

SECTION 23 21 30 - HYDRONIC PUMPS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes in-line centrifugal pumps and accessories.

1.3 SUBMITTALS

- A. Product Data: Include certified performance curves and rated capacities, operating characteristics, furnished specialties, final impeller dimensions, and accessories for each type of product indicated. Indicate pump's operating point on curves.
- B. Shop Drawings: Show pump layout and connections. Include setting drawings with templates for installing foundation and anchor bolts and other anchorages.
 - 1. Wiring Diagrams: Power, signal, and control wiring.
- C. Operation and Maintenance Data: For pumps to include in emergency, operation, and maintenance manuals.

1.4 QUALITY ASSURANCE

- A. Source Limitations: Obtain all hydronic pumps through one source from a single manufacturer.
- B. Product Options: Drawings indicate size, profiles, and dimensional requirements of hydronic pumps and are based on the specific system indicated.
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- D. UL Compliance: Comply with UL 778 for motor-operated water pumps.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Manufacturer's Preparation for Shipping: Clean flanges and exposed machined metal surfaces and treat with anticorrosion compound after assembly and testing. Protect flanges, pipe openings, and nozzles with wooden flange covers or with screwed-in plugs.
- B. Store pumps in dry location.
- C. Retain protective covers for flanges and protective coatings during storage.

- D. Protect bearings and couplings against damage from sand, grit, and other foreign matter.
- E. Comply with pump manufacturer's written rigging instructions.

1.6 COORDINATION

- A. Coordinate size and location of concrete bases.

1.7 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Mechanical Seals: One set mechanical seal(s) for each pump.

PART 2 - PRODUCTS

2.1 CLOSE-COUPLED, IN-LINE CENTRIFUGAL PUMPS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.
 - 1. Armstrong Pumps Inc.
 - 2. Aurora Pump; Division of Pentair Pump Group.
 - 3. Bell & Gossett; Div. of ITT Industries.
 - 4. Patterson Pumps.
 - 5. Taco, Inc.
- B. Description: Factory assembled and tested, centrifugal, close-coupled, in-line pump designed for installation with pump and motor shafts mounted horizontally or vertically. Rate pump for 175-psig (1204-kPa) working pressure and a continuous water temperature of 225 deg F (107 deg C). Each pump shall be thoroughly cleaned and painted with at least one coat of high-grade machinery enamel prior to shipment.
- C. Pump Construction: Pump volute shall be Class 30 cast iron and shall be hydrostatically tested to 150% maximum working pressure. The casing shall be radially split to allow removal of the rotating element without disturbing the pipe connections. The impeller shall be ASTM B 584, cast bronze; statically and dynamically balanced, keyed to shaft, and secured with a locking cap screw. Trim impeller to match specified performance. The liquid cavity shall be sealed off at the motor shaft by an internal mechanical seal with ceramic seal seat and carbon seal ring, suitable for continuous operation at 225 degrees F.
- D. Motors to meet NEMA specifications and shall be the size and voltage as indicated on the drawings. The motor shall have heavy duty grease lubricated bearings designed for the maximum load required by the motor.

2.2 BASE MOUNTED, END-SUCTION CENTRIFUGAL PUMPS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.
 - 1. Armstrong Pumps Inc.

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2. Aurora Pump; Division of Pentair Pump Group.
 3. Bell & Gossett; Div. of ITT Industries.
 4. Patterson Pumps.
 5. Taco, Inc.
- B. Description: Factory-assembled and tested, centrifugal, end-suction pump designed for installation with pump and motor shafts mounted horizontally. Rate pump for 175-psig minimum working pressure and a continuous water temperature of 225 deg. F. Each pump shall be thoroughly cleaned and painted with at least one coat of high-grade machinery enamel prior to shipment.
- C. Pump Construction: Pump volute shall be made of ductile iron with integrally cast pedestal support. The impeller shall be cast bronze, enclosed type, statically and hydraulically balanced. Impeller shall be keyed to the shaft and secured by a hex head impeller nut and washer. Pumps shall be provided with a single inside unbalanced mechanical shaft seal for leakless operation. A suitable arrangement shall be provided to furnish a portion of the pumped liquid to lubricate and cool the seal faces. Casings shall be provided with tapped and plugged holes for priming, vent, and drain. Pump bearing housing shall have heavy-duty greaseable ball bearings. The base shall be made of structural steel and shall also include an integral drain pan. A flexible coupler suitable for both across the line starting applications as well as variable torque loads associated with variable frequency drives, shall connect the pump to the motor and shall be covered by a coupler guard.
- D. Motor: The motor shall be NEMA specifications and shall be the size and voltage called for on the drawings. Pump and motor shall be factory aligned, and shall be realigned by contractor after installation. Provide shaft grounding rings on all motors controlled by variable frequency drives.

