AIR DIFFUSION IN THE COMPOSTING AND DEODORIZATION INSTALLATIONS

biomodulo

waste treatment and smells neutralization

- UNIFORM AIR DIFFUSION
- RESISTANT
- MODULAR

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BIOMODULO VISION

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.

RECYCLING: OUR CHOICE

PP

Not only we transform our ideas into innovative and succesful 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.

5
PP

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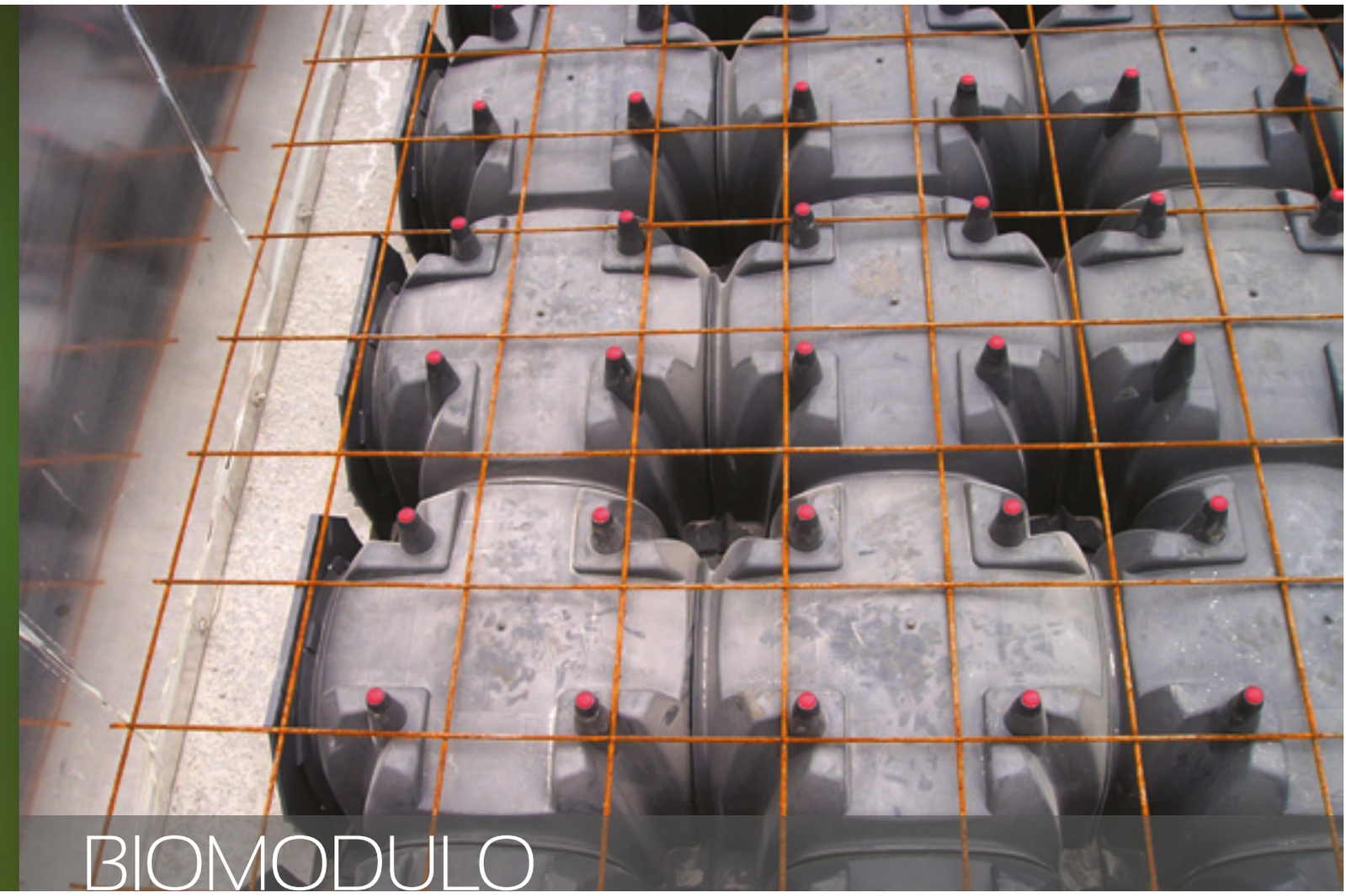
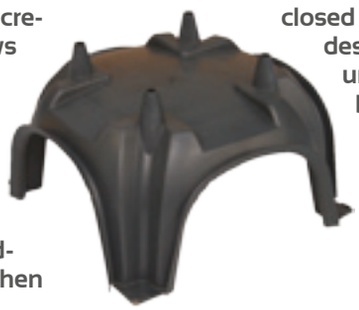
Geoplast S.p.A. in Green Building Council Italy, The Network of Eco-friendly building.

