GOULDS WATER TECHNOLOGY

a xylem brand

SPECIFICATIONS

1GAX2GAXS

1GAX/2GAX

Explosion Proof Submersible Grinder Pumps

GENERAL

- Furnish and install ____ Goulds Water Technology, Model 1GAX or 2GAX, dual seal submersible grinder pump(s), ____ HP, ____ phase, ____ volts, ____ Hz, pump(s) rated for ____ GPM, at ____ Ft. Total Dynamic Head.
- Pump(s) shall be Goulds Water Technology, Order No: ____ .

QUALIFICATIONS

All pump manufacturers must be pre-qualified by the engineer in order to qualify as acceptable manufacturers. Pre-qualification shall be no later than two (2) weeks prior to published bid date for this project. Failure to pre-qualify will be grounds for disqualification after the bid opening date. All decisions of qualification shall reside with the engineer of record at time of bidding.

PUMP DESIGN

Pump(s) shall have 1½ inch or 2" NPT vertical discharge. The pump shall be capable of grinding domestic and commercial raw sewage containing small quantities of plastic, rubber, cloth, paper and other non-abrasive solids.

PUMP CONSTRUCTION

Major pump components shall be of grey cast iron, ASTM A-48, Class 35B, with smooth surfaces devoid of blow holes or other irregularities. All exposed nuts or bolts shall be AISI type 304 stainless steel or brass construction. All metal surfaces coming into contact with the pumpage, other than stainless steel or brass, shall be protected by a factory applied spray coating of acrylic dispersion zinc phosphate primer with a polyester resin paint finish on the exterior of the pump.

Sealing design shall incorporate metal-to-metal contact between machined surfaces. Critical mating surfaces where watertight sealing is required shall be machined and fitted with Nitrile or Viton rubber O-rings. Fittings will be the result of controlled compression of rubber O-rings in two planes and O-ring contact of four sides without the requirement of a specific torque limit.

Rectangular cross sectioned gaskets requiring specific torque limits to achieve compression shall not be considered as adequate or equal. No secondary sealing compounds, elliptical O-rings, grease or other devices shall be used.

VOLUTE

Pump volute(s) shall be single-piece grey cast iron, Class 35B, non-concentric design with smooth passages large enough to pass any media that may enter the impeller. Minimum inlet and discharge size shall be as specified.

IMPELLER

The impeller(s) shall be of grey cast iron, Class 35B, dynamically balanced, single shrouded design having a long throughlet without acute turns. The impellers shall be capable of handling fine slurry from the special cutters. Impeller(s) shall be taper collet fitted and retained with an allen head bolt. All impellers shall be coated with an acrylic dispersion zinc phosphate primer.

GRINDER ASSEMBLY

The pump shall contain special cutters to reduce sewage to a fine slurry. The stationary cutter shall be constructed of hardened 316L stainless steel. The rotary cutter shall be constructed of chrome alloyed cast iron. The cutter materials shall provide corrosion and abrasion resistance.

EXPLOSION PROOF MOTOR

Listed for use in Class I, Division I, Groups C and D; Class II, Division I, Groups E, F and G and Class III, Division I hazardous locations. The pump motor shall be induction type with a squirrel cage rotor, shell type design, housed in an air filled, watertight chamber, NEMA B type. The stator windings and stator leads shall be insulated with moisture resistant Class F insulation rated for 311° F (155° C). The stator shall be dipped and baked three times in Class F varnish and shall be heat-shrink fitted into the stator housing. The use of bolts, pins or other fastening devices requiring penetration of the stator housing is not acceptable. The motor shall be designed for continuous duty handling pumped media of 104° F (40° C) and capable of up to 15 evenly spaced starts per hour. The rotor bars and short circuit rings shall be made of cast aluminum. Thermal switches set to open at 260° F (125° C) shall be embedded in the stator lead coils to monitor the temperature of each phase winding. These thermal switches shall be used in conjunction with and supplemental to external motor overload protection and shall be connected to the control panel. The motor and pump shall be designed and manufactured by the same source.

