SECTION 21 30 00
ELECTRIC FIRE PUMP AND ACCESSORIES

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 GENERAL REQUIREMENTS

A. General Conditions: Refer to the General Conditions, the Supplementary General Conditions and the Special Conditions, all provisions of which apply to work under this section as if written in full herein.

B. The scope of work in these Specifications and/or indicated on the drawings describes the design requirements for the electric fire pump, jockey pump, controllers and all required piping and accessories.

1.03 SYSTEMS

A. Systems and equipment to be provided under the Fire Protection design section shall be as listed below:
   1. Skid-Mount Fire Pump Assembly
   2. Jockey Pump
   3. Fire Pump Controller and Transfer Switch
   4. Jockey Pump Controller
   5. Flow Meter
   6. Test Header

1.04 DESIGN STANDARDS

A. Fire pump assemblies and installations shall be in accordance with the requirements of the following codes, standards and design guides:
   1. National Fire Protection Associations (NFPA) Standards:
      a. NFPA 20 - Installation of Centrifugal Fire Pumps, 1999
   2. Factory Mutual (FM) Approval Guide
   3. Underwriters Laboratories Inc. (UL)
   4. Owner's Insurance Underwriter Requirements

PART 2 PRODUCTS

2.01 FIRE PUMP

A. The Contractor shall provide and install a skid-mounted fire pump assembly designed and factory tested in accordance with the requirements of NFPA 20. The fire pump shall be UL Listed and FM Approved for fire pump service at the specified rating. The system manufacturer will assume unit responsibility for the proper operation of the entire system as specified herein.

B. The fire pump shall be of the double suction horizontal split-case design and shall be UL Listed and FM Approved. The pump will be designed to operate at a maximum of 3500 RPM and will provide a rated capacity of 1000 GPM at a differential pressure 75 psi. At 150% of the rated capacity it shall develop at least 65% of its rated head and shall not exceed 140% of the rated head at zero capacity.

C. Pump casing shall be cast iron with flanged suction and discharge connections. Flanges shall be equivalent to ANSI B16.1 flange ratings. Casing shall be split on the shaft centerline to allow access to rotating elements without disturbing drive or alignment.

D. Casing and impeller wear rings shall be renewable bronze rings locked in position to prevent rotation.

E. Bearings shall be steel, grease lubricated and shall have a minimum B-10 life of 20,000 hours. The bearing housing shall be designed to flush lubricant through, and provide continuous

cleaning of, bearing surfaces. Bearings shall be removable without removing the rotating element or dismantling the pump.

F. Pump shaft shall be steel.

G. Shaft sleeves shall be renewable, bronze slip-fit over the shaft, shall extend full length through the seal box, and shall be locked in place.

H. Impellers shall be enclosed bronze double suction type hydraulically and dynamically balanced.

I. Pump shaft seal shall be stuffing box design with split bronze glands.

J. Pump and drive base shall be formed steel or cast iron with drain pan base. The pump shall be connected to the driving electric motor through a flexible coupling. Coupling shall have a formed sheet steel coupling guard, bolted to the base plate.

K. Motor shall be open drip proof type with a 1.15 service factor. Motors shall comply with the provisions of NFPA 70, National Electric Code as described in NFPA 20. Horsepower rating shall be as required for FM Approval.

L. The fire protection piping and fire pump shall be designed and sized to eliminate the requirement for a main relief valve.

M. Pump shall be fitted with the following accessories:
   1. Automatic casing air relief vent
   2. Casing drain cocks
   3. Discharge pressure gauge (0-300 psig)
   4. Suction pressure gauge (30" Hg to 150 psig)
   5. Name plate with capacity, head, impeller diameter, speed, model number, and serial number
   6. Eccentric suction reducer (if required)
   7. Concentric discharge increaser (if required)
   8. Main relief valve and waste cone (if required)
   9. UL Listed FM Approved flow meter
   10. Fire pump test header complete with the quantity of valves as required by NFPA 20

N. Fire pump system shall be:
   1. Allis Chalmers
   2. Aurora Pump
   3. Fairbanks Morse Pump Co.
   4. Patterson Pump Co.
   5. Peerless Pump
   6. SyncroFlo, Inc.

2.02 FIRE PUMP CONTROLLER

A. The fire protection contractor shall be responsible for coordinating voltages of all fire protection equipment requiring electric motors, switches and relays, including control circuiting.

B. The motor controller assembly shall be UL Listed and FM Approved for fire pump service and for service entrance. It shall be compatible with the motor horsepower and voltage. Cabinet shall be freestanding NEMA 12 rated with baked enamel finish. All internal components shall be accessible from the front.

C. The controller assembly shall have an integral automatic transfer switch and shall be of the combination manual and automatic reduced voltage, electronic, soft-start type (25% of full voltage at starting). Transfer switch shall be 3-pole.

D. The controller shall have across-the-line starting for fire pumps less than 50 HP. For pumps 50 HP and greater, starter shall be reduced voltage, electronic, soft-start type (25% of full voltage at starting).

