**Specifications: Vertical Turbine Pump, Product Lubricated**

**A. Scope**

This specification is for a vertical lineshaft turbine pump with an above-ground discharge manufactured for product lubrication of the lineshaft bearings by the liquid being pumped and furnished with a specified driver and accessories. The pumping unit shall be designed and manufactured in accordance with the latest Hydraulic Institute and AWWA specifications for lineshaft turbine pumps.

**B. Service Conditions**

When installed in a proper turbine pump application, the pumps shall be designed and built to operate satisfactorily with a reasonable service life. The product shall be manufactured by Integrity Pump and Motor Group, LLC, or other manufacturers that meet the required material standards and performance specifications.

**C. Operating Conditions**

Design Conditions: \_\_\_\_\_\_\_\_\_\_\_\_\_ gallons per minute (GPM)

Design Head: \_\_\_\_\_\_\_\_\_\_\_\_\_ feet TDH (Total Dynamic Head)

Minimum Pump Eff: \_\_\_\_\_\_\_\_\_\_\_\_\_ Percent

Maximum Pump Speed: \_\_\_\_\_\_\_\_\_\_\_\_\_ RPM

Liquid Pumped \_\_\_\_\_\_\_\_\_\_\_\_\_

TPL: \_\_\_\_\_\_\_\_\_\_\_\_\_ Feet (Total Pump Length from Head bottom to Strainer bottom)

Well diameter I.D. \_\_\_\_\_\_\_\_\_\_\_\_\_ Inches

**D. Bowl Assembly Construction**

1. Bowl Assembly: The intermediate bowls, discharge cases, and suction bowl shall be flanged and constructed of cast Ductile Iron and conform to ASTM A536 GR. 65-45-12. They shall be free from sand holes, blow holes, or other faults and must be accurately machined and fitted to close tolerances. The intermediate bowls shall have glass-lined enamel or epoxy enamel coated flow passages for maximum efficiency. All threaded discharge cases shall be threaded to an 8 TPI butt standard for product-lubricated column assembly. All assembly bolting shall be Stainless Steel. The bowl assembly bearings shall be constructed of NSF 61 certified Glide 400 Polymer for superior run dry, wear resistance, and low friction coefficient. The suction-bearing Sand Collar shall be constructed of Glide 400 Polymer.

2. Impellers: The impellers shall be Investment-Cast Stainless Steel and conform to AISI/ASTM 304 or 201 Stainless Steel and shall be the enclosed type. They shall be free from defects and must be investment-cast, machined, backfilled, and balanced for optimum efficiency and performance. They shall be securely fastened to the bowl shaft with Stainless Steel taper lock collets or Stainless Steel Keys and Locking Collars, depending on application and impeller construction. C1045 steel will NOT be accepted. The impellers shall be adjustable utilizing a top shaft adjusting nut or adjustable solid shaft coupling.

3. Bowl Shaft: The bowl shaft shall be constructed from PSQ 416 stainless steel, ASTM A582 pump shaft material. It shall be precision machined and straightened within .002 - .004 tolerance.

**E. Discharge Head Assembly – Water Lubricated**

1. Discharge Head: The Discharge head shall be of the high-profile type and have a suitable motor base. It shall be constructed of cast Ductile Iron and conform to ASTM A536 GR. 65-45-12 or fabricated steel. The head shall have a \_\_\_\_\_ size discharge of grooved design or flanged, ASTM 125/150 lb., suitable for the capacity of liquid being pumped. The head shall allow the top shaft to couple above the stuffing box. The head shall be threaded or machined for a flange to accept the desired column pipe in this specification.

2. Stuffing Box: The stuffing box shall be constructed of cast Ductile Iron and conform to ASTM A536 GR. 65-45-12. The sealing material is to contain a minimum of five rings of John Crane 1345 packing and a Lantern Ring constructed of Glide 400 Polymer. The housing shall have an available fitting for pressure relief if needed. The packing gland shall be constructed of Stainless Steel and secured in place by Stainless Steel studs and nuts. The packing box bearing shall be constructed of Glide 400 Polymer. A rubber slinger shall be provided to operate on the top shaft above the packing gland.

**F. Column Assembly – Water lubricated**

1. Intermediate Column: Intermediate column lengths and lineshaft bearing spacing shall not exceed 10 feet with pump speeds up to 2200rpm. Pump speeds between 2200rpm and 3600rpm shall have column and bearing spacing no greater than 5 feet.

2. Column Pipe: The column pipe shall be a minimum grade B Steel pipe with ends machined with 8 TPI butt threads and parallel end faces. The pipe shall be assembled using threaded sleeve-type ductile iron couplings and accept ¾” ring spider-bearing retainers. All column pipes shall be of schedule 40 thickness or greater.

3. Spider Bearings: The spider bearing retainers shall be constructed of Investment Cast Stainless Steel and conform to AISI/ASTM 316 with a machined bearing bore. They shall be furnished for shaft stabilization at each column pipe coupling. A press fit bearing constructed of Glide 400 Polymer shall be installed in each spider.

4. Lineshaft: Lineshaft shall be PSQ 416 Stainless Steel, ASTM A582 pump shaft material, and shall be sized according to the horsepower requirements of the designed pump. The butting faces shall be machined square to the axis of the shaft, with the maximum permissible axial misalignment on the thread axis with the shaft axis .002” in 6”. These shafts shall be coupled with 416 Stainless Steel lineshaft couplings.

**G. Suction Strainer**

Strainer: A basket or Cone Strainer constructed of 304 Stainless Steel shall be provided. Basket strainers shall be clip-on/bolt-on style using Stainless Steel fasteners. Cone strainers shall be designed to thread into the pump suction case.

**H. Electric Motor**

Motor: The motor shall be a heavy-duty squirrel cage induction type, NEMA MG-1, \_\_\_\_\_HP, \_\_\_\_\_\_\_\_\_RPM, vertical hollow shaft motor or solid shaft motor, with a non-reverse ratchet to prevent reverse rotation. A suitable thrust bearing shall be included to meet the designed pump’s hydraulic thrust load plus the weight of the rotating parts under the operating conditions. The motor shall be high efficiency with a WP-1 enclosure, a 1.15 service factor and match the required voltage and phase at 60HZ.