

SECTION 22 11 23
DOMESTIC WATER PUMPS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Domestic water circulating pump and domestic water recirculation pump system.
- B. A complete listing of all acronyms and abbreviations are included in Section 22 05 11, COMMON WORK RESULTS FOR PLUMBING.

1.2 RELATED WORK

- A. Section 01 00 00, GENERAL REQUIREMENTS.
- B. Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- C. Section 22 05 11, COMMON WORK RESULTS FOR PLUMBING.
- D. Section 26 29 11, MOTOR CONTROLLERS.

1.3 APPLICABLE PUBLICATIONS

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.
- B. American Society of Mechanical Engineers (ASME):
 - ASME Boiler and Pressure Vessel Code -
 - BPVC Section VIII-1-2017 Rules for Construction of Pressure Vessels, Division 1
 - BPVC Section VIII-2-2017 Rules for Construction of Pressure Vessels, Division 2-Alternative Rules
- C. International Code Council (ICC):
 - IPC-2015International Plumbing Code
- D. National Electrical Manufacturers Association (NEMA):
 - ICS 6-1993(R2001, R2006) Industrial Control and Systems:
 - Enclosures
 - 250-2014Enclosures for Electrical Equipment (1000 Volts Maximum)
- E. NSF International (NSF):
 - 61-2014aDrinking Water System Components - Health Effects
 - 372-2016Drinking Water System Components - Lead Content
- F. Underwriters' Laboratories, Inc. (UL):
 - 508-1999(R2013)Standard for Industrial Control Equipment
 - 778-2016(R2017)Standard for Motor-Operated Water Pumps

1.4 SUBMITTALS

- A. Submittals, including number of required copies, shall be submitted in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Information and material submitted under this section shall be marked "SUBMITTED UNDER SECTION 22 11 23, DOMESTIC WATER PUMPS", with applicable paragraph identification.
- C. Manufacturer's Literature and Data including: Full item description and optional features and accessories. Include dimensions, weights, materials, applications, standard compliance, model numbers, size, and capacity.
 - 1. Pump:
 - a. Manufacturer and model.
 - b. Operating speed.
 - c. Capacity.
 - d. Characteristic performance curves.
 - 2. Motor:
 - a. Manufacturer, frame and type.
 - b. Speed.
 - c. Current Characteristics.
 - d. Efficiency.
 - 3. Drive: Information in accordance with Section 26 29 11, MOTOR CONTROLLERS.
- D. Certified copies of all the factory and construction site test data sheets and reports.
- E. Complete operating and maintenance manuals including wiring diagrams, technical data sheets, information for ordering replacement parts, and troubleshooting guide:
 - 1. Include complete list indicating all components of the systems.
 - 2. Include complete diagrams of the internal wiring for each item of equipment.
 - 3. Diagrams shall have their terminals identified to facilitate installation, operation and maintenance.

1.5 QUALITY ASSURANCE

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

2. Design Criteria:

- a. Pump sizes, capacities, pressures, operating characteristics and efficiency shall be as scheduled.
 - b. Head-capacity curves shall slope up to maximum head at shut-off. Select pumps near the midrange of the curve, and near the point of maximum efficiency, without approaching the pump curve end point and possible cavitation and unstable operation. Select pumps for open systems so that required net positive suction head (NPSHR) does not exceed the net positive head available (NPSHA).
 - c. Pump Driver: Furnish with pump. Size shall be non-overloading at any point on the head-capacity curve, including in a parallel or series pumping installation with one pump in operation.
 - d. Provide all pumps with motors, impellers, drive assemblies, bearings, coupling guard and other accessories specified. Statically and dynamically balance all rotating parts.
 - e. Furnish each pump and motor with a nameplate giving the manufacturers name, serial number of pump, capacity in GPM and head in feet at design condition, horsepower, voltage, frequency, speed and full load current and motor efficiency.
 - f. Test all pumps before shipment. The manufacturer shall certify all pump ratings.
 - g. After completion of balancing, provide replacement of impellers or trim impellers to provide specified flow at actual pumping head, as installed.
- B. Domestic Water Circulating and Recirculating Pumps: Components shall be assembled by a single manufacturer and the pump motor assembly shall be the standard cataloged product of the manufacturer.

1.6 AS-BUILT DOCUMENTATION

- A. Submit manufacturer's literature and data updated to include submittal review comments and any equipment substitutions.
- B. Submit operation and maintenance data updated to include submittal review comments, substitutions and construction revisions shall be in electronic version on compact disc or DVD inserted into a three ring binder. All aspects of system operation and maintenance procedures, including piping isometrics, wiring diagrams of all circuits, a written description of system design, control logic, and sequence of operation shall be included in the operation and maintenance manual. The operations and maintenance manual shall include troubleshooting

techniques and procedures for emergency situations. Notes on all special systems or devices such as damper and door closure interlocks shall be included. A List of recommended spare parts (manufacturer, model number, and quantity) shall be furnished. Information explaining any special knowledge or tools the owner will be required to employ shall be inserted into the As-Built documentation.

