

Frame Mounted End Suction Pump Specifications

Part I – GENERAL

1.1 WORK INCLUDED

A. Contractor shall furnish and install Grundfos end suction frame mounted pump, PACO Model LF complete with pump, motor, base frame, 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
- N. NSF – National Sanitation Foundation

Part 2 – PRODUCTS

2.1 Frame Mounted End Suction Pumps

- A. Furnish and install frame mounted end suction 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 PUMPS

- A. The pumps shall be flexible coupled, base mounted, single stage, end suction top discharge design, cast iron stainless steel fitted construction specifically designed for high performance.
- B. The pumps shall have the following features:

1. All pumps shall be of the back pull-out design so that the rotating element can be removed from the casing without disconnecting the suction or discharge piping. The casing material shall be close-grained cast iron ASTM A48 - Class 30 with a minimum tensile strength of 30,000 P.S.I. Volute shall have integrally cast suction and discharge connections, gauge ports at nozzles, and vent and drain ports. Pumps with specific speed greater than 1600 shall have double volute casing. Pumps with discharge size 3" and larger shall have suction splitter to reduce pre-rotation and improve efficiency. Casings shall be designed for scheduled working pressure and can withstand hydrostatic test at 150% of the maximum working pressure under which the pump could operate at design speed.
2. Pumps with impeller diameter larger than 5" shall be fitted with bronze renewable case wear rings.
3. Pumps with discharge size 2.5" and larger shall have full flanged connections on both suction and discharge. Suction and discharge flanges shall be drilled to ANSI Class 125# standards and be machined flat face.
4. Pumps with discharge sizes 2" and below shall have NPT threaded connection.
5. Pump shall be mounted on a heavy-duty cast-in-one-piece cast iron bearing frame with integrally cast feet to mount on a common base frame.
6. The bearing frame shall be of the back pull-out design and supply support for heavy-duty single row, double shield, deep groove greased for life ball bearings. The pump shaft shall be adequately supported by the pump bearings to limit the shaft deflection to 0.002 inches. Bearing shall provide a minimum L10 life of 20,000 hours.
7. The pump shaft shall be of solid, stress-proof steel AISI 1144 with Bronze sleeves covering the wetted area of the shaft.
8. 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 rings, 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 piping or volute.
9. Impeller shall be of the enclosed francis vane type, single suction design, made of Stainless Steel 304 (UNS S30400), 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.
10. Pump Construction. The standard material of construction for the pump shall be as below. Special material shall be available as option to suit the liquid pumped.
 - Volute: Cast iron ASTM A48 - Class 30
 - Case Wear ring: Tin Bronze ASTM B584-90500
 - Impeller: Stainless Steel 304 (UNS S30400)

- Shaft: Stressproof Steel AISI 1144
 - Shaft Sleeve: Bronze III932 C89835
 - Mechanical Seals: Carbon – Ceramic with Buna Elastomers and Stainless Steel hardware
 - Bearings: Greased for life Heavy duty Single row Ball bearing
 - Bearing Frame: Cast iron ASTM A48 - Class 30
- C. A flexible coupling shall be employed between the pump and motor. A coupling capable of absorbing torsional vibration and of operating in variable speed applications shall be provided upon requirement. 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.
- D. The pump manufacturer shall provide an OSHA approved coupling guard, which shall be mounted between the pump and motor.
- E. Base frame shall be cast iron or welded structural steel with securely welded cross members and integral drip pan. The minimum base plate stiffness shall conform to ANSI/HI 1.3-2000, section 1.3.5.3 for *Horizontal Base Plate Design* standards. Bases shall be groutable.
- F. Pump rotation shall be clockwise as viewed from the motor end.
- G. Pump shall be of a maintainable design for ease of maintenance and should use machine fit parts that are easily disassembled.
- H. Each pump shall be painted with one coat of high quality factory approved paint and name-plated before shipment from the factory.
- I. Where noted on schedule the pump shall also be NSF-50 or NSF-61 certified.
- J. Pumps shall be manufactured and assembled in an ISO-9001 certified facility.

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 pump shall be installed per manufacturer's recommendations. 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