

City of Lake Forest Park On-Site Grinder Pump Specifications

May 2006

GRINDER PUMP

The **MANUFACTURER** shall furnish complete factory-built and tested Grinder Pump Stations.

The **MANUFACTURER** shall be Environment One Corp. of Niskayuna, NY and the Model number shall be 2010-74.

OPERATING CONDITIONS: The pumps shall be capable of delivering 15 GPM against a rated total dynamic head of 0 feet (0 PSIG) and 9 GPM against a rated total dynamic head of 138 feet (60 PSIG). The pump(s) must also be capable of operating at negative total dynamic head without overloading the motor(s).

WARRANTY: The grinder pump **MANUFACTURER** shall provide a parts and labor warranty on the complete station and accessories for a period of twenty-four (24) months after notice of **OWNER'S** acceptance, but no greater than twenty-seven (27) months after receipt of shipment.

PUMP: The pump shall be a custom designed, integral, vertical rotor, motor driven, solids handling pump of the progressing cavity type with a single mechanical seal. The rotor shall be through-hardened, highly polished, precipitation hardened stainless steel.

GRINDER: The grinder will be of the rotating type with a stationary hardened and ground stainless steel shredding ring spaced in close annular alignment with the driven impeller assembly, which shall carry two hardened type 400 series stainless steel cutter bars.

ELECTRIC MOTOR: As a maximum, the motor shall be a 1 HP, 1725 RPM, 240 Volt 60 Hertz, 1 Phase, capacitor start, ball bearing, air-cooled induction type with a low starting current not to exceed 30 amperes and high starting torque of 8.4 foot pounds. Inherent protection against running overloads or locked rotor conditions for the pump motor shall be provided by the use of an automatic-reset, integral thermal overload protector incorporated into the motor.

TANK AND INTEGRAL ACCESSWAY: Wet Well Dry Well Construction, High Density Polyethylene Construction.

The tank shall be furnished with one EPDM grommet fitting to accept a 4.50" OD DWV or Schedule 40 pipe. Tank shall be minimum 24-inches in diameter and have a minimum depth of 5 feet (assumes no basement). For homes with basements, minimum depth of tank shall be such that tank is received on site with adequate depth for bury without the need for field fit risers.

All discharge piping shall be constructed of 304 Series Stainless Steel and terminate outside the accessway bulkhead with a stainless steel, 1 1/4 inch female NPT fitting. The discharge piping shall include a stainless steel ball valve rated for 200 psi WOG; PVC ball valves will not be

accepted. The bulkhead penetration shall be factory installed and warranted by the manufacturer to be watertight.

The accessway shall include a single NEMA 6P electrical quick disconnect (EQD) for all power and control functions, factory installed with accessway penetrations warranted by the manufacturer to be watertight. The accessway shall also include a 2-inch PVC vent to prevent sewage gases from accumulating in the tank. Vent piping shall be silicone caulked at the interface with the pump station lid upon installation.

The station shall have all necessary penetrations molded in and factory sealed. To ensure a leak-free installation, no field penetrations shall be acceptable.

CHECK VALVE: The pump discharge shall be equipped with a factory installed, gravity operated, flapper-type integral check valve built into the stainless steel discharge piping. Moving parts will be made of a 300 series stainless steel and fabric reinforced synthetic elastomer to ensure corrosion resistance, dimensional stability, and fatigue strength. A nonmetallic hinge shall be an integral part of the flapper assembly providing a maximum degree of freedom to assure seating even at a very low back-pressure.

ANTI-SIPHON VALVE: The pump discharge shall be equipped with a factory-installed, gravity-operated, flapper-type integral anti-siphon valve built into the stainless steel discharge piping with a flapper design/construction similar to the check valve defined above.

CORE UNIT: The Grinder Pump Station shall have cartridge type, easily removable core assembly consisting of pump, motor, grinder, all motor controls, check valve, anti-siphon valve, level control, electrical quick disconnect and wiring.

CONTROLS: All necessary controls, including motor and level controls, shall be located in the top housing of the core unit.

Non-fouling wastewater level controls for controlling pump operation shall be accomplished by monitoring the pressure changes in an integral air column connected to a pressure switch. The level detection device shall have no moving parts in direct contact with the wastewater. High-level sensing will be accomplished in the manner detailed above by a separate air-bell sensor and pressure switch of the same type. Closure of the high-level sensing device will energize an alarm circuit as well as a redundant pump-on circuit. For increased reliability, pump ON/OFF and High-level alarm functions shall not be controlled by the same switch.

ALARM PANEL: Each grinder pump station shall include a NEMA 4X, UL-listed Alarm Panel suitable for wall or pole mounting. The NEMA 4X enclosure shall be manufactured of thermoplastic polyester to ensure corrosion resistance. The enclosure shall include a hinged, lockable cover with padlock, preventing access to electrical components, and creating a secured safety front to allow access only to authorized personnel. The enclosure shall not exceed 10.5" W x 14" H x 7" D, or 12.5" W x 16" H x 7.5" D if certain options are included.

