Post installation maintenance requirements

To ensure that the plant material establishes immediately after installation some aftercare may be needed. This will be dependent upon season of installation and climatic factors. Generally, for autumn to spring installations, no procedures additional to those outlined below will be necessary. For summer installations a temporary irrigation system may be needed.

The following are general guidelines for maintenance related to extensive type Green Roof Systems. Levels of maintenance will be affected by system composition and these guidelines do not constitute any liability to ICB Ltd with regards the performance of the planted system.

Removal of any undesirable plant material. The term 'weed' is inaccurate, one man's weed is another man's establishment of increased biodiversity. Dependent upon material and site requirements removal may be by hand or by a point application of a herbicide. Procedure to be carried out at all maintenance intervals. Assessment of problem weeds and correct timing of the programme is essential.

Checking for pest and diseases. The major problem that will be encountered is infestation by aphids. This can be dealt with using environmentally friendly measures. Aphid attack is most severe when the plants are under stress. Ensuring that the system has the correct nutrient and water retention capacities will minimise this problem. Procedure to be carried out at all maintenance intervals.

Application of slow release nutrient source. CORRECT nutrient status within the substrate is important. Previous fertiliser applied, season, location and nature and condition of plant material determine the levels of nutrients to be applied. Procedure to be carried out when deemed appropriate.

System correction. Extensive type Green Roofs are low maintenance because system design should be such that the desired plants are encouraged whilst undesirable elements are discouraged. Small localised areas (e.g. north side of any roof penetration) of the installed planted element may be found to not satisfy these criteria and undesirable plant material MAY colonise. This plant material should be removed and the substrate conditions amended to ensure that the desirable plants flourish. Procedure to be carried out as part of inclusive 12 months maintenance.

Checking of gutters and drain ways for debris and its removal. Procedure to be carried out at all maintenance intervals.

Removal of flower heads after flowering. Dependent upon individual aesthetic requirements of the client. Late summer/early autumn procedure that can be included in any maintenance agreement.

Removal of leaf litter. The ideal position for EvaGro installation is in full sun. In certain situations adjacent trees could shed leaves onto the roof surface. Dependent upon quantity these may need to be removed. This could be done with a leaf blowing machine. Late summer/early autumn procedure that can be included in any maintenance agreement.

As a general guide, frequency of maintenance visits for a well designed system will be as follows:
Year one: 2-3 visits
Year two and subsequent years: 1-2 visits

icb

The name behind the Ultimate Roof

THE EVAGREEN SYSTEM EXCLUSIVELY DISTRIBUTED BY:
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Unit 1, Dominion Centre, Elliott Road, Bournemouth, Dorset BH11 8JR UK
Tel: 01202 579208 Fax: 01202 581748 www.alwitra.co.uk

alwitra

THE ULTIMATE ROOFING SYSTEM

EVAGREEN

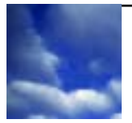



Technical Guide

The ultimate eco-friendly roof exclusively from

icb

The name behind the Ultimate Roof



Introducing EVAGREEN from ICB (International Construction Bureau) Limited the ultimate green roof system developed to meet every type of eco-friendly specification both intensive and extensive. At its heart is one of the world's leading single ply membranes from Alwitra, supported by a range of products designed to turn any roof into a permanent living environment.

Developed using the most modern geocomposite technology, all products have been extensively tested for durability and incorporate some of the world's most advanced materials for guaranteed long life performance. Every component is designed and manufactured to work in harmony.

Why choose eco-friendly?

Green roofs look good and protect the environment – they also offer an alternative approach to waterproofing any industrial, commercial or domestic building.

Green roofs, common throughout much of mainland Europe, were originally designed to help improve the natural absorption and dispersal of rain water especially in developed areas.

The momentum to specify 'green' is now growing in the UK with building owners looking to be environment friendly and architects willing to provide a design edge to industrial and commercial projects. ICB's EvaGreen means it's now easier than ever. The system even includes a chlorine and halogen free membrane – better for the environment and better for those who live in it.

ICB's EvaGreen roof system is supported by unbeatable technical/design resources that few can match. The system has been carefully developed to give a real, truly high performance alternative to traditional industrial and commercial roofing materials. Building owners and architects can now choose to be environment friendly without compromising on performance.

What are the benefits?

> The aesthetic appeal of a green roof – blending in with the surrounding landscape and improving the appearance of industrial or commercial buildings.

> Long life expectancy of the roof. The green roof system literally protects the single ply membrane, and with a little maintenance will still look and perform like new even after decades.

