



Pressurized UV Systems

A look into the advantages and performance of
pressurized UV systems

PSMA 2023

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INTRODUCTION

- Premier Tech Water and Environment has been an innovator in the onsite wastewater treatment industry since first introducing the Ecoflo biofilter in 1995
- Premier Tech has continued to produce sustainable reliable treatment units using both peat moss and now coco filtering media across the globe
- In 2006, Premier Tech saw the need for more tertiary treatment options and began offering a UV light system



OVERVIEW

- What is UV disinfection?
- Types of tertiary treatment
- Differences of pressurized UV systems
- Complete package of combining UV disinfection with advanced secondary treatment
- Design criteria and treatment parameters
- Installation practices
- Service, maintenance, and support
- Benefits for the homeowner

WHAT IS UV DISINFECTION?

- Ultraviolet light disinfection is the method of using light to emit UV rays that inactivate microorganisms by affecting their DNA
 - Microorganisms no longer have the ability to function or reproduce after exposure
 - Done without the introduction of any chemical materials
- UV disinfection can be used to treat both wastewater and drinking water



WHAT IS UV DISINFECTION?

- Typically used where fecal coliform, coliforms, or pathogens is a concern
- Effectiveness is relative to the characteristics of the water/wastewater
- Tertiary treatment



WHEN IS TERTIARY TREATMENT USED IN PA?

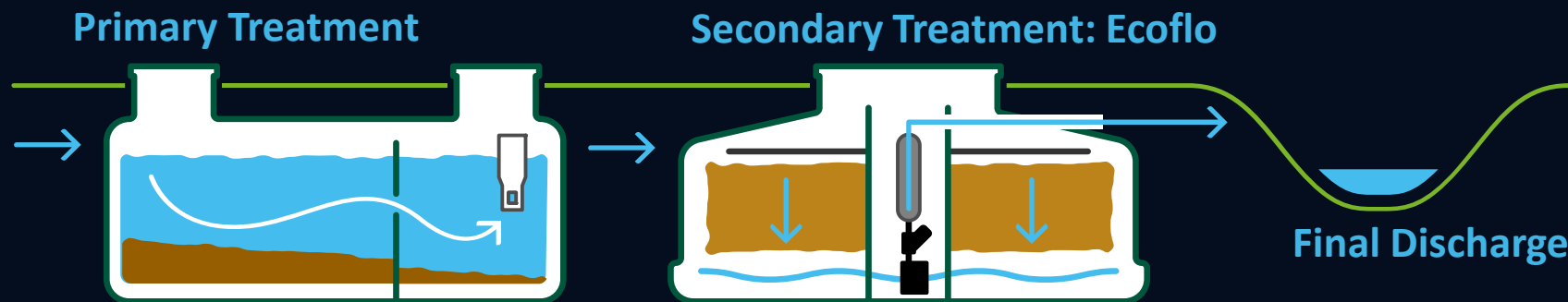
- Direct discharge systems for onsite wastewater treatment
 - These sites often has marginal soil conditions, high water tables, or very difficult physical constraints
 - Repair situations with an existing dwelling unit
 - Direct discharge can be a stream discharge or a dry ditch discharge
- No feasible compliant absorption area on the site

WHEN IS TERTIARY TREATMENT USED IN PA?

- Very close proximity to wells
- In PA tertiary treatment and direct discharge systems are a final resort before holding tanks are used
- Tertiary treatment will follow the advanced wastewater treatment system (secondary)

TERTIARY TREATMENT STEPS

1. Primary Treatment: takes place in the primary (septic) tank
2. Secondary Treatment: uses an advanced treatment unit such as an Ecoflo biofilter treating for CBOD5 & TSS
 - Efficient secondary treatment should be able to reduce up to log2 fecal coliform
3. Tertiary Treatment: additional disinfection using ultraviolet light, specifically designed sand filters, or chlorination



Tertiary Treatment: DiUV integrated UV system

TYPES OF TERTIARY TREATMENT

- Ultraviolet light
- Chlorination
 - Wastewater exits a treatment unit and goes through a small chlorination tank
 - Tablets added by a homeowner or maintenance provider monthly
- Lateral sand filters
 - In-ground wastewater disinfection system with an impermeable bottom constructed onsite by an installation contractor utilizing a specific specialized system sand discharging to an approved end point



GRAVITY VS. PRESSURIZED UV SYSTEMS

- Gravity fed UV systems used to be the only choice
- Gravity fed systems receive effluent based on the demand and use of the septic system
 - The rate at which the effluent flows through the UV system can be inconsistent based on usage
 - Influx events may lead to effluent flowing through the UV system faster than normal usage
- Gravity UV systems do not have the ability to regulate the rate at which effluent flows through
- Pressurized UV systems use a pump allowing effluent to flow through the UV system at a consistent controllable rate

PRESSURIZED UV SYSTEMS

- Using a pump to feed effluent through a UV system provides several key advantages
 - We can control the rate that the effluent moves through the system maximizing the amount of exposure the liquid has to the UV rays
 - Optimize dose of UV ray
 - Predictable treatment results (pending influent levels)
 - Flow rate of 2.6-2.8 GPM
- These systems can be housed in different settings allowing flexibility on the site

CONTEXT

UV light

- All of the previous factors influencing UV disinfection performance and time required for quartz tube fouling are dependant on :
 - quality of drinking water used at each site
 - family habits
 - performance of wastewater treatment system used in front of the UV unit (TSS concentration, sludge release...)
- It is site specific!
- Design and maintenance of UV light product should be adapted to these conditions to minimize their impact on performance

