



GREEN ROOFS



PERMEABLE CAR PARKS

TECHNICAL MANUAL
**Permeable Car Parks
Roads
Soil stabilisation,
Embankments**



EQUESTRIAN FLOORING



OUR MISSION:

To grow new gardens on roofs, terraces and car parks, so that the city may breathe.

Pierre Georget
 Pierre Georget
 CEO

OUTLINE

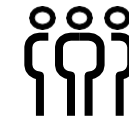
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OUR STRENGTHS



ECOVEGETAL is a company committed to protecting the environment and enhancing living spaces.



ECOVEGETAL is a French, European and responsible company.



ECOVEGETAL is a top company for water management at the plot level.

Our managers and founders are farmers, landscapers and manufacturers.
Francis Pelletier, Pierre Georgel, Jürgen Manzei.

FOR MORE THAN 20 YEARS, ECOVEGETAL has been the professional natural solution for green roofs, car parks and soil stabilisation.

Our job is to assemble and grow plants on roofs, car parks and terraces, creating green spaces or stable and permeable soils. Through hard work, here at ECOVEGETAL, we have become a top choice company for plot-level water management for cities and professionals in just a few years.

ECOVEGETAL provides all necessary expertise and tools. Our company, headquartered in Broué in the French countryside, markets its products throughout Europe, either directly or through subsidiaries or partnerships. Our mission is to spread our expertise and products everywhere.



BENEFITS OF ECOVEGETAL PERMEABLE GROUND SYSTEMS



Rainwater infiltration
Avoids surface runoff



Reduces the heat island effect in the city
Improves the urban climate



Increases biodiversity
Creates substitute biotopes



Manages pollution
Substrate filtration
Improves quality of aquatic environments



Surface useable year-round
Load-bearing capacity and drainage



Water storage
In-ground pool alternative
Calculated by our design team



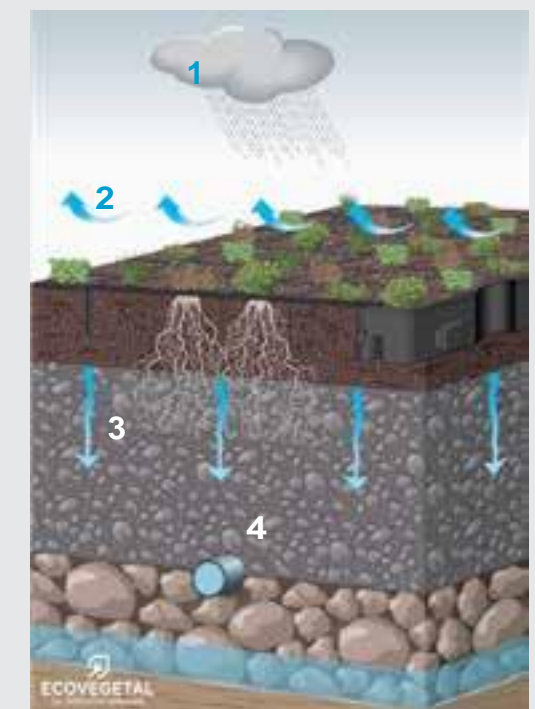
Ideal for all uses
Pedestrians, cyclists, cars, trucks, emergency vehicles, accessible use, etc.

OUR ECOVEGETAL CERTIFIED SYSTEMS

SURFACE RUNOFF COEFFICIENT ZERO
ECOVEGETAL MOSS, ECOVEGETAL PAVERS, ECOVEGETAL GREEN, ECOVEGETAL ROC and VILLAROC are completely permeable systems with a surface runoff coefficient of zero. Our tests are approved by CEREMA.





FIRE LANE WITH LADDER ACCESS
The ECOVEGETAL PAVERS, ECOVEGETAL GREEN and ECOVEGETAL VILLAROC systems are independently approved for fire lanes with ladder access (80 N/cm²).

ROULEPUR RESEARCH PROGRAMME
ECOVEGETAL permeable car parks are effective in retaining pollution. Due to filtration through the substrates and the root system, 97% of suspended matter is retained over a year.




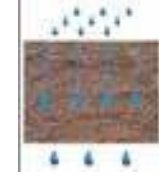

1. Rainfall - 2. Evapotranspiration - 3. Infiltration - 4. Safety drain (overflow) - 5. Temporary storage

1. CHOOSING THE RIGHT SYSTEM

GREEN SPACES		CONCRETE LOOK	
ECOVEGETAL GREEN	ECOVEGETAL MOSS	ECOVEGETAL PAVERS	ECOVEGETAL ROC & VILLAROC
			
Moderate use	Heavy-duty use	Heavy-duty use	Heavy-duty use

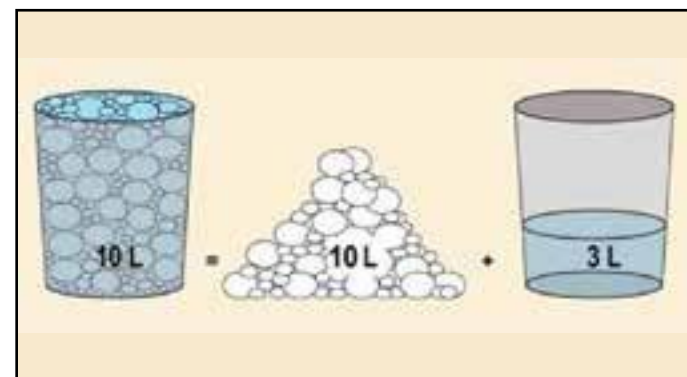
Two parameters define the frequency of use of green car parks, which determine which system you should choose. The number of vehicle rotations during the day is a factor to be taken into account when installing a grass car park. The ECOVEGETAL MOSS system is an intermediate solution using plants that require less water and are more resistant to trampling. Daily parking time should also be taken into account. A green car park must be left empty for a certain number of hours during the day and on weekends to allow the plants to grow.

2. PERMEABILITY OF THE BASE

$K > 10^{-4}$ m/s	$10^{-4} > K > 10^{-6}$ m/s	$10^{-6} > K > 10^{-8}$ m/s
Sandy rocky soils	Sandy loam soils	Clay loam soils
		
Rapid infiltration	Medium infiltration	Slow infiltration

The infiltration capacity of the soil determines the feasibility of a permeable structure. It is expressed by the permeability coefficient K (m/s). For a soil to be eligible for infiltration, its infiltration capacity must be verified. Permeability coefficient in m/s and correspondence in cm/24h: $K = 10^{-4}$ m/s \approx 900 cm/24h; $K = 10^{-5}$ m/s \approx 90 cm/24h; $K = 10^{-6}$ m/s \approx 9 cm/24h; $K = 10^{-7}$ m/s \approx 1 cm/24h. A safety drain is required when $K < 10^{-6}$ m/s to prevent surface water from stagnating, which quickly saturates the base.

3. CHOOSING YOUR DRAINAGE MATERIALS & SOIL BEARING CAPACITY



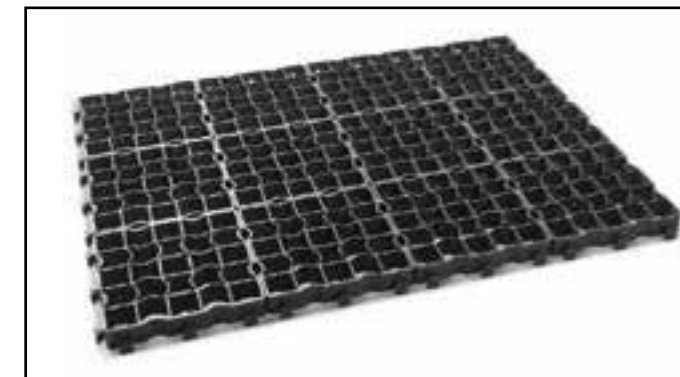
Soil compactness test: Bearing capacity can be checked using a standard Benkelman beam that simulates a deflection recorded on a computer. Choosing the mineral draining gravel: it is important to use certified draining gravel with a permeability coefficient of 10^{-4} m/s. Exception for ECOVEGETAL GREEN: the soil-stone mixture must be composed of 30% Hydrofertil and 70% crushed gravel 30/60. The proportion of Hydrofertil should not exceed the void ratio of the draining foundation (see technical specifications).

4. CHOOSING THE BEDDING LAYER



It is important to use the right bedding layer for the system. For green systems, a physically stable and draining bedding layer should be used. It should be properly adjusted and compacted. We use FERTILIT for ECOVEGETAL GREEN grass car parks, MOSS substrate for the ECOVEGETAL MOSS green solution and FERTIL ROC for ECOVEGETAL ROC & VILLAROC. For mineral or concrete systems, we use a bedding layer of crushed gravel with grain size 4/6.

5. CHOOSING YOUR HOLLOW CORE SLAB



ECORASTER is a hollow core slab made of recycled low-density polyethylene (LDPE). The system is certified environmentally friendly by the TÜV, with a load-bearing capacity of 800 t/m² when filled. It is UV and frost resistant. The hollow core slabs are clipped together using a mortise and tenon fastening system. With 9 slabs and 36 fixing points per m², the modules form a very flexible continuous framework designed to absorb dilation. **ECORASTER slabs are guaranteed for 20 years.**

6. SLAB FILLING



What ECORASTER slabs are filled with depends on the system. For a green look, choose pre-grown slabs, so they are immediately ready upon installation. They are available pre-turfed for the ECOVEGETAL GREEN system or pre-grown for the ECOVEGETAL MOSS system. For a mineral look, ECORASTER slabs are filled with gravel such as seine mignonette, porphyry or quartz. For a concrete look, they can be filled with concrete paving stones of different colours.

