

**DIVISION 33 – UTILITIES
SECTION 33 32 16 – PACKAGED SEWAGE GRINDER PUMPING UNITS**

PART 1 – GENERAL

1.01 SUMMARY

- A. Section Includes: The work specified in this Section consists of providing an Environmental One grinder pump(s) unit with tank, internal piping and operating controls.
- B. Grinder pumps which are proposed by the Developer are to remain privately owned and operated and shall also meet these design criteria, unless specifically requested by the Developer and waived by the Authority.

1.02 REFERENCES

- A. Pennsylvania Department of Transportation Publication 408, Latest Edition
- B. ASTM C-478 - Specifications for Pre-Cast Reinforced Concrete Manhole Sections
- C. National Electric Code - N.E.C.
- D. National Electric Safety Code.

1.03 SUBMITTALS

- A. Submit shop drawings/product data from manufacturer's descriptive literature and specifications for all materials used in this Section. Submit in accordance with Section 01 33 00. The equipment supplier as part of the shop drawing submittal shall submit detention time calculations and any other calculations that reflect the grinder pump system's hydraulic computations.
- B. Specific submittals will be included with each project as may be required for testing, warranties, project manuals, etc.
- C. System Design – Manufacturer will submit an affidavit stating that the design of the low-pressure sewer system collection and conveyance piping as shown on the Drawings is compatible with the long-term operation of their specific Residential Grinder Pump Units and that no segments would create adverse operating conditions due to restrictive piping diameters.

1.04 WARRANTY

- C. The grinder pump manufacturer shall provide a warranty on the complete station and accessories including, but not limited to, control panels, valves, pump components, and wetwell, for a period of twenty-four (24) months after the unit is place into service.

PART 2 – PRODUCTS

2.01 PUMPS

- A. Pump shall be custom designed, integral, vertical rotor, motor driven, solids handling pump of the progressive cavity type with a single mechanical seal. All materials shall be suitable for domestic wastewater service.
- B. Operating Conditions:
 - 1. The pumps shall be capable of delivering 15 gpm at 0 feet TDH, 11 gpm at 92 feet TDH, and 7.8 gpm at 185 feet TDH. The pumps shall also be capable of operating at negative TDH without overloading the motor.

2.02 GRINDER

- A. The grinder shall be capable of reducing all components in normal domestic sewage, including a reasonable amount of foreign objects such as paper, wood, plastic, glass, and rubber, to finely-divided particles which will pass freely through the passages of the pump and the discharge piping.
- B. The grinder shall be placed immediately below the pumping elements and shall be direct-driven by a single, one-piece stainless steel shaft.
- C. The assembly shall be dynamically balanced and operate without objectionable noise for vibration over the entire range of the operating pressures.

2.03 MOTOR

- A. The motor shall be 1 HP, 1725 rpm, 240 volt, 60Hz, single phase.
- B. The motor shall be capacitor start, ball bearing, air cooled induction type with class F insulation, with a low starting current not to exceed 30 amperes and a high starting torque of 8.4 foot pounds.
- C. Inherent protection shall be provided for running overloads or locked rotor conditions through the use of an U.L. listed automatic reset and integral thermal overload protectors incorporated into the motor.
- D. The core shall be provided with a mechanical shaft seal to prevent leakage between the motor and pump.

2.04 WET WELL AND INTEGRAL ACCESSWAY

- A. Wet well shall be a custom molded high density polyethylene as supplied by Grinder Pump manufacturer. Along with the wet well, an integral access way shall be high density polyethylene of a grade selected for environmental stress cracking resistance.
- B. The wet well shall be designed to accept a core unit containing the grinder pump.

- C. All seams created during tank construction shall be thermally welded and factory tested for leak tightness.
- D. The wet well walls and bottom shall be designed to withstand the pressure exerted by saturated soil loading at the maximum burial depth. All station components shall function normally when exposed to maximum external soil pressure and hydrostatic pressure.
- E. The wetwell shall be furnished with necessary penetrations molded in and factory sealed meeting the sizes indicated in the Drawings. No field penetrations shall be acceptable.
- F. The access way shall be an integral extension of the wetwell assembly and include a tamper-proof and waterproof cover assembly. The access way design and construction shall allow for field adjustments of station height to be made in increments of 4" or less.
- G. The access way shall include a factory installed, single NEMA 6P electrical disconnect for all power and control functions.
- H. The access way shall include a 2" PVC vent to prevent sewage gases from accumulating in the wetwell.

