

MODULO



PERMANENT CRAWL SPACE FORMWORK



MODULO ADVANTAGES



Modular and single-use formwork system for ventilated crawl spaces for the creation of a physical barrier between the ground and the building.

RADON GAS MITIGATION

Modulo system guarantees a uniform and natural air circulation that allows the elimination of damp and radon gas from the construction.

VOID SPACE

The void space created under MODULO allows an easy installation of electrical and mechanical systems as well as ventilation.

HIGH LOAD BEARING

Countless pillars, arches and domes create the highest load bearing structure.

LIGHTNESS

By far it is the lightest filling solution; the total weight of the cross section is approximately equal to the thickness of the upper slab.

FAST

When compared with traditional systems, it guarantees a faster installation up to the 80% (in respect to the use of the traditional inert materials).

STACKABLE

Unmatched logistical advantages when transporting and storing. At a height of 50 cm, conventional filling requires 50 trucks of filling in comparison to only 1 truck of MODULO.

RISK FOR YOUR HEALTH



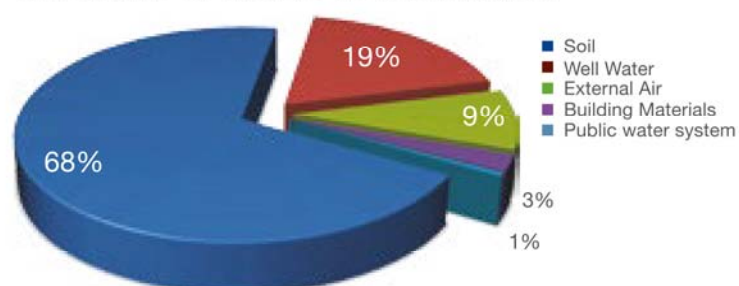
ISSUES CAUSED BY RADON GAS

RADON is an odourless and colourless radioactive gas that can be found in variable quantities in the Earth's crust. The main source of environmental emission of this gas is the soil itself.

Radon tends to accumulate in closed, unventilated rooms of

buildings, especially in ground floors. In these areas, RADON can reach high concentration levels, thus creating very serious health hazards. This problem could be easily prevented if considered during the planning stage of the building.

THE ORIGIN OF RADON IN OUR HOUSES



Source: ©Bob's Radon Mitigation

ISSUES CAUSED BY RISING DAMP

The soil is a heterogeneous mixture of solid elements, air and water. Water can cause serious issues when in contact with a traditional foundation: infiltrations, cold, humid and unhealthy environments. A properly

