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RAINWATER waterloc®
MANAGEMENT SYSTEM
SPECIFICATION GUIDE

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STORM Industriels des Saul **FOUNDING MEMBER**

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Nicoll
BUILDING - SANITARY - ENVIRONMENT

Rainwater drainage is a major challenge.

In our urbanised societies, the ground undergoes systematically waterproofing which prevents normal infiltration of rainwater. Step by step, this process unbalances the hydrological mechanism. Today, to limit the progression of this undesirable effect, new strategies for rainwater drainage have been developed.

As an urban developer, you play a stage-front role.

Drainage networks in our cities do not have enough capacity to handle water run-off entirely. As such, various urban installations need to directly incorporate hydraulic management into their design. The new integrated system, perfected by Nicoll, meets this requirement. With Waterloc®, projects can be designed with a high-performance approach to rainwater management, thanks to unique design on the market.

Take up the challenge and recommend waterloc®

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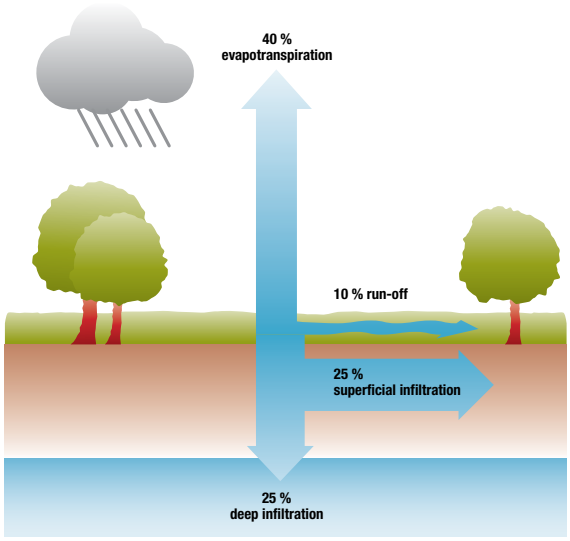
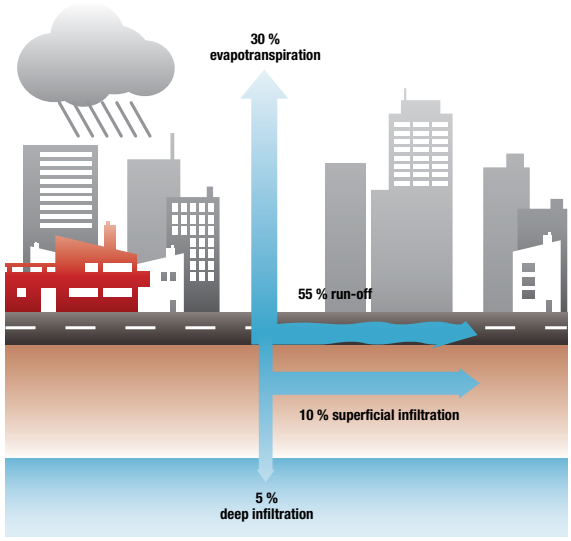
waterloc® Rainwater management : understanding

With urbanisation, our ground is becoming waterproof.

The sharp rise in population density has led to increase large surfaces for living, traffic and industry. This process of waterproofing the ground is preventing rain water from infiltrating naturally, which is increasing the water flow in an alarming manner.



Rural areas



Urban areas

and controlling the impact of urbanisation.

The consequences are multiple.

Inhabited areas are fragelized

Waterproofing, as well as the reduction of natural areas for flood infiltration, are making our built-up areas unable to handle high precipitation situations. By running off directly into the rivers, these waters amplify flooding phenomena. In order to secure the infrastructures and building areas, it is essential to minimize these risks.

The ecological impact is real.

Progressively, the underground water table is going down and ground is drying out. The natural cycle of water is as such disturbed and in (turn leads to repercussions.) Furthermore, water flowing over the ground is contaminated with hydrocarbon : procuring drinking water becomes complicated and the environment is at threat. This is essential to reverse this trend as quickly as possible.

Local authorities are facing reorganisation problems.

This context is generating high costs for the municipalities which, in order to cope, extend their sewage network. Along with this effort comes extrems ducts dimensioning and increase of maintenance costs. To overcome this issue, cities must define new strategies that incorporate drainage, using a diagnostic that is not only complete but also permanent.

WHAT SHOULD BE REMEMBERED?

