



Sistema **Atlantis** *Tank*

www.daliform.com



**Disposable formworks for
rainwater collection tank
and dispersion tanks**

LEGEND:



Water, collection/dispersion tanks



Utility passage



Certifications



Ecocompatibility

SWITCHBOARD

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variable height from 56 cm to 300 cm



Sistema Atlantis

Atlantis Tank is the patented system to create tanks cast on site for the collection or the dispersion of large volumes of water in a small space.

The reinforced concrete structure achievable through the **Atlantis Tank** system consists of a slab, perimeter walls, and a slab supported by small pillars; the structure thus formed, guarantees **high resistance to overload**, both permanent and accidental.

The tank formed with **Atlantis Tank** can be laid underground so as to create a green area on top, or it can be directly loaded for the transit of vehicles, also heavy.

The main features of the Atlantis Tank system are speed, simplicity and cost performance.



Advantages

- The tank can be inspected through a simple inspection pit.
- High resistance to overload, even of vehicles in motion.
- Ease of positioning as it is light-weight and simple to install through the linking of the elements, with time savings of up to 80%.
- Minimum use of concrete for level filling thanks to the lowered dome form, which permits maximum resistance with minimum slab thickness.
- The possibility, due to the pipe system, to have any height up to 3 m supplied to the yard.
- Possibility to bear loads of considerable size by providing the pillars with suitable reinforcement.
- Adaptable to non-standard spaces as the modules can be cut without underpinning.
- Simple material management in the yard, as it is not bulky and can be exposed to bad weather.



Water collection tank



Inspection pit



Inspectionability



Water collection tank



Water collection tank in a greenhouse

Applications

Atlantis Tank is the ideal solution to **create tanks cast on site for the collection and/or the dispersion of water** for the renovation of swimming pools.

Atlantis Tank allows the realization of a tank in the reinforced concrete of a **maximum height of 300 cm**. Thanks to the elevator pipes provided to measure, it is the ideal system for creating multi-level or sloping surfaces.

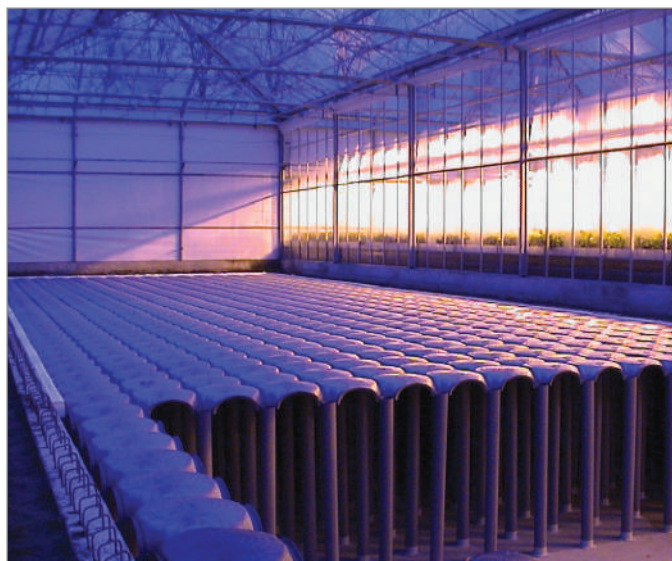
The tank made of Atlantis Tank is **drivable** and it can be implemented under squares, streets and parking lots, both commercial and industrial.

The **dispersion tanks** with Atlantis Tank are intended to **mitigate the effect of floods** caused by exceptional weather events.

In the case of **collection tanks**, the accumulated rainwater can be reused for all those applications that do not require drinking water, such as garden irrigation, fire pumps, toilet flush, house and personal cleaning, ecc..



Collection tank under a commercial parking lot



Water collection tank in a greenhouse



Dispersion tank under a square

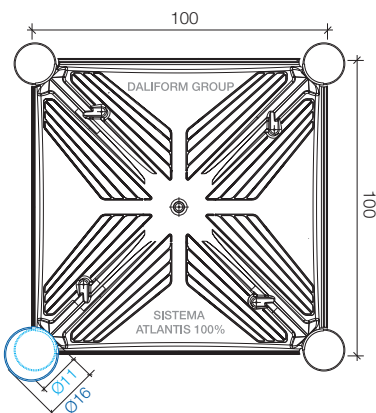
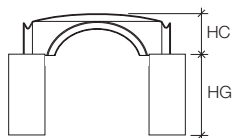
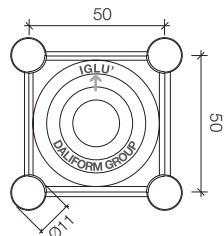


Dispersion tank under a parking lot



Rainwater collection tank

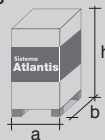
Atlantis System range



Sistema **Atlantis**



	H cm. ▶	from H 56 to H 80	from H 81 to H 110
Working dimensions bxb*	cm	50 x 50	50 x 50
Dome height HC	cm	16	16
Leg height HG	cm	from 40 to 64	from 65 to 94
Quantity of concrete pipe Ø 11 cm	m³/m²	from 0,048 to 0,056	from 0,056 to 0,068
Pallet dimensions*	axbxc	110 x 110 x 250	110 x 110 x 250
	Weight kg	510	510
	Units	300	300
	Sqm	75	75



*Data refer only to the cover. / The product does not fear the bad weather and it can be stored outside.

