

Probably the smartest
green roof in the world

OPTIGRÜN RETENTION ROOF MEANDER

Reduces peak water run off by up to 99 %

OPTIGRÜN[®]
ROOF GREENING

Green Roofing: Water retention and run off delay using green roofs

The Situation.

Every day many acres of open ground are brought into use for new residential or commercial development. A negative consequence of this is that the natural ability of the land to absorb excess rainfall is lost under new hard landscaping and existing surface water drainage systems are put under pressure, resulting in an increased risk of localised flooding.

Rainwater management with green roofs.

Green roofs help to counteract the consequences of increased areas of hard landscaping. They store rainwater, reduce water run off and delay discharge into the drainage system. This reduces pressure on local drainage provision, whilst water evaporation from green roofs helps to improve the local microclimate.

Predicting the run-off coefficient for green roofs.

The internationally accepted green roof guidelines published by the German FLL organisation included state of the art of run-off calculations. Also the European Standard 12056-3 refers to the FLL guidelines.

The guidelines define both annual water retention and the discharge coefficient “C” for green roofs depending on the depth of build-up. The coefficient of discharge C primarily helps to calculate the required capacity of drainage systems.

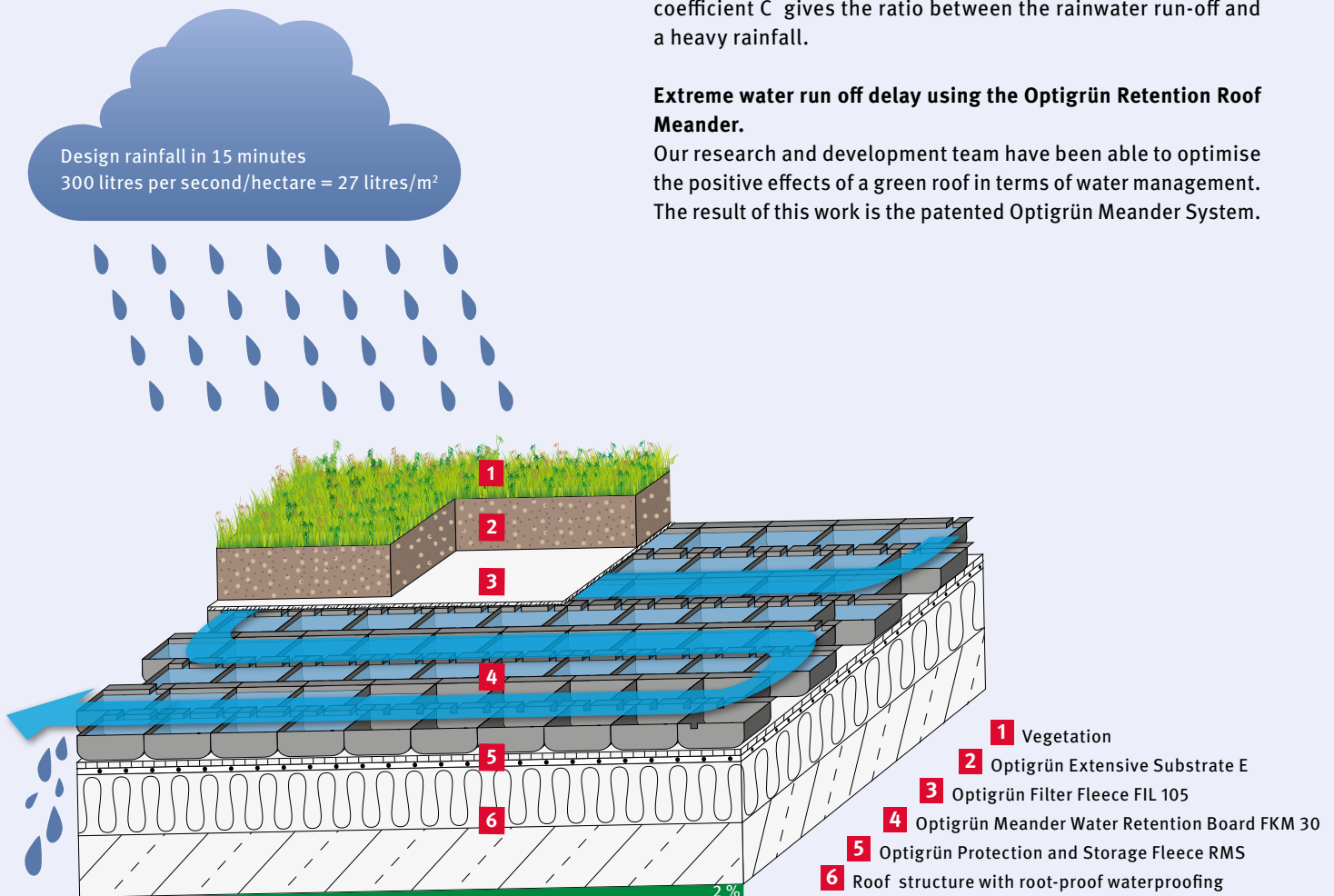
If you require any assistance with calculations please contact the Optigrün technical department at technical@optigrun.com

