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BBA BRITISH BOARD OF AGRÉMENT
TECHNICAL APPROVALS FOR CONSTRUCTION

Agrément Certificate
No 96/3293

PRODUCT SHEET 1 — EVALON AND EVALON V ROOFING SHEETS

PRODUCT SCOPE AND SUMMARY OF CERTIFICATE

This Certificate replaces 89/2363/C to Evalon and Evalon V Roofing Sheets, manufactured from a flexible EVA/PVC Alloy.

AGRÉMENT CERTIFICATION INCLUDES:

- factors relating to compliance with Building Regulations where applicable
- factors relating to additional non-regulatory information where applicable
- independently verified technical specification
- assessment criteria and technical investigations
- design considerations
- installation guidance
- regular surveillance of production
- formal three-yearly review.

KEY FACTORS ASSESSED

Weathertightness — the products and joints in the products, when completely sealed and consolidated, will resist the passage of moisture to the interior of the building (see section 5).

Properties in relation to fire — tests indicate that the products will enable a roof to be unrestricted under the Building Regulations (see section 6).

Resistance to wind uplift — when correctly specified, the products will resist the effects of any wind suction likely to occur in practice (see section 7).

Resistance to foot traffic — the products will accept the limited foot traffic and loads associated with the installation and maintenance of the system without damage (see section 8).

Durability — under normal service conditions, the products will provide a durable waterproof covering with a service life of at least 30 years (see section 10).

The BBA has awarded this Agrément Certificate for Evalon and Evalon V Roofing Sheets to Alwitra GmbH & Co Klaus Göbel as fit for their intended use provided they are installed, used and maintained as set out in this Agrément Certificate.

On behalf of the British Board of Agrément

Date of First issue: 28 October 1996
Date of Third issue: 15 April 2008

Head of Approvals — Materials

Chief Executive

The BBA is a UKAS accredited certification body — Number 113. The schedule of the current scope of accreditation for product certification is available in pdf format via the UKAS link on the BBA website at www.bbacerts.co.uk

Readers are advised to check the validity and latest issue number of this Agrément Certificate by either referring to the BBA website or contacting the BBA direct.

Regulations

In the opinion of the BBA, Evalon and Evalon V Roofing Sheets, if used in accordance with the provisions of this Certificate, will meet or contribute to meeting the relevant requirements of the following Building Regulations:

The Building Regulations 2000 (as amended) (England and Wales)

Requirement:	B4(2)	External fire spread
Comment:		Test data to BS 476-3 : 1958 indicate that on suitable non-combustible substructures the use of the products will enable a roof to be unrestricted under this Requirement. See sections 6.1 to 6.6 of this Certificate.
Requirement:	C2(b)	Resistance to moisture
Comment:		Data for water resistance on the products, including joints, indicate that the products meet this Requirement. See section 5.1 of this Certificate.
Requirement:	Regulation 7	Materials and workmanship
Comment:		The products are acceptable. See section 10 and the *Installation* part of this Certificate.

The Building (Scotland) Regulations 2004 (as amended)

Regulation:	8(1)(2)	Fitness and durability of materials and workmanship
Comment:		The use of these products satisfy the requirements of this Regulation. See sections 9.1, 9.2,10 and the *Installation* part of this Certificate.
Regulation:	9	Building standards — construction
Standard:	2.8	Spread from neighbouring buildings
Comment:		Test data to BS 476-3 : 1958 indicate that on suitable non-combustible substructures the use of the products will be unrestricted by the requirements of clause 2.8.1[(1)(2)] of this Standard. See sections 6.1 to 6.6 of this Certificate.
Standard:	3.10	Precipitation
Comment:		Tests for water resistance of the products, including joints indicate that the use of the products will enable a roof to satisfy the requirements of this Standard, with reference to clauses 3.10.1[(1)(2)] and 3.10.7[(1)(2)]. See section 5.1 of this Certificate.
Regulation:	12	Building standards — conversions
Comment:		All comments given for the systems under Regulation 9 also apply to this Regulation, with reference to clause 0.12[(1)(2)] and Schedule 6[(1)(2)].

(1) Technical Handbook (Domestic).
(2) Technical Handbook (Non-Domestic).

