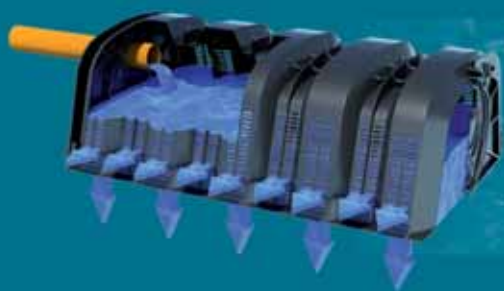




DRENING®



A new system for the realisation of infiltration and storage chambers



acqua
water

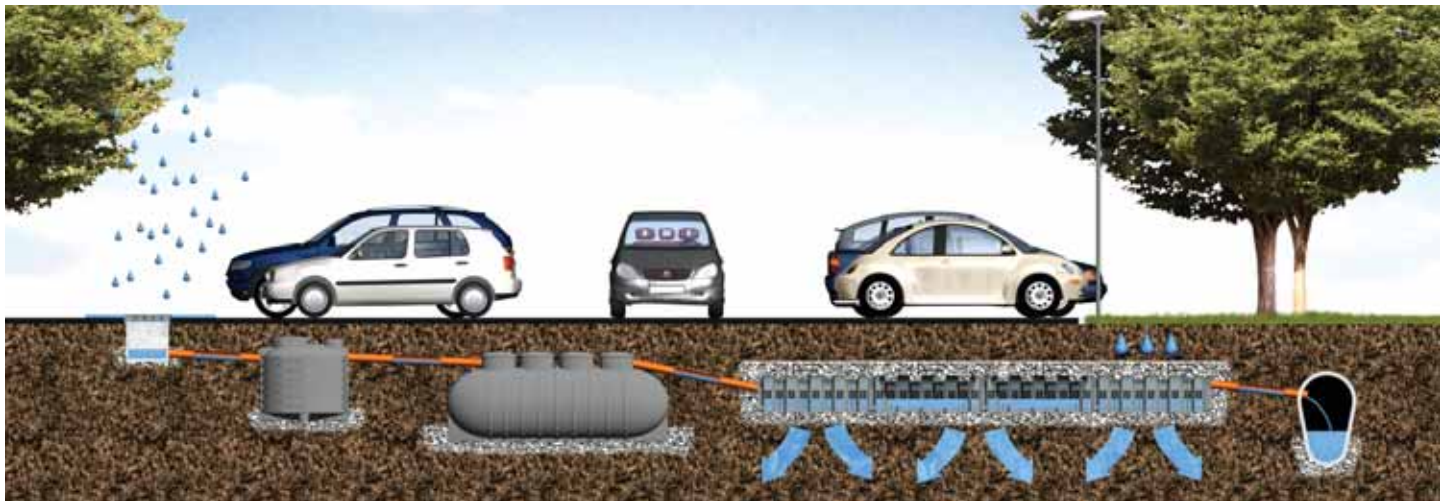
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Residential or industrial development makes land impervious to water, greatly increasing the complexities of stormwater management. Serious hydraulic consequences are created: the overload of existing sewage systems and ditches due to increased surface runoff rates causes a severe increase of riverflow peaks in urban areas. It also becomes necessary to catch and filter stormwater to tackle runoff pollution. Finally stormwater flow is becoming a major requirement to avoid extreme streamflow peaks following heavy rainfall events.

DRENING® DRENING STORMWATER RETENTION AND STORAGE SYSTEM

DRENING® is the solution for stormwater drainage problems in the case of:

- 1. heavy rainfall events
- 2. low-permeability soils
- 3. high groundwater
- 4. soil erosion due to stormwater runoff
- 5. green surfaces such as golf courts, playfields and so on
- 6. infiltration trenches, closure of roadside ditches
- 7. protection of vegetation
- 8. insufficient or non-existing sewer systems



THE ADVANTAGES OF USING DRENING®

- Reduces the waterflow into wastewater systems and streams.
- In case of floods DRENING® effectively controls the flow of stormwater into the main wastewater collection system.
- DRENING® is the only system that allows the creation of underground subdispersion basins in an easy and cost-effective manner.
- Smaller footprint than traditional systems, doesn't need a large excavation to install.
- Thanks to its high load bearing capacity DRENING® is suitable for basins below parking lots, green areas and so on.
- High storage capacity (up to 310 lt/m²) compared to traditional systems.
- The storage and subdispersion chambers can be inspected and cleaned thanks to the pre-marked hole area on the top of each DRENING® element.
- Easy and quick to lay thanks to its double-overlap joining system.
- The low weight and size make make the DRENING® elements easy to handle by a single person in the construction site.
- Subdispersion surface greater than any other draining system.