Determining the discharge coefficient C in accordance with the guidelines.

The FLL guidelines specify a special test method to provide system-related proof of the discharge coefficient C. This method measures the worst case scenario of a green roof experiencing complete water saturation and the resulting run off from a roof gradient of 2 % during a 15-minute rainfall event with a precipitation rate of 300 litres per second/hectare. The discharge coefficient C gives the ratio between the rainwater run-off and a heavy rainfall.

Extreme water run off delay using the Optigrün Retention Roof Meander.

Our research and development team have been able to optimise the positive effects of a green roof in terms of water management. The result of this work is the patented Optigrün Meander System.



The principle behind the patented Meander system is as simple as it is effective – water flows along a winding route from one chamber to another, just like a naturally meandering river or stream. During heavy rainfall the chambers of the board are filled with water and it passes from one chamber to the next causing a long delay in the discharge of excess water.

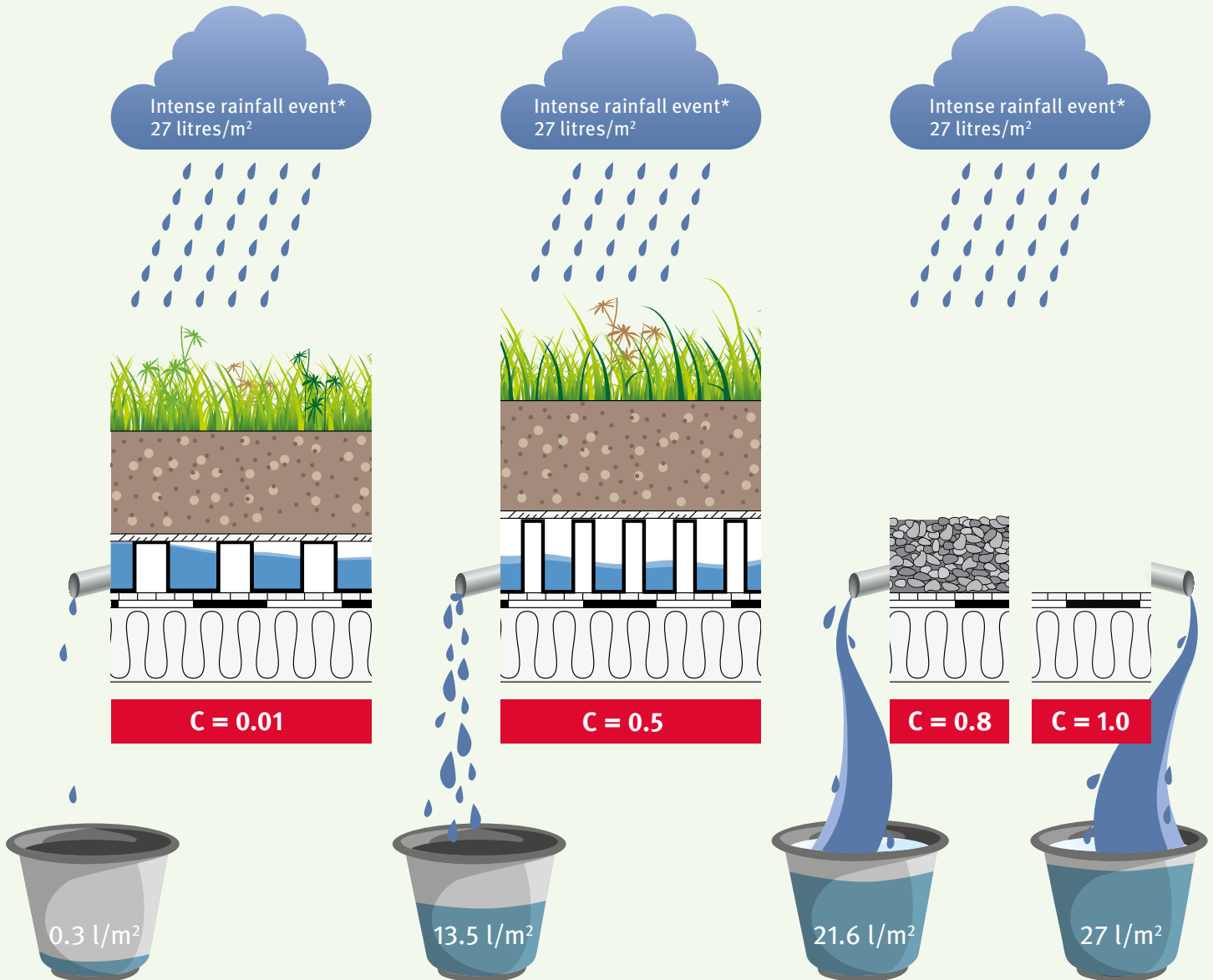
The Meander FKM 60 board, for instance, extends the water flow length by a factor of 13. Each Meander FKM 30 board covers two square metres yet the water flow route inside it measures up to 46 metres in length.

