SECTION 21 3000 - FIRE PUMPS

PART 1 - GENERAL

1.01 SECTION INCLUDES

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

1.02 RELATED SECTIONS

A. Drawings and General Provisions of the Contract apply to this section.

1.03 REFERENCES

- A. FM P7825 Approval Guide; Factory Mutual Research Corporation; current edition.
- B. ITS (DIR) Directory of Listed Products; Intertek Testing Services NA, Inc.; current edition.
- C. NEMA MG 1 Motors and Generators; National Electrical Manufacturers Association.
- D. NEMA 250 Enclosures for Electrical Equipment (1000 Volts Maximum); National Electrical Manufacturers Association.
- E. NFPA 13, 2007 Standard for the Installation of Sprinkler Systems; National Fire Protection Association.
- F. NFPA 20, 2007 Standard for Installation of Stationary Pumps for Fire Protection; National Fire Protection Association.
- G. UL (FPED) Fire Protection Equipment Directory; Underwriters Laboratories Inc.; current edition.
- H. UL 448 Pumps for Fire Protection Service; Underwriters Laboratories Inc.
- I. UL 778 Standard for Motor-Operated Water Pumps; Underwriters Laboratories Inc.
- J. UL 1247 Diesel Engines for Driving Centrifugal Fire Pumps; Underwriters Laboratories Inc.
- K. UL 1478 Fire Pump Relief Valves; Underwriters Laboratories Inc.

FIRE PUMPS

1.04 SUBMITTALS

- A. 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.
- B. Shop Drawings: Indicate layout, general assembly, components, dimensions, weights, clearances, and methods of assembly.
- C. Test Reports: Indicate results of hydrostatic test and field acceptance tests.
- D. Manufacturer's Instructions: Indicate support details, connection requirements, for fire pump system.
- E. Project Record Documents: Record actual locations of components and accessories.
- F. 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, 2007.
- G. Operation Data: Include manufacturer's instructions, start-up data, trouble-shooting check lists, for pumps, drivers, and controllers.
- H. Maintenance Data: Include manufacturers literature, cleaning procedures, replacement parts lists, and repair data for pumps, drivers and controllers.

1.05 QUALITY ASSURANCE

- A. Comply with NFPA 20, 2007 and NFPA 13, 2007; 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 the State in which the Project is located.
- D. Equipment and Components: Bearing UL and FM label or marking.
- E. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc. or testing firm acceptable to the authority having jurisdiction 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 three years' experience.
- H. Provide certificate of compliance from authority have jurisdiction indicating approval of field acceptance tests.

1.06 PRE-INSTALLATION MEETING

A. Convene one week before starting work of this section.

1.07 DELIVERY, STORAGE, AND PROTECTION

- 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.

1.08 MAINTENANCE SERVICE

A. Provide service and maintenance of fire pump, driver, and controller for one year from date of Substantial Completion.

1.09 EXTRA MATERIALS

A. Provide one set of gaskets, screens, and seals for each pump type and model supplied.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Acceptable manufacturers include:
 - 1. Pentair Aurora
 - 2. Fairbanks Morse
 - 3. ITT A-C
 - 4. Namco
 - 5. Patterson

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FIRE PUMPS

2.02 FIRE PUMPS

- A. Fire Pumps: Vertical in-line type; UL 448 and UL 778; single stage, close coupled, radially or horizontally split casing, for in-line mounting, for 250 psi.
 - 1. Casing: Ductile iron, with suction and discharge gage port, casing wear ring, seal flush connection, drain plug, flanged suction and discharge.
 - 2. Impeller: Bronze, fully enclosed, keyed directly to motor shaft.
 - 3. Shaft: Carbon steel with bronze sleeve.
 - 4. Seal: Packing gland with minimum four rings graphite impregnated packing and bronze lantern rings, 230 degrees F maximum continuous operating temperature.
 - 5. Seal: Carbon rotating against a stationary ceramic seat 275 degrees F maximum continuous operating temperature.
 - 6. Performance: As scheduled on the drawings.
 - 7. Motive Power: As scheduled on the drawings.
- B. Fire Pump Accessories:
 - 1. Eccentric suction reducer and OS&Y gate valve on suction side of pump.
 - 2. Concentric increaser and check valve in pump discharge and OS&Y gate valve on system side of check valve.
 - 3. Fire pump bypass fitted with two tamper proof OS&Y gate or butterfly valves and check valve.
 - 4. Main relief valve, UL 1478, and open type waste cone.
 - 5. Suction pressure gage, 4-1/2 inch diameter dial with snubber, valve cock and lever handle.
 - 6. Discharge pressure gage mounted on board attached to pump, with snubber, valve cock and lever handle.
 - 7. 3/4 inch casing relief valve.
 - 8. Float operated minimum 3/4 inch automatic air release valve.

- 9. Hose valve manifold with 2-1/2 inch hose gate valves with caps and chains.
- 10. Flow metering system for closed loop testing.

2.03 ELECTRIC MOTOR DRIVE

- A. Motor: Squirrel cage induction type, NEMA MG 1; in open drip proof NEMA 250 enclosure, or 1770 rpm.
- B. Controller: Limited service type with solid state soft slant type, in NEMA 250 enclosure, including the following:
 - 1. Disconnect Switch: Externally operable, quick break type.
 - 2. Circuit Breaker: Comply with NFPA 20, 2007; 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 155 psi (or 10% lower than operating pressure)
 - 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. 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. Electrical Characteristics: As scheduled on the drawings.

2.04 PRESSURE BOOSTER (JOCKEY) PUMP

- A. Manufacturer: Same as fire pump.
- B. Electrically operated, horizontal turbine or 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 shall start automatically on further pressure drop or on jockey pump failure.
- D. Electrical Characteristics: As scheduled on the drawings.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install in accordance with NFPA 20, 2007.
- B. Provide access space around pumps for service; no less than minimum as recommended by manufacturer.
- C. 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. Mount unit on vibration isolators.
- F. Provide for connection to electrical service.
- G. Lubricate pumps before start-up.
- H. Check, align, and certify pumps by qualified installer prior to start-up.

3.02 FIELD QUALITY CONTROL

- A. Perform field acceptance tests as specified in NFPA 20.
- B. Perform field acceptance tests in the presence of authority having jurisdiction.

3.03 DEMONSTRATION AND INSTRUCTIONS

- A. Demonstrate automatic operation of system including verification of pressure switch set points.
- B. Train Owner's staff in the proper operation of the fire pump system. Provide minimum of eight hours of training and instructions.

END OF SECTION 21 3000

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