

SECTION 11311

CENTRIFUGAL SCREW PORTABLE PUMPING UNIT

EQUIPMENT AND COMPONENT NAME (S) AND NUMBER (S)

Refer to Supplements

PART 1 GENERAL

1.1 WORK OF THIS SECTION

- A. Work: The work necessary to furnish a complete Portable Pumping Unit including screw centrifugal pump, electric motor, vacuum assisted dry priming system, and automatic starting controls. To be permanently installed.

- B. Unit Responsibility: The Work requires that the Centrifugal Screw Portable Pumping complete with all accessories and appurtenances (including, but not necessarily limited to, starter, control panel, priming system, be the end product of the supplier. The supplier shall furnish all components and accessories of the system to enhance compatibility, ease of operation and maintenance and, as necessary, to place the equipment in operation conforming to the specified performance, features, and functions. The foregoing shall in no way alter or modify CONTRACTOR'S responsibilities under the Contract Documents. CONTRACTOR is responsible to OWNER for providing the equipment systems as specified herein.

- C. Like items of equipment provided hereunder shall be the end products of one manufacturer in order to achieve standardization for appearance, operation, maintenance, spare parts and manufacturer's service.

- D. See CONDITIONS OF THE CONTRACT and Division 1, GENERAL REQUIREMENTS, which contain information and requirements that apply to the work specified herein and are mandatory for this project.

1.2 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
 - 1. American Bearing Manufacturers' Association (ABMA)
 - 2. American National Standards Institute (ANSI): B16.1, Cast Iron Pipe and Flanges and Flanged Fittings

3. ASTM International (ASTM): A48, Standard Specification for Gray Iron Castings
4. Hydraulic Institute Standards (HIS)
5. Occupational Safety and Health Administration (OSHA).

1.3 DEFINITIONS

- A. Terminology pertaining to the pumping unit performance and construction shall conform to the ratings and nomenclature of the Hydraulic Institute Standards.

1.4 SUBMITTALS

- A. Action Submittals:

1. Shop Drawings:

- a. Make, model, weight, and horsepower of pump assembly.
- b. Complete pump, electric motor, and vacuum pump catalog information, descriptive literature, specifications, and identification of materials of construction.
- c. Performance data curves at nominal pump speed showing head, capacity, horsepower demand, NPSH required, and pump efficiency over entire operation range of pump, from shutoff to maximum capacity. Indicate separately head, capacity, and horsepower demand, NPSHR and overall efficiency require at Rated Conditions and at Secondary Conditions.
- d. Performance data curves for rated pump RPM.
- e. Certified detailed mechanical and electrical drawings showing equipment dimensions, arrangement, assembly, including locations and type of connections and weights of major equipment and components.
- f. Complete electric nameplate data, motor manufacturer, including any motor modifications.
- g. Factory Finish System

- B. Information Submittals:

1. Special shipping, storage and protections, and handling instructions.
2. Manufacturer's printed installation instructions.
3. Suggested spare parts list to maintain equipment in service for period of 1 year and 5 years. Include a list of special tools required for checking, testing, parts replacement, and maintenance with current price information.

4. List special tools, materials, and supplies furnished with equipment for use prior to and during startup and for future maintenance.
5. Operation and Maintenance Data: As specified in Section 01430, OPERATION AND MAINTENANCE DATA.

1.5 OPERATIONS AND MAINTENANCE DATA

- A. O&M Manuals: Content, format and schedule for providing as specified in Section 01430, OPERATION AND MAINTENANCE DATA.
- B. Maintenance Summary Forms: As specified in Section 01430, OPERATION AND MAINTENANCE DATA.

1.6 EXTRA MATERIALS

- A. Furnish for each set of pumps: One complete set of any special tools required to dismantle pump.

PART 2 PRODUCTS

2.1 GENERAL

- A. Provide a complete, coordinated, and fully functional operating system.
- B. Coordinate pump, electric motor, and priming system as a system.
- C. Pumps supplied under this Section to be a standard product of manufacture and to have proven reliability.
- D. Portable pump system to be capable of running dry or in snoring conditions.

2.2 MANUFACTURERS

- A. “Screwsucker™” 4inch Portable Pumping System, Model 100H-E by APSCO, Inc. of Kirkland, WA. (ph. 425-822-3335).

