

## SECTION 21 30 00

### FIRE PUMPS

#### PART 1 GENERAL

##### 1.01 SUMMARY

- A. Section includes fire pump package, fire pump, electric jockey pump, controllers and automatic transfer and bypass isolation switches.
- B. Related Sections:
  - 1. Division 21 - Common Work Results for Fire Suppression: Product requirements for Fire piping placement by this section.
  - 2. Division 21 - Common Motor Requirements for Fire-Suppression Equipment: Product requirements for fire pump motors for placement by this section.
  - 3. Division 23 - Vibration and Seismic Controls for HVAC and Plumbing Piping and Equipment: Product requirements for pump isolators for placement by this section.
  - 4. Division 23 - HVAC and Plumbing Insulation: Product and execution requirements for pipe and equipment insulation for placement by this section.
  - 5. Division 26 - Equipment Wiring Connections: Execution requirements for pumps specified by this section.

##### 1.02 REFERENCES

- A. FM Global:
  - 1. FM - Approval Guide, A Guide to Equipment, Materials & Services Approved By Factory Mutual Research For Property Conservation.
- B. National Electrical Manufacturers Association:
  - 1. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).
  - 2. NEMA MG 1 - Motors and Generators.
- C. National Fire Protection Association:
  - 1. 2002 NFPA 13 - Installation of Sprinkler Systems.
  - 2. 2002 NFPA 20 - Standard for the Installation of Centrifugal Fire Pumps.
- D. Underwriters Laboratories Inc.:
  - 1. UL 448 - Pumps for Fire Protection Service.
  - 2. UL 778 - Motor Operated Water Pumps.
  - 3. UL 1478 - Fire Pump Relief Valves.
  - 4. UL - Fire Protection Equipment Directory.

##### 1.03 DESIGN REQUIREMENTS

- A. Conform to NFPA 20.
- B. Conform to OSHPD requirements.

##### 1.04 PERFORMANCE REQUIREMENTS

- A. Conform to NFPA 20 and NFPA.

## 1.05 SUBMITTALS

- A. Division 01 - Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Indicate layout, general assembly, components, dimensions, weights, clearances, and methods of assembly.
- C. Product Data: Submit 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.
- D. Field Test Reports: Indicate results of hydrostatic test and field acceptance tests.
- E. Manufacturer's Installation Instructions: Submit support details, connection requirements, for fire pump system.
- F. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

## 1.06 CLOSEOUT SUBMITTALS

- A. Division 01 - Execution and Closeout Requirements: Closeout procedures.
- B. Project Record Documents: Record actual locations of components and accessories.
- C. Operation and Maintenance Data: Submit manufacturer's literature, cleaning procedures, replacement parts lists, and repair data for pumps, drivers and controllers.

## 1.07 QUALITY ASSURANCE

- A. Perform Work in accordance with UL Fire Protection Equipment Directory, FM Approval Guide, and State of California standards.

## 1.08 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience, and with service facilities within 100 miles of Project.
- B. Installer: Company specializing in performing Work of this section with minimum three years documented experience.
- C. Design fire pump system under direct supervision of Professional Engineer experienced in design of this Work and licensed at Project location.

## 1.09 DELIVERY, STORAGE, AND HANDLING

- A. Division 01 - Product Requirements: Product storage and handling requirements.
- B. Accept fire pumps and components on site in factory packing. Inspect for damage. Comply with manufacturers rigging and installation instructions.
- C. Protect fire pumps and components from physical damage including effects of weather, water, and construction debris.
- D. Furnish temporary, inlet and outlet caps and maintain in place until installation.

## 1.10 FIELD MEASUREMENTS

- A. Verify field measurements prior to fabrication.

1.11 WARRANTY

- A. Division 01 - Execution and Closeout Requirements: Product warranties and product bonds.
- B. Furnish five year manufacturer warranty for fire pumps.

1.12 MAINTENANCE SERVICE

- A. Division 01 - Execution and Closeout Requirements: Maintenance service.
- B. Furnish service and maintenance of fire pump, driver, and controller for five years from Date of Substantial Completion.

1.13 EXTRA MATERIALS

- A. Division 01 - Execution and Closeout Requirements: Spare parts and maintenance products.
- B. Furnish one set of gaskets, screens and seals for each pump type and model supplied.

PART 2 PRODUCTS

2.01 FIRE PUMPS

- A. Manufacturers:
  - 1. Peerless Pump
  - 2. Fairbanks
  - 3. Firetrol Controls
  - 4. Substitutions: Not Permitted.

2.02 HORIZONTAL BASE MOUNTED PUMPS

- A. Type: UL 448, UL 778 and FM approved, horizontal shaft, single stage, double suction, direct connected, horizontally split casing, for 250 psi maximum working pressure.
- B. Casing: Cast iron, with suction and discharge gage ports, renewable bronze casing wearing rings, seal flush connection, drain plug, flanged suction and discharge.
- C. Impeller: Bronze double suction fully enclosed, balanced and keyed to shaft.
- D. Bearings: Grease lubricated ball bearings, replaceable without opening casing.
- E. Shaft: Alloy steel with replaceable bronze shaft sleeve.
- F. Seal: Packing gland with minimum four rings graphite impregnated packing and bronze lantern rings, 230 degrees F maximum continuous operating temperature.
- G. Drive: Flexible coupling with coupling guard.
- H. Base plate: Cast iron or fabricated steel with integral drain rim.

