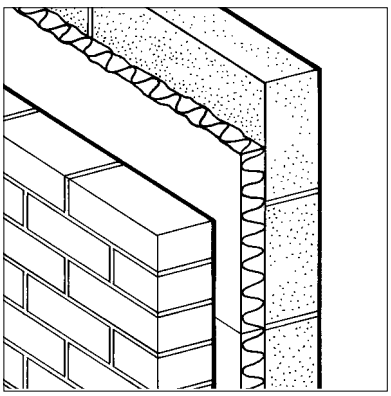
Agrément Certificate No 94/2992
*Fourth issue**

KINGSPAN THERMAWALL TW50 ZERO ODP

Isolant en polyurethanne pour murs creux
Kerndämmung

Product

- *THIS CERTIFICATE RELATES TO KINGSPAN THERMAWALL TW50 ZERO ODP, A FOIL-FACED RIGID URETHANE FOAM BOARD FOR CAVITY WALL INSULATION.*
- *The product is for use in buildings up to and including 25 metres in height, subject to the conditions contained in the* Design Data *part of this Certificate.*
- *The product is installed during construction and is for use as a partial fill board to reduce the thermal transmittance of cavity walls with masonry inner and outer leaves.*
- *It is essential that the walls are built in accordance with the conditions set out in the* Design Data *and* Installation *parts of this Certificate.*
- *In the Republic of Ireland and Northern Ireland the product is marketed under the name Shelterwall B-9.*



Regulations

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

The Secretary of State has agreed with the British Board of Agrément the aspects of performance to be used by the BBA in assessing the compliance of cavity wall insulation with the Building Regulations. In the opinion of the BBA, Kingspan Thermawall TW50 Zero ODP, if used in accordance with the provisions of this Certificate, will meet or contribute to meeting the relevant requirements.

Requirement:	B3(4)	Internal fire spread (structure)
Comment:		Walls incorporating the product can meet this Requirement. See sections 8.2 to 8.4 of this Certificate.
Requirement:	C2(a)(b)	Resistance to moisture
Comment:		Walls incorporating the product can meet this Requirement. See sections 7.2 and 10.2 of this Certificate. In addition the product may be used in situations where it bridges the dpc. See section 10.1 of this Certificate.
Requirement:	L1(a)(i)	Dwellings
Requirement:	L2(a)	Buildings other than dwellings
Comment:		The product can meet this Requirement. See sections 12.2 to 12.4 of this Certificate.
Requirement:	Regulation 7	Materials and workmanship
Comment:		The product is acceptable. See section 13 of this Certificate.

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

In the opinion of the BBA, Kingspan Thermawall TW50 Zero ODP, 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 and workmanship
Standard:	B2.1	Selection and use of materials, fittings, and components, and workmanship
Comment:		The product can contribute to a construction meeting this Standard. See the *Installation* part of this Certificate.
Standard:	B2.2	Selection and use of materials, fittings, and components, and workmanship
Comment:		The product is an acceptable material. See section 13 of this Certificate.
Regulation:	12	Structural fire precautions
Standards:	D6.1 and D6.2	Concealed spaces — Principles
Comment:		Walls incorporating the product can satisfy these Standards. See section 8.4 of this Certificate.
Standard:	D8.2	Fire spread to adjoining buildings — Non-combustible materials
Comment:		The product is combustible but its use is unrestricted by this Standard. See section 8.5 of this Certificate.
Regulation:	17	Resistance to moisture
Standard:	G2.6	Preparation of a site and resistance to moisture from the ground — Resistance to moisture from the ground
Comment:		The product can satisfy this Standard. See section 10.1 of this Certificate.
Standard:	G3.1	Resistance to precipitation — Resistance to precipitation
Comment:		Walls incorporating the product can satisfy this Standard. See sections 7.2 and 10.2 of this Certificate.

Regulation:	22	Conservation of fuel and power
Standard:	J3.1	Buildings in purpose group 1 — Building fabric
Standard:	J8.1	Buildings in purpose groups 2 to 7
Comment:		The product can satisfy these Standards. See sections 12.2 and 12.3 of this Certificate.
Standard:	J4.1	Buildings in purpose group 1 — Limiting thermal bridging at junctions and around openings
Standard:	J9.1	Buildings in purpose groups 2 to 7 — Limiting thermal bridging at junctions and around openings
Comment:		The product can satisfy these Standards. See section 12.4 of this Certificate.

