

Ecoflo® Biofilter (Fiberglass – open bottom)

Installation Guide – USA

This guide contains the information needed to plan the installation of an Ecoflo® Biofilter ST-500 or ST-650. The installation must be performed by an installer trained by Premier Tech Aqua. For more information, contact your local distributor or our customer service at 1 800 632-6356.

Technical Data

Material used

- **Shell:** fiberglass and polyester resin composite;
- **Lid, central support and sampling device:** polyethylene;
- **Tipping bucket and distribution plates:** polyethylene;
- **Filtering media:** natural fibers.

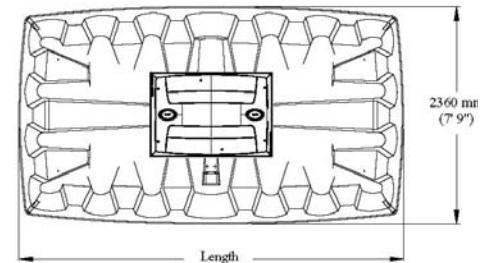


Connections

Flexible, watertight, and adapted to 4" Ø SDR-35 and SCH-40 PVC pipes

Dimensions

Characteristics	ST-500	ST-650
Total length	132" (3345 mm)	164" (4175 mm)
Shell weight	230 lbs (105 kg)	275 lbs (125 kg)
Filtering media volume	138 ft ³ (3,9 m ³)	183 ft ³ (5,2 m ³)



Handling

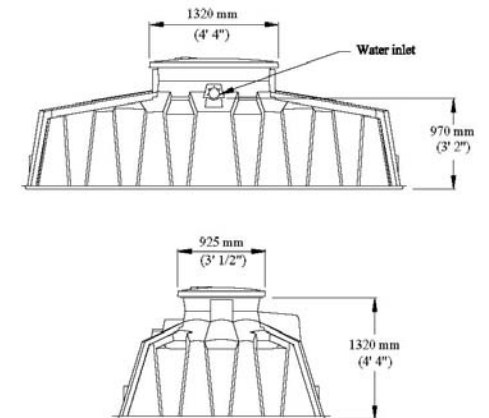
4 lifting rings are located on the top of the Ecoflo® shell

Treatment efficiency

Parameters	Septic Tank Effluent*	Ecoflo® Biofilter Effluent**
Biochemical Oxygen Demand (BOD ₅)	≤ 250 mg/L	≤ 2 mg/L
Total Suspended Solids (TSS)	≤ 75 mg/L	≤ 2 mg/L
Fecal Coliforms (CFU/100 ml)	≤ 2 000 000 CFU/100 ml	≤ 948 CFU/100 ml

* Typical values according to sampling campaigns in Canada and United States since 1995. (80% of septic tank effluent samplings).

** Results obtained during ANSI/NSF Standard 40 certification testing period.



Installation Procedure

1. System components description
2. Components location and special instructions
3. Determination of the effluent disposal method
4. Functions of the Ecoflo® Biofilter ST-500/650
5. Installation sequence
6. Typical installations

1. System components description

1.1 Septic tank

To improve the efficiency of any septic installation and extend the life of the treatment system, we recommend using a larger septic tank than that prescribed. This will also enable the addition of an extra bedroom without tank replacement. The septic tank must comply with local regulation. **Premier Tech Aqua (PTA)** provides a complete line of high-performance polyethylene septic tank with size ranging from 650 gal. to 1,500 gal. See the *Product Technical Guide* for more information on these products.

Effluent filter

The effluent filter extends the life of any treatment systems by keeping the suspended solids in the septic tank. The effluent filter is especially important if the home is equipped with a garbage disposal, a sewage pump or any other appliance that is liable to increase the suspended solids content in the wastewater and thereby create premature clogging of the treatment system. For sites where a pumping station is required to feed the Ecoflo[®], the effluent filter will also prevent solids from reaching the effluent pump.

Effluent filters are normally installed in the second compartment of the septic tank, but may also be installed, after the septic tank in a **PTA** filter container in accordance with local regulations. Please refer to our *Product Technical Guide* for more information on the **Effluent Filter EFT-080** and the **TLF-240 Filter Container**.

1.2 Ecoflo[®] ST-500/650 Biofilter

The Ecoflo[®] Biofilter is a biofiltration system designed to treat domestic wastewater from a residential house. It is installed downstream of the septic tank. It can also be used to treat wastewater from Commercial, Communal and Municipal project; please refer to Premier Tech for more information.

The number of Ecoflo[®] Biofilters required depends on the number of bedrooms in the home and on your local regulation. Refer to *Appendix I* to evaluate the required model and the number of Ecoflo[®] Biofilter required.

Ecoflo[®] Biofilter fiberglass with Submersible Collecting Bottom (if required)

The Ecoflo[®] Biofilter with Submersible Collecting Bottom collects and discharges treated effluent to an appropriate disposal method or into a watercourse, in accordance with local regulations. Refer to the *Ecoflo[®] Biofilter fiberglass with bottom Installation Guide* for more information.

1.3 Pumping station (if required)

The pumping station is installed between the septic tank and the **Ecoflo[®] ST-500/650 Biofilter** in the event that gravity flow is not possible. Like the septic tank, the pumping station must also be watertight to prevent groundwater infiltration. **Premier Tech Aqua's** recommendation for the amount of water released to each Ecoflo[®] Biofilter is 8 to 10 gal. (30 to 40L) per dosing. Refer to the *PSA-240 Installation Guide* for more information. For bigger projects (commercial and communal installations), it is highly recommended to use a timed dosing unit to control the pump's cycle and reduce the peak flows. The daily flow will this way be distributed to the units on a 24 hour basis, increasing the treatment performances and the life time of the organic media. Please refer to the *Commercial Design Guide* for more details.