GREEN BUILDING COUNCIL ITALIA



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

BIOMODULO ADVANTAGES

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

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

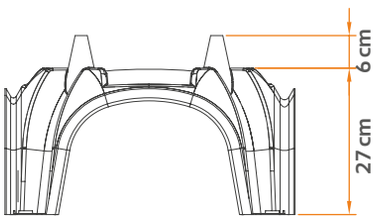
inspectable

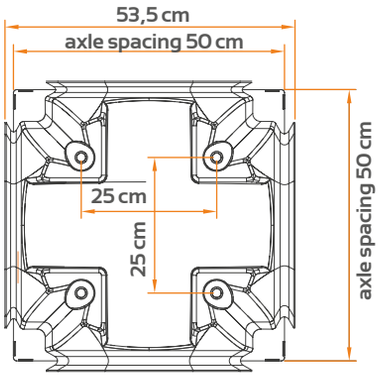
Thanks to **BIOMODULO** structure, inspection and system mantainance are facilitated

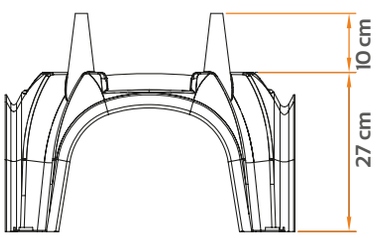
effective

Thanks to an optmized efficiency of the process, the quality of the material is better than the other systems with the same characteristics

