Number BAKQW 10-01	**BDA Agrément® BAKQW 10-01** + **KQ Certificate 58386/01**	**Category** Walls
Date 2010.11.30		**Phase** Design
Code 41 BF56		**Subject** Vapour open cavity rain barrier

Product	**Breather-Foil FR**
Producer	Yorkshire Building Services (Whitwell) Ltd. The Crags Industrial Park Morven Street UK-S80 4AJ Creswell Derbyshire T.: +44 (0) 844 9910044, F.: +44 (0) 844 9910055 E.: technical@ybsinsulation.com, I.: www.ybsinsulation.com
Description	Reflective insulation and vapour open cavity rain barrier made of aluminium foil faced polyethylene bubble film laminate.
Scope (use)	Vapour open cavity rain barrier with breathable open laps to allow moisture to escape from the inner leaf and reflective insulating layer for improving insulation to external cavity walls of timber frame construction, to be installed against the inner leaf sheathing within the cavity with the foil face on the clear cavity side.
Summary of certificate	This certificate covers the following: • 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 specific details • Installation procedure • Compliance with Building Regulations and NHBC Standards (sections 11 & 12)
Major points of assessment	**Breathability (sections 1.2 & 8.2)** The basic property of Breather-Foil FR concerns the breathability. BDA has assessed the breathability of Breather-Foil FR by testing it in situ as installed in a test rig[9]. This has shown that the breathability of the open laps is very effective. **Thermal performance aspects (sections 1.2 & 8.4)** Breather-Foil FR provides a method to enhance the thermal insulation and act as a vapour open membrane. The product can contribute in meeting the U-value requirement for an exterior wall. **Condensation and water penetration risk (section 8.5)** The performance of Breather-Foil FR with regard to interstial condensation, surface condensation and water penetration has been considered. **Behaviour in relation to fire (section 8.6)** An exterior wall system using Breather-Foil FR can be designed to meet the UK requirements. **Durability (section 8.7)** Breather-Foil FR is stable, rot-proof and durable and will remain effective as an insulant and vapour open cavity rain barrier for the life of the building in which it is installed.
Statement	It is the opinion of BDA and Kiwa that Breather-Foil FR is fit for its intended use, provided it is specified, installed and used in accordance with this Certificate. On behalf of BDA Test Institute Professor Nico Hendriks, MSCE Director CPD Notified Laboratory No. 1640 Testing accreditation RvA L 447 On behalf of Kiwa Certification Bouke Meekma Chief Operational Officer Notified Body NB 0620 Member of EOTA TB (Approval Body) Products accreditation RvA C 002 **Both accreditations are acknowledged by UKAS** **To check the validity of this document please consult www.bda.nl**

1. Conditions of use

1. Application

The assessment and certification of Breather-Foil FR relate to the use of the product in buildings with correctly detailed timber frame construction and masonry or discontinuous weather resistant cladding external cavity walls. A correctly installed vapour control layer shall be provided to the internal face of the timber frame. Breather-Foil FR can be applied in building constructions up to 18 metres above ground level. After installation of Breather-Foil FR and completion of the wall construction the wall construction shall allow for a clear cavity of 50 mm for masonry construction or 25 mm for discontinuous cladding. Breather-Foil FR shall not be exposed to organic solvents or plasticisers.

2. Assessment

Breather-Foil FR is not a normal breather membrane as defined by BS 5250:2002[2]. For this reason the product cannot be characterized nor tested by BS 4016:1997 *Specification for Flexible Building membranes (breather type).* BDA has assessed the breathability of Breather Foil FR by testing it in situ as installed in a test rig[9].
This has shown that the breathability of the open laps is very effective. Together with other tests as given in this Certificate it was also shown that the product when correctly installed contributes to the thermal performance of the total wall construction and prevents condensation to occur in walls. It is important that the joints at every roll width remain effectively open to obtain an optimal performance.

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.

