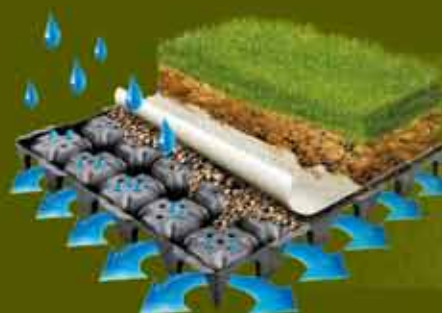




DRAINroof



The ideal solution for roof gardens

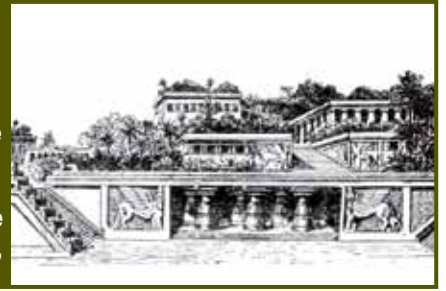


**verde
green**

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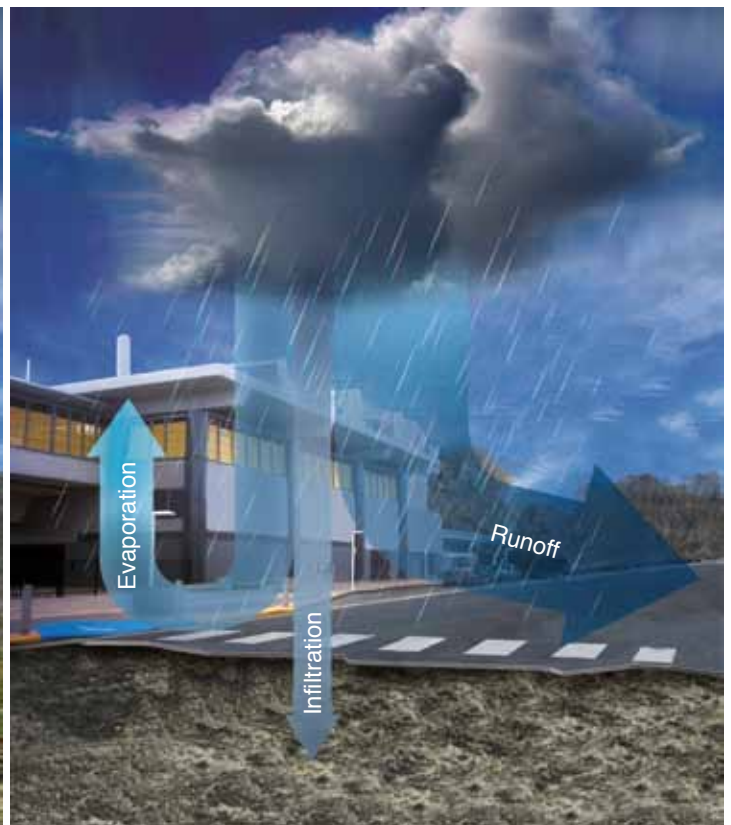
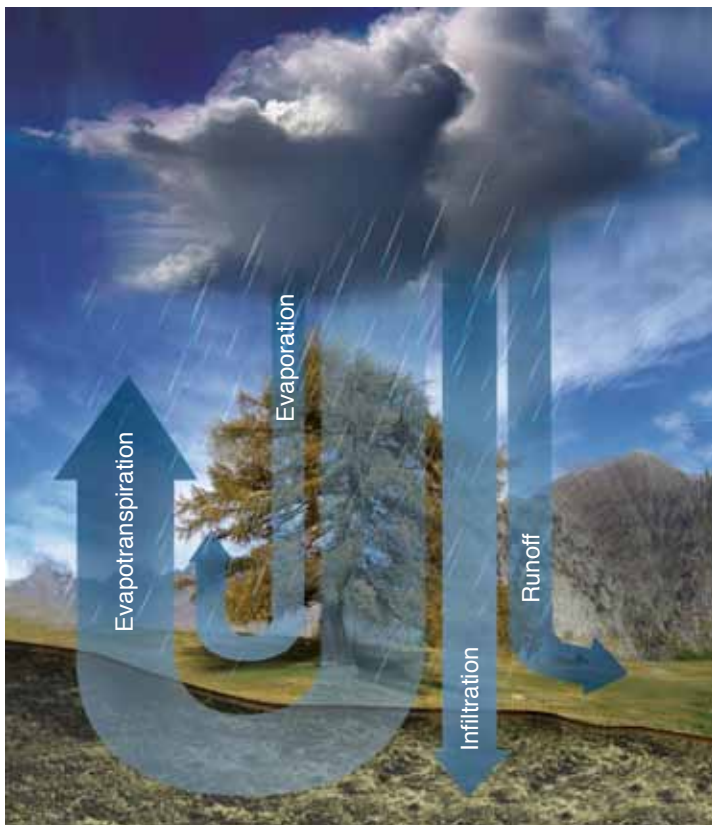
DRAINROOF THE IDEAL SOLUTION FOR ROOF GARDENS

