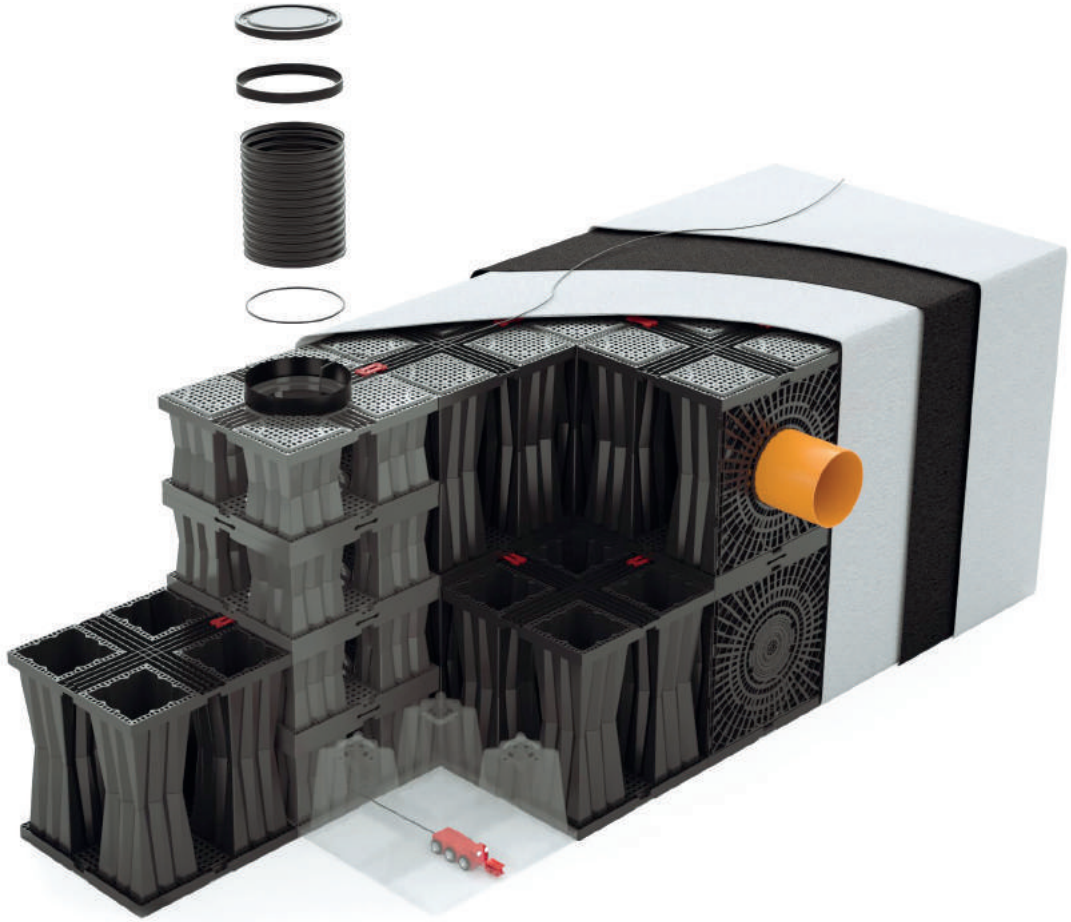
Geoplast Building beyond together

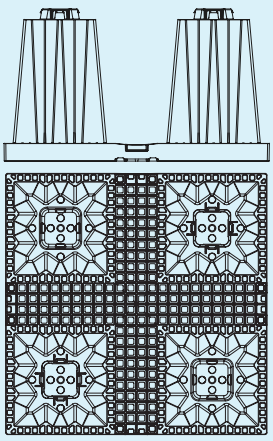
English

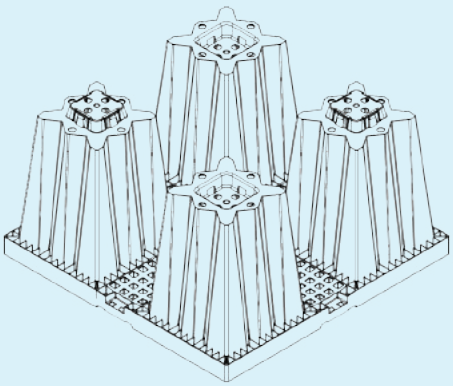


INSTALLATION MANUAL

AQUABOX

MODULAR SYSTEM FOR STORMWATER MANAGEMENT





GEOPLAST WATER SOLUTIONS

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INDEX
INSTALLATION MANUAL

1. EXCAVATION AND INSTALLATION SURFACE

1.1 EXCAVATION AND PREPARATION OF THE BEDDING

The excavation must be carried out according to the design specifications. During the work, the walls of the excavation must be inclined or constructed in such a way that they do not cause any danger for the workers. In any case, local regulations must be observed. Take all measures to ensure that the trench is free of water during the entire installation phase.

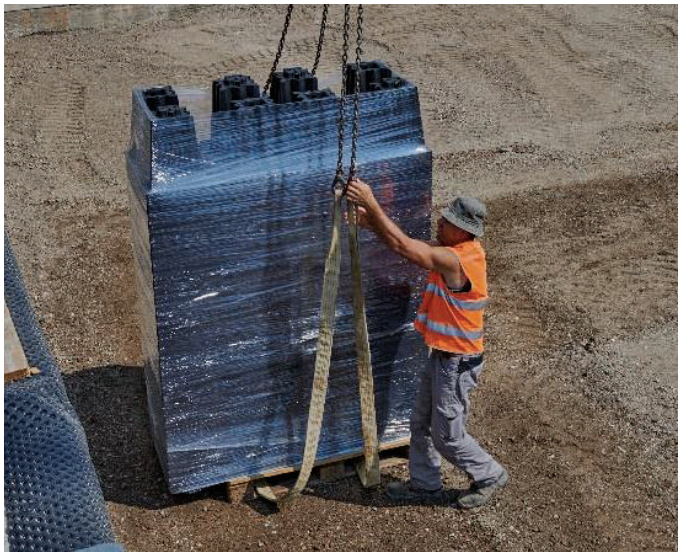
In order to install the AQUABOX and AQUABOX CUBE modules, a flat and stable laying bed is essential. For this aim it is necessary to create a levelling layer of minimum 10 cm above the bottom of the excavation, preferably made of crushed stone or gravel (without fine fractions). The layer must be carefully compacted and smoothed to obtain a flat surface.

