Number BAR 14-030/02/A **Replaces:** BAR 14-030/01/A	BDA ADVIES kiwa Partner for progress **BDA Agrément® BAR 14-030/02/A**	**Category** New built and retrofit existing flat roofs
Date 2014.03.15		**Phase** Assessment
Project number 13-B-0739		
Validity See www.bda.nl		**Subject** Liquid applied waterproofing system

System	**EcoProof™ ST Roofing System**
Supplier (Certificate holder)	EcoProof Ltd. The Enterprise Zone Portobello Sheffield S1 4DP, UK T. : +44 (0) 8443 356 386 E. : support@ecoproof.com W.: ecoproof.com
Description	Cold liquid applied (by low-pressure spraying, roller or brush) modified bitumen emulsion waterproofing system ('kit' according to BDA Guideline-BDA Agrément®1) with or without a carrier of polyester/polypropylene non-woven mat and with or without an in situ applied mineral finish.
Scope (use)	Waterproofing of new built flat roof constructions and over coating of existing flat roof surfaces (see section 7.2) including but not limited to single ply, asphalt, concrete, bitumen roofing felt, thermal insulation and timber and existing pitched roof surfaces of metal or asbestos.
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; • Quality control and continuous surveillance; • Points of attention for the specifier and specific details; • Installation procedure; • Compliance with Building Regulations and non-regulatory Standards.
Major points of assessment	**Walkability aspects (sections 7.1 & 7.2)** The unprotected EcoProof™ Roofing System will resist the effects of limited foot traffic and loads associated with installation and maintenance of the systems without damage. **Water tightness aspects (section 7.3)** An important property of the EcoProof™ Roofing System concerns the water tightness. The system will resist the passage of water and any other form of moisture infiltration into the substrate, details and the building. **Detachment risk (section 7.4)** The EcoProof™ Roofing System will sufficiently resist the effects of any likely wind up-lift forces and the effects of thermal or other minor movements of the substrate likely to occur in practice. **Condensation risk (section 7.5)** The performance of a roof construction waterproofed with the EcoProof™ Roofing System with regard to interstitial condensation and surface condensation has been considered. **Behaviour in relation to fire (section 7.6)** The refurbishment of an existing flat roof using an EcoProof™ Roofing System can be designed to meet the UK requirements. **Durability (section 7.7)** The unprotected EcoProof™ Roofing System will provide under normal service conditions a durable waterproof covering with a service life of at least 20 years.
Statement	It is the opinion of the Kiwa BDA Expert Centre Building Envelope (ECBE) that the EcoProof™ Roofing System is fit for its intended use, provided it is specified, installed and used in accordance with this Certificate. Professor Nico Hendriks, MSc ECBE Chairman Authorisation: Chris van der Meijden, MSc BDA Group Technical Director

Version 02	**Kiwa BDA Expert Centre** **Building Envelope (ECBE)** Department of BDA Group Avelingen West 33 P.O. Box 389 NL – 4200 AJ Gorinchem T : +31(0)183 669690 F : +31(0)183 630630 E : groep@bda.nl W: www.bda.nl Copyright© 2014 BDA	Page 1 of 8 pages

1 Conditions of use

1 Application

The assessment of EcoProof™ Roof System relates to the use of the systems for new built and retrofit existing flat roofs of dwellings and buildings with similar temperature and humidity conditions with correctly installed continuously supported coverings, which have been designed and constructed in accordance with, but not limited to, the relevant clauses of BS 6229[2] and BS 8217[3] or any other structurally sound substrates. The products used for the systems are not classified as dangerous according to EU directive 199/45/EC.

2 Assessment

Kiwa MPA Bautest[*)] and Kiwa BDA Testing[**)] have assessed the EcoProof™ Roofing Systems according to ETAG 005:2004 – Guideline for European Technical Approval of Liquid Applied Roof Waterproofing Kits[4]; a summary of the test results is given in section 3 of this Certificate. Kiwa BDA Expert Centre Building Envelope (ECBE) has assessed all aspects related to the quality control, specifications, installation procedure and Building Regulations.

