

SECTION 15130
HYDRONIC PUMPS

PART 1 - GENERAL

1.01 PROVISIONS INCLUDED

- A. The general provisions of the Contract, including General and Supplementary General Conditions, and Division 1 General Requirements, apply to work specified in this Section.
- B. Requirements of Section 15050, "Basic Mechanical Materials and Methods" apply to work specified in this Section.

1.02 SUMMARY

- A. This section includes separately coupled, base-mounted, end-suction centrifugal pump P8 for energy recovery loop circulation. The pump will be installed and connected to an existing circulating loop to serve as back-up to existing pumps P-6 and P-7.

1.03 SUBMITTALS

- A. Product data including certified performance curves of selected models indicating selected pump's operating point, weights (shipping, installed, and operating), furnished specialties, and accessories.
- B. Shop drawings showing layout and connections for Pump P8. Include setting drawings with templates, and directions for installation of foundation bolts and other anchorages.

1.04 QUALITY ASSURANCE

- A. Hydraulic Institute Compliance: Design, manufacture, and install HVAC pumps in accordance with "Hydraulic Institute Standards."
- B. National Electrical Code Compliance: Provide components complying with NFPA 70 "National Electrical Code."
- C. UL Compliance: Provide HVAC pumps which are listed and labeled by UL, and comply with UL Standard 778 "Motor Operated Water Pumps."
- D. NEMA Compliance: Provide electric motors and components that are listed and labeled NEMA.
- E. Single Source Responsibility: Obtain HVAC pumps from a single manufacturer.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Store pumps in a dry location.
- B. Retain shipping flange protective covers and protective coatings during storage.

- C. Protect bearings and couplings against damage from sand, grit, and other foreign matter.
- D. For storage times greater than 5 days, dry internal parts with hot air or a vacuum-producing device to avoid rusting internal parts. Upon drying, coat internal parts with a protective liquid, such as light oil, kerosene, or antifreeze. Dismantle bearings and couplings, dry and coat them with an acid-free heavy oil, and then tag and store in dry location.
- E. Comply with Manufacturer's rigging instructions for handling.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Subject to compliance with requirements, provide base-mounted, separately-coupled, end-suction pumps of the following:
 1. "Series 1510," Bell & Gossett, ITT.
 2. or approved equal.

2.02 PUMPS, GENERAL

- A. Pumps: Factory-assembled and factory-tested. Fabricate casings to allow removal and replacement of impellers without necessity of disconnecting piping. Type, sizes, and capacities shall be as indicated.
- B. Preparation for Shipping: After assembly and testing, clean flanges and exposed machined metal surfaces and treat with an anticorrosion compound. Protect flanges, pipe openings, and nozzles.
- C. Motors: Conform to NEMA Standard MG-1, general purpose, continuous duty, Design B, except Design C where required for high starting torque; single, multiple, or variable speed with type of enclosure and electrical characteristics as indicated; and grease-lubricated ball bearings. Select motors that are non-overloading within the full range of the pump performance curve.
- D. Efficiency: "Energy Efficient" motors shall have a minimum efficiency as indicated in accordance with IEEE Standard 112, Test Method B. If efficiency is not specified, motor shall have a higher efficiency than the "average standard industry motors," in accordance with IEEE Standard 112, Test Method B.
 1. Motor Frame: NEMA Standard 48 or 54; use pump manufacturer's standard.
- E. Apply factory finish paint to assembled, tested units prior to shipping.

2.03 BASE-MOUNTED, SEPARATELY-COUPLED, END-SUCTION PUMPS

- A. General Description: Pumps shall be base-mounted, centrifugal, separately-coupled, end-suction, single-stage, bronze-fitted, radially split case design, and rated for 175 psig working pressure and 225 deg F continuous water temperature.

- B. Casings Construction: Cast iron, with flanged piping connections, and threaded gage tappings at inlet and outlet flange connections.
- C. Impeller Construction: Statically and dynamically balanced, closed, overhung, single-suction, fabricated from cast bronze conforming to ASTM B 584, keyed to shaft and secured by a locking capscrew.
- D. Wear Rings: Replaceable, bronze.
- E. Pump Shaft and Sleeve Bearings: Steel shaft, with bronze sleeve.
- F. Seals: Mechanical seals consisting of carbon steel rotating ring, stainless steel spring, ceramic seat, and flexible bellows and gasket.
- G. Seals: Stuffing box consisting of a minimum of 4 rings of graphite impregnated braided yarn with a bronze lantern ring between center 2 graphite rings, and a bronze packing gland.
- H. Pump Couplings: Flexible, capable of absorbing torsional vibration and shaft misalignment; complete with metal coupling guard.
- I. Mounting Frame: Factory-welded frame and cross members, fabricated of steel channels and angles conforming to ASTM B 36. Fabricate for mounting pump casing, coupler guard, and motor. Grind welds smooth prior to application of factory finish. Motor mounting holes for field-installed motors shall be field-drilled.
- J. Motor: Secured to mounting frame with adjustable alignment on mounting frame.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine areas, equipment foundations, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of HVAC pumps.
- B. Examine rough-in for piping systems to verify actual locations of piping connections prior to installation.
- C. Examine equipment foundations and inertia bases for suitable conditions where pumps are to be installed.
- D. Do not proceed until unsatisfactory conditions have been corrected.

