GARDEN PRODUCTS
Geocells

guttacell®

Geocell in HDPE **used for soil stabilization, erosion control and retaining walls**

Using **guttacell®** significantly reduces the quantity of aggregates needed to stabilize load-bearing soil. The aggregates are contained in the walls of the cell in order to prevent them from moving laterally due to the weight applied to the system. The multi-purpose use of **guttacell®** leads to significant cost savings thanks its easy preparation, installation and maintenance.

ADVANTAGES

- It can be filled with non-cohesive, or aggregate, taken from the site.
- Resistant to corrosion and UV rays.
- Can be used for excavation and filling in jobs.
- It encourages the growth of deep roots and vegetation in the cells above the ground.
- Fast and easy installation thanks to a minimal preparation of the foundation.
- Flexible panels conform to irregular soil surfaces.
- It slows down water flow, encouraging proper drainage.

guttacell®

Technical data

	CELL 20	CELL 30
Polymer density	0,935 - 0,965 g/cm³	
Resistant to cracks caused by atmospheric agents	>400 hours	
Thickness	1,27 mm ±5%	
Cell height	10 - 15 cm	
Pieces per pallet	50 pieces (h10) - 30 pieces (h15)	
Dimensions of extended cells (width x length)	259 x 224 mm	320 x 287 mm
Area of extended cell	289 cm²	460 cm²
Dimensions of extended grid (width x length)	2,56 x 6,52 m	2,56 x 8,35 m
Grid area	16,7 m²	21,4 m²

SOIL STABILIZATION

guttacell® takes the two-dimensional confinement concept (length and width) and expands it to a third dimension (depth). This horizontal and vertical confinement of the entire depth of the basic layer represents a quality leap in stabilization technology that has important implications on the cost-effectiveness and long-term yield of a project. **The purpose of the layer(s) of basic material is to distribute the applied loads over a larger surface, thus reducing the pressure (load divided by the surface area) placed on the foundations. Since the cell walls oppose any lateral movements, a cheaper and lower quality material can be used as fill.** The system will significantly improve drainage, resulting in longer-lasting roads or car park surfaces.

ADVANTAGES

*An additional benefit of using **guttacell®** to stabilize the soil is the effectiveness of the geocell in distributing the applied loads over a larger surface area. Since each cell is connected to the one next to it inside a grid, each **guttacell®** cell works like a mat. **guttacell®** significantly reduced the pressure exercised on the foundation by the load applied to the surface. The advantage consists in the fact that stabilization can be achieved with less foundation material used in conjunction with **guttacell®**.*

INSTALLATION INSTRUCTIONS

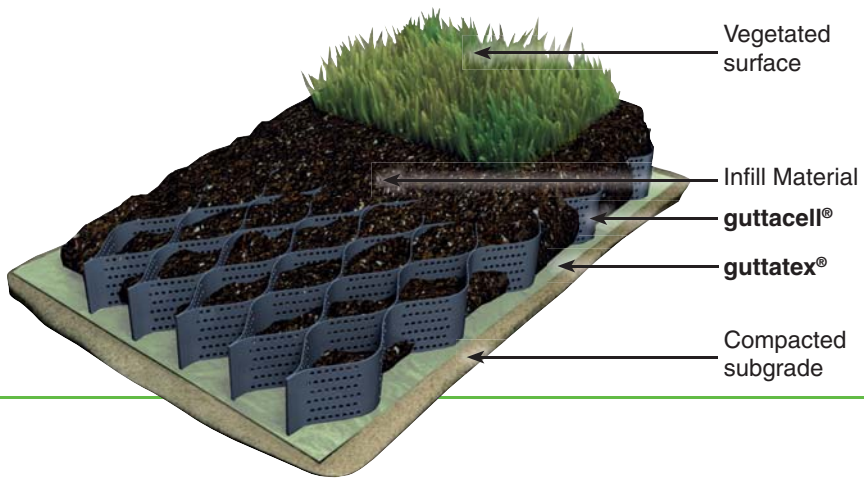
guttacell® can be installed easily and quickly. The grids are shipped to the worksite in compressed form, with dimensions of 30.48 cm x 12.7 cm x cell height.

- If necessary, dig and shape the foundation according to the sizes, degrees and dimensions specified in the drawings.
- If the filling material is different from the foundation material underneath, use a geo-textile to separate the two layers. **guttatex®** type non-woven fabric is chosen, depending on the importance of resistance or permeability. Unroll **guttatex®** directly over the foundation, overlapping the panels by at least 50 cm.
- Decide where to position the first **guttacell®** grid, and drive in small stakes where the four corners of the expanded grid should be.
- Stretch one grid beyond the desired length and then let it go. Position the section over the stakes. To obtain the complete extension of each cell, other stakes may be necessary along the perimeter.
- Fix the **guttacell®** sections to one another using staples or as specified in the construction drawings.
- Install the adjacent grids in the same way, making sure they fit together to obtain a continuous covering.
- Fill in the first lines of the cells using a front loader or dump truck, then push the filling material in the cells using shovels or a bulldozer.
- Continue until the cells are totally filled in.