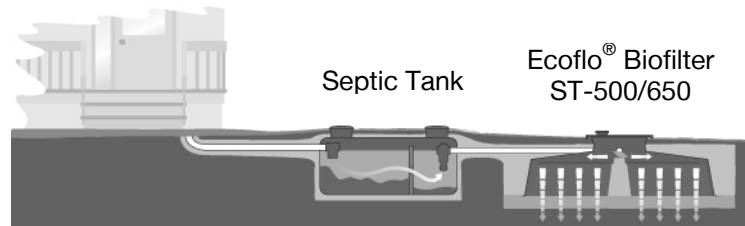
1.4 TPA-300 timed dosing unit (when required)

The **TPA-300** or other acceptable timed dosing units control the release of wastewater to the Ecoflo[®] Biofilters (see **TPA-300** installation guide). All commercial installation with 3 or more Ecoflo[®] Biofilters units should be installed with a time dosing unit with an overall pumping totalizer or with a flow meter.

Premier Tech Aqua has developed a complete line of associated equipment to achieve optimum performance of the Ecoflo[®] Biofilter and any septic system. For information on these products, see the relevant technical manual in this catalogue.

2. Components location and special instructions

Components of a residential gravity-flow septic installation



2.1 Installation conditions

2.1.1 Septic tank

The septic tank must be installed as specified by the septic tank manufacturer. The septic tank must be watertight, be used for disposal of domestic wastewater only (i.e. no roof water, surface water or discharge from footing drains), and be located in a place that is not subject to flooding or where the tank will not be submerged. The septic installation must be installed in accordance with the setbacks prescribed in accordance with local regulations.

2.1.2 Ecoflo® Biofilter

The access lid of the **Ecoflo® ST-500/650 Biofilter** must be 2" aboveground after landscaping has been completed. It is important that all interested parties (installers, landscapers, owners, snow removal company, etc.) be advised of the following:

- Never cover or bury the access lid;
- Never overload the soil (e.g. vehicles, blown snow, embankments) within 10' of the lid;
- Ensure rapid revegetation to prevent soil erosion;
- Ensure the groundwater level never reaches the neck of the shell;
- Never add riser to an **Ecoflo® ST-500/650 Biofilter**.

3. Determination of the effluent disposal method

IMPORTANT: THIS STEP IS CRUCIAL TO ANY SEPTIC INSTALLATION.

The effluent from the **Ecoflo® Biofilter** can either be subsurface discharge or direct discharge according to the local regulation.

3.1 Subsurface disposal

3.1.1 Hydraulic conductivity

An accurate assessment of the soil's hydraulic conductivity is a crucial step in planning any septic installation and should be performed in accordance with local regulation. The soil infiltration capacity is often expressed as a percolation rate, which can be determined by any qualified individual through a field permeability test, a laboratory soil particle-size analysis or any other method approved by the local regulation.

3.1.2 Soil absorption system

Once the soil characteristics have been established, determine the required size of the absorption bed beneath **Ecoflo® Biofilter(s)** according to the *Appendix II*. The absorption bed consists of a minimum depth of 8" of clean crushed stone ½-2" Ø laid under the **Ecoflo® Biofilter(s)**. The shape of the absorption bed may vary depending of the site constraints.

The location of the absorption bed, underneath the **Ecoflo® Biofilter**, must comply with the setbacks prescribed by local regulations governing on-site wastewater treatment systems. If there is discrepancy between the values shown in *Appendix II* of this document and the local regulations for these specific products, the last-mentioned must prevail.

3.1.3 Required soil depth

PTA's recommendation for the minimal vertical separation between the absorption bed and the limiting layer shall be 12" (300 mm) where no specific regulation is available.

NOTE:

- In situ soil's assessment must be performed in accordance with applicable regulations to determine the type of soil and the limiting layer (eg: SHWT, bed rock, clay).
- The above depths must be calculated using seasonal high water table (SHWT).
- The profile of the lot must be such that surface runoff flows away from the septic system.
- Various means can be used to promote infiltration under low-permeability conditions. Contact your local Ecoflo® distributor or **Premier Tech Aqua** for details.

3.1.4 Other Types of disposal methods

For disposal systems such as drip system, infiltration chamber or other gravel less type system refer to the product manufacturers catalog for the sizing and installation recommendations.

3.2 Discharging into a watercourse

3.2.1 Watercourse characteristics

Ecoflo® Biofilter effluent may be discharged into a watercourse in accordance with local regulations. The profile of the lot must be modified to ensure that surface runoff flows away from the septic system.

4. Functions of the Ecoflo® Biofilter

4.1 System components Functions

Lid

- Gives access inside the system;
- Feeds the filtering media with air (via its air intake);
- Secures access with bolted assembly.

Insulating board

- Give a thermal insulation to the system;
- Helps guiding airflow into the shell air ducts;
- Seals the system (with Premier Tech Aqua seals).

Shell

- Encloses the system components;
- Allows connection of air, inlet and outlet pipes;
- Circulates air to the filtering media's ends via its air ducts.

Central support

- Holds the tipping-bucket and one end of the distribution plates;
- Allows air exchange between bottom and top of the filtering media;
- Allows inspection of the absorption bed.