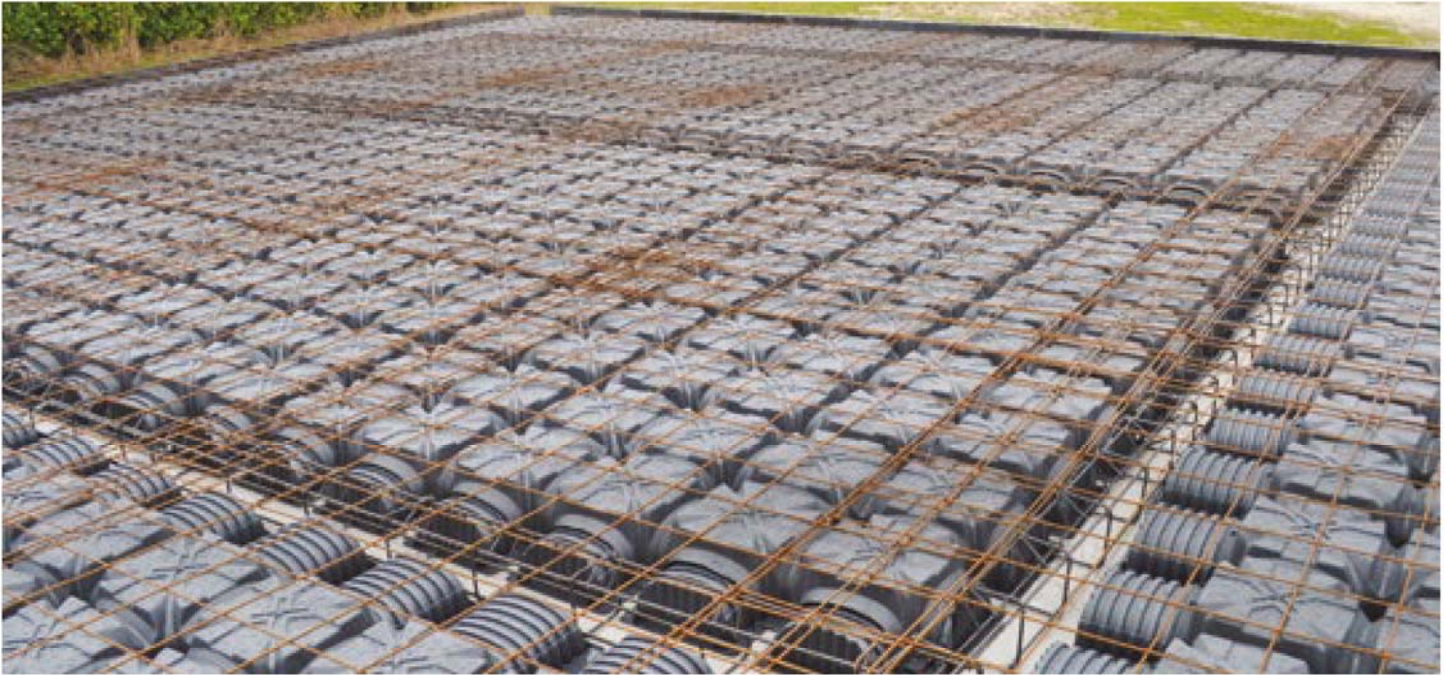
ventilated crawl space creates a physical barrier between the ground and the building and eliminates rising damp issues.

THE SOLUTION

It is possible to defend ourselves against RADON GAS and rising damp by using an effective ventilation system of the foundation. Modulo solution guarantees uniform and natural air circulation between the ground

level and the ground floor: a properly ventilated crawl space creates an "EMPTY SPACE", within the building and the ground, with many benefits for the building's health.

THE VENTILATED CRAWL SPACE



The creation of ventilated foundations, i.e. a void crawl space built under the flooring to improve the health and safety of the house. MODULO is a non-reusable formwork that eliminates rising damp and RADON GAS, which can naturally be found in the soil. MODULO allows the construction of a reinforced concrete structure provided with

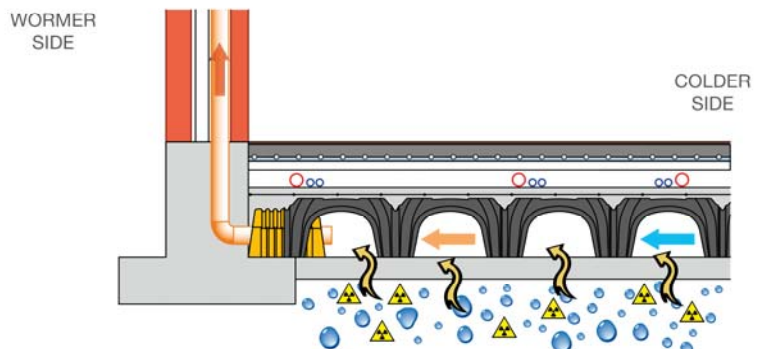
a slab and a series of pillars placed at a fixed distance. Such a structure permits a uniform stress distribution all over the surface, thus producing an excellent load-bearing capacity, both static and dynamic. MODULO is made of regenerated and eco-friendly plastic materials, long-lasting and with a high mechanical resistance.



HOW IS IT CREATED?