Green roofs are the most modern solution to the issues raised by the increase of impervious surfaces in urban areas. Green roof history stems from ancient times, dating back to around 590 b.C. with the construction of the great Hanging Gardens of Babylon. It is said that fresh roses were brought every day to the Queen of that city, in spite of the arid climate of that region.



The technics and materials used to create green roofs have evolved since and have become very important in their realisation. Green roofs provide numerous benefits, including:

- a reduction in the costs of roofing maintenance and end-of-life replacement as they protect the surface from thermal and mechanical shock, thus increasing the roof's lifespan;
- quieter interior environments through their noise attenuation properties;
- green roofs filter chemical air pollutants and physically capture airborne particulates;
- they absorb rainwater and reintroduce it in the natural water cycle;
- green roofs improve the look of buildings thus increasing their value;
- green roofs decrease the total amount of runoff and slow the rate of runoff from the roof, decreasing the need to expand community water treatment infrastructure;
- mitigation of the urban heat island effect, i.e. the temperature increase in urban areas by some degrees vs. the surrounding countryside (the summer temperature on the surface of a green roof is normally around 25°C);
- green roofs create air currents towards the base of buildings, blowing away pollutants and decreasing the temperature of the walls;
- create a habitat for birds and invertebrates within cities.



Stormwater runoff on a green surface is about 15%: on the other hand urban areas are largely impervious and stormwater runoff is as high as 70%.

REGULATIONS

The recent Italian Norm UNI 11235:2007 "Criteria for design, execution, testing and maintenance of roof garden" gives instructions on how to design a green roof. Indications are given on the system build-up: the plant and vegetation layers, the drainage, ventilation, water storage and resistance to biologic attacks.

A clear definition is also given for INTENSIVE- and EXTENSIVE GREEN ROOFS based on the amount of energy required to create and maintain them.

UNI 11235:2007 is an essential tool for green roof designers and creators.

GREEN ROOFS WITH DRAINROOF

DRAINROOF is an engineered drainage layer essential in the construction of a well designed green roof: it is designed to be laid over the waterproofing without causing it any damage, and ensures success to the garden project. Before **DRAINROOF** maintaining correct soil moisture levels was the main issue with green roofs, as incorrect water drainage could kill vegetation by either stagnation or draught: a modern green roof self-regulates the amount of water it needs and uses, thanks to **DRAINROOF**'s high water storage capacity and the drainage holes that allow water in excess to drain away under in the open space under the elements.



With 500 drainage holes per m², **DRAINROOF** totals 1,144 cm² of drainage surface per square meter

THE ADVANTAGES OF A GREEN ROOF WITH DRAINROOF

- The high resistance to compression of **DRAINROOF** (6.000 kg/m²) makes it capable of supporting small vehicles such as mini excavators and other small utility vehicles.
- Water storage capacity of approx. 20 l/m² (may vary depending on the filler material);
- Best aeration of the roots thanks to a total void of 35 liters of air per square meter;
- The 500 holes per m² allow perfect drainage, with a total drainage surface of 1,144 cm²/m²;
- Thanks to the rounded footing design, **DRAINROOF** can be installed directly onto the waterproofing without causing it any damage;
- **DRAINROOF** was especially engineered to self-regulate drainage, irrigation and aeration;
- The special double-overlap joint makes installation very fast.