Tipping-bucket

- Allows even distribution of the influent on both sides of the filtering media;
- Creates hydraulic events required to obtain a good water distribution on the distribution plates and contribute to their self-cleaning.

Distribution plates

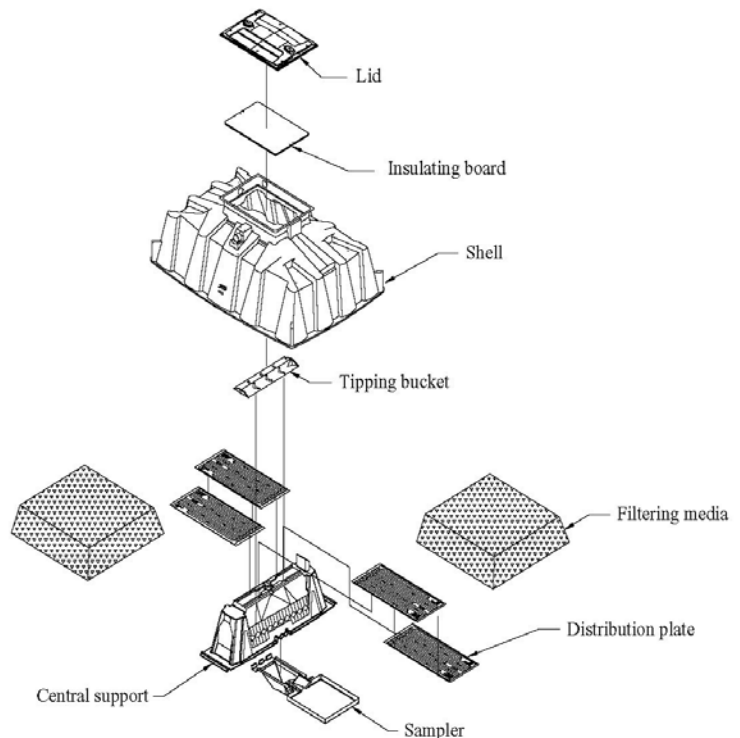
- Allow even distribution of the influent over the filtering media.

Filtering media

- Acts as a support for bacteria that consume the wastewater organic content while trickling down through it;
- Does a physical filtration of the influent solids content;
- Keeps an adequate humidity level required for biomass viability when there is no incoming water.

Sampler

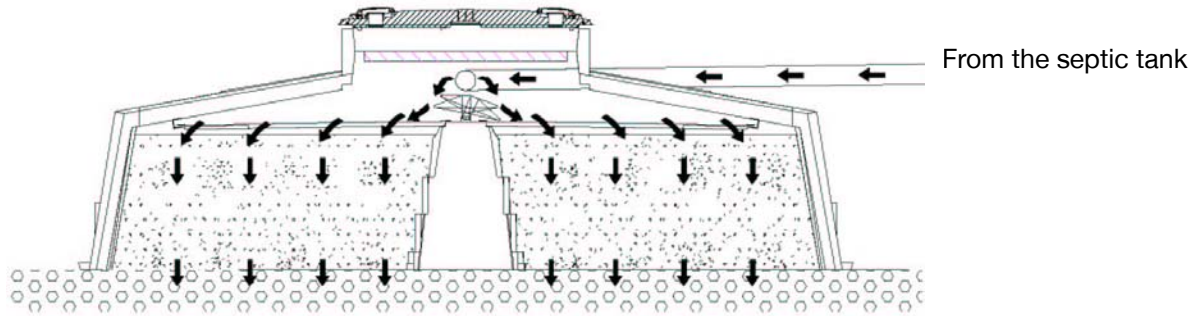
- Allows taking representative samples of the effluent treated by the system.



**Exploded view
of the system**

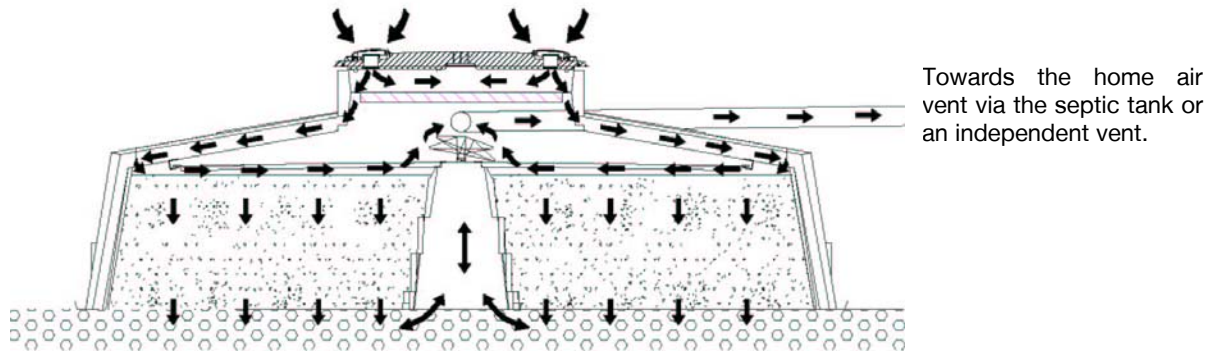
4.2 Global function of the system

The overall function of the **Ecoflo® Biofilter** is to treat domestic wastewater after a primary treatment. It is done via a water and air (oxygen) management inside the system. Wastewater is treated aerobically by bacteria fixed in the filtering media.