- The rate of rainwater run-off is reaching 55% in the urban centers
- Consequences :
- increase in the volumes of rainwater run off
- flooding in urban areas
- decrease in the renewal of watertables
- surface water quality degradation
- rising investment and operating costs for local authorities
- Cities objectives : define integrated strategies for rainwater drainage.

waterloc® Today, rainwater management is moving

Each area has its own approach to rainwater management.

In the middle of the 20th century, there were various ways of approaching rainwater drainage.

1950s

1970s

Hygienist approach

With this approach, rainwater was considered to be a source and/or vector of contamination.

The principle : remove the rainwater far from the cities, and as quickly as possible.

Hydraulic approach

With the expanding urban areas and the constant increase in waterproofed surfaces, the saturation of the drainage networks had to be addressed.

The principle : separate rainwater from waste water.

towards an integrated approach.

1980s

Environmentalist approach

Along with booming ecological awareness, a new piece of information came to light rainwater washing dirty surfaces is a source of degradation for natural environments.

The principle : trap and treat the pollution carried by run-off water.

Today

Maturity age : an integrated approach.

At the dawn of the 21th century, past experiences and our level of knowledge had led us to combine these 3 historical approaches and all of their concerns. Rainwater management is now handled globally and transversally with the engineering and development disciplines.

The integrated approach is defining its challenges...

- Favor rainwater management upstream.
- Use the infiltration capacity of the ground and soil as not as possible.
- Slow down the transfer of water from upstream to downstream.
- Think on a full scale, not only on the project.
- Design urban installations by integrating rainwater drainage.

... and is offering solutions.

In order to support this new view, methods for managing rainwater other than "all pipes" have appeared : techniques referred to as "alternative", are also called compensating solutions. These aimed to attenuate peak flows generated by heavy rainfall and at compensate the negative effects of waterproofing. This stops the aggravation of the existing situation and overloads saturated networks, according to locally-defined flow rates.

WHAT YOU SHOULD RETAIN

- The integrated approach combines 3 historical approaches :
  - hygienist
  - hydraulic
  - environmentalist
- Rainwater management is at the heart of urban installation issues
- The alternative techniques offer new perspectives.

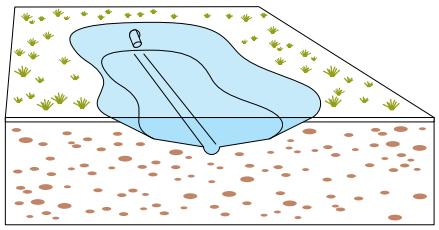
waterloc® Alternative techniques combined with

In an urban context : Alternative techniques are reaching their limits.

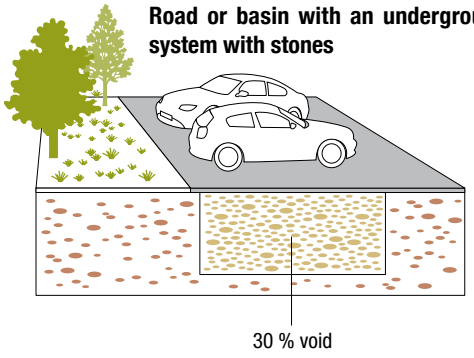
Open-air basins, swales, drainage trenches, dry wells, storage on roof, roads with underground drainage system… Rainwater drainage techniques have had their applications multiplied over the last few years. With a double-evacuation possibility, either through infiltration into the ground or into an outlet, these are proven solutions in the natural environment.

In urban areas however, these techniques used alone are often not sufficient to handle the complex issues of rainwater drainage.

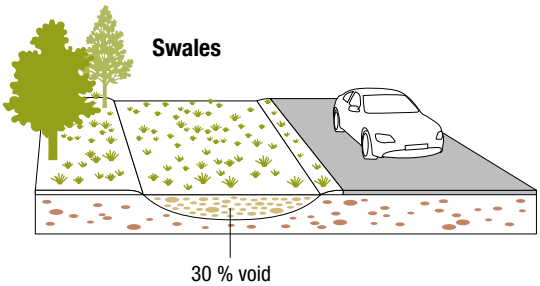
Open-air basin



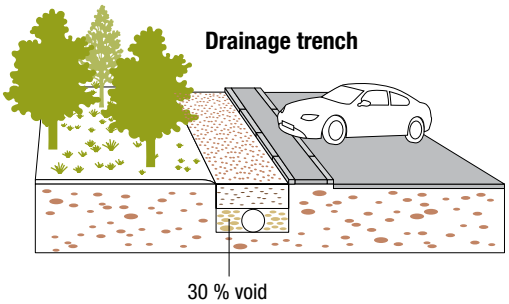
Road or basin with an underground drainage system with stones



Swales



Drainage trench

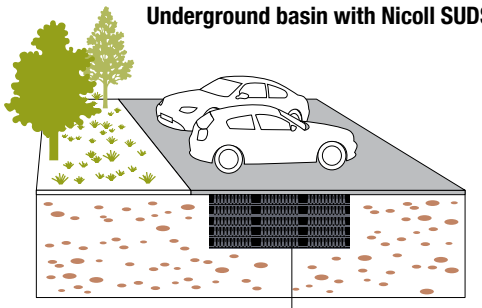


Nicoll solutions : new perspectives.