7. COMPLIANCE WITH INSTALLATION GUIDELINES



In order to make your permeable car park a success, be sure to closely follow ECOVEGETAL'S installation guidelines. Depalletise green slabs within 24 hours and never leave them on pallets over the weekend. Water liberally over the days following installation, depending on rainfall. For composite car parks, follow the chronological order of installation for each product. If the car park is surrounded by curbs, first do a test installation before laying the curbstone.

8. SYSTEM MAINTENANCE



The ECOVEGETAL MOSS system is composed of sedums, alpine grasses and other perennials. This type of system requires little maintenance: you'll need to mow 2 or 3 times per year on the non-pedestrian areas using a string trimmer.

The ECOVEGETAL GREEN system requires more maintenance: fertilisation twice per year, watering during drought, mowing.



FEATURES AND BENEFITS



heavy-duty use



low maintenance



surface runoff coefficient zero



pollution management



grown in France

THE GREEN SOLUTION FOR HEAVY-DUTY USE

ECOVEGETAL MOSS is an extensive vegetation system for car parks adapted to heavy-duty use: high vehicle rotation, long periods of occupation. The chosen seeds encourage gradual cultivation of extensive, low-growing and hardy vegetation.

This system is particularly well suited to water stress in southern regions. Slow colonisation of surfaces by the plants creates a very natural looking landscape.

BENEFITS OF THE SYSTEM

- PRE-GROWN SLAB FOR IMMEDIATE USE
- GREEN SPACE COMPLIANT
- RAINWATER REMOVAL: 60% MINIMUM



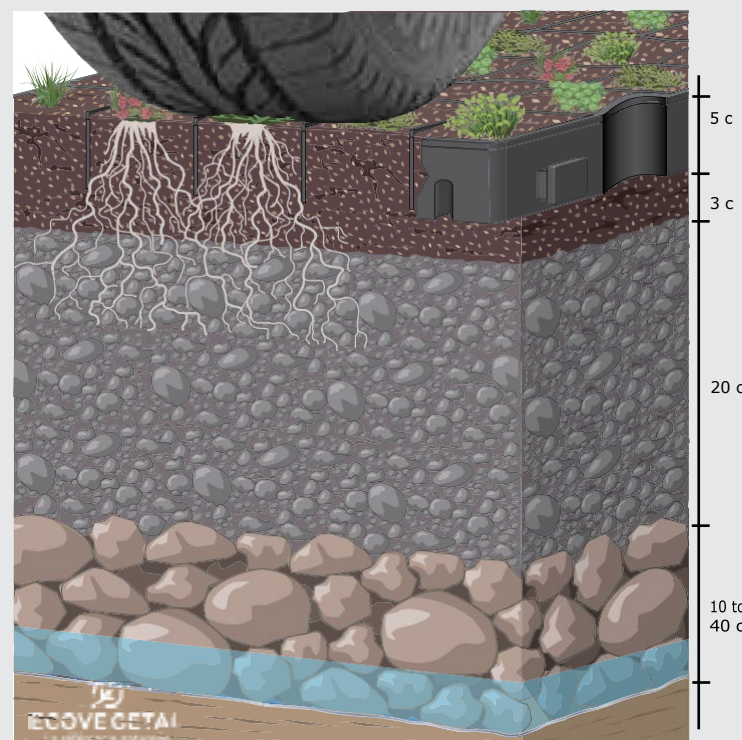
TECHNICAL INSTALLATION

Distribute over 30-60 cm (car or truck), then conduct a geotechnical load-bearing study and verify the soil permeability. A safety drain is recommended for a coefficient below 10^{-6} m/s.

Then lay a geotextile on the levelling course and lay the crushed gravel subbase (40/80) in a thickness of 10 to 40 cm (depending on whether it will be used for cars or trucks). Compact it all down.

In order to ensure the load-bearing capacity and drainage necessary for the car park, the foundation must be made with 20 cm thick certified draining gravel. Lay the pre-grown slabs on an ECOVEGETAL MOSS compacted substrate bed.

To finalise the installation, pass a roller over the green slabs. Once the installation is complete, water by sprinkling 5 to 10 litres of water per m^2 . Keep watering over 2 to 3 weeks during the dry season.



Cross-section

ALPINE GRASS*	SEDUM*	DWARF TREFOIL*	BRECKLAND THYME*	OREGANO*
	PRE-GROWN SLAB			
Pre-grown slabs for immediate use and quick set-up of the car park. Installation all year round (except during frost and heat waves). Height 5 cm. Optional version for on-site planting. We have two on-site planting options: ECOVEGETAL NORTHERN MOSS and ECOVEGETAL SOUTHERN MOSS (*The above list of plants is non-exhaustive).				
	SUBSTRATE ECOVEGETAL MOSS			
Filling and bedding layer material. Allows for slow colonisation by plants from arid zones.				
	CERTIFIED DRAINING			
Drainage material with even grain size ensures good stability after compacting. Permeability coefficient of 10^{-4} m/s.				



FEATURES AND BENEFITS



aesthetic look



immediate use



fire lane certified
80 N/cm²



grown in France

THE TURF SOLUTION FOR MODERATE USE

The ECOVEGETAL GREEN system provides you with an immediate result with pre-turfed slabs. The car park can be put into operation very quickly.

Designed for moderate parking use, it is also the ideal system for fire access roads. If the slabs only receive water and light for a few hours, for example in the evenings or on the weekends, they will grow well. Not allowed on traffic lanes. No water runoff from the asphalt onto the turf slabs.

BENEFITS OF THE SYSTEM

- PRE-TURFED SLAB
- RUNOFF COEFFICIENT 0 TO 0.10
- RAINWATER REMOVAL: 60% MINIMUM
- GREEN SPACE COMPLIANT
- IMMEDIATE PARKING



TECHNICAL INSTALLATION

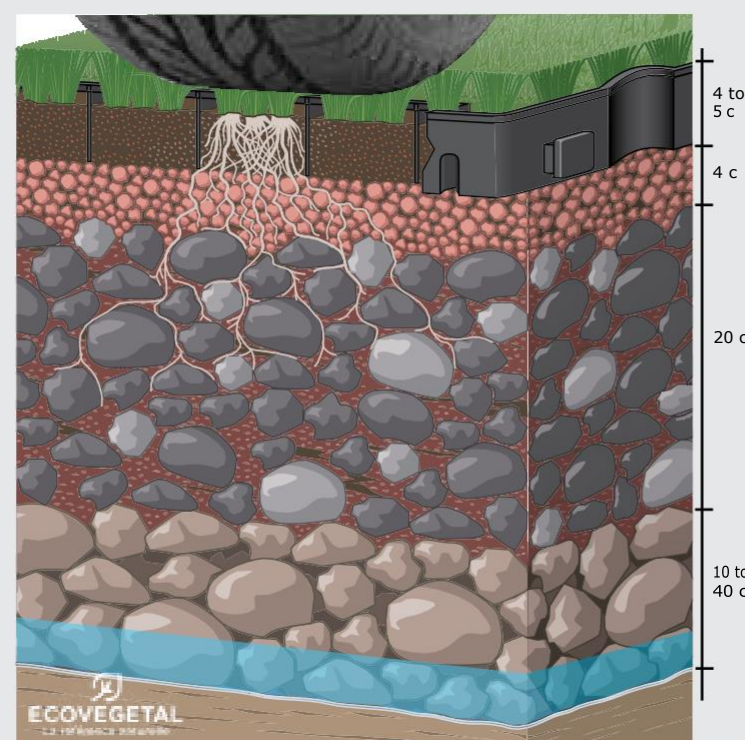
Distribute over 30-60 cm (car or truck), then conduct a geotechnical load-bearing study and verify the soil permeability. A safety drain is recommended for a coefficient below 10⁻⁶ m/s.

Then lay a geotextile on the levelling course and lay the crushed gravel subbase (40/80) in a thickness of 10 to 40 cm (depending on whether it will be used for cars or trucks).

To ensure the load-bearing capacity, fertility and drainage necessary for the car park, the soil/stone mix foundation must be compacted to 20 cm.

ECORASTER slabs are installed on a 4 cm compacted bed (FERTILIT).

Water thoroughly for 1 week to 1 month, depending on weather and installation conditions.



Cross-section



TURF SLAB

Pre-turfed ECOVEGETAL GREEN slabs for immediate use and quick set-up of the car park. Installation all year round (except during frost and heat waves). Height of 4 cm (car) or 5 cm (fire lane). Optional version for on-site planting.



FERTILIT

Fertile, draining and water-retaining bedding layer. Mixture of terracotta and compost. Grain size 0/15.



SOIL-STONE MIX

Mixture of coarse crushed gravel 30/60 and HYDROFERTIL. Fertile, draining and load-bearing mixture.



SUBBASE
40/80

Load-bearing and draining material ensures the mechanical performance of the subbase of the capping layer.

ECOVEGETAL GREEN MERIDIO



FEATURES AND BENEFITS



arid zone



aesthetic look



fire lane



limited irrigation

THE TURF SOLUTION FOR HOT CLIMATES

ECOVEGETAL GREEN MERIDIO is a turfing system for designing and building green areas and car parks that are highly exposed to dry periods.

The capillary irrigation system ensures a perfect result at any time of the year, without any constraints on use. Specifically designed for moderate use parking, it is also the ideal system for fire access roads and car parks in dry and arid areas.

