

# Horizontal Split-Case Pump Specifications

## Part I – GENERAL

### 1.1 WORK INCLUDED

- A. Contractor shall furnish and install Grundfos Horizontal Split-Case pump, PACO Model KP complete with pump, motor, baseframe, coupling and coupling guard in accordance with manufacturer's recommendations and plans.

### 1.2 REFERENCE STANDARDS

The work in this section is subject to the requirements of applicable portions of the following standards:

- A. HI – Hydraulic Institute
- B. ANSI – American National Standards Institute
- C. ASTM – American Society for Testing and Materials
- D. IEEE – Institute of Electrical and Electronics Engineers
- E. NEMA – National Electrical Manufacturers Association
- F. NEC – National Electrical Code
- G. ISO – International Standards Organization
- H. UL – Underwriters Laboratories, Inc.
- I. CSA – Canadian Standards Association
- J. OSHA – Occupational Safety & Health Administration
- K. ASME – American Society of Mechanical Engineers
- L. IEC – International Electrotechnical Commission
- M. ETL – Electrical Testing Laboratories

## Part 2 – PRODUCTS

### 2.1 HORIZONTAL SPLIT-CASE PUMP

- A. Furnish and install Horizontal Split-case pumps as per plans and pump schedule.
- B. The pump, electric motor, base frame, coupling and coupling guard shall be factory assembled at the pump manufacturer's facility. The pump manufacturer shall have complete unit responsibility.

#### 2.1.1 PUMP

- A. The pumps shall be long coupled, base mounted, single stage, double suction, axial split case design, in cast iron bronze fitted construction specifically designed for quiet operation.

- B. Pumps shall have the casing divided on the horizontal centerline. The casing halves shall be accurately machined, bolted and doweled together. A non-asbestos type gasket material shall be furnished between the casing halves. The casing material shall be close-grained cast iron ASTM A48 - Class 35 with a minimum tensile strength of 35,000 P.S.I. Pumps shall be fitted with lead-free bronze renewable case wear rings indexed with a dowel pin for fixed positioning. Removal of the upper casing half and bearing housings shall permit removal of the complete rotating assembly without disturbing piping connections. Volute shall have integrally cast support feet, gauge ports at nozzles, and vent and drain ports. Pumps with larger than 4-inch discharge flanges shall be of the double volute design extending to both upper and lower half of the casing. Casings shall be designed for scheduled working pressure and shall be hydrostatically tested at 150% of the maximum working pressure under which the pump could operate at design speed. Suction and discharge flanges shall be drilled to ANSI Standards and be machined flat face.
- C. Pumps shall be provided with removable bearing housings which will permit inspection and/or replacement of the mechanical seals and bearings without removing the rotating assembly or upper half of the casing. Straightening vanes shall be cast in both the bearing housings and casing to reduce pre-rotation of fluid prior to entry into the impeller.
- D. The bearing housing shall be removable and supply support for heavy-duty single row grease lubricated ball bearings, with provision for purging or flushing if desired. The pump shaft shall be adequately supported by the pump bearings to limit the shaft deflection to 0.002 inches. Bearings shall be ball type, grease lubricated and locked to the shaft with positive locks of ample size to withstand any axial thrust loads. Each bearing housing shall be bolted to the upper and lower casing halves for a full 360-degree support registered fit to insure positive alignment. Bearing shall provide a minimum  $L_{10}$  life of 50,000 hours when calculated at the duty point for the scheduled pump.
- E. The pump shaft shall be of stainless steel with optional bronze sleeves covering the wetted area of the shaft.
- F. The pump manufacturer shall recommend the proper mechanical seal based on the pressure, temperature and liquid outlined on the equipment schedule. Mechanical seals, at a minimum, shall have ceramic stationary seats, carbon rotating seats, Buna elastomers and stainless steel hardware. Application of a mechanical seal shall be internally flushed type, without requiring external flushing lines. Seals shall be capable of being inspected and easily replaced without removing the upper half of the casing.
- G. Impeller shall be of the enclosed Francis Vane type, double suction design, made of silicon bronze, ASTM B584 C87600, both hydraulically and dynamically balanced to ISO 1940-1:2003 balance grade G6.3 and keyed to the shaft. The impeller shall be trimmed to meet the specific hydraulic requirements.

- H. A coupling, capable of absorbing torsional vibration and of operating in variable speed applications, shall be employed between the pump and motor. An optional spacer coupler shall be available in order to allow for replacement of mechanical seals and bearings without disturbing pump volute or movement of the pump's motor and electrical connections.
- I. The pump manufacturer shall provide a coupling guard, per ANSI/ASME B15.1-2000, which shall be mounted between the pump and motor.
- J. Base plate shall be welded structural steel fully enclosed at sides and ends, with securely welded cross members. The minimum base plate stiffness shall conform to ANSI/HI 1.3-2000, section 1.3.5.3 for *Horizontal Base Plate Design* standards.
- K. Pump rotation shall be clockwise or counter-clockwise as viewed from the pump's motor end.
- L. Pump shall be of a maintainable design for ease of maintenance and should use machine fit parts which are easily disassembled.
- M. Each pump shall be painted with one coat of high quality factory approved paint and name-plated before shipment from the factory.
- N. Pump manufacturer shall be ISO-9001 certified.
- O. Standard Pump Construction- The standard material of construction for the pump shall be as below.
  - Casing: Cast iron ASTM A48 – Class 35
  - Case wear ring: Lead-Free Bronze, ASTM B584-90500
  - Impeller: ASTM B584 C87600
  - Shaft: Stress-proof steel, AISI1144
  - Shaft Sleeve: Bronze, III932 C89835
  - Mechanical Seals: Carbon–Ceramic with Buna elastomers and stainless steel hardware
  - Bearings: Grease lubricated heavy-duty ball bearing
  - Optional special material shall be available based on requirements
- P. Optional Pump Construction for 12" to 24" discharge sizes- Optional material of construction for the pump shall be as below.
  - Casing: Ductile iron ASTM A356-80
  - Impeller: AISI304 or AISI316 stainless steel
  - Shaft and Shaft Sleeves: Stainless Steel
  - Optional special material shall be available based on requirements

### **2.1.2 MOTORS**

- A. Motors shall meet scheduled horsepower, speed, voltage, and enclosure design. Pump and motors shall be factory aligned, and shall be realigned after installation by the manufacturer's representative.
- B. Motors shall be suitably sized per ISO5199 and shall meet NEMA specifications and conform

to the standards outlined in EISA 2007.

## **2.2 INSTALLATION**

The pumps shall be realigned by the contractor, according to the standards of the Hydraulics Institute, after grouting of the base and connection of piping.

## **2.3 TESTING**

Where noted on schedule, pumping equipment may require one or more of the following:

- Certified Performance test
- Hydro static test
- NPSH Test
- Any other factory test as noted in the pump schedule

The testing shall be in accordance with Hydraulic Institute level B or the latest HI standard as noted in the pump schedule.

## **2.4 WARRANTY**

The warranty period shall be a non-prorated period of 12 months from date of installation, not to exceed 18 months from date of manufacture. Warranty shall cover against defective material and/or faulty workmanship.

**END OF SECTION**