3 The Building Regulations (Northern Ireland) 2000

In the opinion of the BBA, Kingspan Thermawall TW50 Zero ODP, 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 product is acceptable. See section 13 of this Certificate.
Regulation:	C4	Resistance to ground moisture and weather
Comment:		Walls incorporating the product can satisfy this Regulation. See sections 7.2 and 10.2 of this Certificate. In addition the product may be used where it bridges the dpc. See section 10.1 of this Certificate.
Regulation:	E4	Internal fire spread — Structure
Comment:		Walls incorporating the product can satisfy this Regulation. See sections 8.2 to 8.4 of this Certificate.
Regulation:	F2	Building fabric
Comment:		The product can satisfy this Regulation. See section 12.4 of this Certificate.

4 Construction (Design and Management) Regulations 1994 (as amended) Construction (Design and Management) Regulations (Northern Ireland) 1995 (as amended)

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

See section: 6 *Delivery and site handling* (6.5).

Technical Specification

5 Description

5.1 Kingspan Thermawall TW50 Zero ODP is a rigid urethane foam insulation board, manufactured without the use of CFCs, with a foil facing on both sides.

5.2 The product is supplied in dimensions of:

length (mm)	1200
width (mm)	450 or 600
thickness(1) (mm)	25 to 50 (in increments of 5)

(1) Other thicknesses are available.

5.3 Only insulation retaining fixings approved by the BBA and compatible wall ties should be used with the boards. Names and addresses of suppliers of approved retaining fixings are available from the Certificate holder and the BBA.

5.4 Although approved ties are suitable for insulation retaining purposes, additional twist ties to BS EN 845-1 : 2003 may be required for structural stability in accordance with BS 5628-3 : 2001 where the overall cavity width exceeds 75 mm.

6 Delivery and site handling

6.1 The boards are delivered to site in polythene-wrapped packs. Manufacturer's trade name and BBA logo incorporating the Certificate number are printed on every pack.

6.2 Packs should be stored off the ground on a clean level surface under cover to protect them from moisture and mechanical damage.

6.3 Boards should not be stored in direct sunlight or areas subjected to elevated temperatures.

6.4 Some care must be exercised in handling individual boards to avoid crushing the edges or corners.

6.5 The product must not be exposed to naked flame or other ignition sources. Care must be taken to prevent contact with solvents and bitumen products.

7 General

7.1 Kingspan Thermawall TW50 Zero ODP is effective in reducing the U value (thermal transmittance) of new external cavity walls with masonry inner and outer leaves (masonry includes clay and calcium silicate bricks, concrete blocks, natural and reconstituted stone blocks). It is essential that such walls are designed and constructed to incorporate the normal precautions to prevent moisture penetration.

7.2 Buildings subject to national Building Regulations should be constructed in accordance with the relevant recommendations of:

- BS 5628-3 : 2001. In particular, Clause 5.5 of the Code of Practice *Exclusion to water* should be followed in that the designer selects 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.

7.3 Other buildings not subject to these Regulations should also be built in accordance with the Standards given in section 7.2.

7.4 As with all cavity wall insulation, the construction and detailing should comply with good practice as described in the BBA joint publication *Cavity Insulation of Masonry Walls — Dampness Risks and How to Minimise Them* (see section 10.3 of this Certificate). They are particularly important in areas subject to severe driving rain.

7.5 The use of cavity battens or boards is strongly recommended to prevent bridging by mortar droppings.

7.6 As with any other form of cavity wall insulation, where buildings need to comply with NHBC Standards or Zurich Building Guarantees Technical Standards, specifiers should observe the requirements of these documents.

Buildings up to and including 12 metres high

7.7 Where a residual cavity width of 50 mm or greater is maintained the product can be used in any exposure zone. However, the use of the product does not preclude the need to apply any external render coat or other suitable finish in severe exposure zones where such application would be normal practice.

7.8 The minimum residual cavity width to be maintained during construction must be 25 mm. To achieve this requirement a greater nominal residual cavity width may need to be specified at the design stage to allow for inaccuracies inherent in the building process. The specifier may either:

- design a cavity width by consideration of the dimensional tolerances of the components which make up the wall by reference to the British Standards relating to the bricks, blocks and insulation boards or use the data from their respective manufacturers. In addition, allowance may need to be made for the quality of available building operatives and the degree of site supervision or control; or
- design a nominal residual cavity width of 50 mm (a residual cavity nominally 50 mm wide will be required by the NHBC and Zurich Building Guarantees Technical Standards where normal standards of tolerance and workmanship are adopted).

