

Design guide — Nova Scotia Ecoflo[®] compact biofilter

This guide contains the specific information needed to plan the installation of the **Ecoflo compact biofilter**. For more information, please contact Premier Tech at **1 800 632-6356** or info.ptwe.na@premiertech.com.

IMPORTANT

All treatment system designs/installations must comply with local regulations.

All designers, installers, and maintenance personnel must be trained and familiar with the local regulations, with the codes of their respective areas, and with the Ecoflo compact biofilter design guide.

Premier Tech strongly recommends for the system designer to review each of the Ecoflo compact biofilter installation guides in conjunction with this document. To find them, go to PT-WaterEnvironment.com/ProSpace.

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1 GENERAL DESCRIPTION

The Ecoflo compact biofilter is a biofiltration system designed to treat domestic septic tank effluent to an extremely high level before final dispersal. A typical Ecoflo septic installation consists of:

- a primary/septic tank with an NSF 46-approved effluent filter connected to the tank outlet pipe
- the Ecoflo compact biofilter unit, where domestic wastewater is treated as it trickles through the natural filtering medium
- the Ecoflo compact biofilter is housed in a fiberglass, concrete, or polyethylene tank
- a site-specific effluent dispersal system

The Ecoflo compact biofilter system is based on simple, passive biofiltration principles. Once wastewater has passed through the primary/septic tank, it flows toward the Ecoflo compact biofilter. Inside the biofilter unit, a tipping bucket disperses the wastewater onto specially designed plates, which, ensures even, distribution of the wastewater onto the filtering medium. The wastewater then trickles through the natural filtering medium, where treatment occurs. The treated effluent can either be discharged by gravity or pumped to final dispersal/infiltration into the ground (see Figure 1).

The Ecoflo compact biofilter has been tested, certified and listed by the National Sanitation Foundation International as meeting the requirements of NSF/ANSI Standard 40, Class 1. The Ecoflo compact biofilter EC7 is certified for a hydraulic loading rate (HLR) applicable to the surface of filtering media of 700 L/m²-d (17.2 Gpd/ft²).

2 TREATED EFFLUENT QUALITY

When treating domestic strength wastewater up to the design flows and loads, a properly maintained Ecoflo compact biofilter system will exceed the performance requirements of NSF Standard 40 Class 1. Actual test results established through analytical methods described in NSF/ANSI Standard 40 averaged 8 mg /L in CBOD₅ and 6 mg/L in TSS.

Table 1: Ecoflo compact biofilter treated effluent quality parameters

	Influent	ECF Effluent	Abatement	NSF Std 40 Avg, 30-day
TSS (mg/L)	180 ± 64	6 ± 4	97%	30
CBOD₅ (mg/L)	200 ± 88	8 ± 9	96 %	25
pH	7.3	7.0		6-9
D.O. (mg/L)	0.9 ± 0.7	3.7 ± 2.2		
Temperature (C)	28 ± 3	27 ± 5		

The Ecoflo compact biofilter has demonstrated its robustness over the years. The system does not require any acclimation/ start-up period to consistently provide effluent quality as presented in Table 1, making it the ideal system for secondary or seasonal home applications or any other intermittent use applications. The Ecoflo compact biofilter has also been specifically developed and tested for cold climate applications. Treatment efficiency is not subject to significant variations with ambient air temperature fluctuation.

3 WASTEWATER SYSTEM COMPONENT DESIGN AND SPECIFICATION

3.1 SYSTEM CONFIGURATION

The Ecoflo compact biofilter system designer will be responsible for properly configuring and sizing system components, pumps, and other peripheral component specifications. They will also be responsible for the final dispersal or disposal of treated effluent and construction details. The design shall comply with local codes and regulations.

3.2 DESIGN FLOW

Applicable regulations usually define the daily flow based on the number of bedrooms or occupants with a defined flow per person per day.

3.3 PRIMARY/SEPTIC TANK

The size and configuration of the primary/septic tank shall be in accordance with the NSF listing (as applicable) or requirements. The primary/septic tank shall have a usable volumetric capacity of at least 24 hours of retention. The septic tank, risers, and lids must be watertight.

Some Ecoflo compact biofilter polyethylene models are available in a monobloc Pack configuration that combines the primary/septic tank and the Ecoflo compact biofilter into one unit. Go to PT-WaterEnvironment.com/ProSpace to consult technical datasheets and installation guides for more information on the Ecoflo compact biofilter Pack configuration.

Buoyancy calculation for primary/septic tank should be performed when necessary.

3.4 EFFLUENT FILTER

The effluent filter extends the life of any treatment system by keeping solids in the primary/septic tank.

The effluent filter is especially important if the household is equipped with a sewage pump or any other appliance that may increase the amount of suspended solids in wastewater. These appliances risk jeopardizing the long-term operation of the system and affecting its performance.

When an effluent pump is required as part of the septic system, an effluent filter will also prevent solids from reaching the pump. Usage of **garbage disposal unit** is not recommended as they can cause septic system problems by generating an increased amount of suspended solids, grease and nutrients. However, if such units are proposed to be used, other measures should be taken to mitigate the increased nutrients to the field.

