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EN 12566-3

BIOROCK
Assainissement Non Collectif

USER MANUAL

BEASY-2000

Capacity 300L/day

January 2023

Dear Customer,

Congratulations on your purchase of this BIOROCK Domestic Sewage Treatment Plant. Your new BEASY 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 BEASY system.

The instructions for the maintenance and visual checks of the system will ensure that you have 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.

READ CAREFULLY

The installation and commissioning of your BEASY system should be carried out by a BIOROCK trained and approved installer. Your installer will be able to offer you a maintenance contract. The BIOROCK Warranty is only valid if the required maintenance is carried out by a BIOROCK trained and approved installer.

Should you not wish to take out a maintenance contract, make sure you have your sewage treatment plant inspected and maintained on a regular basis by an industry trained, competent wastewater professional.

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GUIDE VERSION

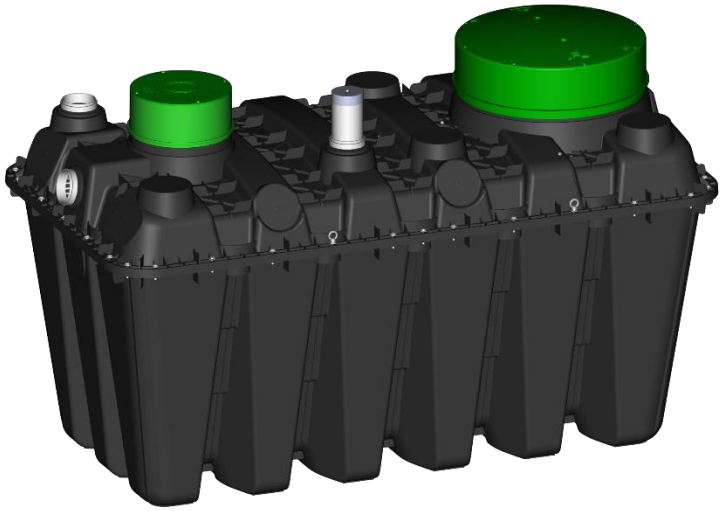
Version	Date	Commentaire
0	February 2022	First issue
1	January 2023	Optimizations

A

BEASY Technology

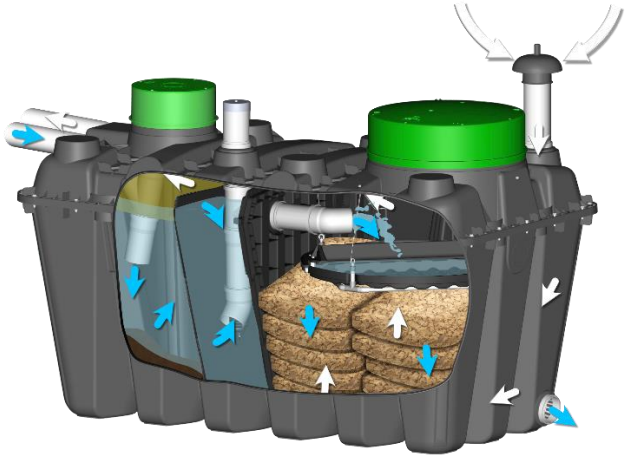
BEASY-2000

Capacity up to 300L/day



1. TECHNOLOGY DESCRIPTION

The BEASY system is a Sewage Treatment Plant belonging to the family of Non-Electric Systems. Domestic wastewater is treated according to the well proven principle of a fixed bed of filter media.



The BEASY sewage treatment unit is exclusively designed for domestic wastewaters purification.

1- **The Primary tank**
The wastewater is collected in the primary tank where settling solids are accumulated at the bottom (anaerobic digestion) and other floating particles (paper, grease…) are accumulated at the surface. The Primary tank provides the pre-treatment phase of the process. The BEASY is equipped with an effective effluent filter at the outlet of the Primary compartment before the water goes on to the secondary compartment

2- **The Bioreactor**
Packed with BIOROCK media the treatment plant provides the secondary treatment phase of the process. Inside the Treatment Unit occurs simultaneously a biological treatment (by the biofilm attached to the media) and a filtration process (by the same media). Oxygen using by the biological reactions is provided by the natural ventilation through BIOROCK media bed.

3- **The discharge options (pump or gravity)**
A pump allows the effluent to be discharged above ground if site conditions prevent a normal gravity discharge. Natural gravity discharge is the preferred option in most cases as no electrical connection is required.

CAPACITY	PRIMARY TANK	FLOW RATE	ORGANIC LOAD
Up to 300L/day	2 compartments with effluent filter	300 L/day	0,12 kg/day

2. USAGE

Important precautions for the proper use of the BEASY system:

- **Only domestic sewage** should enter the system; no rainwater is allowed.

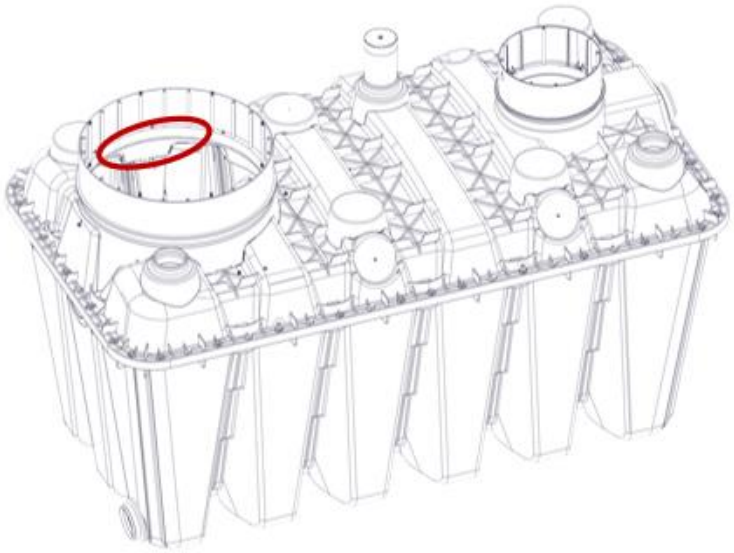
- To ensure the good working order of the BEASY system, the use of automatic toilet cleaners, electric waste-disposal systems and pumps equipped with blades are not to be used. In some cases (professional kitchen on site or if **the tank is away for more than 10m of the building**) an efficient and properly sized grease trap should be installed. The grease trap should be installed before the primary tank.

- 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 groundwater are forbidden. Any biological activator normally used for septic tank is also forbidden.

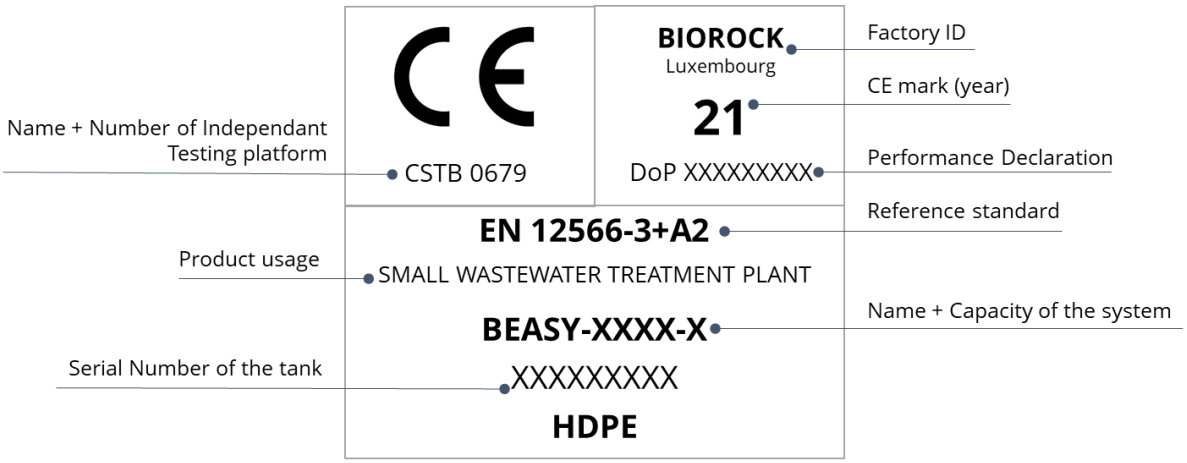
We recommend that pipework at the outlet of the BEASY should allow sampling.