Sistema **Atlantis 100%**



	H cm. ▶	from H 56 to H 80	from H 81 to H 110
Working dimensions bxb*	cm	100 x 100	100 x 100
Dome height HC	cm	12	12
Leg height HG	cm	from 44 to 68	from 69 to 98
Quantity of concrete pipe Ø 11 cm	m³/m²	from 0,038 to 0,040	from 0,040 to 0,043
Quantity of concrete pipe Ø 16 cm	m³/m²	from 0,043 to 0,047	from 0,047 to 0,053
Pallet dimensions*	axbxc	110 x 110 x 250	110 x 110 x 250
	Weight kg	740	740
	Units	70	70
	Sqm	70	70






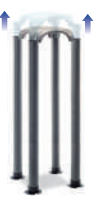








*Data refer only to the cover. / The product does not fear the bad weather and it can be stored outside.

Table of pre-dimensionig referred to Atlantis System 50x50 and Atlantis System 100x100 cm of h 100 cm with pipe Ø11cm

Type of road load	Overload	Hood thickness	Slat thickness Rck30	Scree thickness	Pressure on the ground	Welded mesh	
	Kg/m²	cm	cm	cm	Kg/cm²	mm	mesh cm
Example 1	2500	10	15	30	0,42	double Ø 8	20 x 20
Example 2	5000	16	20	35	0,86	double Ø 8	20 x 20

The table expresses, starting from the various examples of overload and of thickness (to be given to the slab), the pressures that would be applied to the feet of the structure, in relation to the (eventual) thicknesses of the lean concrete.

					
from H 111 to H 140	from H 141 to H 170	from H 171 to H 200	from H 201 to H 230	from H 231 to H 260	from H 261 to H 300
50 x 50	50 x 50	50 x 50	50 x 50	50 x 50	50 x 50
16	16	16	16	16	16
from 95 to 124	from 125 to 154	from 155 to 184	from 185 to 214	from 215 to 244	from 245 to 284
from 0,068 to 0,080	from 0,080 to 0,089	from 0,089 to 0,100	from 0,100 to 0,111	from 0,111 to 0,122	from 0,122 to 0,136
110 x 110 x 250	110 x 110 x 250	110x110x250	110x110x250	110x110x250	110x110x250
510	510	510	510	510	510
300	300	300	300	300	300
75	75	75	75	75	75

					
from H 111 to H 140	from H 141 to H 170	from H 171 to H 200	from H 201 to H 230	from H 231 to H 260	from H 261 to H 300
100 x 100	100 x 100	100 x 100	100 x 100	100 x 100	100 x 100
12	12	12	12	12	12
from 99 to 128	from 129 to 158	from 159 to 188	from 189 to 218	from 219 to 248	from 249 to 288
from 0,043 to 0,046	from 0,046 to 0,049	from 0,049 to 0,051	from 0,051 to 0,054	from 0,054 to 0,057	from 0,057 to 0,060
from 0,053 to 0,059	from 0,059 to 0,065	from 0,065 to 0,070	from 0,070 to 0,076	from 0,076 to 0,082	from 0,082 to 0,088
110 x 110 x 250	110 x 110 x 250	110x110x250	110x110x250	110x110x250	110x110x250
740	740	740	740	740	740
70	70	70	70	70	70
70	70	70	70	70	70

Certifications



- Technical Construction Certificate issued by the Technical and Test Institute for Constructions Prague (Czech Republic).
- Technical Construction Certificate issued by the Agency for Quality Control and Innovation in Building (Hungary).
- Hygienic Certificate issued by the National Institute of Hygiene (Poland)
- Acoustic check for the verification of DIN standards, Avis Technique issued by the French institute CSTB.
- Series of loading and breaking tests certified by the University of Padua.
- Member of the Green Building Council Italia
- Company Certified according to International Standards UNI EN ISO 9001 (Quality), UNI EN ISO 14001 (Environment) and SA 8000 (Social responsibility).
- Certification of Conformity to the Environmental Compatibility Criteria (CCA).

Installation method (Images and schemes referred to atlantis 50x50 cm with pipe having diameter 11 cm)



The Atlantis System is made up of three basic elements in its standard configuration: Atlantis formwork h 16 cm (A), pipe (B) diameter 110 mm (external and of a variable height, slip-on pipe base (C) with an enlarged support surface.

In order to plug the formworks laid against the wall, it is suggested to use the panel accessory made of polystyrene.

