



Orenco[®]

Changing the Way the World Does Wastewater[®]

Pre-assembled Effluent Sewer Equipment Package Specifications

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PART 1 GENERAL

1.01 DEFINITIONS

- A. Wherever used in these specifications and printed with initial bold capital letters, the terms listed below will have the meanings indicated which are applicable to both the singular and plural thereof.
1. *Contractor* – The individual or entity with whom Owner has entered into the agreement.
 2. *Engineer* – The individual or entity named as such in the agreement.
 3. *Inspector* - The specific individual designated by the Owner, Engineer, Contractor, and Manufacturer to ensure quality control by inspecting and certifying that each STEP unit is installed in compliance with the Manufacturer’s recommendations and requirements,
 4. *Manufacturer* – A supplier, fabricator, distributor, materialman, or vendor having a direct contract with Contractor or Owner to furnish materials or equipment to be incorporated in the work by contractor.
 5. *Owner* – The individual or entity with whom Contractor has entered into the agreement and for whom the work is to be performed.
 6. *Bidder* – The individual or entity who submits a Bid directly to the Owner
 7. **STEP Package** – Septic tank effluent pump equipment pre-installed in a monolithic polyethylene tank complete with controls, pumps, pump vaults, etc.

1.02 GENERAL DESCRIPTION

The **MANUFACTURER** shall furnish a complete pre-installed and tested Septic Tank Effluent Pump (STEP) package(s), each consisting of a monolithic polyethylene tank, ribbed riser, fiberglass lids, pump vault, effluent screen, discharge assembly, anti-siphon/check valve assembly, external splice box, mechanical floats and control panel. For ease of serviceability, all STEP packages will be of like type through out the system unless otherwise specified by **ENGINEER**.

1.03 SUBMITTALS

MANUFACTURER shall furnish six sets of shop drawings and technical data sheets for the completed tank package and its components. The submittals shall clearly specify the materials of construction, equipment compatibility, along with drawings for each unique package being supplied.

1. Product/System submittals, including, but not limited to;
 - a. Equipment/system warranty along with exclusions
 - b. Effluent filter design
 - i. Flow area
 - ii. Surface area

- iii. Maintenance frequency
- c. Pump motor description
 - i. Manufacturer and origin
 - ii. Warranty
- d. Pump liquid end description
 - i. Manufacturer and origin
 - ii. Life-cycle cost (repair and replacement frequency and cost). Note liquid ends must be remove-able and repairable and cleanable.
 - iii. Warranty
- e. Pump Lead description
 - i. Lead must be SOOW, extra heavy duty cord (600V) CSA approved.
- f. Control panel components
 - i. Manufacturer and origin
 - ii. Warranty
 - iii. Enclosure description
- g. Hanging Discharge Assembly
 - i. Manufacturer and origin
 - ii. Warranty
- h. Risers
 - i. Manufacturer and origin
 - ii. Warranty
- i. Lids
 - i. Manufacturer and origin
 - ii. Warranty
- j. Polyethylene Tank
 - i. Manufacturer and origin
 - ii. Warranty
 - iii. Description of Tank Materials and construction process

1.04 OR-EQUAL EVALUATIONS

1. Throughout the equipment specifications you will find the term “or approved equal.” For this project, this term “approved equal” shall mean equal in the judgment of the ENGINEER. Should the **CONTRACTOR** seek approval of a product other than the brand or brands named in the specifications, it shall furnish written evidence that such product conforms in all respects to the specified requirements, and that it has been used successfully elsewhere under similar conditions. It will not be the responsibility of the MANUFACTURER specified within these specifications to provide research, documentation, or data supporting the difference between the “or equal” and the specified product. This will be the sole responsibility of the CONTRACTOR seeking the approval.