Effluent filters used with the Ecoflo compact biofilter shall be NSF-46 certified, 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 Water and Environment highly recommends using the effluent filter PL-122 from Polylok.

Effluent filters are normally installed at the outlet of the primary/septic tank outlet. *However, they may also be installed downstream of a primary/septic tank in Premier Tech Water and Environment's TLF-240 effluent filter container in accordance with local regulations. For more information, go to PT-WaterEnvironment.com/ProSpace.*

3.5 ECOFLO COMPACT BIOFILTER

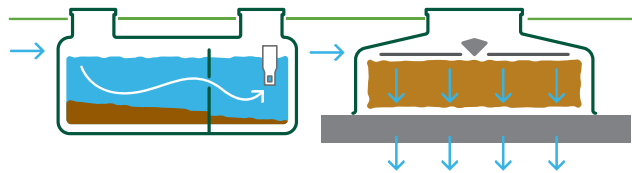
The Ecoflo compact biofilter is a biofiltration system designed to treat domestic wastewater. Once the wastewater has passed through the primary/septic tank, it then flows toward the Ecoflo compact biofilter. Inside the biofilter, a central tipping bucket equally distributes wastewater on both sides of the biofilter. Both sides are equipped with specially designed plates that evenly distribute wastewater over the filtering medium. The wastewater then trickles through the filtering medium as microorganisms in the filtering medium decompose pollutants.

Under the right conditions, a soil absorption system can return treated effluent into the environment by infiltration. Local regulations and site conditions may require an additional system to provide further treatment for treated effluent to be safely discharged. It is important to note that the final effluent dispersal method is specific to each site.

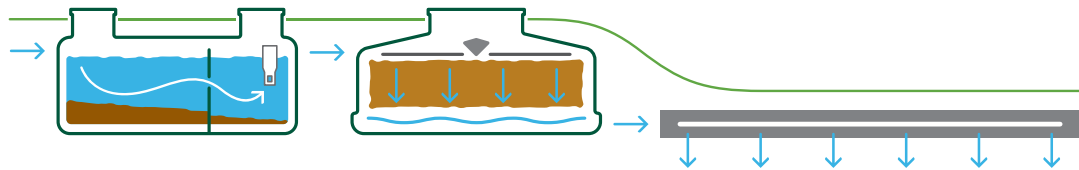
The site-specific design will detail the final effluent dispersal method. Effluent may either be discharged to a pad located directly underneath the Ecoflo compact biofilter unit (open bottom models), or sent through a piped outlet for gravity discharge to a trench, pressurized system, or other applicable effluent dispersal method (Figure 1).

Figure 1 – Typical installation schemes

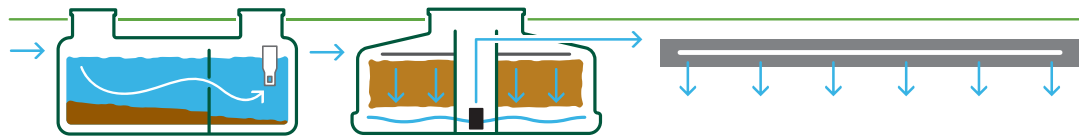
INFILTRATION DISCHARGE



GRAVITY DISCHARGE

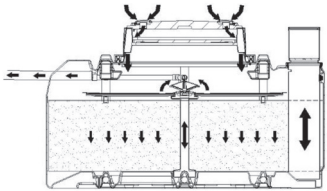
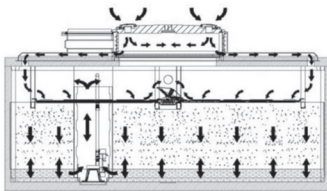
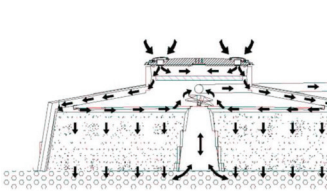


PUMPED DISCHARGE



3.5.1 Aeration principle in the Ecoflo compact biofilter

To perform efficiently, the system requires a sufficient amount of oxygen to feed the microorganisms in the filtering medium. The aeration principle of the system is based on gravity air flow, as illustrated in the air flow diagrams below. The air intake is located on the main access lid of the biofilter unit. An independent vent ensures consistent air flow through the system. Thus, air enters the system through the lid and is deflected by a panel to the aeration channels, which distribute air throughout the tank. The central support and/or pumping vault provide a link between the bottom and the top of the filtering medium. Air also penetrates into the filtering bed through water infiltration. Air coming out of the filtering medium evacuates by passing through the opening located on top of the central support or on the access well. Finally, it is conducted by convection to the house's air vent via the septic tank.