The Building Regulations (Northern Ireland) 2000 (as amended)

Regulation:	B2	Fitness of materials and workmanship
Comment:		The products are acceptable. See section 10 and the *Installation* part of this Certificate.
Regulation:	B3(2)	Suitability of certain materials
Comment:		The products are acceptable. See sections 9.1 and 9.2 of this Certificate.
Regulation:	C4(b)	Resistance to ground moisture and weather
Comment:		Data for water resistance of the products, including joints, indicate that the use of the products can enable a roof to satisfy the requirements of this Regulation. See section 5.1 of this Certificate.
Regulation:	E5	External fire spread
Comment:		Test data to BS 476-3 : 1958 indicate that on suitable substructures, the use of the products will enable a roof to be unrestricted under the requirements of this Regulation. See sections 6.1 to 6.6 of this Certificate.

Construction (Design and Management) Regulations 2007
Construction (Design and Management) Regulations (Northern Ireland) 2007

Information in this Certificate may assist the client, CDM co-ordinator, designer and contractors to address their obligations under these Regulations.

See sections: 1 *Description* (1.3) and 2 *Delivery and site handling* (2.2 and 2.3).

Non-regulatory Information

NHBC Standards 2007

NHBC accepts the use of the use of Evalon and Evalon V Roofing Sheets, 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.*

In the opinion of the BBA, Evalon and Evalon V Roofing Sheets, when installed and used in accordance with this Certificate, satisfy the requirements of the *Zurich Building Guarantee Technical Manual*, Section 4 *Superstructure*, Sub-section *Flat roofs*.

General

This Certificate replaces Certificate No 89/2363/C and relates to Evalon and Evalon V Roofing Sheets, manufactured from polyvinyl chloride (PVC) modified ethylene vinyl acetate (EVA), for use on suitable designed flat, pitched or curved roofs with limited access (exposed membrane roofs only).

The sheets are for use as:

- a fully adhered roof covering
- a mechanically fastened roof covering
- a loose-laid roof covering on roofs ballasted with gravel or any other material (such as paving slabs on paving supports), approved by the manufacturer (warm roofs, duo roofs, terraced roofs, inverted roofs, and green roofs — roof gardens).

The products are manufactured in Germany by the Certificate holder and marketed in the UK by ICB (International Construction Bureau) Ltd, Unit 1, Dominion Centre, Elliott Road, Bournemouth, Dorset BH11 8JR. Tel: 01202 579208, Fax: 01202 581748, e-mail: info@icb.uk.com, website: www.icb.uk.com

Installation must be carried out by operatives trained and licensed by the UK marketing company. Details are available from the UK marketing company.

Technical Specification

1 Description

1.1 Evalon and Evalon V Roofing Sheets, are manufactured from flexible ethylene vinyl acetate terpolymer (EVA), polyvinyl chloride (PVC), fillers, pigments, stabilisers and processing aids. This mixture is homogenised and thermally fused before calendering into sheets.

1.2 Evalon V is backed with a polyester fleece (nominal weight 160 gm^{-2}) and includes an unbacked selvedge with a minimum width of 50 mm on one side for overlapping and homogeneous heat or solvent welding.

1.3 The nominal characteristics of the sheets are given in Table 1.

Table 1 Nominal characteristics

	Membrane			
Characteristics (units)	Evalon		Evalon V	
Thickness (mm)	1.2	1.5	2.2/1.2[3]	2.5/1.5[3]
Roll width[1] (m)	1.05, 1.55, 2.00	1.05, 1.55, 2.00	1.05, 1.55, 2.05	1.05, 1.55, 2.05
Roll length (m)	25	25	25	25
Unit weight (kgm^{-2})	1.50	1.80	1.60	2.0
Roll weight[2] (kg)	39, 58, 75	49, 72, 93	44, 64, 85	52, 78, 102

(1) Other sizes are available.

(2) Gross (including packing).

(3) Selvedge thicknesses of 1.2 mm and 1.5 mm without backing — with backing, approximately 2.2 mm and 2.5 mm respectively.

