



BUILDINGS THAT CHANGE THE FUTURE

inPLUVIO
Drain Blocs



technical catalogue 10/2024



**HYDRAULIC
RISKS
GROUND
DEFENSE
SYSTEM**

THE PROBLEM

The strong climate changes and the massive cementification that our territory has undergone in recent years have highlighted the inadequacy of rainwater regimentation networks, dramatically increasing the hydraulic risk throughout our territory.

The consequences of all this are the flooding of roads and industrial areas, as well as the overflowing of watercourses that cause considerable damage to communities.

There is therefore an increasing demand for innovative solutions to solve this problem that are resistant, easy to lay and suitable for all conditions.

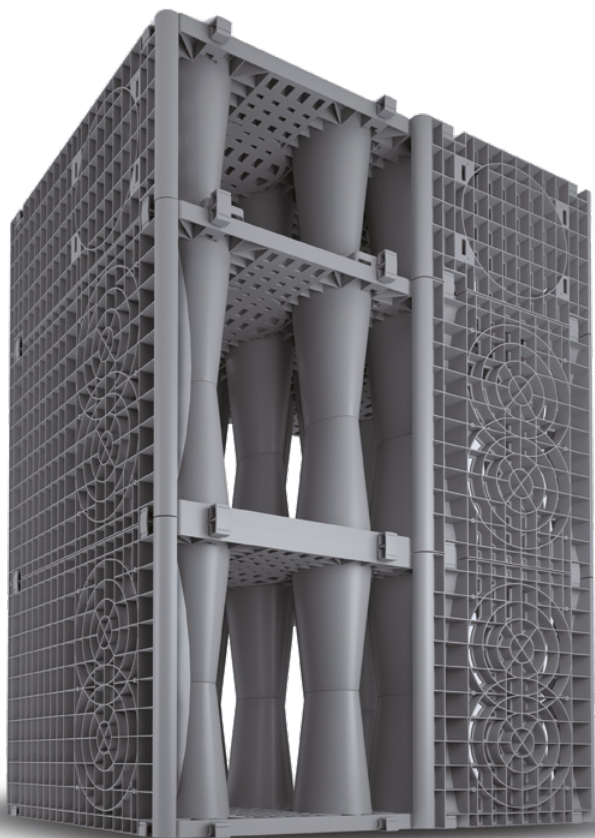
Starplast with its many years of experience in stormwater management presents:

in**PLUVIO**

THE SOLUTION

inPLUVIO

Drain Blocs



Starplast proposes its new sustainable urban drainage product, innovative, modern and durable, which allows the management of large volumes of rainwater, with the aim of:

- protect the territory
- improve water quality
- reuse stored water for non-drinking purposes

inPLUVIO joins the wide range of Starplast products, whose mission is sustainability and the protection of our most precious asset: **water**.

inPLUVIO is a system of drainage blocs, made of injection-moulded polypropylene (PP) plastic material, with high mechanical resistance.

The system consists of two stackable elements (for optimised transport) which, when joined together, form the single module with dimensions of: 1,000 x 600 x h720 mm, with a volume of 0.42 m³. The assembly of the various modules, joined by the anchorages and side walls, allows the construction of the underground system of various volumes for multiple applications.

in**PLUVIO** offers the possibility of creating large volumes of underground water storage without resorting to concrete structures or open basins. This makes it possible not to subtract space from urban areas, guaranteeing usability of the land above, and avoiding structural calculations (only geological) so that it is also extremely easy to operate from a maintenance point of view.

The main applications of in**PLUVIO** are:

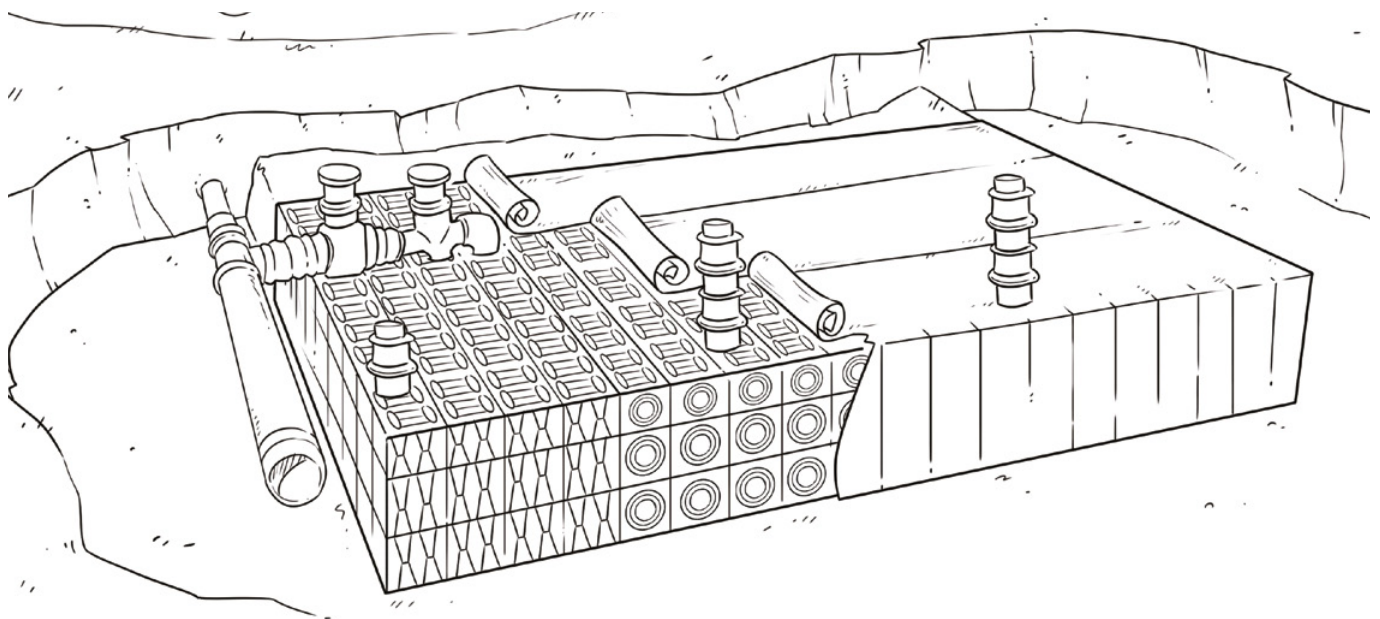
HYDRAULIC INVARIANCE
(retention tanks)