7.9 The size of residual cavity obtained in the processes described in section 7.8 is also subject to the limitations in respect of exposure of the proposed building as set out in Table 1.

Table 1 Maximum allowable total exposure factors of different constructions

Construction	Maximum allowable exposure factor *E*
All external masonry walls protected by: rendering (to BS 5262 : 1991) tile hanging slate hanging timber, plastic or metal weatherboarding or cladding	no restriction
One or more external masonry walls constructed from facing clay brickwork or natural stone, the porosity of which exceeds 20% by volume. Mortar joints must be flush pointed or weatherstruck	100
One or more external masonry walls constructed from calcium silicate bricks, concrete blocks, reconstituted stone or natural stone, the porosity of which is less than 20% by volume, or any material with raked mortar joints	88

Buildings over 12 metres high and up to and including 25 metres high

7.10 The width of the residual clear cavity to be achieved is to be in excess of 50 mm, and the following requirements apply:

- from ground level the maximum height of continuous cavity walls must not exceed 12 metres; above 12 metres the maximum height of continuous cavity walls must not exceed 7 metres. In both cases breaks should be in the form of continuous horizontal cavity trays discharging to the outside
- the specifier must take extra care when detailing to ensure that the introduction of the insulation does not affect the weather resistance of the wall. More than average site supervision is recommended during installation of the product
- the exposure factor or index must not exceed 120
- where, for structural reasons, the cavity width is reduced, eg by the intrusion of ring beams, a minimum residual cavity width of 25 mm must be maintained and extra care must be taken with

fixings and weatherproofing, eg the inclusion of a cavity tray.

8 Behaviour in relation to fire

8.1 The product does not prejudice the fire resistance properties of the wall. It is unlikely to become ignited within the cavity when used in the context of this Certificate. If fire does penetrate into an unventilated cavity, the amount of air present will be insufficient to support combustion, and flame spread will be minimal.

8.2 The requirements of the Building Regulations relating to fire spread in cavity walls, can be met in buildings of all purpose groups without the need for cavity barriers, provided the construction complies with the provisions detailed in:

England and Wales

Approved Document B, Diagram 32.

Northern Ireland

Technical Booklet E, Diagram 3.5.

8.3 A summary of these provisions is given here:

England and Wales, and Northern Ireland

(1) The wall must consist of masonry inner and outer leaves, each at least 75 mm thick.

(2) The cavity must not be more than 100 mm wide (Northern Ireland only).

(3) The cavity must be closed at the top of the wall and at the top of any opening.

(4) In addition to the insulation only the following should be placed in, or exposed to, the cavity:

- timber lintels, window or door frames, or end of timber joists
- pipe, conduit or cables
- dpc, flashing, cavity closer or wall tie
- domestic meter cupboard, provided there are not more than two cupboards to a dwelling, the opening in the outer leaf is not more than 800 mm by 500 mm for each cupboard, and the inner leaf is not penetrated except by a sleeve not more than 80 mm by 80 mm, which is fire-stopped.

8.4 For constructions not covered by sections 8.2 and 8.3, cavity barriers must be provided to comply with:

England and Wales

Approved Document B, Section 10

Scotland

Technical Standards D6.1 and D6.2

Northern Ireland

Technical Booklet E, paragraphs 3.27 to 3.30.

8.5 The product is combustible but may be used in walls of buildings with no storey at a height of more than 18 m above the ground that are on or less than one metre from a relevant boundary in accordance with the exceptions permitted in Technical Standard D8.2.

9 Proximity of flues and appliances

When installing the product in close proximity to certain flue pipes and/or heat-producing appliances the following provisions to the national Building Regulations are acceptable:

England and Wales

Approved Document J

Scotland

Technical Standards, Part F, *Provisions deemed to satisfy the standards*

Northern Ireland

Technical Booklet L.

10 Liquid water penetration

10.1 When the product is used in situations where it bridges the dpc in walls, dampness from the ground will not pass through to the inner leaf provided the wall is detailed in accordance with the requirements and provisions of the national Building Regulations:

England and Wales

Approved Document C, Section 5.4–5.6

Scotland

Technical Standard (G2.6)

Northern Ireland

Technical Booklet C, Section 1.6.

10.2 Constructions incorporating the product and built in accordance with BS 5628-3 : 2001 and section 7 of this Certificate, will resist the transfer of precipitation to the inner leaf and satisfy the national Building Regulations:

England and Wales

Requirement C2(b)

Scotland

Technical Standard G3.1

Northern Ireland

Technical Booklet C, Section 2.