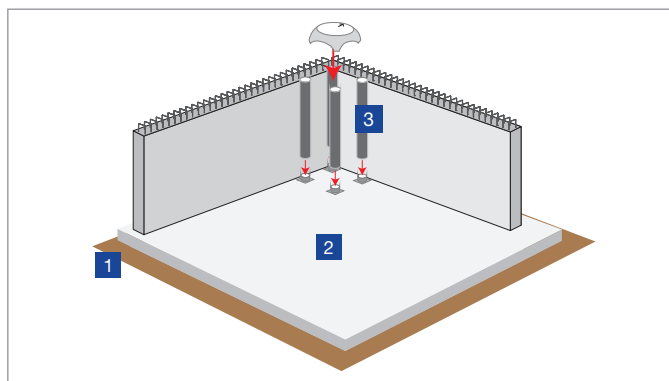
The Atlantis formworks are simple to install: the procedure consists of inserting the pipe into the slip-on base and then linking the Atlantis formwork to the far end of the pipe using the bayonet coupling. Each piece can be hooked to the adjacent piece thanks to the shaped grooves for the male/female linking. For this, simply position them in horizontal rows from the left to the right, with the **arrow on the top** turned outward from the operator, proceeding to the end of each row.

Thanks to the modularity and lightness of Atlantis, each operator will be able to position up to 30 m² per hour standing comfortably in an erect position.

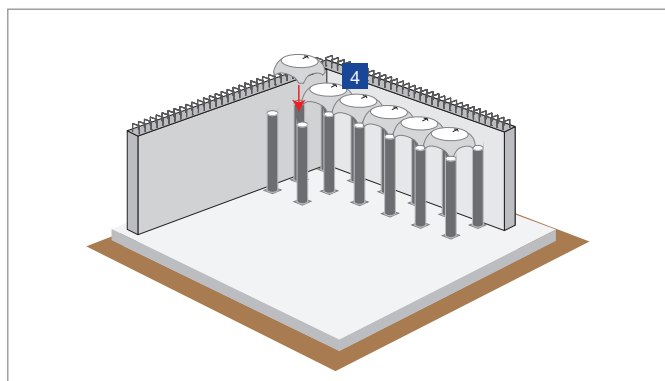


Details of the complete Atlantis System positioning sequence.

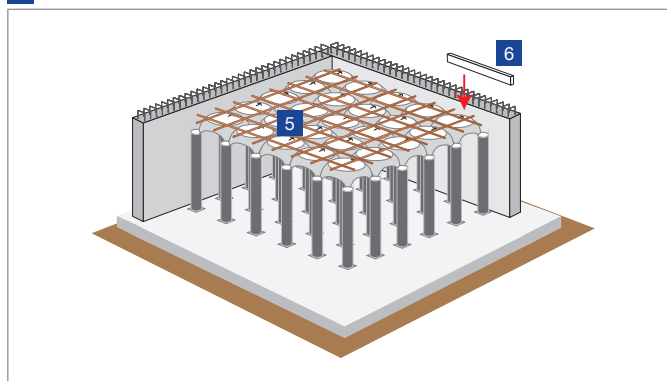
Method for creating under-floor cavities



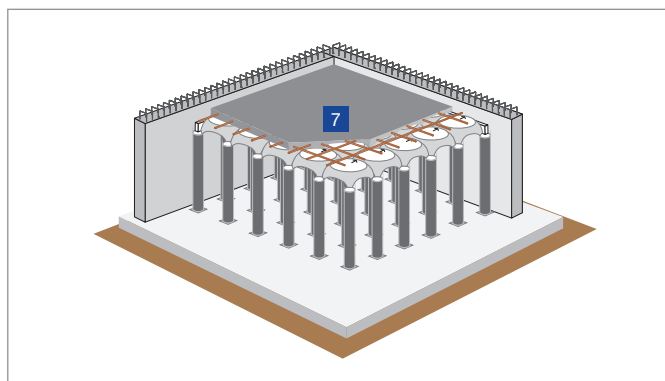
- 1 Preparation of the natural ground.
- 2 Preparation of the lean concrete foundation, to be sized according to the loads and capacity of the ground.
- 3 Pose of Atlantis system (foot+pipe+formwork)



- 4 Pose the elements from left to the right; once completed a row, proceed with next one.



- 5 Laying the welded mesh Ø 6 20x20 above the formworks.
- 6 Insert polystyrene panels, between wall and formwork, along the cavity perimeter.



- 7 Realization of concrete casting, filling previously Atlantis pipes and then covering the formworks till reaching the quote of project.



To ensure a correct installation and perfectly created under-floor cavity please refer to the product's usage requirements.

Dry assembly method



fig. 1 - Dry positioning of the first formwork, the arrow is facing the foundation curb

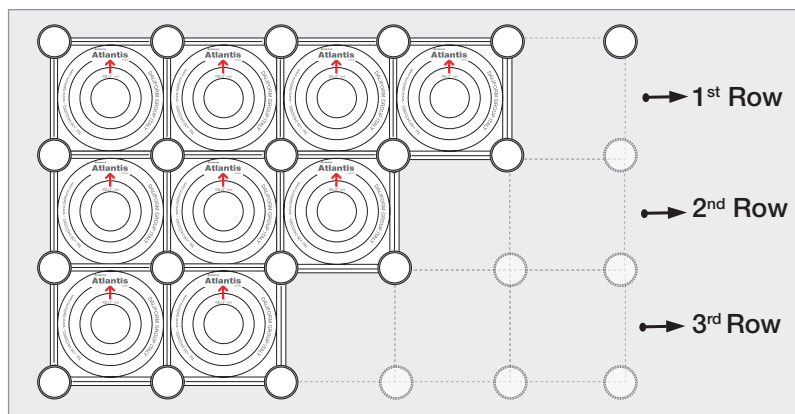


fig. 2 - Dry positioning sequence of the modules by row

- 1** Position the first element to the upper left with respect to the work surface, making sure that the arrow is pointing up; (fig. 1)
- 2** Unite the elements in sequence, by horizontal row, proceeding from the left towards the right and from the top downwards (following the direction normally used for writing), as shown graphically on the crown of each unit. (fig. 2)