A cellular system entirely wrapped with geotextile and/ or even partially wrapped with HDPE geomembrane, which collects rainwater and returns it to the receiving water bodies (rivers, sewers, groundwater) in a controlled manner, providing for its regimentation in order to:

- reduce the size of drained networks
- reduce the size of lifting stations
- optimise groundwater recharge
- manage reservoir overflows where water can be controlled and drained in areas away from receptors
- use them as water drainage for lowering the water table upstream of retaining walls for soil retaining.

WATER COLLECTION BASINS
(accumulation)

System completely wrapped with HDPE geomembrane and externally with geotextile. It is used as a system for large accumulations of water, reaching volumes of 3/5000 m³ and more (underground ponds) for irrigation purposes, making the most of the increasingly rare water resource in periods of prolonged drought.



ADVANTAGES

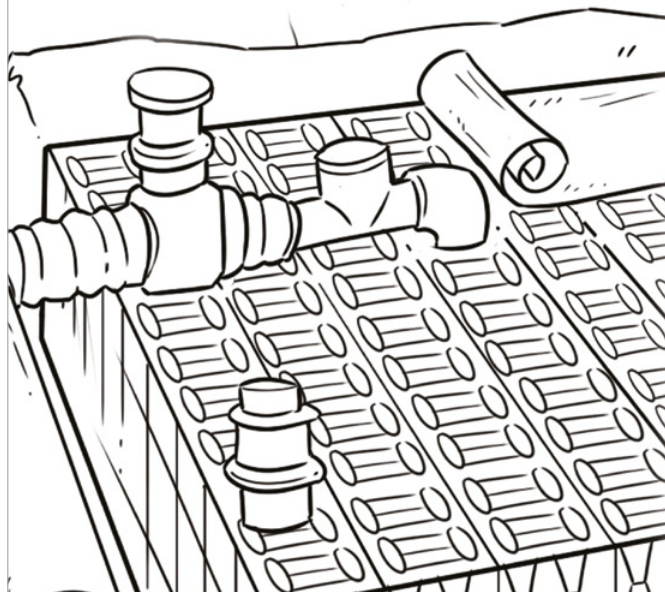
Drainage systems through the use of drainage blocs were born a few decades ago as an effective response to the growing urbanisation, which today is more aware of their use to mitigate heavy storms, thus reducing water runoff.

Starplast has always distinguished itself in the realisation of its products by making the necessary technical improvements in order to optimise their performance or by including in its projects simplifications for maintenance activities, guaranteeing durability over time.

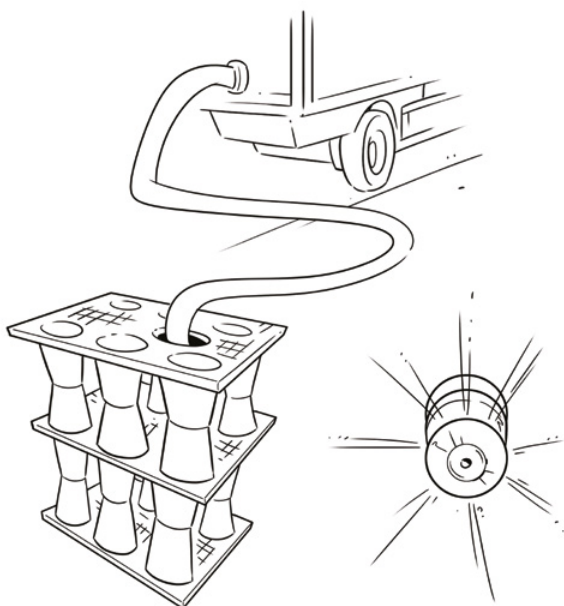
in**PLUVIO** was created after a careful and accurate study of its working group with technicians and operators in the specific sector, in order to result in a system with modern, innovative features and proven functionality over time.

The in**PLUVIO** system is specifically distinguished by the following innovative aspects:

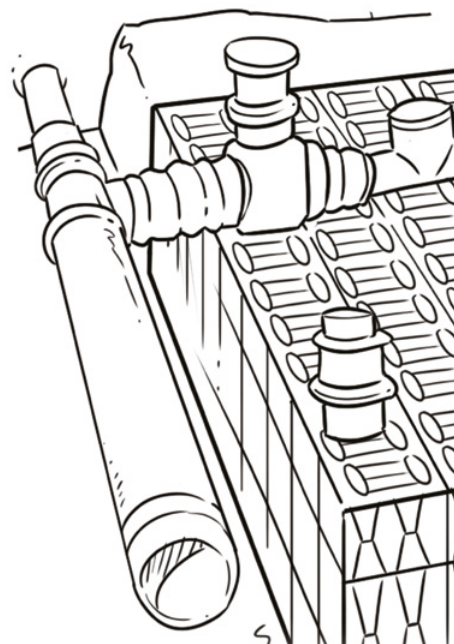
MULTIPLE DEPLOYMENT OF INSPECTION POINTS at no additional cost