**) CPD Notified Laboratory Nr. NB 2007*

***) CPD/CPR Notified Laboratory Nr. NB 1640; Testing Accreditation RvA L 447 (acknowledged by UKAS)*

3 Installation

The systems shall only be installed by contractors who's employees have been trained and approved by the Certificate holder. The systems shall be installed strictly in accordance with the instructions of the Certificate holder and the requirements of this Certificate. EcoProof™ systems shall only be sprayed by those who have access to a suitable spraying machine, as provided by the Certificate holder.

4 Geographical scope

The validity of this document is limited to England, Wales, Scotland and Northern Ireland, with due regard to section 10. Regulations.

5 Validity

The purpose of this BDA Agrément® is to provide for well-founded confidence to apply the EcoProof™ Roofing System in the described applications and according to approved specifications (see also article 9.3). According to the BDA Guideline – BDA Agrément®[1] the validity of this document is therefore three years after the official date of issue, published on www.bda.nl. After this the validity can be extended every three years after positive review, under the strict condition that the EC FPC Certificate[10] also remains valid, see section 6.

2 Frame of reference

1 BDA Guideline – BDA Agrément®, 12th December 2013
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 ETAG 005:2004, parts 1, 2 and 7 Guideline for European Technical Approval of Liquid Applied Roof Waterproofing Kits
5 Kiwa MPA Bautest report DD 4055/2011: Testing of IsoBran S and R-roof systems *(identical to EcoProof™ Roofing Systems)* according to ETAG 005[4], 17th January 2011 *(in German)*
6 Test Institute Hoch report PB-Hoch-110451: Determination of reaction to fire of IsoBran S and R-roof systems *(identical to EcoProof™ Roofing Systems)* according to ETAG 005-01[4], 17th May 2011 *(in German)*
7 Test Institute Hoch report KB-Hoch-110452-2: Classification using test data from reaction to fire of IsoBran S and R-roof systems *(identical to EcoProof™ Roofing Systems)* according to 5.2.1 ETAG 005-01[4], 17th May 2011 *(in German)*
8 Colas Health & Safety Information Data Sheet No. 30b on the ingredients bitumen, water and emulsions (A1-60) of EcoProof™ , 4th May 2007
9 EcoProof™ Material Safety Data Sheet No. Eco 0002 on polyester/polypropylene non-woven mat, 4th August 2008
10 EC Certificate of Factory Production Control GB11/83612: Surface protection coating system for concrete by spraying, placed on the market by EcoProof Ltd., issued by SGS United Kingdom Limited, Notified Body 0120, 19th February 2014
11 BS EN 1504-2:2004 Products and systems for the protection and repair of concrete structures - Definitions, requirements, quality control and evaluation of conformity - Part 2: Surface protection systems for concrete
12 EcoProof™ Specifications for single ply, asphalt, concrete, bitumen roofing felt, thermal insulation, metal, asbestos and timber roofs, as provided by EcoProof Ltd. 27th August 2013
13 Exova Warrington Test Report No. 310890: External Fire Exposure Test - EcoProof Limited, 6th September 2011
14 BS 476 Part 3:2004 British Standard Specification for Fire Tests on Building Materials and Structures - External Fire Exposure Roof Tests
15 NHBC Standards Chapter 1, Technical Requirement R3 and Chapter 7.1 Flat Roofs and Balconies
16 BS 5250:2011 Code of practice for control of condensation in buildings
17 BS 1607:2013 Thermal insulating products for building applications. Determination of tensile strength perpendicular to faces

Remark: in the text of this document reference is made to these sources by adding the relevant reference number in superscript

3 Independently verified system characteristics of components used for critical functions*)

EcoProof™ ST

*) The critical functions which apply to this section and section 4 are the behaviour in relation to fire, weatherproofing and durability, as mentioned in R3(a) of the NHBC Standards[15]

All characteristics have been determined according to ETAG 005[4] as given in Kiwa MPA Bautest report DD 4055/2011[5]