DRAINROOF EXTENSIVE GREEN ROOF

An **EXTENSIVE** green roof is **LOW ENERGY**: it uses little energy both to create and to maintain. Most green roofs fall under this classification, as they are by their very nature mostly inaccessible, and therefore must be virtually self-sustaining.

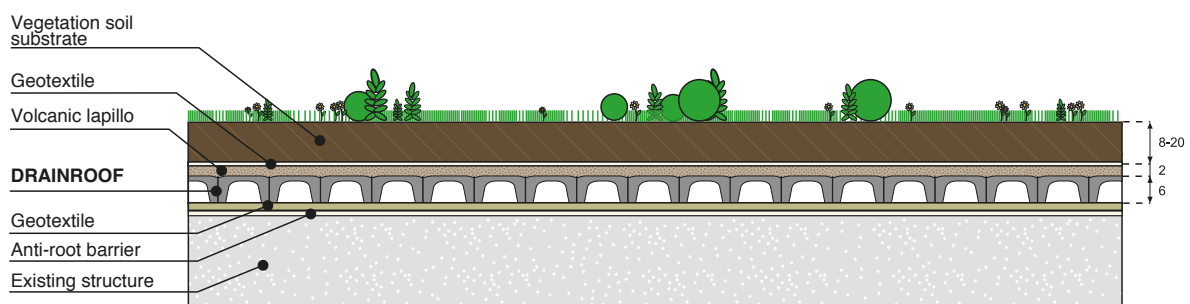
The characteristics of an extensive green roof are:

- thin system build-up;
- low-bearing shrubs or grasses, small root system, low maintenance;
- only an emergency irrigation system is required;
- low weight (70 to 250 kg/m²)
- used also slanted roofs.



REALISATION OF AN EXTENSIVE GREEN ROOF WITH DRAINROOF

- Lay a root-barrier;
- For extra protection of the waterproofing it is best to lay a non-woven geotextile, weight 200 g/m²;
- Install the **DRAINROOF** elements made of regenerated plastic (PP), resistant to organic substances, that act both as water-storage and -drainage layer;
- Fill the **DRAINROOF** elements with high water-retaining pumice or volcanic lapillo, grain-size 10-12 mm, then cover with extra 2 cm above the top of the modules;
- Lay a filtering- and separator-sheet of non-woven geotextile, weight 150 g/m², to prevent the filler material and the vegetation soil from intermingling;
- Vegetation soil substrate of 8 to 20 cm thickness;
- Construction of irrigation system.



THICKNESS OF THE VEGETATION LAYER (cm)	SUITABLE PLANTS	MAINTENANCE (h/m ² /year)*	FLOW RATE	
			SLOPE < 15°	SLOPE > 15°
8	Sedum	< 0.02	0.4	0.5
10	Low-bearing perennial grasses	< 0.02	0.4	0.5
15	Large perennial grasses, small low-bearing shrubs	< 0.02	0.4	0.5
20	Grass lawn	0.021 - 0.06	0.3	> 0.5

*Example of maintenance for 1,000 m²: required hours, per year = 0.02 x 1,000 = 20 h