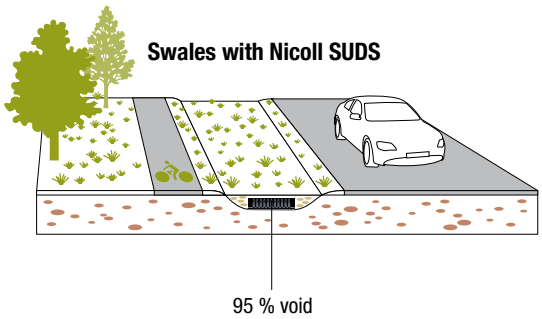
The Sustainable Underground Draining System (SUDS) amplifies capacities and adds value to the land.

Using this observation as a basis, an additional process has come to light : SUDS, a reservoir structure consist of stackable plastic modules, with a high void ratio. These modules are covered on all sides with a geotextile, and in case of watertight structure, with a membrane.

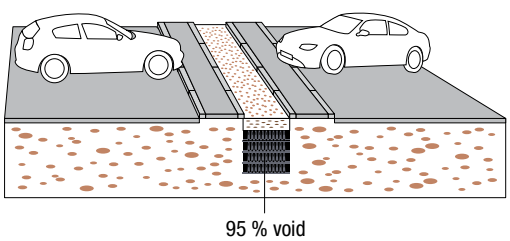
Underground basin with Nicoll SUDS



Swales with Nicoll SUDS



Drainage trench with Nicoll SUDS



WHAT YOU SHOULD RETAIN

The advantages of SUDS :

- a high void ratio of 95%
- low resistance to the vertical and horizontal transfer of water
- modular elements that can be handled by a man
- high resistance to vertical compression, for use under roads, parking areas or infrastructures

BUILDING - SANITARY - ENVIRONMENT

Legislation : moving towards sustainable solutions.

Progressively, political measures are coming out.

Laws concerning rainwater management over the last twenty years, have never ceased favouring a better handling of the issue. From European standpoint as well as local one, decision-makers are aware of the urgency of the situation. Also, the constraints concerning creating infrastructures and buildings are increasingly strict.

Their objectives are defined over the long term.

All of these legislative references have for purpose to set the framework for a sustainable drainage policy. This consists approving building permits for urban development ensuring following conditions :

- the quality of service designed for the current and future populations is maintained, in terms of health and public hygiene, risk control and comfort ;
- the natural environment is preserved and respected ;
- costs are controlled, (investment as well as operating costs)

waterloc® One system, three solutions.

Rainwater regulation.

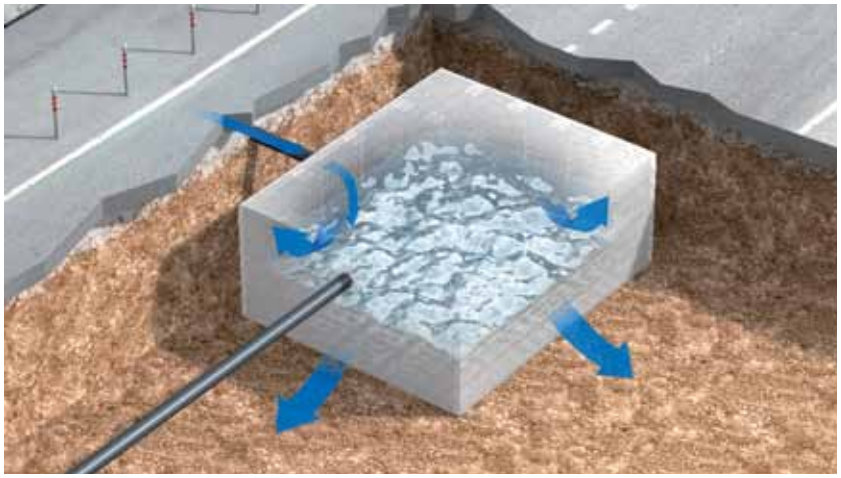
Objective

Cap the inflow of rain water in sewage by deferring restitution of the excess run-off water by providing temporary storage.

