Rev. 4 dated 28.8.14

Watering Requirement Guidelines for Extensive and Bio-diverse Green Roof Installations

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1. INTRODUCTION

It is essential that all types of green roof, regardless of the planting specified, receives the correct level of care and attention immediately after completion, to ensure that the plants installed can rapidly and healthily establish within their new rooftop environment.

Essential to this process is the provision of an adequate water supply of sufficient pressure to roof level, to deliver either temporary watering during the proposed period of plant establishment or otherwise a permanent installed irrigation system that can provide watering on demand.

The type required is dependent upon the landscaping system specified and this is outlined in the sections below.

The following information is intended as a guide to assist in the planning of establishment watering and where installed, permanent irrigation, as being part of the long-term management and maintenance of all Bauder Extensive green roof systems.

It is recommended that this document is read alongside the appropriate Bauder installation and establishment maintenance guidelines together with general maintenance guidelines for the proposed vegetation type.

2. WATERING REQUIREMENTS PARTICULAR TO SPECIFIC BAUDER EXTENSIVE LANDSCAPING SYSTEMS

XERO FLOR XF301 LIGHTWEIGHT SEDUM BLANKET SYSTEM

This product does not require installation over a substrate growing medium, as the growing medium and moisture retention are self-contained, making this system the lightest of its type currently available. Bauder SDF Mat drainage layer is incorporated if the roof falls are less than 2°, otherwise the blanket is applied directly to the waterproofing.

A key advantage of XF301 is that it can be installed on slopes of up to 25°, without needing a heavily constructed and expensive landscape retention system, instead using a unique spiked retention component attached at set intervals to the waterproofing surface.

One consequence of being so lightweight and of shallow build-up, is the importance of annual maintenance, particularly fertilizing, as the system has little inherent nutrient.

The benefit of applying a shallow build-up on steeper slopes can also have a consequence in respect of water retention capacity and therefore provision for artificial irrigation should be allowed for under certain conditions. These are outlined below: -

Sedum blanket being applied to a steep sloped roof, fitted with both retention strips and drip line irrigation.

- **Roof falls up to 2°** - No artificial irrigation required
- **Roof Slopes in excess of 5 degrees, exposed locations or south facing** – Consider
- **Roof Slopes in excess of 10 degrees** – provision for irrigation considered essential
- **Slopes from 1-5 degrees coastal or exposed locations** – Consider
- **Slopes in excess of 5 degrees coastal, south facing and exposed locations** – provision for irrigation considered essential

For roofs less than 50 m² in area and single storey in height, irrigation can be achieved using a simple hose and sprinkler arrangement, but for larger areas it is more practical and cost effective to install a permanent drip line system.

Watering with an irrigation system is still periodic and only necessary during prolonged periods of drought or otherwise to maintain appearance. Over-watering will encourage grass and other weeds to establish and is not generally good for sedum plant health, as the plants need to go through the drought process to become hardy for surviving extreme weather conditions. Therefore watering once every 4-6 days during hot, dry periods, during dawn or dusk is recommended.

3. VEGETATION OVER A SUBSTRATE GROWING MEDIUM

This applies to the following Bauder vegetation finishes: -

- **Xero Flor XF118 wild flower blanket**
- **Xero Flor XF300 sedum blanket**
- **Bauder Traditional and UK Native Species plug plants**
- **Bauder KS Plus seed mix**

All of the above vegetation options are installed either over or within Bauder Extensive Substrate growing medium. These extensive green roof systems are generally intended to persist without any form of artificial irrigation once the vegetation is established.

However, aspect and location are factors that have a bearing and together with consideration towards our changing climate over the long-term means that provision for watering needs careful assessment. The broader range of vegetation now being used and the visual appearance sometimes demanded there will be projects that will require or benefit from the inclusion of a permanent irrigation system or water feed to roof level fitted during construction.

This does not necessarily mean a requirement for regular irrigation, but it does ensure that during times when additional watering above and beyond normal rainfall is required, this can be provided.

In particular, this applies to sloped roofs over 5° and the system types where permanently installed irrigation provision should be considered, are listed below: -

- **Bauder XF118** – Consider for enhanced visual appearance
- **Bauder UK Native Species Plug Plants** – Consider for enhanced visual appearance
- **Bauder KS Plus seed mix (both during and after planting has become established)** – Consider for enhanced visual appearance

Regardless of the green roof system specified, we would always recommend that sufficient watering points of adequate pressure are always provided at roof level to allow the entire roof area to be irrigated by hose and sprinkler during particularly prolonged periods of drought. It is cheaper periodically to add water than to replace planting.