• Identification properties			
- min. thickness, as applied	:	2.0	mm
- min. mass, as applied without mineral finish polyester/polypropylene carrier	:	1.5	$kg.m^{-2}$
- nominal mass	:	100	$g.m^{-2}$
- minimum tensile strength (BS ISO 9073-3)	:	210	N
- elongation at break	:	45-50	%
• reaction to fire classification (BS EN 13501-1)[6]	:	Euroclass E	
• resistance to external fire exposure[13]			
- category (BS 476: Part 3:2004)[14]	:	EXT. F. AB	
• water vapour diffusion resistance	:	72.4	m
• water tightness at 200 kPa/72h	:	tight	
• wind up-lift resistance	:	365	kPa
• resistance to mechanical damage (5°C - 40°C)			
- static indentation classification on steel	:	L3	
on EPS	:	L4 (L3 at 5°C and 40°C)	
- dynamic indentation classification on steel	:	I3	
on EPS	:	I3	
• fatigue cycling resistance classification of fully or partly bonded system	:	W1	
• resistance to low and high temperature effects			
- dynamic indentation at -10°C classification	:	I2	
- low temperature flexibility at -10°C	:	pass	
- static indentation at 60°C on steel classification of EcoProof™ ST[5]	:	L1	
• resistance to heat ageing (100 d at 80°C)			
- dynamic indentation classification on steel	:	I2	
- fatigue resistance classification	:	W1	
• resistance to UV-radiation and moisture			
- dynamic indentation classification on steel	:	I2	
- low temperature flexibility at -10°C	:	pass	
• resistance to water ageing (60 d at 60°C)			
- static indentation on steel classification of EcoProof™ ST[5]	:	L1	
• installation temperature[12]	:	+5 to +35	°C
• service temperature[12]	:	-15 to +40	°C

4 Assessed ancillary items used for critical functions*)

*) See section 3

- EcoProof™ Flood Coat to seal in any porous surface
- EcoProof™ Liquid Membrane to be applied by roller or brush in details
- EcoProof™ Mastic Adhesive to fill any gaps
- EcoProof™ Strengthening Tape, a geotextile reinforcement tape used in conjunction with EcoProof™ Mastic Adhesive to prepare the surface ready for waterproofing with EcoProof™ Liquid Membrane or the EcoProof™ Roofing System. It should be used to reinforce and cover joints, large gaps, pipe work, up-stands, 90° angles and any other detail and preparation areas
- EcoProof™ Grey Top Coat to provide for a solar reflective finish

5 Quality control

EcoProof™ Roofing System components are produced under a Quality Management System, which enables the Certificate holder to demonstrate that the components fulfil 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 system components that conform to the specifications in this Certificate;
- the supplier must identify and document the essential requirements that are relevant for the components 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 components conform to the identified safety requirements;
- the Certificate holder in its measurement and control of the production process and finished components 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

5 Quality control (continued)

- 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;
- SGS UK Ltd., Notified Body 0120 has performed the initial inspection of the factory and of the Factory Production Control (FPC) and performs the continuous surveillance and approval of the FPC. In compliance with the CPD/CPR it has been stated that the construction products EcoProof™ Roofing System are submitted by the manufacturer to the initial type-testing of the products of samples taken at the factory in accordance with a prescribed test plan; the EC FPC Certificate GB11/83612[10] attests that all provisions concerning the attestation of conformity and the performances described in Annex ZA of BS EN 1504-2:2004[11] was applied and that the product fulfils all the prescribed requirements.

6 Continuous surveillance

The EC FPC Certificate of Factory Production Control GB11/83612[10] is valid until the 1st May 2016 and remains valid subject to satisfactory surveillance audits and the conditions in the factory or the FPC itself are not modified significantly, see also section 1, article 5.

7 Points of attention for the specifier

1 Roof design

- within the geographical scope (see section 1.4) EcoProof™ Roofing System ST (ST= Standard Temperature) will be appropriate in practically all cases; in cases where due to unusual circumstances relatively high surface temperatures (> 40°C) could occur during relatively long periods (> 4 weeks), advice should be asked from the Certificate holder;
- the roof construction shall conform with current Building Regulations, British Standards and relevant Codes of Practice;
- the access to the roof shall be limited, meaning roofs subjected only to pedestrian traffic for maintenance of the roof covering and cleaning of gutters, etc;
- the minimum finished fall of a flat roof surface shall be 1 : 80;
- the minimum finished fall of a pitched roof surface shall be 1 : 6;
- the roof type shall be acceptable according to article 7.2;
- the existing roof finishing shall form an acceptable surface according to article 7.2;
- the substrate for the EcoProof™ Roofing System shall be designed, constructed and prepared in accordance with the relevant clauses of BS 6229[2] and BS 8217[3];
- EcoProof™ Roofing System can be applied either without or with a finish of mineral granules or with EcoProof™ Grey Top Coat to provide for a solar reflective finish.