Water flow diagram

To be treated, the wastewater goes first into the septic tank where it is submitted to a primary treatment and then it enters into the **Ecoflo® Biofilter**. Once inside the **Ecoflo®**, the water is directed into the tipping-bucket in order to be split equally over the distribution plates located on both sides of the central support. These plates include channels with orifices to distribute the effluent evenly on top of the filtering media. Afterwards, wastewater trickles down into the filtering media where its organic content is consumed by bacteria before entering the absorption bed located underneath the biofilter.



Air flow diagram

To be efficient, the system requires enough oxygen so that the filtering media's bacteria do their work. In order to achieve this goal, the filtering media is fed in oxygen by air flowing both at the top and bottom of the filtering media. Air comes into the system by the intake located on the lid. Then, it goes to the extremities of the filter bed via the shell's air ducts. Air flows at the top of the filtering media underneath the distribution plates, and enters into the filtering media via the water infiltration that takes it to the bottom. Moreover, a gas exchange occurs at the top and bottom of the filtering media promoting its oxygenation. The opening located in the central support chimney allows air circulation between the top and the bottom of the filtering media. Finally, the air circulation in the system is ensured by convection to the home air vent (or independent vent) via the inlet pipe and the septic tank.

5. Ecoflo® Biofilter ST-500/650 installation

5.1 Make sure you have the following components:

A - 1 shell containing:

- 1 bag containing owner's documents
- 6 plastic ty-raps:
- 1 insulating board

A1 - 1 shell lid

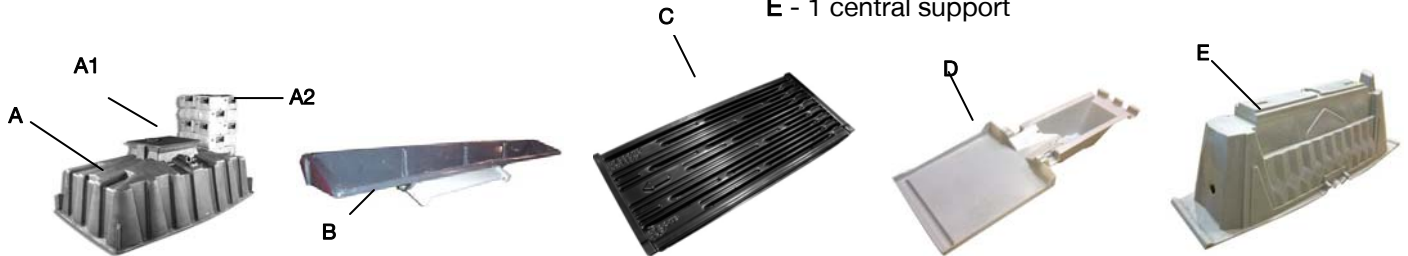
A2 - 1 pallet of filtering media

B - 1 tipping bucket

C - 4 distribution plates

D - 1 sampler

E - 1 central support



5.2 Absorption bed, sampler and central support installation



Prepare the absorption bed in accordance with the sizes prescribed in section 3.1.2 of this guide.

- Clean crushed stone 1/2-2" Ø.
- Minimum thickness of the bed is 8".



Place the sampler on the clean crushed stone bed and make sure that the sampler is installed with a slope allowing effluent flow directed to the sampler bucket. After, lay the central support on top of the sampler.

5.3 Shell installation and leveling



The sampling port should be in the centre under the central support. Make sure the central support is leveled and in full contact with the surface of the absorption bed.

Place the shell on the central support and ascertain that the shell sits properly on the central support. The central support, **including its air vent** must exactly fit the shell shapes.

Double check to make sure the shell and central support are both level and in full contact with the surface of the clean crushed stone.

5.4 Geotextile installation and Ecoflo® Biofilter backfilling



Place a geotextile (polymeric membrane permeable to air and water) on top of the clean crushed stone around the shell only so as to protect the stone from being contaminated or obstructed by objects or particles.

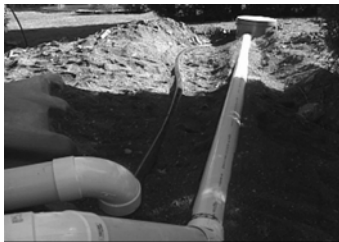
There should be no geotextile under the **Ecoflo® Biofilter**.

The backfill material should contain no organic matter, impervious soil, stones, rocks, debris or other objects that could damage the shell.

WARNING! When backfilling the **Ecoflo® Biofilter**, start by stabilizing the shell by carefully backfilling each of the four corners. Backfill the two long sides next, followed by the two ends. It is important that the backfill material be deposited, not dumped. Using a bulldozer for this step is not recommended. **Never install a riser on an Ecoflo® Biofilter ST-500/650;**

Don't forget the inspection permit, where applicable

5.5 Inlet pipe connection



Connect the inlet pipe to the Ecoflo® Biofilter, ensuring a steady downward slope to the Biofilter inlet. It is important that the soil under the pipe be well compacted.

5.6 Inlet pipe and flexible adapter coupling

Assembly

1. Loosen the clamp without removing it from the adapter and slide it towards the adapter end.
2. Clean the pipe and apply a PVC primer.
3. Apply PVC cement inside the adapter and on the pipe end which is to be inserted in the adapter.
4. Insert the pipe (covered with cement) into the adapter until it reaches the bottom.
5. Tighten back the clamp on the adapter and the 4" pipe.

