

Approved Manual and Installation Guide for Sub-Surface Ecoflo® Biofilters

On-Site Sewage Disposal Systems Manufactured by Premier Tech Aqua

**Prepared for
Nova Scotia Environment
by
Premier Tech Aqua**

October, 2010

This installation guide includes technical information relative to the design and the installation of the different Ecoflo® Biofilter models. The first section includes a Technical Data Sheet presenting for all the Ecoflo® Biofilter models, their components, dimensions, etc. The second section is specific to the design of the different Ecoflo® models and provides examples of typical installations; the third section provides the installation instruction for the different Ecoflo® models.

This document has been developed by Premier Tech Aqua (PTA) to include specific references and pertinent information for the design and installation of Ecoflo® Biofilters in the Province of Nova Scotia. Systems must be designed and installed in accordance with the Nova Scotia Environment “On-site Sewage Disposal Systems, Technical Guidelines” dated 1 April 2009, and any future amendments. Where this document does not indicate information on a specific point, the designer and installer shall use the Technical Guidelines standard on the point as the minimum requirement. However, if different standards are stated on any point in this document, compared to the Technical Guidelines (such as effluent filters being required on the outlet of the septic tank), the requirements in this document shall govern.

General literature published by PTA frequently refers to these units being certified under an “NQ 3680-910” standard for an advanced secondary treatment system. Such references are not applicable in Nova Scotia where this Approved Manual and Installation Guide, together with the Nova Scotia Technical Guidelines and the On-Site Sewage Systems Regulations made under the Nova Scotia *Environment Act* and *Health Act*, are the only official documents related to the design and installation of Ecoflo® Biofilters in Nova Scotia.

Reference to PTA septic tanks, pumping stations, and accessories in this document signify approval for use in Nova Scotia only as integral components involved in installation of Ecoflo® Biofilters in Nova Scotia. Such units may be used in other applications where regular Approval of such component(s) has been given and the item(s) registered as Approved Product in Appendix L of the Technical Guidelines.

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Technical Introduction

IMPORTANT! THIS INTRODUCTON PROVIDES CRITICAL INFORMATION AND CLARIFICATION OF TERMS THAT NEED TO BE READ AND UNDERSTOOD IN ORDER TO ENSURE PROPER USE OF THIS MANUAL

CLARIFICATION

Ecoflo Biofilter shell can be made of various materials such as, but not limited to: fibreglass, concrete, polyethylene, etc. Ecoflo® Biofilter models are designed for a maximum hydraulic loading rate of 290 L/m³ per day of organic filter medium.

All Ecoflo® Biofilters with open bottom (See PART II A of this Manual) are designed as Sub-Surface Discharge Systems.

An Ecoflo® Biofilter with collecting bottom (See PART II B of this Manual) can discharge to an absorptive bed where soil conditions (e.g. allowable vertical Hydraulic Loading Rate) allow *for total acceptance of the complete flow by the in-situ sub-soils* and thus are considered Sub-Surface Discharge Systems.

Sizing of the absorptive bed for these systems is based on the design principles and criteria (e.g. Hydraulic Loading Rates for various soil types) provided in PART II of this manual.

Sub-Surface Discharge

This term applies to disposal methods for an effluent where the design allows *for total acceptance of the complete flow by the in-situ sub-soils*. In Sub-Surface Discharge design calculations the absorptive area bed is sized based on the design flow (L/day) and the (allowable) vertical Hydraulic Loading Rate (L/m²/day) of the on-site sub-soils accepting the flow.

Surface Discharge

This term applies to disposal methods for an effluent where the design does not allow for *total* acceptance of the complete flow by the in-situ sub-soils. In Surface Discharge Design some or all of the design flow is presented as a surface flow. Examples of surface discharge include:

- pipe discharge to a receiving water;
- pipe discharge to a ditch;
- a perforated pipe installed in a gravel trench or French Drain where part of flow is accepted into the sub-soils along length of the gravel area but the total flow is not directly accepted into the sub-soils;
- discharge through a toe drain.

**** THIS MANUAL DOES NOT ADDRESS SURFACE DISCHARGE ****

PART I – Ecoflo® Biofilter Technical Data Sheet

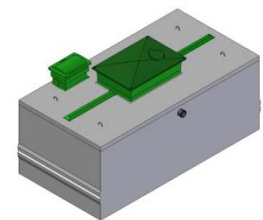
Ecoflo® models

	Fiberglass Shell	Concrete Shell
Open bottom	ST-500 ST-650	N/A
Closed bottom	STB-500 STB-650	STB-500B STB-650B
Closed bottom with integrated pump vault	NA	STB-500BR STB-650BR



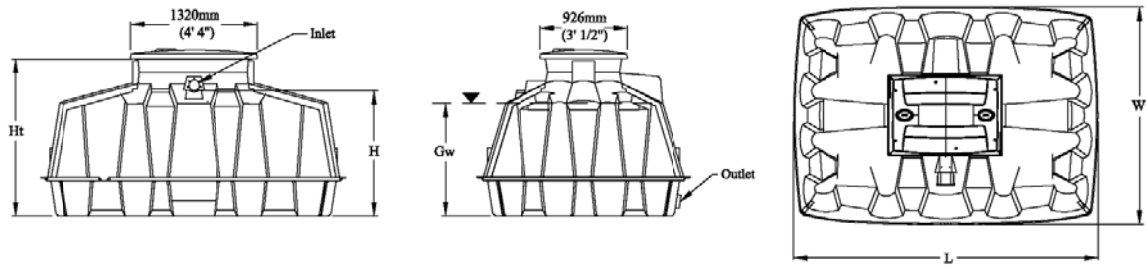
Ecoflo® components material

	Fiberglass Shell	Concrete Shell
Shell	Fiberglass/polyester resin composite	Reinforced concrete 5000 psi
Top tile	NA	Reinforced concrete 5000 psi
Main access and ventilation system	Polyethylene plastic	Fiberglass/polyester resin composite
Lids	Polyethylene plastic	Polyethylene plastic
Sampling device	Polyethylene plastic	N/A
Secondary access and access funnel	N/A	Polyethylene plastic
Support rails	N/A	PVC
Tipping bucket, central support & distribution plates	ABS plastic or Polyethylene plastic	ABS plastic or Polyethylene plastic
Filtering media	Natural organic fibres	Natural organic fibres
Volume of filtering media	Models 500: 3.9 m ³ (138 ft ³) – 23 bags Models 650: 5,2 m ³ (183 ft ³) – 30 bags	
Connections	Flexible, watertight and adapter to 100 mm Ø (4") SDR-35 and SCH-40 PVC pipes.	Flexible, watertight and adapter to 100 mm Ø (4") SDR-35 and SCH-40 PVC pipes. Outlet of the STB-650BR adapter to 25 mm (1") Ø flexible pipes.



Dimensions – FIBERGLASS MODELS

	ST-500	STB-500	ST-650	STB-650
Total length (L)	3345 mm (132")		4175 mm (164")	
Total width (W)	2360 mm (7'9")			
Total height (H)	1320 mm (4'4")	1700 mm (5'7")	1320 mm (4'4")	1700 mm (5'7")
Height to the inlet (Hi)	970 mm (3'2")	1345 mm (4'5")	970 mm (3'2")	1345 mm (4'5")
Bottom height	N/A	380 mm (15")	N/A	380 mm (15")
Maximum groundwater level	N/A	1245 mm (49")	N/A	1245 mm (49")
Shell weight	105 kg (230 lbs)	210 kg (460 lbs)	125 kg (275 lbs)	250 kg (550 lbs)

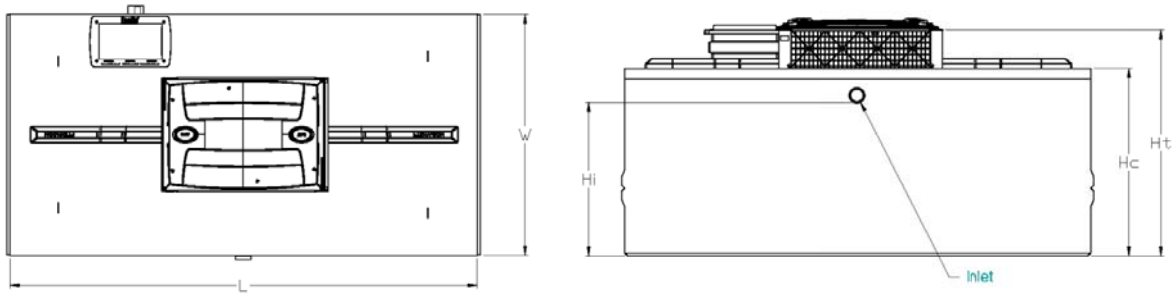


Dimensions – CONCRETE MODELS

	STB-500B STB-500BR	STB-650B STB-650BR ⁽¹⁾
Weight of the top tile*	1 180 kg (2 600 lb)	1 610 kg (3 550 lb)
Weight of the shell*	4 000 kg (8 810 lb)	4 750 kg (10 470 lb)
Length (L)	2 920 mm (115")	3 800 mm (150")
Width (W)	1 960 mm (77")	1 960 mm (77")
Total height (Ht)	1 870 mm (74")	1 820 mm (72")
Concrete tank height (Hc)	1 570 mm (62")	1 520 mm (60")
Height to the inlet (Hi)	1 300 mm (51")	1 250 mm (49")
Storage capacity	362 L (95 USg)	492.4 L (130 USg)

*approximate weight: may vary.

(1) Ecoflo Biofilter models housed in concrete shell which model numbers terminate by BR include an integrated pump vault.



Handling

Fiberglass Shell	Concrete Shell
2 or 4 lifting rings are located on top of the shell (2 rings minimum are required to lift the shell)	2 hoisting grooves allow handling of the system with the proper hoisting equipment. The shell and the top tile can also be moved separately with the 4 hoisting rings on the top tile and 4 more rings inside the shell (on the bottom).

Treatment Efficiency – Ecoflo Effluent Quality (source: NSF bench test)

NSF cert.	Average	Std. Dev.	Min.	Max.	Median
BOD5	2	0.3	< 2	4	< 2
TSS	2	0.7	< 2	8	< 2
Fecals	185 *	2 053	4	10 600	174

* Geometric mean

PART II – Ecoflo® Biofilter Design Guidelines

Approved Design Manual and Installation Guide- Nova Scotia

This document contains the information required to plan and design the installation of the Ecoflo® Biofilters – Open Bottom in the Province of Nova Scotia. The design must be made by a Qualified Person Level 1. The installation must be performed by an on-site sewage system installer who is certified in Nova Scotia and who has been trained and accepted by PTA. You can get a list of currently certified and accepted installers by contacting our customer service at 1 800 6-ECOFLO (1 800 632-6356).

A) Installation procedure for the Ecoflo® Biofilter with OPEN BOTTOM - ST Series Models

1. System components description
2. Components location and special instructions
3. Effluent disposal method determination
4. Typical installations



1. System components description

1.1 Septic tank

Septic tanks must conform to Section 3.1 of the Nova Scotia Environment (NSE) On-Site Sewage Disposal Systems Technical Guidelines (hereafter referred to as 'Technical Guidelines') or be a PTA unit described in this document. Determine the required tank size according to the Technical Guidelines. **To optimize** the efficiency of any septic installation and extend the life of the treatment system, **we recommend** using a larger septic tank than that prescribed.

If a repair installation is proposed, two options are possible:

1. **Replacing the septic tank:** the new tank must be equipped with an **Effluent filter EFT-080** by PTA or **Polylok PL-122**. It is also possible to supply it with a **TAD-240** septic tank adapter, **PSR-060** or **PSR-140** risers and **LID-240** lids allowing easy access inside the septic tank and to the effluent filter. You can also use the **PST 420/500/660 high performance polyethylene septic tanks** from PTA.
2. **Upgrading the existing septic tank:** the tank must be inspected to make sure that it is in good condition and an effluent filter must be installed in a separate filter container outside the tank. A **TAD-240 septic tank adapter** may also be installed to facilitate access inside the tank and to the effluent filter.

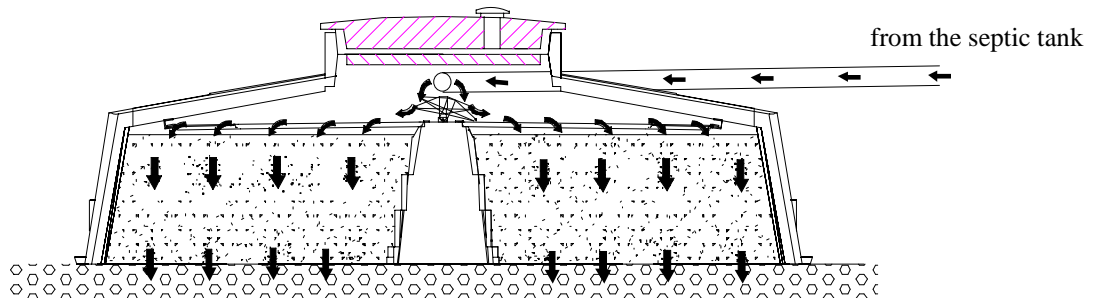
1.2 Effluent filter EFT-080 by PTA or Polylok pl-122

The use of an **effluent filter is mandatory with an Ecoflo® Biofilter**. The effluent filter models that meet this criterion are the **EFT-080** from PTA and the **Polylok PL-122**. **It is therefore strictly prohibited to use another type of effluent filter**. The effluent filter stops suspended solids from reaching the filtering media and the effluent pump, solids that could interfere with good functioning of operations. The effluent filter is usually installed in the second compartment of the septic tank, but may also be installed, in accordance with existing standards, in the **TLF-240 filter container by PTA**, which is placed after the septic tank and before the pumping station (if applicable). The effluent filter container must be installed in compliance with the clearance distances prescribed for septic tanks.

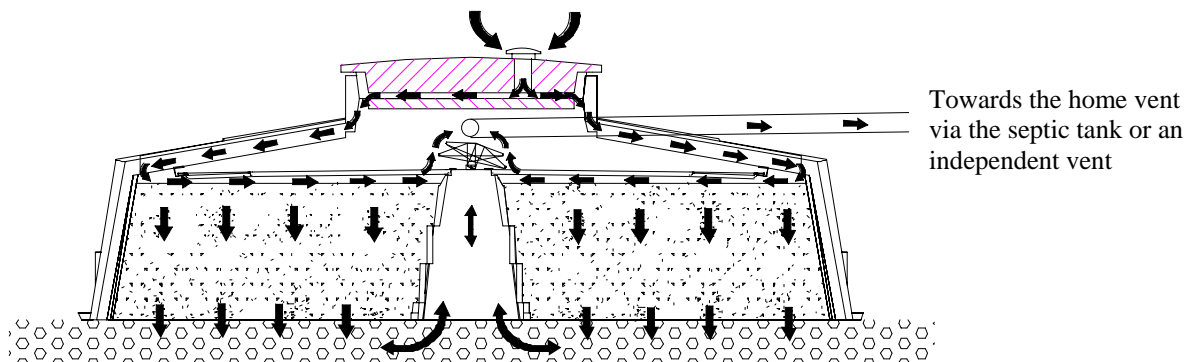
1.3 Ecoflo® Biofilter

The Ecoflo® Biofilter is a biofiltration system approved for use in Nova Scotia for the treatment of wastewater. It is always installed following a septic tank equipped with an effluent filter. The model and number of Biofilter units required is determined according to the design flow. According to Nova Scotia regulation, the all Ecoflo models can handle up to 290 L/m³ of filtering media per day or 230 L/m² per day. As such, select the type and number of Ecoflo units necessary to provide for at least the daily design flow.

1.4 General function of the system



Water flow diagram



Air flow diagram

The Ecoflo® Biofilter is designed to treat domestic wastewater after a primary treatment. This function is performed as the wastewater percolates through the peat based filtering media. It is absorbed briefly where beneficial aerobic microorganisms and fungus degrade the waste constituents and produce highly treated effluent.

To be treated, the wastewater goes first into the septic tank where it is submitted to a primary treatment and then it flows to the Ecoflo® Biofilter. The water is directed into an internal tipping bucket where effluent is dosed equally in one gallon increments onto the peat medium by specially designed distribution plates. The distribution plates are located on both sides of the central support. These plates include channels and orifices to distribute the effluent evenly on top of the filtering media. After, wastewater trickles down into the filtering media where its organic content is consumed by fixed bacteria before entering the absorption bed located underneath the Biofilter.

