



Installation guide

ECOFLO[®]

Linear biofilter EL15 model series



DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Drinking Water & Groundwater Protection Division

THIS IS SUBJECT TO PROVISIONS
OR CONDITIONS LISTED IN PERMIT

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Installation guide – Ecoflo[®] linear biofilter EL15 model series

This guide contains the information required to install an **Ecoflo linear biofilter EL15 model series**. The installation must be performed by a duly trained installer. A list of installers and replacement parts can be provided by contacting our customer service at **1 800 632-6356**.

The **Ecoflo linear biofilter EL15** treatment system is a Class I treatment level system certified according to NSF/ANSI 40 standard. It includes a primary/septic tank, an effluent filter, a distribution box, sampling device, and a number of treatment modules (proportional to the flow to be treated) positioned on a system sand layer. All information relating to other components of Premier Tech Water and Environment's septic system is presented in respective installation guides on the www.PT-WaterEnvironment.com website.

TERMINOLOGY

- **Distribution channel:** perforated gutter integrated into the treatment module's protective chamber
- **Run:** a series of treatment modules assembled in one continuous line
- **Row:** a run of treatment modules, including the underlying sand layer

TOOLS REQUIRED

- Level
- Drill & drill bits
- Tamper/compactor
- Laser/transit
- Measuring tape
- 5" hole saw
- 1 7/8" hole saw
- 9/16" and 5/16" socket or wrench

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1 MAIN COMPONENTS OF THE ECOFLO LINEAR BIOFILTER EL15 TREATMENT MODULE

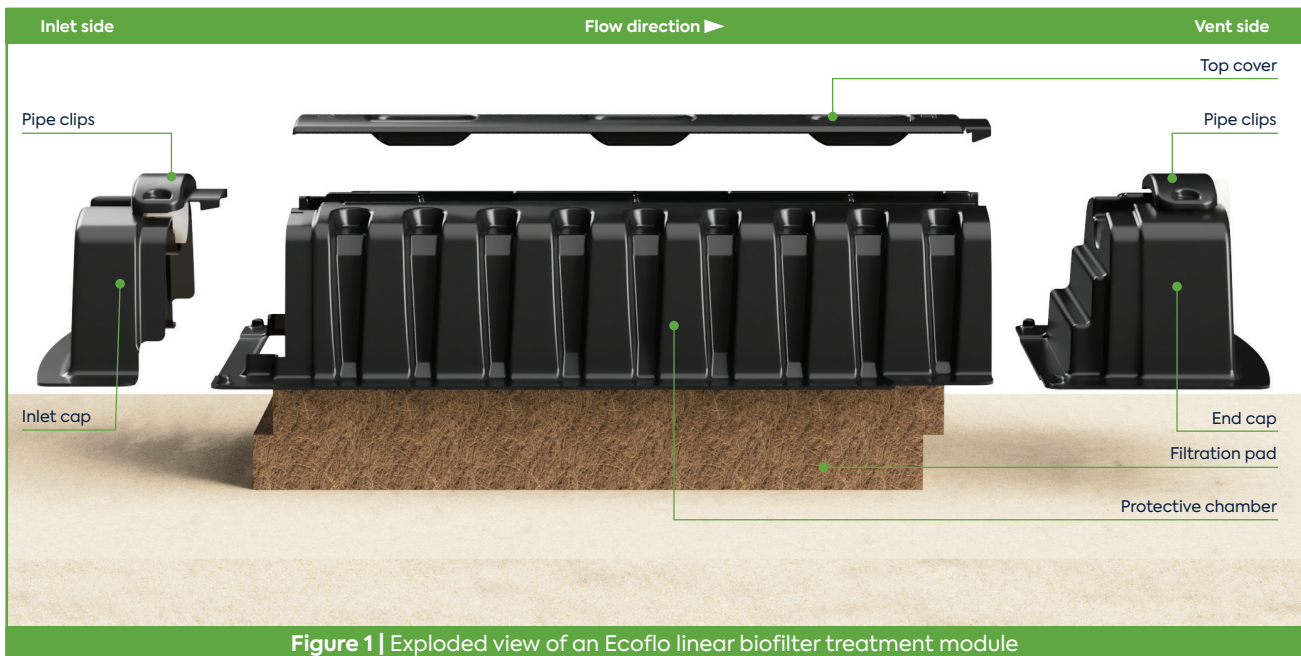
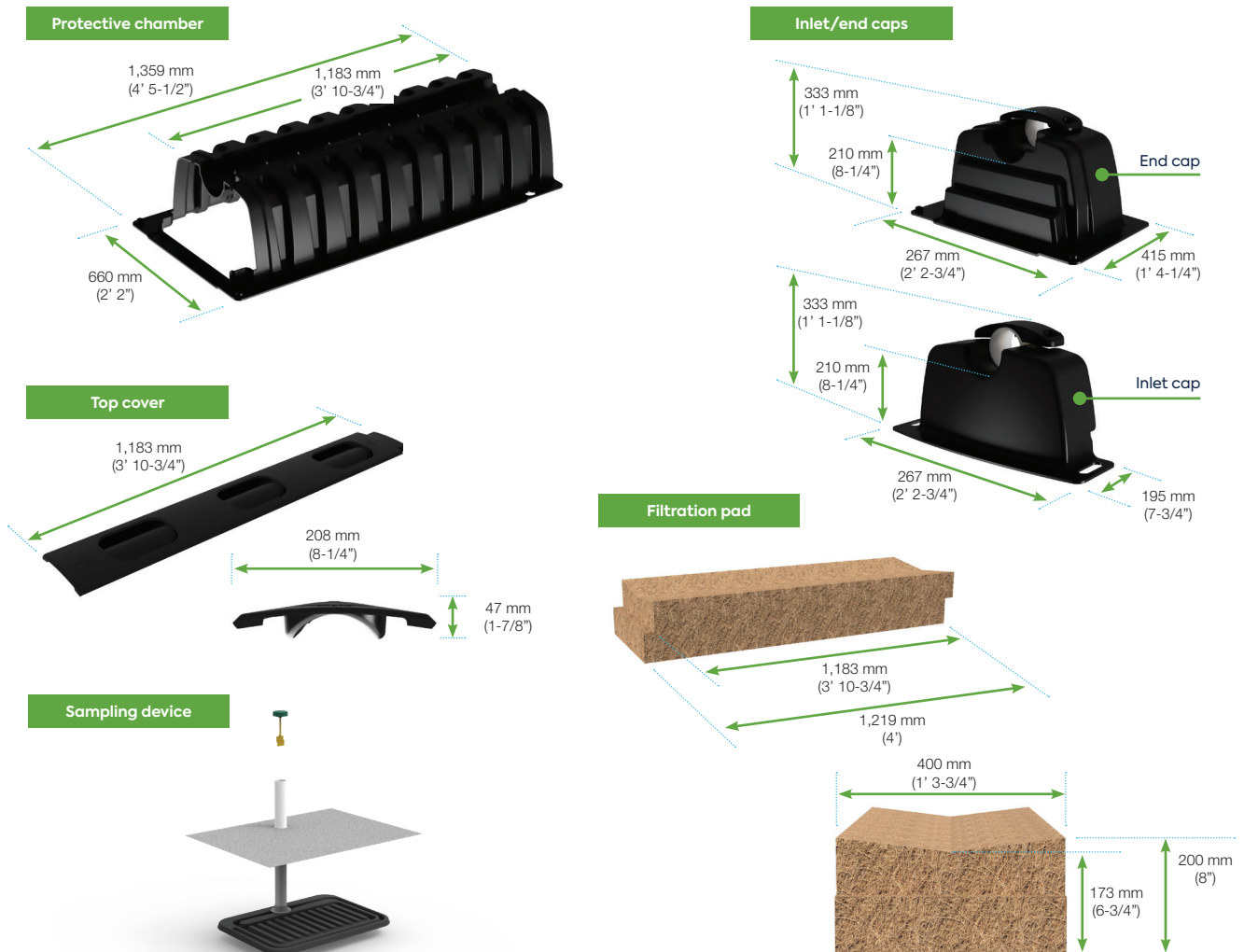