Compression level Dpr must be ≥ 97% (Evd ≥ 25 MN / m2 or CBR ≥ 8% top edge of bedding). If soil has been included in the infiltration calculation, the permeability of the compacted layer must at least correspond to the permeability (kf value) of the backfill soil (soil groups GE, GW, SE, SW, SI).

The quality of the laying bed is decisive for the further installation and strongly influences both the load-bearing and the laying properties of the storage/infiltration modules, particularly in the case of multi-layer designs and higher loads (soil and vehicle traffic load).

1.2 AQUABOX PALLETS UNLOADING

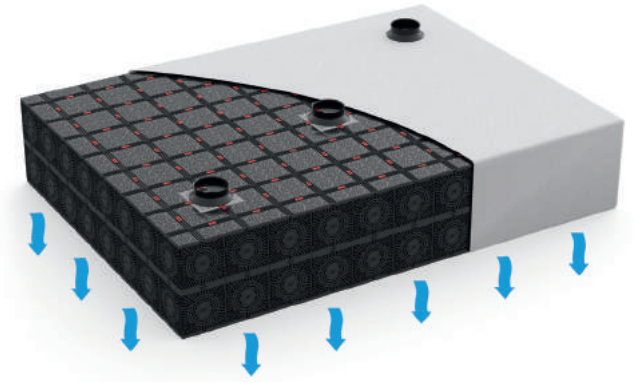
Attention must be observed while unloading the AQUABOX pallets from the truck. Any AQUABOX pieces damaged must be discarded and replaced by new parts.
Geoplast Spa is not responsible for any material damaged during these operations.



2. GEOTEXTILE AND GEOMEMBRANE LAYERS

2.1 INFILTRATION TANK

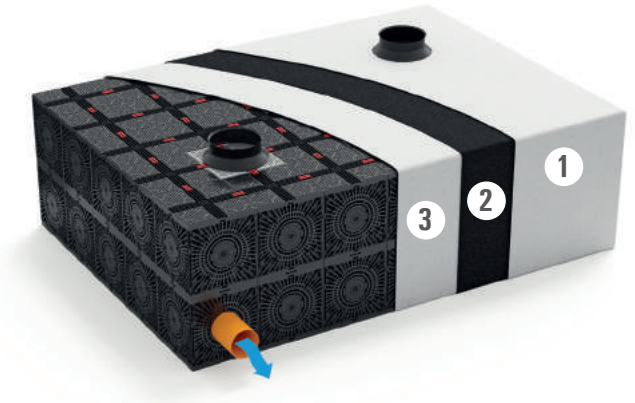
An AQUABOX infiltration tank must be water-permeable, and is simply wrapped in one layer of geotextile.



2.2 DETENTION TANK

In order to create a detention tank 3 layers are required:

1. First layer-geotextile
2. Second layer-geomembrane
3. Third layer-geotextile



2.3 FIRST LAYER - GEOTEXTILE

Initially, the first layer of geotextile must be laid on the bedding layer. The purpose of this layer is to protect the underside geomembrane from the roughness of the bedding material.
The geotextile must have sufficient excess side length to wrap the entire system. It must overlap at least 30 cm on all edges.

The characteristics of the geotextile are important and must achieve these minimum standards:

Thickness: ≥ 2 mm
Drill resistance: 2,0 kN
Geotextile class: 3
Characteristic opening width: 0,08 mm
kf (at 20 kPa): 6 x 10-2 m / s
Water permeability according to EN ISO 11058: 90 l / mq
Mass per unit area: 200 g / m^2

Ensure that the surface of the geotextile is completely closed and that no openings occur during backfilling!

2.4 SECOND LAYER-GEOMEMBRANE

This layer makes the AQUABOX tank watertight.
The geomembrante must be laid on top of the previously laid geotextile as indicated at par. 2.1.
Perform all heat welding that cannot be performed after installation of the AQUABOX elements, such as those under the tank.

2.5 THIRD LAYER-GEOTEXTILE

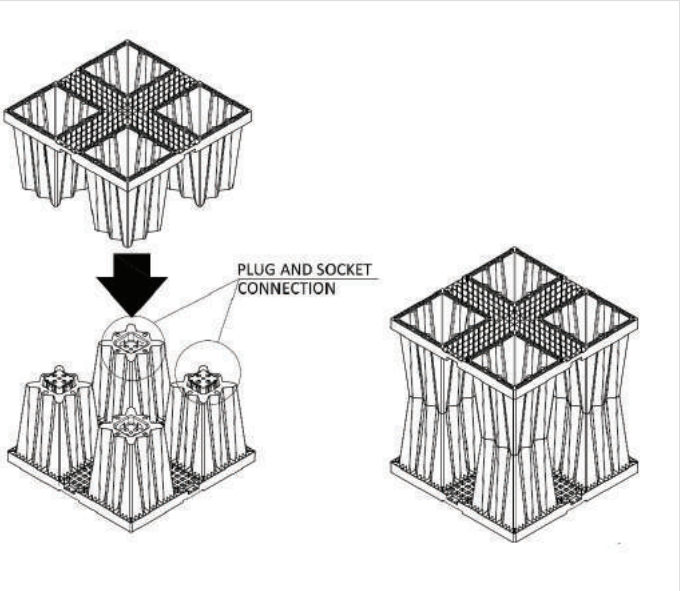
Before laying the AQUABOX modules, a layer of Geotextile must be laid to protect the waterproof membrane described in point 2 from the sharp edges of the AQUABOX. Some part of AQUABOX module could damage the geomembrane under heavy operating loads.

3. INSTALLATION OF AQUABOX MODULES AND ACCESSORIES

Each AQUABOX module consists of two half elements. Thanks to the Aqualock overlapping system, each module can be pre-assembled by a single person without the need of crane or mechanical means of transport.
The modules can be pre-assembled either inside or outside the trench. The pre-assembled modules must then be organised according to the design specifications.