		
Polyethylene Ecoflo compact biofilter air flow diagram	Concrete Ecoflo compact biofilter air flow diagram	Fiberglass Ecoflo compact biofilter air flow diagram

3.6 DESIGN CRITERIA

Usually, the model and the number of Ecoflo compact biofilter units are determined either by the number of bedrooms in a home or by the total domestic wastewater flow per day. The model selection also depends (without limitation) on the available space, the topography of the lot, the seasonal high groundwater table depth, and the type, permeability, and depth of the natural soil on site.

There are many different models of the Ecoflo compact biofilter. Each has different characteristics. The letters and numbers associated with the Ecoflo compact biofilter specify the model's characteristics, as presented in the following table with model **EC7-2200-P-P (PACK)** as a reference:

EC refers to the Ecoflo compact biofilter model	EC = Ecoflo compact biofilter		
7	Maximum applicable HLR 700 L/m ² -d		
2200 refers to the daily flow capacity	2.8 - 1900 = Capacity of 1900 liters per day 3.4 - 2200 = Capacity of 2200 liters per day 3.8 - 2600 = Capacity of 2600 liters per day 4.1 - 2800 = Capacity of 2800 liters per day 5.0 - 3500 = Capacity of 3500 liters gallons per day 5.7 - 4000 = Capacity of 4000 liters gallons per day 6.5 - 4500 = Capacity of 4500 liters per day 7.3 - 5000 = Capacity of 5000 liters per day 7.5 - 5200 = Capacity of 5200 liters per day		
P refers to the material of the shell	C = Concrete	F = Fiberglass	P = Plastic (Polyethylene)
P refers to disposal mode	G = Gravity	O = Open bottom (perforated)	P = Pumped
PACK refers to configuration of the primary/septic tank and biofilter	PACK = monobloc configuration		No mention = In line

Therefore, according to this nomenclature, the EC7-2200-P-P (PACK) model refers to the Ecoflo compact biofilter version EC7, with a daily flow capacity of 2200 liters, in a polyethylene shell with a watertight bottom and an integrated pump. Both primary/septic tank and biofilter are integrated in one unit. The following table displays all the Ecoflo compact biofilter models available on the market:

			
	Polyethylene shell	Concrete shell	Fiberglass shell
Open bottom	EC7-4000-P-O EC7-5000-P-O	N.A.	EC7-4500-F-O EC7-5250-F-O
Closed bottom - gravity discharge	EC7-1900-P-G (standalone or PACK) EC7-2200-P-G (standalone or PACK) EC7-2800-P-G (standalone or PACK) EC7-4000-P-G EC7-5000-P-G	EC7-1900-C-G EC7-2600-C-G EC7-4500-C-G	N.A.
Closed bottom - pumped discharge	EC7-1900-P-P (stand alone or PACK) EC7-2200-P-P (stand alone or PACK) EC7-2800-P-P (stand alone or PACK) EC7-4000-P-P EC7-5000-P-P	EC7-1900-C-P EC7-2600-C-P EC7-4500-C-G	N.A.

Consult the technical data sheets at [PT-WaterEnvironment.com/ProSpace](https://www.pt-waterenvironment.com/ProSpace) for additional information on these models, such as built-in storage and dosing capacities, dimensions, weight, etc.

Table 2 summarizes the principal design criteria for the Ecoflo compact biofilter.

Table 2: Ecoflo compact biofilter EC7 model series design criteria

HLR	700 L/m ² .d
OLR	85 g CBOD ₅ /m ² .d
Filtering Media height	65 cm

Table 3 summarizes the system's capacity depending on the different Ecoflo compact biofilter models.

Table 3: Ecoflo compact biofilter system capacity

Ecoflo compact biofilter EC7	Ecoflo compact biofilter unit size	Filtering media surface (m²)	Maximum flow rate capacity (L/d)	Premier Tech Water and Environment's recommended application
1900	2.8	2.8	Up to 1900	Up to 3 bedrooms
2200	3.4	3.4	Up to 2200	Up to 4 bedrooms
2600	3.8	3.8	Up to 2600	Up to 5 bedrooms
2800	4.1	4.1	Up to 2800	Up to 5-6 bedrooms
3500	5.0	5.0	Up to 3500	Up to 6 bedrooms or commercial applications
4000	5.7	5.7	Up to 4000	
4500	6.5	6.5	Up to 4500	
5000	7.3	7.3	Up to 5000	
5250	7.5	7.5	Up to 5250	

NOTE: The model and number of Ecoflo compact biofilter units is determined either by the number of bedrooms in a home or by total domestic wastewater flow per day. The designs of the different Ecoflo compact biofilter models developed by Premier Tech Water and Environment are essentially based on the number of bedrooms, regardless of the design flow rate specification in a given area.

Please contact your local Premier Tech Water and Environment representative for model availability and approvals in your area.

The suggested uplift restraint configuration for each Ecoflo compact biofilter model is presented in their respective installation guides. Buoyancy calculations for Ecoflo compact biofilter models are summarized in the appendix. For Ecoflo compact biofilter units housed in locally provided concrete tanks, the designer shall perform buoyancy calculation to ensure adequate tank uplift restraint when any part of the tank is below the estimated seasonal high water table.

