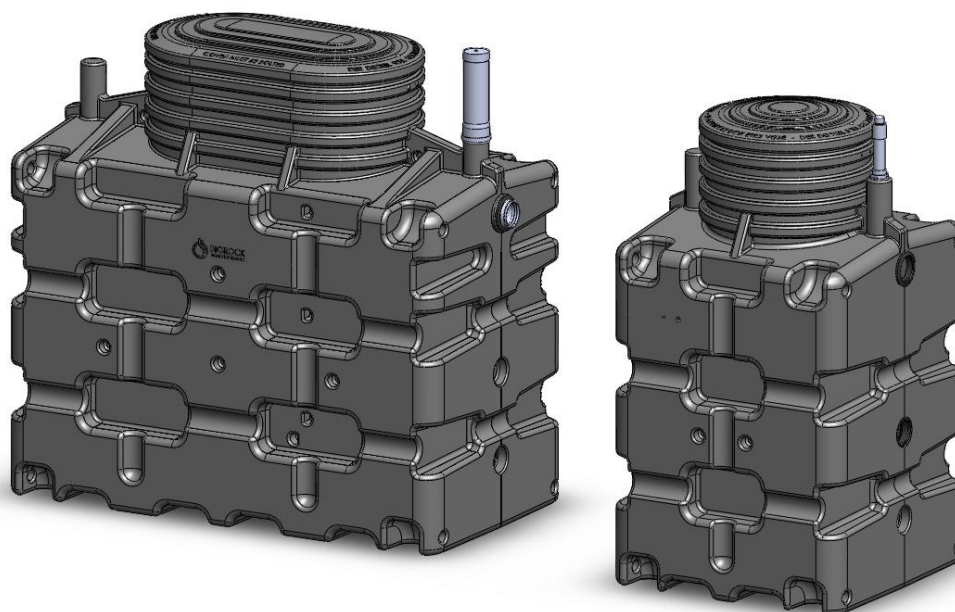




INSTALLATION & MAINTENANCE INSTRUCTIONS FOR THE BIOROCK[®] UNITS

United Kingdom and Ireland



BIOROCK-ST2-3300 + BIOROCK-5



Dear Customer,

Congratulations on your purchase of this BIOROCK® Domestic Sewage Treatment Plant. Your new BIOROCK® will guarantee years of trouble-free operation, peace of mind and protection for the environment.

We highly recommend that you familiarize yourself with this guide for the installation, commissioning and maintenance of your new BIOROCK® system.

The instructions for the maintenance of and visual checks of the system will ensure that you to maintain a reliable and long-lasting sewage treatment plant.

Please do not hesitate to contact your BIOROCK® distributor for any queries or further assistance.

Thank you for choosing BIOROCK.

Name of your BIOROCK® Distributor:

Contact details:

Official Stamp:

BIOROCK S.à.r.l.
Z.A.E. Robert Steichen,
5, rue Bommel
L-4940 HAUTCHARAGE
Luxembourg
E-Mail: info@biorock.com

BIOROCK UK
5300 Lakeside,
Cheadle Royal Business Park,
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Tel: 0161 246 6065

BIOROCK Ireland
The Crescent Building,
Northwood,
Santry,
Dublin 9
Tel: +353 (0)1 893 4948

Approval certificate for the BIOROCK® Domestic Sewage Treatment Plant

(Retain a copy of this certificate with your Owner's Manual)

This must be completed and a copy returned to:

BIOROCK Sarl
Z.A.E. Robert Steichen,
5, rue Bommel
L-4940 HAUTCHARAGE (Luxembourg)
Email: info@biorock.com

Owner	Installer
Surname.....	Company name.....
First name.....	Surname.....
Address :	First name.....
.....	Address :

Date of installation of the BIOROCK® STP:

Date of the commissioning of the BIOROCK® STP:

Indicate:

Nature of building: Number of rooms: Number of occupants:

Soil conditions: Dry ☐ Damp ☐ Difficult ☐ Sloped ☐ Other

Outlet:

Tank ☐ Storm drainage system ☐ Seepage ☐ Re-use of treated water ☐ Other ☐

Type and capacity of primary tankSerial
number.....

Type and capacity of BIOROCK® unitSerial number.....

Natural ventilation ☐ Electric ventilation ☐ Intermediary pumps ☐ Exterior pumps ☐

Below concrete surface or vehicular access way ☐

Declaration:

The BIOROCK® STP has been installed and tested in accordance with:

- The current regulations stating the technical requirements applicable to domestic sewage treatment plants in the territory where the plant has been installed.
- Installation, use and maintenance requirements of the primary tank and its effluent-filter, indicated in the instruction manual as provided by the material manufacturer.
- Current installation, use and maintenance requirements of the BIOROCK® system.

Signed at on

Seals and signatures

The owner	Seal of the supervisory authority	The installer
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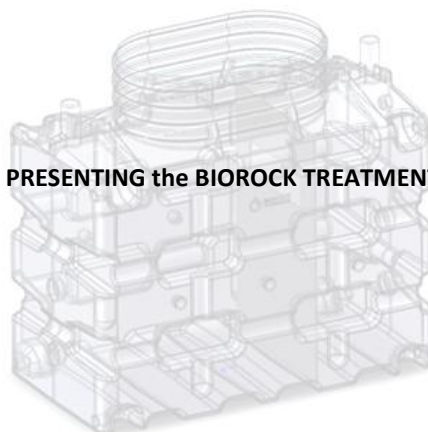
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PRESENTING the BIOROCK TREATMENT SYSTEM



Guarantee:

In order to claim guarantee you or your installer need to take digital color pictures of the complete installation.