> An attractive, extended living space – not just an ordinary industrial or commercial roof – plants, trees, birds and small animals can make it their home too.

> Reduction of thermal shock to the building, its roof and substrate. UV radiation largely absorbed by the green roof system.

> Excellent insulant – therefore less energy consumed. A green roof will act as a highly effective way to insulate a building.

> Better living environment for those in the building – access to a roof garden or sun terrace, proven investment in price of property.

> Dust and nutrient filtration system for the atmosphere. Natural carbon dioxide absorption and removal system.

> Improvement of micro-climate.

> Noise reduction. The system acts as an ideal acoustic insulant – more effective than many man-made materials.

> Better absorption and slow release of rain water will help to balance water tables in highly developed areas or areas prone to flooding.

Extensive or Intensive?

Intensive: Plants, shrubs, planters, trees, paving, walkways, terraces, and turf/grass.

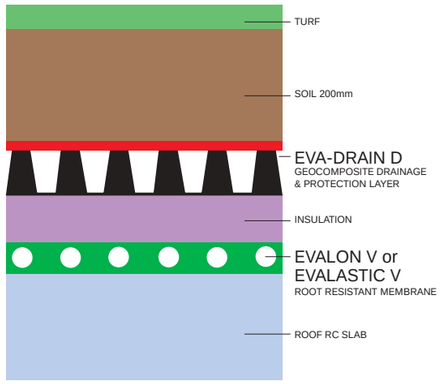
Similar to any garden, requiring the same maintenance/care. Usually based on a thick soil or substrate layer requiring artificial irrigation. Plants should always be specially selected. The system can be considerably heavier than more traditional methods of roofing. It can therefore have major structural implications.

Extensive: Sedum, paving.

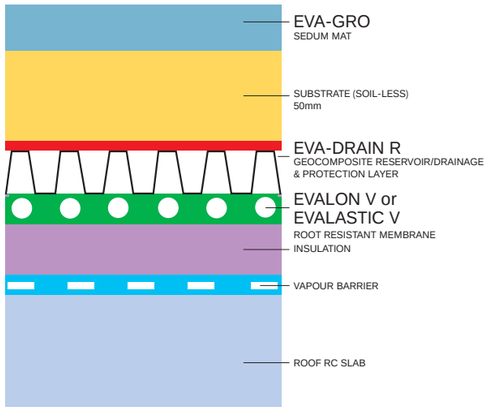
Low management requirements and doesn't usually require irrigation. Plant styles are naturalistic with the objective of establishing a self-sustaining plant community on the roof. Also able to accommodate paving for recreational use.

Design requirements

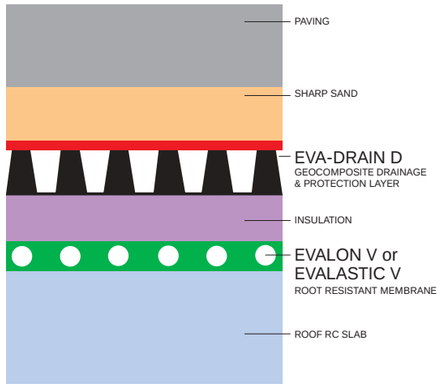
*(Not to scale)



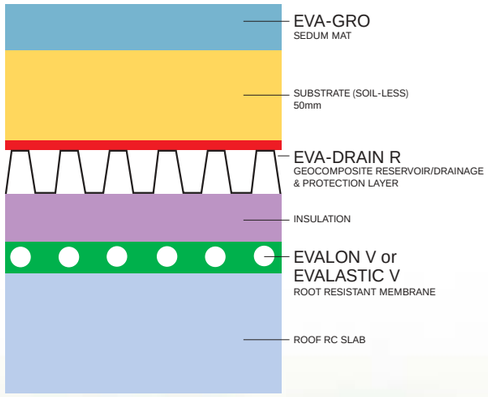
Intensive – inverted roof



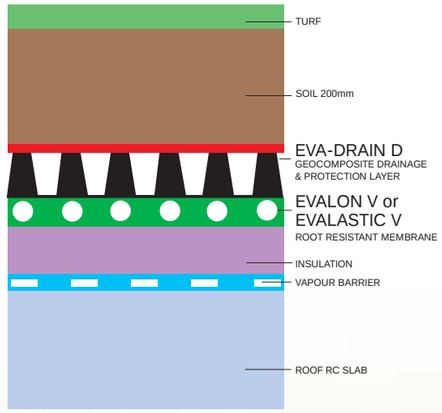
Extensive – Warm roof



Roof Terraces

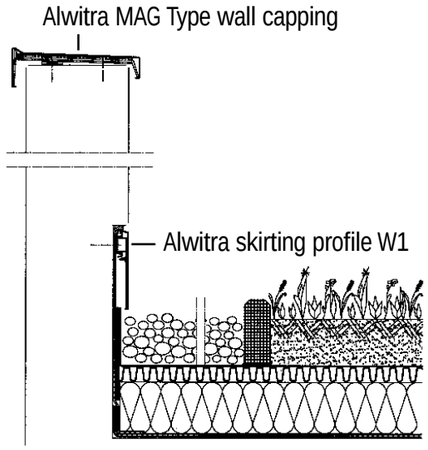


Extensive – inverted roof

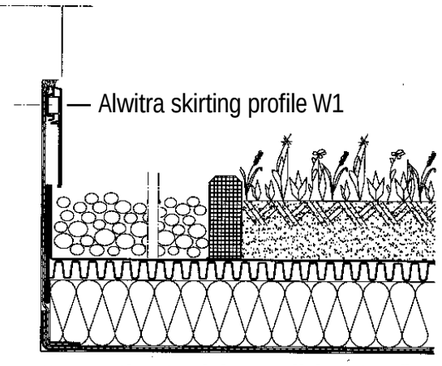


Intensive – Warm roof

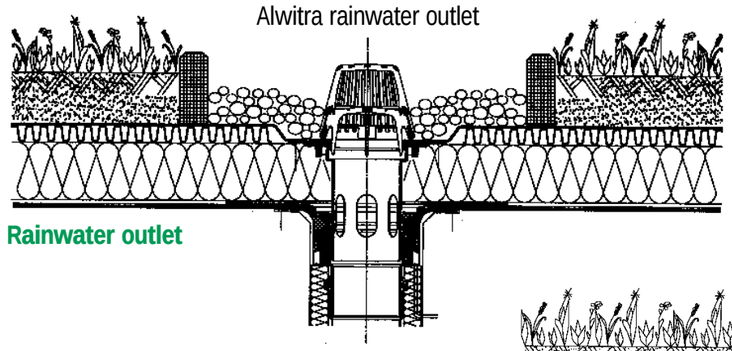
Installation detail



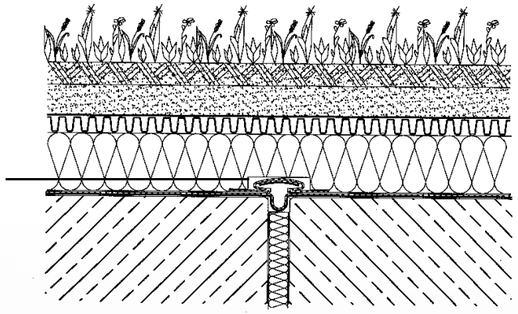
Perimeter detail



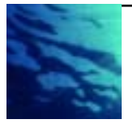
Connection to rising wall (Upstand)



Rainwater outlet



Expansion joint detail



Design and construction

The prime objective in the design and construction of a green roof system is that the established planted roof will be aesthetically pleasing, environmentally beneficial and will not compromise the essential function of the roof, that is to prevent water entering the building. The following points should be taken into account:

> Position of the building
> Orientation of the roof
> Height of the roof above the ground
> Roof pitch
> Weight limitations of the building
> Preferred planting
> Sustainability of components
> Levels of maintenance
> Performance required of plant layer

Generally, the EvaGreen system is based on the following elements built up on the pre-installed membrane:

> Drainage, protection and reservoir layer
> Substrate or soil layer
> Plant layer

Typical weights/loading

Extensive Green Roof

> Sedum with rootzone (wet weight)	40kg/m²
> Substrate	38kg/m²
> Drainage/reservoir layer	1kg/m²
> Waterproofing	1.7kg/m²
> 50mm thick insulation	3kg/m²
	83.7kg/m²

Intensive Green Roof

> Turf	30kg/m²
> Soil 200mm depth (wet weight)	360kg/m²
> Drainage layer	1kg/m²
> Waterproofing	1.7kg/m²
> 50mm thick insulation	3kg/m²
	395.7kg/m²

Installation

EvaGro

Delivery:
Palletised 11 – 15 rolls per pallet. For deliveries in the months May – Sept EvaGro can only be held in the rolled state for 48 hrs max. For deliveries during late September to end April rolled state can be extended to 96 hrs depending on temperature.

Plant composition:
Approx 30 species can be used. In general each roll will contain 8 – 10 species. For extensive type roof applications these species will be predominantly from the genus sedum.

Installation:
EvaGro must be unrolled carefully onto correctly installed drainage and substrate layer. The newly installed Evagro mat must then be irrigated to ensure the drainage layer/substrate is to full capacity. This process may need to be repeated until Evagro is established – dependent on environmental conditions.

Lead Time:
Dependent on quantity. To ensure requirements can be met please advise as early as possible.

Membrane

Always install to ICB/Alwitra's instructions. Usually loose laid and ballasted. All laps to be welded. A non destructive leak detection test should be carried out prior to installation as a precautionary measure.

Drainage layer

Geocomposite drainage layer consisting of a cuspated HDPE sheet bonded on one side to a geotextile filter fabric. The other side, against the structure is flat. Adjacent sheets are fixed with the core butt jointed. The geotextile flap on the edge of the drainage sheet should be extended across the joint shiplap style. All fixing and cutting detail should be in accordance with ICB's instructions.

Backfill material should not contain sharp objects. Normal compaction can be used adjacent to the drainage sheet. On horizontal surfaces the backfill should be placed on an advancing face. Mechanical plant should not operate directly on the drainage sheet unless protected by 150mm of backfill material.

The Products

EvaDrain R (Extensive)

A geotextile filter, thermally bonded on the flat side of a cuspated HDPE (high density polyethylene) core. It provides a lightweight drainage layer and water reservoir to sustain plant growth. Scientifically designed to retain optimum moisture levels Evadrain R will help ensure perfect plant growth.

EvaDrain R technical properties:

Composite		HG1.0	HG0.1	
In plane water flow at 100Pa	(l/m/sec)	16	5	BS 6906(7)(MOD)
Thickness at 2kPa	(mm)	26		BSEN 964-1:1995
Tensile strength long/cross	(kN/m)	14		BSEN ISO 10319:1996
Elongation long/cross	(%)	50		BSEN ISO 10319:1996
CBR puncture resistance	(N)	3000		BSEN ISO 12236:1996
Water reservoir volume	(l/m²)	7		
Mass/unit area (dry)	(g/m²)	1300		BSEN 965:1995
Mass/unit area (saturated)	(g/m²)	8200		BSEN 965:1995
Life expectancy	(yrs)	120		
Working temperature	(°C)	-20 to 80		
Chemical resistance		Excellent resistance to all common chemicals.		
Bacteria/fungi		Does not support growth.		
Compatibility with waterproofing membranes		Fully compatible.		
Health, safety, environment		INERT. No known health hazard. No precautions necessary.		

EvaDrain D (Intensive)

A geotextile filter thermally bonded on one side of a cuspated HDPE core. Overall thickness is 6mm and is designed to ensure excess water is drained away from the soil or sand bedding layer for optimum moisture levels without swamping or ponding. Also provides protection for the waterproofing membrane.

EvaDrain D technical properties:

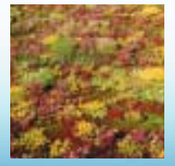
Composite		HG1.0	HG0.1	
In plane water flow at 100Pa	(l/m/sec)	0.95	0.30	BS 6906(7)(MOD)
at 240kPa		0.80	0.24	
at 500kPa with soft foam		0.65	0.19	
Flow reduction after 1,000,000 hours	(%)	<6		DTp C1514
Thickness at 2kPa	(mm)	5.5		BSEN 964-1:1995
Tensile strength long/cross	(kN/m)	15/15		BSEN ISO 10319:1996
Elongation long/cross	(%)	80/40		BSEN ISO 10319:1996
CBR puncture resistance	(N)	2,500		BSEN ISO 12236:1996
Life expectancy	(yrs)	120		
Working temperature	(°C)	-20 to 80		
Chemical resistance		Excellent resistance to all common chemicals.		
Bacteria/fungi		Does not support growth.		
Compatibility with waterproofing membranes		Fully compatible. All components compatible with potable water.		
Health, safety, environment		INERT. No known health hazard. No precautions necessary.		

The Membrane

A high performance green roof starts with a high performance green membrane – and Evalastic is the perfect choice. PVC, halogen and chlorine free and root resistant, Evalastic gives eco-conscious specifiers and building owners a real high performance alternative to existing PVC based membranes.

EvaGro

Sedum mat with rootzone and specifically formulated substrate – for use above EvaDrain R – is designed to blend in naturally with any environment. Sedum species are carefully selected for the purpose and require less maintenance than an intensive roof garden.



AquaDrain Grating

User friendly and designed to be fitted on site, the AquaDrain grating system will ensure perfect drainage where flagstones, paving stones or promenade tiles are used. AquaDrain grating ensures perfect drainage and removal of water at perimeters and door thresholds and also facilitates a ramped access system.