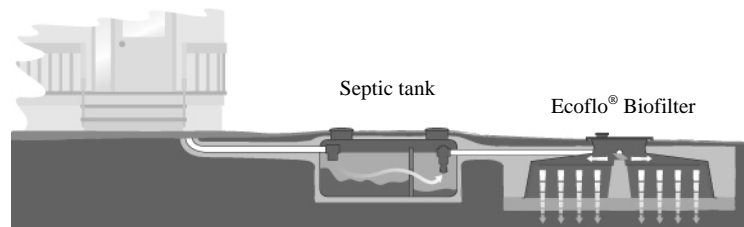
To be efficient, the system requires enough oxygen transfer for the bacteria to do their work. The aeration of the system is based on a gravity air flow as illustrated on the diagram above. The air intake is located on the lid of the biofilter and an independent vent assures the air flow through the system. 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 airflow ducts and circulates at the top of the filtering media underneath the distribution plates. It penetrates then into the filtering media via water infiltration. Also, a gas exchange occurs at the top and at the base of the filtering media promoting its oxygenation. The air coming out of the filtering media is evacuated by passing through the opening located at the top of the central support. Finally, it is conducted by convection to the home air vent via the septic tank.

1.5 Pumping Station (if applicable)

The Ecoflo[®] typically does not require a pump, but receives gravity-fed effluent from the septic tank. If the system requires a pumping station, a **PSA-240L Pumping Station** (or an approved product - in either case the standard requirements of the Technical Guidelines for pump chamber capacity shall be met) should be installed downstream of the septic tank and/or the effluent filter container, unless site conditions do not permit this configuration (see *PSA-240L Installation Guide* for information on its function and installation as example). Where it is necessary to pump to the septic tank, the additional standard requirements of the Technical Guidelines concerning septic tank type and size, discharge per pump cycle, discharge rate, and flow control must be observed. Like the septic tank, the pumping station must also be watertight to prevent groundwater infiltration. The amount of water released to each Ecoflo[®] Biofilter must be within 30 to 40 L (6.6 to 8.8 imp. gal.) per dosing.

2. Components location and special instructions

Components of a residential gravity-flow septic installation



2.1 Minimum clearance Distances prescribed by regulation

See Table 2.5 (A) of the Technical Guidelines for horizontal clearance distances applicable to all on-site sewage disposal systems in Nova Scotia, including PTA units. In addition, no trees are to be located within 2 m (6.5 ft) of the absorption bed, and, no motorized traffic or heavy loading is to be located within 3 m of the lid of the unit.

The use of the term “absorption bed” in this document has the same meaning as “disposal field” in the Technical Guidelines for the purpose of determining minimum clearance distances.

2.2 Installation conditions

Contact the septic tank manufacturer to see if they recommend a maximum installation depth. The septic tank must be watertight and receive only household wastewater in accordance with the Technical Guidelines.

Depending on the situation, an interceptor trench may be installed up slope/around the septic tank to prevent groundwater infiltration.

The **Ecoflo® Biofilter** must be installed in a place:

- Where soil conditions affecting the absorption bed are acceptable, as specified in Part II A Section 3.1.2;
- Where the area around the unit (and around the absorption bed if it is remotely located), has positive surface water drainage away from the unit and the bed;
- That is not subject to flooding or groundwater rise;
- Where it is accessible for pumping and maintenance.

The lid of the **Ecoflo® Biofilter** must be 50 mm (2") aboveground after the final landscaping has been completed.

It is important that all interested parties (installer, landscaper, owner, snow removal company) be advised of the following:

- Never cover or bury the lid;
- Never overload the ground within 3 m (10') of the lid (e.g. vehicle, blown snow, embankment);
- Ensure rapid revegetation to prevent soil erosion.

3. Effluent disposal method determination

Important! THIS IS A CRUCIAL STEP IN ANY SEPTIC INSTALLATION

3.1 Subsurface disposal

3.1.1 Natural soil and site characterization

The **Ecoflo® Biofilter** system requires a design by a QP1 certified in Nova Scotia. The design process includes, among others, consideration of the site topography, the gradient of the receiving ground, the soil permeability as well as the rock and groundwater level. Soil permeability assessment is essential to size the absorption bed for the **Ecoflo® Biofilter**.

3.1.2 Absorption area bed

Once the soil and site characteristics have been established, determine the required size of the absorption area bed beneath the **Ecoflo® Biofilter**, using the definitions of soil types in Section 2.5.2 in the Technical Guidelines. The table below provides the minimum area per soil type based on the specified design flows. If the design flow differs from those listed (up to 2200 L/day), the minimum area is the flow rate divided by the hydraulic loading rate permissible by soil type. Example: Minimum bed area for design flow of 1500 L/day in medium to coarse sand would be:

$$\frac{1500 \text{ L/day}}{45 \text{ L/m}^2\text{/day}} = 33 \text{ m}^2$$

The absorption bed consists of a minimum depth of 200 mm (8") of clean crushed stone 15-60 mm Ø (½"-2") in diameter, with a high fraction being 20 mm (¾") in diameter, under the **Ecoflo® Biofilter** (see next paragraph concerning remote location). As shown in figures 1 and 2 below, the absorption bed width and length are proportional to **Ecoflo® Biofilter** dimensions.

The shape of the absorption bed and position of the **Ecoflo® Biofilter** on the crushed stone may vary depending on site constraints. If the absorption bed is located elsewhere than directly beneath the units, an **Ecoflo Biofilter** with collecting bottom (the STB series models) and solid piping (and pumping if needed) shall be used to convey the effluent to the bed. Table 3.1 provides sizing criteria for absorption bed.

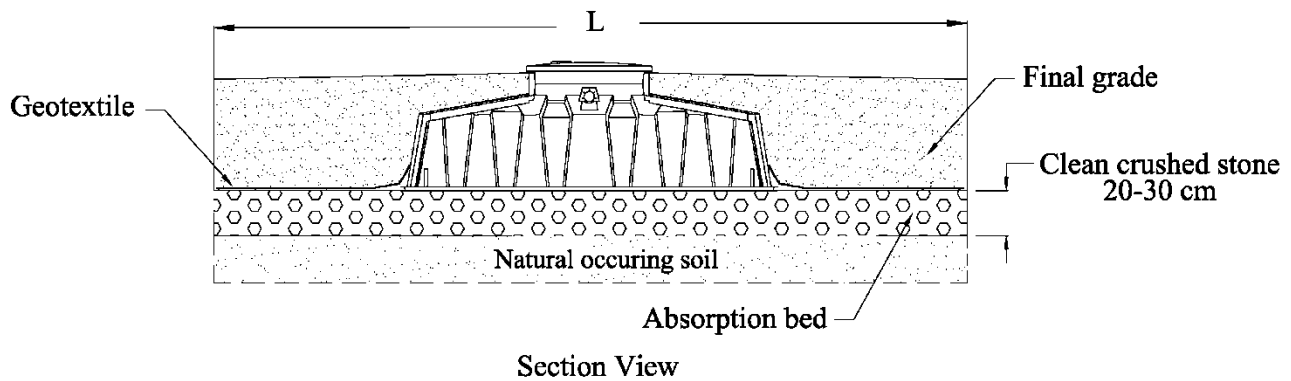
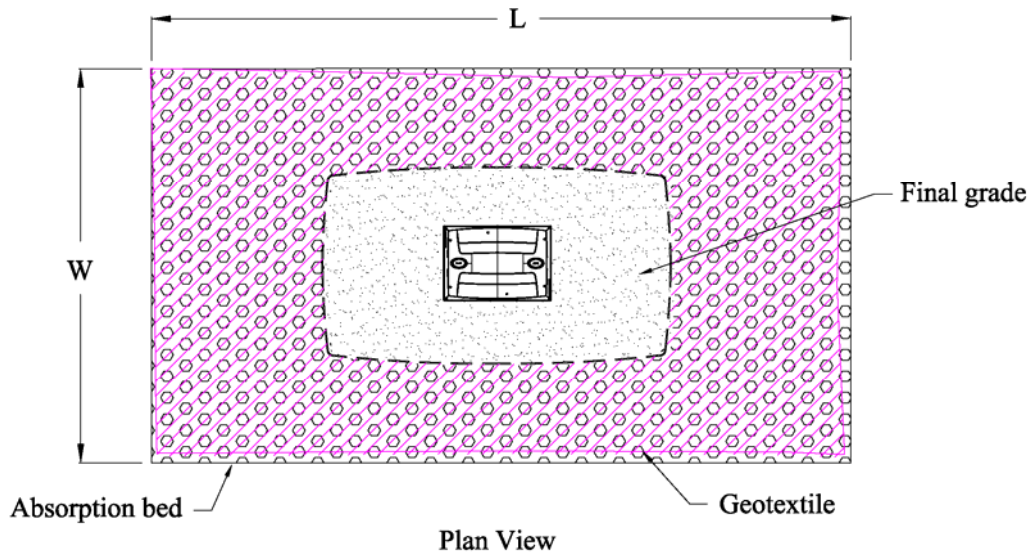
Table 3.1 – Sizing of Absorption Bed

Example Design Flow (L/day)	Number of Ecoflo [®] Biofilter required		Minimum Area of Absorption Bed, by Soil Type					
			Medium to Coarse Sand	Fine Sandy Gravel	Silty Sand	Sandy Silt	Clayey Silt	Silty Clay
			Hydraulic Loading Rate used (L/ m ² /day)					
			45	40	32	27	22	15
			m ²	m ²	m ²	m ²	m ²	m ²
500	1	-						
1000	1	-	22	25	31	37	45	67
1200	-	1	27	30	38	44	55	80
1350	-	1	30	34	42	50	61	90
1500	-	1	33	38	47	56	68	100
1700	2	-	38	43	53	63	77	113
2050	2	-	46	51	64	76	93	137
Design notes:								
For larger flows, non-residential sources, and system clustering please consult Appendix F in the NS Technical Guidelines. In any case where an absorption bed exceeds 150 m ² an engineering review of potential local water table mounding should be completed. The mounded water table for these systems must be at least 300 mm below the absorption bed.								

If disposal under the unit is not possible effluent can be directed to a disposal field as described in the Technical Guidelines. If the slope on the lot is less than 3% and an area bed or mound are proposed, the loading rates in Table 3.1 are used to determine the size of the field. If the field is a contour (C1, C2, or C3) the required length is calculated following the design procedure found in Chapter 5 of the Technical Guidelines. The length of contour is the same as for septic tank effluent but it is possible to reduce the width of the trench using the loading rates in Table 3.1 to calculate the required bottom area of the trench.

3.1.3 Soil depth required under the absorption bed

There must be at least 600 mm (24") of soil between the base of the absorption bed and the seasonal high water table, bedrock, highly impermeable soil (clay, silty clay, or clayey silt), or highly permeable soil (rock or clean gravel).



3.1.4 Final cover

Shall meet Nova Scotia guidelines

3.1.5 Mounding analysis

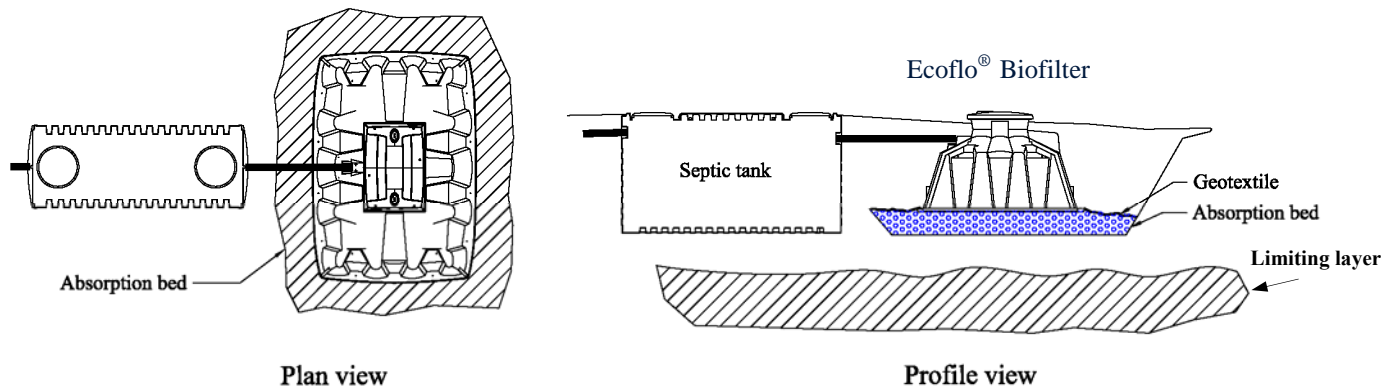
When mounding may be a concern the designers should make themselves aware of the theories involved and include consideration for mounding in the calculations of system size and shape. The best way to limit or avoid mounding concerns is to keep the disposal field long and narrow with the long dimension following the site contour.

4. Typical installations

Type of installation varies according to site conditions. Here are different types of installations:

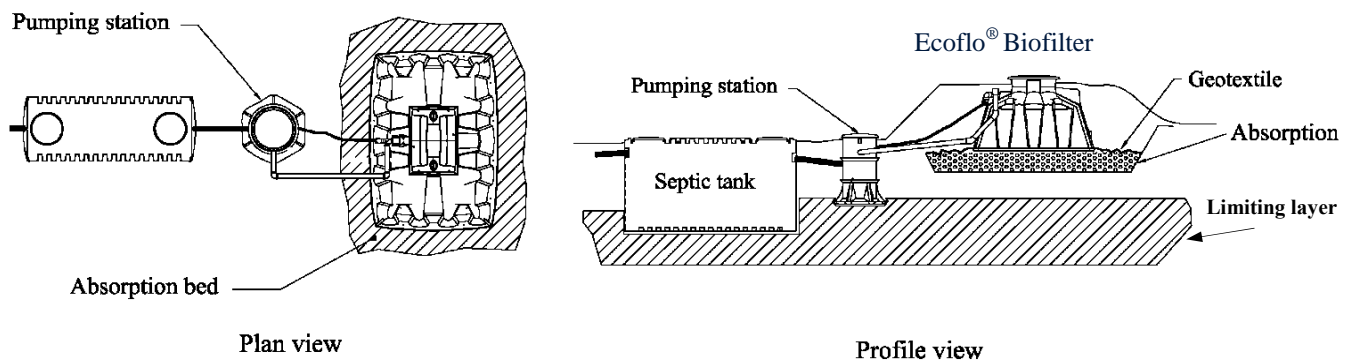
In all cases, the area and depth of the absorption bed and soil depth under the absorption bed, must comply with Part II A Section 3.1 of this document.

Type 1 Installation on flat ground with gravity flow



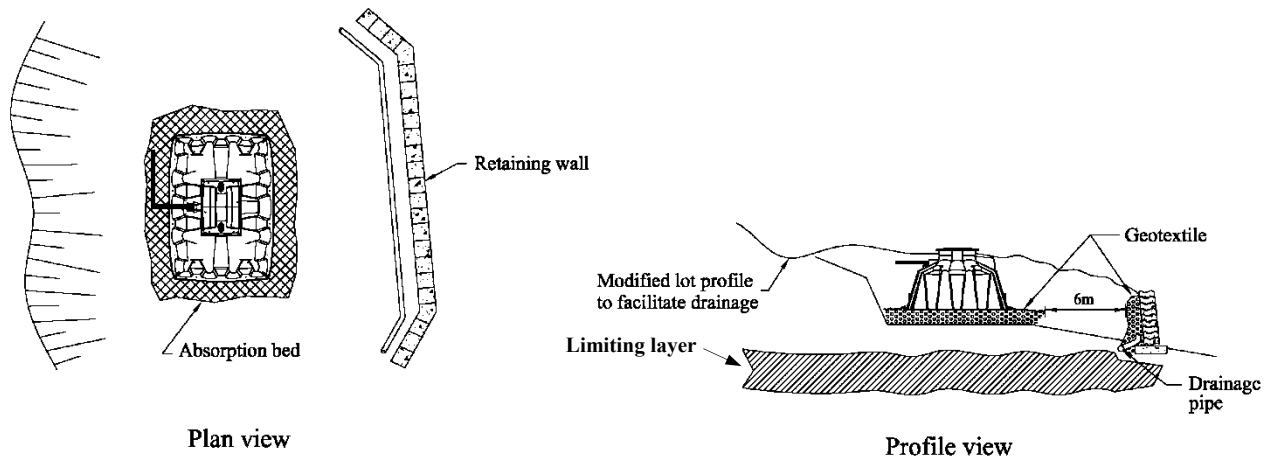
Type 2 Aboveground installation on a flat site

- For installations with a pumping station, the amount of water released to each **Ecoflo® Biofilter** should not exceed 30 to 40 L (6.6 to 8.8 imp. gal.) per dosing. See Part II A Section 1.5 of this document concerning pumping configuration.
- To ensure air circulation, the pumping station must be linked to the **Ecoflo® Biofilter** by an airflow duct.
- The pumping station must be watertight.
- The pumping station must be accessible at all times.



