FOAMPARTNER
best in foam

HyPore Roof & TCL 40100

Innovative Roof Greening for Better Ecology, Climate and Economy

VIRIdiVITA®
Saving water for life

ecovative

Innovative Roof Greening for Better Ecology, Climate and Economy

The consequences of climate change for our cities

The earth is getting warmer and warmer every day. In the last hundred years alone, the average temperature has risen by almost one degree Celsius. The effects of climate change vary regionally and locally. In some regions, for example, extreme weather events with increasing precipitation are becoming more frequent, while in other areas heat waves and droughts are occurring more frequently.

This means that atmospheric radiation in our cities has been rising steadily for years. Buildings, sealed roads and sidewalks absorb heat during the day and release it into the environment at night. At the same time, the risk of flooding has increased due to the increasing frequency of heavy rains. Urban sewerage systems are overloaded and can no longer absorb the large amounts of precipitation that fall in a short time.

Green Roofs Make Ecological and Economic Sense

Roof areas represent a high proportion of the city's surface area, at around 30-50%. In this respect, green roofs can make a significant contribution to improving the urban climate. Green roofs act like settlement biotopes, which have a positive effect on rainwater management as well as on the air temperature in the immediate vicinity.

Water retention & compensation for extreme rain fall
A green roof can absorb and evaporate more than half of the annual rainfall. The burden on the sewerage system is reduced, and the sewage costs are lowered.

Improved air quality
The summer heating of the city air can be reduced by a green roof and also dust and pollutants are filtered from the air.

Green roofs have a positive influence on the CO_2 balance, because they help save energy for heating and air conditioning systems. This not only has a positive effect on the wallet, but is also good for the climate thanks to lower CO_2 emissions. The vegetation on the roof helps to bind the CO_2 in the atmosphere and convert it into oxygen through photosynthesis.

Energy saving insulation
Green roofs have an insulating effect and help protect buildings against UV radiation. At the same time, they extend the service life of the roof sealing.

Pleasant room climate
Green roofs compensate for temperature extremes. The indoor climate in the building is improved by evaporative cooling in summer and additional thermal insulation in winter.

The greening of buildings can contribute to the biodiversity and species diversity of our ecosystem by creating new habitats for flora and fauna. Green roofs are not only oases for wildlife, but also offer people a better quality of life.

More biodiversity
Through the recovery and interconnection of the roof areas, bees, bumblebees, butterflies, beetles and birds find their way back to our cities. They find food and shelter on the green roofs.

Optical attractiveness
Green roofs can create an exciting interplay between architecture and nature and visually enhance buildings. This creates new retreat and recreation areas in the city, inviting you to relax.

In close cooperation with the Swiss garden and landscape architect Urs Sutter, FoamPartner has developed special foams for modern green roof systems that optimally combine ecological demands with economic benefits.

The core of these green roof systems is an innovative water storage mat that is marketed by the company VIRIdiVITA GmbH under the name VIRIdiVITA premium roof. Further details about the product, especially about the design and the functional properties of VIRIdiVITA premium roof are available on the following pages.

VIRIdiVITA & FoamPartner
A partnership for more ecology, climate protection and economic efficiency

Nature Oriented Rainwater Management Through Roof Greening

Protection against extreme rain fall & improvement of the microclimate
In the event of heavy rain fall, a quantity of 5 l of rain can fall per square meter within 5 minutes. If the heavy rain continues, the sewage system is quickly overloaded, and flooding can occur in the basement and first floor of a building.

An essential task of the roof greening and the water storage mat is water retention. With intensive green roofs, an almost complete retention of rainwater can be achieved. This not only relieves the settlement water supply, but also improves the local microclimate in the long term, since the evaporation of the stored rain water ensures active cooling of the ambient temperature, especially in hot months.

Functionality of the VIRIdiVITA green roof system
The storage capacity of a VIRIdiVITA premium roof water storage mat is up to 42 l/m². This is possible with material thickness of the retention layer of only 50 mm. The VIRIdiVITA substrate layer can additionally absorb 18 l/m² of rainwater. This results in a total water retention capacity of 60 l/m².