1.4 The products are also available with an added fire retardant (Evalon FR).

1.5 Ancillary items for use with the sheets include:

- tapes of unbacked Evalon membrane — in widths from 100 mm to 750 mm
- Evalon SK-A self-adhesive flashing membrane — in widths from 330 mm to 750 mm
- Alwitra adhesive type L40 — a solvent-based adhesive for bonding the products to substrates
- ICB HA membrane adhesive — solvent-based adhesive for bonding the products to substrates
- Alwitra solvent-welding agent type THF — for cold welding of lap jointing/welding work
- Evalon Walkway Tiles
- EVA-metal galvanized steel sheets laminated with Evalon membrane for various applications
- prefabricated Evalon sections including corners for use with TA/TAG/WA profiles, lightning conductor penetrations, sleeves and collars in various dimensions
- liquid Evalon paste for additional protection of joints
- Alwitra Evalon standing seam profiles — a decorative profile for use on pitched/curved roofs

- Alwitra MA, MAG, MAK wall caping profiles
- Alwitra TA, TAG, Art-Line edge trims/fascia profiles and soffits
- Alwitra WA counter flashing and protective skirting profiles
- Alwitra rooflight systems
- Alwitra rainwater outlets
- Alwitra paving slab supports
- fasteners and fastening plates — for use in mechanically fixed applications
- termination bars — for fixing membrane at roof perimeters.

1.6 Quality control checks are carried out during production and on the final product. Checks on the final product include tensile strength and elongation.

2 Delivery and site handling

2.1 The products are delivered to site in rolls wrapped in polyethylene film. The wrapper bears the manufacturer's name, product identification, roll width, roll length, colour and the BBA identification mark incorporating the number of this Certificate.

2.2 Rolls should be stored horizontally undercover and on a clean, level surface in a dry environment.

2.3 The adhesives, Alwitra solvent welding agent and Alwitra Liquid Evalon are all classified as 'highly flammable' under *The Chemicals (Hazard Information and Packaging for Supply) Regulations 2002* (CHIP3), and bear the appropriate hazard warning and should be stored accordingly. The flashpoints and classification of components are given in Table 2.

Table 2 Flashpoint and hazard classification

Material	Flashpoint (°C)	Classification
Alwitra adhesive type L40	–24	Highly flammable
ICB HA membrane adhesive	–18	Highly flammable Harmful
THF	–14	Highly flammable irritant
Liquid Evalon	–14	Highly flammable Harmful

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on Evalon and Evalon V Roofing Sheets.

Design Considerations

3 General

3.1 Evalon and Evalon V Roofing Sheets are satisfactory for use as:

- a fully-adhered roof covering on flat pitched and curved roofs with limited access
- a mechanically-fixed roof covering on flat pitched and curved roofs with limited access
- a loose-laid roof covering on flat and low-pitched roofs ballasted with gravel or any other material (eg paving slabs on paving supports) approved by the manufacturer (warm roofs, duo roofs, cold roofs, terrace roofs inverted roofs and roof gardens — green roofs).

3.2 Limited access roofs are defined for the purpose of this Certificate as those roofs subjected only to pedestrian traffic for maintenance of the roof covering and cleaning of gutters, etc. Where traffic in excess of this is envisaged, special precautions, such as additional protection to the membrane, must be taken.

3.3 Flat roofs are defined for the purpose of this Certificate as those roofs having a minimum finished fall of 1:80. For design purposes, twice the minimum finished fall should be assumed, unless a detailed analysis of the roof is available, including overall and local deflection, direction of falls, etc. Pitched roofs are defined for the purpose of this Certificate as those having a fall in excess of 1:6.

3.4 Decks to which the products are to be applied must comply with the relevant requirements of BS 6229 : 2003, BS 8217 : 2005 and, where appropriate, *NHBC Standards* 2007, Chapter 7.1, or *Zurich Building Guarantee Technical Manual* 2007, Section 4 *Superstructure*, Sub-section *Flat roofs*, pages 268 to 270.

3.5 Insulation systems or materials used in conjunction with the product must be approved by the Certificate holder and either:

- as described in BS 8217 : 2005, or
- the subject of a current BBA Certificate and be used in accordance with, and within the limitations of, that Certificate.

3.6 Dead loads on garden roofs can dramatically increase if the drains become partially or completely clogged, causing waterlogging of the drainage soil layers. Gravel guards should be used on rainwater outlets and these should be inspected annually.