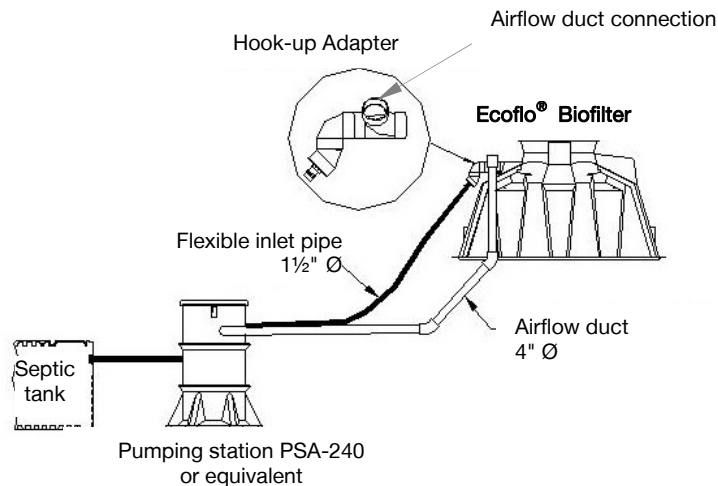


5.7 Pipe installation details when a pumping station is required to feed the Ecoflo® Biofilter ST-500/650

When the use of a pumping station is required to feed an Ecoflo® Biofilter ST-500/650, the following instructions must be taken into account:

- The pumping station must be accessible at all times.
- For installations with a pumping station, the amount of water released to each Ecoflo® Biofilter should not exceed 8 to 10 US gal. (30 to 40 L) per dosing.
- The pumping station must be watertight to infiltration and exfiltration.
- The inlet pipe (flexible pipe of 1.5" Ø) uses a **hook up adapter** to allow connection to the Ecoflo® Biofilter inlet which has a diameter of 4" Ø. **Take note that the use of the adapter is mandatory to break the jet stream coming from the pumping station.**
- An airflow duct must link the pumping station and the Ecoflo® Biofilter to ensure air circulation. The airflow duct is connected to the adapter located at the Biofilter's inlet, as illustrated below.
- Depending on site conditions, a forced vent may be required.

To facilitate the understanding of these instructions, refer to the diagram below and to the **Pumping station PSA-240** Installation Guide.



Drawing 1: Pipe installation in systems with a pumping station

5.7 Final backfilling and filtering media installation



Add a final layer of backfill and cover with topsoil.

The access lid must be 2" aboveground once the final landscaping has been completed.



Fill the 2 sides of the shell with equal amounts of the filtering media on both sides of the central support.

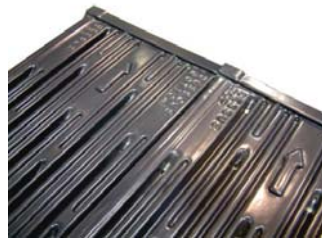
Fill up to below the distribution plates.



Level the filtering media surface with a rake. The surface of the filtering media should be just underneath the distribution plates.

Attention! Avoid compacting the filtering media (do not lean on it).

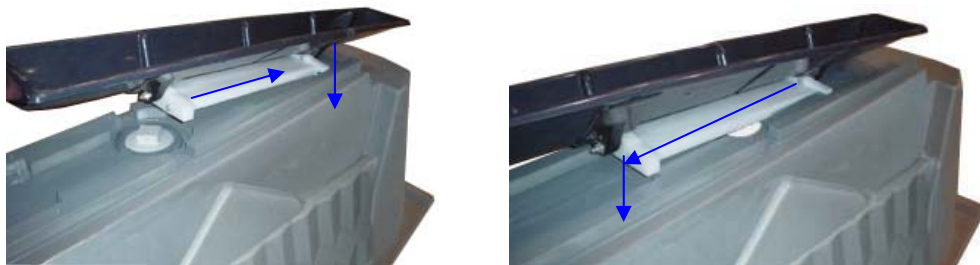
5.8 Distribution plates installation



- Install the distribution plates by sliding them onto the brackets located at the top of the shell roof.
- The arrow on the distribution plates must be oriented toward the end of the tank.
- Install the first plate on the left side, followed by a second plate on the right side, fitting it onto the edge of the first plate.
- Follow this same procedure for both sides of the shell (two plates on each sides).

The distribution plates should rest on top of the central support and be attached to it using the four black plastic ty-raps provided for this purpose.

5.9 Tipping-bucket installation



Once the distribution plates are securely in place, install the tipping bucket by inserting the locking notches into the central support anchors.

5.10 System operation verification and sealing



After making sure the distribution system operates properly, close the **Ecoflo® Biofilter** by installing first the insulating board and then the lid. Seal it shut by attaching the handle of the insulating board to the access of the **Ecoflo® Biofilter** using the two plastic seals.