- C. The installing contractor shall maintain as-built drawings of each completed phase for verification; and, shall provide the complete set at the time of final systems certification testing. As-built drawings are to be provided, and a copy of them in Auto-CAD version 2014 provided on compact disk or DVD. Should the installing contractor engage the testing company to provide as-built or any portion thereof, it shall not be deemed a conflict of interest or breach of the 'third party testing company' requirement.
- D. Certification documentation shall be provided to COR 10 working days prior to submitting the request for final inspection. The documentation shall include all test results, the names of individuals performing work for the testing agency on this project, detailed procedures followed for all tests, and certification that all results of tests were within limits specified.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Material or equipment containing a weighted average of greater than 0.25 percent lead shall be prohibited in any potable water system intended for human consumption, and shall be certified in accordance with NSF 61 or NSF 372.

2.2 DOMESTIC WATER RECIRCULATING PUMP

- A. General:
 - 1. Centrifugal, single stage, pump. Driver shall be electric motor, close coupled or connected by flexible or magnetic coupling. Pump for domestic water system shall be designed for quiet, trouble-free operation at a minimum of 82 degrees C (180 degrees F) water service and 1,035 kPa (150 psig).
 - 2. Mounting shall be in-line, vertical or horizontal.
 - 3. Stamped or engraved stainless steel nameplate.
 - 4. Motors: Maximum 40 degrees C (104 degrees F) ambient temperature rise, drip-proof, for operation with current, voltage, phase and cycle shown in schedule on Electrical drawings, conforming to NEMA

Type 4. Motors shall be equipped with thermal overload protection. When motor has cooled down it shall re-start automatically if the operating control has been left on and the system requires pump to start.

5. Pump shall operate continuously with on-off switch, or with an HOA switch for automatically controlled pumps, for manual shut down. In the inlet and outlet piping of the pump, shutoff valves shall be installed to permit service to the pump, strainer, and check valve without draining the system.
6. A check valve shall be installed in the pump discharge piping immediately downstream of the pump. A strainer with drain valve and removable strainer screen or basket shall be installed immediately upstream of the pump.

B. Horizontal, Wet-Rotor Circulators:

1. Maintenance free, close-coupled pump and motor with maximum 3,300 rpm rotational speed.
2. Bronze body construction with ceramic shaft, plastic impeller, fluid lubricated bearings, no mechanical seal, and flanged or soldered joint connections. Pump shall be capable of pumping 11.3 LPM (3 GPM) @ 2.5 Meters of head (8 Feet of head) when drive by 1/12 HP single phase, 110 VAC motor, the capacity scheduled on drawings.
3. Bearings: Carbon type.

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A. General:

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2. Mounting shall be in-line, vertical or horizontal.
3. Stamped or engraved stainless steel nameplate.
4. Motors: Maximum 40 degrees C (104 degrees F) ambient temperature rise, drip-proof, for operation with current, voltage, phase and cycle shown in schedule on Electrical drawings, conforming to NEMA Type 4. Motors shall be equipped with thermal overload protection. When motor has cooled down it shall re-start automatically if the operating control has been left on and the system requires pump to start.

5. Pump shall operate continuously with on-off switch, or with an HOA switch for automatically controlled pumps, for manual shut down. In the inlet and outlet piping of the pump, shutoff valves shall be installed to permit service to the pump, strainer, and check valve without draining the system.
6. A check valve shall be installed in the pump discharge piping immediately downstream of the pump. A strainer with drain valve and removable strainer screen or basket shall be installed immediately upstream of the pump.

B. Horizontal, Wet-Rotor Circulators:

1. Maintenance free, close-coupled pump and motor with maximum 3,300 rpm rotational speed.
2. Bronze body construction with ceramic shaft, plastic impeller, fluid lubricated bearings, no mechanical seal, and flanged or soldered joint connections. Pump shall be capable of pumping 30.2 LPM (8 GPM) @ 2.5 Meters of head (8 Feet of head) when drive by 1/12 HP single phase, 110 VAC motor, the capacity scheduled on drawings.
3. Bearings: Carbon type.

PART 3 - EXECUTION

3.1 STARTUP AND TESTING

- A. Make tests as recommended by product manufacturer and listed standards and under actual or simulated operating conditions and prove full compliance with design and specified requirements. Tests of the various items of equipment shall be performed simultaneously with the system of which each item is an integral part.
- B. System Test: After installation is completed provide an operational test of the completed system including flow rates, pressure compliance, alarms and all control functions.
- C. When any defects are detected, correct defects and repeat test at no additional cost or time to the Government.
- D. The COR will observe startup and contractor testing of selected equipment. Coordinate the startup and contractor testing schedules with the COR. Contractor shall provide a minimum of 10 working days prior to startup and testing.

3.2 DEMONSTRATION AND TRAINING

- A. Provide services of manufacturer's technical representative for four hours to instruct VA Personnel in operation and maintenance of the system.

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