BENEFITS OF THE SYSTEM

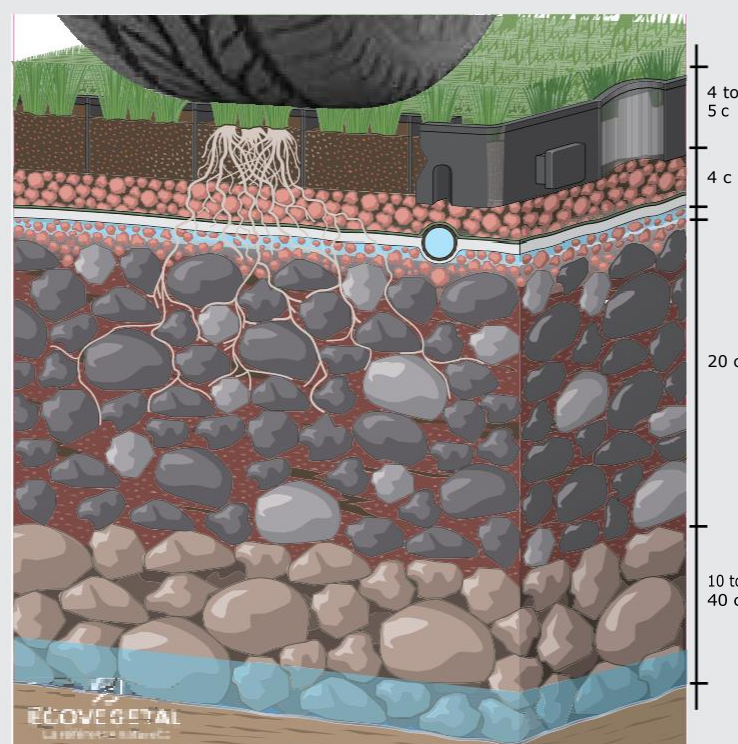
- 60% WATER SAVED COMPARED TO SPRINKLER IRRIGATION
- AVOIDS DAMAGE TO THE IRRIGATION SYSTEM
- GREEN SPACE COMPLIANT
- IMMEDIATE PARKING



TECHNICAL INSTALLATION

The ECOVEGETAL GREEN MERIDIO system is installed the same way as the system without irrigation. In this case, AQUANAT TP must be inserted between the foundation made of a soil/stone mixture and a FERTILIT substrate bed.

Turf slabs still need to be watered by sprinklers until the root system reaches the mat. For on-site planting, the system must be watered by sprinkling for much longer (minimum 1 month). Once the grass has grown and is in place, switch to irrigation by AQUANAT TP. Expect 3 to 6 mm per day depending on the region and weather conditions. Coupling with a rain gauge can be very useful to limit water consumption.



Cross-section



TURF SLAB

Pre-turfed ECOVEGETAL GREEN slabs for immediate use and quick set-up of the car park. Installation all year round (except during frost and heat waves). Height of 4 cm (car) or 5 cm (fire lane). Optional version for on-site planting.



FERTILIT

Fertile, draining and water-retaining bedding layer. Mixture of terracotta and compost. Grain size 0/15.



AQUANAT TP

AQUANAT TP consists of a drip in an irrigation mat. This irrigation mat is placed between the MTP and the FERTILIT. This allows the water to be evenly distributed over the entire irrigated car park.








MTP

Mixture of coarse crushed gravel 30/60 and HYDROFERTIL. Fertile, draining and load-bearing mixture.



FEATURES AND BENEFITS

-  low maintenance
-  UV resistant
-  cost-effective
-  absorbs expansion
-  rainwater infiltration

THE COST-EFFECTIVE SOLUTION FOR PERMEABLE CAR PARKS

ECOVEGETAL MINERAL is a system of ECORASTER hollow core slabs and a mineral filling with an appropriate grain size.

ECORASTER slabs are UV-resistant and do not need to be protected by a layer of gravel. Perfectly maintained filling over the entire surface of the car park. The structure of the slabs can absorb dilation, which prevents them from lifting.

BENEFITS OF THE SYSTEM

- TRUCK ACCESSIBLE (E50 SLAB)
- RUNOFF COEFFICIENT 0
- NO RUTTING
- USES LOCAL AGGREGATES

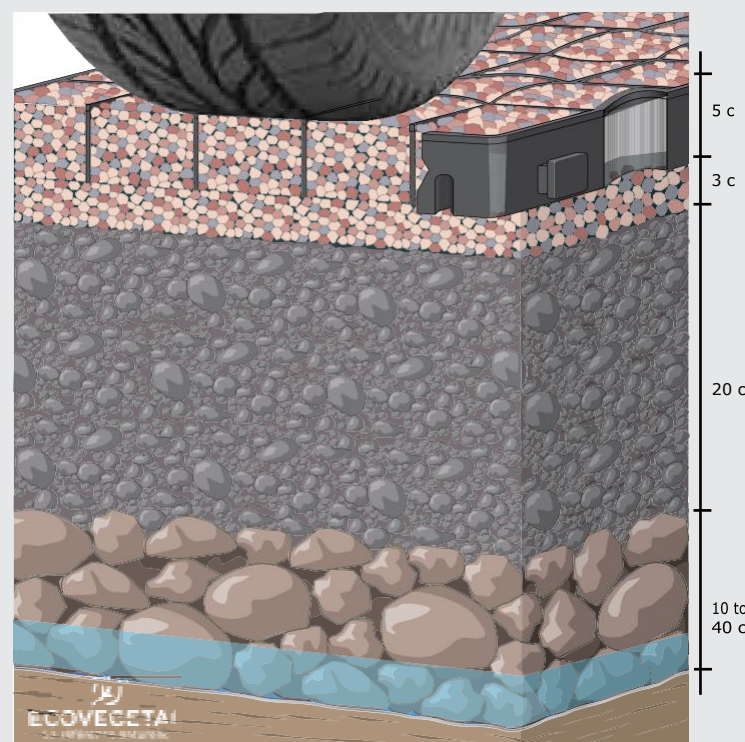


TECHNICAL INSTALLATION

Distribute over 30-60 cm (car or truck), then conduct a geotechnical load-bearing study and verify the soil permeability. A safety drain is recommended for a coefficient below 10^{-6} m/s.

Then lay a geotextile on the levelling course and lay the crushed gravel subbase (40/80) in a thickness of 10 to 40 cm (depending on whether it will be used for cars or trucks). Compact it all down. In order to ensure the bearing capacity and drainage necessary for the car park, the foundation must be made with 20 cm thick certified draining gravel.

Lay the ECORASTER slabs on a 3 cm bed that is identical to the filling material. Shake the slab and then finish filling all the way. Use manual or mechanical sweeping to create a slight setback from the slab level. The grain size must not exceed 10 mm.



Cross-section



ECORASTER E50

The ECORASTER hollow core slab keeps the assembled surface completely stable; All vehicle types. 20-year warranty. Wall thickness 3.5 mm. Filled load-bearing capacity: min 800 t/m².



ECORASTER S50

The ECORASTER hollow core slab keeps the assembled surface completely stable; Cars. 20-year warranty. Wall thickness 2.5 mm. Filled load-bearing capacity: min 800 t/m².



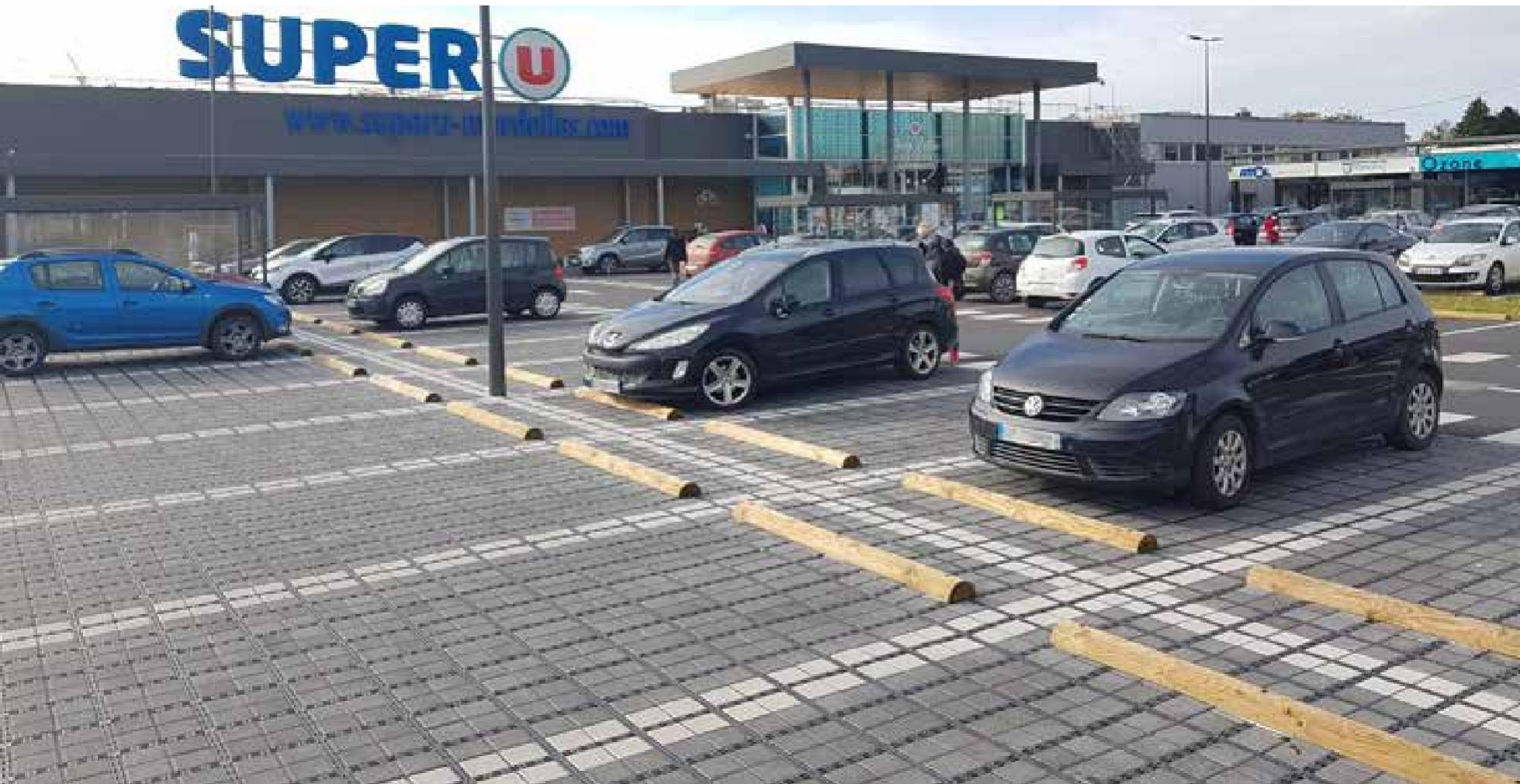
ECORASTER E50 LINE

ECORASTER E50 LINE slab 1 x 0.183 m, ideal for permeable car parks. 20-year warranty. Filled load-bearing capacity: min 800 t/m².



