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NEW YORK STATE OF OPPORTUNITY. Department of Environmental Conservation

Division of Environmental Remediation
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Hoosick Falls PFOA Point of Entry Treatment and Point of Use Treatment Systems Site Management Plan for NYSDEC Installed Treatment Systems

NYS Spill No. 1511059

June 2021

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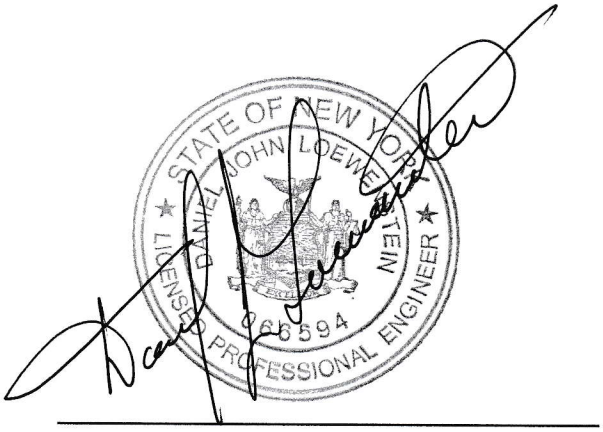

Daniel J. Loewenstein, P.E.
Senior Vice President

HOOSICK FALLS PFOA POINT OF ENTRY TREATMENT AND POINT OF USE TREATMENT SYSTEMS SITE MANAGEMENT PLAN FOR NYSDEC INSTALLED TREATMENT SYSTEMS

Prepared for:

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June 2021

CONTENTS

FIGURES

APPENDICES

1 INTRODUCTION

Arcadis of New York, Inc. (herein referred to as “Arcadis”), on behalf of the New York State Department of Environmental Conservation (NYSDEC) has prepared this Site Management Plan (Plan) for the Point of Entry Treatment (POET) and Point of Use Treatment (POUT) Systems site maintenance and sampling activities at properties located within and in the environs of the Towns of Hoosick, Cambridge, and White Creek, New York. This Plan outlines the general activities required to monitor, maintain, and optimize operation of the POET and POUT systems installed by the NYSDEC. The Plan is a working document that will be revised, on an as needed basis, for system modifications and changes to the monitoring and/or maintenance programs.

1.1 Location and Description

The primary site location is the Town of Hoosick (Hoosick), New York. Hoosick is located approximately 30 miles northeast of Albany, New York (Figure 1). Hoosick and some neighboring areas including the Towns of Cambridge and White Creek have been identified as an area of concern (AOC) based on the results of previous drinking water sampling. Prior samples collected by the NYSDEC, Rensselaer County Department of Health, and New York State Department of Health (NYSDOH) indicated the presence of detectable concentrations of perfluorooctanoic acid (PFOA) in drinking water. As a result, POET and POUT systems have been installed by the NYSDEC on private water supply wells located inside the AOC.

2 TREATMENT SYSTEM DESCRIPTION

2.1 Point of Entry Treatment (POET)

POET systems were installed by the NYSDEC as whole-house treatment systems to filter and disinfect groundwater from existing private supply wells used for drinking water. The POET Site Management project is being implemented by the NYSDEC to perform sampling, reporting, and maintenance of the POET systems.

In general, the extracted groundwater is plumbed to an existing pressure tank typically located within the basement or utility space of a property. A sample port is installed immediately after the pressure tank to capture samples of raw untreated water, and the water is then routed to an installed sediment / pre-filter. The water continues through the pre-filter and flows through a flow restrictor, and then through a flow meter. After passing through the flow meter, the water continues into the first (lead position) of two Granular Activated Carbon (GAC) filter canisters. A sample port is installed after the first GAC canister, and water is then routed through a second (lag position) GAC canister. After passing through both GAC canisters, the water may then be routed through an existing water softener that was previously installed by the owner. Finally, the treated water is routed through an Ultraviolet (UV) disinfection unit where the water is disinfected, and then flows directly into the existing plumbing for use within the residence or commercial establishment. A sample port is installed after the UV disinfection unit to capture post-treatment samples.

The major components of the typical POET system are:

- One Sediment Pre-Filter
- One Flow Restrictor
- One Flow Meter
- Two Granular Activated Carbon (GAC) Canisters
- One UV Disinfection Unit
- One GFCI Outlet
- Three Sample Port Taps
- Four or Five Shutoff Ball Valves

Figure 2 is attached to this plan depicting a typical POET system. Overall configuration and actual components used may vary based upon site specific variables such as available space and existing plumbing.

2.2 Point of Use Treatment (POUT)

POUTs can be installed as treatment systems located immediately prior to the point where water is dispensed for use. Typically, a POUT system would apply where space is limited, or where a typical network of distribution pipes throughout a structure does not exist. An example would be a livestock watering station at a farm, or a residential mobile home where space is limited and smaller carbon canisters may be employed beneath a kitchen sink. The components of a POUT system are generally the same as those described above for a POET system, but differ in that the system is installed at the point of use and not prior to a network of plumbing, based on existing site characteristics. POUT systems being utilized on this site employ carbon block filter canisters for treatment, typically incorporate between

one and three carbon block canisters, and generally do not have a UV light component. Figure 3 depicts components of a typical POUT system. Overall configuration and components may vary based upon site specific variables such as available space and existing plumbing.

2.3 POET Enclosures

Locations where the interior of the existing structure does not have sufficient available space to install and/or maintain a POET system may be candidates for installation of an outdoor POET enclosure. Generally, a POET enclosure is a painted wooden shed constructed to contain the POET system, and is installed in an outdoor space at the location. Dimensions of the enclosure can vary depending on results of the site evaluation and site-specific characteristics, but typically consist of a 4-foot by 6-foot wooden structure with space to contain POET system equipment. The enclosures are equipped with a space heater to maintain sufficient operating temperatures during the winter season. The space heaters are 1,500 or 2,000-watt wall-mounted units installed at the time of construction. Specific features may be incorporated based on individual site characteristics and/or local building code requirements. Figure 4 provides a representative diagram of a typical POET system enclosure.

The enclosures are fully insulated and maintained to ensure optimum treatment system performance during the range of seasonal temperatures. Winterization measures are implemented prior to the onset of freezing weather conditions (i.e. temperatures below 32 degrees Fahrenheit), with field crews confirming that adequate insulation is in place, sealing off any potential areas subject to drafts, and confirming space heater settings to ensure the plumbing and equipment does not freeze. Warm weather season protocols generally include verifying adequate ventilation mechanisms are in place to minimize condensation and inhibit moisture buildup within the enclosure. A POET enclosure information sheet, included in Appendix D, is provided to homeowners to inform them of recommended preventative maintenance requirements associated with the enclosures.

3 PRIVATE WATER SUPPLY SAMPLE COLLECTION FOLLOWING POET/POUT INSTALLATION

Sampling activities will generally be conducted in accordance with the sample frequencies described in Table 1 below. The sampling schedule used to prepare this Plan has been based upon assumptions following review of existing data. The sampling schedule is dependent upon securing property access at an individual location, and is subject to recurrent evaluation and revision based upon actual field conditions encountered, data generated, and the securing of owner consent to allow recurrent sampling activities.

TABLE 1 – Drinking Water Treatment System Sample Frequencies*

System PFOA or PFOS Concentration	Sample Frequency	Analysis	Treatment Sample Locations	QC Samples	QC Sample Frequency
Each Active System	Approximately 3 months following clearance	6 PFAS	PRE MID POST	FD MS/MSD	One per 20 Samples (5%)
Greater than or equal to 70 ppt	Tri-Annually	6 PFAS	PRE MID POST	FD MS/MSD	One per 20 Samples (5%)
Greater than or equal to 35 ppt and less than 70 ppt	Semi-Annually	6 PFAS	PRE MID POST	FD MS/MSD	One per 20 Samples (5%)
Less than 35 ppt**	Annually	6 PFAS	PRE MID**	FD MS/MSD	One per 20 Samples (5%)
Non-Detect***	Annually	6 PFAS	PRE***	FD MS/MSD	One per 20 Samples (5%)

*** The sampling schedule is dependent on securing property access at an individual location, and is subject to recurrent evaluation and revision based upon actual field conditions encountered and the data generated. Sample frequency and locations may be modified based on performance and sampling results.**

**** For annually sampled sites (2-34 ppt), only pre-treatment (raw water) and mid-treatment samples are collected. If the laboratory reports a detection in the MID sample, indicating breakthrough at the lead GAC canister has occurred, GAC canisters are replaced.**

*****For sites that have historically been non-detect (ND), only a pre-treatment (raw water) sample is collected. If the laboratory reports a detection, MID and POST samples are collected in a follow-up visit, and the subject location is assigned to a category according to the detection level for future sampling frequency.**

ppt: Parts Per Trillion

To establish a baseline for future evaluation purposes, an initial site management sampling event is planned at each system location approximately 3 months after the system is cleared for use, regardless of initial influent PFOA & perfluorooctanesulfonic acid (PFOS) concentrations. After that initial sampling event, for systems where prior analysis reported PFOA or PFOS concentrations greater than or equal to 70 parts per trillion (ppt), samples will initially be collected on a tri-annual basis (every four months). At systems where PFOA or PFOS concentrations were reported between 35 ppt and 70 ppt, samples will initially be collected semi-annually (every six months). At systems where PFOA or PFOS were reported at concentrations less than 35 ppt, including those reporting non-detect, samples will initially be collected on an annual basis.

The sampling schedule and associated sampling frequencies identified above are based upon the review of analytical and operational data used to monitor treatment system performance. The data includes years of POET system maintenance and laboratory analytical results utilized to promote an effective site management program. The planned sampling frequencies are evaluated on a continuous basis as data becomes available, and may be modified in accordance with that data to facilitate effective water treatment. This Plan is a working document and the identified sampling program may be revised on a site-specific or programmatic basis as needed and as data or field observations may dictate.

Per- and polyfluoroalkyl substances (PFAS) sampling, specifically for six perfluorinated compounds including PFOA and PFOS, will generally be conducted by collecting samples at three locations within each treatment system; pre-treatment (raw untreated water), mid-treatment (after the first GAC canister and prior to the second GAC canister), and post treatment (after the entire treatment system). In certain site-specific situations sampling may only consist of pre and post-treatment samples, based on site characteristics, such as some POUT locations which have no mid-treatment port. Locations that have historically not reported a detection of PFAS will have one pre-treatment sample collected. If the laboratory reports a detection at a previously non-detect site, a follow-up event will be scheduled to collect mid-treatment and post-treatment samples, and the subject location will be assigned to a category based on the detection level for future sampling frequency. Locations with raw water concentrations between 2 ppt and 35 ppt will have pre-treatment and mid-treatment samples collected. If the laboratory reports a detection in the mid-treatment sample, indicating breakthrough at the lead GAC canister has occurred, a follow-up event will be scheduled to replace the GAC canisters. Samples will be consolidated for shipment under chain-of-custody to be analyzed for six PFAS including PFOA and PFOS via ISO Method 25101, EPA Method 533, or EPA Method 537 Revision 1.1.

Total organic carbon (TOC) may be analyzed as directed by the NYSDEC. The TOC samples will be collected from the pre-treatment (raw water) sample port. Samples will be consolidated for shipment under chain-of-custody to be analyzed for TOC via SM 5310B.

Quality control samples including a field duplicate (FD), and a matrix spike / matrix spike duplicate (MS/MSD), will be performed on PFAS samples and collected at rates of one per 20 cumulative samples (5%). Field duplicates are defined as samples collected simultaneously from the same source under identical conditions. Field duplicates will be collected from the post treatment sample port.

Table 2 below identifies the sample methods and requirements.

TABLE 2 - Sample Methods and Requirements

Analytical Group	Laboratory	Analytical Method	Sample Volume	Sample Containers	Preservation Requirements
Six PFAS including PFOA and PFOS	ELAP Certified	ISO 25101,EPA 537 rev.1.1 or EPA 533	500 mL	(2) 250 mL HDPE or polypropylene bottles	4°C (+/- 2°)*
Total Organic Carbon (TOC)	ELAP Certified	SM 5310B	120 mL	(1) 120 mL amber glass bottle	H_2SO_4 4°C (+/- 2°)

*** Samples that are anticipated to contain chlorinated water shall be collected into a container prepared with Trizma preservative for PFAS analysis.**

Samples will be collected from each port separately in the order of post-treatment first, followed by mid-treatment, and concluded with pre-treatment (raw). Prior to collecting samples, NYSDEC representatives will confirm the POET system has not been placed into bypass mode by the owner.

When collecting samples for PFAS analysis, the samplers must use caution to minimize the potential for cross-contamination. Clothing worn by sampling personnel must have been laundered multiple times, and fabric softeners or stain-resistant applications are prohibited. Clothing that contains GORE-TEX® or other synthetic water-resistant materials, or has been treated with water-repellent applications, should not be worn during sampling activities. Many food and drink packaging materials and personal care products contain PFAS. Similarly, pre-existing plumbing components such as thread-seal tape may contain PFAS and be present in the vicinity of a treatment system location. Such items should be avoided when conducting sampling tasks, and staff that may handle products potentially containing PFAS should wash hands thoroughly prior to engaging in sample collection.

Nitrile gloves should be changed frequently during the course of sampling activities. The sampler must wear a fresh pair of nitrile gloves while filling and sealing the sample bottles for each sample set. Care must be taken to restrict the time a bottle is open to only when the container is being filled with the sample, which will assist to minimize potential airborne dust or fibers from entering the sample bottle. The bottle cap should not be set down, and the sampler should use caution to avoid touching the rim of the bottle or inside of the cap.

Sample containers must be laboratory-provided bottleware (HDPE or polypropylene) for PFAS analysis, and not contain polytetrafluoroethylene (PTFE, Teflon™) materials or cap liners with a PTFE layer.

Additional details regarding sample collection are included in Appendix A, NYSDEC POET System Specification. Appendix A is a general specification, and not all components will apply to this site management program. A sample collection protocol detailing the general sampling plan for site

evaluation, clearance, and site management sampling is provided in Appendix D. Protocols detailing the general processes involved in sampling activities are also included in Appendix D.

3.1 Sample Data Management

During a typical sampling event, crews will collect and record routine data from the treatment systems including HF system number, water usage, UV counter, sample collection times, and other relevant data which will be recorded on-site with a tablet computer equipped with data collection software. Data will be incorporated into a SharePoint database for use by data processing, call center, and project staff.

To maintain consistency, samples collected will be identified as follows:

HFXXXXMMDDYYPOS; where,

- HFXXXX is the System ID number for the sample location.
- MMDDYY is the month, day, and year.
- POS is the position sampled (PRE, MID, or POST).
- DUP will appear in the sample name where applicable to identify a duplicate sample (e.g. HFXXXXMMDDYYPOSTDUP).

Typical turnaround time for laboratory reporting is expected to be 10 business days from receipt of samples by the lab. Analytical results will be submitted to Arcadis from the laboratory in electronic format compatible with EQuIS. Arcadis will assist NYSDEC with incorporating results into the EQuIS database. Arcadis will also maintain a database of analytical results, utilize a data platform through SharePoint, and generate weekly and monthly reports to identify and prioritize locations requiring sampling and/or maintenance. Routine progress meetings will be held, as deemed necessary, with NYSDEC and NYSDOH to coordinate project efforts.

Appendix E includes the schedule for routine deliverables produced by the data management group. A routine site management report will also be generated by Arcadis to distribute summaries of routine project activities and items of note. Reports will summarize number of property owners contacted to date, number of systems scheduled for sampling and maintenance to date, number of systems where samples were collected or repairs completed to date, and additional items of note regarding project activities.

4 OPERATION AND MAINTENANCE (O&M)

4.1 POET O&M

POET O&M activities will typically consist of routine and emergency (as needed) repairs, replacement of GAC canisters, and routine maintenance or replacement of other treatment system components such as UV lamps. O&M activities will be completed based on scheduled routine maintenance, analytical results, or calls for service made by the property owner. The O&M schedule used to prepare this Plan has been based upon assumptions following review of existing data. The O&M schedule is dependent on securing property access at an individual location, and is subject to recurrent evaluation and revision based upon actual field conditions encountered and evaluation of the data generated. Table 3 below depicts anticipated routine O&M activities and schedule.

TABLE 3 - Routine POET O&M Activities and Schedule**

System PFOA or PFOS Concentration	GAC Filter Replacement	Pre-Filter Replacement*	UV Sleeves	UV Lamps	System Components Inspection
Each Active System	As needed based upon inspection and data gathered	Monthly*	Replace Annually; Clean as needed	Replace Annually	During routine sampling and maintenance visits

* Pre-filters will typically be replaced monthly or as needed by property owner.

** The O&M schedule is dependent on securing property access at an individual location, and is subject to recurrent evaluation and revision based upon actual field conditions encountered and evaluation of the data generated.

Replacement of GAC canisters will occur when analytical results indicate that “breakthrough” has occurred at the lead GAC canister. Breakthrough is defined as a mid-treatment sample reporting an individual PFOA or PFOS concentration of 5 ppt or greater. For annually sampled locations (less than 35 ppt), GAC replacement will generally occur when analytical results report a mid-treatment detection of PFOA or PFOS, regardless of the concentration detected. Replacement consists of removing the lead GAC canister, moving the lag canister into the lead position, and installing a new GAC canister in the lag position. Based on site-specific data or observations, both GAC canisters may be exchanged during a replacement event.

Field crews will clean or replace the UV system quartz sleeves as needed based upon sleeve inspection. Inspections of system components will occur during routine sampling and maintenance visits. UV lamps and sleeves will be replaced annually or per manufacturer recommendations. UV lamp replacement will be implemented to coincide with routine sampling or maintenance visits where practical. Horizontally-mounted UV systems will have residual water removed via a vacuum attachment prior to UV sleeve

removal, to avoid potential lamp damage during sleeve inspection and cleaning activities. UV systems are connected to ground-fault circuit interrupter (GFCI) electrical outlets which have the potential to trip and shut off power to the UV system under some circumstances. Field crews will educate homeowners to periodically check the UV system to confirm the power is on, particularly in cases of power surges or power loss associated with storm events, and to manually reset the GFCI outlet when necessary.

NYSDEC will provide property owners with a supply of pre-filters and guidance on how to complete pre-filter replacement. It is anticipated that system owners will self-perform pre-filter replacements on a monthly basis or as needed in an effort to reduce the frequency of contractor service visits. However, O&M crews will also perform pre-filter replacements on scheduled service visits where necessary. The Maintenance Guide distributed to property owners that provides detailed instructions on how to change the pre-filter is included in Appendix B. The Maintenance Guide is produced in laminated format and is designed to be attached to the system for easy reference.

An O&M subcontractor will be on-call 24-hours a day in case of emergency service calls, and will assess the nature of the call and schedule emergency visits as needed. Emergency visits could be scheduled during nights and/or weekends. It is anticipated that an emergency visit will consist of an inspection of the cause for emergency, replacement or repair of required parts, and a recorded form detailing circumstances of the visit. An electrical subcontractor and a plumbing subcontractor will also be on-call to support O&M activities as needed.

System owners are directed through the Maintenance Guide and the POET System Guide (Appendix B) pamphlet to contact the call center / NYSDEC Hotline in advance, should they anticipate being away for more than two weeks and not using the POET system. Prior to use upon their return, system owners vacating their property for between two and four weeks will be advised to flush their system with at least 100 gallons of water by typically allowing an indoor faucet to run for at least 45 minutes. System owners that are away for four weeks or more will be advised to schedule the exchange of their carbon canisters prior to using water upon their return.

A humid environment may exist where POET systems have been installed and is typical of basement settings. The humid conditions will sometimes result in condensation forming on the exterior of system equipment. The condensation has the potential to accumulate during humid conditions and may result in the pooling of condensate on flat surfaces in the vicinity of the system. At system locations where this problem has been reported or is expected to occur, O&M crews may install neoprene insulating jackets on system GAC canisters to reduce condensation, insulate piping, and/or install drip trays beneath system components to contain any accumulating condensation and minimize the potential for impacts to surrounding surfaces.

When hydrogen sulfide odors are reported to be associated with a system, the system owner will be advised to flush the system with at least 100 gallons of water by typically allowing an indoor faucet to run for at least 45 minutes. If an odor issue persists, the field crew will investigate, and when necessary, both carbon canisters will be replaced to remove any potential presence of odor-causing bacterial growth. Prior to the initial canister exchange for a location due to odor, a biological activity reaction test may be performed on samples to detect the potential presence of sulfate reducing bacteria. A sample may be collected from the post sample port, and (where applicable) the affected sample port, if different. These bacteria samples will be collected only initially in the program where applicable to gather data useful for evaluating maintenance protocols. Should the odor issue be reported again in the near term

(approximately 3 to 4 months) after canisters have been exchanged, the homeowner will be advised to consult a water well professional about a potential need to disinfect the well and/or determine the cause of bacterial contamination. The homeowner will also be advised to contact local health department authorities for recommended disinfection procedures. If the homeowner attempts any well disinfection procedures to resolve bacterial issues, such as procedures using chlorine, the POET system should be put into bypass until the process is complete and any chlorine is cleared, so as not to damage the GAC and impair treatment system performance.

Water softeners associated with plumbing systems are not considered part of the POET system, and will not be monitored or maintained by NYSDEC. Similarly, filters installed for the purpose of removing arsenic or any other contaminants are not considered components of the POET system, and will not be monitored or maintained by NYSDEC.

The POET system maintenance guide and a hanging tag identifying the water main shut-off valve will be installed at treatment system locations. In addition, an informational label complete with emergency service contact number will also be posted at each treatment system. Examples of the hanging tag and service label are included as Figure 5.

Residents concerned about disposing of water generated during pre-filter replacement activities will be advised to leave the container of drained water outside and allow for evaporation when feasible. If that method is not practical, the resident may pour the water into an absorbent material and dispose of the material and sediment filter along with typical household waste destined for a permitted solid waste landfill.

Protocols detailing the general process involved in carbon canister exchanges and maintenance/repair visits are included in Appendix D. Vendor-issued equipment manuals and specifications associated with UV systems and POUT filters in use are provided in Appendix F.

4.2 POUT O&M

Similar to POET O&M activities, the POUT O&M will typically consist of routine and emergency (as needed) repairs, replacement of carbon block filters, and routine inspections performed in connection with scheduled sampling events. O&M activities will be completed based on scheduled routine maintenance, analytical results, or calls for service made by the property owner. The O&M schedule used to prepare this Plan has been based upon assumptions following review of existing data. The O&M schedule is dependent on securing property access at an individual location, and is subject to recurrent evaluation and revision based upon actual field conditions encountered and evaluation of the data generated.

Table 4 below depicts anticipated routine POUT system O&M activities and schedule.

TABLE 4 - Routine POUT O&M Activities and Schedule**

System PFOA or PFOS Concentration	Carbon Block Filter Replacement	Pre-Filter Replacement*	System Components Inspection
Each Active System	Annually or as needed based upon inspection and data gathered	Monthly*	During routine sampling visits

* Pre-filters will typically be replaced monthly or as needed by property owner.

** The O&M schedule is dependent on securing property access at an individual location, and is subject to recurrent evaluation and revision based upon actual field conditions encountered and evaluation of the data generated.

Replacement of POUT carbon block filters will occur annually, or when analytical results indicate that "breakthrough" has occurred at the lead carbon block filter. Breakthrough in a POUT system is defined as a mid-treatment sample indicating a detection of PFAS. Replacement consists of removing the lead carbon block filter, moving the lag filter into the lead position, and installing a new carbon filter in the lag position.

When hydrogen sulfide odors are reported to be associated with a POUT system, the system owner will be advised to flush the system with at least 20 gallons of water by allowing the point-of-use faucet to run for at least 10 minutes. If an odor issue persists, the field crew will investigate, and when necessary, the POUT carbon block filters will be replaced to remove any potential presence of odor-causing bacterial growth.

4.3 Non-Typical Treatment System O&M

Select locations may have treatment systems installed by NYSDEC that do not consist of the typical components and specifications identified in this Plan. Examples of locations that would not be considered a typical POET installation would include certain public water supplies that serve many people, such as a school facility, apartment complex, or a treatment system installed at a municipal supply source. Such treatment systems generally include larger GAC contact vessels and enhanced components associated with larger water volumes. Certain O&M processes associated with non-typical installations are outside of the scope of this Plan, and where required are generally addressed in site-specific O&M Plans developed for individual locations and site-specific needs.

4.4 O&M Warehouse

An O&M warehouse has been established to implement site management operations. Project personnel, sampling staff, and O&M crews will use the warehouse as a functional workspace, equipment staging area, parts and materials storage space, and carbon preparation area.

A GAC canister cleaning space has been set up at the warehouse and includes a containment basin to empty and rinse used canisters of spent carbon. Cleaning process water will be collected and contained in a storage tank. Water used in the cleaning and dewatering process will be characterized before being properly disposed of off-site. Spent GAC that has been removed from the canisters will be staged in a dewatering roll-off container. Water captured during the dewatering process will be transferred to the storage tank. When contents are full and sufficiently dewatered, the GAC roll-off will be characterized and transported off site for proper treatment or disposal.

A canister preparation area has been set up at the warehouse to perform the hydration and backwash/flushing process for fresh carbon canisters. A document detailing the GAC canister preparation procedures is included in Appendix A, NYSDEC POET System Specification, dated November 8, 2017. Appendix A is a general specification, and not all components will apply to this site management program.

The current warehouse location utilizes water from a water supply well which is routed through a POET system prior to use, and samples will be collected on a routine basis to confirm the absence of PFAS detections. Water from the well is used for hydrating and preparation of fresh GAC canisters, and will be processed through an on-site recirculation system to ensure adequate volume for process needs. The recirculation system is equipped with an Isolux arsenic filtration unit, and samples will be collected for arsenic analysis on a routine basis as necessary to monitor water quality and filter performance, and ensure arsenic concentrations within the recirculation system remain below applicable guidelines.

In addition to carbon canister processes, the O&M crews utilize the warehouse space to store parts and materials associated with installation and maintenance of the POET/POUT systems. The project team will perform inventory control to maintain accurate records of parts and materials available to complete site operations, and will procure materials to maintain necessary inventory at the warehouse.

4.5 Call Center

A call center has been established at the Arcadis Clifton Park office to schedule routine sampling and maintenance visits with homeowners. Additionally, the call center staff addresses inquiries from homeowners and coordinates responses for emergency service calls made to the public hotline phone number. Incoming calls received outside of normal business hours are answered by a contracted answering service. In cases where repairs are requested, both call center staff and the after-hours answering service will contact the on-call O&M crew, 24 hours per day, 7 days a week. The O&M crew will respond to provide repairs as necessary, and coordinate assistance from the on-call plumber and electrician as required. The call script used by the call center to respond and provide program information to the public is included in Appendix C.

Call center personnel will populate calendars to provide coordinators and crews with accurate schedules to complete sampling and maintenance tasks. The call center team will field requests from property

owners, internal project staff, and NYSDEC to effectively prioritize and schedule locations requiring sampling and O&M activities. Schedules will be distributed to project staff and crews to coordinate daily POET system sampling and maintenance assignments. An outline of daily duties and standard protocol for the call center is also included in Appendix C.

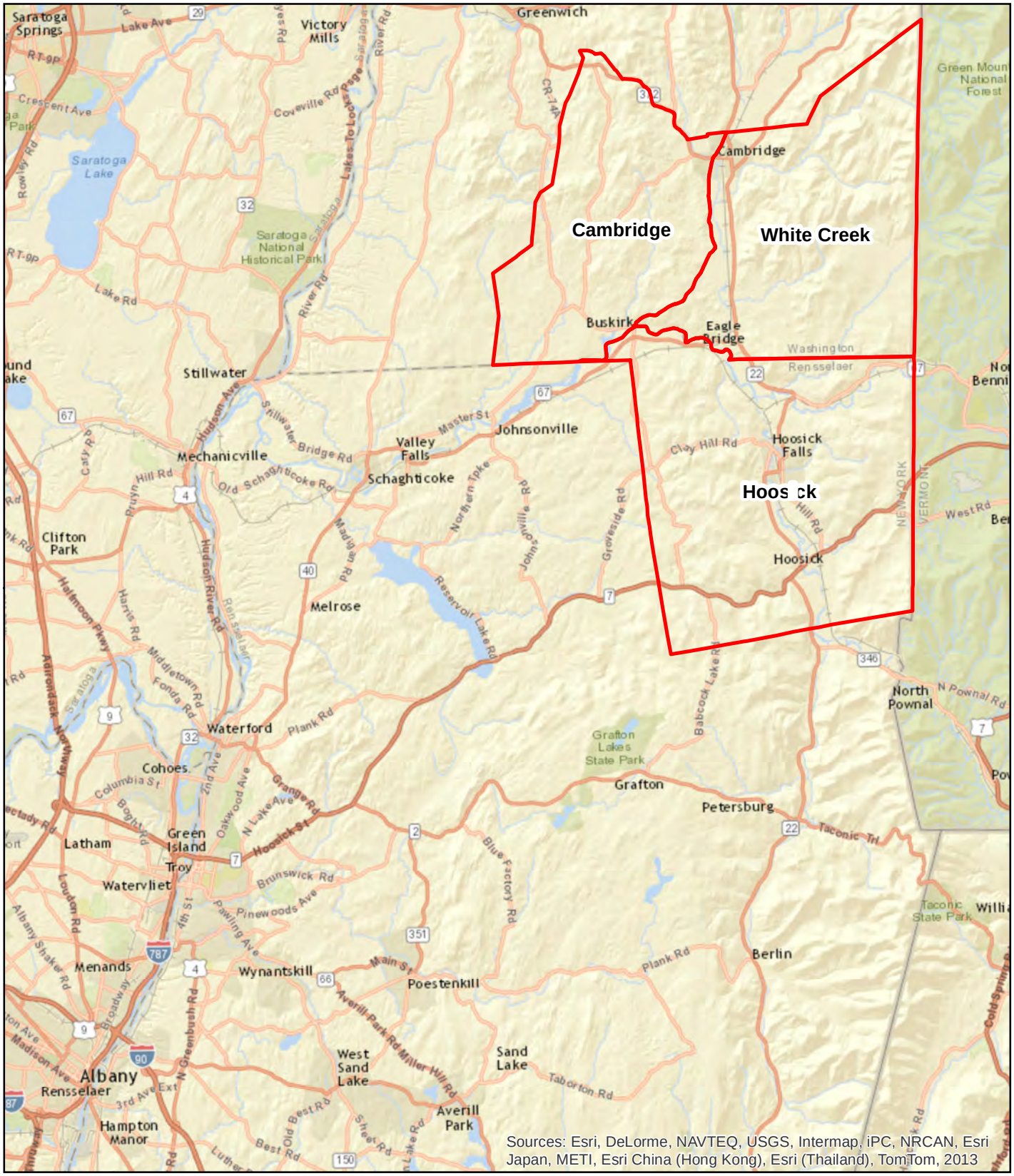
4.6 O&M Data Management

Similar to the sample collection data management, during O&M activities the crews will collect routine data from the treatment systems, including HF system number, a recording of water usage, UV counter, activities completed (filter replacements, etc.), and other relevant data which will be recorded on-site with a tablet computer equipped with data collection software. Notations regarding system-specific characteristics will also be recorded for reference.

Data will be incorporated into SharePoint databases for use by data processing, call center, and project staff. Weekly and monthly reports will be created to identify and prioritize locations requiring O&M activities, and routine progress meetings will be held with NYSDEC to coordinate project efforts.

Appendix E includes the current schedule for routine deliverables produced by the data management group. Periodic site management reports will also be generated to distribute summaries of routine project activities and items of note. Reports will summarize number of property owners contacted, number of systems scheduled for sampling and maintenance, number of systems where samples were collected or repairs completed, and additional items of note regarding project activities.

FIGURES



0 1 2 4 6 8 Miles

N

Legend

Subject Municipalities

NYSDEC DIVISION OF ENVIRONMENTAL REMEDIATION
HOOSICK FALLS PFOA POINT OF ENTRY
& POINT OF USE TREATMENT SYSTEMS

SITE LOCATION
SPILL NO. 1511059

ARCADIS Design & Consultancy for natural and built assets

FIGURE
1

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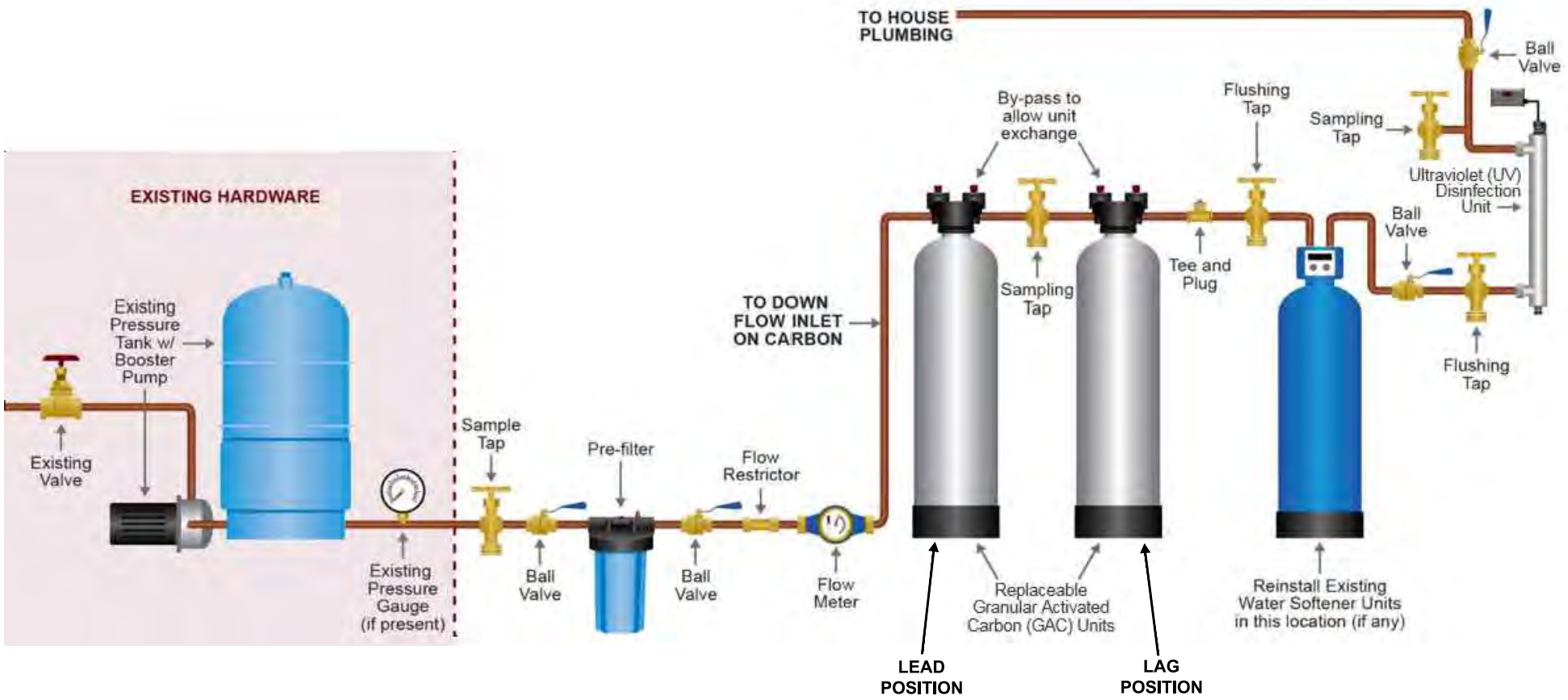

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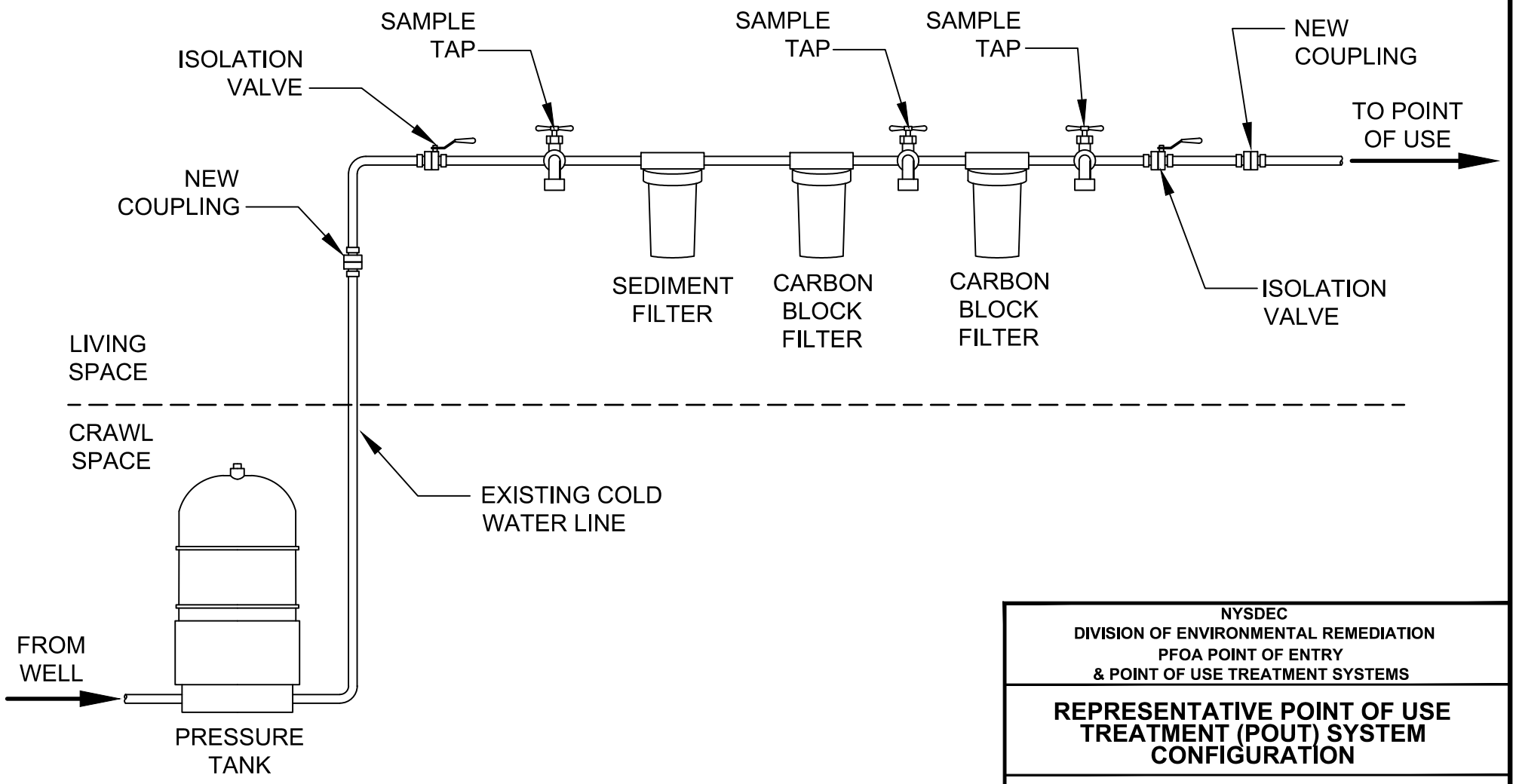
PFOA POINT OF ENTRY
& POINT OF USE TREATMENT SYSTEMS

TYPICAL POINT OF ENTRY TREATMENT (POET) SYSTEM CONFIGURATION

ARCADIS | Figure 2

USER: HAUSMANN FILENAME: C:\ACAD\PROJ\00266442.0000\FIGURES\FIG 3-POUT DIAGRAM-NEW.DWG FILE SAVE DATE: 2/2/2017 8:45 AM PLOT DATE: 2/2/2017 9:41 AM



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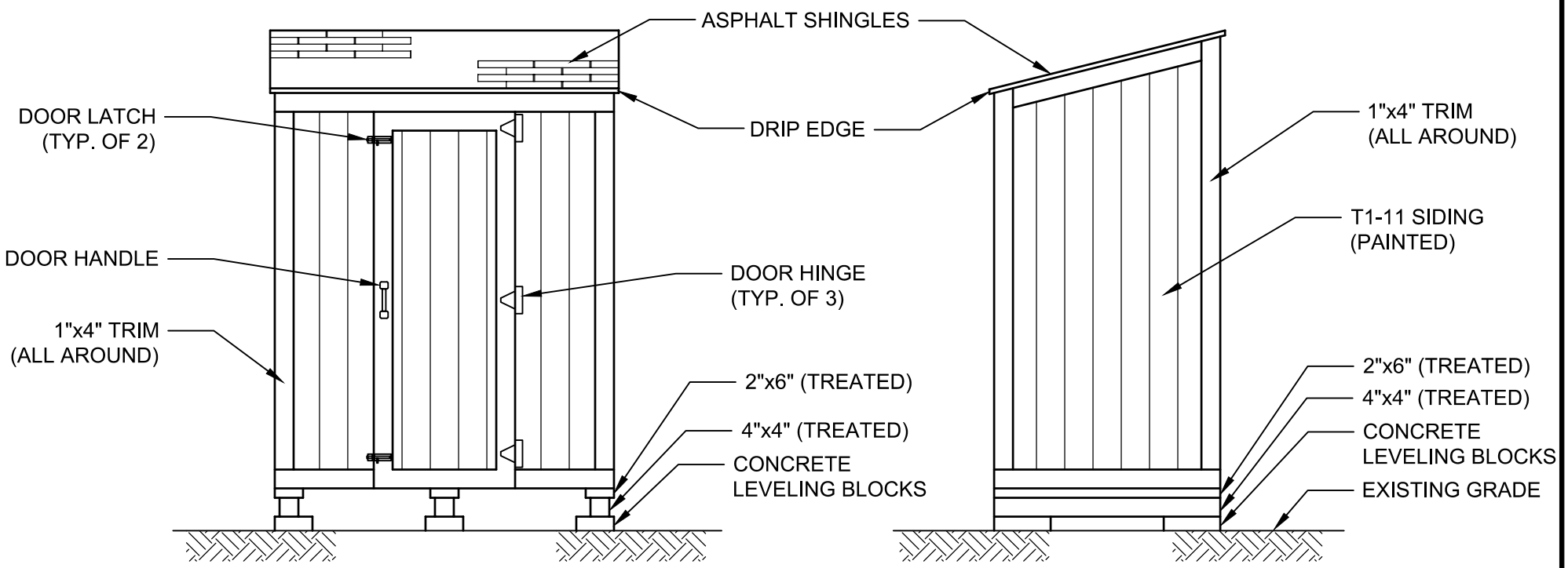
PFOA POINT OF ENTRY
& POINT OF USE TREATMENT SYSTEMS

REPRESENTATIVE POINT OF USE TREATMENT (POUT) SYSTEM CONFIGURATION

ARCADIS | Figure 3



FRONT VIEW
NOT TO SCALE

SIDE VIEW
NOT TO SCALE

NOTE:

DETAILS MAY BE MODIFIED BASED UPON SITE SPECIFIC CHARACTERISTICS.