3.7 INFLUENT PUMPING STATION (WHEN APPLICABLE)

A pumping station is needed whenever wastewater cannot be conveyed from the primary/septic tank to the Ecoflo compact biofilter. Like the primary/septic tank, the size and configuration of the pump tank shall be based on design flow and occupancy according to state or local requirements. The pump tank, risers, and lids must be watertight.

The dosing rate to the Ecoflo compact biofilter should be between 30 to 40 liters of wastewater every pump cycle.

The pumping station unit must have adequate venting to avoid any buildup of harmful gases, airlock, and corrosion. This can be accomplished by using a separate vent pipe on the pump chamber or septic tank, by using a vented lid, or by connecting the pumping station to the main building vent stacks.

Buoyancy calculation for the pumping station tank should be performed when necessary.

Premier Tech Water and Environment offers several models of pumping stations (PSA-240, PSA-240H, PSA-240NP, PSX-240). For more information, go to [PT-WaterEnvironment.com/ProSpace](https://www.pt-waterenvironment.com/ProSpace).

It is the designer's responsibility to ensure that pumping stations configuration and sizing meet state and local requirements.

3.8 DISCHARGE PUMP (WHEN APPLICABLE)

As presented in table above, some concrete or polyethylene Ecoflo compact biofilter models come with a closed bottom configuration that includes a discharge pump vault. This allows the Ecoflo compact biofilter to pump treated effluent towards final dispersal. The integrated pump vault includes a pump, a float tree with an ON/OFF float and an alarm float, and an alarm box.

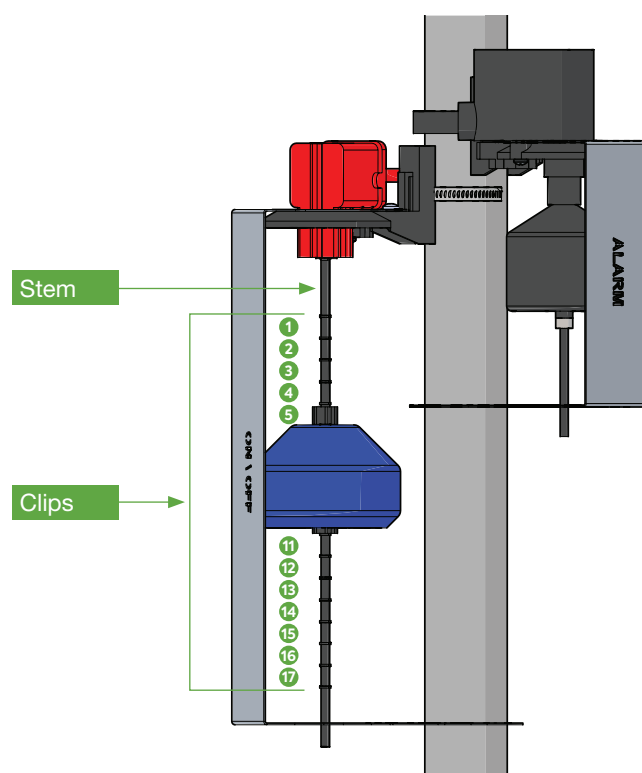
Each of the EC7-XXX-P-P models listed below offers a certain built-in capacity for dosing and storage in case of emergency. These are presented on each product's respective technical data sheets.

Table 4: Dosing volume available and float adjustments for polyethylene unit

	EC7-1900	EC7-2200	EC7-2800	EC7-4000	EC7-5000
Unit Size	2.8	3.4	4.1	5.7	7.3
Maximum Applicable Flow Rate (L/d)	1900	2200	2800	4000	5000
Float adjustments (see Figure 2)	Dosing volume provided (L)				
Factory setting	21	24	26	20	20

See below for adjustments

Figure 2 - Float tree and float adjustment for EC7-XXX-C/P-P



Floats factory settings are set to provide 80 to 375 litres per dose depending on models' capacities. However, floats can be adjusted on-site according to information provided in Table 4 if the bigger dose is required depending on specific site conditions and design. For gravity distribution we recommend, theoretically, a dose volume of $\frac{1}{4}$ of daily design flow, 4 times a day.

Depending on application and site conditions, additional volume for dosing and/or emergency may be required and provided with an additional independent dosing tank.

Consult the Technical Data Sheets at PT-WaterEnvironment.com/ProSpace for additional details on integrated pump vault for these models, such as built-in storage and dosing capacities, dimensions, etc.

Table 5: Dosing Volume and Float Adjustment for poly/concrete models

POLYETHYLENE

Desired dose volume					Adjustment
2.8 – 1900	3.4 – 2200	4.1 – 2800	5.7 – 4000	7.3 – 5000	
95 L	115 L	130 L	115 L	150 L	None (factory setting)
300 L	360 L	375 L	320 L	435 L	Place a clip at the 5th and 15th spaces from the top of the stem.
400 L	455 L	490 L	415 L	585 L	Place a clip at the 3rd and 15th spaces from the top of the stem.
490 L	565 L	625 L	530 L	735 L	Place a clip at the 2nd and 16th spaces from the top of the stem.
605 L	680 L	755 L	660 L	890 L	Place a clip at the 1st and 17th spaces from the top of the stem.
			870 L	1115 L	Place a clip at the 17th space from the top of the stem. DO NOT PLACE ANY OTHER CLIPS.