DRAINROOF INTENSIVE GREEN ROOF

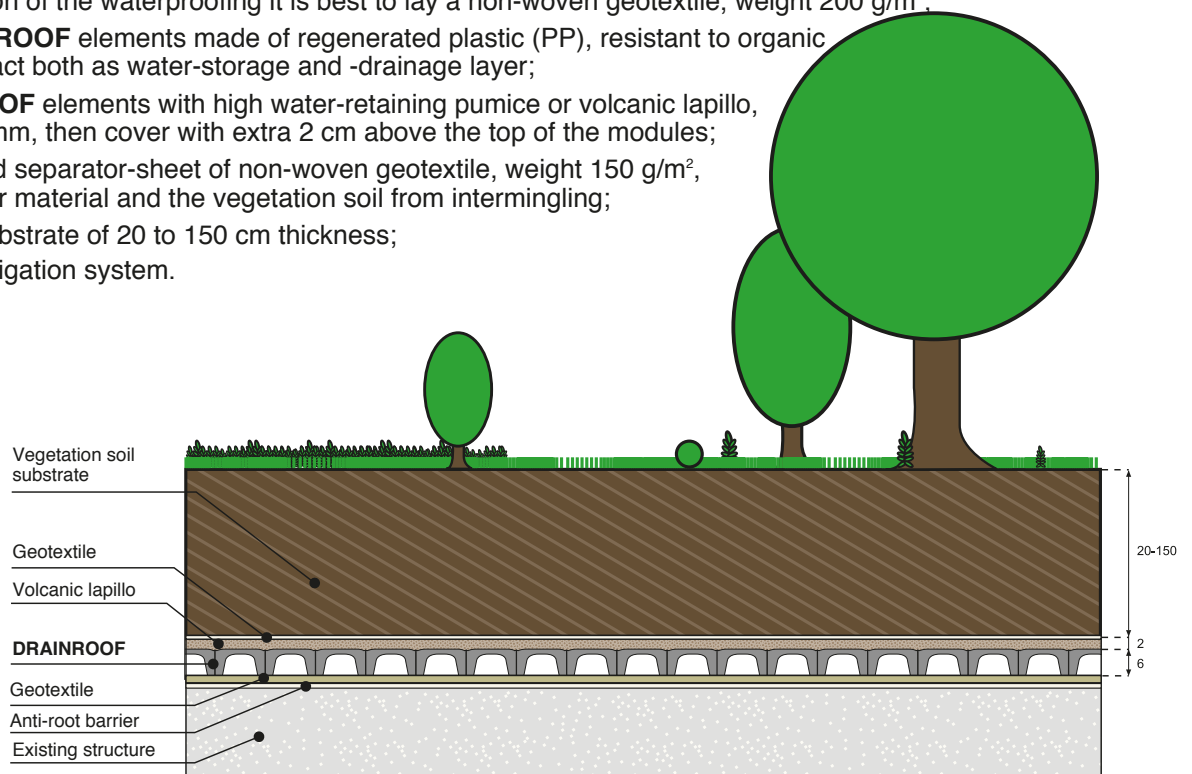


INTENSIVE green roofs are **HIGH ENERGY**: they require a lot of energy for both their realisation and upkeep. The main characteristic of an intensive green roof is its usability, as it can be enjoyed the same way as an ordinary garden. This requires:

- thick build-ups;
- large plants are used such as tall grasses, tall bushes and trees, requiring high maintainance;
- frequent and abundant artificial irrigation is required;
- greater weight bears on the roof (250 to 2,000 kg/m²);
- higher realisation and maintainance cost.

CREATION OF AN INTENSIVE GREEN ROOF WITH DRAINROOF

- Lay a root-barrier;
- For extra protection of the waterproofing it is best to lay a non-woven geotextile, weight 200 g/m²;
- Install the **DRAINROOF** elements made of regenerated plastic (PP), resistant to organic substances, that act both as water-storage and -drainage layer;
- Fill the **DRAINROOF** elements with high water-retaining pumice or volcanic lapillo, grain-size 10-12 mm, then cover with extra 2 cm above the top of the modules;
- Lay a filtering- and separator-sheet of non-woven geotextile, weight 150 g/m², to prevent the filler material and the vegetation soil from intermingling;
- Vegetation soil substrate of 20 to 150 cm thickness;
- Construction of irrigation system.



