biomodulo

waste treatment and smells neutralization

• UNIFORM AIR DIFFUSION
• RESISTANT
• MODULAR
Nothing can be created, neither destroyed, but all can change form: this is a natural rule we want to follow in order to minimize the impact our waste have on the environment.

**BIOMODULO VISION**

Not only we transform our ideas into innovative and successful products, but also we study and select the right materials to guarantee high quality and respect of the environment. Polypropylene (PP) is a recyclable material that can be obtained also from the regeneration of plastic waste. Strong and solid, it can easily resist to high breaking loads and abrasions, it guarantees a very effective thermal insulation and resistance to the atmospheric agents.

**RECYCLING: OUR CHOICE**


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BIOMODULO
THE SOLUTION

BIOMODULO is a disposable formwork, created with 100% regenerated PP, that allows the easy realization of perforated and self-supporting floorings for air diffusion in bio-stabilization systems or within the filtration material to remove the unpleasant odours. BIOMODULO, patented by Geoplast, is provided with 4 nozzles with formwork which are available with 2 different heights, depending on the slab’s thickness. The nozzles are then closed with caps during the pouring stage. They were designed with an ideal diameter to guarantee a uniform air diffusion all over the flooring, on the basis of the payloads that are generally used in this type of installations. The concrete flooring made with BIOMODULO, resists to the continuous transit of heavy vehicles that can generally be found in the installations for the aerobic treatment of solid wastes.

INSTALLATIONS FOR AEROBIC TREATMENT OF SOLID WASTES

BIO-FILTERS
The lightness and the use of compensation accessories guarantee a quick implementation of the system.

Disposable formwork for the creation of perforated and self-supporting floorings for bio-filters and systems for the aerobic treatment of solid wastes.

**BIOMODULO**

**Advantages**

- **easy**
  - **BIOMODULO** is very easy and intuitive to install, differently from the other traditional systems.

- **quick**
  - The lightness and the use of compensation accessories guarantee a quick implementation of the system.

- **ventilation**
  - Thanks to the holes and to the nozzles conformation, a uniform distribution of the air all over the surface, is possible.

- **resistant**
  - **BIOMODULO** flooring guarantees the transit of heavy vehicles for loading and unloading operations.

- **inspectable**
  - Thanks to **BIOMODULO** structure, inspection and system maintenance are facilitated.

- **effective**
  - Thanks to an optimized efficiency of the process, the quality of the material is better than the other systems with the same characteristics.

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BIOMODULO TECHNICAL DATA

BIOMODULO H6

- Real size (cm): 50 x 50 x 33
- Nozzles height (cm): 6
- Free span height (cm): 21
- Free span length (cm): 34
- Pipe max. ø (1) (mm): 200
- 2 pipes max. ø (2) (mm): 160
- Material: PP
- Level filling concr. (m³/m²): 0,10
- Weight (kg): 1,65
- Packaging Size (cm): 103 x 103 x 245
- No. pcs. per pallet: 300
- M² per pallet: 75
- Nozzles base ø (mm): 45
- Air outlet holes ø (mm): 16,5

BIOMODULO H10

- Real size (cm): 50 x 50 x 37
- Nozzles height (cm): 10
- Free span height (cm): 21
- Free span length (cm): 34
- Pipe max. ø (1) (mm): 200
- 2 pipes max. ø (2) (mm): 160
- Material: PP
- Level filling concr. (m³/m²): 0,14
- Weight (kg): 1,65
- Packaging Size (cm): 103 x 103 x 255
- No. pcs. per pallet: 300
- M² per pallet: 75
- Nozzles base ø (mm): 45
- Air outlet holes ø (mm): 16,5

LOAD WITH HEAVY VEHICLES

- Distributed overload (kg/m²): 15.000
- Concentrated overload. 40x40 cm (kg): 10.000
- Hood thickness (cm): 25
- Weak concrete thickness (cm): 0,49
- Weak concrete pressure (kg/cm²): 6,88
- Gravel thickness (cm): 5,66
- Ground pressure (kg/cm²): 1,18
- Type of mesh: ø 6-8/20x20
- ø 10/20x20

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**BIOMODULO**

**SPECIFIC AND ACCESSORIES**

1. **NOZZLE**: truncated cone shaped, allows the air outlet speed to be optimal, in order to avoid clogging issues which are linked to the presence of leachate in the waste.

2. **GEOBLOCK**: is an adjustable extension which compensates the distance between the crawl space and the wall and avoids BIOMODULO cutting.

3. **FERMAGETTO**: is a side compensation element, which is placed near the side walls to close the crawl space. It avoids the concrete penetration during the pour.

4. **CAPS**: are required to close the nozzles during the pouring stage and to avoid the concrete penetration into the crawl space. Once the slab is created, they are removed in order to obtain the holes from where the air is going to escape.

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**INSTALLATION**

BIOMODULO installation should be performed from right to left and from bottom to top, following the scheme on the side. The product is provided with direction arrows which should face the top, in order to follow the right installation.

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**BIOMODULO | PLACE ON-SITE**

**1. SUBFLOOR CREATION**
Creation of the supporting subfloor. A layer of rolling gravel (25cm), weak concrete (10cm) and a insulating layer made of HDPE (required in the composting system), are recommended.