2.05 PIPING AND ASSEMBLY

- A. All discharge piping shall be 304 stainless steel and shall terminate outside the access way bulkhead with a stainless steel fitting.
- B. The discharge piping shall include a flexible hose assembly with stainless steel end fittings and a stainless steel ball valve.
- C. The package grinder pump station shall contain a pre-installed PVC check valve, anti-siphon valve, and redundant check valve.
- D. The piping and fittings of the grinder pump unit shall be compatible with the SDR 21 PVC piping proposed for the lateral service lines and main pressure lines.
- E. All vent piping and electrical conduit piping shall be SCH 40 PVC pipe.

2.06 CONTROLS

- A. All controls shall be located in the top housing of the core unit attached with stainless steel fasteners. The pumps shall be controlled automatically by an integral, air-bell level sensor connected to a pressure switch. High level sensing will be accomplished with a separate air-bell sensor and pressure switch. A breather assembly shall also be equipped with each core unit.

2.07 CONTROL PANEL

- A. Each grinder pump station shall have a separate control panel. The panel shall be permanently mounted, preferably to a structure or building. The panel shall be located so that the alarm horn and light are not hidden.

1. Enclosure:
 - a. Wall mounted NEMA 4X thermoplastic electrical enclosure designed to accommodate the appropriate power requirements.
 - b. The size of the enclosure shall not exceed 16 inches in height and 12.5 inches in width.
 - c. The enclosure shall have a dead front and be equipped with padlock facilities. Padlock and keys (alike) shall be provided.
2. Control Panel:
 - a. One (1) – 15 amp, double pole circuit breaker for the power circuit.
 - b. One (1) – 15 amp, single pole circuit breaker for the alarm circuit.
 - c. Push to run switch.
 - d. High level (redundant) pump starting control.
 - e. Terminal blocks, integral power bus, push to run feature, and complete alarm circuits.
3. Alarms
 - a. Visual - Red alarm lamp mounted to top of enclosure.
 - b. Audio – Externally mounted capable of 93 dB buzzer at 2 feet. A deactivating push-type switch encapsulated in a weatherproof silicone boot shall be mounted on the bottom of the enclosure.

2.08 CONCRETE

- A. Provide precast concrete anchors sized as needed to resist floatation unless otherwise directed by the Engineer. Provide calculations for sizing of the precast concrete anchors.
- B. Provide concrete anchor per as recommended by Grinder Pump manufacturer.

2.09 SPARE PARTS

- A. Provide the following spare parts, per every 10 grinder pumps, as part of the work (at a minimum, provide the following):
 1. Two (2): pump core unit, complete with level sensors, check valve, anti-siphon valve, pump motor unit, and grinder.
 2. Two (2): control panels.
 3. Two (2): basin covers.

4. One (1): 12” cubed boxes, each with one set of manufacturer’s recommended spare parts consisting of: control chip, on/off switch, motor seal, pump stator, stator liner, breather patch and discharge grommet.

PART 3 – EXECUTION

3.01 INSTALLATION

- A. Install equipment with skilled labor in accordance with manufacturer’s instructions.
- B. All grinder pump station pits shall be placed on a minimum six (6) inch depth of AASHTO No. 57 aggregate.
- C. Install internal/external piping using specified materials.
- D. Install cast-in-place concrete anchor around unit when needed to resist floatation.
- E. Install and connect electrical components.
- F. Equipment installed shall be inspected, adjusted, approved and certified satisfactory by the manufacturer. Provide certification(s) that equipment is ready for operation.

3.03 BACKFILL AND COMPACTION

- A. If cast-in-place concrete anchors are used, backfilling of grinder pump stations shall not commence until all cast-in-place concrete has reached its required compressive strength.
- B. Backfill around exterior piping and enclosure shall be as detailed in Section 31 23 33.
- C. Compaction shall meet the requirements of Section 31 23 33.

3.04 OPERATION

- A. Three (3) copies of the Operation and Maintenance Manuals shall be provided to the Authority. Coordination with the Authority for startup of systems will be required.

3.05 TESTING AND STARTUP

- A. All piping shall be tested in accordance with Section 33 31 00 and/or as may be directed by the Authority.
- B. Complete in accordance with manufacturer’s instructions.
- C. Each grinder pump shall be submerged, operated and tested for performance compliance to its respective curve. Testing process and periodic inspection of testing process shall be conducted and approved by UL.

- D. The services of a factory-authorized technician shall be provided for a minimum of one (1) day. Technician shall instruct and train installation and maintenance personnel in the proper operation in accordance with manufacturer's instructions.

END OF SECTION