Table 1: Functions and details of each component of an Ecoflo linear biofilter treatment system

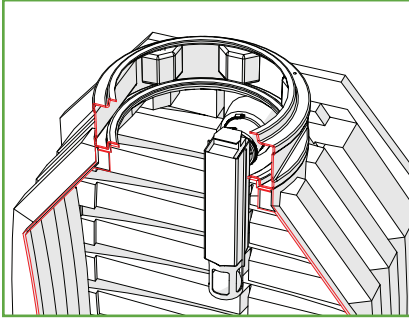
Component	Material	Functions and details
Sand layer	Sand	Not provided by Premier Tech Water and Environment. Filtration sand with a d10 between 0.13 and 0.60 with a Cu < 8, no more than 5% fines passing through a 0.074 mm sieve, and a percolation time of at least 4 min/cm and no more than 12 min/cm, or according to local regulations.
Collection and sampling tray	Polyethylene	1,200 mm x 600 mm (48" x 24")
Filtration pad	Consolidated coco fibers	Wastewater treatment Nominal 1,18 m X 0,40 m X 0,20 m (48" x 16" x 8")
Protective chamber	ABS	Protects system components and distributes water on the filtration pads. 1,36 m X 0,66 m X 0,30 m (531/2" x 26" x 12")
Inlet/end caps	ABS	Closes runs and allows piping connection.
Top cover	ABS	Allows distribution channel access, protection, and chamber stabilization.
Distribution box (option 1)	Plastic or concrete	Promotes even distribution of wastewater into runs.
Pumping station (options 2 and 3)	Polyethylene or concrete	Pumping station when options 2 or 3 are selected. In option 2 the distribution box is required. May be provided by Premier Tech Water and Environment.



2 PROCESS OVERVIEW AND DESCRIPTION

2.1 PRIMARY TREATMENT

The size and configuration of the primary/septic tank must be in accordance with the NSF listing (as applicable) or with local requirements. The primary/septic tank clarifies wastewater by letting suspended solids settle to the bottom and prevents clogs in the secondary or advanced secondary treatment system by retaining floating matter. Any primary/septic tank that meets local regulations can be used for primary treatment.



An existing primary/septic tank can be used instead of a new one. Its condition must be carefully inspected before being used for primary treatment. An effluent filter must be installed at its outlet if it is not already equipped with one.

Effluent filters used with the Ecoflo linear biofilter EL15 must have a minimal flow area of 600 cm² (92 in²) and filter particles 1.6 mm (1/16") and larger. While many different effluent filter brands meet those requirements, Premier Tech Water and Environment recommends Polylok's PL-122 effluent filter or an equivalent.