2. Product/System submittals, including, but not limited to;
 - a. The number of years the **MANUFACTURER** has been in business of manufacturing relevant products/systems
 - b. Size of company, including
 - i. Number of employees related to relevant products/systems
 - ii. Number of engineers on staff related to relevant products/systems
 - iii. Product specifications and a detailed description of how each product or component is “equal” to the specified product, system, or component. A side by side comparison is required.
 - c. Equipment/system warranty along with exclusions
 - d. Performance claims, including, but not limited to;
 - e. Effluent filter design
 - i. Flow area
 - ii. Surface area
 - iii. Maintenance frequency
 - f. Pump motor description
 - i. Manufacturer and origin
 - ii. Length of service
 - iii. Number of units in operation
 - iv. Life-cycle cost (repair and replacement frequency)
 - v. Warranty
 - g. Pump liquid end description
 - i. Manufacturer and origin
 - ii. Length of service
 - iii. Number of units in operation
 - iv. Life-cycle cost (repair and replacement frequency and cost). Note liquid ends must be remove-able and repairable and cleanable.
 - v. Warranty
 - h. Corrosion resistance
 - i. Pump Lead description
 - i. Lead must be SOOW, extra heavy duty cord (600V) CSA approved.
 - j. Control panel components
 - i. Manufacturer and origin
 - ii. Length of service
 - iii. Number of units in operation
 - iv. Warranty
 - v. Enclosure description
 - k. Evidence of successfully obtaining approval for a system with similar permit requirements with the regulating authority
 - l. Summary of product/system track record and history, including, but not limited to;
 - i. Number of similarly sized systems
 - ii. Detailed summary of, at minimum, ten (10) similarly sized systems, at least five (5) years old, including, but not limited to;
 1. Project name, location, and application
 2. Years in operation
 3. Current average daily flows and design flows
 4. Operator name and contact information
3. **BIDDER** shall specify and furnish documentation related to manufacturer (or representative) support services, including, but not limited to;
 - 1) Installation training program and support material
 - 2) Installation oversight program and support material

- 3) Operator training program and support material
- 4) Startup services program and support material

1.05 EXPERIENCE CLAUSE

The equipment furnished shall be manufactured and supplied by a company experienced in the design and manufacture of effluent sewer systems. **MANUFACTURERS** shall have at minimum ten (10) years experience in the design and manufacturer of effluent sewers systems of similar size and equipment specified. **MANUFACTURERS** shall have at minimum of twenty-five (25) successful installations of effluent sewer systems, which each installation having a minimum of ten (10) pumps discharging into a common force main.

1.06 MANUFACTURER

The **MANUFACTURER** shall furnish a complete factory built pre-assembled STEP Package(s) and tank, each consisting of a polyethylene tank, pump vault, effluent screen, discharge assembly, anti-siphon valve, ball valve, check valve, splice box, mechanical floats and controls. The **MANUFACTURER** shall supply detailed installation and O&M instructions for its product, as well as, evidence of an established service program. The service program shall include complete parts, service manuals, and maintenance of replacement part inventory.

STEP package(s), complete with all appurtenances, form an integral system, and as such, shall be supplied by one STEP Package manufacturer. The **CONTRACTOR** shall be responsible for the satisfactory operation of the entire system. The equipment specified shall be a product of a company experienced in the design and manufacture of STEP Packages specific to use in low pressure sewage systems.

The **MANUFACTURER** of the STEP package shall be AQWA, Inc or approved equal.

1.07 WARRANTY

The effluent system pump **MANUFACTURER** shall provide a ten (10) year warranty for the pump and a (5) year warranty for the the remaining STEP package components, including, but not limited to the pump vault, hanging discharge assembly, control panel, mechanical float switches and splice box. Warranty term shall ensue after **OWNER'S** acceptance and system startup procedures are complete. The **MANUFACTURER** shall submit detailed exclusions from the warranty or additional cost items required to maintain the equipment in warrantable condition. The warranty shall be documented in product literature.

The polyethylene tank **MANUFACTURER** shall provide a lifetime warranty against corrosion and a 5 year warranty and labor insurance against tank defects in material not attributed to improper tank installation. The **MANUFACTURER** shall submit detailed exclusions from the warranty or additional cost items required to maintain the equipment in warrantable condition. The warranty shall be documented in product literature.

1.08 SERVICEABILITY

The STEP package(s) shall be completely serviceable, with easy access to the pump(s), effluent screen, and floats. The pump shall be designed for removal without removing the effluent screen and floats.

1.09 PUMPS

The pump must be approved for use in pump vault as described in these specifications. Pump shall be 1/2 to 1.5 hp, 115/230 VAC, single phase, 60 Hz, two-wire motor, with 10 foot long extra heavy duty (SOOW) electrical cord with ground. The pumps must be submersible High-Head Effluent pumps. Pumps shall be UL and CSA listed for use with effluent. The pumps must have a minimum 24-hour run dry capability without water lubrication. The pumps shall have a 1/8-inch bypass orifice to ensure flow circulation for motor cooling and to prevent air bind. The pump shall have a floating impeller design to protect against up thrust and increase pump life. The pumps liquid ends must be repairable (by replacing impellers and/or diffusers) for better long-term cost of ownership. The motor must be rated for continuous use and frequent cycling, at least 100 cycles per day. The motor cable must be suitable for Class 1, Division 1 and 2 applications. The pumps shall be lightweight for easy removal and maintenance. The pump intake screen must be 1/8-inch mesh polypropylene. The pump shall have internal thermal overload protection and internal lightning protection. All pumps shall undergo 3-point (Dead head, Design Flow, and Design Flow + 30%) wet testing at the factory to confirm performance.