GENERAL POINTS

The BIOROCK® unit is a compact Domestic Sewage Treatment Plant; it relies on the innovative BIOROCK® biological filtration process. The BIOROCK® sewage treatment unit is exclusively intended for domestic waste water purification, i.e. effluent and household waste water, treated primarily in a primary tank with an effluent filter. The BIOROCK® plant consists of a Primary Tank and a BIOROCK® Bioreactor. Both parts (primary tank and Bioreactor) must be independently ventilated.

1.1 Dimensions

Parameters / model	BIOROCK-5	BIOROCK-10	BIOROCK-15
Maximum Person Equivalents (P.E.)	5 P.E.	10 P.E.	15 P.E.
Volume of the primary tank	3,300 L.	3,300 L.	5,300 L.
Waste water volume	750 L./ day	1,500 L./ day	2,250 L./ day

The minimum volume of the primary tank, indicated above, is a guideline, and these indications cannot, in any case, be substituted with those of the documents and manuals of the manufacturer, and with the requirements of the regulations and norms of each country.

1.2 Important precautions

To ensure the good working order of the BIOROCK® system, the use of automatic toilet cleaners, electric waste-disposal systems and pumps equipped with blades are not to be used.

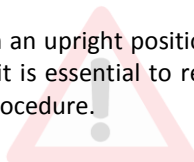
Do not dispose of solid, non-degradable debris in any waste water pipe in the building.

Do not dispose of the following items to the BIOROCK® system: kitchen or motor oils, fats, wax, resin, paint, solvents, hydrocarbon-based products (petrol, crude oil etc.), any pesticide or antibacterial product, items of a toxic nature, boiler or air-conditioning condensate, swimming pool backwash, rainwater, drainage water or ground-water.

1.3 Technical characteristics

	BIOROCK-5	BIOROCK-10	BIOROCK-15
Length	1,150 mm	1,400 mm	2,150 mm
Width	1,150 mm	1,150 mm	1,150 mm
Maximum height	2,100 mm	2,100 mm	2,100 mm
Minimum height	1,740 mm	1,740 mm	1,740 mm
Diameter of the manhole riser	700 mm	700 mm	700 x 1,200 mm
Inlet height/tank floor	1,440 mm	1,440 mm	1,440 mm
Outlet height above tank bottom	300 mm	300 mm	300 mm
Inlet/outlet height difference	1,098 mm	1,098 mm	1,098 mm
Tank weight (excludes water weight)	186 kg	223 kg	297 kg

Warning: The system must be kept at all time in an upright position. In case a unit is overturned or tilted in such a way as to disturb the bags of BIOROCK® Media, it is essential to remove the BIOROCK® media and repack the bags according to the BIOROCK® media replacement procedure.



1. OPERATING PRINCIPLES for your BIOROCK® Domestic Sewage Treatment Plant

1.1. The Primary tank

The primary tank receives the raw domestic wastewater for pre-treatment. The raw waste water is a mix of grey water (waste water from baths, showers, kitchen sinks, dishwashers, laundry effluents and wash hand basins) and black water (waste water from toilets).

This waste water flows downward to be collected at the bottom of the house, at the primary tank. The liquor comprises matter in suspension, fats and other floating matter.

The fats and other floating matter rise to the surface to form a scum layer on the surface of the primary tank. The heavy matter settles, accumulating at the bottom of the tank; this is the sludge. This sludge is digested and liquefied after months of storage by anaerobic fermentation.

The installation of a sewage effluent-filter (integrated into the primary tank) traps the suspended matter, fats and residual floating matter, resulting in a higher pre-treatment quality.

1.2. The BIOROCK® sewage treatment unit

The BIOROCK® sewage treatment unit is a biological purification system, using the BIOROCK® media as a carrier material for bacteria. The BIOROCK® unit, consisting of two biological filtration steps and one aeration step, has pre-treated water passed through it by gravity. The pre-treated water is spread over the surface of the first layer of BIOROCK® media by a dispersion system and penetrates into it for purification.

The fine residual matter in suspension (contained in the pre-treated water) is deposited and accumulated in the first step of the filtration, and is progressively digested.

This level consists of two layers, one on top of the other; the upper layer comprises BIOROCK® Media 20x20x20 mm and the lower filter mattress of BIOROCK® Media 10x10x10 mm.

Below the first layer, the waste water flows through a ventilation space comprised of polyethylene rings. Dripping through the plastic filling, the sewage water is further oxidized before penetrating the second layer of BIOROCK® media.

Because of this, the BIOROCK® unit must be correctly ventilated, independently of the primary tank. The ventilation can be done by natural draft, or if required, by means of a wind driven ventilator. The second layer is made up of BIOROCK® Media 20x20x20 mm.

The treated water, discharging from the unit, must flow by gravity to the next receptacle, or to an extraction point. The water must never remain in the outflow pipe.

The materials used in the BIOROCK® system are corrosion resistant. It is important to use the correct components during a replacement. The pipes are PVC. All of the screws and metal components are of stainless steel. The tank is made of UV- and corrosion-resistant polyethylene.