DETAILS:

- INSULATION - RIGID BOARD, WALLS R19, CEILING R38, FLOOR R30.
- PAINT - EXTERIOR LATEX FLAT, PAINT WITH PRIMER, WHITE.
- DIMENSIONS - FLOOR PLAN 4' x 6', HEIGHT 7' FRONT AND 8' REAR.
- ROOF PITCH - 2.5 ON 12 (I.E. 2 1/2" RISE IN 12")
- HARDWARE - GALVANIZED 3" BARREL BOLTS (2 EA.), 4" TEE HINGE (3 EA.), 6" DOOR PULL.
- FASTENERS - EPOXY OR CERAMIC COATED SCREWS.
- DECK JOISTS & SLEEPERS (4"x4") - USE TREATED LUMBER FOR GROUND CONTACT.
- FLOOR - 2"x6" JOISTS WITH 3/4" PLYWOOD DECKING, RIGID BOARD INSULATION BETWEEN JOISTS.
- WALLS - 2"x4" WITH 5/8" T1-11 SHEATHING, RIGID BOARD INSULATION (2" THICK) BETWEEN STUDS AND 1" OVER STUDS.
- ROOF - 2"x6" RAFTERS WITH 3/4" PLYWOOD, 15 LB. TAR PAPER, ASPHALT SHINGLES, RIGID BOARD INSULATION BETWEEN RAFTERS, 2" OVER BOTTOM OF RAFTERS.

NYSDEC
DIVISION OF ENVIRONMENTAL REMEDIATION
PFOA POINT OF ENTRY
& POINT OF USE TREATMENT SYSTEMS

TYPICAL POINT OF ENTRY TREATMENT (POET) SYSTEM ENCLOSURE

ARCADIS | Figure 4

Figure 5
Treatment System Service Label & Water Main Valve Tag

NYSDEC Division of Environmental Remediation
POET Systems Site Management

NEW YORK STATE OF OPPORTUNITY. Department of Environmental Conservation

ATTENTION

Point of Entry Treatment System in operation.
Do not alter or disconnect. If for any reason you believe that the system is not working properly, call:

New York State Department of Environmental Conservation
toll-free at: 1-888-459-8667 for service or inspection.

(Description, Date)

System Installation.....

Maintenance/Inspection Activity .....

Maintenance/Inspection Activity .....

APPENDIX A

NYSDEC POET System Specification

New York State Department of Environmental Conservation (Department)
Point of Entry Treatment (POET) System Specification

Table of Contents

New York State Department of Environmental Conservation (Department) Point of Entry Treatment (POET) System Specification

I. POET System General Requirements

a. The POET system, described herein, is for use in residential properties, individual single family homes to four unit apartment buildings, and certain commercial establishments. Providing similar water treatment for a facility determined to be a public water supply, regulated by the New York State Department of Health (NYSDOH), may include additional requirements.

b. The Contractor shall comply with the NYSDOH Environmental Health Manual CSFP 530, dated November 6, 2000, entitled "Individual Water Supplies – Activated Carbon Treatment Systems" or the most recent version. Additionally, the Contractor shall comply with attachment 1, 10 NYCRR Appendix 75-B, effective December 1, 1990, entitled "(IWS Treatment Devices)" or the most recent version.

c. The Contractor shall furnish all labor, tools, and equipment necessary to provide a complete operating water treatment system as described below, and if directed by the Department, shall provide continuous operation and maintenance of the installed systems, including all required water sampling.

d. The POET system must be installed by a qualified person based on their training and experience and/or based on any specific qualifications as may be required per applicable regulation, code, etc. of the municipality where the POET is installed.

e. The majority of systems to be installed will be utilized for the removal of organic chemicals such as chlorinated solvents and petroleum hydrocarbons from drinking water wells. The systems will be referred to herein as the "Standard System", and shall include, at a minimum, the equipment and appurtenances indicated on the schematic diagram.

f. Greensand filters, water softeners, flow restrictors and chlorinators will not be required in all systems and shall be installed on an as-needed basis as determined by the Department. When required, these units are subject to the same installation criteria as the Standard System. The Department will notify the Contractor when installation of other than a Standard System is required and the additional or modified equipment will be subject to the Department's approval.

g. The Contractor shall contact owners and conduct pre-installation inspections to verify well capacity, system information and proper orientation, and notify the Department of any constraints for a Standard System. The Contractor shall also contact the owners to arrange for installation of the treatment systems and to perform system maintenance and water sampling as required. The Contractor shall obtain any and all required permits, licenses, and inspections. The Contractor shall perform any and all sampling and analyses required prior to installation of the system. The Contractor shall install, monitor, and service the treatment system as required by the Contract.

h. All tanks and treatment equipment installed under this specification shall use non-toxic materials. All coatings must comply with the NSF and American National Standards Institute (NSF/ANSI) Standard 61 for use in potable water systems, where appropriate.

In general, this work will include, but is not limited to:

i. Contacting the individual installation customers to arrange for a time when the necessary installation may be made and/or maintenance and sampling events may be performed.

ii. Informing the individual installation customers of the space requirements for the necessary equipment.

iii. Arranging for and obtaining any and all required permits, licenses, and inspections.

iv. Furnishing and installing the POET system, along with any supports, fittings, copper pipe, etc. required for the installation.

v. Performing maintenance as detailed under “Scheduled Maintenance” (Section I.i) for the duration of the work.

vi. Clean up after installation and/or after any maintenance/sampling activities have been completed.

vii. Completing any electrical wiring, per local code, required to provide a source of power for the Ultraviolet Disinfection Units.

viii. Making repairs and/or changes following any inspection of individual installations, to provide for an acceptable (code-compliant) system. Repair/Changes of this nature are to be performed at no additional cost.

ix. Collecting required water samples from the completed system and shipping or transporting the samples to an approved laboratory. All samples shall be collected following the sampling procedures in DER’s Spill Guidance Manual and DER-10 and/or the Contractor shall provide a written Standard Operating Procedures (SOP) for sampling for the Department’s approval.

x. Providing for a twenty-four (24) hour, seven (7) day per week answering service, such that the Contractor can receive notice to install, monitor, replace, or maintain a water system at any time, and then provide the required services within twenty-four (24) hours of such notification.

xi. Proper disposal and/or regeneration of spent activated carbon.

xii. Providing for unscheduled maintenance or other services within twenty-four (24) hours of notification as provided for in part x. above.

xiii. The Contractor shall undertake every effort to ensure that the manufacturer's warranties are maintained in full force through the manufacturer's warranty period. Any repairs to the system during the warranty period shall be made at no cost to the Department.

i. The Contractor shall supply and install piping, valving, sampling taps, fittings, hangers, and all other components not listed herein but required to provide a functioning installation. Nothing in this section shall be construed as indicating that anything other than a completed, fully functioning installation is required.

II. POET System General Specifications

a. The water treatment system shall be installed as shown on the schematic diagram (Figure 1). Adjustments may be allowed to: a) provide easy access for sampling and/or periodic replacement of appropriate units, b) account for space limitations, c) address resident's requests, and/or provide for proper operation of the system. It shall be the responsibility of the Contractor to visit the project area to become familiar with the type of construction employed and possible obstacles which may be encountered in completing the installation. The Department shall not be held responsible for claims made by the Contractor as a result of its failure to do so. The Standard Water Treatment System installed and supplied is illustrated as on the schematic diagram and consists of:

All components, tools, and accessories used in this process must be known to be Teflon-free (including free from substances that may contain perfluorooctanoic acid or perfluorooctane sulfonic acid) and must be rated for use in potable water systems.

No Teflon tape or pipe joint compound containing Teflon is to be used on any system installs. All system piping and fittings shall be 1/2",3/4", or 1" copper and consists of:

- 5/8" by ¾" water meter
- 1/2", 3/4", or 1" ball valves
- ¾" gate valves
- ¾" check valves (only in commercial systems and if necessary)
- ½" sampling ports
- Water pre –filtration unit with cartridge (5 micron), 12 replacement cartridges are to be left at the residence
- Activated carbon vessels with a minimum capacity of 2 cubic feet each.
- GAC must be Calgon FILTRASORB 600 AR Plus or equivalent GAC that meets ANSI/ AWWA B604 Granular Activated Carbon and ANSI/NSF 61 Drinking Water System Components - Health Effects standards as approved by the Department.
- Ultraviolet light with a minimum dosage of 40,000 microwatts sec/cm2, and that is designed to operate with 120V-60Hz AC current. The unit should include a manufacturer-installed 6-8 foot grounded plug. The unit must be equipped with an audio and visual alarm to indicate if light intensity drops below minimum.

- Ground Fault Interrupt circuit. The UV unit must be powered through a GFI receptacle.
- Miscellaneous piping, fittings and appurtenances necessary to complete the installation.

b. All materials furnished by the Contractor shall be subject to approval by the Department, and must be approved for use in potable water supplies, and meet all local building codes/ordinances governing plumbing. The Contractor shall provide properly trained personnel for the installation and maintenance of the system who meet the appropriate health and safety requirements of all applicable local, State, and Federal rules, laws and regulations.

   i. Restrictions on use of Lead-Containing Materials: Currently, all products certified by NSF as compliant with Annex G are also compliant with NSF/ANSI 372. No additional testing is required beyond the normal routine monitoring of certified products. Additional information can be found at the NSF website at www.nsf.org. The listings of products currently certified by NSF to Annex G will continue to bear the [G] certification footnote:

      [Current Footnote]
      [G] Product complies with NSF/ANSI 372 and conforms with lead content requirements for "lead-free" plumbing as defined by California, Vermont, Maryland, and Louisiana state laws and the U.S. Safe Drinking Water Act in effect January 4, 2014]

c. All pipe fittings furnished by the Contractor shall be ¾" or 1" copper, appropriate for potable water systems, unless otherwise approved. All electrical wiring and fixtures shall be Underwriters Laboratories (UL) approved. No leaded solder may be used for pipe fitting installation work and all solder must be approved for use in potable water systems. All tanks and treatment equipment installed under these specifications shall use non-toxic materials and all material coatings must be approved by the NSF for use in potable water systems, where appropriate.

d. The Contractor shall be required to remove the POET system when and as directed by the Department. The treatment system shall be removed from the premises and properly salvaged or disposed of by the Contractor.

e. After the installation, each system is to be thoroughly flushed and inspected for leakage under normal house pressure by the Contractor prior to acceptance. The Contractor shall notify the Department upon completion of each installation and provide a completed Installation Checklist and arrange for inspection of the units and subsequent approval.

III. POET System Detailed Specifications

a. Granular Activated Carbon (GAC) – The Contractor shall supply and install GAC vessels meeting the specifications. Only virgin GAC may be used. Upon notification by the Department, the Contractor shall remove and dispose of spent GAC. Such removal shall be performed consistent with applicable local, State and Federal requirements as specified.

b. Granular Activated Carbon Vessels – GAC vessels are to be supplied and installed as part of the treatment system and shall be construed to meet the following requirements:

i. Units shall be downflow design and constructed of stainless steel, nylon, or fiberglass wound ABS plastic approved for use for potable water supply purposes.

ii. Each vessel is to be supplied with manually operated pressure venting, or heads that allow venting, as well as inlet and outlet shut-off valves which permit the removal and replacement of the vessel without the need for auxiliary valves.

iii. Vessels shall be supported in an upright position with a stand of approved construction firmly fixed to the bottom of the vessels.

iv. All vessels are to be equipped with an inlet distribution and an outlet collection device.

v. Vessels should be sized to allow for 100% removal of contaminants by the lead vessel.

vi. All vessels shall have a normal inside diameter of no less than nine (9) inches and an effective height of no less than thirty-six (36) inches. For purposes of this part the height will be measured from the bottom of the bottom-most outlet of the distribution device to the top of the uppermost outlet on the collection device. Only that depth having a corresponding nominal cross-sectional dimension of nine (9) inches maximum may be included in the effective depth calculation. For locations where there is insufficient head room (e.g., basement crawl space), a solution will developed by the Contractor and approved by the Department before installation.

vii. The flow rate through the carbon treatment unit shall not exceed ten (10) gallons per minute per square foot of cross-sectional surface area (in one vessel), or as dictated by the GAC provider. Flow rates will be controlled by a flow limiting device, if necessary, to maintain the proper hydraulic loading rate. The flow limiting device should be installed as shown on Figure 1.

viii. All GAC vessels are to be approved by the NSF for potable water use, as appropriate.

ix. The clear water head loss through each GAC vessel, with no carbon installed, shall be certified by the vessel supplier to not exceed two (2) psi at flow rate of five (5) gpm.

x. GAC vessels are to have a minimum working pressure of one hundred (100) psi and a minimum operating temperature rating of not less than one hundred degrees Fahrenheit (100°F).

xi. Contractors must furnish detailed specifications for the GAC vessels and associated equipment.

xii. GAC vessels equipped with an integral threaded distribution/collection cap shall have the cap secured to the vessel with a minimum of six (6) No. 8 threads and O-ring rubber gasket to form a tight seal.

xiii. Inlet and outlet connections on the vessels shall be National Pipe Thread (NPT) with a diameter at least equal to that of the system piping, and in no case less than ¾".

xiv. Regardless of the type, the minimum accessible clear opening on the GAC vessels shall not be less than 2 ½" in diameter.

xv. Bolted caps, if used, shall be firmly affixed to the GAC vessels with a minimum of eight (8) bolts spaced at equal intervals and sealed with a ¼" form-fitting rubber gasket or equivalent.

xvi. Strainers supplied with the vessels shall have a maximum clear opening of 0.40 millimeters and must be manufactured of high impact plastic or stainless steel.

xvii. Drop pipes extending from the head of the vessel to the collection strainer must be manufactured of high impact plastic or stainless steel.

c. Particulate Filters: Particulate filter units to be installed to remove dirt, sediment or other particulate matter from the well water before processing in the POET system. The particulate filtration units shall conform to the following specifications:

i. The filtration units shall use replaceable filter media consisting of either bags or cartridges. Specifications for the media are included in part III.d of these specifications.

ii. Each filtration unit shall be equipped with a manually operated pressure relief valve and required O-rings and shall be installed so as to permit the normal removal and replacement of the filter media by hand without auxiliary valves.

iii. The filtration housing shall be plastic or stainless unless otherwise approved by the Department.

iv. The filter units shall be approved by the NSF for potable water supply use.

v. The maximum allowable head loss through the unit at a filtration rate of five (5) gallons per minute, and with a clean filtration cartridge installed, shall be three (3) psi.

vi. Each filtration unit shall have a minimum operating pressure rating of one hundred (100) psi and a minimum operating temperature rating of not less than one hundred degrees Fahrenheit (100°).

vii. The filtration unit shall be furnished with ¾", or greater, NPT inlet and outlet connections.

viii. Each unit shall be supplied with an installed filtration cartridge satisfying the requirements of Section III of these specifications.

d. Particulate Filter Media: Cartridges are to be compatible with the filtration unit supplied under Section II of these specifications. For the duration of the Call Out, twelve (12) replacement cartridges are to be left with each installed unit on an annual or as needed

basis. The filter cartridge is to be replaced monthly or upon a noticeable drop in water pressure. Particulate filter cartridges shall satisfy the following requirements:

i. Cartridges shall be constructed of cellulose, glass-cellulose or polypropylene matrix.

ii. Cartridges shall have a progressive density structure to provide for maximum solid retention.

iii. Cartridges shall be supplied with all required O-rings or gasket seals.

iv. Clean filter cartridges, when installed in a filter housing satisfying the requirements of Section II of these specifications, shall be capable of processing design flow with a maximum pressure drop of three (3) psi.

v. Cartridges shall have a minimum operating pressure of one hundred (100) psi and a minimum operating temperature of 100 degrees Fahrenheit (100°F).

vi. All cartridges shall be designed to remove suspended matter with a size of 5.0 microns or greater.

vii. In some cases, cartridges shall also be impregnated with an oxidizing agent to enable the filtration units to remove both dissolved and colloidal iron and manganese.

vii. Contractors are expected to supply the pressure curves, relating flow to head loss through the cartridge and the estimated removal efficiencies and cartridge life expectancy for the removal of dissolved iron and manganese, for the cartridge to be furnished.

e. UV Disinfection Units:

i. An ultraviolet disinfection unit shall be installed in the treatment system as indicated on the schematic diagram figure 1. The installation shall include all appurtenant wiring, controls, and piping necessary to provide a functional unit.

ii. UV disinfection units and their maintenance may be considered optional items at the discretion of the Department. (For public water supplies with external distribution systems, post treatment disinfection with sodium hypochlorite should be provided to maintain a chlorine residual in the system)

iii. The following requirements shall apply to the UV disinfection units:

- The UV disinfection unit shall consist of a UV lamp mounted in a totally enclosed steel housing
- The unit shall come equipped with NPT inlet and outlet connections at least equal to the diameter of the system piping and in no case less than ¾”
- With new lamp installed, the unit shall have a minimum dosage of forty thousand (40,000) microwatts sec/cm^2 at a flow rate of five (5) gpm
- Units shall be designed with a maximum operating pressure rating of at least one hundred twenty-five (125) psi and an operating temperature range of forty (40) to one hundred (100) degrees Fahrenheit

- Units shall be capable of processing with a head loss of no greater than two (2.0) psi at five (5) gpm
- Each unit shall be designed to operate with 120V – 60 Hz AC current and come equipped with a manufacturer-installed six (6) to eight (8) foot grounded electrical cord and plug. All electrical components shall be approved by the Underwriters Laboratory or equivalent reviewing agency
- A ground fault circuit interrupter protected outlet should be supplied to plug the UV light into
- Lamp casings shall be stainless steel, unless otherwise approved by the Department
- Each unit shall come equipped with mounting brackets for mounting onto a fixed surface
- Units with a view lens shall be equipped with a filtered lens that allows for the safe inspection of the lamp operation emission by eliminating the exposure of ultraviolet radiation to the inspector.
- Each UV disinfection unit shall have a sending device equipped with both a visual and an audio warming alarm which shall be activated when the ultraviolet light source intensity falls below a minimum intensity level (for public water suppliers, an automatic shut-off or a flow diversion valve shall be provided to prevent inadequately disinfected water from entering into the water system, if the ultraviolet light source falls below a minimum intensity level)
- Each sending unit shall have an adjustable calibration control for manually adjusting the intensity below which the device shall activate the alarm
- Prior to installation of the ultraviolet disinfection unit, a raw water sample should also be collected and analyzed for the parameters listed below to determine the need for and type of supplemental pretreatment in addition to particulate removal. Any proposed pretreatment must be authorized by the Department.

f. Water Flow Meter:

   i. Water meters shall conform to the American Water Works Association, Standard C 710-95 and:
      - Shall be 5/8" X ¾"
      - Shall be frost free type
      - Shall be furnished with coupling nuts and tail pieces
      - Shall read in United States Gallons
      - Shall be remote, sealed register
      - Coupled drive shall be provided
      - The main meter casing may be of a polycarbonate (fiberglass reinforced) synthetic polymer, or bronze

g. Gate Valves: Gate valves shall be ¾", on hundred twenty-five (125) pound bronze. They shall be rated for two hundred (200) psi non-shock cold water. Valves shall be non-rising stems.

h. Ball Valves: Ball valves shall be ½" or ¾," one hundred twenty-five (125) pound bronze, rated for two hundred (200) psi non-shock cold water. Valves shall have an operating lever.

i. Check Valves: (if used) Check valves shall be ¾", horizontal swing, Y-type one hundred twenty-five (125) pound bronze with renewable discs. They shall be rated for two hundred fifty (250) psi non-shock cold water.

j. Sampling Taps: Sampling taps shall be installed as shown in figure 1 in order to sample raw water, water between carbon filters, and treated water. The taps shall consist of the following fittings, a ¾" x ¾" x ½" copper 90° ell (long radius), or ¾" x ¾" x ¾" Tee, and a ¾" gate valve. All fittings are to have a minimum pressure rating of one hundred twenty-five (125) psi non-shock cold water. If hose bibs are used, they must include a backflow preventer.

k. Pressure Gauges (if used): Pressure gauges shall be installed as shown in figure 1 (i.e., before the prefilter and before and after the activated carbon unit). The gauges shall have a single faced 1 ½" dial with a scale range of zero (0) to one hundred (100) psi. The gauges shall be constructed with a drawn steel casing, phosphor bronze Bourbon tube, brass movement and ¼" NPT male bottom connection. Pressure gauges should fit into a ¾" x ¾" x ½" copper tee with a ½" sleeve tapped for a ¼" NPT. Accuracy shall be two percent (2%) total scale range.

l. Granular Activated Carbon

Parameter	Requirement(s)
Parent Material (virgin)	Bituminous Coal, Coconut Shell, or Lignite
Approved Product(s)	Calgon Filtrasorb 600 AR Plus or equivalent
Nominal Mesh Size (U.S. Sieve Series)	12 x 40
Apparent Density (acceptable range) (lb/ft^3)	24 - 38

The contractor shall ensure that the carbon has been prepared and analytical data demonstrates that the carbon will have no backwash characteristics that result in an exceedance of NYS or federal drinking water standards.

m. Ultraviolet Disinfection Unit – Pre-Installation Water Quality Analysis

Parameter	Upper Guidance Levels
Iron	0.3 mg/l
Manganese	0.05 mg/l
Hardness (calcium)	300 mg/l[1]
Hydrogen Sulfide	1 mg/l
Turbidity	1 NTU

[1] Hardness equivalent of 17.5gpg (300 mg CaCO3/l) or greater would need softening

Raw water quality data, for existing sources only, is necessary to determine the need for supplemental pre-treatment, in addition to particulate removal, prior to installation of ultraviolet disinfection unit. All testing is to be performed using field test kits acceptable to the Department. In some instances it may be necessary to send confirmatory samples to be analyzed by an ELAP certified laboratory.

IV. POET GAC Vessel Preparation and Assembly Procedures

This section defines the procedures used to assemble, hydrate, backwash, and otherwise prepare Granular Activated Carbon (GAC) vessels for use in Point of Entry Treatment (POET) systems. These procedures have been developed to aid Department staff and contractors assigned to complete these tasks, and must be completed in accordance with the requirements and guidance provided herein, unless otherwise approved by the Department.

a. Assembly Instructions

For ENPRESS vessels equipped with Vortech diffusers, which do not need a gravel pack, skip Step 1 and go directly to Step 2.

ENPRESS vessels with Vortech diffusers are readily identified by the Vortech decal located near the bottom of the vessels. These vessels have a plastic “flower” diffuser permanently affixed across the entire vessel bottom with a fixed riser and do not need any gravel pack. Look inside the vessel with a flashlight to see the “flower” if there is any question.

Example: vessel with gravel pack (left), ENPRESS vessel with Vortech diffuser (right)

Vessel with gravel pack ENPRESS vessel with Vortech

Preparation Steps

i. Adding Gravel to non-Vortech vessel (e.g. Clank, Structural, Canature, etc.):

- Un-screw, by hand, the manifold from top of vessel (if so supplied).
- Insert the removable basket diffuser and riser pipe into the notch at the bottom-center of the vessel.

NOTE: The top of riser pipe, when properly seated in the bottom of the vessel, should be flush with the top of the vessel. If the top of the riser pipe is above or below the top of the vessel, the riser should not be used unless it can be confirmed that the riser will reach and seat in the O-ring of the manifold being used, or not be so tall as to prevent complete installation of the manifold.

- Place a plastic cap on, or otherwise plug, the top of the removable riser pipe to prevent gravel from entering the riser pipe during the fill process.
- Place the manufacturer-supplied funnel (blue) in the top of the vessel.
- Add 1.5 gallons (by volume) of No. 3 gravel to the vessel bottom (10" or 12" diameter vessel) using a 5-quart plastic bucket to pour gravel through funnel. This volume of gravel will just cover or be slightly above the basket diffuser.

ii. Adding GAC Media to the Vessel:

NOTE: THIS STEP MUST BE CONDUCTED IN A WELL VENTILATED AREA WITH RESPIRATORY PROTECTION.

- Place a plastic cap on, or otherwise plug, the top of the riser pipe to prevent GAC from entering the riser pipe during the fill process.
- Place the manufacturer-supplied funnel (blue) in the top of the vessel.
- Pour GAC media into the vessel until approximately 2/3 full. Do not completely fill the vessel with GAC, or there will be no room for bed expansion during backwashing. Gently shake vessel periodically to ensure that the GAC media settles without voids or bridging.
- Remove the plastic cap or other plug from the top of the riser pipe.
- Place the appropriate manifold on the vessel until GAC hydration is performed.
- The non-Vortech gravel-packed vessels may pose a problem with the riser "floating" out of the vessel when not confined by the manifold, or when exchanging manifolds. Application of NSF approved, safe for potable water lubricant on the O-ring where it contacts the riser pipe may help when exchanging manifolds.
- Write the initials of the vessel assembler and date of assembly on the top of the vessel, or otherwise label as directed.

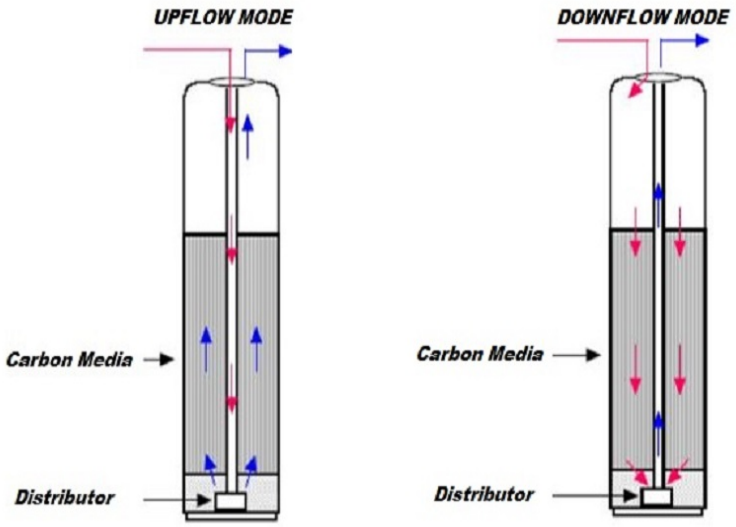
NOTE: There is an O-ring in the manifold that may be hard to reach with the filter basket in place. In this case, the top of the riser pipe can be lubricated with NSF-approved lubricant.

NOTE: When attaching the filter basket to the manifold, twist the basket until it clicks into the locked position (this may require considerable strength). Once locked, it cannot be removed by twisting in the opposite direction. Be sure the basket is secure before installing the manifold.

b. GAC Hydration - UPFLOW MODE:

BEFORE CONTINUING, THE FOLLOWING INFORMATION SHOULD BE REVIEWED AND UNDERSTOOD.

There are two possible flow configurations for the POET GAC vessels:



UPFLOW – water enters through the riser pipe and travels up through the GAC bed
DOWNFLOW – water travels down through the GAC bed and exits through the riser pipe

NOTE: Hydrate and Backwash the filters in the UPFLOW configuration. Settle the GAC media, install and operate the filter in the DOWNFLOW configuration.

NOTE: The following steps assume a clean, clear and potable source of water has been established and can be delivered at a flow rate of between five (5) and eight (8) gallons per minute (gpm). A potable water supply manifold (Figure 1) with flow meters and appropriate valves for control and throttling of flow is needed for backwashing more than one cylinder at a time.

NOTE: GAC must be properly hydrated before use. Otherwise, air trapped in the GAC grains can cause GAC loss during backwashing (due to buoyancy) and interfere with contaminant uptake. For gravel-diffused vessels, hydration must be done carefully to prevent the riser from "floating," or rising out of the gravel. For this reason, GAC hydration should be performed with the vessel manifold in place.

- Plumb the vessel manifold to the potable water supply and waste lines in the UPFLOW configuration.
- Slowly add clean potable water until the vessel is completely filled.
- The GAC grains will take up water during the hydration phase. Periodically check the water level in the vessel and ensure that the GAC is completely immersed in water.
- Leave the downflow inlet valve open so air can be released.

NOTE: Due to the bubbling that occurs during the GAC hydration process, some water may be discharged from the vessels.

- Allow the GAC to soak in water for a minimum of 24 hours.
- Record the date and start/end time of the hydration period on the outside of vessel

NOTE: DO NOT ALLOW VESSEL TO SIT FOR MORE THAN 3-4 DAYS PRIOR TO BACKWASHING.

c. Backwashing – UPFLOW MODE:

- Plumb the vessel manifold to the potable water supply and waste lines in the UPFLOW configuration.
  - Manifold Type A (Figure 2 - left): Connect the clean water supply line to the UPFLOW fitting and the waste line to the DOWNFLOW fitting.
  - Manifold Type B (Figure 2 - right): Connect the clean water supply line to the side labeled "IN" and the waste line to the side labeled "OUT".
- The backwash curve from the GAC manufacturer is in units of gpm/sq.ft. The 10" and 12" diameter vessels have a cross-sectional area of approximately 0.5 and 0.8 sq.ft., respectively. According to the backwash curve attached (Figure 3), the manufacturer's recommended bed expansion of 20-30% corresponds to **6 gpm for the 10" vessels and 7-8 gpm for the 12" vessels**. DO NOT FLUSH AT A HIGHER FLOW RATE as bed expansion can force GAC grains against the top screen and out of the vessels.
- Slowly open the water supply valve at each of the flowmeters and increase the flow rate to 6 gpm or 8 gpm depending upon vessel size. Backwash each vessels for a total of 75 gallons or until the water flowing from the waste line is clear (i.e., it contains no visible GAC particles/fines).
- The flowmeters cannot be zeroed, as they measure total accumulative flow to the hundredth of a gallon. Therefore, the initial number indicated on each flowmeter must be recorded and 75 gallons ADDED to this number to determine the final target total for each tank.
- Upon completing the high volume backwash to remove GAC fines, collect a small sample of water from each waste line and check for floating particles. If present, continue to backwash until no particles are present.
- After the fines have been removed, reduce the flow rate to achieve a 10 minute Expanded Bed Contact Time (i.e., volume of carbon bed (gallons) divided by 10 minutes) as required by the size of the tank and carbon bed volume (e.g., 1.7 gpm for a 10 inch diameter, 54 inch tall cylinder with 1.6 ft^3 of GAC). Flush a total of 20 bed volumes through the vessel at the reduced flow rate (e.g., 239 gallons for a vessel with 1.6 ft^3 of GAC). For locations where there is limited water available for tank preparation, flush a total of 150 gallons.
- If flow diminishes in the waste line of a given vessel, pulsing the inlet valve may help clear a blockage.
- If pulsing the flow does not restore flowrate, then briefly change to DOWNFLOW mode by temporarily switching hose configuration. Once the required backwash flowrate is re-established, return to UPFLOW mode, and continue the backwash.
- Watch all tanks that are discharging carbon at a high rate, and use a clear or white container to capture a discharge sample for observation. It is quite obvious if dust or

carbon granules (solid media) are being flushed. An internal tank problem is rare,but a failure can allow the carbon media to flush out. Be on the look-out for any major discharge of tank media.

d. GAC Settling and Final Inspection – DOWNFLOW MODE:

- Once backwash is complete, reverse the potable water supply hoses and flush for approximately five minutes at five gpm, or 30 gallons, in the DOWNFLOW mode to settle the GAC media in vessel. For locations where there is limited water available for tank preparation, flush 25 gallons.
- If the vessel manifold is removed after settling, a flashlight should be used to inspect the GAC level in the vessel. If necessary, a shop-vac with a pipe fitting can be used to remove water from the riser pipe and expose the GAC surface. Refill the vessel with water after inspection.
- Attach a tag to top of vessel with the initials of who performed the work, as well as the backwash date and time (or some alternate tracking information).

e. Final assembly:

- If not already in place, screw the manifold onto the top of the vessel and tighten (be sure the white filter basket is attached to bottom of manifold).

NOTE: Check for missing or damaged O-rings. There is an O-ring that contacts the riser pipe and an O-ring that contacts the top of the vessel. BOTH must be present.

NOTE: put a small film of NSF-approved lubricant on all O-rings before assembly, including valve assemblies.

- Create and print VESSEL ID label using the attached naming convention (Figure 4) and attach to the top of vessel just below manifold.
- Attach a sticker indicating the type of GAC (e.g. F 600 AR+ 12X40).

NOTE: If Manifold Type B is used, the in and out arrows can be reversed by removing the four crosshead screws and rotating the head 180 degrees for either DOWNFLOW or UPFLOW mode and replacing the screws. Verify that the “in” arrow is the DOWNFLOW mode. Connect paper tag to the side of the manifold labeled “in” to ensure the vessels are installed in the DOWNFLOW configuration.

NOTE: DO NOT ALLOW VESSEL TO SIT FOR MORE THAN 3-4 DAYS PRIOR TO INSTALLATION IN THE RESIDENCE.

NOTE: If the holding time on a backwashed vessel expires, the vessel can be “freshened” with a 10-15 minute backwash (1-2 bed volumes), followed by a brief period of DOWNFLOW settling as described in Step d. above. A new holding time is then established.

Installation Notes:

1. An experienced GAC installer must conduct a pre-installation evaluation to identify complicating matters (low headroom, unique well system). Good documentation is necessary for this step; get the information to the installer, if different.

2. After installation, have the user run water to remove entrapped air in the entire system and identify other concerns while you're still there to allow for questions, problem identification.

3. The first half-dozen or so GAC installations for a plumber will take significantly longer than planned.

4. Don't begin an installation too late in the day (after 3pm) to allow adequate time to procure unexpected supplies.

5. If there is a need for a large number of installations, use a standardized manifold and GAC system (GAC vessels, particulate filters, UV unit). This improves long term operation & maintenance efficiency.

NOTE: PRIOR TO CONNECTING THE SECOND GAC VESSEL TO HOMEOWNER'S PLUMBING SYSTEM, A FLUSH OF THE SYSTEM SHOULD BE CONDUCTED TO ENSURE THAT NO GAC FINES ARE PRESENT.

V. POET Sampling Plan and Procedures

a. Sampling Plan: After the POET system has been installed, at least three times the POET system empty volume (typically approximately 50 gallons for a total of 150 gallons) must be run through the system prior to sampling to ensure that the water sampled is representative of treated well water.

Requirements for sampling of the POET system will be established by the Department on a case-by-case basis. Typically, sampling after installation will consist of drinking water volatile organic compounds (VOCs, to determine if there are any organic compounds in the well water that could load the GAC with compounds other than the target compound) and total coliforms to determine if there is bacterial contamination in the well water (other site-specific requirements may be included by the Department):

Analytes	Pre-Carbon	Mid-Carbon	Post-Carbon
Drinking Water VOCs[1]	Yes	Yes	Yes
Total Coliforms[2]	Yes	No	Yes

Notes:
1. Using EPA Test Method 524.

2. Using EPA Test Method 9221 B.1/B.2, 9222 B/C, 9223 B, or 1604.

Laboratory analysis turnaround time shall be three days unless otherwise specified by the Department.

All analyses shall be completed by a laboratory currently approved under the New York State Environmental Laboratory Accreditation Program (ELAP).

b. Sampling Procedures

Samples and sampling equipment must not come in contact with aluminum foil, low density polyethylene (LDPE), glass or polytetrafluoroethylene (PTFE, Teflon™) materials including sample bottle cap liners with a PTFE layer. Clothing that contains PTFE material (including GORE-TEX®) or that have been waterproofed with PFC materials must be avoided. Many food and drink packaging materials and "plumbers thread seal tape" contain PFCs. All clothing worn by sampling personnel must have been laundered multiple times. The sampler must wash hands before sampling and wear nitrile gloves while filling and sealing the sample bottles. Pre-cleaned sample bottles with closures, coolers, ice, sample labels and a chain of custody form will be provided by the laboratory.

There are three sampling port locations on each system: influent (raw, pre-carbon), intermediate (mid-carbon) and effluent (post-carbon). Check the water meter to see that the system has been in use and the water in the system is representative of the incoming water. Purge at least one gallon from each sampling port. Sample each port separately in the following order: effluent, intermediate, influent (raw).

Fill two pre-cleaned 250 mL HDPE or polypropylene bottle with the sample.
Cap the bottles with an acceptable cap and liner closure system.
Label the sample bottles.
Fill out the chain of custody.
Place in a cooler maintained at 4 ± 2º Celsius.

Collect one field duplicate for every sample batch, not to exceed 20 samples.
Collect one matrix spike / matrix spike duplicate (MS/MSD) for every sample batch, not to exceed 20 samples. The MS/MSD is to be collected at the first sampling location.

VI. POET System Maintenance

a. The Contractor shall supply all labor, equipment, cartridge filters, GAC media, treatment chemicals, replacement ultraviolet lamps, and miscellaneous supplies needed to complete, operate and properly maintain the treatment systems over the term of the Contract until directed otherwise by the Department.

b. A log book shall be kept for each system. The log book shall be used to record relevant information such as sampling dates, GAC replacement dates, water meter readings, UV light changes and prefilter changes. This information shall also be submitted semi-annually to the Department for each installation.

c. For the Contractor's information, typical maintenance activities are expected to include:

i. Periodic replacement of the particulate prefilter will normally be performed by the occupant (once per month). Contractor shall provide occupant with instructions on

proper change-out and supply twelve (12) prefilters. The Contractor shall perform all other maintenance activities listed herein. If the occupant is unable to change-out the prefilter, the Contractor shall complete the task on a monthly or as needed basis.

ii. Periodic replacement of GAC media as directed by the Department.

iii. Cleaning of UV light quartz sleeve as needed (minimum every six months) and other service as recommended by the manufacturer.

iv. Replacement of UV bulbs (minimum of once per year or as needed).

v. Complete system inspection during each maintenance visit.

vi. Collection of water samples, from the appropriate system sampling taps, during scheduled and unscheduled maintenance visits, or as directed by the Department.

vii. Inspection of the homeowner's well and pressure tank system, to confirm that these are operating properly, before installing the POET system. As part of the inspection, the Contractor must also complete the Pre-installation Checklist, which must then be submitted to the Department.

viii. Complete system inspection during each maintenance visit, including a check for leaks, proper valve settings and proper pressure, and completion of the POET System Maintenance Checklist and submission of this checklist to the Department.

d. Unscheduled Maintenance and Special Sampling Visits:

i. The Contractor shall perform within four (4) hours or the next work day after notification, all repairs, maintenance, removal of existing systems, or other services required to resolve problems with the system, including any emergency situation. An emergency situation shall be construed as a major leak in the system or the lack of adequate water pressure.

ii. The Department may also request that the Contractor conduct special sampling visits. Notification for unscheduled maintenance or special sampling visits may be authorized only by the Department. If emergency service is requested by the resident, the Department Representative should be contacted and notified of the need as soon as possible, but the temporary unavailability of the Department Representative is not to preclude the performance of any required immediate corrective action.

c. Removal, Replacement, and Disposal of Spent GAC Media:

When the analysis of the water samples indicate that the contaminant has broken through the first GAC vessel or at the discretion of the Department, the Contractor will be directed by the Department to replace the spent GAC. The following procedure should be followed:

i. The first (lead) GAC vessel shall be removed.

ii. The second (lag) GAC vessel shall be moved to the lead position.

iii. A freshly charged and backwashed GAC vessel shall be installed in the lag position.

iv. The former lead vessel shall be removed from the site by the Contractor. The GAC media shall then be removed from the former lead vessel, drained to the extent possible, and appropriately disposed of by the Contractor.

v. The former lead vessel, once emptied of GAC media, will be rinsed and pressure washed to remove carbon and stains from the interior walls. The vessel will then be disinfected with a chlorine solution, adding 1/3 ounce of chlorine bleach to 1 gallon of water in the spray pump, spraying the exterior and interior of vessels including stems. The solution will be let stand for at least 30 minutes, then the vessel will be rinsed with water 3 to 5 times. Water will be dumped and remaining water removed with a shop vacuum. Vessels will be left to air dry in an upright position. When completely dry, the top will be taped and "Disinfected" written on the tape.

vi. The Contractor is responsible for appropriate disposal, including any potential testing or manifesting requirements if the waste may be considered hazardous.

VII. POET System Record Keeping

a. The Contractor shall, at a minimum, maintain a list of information on all POET systems, including:

   i. The resident's name, street address, mailing address, telephone number, and email address.

   ii. The property owner's name, street address, mailing address, telephone number, and email address.

   iii. The name of the person to be contacted to arrange for the scheduling of maintenance or sampling, their street address, mailing address, telephone number, and email address.

b. A copy of this list shall be provided to the Department semiannually.

c. Additionally, the following reports and checklists shall be performed and provided to the Department:

   i. Complete inspection of the homeowner's well and pressure tank system, prior to installation of each GAC system, with completion of the Pre-installation Checklist. This checklist will be utilized to establish the condition of the existing household plumbing

and provide the justification for the installation of any equipment not specified in the Standard System.

ii. Upon completion of the installation, the POET System Installation Checklist must be completed and signed by the installer.

iii. Complete system inspection during maintenance visits, including a check for leaks, proper valve settings and proper pressure, completion of the POET System Maintenance Checklist.

iv. A semiannual report shall be submitted to the Department which shall include a summary of the analytical data from sampling rounds, water meter readings, a summary of all routine and emergency service provided during the reporting period, and a statement of the system condition based on any inspections that were performed.

d. Items requested by the Department and deemed necessary for a properly operating system, but not included in this specification, or the Standard System such as a water softener or heated enclosure for the Standard System where sufficient space is unavailable in the residence) shall be paid by submission of actual receipted costs based upon the lowest of a minimum of three (3) quotes and purchasing from the lowest quote. Minor modifications to an existing treatment system, unscheduled maintenance work or special sampling visits may be paid at rates in the Contract or be subcontracted out.