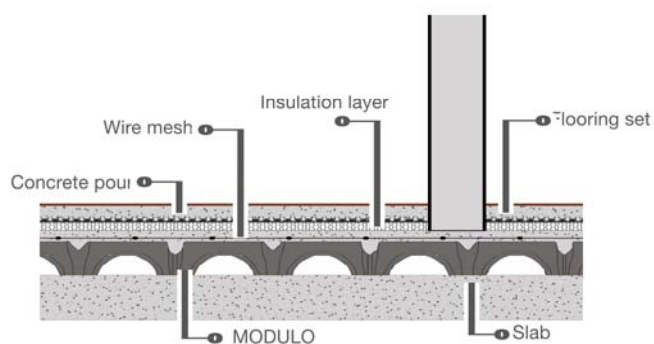
MODULO is the most useful solution to take advantage of the CHIMNEY EFFECT. This effect can be obtained placing the inlet holes on the northern side and the outlet holes on the southern side at a higher point. In order to guarantee a uniform circulation, all the areas of the foundation must be connected together. The air

flow is guaranteed by the PVC pipes inside the wall that heat up and cause an upward movement of the air from the foundation. The ventilation of these areas connected with the outside is called chimney effect and permits the elimination of rising damp and the dispersion or Radon Gas.



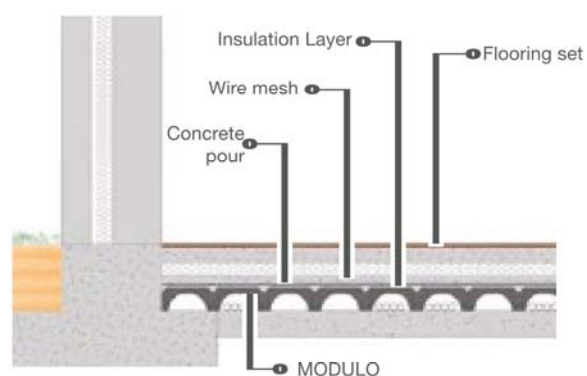
LIGHTENING OF SLABS

MODULO is also a lightening system that can offer many benefits. First, it is particularly useful in multi-storey buildings as the total structure becomes lighter with MODULO system. This lightness reduces the thickness of the slab, as well as the total load of the structure burdening on pillars and foundations. Second, there are savings both in terms of time, labour and material costs, because the amount of concrete and steel used is highly reduced. Finally, thanks to the creation of a void space in multi-storey buildings, MODULO ensures noise reduction, heat insulation and an higher living comfort.



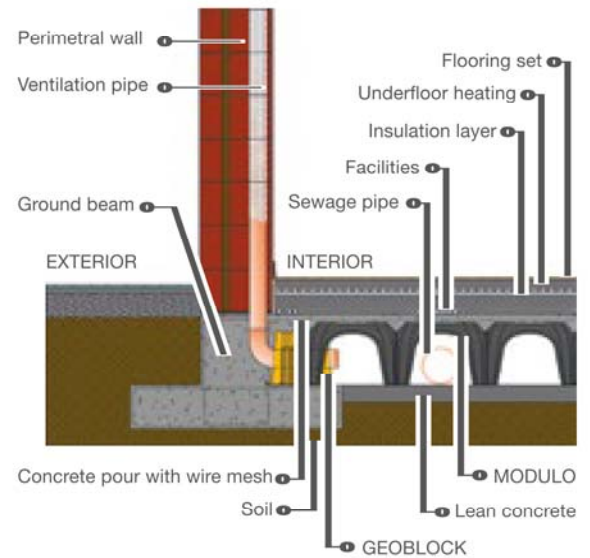
TECHNICAL VOID SPACE

With MODULO it is possible to raise the level of the floor and also create a structural void space that allows the passage of electrical, heating, ventilation, air conditioning and plumbing systems. This space allows an easy and economic functioning of the building. Cables and pipes can be laid before or after the construction and the maintenance is not invasive. Moreover, the implementation can be made in both new and renovated buildings. The surface is continuous unlike modular raised floors and has a very high load bearing capacity.



