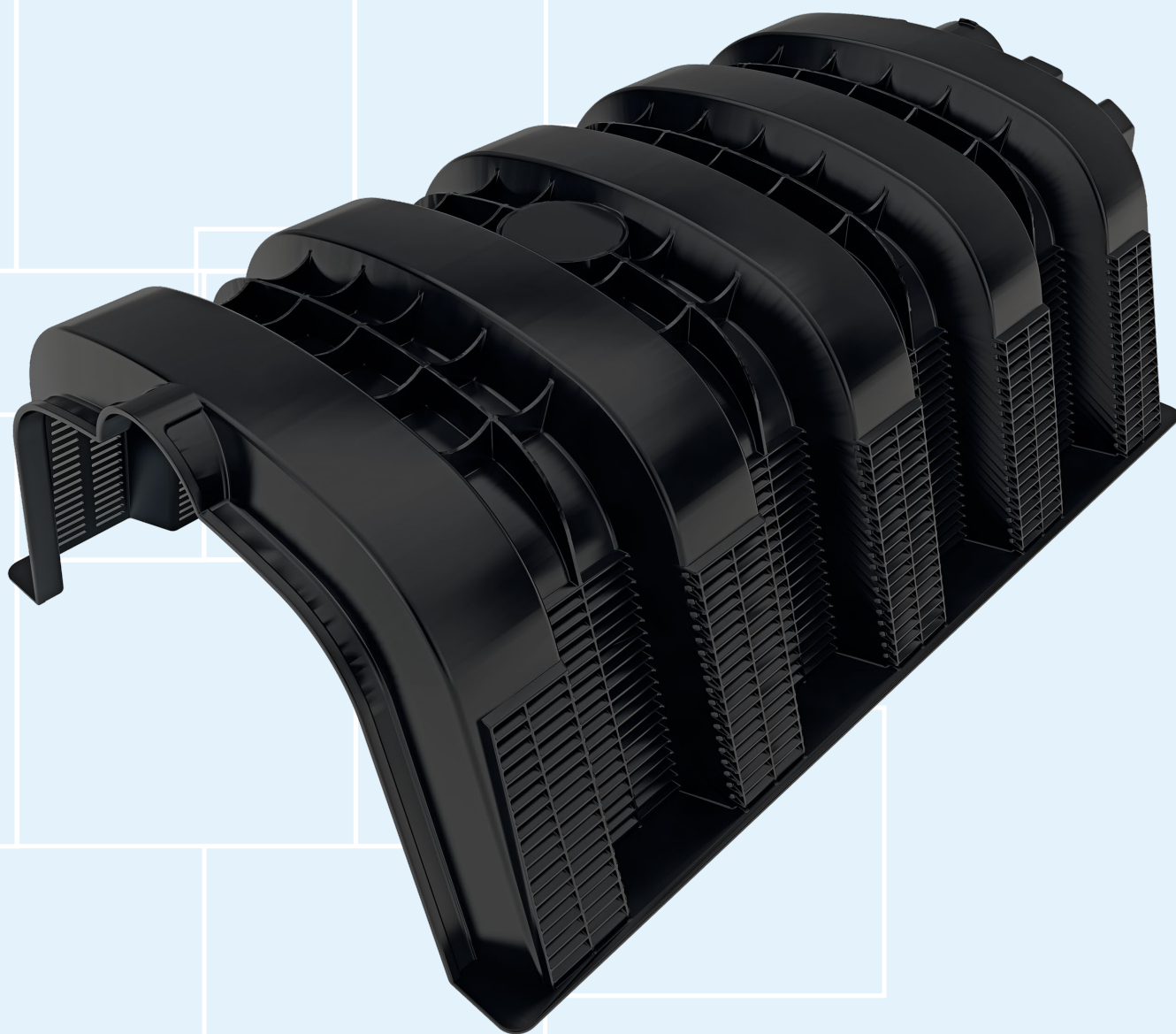




DRENING

TUNNEL ELEMENT FOR
RAINWATER STORAGE AND DISPERSION



ADVANTAGES



The Drening infiltration tunnel has been designed to be installed in areas with a large available infiltration area. The system consists of a succession of interconnected tunnels and a closing cap at the two ends of each row of elements. Installation is on one level only.

The basin must be sized according to the volume of rainwater to be disposed of, always taking into account the parameters that influence its calculation: the rainfall, the nature of the soil, the drainage surface and the loads applied.



REDUCED EXCAVATION

It allows a low-depth, non-invasive operation, ideal in areas with a high water table.