THICKNESS OF THE VEGETATION LAYER (cm)	SUITABLE PLANTS	MAINTAINANCE (h/m ² /year)*	FLOW RATE	
			SLOPE < 15°	SLOPE > 15°
30	Tall shrubs and small trees	0.021-0.06	0.2	> 0.5
50	Trees taller than 10 m	> 0.06	0.1	> 0.5
80	Trees between 10 and 16 m tall	> 0.06	0.1	> 0.5
> 100	Trees taller than 16 m	> 0.06	0.1	> 0.5

*Example of maintainance for 1,000 m²: required hours, per year = 0.06 x 1.000 = 60 h

DRAINROOF TECHNICAL DATASHEET



HOW TO INSTALL

- a) Source and lay a root barrier
- b) For extra protection of the waterproofing it is best to lay a non-woven geotextile, weight 130 g/m²
- c) Source and install **DRAINROOF** modules in regenerated plastic (PP), resistant to chemical and organic agents:
 - I. Dimensions: 50 x 50 x H 6 cm (2.5 cm)
 - II. Water storage capacity: 12 l/m² (6 l/m²)
 - III. Draining surface: 318 cm²/m² (547 cm²/m²)
 - IV. Drain flow volume: 40 l/m² (17.2 l/m²)
 - IV. Install with double-overlap joint, cut modules when necessary
- d) Fill the **DRAINROOF** elements with high water-retaining pumice or volcanic lapillo, grain-size 10-12 mm, then cover with extra 2 cm above the top of the modules. Procedure is not necessary in the case of use of **DRAINROOF** H2.5 cm
- e) Lay a sheet of non-woven geotextile, weight 150 g/m², to prevent the filler material and the vegetation soil from intermingling;
- f) Vegetation soil substrate of 8 to 150 cm thickness of specific extensive- or intensive green roof soil;
- g) Construction of irrigation system.

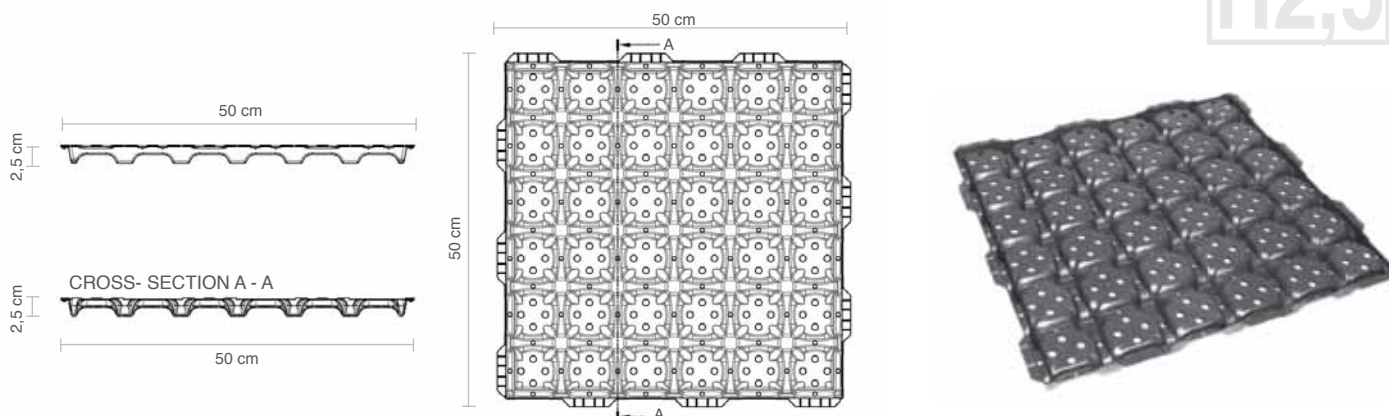


DRAINROOF

the under side of the modules is shaped to allow water run-off in all directions, allowing a very high dispersion rate.

