SUBMERSIBLE SOLIDS HANDLING PUMPS
HPE SERIES SPECIFICATION SHEET

GENERAL

Furnish Hydromatic HPE series or premium solids handling submersible sewage pump(s) as specified herein.

Pump shall be equipped with stainless steel nameplate, stating the unit is accepted for use in Standard Location or NEC class 1, division 1, groups C, D hazardous locations with third party, Factory Mutual, approval.

The pump shall be non-overloading throughout the entire range of operation without employing service factor. The pump shall reserve a minimum service factor of 1.30. The performance curve submitted for approval shall state in addition to head and capacity performance, the pump efficiency, solid handling capacity, and reflect motor service factor.

Job Name: _____

- Pump: HYDROMATIC HPE _____
- Number of Pumps: _____
- Impeller: _____
- Discharge: Shall be _____ " ANSI flange.
- Motor: Shall be _____ HP _____ V _____ Hz _____ Phase, Oil Filled Design. Motor shall be Explosion Proof listed.
- Power Cord: Shall be epoxy potted and equipped with a minimum of 35' of power cord.
- Pump Operating Characteristics: Each pump shall be verified for performance. Pump Shall operate at following conditions;
  - 0 GPM at _____ TDH
  - _____ GPM at _____ TDH
  - _____ GPM at _____ TDH
  - _____ GPM at _____ TDH

CONSTRUCTION

Castings – Cord Cap/Motor Housing/Bearing Housing/Seal Plate shall be ASTM A48 Class 30 Cast Iron

Shaft shall be 416 Stainless Steel

Impeller - ASTM A48 Cast Iron Class 30 or ASTM A536 Ductile Iron Class 65

Fasteners/Hardware shall be 300 series Stainless Steel

Elastomers – O-Rings/Mechanical Seals/Cord Grip Grommets shall be Nitrile with optional Fluoropolymer Elastomer

Mechanical Seals shall be Carbon/Silicon Carbide with optional Silicon Carbide/Silicon Carbide, Tungsten Carbide/Silicon Carbide or Cartridge Seal

Power Cable shall be type SOOW or W while Control Cable shall be SOOW

Lifting Bail shall be welded or forged 300 Series Stainless

ELECTRICAL POWER CORD

Standard:

The power cord will be SOOW or W, oil and water resistant 600v, 90C, UL and CSA approved and applied per NEC ampacities ratings at the cables rated temperature for intermittent / continuous duty. The pump shall be double protected with a compression fitting and an epoxy potted area that seals each conductor at the power cord entry to the pump. The power cable entry into the cord cap assembly shall first be made with a compression fitting. Each individual lead shall be stripped down to bare wire at staggered intervals and each strand individually separated. This area of the cord cap shall then be filled with an epoxy compound potting. This assembly will prevent water contamination from gaining entry even in the event of wicking or capillary action. The power cord leads shall be connected to the motor leads with a terminal block or extra heavy connectors. The cord cap assembly where bolted to the motor housing shall be sealed with a Nitrile O-ring on a beveled edge to assure proper sealing. Wiring connection shall be done through a terminal block eliminating wire nuts or use of heavy duty crimp connectors.

MOTOR

The motors shall meet premium efficiency in accordance with IEC 60034-30, level IE3 and NEMA MG1 [NEMA 12.60 Enclosed motor]. Motor rating tests shall be conducted in accordance with CSA C390-10 requirements. A certificate shall be available upon request. The motors are submerged in non-toxic, oil filled, cool running design providing significantly reduced operating temperatures. Pump designs requiring a secondary cooling apparatus shall be deemed unapproved and not equal. Air filled pump designs shall not be considered equal or approved.

- Motor will be of the squirrel-cage induction design, NEMA type A or B for 3 Phase [Per NEMA MG1 1.19] & NEMA type L for 1 Phase [Per NEMA MG1 1.20]
- The copper stator windings shall be insulated with moisture resistant Class H insulation materials, rated for 180° C (356° F). [Per NEMA MG1 1.66]
- The service factor shall be 1.3 in wet pit service and 1.0 for VFD operation (as defined by MG1 standard). The motor shall have a voltage tolerance of +/- 10% from nominal, and a phase to phase voltage imbalance tolerance of 1%.
- 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), and intermittently up to 50° C (122° F). Each of the three phases will have a UL/FM approved thermostat or thermistor. The winding operating temperature at rated horsepower and service factor will be a maximum of 130° C @ 40° C ambient. (Maximum of 150° C for 320/360 frame HPE product)
- The motor shall be capable of handling up to 15 (>=20kW) and 20 (<20kW) evenly spaced starts per hour without overheating. [Per NEMA MG1 12.54]
- The motor shall meet the requirements of NEMA MG1 Part 30 and 31 for operation on PWM type Variable Frequency Drives. The rotors will have high efficiency laminated steel with die cast bars and shorting rings. The stators will have high efficiency laminated steel (if required to meet premium efficiency), with inverter duty rated, Class H magnet wire & insulation materials. Each of the three phases will have a UL/FM approved thermostat or thermistor set for 130C +/-5. (150C +/-5 for 320/360 frame HPE product)

BEARINGS

The upper bearing shall be a heavy-duty radial single row ball bearing while the lower bearing shall be a double row heavy-duty angular contact ball bearing of the thrust limiting design. Minimum of 50,000 hours of B10 bearing life for radial & thrust bearings while operating across entire hydraulic operating range of the pump. Any Pumps having rated B10 life only at the BEP shall not be considered equal or approved. Bearing shall be lubricated for life from the factory and will be accomplished through the non-toxic, low viscous, dielectric oil in the frame. Pump designs requiring periodic scheduled bearing service shall not be considered equal or approved. Single row or sleeve lower bearings shall not be acceptable.