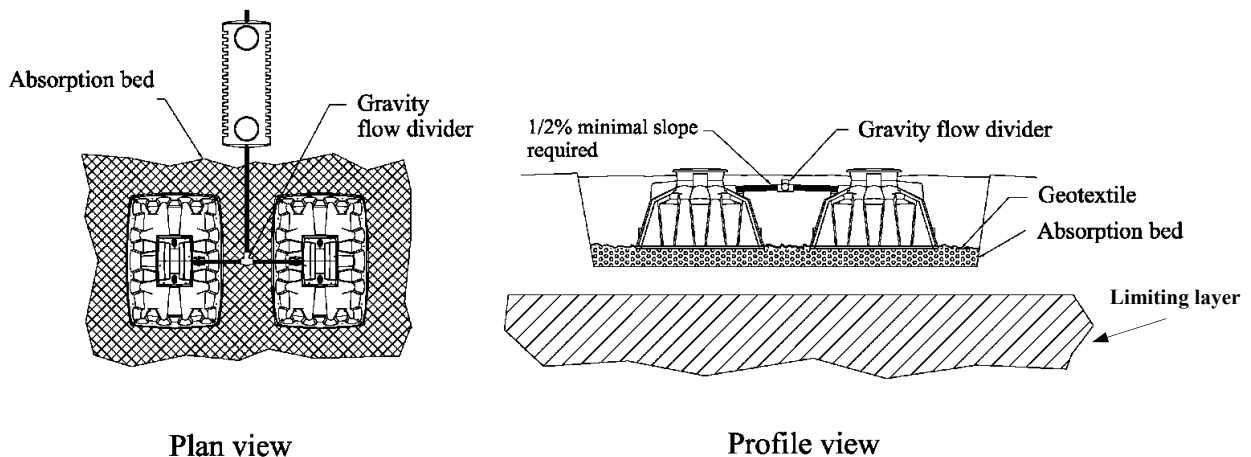
Type 3 Surface installation on a sloped site

- On sloped sites, the shell should be placed at right angle 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 base of the retaining wall must be well drained to ensure that the soil and septic system remain stable.
- If there is no retaining wall, the backfill material and method used must ensure that the backfill remains stable and does not slide and displace the **Ecoflo® Biofilter**.
- Final cover shall meet Nova Scotia guidelines



Type 4 Installation with two Ecoflo® Biofilters fed by gravity

Installation comprising two **Ecoflo® Biofilters** fed by gravity requires a flow divider. **Premier Tech Aqua** offers two gravity flow divider models: the **GFD-200 gravity flow divider** and the **GFD-200A adjustable gravity flow divider**.



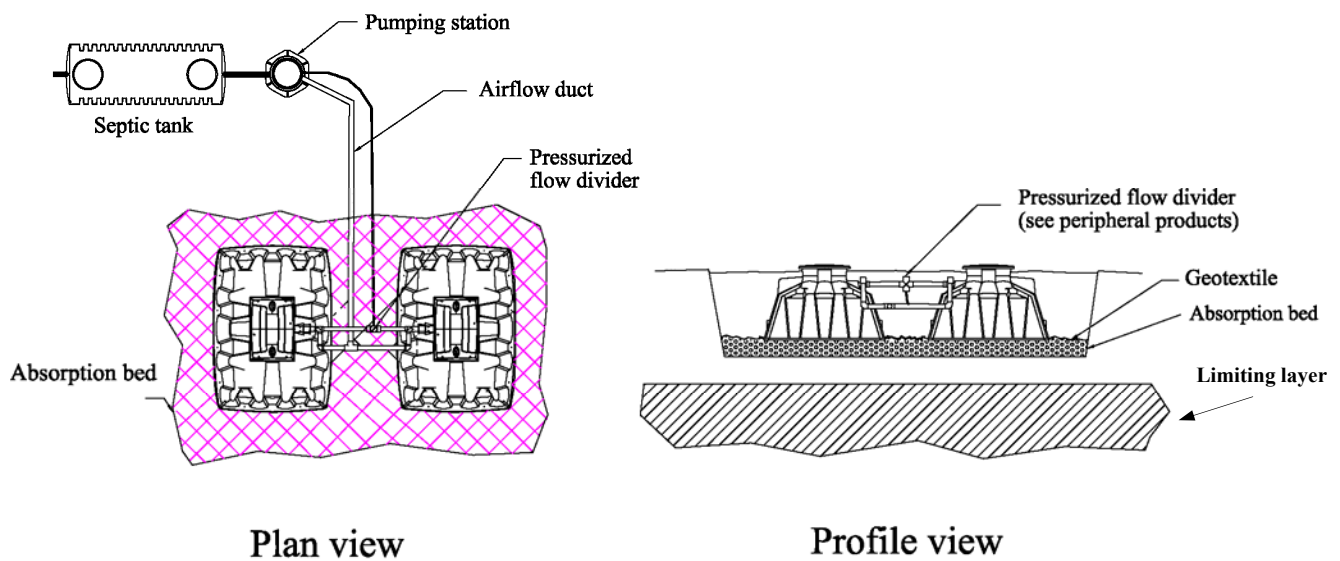
Type 5 Installation with two or three Ecoflo® Biofilters fed by a pumping station

Installation with two or three Ecoflo® Biofilters that can not be fed by gravity requires a PSA-240L Pumping Station and PFS-200/300 pressurized flow dividers.

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.

Important: the amount of water released to each Ecoflo® Biofilter must not exceed 30 to 40 L (6.6 to 8.8 imp. gal.) per dosing. See Part II A Section 1.5 of this document concerning pumping configuration.



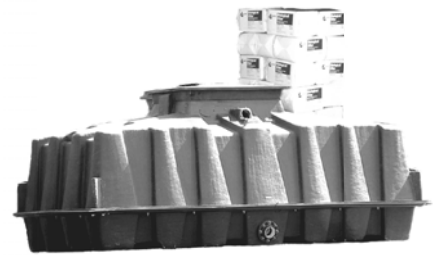
PART II B - Ecoflo® Biofilters with collecting bottom

Approved Design Manual and Installation Guide – Nova Scotia

This document contains the information required to plan and design the installation of the Ecoflo® Biofilters – Close Bottom in the Province of Nova Scotia. The design must be made by a Qualified Person Level 1. The installation must be performed by an on-site sewage system installer who is certified in Nova Scotia AND who has been trained and accepted by PTA. You can get a list of currently certified and accepted installers by contacting our customer service at 1 800 6-ECOFLO (1 800 632-6356).

B) Installation procedure for the Ecoflo® Biofilter with COLLECTING BOTTOM - STB Series Models

1. System components description
2. Components location and special instructions
3. Determination of the effluent disposal method
4. Functions of the Ecoflo® Biofilter
5. Typical installations



1. System components description

1.1 Septic tank

The requirements for septic tanks are as stated in Part II A in this document.

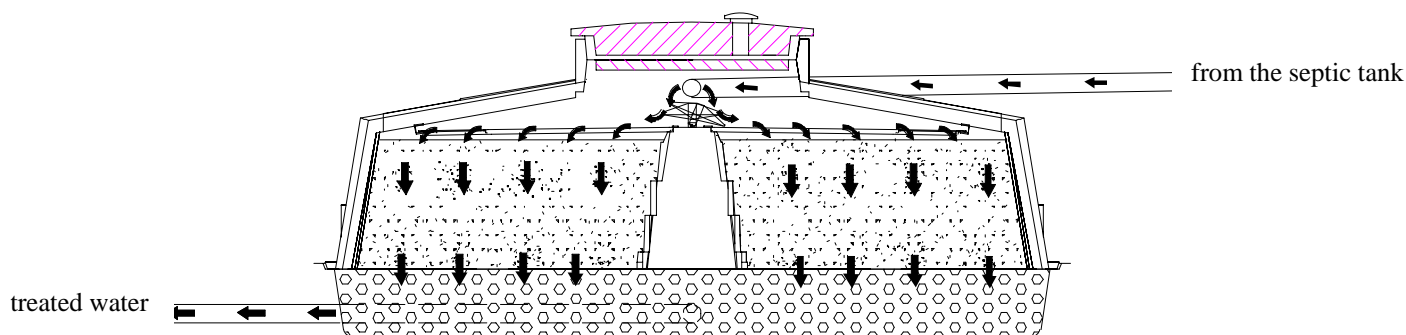
1.2 Premier Tech Aqua's Effluent filter EFT-080 or Polylok PL-122

The requirements for an effluent filter is as stated in Part II A in this document.

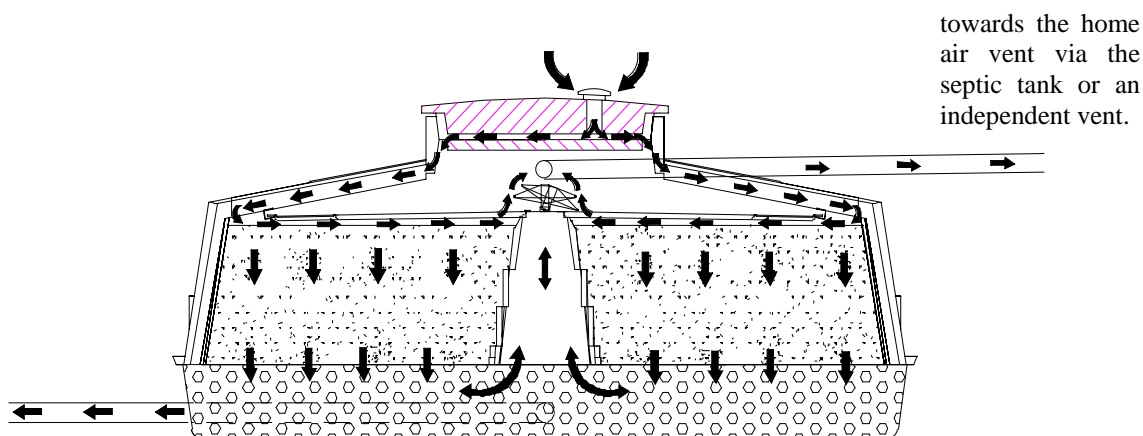
1.3 Ecoflo® Biofilter STB-500/650 with submersible collecting bottom

The Ecoflo® Biofilter STB-500/650 is a biofiltration system approved for use in Nova Scotia for the treatment of wastewater. It is always installed following a septic tank equipped with an effluent filter. The model and number of Biofilter units required is determined as stated in Part II A Table 3.1 of this document.

1.4 General function of the system



Water flow diagram



Air flow diagram

The Ecoflo® Biofilter is designed to treat domestic wastewater after a primary treatment. This function is performed as the wastewater percolates through the peat based filtering media. It is absorbed briefly where beneficial aerobic microorganisms and fungus degrade the waste constituents and produce highly treated effluent.

To be treated, the wastewater goes first into the septic tank where it is submitted to a primary treatment and then it flows to the Ecoflo® Biofilter. The water is directed into an internal tipping bucket where effluent is dosed equally in one gallon increments onto the peat medium by specially designed distribution plates. The distribution plates are located on both sides of the central support. These plates include channels and orifices to distribute the effluent evenly on top of the filtering media. After, wastewater trickles down into the filtering media where its organic content is consumed by fixed bacteria before entering the absorption bed located underneath the Biofilter.

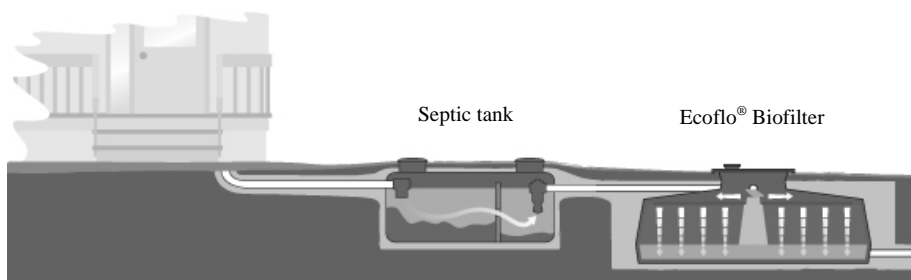
To be efficient, the system requires enough oxygen transfer for the bacteria to do their work. The aeration of the system is based on a gravity air flow as illustrated on the diagram above. The air intake is located on the lid of the biofilter and an independent vent assures the air flow through the system. 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 airflow ducts and circulates at the top of the filtering media underneath the distribution plates. It penetrates then into the filtering media via water infiltration. Also, a gas exchange occurs at the top and at the base of the filtering media promoting its oxygenation. The air coming out of the filtering media is evacuated by passing through the opening located at the top of the central support. Finally, it is conducted by convection to the home air vent via the septic tank.

1.5 Pumping station (when Applicable)

The Ecoflo[®] typically does not require a pump, but receives gravity-fed effluent from the septic tank. If the system requires a pumping station, a **PSA-240L Pumping Station** (or an approved product - in either case the standard requirements of the Technical Guidelines for pump chamber capacity shall be met) should be installed downstream of the septic tank and/or the effluent filter container, unless site conditions do not permit this configuration (see *PSA-240L Installation Guide* for information on its function and installation). Where it is necessary to pump to the septic tank, the additional standard requirements of the Technical Guidelines concerning septic tank type and size, discharge per pump cycle, discharge rate, and flow control must be observed. Like the septic tank, the pumping station must also be watertight to prevent groundwater infiltration. The amount of water released to each Ecoflo[®] Biofilter must be within 30 to 40 L (6.6 to 8.8 imp. gal.) per dosing.

2. Components location and special instructions

Components of a residential gravity flow septic installation



2.1 Minimum Clearance Distances Prescribed by Regulation

See Table 2.5 (A) of the Technical Guidelines for horizontal clearance distances applicable to all on-site sewage disposal systems in Nova Scotia, including PTA units. In addition, no trees are to be located within 2 m (6.5 ft) of the absorption bed (if applicable), and, no motorized traffic or heavy loading is to be located within 3 m of the lid of the unit.

The use of the term “absorption bed” in this document has the same meaning as “disposal field” in the Technical Guidelines for the purpose of determining minimum clearance distances.

2.2 Installation conditions

Contact the septic tank manufacturer to see if they recommend a maximum installation depth. The septic tank must be watertight and receive only household wastewater in accordance with the Technical Guidelines.

Depending on the situation, an interceptor trench may be installed up slope/around the septic tank to prevent groundwater infiltration.

The Ecoflo[®] Biofilter must be installed in a place:

- where the area around the unit (and around the absorption bed, if any), has positive surface water drainage away from the unit and the bed;
- that is not subject to flooding or groundwater rise, such that maximum level of the groundwater table rises over the shoulder of the Ecoflo[®] Biofilter, which means 1245 mm (49") from the base of the shell. If there is a possibility that the groundwater may rise higher than that, drainage by means of ditching or subdrains is required around the Biofilter to prevent it;
- where it is accessible for pumping and maintenance.

3. Determination of the effluent disposal method

IMPORTANT! THIS STEP IS A CRUCIAL ELEMENT FOR ANY SEPTIC INSTALLATION

Disposal methods

The effluent of the **Ecoflo[®] Biofilter with collecting bottom** can be discharged by gravity flow or via a pumping station (if needed) that brings the effluent to an absorption bed. If a pump is used, the **pumping station PSA-240L** that has been specially designed for this application can be used in conjunction with the Ecoflo models with a fibreglass shell. Note that the Ecoflo models with a concrete shell have an integrated pump vault thus the use of an external pumping station is not required.