Application example: overlying tanks

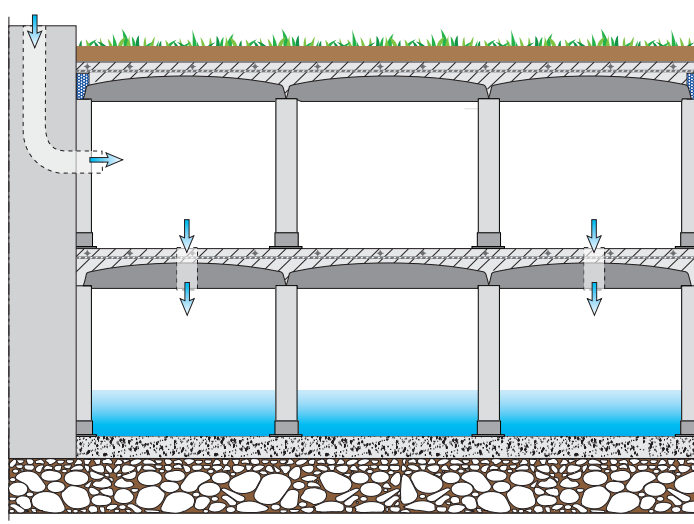


From a **town planning** point of view, the use of reinforced concrete tanks to be placed below green areas would not be correct, whereas it would be more logical to distribute tanks in areas to be used for parking or under other buildings. In some cases, it may be necessary to realise **large volumes of water with a reduced surface**. For this purpose, **overlying tanks** on multiple levels can be designed. The collected volume by square metre will be the sum of the volumes accumulated by the individual tanks. The tank plan can be very flexible.

The result makes it possible to **limit the cementification of the ground** to areas suitable from a town planning point of view and have **greater planning freedom**.

The tank formed with **Atlantis Tank** can be laid underground so as to create a green area on top, or it can be directly loaded for the transit of vehicles, also heavy.

Daliform Group technicians are available to you to help you design your under-floor cavity, and upon request can provide customised studies with calculations and executive drawings.



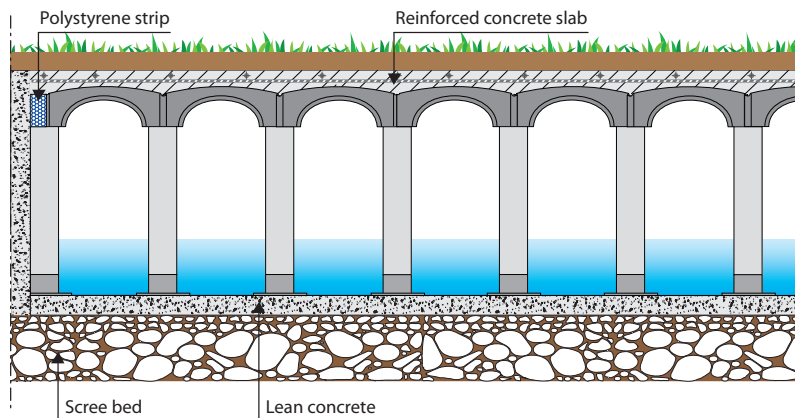
Application example: water collection tanks.