EASE OF CLEANING THE BASIN DRAINING BLOCS with remote-controlled water jets



SPECIFIC DISTRIBUTION MANIFOLDS (adaptable to any line pipe) For optimization of water inlets



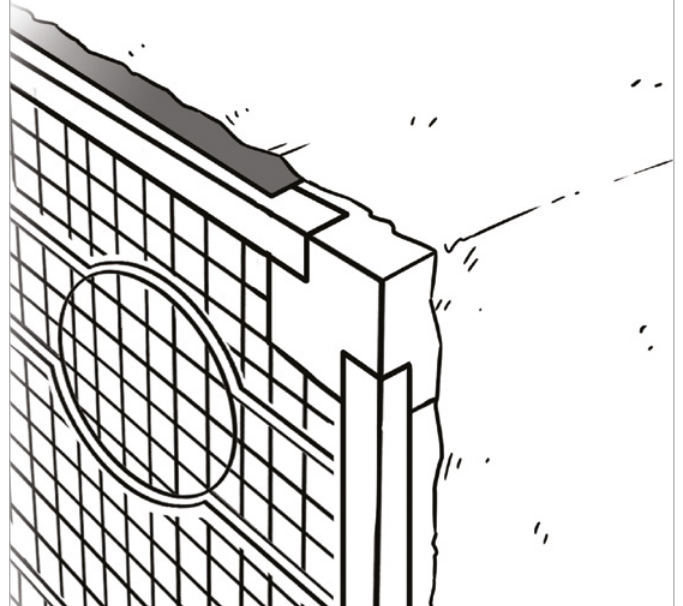
SEPARATION OF COARSE FOREIGN BODIES INCOMING

by means of special grids

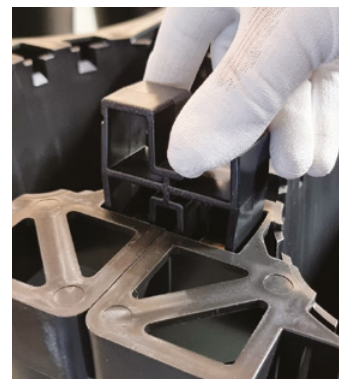
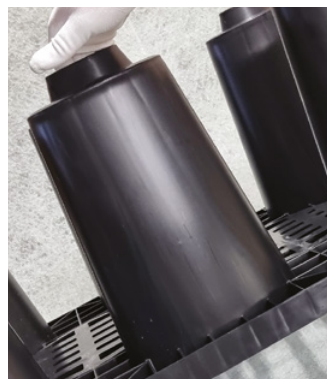


SPECIFIC ACCESSORIES FOR LINING WITH HDPE GEOMEMBRANE

to guarantee the hydraulic seal



DETAILS THAT MAKE A DIFFERENCE



OTHER IMPORTANT ASPECTS OF inPLUVIO



EASE OF TRANSPORT

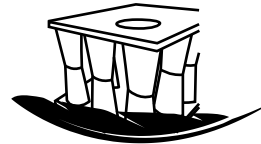
inPLUVIO makes it possible to build large vessels at a low transport cost:

- Stackable together, one truck transports up to 550 m³ volume of drainage blocs
- Reduced transport with lower of CO₂ emissions
- Reduction of storage space in retail warehouses



RAPID LAYING ON SITE

With smart coupling systems, the system is easy and quick to install, reducing the time required for installation.



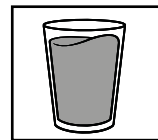
LIGHTNESS

The inPLUVIO system is easy and quick to position thanks to the low weight of the elements (the single element weighs less than 9.5 kg).



SIMPLE MAINTENANCE

The system is easy to inspect with video inspection and simple to clean with a water jet thanks to the presence of inspections and elements with suitable shapes. A number of accessories are available for simple maintenance that can also be carried out independently without the aid of specialised companies.



LARGE VOLUME

The inPLUVIO system guarantees a usable volume of 96% of the total footprint.



ACCESSORIES

Build the entire system thanks to countless accessories such as:

- water inlet/outlet couplings
- distribution manifolds
- coarse/plastic inlet grids
- inspection hatches
- manholes with various types load class A15, B125, C250, D400.
- angles for HDPE sheet positioning.



RESISTANCE

inPLUVIO systems can be used in a variety of situations, from pedestrian zones to heavy duty driveways, thanks to the use of polypropylene PP material, loaded with high load resistance, corresponding to specific standards (up to 400 KN/m²). The system complies with EN 1570-EN1571 standards.

STANDARDS AND MECHANICAL RESISTANCE

One of the main prerogatives of draining cell systems is to create large volumes of water storage that are completely underground, while keeping the surface above usable for other purposes such as:

- GARDENS
- SQUARES
- CAR PARKS
- ETC.

it is therefore necessary that the system be self-supporting according to the load for which the overlying surface is intended.

in**PLUVIO** has been designed and manufactured with high mechanical resistance materials, and finally tested with load tests and simulations over time, so that the system itself complies with the reference standards imposed in the construction of these elements **EN 1570 - EN 1571**, so that it can be used in different situations.

it is essential in any case, when designing a rolling system, to respect the dimensions indicated in the accompanying documents.

HYDRAULIC DIMENSIONING

The regulations imposed by the European Community, concerning hydraulic dimensioning calculations for lamination basins are issued by the individual regions or local authorities.