1.10 BUILDING SEWER

Building side sewers shall be watertight and installed by a Contractor licensed to such work as per the local and state licensing requirements. Building sewer materials, installation and testing shall be per the current local plumbing code.

PART 2 ONSITE INTERCEPTOR TANK

2.01 POLYETHYLENE TANKS

1. The MANUFACTURER shall be Roth Global Plastics™ or approved equal. The MANUFACTURER shall supply detailed installation, O&M instructions, and warranty terms to the ENGINEER.
2. Structural Requirements:
 - a. Polyethylene Tanks shall be analyzed using finite element analysis (FEA) for buried structures. The FEA should be submitted in graphical and table format showing color-coded stress areas on the tank. The FEA should also indicate the volumetric changes of the tank at 1” Hg increments through the point of yield. Calculations shall address the following:
 - i. Strength: Maximum of 5% deflection in tank dimension, length width and height based on service load (including creep)
 - ii. Buoyancy: Include an installation design solution that offers 2:1 safety factor where counter-buoyant measures are indicated.
3. Performance Testing:
 - a. Resin Material Properties: Acceptable resins shall include high molecular weight high-density polyethylene (HMW-HDPE). Resin physical properties are provided below.

Min per IAPMO/ANSI Z1000-2007

RMT material spec

Density

ASTM D1505

0.954 g/cm³ (0.95)

Tensile Strength min)	ASTM D638	2400 PSI	4200 PSI (4000 PSI
Elongation @ break	ASTM D638		800%
Flexural Modulus PSI min)	ASTM D790	85000 PSI	195,000 PSI (150,000
Env Stress Cracking	ASTM D1693	150 Hrs	>1000 Hrs

4. Vacuum Testing: The tanks shall be subjected to vacuum testing by the factory both with and without internal stiffening supports (if used). Testing of the tanks both with and without any internal stiffening supports is to identify potential point loading (with stiffeners in place) that could produce a potential rupture during installation. The testing of the tanks without internal stiffening supports shall demonstrate that the one-piece monolithic structure evenly and adequately distributes the test load and is not subject to uneven load dispersion and sudden, non-linear deformation. Deformation shall be measured both along the longitudinal axis of the roof and floor of the tank by fastening a straight edge to the tanks and measuring from the straight edge to the point on the tank where the greatest deformation is observed. The tanks shall be capable of the following vacuum loads:

Vacuum	Without stiffening supports	With stiffening supports
1" Hg	No visible deformation	No visible deformation
2" Hg		
3" Hg		
4" Hg		
5" Hg		

- a. After vacuum testing to the above points, the vacuum level shall be raised as necessary to cause the tank to yield. Yield is defined as the point where the tank rapidly and significantly fails to exhibit linear deformation in response to increased vacuum load. The tanks shall be tested for yield both with and without stiffening supports. The results shall be recorded and submitted to the Engineer. After vacuum testing a random tank(s) per the above protocol, each tank shall be subjected to and pass the watertightness testing listed below.

5. Construction

- a. **MANUFACTURER** shall provide a tank in a four layer co-extrusion monolithic blow molding process. Molding process includes air blow cycle @ 140 PSIG insuring that each tank is void free and air/water tight.
- b. Wall thickness: ¼" minimum. Manufacturer to provide a test report including wall thickness test results and part weight.
- c. Tank Weight/Capacity Ratio: Gallons-to-pounds ratio (based on net capacity) shall be .35 minimum.
- d. Inlet Plumbing: Pipe to tank interface shall include a watertight pipe seal ASTM C564 listed. Inlet pipe shall be 4 or 6 inch Sch 40 PVC or ABS pipe. Inlet fitting shall be a long radius tee with an extension into the liquid of 14 inches minimum.
- e. Tank markings: Tanks shall be marked with the following data: Inlet End- Model code, working capacity, standard burial depth, agency certification plate. Outlet End- Mfg ID, agency certification plate, label with tank serial number.
- f. Tank Interior: The interior of a septic tank is a corrosive environment. The interior lining of the tanks shall be virgin resin and shall not include any recycled material, or regrind. Any interior components of the tank below the liquid level (plumbing tees, filters, compartment walls or stiffening supports) shall be non-metallic and shall be