DRENING® APPLICATIONS

DRENING®: sanitary plumbing

Wastewater drainage for any residential or industrial building: water from sanitary plumbing or any water of compromised purity.



DRENING®: shopping centre and carpark

Basins can be made under roads, parking lots and green surfaces at a depth from 1 to 3.5 m, for stormwater subdispersion or storage.



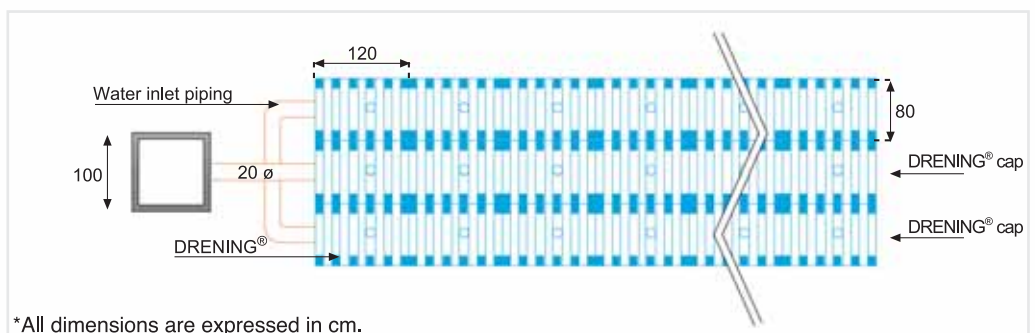
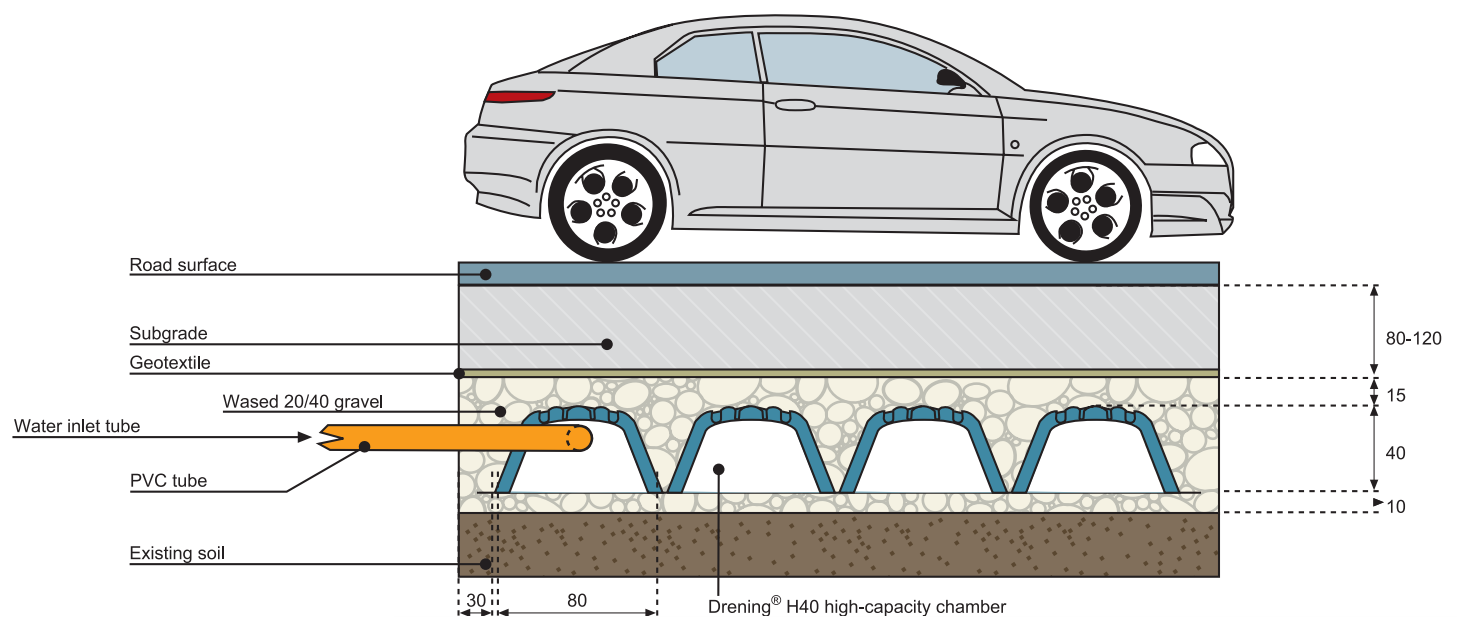
DRENING®: rainwater reuse

DRENING® used for rainwater collection, storage and reuse.