2 Acceptable roof types and surfaces

Within the framework of this Certificate the following roof types and roof covering types are allowed to be waterproofed with EcoProof™ Roofing Systems (see also the figures in section 8), with due respect to article 7.1 and the NHBC Standards, reference **R3(a), (iv)**:

Roof types:

- warm exposed flat roofs
- cold exposed pitched metal or asbestos roofs with a maximum pitch
- inverted roof build-ups with aggregate or paver ballast on flat roofs

Attention: green roof specifications have not been tested

Roof covering types:

- single ply
- asphalt
- concrete
- bitumen roofing felt
- corrugated metal
- corrugated asbestos
- timber

The fitness for purpose of the substrates shall be established according section 9, article 3 of this Certificate.

3 Water tightness

- an important property of the EcoProof™ Roofing System concerns the water tightness; the systems will resist the passage of water and any other form of moisture infiltration into the substrate, details and the building;
- tests[5] have shown that roof constructions waterproofed with the system when installed in accordance with section 9 of this Certificate meet or comply with the relevant requirements of the National Building Regulations:
  England and Wales – Approved Document C, Requirement C2(b), Section 6
  Scotland – Mandatory Standard 3.10, clauses 3.10.1 and 3.10.7
  Northern Ireland – Regulation C4(b).

7 Points of attention for the specifier (continued)

4 Detachment risk

- tests[5] have shown that the EcoProof™ Roofing System will sufficiently resist the effects of any likely wind up-lift forces;
- when installed in accordance with section 9 of this Certificate the system will provide a waterproof roof resisting sufficiently the effects of thermal or other minor movements of the substrate likely to occur in practice.

5 Condensation risk

Roofs incorporating the system will adequately limit the risk of interstitial condensation when designed in accordance with BS 5250[16].

6 Behaviour in relation to fire

- the system does not prejudice the fire-resistance properties of the roof. Therefore, the components of the system will not contribute to the development stages of a fire or present a smoke or toxic hazard;
- when properly installed, the system will not add significantly to any existing fire hazard;
- the reaction to fire has been classified[7] as Euroclass E according to BS EN 13501-1;
- the resistance to external fire exposure has been categorized as EXT. F. AB according to BS 476: Part 3:2004.

7 Durability

The system is stable, rot-proof and will provide under normal service conditions a durable waterproof covering with a service life of at least 20 years. There is no risk for moth or beetle infestation.

8 Specific details

Figure 1 – Typical build-up of flat roof application of the EcoProof™ Roofing System

