*This guide contains specific information required to plan the installation of an **Ecoflo® Coco Filter in the state of Illinois.** The installation must be performed by an authorized installer. For more information, contact your local distributor or our customer service at **1 800 632-6356.***

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1. Wastewater System Component Description

1.1 Septic Tank

The septic tank should comply with local regulation requirements. 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. Premier Tech Aqua provides a complete line of high-performance polyethylene septic tanks ranging from 600 USG to 1530 USG. Consult Premier Tech Aqua's Septic Tank Promotional Guide at ***ptzone.premiertechaqua.com*** for more information on these products.

1.2 Effluent Filter

The effluent filter extends the life of any treatment system by keeping solids in the septic tank. The effluent filter is especially important if the household is equipped with a sewage pump or any other appliance that is liable to increase the suspended solids content in the wastewater and thereby jeopardize the operation of the system and affect its performance. In situations where an effluent pump is required as part of the septic system, an effluent filter will also prevent solids from reaching said pump. **No garbage disposal unit should be installed on your septic system.**

Effluent filters to be used with the Ecoflo® Coco Filter shall have a minimal flow area of 9 in² and filter particles 1/16" and larger. While many different brands of effluent filters meet those specifications, Premier Tech Aqua highly recommends the use of the effluent filter PL-122.

Effluent filters are normally installed in the second compartment of the septic tank, however, they may also be installed downstream of a septic tank in Premier Tech Aqua's TLF-240 effluent filter container in accordance with local regulations. Please refer to Premier Tech Aqua's Effluent Filter Promotional Guide as well as the Effluent Filter Container Promotional Guide at ***ptzone.premiertechaqua.com*** for more information on these products.

1.3 Ecoflo® Coco Filter

The Ecoflo® Coco Filter is a biofiltration system designed to treat domestic strength wastewater. Once the wastewater has passed through the septic tank, it then flows towards the Ecoflo® Coco Filter. Inside the biofilter, a central tipping bucket equally scatters the wastewater on both sides of the biofilter. Both sides are equipped with specially designed plates which evenly distribute the wastewater on top of the filtering media. The wastewater then trickles through the natural fibrous filtering media as its organic matter is decomposed by the microorganisms attached to the media. Finally, the treated wastewater is discharged into the environment, either by infiltration in a soil absorption system, or in a watercourse, provided certain conditions are met. Where and when applicable, the treated effluent may be required to go through another treatment system before being discharged into the environment.

The biofilter can also be used for commercial, institutional, communal or municipal applications when the wastewater to be treated is comparable to domestic wastewater. Please contact Premier Tech Aqua's customer service for more information on these applications.
Usually, the model and the number of Ecoflo® Coco Filters are determined either by the number of bedrooms in a home or by the total domestic wastewater flow per day. The selection of the model also depends on the available surface area, the topography of the lot, as well as the type, permeability and depth of the natural soil on site.

There are many different models of Ecoflo® Coco Filters and each model has different characteristics. The letters and numbers associated with the Ecoflo® Coco Filter specify the model's characteristics, as presented in the following table with model ECC-860P-NA-1 as reference:

EC refers to the Ecoflo model	EC = Ecoflo® Coco Open or perforated bottom (infiltration under the biofilter)
C refers to the material of the shell	C=Concrete F= Fiberglass P= Plastic (Polyethylene)
860 refers to the daily flow capacity	400 = Capacity of 400 gallons per day 500= Capacity of 500 gallons per day 600 = Capacity of 600 gallons per day 750= Capacity of 750 gallons per day 860 = Capacity of 860 gallons per day 970= Capacity of 970 gallons per day
P refers to disposal mode	P= pumped G = Gravity O = Open bottom (perforated)
NA*	NA = Not assembled A = Assembled
1	1 = 1 module 2 = 2 modules 3 = 3 modules

*Concrete version only

Therefore, according to this nomenclature, the ECC-860P-H1-NA-1 model refers to a concrete, watertight bottom Ecoflo® Coco Filter with a daily flow capacity of 860 gallons and an integrated pump. Furthermore, the nomenclature specifies that there is only one non assembled low height module.