2. Frame of reference

1. Directive BDA Agréments, September 2010
2. BS 5250: 2002 *Code of practice for control of condensation in buildings*
3. BS 5268 *Code of practice for timber*
4. BS 5628 Part 3:*2001 Code of practice for the use of masonry: materials and components, design and workmanship*
5. BS 4016:1997 *Specification for flexible building membranes (breather type)*
6. BS 8000:Part 3:2001 *Workmanship on building sites: code of practice for masonry*
7. BS 8000:Part 4:1982 *Workmanship on building sites: code of practice for waterproofing*
8. NHBC Standards, Chapter 6.2 *External timber framed walls*
9. BDA Report 0021-L-08/2: *Breather-Foil FR, hygrothermal testing, 2008.06.17*
10. BDA Report 0270-K-10/1: *Breather-Foil FR, initial Type Testing, 2010.11.12*
11. BDA Report 0082-L-09: *Breather-Foil FR, air permeability tests, 2009.04.01*
12. Bodycote warringtonfire Report nr. 181614: *BS 476:Part 7: 1997, Method For Classification Of The Surface Spread Of Flame Of Products, 2009.03.31*
13. BDA-Kiwa report: *Technical Documentation, containing information to demonstrate the conformity of the products to the applicable requirements of BDA Agrément®+ KQ certificate BAKQW 10-01/58386/01*

3. Independently verified product characteristics

• Nominal thickness BS EN 823:1995[10]	: 4 mm
• Nominal width BS EN 1848-2:2001[10]	: 1350/2620 mm
• Nominal length BS EN 1848-2:2001[10]	: 25/50 m
• Installed air permeability at 50 Pa BS EN 12153[10]	: 54 $m^3.m^{-2}.(24h)^{-1}$
• Thermal resistance of foil, bubble film laminate and minimum 25 mm*) clear cavity R_g BS EN 12667:2001[10]	
- calculated according BS EN ISO 6946[10]	: 0,786 $m^2.K.W^{-1}$
- recommended calculation value[10]	: 0,770 $m^2.K.W^{-1}$
• Hemispherical emissivity of foil face	
- measured value prEN 16012:2010[10]	: 0,05 ± 0,01
- recommended calculation value[10]	: 0,06
• Thermal resistance, bubble film laminate only BS EN 12667:2001[10]	: 0,121 $m^2.K.W^{-1}$
• Nail tear resistance BS EN 12310-1:1999, minimal[10]	: 70 N

*) For masonry the minimum cavity is 50 mm

4. Ancillary items (outside scope of this certificate)	• Breather-Foil Insulation aluminium foil-backed tape with acrylic adhesive for repair and detailing of the product, width 75 mm • 14 mm staples or nails • vapour control layer
5. Factory prodution control (FPC)	Kiwa Certification, Approval Body, has determined that Yorkshire Building Services (Whitwell) Ltd. (YBS), with respect to the product Breather-Foil FR fulfils all provisions concerning the attestation of conformity and the performances described in the specifications of this certificate. The Factory production control system of YBS is in line with the Technical Documentation from the producer[13]. Kiwa has performed the initial inspection of the factory and of the factory production control and performs the continuous surveillance of the factory production control.
6. Quality control	Breather-Foil FR is produced under an independently certified EN ISO 9001: 2000 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: • 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 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.
7. Annual verifiction procedure	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. 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: • Thickness BS EN 823:1995 • Width BS EN 1848-2:2001 • Length BS EN 1848-2:2001 • Hemispherical emissivity of foil face prEN 16012:2010 • Thermal resistance, bubble film laminate only BS EN 12667:2001
8. Points of attention for the specifier	1. The product is delivered in rolls packed in a protective sealed bag and should include product name, dimensions, the BDA identification mark, the Kiwa KQ mark and the number of this certificate. 2. **Breathability** After proper installation as described in this Certificate the breathable open laps of the Breather-Foil FR membranes (see figures 1 and 2) will allow moisture to escape from the inner leaf of the wall construction into the cavity.