CRUSHED GRAVEL 4/6

Pea gravel, porphyry, pozzolan, quartz, flint, etc. Grain size < 10 mm. Different colours available depending on the region.



FEATURES AND BENEFITS



easy to install



surface runoff coefficient zero



fire lane certified 80 N/cm²



up to 10% slope (with edge)



handicap accessible

FULLY PERMEABLE PAVERS

The ECOVEGETAL PAVERS system is easy to install and can be adapted to many different environments.

ECOVEGETAL PAVERS are perfect for heavy-duty use permeable car parks, traffic lanes or pedestrian walkways. ECOVEGETAL PAVERS make it easy to divide parking spaces and handicap spaces.

ECOVEGETAL PAVERS are the perfect combination of an ECORASTER BLOXX slab and a concrete paving stone filling. The whole system is designed for optimum stability. The drains make the mineral surface completely permeable.

BENEFITS OF THE SYSTEM

- QUICK INSTALLATION: A TEAM OF 5 CAN INSTALL 300 M² PER DAY
- CREATIVE LAYOUT
- ZERO IMPACT ON THE ENVIRONMENT



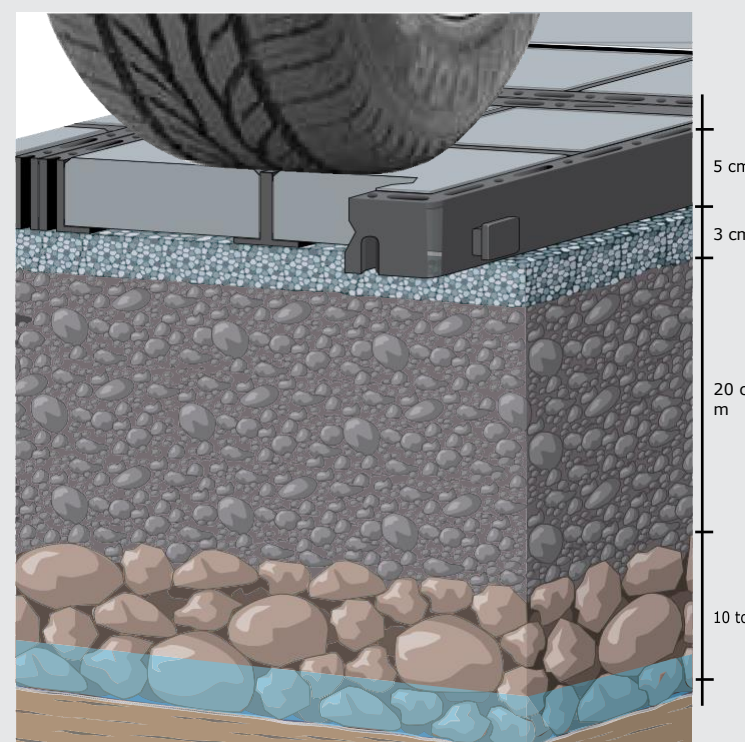
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Then lay a geotextile on the levelling course and lay the crushed gravel subbase (40/80) in a thickness of 10 to 40 cm (depending on whether it will be used for cars or trucks). Compact it all down. In order to ensure the bearing capacity and drainage necessary for the car park, the foundation must be made with 20 cm thick certified draining gravel.

The 3-cm thick bed must be properly compacted and made of a maximum of 4/6 crushed gravel.

ECORASTER BLOXX slabs are then joined using the patented mortise and tenon system. Fill in empty slabs with coloured paving stones to mark out the parking spaces or form a pattern. Run a plate compactor to stabilise the system.



Cross-section



PAVERS

Use our maintenance-free filling PAVERS for creative layouts. They are available in seven colours: ivory, red, grey, anthracite, green, blue and pink.



ECORASTER BLOXX

Resistant to heavy loads, UV rays and solvents. With the mortise and tenon system, these slabs are compatible with all ECORASTER slabs.

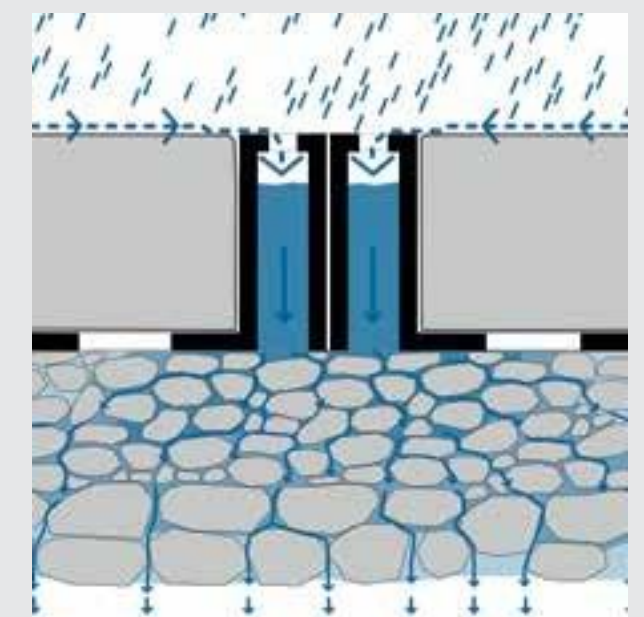


ECORASTER BLOXX LINE

A new product for dividing parking spaces up to 2.50 m wide. Size 18x33 cm. Sold by the linear meter.

100% RAINWATER INFILTRATION

Surface runoff coefficient zero





FEATURES AND BENEFITS



easy to install



surface runoff coefficient zero



heavy-duty use



pollution management

AESTHETICS AND ECOLOGY COMBINED

ECOVEGETAL COMPOSITE combines our ECOVEGETAL PAVERS and ECOVEGETAL MOSS solutions for an aesthetic appearance resistant to heavy-duty use of the permeable parking area.

ECOVEGETAL COMPOSITE is 100% modular due to the mortise and tenon fastening system. ECORASTER slabs can be clipped together for greater stability and load-bearing capacity.

With ECOVEGETAL COMPOSITE, parking area layout design is limitless. This solution infiltrates 100% of rainwater.

BENEFITS OF THE SYSTEM

- CREATIVE LAYOUT
- PRE-GROWN SLABS FOR IMMEDIATE USE
- SURFACE RUNOFF COEFFICIENT ZERO
- IMMEDIATE PARKING
- PERENNIAL VEGETATION FOR VERY HEAVY-DUTY USE

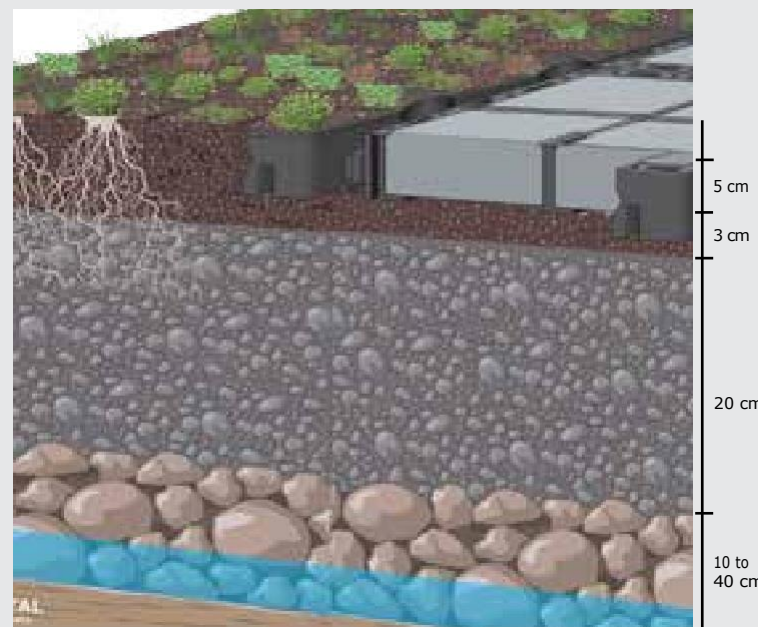


TECHNICAL INSTALLATION

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Then lay a geotextile on the levelling course and lay the crushed gravel subbase (40/80) in a thickness of 10 to 40 cm (depending on whether it will be used for cars or trucks). Compact it all down.

In order to ensure the load-bearing capacity and drainage necessary for the car park, the foundation must be made with 20 cm thick certified draining gravel. Apply a bed of ECOVEGETAL MOSS substrate and compact it. Then clip the pre-grown ECORASTER slabs and the ECORASTER BLOXX slabs together in accordance with the predefined layout and insert the coloured concrete paving stones into the slabs.



Cross-section



PRE-GROWN ECOVEGETAL MOSS



ECORASTER BLOXX



ECORASTER BLOXX LINE



PAVERS

Our pre-grown ECOVEGETAL MOSS slabs are ready for immediate use, perfect for quickly setting up the car park. Installation all year round (except during frost and heat waves). Height 5 cm. Optional version for on-site planting. We have two on-site planting options: ECOVEGETAL NORTHERN MOSS and ECOVEGETAL SOUTHERN MOSS (*The above list of plants is non-exhaustive).