The following table displays all the Ecoflo® Coco Filter models available on the market:



	Polyethylene Biofilter Shell	Concrete Biofilter Shell	Fiberglass Biofilter Shell
Open Bottom	ECP-750O ECP-860O ECP-970O	N.A.	ECF-650O ECF-860O ECF-990O
Closed Bottom - Gravity discharge	ECP-750G ECP-860G ECP-970G	ECC-860G	N.A.
Closed Bottom - Pumped discharge	ECP-750P ECP-860P ECP-970P	ECC-860P	N.A.

Consult the Technical Data Sheets at *ptzone.premiertechaqua.com* for additional information on these models, such as storage capacities, dimensions, weight, etc.

A maximum hydraulic loading rate (HLR) of 12.25 USG/ft² per day can be applied on the filtering media surface of the Ecoflo® Coco Filter. Therefore, the table below summarizes the system's capacity depending on the different Ecoflo® models.

Ecoflo® Coco Filter Series	Filtering media Surface (ft²)	Maximum Flow rate capacity (USG/d)	Premier Tech Aqua's recommended application
650	53	up to 650	up to 4 bedrooms
750	61	up to 750	up to 5 bedrooms
860	70	up to 860	up to 5 - 6 bedrooms
970	79	up to 965	up to 6 bedrooms or CC applications
990	81	up to 990	

Please contact your local PTA representative for model availability and approvals in your area.

1.4 Pumping Station (if applicable)

When the wastewater between the septic tank and the Ecoflo® Coco Filter cannot be conveyed by gravity, a pumping station must be installed between the two units. Like the septic tank, the pumping station should comply with local regulations and must also be watertight in order to prevent groundwater infiltration. Premier Tech Aqua offers several models of pumping stations (PSA-240, PSA-240L, PSA-240H, PSA-240NP, PSX-240).

An air vent is necessary when pumping to an Ecoflo Coco unit, please refer to the installation guide for more information available at *ptzone.premiertechaqua.com*

Premier Tech Aqua recommends sending approximately 30 to 40 L of wastewater to the Ecoflo® Coco Filter every pump dosing cycle. For more information on the pumping stations, please consult Premier Tech Aqua's Pumping Station Promotional Guide which can be found at *ptzone.premiertechaqua.com*.

1.5 Dosing units (if applicable)

Special attention shall be given to even flow distribution between the units when using 3 or more Ecoflo Coco Filters. Consult Premier Tech Aquaat *ptzone.premiertechaqua.com* for more information on these products for means to promote even distribution.

Premier Tech Aqua has developed a complete line of related products to increase the performance of the biofilter and any septic system. Please consult the Peripherals Catalogue at **ptzone.premiertechaqua.com** for Premier Tech Aqua's complete list of products.

2. Location of Wastewater System Components

2.1 Septic Tank Installation Conditions

The septic tank, equipped with an effluent filter, must be located:

- Where there is no motorized vehicletraffic;
- Where it is accessible at all times for maintenance and emptying;
- In an area that is not likely to be flooded and where it will not be submerged (depending on the situation, a drain may be required around the septic tank to prevent installation of the septic tank in ground water).

The septic tank must be installed as specified by the septic tank manufacturer. The septic tank must be watertight and be used for disposal of domestic wastewater only (i.e. no roof water, surface water or discharge from footing drains). The septic installation must be installed in accordance with the minimum clearance prescribed by local regulations.

2.2 Ecoflo® Coco Filter Installation Conditions

The Ecoflo® Coco Filter must be installed according to the following recommendations:

- NEVER cover or bury the lid of an Ecolfo® Coco Filter;
- NEVER install risers on the access of fibreglass open bottom or polyethylene Ecoflo® Coco Filter models;
- NEVER install more than ONE (1) RISER on the access of a concrete Ecoflo® Coco Filter. Use only Premier Tech Aqua's products.;
- NEVER plant trees or bushes within 20' of the lid of the Ecoflo® Coco Filter and/or within 6.5' of the infiltration area;
- NEVER connect a drain pipe, roof gutter, sump pump or air conditioning drain to your septic system;
- NEVER operate a vehicle or place an object weighing more than 500 lb within 16.5 ft of the lid of the Ecoflo® Coco Filter;
- ALWAYS ensure a minimum horizontal setback of 10 ft from the Ecoflo shell to any upslope retaining walls or the toe of a slope (where slope bottom meets level ground) AND ensure an upslope interceptor drain is installed to direct surface and/or ground water away from the Ecoflo module and soil absorption system;
- The lid of the Ecolfo® Coco Filter must be at least 2" above the surface of the landscaped lot;
- Make sure the ground cover grows back quickly to prevent soil erosion;
- Make sure the seasonal high groundwater level is at any time at least 12" below the bottom of any open bottom Ecoflo® Coco Filter (ST models);
- The open bottom Ecoflo® Coco Filter (ST models) must be installed in a location that is never likely to be flooded or submerged by groundwater. If this is the case, other closed bottom Ecoflo® Coco Filtermodels in Concrete, polyethylene or fibreglass can be used. If required, please contact our Customer Service Department for more information on that subject.
- Polyethylene Ecoflo® Coco Filter models shall not be installed in groundwater or fully saturated soils.
- For concrete or fiberglass closed bottom Ecoflo® Coco Filter models, the groundwater level should never reach the shoulder of the shell.

It is very important to advise everyone involved (installer, landscaper, owner, snow removal service, etc.) of the above recommendations so they do not damage the components of the wastewater treatment system.

By respecting these guidelines, you are contributing to the proper operation of your wastewater treatment system.

3. Effluent Discharge

IMPORTANT! THIS IS A CRUCIAL STEP FOR EVERY SEPTIC INSTALLATION.

The Ecoflo® Coco Filter provides a variety of disposal/dispersal methods of the treated effluent (depending on local regulations).

Here are some methods suggested by Premier Tech Aqua:
- Subsurface discharge towards trenches, an infiltration bed or pad, a drip irrigation system or any type of gravel-less system;
- Surface discharge into a watercourse when conditions and regulations permit it;

Generally, with the open bottom Ecolfo® Coco Filter models (ST models), the treated effluent is discharged directly beneath the Coco Filter. For closed bottom models (STB models), the treated effluent can be discharged either by gravity or pumped towards the disposal/dispersal method or a disinfection process.

3.1 Hydraulic Conductivity

Site assessment and soil conditions are critical to determine the appropriate type of treated effluent discharge. An accurate assessment of the soil's hydraulic conductivity is essential in planning any septic installation. This assessment should be performed in accordance with local regulations Adequate sizing of the soil absorption system relies on the determination of the soil's infiltrative capacity and will ensure adequate infiltration of the treated effluent into the soil at all times. The soil's infiltrative capacity is often expressed as a percolation rate (average time in minutes that is required for water to drop one centimetre in the soil), which can be determined by a qualified individual through a field permeability test, a laboratory soil particle-size analysis, or any other method approved by local regulations. Soil permeability and analysis is most important within the horizon intended to be the point of application of the treated effluent.

3.2 Subsurface Discharge

3.2.1 Soil Absorption System

Once the soil characteristics have been established, determine the size of the soil absorption system required to receive the treated effluent of the Ecoflo® Coco Filter(s). The size and shape of the soil absorption system may vary depending on site constraints.

Soil Absorption System Size = Daily Design Flow ÷ Soil Hydraulic Loading Rate

According to Administrative Code of Illinois – Title 77, Chapter 1, Subchapter r, Part 905, section 905.60 – treated effluent can be discharged in an:

- Seepage field;
- Gravel seepage field;
- Seepage beds;
- etc.

For **close bottom Ecoflo Coco Filter configuration** the treated effluent is collected at the bottom of the unit and can be directed either by gravity or pump to one of the dispersal means mentioned above.

For **open bottom configuration Coco Filter configuration** the treated effluent is infiltrated by gravity directly into a dispersal/seepage bed underneath the unit. Additional details are presented in section 3.2.3 below.

As per section 905.96 of the Administrative Code referenced above, the size of the subsurface system for final disposal of the Ecoflo Coco Filter, can be reduced by 1/3 since the effluent quality meets and even exceed the requirements of Section 905.110(d)(1)(A) and (B).

While Appendix A , Illustration M, Exhibit A of the Administrative Code of Illinois referenced above presents loading rate factors applicable for subsurface system sizing, Premier Tech Aqua suggests to use loading rate factors presented in the table below. A comparison to loading rate factors including the size reduction according to Illinois Administrative Codes is also provided.

Infiltration - subsurface system 905.60					PTA
Percolation Rate Equivalent	**Design Groups**	**Soil Groups (Most Limiting Layer)**	**Permeability Range**	**Code Loading Rates including size reduction for Peat syst. USG/ft²-d**	**Proposed Loading Rates USG/ft²-d**
Unsuitable	I	1A	Very Rapid		
10 minutes/inch	II	2A; 2B; 2K	Rapid	1.50	2
15 minutes/inch	III	3B; 3K	High Moderately Rapid	1.36	1.8
20 minutes/inch	IV	3A; 3L; 4D; 4K	Low Moderately Rapid	1.25	1.6
23 minutes/inch	V	4A;; 4B; 4H; 4L; 5D	Very High Moderate	1.13	1.5
25 minutes/inch	VI	4F; 4M; 5B	High Moderate	1.03	1.33
30 minutes/inch	VII	4N; 5A; 5C; 5H; 5K; 6D	Moderate	0.92	1.21
35 minutes/inch	VIII	4O; 5E; 5I; 5L; 6A; 6B; 6E; 6H; 6K	Low Moderate	0.78	1.05
40 minutes/inch	IX[2]	5F; 5M; 6C; 6L; 7D; 7F	High Moderately Slow	0.67	0.9
50 minutes/inch	X[2]	5G; 6F; 6I; 7E; 7C; 7H	Low Moderately Slow	0.60	0.75
70 minutes/inch	XI[2]	5N; 6G; 6J; 6M; 7F; 7I	Slow	0.41	0.48
90 minutes/inch	XII[2]	7G; 7J; 7L; 8E; 8I	Very Slow	0.30	0.4
	XII[2]	5O; 6N; 6O; 7M; 7N; 7O; 8J; 8M; 8O	NR[3]		0.35
	XIII	9	SUBSURFACE DISPOSAL NOT		

3.2.2 Natural Soil Depth Required

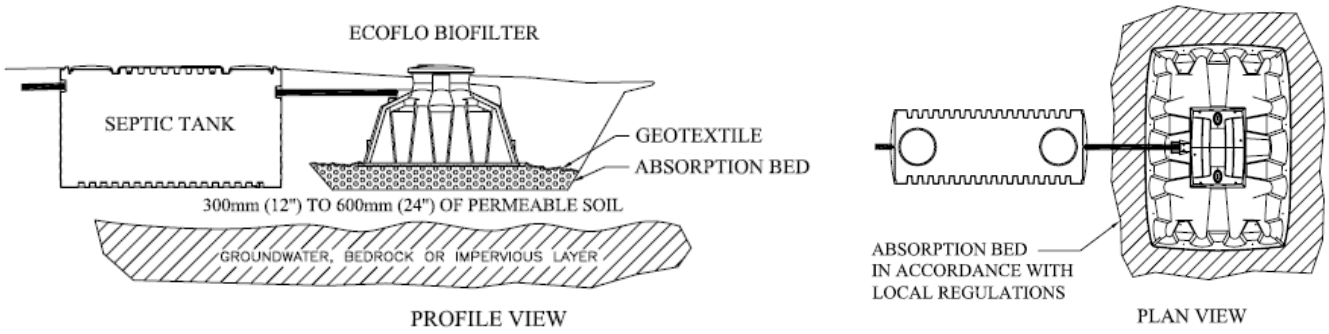
Premier Tech Aqua recommends that the minimal **vertical distance** between the clean crushed stone and the limiting layer (groundwater, bedrock or impervious layer) be at least of 12".

Always consider the following when designing a soil absorption system:

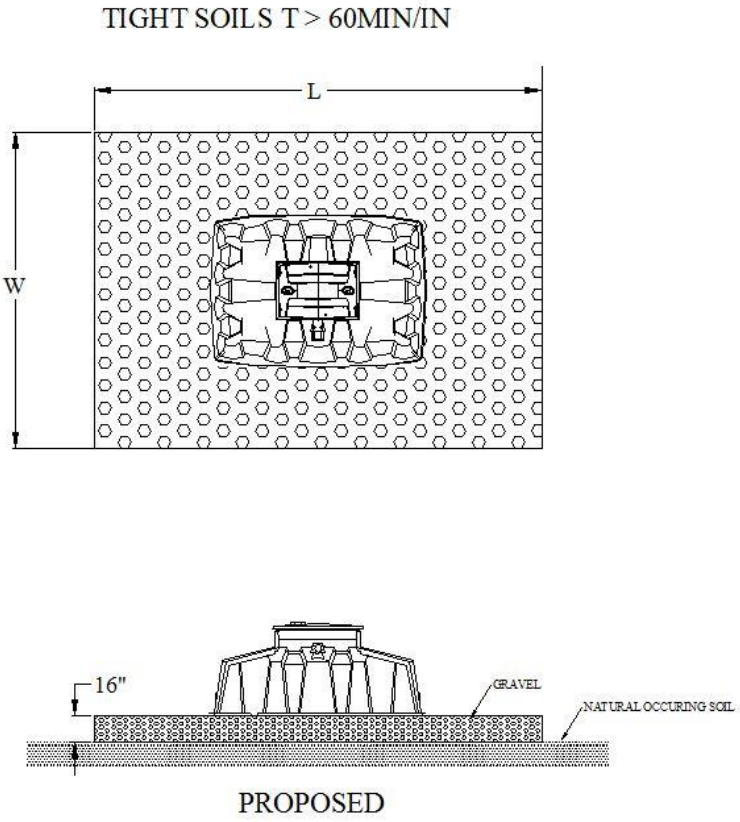
- Soil assessment must be performed in accordance with local regulations in order to determine the type of soil as well as the depth of any limiting layer (groundwater, bedrock or impervious layer);
- When referring to groundwater, the **Seasonal High Groundwater Level** (SHGL) must be taken into account;
- The profile of the lot must be such that runoff water flows away from the septic system;
- The shape of the soil absorption system **may vary** according to site conditions;
- Various means can be used to promote infiltration in low permeability soils. Contact your local distributor or Premier Tech Aqua for suggestions.

3.2.3 Open Bottom Configuration

The absorption bed/dispersal area has a minimum depth of 8" of 1/2" to 2" (3/4" recommended) of clean crushed stone or drain rock overlaying natural occurring soil as shown in figure below.



For soils with a percolation rate (T) greater than 60 min/in, it is recommended to increase the height of the clean crushed stone layer to 16” to better promote water distribution onto the absorption bed/dispersal area as shown in figure below.

