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**NATIONAL
TYPE
APPROVAL**

Certificate No: 362-3-7138

Date: 28 February 2006

1 Certificate holder

Name: YBS Insulation Ltd

Address: The Craggs Industrial Park, Creswell, Derbyshire S80 4AJ

tony@ybsinsulation.com

Tel: 01909 721662

2 System Title

Description: YBS Insulation SUPER QUILT 14

3

The system has been assessed on the following drawings and documents:

Drawing No.: Test Report CIM 122/R3 Sheffield Hallam University.

Roof insulation to achieve a U-Value of 0.16W/m²/K.

Limitations: To be installed on pitched roofs to manufacturers instructions.

4 Assessment

The design and method of construction of the system described in (2) above has been examined and as far as it has been shown has been found to be capable of complying with current Building Regulations.


5 Conditions of certification

- 1 The design shown and the materials specified shall not be changed without reference to the local authority responsible for certifying the system.
- 2 The certificate shall be valid for three years or until invalidated by formal notice.
- 3 Where reference is made on a plan to any Code of Practice, British Standard or manufacturer's instruction it shall be construed as a reference to such publication in the form in which it is in force at the date of this certificate.
- 4 This certificate should not be regarded as a formal approval under the Building Regulations.

6 Authority

This system approval certificate is authorised by:

Name: C. P. DEACON

Signature: 

on behalf of: Calderdale Metropolitan Borough Council

An Evaluation of SuperQuilt Multi-Layer Insulation Blanket in Roofs



**Report No. CIM 122/r3
February 2005**

Originated by: *F. O'Flaherty* **Date:** *25/02/05*
**Dr. F. O'Flaherty
(Project Manager)**

Checked by: *Hosna Bougdah* **Date:** *25/2/2005*
Dr. H. Bougdah

Approved by: *P. Mangat* **Date:** *25/2/2005*
**Prof. P Mangat
(Director)**

Summary

Evaluation of SuperQuilt multi-layer insulation blanket in roofs

The Centre for Infrastructure Management (CIM) at Sheffield Hallam University evaluated the performance of SuperQuilt insulation material against 200mm of conventional Glasswool insulation material. The aim of the field test, conducted between December 2004/January 2005, was to maintain a temperature of 21°C in custom built enclosures replicating roof spaces when exposed to winter conditions. Insulation was applied in accordance with standard procedures for the relevant materials. Thermocouples were used to monitor the internal and external temperatures whereas meter readings gave the power consumed in each of the enclosures throughout the monitoring period. The test procedure was considered to be a very suitable approach in determining an effective thermal resistance value for SuperQuilt.

The following conclusions are based on the results of the test described in greater detail in *Report No. CIM 122/r3*:

- SuperQuilt insulation material was much easier to apply compared to standard Glasswool insulation
- SuperQuilt provides a different insulating mechanism compared to standard Glasswool. Heat was circulated more efficiently in the roof space insulated with SuperQuilt due to the highly reflective surface
- Less heat input was required in the SuperQuilt enclosures to maintain a temperature of 21°C at the control thermostat
- Power consumption of the SuperQuilt enclosure was 26% lower than the Glasswool enclosure over the monitoring period (Fig. 1)
- Simplified calculations showed that the performance of the SuperQuilt was equivalent to 270mm of Glasswool insulation which equates to an effective thermal resistance of 6.1 m²KW (thermal resistance of Glasswool: 4.5 m²KW)
- The effective thermal resistance value of 6.1 m²KW contributes to meeting or exceeding the elemental U value requirements of the following current standards:
 - The England and Wales Regulations Part L
 - The Scottish Standards Part J
 - The Northern Ireland Regulations Part F
 - The Republic of Ireland Regulations Part L