It is therefore advisable to check, depending on the local destination of the basin, the references of the basin volume calculation method (minimum requirements method; rainfall-only method, etc.).

The references of the requisites are not present in the documentation accompanying the product, as they are constantly evolving. In any case, our technical department will be able to help with a design verification.

SYSTEM COMPONENTS

MODULES

It is essential that when ordering the **inPLUVIO** system, the final design solution is already predefined, so that when the material is delivered, all the elements necessary for the construction of the complete system are in place. Please contact our technical department to propose the right solution.

INP 001
Half-cell



INP 002
Half-cell with
inspection hole
(manhole)



INP 003
Cell joint



INP 004
Cell half-joint



INP 008
Male cone
half cell



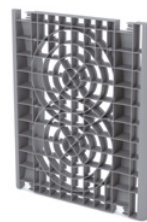
INP 009
Female cone
half cell



INP 009
Female cone
half cell



INP 007
Wall
short side



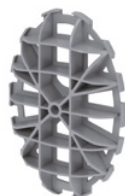
INP 010
Half wall
long side



INP 011
Half wall
short side



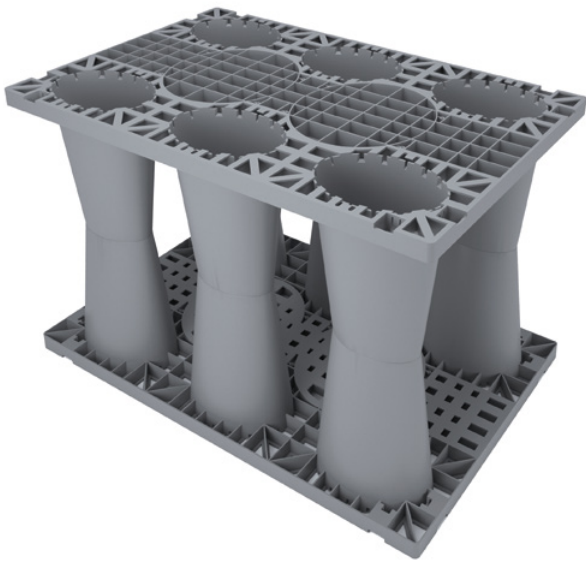
INP 005
Cell cone caps



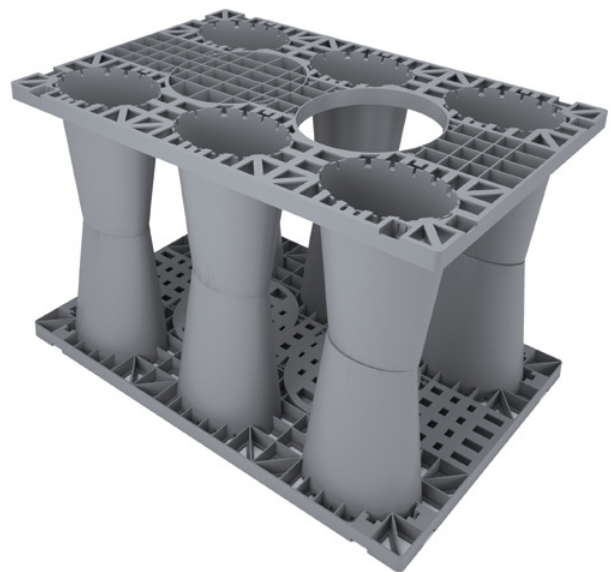
ASSEMBLED

The system is easy to assemble on site without the use of mechanical means, as the elements can be handled by a single person. The connections between the individual elements and the side walls are easy and intuitive.