CHECK POINTS TO BE VERIFIED FOLLOWING INSTALLATION:

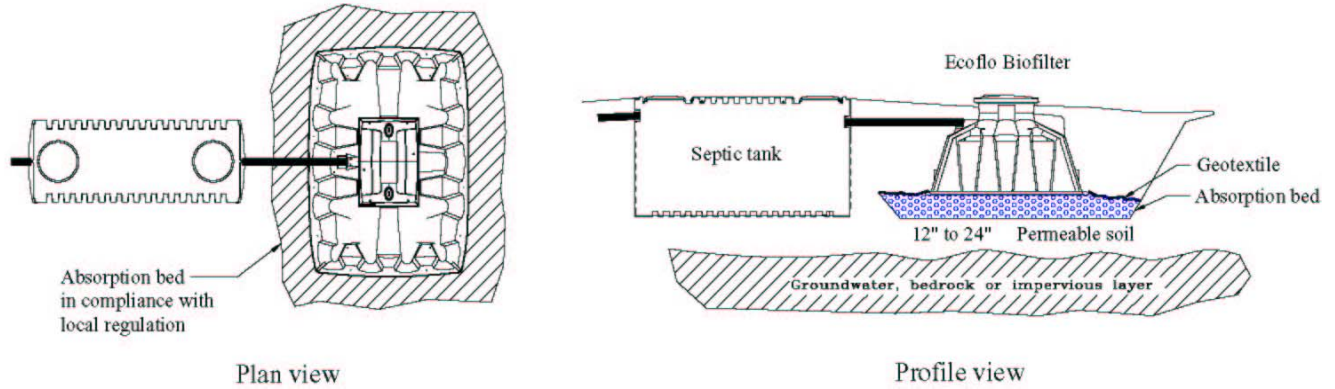
- Never cover or bury the access lid;
- Never plant trees within 16.4' of the **Ecoflo® Biofilter** lid and within 6.5' of the absorption bed;
- Never install a riser on an Ecoflo® Biofilter ST-500/650;**
- Never open or enter the **Ecoflo® Biofilter** after installation without prior authorization;
- Never connect a drain pipe or a roof gutter or a sump pump or an air conditioning drain to the septic installation;
- Never drive vehicles or place objects weighing over 500 lb within 10' of the lid**, and if you plan to do any landscaping, make sure you advise those involved so they don't damage your septic system;
- In case of a lapse of time between the initial installation and final landscaping, identification and protective barriers should be placed to identify the unit, to keep traffic off the unit, and to indicate what final grade must be at the unit;**
- Do not let anything accumulates on top of the septic system (ex. blown snow);
- When an installation includes a pumping station upstream from the biofilter, the vent pipe must be connected from the pumping station to the biofilter, as described in section 5.6.
- The home must be equipped with an air vent that is in proper working order and complies with the applicable standards; **Premier Tech Aqua** strongly recommends using a 4" Ø pipe;
- Give the owner the plastic bag containing the *Owner's Manual* and the *Maintenance Agreement*;
- Mention to the customer to fill out and sign the *Maintenance Agreement*. He must keep the white copy, send the yellow copy to the municipality (when required) and the pink copy to **Premier Tech Aqua**.

6. Typical installation

The type of installation depends on site topography. **Below are some examples:**

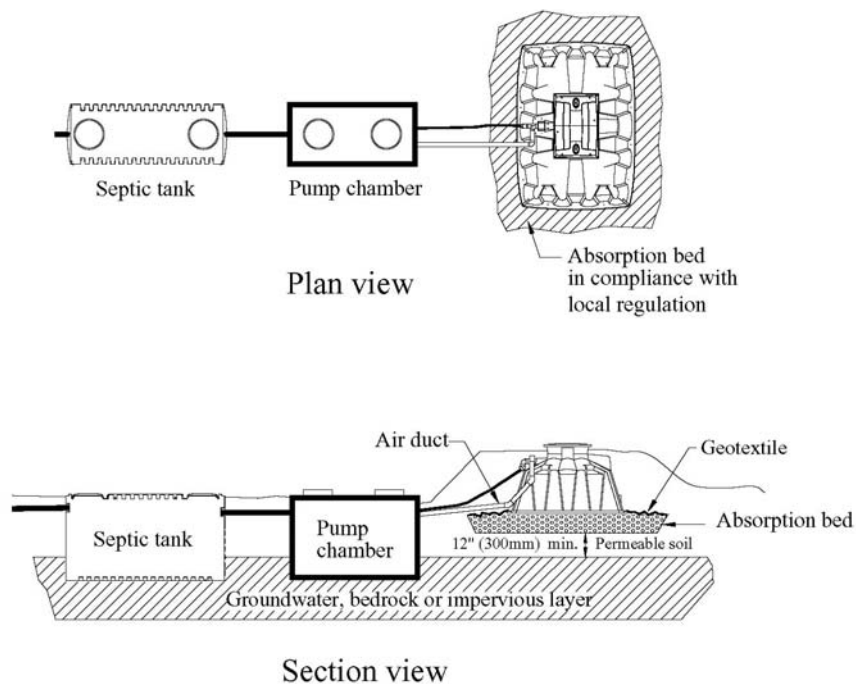
Note that other arrangements are also possible. For more information, contact your local distributor or our customer service line at 1 877 295-5763.