Application

In order to offset any negative effects in new construction or new installation generating waterproofing.

Rainwater infiltration.



Objective

Cap the inflow of rainwater, by providing temporary storage of the excess run-off water and restitute to the natural environment via infiltration into the surrounding ground (assuming soil permeability is compatible).

Application

For any new construction or any new installation generating waterproofing, in order to offset the negative effects of it or in the event where there is no public network.

Reuse of rainwater.

Objective

Reuse of rainwater by storing it in order to save drinking water.

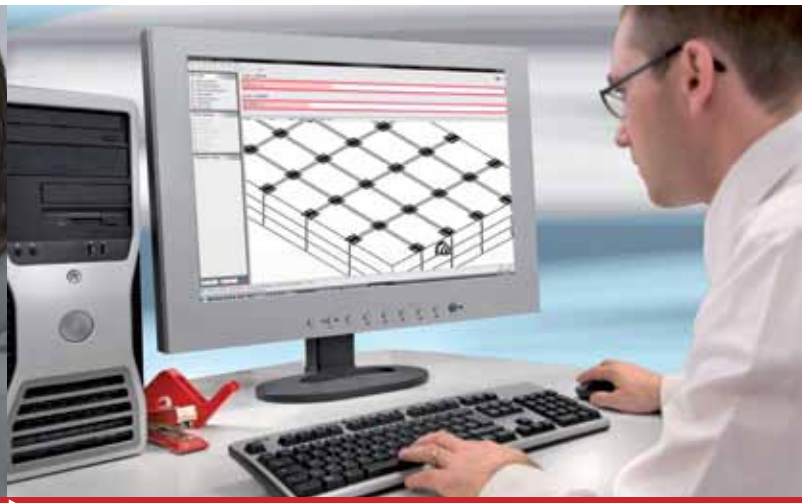
Application

In areas where the use of water is high and is not required (stadiums, pedestrian areas or green space, fire water reserves, etc.) Not valid for drink water.

waterloc® With Nicoll, benefit from a global

Personalised support all throughout your project.

In managing rain water, the Waterloc® system stands out not only because of its performance, but also by the quality of technical service support.



1 Preliminary project

Nicoll engineers assist local authorities, urban developers, urban planners and public works companies in gathering all the information needed to examine a Waterloc® solution.

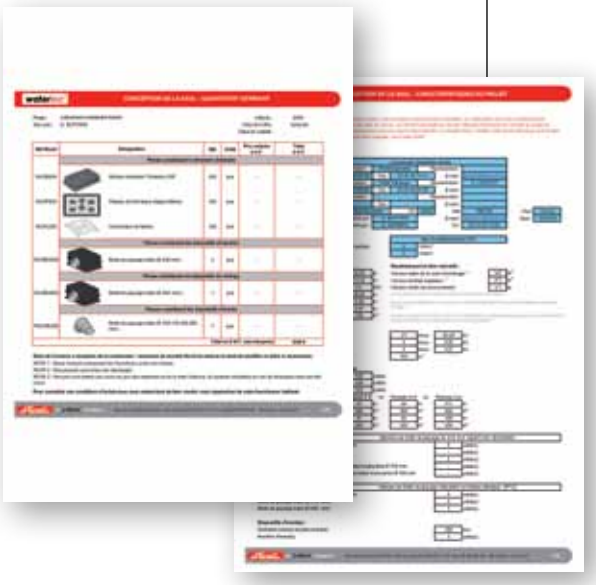
2 Technical study

Nicoll's technical-sales department will carry out a complete study in order to facilitate prescription and integration of a Waterloc® solution into the project.

solution for rainwater drainage.

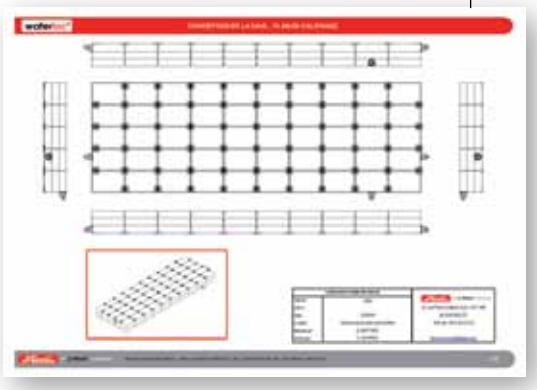
3 Assistance in drawing up an estimate

Using the study, the exact check list of parts needed to build the Waterloc® solution is provided as well as assistance in obtaining figures for the project : soil evacuation, backfill, quantities of geotextile and/or geomembrane.



