IRRIGATION & INDUSTRIAL BID SPECIFICATIONS

VERTICAL SUBMERSIBLE TURBINE PUMPS (5-, 6-, 8-, & 9-INCH)

1.0 GENERAL

1.1 Manufacturer Requirements

1.1.1 Manufacturer shall be in active production of Vertical Submersible Turbines used on submersible water well motors.

1.1.2 Each factory assembled pump shall be wet tested at 3 points to verify it meets factory specifications and the resulting curve from this test shall be shipped with the pump.

1.1.3 Curves used to select the pump must have their accuracy verified by the pump manufacturer as true and correct for current production. A curve and manufacturer statement confirming this shall be submitted with the bid.

1.1.4 Manufacturer shall be a recognized member of water systems industry associations such as National Groundwater Association (NGWA) and Water Systems Council (WSC) and actively contribute both human and financial resources to continuously improving water industry standards.

1.1.5 Pumps and motors shall be by the same manufacturer to ensure the best optimization of components relative to performance and service life.

1.1.6 Pump and motor shall be manufactured by Franklin Electric or have obtained an "Approved Equal" status from the Specifying Engineer.

1.2 Quality Requirements

1.2.1 Pumps shall be produced in an ISO certified facility in North America.

1.2.2 Every factory assembled pump shall be wet tested to verify it meets manufacturing performance specifications prior to shipment.

1.3 Permanently Affixed Nameplate Minimum Data

1.3.1 Original Manufacturer's Name (OEM)

1.3.2 Country of Assembly

1.3.3 Model Number (pump description)

1.3.4 Serial Number (a unique manufacturing number for this unit)

1.3.5 Order Number (bill of material number)

1.3.6 Pump Submersible Motor Horsepower Required

1.4 After the Sale In-Field Minimum Requirements

1.4.1 The pump manufacturer shall directly employ a North American based, full-time, Field Service Group that is regionally disbursed.

1.4.1.1 They shall provide at-the-well site assistance.

1.4.1.2 They shall provide support by telephone and internet.

1.4.1.3 They shall conduct application and installation group training regularly in the field.

1.4.2 Their group shall maintain factory based training facilities in North America and schedule periodic training classes.

1.4.3 Factory laboratories shall furnish no-charge written performance and teardown reports to the Field Service Group and customer to assist them in resolving field issues.

1.5 Application and Installation Documentation Minimum Requirements

1.5.1 The pump manufacturer shall create and provide a Pump Owner's Manual for their submersible pumps that clearly provides data required to properly install the pump.

1.5.2 This manual shall be regularly reviewed and updated by the pump manufacturer to ensure the manual remains both correct and current.

1.5.3 This manual shall be available in a published copy for field use and on the manufacturer's internet site.

2.0 PUMP SPECIFICATIONS

2.1 Pump Construction

2.1.1 Motor Adapter and Discharge Case Materials shall be ductile close grain cast iron with a minimum material strength equal to ASTM A536 65-45-12 ductile iron. They shall be free from sand holes, blow holes or other faults and must be accurately machined and fitted to close tolerances.

2.1.2 Bowls shall be designed for maximum efficiency and be of high strength ductile iron or gray iron lined with vitreous enamel to provide superior wear resistance.

2.1.3 Bowls and their connecting bolts shall be capable of withstanding maximum pressures not less than:

- 5-inch STS: 800 PSI (pounds per square inch)
- 6-inch STS: 400 PSI
- 6-inch STS, XP construction: 700 PSI
- 8-inch STS: 650 PSI
- 8-inch STS, XP construction: 1300 PSI
- 9-inch STS: 750 PSI

2.1.4 Upthrust Protection: The top end of the pump shall have an upthrust protection system that includes a type 300 series stainless steel bolt that accurately allows for the adjustment of the upthrust gap.

2.1.5 Impellers shall be enclosed type and investment cast from ASTM A744 CF8 stainless steel. They shall be free from defects and must be balanced to grade G6.3 or higher from ISO 1940/1 for optimum performance and minimum vibration. Impellers are to be standard product of the pump manufacturer and not contain special workmanship to temporarily increase efficiency.

2.1.6 Impeller Fastening: The impellers shall be secured to the shaft with taper locking collets of type 316 or 416 series stainless steel.

2.1.7 Discharge Case/Bracket shall be provided with an extended length ASTM 8584 C89835 copper bismuth bearing that is grease packed with a non-toxic FDA approved waterproof grease.

2.1.8 Suction Inlet Adapter/Bracket shall be high strength ductile iron with a minimum strength equal to ASTM A536 65-45-12 and shall contain an ASTM 8584 C89835 copper bismuth bearing. The inlet area shall have a net open area of at least four times the eye of the impeller.

