SECTION 333219 - SEPTIC TANK EFFLUENT PUMPS

This Section specifies septic tank effluent pump units for installation in low-pressure septic tank effluent pumping (STEP) systems. This Section includes factory-assembled units consisting of submersible sewage pumps, mercury-switch level controls, discharge piping with hydraulically sealed discharge flange, check valve, ball valve, pump mounting plate with bottom rail support, pump lifting chain, pump control panel, and other appurtenances.

Concrete septic tanks are specified in Section 333413.13, fiberglass septic tanks are specified in Section 333413.23, and PE septic tanks are specified in Section 333413.33.

1. GENERAL
   * + 1. SUMMARY
          1. Section Includes: Septic tank effluent pumps.
          2. Related Requirements:

List other Sections directly related to or affecting Work of this Section. Include Sections specifying information expected to be found in this Section, as well as Sections required to describe complete system or assembly requirements.

Section 333100 - Sanitary Sewerage Piping: Connections to sanitary sewer system.

Section 333413.13 - Concrete Septic Tanks: Effluent wet well.

Section 333413.23 - Fiberglass Septic Tanks: Effluent wet well.

Section 333413.33 - Polyethylene Septic Tanks: Effluent wet well.

Section 400593 - Common Motor Requirements for Process Equipment: Requirements for electric motors as specified in this Section.

* + - 1. REFERENCE STANDARDS

List reference standards included within text of this Section, with designations, numbers, and complete document titles.

LEED requires compliance with specific editions of referenced standards. Consider including publication dates for referenced standards in this Section to ensure the correct standard is used for LEED compliance.

* + - * 1. American Bearing Manufacturers Association:

ABMA 9 - Load Ratings and Fatigue Life for Ball Bearings.

* + - * 1. ASTM International:

ASTM A53 - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.

* + - * 1. National Electrical Manufacturers Association:

NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).

* + - 1. PREINSTALLATION MEETINGS
         1. Convene minimum [**one week**] [**<\_\_\_\_\_\_\_\_> weeks**] prior to commencing Work of this Section.
      2. SUBMITTALS

Only request submittals needed to verify compliance with Project requirements.

* + - * 1. Submittals for this section are subject to the re-evaluation fee identified in Article 4 of the General Conditions.
        2. Manufacturer’s installation instructions shall be provided along with product data.
        3. Submittals shall be provided in the order in which they are specified and tabbed (for combined submittals).
        4. Product Data: Submit manufacturer information describing materials of construction and fabrication.
        5. Shop Drawings: Indicate detailed dimensions for materials and equipment, wiring and control diagrams, performance charts and curves, installation and anchoring requirements, fasteners, and other details.
        6. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

Include separate paragraphs for additional certifications.

* + - * 1. Manufacturer Instructions: Submit detailed instructions on installation requirements, including storage and handling procedures.
        2. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.
        3. Qualifications Statements:

Coordinate following subparagraphs with requirements specified in QUALIFICATIONS Article.

Submit qualifications for manufacturer and installer.

Submit manufacturer's approval of installer.

Remove paragraph if not a LEED project.

* + - 1. SUSTAINABLE DESIGN SUBMITTALS
         1. Section 018113 - LEED Documentation Requirements: Requirements for sustainable design submittals.
         2. Manufacturer's Certificate:

Certify that products meet or exceed specified sustainable design requirements.

Insert material certifications list below to suit products specified in this Section and Project sustainable design requirements. Specific certificate submittal and supporting data requirements are specified in Section 018113.

Materials Resources Certificates:

Certify source and origin for [**salvaged**] [**and**] [**reused**] products.

Certify source for regional materials and distance from Project Site.

* + - * 1. Product Cost Data:

Submit cost of products to verify compliance with Project sustainable design requirements.

Exclude cost of labor and equipment to install products.

Provide cost data for following products:

Edit list of material cost data below to suit products specified in this Section and Project sustainable design requirements. Specific cost data requirements are specified in Section 018113.

Salvaged, refurbished, and reused products.

Regional products.

<**\_\_\_\_\_\_\_\_**>.

