

SECTION 221123 - DOMESTIC WATER 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. Horizontally mounted, in-line, close-coupled centrifugal pumps.
- 2. Vertically mounted, in-line, close-coupled centrifugal pumps.
- 3. Separately coupled, base-mounted, end-suction centrifugal pumps.

- B. Related Sections include the following:

- 1. Division 22 Section "Domestic-Water Packaged Booster Pumps" for booster systems.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include materials of construction, rated capacities, certified performance curves with operating points plotted on curves, operating characteristics, electrical characteristics, and furnished specialties and accessories.

- B. LEED Submittals:

Retain "Product Data for Prerequisite EA 2" Subparagraph below for applying controls to limit hot-water circulation pump operation to periods when hot water is required; coordinate with "Controls" Article.

- C. Product Data for Prerequisite EA 2: Documentation indicating that units comply with applicable requirements in ASHRAE/IESNA 90.1, without amendments, Section 7 - "Service Water Heating."

1.4 CLOSEOUT SUBMITTALS

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

1.5 QUALITY ASSURANCE

- A. 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.
- B. UL Compliance: Comply with UL 778 for motor-operated water pumps.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Retain shipping flange protective covers and protective coatings during storage.
- B. Protect bearings and couplings against damage.
- C. Comply with pump manufacturer's written rigging instructions for handling.

1.7 COORDINATION

- A. Coordinate sizes and locations of concrete bases with actual equipment provided.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS

- A. Pump motors shall be 1750 rpm maximum and sized for non-overloading service.
- B. Pumps shall have stainless steel shafts and sleeves, bronze wear rings, and cast iron bases. Bases shall be designed for grouting in place.
- C. Mechanical seals: John Crane Type XP662D1, with Viton bellows, tungsten carbide and carbon seal faces.
- D. Pump couplings: Woods Dura-Flex or Rexnord Omega elastomeric type.
- E. Pump bearings: S.K.F., Fafnir, or New Departure grease lubricated, heavy duty, deep groove ball bearings with a certified rating design of 200,000 hours of average bearing life.

2.2 HORIZONTALLY MOUNTED, IN-LINE, CLOSE-COUPLED CENTRIFUGAL PUMPS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Bell & Gossett Domestic Pump; ITT Corporation; Series 80.
 - 2. Flowserve Corporation.
 - 3. PACO Pumps; Grundfos Pumps Corporation, U.S.A.
 - 4. TACO Incorporated.

- B. Description: Factory-assembled and -tested, in-line, single-stage, close-coupled, overhung-impeller centrifugal pumps designed for installation with pump and motor shaft mounted horizontal. Rate pump for 175-psig (1204-kPa) minimum working pressure and a continuous water temperature of 225 deg F (107 deg C).
- C. Pump Construction:
 - 1. Casing: Stainless-steel or bronze, radially split with threaded companion-flange connections for pumps with NPS 2 pipe connections and flanged connections for pumps with NPS 2-1/2 pipe connections.
 - 2. Impeller: ASTM B 584, cast bronze or stainless steel, statically and dynamically balanced, closed, and keyed to shaft.
 - 3. Shaft and Shaft Sleeve: Stainless-steel shaft with deflector, with copper-alloy shaft sleeve. Include water slinger on shaft between motor and seal.
- D. Motor: Inverted duty variable torque, with grease-lubricated ball bearings; and resiliently or rigidly mounted to pump casing.

2.3 VERTICALLY MOUNTED, IN-LINE, CLOSE-COUPLED CENTRIFUGAL PUMPS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Bell & Gossett Domestic Pump; ITT Corporation; Series 80.
 - 2. Flowsolve Corporation.
 - 3. PACO Pumps; Grundfos Pumps Corporation, U.S.A.
 - 4. TACO Incorporated.
- B. Description: Factory-assembled and -tested, in-line, single-stage, close-coupled, overhung-impeller centrifugal pumps designed for installation with pump and motor shaft mounted vertical. Rate pump for 175-psig (1204-kPa) minimum working pressure and a continuous water temperature of 225 deg F (107 deg C).
- C. Pump Construction:
 - 1. Casing: Stainless-steel or bronze, radially split, cast iron, with wear rings and threaded companion-flange connections for pumps with NPS 2 pipe connections and flanged connections for pumps with NPS 2-1/2 pipe connections.
 - 2. Impeller: ASTM B 584, cast bronze or stainless steel, statically and dynamically balanced, closed, and keyed to shaft.
 - 3. Shaft and Shaft Sleeve: Stainless-steel shaft, with copper-alloy shaft sleeve.
- D. Motor: Inverted duty variable torque, with grease-lubricated ball bearings; and rigidly mounted to pump casing.