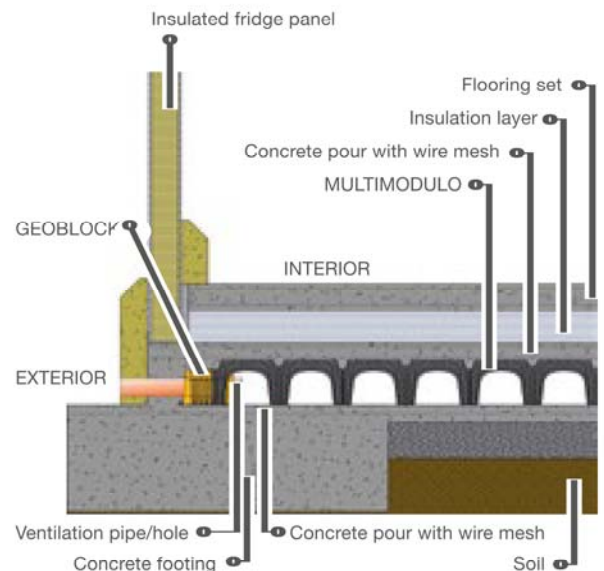
FILLING OF SLABS AND FOUNDATIONS

Thanks to its logistical advantages and lightness, MODULO is the best filling system. In comparison with traditional filling materials (such as: sand, gravel, etc...), MODULO is the lightest since the extra load of the filling is only the concrete that comes on top of the system. Moreover, when used on the roof of a building, it lightens the entire structure, favouring also the ventilation.



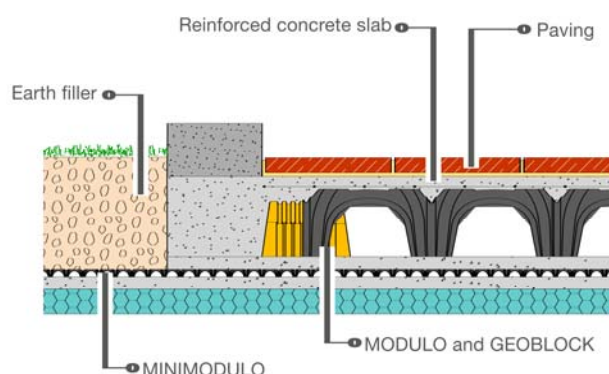
FRIDGE CELLS

Fridge cells and warehouses are increasingly common in food industry. There the freezing cold is transmitted through the building, downwards to the ground, taking it to a temperature below 0°C. In these situations a process known as frost heaving (or frost heave) occurs: when the water contained in the soil freezes, its volume increases and expands upwards, with a risk of raising the foundation package and consequently leading to the formation of warps and cracks on the floor.



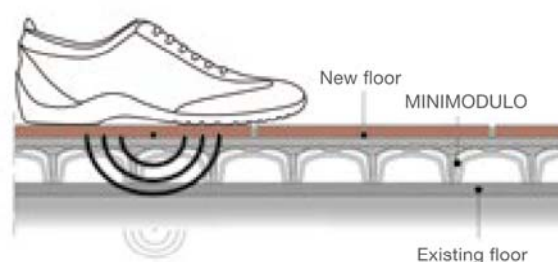
GREEN ROOF WALKWAYS

Green areas have always been an additional value to our cities. In small areas where there is not enough space to use, different levels solutions had to be taken into consideration so, the concept of green roof had to be introduced. Green roofs need walkways to cross the green areas as it happens in our gardens and MODULO large range of heights are the best solution.



ACOUSTIC INSULATION

Modulo H6 is the best solution to control the noises in a building. It is placed between the screed and the slab structure and when implemented, it makes possible the increasing of the comfort level of the buildings. Modulo H6 offers also other benefits, its cavity is excellent for the passage of cables and pipes and it is also a less heavy solution than the classical screed. In combination with specific phono insulating packages Modulo h6 helps to approach the standard values specified by regulations in terms of noise, which depends on the building's use and on the specific laws and phono insulation parameters.