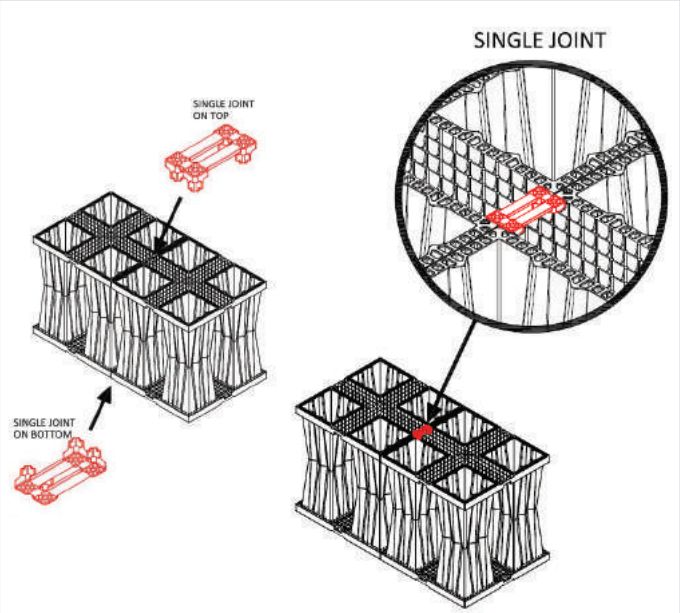
3.1 AQUABOX MODULE ASSEMBLING

Each AQUABOX features plug and socket connections, which makes assembling the modules very quick and easy.
Simply lay one element on the ground and join it to another by applying some pressure.

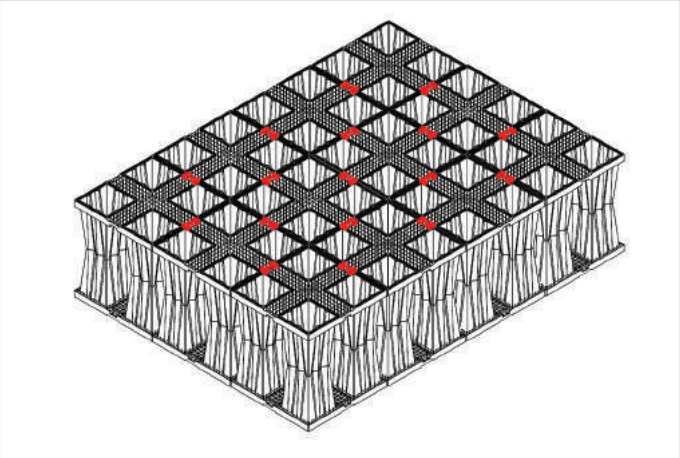


3.2 ONE LEVEL OF AQUABOX

Pre-assembly of the AQUABOX module, and horizontal linking of assembled modules. Modules are linked using the SINGLE JOINT, two of which are used per connection, one under and one above. The single joints are inserted in the corresponding slots.

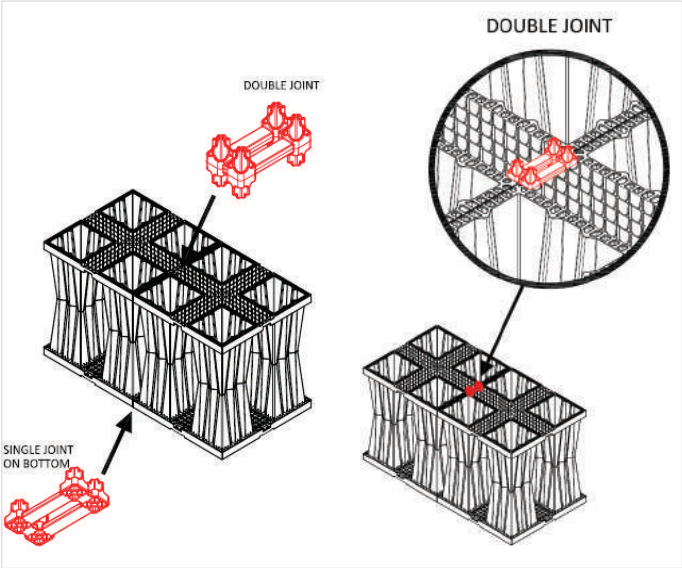


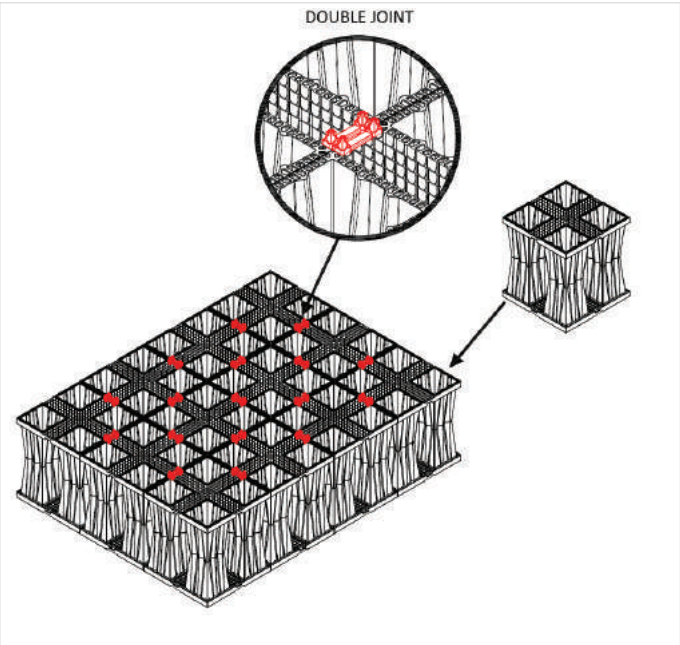
Continue linking the AQUABOX modules using all SINGLE JOINT connectors above and below the modules as required, until all the modules constituting the tank have been fully connected.



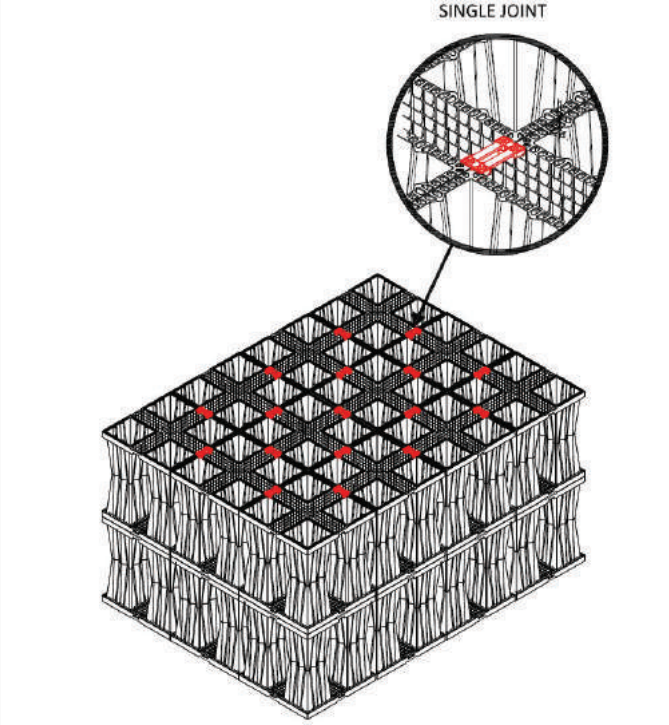
3.3 MULTIPLE LEVELS OF AQUABOX

Pre-assembly of the AQUABOX module, and horizontal linking of assembled modules. Modules are linked using the SINGLE JOINT below the modules (same as par. 3.1), and the DOUBLE JOINT above.
The double joint connector is used to link stacked modules in two or more layers.