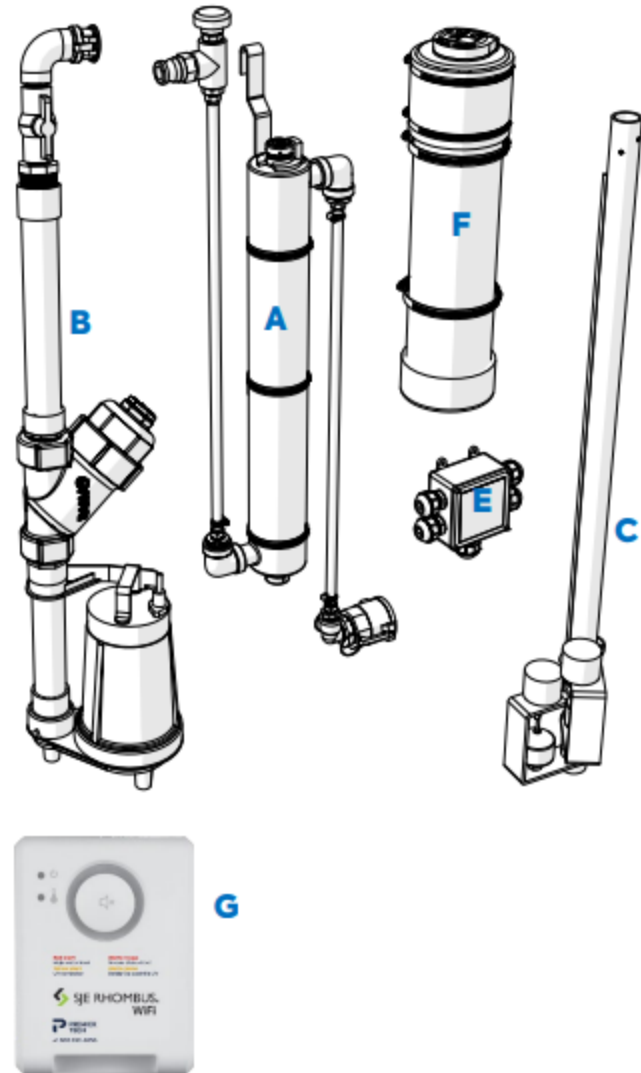
CONTEXT

UV light

- Design and maintenance of UV light product should be adapted to these conditions to minimize their impact on performance
- Less environmental risks because no chemical reaction with organic matter
- Reliability of UV disinfection is subjected to transmissivity of UV light in the wastewater to be treated which is influenced by many factors acting in different ways

PRESSURIZED UV SYSTEMS - COMPONENTS

1.1. Main components & fonctions



A- UV unit

- Includes the UV lamp and the quartz sleeve;
- Exposes the water to UV rays;
- Equipped with quick disconnects for easy retrieval of the lamp.

B- Pump assembly

- Provides pressurized water to the UV unit;
- Equipped with a mesh filter;
- Equipped with an entry valve that can isolate the UV unit during servicing.

C- Float tree

- Pre-wired to the pump assembly and the junction boxes;
- Manages the pumping events;
- Detects high water levels.

D- Alarm float

- Warns the homeowner of an abnormal situation in the septic installation;

E- Junction box

- Protects electrical connections;

F- Watertight box

- Houses the UV controller;

G- Wi-Fi alarm box

PRESSURIZED UV SYSTEMS - COMPONENTS

Quartz sleeve

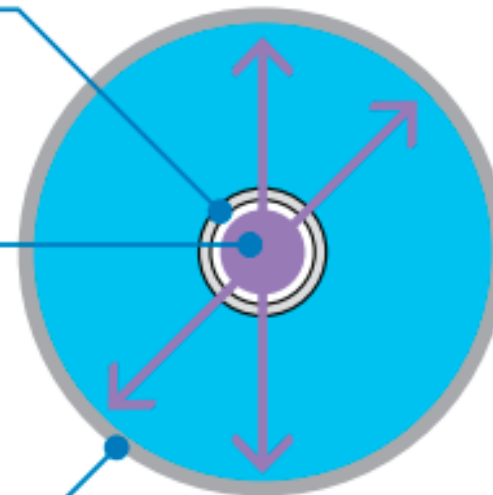
Isolates UV lamp.