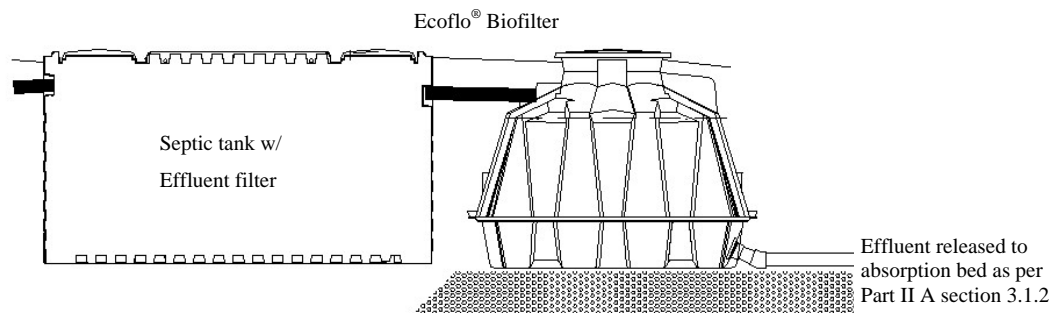
3.1 Discharge to an absorption bed (WHEN applicable)

The requirements for absorption beds are as stated in Part II A section 3 of this document. The absorption bed is to be entirely covered on top by geotextile. All piping within the absorption bed shall be installed in accordance with the Nova Scotia Technical Guidelines.

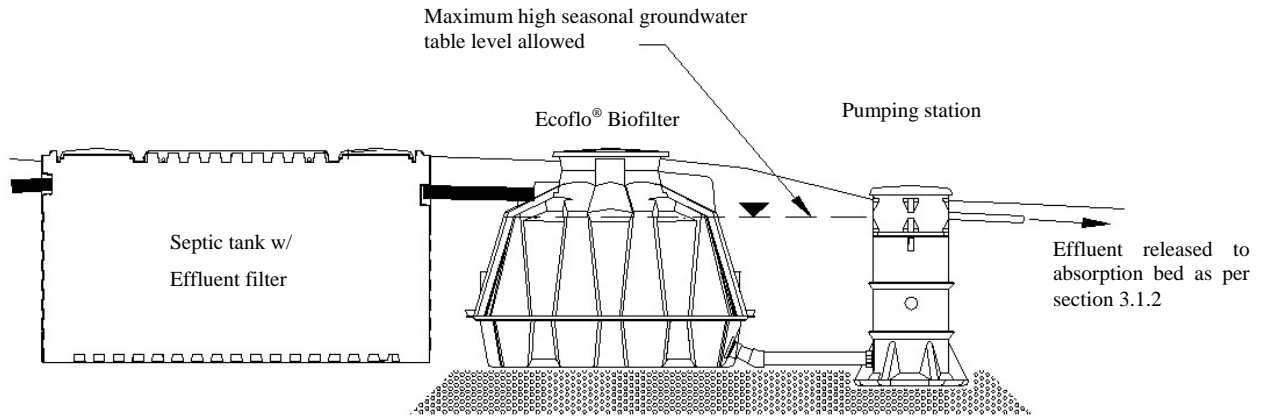
4. Typical installations

The type of installation depends on site conditions and the Technical Guidelines. Below are some examples. The Ecoflo shell could be either in fibreglass or in concrete. Note that the Ecoflo models with a concrete shell have an integrated pump vault thus the use of an external pumping station is not required.

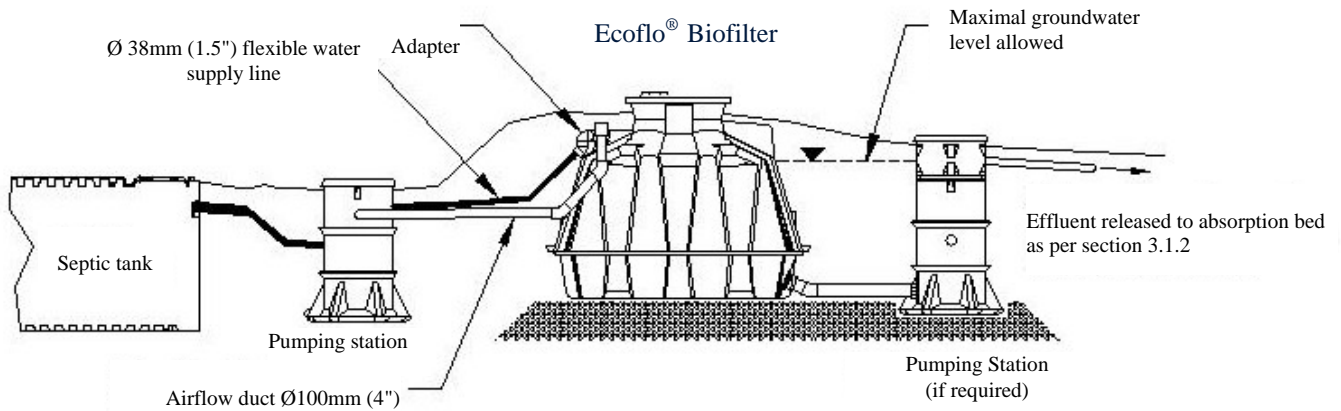
Type 1 Gravity flow installation with effluent release to absorption bed



Type 2 Gravity flow installation with effluent release to a pumping station



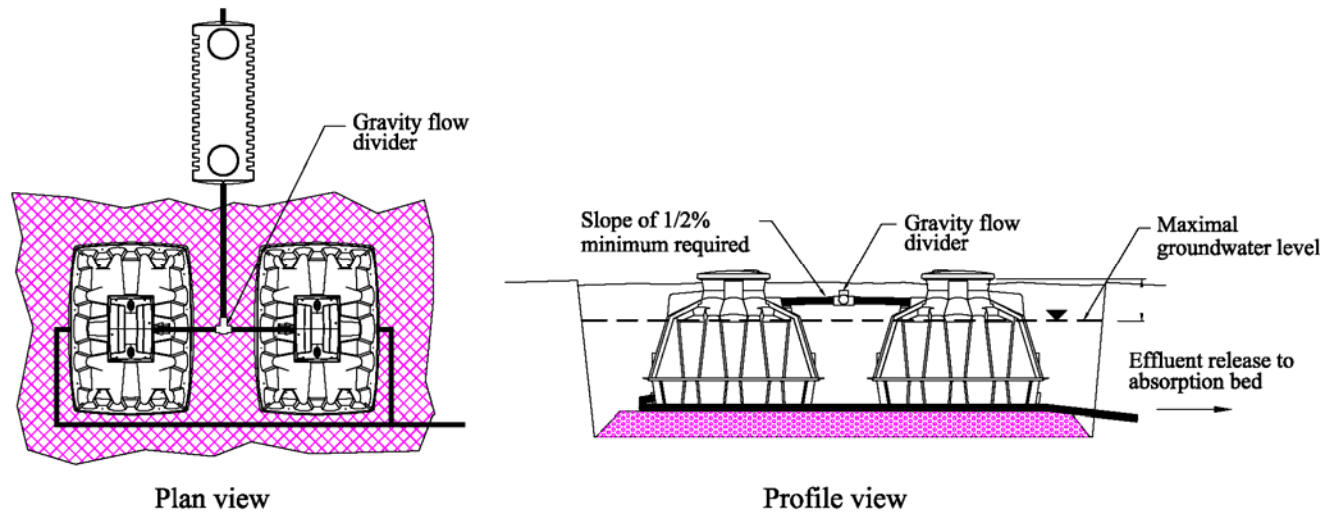
Type 3 Partially above-ground installation with effluent pumped up to an absorption bed



Type 4 Gravity flow installation with two Ecoflo® Biofilters

Onsite systems comprising two Ecoflo® Biofilters require a flow divider. Premier Tech Aqua offers two gravity flow divider models:

- the GFD-200 gravity flow divider and
- the GFD-200A adjustable gravity flow divider.



Part III - Ecoflo® Biofilter Assembly and Installation Guide

Approved Design Manual and Installation Guide – Nova Scotia

A) Ecoflo® Biofilter with Open Bottom – ST Series Models

1. Ecoflo® Biofilter functions

1.1 System components functions

Lid:

- Gives access inside the shell;
- Feeds with air the filtering media (via its intake);
- Securely fastened with bolted assemblies.

Insulating board:

- Give a thermal insulation to the system;
- Helps guiding airflow into the shell's air ducts;
- Seals the system (with Premier Tech ty-raps);
- Constitute an added security against frost.

Shell (including optional riser, if any):

- Encloses the system components;
- Holds air and water pipes connections to the system;
- Circulates air via its air ducts to the ends of the filtering media.

Central support:

- Support the tipping bucket and one end of the distribution plates;
- Allow air exchange between bottom and top of the filtering media;
- Its access 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:

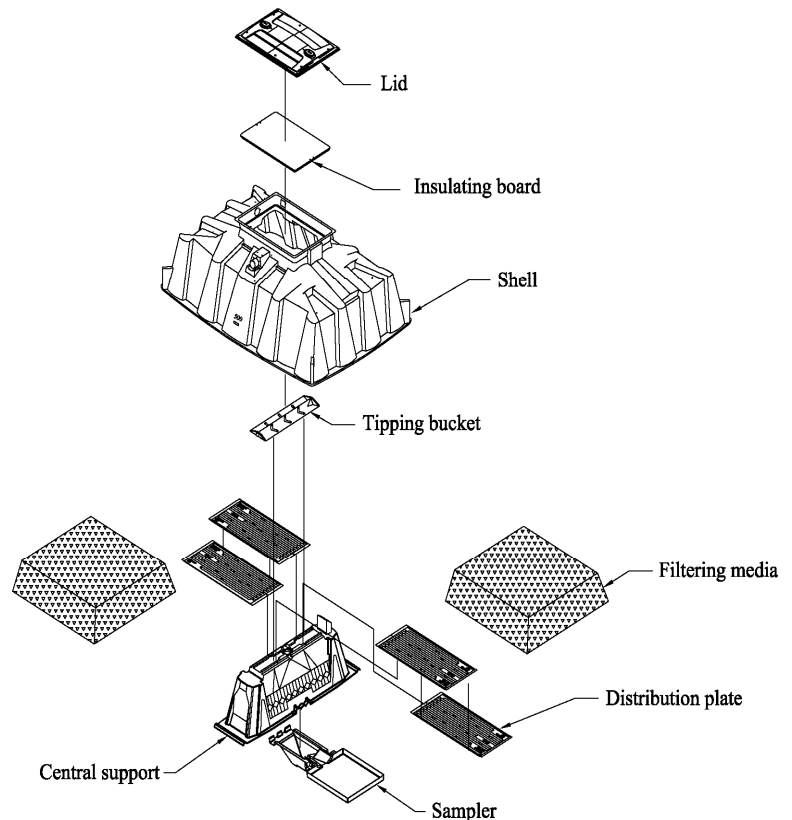
- Allow even distribution of the influent over the filtering media.

Filtering media:

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

Sampling device:

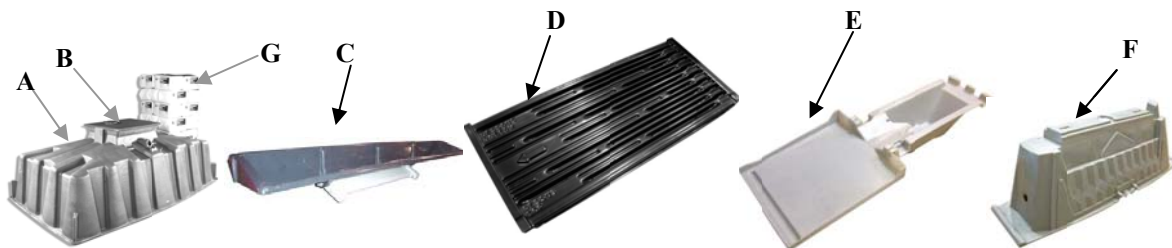
- Allows taking representative samples of the effluent treated by the system.



2. Installation sequence

2.1 Make sure that you have all the following components or articles

- A. 1 shell including :
- 1 bag with the owner's documentation
 - 4 black plastic ty-raps, 2 ty-raps marked Premier Tech
 - 1 insulating board
- B. 1 lid
- C. 1 tipping-bucket
- D. 4 distribution plates
- E. 1 sampler
- F. 1 central support
- G. 1 pallet of filtering media



**For any problem, faulty or missing part,
contact our customer service at 1 800 632-6356.**

NOTE: The installer is responsible to take the precautionary measures of safety applying to all installation steps, including wearing a hard hat, gloves, boots, glasses, mask, etc.

2.2 Absorption bed, sampling device and central support



Prepare the absorption bed in accordance with the sizes prescribed in *Part II section 3.1.2* of this document (1).

- Clean crushed stone 15-60 mm Ø (½-2"), with a high fraction of a diameter of 20 mm (¾") (2);
- Minimum thickness of the bed is 200 mm (8") (3).

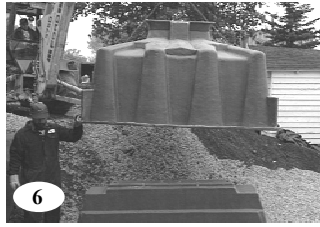
After that, place **the sampling device on the crushed stone bed with its flat part on the right side of the supply line** (when we look at the absorption bed from the septic tank) (4).

2.3 Setting the shell in and levelling



5

The sampler's receptacle must be located in the center and under the central support. Level the central support and make sure that it is in full contact with the surface of the crushed stone.



6

Place the shell on the central support. Take note that the central support must be embedded in the shell. **The central support funnel must be located opposite the water inlet.**



7

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

2.4 Geotextile installation and Ecoflo® Biofilter backfill



8

Place a **geotextile** (polymeric membrane permeable to air and water) on top of the crushed stone **around the shell only** so as to protect the stone from contamination or obstruction from objects or particles.

There should be no geotextile under the Ecoflo® Biofilter. The backfill material should be clean fill ranging in particle size from 0.2 – 2.0 mm and contain no organic matter, impervious soil, stones, rocks, debris or other objects that could damage the shell.



9

Warning! When backfilling the **Ecoflo® Biofilter**, start by stabilizing the shell by carefully backfilling the four corners.

After, backfill the two long sides, 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.

2.5 Supply line connection



10

All pipe connections to a treatment unit must be watertight and flexible. Connect the supply line to the **Ecoflo® Biofilter**, ensuring a steady downward slope of at least 2 % toward the **Biofilter**.

It is important that the soil underneath the pipe be well compacted.

2.6 Supply line connection to the flexible adapter*

Assembly steps

1. Loosen the clamp without removing it from the adapter;
2. Clean the supply pipe end and apply a PVC primer;
3. Apply PVC cement inside the adapter and on the supply pipe end;
4. Insert the pipe covered with cement all the way inside the adapter;
5. Tighten back the clamp on the adapter and the supply pipe.

* The same procedure is applicable to the vent pipe connection when a pumping station is used.

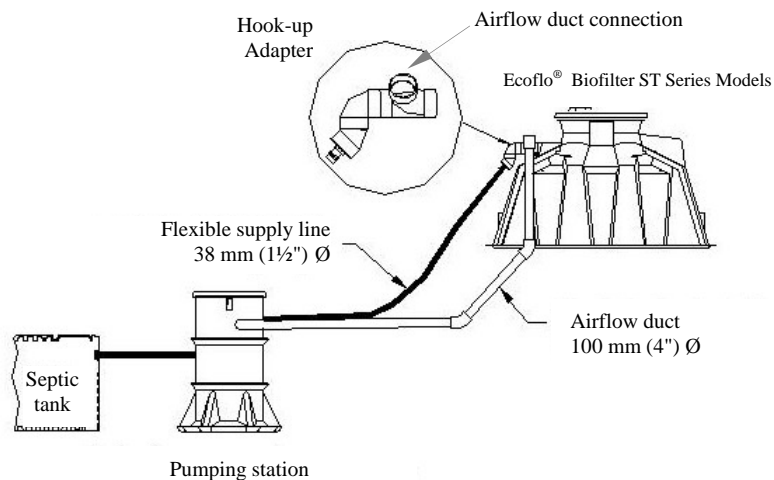


Pipe installation details when a pumping station is required to feed the Ecoflo® Biofilter ST Series Models

When the use of a pumping station is required upstream of 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** must be within 30 to 40 L (6.6 to 8.8 imp. gal.) per dosing. See Part I Section 1.5 of this document concerning pumping configuration.
- The pumping station must be watertight to infiltration and exfiltration.
- The supply line (flexible pipe of 38 mm Ø (1.5")) uses an **adapter** to allow connection to the **Ecoflo® Biofilter** inlet which has a diameter of 100mm Ø (4"). **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.

To facilitate the understanding of these instructions, refer to the diagram below, or to the **pumping station PSA-240L** Installation Guide, as example.



Pipe installation in systems with a pumping station

2.7 Final backfill and filtering media installation



Add final backfill and cover with topsoil.

The lid must be 50 mm (2") aboveground once the final landscaping has been completed.