10.3 In all situations it is particularly important to ensure during installation that:

- wall ties and fixings are installed correctly and are thoroughly clean
- excess mortar is cleaned from the cavity face of the leading leaf and any debris removed from the cavity
- mortar droppings are cleaned from the exposed edges of installed boards
- boards are properly installed and butt jointed

- installation is carried out to the highest level on each wall or the top edge of the insulation is protected by a cavity tray
- at lintel level, a cavity tray, stopends and weepholes, must be provided.

11 Water vapour penetration

11.1 The product has a high resistivity and, therefore, will provide a significant resistance to water vapour transmission. Joints between boards will facilitate the passage of water vapour under normal conditions of temperature and humidity.

11.2 If the product is to be used in the external walls of rooms expected to have high humidities, care must be taken to provide adequate permanent ventilation to avoid possible problems from the formation of interstitial condensation in the internal wall leaf.

12 Thermal insulation

12.1 For the purpose of U value calculations to determine if the requirements of the Building (or other statutory) Regulations are met, the thermal conductivity ($\lambda_{90/90}$ *value*) of the product as declared by the Certificate holder are given in Table 2 (see section 17).

Table 2 Thermal conductivity

Board thickness (mm)	Declared value ($Wm^{-1}K^{-1}$)
17–30	0.022
>30	0.023

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

England and Wales

Approved Documents L1 and L2, Elemental Table 1

Scotland

Technical Standards J3.2, Table 1 and J8.3, Table

Northern Ireland

Technical Booklet F, Table 1.2 or 1.4.

12.3 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.

12.4 Care should be taken to ensure that the design allows for limiting excessive additional heat loss and risk of surface condensation at openings within the boards and at junctions between the boards and other building elements. Reference can be made to *Limiting thermal bridging and air leakage : Robust construction details for dwellings and similar buildings* TSO 2002 or BR 262 : 2002 *Thermal insulation : avoiding risks.*

13 Durability

The product is dimensionally stable, rot-proof and durable, and will remain effective as an insulant for the life of the building.

Installation

14 General

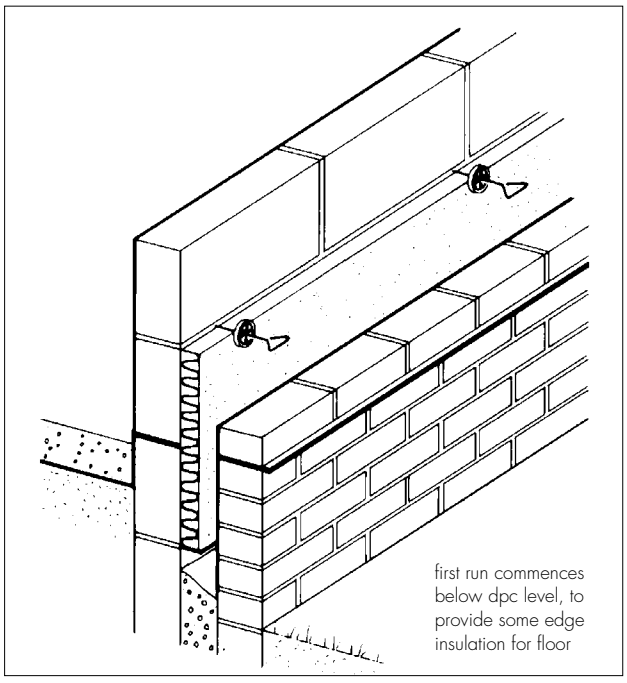
It is recommended that the inner leaf be constructed ahead of the outer leaf, as boards, fastened to the cavity face of the inner leaf, give a slightly-enhanced thermal performance. It is essential that the spacing of the wall ties/clips allows the long edge of each board to be secured at a minimum of two points.

15 Procedure

15.1 A section of the inner leaf is built with the first row of wall ties, at approximately 600 mm horizontal spacing, where the insulation is to begin. It is recommended that the wall ties are not placed directly on the damp-proof course. The first run of boards may commence below damp-proof course level to provide some edge insulation for the floor (see Figure 1).