BIOMODULO TECHNICAL DATA





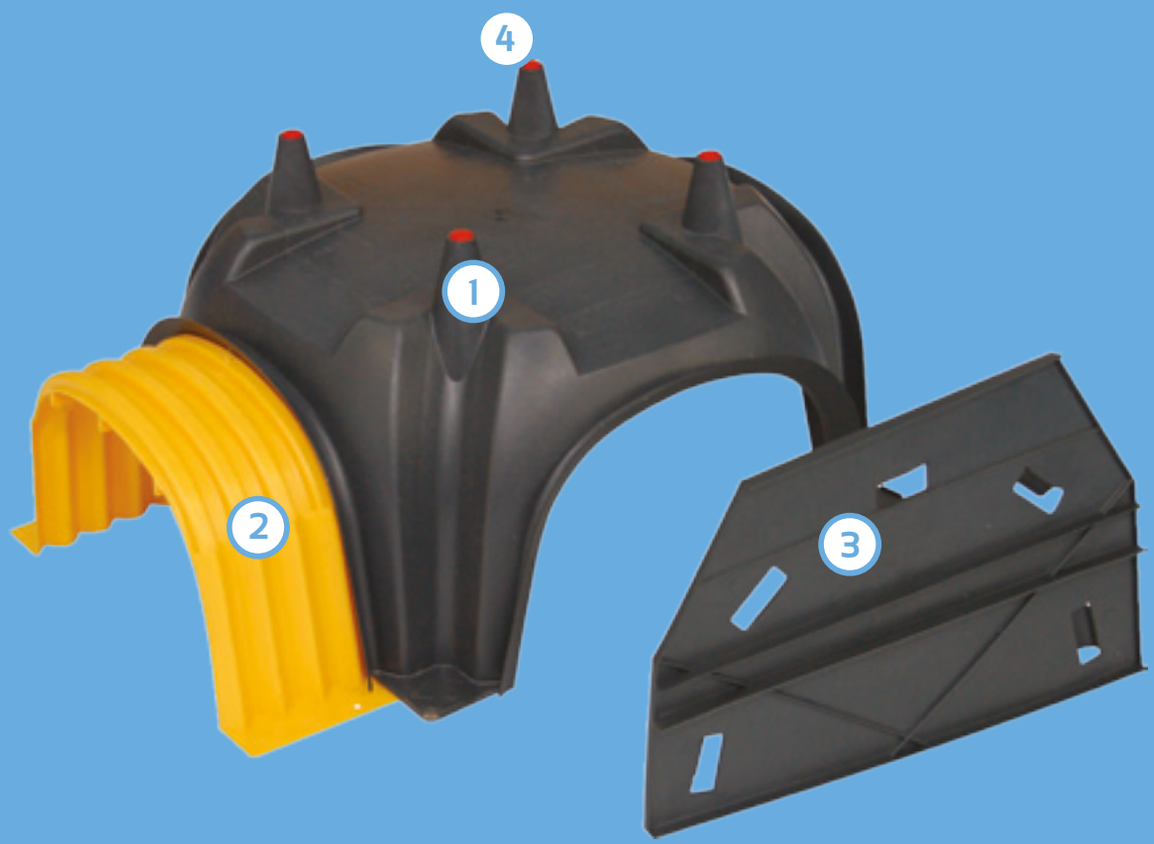


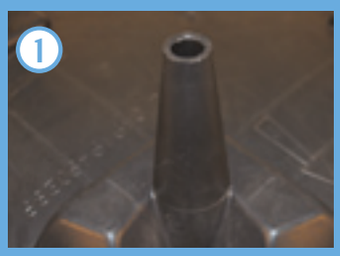
	BIOMODULO H6	BIOMODULO H10
Real size (cm)	50 x 50 x 33	50 x 50 x 37
nozzles height (cm)	6	10
free span height (cm)	21	21
free span lenght (cm)	34	34
pipe max. ø (1) (mm)	200	200
2 pipes max. ø (2) (mm)	160	160
Material	PP	PP
level filling concr. (m^3m^2)	0,10	0,14
Weight (kg)	1,65	1,65
Packaging Size (cm)	103 x 103 x 245	103 x 103 x 255
N° pcs. per pallet	300	300
m^2 per pallet	75	75
nozzles base ø (mm)	45	45
air outlet holes ø (mm)	16,5	16,5

LOAD WITH HEAVY VEHICLES

BIOMODULO H6	BIOMODULO H10	
10.000	15.000	Distributed overload (kg/m^2)
12.000	12.000	Concentrated overload. 40x40 cm (kg)
6	10	Hood thickness (cm)
10	10	Weak concrete thickness (cm)
5,66	6,88	Weak concrete pression (kg/cm^2)
25	25	Gravel thickness (cm)
0,49	1,18	Ground pression(kg/cm^2)
ø 6-8/20x20	ø 10/20x20	Type of mesh

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.

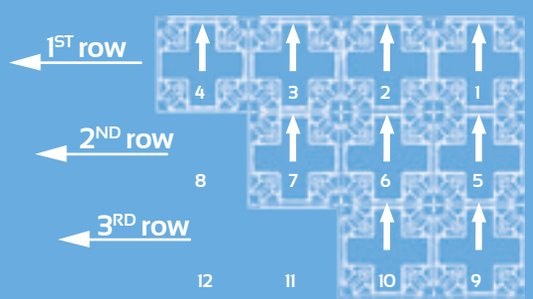
2 GEOBLOCK: is an adjustable extension which compensates the distance between the crawl space and the wall and avoids BIOMODULO cutting.

