

SECTION 11370

SLUDGE TRANSFER PUMP AND AGITATOR ASSEMBLY

1. PART GENERAL

1.1 SECTION INCLUDES

- A. Furnishing, testing, installation and adjustment of sludge transfer pump complete with motor, drive and trailer. This shall include all supervision, labor equipment and materials for the total installation, including all testing, adjustment, start-up services specified and also including placement of the equipment into satisfactory and acceptable operation.

1.2 RELATED SECTIONS

- A. The General and Special Conditions apply to this section of the specifications. Also refer to:
 - 1. Division 15 Mechanical
 - 2. Division 1 General Requirements

1.3 REFERENCES

- A. American National Standards Institute (ANSI)
 - 1. B161.1 Cast Iron Pipe and Flanged Fittings
Class 25, 125, 250 and 300

1.4 SUBMITTALS

- A. Submit product data and manufacturer's instructions under provisions of Section 01300-Standards.
- B. Product Data
 - 1. Indicate pump type, capacity and power requirements.
 - 2. Submit pump curve showing pump performance characteristics.
 - 3. Submit manufacturer's installation and start-up instructions.
 - 4. Submit vendor list for replacement parts.

5. Submit a list of references (minimum of two (2) references) of other installations of equipment specified herein.

C. Shop drawings and/or manufacturers literature with dimensional data depicting such dimensions as length, spacing between agitation nozzles, gear box ratios and other items pertinent to the operation and maintenance of the pump.

1.5 OPERATION AND MAINTENANCE DATA

A. Submit operation and maintenance data under provisions of Section 01700-Contract Closeout.

B. Include operation and maintenance and inspection data, replacement parts and vendor, and manufacturers service representative with address and phone number.

1.6 DELIVERY, STORAGE AND HANDLING

A. Ship equipment and material complete, except where partial disassembly is required by transportation regulations for protection of components.

B. Deliver, store, protect and handle products to site under provisions of Section 01600. Inspect for damage.

1.7 WARRANTY

A. Provide one-year manufacturer's warranty against defects in workmanship and materials under normal use, operation and service.

B. Provide for manufacturer's replacement of defective parts.

C. Warranty shall be in published form and apply to all similar units.

D. Submit warranty under provisions of Section 01700 - Contract Closeout.

2. PART 2 PRODUCTS

2.1 PUMP

A. Manufacturer

1. J. Houle and Fils, Inc. Quebec, Canada/HTI, Inc. Suttons Bay, MI. 231-995-7630

2. Substitutions: Under provisions of Section 01600.

B. General

1. Pump shall be suitable for the service of pumping and agitating liquid sludge in range of solids up to 10% total solids.
2. Equip pumping system with necessary accessories, including hydraulic lifting attachments, lubricators, pressure gauges and drainage connections.
3. Pump and trailer assembly must be designed so to access the sludge pumpout openings and hatches on the sludge storage tank in order to properly position the pump for operation.

C. Functional Requirements of Pump

1. The Sludge Transfer Pump shall be capable of providing a minimum of 45 psi discharge pressure at the pump discharge. The pump discharge shall be equipped with 6" flexible hose discharge connections. (Kamlock, OPW or equal)
2. Pump shall be suitable for pumping abrasive sludge that may contain rags, plastics and other debris and shall be capable of passing up to 2" diameter solids. Pump shall be capable of pumping varied solids concentrations up to 10 percent by weight.
3. Pump shall be capable of completely pumping down the storage tank to the top of the pumpout sump of the tank. Supplier of the pump shall be responsible for providing a pump length based on height of tank such that the pump will pump contents of the tank to the level specified above.
4. The pump shall be capable of mixing the contents of the sludge storage tank by pumping sludge through two agitation nozzles, transferring sludge to the tank through a sludge transfer pipeline, and both mixing and transfer pumping at the same time.
6. Pump discharge characteristics and the configuration of the two agitation nozzles shall be such that nozzle flow shall be sufficiently large that the effective agitation and mixing will result, even with a

full tank and high sludge concentration of 10 per cent total solids by weight. The pump shall be capable of operation with load out flow and flow through the agitation nozzles at the same time. Flow to each agitation nozzle, the direction of each agitation nozzle (vertical and horizontal) and the discharge to a load out station shall be controllable by hydraulics from a single location beside the pump where the operator has easy access to all engine and hydraulic controls and has view of engine monitoring gauges.