Figure 1: Schematic Diagram for Point of Entry Treatment System

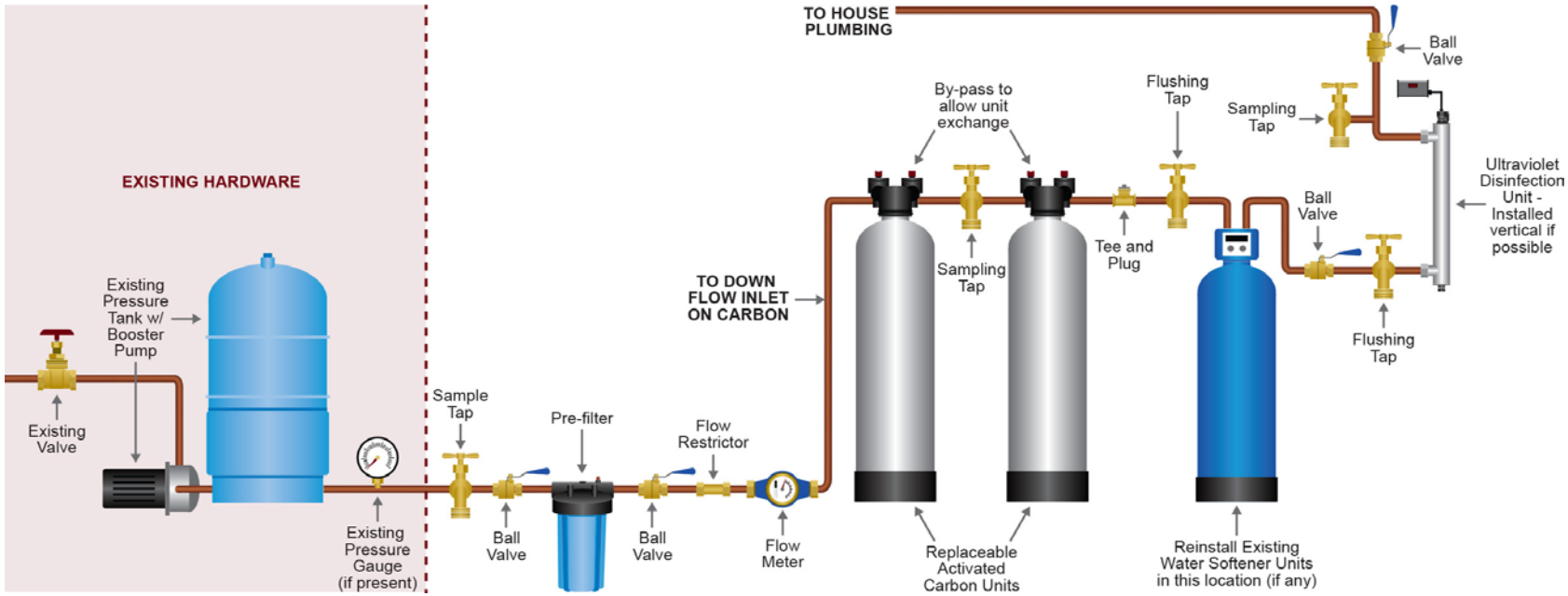


Figure 2

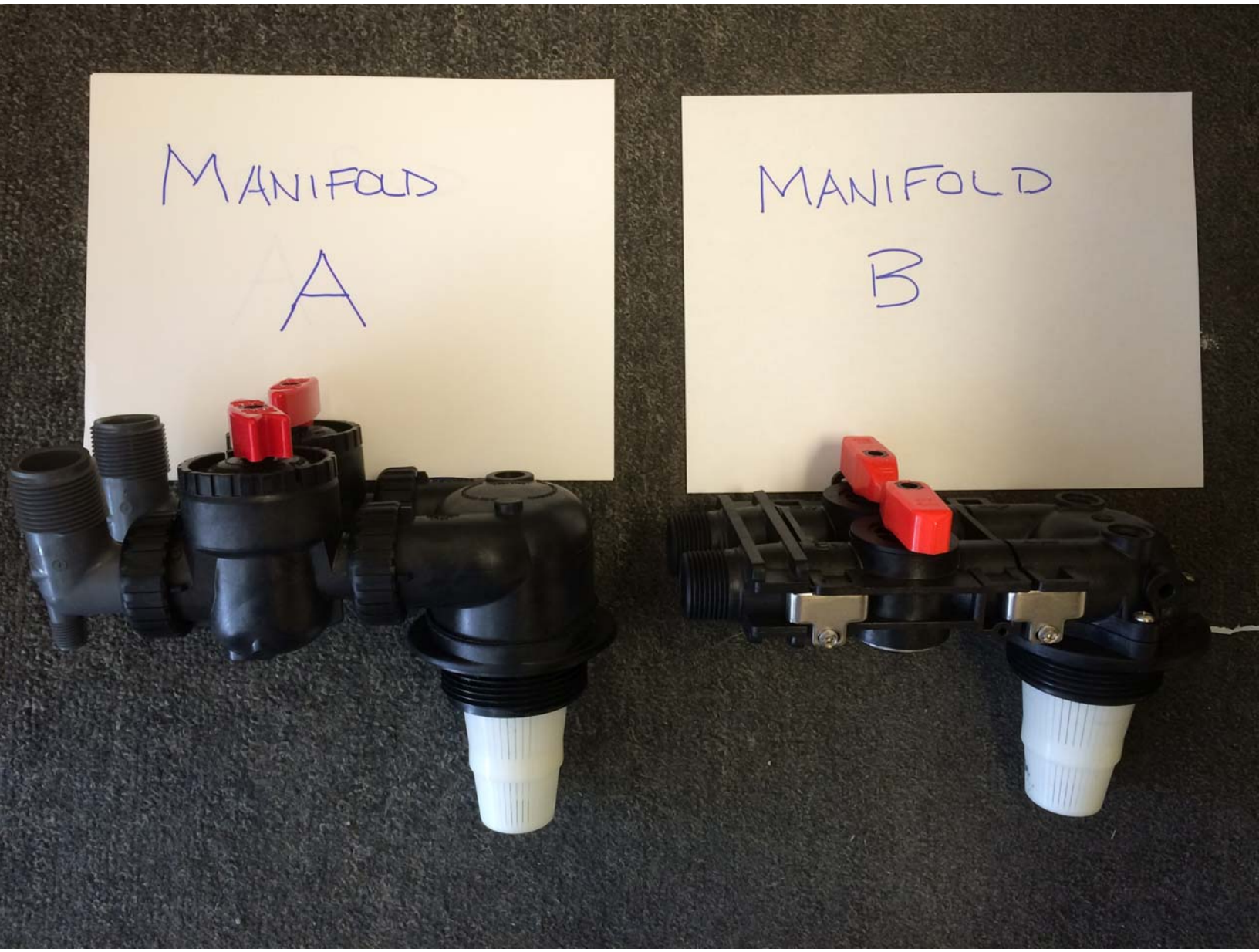
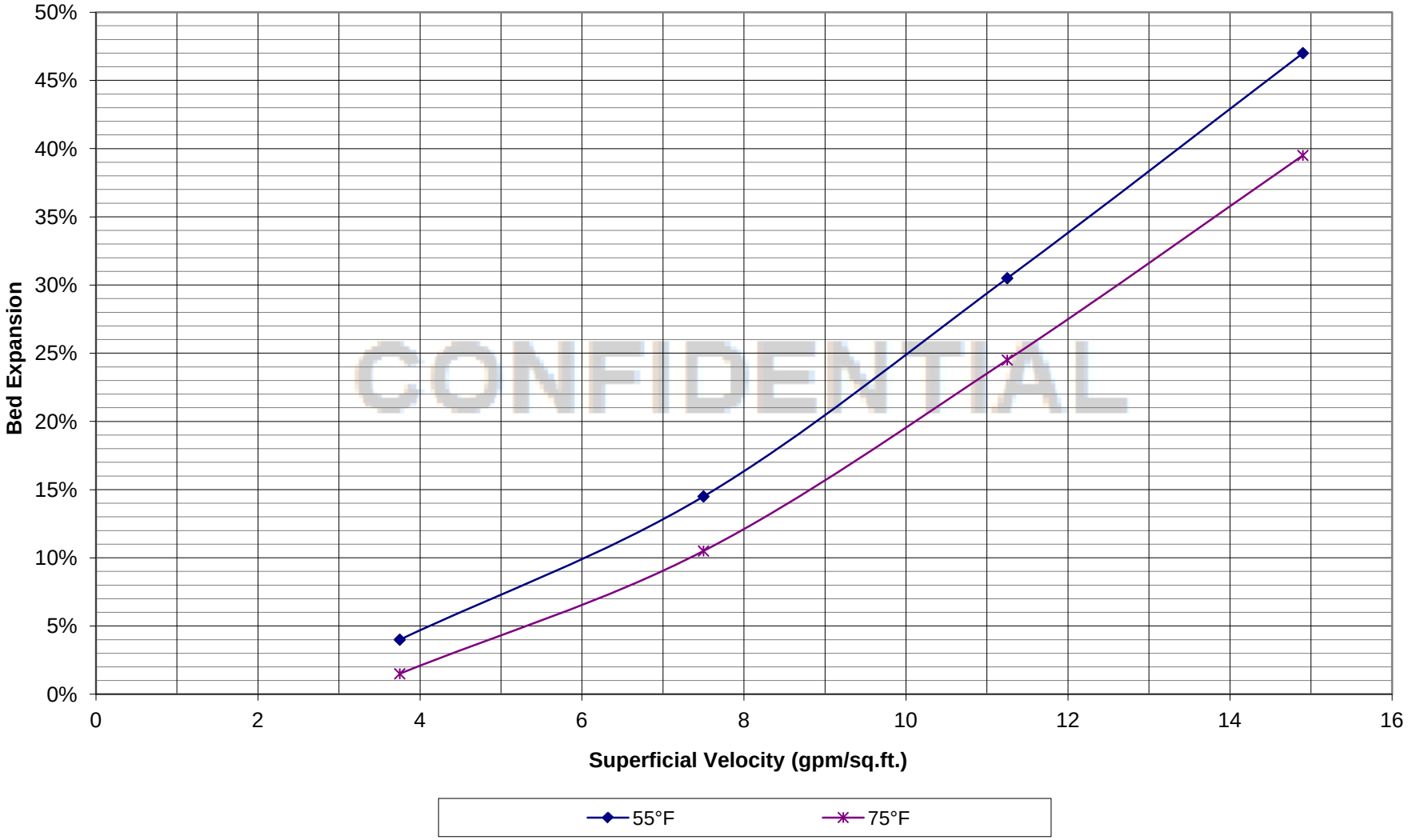


Figure 3

F600 AW (12x40) - Bed Expansion
Backwashed & Segregated



L:\Carbon\Bed Expansion Curves\F600 AW 12x40 Bed Expansion.xls

Figure 4
TANK LABELING CONVENTION

Example: EAB-0001
E = Tank Manufacturer
A = Tank Size
B = Manifold Type
0001 = Tank Number

Manufacturer Code	
EnPress	E
Structural	S
Clack	C
Canature	N

Size Code	
1054	A
1252	B
818	C
1047	D
1242	E

Manifold Code	
A	Threaded
B	Clips
C	Straight
D	Clips (a)

NEW YORK STATE DEPARTMENT OF HEALTH **OFFICE OF PUBLIC HEALTH** **CENTER FOR ENVIRONMENTAL HEALTH** **TECHNICAL REFERENCE**	**ITEM NO: CSFP 530 DATE: 11/6/00** **SUBJECT:** Individual Water Supplies Activated Carbon Treatment Systems Review Required Page 1 of 6

PURPOSE

To provide guidance to local health departments for establishing minimum standards for using granular activated carbon (GAC) filters to treat individual household water supplies contaminated by organic chemicals.

Water Quality Determinations

1. It is recommended that the Bureau of Environmental Exposure Investigation (BEEI) or a Regional Toxic Coordinator be contacted if organic chemical contamination is suspected or found in an individual household water supply. BEEI staff can help with sampling protocols and provide information on known and potential sources of contamination. The following analyses should be considered:

    a. EPA Method 502.2 (Volatile Organics in Water) is recommended when a well is located in the immediate vicinity of an oil storage facility and/or a gasoline station. EPA Method 502.2 will give results for many benzene compounds including benzene, toluene and xylenes. If the suspected contaminant source is gasoline, the analysis should include the compound methyl tertiary-butyl ether (mtbe). If the suspected contaminant is fuel oil or gasoline, a Ketone/Fuel Oil analysis (Method 310-34) should be requested.

    EPA Method 502.2 is also recommended when a well is located in the immediate vicinity of a suspected source of chlorinated or brominated solvents which are used in dry cleaning and degreasing operations, etc. Common solvents may include but are not limited to tetrachloroethene, trichloroethane and trichlorethene.

    b. EPA Method 502.2 and EPA Method 525 or EPA Method 625 (Base/Neutral Extractables), Hazardous Substance List Metals, PCBs, and Pesticide analyses are recommended if the well is located in the immediate vicinity of a landfill without monitoring wells/data.

    c. Analyses for specific chemicals are recommended if a well is located in the immediate vicinity of an industry using chemicals. If the chemicals used are unknown, some combination of EPA Method 502.2, EPA Method 525, or EPA Method 625, Hazardous Substance List Metals, PCBs, Ketone, Pesticide or Herbicide analyses should be performed.

d. If the well water exhibits effervescence, methane analysis is recommended even though this natural gas is not listed in the Drinking Water Standards. Methane represents a potential fire and explosion hazard at concentrations of as little as 5.53 percent in air.

2. Laboratory analyses must be performed by an Environmental Laboratory Analysis Program (ELAP) certified lab using a method approved for the contaminants of concern. The analytical method should have a detection limit below New York State drinking water standards.

3. Olfactory evidence of contamination is sufficient justification in cases where fuel oil spills are suspected for the installation of GAC filters. However, a Ketone/Fuel Oil analysis should still be conducted.

CRITERIA FOR THE INSTALLATION OF GAC FILTERS

Household GAC filter units are suitable for use in treating private water supplies which contain organic chemicals, in excess of standards or current guidance, provided the following conditions are met:

1. That the units are installed in-line and serve the whole house.

2. That the treatment unit is capable of processing water at a flow rate of five (5) gallons per minute (gpm) or at a flow rate equal to the well pump discharge rate.

3. That the carbon treatment flow rate not exceed ten (10) gpm per square foot of activated carbon media surface area. Flow rates can be controlled by a flow limiting device.

4. That the minimum empty bed contact time be three minutes. This can be accomplished with at least two filter units of equal size placed in series.

5. That only virgin carbon be used. The cylinder should be recharged at a point outside the residence and the spent activated carbon disposed of properly by the vendor.

6. That disinfection be provided after the activated carbon unit. The preferred method of disinfection is an ultraviolet unit with a minimum rating of five (5) gpm. The ultraviolet unit should have an audio and visual alarm device with a manual reset button for the audio

alarm. This alarm detects when the strength of the ultraviolet light reaching the sensor is inadequate to disinfect the water stream.

An alternate method of disinfection would be to use sodium hypochlorite. Adequate disinfection time should be provided after the point of injection and prior to consumption if sodium hypochlorite is used. In some cases, a disinfection unit on-line before the filters may also be necessary if a build-up of bacteria in the carbon filters is anticipated.

7. Under special conditions provisions may be made for a backwash cycle. Treatment units capable of backwashing should use only treated water for the purpose. Backwashing should be at a minimum rate of ten (10) gpm for at least two minutes. Each activated carbon unit should be backwashed separately. The backwashing should be accomplished in a manner that does not create a cross-connection. The wastewater should not be discharged to the ground surface but may be discharged to a septic system.

8. That the system should be designed with consideration for the physical, chemical, and biological parameters of the water source.

9. The treatment system should be installed to conform with the schematic illustrated by Figure 1. The following design issues should be addressed:

   a. Meter to record total flow.

   b. Sample taps to sample raw water, water between carbon filters, and treated water.

   c. Adequate plumbing to isolate (by-pass) the carbon units and when necessary to allow for backwashing.

   d. Nontoxic materials and coatings.

   e. All units should safely withstand the highest water pressure in the system.

   f. Ease of access to all units.

   g. Prefiltration (where appropriate) to remove turbidity.

   h. Adequate plumbing to isolate the prefiltration unit (s) for ease of filter change.

i. Pressure gauges before the prefilter, and before and after the activated carbon unit.

j. Provisions are made so that flow rates can be restricted.

k. The system should provide a minimum of 20-30 pounds per square inch (psi) of water pressure to the household piping.

l. Each treatment unit (prefilter, carbon tank) should not result in more than a five (5) psi drop in pressure across the unit.

CRITERIA FOR THE REMOVAL OF GAC FILTERS

Removal of GAC filters may be considered using the following criteria:

1. The individual household water supply source is replaced with water from a public water supply or an acceptable alternative water supply that is properly located, constructed and protected from potential sources of contamination. The original water supply source should be physically disconnected from the household water supply system, OR

2. The contaminant source impacting the household water supply source has been adequately addressed (i.e., to the extent practical contaminant source(s) are cleaned up, groundwater remediation to the NYS DEC groundwater standards has been achieved, long-term monitoring is in place), there is no olfactory evidence of contamination in that source and one year of quarterly sampling results show chemical levels at or below 50 percent (50%) of the NYS Drinking Water Standard(s).

SUPPLEMENTARY INFORMATION

1. Because volatilized toxic organic chemicals can be inhaled during baths and showers, the following types of point-of-use activated carbon units are not suitable for use where the water contains volatile organic chemicals.

   a. Pour-through units.

   b. Faucet-mount units.

NEW YORK STATE DEPARTMENT OF HEALTH OFFICE OF PUBLIC HEALTH CENTER FOR ENVIRONMENTAL HEALTH TECHNICAL REFERENCE	**ITEM NO: CSFP 530 DATE: 11/6/00** **SUBJECT:** Individual Water Supplies Activated Carbon Treatment Systems [Currently Under Revision (4/1/2009)] Page 5 of 6

c. Line-bypass units.

d. In-line, one-tap units.

2. System Maintenance

The ultraviolet light disinfection unit requires periodic maintenance. The bulb/lamp needs to be changed periodically; some manufacturers suggest changing the bulbs yearly. Units with manual wipes need to be periodically wiped to assure that deposits or films do not build-up and prevent proper ultraviolet light disinfection. Raw water should be sampled for bacteriological characteristics prior to installation of the filtration system to evaluate the biological parameters of the water source. Treated water should be sampled for bacteria after initial installation to test the effectiveness of the ultraviolet light disinfection unit.

An assessment of the breakthrough life of the carbon filters should be made utilizing chemical breakthrough curves and should be based on water usage, chemical classification or parameters or compounds, and chemical concentrations.

When treatment systems are installed in conjunction with petroleum spills or State and Federal Superfund investigations, sampling frequency should be determined based upon the assessment outlined above. In most cases monthly sampling for the first three months and quarterly thereafter is appropriate. Sampling frequency may be adjusted on a site specific basis. Changes in the sampling frequency should be made in consultation with the State and/or local health department. Analytical data results should be provided to the State and local health department and the homeowner/home occupant.

A log book should be affixed to each carbon unit. The log book should be used to record relevant information such as sampling dates, change of carbon filter dates, water meter readings, UV light changes, and prefilter changes.

REFERENCES

1. Interim Report, “Point-Of-Use Activated Carbon Treatment Systems,” New York State Department of Health - December 1982.

2. “Rural Water Supply,” New York State Department of Health.

NEW YORK STATE DEPARTMENT OF HEALTH **OFFICE OF PUBLIC HEALTH** **CENTER FOR ENVIRONMENTAL HEALTH** **TECHNICAL REFERENCE**	**ITEM NO: CSFP 530 DATE: 11/6/00** **SUBJECT:** Individual Water Supplies Activated Carbon Treatment Systems [Currently Under Revision (4/1/2009)] Page 6 of 6

2. 10NYCRR Part 75 - Standards for Individual Water Supply and Individual Sewage Treatment Systems.

3. 10NYCRR Appendix 75-B - Individual Water Supplies - Treatment Systems.

APPENDIX B

POET Maintenance Guide and POET Homeowner Pamphlet

MAINTENANCE GUIDE
POINT-OF-ENTRY WATER TREATMENT SYSTEM

How to Change the Pre-Filter

Step 1: Place a bucket under the pre-filter.

Step 2: Turn off the water supply using the two valve levers located on either side of the pre-filter (see diagram above for location of pre-filter and levers).

Step 3: Press down on the pressure relief button (if present on top of the housing cap/lid) to relieve pressure inside the filter container.

Step 4: Slowly unscrew (turn to the left) the filter container from below the housing. Do this by hand or use the filter wrench supplied with system. A small amount of water may come out of the housing into the bucket. If the O-ring gasket comes loose, put it back in place around the top of the cartridge. If the O-ring is damaged, call the DEC Hotline for a replacement.

Step 5: Remove the used filter cartridge and discard it in your normal trash. Rinse and clean the inside of the filter container, if needed (there may be some natural sediment in the bottom).

Step 6: Insert a new filter cartridge into the filter container, making sure the cartridge is centered and slips over the small standpipe inside the container or attached to the housing cap/lid.

Step 7: Make sure the new filter is centered, and then screw the filter container back onto the housing cap/lid. Hand tighten it or use the filter wrench to tighten. DO NOT OVER-TIGHTEN.

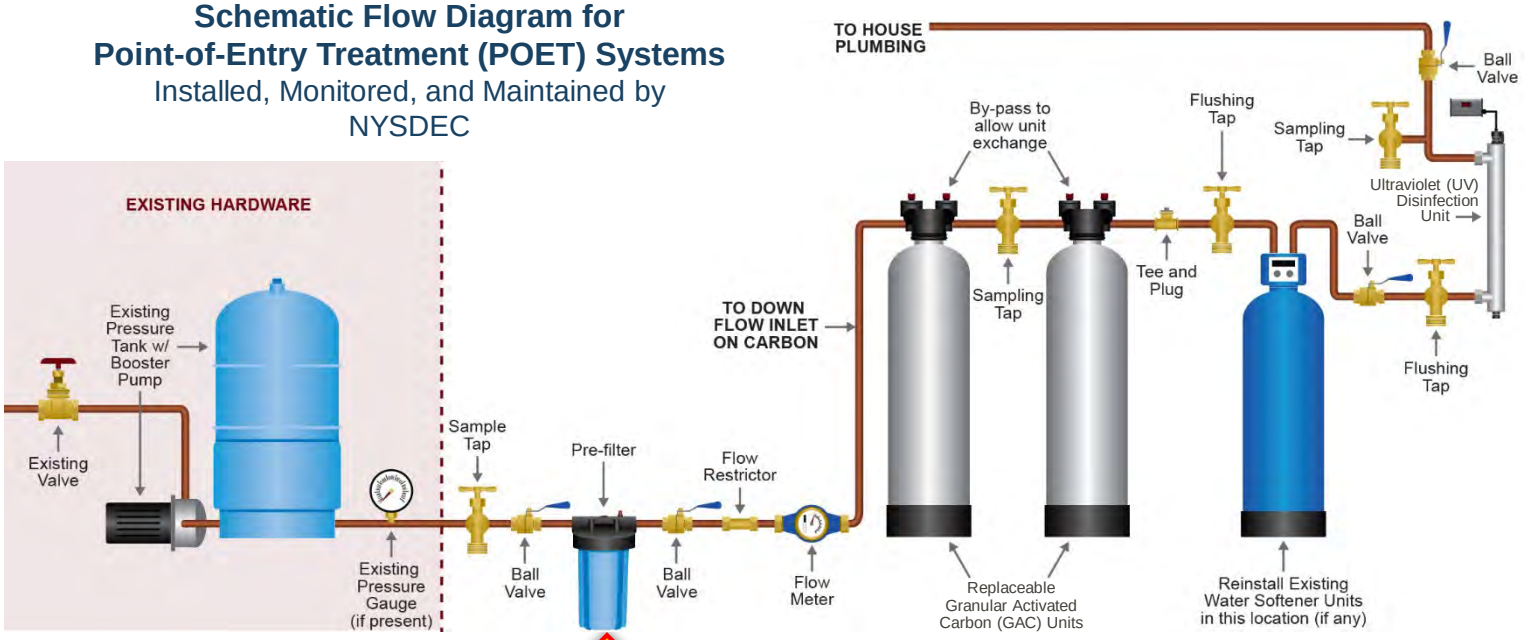
Step 8: Slowly turn on the water supply again and allow the filter housing to fill with water.

Step 9: Press down on the pressure relief button again (if present) to release air that may be trapped inside.

Step 10: Check and inspect for leaks until the unit or system is pressurized. If water leaks from between the housing cap/lid and the filter container, please check that the O-ring gasket is in place and not damaged, and check that the filter was centered and fits easily between the filter container and the housing cap/lid.

Schematic Flow Diagram for Point-of-Entry Treatment (POET) Systems

Installed, Monitored, and Maintained by NYSDEC



WHEN TO CALL THE DEC HOTLINE 1 888 459 8667 (24/7)

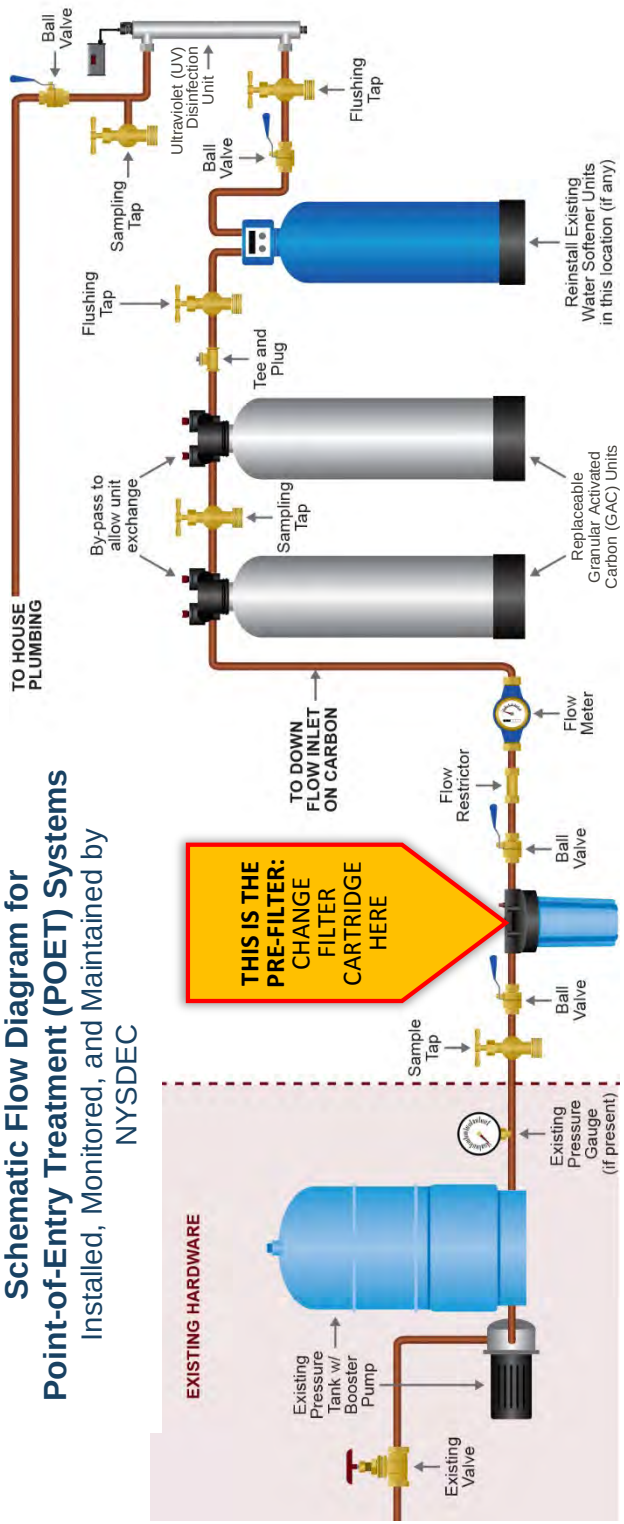
- Before being away for more than 2 weeks
- To arrange for repair do not attempt any system or plumbing repairs yourself
- When you need more pre filters
- If you have any questions

THIS IS THE PRE-FILTER: CHANGE FILTER CARTRIDGE HERE

NEW YORK STATE OF OPPORTUNITY. Department of Environmental Conservation

WHEN TO CHANGE THE PRE-FILTER

- At least monthly so the system operates properly and to reduce the frequency of in home service by DEC representatives
- When water pressure drops, which means the filter may be clogged with natural sediment from the well
- Prior to leaving the building for more than 2 weeks if you are not home during winter months, call the DEC Hotline for instructions



Schematic Flow Diagram for Point-of-Entry Treatment (POET) Systems
Installed, Monitored, and Maintained by NYSDEC

System Maintenance is Important

Monthly pre-filter replacement is recommended as an important part of keeping the system operating properly and maintaining good water pressure. The pre-filter removes sand, sediment, and other natural small particles that may come in from the well. Maintaining a clean pre-filter also reduces the need for in-home service by DEC representatives.

While DEC is responsible for overall maintenance of the system, it is suggested that pre-filter replacement be performed by the occupant.

DEC will provide a free annual supply of pre-filters and show you how and when to complete the replacement.

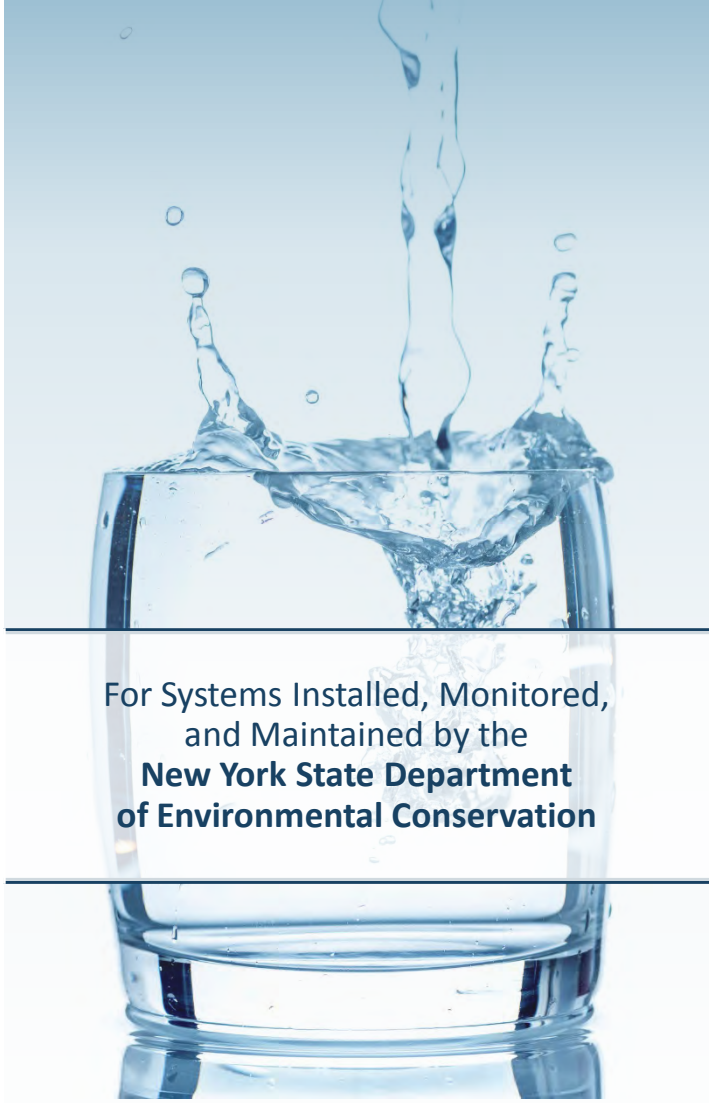
Generic instructions on how to change the pre-filter are provided in DEC's "How To Change the Pre-Filter" supplement to this guide. For more specific guidance or questions, call the DEC Hotline at 1-888-459-8667.

Maintenance activities DEC must perform include routine sampling, periodic replacement of the GAC tanks, cleaning or replacing the UV light quartz sleeve as needed, system inspection and checking for leaks, and checking proper valve settings and pressure.

WHEN TO CALL THE DEC HOTLINE 1-888-459-8667 (24/7)

- Before being away for more than 2 weeks
- To arrange for repair do not attempt any system or plumbing repairs yourself
- When you need more pre filters
- If you have any questions

POINT-OF-ENTRY TREATMENT (POET) SYSTEM GUIDE



For Systems Installed, Monitored, and Maintained by the
New York State Department of Environmental Conservation

NEW YORK STATE OF OPPORTUNITY. Department of Environmental Conservation

This guide describes the main components and benefits of the Point-Of-Entry Treatment (POET) System installed in your home or building by the New York State Department of Environmental Conservation (DEC).

The purpose of the water treatment is to remove certain contaminants that may be in the drinking water entering area homes and buildings. The water treatment systems installed are specifically designed to address Perfluorinated compounds (PFCs), including perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS).

How the System Works

POETs are installed to filter and treat all water as it enters your home or building. As shown on the system flow diagram (back page), POETs filter and treat water using a small pre-filter followed by two tanks of granular activated carbon (GAC). In certain cases, smaller point-of-use treatment systems (POUTs) attach to faucets and fixtures where your water is dispensed.

POETs are designed to filter and disinfect groundwater (well water) for use in residential or commercial properties. Via your well pump, groundwater is piped into an existing pressure tank and then through an installed pre-filter (sediment trap) to remove sand and other natural small particles that may come in with the water.

As shown on the flow diagram, the water continues through the pre-filter and a flow restrictor, and then through a flow meter to measure how much water is flowing through the system. From there, the water continues into the first of two tanks filled with GAC to begin cleaning the water. The second GAC tank acts as a backup to provide redundancy to the filtering process. Next, the water may flow into a water softener if a softener was already in place before the POET or POUT system was added.

Finally, the water passes through an ultraviolet (UV) unit where the water is disinfected before it flows directly into the existing plumbing for use within the residence or commercial building.

Benefits of Water Treatment

POET and POUT systems control a wide variety of contaminants in drinking water and often use the same technology found in large centralized treatment plants, but at a much smaller scale.

This established technology reduces the amount of organic contaminants, controls turbidity (cloudiness of the water), and removes micro-organisms and many other contaminants. Aesthetic factors such as taste, odor, or color can also be improved with treatment.

QUESTIONS?
PLEASE CALL THE DEC HOTLINE
(available 24/7) at 1-888-459-8667

Water Quality Testing

DEC representatives will collect water from the "sampling taps" installed in the system at a minimum of once per year. Systems with higher incoming concentrations will initially be sampled more frequently. This routine sampling effort will provide data for the DEC to determine the lifespan of the carbon in the GAC tanks. The sampling and maintenance frequency is based on your specific well water and treatment system, and depends not only on sample results, but also how long the system components are performing as intended.

Additional follow-up visits to replace GAC tanks may be scheduled when necessary. Please note that the periodic sampling and maintenance schedule may change in the future based upon your sampling results, so that the system continues to successfully remove PFOA and PFOS from your drinking water.

Granular Activated Carbon Replacement

When water testing results indicate that a GAC tank needs to be changed, DEC representatives will promptly schedule a visit to perform the change out. This process typically involves installing a fresh GAC tank to replace the second tank in the system, and moving up the second tank to be first in line on the system. You do not need to flush the line prior to water use after the GAC tanks are replaced.

Maintenance at No Cost to You

Maintenance of POET systems in homes and commercial buildings is expected to continue until sampling data indicate well water treatment is no longer necessary. As the environmental investigation in the area continues and data indicate that a treatment system is no longer needed, DEC will either remove the system or turn over the system to the property owner, whichever the owner prefers. Property owners are not expected to pay the cost of POET system maintenance and water sampling and analysis.

Flushing Your Home's Plumbing and Maintaining Your POET System

MAY 2021

The New York State Department of Environmental Conservation (DEC) recently installed a Point of Entry Treatment (POET) water filtration system at your residence or business. These systems treat groundwater wells impacted by contaminants, and typically consist of two granular activated carbon (GAC) tanks that are connected to the plumbing system of a home.

You must flush your system following the protocols below. The DEC will sample your water and have it analyzed to ensure that the GAC system is working properly. Approximately two weeks after your installation, the DEC will provide you with a phone call and letter verifying that your water is now acceptable for all uses.

Do not drink or use your water for cooking until you receive a verification from the DEC that it is acceptable for all uses.

Flushing Your Home's Plumbing

Follow these steps to ensure your water pipes are adequately flushed after the GAC system is installed.

Step 1. Flush cold-water system

- Open all indoor cold-water faucets, including every sink, shower, and bathtub.
- Run the cold water for 5 minutes.
- Shut off all cold-water faucets.

Step 2. Flush hot-water system

- Open all hot-water faucets, including every sink, shower, and bathtub.
- Run hot water for 15 minutes. This will replace the water in your hot water tank with filtered water.
- Shut off all hot-water faucets.

Step 3. Flush fixtures and appliances

- Refrigerator water lines and ice makers:
  - Flush refrigerator water dispensers for 5 minutes; consider replacing any refrigerator water filters.
  - Discard ice from your freezer. If you have an automatic ice maker, make/discard 5 batches of ice.
- Other water-using appliances, filtration units, and water softeners:
  - Discard existing water; clean your coffee makers, humidifiers, oral, medical, or health care devices.
  - Take steps to clean other water filtration units, consider replacing filters, and backwash (regenerate) water softeners.

Maintaining Your System

Your POET system will require periodic maintenance to replace the GAC and maintain other components of your filtration system. Future maintenance of your filtration system will be performed free of charge until sampling data indicates treatment is no longer necessary, or an alternate drinking water source is available. DEC will contact you to arrange for POET system maintenance and the collection of water samples for periodic evaluation.

To contact DEC about your POET system (questions, scheduling appointments, repairs, etc.), please call: 1-888-459-8667

NEW YORK STATE | Department of Environmental Conservation

APPENDIX C

Call Center Phone Script & FAQs

POET Systems O&M Call Script and Program Information

Speaking with resident to schedule O&M sampling:

Good morning/afternoon/evening, my name is _____ with Arcadis, and I am calling on behalf of the New York State DEC. How are you today? I am calling you to schedule an appointment for routine monitoring of your well water treatment system. What day of the week works best for you? Would you prefer AM, which is an 8 am–1 pm window, or PM, which is a 2:30 pm-6pm window? Okay, we now have you scheduled for _____ (month/day), between the times of _____ (AM/PM). You will receive a phone call from our staff approximately 15 minutes before they arrive. And if you have any other questions, feel free to give us a call back at the Hotline number. (Provide the DEC hotline number if needed: 1-888-459-8667.) Thank you so much and we will see you on _____ (month/day) between _____ (AM/PM timeframe).

Leaving a message to schedule O&M sampling:

Good morning/afternoon/evening, my name is _____ with Arcadis, and I am calling on behalf of the New York State DEC. I am calling you to schedule an appointment for routine monitoring of your well water treatment system. If you could, please return my call at 888-459-8667. Again the number is 888-459-8667. I would greatly appreciate it. I look forward to hearing from you.

Questions and Answers

1. Q: Why are you scheduling this? / What is routine monitoring?

   A: Your treatment system requires periodic monitoring to ensure the system is working properly. These routine checks include water sampling, and also maintenance tasks like replacing carbon filters and UV lamps. This routine system maintenance is being completed at no cost to you.

2. Q: How often will my system be sampled / maintained?

   Higher Concentrations (greater than 70 PPT)

   A. The sampling and maintenance frequency is based on your specific well water and treatment system, and depends not only on sample results, but also how long the system components are performing as intended. Initially, you can expect that samples will be collected tri-annually (every 4 months) to confirm that the system is working properly, with additional follow-up visits to exchange carbon filters when necessary. The periodic sampling and maintenance schedule may change in the future to ensure your system is performing as intended. If you have any questions or issues between our scheduled visits, you can always call us (888-459-8667).

Lower Concentrations (less than 70 PPT)

A. The sampling and maintenance frequency is based on your specific well water and treatment system, and depends not only on sample results, but also how long the system components are performing as intended. Initially, you can expect that samples will be collected every 6 to 12 months to confirm that the system is working properly, with additional follow-up visits to exchange carbon filters when necessary. The periodic sampling and maintenance schedule may change in the future to ensure your system is performing correctly. If after several rounds of data have been collected, and your water is showing no signs of significant impacts from PFOA contamination, the treatment system may no longer be necessary depending on regulatory health guidelines. If you have any questions or issues between our scheduled visits, you can always call us (888-459-8667).

3. Q: Effectiveness of the POET systems both as a filtration agent for PFOA, and the benefits and ability (or inability) of the systems to filter other harmful organic and inorganic compounds or materials.

   A: POET systems are used to control a wide variety of contaminants in drinking water and often use the same technology concepts employed in centralized treatment—but at a much smaller scale. This technology is applied to reduce levels of organic contaminants, control turbidity, micro-organisms and many other contaminants. Aesthetic factors, such as taste, odor, or color can also be improved with treatment by POET systems. The POET systems installed in Hoosick Falls were specifically designed to address PFOA contamination.

4. Q: General O&M maintenance requirements of the POET systems, and the program in place to provide for such maintenance:

   - It is recommended that periodic replacement of the particulate pre-filter occur monthly. Depending on the amount of sediment present in the water and captured by the filter, replacement may only be necessary up to every three months. During the routine scheduled O&M visits, crews will inspect and replace pre-filters as necessary, and where required to correct issues concerning pressure and flow. Property owners will be provided with instructions on proper change-out, and a supply of pre-filters to complete additional replacements at their convenience, if needed.
   - Periodic replacement of GAC filter media, by a DEC contractor.
   - Cleaning of UV light quartz sleeve as needed, by a DEC contractor.
   - Complete system inspection during each maintenance visit, including a check for leaks, proper valve settings, and proper pressure.
   - The DEC will retain standby contractor services to perform these maintenance activities, and will have a standby contractor on call 24/7 for emergencies and repairs that cannot wait until normal business hours.

POET Systems O&M Call Script and Program Information

5. Q: Estimated lifespan of the POET system

   A: These systems have very few moving parts and, therefore, with proper maintenance can be expected to have long lifespans on the order of decades.

6. Q: Estimated lifespan of the carbon in the POET systems and the program for carbon change out

   A: This generally depends on the level of contamination in the water, as well as other characteristics specific to each well. Routine sampling will provide data for the DEC to determine the lifespan of the carbon.

7. Q: Carbon filter canister exchanges

   A: When the analysis of the water samples indicate that the contaminant has broken through the first carbon filter canister, or at the discretion of the Department, the Contractor will be directed by the Department to replace the spent carbon. The following procedure will be followed:

   - The first (lead) GAC canister shall be removed.
   - The second (lag) GAC canister shall be moved to the lead position.
   - A freshly charged and backwashed GAC canister shall be installed in the lag position.

8. Q: How long will the DEC continue Operation and Maintenance of the POET systems?

   - It is expected that maintenance of POET systems for residents **with contaminated well water** will continue indefinitely.
   - As investigation continues, and data for residents **without contaminated well water** justifies that a treatment system is no longer needed, DEC will take steps to either remove or turn over the system to the property owner to operate and maintain; this will be determined by the property owner.

9. Q: What is the estimated yearly cost of operation, maintenance, testing and consumable supplies (carbon filters and ultraviolet bulbs) to operate the POET systems?

   A: Currently, the DEC estimates the yearly cost of operation and maintenance of a residential POET system, including sampling and analyses, to be $5000.

