



GP 2000 IP

Typical Specifications

Semi-Positive Displacement Type Grinder Pump Station

1.0 GENERAL

- **1.01 GENERAL DESCRIPTION:** The **MANUFACTURER** shall furnish complete, factory-built and -tested grinder pump station(s), each consisting of the grinder pump, a basin constructed of polyethylene, IP 68 (NEMA 6P) electrical quick disconnect (EQD), pump removal system, shut-off valve, anti-siphon valve, check valve, electrical alarm panel, and all necessary internal wiring and controls. All components and materials shall be in accordance with Section 2.0 of this product specification. For ease of serviceability, all pump motor/grinder units shall be of like type and horsepower throughout the system.
- **1.02 SUBMITTALS:** After receipt of notice to proceed, the **MANUFACTURER** shall furnish a minimum of six sets of shop drawings that detail the equipment to be furnished, including dimensional data and materials of construction. The **ENGINEER** shall promptly review this data and return two copies as accepted, or with requested modifications. Upon receipt of accepted shop drawings, the **MANUFACTURER** shall proceed immediately with fabrication of the equipment.
- **1.03 MANUFACTURER:** Grinder pump stations, complete with all appurtenances, form an integral system, and as such, shall be supplied by one grinder pump station 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 grinder pumps for specific use in low pressure sewage systems. The company shall submit detailed installation and user instructions for its product, submit evidence of an established service program including complete parts and service manuals, and will be responsible for maintaining a continuing inventory of grinder pump replacement parts. The **MANUFACTURER** shall provide a reference and contact list from 10 of its largest contiguous grinder pump installations of the type of grinder pumps described within this specification.

The **MANUFACTURER** of the grinder pump station shall be Environment One Corporation (or proposed alternate).

Attention is directed to the fact that the drawings and overall system design are based on a particular piece of equipment from a particular manufacturer. These specifications are intended to provide guidelines for standard equipment of a recognized manufacturer who already meets all the requirements of this specification.

- 1.03a ALTERNATE EQUIPMENT: In the event that the CONTRACTOR or another supplier proposes an alternate to the specified MANUFACTURER, the ENGINEER recognizes that it will be difficult to conform to certain details of this specification due to different manufacturing techniques or grinder pump station designs. If proposing an alternate, the CONTRACTOR (supplier) must submit, no less than 15 business days in advance of the bid date, a complete description of any changes that will be necessary to the system design, a complete submittal package as outlined in Section 1.02 SUBMITTALS, a system hydraulic analysis (including pipe sizes, flows, velocities, retention times and number and location of recommended valves and cleanouts, if any) based on the proposed pump, a list of exceptions to this specification, and demonstration of compliance to Section 1.04 EXPERIENCE CLAUSE of this specification. This information must be submitted to the ENGINEER for pre-approval of the alternate equipment being proposed and determination of compliance with these contract documents. If the equipment differs materially or differs from the dimensions given on the drawings, the CONTRACTOR (supplier) shall submit complete drawings showing elevations, dimensions, or any necessary changes to the contract documents for the proposed equipment and its installation. Preapproval, if granted, will be provided in writing by the ENGINEER to the CONTRACTOR (supplier) at least five business days in advance of the bid date. If the ENGINEER'S approval is obtained for alternate equipment, the **CONTRACTOR** (supplier) must make any needed changes in the structures, system design, piping or electrical systems necessary to accommodate the proposed equipment at the expense of the CONTRACTOR (supplier).
- 1.04 EXPERIENCE CLAUSE: The equipment furnished hereunder shall be the product of a company experienced in the design and manufacture of grinder pumps specifically designed for use in low pressure systems. All manufacturers proposing equipment for this project shall have at least 10 years of experience in the design and manufacture of units of identical size(s) and performance to the specified units. All manufacturers proposing equipment for this project must also have not less than 500 successful installations of low pressure sewer systems utilizing grinder pumps of like type to the grinder

pumps specified herein. An installation is defined as a minimum of 25 pumps discharging into a common force main that forms a low pressure sewer system. The **CONTRACTOR** (supplier) proposing alternate equipment shall also submit, as part of the bid schedule, an installation list with contact person(s), phone number(s) and date(s) of installation of at least 10 installations of the type of pump specified herein that have been in operation for at least 10 years.