3.02 EQUIPMENT BASES

- A. Concrete equipment pads refer to specification section 03300.

3.03 INSTALLATION

- A. General: Comply with the manufacturer's written installation and alignment instructions.

- B. Install pumps in locations and arranged to provide access for periodic maintenance, including removal of motors, impellers, couplings, and accessories.
- C. Support pumps and piping separately so that the weight of the piping system does not rest on the pump.
- D. Set base-mounted pumps on concrete foundation. Disconnect coupling halves before setting. Do not reconnect couplings until the alignment operations have been completed.
 - 1. Support pump base plate on rectangular metal blocks and shims, or on metal wedges having a small taper, at points near the foundation bolts to provide a gap of 3/4 to 1-1/2 inches between the pump base and the foundation for grouting.
 - 2. Adjust the metal supports or wedges until the shafts of the pump and driver are level. Check the coupling faces and suction and discharge flanges of the pump to verify that they are level and plumb.

3.04 ALIGNMENT

- A. Align pump and motor shafts and piping connections after setting on foundations, after grout has been set and foundations bolts have been tightened, and after piping connections have been made.
 - 1. Adjust alignment of pump and motor shafts for angular and parallel alignment by one of the two methods specified in the Hydraulic Institute "Centrifugal Pumps - Instructions for Installation, Operation and Maintenance."
- B. After alignment is correct, tighten the foundation bolts evenly, but not too firmly. Fill the base plate completely with nonshrink, nonmetallic grout, with metal blocks and shims or wedges in place. After grout has cured, fully tighten foundation bolts.
 - 1. Alignment tolerances shall meet manufacturers recommendations.

3.05 CONNECTIONS

- A. General: Install valves that are same size as the piping connecting the pump.
- B. Install suction and discharge pipe sizes equal to or greater than the diameter of the pump nozzles.
- C. Install a nonslam check valve and globe valve on the discharge side of inline pumps.
- D. Install a triple-duty valve on the discharge side of base-mounted, end-suction pumps.
- E. Install a gate valve and strainer on the suction side of inline pumps.
- F. Install a pump suction difuser and gate valve on the suction side of base-mounted, end-suction pumps.
- G. Install flexible connectors on the suction and discharge side of each base-mounted pump.

- H. Install pressure gages on the suction and discharge of each pump at the integral pressure gage tappings provided.
- I. Install temperature and pressure gage connector plugs in suction and discharge piping around pump. Temperature and pressure gage connector plugs are specified in Division 15 Section "Meters and Gages."
- J. Electrical wiring and connections are specified in Division 16 sections.
- K. Control wiring and connections are specified in other Division 15 sections.

3.06 FIELD QUALITY CONTROL

- A. Check suction lines connections for tightness to avoid drawing air into the pump.

3.07 START-UP, ADJUSTMENT, & TESTING

- A. Final Checks Before Start-Up: Perform the following preventative maintenance operations and checks before start-up:
 1. Lubricate oil-lubricated bearings.
 2. Remove grease-lubricated bearing covers and flush the bearings with kerosene and thoroughly clean. Fill with new lubricant in accordance with the manufacturer's recommendations.
 3. Disconnect coupling and check motor for proper rotation. Rotation shall match direction of rotation marked on pump casing.
 4. Check that pump is free to rotate by hand. For pumps handling hot liquids, pump shall be free to rotate with the pump hot and cold. If the pump is bound or even drags slightly, do not operate the pump until the cause of the trouble is determined and corrected.
- B. Starting procedure for pumps with shutoff power not exceeding the safe motor power:
 1. Prime the pump, opening the suction valve, closing the drains, and prepare the pump for operation.
 2. Open the valve in the cooling water supply to the bearings, where applicable.
 3. Open the cooling water supply valve if the stuffing boxes are water-cooled.
 4. Open the sealing liquid supply valve if the pump is so fitted.
 5. Open the warm-up valve of a pump handling hot liquids if the pump is not normally kept at operating temperature.
 6. Open the recirculating line valve if the pump should not be operated against dead shutoff.
 7. Start the motor.
 8. Open the discharge valve slowly.
 9. Observe the leakage from the stuffing boxes and adjust the sealing liquid valve for proper flow to ensure the lubrication of the packing. Do not tighten the gland immediately, but let the packing run in before reducing the leakage through the stuffing boxes.
 10. Check the general mechanical operation of the pump and motor.
 11. Close the recirculating line valve once there is sufficient flow through the pump to prevent overheating.

- C. If the pump is to be started against a closed check valve with the discharge gate valve open, the steps are the same, except that the discharge gate valve is opened some time before the motor is started.
- D. Refer to Division 15 Section “Testing, Adjusting, and Balancing” for detailed requirements for testing, adjusting, and balancing hydronic systems.

END OF SECTION 15185