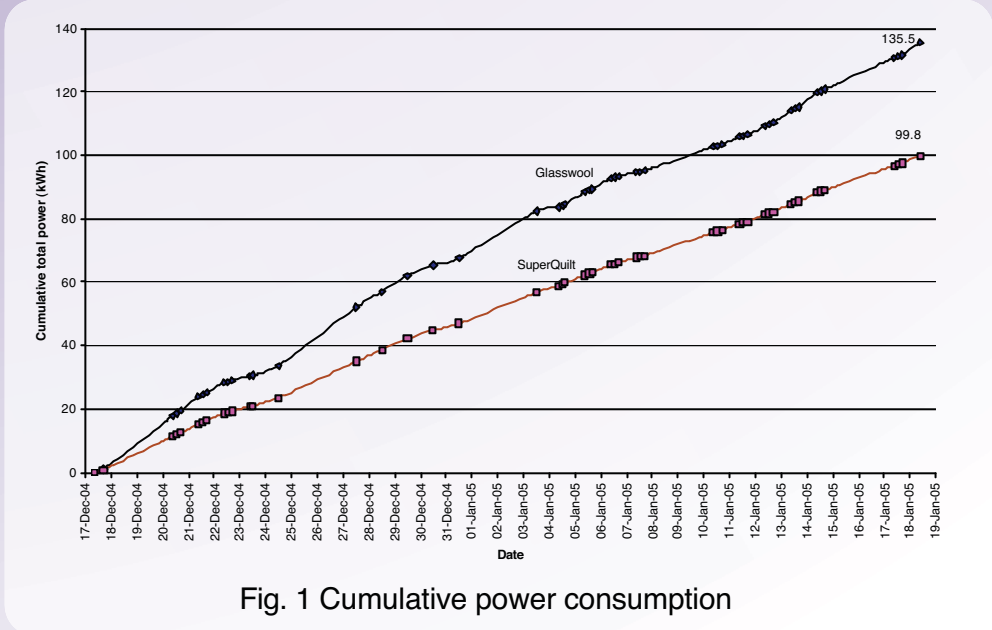






Fig. 1 Cumulative power consumption

Number BPD 08-275.2	 <p style="text-align: center;">BDA Agrément Nr. BPD 08-275.2</p> <p style="text-align: center;">Data Sheet Roof Design</p> <p style="text-align: center;">To check the validity of this document please consult www.bda.nl</p>	Category Specific																																			
Date 2008.09.15		Phase Design																																			
Code 41MF99		Subject Multi-foil reflective thermal insulation for roofs																																			
Product Supplier Description Scope (objective) Frame of reference Product characteristics Ancillary items Points of attention	<p>Super Quilt 15</p> <p>Yorkshire Building Services (Whitwell) Ltd. The Craggs Industrial Park Morven Street UK-S80 4AJ Creswell Derbyshire T.: +44 (0) 1909 721662, F.: +44 (0) 1909 721442 E.: technical@ybsinsulation.com, I.: www.ybsinsulation.com</p> <p>Multi-layered roof insulation material made up of metallic foil, flexible wadding and closed cell foam. The layers are stitched together in a diagonal pattern. The core of the product consists of four layers of polyester fibre wadding and four closed cell foam separated by five metallized film layers.</p> <p>Thermal insulation for use above and/or below rafters in tiled or slated pitched roofs of dwellings and buildings with similar temperature and humidity conditions, designed and constructed in accordance with the relevant clauses of BS 5534: 2003 (ref. 4).</p> <ol style="list-style-type: none"> Directive BDA Agréments (Praktijkbladen), September 2008 BDA Agrément Nr. BPD 08-276.2 Super Quilt 15 (phase: installation) BDA Agrément Nr. BPD 08-277 Super Quilt 15 (phase: regulations and details) BS 5534: 2003 Code of practice for slating and tiling (including shingles) – Design BS 5250: 2002 Code of practice for control of condensation in buildings BDA report 0024-L-08/1 Super Quilt 15: determination of the thermal performance (EN 12667), 2008.05.22 BDA report 0024-L-08/5 Super Quilt 15: determination of the thermal performance (EN 12667), 2008.07.11 CIM report no. 122/r3: an evaluation of Super Quilt Multi-layer Insulation blanket in roofs, February 2005 Fraunhofer report P17-138-e/2006 Super Quilt 15: determination of the mass per unit area (EN 1602), 2006.09.28 Fraunhofer report P17-138-e/2006 Super Quilt 15: dimensions (EN 822), 2006.09.28 TNO report Super Quilt 15: determination of the emission coefficient of the surfaces, 2008.04.29 Fraunhofer report P17-140-e/2006 Super Quilt 15: tensile strength parallel to faces (EN 1608), 2006.09.28 Fraunhofer report HoFM-09e/2006 Super Quilt 15: water vapour transmission properties (EN ISO 12572), 2006.10.04 Fraunhofer report P17-139-e/2006 Super Quilt 15: determination of dimensional stability under specified temperature and humidity conditions (EN 1604), 2006.09.28 Bodycote warringtonfire report 167855 Super Quilt 15: classification of reaction to fire performance (EN 13501-1), 2007.10.08 <table border="0"> <tr> <td>• nominal length</td> <td>: 10.00, 6.667</td> <td>(m)</td> </tr> <tr> <td>• nominal width</td> <td>: 1500</td> <td>(mm)</td> </tr> <tr> <td>• nominal thickness</td> <td>: 40</td> <td>(mm)</td> </tr> <tr> <td>• nominal mass</td> <td>: 0.80</td> <td>(kg.m⁻²)</td> </tr> <tr> <td>• thermal performance</td> <td>: see table 1</td> <td></td> </tr> <tr> <td>• dimensional stability (length)</td> <td>: 1.5</td> <td>(%)</td> </tr> <tr> <td>• dimensional stability (width)</td> <td>: 2.3</td> <td>(%)</td> </tr> <tr> <td>• tensile strength parallel to faces</td> <td>: 142</td> <td>(kPa)</td> </tr> <tr> <td>• water vapour diffusion resistance with seam</td> <td>: 420</td> <td>(-)</td> </tr> <tr> <td>• water vapour diffusion resistance without seam</td> <td>: 58000</td> <td>(-)</td> </tr> <tr> <td>• emission coefficients of surfaces</td> <td>: see table 