In lieu of this experience clause, the **CONTRACTOR** (supplier) of alternate equipment will be required to submit a five-year performance bond for 100 percent of the stipulated cost of the equipment as bid and as shown in the bid schedule. This performance bond will be used to guarantee the replacement of the equipment in the event that it fails within the bond period.

- **1.05 OPERATING CONDITIONS:** The pumps shall be capable of delivering .75 lps against a rated total dynamic head of 0 meters and .40 lps against a rated total dynamic head of 56 meters. The pump(s) must also be capable of operating at negative total dynamic head without overloading the motor(s). Under no conditions shall in-line piping or valving be allowed to create a false apparent head.
- **1.06** WARRANTY: The grinder pump MANUFACTURER shall provide a part(s) and labor warranty on the complete station and accessories, including, but not limited to, panel and redundant check valve, for a period of 24 months after notice of OWNER'S acceptance, but no greater than 27 months after receipt of shipment. Any manufacturing defects found during the warranty period will be reported to the MANUFACTURER by the OWNER and will be corrected by the MANUFACTURER at no cost to the OWNER.
- 1.07 WARRANTY PERFORMANCE CERTIFICATION: As a bid certification requirement, each bidder shall provide with their bid schedule a Warranty Performance Certification statement executed by the most senior executive officer of the grinder pump MANUFACTURER, which certifies a minimum of a 24-month warranty. They must further detail any exclusions from the warranty or additional cost items required to maintain the equipment in warrantable condition, including all associated labor and shipping fees, and certify that the MANUFACTURER will bear all costs to correct any original equipment deficiency for the effective period of the warranty. All preventive maintenance type requirements shall be included in this form as exclusions. These requirements include, but are not limited to, unjamming of grinder mechanism, unplugging of lines, periodic motor maintenance, and periodic cleaning of liquid level controls. Should the CONTRACTOR (supplier) elect to submit a performance bond in lieu of the experience clause outlined above, this Warranty Performance Over the warranty period. A Warranty Performance Certification form is included with the bid schedule and must be completed and submitted as part of the bid package. Bids with incomplete forms or missing forms will be considered non-responsive.

2.0 PRODUCT

- **2.01 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. Double radial O-ring seals are required at all casting joints to minimize corrosion and create a protective barrier. All pump castings shall be cast iron, fully epoxy-coated to 8-10 mil nominal dry thickness, wet-applied. The rotor shall be through-hardened, highly polished, precipitation hardened stainless steel. The stator shall be of a specifically compounded ethylene propylene synthetic elastomer. This material shall be suitable for domestic wastewater service. Its physical properties shall include high tear and abrasion resistance, grease resistance, water and detergent resistance, temperature stability, excellent aging properties, and outstanding wear resistance. Buna-N is not acceptable as a stator material because it does not exhibit the properties as outlined above and required for wastewater service.
- **2.02 GRINDER:** The grinder shall be placed immediately below the pumping elements and shall be directdriven by a single, one-piece motor shaft. The grinder impeller (cutter wheel) assembly shall be securely fastened to the pump motor shaft by means of a threaded connection attaching the grinder impeller to the motor shaft. Attachment by means of pins or keys will not be acceptable. The grinder impeller shall be a one-piece, 4140 cutter wheel of the rotating type with inductively hardened cutter teeth. The cutter teeth shall be inductively hardened to Rockwell 55-58c for abrasion resistance. A stationary, quenchhardened and ground shredding ring will be provided. The shredder ring shall be white cast iron and have a staggered tooth pattern with only one edge engaged at a time, maximizing the cutting torque. These materials have been chosen for their capacity to perform in the intended environment as they are materials with wear and corrosive resistant properties.

This assembly shall be dynamically balanced and operate without objectionable noise or vibration over the entire range of recommended operating pressures. The grinder shall be constructed so as to minimize clogging and jamming under all normal operating conditions including starting. Sufficient vortex action shall be created to scour the tank free of deposits or sludge banks which would impair the operation of the pump. These requirements shall be accomplished by the following, in conjunction with the pump:

- 1. The grinder shall be positioned in such a way that solids are fed in an upward flow direction.
- 2. The maximum flow rate through the cutting mechanism must not exceed 1.2 metres per second. This is a critical design element to minimize jamming and as such must be adhered to.
- 3. The inlet shroud shall have a diameter of no less than 127 mm. Inlet shrouds that are less than 127 mm in diameter will not be accepted due to their inability to maintain the specified 1.2 metres per second maximum inlet velocity which by design prevents unnecessary jamming of the cutter mechanism and minimizes blinding of the pump by large objects that block the inlet shroud.
- 4. The impeller mechanism must rotate at a nominal speed of no greater than 1500 rpm.