CASE HISTORY



Geoplast Products
Modulo & Geoblock



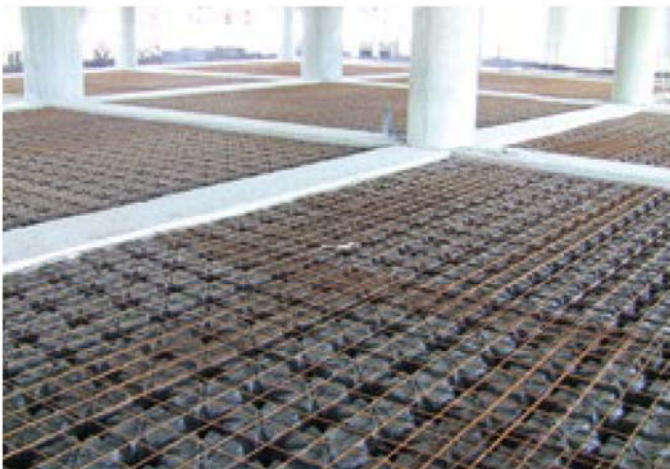
Ciudad de las artes y las ciencias, Spain
Santiago Calatrava e Félix Candela architects



Geoplast Product
Multimodulo



Morocco Mall, Morocco
Davide Padoa Design International



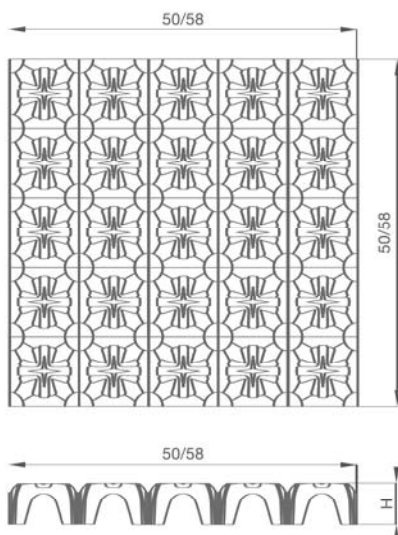
Geoplast Products
Modulo & Geoblock



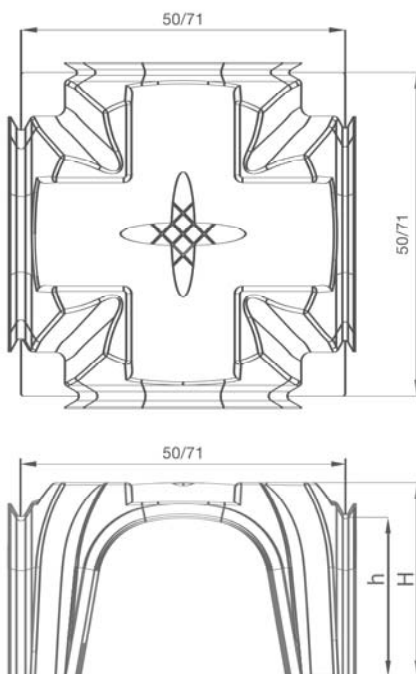
Adnan Menderes Airport, Turkey
Yakup Hazan Architecture