70 W UV lamp

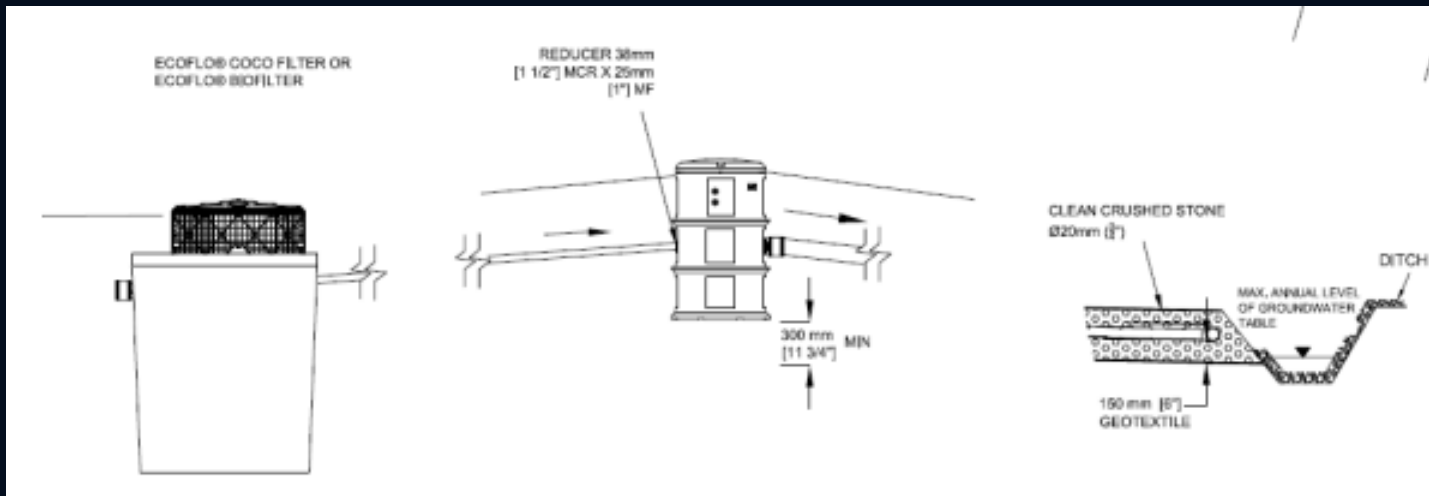
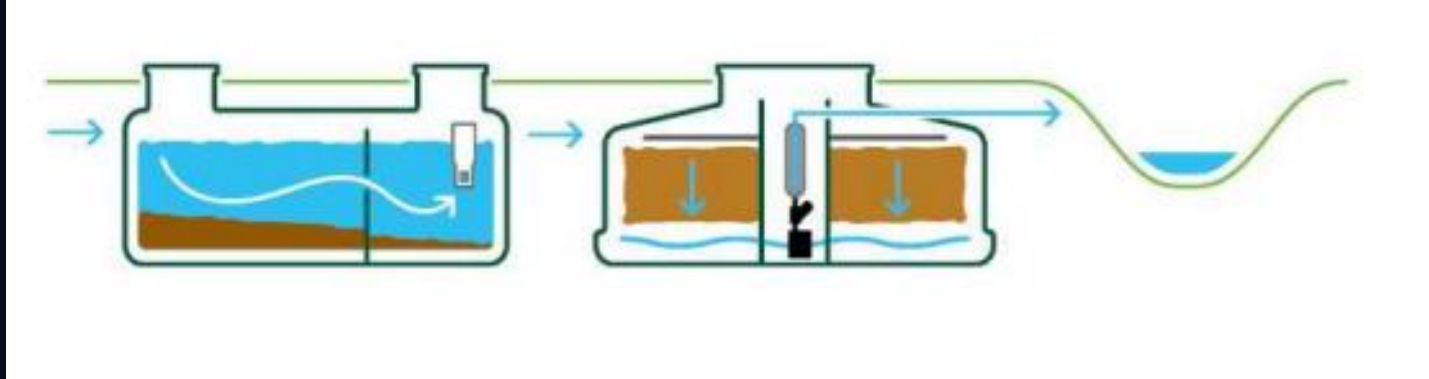
Exposes wastewater pathogens to UV radiation.

Stainless steel pipe

Holds wastewater for UV disinfection.



PRESSURIZED UV SYSTEMS - LAYOUT





UV systems

PREMIER TECH UV SYSTEMS

A complete package

Premier Tech proudly offers pressurized UV systems designed to function with the Ecoflo biofilter



HOW DOES OUR ECOFLO SEPTIC SYSTEM WORK?

- Receives wastewater from the septic tank
- Distributes the wastewater across the filtering medium for treatment made of coconut husk fragments
- The coconut filter creates a physical barrier that captures and removes wastewater pollutants



PERMANENT SEPTIC INSTALLATION

Never needs to be moved

**Physical barrier that retains pollutants
from wastewater**

Filtering media replacement:

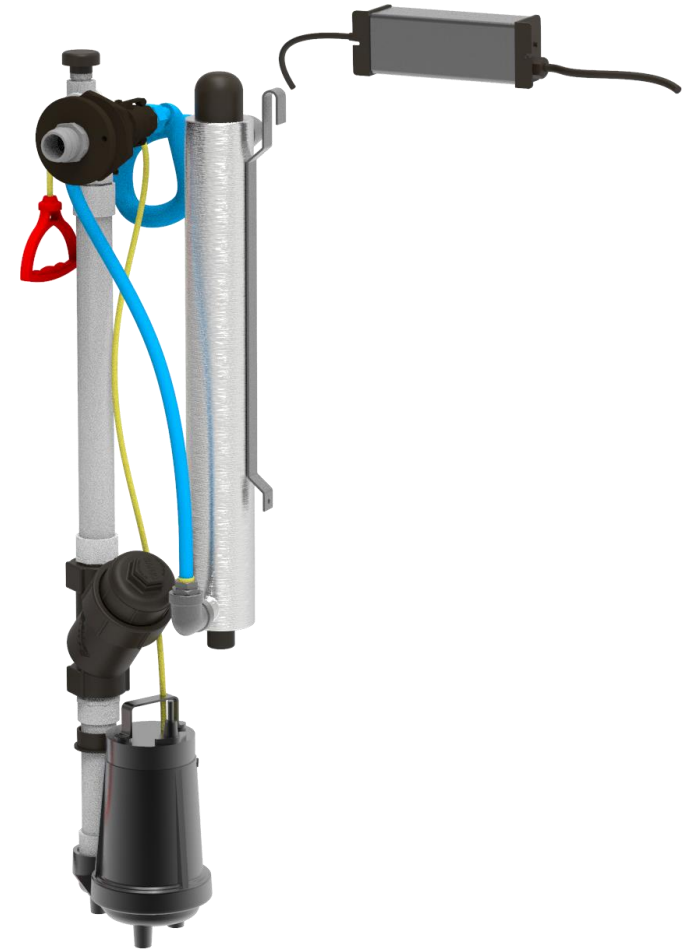
- **new warranty (10 years)**
- **new media at low cost**
- **no excavation**
- **no risk to the environment
or public health**

