



## MOBILE HYDRAULIC PROPELLER PUMP SPECIFICATIONS

### 1.0 SCOPE

This specification covers supply and installation of Hydraulically driven, end-suction Axial or Mixed Flow Pump and Discharge Piping designed specifically for municipal, commercial and industrial water handling applications. Pump(s) shall be manufactured by FPI of Pompano Beach, FL, or approved equal.

**1.1 Qualifications** - The pump manufacturer shall be a company actively engaged and specialized in the manufacture of the type of specified pump(s) in this section. Design of the pumps shall be under direct supervision of a Registered Professional Engineer in the State of manufacture and experienced in the design of pumps described in this section. Pump manufacturer must be ISO 9001 Certified for the manufacture of Axial Flow Pumps. ISO Certificate must be included with the bid.

### 2.0 OPERATING CONDITIONS

Number of Pump(s)	_____
Design Capacity	_____ GPM (m <sup>3</sup> /sec)
Min. suction water elevation	_____ ft. (GNVD) (m)
Design suction water elevation	_____ ft (m)
Max. suction water elevation	_____ ft (m)
Min discharge water elevation	_____ ft (m)
Design discharge Water Elevation	_____ ft.(m)
Max discharge water elevation	_____ ft (m)
Min TDH	_____ ft. (m)
Design TDH	_____ ft. (m)
Maximum TDH	_____ ft. (m)
Guaranteed Efficiency at design point	_____ %

The pump(s) performance shall be non-overloading for the design KW of the furnished driver. Driver and related components shall have not less than a 1.15 S.F.

2.1 **Speed** – The speed of the pumps shall not exceed \_\_\_\_ revolutions per minute.

### 3.0 MATERIALS

**Material types** - Materials not specifically described shall conform to the latest approved industry standard(s) covering appropriate class or types of materials. In general, the material types used in the manufacture of the pumps shall conform to the following:

<u>COMPONENT</u>	<u>MATERIAL TYPE</u>	<u>SPECIFICATION</u>
Mounting Plate	Structural Steel	ASTM A-36
Column & Elbow	Corten	ASTM A-242
Steel Plate	Corten	ASTM A-242
Cold Rolled Steel bars		AISI/A-1018
Hot Rolled Steel Bars		ASTM A-36
Stainless Steel Plate	316 Type L	
Pipe	Schedule 80	A-53
Propeller Shafting	416 SS	ASTM 276
Intake bell	Corten	ASTM/A-242
Bearings	Angular contact	

### 4.0 PUMP CONSTRUCTION

The pump shall be hydraulically driven, consisting of an intake bell, impeller housing, bearing housing with mechanical seal, lower and upper bearing section and discharge diffuser components. The complete water pump assembly and discharge pipe shall be painted per Engineer’s specifications.

4.1 **Pump / Diffuser Bowl** - The Intake Bell shall be made of ASTM A242 steel plate, with a minimum wall thickness of \_\_ in (mm) and shall be flanged for mating to the propeller housing. Intake Bell diameter shall be no less than 1-1/2 times the impeller diameter. It shall be supported entirely by the propeller housing. The propeller housing shall be made of ASTM A242 steel and shall be flanged for mating to the suction bell. It shall provide a close running tolerance to the propeller.

4.2 **Propeller** - The Propeller and hub shall be manufactured from ASTM A242 steel plate, with a minimum wall thickness of \_\_\_\_ in (mm). The propeller shall be attached to the shaft by a locking nut and key. The propeller bore shall be tapered for ease of assembly and disassembly. The propeller blades shall be ground and polished for maximum hydraulic efficiency. The blades shall be chamfered on both sides for full penetration welding. The periphery of the blades shall be machined for a close running fit with the impeller bowl. The complete propeller shall be statically balanced after manufacturing.

**4.3 Propeller Shaft / Bearing Housing** – The propeller shaft shall be of ASTM A-276, Type 416, stainless steel. Provide for removal of propeller from below without disassembly of pump above propeller bowl. The propeller shaft shall be supported and held in place by means of angular contact thrust bearings designed for total down thrust and momentary upthrust and encased in a specially design bearing housing manufactured out of ASTM A-242.

