

L. GREEN ROOF IRRIGATION

Extensive green roof systems establish plant cover that will (after a consolidation period of variable duration) maintain itself somewhat autonomously with little or no need for artificial watering. The main plants used in our systems are succulent plants from the crassulaceae family (especially sedum), which require little water. However, in certain conditions (determined by factors such as the project location and the presence of semi-intensive vegetation and/or pitched roofs) it may be necessary to supplement the natural rainfall with a rooftop watering system.



WHEN SHOULD A WATERING SYSTEM BE INSTALLED

SEDUMS – VERY HARDY PLANTS

Sedums develop best in a sunny location, and are considered to be plants that require little water. They require an estimated three times less water than a lawn in a comparable location. Sedums are succulent plants with two physiological adaptations that make them remarkably resistant to drought: they store water in their leaf tissue, and their crassulacean metabolism reduces water losses by closing their stomata during the day. Sedum plants expand horizontally to form a mat and have excellent regenerative capabilities. Coverage ratios may vary according to the season. The sedum mat may regress during extended dry periods but the regenerative capabilities of these plants are such that the original volume of vegetation is quickly restored after even a severe drought.



In this context, the rainfall profile – and in particular the local rainfall frequency – is a key factor in the decision whether or not to install an automatic watering system. In many regions, plant cover with the **STANDARD PLANT MIX** will not require additional watering except in the event of an extended drought or sustained high temperatures.

KEY FACTORS WHEN DECIDING WHETHER TO INSTALL A WATERING SOLUTION

The main factors in the decision whether to install an irrigation system are as follows:

 **Esthetic requirements:** The importance attached to the plant cover's appearance will influence the decision whether or not to install a watering system. Artificial watering supplements the natural rainfall at the site, minimizing the water stress experienced by the plants. As a result, the vegetation grows strongly and has a flourishing appearance. The customer's willingness to tolerate reduced coverage during periods of harsh weather may be a factor in their final decision: even if not essential for the vegetation's survival, a watering solution may be desirable if

the rooftop is very visible and subject to particular requirements in terms of its appearance.

 **The local climate** (rainfall frequency and intensity, summertime temperatures, wind, etc.) and the green roof system's compatibility in terms of water retention capacity. **HYDROPACK®** is designed for optimum water retention. This design helps to enable plants to survive between rainy periods in many regions.

In certain circumstances (e.g. projects located in hot regions, steeply pitched roofs, etc.) watering is essential in order for plants to survive between rainy periods.

🌱 **Technical constraints:** factors such as the roof's exposure, pitch or height above ground may call for a built-in watering system.

TECHNICAL CONSTRAINTS

The design intent of the green roof and the related environmental constraints vary between projects. Consequently, we recommend installing an automatic watering system (regardless of geographical location) in the following cases:

- 🌱 The roof pitch is steeper than 15%
- 🌱 The roof is highly exposed to the sun, particularly if it is also pitched
- 🌱 The roof is known to be exposed to strong winds or wind corridors. Depending on the roof height, winds may be much stronger at roof level than on the ground. The likelihood of strong winds may also affect the choice of watering system, as a sprinkler-type system might be an inconvenience to neighbors in particularly windy areas
- 🌱 Precipitation is partially or totally prevented from falling onto the roof (by a canopy or roof overhang, for example)

🌱 **Vegetation type** (extensive or semi-intensive): the customer's choice of plants may include species that require significant quantities of water. In such cases, the composition of the plant cover makes an automatic water system essential.



Many technical constraints can be mitigated by installing a meteorological station to monitor the conditions that the green roof face, and water accordingly.



The electrical and hydraulic part of a watering system in a buried inspection chamber

VEGETAL i.D. WATERING SOLUTIONS

An irrigation network has three main parts:

A HYDRAULIC PART : drip or sprinkler-based distribution system.

This part determines whether water is distributed via drip irrigation pipes, nozzles or sprinkler heads. These components are interconnected and water is distributed to them through a system of pipes with fittings of various sizes and purposes.

 The **drip irrigation** technique provides localized watering directly into the growing medium. It concentrates water at the base of the plants. Drip systems use a low flow-rate and are able to operate at very low pressures.

 The **sprinkling** approach sprays water onto the leaves and the whole planted area.

HYDRAULIC MODULE : generally located in valve inspection chambers. This part of the system consists of manual and electrically-operated valves, filters and pressure regulators that automate the system and ensure that it is able to operate reliably over the long term. They are sized to suit the water pressure and flow-rate available on the roof.

CONTROL MODULE : essential if watering is to be programmed and automated. AC or battery-powered programmers are essential components of this system, setting watering frequencies, durations and periods, etc. Some programmers have more advanced functions than others. Depending on the model, programmers may control either a single electrically-operated valve or multiple valves.

The choice between a sprinkler-based or a drip solution for distributing water will depend on the nature of the project. The table below shows a few factors that can guide this choice. For more information, contact your local sales manager for advice.