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, rubber and the like, to finely divided particles which will pass freely through the passages of the pump and the 32 mm diameter stainless steel discharge piping.

- **2.03 ELECTRIC MOTOR:** As a maximum, the motor shall be a 1-hp, 1450-rpm, 250/240-volt, 50-Hz, 1phase, capacitor-start, ball-bearing, air-cooled induction type with Class F insulation, a low starting current not to exceed 30 amperes and high starting torque of 15.6 N-m. The motor shall be press-fit into the casting for better heat transfer and longer winding life. 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. This motor protector combination shall have been specifically investigated and listed by Underwriters Laboratories, Inc. for the application. Non-capacitor-start motors or permanent-split capacitor motors will not be accepted because of their reduced starting torque and consequent diminished grinding capability. To reduce the potential of environmental concerns, the expense of handling and disposing of oil, and the associated maintenance costs, oil-filled motors will not be accepted.
- **2.04 MECHANICAL SEAL:** The pump/core shall be provided with a mechanical shaft seal to prevent leakage between the motor and pump. The seal shall have a stationary ceramic seat and carbon rotating surface with faces precision lapped and held in position by a stainless steel spring.
- **2.05 TANK:** The tank shall be made from rotational-molded polyethylene, with an appropriate melt index to ensure high environmental stress cracking resistance. The tank shall have a minimum thickness of 8 mm. All seams created during tank construction are to be thermally welded and factory tested for leak tightness. The tank wall and bottom must withstand the pressure exerted by saturated soil loading at maximum burial depth. The basin shall incorporate a tapered bottom to minimize the retained volume. The bottom of the tank shall include a flange that extends beyond the tank walls to support a concrete anchor, as required, to prevent flotation. All station components must function normally when exposed to 150 percent of the maximum external soil and hydrostatic pressure.

The suitability of the polyethylene tank for the application shall be demonstrated through "type" testing and "routine quality control testing" in accordance with Australia/New Zealand Standard AS/NZS 1546.1. Compliance to the standard shall be certified through a qualified certification accredited by the Joint Accreditation System of Australia and New Zealand (JAS-ANZ).

- **2.06 TANK COVER:** The tank cover shall be constructed of either polyethylene resin or fiberglass reinforced polyester. The suitability of the cover to meet imposed loading shall be demonstrated in accordance with the testing requirements of Australia/New Zealand Standard AS/NZS 1546.1. The cover shall be secured with threaded stainless steel fasteners to reduce the likelihood of unauthorized access. The cover shall provide low profile mounting and incorporate a means of providing required ventilation to the station in accordance with national and local plumbing code requirements.
- **2.07 STATION PIPING:** The pump discharge piping components shall be 1 ¹/₄" IPS and consist of a flexible hose assembly with stainless steel end fittings, a stainless steel ball valve, rated at 1.4 MPa, with integral union to facilitate piping disconnect from ground level. Installation of the pump discharge piping

shall require field assembly by the installing party. The power and control cable shall connect to the pump be means of the provided IP 68 (NEMA 6P) electrical quick disconnect (EQD) and shall enter the tank through a watertight strain relief connector installed by the manufacturer.

2010 IP & 2012 IP Models: The tank shall have a stainless steel discharge bulkhead that terminates outside the tank wall with a 1 ¼" BSP female pipe thread. The discharge bulkhead shall be factory-installed and warranted by the manufacturer to be watertight. The tank shall be furnished with an elastomer grommet to accept a 100 mm DWV uPVC (110.2 mm OD) inlet pipe. Installation of the inlet grommet shall require field penetration (ø 127 mm) of the tank wall by the installing party.

2014 IP Model: The tank shall have a stainless steel manifold that terminates outside the tank wall with a 1 ¼" BSP male pipe thread. The discharge bulkhead shall be factory-installed and warranted by the manufacturer to be watertight. The tank shall be furnished with an elastomer grommet to accept a 150-mm DWV, uPVC (160.3 mm OD) inlet pipe. The tank inlet penetration will be located and drilled by the **MANUFACTURER**. Installation of the inlet grommet shall be completed by the installing party.