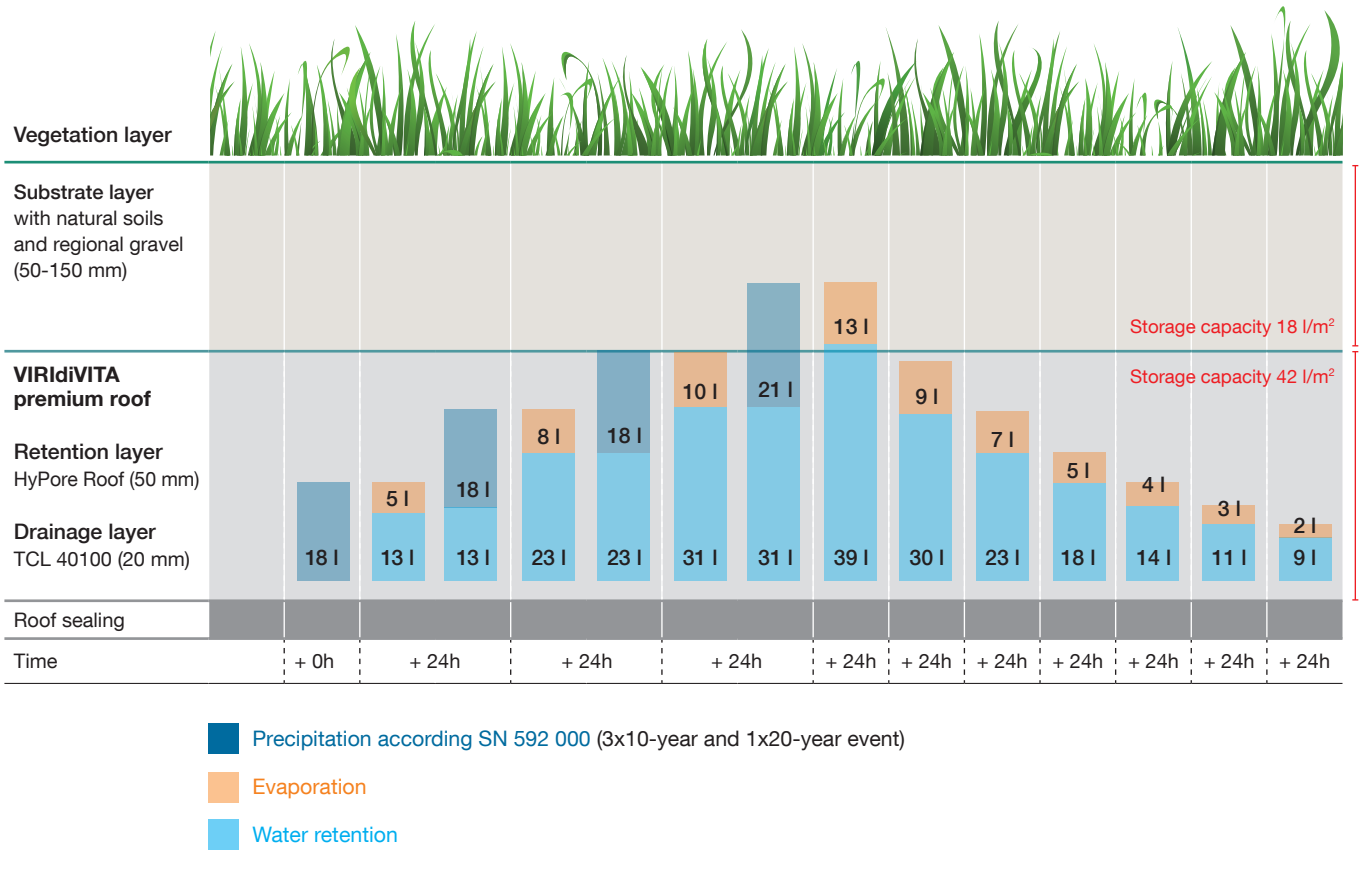
The water binds on the surface of the roof greening system, i.e. in both the substrate and the retention layer, and is thus available to the plants. The HyPore Roof foam stores the water in the retention layer. It is characterized by a unique, double cell material structure. Its fine pores are particularly hydrophilic and are largely responsible for the absorption and retention of rainwater. Special additives are also attached to the cell wall of the larger pores, which have an additional absorbing effect. Since they are already incorporated into the foam matrix during the manufacturing process, they are permanently available in the application. A further advantage of these additives is their growth promoting property for the plants.