SIMPLE INSTALLATION

Thanks to its lightness, less than 10 kg per element, it can be handled manually without the need for recourse to mechanical means.



UNIVERSAL SOLUTION

The most frequent applications are:

- at the outlet of an overflow for stormwater management tanks,
- as infiltration tank after a filtration system,
- at the outlet of a non-collective sewage system.

THE SOLUTION

Drening is a modular element made of recycled plastic, designed to create underground tanks for in situ rainwater management.

Depending on the type of installation, Drening favours underground drainage by limiting surface flow.

This prevents flooding and contributes to the recharge of groundwater tables; alternatively it allows the reuse of the collected water to save drinking water resources.

Drening can also be used for sub-irrigation of pre-treated wastewater from buildings not connected to the sewer system.

The material and structure of Drening have been studied specifically to create high-strength systems. The product can be placed under heavy-traffic areas, and requires a shallow excavation for a low-invasive installation operation.



ATTENUATION TANKS

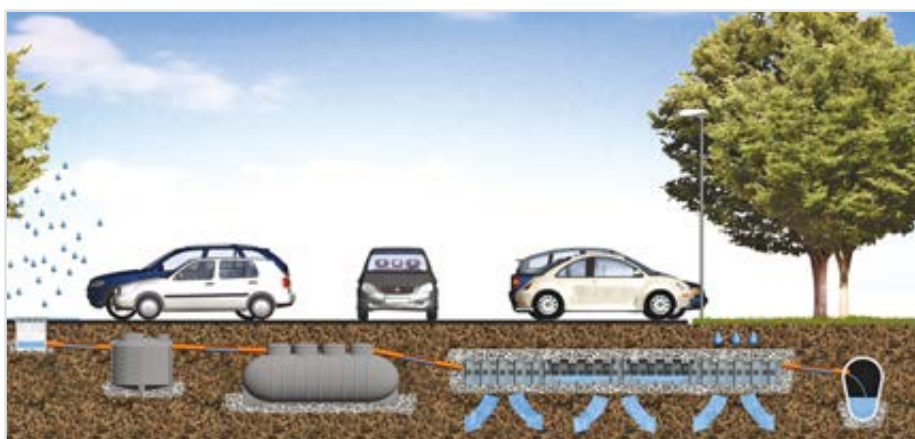
STORMWATER DETENTION AND REUSE

WASTEWATER INFILTRATION

RESTORATION OF HYDROLOGICAL BALANCE

Drening is not simply a measure to prevent flooding but, by favouring the infiltration of water into the subsoil, it is a part of a wider system that aims to recharge the aquifers, one of the most exploited sources of water supply by man.

In this way the natural water balance is maintained, even in areas where the soil has been rendered impervious.