3.7 The sheets can be applied to vertical surfaces up to 1 m. For other applications, the Certificate holder's advice regarding the fire performance of the system should be sought.

3.8 When used over polystyrene-based insulation products, an isolating layer must be used in areas where cold solvent welding is to be performed, or where substrate adhesive may be used. This is to protect the insulation layer from the solvents present in these products.

3.9 Where contact with solvent-based products (eg wood preservatives) is likely, consideration should be given to the use of an isolating layer and the advice of the Certificate holder must be sought.

4 Practicability of installation

Installation must be carried out by trained and approved operatives (see section 11.1).

5 Weathertightness

5.1 Tests confirm that the products, and joints in the products, when completely sealed and consolidated, will adequately resist the passage of moisture to the inside of the building and so meet the requirements of the national Building Regulations (see section 15, Tables for *Physical properties*):

England and Wales — Approved Document C, Requirement C2(b), Section 6

Scotland — Mandatory Standard 3.10, clauses 3.10.1[(1)(2)] and 3.10.7[(1)(2)]

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).

Northern Ireland — Regulation C4(b).

5.2 The products are impervious to water and, when used in one of the systems described in this Certificate, will give a weathertight roof capable of accepting minor structural movement without damage (see section 15, Table for *Physical properties*).

6 Properties in relation to fire

6.1 When tested in accordance with BS 476-3 : 1958:

- a system comprising a 12 mm thick chipboard deck, one layer of bitumen bonded (95/25 grade bitumen felt vapour barrier, one bitumen 5 bonded (95/25 grade) 35 mm polyisocyanurate insulation layer covered by Evalon V bonded using L40 adhesive achieved on EXT.F.AB rating
- a system comprising a 12 mm thick chipboard deck, one layer of torched-on bitumen felt vapour barrier, one bitumen bonded (95/25 grade) 50 mm polyisocyanuarate insulation layer covered by Evalon V FR bond using L40 adhesive achieved on EXT.F.AA rating.

6.2 When used in a loose-laid and ballasted specification including a minimum depth of 50 mm of aggregate, the products shall be deemed to satisfy BS 476-3 : 1958 designation EXT.F.AA.

6.3 In the opinion of the BBA, a roof garden or green roof incorporating Evalon membrane covered with a drainage layer of gravel 100 mm thick and a soil layer of minimum 300 mm thick will be designated EXT.F.AA.

6.4 In the opinion of the BBA, when used in irrigated roof gardens or green roofs, the use of the Evalon membrane will be unrestricted under the national requirements:

England and Wales — Requirement B4[(2)]

Scotland — Mandatory Standard 2.8, clause 2.8.1[(1)(2)].

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).

Northern Ireland — Regulation E5.

6.5 The designation of other specifications (eg on combustible substrates) should be confirmed by:

England and Wales — Test or assessment in accordance with Approved Document B, Appendix A, clause A1

Scotland — Tests to conform to Mandatory Standard 2.8, clause 2.8.1[(1)(2)].

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).

Northern Ireland — Test or assessment by a UKAS accredited laboratory or an independent consultant with appropriate experience.

6.6 If allowed to dry, the plants used may allow flame spread across the roof. This situation should be taken into consideration when selecting the plants for the garden. Appropriate planting, irrigation and/or protection should be applied to ensure the overall fire-rating of the roof is not compromised by its use.

7 Resistance to wind uplift

7.1 The adhesion of fully-bonded sheets to the substrate is governed by the cohesive strength of the substrate. On substrates of high-cohesive strength, the adhesion of the products is sufficient to resist the effect of wind suction, thermal

cycling and minor structural movements occurring in practice. However, in areas of high wind exposure, consideration should by given regarding the additional use of fixings, especially on porous substrates.

7.2 When the sheets are mechanically fixed, the resistance to wind uplift of the membranes is provided by mechanical fasteners secured to the deck and passing through the membrane. The number of fixings and their position will depend on:

- wind uplift forces to be resisted
- pull-out strength of fasteners
- elastic limit of the sheet
- appropriate safety factors.

7.3 The number of fixings used should be established by reference to the wind uplift forces calculated in accordance with BS 6399-2 : 1997 on the basis of maximum permissible loads of 0.40 kN per fixing.