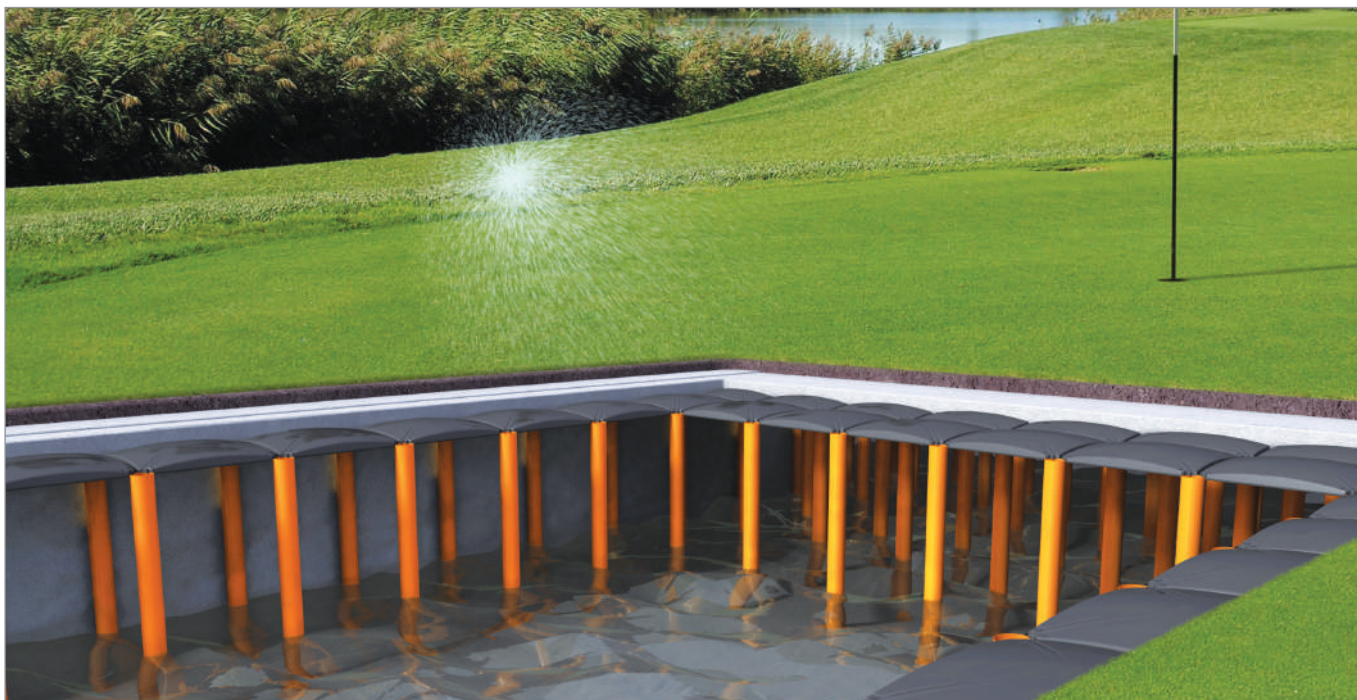
Thanks to its modularity, manoeuvrability, ease of installation and large vertical accumulation capacity, **Atlantis** is the ideal tool for creating large volume tanks at **extremely low costs**. Its spherical vaulted structure provides the concrete casting with considerable resistance with less thickness so that the outside of the tank can be used as a surface for a parking lot (ex.: *the IKEA parking lot in Amsterdam*) or for sports facilities (ex.: *tennis courts, football fields etc.*). The same principle can also be applied to **residential building**, both for individual homes or in the case of parcelling. It is possible in fact to prepare suitable volumes to be covered with Atlantis formworks, which will be subsequently filled with the rainwater collected by the building's rainwater draining system. The volume of collected water can be used for all applications that do not require potable water, such as for flushing the wc, for the washing machine, watering the garden, fire extinguishing pumps, etc. The tank must be made waterproof and have an overflow valve installed.

Tank maintenance is made possible by the large walkable spaces inside the tank, created through the combined use of the **Atlantis system** and the **Beton Up accessory**.

A large distance between the columns can be obtained with the use of **Atlantis 100%**.



Collection tank used as a fire extinguishing system



Water collection tank.

In the **private sector** 50% of our daily water need could be replaced by rainwater:

- for irrigation (promotes optimal mineral absorption);
- for the washing machine and house cleaning (rainwater does not promote the formation of limescale);
- for flushing the wc;
- for washing the car

obviously at no cost for its use.

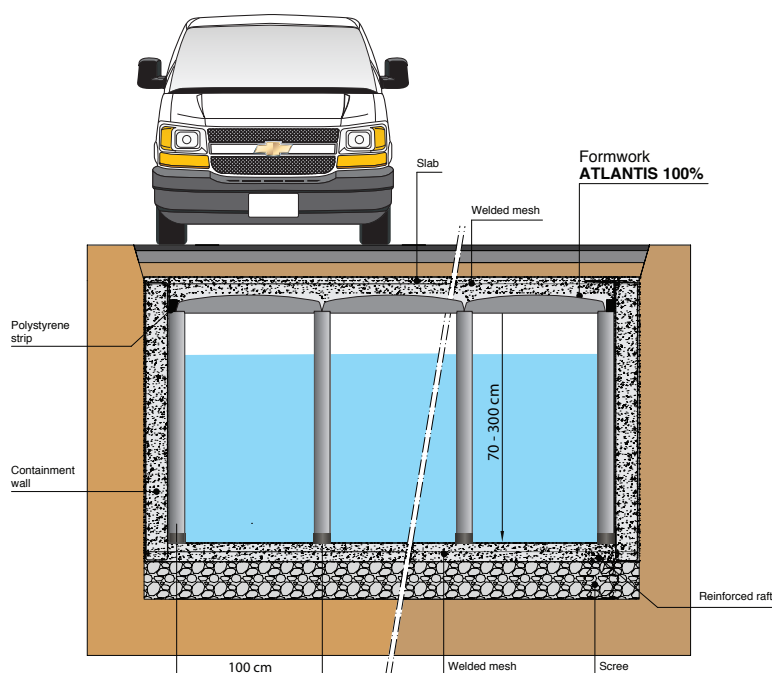
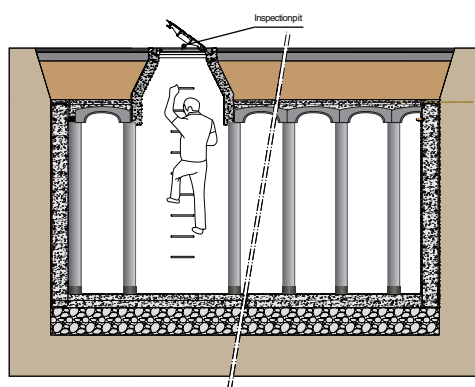
Rainwater can also be used in the **industrial sector** (factories, offices) in productive cooling, washing, rinsing processes and any other non-food process as well as for fire extinguishing systems using accumulation tanks.