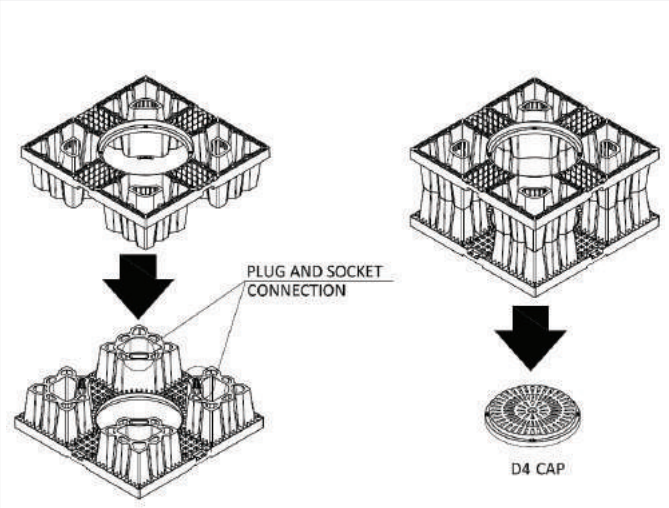


When the last layer of AQUABOX is completed horizontal link with the Single Joint must be installed.



3.4 AQUABOX CUBE

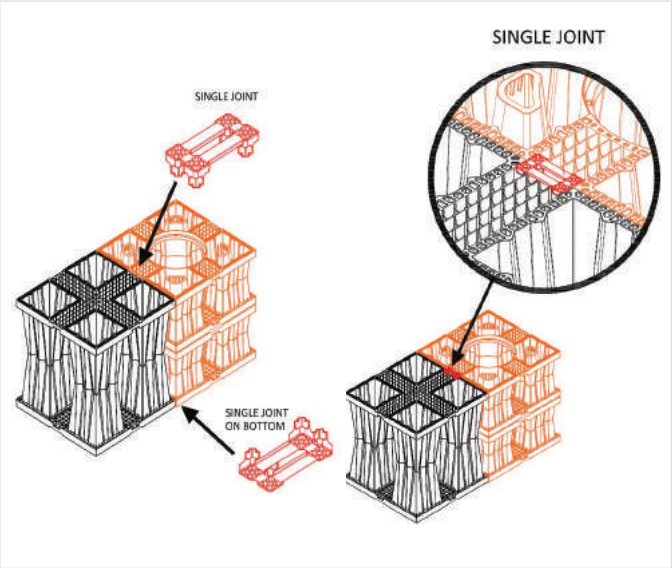
AQUABOX Cube module assembling is very fast and easy, thanks to his plug and socket connection in the middle part of the element, AQUABOX Cube can be assembled just pushing the two half pieces on the floor.

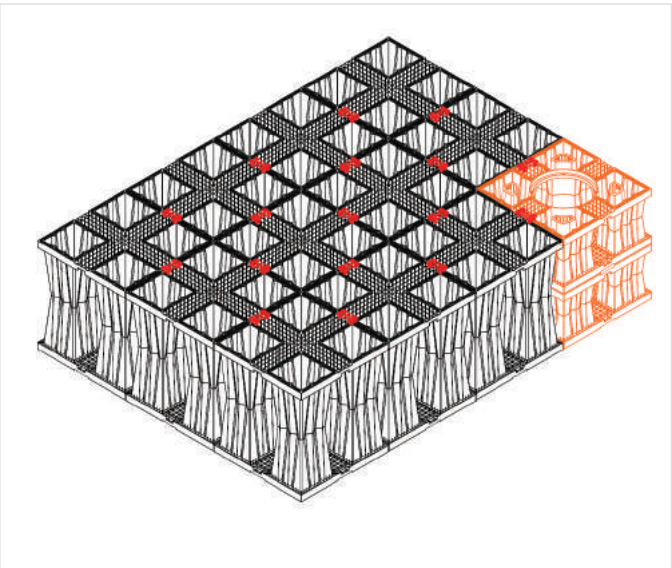


The D4 CAP is placed on the bottom of the tank in order, to lock the circular opening in AQUABOX CUBE.

3.5 AQUABOX CUBE ONE LEVEL INSTALLATION

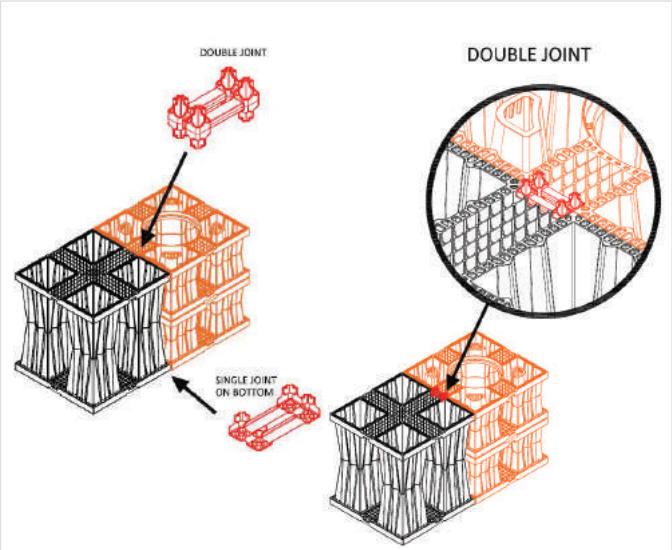
In one-layer installations SINGLE JOINT connectors must be used for all links between elements.



