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WIMLAS LIMITED
 CERTIFICATE OF ASSESSMENT

CERTIFICATE NUMBER
 050/98
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 May1998

PRODUCT THERMA-FLECT EPS ROOF BOARD	SUPPLIED BY Yorkshire Building Services (Whitwell) Limited Units 5/6/7 Creswell Industrial Estate Creswell Derbyshire S80 4BU Tel: 01909 721662 Fax: 01909 721442
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SUMMARY

Therma-flect EPS Roof Board has been assessed to confirm its suitability for use in pitched roof construction, combining thermal insulation and an underlay for protection against wind driven rain and snow. It can be used either under slates or tiles or at rafter level. Therma-flect EPS Roof Board is a laminated board comprising expanded polystyrene board bonded to an aluminium foil faced polyethylene bubble film multilayer laminate, with an overlap projection of the bubble film at the vertical edges and the bottom edge of the polystyrene board.

The characteristics of the product and the methods of application have been reviewed with respect to the Building Regulations current in the United Kingdom. The assessment has referred to British Standards and other publications current in February 1998.

The assessment is described in the following pages which form integral parts of this certificate.

LIMITATIONS OF USE

Therma-flect EPS Roof Board is certified for use as a supported insulating roof underlay for installation on pitched roofs above 15 degrees or as roof insulation at rafter level . The roofs must be constructed with adequate strength and stability to support safely the imposed wind loads. The roof design must be in accordance with BS 5534 Code of practice for slating and tiling. Therma-flect EPS Roof Board must be fully protected with a waterproof roof covering system. There must be no manual or mechanical trafficking access directly onto the Therma-flect EPS Roof Board during installation or subsequent operations

The installation of Therma-flect EPS Roof Board must be applied strictly in accordance with the manufacturer's instructions, and the requirements of this certificate.

STATEMENT

It is the opinion of WIMLAS Limited that Therma-flect EPS Roof Board is satisfactory for use within the stated limitations provided that it is used in accordance with the manufacturer's specifications, their instructions and the requirements of this certificate.

CONFIRMATION

For and on behalf of WIMLAS Limited	
P D Johnson	Manager
R D Jones	Director

1. TECHNICAL SPECIFICATION

1.1 Description of Product

1.1.1 Therma-flect EPS Roof Board is a laminate assembled with square edged expanded polystyrene board manufactured to BS 3837 SD FRA grade of thicknesses from 70 to 130 mm and sizes 570 mm x 1200 mm, or 370mm x1200mm. The expanded polystyrene board is bonded to a 5 mm thick aluminium foil faced polyethylene bubble film multilayer laminate, 700 mm x 1300 mm, or 500mm x 1300mm, with the overlap projection at the sides and bottom edge of the polystyrene board.

1.1.2 Therma-Flect EPS Tilt Board Membrane is a 5 mm thick, 400mm wide aluminium foil faced polyethylene bubble film multilayer laminate supplied in rolls up to 25m.

1.1.3 YBS aluminium foil tape is a 50mm wide faced sealing tape for taping laps.

1.2 Product performance

1.2.1 Therma-flect EPS Roof Board will provide insulation and act as an underlay in new tiled or slated pitched roofs constructed in accordance with BS 5534:Part 1. In existing pitched roofs Therma-flect EPS Roof Board will provide insulation at rafter level. .

1.2.2 Therma-flect EPS Roof Board may be installed on new or existing buildings. In all cases it must be established or ensured that the timber roof supporting structure is adequately secured to the building, and capable of withstanding the maximum expected wind uplift forces; this includes existing roofs previously tiled without an underlay.

1.2.3 Therma-Flect EPS Roof Board is intended to provide a method to enhance the thermal insulation of new or existing roofs. Roofs incorporating the insulation can be constructed to give a U-value below 0.25 W/m²K The thermal resistance of the product and associated clear air space for its different thicknesses are given in Table 1. Proportional area calculations for the rafters should be undertaken to establish insulation requirements.