The Alarm Panel shall contain one (1) 15-amp, double-pole circuit breaker for the pump core's power circuit and one (1) 15-amp single-pole circuit breaker for the alarm circuit. The panel shall contain a push-to-run feature, an internal run indicator, and a complete alarm circuit. All circuit boards in the Alarm Panel are to be protected with a conformal coating and the AC power circuit shall include an auto resetting fuse.

The Alarm Panel shall include the following features: external audible and visual alarm; push-to-run switch; and redundant pump start with high level alarm capability. The alarm sequence is to be as follows:

1. When liquid level in the sewage wet-well rises above the alarm level, audible and visual alarms are activated, the contacts on the alarm pressure switch close, and the redundant pump starting system is energized.
2. The audible alarm may be silenced by means of the externally mounted, push-to-silence button.
3. Visual alarm remains illuminated until the sewage level in the wet-well drops below the "off" setting of the alarm pressure switch.

The visual alarm lamp shall be inside a red, oblong lens at least 3.75" L x 2.38" W x 1.5" H. Visual alarm shall be mounted to the top of the enclosure in such a manner as to maintain NEMA 4X rating. The audible alarm shall be externally mounted on the bottom of the enclosure, capable of 93 dB @ 2 feet. The audible alarm shall be capable of being deactivated by depressing a push-type switch that is encapsulated in a weatherproof silicone boot and mounted on the bottom of the enclosure (push-to-silence button).

Generator Receptacle and Auto Transfer – The Alarm Panel shall include a 20 amp, 250 VAC generator receptacle with a spring-loaded, gasketed cover suitably mounted to provide access for connection of an external generator while maintaining a 4X rating. An automatic transfer switch shall be provided, which automatically switches from AC power to generator power during a power outage. The alarm board power shall be provided through the generator receptacle during a power outage. When AC power is restored, the panel is automatically switched back to the AC power mode.

Service Equipment/Main Service Disconnect Breaker – A separate, internal breaker rated and approved for use as "service equipment" and acts as a main service disconnect of the grinder pump station shall be provided.

PreSTAT Feature – The Alarm Panel shall include a module providing the following features:

- Viewable real time data: volts, amps, run time
- Predictive Status or Trouble indication for unacceptable voltages or amperages, and Extended Run-time of pump core, providing advanced warning of pending service requirements
- Audible and visual high level alarm indication
- Field-adjustable high level alarm delay between zero and 10 minutes
- Alarm-activated dry contacts. Normally open relay contact closes upon alarm activation.
- Alarm-activated Remote Sentry indoor alarm module contacts. Will work with or without power to the board and is designed to work with E/One's Remote Sentry.
- Alarm-activated remote powered terminal. Normally open relay contact closes upon alarm activation supplying an output voltage equal to the alarm circuit input supply voltage.
- 16-character, single row alpha numeric LCD
- Event/cycle counter
- Run-time/hour meter
- Power-up delay with low voltage/brown-out protection (optional)

- Communication capability utilizing built-in auto dialer. Features include: field-programmable reporting to two separate numbers; ability to recognize when the phone line is in use and retry until successful; report a Trouble or Alarm condition; and provide either a field-recorded voice message or tone signal

Specific indicators and switches shall include:

- Ready LED to indicate AC power to the station is satisfactory
- Pump Run LED to indicate pump is operating
- Trouble LED indicator
- High Level Alarm LED indicator
- Manual Run switch to manually activate pump
- Enter switch is used to enter selections
- Scroll switch for navigating through menus
- Normal Operation LED for Mode status
- Diagnostic LED's to indicate the Mode switch has been activated

Remote Sentry Indoor Alarm Module – *OPTIONAL FOR HOMEOWNER* - A separate, remote indoor alarm module shall be provided to indicate a high level alarm with or without AC power to the grinder pump station. The Remote Sentry indoor alarm module shall have an internal power source enabling its continued operation without AC power. The Remote Sentry shall have an audible alarm and a visual alarm, both of which shall automatically reset if the high level alarm condition is eliminated. The Remote Sentry indoor alarm module shall include a Silence switch for the audible alarm and a Test switch.

FACTORY TEST: Each grinder pump shall be submerged and operated for 5 minutes (minimum). Included in this procedure will be the testing of all ancillary components such as, the anti-siphon valve, check valve, discharge assembly and each unit's dedicated level controls and motor controls. All completed stations shall be factory leak tested to assure the integrity of all joints, seams and penetrations. All necessary penetrations such as inlets, discharge fittings and cable connectors shall be included in this test along with their respective sealing means (grommets, gaskets etc.).

DELIVERY: All Grinder Pump units will be delivered to the job site 100 percent completely assembled, including testing, ready for installation. Grinder pump units will be individually mounted on wooden pallets.

SPARE CORE: The **MANUFACTURER** will supply one (1) spare grinder pump core for every 50 grinder pump stations installed, complete with all operational controls, level sensors, check valve, anti-siphon valve, pump/motor unit, and grinder.

PIPING

All on-site piping shall be Schedule 80 PVC with welded socket fittings. On-site sewer piping shall maintain a minimum 10-foot clearance from water service piping. Should the 10-foot clearance be unable to be obtained, sewer pipes shall be encased as shown on the Phase I Improvements Drawings.

Direct bury cable shall be installed in conduit for protection.