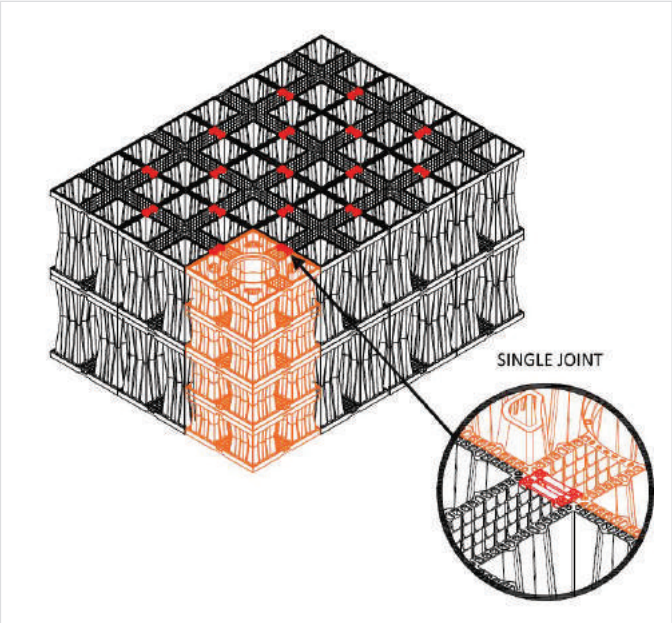


3.6 AQUABOX CUBE MULTIPLE LEVELS INSTALLATION

In case of multiple levels tanks, the connection between layers is done using the DOUBLE JOINT, connections under the first layer are done using the SINGLE JOINT.



Connections at the top of the last layer are done using the SINGLE JOINT connector.



3.7 SHAFT CONNECTION FOR AQUABOX CUBE

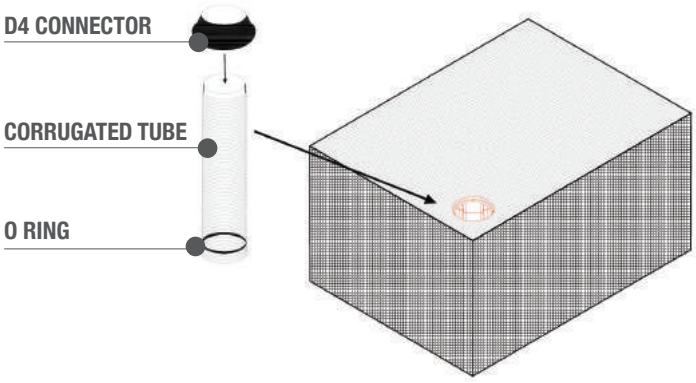
The connection of the shaft on the AQUABOX cube is easy as the tube will fit into the dia. 400 mm opening in the AQUABOX CUBE module, and will remain standing with minimal support required. This operation must be performed after the geomembrane and the geotextile layers are installed above the tank. This way it is possible to waterproof the opening with a seal ring.

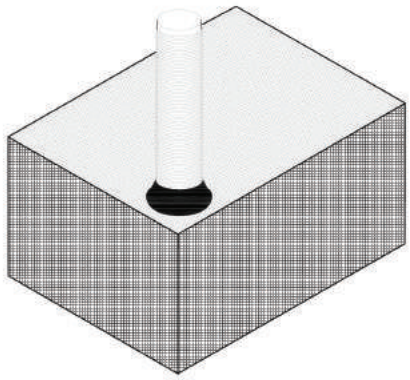
Depending from the acting loads, the inspection point cover may be installed directly onto the end of the tube, or instead, in the case of heavy loads, a load-distribution concrete ring to support the cover elemnet is mandatory.

The two main solution for lid connection ot the tube are Heavy Trafic Load and Pedestrian Load. Smooth tubes can be used instead of corrugated tubes.

	**LID** Ø400 mm
	**LID SEAL RING** Ø400 mm
	**CORRUGATED TUBE** Ø400 mm
	**SEAL RING** Ø400 mm
	**D4 CONNECTOR** Ø400 mm

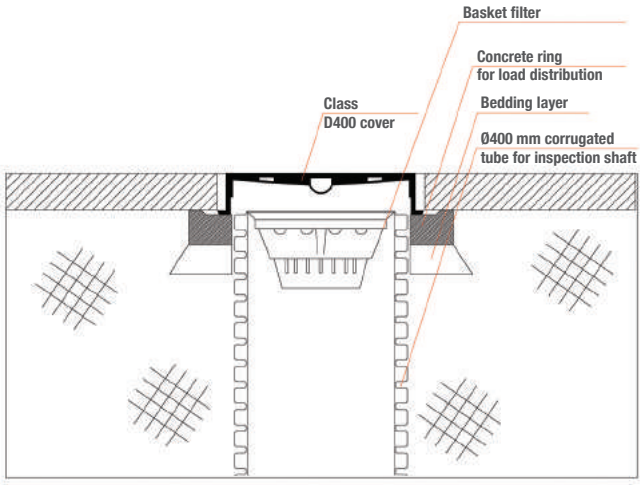
Installation of ispection shaft and accessories shown below.

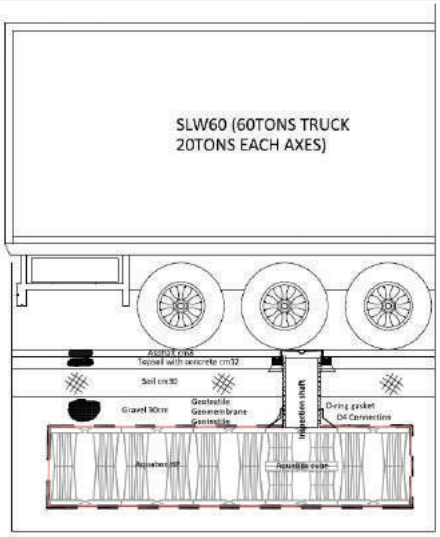




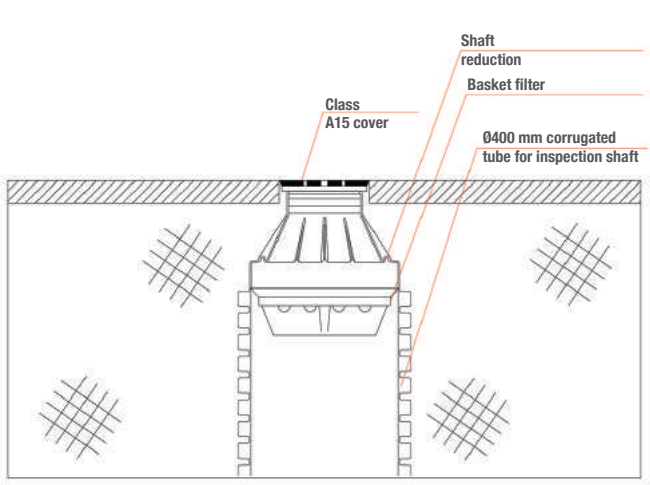
Heavy traffic Inspection shaft detail. Note that the manhole cover is supported by a concrete ring around the tube.