PREMIER TECH UV SYSTEMS

- The Ecoflo biofilter with integrated UV is a complete system for tertiary treatment
- Industry professionals are able to work with one manufacturer for all components for the life of the system
- Homeowners are able to work with one manufacturer for service, sampling, and support
- Does not release untreated wastewater into the environment even if there is a failure
- UV certified under BNQ Standard NQ 3680-910

PREMIER TECH UV SYSTEMS

- The Rewatec Integrated DiUV system is designed to work in conjunction with the Ecoflo biofilter
- This complete package provides many benefits for design, installation, and support to the homeowner after the installation



REWATEC™

INTEGRATED UV DISINFECTION (DiUV)

Improved design

- Filter included
- Integrated pump
- Ready-to-use
- Pre-wired
- 100' wire included
- Wi-Fi alarm included



STAND-ALONE DiUV



CLASSIC UV DISINFECTION
INTEGRATED OR SEPARATE TANK

PREMIER TECH UV SYSTEMS

- Performance that is guaranteed
- Ecoflo units using the Rewatec DiUV systems are proven to provide consistent treatment for homeowner's
- Flexible options that can be adapted to any property
- Integrated and stand alone UV options
- Less work required on the installation and easy to source components

PREMIER TECH UV SYSTEMS – DESIGN

- The design process is simple when using this package system
- The all-in-one package can utilize an Ecoflo pack unit or an existing primary tank
- Concrete and polyethylene Ecoflo models available to meet various site needs
- Full support and assistance from PTWE for system designers and SEOs
- Detailed design guide is available
- All pump and float specs are easy to find to include on a design
- Pump is designed specifically for this system – low head continuous duty

PREMIER TECH UV SYSTEMS

| ECO FLO [®] | | | REWATEC [™] SPECIALIZED TREATMENT OPTIONS | |
|----------------------|------|--------------------|---|--|
| Hydraulic Capacity | Size | Model | Integrated UV disinfection (DIUV) | UV disinfection (DIUV) in separate tank |
| POLYETHYLENE | | | | |
| 500 US gal/d | 2.8 | EC7-500-P-G/P | ✓ | ✓ |
| | | EC7-500-P-G/P-PACK | ✓ | ✓ |
| 600 US gal/d | 3.4 | EC7-600-P-G/P | ✓ | ✓ |
| | | EC7-600-P-G/P-PACK | ✓ | ✓ |
| 750 US gal/d | 4.1 | EC7-750-P-G/P | ✓ | ✓ |
| | | EC7-750-P-G/P-PACK | ✓ | ✓ |
| 1,050 US gal/d | 5.7 | EC7-1050-P-G/P | ✗ | ✓ |
| 1,350 US gal/d | 7.3 | EC7-1350-P-G/P | ✗ | ✓ |
| CONCRETE | | | | |
| 500 US gal/d | 2.8 | EC7-500-C-G/PDV | ✓ | ✓ |
| 600 US gal/d | 3.4 | EC7-600-C-G/P | ✓ | ✓ |
| 750 US gal/d | 4.1 | EC7-750-C-G/PDV | ✓ | ✓ |
| 1,200 US gal/d | 6.5 | EC7-1200-C-G/PDV | ✗ | ✓ |

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.

PREMIER TECH UV SYSTEMS – TREATMENT AND PERFORMANCE

Ecoflo performance:

| Parameters | Influent | Ecoflo effluent | Abatement | NSF Std 40 Avg, 30-day |
|--------------------------|-----------|-----------------|-----------|---------------------------|
| TSS (mg/L) | 180 ± 64 | 6 ± 4 | 97% | 30 |
| CBOD ₅ (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 | | |

PREMIER TECH UV SYSTEMS – TREATMENT AND PERFORMANCE

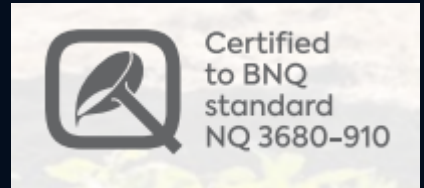
Influent parameters:

A drinking water test is recommended, but not mandatory. Drinking water should respect the following levels:

| Water Quality and Minerals | Level |
|----------------------------|------------------------|
| Iron | < 0.3 ppm (0.3 mg/L) |
| Hardness | < 7 gpg (120 mg/L) |
| Manganese | < 0.05 ppm (0.05 mg/L) |
| Tannins | < 0.1 ppm (0.1 mg/L) |

PREMIER TECH UV SYSTEMS – TREATMENT AND PERFORMANCE

Bench test requirements:



The Ecoflo biofilter has demonstrated to steadily contribute on average to log 2 abatement of fecal coliforms and the UV disinfection system to an additional log 4 abatement of fecal coliforms.