- capable of withstanding the elements of this corrosive environment and shall not react, corrode or breakdown over the life expectancy of the tank.
- g. Internal Stiffening Supports. Internal stiffening supports shall be installed and will allow free access for pumping and cleaning the tank as necessary. Internal stiffening supports shall comply with all provisions of this specification.
6. Agency Listing: **MANUFACTURER** shall provide tanks tested and certified to the following standards: IAPMO/ANSI Z1000/2007 - American National Standard for Prefabricated Septic Tanks CSA B66-2005 Construction Standards for Prefabricated Septic Tanks.
 7. Installer Certification and Installation: Tanks shall be installed with strict adherence to manufacturer's installation instructions. Installation shall be performed only by **CONTRACTORS** who have completed the **MANUFACTURER'S** Installer Certification Training Program. All applicable state, local and municipal codes shall be adhered to in the installation and design use of this equipment. Tanks shall be capable of being installed without the use of water during backfilling.
 8. Warranty: The tank **MANUFACTURER** shall provide a 5 year warranty for the tank. The warranty is limited to the replacement of the tank(s) in question of an equivalent model and up to \$2,500 per tank per installation providing the system failure is determined to be due to tank workmanship or materials only. Failure to properly design, apply or install the tank resulting in system failure does not constitute a valid warranty claim (e.g. failure to provide proper anti-buoyancy measures). Warranty on labor is valid for five (5) years from the date of installation.
 9. Inlet plumbing shall include an inlet tee that penetrates 18" into the liquid from the inlet flow line. (The depth may vary depending on the tank's height; in all cases, though, the inlet should extend to a level below the bottom of the maximum scum depth). The inlet plumbing shall allow for natural ventilation back through the building sewer and vent stack.

PART 3 TANK ACCESS EQUIPMENT

3.01 RISERS

Risers **MANUFACTURER** shall be Orenco Systems, Inc. or approved equal. Risers shall be required for access to internal vaults and access into the septic tanks for septage pumping. All risers shall be constructed watertight. The risers shall be attached to the tanks such that a watertight seal is provided. Risers shall extend 2" above original grade to allow for settlement and to ensure positive drainage away from the access. Risers containing pumping assemblies or electrical splice boxes shall be a minimum of 24" in diameter and shall be of sufficient diameter to allow removal of internal vaults without removing splice boxes, etc. Adhesive required to adhere the PVC or fiberglass risers to either fiberglass or ABS tank adapters shall be a two-component methacrylate structural adhesive. To ensure product compatibility, a single manufacturer shall supply risers, lids, and attachment components.

3.02 INLET RISERS

Inlet risers shall be Orenco Systems®, Inc. Ultra-Rib 24-in diameter riser. The material shall be PVC as per ASTM D-1784 and tested in accordance with AASHTO M304M-89. The risers shall be constructed of non-corrosive material and designed-to-be buried in soil. Risers shall have a minimum stiffness of 10 psi, when tested according to ASTM D2412. Risers shall be capable of

withstanding a truck wheel load (54 square inches) of 2500 pounds for 60 minutes with a maximum vertical deflection of a 1/2 an inch. Risers shall extend to 2 inches above the ground surface to allow for settlement and shall have a minimum nominal diameter of 18 inches.

3.03 OUTLET RISERS

Outlet risers shall be Orenco Systems[®], Inc. Ultra-Rib 24-in diameter riser or approved equal. The material shall be PVC as per ASTM D-1784 and tested in accordance with AASHTO M304M-89. The risers shall be constructed of non-corrosive material and designed-to-be buried in soil. Risers shall have a minimum stiffness of 10 psi, when tested according to ASTM D2412. Risers shall be capable of withstanding a truck wheel load (54 square inches) of 2500 pounds for 60 minutes with a maximum vertical deflection of 1/2 an inch. Risers shall be at least 12 inches high, shall have a minimum nominal diameter of 24 inches and shall be factory-equipped with the following:

1. External Splice box with grommet and hanging discharge assembly: when applicable, Orenco Systems[®], Inc. EPDM grommets shall be installed by the manufacturer for discharge piping, vent piping, and/or the electrical conduit to assure a watertight seal.