2.03 FIRE PUMP ACCESSORIES

- A. Eccentric suction reducer and OS&Y gate or butterfly valve on suction side of pump.
- B. Concentric increaser and check valve in pump discharge and OS&Y gate or butterfly valve on system side of check valve.

- C. Fire pump bypass fitted with OS&Y gate or butterfly valves and check valve.
- D. Main relief-valve, UL 1478, open and enclosed type waste cone.
- E. Suction pressure gage, 4-1/2 inch diameter dial with snubber, valve cock and lever handle.
- F. Discharge pressure gage mounted on board attached to pump, with snubber, valve cock and lever handle.
- G. Casing 3/4 inch relief valve.
- H. Float operated 1 inch automatic air release valve.
- I. Hose valve manifold with 2-1/2 inch hose gate valves with caps and chains.
- J. Flow metering system for closed loop testing.

## 2.04 ELECTRIC MOTOR DRIVE

- A. Motor: Squirrel cage induction type; in open drip proof NEMA MG-1 enclosure, 3500 rpm. Refer to Division 21.
- B. Controller: Limited service type with soft starting starter, in NEMA 250 Type 4X enclosure, including the following:
  - 1. Disconnect Switch: Externally operable, quick break type.
  - 2. Circuit Breaker: Size to 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 75 psi.
  - 5. Running Period Timer: Keeps motor in operation when started automatically, for minimum of seven minutes.
  - 6. Pilot Lamp: Indicates circuit breaker closed and power available.
  - 7. Test Accessories: Ammeter test link and voltmeter test studs.
  - 8. Alarm Relay: Energizes alarm to indicate circuit breaker open or power failure.
  - 9. Switch Relay: For remote start.
  - 10. Manual Selector Station: On enclosure marked "Automatic" and "Non-Automatic."
- C. Automatic transfer and bypass isolation switches:
  - 1. Switch shall be listed specifically for fire pump applications. The switch shall be supplied with a listed and approved electric fire pump controller. The fire pump controller and automatic transfer and bypass isolation switch shall be completely factory assembled, wired, tested and shipped as a single complete unit for easy field connection to the power sources and the fire pump motor.
  - 2. The switches shall be listed by UL for transfer switch service and also meet the requirements of NFPA 10, Standard for the Installation of Stationary Pumps for Fire Protection and NFPA 70, National Electrical Code. The switches shall be listed by UL under UL-1008, Automatic Transfer Switches as well as UL-508 Industrial Control Equipment.
  - 3. A "normal-test" selector switch shall be supplied to facilitate manual testing of the automatic transfer switch. A "retransfer to normal power – timed/immediate" selector switch shall be provided for manually bypassing time delay functions and returning to normal power.
  - 4. The transfer switch control panel shall have the ability to log data and to maintain the last 99 events, even in the event of total power loss. The events shall be time and date stamped and maintained in a non-volatile memory. The events shall include.
    - a. Date, time and reason for transfer from normal to emergency.
    - b. Date, time and reason for transfer from emergency to normal.
    - c. Date, time and reason for engine start.
    - d. Date and time engine stopped.

- e. Date and time emergency source available.
- f. Date and time emergency source not available.
- g. Total number of transfers.
- h. Total number of transfers due to source failure.
- i. Total number of days control panel is energized.
- j. Total number of hours both normal and emergency sources are available.

## 2.05 PRESSURE BOOSTER (JOCKEY) PUMP

- A. Manufacturers:
  - 1. Peerless
  - 2. Fairbanks
  - 3. Substitutions: Not Permitted.
- B. Electrically operated horizontal close-coupled 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 starts automatically on further pressure drop or on jockey pump failure.

## 2.06 ELECTRICAL CHARACTERISTICS AND COMPONENTS

- A. Electrical Characteristics: In accordance with Division 26.
- B. Motors: In accordance with Division 21.
- C. The controller shall be designed for soft start.
- D. Disconnect Switch: Factory mount in control panel.
- E. Floor mounted for electrical connection to the motor by the equipment installer.
- F. Hospital OSHPD products, provide approved transfer switch.

## PART 3 EXECUTION

### 3.01 INSTALLATION

- A. Install Fire Pump in accordance with NFPA 20.
- B. Install pumps with space for service access; no less than minimum recommended by manufacturer.
- C. Install fire suppression piping in accordance with Division 21. Decrease from line size with long radius reducing elbows or reducers. Support piping adjacent to pump independently from pump casing. For base mounted pumps, install supports under elbows on pump suction and discharge.
- D. Install drains for bases and seals. Install piping to and discharging into floor sink.
- E. Install pump above floor on grade on vibration isolators. Refer to Division 21.
- F. Install piping associated with pump and pump casing and exhaust silencer.
- G. Insulate piping associated with pump, pump casing and exhaust silencer. Refer to Division 23.
- H. Connect to electrical service. Refer to Division 26.

- I. Lubricate pumps before start-up.
- J. Check, align, and certify base mounted pumps by qualified millwright prior to start-up.

3.02 FIELD QUALITY CONTROL

- A. Division 01 - Quality Requirements, 01 70 00 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Perform flow test on entire system in accordance with NFPA 20.
- C. Schedule test to be witnessed by Fire Marshal, Authority Having Jurisdiction, County's insurance underwriter and County's Representative.
- D. Pump manufacturer shall have responsibility for the proper operation of the complete unit assembly both at factory and in the field.

3.03 DEMONSTRATION AND TRAINING

- A. Demonstrate automatic operation of system including verification of pressure switch set points.

END OF SECTION