

**SECTION 22 11 23.13**

**DOMESTIC-WATER PACKAGED BOOSTER 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. Multiplex, variable-speed booster pumps.

**1.3 DEFINITIONS**

- A. PID: Proportional Integral Derivative.
- B. VFC: Variable-frequency controller.

**1.4 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
  - 1. Include construction details, material descriptions, and dimensions of individual components and profiles.
  - 2. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

**1.5 INFORMATIONAL SUBMITTALS**

**1.6 CLOSEOUT SUBMITTALS**

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

**1.7 DELIVERY, STORAGE, AND HANDLING**

- A. Retain protective coatings and flange's protective covers during storage.

1.8 COORDINATION

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

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Drinking Water System Components - Health Effects and Drinking Water System Components - Lead Content Compliance: NSF 61 and NSF 372.

2.2 MULTIPLEX, VARIABLE-SPEED BOOSTER PUMPS

- A. Description: Factory-assembled and -tested, fluid-handling system for domestic water, with pumps, piping, valves, specialties, and controls, and mounted on base.
- B. Pumps:
  - 1. Type: Vertical, can, as defined in HI 2.1-2.2 and HI 2.3 for in-line, barrel or can, lineshaft, vertical pump.
  - 2. Impeller: Closed, stainless steel; statically and dynamically balanced and keyed to shaft.
  - 3. Shaft: Stainless steel.
  - 4. Seals: Mechanical and stuffing-box types.
  - 5. Bearings: Water-lubricated bushing type.
- C. Motors: Single speed, with grease-lubricated or pre-greased, permanently shielded, ball-bearings. Select motors that will not overload through full range of pump performance curve.
- D. Piping: Stainless-steel pipe and fittings .
- E. Valves:
  - 1. Shutoff Valves NPS 2-1/2 and Larger: , Ball valve in each pump's suction and discharge piping and in inlet and outlet headers.
  - 2. Check Valves NPS 2-1/2 and Larger: Silent type in each pump's discharge piping.
- F. Dielectric Fittings: With insulating material to isolate joined dissimilar metals.
- G. VFC: Comply with Section 26 29 23 "Variable-Frequency Motor Controllers."
- H. Base: Structural steel.

2.3 STATION

- A. The station shall provide varying water flow rate at a constant pressure or ASHRAE 90.1 compliant pressure profile through the use of a PID PLC controller and variable speed drives.

- B. Isolation valves for each set of pumps and check valves.
- C. Common suction and discharge manifold
- D. 4-20 mA transducer(s) located on the station discharge manifold
- E. A 4-20 mA transducer shall be provided on the suction manifold.
- F. Factory mounted controller and dedicated variable frequency drives for each pump.
- G. A common base or frame for components listed above.

#### 2.4 HYDRO-PNEUMATIC TANK

- A. Provide a Section VIII, ASME Code, National Board stamped, hydro-pneumatic tank. Tank shall be provided complete with a NSF approved replaceable bladder, bottom connection, air fill valve, tank drain valve and gauge.
- B. The hydro-pneumatic tank shall be mounted adjacent to system with a minimum 1" feed line and full port ball valve on the pump station discharge header or shall be remote mounted as shown per drawings. \* If the tank is adjacent mounted, it shall be the responsibility of the installing contractor to provide the feed line between the system tank feed valve and tank connection. If the tank is remote mounted, it shall be the responsibility of the installing contractor to provide the feed line, isolation valves, and any other necessary appurtenances between the tank and building piping.

#### 2.5 CONTROL PANEL

- A. Control panel shall be provided by the manufacturer with single point power connection, control power disconnect and safety interlock, solid-state PLC logic controller, fused 120 V AC control voltage transformer, fused 24 V DC power supply, 6-inch color touch screen HMI operator interface with integral start-stop-auto and alarms, and automated pump runtime cycling.

#### 2.6 MOTORS

- A. Comply with NEMA designation, temperature rating, service factor, enclosure type, and efficiency requirements for motors.
  - 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 NFPA 70.

## 2.7 SOURCE QUALITY CONTROL

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by an NRTL, and marked for intended location and application.
- B. ASME Compliance: Comply with ASME B31.9 for piping.
- C. UL Compliance for Packaged Pumping Systems:
  - 1. UL 508, "Industrial Control Equipment."
- D. Booster pumps shall be listed and labeled as packaged pumping systems by testing agency acceptable to authorities having jurisdiction.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine roughing-in for booster pumps to verify actual locations of piping connections before booster-pump installation.

### 3.2 INSTALLATION

- A. Booster-Pump Mounting:
  - 1. Install booster pumps on cast-in-place concrete equipment base(s). Comply with requirements for equipment bases and foundations specified in Section 03 30 00 "Cast-in-Place Concrete."
  - 2. Comply with requirements for vibration isolation and seismic-control devices specified in Section 22 05 48 "Vibration and Seismic Controls for Plumbing Piping and Equipment."
  - 3. Comply with requirements for vibration isolation devices specified in Section 22 05 48.13 "Vibration Controls for Plumbing Piping and Equipment."
- B. Support connected domestic-water piping so weight of piping is not supported by booster pumps.

### 3.3 PIPING CONNECTIONS

- A. Comply with requirements for piping specified in Section 22 11 16 "Domestic Water Piping." Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Booster-Pump Piping Connections: Connect domestic-water piping to booster pumps. Install suction and discharge pipe equal to or greater than size of system suction and discharge headers .
  - 1. Install shutoff valves on piping connections to booster-pump suction and discharge headers . Install ball, butterfly, or gate valves same size as suction and discharge headers .

2. Install union, flanged, or grooved-joint connections on suction and discharge headers at connection to domestic-water piping. Comply with requirements for unions and flanges specified in Section 22 11 16 "Domestic Water Piping."
3. Where installing piping adjacent to booster pumps, allow space for service and maintenance.

#### 3.4 ELECTRICAL CONNECTIONS

- A. Connect wiring according to Section 26 05 19 "Low-Voltage Electrical Power Conductors and Cables."
- B. Ground equipment according to Section 26 05 26 "Grounding and Bonding for Electrical Systems."
- C. Install electrical devices furnished by manufacturer, but not factory mounted, according to NFPA 70 and NECA 1.

#### 3.5 CONTROL CONNECTIONS

- A. Install control and electrical power wiring to field-mounted control devices.

#### 3.6 IDENTIFICATION

- A. Identify system components. Comply with requirements for identification specified in Section 22 05 53 "Identification for Plumbing Piping and Equipment."
- B. Install nameplate for each electrical connection, indicating electrical equipment designation and circuit number feeding connection.
  1. Nameplate shall be laminated acrylic or melamine plastic signs, as specified in Section 26 05 53 "Identification for Electrical Systems."

#### 3.7 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.

END OF SECTION 22 11 23.13

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