3.04 RISER-TO-TANK ATTACHMENT

All attachment components shall be constructed of waterproof, non-corrosive materials, such as PVC, ABS, fiberglass, or stainless steel. Adhesives and sealants shall be waterproof, corrosion resistant and approved for the intended application. The riser-to-tank connection shall be watertight and structurally sound. The riser-to-tank connection shall be capable of withstanding a vertical uplift of 5000 pounds to prevent riser separation due to tank settlement, frost heave, or accidental vehicle traffic over the tank. Risers shall be attached to Roth polyethylene tanks with Orenco Systems, Inc. Model FRTA24-R tank adapter bolted to tank using FRTA24RBDKIT bolt down kit, and a two-component methacrylate structural adhesive.

3.05 LIDS

One lid shall be furnished with each access riser. Lids shall be Orenco Systems[®], Inc. Model FLD24G or approved equal. Lids shall be fiberglass with green non-skid finish, and provided with stainless steel bolts, and wrench. Lids shall be waterproof, corrosion resistant and UV resistant. Lids shall be flat, with no noticeable upward dome. A crown or dome of no more than 1/8" is allowable. Lids shall not allow water to pond on them. Lids shall have a green non-skid finish. Lids shall form a watertight seal with the top of riser. Lids shall be capable of withstanding a truck wheel load (54 square inches) of 2500 pounds for 60 minutes with a maximum vertical deflection of 3/4 of an inch. Lids shall be provided with tamper-resistant stainless steel fasteners and a tool for fastener removal. Tamper-resistant fasteners include recessed drives, such as hex, Torx, and square. Fasteners that can be removed with common screwdrivers, such as slotted and Phillips, or fasteners that can be removed with standard tools, such as pliers or crescent wrenches, are not considered tamper-resistant. To prevent a tripping hazard, fasteners shall not extend above the surface of the lid.

3.06 RISER INSTALLATION

Riser installation shall be accomplished according to the **MANUFACTURER'S** instructions. For cold weather areas, risers shall be backfilled with 3/8" pea gravel or other similar granular material to prevent frost heave.

PART 4 SEPTIC TANK EFFLUENT PUMPING ASSEMBLIES (SINGLE FAMILY RESIDENCES)

Pump package systems shall be **MANUFACTURED** by Orenco Systems®, Inc. High-Head Pumping Assemblies or approved equal, composed of:

4.01. RISERS AND LIDS

See PART 3.

4.02 PUMP VAULT

The pump vault shall be Orenco Systems®, Inc. Model PVU48-1818, Universal Biotube® Pump Vault or approved equal. The filter shall have a minimum effective screen area of no less than 15.5 square feet. The Biotube pump vault shall consist of a 12-inch diameter polyethylene vault with eight (8) 2-inch diameter holes evenly spaced around the perimeter, located appropriately to allow for maximum sludge and scum accumulation before requiring pumping (approximately 70% of minimum liquid level). Housed inside the polyethylene vault shall be the Biotube assembly consisting of 1/8-inch mesh polypropylene tubes. Attached to the vault is a flow inducer to accept one or two high-head effluent pumps.

4.03 HANGING DISCHARGE ASSEMBLY

Hangind discharge assembly shall be Orenco Systems®, Inc. Model HDAS24125CFCASLC or approved equal. Discharge assembly shall be 1.25-inch diameter and include sch 80 anti-siphon valve, bronze check valve, stainless steel crimp nipple, reinforced EPDM flexible hose, sch 80 flow control disc, sch 80 linecheck valve, quik-disconnect and fiberglass reinforced poymer mounting plate 150 psi PVC ball valve, 150 psi PVC check and anti-siphon valve, PVC flex hose with working pressure rating of 100 psi, and Schedule 40 PVC pipe with cam coupler adapter for quick disconnect.

4.04 FLOAT SWITCH ASSEMBLY

1. Non-telemetry control panels:

- a. Float switches shall be Orenco Systems®, Inc. Model MFPBN or approved equal. Float switch assembly shall have three float switches mounted on a 21-in PVC stem attached to the filter cartridge. The floats must be adjustable and must be removable without removing the pump vault. The high- and low-level alarms and on/off function shall be preset as shown in the engineer's plans. Each float lead shall be secured with a nylon strain relief bushing at the splice box. The floats shall be UL or CSA listed. The on/off float shall be rated for a minimum of 5.0A @ 120 VAC.