2.08 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. The check valve will provide a full-ported passageway when open, and shall introduce a friction loss of less than 0.15 meters of water at maximum rated flow. 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. The valve body shall be made of an engineered thermoplastic resin. The valve shall be rated for continuous operating pressure of 1.6 MPa (235 psi). Ball-type check valves are unacceptable due to their limited sealing capacity in slurry applications.

Each grinder pump installation shall also include one separate check valve of the type detailed in Section 2.08 for installation in the service lateral between the grinder pump station and the sewer main, preferably next to the curb stop. The separate check valve shall be provided as a separate line item in the bid schedule.

- **2.09 ANTI-SIPHON VALVE:** The pump discharge shall be equipped with a factory-installed, gravityoperated, flapper-type integral anti-siphon valve built into the stainless steel discharge piping. Moving parts will be made of 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 ensure proper operation even at a very low pressure. The valve body shall be made of an engineered thermoplastic resin. Holes or ports in the discharge piping are not acceptable anti-siphon devices, due to their tendency to clog from the solids in the slurry being pumped. Anti-siphon port diameter shall be no less than 60 percent of the inside diameter of the pump discharge piping.
- **2.10 CORE UNIT:** The grinder pump station shall have an easily removable core assembly that consists of the pump, motor, grinder, all motor controls, check valve, anti-siphon valve, EQD and wiring. Models 2010 IP and 2012 IP will have a single core, and Model 2014 IP will have two cores. The watertight integrity of the core unit shall be established by 100 percent factory test at a minimum of 34 kPa.
- 2.11 CONTROLS: All necessary motor starting controls shall be located in the cast iron enclosure of the core unit secured by stainless steel fasteners. Locating motor starting controls in a plastic enclosure is not acceptable. Wastewater level sensing controls shall be housed in a separate enclosure from motor starting controls. Level sensor housing must be sealed via a radial type seal; solvents or glues are not acceptable. Level sensing control housing must be integrally attached to pump assembly so that it may be removed from the station with the pump and in such a way as to minimize the potential for the accumulation of grease and debris accumulation, etc. Level sensing housing must be a high-impact thermoplastic copolymer over-molded with a thermo plastic elastomer. The use of PVC for the level sensing housing is not acceptable.

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 air column shall be integrally molded from a thermoplastic elastomer suitable for use in wastewater and with excellent impact resistance. The air column shall have only a single connection between the water level being monitored and the pressure switch. Any connections are to be radial sealed with redundant O-rings. The level detection device shall have no moving parts in direct contact with the wastewater and

shall be integral to the pump core assembly in a single, readily-exchanged unit. Depressing the push to run button must operate the pump even with the level sensor housing removed from the pump.

All fasteners throughout the assembly shall be 300 Series stainless steel. High-level sensing will be accomplished in the manner detailed above by a separate air column 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. Float switches of any kind, including float trees, will not be accepted due to the periodic need to maintain (rinsing, cleaning) such devices and their tendency to malfunction because of incorrect wiring, tangling, grease buildup, and mechanical cord fatigue. To assure reliable operation of the pressure switches, each core shall be equipped with a factory installed equalizer diaphragm that compensates for any atmospheric pressure or temperature changes. Tube or piping runs outside of the station tank or into tank-mounted junction boxes providing pressure switch equalization will not be permitted due to their susceptibility to condensation, kinking, pinching, and insect infestation. The grinder pump will be furnished with a 6 conductor 14 gauge, type SJOW cable, pre-wired and watertight to meet UL requirements with a **FACTORY INSTALLED** IP 68 EQD half attached to it.

2.12 ALARM PANEL

Duplex (2014 IP Model): The grinder pump station shall include an IP 65, CE listed control and alarm panel(s) suitable for wall or pole mounting by the **CONTRACTOR**. The enclosure shall be manufactured of fiberglass or thermoplastic resin to assure corrosion resistance. The enclosure shall include a hinged padlockable cover. The panel shall contain one 15-amp single pole circuit breaker for the alarm circuit, and shall contain one 15-amp single pole circuit breaker for the panel shall contain terminal blocks, integral power bus, push-to-run feature and a complete alarm circuit. All circuit boards in the alarm panel are to be protected with a conformal coating on both sides and the AC power circuit shall include voltage limiting protective device.