Advantages

The tank can be inspected through a simple inspection pit.

The inside of the tank can be accessed for:

- Cleaning
- Checking the water level
- Checking the microbiological status of the water
- Checking any pipes or systems installed in the tank



The implemented tank can be loaded directly on the concrete layer or be positioned underground to create an asphalted parking lot or a green area on the surface.

Application example: water dispersion tanks.



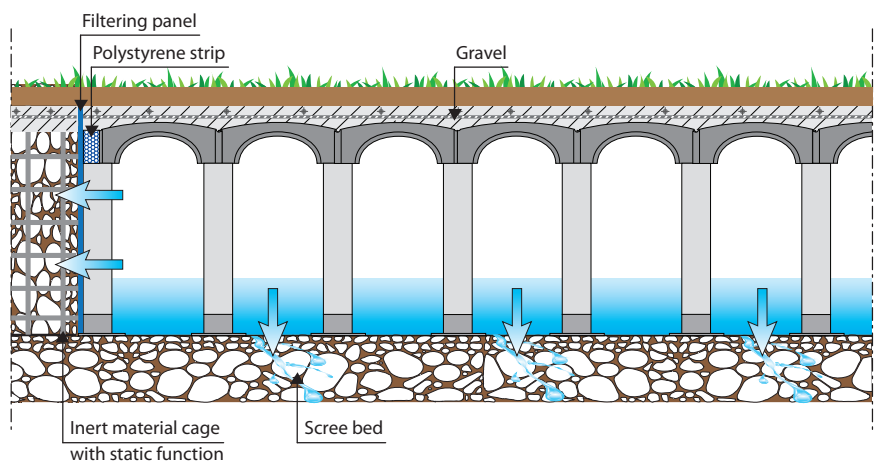
In comparison to collection tanks, **dispersion tanks** are not perfectly waterproof but permit the gradual release of the rainwater to the water bed through slits in the walls or draining bottom.

Dispersion tanks are a means for **rebalancing the ground water that have been decreased** due to cementification, which has seriously reduced the natural draining capacity of the ground. As seen previously, on a river basin level, the dispersion tanks could be a **tool for planning, thereby decreasing, the hydrogeological risk.**

On a public level, on a river basin level, there are many benefits:

- relieving the sewage system in the case of heavy rain and resulting reduction in the capacity delivered to the purifiers and the final destination (rivers, lakes, sea, etc.);
- the local hydrological balance is preserved.

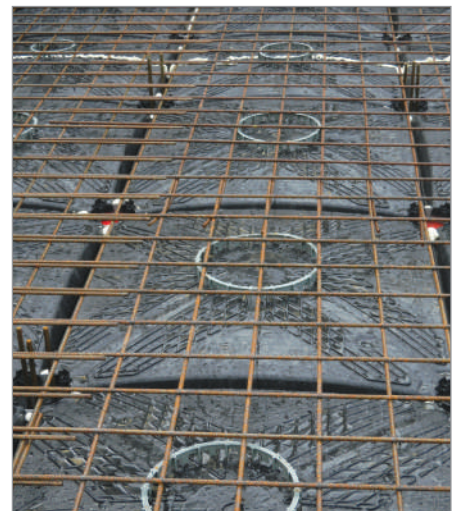
The implemented tank can be **loaded directly on the concrete layer** or be positioned underground to create an **asphalted parking lot or a green area** on the surface.



Considering a more local scale, other areas of use can be defined such as the **sewer system** (drain sewage and mixed). It is also influenced by the rain and normally must be made larger as the urban area expands. The use of **dispersion tanks**, also concentrated in various points of the territory where the rain water collected from multiple areas is directed, would make it possible to **reduce the costs** related to creating many small sized basins and lower the collective costs to permit an increase in the sewer capacity. A careful cost-benefit analysis could lead local authorities to introduce urban planning obligations to locally disperse rainwater, maintaining the water balance, reducing the collective system management costs, supplying local ground water, promoting **more sustainable growth.**

The benefits on a public level, on a community scale, are:

- the public collection networks will not need to be expanded because of the excess rainwater that is not absorbed by the ground on an urban level, due to progressive cementification, is kept or dispersed locally;
- decrease in the risk of saturation of the sewer system
- supplying local ground water





Water dispersion tank.

Daliform Group technical office



FEASIBILITY STUDY

Predimensioning and optimisation of the structures, alternative and/or revised proposals, material and manpower estimates, cost analysis.
Evaluation of forced ventilation in the case of cold rooms.

CALCULATION REPORT

Reports certifying the execution of Daliform Group constructive systems.



SUPPORT FOR THE EXECUTIVE DESIGN

Support by design professionals. Upon request, the formwork positioning plan can be supplied with a list of the products required to carry out the work and the relative accessories.

