Technical Specifications

A Series Non-Clog Submersible Pump
Installation: Horizontal Dry Pit
Variant: Closed Loop Cooling System

- SCOPE
  These specifications cover the description, performance, and installation of the electric submersible pump(s) to be procured for customer's project. The pump(s) described here are intended for use in a dry well pumping station, installed in the dry well and connected to piping via ANSI Class 125 Cast Iron inlet and outlet flanges. The pump assembly including Impeller, Volute, Motor and Pipe Connections shall be in full compliance with these specifications.

- GENERAL CONDITIONS
  Furnish and install ___Homa Model _____ Electric Submersible Wastewater Pump(s), each consisting of a single stage, non-clog centrifugal pump, close-coupled to a squirrel cage induction type electric motor assembled in a single-body, watertight aggregate, capable of maintaining its watertight integrity submerged under 80 feet of water, complete with Horizontal mounting brackets for automatic operation in a Dry Well. The Pump Discharge connection shall be ___inch ANSI Class 125 Cast Iron.

- PERFORMANCE GUARANTEE
  The pump shall be designed to handle raw, unscreened sewage, storm water, sludge or similar contaminated liquid at a operating point of ____ GPM at ____ FT TDH with a Hydraulic Efficiency of at least ___% . Shut-off head shall be ___ FT minimum. As this pump will be utilized for solids handling, it must be capable of repeatably passing spherical solids up to ___ inch in diameter.

- MATERIALS OF CONSTRUCTION
  Major castings: ASTM A48 Class 40B Cast Iron. - Wear Ring: ASTM Bl44 Bronze. - Shaft: AISI 430F Stainless Steel. - Fasteners: AISI 304 Stainless Steel. - O-Rings: Nitrile Rubber. - Shaft Seals: Silicon Carbide/Silicon (motor and impeller side). Cable Jacket: Neoprene. - Cable Entry: elastomer grommet, stainless steel washers.- Protective Coating (on outside surface): High Solids Epoxy.

- IMPELLER
  Impeller will be cast as one piece and shall be one of the following designs:
  ( ) single-vane closed (double-shrouded), radial non-clog (“AM” or “AMX” Models)
  ( ) two-vane closed (double-shrouded), radial non-clog (“AK” Models)
  ( ) multi-vane open (single-shrouded), torque-flow (vortex, 4" and 6" “AV” models)
  statically and dynamically balanced, to assure that vibration amplitudes, measured at the level of the upper bearing while operating in a vertical position, remain within the limits specified by the Hydraulic Institute Standards.

- VOLUTE
  Volute will be cast in one piece, with smooth internal contours and surfaces, providing obstruction-free passageways with low friction losses. A stationary Wear Ring, made of bronze, shall maintain close tolerances between the rotating Impeller and the stationary Volute.

- SHAFT
  Pump shaft must have generous shoulder fillet radii to minimize stress concentration and fatigue. Deflection at the Shaft Seal within the operating range shall not be more than 0.002 inch.

- BEARINGS
  Pump shaft shall be supported by anti-friction bearings, designed for 50,000 hours B-l0 Life at the pumps Best Efficiency Point ,and shall be factory pre-lubricated for life. The lower impeller-side bearing will be a double-row, deep groove ball bearing, axially retained, to sustain both axial and radial loads. The upper motor-end bearing is a single-row, deep groove ball bearing axially floating, to sustain radial loads only.

Technical Specifications

- WATERTIGHT INTEGRITY

  The watertight integrity of the single-body pump-motor assembly shall be assured.
  The Cable Entry shall contain an elastomer grommet, flanked by two washers, closely fitted to the cable O.D. A watertight seal shall be maintained by screwing a threaded gland down to a positive stop (metal-to-metal, to prevent permanent deformation by overtightening), thereby tightly compressing the grommet around the cable. The gland will provide a strain-relieving , anti-kink feature, functioning independently from the separate sealing action. For pumps above 30 horsepower an isolated Junction Box containing the Terminal Board, and sealed from the Motor Compartment by a watertight isolation plate, will provide a secondary barrier against water or moisture penetration. Each pump shall be supplied with 30 feet of SO Type power cable.

- SEALS

  Motor Compartment shall be isolated from the Liquid End by Single Mechanical Shaft Seals in tandem arrangement (dual-independent, both oriented to resist pressure from the impeller). The upper motor side seal shall run in an Oil Chamber, which separates the Motor Compartment from the Liquid End and provides permanent lubrication and cooling. The lower impeller side seal will also get lubrication from the Oil Chamber. Each seal will have a stationary portion and a positively driven rotary portion. Springs must be protected from the pumped liquid; and under no circumstances can solid particles accumulate on the external spring and hamper its effectiveness. Seals must not require repeated checking or re-adjustment, except periodic inspection of the oil chamber. At the interfaces of major castings, sealing shall by accomplished by resilient Buna-N O-Rings, confined within closely fitted, high surface quality rabbet joints, compressed only to the prescribed dimension by metal-to-metal contact, allowing radial movement and preventing permanent set. Flat gaskets and seal rings, which may be squeezed unevenly or beyond the permanent deformation limit, are not allowed.

- SEAL PROBE

  A single wire, conductive seal probe shall be provided with pump. Probe shall be mounted into mechanical seal chamber and shall be accessible without disassembly of pump. When interlocked with control panel, probe shall indicate the presence of contaminants within mechanical seal chamber..

- ELECTRIC MOTOR

  Each pump shall be driven by a Submersible Squirrel Cage Induction Motor, rated at ___ HP _____RPM_____Volts____ Phase. Motor shall be NEMA Design B for continuous duty, capable of sustaining a minimum of 10 starts per hour. The pump and motor shall be produced by one manufacturer and shall be of the air-filled, watertight design.

  All stator windings and leads shall be insulated with moisture-resistant Class F Insulation, capable of withstanding l55^{O}C Max. temperature, dipped and baked three times. Upon assembly the stator shall be heat-shrink-fitted into the stator housing; the use of bolts, pins or other fastening devices, which would require penetration of the stator housing, shall not be acceptable.

  In each phase winding there shall be embedded a bi-metallic temperature sensor, wired in series and interlocked with the motor overload protection in the Control Panel. Any of these thermal sensors shall cut out electric power if the temperature in its winding exceeds l40^{O}C, but shall automatically reset when the winding temperature returns to normal. The motor shall be non-overloading through the selected performance curve and have a Service Factor of l.l5.

  When the application requires, the motor shall be approved for use in Hazardous (Classified) areas. Pumps shall be suitable for operation in Class 1, Division 1, Groups C & D Areas only and shall be approved by Factory Mutual (FM) for use in the area classification indicated. Seal leak probe, if required, shall be dual wire. All FM Approved pumps supplied for use in Hazardous areas shall be supplied with an isolated junction box as described above.

- COOLING SYSTEM

  Motors shall be equipped with a self contained, internal cooling system to provide adequate cooling of the motor under any operating point on the selected performance curve. Cooling system shall be comprise of a shaft driven impeller operating within a diffuser assembly to provide directional flow of coolant media from the heat exchange area, through the stator housing, and returning to the heat transfer area. Heat is to be removed from the coolant media by contact with the surface of the heat transfer plate being continuously cooled by the pumpage. Auxillary ports are to be included in the coolant loop to permit external connection in the event of high temperature pumpage.