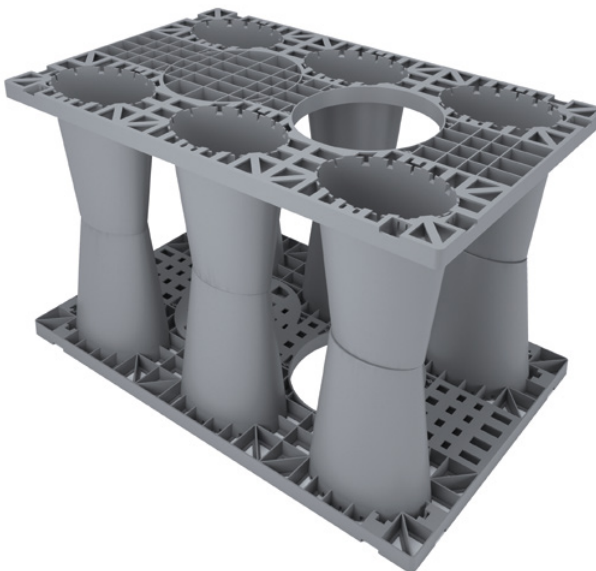
INP 001 + INP 001
Complete cell module



INP 001 + INP 002
Complete cell module for inspection base



INP 002 + INP 002
Complete cell module for inspection channel



EXAMPLE OF ASSEMBLY

INP 005
Cell cone caps

INP 008
Male half-cell cone

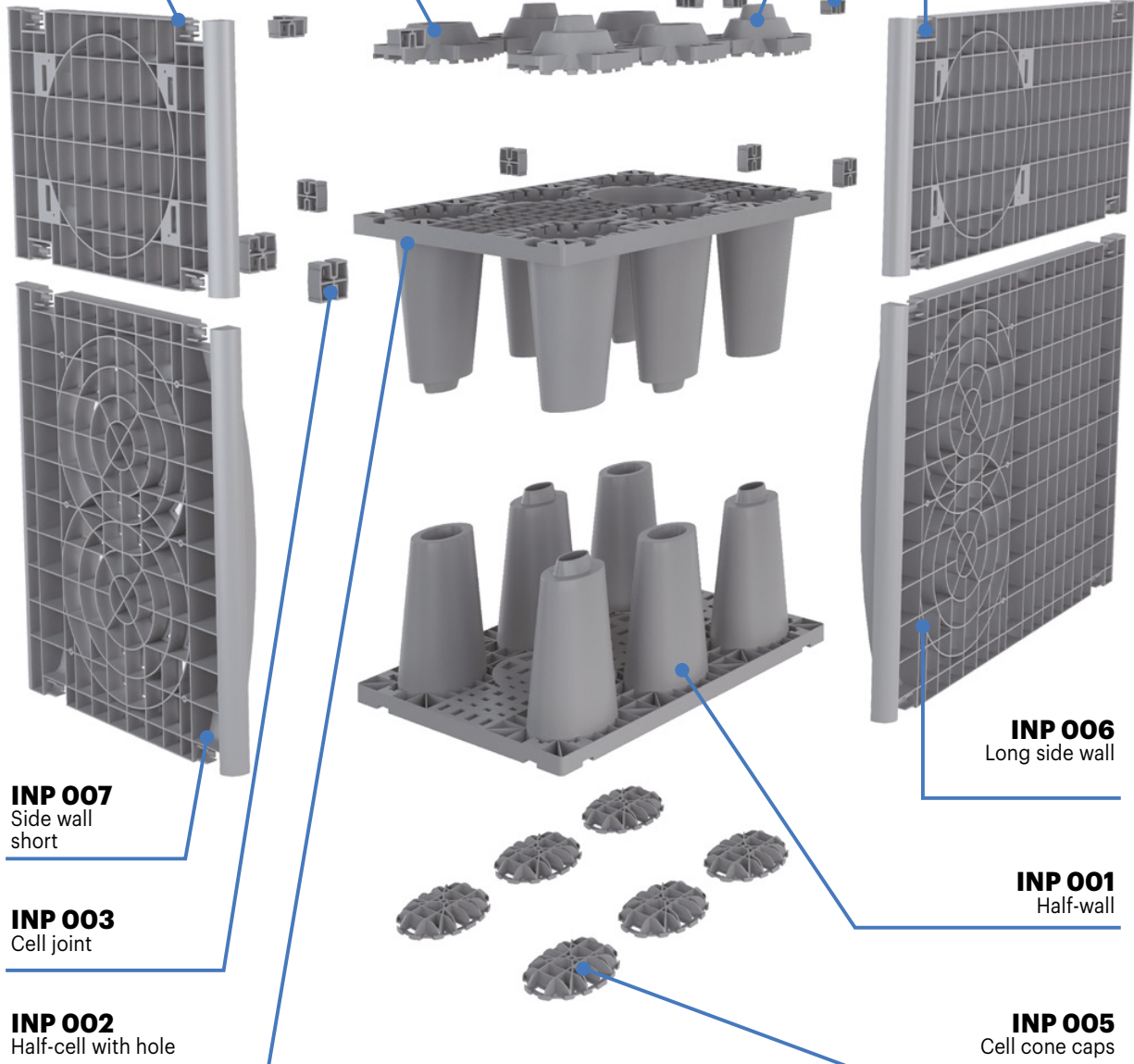
INP 002
Half-cell with hole

INP 004
Half cell cone

INP 009
Female half-cell cone

INP 010
Half cell wall
long sidewall

INP 011
Half-cell wall short side



INP 007
Side wall
short

INP 006
Long side wall

INP 003
Cell joint

INP 001
Half-wall

INP 002
Half-cell with hole

INP 005
Cell cone caps

COMPOSITION

ACCESSORIES TO COMPLETE THE SYSTEM

INP 630x400x500

Line collector
with 630 junction



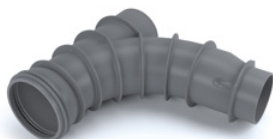
INP 500x400x400

Line collector
with shunt 500



INP 400x400x400

Line collector
with shunt 400



INP ISP 400x250

Inspection port
chimneys 250



INP POZ 400x400/355

Meshable
manhole 400



INP GRI 600

Stainless steel
grating for
manhole 600



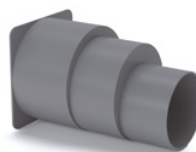
INP INA 400x250-250

Inspectable inlet
distributor high 250



INP SCO

Spillway inlet
telescopic



INP CUR

90° elbow
400x250



INP ANG

PE angles for HDPE
geomembrane



MAINTENANCE ACCESSORIES

INP VIP

Video inspection

INP AVO

Angle for vertical/horizontal joint

INP IDR

Swivel hydrant

INP PTA

Pipe guard for angle bracket

SERVICES

INP MON

On-site cell assembly

INP MAP

Scheduled maintenance

TECHNICAL AREA

CHAPTER ITEM

Supply of InPLUVIO underground rainwater drainage or storage system with single stackable elements (half-blocs) for optimisation of transport, made of highly mechanically resistant polypropylene (PP) plastic material, with an empty/full volume ratio of 96%.

The single element, made up of elliptical truncated cones with a male-female coupling, forms the 'cell module' and must comply with the following mechanical characteristics: crush strength 400 KN/m² and lateral load resistance of 100 KN/m² in accordance with standards EN 17150 and EN 17151.