Type 1: Gravity-flow installation on a flat site



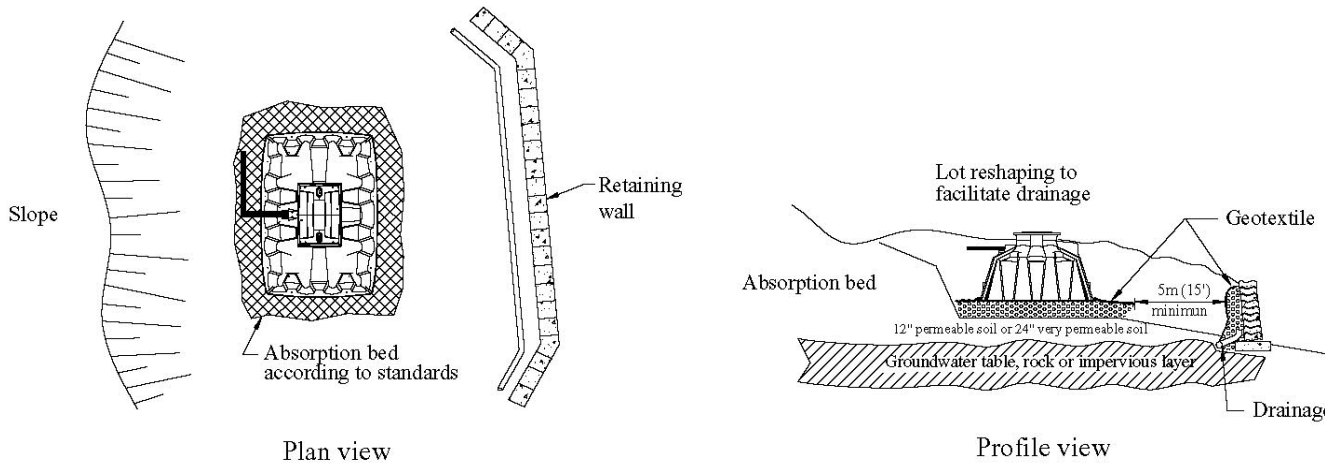
Type 2: Above-ground installation on a flat site

- PTA recommends each Ecoflo[®] receive 8 to 10 gal. (30 to 40 L) per dose.
- The pump chamber and Ecoflo[®] Biofilter must be connected by a vent pipe.
- The pump chamber must be watertight and accessible at all times.



Type 3: Above-ground installation on sloped site

- On sloped sites, the shell should be placed at right angles to the slope.
- The profile of the lot should be such that surface runoff flows away from the **Ecoflo® Biofilter** and absorption bed. If necessary, the profile should be modified.
- To account for water released into the soil by the **Ecoflo® Biofilter**, the ground around the base of the retaining wall must be well drained to ensure the soil and septic system remain stable.
- If there is no retaining wall below the **Ecoflo® Biofilter**, the backfill materials and method used must ensure that the backfill remains stable and does not slide and displace the **Ecoflo® Biofilter**.

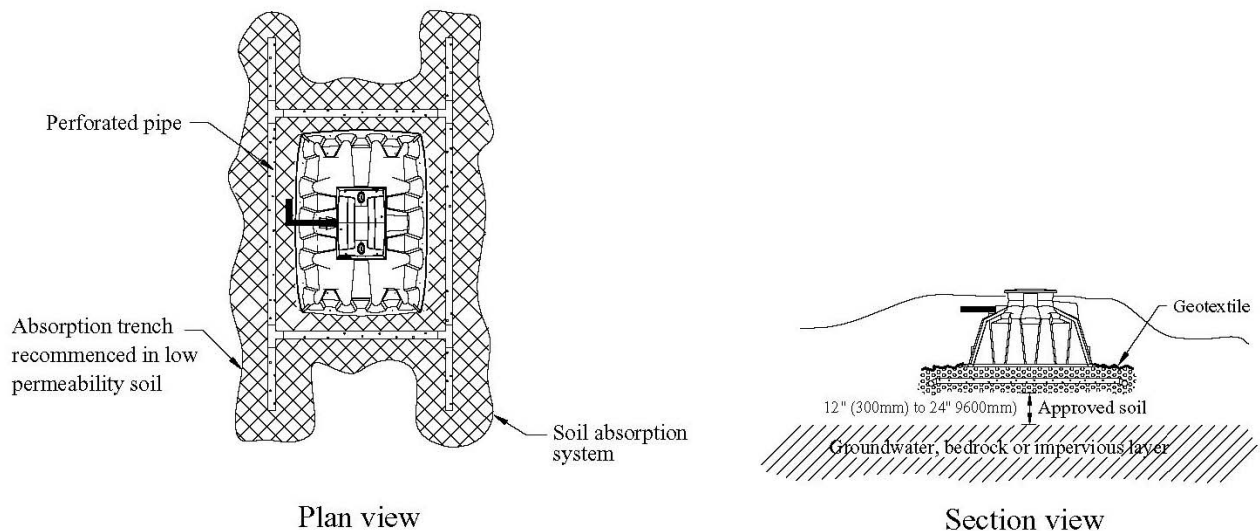


Note: Setback, distances for drainage features and embankment must conform to local regulations.

Type 4: Ways to promote infiltration

Under limited permeability conditions, effluent infiltration can be improved by various means, such as increasing the area and/or perimeter of the absorption bed.

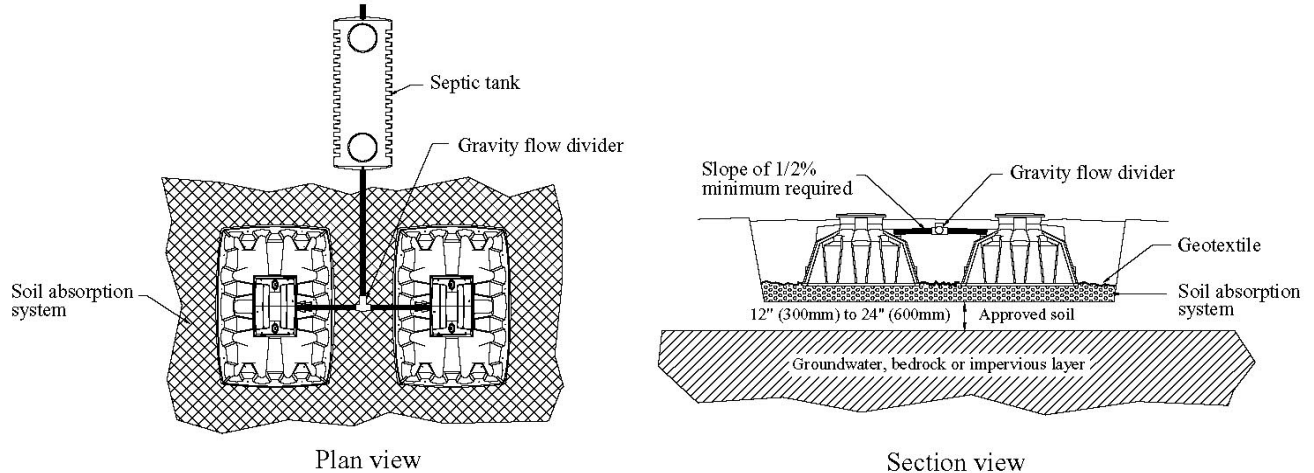
To find out other ways to promote infiltration, contact **PTA**.