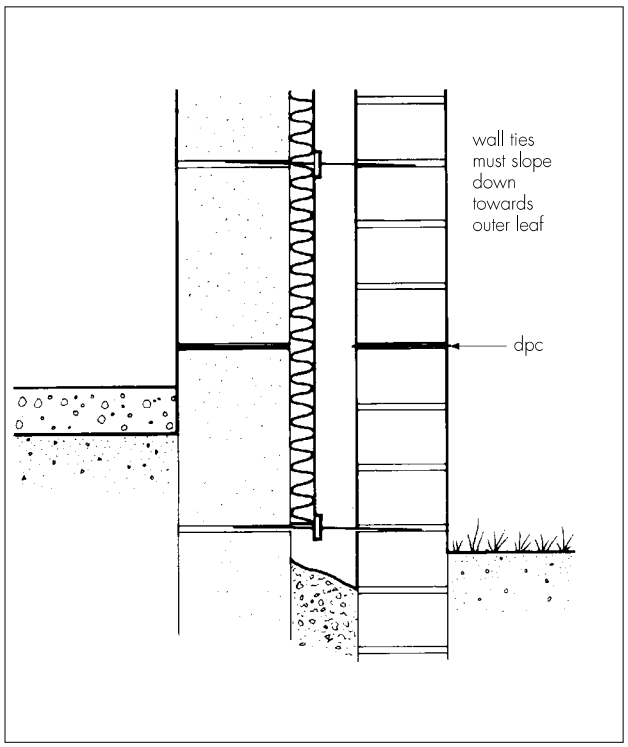
15.2 The leading leaf is built up to the required height, with wall ties placed at a vertical height of 450 mm ensuring the drip of the tie is located halfway across the residual cavity width. Excess mortar is cleaned from the cavity face of the leading leaf, and the boards are placed on the wall ties, behind the retaining clips, to form a closely butt-jointed run.

Figure 1 Installation of Kingspan Thermawall TW50 Zero ODP



15.3 The second row of wall ties is fitted to retain the tops of the boards. It is essential that all wall ties slope downwards towards the outer leaf (see Figure 2) and at centres not exceeding 900 mm to ensure that each board is secured at a minimum of three points.

Figure 2 Installation of wall ties



15.4 Additional ties may be required to satisfy the structural requirements of BS 5628-3 : 2001 and/or to ensure adequate retention of boards or cut pieces.

15.5 The other leaf is then built up to the level of the top of the boards.

15.6 All boards should be butted with vertical joints staggered. Insulation boards and wall ties should be staggered as construction proceeds and carried up to the highest level of wall, except where protected by a cavity tray.

Mortar droppings

15.7 After each section of the leading leaf is built, excess mortar should be removed from the cavity face and mortar droppings cleaned from exposed edges of the installed board, before installation of the next run of boards. Use of a cavity board or a cavity batten will protect the installed board edges and help to keep the cavity clean as the following leaf is built (see Figures 3 and 4).

Wall openings

15.8 Where openings such as doors and windows are in close proximity it is recommended that a continuous lintel or cavity tray is used. Individual lintels or cavity trays should have stopends and be adequately drained.

Cut pieces

15.9 Boards can be cut, using a sharp knife or fine-toothed saw, to fit openings, eg around windows, doors and air bricks. It is essential that cut pieces of board completely fill the spaces for which they are intended and are adequately secured.

Protection

15.10 All building involving the boards, particularly interrupted work, must conform to BS 5628-3 : 2001, Annex A4.1.31 *Handling and site storage*, Annex A5.1.1 *Weather conditions*, Annex A5.4.4 *Installing insulation*.