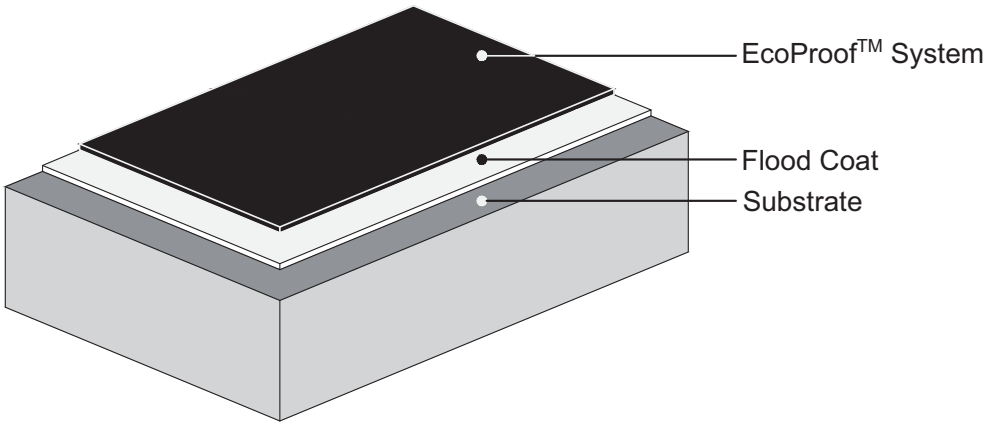
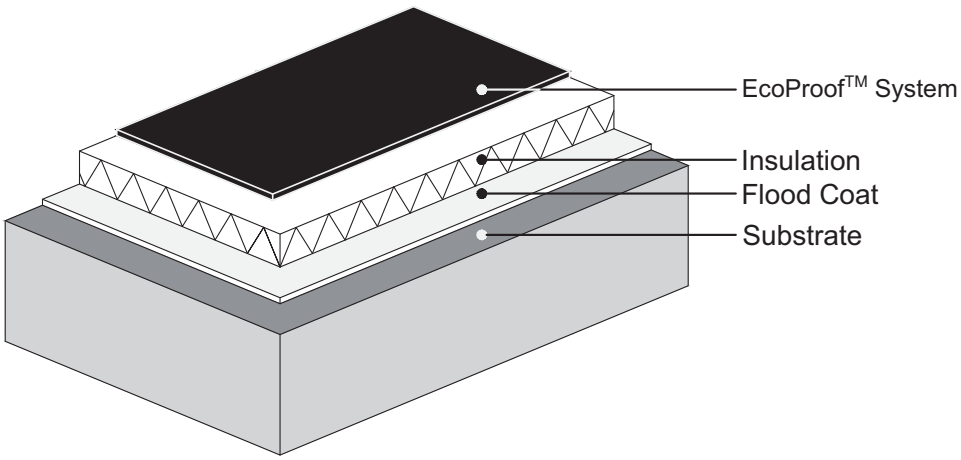


Figure 2 – Typical build-up of flat roof application of the EcoProof™ Roofing System with additional thermal insulation



8 Specific details (continued)

Figure 3a – Detailing cracks and joints in existing roof finishing; all cracks ≥ 1 mm shall be treated; cracks ≥ 3 mm shall firstly be filled with EcoProof™ Mastic Adhesive
Note: in case of new constructed roofs the maximum allowable width of a crack to be treated is 3 mm, substrates showing cracks >3 mm shall be repaired structurally by the responsible contractor before the EcoProof™ Roofing System is applied

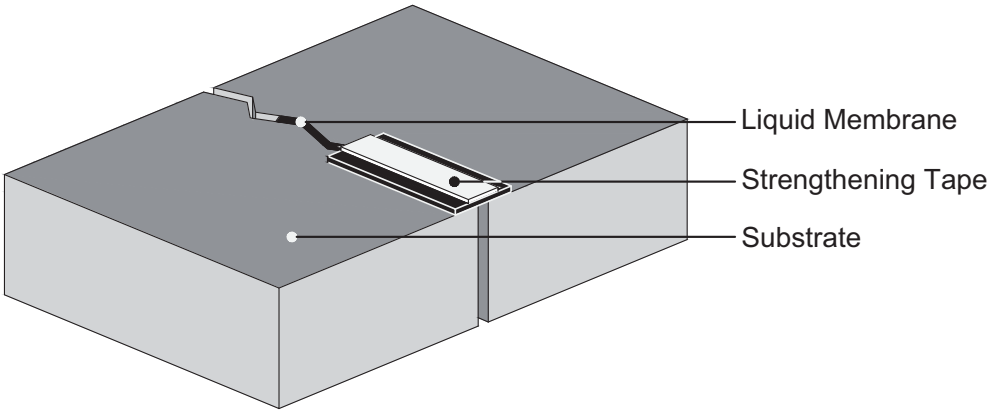
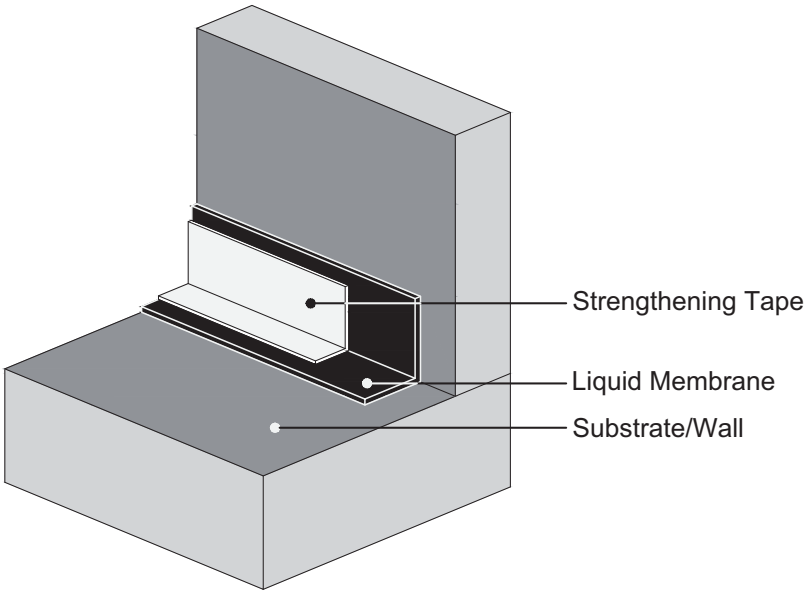


