

SECTION 23 22 23
STEAM CONDENSATE PUMPS

PART 1 - GENERAL

1.1 STIPULATIONS

- A. The specifications sections "General Conditions to the Construction Contract", "Special Conditions" and "Division 01 - General Requirements" form a part of this Section by this reference thereto, and shall have the same force and effect as if printed herewith in full.

1.2 SUMMARY

- A. This Section includes electric pressure-powered condensate pumps for low-pressure steam condensate return systems.
- B. Related Sections include the following:
 - 1. Division 23 Section "Common Motor Requirements for HVAC Equipment" for general motor requirements for electrically powered steam condensate pumps.

1.3 ACTION SUBMITTALS

- A. Product Data: Include certified performance curves and rated capacities; shipping, installed, and operating weights; furnished specialties; and accessories for each type of product. Indicate pump's operating point on curves. Include receiver capacity and material.
- 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: Detail wiring for power, signal, and control systems and differentiate between manufacturer-installed and field-installed wiring.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For steam condensate pumps to include in maintenance manuals.

1.5 QUALITY ASSURANCE

- A. Regulatory Requirements: Fabricate and test steam condensate pumps to comply with HI 1.1-1.5, "Centrifugal Pumps for Nomenclature, Definitions, Application and Operation," and HI 1.6, "Centrifugal Pump Tests."
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction.
- C. ASME Compliance: Fabricate and label receivers to comply with ASME Boiler and Pressure Vessel Code: Section VIII, "Pressure Vessels," Division 1.

1.6 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 steam condensate 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.

1.7 COORDINATION

- A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 03 Section "Cast-in-Place Concrete." Concrete base construction is specified in Division 23 Section "Common Work Results for HVAC".

1.8 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace cast iron receivers that fail due to corrosion within specified warranty period.
 - 1. Warranty Period: Ten (10) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Electric Centrifugal Steam Condensate Pumps with Receivers:
 - a. ARI Armaturen
 - b. Bell and Gossett; a Div. of Xylem Inc.
 - c. Hoffman Specialty/ Domestic Pump, a Div. of Xylem Inc.
 - d. Spirax Sarco, Inc.
 - e. Sterling, Inc.; Heating Specialties Div.
 - f. Armstrong International
 - g. Shipco Pumps
 - h. Skidmore; a Div. of The Swan Group
 - i. Watson McDaniel Inc.
 - j. Weil Pump; a Div. of Wilo.
 - k. Or equal as approved by the Professional.

2.2 ELECTRIC CENTRIFUGAL STEAM CONDENSATE PUMPS WITH RECEIVERS

- A. Description: Factory-fabricated, packaged, electric-drive pump units; with receiver, pumps, controls, and accessories suitable for operation with low-pressure steam condensate.
- B. Configuration: Floor-mounting, duplex units with receiver and float switches.
 - 1. Receiver: Floor-mounting, close-grained cast iron; with externally adjustable float switches, water-level sight glass, condensate thermometer, pump discharge pressure gages, , flanges for pump mounting, condensate inlet, vent, and overflow connections, and two lifting eyebolts.
 - a. The elevation of the receiver inlet shall be no higher than that indicated on the Drawings.
 - 2. Inlet Basket Strainer: Cast iron with self-cleaning bronze screen, dirt pocket, and cleanout plug on receiver inlet.
 - 3. Pumps: Centrifugal; close coupled; vertical design; permanently aligned; dynamically balanced; bronze fitted, and with enclosed bronze case rings, stainless-steel shafts, and mechanical seals rated for 250 deg F.; and mounted on receiver flanges.
 - a. Provide a bronze isolation valves on each individual pump suction to permit pump service or replacement while the adjacent pump operates.
 - b. Pumps and receiver design shall be suitable for 200 deg. F. steam condensate at the flow rate scheduled on the Drawings without cavitation or other damage.
 - 4. Motors: ODP type.
 - 5. Control Panel: UL Listed, NEMA 250, Type 2 enclosure with hinged door and grounding lug, mounted on unit; factory wired for single-point external electrical connection; and with the following included within cabinet:
 - a. Main power supply disconnect switch.
 - b. Motor controller for each pump.
 - c. Electrical alternator.
 - d. Pilot lights to indicate pump operation.
 - e. Momentary contact "TEST" push button on cover of each pump.
 - f. Numbered terminal strip.
 - g. Individual disconnect switches for each pump.
 - h. Fused transformer for each control circuit.
 - i. High level alarm contacts.
 - 6. Control Circuits: Independent of each pump with electrical alternator to operate pumps in sequence and allow both pumps to operate on receiver high level.
 - 7. Manual Lead - Lag - Hand - Off selector switches: Provide manual of shutting off pumps, testing pump operation in Hand, and manual override of electrical alternator when active pump is manually selected and allows both pumps to operate on receiver high level. Provide the required number of float switches.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine equipment foundations and anchor-bolt locations for compliance with requirements for installation.
- B. Examine rough installation of steam condensate piping.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 STEAM CONDENSATE PUMP INSTALLATION