8. Points of attention for the specifier (continued)

3. **Wall insulation**
   - the building physical behaviour of wall structures incorporating 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. He will check the building physical behaviour of the designed wall construction and if need be, give advice about improvement to achieve final specification;
   - Breather-Foil FR must be installed in accordance with the requirements of the manufacturer's instructions and this certificate;
   - Breather-Foil FR must be applied to the inner leaf timber frame sheathing with the foil face of the bubble film facing outwards into the cavity, ensuring 75 mm horizontal overlaps are positioned to create a waterproofing lap.

4. **Thermal performance aspects**
   - Breather-Foil FR provides a method to enhance the thermal insulation and act as a vapour open membrane (by means of open joints at every roll width) within external cavity walls with a timber frame inner leaf. Walls incorporating the insulation can be constructed to give a U-value below 0,30 $W.m^2.K^{-1}$. The thermal resistance of the product and associated clear cavity is given on page 2 of this document;
   - 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 section 11 of this certificate;
   - a typical wall timber frame construction with Breather-Foil FR vapour open cavity rain barrier is given in figure 1.

5. **Condensation and water penetration risk**
   - walls incorporating the product will adequately limit the risk of interstitial condensation when designed and installed in accordance with this certificate;
   - Breather-Foil FR presents no significant risk of water penetration provided that masonry cavity walls are designed and constructed to the requirements of BS 5628 Part 3[4] to prevent moisture penetration, that discontinuous cladding has appropriate laps and due attention is made of the building exposure rating. Where the clear cavity, after the installation of Breather-Foil FR, exceeds 50 mm the product can be used in any exposure zone;
   - it is essential that cavity walls incorporating the product in the cavity are designed in such a way that they contain the normal precautions against moisture ingress;
   - specifically the continuity of vapour control layers must be maintained at laps and joints;
   - all sorts of perforations should be kept to a minimum and well be sealed;
   - Breather-Foil FR does not absorb water by capillarity. Where Breather-Foil FR bridges dpc level, water is not transferred from the ground to the construction.

6. **Behaviour in relation to fire**
   - Breather-Foil FR will not impair the fire resistance performance of the walls. Since the insulation is combustible it must be adequately separated from: heat producing appliances, incinerators, hearths, ductwork for high temperature gases, flues, chimneys and fire places or recesses (see regulations);
   - when tested to BS 476 Part 7 Surface spread of flame Breather-Foil FR is designated Class 1[12].

7. **Durability**

   The product is stable, rot-proof and durable and will remain effective as vapour open cavity rain barrier and insulant for the life of the building in which it is installed. There is no risk for moth or beetle infestation.

9. Specific details

Figure 1 – Typical wall timber frame construction with Breather-Foil FR vapour open cavity rain barrier and masonry construction