Figure 3b – Detailing angles



Remark 1: As part of the required technical consulting service (see paragraph 9.5) the Certificate holder can provide, for special (cad) details, for example on openings, outlets and gutters.

Remark 2: EcoProof Ltd. hosts regular training programmes to provide contractors with the necessary skills and product knowledge to become a fully certified EcoProof Approved Contractor.

9 Installation aspects

1. General

- the systems shall be installed strictly in accordance with the instructions of the Certificate holder and the requirements of this Certificate and only by contractors who's employees have been trained and approved by the Certificate holder. EcoProof™ systems shall only be sprayed by those who have access to a suitable spraying machine;
- installation of EcoProof™ Roofing Systems and ancillary items shall be in accordance with the Certificate holder's specifications[12] and current good building practice;
- cracks, substrate damage and deterioration shall be repaired prior to installation of the waterproof membrane system in accordance with the relevant clauses of BS 6229[2] and BS 8217[3];
- all surfaces to be waterproofed shall be structurally stable, clean, dry and free from release agents, dust, laitance, oils, paints or other forms of contamination;
- after cleaning and preparation of the substrate is complete, all surfaces shall be inspected for surface irregularities (such as cracks, blisters and plies) and suitable repairs made according to section 8, figure 3a and the installation instructions of the Certificate holder[12];
- EcoProof™ Roofing Systems shall not be applied at an ambient temperature < 5°C.

2. Delivery and site handling

- the components of the EcoProof™ Roofing Systems are delivered on site in protective containers; the label should include product component name, the suppliers name, health and safety information, weight, the BDA identification mark, preparation and installation instructions and the number of this Certificate; it is recommended to read the Material Safety Data Sheet (MDDS) carefully prior to the opening of the containers;
- the containers should be stored in clean, dry conditions, not exposed to sunlight;
- the containers must be protected from being dropped or crushed by objects; care must be exercised when storing large quantities on site;
- the containers 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 components when installed, on site precautions must be taken to protect them from mud and dirt.

3. Fitness for purpose of the substrate

- right from the start of a project the substrate on the actual location must be assessed to establish its being fit for purpose; it is recommended to perform a pulling test according to BS EN 1607[17] on the adhesion, the tensile strength perpendicular to the roof surface shall be at least 4 kPa;
- the application of EcoProof™ Roofing System is only allowed on a substrate fit for purpose; it is essential that the following specific performance requirements are met:
  - flatness in accordance with the relevant clauses of BS 6229[2] and BS 8217[3]
  - durable strength of the structure which must be capable of absorbing all forms of external loadings as established by a Structural Engineer to BS EN 1991 (Eurocode 1)
  - stiffness, durable adhesion and pre-treatment of the substrate in accordance with the relevant clauses of BS 6229[2] and BS 8217[3]
- in case the fitness for purpose has not been demonstrated, installation of the EcoProof™ Roofing System is not allowed within the framework of this Certificate.