7.4 When used in a loose-laid and ballasted system, the precise ballast requirements should be calculated in accordance with the relevant parts of BS 6399-2 : 1997, but should be a minimum thickness of 50 mm (20 to 40 grade gravel). The use of concrete slabs on suitable supports should be considered in areas of high wind exposure and the advice of the Certificate holder should be sought.

7.5 The soil used in green roof and garden roofs should not be of a type that will be removed, or become localised due to wind scour experienced on site.

7.6 It should be recognised that the type of plants used could significantly affect the expected wind loads experienced in service.

8 Resistance to foot traffic

8.1 Tests indicate that the system can accept, without damage, the limited foot traffic and light concentrated loads associated with installation and maintenance operations. However, reasonable care should be taken to avoid puncture by sharp objects or concentrated loads (see section 15, Table for *Physical properties*).

8.2 Where regular traffic is envisaged, a walkway should be provided using either concrete slabs supported on bearing pads or other appropriate means of protection, eg Evalon Walkway Tiles or rubber/plastic tiles.

8.3 Once the green roof or roof garden is installed, it can be regarded as a suitable protection of the membrane in use.

9 Maintenance

9.1 Roofs covered with the product should be the subject of annual inspections, as is good practice with all waterproofing systems, to ensure continued security and performance, especially those roofs without ballast.

9.2 It is imperative that the drainage system of the green roof or roof garden is designed correctly, and provision is made for access for maintenance purposes. Inspection of the drains should be carried out regularly to avoid waterlogging of the garden and the subsequent increase in dead weight load.

10 Durability

Accelerated weathering tests and performance in use confirm that satisfactory retention of physical properties is achieved. All available evidence indicates that the products should have a life of at least 30 years.

Installation

11 General

11.1 Installation of Evalon and Evalon V Roofing Sheets must be carried out by trained and approved installers working in accordance with the relevant clauses of the Certificate holder's instructions, BS 8000-4 : 1989 and this Certificate. Typical constructions are given in Figure 1.

11.2 The products may be laid in conditions normal to roofing work and should not be laid in wet or damp weather, or at temperatures below 5°C, unless suitable precautions are taken.

11.3 Deck surfaces should be clean, dry, and free from sharp projections such as nail heads and, concrete nibs. When used as a repair medium over a traditional bitumen felt system, the surface dressing must be removed. On rough decks or when used over mineral surfaced bituminous felts, Evalon V must always be used.

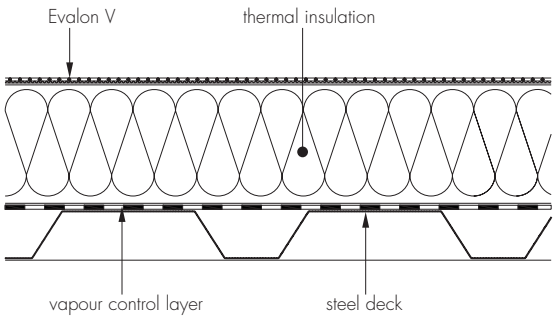
11.4 Solvent-based adhesives in adhered specifications or cold solvent welding must not be in direct contact with polystyrene-based products, as the active solvents present are not compatible with such products.

12 Procedure

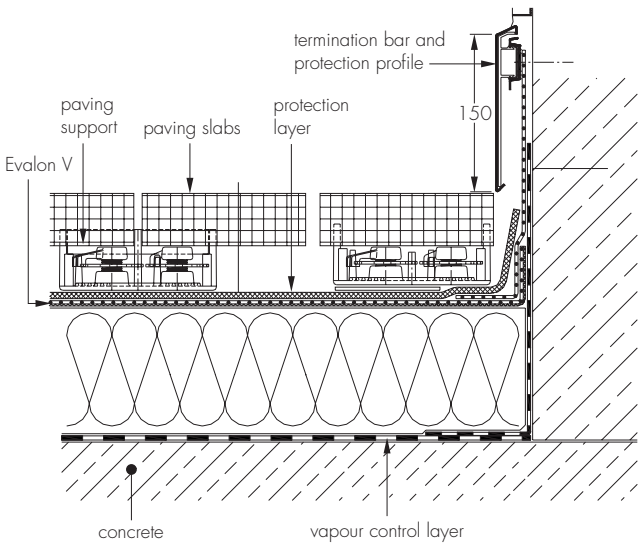
Fully bonded

12.1 Where necessary, a first layer of bitumen felt conforming to BS 8747 : 2007, Type 5U, should be bonded to the substrate using traditional pour and roll bitumen bonding techniques. Alternatively, a first layer of bitumen felt, containing at least a 100 gm^{-2} glass-reinforcing core, the subject of a current BBA Certificate, and used within the limitations of that Certificate, may be used.