Premier Tech Water and Environment does not recommend the use of a garbage disposal unit or water softener discharge. Follow state and local code for tank and dispersal area sizing if one is being used.

2.2 WATER DISTRIBUTION

A distribution box is designed to promote even distribution of wastewater into rows of a distribution system. The distribution box is installed after the primary treatment. The wastewater from the septic/primary tank flows by gravity to the distribution box and is evenly distributed to the Ecoflo EL15 treatment rows installed onto a 6" (150 mm) high sand layer. Depending on site conditions, distribution of the wastewater from the primary treatment tank to the Ecoflo EL15 treatment modules can be achieved by three different methods:

Option 1 : By gravity to a distribution box

Option 2: Pumped to a distribution box

Option 3: Pumped to low-pressure pipes

For option 1, the wastewater from the septic/primary tank flows by gravity to a distribution box which distributes by gravity the wastewater evenly into the distribution channel of each run of treatment modules (gravity distribution).

For option 2, the primary treated wastewater is pumped to a distribution box where the flow is evenly divided to distribute the wastewater to each run of treatment modules (pump to gravity distribution).

For option 3 the primary treated wastewater is pumped into a network of small diameter perforated pipes inserted within the distribution channels of the treatment modules (low pressure distribution).

GRAVITY DISTRIBUTION SYSTEM

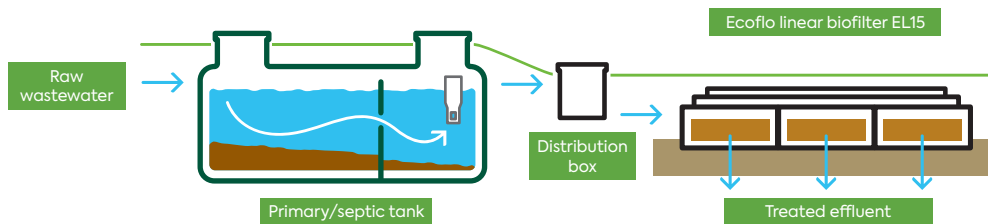


Figure 2.2 | Ecoflo linear biofilter gravity wastewater distribution

2.3 PUMPING STATION

A pumping station is required when gravity flow cannot be used to convey wastewater from the primary/septic tank to the Ecoflo linear biofilter EL15. The size and configuration of the pumping station must be based on design flow and must comply with local regulations.

For every meter of treatment module, we recommend a pump dose cycle of between 0.12 and 0.32 gal per feet of treatment module (1.5 to 4 L/m).

The pumping station must have adequate ventilation to avoid buildup of harmful gases, air lock, and corrosion. This can be accomplished by using a separate vent pipe in the pump chamber or in the primary/septic tank or by using a vented lid. The pumping station must also be watertight.

GRAVITY DISTRIBUTION SYSTEM

Wastewater from the primary/septic tank is pumped to a distribution box that evenly distributes wastewater to each treatment module.

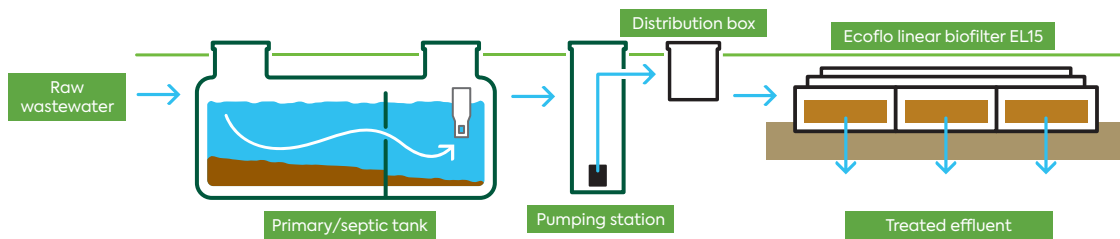


Figure 2.3.1 | Ecoflo linear biofilter pump-to-gravity wastewater distribution

LOW-PRESSURE DISTRIBUTION SYSTEM

Wastewater from the primary/septic tank is pumped into a network of small diameter perforated pipes inserted within the distribution channels of each treatment module.