Resistant to heavy loads, UV rays and solvents. With the mortise and tenon system, these slabs fit perfectly with all ECORASTER slabs.

A new product for dividing parking spaces up to 2.50 m wide. Size 18x33 cm. Sold by the linear meter.

Use our maintenance-free filling PAVERS for creative layouts. They are available in seven colours: ivory, red, grey, anthracite, green, blue and pink.

ACCESSIBLE PARKING SPACES



THE MODULAR AND COMPLIANT SOLUTION

Handicap accessible parking spaces must be marked on the ground and with a vertical panel that shows the international symbol. The car park must also be connected to an accessible pathway.

The ECOVEGETAL PAVERS system makes it possible to design draining parking spaces with an area compliant with articles 2 and 3 of the French Building and Housing Code on accessibility.

- They can be clipped to the ECOVEGETAL permeable system used for the rest of the car park.
- This prevents handicap spaces from being soft, slippery and reflective. They are without obstacles for wheelchairs.

FEATURES AND BENEFITS

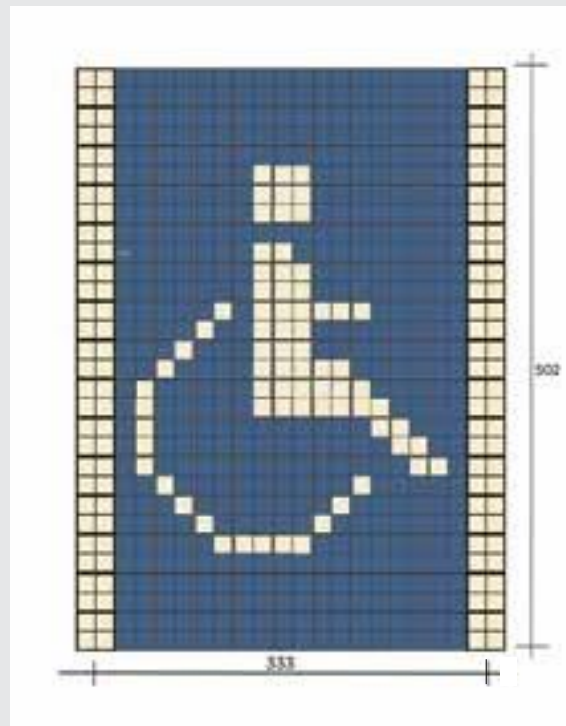


ACCESSIBLE SPACES ECOVEGETAL PAVERS

Example of a handicap accessible space created using the ECOVEGETAL PAVERS system.

- Width: 3.33 m
- Length: 5.02 m
- Colours: blue and ivory
- Number of paving stones: 133 ivory and 467 blue paving stones.

To save time and make installation easier, the accessible space is laid on the same foundation and bed as the rest of the permeable parking system.



ELECTRIC VEHICLES



French decree No. 2011-873 of 25 July 2011 on facilities for charging electric or plug-in hybrid vehicles at buildings provides for the following:

All or part of the parking spaces must be designed in such a way as to be able to accommodate, at a later date, a charging station for electric or rechargeable hybrid vehicles, including a metering system for individual billing of consumption.

For this purpose, ducts, cable trays or conduits shall be installed from the general low-voltage switchboard in such a way that they can serve at least 10% of the motor vehicle spaces, with a minimum of one space.

- Preserves infiltration throughout the entire system.
- Allows for continuity of the layout by clipping in with the other slabs.

FEATURES AND BENEFITS

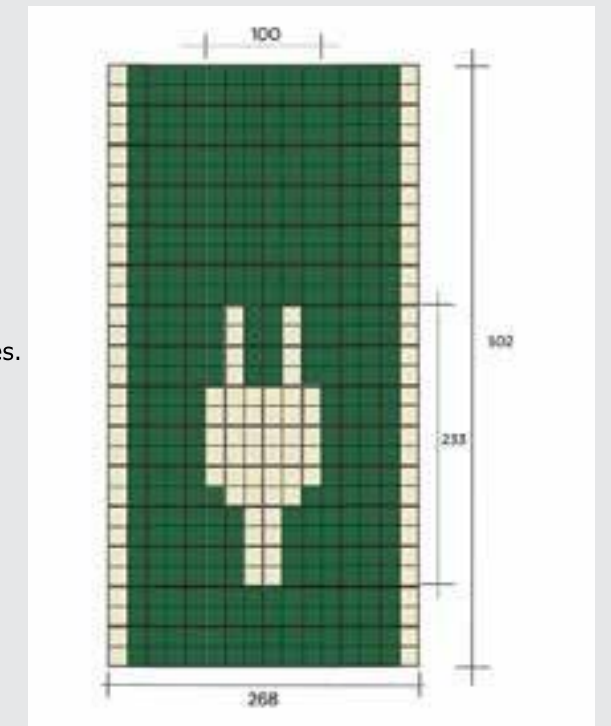


VEHICLE SPACES ECOVEGETAL ELECTRIC

Example of an electric vehicle space created using the ECOVEGETAL PAVERS system.

- Width: 2.68 m
- Length: 5.02 m
- Colours: green and ivory
- Number of paving stones: 110 ivory and 370 green paving stones.

To save time and make installation easier, the space is laid on the same foundation and bed as the rest of the permeable parking system.





CONNECTING ASPHALT TO

ECOVEGETAL recommends two options between the asphalt and ECORASTER slabs without a curb:

SAW-CUTTING:

Saw-cutting the asphalt before laying the ECORASTER slabs ensures a clean finish. This operation can be time-consuming and costly, however.

HOT CASTING:

A simple and affordable solution: you may pour asphalt at 180°C against the ECORASTER slab. ECORASTER is highly resistant to the heat generated by asphalt.



DELIMITATIONS USING STUDS AND NAILS

Insert the studs and marking nails into the square holes of the ECORASTER slabs. Lugs ensure a durable hold. Marking may vary in density, with or without painting on the ground. An easy to install solution for permanently delimiting parking spaces.



PMI STAINLESS STEEL NAILS



WHITE PMC STUDS



BLACK PMC STUDS

ECOVEGETAL PERMEABLE CAR PARKS

ECOVEGETAL VILLAROC



FEATURES AND BENEFITS



pedestrian comfort



surface runoff coefficient zero



driveable for cars and trucks



fire lane certified 80 N/cm²



made in France

THE CONCRETE SOLUTION FOR CITIES THAT BLOOM

ECOVEGETAL VILLAROC heavy-duty slabs are designed to create parking spaces, alleys, sidewalks and pedestrian walkways, bike paths and parking areas for cars or commercial vehicles. Their elegant and very graphic design can be used for large surfaces. They ensure proper infiltration of rainwater into the ground and good pedestrian comfort.

The ECOVEGETAL VILLAROC system can be mineral for a more urban look or green for cooler cities in summer. It increases evaporation (mineral) and evapotranspiration (green) capacity and directly replenishes the water table.

BENEFITS OF THE SYSTEM

- OPENWORK SLABS OVER 28% OF THE SURFACE
- HIGH RAINWATER INFILTRATION
- AVAILABLE IN TWO COLOURS FOR PLANT OR MINERAL FILLING
- DRIVEABLE SLOPES UP TO 20% AND 100% ON EMBANKMENTS



NORTHERN AND SOUTHERN MOSS GREEN SLABS

The selected species, resistant to heavy-duty use of the car park, come from arid environments and create a truly independent ecosystem that does not require maintenance



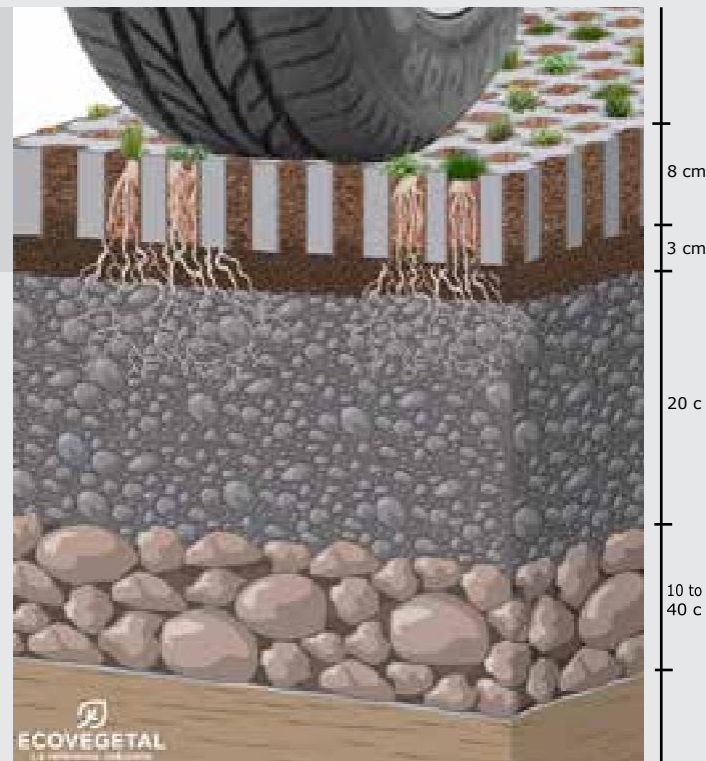
VILLAROC SLAB

Dimensions: 33 x 33 cm.
Heights: 8 cm
Available colours: grey and anthracite.



FERTIL ROC BEDDING & FILLING SUBSTRATE

A fertile, water-retaining bedding layer for planting, consisting of a mixture of crushed terracotta, pozzolan and green waste compost. Grain size 0/4.



Cross-section



VILLAROC SLAB

Dimensions: 33 x 33 cm.
Heights: 8 cm
Available colours: grey and anthracite.