| Certification program | Influent | Ecoflo Coco Effluent | UV disinfection (DiUV) Effluent |
|--|--------------------|----------------------|---------------------------------|
| | Fecal Counts (log) | | |
| ANSI/NSF Std 40 Class I | 6.6 | 4.6 | n.a |
| BNQ 3680-910 Annexe A (Equivalent to ANSI/NSF Std 40 Class I) | 6.3 | 4.2 | 0.4 |

PREMIER TECH UV SYSTEMS – TREATMENT AND PERFORMANCE

Ecoflo with DiUV system treatment results:

The table below summarizes the results obtained at effluent of the Ecoflo biofilter combined to the UV disinfection system DiUV during the BNQ 3680-910 certification.

| Parameters | | Fecals (UFC/100 mL) |
|---------------|---------|---------------------------------|
| Influent | Mean | 2 863 158 Geomean: 2 408 394 |
| | St. Dev | 1 551 416 |
| | Minimum | 500 000 |
| | Maximum | 7 900 000 |
| | n | 76 |
| Effluent DiUV | Mean | 2.3 Geomean: 2.2 |
| | St. Dev | 1.3 |
| | Minimum | <2 |
| | Maximum | 10 |
| | n | 69 |

TREATMENT EFFICIENCY – ECOFLO BIOFILTER WITH UV SYSTEM

Treatment results:

| Parameter | BNQ* Effluent Standard | DiUV Effluent |
|-------------------------|------------------------------|-----------------------------|
| TSS | < 15 mg/L | 4 mg/L |
| CBOD₅ | < 15 mg/L | 4 mg/L |
| Fecal coliforms | < 20 CFU/100 mL [†] | < 2 CFU/100 mL [†] |

* Bureau de normalization du Québec certification, similar to NSF certification.

† Before photoreactivation.

PREMIER TECH UV SYSTEMS – INSTALLATION

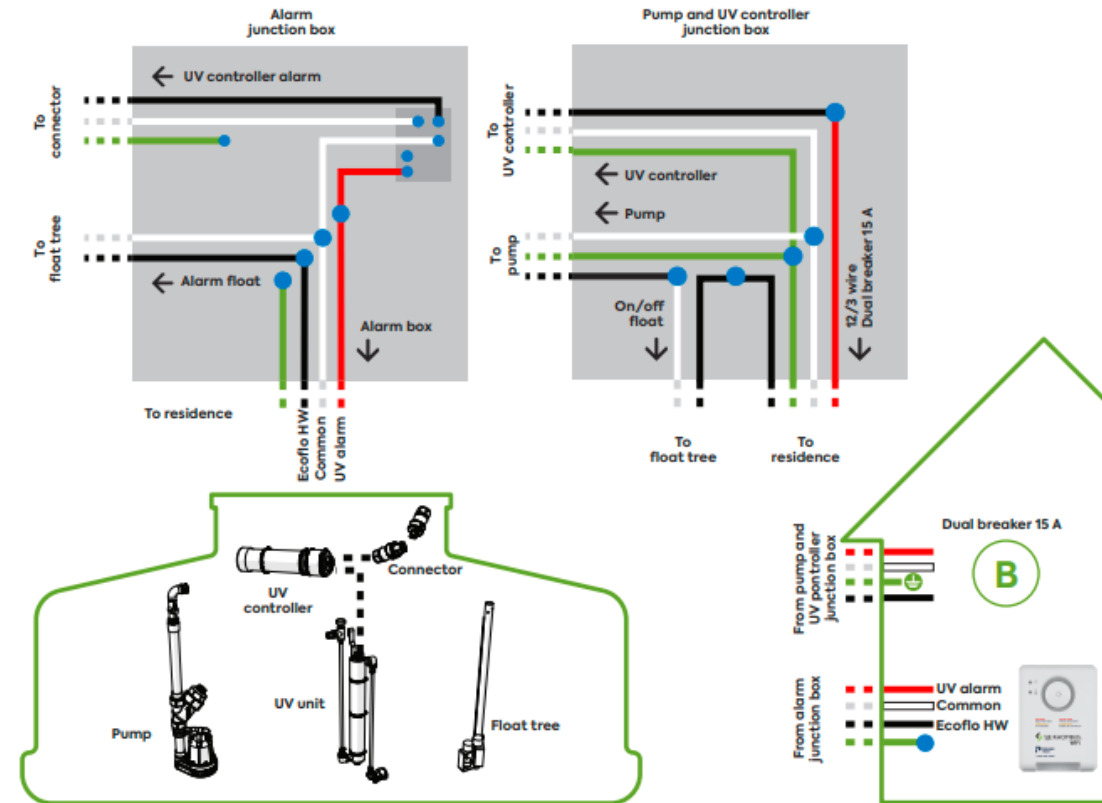
- Installation manuals and videos for installers
- Direct field support from PTWE
 - In person or over the phone
- UV system is already set up and settings are made at the factory
- Installation is as easy as installing a standard Ecoflo unit
- Less work in the field allows for a quick and simple installation
- Pre-wired & no float adjustments needed

REWATEC™

INTEGRATED UV DISINFECTION (DiUV)