**2. BIOMODULO INSTALLATION**
Manual installation of BIOMODULO and of the compensation system Geoblock and Fermagate. Then, creation of the inspection channels with Geoblock.

**3. WELDED MESH INSTALLATION**
Place of the sector welded mesh.

**4. CONCRETE POUR**
Concrete filling pour, strength class Rch' = 250 kg/cm² and consistency class S4. Subsequent pour vibration.

**5. POUR SMOOTHING**
Pour smoothing, in order to create a uniform layer.

**6. CAPS REMOVAL**
Removal of the nozzles closure caps, to allow the inlet air passage.
AEROBIC STABILISATION, also known as composting (if the final product is intended to be used in agronomy), is an organic degradation process of the substances that can be found in the waste. The process is carried out by aerobic and thermophilic micro-organisms. Blowing the air in the pile of waste, the bacterial activity is stimulated. The heat develops, in order to accelerate the degradation process and obtain a biological stable and sanitised final product with a low water content.

THE PROCESS TAKES PLACE IN 2 DIFFERENT STAGES:

ACTIVE FERMENTATION
This process is characterised by an intensive bacterial activity, with a quick degradation of the substances in the waste.

MATURATION
In this process the slowest reactions are developed until the organic substance is stabilised. During both stages, BIOMODULO guarantees a uniform diffusion of the air within the waste, reaching an optimal stabilisation level.

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BIOMODULO can be used in two types of aerobic stabilisation systems, in order to create perforated floorings:

- **BASINS:** areas of the warehouse where the waste is stored in heaps and the ventilation comes both from the flooring and from a periodic mechanic treatment. The aim is to obtain a uniform oxygenation of the waste.

- **BIOCELLS:** closed-tunnel systems where the air comes from the flooring, but the mechanic treatment of the waste is not provided. During the process, the main parameters are checked (humidity, temperature, etc.).
Optimal treatment of organic waste

BIOMODULO allows the creation of a perforated flooring, with a uniform distribution of the holes all over the surface. This facilitates a uniform diffusion of the air within the waste, in order to optimize the process and obtain an high quality final product. BIOMODULO structure has a high resistance to loads, allowing the transit of the machinery for the load and unload of the material or for the waste mechanic treatment.

Uniform air diffusion
Quick and easy installation
High resistance to loads
ENVIRONMENT

ADVANTAGES IN USING GEOBLOCK

1- BIOMODULO
2- GRAVEL
3- GEOBLOCK CUT AT THE EDGES
4- INSPECTION CHANNEL
5- SORTING GRID OR MANHOLE COVER
6- CONCRETE POUR
7- WEAK CONCRETE

COMPENSATION BETWEEN THE CRAWL SPACE AND THE PERIMETRAL WALL
The formwork cut is avoided (no waste of material)
• The system is adapted to the bio-filter and biocell sizes
• The installation times decrease

INSERTION OF THE SUPPLY PIPES
GEOBLOCK has to be cut at the edges in order to facilitate the insertion of the supply pipes into the structure and avoid discontinuities during the pour of the flooring.

CREATION OF INSPECTION CHANNELS
GEOBLOCK is ideal to create inspection channels easily and quickly, to check the air diffusion system. The crawl space stops near the channels, avoiding the concrete penetration during the pouring stage. Moreover, it allows the realization of a support for the grids and the manhole covers that are placed over these structures.

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**BIOFILTRATION** is a biological process to reduce the pollutants that can be found in the waste air. This process exploits the action of the microorganisms (bacteria, yeasts, moulds) to remove the foul-smelling substances. These organisms degrade the foul-smelling substances turning them into odourless compounds (CO₂ and water). The **BIO-FILTER** is a system provided with a perforated flooring, where the air is inserted to be purified and divided into side walls made of metal (steel or aluminium), plastic materials or concrete. The filtration material is then placed over the flooring. It can be of different types (wood chips, plastic elements, peat, etc.). The waste air is sucked from the rooms and inserted in the **BIO-FILTER**.

It passes through the filtration material where it is purified and re-introduced in the environment. The system is valid to purify the air in warehouses or in industrial installations that generate unpleasant odours, like composting systems or food industries.

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**PROCESS DESCRIPTION**

**BIOMODULO | BIO-FILTRATION**

1. WASTE AIR INLET PIPE
2. AIR DISTRIBUTION CHANNEL
3. CONTAINING WALLS
4. FILTRATION MATERIAL
5. BIOMODULO
6. GRAVEL
7. AIR IMMISSION HOLES
8. WEAK CONCRETE
9. CONCRETE SLAB
10. INSPECTION AREA
11. LEACHATE COLLECTION

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Effective elimination of unpleasant odours

**BIOMODULO** allows the creation of the perforated floorings that insert the air in the bio-filter. The system can be used with any type of structure (steel or concrete) and can be adapt to the shape of the tank using Geoblock accessories and Fermagetto. The regular distribution of the holes allows the uniform diffusion of air within the filtration material where the purification takes place, increasing the process efficiency. **BIOMODULO** structure is completely transitable, in order to facilitate the periodic replacement of the filtration material.

**Effective elimination of unpleasant odours**

**Optimal air diffusion**

**Easy to install**

**Resistant to loads**

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