2. Telemetry control panels:

- a. Float switch shall be Orenco Systems®, Inc. Model MF3P with three switch floats mounted on a PVC stem attached to the filter cartridge. The floats must be adjustable and must be removable without removing the pump vault. The high/pump on, pump off and low-level alarms shall be preset as shown in the engineer's plans. Each float lead shall be secured with a nylon strain relief bushing at the splice box. The floats shall be UL or CSA listed.

4.05 HIGH-HEAD EFFLUENT PUMP

All pumps shall comply with general requirements set forth in section I (above). Residential pumps shall be an Orenco Systems[®], Inc. Model PF100511, 1/2 hp, 115 VAC, single phase, 60 Hz, two-wire motor, with 10 foot long extra heavy duty (SOOW) heavy duty electrical cord with ground, or approved equal. The pumps shall be capable of delivering 18 GPM at a pressure of 14 ft, 10 GPM at 171 ft, and 0 GPM at 250 ft. When used in conjunction with a flow controller, the pump shall be capable of providing 5 gpm against a head of 190 feet and 12 gpm against a head of 14 ft .

4.06 ELECTRICAL SPLICE BOX

Splice box shall be Orenco Systems[®], Inc. Model SBEX series external splice box or approved equal, UL approved for wet locations, equipped with up to four (4) electrical cord grips and two 3/4-inch outlet fitting. Also included shall be UL listed waterproof butt splice connectors.

4.07 CONTROLS AND ALARMS

1. Standard Control System

- a. Standard control panel shall be Orenco Systems, Inc. S1_Series or approved equal. Controls and alarms shall be listed per UL 508. Panels shall be repairable in the field without the use of soldering irons or substantial disassembly.
 - i. Standard Components
 1. Motor-Start Contactor: 120 VAC, 1hp, 16 FLA, 60 Hz; 2.5 million cycles at FLA (10 million at 50% of FLA).
 2. Toggle Switch: Single-pole, double-throw HOA switch. 20 amps, 1 hp.
 3. Controls Circuit Breaker: 10 amps, OFF/ON switch. Single-pole 120 VAC. DIN rail mounting with thermal magnetic tripping characteristics.
 4. Pump Circuit Breaker: 20 amps, OFF/ON switch. Single-pole 120 VAC. DIN rail mounting with thermal magnetic tripping characteristics.
 5. Audio Alarm: 95 dB at 24", warble-tone sound.
 6. Visual Alarm: 7/8" diameter red lens, "Push-to-silence." NEMA 4, 1-watt bulb, 120 VAC
 7. Panel Enclosure: Measures 11.5" high x 9.3" wide x 5.4" deep. NEMA 4X rated. Constructed of UV-resistant fiberglass; hinges and latch are stainless steel.
 8. S1 Panel Ratings: 120 VAC, 1 hp, 14 amps, single phase, 60 Hz.
 9. Redundant Off Relay: 120 VAC, provides a secondary off. Sounds alarm on low-level condition. DIN rail mount.
 - ii. Optional Components
 1. Redundant Off Relay: 120 VAC, provides a secondary off. Sounds alarm on low-level condition. DIN rail mount.
 2. Pump Run Light: 7/8" green lens. NEMA 4, 1-watt bulb, 120 VAC.
 3. Heater: Anti-condensation heater. Self-adjusting: radiates additional wattage as temperature drops.
 4. Event Counter: 120 VAC, 6-digit, non-resettable.
 5. Elapsed Time Meter: 120 VAC, 7-digit, non-resettable. Limit of 99,999 hours; accurate to 0.01 hours.
 - iii. Alternate Option
 1. S2_Series control panel or approved equal in 240VAC configuration

2. Telemetry Control System

- a. Telemetry enabled panel shall be Orenco Systems[®], Inc. Model VCOM-S1RO Series or approved equal control panel. The system will be monitored via remote telemetry,