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

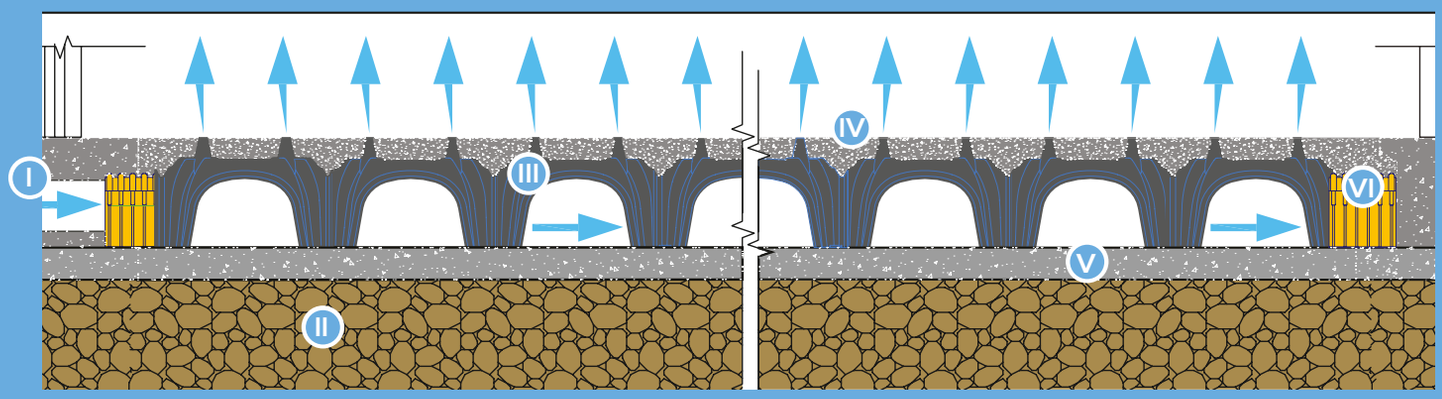
4 CAPS: are required to close the nozzles during the pouring stage and to avoid the concrete penetration into the crawl space. Once the slab is created, they are removed in order to obtain the holes from where the air is going to escape.

INSTALLATION

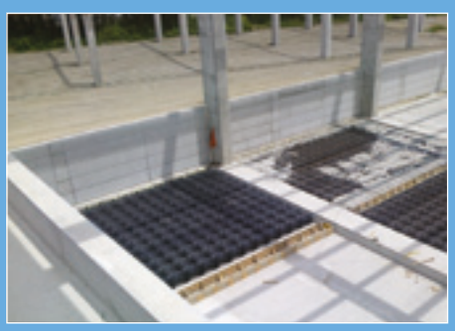
BIOMODULO installation should be performed from right to left and from bottom to top, following the scheme on the side. The product is provided with direction arrows which should face the top, in order to follow the right installation.



BIOMODULO
PLACE ON-SITE



I - AIR INLET PIPE
II - GRAVEL
III - BIOMODULO
IV - REINFORCED CONCRETE POUR
V - WEAK CONCRETE
VI - GEOBLOCK



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 Fermagetto. 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 Rck'= 250 kg/cm^2 and consistency class S4. Subsequent pour vibration.

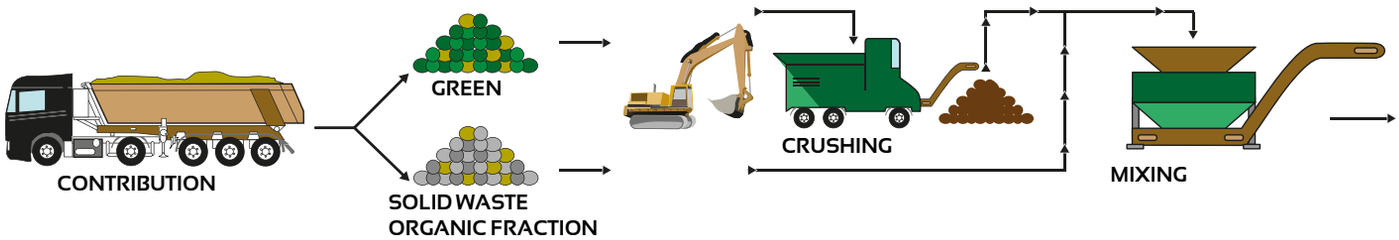
⑤ POUR SMOOTHING

Pour smoothing, in order to create a uniform layer.