The control/alarm panel(s) shall include the following features:

- 1. External audible and visual alarm
- 2. Push-to-run switch
- 3. Push-to-silence switch
- 4. Redundant pump start
- 5. High level alarm capability
- 6. Corrosion-proof enclosure
- 7. IP 65 rated enclosure
- 8. Lockable latch with padlock
- 9. Circuit breakers
- 10. Terminal blocks and ground lugs
- 11. Dry contacts
- 12. Lead/lag indicator lights
- 13. Alarm indicator lights
- 14. Run indicator lights

Optional:

1. Generator Receptacle with manual transfer switch

The high-level alarm system shall operate as follows:

- 1. The pumps will go into alarm mode if either pump alarm switch closes. During the initial alarm mode both pumps will run and the alarm light and horn will be delayed for 3.5 minutes. If the station is still in high-level alarm after 3.5 minutes the light and horn will be activated.
- 2. The audio 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 wetwell drops below the "off" setting of the alarm switch for both pumps.

The visual alarm lamp shall be inside a red, oblong lens at least 9 5mm L x 60 mm W x 38 mm H or in a red fluted lens at least 66 mm in diameter and 42 mm in height. Visual alarm shall be mounted to the top of the enclosure in such a manner as to maintain the IP 65 (NEMA 4X) rating. The audible alarm shall be externally mounted on the bottom of the enclosure, capable of 93 dB @ 0.5 m. 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).

Simplex (2010 IP & 2012 IP Models): Each Simplex grinder pump station shall include an IP65, CElisted alarm panel suitable for wall or pole mounting. The IP65 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 266 mm W x 355 mm H x 177 mm D, or 317 mm W x 406 mm H x 190 mm D if certain options are included.

The alarm panel shall contain one 15-amp, single-pole circuit breaker for the pump core's power circuit and one 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 on both sides and the AC power circuit shall include an auto-resetting fuse.

The alarm panel shall include the following features:

- 1. External audible and visual alarm
- 2. Push-to-run switch
- 3. Push-to-silence switch
- 4. Redundant pump start
- 5. IP65 rated enclosure
- 6. Lockable latch with padlock
- 7. Circuit breakers
- 8. Terminal blocks and ground lugs
- 9. High level alarm capability

The alarm sequence is to be as follows when the pump and alarm breakers are on:

- 1. When liquid level in the sewage wetwell rises above the alarm level, audible and visual alarms are activated, the contacts on the alarm pressure switch activate, 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 wetwell drops below the "off" setting of the alarm pressure switch.

The visual alarm lamp shall be inside a red, oblong lens at least 95 mm L x 60 mm W x 38 mm H. Visual alarm shall be mounted to the top of the enclosure in such a manner as to maintain the IP 65 (NEMA 4X) rating. The audible alarm shall be externally mounted on the bottom of the enclosure, capable of 93 dB @ 0.5 m. 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).

Optional Features:

(OPTIONAL) Alarm Contacts Package – Note: The Alarm Contacts Package is included with optional Protection, PreSTAT and Extreme Package as outlined below

- Alarm Activated Dry Contacts Normally open relay contact closes upon alarm activation.
- Alarm Activated Contacts for Remote Indoor Alarm Module Will work with or without power to the alarm panel 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 which will be equal to the alarm circuit input supply voltage.

(OPTIONAL) Generator Receptacle with Manual Transfer Switch

Optional Packages:

(OPTIONAL) Protection Package

Provides protection from the following three operating conditions:

- **Low Voltage (Brownout) Protection** A lockout cycle will prevent the motor from operating and will illuminate an LED if:
 - the pump is running and the voltage drops below a predetermined minimum (211 volts for a 240 volt system) for 5 seconds
 - the pump is off and the voltage is below the predetermined starting voltage (220 volts for a 240 volt system)

The system continues to retest every second indefinitely. If the lockout cycle has been initiated and the voltage comes back above the predetermined starting voltage, the system will function normally (pump starts). The LED remains illuminated during a Brownout condition and remains latched until the pump breaker is turned off and then on again (reset). The audible and visual alarm will not be activated unless there is a high wastewater level in the tank.