➤ The BIOROCK® system does not release any smell

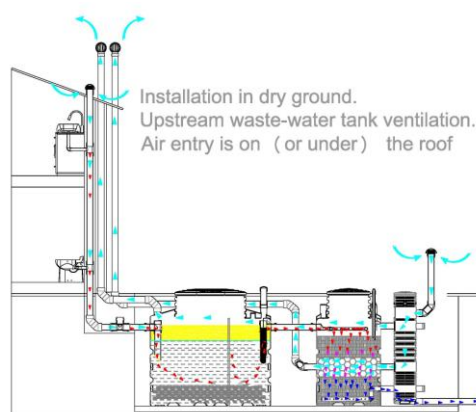
The BIOROCK® system's purification process relies on aerobic oxidation; preventing the release of malodors. The tank is covered by a lid, and the air is removed by a ventilation duct, Ø 110 mm, which must be situated at least 4 m¹ (14') above the air-inlet pipe.

We remind you that this duct must be installed at least one meter away from any other ventilation system working in the building.

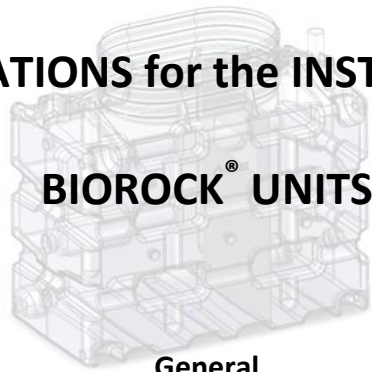
➤ Maintenance access

Access for maintenance is mandatory, as much for the primary tank as for the BIOROCK® sewage treatment unit and its inspection points.

The seals of the inspection points are screwed on. Make sure that the screws are always kept tightly screwed for safety.



RECOMMENDATIONS for the INSTALLATION of the



General

The following recommendations, for the attention of installers of BIOROCK® Domestic Sewage Treatment Plants, are guidelines for the installation according the location, the soil type, and the environment of the installation zone of this equipment.

These indications cannot, in any instance, be substituted with those contained in the documents and manuals of the manufacturer, nor with the requirements of local regulations, or the respective trade and safety regulations of each country.

1. INSTALLATION

1.1 Location

The installation of the works must be located away from traffic and zones used for vehicle parking, cultures, plantations and storage zones, except for certain precautions outlined below.

1.2 Minimum distance for equipment installation

The installation must respect a minimum distance of around 7 m¹ from any large structure, 7 m¹ from the property boundary or hedges, and on average 1.5 times the height of any tree.

The minimum distance defined by a country's regulations is variable when applied to:

- sewage treatment units of variable heights
- different types of ground
- unusually founded structures (continuous spread footing, slabs, beams supported by piles etc.), and at different levels

If it is impossible to maintain a minimum distance for a sewage treatment unit, the equipment can be installed at less than 5 m¹ from a structure, but in this case the distance must be defined by a qualified engineer.

The minimum distance is designed to prevent:

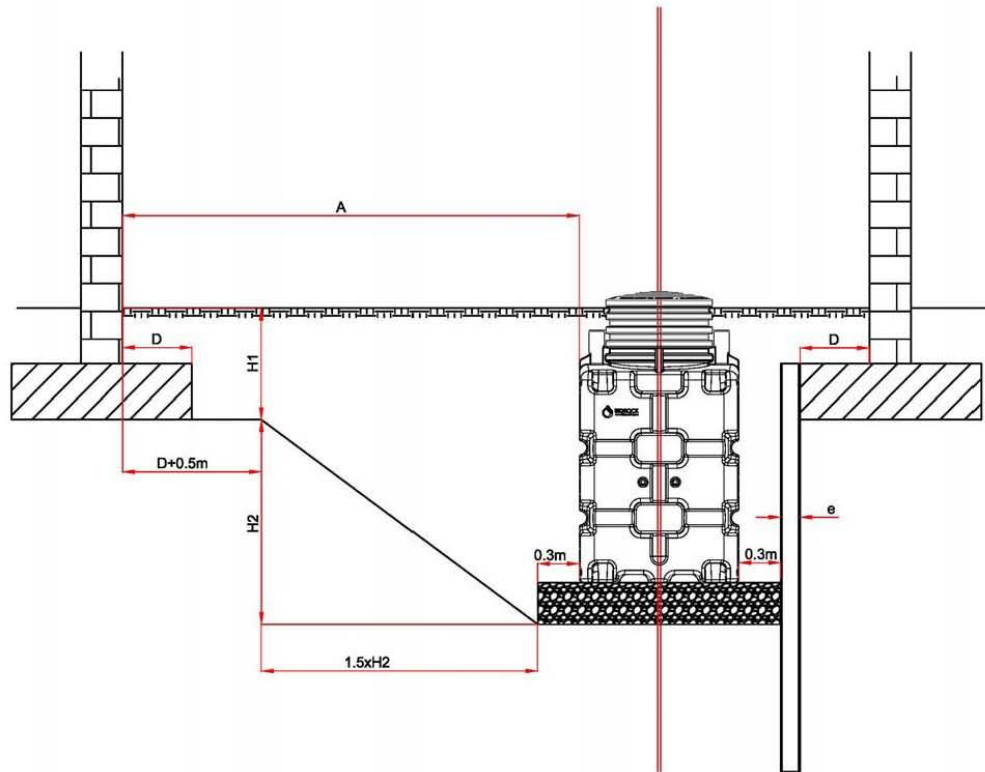
- undermining of the foundations if it is load-bearing
- subjecting unequal pressure from the foundations on one side of the equipment

The following two examples are a guide:

- in an open pit with clear, dry ground
With the BIOROCK® units of which the pit base is around -2.4 m¹ and for example a continuous spread footing founded at -0.80 m¹ with an overhang of 0.50 m¹,
the minimum distance A=3.70 m¹
- with a shoring
The minimum distance A= (0.8m¹ + thickness of the shoring as calculated by the engineer)

See the diagram on the following page

Information about the proximity of the structur



A	<p>Minimum distance</p> $A = (D + 0,5) + (1,5 \times H2) + 0,3$
D	Foundation overhang at the edge of the structure
H2	Height difference between the base of the pit and the base of the foundation
e	Shoring thickness (concrete wall or Berlin-style shoring, for example)

1.3 Depth

The depth depends on the nature of the ground, which determines the dimensions of the equipment supports, on the distance and on the height of the treated water outflow point.