3. IDENTIFICATION

Before installing the BEASY, please copy the serial number of each tank on to the documents to be kept by the customer (Appendix 4 and 5 of this Manual) as shown below:



Detail of the identification plate inside the tank:

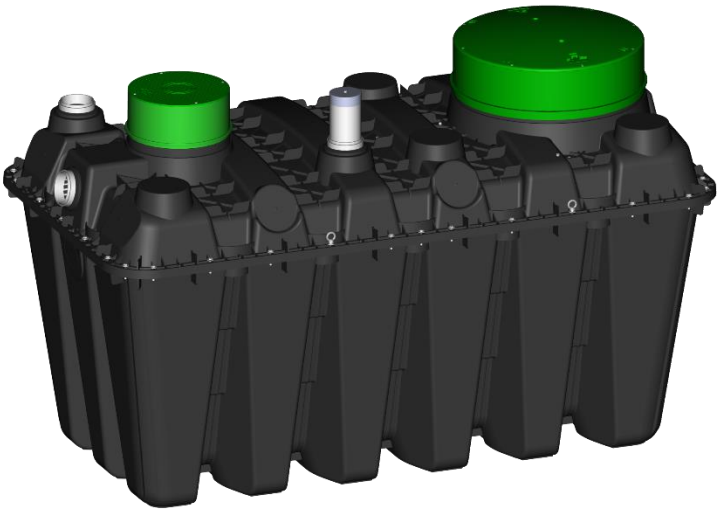

CE
BIOROCK
Luxembourg
21
CSTB 0679
DoP XXXXXXXXX
EN 12566-3+A2
SMALL WASTEWATER TREATMENT PLANT
BEASY-XXXX-X
XXXXXXXXX
HDPE
Factory ID
CE mark (year)
Performance Declaration
Reference standard
Name + Capacity of the system
Name + Number of Independant Testing platform
Product usage
Serial Number of the tank

B

HOW TO INSTALL

BEASY-2000

Capacity 300L/day



Please note that BIOROCK shall not be responsible for any installation design parameters and groundworks at any case. We recommend involving a civil engineer or a specialized design office in the design of the system installation if necessary and to follow best practices of the industry.

1. PLACING BEASY

- Check the tank and associated equipment (options, connections, seals, etc.). Before installation, take in count technical details for each system.
- A minimum distance of about 3m from the building and 3m from trees which have extensive roots should be ensured.
- A minimum distance of 3m from any construction work should be ensured, otherwise the stability of the building should be checked.
- The installation should be located away from any traffic areas and parking (at least 3m).
- Consult a professional engineer if the units are to be installed deep in the ground. The access to the system has to be guaranteed.
- Covers should not be buried and should always remain accessible for maintenance
- Connections are made with flexible seals with a diameter of 110mm
- The effluent inlet pipe to the primary decanter should have a minimum gradient of 2 % and a maximum of 4%. The outlet pipe to the discharge point should have the minimum gradient of 2%.
- Install a grease trap if the system is installed 10m away from the building.
- The air outlet of the ventilation has to be installed less than 15m away from the tank.
- Local rules and legislation should be respected

2. EXCAVATION

Excavation dimensions:

	WIDTH *(backfilling included)*	**LENGTH** *(backfilling included)*	**Minimum footprint**
BEASY-2000	**1,70 m**	**2,70 m**	**4,60 m²**

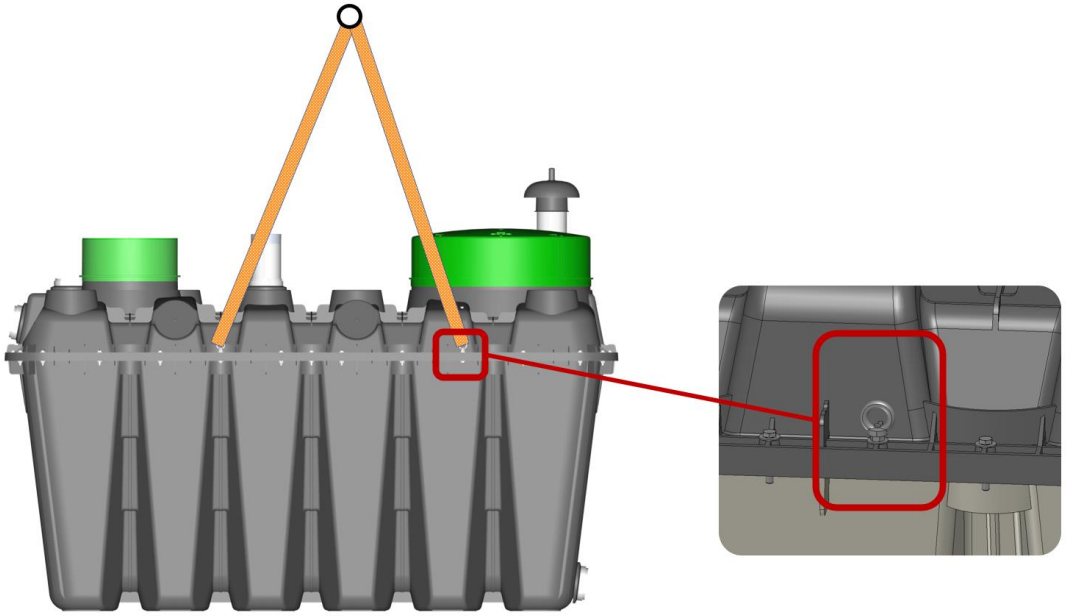
The distance between the side of the excavation and the BEASY must be minimum of 200 mm. A stable base must be created at the bottom of the excavation. Mud and other soft materials must be removed from the bottom of the excavation prior to installation.

Ensure that topsoil is put to one side enabling it to be used when finalizing the backfill.

3. HANDLING BEASY

Weight of the tank: around **160 kg**

The BEASY must be handled carefully using two lift straps tightened to the slinging rings. Guarantee the safety rules when lifting the tank.

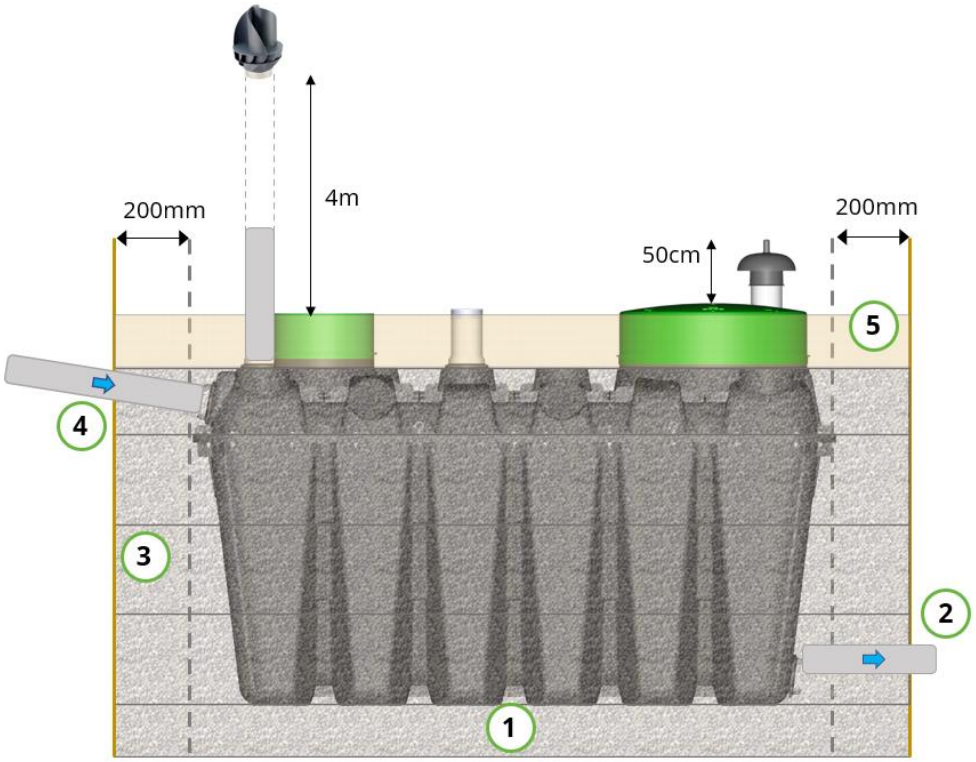


After delivery to the site, the equipment must be transported, stored and handled in such a way that it is protected from any action, particularly mechanical action, which could cause some damages.

4. INSTALLATION (DRY CONDITIONS)

Conditions for installation:

- Dry and stable ground conditions
- Absence of water at the bottom of the excavation



1. Use **pea gravel** (3-6mm) to create **a base of 200mm** thickness at the bottom of the excavation. The base should be clean, level and compacted. The units must stand on a clean, stable, leveled, and compacted base.

2. Place the BEASY horizontally on the base and ensure that the unit is perfectly Installed and stable on the base. Connect the discharged pipe to the outlet of the tank. Ensure that the seals are watertight. The pipe to the discharge point should have a gradient of 2%.

3. Backfill the hole with **pea gravel** (3-6mm) whilst filling the primary decanter with water at the same level for 300mm high. Compact the backfill manually. Then repeat the task (300mm of backfill whilst filing the tank then compact manually). Stop once achieving the inlet opening of the primary tank.