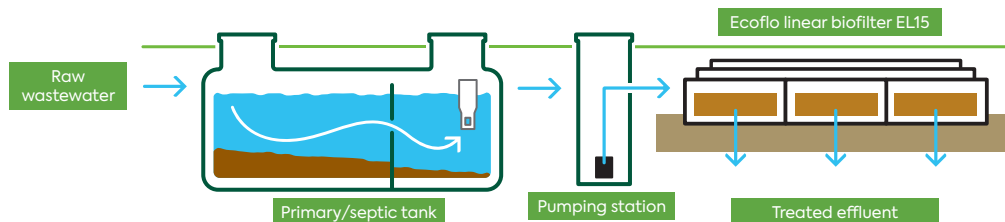


Figure 2.3.2 | Ecoflo linear biofilter low pressure distribution of wastewater

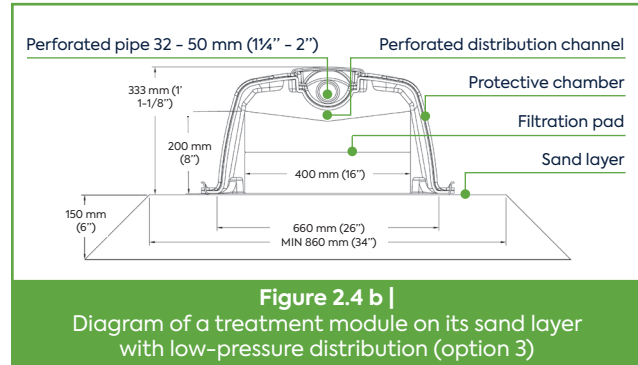
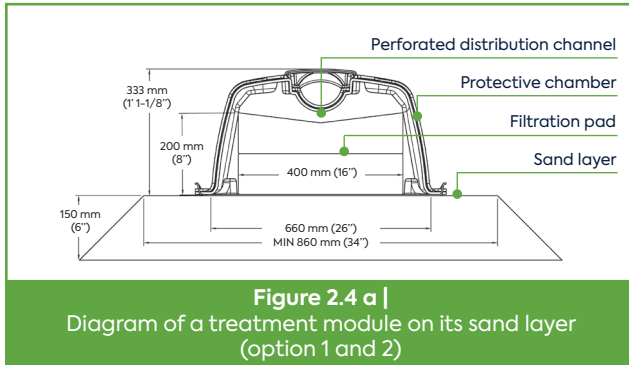
2.4 TREATMENT MODULES

Wastewater travels through the perforated distribution channel of each treatment module and is discharged onto the surface of the filtration pads. Treatment begins as wastewater percolates through the pads. Particles get filtered while microorganisms within the pads perform an aerobic degradation of organic matter. Treatment is completed in the sand layer beneath the pads.

Treated water can then directly infiltrate into the underlying soil as prescribed by local authorities and depending on site conditions.

The treatment modules are composed of the following (figures 2.4 a and b):

- a filtration pad with 200 mm (8") nominal thickness and 400 mm (16") wide placed under the protective chamber
- a protective chamber 610 mm (24") wide and 330 mm (13") high
- a perforated distribution channel along the surface of the filtration pad
- the low-pressure distribution option uses 32 to 50 mm (1.25 to 2") perforated pipes inserted in the perforated distribution channel (figure 2.4 b)



3 INSTALLATION INSTRUCTIONS

Notify all concerned parties (installer, landscaper, owner, snowblower, etc.) of the installation to avoid damaging the septic system components. It is also important to prevent runoff water infiltration into the system's components (primary/septic tank, distribution box, pumping station).

3.1 MINIMUM DISTANCES TO RESPECT

The Ecoflo linear biofilter EL15 treatment system must be installed in a location:

- free of motorized traffic
- unlikely to be submerged
- accessible to service and maintenance
- 2 m (6') from any tree
- conforming with local regulations

3.2 INSTALLATION CONDITIONS

3.2.1 Primary/septic tank

The primary/septic 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 cleaning
- an area safe from floods and submerging (for example, the septic tank may require a drain around it in case of groundwater)

Primary/septic tank and the final effluent disposal have a direct impact on the positioning of the other components composing the treatment train, thus a careful attention shall be given to these.

The septic tank must be installed as specified by the septic tank manufacturer. The septic tank must be watertight and must be used for the disposal of domestic wastewater only (for example, 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.

3.2.2 Distribution box

The distribution box must be installed according to the following recommendations:

- The lid must always be accessible. Never cover it with mulch, soil, or any fixed structure.
- Backfill should be no higher than 50 mm (2") below the lid once landscaping is complete.
- Never drive a vehicle or place an object weighing more than 225 kg (500 lb) within 3 m (10') of the distribution box.
- Ensure rapid vegetation recovery to avoid erosion.

3.2.3 Ecoflo linear biofilter EL15

The Ecoflo linear biofilter EL15 must be installed according to the following recommendations:

- Never drive a vehicle over the Ecoflo linear biofilter EL15.
- Ensure rapid vegetation recovery to avoid erosion.
- Never place heavy objects within 2 m (6') of the Ecoflo linear biofilter

Complying with these instructions contributes to the septic system's proper functioning and may help increase the Ecoflo linear biofilter EL15's lifespan. Failure to comply with these guidelines may result in the invalidation of the warranty at Premier Tech's discretion.

4 FINAL DISPERSAL

4.1 CONFIGURING THE DISPERSAL AREA AND THE ECOFLO LINEAR BIOFILTER EL15

Premier Tech Water and Environment proposes several possible configurations for the Ecoflo linear biofilter EL15, depending on site constraints. Configurations may be categorized as "bed" or "trench" and as "raised" or "in-ground". The sand layer's minimal height must be 0.15 m (6") on its thinnest side if the ground is sloped. Detailed descriptions of each configuration are presented in the Ecoflo linear biofilter design guide.

4.1.1 Bed configurations

Bed configurations use a dispersal area where the system sand layer and runs/laterals are placed in parallel over a single continuous soil layer.

4.1.2 Trench configurations

Runs in trench configurations are spaced further apart and each have a separate sand layer. The trench's total surface must always follow local regulations for dispersal area sizing, with a minimum width of 86 cm (34").

4.1.3 Spacing within a run

Spacing between modules within a run is not required. However, modules can be spaced out to give sites with low percolation rates a more balanced dispersal area coverage. This can be done with either a bed or trench configuration. End caps must always be installed at the end of each sub-run to prevent backfill from entering the modules. Each sub-run can be composed of one or more treatment modules.