Watering system		
Flow rate		
Watering duration		
Aesthetic result	Slow-acting effect	Fast-acting effect
Area	All Unusually-shaped areas	Large
Maintenance		
Appearance	Barely visibly after the growth	Very discreet from the beginning
Implementation		
Example at the time of installation		

Note: Contrary to popular belief, the drip solution does not consume less water.

WHEN DO YOU REALLY WATER A GREEN ROOF?

The watering system, whether manual or automatic, is mainly used:

 During the initial period after planting, until the plants' root networks have been fully established (when a non pre-grown vegetation system consisting of fragments or small plugs). This consolidation period is eliminated with the **HYDROPACK®** solution.

 For routine maintenance, during extended droughts or throughout the summer, depending on the project constraints.

MAINTAINING THE IRRIGATION SYSTEM

Whichever watering solution you choose, it is essential to inspect your system at least two to four times a year. The most frequent maintenance operations include:

-  Reprogramming the irrigation frequencies and doses
-  Winterizing and draining the system in the fall, and filling it in the spring

SIZING ROOFTOP WATER SUPPLIES

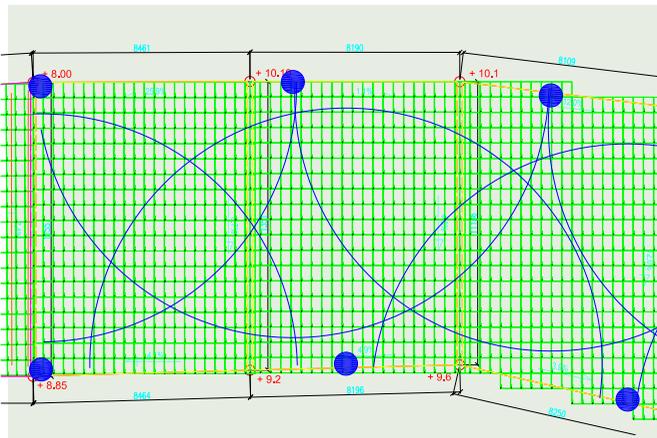
A water supply to the roof is essential, even if no watering system is installed.

The water supply capacity, flow-rates, water pressure and the number of faucets required depend on the surface area to be watered.

We recommend that the green roof site be provided one or more supply points of suitable capacity for the planted area (**pressure >36 PSI**). The water supply should be available at roof level at the time of the installation and remain in operational condition throughout the roof's service life. No point on the roof should be more than 90 feet from the nearest faucet.

The table below serves as a rough guide for sizing the rooftop water supply for your project. These figures are for guidance only, subject to confirmation on a case-by-case basis by **Vegetal I.D.** engineers.

WATERED AREA	SUPPLY PIPE DIAMETER (inches)	MINIMUM FLOW RATE (gpm)	MINIMUM PRESSURE (psi)
less than 1,000 sq. ft	1	6.6	36.3
1,000 to 4,000 sq. ft	1 1/4	11	36.3
4,000 to 10,000 sq. ft	1 1/2	20	43.5
greater than 10,000 sq. ft	1 1/2 or 2	20	50.8 - 58



With **Vegetal I.D.**, an **in-depth technical study** is carried out for every green roof project to determine the irrigation requirements. Our engineers will recommend the most suitable watering solution and specify all system components to suit your project's technical requirements and esthetic considerations.

Vegetal I.D. watering solutions are designed and sized specifically for green roof applications. (This approach covers the watering system equipment and accessories, as well as the sizing and programming aspects). At **Vegetal I.D.**, we harness our experience with plants and their needs to ensure that your vegetation looks great by installing a built-in irrigation system that is as effective and discreet as possible.

SERIOUS ABOUT SUSTAINABLE WATER MANAGEMENT

VEGETAL I.D. extensive green roof solutions optimize your water management strategy:

🌱 **HYDROPACK®** modules are able to absorb large quantities of rainwater (1.1") and distribute it to the plants from their built-in water reserves.

🌱 **HYDROPACK®** can be combined with our **STOCK & FLOW®** solution to collect even more water (2.3"). The stored water can be used to passively irrigate the plants using the **IRRIG'UP®** component of **STOCK & FLOW®** which passively waters the plants above.

COMBINING HYDROPACK WITH AN IRRIGATION SYSTEM

The built-in water reserve saves water

PRE-GROWN MODULE HYDROPACK®	VEGETAL I.D. WATERING SOLUTION
 <p>A permanent water reserve (1/5 gal./sq. ft) that fills while it rains and then releases water to the plant cover by wicking</p> <p>Excess rain or irrigation water is distributed between the interconnecting modules (via the water reservoirs) when the substrate is saturated with water</p>	 <ul style="list-style-type: none"> 🌱 Designed to intelligently supplement natural rainfall 🌱 Performance and discretion

Combining our solutions:

- 🌱 **Reduces the need for externally-supplied water**
by making maximum use of natural rainfall and minimizing water consumption
- 🌱 **Optimizes distribution of rain/irrigation water**
across the roof surface, even on steeply-pitched roofs
- 🌱 **Enables the Vegetal I.D. irrigation system to be sized correctly** for all projects

A truly environmentally-friendly solution

for extensive green roofs that require occasional watering