Table 1 Thermal resistance values

Therma-Flect EPS Roof Board overall thickness mm	Thermal resistance m ² K/W
70mm	2.5
125mm	3.9
135mm	4.2

1.2.4 Therma-Flect EPS Roof Board is intended to provide a method to enhance the water resistance of new roofs as a secondary waterproofing layer below roofing tiles or slates. Water penetration resistance tests with the aluminium foil facing towards the underside of the tiles have confirmed that Therma-flect EPS Roof Board is water resisting, and when installed in a roof constructed to BS 5534:Part 1, the product will resist the passage of water to the interior of the building.

1.2.5 When used directly below tiling, with the aluminium foil facing towards the underside of the tiles, tests have shown that the water vapour resistance at joints of installed Therma-flect EPS Roof Board is less than 20 MNs/g. There is in excess of 1.2 linear metre of unsealed joint per square metre of Therma-flect Roof Board as laid. It should therefore be considered for design purposes as a permeable membrane. When installed with the aluminium foil facing towards the inside, it must be used below a roof underlay, the joints must be sealed. The water vapour resistance, when sealed, is greater than 250 Mns/g.

1.2.6 When Thema-Flect EPS Roof Board is installed in accordance with this certificate and the appropriate clauses of BS 5250 the surface or interstitial condensation is considered to be unlikely to occur with the constructions specified in this certificate. However, condensation risk calculations should be undertaken using the method of assessment given in BS 5250 to ensure harmful condensation is not developed for the intended application. Provision must be made in the roof design to provide, as a minimum, ventilation equivalent to the requirements of BS5534:Part1 for each designed roof pitch. Eaves openings and/or tile ventilators with an equivalent opening area may be considered a practicable method of achieving adequate ventilation above the Thema-Flect EPS Roof Board. Ridge ventilators may be considered only in combination with low level ventilation.

1.2.7 Loading tests on Therma-flect EPS Roof Board to determine rigidity have shown that the material will adequately resist wind uplift forces with up to 330 mm batten spacings, on 600 mm centred rafters, for locations where the wind uplift is no greater than 1800 N/m².

1.2.8 No additional hazard in the event of fire will be introduced by the use of Therma-flect EPS Roof Board when compared to roofing felts produced to BS 747.

1.2.9 Therma-Flect EPS Tilt Board Membrane is suitable for exposure at eaves.

1.2.10 Therma-flect EPS Roof Board is considered to be durable for at least 30 years in the building in which it is incorporated. This is provided the roofing is designed and installed in accordance with the relevant requirements of BS 5534, and Therma-flect EPS Roof Board is installed in accordance with the requirements of the manufacturer and the requirements of this certificate.

2. BUILDING REGULATIONS

The relevant Building Regulation requirements for the product are:-

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

Requirement

C4 Resistance to weather and ground moisture - Therma-flect EPS Roof Board will adequately resist the passage of moisture to the underlying structure, provided it is appropriately installed in a roof constructed in accordance with BS 5534:Part 1 and the manufacturers instructions.

F2 Control of condensation - when Therma-flect EPS Roof Board is applied to pitched roof constructions which have requirements for ventilation as described in Section 1.2.6 of this certificate, this Regulation can be satisfied.

J3 Protection of the building from heat producing appliances - in order to comply with this Regulation Therma-flect EPS Roof Board must be isolated from the outer wall of a flue pipe for a solid fuel, gas or oil-fired appliance by a separation of a minimum of 25 mm. Therma-flect EPS Roof Board must be separated from a brick or blockwork flue.

L1 Resistance to the passage of heat - roofs, formed using Therma-flect EPS Roof Board, can be designed using the elemental approach and constructed to have a "U" value of better than 0.25 W/m²K.

Regulation

7 Materials and workmanship - Therma-flect EPS Roof Board is manufactured from materials which are suitably safe and durable for the intended application and will perform satisfactorily when correctly installed.