2.1.9 Suction Inlet Bearing Protection: This bearing shall be protected from abrasive damage by an inlet bracket designed that only allows pumped water to enter above the bearing. The bearing shall also be protected by a sand rejection collar placed just above the bearing. The sand rejection collar shall be made of type 300 series stainless steel.

2.1.10 Suction Inlet Strainer/Screen shall only allow water to enter above the bearing. The strainer/screen shall be made of type 302 series stainless steel.
2.1.11 Pump Shaft shall be ASTM A582 type 416 stainless steel. The shaft shall be precision turned, ground and polished to a minimum surface finish of 40 micro-inches, rms (root mean squared).
2.1.12 Bowl Bearings: All bowls shall have a water lubricated Styrene-Butadiene fluted rubber bearings, Viton fluted rubber bearings, or copper bismuth bearings as required by this specification.
2.1.13 Case, Bowls, and Adapter Connections shall be of the high pressure bolt-together style. The bolts shall be quick drive hex head 18-8 stainless steel.
2.1.14 Cable Guard shall be 18-8 stainless steel and be positively attached to the pump with 300 series stainless steel, slotted, hex head screws. The screw head shall be suitable for either a socket or a straight blade screwdriver.
2.1.15 Motor Coupling shall be stainless steel and shall conform to NEMA specifications. The coupling shall be capable of transferring the total torque including starting torque in either direction of rotation. The coupling shall have a set screw so it can be correctly positioned on the pump shaft.
2.1.16 Pump Discharge Threading shall be NPT (National Pipe Tapered) threads.
2.1.16.1 5-inch pumps shall have either 3- or 4-inch FNPT (Female NPT) threads as required by this specification.
2.1.16.2 6-inch pumps shall have 4-inch FNPT threads.
2.1.16.3 8-inch pumps shall have either 4- or 6-inch FNPT threads as required by this specification.
2.1.16.4 9-inch pumps shall have either 6-inch FNPT threads, or a combination of 6-inch FNPT and 8-inch MNPT (Male NPT) threads.
2.1.17 Column Pipe shall be "Grade A" steel pipe with the ends machined with 8 threads per inch with ¾-inch taper. Inside diameter of the pipe shall have losses equal to or less than 5-feet per 100-feet of length. Pipe shall be connected with threaded sleeve steel couplings and threaded spring loaded check valves as required by the motor manufacturer application manual.

2.2 Industry Standard Requirements
Pumps shall be designed and furnished in accordance with the HI (Hydraulic Institute) and AWWA (American Water Works Association) specifications for submersible turbine pumps.

2.3 Design Conditions
2.3.1 Design flow requirements: gpm (gallons per minute)
2.3.2 Design total dynamic head: feet (TDH)
2.3.3 Minimum pump efficiency: %
2.3.4 Maximum allowable speed: rpm
2.3.5 Liquid to be pumped: Water
2.3.6 Pump discharge setting feet below ground level
2.3.7 Water drawdown level: feet below ground level
2.3.8 Well casing inside diameter: inches

2.4 Pump Mechanical Options (Select Only One in Each Section)
2.4.1 Pump Diameter is not critical. Select the best pump for the design conditions.
- 5-inch pump
- 6-inch pump
- 8-inch pump
- 9-inch pump

2.4.2 Bowl Shaft Bearings
- Styrene-Butadiene fluted rubber bearings (standard): These bearings are best for most water well applications where there is a chance of some abrasives being present.
- Copper bismuth bearings (optional): These bearings are an option for water well applications where no or extremely few abrasives may be present.
- Viton fluted rubber bearings (optional): These bearings are best for chemically aggressive water and/or higher temperature water.

2.4.3 Pump Discharge Diameter: Notice: Column pipe "Best Practice" is for losses to be less than 5-feet per 100-feet of length. Discharge size is not critical. Select the best diameter for the design conditions.
- 5-inch pump: 3-inch discharge
- 5-inch pump: 4-inch discharge
- 6-inch pump: 4-inch discharge
- 8-inch pump: 4-inch discharge
- 8-inch pump: 6-inch discharge
- 9-inch pump: 6-inch discharge
- 9-inch pump: 6- and 8-inch combination discharge

2.5 Agency Approvals
2.5.1 Water Quality Mechanical Device NSF/ANSI-61 & 372 Cold Water 6R21
2.5.2 CSA Certified (Pump End Only)

CLASSIFIED UL
WATER QUALITY MECHANICAL DEVICE NSF/ANSI 61 & 372 COLD WATER 6R21

CSA CERTIFIED PUMP END ONLY
151236
C US
NSF/ANSI 61 Drinking Water