2</td> <td></td> </tr> <tr> <td>• reaction to fire classification</td> <td>: E</td> <td></td> </tr> </table> <ul style="list-style-type: none"> YBS Insulation foil-backed tape with acrylic adhesive, width 75 mm 14 mm staples or nails vapour control layer roof tile underlay pre-treated counter battens, softwood battens and tiling laths roofing slates or tiles additional insulation where required <ol style="list-style-type: none"> The product is delivered in rolls packed in a protective sealed bag and should include product name, dimensions, the BDA identification mark and the number of this Agrément. Roof insulation <ul style="list-style-type: none"> the building physical behavior of roof structures incorporating the insulation at ceiling level must be analyzed by a specialist; special attention should be given to the air tightness of the ceiling, being the most important measure to avoid excessive condensation in the space above the insulation; if ventilation has been provided above the Super Quilt layer, there is no requirement for a vapour control layer above the (plasterboard) ceiling, provided that the Super Quilt layer is thoroughly sealed at all joints, resulting in an airtight layer; if ventilation openings are used they should be positioned along two opposite sides of the roof at eaves level in accordance with BS 5250: 2002 (ref. 5); ventilation openings should be arranged in such a way that blockage is prevented and also the ingress of rain, snow, birds and small mammals. Thermal performance aspects <ul style="list-style-type: none"> for the purpose of U value calculations to determine if the requirements of the Building (or other statutory) Regulations are met, the thermal resistance of the product in combination with a non-ventilated air cavity on both sides of the Super Quilt 	• nominal length	: 10.00, 6.667	(m)	• nominal width	: 1500	(mm)	• nominal thickness	: 40	(mm)	• nominal mass	: 0.80	(kg.m ⁻²)	• thermal performance	: see table 1		• dimensional stability (length)	: 1.5	(%)	• dimensional stability (width)	: 2.3	(%)	• tensile strength parallel to faces	: 142	(kPa)	• water vapour diffusion resistance with seam	: 420	(-)	• water vapour diffusion resistance without seam	: 58000	(-)	• emission coefficients of surfaces	: see table 2		• reaction to fire classification	: E	
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Points of attention (continued)	<p>layer of 25 mm may be taken as given in table 1; this performance can be different if the product is combined with certain products facing the air cavity at the opposite side, as given in table 1;</p> <ul style="list-style-type: none"> - for the thermal performance in actual practice (in situ measurements) guidance is given in CIM report no. 122/r3: an evaluation of Super Quilt Multi-layer Insulation blanket in roofs, February 2005 (ref. 8); - the requirement for limiting the heat loss through the building fabric, including the effect of thermal bridging can be satisfied if the U values of the building elements do not exceed the maximum values in the relevant Elemental Methods given in the national Building Regulations of England and Wales (Approved Documents L), Scotland (Technical Standards J) and Northern Ireland (Technical Booklet F); further information on regulations is given in BDA Agrément Nr. BPD 08-277 Super Quilt 15 (phase: regulations and details, ref.3); - a typical roof timber frame construction with multi-foil insulation is shown in ref.3. <p>4. Condensation risk</p> <ul style="list-style-type: none"> - Roofs incorporating the product will adequately limit the risk of interstitial condensation when designed in accordance with BS 5250: 2002, Section 8.4 and Appendix D (ref. 5). Guidance on preventing condensation from moisture due to drying out after construction and other sources is given in BRE Digest 369 and BRE report BR 262: 2002; - When