⑥ CAPS REMOVAL

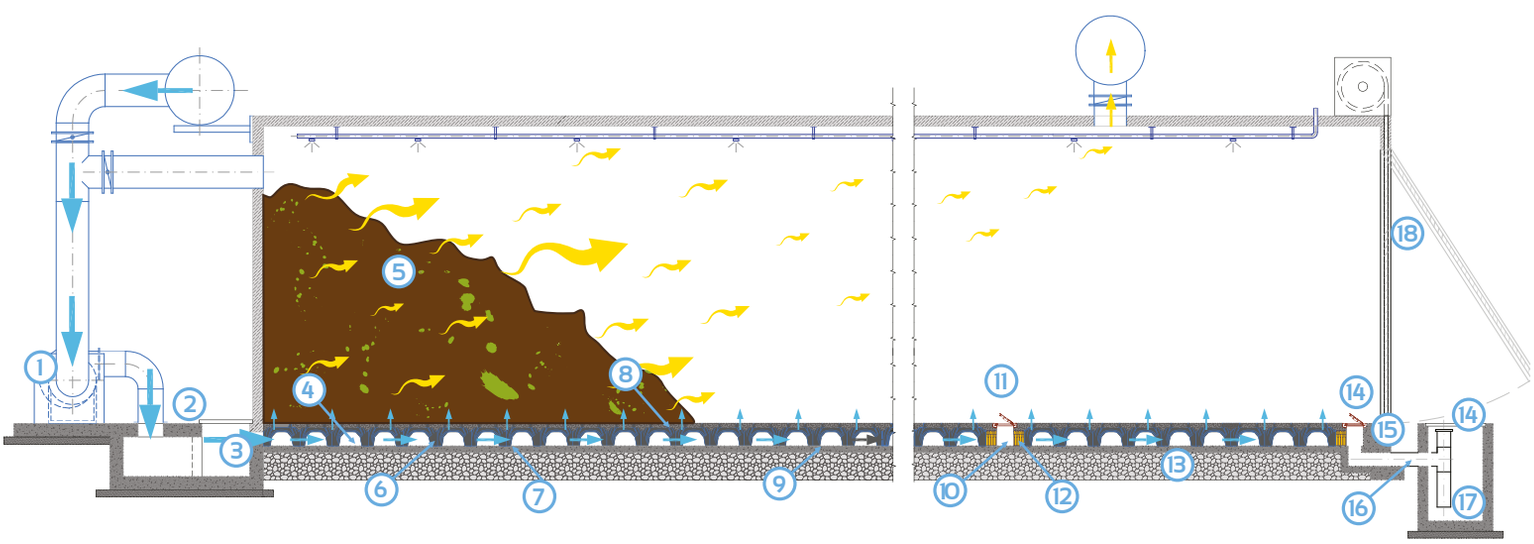
Removal of the nozzles closure caps, to allow the inlet air passage.

BIOMODULO AEROBIC



PROCESS DESCRIPTION

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 developes, in order to acelerate the degradation process and obtain a biological stable and sanitised final product with a low water content.



