

## Eccentric Hose Pumps

### **Part 1 – General**

#### 1.01 Description

- A. Pumps described in this section shall be peristaltic hose-type complete with accessories as indicated and specified.
- B. The quantity of pumps shall be supplied as indicated in the process pump schedule.
- C. Provide ample room and facilities for inspection, repair, and adjustment.

#### 1.02 Related Work

#### **AS REQUIRED FOR SPECIFIC PROJECT**

#### 1.03 Quality Assurance

- A. All hose pumps to be the product of one manufacturer.
- B. Pumps to be manufacturer's standard catalog product.
- C. Pump manufacturer must provide pumps, gear reducers, motors, drives, pulsation dampeners, leak detection systems and pressure gauges/switches and other accessories as specified herein, regardless of manufacturer, as a complete integrated package to insure proper coordination and compatibility. Pumps and variable frequency drives and/or control panels will be rejected if not supplied by the pump manufacturer.

#### 1.04 Submittals

- A. Submit the following:
  - 1. A copy of this specification section with related addenda shall be submitted with each paragraph check-marked to designate specification compliance or marked to indicate deviation from the specification.
  - 2. If deviations are indicated, these items shall be circled with a detailed written justification for the deviation and any resultant changes required for the proper coordination of this equipment into the system.
  - 3. Failure to include a copy of the marked up specification or detailed justification will result in rejection of the entire submittal with no further review and consideration.
  - 4. Certified shop drawings.
  - 5. Data regarding pump and motor characteristic and performance inclusive of guaranteed performance curves showing equipment meets the specified requirements of head, capacity, and horsepower.
  - 6. Provide characteristic curves for variable speed pumps.
  - 7. Shop drawings and catalog information for all accessory items.
  - 8. Complete dimensional drawings showing recommended location of anchor bolts.
  - 9. Operating and maintenance instruction and parts lists.
  - 10. Schematic control and power wiring.
  - 11. Recommendations for long and short term storage.
  - 12. Recommended location and mounting of pulsation dampening devices.

#### 1.05. Delivery, Storage, & Handling

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- A. Shipping
  - 1. Ship equipment, material, and spare parts complete, except where partial disassembly is required by transportation regulations or for protection of components.
  - 2. Pack all spare parts in containers bearing labels clearly designating its contents.
  - 3. Deliver spare parts at the same time as the equipment. Deliver to Owner after completion of work.
  - 4. Ship pumps with hoses and lubricant installed unless otherwise directed by the manufacturer or this specification.
  
- B. Receiving
  - 1. Contractor to inspect and inventory items upon delivery to site.
  - 2. Contractor to store and safeguard equipment, material, instructions, and spare parts in accordance with manufacturer's written instructions and in an indoor location.

## **Part 2 – Eccentric Hose Pump**

### 2.01 Manufacturers

- A. Eccentric Pumps - PO Box 190159, Atlanta, GA 31119 [www.eccentricpumps.com](http://www.eccentricpumps.com)

### 2.02 Pump Construction

- A. Pump
  - 1. General
    - a. Positive displacement, peristaltic type hose pump
    - b. Capable of operating in either direction without flow variation
    - c. Capable of running dry without damage to pump or hose
    - d. Capable of pulling 95% of full vacuum
    - e. Repeatability:  $\pm 1\%$  accurate
    - f. Valveless/Glandless design with no dynamic seals in contact with the pumped product.
    - g. Direct Coupled gear drive arrangement as specified herein.
  - 2. Hose and Lubricant
    - a. Hose shall be manufactured of three layers with an extruded inner wetted layer compatible with the process fluid, multiple layers of fabric reinforcement and an elastomeric outer layer. Hose outside diameter shall maintain a wall thickness within  $\pm 0.5$  mm tolerance. Hoses that do not meet these minimum requirements are not acceptable.
    - b. Minimum static burst pressure rating of 800 psi
    - c. 60-64 shore A durometer.
    - d. Hose must be replaceable without pump removal.
    - e. Pump housing shall be filled approximately 30% with a food grade hose lubricant blended to provide a medium for cooling and lubrication.
    - f. Provide a threaded drain plug at the lowest point of the pumping chamber to allow the complete drainage of lubricant.
  - 3. Pump Body with Internal Bearing Frame
    - a. Pump body shall be constructed of Aluminum 356T6 and shall be supplied with an internally mounted bearing assembly that is independent of the gear