Fill the Biofilter with the filtering media.



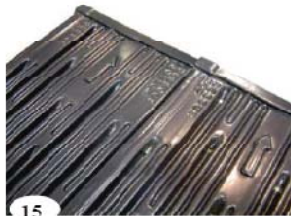
Level the surface of the filtering media with a rake. The top of the filtering media should be just below the distribution plates.

Attention! Avoid compacting the filtering media (do not step on it). It is possible to have leftover filtering media after completion.

2.8 Setting the distribution plates



14



15



16



17

Install the distribution plates by sliding them onto the brackets located at both ends of the shell (14-16).

- Place 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 the other side of the shell (two plates on each side).

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 (17).

2.9 Tipping-bucket installation



18



19



20

Once the distribution plates are securely in place (17), fix the tipping-bucket on the central support by inserting its locking catches in the central support anchors (18/19). Verify that the tipping-bucket installation has been done properly by tipping it from left to right to make sure nothing is blocking it (20).

2.10 System operation verification and warranty seals



After making sure the distribution system operates properly, close the **Ecoflo® Biofilter** by installing first the insulating board and then the lid (21). Seal it shut by attaching the handle of the insulating board to the access of the **Ecoflo® Biofilter** using the two plastic ty-raps marked "**Premier Tech Aqua**" (22).

Don't forget the inspections required by the Nova Scotia Regulations.

Check points following installation:

- Never cover or bury the lid;
- Never install the absorption bed of an **Ecoflo® Biofilter** within 2 m (6.5') of a tree;
- Never enter the biofilter after installation without prior written authorization;
- Never drive vehicles or place objects weighing over 225 kg (500 lbs) within 3 m (10') of the lid, and make sure you advise those involved so they don't damage your septic system (landscaper, snow blower);
- Do not shovel or blow snow so it accumulates on top of the septic system. The overload could cause damage;
- For an installation with a pumping station located upstream of the **Ecoflo® Biofilter**, the airflow duct must be connected from the pumping station to the **Ecoflo® Biofilter**.
- Homes must be equipped with an air vent that is in proper working order and complies with the applicable standards; **PTA** recommends the use of a 100 mm (4") Ø pipe;
- Give the owner the plastic bag containing the Owner's Manual and the Maintenance Agreement;
- Tell the customer to fill out and sign the Maintenance Agreement. He must keep the white copy, send the yellow copy to the authorized distributor and the pink copy to Premier Tech Aqua.

**FOR ANY PROBLEM, QUESTION OR COMMENT,
DO NOT HESITATE TO CONTACT OUR CUSTOMER SERVICE AT
1 800 632-6356**

3. Shipping and handling instructions

3.1 Shipping from the dealer to the installation site

- Use a vehicle with loading space large enough for the **Ecoflo® Biofilter** to fit in completely.
- Secure the Biofilter to the vehicle with appropriate straps.
- The carrier is responsible for any damages and for observance of traffic regulations.
- As much as possible, use the anchor rings to load the Biofilter onto the vehicle.

3.2 Handling

- Handle with care to avoid damages.
- Use the anchor rings to unload the Biofilter (especially for assembled Biofilter). Make sure that the forks used are long enough to reach completely across the Biofilter.
- The material handler is responsible for any damages that may occur.

3.3 Loading configuration

- The loading configuration depends on the type of vehicle used to transport the Biofilter(s) to the installation site.
- The loading area must be at least 4.2 m x 2.4 m for the **Ecoflo® Biofilter** to fit inside completely.
- The carrier must keep enough space to carry the filtering media bags (bags can be taken off the pallet). A pallet of filtering media measures about 1.4 m x 1.1 m.

B) Ecoflo® Biofilter with Collecting Bottom – Fiberglass Shell

1 Functions of the Ecoflo® Biofilter STB Series Models

1.1 Component functions

Lid:

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

Insulating board:

- Gives a thermal insulation to the system;
- Helps guiding airflow into the shell air ducts;
- Seals the system (with **Premier Tech Aqua** tie wraps);
- Constitutes an added security against frost.

Shell (including optional riser, if any):

- Encloses the system components;
- Allows connection of air and water pipes;
- Circulates air to the filtering media's extremities via its ducts.

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 plate:

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

Central support:

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

Filtering media (FM):

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

Crushed stone at the bottom of the biofilter:

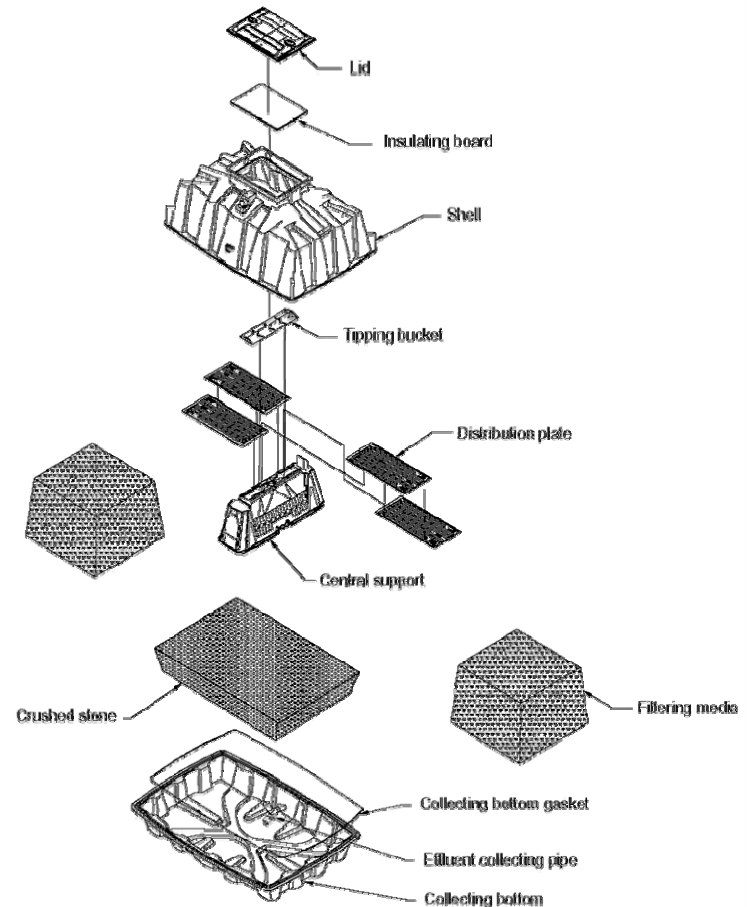
- Supports the filtering media;
- Weighs down the system to resist to the hydrostatic uplift (for a level of groundwater up to 50 cm below ground surface).

Effluent collecting pipe:

- Strainer tube used to evacuate the treated effluent out of the shell.

Collecting bottom gasket:

- Seals bottom and top of the shell.



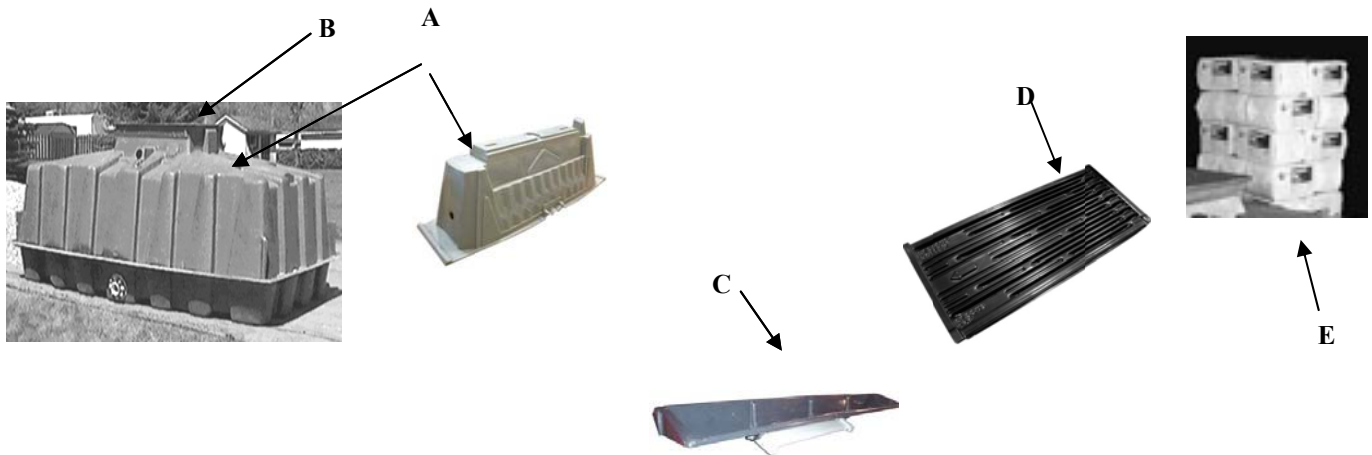
Collecting bottom:

- Holds the treated effluent;
- Allows connection of the effluent discharge pipes;
- Makes the shell watertight and resistant to groundwater pressure.

2. Installation sequence

2.1 Make sure you have all the following components:

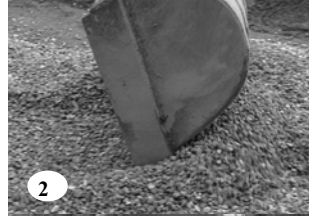
- A. 1 shell with submersible collecting bottom, central support and integrated effluent collecting pipe:
 - 1 packet containing the Owner's documents
 - 4 black plastic tie wraps, 2 tie wraps marked "Premier Tech"
 - 1 insulating board
 - 1 optional riser
- B. 1 shell lid
- C. 1 tipping-bucket
- D. 4 distribution plates
- E. 1 pallet of filtering media



**For any problem, broken or missing part,
contact our customer service at 1 800 632-6356.**

NOTE: The installer is responsible for all safety measures applicable to all steps of installation including the use of hard hat, gloves, boots, glasses, mask, etc.

2.2 Excavate and put shell in



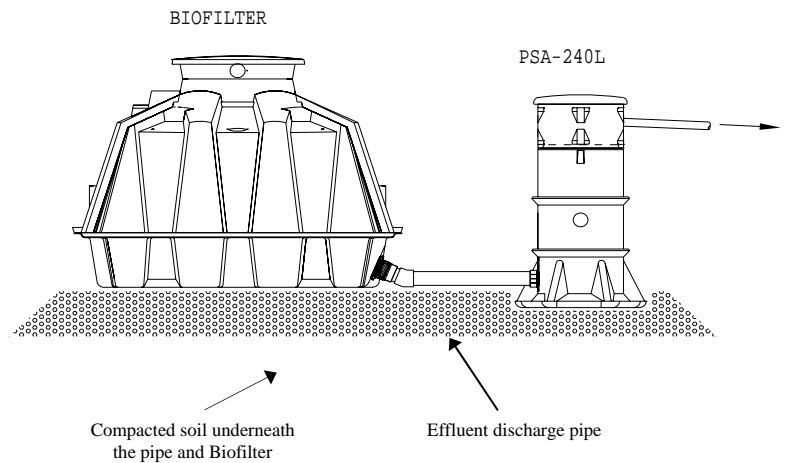
Excavate an area approximately 4 m x 4.5 m (13' x 15'). Lay a 150 mm (6") bed of gravel 20 mm Ø (¾"), free of organic matter and of similar diameter.

Level and compact the gravel surface.

Install the **Ecoflo® Biofilter** in the excavated area. Make sure it is levelled and in full contact with the foundation.

FOR INFORMATION REGARDING INSTALATION OF THE ABSORPTION BED SEE SECTION 3 IN PART II A OF THIS MANUAL.

2.3 Connect the effluent discharge pipe

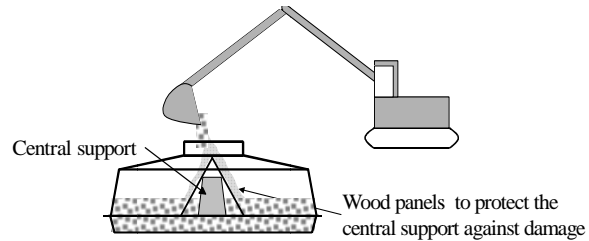


Connect the **Biofilter** effluent discharge pipe (5). It can be connected to a pumping station, or lead directly to an absorption system.

2.4 Put crushed stone into the shell

IMPORTANT: This step must be done on the same day that the shell is put in.

We recommend protecting the central support against damage by leaning two wood panels 0.66 m x 2.44 m (26" x 96") on each side.



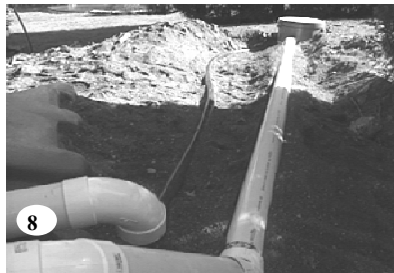
Place a 381 mm (15") layer of 20 mm Ø (¾") clean crushed stone in the bottom of the **Ecoflo® Biofilter**, on both sides of the central support. The stone must be dropped on both sides alternatively. Spread the crushed stone over the entire surface of the bottom and under the central support after each dumping. At the end, the top of the crushed stone bed should be even with the shell and bottom's joint.

2.5 Backfill and connect the supply line



When backfilling the **Ecoflo® Biofilter**, first stabilize the shell by carefully backfilling each of the four corners. Backfill the two long sides next, followed by the two ends, in successive layers of 30 cm (12"). It is important that the backfill material be placed, not dumped, which is why we do not recommend using a bulldozer for this step.

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



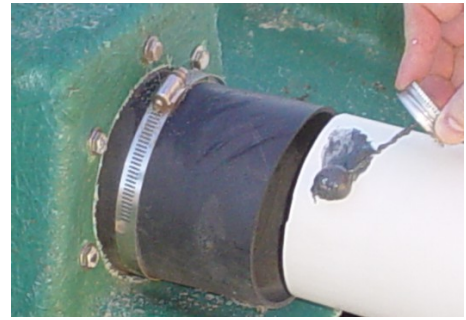
Connect the supply line to the Ecoflo® Biofilter, ensuring a steady downward slope of at least 2 percent toward the Biofilter intake. Make sure the soil is well compacted under the pipes.

2.6 Connect the supply line to the flexible adapter *

Assembly steps

1. Loosen the clamp and push it back. Don't remove it from the adapter;
2. Clean the pipe and apply a PVC primer;
3. Apply PVC cement inside the adapter and on the pipe end;
4. Insert the pipe (covered with cement) all the way inside the adapter;
5. Bring the clamp forward and tighten it on the adapter and the 4" (100 mm) Ø pipe.

* The same procedure is applicable for vent pipe connection when there is a pumping station

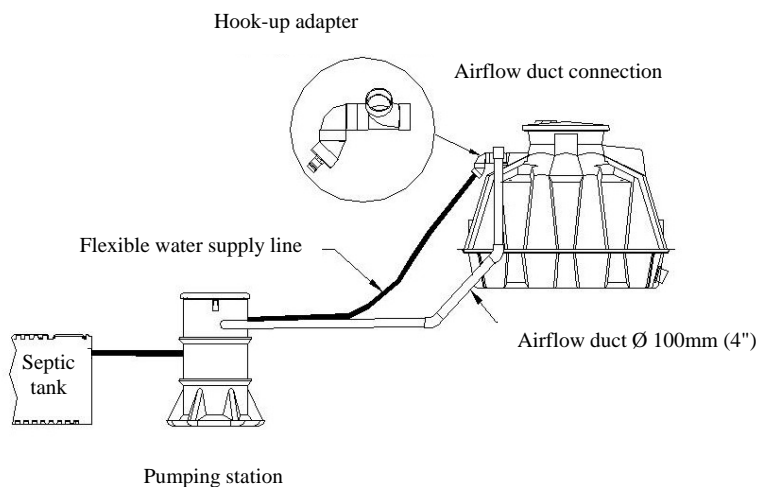


Pipe installation details when a pumping station is required to feed the Ecoflo® Biofilter STB Series Models

When the use of a pumping station is required upstream of an Ecoflo® Biofilter STB-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 30 to 40 L (6.6 to 8.8 imp. gal.) per dosing. The Ecoflo® typically does not require a pump, as it generally receives gravity-fed effluent from the septic tank. If the system requires a pumping station, the **PSA-240L Pumping Station** (or approved product – see Part I section 1.4) should be installed downstream of the septic tank and/or the effluent filter container, unless site conditions do not permit this configuration (see *PSA-240L Installation Guide* for information on its function and installation as example). Where it is necessary to pump to the septic tank, the additional standard requirements of the Technical Guidelines concerning septic tank type and size, discharge per pump cycle, discharge rate, and flow control must be observed. Like the septic tank, the pumping station must also be watertight to prevent groundwater infiltration.
- The pumping station must be watertight to infiltration and exfiltration.
- The supply line (flexible pipe of 38 mm Ø (1.5")) uses an adapter to allow connection to the Ecoflo® Biofilter inlet which has a diameter of 100 mm Ø (4"). **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.