installed in accordance with BDA Agrément Nr. BPD 08-276.2 Super Quilt 15 (phase: installation, ref. 2) the product will provide a convection-free envelope of high vapour resistance; - When installed above rafters a vapour barrier should be installed in conjunction with a suitable breather membrane under the tiles, without a ventilated air space; - When installed below rafters the product will perform as a vapour barrier and should be used in conjunction with a suitable breather membrane under the tiles, without a ventilated air space. <p>5. Behaviour in relation to fire</p> <ul style="list-style-type: none"> - When installed with an internal lining board, e.g. 12.5 mm thick plasterboard, the insulation will be contained between the roof and internal lining board, until one is destroyed. Therefore, the insulation will not contribute to the development stages of a fire or present a smoke or toxic hazard. - The insulation must not be carried over junctions between roofs and walls required to provide a minimum period of fire resistance. - The continuity of fire resistance must be maintained, for example as described in: England and Wales- Approved Document B, Vol Scotland-Mandatory Standard 2.2, clause 2.2.10; Northern Ireland-Technical Booklet E, paragraph 3.21. - The use of the product will not affect the fire rating obtained by tiled or slated roofs when evaluated by assessment or test to BS 476-3: 1958. <p>6. Durability</p> <p>The product is stable, rot-proof and durable and will remain effective as an insulant for the life of the building in which it is installed. There is no risk for moth or beetle infestation.</p> <p>Table 1 – Possible thermal resistances (R_{eq} in $m^2.K.W^{-1}$) of combinations of Super Quilt 15, as measured under an angle of 45° under different heat flow conditions (ref. 6)</p> <table border="1" data-bbox="368 1301 1150 1771"> <thead> <tr> <th>Number combinations</th> <th>Winter conditions (heat flow upwards)</th> <th>Summer conditions (heat flow downwards)</th> </tr> </thead> <tbody> <tr> <td>1. <ul style="list-style-type: none"> • High emissivity surface • 25 mm air cavity • Super Quilt 15 • 25 mm air cavity • High emissivity surface </td> <td>2,51</td> <td>2,91</td> </tr> <tr> <td>2. <ul style="list-style-type: none"> • Low emissivity surface • 25 mm air cavity • Super Quilt 15 • 25 mm air cavity • High emissivity surface </td> <td>3,06</td> <td>2,91</td> </tr> <tr> <td>3. <ul style="list-style-type: none"> • Low emissivity surface • 25 mm air cavity • Super Quilt 15 • 25 mm air cavity • Low emissivity surface </td> <td>3,02</td> <td>2,89</td> </tr> </tbody> </table> <p>Table 2 – Coefficients of emissivity of the outer layers (ref. 11)</p> <table border="1" data-bbox="368 1872 1458 2051"> <thead> <tr> <th>Layer</th> <th>Plane</th> <th>Emissivity</th> <th>Material</th> </tr> </thead> <tbody> <tr> <td rowspan="2">1</td> <td>1</td> <td>0.03</td> <td rowspan="2">Metallized film with grating reinforcement</td> </tr> <tr> <td>2</td> <td>0.61</td> </tr> <tr> <td rowspan="2">15</td> <td>29</td> <td>0.53</td> <td rowspan="2">Metallized film with grating reinforcement</td> </tr> <tr> <td>30</td> <td>0.08</td> </tr> </tbody> </table>		Number combinations	Winter conditions (heat flow upwards)	Summer conditions (heat flow downwards)	1. <ul style="list-style-type: none"> • High emissivity surface • 25 mm air cavity • Super Quilt 15 • 25 mm air cavity • High emissivity surface 	2,51	2,91	2. <ul style="list-style-type: none"> • Low emissivity surface • 25 mm air cavity • Super Quilt 15 • 25 mm air cavity • High emissivity surface 	3,06	2,91	3. <ul style="list-style-type: none"> • Low emissivity surface • 25 mm air cavity • Super Quilt 15 • 25 mm air cavity • Low emissivity surface 	3,02	2,89	Layer	Plane	Emissivity	Material	1	1	0.03	Metallized film with grating reinforcement	2	0.61	15	29	0.53	Metallized film with grating reinforcement	30	0.08
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Date 2008.09.15		Phase Installation
Code 41MF99		Subject Multi-foil reflective thermal insulation for roofs
Installation procedure	<ol style="list-style-type: none"> 1. General <ul style="list-style-type: none"> - installation of Super Quilt 15 and additional products should be in accordance with the Certificate holder's instructions and current good building practice; - during installation care must be taken to avoid damaging of the product. Should damage occur, holes in the product should be repaired with suitable tape, as provided by the Certificate holder; - the product should be attached to the rafters by using staples or nails of at least 14 mm length; - the width of overlap joints must be at least 50 mm; the joints must be taped over the full length with suitable tape, as provided by the Certificate holder; - when the product is cut to fit around openings or connections, gaps must be minimized; any exposed cut edges should be sealed with suitable tape, as provided by the Certificate holder. 2. Delivery and site handling <ul style="list-style-type: none"> - the product is delivered to site in rolls packed in a protective bag sealed with a plastic tie. Fitting instructions are placed in the bag; - the rolls should be stored in clean, dry conditions, not exposed to sunlight; - the product must be protected from being dropped or crushed by objects. Care must be exercised when storing large quantities on site; - the product must not be exposed to open flame or other ignition sources and must be stored away from flammable material such as paint and solvents; - to ensure maximum performance of the product when installed, on site precautions must be taken to protect it from mud and dirt. 3. Roof insulation <ul style="list-style-type: none"> - the product shall be cut equal to the length of the sloping section plus 100 mm; - installation should start from the ridge with the product being unrolled parallel to the eaves across the rafters, after which it is fixed using staples or nails; - the product should be held in place using 32 mm by 25 mm wooden battens in such a way that there is a 25 mm air cavity above the product and a 25 mm air cavity below the product; - when installed above rafters a vapour barrier should be installed in conjunction with a suitable breather membrane under the tiles, without a ventilated air space; - when installed below rafters the product will perform as a vapour barrier and should be used in conjunction with a suitable breather membrane under the tiles, without a ventilated air space; - the breather membrane should be installed on the counter battens and tiling battens attached perpendicular to the rafters; - roof tiles or slates shall be installed in accordance with BS 5534: 2003; recommendations of the tile/slate manufacturer should be followed. 4. Ceiling <ul style="list-style-type: none"> - a foil-backed layer of plasterboard should be fixed to the battens in case of the roof insulation installed below the rafters. The batten size should be sufficient to ensure a 25 mm gap between the product and the plasterboard; - in case of the roof insulation installed above the rafters the foil-backed layer of plasterboard can be fixed directly to the rafters; - further details are given in BDA Agrément Nr. BPD 08-277 Super Quilt 15 (phase: regulations and details, ref. 3). 5. Maintenance and repair <ul style="list-style-type: none"> - once installed, the product does not require any maintenance. Small holes, rips or punctures in the outer layers should be repaired with YBS Insulation tape. 6. Regulations <p>Further information on regulations is given in BDA Agrément Nr. BPD 08-277 Super Quilt 15 (phase: regulations and details, ref.3).</p> 	
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