4 Assistance during installation

According to countries, the company will receive a help for installation.



waterloc® A design thought out down to the smallest

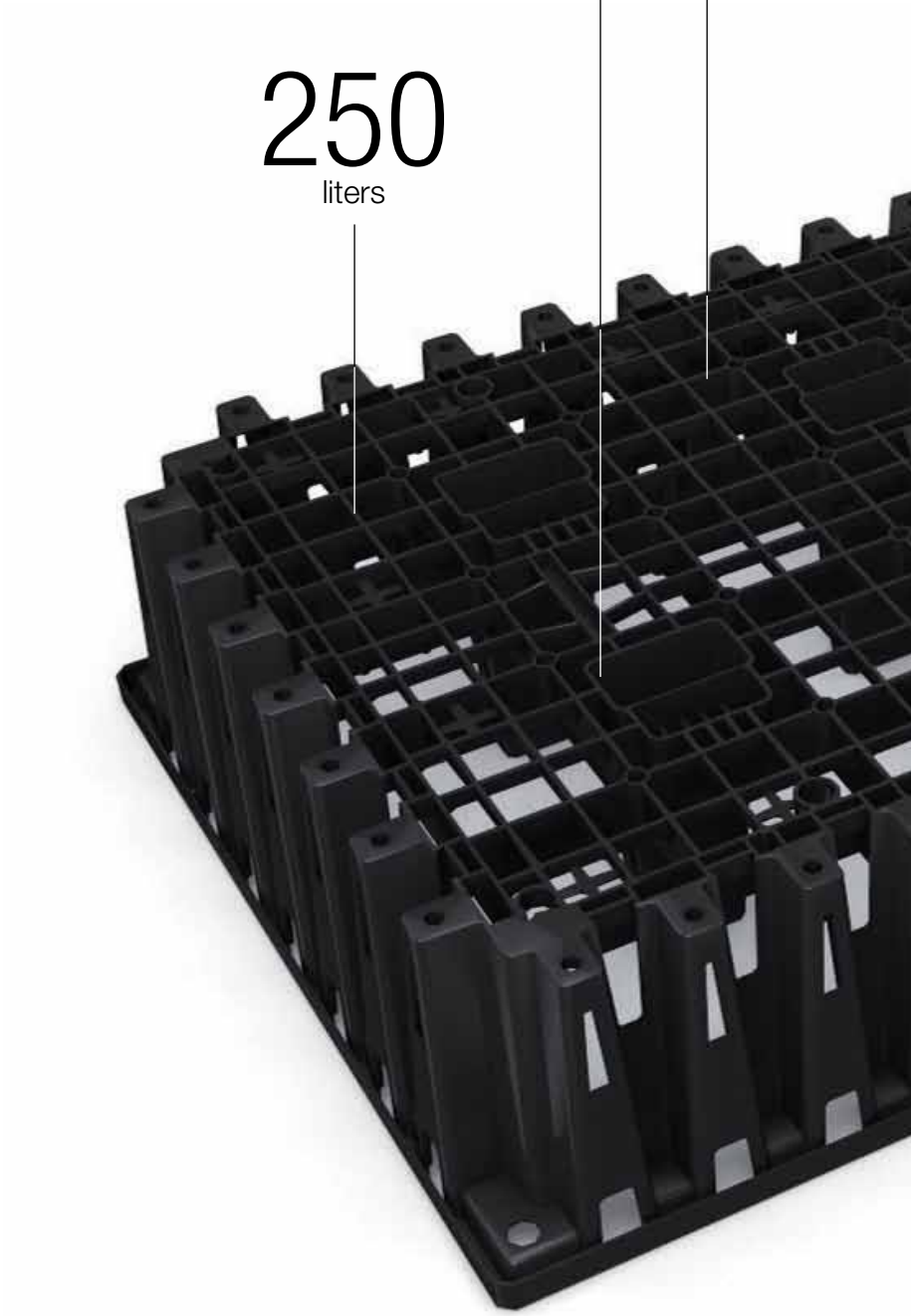
Easy-to-handle cells

- Grasping handle allows for handling even when wearing gloves.
- Light cell (12 kg).

Total volume retention capacity

>95 %

250 liters



A unique model

Nestable and stackable : less volume of stock on the site, and in terms of transportation (reduced CO_2 emissions).

details.

