

Hydroflo Pumps USA, Inc.
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Specifications: Vertical Turbine Pump, Deep Set, Oil Lubricated

A. Scope

This specification covers a deep well lineshaft turbine pump with above ground discharge, arranged for oil lubrication of the lineshaft bearing by a manual or electric assembly and furnished with suitable driver and accessories as specified herein. The pumping unit shall be designed and furnished in accordance with the latest Hydraulic Institute and AWWA Standard for lineshaft turbine pumps.

B. Service Conditions

The pump shall be designed and constructed to operate satisfactorily with a reasonable service life, when installed in a dependable and adequate water resource location. The pump shall be the product of, and manufactured by Hydroflo Pumps. Other manufacturers will be considered providing the unit offered is an approved equal in all respects to the brand and model preferred by the customer. Factory pump curves for alternate pumps shall be submitted with the bid.

C. Operating Conditions

Design conditions:	_____	Gallons per minute
Design head:	_____	Feet total dynamic head (TDH)
Minimum pump efficiency of:	_____	Percent
Maximum allowable speed:	_____	RPM
Pump bowl setting:	_____	Feet
Well diameter I.D.:	_____	Inches

D. Pump Construction

1. Bowl assembly: The bowls shall be flanged type constructed of close grained cast iron conform to ASTM A48, class 30. They shall be free from sand holes, blowholes, or other faults and must be accurately machined and fitted to close tolerances. They shall be capable of withstanding a hydrostatic pressure equal to twice the pressure at rated flow or 1.5 times shut-off head, whichever is greater. The intermediate bowls shall have enamel or epoxy lined waterways for maximum efficiency and wear protection. All intermediate bowls shall be of identical design for interchangeability. An oil lubricated adapter with drain ports and adapter bearing shall be used to connect the intermediate bowl to the enclosed column assembly. An extra long bronze throttle bushing shall be used in the top intermediate bowl and oil lube adapter to minimize the amounts of water leakage through the drain ports. Drain ports are to be provided with sufficient area and shape and angle to permit a non-horizontal escape of water that passes through the throttle bushing. All bowls shall be fitted with sleeve type bearing of bronze alloy C584-836.

2. Impellers: The impellers shall be constructed by investment cast 201ss or 304ss steel, ASTM A296 and shall be the enclosed (or semi-open) type. They shall be free from defects and must be accurately cast, machined for optimum performance and minimum vibration. Impellers shall be balanced to grade G6.3 of ISO 1940 as minimum. They shall be securely fastened to the bowl shaft with taper locks of 416ss steel.

3. Suction: The suction bowl shall be provided with a non-soluble grease packed bronze bearing. A bronze sand collar shall be provided to protect this bearing from abrasives in the pumping fluids. The bearing housing shall have sufficient opening at the bottom for easy removal of the bearing.

4. Shaft: The bowl shaft shall be constructed from ASTM A582 type 416 stainless steel. It shall be precision ground and polished with surface finish better than 40 RMS.

E. Column Assembly-Oil Lubricated

1. Column pipe: The column pipe shall be furnished in sections not exceeding a nominal length of 20 ft. It shall be of ASTM A53 grade B steel pipe and weight shall be not less than schedule 30. The pipe ends shall be machined with 8 threads per inch with 3/16 taper and faced parallel to butt against subsequent column pipes. Inside diameter of the pipe shall be such that the head losses shall not be over 5 feet per 100 feet of pipe. The pipe shall be connected with threaded sleeve type steel couplings.

2. Enclosing Tube: The enclosing tube shall be made of ASTM A120 schedule 80 pipe in interchangeable section not more than 5 ft. in length. The top special section shall be designed for applying proper tension to the tube. Both ends of each tube length shall be bored, faced, and inside threaded with left hand threads. The ends of the tube shall be square with the axis and shall butt to ensure accurate alignment. The tube shall be of such overall assembled length to properly match the length of the discharge column. The enclosing tube shall be stabilized in the column pipe by rubber centering spider spaced 20 feet from the top and bottom, and 40 feet intervals throughout the balance of the column length.

3. Bearings: The lineshaft bearing which serves as a coupling for the shaft tubing shall be spaced at each tube length, to maintain alignment of pump shafting and to prevent excessive vibration. They shall be of bronze material and machined, threaded and grooved for proper lubrication.

4. Lineshaft: The lineshaft shall be of ASTM A108 Grade C1045 steel ground and polished with surface finish not to exceed 40 RMS. They shall be furnished in interchangeable section not over 20 feet in length, and shall be coupled with threaded steel couplings machined from solid steel bar. It shall have left-hand threads to tighten during pump operation. The diameter of the shaft and coupling shall be designed in according with AWWA E101 Standard.

F. Discharge Head Assembly-Oil Lubricated

1. Discharge Head: It shall be of the high profile type to allow shaft coupled above tension plate/tension nut assembly and provided for mounting the driver and support the column and bowl assemblies. It shall be of high-grade Ductile Iron, ASTM A48 Class 65, or fabricated steel. The above ground outlet shall be flanged to match ___ inch ANSI class 125 (for cast iron) or class 150 (for steel). It shall have a 1/2" NPT connection for a pressure gauge.

2. A tension plate and tension nut assembly shall be installed in the discharge head to allow proper tension to be placed on the shaft enclosing tube. The tension plate nut shall be of cast iron with O-ring at the bottom end to provide the seal. The tension nut/bearing shall be made of silicon bronze to maintain tube tension and support for the head shaft. After proper tensioning, the tension nut shall be locked into position by a steel capscrew.

G. Suction Pipe and Strainer

The suction pipe shall be ___ feet in length and shall have a minimum inside diameter and weight equal to or larger than that of the discharge column pipe. A suitable cone strainer of 18-8ss steel shall be provided having a free area of at least five times the flow area of the suction pipe.

H. Electric Motor

The motor shall be a heavy duty squirrel cage induction type, NEMA Class B or Class F insulation with WP-I enclosure, ___ RPM vertical hollow (or solid) shaft motor; with a non-reverse ratchet (or self-release coupling) to prevent reverse rotation of the rotating elements. A thrust bearing of ample capacity to carry the weight of all rotating parts plus the maximum hydraulic thrust load under all conditions of operation calculated L10 life shall be no less than 8800 hours. The motor shall be standard (or premium) efficiency, 1.15 service factor, and suitable for use on ___ volt, three phase, 60 Hz electric service.

An adjusting nut shall be provided at the top of the motor for setting the impeller to bowl running clearance.