* + - 1. CLOSEOUT SUBMITTALS
         1. Section 017716 - Contract Closeout: Requirements for submittals.
         2. Project Record Documents: Record actual locations of septic tank effluent pumps.
      2. MAINTENANCE MATERIAL SUBMITTALS
         1. Spare Parts:

Furnish one spare pump and motor assembly for every <**\_\_\_\_\_\_\_\_**> units, or fraction thereof, actually installed.

* + - * 1. Tools: Furnish special [**wrenches**] <**\_\_\_\_\_\_\_\_**> and other devices required for Director’s Representative to maintain and calibrate pump systems.
      1. QUALITY ASSURANCE

Include following paragraph only when cost of acquiring specified standards is justified.

* + - * 1. Maintain <**\_\_\_\_\_\_\_\_**> [**copy**] [**copies**] of each standard affecting Work of this Section on Site.
      1. QUALIFICATIONS

Coordinate following paragraphs with requirements specified in SUBMITTALS Article.

* + - * 1. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum [**three**] <**\_\_\_\_\_\_\_\_**> years' [**documented**] experience.
        2. Installer: Company specializing in performing Work of this Section with minimum [**three**] <**\_\_\_\_\_\_\_\_**> years' [**documented**] experience [**and approved by manufacturer**].
      1. DELIVERY, STORAGE AND HANDLING
         1. Section 016500 - Materials and Equipment: Requirements for transporting, handling, storing, and protecting products.
         2. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.
         3. Handling: Prepare pumps and accessories for shipment in a manner to prevent entry of foreign matter into body of item.
         4. Storage:

Store materials according to manufacturer instructions.

Do not store products directly on ground.

* + - * 1. Protection:

Protect materials from moisture and dust by storing in clean, dry location remote from construction operations areas.

Provide additional protection according to manufacturer instructions.

* + - 1. EXISTING CONDITIONS
         1. Field Measurements:

Verify field measurements prior to fabrication.

Indicate field measurements on Shop Drawings.

* + - 1. EXTENDED WARRANTY

This Article extends warranty period beyond one year. Extended warranties may increase construction costs and State enforcement responsibilities. Specify warranties with caution. Note that Extended Warranties are not typically used and need to be approved by the OGS Project Manager.

* + - * 1. Furnish [**five**] <**\_\_\_\_\_\_\_\_**>-year manufacturer's warranty for pumps [**and**] <**\_\_\_\_\_\_\_\_**>.

1. PRODUCTS
   * + 1. EFFLUENT PUMPS
          1. [Manufacturers](http://www.specagent.com/LookUp/?ulid=13280&mf=04&src=wd):

Liberty Pumps, (800) 543-2550, 7000 Apple Tree Ave., Bergen, NY 14416

Orenco Systems Inc., (800) 348-9843, 814 Airway Ave., Sutherlin, OR 97479.

Approved equivalent.

Insert descriptive specifications below to identify Project requirements and to eliminate conflicts with products specified above.

* + - * 1. Description:

Casing: Cast iron.

Impeller:

Type: Semi-open.

Material: [**Bronze**] [**or**] [**cast iron**].

* + - * 1. Performance and Design Criteria:

Flow Capacity for Each Pump:

Design Point:<\_\_\_\_\_\_\_\_> gpm at <\_\_\_\_\_\_\_\_> feet total dynamic head (TDH).

Secondary Point: <\_\_\_\_\_\_\_\_> gpm at <\_\_\_\_\_\_\_\_> feet TDH.

Minimum Shutoff Head:<\_\_\_\_\_\_\_\_> feet TDH.

* + - * 1. Operation:

Electrical Characteristics:

As specified in <\_\_\_\_\_>.

[**<\_\_\_\_\_\_\_\_> hp**] [**<\_\_\_\_\_\_\_\_> RLA**].

Voltage: <**\_\_\_\_\_\_\_\_**> V, [**single**] [**three**] phase, 60 Hz.

Maximum [**Fuse Size**] [**Circuit Breaker Size**] [**Overcurrent Protection**]: <**\_\_\_\_\_\_\_\_**> A.