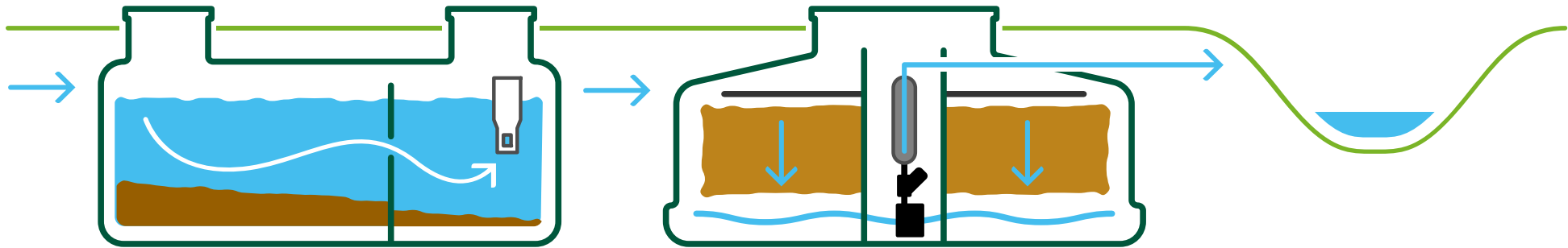
Electrical connections

- Double breaker 15A 120V
- 100' wires identified (pump & alarm)
- Two alarms (high level & UV lamp)



MAXIMUM PUMPING DISTANCE

| HEAD | MAXIMUM PIPE LENGTH Ø 1" - 1,5" |
|------|------------------------------------|
| 15' | 100' |

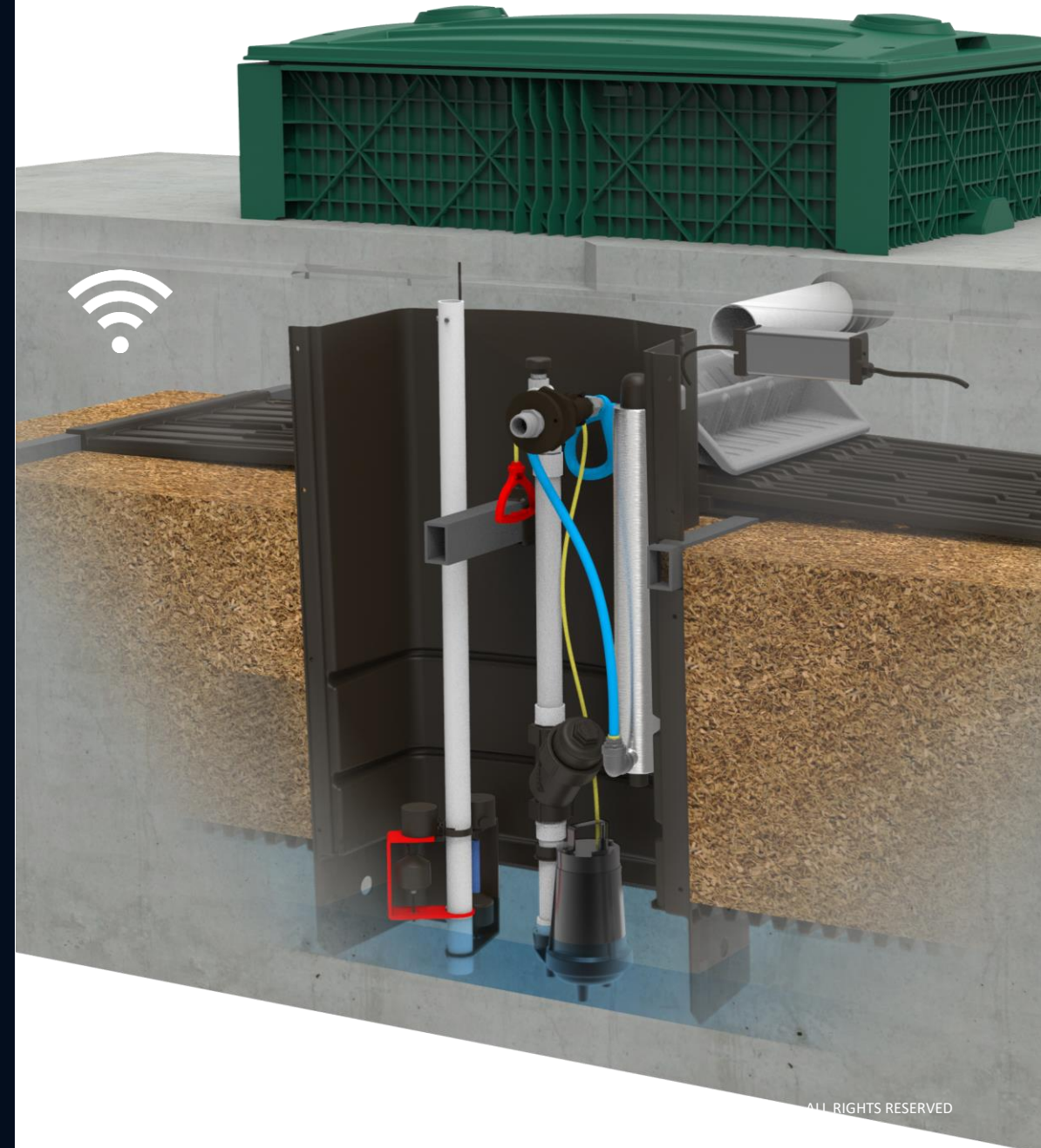


REWATEC[®]

INTEGRATED UV DISINFECTION (DiUV)