POET Systems O&M Call Script and Program Information

10. Q: Will individual residents be expected to pay for the operation and maintenance of the POET systems at some point in the future; and if so, what criteria will be used to make such a determination?

    A: Individual residents are not expected to pay these costs initially. If a system's well water is showing no signs of significant impacts from PFOA contamination, and it has been determined the treatment system is no longer necessary depending on regulatory drinking water guidelines, the system may be removed or turned over to the homeowner, at homeowner option. If the homeowner chooses to keep a system in place, it is anticipated that the actual cost to maintain an individual system at that time will be known, and will likely be far less than $5000 per year.

11. Q: For questions about any health effects, blood testing, getting a water filtration system, or the public water supply:

    A: These questions are best answered by the Department of Health. Please call the DOH Hotline at 1-800-801-8092 (Mon-Fri, 9AM – 8PM; Sat, 9AM – 3PM)

12. Q: For requests to speak directly to someone with NYSDEC:

    A: Please contact the NYSDEC at 518-402-8000 during normal business hours.

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation | Department of Health | Agriculture and Markets

FREQUENTLY ASKED QUESTIONS: PFOA IN SOILS, WATER, AND IMPACT ON AGRICULTURE

August 2016

Q. What is PFOA?

Perfluorooctanoic acid (PFOA) belongs to a group of manufactured chemicals called perfluorinated chemicals (PFCs). PFCs were once widely used to make household and commercial products that resist heat and repel oil, stains, grease, and water. Such products include nonstick cookware, surface coatings for stain-resistant carpets and fabric, and paper and cardboard food packaging. Manufacturers began phasing out the use of PFOA in 2006.

Q. Can PFOA be present in soils?

Yes, PFOA, as well as a related chemical perfluorooctane sulfonate (PFOS), can enter soils through discharges to the environment, including spills and possibly air deposition. Based on sampling conducted in Hoosick Falls and Petersburgh by New York State, low levels of PFOA and PFOS have been detected in some samples from yards, gardens, and vacant lots.

Q. How can I find out if PFOA is in my water or soil?

Tests can detect the level of PFOA or PFOS in your home water source, in your farm water source, or in your soil. If you live in an area where you believe there may be possible PFOA or PFOS exposure, you can find out how to get your drinking water tested by calling the New York State Department of Health at 518-402-7860. If you live near a suspected illegal dumping site, please contact the Department of Environmental Conservation at 518-402-9676.

Q. What do I do if a test shows PFOA in my water?

If drinking water contains PFOA and PFOS at individual or combined concentrations greater than 70 parts per trillion, the U.S. Environmental Protection Agency (EPA) health advisory level, the EPA recommends that consumers consider options to reduce exposure, including the use of an alternative drinking water source. Properly maintained granular activated carbon filters effectively remove PFOA, PFOS, and other PFCs from water. If you would like information on installing a carbon filter for either residential or agricultural water, please contact the Department of Environmental Conservation at 518-402-8044. For more information, please visit:
http://www.health.ny.gov/environmental/investigations/hoosick/docs/hoosick_pou_final.pdf

Q. Can I garden or engage in other activities that involve contact with soil on my property?
Yes. Based on sampling to date, the amount of PFOA and/or PFOS exposure that a gardener or someone, including children, contacting soil might have from accidentally ingesting or inhaling soil dust would be insignificant. Any possible skin absorption would also be insignificant. However, it is always a good idea to wash hands after contact with soil from any location and to follow healthy gardening practices. For more information about these practices, please visit: http://www.health.ny.gov/publications/1301/

Q. I have a backyard garden. Can I eat what I've grown in soil on my property?
Yes. While PFOA and PFOS may be detected in soil samples, research shows that the amount of these chemicals taken up by plants is limited. Based on sampling to date, you may eat fruits and vegetables grown in soil with PFOA and PFOS unless you live near a site where illegal disposal of PFOA or PFOS may have occurred. If you live near a suspected illegal dumping site, please contact the Department of Environmental Conservation at 518-402-9676.

Q. Is it safe to consume dairy products from cows that may have been exposed to PFOA?
Yes. Research shows that dairy cows are much more efficient than humans at eliminating PFOA from their bodies through urine and they only excrete a small amount of PFOA in their milk. Furthermore, research on cows fed water with high levels of PFOA—far higher than levels found in Hoosick Falls and Petersburgh—found zero to minimal levels of PFOA in their milk.

Q. I raise livestock for meat. What do I need to know?
Research shows that animals, such as cattle, pigs, and sheep are much more efficient than humans at eliminating PFOA from their bodies. Nevertheless, the Department of Agriculture and Markets recommends that if the water source for livestock is above the EPA health advisory level, livestock should be given water below the EPA health advisory level prior to slaughter. Producers who believe PFOA may be in their water can find out how to get a water test by contacting the NYS Department of Health at 518-402-7860.

Q. I raise chicken for eggs and meat. What do I need to know?
The Department of Agriculture and Markets recommends that if the water source for your chickens is above the EPA health advisory level, your chickens should be given water below the EPA health advisory level prior to slaughter and egg consumption. Producers who believe PFOA may be in their water can find out how to get a water test by contacting the NYS Department of Health at 518-402-7860.

Q. Should I be concerned about local maple syrup?
We have no evidence, either here in New York or in neighboring Vermont, that maple syrup contains PFOA at levels that are a concern for health. The NYS Department of Agriculture and Markets tested sap collected directly from maple trees from locations in Hoosick Falls and Petersburgh. The results from the samples ranged from undetectable to very low trace levels. If a maple producer would like to find out how to get a water test, please contact the Department of Health at 518-402-7860.

Q. If I have questions who should I call?
If you have questions about health effects from PFOA or PFOS in soils, or would like to find out how to get a water test, please contact the Department of Health at 518-402-7800.

If you have questions about PFOA and agricultural products, contact the Department of Agriculture and Markets at 518-457-2771.

If you have questions about soil sampling, illegal dumping, or water filtration, contact the Department of Environmental Conservation at 518-402-9676.

CALL CENTER DAILY DUTIES

- 8 AM: turn **off** overnight answering service and answer any incoming phone calls
- 9 AM: Data will provide a call list for Installs, Evals, Clearance Sampling, O&M Sampling, and Tank exchanges.
    - Verify we have a sheet for each system number on call list, if no sheet then create one
- Call everyone for which you have sheets
    - Note: skip a day between calling people, that way we don't irritate them by leaving a voice message daily
    - Label on sheet notes the day/time you call, and the following:
        - LM= left message
        - NA=no answer
        - Any other pertinent notes
- Schedule appointments:
    - On scheduling chart provide the following information:
        - Sampling (Clearance or O&M)= list HF/PB/NB number (and preferred time, or time range, if requested)
        - Installs= list HF/PB/NB number (and preferred time, or time range, if requested)
        - Evals and Exchanges= list HF/PB/NB number (and preferred time, or time range, if requested)
    - Fill out form in its entirely, initial/date/time at the bottom, and submit to data team
- Answer phones:
    - Refer to scripts for verbiage
- Cut off for scheduling for next day is **12:00 pm noon**!
    - At noon, transfer all data hand written on scheduling chart to excel
    - Pdf chart
    - At 1 pm email current/updated scheduling chart to:
      To: O&M Coordinator
      Cc: Sample Coordinator; Data Management; DEC Field Lead
      Naming convention of 1:00 pm chart pdf:
      2016_08_28_Hoosick Falls_Scheduling List_1300
      2016_08_28_Petersburgh_Scheduling List_1300
      2016_08_28_Newburgh_Scheduling List_1300

- At end of day, send another current/updated scheduling chart pdf to those listed above as well
    - Naming convention of 5:00 pm chart pdf:
      2016_08_28_Hoosick Falls_Scheduling List_1700
      2016_08_28_Petersburgh_Scheduling List_1700
      2016_08_28_Newburgh_Scheduling List_1700

- End of day: turn **on** overnight answering service

At any time you leave the phone and are unable to take a call, please check voice mail.

To check voice mail:

- Hit “voicemail” on phone
- Type hotline extension
- Enter Password
- Check any missed messages, and return calls promptly

Repairs:

- Email O&M Coordinator all repairs. Include the following information in email:
    - Email subject: “HFXXXX REPAIR REQUEST”
    - Email contents:
        - HF number
        - Owner name
        - Address
        - Phone number
        - Reason(s) for repair
        - Any additional info needed, for example, bring extra filters

Ultra Violet (UV) Disinfection Unit Alarm Reset Guidance

Last Updated: January 30, 2017

1. Determine type of unit installed.
   - The UV lamps for all systems installed have an effective life of approximately 9,000 hours, which is approximately 375 calendar days.

2. Ask the caller what number is currently being displayed on the system's controller unit LCD screen or, in the event the system is a VIQUA S8Q-PA or VH200-F10, what code is being displayed on the controller's LED screen.

3. Proceed with unit specific instructions outlined below.

ATS PURIFICARE PFC-8

This system counts down the lamp life from 365 calendar days to 0 calendar days. 30 calendar days prior to day 0, this system will start to beep and a symbol will appear on the touch screen that is shaped like a bell with lightning bolts around the outside. The word "snooze" will appear inside the bell. Simply touch the snooze symbol on the touchscreen and the alarm should stop. The system can be snoozed for a specified duration of time by touching the "home" button on the touchscreen where the user will be prompted with additional options on the touchscreen. The UV lamp will continue to properly disinfect drinking water for up to 375 days from the time it was installed.

PURA GEN5-108

This system counts down the lamp life from 375 calendar days to 0 calendar days. An audible "chirp" will begin seven days prior to day 0. Therefore, the lamp should be replaced within seven calendar days from the time the alarm began, and before reaching the 9,000-hour lamp life.

The "chirp" will continue every 15 seconds until it is suspended. The "chirp" can be suspended by depressing the red controller button located on the front of the controller LCD screen for five seconds (Button is a red triangle shape) (Controller is a grey box with LCD Screen and located adjacent to the UV lamp unit). This will suspend the alarm for seven calendar days at which time the alarm will begin again. The alarm can be suspended as many times as desired, but if the lamp is not changed within seven calendar days of the first alarm, the water may not be properly disinfected.

VIQUA S8Q-PA / VIQUA VH200-F10

These systems count down lamp life from 365 calendar days to 0 calendar days. On day "0" the controller will display "A3" and an audible "chirp" will begin. At that time the lamp should be replaced within ten calendar days from the time the alarm first began, and before reaching the 9,000-hour lamp life.

The "chirp" can be suspended up to four separate times by depressing the timer reset button located on the left side of the controller for five seconds. This will suspend the alarm for seven days. Once the alarm is suspended the fourth time it can only be reset by changing the UV lamp

and manually resetting the control timer. It is important to note that if the lamp is not changed within ten calendar days of the first alarm, the water may not be properly disinfected.

VIQUA D4+

This system counts down lamp life from 365 calendar days to 0 calendar days. On day "0" an alarm will begin. At that time the lamp should be replaced within ten calendar days from the time the alarm first began, and before reaching the 9,000-hour lamp life.

The alarm can be suspended up to four separate times by touching the mute button displayed on the LCD touch screen. This will suspend the alarm for seven days. Once the alarm is suspended the fourth time it can only be reset by changing the UV lamp and manually resetting the Lamp Life. It is important to note that if the lamp is not changed within ten calendar days of the first alarm, the water may not be properly disinfected.

APPENDIX D

Sample Collection and O&M Protocols

POET Systems Sample Collection Protocol

Site Evaluation & Initial Sampling

System PFOA & PFOS Concentration	Sample Frequency	Analysis	Sample Locations	QC Samples	QC Sample Frequency	Laboratory	Turn-Around Time
All Systems	As Scheduled or During Site Evaluation	PFAS (6)	RAW WATER	FD & MS/MSD	One per 20 Samples	ELAP Certified	10-day TAT

System Install / Clearance Sampling

System PFOA & PFOS Concentration	Sample Frequency	Analysis	Sample Locations	QC Samples	QC Sample Frequency	Laboratory	Turn-Around Time
All Systems	Following Installation	PFAS (6)	PRE POST	FD & MS/MSD	One per 20 Samples	ELAP Certified	3-day TAT
		TOC	PRE	None	None	ELAP Certified	
		Arsenic and Lead	PRE POST	FD & MS/MSD	One per 20 Samples		

Site Management (SM) / O&M Sampling

System PFOA & PFOS Concentration	Sample Frequency*	Analysis	Sample Locations	QC Samples	QC Sample Frequency	Laboratory	Turn-Around Time
Each Active System	Approximately 3 months following clearance	PFAS (6)	PRE MID POST	FD & MS/MSD	One per 20 SM Samples	ELAP Certified	10-day TAT
Greater than or equal to 70 ppt	Tri-Annually	PFAS (6)	PRE MID POST	FD & MS/MSD	One per 20 SM Samples		
Greater than or equal to 35 ppt and less than 70 ppt	Semi-Annually	PFAS (6)	PRE MID POST	FD & MS/MSD	One per 20 SM Samples		
Less than 35 ppt	Annually	PFAS (6)	PRE MID	FD & MS/MSD	One per 20 SM Samples		
Non-Detect	Annually	PFAS (6)	PRE	FD & MS/MSD	One per 20 SM Samples		

*Sampling frequency will be reviewed on a periodic basis by the DEC as data is collected for each POET and may be modified for the specific location or for all POETS in a given area.

Carbon Canister Exchanges

System PFOA & PFOS Concentration	Sample Frequency	Analysis	Sample Locations	QC Samples	QC Sample Frequency	Laboratory	Turn-Around Time
All Systems	No Sampling Required					None	None

Point of Entry Treatment System (POET) Enclosure Information Sheet

Arcadis CE, Inc.
855 Route 146
Suite 210
Clifton Park
New York 12065
Tel 518 250 7300
Fax 518 250 7301

POET Enclosure Preventative Maintenance Requirements

Given that your POET system has been installed outside of your home, there are necessary precautions that we recommend you take to minimize the potential for damage during cold weather conditions, and to allow for access to your system year-round by New York State Department of Environmental Conservation (DEC) maintenance and monitoring contractors.

POET enclosures constructed by DEC contractors are equipped with thermometers, foamboard insulation along the interior walls, and have electric heaters installed to prevent the system from freezing during cold weather months. The electric heater thermostats are initially set to the lowest possible setting needed to maintain above-freezing temperatures within your POET enclosure, and to minimize increases to your winter electric bills. However, homeowners may need to adjust heater settings periodically during cold temperature extremes. It is recommended that you adhere to the following guidelines to ensure your POET system and enclosure continue operating effectively.

Preventative Maintenance Requirements:

- Make sure enclosure doors are shut at all times.
- Inspect enclosures routinely inside and out for the following:
  - GFI electrical outlets have not tripped, reset as needed;
  - Internal temperatures are above freezing (recommended temperature inside enclosure is at least 40º F);
  - Water leaks;
  - Bird and/or rodent burrowing and chewing damage.
- Remove snow/ice in front of enclosure doors.
- Excessive snow loads should be removed from the enclosure roof.
- Maintain a cleared snow path to your enclosure for access by sampling and maintenance crews.
- The POET enclosure is not to be used for storage of any personal materials or equipment.

Contact the NYSDEC hotline immediately if any problems arise with your POET enclosure system at **1-888-459-8667**.

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Environmental Remediation
625 Broadway, 12th Floor, Albany, New York 12233-7011
P: (518) 402-9706 | F: (518) 402-9020
www.dec.ny.gov

SITE MANAGEMENT PROTOCOLS: SITE MANAGEMENT SAMPLING/ ROUTINE MAINTENANCE VISITS

1) Health and Safety

Please refer to the Health and Safety Plan (HASP) before completing field work. Ensure that the appropriate PPE is worn at all times. Stop work authority should be used in any situation that you feel is unsafe. Never enter a residence alone.

2) Principle

The purpose of this Standard Operating Procedure (SOP) is to outline the necessary tasks to complete while conducting Site Management (SM) Sampling for installed POET/POUT water treatment systems.

3) Resources and Supplies

- Site specific HASP
- Truck which will be stocked with necessary tools and equipment, check stock daily
- Tablet and the proper downloaded information for the day's tasks
- PPE, including an ample amount of nitrile gloves
- Tablet with GPS
- DEC ID badge
- 5-gallon bucket and 1 gallon milk jug (or similar) for purging sample tap
- Sample bottles
- Cooler(s) and ice
- Replacement Pre-filters & UV Sleeves
- CLR
- Replacement O-rings & Lubrication
- Rags/ paper towels
- Hair dryer
- Wet/dry shopvac
- Portable GFCI

4) Sampling Preparation

- On your tablet, load the assigned sampling visits. Discuss any possible difficulties that the site may present with the sampling coordinator.
- Double check that the proper resources and supplies were acquired for the day's work and are confirmed to be in working condition. Enter the address into your GPS before leaving for the residence. Have a general idea of the location so you can maximize your attention on the road.

5) Sampling Procedure

- Display your ID badge at all times while at the residence.
- Introduce yourself and team to the homeowner and let them know that you are there for site management sampling as well as routine maintenance. Outline the basics of the sampling and maintenance that you will be performing.
- When the homeowner shows you where their system is, take note of the surroundings and recognize any hazards that may disrupt your duties. If applicable, make note of any issues or hazards in the tablet so samplers are aware for future visits.
- Confirm that the POET system has not been placed in bypass mode by the owner. If so, contact the sampling coordinator immediately.
- Purge one gallon through each port where samples will be collected.
- Review and QC-check the prepared sample bottle labels to ensure the labels are marked with the appropriate location and site management sampling is stated. Fill in sample times and any other applicable information. Adhere the water-proof labels to the bottles.
- Plan for collection of quality control samples as required. QC samples will be collected from the POST sample position, concurrently with collection of the POST parent sample. One duplicate sample and one set of MS/MSD samples are required for every 20 samples collected. Make sure to mark these in your notes on the tablet. If there are any questions about where or when to collect QC samples please refer to the daily sampling schedule, or ask the sampling coordinator.
- Put on a fresh set of nitrile gloves, and collect the water samples in the prepared sample bottles. Start with the POST sample first. When collecting each sample, confirm that the information and sampling IDs identified on each bottle are correct and correspond to the location being sampled.
- Proceed with collecting the MID sample, and finish by collecting the PRE sample last.
- When filling out the Chain of Custody (COC) make sure that the sample name and times match exactly.
- Make sure to enter all necessary information into tablet forms. If any routine maintenance (outlined below) is performed, make sure to fill out necessary tablet forms. Additionally, do not forget to mark the O&M tag with the date and activities performed. Ensure the system is also equipped with a main shut off tag and a pre-filter changeout tag.
- Routine Maintenance: Start this section of the visit only after all samples have been collected successfully.

6) Routine Maintenance

- **Pre-filter Change out:**
  i) Place a bucket under the pre-filter.
  ii) Turn off the water supply using the two valve levers located on either side of the pre-filter.
  iii) Press down on the pressure relief button (if present on top of the housing cap/lid) to relieve pressure inside the filter container.
  iv) Slowly unscrew (turn to the left) the filter container from below the housing. Do this by hand or use the filter wrench supplied with system. A small amount of water may come out of the housing into the bucket. If the O-ring gasket comes loose, put it back in place around the top of the cartridge. If O-ring becomes damaged, replace.
  v) Remove the used filter cartridge and discard back at warehouse. Rinse and clean the inside of the filter container, if needed (there may be some natural sediment in the bottom).

vi) Insert a new filter cartridge into the filter container, making sure the cartridge is centered and slips over the small standpipe inside the container or attached to the housing cap/lid.
vii) Make sure the new filter is centered, and then screw the filter container back into the housing cap/lid. Hand tighten it or use the filter wrench to tighten. DO NOT OVER-TIGHTEN.
viii) Slowly turn on the water supply again and allow the filter housing to fill with water
ix) Press down on the pressure relief button again (if present) to release air that may be trapped inside.
x) Check and inspect for leaks until the unit or system is pressurized. If water leaks from between the housing cap/lid and filter container, please check that the O-ring gasket is in place and not damaged, and check that the filter was centered and fits easily between the filter container and the housing cap/lid.

- **UV Sleeve Cleaning:**
  i) Place bucket under the UV light & unplug the UV light
  ii) Turn off the water supply using the two isolation valves located on either side of the UV light.
  iii) After opening bottom spigot, you will only get a few drops of water, slowly open top spigot above UV light and this will allow the water to drain (about a gallon).
  iv) Open spigot to drain water (into bucket) from the UV system
  v) Wearing gloves, unscrew/disconnect and remove the UV bulb from the system (only touch the ceramic end of the bulb and use caution as bulb may be hot). Place bulb is a safe location.
  vi) Remove sleeve from UV housing. Place a small amount of CLR on a clean rag and rub into sleeve until any film/grime on the sleeve is gone.
  vii) Once clean, place the sleeve back into the UV housing. Please make sure O-rings are seated properly. (O-rings should be checked and replaced if necessary)
  viii) After water is turned on and no leaks present, bleed air from top spigot above UV light. Recheck for leaks.
  ix) Turn water on slowly by opening both isolation valves one at a time to check for any leaks in the system. Once it is confirmed that there are no leaks, place UV bulb inside sleeve and reconnect.
  x) Plug UV back in to supplied GFI outlet and ensure the controller displays the day countdown (this may take a few minutes).
- Perform a QC check of the entire system, check for leaks, the sediment filter, and UV light.
  i) If any issues can be handled immediately, repair them while onsite (after samples are collected).
  ii) If there are issues that could not be fixed due to lack of time, an additional repair visit must be scheduled.
- Record the proper information in the tablet.

7) Finishing

- Let the homeowner know that tasks are complete and answer any questions they may have. Any questions that you are unsure of, have them reach out to the DEC hotline.
- Bring samples back to the warehouse (transport in cooler with ice), complete all necessary COC forms and leave samples refrigerated until the courier arrives.

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

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SITE MANAGEMENT PROTOCOLS: INITIAL DEC SAMPLING

1) Health and Safety

Please refer to the Health and Safety Plan (HASP) before completing field work. Ensure that the appropriate PPE is worn at all times. Stop work authority should be used in any situation that you feel is unsafe. Never enter a residence alone.

2) Principle

The purpose of this Standard Operating Procedure (SOP) is to outline the necessary tasks to complete while conducting Initial DEC Sampling for homeowners requesting a POET system.

3) Resources and Supplies

- Truck, which will be stocked with necessary tools and equipment; check stock daily
- Tablet, containing the proper downloaded information for the day's tasks
- PPE, including an ample amount of nitrile gloves
- Tablet with GPS
- DEC ID badge
- 5-gallon bucket and 1 gallon milk jug (or similar) for purging sample tap
- Extra POET Homeowner Guide Pamphlets
- Sampling bottles
- Cooler(s) and Ice

4) Sampling Preparation

- On your tablet, load the assigned initial sampling visits and coordinate with evaluation inspectors as needed. Discuss any possible difficulties that the site may present with the Operations Unit (Ops).
- Double check that the proper resources and supplies were acquired for the day's work and are confirmed to be in working condition.
- Enter the address into your GPS before leaving for the residence. Your coworker should be providing you with directions; avoid using your cell phone while driving. Have a general idea of the location so you can maximize your attention on the road.

5) Sampling Procedure

- Display your ID badge at all times while at the residence.
- Introduce yourself and the team to the homeowner; let them know that you are there for initial sampling.
- When the homeowner shows you where their pressure tank is, take note of the surroundings and recognize any hazards that may disrupt your duties. Record these potential hazards in the tablet so it is known by staff that visit the site in the future. Attempt to take the sample as close

to the pressure tank as possible. Make sure to purge a minimum of one gallon through the sample location.

- After donning a fresh set of clean nitrile gloves, take the water samples via the sampling bottles. Complete MS/MSD and/or duplicates as needed. Be sure to label the bottles properly so that a Chain of Custody (COC) form can be completed efficiently. Fill out the blanks on the pre-printed labels, including but not limited to: sample time (hh:mm), sample ID (HFXXXXMMDDYY), and samplers initials. Adhere the water-proof labels to the bottles. When filling out the Chain of Custody (COC) make sure that the sample name and times match exactly.
- Record the proper information in the tablet.
  i) Analytes sampled for
  ii) Purge time and volume
  iii) If MS/MSD and/or duplicates were collected
  iv) Any additional notes or comments
- Answer any questions the homeowner may have. Any questions that you are unsure of, have them reach out to the DEC hotline number. Health-related questions should be referred to NYSDOH.
- Bring samples back to the command post (transport in cooler), complete all necessary COC forms, and leave samples refrigerated until the laboratory courier arrives.

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SITE MANAGEMENT PROTOCOLS: CLEARANCE SAMPLING

1) Health and Safety

Please refer to the Health and Safety Plan (HASP) before completing field work. Ensure that the appropriate PPE is worn at all times. Stop work authority should be used in any situation that you feel is unsafe. Never enter a residence alone.

2) Principle

The purpose of this Standard Operating Procedure (SOP) is to outline the necessary tasks to complete while conducting Clearance Samplings for installed POET water treatment systems.

3) Resources and Supplies

- Site specific HASP
- Truck which will be stocked with necessary tools and equipment; check stock daily
- Tablet and the proper downloaded information for the day's tasks
- Rubber 25-foot hose
- PPE, including an ample amount of nitrile gloves
- Tablet with GPS
- DEC ID badge
- 5-gallon bucket and 1 gallon milk jug (or similar) for purging sample tap
- Sample collection bottles
- Cooler(s) and ice

4) Sampling Preparation

- On your tablet, load the assigned sampling visits. Discuss any possible difficulties that the site may present with the sampling coordinator.
- Double check that the proper resources and supplies were acquired for the day's work and are confirmed to be in working condition. Enter the address into your GPS before leaving for the residence. Have a general idea of the location so you can maximize your attention on the road.

5) Sampling Procedure

- Display your ID badge at all times while at the residence.
- Introduce yourself and the team to the homeowner and let them know that you are there for clearance sampling. Outline the basics of the sampling and that you will be performing a quality control check of their system as well.
- When the homeowner shows you where their system is, take note of the surroundings and recognize any hazards that may disrupt your duties.
- Confirm that the POET system has not been placed in bypass mode by the owner. If so, contact the sampling coordinator immediately.

- Discuss with the homeowner the purging options as well as the amount of water that needs to be purged. An outside spigot is the ideal purge method. If this is not an option discuss purging via a bath tub or if the location allows, hook up a hose directly to the post-system sampling port.
- When the team and the homeowner decide on the best purge method, proceed with the purge after marking down the initial flow meter measurement.
- Once 75 gallons (or amount decided with homeowner) has been purged through the system, stop the purge and prepare for collecting sample.
- Purge one gallon through each port where samples will be collected.
- After donning a fresh set of clean nitrile gloves, collect the water samples using the designated sample bottles. Start with the POST sample (collect PFC sample first, then if necessary collect any additional POST samples). Collect the PRE sample last (again collecting PFC first).
- Where required, fill out the blanks on the pre-printed labels, including but not limited to: sample time (hh:mm), sample ID (HFXXXXYYYYMMDD), and samplers initials. Also please QC the labels to ensure the label is marked with the appropriate location (HF/PB/NB) and clearance sampling is stated. Ensure all information is accurate. Adhere the water-proof labels to the bottles. When filling out the Chain of Custody (COC) make sure that the sample name and times match exactly.
- Complete quality control samples as required. One set of MS/MSD samples and one duplicate sample of each analysis is required for every 20 samples. Make sure to mark these in your notes. If there are any questions about where or when to collect QA/QC samples please refer to the daily sampling schedule, or confer with the sampling coordinator.
- While the purge is being completed, perform a QC check of the entire system, check for leaks, inspect the sediment filter, and UV light.
  i) If any issues can be handled immediately, repair them while onsite (after samples are collected).
  ii) If there are issues that could not be fixed due to lack of time, an additional repair visit will have to be scheduled.
- Record the proper information in the tablet.
  i) Analytes sampled for
  ii) Purge time and volume
  iii) If MS/MSD and/or duplicates were taken
  iv) Any additional notes or comments
- Let the homeowner know that tasks are complete and answer any questions they may have. Any questions that you are unsure of, have them reach out to the DEC hotline. Health-related questions should be referred to NYSDOH.
- Bring samples back to the command post (transport in cooler with ice), complete all necessary COC forms, and leave samples refrigerated until the laboratory courier arrives.

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SITE MANAGEMENT PROTOCOLS: TANK EXCHANGE

1) Health and Safety

Please refer to the Health and Safety Plan (HASP) before completing field work. Ensure that the appropriate PPE is worn at all times. Stop work authority should be used in any situation that you feel is unsafe. Never enter a residence alone.

2) Principle

The purpose of this Standard Operating Procedure (SOP) is to outline the necessary tasks to complete while conducting Tank Exchanges for installed POET/POUT water treatment systems.

3) Resources and Supplies

- Truck, which will be stocked with necessary tools and equipment, check stock regularly
- Tablet and the proper downloaded information for the day's tasks
- Purging apparatus (and screw driver) and rubber 25-foot hose
- Proper tanks for exchanges
- PPE
- Cellphone with GPS
- DEC ID badge
- Hand truck
- 5-Gallon bucket
- Wet-Dry Shopvac
- Electrical extension cord
- Portable GFCI

4) Exchange Preparation

- On your tablet, load the assigned exchange(s). Discuss any possible difficulties that the site may present with Ops (e.g. steep stairs, low ceiling, and tight install).
- Sign out a purging apparatus ("duck call") from the warehouse so that the spigots can be utilized for purging.
- Coordinate with Logs to load up the proper tanks for the exchange as stated on the Exchange Form from Ops. Sizes will be either 10x54, 12x52, 10x18, or POUT filters. Finally, check that the heads are the correct style, either threaded or clamp.
  Pro-tip: A hand truck and proper lifting techniques should always be used when handling larger tanks as they are upwards of 290 pounds.
- Enter the address into your GPS before leaving for the residence. Your Arcadis coworker should be providing you with directions, avoid using your cell phone while driving. Have a general idea of the location so you can maximize your attention on the road.

5) Exchange Procedure

- Display your ID badge at all times while at the residence.
- Introduce yourself and team to the homeowner and let them know that you are there for a tank exchange and maintenance activities. Outline the basics of the exchange (removing the lead tank, moving the secondary tank into the lead position, placing a fresh tank in the secondary position) and that you will be performing a quality control check and maintenance of their system as well.
- When the homeowner shows you where their system is, take note of the surroundings and recognize any hazards that may disrupt your duties (height restrictions, low light, insects, slipping hazards, etc.).
- Analyze the current system and confirm that the same tank size and type is installed as the Exchange Form noted.
- Once everything is confirmed, offload the new tank and place it near the system.
- Alert the homeowner that the water will be turned off during the exchange. Once they are aware, use the main shut off valve to turn the primary water from the well off. Also, turn off the valve after the second tank and before the UV system.
- Place the tanks connected to the system in bypass mode (valves perpendicular to tank in/out).
- Unscrew/unclamp lead tank in line of the system.
- Connect the compressed air line to the outlet connection of the tank, connect the discharge hose to the inlet connection of the tank.
- Apply compressed air to blow out the water inside the tank.
- Use the buddy system to ease the movement of the heavy tank and place safely out of the work space.
- Unscrew/unclamp second tank in line of the system and rescrew/reclamp into the first tank spot.
  Note: For systems with six tanks (10x18s), the first three in the system's flow are considered Tank 1 and will be removed. The second three are considered Tank 2 and will be placed into Tank 1's place. Three new tanks will be placed into Tank 2's place.
- Screw/clamp replacement tank into the second tank position.
- Slowly place both tanks into treatment mode (valves parallel to tank in/out).
- Slowly turn the main shut off valve back on (parallel to flow).
  Pro-tip: Turning on the water slowly greatly reduces the risk of water hammer which has the ability to damage the system's plumbing.
- Attach the flushing apparatus to the spigot located after the carbon tanks.
- Slowly turn on the spigot and allow the water to drain into a five gallon bucket. Check the water quality and ensure that there is not a high level of carbon particulates present. Keep flushing the system as needed until water quality is satisfactory.
- Once flushing is complete and the spigot is turned to off, slowly turn the valve on before the UV system.
- Perform a QC check of the entire system, check for leaks, the sediment filter, and UV light.
  i) If any issues can be handled immediately, repair them while onsite.
  ii) If there are issues that could not be fixed due to lack of time, a repair visit will have to be scheduled.

- Record the proper information in the tablet.
  i) Tank head serial number
  ii) Tank ID, manufacturer, and serial number
  iii) Carbon type
  iv) UV and flow meter count
- Take the removed tank back to the truck.
- Alert the homeowner that the water is back on and answer any questions they may have. Any questions that you are unsure of, have them reach out to the DEC hotline.
- Return the old tank to the warehouse and ensure that the appropriate paperwork is uploaded to SharePoint.

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SITE MANAGEMENT PROTOCOLS: MAINTENANCE/REPAIRS

1) Health and Safety

Please refer to the Health and Safety Plan (HASP) before completing field work. Ensure that the appropriate PPE is worn at all times. Stop work authority should be used in any situation that you feel is unsafe. Never enter a residence alone.

2) Principle

The purpose of this Standard Operating Procedure (SOP) is to outline the necessary tasks to complete while conducting maintenance and/or repairs for installed POET/POUT water treatment systems.

3) Resources and Supplies

- Truck which will be stocked with necessary tools and equipment, check stock regularly
- Tablet and the proper downloaded information for the day's tasks
- Purging apparatus (and screw driver) and rubber 25-foot hose
- PPE
- Cellphone with GPS
- DEC ID badge
- 5-Gallon bucket

4) Repair/Maintenance Preparation

- On your tablet, load the assigned repair(s). If repair is an emergency, there may not be a form available. Load a blank repair form to the tablet if needed. Discuss any the issue with the system and possible difficulties that the site may present with Ops (e.g. steep stairs, low ceiling, and tight install).
- Sign out a purging apparatus ("duck call") from the Logistics Unit (Logs) so that the spigots can be utilized for purging, if necessary.
- Check that the maintenance/repair bin is fully stocked with the proper materials.
- Enter the address into your GPS before leaving for the residence. Have a general idea of the location so you can maximize your attention on the road.

5) **Repair Procedure** (see 6 for maintenance)

- Display your ID badge at all times while at the residence.
- Introduce yourself and team to the homeowner and let them know that you are there for the requested repair.
- When the homeowner shows you where their system is, take note of the surroundings and recognize any hazards that may disrupt your duties.
- Immediately shut off the system at the pressure tank if any part of the system is leaking.

- Analyze the system first for the reported callout and investigate the rest of the system for other possible irregularities before completing the repair.
- Alert the homeowner that the water will be turned off during the repair. Once they are aware, use the main shut off valve to turn the primary water from the well off, if it has not been done so already. Also, turn off any valves around the area being repaired to isolate any leaks.
- Repair/replace any items that were affected by the issue.
  Note: If the repair requires the UV system to be drained, ensure that it is unplugged to avoid overheating.
- Slowly turn the main shut off valve back on (parallel to flow). After the main valve is turned on, turn any other valves on slowly in sequence.
  Pro-tip: Turning on the water slowly greatly reduces the risk of water hammer which has the ability to damage the system's plumbing.
- Perform a final QC check of the entire system, check for leaks, the sediment filter, and UV light.
  i) If any issues can be handled immediately, repair them while onsite.
  ii) If there are issues that could not be fixed due to lack of time, an additional repair visit will have to be scheduled.
- Record the proper information in the tablet.
  i) Materials used
  ii) Model and serial number of any items that were replaced
- Alert the homeowner that the water is back on and answer any questions they may have. Any questions that you are unsure of, have them reach out to the DEC hotline.
- Ensure that the appropriate paperwork is uploaded to SharePoint.

6) Maintenance

- Analyze the system first for the scheduled maintenance item(s) and investigate the rest of the system for other possible irregularities before completing the maintenance.
- Alert the homeowner that the water will be turned off during the maintenance.
  i) UV Lamp
    (1) Unplug the UV system. If the UV system is on and not flooded, it can overheat.
    (2) Isolate the UV system with shut off valves.
    (3) Drain the UV system using the spigot before the UV system.
    (4) Replace the lamp as instructed by the manufacturer. **DO NOT** touch the bulb with your bare hands or get it wet.
    (5) Clean the quartz sleeve as needed.
    (6) Reinstall the sleeve and bulb back into the UV housing. **DO NOT** plug the system back in until it is fully flooded.
  ii) Sediment Filter
    (1) Isolate the sediment filter using the shut off valves on both sides.
    (2) Release the pressure from the filter by pressing the red button on top.
    (3) Unscrew the sediment filter using the filter wrench.
    (4) Check and note the condition of the filter.
    (5) Insert a new filter, ensure that plumber's lube is applied to the filter's gasket.
    (6) Check that the O-ring on the filter's housing is still set and screw the filter back into the head.

Pro-tip: Do not over tighten as this can cause leaks. Tight is good, too tight is broke.

- Slowly turn the main shut off valve back on (parallel to flow). After the main valve is turned on, turn any other valves on slowly in sequence.
  Pro-tip: Turning on the water slowly greatly reduces the risk of water hammer which has the potential to damage the system's plumbing.
- Perform a final check of the system for leaks or other abnormalities.
  i) If any issues can be handled immediately, repair them while onsite.
  ii) If there are issues that could not be fixed due to lack of time, an additional repair visit will have to be scheduled.
- Have the homeowner run their water to make sure everything is back to normal.
- Record the proper information in the tablet.
  i) Materials used
  ii) Model and serial number of any systems that were replaced
  iii) Flow meter reading and UV counter
- Alert the homeowner that the water is back on and answer any questions they may have. Any questions that you are unsure of, have them reach out to the DEC hotline.
- Ensure that the appropriate paperwork is uploaded to SharePoint.

APPENDIX E

Routine Data Deliverables

Data/GIS Deliverables
Updated on 3/31/2020

Notes: Excel Report Formatting: 11x17, narrow margins, landscape.
Access Report Formatting: check report shading and titles.

NOTE: Spill number HF is ER.1511059
Spill number PB is ER.1511566
Spill number LBR is ER.1512036
Hazardous Waste WH is hw.1709732

DAILY REPORTS				
Time	**Deliverables**	**File & Deliver To:**	**Notes:**	**Leader**
0900	**Call Lists HF/PB/NB/ WH*:** • Evaluations • Exchanges • Installations • Sampling • Repairs *Only send out if there are HF/PB/NB/WH#'s listed on call lists	Email .pdf to: To: HoosickPOET@dec.ny.gov; CC: Sampling Coordinator CC: Call Center Save .pdf to SharePoint Call Lists	Title & File Name: Today's date and (i.e. Report.er.1511059.YYYY-MM-DD.HSFPOET_CallListsEvals/Installs/Sample/Exchanges_Arcadis)	DM
1300	**Sampling Schedule HF/PB**	Email .pdf to: To: HoosickPOET@dec.ny.gov; CC: Field Crews / Coordinators Export Access Report to Excel and Email .xlsx to Sampling Coordinator Save .pdf and excel to SharePoint Field Schedules	Title & File Name: Today's date (i.e. Report.er.1511059.YYYY-MM-DD.HSFPOET_SamplingSchedule_Arcadis) **Coordinate these schedules at 1200 with call center** Export Access Report to Excel and Email .xlsx to Sampling Coordinator Save .pdf and excel to SharePoint Field Schedules Send separate email for each site	DM
1300	**Scheduled Work Assignments HF/PB/NB/ WH** • Evaluations (.pdf) • Installations (.pdf) • Exchanges (.pdf) • Repairs (.xls and .pdf)	Email .pdf to: To: HoosickPOET@dec.ny.gov; CC: Field Crews / Coordinators Save .pdf to SharePoint Field Schedules	Title & File Name: Today's date (i.e. Report.er.1511059.YYYY-MM-DD.HSFPOET_SchedWAEvals/Installs/Exchanges/Repair_Arcadis) **Coordinate these schedules at 1200 with call center** Save .pdf to SharePoint Field Schedules Send separate email for each site	DM
1300	**Wel-Dun Sampling HF+PB Combined**	Email .pdf to: To: HoosickPOET@dec.ny.gov; CC: Field Crews / Coordinators Save .pdf to SharePoint Field Schedules	Title & File Name: Today's date (i.e. Report.er.1511059.YYYY-MM-DD.HSFPOET_WelDunSamples/Installs/Exchanges/Repair_Arcadis) **Coordinate these schedules at 1200 with call center** Save .pdf to SharePoint Field Schedules Send separate email for each site	DM
1300	**Wel-Dun Repairs HF+PB Combined**	Email .pdf to: To: HoosickPOET@dec.ny.gov; CC: Field Crews / Coordinators Save .pdf to SharePoint Field Schedules	Title & File Name: Today's date (i.e. Report.er.1511059.YYYY-MM-DD.HSFPOET_WelDunSamples/Installs/Exchanges/Repair_Arcadis) **Coordinate these schedules at 1200 with call center** Save .pdf to SharePoint Field Schedules Send separate email for each site	DM

Data/GIS Deliverables
Updated on 3/31/2020

WEEKLY REPORTS				
Day	**Deliverables**	**File & Deliver To:**	**Notes:**	**Leader**
MON	**HF/PB/NB Weekly Report**	Complete email numbers for PB, WC, CB. Attach .pdf all three reports. Send separate email from EH/WH. Report to: To: HoosickPOET@dec.ny.gov; CC: NYSDEC, NYSDOH, Project Management Save .pdf to Arcadis project folder and SharePoint	Title and File Name: Petersburgh Spill Weekly Report & Today's Date Hoosick Falls Spill Weekly Report & today's Date Newburgh Spill Weekly Report & today's Date	DM
MON	**WH Weekly Report*** ***Reduced to Monthly**	Complete email numbers. Attach .pdf. Send separate email from HF/PB/NB. Report to: To: HoosickPOET@dec.ny.gov; CC: NYSDEC, NYSDOH, Project Management Save .pdf to Arcadis project folder and SharePoint	Title and File Name: West Hampton Falls Spill Weekly Report & today's Date	DM
TUE	**On-Hold Report HF/PB/NB**	Email .xlsx to: TO: NYSDEC, Project Management	Title & File Name: HF POET On-Hold PB POET On-Hold NB POET On-Hold	DM
WED	**All POET Data Spreadsheet HF/PB/NB*/WH*** ***NB/ WH reduced to quarterly**	Export SharePoint Database to Excel and Email .xlsx to: To: HoosickPOET@dec.ny.gov; CC: NYSDEC, NYSDOH Save .xlsx to SharePoint Progress to Date	Title & File Name: Today's date (i.e. Report.er.1511059.YYYY-MM-DD.HSFPOET_AllPoetData_Arcadis)	DM

Data/GIS Deliverables
Updated on 3/31/2020

MONTHLY REPORTS				
Month	**Deliverables**	**File & Deliver To:**	**Notes:**	**Leader**
N/A	**EQuIS Data**	Email .pdf to: To: nyenvdata@dec.ny.gov;	N/A	DM
1st Mon	**Site Management Monthly Report** • Maps	Email .xlsx report, attach .pdf of report log, sampling tables, GIS SM map to: TO: NYSDEC, Project Management	Title & File Name: Report.er.1511059.YYYY-MM-DD.HSFPOET_OMMonthlyNoX_Arcadis)	**Report:** DM **Maps:** DM
3rd Thurs	**Progress To Date Reports HF/PB/NB/WH (Completed Work Reports)** ***Reduced to Monthly** • Evaluations (HF/PB/NB/WH) • Installs (HF/PB/WH) • Initial Sampled (PB)	Attach to Meeting Minutes and distribute to list below. Save .pdf to SharePoint Progress to Date	Title & File Name: Today's date (i.e. Report.er.1511059.YYYY-MM-DD.HSFPOET_PTDEvals/Installs/Exchanges/ClearedUse_Arcadis)	DM
3rd Thurs	**POETS Site Management Progress Meeting Minutes**	Email .pdf, Attach .pdf Progress Report CC: NYSDEC, NYSDOH, Attendees	Title & File Name: Report.er.1511059.YYYY-MM-DD.HSFPOET_SMMtgNoXMinutes_Arcadis	DM
1st Wed	**GIS Status Map HF/PB/WH** • Status Map	Email Maps .pdf to: To: HoosickPOET@dec.ny.gov; CC: NYSDEC, Project Management Save Maps .pdf to SharePoint (Field Schedules and Progress to Date)	Status Map: Title & File Name: Today's Date (i.e. Report.er.1511059.YYYY-MM-DD.HSFPOET_StatusMap_Arcadis	DM
1st Wed	**Completed DEC Initial Sampling List HF/PB**	Email .pdf and .xlsx to: To: NYSDEC, NYSDOH	Title & File Name: Today's date (i.e. Report.er.1511059.YYYY-MM-DD.HSFPOET_DECInitialSample_Arcadis)	DM
1st day of month	**Commercial Sites Export**	Email .xlsx to: To: HoosickPOET@dec.ny.gov; CC: NYSDEC, Project Management	Title & File Name: Commercial_Export_YYYYMMDD	DM
1st day of month	**POET Enclosure List**	Email .xlsx to: To: HoosickPOET@dec.ny.gov; CC: NYSDEC, Project Management	Title & File Name: POET_Enclosures	DM
Weeks of January 1 and July 1	**Newburgh Sample Results Summary**	Email .xlsx to: To: HoosickPOET@dec.ny.gov; CC: NYSDEC, Project Management	Title & File Name: Newburgh POETS Analytical Summary	DM
1st FRI	**Sites Pending POETS Installation**	Email .pdf and .xlsx to: To: HoosickPOET@dec.ny.gov; CC: NYSDEC, Project Management	Title & File Name: Today's Date (i.e. Report.er.1511059.YYYY-MM-DD.HSFPOET_Pending Install_Arcadis)	DM

APPENDIX F

Equipment Manuals

VIQUA

Owner's Manual

Models:

S2Q-PA, S5Q-PA, S8Q-PA, S2Q-P/12VDC, S5Q-P/12VDC

NSF Standard 55 Class B Validated Models:

SV5Q-PA, SV8Q-PA

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System Tested and Certified by NSF International against CSA B483.1 and NSF/ANSI 55 for Disinfection Performance, Class B

MEMBER Water Quality Association

520104_RevN

Congratulations on the purchase of your ultraviolet (UV) water disinfection system! This system uses the most advanced UV technology on the market and is designed to provide you with years of trouble free operation with minimal maintenance required to protect your drinking water from microbiological contaminants.