E. The controller assembly shall be designed to withstand the fault current for minimum short circuit capacity delivered to the controller and shall be clearly indicated on the controller

submittal. Coordinate the required rating of the controller with the electrical specifications and drawings.

F. Controller shall include the following:
   1. All controller components, including circuit breaker and contactors shall be front mounted, front wired and front accessible for maintenance.
   2. Controller shall include a motor rated combination isolating disconnect switch/circuit breaker, mechanically interlocked and operated with a single externally mounted handle.
   3. Controller shall be supplied with a pressure switch with a range of 0-300 psi and have independent high and low pressure settings. The pressure switch shall be mounted inside the controller.
   4. Controller shall have externally mounted individual, visible and audible indicators for power or power failure available, low pressure, pump operation, local start, phase failure, phase reversal, interlock on, pump running and run timer on.
   5. The controller shall have externally mounted operators including start pushbutton, stop pushbutton and emergency run mechanism. The start pushbutton and emergency run mechanism shall be separate units and not combined.
   6. The controller shall have a solid state minimum running period timer set for one minute for each ten horsepower. The minimum run timer shall include a flange mounted timer running pilot light to indicate when the run timer is in the timing mode.

G. Controller shall include the following remote alarm features for remote annunciation at the main fire alarm control panel:
   1. Pump running light
   2. Loss of phase/powerlight
   3. Phase reversal light
   4. Transfer switch normal
   5. Transfer switch emergency

H. The controller shall be completely assembled, wired, and factory tested by the system manufacturer.

I. Fire Pump Controller shall be:
   1. Cutler-Hammer
   2. Firetrol
   3. Hubbell Controls
   4. Joslyn Clark
   5. Master Controls

2.03 JOCKEY PUMP

A. Jockey Pump shall be a vertical multi-stage centrifugal type, coupled to an open drip proof motor.

B. Pump casing shall be cast iron with 200 psig minimum operating pressure.

C. Pump shall be bronze fitted and supplied with a relief valve between the pump and check valve.

D. Jockey pump shall be same manufacturer as the fire pump or by Grundfos Pump Corporation.

2.04 JOCKEY PUMP CONTROLLER

A. Jockey pump controller shall be combined manual/automatic type assembled, wired, and tested at the factory. Assembly shall be UL Labeled and FM Approved.

B. Controller shall include the following:
   1. One (1) externally operated fusible disconnect or circuit breaker switch
   2. One (1) front mounted hand-off-auto select switch
   3. One (1) running period timer to keep motor running for a predetermined time after each automatic start
   4. One (1) pre-piped mercoid pressure switch

C. Jockey pump controller shall be same manufacturer as fire pump controller.

D. Cabinet shall be NEMA 12 rated with baked enamel finish.

2.05 FLOW METER

A. Flow meter shall be UL Listed, FM Approved annubar type designed for mounting in pipe. Flow meter shall have a water flow capacity of 175% of pump rated capacity. Flow meter shall be provided with annubar flow sensor, valved high and low side connections, a flow indicator and interconnecting tubing. Flow meter element and indicator shall be sized for pump rated capacity.

2.06 TEST HEADER

A. Test header shall be (three) (four) outlet, horizontal (flush mount) (free standing) outlet style complete with 2-1/2" fire department valves, caps and chains. All exposed surfaces shall be polished chrome plated. Hose connection shall comply with local fire department requirements. Assembly shall be located 2'-6" above finished grade to the centerline of the valve outlets. Test header shall be Potter Roemer 5860 series or approved equal.

PART 3 EXECUTION

3.01 INSTALLATION

A. Fire pump system shall be installed in accordance with NFPA 20 and as indicated on the drawings.

B. Controllers shall be installed in accordance with NFPA 20.

C. Flow meter shall be installed in accordance with manufacturer's instructions.

D. Fire pump and jockey pump pressure control sensors shall be installed in accordance with NFPA 20.

E. Sprinkler system pipe, fittings and valves shall be of the pressure rating required to eliminate the requirement for a main relief valve on the fire pump.

F. Fire pump drip pan base shall be piped to floor drain.

G. All equipment will be factory tested in accordance with the requirements of NFPA, UL and FM. Additionally, the entire system shall be hydrostatically tested fully assembled by the system manufacturer prior to shipment.

3.02 SUBMITTAL DATA

A. The submittal data for the pumping system shall include, but not be limited to: pump curves, individual computer data sheets, system drawings, and complete description of control panel, with wiring diagram, sequencing data, instrumentation, and alarms.

B. The pumping system shall be guaranteed in writing by the manufacturer for a period of one (1) year from final acceptance by the Owner.

C. Start-Up-Service

1. The service of a factory trained representative shall be provided on the jobsite for a minimum of one (1) day to provide the manufacturer's certification and start-up of the fire pump assembly. A formal report is to be issued indicating any revisions required for certification of the assembly by the manufacturer. Instruction and training of the operator's personnel shall be provided following certification of the assembly.

END OF SECTION