

SECTION 21 3000
FIRE PUMPS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Fire pump package, including fire pump, electric motor drive, controller, and accessories.
- B. Electric jockey pump.

1.02 RELATED REQUIREMENTS

- A. Section 21 0500 - COMMON WORK RESULTS FOR FIRE SUPPRESSION: Fire protection piping.
- B. Section 21 0513 - Common Motor Requirements for Fire Suppression Equipment.
- C. Section 21 0548 - Vibration and Seismic Controls for Fire Suppression Piping and Equipment.
- D. Section 21 0716 - Fire Suppression Equipment Insulation.
- E. Section 21 0719 - Fire Suppression Piping Insulation.
- F. Section 26 2717 - Equipment Wiring: Electrical characteristics and wiring connections.

1.03 REFERENCE STANDARDS

- A. FM (AG) - FM Approval Guide; current edition.
- B. ITS (DIR) - Directory of Listed Products; current edition.
- C. NEMA MG 1 - Motors and Generators; 2014.
- D. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2014.
- E. NFPA 13 - Standard for the Installation of Sprinkler Systems; 2016.
- F. NFPA 20 - Standard for the Installation of Stationary Pumps for Fire Protection; 2016.
- G. UL (DIR) - Online Certifications Directory; current listings at database.ul.com.
- H. UL 448 - Centrifugal Stationary Pumps for Fire-Protection Service; Current Edition, Including All Revisions.
- I. UL 778 - Standard for Motor-Operated Water Pumps; Current Edition, Including All Revisions.
- J. UL 1478 - Fire Pump Relief Valves; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene one week before starting work of this section.

1.05 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturers literature including general assembly, pump curves showing performance characteristics with pump and system, operating point indicated, NPSH curve, controls, wiring diagrams, and service connections.
- C. Shop Drawings: Indicate layout, general assembly, components, dimensions, weights, clearances, and methods of assembly.
- D. Certificates: Certify that fire pumps meet or exceed specified requirements at specified operating conditions and that the installation complies with regulatory requirements. Submit summary and results of shop tests performed in accordance with NFPA 20.
- E. Test Reports: Indicate results of hydrostatic test and field acceptance tests.
- F. Manufacturer's Instructions: Indicate support details, connection requirements, for fire pump system.

1.06 QUALITY ASSURANCE

- A. Comply with NFPA 13 and NFPA 20; where requirements differ comply with the most stringent.
- B. Maintain on site at all times one copy of each design and installation standard referenced.

- C. Design fire pump system under direct supervision of a Professional Engineer experienced in design of this Work and licensed at Michigan.
- D. Equipment and Components: Bearing FM (AG) label or marking.
- E. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.
- F. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.
- G. Installer Qualifications: Company specializing in performing the work of this section with minimum 3 years experience.
- H. Provide certificate of compliance from authority have jurisdiction indicating approval of field acceptance tests.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver fire pumps and components in factory packing. Comply with manufacturer's rigging and installation instructions.
- B. Protect fire pumps and components from physical damage including effects of weather, water, and construction debris.
- C. Provide temporary inlet and outlet caps, and maintain in place until installation.

PART 2 PRODUCTS

2.01 FIRE PUMPS

- A. Manufacturers:
 - 1. AC Fire Pump, a xylem brand; _____: www.acfirepump.com.
 - 2. Patterson Pump Company, a Gorman-Rupp Company; _____: www.pattersonpumps.com.
 - 3. Peerless Pump Company; _____: www.peerlesspump.com.
- B. Horizontal base-mounted type; UL 448; and UL 778 horizontal shaft, single-stage, double suction, direct connected, horizontally split casing, for 250 psi maximum working pressure.
 - 1. Casing: Cast iron, with suction and discharge gage ports, renewable bronze casing wearing rings, seal flush connection, drain plug, flanged suction and discharge.
 - 2. Impeller: Bronze double suction fully enclosed, balanced and keyed to shaft.
 - 3. Bearings: Grease lubricated ball bearings, replaceable without opening casing.
 - 4. Shaft: Alloy steel with replaceable bronze shaft sleeve.
 - 5. Seal: Packing gland with minimum four rings graphite impregnated packing and bronze lantern rings, 230 degrees F maximum continuous operating temperature.
 - 6. Drive: Flexible coupling with coupling guard.
 - 7. Baseplate: Cast iron or fabricated steel with integral drain rim.
 - 8. Performance:
 - a. Flow: _____ gpm, at _____ feet head.
 - b. Motor: _____ hp, _____ volt, single phase, 60 Hz.
- C. Accessories:

2.02 ELECTRIC MOTOR DRIVE:

- A. Motor: Squirrel cage induction type, NEMA MG 1; in open drip proof NEMA 250 enclosure, 3500 rpm. Refer to Section 21 0513.
- B. Controller: Limited service type with auto-transformer starter, in NEMA 250 enclosure, including the following:
 - 1. Disconnect Switch: Externally operable, quick break type.
 - 2. Circuit Breaker: Comply with NFPA 20; minimum 65,000 amperes interrupting capacity.
 - 3. Motor Starter: Energized automatically through pressure switch or manually by externally operable handle.
 - 4. Pressure Switch: Set to cut in at _____ psi.

5. Running Period Timer: Keeps motor in operation when started automatically, for a minimum of seven minutes.
 6. Pilot Lamp: Indicates circuit breaker closed and power available.
 7. Alarm Relay: Energizes alarm to indicate circuit breaker open or power failure.
 8. Switch Relay: For remote start.
 9. Manual Selector Station: On enclosure marked "Automatic" and "Non-Automatic".
- C. Electrical Characteristics:
1. ____ hp.
 2. ____ volts, single phase, 60 Hz.

2.03 PRESSURE BOOSTER (JOCKEY) PUMP

- A. Manufacturers:
1. Armstrong Pumps Inc; ____: www.armstrongpumps.com.
 2. Grundfos; ____: www.us.grundfos.com.
- B. Electrically operated, horizontal turbine type with standard open drip-proof horizontal motor.
- C. Control by automatic jockey pump controller with full voltage starter and minimum run timer to start pump on pressure drop in system and stay in operation for minimum period of time. Fire pump shall start automatically on further pressure drop or on jockey pump failure.
- D. Electrical Characteristics:
1. ____ hp.
 2. ____ volts, single phase, 60 Hz.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install in accordance with NFPA 20.
- B. Provide access space around pumps for service; no less than minimum as recommended by manufacturer.
- C. Install piping in accordance with Section 21 0500. Decrease from line size with long radius reducing elbows or reducers. Support piping adjacent to pump such that no weight is carried on pump casings. For base mounted pumps, provide supports under elbows on pump suction and discharge.
- D. Provide drains for bases and seals, piped to and discharging into floor drains.
- E. Provide for connection to electrical service. Refer to Section 26 2717.
- F. Lubricate pumps before start-up.
- G. Check, align, and certify pumps by qualified installer prior to start-up.

3.02 FIELD QUALITY CONTROL

- A. Perform field inspection and testing in accordance with Section 01 4000 - Quality Requirements.
- B. Perform hydrostatic tests, flushing, and field acceptance tests as specified in NFPA 20.
- C. Perform field acceptance tests in the presence of Fire Marshal.

3.03 CLOSEOUT ACTIVITIES

- A. See Section 01 7800 - Closeout Submittals, for closeout submittals.
- B. See Section 01 7900 - Demonstration and Training, for additional requirements.
- C. Demonstration:
- D. Demonstrate automatic operation of system including verification of pressure switch set points to Owner.
- E. Use operation and maintenance data as reference during demonstration.
- F. Briefly describe function, operation, and maintenance of each component.
- G. Training: Train Owner's personnel on operation and maintenance of system.

1. Use operation and maintenance manual as training reference, supplemented with additional training materials as required.
2. Provide minimum of two hours of training.
3. Instructor: Manufacturer's training personnel.
4. Location: At project site.

END OF SECTION 21 3000