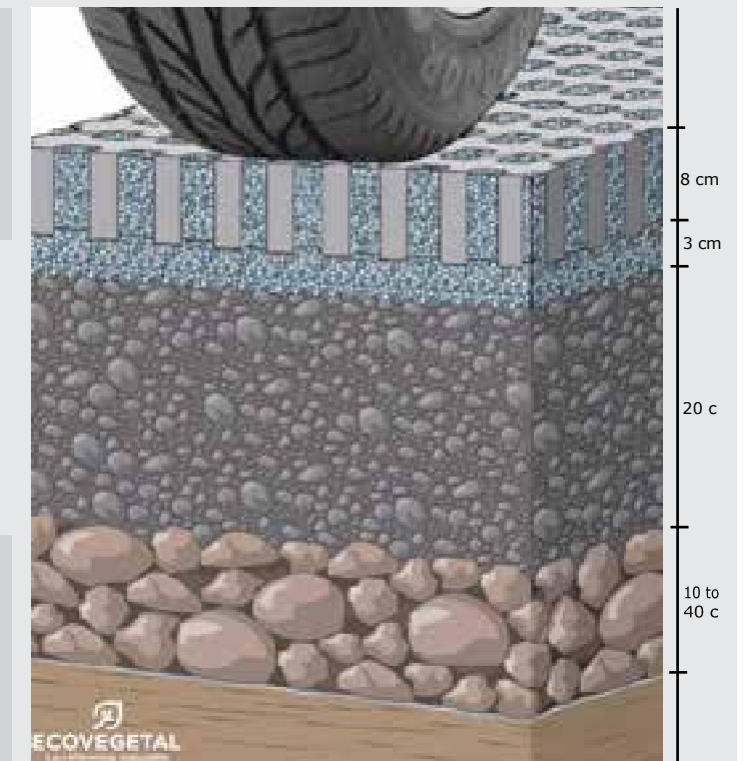
7 MM ECOPAVER SPACERS

For separating parking spaces.
Dimensions: 20 x 20 cm. Height: 80. colour: grey or anthracite.



CRUSHED GRAVEL 4/6 OR 6/10

Pea gravel, porphyry, pozzolan, quartz, flint, etc. Grain size < 10 mm.
Different colours available depending on the region.



Cross-section



FEATURES AND BENEFITS



heavy-duty use



surface runoff coefficient zero



steep slope ramp



recycled and recyclable



made in France

THE GREEN CONCRETE SOLUTION

High-strength ECOVEGETAL ROC slabs are designed to create traffic lanes or parking spaces. Different slab thicknesses are available: 80, 100 or 120 mm.

The substrate, made of recycled terracotta crushed clay, is specifically adapted. It encourages progressive growth of low-growing vegetation that is adapted to concrete slabs. The vegetation cover changes with the seasons. The overall appearance is homogenous, depending on the use of the car park and the interaction of with local plants.

BENEFITS OF THE SYSTEM

- DELIMITING SPACES USING ROC STUDS
- OPENWORK SLABS OVER 42% OF THE SURFACE FOR PLANTING AND RAINWATER INFILTRATION
- AVAILABLE IN TWO COLOURS FOR PLANT OR MINERAL FILLING



NORTHERN AND SOUTHERN MOSS GREEN SLABS

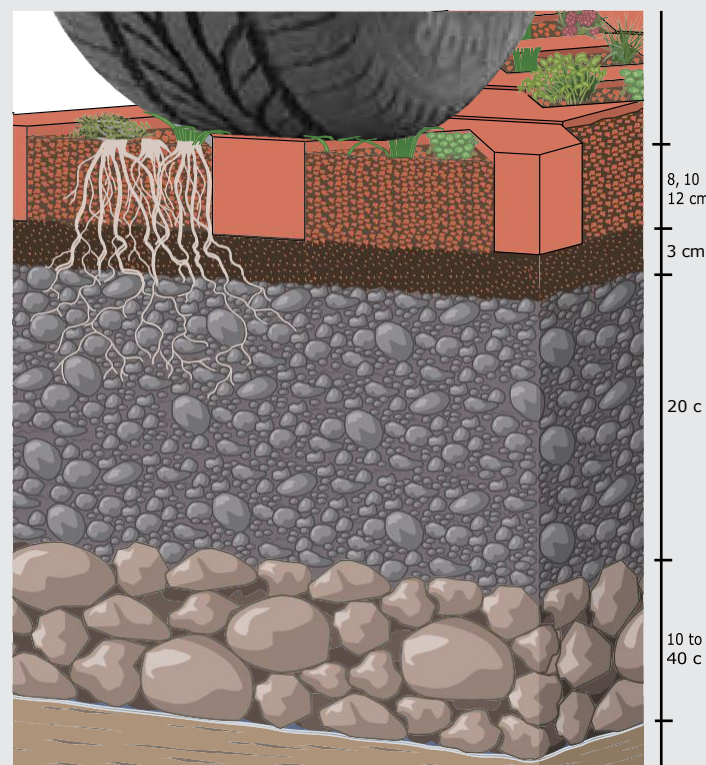
The selected species, resistant to heavy-duty use of the car park, come from arid environments and create a truly independent ecosystem that does not require maintenance.



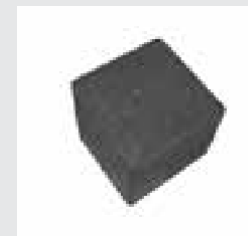
ECOVEGETAL ROC SLAB
 Dimensions: 600 x 400 mm.
 Heights: 80, 100, 120 mm
 Available colours: grey and anthracite.



FERTIL ROC BEDDING SUBSTRATE
 A fertile, water-retaining bedding layer for planting, consisting of a mixture of crushed terracotta, pozzolan and green waste compost. Grain size 0/4.



Cross-section



ROC STUDS

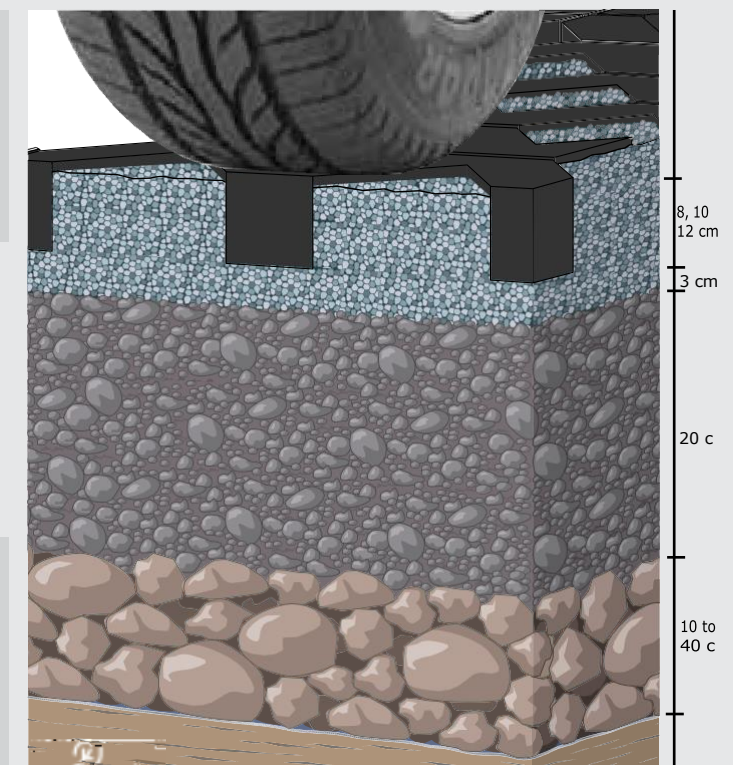
For separating parking spaces.
 Dimensions: 83 x 83 mm.
 Height: 80 or 100 mm.
 Available colours: grey, ivory and anthracite.



ECOVEGETAL ROC SLAB
 Dimensions: 600 x 400 mm.
 Heights: 80, 100, 120 mm
 Available colours: grey and anthracite.



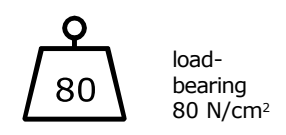
CRUSHED GRAVEL 4/6 OR 6/10
 Pea gravel, porphyry, pozzolan, quartz, flint, etc. Grain size < 10 mm.
 Different colours available depending on the region.



Cross-section



FEATURES AND BENEFITS



THE SOLUTION FOR CONSOLIDATING AND INDICATING

The ERP regulations for emergency vehicle lanes specify the dimensions and load and puncture resistance requirements for fire lanes:

- Load-bearing capacity calculated for a 160 kN vehicle with a maximum of 90 kN/axle, with the axles at least 3.60 metres apart.
 - Puncture resistance: 80 N/cm² on a minimum surface area of 0.20 m² (Decree of 10 October 2005).
- ECORASTER E50 slabs perform far beyond what is required for fire lanes and ladder access lanes according to the ERP fire safety regulations.
- Load-bearing capacity ECORASTER E50 up to 3432 kN/m² with a maximum of 200 kN/axle and puncture resistance ECORASTER E50 183 N/cm².