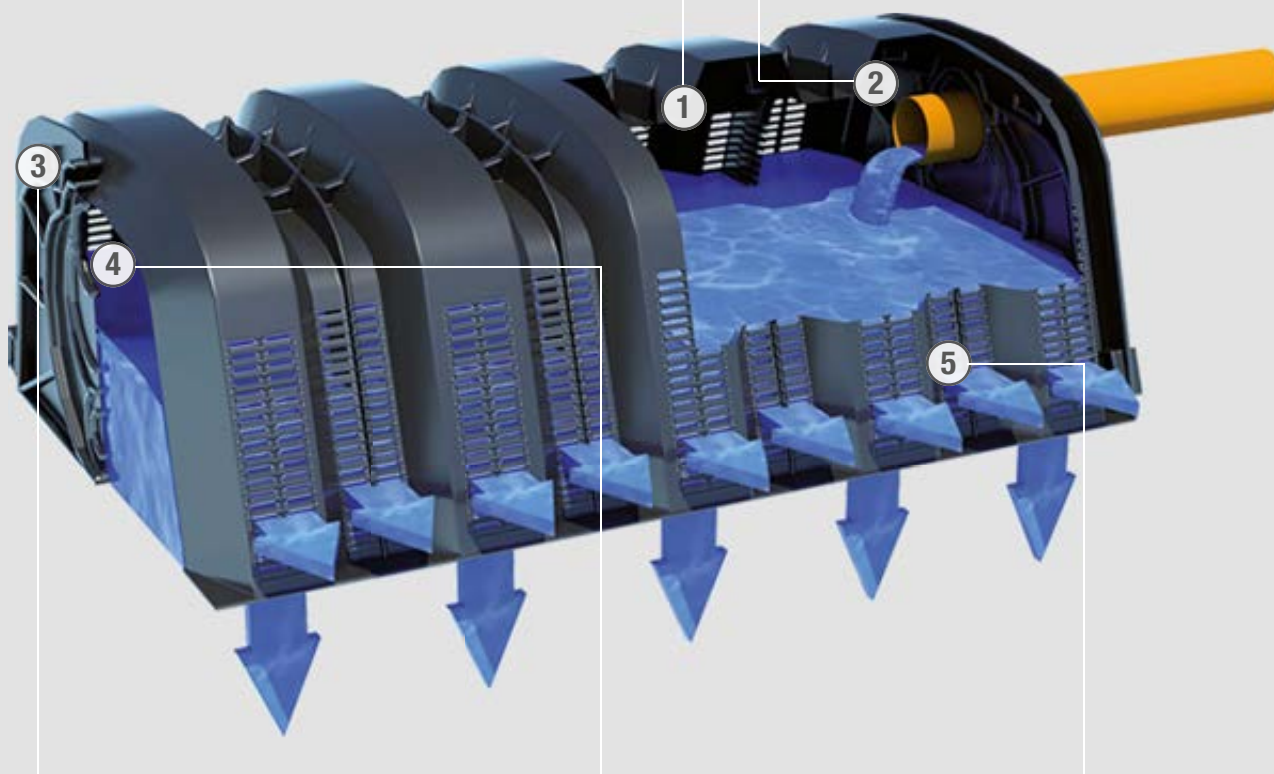
DETAILS THAT MAKE THE DIFFERENCE



① Designed for connection of a ventilation channel or inspection point.



② Reinforced arch structure to provide resistance even to heavy loads.



③ Drening Cap for simple fitting, suitable for pipes with DN from 60 mm to 320 mm, inserted at the base or the top.



④ Double overlapping hooking that allowing interlocking installation and a stable connection between the elements.

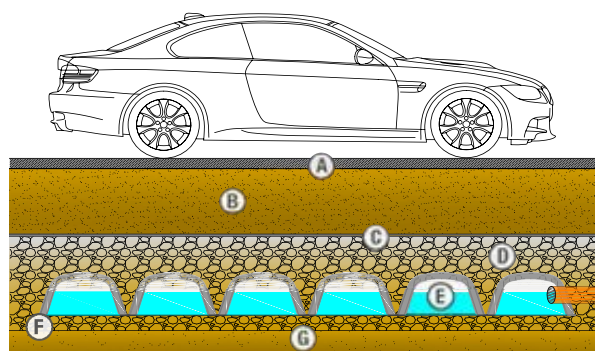


⑤ The base is completely open and side walls are slotted, creating an infiltration surface of 12.400 cm² per element.

INSTALLATION

LEGEND

- | | |
|----------------------------|---------------------------|
| (A) Road surface | (E) Draining |
| (B) Covering | (F) Gravel (infiltration) |
| (C) Geotextile | Waterproofing (detention) |
| (D) Washed gravel 20/40 mm | (G) Natural soil |



① GRAVEL LAYING

Construction excavation and laying of washed gravel 20-40 mm with thickness 10-15 cm.



② INSTALLATION

Manual installation of Draining (estimated speed: 1 element per minute).



③ CONNECTIONS

Closing of the system with the specific caps and insertion of the power source pipes and the overflow ones (if required by the project).



④ COVERING

Backfill of at least 30 cm and covering with washed gravel 20-40 mm for a minimum thickness of about 15 cm (this can change depending on the provided layer build-up).



⑤ GEOTEXTILE

Place geotextile all over the contact surface between the gravel and the natural ground.



⑥ FINISHING

Finished surface (road, carpark or vegetated) as required by the project.

DRENING APPLICABLE LOADS

Depending on the loads applied to the system, a minimum thickness must be provided to covering the Drening chambers.



The recommended layer build-up depending from the applied loads are available in Geoplastglobal.com
In case of modification of the proposed cross-sections please contact the technical office of Geoplast Spa.



BEFORE



AFTER

INFILTRATION UNDER CAR PARKS

Drening is the ideal solution to deal with rainwater in car parks as it significantly reduces the water volume in the drainage system, facilitating the infiltration in the subsoil in order to prevent surface floods. The easy and fast installation allows to build also very large basins in a very short time.

In this way Drening is a very competitive solution compared to other traditional drainage systems.



ROOFTOP RAINWATER INFILTRATION

Drening allows the construction of underground tanks to store efficiently and rapidly the water flowing from loading and unloading areas or from the roofs of industrial and commercial buildings.

