

FILE: SPEC3-11

### Effluent/Grinder Pumps

**SCOPE:** Furnish and install \_\_\_\_\_ submersible grinder pump (s). Each pump shall be capable of delivering the following performance points, \_\_\_\_\_ U.S. GPM at \_\_\_\_\_ TDH;  
\_\_\_\_\_ U.S. GPM at \_\_\_\_\_ TDH;  
\_\_\_\_\_ U.S. GPM at \_\_\_\_\_ TDH,  
with a shut off head of \_\_\_\_\_ TDH (minimum). The pump motor speed shall be \_\_\_\_\_ RPM, \_\_\_\_\_ HP (maximum), \_\_\_\_\_ Phase, 60 Hertz, \_\_\_\_\_ Volts. The pump (s) shall be manufactured by a company regularly engaged in the manufacture and assembly of similar units for a minimum of five (5) years. The pump (s) shall be Barnes® model \_\_\_\_\_.

**DESIGN:** A centrifugal submersible grinder pump designed to reduce all material found in normal domestic and light industrial sewage, including plastics, rubber, sanitary napkins, and disposable diapers into a finely ground slurry. The resultant slurry is then pumped through small diameter piping into a gravity interceptor or treatment facility. The temperature limitation of the liquid being pumped is 104 degrees F continuous and shall be capable of running dry for extended periods.

**PUMP CONSTRUCTION:** Unit (s) shall be CSA listed for Class I, Groups C & D, Division 1, hazardous locations. The volute, seal plates and motor housing shall be constructed of high quality ASTM A-48 class 30 cast iron. The pump (s) shall be painted with a water based air dry enamel of 2.0 mil minimum thickness. All exposed hardware shall be 300 series stainless steel. Discharge connection shall be a standard \_\_\_\_\_ inch NPT in the vertical position.

The pump impeller shall be of the recessed vortex design. Pumps with standard centrifugal semi-open impeller designs shall not be acceptable. The impeller shall be of ASTM A-48 class 30 cast iron construction and machined for threading to the motor shaft. The impeller shall be capable of being trimmed to meet specific performance characteristics.

The grinder mechanism shall consist of a radial cutter threaded and locked on the motor shaft by a washer in conjunction with a countersunk flat head cap screw, and a shredding ring containing a minimum of fifteen flow passages with cutting edges. The shredding ring shall be reversible to provide twice the cutting edge life. Both the shredding ring and radial cutter shall be constructed of 440C stainless steel hardened to a min. Rockwell C55 and shall be finish ground for a fine cutting edge. Two-stage cutter mechanisms requiring external adjustment for proper clearance are not acceptable.

The unit shall utilize a tandem mechanical shaft seal arrangement and shall operate in an oil atmosphere. The materials of construction shall be carbon for the rotating face and ceramic for the stationary face, lapped and polished to a tolerance of one light band, 300 series stainless steel hardware, and all elastomer parts to be Buna-N. The seal shall be commercially available and not a proprietary design of the manufacturer.

Single phase motors shall be of the capacitor start, capacitor run design and the three phase motors shall be of the dual-voltage 230/460 design. The pump shall be designed to be non-overloading throughout the entire pump curve. The rotor and stator assembly shall be of the standard frame design and secured to the pump seal plate by four threaded fasteners allowing for easy serviceability.

The motor shall be constructed with the windings operating in a sealed environment containing clean dielectric oil, making it capable of operating in a totally, partially or non-submerged condition for extended periods of time without damage due to the heat being generated.

Air-filled motors shall not be acceptable. The motor windings shall be of Class F insulation with Class H wire. The motor shall meet the standard NEMA design L for single phase and NEMA design B for three phase. The motor shaft shall be of 416 stainless steel. Protection against excessive temperature shall be provided by heat sensor thermostat attached to the stator windings and connected in series with the contactor coil in the control panel.

The lower bearing shall be of the double row ball type to accept radial and thrust loads, and the upper bearing of the single row ball type for radial loads. Bearings shall operate in an oil bath atmosphere for superior life. Permanently lubricated bearings are not acceptable.

**THREE PHASE:** The pump shall be equipped with (30/50/75/100) ft. of a CSA-qualified submersible plug-n-play connect power cable constructed in accordance with type W guidelines and shall include the moisture and temperature sensor leads. The cable entry system shall consist of an expanding rubber plug held in place by a cast stainless steel plate indicating voltage and max amps.

**SINGLE PHASE:** The pump shall be equipped with (30/50/75/100) ft. of a CSA-qualified submersible plug-n-play connect power cable constructed in accordance with Type W guidelines and shall include the moisture and temperature sensor leads. The cable entry system shall consist of an expanding rubber plug held in place by a cast stainless steel plate indicating voltage and max amps.

**PUMP TEST:** The pump manufacturer shall perform the following inspections and tests:

1. A check of the motor voltage and frequency shall be made as shown on the name plate.
2. A motor and cable insulation test for moisture content or insulation defects shall be made per UL/ CSA criteria.
3. The pump shall be completely submerged and run to determine that the unit meets three pre-determined hydraulic performance points.

If certified testing is required, the manufacturer shall offer to perform tests in accordance with Grades B, E and U of Hydraulic Institute standards.

**START-UP:** The pump (s) shall be tested at start-up by a qualified representative of the manufacturer. A start-up report as provided by the manufacturer shall be completed before final acceptance of the pump (s).

**DOCUMENTATION:** The manufacturer, if requested, will supply a minimum of \_\_\_\_\_ sets of standard submittal data; Standard submittal data consist of:

- a. Pump catalog data;
- b. Pump performance curve;
- c. Break away fitting data;
- d. Access frame data;
- e. Typical installation drawing;
- f. Control panel data
- g. Panel wiring schematic;
- h. Accessory data;
- i. Installation & Operation Manuals with Parts List