A SUMMARY OF THE TECHNICAL DATA

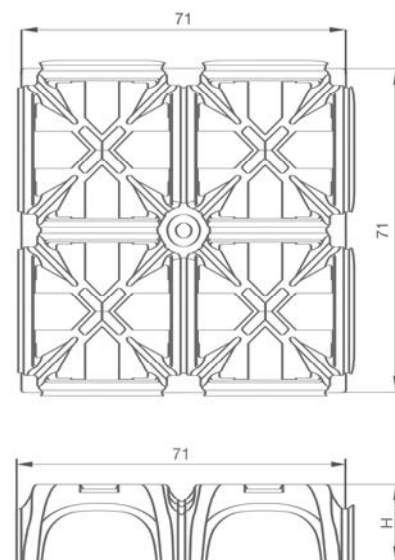
MINIMODULO



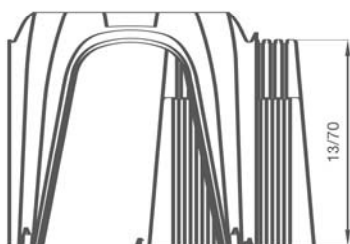
MODULO



MULTIMODULO

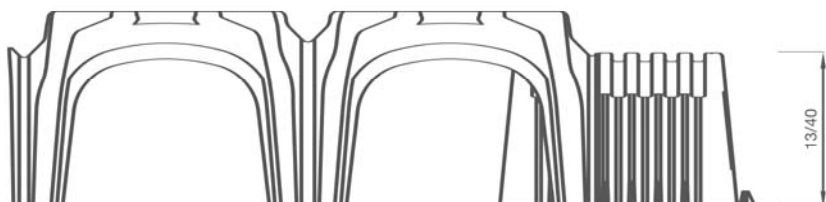


ACCESSORIES FOR VENTILATED FOUNDATIONS



GEOBLOCK MODULO

HEIGHT from 13 to 70 cm
WEIGHT PCS. from 0,55 to 4,18 kg



GEOBLOCK MULTIMODULO

HEIGHT from 13 to 40 cm
WEIGHT PCS. from 0,39 to 1,05 kg

THE EXTENSION GEOBLOCK

The combination of MODULO and GEOBLOCK allows the creation of a monolithic slab without the risk of cracks or breakages. The extension is an

adjustable product, adaptable to any worksite situation and available for every MODULO height.



WHAT ARE THE ADVANTAGES?

STRUCTURAL CONTINUITY

Single pour of crawl space and foundation beams

SAFETY IN THE WORKSITE

It is possible to walk over the formwork, especially along the perimeter, as there is always a complete element

ELIMINATION OF THE DOUBLE FORMWORK

Thanks to **GEOBLOCK** the beams does not need to be formed internally

COMPENSATION ADJUSTABILITY

The depth of **GEOBLOCK** extension can be modified

NO CUTTING OF THE FORMWORK

The distances can be compensated without cutting the formwork



CUTTING



NO CUTTING

THE PLANNING

GEOPLAST offers a planning service on the basis of a DWG analysis of the foundation, in order to

obtain a graphic file with an accurate counting of the pieces and a detailed installation scheme.



DIMENSIONS OF MINIMODULO - MODULO - MULTIMODULO



MINIMODULO H3 - H9

	Dimensions (cm)	Concrete consumption m ³ /m ²	Package dim. (cm)	Package (m ²)	No. pieces	Weight per unit (kg)
MODULO H3	50 x 50	0,004	120 x 102 x H220	180	720	0,77
MODULO H6	50 x 50	0,009	120 x 102 x H220	180	720	0,95
MODULO H9	58 x 58	0,010	120 x 120 x H240	240	720	1,16



MODULO H13 - H40

	Dimensions (cm)	Concrete consumption m ³ /m ²	Package dim. (cm)	Package (m ²)	No. pieces	Weight per unit (kg)
MODULO H13	50 x 50	0,028	102 x 102 x H235	90	360	1,12
MODULO H15	50 x 50	0,030	102 x 102 x H240	90	360	1,08
MODULO H17	50 x 50	0,035	102 x 102 x H235	90	360	1,30
MODULO H20	50 x 50	0,037	102 x 102 x H240	90	360	1,32
MODULO H25	50 x 50	0,038	102 x 102 x H235	90	360	1,34
MODULO H27	50 x 50	0,040	102 x 102 x H235	75	300	1,38
MODULO H30	50 x 50	0,044	102 x 102 x H240	75	300	1,49
MODULO H35	50 x 50	0,052	107 x 107 x H230	75	300	1,54
MODULO H40	50 x 50	0,056	107 x 107 x H230	75	300	1,71