Thanks to its high strength, Drening can also be installed under high traffic areas, such as manoeuvring yards and truck parks. Moreover, the modularity of the product adapts very well to the available surface.



RESIDENTIAL DEVELOPMENTS

Drening is the low impact solution to prevent flooding in new developments and comply with local regulations on drainage in the storm drain network. It ensures optimal stormwater drainage and water management “on site”, avoiding the inconvenience and safety problems of an open water pond.

Drening adapts to all available surfaces, thanks to its modular structure, and allows for a less invasive intervention in terms of excavation.



DRAINAGE OF ROAD INFRASTRUCTURES

Drening can be used to create drainage systems (roadside trenches, tanks under roundabouts) to quickly handle rainwater flowing from the roadway, avoiding traffic disruption.

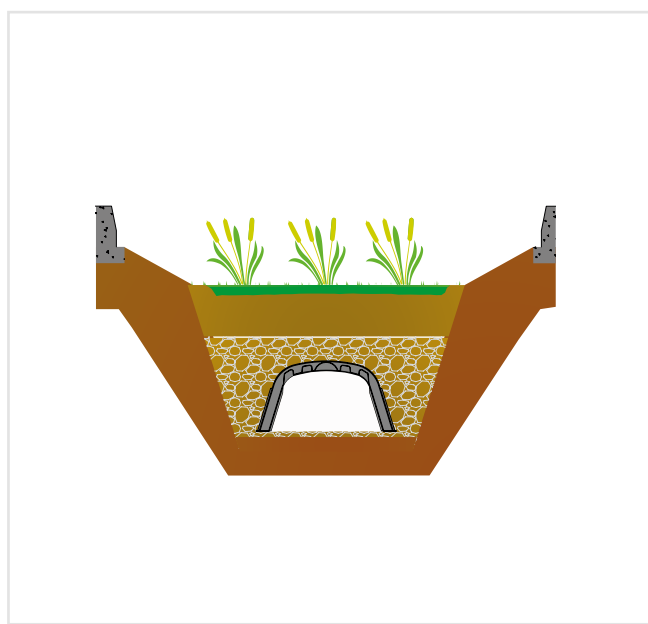
Thanks to its compact size and quick installation, it is a very easy system to handle in the small spaces typical of road construction sites. The high resistance to loads allows installations even in areas subject to heavy traffic.



DRENING AND PHYTODEPURATION

Drening can be used as a support element for slightly depressed vegetated trenches, placed on the edge of roads or car parks, into which rainwater is conveyed. In this way, the pollutants present in the runoff water are removed by means of phytopurification and filter into the ground, and are then emptied and disposed of in the basin below.

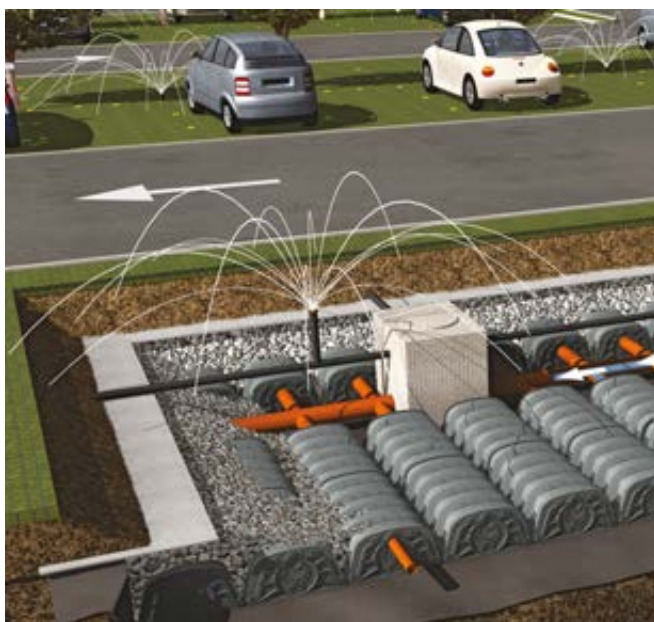
In doing so, in addition to a quantitative management of rain flow rates, a cleaner water is returned to the environment.