In addition, the air permeability of the foam plays an important role, as it allows the rain to evaporate. Due to the open cell structure of the larger pores, 30-40% of the water can evaporate within 24 hours.

Despite the minimal thickness of the water storage mat, VIRIdiVITA premium roof can be used to create a particularly natural and ecologically valuable green roof with an optimal water absorption capacity. At the same time, the weight on the roof is reduced to a minimum.

In application tests with external partners and test institutes, the company VIRIdiVITA has carried out precipitation simulations to evaluate the retention capacity and storage potential of the water storage mat.

The results speak for themselves:
- Water retention capacity*: 42 l/m²
- Water discharge coefficient (C-value)*: 0.023
- Precipitation retention: 97.7%

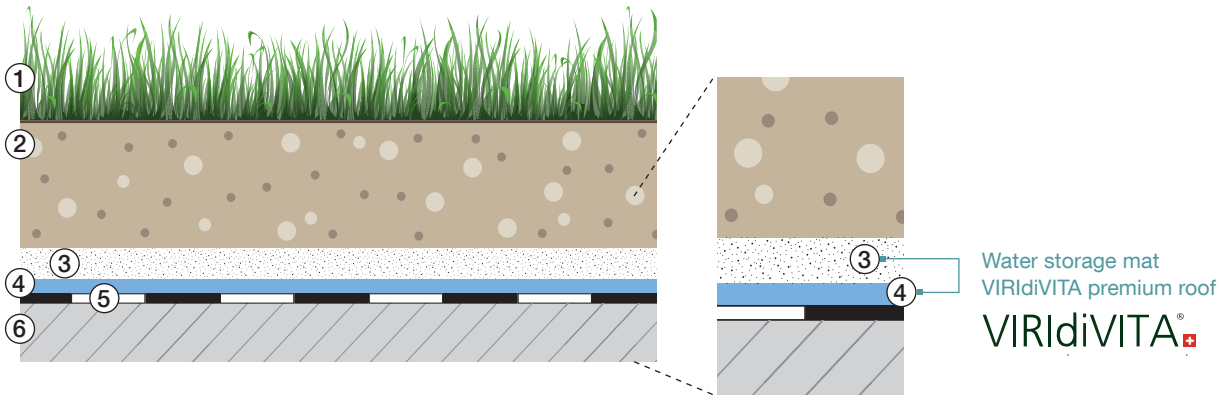


* EMPA Material Science and Technology PB 462158-2

Foam Based Roof Greening Systems

Construction of an intensive roof greening

In the case of intensive roof greening, a water storage mat is laid on the roof membrane, which is then covered with a layer of substrate needed for vegetation. The water storage mat is equipped with the special foams HyPore Roof and TCL 40100, which store rain water to a certain extent, but also release excess water to prevent waterlogging of the plants. The foam HyPore Roof acts as a storage medium in the retention layer and TCL 40100 as a filter material in the drainage layer. The water storage mat has a total thickness of only 7 cm.



1 Vegetation layer with native plants, e.g. mosses, grasses, succulents, and herbs

2 Substrate layer with natural soils and regional gravel (50-150 mm)

3 Retention layer with storage medium HyPore Roof from FoamPartner (50 mm)

4 Drainage layer with TCL 40100 filter foam from FoamPartner (20 mm)

5 Roof waterproofing

6 Roof construction

Advantages of foams over other materials

At present, there are various roof greening systems that use different materials for water retention and drainage.

Polyurethane foams offer numerous advantages over other materials, such as non-woven, mineral or stone wool, along the entire product life cycle - from manufacture to application and disposal. The HyPore Roof and TCL 40100 foams have been specially developed for the VIRIdiVITA premium roof water storage mats and offer the following properties.

Production
HyPore Roof and TCL 40100 are available already bonded as a combined retention and drainage mat. In total, the optimal material thickness is 70 mm. This can also be adapted to individual requirements. The mat can be cut to any desired size without special equipment, making installation extremely easy.