4. Roof installation

- it is recommended to start with the detailing; guidance is given in the figures 3a and 3b of section 8 and in the EcoProof™ Specifications[12];
- leave between 1 – 2 hours for the detailing to be fully cured before application of the main membrane;
- the main membrane of the EcoProof™ Roofing Systems is a two coat system applied by brush, roller or airless spray; the contractor is to determine the most suitable method of application;
- the main membrane should be applied at an average rate of 1.0 $l.m^2$ per coat; the first coat must allow to dry before applying the second coat;
- any required mineral finishing must be scattered in the still uncured top coat in a minimum quantity of 1.5 $kg.m^{-2}$.

5. Maintenance and repair

- once installed strictly in accordance with the requirements of this Certificate and of the Certificate holder, the applied system only requires normal maintenance, comparable with the maintenance as required for single-ply and bitumen felt roof surfaces;
- the system should be subjected to regular annual inspections by a competent approved contractor and roof drains and gutters kept clear as is good practice;
- if during the inspection any damage e.g. in the form of cracks or fish mouthing is observed, these damages shall be repaired (preferably during the inspection) using the same method as given in the specifications of the Certificate holder[12] and illustrated in figure 3a of section 8 of this Certificate;
- the Certificate holder must continue to provide a technical consulting service, such as but not limited to special (cad) details.

10 Regulations

1. Requirements: The Building Regulations (England and Wales) (as amended)

- B4(2) External fire spread – tests[6,13] indicate that on suitable substructures the use of the system will enable a roof to be unrestricted under this Requirement; EcoProof™ Roofing Systems have a Euroclass E rating and Category EXT. F. AB, see section 7.5 of this Certificate;
- C2(b) Resistance to moisture - tests for water tightness of the system, including joints[5], indicate that the system meets this Requirement, see section 7.3 of this Certificate;
- Regulation 7 Materials and workmanship – EcoProof™ Roofing Systems are manufactured from suitably safe and durable materials for their application and can be installed to give a satisfactory performance, see section 9 of this Certificate.

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

2.1 Regulations 8 (1)(2) Durability of materials and workmanship

- EcoProof™ Roofing Systems are 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, see section 9 of this Certificate.

2.2 Regulation 9 Building Standards Construction

Section 2 Fire

- 2.8 Spread from neighbouring buildings – tests[6,13] indicate that the system when applied to a non-combustible substrate, can be assessed as having low vulnerability under clause 2.8.1 of this Standard, EcoProof™ Roof Systems have a Euroclass E rating and Category EXT. F. AB, see section 7.5 of this Certificate;

Section 3 Environment

- 3.10 Precipitation – a roof waterproofed with an EcoProof™ Roofing System can adequately resist the passage of moisture provided the roof is constructed in accordance with BS 6229:2003[2] and Section 9 of this Certificate, with reference to clauses 3.10.1 and 3.10.7 of this Standard;

2.3 Regulation 12 Building Standards Construction

All comments given for the EcoProof™ Roofing System under Regulation 9 also apply to this Regulation, with reference to clause 0.12 and Schedule 6 of this Standard.

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

- B2 Fitness of materials and workmanship – EcoProof™ Roofing Systems are manufactured from materials which are considered to be suitably safe and acceptable for use as waterproofing and finishing of roofs as described in this Certificate, see sections 7 and 9;
- C5 Resistance to moisture and weather – where EcoProof™ Roofing Systems are installed on roofs as described in this Certificate, these roofs can be designed and constructed so as to prevent the passage of moisture or water vapour through it. Guidance is given in sections 7 and 9 of this Certificate;
- E5(b) External Fire spread – tests[6,13] indicate that on suitable substructures the use of the system will enable a roof to be unrestricted under this Requirement; EcoProof™ Roof Systems have a Euroclass E rating and Category EXT. F. AB, see section 7.5 of this Certificate.

11 NHBC Standards

NHBC accepts the use of the EcoProof™ ST Roofing System, when installed and used in accordance with this Certificate, as meeting Technical Requirement R3 in relation to NHBC Standards Chapter 7.1 Flat Roofs and Balconies[15].