2.4 SEPARATELY COUPLED, BASE-MOUNTED, END-SUCTION CENTRIFUGAL PUMPS

- A. Manufacturers:

1. Bell & Gossett; Div. of ITT Industries; Series 1510.
 2. Flowserve Corporation.
 3. Taco, Inc.
- B. Description: Factory-assembled and -tested, centrifugal, overhung-impeller, separately coupled, end-suction pump as defined in HI 1.1-1.2 and HI 1.3; designed for base mounting, with pump and motor shafts horizontal. Rate pump for 175-psig (1204-kPa) minimum working pressure and a continuous water temperature of 225 deg F (107 deg C).
- C. Pump Construction:
1. Casing: Radially split, cast bronze, with replaceable bronze wear rings, threaded gage tappings at inlet and outlet, drain plug at bottom and air vent at top of volute, and flanged connections. Provide integral mount on volute to support the casing, and attached piping to allow removal and replacement of impeller without disconnecting piping or requiring the realignment of pump and motor shaft.
 2. Impeller: 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.
 3. Pump Shaft: Stainless steel.
- D. Coupling Guard: Dual rated; ANSI B15.1, Section 8; OSHA 1910.219 approved; steel; removable; attached to mounting frame.
- E. Mounting Frame: Welded-steel frame and cross members, factory fabricated from ASTM A 36/A 36M channels and angles. Fabricate to mount pump casing, coupling guard, and motor.

2.5 MOTORS

- A. Comply with NEMA designation, temperature rating, service factor, enclosure type, and efficiency requirements for motors specified in Division 22 Section "Common Motor Requirements for Plumbing Equipment."
1. Motor Sizes: Minimum size as indicated. If not indicated, large enough so driven load will not require motor to operate in service factor range above 1.0.
 2. Controllers, Electrical Devices, and Wiring: Comply with requirements for electrical devices and connections specified in Division 26 Sections.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine roughing-in of domestic-water-piping system to verify actual locations of connections before pump installation.

3.2 PUMP INSTALLATION

- A. Install all pumps in strict accordance with manufacturer's instructions. Provide service space around pumps as recommended by the pump manufacturer.
- B. Do not mount pumps on walls that are common to critical areas such as offices, conference rooms, classrooms, etc. In-line pumps shall be installed directly in the piping system, and supported independently from the piping.
- C. Comply with HI 1.4.
- D. Install horizontally mounted, in-line, close-coupled centrifugal pumps with shaft(s) horizontal.
- E. Install vertically mounted, in-line, close-coupled centrifugal pumps with shaft vertical.
- F. Install continuous-thread hanger rods and spring hangers of size required to support pump weight.
 - 1. Comply with requirements for vibration isolation devices specified in Division 22 Section "Vibration Controls for Plumbing Piping and Equipment." Fabricate brackets or supports as required.
 - 2. Comply with requirements for hangers and supports specified in Division 22 Section "Hangers and Supports for Plumbing Piping and Equipment."
- G. Grout pump mounting base full after piping is connected but before pump drive is aligned. After grouting, align pump drive shaft to 5 mils, even if pump is factory aligned, and conduct vibration test.
- H. Pumps shall be mounted and aligned in accordance with the Standards of the Hydraulic Institute, Section IX, paragraphs B-135 through B-151. Alignment measurements should be documented and submitted along with pump test reports.
- I. Realignment after installation prior to start up will be performed by Owner.

3.3 CONNECTIONS

- A. Comply with requirements for piping specified in Division 22 Section "Domestic Water Piping." Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Install piping adjacent to pumps to allow service and maintenance.
- C. Connect domestic water piping to pumps. Install suction and discharge piping equal to or greater than size of pump nozzles.
 - 1. Install flexible connectors adjacent to pumps in suction and discharge piping of the following pumps:
 - a. Horizontally mounted, in-line, separately coupled centrifugal pumps.
 - b. Horizontally mounted, in-line, close-coupled centrifugal pumps.

- c. Vertically mounted, in-line, close-coupled centrifugal pumps.
 - d. Comply with requirements for flexible connectors specified in Division 22 Section "Domestic Water Piping."
2. Install shutoff valve and strainer on suction side of each pump; and check valve, balancing valve, and shutoff valve on discharge side of each pump. Install check and shutoff valves same size as connected piping. Comply with requirements for valves specified in Division 22 Section "General-Duty Valves for Plumbing Piping" and comply with requirements for strainers specified in Division 22 Section "Domestic Water Piping Specialties."
 3. Triple duty valves are not allowed.
 4. Suction diffusers can be used in lieu of in-line strainers, long radius elbow and spool piece.
 5. Install pressure gage at suction of each pump and pressure gage at discharge of each pump. Install at integral pressure-gage tapings where provided or install pressure-gage connectors in suction and discharge piping around pumps. Comply with requirements for pressure gages and snubbers specified in Division 22 Section "Meters and Gages for Plumbing Piping."
- D. Comply with Division 26 Sections for electrical connections, and wiring methods.

3.4 IDENTIFICATION

- A. Comply with requirements for identification specified in Division 22 Section "Identification for Plumbing Piping and Equipment" for identification of pumps.

3.5 STARTUP SERVICE

- A. 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. Set pressure switches, thermostats, timers, and time-delay relays for automatic starting and stopping operation of pumps.
 5. 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.
 6. Prime pump by opening suction valves and closing drains, and prepare pump for operation.
 7. Start motor.
 8. Open discharge valve slowly.
 9. Adjust temperature settings on thermostats.

10. Adjust timer settings.

3.6 ADJUSTING

- A. Adjust domestic water pumps to function smoothly, and lubricate as recommended by manufacturer.
- B. Adjust initial temperature set points.
- C. Set field-adjustable switches and circuit-breaker trip ranges as indicated.

END OF SECTION 221123