Application
The water storage mat with HyPore Roof and TCL 40100 offers a high water absorption capacity, but at the same time drains excess water. The material is particularly light, so that the mat in dry condition only weights 2.5 kg/m^2 and in saturated condition 44.5 kg/m^2. The substrate adds 92.5 kg/m^2 and 110.5 kg/m^2 respectively. This makes the lightweight roof greening system particularly suitable for flat and pitched roofs. The foams are characterized by a high material elasticity and good recovery behavior, so that the mat can be removed after compression, spontaneously returns to its original state, e.g. when the roof is walked on or due to snow in winter.

Service life
VIRIdiVITA premium roof water storage mats have a service life of about 30 years. It does not have to be disposed of as hazardous waste, as is the case with other materials, but can be recycled via the waste cycle management system.

Product benefits of foams

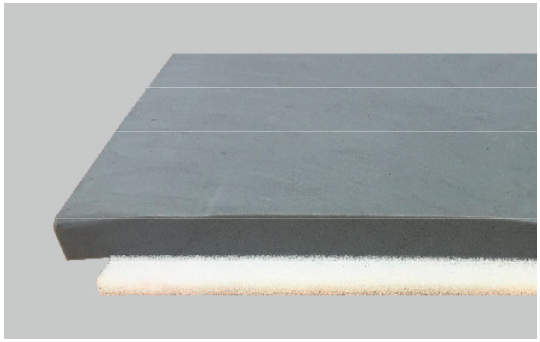
Polyurethane foams offer numerous advantages over other materials along the entire product life cycle.

		Systems with foams HyPore Roof and TCL 40100	Systems with non-woven	Systems with mineral wool or stone wool	Other storage systems with retention sheets
Production	Easy handling and processing in production and reduced material usage	↑	↓	→	→
Application	High water absorption capacity, storage and retention	↑	↓	→	→
	Good drainage capability of excess water with simultaneous filtration of impurities	↑	↓	→	→
Application	Suitable for lightweight construction for maximum weight savings on the roof	↑	↓	→	→
	Fast recovery to the original state (e.g. after stepping on) thanks to high material elasticity	↑	↓	↓	↓
Service life	Durability or lifetime of the green roof	~30 years	~15 years	~20 years	~20 years
	Easy and ecological disposal	↑	↓	↓	↓

Technical data of foams

Product properties	Test method	HyPore Roof	TCL 40100
Net density [kg/m^3]	DIN EN ISO 845	28	28
Compressive strength [kPa] at 40%	DIN EN ISO 3381/1	20	10
Tensile strength [kPa]	DIN EN ISO 1798	150	150
Elongation at break [%]	DIN EN ISO 1798	30	60
Air flow [l/(m^2+s)] at 200 Pa	DIN EN ISO 9237	600	4500
Water retention [g]	RPA-1010	350	-

The indicated data refer to typical values and slight variations are in general within the specification.



Water storage mat VIRIdiVITA premium roof with HyPore Roof retention layer (upper sheet) and TCL 40100 drainage layer (lower sheet)

Easy installation of the VIRIdiVITA premium roof water storage mats is guaranteed thanks to handy sheets in the dimensions 200 x 100 x 7cm

FoamPartner Group

Business Segment Specialties

FoamPartner is a leading producer and converter of first-class foam solutions for technical and comfort applications. With a broad range of over 200 specialty foams, we are a customer focused, innovative partner for the automotive, manufacturing, and bedding industries.

With 13 sites in the three most important economic regions of Europe, the Americas, and Asia Pacific, and over 1,100 employees, we combine global expertise with local entrepreneurial drive to create value for our customers.

With the goal of being known as "Best in Foam", our business segments develop best-in-class foam solutions together with our customers.

The Specialties segment supplies the market with versatile foams based on polyurethane and polyethylene. Thanks to many years of experience and extensive know how in foam production and processing, we develop innovative products and sustainable solutions for a wide range of applications.

One focus is on special applications for horticulture, plant cultivation and agricultural care. Within the framework of our sustainability strategy, we support ecological projects in cooperation with external partners. Together with VIRIdiVITA, for example, we have developed innovative foam based water storage mats for green roofs. Green roofs make an important contribution to mitigating climate change in our cities and make a significant contribution to improving the urban climate.

VIRIdiVITA & FoamPartner
A partnership for more ecology, climate protection and economic efficiency

ecovative

The Ecovative label stands for our promise “Best in Foam – Sustainable through Innovation” and is our award for innovative product solutions with special sustainable and economic value.

Global Presence

FOAMPARTNER best in foam

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