4. WATERING DURING AND IMMEDIATELY FOLLOWING INSTALLATION

For all applications involving substrate growing medium, the substrate should be thoroughly watered to moisten it before the planting is installed and also to fill the underlying water storage board, so that some water retention is provided.

Once the planting has been installed, apply Bauder Xero Flor organic fertilizer at a rate of 80g/m², by using the recommended applicator trolley which ensures adequate and even pellet coverage.

Thoroughly water the vegetation immediately after installation or as soon as a sufficient area of planting is installed that can be watered using sprinklers.

Initial watering must be by surface mounted sprinklers to water in the fertilizer. Do not over-water the fertilizer if the substrate is already well moistened. Use just enough to wash the fertilizer pellets off any vegetation leaves to prevent burning.

Special note Regarding Bauder KS seed mix

This seed mix is provided in a formulation that allows it to be applied direct to a moist substrate and should **not** be watered in after installation, but left to germinate and establish at its own pace, requiring irrigation only in prolonged drought conditions once established.

5. ESTABLISHMENT WATERING

Establishment watering needs to be correctly managed to ensure that the landscaping is kept sufficiently moist to encourage strong root development whilst ensuring that the system never becomes too wet.

All newly installed sedum blanket vegetation will require watering for at least the first month after completion.

The wild flower, herb and rockery vegetation species used in all other extensive/bio diverse green roofs will need to receive irrigation for at least 10 weeks after completion, and will require close attention over the first 4 weeks to ensure that the system is kept moist without becoming over-saturated.

Frequency of watering is dependent upon the time of year and current weather conditions, but with sedum vegetation this is usually only required every 4-6 days during the summer months. With all other species it is possible that watering could be required on a more frequent basis in hot weather, which can only be determined by a visual inspection to review if the plants are wilting.

Water the vegetation for a period of approximately 1-2 hours to ensure that the growing medium is fully saturated. If the green roof has a leaky pipe or drip line irrigation system fitted then this can be employed to provide the required post-installation watering.

Please note that drip line irrigation is not suitable for initial watering in of the fertiliser, and therefore surface sprinklers should be used - see item 4 above.

6. METHODS OF WATERING AND THE EQUIPMENT REQUIRED

Temporary watering

There are a number of methods that can be used to facilitate temporary watering on site and these would be employed for establishment watering, for those landscapes not requiring any permanent irrigation, or otherwise when the permanent irrigation is not yet operational.

It is important to have a main's feed (or several mains feeds) to roof level of sufficient pressure to water the total vegetated area. A hub may be set up to then distribute water to the various areas via a set of secondary feeds.

Example opposite of a temporary watering system hub rigged up on site to provide adequate mains watering feeds to different roof areas.

These help the contractor managing installation and establishment watering to control irrigation from a central point, whilst retaining flexibility if the apparatus needs to remain mobile.

In situations where the mains water pressure is found to be insufficient, a Bowser can be used together with a pump, to provide water at the required pressure to roof level.

Image supplied courtesy of Morclean Ltd

Mobile Bowsers are fine as a solution for temporary watering during installation where a mains feed is not yet available or for short term watering i.e. establishment watering of XF301 sedum blankets.

However, for longer term establishment watering as is required for XF118 wildflower blankets, where this can be required for up to 10 weeks, a permanent feed to roof level of the required minimum pressure is necessary.

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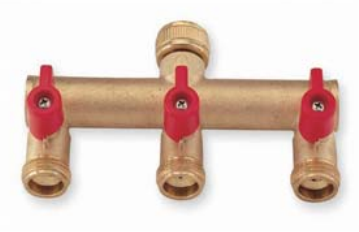
Requirements for mains water supply

A supply of mains water must be provided on site prior to the delivery and installation of the vegetation.
A minimum of 3 bar pressure at roof level is required to provide sufficient pressure to enable up to four sprinkler units to operate simultaneously. This is sufficient to cover an area of approximately 450 m² at any time, depending upon the water supply available.

Testing the water pressure

The water pressure and flow available from the mains feed must be checked with a suitable pressure gauge (see opposite) to confirm that the system is adequate in advance of the installation of the vegetation.



Multiple Hose connectors

Three-way multiple brass hose connectors provide a quick and efficient method of connecting up several hoses to the mains supply simultaneously.