To ensure ongoing disinfection of your water, UV lamps need to be replaced annually with VIQUA factory-supplied replacements. VIQUA lamps are the result of extensive development resulting in a highly efficient disinfection platform with extremely stable UV output over the entire 9000 hour lifetime. Its success has led to a proliferation of non-genuine copies in the market.

The UV lamp is the heart of the disinfection system, and there should be no compromise when it's time for a replacement.

Why should you insist on genuine factory supplied VIQUA replacement lamps?

- Use of widely available, non-genuine, replacement lamps has been shown to damage the control module of VIQUA UV disinfection equipment.
- An increasing number of calls to VIQUA Technical Support are connected with non-genuine lamps being used (unknowingly) as replacements.
- Damage arising from the use of non-genuine lamps poses a safety risk and is not covered by equipment warranty.
- Unless the UV equipment is equipped with a UV sensor (monitor), it is not possible to verify the UV (invisible) output of replacement lamps.
- Similar appearance to the original lamp and the presence of (visible) blue light does not mean equivalent disinfection performance.
- VIQUA replacement lamps undergo rigorous performance testing and strict quality control processes to ensure that the safety and performance certifications of the original equipment are not compromised.

So, you can see that it's simply not worth the risk! Insist on genuine VIQUA replacement lamps.

Section 1 Safety Information

These are the original instructions. Please read this entire manual before operating this equipment. Pay attention to all danger, warning, and caution statements in this manual. Failure to do so could result in serious personal injury or damage to the equipment.

Make sure that the protection provided by this equipment is not impaired. DO NOT use or install this equipment in any manner other than that specified in the installation manual.

1.1 Potential Hazards:

Read all labels and tags attached to the system. Personal injury or damage to the system could occur if not observed.

	Waste electrical and electronic equipment (WEEE). This symbol indicates that you should not discard wasted electrical or electronic equipment (WEEE) in the trash. For proper disposal, contact your local recycling/reuse or hazardous waste center.		This symbol indicates not to store any combustible or flammable material close to the system.
	This symbol indicates there is Mercury present.		This symbol indicates that the contents of the transport package are fragile and the package should be handled with care.
	This is the safety alert symbol. Obey all safety messages that follow this symbol to avoid potential injury. When on the equipment, refer to the Operational and Maintenance manual for additional safety information.		This symbol indicates safety glasses with side protection is required for protection against UV exposure.
	This symbol indicates a risk of electrical shock and/or electrocution exists.		This symbol indicates gloves must be worn.
	This symbol indicates the marked equipment may contain a component that can eject forcibly. Obey all procedures to safely depressurize.		This symbol indicates safety boots must be worn.
	This symbol indicates the system is under pressure.		This symbol indicates the operator must read all available documentation to perform required procedures.
	This symbol indicates there is a potential UV hazard. Proper protection must be worn.		This symbol indicates the plumber must use copper piping.
	This symbol indicates the marked item could be hot and should not be touched without care.		This symbol indicates that the system should only be connected to a properly grounded, grounding-type controller receptacle that is protected by a Ground Fault Circuit Interrupter (GFCI).
	This symbol indicates there is a potential for VERY hot water when flow is started.		

Warning: This product may contain chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

1.2 Safety Precautions:

⚠DANGER

Failure to follow these instructions will result in serious injury or death.

- **Electric Shock:** To avoid possible electric shock, special care should be taken since water is present near the electrical equipment. Unless a situation is encountered that is explicitly addressed by the provided maintenance and troubleshooting sections, DO NOT attempt repairs yourself, refer to an authorized service facility.
- **GROUNDING:** This product must be grounded. If it should malfunction or breakdown, grounding provides a path of least resistance for electric current to reduce the risk of electrical shock. This system is equipped with a cord having an equipment-grounding conductor and a grounding plug. The plug must be plugged into an appropriate outlet that is properly installed and grounded in accordance with all local codes and ordinances. Improper connection of the equipment-grounding conductor can result in a risk of electrocution. Check with a qualified electrician or service personnel if you are in doubt as to whether the outlet is properly grounded. DO NOT modify the plug provided with this system – if it does not fit in the outlet, have a proper outlet installed by a qualified electrician. DO NOT use any type of adapter with this system.
- **GROUND FAULT CIRCUIT INTERRUPTER PROTECTION**: To comply with the National Electrical Code (NFPA 70) and to provide additional protection from the risk of electric shock, this system should only be connected to a properly grounded, grounding-type controller receptacle that is protected by a Ground Fault Circuit Interrupter (GFCI) or to a residual current device (RCD) having a rated residual operating current not exceeding 30 mA. Inspect operation of GFCI as per manufacturer's suggested maintenance schedule.
- DO NOT operate the disinfection system if it has a damaged cord or plug, if it is malfunctioning or if it has been dropped or damaged in any manner.
- DO NOT use this disinfection system for other than intended use (potable water applications). The use of attachments not recommended or sold by the manufacturer / distributor may cause an unsafe condition.
- DO NOT install this disinfection system where it will be exposed to the weather or to temperatures below freezing.
- DO NOT store this disinfection system where it will be exposed to the weather.
- DO NOT store this disinfection system where it will be exposed to temperatures below freezing unless all water has been drained from it and the water supply has been disconnected.

⚠ WARNING

- During extended periods of no water flow, the water in your chamber can become very hot (Approx. 60 °C) and potentially lead to scalding. It is recommended to run your water until this hot water has been purged from your chamber. Do not allow water to contact your skin during this time. To eliminate this condition, a temperature management valve can be installed at the outlet of your UV system.
- This system contains a UV Lamp. Do not operate the UV Lamp when it is removed from the chamber. Unintended use or damage of the system may result in the exposure of dangerous UV radiation. UV radiation may, even in little doses, cause harm to the eyes and skin.
- Changes or modifications made to this system without the consent of the manufacturer could render the system unsafe for operation and may void the manufacturer's warranty.

⚠ CAUTION

Failure to follow these instructions could result in minor or moderate injury.

- Carefully examine the disinfection system after installation. It should not be plugged in if there is water on parts not intended to be wet such as, the controller or lamp connector.
- Due to thermal expansion concerns and potential material degradation due to UV exposure, it is recommended to use metal fittings and at least 10" of copper pipe on the outlet of your UV chamber.
- **Hg EXPOSURE**: The UV lamp contains mercury. If the lamp breaks, then avoid inhalation or ingestion of the debris and avoid exposure to eyes and skin. Never use a vacuum cleaner to clean up a broken lamp as this may scatter the spilled mercury. Obey local regulations and guidelines for the removal and disposal of mercury waste.

NOTICE

- The UV lamp inside the disinfection system is rated at an effective life of approximately 9000 hours. To ensure continuous protection, replace the UV lamp annually.
- The UV system is not to be used or played with by children. Persons with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, are also not to handle the UV system unless they have been given supervision or instruction.
- This system is intended to be permanently connected to the water lines.
- This system is not intended to be used in or above water or outdoors or used in swimming pools when persons are in the pool.
- **EXTENSION CORDS**: If an extension cord is necessary, use only 3-wire extension cords that have 3-prong grounding-type plugs and 3-pole cord connectors that accept the plug from this system. Use only extension cords that are intended for outdoor use. Use only extension cords having an electrical rating not less than the rating of the system. A cord rated for less amperes or watts than this system rating may overheat. Exercise caution when arranging the cord so that it will not be tripped over or pulled. DO NOT use damaged extension cords. Examine extension cord before using and replace if damaged. DO NOT abuse extension cord. Keep extension cord away from heat and sharp edges. Always disconnect the extension cord from the receptacle before disconnecting this system from the extension cord. Never yank cord to pull plug from outlet. Always grasp the plug and pull to disconnect.
- If the supply cord is damaged, it must be replaced by a special cord or assembly available from the manufacturer or its service agent.
- **SYSTEM PROTECTION:** To protect your Controller, a UL1449 certified (or equivalent) transient voltage surge suppressor is strongly recommended.
- The UV lamp in this system conforms to the applicable provisions of the Code of Federal Regulations (CFR) requirements including, Title 21, Chapter 1, Subchapter J, Radiological Health.
- Read and understand the Owner's Manual before operating and performing any maintenance on this equipment.

1.3 Water Chemistry

Water quality is extremely important for the optimum performance of your UV system. The following levels are recommended for installation:

Water Quality and Minerals	Level
Iron	< 0.3 ppm (0.3 mg/L)
Hardness*	< 7 gpg (120 mg/L)
Turbidity	< 1 NTU
Manganese	< 0.05 ppm (0.05 mg/L)
Tannins	< 0.1 ppm (0.1 mg/L)
UV Transmittance	> 75% (call factory for recommendations on applications where UVT < 75%)

* Where total hardness is less than 7 gpg, the UV unit should operate efficiently provided the quartz sleeve is cleaned periodically. If total hardness exceeds 7 gpg, the water should be softened. If your water chemistry contains levels in excess of those mentioned above, proper pre-treatment is recommended to correct these water problems prior to the installation of your UV disinfection system. These water quality parameters can be tested by your local dealer, or by most private analytical laboratories. *Proper pre-treatment is essential for the UV disinfection system to operate as intended*.

Section 2 General Information

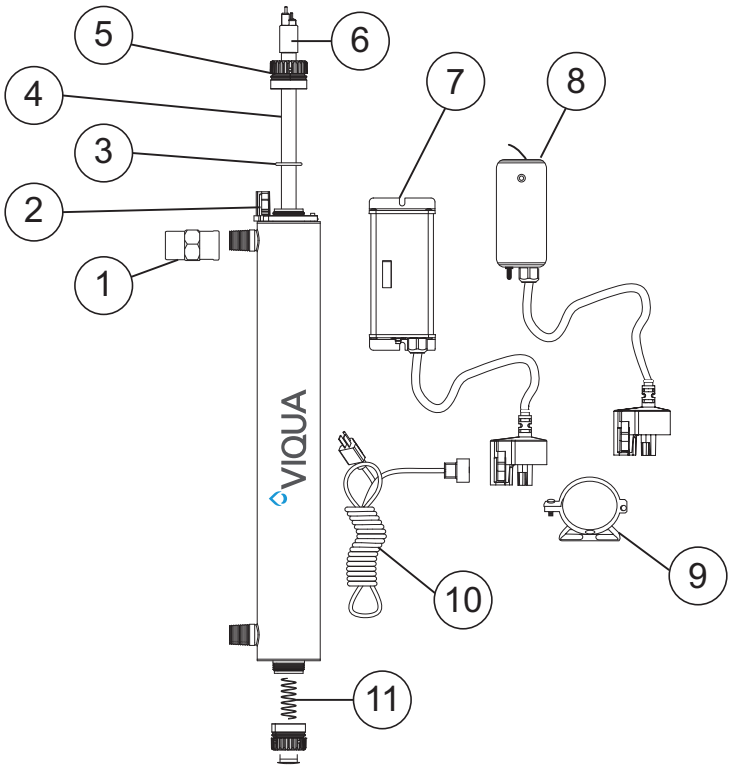


Figure 1 System Components

Item	Description	Part Number	UV Systems
1	Flow restrictor (Only for certified models)	440263-R	SV5Q-PA
		440264-R	SV8Q-PA
2	Lamp connector base	270276-R	Used on all systems
3	O-ring	410867	Used on all systems
4	Open-ended, 214 fused quartz sleeves with fire polished ends	QS-001	S1Q-PA
		QS-330	S2Q-PA
		QS-463	S5Q-PA, SV5Q-PA
		QS-810	S8Q-PA, SV8Q-PA
5	Retaining nut	RN-001	Used on all systems
6	Hard glass, coated Sterilumze®-EX UV lamps for long, consistent life (9000 hours)	S330RL	S2Q-PA
		S463RL	S5Q-PA, SV5Q-PA
		S810RL	S8Q-PA, SV8Q-PA
7	Controller (for 100-240V models only)	BA-ICE-S	S5Q-PA, S8Q-PA, SV5Q-PA, SV8Q-PA
8	Controller (for 12VDC models only)	BA-RO/P/12	S2Q-P/12VDC, S5Q-P/12VDC
9	2.5” Mounting brackets	410958-R	Used on all systems
10	IEC replacement power cords for VIQUA ICE Controller (sold separately)	260010	NORTH AMERICAN (NEMA 5-15P), 3-PRONG GROUNDED
		602637	CONTINENTAL EUROPEAN (CEE 7/7) 2-PIN WITH GROUND, “SCHUKO”
		260012	UK VERSION (BS 1363) 3-PRONG GROUNDED (5 AMP FUSE)
		260013	AUSTRALIAN VERSION (AS 3112) 3-PRONG GROUNDED
		260019	NO CONNECTOR, 3-WIRE, BARE LEADS
11	Spring	SP008	Used on all systems

Section 3 Installation

3.1 UV Disinfection System

⚠CAUTION

⚠ Electronic controller must be connected to a Ground Fault Protected Circuit (GFCI) receptacle. Ensure green ground wire ring terminal is securely fastened to ground stud on UV chamber.

The disinfection system is designed to be mounted either horizontally or vertically at the point-of-use or point-of-entry depending on the specific flow rate of the unit.

Note: *The ideal installation is vertical with the lamp connector on top. This is to prevent water damage from occurring on the lamp pins and lamp connector.*

- The controller should be mounted either above or beside the UV chamber. Always mount controller horizontally to prevent moisture from running down cordage and causing a potential fire hazard. Drip loops in all cordage connected to controller is highly recommended. Refer to Figure 5.
- The complete water system, including any pressure or hot water tanks, must be sterilized before start up by flushing with chlorine (household bleach) to destroy any residual contamination. Refer to Section 3.2.
- The disinfection system is intended for indoor use only. DO NOT install disinfection system where it may be exposed to the weather.
- Install the disinfection system on cold water line only, before any branched lines.
- A 5 micron sediment filter must precede the disinfection system. Ideally, the disinfection system should be the last treatment the water receives before it reaches the faucet.

Procedure:

1. Figure 2 shows the installation of a typical disinfection system and the related components that may be used for the installation. The use of a by-pass assembly is recommended in case the system requires “off-line” maintenance. In this case, note the system requires supplementary disinfection for the distribution system if any water is used during by-pass condition. In addition, during by-pass, the water will NOT be disinfected and a “DO NOT CONSUME THE WATER” tag should be physically installed on the by-pass assembly until such time as the system is sanitized and returned to service. For more information, refer to Section 3.2. If the water is to be consumed while the system is off-line, the water must be boiled for two minutes prior to consumption.

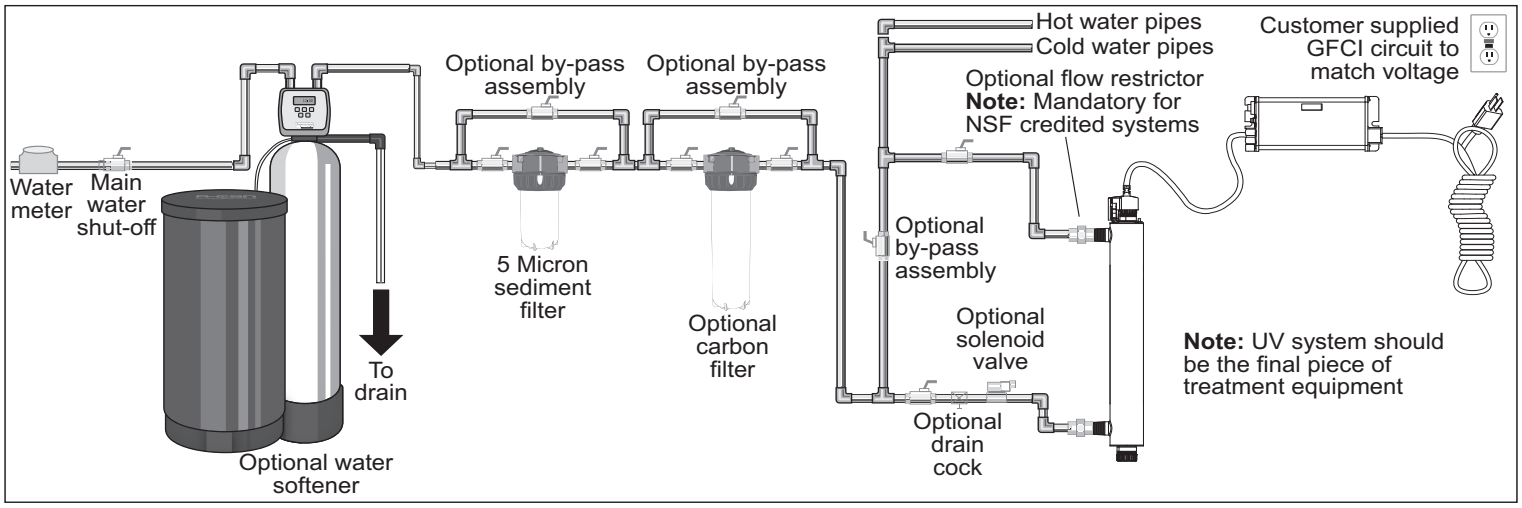


Figure 2 Disinfection System

2. Select a suitable location for the disinfection system and its related components. As it is recommended to install a GFCI, make sure that this is taken into consideration prior to any installation. The system can either be installed vertically (inlet port at the bottom) as shown in Figure 3 A, or horizontally as shown in Figure 3 B. However, the vertical installation is the most preferred method. When selecting a mounting location, leave enough space to allow the removal of the UV lamp and/or quartz sleeve (typically leave a space equal to the size of the UV chamber itself).

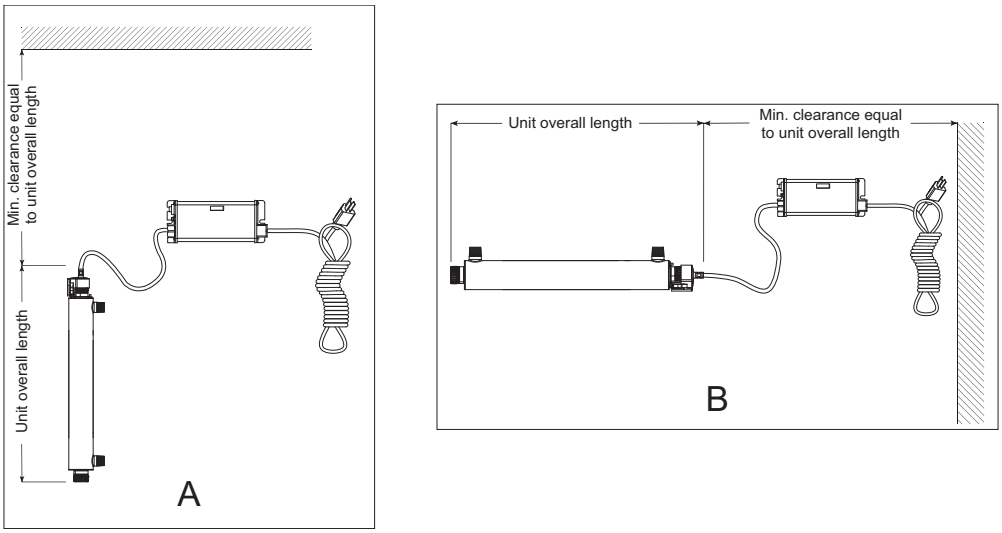


Figure 3 Disinfection Installation - Vertical and Horizontal

3. Mount the system to the wall using the supplied clamps. Various connection methods can be used to connect the water source to the system, however union type connectors are recommended. The use of a flow restrictor device will help to maintain the manufacturers rated flow. The flow restrictor should be installed on the outlet port and is designed to be installed in one direction only. Ensure that the flow of the water matches the flow direction as indicated on the flow restrictor. Refer to Figure 4.

   Note: *DO NOT solder connections while attached to the system as this could damage the O-ring seals.*

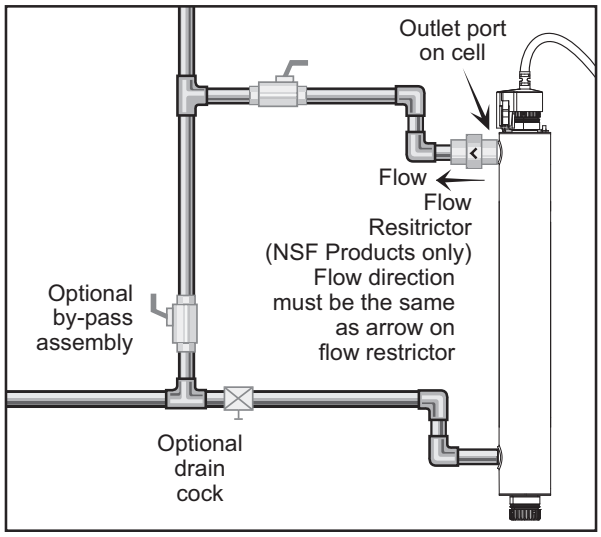


Figure 4 Flow Restrictor

4. Mount the VIQUA ICE controller horizontally to the wall, near the UV chamber. Ideally place the controller above the chamber and away from any water connection point, to prevent any water from potentially leaking onto the controller by means of a leak at a connection point or a “sweating” system. Make sure you allow for a “drip-loop” as shown in Figure 5 on the UV lamp, UV sensor, and power cord, again, to prevent any water from potentially entering the controller.

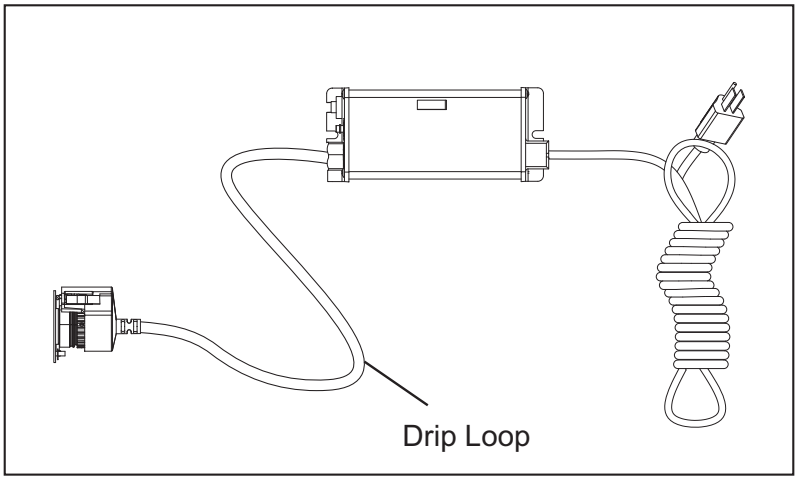


Figure 5 Drip Loop

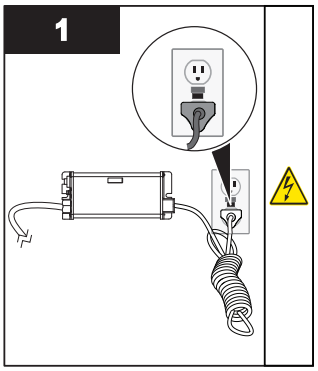
5. Install the UV lamp. Refer to Section 4.1.
6. When all plumbing connections are complete, slowly turn on the water supply and check for leaks. The most likely cause of leaks is from the O-ring seal. In case of a leak, shut water off, drain cell, remove the retaining nut, wipe the O-ring and threads. Clean and re-install.
7. Once it is determined that there are no leaks, plug the system into the ground fault interrupter and check controller to ensure the system is operating properly. The controller should illuminate without any alarms.

   Note: *DO NOT look directly at the glowing UV lamp.*
8. Allow the water to run for a few minutes to clear any air or dust that may be in the UV chamber.

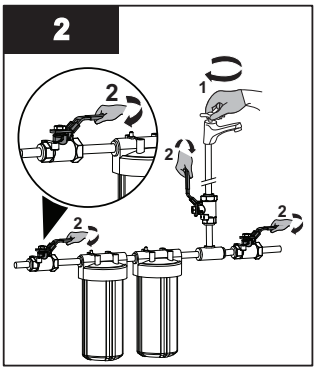
   Note: *When there is no flow, the water in the cell will become warm, as the UV lamp is always on. To remedy this, run a cold water tap anywhere in the house for a minute to flush out the warm water.*

3.2 Disinfection Procedure

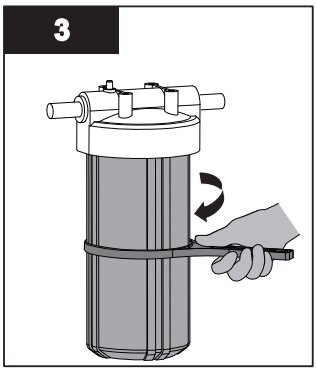
UV disinfection is a physical disinfection process and does not add any potentially harmful chemicals to the water. As UV does not provide a disinfection residual, it is imperative that the entire distribution system located after the UV be chemically disinfected to ensure that the plumbing system is free from any bacteriological contaminants. The disinfection process must be performed immediately after the UV unit is installed and repeated thereafter whenever the UV is shut down for service, without power, or inoperative for any reason. The procedure for sanitizing the plumbing system is readily accomplished as follows:



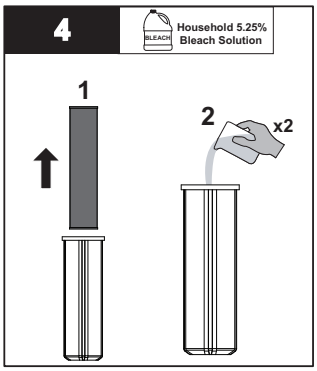
- Ensure the controller is plugged in for entire disinfection process.



- Shut off the water supply.
- Close each faucet.

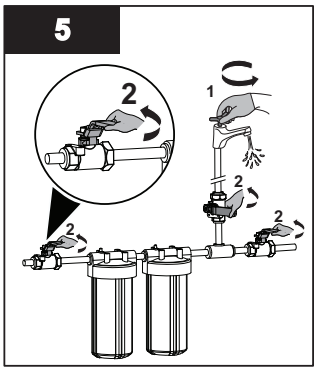


- Remove filter cartridge(s).

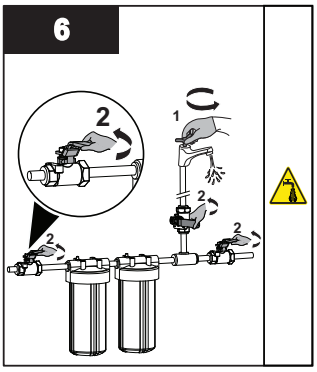


- Pour 2 cups of household bleach solution into the filter housing(s).

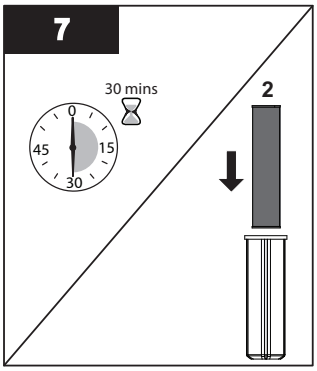
  Note: *DO NOT use Hydrogen Peroxide.*



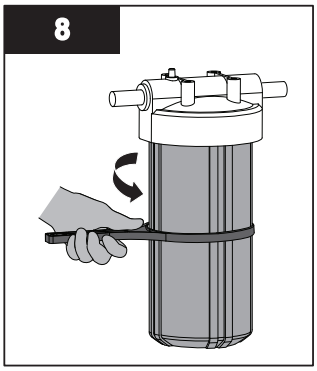
- Re-install the housings.
- Turn on the cold water supply.
- Open each faucet and all water openings until you smell the bleach and then close the faucets.



- Turn on the hot water supply.
- Open each faucet and all water openings until you smell the bleach and then close the faucets.



- DO NOT use water for 30 minutes.
- Flush the system until no chlorine smell is detectable and reinstall the filters.



- Reinstall filter housing(s).

Notes: *1) The addition of chlorine (bleach) to a hot water tank that has in the past been fed with untreated raw water with high levels of other contaminants (iron, manganese, hydrogen sulphide, organics, etc.) will result in oxidation of these contaminants and may require repeated flushing of the hot water tank. This contingency must be dealt with independently under the start-up procedure for any other conditioners that may form a part of the pre-treatment for the UV unit.*

2) The above disinfection procedure will result in a massive chlorine residual far in excess of the 0.5 to 1.0 mg/L typically present in municipally chlorinated water and of a magnitude consistent with the minimum 50 mg/L chlorine solution recommended for the disinfection of distribution systems known to be contaminated. DO NOT consume water until complete system has been flushed.

Section 4 Maintenance

⚠WARNING

- Always disconnect power before performing any work on the disinfection system.
- Always shut-off water flow and release water pressure before servicing.
- Regularly inspect your disinfection system to ensure that the power indicators are on and no alarms are present.
- Replace the UV lamp annually (or biennially if seasonal home use) to ensure maximum disinfection.
- Always drain the chamber when closing a seasonal home or leaving the unit in an area subject to freezing temperatures.

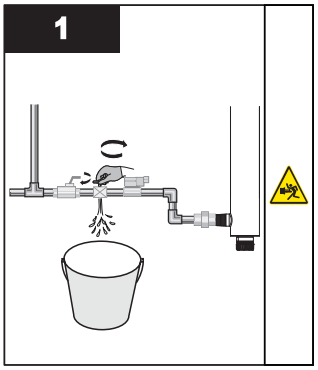
4.1 Replacing UV Lamp

NOTICE

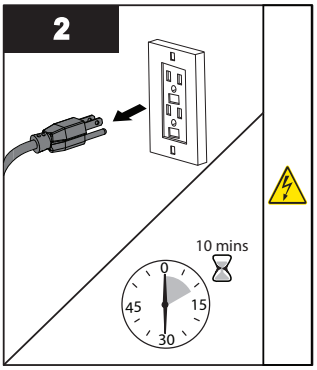
- Reset UV lamp life timer after UV lamp replacement. Refer to Section 5.1.3. Refer to www.lamprecycle.org for UV lamp disposal.
- DO NOT use water during replacement of UV lamp.

UV lamp replacement is a quick and simple procedure requiring no special tools. The UV lamp must be replaced after 9000 hours of continuous operation (approximately one year) in order to ensure adequate disinfection.

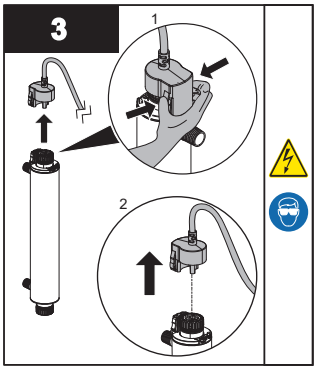
Procedure:



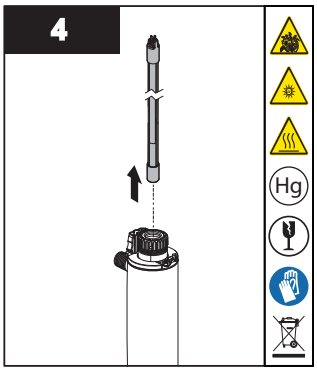
- Shut off the water line to chamber and release system pressure before servicing.



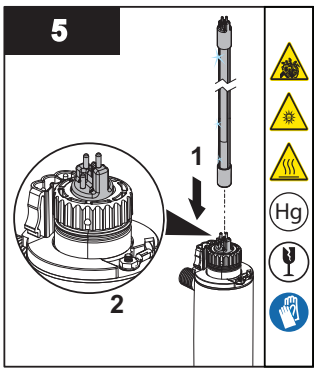
- Disconnect main power source and allow the unit to cool for 10 minutes.



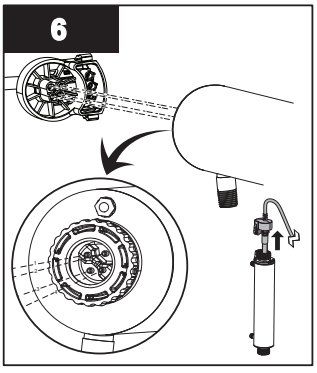
- Remove the lamp connector by squeezing the plastic locking tabs on the side of the connector.



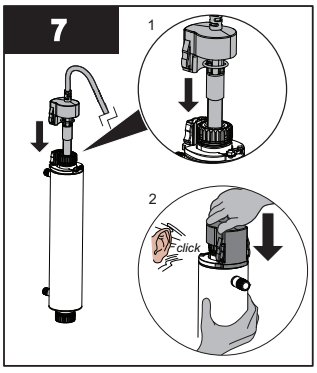
- Remove the lamp in upward direction from the chamber and lamp connector base.
- Always hold the lamp at the ceramic ends.



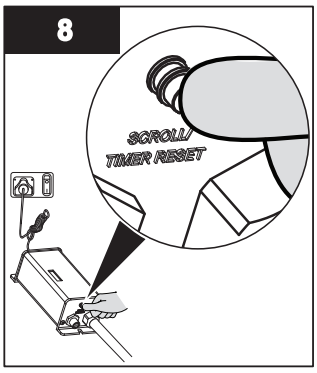
- Insert the new lamp fully into the chamber leaving about two inches of the lamp protruding from the chamber.



- Attach the connector to the lamp and note that the connector will only allow correct installation in one position.



- Push the lamp connector against lamp connector base together until an audible click is heard.
- Re-pressurize the system to check for leaks.



- Hold down the timer reset button and reapply power to the controller until you see rSEt, then release timer reset button.
- A 5 second delay will occur until you hear an audible tone and LED display will read once again 365.

VIQUA

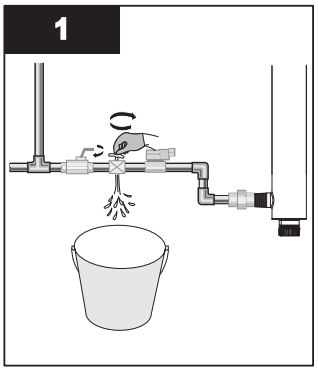
4.2 Cleaning and Replacing Quartz Sleeve

Note: *Minerals in the water slowly form a coating on the quartz sleeve. This coating must be removed because it reduces the amount of UV light reaching the water, thereby reducing disinfection performance. If the sleeve can not be cleaned, it must be replaced.*

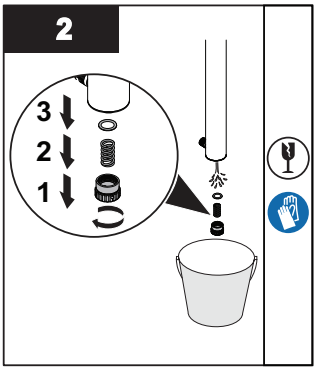
Prerequisites:

- Shut off water supply and drain all lines.
- Remove the UV lamp. Refer to Section 4.1.

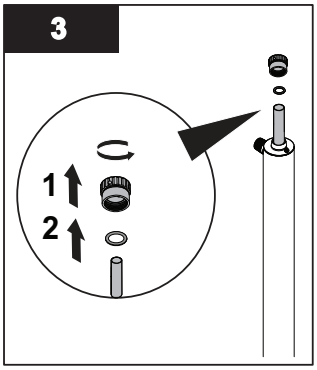
Procedure:



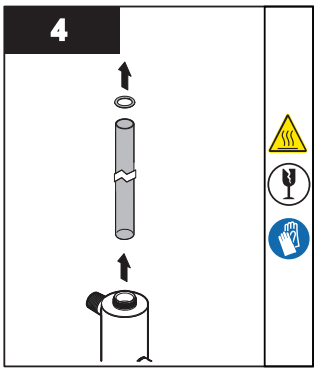
- Drain the chamber by using the drain port.



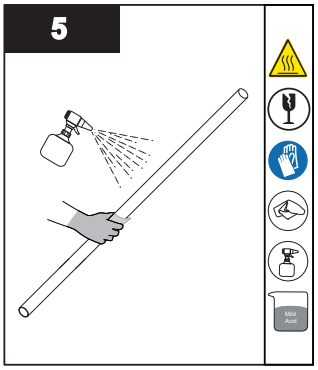
- Remove the bottom retaining nut, floating spring, and O-ring.



- Remove the top retaining nut and O-ring.

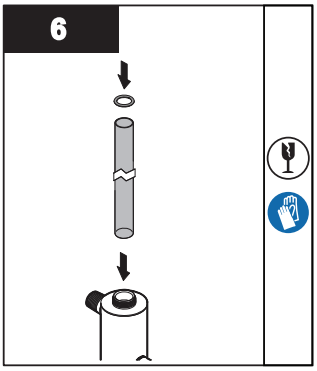


- Carefully, remove O-ring adhering to the quartz sleeve.
- Remove the quartz sleeve.

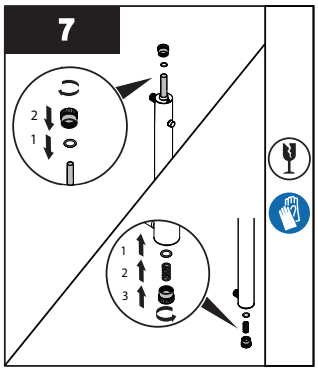


- Clean the quartz sleeve with a cloth soaked in CLR, vinegar or some other mild acid and then rinse with water.

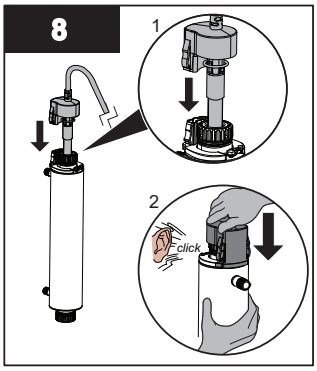
  Note: *If sleeve cannot be cleaned completely or it is scratched or cracked, then replace the sleeve.*



- Reinstall the quartz sleeve in the chamber allowing the sleeve to protrude an equal distance at both ends of the chamber.
- Slide supplied O-rings onto each end of the quartz sleeve.



- Reinstall the top and bottom retaining nuts, floating spring, and O-rings respectively.
- When service is complete, assemble the prerequisites in the reverse order of disassembly.



- Push the lamp connector against lamp connector base together until an audible click is heard.
- Plug in controller and verify the POWER-ON LED display.
- Re-pressurize the system to check for leaks.

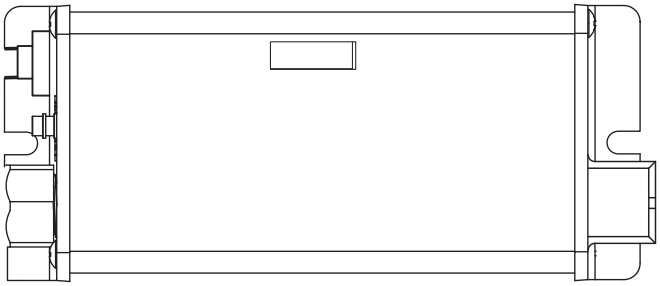
Note: *After replacing the UV lamp or quartz sleeve perform the disinfection procedure, refer to Section 3.2.*

Section 5 Operation

⚠ WARNING

The advanced warning system has been installed to provide the optimum protection against microbiological contamination in water. DO NOT disregard the warning signals. The best way to ensure optimum UV performance is to have the water microbiologically tested by a recognized testing agency on a regular basis.