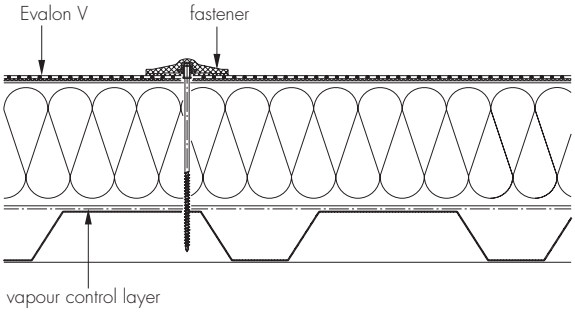
Figure 1 Typical construction detail (all dimensions in mm)



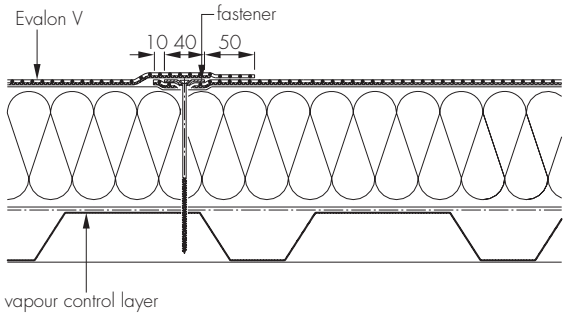
Evalon – fully adhered



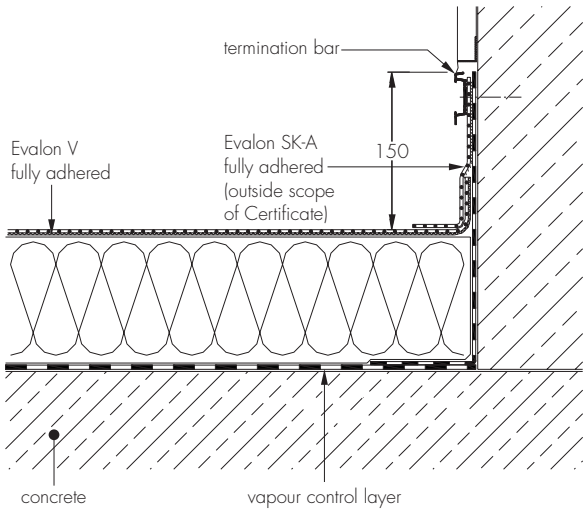
Evalon – loose laid with paving slabs



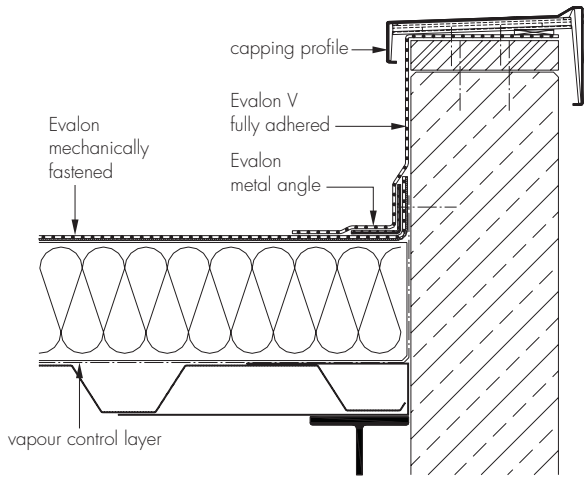
Evalon – mechanically fastened



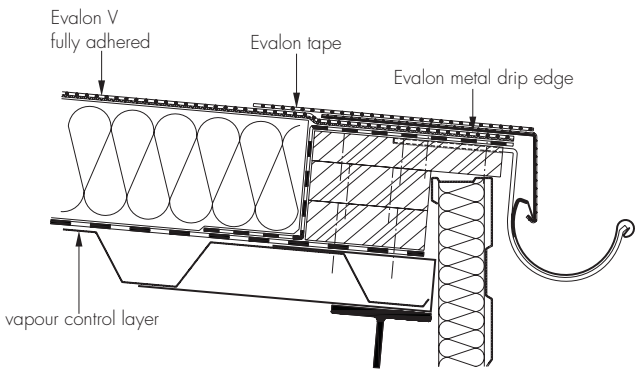
Evalon – mechanically fastened lap detail