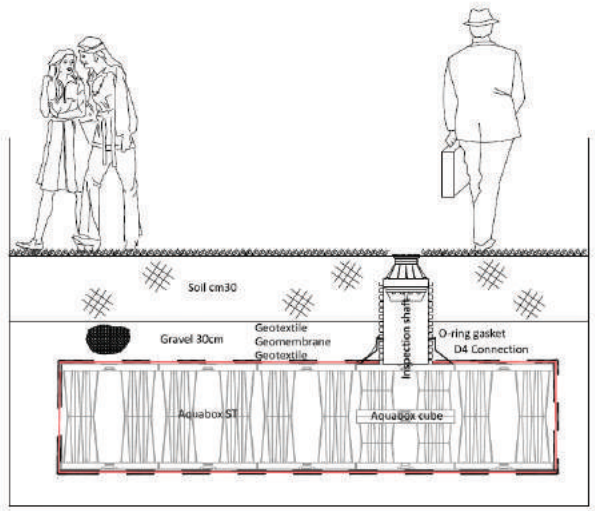
VEHICLE LOAD COVER DETAIL





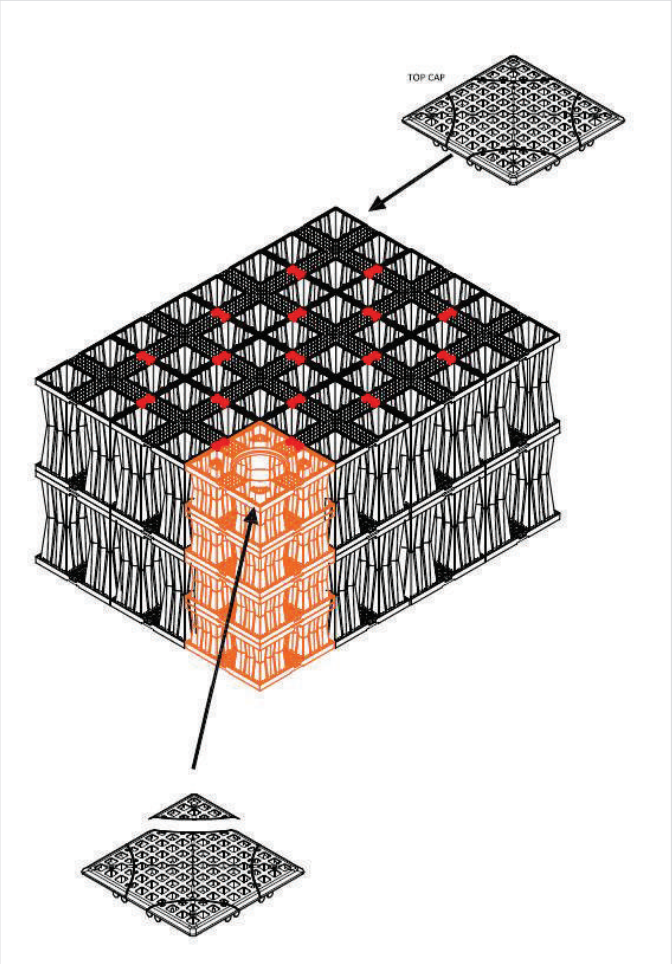
PEDESTRIAN LOAD COVER DETAIL

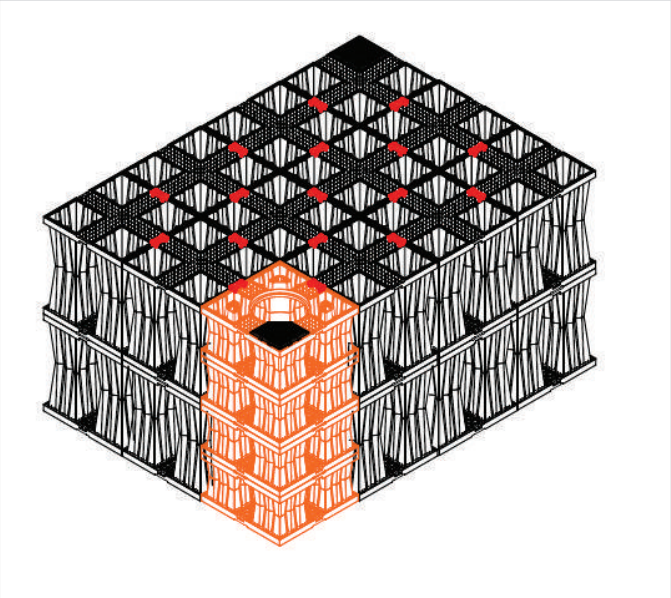


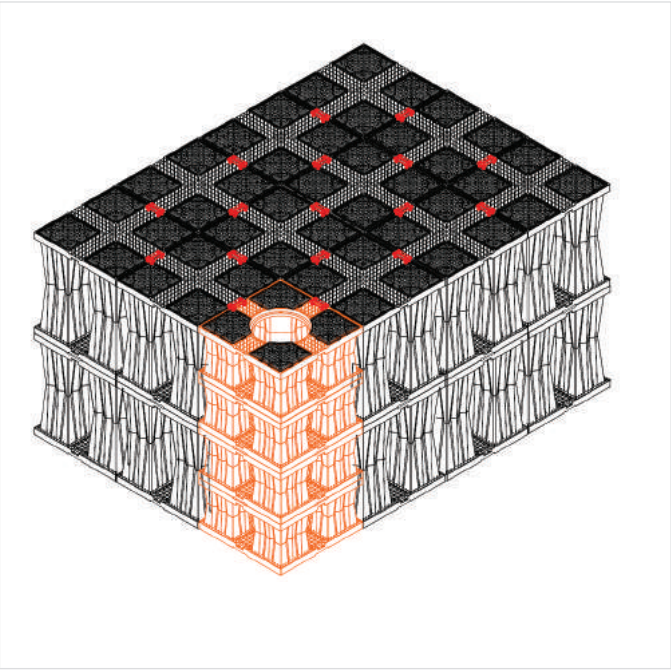


3.8 TOP CAP ELEMENT FOR AQUABOX AND AQUABOX CUBE

The TOP CAP elements are fitted onto the topmost layer of AQUABOX modules, its purpose is to provide a continous support for the geotextile layer.
To fit the Top Cap onto AQUABOX CUBE elements simply cut off the corners along the marked lines.