5 INSTALLATION SEQUENCE

IMPORTANT: THE INSTALLER IS RESPONSIBLE FOR THE SAFETY MEASURES APPLICABLE TO ALL STAGES OF THE INSTALLATION INCLUDING THE WEARING OF HELMETS, GLOVES, BOOTS, GLASSES, MASKS, ETC.



During a typical installation, the components are installed in the following sequence:

- primary/septic tank
- distribution box, pumping station
- Ecoflo linear biofilter EL15 (installed directly over the dispersal area)
- water inlet and discharge pipe connections

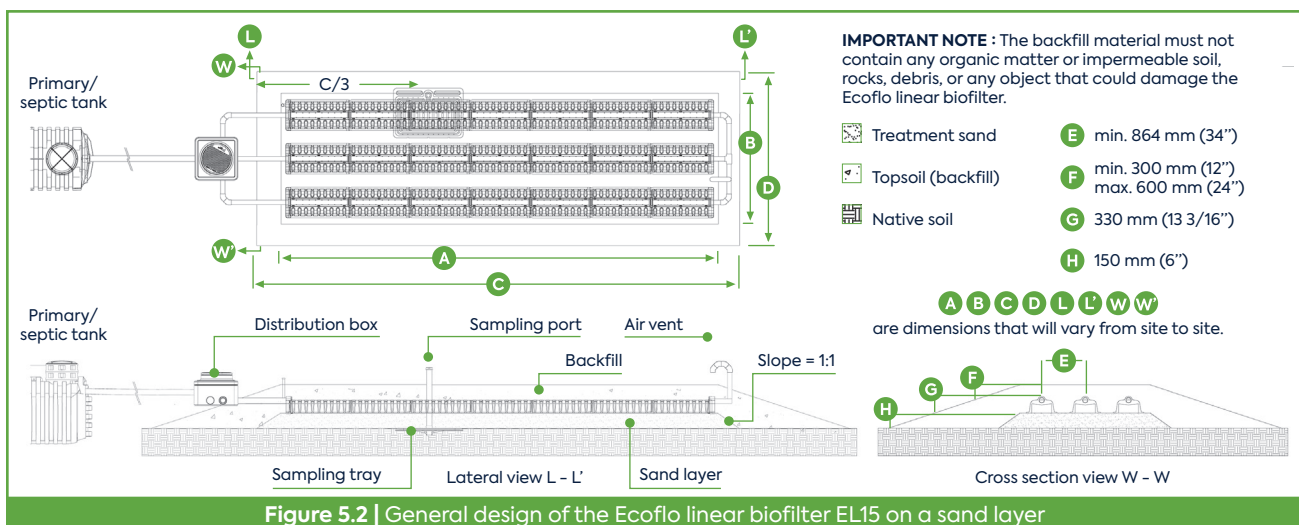
5.1 GENERAL SPECIFICATIONS

- All pipe connections to a wastewater treatment unit must be flexible and watertight.
- When cutting pipes, be sure to cut at right angle in order to maximize the surface to be glued and clean all the plastic residues inside and outside the pipes.
- Pipes and fittings must be dry and clean before applying glue.
- Apply a coat of PVC primer on the surfaces before gluing (inside the fitting connections and around the pipes).
- Use a standard PVC cement for connections.
- After applying glue, complete the connection rapidly. Keep a slight pressure on the connection for a few seconds.
- For threaded fitting connections, use Teflon tape or equivalent.
- The soil under the pipes must be well compacted.
- Protect the pipes against freezing if the soil depth is not sufficient to offer a good protection.
- Make sure the soil is sufficiently compacted under all pipes.

5.2 EXCAVATION

NOTE: Do not excavate in wet conditions or in overly moist soils, as this causes machinery to smear the soil. Keep machinery off infiltration areas. Soil that forms a rod 3 mm (1/8") or less in diameter when rolled with the fingers, or that does not crumble easily, contains too much moisture to be worked. Do not excavate frozen soils.

- Install sedimentation and erosion control measures. Temporary drainage swales/berms can be installed to protect the site from rainfall. Set soil grades to ensure that storm water drainage and ground water is diverted away from the dispersal area once the system is complete.
- Excavate the dispersal area according to local regulation, soil permeability, and system capacity. Premier Tech Water and Environment recommends excavating a 300 mm (12") clearance area around the dispersal area. For trench configurations, ensure proper center-to-center separation in accordance with permit design.
- Rake the bottom and sides if smearing occurred while excavating. Remove large stones and other debris.
- Scarify the receiving layer to maximize interface between the native soil and the system sand.
- Level the surface of the dispersal area.
- Determine the location of the Ecoflo linear biofilter EL15.
- Determine the location of the sampling tray. The edge of the sampling tray must be positioned approximately at first third of the length of a row, based on the direction of water flow. For trench configurations, select a row to serve as reference. For example, if a run is 15 m (50') long, the edge of the sampling tray must be set at the the 5 m (16') mark beneath the system.
- Excavate the location of the sampling tray underneath the row and place the sampling tray directly onto the native soil. Cover with the provided geogrids.
- Insert the provided sampling port into the sampling tray outlet.



5.3 SAND LAYER

- Place 150 mm (6") septic sand meeting specifications in Table 1 in two 75 mm (3") consecutive layers on the chosen surface.
- Respect a minimum slope ratio of 1:1.
- Stabilize each 75 mm (3") sand layer. Premier Tech Water and Environment recommends to water the sand after it is set up or to use the pail of a mechanical shovel. Passing tracked equipment or a vibrating compactor over the sand layer lifts will provide even compaction and prevent settling of the protective chambers.