Evalon – edge detail



Evalon – capping/edge detail



Evalon – eaves detail

12.2 The first layer of bitumen felt must be allowed to cool prior to the application of the products. The first layer should then be coated with either Alwitra L40 or ICB HA membrane adhesive at a rate of between 0.20 kgm^{-2} and 0.50 kgm^{-2} depending on the condition of the substructure.

12.3 The roofing sheets should be unrolled into the adhesive taking care not to stretch the material. Adjacent sheets should overlap by a minimum of 40 mm. Roll ends should overlap a minimum of 40 mm for Evalon, and be butt jointed for Evalon V. The Evalon V joints must be waterproofed using strips of Evalon, at least 100 mm wide, centrally welded over the joint.

12.4 Surplus adhesive must be removed from the joint areas prior to welding. Lap welding techniques are described in section 13.

12.5 When used as a repair medium over traditional built-up bitumen roofing systems, the existing covering must be made good. Surface dressings, such as mineral chippings, should be removed. The membranes may then be bonded directly to the existing roof covering in the manner described in sections 12.2 to 12.4.

Mechanically fixed

12.6 The products may be used in mechanically fixed systems either as a single layer or over a bonded bitumen layer (as described in section 12.1).

12.7 The sheets should be unrolled over the substrate, taking care to avoid any folds or ripples. Edge overlaps to adjacent sheets must be a minimum of 100 mm. End laps for the Evalon membrane should be a minimum of 40 mm. Ends of Evalon V should be butt jointed and waterproofed with a strip of Evalon, at least 100 mm wide, centrally welded over the joint.

12.8 The position of fixings, and the number required, will depend upon the type used, the type of deck and the wind uplift forces to be resisted.

12.9 The first sheet is fixed to the substrate with the fixing plates positioned 10 mm from the sheet edge. The adjacent sheet should be laid over the first sheet and lap jointed along the final 40 mm as described in section 13.

12.10 Perimeter fixings at sheet edges should be waterproofed using 100 mm wide strips of Evalon welded to the membrane using the techniques described in section 13.

12.11 A range of prefabricated accessories is available from the Certificate holder. Advice on the selection of accessories should be sought from the Certificate holder.

Loose-laid and ballasted applications

12.12 The sheets are unrolled and loose-laid with 40 mm side laps, welded using hot-air or solvent welding as described in section 13. The ends of the rolls should be butt jointed and taped with 100 mm wide unbacked Evalon tape in accordance with the Certificate holder's instructions.

12.13 The sheets should be covered with at least 50 mm of washed rounded shingle of from 20 mm to 40 mm in diameter. In areas of high wind exposure, paving slabs may be considered for use.

12.14 Concrete paving slabs may be used as an alternative to shingle but a protective sheet must be laid between the Evalon sheet and the supports.

12.15 When the sheet is laid directly onto a concrete deck, a protective layer of PE-foam or polyester fleece (minimum 200 gm^{-2}) should be laid. When used as the waterproofing layer in a roof designed to the inverted roof concept, a protective sheet must be laid between the concrete deck and the Evalon sheet.

12.16 For green roof or garden roof applications, the Certificate holder's instruction should be strictly followed.

13 Lap joints

Hot-air welding

13.1 Welding may be achieved by automatic or hand-operated hot-air welding machines in accordance with Certificate holder's instructions.

13.2 Lap joint areas on both sheets must be cleaned on a minimum width of 50 mm and then dried.

13.3 The weld joint must be a minimum width of 20 mm. When using a hand-held welding machine, the seam must be rolled immediately using a silicone rubber or steel seam roller, to ensure an even bond.

13.4 On completion of the weld, the seam should be tested by running a metal probe down the junction to check for continuity.