7. System pump curve shall be furnished upon request.

D. Pump Construction

1. The pump frame shall be constructed of 6" X 8" torsion proof steel tubing a minimum of 3/16 inches thick. The vertical drive shaft shall be a minimum of 1.75 inch diameter solid steel shaft with 3 universal joints equally spaced at the top, center and bottom of vertical shaft. The gear box shall be heavy duty designed for use in a liquid environment with an oil level visual gauge. Pump shall have a 20-inch diameter impeller, 24-inch diameter impeller housing, 4-sharpened cutting blades attached to the impeller housing and 6-self cleaning impeller blades.
2. The pump impellor housing assembly shall be capable of being lowered into a 36" x 60" sump and shall have a stopping device to keep the pump at least 12" off the bottom of the sump.
3. Pump shall have a dual hydraulic system operated from an engine driven hydraulic pump so that the operator pump can lower the pump into the tank sump through a 48" X 72" opening and perform the pumping and agitation functions of the pump from a single location.
4. Pump will be used to transfer thickened sludge from a tank to a truck and to thoroughly agitate contents of the tank prior to the transfer operation.
5. Pump shall be equipped with 2 agitation nozzles, one located 36 inches above the impeller and one located 102 inches above the impeller. Top nozzle shall be capable of a horizontal rotation radius of 200 degrees and vertical rotation radius of 60 degrees. Bottom nozzle shall be fixed vertically (90 degrees) to pump discharge pipe. Both the horizontal and vertical movement shall be by mechanical means with a locking mechanism at operators desired position.

6. All equipment and appurtenances necessary for proper operation of the sludge transfer pump shall be provided.

2.2 ENGINE

A. Engine shall be a diesel-fueled, general-purpose, liquid-cooled, 4-cycle, compression-ignition type, with six cylinders. The engine shall be turbo-charged. The engine shall be a standard product of the manufacturer, complete with all appurtenances normally furnished and any other devices required herein. The engine shall be Caterpillar Model No. 3056 DIT, or equal. The engine shall be rated 150 horsepower at 2500 rpm intermittent or 135 horsepower at 2500 rpm continuous. Engine speed shall be controlled by a governor to maintain PTO speed through variations in load. Engine shall be complete with fuel pump, lubricating system, air intake filter/silencer, starting system, cooling system, exhaust system, engine mounted hydraulic pump and engine block heater for cold weather starting. Appurtenances shall include all required for a complete operating system, including the following:

1. Fuel System. Provide a 100 gallon aluminum trailer-mounted fuel tank with filter neck, drain, fuel gauge, primary fuel filter and fuel lines, all to be completely installed. Fuel filter shall be full flow, two stage replaceable element type; provide two spare filter elements. The filter cap shall be lockable.
2. Battery. The battery shall be in a hard rubber or fiberglass case with solid one-piece top especially intended for the starting duty required by this application. It shall have sufficient capacity to deliver no less than 3 cranking cycles at 15 seconds each, spaced at intervals of 30 seconds at a block temperature of 50EF. Cables from battery to engine starter and control shall be of ample size and properly insulated. Battery shall be a 12 volt Group 27, deep cycle unit with 675 cold cranking amps.
3. Coolant. The engine cooling system shall be filled with a 50-50 water ethylene/glycol solution with rust inhibitor.
4. Automatic System Protection. Engine shall be equipped with automatic safety controls which will shut down the engine in the event of low lubricating oil pressure or high coolant temperature.
5. Fluid Power Pump. A compatible bolt-on fluid power

pump shall be furnished to power the sludge transfer pump's auxiliary operating systems. Coordinate with sludge transfer pump manufacturer to determine flow and pressure requirements. Pump drive shall be SAE A 2 bolt mounting pad with SAE B spline drive.

6. Noise Control. Exhaust system silencer(s) and flexible connectors shall be provided. Silencer(s) shall be critical type. Provide additional engine enclosure as needed to assure quiet residential noise level of 45 dBA at 1000 meters.

2.3 CLUTCH AND GEAR REDUCER

- A. Clutch shall be hand operated from a conveniently accessible location on the trailer.
- B. Gear reducer shall provide 1000 rpm PTO drive speed.
- C. Manufacturer shall be Funk, Inc., or equal.

2.4 DRIVE SHAFT

- A. A drive shaft shall be furnished to connect the engine gear reducer output shaft to the pump.

2.5 TRAILER

- A. The pump shall be mounted on a tandem axle trailer, with four (4) 15-inch or 16-inch tires, V-tongue, 2 15/16" ball coupler, 3" x 6" x 3/16" tubular frame, electric brakes, four (4) jack stands capable of supporting weight of trailer and pump combination, fenders, rear bumper, 6,000 lb. rated axles and other miscellaneous components to make a complete and workable system with the drive engine to satisfactorily operate the sludge transfer pump and agitator at 1,000 RPM through a P.T.O. drive. The trailer shall be rated for the equipment weight, retractable dead stand, and safety chains. Trailer shall be sized as required for pump, engine and clutch/gear reducer box.

2.6 DISCHARGE HOSE

- A. Contractor shall supply twenty (20) feet of (6) inch diameter

flexible rubber discharge hose rated for a working pressure of 100 psi. Hose shall have a smooth EPDM rubber inside tube and an EPDM outside cover that resists abrasion, ozone, and sunlight. Hose shall be furnished with end quick couplings to mate with the sludge transfer coupling on one end and with two mating couplings on the other end, one coupling to be installed on the end of the sludge transfer pipe by the Contractor.

PART 3 EXECUTION

3.1 FIELD TEST, ADJUSTMENT AND START-UP

- A. After completion of installation of the unit and related equipment, field tests, adjustment and start-up shall be conducted in accordance with Section 01650 - Starting of Systems of these specifications.
- B. Provide start-up assistance by a factory or authorized representative consisting of one trip of one eight (8) hour day of service.

END OF SECTION