Type 5: Gravity-flow installation with two Ecoflo® Biofilters

Onsite systems comprising two or three Ecoflo® Biofilters require a flow divider.

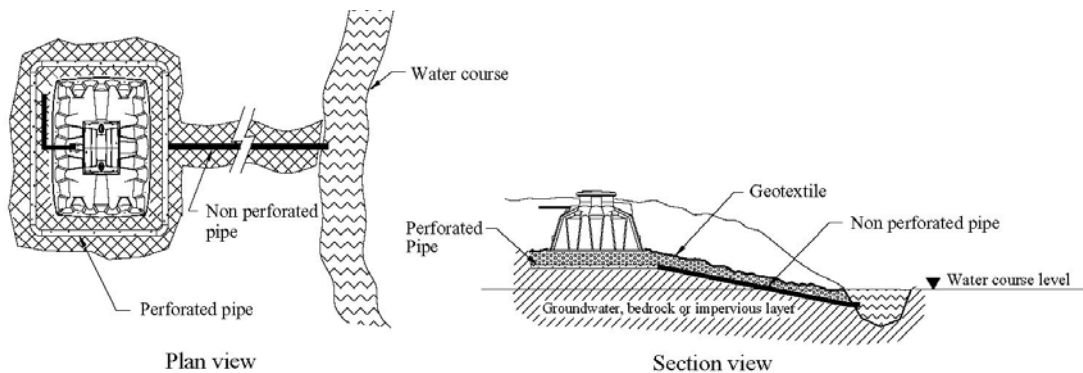
PTA offers two gravity flow divider models: the GFD-200 Gravity Flow Divider and the GFD-200A Gravity Flow Director.



Type 6: Direct discharge installation

- The seasonal high water level should be considered to ensure the base of the shell is never submerged.
- Absorption bed sizes do not necessarily apply to installations with discharge to a watercourse.
- In this type of installation, peripheral drainage is required to avoid recharge in the wastewater catchment area.

IMPORTANT: Installation with discharge to a watercourse requires NPDES approval.



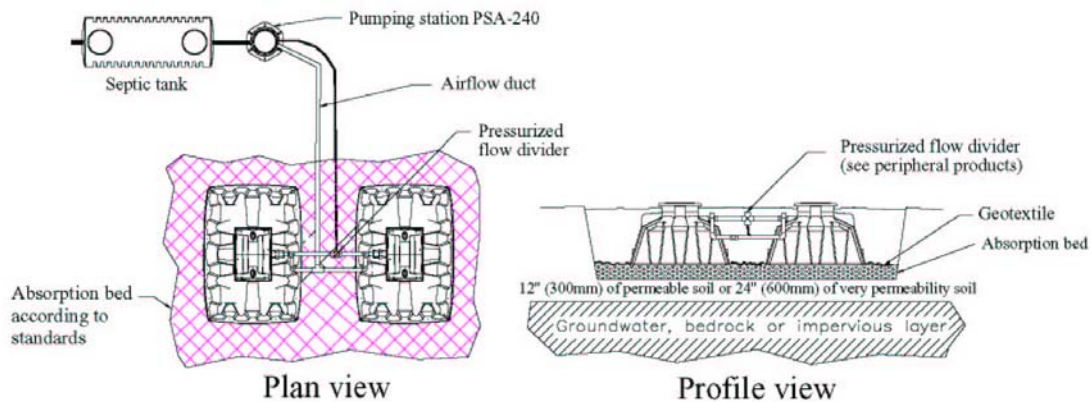
*The Ecoflo® STB-500/650 Biofilter is also suitable for installations with discharge to a watercourse on sites with low-permeability conditions or in areas subject to flooding or submergence (see the *Ecoflo STB-500/650 Biofilter with Submersible Collecting Bottom Installation Guide*).

Type 7: installation with Pump to feed two Ecoflo® Biofilters

Onsite systems with two or three Ecoflo® Biofilters require a Pumping station PSA-240 and PTA's Pressurized Flow Dividers PFS-200/300.

PTA offers several pressurized flow divider models. The schematic diagrams below show an installation using the PFS-200 Pressurized Flow Divider. Flow dividers are also available for onsite installations with multiple systems of up to ten Ecoflo® Biofilters.

Note: PTA recommends to use a Timed Dosing Unit TPA-300 to ensure optimum treatment, efficiency and operation of the Ecoflo® Biofilters. The amount of water released to each Ecoflo® Biofilter must not exceed 8 to 10 gal. (30 to 40 L).



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