



RETENTION ROOF FLOW CONTROL

**Sewer capacity exceeded?
Flooding and overheating problems?**

- Observance of restrictions on discharge into the drainage system
- Discharge yield, from less than 1 l/s adjustable
- Containment volume on the roof of up to 140 l/m²
- Increase in evaporation performance using patented capillary columns
- Revitalisation of the natural water cycle in the city

**New: Smart Flow
Control 4.0 controlled
via weather app**

OPTIGRÜN®
ROOF GREENING

Fields of action in climate protection

It has now been generally acknowledged and demonstrated that we are living in a phase of climate change caused by man. Climate change is particularly serious in high-density urban areas in many cities.

Measurements for climate change adaption (Fig. 1)

While a green roof only has a minor influence on reducing greenhouse gases, it offers highly effective and scientifically proven solutions in all three areas of climate change adaptation.

- › Heat prevention
- › Flooding prevention
- › Health issues

If we want to tackle the problems of inner cities at the root cause, the roof areas in the city, which are generally unused, offer diverse, untapped potential to effectively reduce the impact of climate change:

1. Reduction in the degree of soil sealing
e.g. extensive green roof instead of non-green roof
2. Relieving pressure on the sewer system and flood prevention
e.g. retention roof with containment volume on the roof and defined flow control system
3. Reduction in radiation energy and overheating e.g.
extensive green roof instead of non-green roof
4. Health care: Quality of life, work and living e.g. usable
garden roof instead of gravel roof
5. Sustainable energy production and energy saving e.g.
combination of green roof and photovoltaics
6. Biodiversity and linking of natural environments
e.g. nature roof instead of gravel roof

Prospect

Architects, urban planners, civil engineers and urban water management experts need to think again and look at the new potential of roof areas, especially in high-density urban areas. Special retention roof systems offer effective opportunities to implement new water-based urban planning, which is oriented towards the natural water balance with a focus on evaporation and retention. Green roofs ensure a lower temperature amplitude in the building, save energy and reduce overheating in cities. Controlled drainage reduces the load on the sewer system. Green roofs can offer a direct recreation area for growing urban areas and can make an important contribution to healthy living.

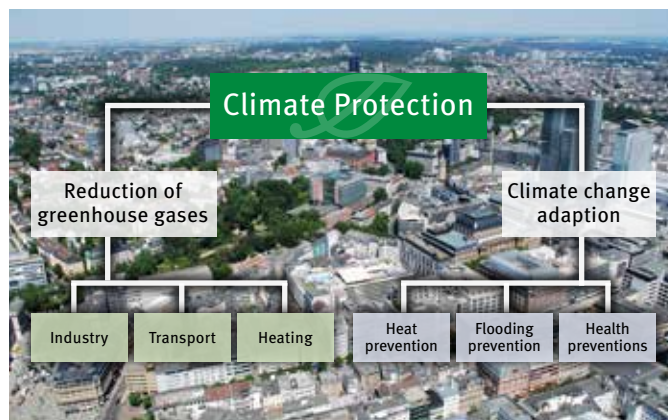


Fig. 1 Fields of action

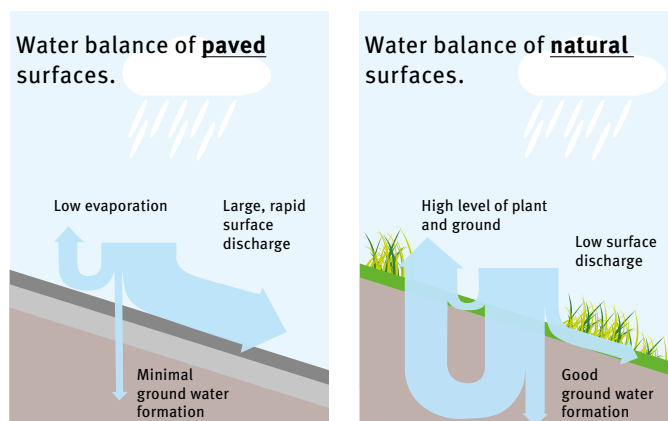


Fig. 2 Relieving of the sewer systems and flood prevention



Fig. 3 Health prevention



Fig. 4 Species diversity and biotope network

Performance of the Optigreen Retention Roofs

With regard to the water balance, retention roofs offer the following performance features:

Water retention l/m^2 , peak discharge coefficient C_s and maximum drainage rate $\text{l/s} \times \text{ha}$.

