

SCOPE

Furnish (QTY____) Stancor™ SX-4500 submersible dewatering pump(s) capable of delivering a maximum capacity of____ GPM at____ feet of TDH when operated by 45 HP, 3450 RPM____ volt, ____ phase, 60Hz motor. The motor shall be an integral part of the pumping unit and shall not exceed____ HP and____ amps at____ volts. The pump discharge size shall be____ inch male threaded. Pump shall be operated with a manual or automatic control panel and be equipped with____ feet of power cable between the pump and control panel. Strain reliefs shall be provided at each cable entry into the pump.

PUMP DESIGN

The pump(s) shall be MSHA approved and meet the explosion-proof requirements of the Title 30 of the Code of Federal Regulations, Part 18 (30 CFR 18).

The pumps(s) shall be designed to handle large flows of dirty water at medium to high heads. Each pump model shall be furnished with a water jacket cooling system allowing safe operation in shallow water and dry locations for substantial periods of time. The SX-4500 model shall be convertible from standard high head to high volume version. Each pump shall be equipped with a stainless steel inlet screen to prevent large solids from entering the impeller. Pump weight must not exceed 345 lbs (without cable).

PUMP CONSTRUCTION

Major pump components shall be of 356-T6 Aluminum with smooth surfaces devoid of porosity or other irregularities. All exposed fasteners shall be AISI type 304 stainless steel. Critical mating surfaces where a watertight seal is required shall be machined and fitted with NBR o-rings. Sealing will be the result of controlled compression of rubber o-rings without requiring a specific torque on fasteners to accomplish sealing. Rectangular cross sectioned gaskets requiring specific fastener torque to achieve compression shall not be considered adequate or equal. No secondary sealing compounds shall be used or required. The pump shall be of a dual stage design.

Impellers: The two impellers shall be of the semi-open type and constructed of AISI type 316 stainless steel. Each impeller shall be dynamically balanced to insure vibration-free operation. The impellers shall be positively keyed to the shaft and secured with a stainless steel nylon lock nut.

Volutes: The upper volute shall be an adjustable volute and the lower volute shall be fixed and adjustment shall be made with use of shims. Both volutes shall be rubber lined 356-T6 aluminum. The rubber lining shall extend and cover the entire suction port in order to reduce abrasion. Both volutes shall be mounted to the motor housing with stainless steel studs and adjusting nuts for the lower volute to permit close tolerance adjustment between the adjustable volute and impeller for maximum pump efficiency. Adjustment to allow for wear and restore peak pumping performance shall be accomplished using standard tools.

Pump Diffuser: The diffuser shall be constructed of plastic for abrasion resistance. A replaceable plastic diffuser shall be used to prevent abrasion of the motor housing.

Suction Strainer: The pump shall sit on a AISI 304 Stainless Steel strainer designed to support the weight of the pump. Strainer opening shall be 9mmX22mm.

Shaft & Rotating Assembly: The common motor/pump shaft that is in contact with pump's mechanical seals shall be of 416 stainless steel material and shall have a polished finish and accurately machined shoulders to accommodate bearings, seals and impeller. Carbon steel shafts shall not be considered adequate or equal. The rotating assembly (impeller, shaft and rotor) shall be dynamically balanced such that undue vibration or other unsatisfactory characteristics will not result when the pump is in operation.

Pump Discharge: The pump discharge shall be AISI 316 Stainless Steel and configurable to provide a vertical or horizontal connection. The discharge shall be 4" NPT male thread.