2.2 The Building Standards (Scotland) Regulation 1990 (as amended)

Regulation

B2.1 Selection and use of materials - Therma-flect EPS Roof Board is manufactured from materials considered to be suitable for the intended application and is able to resist deterioration provided that it is installed in accordance with the requirements of this certificate.

F Chimneys, flues, hearths and the installation of heat producing appliances - roofs formed with Therma-flect EPS Roof Board will comply with these Standards, provided that the Therma-flect EPS Roof Board is isolated from the flue of a gas-fired or solid fuel or oil-fired heat producing appliance, by a separation as determined by a test to BS 4543:Part 1 for Class of appliance.

G3.1 Resistance to precipitation - roofs formed using Therma-flect EPS Roof Board in accordance with the requirements of this certificate will provide adequate weather-tightness.

G4 Condensation - roofs formed using Therma-flect EPS Roof Board in accordance with the requirements of this certificate and of BS5250 can be designed and constructed to not be subject to undue interstitial or inner surface condensation.

J2 Resistance to the passage of heat - roofs, formed using Therma-flect EPS Roof Board, can be designed using the elemental approach and constructed to have a "U" value of better than 0.25 W/m²K

N2.1 Standards for electrical installations - electrical wiring installed in accordance with the requirements of Clause 3.2.11 below of this certificate will provide an adequate degree of safety and protection against its being the source of fire.

2.3 The Building Regulations (Northern Ireland) 1994

Regulation

B2 Fitness of materials and workmanship - Therma-flect EPS Roof Board is manufactured from materials which are considered to be safe and to be suitable for use as roof underslating and will resist deterioration provided that it is installed in accordance with the requirements of this certificate.

C4 Resistance to ground moisture and weather - when incorporated in a pitched roof construction in accordance with BS 5534:Part 1, and appropriately installed, Therma-flect EPS Roof Board will satisfy this requirement.

C6 Condensation - when Therma-flect EPS Roof Board is applied to pitched roof constructions which have requirements for ventilation as described in Section 1.2.6 of this certificate, this Regulation can be satisfied.

F2 Conservation of fuel and power - roofs can be designed and constructed, using Therma-flect EPS Roof Board, to have sufficient thickness of insulation contributed by the Therma-flect EPS Roof Board to permit their use as the sole provision necessary to meet the requirements of these Regulations.

L2 Heat producing appliances and associated constructions - roofs formed with Therma-flect EPS Roof Board will comply with these Regulations, provided that the Therma-flect EPS Roof Board is isolated from the flue of a gas-fired or solid fuel or oil-fired heat producing appliance, by a separation as determined by a test to BS 4543:Part 1 for either Class of appliance or may be ascertained by reference to Technical Booklet L Heat producing appliances.

3.INSTALLATION / PRACTICAL APPLICATION

3.1 Storage and Handling

3.1.1 Therma-flect EPS Roof Board is supplied in packs of eight boards in a polyethylene bag.

Packs should be securely stacked on a level surface, preferably under cover, and must not be allowed to rest against sharp projections. Packs stacked in the open must be protected from accidental damage.

3.1.2 Reasonable precautions must be taken in handling the sheets to prevent damage, such as tears or perforations, occurring before and during installation, and prior to the application of the roof covering.

3.2 Installation

3.2.1 The installation and fixing of the Therma-flect EPS Roof Board must be in accordance with the instructions of Yorkshire Building Services and with the requirements of this certificate.

3.2.2 For application in new construction below tiling, with the expanded polystyrene between the rafters and the bubble film laminate lapped 100mm and fixed on the upper face of the rafters, installation is commenced by positioning Therma-flect EPS Roof Board between the rafters starting at the eaves and working towards the ridge of the roof. Vertical bubble film laminate joints must be secured on the rafter with at least 25mm by 15mm vertical battens.