ATTENTION: Ensure that the sand layer is level.

5.4 PRIMARY/SEPTIC TANK

The primary/septic tank must be installed according to the following instructions:

- Both openings must extend to the soil surface through watertight and insulated risers and be equipped with watertight lids. Backfill should be no higher than 50 mm (2") below the lid final grade.
- The installation must be 100% watertight and receive only domestic wastewater (no roof water, surface water, or discharge from footing drains).
- The primary/septic tank must be placed where it is safe from being flooded or submerged. There must be positive drainage away from the tank or method to shed water away from the tank such as a berm, swale, or diversion ditch.
- Connect the inlet pipe from the primary/septic tank to the distribution box, ensuring the pipe runs downward along its length to the distribution box water inlet (minimum slope of 1%).
- Follow the tank manufacturer's recommendations.

5.5 PUMPING STATION AND DISTRIBUTION BOX

Install the distribution box, pumping station, and/or distribution box on a level and well-compacted soil to minimize movement over time. Adding a layer of gravel or a concrete slab can minimize the risk of movement. This will help maintain an even distribution between each run of treatment modules throughout the product's lifespan. The pipes are connected by a provided adapter (see section 5.7.1), allowing for the primary/septic tank's outlet pipe to be connected to the distribution box inlet.

5.6 INSTALLING THE DISPERSAL AREA AND TREATMENT MODULES

Figure 5.6.1 |

Mark the dispersal area perimeter. Excavate the space required or construct a dispersal area for the installation according to the design.

Rake the bottom and sides if smearing has occurred. Remove large stones and other debris.

Scarify the receiving layer to maximize the interface between the native soil and the septic sand.

Level the surface of the dispersal area.





Figure 5.6.2 |

The edge of the sampling tray must be positioned approximately at the first third of the length of a row, based on the direction of water flow. For trench configurations, select a row to serve as reference.

The sampling tray must be installed beneath the row and the sand layer.



Position of the sampling device

Figure 5.6.3 |

Place 15 cm (6") of septic sand in two consecutive 7.5 cm (3") lifts (recommended) on the required surface to achieve 90% compaction.

Stabilize each 7.5 cm (3") lift of sand by using the bucket of an excavator or other appropriate method.

The sand layer must be level.



Figure 5.6.4 |

Use the design plan to identify the center of each treatment row (A).

Respect the minimum lengths provided in the diagram below when placing the first pad of each run.

Space and arrange runs evenly on the sand layer's surface to optimize the distribution of treated water on the dispersal area. Mark 1/3 length of an outside row for the sampling device.

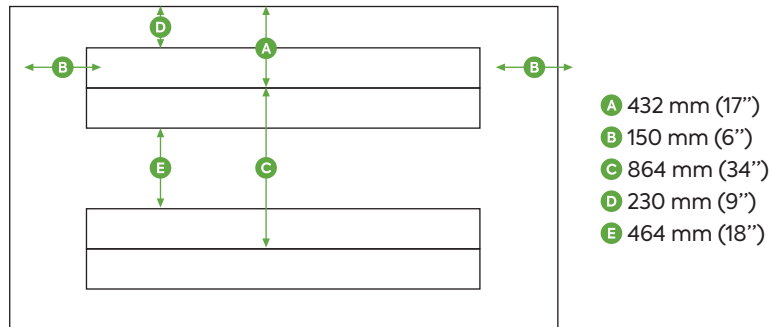


Figure 5.6.5 |

Start from the end of the row. Center the first end cap on the sand layer. The end cap is labeled on the underside.

We recommend installing the sampling device during this step if not already installed.

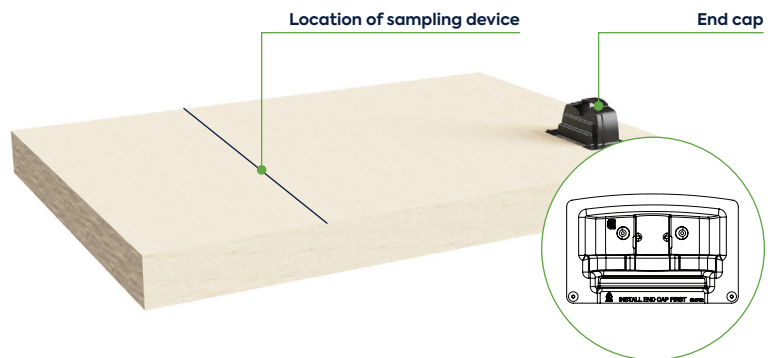


Figure 5.6.6 |

Lay down the first filtration pad so that it nests on the end cap. Ensure the V-shape is on top. Keep 150 mm (6") minimum distance between the end of the treatment row and the end of the sand layer.

* Do NOT lay out all filtration pads at once. Install protective chambers after each filtration pad.



Figure 5.6.7 |

Place the protective chamber over the filtration pad. Ensure the chamber's under tab aligns with the filtration pad's bottom.



Figure 5.6.8 |

Gradually lengthen the run by adding an alternating succession of pads and interlocking chambers until you reach the front.

The filtration pads are overlapping, forming a tight joint.