5.1 Basic Systems Incorporating BA-ICE-S Controller



5.1.1 UV lamp Life Remaining (days)

365 The controller tracks the number of days of operation of the UV lamp and the controller. The default screen will display the total UV lamp life remaining (in days). The controller will count down the number of days remaining until the UV lamp requires changing (365 days to 1 day). At “0” days, the controller will display A3 and sound an intermittent audible chirp (1 second on, 5 seconds off), indicating the need to change the UV lamp.

5.1.2 Understanding your “A3” Code

A3 ***DEFERRAL*** - Once the “A3” or end of UV lamp life message is shown on the LED display, the audible alarm can be deferred up to 4 separate times. The delay is designed to allow you time to address the alarm while you obtain a new UV lamp. This can be done by simply depressing the timer reset button for 5 seconds, which is located on the left side of the controller. Each time the timer reset button is pressed the controller alarm is deferred seven days. Once the final 7 day deferral has been reached the alarm can only be silenced by changing the UV lamp and manually resetting the controller timer, refer to Section 4.1.

5.1.3 Resetting UV lamp Life

Refer to Section 4.1.

Note: *Even though the alarm on the system can be deferred for a period of time, it is important to address each and every alarm condition as they are indicating that there is a potential problem with the system and should be remedied.*

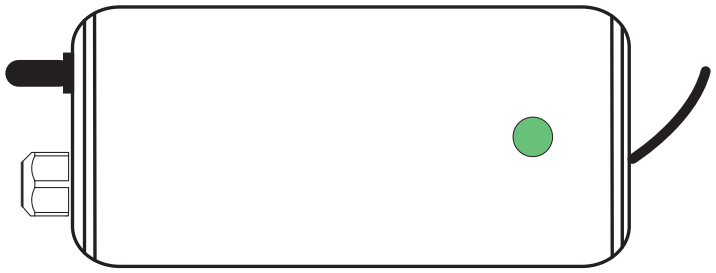
5.1.4 Total Days of Operation

1680 The controller also displays the total running time of the controller. To obtain this reading, press the push-button once. The total running time of the controller will be numerically displayed in days. This information will remain displayed for ten seconds and will then revert back to the UV lamp life remaining default screen. It should be noted that this value cannot be reset.

5.1.5 UV lamp Failure (Blank Screen)

When the system recognizes UV LAMP FAILURE (no current running through the UV lamp), the display will be blank (no default UV LAMP LIFE REMAINING screen) and the system will sound an intermittent audible tones (1 second on,1 second off). The system will remain in this state, until this condition is remedied.

5.2 12VDC Systems Incorporating BA-RO/P/12 Controller



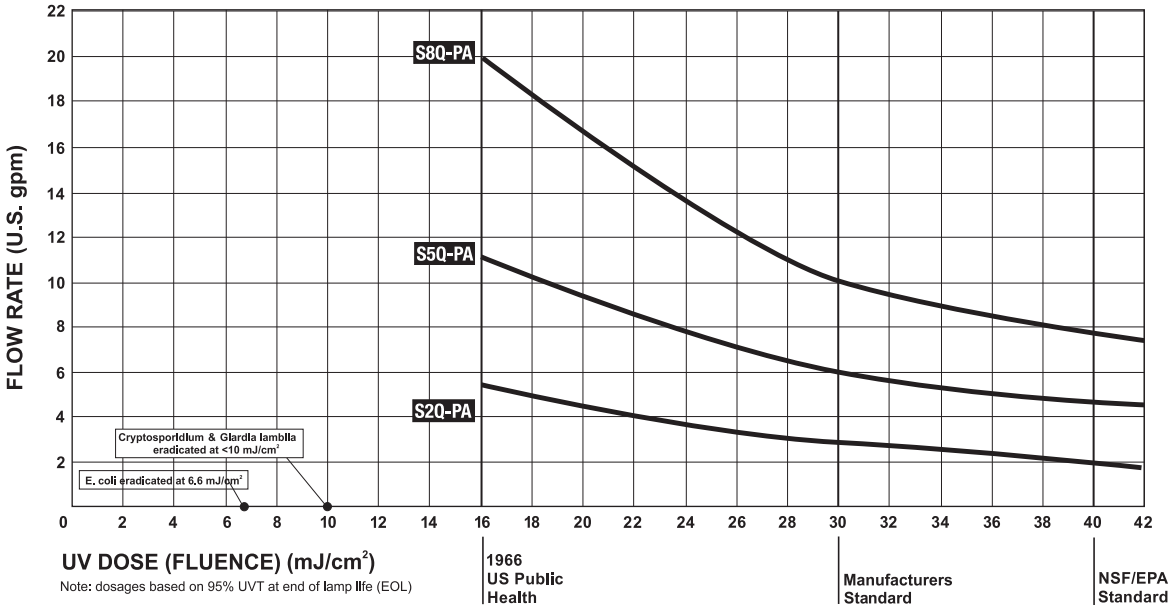
Green LED indicates UV lamp “ON”.

Section 6 Troubleshooting

Symptom	Possible Causes	Solutions
Pressure Drop	Sediment pre-filter clogged	Replace filter cartridge with appropriate 5 micron cartridge. ***Note:*** *Check source water supply as fluctuations may occur in source pressure.*
	Flow regulator	Flow regulator will result in pressure drop when approaching full flow.
High Bacteria Counts	Quartz sleeve is stained or dirty	Clean sleeve with scale cleaner and eliminate source of staining problem (ie. soften hard water, refer to Section 4.2.
	Change in feed water quality	Have source water tested to ensure that water quality is still within allowable limits for this system.
	Contamination in water lines after UV system (eg. power failures, plumbing	Disinfection system must have a bacterial free distribution system to work effectively. Refer to Section 3.2
	Possible break-through of sediment through pre-filter	Have source water tested for turbidity - may need stepped filtration in order to catch all sediment entering water system (20 micron filter followed by a 5 micron filter followed by UV
Heated Product Water	Common problem caused by infrequent use of water	Run water until it returns to ambient temperature.
Water Appears Milky	Caused by air in the water lines	Run water until air is purged.
Unit Leaking Water	Problem with O-ring seal (on retaining nut and/or UV sensor)	Ensure O-ring is in place, check for cuts or abrasions, clean O-ring, moisten with water/ lubricant and re-install, replace if necessary (410867).
	Condensation on UV chamber caused by excessive humidity & cold water	Check location of disinfection system and control humidity.
	Inadequate inlet/outlet port connections	Check thread connections, reseal with Teflon® tape and re-tighten.
System Shutting Down Intermittently	Interrupted controller	• Ensure system has been installed on its own circuit, as other equipment may be drawing power away from UV (ie. pump or fridge). • UV system should not be installed on a circuit which is incorporated into a light switch.
UV lamp Failure Alarm on - New lamp	Loose connection between UV lamp and connector	Disconnect UV lamp from connector and reconnect, ensuring that a tight fit is accomplished
	Moisture build up in connector may keep UV lamp and connector from making a solid connection	Eliminate chance of any moisture getting to the connector and/or lamp pins

DISPLAY FAULT MODES	
LED display reads “A3”	• UV lamp life expired - countdown is at “0” days. Refer to Section 5.1.2, Understanding your A3 Code. • Press reset button for a deferred alarm, replace UV lamp
LED display is blank	• Controller is in UV lamp failure mode. Refer to Section 5.1.5, UV Lamp Failure. Replace UV Lamp, refer to Section 4.1. • Power system down, allowing it to reset itself; apply power in order to confirm that the controller is able to power UV lamp • Check to see if there is sufficient power to the UV system
Green LED off (12 VDC only)	• UV lamp failure. Replace UV Lamp, refer to Section 4.1. • No input voltage to controller

Section 7 Manufacturer's Dose Flow Chart



Section 8 Specifications: Standard and Validated

Model		S2Q-P/12VDC/ S2Q-PA		S5Q-P/12VDC/ S5Q-PA/SV5Q-PA*		S8Q-PA/ SV8Q-PA*
Flow Rate	*NSF Class B Certified 16mJ/cm² @ 70% UVT	-		3.6 gpm (13.6 lpm) (0.8 m³/hr)		7 gpm (26.5 lpm) (1.6 m³/hr)
	US Public Health 16mJ/cm² @ 95% UVT	5 gpm (19 lpm) (1.1 m³/hr)		11 gpm (42 lpm) (2.5 m³/hr)		20 gpm (75 lpm) (4.5 m³/hr)
	VIQUA Standard 30 mJ/cm² @ 95% UVT	3 gpm (11 lpm) (0.7 m³/hr)		6 gpm (23 lpm) (1.4 m³/hr)		10 gpm (38 lpm) (2.3 m³/hr)
	NSF/EPA 40mJ/cm² @ 95% UVT	2 gpm (7 lpm) (0.4 m³/hr)		4.5 gpm (17 lpm) (1.0 m³/hr)		8 gpm (29 lpm) (1.8 m³/hr)
Dimensions	Chamber	43.2 cm x 6.4 cm (17" x 2.5")		56 cm x 6.4 cm (22" x 2.5")		90 cm x 6.4 cm (35" x 2.5")
	Controller 100-250 VAC	18.6 cm x 8.1 cm x 6.4 cm (7.3" x 3.2" x 2.5")		18.6 cm x 8.1 cm x 6.4 cm (7.3" x 3.2" x 2.5")		18.6 cm x 8.1 cm x 6.4 cm (7.3" x 3.2" x 2.5")
	Controller 12 VDC	13.5 cm x 4.3 cm x 5.8 cm (5.3" x 1.7" x 2.3")		13.5 cm x 4.3 cm x 5.8 cm (5.3" x 1.7" x 2.3")		-
Inlet/Outlet Port Size[1]		1/2" MNPT		3/4" MNPT"		3/4" MNPT
Shipping Weight		2.7 kg (6 lbs)		2.7 kg (6 lbs)		4.5 kg (10 lbs)
Electrical	Voltage[2]	100-240 V / 50/60 Hz	12 VDC	100-240 V / 50/60 Hz	12 VDC	100-240 V / 50/60 Hz
	Max. Current	0.6 Amp	1.8 Amp	0.6 Amp	1.8 Amp	0.6 Amp
	Power Consumption	22 W	20 W	30 W	27 W	46 W
	UV lamp Watts	17 W	15 W	25 W	20 W	37 W
Maximum Operating Pressure		125 psi (861 kPa)		125psi (861 kPa)		125 psi (861 kPa)
Minimum Operating Pressure		15 psi (103 kPa)		15psi (103 kPa)		15 psi (103 kPa)
Ambient Water Temperature		2-40 ºC (36-104 ºF)		2-40 ºC (36-104 ºF)		2-40 ºC (36-104 ºF)
UV Lamp Type		Sterilume™-EX (standard-output)		Sterilume™-EX (standard-output)		Sterilume™-EX (standard-output)
UV Chamber Material		304 SS		304 SS		304 SS

[1] Units ending in "/2B" have BSPT connections.

[2] Units ending in "/2" are for 230V applications.

Section 9 Manufacturer’s Warranty

Our Commitment

VIQUA is committed to ensuring your experience with our products and organization exceeds your expectations. We have manufactured your UV disinfection system to the highest quality standards and value you as our customer. Should you need any support, or have questions about your system, please contact our Technical Support team at 1.800.265.7246 or technicalsupport@viqua.com and we will be happy to assist you. We sincerely hope you enjoy the benefits of clean, safe drinking water after the installation of your VIQUA disinfection system.

How to Make a Warranty Claim

Note: *To maximise the disinfection performance and reliability of your VIQUA product, the system must be properly sized, installed and maintained. Guidance on the necessary water quality parameters and maintenance requirements can be found in your Owner’s Manual.*

In the event that repair or replacement of parts covered by this warranty are required, the process will be handled by your dealer. If you are unsure whether an equipment problem or failure is covered by warranty, contact our Technical Support team at 1.800.265.7246 or e-mail technicalsupport@viqua.com. Our fully trained technicians will help you troubleshoot the problem and identify a solution. Please have available the model number (system type), the date of purchase, the name of the dealer from whom you purchased your VIQUA product (“the source dealer”), as well as a description of the problem you are experiencing. To establish proof of purchase when making a warranty claim, you will either need your original invoice, or have previously completed and returned your product registration card via mail or online.

Specific Warranty Coverage

Warranty coverage is specific to the VIQUA range of products. Warranty coverage is subject to the conditions and limitations outlined under “General Conditions and Limitations”.

Ten-Year Limited Warranty for VIQUA UV Chamber

VIQUA warrants the UV chamber on the VIQUA product to be free from defects in material and workmanship for a period of ten (10) years from the date of purchase. During this time, VIQUA will repair or replace, at its option, any defective VIQUA UV chamber. Please return the defective part to your dealer who will process your claim.

Three-Year Limited Warranty for Electrical and Hardware Components

VIQUA warrants the electrical (controller) and hardware components to be free from defects in material and workmanship for a period of three (3) years from the date of purchase. During this time, VIQUA will repair or replace, at its option, any defective parts covered by the warranty. Please return the defective part to your dealer who will process your claim.

One-Year Limited Warranty for UV lamps, Sleeves, and UV Sensors

VIQUA warrants UV lamps, sleeves, and UV sensors to be free from defects in material and workmanship for a period of one (1) year from the date of purchase. During this time, VIQUA will repair or replace, at its option, any defective parts covered by the warranty.Your dealer will process your claim and advise whether the defective item needs to be returned for failure analysis.

Note: *Use only genuine VIQUA replacement lamps and sleeves in your system. Failure to do so may seriously compromise disinfection performance and affect warranty coverage.*

General Conditions and Limitations

None of the above warranties cover damage caused by improper use or maintenance, accidents, acts of God or minor scratches or imperfections that do not materially impair the operation of the product. The warranties also do not cover products that are not installed as outlined in the applicable Owner’s Manual.

Parts repaired or replaced under these warranties will be covered under warranty up to the end of the warranty period applicable to the original part.

The above warranties do not include the cost of shipping and handling of returned items.The limited warranties described above are the only warranties applicable to the VIQUA range of products. These limited warranties outline the exclusive remedy for all claims based on a failure of or defect in any of these products, whether the claim is based on contract, tort (including negligence), strict liability or otherwise. These warranties are in lieu of all other warranties whether written, oral, implied or statutory. Without limitation, no warranty of merchantability or of fitness for a particular purpose shall apply to any of these products.

VIQUA does not assume any liability for personal injury or property damage caused by the use or misuse of any of the above products. VIQUA shall not in any event be liable for special, incidental, indirect or consequential damages. VIQUA’s liability shall, in all instances, be limited to repair or replacement of the defective product or part and this liability will terminate upon expiration of the applicable warranty period.

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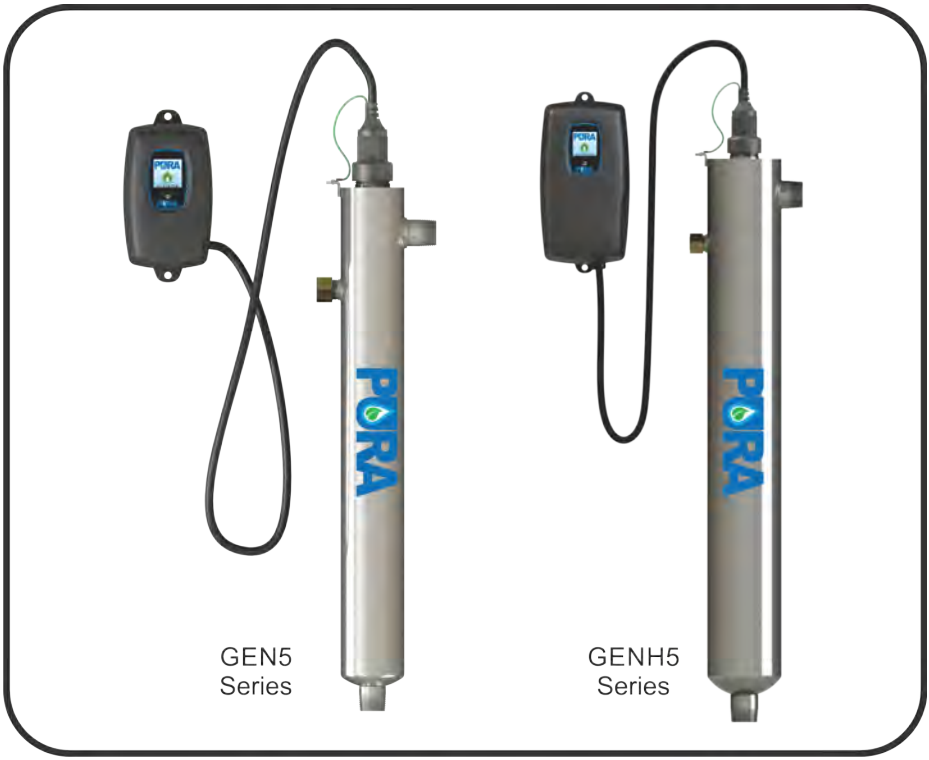
OWNERS MANUAL

Operation & Installation Instructions



Revision #: 1
Date: July 2015

Congratulations on purchasing this ultraviolet disinfection system. By purchasing an PURA UV Disinfection system you are receiving not only a high quality product but also peace of mind. Protecting your water supply with a UV system gives you reassurance that your family will have access to safe drinking water throughout your entire home with no chance of microbiological contamination. This is a chemical free process which is simple in its concept and effective in its ability to inactivate microorganisms present in the water supply. Simple maintenance, continuous disinfection and ultimately safe water, PURA makes it that easy.

TABLE OF CONTENTS

Safety Considerations

Although your UV system has been manufactured to the highest safety standards, care must be followed when operating and/or maintaining your system.

1. Before servicing this equipment, disconnect the power cord from the electrical outlet.

2. **Energy given off by the UV lamp can be harmful to your eyes and skin**. NEVER look directly at an illuminated UV lamp without adequate eye protection and always protect your skin from direct exposure to the UV light.

3. For complete disinfection, use ONLY genuine replacement parts.

4. Do not operate the unit if it has any damaged or missing components.

5. To avoid possible electrical shock, use only with a properly grounded electrical outlet.

6. Never perform any maintenance to the system unless you are comfortable in doing so. Contact the manufacturer for service instructions if required.

7. Do not use this system for any purpose other than what it was intended for. Misuse of this system could potentially cause harm to the user or others.

8. Your system is intended to be installed indoors and away from leaking plumbing. DO NOT plug the unit in if the system or any of the components are wet.

9. The disinfection system should be directly installed into a ground fault circuit interrupter (GFCI). If the use of an extension cord is required, the cord must be manufactured with a minimum of 16 gauge wire and care should be taken to avoid potential tripping hazards.

10. We recommend that a licensed plumber or certified technician install the system.

Before You Begin

The following will be needed for installing the UV system:

Tools

- Pipe cutter, hacksaw or other specialised tools required to cut into your existing plumbing
- Soldering tools (torch, flux, emery cloth and solder)
- Wrench (for tightening fittings)

Other Materials

- Inlet/outlet connections
- Teflon™ tape

Water Quality Parameters

UV disinfection is extremely effective against microorganisms but only if the UV light can pass through the water it needs to treat. This means that the quality of your water is very important in order to ensure complete disinfection.

Treated water should be tested for at the least the parameters listed below. If the water exceeds the listed parameters PURA strongly recommends that appropriate pretreatment equipment be installed (equipment required will depend on parameters being treated):

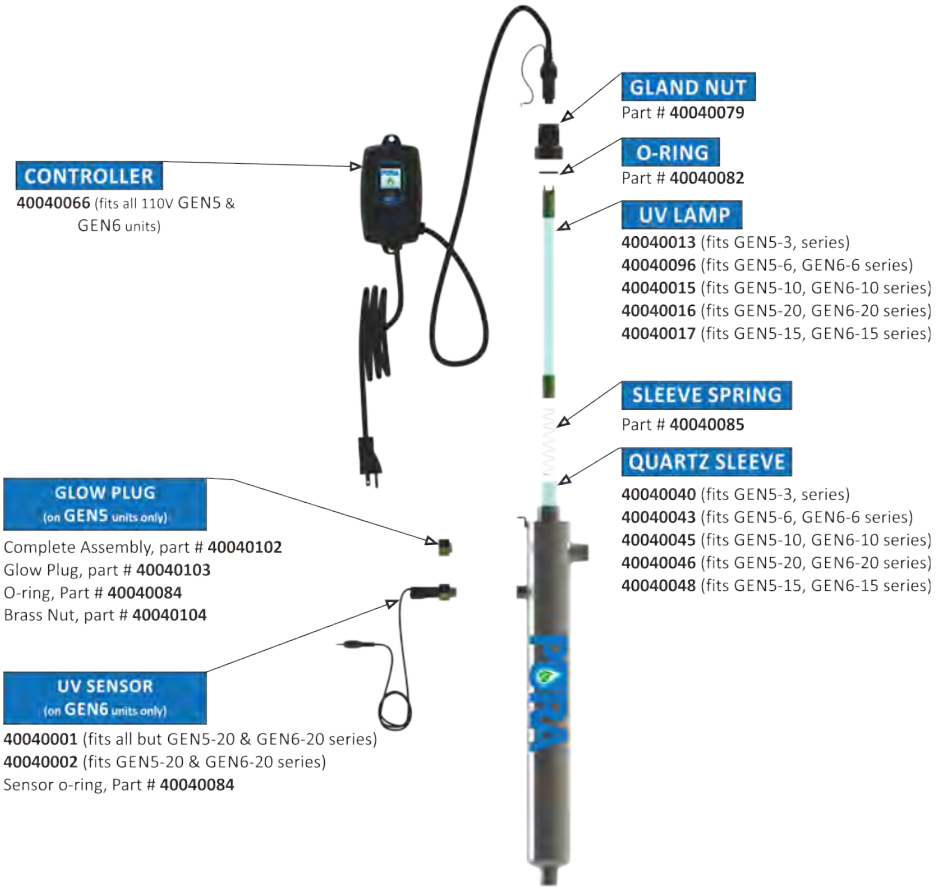
Hardness:	<7 gpg (120 mg/L) – if hardness level is 7 gpg or slightly below the quartz sleeve must be cleaned periodically in order to ensure efficient UV penetration; if above the water should be softened.
Iron (Fe):	<0.3 ppm (0.3 mg/L)
Manganese (Mn):	<0.05 ppm (0.05 mg/L)
Turbidity:	< 1 NTU
Tannins (organics):	<0.1 ppm (0.1 mg/L)
UVT (transmittance):	>85% (Please contact PURA if water has a UVT that is less than 80% for pre-treatment recommendations)

You can have your water tested at a private analytical laboratory or by your local dealer. It is always recommended to install pre-filtration of at least 5 microns prior to an PURA disinfection system.

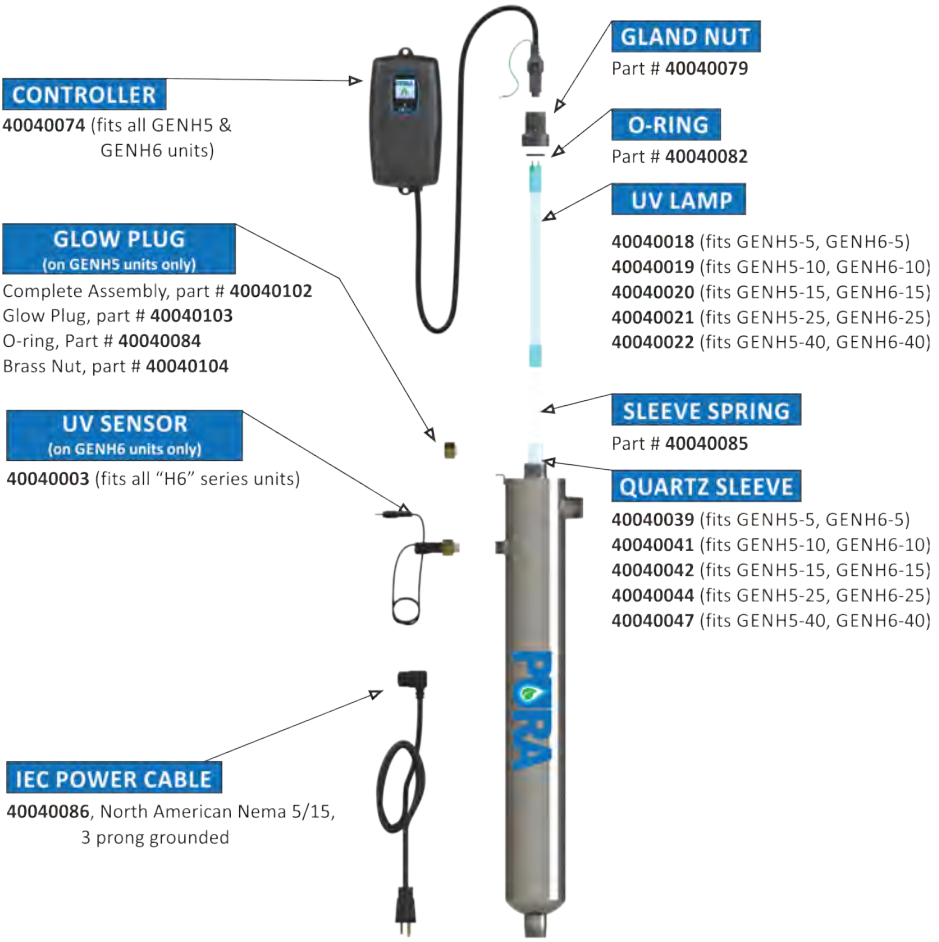
Assembly

Unpack the system and ensure all the components are included with the system. Your system is shipped with the following components:

"GEN" Series (Standard output lamp systems)



“GENH” Series (High output lamp systems)



System Sizing

All PURA systems are rated for a specific flow rate in water that meets the quality parameters on page 5. **PLEASE NOTE** that increasing the flow above this rating or disinfecting water that does not meet the quality paramaters will decrease the dose and therefore compromise the microorganism inactivation. To determine the flow rate, follow these simple steps:

1.Be sure no water is being used in the home.

2.Open a faucet or tap nearest the pressure system and run until the well pump starts.

3.Close the faucet and using a second hand watch, record the length of time in seconds until the pump stops. This is known as the cycle time.

4.Then using a container of known volume, preferably in US Gallons, open the faucet or tap nearest the pressure system and measure the amount of water drawn off until the pump starts again. Depending on the size of the container used, it is acceptable to turn the faucet on and off to empty the container. This measurement is known as the draw down.

To calculate the pressure system flow rate divide the draw down by the cycle time and multiply that by 60.

Draw Down_____÷ Cycle Time_____ x 60=_____Pumping Rate in USGPM

Location

For Point of Entry (POE) systems, choose a location where the main cold water line is accessable. The system must be installed after other water treatment equipment (softener or filters), but before any branches (See Figure 1). For Point of Use (POU) systems, install the unit just before the tap. PURA recommends that a 20 micron filter be installed **before** the UV system for a final polishing step before the water is disinfected.

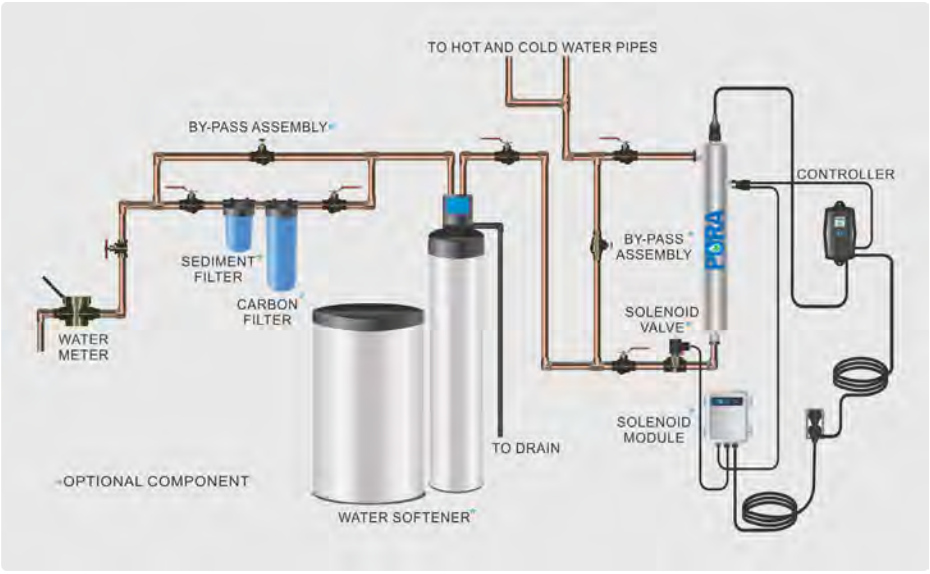


Figure 1. Recommended POE Installation Location

To facilitate lamp removal, ensure there is enough space at the lamp connector end of the UV chamber to safely remove the UV lamp and/or quartz sleeve (See Figure 2).

The controller will require a ground fault circuit interrupter (GFCI or GFI) outlet and should be mounted beside or above the reactor.

PLEASE NOTE: All PURA disinfection systems are intended for indoor use only as they should not be exposed to the elements.

Installation

Step 1: The reactor can be installed either horizontally or vertically using the clamps provided. Vertical installation is the preferred method with the inlet at the bottom (lamp connection at the top) as it allows any air that may be in the pipework to be easily purged from the system.

Step 2: The use of a by-pass assembly is recommended as it will allow you to isolate the UV reactor. This will allow for easier access in case maintenance is required (See Figure 3).

Step 3: Use the supplied fasteners to mount the UV reactor to wood or drywall. If mounting to an alternate material you will need to purchase the proper corresponding fasteners.

Step 4: For water supplies where the maximum flow rate is unknown, a flow restrictor is recommended so that the rated flow of your particular PURA system is not exceeded. The flow restrictor should be installed on the outlet port of the reactor.

Step 5: It is recommended to have a licensed plumber connect the UV reactor to the water supply and may be a requirement depending on where you are located.

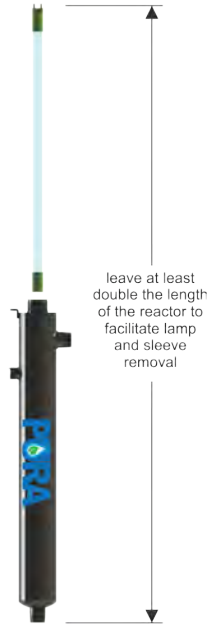


Figure 2. Lamp Removal Spacing

Figure 3.
By-pass assembly

Note: Installation of your PURA disinfection systems should comply with applicable local regulations.

Step 6: Once the system has been plumbed in, gently remove the quartz sleeve from its packaging being careful not to touch the length with your hands. The use of cotton gloves is recommended for this procedure as oils from the hands can leave residue on the sleeve and lamp which can ultimately block the UV light from getting to the water.

Carefully slide the sleeve into the reactor until you can feel it hit the opposite end of the reactor. Align the sleeve so it centered along the length of the reactor, then gently push it in to lock it into the internal centering springs in the far side of the reactor. CAUTION: Pushing too hard when the sleeve is not aligned can damage the centering springs. Slide the o-ring onto the sleeve until it is butted up against the reactor.

Figure 4. Quartz Sleeve Installation

Step 7: Hand tighten the provided gland nut over the quartz sleeve onto the threaded end of the reactor. It has a positive stop to prevent over-tightening. A firm force may be required to fully tighten the gland nut, but DO NOT USE TOOLS for this step. Insert the provided stainless steel compression spring into the quartz sleeve. The spring works with the lamp and lamp connector to create the proper lamp alignment. **PLEASE NOTE:** DO NOT install a UV lamp inside the quartz sleeve without the sleeve spring in place.

Step 8: Install the UV sensor **(only with UV monitor upgrade)**. Align the flat portion so it faces the gland nut end and matches up with the half metal lip on the sensor port (see Figure 5). Insert the sensor so it is fully seated and hand tighten the sensor nut.

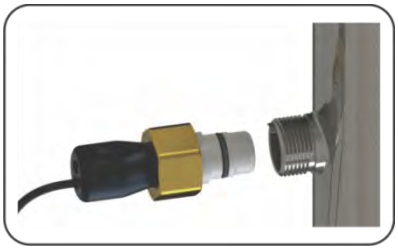


Figure 5. UV Sensor Installation

Figure 6. IEP Connection

Step 9: The reactor is now ready for water flow. When all plumbing connections have been completed, slowly turn on the water supply and check for leaks. Make sure the by-pass valves are functioning properly and that the water is flowing through the reactor. The most common leak is from the o-ring not making a proper seal on the reactor. For new installations, review steps 7 and 8. For older systems drain the reactor, remove the o-ring, dry it and reapply silicon grease. Reinstall the o-ring ensuring that it is properly sealed against the reactor and check again for leaks.

Step 10: Mount the controller to the wall so it is above or beside the reactor to ensure that no moisture can deposit on any of the connections (see Figure 1). Always mount the controller vertically. For monitored systems, insert the sensor connector into the IEP port located on the right side of the controller (Figure 6). For the sensor to be recognised by the controller, the controller power must be plugged in last. **Do not plug the controller power cord in before the last step.**

Step 11: Always hold UV lamps by their ceramic ends, not by the lamp quartz. Remove the lamp from its packaging. Again, the use of cotton gloves is recommended. Insert the UV lamp into the reactor, being careful not to drop it.

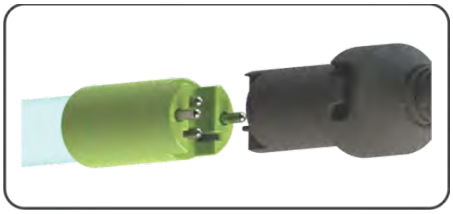


Figure 7a. Standard Output UV Lamp Connection

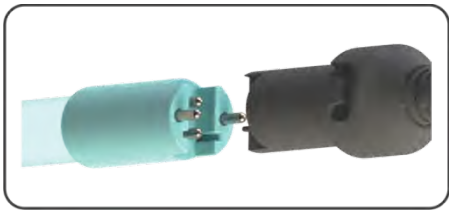


Figure 7b. High Output UV Lamp Connection

Step 12: Plug the lamp connector into the lamp. Note the keying for proper alignment (see Figure 7a, 7b). Insert the lamp connector into the gland nut and turn the connector approximately ¼ turn to lock the connector to the gland nut as in Figure 8.

Figure 8. Lamp Connector

Step 13: Tighten the captive ground screw to the ground lug on the UV reactor to ensure proper grounding.

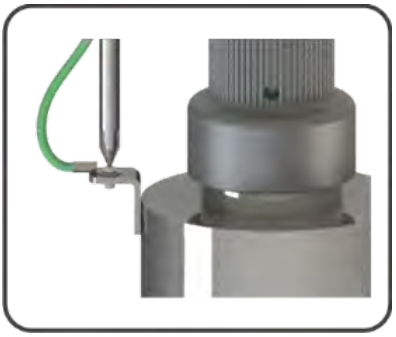


Figure 9. Ground Screw Connection

Step 14: Your system is now ready to be plugged into the appropriate GFCI protected outlet. Refer to the following section before any water is allowed to flow through the system.

System Disinfection

With a new installation, or any time the UV system is shut down for service, without power, or is inoperative for any other reason, the pipework in the home or facility could be contaminated. Use the following steps to fully disinfect the pipework throughout the entire home or facility.

Step 1: Check for and remove any “dead ends” in the pipework throughout the home as these can harbor bacteria. Plug in the UV system and wait until it is ready for operation.

Step 2: Remove the filter cartridge from the last filter housing and fill it with 1-2 cups of household bleach (most are 5.25% chlorine). Replace the filter housing and slowly turn on the water supply.

Step 3: At a water outlet, run the water until bleach can be smelled. Repeat this for all taps, toilets, shower heads, refrigerators, outdoor taps, the washing machine, dishwasher, etc. at the home or facility. Once finished, wait a minumum of 30 minutes before continuing.

Step 4: Reinstall the filter cartridge into the filter housing and flush the chlorine solution by opening all taps until chlorine can no longer be detected. Your home has now been completely disinfected with your PURA system ready to inactivate any microorganisms that enter the home.

Cleaning the Quartz Sleeve

Depending on the water quality, the quartz sleeve may require periodic cleaning. At a minimum, the quartz sleeve should be cleaned on an annual basis. The following steps outline a basic cleaning procedure.

Step 1: If a by-pass assembly is installed, shut the inlet valve off to prevent water flow through the system. Otherwise, turn off main water inlet valve (and/or turn off the water pump).

Step 2: Disconnect power cord of UV system from electrical outlet.

Step 3: Release water pressure by opening a downstream tap and then close the outlet shut-off valve (if any). If there is no outlet shut-off valve, expect water to drain from the system as the head pressure in the system will cause the water to flow back down.

Step 4: Remove the captive ground screw from the ground lug on the UV reactor.

Step 5: Remove the lamp connector from the reactor (gland nut) by pushing the lamp connector in and turning it ¼ turn counter-clockwise. Disconnect the lamp connector from the lamp. CAUTION: the lamp may be hot!

Step 6: Being careful to touch only the ceramic ends, remove the lamp out of the reactor.

Step 7: Unscrew the gland nut from the reactor exposing the end of the quartz sleeve.

Step 8: Remove the quartz sleeve and o-ring by **gently twisting and pulling** the quartz sleeve.

Step 9: Using a soft, lint-free cloth or towel wipe the sleeve down using a commercial scale cleaner (i.e. CLR® or LIME-A-WAY®). This removes scaling or iron deposits that may be on the outside of the quartz sleeve. Be careful not to get any moisture or liquids inside of the sleeve.

Step 10: Dry the sleeve with a separate cloth.

Step 11: Replace the o-ring and slide the sleeve back into the reactor following steps 7 and 8 from the installation section of the manual.

Cleaning the UV Sensor

Depending on the water quality, the UV sensor may require periodic cleaning. At a minimum, the UV sensor should be cleaning on an annual basis. The following steps outline a basic cleaning procedure.

Step 1: If a by-pass assembly is installed, shut the inlet valve off to prevent water flow through the system. Otherwise, turn off main water inlet valve (and/or turn off the water pump).

Step 2: Disconnect power cord of UV system from electrical outlet.

Step 3: Release water pressure by opening a downstream tap and then close the outlet shut-off valve (if any). If there is no outlet shut-off valve, expect water to drain from the system as the head pressure in the system will cause the water to flow back down.

Step 4: Place something under the reactor to catch any water that may come out of the reactor during the removal of the UV sensor.

Step 5: Unscrew (counterclockwise) sensor nut from the reactor and pull the sensor slowly out of the sensor port.

Step 6: Holding the sensor in your hand wipe the flat portion (sensor face) of the sensor with isopropyl alcohol using a clean lint-free cloth.

Step 7: Replace sensor following step 9 from the installation section of the manual.

Temperature Management Devices

Your PURA system is designed to run continuously to ensure optimal disinfection. However, during periods when no water is drawn through the system, the energy from the disinfection process can cause the temperature of the water inside the chamber to rise. In extreme situations elevated water temperature or the fluctuation in temperature can lower the output of the UV lamp. In these cases, or if the elevated water temperature is a nuisance, it is recommended to use one of the following forms of temperature management devices.

Cooling Fan

Designed for use on the GENH systems, the fan runs continuously to cool the water by forced convection. The long-life fan is powered independently using a compact modular power adapter that operates from 90-265V (47-63Hz)

Temperature Relief Valve (TRV)

On reaching a higher temperature, the TRV is designed to drain a small amount of water to allow fresh, cooler water to enter the system. The TRV works without power and comes complete with 10' of drain line.

Operation

The PURA system comes with a feature laden controller that incorporates both the lamp driver (ballast) and control features in one water-tight case. Two controllers are available for the PURA systems (depending on your model).

Controller

standard-output controller
"GEN" series

high-output controller
"GENH" series

These controllers feature a power factor corrected, constant current lamp driver with a universal power input. A full colour LCD screen provides the user with a detailed description of the system's performance in addition to providing any applicable fault messages and system diagnostics. The controllers used in both the monitored and non-monitored systems are identical. All controllers include an "infinite expandability port" located on the right side of the controller. Optional modules like the UV sensor can be plugged into the expandability port of an PURA controller to give additional features.

Power-up Sequence

On start up, the controller will run through a diagnostic start-up and the sequence will be displayed as follows on the colour LCD:

Home Screen

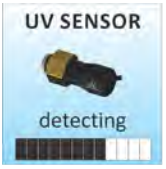
starting diagnostic check

lamp preheats, then starts

Next, the controller checks for and initialises any optional modules that may be attached to the system.

UV Sensor

Module Check



detecting the presence of a UV sensor

if sensor is present, returns this screen

OR

if sensor is not present, returns this screen

Solenoid

Module Check

detecting the presence of a solenoid module

if solenoid module is present, returns this screen

OR

if solenoid module is not present, returns this screen

4-20 mA

Module Check

detecting the presence of a 4-20mA module

if 4-20mA module is present, returns this screen

OR

if 4-20mA module is not present, returns this screen

Ethernet

Module Check

detecting the presence of a ethernet module

if ethernet module is present, returns this screen

OR

if ethernet module is not present, returns this screen

Remote Alarm

Module Check

detecting the presence of a remote alarm module

if remote alarm module is present, returns this screen

OR

if remote alarm module is not present, returns this screen

A final module screen is displayed showing which specific modules were initialised.

The controller then displays the lamp optimisation screen for 60 seconds to allow the lamp to reach its optimum output, followed a final “start-up complete” screen. The system will now be ready to disinfect water flow.

Operational Screens

On systems without the UV monitor, the default screen shows the **PURA Home Screen**. At any point during operation the user is able to scroll through the **PURA Home Screen, Lamp life remaining** and **QR Code/Contact Info** screens by pressing the push button located on the front of the controller.

standard-output controller "GEN" series

Home Screen

press button once

press button twice

Operational Screens with UV Monitor Upgrade

On systems that have the UV sensor installed, the default screen shows the **UV Intensity**. At any point during operation the user is able to scroll through the **UV Intensity**, **Lamp life remaining** and **QR Code** screens by pressing the button located on the front of the controller.

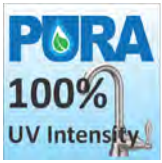
Home Screen

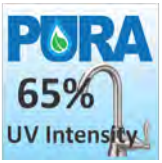
press button once

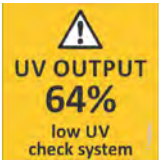
press button twice

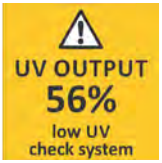
UV Intensity (with UV Monitor Upgrade)

The UV Intensity screens display the level of UV light detected by the sensor. UV intensity can be affected by poor water quality, scaling on the quartz sleeve and/or sensor, lamp failure or lamp expiring. The following screens show the UV Intensity dropping.