3.2.3 At the eaves of the roof Therma-flect EPS Roof Board should be separated between polystyrene and bubble film, to allow for the Therma-Flect EPS Tilt Board Membrane bubble film to be inserted and dressed below the Therma-flect EPS Roof Board bubble film and extend over the fascia board so that run off water is directed into the gutter, see Fig 1, and Clause 35.1 in BS 5534:Part 1. Some of the polystyrene may be required to be cut away. The Therma-Flect EPS Tilt Board Membrane bubble film must be applied on completion of installation of the Therma-flect EPS Roof Board at the eaves.

3.2.4 Each horizontal run of Therma-flect EPS Roof Board must be nailed in position at clips, and secured by through-nailed vertical counter battens keeping the number of perforations to a minimum. Tiling battens must be fixed through to the rafters. The minimum width of horizontal laps must be as recommended in BS 5534:Part 1 and as reproduced in Table 2. Vertical joints must overlap and must be secured on a rafter. Corrosion resistant staples or clout nails must be used and should comply with the requirements of BS 5534:Part 1.

TABLE 2: Minimum horizontal overlap (reproduced from BS 5534:Part 1)

Rafter Pitch degrees	Min Horizontal Lap mm
15 - 34	100
35 and above	75

3.2.5 Therma-flect EPS Roof Board is not designed to withstand the weight of operatives or tiles being loaded out. Tiling battens must be installed as work progresses from eaves to ridge for achieving purchase for feet and avoiding damage to the Therma-flect EPS Roof Board surface. No materials or implements should be rested on the Therma-flect EPS Roof Board.

3.2.6 It must be ensured that the roof design and construction allows for adequate ventilation of the roof by providing sufficient eaves openings and/or tile ventilators with an equivalent opening area. See 1.2.6. Due care must be taken that the Therma-flect EPS Roof Board does not obstruct the flow of air at any ventilation opening.

3.2.7 In order to prevent the Therma-flect EPS Roof Board bubble film sagging behind the fascia and forming a water trap, the Therma-flect EPS Roof Board must be supported at the eaves with a tilting fillet board running continuously along the length of the eaves.

3.2.8 At ridges and hips an extra layer of Therma-Flect EPS Tilt Board Membrane bubble film must be applied over Therma-flect EPS Roof Board, by laying a strip of Therma-Flect EPS Tilt Board Membrane bubble film centrally above the Therma-flect EPS Roof Board to the main roof. In valleys, a strip of Therma-Flect EPS Tilt Board Membrane bubble film 400 mm wide, must be laid over the gutter bed, but under the main roof Therma-flect EPS Roof Board, and be held down by valley battens where used. The main roof Therma-flect EPS Roof Board must be dressed over the valley battens in this case.

3.2.9 Standard methods of workmanship should be used to apply Therma-flect EPS Roof Board at penetrations and abutments. It must be ensured that the Therma-flect EPS Roof Board foil membrane is turned up not less than 50 mm at all abutments to be overlapped by the flashings. Penetrations by soil and vent pipes must be dealt with as follows. The Therma-flect EPS Roof Board membrane must be star-cut carefully to prevent tears and the polystyrene cut out, then closely fitted over the pipe, ensuring that all the tabs project upwards along the pipe, and then the tabs taped around the circumference. A proprietary collar must be fitted over the pipe to protect the tape.

3.2.10 For application from within the roof construction or loft space, with the expanded polystyrene between the rafters and the bubble film laminate lapped 100mm and fixed on the lower face of the rafters, installation is commenced by positioning the Therma-flect EPS Roof Board between the rafters with the aluminium foil face towards the inside of the building, starting at the eaves and working towards the ridge of the roof. Vertical bubble film laminate joints must be secured on the rafter and sealed with YBS joint tape. Horizontal bubble film laminate joints must be sealed with YBS joint tape. Where the loft space is to be dry lined at rafter level vertical battens must be applied to ensure a 25mm air gap between foil face and dry lining.