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



2.7 Add final layer of backfill and install filtering media



Add a final layer of backfill and cover with topsoil.

The access lid must be 50 mm (2") aboveground once the final landscaping has been completed.



Fill the Biofilter with the filtering media.



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).

2.8 Install distribution plates



- Install the distribution plates by sliding them onto the brackets located at both ends of the shell (12, 13, & 14).
- Place 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 (14).
- Follow this same procedure for the other side of the shell (two plates on each side) (14).
- 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 (15).

2.9 Install tipping-bucket



Once the distribution plates are securely in place (15), fix the tipping-bucket on the central support by inserting its locking catches in the central support anchor slots and set the other end down in position (16/17). Verify that the tipping-bucket installation has been done properly by tipping it from left to right to make sure nothing is blocking it (18).

2.10 Make sure the system operates properly and put the warranty seals



After making sure the distribution system operates properly, close the **Ecoflo[®] Biofilter** by installing first the insulating board and then the lid (19). Seal it shut by attaching the handle of the insulating board to the access of the **Ecoflo[®] Biofilter** using the two plastic ty-raps marked "Premier Tech" (20).

Don't forget the inspections required by the Nova Scotia Regulations.

Checkpoints following installation:

- Never cover or bury the access lid.
- If a riser is required, only add a **Premier Tech Aqua riser STR-080** to the **Ecoflo[®] Biofilter**.
- Install only one riser per Biofilter.
- Never locate an absorption bed within 2 m (6.5') from a tree.
- Never enter the shell after installation without prior written authorization.
- Never drive vehicles or place objects weighing over 225 kg (500 lb) within 3 m (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.
- Do not let anything accumulates on top of the septic system. The overload could cause damage.
- For an installation with a pumping station located upstream of the **Ecoflo[®] Biofilter**, the airflow duct must be connected from the pumping station to the **Ecoflo[®] Biofilter**.
- Mark the appropriate classification box on the identification sticker located inside the access of the **Ecoflo[®] Biofilter**
- 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 100 mm (4") Ø pipe.
- Give the owner the plastic packet containing the Owner's Manual and the Maintenance Agreement.
- Mention to the customer to fill out and sign the Maintenance Agreement. They must keep the white copy, send the yellow copy to the authorized distributor and the pink copy to **Premier Tech Aqua**.

**FOR ANY PROBLEM, QUESTION OR COMMENT,
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1 800 632-6356**

3. Shipping & Handling Instructions

3.1 Shipping from the dealer to the installation site

- Use a vehicle with loading space wide enough for the **Ecoflo[®] Biofilter** to fit in completely.
- Secure the Biofilter to the vehicle with appropriate straps.
- The carrier is responsible for any damage and for the observance of traffic regulations.
- As much as possible, use the anchor rings to load the Biofilter onto the vehicle.

3.2 Handling

- Handle with care to avoid damages.
- Use the anchor rings to unload the Biofilter. If forks are used, make sure that the forks are long enough to reach across the whole Biofilter.
- Material handler is responsible for any damages that may occur.

3.3 Loading configuration

- The loading configuration depends on the type of vehicle used to transport the Biofilters to the installation site.
- The loading area must be at least 4.2 m x 2.4 m (14' x 8') for the Ecoflo[®] Biofilter to fit in completely.
- The carrier must keep enough space to transport the filtering media bags (bags can be taken off the pallet). A pallet of filtering media bags measures about 1.4 m x 1.1 m (4.6' x 3.6').

C) Ecoflo[®] Biofilter with Collecting Bottom – Concrete Shell

1. Operation of the Ecoflo[®] Biofilter STB Series Models B and BR

1.1 Operation of the components (see exploded view of the system on the following page)

Lids:

- Provide access to the inside the system (main and secondary accesses);
- Provide air to the filtering media (via air intake on main access);
- Secure access with bolted assembly.

Insulating boards:

- Provide thermal insulation for the system;
- Help guide airflow into the shell's air ducts (main access only);
- Seal the system (main access only) (with Premier Tech ty-raps).

Shell (tank and top tile):

- Contains the system components;
- Allows connection of air, inlet and outlet pipes;
- Circulates air to the ends of the filtering media via its air ducts;
- Holds the treated effluent.

Central support plate:

- Supports the tipping bucket and one end of the distribution plates.

Support rails:

- Support the other end of the distribution plates.

Tipping bucket:

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

Distribution plates:

Allow even distribution of the influent on the filtering media.

Filtering media:

- Consists a layer of filtering media;
- Acts as a support for the bacteria that consume the organic content in the wastewater while trickling down through it;
- Physically filters the solids content of the effluent;
- Keeps an adequate level of humidity required for biomass viability when there is no incoming water.

Treated effluent collection area:

- Layer of clean crushed stone 20 mm \varnothing ($\frac{3}{4}$ ");
- Supports the filtering media;
- Ensures drainage of the treated effluent;
- Allows air to circulate under the filtering media.

Access well:

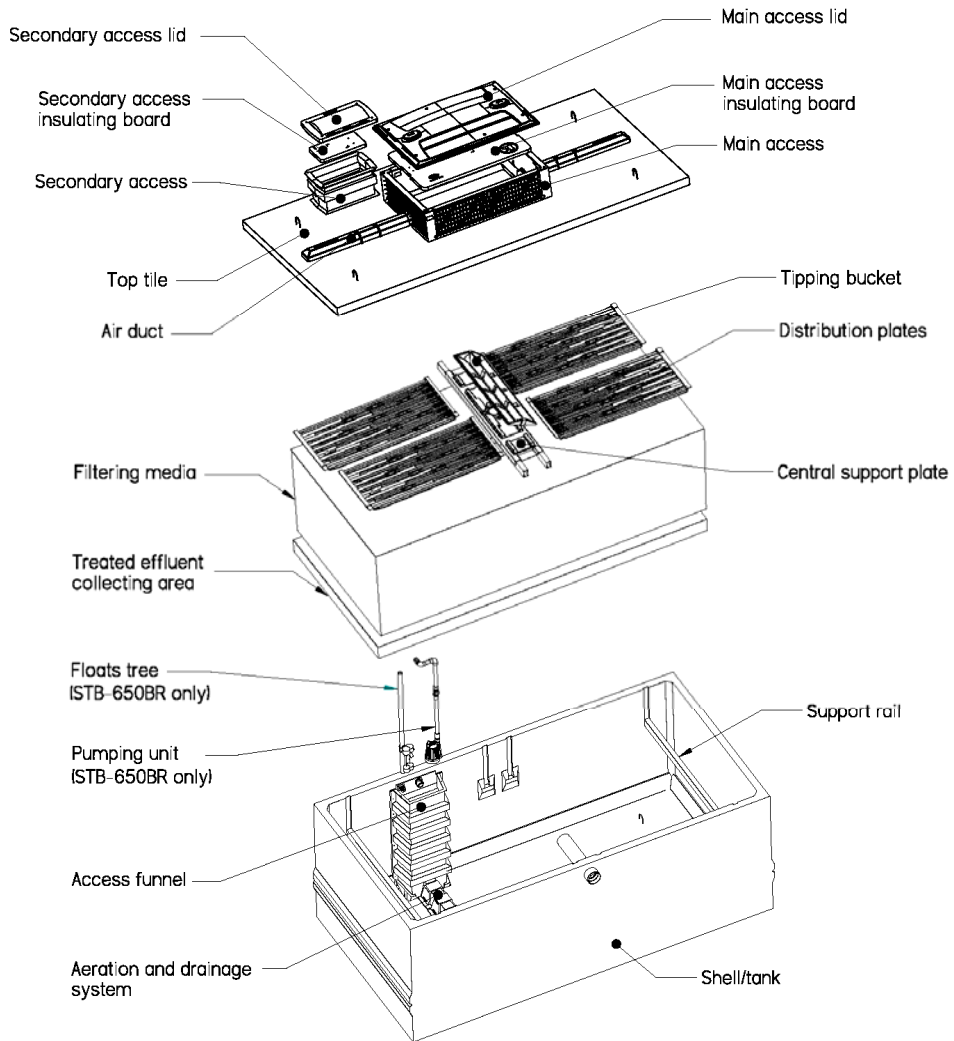
- Contains the pumping equipment (models STB-500 and STB-650BR only);
- Allows air circulation between the top and the bottom of the filtering media;
- Allows access to the bottom of the system to collect samples of the treated effluent.

Aeration and drainage system:

- Takes the effluent from the gravel bed and directs it towards the discharge pipe;
- Allows air to circulate under the filtering media.

Pumping unit (STB-500BR and STB-650BR models only):

- Includes a pump, a float tree, an ON/OFF float, an alarm float and an alarm box;
- Pumps the treated effluent towards an absorption area, or a tertiary treatment system.

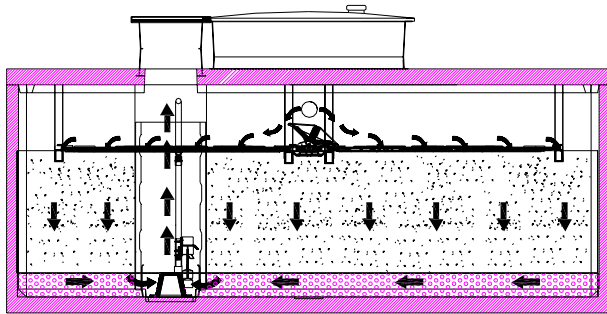


Note: Float tree is used in all STB concrete series models terminating by the BR suffix.

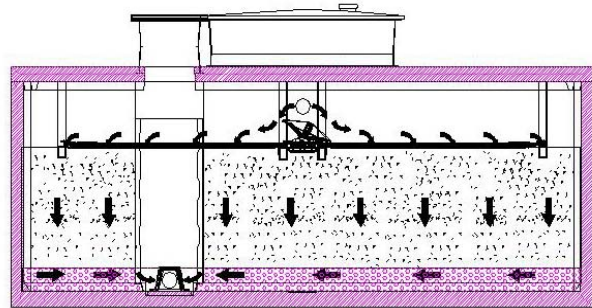
Exploded view of the system

1.2 Overall operation of the system

The overall operation of the Ecoflo® Biofilter is to treat domestic wastewater following a primary treatment. This is done via a water and air (oxygen) management inside the system. Wastewater is treated aerobically by bacteria attached to the filtering media.

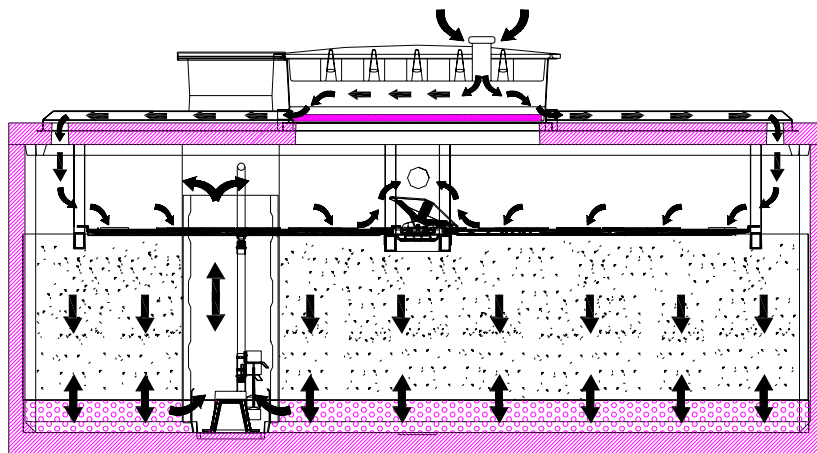


Water flow diagram



**Water flow diagram
(STB-650B discharged by gravity)**

To be treated, the wastewater first goes into the septic tank where it is submitted to a primary treatment and then it enters the Ecoflo® Biofilter. Once inside the Ecoflo®, the water is directed to the tipping bucket to be distributed evenly over the distribution plates located on both sides of the central support plate. These plates include channels with orifices (openings) to distribute the influent evenly on top of the filtering media. Afterwards, wastewater trickles down into the filtering media where its organic content is consumed by bacteria. The treated effluent is collected in the gravel bed and evacuated by gravity (STB-500B, STB-650B) or using an integrated pump (STB-500BR, STB-650BR).



Airflow diagram

To be effective, the system requires enough oxygen for the bacteria on the filtering media to do their work. To achieve this, the filtering media is fed oxygen by the air that flows at the top and at the bottom of the filtering media. The air comes into the system through the intake located on the main access lid. Then, it is directed to both ends of the filter bed via the air ducts in the shell. Air flows over the surface of the filtering media underneath the distribution plates, and penetrates the filtering media partly through the infiltration of water that takes it from the surface to the bottom of the filtering media. As well, there is an exchange of gases both at the top and at the bottom of the filtering media, which promotes its oxygenation. The opening located in the access well of the central support allows air to circulate between the top and the bottom of the filtering media. Finally, air circulates throughout the system by means of convection, from the home air vent (or independent vent) to the inlet pipe and the septic tank.

2. Installation sequence

2.1 Make sure you have all the following components:

A. 1 concrete shell including :

- i 1 access well
- ii 1 aeration and drainage system
- iii 1 inlet adapter 100 mm Ø (4")
- iv 1 outlet adapter cast in the concrete shell (not shown)
 - 25 mm Ø (1") (STB-500/650BR)
 - 100 mm Ø (4") (STB-500/650B)
- v 1 bag (not shown) containing the owner's documents, 4 black plastic ty-raps and 2 ty-raps marked Premier Tech (Ty-Rap®)

B. 1 top tile including :

- i 1 main access embedded in concrete and including an insulating board and a lid attached with 4 lag screws
- ii 1 secondary access embedded in concrete and including an insulating board and a lid attached with 4 lag screws
- iii 2 air ducts

C. 1 pallet of filtering media ("top layer" bags and "bottom layer" bags)

D. 1 central support plate

E. 2 PVC support rails

F. 4 distribution plates

G. 1 tipping bucket

H. 2 sections of netting

I. Butyl seal

Additional items for model STB-500BR, STB-650BR only (see sections 2.7 and 2.10 for the following items):

J. 1 crenate outlet coupling 25 mm Ø (1") for flexible pipes

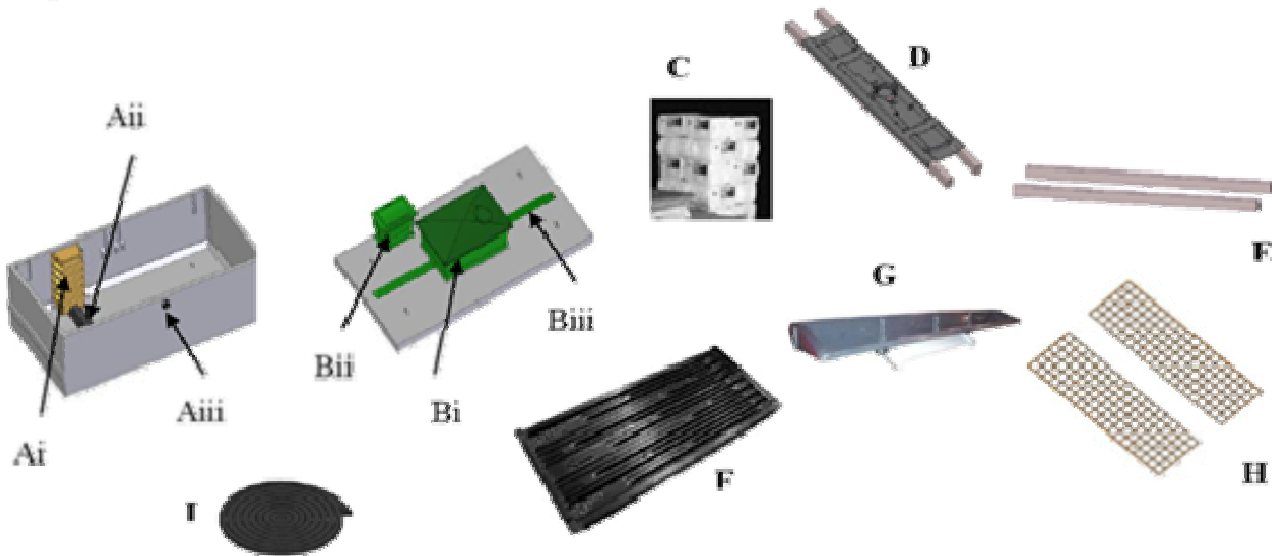
K. 1 coupling 25mm Ø (1") to connect the effluent discharge pipe to the polishing field

L. 1 pumping unit with float tree installed inside the access well

M. 1 alarm box

N. 1 junction box

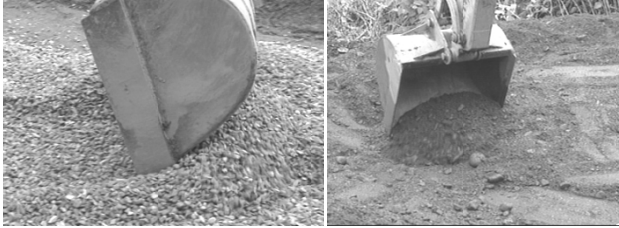
O. Seal connectors (for the electric wires)



**For any problem, broken or missing part,
contact our Customer Service Department at 1 800 632-6356**

NOTE: The installer is responsible for all safety measures applicable to all installation steps, including the use of a hard hat, gloves, boots, safety glasses, face mask, etc.