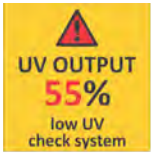




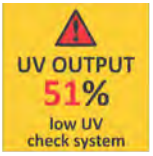




Below 56%, the numbers and warning sign turn red and an audible chirp is given by the ballast every 15 seconds. Below 51%, the screen is solid red and a constant audible alarm is given. This alternates with a screen indicating “water may be unsafe for consumption”. With the solenoid module, the controller de-activates the solenoid valve, shutting off all water flow.



15 sec. audible chirp



15 sec. audible chirp

constant alarm

Lamp Countdown Sequence

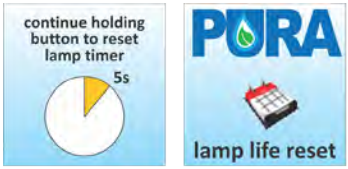
The system counts down the number of days until a lamp change is required.

At seven days remaining, the screen changes to a yellow caution screen with an audible chirp every 15 seconds. Past the zero day threshold, the screen changes to solid red and cycles between a red “lamp expired” screen and a “water may be unsafe for consumption” screen. The same intermittent audible chirp is heard throughout this lamp expired sequence.

At any point during this sequence, the audible chirp can be deferred by holding the controller button down for a period of five seconds, after which the screen below will be displayed. After the seven days deferral expires, the alarm will sound once again. The deferral can be repeated as many times as you wish. **PLEASE NOTE:** At any point after lamp expiration, the water may be unsafe for consumption and should not be consumed without another form of disinfection.

Lamp Countdown Reset Sequence

When changing the lamp, the day countdown timer must be reset to match the newly installed lamp. To reset, firmly hold down the button on the controller while plugging the power cord back into the outlet. Continue holding down the button for five seconds as indicated until you hear an audible chirp confirming the timer has been reset. The following two screens will be displayed during this process.



Failure Modes

Hard Alarms: The following give a constant audible alarm. If present, the solenoid valve is closed, and the 4-20, Volt free and ethernet module transmit the alarm.

Lamp Failure	UV Sensor Failure
	 

Soft Alarms: The following remaining errors give a 15 second audible chirp only

Solenoid Module Failure	4-20mA Module Failure	Volt Free module failure	Ethernet module Failure
			

Boil Water Advisory: If any failure occurs on an PURA system, the water must not be used for human consumption until the system is returned to a safe operational mode. If the water is used for human consumption during this period, the water must be boiled (minimum 20 minutes at a full boil) prior to consumption.

QR Codes

A **QR code** (Quick Response code) is a matrix barcode first designed for the automotive industry. PURA uses the QR code to store a link to a specific page on our website. Users with a camera phone equipped with the correct reader application can scan the image of the QR code and over a wireless network connect to a PURA web page in the phone's browser. PURA' QR webpage has information on how to purchase replacement components as well as a helpful video directory on system servicing (i.e. How to change a UV lamp or quartz sleeve). To access the QR code on the PURA controller, press the control button twice and the QR code screen will appear as follows:

Expansion Modules

PURA controllers incorporate an "**Infinite Expandability Port**" (**IEP**) which allows for expansion to the UV sensor and all other modules. Each module (including the sensor) comes with both a male and female connection. Connect any device to the controller and all subsequent devices are then connected into the female end of last device added in a "daisy chain" configuration.

The following optional expansion modules are available for use on PURA controllers. Contact your authorised distributor for purchasing information.

DRY CONTACT (VOLT FREE) CONNECTION MODULE: Allows for a connection to a remote device such as a buzzer, light, alarm system, PLC, etc., via a pair of contacts. In normal operation the OK and COM contacts will be connected, and in a fault condition (Low UV, Lamp fail, Power Fail), the Fault and COM contacts will be connected. Maximum Contact Rating is 1A-120-230V AC/DC (use 16-22 AWG).

SOLENOID CONNECTION MODULE: Connects a NORMALLY CLOSED line voltage solenoid valve to the system. On a non-monitored system, the solenoid will only close on a lamp failure error. On a monitored system, the solenoid is closed when the UV level drops below 50%. Also note that in cases where emergency use of untreated water is required, the controller can be placed into a manual override mode allowing for the flow of water in an alarm condition.

4-20 mA MODULE: Outputs a 4-20mA signal of the UV output to a remote device such as a data logger or computer.

ETHERNET MODULE: Allows for all controller functions to be connected to a computer via an Ethernet cable.

Coming Soon

PURA Standard Output System Specifications

PURA	PURA EQUIPMENT SPECIFICATIONS				
	Residential systems (standard output lamps)				
MODEL	**GEN5-3**	**GEN5-6 GEN6-6**	**GEN5-10 GEN6-10**	**GEN5-15 GEN6-15**	**GEN5-20 GEN6-20**
Flow Rate (@30mJ/cm²)	3.1 gpm	5.8 gpm	11 gpm	15 gpm	21 gpm
	11.4 lpm	22.7 lpm	41 lpm	57 lpm	79 lpm
	0.7 m^3/hr	1.4 m^3/hr	2.5 m^3/hr	3.4 m^3/hr	4.8 m^3/hr
Flow Rate (@40mJ/cm²)	2.4 gpm	4.4 gpm	8.3 gpm	12 gpm	16 gpm
	9.1 lpm	17 lpm	31 lpm	45.4 lpm	59 lpm
	0.5 m^3/hr	1.0 m^3/hr	1.9 m^3/hr	2.7 m^3/hr	3.6 m^3/hr
Port Size	½"MNPT	¾"MNPT	¾"MNPT	1"MNPT	1"MNPT
Electrical	90-265V/50-60Hz.				
Plug Type	American: NEMA 5-15P				
Lamp Power (Watts)	15	22	39	50	42
Power (Watts)	20	30	49	62	51
Replacement Lamp	40040013	40040014	40040015	40040017	40040016
Replacement Sleeve	40040040	40040043	40040045	40040048	40040046
Reactor Dimensions	6.4 x 36.4 cm (2.5 x 14.3")	6.4 x 54.2 cm (2.5 x 21.3")	6.4 x 89.5 cm (2.5 x 35.2")	6.4 x 101.6 cm (2.5 x 40.0")	8.9 x 91.7 cm (3.5 x 36.1")
Chamber Material	304 Stainless Steel, A249 Pressure Rated Tubing				
Controller Dimensions	17.2 x 9.2 x 7.6 cm (6.8 x 3.6 x 3")				
Operating Pressure	0.7-10.3 bar (10-150 psi)				
Operating Water Temperature	2-40° C (36-104° F)				
UV Monitor	No	Yes on all "GEN6" models. Upgrade available for "GEN5" models			
Solenoid Output	Yes (optional solenoid module (40040006) sold separately)				
Dry Contacts	Yes (remote alarm module (40040008) sold separately)				
4-20mA Output	Yes (4-20mA module (40040007) sold separately)				
Lamp Change Reminder (audible & visual)	Yes				
Lamp Out Indicator (audible & visual)	Yes				
Shipping Weight	3.3 kg (7.3 lbs)	4.2 kg (9.3 lbs)	6.8 kg (15.0 lbs)	8.0 kg (17.6 lbs)	7.5 kg (16.5 lbs)

PURA High Output System Specifications

PURA	PURA EQUIPMENT SPECIFICATIONS Multi-Use Systems (high output lamps)				
MODEL	**GENH5-5 GENH6-5**	**GENH5-10 GENH6-10**	**GENH5-15 GENH6-15**	**GENH5-25 GENH6-25**	**GENH5-40 GENH6-40**
Flow Rate 30mJ/cm² @ 95% UVT	4.0 gpm	10 gpm	14 gpm	25 gpm	40 gpm
	15 lpm	38 lpm	53 lpm	95 lpm	151 lpm
	1.1 m³/hr	2.3 m³/hr	3.2 m³/hr	5.7m³/hr	9.1m³/hr
Flow Rate 40mJ/cm² @ 95% UVT	3.0 gpm	7.0 gpm	11 gpm	19 gpm	31 gpm
	15 lpm	27 lpm	41 lpm	72 lpm	117 lpm
	0.7 m³/hr	1.6 m³/hr	2.5 m³/hr	4.3 m³/hr	7.0 m³/hr
Flow Rate Hot Water (-HW suffix) model 30mJ/cm² @ 75% UVT	2.8 gpm	7.0 gpm	9.8 gpm	16 gpm	28 gpm
	11 lpm	26 lpm	37 lpm	61 lpm	110 lpm
	0.6 m³/hr	1.6 m³/hr	2.2 m³/hr	3.6 m³/hr	6.4 m³/hr
Flow Rate Low UVT (-50 suffix) model 30mJ/cm² @ 50% UVT	1.7 gpm	4.2 gpm	6.0 gpm	10 gpm	17 gpm
	6.4 lpm	16 lpm	23 lpm	38 lpm	64 lpm
	0.4 m³/hr	1.0 m³/hr	1.4 m³/hr	2.3 m³/hr	3.9 m³/hr
Flow Rate TOC (-TOC suffix) model 150mJ/cm² @ 98% UVT	0.8 gpm	2.0 gpm	2.8 gpm	5.0 gpm	8.0 gpm
	3.0 lpm	7.6 lpm	11 lpm	19 lpm	30 lpm
	0.2 m³/hr	0.5 m³/hr	0.6 m³/hr	1.1 m³/hr	1.8 m³/hr
Port Size	¾"MNPT	¾"MNPT	1"MNPT	1"MNPT	1 ½"MNPT
Electrical	90-265V/50-60Hz.				
Plug Type	American: NEMA 5-15P				
Lamp Power (Watts)	18	34	45	67	101
Power (Watts)	20	36	48	72	108
Replacement Lamp	40040018	40040019	40040020	40040021	40040022
Replacement Sleeve	40040039	40040041	40040042	40040044	40040047
Reactor Dimensions	8.9 x 29.8 cm (3.5 x 11.7")	8.9 x 41.8 cm (3.5 x 16.5")	8.9 x 50.8 cm (3.5 x 20.0")	8.9 x 68.3 cm (3.5 x 26.9")	8.9 x 103.4 cm (3.5 x 40.7")
Chamber Material	316L Stainless Steel, A249 Pressure Rated Tubing				
Controller Dimensions	21.7 x 10.8 x 8.9 cm (8.6 x 4.2 x 3.5")				
Operating Pressure	0.7-10.3 bar (10-150 psi)				
Operating Water Temperature	2-40° C (36-104° F)				
UV Monitor	Yes on all "GENH6" models. Upgrade available for "GENH5" models				
Solenoid Output	Yes (optional solenoid module (40040006) sold separately)				
Dry Contacts	Yes (remote alarm module (40040008) sold separately)				
4-20mA Output	Yes (4-20mA module (40040007) sold separately)				
Lamp Change Reminder (audible & visual)	Yes				
Lamp Out Indicator (audible & visual)	Yes				
Shipping Weight	4.5 kg (9.9 lbs)	5.4 kg (11.9 lbs)	6.0kg (13.2 lbs)	7.2 kg (15.9 lbs)	9.7 kg (21.4 lbs)

Canature Watergroup Inc. (Canature)
Limited Warranty Statement

Products manufactured by PURA are warranted to the original user only to be free of defects in material and workmanship for a period as specified below. This warranty only applies to the original purchaser and is not transferable.

UV SYSTEMS
Ten (10) year Limited Warranty on the stainless steel reactors, from the date of original purchase, or installation (proper documentation required for verification).

ELECTRONICS
Three (3) year Limited Warranty on the ballasts and controllers, from the date of original purchase, or installation (proper documentation required for verification).

UV LAMPS, UV SENSORS & QUARTZ SLEEVES
One (1) year Limited Warranty on all PURA ultraviolet lamps, UV sensors and quartz sleeves from the date of original purchase, or installation (proper documentation required for verification).

This PURA Ultraviolet Disinfection System will be repaired or replaced, at our sole option, providing that the ultraviolet system or any component is defective in materials or workmanship for the periods outlined above and subject to the "Limitations of Warranty" as outlined below. Canature's liability under this warranty shall be limited to repairing or replacing the product, without charge, F.O.B. Canature's closest Distribution Facility or authorized service depot. Canature will not be liable for any costs of removal, installation, transportation, or any other charges which may arise in connection with a warranty claim. Canature will not be liable for damage or wear to products caused by abnormal operating conditions, accident, abuse, misuse, unauthorized alteration or repair, or if the product was not installed in accordance with the Manufacturers printed installation and operating instructions.

LIMITATIONS OF WARRANTY

This warranty does not apply to any of the following:

- Water Quality Parameters lie outside of the following ranges
    - Hardness > 120 mg/L (7 gpg)
    - Iron > 0.3 mg/L (ppm)
    - Manganese > 0.05 mg/L (ppm)
    - Tannins > 0.1 mg/L (ppm)
    - Turbidity > 1 NTU
    - Transmittance (UVT) < 75%
- A product that has been incorrectly installed according to the technical installation manual.
- A product that has been modified in any manner, unless approved by the manufacturer.
- A product where the serial number has been altered defaced or removed.
- Damage caused by the use of parts that are not compatible, suitable and/or authorised by PURA for use with the product (e.g. non-original lamps or sleeves).
- Damage caused during shipment of the product.
- Water damage is found inside ballast housing or controllers.
- Product is installed outdoors in direct contact with the environment (rain).
- Product is installed in freezing temperatures.
- Product is used in conditions that exceed PURA's specifications.

TO GET WARRANTY SERVICE

Please contact the Dealer or Distributor where the product was originally purchased to obtain service under this warranty. Your Dealer / Distributor will obtain a Warranty Return Authorization and will then need to return the product to Canature, together with proof of purchase and installation date, failure date, and supporting installation data. Any defective product to be returned must be sent freight prepaid.

CANATURE WATERGROUP INC. WILL NOT BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES, LOSSES, OR EXPENSES ARISING FROM INSTALLATION, USE, OR ANY OTHER CAUSES. THERE ARE NO EXPRESS OR IMPLIED WARRANTIES, INCLUDING MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, WHICH EXTEND BEYOND THOSE WARRANTIES DESCRIBED OR REFERRED TO ABOVE.

THIS LIMITED WARRANTY IS THE SOLE AND EXCLUSIVE WARRANTY MADE BY CANATURE WITH RESPECT TO THIS ULTRAVIOLET DISINFECTION PRODUCT, AND IS GIVEN IN LIEU OF ANY OTHER WARRANTY. TO THE EXTENT ALLOWED BY APPLICABLE LAW, ANY AND ALL EXPRESS OR IMPLIED WARRANTIES NOT SET FORTH HEREIN ARE WAIVED AND DISCLAIMED, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR USE. CANATURE'S LIABILITY UNDER THIS LIMITED WARRANTY IS LIMITED SOLELY TO THOSE LIABILITIES SET FORTH ABOVE. IN THE EVENT THAT ANY PROVISION OF THIS LIMITED WARRANTY SHOULD BE FOUND TO BE OR BECOME INVALID OR UNENFORCEABLE UNDER APPLICABLE LAW, THE REMAINING TERMS AND CONDITIONS HEREOF SHALL REMAIN IN FULL FORCE AND EFFECT AND SUCH INVALID OR UNENFORCEABLE PROVISION SHALL BE CONSTRUED IN SUCH A MANNER AS TO BE VALID AND ENFORCEABLE.

Warranty Registration

It is imperative that you complete the warranty registration process. This not only registers your UV disinfection system for the provided manufacturer's warranty, but also allows the factory to provide you with any important product updates or technical bulletins concerning your product. To register, completely fill out the included warranty card, including a valid e-mail address. **PLEASE NOTE:** This information is for the sole purpose of technical support for your disinfection system and will not be used, or sold, to any other organisation for any other purpose.

Canature Watergroup™
655 Park St.
Regina, SK, S4N 5N1
CANADA
Toll Free: (877) 299-5999

9760 Mayflower Park Drive
Suite 110
Carmel, IN 46032 USA
Toll Free: (800) 354-7867

PN#910048

PENTEK ECP SERIES
PLEATED CELLULOSE POLYESTER CARTRIDGES

HIGHER WET STRENGTH THAN REGULAR CELLULOSE CARTRIDGES

Pentair‡ Pentek‡ ECP Series Cartridges are manufactured from a special formulation of resin-impregnated cellulose and polyester fibers.

This unique blend of materials provides a higher wet strength than regular cellulose cartridges. It also provides high flow rates and dirt-holding capacity while maintaining extremely low pressure drop.

The media is pleated around a polypropylene core for added strength. The pleated endcaps of the standard cartridges are immersed in a thermo-setting vinyl plastisol. The Big Blue cartridges have a molded endcap with gaskets. The pleated ends are sealed to the endcap with a thermoplastic adhesive. The overlap seam is sonically welded to reduce internal bypass, improving filtration efficiency.

ECP Series Cartridge endcaps feature a color-coding system for easy identification of micron ratings: tan (1 micron), white (5 micron), blue (20 micron), and yellow (50 micron).

ECP Series Cartridges contain more media surface area than most competitive cartridges. The Standard 10" ECP cartridge contains 6 ft² of media while most cartridges contain only 4.5 ft². Other available ECP cartridge sizes contain the following amount of media:

– Standard 10" cartridge: 6 ft²
– Standard 20" cartridge: 12 ft²
– BB 10" cartridge: 18 ft²
– BB 20" cartridge: 36 ft²

FEATURES/BENEFITS

Replaces Pentek CP and HFCP Series Cartridges

Special formulation of resin-impregnated cellulose and polyester fibers

Provides higher wet strength than regular cellulose cartridges

Minimal unloading and media migration

Nominal 1, 5, 20, 50 micron rating

Lengths: 10", 20"

SPECIFICATIONS

Filter Media – Cellulose polyester

Standard Endcaps – Vinyl plastisol

Big Blue Endcaps – Polypropylene

Core – Polypropylene

Temperature Rating – 40-125ºF (4.4-51.7ºC)

SPECIFICATIONS AND PERFORMANCE

MODEL #	PART #	ENDCAP COLOR	MAXIMUM DIMENSIONS	RATING (NOMINAL)	INITIAL (PSI) @ FLOW RATE (GPM)
ECP1-10	255481-43	Tan	2.63" x 9.75" (67 mm x 248 mm)	1 micron	<1 psi @ 10 gpm (<0.1 bar @ 38 Lpm)
ECP5-10	255482-43	White	2.63" x 9.75" (67 mm x 248 mm)	5 micron	<1 psi @ 10 gpm (<0.1 bar @ 38 Lpm)
ECP20-10	255483-43	Blue	2.63" x 9.75" (67 mm x 248 mm)	20 micron	<1 psi @ 10 gpm (<0.1 bar @ 38 Lpm)
ECP50-10	255484-43	Yellow	2.63" x 9.75" (67 mm x 248 mm)	50 micron	<1 psi @ 10 gpm (<0.1 bar @ 38 Lpm)
ECP1-20	255485-43	Tan	2.63" x 20" (67 mm x 508 mm)	1 micron	<1 psi @ 10 gpm (<0.1 bar @ 38 Lpm)
ECP5-20	255486-43	White	2.63" x 20" (67 mm x 508 mm)	5 micron	<1 psi @ 10 gpm (<0.1 bar @ 38 Lpm)
ECP20-20	255487-43	Blue	2.63" x 20" (67 mm x 508 mm)	20 micron	<1 psi @ 10 gpm (<0.1 bar @ 38 Lpm)
ECP50-20	255488-43	Yellow	2.63" x 20" (67 mm x 508 mm)	50 micron	<1 psi @ 10 gpm (<0.1 bar @ 38 Lpm)
ECP1-BB	255489-43	Tan	4.5" x 9.75" (114 mm x 248 mm)	1 micron	<1 psi @ 20 gpm (<0.1 bar @ 76 Lpm)
ECP5-BB	255490-43	White	4.5" x 9.75" (114 mm x 248 mm)	5 micron	<1 psi @ 20 gpm (<0.1 bar @ 76 Lpm)
ECP20-BB	255491-43	Blue	4.5" x 9.75" (114 mm x 248 mm)	20 micron	<1 psi @ 20 gpm (<0.1 bar @ 76 Lpm)
ECP50-BB	255492-43	Yellow	4.5" x 9.75" (114 mm x 248 mm)	50 micron	<1 psi @ 20 gpm (<0.1 bar @ 76 Lpm)
ECP1-20BB	255493-43	Tan	4.5" x 20" (114 mm x 508 mm)	1 micron	<1 psi @ 20 gpm (<0.1 bar @ 76 Lpm)
ECP5-20BB	255494-43	White	4.5" x 20" (114 mm x 508 mm)	5 micron	<1 psi @ 20 gpm (<0.1 bar @ 76 Lpm)
ECP20-20BB	255495-43	Blue	4.5" x 20" (114 mm x 508 mm)	20 micron	<1 psi @ 20 gpm (<0.1 bar @ 76 Lpm)
ECP50-20BB	255496-43	Yellow	4.5" x 20" (114 mm x 508 mm)	50 micron	<1 psi @ 20 gpm (<0.1 bar @ 76 Lpm)

WARNING: Do not use with water that is microbiologically unsafe or of unknown quality without adequate disinfection before or after the system.

PENTAIR

WATER QUALITY SYSTEMS
5730 NORTH GLEN PARK ROAD, MILWAUKEE, WI 53209
P: 262.238.4400 | F: 262.238.4404
WATERPURIFICATION.PENTAIR.COM
CUSTOMER CARE: 800.279.9404 | tech-support@pentair.com

310111 REV D MY15

Purificare

ENHANCED DISINFECTION

PFC Series

Ultraviolet Disinfection Systems

MODELS:

PFC-8
PFC-12
PFC-20

Installation, Operation and Maintenance Manual

CAUTION: Read and Follow all safety rules and operating instructions before first use of product.

Dealer Info:

Revised: 6/2015

Table of Contents

General Safety Instructions

WARNING - to guard against injury, basic safety precautions should be observed, including the following:

1. READ AND FOLLOW ALL SAFETY INSTRUCTIONS.

2. DANGER - To avoid possible electric shock, special care should be taken since water is present near electrical equipment. Unless a situation is encountered that is explicitly addressed by the provided maintenance and troubleshooting sections, do not attempt repairs yourself, refer to an authorized service facility.

3. Carefully examine the disinfection system after installation. It should not be plugged in if there is water on parts not intended to be wet.

4. Do not operate the disinfection system if it has a damaged power cord or plug, if it is malfunctioning or if it is dropped or damaged in any manner.

5. Always shut off water flow and unplug the disinfection system before performing cleaning or maintenance activities. Never pull on the power cord to remove it from an outlet. Grab the plug and pull to disconnect.

6. Do not use this disinfection system for other than the intended use (potable water applications.) The use of attachments not approved, recommended or sold by the manufacturer / distributor may cause an unsafe condition.

7. Intended for indoor use. Do not install this disinfection system where it will be exposed to the weather. Do not store this disinfection system where it will be exposed to temperatures below freezing unless all the water has been drained from it and the water supply has been disconnected.

8. Read and observe all the important notices and warnings on the water disinfection system.

9. If an extension cord is necessary, a cord with a proper rating should be used. A cord rated for less Amperes or Watts than the disinfection system is rated for may cause over heating. Care should be taken to arrange the cord so that it will not be tripped over or accidentally pulled from the outlet.

1. SAVE THESE INSTRUCTIONS.

2. WARNING: The light given off by this unit can cause serious burns to unprotected eyes and skin. Never look directly at a lit UV lamp. When performing any work on the UV Disinfection System, always unplug the unit first. Never operate the UV system while the lamp is outside of the UV chamber.

3. WARNING: The UV lamp inside of the disinfection system is rated at an effective life of approximately 9,000 hours. To ensure continuous water treatment, replace the UV lamp annually with the appropriate Aqua Treatment Services UV lamp. Failure to comply may present a fire hazard.

Function

The function of this ultraviolet disinfection unit is to provide in excess of 99.9% reduction of all water borne pathogenic (disease causing) bacteria.

Model ATS series have a number code designation correspondent to the maximum gpm (gallons per minute) flow rate of the unit. I.E.- PFC-8 has a maximum flow capacity of 8 gpm.

Applications: PFC Units are designed to destroy micro-organisms in water supplies. The Ultraviolet lamp peak radiation of 254 nanometer wavelength (nm) destroys or inactivates the D.N.A. (deoxyribonucleic acid) which absorbs the Ultraviolet radiation. PFC units meet minimum dosages of 30,000 microwatt second per square centimeter.

MAXIMUM CONCENTRATION LEVELS BEFORE ULTRAVIOLET:

Turbidity.....5 NTU

Color.....None

Manganese.....0.05 ppm

Hardness.....7 gpg

Iron.....0.3 ppm

pH.....6.5 - 9.5ppm

Important Note - Pre-filtration equipment may be required if these parameters cannot be maintained. Flow rate must not exceed rated capacity of the unit.

Description

The PFC series has an unique design with an ultraviolet germicidal lamp housed within a single quartz sleeve surrounded by a stainless steel pressure chamber. The chamber is fabricated out of 304 Stainless Steel.

These units come with an ultraviolet lamp designed with four pins at one end.

The quartz sleeve is intended to be placed through the disinfection chamber and will slightly protrude through the threaded nipple. The ultraviolet lamp is placed within this quartz sleeve. The U.V. light shines through this specially designed hard quartz sleeve for maximum disinfection efficiency to meet the requirements for bacteria reduction in potable water.

The inlet is located on the bottom of the chamber and the outlet can be on either side dependent upon installation. A sight Port is provided for safe and easy view of operation. A bracket is secured to the wall and the chamber is held in place by tightening the lock nut to both mounting bracket and chamber.

Installation

GENERAL CONSIDERATIONS FOR ALL DISINFECTION UNITS:

1. When installing the equipment, it is necessary that the unit be isolated from vibration, heavy equipment, and poorly connected piping.

2. Incoming water temperature to the unit should not exceed 35° minimum to 110° maximum degrees Fahrenheit.

3. The operating pressure should not exceed 100 psi.

4. Before putting the unit into final operation follow sanitation procedures as outlined in this manual for proper disinfection. Sanitizing all discharge piping and fittings with household bleach from disinfection unit to point of use removes existing contaminants and gives the unit a "clean start." Be sure to rinse with U.V. treated water.

5. A proper flow control, included with the unit, must be used to insure only the designated flow through the unit.

GENERAL PRECAUTIONS TO BE FOLLOWED AT ALL TIMES:

1. Always disconnect electrical power to any U.V. unit before servicing.

2. Under no circumstances should personnel look at a U.V. lamp in operation (EXCEPT through an external sight Port lens located on the outside of the unit).

3. U.V. disinfection units must always be properly grounded.

The PFC series are always placed after the pressure tank and any other type of treatment devices (i.e. softeners, filters).

These units are normally installed in a vertical position in an enclosed area with good ventilation. Allow clearance of at least the unit's length at one end for quartz sleeve and lamp replacement. Two (2) anchor bolt holes are provided for proper wall support. Use wall plugs with screws for sufficient support (not included). A lock nut secures the mounting bracket to the U.V. chamber.

If your piping system is subject to impulse pressure resulting in a "water hammer" condition, a surge tank or other means must be provided to remove this condition; otherwise, this extreme shock pressure condition may rupture or fracture the quartz sleeve.

Make all plumbing connections to allow for ease of service. Be sure to follow all local plumbing codes and U.V. restriction requirements where specified by local authorities.

STEP BY STEP INSTALLATION:

1. Turn off the water before cutting into the water line.

2. Assess the installation (i.e. type of pipe, size of lines, etc.) and obtain necessary plumbing fittings for installation. Inlets and outlets on PFC units are 3/4" FNPT and 1" MNPT. Use Teflon tape on all threaded connections and avoid over tightening.

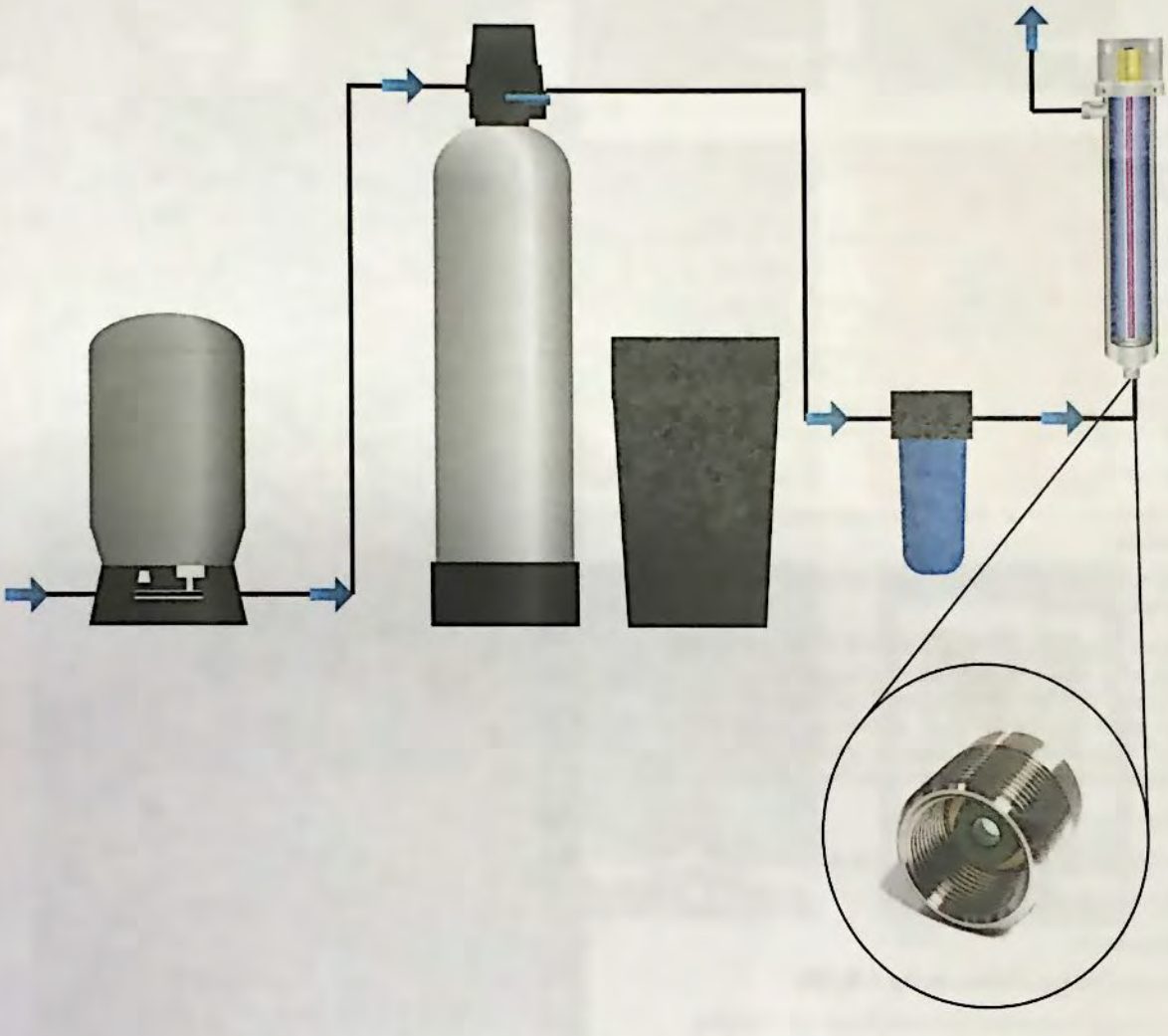
Note: The flow control is a press in type. Each unit has a 3/4" FNPT and 1" MNPT inlet/outlet machined so the flow control can be easily inserted into the bottom port inlet. Make sure the rubber part of the flow control is facing outward from the bottom inlet. Simply hand press or slightly tap in the flow control until it sits on the inside ledge of the machined bottom inlet.

3. Using the mounting bracket provided, secure unit to wall, or other surface. Make sure to allow enough room to install, replace, and clean the quartz sleeve and lamp. Installing a water shut-off valve before and after the unit is recommended to make servicing easy.

4. After mounting, install quartz sleeve, O-Ring, and lamp per instructions. Turn on the water slowly, check for leaks, and repair as needed prior to full service operation.

5. After the unit is full of water, plug it into a grounded 110V outlet. Observe operation through the safety sight Port. The lamp will show a bright blue glow. If any problems are noted, consult trouble shooting guide.

Installation Diagram



Electronic Controls & Startup Procedures

OPERATING INSTRUCTIONS

Your UV System is equipped with the ATS-287-2 UV Lamp Detector and Timer circuit board which is designed to provide a continuous monitoring system of the UV lamp operational status. This is also equipped with an internal and external fused surge protection system. This solid state electronic circuit board provides the latest in Touchscreen/ UV lamp monitoring technology.

UV LAMP / CONTROL BOX START UP PROCEDURE

1. Make sure the UV lamp is inserted per instructions into the quartz sleeve and UV chamber. Then plug the UV lamp into the lamp connector.
2. Plug the electrical control box into a 120volt wall plug outlet.
3. Upon start up the UV lamp Detector and Timer circuit board will perform a self diagnostic test. When power is applied the circuit board will perform an output check to see if lamp or probe is connected. Once detected, the lamp will light and go into an approximate 2 minute lamp optimization period. **(as shown in fig 1 - 1D)**
4. Quick Beep
5. The number 364 is displayed representing 364 days remaining
6. Once warmed up, the logo and number of remaining days is displayed.
7. Set the 1 Year Lamp Timer – WITH NEW UV LAMP\ Make sure the control box is plugged into the wall outlet and the UV lamp is on. Touch the right green arrow until "Reset lamp" is displayed. Touch the red "reset" button and then touch the green check mark to rest lamp for 1 year. **(as shown in fig 2 & 2A)**
8. Snooze Alarms
   - Touch 🔔 to snooze alarm or touch the 🏠 button on display or control box.
9. Alarm screens

   A. Lamp Out **(as shown in fig 3 & 3A)**

   • Circuit board has detected lamp out. Unplug unit and check lamp connection, and plug the unit back in.

   B. Lamp Life Low **(as shown in fig 4)**

   • Circuit board has detected that there are 30 days remaining on the lamp life.

10. Dealer Information - This screen contains dealer contact information. If you touch the right green arrow you will see a scanable QR code which can be scanned with a smart phone to obtain dealer information. **(as shown in fig 5 & 5A)**

11. Software Version - This screen displays the current software version for the cercuit board. **(as shown in fig 6)**

overlay

Sample Screen Shots

fig 1

fig 1A

fig 1B

fig 1C

fig 1D

fig 2

fig 2A

fig 3

fig 3A

fig 4

fig 5


fig 5A

fig 6

Sanitation Procedure

HOW TO DISINFECT A WATER SYSTEM:

Every new well, or existing water supply system that has been disrupted for service or repair, should be disinfected before it is returned to use. Water in the well and storage tank should be treated with a strong chlorine solution to destroy disease organisms. All pipelines and fixtures in the distribution system should be rinsed and flushed with chlorinated water. Upon installation of a U.V. disinfection unit or yearly bulb replacement service, disinfection with chlorine to initially flush the system is recommended to assure line sanitation prior to U.V. start up.

The source of chlorine can be ordinary household liquid laundry bleach (about 5.25% available chlorine). The quantity required depends on the volume of water to be treated. The United States Environment Protection Agency (EPA) indicated that about 100 parts of chlorine, by weight, mixed in a million parts of water will destroy essentially all water-borne disease organisms. Table 1 shows the quantity of liquid bleach required to disinfect wells of various diameters and depths.

DISINFECTION PROCEDURE:

1. Remove the cap or seal from the casing and measure the depth of the water in the well, then refer to Table 1 to determine how many chlorine pellets should be used. In some instances removing the seal to measure the water can be a difficult task, and it is easier to estimate well and water depth from well log or other records.

2. Remove well cap and determine if there is an unobstructed path from the top of the well to the water level. If it is not possible to remove the well cap, remove vent or sanitation access plug.

3. Drop one pellet into the well and listen to hear if it hits the water. If the pellet hits the water, drop one-half the number of pellets determined to be needed into the well. These will sink to the bottom and sanitize the lower part of the well.

4. Mix the remaining pellets in a few gallons of water in a CLEAN plastic container and pour the solution into the well.

5. In order to mix the chlorine thoroughly throughout the entire water system, it is necessary to recirculate the water in the well. This can be accomplished by connection a hose to an out side faucet that is located after the pressure tank. Use hose to run water back down the well (this also rinses upper portion of well). After about 15 minutes of recirculation the water, a strong chlorine odor should be apparent. Turn off hose.

6. Bypass water softener and filters and open each water outlet in the water system until chlorine is present in water. This procedure assures that all the water in the system is chlorinated.

7. Allow the chlorinated water to stand in the system for at least one (1) hour, and preferable overnight. After this, open an outside faucet system until water runs chlorine free. Repeat flush operation on each faucet in system.

NOTE:

A. Chlorine may break loose iron deposits, slime and organic material. This material will make the water discolored. The material broken loose may plug pump screens. Do not continue to run pump if water doesn't flow.

B. The high level of chlorine required to sanitize a water system is corrosive to most metals and chlorine solution must not be allowed to remain in water system more than 36 hours before being completely flushed from system.

8. After system has been completely flushed, perform a bacteriological analysis on the water following all applicable procedures.

NOTE: Always follow the sanitizing procedure required by applicable state or local laws.

EPA Registered: Well sanitizer pellets are EPA Registered for sanitizing potable water. EPA Registration No. 50510-1

LARGE DIAMETER WELLS: Dug or bored wells should be disinfected in the same way as a drilled one. Lower the water level as much as possible, remove the sand, silt and debris, and then treat with the chlorine solution. Mix thoroughly by circulating the water back into the well and use the hose to rinse the interior lining of the well. Do not try to disinfect an unprotected, unlined well because new seepage or surface contamination will flow into the water about as fast as you can disinfect it. Disinfect the pipeline distribution system as indicated for drilled wells.

SPRINGS AND CISTERNS: Mix about ½ cup of household bleach in 5 gallons of water and use this to scrub the walls of the spring box or holding tank. With a constant flow of fresh water from the spring, there is probably no way of detaining the chlorine solution in the reservoir for more than a few minutes. However, the chlorinated water should flow through the pipeline to disinfect the distribution system. Cisterns can be disinfected in the same way but a source of clean water will be needed to flush the dirty waste out of the system.

For additional information about how to protect wells and springs and keep them from becoming contaminated, call or visit your local Cooperative Extension office, or your nearest certified water treatment specialist.

TABLE 1 ** Quantity of solution mixed - 5.25% available chlorine (laundry bleach) for disinfecting wells, or 52,500 P.P.M..

WQA recommends 50mg/l or ppm chlorine concentration.

Formula - C2 X V2 / C1 = V1

C1= Household Bleach (52,500 P.P.M.)

V1= Chlorine Amount Needed

C2= 50 mg/L V2= 80 gallons holding time

I.E. 50-ml/g X 80 gal= 4000/52,500= .08 gallons of chlorine (5.25%)

.08 gal chlorine (5.35%) X 128 (oz/gal) = 10.24 oz (5.25%)

Dug Wells - 3 to 4 feet diameter - 4 cups per foot of water

Drilled Wells - 3 to 8 inch diameter - 1 cup per foot of water

Sanitation Procedure Continued

TOO MUCH CHLORINE IS BETTER THAN TOO LITTLE: **In situations where it is inconvenient to determine depth of water or diameter of a drilled well, a minimum of 1/2 gallon of household bleach may be used for wells up to 8 inches in diameter with estimated to be less than 80 feet deep; 1 gallon should be used for similar size wells with water deeper than 80 feet. In case of a well yielding more than 50 gallons per minute, special procedures are required. Seek the advice of a certified water treatment specialist.

Wait a day or two before you have another sample tested. Do not take a sample for testing if the odor of chlorine is still present in water.

REMEMBER - To make your water supply safe:

• Locate your well properly.

•Protect it from surface contamination.

•Test water periodically for coliform bacteria. (Home-yearly, Farm-2X yearly)

•Chlorinate, or filter and disinfect the water if necessary.

Plumbing Line Sanitation Only:

When installing an ultraviolet disinfection system, a prefilter with sump may serve as a source to sanitize the water lines only. For whole system disinfection follow procedure as outlined above.

Source: The Pennsylvania State University College of Agriculture Cooperative Extension.

How to Sanitize a Water System Using Well Sanitizer Pellets

Table 1

NOTE:

Pellets Weight = 1.14 gram each, 25 pellets/oz., 400 pellets/lb.

1 cup of pellets = 1/2 lb., or 200 pellets, or 8 oz.

To produce a 400 P.P.M. chlorine concentration, to sanitize a water system, use one-half (1/2) pound chlorination pellets for each 100 gallons of water in the system (1/2 lb/100 gal= 8 oz/100 gal= 200 pellets/ 100 gal= 1 cup pellets/100 gal). Table 1 shows how many pellets too use per 100 feet of water in various diameter wells.

Well Diameter Inches	Weight of Pellets lbs. - oz.	Cups of Pellets	Number of Pellets
2	0 - 1.5	1/4	40
3	0 - 3.0	2/5	80
4	0 - 6.0	3/4	140
5	0 - 8.0	1	200
6	0 - 12.0	1-1/2	300
8	1 - 5.0	2-1/2	500
10	2 - 0	4	800
12	3 - 0	6	----
24	12 - 0	24	----
36	26 - 0	---	----

Maintenance

QUARTZ SLEEVE:

Installation of the Quartz Sleeve:

Always handle quartz sleeves carefully to prevent breaking or chipping. The quartz sleeves are to be clean and free of fingerprints before installing.

After unplugging the unit, remove the brass dust cap and electrical connection. Then remove brass end nut. Install the quartz sleeve through the stainless steel threaded nipple until it is centered in the Quartz spring. Use a small amount of plumber's grease and install the O-ring around the quartz sleeve. Avoid riding the O-Ring on any threaded part of the nipple. Hand-tighten the brass end-nut to form a compression seal around the quartz sleeve. Avoid overtightening the nut, which may cause a fracture on the end of the quartz sleeve. Under normal operation conditions, hand-tightening will provide a 100 psi seal. Do not use any devices to tighten end nut.

After you have tightened the brass end nut and all other plumbing connections, open the outlet valve. Slowly open the inlet valve and flush out all remaining air. Then close the outlet valve and slowly open the inlet valve fully. Check the unit for leaks. If you find a leak at the brass end-nut, tighten the brass end-nut further. If the leak continues, drain the unit and inspect the quartz O-Ring and quartz sleeve for proper seal. Once you complete checking the unit, reassemble O-Ring and tighten brass end-nut. Repressurize the unit and check again.