- A. Install pumps according to manufacturer's written instructions.
- B. Install pumps according to HI 1.1-1.5, "Centrifugal Pumps for Nomenclature, Definitions, Application and Operation."
- C. Install pumps to provide access for periodic maintenance, including removing motors, impellers, couplings, and accessories.
- D. Support pumps and piping separately so piping is not supported by pumps.
- E. Install pump-receiver packages on concrete bases. Anchor units to bases using inserts or anchor bolts.
- F. Install thermometers and pressure gages.

3.3 CONNECTIONS

- A. Piping installation requirements are specified in other Division 23 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Install piping adjacent to machine to allow service and maintenance.
- C. Install inlet strainer with a valved bypass to drain at system return connection.
- D. Install check valve, shutoff valve, and automatic flow balancing / flow-limiting valve at pump discharge connections for each pump unit.
- E. Install pipe drain to nearest floor drain for overflow and drain piping connections.
- F. Install full-size vent piping, terminating to atmosphere where indicated on the Drawings.
- G. Install electrical connections for power, controls, and devices.
- H. Electrical power and control wiring and connections are specified in Division 26 Sections.

- I. Ground equipment.
 - 1. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

3.4 FIELD QUALITY CONTROL AND START UP

- A. Engage a factory-authorized representative to perform field quality control and startup service described in this Article.
- B. Verify that steam condensate pumps are installed and connected according to the Contract Documents.
- C. Complete installation and startup checks according to manufacturer's written instructions.
- D. Clean strainers.
- E. Verify that electrical wiring installation complies with manufacturer's written instructions and the Contract Documents.
- F. Set steam condensate pump controls.
- G. Set pump controls for automatic start, stop, and alarm operation.
- H. Perform the following preventive maintenance operations and checks before starting:
 - 1. Lubricate bearings.
 - 2. Set float switches to operate at proper levels.
 - 3. Set throttling valves on pump discharge for specified flow.
 - 4. Check motors for proper rotation.
 - 5. Test pump controls and demonstrate compliance with requirements.
 - 6. Replace damaged or malfunctioning pump controls and equipment.
 - 7. Verify that pump controls are correct for required application.
- I. Start steam condensate pumps according to manufacturer's written startup instructions.

3.5 DEMONSTRATION

- A. Engage a factory authorized representative to train Client Agency's maintenance personnel to adjust, operate, and maintain steam condensate pumps as specified below:
 - 1. Train Client Agency's maintenance personnel on procedures and schedules for starting and stopping, troubleshooting, servicing, and maintaining pumps.
 - 2. Review data in maintenance manuals.
 - 3. Schedule training with Client Agency, through Architect, with at least seven days' advance notice.

END OF SECTION