## **DiUV Self-cleaning disinfection unit**



## Installation guide - Québec

The Ecoflo<sup>®</sup> Biofilter with a DiUV Self-cleaning disinfection unit is a tertiary treatment system with disinfection, certified Class V of Standard NQ 3680-91. It consists of a septic tank, an effluent filter, an Ecoflo<sup>®</sup> Biofilter and a DiUV Self-cleaning disinfection unit. All information relative to the septic tank, effluent filter and Ecoflo<sup>®</sup> Biofilter can be found in the Installation Guides of these products available at ptzone.premiertechaqua.com. Following is the information needed to install the Disinfection unit.

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## 1. Description of components

The **DiUV Self-cleaning disinfection unit** is designed to treat water from advanced secondary treatment unit as the Ecoflo<sup>®</sup> Biofilter. It is pre-assembled in two groups:

- 1) The tank (including the various connectors, isolation and sampling valves, anti-siphon valve, lid, electrical junction box and the UV unit support device);
- 2) The UV unit is packaged in a cardboard box and placed in the tank for transport.

The **DiUV Self-cleaning disinfection unit** can be used for dwellings with up to 6 bedrooms (total daily flow  $\leq 2 \ 160 \ \text{L/d}$ ) or any other type of establishment that generates domestic wastewater (total daily flow  $\leq 3 \ 240 \ \text{L/d}$ ).

To optimize the time the pathogens are exposed to the ultraviolet (UV) rays and therefore attain the required level of treatment, the instantaneous flow of the **DiUV Self-cleaning disinfection unit** must not exceed 25 L/minute.

## 2. Location of components and specific instructions

The location of any watertight treatment system and all its components is determined by the minimum distances defined in Regulation Q-2, r.22, as indicated in the table below.

#### 2.1 Minimum distances to be respected according to Regulation Q-2, r.22 (Division III.1)

Reference Points	Minimum Distance
Dwelling	1.5 m (5')
Drain pipe	N/A
Property or residence line	1.5 m (5')
Top of a backfill	N/A
Tree or shrub	N/A
Well or source used as water supply	15 m (50')
Tube well	15 m (50')
Drinking water pipe	1.5 m (5')
Swamp or pond	10 m (33')
Lake or watercourse	Within the riparian strip

#### 2.2 Installation conditions

Like the septic tank and the Ecoflo® Biofilter, the *DiUV Self-cleaning disinfection unit* must be installed in an area that is:

- free of motorized traffic;
- accessible for maintenance purposes;
- not likely to be submerged (for example: low point of the lot, flood-prone area).

**Premier Tech Aqua** requires, at all times, a minimum distance of 5 m (16'5'') between any vehicles, or any object weighing more than 225 kg (500 lb), and its products after backfilling.

As well, the bottom of the lid of the *DiUV Self-cleaning disinfection unit* must be 50 mm (2") above ground level <u>after final landscaping</u>. It is also important to advise all parties involved (installer, landscaper, owner, snow removal company, etc.) that:

- the lid must never be covered or buried (always accessible);
- runoff must not be directed towards the lid (water must never reach the components);
- never add extensions on the access of the DiUV Self-cleaning disinfection unit;
- the ground less than 5 m (16'5'') from the lid must not be overloaded (for example: vehicle, blown snow, embankment, etc.);
- care should be taken to ensure vegetation near the unit grows back quickly to prevent soil erosion.

The effluent of a tertiary treatment system with disinfection that cannot be carried towards a leaching field that complies with Division XV.4 defined in Regulation Q-2, r.22 may be discharged

- 1) into a lake listed in Schedule 2 or into any watercourse or ditch upstream from the lake;
- 2) into a lake, swamp or pond located north of the 49°30' parallel in Municipalité régionale de comté de Manicouagan, north of the 50°30' parallel in Municipalité régionale de comté de Sept-Rivières or north of the 49th parallel elsewhere in Québec, or into any watercourse or ditch upstream from the lake, swamp or pond; or
- 3) into a watercourse or ditch not referred to in paragraphs 1 and 2, if the watercourse or ditch is not located upstream from a lake.

## 3. DiUV Self-cleaning disinfection unit operation

The **DiUV Self-cleaning disinfection unit** is designed to lower the fecal coliform concentration to below 200 UFC/100 ml\*. The operating principle of the **DiUV Self-cleaning disinfection unit** is to expose the microorganisms to ultraviolet (UV) rays. The dose depends on the operating time and the intensity of the rays. The flow entering the unit ensures maximum exposure time and the quartz sleeve is kept clean to optimise the intensity of the rays.

#### DiUV Self-cleaning disinfection unit components

#### A- Tank and lid

- Connects the disinfection chamber with the rest of the treatment system;
- Resists soil movements;
- Ensures the system is watertight and protects the internal components;
- Limits access with bolts.

#### B- Water inlet ball valve

• Isolates UV unit during maintenance.