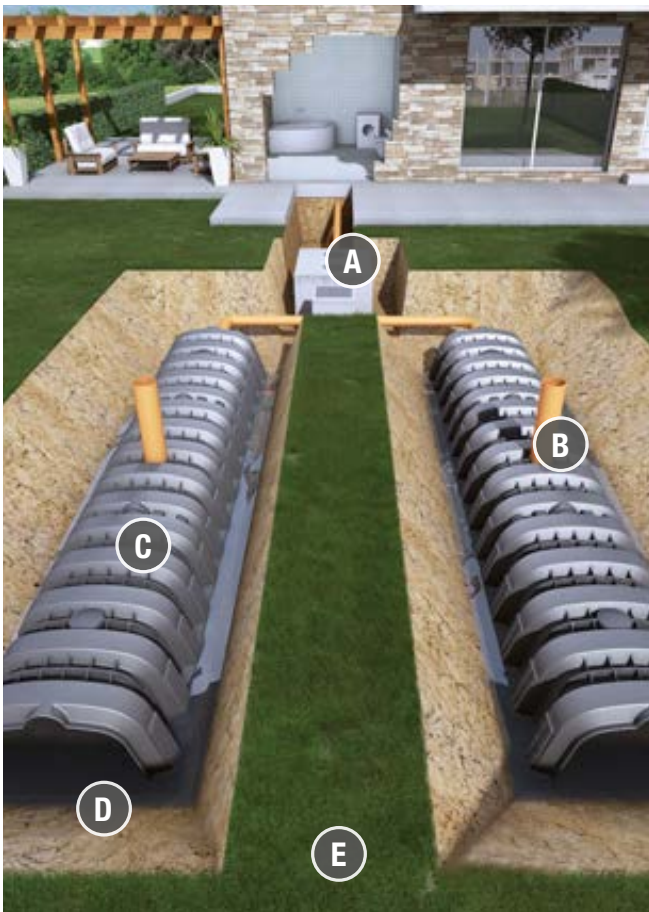
RAINWATER DETENTION AND REUSE

By means of appropriate waterproofing to block dispersion into the subsoil, Drening makes it possible to create tanks used to collect rainwater drained from surfaces for irrigation.

In this way, in addition to solving drainage problems, whenever possible it also saves drinking water by replacing it with rainwater is a viable option.



DRENING REFLUE



DOMESTIC WASTEWATER INFILTRATION

Drening can also be used for the disposal by sub-irrigation of domestic waste water, after a purification treatment (septic tank), an ideal solution for residential settlements not connected to the sewerage network.

Installing a ventilation will prevent bad odours and cleaner water will be returned to the environment. Drening is also easier to clean and inspect than the traditionally used perforated tube.

LEGEND

- | | |
|------------------------|--------------------------------|
| (A) Septic tank | (D) Infiltration |
| (B) Ventilation | (E) Trench installation |
| (C) Drening | |

INSTALLATION



① EXCAVATION

Dig a trench at least 900 mm wide at the base.



③ INSTALLATION OF DRENING

Install the Draining chambers.



⑤ LAYING OF GETOTEXTILE

Lay geotextile over the whole surface.



② SPREAD GRAVEL

Spread gravel 20/40 mm (minimum layer thickness 100 mm).



④ COVERING

Connect feeding and ventilation pipes. Cover with at least 150-200 mm of gravel 20/40 mm.



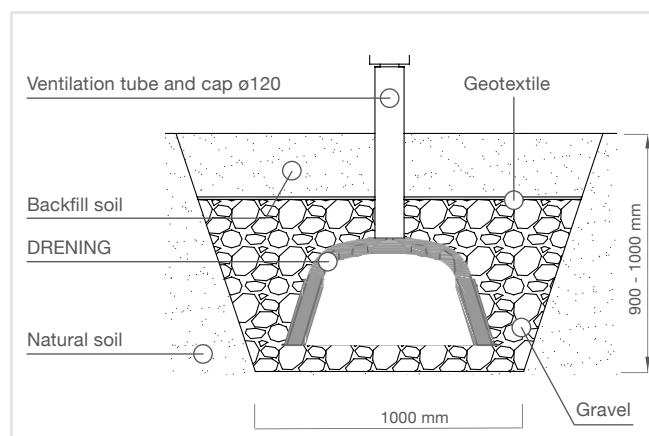
⑥ COMPLETE FILLING

Cover until the ground level has been reached.

VENTILATION

Ventilation of the system is essential to prevent the propagation of odours, as well as encouraging the purification of wastewater.

The absence of air, in fact, leads to anaerobic bacterial degradation of the organic matter present in the wastewater, which produces an unpleasant odour.