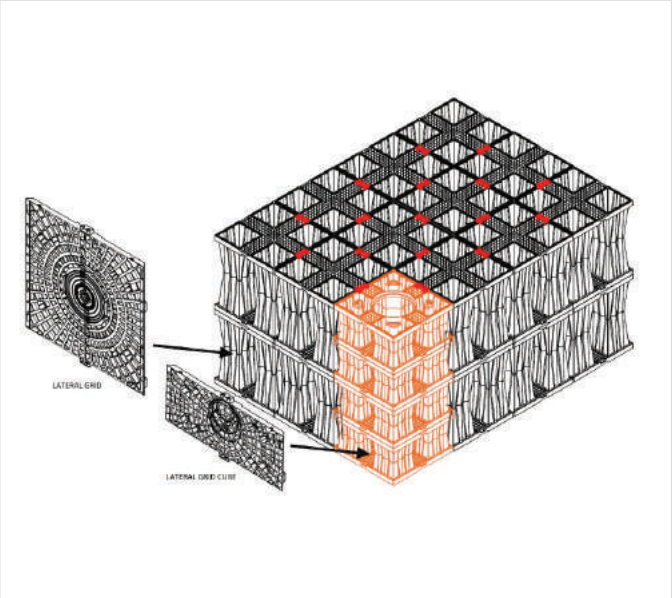


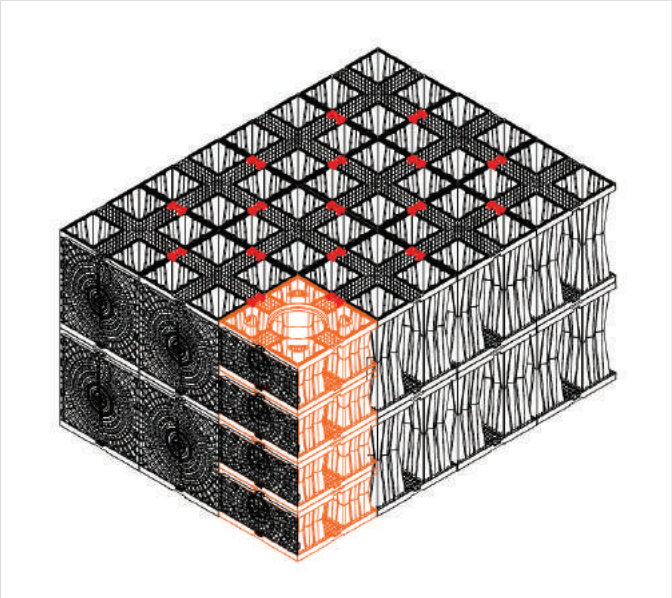




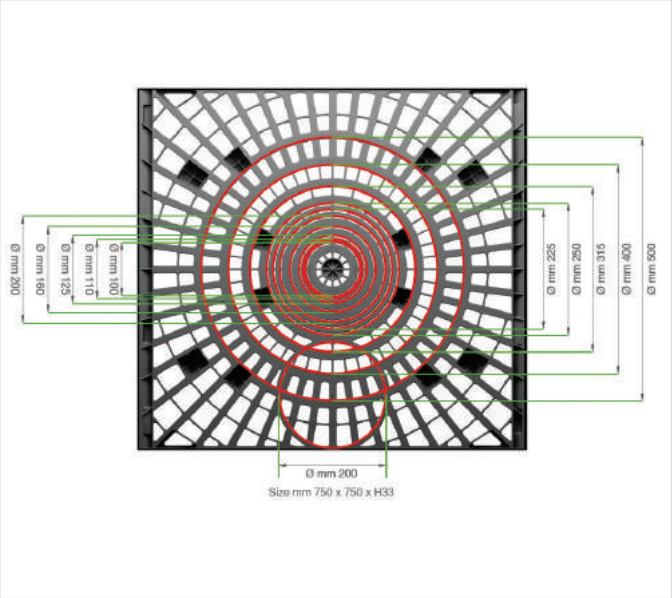
3.9 SIDEWALL GRIDS

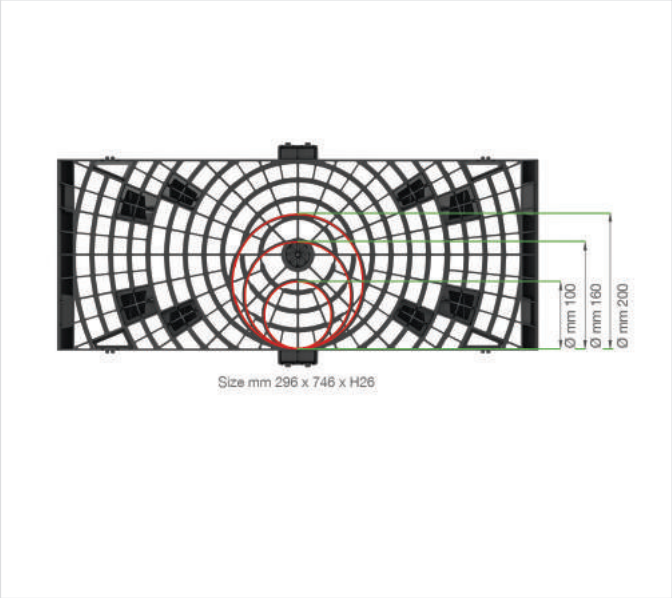
Once the AQUABOX modules have been installed, the sides of the tank are closed using the SIDE GRIDS.