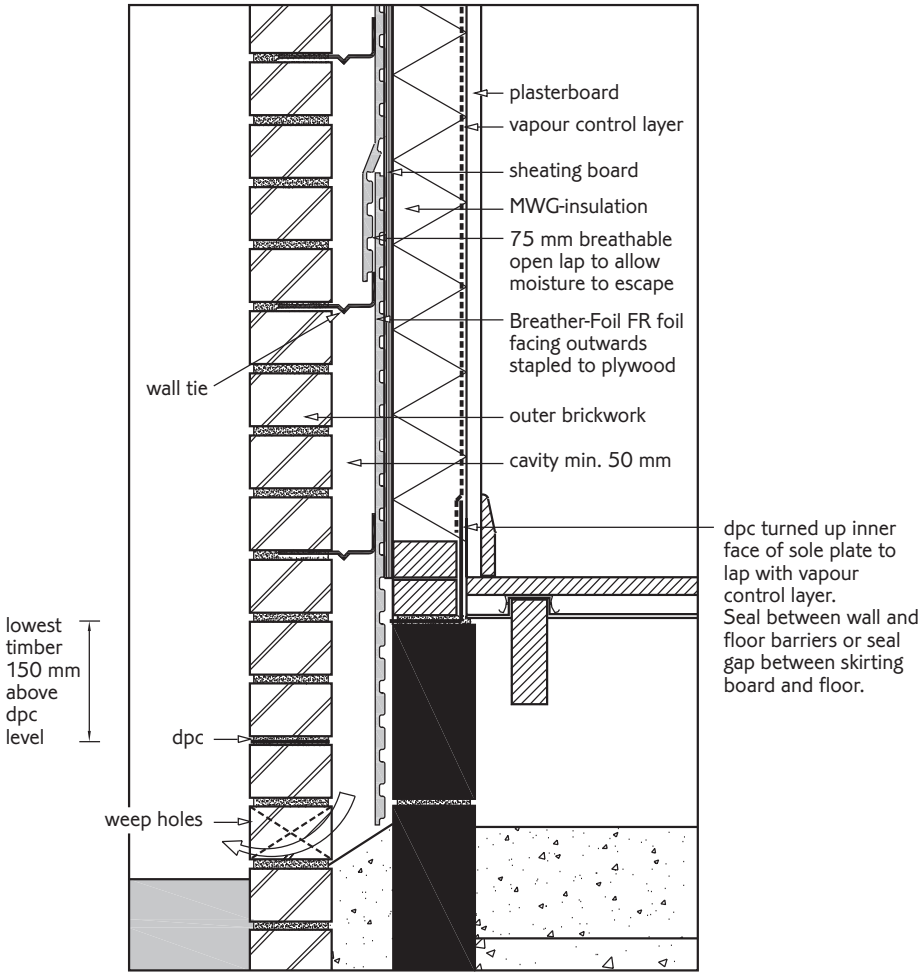
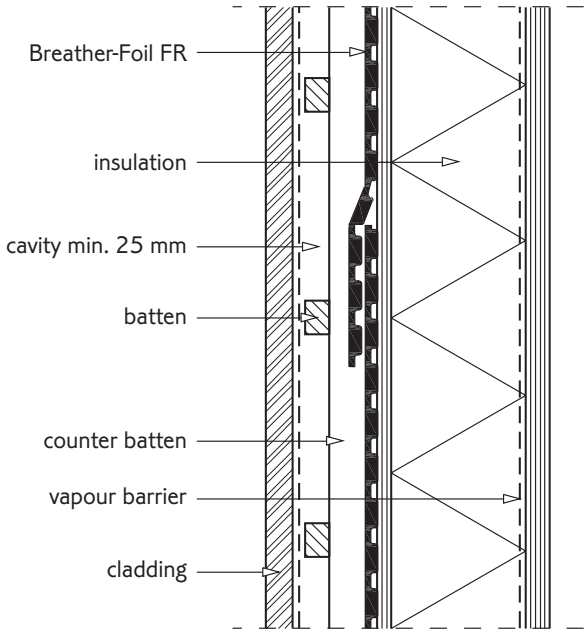


Figure 2 – Typical wall timber frame construction with Breather-Foil FR vapour open cavity rain barrier and external cladding



10. Installation procedure

1. **General**
   - installation of Breather-Foil FR 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 aluminum foil-backed tape with acrylic adhesive for repair in detailing of the product,
     as provided by the Certificate holder, see section 4 of this certificate;
   - the product should be attached to the inner leaf timber frame sheathing by using staples or nails of at least 14 mm length and secured with wall ties;
   - Breather-Foil FR must be applied with the foil face of the bubble film facing outwards into the cavity, ensuring 75 mm horizontal overlaps are positioned to create a waterproofing lap;
   - when the product is cut to fit around openings or connections, gaps must be minimized; any exposed cut edges should be sealed with aluminum foil-backed tape with acrylic adhesive for repair in detailing of the product,
     as provided by the Certificate holder, see section 4 of this certificate;
   - the outer leaf must be built ensuring that the designed minimum clear cavity is maintained. After raising each masonry section, loose mortar must be cleaned from the insulation, not allowing mortar to fall into the cavity;
   - at external and internal corners Breather-Foil FR should be laid with overlaps with a minimum width of 150 mm.
     It should be wrapped around the corner and the overlap secured with staples;
   - at ground level Breather-Foil FR must extend below the level of internal flooring insulation. The installation of Breather-Foil FR should be carried out to the highest level of each wall;
   - during construction Breather-Foil FR will provide a temporary rain screen, but the external cladding should be completed as soon as possible. In exposed conditions the vertical laps must be secured with battens;
   - timber and timber products shall either be naturally durable or where necessary be treated with preservative to give adequate resistance against decay and insect attack;
   - a typical installation built-up is given in figure 1.