The combined service factor (combined effect of voltage, frequency and specific gravity) shall be a minimum of _____ . The motor shall have a voltage tolerance of plus or minus 10%. The motor shall be designed for operation up to 104° F (40° C) ambient and with a temperature rise not to exceed 176° F (80° C).

BEARINGS

The pump shaft shall rotate on two bearings. Motor bearings shall be permanently grease lubricated. The upper bearing shall be a single deep groove ball bearing. The lower bearing shall be a two row angular contact bearing to compensate for axial thrust and radial forces. Sleeve or single row lower bearings are not acceptable.

COOLING SYSTEM

Motors are sufficiently cooled by the surrounding environment or pumped media. A water jacket is not required.

PUMP SHAFT

The pump and motor shaft shall be the same unit. The pump shaft is an extension of the motor shaft. The shaft shall be AISI type 431 stainless steel. The use of shaft sleeves and shaft material of lower quality than 431 stainless steel shall not be allowed or considered equal. This is because a shaft sleeve only protects the shaft around the lower mechanical seal and not in the oil housing and above.

MECHANICAL SEAL

Each pump shall be provided with a tandem mechanical shaft seal system consisting of two totally independent seal assemblies. The seals shall operate in a lubricant reservoir that hydrodynamically lubricates the lapped seal faces at a constant rate. The lower, primary seal unit, located between the pump and the lubricant chamber, shall contain one stationary and one positively driven rotating ceramic ring. Seal lubricant shall be FDA approved, non-toxic. The upper, secondary seal unit, located between the lubricant chamber and the motor housing, shall contain one stationary hard face seal ring and one positively driven rotating hard face seal ring. Refer to nomenclature page for specific seal materials. Each seal interface shall be held in contact by its own spring system. The seals shall require neither maintenance nor adjustment nor depend on direction of rotation for sealing. The position of both mechanical seals shall depend on the shaft. Mounting of the lower mechanical seal on the impeller hub will not be acceptable.

The following seal types shall not be considered acceptable nor equal to the dual independent seal specified: shaft seals without positively driven rotating members, or conventional double mechanical seals containing either a common single or double spring acting between the upper and lower seal faces. Cartridge type systems will not be acceptable. No system requiring a pressure differential to offset pressure and to effect sealing shall be used.

Each pump shall be provided with a lubricant chamber for the shaft sealing system. The lubricant chamber shall be designed to prevent overfilling and to provide lubricant expansion capacity. The drain and inspection plug, with positive anti-leak seal shall be easily accessible from the outside. The seal system shall not rely upon the pumped media for lubrication.

CABLE ENTRY SEAL

The cable entry seal design shall preclude specific torque requirements to insure a watertight and submersible seal. The cable entry shall consist of a single cylindrical elastomer grommet, flanked by washers, all having a close tolerance fit against the cable outside diameter and the entry inside diameter and compressed by the body containing a strain relief function, separate from the function of sealing the cable. The assembly shall provide ease of changing the cable when necessary using the same entry seal. Epoxies, silicones or other secondary sealing systems shall not be considered acceptable.

POWER CABLE

The power cable shall be sized according to the NEC and ICEA standards and shall be of sufficient length to reach the junction box without the need of any splices. The outer jacket of the cable shall be oil resistant chloroprene rubber. The motor and cable shall be capable of continuous submergence underwater without loss of watertight integrity to a depth of 65 feet. The motor horsepower shall be adequate so that the pump is non-overloading throughout the entire pump performance curve from shut-off through run-out.

PROTECTION

All stators shall incorporate thermal switches in series to monitor the temperature of each phase winding. At 260° F (125° C) the thermal switches shall open, stop the motor and activate an alarm.

A leakage sensor shall detect water in the stator chamber. The Float Leakage Sensor (FLS) is a small float switch used to detect the presence of water in the stator chamber. When activated, the FLS, when connected to a Mini CAS, will send an alarm and, if desired, stop the motor.

The thermal switches and FLS shall be connected to a Mini CAS (Control and Status) monitoring unit. The Mini CAS is designed to be mounted in any control panel.

Use of voltage sensitive solid state sensors and trip temperature above 260° F (125° C) shall not be allowed.

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