MODULO H45 - H70

	Dimensions (cm)	Concrete consumption m ³ /m ²	Package dim. (cm)	Package (m ²)	No. pieces	Weight per unit (kg)
MODULO H45	71 x 71	0,064	151 x 151 x H230	150	300	3,30
MODULO H50	71 x 71	0,076	151 x 151 x H230	150	300	3,65
MODULO H55	71 x 71	0,078	151 x 151 x H225	120	240	3,80
MODULO H60	71 x 71	0,079	153 x 153 x H230	120	240	3,85
MODULO H65*	71 x 71	0,084	153 x 153 x H230	120	240	4,02
MODULO H70*	71 x 71	0,083	153 x 153 x H240	120	240	4,07



MULTIMODULO H13 - H40

	Dimensions (cm)	Concrete consumption m ³ /m ²	Package dim. (cm)	Package (m ²)	No. pieces	Weight per unit (kg)
MULTIMODULO H13	71 x 71	0,020	151 x 151 x H225	180	360	2,05
MULTIMODULO H15	71 x 71	0,027	151 x 151 x H225	180	360	2,09
MULTIMODULO H17	71 x 71	0,028	151 x 151 x H226	180	360	2,15
MULTIMODULO H20	71 x 71	0,032	151 x 151 x H250	150	300	2,42
MULTIMODULO H25	71 x 71	0,033	151 x 151 x H235	180	360	2,51
MULTIMODULO H27	71 x 71	0,035	151 x 151 x H235	180	360	2,56
MULTIMODULO H30	71 x 71	0,042	151 x 151 x H250	150	300	2,86
MULTIMODULO H35	71 x 71	0,045	151 x 151 x H240	180	360	2,66
MULTIMODULO H40	71 x 71	0,050	151 x 151 x H265	150	300	3,30

DIMENSIONS OF GEOBLOCK - ACCESSORIES



GEOBLOCK MODULO H13 - H70

	Package dim. (cm)	No. pieces	Weight per unit (kg)
GEOBLOCK MODULO H13	110 x 110 x H180	500	0,55
GEOBLOCK MODULO H15	110 x 100 x H180	500	0,62
GEOBLOCK MODULO H17	110 x 120 x H190	500	0,68
GEOBLOCK MODULO H20	110 x 120 x H195	500	0,77
GEOBLOCK MODULO H25	110 x 120 x H195	500	0,99
GEOBLOCK MODULO H27	115 x 120 x H200	500	1,10
GEOBLOCK MODULO H30	115 x 120 x H200	500	1,19
GEOBLOCK MODULO H35	115 x 120 x H210	500	1,43
GEOBLOCK MODULO H40	120 x 130 x H210	500	1,54
GEOBLOCK MODULO H45	100 x 120 x H220	200	2,62
GEOBLOCK MODULO H50	100 x 120 x H225	200	2,86
GEOBLOCK MODULO H55	106 x 120 x H230	200	3,56
GEOBLOCK MODULO H60	106 x 120 x H240	200	3,64
GEOBLOCK MODULO H65	110 x 120 x H240	200	4,07
GEOBLOCK MODULO H70	110 x 120 x H245	200	4,18



GEOBLOCK MULTIMODULO H13 - H40

	Package dim. (cm)	No. pieces	Weight per unit (kg)
GEOBLOCK MULTIMODULO H13	120 x 100 x H110	500	0,39
GEOBLOCK MULTIMODULO H15	110 x 93 x H110	500	0,41
GEOBLOCK MULTIMODULO H17	121 x 93 x H110	500	0,48
GEOBLOCK MULTIMODULO H20	110 x 97 x H120	500	0,52
GEOBLOCK MULTIMODULO H25	122 x 100 x H120	500	0,69
GEOBLOCK MULTIMODULO H27	120 x 102 x H130	500	0,72
GEOBLOCK MULTIMODULO H30	120 x 102 x H130	500	0,78
GEOBLOCK MULTIMODULO H35	124 x 103 x H140	500	0,94
GEOBLOCK MULTIMODULO H40	125 x 107 x H140	500	1,05