DRENING® INSTALLATION INSTRUCTIONS

1. Create a washed gravel 20/40 bedding, 8 to 10 cm thickness.
2. Lay the GEOPLAST DRENING® subdispersion chambers with the following properties:
 - a. Size 120 x 80 x H40 cm
 - b. Storage capacity of 310 lt/m²
 - c. Resistance to compression for a total backfill thickness above DRENING® of 40 to 250 cm, equal to 150 ton/m²
 - d. Lateral infiltration surface of 2,800 cm² for each element.
3. Close each row with the DRENING® caps and connect the water collection pipes of max. \varnothing 200 mm.
4. Allow for 30 cm gravel backfill all around the basin system. Cover with min. 15 cm of washed gravel dia. 20/40 mm, vibration compacted.
5. Place a layer of geotextile class 6 over the whole contact surface between gravel and natural soil.
6. Complete the water collection piping, catch basins, ventilation- and inspection manholes, tube diameter according to design specifications.
7. Backfill with compacted soil.
8. Place a layer of geotextile and soil backfill before preparing the subgrade for a paved surface.



*All dimensions are expressed in cm.



At the beginning of a project it is necessary to evaluate:

- The surface of impervious land
- The waterflow that can be handled by the wastewater collection system within the given duration
- The amount of water that can be absorbed by the soil at the maximum rainfall rate
- Local rainfall frequency and intensity
- In locations with permeability (K) below 10^{-6} it is recommended to connect the system to a wastewater collection system. Should this not be possible it will be necessary to oversize the system.

SOIL TYPE	Permeability $V_i = (m/s)$
Clay	10^{-9}
Clay loam	$10^{-8} / 10^{-7}$
Silt	10^{-6}
Fine sand	10^{-5}
Heavy sand	10^{-4}
Fissured rock	10^{-3}

Example of size calculation with the DRENING® system:

With a heavy rainfall such as during an intense storm the average rainfall is 25-30 mm in 15-30 minutes.

Example: let's suppose a surface of 5,000 m² during a heavy storm. It must be noted that during the past years floods have been caused by rainfalls as heavy as 80 mm in just 30 minutes.

Impervious surface (asphalt, cement, etc.)	5,000 m²
Rainfall in 30 minutes	60 mm (60 l/m ²)
Water volume to be accumulated x 5,000 m ²	300,000 l (300 m³)
Surface of DRENING® chamber	0.96 m ²
Volume of DRENING® chamber	0.3 m ³
Thickness of gravel backfill	15 cm
Thickness of gravel around the chamber	10 cm
Thickness of gravel foundation	30 cm
Volume of 20/40 gravel around each DRENING®	0.084 m ³

Volume of water contained in 20/40 gravel (30% of the gravel volume around DRENING®)	0,0252 m ³
Water volume stored by each DRENING®	0,3252 m ³

BASIN SIZE CALCULATION TABLE		
No. of DRENING®	$300 / 0.3252 = 922$	930
Total basin volume	930×0.3	279 m ³
Basin footprint	930×0.96	892.8 m ²
No. of rows	$\sqrt{892.8 / 0.80}$	37 rows
No. of DRENING® per row	$930 / 37$	25