2. **Delivery and site handling**
   - 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. **Maintenance and repair**
   - once installed, the product does not require any maintenance for the design life of the building, 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.

11. Regulations

1. **Requirements: The Building Regulations (England and Wales) (as amended)**
   - B3(4) Internal fire spread (structure) – combustible materials are permitted by the regulation. Breather-Foil FR has a Class 1 surface spread of flame rating.
   - C4 Resistance to weather and ground moisture – Breather-Foil FR can adequately resist the passage of moisture to the underlying structure, provided the wall is constructed in accordance with BS 5628:Part 3: 2001[4] and the requirements of this Certificate.
   - J3 Protection of the building from heat-producing appliances – in order to comply with this Regulation Breather-Foil FR must be adequately separated or shielded from a chimney, flue, fireplace recess, heat-producing appliance or heath. 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 – walls constructed using Breather-Foil FR can be designed and constructed to provide a U-value of not greater than 0.30 $W.m^{-2}K^{-1}$.
   - Regulation 7 Materials and workmanship – Breather-Foil FR is manufactured from suitably safe and durable materials for their application and can be installed to give a satisfactory performance.

11. Regulations (continued)

2. **Requirements: The Building (Scotland) Regulations (as amended)**

2.1 **Regulations 8 (1) Durability of materials and workmanship**

- Breather-Foil FR is manufactured form 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.

2.2 **Regulation 9 Building Standards Construction**

Section 2 Fire

- 2.4 cavity barriers - combustible materials are permitted in the cavity but require any opening to be sealed.
- 2.5 Heat-producing, solid fuel burning or oil- or gas-fired installations - a wall, incorporating Breather-Foil FR can be designed and constructed to comply with these Standards, provided that they are isolated from the flue of a gas-fired, or 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.

Section 3 Environment

- 3.10 Precipitation – Breather-Foil FR can adequately resist the passage of moisture to the underlying structure provided the wall is constructed in accordance with BS 5628: Part 3[4] and the requirements of this Certificate.
- 3.15 Condensation – a wall formed using Breather-Foil FR in accordance with the requirements of this Certificate and of BS 52502, can be designed and constructed to comply with these Standards.

Section 6 Energy

- 6.2.1. Conservation of fuel and power: the building fabric - external cavity walls can be designed and constructed with Breather-Foil FR to provide a U-value of less than 0.27 $W.m^{-2}K^{-1}$.

3. **Requirements: The Building Regulations (Northern Ireland) (as amended)**

- B2 Fitness of materials and workmanship – Breather-Foil FR is manufactured from materials which are considered to be suitably safe and acceptable for use as cavity wall insulation for an external wall.
- C5 Resistance to ground moisture and weather – where Breather-Foil FR is installed within an external cavity wall, that wall can be designed and constructed so as to prevent the passage of moisture or moisture or water vapour through it. Advice is given in ref. 3.
- C7 Condensation - a wall incorporating Breather-Foil FR can be designed and constructed to prevent any harmful effect from moisture in the form of interstitial condensation.
- E6 Internal fire spread: structure – combustible materials are permitted in an external cavity wall.
- F2 Conservation of fuel and power – External cavity walls, incorporating Breather-Foil FR between the inner and outer external wall leaves, can be designed and constructed to provide a U-value no greater than 0.30 $W.m^{-2}.K^{-1}$.
- L2 Heat-producing appliances and associated constructions – a wall, incorporating Breather-Foil FR can be designed and constructed to comply with these Regulations, provided that the insulation is isolated from the flue of a gas-fired, or solid fuel of 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 the appliance.

12. NHBC Standards

NHBC accepts the use of Breather-Foil FR, provided it is specified, installed and used strictly in accordance with this Certificate, in relation to the NHBC Standards, Chapter 6.2 *External timber framed walls*[8].