We recommend that you fill in the pit to a maximum of 1 m¹ from the lowest level of the raised section, with uncovered accessible seals to allow for maintenance.

1.4 Connection

The primary tank must be installed as close as possible (less than 10 m¹) from the untreated water outflow point, and linked to it by 110 mm diameter pipes, with a maximum possible slope of 2-4%.

The connecting joints on the tanks are flexible.

The waste water outflow has a minimum slope of 1%.

1.5 Ventilation of the BIOROCK® unit

Ventilation is necessary for BIOROCK® units, and must be independent of the primary tank. Natural ventilation is sufficient in most cases.

The BIOROCK® units will normally work with natural ventilation. In some cases, a wind driven ventilator may improve this flow.

The air extraction must be positioned at the highest point, and at more than one meter from any obstacle or ventilation, so the flow is not interrupted.

A circular pipe allows for, in principle, a better suction than a square conduit. Joints in the tubing will lessen the suction. If, however, joints must be used, it is preferable to choose 2x45° rather than 1x 90° joint.

2. INSTALLATION of the UNITS

All excavation work for the equipment installation must be carried out according to the norms and regulations applicable in the different countries.

The conditions for the excavation of the pit, the installation of the bed and the filling therein depend on the nature of the soils in the area chosen for the BIOROCK® system installation.

2.1 Clear, dry and stable ground

➤ *The tank installation pit see picture 1*

The pit bottom level is determined by that of the inflow pipes, and is located at 300 mm lower than the base of the units.

Topsoil can't be used as fill material at the end of the installation, unless it is suitable for this purpose.

Prepare an excavation large enough receive the equipment. In the base of the pit, prepare a 300 mm bed, and with a sufficient width to fill in 300 mm of sand around the unit. Follow the safety regulations determined by the local and applicable occupational health and safety laws.

The bottom of the pit must be clean, clear and stable. Any patch of peat, mud or unstable ground must be removed and replaced by high-quality backfill.

➤ *Bed see picture 2*

After compacting the bottom of the pit, a 300 mm bed of compacted "0-6" sand must be installed, extending 300 mm lengthwise and widthwise past the edges of the equipment. Ensure the bed is completely flat and level.

➤ **Units installation**

Once the base is stabilized, position the equipment, making sure that the stabilized sand is spread completely underneath the base of the tank, filling any spaces to ensure stability.

Before connecting the plumbing pipework and the ventilation pipework, it is vital to ensure that each item is perfectly set and securely inserted into the bottom of the pit, and allow sufficient water flow for the effluent to flow freely.

The various connections in the pipes and ventilation must be air- and water-tight, if necessary by using air- and water-tight seals.

➤ **Backfill see picture 2**

The lateral backfill against the sides of the equipment is made up of clean, preferentially stabilized sand with a granulometry of 0-6, applied symmetrically by successive layers of 300 mm thickness by 300 mm wide. Make sure it fills any gaps among the tanks.

You can backfill the remaining space between the stabilized sand and the pit walls with 300 mm layers of the earth removed from the pit, compacted and with stones removed.

☑ **All backfill must be free of any sharp or pointed objects.**

While backfilling the hole, both Primary Tank and BIOROCK[®] unit are filled with clean water up to 300 mm, the same level as the backfill, to reduce the pressure on the sides.

☑ **At this time it is very important to verify that the tanks and connections are air and water-tight as they are being backfilled.**

The top of the tanks are also backfilled with lean-mix up to a height of 300 mm, and until normal ground level with top soil removed from the pit.

Once the backfilling is complete, you need to ensure the unit's water distribution pipe is level and the in- and out-flows flow freely.

Place the lid onto the completed installation and secure with lateral screws.

WARNING

***Mechanized compacting must not be used on or around the tanks.
Use manual compacting boards instead.***

2.2 Special types of ground, and installation precautions for unusual situations

➤ **Damp ground, subterranean water, variations in the water table etc.**

Carry out the installation as for dry clear ground, save for the following recommendations and modifications:



BIOROCK[®] tanks can be installed in wet soils, provided that all precautions necessary are taken to prevent water pressure from building up against the sides of the plastic tanks.

Use a side pump to keep the pit dry during the digging. Keep the side pump running until the concrete has been fully hardened.

The bottom of the pit needs to be 300 mm lower to support a reinforced concrete slab on a geotextile mat which is 30 mm longer and wider than the equipment.

The reinforcing steel rods of this reinforced concrete slab need to be determined by an engineer, with two anchoring bars sunk in, onto which are fastened corrosion-resistant webbing to avoid the units from buoying up.

☑ **Making stabilized cement-sand:**

Dry-mix 1 m³ of 0-6 sand with 200 kg of cement.

Compact lightly to encourage it to set.