#### C- Anti-siphon

• Allows the overflow pipe to empty after a pumping event.

#### D- UV Unit

- Includes 2 UV lamps and the quartz sleeve;
- Exposes the effluent to UV rays;
- Equipped with a self-cleaning system.

#### E- Sliding rail system

- Attaches the UV unit to the tank;
- Allows easy removal of the UV unit for maintenance.

#### F- Sampling point

- Is used to collect samples of treated effluent;
- Allows filling of UV unit upon installation.

#### G- Junction box

• Protects electrical connections.

#### H- Alarm box (installed inside the dwelling) and alarm float

- An alarm is used to detect and inform about abnormal presence of water in the tank;
- An alarm is used to detect and inform when the UV unit is not functioning properly.

<sup>\*</sup>The maximum concentration for tertiary treatment systems with UV disinfection must be divided by a factor of 10 to take into account the reactivation of fecal coliforms after disinfection.





## 4. Installation procedure

The components of the *DiUV Self-cleaning disinfection unit* must be handled with care during all steps involved in the installation. The assembly contains fragile components like the quartz sleeve and the two UV lamps. Always handle the components with care; avoid rough movements and impact with other objects.

\* The installer is responsible for all safety and security measures that apply to any and all steps involved in the installation, including wearing a hard hat, gloves, boots, safety glasses, a mask, etc.

#### 4.1 Excavation and putting the DiUV Self-cleaning disinfection unit in place



Excavate an area of approximately 1.5 m  $\times$  1.5 m (5'  $\times$  5'). Add a 150 mm (6") layer of gravel  $\emptyset$  0 – 20 mm (0 -  $\frac{3}{4}$ ") free of any vegetation.

Level and compact the surface of the gravel.

Install the tank of the **DiUV Self-cleaning disinfection unit** as planned at excavation. Make sure the tank is level and well seated on the bottom of the excavated area.

#### 4.2 Connecting the water inlet pipe

Connect the pressurized outlet pipe of the advanced secondary treatment system to the inlet pipe of the tank containing the lamp with the flexible Ø 25 mm (1") pipe. The tank is equipped with a flexible Ø 25 mm (1") pipe adaptor. First, remove the protective cap and, using a stainless steel clamp, attach the flexible pipe to the adaptor. Make sure the pipe is properly protected against freezing.

Also inspect the water intake and pumping station upstream of the DiUV Self-cleaning disinfection unit. They should not contain debris such as sand, gravel, plastic filings, shavings, etc. Clean the pumping station by removing or vacuuming any debris that could clog the pipes or strainer.

#### 4.3 Connecting the outlet pipe

Connect the effluent outlet pipe of the **DiUV Self-cleaning disinfection unit** towards the disposal point. When the treated effluent is discharged in a ditch, the pipe must consist of a 3 m (10 ft.) piece of perforated pipe, 100 mm (4") in diameter, in accordance with Standard NQ 3624-050. The piece of perforated pipe must be installed parallel to the ditch and covered with a 200 mm (8") layer of clean Ø 20 mm (34") stone in order to reduce the risk of freezing, prevent vermin from entering the treatment system, and limit the possibility of contact with people (the waste is diffused under the gravel zone).









### 4.4 Attaching and connecting the UV unit to the tank

Once the tank is in place, follow the instructions below to place the UV unit on the support.

- 1. Remove the lid of the tank and take out the box containing the UV unit.
- 2. Open the box containing the UV unit and unpack it near the tank.
- 3. Using the handle, remove the lamp support and place it near the tank.



4. Put the float tree in place. Make sure it is positioned correctly at the bottom of the tank. Position the electrical junction box on the wall of the tank where the cable entry seals for the electrical wiring are attached. Close the pipe clip. Place the flexible sampling hose inside the float tree.



5.

5. Using the quick-release coupling, connect the lamp's flexible inlet pipe to the piping behind the lamp support.



6. Once the lamp is attached to its support, it can be used as a prop or support to continue the equipment assembly. Simply slide the lamp support onto the tank support, making sure the slot is well aligned with the retaining pin.



**IMPORTANT:** Fill the disinfection chamber with potable water. To do this, pour water into the lamp's outlet pipe (the one above the lamp) until water comes out the water inlet pipe. Collect the water that comes out of the water inlet. Make sure there is never any water on the bottom of the tank. If water does spill into the bottom of the tank, be absolutely sure the water is absorbed or aspirated. Also make sure water is never splashed on to the UV unit. **Caution: Do not operate the device if there is no water**. There must be water in the disinfection chamber to prevent any damage to internal components. The unit must be switched on as soon as it is filled with water.

7. Carefully lower the lamp back into place. Assemble the inlet and outlet quick-release couplings.



#### 4.5 Connecting the DiUV Self-cleaning disinfection unit's power and alarms

The alarm box must be installed inside the dwelling where a failure alarm can easily be heard. Note that there is one alarm box for the **DiUV Self-cleaning disinfection unit** and another for the **Ecoflo® Biofilter**.