DRENING REFLUE DIMENSIONING

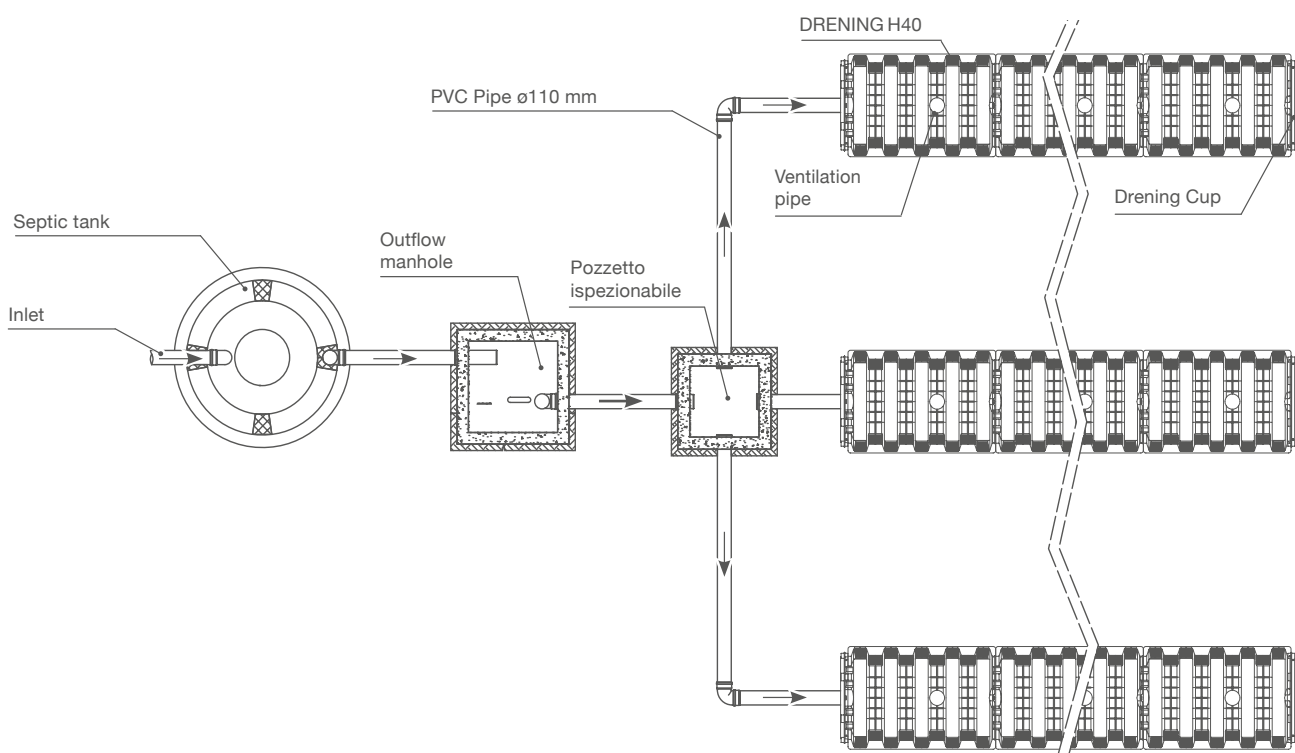
Soil type	No. of Drening chamber per Population Equivalent*	Infiltration volume (l)	Infiltration surface (cm ²)
Large sand or pebbles, or gravel, or mixed	1	300	12400
Fine sand	1,5	450	18600
Sand or gravel, or pebbles with limestone	2	600	24800
Clay or limestone with much sand, or pebbles	3	900	37200
Clay or limestone with little sand, or pebbles	6	1800	74400
Impervious compact clay	Not suitable	-	-

*Equivalence of the individual pollution load in household sewage produced by one person in the same time, conventionally equivalent to a BOD of 60g of oxygen per day.

The number of Drening chambers that will compose the infiltration trench is obtained starting from the type of soil and the population equivalent that the system will serve.

To obtain this data it is sufficient to multiply the population equivalent by the coefficient in the table, based on the type of soil in which the trench will be installed.

TYPICAL INSTALLATION DIAGRAM



REFERENCES

DRENING, NEW DEVELOPMENT, MILAN, ITALY

Multiple Drening infiltration systems were installed in a new residential centre to handle a rainwater volume of approximately 450 cubic metres.



DRENING, RESIDENTIAL DISTRICT, ALESSANDRIA, ITALY

The 4 tanks made with Drening, have allowed to temporarily collect rainwater coming from the roofs, the squares and the streets of the new residential district, thus avoiding the discharge into the existing sewerage system, considered undersized by the designer.





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