- UL-recognized and FCC-approved for the application, and shall contain the following operating modes:
- i. A “Start-up Mode” during which the system will collect trend data for establishing future operating standards,
 - ii. A “Normal Mode” that manages day-to-day functions of the system,
 - iii. A “Test Mode” that suspends data collection and communications with the central server so that operators can install and service the system without affecting the panel’s trend data and web-based communication.
- b. In addition, the control system shall be capable of the following functions:
- i. Data Collection and Utilization: Logs data of system conditions and events, such as pump run time, pump cycles, alarm conditions, and alert conditions.
 - ii. Troubleshooting and Diagnostic Logic: Programmed to identify and report suspected failed components (Alarms) and negative trends in operating data (Alerts).
 - iii. Advanced Control Logic: Advanced control logic will activate in the event of component malfunction to diagnose the system using pre-established trend data and, if necessary, modify the operation of the system until the system can be serviced.
 - iv. Communications and Alarm Management: The control and monitoring system shall operate such that the telemetry control unit will communicate with a web-based monitoring application for reporting and alarm management. The system shall provide for a minimum of three levels of password-protected security access and control to ensure only qualified personnel can access and communicate with the panel. The communication protocol shall allow the operator to communicate with the telemetry unit using any modem (Mac or PC) and a web browser, or a simple communication program (e.g. HyperTerminal or Z-Term). Telemetry units requiring proprietary software shall not be considered.
- c. The telemetry unit will provide automatic notification or call-in to the host in the event of:
- i. Alarms, which signal fault conditions that need to be addressed immediately (e.g. high or low liquid levels, pump failure, failed contactor, etc.);
 - ii. Alerts, which signal less critical conditions that require attention, but which will engage the panel’s troubleshooting and diagnostic logic and alternative operating modes (e.g. stuck float switch, leaking tank, brownout, high flows, etc.);
 - iii. Updates, which include follow-up reminders or all-clear notifications following Alarms/Alerts, as well as scheduled panel reports;
 - iv. Manual forced communication, from panel to host to effect an update of queued programming changes.
- d. In addition, the unit shall have the capability of real-time direct connection to the panel via laptop serial port, to allow the operator real-time access to detailed logged data and the ability to change point values.
- e. Standard Components
- i. Motor-Start Contactor: 120 VAC, 1hp, 16 FLA, 60 Hz; 2.5 million cycles at FLA (10 million at 50% of FLA).
 - ii. Remote Telemetry Unit: ATRTU-100; 36/18 VAC (center tap transformer), 8 digital inputs, 4 analog inputs, 4 digital outputs, 0 analog outputs, on-board modem (2400 baud), LED input and output indicators, 1-year battery backup of data and program settings.
 - iii. Phone line Surge Arrestor/DSL Filter: Surge protection for phone line. DSL filter for lines that also carry DSL service. Connection to panel via RJ11 jack or terminal block.

- iv. Controls Circuit Breaker: 10 amps, OFF/ON switch. Single-pole 120 VAC. DIN rail mounting with thermal magnetic tripping characteristics.
- v. Pump Circuit Breaker: 20 amps, OFF/ON switch. Single-pole 120 VAC. DIN rail mounting with thermal magnetic tripping characteristics.
- vi. Fuse: 120 VAC Primary, 36 VCT @ 0.85 A Secondary
- vii. Transformer: 250VAC, 1A
- viii. Audio Alarm: 95 dB at 24", warble-tone sound.
- ix. Toggle Switch: Single-pole switch, automatic On, with spring-loaded, momentary, manual On. 20A, 1hp.
- x. Visual Alarm: 7/8" diameter red lens, "Push-to-silence." NEMA 4, 1-watt bulb, 120 VAC
- xi. Panel Enclosure: Measures 13.51" high x 11.29" wide x 5.58" deep. NEMA 4X rated. Constructed of UV-resistant fiberglass; hinges and latch are stainless steel.
- xii. VCOM-S1RO Panel Ratings: 120 VAC, 1 hp, 16 amps, single phase, 60 Hz.
- f. Optional Components
 - i. Pump Run Light: 7/8" green lens. NEMA 4, LED, 120 VAC.
 - ii. Heater: Anti-condensation heater. Self-adjusting: radiates additional wattage as temperature drops.
- g. Alternate Option
 - i. VCOM-S2RO Panel in 240VAC configuration

4.08 INSTALLATION

All pumping system components shall be pre-installed in polyethylene tank in accordance with the **MANUFACTURER'S** recommendations, the engineer's plans, and all state and local regulations.

4.09 LOCATION

The pump control panel shall be mounted on a post or exterior wall nearest the tank and pump. If mounting to an exterior wall, try to select a garage or outbuilding where the sound of the motor contactor engaging will not be noticed. If a garage or outbuilding wall isn't available, installation should include use of sound-deadening insulation. (Post and panel mounting assemblies are acceptable.) The control panel shall be located within 50 feet and in sight of the pump motor or shall be provided with a lockable disconnect switch. The panel, when possible, should be mounted in the shade and protected from the weather. The panel should be located at a convenient height (usually about five feet above the ground) and where it will be accessible for maintenance.