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- drive bearings. Gear unit shall be direct coupled and mounted to the back of the pump body and shall be completely isolated from the process fluid and pump lubricant through the sealed bearing assembly. Gear unit and drive components shall be serviceable without removal of pump shaft.
- b. The single roller, whose diameter is at least 40% of the inside diameter of the pump body, shall be constructed of UHMW PE and shall be mounted on a removable eccentric shaft. The roller shall have full length sleeve bearings on its inside diameter for to carry the load of the compressed hose. Pumps incorporating sliding shoes or multiple rollers are unacceptable.
  - c. The pump main shaft shall be independently supported on its own set of ball bearings such that the bearings are located within the bearing assembly of the main body. Bearings shall be sealed via a seal constructed of Buna-N. Bearings shall be greased with a grease point access located at the top of the pump.
  - d. The eccentric shaft and roller shall be driven by a shaft which extends through the bearing housing and shall be keyed for hollow shaft connection to the direct coupled gear unit.
  - e. External bearing frames which allow overhung loading and requiring long coupling configurations are not acceptable. Close coupled pumps where the rotor is mounted directly on the gearbox shaft are not acceptable.
  - f. The drive and housing shall be design to accommodate multiple hose sizes for flexibility of operation and future modification without changes to the pump housing or drive assembly.
4. Connectors
    - a. Supply pump with threaded inlet and outlet connections to NPT standards. Connections shall be provided in a material compatible with the process fluid as indicated in the Process Pump Schedule.
    - b. Pump hose shall extend from the pumping chamber to the clamping area of the main body. The hose connection shall be captured by a single band-it style closure constructed of stainless steel.
    - c. The hose barb shall have a stainless steel positioning washer located behind the barb hex and in front of the hose.
    - d. The pump and clamp assembly shall be cast with a hex shape to catch the barb so that the connections are rigid.
    - e. Inlet and outlet connections must be located 180° from one another and located at the top of the pump.
  5. Pump Cover
    - a. Cover shall be constructed of Aluminum SR319.
    - b. Provide a clear viewing inspection window constructed of clear polycarbonate. Window shall be sufficiently sized to view direction of rotation of the pump. Window shall indicate the level of lubricant when the pump is stationary.
    - c. Pump cover shall be sealed to the pump body via an EPDM gasket.
    - d. Pump hardware shall be stainless steel.
  6. Frame
    - a. Frame shall be integral to the main body of the pump.

## 2.04 Pump Drive System

### A. Gearing

1. Provide planetary, cycloidal or off-set helical gearing mounted to the pump housing and supplied with a female hollow input shaft to accept the main pump shaft.
2. Construct gears and shafts of alloy steel and housings of cast iron or aluminum.
3. Match torque rating of pumping equipment, with gearing classified for continuous heavy shock duty, AGMA Class III, 24 hr duty with a minimum of 1.5 service factor.
4. Design gear reduction to match output speed requirement of the pump.

### B. Motors

#### **THIS IS A TYPICAL MOTOR SPEC – PLEASE MODIFY AS REQUIRED FOR EACH APPLICATION**

1. Provide premium efficient, TEFC or TENV, squirrel-cage induction motors conforming to the latest applicable requirements of NEMA, IEEE, ANSI, and NEC standards.
2. Provide motor HP in accordance with Process Pump Schedule.
3. Motors are to be designed for continuous operation. Motors shall have 1.15 service factor but shall be selected for operation within their full load rating without applying the service factor.
4. External cooling fan on TEFC motors shall be corrosion resistant, non-sparking, bi-directional, keyed, clamped, and shouldered on the motor shaft.
5. Motors shall be rated for inverter duty with PWM type variable frequency drives. Motors frame size 56-180 shall be rated for 10:1 constant torque continuous duty over 6-60 Hz. Larger frame motors shall be rated for 4:1 constant torque continuous duty over 15-60 Hz.

## 2.05 Exterior Coating

- A. Provide pump assembly finish coated within manufacturer's standard coating system.

## 2.06 Accessories & Controls

#### **THE FOLLOWING ITEMS ARE OPTIONAL FOR YOUR SYSTEM. PLEASE REFER TO THE FACTORY TO SELECT THOSE ITEMS APPROPRIATE TO YOUR APPLICATION.**

1. High lubricant leak detector
  - a. Provide a float type magnetic switch or capacitance sensing switch located near the top of the pump to detect leakage of pumped product into the pump. Mount the sensor on the rear of the pump body.
  - b. Supply the sensor with the option of normally open or normally closed operation.
  - c. Pump manufacturer to supply switch only. Contractor is responsible for alarm, wiring and relay to turn pump off unless otherwise specified herein.
2. Inlet and Outlet Pulsation Dampeners
  - a. Supply an inlet and /or outlet pulsation dampener as listed in the process pump schedule.
  - b. Pulsation dampeners to be rechargeable bladder type.
3. Variable Frequency Drives

- a. Supply a variable frequency drive as specified and if required in the process pump schedule.

#### 2.07 Spare Parts

- A. Provide spare parts that are identical to and interchangeable with parts installed. Furnish and deliver the following spare parts for each size pump:
  - 1. Two replacement hoses
  - 2. Two hose lubricant refills

### **Part 3 - Execution**

#### 3.01 Installation (By Contractor)

- A. Contractor shall install items in accordance with manufacturer's printed instructions, the project drawings and as specified.
- B. Contractor shall install pumping equipment on a concrete pad and make final alignment.
- C. Contractor shall install accessories in accordance with manufacturer's written instruction.
- D. Contractor shall prove the pump's suction and discharge port connections to process lines are non-leaking and made in a free supported state without need to apply vertical or horizontal pressure to align piping with pump nozzles.

#### 3.02 Field Testing

(By Contractor with assistance of Manufacturer's Field Service Technician)

- A. After installation of pumping equipment, and after inspection, operation, testing, and adjustment have been completed by the Contractor in the presence of the Manufacturer's Field Service Technician, Contractor shall conduct running test for each pump in the presence of the Engineer to determine its ability to operate within the performance limits specified and to deliver its rated capacity within the pressure requirements specified. Contractor shall provide labor, piping, equipment, and materials necessary for conducting all field tests.
- B. Contractor shall make all adjustments necessary to place equipment in specified and working order at the time of above tests.
- C. Promptly correct or replace all defective equipment revealed by or noted during tests at no additional cost to the Owner and repeat tests until specified results acceptable to Engineer are obtained.