2.2 Excavation, foundation and installation of the system



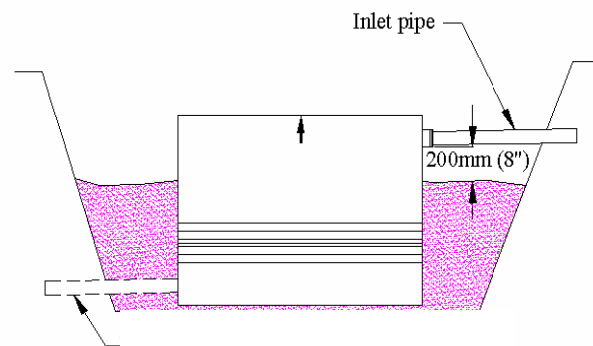
Excavate an area approximately 3.0 m x 4.5 m (10' x 15'). Depending on the soil condition, it might be necessary to add a 150 mm (6") layer of gravel 0-20 mm Ø (0-3/4") that does not contain any vegetable matter, or a layer of clean crushed stone 20 mm Ø (0-3/4") surrounded by a geotextile. Set the shell down making sure that it is levelled and that its entire floor is in contact with the foundation that has previously been compacted and levelled.

For the Ecoflo® Biofilter STB-500B, STB-650B **only** (discharge by gravity), before going to the next step, connect the effluent discharge pipe using the flexible and watertight coupling. Connect the pipe to the Ecoflo® Biofilter making sure it is in a downward position all along its length and down to the disposal area. Make sure the soil underneath the pipe is well compacted.

2.3 Initial backfill of the shell

The height of the inlet invert is 1255 mm (49 3/8"). Make sure that the maximum seasonal level of the groundwater table is at least 75 mm (3") below the lid joint.

Backfill the shell up to 200 mm (8") under the inlet invert. When backfilling the shell, start by the two lateral sides and then backfill the two ends. It is important that the backfill material be deposited, not dumped, which is why we do not recommend using a bulldozer for this step. **The backfill material should be sandy, with little or no rocks or stones larger than 50 mm (2") in diameter.**

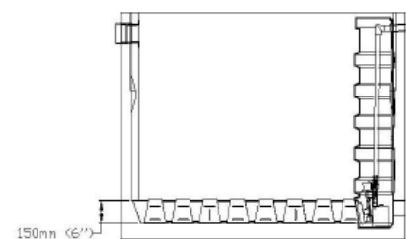


ATTENTION: When backfilling, make sure that no backfill material gets into the shell.

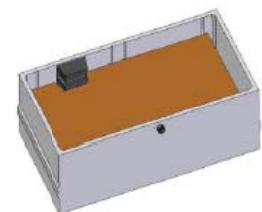
2.4 Putting the gravel and the filtering media down

Once inside the tank, evenly spread a 200 mm (8") layer of clean crushed stone (with no fine particles or organic debris). To determine the upper level of the crushed stone layer to put, use the upper level of the draining chamber.

From the outside of the tank, pour the bags of filtering media marked **bottom layer** on the lower part of the tank. Level the surface and add two sections of netting to separate the two layers of filtering media. Then pour the bags marked **top layer** up to the lowest level of the grooves in the concrete walls where the support rails are located and level the surface (see illustration on the right). Remove any particles from the grooves and place the support rails in the end grooves and the central support plate in the center groove. Finish pouring the filtering media up to the top of the support rails and level it with a rake. In the end, the surface of the filtering media must be at the upper level of the support rails of the distribution plates.



Level of crushed stone

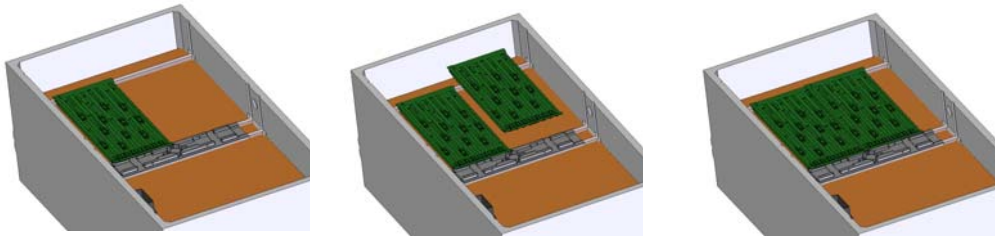


Level of filtering media

ATTENTION!

- When moving inside the tank, make sure no backfill material gets into it.
- Make sure not to compact the filtering media (do not lean on it).
- Carefully level the surface of the filtering media.
- Make sure no filtering media falls into the access well while the tank is being filled.

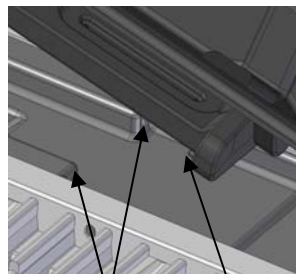
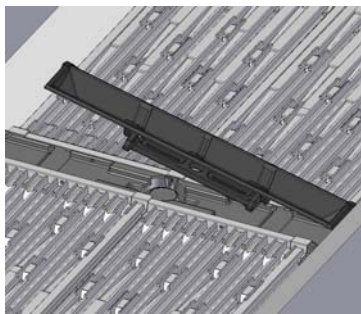
2.5 Installing the distribution plates



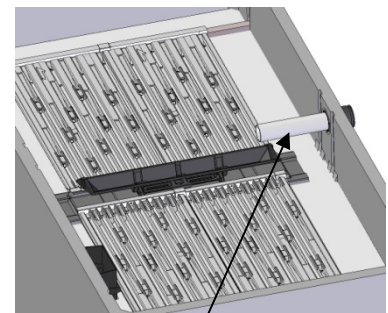
- Install the distribution plates by placing them on their support rails at both ends.
- The arrow on the distribution plates must be oriented toward the end of the tank.
- Place the first plate on the left side and place the second plate against the edge of the first one.
- Repeat on the right side of the shell (2 plates on each side of the shell).

The distribution plates sit on top of the central support plate and must be attached to it with four black plastic ty-raps.

2.6 Installing the tipping bucket and the inlet pipe



Anchor slots Locking catch



Inlet pipe (interior part)

Once the distribution plates are in place, install the tipping bucket by inserting its locking catches in the anchor slots of the central support plate and push down the other end to make sure the tipping bucket stays in place. Check that the installation of the tipping bucket by tipping it from left to right to make sure nothing is blocking it. Then, glue the interior part of the inlet pipe in the tank's water inlet. Be sure that the end of the inlet pipe is lower than the water inlet in order to have a good water flow coming inside the system.

2.7 Connecting the pipes (inlet and discharge pipes)

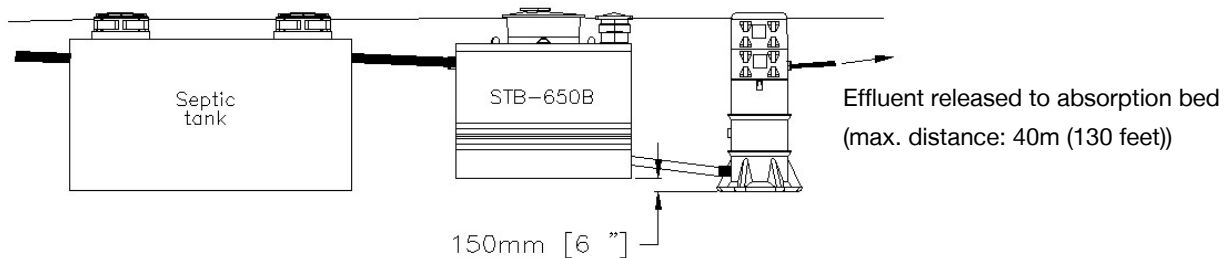
Connect the inlet pipe from the septic tank to the Ecoflo® Biofilter water inlet, making sure that the pipe runs downward along its length to the Ecoflo® Biofilter's water inlet. The soil underneath the pipe must be well compacted. The Ecoflo® Biofilter is equipped with a standard flexible inlet adapter and is connected with a regular pipe clamp.

As well, the STB-500BR, STB-650BR effluent must be connected to the means of disposal (absorption area, tertiary treatment system) of the treated effluent by a 25 mm Ø (1") flexible pipe that can support at least 700 kPa (100 PSI) of pressure and is compatible with the underground applications. A 25 mm Ø (1") crenated outlet coupling (item J) connects this flexible pipe to the Biofilter outlet. The other end of the pipe is connected to the polishing field using the supplied coupling (Item K).



What you must know:

- **Maximum length of pressurized pipe** (flexible pipe) at the pump's outlet: **20 m (65')** with **25 mm Ø (1") pipe**.
- When the length of the pressurized pipe required is more than **20 m (65 ft)** and less than **40 m (130 ft)**, it is possible to use a pumping station PSA-240L as shown on next figure. A 14" riser must be use on the PSA-240L. The diameter of the pressurized pipe is 1 ½". No floats adjustment is required.



- The **head** (the difference in elevation between the base of the tank and the end of the pressurized pipe) must be **no more than 6 m (20')**. The pipes must be positioned such that they can drain by gravity.

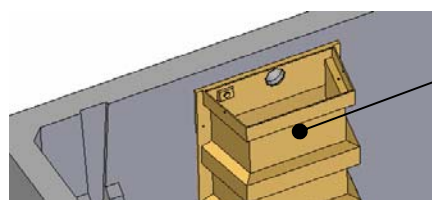
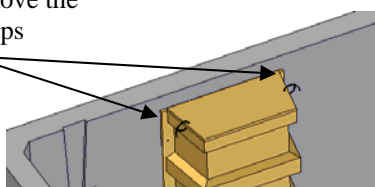
ATTENTION!

The inlet pipe invert must be always higher than the level of the groundwater table. If the terrain layout it is such that surface run-off accumulation is possible, an interceptor ditching up slope the system or absorption area, may need to be installed to prevent any risk of infiltration.

2.8 Opening of the access well

In model STB-500B, STB-650B, the main function of the access well is to allow air to flow between the top and the bottom of the system. In model **STB-500BR, STB-650BR**, the access well is also used as a vault for the pumping unit. The cover of the access well is there to prevent gravel or particles of filtering media to fall into the access well during installation. **Therefore, once the filtering media has been put down, remove the cover (taking care not to let the ty-raps fall inside the well and do NOT put it back on.**

Remove the ty-raps



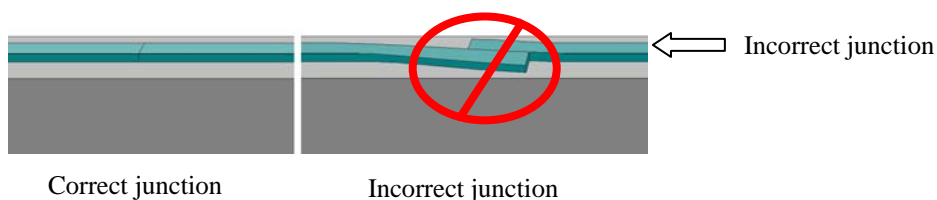
Access well without its cover

Model STB-500/650B illustrated

2.9 Installing the top tile and doing the final backfilling of the system

ATTENTION! The top tile must be installed before finishing to backfill.

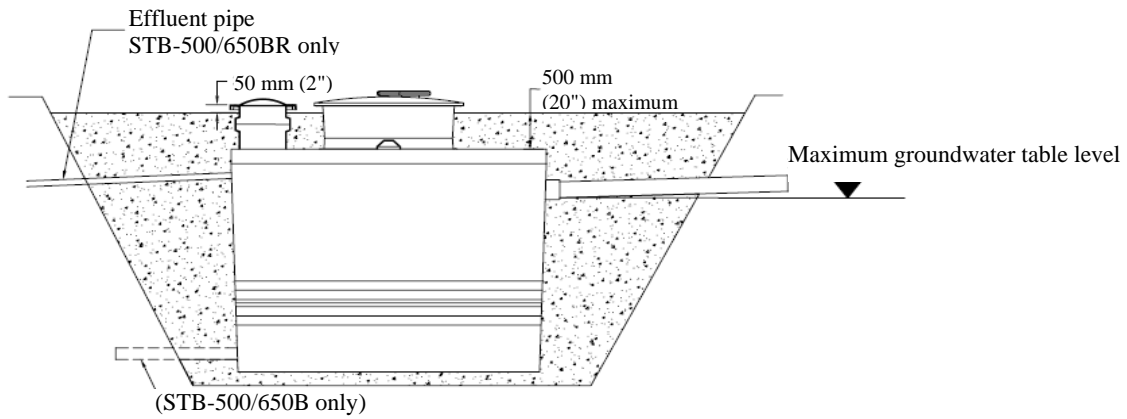
Before laying the butyl seal, carefully clean the rim of the tank. To ensure the seal is watertight, it must be put down in one continuous section without overlapping where the two ends meet, as shown below. Proper cleaning of the bottom of the top tile is required to ensure the seal is watertight and that no backfill material gets into the filtering media.



Once the butyl seal is installed, place the top tile on the tank being careful to align the secondary access with the access well. To properly position the access, make sure the indicator marks on the top tile align with those on the tank.

Finish backfilling. It is important that the backfill material be deposited, not dumped, which is why we do not recommend using a bulldozer for this step. **The backfill material should be sandy with little or no rocks or stones larger than 50 mm (2") in diameter.** Allow space for plant cover and make sure that the lids are 50 mm (2") above the finished landscaping.

The usual burial depth is 300 mm (12 "). If necessary, you may **ADD ONLY ONE (1) 20 cm (8") riser on the main access (STR-080) and secondary (STR-080SP) access.** **The maximal burial depth is 500 mm (20") over the top tile.**



2.10 Checking the pump and the electrical wiring (For series model with BR suffix)

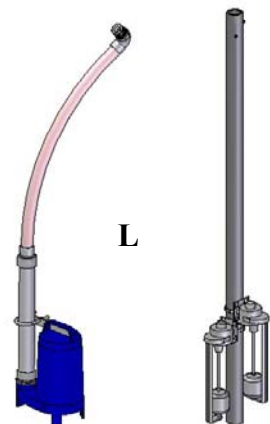
Step 1 Checking the pump

Visually inspect the components inside the access well (pump, float tree, floats) to make sure they are properly installed and will work as they should.

Step 2 Electrical wiring

All electrical connections must be done by a certified electrician. To provide power to the system (from the dwelling (home) to the system), 2 double-strand power-supply wires are needed. These wires will be buried underground. Use a pipe to protect the buried wires. The wire calibre must also be chosen by a certified electrician. One of the wires will be used as the power supply and the other will connect the alarm float current to the alarm box or the control panel (when required).

Seal connectors must be used to pass through the secondary access. In fact, the wires must go into the secondary access under the access's structural rib. In order to fix the connector through the secondary access wall, drilled two 13/16" holes. Use the reference point provided for this purpose (see secondary access figure below).



