Technical Specifications

A Series Non-Clog Submersible Pump
Installation: Vertical Dry Pit

- 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 Base Elbow for automatic operation in a Dry Well. The Pump Discharge connection shall be ___inch ANSI Class 125 Cast Iron and the Base Elbow inlet 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. – Cooling Jacket: AISI 304L Stainless Steel. - O-Rings: Nitrile Rubber. - Shaft Seals: Silicon Carbide/Silicon Carbide (impeller and motor side). Cable Jacket: Neoprene. - Cable Entry: elastomer grommet, stainless steel washers.- Protective Coating: 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” & “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 minimum 50,000 hours B-l0 Life at the pumps Best Efficiency Point ,and shall be factory pre-lubricated. 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.

  Each Cable Entry Assembly 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 cable entry gland into a cable inlet flange which bolts into the motor cap. The cable entry gland threads down to a positive stop, 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. The cable inlet flange shall contain an oring groove on the bottom side of the flange to allow for watertight integrity of the bolt-on cable entry assembly when bolted into the entry holes in the motor cap. For pumps above 10 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 readjust-ment, 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 conductive seal probe shall be provided with pump. Probe shall be mounted into mechanical seal chamber and when interlocked with control panel, probe shall indicate the presence of contaminants within mechanical seal chamber. Option for external seal probe devices shall be readily available and field retrofittable for all pumps.

- ELECTRIC MOTOR

  Each pump shall be driven by a Submersible Squirrel Cage Induction Motor in accordance with NEMA MG I Section IV Part 30, rated at ___ HP _____RPM_____Volts____ Phase. Motor shall be NEMA Design B for continuous duty, capable of sustaining 15 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 H Insulation. 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, 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 and shall be approved by Factory Mutual (FM) for use in the area classification indicated.

- COOLING JACKET

  Motors shall be equipped with a Cooling Jacket around the Stator Housing, filled during operation with the pumped liquid, to provide adequate cooling of the motor under any operating point on the selected performance curve. Impeller back vanes shall be employed to keep liquid in forced circulation throughout the cooling jacket and a properly sized and positioned air vent pipe shall assure air is not trapped within jacket.