DO NOT ALLOW VEHICLES TO DRIVE OVER CELLS THAT HAVE YET TO BE FILLED IN.

- Always overfill the cells at least 5 cm, so that the material can settle.
- Lastly, the **guttacell®** needs to be compacted.

Once the cells have been filled in and the system has been compacted, the **guttacell®** foundation is ready to withstand heavy traffic loads.



SLOPE EROSION CONTROL

The **guttacell®** cellular confinement systems offer a solution to a wide range of complex situations, such as riverbeds and slopes subject to erosion with either constant or intermittent flows. Vegetated **guttacell®** offers good performance in low to moderate flow applications.
For greater flows, **guttacell®** can be filled with angular rock or concrete.

SUITABLE CELL DEPTH & APERTURE
For Slope Erosion Control applications, Cell depth and Aperture are determined by:
- **Fill material weight and dimensions**
- **Gradient of the slope**
- **External environmental factors**
- **Economic**

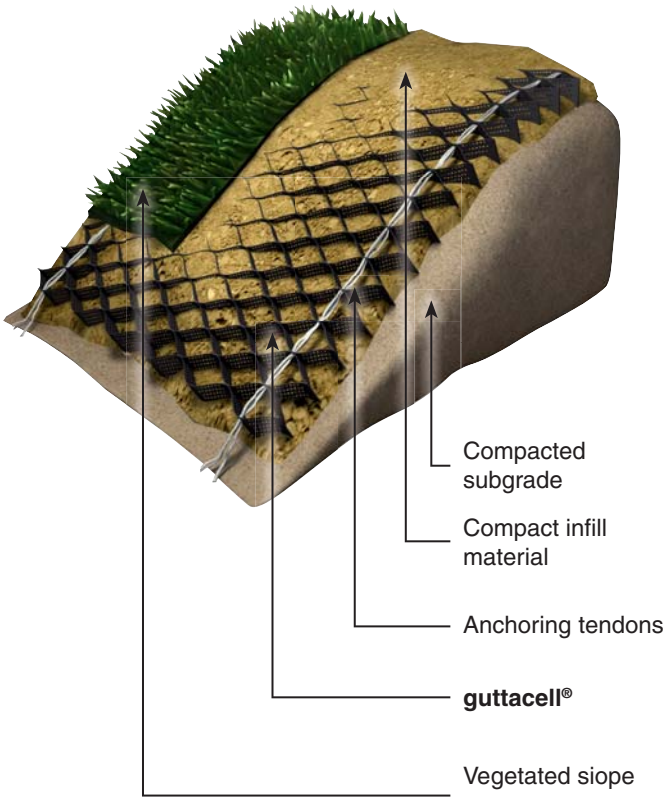
It is very important to suitably anchor **guttacell®** to the slope for best product performances.

INSTALLATION INSTRUCTIONS
- Prepare the surface by completely removing the, debris and unusable soil from the area where the **guttacell®** cellular confinement system will be positioned. Comply with project specifications for replacing all types of soil.
- If the use of a geo-textile is required, such as **guttatex®**, the installation must be carried out in compliance with the instructions provided with the product.
- Partially install the stakes or the J-hooks, letting them stick out for a height equal to the depth cell plus an additional 50 cm or so, positioning them along the top edge of the area on which the **guttacell®** must be installed (or in the anchoring trench).

As a general rule, the length of the J-hooks should be three times the depth of the cell.

ANCHORING REQUIREMENTS DEPEND ON THE DEPTH OF THE FLOW PEAK, ON VARIOUS FACTORS SUCH AS GRADIENT OF SLOPE, LENGTH OF SLOPE, UNIT FILL WEIGHT, AND OTHERS. DESIGN ENGINEERS SHOULD DETERMINE THE PROPER ANCHORING SYSTEM BASED UPON SPECIFIC SITE INFORMATION.