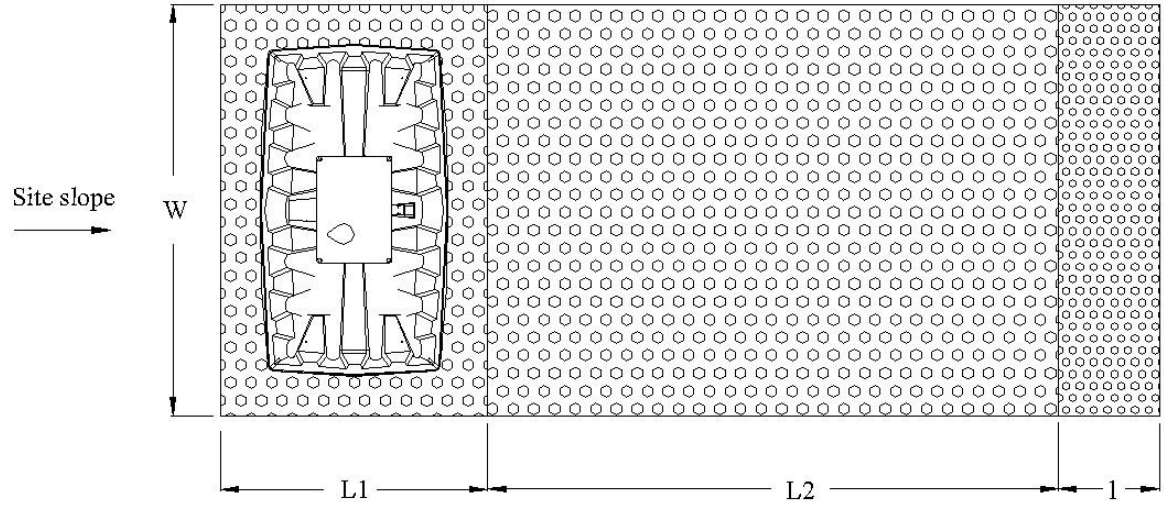


For soils with a percolation rate (T) greater than 90 min/in but not lesser than 60 min/in, the absorption bed/dispersal area shall be designed according to a 'Mantle Design' (section 3.2.4).

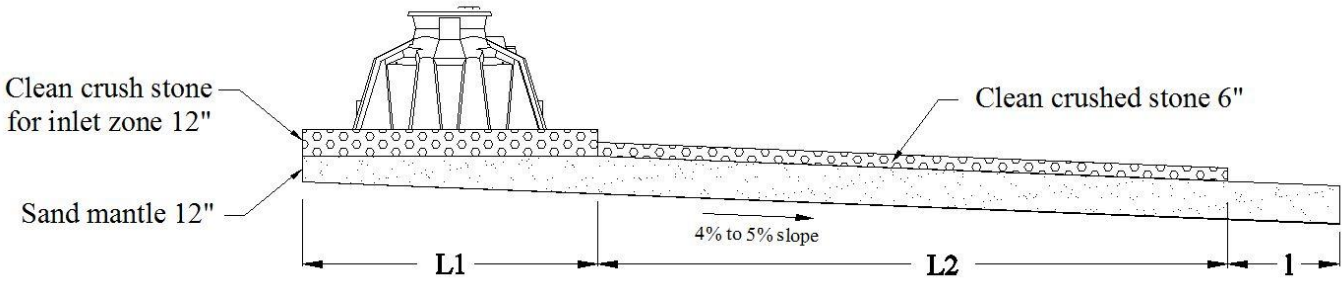
3.2.4 Mantle Design

The mantle must **be installed at-grade** and is equipped with an inlet zone (L1) that feeds the sand filter vertically. This zone consists of a layer of 12" of 1/2" to 2" (3/4" recommended) of clean crushed stone or drain rock resting on a layer of filter sand. In the case of an Ecoflo® Coco Filter with open bottom (ST models), the water percolates inside the biofilter by gravity and then trickles directly into the inlet zone (located directly beneath the biofilter). Once the water has percolated vertically through the sand layer, it then trickles slowly over the entire length of the mantle.

As shown in the figures below, the mantle (L2) consists of a 6" layer of 1/2" to 2" (3/4" recommended) of clean crushed stone or drain rock over a 12" layer of sand (filter sand). The 12" of sand underlay and the 6" of gravel must be extended at least 23 ft beyond the perimeter of the Ecoflo® Coco Filter shell, in the direction of the flow. The natural occurring soil underneath the mantle is sloped at 2 to 5% to direct the flow down the mantle. A dispersal area at the end of the 23 ft mantle (l) helps any remaining effluent to be absorbed into the ground.



Plan View



Section View

Filter sand must meet the following specifications:

- 0.15 mm ≤ D_{10} ≤ 0.45 mm;
- Cu ≤ 5.0;
- less than 3% of particles smaller than 80 µm;
- less than 20% of particles larger than 2.5 mm.