Examples of water run off on different roof build-ups

Optigrün Meander 30
(with 90 mm build-up depth)

Conventional extensive green roof with a drainage board
(with 100 mm build-up depth)

Gravel Roof/Non-green roof



Only 0.3 litres/m² reach the drainage system during the above rainfall intensity. 26.7 litres/m² are retained on the roof!

Half of the rainfall, i.e 13.5 litres/m², flows off the roof....

....it doesn't have to be that much!

Of the 27 litres/m² of rainfall, 21.6 litres/m² flow off a gravel roof and put the drainage system under enormous pressure.

Things are even worse on a non-green roof: nearly 100 % of the rainwater flows straight into the drainage system.

Conclusion:
The Optigrün Retention Roof Meander, using the Meander FKM 30, reduces the burden on the drainage system during intense rainfall* by 99 %.

* Hydrological design in accordance with FLL –
300 litres per second/hectare in 15 minutes = 27 litres/m²
Roof gradient: 2 %

Optigrün Retention Roof Meander 30

Applications

- Flat roof 0 – 5 degrees
(not suitable for inverted roofs)



1 Sedum-Moss Vegetation



2 Optigrün Extensive Substrate E (60 mm)



3 Optigrün Filter Fleece FIL 105



4 Optigrün Meander Water Retention Board FKM 30



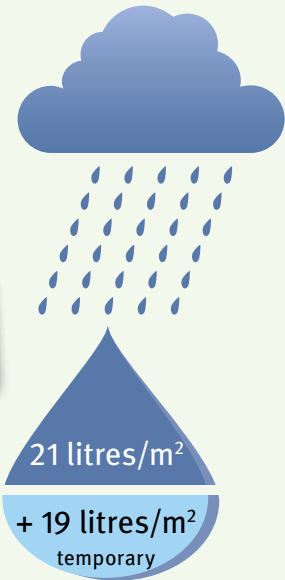
5 Optigrün Protection and Storage Fleece RMS 300/500