Dual Seal System: Each pump shall be equipped with a tandem mechanical shaft seal system consisting of two totally independent seal assemblies. The mechanical seals shall be of non-proprietary design, and shall be manufactured by a major independent manufacturer specializing in the design and manufacture of mechanical seals. The lower, primary seal unit, located between the pump and the lubricant chamber, shall be a metal below seal with SiC/SiC seal faces. The upper, secondary seal unit, located between the lubricant chamber and motor housing, shall be a rubber below seal with Carbon/Ceramic seal faces. Each seal interface shall be held in contact by its own spring system. The seals shall not require



routine maintenance, or adjustment, and shall not be dependent on the direction of rotation for proper sealing. Each pump shall be provided with a lubricant chamber for the shaft sealing system which shall provide heat transfer and maximum seal cooling. The lubricant chamber shall be designed to prevent overfilling, and to provide lubricant expansion capacity. The drain and inspection plug shall have a positive anti-leak seal, and shall be easily accessible from the outside of the pump. The seal system shall not rely upon the pumped media for lubrication and shall not be damaged when the pump is run dry. Seals of proprietary design, or seals manufactured by other than major independent seal manufacturing companies shall not be considered equal.

Bearings: Each pump shaft shall rotate on high quality permanently lubricated, greased bearings. The upper bearing shall be a deep grooved ball bearing and the lower bearing shall be two heavy duty angular contact ball bearings mounted in a back to back arrangement. Bearings shall be of sufficient size and properly spaced to transfer all radial and axial loads to the pump housing and minimize shaft deflection. L-10 bearing life shall be a minimum of 50,000 hours at flows ranging from ½ of BEP flow to 1½ times BEP flow (BEP is best efficiency point). The bearings shall be manufactured by a major internationally known manufacturer of high quality bearings, and shall be stamped with the manufacturer's name and size designation on the race. Generic or unbranded bearings from other than major bearing manufacturers shall not be considered acceptable.

Motor: The motor shall be housed in a water-tight 356-T6 grade aluminum enclosure capable of continuous submerged operation to a depth of 20 meters (65 feet). The motor shall be of the squirrel-cage induction design, NEMA type B and shall have an IP68 protection rating. The copper stator windings shall be insulated with moisture resistant Class F insulation materials, rated for 155°C (311°F). The stator shall be press fitted into the stator housing. The use of bolts, pins or other fastening devices requiring penetration of the stator housing is unacceptable. The rotor bars and short circuit rings shall be made of cast aluminum. The motor shall be designed for continuous duty. The maximum continuous temperature of the pumped liquid shall be 40°C (104°F). The motor shall be capable of handling up to 10 evenly spaced starts per hour without overheating. The service factor shall be 1.15. The motor shall be able to resist a voltage deviation of +/- 10% from nominal, and a phase to phase voltage imbalance tolerance of 1%. The motor shall have an integral cooling jacket and be capable of operating, completely submerged, partially submerged, or unsubmerged.

Overload Protection: The motor shall be protected by an internally mounted motor overload protection and sized per the NEC code.

Thermal Protection: Each phase of the motor shall contain a normally closed bi-metallic temperature monitor switch imbedded in the motor windings. These thermal switches shall be connected in series and set to open at 130°C +/- 5°C (266°F). They shall be connected to the motor starter, and used in conjunction with, and supplemental to, the motor overload protection.

Power Cable: The power cable shall be sized according the 30 CFR part 18 code of federal regulation (MSHA) standard and shall be of sufficient length to reach the junction box without requiring splices. The outer jacket of the cable shall be oil and water resistant thermoplastic elastomer. An approved circuit breaker must also be used in conjunction to the pump, according to MSHA approval.

Cable Entry/Junction Chamber: The cable entry design shall not require a specific torque to insure a watertight seal. The cable entry shall consist of cylindrical elastomer grommets, flanked by stainless steel washers. A cable entry cap incorporating a strain relief and bend radius limiter shall mount to the cable entry boss, compressing the grommet ID to the cable while the grommet OD seals against the bore of the cable entry. Cable entry designs which utilize potting compounds to provide a watertight seal, or those which do not allow the cable to be easily changed in the field shall not be considered equal. The junction chamber shall be isolated and sealed from the motor chamber by o-rings. Electrical connections between the power cables and motor leads shall be made via a compression type grommet sealing each motor cable lead individually.



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