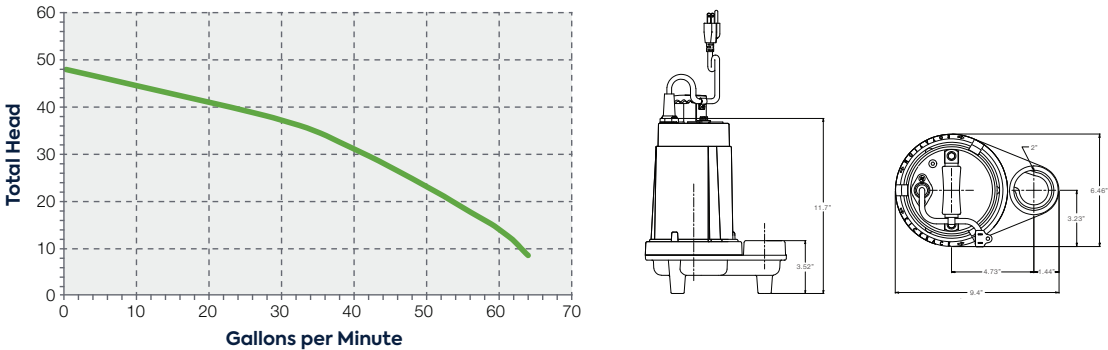
CONCRETE

Desired dose volume			Adjustment
2.8 – 1900	4.1 – 2800	6.5 – 4500	
75 L	115 L	360 L	None (factory setting)
265 L	360 L	n/a	Place a clip at the 5th and 15th spaces from the top of the stem.
340 L	454 L	490 L	Place a clip at the 3rd and 15th spaces from the top of the stem.
415 L	530 L	625 L	Place a clip at the 2nd and 16th spaces from the top of the stem.
470 L	625 L	755 L	Place a clip at the 1st and 17th spaces from the top of the stem.
565 L	740 L	830 L	Place a clip at the 17th space from the top of the stem. DO NOT PLACE ANY OTHER CLIPS.

The pump provided with those models presents the following characteristics:

Champion 0.5 HP pump | 8.5 Amps | 1 phase, 60 Hz, 115 V

Pump performance curve



Electrical specification for floats

Float switches must be used with pumps that provide integral thermal overload protection.

	Single phase	
	Maximum pump running current	Maximum pump starting current
120 VAC 50/60 Hz	13 A	60 A
230 VAC 50/60 Hz	12 A	60 A

The performance curve above represents the pump supplied with the polyethylene and concrete Ecoflo compact biofilters with an integrated pump. Note that this curve was obtained with clear water and might not perform as well with wastewater. If you have questions about the interpretation of this curve, please do not hesitate to contact Premier Tech Water and Environment.

The pumping unit uses 0.25 kWh per day. Pumps that exceed the currents in these specifications require a pump controller that will allow the stock floats to be used for signal rather than providing power. Refer to the technical data sheet for the vault dimensions.

The maximum length of the pressurized pipe from the pump’s outlet depends on the head (difference in elevation between the base of the pump and the end of the pressurized pipe). The maximum length of the pressurized pipe from the pump’s outlet is limited by the volume of water that returns to the polyethylene Ecoflo compact biofilter once the pump has stopped running. **It is the designer’s responsibility to make sure that pumping station configuration and sizing meet state and local requirements.**

3.9 FLOW DIVIDERS (WHEN APPLICABLE)

An installation with two Ecoflo compact biofilter units that cannot use gravity distribution or with three or more Ecoflo compact biofilter units must consider using a flow divider to create an even distribution between components.

Premier Tech Water and Environment offers several pressurized flow dividers. For more information, go to PT-WaterEnvironment.com/ProSpace.

3.10 COMMERCIAL APPLICATIONS

The Ecoflo compact biofilter can also be used for commercial or municipal applications when the wastewater to be treated is comparable to domestic wastewater. Certain conditions must be taken into consideration, such as:

- For commercial applications, it is strongly recommended to add to the treatment chain an Equalization Tank (EQ tank) to regulate the wastewater flow over a 20 h period/day to the Ecoflo units;
- For commercial applications, a hydraulic loading rate (HLR) of 500 L/m² (12.3 gal/ft²) rather than the 700L/m² (17.2 gal/ft²) for residential applications shall be considered;
- It is important to respect the most restrictive design criteria:
 - Organic Loading Rate (OLR) or Hydraulic Loading Rate (HLR). When there is high-strength wastewater, OLR is used and when the project is designed for domestic-type wastewater, HLR is used;
 - Typical septic tanks influent values considered for domestic wastewater are:
 - before septic tank — less than 250 mg/L in CBOD₅, less than 300 mg/L in TSS, less than 50 mg/L in TKN, less than 10 mg/L in total phosphorous
- Maximum Ecoflo Coco Filter influent CBOD₅ concentration applicable for single pass : 300 mg CBOD₅/L (septic tank effluent)
- For CBOD₅ concentrations higher than 300 mg CBOD₅/L (septic tank effluent) but not exceeding 600 mg/L (septic tank effluent), the use of a recirculation loop on the Ecoflo Coco Filter (dilution of water concentration upstream) shall be considered. A maximum of 1Q of recirculation is tolerated for higher organic loading applications.
- Ecoflo Coco Filter units should not be used to treat only restaurant-type wastewaters
- For high strength wastewater: CBOD₅ < or = 300 mg/L at septic tank effluent
 - Ecoflo can be operated in single pass mode
 - OLR recommended: 100 g/m² per day (0.02 lbs/ft² per day).
- For high strength wastewater: CBOD₅ > 300 mg/L at septic tank effluent
 - It is recommended to add a recirculation loop (from the Ecoflo outlet back to the septic tank) to dilute the wastewater going into the system;
 - Maximum CBOD₅ concentration accepted on the Ecoflo Coco Filter is 600 mg/L;
 - Under these conditions maximum allowable organic loading rate is 75 g/m² per day (0.015lbs/ft² per day). The organic loading rate has been lowered due to the recirculation of the treated water upstream of the system.
 - A recirculation rate of 1Q from the Ecoflo Coco Filter outlet back to the septic tank is recommended. Between CBOD₅ concentrations of 300 mg/L to 600 mg/L (septic tank effluent), the recirculation rate (from 0Q to 1Q) is proportional to the CBOD₅ concentration going into the system.

Please contact Premier Tech at 1 800 632-6356 or at info.ptwe.na@premiertech.com for more information on these applications.

3.11 FILTERING MEDIUM LIFESPAN

The effective lifespan of the Ecoflo compact biofilter's filtering medium is estimated to last a minimum of 10 years under the following conditions:

- if the system has been operated at or under design flow and loadings
- if the system has been designed and installed in accordance with Premier Tech Water and Environment guidelines
- if the system has been maintained in accordance with Premier Tech Water and Environment guidelines by a Premier Tech Water and Environment trained service provider, been operated under an ongoing service contract, and is in compliance with all administrative authority permit conditions

After 10 years, the filtering medium is analyzed by one of Premier Tech Water and Environment's authorized agents. Under normal usage, if the filtering medium has not been abused and the operating guidelines have been respected, the filtering medium can still be used for some additional years. However, the Ecoflo compact biofilter's filtering medium must be renewed before the system's treatment capacity and performance deteriorates. The filtering medium is easily removed by using a truck adapted to pump out septic tank sludge. The new filtering medium is then installed by the pumper or an authorized agent.

3.12 FINAL DISPERSAL

The final dispersal system must be designed in accordance with Premier Tech's guidelines (refer to section 5) and/or local regulations.

4. LOCATION OF WASTEWATER SYSTEM COMPONENTS

4.1 PRIMARY/SEPTIC TANK INSTALLATION CONDITIONS

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

- where there is no motorized vehicle traffic
- 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 primary/septic tank to prevent installing it in groundwater)

The septic tank/primary must be installed according to the manufacturer's specifications. The primary/septic tank must be watertight and only be used to dispose of domestic wastewater (for instance, no roof water, surface water, or discharge from footing drains). The septic installation must be installed in accordance with the minimum clearance prescribed by state or local regulations.

4.2 ECOFLO COMPACT BIOFILTER INSTALLATION CONDITIONS

The Ecoflo compact biofilter must be installed according to the following recommendations:

- NEVER cover or bury the lid of the Ecoflo compact biofilter
- NEVER plant trees or bushes within 2 m (6.5') of the infiltration area
- NEVER connect a drainpipe, roof gutter, sump pump, or air conditioning drain to your septic system
- ensure the ground cover grows back quickly to prevent soil erosion
- for polyethylene models, use a sandy material free of rocks and stones as backfill
- for concrete models, use a sandy material with rocks or stones no larger than 60 cm (2'') as backfill

In addition to those recommendations, some additional models' specific considerations are detailed in the Table 6:

Table 6: Minimum distances to respect for Ecoflo compact biofilter reference point