2.3 PUMP SPECIALTY FITTINGS

- A. Suction Diffuser: Cast Iron NPT and Flanged Models Rated for a Maximum Working Pressure of 175 PSIG. The flow straightening fitting shall be of cast iron construction. The fitting shall have a stainless-steel combination diffuser-strainer-orifice cylinder with 3/16" diameter perforations to protect the system pump. The full-length stainless-steel flow straightening vanes shall provide non-turbulent flow to the suction side of the system pump. The start-up strainer shall be of 16 mesh bronze, and the support foot shall eliminate pipe strain at the flow fitting/pump connection. All internal components shall be replaceable.
- B. Triple-Duty Valve: Angle or straight pattern, 175-psig pressure rating, cast-iron body, pump-discharge fitting; with drain plug and bronze-fitted shutoff, balancing, and check valve features. Brass gage ports with integral check valve, and orifice for flow measurement.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine equipment foundations and anchor-bolt locations for compliance with requirements for installation tolerances and other conditions affecting performance of work.
- B. Examine roughing-in for piping systems to verify actual locations of piping connections before pump installation.
- C. Examine foundations and inertia bases for suitable conditions where pumps are to be installed.

3.2 PUMP INSTALLATION

- A. Install pumps with access for periodic maintenance including removal of motors, impellers, couplings, and accessories.
- B. Independently support pumps and piping so weight of piping is not supported by pumps and weight of pumps is not supported by piping.
- C. Install continuous-thread hanger rods and of sufficient size to support pump weight.
- D. Suspend vertically mounted, in-line centrifugal pumps independent of piping. Install pumps with motor and pump shafts vertical. Use continuous-thread hanger rods and vibration isolators of sufficient size to support pump weight.
- E. Set base-mounted pumps on concrete pad.

3.3 ALIGNMENT

- A. Align pump and motor shafts and piping connections after setting on foundation, grout has been set and foundation bolts have been tightened, and piping connections have been made.
- B. Comply with pump and coupling manufacturers' written instructions.
- C. Adjust pump and motor shafts for angular and offset alignment.

3.4 CONNECTIONS

- A. Install piping adjacent to pumps to allow service and maintenance clearance.
- B. Connect piping to pumps providing all required fittings. Install valves and other accessories that are same size as piping connected to pumps.
- C. Install check valve and throttling valve or triple-duty valve on discharge side of pumps.
- D. Install Y-type strainer or suction diffuser on suction side of all pumps. Install a shutoff valve on suction side of pumps.
- E. Install flexible connectors on suction and discharge sides of base-mounted pumps between pump casing and valves.
- F. Install pressure gauges on pump suction and discharge, at integral pressure-gauge tapping, or install single gauge with multiple input selector valve.

3.5 STARTUP SERVICE

- A. Engage a factory-authorized service representative to perform startup service.
 - 1. Complete installation and startup checks according to manufacturer's written instructions.
 - 2. Check piping connections for tightness.
 - 3. Clean strainers on suction piping.
 - 4. Perform the following startup checks for each pump before starting:

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- a. Verify bearing lubrication.
 - b. Verify that pump is free to rotate by hand and that pump for handling hot liquid is free to rotate with pump hot and cold. If pump is bound or drags, do not operate until cause of trouble is determined and corrected.
 - c. Verify that pump is rotating in the correct direction.
5. Prime pump by opening suction valves and closing drains, and prepare pump for operation.
6. Start motor.
7. Open discharge valve slowly.

3.6 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain hydronic pumps.

END OF SECTION 23 21 30