Minimum Circuit Ampacity: <**\_\_\_\_\_\_\_\_**>.

Minimum Power Factor: <**\_\_\_\_\_\_\_\_**> percent at rated load.

Motors:

As specified in Section 400593 - Common Motor Requirements for Process Equipment.

Type: Submersible.

Windings: Open, operating in dielectric oil.

Seals: Two carbon/ceramic mechanical shaft seals with oil chamber between seals.

Moisture Detection: Mount electrode between seals to detect water leaking into seal chamber and to energize light on control panel.

Motor and Pump Shaft: Integral stainless steel.

Bearing life is percent failure at rated hours; for example, L10 life at 300,000 hours means 10 percent of bearings may be expected to fail at 300,000 hours.

Bearings:

Upper and lower ball bearings to support rotor.

Lower bronze sleeve or ball bearing for radial loads from impeller.

Minimum L10 Life: [**15,000**] <**\_\_\_\_\_\_\_\_**> hours.

Ball Bearings: Comply with ABMA 9.

Fasteners: Stainless steel.

Leads: Potted in epoxy compound to form leakproof seal.

Control Panel:

Type: NEMA 250 Type [**3R**] <**\_\_\_\_\_\_\_\_**>.

Mounting:

[**Wall**] [**Pipe stand**].

Coordinate location with Director’s Representative.

Control Circuits: Wired completely separate from power circuits.

Accessories:

Control circuit and alarm transformers.

Terminal strips for controls, pumps, and alarms.

Circuit lightning protection.

Controls:

Motor Thermostat:

Protect motor with heat sensor thermostat to de-energize motor when overloaded.

Automatically reset thermostat when temperature drops to designated level.

Sealed float-type mercury switches to control wet-well liquid level and signal alarm.

Suspended mercury-tube switches sealed in shock-resistant solid polyurethane float.

Cords: Neoprene-jacketed, weighted, and suspended from NEMA 250 Type [**4**] <**\_\_\_\_\_\_\_\_**> junction box.

Level Setting: Adjustable from top of wet well.

Disconnect Switch: Factory mounted in control panel.

Operation Sequences:

Simplex Control Sequence:

When basin liquid level increases to [**PUMP START setting**] [**Elevation <\_\_\_\_\_\_\_\_>**], PUMP START switch energizes pump.

When sump liquid level decreases to [**PUMP STOP setting**] [**Elevation <\_\_\_\_\_\_\_\_>**], PUMP STOP switch de-energizes pump.

If basin liquid level continues to rise, HIGH LEVEL alarm switch energizes alarm signal when liquid level reaches [**HIGH LEVEL setting**] [**Elevation <\_\_\_\_\_\_\_\_>**].

\*\*\*\*\*\* [OR] \*\*\*\*\*\*

Duplex Control Sequence:

When basin liquid level increases to [**LEAD PUMP START setting**] [**Elevation <\_\_\_\_\_\_\_\_>**], LEAD PUMP START switch energizes lead pump.

When basin liquid level decreases to [**PUMP STOP setting**] [**Elevation <\_\_\_\_\_\_\_\_>**], PUMP STOP switch de-energizes lead pump.

When lead pump is de-energized, alternating relay indexes such that lag pump starts on next rise in basin liquid level.

If basin liquid level continues to rise to [**LAG PUMP START setting**] [**Elevation <\_\_\_\_\_\_\_\_>**], LAG PUMP START switch energizes lag pump.

When basin liquid level decreases to [**PUMP STOP setting**] [**Elevation <\_\_\_\_\_\_\_\_>**], PUMP STOP switch de-energizes both pumps.

If basin liquid level continues to rise, HIGH LEVEL alarm switch energizes alarm signal when liquid level reaches [**HIGH LEVEL setting**] [**Elevation <\_\_\_\_\_\_\_\_>**].

Remove paragraph if not a LEED project.

* + - 1. SUSTAINABILITY CHARACTERISTICS

Insert sustainable design characteristics in this Article to suit content of this Section and Project sustainable design requirements specified in Section 018113.