DRENING®: ADVANTAGES VS. TRADITIONAL SYSTEMS

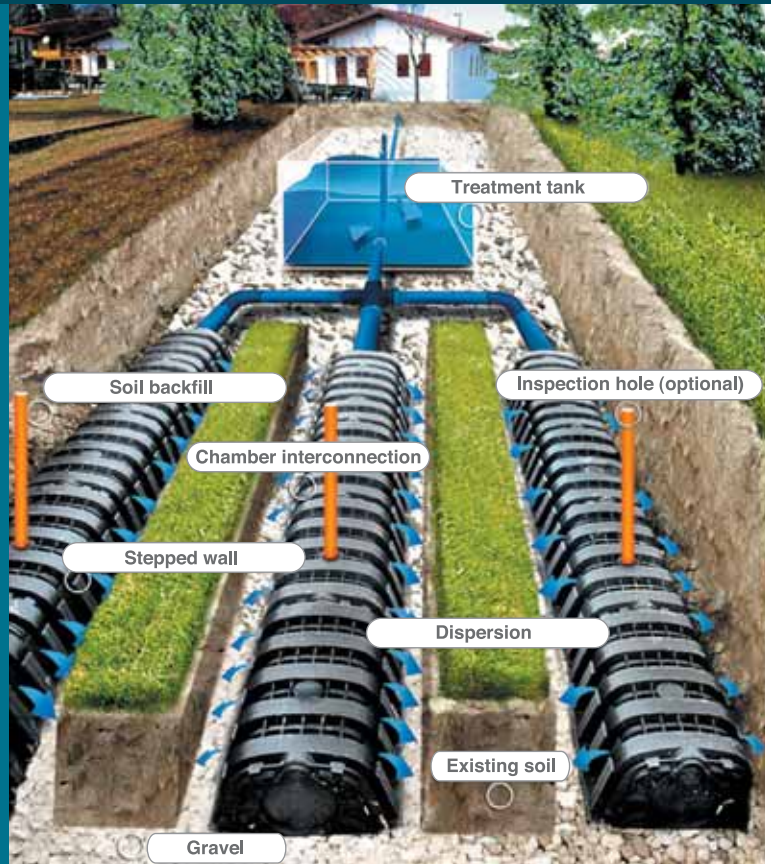
DRENING®: sanitary plumbing

Whenever the connection to a sewage system is not desirable or possible the DRENING® system can be used for the treatment and subdispersion of wastewater. There can be single- as well as multiple-dispersion tunnels created using DRENING® elements.

Ahead of the subdispersion basin a treatment tank will remove the solid part of the wastewater and uniformly distribute the liquid to the subdispersion system.

Thanks to its infiltration characteristics DRENING® the task of designing a wastewater dispersion system is simple, making the realization extremely flexible and precise.

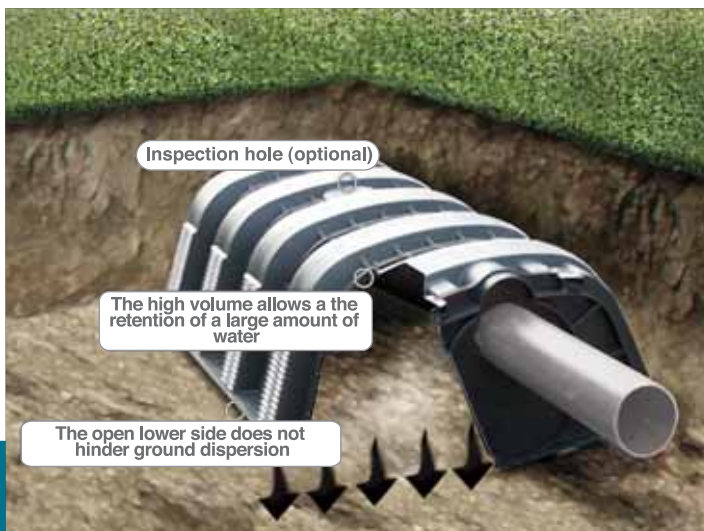
DRENING® has a far higher infiltration capability than tradition systems such as perforated pipes or dispersion rings of equivalent volume, as the lower side of each element is open and guarantees the highest possible contact surface.



Highest draining

A

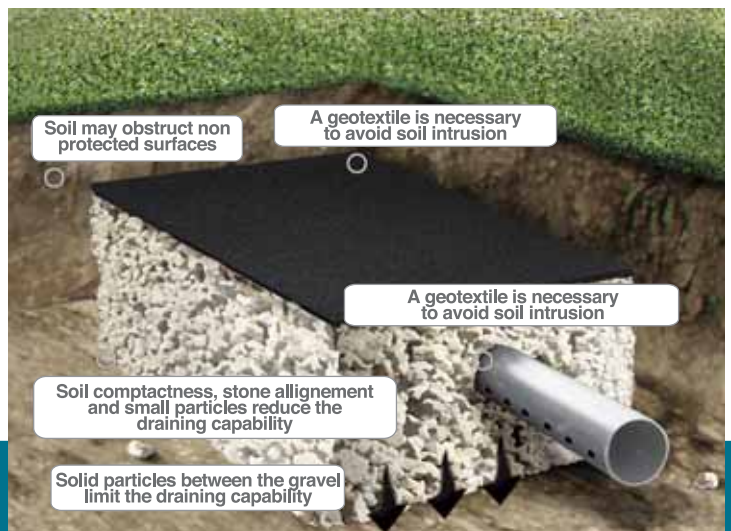
The DRENING® system guarantees a 100% efficiency thanks to the completely open lower side



Limited drainage

B

The traditional perforated pipe and gravel system is 50% less efficient, as the real draining surface is limited.



DRENING®: advantages vs. traditional systems

- Increase of the infiltration volume and surface, as well as rate;
- Reduction of the dig depth, thus increasing the safety distance from the groundwater;
- Reduction of the gravel backfill volume;
- Reduction of the dig length compared with the pipe and gravel system;
- Increased air volume, required by aerobic microorganism to break down organic matter and avoid rot
- Quick and easy to place without the need for a crane or a forklift truck;
- DRENING® is made of regenerated HD PE (high density polyethylene) and has an excellent resistance to chemicals found in wastewater.