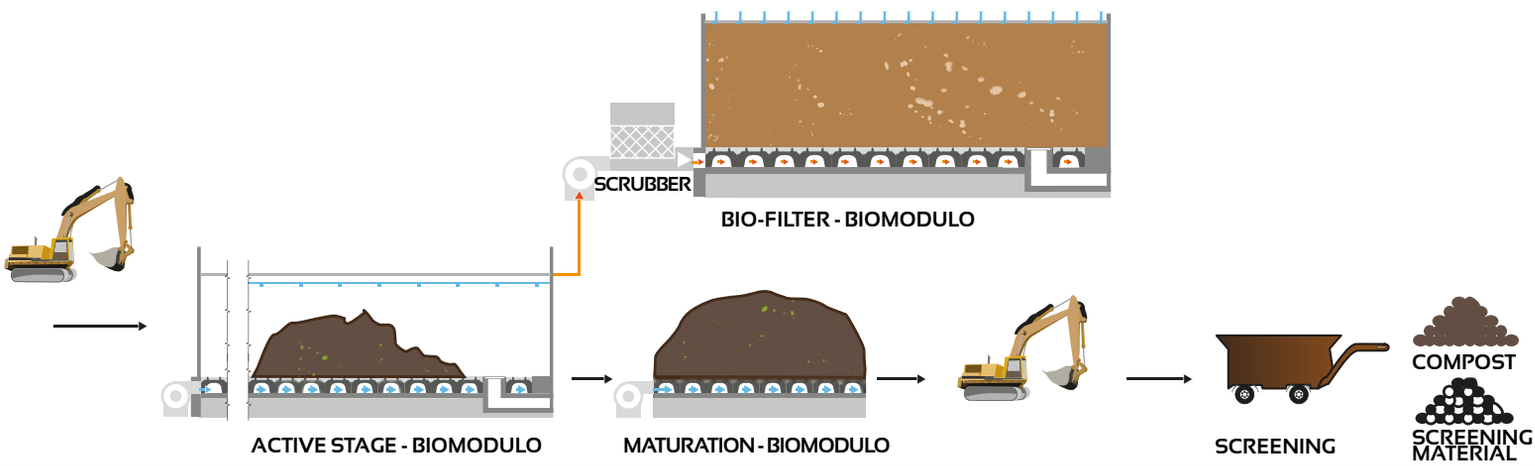
1- VENT
2- PIPE INSPECTION
3- AIR INLET HOLE
4- AIR TRANSIT HOLES
5- MATERIAL
6- BIOMODULO
7- SHEATH IN HDPE
8- CONCRETE POUR
9- WEAK CONCRETE
10- INSPECTION CHANNEL
11- WALKABLE GRID
12- GEOBLOCK (OPENED ENDS)
13- GRAVEL
14- INSPECTION
15- CONCRETE KERBS
16- PVC PIPES
17- PERCOLATE DRAINING
18- GATE

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.

STABILISATION



INSTALLATIONS

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 storaged in heaps and the ventilation comes both from the flooring and from a periodic mechanic treatment. The aim is to obtain a uniform oxygenetation 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 ecc.).

AEROBICS STABILISATION SYSTEMS

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 optain an high quality final product. BIOMODULO structure has an 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

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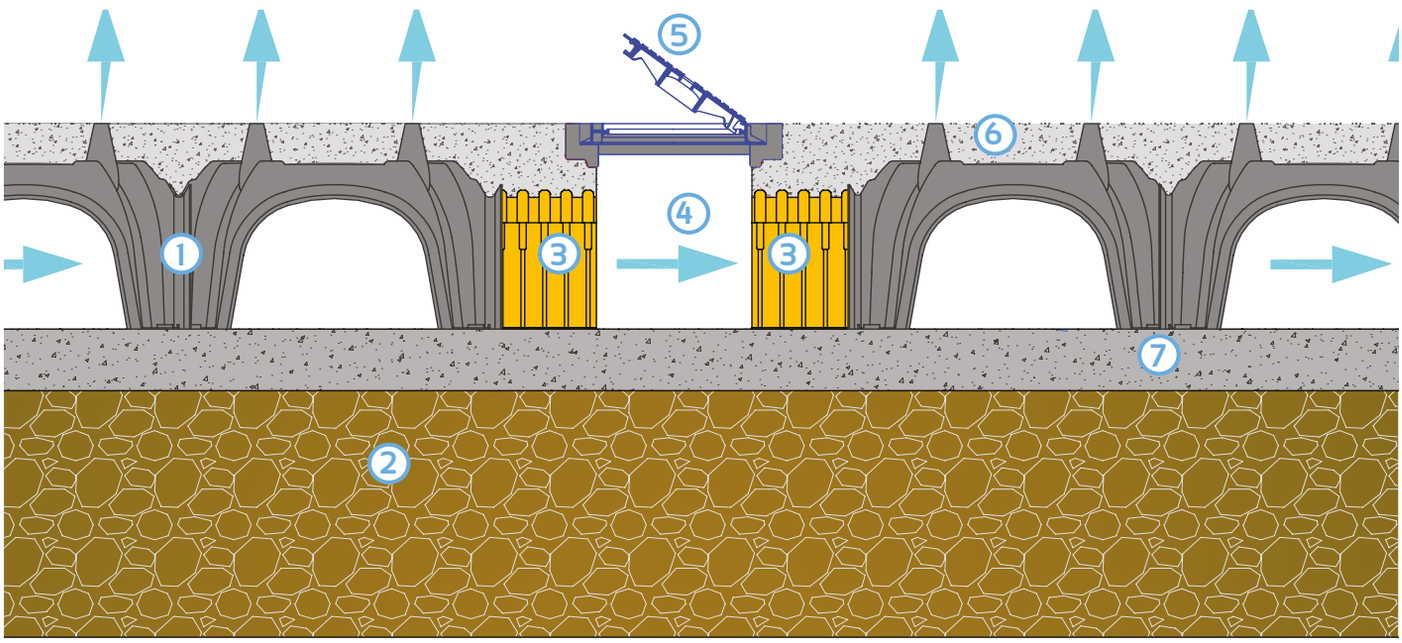
GEOBLOCK