Optigreen international AG offers the right solution for all urban requirements for modern rainwater management:

1. Optigreen Retention Roof Meander

(see Fig. 1 and 2):

Reducing peak drainage outflow

The Optigreen System Solution 'Retention Roof' Meander 30 and Meander 60 achieve very good water retention values with approx. $21 - 53 \text{ l/m}^2$ and extremely good peak discharge coefficients with $C_s = 0.01$ to 0.17 . However, it is not possible to define any individual throttle discharge for the meander products. The max. throttle discharge results directly from the discharge coefficient of the meander plates.

2. Optigreen Retention Roof Flow Control

(see Fig. 3 and 4):

Observance of fixed restrictions on discharge

With the Optigreen System Solution Retention Roof Flow Control, which is suitable for green roofs (extensive, intensive) and even for public areas (accessible to vehicles and pedestrians), specified restrictions on discharge can be verifiably observed. The centrepiece of the newly developed system solution is the Optigreen Water Retention Box WRB with Flow Control System. The flow control solution regulates the maximum drainage rate and creates an additional storage area on the roof of max. 80 l/m^2 with the Water Retention Box WRB 85i and 76 l/m^2 with WRB 80F or 140 l/s with the Water Retention Box WRB 150.

Evaporation to support the local water balance

Due to the integrated capillary system, the permanently stored rainwater from the Water Retention Box WRB is guided into the green structure and evaporates via the vegetation.

Optigreen therefore offers the first retention roof with a hollow body volume and integrated recirculation of rainwater back into the natural water cycle. Natural evaporation is a key component of the system. Using flow control settings determined for the specific property, the water discharge delay can be adjusted in such a manner that the maximum drainage rate is only for example 0.1 l/s .

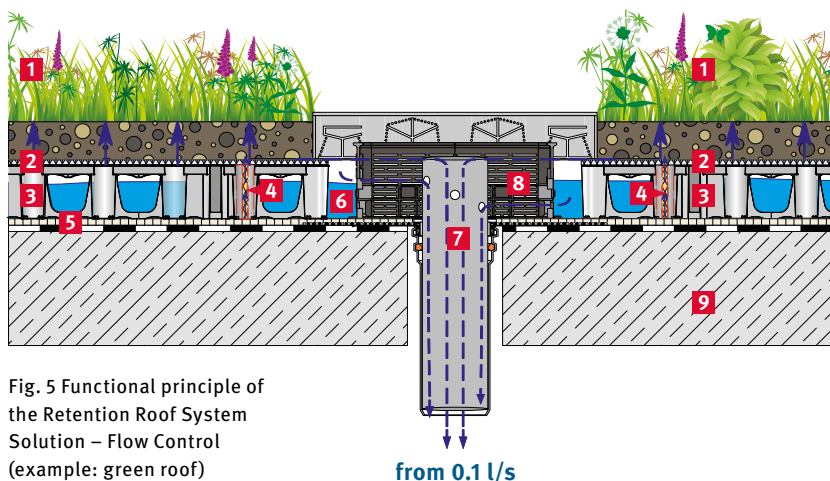


Fig. 5 Functional principle of the Retention Roof System Solution – Flow Control (example: green roof)

Solutions for reducing peak drainage outflow

Fig. 1

Retention Roof Meander 30

Temporary water storage: $21 - 40 \text{ l/m}^2$
Discharge coefficient: $C_s = 0.01$



Fig. 2

Retention Roof Meander 60

Temporary water storage: $38 - 53 \text{ l/m}^2$
Discharge coefficient: $C_s = 0.17$



Solutions to observe fixed restrictions on discharge

Fig. 3

Retention Roof Flow Control WRB 80F (extensive green roof)

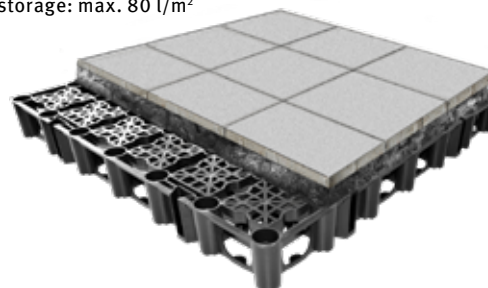
Temporary water storage: max. 76 l/m^2
+ 3.5 l/cm substrate



Fig. 4

Retention Roof Flow Control WRB 85i (Public Roof)