Two strand wires that can be buried are provided to connect the electrical components of the **DiUV Self-cleaning disinfection**: the first is for the power supply and the second to connect the alarms to the alarm box located in the dwelling.

Connect the UV lamp alarm to the alarm box located inside the dwelling. Also refer to the electrical diagram to connect the power to the dwelling.

The electrical connections for the **DiUV Self-cleaning disinfection unit** and the alarm float must be executed by a licensed electrician. Also, the power for the **DiUV Self-cleaning disinfection unit** must be connected to a protected circuit using a Class A ground fault circuit interrupter (GFCI).

Use two (2) separate circuit-breakers, one to operate the **DiUV Self**cleaning disinfection unit and the other to connect the alarm box. Do not connect anything else to these circuit-breakers (for example, a household appliance). They must be used exclusively for the **DiUV Self-cleaning** disinfection unit and the alarm box.

The electrician in charge of the electrical connections must respect all regulations and standards that apply where the installation is being done.







Electrical connection diagram

#### 4.6 Final backfilling

Add the final backfill and a layer of top soil. Once the surface of the soil is covered with vegetation, the bottom of the lid of the tank must be 50 mm (2") above the surface of the finished landscaping. Make sure runoff does not flow towards the lid of the disinfection unit.

#### 4.7 Starting up the disinfection unit

Before the unit is started, the disinfection chamber must be filled with water (refer to step 7 of section 4.4). Check that quick connects are secure and that inlet and outlet valves are fully opened (handle parallel to the body of the valve). Make sure the sampling device is close.

Start the disinfection unit by setting the electrical breaker to "on". It is recommended to operate the secondary advanced treatment system pump for a few hours as well as supply water to the **DiUV Self-cleaning disinfection unit** to ensure there are no leaks. Once the unit is functioning and no leaks are detected, put the lid in place and screw it on using the four lag screws supplied with the system. Make sure the lid's watertight seal is properly installed. Electrical start-up and filling the lamp with clean water should be done simultaneously.



#### Notes:

- Once the unit is plugged in, the new UV lamps may take from a few moments to several hours to reach full power. Having a UV lamp malfunction alarm is normal with a new system (or with newly installed lamps) until the lamps have reached full power.
- When the UV lamp is operating under normal operating conditions, the warning lamp is green. If a problem occurs, one of the red warning lamps will light up or flash and the sound alarm will be activated. Take note of the state of the warning light and contact **Premier Tech Aqua**'s customer service department.
- If the alarm of the UV lamp is activated or if there is too much water in the bottom of the tank, the alarm box located inside the dwelling will be activated. The red warning lamp will light up and a sound alarm will be activated. To deactivate the sound alarm, press the "Silence" button. Contact **Premier Tech Aqua**'s customer service department.

#### Don't forget the municipal inspection, if one is required.

## Important comments

- □ Never cover or bury the lid on the tank of the **DiUV Self-cleaning disinfection unit**.
- □ The lid must be 50 mm (2") above the surface of the soil, even after the final landscaping, and runoff must not flow towards the lid.
- □ Never add extensions on the access of the DiUV Self-Cleaning disinfection unit.
- Never operate a vehicle or place objects weighing more than 225 kg (500 lb) less than 5 m (16.4') from the lid and make sure the landscapers are aware of this.
- Avoid accumulating anything that may cause on overload (for example, compacted snow) on top of your septic system or one of its components.
- □ The dwelling must be equipped with a functional venting system that complies with applicable standards. **Premier Tech Aqua** strongly recommends using a 100 mm (4") diameter pipe.
- Check the appropriate classification box (Class V: with UV lamp) on the **Ecoflo® Biofilter's** fact sheet.
- Give the owner the plastic envelope that contains the Owner's Manual.

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

## 5. Typical installations

Type 1 DiUV Self-cleaning disinfection unit powered by a pump integrated within the Ecoflo<sup>®</sup> Biofilter



#### Type 2 DiUV Self-cleaning disinfection unit pump integrated for 5 or 6 bedroom applications



#### Note:

• The base of the Biofilter with integrated pump (Model STB-500BR) must always be at least 150 mm (6") lower than the base of the **Ecoflo® Biofilters** without a pump (Model STB-500B).

#### Type 3 DiUV Self-cleaning disinfection unit powered by a pump integrated within the STB-570PR Ecoflo<sup>®</sup> Biofilter



# Type 4 DiUV Self-cleaning disinfection unit powered by a PSA-240-L pumping station for 5 or 6 bedroom applications



#### Notes:

- The base of the pumping station must always be at least 250 mm (10") lower than the base of the two Ecoflo<sup>®</sup> Biofilters.
- The base of the two Ecoflo® Biofilters must be at the same level.

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