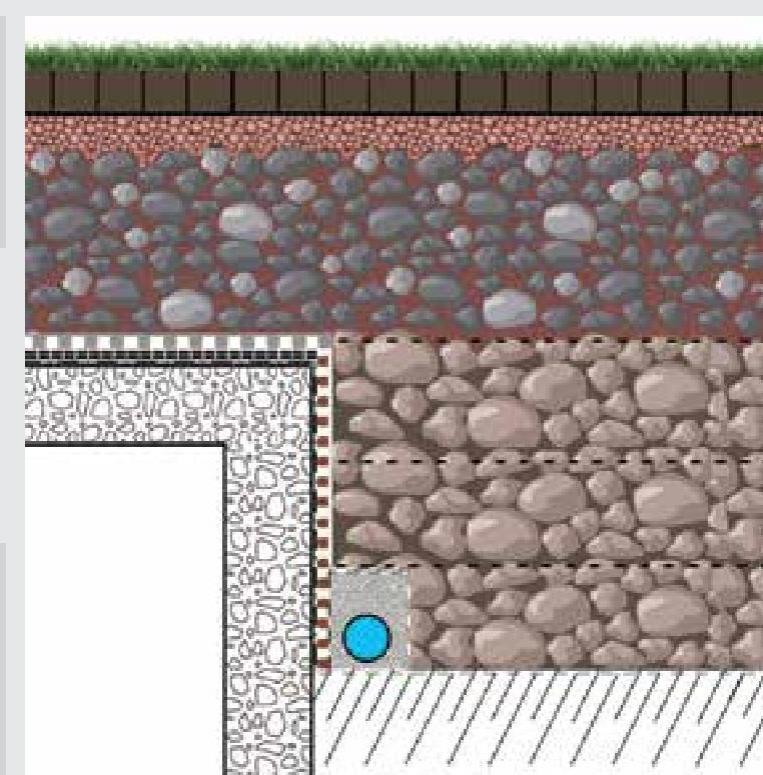
ECOVEGETAL GREEN
 Solution for grass fire lanes. System approved by an independent body for fire use in ladder lanes access according to test 019988 (80 N/cm²).



SOIL-STONE MIX
 Mixture of coarse crushed gravel 30/60 and HYDROFERTIL. Fertile, draining and load-bearing mixture.



SOIL-STONE MIX
 Mixture of coarse crushed gravel 30/60 and HYDROFERTIL. Fertile, draining and load-bearing mixture.



Grass fire lane on an in-ground slab



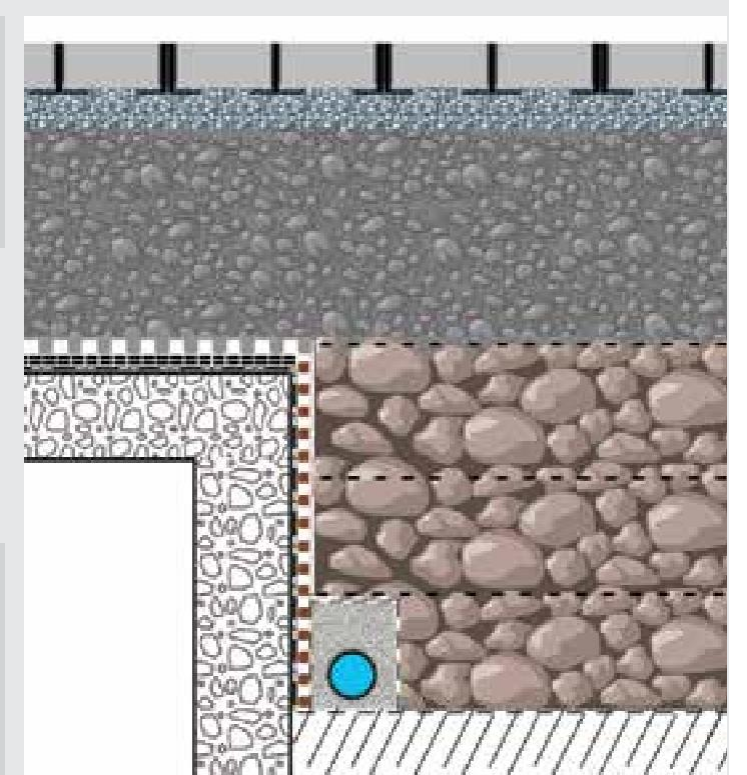
ECOVEGETAL VILLAROC
 Solution for concrete fire lanes. System approved by an independent body for use in fire lanes with ladder access according to trial 022275 (80 N/cm²).



ECOVEGETAL PAVERS
 Solution for concrete fire lanes. System approved by an independent body for use in fire lanes with ladder access according to trial 019989 (80 N/cm²).



ECOVEGETAL VILLAROC
 Solution for concrete fire lanes. System approved by an independent body for use in fire lanes with ladder access according to trial 022275 (80 N/cm²).



Concrete fire lane on an in-ground slab

EMBANKMENTS WITH ECOGREEN



THE SOLUTION FOR GREEN EMBANKMENTS

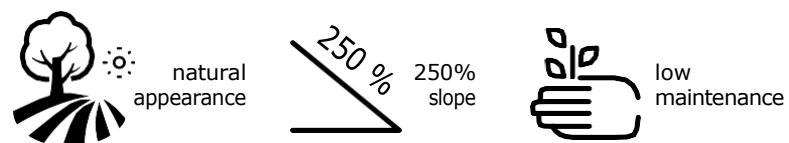
In landscaping, reliable stabilisation is essential for reinforcing embankments. When the only option is to create a concrete or sealed embankment, vegetation can only grow with an appropriate technique.

ECOGREEN* geogrids make it possible to re-vegetate embankments rendered infertile and unstable by concrete. Appropriate vegetation can be planted using the large hollow core structure, giving the edges a natural look and allowing biodiversity to develop.

Two options:

- Embedded in concrete
- Supported by a concrete sill at the bottom of the slope

FEATURES AND BENEFITS



EMBANKMENTS WITH ECORASTER



PROTECTION AGAINST SOIL EROSION AND DEGRADATION

Slope and embankment erosion is a multifactorial process, often the result of natural phenomena combined with human action.

This soil degradation can have serious consequences: irreparable loss of arable land, mudflows, pollution of surface waters and declining biodiversity.

In order to prevent these negative effects, erosion prevention and verification measures should be put in place as soon as possible to prevent sediment from being washed away by rainwater.

ECOVEGETAL has developed a simple, innovative and eco-friendly solution using ECORASTER geogrids.

FEATURES AND BENEFITS



PRE-GROWN MAT
Ideal vegetation for planting embankments.
Quick recovery of landscaped areas.



SAXALIS 1.1 FP SUBSTRATE
Enriched mineral substrate made of mineral aggregates enriched with organic matter and fine particles for better water retention. Specifically designed for sloping vegetation.



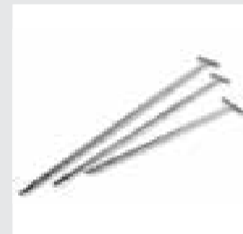
ECOGREEN*
High load-bearing and shear resistance.
Easy to assemble. Useable during construction.
Recycled and recyclable.



* Formerly GEORASTER



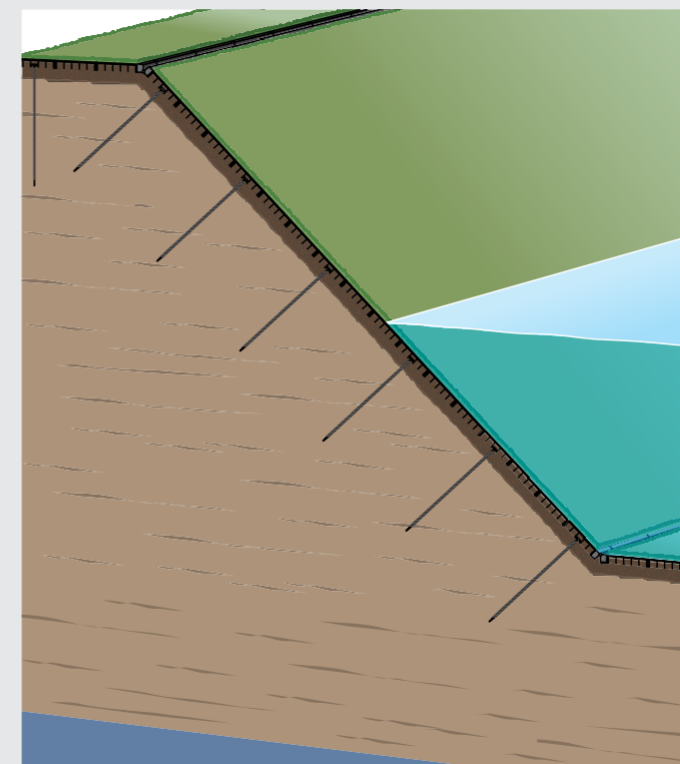
VARIABLE ANGLE
Used to form variable angles when stabilising embankments or earth mound barriers.
Height: 4 or 5 cm.



STEEL ANCHOR PLUG
Installed in the notches of the central core of the A50 slab.
Provides flexibility so the geogrid can follow the contours of the ground. Disappears once the slabs are filled.



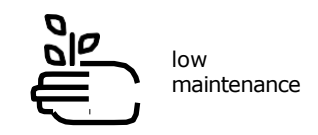
ECORASTER E50 GREEN
Hollow core slab ideal for creating embankments.



Cross-section



FEATURES AND BENEFITS



SOLUTIONS FOR THE CITY OF TOMORROW

Bringing nature back into cities is one of the solutions for adapting to the effects of climate change.

Urbanisation in France is causing sealing of surfaces and soils, rainwater overflow, heat island effects and loss of biodiversity.

ECOVEGETAL offers a range of solutions to prevent sealing of soils in towns and cities for public squares, sidewalks, pedestrian walkways, etc.

BENEFITS OF THE SYSTEM

- INFILTRATION OF RUNOFF FROM IMPERMEABLE SURFACES
- CREATIVE LAYOUT
- ZERO IMPACT ON THE ENVIRONMENT
- LOW MAINTENANCE



PESTICIDE-FREE

Since 1 January 2017, the use of chemical pesticides has been prohibited in all public spaces (towns, departments, regions, nationally) in order to protect biodiversity and public health.

The aim is to protect water quality, regenerate soil, encourage pollination of plants and improve air quality.

ECOVEGETAL supports local governments in their efforts to adopt new practices in implementation of the law.

The ECOVEGETAL MOSS system is particularly well adapted for cemeteries: low soil maintenance, landscape integration, rainwater infiltration.

The selected low-growth plant species come from arid environments and are resistant to heavy-duty use of pathways.