Length of (L1) = 10', length of (L2) = 23'
Width of (L1)&(L2) = Q ÷ 20.5 USG/ft-d

At the end of the mantle a dispersal area (l) allows the fully treated water to be absorbed in the soil. The sizing of this area is based on the percolation rate of the natural occurring soils and is constituted of 12" of 1/2" to 2" (3/4" recommended) of clean crushed stone or drain rock. This dispersal area (l) is calculated as follow:

$$S = \frac{Q*T}{50\%} * \frac{0.13368\,ft^3/USG*12in/ft}{1440\,\min/d}$$

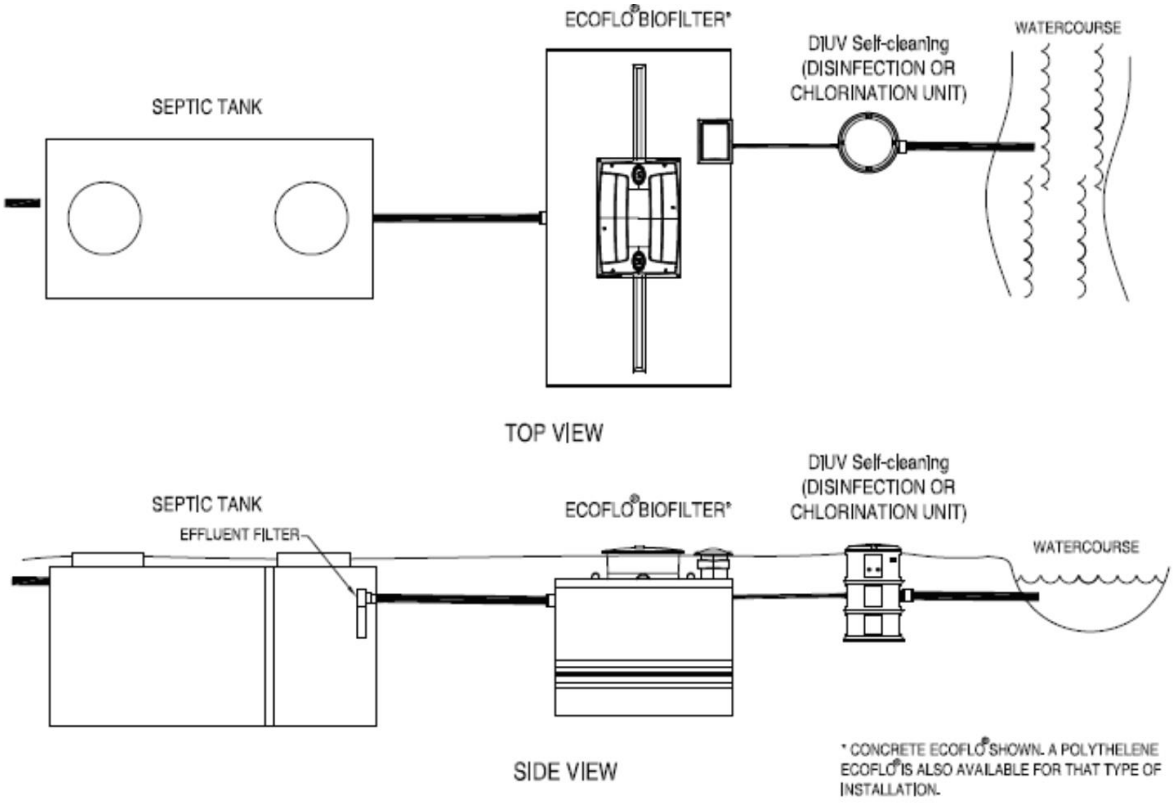
where, S = dispersal area (ft²)
Q = design flow rate (USG/d)
T= percolation rate (min/in)
A 50 % safety factor is applied

The width of the dispersal (l) area is usually the same as the width of the mantle (W), therefore, to determine the dispersal area's length (L), divide the dispersal area surface by the width of the mantle. Area (l) can be wider than the mantle area (W) but not smaller.

The material used for the backfill must not contain any organic matter or impermeable soil, stones and debris.

3.3 Surface Discharge

Depending on local regulations and jurisdictions, the Ecoflo® Biofilter's effluent could be discharged into a watercourse. Requirements for such applications vary from one jurisdiction to another. Contact your local PTA representative to know if it is allowed in your area.



If you have any questions or comments, do not hesitate to contact Premier Tech Aqua at 1 800 632-6356.

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1 800 632-6356
418 862-6642
pta@premiertech.com
PREMIERTECHAQUA.COM