Approx.
95
kg/m²

from
60
kg/m²

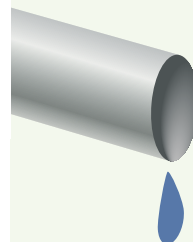
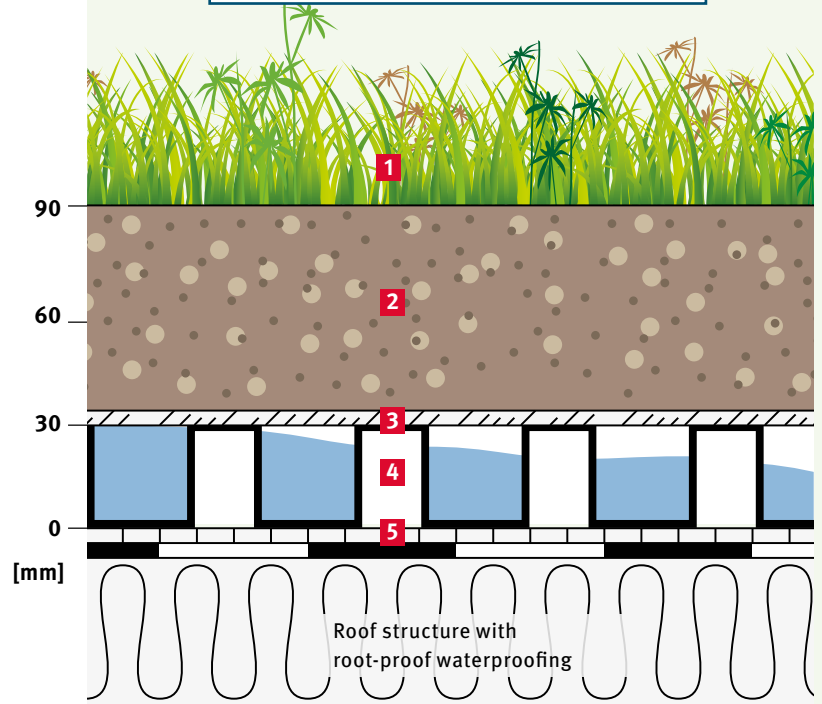
Optigrün Retention Roof Meander 30 extra light: especially light construction on request. Discharge coefficient $C_s = 0.12$

High reduction of peak run off in conjunction with a lightweight, shallow depth and low maintenance.



Waterstorage

Substrate storage 60 mm x 3.5 l/m² x cm = 21 l/m²
Temporary volume Meander Board = 19 l/m²



Run off coefficient $C_s = 0.01^*$

Peak run off reduction 99 %

Costs



Care



Variety of species



Optigrün Retention Roof Meander 60

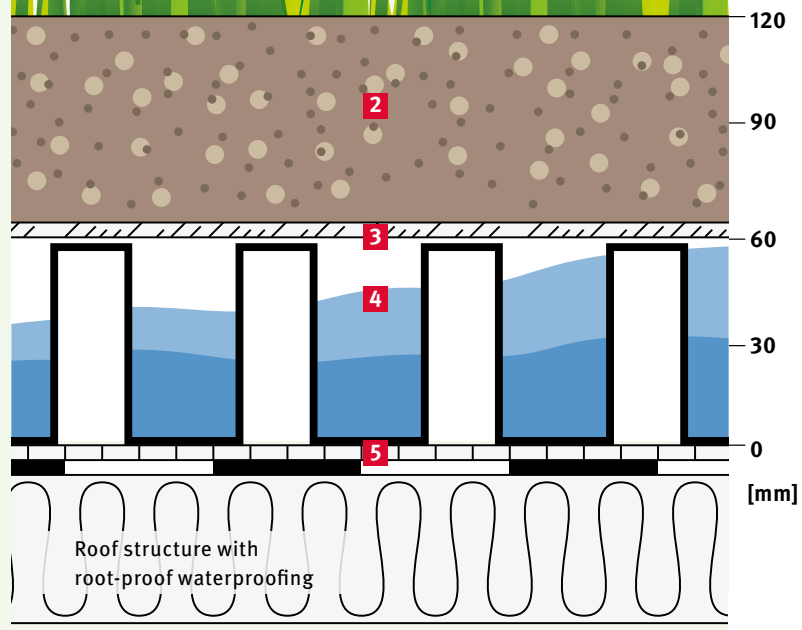


High level of water retention with a wide variety of species combined with a large reduction in peak run off rate.