The hydraulic motor shall be of fixed displacement, vane type designed for the torque imposed by the propeller and to meet the design speed criteria. The propeller shaft and the motor shaft shall be coupled using a jaw-type coupling. The assembly shall be prevented from turning in the reverse direction by utilization of check valves in the hydraulic circuit. Adequate hose length shall be provided based on the site requirements to connect the pump assembly to the drive unit. An external oil cooler may be provided depending on the design loads.

**4.4 Pump Column and Discharge Elbow** - The pump column and discharge elbow shall be made of ASTM A242 steel plate, with a minimum wall thickness of \_\_\_\_in (mm). The elbow shall be of the long radius, with the centerline radius not less than 1 times the nominal pipe diameter.

**4.5 Lifting Lugs** – Major pump components shall be furnished with lifting lugs to facilitate handling, and designed and arranged to allow safe handling of pump components singly or collectively as required during shipping, installation, and maintenance.

**4.6 Nuts and Bolts** – Bolts used in assembling pump and its supporting members shall be of Stainless Steel. Only hexagonal bolts and nuts shall be used. Washers shall be of Stainless Steel.

**4.7 Name Plate** - A stainless steel pump name plate shall be furnished stating the manufacturers name and location, pump serial number, design RPM, rated gallons per minute capacity at the specified TDH. The name plate shall be located in a readily visible location.

**4.8 Hardware** – All Machine bolts, nuts and capscrews shall be hex head type. Hardware and parts requiring special tool shall not be used.

**4.9 Mobile Unit** - The unit shall be constructed out of rigid frame and steerable front and with adequate stiffness to all the loading and unloading of the pumping unit with ease. The following components shall form the part of the unit assembly:

1. Diesel engine with the details provided herein

2. Hydraulic pump assembly consisting of relief valve, filters and strainers, oil reservoir.
3. Diesel fuel reservoir with necessary control components
4. Water pump support components, discharge hose and hydraulic winch and controls.

4.10 **Hydraulic Controls** – Necessary hydraulic controls shall be provided for the unit operation with all the necessary safety shut down features.

5.0 **WELDING** – Pump and pipe welding shall be continuous and full penetration inside and out. All slag shall be removed and undercutting shall not exceed 15% of the material thickness.

6.0 **PAINTING** – Pump interiors and exteriors shall be painted with the manufacturers paint system, or as specified. As a minimum, the pump shall be sandblasted to paint manufacturers specifications, then painted with two (2) coats (minimum 6 mils) of a high solids epoxy paint system similar to Ameron Amerlco 400 and Amercoat 450 or approved equal. Alternate paint systems are acceptable provided that the pump manufacturer can demonstrate corrosion resistance equal to the high solids epoxy system.

7.0 **INSPECTION** – The pump manufacturer shall arrange for the inspection by the Engineer of the pump parts during manufacturing to assure compliance with these specifications. The owners representative shall have the option of witnessing the pump performance testing.

## 8.0 PIPING

8.1 **Piping** - Piping shall be of ASTM A242 steel with a minimum \_\_\_\_in (mm) wall thickness. Approximate dimensions shall be field verified.

8.2 **Siphon Breaker** – Siphon Breaker if required, shall be Harris \_\_\_\_in (mm) Siphon Breaker and Air Relief Valve by W.P. Wilson & Sons.

## 11.0 EXECUTION

11.1 **Testing** - The pumps shall be field certified performance tested as per HI test standards prior to pump approval. The owners representative shall have the option of witnessing the pump performance testing. The manufacturer shall submit three bound copies of the field test report, prior to acceptance by owner.

11.2 **Inspection** – The pump manufacturer shall arrange for the inspection by the Engineer of the pump parts during manufacturing to assure compliance with these specifications.

11.3 **Warranty** – The pumps shall be warranted for one (1) year. Warranty shall include both the pump and the drive unit. Warranty shall go into effect from the date of acceptance by the owner. Defects or failures shall be promptly replaced with new parts by the manufacturer at no additional cost to the owner within the warranty period.

Exceptions shall include instances where it could be conclusively proven that failure was a result of improper operation of the equipment, either prior or after the acceptance by the owner.