Figure 3 Use of cavity board

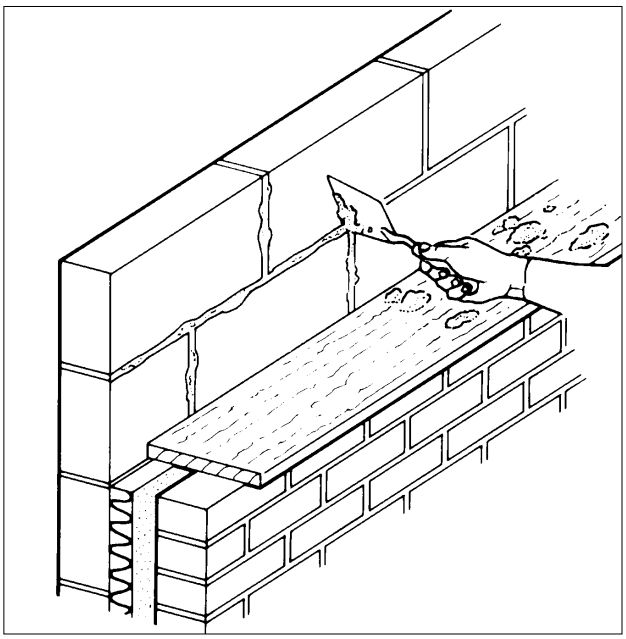
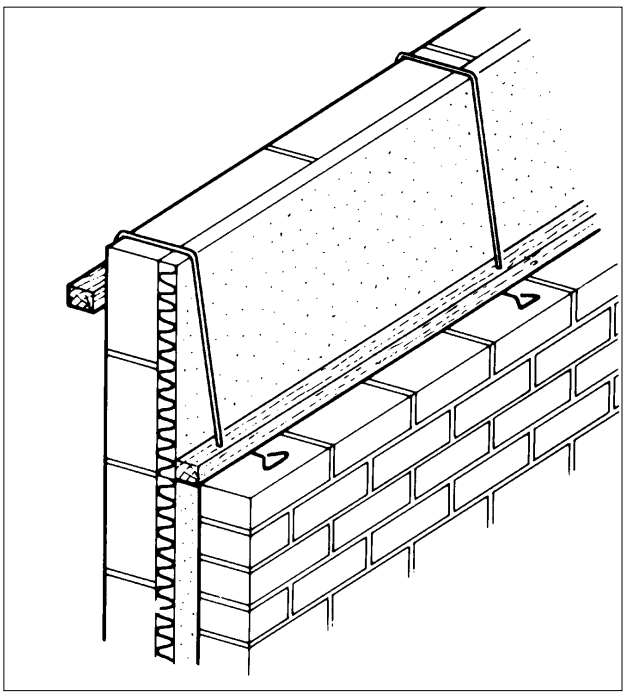


Figure 4 Use of cavity batten



Technical Investigations

The following is a summary of the technical investigations carried out on Kingspan Thermawall TW50 Zero ODP.

16 Investigations

An examination was made of data relating to:

- dimensional accuracy
- density
- compressive strength
- dimensional stability with temperature and humidity
- thermal conductivity (fresh and aged).

17 Other investigations

17.1 A re-examination was made of data on which Certificate No 97/3365 (covering Kingspan Thermawall TW51) was based. The conclusions drawn remain valid.

17.2 The manufacturing process was examined, including the methods adopted for quality control, and details were obtained of the quality and composition of the materials used.

17.3 Thermal conductivity data was examined in accordance with BS EN 13165 : 2001, to determine a value representative of 90% of production with a 90% confidence limit.

Additional Information

The quality management systems of Kingspan Insulation Limited have been assessed and registered as meeting the requirements of BS EN ISO 9002 : 1994 by the British Standards Institution Quality Assurance (Certificate No FM 10697).

Bibliography

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

BS 5628-3 : 2001 *Code of practice for use of masonry — Materials and components, design and workmanship*

BS 8000-3 : 2001 *Workmanship on building sites — Code of practice for masonry*

BS EN 845-1 : 2003 *Specification for ancillary components for masonry — Ties, tension strips, hangers and brackets*

BS EN 13165 : 2001 *Thermal insulation products for buildings — Factory made rigid polyurethane foam (PUR) products — Specification*

BS EN ISO 9002 : 1994 *Quality systems. Model for quality assurance in production, installation and servicing*

Conditions of Certification

18 Conditions

18.1 This Certificate:

(a) relates only to the product that is named, 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) is valid only within the UK;

(d) has to be read, considered and used as a whole document — it may be misleading and will be incomplete to be selective;

(e) is copyright of the BBA;

(f) is subject to English law.

18.2 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, are references to such publication in the form in which it was current at the date of this Certificate.

18.3 This Certificate will remain valid for an unlimited period provided that the product and the manufacture and/or fabrication including all related and relevant processes 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 as and when deemed appropriate by the BBA under arrangements that it will determine; and

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

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

(a) the presence or absence of any patent, intellectual property 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 actual works in which the product is installed, used and maintained, including the nature, design, methods and workmanship of such works.

18.5 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, Kingspan Thermawall TW50 Zero ODP is fit for its intended use provided it is installed, used and maintained as set out in this Certificate. Certificate No 94/2992 is accordingly awarded to Kingspan Insulation Limited.

On behalf of the British Board of Agrément

Date of Fourth issue: 15th March 2005

Chief Executive

**Original Certificate issued 28th April 1994. This amended version includes references to the revised Building Regulations and CDM Regulations, change of product dimension, and lambda value, additional* Design Data *information and new* Conditions of Certification.

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