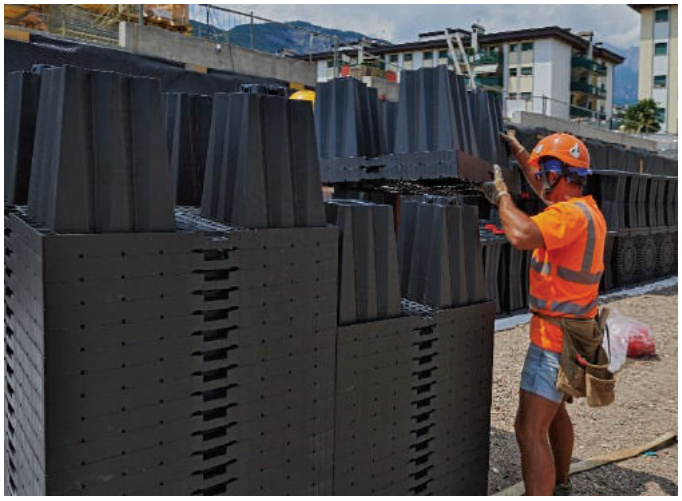
On the grid elements there are several dimension of tubes indicated. In this way is easily to understand which dimensions has be to cut with perfect accuracy.

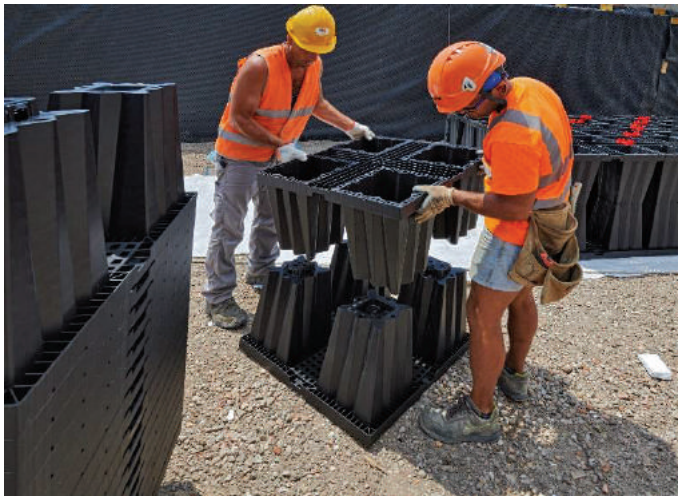


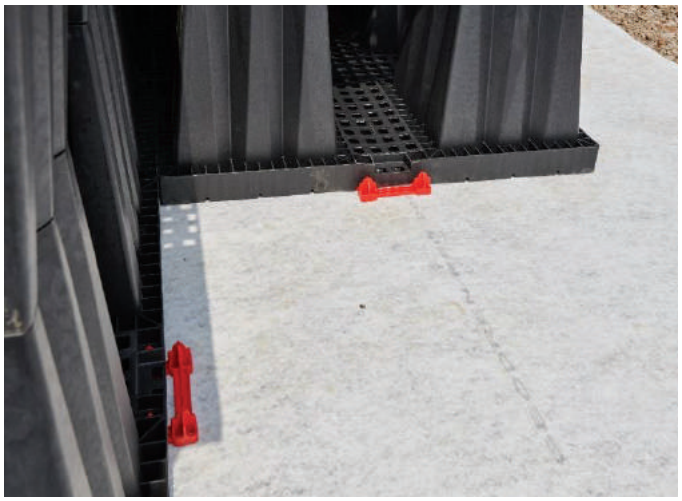


4. INSTALLATION SEQUENCE - VISUAL GUIDE

4.1 INSTALLATION OF AQUABOX MODULES







4.2 AQUABOX CUBE INSTALLATION

4.3 GEOTEXTILE WRAPPING AND BACKFILL MATERIAL

5. MAINTENANCE AND CLEANING

Make sure that no foreign objects enter into the pipes or the Aquabox modules. Special attention is required if a polluting substance will be present in the vicinity of the installation area. First checks (and all cleaning operations) should take place before the delivery of the material and after the complete installation of the system.

A visual inspection of the system and inlet shaft, as well as an inspection with video camera robots are recommended. These inspections should then be recorded in a maintenance book of the tank.
Further checks should take place every six months for the first year of use.
These inspections will give information useful to program the inspection and cleaning interventions for the future. To this end, cleaning operations must start with the cleaning of the supply pipes and upstream wells, especially if they also act as a sediment trap.
Thereafter the system should be inspected and cleaned at least twice a year, preferably in Spring and Autumn, and of course after every extreme weather event.

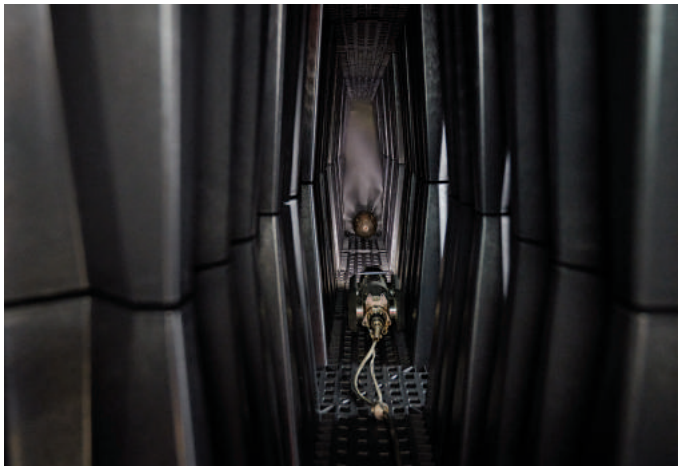
System control is essential the in the following periods:

- End of construction site operations;
- After intense rainfall events;
- In case of failure or malfunction of the pretreatment units, if applicable;
- At least once a year.

5.1 CLEANING OF THE AQUABOX MODULES

A cleaning of the drainage system can usually be carried out by cleaning and vaacuming the dirt from the inspection shaft. Cleaning operations must begin from the cleaning and vaacuming of the upstream pipes and from the upstream inspection shaft or the sediment trap, if present. In fact, in case of heavy pollution (high amount of sediment) cleaning of the whole Aquabox system must be done with high pressure cleaning of the internal channels.

When cleaning with a spray probe, it is recommended to use nozzles with a rotation of 90° and a water jet at 45°. The nozzles used must have a pressure between 80 and 120 bar, higher pressure values could damage the geotextile.



6. DISCLAIMER

All images of AQUABOX components and products contained in this document are for illustrative purposes only. Colour, size, scale of the element and its representation may not correspond exactly to the product, but are represented in such a way to most effectively convey meaning. E.g.: the colour orange is used to better identify AQUABOX CUBE, it is not the real colour of the product.

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