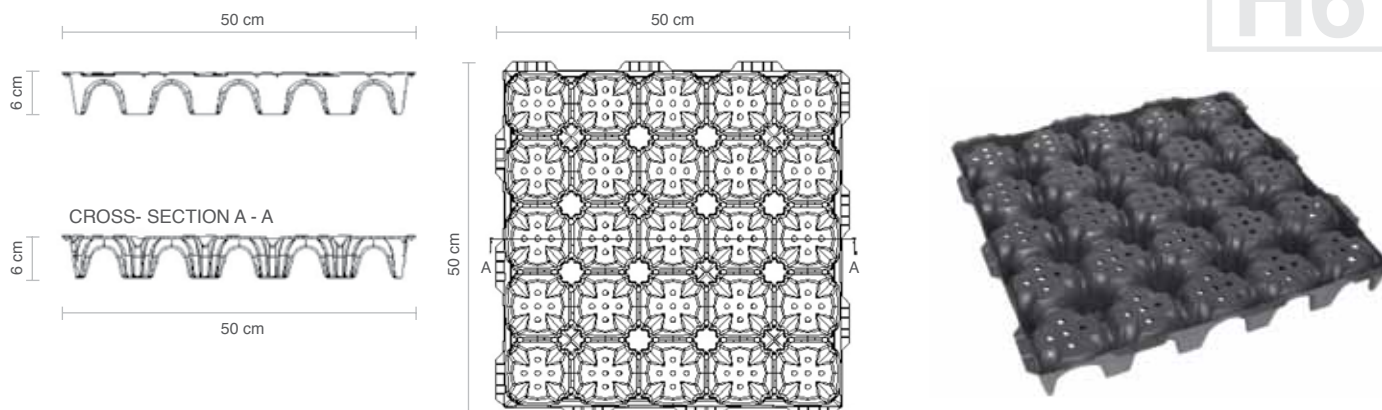
COMPARISON DRAINroof H2,5 AND H6

TECHNICAL DATASHEET DRAINroof H2,5



MATERIAL	Regenerated Polypropylene (PP*)
DIMENSIONS	50 x 50 x H2.5 cm (= 4 pcsz./m ²)
RESISTANCE TO COMPRESSION	3.200 kg/m ²
DRAINING SURFACE	547 cm ² /m ²
WATER STORAGE	6 l/m ²
VOLUME FLOW	17.2 l/m ²
WEIGHT PER M²	2.39 kg/m ²
PACKAGING	1440 pcs. (= 360 m ²)

TECHNICAL DATASHEET DRAINroof H6



MATERIAL	Regenerated Polypropylene (PP*)
DIMENSIONS	50 x 50 x H6 cm
RESISTANCE TO COMPRESSION	6.000 kg/m ²
DRAINING SURFACE	318 cm ² /m ²
WATER STORAGE	12 l/m ²
VOLUME FLOW	40 l/m ²
WEIGHT PER M²	4 kg/m ²
PACKAGING	720 pcs. (= 180 m ²)

* Regenerated Polypropylene (PP): Flexural modulus 1100 N/mm² – Tensile strength 35 N/mm² – Coefficient of thermal expansion 0,15 mm/m/°C.

WHERE TO USE DRAINROOF

EXTENSIVE- OR INTENSIVE GREEN ROOFS
ROOFS OF GARAGES, FACTORIES, TALL BUILDINGS OR PRIVATE HOMES.
GREEN ROOFS WITH SLOPE OF UP TO 30%



DRAINROOF THE IDEAL SOLUTION FOR GREEN ROOFS



DRAINroof Thanks to its double-overlap joint, once installed DRAINROOF gives a stable surface even before filling.



GEOPLAST is a member of A.I.V.E.P.
Italian Green Roof Association

Disclaimer: the values shown in this brochure are for guidance only. They are not meant to be used for design criteria. Their use and reliance thereon for any purpose by anyone is entirely voluntary and at the sole risk of the user. GEOPLAST is not responsible for any loss, claim, or damage resulting from their use.

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ASSEMBLY HANDBOOK AND TECHNICAL SPECIFICATION

Available in our website www.geoplast.it in the "Area download" section.

Authorized dealer:



Manufactured by:
GEOPLAST S.p.A.
Via Martiri della Libertà, 6/8
35010 Grantorto (PD) - Italy
tel +39 049 9490289 - fax +39 049 9494028
e-mail: geoplast@geoplast.it - www.geoplast.it

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