The cell module shall have the following dimensions: 1,000 x 600 x h720 mm equal to a volume of 0.42 m³ with a minimum distance between coupling cones of 250 mm. The cell modules are assembled together by means of specific hooks, with suitable reinforcing side walls and completely wrapped with 100 g/m² geotextile and 2.5 mm thick HDPE geomembrane in the case of use as storage.

On the upper part of the basin, inspection and maintenance chimneys must be arranged channelled down to the base of the basin at a distance of no more than 2.4 m from each other and alternating on two opposite sides. Correct maintenance over time is ensured by the passage of the cleaning and video-inspection hydrant through the Ø 250 'cell module with inspection' positioned every 4th 'cell module' on the line heads perpendicular to the cleaning track.

The water conveyance pipes must be connected to specific manifolds for correct distribution of the water in the various points of the basin and equipped with a grid to separate coarse bodies and plastics.

Total dimensions of the drainage basin:

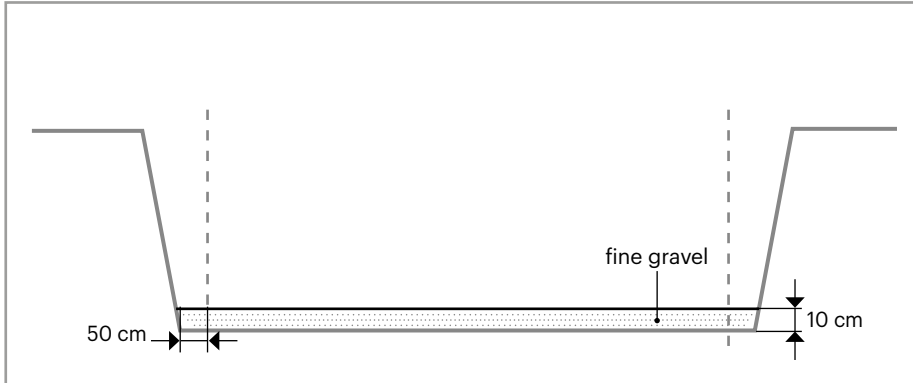
Volume m³

Surface area m X

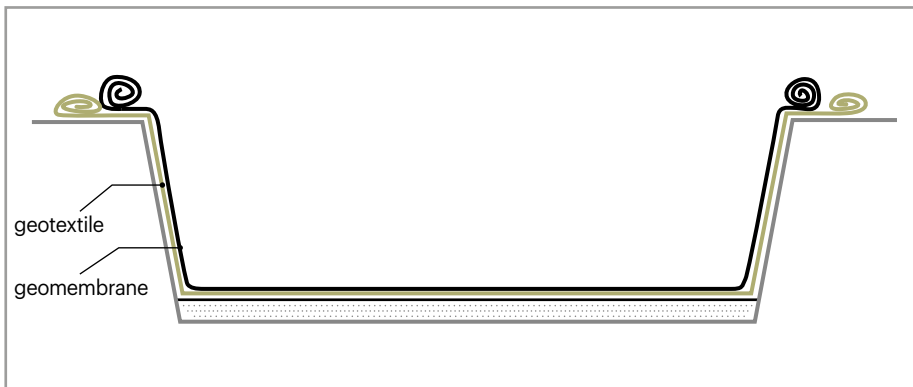
Height m

price per €/mc

DRAINAGE AND STORAGE SYSTEM



Excavate the ground, planning to leave a distance between the system and the walls of at least 50 cm. The excavation must be stable and therefore safe for the workers. Create a 10 cm layer with fine gravel, compacted and levelled, which ensures permeability for the system.

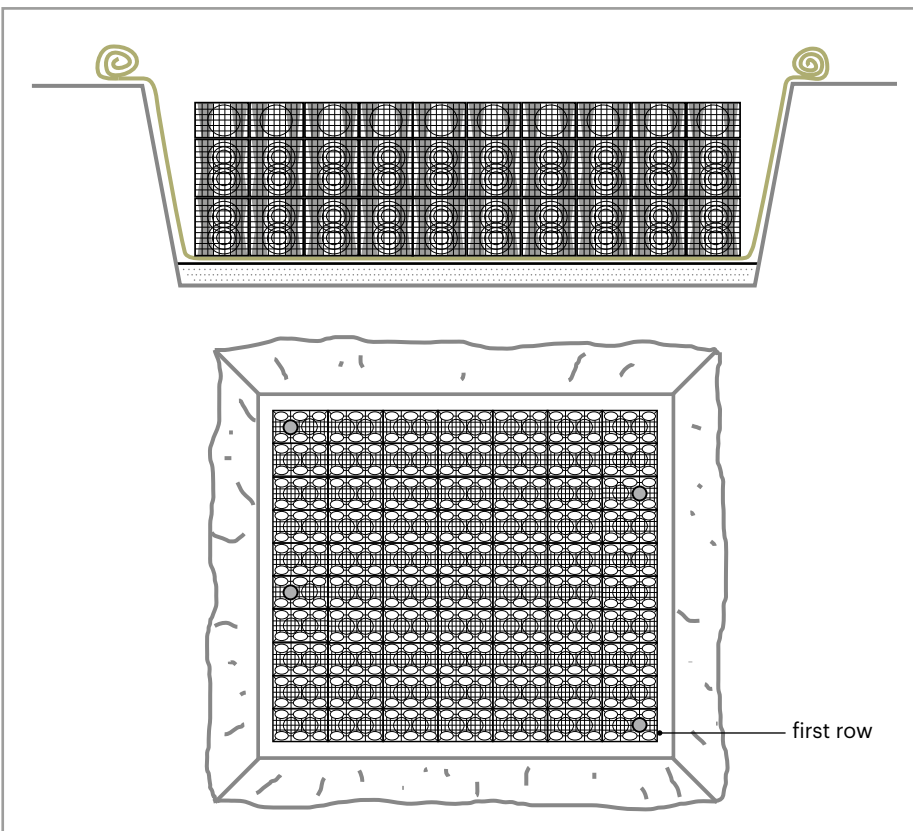


DRAINING SYSTEM

Spread appropriate geotextile in such a quantity that it can completely envelop the system.