Most complete UV offer
in the industry

- Start-up
- Year 1 maintenance
- 1st UV lamp replacement



START-UP

- Initial contact by phone
- Explanations
- Site visit



SERVICE AND MAINTENANCE

- Due to the environmentally sensitive areas UV systems are often used having a quality network to maintain these systems is important
- Warranty and maintenance contract held by PT
- Trained partners and PT field technicians provide direct service to property owner's
- Bulb change is done annually during the maintenance visit
 - Also servicing the Ecoflo unit
 - Count down timer showing time since last bulb change
- Guaranteed treatment performance when maintained and serviced properly for CBOD5, TSS, and fecal coliform (with residential strength waste)

SERVICE AND MAINTENANCE

- Service providers dispatched automatically – no need for the homeowner to worry about scheduling
- Sampling coordinated and done by PT each year during annual maintenance
 - Can test for required parameters on a site by site basis
- Built in sampling port ensures an easy way to retrieve samples
- Sampling guide from PT is provided to all service partners maintaining Rewatec DiUV systems
- Customized for each site
- Reports available for homeowners or the local authority

WI-FI ALARM

Integrated in all the UV products

- Response in less than 48 hours
- Service warranty
- Easy set-up



ANNUAL MAINTENANCE

- Maximize the medium lifetime
- Protect the investment of your customer
- 15-point inspection
- filter aeration and scarification
- UV bulb change
- Sampling of treated effluent



NETWORK OF PARTNERS

- Local partners trained every year by Premier Tech Water and Environment
- Contract requiring
 - Courtesy
 - Commitment to an ethics' code
 - Professionalism on the property
 - Respect of PTWE procedures
 - Messages for partners added throughout the year



WORRY-FREE WARRANTY

The most complete warranty in the industry:

1. product warranty
2. performance warranty
3. service warranty

PRODUCT WARRANTY

ECOFLO®



- Tanks
- Filtering media
- Components *
- Replacement parts
- Labor included
- Pumps and floats: 3 years
- Pump replacement: 2 years

PRODUCT WARRANTY

REWATEC™

UV disinfection (DiUV)



- **Original parts**
- **Replacement parts**
- **Components***
- **Labor included**