PART 5 SUPPORT, TRAINING, TESTING, AND OVERSIGHT

5.01 INSTALLATION AND FIELD TESTING TRAINING

The **MANUFACTURER** shall provide the services of a trained representative to instruct the installing **CONTRACTOR'S** crew and **INSPECTOR** regarding the proper installation and field testing of each STEP unit per the **MANUFACTURER'S** recommendations and requirements. The **MANUFACTURER** shall have a trained representative provide installation and field testing training services for a minimum of one (1) visit of a minimum of one (1) eight-hour day at the beginning of construction.

5.02 QUALITY CONTROL

1. To ensure quality control, the **INSPECTOR** shall inspect and certify that an initial installation of each STEP unit is in compliance with the **MANUFACTURER'S** recommendations and requirements, using the form provided in APPENDIX A "STEP INSTALLATION CHECKLIST".
2. Upon completion of the inspection, the **INSPECTOR**, in coordination with the **ENGINEER**, shall perform or direct the **CONTRACTOR** to perform any required adjustments to the equipment and place into operation under the supervision of the **ENGINEER**. All equipment and materials required to perform the testing shall be the responsibility of the **CONTRACTOR**. The completed inspection checklist shall be signed by the **INSPECTOR** and copies faxed, emailed, or mailed to the **ENGINEER** and **MANUFACTURER** within one (1) week of each corresponding STEP unit being installed and prior to System Commissioning.

5.04 OPERATION AND MAINTENANCE

The **MANUFACTURER** shall provide operation and maintenance manuals to be sent to the **OWNER**, and to the **ENGINEER**. Operation and Maintenance manuals shall include a signed copy by the **INSPECTOR** of APPENDIX A "STEP INSTALLATION CHECKLIST" for each STEP installation.

APPENDIX A



STEP INSTALLATION CHECKLIST

SYSTEM OWNER: ___

DATE:

SITE ADDRESS:

SYSTEM PROVIDER:

CONTRACTOR:

INSPECTOR:

AS-BUILT SITE DIAGRAM

Please draw an as-built sketch of the site including approximate location of buildings, property boundaries, trees, fences, existing septic systems, existing wells, new septic tank, recirculation tanks, pump basins, AdvanTex® system, sewer piping, drainfield, etc. Include dimensions.

YES	NO	PRE-INSTALLATION	DATE/INITIAL:
		Tank location approved per engineer	
		Panel location approved per engineer	
		Electrical supply (# circuits/disconnect)	
		STEP equipment package reviewed and approved	
		Certificate of Origin	
		Service Connection located	

			Review riser to tank connection and piping to tank method	
YES	NO	TANK INSTALL (per Manufacture)	DATE/INITIAL:	
			Tank Warranty	
			Date manufacture specified	
			Factory leak test documentation	
			Inlet connection approved	
			Certificate of Origin	
			Inlet tee installed	
			Riser-to-Tank connections approved	
			Tank is level and properly bedded	
			Passes leak test/water tight test (tank filled 2" above tank/riser connection)	
YES	NO	PUMPING SYSTEM	DATE/INITIAL:	
			Splice Box Location Acceptable	
			Pump Vault/Screen Easily Accessible for Maintenance	
			Discharge Assembly Installed Correctly	
			Service Lateral Properly Bedded and Depth is Sufficient	
			Toning Wire Present	
			Check Valve Installed Correctly	
			Control Panel Location and Height Acceptable	
			Conduit Wiring Acceptable (waterproof wire nuts used)/Seal Offs (panel and splice box)	
			Service Connection Valve Box/Accessibility	
YES	NO	START UP	DATE/INITIAL:	
			Risers Backfilled to Grade (within 2-inches of lid)	
			Appropriate Sized Pump Circuit Breaker	
			Circuit Breaker Marked Appropriately	
			Separate Alarm Circuit (preferred, not required)	
			Pump Operation Voltage	

			Amps	
			Float Operation Alarm On/Off Low Level	
			Float Settings Accurate (record dimensions from top of tank)	
			Alarm On/Off Low Level	
			Controls Audible Alarm Visual Alarm	
			Emergency Call Sticker in Place	
			All Lids are In Place and Locked	
			Home Owner's Do's & Don'ts Delivered to Homeowner	
			Site Pictures Attached	

Inspector Signature:

Date: