



Sky Garden Ltd, Unit 4 Beta, Orchard Industrial Estate, Toddington, Glos, GL54 5EB
T: 01242 620905 F: 01242 620739
www.sky-garden.co.uk

Operations and Maintenance Manual: 83 Fellows Road

Sedum is live material and must be irrigated immediately following installation and regularly thereafter! We stress this irrigation must continue in the first 4 months following installation, this is especially critical during hot and dry periods.

We accept no responsibility for failure to comply with this notice.

Please refer to our full terms and conditions for further information.

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Introduction

This manual has been produced to benefit you, the owner of a Sky-Garden living roof. It provides you with the documentation required to understand how your roof was installed and a break down of Sky-Garden specifications. This manual also offers you advice regarding your warranty and how to maintain your roof.

System Overview

Layer (Bottom to Top)	Brief Description
Drainage Layer	Sky-Garden Drainage Layer Recycled open pore CFC-free soft foam with cuspated face to allow free drainage. Unit size: 1.0m x 0.75m x 30mm deep Weight: 2.6 kg/m ² (17.5 kg/m ²)
Filter Fleece	Sky-Garden Filter fleece. Dimensions: 1 x 150 m = 150m ² Material: Mixed Synthetic Staple Fibres Colour : Grey Weight : 180 g/m ²
Substrate (growing medium)	Lightweight aggregate 80mm depth Grading: 11mm to 2mm Weight: Typically 1.25 tonne/m ³
Vegetation	Sedum Blanket: A pre grown vegetated layer with between 6 – 8 varieties of sedum giving an instant 75% minimum vegetated cover. Dimensions: 1.20 x 2.00 m Thickness: 4 - 6 cm
River stone Border	Rounded quartzite and granite river stone Giving a sharp presentation border. Grade: 20 – 40 mm



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Product Specifications

Sky-Garden Drainage Layer

Sky-Garden's drainage layer is produced from recycled foam with a cusped (egg cup) base layer. This design allows for a 2 part function. The cusped design allowing for drainage of excess water, the foam material provides a nutrient and water retention layer feeding the system above. The drainage layer is recycled material free from PUR (polyurethanes).

- Material: Recycled open-pore emission free PUR soft foam.
- Roll size: 1m x .75m x 30mm
Body thickness: 18-20mm
Cusped thickness: 15-18mm
- Weight: 2.6 kg/m²
- Apparent density: 100 ± 20% kg/m³
- Compressive strength: 10 ± 20% kPa
- Tensile strength: > 55 kPa
- Breaking elongation: > 40%
- Water storage capacity: 17.0 l/m²

Filter Fleece

Sky-Gardens filter fleece is a mixed synthetic staple fibre designed to capture fines preventing blockage of the drainage/ water retention layer below.

- Material: Mixed Synthetics
- Dimensions: 100 m by 1.5m = 150m²
- Weight: 0.18kg/m²



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Sky-Garden Sedum Substrate

Sky-Garden sedum substrate is a low nutrient, free draining root zone for use in conjunction with our living roofs. Manufactured from a lightweight recycled aggregate mix, our substrate is designed to aid long term, self sustaining growth.

- Material: 100% recycled light weight crushed brick aggregate
- Bulk density: 0.95 Tonnes/m³(dry)
1.25 tonnes /m³ (wet)
- Colour: Light brown / dark red.
- PH value: Range (6.8 – 8.2)
- Consignment size: 25Kg bags / bulk bags (1 m³) / loose bulk
- Grading:11mm>2mm

Sky-Garden Sedum Blanket

Sky-garden's Sedum Blanket is a pre grown vegetation covering. The blanket is a layered system designed to achieve 70% - 90% instant vegetation coverage using between 4-8 sedum varieties.

Its base is a geo-composite polypropylene mesh, above which a coir (coconut) fibre layer lies. Above this is a 20mm layer of low nutrient (inorganic) substrate growing medium. The vegetation (sedum rhizomes) is then grown in to the substrate and the roots knit the layers together over time.

- Roll Size:1.2m x 2m x 40mm
- Weight: (Dry) 15kg/m² (Wet) 30 kg / m²

River-stone Border

The river stone is for use with in our green roof borders, providing free drainage and an astatically pleasing finish.

- Materials : Mixed rounded quartzite and granites
- Colours: Grays, browns and reds.
- Size : 20 – 40 mm
- Delivered as: 25kg bags.
- Standard border dimensions: 300mm width by 30mm height.



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Installation Procedure

- The Roof was initially checked to ensure that a safe working environment was in place i.e. edge protection/scaffold or mansafe system was present. Sky – Gardens or the contractor ensured lifting equipment was ready to lift materials to the roof. Ensuring all other trades had finished working on the roof before work commences.
- Drainage tiles were placed onto the roof ensuring each tile was butted directly up to the next piece creating a continuous drainage layer. Drainage tiles were cut at perimeters of roof leaving a neat edge. Where protruding skylights etc came through the roof the drainage layer were butted to the protrusion and in a similar method to that of the roof perimeter.
- If required a filter fleece was rolled onto the drainage layer to protect the layer from being blocked by fines. The fleece was overlapped by 100mm to again prevent any blockage of the drainage layer.
- River stone boarders were constructed through the use of 25kg bags placed at the green roof perimeter (1 bag per 800mm). Bags were split open and pebbles were hand places evenly along boarder at a width of 300mm and height of 30mm (site specific).

Substrate is spread on to the roof via two methods:

Either 25kg sedum substrate bags were placed onto the roof over fleece at 1.6 bags per m². Bags were then cut bags at and spilled evenly over fleece. The substrate is then raked to ensure an even layer over roof.

If tonne bags were used the bags were raised onto the roof using lifting equipment then shovelled from the bag onto the roof evenly ensuring a 80mm layer.

For the live material, the sedum matting was laid over the substrate ensuring each piece was butted up to the previous with an overlap of 20-40mm in to allow for shrinkage. Rolls were cut at roof perimeters and extra pieces were used to cover any bare patches. Sedum is an extremely hardy species that will grow and take in a wide range of environments. This 'patching' will therefore take very quickly to fill the light areas.

Sky-Garden / the roof contractor made all possible arrangements to ensure no other trades were allowed to access roof prior to installation. This cannot obviously always be the case.



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Installation notes

- All materials were supplied to and delivered directly to the site. The live material was unloaded immediately and installed within 48 hours of delivery to site.
- The supporting build up of drainage layers, filter sheet, substrate and any hard landscaping was completed before the live material was delivered to site, minimizing the vegetation stand time.
- The optimum period to install sedum system is late September/early October, and late March/early April. Extra care must be taken during the months of June, July and August to ensure sedum is not overheated – refrigerated delivery vehicles and off-loading within 24 hours are recommended. Extra irrigation requirements may be required during summer months, these are discussed below.
- In high wind conditions it may be necessary to temporarily pin the sedum matting down through to the drainage board or wire tie each blanket.

As per your quotation.

Sedum is a live product and must be unloaded and watered immediately upon installation. If watering is not implemented immediately and for the first 12 weeks in situ, Sky-Garden cannot take responsibility for the growth and success of the vegetation. This is especially important during the period 01/05 - 30/09 each year. For pitched roofs over 7.5 degrees we would recommend the installation of a permanent irrigation system.

- Irrigation should take the form of complete system saturation at least once a week, in the first 12 weeks following installation. These same steps should be taken during prolonged periods of hot and dry weather.
- Should temporary irrigation in place we recommend the following:
 - Regularly check that the sprinklers are correctly positioned, prevailing wind may affect coverage.
 - Regularly check that the tank water is suitable for the roof irrigation.
 - In the event that the water becomes contaminated, turn off the irrigation immediately and drain the system.
 - Regularly check that the submersible pump remains submerged in the tank
 - Do not operate the pump out of the tank, this will cause the pump to fail
 - With the onset of winter, the system will need to be drained and decommissioned



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Maintenance

Following the installation of your Sky-Garden living roof, a maintenance schedule should be organised to ensure you're getting the best from your roof. It is important to recognise that although our systems are generally low maintenance; this does not mean they require no maintenance. We recommend some basic care and attention should be paid to your roof once or twice per year and particularly in the following few months after initial installation.

The Sedum

Please note that the sedum plants will not be 'green' all year around. It is quite common for the plants to change colour at different times of the year, particularly when under stress from lack of water or in frosty conditions. In the spring and summer the plants will flower and it is quite common for some of the varieties of plant in the blanket to die back in the winter. Maintenance of the sedum should concentrate on the removal of weeds and to insure healthy growth, in the unlikely event the sedum appears to be of low coverage or struggling then fertiliser should be applied to aid long-term growth.

Irrigation

During the first two months following installation the sedum blanket recovers from being moved and agitated during the transportation and installation. Should the weather be particularly dry during this period then watering is essential to ensure the green roof establishes itself as quickly as possible. This should be administered once every two to three days via hose or sprinkler system until system is at full saturation. If you want it to remain 'green and luscious' in dry conditions, you should consider the installation of an irrigation system. Irrigation however is not essential, sedums are a very drought tolerant plant, this advice is only relevant to prolonged (2 weeks) hot and dry periods.

Weather

Regular checks should be undertaken to ensure that high winds or heavy rainfall have not moved or dislodged any of the materials. This is essential during the first few months as the sedum plants will not have fully rooted into the underlying layers and will be more vulnerable. The movement of products is unlikely but possible in extremes of weather. Should it move, providing it has not been damaged, simply move it back and water in well.

Drainage

Open drains should be checked for build up of dead vegetative material and cleaned as appropriate at each 6 month/annual inspection. This also applies to covered drainage outlets.



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Fertilising

Sky garden recommend that sedum fertiliser be applied twice annually for long-term healthy growth of the sedum. Customers can purchase and apply our fertiliser by hand.

Our Maintenance Package

Sky-Gardens do offer maintenance packages should you wish preserve the diversity and aesthetic performance of your green roof. Our package includes bi-annual visits: one in the spring / early summer and one autumnal visit, we also offer general roof inspections and assessments. All visits are carried out by our own registered living roof maintenance teams who are experienced with our systems and understand the key elements of long-term living roof success.

Any fertiliser and/or weed control treatments are included as part of the package and will be undertaken by certified employees only. Our fertiliser or weed killer applications come from a range of products developed specifically for Sky-Garden roof systems and are natural organic or naturally derived. Herbicides are species specific, low impact and used only as a last resort to tackle invasive or widespread weed problems.

The standard maintenance package will run over a 12 month period from the date of contract and will contain two remedial visits to inspect and carry out the required works as detailed below. Costs of maintenance are based on our daily rate for our maintenance team, on the number of visits per year, the location, the accessibility of the roof area and provisions of man safe systems. We cannot access any roofs without a suitable man safe system in place.