- Run Dry Protection A 20-minute lockout cycle will prevent the motor from operating and will illuminate an LED when the wastewater level in the tank is below the pump inlet level. The condition is rechecked every 20 minutes. If the lockout cycle has been initiated and the condition is satisfied, the pump is allowed to cycle normally but the LED remains latched. The LED will remain latched until the pump breaker is turned off and then on again (reset). If the condition is not satisfied after three consecutive attempts, the visual and audible alarm will be activated until the pump breaker is turned on and off (reset) or until there is one cycle of normal operation. If a high level condition is presented at any time, a pump run cycle will be activated.
- **High System Pressure Protection** A 20-minute lockout cycle will prevent the motor from operating and will illuminate an LED when the pressure in the discharge line is atypically high (closed valve or abnormal line plug). The condition is rechecked every 20 minutes. If the condition is satisfied, the pump is allowed to cycle normally but the LED remains latched. The LED will remain latched until the pump breaker is turned off and then on again (reset). The audible and visual alarm will not be activated unless there is a high wastewater level in the tank.

In all of the above cases, if more than one error condition is presented, the LED depicting the most recent error condition will be displayed.

Other included features:

- Alarm Contacts Package (as detailed above)
- Inner door dead front
- Separate LED's for each condition

(OPTIONAL) Protect PLUS Diagnostic Package, consisting of:

- All Protection Package features (as detailed above)
- High/Low Voltage monitoring with Trouble indication
- High/Low Current monitoring with Trouble indication
- Extended Run Time monitoring with Trouble indication
- Cycle/Event Counter
- Run Time Counter (Hour Meter)
- Run Time Limit (time-adjustable, user-selected options: 10 minutes (default), 15, 30, 60, or 120 minutes
- Power-up Delay (time-adjustable, user-selected options: None (default), 5, 10, 15, 20, 30, 40, or 50 minutes
- Alarm Delay (time-adjustable, user-selected options: None (default), 30 seconds, 1, 2, 5, or 10 minutes

Specific Protect PLUS indicators and programming features shall include:

- Ready LED to indicate AC power to the station is satisfactory
- Pump Run LED to indicate pump is operating
- Trouble LED indicator and Visual Alarm notification ("Blinking" Alarm Lamp)
- High Level Alarm LED indicator
- Manual Run switch to manually activate pump
- Menu-driven programmable controller with navigation overlay-type buttons (Enter and Scroll)
- Normal Operation LED and Mode button for Mode status
 - Pump Performance menu LED with LCD Display of the following pump performance statistics:
 - Real-time Voltage
 - Real-time Amperage
 - o Real-time Wattage
 - Minimum/Maximum Voltage
 - Minimum/Maximum Amperage
 - Minimum/Maximum Run-time
 - o Average Run-time
 - o Last Run-time
 - Cycle/Event Counter
 - Run Time Counter (Hour Meter)

- Diagnostics Menu LED
- Initialize System Menu LED
- Run Limit Menu LED
- Alarm Delay Menu LED
- Power Delay Menu LED
- 2.13 SERVICEABILITY: The grinder pump core, including level sensor assembly, shall have at least two lifting hooks complete with lift-out harness connected to its body to facilitate easy core removal when necessary. The level sensor assembly must be easily removed from the pump assembly for service or replacement. All mechanical and electrical connections must provide easy disconnect capability for core unit removal and installation. Each EQD half must include a watertight cover to protect the internal electrical pins while the EQD is unplugged. A push-to-run feature will be provided for field troubleshooting. The push-to-run feature must operate the pump even if the level sensor assembly has been removed from the pump assembly. All motor control components shall be mounted on a readily replaceable bracket for ease of field service.
- **2.14 CORROSION PROTECTION:** All materials exposed to wastewater shall have inherent corrosion protection. Acceptable corrosion protection includes epoxy-coated cast iron, fiberglass, stainless steel, polyethylene, nylon, EPDM and PVC.
- **2.15 SAFETY:** The grinder pump shall be free from objectionable noise, odor or health hazards in its capability to perform as specified in either individual or low pressure sewer system applications.

The grinder pump shall be free from electrical and fire hazards as required in a residential environment. As evidence of compliance with this requirement, the grinder pump and control panel shall be evaluated against the criteria of Australia/New Zealand Standard AS/NZS 3350.2.41 and approved as such through issuance of a Certificate of Suitability to this standard.

3.0 EXECUTION

3.01 FACTORY TEST: Each grinder pump shall be submerged and operated. 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 factory tests shall incorporate each of the above-listed items. Actual appurtenances and controls that will be installed in the field shall be particular to the tested pump only. A common set of appurtenances and controls for all pumps will not be acceptable. Certified test results shall be available upon request showing the operation of each grinder pump at two different points on its curve, with the highest pressure point being 413 kPa, +/- 3 percent. The ENGINEER reserves the right to inspect such testing procedures with representatives of the **OWNER**, at the **GRINDER PUMP MANUFACTURER'S** facility.