DRENING®: basin size calculation

Group	Soil type	No. of DRENING® per equivalent inhabitant*	Percolation volume (l)	Infiltration surface (cm²)
1	Rough sand or stones, or gravel, or mixed	1	300	12,400
2	Fine sand	1.5	450	18,600
3	Sand or gravel or stones with silt	2	600	24,800
4	Clay or silt with a lot of sand or stones	3	900	37,200
5	Clay or silt with few sand or stones	6	1,800	74,400
6	Compact impervious clay	Not suitable	—	—

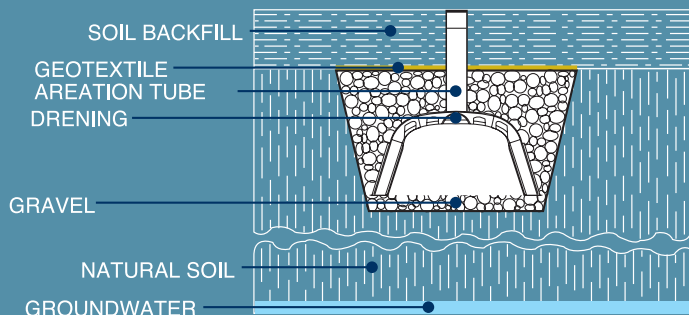
The size of the DRENING® system for wastewater infiltration must take into account the type of soil within the area where it will be placed, and the amount of equivalent inhabitants.

* Parameter indicating the pollution level produced by an inhabitant, by convention equal to a BOD of 60g of oxygen per day.

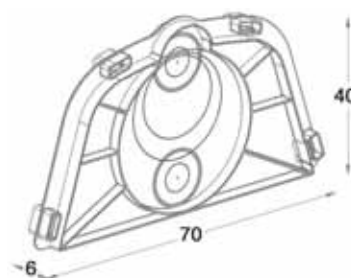
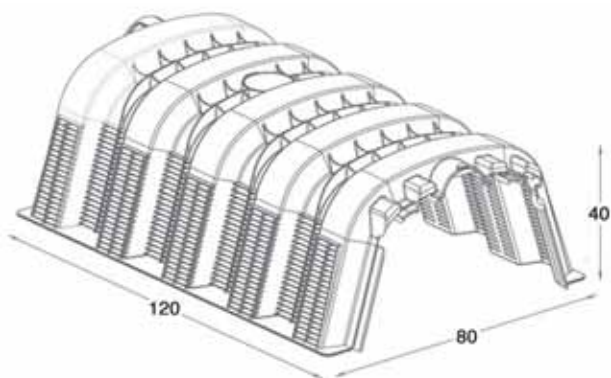
DRENING®: installation instructions



- Dig a trench 90-100 cm depth, at least 90 cm wide at the base, with inclination of the sides depending from the type of soil available. **N.B.: the distance between the bottom of the trench and the highest groundwater level must never be less than one meter;**
- Fill the bottom of the trench with 30/60 mm gravel, 10 cm layer thickness;
- Place DRENING® at the centre of the trench, with an inclination angle of 0.5%;
- Insert the aeration tube in the dedicated area on top of the DRENING® to allow the survival of aerobic bacteria;
- Allow for at least 20 cm gravel backfill along the sides and over the top of the system, gravel size 30-60 mm;
- Place a layer of geotextile to avoid silting of the system;
- Fill the trench back to ground level and if required sow grass.



DRENING® TECHNICAL DATA



*All dimensions are expressed in cm.

Size	120 x 80 x H40 cm
Material	HD PE (high density regenerated polyethylene)*
Weight per element	11 kg
Volume	310 lt/m ²
Resistance to compression with a total backfill of 40 to 250 cm above DRENING®	8 tons per wheel (150 t/m ²)
Lateral infiltration surface	2,800 cm ² per element
Packaging	40 pcs.
Package size	80 x 120 x H230 cm

(*) Polyethylene: Flexural modulus 780 N/mm² - Tensile strength 22 N/mm² - Coefficient of thermal expansion 0.2 mm/m/°C



CUSTOMER SERVICE: PROJECT DEVELOPMENT

Send your projects in DWG format to: ufficiotecnico@geoplast.it

ASSEMBLY HANDBOOK AND TECHNICAL SPECIFICATION

Available in our website www.geoplast.it in the "Area Download" section.

Authorized dealer:



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REV. 002
ST.10/2010