ECOVEGETAL MOSS

ECOVEGETAL MOSS is a system with ECORASTER E50 hollow core slabs that are pre-grown or seeded on-site. The seeds encourage gradual cultivation of extensive, low-growing and hardy vegetation.

ECOVEGETAL PAVERS

ECOVEGETAL PAVERS is the perfect combination of an ECORASTER BLOXX slab and a concrete paving stone filling. The drains make the surface completely permeable. Highly resistant, they can be used by pedestrians, cars and emergency vehicles. Lightweight and easy to install. Paving stone colours: grey, anthracite, red, ivory, blue, green and pink.

ECOVEGETAL VILLAROC





The VILLAROC SLAB can be planted or filled with gravel for a mineral filling. Pedestrian comfort. Alleys, footpaths. Height 80 mm. Colours: grey or anthracite.

SEDUM MAT

Pre-grown biodegradable mat with appropriate species of sedum. Immediate revegetation of pathways between graves. Mats are installed edge to edge.



FEATURES AND BENEFITS

-  pedestrian accessible
-  driveable for cars
-  driveable for trucks
-  rainwater infiltration

FOR A LARGER PERMEABLE SURFACE
 In order to comply with the most recent regulations on soil permeability, it is customary to stabilise parking spaces and parking areas.

To increase the permeable surface, it is also possible to stabilise the access roads. ECOVEGETAL solutions completely infiltrate rainwater, making it possible to eliminate the rainwater network, greatly limit the leakage rate at the plot level and disperse pollutants for better biodegradation.

- BENEFITS OF THE SYSTEM**
- SURFACE RUNOFF COEFFICIENT ZERO
 - LARGE DRAINAGE AREA
 - HEAVY-DUTY USE ROAD
 - LOAD-BEARING, STABLE SURFACE



SHOPPING CENTRE CASE STUDY

Shopping centre car parks are a strategic issue for businesses. Use varies depending on the day and time of the week. Vehicle rotation is very high.

The car park access roads are very busy, be it with trucks and vans making deliveries, visitors' cars or the pedestrians themselves with shopping carts. A strong, durable and maintenance-free covering is therefore necessary.

ECOVEGETAL systems are compliant with the ALUR law on soil permeability. The ECOVEGETAL PAVERS system with mortise and tenon fastening provides excellent durability for car parks and permeable concrete access roads.



ECOVEGETAL PAVERS

ECOVEGETAL PAVERS is the perfect combination of an ECORASTER BLOXX slab and a concrete paving stone filling. The drains make the surface completely permeable. Highly resistant, they can be used by pedestrians, cars, trucks and emergency vehicles. Lightweight and easy to install. Paving stone colours: grey, anthracite, red, ivory, blue, green and pink.



ECOVEGETAL VILLAROC

VILLAROC SLABS can be seeded for a green look or filled with gravel for a mineral filling. Highly resistant, they can be used by pedestrians, cars, trucks and emergency vehicles. Heights: 80 mm. Colours: grey or anthracite.



ECOVEGETAL ROC
 ROC SLAB 100, 120

The VILLAROC SLAB can be filled with gravel or ROC PLOTS for a mineral filling. Heights: 100 or 120 mm. Colours: grey.



CURVED SECTION

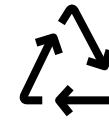
Curved sections are used to form curves in soil stabilisation. Specially developed for the ECORASTER system.



FEATURES AND BENEFITS



20-year warranty



recycled and recyclable



patented



quick installation



UV resistant

A SAFE, FLEXIBLE AND EASY TO USE BASE

The hollow core slab is an innovation imported from Germany, where it was developed in the early 1990s.

Made of recycled and recyclable LDPE material, which is environmentally friendly, the tiles interlock to form a completely resistant, flat and flexible surface.

The cell structures of the slab are delivered empty, but can be filled with many types of substrates to create mineral or green surfaces. Load-bearing capacity from 150 to 350 t/m² empty and up to 800 t/m² filled.

THE BENEFITS OF SLABS

- INSTALLATION WITHOUT EXPANSION JOINTS
- ALSO AVAILABLE IN GREEN AND BROWN
- MORTISE AND TENON FASTENING
- ENVIRONMENTALLY FRIENDLY

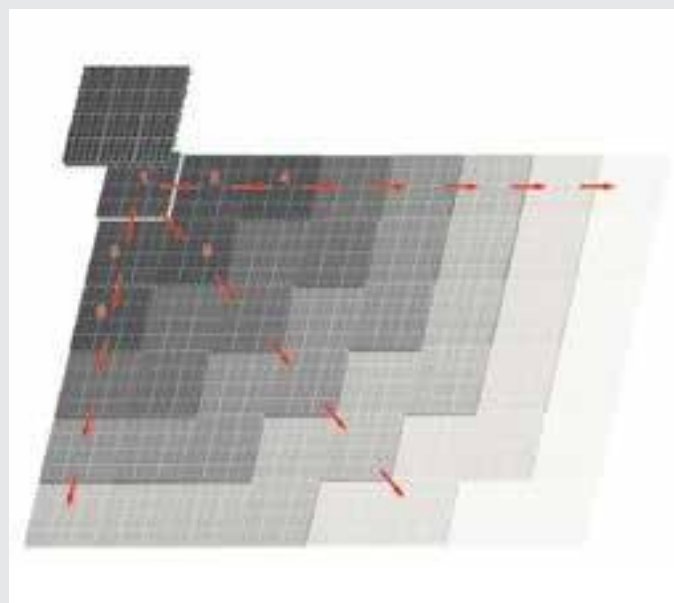


HOW TO INSTALL ECORASTER SLABS

Place the ECORASTER slabs over the entire surface to be stabilised.

Start with a corner and point the tenons (which protrude from the slabs) in both directions of the installation. This makes it very easy to install the next slabs using the same principle, pressing the tenons with the foot.

Lay the slabs diagonally in order to avoid shifting them during assembly, especially if there is a large area to cover.



Diagonal slab installation
Average installation efficiency: 800 m² / day (excluding cutting) with 5 to 6 people

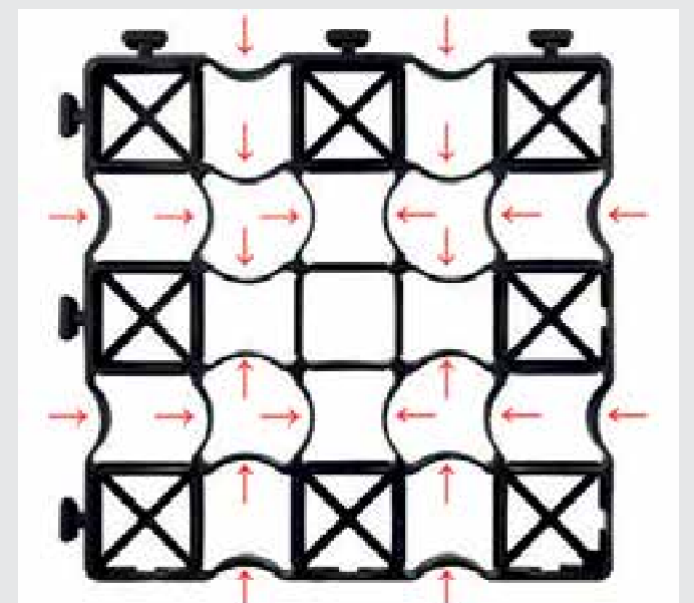
ECORASTER COMPATIBLE WITH HOT CLIMATES

ECORASTER slabs are very well structured. They do not dilate in heat.

Lateral deformation is prevented by cross-bracing the edge of the slab.

The soft, curved walls of the slab absorb expansion and prevent the slabs from lifting (red arrows).

ECORASTER slabs can therefore be installed without expansion joints.



OVERALL SYSTEM COMPARISON

SYSTEMS	GREEN LOOK			MINERAL AND CONCRETE LOOK			
	ECOVEGETAL GREEN	ECOVEGETAL MOSS	ECOVEGETAL COMPOSITE	ECOVEGETAL MINERAL	ECOVEGETAL PAVERS	ECOVEGETAL VILLAROC	ECOVEGETAL ROC
	zone 1 and 2 (zone 3 GREEN MERIDIO)	zone 1, 2 and 3	zone 1, 2 and 3	zone 1, 2 and 3	zone 1, 2 and 3	zone 1, 2 and 3	zone 1, 2 and 3
SURFACE RUNOFF COEFFICIENT	0	0	0	0	0	0	0
SYSTEM RUNOFF COEFFICIENT*	WITHOUT WATER STORAGE / IDF 10-YEAR / 38 mm IN 6H 0 to 0.35 WITH WATER STORAGE OF 70 mm / SOUTH 10-YEAR / 160 mm IN 6H 0 to 0.40	0.20 to 0.60 0.10 to 0.50	0.30 to 0.70 0.20 to 0.50	0.40 to 0.80 0.30 to 0.60	0.60 to 0.80 0.40 to 0.70	0.60 to 0.80 0.40 to 0.70	0.60 to 0.80 0.40 to 0.70
MINIMUM RAINFALL REMOVAL**	80%	60%	60%	30%	30%	30%	30%
MAINTENANCE							
INTENSITY OF USE							
WATER REQUIREMENT							
FERTILISATION							
FIRE LANE							
ACCESSIBILITY							
COST OF SYSTEM WITH FOUNDATION***	€70-110	€70-85	€90-105	€60-65	€85-100	€110-130	€90-120
Find this system on page....	page 10	page 8	page 18	page 14	page 16	page 24	page 26

* For base permeability of 10⁻⁶ m/s and a subbase thickness of 20 cm.

** Île-de-France over a period of 3 months.

***Estimated cost for a complete system (with foundation and subbase), excluding excavation and disposal (estimated at €20/m³) and special configurations