3.2.11 Where electric cabling is present, plasticiers from electric cable sheathing must not come in to contact with the Therma-flect EPS Roof Board. An appropriate isolation material, such as a conduit, must be interposed between the two.

3.2.12 Repairs can be carried out by replacement of whole boards ensuring that laps are secured under adjacent battens.

4. TECHNICAL APPRAISAL

4.1 Laboratory measurements of the physical properties of the material have been made. Tests and inspection of data have been carried out to determine the following properties and performance characteristics of Therma-flect EPS Roof Board:-

- resistance to tear propagation
- water vapour permeability
- water penetration resistance
- thermal performance.

Assessment has been made of the product design, with reference to its application and practicality of installation of the material. Technical data for the product and the results of performance tests are given in Table 3

4.2 Quality Control

In the opinion of WIMLAS Therma-flect EPS Roof Board is manufactured from materials suitable for the application. Manufacture is carried out to a documented quality system and regular inspections are carried out during manufacture.

TABLE 3: Technical Data for Therma-flect EPS Roof Board

Property	Test Description	Result
Resistance to Nail tear of film	BS 747	> 40N
Thermal resistance of foil, bubble film laminate and clear cavity	BS 874	0.71 m ² K/W
Thermal conductivity of polystyrene insulation		0.037 W/mK for polystyrene
Resistance to passage of water vapour	BS 7374	unsealed joints < 20 MNs/g sealed joints > 250 MNs/g
Water penetration	Leakage after 24h	Nil

4.3 British Standards

The following British Standards have been referred to for this assessment:

BS 747	Specification for roofing felts
BS 2782	Methods of testing plastics
BS 3837;Part 1:1991	Expanded polystyrene boards: specification for boards manufactured from expandable beads.
BS 5250:1989(1995)	Code of practice for the control of condensation in buildings.
BS 5534:Part 1:1997	Code of practice for slating and tiling (including shingles): Design.
BS6399 Part 2	Code of basic data for the design of buildings - Wind loads.
BS 8000:Part 6:1990	Workmanship on building sites :Code of practice for slating and tiling of roofs and claddings.

The following Union Européenne Pour L'Agrement Technique Dans Le Construction (UEAtc) documents have been referred to for this assessment:

UEAtc MOAT 27 1983	General Directive for the Assessment of Roof Waterproofing Systems.
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The following documents have been referred to for this assessment:

Anderson B R	The Thermal Resistance of Airspaces in Building Construction. Building and Environment Vol 16 No 1 pp35-39 1981
Building Research Establishment	BR262 Thermal Insulation : Avoiding risks 1994

5. CONDITIONS OF CERTIFICATE USE

5.1 Validity

This certificate will be valid for a period of five years. It will remain valid in so far as:

- a. The materials and method of manufacture are unchanged.
- b. The designs and specifications are unaltered from those examined by WIMLAS.
- c. Yorkshire Building Services continues to have the product checked by WIMLAS.

5.2 Health and Safety

This certificate and the recommendations herein do not purport in any way to restate the requirements of the Health and Safety at Work Act 1974 or any statutory or common law duty of care which exists now or in the future: nor is compliance with these recommendations to be assumed as satisfying the requirements of the said Act or any existing or future statutory or common law duty of care.

5.3 Reference to Other Documentation

Where reference is made in this certificate to any Act of Parliament, Regulation, Code of Practice, British or other Standard or other publications, it shall be construed as reference to such publication in the form in which it is in force at the date of issue of the certificate.

5.4 Patents

WIMLAS makes no representational warranty that any patent or similar industrial property right is valid or that the manufacture, use, sale, lease or any other dealing or disposition of the product in whole or in part is not an infringement of any patent or industrial property right not owned by Yorkshire Building Services.

Confirmation that a Certificate is current may be obtained from WIMLAS.

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