SHAFT

The pump shaft shall be an integral, one piece unit adequately designed to meet the maximum torque required at any normal start up condition or operating point in the system. Shafts of carbon steel, chrome plated or spin welded shafts shall not be considered adequate or equal. Material of shaft shall be 416 stainless steel conforming to ASTM 8582.

FLUID END

The impeller shall be ASTM Class 30 Cast Iron or ASTM Class 65 Ductile Iron with optional SST available. The impeller mounting is to be a slip fit onto a tapered shaft and a drive key. The impeller shall be attached to the shaft by a SST fastener and impeller washer. The impeller is to be balanced to ISO1940-1 Grade G6.3 standard. Impeller designs that rely on fins or pins protruding into the suction path to assist in the handling of fibrous material shall not be considered equal. Impellers shall be of the radial single or two vane type or a vortex impeller having the ability to pass a wide range of solids. Any impeller design requiring mechanical bypass mechanism located in the volute in order to handle solids shall not be considered equal or acceptable.

The volute shall be ASTM Class 30 also with optional SST. It will consist of a centerline discharge one piece design. The passages are to be large enough to pass the same solid size as the impeller. The discharge and inlet flanges shall be ANSI Class 125 and be integrated into the volute case. The wear rings shall be replaceable radial wear rings constructed of 85-5-5-5 bronze that come standard in the volute case with optional SST available in 304, 316 or 410.

CHOPPER FLUID END

The chopper fluid end shall feature a cutting blade and plate made from 440 stainless steel and hardened to 57-60 Rockwell C. The cutting plate will be adjustable to ensure proper alignment and will feature a relief groove to force debris from the cutting surface. The cutting blade will have serrated edges and will be fastened to the impeller in a manner that allows for easy replacement. Any chopper pump that performs the cutting action directly with the impeller or with a cutting blade that is integral to the impeller shall not be considered equal or acceptable.

SEALS

Each pump will be equipped with a tandem mechanical seal design. The lower seal shall be of the type 2 design and constructed of Carbon/ Silicon Carbide and be replaceable without disassembly of the seal chamber and without the use of special tools. The upper seal shall of the type 2100 design and constructed of Carbon/Silicon Carbide. Each seal will not require routine maintenance or adjustment. For ease of maintenance both the lower and upper seals shall be locally available and of a standard design.

SHAFT GROUNDING RING

The pump shall be capable of being equipped with an optional shaft grounding ring. This shaft current mitigation technology uses proprietary conductive filaments to protect bearings from stray shaft currents by providing a low impedance path to ground, drawing the currents safely away from the bearings. Pumps not utilizing a current diverter technology shall not be considered equal or acceptable.

EQUIPMENT MONITORING

The integrity of the mechanical seal system shall be continuously monitored during pump operation and stand by time. Two electrical probes shall be provided in a sensing chamber positioned between the primary and secondary mechanical seal for detecting the presence of water contamination within the chamber. The sensing chamber shall be fitted with environmentally safe nontoxic oil. A solid state relay mounted in the pump control panel or in a separate enclosure shall send a low voltage, low amperage signal to the probe, continuously monitoring the conductivity of the liquid in the sensing chamber. If sufficient water enters the sensing chamber through the primary mechanical seal, the probe shall sense the increase in conductivity and signal the solid state relay in the control panel. The relay shall then energize a warning light on the control panel, or optionally, cause the pump to shut down. This system shall provide an early warning of mechanical seal leakage, thereby preventing damage to the submersible pump and allowing scheduled rather than emergency maintenance. Systems utilizing float switches or any other monitoring devices located in the stator housing rather than in a sensing chamber between the mechanical seals are not considered to be early warning system, and shall not be considered equal.

SERVICEABILITY

The motor housing, seal housing with seal plate and impeller still attached to the shaft shall be capable of being lifted out of the volute case from the top as one assembly. For ease of repair, the motor stator shall be securely held in place by an end ring so it can be easily removed without the use of heat or a press.

TESTING

All pumps shall be built in a dedicated domestic factory with sixty years of continuous operation. All pumps shall be visually inspected to confirm they are built in accordance with the specification as to HP, voltage, phase and hertz. The motor housing will be filled with dielectric oil and shall be allowed to run dry to check for proper rotation. Discharge piping shall be attached, the pump submerged in water, and amp readings shall be taken on each phase to verify balanced stator windings. All pumps shall receive standard Hydraulic Institute® (HI) non-witnessed testing at a third-party agency-certified test lab.

PAINT

The pump shall be painted with waterborne hybrid acrylic/alkyd paint. This custom engineered, quick dry, low VOC paint shall provide superior levels of corrosion and chemical protection. Optional coatings are available through the factory of chlorinated rubber, coal tar epoxy and polyamide epoxy.

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