High resistance :
- to vertical compression (backfill and moving loads)
- to lateral compression (earth pressure)

Geometry and materials chosen for their high resistance over the long term

Weight of module
13 kg

100 %
Recyclable

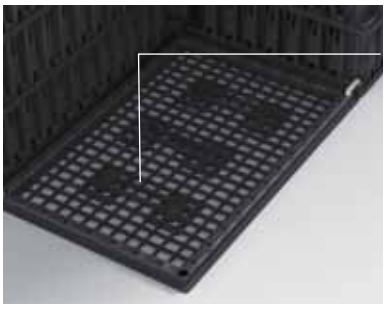
Minimum height of the covering is specified during the study according to the traffic conditions and each country curent legislation.

BENEFITS

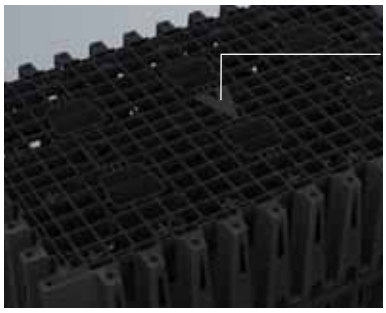
- 250 litre cell (void volume > 95 %)
- Quick and easy to install
- Nesting for easy transportation
- Connectors integrated within the module
- 100 % recyclable
- Small surface area required during work on site
- Half as many trucks to unload, arrange, etc.
- Half as many pallets required in the trench

waterloc® A unique design, for optimal performance.

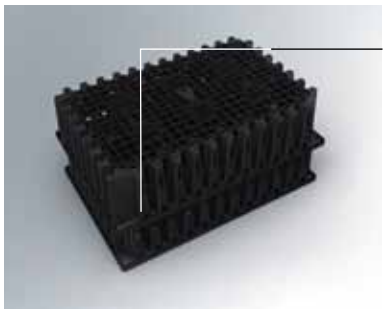
Simple and reliable to assemble



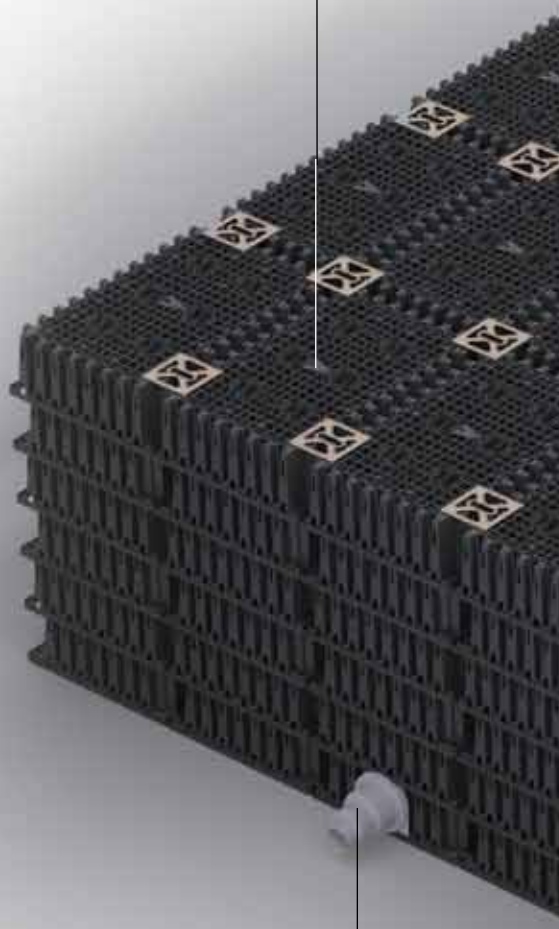
• Base plate.



• Large-size markings, ensuring proper stacking direction.

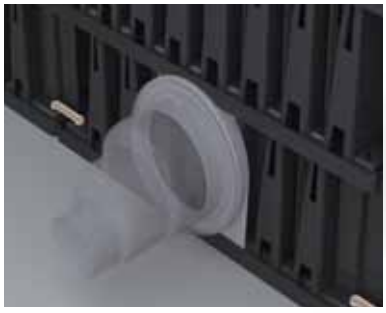


• Centring snugs around the entire periphery, which lock the module in laterally.