REQUIREMENTS FOR CLEANING THE QUARTZ SLEEVE:

As water passes through the U.V., minerals, debris and other matter in the water may deposit onto the quartz sleeve. After sufficient film has formed on the quartz sleeve, the ability of the ultraviolet germicidal rays to pass though the quartz sleeve and into the water may be impaired. Therefore, it is necessary to determine a cleaning schedule for the quartz sleeve. The frequency will depend on the specific type of water conditions. If the water has been processed through deionization, reverse osmosis, or is distilled, cleaning may be required only once per year. If untreated water is used, the cleaning frequency will vary. A minimum of once yearly is standard recommendation for cleaning and lamp replacement. Contact your local dealer for scheduling this service. Your specific situation will vary the frequency time according to the water quality of the home or facility application.

QUARTZ SLEEVE CLEANING PROCEDURES:

To clean the quartz sleeve, turn off the water flow to the disinfection unit, turn power off, and at a separate faucet or valve relieve the water pressure from the UV. Then disconnect the electrical service to the lamp pins. Carefully remove the U.V. lamp. Loosen the end nut with O-Ring and remove the quartz sleeve. The quartz sleeve may then be washed with a mild soap and hot water solution and rinsed clean with hot water. Should this be insufficient to clean the quartz sleeve, a mild acid may be used (i.e. vinegar). Be certain to follow all recommended safety and handling procedures on the acid container. It is important to handle the quartz sleeve with care to prevent breakage. Make certain that all finger prints are wiped clean before reinstalling (see installation of the quartz sleeve). Replace O-Ring [ATS8-544(1)] every time a quartz sleeve is cleaned or replaced. We reccommend replacing the quartz sleeve once a year.

U.V. LAMPS:

INSTALLATION OF THE ULTRAVIOLET LAMPS:

****DO NOT PUT POWER ON AT THIS TIME!****

CAUTION: Never operate or look directly at U.V. lamp outside the disinfection chamber.

Make sure unit is unplugged when installing or servicing ultraviolet lamp. Remove any paper tabs on the U.V. lamp and avoid allowing fingerprints and other debris to deposit. Carefully place the lamp inside the quartz sleeve leaving enough space to connect the socket connector to the lamp pins. Then gently slide the brass dust cap over the end nut, securing the lamp and protecting it from dust.

ULTRAVIOLET LAMP MAINTENANCE REQUIREMENTS: The U.V. lamp is rated for 9,000 hours of continuous use. After this period of time, the U.V. lamp has undergone a photochemical change. While the lamp will not normally be burned out, the lamp quartz may no longer emit the 254-nm shortwave U.V. to effectively kill bacteria. Failure to replace the U.V. lamps every 9,000 hours may cause bacteriological breakthrough. Should the use of the disinfection unit be intermittent, in no case should the U.V. lamp be used for more than 24 months regardless of the number of hours of operation due to normal shelf life degradation of the U.V. bulb. Changing the quartz sleeve should be done at the same time U.V. lamp replacement is scheduled.

It is recommended that your water supply be tested periodically (yearly) through your local health department or approved certified laboratory.

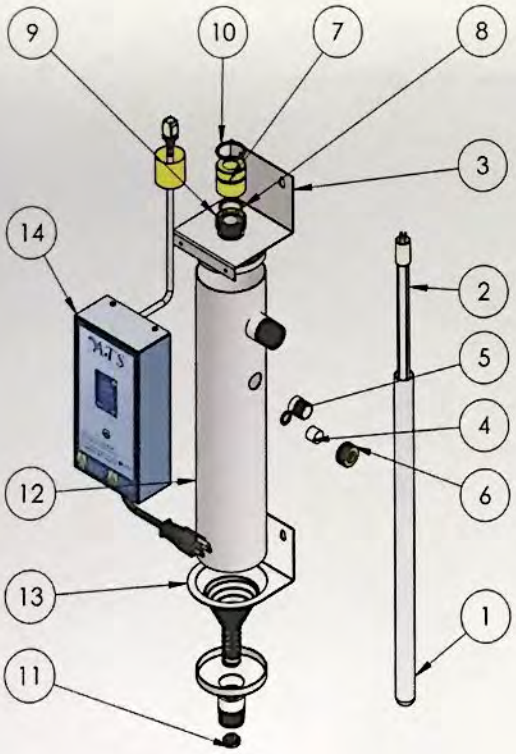
ELECTRICAL:

The PFC series are furnished with 6' line cord that will plug into a 110V outlet. Electrical receptacles must be properly grounded for safe operation. Improper grounding will void any warranty.

When possible use a separate breaker to minimize voltage fluctuations and avoid accidental shut off. After unit is installed and water is turned on, plug the unit into 110V wall receptacle. View lamp operation through safety Sight Port lens. NOTE: Avoid exposing your eyes to U.V. light.

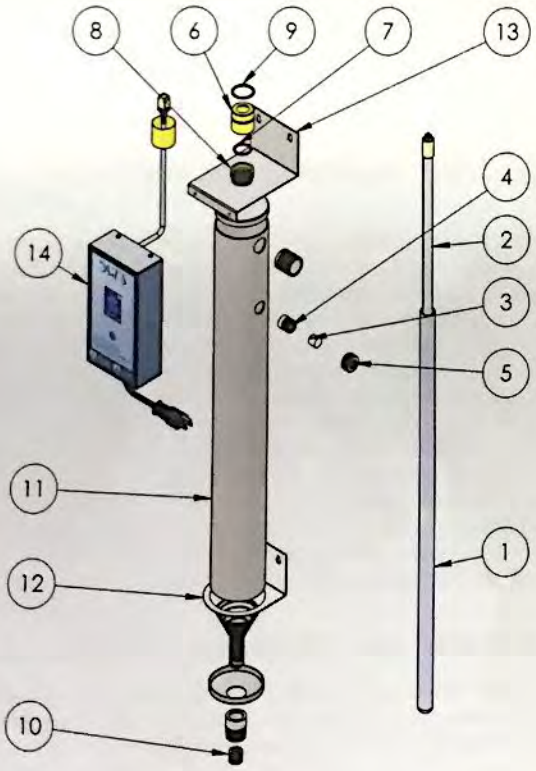
Parts Breakdown PFC-8

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	ATS-476D	Domed Quartz	1
2	ATS4-450	UV Lamp	1
3	ATS-268	Top Mounting Bracket	1
4	ATS-5172	Sightport Lens	1
5	ATS-5173	Orange .7" OD Viewport O Ring	1
6	ATS-5171	Sightport Nut	1
7	ATS5-409	Brass End Nut	1
8	ATS8-544	Orange 1.2" OD ORing	1
9	ATS5-410	Lock Nut	1
10	ATS8-546	Black 1.5" OD ORing	1
11	ATS-8GPM	Flow Control	1
12	STS-8GPM	8 Gallon Per Minute Bottom Feed Assembled Chamber	1
13	ATS-269	(OPTIONAL) Bottom Mounting Bracket	1
14	ATS-PFC	PFC Control Box	1



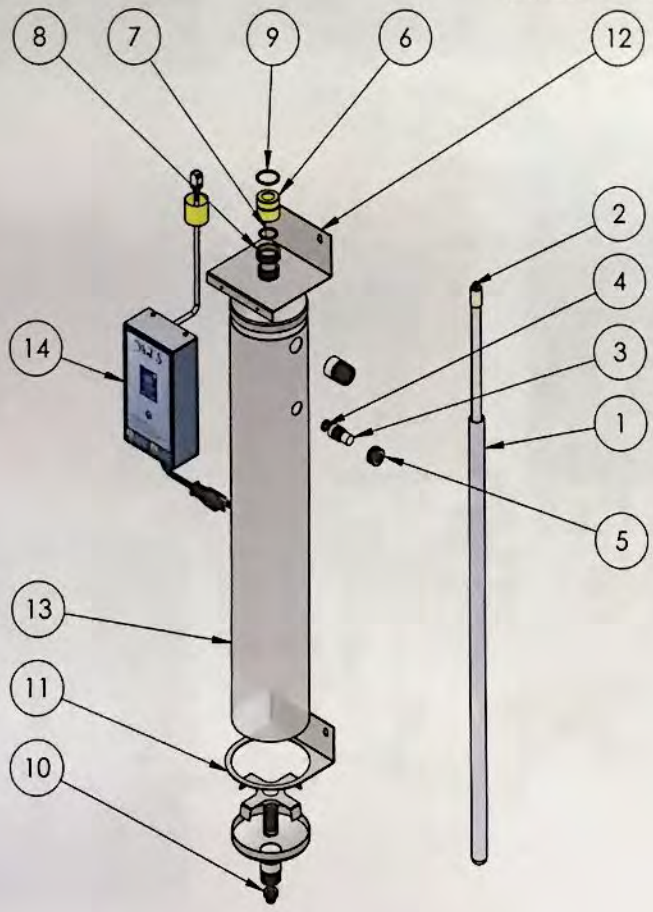
Parts Breakdown - PFC-12

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	ATS1-759D	Domed Quartz	1
2	ATS4-739	UV Lamp	1
3	ATS-5172	Sightport Lens	1
4	ATS-5173	Orange .7" OD Viewport O Ring	1
5	ATS-5171	Sightport Nut	1
6	ATS5-409	Brass End Nut	1
7	ATS8-544	Orange 1.2" OD ORing	1
8	ATS5-410 Lock Nut	Lock Nut	1
9	ATS8-546	Black 1.5" OD ORing	1
10	ATS-12GPM	12 GPM Flow Control	1
11	STS-12GPM	Assembled PFC-12 Chamber	1
12	ATS-269	Bottom Mounting Bracket	1
13	ATS-268	Top Mounting Bracket	1
14	ATS-PFC	PFC Control Box	1

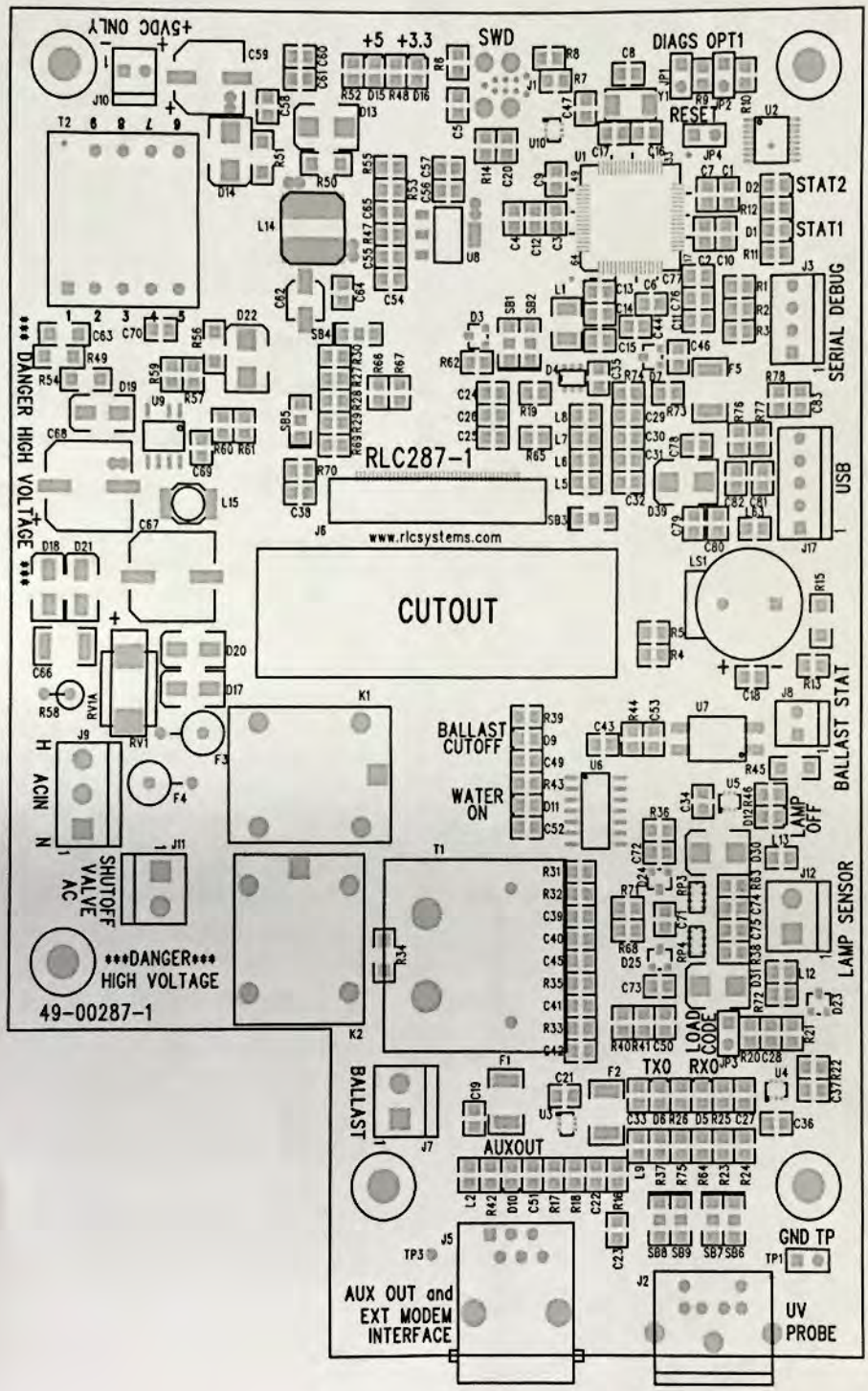


Parts Breakdown - PFC-20

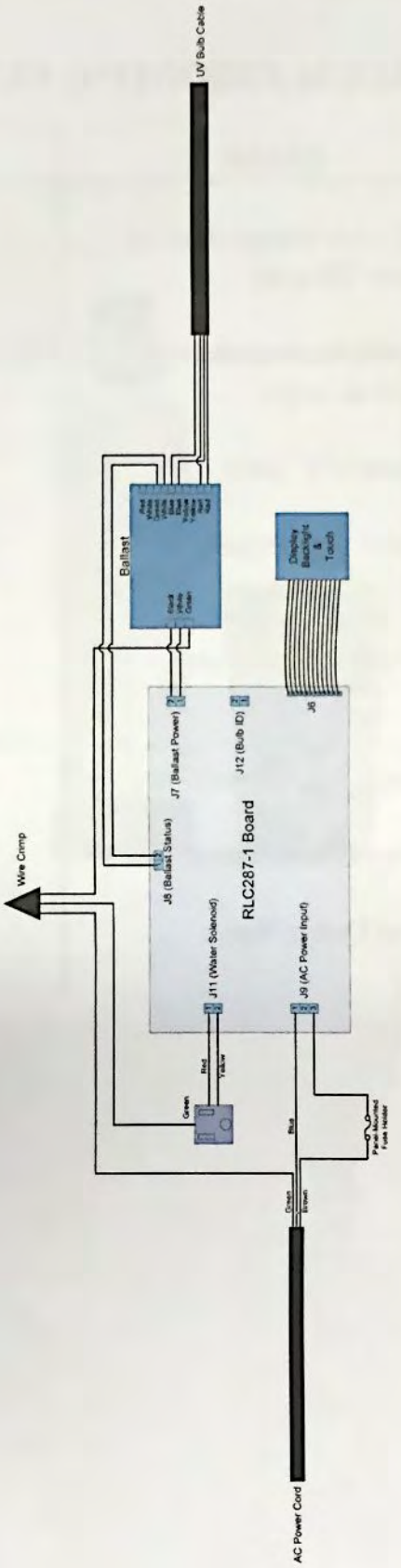
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	ATS-832D	Domed Quartz	1
2	ATS4-810	UV Lamp	1
3	ATS-5172	Sightport Lens	1
4	ATS-5173	Orange .7" OD Viewport O Ring	1
5	ATS-5171	Sightport Nut	1
6	ATS5-409	Brass End Nut	1
7	ATS8-544	Orange 1.2" OD ORing	1
8	ATS5-410 Lock Nut	Lock Nut	1
9	ATS8-546	Black 1.5" OD ORing	1
10	ATS-20GPM	20 Gallon Per Minute Feed Assembled Chamber	1
11	ATS-271	Bottom Mounting Bracket	1
12	ATS-270	Top Mounting Bracket	1
13	STS-20GPM	20 Gallon Per Minute Bottom Feed Assembled Chamber	1
14	ATS-PFC	PFC Control Box	1



Circuit Board Layout



Wiring Diagram



Troubleshooting

TROUBLESHOOTING GUIDE

PROBLEM	CAUSE	CORRECTION
U.V. lamp will not light	Check input voltage if below or above 120 volts	Install a voltage regulator
	Line cord disconnected or outlet defective	Check, replace
	Defective U.V. lamp	Replace
	Defective lamp ballast	Check output voltage Replace ballast
	Loose open-circuit wire	Trace out and repair
Leak at quartz nipple	Defective or cracked O-Ring	Replace O-Ring
	O-Ring not seated properly	Replace O-Ring
	Cracked Quartz Sleeve	Replace Quartz Sleeve

Sterile Water Sample Procedures

SUGGESTED PROCEDURE FOR OBTAINING STERILE WATER SAMPLES:

Prior to taking the water sample, be sure to have on hand an adequate supply of sterile bottles **(as shown in fig 1).** These sterile bottles should be obtained from a reputable laboratory and should have been autoclaved and contained within a plastic outer wrapping.

fig 1

1. Prior to taking the sample, it is imperative that the sample valve, faucets, etc. be opened at full force for a complete three and a half minutes.

2. After the valve has been left wide open for three and one half minutes, reduce the flow to a reasonable stream of water. Flow to drain an additional three minutes.

3. Open the sterile bottle or sterile container being used. Holding the cap in a down position, the operator should then hold his breath while taking the sample so as to avoid oral contamination of the sample. The operator must not allow his finger to touch the inside of the cap or the neck of the bottle.

4. After the sample has been taken, the cap should immediately be tightly placed on the sample container.

5. The sample container should be placed in a plastic wrapping, kept cool, and should be taken to the laboratory for plating as soon as possible following the above procedure.

We recommend duplicate samples be taken at each test station during each specific test so as to avoid loss of sample through laboratory error and to insure reasonable validity through comparison.

Check with your local laboratory to assure proper sampling and submittal procedure.

Specifications

SPECIFICATIONS:

Model#	Max. Flow GPM	No. Lamps	KW @ 120V	AMP @ 120V	Pipe Size	Overall Dimensions L x W x D	Wetted Material	Shipping Weight
PFC - 8	8	1	0.03	0.25	3/4" FNPT / 1" MNPT	21" x 3.5" x 3.5"	304 SS	9 lbs.
PFC- 12	12	1	0.03	0.25	3/4" FNPT / 1" MNPT	32" x 3.5" x 3.5"	304 SS	18 lbs.
PFC - 20	20	1	0.03	0.25	3/4" FNPT / 1" MNPT	35" x 5" x 5"	304 SS	21 lbs.

NOTES: 220V Specs are available upon request

PFC Series
UV DISINFECTION

Parts Breakdown:

1. Mounting Bracket
2. Outlet
3. Sight Port
4. Quartz Sleeve
5. UV Lamp
6. Inlet
7. Quartz Sleeve Stabilizer
8. Optional Bottom Mounting Bracket

OPTIONAL ACCESSORIES

Solenoid:

This solenoid acts as a fail safe shut-off valve. Providing extra protection for the system.

UV Probe:

UV dosage metering device. This UV Probe reads only the 254-nm intensity output of the Ultraviolet Light within the UV treatment chamber. Optional on PFC units only.

Warranty

Aqua Treatment Service Inc

REV. June, 2015

MANUFACTURER'S LIMITED WARRANTY

In accordance with the Manufacturer's warranty, and subject to the conditions hereinafter set forth, ATS will repair or replace to the original user or consumer, equipment, parts or components found to be defective in manufacturing or workmanship.

WARRANTY PERIODS:

UV Chambers	10 yrs.
Electrical Components (excludes UV lamp)	2 yr.
UV Lamp, Quartz Sleeve	90 days prorated

WARRANTIES NOT APPLICABLE: To defects or malfunctions resulting from failure to properly install, operate or maintain the unit in accordance with printed instructions; failure to use ATS authorized replacement parts, to failures resulting from shipment or handling, abuse, accident, negligence, freezing, fire or heat, direct exposure to weather or sunlight, water temperatures and pressures exceeding specif ications, flooding or other acts of God not considered normal operating condition; to normal maintenance services and the parts used in connection with such service; to units which are not installed in accordance with applicable local codes, ordinances and good trade practices; if the unit is moved from its original installation location; or if unit is used for purposes other than for what it was designed and manufactured.

LABOR COSTS, LIABILITY: Aqua Treatment Service, Inc., shall ***IN NO EVENT*** be responsible or liable for the cost of field labor or other charges incurred by any customer in installing, removing and/or reaffixing any ATS, part or component thereof, or be liable for any injury, loss or damage, direct or indirect, special or consequential, arisin g out of the use of, misuse, or the inability to use such product. Before use, Distributor, Dealer or User shall determine the suitability of the product for his/her intended purposes, and shall assume all risk and liability in connection therewith.

RETURNS: A ***RETURN MERCHANDISE AUTHORIZATION NUMBER (RMA #)*** is required on ***ALL RETURNS***. Contact ATS to obtain this number. The RMA # **MUST** be clearly written on the outside of the package. Address shipments to the Return Department ATS, 194 Hempt Road, Mechanicsburg, PA, 17050, and freight prepaid. All returns should be accompanied with a written description of mode or reason of failure.

The customer must order ATS replacement parts if required as a standard purchase unt il the defective part is received and evaluated by the factory. ATS will inspect, test, and determine the cause of defective components or parts. ATS at its sole discretion will make necessary repairs to or replace components. ATS will determine the extent of the warranty coverage and the proper warranty credit to be applied. The return freight will be credited to the customer for warranty repairs or replacements.

For your warranty protection, the warranty card must be completed and returned to ATS within 10 days of installation. In the absence of other suitable proof of installation date, the effective date of this warranty will be based on the date of manufacture plus 30 days.

This warranty gives you specific legal rights and you may also have other rights, which vary, from state to state.

PENTEK ECP SERIES
PLEATED CELLULOSE POLYESTER CARTRIDGES

HIGHER WET STRENGTH THAN REGULAR CELLULOSE CARTRIDGES

Pentair‡ Pentek‡ ECP Series Cartridges are manufactured from a special formulation of resin-impregnated cellulose and polyester fibers.

This unique blend of materials provides a higher wet strength than regular cellulose cartridges. It also provides high flow rates and dirt-holding capacity while maintaining extremely low pressure drop.

The media is pleated around a polypropylene core for added strength. The pleated endcaps of the standard cartridges are immersed in a thermo-setting vinyl plastisol. The Big Blue cartridges have a molded endcap with gaskets. The pleated ends are sealed to the endcap with a thermoplastic adhesive. The overlap seam is sonically welded to reduce internal bypass, improving filtration efficiency.

ECP Series Cartridge endcaps feature a color-coding system for easy identification of micron ratings: tan (1 micron), white (5 micron), blue (20 micron), and yellow (50 micron).

ECP Series Cartridges contain more media surface area than most competitive cartridges. The Standard 10" ECP cartridge contains 6 ft^2 of media while most cartridges contain only 4.5 ft^2. Other available ECP cartridge sizes contain the following amount of media:

– Standard 10" cartridge: 6 ft^2
– Standard 20" cartridge: 12 ft^2
– BB 10" cartridge: 18 ft^2
– BB 20" cartridge: 36 ft^2

FEATURES/BENEFITS

Replaces Pentek CP and HFCP Series Cartridges

Special formulation of resin-impregnated cellulose and polyester fibers

Provides higher wet strength than regular cellulose cartridges

Minimal unloading and media migration

Nominal 1, 5, 20, 50 micron rating

Lengths: 10", 20"

SPECIFICATIONS

Filter Media – Cellulose polyester

Standard Endcaps – Vinyl plastisol

Big Blue Endcaps – Polypropylene

Core – Polypropylene

Temperature Rating – 40-125ºF (4.4-51.7ºC)

SPECIFICATIONS AND PERFORMANCE

MODEL #	PART #	ENDCAP COLOR	MAXIMUM DIMENSIONS	RATING (NOMINAL)	INITIAL (PSI) @ FLOW RATE (GPM)
ECP1-10	255481-43	Tan	2.63" x 9.75" (67 mm x 248 mm)	1 micron	<1 psi @ 10 gpm (<0.1 bar @ 38 Lpm)
ECP5-10	255482-43	White	2.63" x 9.75" (67 mm x 248 mm)	5 micron	<1 psi @ 10 gpm (<0.1 bar @ 38 Lpm)
ECP20-10	255483-43	Blue	2.63" x 9.75" (67 mm x 248 mm)	20 micron	<1 psi @ 10 gpm (<0.1 bar @ 38 Lpm)
ECP50-10	255484-43	Yellow	2.63" x 9.75" (67 mm x 248 mm)	50 micron	<1 psi @ 10 gpm (<0.1 bar @ 38 Lpm)
ECP1-20	255485-43	Tan	2.63" x 20" (67 mm x 508 mm)	1 micron	<1 psi @ 10 gpm (<0.1 bar @ 38 Lpm)
ECP5-20	255486-43	White	2.63" x 20" (67 mm x 508 mm)	5 micron	<1 psi @ 10 gpm (<0.1 bar @ 38 Lpm)
ECP20-20	255487-43	Blue	2.63" x 20" (67 mm x 508 mm)	20 micron	<1 psi @ 10 gpm (<0.1 bar @ 38 Lpm)
ECP50-20	255488-43	Yellow	2.63" x 20" (67 mm x 508 mm)	50 micron	<1 psi @ 10 gpm (<0.1 bar @ 38 Lpm)
ECP1-BB	255489-43	Tan	4.5" x 9.75" (114 mm x 248 mm)	1 micron	<1 psi @ 20 gpm (<0.1 bar @ 76 Lpm)
ECP5-BB	255490-43	White	4.5" x 9.75" (114 mm x 248 mm)	5 micron	<1 psi @ 20 gpm (<0.1 bar @ 76 Lpm)
ECP20-BB	255491-43	Blue	4.5" x 9.75" (114 mm x 248 mm)	20 micron	<1 psi @ 20 gpm (<0.1 bar @ 76 Lpm)
ECP50-BB	255492-43	Yellow	4.5" x 9.75" (114 mm x 248 mm)	50 micron	<1 psi @ 20 gpm (<0.1 bar @ 76 Lpm)
ECP1-20BB	255493-43	Tan	4.5" x 20" (114 mm x 508 mm)	1 micron	<1 psi @ 20 gpm (<0.1 bar @ 76 Lpm)
ECP5-20BB	255494-43	White	4.5" x 20" (114 mm x 508 mm)	5 micron	<1 psi @ 20 gpm (<0.1 bar @ 76 Lpm)
ECP20-20BB	255495-43	Blue	4.5" x 20" (114 mm x 508 mm)	20 micron	<1 psi @ 20 gpm (<0.1 bar @ 76 Lpm)
ECP50-20BB	255496-43	Yellow	4.5" x 20" (114 mm x 508 mm)	50 micron	<1 psi @ 20 gpm (<0.1 bar @ 76 Lpm)

WARNING: Do not use with water that is microbiologically unsafe or of unknown quality without adequate disinfection before or after the system.

PENTAIR

WATER QUALITY SYSTEMS
5730 NORTH GLEN PARK ROAD, MILWAUKEE, WI 53209
P: 262.238.4400 | F: 262.238.4404
WATERPURIFICATION.PENTAIR.COM
CUSTOMER CARE: 800.279.9404 | tech-support@pentair.com

310111 REV D MY15

MATRIKX®
Extruded Carbon

CTO® PLUS™

High Capacity Chemical, Chlorine Taste & Odor Reduction Filter

FEATURES & BENEFITS

- 0.6 µm Nominal Filtration*
- High Chemical Adsorptive Capacity*
- High VOC Reduction*

NSF® COMPONENT
The MATRIKX + CTO® is Tested and Certified by NSF International under NSF/ANSI Standard 42 for material requirements only.

Tested and certified by WQA to NSF/ANSI 42 for material requirements only.

TYPICAL USAGES

MATRIKX® CTO® PLUS™ provides comprehensive control of chlorine taste and odor. MATRIKX® CTO® PLUS™ offers: 0.6 µm nominal filtration with extended life as a fine sediment and silt control filter, comprehensive removal of chlorine taste and odor and chemicals that contribute to taste and odor, and high VOC reduction capacity. The service life of MATRIKX® CTO® PLUS™ filters are greatly extended by a prefiltration medium.

TECHNICAL SPECIFICATIONS AND ORDER INFORMATION

Part No.	O.D. x Length (nominal)	Chlorine Taste & Odor Reduction Capacity @ Flow*	Nominal µm Rating*	Chloroform Reduction*	Initial ΔP @ Flow*
01-250-125-975	2.50" x 10"	>20,000 gal. @ 1.0 GPM >75,000 L @ 3.8 LPM	0.6 µm	500 gal. @ 0.5 GPM 1,800 L @ 1.9 LPM	3.5 psid @ 1.0 GPM 0.24 bar @ 3.8 GPM
01-250-125-20	2.50" x 20"	>45,000 gal. @ 2.3 GPM >170,000 L @ 8.7 LPM	0.6 µm	1,100 gal. @ 1.2 GPM 4,400 L @ 4.5 LPM	3.0 psid @ 2.0 GPM 0.21 bar @ 7.6 GPM
01-425-125-975	4.25" x 10"	>70,000 gal. @ 3.0 GPM >264,000 L @ 11.4 LPM	0.6 µm	1,700 gal. @ 1.5 GPM 6,500 L @ 5.7 LPM	9.0 psid @ 2.0 GPM 0.62 bar @ 7.6 LPM
01-425-125-20	4.25" x 20"	>150,000 gal. @ 7.0 GPM >567,000 L @ 26.5 LPM	0.6 µm	5,600 gal. @ 3.5 GPM 21,000 L @ 13.2 LPM	8.5 psid @ 4.0 GPM 0.59 bar @ 15.1 LPM

*Based on Manufacturer's Internal Testing

Manufactured using KX®'s proprietary extrusion process, the MATRIKX® CTO® PLUS™ is ideal for use in residential and commercial water purification systems, industrial effluent water treatment, food service, industrial makeup, product rinse, process water, and pre- and post-RO systems which require nearly absolute chlorine taste and odor reduction.

KX TECHNOLOGIES
The Science Behind Better Water®

CTO® PLUS™

ORDER INFORMATION

To order, contact an authorized Master Stocking Distributor (no factory-direct ordering or shipping).

EXTRUDED CARBON = EXCEPTIONAL VALUE

MATRIKX® CTO® PLUS™ filters consist of activated carbon particles fused into a uniform block with enhanced adsorptive capacity and efficiency. MATRIKX® CTO® PLUS™ filters flow in a radial (outside-to-inside) direction, providing increased dirt-holding capacity and low pressure drop. Unlike granular activated carbon (GAC) filters, MATRIKX® CTO® PLUS™ cartridges will not channel or bypass due to the extreme uniformity of their extruded activated carbon core. Service life of the MATRIKX® CTO® PLUS™ filter is greatly extended by a prefiltration medium.

- No channeling
- No fluidizing
- No bypassing
- Lowest extractables, pure materials of construction
- Maximum service life and resistance to fouling
- Graded density prefiltration design
- Manufactured using FDA-compliant materials
- Color coded molded one-piece gasket and end cap

IMPORTANT NOTICE: Performance claims are based on a complete system, including a filter, housing, and connection to a pressurized water source. This filter must be placed in an appropriate system, and operated according to the system's specifications in order to deliver the claimed performance. It is essential to follow operational, maintenance, and filter replacement requirements, as directed for each application, for this filter and system to perform correctly. Read the Manufacturer's Performance Data Sheet accompanying the system and change the filter as suggested. The contaminants or other substances removed or reduced by this water filter are not necessarily in all users' water.

NOTES

1. Projected chlorine taste and odor reduction capacity when tested in accordance with NSF/ANSI Standard 42 protocol.
2. Nominal particulate rating (0.6 µm) is for >85% of a given size as determined from single-pass particle counting results.*
3. Absolute particulate rating (2 µm) is for >99.9% of particles of a given size as determined from single-pass particle counting results.**

* Nominal Filter Rating: Filter rating indicating the approximate size particle, the majority of which will not pass through the filter. It is generally interpreted as meaning that 85% of the particles of the size equal to the nominal micron rating will be retained by the filter. (WQA Glossary of Terms, Third Edition, 3-97).

** Absolute Filter Rating: Filter rating meaning that 99.9% (or essentially all) of the particles larger than a specific micron rating will be trapped on or within the filter. (WQA Glossary of Terms, Third Edition, 3-97).

WARNINGS

Maximum Operating Temperature: 125°F/51.67°C Maximum Operating Pressure: 250 psig/17.24 bar Maximum Differential Pressure: 100 psid/6.895 bar Collapse Pressure: 200 psid/13.79 bar

MATRIKX® filters are not to be autoclaved or steam-sterilized. Use MATRIKX® CTO® PLUS™ carbon filters only with microbiologically safe and adequately disinfected water. Activated carbon filters are not designed to kill or remove bacteria or viruses. Actual results obtained will vary with various combinations of organic contaminants, changes in pH or other conditions encountered in actual use. All information presented here is based on data believed to be reliable. It is offered for evaluation and verification, but is not to be considered a warranty of any kind.

MATRIKX® filters are designed to fit most standard household and commercial or industrial housings. Contact KX Technologies LLC to check filter housing compatibility. This cartridge must be placed in an appropriate housing and flushed for a minimum of 5 minutes prior to use. Use only with microbiologically safe and adequately disinfected water.

LIMITED LIABILITY

KX Technologies LLC makes no warranties of any kind, expressed or implied, statutory or otherwise, and expressly disclaims all warranties of every kind, concerning the product, including, without limitation, warranties of merchantability and fitness for a particular purpose, except that this product should be capable of performing as described in this product's data sheet. KX Technologies LLC's obligation shall be limited solely to the refund of the purchase price or replacement of the product proven defective, in KX Technologies LLC's sole discretion. Determination of suitability of this product for uses and applications contemplated by Buyer shall be the sole responsibility of Buyer. Use of this product constitutes Buyer's acceptance of this Limited Liability.

MADE IN THE U.S.A.
DISTRIBUTED BY:

KX TECHNOLOGIES
The Science Behind Better Water®

A Marmon Water/Berkshire Hathaway Company

55 Railroad Avenue • West Haven, CT 06516-4143 • Telephone: 203-799-9000 • Fax: 203-799-7000 • E-mail: sales@kxtech.com

KX Technologies Pte Ltd • No. 2 Serangoon North Avenue 5, #01-01 • Singapore 554911

Com-Pak

Perfectly simple warmth for any room

- Efficient, quiet fan
- Warm up in a hurry with a fast-heating element
- Unique compact design is recess mounted into your wall to suit any room
- All metal surfaces are powder-coated paint to remove sharp edges and provide a durable finish
- Easy to install
- Rest easy – includes high temperature safety shutoff
- Available with or without built-in thermostat

Get warm on your terms with our most popular wall heater. The Com-Pak is an efficient, affordable way to add warmth without installing ductwork. Our hard wired heaters have proven safety features and multiple installation options, so your family can enjoy safe, sensible warmth for years.

ARCHITECTURAL - ENGINEERING INFORMATION

Fan forced up flow electric air heaters are ETL listed, factory rated at 120V, 208V, and dual field rated 208V/240V. A powder coated 20 gauge wall mounting can with six knockouts and 34 cubic inch wiring compartment is provided with each complete heater. Each complete heater is powder coated, of unitized construction and attaches to the wall can with a single screw and is self-contained and completely separate from the wall mounting can. Element is of nichrome type wire wrapped on mica insulators with a 16 amp rated, at 240V, high temperature manual power reset limit switch, and a one-time over temperature thermal back-up fuse, both located on the element board in the heated air flow for faster response time to abnormal conditions. A two stage centrifugal blower delivering approximately 40 to 55 CFM is driven by an impedance protected motor. The motor is totally isolated from the heating chamber. Metal grill is of one piece, 20-gauge construction and finished with a powder coat paint system.

TECHNICAL INFORMATION

UL safety standards require the heater to be placed a minimum distance of 3/4 inches (1.9 cm) from adjacent surfaces and 4-1/2 inches (11.4 cm) from the floor. Manufacturer recommends installations 12 inches from all surfaces for longer and cleaner performance. All models 1500 watts or less may be ceiling mounted. A 3-foot (91.4 cm) minimum clearance is required for furniture or other objects placed directly in front of the heater.

Electric wall heaters and thermostats work best when installed on an inside wall.

CADET
INVITING WARMTH

cadetheat.com
855.CADET.US
Vancouver, Washington

Made in the USA

2 Year Warranty

ETL Listed US
Intertek
tested to UL standards

COM-PAK

Grill: 9"W x 12"H x 1"D • Rough-in: 8"W x 10-1/8"H x 4"D
Thermostat temperature range 40°F to 85°F
Heater assemblies require a wall can, grill kit, and may require a thermostat

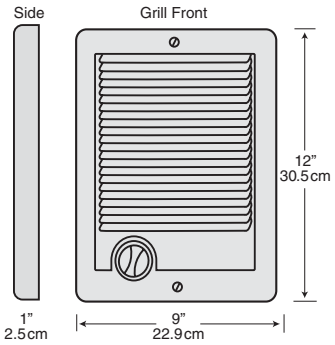
PART	MODEL*	DESCRIPTION	WATTS	VOLTS	AMPS	BTUS	WT/LBS
67508 67580	CSC101TW CSC101TA	Complete unit with stat, wall can & grill, white or almond	1000	120	8.3	3415	7
67509 67581	CSC151TW CSC151TA	"	1500	120	12.5	5120	7
67505 67577	CSC102TW CSC102TA	"	1000/750	240/208	4.2/3.6	3415/2560	7
67506 67578	CSC152TW CSC152TA	"	1500/1125	240/208	6.3/5.4	5120/3840	7
67507 67579	CSC202TW CSC202TA	"	2000/1500	240/208	8.3/7.2	6825/5120	7
67549	CSC101	Complete unit w/o stat, with wall can & grill	1000	120	8.3	3415	7
67553	CSC151	"	1500	120	12.5	5120	7
67541	CSC102	"	1000	240/208	4.2/3.6	3415/2560	7
67543	CSC152	"	1500	240/208	6.3/5.4	5120/3840	7
67544	CSC202	"	2000	240/208	8.3/7.2	6825/5120	7
67550 67560	CS051 CS051T	Heater assembly w/o thermostat Heater assembly with thermostat	500	120	4.2	1710	3.5 4
67515 67523	CS101 CS101T	"	1000	120	8.3	3415	3.5 4
67516 67524	CS151 CS151T	"	1500	120	12.5	5120	3.5 4
67563 67573	CS058 CS058T	"	563	208	2.7	1925	3.5 4
67564 67589	CS078 CS078T	"	750	208	3.6	2560	3.5 4
67557 67586	CS108 CS108T	"	1000	208	4.8	3415	3.5 4
67569 67598	CS118 CS118T	"	1125	208	5.4	3840	3.5 4
67571 67599	CS158 CS158T	"	1500	208	7.2	5120	3.5 4
67517 67525	CS208 CS208T	"	2000	208	9.6	6825	3.5 4
67584 67585	CS052 CS052T	"	500/375	240/208	2.1/1.8	1710/1280	3.5 4
67510 67518	CS072 CS072T	"	750/563	240/208	3.1/2.7	2560/1925	3.5 4
67511 67519	CS102 CS102T	"	1000/750	240/208	4.2/3.6	3415/2560	3.5 4
67512 67520	CS122 CS122T	"	1250/937	240/208	5.2/4.5	4265/3200	3.5 4
67513 67521	CS152 CS152T	"	1500/1125	240/208	6.3/5.4	5120/3840	3.5 4
67514 67522	CS202 CS202T	"	2000/1500	240/208	8.3/7.2	6825/5120	3.5 4

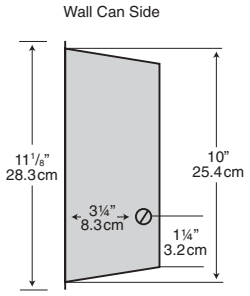
WALL HEATER ACCESSORIES (MODEL CS)

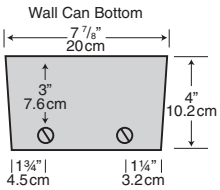
PART	MODEL*	DESCRIPTION	VOLTS	AMPS	WT/LBS
67061 67060	CC CC10	Wall can for model CS, single or 10-pack			2.8 22.5
69110 69111 69112	CCSMB CCSMW CCSMA	Surface mount wall can for model CS, black, white or almond			4.4
67079 67081	CGW CGW10	Vertical grill kit for model CS, single or 10-pack, white			1.5 12.3
67075 67080	CGA CGA10	Vertical grill kit for model CS, single or 10-pack, almond			1.5 12.3
65015 65016	CMGA CMGA5	Horizontal grill kit for model CS, single or 5-pack, almond			2.0 7.5
65005 65006	CMGW CMGW5	Horizontal grill kit for model CS, single or 5-pack, white			2.0 7.5
67063 67065	CTT1W CTT1A	Built-in thermostat kit for model CS, single pole, 40°F to 85°F, white or almond	240/208/120	22	.2
67064 67066	CTT2W CTT2A	Built-in thermostat kit for model CS, double pole, 40°F to 85°F, white or almond	240/208/120	22	.2
67067	CTT1P	Built-in thermostat kit, tamper proof for model CS, single pole, 40°F to 85°F	240/208/120	22	.2
67105 67100	CAMW CAMA	Adapter plate for model CS, 18-1/2"w x 22"h, white or almond			3.5
67115 67110	SAMW SAMA	Adapter plate for model CS, 12"w x 21-1/4"h, white or almond			2
67088	FWAP	Adapter kit repurposes outdated model FW wall can and grill, use with model CS heater assembly			1

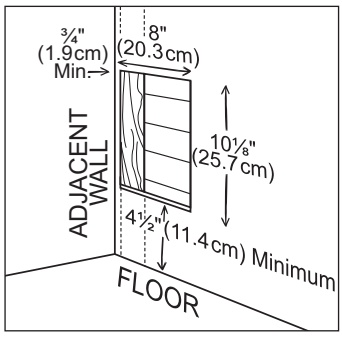
*Suffix W or A in model designates color

CADET
INVITING WARMTH









ROUGH-IN: 8"W X 10-1/8"H X 4"D

Model No. Code

CS C 15 2 T W

- Com-Pak wall heater
- With wall can
- Wattage: 20 = 2000, 15 = 1500, 12 = 1250, 10 = 1000, 07 = 750, 05 = 500
- Voltage: 1 = 120, 2 = 240/208, 8 = 208
- Includes thermostat
- Color: W = White, A = Almond

If horizontal mounting is preferred for heater assemblies without thermostat, use model CMGA or CMGW.

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