		Fiberglass	Polyethylene 2.8 – 3.4 – 4.1	Polyethylene 5.7 – 7.3	Concrete
Riser allowance		No additional riser allowed	Maximum one additional 6" riser	No additional riser allowed	Maximum one additional 8" riser
Base of excess backfill, slopes, or embankments vs. biofilter lid*	A	4,88 m (16')	3,96 m (13')		3,05 m (10')
Parking area*	B	4,88 m (16')	3,96 m (13')		3,05 m (10')
Vehicle or object weighting more than 500 lbs*	C	4,88 m (16')	3,96 m (13')		3,05 m (10')
Retaining Wall*	D	4,88 m (16')	3,96 m (13')		3,05 m (10')
Tree		4,88 m (16')	N/A		N/A
Finished landscaping vs. base of Ecoflo lid	E	5,08 cm (2")			
Groundwater vs. base of Ecoflo compact biofilter unit**	Fp	3,66 m (12") below the bottom of the Ecoflo compact biofilter unit	Gravity: up to the base of the Ecoflo Pumped: 0,61 m (2') above the base of the Ecoflo	Up to the base of the Ecoflo compact biofilter	Gravity: Up to the base. Pumped: To the inlet invert

* See Figure 3

** See Figure 4

Figure 3 – Minimum distances to respect for Ecoflo Coco Filter

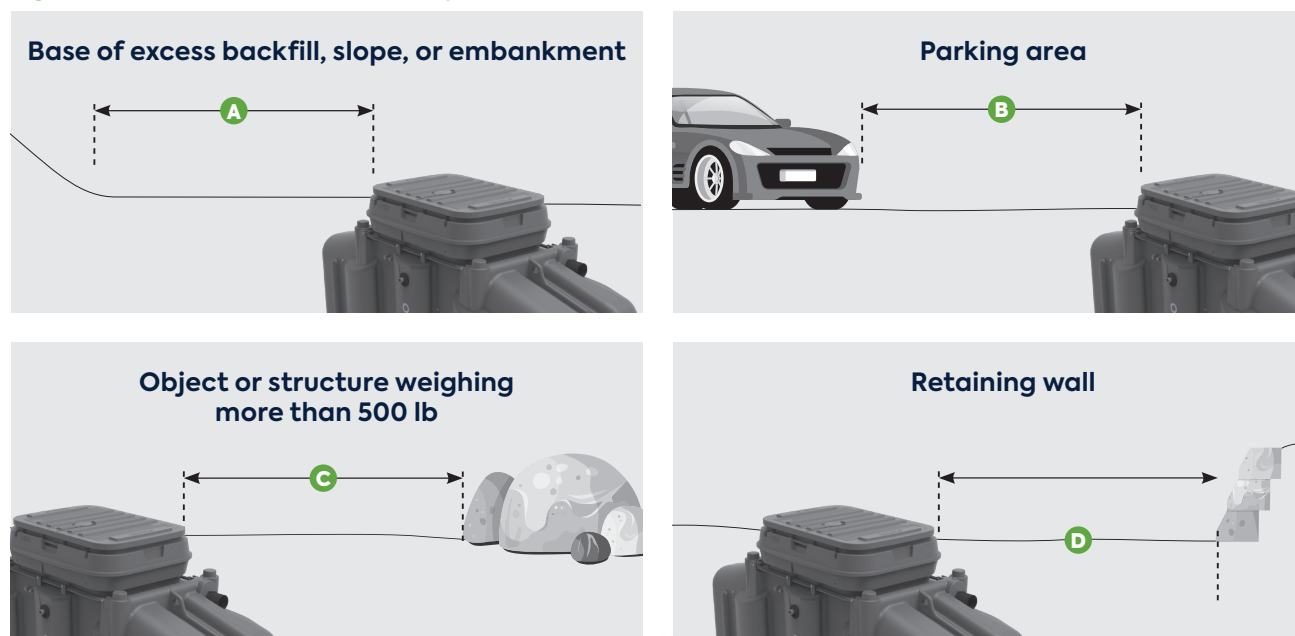
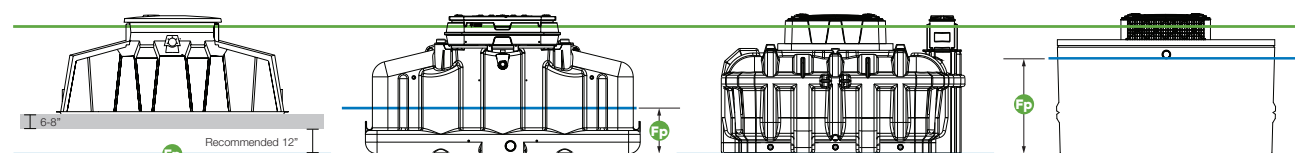


Figure 4 – Minimum distances to respect for Ecoflo compact biofilter



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.

5. EFFLUENT DISCHARGE

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

The Ecoflo biofilter provides a variety of disposal/dispersal methods of the treated effluent (depending on local regulations). Dispersal area can be configured as a fully buried, partially raised or fully raised dispersal bed or trenches. Depending on local regulation, surface discharge may be possible under certain conditions following additional complementary treatment.

Ecoflo biofilter treated effluent can be discharged either by gravity or pumped to the final dispersal area. With open-bottom Ecoflo biofilter models, the treated effluent is discharged directly beneath the Ecoflo biofilter. For closed-bottom models, the treated effluent can be discharged either by gravity or pumped toward one of the dispersal methods mentioned above.