- Stretch one grid beyond the desired length and then let it go.
- Position the last **guttacell®** grids on top of the stakes previously laid, and complete the installation of the stakes or of the “J-hook until they are flush with or slightly below the cell walls.
- Fix the **guttacell®** sections to one another using staples or as specified in the construction drawings.
- Line up the adjacent **guttacell®** grids so that they are at the same level and flush one with the other.
- Once **guttacell®** is positioned correctly, fill in the grid using the material listed in the specifications.
- Limit the fill material drop height to 1 m at the most in order to prevent any damage to the system.
- Lastly, compact the fill material (sand, aggregate, concrete, or vegetated soil) using a shovel or level them out by hand.



guttacell®

RETAINING WALLS

The growing scarcity of land that is affordable and easy to build upon is causing engineers, contractors, and developers to find innovative ways to use less desirable parcels of land. Areas with rough terrain and/or steep slopes were once considered as being unusable for development. Much of these areas can be made virtually flat, and thereby usable, through the employment of structures such as retaining walls and steepened slopes made with **guttacell®**.

INSTALLATION INSTRUCTIONS

BEFORE YOU START

- Make sure that local conditions and the **guttacell®** system project for soil containment match the specifications on the construction drawings.

PREPARING THE AREA AND THE FOUNDATION

- Remove any debris and vegetation in order to prepare the area on which to install the **guttacell®** system for soil containment.
- Complete the initial earth movement, excavation or filling in jobs as specified in the project.
- Remove soil from the site that is not suited to installation of the **guttacell®** system and replace it with suitable material.
- Prepare the foundation soil as specified before you position the base material.

MAKE SURE THAT SYSTEM INSTALLATION AND PROTECTION OF EXCAVATION DRAINAGE ARE CARRIED OUT ACCORDING TO PRODUCT SPECIFICATIONS.

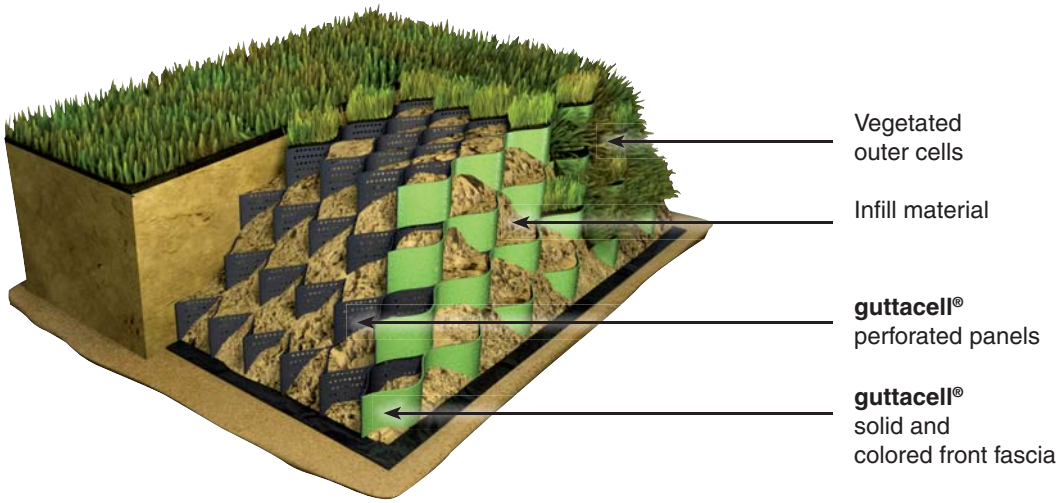
- Install the specified underground drainage piping in the position and height specified in the project drawings, making sure a 2% gradient is maintained for all free outlets.
- Makes sure that all piping connections are secure and that they are connected to discharge pipes or to a pre-existing and fully operational underground drainage system.
- If specified, position the piping underground with bedding material wrapped in geo-textile (i.e. sand, fine gravel, pebbles, etc.).
- Make sure the discharge pipes to the outlets do not cause localized erosion that may affect the stability of the **guttacell®** wall.
- If specified, place a suitable geotextile on the base and on the excavation front located behind the **guttacell®** wall.
- If specified, install suitable drainage composite material.
  Make sure the system works properly and that it is connected to a suitable underground drainage or discharge system.

INSTALLING THE **guttacell®** SECTIONS

- Stretch out the **guttacell®** grid in the proper position.
- Keep the grid **guttacell®** stretched out using straight stakes or J-hooks. Alternative solutions are possible.
- Line up the edges of the **guttacell®** wall sections correctly, and make sure that the top surface of the adjacent sections is contiguous.
- Fix the **guttacell®** wall sections one to the other using staples or as specified in the construction drawings.
- Fill in the **guttacell®** wall section with the specified filling material and then level it at about 50 mm above the cell wall.
- Compact and lay the fill material.
- Remove any excess material.

In loose earth areas, extend the material found on site beyond the slope excavation, while in the filling in areas position it as specified in the construction drawings.

Detailed guidelines for the design of retaining walls using guttacell® are available at your local dealer. The final design of any supporting wall must be carried out by a qualified engineer.



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