The lateral backfill around the equipment is completed as for the dry ground, but concrete replaces stabilized cement-sand 0-6 for the 300 mm thickness backfill around the sides.

N.B. Use a side pump until the concrete has completely hardened.

➤ **Unusual situations**

Poorly- or non-draining ground, flood zones, impossible to connect the outflow by gravity, high ground water conditions, etc.



BIOROCK® tanks can only be installed in unusual situations, provided that all precautions necessary are taken to prevent water pressure from building up against the sides of the plastic tanks.

We recommend you dig a drainage trench lateral to the equipment in the bottom of the pit if level allows.

This trench is made of a drainage pipe surrounded by 20-50 mm gravel, all covered by a geotextile mat. This drainage trench will link the equipment pit to a relief well if level allows.

You can also surround the plastic tank with a locally built concrete tank. You can use the plastic tank as a lost shutter.

In unusual situations such as areas of high ground water, a structural engineer should be consulted to advise on an adequate installation procedure.

N.B. *BIOROCK never takes the responsibility for installation in unusual situations.*

➤ **Gravel soils**

Carry out the installation as for dry clear soils, save for the following recommendations and modifications.

After digging the pit, make sure there are no hard or pointy objects caused by insufficient rock removal where the bed will be.

The bed as well as the lateral backfill will be made of:

- 0-6 ordinary sand if the ground is dry and clear, and if the rock comes through the entirety of the surface with which the equipment will be in contact.
- 0-6 stabilized cement-sand if the ground is wet or in presence of a water table, or if the floor of the pit is comprised of several different materials. In this case, everything will sit on a reinforced concrete slab, 150 mm thick.

➤ **Non-stabilized or unstable ground**

Non-stabilized soil (sand, clay, silt, shale, etc.) are made up of material which is sensitive to changes in water content. Installation therefore proceeds as for damp soils: a reinforced concrete slab, bed and backfill of stabilized cement-sand.

➤ **Sloped ground (more than 5%)**

The equipment must always be installed horizontally, and must never be subjected to uneven pressure. The bed and the lateral backfill are installed according to the nature of the ground, as described above. The equipment must be protected from uneven pressure by a system of shoring devised by an engineer.

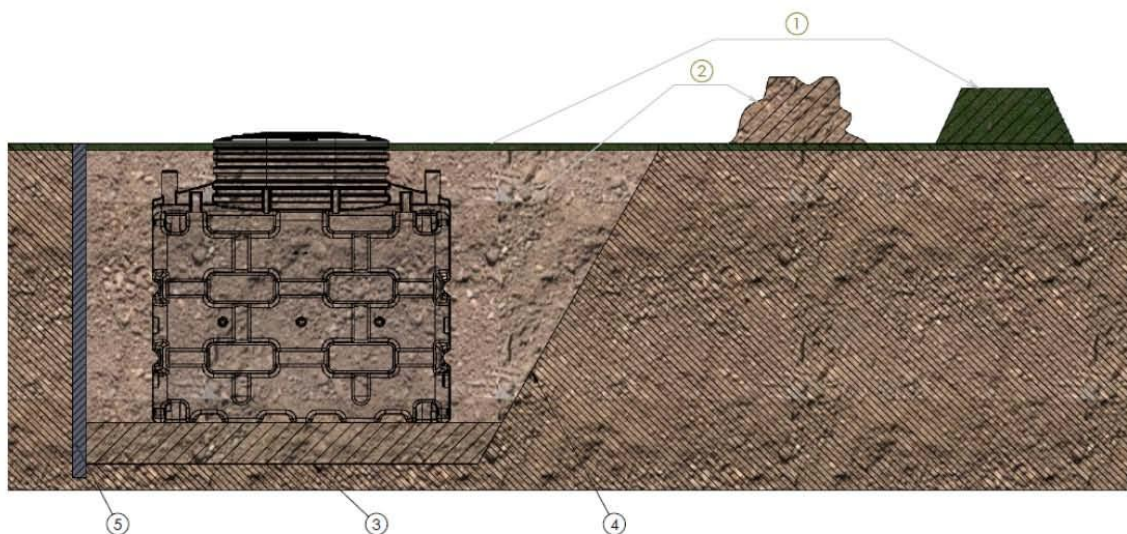
➤ **Areas subjected to traffic or storage**

If it is not possible to avoid these areas for the installation of the equipment, you must respect the bed and lateral backfill conditions according to the nature of these soils.

Construct a reinforced concrete dividing slab above the equipment to protect it.