Make the appropriate electrical connections using the parts provided (junction box and seal connectors). First, remove the plug connectors from the float and pump wires by cutting the wires 5 cm (2") from the end. The junction box is located on the insulating board of the secondary access. Identify each wire and insert it into the junction box according to the electrical diagram provided. Use seal connectors for the electrical connections to ensure the water does not affect the electrical circuit. Respect the diagram's colour code. As well, since the white wire of the ON/OFF float is connected to the pump's black wire (live wire), covering the white wire with black electrical tape is recommended. Then, close the junction box. Pass the wires from the pump through the slot in the insulating board. Place the insulating board into the access, with the electrical box on top of it, and put the secondary access cover on.



M



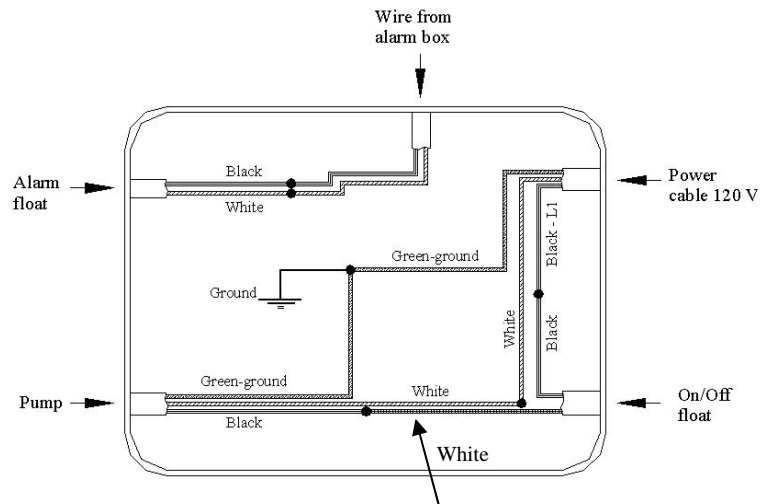
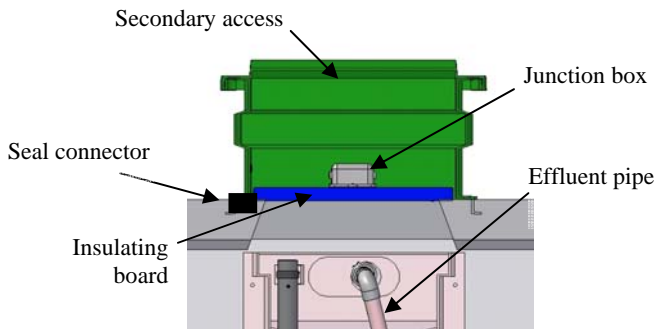
N



O

Notes: The electrical connections for the pump and the alarm box must be on two separate electric circuits.

The pumping unit uses 0.075 kW.h of power per day.



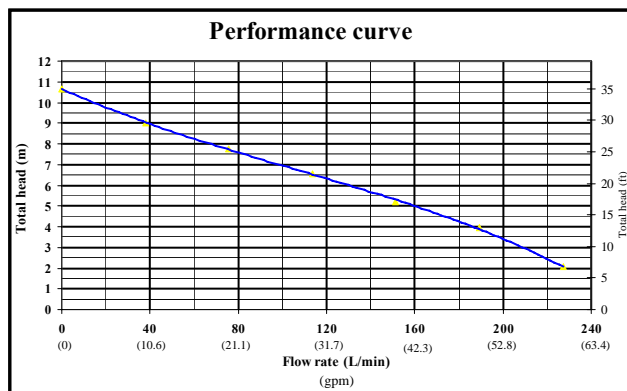
Cover the white wire on the ON/OFF float with black electrical tape.

THE PUMP'S PERFORMANCE CURVE

The figure on the right shows the performance curve of the pump supplied with the Ecoflo® Biofilter STB-500/650BR. Note that this curve was obtained in clear water. In wastewater, the pump's performance may not be as good. If you have questions as to the interpretation of this curve, please do not hesitate to contact Premier Tech Aqua.

Pump characteristics:

- 0.4 HP
- 9.1 Amperes
- 1 Ø, 60 Hz, 115 V



2.11 Starting up the system and affixing the warranty seals

<input checked="" type="checkbox"/> Système classe III	Fosse septique avec préfiltre certifiée NQ 3680-905 et Biofiltre Ecoflo®		NQ 3680-910
Classe III system	Septic tank with effluent filter NQ 3680-905 and Ecoflo® Biofilter		
<input type="checkbox"/> Système classe V	Fosse septique avec préfiltre certifiée NQ 3680-905, Biofiltre Ecoflo® et FDI		
Classe V system	Septic tank with effluent filter NQ 3680-905, Ecoflo® Biofilter and FDI		
Modèle • Model	STB-650BR (-FDI)	# certificat • Certificat #	791
Capacité • Capacity	1440 l/jour (day)	# série • série #	6E-000 500
	Premier Tech 1 800 632-6356	Brevets (Patents) : USA 5,618,414-5,206,206; CAN 2,022,097-2,149,202 PCT/CA96/00298; Euro 96,913,404,8	



Then, put the insulating board in place using the seals marked Premier Tech®. Once in place, these seals link the main access of the Ecoflo® Biofilter to the handle on the insulating board. Finally, secure the lid using the plastic Tinnerman-type fasteners and the lag screws.

Note that the owner has nothing to do to start up the system.

Don't forget the inspections required by the Nova Scotia Regulations.

Checkpoints following installation:

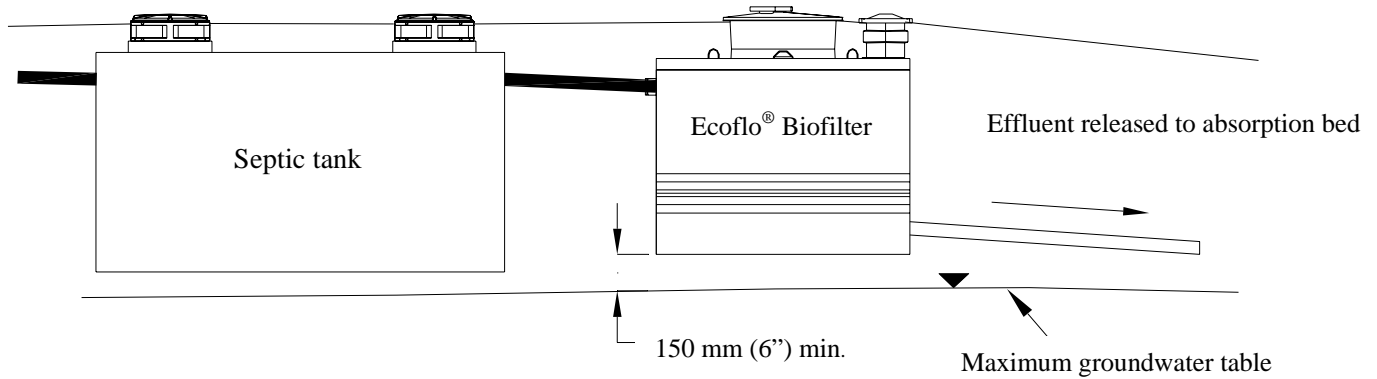
- Never cover or bury the access lid.
- Never put the absorption bed of the Ecoflo® Biofilter within 2 m (6.5') of a tree.
- Never open or go inside the Ecoflo® Biofilter once the installation is completed without prior authorization.
- Never connect a drain pipe, roof gutter, sump pump or air conditioning drain to the septic installation.
- Never operate a vehicle or place any object weighing over 225 kg (500 lb) within 5 m (16.4') of the lid** and make sure everyone involved in landscaping knows this.
- If there is a certain period of time between the initial installation and final landscaping, identification and protective barriers should identify the unit, keep traffic off the unit, and indicate the final level of the installation.**
- A riser can be added to the system's accesses. The maximum thickness of the layer of soil on top of the top tile is 500 mm (20"). Use ONLY ONE (1) PTA riser per access (the STR-080/ STR-080SP extension kit)**
- Do not let anything accumulate on top of the septic system (for example, blown snow).
- The dwelling (home) must be equipped with an air vent that is in proper working order and complies with applicable standards; Premier Tech Aqua strongly recommends using a 100 mm Ø (4") pipe.
- Give the owner the plastic bag containing the Owner's Manual and the Maintenance Agreement.
- Make sure the customer fills out and signs the Maintenance Agreement, keeps the white copy, sends the yellow copy to the municipality (when required) and the pink copy to the Premier Tech Aqua.

**FOR ANY PROBLEM, QUESTION OR COMMENT,
DO NOT HESITATE TO CONTACT OUR CUSTOMER SERVICE DEPARTMENT
AT 1 800 632-6356.**

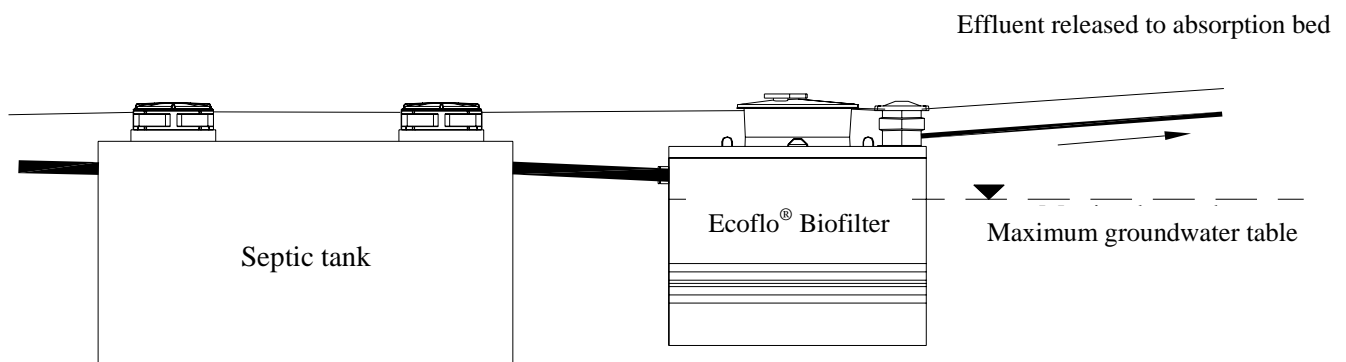
3. Typical installations

The type of installation depends on the site constraints. Here are some examples.

Type 1: Installation on flat grounds with effluent discharged by gravity (STB-500B or STB-650B)

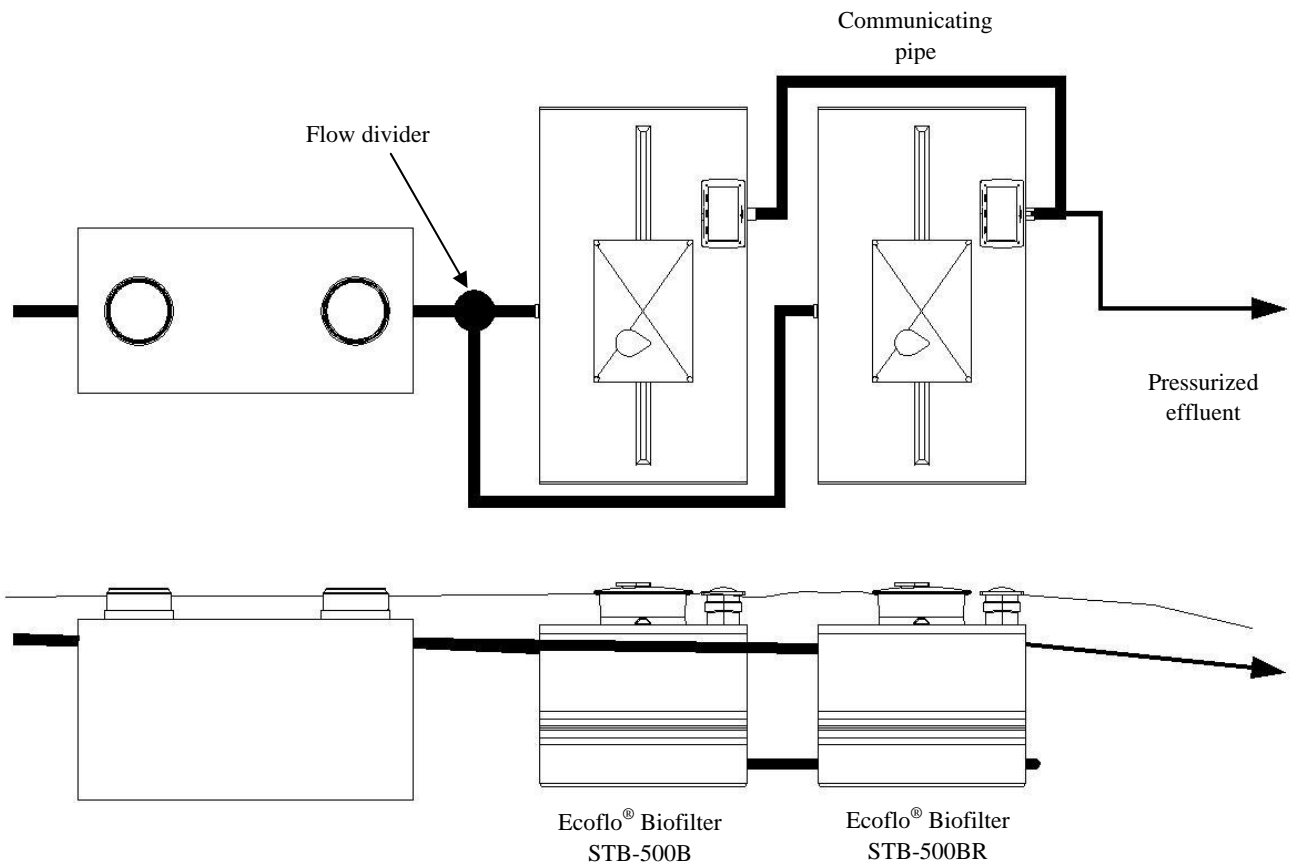


Type 2: Installation on flat ground with an integrated pump (STB-500BR or STB-650BR)



Note: The maximum groundwater table must never be higher than 75 mm (3'') below the lid joint of the Biofilter.

Type 3: Installation with effluent discharge pumped (STB-500B + STB-500BR)



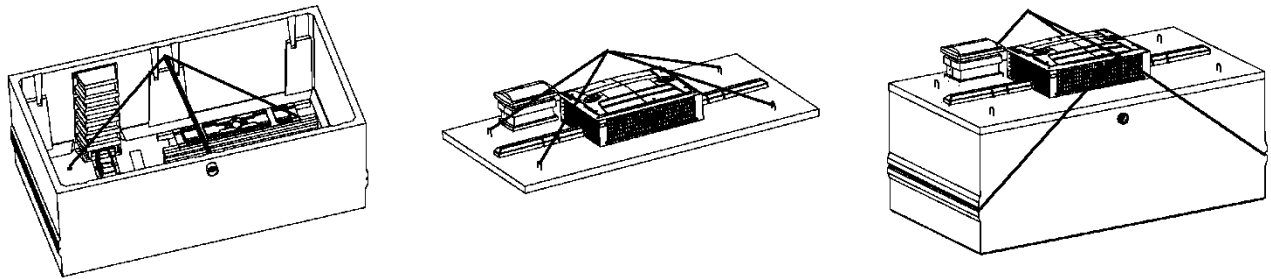
4. Transportation and handling instructions

4.1 Transportation of the Ecoflo® Biofilter from the dealer to the installation site

- Use a vehicle with loading space wide enough for the Ecoflo® Biofilter to fit in completely.
- The vehicle must also be capable of unload the Ecoflo® Biofilter to an appropriate location on the installation site.
- Secure the Ecoflo® Biofilter to the vehicle with appropriate straps.
- The transporter is responsible for any damages and for the observance of traffic regulations.

4.2 Handling

- The tank and the top tile can be handled (moved) together or separately.
- Make sure no one is inside the Ecoflo® Biofilter during handling.
- To handle the tank and the top tile together, use the lifting grooves and chains on both ends of the tank.
- To handle the tank and the top tile separately, use the anchor rings or the lifting grooves.
- When using the anchor rings, make sure to use all 4 rings and chain sections of equal length.
- The material handler is responsible for any damages he causes.



Handling diagrams for the Ecoflo® Biofilter

4.3 Loading configuration

- The loading configuration depends on the type of vehicle used to transport the Ecoflo® Biofilter to the installation site.
- The loading area must be at least 3.8 m x 2.0 m for the Ecoflo® Biofilter to fit in completely.
- The transporter must keep enough space to transport the filtering media bags (bags can be taken off the pallet). A pallet of filtering media bags measures about 1.5 m x 1.2 m (4'10" x 3'10").