All completed stations shall be factory leak-tested to assure the integrity of all joints, seams and penetrations. All necessary penetrations such as factory-installed inlets, discharge fittings and cable connectors shall be included in this test along with their respective sealing means (grommets, gaskets etc.).

3.02 INSTALLATION: Earth excavation and backfill are specified in the specific model's installation instructions, but are also to be done as a part of the work under this section, including any necessary sheeting and bracing.

The **CONTRACTOR** shall be responsible for handling ground water to provide a firm, dry subgrade for the structure, and shall guard against flotation or other damage that results from general water or a flood.

The grinder pump stations shall not be set into the excavation until the installation procedures and excavation have been approved by the **ENGINEER**.

All materials shall be inspected upon delivery to ensure that there is no damage due to shipping. The tank shall not be dropped, rolled or laid on its side for any reason.

Remove packing material. Users' instructions *must* be given to the **OWNER**. Installation of the grinder pump shall be performed in accordance with the installation instructions manual provided with the grinder pump station. Installation shall require the use of a suitable backfill material or concrete pad to provide a firm, level base for the tank. Anchoring of the tank to prevent buoyancy and tank backfill shall be completed in accordance with the **ENGINEER'S** recommendation. Installation shall be accomplished

so that the tank extends above the finished grade line as specified in the installation instructions manual. The tank lid shall not be located below grade. The finished grade shall slope away from the unit.

Model 2010 IP & 2012 IP: The **CONTRACTOR** will provide and install a length of 100 mm DWV uPVC (110.2 mm OD) pipe with cap to stub out the inlet for the property owners' installation contractor, as required, and as depicted on the contract drawings.

Model 2014 IP: The **CONTRACTOR** will provide and install a length of 150 mm DWV uPVC (160.3 mm OD) pipe with cap to stub out the inlet for the property owners' installation contractor, as required, and as depicted on the contract drawings.

All restoration will be the responsibility of the **CONTRACTOR**. Per-unit costs for this item shall be included in the **CONTRACTOR'S** bid price for the individual grinder pump stations. The properties shall be restored to their original conditions in all respects, including, but not limited to, curb and sidewalk replacements, landscaping, loaming and seeding, and restoration of the traveled ways, as directed by the **ENGINEER**.

The electrical enclosure shall be installed and wired to the grinder pump station by the **CONTRACTOR**. An alarm device is required on every installation; there shall be *no exceptions*. It will be the responsibility of the **CONTRACTOR** and the **ENGINEER** to coordinate with the individual property owner(s) to determine the optimum location for the alarm panel.

The **CONTRACTOR** shall mount the alarm device in a conspicuous location per national and local codes. The alarm panel will be connected to the grinder pump station by a length of 6-conductor, type TC cable as shown on the contract drawings. The 2014 IP model will have two cables. The power and alarm circuits must be on a dedicated circuit.

3.03 START-UP AND FIELD TESTING: The **MANUFACTURER** shall provide the services of qualified, factory-trained technician(s) who shall inspect the placement and wiring of each station, perform field tests as specified herein, and instruct the **OWNER'S** personnel in the operation and maintenance of the equipment before the stations are accepted by the **OWNER**. All equipment and materials necessary to perform testing shall be the responsibility of the **INSTALLING CONTRACTOR**. This will include, as a minimum, a portable generator (if temporary power is required) and water in each basin.

The services of a trained factory-authorized technician shall be provided at a rate of one four-day week for each 100 grinder pump stations supplied. Each day shall be 10 person hours in duration.

Upon completion of the installation, the authorized factory technician(s) will perform the following test on each station:

Model 2010 IP & 2012 IP:

- 1. Ensure all service and alarm panel breakers are in the OFF position.
- 2. Open the discharge valve in the tank by swinging the valve handle to the ON (vertical) position.
- 3. Open any additional discharge valves. Some installations may have additional discharge line valves before entering the street main.
- 4. Turn ON the power to the alarm panel, from the building service panel.
- 5. Set the alarm panel, alarm circuit breaker to the ON position.
- 6. Fill the wetwell with water to a depth sufficient to verify the high level alarm is operating. Shut off the water when the alarm light illuminates and the alarm sounds. Push the silence switch located under the left-hand side of the panel to silence the alarm.
- 7. Set the pump power circuit breaker to ON. The pump should immediately turn ON. Within approximately three minutes the alarm light will turn OFF. After approximately an additional three minutes the pump will turn OFF.
- 8. Turn on all alarm panel breakers when the station is ready to be placed into service.