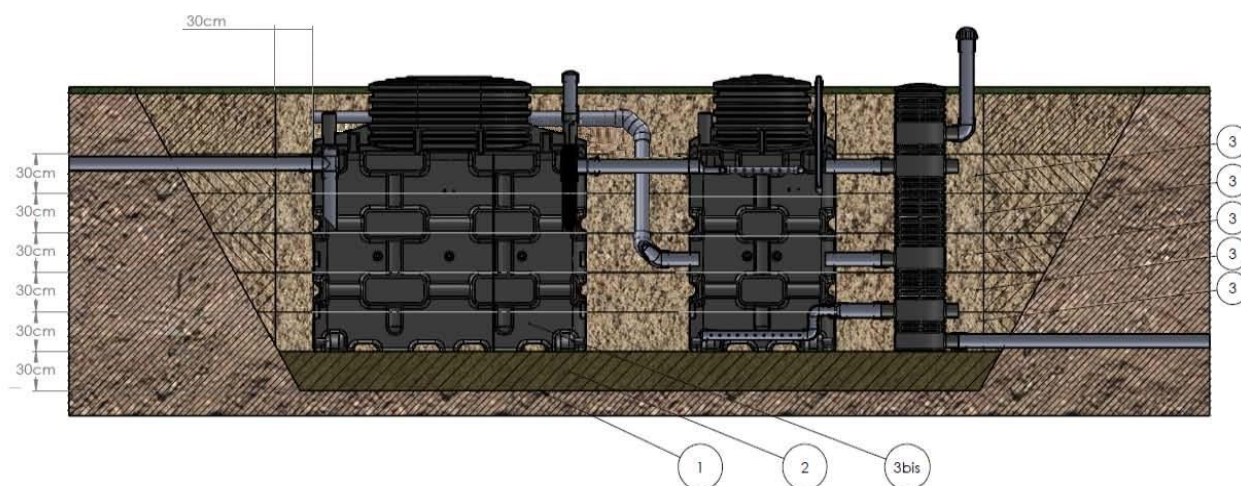
This needs to be calculated by an engineer as a load-bearing slab. This slab will transfer the weight exerted by moving or static loads to its supports, located outside the area excavated for the pit. The foundations of the slab must be at a sufficient level so the loads will not affect the sides of the equipment.

EXCAVATION, DIGGING the PIT



1	Removal of topsoil and storage
2	Excavation for the pit and partial storage (if required for the backfill)
3	Rough leveling and compacting of the bottom of the pit
4	Natural slope for clean earth
5	Filling of clean water at the same rate as the backfill

INSTALLATION on CLEAN and CLEAR GROUND



1	Verification of the flatness and compacting of the bottom of the pit
2	Bed (30cm of compacted sand)
3	Lateral backfill of 0-6 sand by successive layers of 30cm
3bis	Filling of clean water at the same rate as the backfill

OPERATION and MAINTENANCE PROCEDURES

1. SAFETY GUIDELINES relating to the commissioning and operation of BIOROCK® units

- Never smoke near the work area while the operations described in this manual are being carried out, and never enter the work area without having taken all the prior precautions for ventilation and atmospheric testing in the work area as prescribed in the applicable local regulatory provisions.
- BIOROCK® treatment systems do not require any external energy source, except where an electrical ventilator and or pump is utilized, so there is no risk of electric shock.
- Utilize certified professionals for all installation and maintenance work, and for all operations undertaken on this sewage treatment plant. Your distributor and/or your installer will advise you on how to set up a maintenance contract.
- You should avoid any accidental contact with the waste water. Personnel working on the equipment must wear protective clothing (water-proof gloves, suits, eye and face protection and protective shoes).
- Any risks during the installation are related to excavation or handling of material. While installing the tanks, use a sling hung from the 4 corners of the upper part of the pit. Make sure that nobody is in the maneuvering zone, and do not position yourself under the load.
- Accessibility for maintenance checks is obligatory, for the primary tank as much as for the BIOROCK® treatment unit.
- The seals of the inspection points are screwed on; make sure that the screws are always kept tightly screwed for safety.
- During an operation on the equipment, never leave the inspection points unsupervised while open.
- After work has finished, ensure that nothing has entered the tank, carefully replace the lid and tighten the screws to shut it.
- Lids are for pedestrian use only.

2. THE PRIMARY TANK — MAINTENANCE GUIDE

BIOROCK® advises to use an effluent filter in the outlet of the Primary tank before going to the BIOROCK® unit.

Sampling the pre-treated waste water outflow from the primary tank: once a year at the same time with primary tank emptying (annual maintenance)

- Check (visually) the pre-treated waste water quality.
- Take a sample (with rubber or latex domestic use gloves) of the purified sewage water in a clean glass.
- The water color should range from light brown to yellow, from turbid to very turbid, but very little deposit should show at the bottom of the sample after it has rested for twenty minutes.
- The purified water may have a slightly (septic) odour.

⚠Warning! If the water looks different or you find deposits in the-treated waste water, this may be caused by:

- Water flowing too fast through the equipment (hydraulic overload). Check that no rainwater run-off system passes through the installation. If the sample is taken upstream of the tank, check that the flow of the hydraulic pump is compatible with the size of the primary tank.
- The primary tank being too small to accommodate normal usage.
- Incorrect disposal of harmful, toxic, anti-bacterial or non-biodegradable products into the installation.
- You may need to call a certified septic tank cleaning company to empty the primary tank and to clean it (skimming off the fats and floating matter — the surface layer). Never completely empty the primary tank; always leave a layer of sludge on the bottom to ensure that it continues to function correctly after it has been emptied.
- In all of these cases, you should consult the documents and user manuals provided by the tank manufacturer.