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

ADVANTAGES IN USING GEOBLOCK

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

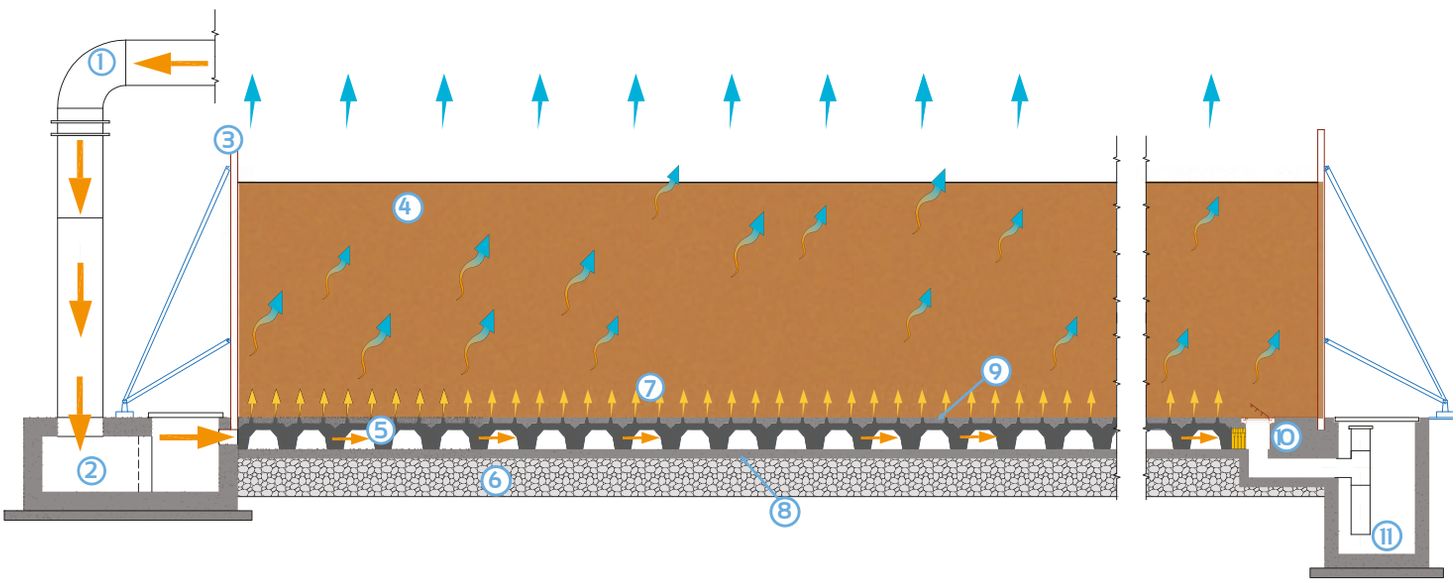
INSERTION OF THE SUPPLY PIPES

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.