2014 IP Model:

- 1. Ensure all service and alarm panel breakers are in the OFF position.
- 2. Open both discharge valves in the tank by swinging the valve handles to the ON (vertical) position.
- 3. Open any additional discharge valves. Some installations may have additional discharge line valves before entering the street main.
- 4. Turn ON power to the alarm panel from the building service panel.
- 5. Turn on the alarm circuit breaker (not labeled "Pump 1" or "Pump 2") located on the right-hand side of the group of breakers. No lights should illuminate on the control board unless the water level is already above the alarm level; if so, the red LED will illuminate.
- 6. Fill the tank with water until the alarm turns on. There is approximately a 4-minute delay after reaching the alarm level (approximately 850 mm from the tank bottom) before the alarm will sound. Push the silence switch located under the left-hand side of the panel to silence the alarm.
- 7. Turn off all circuit breakers in the alarm panel. Slide the "Auto/Both" switch to the "Both" (down) position. Again, turn on the alarm circuit breaker.
- Turn on the Pump 1 circuit breaker. Pump 1 should start and the left, yellow and green LED's for Pump 1 should illuminate (check Pump 1 amperage per "Operational Electrical Test" section).
 Pump 1 will pump the water level down (approximately 330 mm from the tank bottom) and shut off.
- 9. Turn off the Pump 1 breaker and turn on the Pump 2 breaker. Fill the station with water until Pump 2 turns on (approximately 430 mm from the tank bottom). The Pump 2 right, yellow and green LED's should illuminate (check Pump 2 amperage per "Operational Electrical Test" section). Pump 2 will pump the water level down (approximately 330 mm from tank bottom) and shut off.
- 10. Turn off all alarm panel breakers. Slide the "Auto/Both" switch up to the "Auto" position.
- 11. Turn on all panel breakers when the station is ready to be placed in service.

Upon completion of the start-up and testing, the **MANUFACTURER** shall submit to the **ENGINEER** the start-up authorization form describing the results of the tests performed for each grinder pump station. Final acceptance of the system will not occur until authorization forms have been received for each pump station installed.

4.0 OPERATION AND MAINTENANCE

- **4.01 SPARE CORE:** The **MANUFACTURER** will supply one 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.
- **4.02 MANUALS:** The **MANUFACTURER** shall supply four copies of Operation and Maintenance Manuals to the **OWNER**, and one copy of the same to the **ENGINEER**.

END OF SECTION

WARRANTY CERTIFICATION

I, signature below as its most senior operating e	, by executive, certify that	and through my duly authorized
will provide a two (2) year warranty on grinder	r pump equipment manu	factured and supplied by
	for the	
project. I further certify that, other than failure instructions, no exclusions and/or cost items t labor and shipping fees, exist except as detail	to install equipment in a o maintain said equipme led immediately below:	ccordance with manufacturer's ent in warrantable condition, including
EXCLUSIONS: 1 2 3		
COST ITEMS TO MAINTAIN EQUIPMENT IN WARRANTABLE CONDITION:	Required Frequency (mos)	Avg. monthly cost (\$) times warranty period
1 2 3 4		\$ \$ \$

Total labor/material cost to maintain equipment in warrantable condition for warranty period (\$):

For any items not identified as exclusions or additional cost items above, OR for additional labor & material costs required to maintain equipment in warrantable condition that exceed the Avg. monthly cost (\$) detailed above, ______ will bear all costs to correct such original equipment deficiency for the effective period of the warranty including all applicable labor and shipping fees.

Signature

5.

Date

\$

Title

WARRANTY CERTIFICATION SPECIFICATION LANGUAGE

As a pre-bid certification requirement, each bidder shall provide a Warranty Performance Certification executed by the most senior executive officer, which certifies a minimum of a two (2) year warranty. They must further detail any exclusions from the warranty or additional cost items required to maintain the equipment in warrantable condition, including all associated labor and shipping fees, and certify that the manufacturer will bear **all** costs to correct original equipment deficiency for the effective period of the warranty.



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