Heavy duty hose pipe

Sufficient lengths of heavy duty hose to be provided to reach all roof areas

Pipe joiners

Hose pipe can be extended to the length required using these proprietary brass pipe joiners

Small Areas up to 20m²

An adjustable spray head is suited for very small areas and for watering in fertilizer

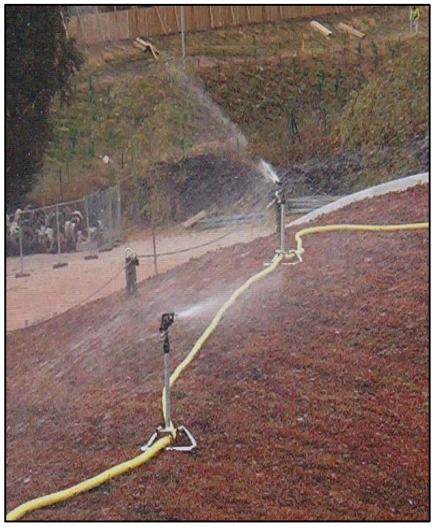
Areas under100m²

Used with narrower head nozzles or alternatively use domestic oscillating sprinklers

Areas over 100 m²

Surface mounted sled riser units with changeable sprinkler heads give variable spray pattens

Watering roof areas over 100m²



Riser units can be 'daisy chained' together to irrigate the length of the roof. Sprinkler heads can be changed to enable different spray patterns to be employed to suit each roof area as required.

Several roof areas can be watered simultaneously using a multi-connector at the mains, so long as sufficient water pressure and flow is available for each separate feed.

When watering large roofs on public buildings such as schools, these will often have water meters fitted. The occupiers may wish a meter reading to be taken before watering commences, so that the cost of the water usage can be separated and later reimbursed.

Time control for evening irrigation

Battery operated timer control units are available to help control watering efficiency. These can be set to allow watering at dawn or dusk when wind and evaporation levels are at their lowest, thus preventing unnecessary water loss.

This facility is important for installations carried out during the dry summer months, as it enables the water to saturate the sedum blanket or substrate system which gives the plants the opportunity to take on and store water.

A separate timer will be required for each hose run in operation.

Permanent Drip line irrigation

This system can be installed for both occasional and regular watering. The system layout and components required for any individual green roof system will be dependent upon a number of factors, including vegetation type, substrate depth and roof slope. We would strongly recommend seeking project-specific advice from a specialist irrigation company to ensure that the proposed system will meet required criteria.

A minimum of 2 bar pressure at roof level is required for most systems to operate correctly. The system must be fully operational with all operational controls easily accessible for use. The irrigation system would normally require Category 5 back-flow prevention.

A permanent drip line system (where installed) is not suitable for the task of carrying out the initial surface watering after fertilizer has been applied. Fertilizer should be properly watered in using surface watering sprinklers to prevent burning the leaves and damaging the plants.

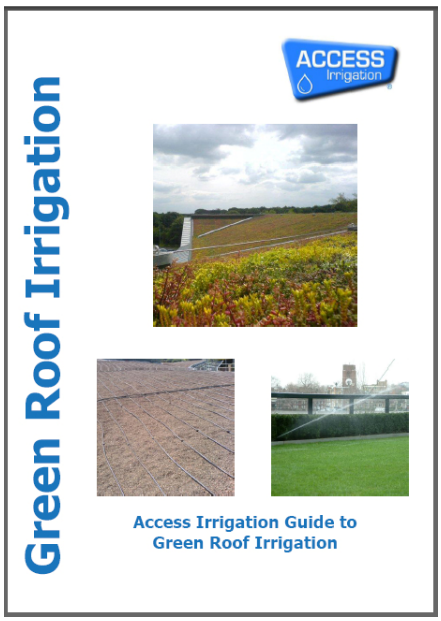
Watering is best carried out automatically at dawn or dusk using a timer control unit.

7. SPECIALIST ADVICE

Advice and Supply of Irrigation equipment

Access Irrigation Ltd is one of the country's longest established irrigation specialists and has considerable experience in many types of irrigation, including green roofs.

They are happy to provide irrigation advice on any Bauder project and can supply a wide range of irrigation products and technical advice.



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Technical Advice on Installation and maintenance of Extensive green roof systems

For project specific advice relating to establishment watering and irrigation issues that relate specifically to Bauder Green Roof systems, please contact our Technical Department using the details below.

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