Temporary water storage: max. 80 l/m^2



- 1 Optigreen green roof build-up
- 2 Optigreen Suction and Capillary Fleece RMS 500K
- 3 Optigreen Water Retention Box WRB 85i, WRB 150 or alternatively WRB 80F
- 4 Capillary Columns for water transport from storage level to RMS 500K
- 5 Optigreen Protection and storage Fleece RMS 500
- 6 Water storage
- 7 Optigreen Inspection Chamber and Flow Control System according to calculation
- 8 Optigreen Trim Edge SKL
- 9 Suitable roof construction (static, roof membrane, 0° roof)

Retention Roof – Flow Control for extensive and intensive green roofs



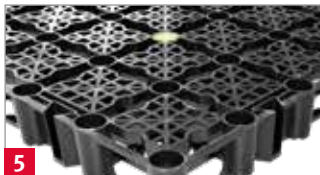
Extensive and intensive green roof



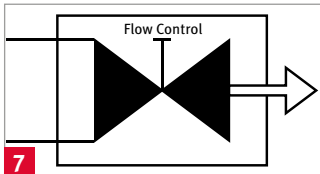
Optigreen Suction and Capillary Fleece RMS 500 K



Optigreen Water Retention Box WRB 80F for extensive greenings with capillary system



Optigreen Water Retention Box WRB 85i for intensive greenings with capillary system



Optigreen Flow Control System object specific adjustment of the flow diameter



Optigreen Protection and Storage Fleece RMS 500 resp. 900

Special features

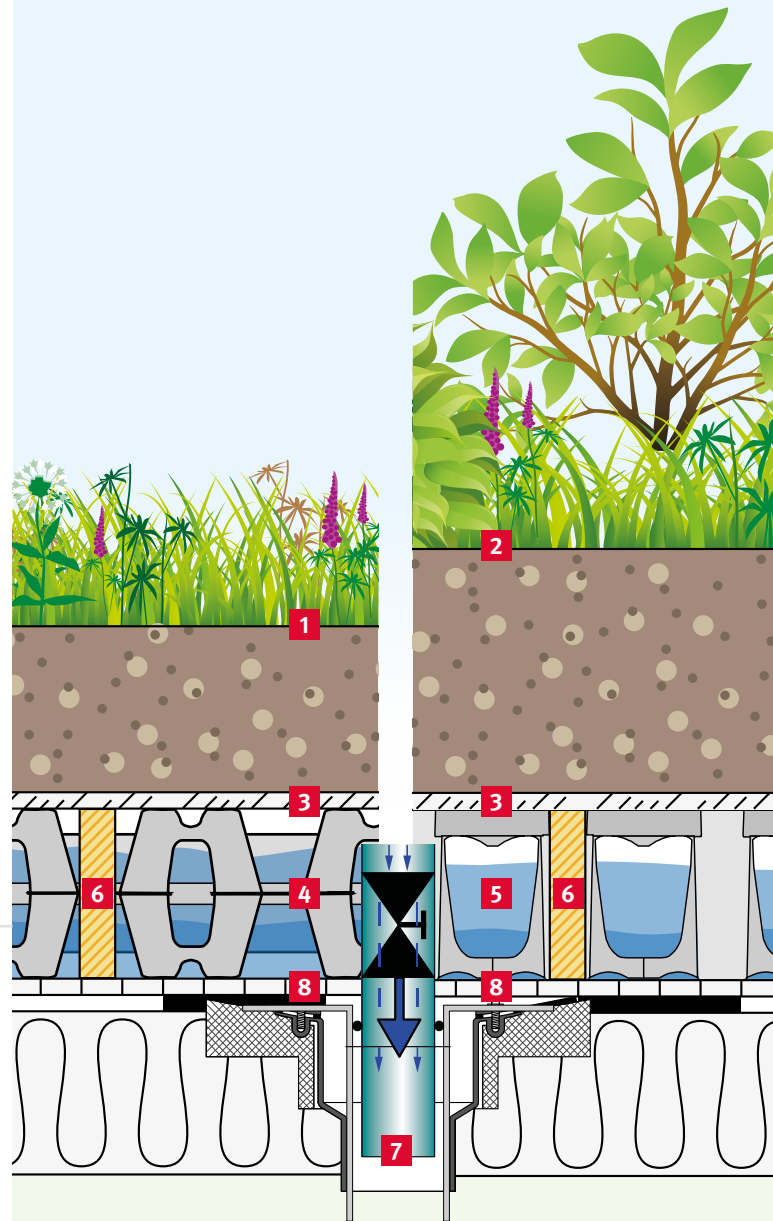
- Greenable: retention plus greening
- Optigreen Water Retention Box WRB with flow control
- Additional storage volume from 76 to 140 l/m²
- Discharge yield, also less than 1 l/s adjustable
- Increased transpiration performance through an integrated capillary system