4. Connect the raw wastewaters pipe from the building to the water inlet of the tank. Ensure that the seals are watertight. The pipe should have a **gradient of 2%**. Check that all levels are correct so that the wastewater can flow freely through the system.

Ventilation: connect the **air inlet pipe vertically at 50cm** high from the covers. Always use DN110mm PVC pipe. Plug the cap to the inlet pipe. Connect the **air outlet pipe**

vertically at 4m high from the covers. Plug the wind driven fan or the static fan (depending on the environment conditions) to the outlet pipe. Fix the air outlet pipe to a support in order to hold the 4m pipe. Ensure that the seals are watertight.

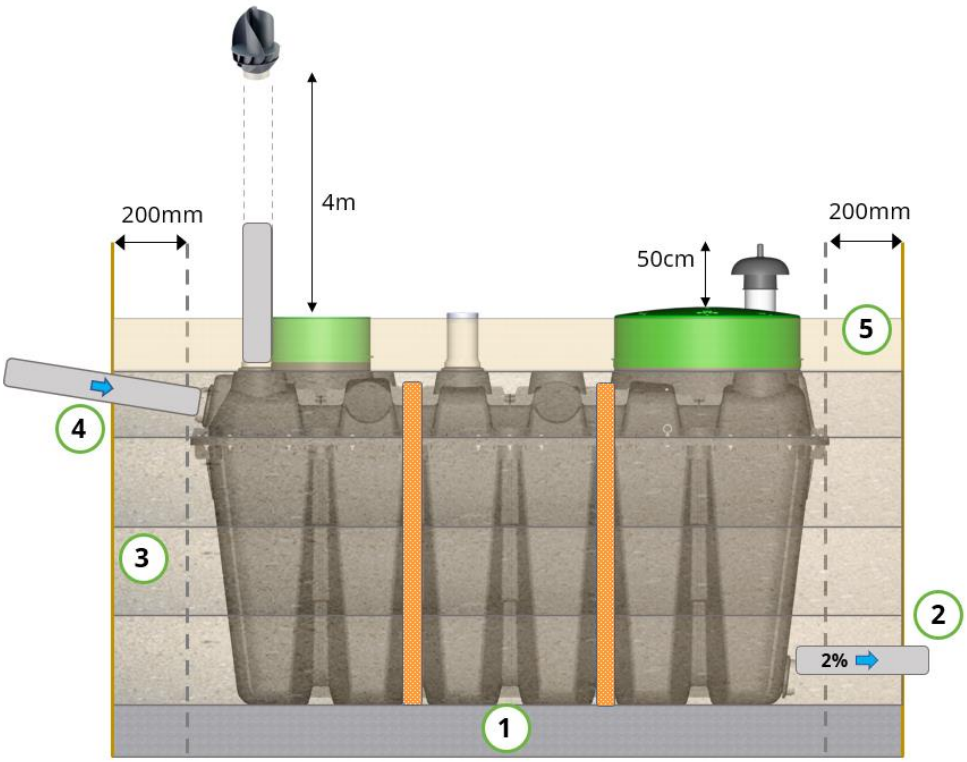
It's possible to place the air outlet on the roof of a building located at least 40 cm above roof level and at least 1m away from any windows or skylights or others pipes (fence, vent...). Always use DN110mm PVC pipe. The slope of the ventilation pipe to the building should have a gradient of 2% minimum. Do not use 90° elbow to install the upper ventilation (use 45° elbow instead) The distance between the building and the BEASY has to be less than 15m.

5. Once all connections are correctly positioned, keep backfilling with pea gravel. Check the level of the tank once the backfilling is finished. Finalize the **last 200mm with the excavated soil** (after removing stones and sharp objects). Always keep the system accessible. The maximum level of topsoil above the backfill is 200 mm.

5. INSTALLATION (WET CONDITIONS)

Conditions for installation:

- Wet ground (clay soil, ...)
- Presence of high ground water table etc.



1. Make a **concrete base of 200mm** thickness at the bottom of the excavation. This concrete slab should extend at least 200mm all around the tanks. <u>This slab must be</u>

calculated by an engineering consultant. The units must stand on a clean, stable, leveled, and compacted base.

2. Place the BEASY horizontally on the base and ensure that the unit is perfectly Installed and stable on the base. Connect the discharged pipe to the outlet of the tank. Ensure that the seals are watertight. The pipe to the discharge point should have **a gradient of 2%**. Anchor the BEASY using two straps as shown on the scheme above.

3. Backfill the hole with **sand mixed with cement** (200kg of cement per m^3) whilst filling the primary decanter with water at the same level for 300mm high. Compact the backfill manually. Then repeat the task (300mm of backfill whilst filing the tank then compact manually). Stop once achieving the inlet opening of the primary tank.

4. Connect the raw wastewaters pipe from the building to the water inlet of the tank. Ensure that the seals are watertight. The pipe should have a **gradient of 2%**. Check that all levels are correct so that the wastewater can flow freely through the system

Ventilation: connect the **air inlet pipe vertically at 50cm** high from the covers. Always use DN110mm PVC pipe. Plug the cap to the inlet pipe. Connect the **air outlet pipe vertically at 4m high** from the covers. Plug the wind driven fan or the static fan (depending on the environment conditions) to the outlet pipe. Fix the air outlet pipe to a support in order to hold the 4m pipe. Ensure that the seals are watertight.

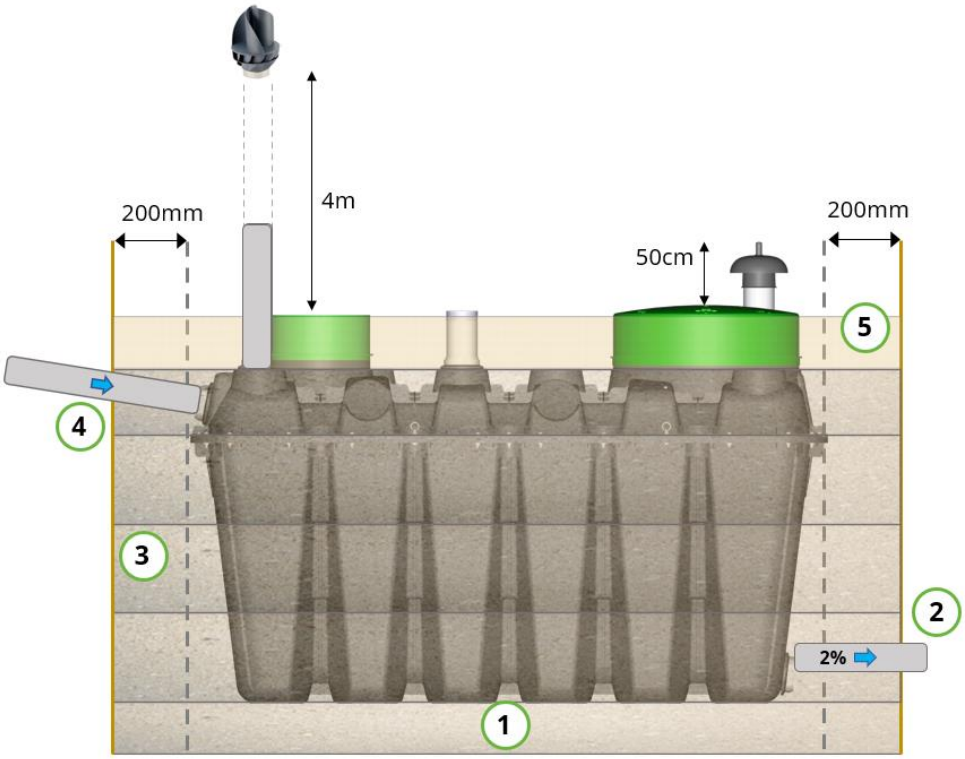
It's possible to place the air outlet on the roof of a building located at least 40 cm above roof level and at least 1m away from any windows or skylights or others pipes (fence, vent...). Always use DN110mm PVC pipe. The slope of the ventilation pipe to the building should have a gradient of 2% minimum. Do not use 90° elbow to install the upper ventilation (use 45° elbow instead) The distance between the building and the BEASY has to be less than 15m.

5. Once all connections are correctly positioned, keep backfilling with pea gravel. Check the level of the tank once the backfilling is finished. Finalize the **last 200mm with the excavated soil** (after removing stones and sharp objects). Always keep the system accessible. The maximum level of topsoil above the backfill is 200mm.

6. INSTALLATION (DIFFICULT CONDITIONS)

Conditions for installation:

- Wet ground (clay soil, ...)
- Presence of high ground water table etc.



1. Use **sand mixed with cement** (200kg of cement per m^3) to create **a base of 200mm** thickness at the bottom of the excavation. The base should be clean, level and compacted. The units must stand on a clean, stable, leveled, and compacted base.