Customer resources

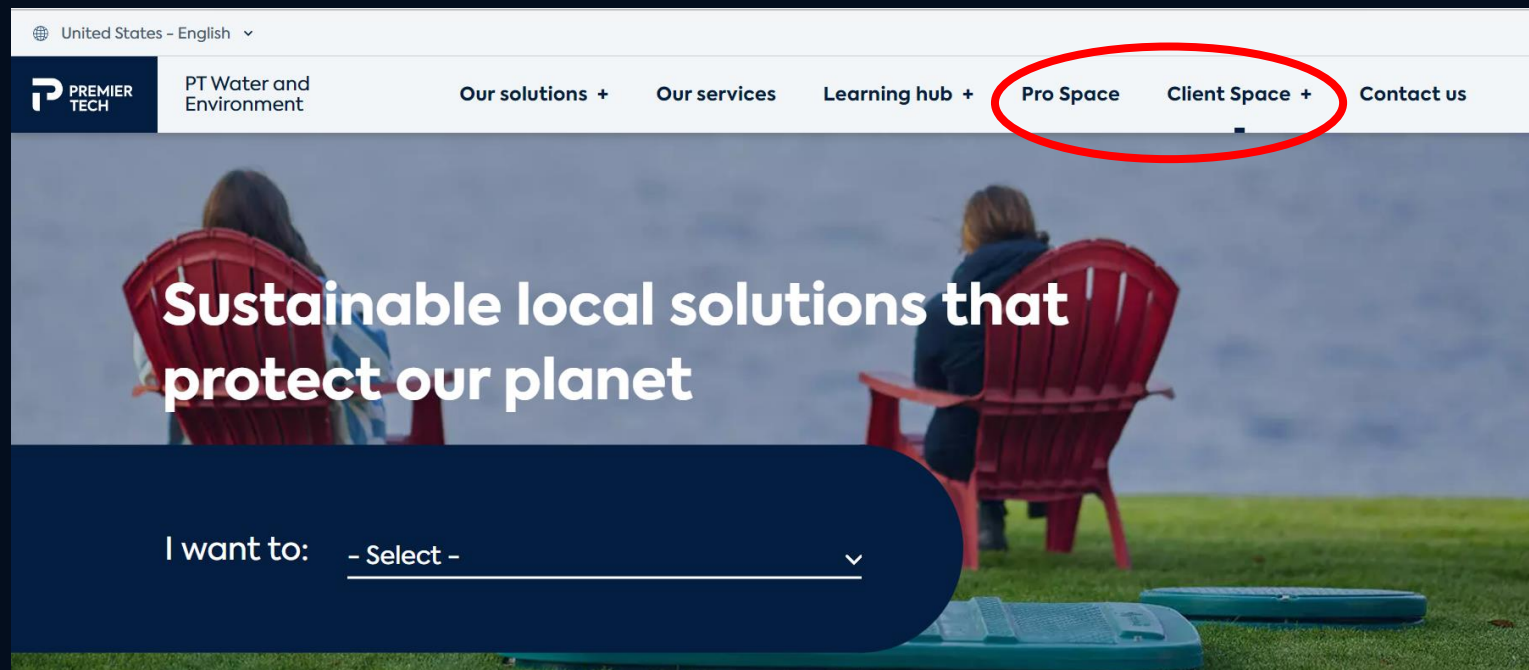
PREMIER TECH WATER AND ENVIRONMENT HOTLINE

CUSTOMER SERVICE

1 800 632-6356



PREMIER TECH WATER AND ENVIRONMENT WEB RESOURCES



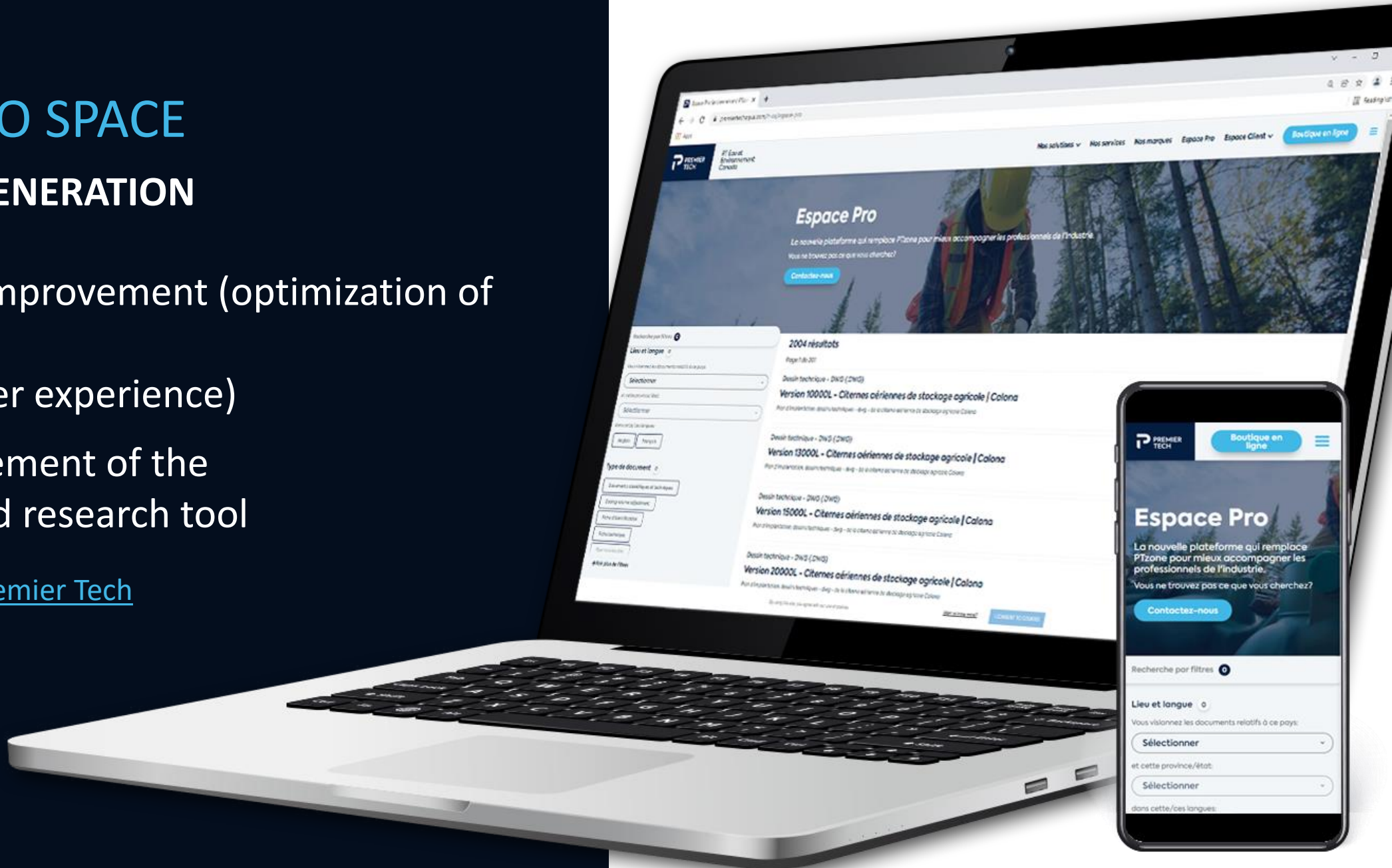
- Pro Space for installers, designers, and SEOs
- Client Space for homeowners

www.PT-WaterEnvironment.com

NEW PRO SPACE SECOND GENERATION

- Visual improvement (optimization of the customer experience)
- Improvement of the Keyword research tool

[Pro Space | Premier Tech](#)



PREMIER TECH'S 360° SUPPORT

IMMEDIATE ASSISTANCE

Experts available **8 a.m. to 5 p.m.** (TBD), Monday to Friday, to answer your field questions

IN-PERSON FIELD SUPPORT

Experts go **on site** when challenges cannot be resolved with a video call

ACCESSIBLE TRAINING

Online training programs make your installations as simple as possible

FULL CUSTOMER SUPPORT

Teams assist customers directly so you can concentrate on your work



Resources for the user

INFORMATION FOR THE HOMEOWNER

- Many homeowners can be overwhelmed by a septic system project
- There are many ways to support those customers with information presented to them before the installation
- They may be unaware of requirements like annual maintenance, sampling, and even general care of their system
- As industry professionals we should do our best to prepare homeowners for what is being designed and installed



INFORMATION FOR THE HOMEOWNER

- Important topics to cover:
 1. An overview of what system is being installed such as an Ecoflo biofilter with an integrated DiUV system
 2. Why their property needs to have tertiary treatment
 3. Expected performance of the system
 4. What they should expect during annual maintenance
 5. Who to contact if there is an alarm
 6. Expect a start up phone call
 7. General care and long term responsibilities as found in their Owner's manual



ECOFLO® REWATEC™

**The best long-term
investment guaranteed**



ALL RIGHTS RESERVED

Thank you!

Questions?

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