

SECTION 232123 – 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. Section includes:
 - 1. Close-coupled, in-line centrifugal pumps.
 - 2. Close-coupled, end-suction centrifugal pumps.
 - 3. Separately coupled, vertically mounted, in-line centrifugal pumps.
 - 4. Separately coupled, base-mounted, end-suction centrifugal pumps.
 - 5. Separately coupled, base-mounted, double-suction centrifugal pumps.

1.3 DEFINITIONS

- A. Buna-N: Nitrile rubber.
- B. EPT: Ethylene propylene terpolymer.

1.4 ACTION SUBMITTALS

- A. Submittals shall be formatted per Section 230000 “General Mechanical Requirements”.
- B. Product Data: For each type of pump. 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.
- C. Shop Drawings: For each pump.
 - 1. Show pump layout and connections.
 - 2. Include setting drawings with templates for installing foundation, anchor bolts and other anchorages.
 - 3. Include diagrams for power, signal, and control wiring.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For pumps to include in emergency, operation, and maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- 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 mechanical seal for each pump.

PART 2 - PRODUCTS

2.1 CLOSE-COUPLED, END-SUCTION CENTRIFUGAL PUMPS

- A. Manufacturers:
 - 1. Armstrong Pumps, Inc.
 - 2. Aurora Pumps.
 - 3. ITT Corporation; Bell & Gossett.
 - 4. Paco Pumps.
- B. Description: Factory-assembled and tested, centrifugal, overhung-impeller, close-coupled, end-suction pump as defined in HI 1.1-1.2 and HI 1.3; designed for installation with pump and motor shafts mounted horizontally.
- C. Pump Construction:
 - 1. Casing: Radially split, cast iron, with replaceable bronze wear rings, drain plug at bottom and air vent at top of volute, threaded gage tappings at inlet and outlet, and flanged connections.
 - 2. Impeller: ASTM B 584, cast bronze; statically and dynamically balanced, keyed to shaft, and secured with a locking cap screw.
 - 3. Pump Shaft: Steel, with copper-alloy shaft sleeve.
 - 4. Mechanical Seal: Carbon rotating ring against a ceramic seat held by a stainless-steel spring, and Buna-N bellows and gasket. Include water slinger on shaft between motor and seal.
 - 5. Pump Bearings: Permanently lubricated ball bearings.
- D. Motor: Single speed and rigidly mounted to pump casing.
 - 1. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
 - 2. Comply with NEMA designation, temperature rating, service factor, and efficiency requirements for motors specified in Section 230513 "Common Motor Requirements for HVAC Equipment."
- E. Capacities and Characteristics: Shown in Pump Schedule on Drawings.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine all pumps before installation. Reject pumps that are damaged.

- B. Examine equipment foundations and anchor-bolt locations for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- C. Examine roughing-in for piping systems to verify actual locations of piping connections before pump installation.
- D. Examine foundations and inertia bases for suitable conditions where pumps are to be installed.
- E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PUMP INSTALLATION

- A. Comply with HI 1.4.
- B. Install pumps to provide access for periodic maintenance including removing motors, impellers, couplings, and accessories.
- C. Independently support pumps and piping so weight of piping is not supported by pumps and weight of pumps is not supported by piping.
- D. Equipment Mounting:
 - 1. Install base-mounted pumps on cast-in-place concrete equipment bases. Comply with requirements for equipment bases and foundations specified in **[Section 033000 "Cast-in-Place Concrete."]** **[Section 033053 "Miscellaneous Cast-in-Place Concrete."]**
 - 2. Comply with requirements for vibration isolation and seismic control devices specified in Section 230548 "Vibration and Seismic Controls for HVAC."
 - 3. Comply with requirements for vibration isolation devices specified in Section 230548.13 "Vibration Controls for HVAC."
- E. Equipment Mounting: Install in-line pumps with continuous-thread hanger rods and **[elastomeric hangers] [spring hangers] [spring hangers with vertical-limit stop]** of size required to support weight of in-line pumps.
 - 1. Comply with requirements for seismic-restraint devices specified in Section 230548 "Vibration and Seismic Controls for HVAC."
 - 2. Comply with requirements for hangers and supports specified in Section 230529 "Hangers and Supports for HVAC Piping and Equipment."

3.3 ALIGNMENT

- A. Engage a factory-authorized service representative to perform alignment service.
- B. Comply with requirements in Hydronics Institute standards for alignment of pump and motor shaft. Add shims to the motor feet and bolt motor to base frame. Do not use grout between motor feet and base frame.
- C. Comply with pump and coupling manufacturers' written instructions.
- D. Adjust pump and motor shafts for angular and offset alignment by methods specified in HI 1.1-1.5, "Centrifugal Pumps for Nomenclature, Definitions, Application and Operation."
 - 1. Alignment shall be reverse dial indicator or laser method.

2. Indicated run-out shall not exceed 0.001 inches.
3. Angular and offset misalignment shall be as follows:

	Maximum Angularity	Maximum Offset
1200 rpm	0.0015"	0.001"
1800 rpm	0.0010"	0.001"
3600 rpm	0.0005"	0.001"

- E. After alignment is correct, tighten foundation bolts evenly but not too firmly. Completely fill baseplate with nonshrink, nonmetallic grout while metal blocks and shims or wedges are in place. After grout has cured, fully tighten foundation bolts.

3.4 CONNECTIONS

- A. Comply with requirements for piping specified in Section 232113 "Hydronic Piping." Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Where installing piping adjacent to pump, allow space for service and maintenance.
- C. Connect piping to pumps. Install valves that are same size as piping connected to pumps.
- D. Install suction and discharge pipe sizes equal to or greater than diameter of pump nozzles.
- E. Install check and shutoff valves on discharge side of pumps. A check valve is not required in a single pump configuration.
- F. Install strainer or suction diffuser and shutoff valve on suction side of pumps.
- G. Install flexible connectors with vane straighteners on suction and discharge sides of base-mounted pumps between pump casing and valves.
- H. Install pressure gages on pump suction and discharge or at integral pressure-gage tapping.
- I. Ground equipment according to Section 260526 "Grounding and Bonding for Electrical Systems."
- J. Connect wiring according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

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:
 - 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 as specified below:
 1. Train University's maintenance personnel on procedures and schedules for starting and stopping, troubleshooting, servicing, and maintaining pumps.
 2. Review data in maintenance manuals. Refer to Division 01.
 3. Schedule training with Owner's Representative.

END OF SECTION 232123