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

PROCESS DESCRIPTION

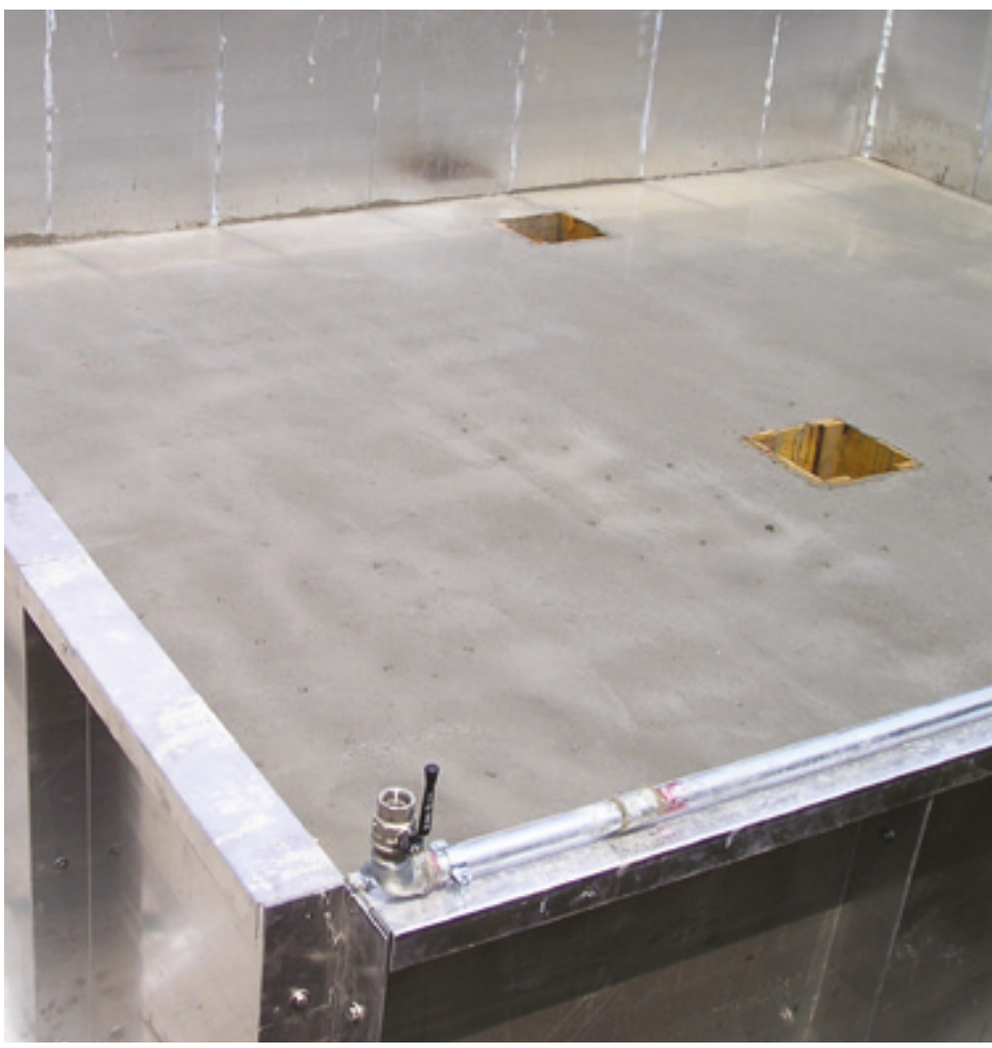
BIOFILTRATION is a biological process to reduce the pollutants that can be found in the waste air. This process exploits the action of the microorganisms (bacteria, yeasts, moulds) to remove the foul-smelling substances. These organisms degrade the foul-smelling substances turining them into odourless compounds (CO_2 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 alluminium), plastic materials or concrete. The filtration material is then placed over the flooring. It can be of different types (wood chips, plastic elements, peat, ecc.). 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.

BIO-FILTERS

Effective elimination **of unpleasant odours**

BIOMODULO allows the cration 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.

Optimal air diffusion
Easy to install
Resistant to loads



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