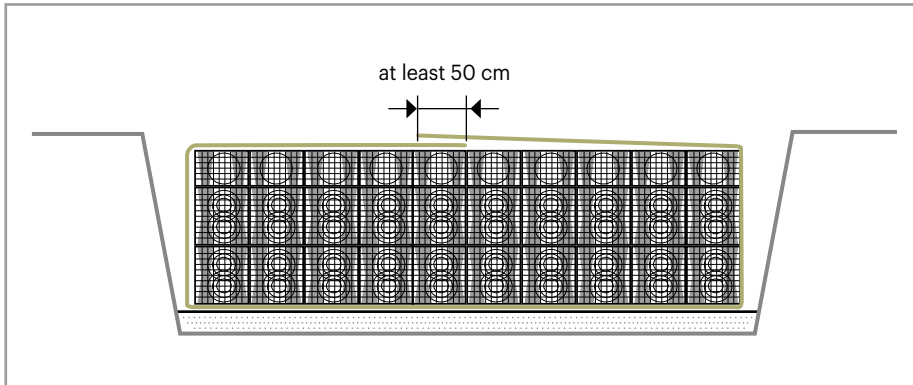
ACCUMULATION SYSTEM

Before the geomembrane, lay in geotextile in such a quantity that it can completely envelop the system.



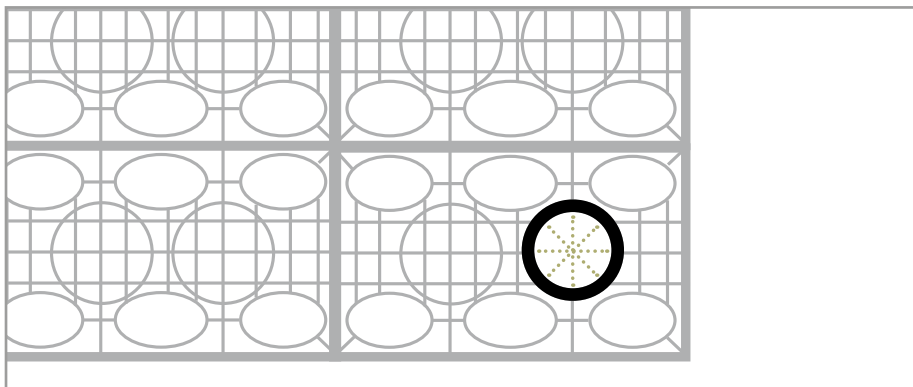
Position the kit inPluvio (for assembly see diagram on page 12) by preparing the inlets of the pipes and inspections. In order to ensure better inspection and cleaning of the system, it is advisable to position manholes no. 2 every 4 rows in an opposing manner (see diagram alongside).

LAYING

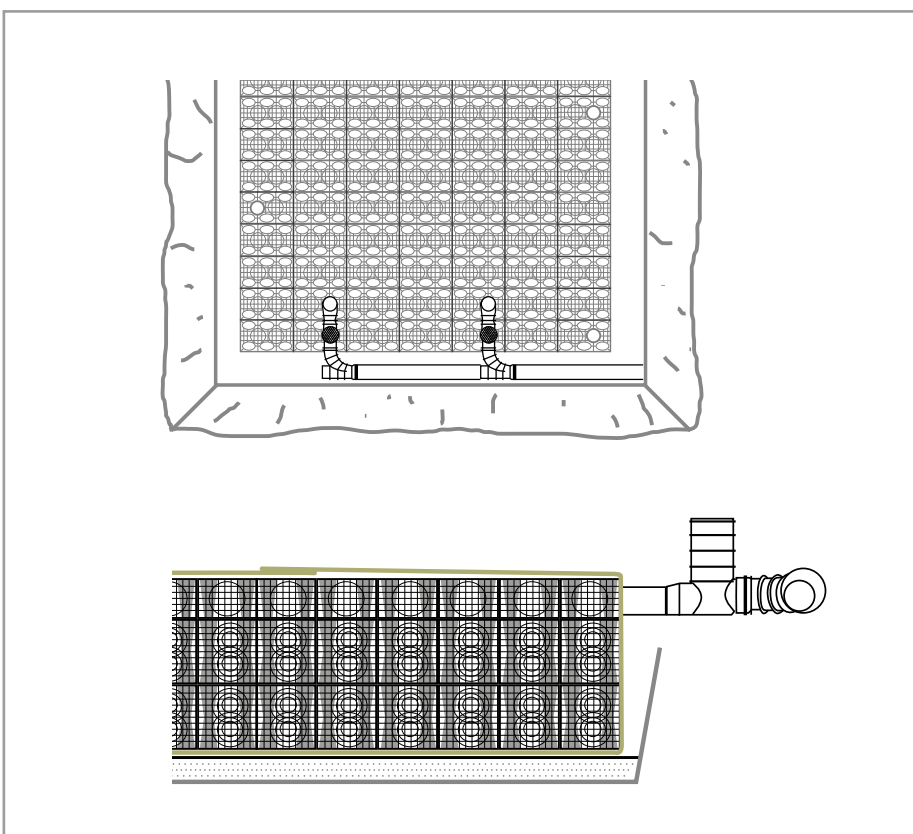


Wrap the entire system completely with geotextile, overlapping the two sides by 50 cm.