2.3 EQUIPMENT DESCRIPTION AND CONSTRUCTION DETAILS

- A. Pump:
 1. Pump shall be a Hidrostral D100-HO1R Pump. The basic design shall be a single passage, clog free pump utilizing a screw centrifugal impeller. Pump shall be capable of:
 - i. 637 GPM @ 27 feet TDH

- ii. 263 GPM @ 50 feet TDH @1800 RPM
- iii. Continuous Duty point 400 gpm @ 35 ft TDH

- 2. Continuously rising head-capacity curve from runout to shutoff.
- 3. Designed to operate continuously at any point in specified operating range of performance curve without cavitation, overheating, or excessive vibration.
- 4. Motor nameplate horsepower rating not to be exceeded by pump brake horsepower required at any point on nominal pump performance curve.
- 5. Pump shall be capable of continuous operation in dry condition.
- 6. Greater than 75 % Best Efficiency

B. Casing:

- 1. Back pullout design allowing for removal of rotating element without disturbing piping connections.
- 2. Heavy wall, one-piece volute construction with integral flanged discharge flange and smooth fluid passages. Provide drilled and tapped volute vent and drain connections.
- 3. The pump volute, back plate and suction piece housing shall be of close-grained cast iron, ASTM A48-CL30.
- 4. The impeller shall be ASTM A-536 72 Iron, HB 270.
- 5. The suction shall have an independently replaceable suction liner minimum 270 Brinell Iron, ASTM A 536-72 and shall be externally adjustable by means of three stainless steel regulating screws. Each adjusting screw shall incorporate a mechanism for positively advancing, positively retracting, and positively locking the position of the suction liner in so that the necessary running clearances between the liner and impeller can be maintained.

C. Bearing Housing

- 1. The bearing housing shall be of cast iron, ASTM A48Cl-30 and shall be of the back pull out design.
- 2. The shaft shall be steel and provided with suitable bearings capable of taking all mechanical and hydraulic loads. Unless otherwise specified, bearings shall provide a minimum B10 bearing life of 50,000 hours without credit for hydraulic balancing by pump out vanes, grooves, or wear rings.
- 3. The shaft seals shall be isolated from contaminants in the pumped media by a labyrinth fit between the impeller backside and the volute back plate, as well as by pump-out grooves machined into

the impeller back shroud and into the volute back plate, to prevent debris reach the shaft seal.

D. Mechanical Seal

1. Tandem Mechanical Seal Arrangement requiring no external flush. shaft sealing shall be by independently-mounted, tandem mechanical seals contained in an oil chamber that is formed as an intrinsic part of the bearing frame and allows the seals to be completely submerged in and lubricated by the oil bath. Externally mounted oil reservoirs are not acceptable.
2. The mechanical seal nearest the bearing shall utilize carbon/ceramic faces and shall isolate the seal cooling oil from the bearing frame.
3. The mechanical seal nearest the impeller shall be a stainless steel or rubber bellows type construction firmly attached to the rotating face and clamped to the shaft, to prevent contaminants from contacting the stainless-steel spring which loads the seal face. The seal faces shall be a solid tungsten-carbide rotating face running against a solid silicon-carbide stationary face. Seals with both faces of similar materials, or seals, with bonded, soldered, or converted face surfaces are not equal or acceptable.

E. Electric Motors

1. Pump
 - A. 10 hp maximum hp
 - B. May operated with manual or with automatic level switching.
2. Vacuum Pump
 - A.2 hp Maximum
 - B. Operated in conjunction with Priming System solenoid valve.

F. Priming System and Control Panel

1. The priming system shall be a “dry prime” vacuum system which shall incorporate a priming chamber, priming probes, and controlled via an electronic controller.
2. A Busch Vacuum pump shall be supplied. The vacuum pump shall be oil lubricated and driven by an electric motor. A solenoid valve will operate simultaneously with the vacuum pump to operate/intiate dry priming. The normally closed solenoid valve will only open when the vacuum pump is engaged.
3. The priming chamber shall have a clear Plexiglas viewing window with electronic level probes mounted in the priming chamber.
4. An electronic control panel shall be furnished to control the dry prime vacuum system.

G. Control Panel

1. A control panel will be furnished in a NEMA 4X enclosure. The outside of the panel shall be furnished with an hour meter, run light, automatic start /stop and level control switch, phase presence and direction indicator.
2. The control panel will be furnished with a connection for automatic start-stop of the unit with level control probes.
3. The control panel shall operate and incorporate all the electrical features for the motor, pump, priming system, and automatic level control.
4. Unit failure and shutdown protection shall be included.

3.5 MANUFACTURER'S SERVICES

A. Installation, Startup, and Testing Services:

1. Provide complete manufacturer's installation, startup, and testing services in accordance with Section 01640, MANUFACTURERS' SERVICES, and Section 01810, EQUIPMENT TESTING AND FACILITY STARTUP.
2. Provide Qualifications of Manufacturer's Representative.

B. Training Services

1. Provide training of Owner's personnel in accordance with Section 01640, MANUFACTURERS' SERVICES.
2. Provide 1 person-day of pre-startup training, which shall be provided in one session.