⚠ Warning! If you notice any foul odours, these may be caused by:

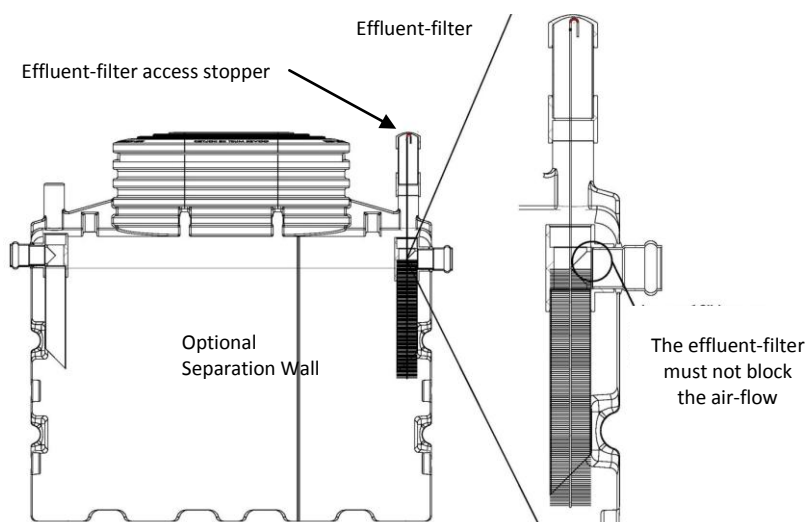
- The ventilation system is not air-tight upstream of the primary tank.
- The waste water system from the extraction points (sink, WC, baths, showers, other drains, etc.) down to the primary tank is not air- or water-tight
- The inspection seals or the seals on the primary tank are not air- or water-tight.
- Insufficient airflow through the ventilation system (ventilation pipes with a diameter of less than 110mm, a badly-positioned static extractor fan, etc.)
- A block in the air-flow in the tank itself, because the surface layer has become too thick (fats & floating matter, for example).
- In all of these cases, you should consult the documents and user manuals provided by the manufacturer.

Diagram of the 3,300 Liters BIOROCK® primary tank

Effluent-filter cleaning:

Only during emptying of the Primary tank, or earlier if necessary.

- Open the lid on the PVC tube granting access to the effluent-filter.
- Grasp the rod holding the effluent-filter, and lift to remove.
- Hose down the effluent-filter to remove possible solid particles.
- Replace the effluent-filter into the PVC tube, making sure to replace it in its initial position.
- You will need to change the effluent-filter if the brush bristles have been crushed into the middle or damaged, rendering the filtration defective.
- We recommend you change the effluent-filter as necessary.



Emptying the primary tank:

The first emptying of the primary tank takes place, when the sludge level reaches 50% of the primary tank volume unless superseded by local regulations.

- Call a certified septic-tank emptier for the operation.
- Clean the effluent-filter when the Primary Tank is emptied.
- The frequency with which the tank is emptied may be adapted according to the nature of the operation and how many people live in the building. It must be emptied when the sludge level reaches 50%.
- The cleaning certificate, written by the certified septic tank cleaning company, must be conserved by the owner in their maintenance guide.
- The septic tank emptier would pressure wash the sides of the tank and the effluent-filter to remove the accumulated fats and other matter.
- The tanker, while emptying the primary tank, must not be parked with the motor at less than 4 meters (14') from the installation to ensure and maintain stability.
- Refill the Primary Tank with clean water after emptying before putting it back into operation.

Further information:

The quantity of sludge produced is influenced by how the unit is used (size, frequent overloads, type of waste water, routine maintenance). Each unit is different.

We estimate that an installation of 5 PE will produce a maximum of +/- 900 liters of sludge in the first year.

The quantity of sludge produced will reduce over the first few years: normally after the fourth or fifth year, the residual quantities have decreased by 40%. When emptying, the cleaner must leave a few centimeters of sludge at the bottom of the tank; the bacteria that break down the sludge are specific, and take a long time to develop.

N.B. *The primary tank must be filled with clean (fresh) water after cleaning.*

2. THE BIOROCK® TREATMENT UNIT - MAINTENANCE GUIDE -

Sampling of the purified water: At the same time with primary tank emptying and maintenance intervention.

⚠ Warning! Only take a sample of running water!

Do this directly at the unit's outflow (reference 5 of the diagram); if not, use the inspection point installed for this purpose (see chapter 2: installation with inspection point, page 8 of the installation guide).

If the flow is insufficient, it may be necessary to use a flush to start the water flowing. Use water-proof gloves.

- Remove the surface layer.
- Using a telescopic sampler or a syringe, take a sample.
- Visually check the waste water quality. The water should be clear with very few visible deposits at the bottom of the recipient after letting it rest for 20 minutes.
- The water shouldn't have a septic or nauseating odor. It may have the characteristic smell of fresh humus.
- If the visual check seems to show a malfunction (turbid treated water, presence of deposits or suspended matter, nauseating or septic odor), take the sample to a certified laboratory for testing.

Checking the inflow of pre-treated waste water: visual checks once per year

Visually check the inflow of pre-treated water coming from the primary tank; there should be no seepage where the components are fitted together.

Checking the waste water distribution: once per year

Check the waste water distribution on the filters, and if necessary clean the waste water dispersion system with a high-pressure hose. Unclip the retaining collars, remove the distribution system and hose down to remove the debris.

Checking excessive local settling of the BIOROCK® Media:

Over the course of time, the BIOROCK® Media, under the influence of the water, will progressively settle towards the centre of the unit.

You should therefore, if necessary shake the filter bags evenly on the unit's surface or add extra bags of BIOROCK® Media, to allow for a better waste water infiltration.

**Checking the flow and cleaning of the filters: visual checks once per year**

Pre-treated water must be able to flow freely through the layers of BIOROCK® Media.

If the laboratory confirms a problem with the water quality check:

- whether the primary tank is functioning properly
- the quality of the pre-treated water
- there are no fatty deposits on the unit surface
- the distribution of pre-treated water on the unit
- whether the unit's upper ventilation is functioning properly
- whether the unit's ventilation is functioning properly
- that the unit is the correct size for its daily use
- The absence of harmful, toxic, antibacterial or non-biodegradable products in the installation.