ON-SITE SUPPORT

If necessary, our technical staff can be present on-site to help the construction company during the operational phase.

The technical consultancy is only valid for the Daliform Group construction systems.

To contact the technical office: Tel. +39 0422 208350 - tecnico@daliform.com

To obtain updated technical cards, support material, new photos and case studies, go to www.daliform.com

Implementations photo gallery



Water collection tanks in a greenhouse



Water collection tank under an industrial area



Water dispersion tank under a residential area



Water collection tank under an industrial area



Collection tank under a commercial parking lot



Collection tank under a parking lot



Collection tank under a green area



Water collection tank



Dispersion tank under a residential area



Dispersion tank under a residential area



Collection tank under an industrial area



Dispersion tank under a residential area

Determination of the accumulation tank volume

The determination of the tank volume is based on the water need and on the rainfall in the area. In particular, the quantity of rainwater that can be collected in a year is calculated with the following formula:

$$Q = S * h * \eta * \phi$$

Where:

- S** (m²) = horizontal projection of all surfaces exposed to the rain.
- h** (mm) = height of the rainfall in a year. It varies for each location; the data can be obtained from the almanacs of the Hydrographic Service of the Ministry of the Environment.
- η** (%) = effectiveness of the filter that is provided by the manufacturer and concerns the fraction of the water flow that is effectively usable downstream of the filter.
- φ** (%) = surface outflow coefficient. This considers the quantity of water that effectively flows towards the accumulation system, depending on the nature of the surface, the orientation and the slope.

Type of surface	Outflow coefficient (diameter)
Sloping roof	80-90
Flat, non gravelly roof	80
Flat gravelly roof	60
Intensive green roof	30
Extensive green roof	50
Stone paved surface	80
Asphalting	90

Subsequently, the water requirements are evaluated, taking into account the number of people, water use and the irrigated surfaces. The following table shows a calculation example.

Use	Average yearly use (litres)/person	Number of people	Specific water use (Fis)
Wc	9000	x _____ person	+
Washing machine	5000	x _____ person	+
House cleaning	1000	x _____ person	+
Gardening	450 litres/m ²	x _____ person	+

Total Fi (litres)

For large sized systems, the following must be considered, for example:

school = 1000 l/person

office = 1500 l/person

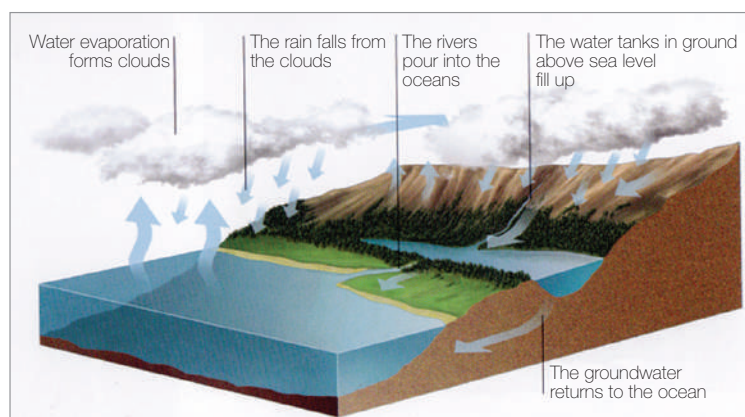
The water need is therefore compared with the quantity of water that can be collected and the smaller of the two obtained values is used for determining the usable quantity.

The tank capacity calculation takes the average dry period into account, that is the number of days that it does not rain. This number can be found from the Hydrographic Service publications, but for simplicity a constant equal to 6% of the usable water volume is utilised, which guarantees the water need for three weeks.

In conclusion, the tank volume is calculated using the following formula:

$$V = (\text{the lower between } Q \text{ and } F_i) * 0.06$$

Example: hydrogeological risk in Italy



The progressive extension of areas covered with asphalt/concrete due to a constant growth of settlement density (almost doubled over the past 50 years), causes **considerable changes to the water's surface and underground system** and its qualitative characteristics.

To this is added a climatic variation due to an **increase in temperature** that, even if only a few degrees, changes traditional weather patterns.

The most visible effect is a tropicalisation of the climate, even in temperate areas, resulting in more violent and intense rainfall, followed by increasingly extended dry periods.

Even if the quantity of rain varies little in absolute terms, the effect of this climatic trend is that the same quantity of rain falls in very concentrated periods of time. In fact, there is an **increasing** amount of **floods and landslides** connected directly to the increasing **hydrogeological risk**.

Floods such as in Piedmont (1994), Versilia (1996), Sarno (1998), Calabria and Piedmont (2000), up to the most recent in Valboite (BL), Messina and the shocking landslide in Vibo Valentia must not only be managed as emergencies but **must be solved with programmed development operations targeted for the territory by the competent authorities**.

However, unfortunately, from the Galli law from 1994 to the water regulation of 2000 and development projects by water basin authorities, much has been done on paper, whereas in concrete terms the hydrogeological risk remains.

Consequences

The consequences of these concurrent events lead to a considerable alteration in the water cycle:

- due to greater waterproofing and higher speed of the surface outflows, when raining, the water flow rates towards the receivers increase, increasing floods and overloading the sewer system and purification systems;
- due to reduced infiltration of meteoric water in the subsoil, a lower water bed level has been measured;
- the quality of the meteoric water that flows through urban areas becomes polluted;
- waste of drinking water.