Solvent welding

13.5 Welding may be achieved using Alwitra solvent-welding agent type THF in accordance with Certificate holder's instructions.

13.6 The lap joint areas on both sheets must be cleaned to a minimum width of 50 mm and then dried.

13.7 Both surfaces must be coated with solvent, to a minimum width of 30 mm and be brought together. The joints must be rolled immediately using a silicone rubber or a steel seam roller to ensure an even bond.

13.8 Seams are finally tested in the manner described in section 13.4.

14 Repair

In the event of accidental damage, repairs should be carried out in accordance with the Certificate holder's instructions. Repairs are made by applying a patch of Evalon, extending at least 50 mm beyond the defect. The damaged area should be cleaned back to the unweathered material and the patch hot-air or solvent welded to the roofing sheet.

Technical Investigations

15 Tests

15.1 Data from tests on Evalon and Evalon V Roofing Sheets conducted by BAM, MPA Darmstadt and evaluated by the BBA in the context of UK roofing practices are summarised in Table 3.

Table 3 Physical properties

Test (units)	Mean results				Method[1]
	Evalon		Evalon V		
	Longitudinal	Transverse	Longitudinal	Transverse	
Dimensional stability (%) free	−0.1	−0.1	−0.2	−0.1	EN 1107-2
Tensile strength (N per 50 mm)	—	—	635	705	EN 12311-2
Tensile strength (Nmm^{-2})	16.8	16.3	—	—	EN 12311-2
Elongation (%)	375	375	80	98	EN 12311-2
Tear strength (N)	127	112	262	274	EN 12310-2
Low temperature flexibility (°C)	−30		−30		EN 495-5
Joint strength (N per 50 mm)	665		640		EN 12317-2
Peel strength (N per 50 mm)	230		280		EN 12316-2

(1) The test documents are detailed in the *Bibliography*. Numbers in the table refer to sections/parts of the various documents.

— not tested.

15.2 Tests were carried out to examine:

- water vapour transmission rate and resistance
- fatigue cycling on unaged material and material heat aged for 28 days at 80°C
- peel resistance from various substrates: bitumen felt, chipboard, asbestos cement and galvanized steel
- wind uplift resistance
- thermal shock
- dynamic indentation (eps and perlite substrates)
- static indentation (eps and concrete substrates)
- tensile strength of joints.

16 Investigations

16.1 An examination was undertaken of existing data on the fire performance of the products to BS 476-3 : 1958.

16.2 The manufacturing process was examined, including the methods adopted for quality control, and details were obtained of the quality and composition of the materials used.

16.3 Visits were made to existing sites to assess the performance in use.

16.4 An examination was undertaken of existing data on the mechanical fixings, and wind uplift testing on the mechanically fixed system, from WSP (Aachen).

16.5 Existing data for Evalon was examined on resistance to root and sprout penetration.

16.6 A reassessment of the *Durability* statement was based on a visit to an existing site in Germany and results of tests conducted on unaged and natural-aged material.

Bibliography

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EN 12310-2 : 2000 *Flexible sheets for waterproofing — Determination of resistance to tearing — Plastic and rubber sheets for roof waterproofing*

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DIN 53455 : 1981 *Testing of plastics, tensile test*

17 Conditions

17.1 This Certificate:

- relates only to the product/system that is named and described on the front page
- is granted only to the company, firm or person named on the front page — no other company, firm or person may hold or claim any entitlement to this Certificate
- is valid only within the UK
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17.3 This Certificate will remain valid for an unlimited period provided that the product/system and the manufacture and/or fabrication including all related and relevant processes thereof:

- are maintained at or above the levels which have been assessed and found to be satisfactory by the BBA
- continue to be checked as and when deemed appropriate by the BBA under arrangements that it will determine
- are reviewed by the BBA as and when it considers appropriate.

17.4 In granting this Certificate, the BBA is not responsible for:

- the presence or absence of any patent, intellectual property or similar rights subsisting in the product/system or any other product/system
- the right of the Certificate holder to manufacture, supply, install, maintain or market the product/system
- individual installations of the product/system, including the nature, design, methods and workmanship of or related to the installation
- the actual works in which the product/system is installed, used and maintained, including the nature, design, methods and workmanship of such works.

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