⚠ Warning! Any long-lasting accumulation of water on the surface of the BIOROCK® Media means that you must clean the first stage of the BIOROCK® Media. If you have not subscribed to maintenance and cleaning contract, call a certified professional for the maintenance work and for any operations on the Domestic Sewage Treatment Plant. The frequency of these cleaning or filter replacement operations is determined by the quality or quantity of waste water outflow. For this reason, it is essential to keep the primary tank and sewage filter well maintained.

⚠ Warning! If you still notice presence of fats, if flow difficulties persist after the above cleaning operations should verify that the accumulation of fat upstream the unit is not responsible for. In this case, the Primary Tank and the effluent-filter efficiency must be checked. If you have not subscribed to maintenance and cleaning contract, call a certified professional for the maintenance work and for any operations on the Domestic Sewage Treatment Plant.

⚠ Warning! If you notice the presence of deposits (suspended matter) in the treated waste water, and if the unit is clogged up:

A prolonged overload of pollution in the installation, repeated misuse of the primary tank (late emptying, sludge removal, etc.), an inefficient effluent-filter and neglect over several years can lead to a saturation of the BIOROCK® Media in the bioreactor. These deposits block the BIOROCK® Media. You should then clean the whole unit and/or the bags of BIOROCK® Media.

Cleaning or replacement procedure for the BIOROCK® Media:

Notice: To remove the bags of BIOROCK® Media, use a metal hook.

- Unscrew the safety screws and open the units seal.
- Remove the N°2 bags of BIOROCK® Media from the first level and place them away from the BIOROCK® unit.
- Remove the N°1 bags of BIOROCK® Media from the first level up to the level of the black polyethylene aeration rings, and place them away from the BIOROCK® unit.
- Remove the aeration rings and place them away from the BIOROCK® unit.
- Remove the N°2 bags of BIOROCK® Media from the second level and place them away from the BIOROCK® unit.
- Clean the bottom and sides of the tank with water.
- Wash all of the bags in a receptacle full of water, agitating them aggressively so all of the sludge that has accumulated in the bags of BIOROCK® Media is removed. For this, a (low pressure) hose can help in the cleaning process. The dirty water should be poured from upstream into the primary tank.
- Alternatively some or all of the media can be replaced with new bags of BIOROCK® Media. Carefully replace the bags in the unit.

Reference table for BIOROCK® Media installation:

(From bottom to top)

	Layer 1	Layer 2	Layer 3	Layer 4	Layer 5	Layer 6	Layer 7
BIOROCK-5	8 bags of BIOROCK® Media 20x20x20mm	11 bags of BIOROCK® Media 20x20x20mm	11 bags of BIOROCK® Media 20x20x20mm	11 bags of BIOROCK® Media 20x20x20mm	6 bags of aeration rings	11 bags of BIOROCK® Media 10x10x10mm	8 bags of BIOROCK® Media 20x20x20mm
BIOROCK-10	10 bags of BIOROCK® Media 20x20x20mm	13 bags of BIOROCK® Media 20x20x20mm	14 bags of BIOROCK® Media 20x20x20mm	13 bags of BIOROCK® Media 20x20x20mm	8 bags of aeration rings	14 bags of BIOROCK® Media 10x10x10mm	10 bags of BIOROCK® Media 20x20x20mm
BIOROCK-15	14 bags of BIOROCK® Media 20x20x20mm	20 bags of BIOROCK® Media 20x20x20mm	18 bags of BIOROCK® Media 20x20x20mm	20 bags of BIOROCK® Media 20x20x20mm	12 bags of aeration rings	20 bags of BIOROCK® Media 10x10x10mm	12 bags of BIOROCK® Media 20x20x20mm

While replacing the bags of BIOROCK® Media, make sure that each layer of bags completely covers the surface of the unit, ensuring that there is no free space between the bags. Make sure that the bags overlap each other at an angle 45 degrees.

If necessary, your installer, your distributor, or the company in charge of the maintenance, will be able to give you a quote to supply and replace all required material.

⚠Warning!

If you notice unpleasant smells:

You have to make sure that these smells do not come from your primary tank, nor from the waste water outflow pipes in the building.

A BIOROCK® unit in good working order does not give off a nauseating odor, but a smell of fresh humus.

Problems may arise from:

- An insufficient suction from the upper ventilation and/or from re-ventilation (ventilation pipe obstruction, a badly positioned extractor fan, etc.).

Treated water seeping out of the BIOROCK® treatment unit:

Water must not be allowed to accumulate in the effluent pipe. If there is purified water in the pipe, this means that the unit has been flooded; it must function continuously by the force of gravity.

You should check the water flow at the treated water outflow point (for a build-up of water in the tank or collection receptacle, etc.) and the state of the outflow pipes (obstruction, blockage, etc.).

Malfunction alarm system:

Although the BIOROCK® system is reliable and resistant, an exterior factor may disturb the waste water outflow.

In case of any blocking of the BIOROCK® Media in the system, or when the effluent pipe is blocked, or if the effluent pump doesn't function, a visual alarm is provided above the treatment unit, between its lid and the air inlet.

Normally, the indicator is in its lower position, at ground level. If there is a problem, the raising of the level will cause the buoy to rise. As soon as the indicator is no longer in its lower position, you must check the installation as described above.

The BIOROCK® treatment system is easy to maintain and requires a minimum of attention.

The correct unit selection and appropriate supervision will ensure peace of mind and a quality of waste water above and beyond what is required by environmental regulations.