Field of application

Extensive and intensive green roofs:
Optigreen System Solution Economy Roof,
Nature Roof, Garden Roof and Landscape Roof



temporary
permanent
water storage



Technical Data

	Extensive Greening	Intensive Greening
Weight	120 – 300 kg/m ² or 1.2 – 3.0 kN/m ²	300 – 570 kg/m ² or 3.0 – 5.7 kN/m ²
Build-up depth	160 – 250 mm	250 – 500 mm
Roof pitch	0°	0°
Vegetation form	herbs- grasses-sedum	perennial plants-shrubs-trees-lawn areas
Water retention	up to 76 – 140 l/m ² + water retention in the substrate	up to 80 – 140 l/m ² + water retention in the substrate
! Maximum run-off rate object-related adjustable	from 0.1 l/s	from 0.1 l/s

Retention Roof – Flow Control for walkable and driveable Public Roofs

Field of application

Walkable and driveable public roofs:
Optigreen System Solution Public Roof
and Green Public Roofs



Special features

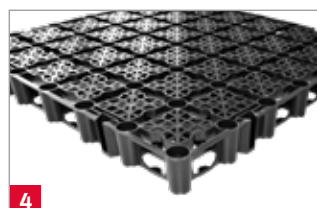
- Accessible to vehicles and pedestrians: retention plus public area
- Also under road surfaces up to 76 – 140 l/m² storage volume
- Discharge yield, also less than 1 l/s adjustable
- Low weight due to hollow body drainage (Water Retention Box WRB)
- Project specific approval: Waterproofing and inverted roof



Public roof areas, walkable, drivable and greened



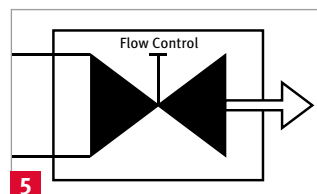
Optigreen Filter Fleece FIL 300



Optigreen Water Retention Box WRB 85i



Optigreen Water Retention Box WRB 85v
for higher weight loading



Optigreen Flow Control System
object specific adjustment of the flow diameter



Optigreen SGL 500 and Optigreen TGF 0.2 mm

Property-specific approval:
depending on waterproofing,
loads or inverted roof

temporary
permanent
water storage

Property-specific,
calculable water reservoir
and flow control setting!

Public Roof

from 450 kg/m²
resp. from 4.5 kN/m²
from 280 mm

0°

–

max. 80 – 140 l/m²

from 0.1 l/s

Public Green Roof

from 400 kg/m²
resp. from 4 kN/m²
from 260 mm

0°
Lawn

max. 80 – 140 l/m²

from 0.1 l/s

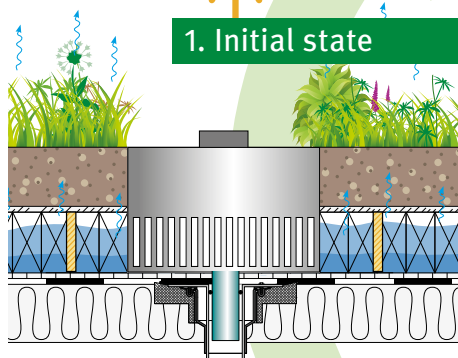
Smart Flow 4.0 “Smart Flow Control”: electronic control via weather app

New: Smart Flow Control 4.0 controlled via weather app

2. Weather forecast: rainfall

If rain is expected the weather app activates the Discharge 4.0 Smart Flow Control to open the rainwater outlet and the predicted storm-water volume is drained off. This is discharged into what is, at this point, an empty surface water drainage system. Space is then created within the Water Retention Box for the expected volume of new rainfall to be stored.

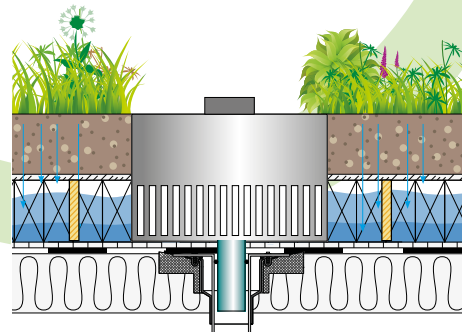
1. Initial state



Rain water is stored for dry periods: water available for the vegetation and for evaporative cooling.

3. Water retention during rainfall

Rainfall volume is stored in the Water Retention Box; no discharge into the surface water sewer.



A video related to this subject is available in our media library!

www.optigreen.co.uk/specification-support/media-library/optigreen-videos/

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