ACCESSORIES OF MULTIMODULO SYSTEM

FERMAGETTO IN PLASTIC PAPERBOARD

Side closure element for MULTIMODULO heights from 13 to 40 cm



ACCESSORIES OF MODULO SYSTEM

FERMAGETTO MODULO

This element prevents the intrusion of concrete in the crawl space. It is available for MODULO heights from 13 to 40 cm



ACCESSORIES OF MODULO SYSTEM

FERMAGETTO IN PLASTIC PAPERBOARD

Side closure element for MODULO heights from 45 to 70 cm



ACCESSORIES OF MODULO SYSTEM

*RING

retaining for MODULO H65 e H70

LOAD TABLES

MINIMODULO

LOAD (Kg/m ²)	THICKNESS of the slab (cm)*	WIRE MESH (mm)	THICKNESS lean concrete (cm)	THICKNESS gravel (cm)	GROUND pressure (Kg/cm ²)
500	5	Ø5/25x25	5		0,21
1,000	5	Ø6/20x20	5		0,42
2,500	5	Ø6/20x20	5		1,06
5,000	5	Ø8/20x20	10		0,76
10,000	6	Ø10/20x20	5	10	0,77

> 10,000

To evaluate each case, please contact Geoplast Technical Department

MODULO 50 X 50

LOAD (Kg/m ²)	THICKNESS of the slab (cm)*	WIRE MESH (mm)	THICKNESS lean concrete (cm)	THICKNESS gravel (cm)	GROUND pressure (Kg/cm ²)
500	5	Ø5/25x25	5		0,29
1,000	5	Ø6/20x20	5		0,58
2,500	5	Ø8/20x20	10		0,72
5,000	6	Ø8/20x20	5	10	0,90
10,000	8	Ø10/20x20	5	15	1,10

> 10,000

To evaluate each case, please contact Geoplast Technical Department

MODULO 71 X 71

LOAD (Kg/m ²)	THICKNESS of the slab (cm)*	WIRE MESH (mm)	THICKNESS lean concrete (cm)	THICKNESS gravel (cm)	GROUND pressure (Kg/cm ²)
500	5	Ø5/25x25	5		0,42
1,000	5	Ø6/20x20	5		0,85
2,500	6	Ø8/20x20	10		1,14
5,000	7	Ø8/20x20	5	10	1,42
8,000	10	Ø10/20x20	5	15	1,35

> 10,000

To evaluate each case, please contact Geoplast Technical Department

MULTIMODULO

LOAD (Kg/m ²)	THICKNESS of the slab (cm)*	WIRE MESH (mm)	THICKNESS lean concrete (cm)	THICKNESS gravel (cm)	GROUND pressure (Kg/cm ²)
500	5	Ø5/25x25	5		0,21
1,000	5	Ø6/20x20	5		0,41
2,500	5	Ø6/20x20	5		1,03
5,000	5	Ø8/20x20	10		0,85
10,000	6	Ø8/20x20	5	15	1,07

> 10,000

To evaluate each case, please contact Geoplast Technical Department

*Concrete class C20/25 minimum



INSTALLATION OF MODULO + GEOBLOCK



① PREPARATION

Creation of a laying surface with lean concrete and installation of the external formwork and the reinforcements of the perimetral beams.



② FACILITIES

Installation of the pipes to place them into the perimetral ventilation holes and then place of the possible channeling systems for the pipes.



③ FORMWORK

Installation of MODULO formwork following the instructions, from right to left as marked in the formwork, without any cutting.



④ GEOBLOCK

Installation of GEOBLOCK to get closer to the reinforcements of the foundation: in this way GEOBLOCK permits the shuttering of the beams.



⑤ REINFORCEMENT

Installation of the load distribution mesh on MODULO formwork and connect it to the foundation beams reinforcement.



⑥ SINGLE POUR

Pour of the beams and the foundation slabs. Follow the instruction in order to pour correctly.

MODULO formwork system must be installed FROM RIGHT TO LEFT AND FROM TOP TO BOTTOM, keeping the molded arrows pointing towards and to the left.

It is essential to verify the correct anchoring of the feet!