5.1 NATURAL SOIL AND SITE CHARACTERIZATION

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 and will determine if subsurface discharge is possible. 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.

5.2 SOIL DEPTH UNDER THE ADSORPTION AREA

The vertical distance between the absorption bed and the limiting layer (groundwater, rock, or impervious layer) must be in accordance with local regulations. We recommend, however, to maintain at least 300 mm of unsaturated soil below the clean crushed stone layer underneath an open-bottom unit.

5.3 SUBSURFACE DISCHARGE — SIZING

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

As per the approved Manual and Installation Guide for Sub-surface Ecoflo Biofilters prepared for Nova Scotia Environment, dated May 2014, the size of the absorption area for final dispersal of Ecoflo effluent is calculated using the soil loading rate factors presented in Table 7.

Table 7 – Maximum soil hydraulic loading rate for Ecoflo treated effluent

Soil	Permeability (Hydraulic conductivity) Range m/s x 10 ⁶	Soil HLR using Ecoflo (L/m ² -d)
Medium to coarse sand	80-500	45
Fine sandy gravel	20-80	45
Silty sand	8-20	32
Sandy silt	3-8	27
Clayey silt	0.8-3	22
Silty clay	0.2-0.8	15
Clay	<0.8	8

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 Nova Scotia 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 7 to calculate the required bottom area of the trench.

For larger flows, non-residential sources, and system clustering, please consult Appendix F in the Nova Scotia Technical Guidelines. In any case, where an absorption bed exceeds 150 m², 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.

5.4 SURFACE DISCHARGE — ADDITIONAL TREATMENT OPTION

When required and if allowed by regulations, the Ecoflo compact biofilter can be combined with the Rewatec UV disinfection unit (DiUV) or another UV disinfection system to reduce the fecal coliforms concentration below 200 UFC/100 mL to allow direct surface or groundwater discharge. For more information on the Rewatec DiUV, go to PT-WaterEnvironment.com/ProSpace.

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

ANNEX 1 | BUOYANCY CALCULATIONS FOR THE POLYETHYLENE UNITS

Ecoflo Coco Model Units		2.8			2.8 PACK			3.4			3.4 PACK			4.1			EC7-1050-P	EC7-1200-P	EC7-1350-P
Number of Risers		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3			
Total height of the unit	m	1.62	1.77	1.92	1.62	1.77	1.92	1.62	1.77	1.92	1.62	1.77	1.92	1.62	1.77	1.92			
Maximum tank volume under ground water table ¹	m³	3.13	3.13	3.13	5.78	5.78	5.78	3.5	3.5	3.5	6.5	6.5	6.5	4.23	4.23	4.23			
Buoyancy ²	kg	3,130	3,130	3,130	5,780	5,780	5,780	3,500	3,500	3,500	6,500	6,500	6,500	4,230	4,230	4,230			
Uplift restraint calculation																			
Weight of the unit with internal components and filtering media ⁵	kg	550	550	550	750	750	750	600	600	600	840	840	840	650	650	650			
Soil cover height	mm	461	607	761	416	570	728	280	430	578	280	430	578	380	527	675			
Weight of soil on the top of the unit ³	kg	1,667	2,193	2,750	2,909	3,987	5,092	1,030	1,582	2,127	2,029	3,145	4,282	1,960	2,718	3,482			
Backfilling weight on the basal area of the unit																			
Unit basal area	m²	0.48	0.48	0.48	1.152	1.152	1.152	1.04	1.04	1.04	2.04	2.04	2.04	0.76	0.76	0.76			
Unsaturated soil weight	kg	476	591	707	1,143	1,419	1,696	1,032	1,281	1,531	2,024	2,513	3,003	754	936	1,119			
Saturated soil weight	kg	199	199	199	477	477	477	431	431	431	845	845	845	315	315	315			
Total uplift restraint	kg	2,892	3,533	4,205	5,279	6,633	8,014	3,093	3,894	4,688	5,738	7,343	8,970	3,679	4,619	5,565			
Additional anchoring proposed ⁴																			
Anchoring area provided ⁶	m²	2.1			2.1			2.1			2.1			2.1					
Unsaturated soil weight	kg	923			929			1,042			1,042			1,042					
Saturated soil weight	kg	558			562			630			630			630					
Total additional restraint provided by anchoring	kg	1,481			1,490			1,672			1,672			1,672					
Total additional restraint provided by anchoring	kg	4,372			6,769			4,764			7,409			5,350					

SHALL NOT BE INSTALLED IN FULLY SATURATED SOIL.

GWT shall not exceed 1 foot from the bottom of the unit.

¹ Assuming a maximum high ground water level of 1 m from the bottom of the tank for poly unit and up the the inlet pipe for the concrete unit

² Buoyancy force is assuming saturated soil (worst case scenario)

³ Assuming a soil density of 1600 kg/m³

⁴ According to specification provided in the Intallation Guide

⁵ Assuming dry filtering media for all models and empty primary tank for the pack configuration (worst case scenario)

⁶ Assuming 50% of efficiency

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