38 litres/m²
+ 15 litres/m²
temporary

Waterstorage

Substrate storage 60 mm x 3.5 l/m² x cm = 21 l/m²
Permanent volume Meander Board = 17 l/m²
Temporary volume Meander Board = 15 l/m²



Approx. 95 kg/m²

Applications

- Flat roofs 0 – 5 degrees (not suitable for inverted roofs)
- Additional permanent rainwater storage



1 Herb-Grass-Sedum Vegetation



2 Optigrün Extensive Substrate E (60 mm)



3 Optigrün Filter Fleece FIL 105



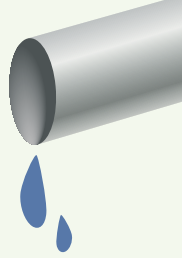
4 Optigrün Meander Water Retention Board FKM 60



5 Optigrün Protection and Storage Fleece RMS 300/500

Run off coefficient $C_s = 0.17$

Peak run off reduction 83 %



Costs



Care



Variety of species



Optigrün Retention Roof Flow Control

Further Optigrün System Solutions to the topic Rainwater Management

With the Optigrün 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 Optigrün 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/m² with the Water Retention Box WRB 85i and 76 l/m² 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.

Optigrün 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.

Request free hard copy of our Retention Roof Flow Control brochure: info@optigruen.co.uk >>



Abb. 1
Retention Roof Flow Control WRB 80F
(extensive green roof)
Temporary water storage: max. 76 l/m²
+ 3.5 l/cm substrate

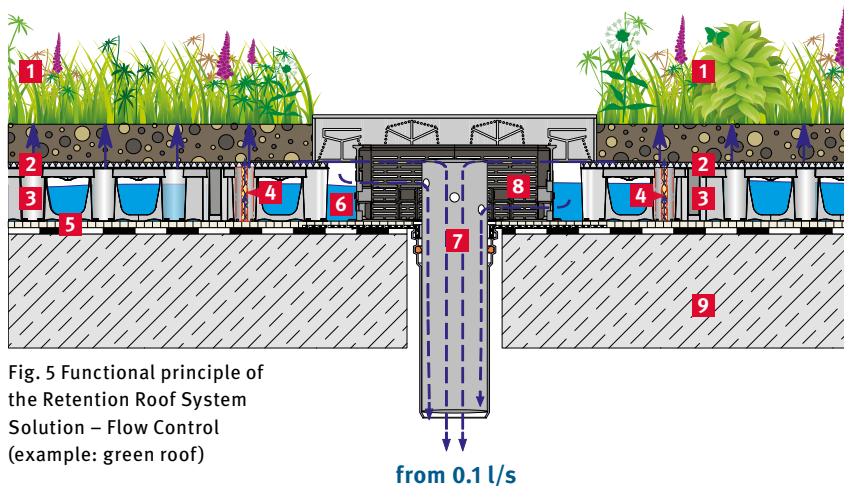


Fig. 5 Functional principle of the Retention Roof System Solution – Flow Control (example: green roof)

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

OPTIGRÜN[®]
ROOF GREENING

GERMANY

Optigrün international AG
Am Birkenstock 15 – 19
72505 Krauchenwies-Göggingen
Phone +49 7576 772-0
Fax +49 7576 772-299
E-mail info@optigruen.de

UNITED KINGDOM

Optigrün Limited
Albany Chambers
26 Bridge Road East
Welwyn Garden City (Herts), AL7 1 HL
Phone +44 203 589 9400
Fax +44 207 117 1664
E-mail info@optigruen.co.uk

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