2. Place the BEASY horizontally on the base and ensure that the unit is perfectly Installed and stable on the base. Connect the discharged pipe to the outlet of the tank. Ensure that the seals are watertight. The pipe to the discharge point should have **a gradient of 2%**.

3. Backfill the hole with **sand mixed cement** (200kg of cement per m^3) whilst filling the primary decanter with water at the same level for 300mm high. Compact the backfill manually. Then repeat the task (300mm of backfill whilst filing the tank then compact manually). Stop once achieving the inlet opening of the primary tank.

4. Connect the raw wastewaters pipe from the building to the water inlet of the tank. Ensure that the seals are watertight. The pipe should have a **gradient of 2%**. Check that all levels are correct so that the wastewater can flow freely through the system

Ventilation: connect the **air inlet pipe vertically at 50cm** high from the covers. Always use DN110 PVC pipe. Plug the cap to the inlet pipe. Connect the **air outlet pipe vertically at 4m high** from the covers. Plug the wind driven fan or the static fan (depending on the environment conditions) to the outlet pipe. Fix the air outlet pipe to a support in order to hold the 4m pipe. Ensure that the seals are watertight.

It's possible to place the air outlet on the roof of a building located at least 40 cm above roof level and at least 1m away from any windows or skylights or others pipes (fence, vent...). Always use DN110 PVC pipe. The slope of the ventilation pipe to the building should have a gradient of 2% minimum. Do not use 90° elbow to install the upper ventilation (use 45° elbow instead) The distance between the building and the BEASY has to be less than 15m.

5. Once all connections are correctly positioned, keep backfilling with pea gravel. Check the level of the tank once the backfilling is finished. Finalize the **last 200mm with the excavated soil** (after removing stones and sharp objects). Always keep the system accessible. The maximum level of topsoil above the backfill is 200mm.

7. UNDER ROADS, COURTYARDS OR STORAGE AREAS

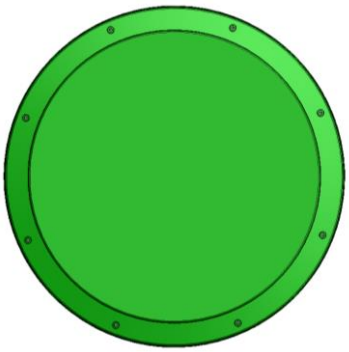
For an installation under roads, courtyards or storage areas, **a distribution slab of reinforced concrete should be constructed and placed above the tank.**

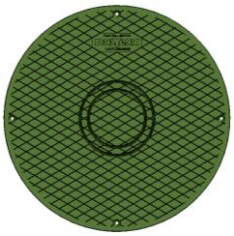
- The concrete slab must be constructed in such a way that it does not rest on the tank
- The edges of the slab must rest on the surrounding ground; the ground must be stable. If unstable ground, specific foundations should be built
- These foundations, the thickness of the slab distribution, the access to the lids of the tanks, the unit and sampling pipe, the reinforcement and the structure of the slab, etc., will be **specified by a qualified civil engineer**, based on expected traffic loads and the nature of the soil.
- The access to the covers (the 300mm for the primary tank and the 600mm for the treatment unit) and the air inlet of the treatment unit must be guaranteed by the openings included in the concrete slab. The slab opening above the air inlet cannot be airtight (air from outside must flow to the air inlet cap).

8. COVER / RISER

COVER:

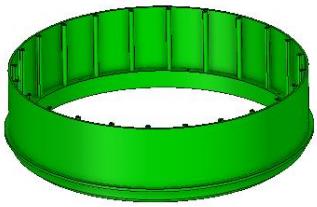
The BEASY has two sizes of polyethylene covers: 300mm and 600mm diameter. Screws are used to fix the cover to the tank: 8 for the 600mm cover and 4 for the 300mm cover.

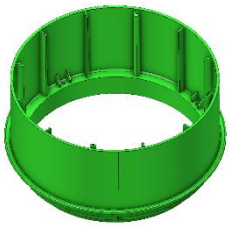




RISER:

The BEASY includes two risers. One for the 600mm diameter cover and one for the 300mm diameter cover. Each riser is 150mm high.
Screws are used to fix the riser to the tank adaptor: 8 for the 600mm riser and 4 for the 300mm riser.





It's possible to **add another 150mm riser** on the top of the existing one.

9. START-UP

Once the installation is completed, the commissioning of the system must be carried out as soon as raw wastewater flows into the BEASY. This operation has to be carried out by the installer as follows:

1- CHECKING THE DISTRIBUTION FLOW

In the presence of wastewater, make sure to comply with the safety instructions (see §C.1).

1.1 Check that the water is flowing correctly into the primary tank. The inlet must not be clogged by any solids or objects and the effluent filter must be properly positioned as shown below.

1.2 Check that the seal of the DN110 feeding pipe of the treatment unit is not leaking.

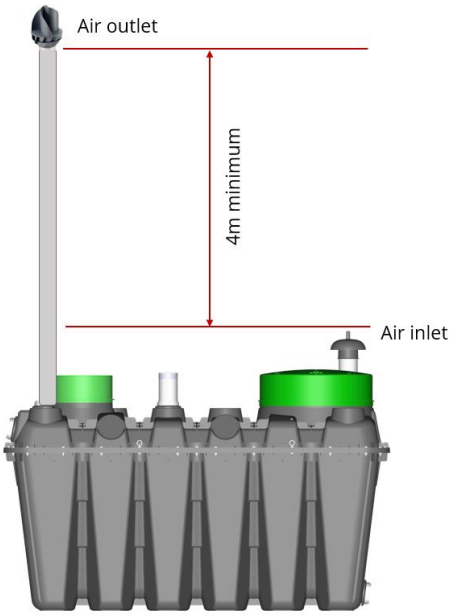
1.3 Check that the tipping tray is working correctly. Make sure that it's tipping several times. The pretreated water flushed by the tipping tray should be evenly distributed on all the holes of the distribution plate. No overflow out of the distribution plate should be observed. Check that the distribution plate is level.

If this is not the case, adjust the 4 screws fixed at the stainless-steel cable that holds the distribution plate.

1.4 Check the treated water flow at the treatment compartment outlet through the sampling chamber, the pumping station or directly at the discharged area (waterways, river, ...).

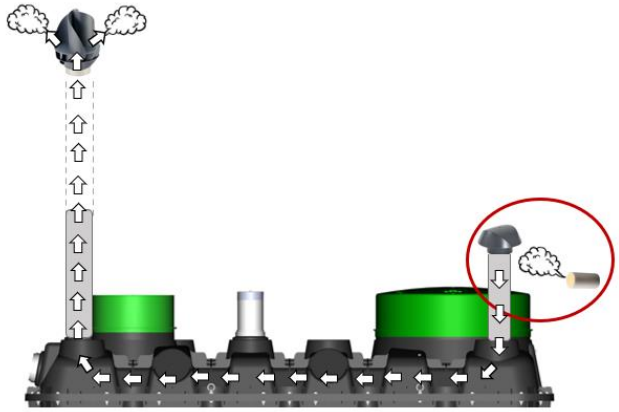
2- VENTILATION

The BEASY must be ventilated. Make sure that the ventilation is functional by performing a smoke test [(1)]. No 90° PVC elbow must be fitted on the PVC upper ventilation line (use 45° elbow instead). Depending on the conditions of the location environment (wind exposure), it is recommended to install a wind driven fan. The upper and lower vents should be in an open area (tree at more than 3m). The lower ventilation is placed at > 50cm from the ground. The height difference between the upper and lower ventilation must be > 4m.



(1) **Smoke testing** is the best approach to ensure that the primary tank and the treatment unit(s) are functioning properly. The test consists of placing a smoke cartridge at the air inlet (lower ventilation) and observing the smoke flow at the outlet (upper ventilation). Within 2-3 minutes, smoke should be visible at the air outlet.

Do not place the smoke cartridge directly on the surface of the system components (PVC pipe, tipping tray, media, ...). Use a resistant support (ceramic plate, metal cover, glass, ...) to put it on a flat surface (e.g. on the distribution plate) or use a clamp to keep it close to the air inlet ventilation cap. Once the smoke generator is ignited, close all the covers to keep everything airtight.



Achieving efficient ventilation is the responsibility of the installer as he is familiar to the implementation site and local conditions that may interfere in the system's venting.

3- ACCESSIBILITY

Accessibility to the system and all the covers must be ensured at all times. After commissioning, all covers must be secured (use the screws to close the cover).

10. CONFORMITY AND WORK COMPLETION

In all cases, the owner and the installer will jointly complete the warranty activation form for BEASY (Appendix 5) and send it back to the manufacturer by email sav@biorock.com or by filling the form on our website www.sav.biorock.com. Once completed, this document validates the warranty of the system when received by the manufacturer.

11. COMPLIANCE WITH REGULATIONS AND STANDARDS

The BEASY complies with all requirements of EN 12566-3 +A2, 12566-6 and the Construction Product Regulations.

Performance tests for the CE marking of BEASY were produced and validated by the European Platform notified as CSTB, notification n°0679, located in Nantes, France.

12. WARRANTY

10 years warranty on the media*1
25 years warranty on the tank*

*[*1] The warranties only apply when the unit is installed and used in accordance with the instructions and details in this manual.*

The equipment and accessories produced at the BIOROCK factory are guaranteed not to have any manufacturing defects. The equipment and accessories must be transported, stored and handled in such conditions that they are not damaged and do not deteriorate. The BEASY unit should never be laid on their side. In case of bad shipment or other damage, the BIOROCK Media should be re-placed correctly as shown in the User Guide.

In the case of incomplete delivery (missing equipment or accessories) or damage observed on delivery, these remarks / observations should be listed on the carriers delivery note or bill. The carrier and the supplier must be informed within 48 hours or 2 business days.

In case of malfunction or construction defect acknowledged by the supplier, the warranty is limited to the replacement of defective parts, excluding all other costs involved. The defective equipment and accessories will be repackaged in their original packaging (if any) and will be made available to the manufacturer.

The warranty will not apply if:

- Failure to correctly size the sewage treatment plant;
- Failure to follow either the installation requirements or the manufacturers recommendations for the use and maintenance of the primary tank and its pre-filter, as specified in the user's guide (including emptying instructions - constant level);
- Failure to follow either the installation requirements or the manufacturers recommendations for the use and maintenance of the treatment unit, as specified in the user's guide
- Non-compliance with other requirements of regulations and standards in force;
- Damage caused by accidental or climate events beyond our control.

The owner of the treatment unit must complete the installation form (Appendix 5 in the User's Guide) to benefit from the "Manufacturer's Warranty".

The owner must complete the maintenance form (Appendix 4 in the manual) and keep it up-to-date by adding any maintenance and commissioning activity carried out on the BEASY Sewage Treatment Plant.

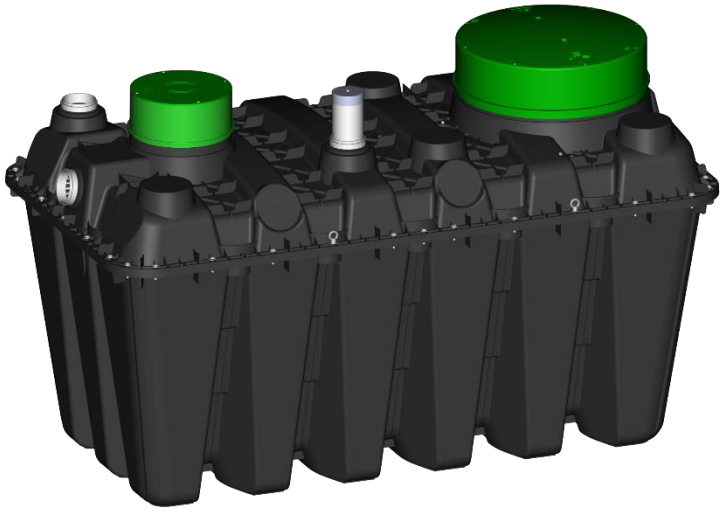
Follow the maintenance instructions and visual controls to maintain a reliable and durable system. Please contact your dealer with any question.

C

HOW TO MAINTAIN

BEASY-2000

Capacity up to 300L/day



1. SAFETY INSTRUCTIONS

Related to the Commissioning and operation of BIOROCK® compact wastewater treatment systems.

BIOLOGICAL RISK

- **It is mandatory to avoid any contact with the effluents.** The operator must wear individual protection gear (waterproof gloves, protective overalls, safety glasses and safety shoes) and must keep disinfectant products nearby. Even treated wastewater contains microbial fecal germs (bacteria that are responsible for serious diseases).

In case of direct contact with the skin, rinse the affected area thoroughly with clean water and apply a disinfectant. Please seek medical advice from your general practitioner.

- **It is strictly forbidden to reuse treated water** for any application involving a risk of direct or indirect human contact *(washing, surface irrigation, underground irrigation for garden growing vegetables, discharge into a pond or lake, etc.).*

- Make sure to keep the treated water outlet (pit) clean so to avoid the growth of mosquito that could spread vector-borne diseases, nor to cause an unpleasant smell.

CHEMICAL RISK

- Do not smoke near the tanks during all the operations described in this manual.

- Do not open the covers without first taking all the necessary safety measures (breathing apparatus, degassing of the tanks, etc.). Biological reactions that take place in the primary tank (fermentation) produce gases (in particular hydrogen sulphide H_2S and methane CH_4) that can be toxic in high concentrations (especially when the system's ventilation is not functional).

- For the reasons explained above, it is forbidden to enter in the tank.

PHYSICAL RISK

- The BEASY does not require any external energy source (electricity consumption is 0 kWh/d), thus avoiding any noise.

- When the presence of a pumping station is necessary to discharge the treated water, operations on the electromechanical equipment (pump, control panel) must be carried out by a qualified professional for electrical work.

MECHANICAL RISK

- It is forbidden to drive or park within 3 meters of the tanks' perimeter.

- Access to manholes and system covers is mandatory for maintenance operations, both for the primary compartment (300mm diameter) and for the treatment unit (600mm diameter). It is forbidden to leave any load on the covers.

- The covers are secured with screws, make sure that the screws are always airtightened for the safety of all.

- Never leave the tank open when working. Covers must be secured after every operation.

- Do not walk, park or pile loads on the cover.

- While installing the tank, use a lifting bar and two lift straps around the tank. Make sure that no one is in the maneuvering area, and do not position yourself under the load

2. ANNUAL MAINTENANCE

BIOROCK After Sales Service (sav@biorock.com) offers its expertise for the maintenance of your system, allowing you to be in contact with our technical team. It is highly recommended to hire a specialized professional for the maintenance work on your wastewater treatment plant. Your distributor and/or your installer will advise you on how to set up a maintenance contract.

In order to ensure that the system's performance is maintained along the years, it is essential to follow on a regular basis the maintenance and usage recommendations described below from §1. To §9. and §A.2 for the usage.

For any annual maintenance, fill in the maintenance form (Appendix 4).

For safety instructions, please refer to **§C.1.**

1- General visual inspection of the plant

- The BEASY must be easily accessible
- All covers must be clear and accessible with no loads placed on them
- **Check the flow throughout the entire system**:
  - ✓ After opening the two covers, make sure that the system receives enough raw wastewater *(flush the toilet several times or let a shower or tap run for a few seconds)*
  - ✓ Check that raw wastewater flow correctly by gravity to the primary tank. No large solids or objects should clog the pipe
  - ✓ Check the flow at the primary tank outlet and make sure that the prefilter is at the right position (the top of the prefilter has to be at the water level)

  - ✓ Make sure that the water entering the treatment unit feeds the tipping tray and that the treated water is evenly distributed on the distribution plate. See **§B 9.1**
  - ✓ Check the treated water flow at the treatment unit outlet through the sampling chamber or the pumping station
- Check the PVC pipes for water leakage (around the seals)

2- Wastewater sampling at the primary tank outlet

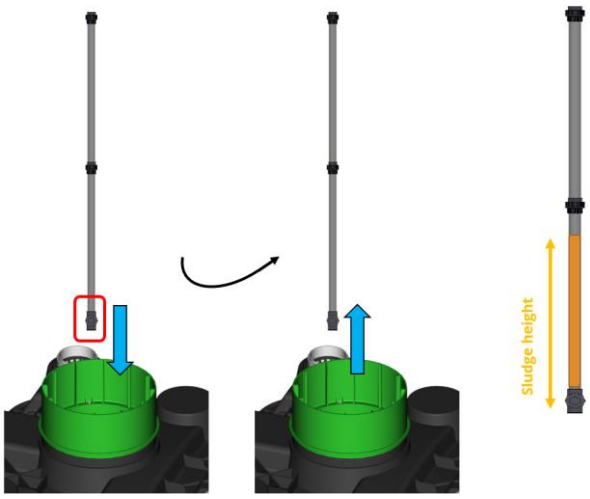
- Check (visually) the water quality of the primary tank wastewater.

- Take a sample of water *(for safety instructions, please refer to §C.1. for any operation involving wastewater)* at the primary tank outlet. Use a clean glass container.
- Water should be light brown, brown or yellow, turbid to very turbid, but there should be few particles visible at the bottom of the glass after letting the sample settle down for 20 minutes. The collected wastewater may have a slight septic odor.

3- Measuring sludge level in the primary tank

Sludge measurement is required to assess the exact sludge level in the tank in order to accurately determine how often the tank should be emptied. The tool used for the measurement is a **PVC sludge pipe** with a metric scale and a reverse check valve. *(see §C.1 for safety instructions for operations involving wastewater)*

- Assemble the parts of the sludge pipe together
- open the 300mm cover
- Insert the pipe at the primary tank inlet (the side with the check valve must be first immersed into the water)
- Once the bottom of the tank is reached, pull up the sludge pipe.
- Let it settle for 20 minutes and write down the sludge level.



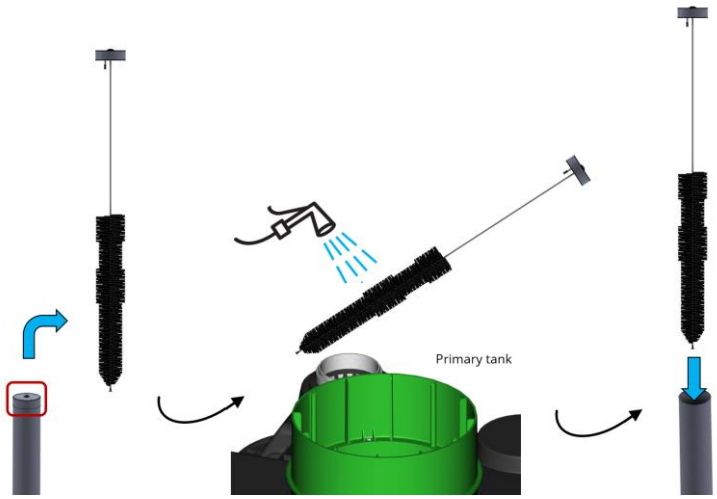
Emptying must be done when the sludge level reaches **50%** of the water level **= 430mm**.

Call in an approved tank cleaning contractor to carry out the emptying operations. Disposal of the sludge must be carried out in accordance with the regulations.
It is advisable to clean with a pressurized water jet the tank walls to remove all grease and substances that would have accumulated on the walls. This operation should be done by the contractor. The primary tank must be immediately fill in with water after the cleaning.
Note that the truck should not be parked less than 3 meters from the BEASY.

The amount of sludge produced is influenced by the usage of the system (depending on the sizing of the system, the frequent pollution overloads, the effluents characteristics, or the routine maintenance). Each system has its own specific. Therefore, **the sludge measurement method described above is the most reliable way to determine when it is required to empty the primary tank.**

4- Cleaning the effluent filter of the primary tank

- Open the PVC cap located between the two openings and gently pull it up to take it out (the rod of the filter is fixed to the cap). S*ee §C.1 for safety instructions for operations involving wastewater.*
- Open the 300mm diameter cover of the primary tank and clean the effluent filter with a water jet above it.
- Put the effluent filter back into the PVC pipe, and make sure to put it back in its original position



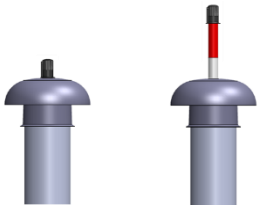
5- Wastewater sampling at the treatment unit outlet

- Check visually the treated water quality *(if the flow is not sufficient, you may have to flush the toilet or open a tap to generate a flow)*
- Sampling can be done through a sampling chamber, either directly from the pumping station if installed, or at the effluent outlet when accessible *(see §C.1 for safety instructions for operations involving wastewater)*
- Use a sampling tool with a telescopic handle or a flexible hose connected to a water pump fixed on a drill and take the sample. It is important to take the sample halfway up (not on the surface or at the bottom) and not to stir water when taking the sample from a manhole or a lift station.
- After letting the sample stand for 20 minutes, water should be clear with minimal particles visible at the bottom. Water should not have a septic or foul smell. It may have a typical smell of fresh humus.

6- Alarm inspection

While running, the alarm indicator is in the lowest point at ground level. In case of a problem, water is going up which cause the float of the alarm to rise up then the red tape appears out of the ground.

- Lift up the alarm slightly and let it drop down by itself. There should be no resistance.



7- Checking and adjusting the treatment unit's distribution system

If the flow is not sufficient, you may need to flush water from the toilet or open a tap to increase the flow.

- Make sure that the water coming out of the primary tank flows by gravity to the tipping tray. No leak should be observed around the seal of the DN110 pipe.
- Bring out the tipping tray and clean it with a water jet above the primary tank manhole.
- Bring out both parts of the distribution plate and clean them with a water jet above the primary tank manhole
- Put back first the two parts of the distribution plate and then the tipping tray.
- Check that the tipping tray is working correctly. Make sure that it's tipping several times. The pretreated water flushed by the tipping tray should be evenly distributed on all the holes of the distribution plate. No overflow out of the distribution plate should be observed.

  Check that the distribution plate is level (***see §B.9.1.3***)

  If this is not the case, adjust the 4 screws fixed at the stainless-steel cable that holds the distribution plate (***see §B.9.1.3***).

8- Media inspection

- Bring out the tipping tray and both sections of the distribution plate
- Check visually the condition of the BIOROCK® media *(see §4.1 for safety instructions when working with wastewater)*. No water stagnation or dense clogging should be observed on the surface (good flow through the filtering media). The media should not be packed

Make sure to write down your observations in the maintenance form (Appendix 4).
In case of clogging, settling or stagnation, please contact BIOROCK after-sales services (sav@biorock.com).

9- Checking the proper functioning of the ventilation system

Follow the procedure described in point 2 of commissioning **§B.9.2**

3. TROUBLESHOOTING

Performance of the BEASY will last for a long time, provided that you follow our instructions for installation, use and maintenance.

In case of malfunction of your system, please refer to the table below and contact our after-sales department (sav@biorock.com), your installer and the distributor of our system. For any actions on the system, fill in the maintenance form (appendix 4).

For all operations involving possible contact with wastewater, please refer to the safety instructions, see **§C.1**

1- PRIMARY TANK

Bad odors	
Possible causes	Actions
◆ Seals of the ventilation system are not airtight. ◆ Seals of the wastewater system from the discharge points (sink, WC, baths, showers, various siphons, etc.) to the primary tank are not waterproofed. ◆ Seal on the 300mm cover is not airtight. ◆ Poor ventilation (ventilation pipe with a diameter < 100 mm, bad positioning of the extractor, 90° elbow, etc.). ◆ Restriction of air ventilation inside the tank, e.g. due to the presence of a thick layer of grease and floating substances.	◆ Check for leaks in the ventilation and sewage network from the building to the primary tank. ◆ Check that the covers are properly secured and undamaged. ◆ Check for the presence of sealing joints in the covers. ◆ Perform a smoke test ◆ Measure the sludge level (also measure the level of grease and floating particles on the surface)
Poor water quality or presence of suspended solids	
◆ Hydraulic overload: excessive water flow through the plant. ◆ Under-sizing of the primary tank compared to its regular use. ◆ Unusual discharge of harmful, toxic or bactericidal, non-biodegradable products in the system ◆ Maximum sludge level exceeded ◆ The maintenance of the system was not performed (at least once a year)	◆ Make sure that there is no rainwater network connected to the plant. ◆ Make sure that surface water does not flow into the system (check the seals of the covers). ◆ Make sure that water consumption is equal to or less than the daily flow rate expected for the system. ◆ If a pump is installed upstream, make sure that the pump capacity is compatible with the daily flow rate ◆ If a grease trap is installed upstream, make sure that it is sized according to the best practices, that its maintenance is ensured and that it is emptied regularly as required. ◆ If needed, call on an approved tank cleaning contractor to empty the primary tank
Backflow to the building	
Clogging at the primary tank inlet (no or low flow of raw wastewater at the inlet)	◆ Open the cover to have access to the primary tank inlet. ◆ Check if the PVC Y fitting inlet is clogged. Clean, if needed, with a water jet. ◆ If no flow is observed after cleaning the y-branch inlet, call a specialized company for a camera inspection and a complete cleaning of the wastewater inlet pipe.
Clogged effluent filter	Clean the effluent filter (see 4-Cleaning of the effluent filter **§C.2.4**)

The Effluent filter not working (The brush bristles are flattened in the center or damaged or the holding rod is broken).	Change the effluent filter (see 4-Cleaning of the effluent filter **§C.2.4**) ◆ Open the PVC cap to have access to the effluent filter. ◆ Pick up the rod holding the effluent filter in the PVC tube and pull it out slowly. ◆ Insert the new effluent filter back into the PVC pipe, and make sure to place it in the right position (see **§C.2.1**) ◆ If your notice that the holding rod is broken, check the ventilation (see 2-Ventilation **§B.9.2**). Gases produced by the fermentation reactions in the tank can build up in high concentrations due to the lack of functional ventilation and corrode the rod.

2- TREATMENT UNIT

Bad Odors	
Possibles causes	Actions
◆ Malfunction of the primary tank (see table above **§C.3.1 Primary tank**) ◆ Poor ventilation (ventilation pipe diameter < 100 mm, poor positioning of the extractor, 90°elbow, insufficient height difference between upper and lower ventilation, blocked air inlet etc.) ◆ Malfunction of the treatment unit's biological reactor caused by a hydraulic overload or a pollution overload > the sizing recommended by the engineering consultant ◆ Unusual discharge of harmful, toxic or bactericidal, non-biodegradable products in the installation. ◆ Annual maintenance was not performed	◆ Make sure that the installation, maintenance and usage recommendations of the system are followed. ◆ Make sure that the design recommendations given by the engineering consultant have been followed. ◆ Make sure that the primary tank performs (see table above **§C.3.1 Primary tank**) ◆ Make sure the ventilation is working properly (see 2-Ventilation **§B.9.2**) ◆ Check the media condition (see 8-Media inspection **§C.2.8.**) ◆ Make sure that the maintenance is performed every year
Different quality and/or presence of suspended solids in the treated wastewater	
◆ A hydraulic or organic overload (one-off or permanent) on the wastewater treatment system ◆ Unusual discharge of harmful, toxic or bactericidal, non-biodegradable products in the system ◆ Repeated malfunctions of the primary tank (late emptying, effluent filter not clean, etc.) can lead to the congestion of the treatment unit with sediments or suspended solids. ◆ Non-functional ventilation ◆ Poor distribution of the pre-treated effluent by the distribution system ◆ Pumping station downstream not adapted or not maintained ◆ Annual maintenance not performed	◆ Make sure that the design recommendations given by the engineering consultant have been followed. ◆ Make sure that the primary tank performs (see table above **§C.3.1** Primary tank) ◆ Make sure that the ventilation is working properly (see 2-Ventilation **§B.9.2**) ◆ Check the flow in the treatment unit, particularly the distribution by the tipping tray (see **§C.2.7**) ◆ Check the media condition (see 8-Media inspection **§C.8.2**) ◆ If a pump is installed downstream, make sure that the pump capacity is compatible with the hydraulic peak flow ◆ Make sure that maintenance is performed annually
Water stagnation, clogging or packed media	

The BIOROCK® media can become clogged or/and packed gradually in case of malfunction: ◆ A hydraulic or organic overload (one-off or permanent) on the treatment system ◆ Unusual discharge of harmful, toxic or bactericidal, non-biodegradable products in the installation ◆ Repeated malfunctions of the primary tank (late emptying, sludge discharge, etc.) can lead to the congestion of the treatment unit with sediments or suspended solids. ◆ Non-functional ventilation ◆ Poor distribution of the pre-treated effluent by the distribution system ◆ Annual maintenance not performed	◆ Make sure that the design recommendations given by the engineering consultant have been followed. ◆ Make sure that the primary tank performs (see table above **§C.3.1** Primary tank) ◆ Make sure that the ventilation is working properly (see 2-Ventilation **§B.9.2**) ◆ Check the flow in the treatment unit, particularly the distribution by the tipping tray (see **§C.2.7**) ◆ Check the media condition (see 8-Media inspection **§C.2.8**) If the findings show that the BIOROCK® media is damaged or completely clogged, proceed to its replacement (see below **1-Replacement of the BIOROCK® media**) ◆ Make sure that the maintenance is performed annually.
The alarm is up	
◆ Clogging of the infiltration system or gravity discharge downstream of the BEASY ◆ The unit installation is not correct according to the typology of the terrain (leading to cracking/deformation of the tank, ...) ◆ Water rising in the outlet (pit, river, ...) ◆ Blocked, clogged or broken discharge pipe ◆ Malfunction of the pumping station (lifting pump not functioning, check valve or floating device not working) ◆ Pumping station not adapted or not maintained	◆ Make sure that the water table does not exceed the water level of the unit (see **Appendix 1** Technical Drawing) ◆ Make sure that the installation recommendations have been followed according to the typology of the terrain (see **§B.** Installation) ◆ Make sure that the pump sizing fits the hydraulic peak flow and the discharge height/length required to reach the outlet ◆ Replace the lifting pump or the floater ◆ Release the check valve ◆ Check the flow at the treated water discharge point (rise of water in the pit or the receiving collector, etc.) and the condition of the discharge pipe (obstruction, blockage, etc.).

3- Replacement of the BIOROCK® media

For all operations involving possible contact with wastewater, please refer to the safety instructions, see **§C.1**

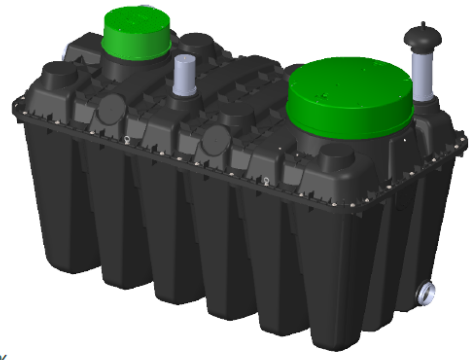
1. Open the treatment unit covers by unscrewing the safety screws
2. Pull out the tipping tray and both parts of the distribution plate
3. Take out the BIOROCK® media bags. **When handling the media, use a metal hook to clip the net that hold the media.**
4. Clean by water jet the bottom and sides of the tank
5. Dispose of the BIOROCK® media bags. **BIOROCK® media should be handled as a mineral substrate waste and disposed of by a licensed company.**
6. Install the new BIOROCK® media bags
   → When placing the bags, make sure that each layer of bags covers the entire surface of the unit, leaving no gaps between them.
7. Put back first the two parts of the distribution plate and then the tipping tray

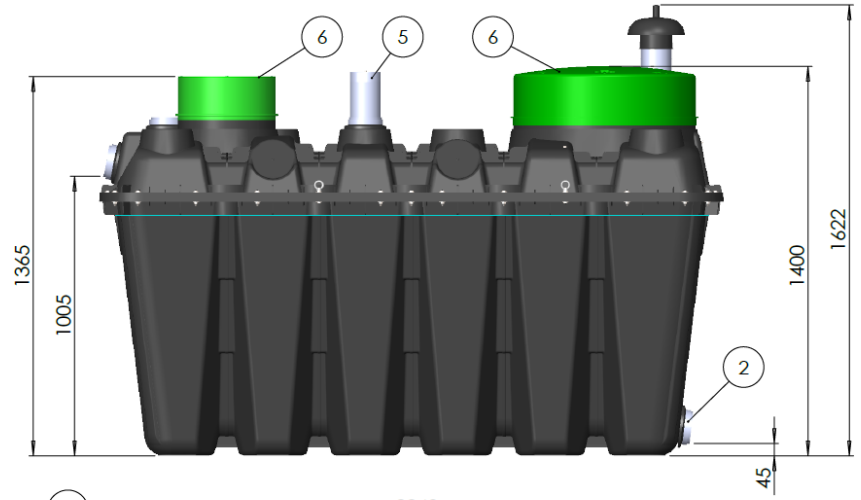
8. Make sure that the distribution plate is leveled and that the water is evenly distributed (see point **§B.9.1.3**)

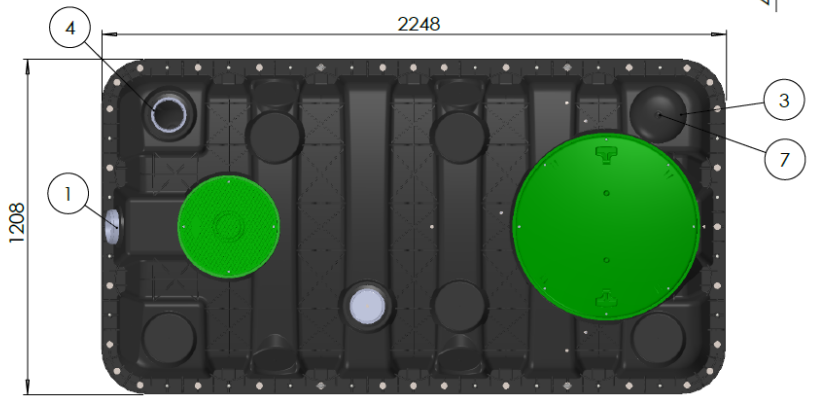
9. Make sure that the covers are secured at the end of the operation.

APPENDIX 1 – TECHNICAL DRAWING

BEASY-2000
Capacity 2PE







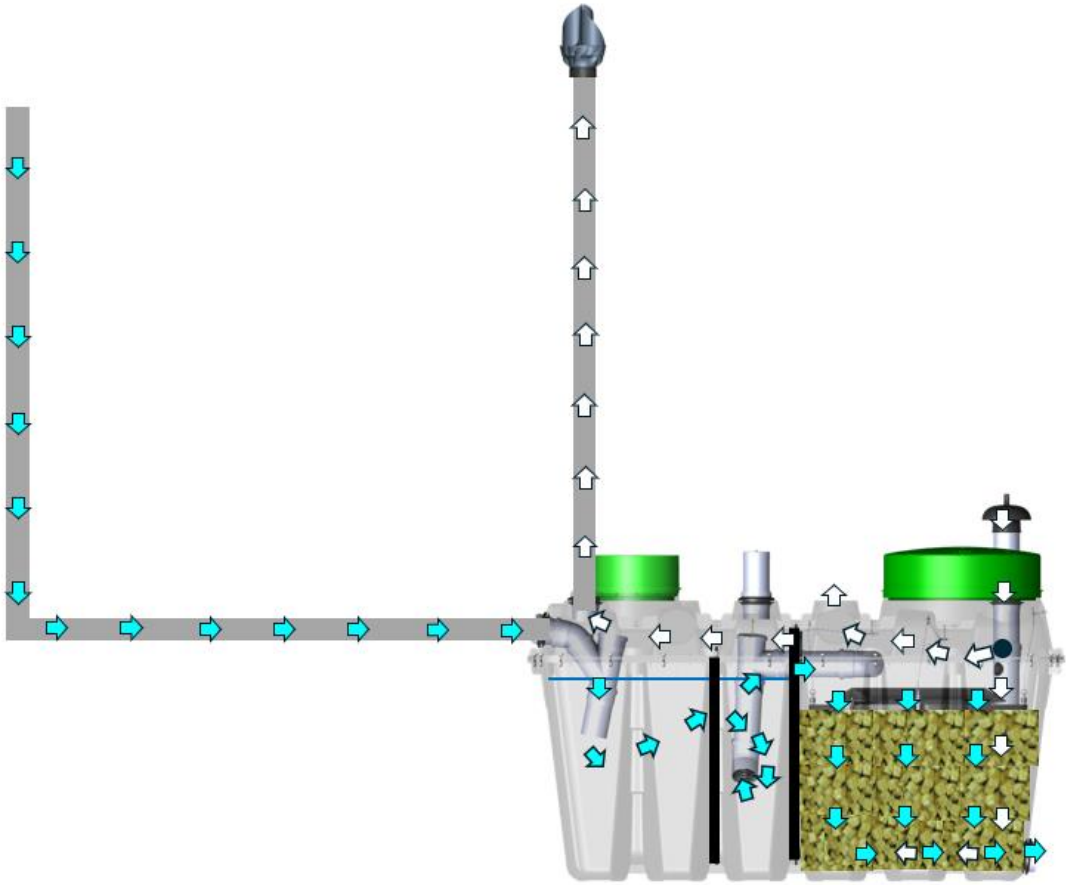
Tolerance +/-3%

CARACTERISTICS	VALUE	UNIT
Capacity in Population Equivalent	2	PE
Daily volume of wastewater	300	liters/day/PE
PRIMARY TREATMENT	**VALUE**	**UNIT**
Volume (Water level)	725	L
Volume compartment 1	475	L
Volume compartment 2	250	L
Surface	1,1	m²
Effluent Filter	1	/
SECONDARY TREATMENT	**VALUE**	**UNIT**
Media volume	626	L
Media height	670	mm
Media area	0,9	m²
SPECIFICATION	**VALUE**	**UNIT**
Volume	1450	L
Overall length	2248	mm
Overall width	1208	mm
Overall height	1622	mm
Total weight (without water)	148	kg
Pipes diameter	110	mm

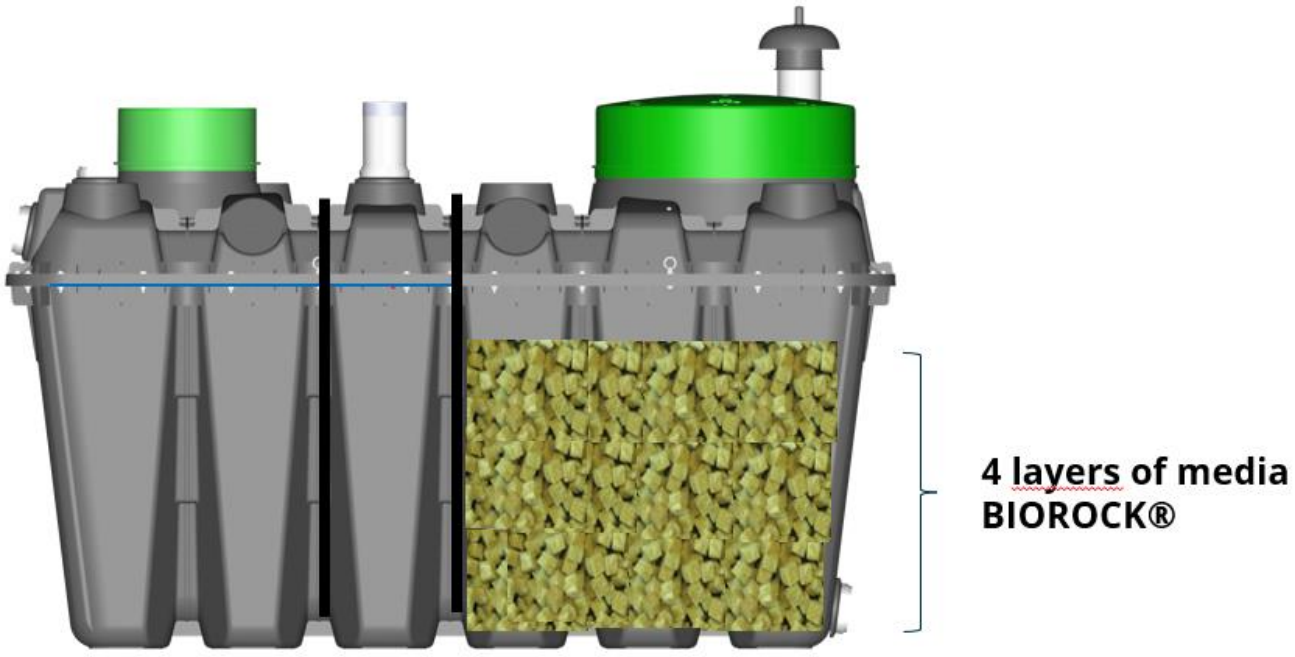
N°	Description
1	Water Inlet
2	Water Outlet
3	Air Inlet
4	Air Outlet
5	Access to effluent filter
6	Ø600 mm and Ø300 mm lids
7	Alarm

BIOROCK		BEASY-2000	
Creation	Date		
NH	05/01/2023		
Approval	Date	Material: /	Mass: Page: 1 / 1
AF	18/01/2023		
Format: A3	Scale: 1:15		FT-0001316

APPENDIX 2 – AERATION & WATER DISTRIBUTION OF THE BEASY



APPENDIX 3 – BIOROCK® MEDIA LAYER IN THE BEASY



APPENDIX 4 - MAINTENANCE AND ACTIONS FORMS

To be completed – TO BE KEPT BY THE USER

DATE OF COMMISSIONING: ..... / ..... / .....
Serial Product N° of tank: (see page 7)

Warning:
Please keep sludge emptying documents and proofs validated by the contractor.

DATE	WORK CARRIED OUT	CONTRACTOR NAME	COMMENTS

APPENDIX 5 – ACTIVATION OF THE WARRANTY

This form has to be returned to BIOROCK within 120 days from the date of the commissioning

INSTALLATION FORM FOR THE BEASY

Please fill in and return a copy:
By e-mail : aftersales@biororck.com

Or fill in the form on our website :
sav.biorock.com

KEEP A COPY WITH YOUR MAINTENANCE GUIDE.

SERIAL NUMBER: .....

DATE OF INSTALLATION: ...../...../.....

DATE OF COMMISSIONING: ...../...../.....

DISTRIBUTOR:
Name:
Address:

Tel:
Fax:
Email :

INSTALLER:
Last name:
First Name:
Company name:
Address:

Tel:
Fax:
Email :

OWNER
Last name:
First Name:
Address:

Tel:
Email :

INSTALLATION ADRESS IF DIFFERENT FROM THE OWNER
Last name:
First Name:
Address:

Tel:
Email :

Specify :

Type of housing: ..... Number of rooms : ..... Number of occupants: .....

Construction: □ New □ Existing

Terrain (sub-soil) : □ Dry □ Wet □ Difficult □ Sloping □ Under roadways

Discharge : □ Infiltration □ Drainage □ Surface discharge □ Other :

Ventilation: □ Natural □ Electrical

Riser: □ No □ Yes (maximum 1)

Pumping station: □ At the outlet of the BEASY □ At the collecting tank from the building

Declaration:

The BEASY system is installed and commissioned in accordance with:

- The current legislations stating the technical requirements applicable to domestic sewage treatment plants in the territory where the system has been installed
- The installation, usage and maintenance requirements indicated in the manual provided

Signed at: ..... on .....

Owner:	Authority (if applicable)	Installer:

02/02/23