Sampling device

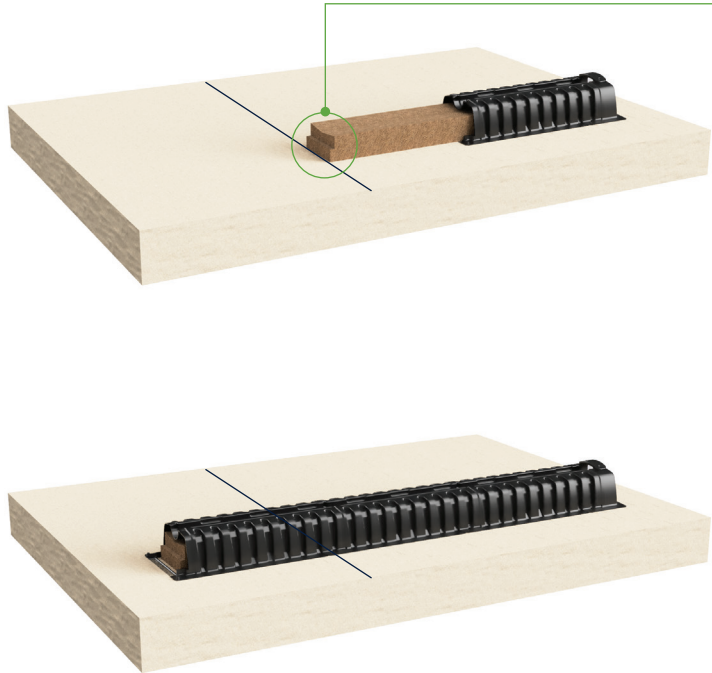


Figure 5.6.9 |

Install the front cap at the front of the run. The front cap is labeled on the underside.



Figure 5.6.10 |

Place the distribution channel covers, starting from the front.



Figure 5.6.11 |

Repeat steps 5.5.5 to 5.5.11 for each run required for the installation.

Only one sampling device and inspection port is required per system.



Figure 5.6.12 |

Install the inlet pipe and secure it using the bolts provided with the inlet cap pipe clip.

Repeat this step for all treatment lines.

For low pressure distribution, insert predrilled distribution pipe.

The recommended orifice spacing is 0.6 m (min 2 holes per pod) along the lateral.

The minimum size is 4.75 mm (3/16" nominal).



Figure 5.6.13 |

Install the provided observation pipe on the inlet cap by drilling a 1 7/8" hole in one of the marked locations each side of the inlet.

Each installation requires only one observation port.

The observation port must be installed on the same run as the sampling device.



Figure 5.6.14 |

Install the ventilation pipe and secure it using the bolts provided with the end cap pipe clip. Support pipes before backfilling.

Whenever possible, connect the runs through the end caps using tees and 90° elbows. Use a tee to mount a ventilation pipe upward (see illustration). If the runs are more than 2 m (6') apart, it is preferable to install a ventilation pipe on each run to ensure proper aeration of the treatment system.



5.7 CONNECTING THE PIPES

NOTE: A minimum slope of 1% must be maintained along the entire length of the pipes between the primary/septic tank and the distribution box, and from the distribution box to the Ecoflo linear biofilter EL15 treatment modules if using gravity flow. The soil under the pipes must be well-compacted.

- Connect the pipe between the primary/septic tank and the pumping station or distribution box.

5.7.1 Pump to gravity

- A distribution box must be installed on compacted soil or a base to avoid settling. It must be equipped with a velocity reduction device as a tee or baffle.
- Ventilation of treatment lines must be accomplished by connecting a 100 mm (4") pipe between the distribution box and the pumping station.