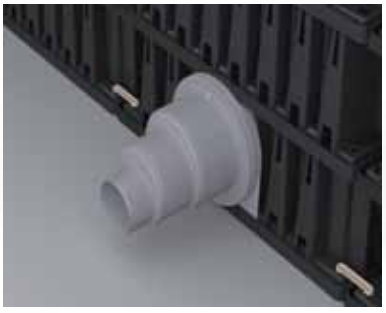


Inlet/outlet/vent for the Waterloc® basin (Ø 100-110-160-200 mm)

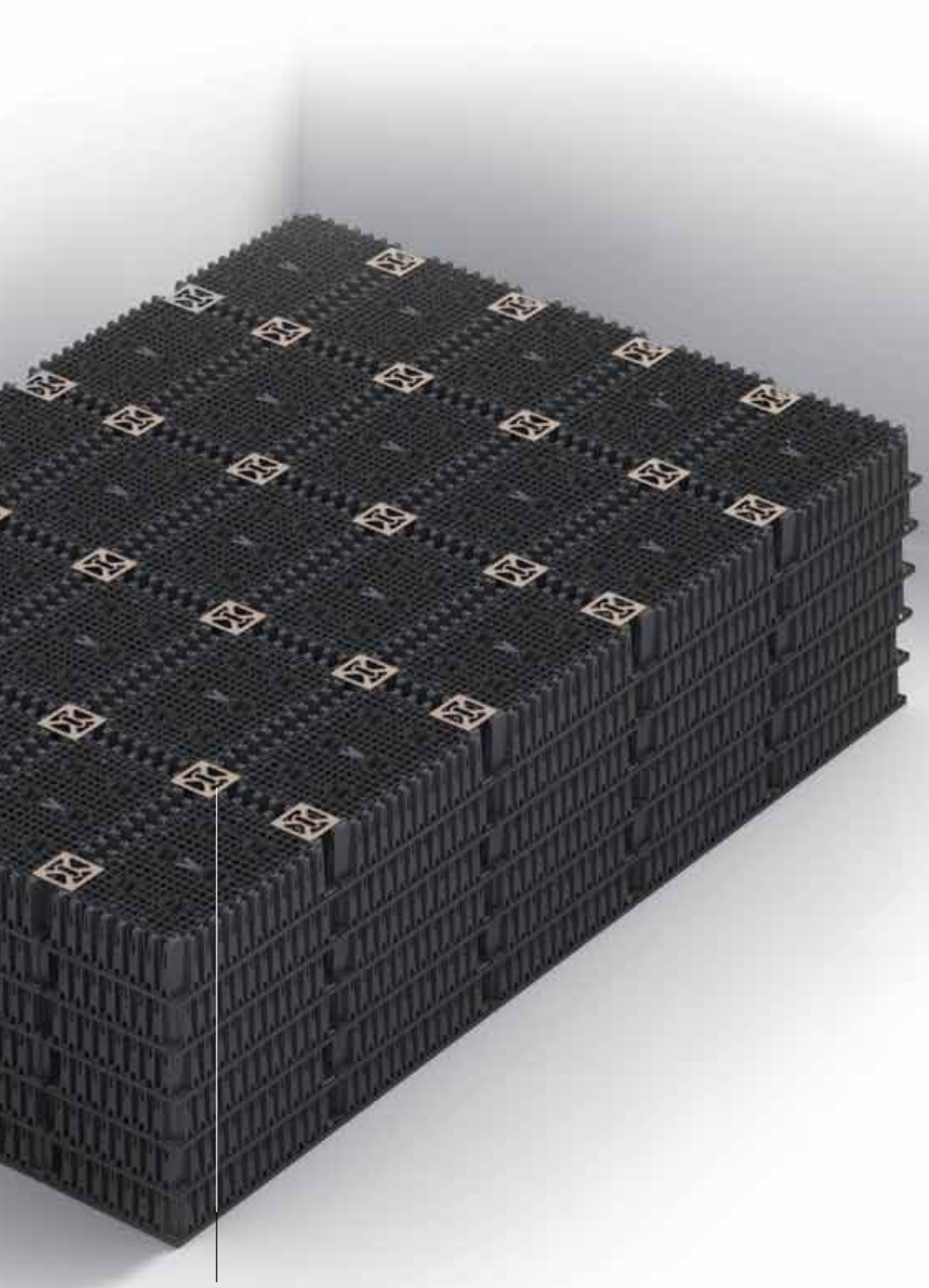
This system allows the geomembrane to be clamped and as such be tight. It also allows for positioning at any location on the basin.



• Fastening plate on the cell doubles as a clamping flange.



• Inlet/outlet socket, via simple 180° rotation (inlet or outlet).



Connectors

- Large size: resistant part, easy to assemble, limits the risk of misplacing items...
- Few connectors to install (save time when implementing).