Solution

This problem can be solved with **rainwater collection tanks**, which are systems that collect the rainfall peaks, permitting the sewer and water treatment systems to work at the most constant rate possible, with certain **economic and operating efficiency benefits** even in peak load situations.

The excessive dilution of liquids in water treatment systems has a very negative impact on efficiency, which can be remedied by progressively disposing of the surplus water after an intense rainfall.

Similarly, for sewer systems a sudden increase in the volume of water to be disposed of can seriously disturb the operation of a system that is correctly sized under normal operating conditions.

In this sense, the tanks **represent an economic solution that can be implemented in a brief period of time** for adjusting a sewer system to the increasing operative needs that derive from expanding urban areas.

In addition to these advantages, underground meteoric water collection tanks, **without any limit on vehicle access**, make it possible to **store the water** and then **reuse it later**.

Recent regulations regarding water protection place an emphasis on the need to create accumulation and dispersion tanks in order to avert the danger of floods, without considering that the topic of the sustainable transformation of the territory is slowly growing in importance. Thanks to the Atlantis System, rainwater collection tanks, dispersion tanks and water recirculation greenhouses can be created. This restores the ground's draining ability that was taken away by the concrete, without any visual or environmental impact.

Specifications

Implementation of a reinforced concrete tank for a total height of _____ cm with the supply and on-site positioning of recycled plastic **Atlantis** formworks from the Daliform Group, consisting of modular formworks positioned dry for the quick dry formation of a self-bearing pedestrian accessible platform above which the C20/25 cement is cast to fill the formwork up to its crown and an upper slab of _____ cm reinforced with welded mesh Ø _____ cm 20 x 20 cm, levelled and smoothed with a plastering trowel.

The **Atlantis system** shall be composed of recycled plastic formwork such as **Iglù®** with convex cover with dimensions **50x50 cm**, h 16 cm and sustained by pipes Ø110 mm, di h _____ cm, complete with slip on bayonet connection feet, which can be walked on when dry, guaranteeing a **breaking resistance** of 150 kg in correspondence of the centre of the arch with an 8 x 8 cm clamp.

or

The **Atlantis 100% system** shall be composed of recycled plastic formwork such as **Iglù®** with convex cover with dimensions **100x100 cm**, h 12 cm and sustained by pipes Ø110 (or Ø160) mm, di h _____ cm, complete with slip on bayonet connection feet, which can be walked on when dry, guaranteeing a **breaking resistance** of 150 kg in correspondence of the centre of the arch with an 8 x 8 cm clamp.

Formworks in recycled plastic, such as **Iglù®**, for the formation of the **Atlantis system**, must not release polluting substances, have an **Environmental Compatibility Certification** and be produced by a Company Certified according to International Standards **UNI EN ISO 9001** (Quality), **UNI EN ISO 14001** (Environment); **BSI OHSAS 18001** (Safety) and **SA 8000** (Social responsibility).

The company that supplies the formworks such as **Iglù®**, for the formation of the **Atlantis system**, must also exhibit the product certificate approved by an **EOTA** (European Organisation for Technical Approvals) member agency.

Including accessories, waste, cutting and all other expenses: _____ /m² _____

Supply and installation cost grid







Sample referred to Atlantis system 100x100 cm having pipe Ø 11 cm

No.	Item	U.M.	Quantity	Unit price	Total
1	Supply of Atlantis formwork L 100 x L 100 x H 12 cm	m ²	1		
2	Supply of Ø 110 mm pipe with basew	no.	4		
3	Dry positioning of the Atlantis system on the foundation	h/m ²	0.05		
4	Supply and positioning of the welded mesh Ø 6/20x20 cm	kg/m ²	2.328		
5	Supply and casting of concrete C25/30 - formwork up to the crown	m ³ /m ²	0.034		
6	Supply and casting of concrete C25/30 - filling of the pipes*	m ³ /m ²			
7	Supply and casting of concrete C25/30 - thickness upper slab	m ³ /m ²			

* 0.036 m³/m² per ml of pipe

Total cost €/m²

Logistics - pallet capacity

MEANS OF TRANSPORT	NO. OF PALLETS	
Tractor (8.20/9.60x2.45)	14/16	
Trailer (6.20x2.45)	10	
Tractor+ Trailer type "BIG" (8.40+7.20x2.45)	14 + 12	
Semi-trailer (13.60x2.45)	24	
20 feet container	10*	
40 feet container	20*	

* the m² per pallet can vary based on the type of container.

The information contained in this catalogue could be changed. Please request updated informations from DALIFORM GROUP, which reserves the right to make changes at any moment without notice. In consideration of recycled material, it is specified that there are tolerance margins caused by environmental factors.



www.daliform.com

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Made in Italy

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GROUP
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Certified Management System UNI EN ISO 9001,
UNI EN ISO 14001, BS OHSAS 18001, SA 8000

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Rating di legalità: ★★+



PRODOTTO CONFORME
ai criteri di
COMPATIBILITÀ AMBIENTALE
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