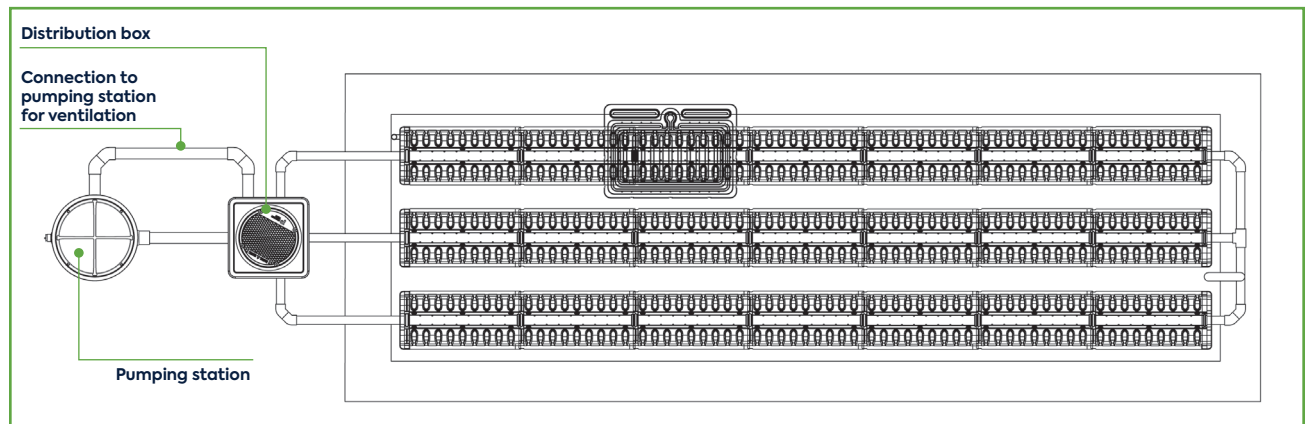


Figure 5.7.1 | Pump-to-gravity installation schematic

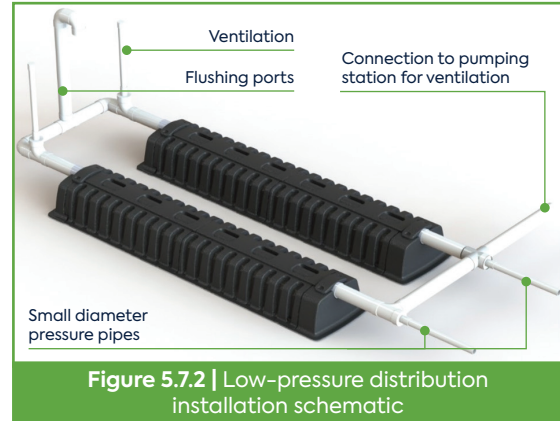
5.7.2 Low-pressure distribution

As shown in figure 5.7.2, low-pressure distribution piping is assured through small diameter pressurized orifices. A smaller pressure pipe, normally 32 mm (1.25") to 50 mm (2"), is inserted inside the distribution channel of the treatment module. Connection between treatment lines can be assured with a 4-way fitting. Ventilation of treatment lines must be accomplished by connecting the 4" pipe that hold the pressurized pipe to the pumping station.

Orifice spacing is 0.6 m (min 2 holes per pod). Drainage of the line after each pump cycle is assured through drainage orifices. Orifices must face upward at 0° (12 o'clock), while drain hole must face downward at 180° (6 o'clock).

Orifice size is determined using low pressure distribution calculations assuring that the flow is equally divided to every orifice and the residual pressure result in a minimum of 600 mm (2') squirt height at the distal end of the furthest run. Flushing ports are required to maintain the free flow of effluent from orifices at the distal ends of each lateral.

- Whenever a pumping station is installed, ensure proper ventilation between the septic tank, the pumping station, the distribution box, and treatment runs by connecting the components with dedicated ventilation pipes.



5.8 FINAL BACKFILL

- Finalize the backfill with a minimum layer of 300 mm (12") and maximum of 600 mm (24") of topsoil over the chambers. The backfill must be permeable to water and air and exempt of any organic matter, impervious soil, stones, rocks, debris, or other objects that could damage the modules. Backfill to the top of the chamber with initial backfill, ensuring all pipes and other components are secured and supported before final backfill is put over the chambers.
- Ensure the sampling, observation, and ventilation ports are vertical and stable when placing the backfill material.
- Ensure the profile of the final grade diverts runoff water away from the septic system.
- Backfill should be no higher than 50 mm (2") below the lid once landscaping is complete.
- Keep all septic system lids accessible at all times. Never cover them with mulch, soil, or any fixed structure.
- **Do not run machinery, vehicles, or place other objects on top of any component of the system.**

5.9 SYSTEM COMMISSIONING AND MARKING

On the left side of the sticker, check the Ecoflo linear biofilter model installed and the configuration of the installation on the right side. In the example below, the system installed would consist of an Ecoflo linear biofilter EL30 system with 18 treatment modules and single-point discharge. Checked boxes on the right side show that the system is fed by means of a gravity distribution box and placed into three (3) treatment rows.



Figure 5.9.1 | Location and example of identification sticker

NOTE: The system start-up doesn't require any particular action from the homeowner.

6 SHIPPING, HANDLING, AND STORAGE

6.1 SHIPPING FROM THE DISTRIBUTOR TO THE INSTALLATION SITE

- Ensure the filtration pads are protected from weather conditions that may compromise their integrity.
- Secure and fasten the Ecoflo linear biofilter EL15 components with straps. Avoid excessive compression of the pads to maintain their shape and integrity.
- The carrier is responsible for complying with traffic regulations and for any damage that may occur during shipping.

6.2 HANDLING INSTRUCTIONS

- Larger components must always be moved safely. Ensure that all people are in a safe place and at a safe distance from the system and equipment on site.
- Components must be handled gently and evenly.
- Avoid using handling methods that could damage the components.

NOTE: The handler is responsible for any damage that occurs during handling operations.

7 IMPORTANT NOTES

7.1 LOCATION AND OVERLOAD

- Ensure the dispersal area is at least 2 m (6') away from any tree.
- Clear away any materials that accumulate above the septic system to protect it from damage.
- Never drive a vehicle or place objects weighing more than 225 kg (500 lb) within 3 m (10') of the lids or overtop of the system. Notify anyone responsible for landscaping of this instruction.
- If there is any delay between installation and final landscaping, place markers and protective barriers that identify the Ecoflo linear biofilter EL15's location to protect the unit from traffic and other possible damage.

7.2 CONFIGURATION

- Never connect a drainage line, roof gutter, sump, dewater pump, or air conditioner drain to the septic system.
- Never empty the contents or backwash water from a spa or pool into the septic system.
- The residence must have a functional plumbing vent that complies with the applicable standards. Premier Tech Water and Environment strongly recommends the use of a 100 mm (4") diameter pipe.

7.3 REMINDERS

- Give the customer the owner's booklet and the maintenance agreement.
- Instruct the customer to complete and sign the maintenance agreement, to keep the white copy, to give the yellow copy to their local authority, and to return the pink copy to Premier Tech.

Following these guidelines contributes to the proper functioning of the septic system and increases the chances of extending the lifespan of the Ecoflo linear biofilter EL15 treatment components. Failure to comply with these guidelines may result, at Premier Tech's discretion, in the invalidation of the warranty.