* + - * 1. Section 018113 - LEED Documentation Requirements: Requirements for sustainable design compliance.
        2. Material and Resource Characteristics:

Recycled Content Materials: Furnish materials with maximum available recycled content [**including:**] [**.**]

Insert list of materials specified in this Section required to have recycled content.

<**\_\_\_\_\_\_\_\_**>.

Regional Materials: Furnish materials extracted, processed, and manufactured within 500 miles of Project Site [**including:**] [**.**]

Insert list of materials specified in this Section required to be regional materials.

<**\_\_\_\_\_\_\_\_**>.

* + - 1. ACCESSORIES:
         1. Pump Discharge Piping:

Material:

Galvanized seamless steel.

Comply with ASTM A53, Grade B, seamless.

Wall Thickness: [**Schedule 40**].

Connections: Threaded.

Check Valve:

Type: Combination horizontal spring loaded.

Body: Cast iron.

Mounting: Bronze.

Pin and Spring: Stainless steel.

Disc: Renewable.

Hydraulically sealed.

"Quick" disconnect.

Discharge flange.

Ball Valve:

Description: Ball valve with stem extension in each pump discharge line.

Type: Top entry.

Joints: Threaded.

Body: Bronze.

Ball: Chrome plated.

Seat: Double seal, TFE.

Stem Seal: TFE.

Bonnet O-ring.

Working Pressure: [**200**] <\_\_\_\_\_\_\_\_> psig.

* + - * 1. Pump Guide Rails:

Material: 304 Stainless steel piping.

Minimum Diameter: [**1**] <\_\_\_\_\_\_\_\_> inch.

* + - * 1. Pump Mounting Plates, Guide Rail Braces, and Guide Rail Supports: Epoxy-coated steel.
        2. Pump Lifting Chains: 304 Stainless steel.
        3. Visual and Audible Alarm:

Description: HIGH LEVEL alarm indicator light and audible alarm assembly to fit standard electrical wall box, for installation on exterior of premises.

Signal Cable: According to local code requirements.

Location: Coordinate with property Director’s Representative.

* + - * 1. Fasteners and Hardware: Stainless steel.

1. EXECUTION
   * + 1. EXAMINATION
          1. Verify that connections, sizes, and locations are as indicated on Drawings.
       2. PREPARATION
          1. Conduct operations as not to interfere with, interrupt, damage, destroy, or endanger integrity of surface or subsurface structures, utilities, and landscape in immediate or adjacent areas.
       3. INSTALLATION
          1. According to manufacturer instructions.
          2. Install at depth such that discharge pipe to low-pressure sewer is located minimum [36] <\_\_\_\_\_\_\_\_> inches below finished grade.
          3. Provide necessary piping, fittings, and valves as indicated on Drawings.
          4. Installation Standards: Install Work according to <**\_\_\_\_\_\_\_\_**> standards.
       4. FIELD QUALITY CONTROL
          1. Testing:

Test each pump with clean water through minimum of four complete cycles of septic tank wet well, including HIGH LEVEL and LOW LEVEL conditions.

Demonstrate correct sequence of pump operation, control settings, alarm settings, freedom from pump vibration, noise, and overheating.

Provide water for testing purposes.

* + - * 1. Manufacturer Services: Furnish services of manufacturer's representative experienced in installation of products furnished under this Section for not less than <**\_\_\_\_\_\_\_\_**> [**days**] [**hours**] on Site for installation, inspection, startup, field testing, and instructing Facility personnel in maintenance of equipment. Coordinate with Director’s Representative.
        2. Equipment Acceptance:

Adjust, repair, modify, or replace components failing to perform as specified and rerun tests. Coordinate with Director’s Representative.

Make final adjustments to equipment under direction of manufacturer's representative.

* + - * 1. Furnish installation certificate from equipment manufacturer's representative attesting that equipment has been properly installed and is ready for startup and testing.
      1. ADJUSTING
         1. Check and adjust liquid level control and alarm settings.
      2. DEMONSTRATION
         1. Demonstrate equipment startup, shutdown, pump removal and replacement, routine maintenance, and emergency repair procedures to Facility personnel. Coordinate with Director’s Representative.

END OF SECTION 333219