





Number BAR 13-014/01/C Replaces: -	  Partner for progress	Category Flat roofs
Date 2013.05.01		Phase Assessment
Project number 12-B-0968		Subject Multi-foil reflective thermal insulation
BDA Agrément® BAR 13-014/01/C Document linked with Kiwa Certificate KGaC 2006 GB, issued by Kiwa Ltd., Cheltenham, UK		
Product Producer Description Scope (use) Summary of Certificate Major points of assessment Statement	<p>SuperQuilt 19</p> <p>Yorkshire Building Services (Whitwell) Ltd. The Craggs Industrial Park Morven Street Creswell Derbyshire S80 4AJ UK</p> <p>T. : +44 (0) 1909 721662 F. : +44 (0) 1909 721442 I. : www.ybsinsulation.com E. : technical@ybsinsulation.com</p> <p>Multi-layered roof insulation material made up of nineteen layers of metallic foil, flexible wadding and closed cell foam. The layers are spot wise connected by 40 mm long double T plastic clips in a regular pattern, avoiding thermal bridging and creating flat and parallel surfaces (Product Type 1 according BS EN 16012¹⁴). The first and nineteenth layer consist of aluminium foil with polyethylene backing and reinforcing scrim. The core of the product consists of four layers of polyester fibre wadding and six double layers of closed cell foam separated by seven metallized film layers. The product is not an underlay.</p> <p>Thermal insulation for use between and/or below roof joists in flat roofs of dwellings and buildings with similar temperature and humidity conditions, designed and constructed in accordance with the relevant clauses of either BS 6229² or BS 8217³ and NHBC Standards, chapter 7.1, where appropriate.</p> <p>This Certificate covers the following:</p> <ul style="list-style-type: none"> • Conditions of use • Frame of reference, including relevant codes of practice and test reports • Independently verified product characteristics • Factory Production Control • Annual verification procedure • Points of attention for the specifier and detail principles • Installation procedure • Compliance with Building Regulations <p>Thermal performance aspects (sections 1.2, 8.2 & 8.3) The basic property of SuperQuilt 19 concerns the thermal performance. BDA Test Institute has assessed the thermal performance of the product according BS EN ISO 6946 and the principles of BR443. The product can contribute substantially in meeting the U-value requirement for a flat roof.</p> <p>Condensation and water penetration risk (section 8.4) The performance of SuperQuilt 19 with regard to interstitial condensation, surface condensation and water penetration has been considered.</p> <p>Behaviour in relation to fire (section 8.5) An insulated flat roof system using SuperQuilt 19 can be designed to meet the UK requirements.</p> <p>Durability (section 8.6) SuperQuilt 19 is stable, rot-proof and durable and will remain effective as an insulant for the life of the building in which it is installed.</p> <p>It is the opinion of the Kiwa BDA Expert Centre Building Envelope (ECBE) that SuperQuilt 19 is fit for its intended use, provided it is specified, installed and used in accordance with this Certificate.</p> <div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;">  Professor Nico Hendriks, MSc ECBE Chairman </div> <div style="text-align: center;">  Authorization: Chris van der Meijden, MSc BDA Advies Unit Manager </div> </div> <p style="text-align: center;">To check the validity of this document please consult www.bda.nl</p>	
Version 01	Kiwa BDA Expert Centre Building Envelope (ECBE) Department of BDA Advies BDA Group Ltd (BDA Groep B.V.) Avelingen West 24 P.O. Box 389 NL - 4200 AJ Gorinchem	Page 1 of 7 pages T: +31(0)183 669690 F: +31(0)183 630630 Copyright© 2013 BDA

<p>1 Conditions of use</p>	<p>1 Application The assessment and certification of SuperQuilt 19 relate to the use of the product in dwellings and buildings with similar temperature and humidity conditions and correctly detailed flat roofs, designed and constructed in accordance with the relevant clauses of either BS 6229² or BS 8217³ and where appropriate the NHBC Standards, Chapter 7.1¹⁵. SuperQuilt 19 shall not be exposed to organic solvents or plasticisers.</p> <p>2 Assessment BDA Test Institute*) has assessed the thermal performance of the product according BS EN 16012 (BS EN 12667: 2001). The hemispherical emissivity has been assessed according BS EN 16012, Annex D and the characteristic properties according BS EN 823, BS EN 1848-2, BS EN 1602, 1604 and 1608, BS EN 12310-1 and BS EN ISO 12572. *) CPD Notified Laboratory Nr. NB 1640; Testing Accreditation RvA L 447 (acknowledged by UKAS)</p> <p>3 Installation It is recommended that the quality of installation and workmanship is controlled by an independent competent inspector. This inspector can be either a qualified employee of the specifier or a qualified employee of a consulting engineer. The product shall be installed strictly in accordance with the instructions of the Certificate holder and the requirements of this Certificate.</p> <p>4 Geographical scope The validity of this document is limited to England, Wales, Scotland and Northern Ireland, with due regard to section 11. Regulations.</p>																																																
<p>2 Frame of reference</p>	<ol style="list-style-type: none"> 1 BDA Guideline – BDA Agrément®, 15th June 2012 2 BS 6229:2003 Flat roofs with continuously supported coverings. Code of practice 3 BS 8217:2005 Reinforced bitumen membranes for roofing. Code of practice 4 BS 5250:2011 Code of practice for control of condensation in buildings 5 BS EN ISO 6946: 2007 Building components and building elements -Thermal resistance and thermal transmittance - Calculation method 6 BDA Report 12-B-0480/2 SuperQuilt 19: Calculation of thermal resistance, BDA Dakadvies B.V., Gorinchem, 2012.06.21 7 BR443: Conventions for U-value calculations, 2006 edition, BRE Scotland 8 BDA Agrément® BAR 12-454/01/C, Kiwa BDA Expert Centre Building Envelope, Gorinchem, linked with Kiwa Certificate KGaC 2006 GB, issued by Kiwa Ltd., Cheltenham, UK, 2012.07.25 9 BDA Report 0210-L-11/1rev SuperQuilt 19: Determination of product characteristics (initial type testing), 2012.06.21 10 BDA Report 0210-L-11/2 SuperQuilt 19: Determination of thermal resistance (initial type testing), 2012.01.26 11 BDA Rapport 0244-L-12/1 SuperQuilt 19: Determination of thermal resistance (compressed core), BDA Keuringsinstituut B.V., 2012.07.24 12 BDA-Kiwa report: Technical Documentation, containing information to demonstrate the conformity of the products to the applicable requirements of BDA Agrément®+ Kiwa Certificate BAR 13-014/01/C 13 BBA Information Bulletin No. 3: Reflective foil Insulation – Conventions for U-value calculations, March 2010 14 BS EN 16012: 2012 Thermal insulation for buildings – Reflective insulation products – Determination of the declared thermal performance 15 NHBC Standards:2012, Chapter 7.1 Flat Roofs and Balconies 16 Kiwa Guideline K22005, 15th June 2012 17 Kiwa Certificate KGaC 2006 GB, 2012.07.25, Kiwa Ltd., Cheltenham, UK <p>Remark: in the text of this document reference is made to these sources by adding the relevant reference number in superscript</p>																																																
<p>3 Independently verified product characteristics</p>	<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></td> <td></td> </tr> <tr> <td>- core¹⁰</td> <td>: 1,52</td> <td>(m².K.W⁻¹)</td> </tr> <tr> <td>- compressed core¹¹</td> <td>: 0,47</td> <td>(m².K.W⁻¹)</td> </tr> <tr> <td>• thermal performance⁶ of SuperQuilt 19 with 2 adjacent non-ventilated nominal 25 mm wide cavities, heat flow vertical upwards</td> <td>: 2,49</td> <td>(m².K.W⁻¹)</td> </tr> <tr> <td>• emission coefficient of outer surfaces⁹</td> <td>: 0.02</td> <td>(-)</td> </tr> <tr> <td>• dimensional stability (length)⁹</td> <td>: 1.5</td> <td>(%)</td> </tr> <tr> <td>• dimensional stability (width)⁹</td> <td>: 2.3</td> <td>(%)</td> </tr> <tr> <td>• tensile strength parallel to faces⁹</td> <td>: 142</td> <td>(kPa)</td> </tr> <tr> <td>• tearing resistance (nail shank)⁹</td> <td>: 408</td> <td>(N)</td> </tr> <tr> <td>• water vapour diffusion factor μ (with seam)⁸</td> <td>: 1700</td> <td>(-)</td> </tr> <tr> <td>• water vapour diffusion factor μ (without seam)⁸</td> <td>: 75000</td> <td>(-)</td> </tr> <tr> <td>• reaction to fire classification⁸</td> <td>: Euroclass E (BS EN 13501-1)</td> <td></td> </tr> </table>	• nominal length	: 10.00, 6.667	(m)	• nominal width	: 1500	(mm)	• nominal thickness	: 40	(mm)	• nominal mass	: 0.80	(kg.m ⁻²)	• thermal performance			- core ¹⁰	: 1,52	(m ² .K.W ⁻¹)	- compressed core ¹¹	: 0,47	(m ² .K.W ⁻¹)	• thermal performance ⁶ of SuperQuilt 19 with 2 adjacent non-ventilated nominal 25 mm wide cavities, heat flow vertical upwards	: 2,49	(m ² .K.W ⁻¹)	• emission coefficient of outer surfaces ⁹	: 0.02	(-)	• dimensional stability (length) ⁹	: 1.5	(%)	• dimensional stability (width) ⁹	: 2.3	(%)	• tensile strength parallel to faces ⁹	: 142	(kPa)	• tearing resistance (nail shank) ⁹	: 408	(N)	• water vapour diffusion factor μ (with seam) ⁸	: 1700	(-)	• water vapour diffusion factor μ (without seam) ⁸	: 75000	(-)	• reaction to fire classification ⁸	: Euroclass E (BS EN 13501-1)	
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<p>4 Ancillary items (outside scope of this Certificate)</p> <p>5 Factory Production Control (FPC)</p> <p>6 Quality control</p> <p>7 Annual verification procedure</p>	<ul style="list-style-type: none"> • YBS Insulation foil-backed tape with acrylic adhesive, width 75 mm • 14 mm staples or nails • pre-treated counter battens, softwood battens and tiling laths • additional insulation where required <p>Kiwa N.V., Approval Body, has determined that Yorkshire Building Services (Whitwell) Ltd. (YBS), with respect to the product SuperQuilt 19 fulfills all provisions concerning the specifications described in BDA Agrément® nr. BAR 13-014/01/C. The Factory Production Control has been found to comply with the Kiwa Guideline K22005¹⁶ and BDA Agrément® nr. BAR 13-014/01/C. The Factory Production Control system of YBS is in line with the Technical Documentation from the producer¹². Kiwa Ltd. has performed the initial inspection of the factory and of the Factory Production Control and performs the continuous surveillance of the Factory Production Control¹⁷.</p> <p>SuperQuilt 19 is produced under a Quality Management System, which is deemed to satisfy the requirement concerning the FPC. The quality system enables the Certificate holder to demonstrate that the product fulfils the requirements of this Certificate. This means that the following aspects are covered:</p> <ul style="list-style-type: none"> • the quality objectives, quality planning, quality manual and control of documents must fully take on board the objective of delivering a product that conforms to the specifications in this Certificate; • the manufacturer must identify and document the essential requirements that are relevant for the product and the harmonised standards to be used or other technical solutions that will ensure fulfilment of the specifications in this Certificate; • the identified standards or other technical solutions must be used as design input, and as verification that design output as given in a continuous technical consulting service, maintained by the Certificate holder ensures that the specifications in this Certificate will be met; • the measures taken by the Certificate holder to control production must ensure that the products conform to the identified safety requirements; • the Certificate holder in its measurement and control of the production process and finished products must identify and use methods which are identified in standards or other appropriate methods to ensure that the specifications in this Certificate are met; and • quality records, such as inspection reports and test data, calibration data, qualification reports of the personnel concerned, must be suitable to ensure the fulfilment of the applicable specifications in this certificate. <p>In order to demonstrate that the FPC is in conformity with the requirements of the technical specification described in this certificate the continuous surveillance, assessment and approval of the FPC will be done in a frequency of not less than 1 time per year by Kiwa Ltd. For the purpose of the annual assessment a sample of the product (1 roll) will be independently taken at the production site. The annual assessment will concern the following product characteristics, which will be determined and assessed by BDA and Kiwa Ltd.:</p> <ul style="list-style-type: none"> • Thickness BS EN 823:1995 • Width BS EN 1848-2:2001 • Length BS EN 1848-2:2001 • Mass BS EN 1602:1997 • Thermal resistance of core BS EN 16012:2012, method B (BS EN 12667: 2001) • Hemispherical emissivity of foil faces BS EN 16012:2012, Annex D <p>Remark: If at the time of the verification testing a new version of a mentioned Test Standard has been issued, this new version shall prevail</p>	
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<p>8 Points of attention for the specifier</p>	<p>1 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 Certificate.</p> <p>2 Roof insulation</p> <ul style="list-style-type: none"> - 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 SuperQuilt layer, there is no requirement for a vapour control layer above the (plasterboard) ceiling, provided that the SuperQuilt layer is thoroughly sealed at all joints, resulting in an airtight layer; - the building physical behaviour of roof structures, which incorporates the insulation must be analyzed by a specialist; The specialist can be either a qualified employee of the specifier or a qualified consultant or a qualified employee of the Certificate holder. They will check the building physical behaviour of the designed roof construction and if need be, advice about improvement to achieve final specification; - if ventilation openings are used they should be positioned along two opposite sides of the roof in accordance with BS 5250⁴; - ventilation openings should be arranged in such a way that blockage is prevented and also the ingress of rain, snow, birds and small mammals. <p>3 Thermal performance aspects</p> <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 SuperQuilt layer of 25 mm (nominal value) is to be calculated according to BS EN ISO 6946⁵ and/or BR443⁷, the thermal bridging effect has to be assessed according to BBA Information Bulletin No. 3: Reflective foil insulation – Conventions for U-value calculations, March 2010¹³; - to minimize the effect of thermal bridging cross-battening is advised; - 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 Regulations 9) and Northern Ireland (Technical Booklet F); further information on regulations is given in section 11 of this Certificate. <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 5250⁴; - when installed in accordance with this Certificate the product will provide a convection-free envelope of high vapour resistance; - when installed against the internal side of the roof joists or battens the product will perform as a vapour barrier, see also section 10; - it is recommended not to deviate from the detail principles as given in section 9 of this BDA Agrément®; in case the specifier wishes to deviate from these details it is recommended to seek advice from an expert e.g. through the holder of this Certificate. <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 ply decking of 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 roofs 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, Volume 1, Sections 5.11 to 5.12; 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 flat roofs with continuously supported coverings when evaluated by assessment or test to BS 476-3:2004. <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>	
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9 Detail principles

Figure 1 - Typical between roof joists application of SuperQuilt 19 in combination with foiled rigid insulation (warm roof)

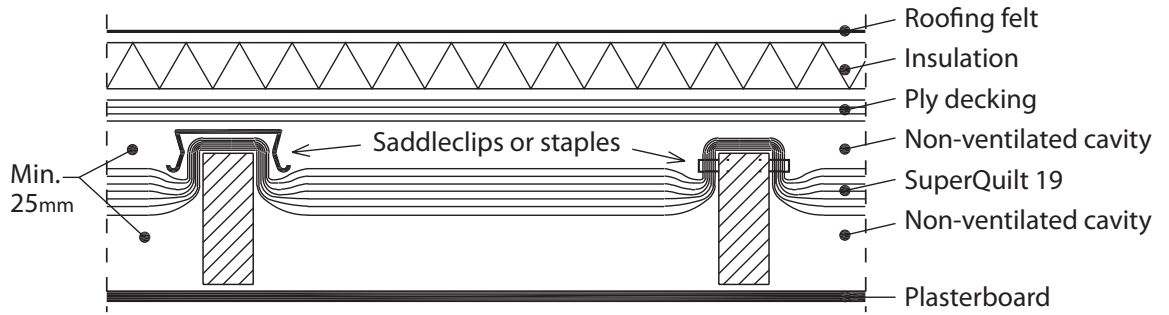


Figure 2 - Typical double layer application, under and between roof joists

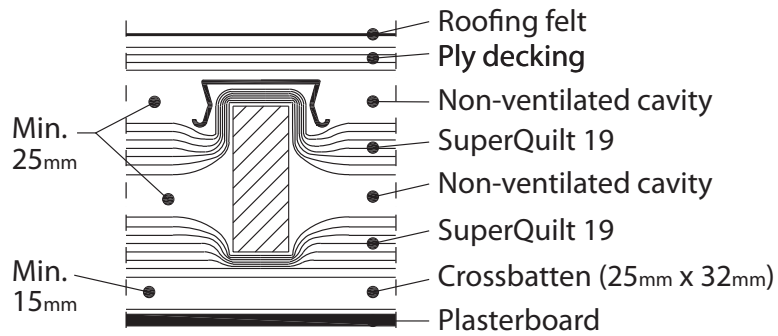


Figure 3 - Typical under roof joist application with 2 adjacent non-ventilated air layers, in combination with foiled rigid insulation (cold roof)

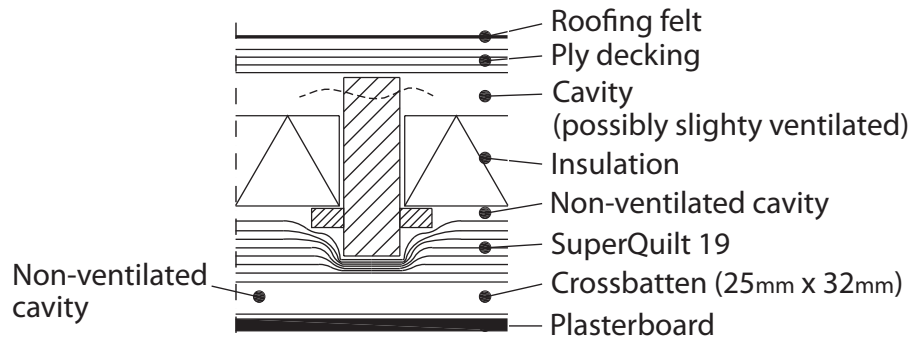
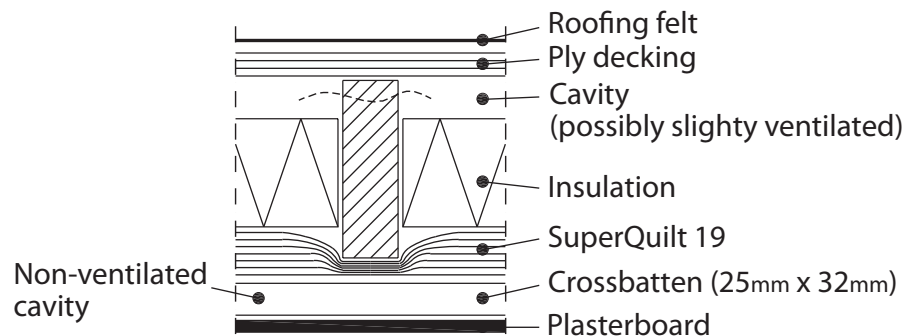


Figure 4 - Typical under roof joist application with 1 adjacent non-ventilated air layer, in combination with glass wool (cold roof)



<p>10 Installation procedure</p>	<p>1 General</p> <ul style="list-style-type: none"> - installation of SuperQuilt 19 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 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 roof joists or battens 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. <p>2 Delivery and site handling</p> <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. <p>3 Roof insulation</p> <ul style="list-style-type: none"> - the product shall be cut equal to the width of the roof section plus 100 mm; - installation should start from the external wall with the product being unrolled perpendicular to the roof joists, after which it is fixed using staples or nails or with saddle clips where appropriate; - the product should be held in place using timber battens or by other means, as shown in the figures 1 through 4 in section 9 of this document, in such a way that there is a nominal 25 mm air cavity above the product (if applicable) and a nominal 25 mm air cavity below the product, resulting in an effective minimum cavity thickness of 13 mm; - to minimize the effect of thermal bridging cross-battening is advised; - when installed below roof joists the product will perform as a vapour barrier; - the roofing shall be installed in accordance with either BS 6229² or BS 8217³ and where appropriate the NHBC Standards, Chapter 7.1¹⁵; - typical examples of applications are given in figures 1 through 4 (see section 9). <p>4 Ceiling</p> <ul style="list-style-type: none"> - A layer of plasterboard should be fixed to the battens in cases where the roof insulation is installed below the roof joists. The batten size should be sufficient to ensure a nominal 25 mm gap between the product and the plasterboard; - in cases where the roof insulation is installed between the roof joists the foil-backed plasterboard can be fixed directly to the roof joists; - further details are given in section 9 of this Certificate. <p>5 Maintenance and repair</p> <ul style="list-style-type: none"> - once installed, the product does not require any maintenance, provided that it remains installed strictly in accordance with the requirements of this Certificate and of the Certificate holder; - the Certificate holder must continue to provide a technical consulting service. 	
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<p>11 Regulations</p>	<p>1 Requirements: The Building Regulations (England and Wales) (as amended)</p> <ul style="list-style-type: none"> - B3(4) Internal fire spread (structure) – Junctions between roofs and compartment walls must be fire stopped. SuperQuilt 19 has a Class 1 surface spread of flame rating. The insulation must not be carried over junctions between roofs and walls required to provide a minimum period of fire resistance; - C4 Resistance to weather and moisture – SuperQuilt 19 can adequately resist the passage of moisture to the underlying structure, provided the roof is constructed in accordance with either BS 6229² or BS 8217³ where applicable and the requirements of this Certificate; - J3 Protection of the building from heat-producing appliances – in order to comply with this Regulation SuperQuilt 19 must be adequately separated or shielded from a chimney, flue, fireplace recess, heat-producing appliance or hearth. The separations recommended, where appropriate, are detailed in Approved Document J supporting these Regulations, to which reference must be made; - L1 Conservation of fuel and power – roofs constructed using SuperQuilt 19 can be designed and constructed to provide a U-value of no greater than 0.20 W.m²K⁻¹; - Regulation 7 Materials and workmanship – SuperQuilt 19 is manufactured from suitably safe and durable materials for their application and can be installed to give a satisfactory performance. <p>2 Requirements: The Building Regulations (Scotland) (as amended)</p> <p>2.1 Regulations 8 (1) Durability of materials and workmanship</p> <ul style="list-style-type: none"> - SuperQuilt 19 is manufactured from acceptable materials and are considered to be adequately resistant to deterioration and wear under normal service conditions, provided they are installed in accordance with the requirements of this Certificate. <p>2.2 Regulation 9 Building Standards Construction</p> <p>Section 2 Fire</p> <ul style="list-style-type: none"> - 2.4 Cavity barriers - combustible materials are permitted in the roof cavity but require any opening to be sealed. The insulation must not be carried over junctions between roofs and walls required to provide a minimum period of fire resistance; - 2.5 Heat-producing, solid fuel burning or oil- or gas-fired installations - a roof, incorporating SuperQuilt 19 can be designed and constructed to comply with these Standards, provided that they are isolated from the flue of a gas-fired, solid fuel, or oil-fired heat-producing appliance by a separation. The insulation must be adequately separated from a fire place opening, recess, hearth or flue pipe, or from any heat-producing appliance. <p>Section 3 Environment</p> <ul style="list-style-type: none"> - 3.10 Precipitation – SuperQuilt 19 can adequately resist the passage of moisture to the underlying structure provided the roof is constructed in accordance with either BS 6229² or BS 8217³ where applicable and the requirements of this Certificate; - 3.15 Condensation – a roof formed using SuperQuilt 19 in accordance with the requirements of this Certificate and of BS 5250⁴, can be designed and constructed to comply with these Standards. <p>Section 6 Energy</p> <ul style="list-style-type: none"> - 6.1(b) Where a proposed roof U-value is not better than (or is greater than in Scotland) the relevant 'notional' value, additional energy saving measures will be required in the building envelope and/or services to achieve the required overall carbon dioxide emission rate reduction of about 20% in dwellings (18% to 25% in Scotland) and 23% to 28% in buildings other than dwellings; - 6.2.1. Conservation of fuel and power: the building fabric - external cavity roofs can be designed and constructed with SuperQuilt 19 to provide a U-value of no greater than 0.35 W.m²K⁻¹. <p>3 Requirements: The Building Regulations (Northern Ireland) (as amended)</p> <ul style="list-style-type: none"> - B2 Fitness of materials and workmanship – SuperQuilt 19 is manufactured from materials which are considered to be suitably safe and acceptable for use as vapour open roof cavity rain barrier; - C5 Resistance to moisture and weather – where SuperQuilt 19 is installed within a timber roof construction, that roof can be designed and constructed so as to prevent the passage of moisture or water vapour through it. Advice is given in section 10 of this Certificate; - C7 Condensation - a roof incorporating SuperQuilt 19 can be designed and constructed to prevent any harmful effect from moisture in the form of interstitial condensation; - E5(b) The product will not affect the external fire rating of a timber flat roof in which it is installed; - F2 Conservation of fuel and power – Timber roof constructions, incorporating SuperQuilt 19 between the ply decking and ceiling, can be designed and constructed to provide a U-value of no greater than 0.35 W.m².K⁻¹; - F3(2) The product can contribute to a building satisfying its Target Emission Rate; - L2 Heat-producing appliances and associated constructions – a roof, incorporating SuperQuilt 19 can be designed and constructed to comply with these Regulations, provided that the insulation is isolated from the flue of a gas-fired, solid fuel or oil-fired heat-producing appliance or an incinerator. They must be adequately separated from a chimney or fireplace recess, from a flue pipe, from a hearth or from a heat-producing appliance. 	
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