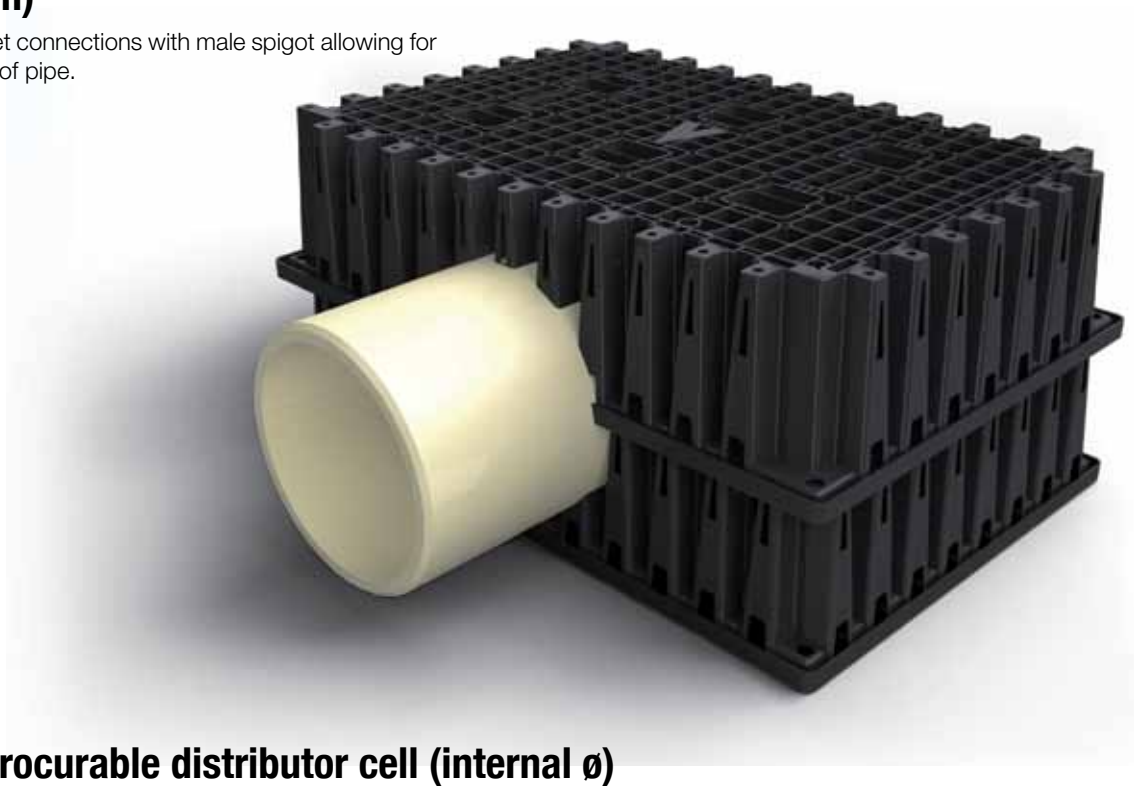
- Small connectors for alignment of first level cells.

- Top cell connectors only on the last level of the stack.

waterloc® Flexibility for all projects.

Large diameter socket connections (315 or 400 mm)

500 L set with PP socket connections with male spigot allowing for connection to any type of pipe.



Ø 150 mm hydrocurable distributor cell (internal ø)

Cell with PVC drain with a slit on the upper half, making it possible to :

- prevent pollution carried by the washing of the ground from the first rain from penetrating into the basin
- inspect the drains in order to check that the basin is in good condition
- clean the drains in order to maintain the basin.

Passing the inspection robot

waterloc® A global solution.

Before specifying a Waterloc® solution, several points need to be complied with :

Rainwater pollution treatment process

Pre-treating rainwater upstream of the basin is recommended in order to increase system sustainability.

Basin implementation

Until local requirements exist, basin installation is required as follows :

1- Near buildings, the underground drainage structure must be at least equal to the distance of the depth of the excavation on the horizontal direction.

2- Separation in terms of trees or bushes should be at least equivalent to the height of the adult plant (except in cases a system is provided to confine root development).

3- Minimum 5 m separation from the nearest buildings for infiltration application.

4- Infiltration in the presence of an underlying underground water table : a minimum depth of 1 meter is reserved between the highest level of the table water and the bottom of the infiltration structure.

5- Remember that the excavation is generally clearly wider and longer than the basin itself due to the angle of excavation talus and the necessity of maintaining a lateral clearing at the end of the trench of about 0.8 to 1 m around the basin in order to work in good conditions. Passing the inspection robot.

Nicoll products in the Environmental Speciality fall in line with the global "SWS" Sustainable Water Solutions approach conducted by all of the companies in the Aliaxis Group. www.sustainablewatersolutions.com

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