In the case of **ACCUMULATION SYSTEM**, wrap the whole system first with geomembrane by welding it near the corners, then wrap it with geotextile.



Drill the layers where the pipes and manholes will be inserted.



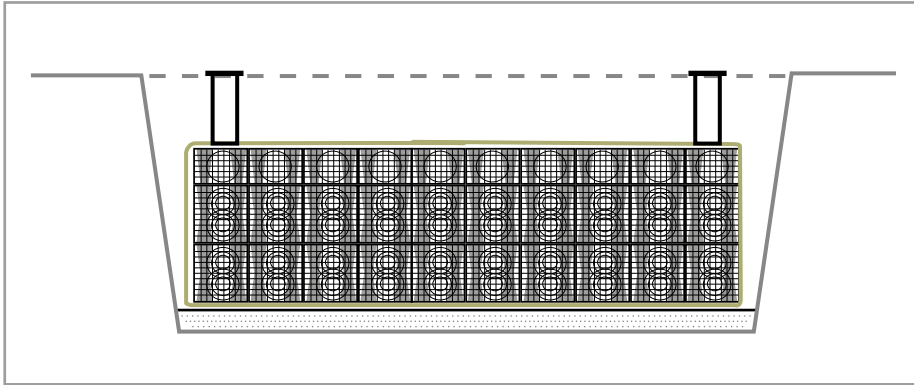
MANIFOLD POSITION INPUT:

Top entry solution

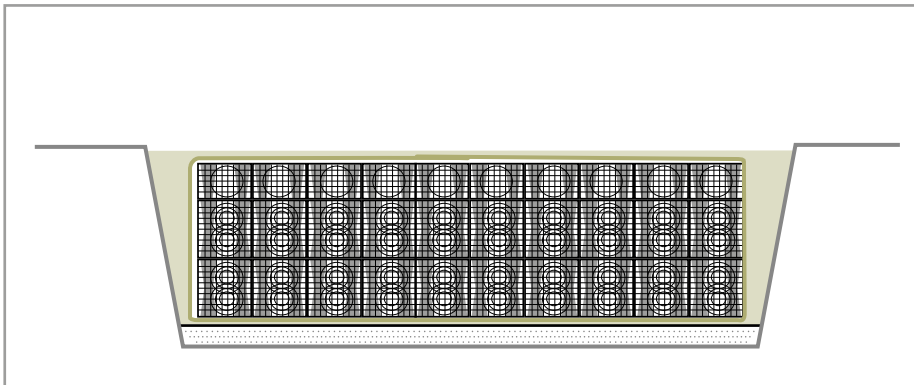
Position the inlet and outlet manifolds at the top of the system.

Side inlet solution

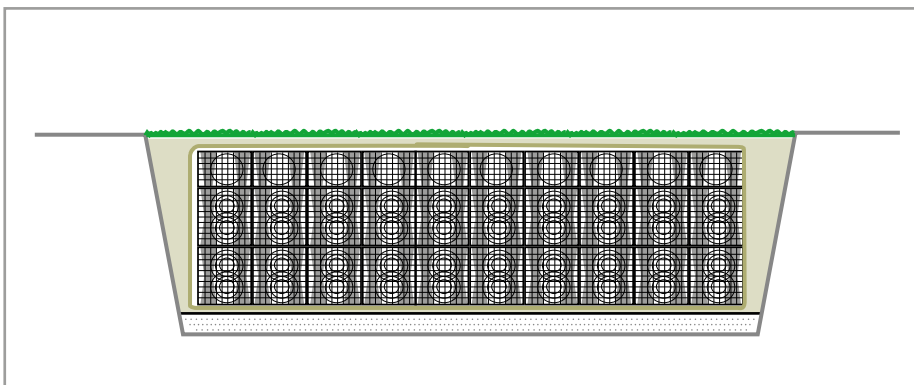
Position the inlet and outlet pipes in the vertical wall.



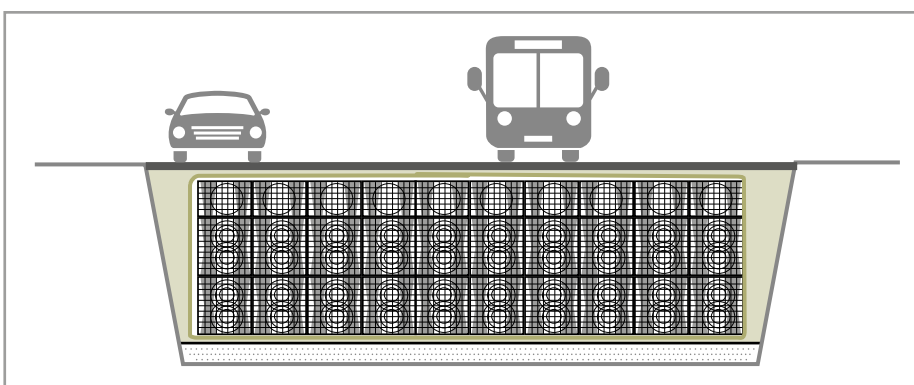
In the case of a top entry solution, position the chimney extensions.



Backfill laterally and compact using material with a maximum grain size of 30 mm (do not use clays or material with a larger grain size that could damage the geotextile).




Cover the system with:
- topsoil.




- asphalt for car parks
or driveways:
A15, B125, C250, D400.



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*VISIT
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