

SECTION 13920

FIRE PUMPS

PART 1 - GENERAL

1.1 WORK INCLUDED:

- A. Furnish, install and test a motor-driven fire pump, jockey pump, and controllers in the space provided and as shown in the contract drawings.
- B. Provide pumps, controllers and appurtenances in accordance with this Section, the contract drawings and the Reference Codes and Standards.
- C. In case of conflict, the Reference Codes and Standards take precedence. Advise the SOM Project Manager of such conflicts prior to taking action.

1.2 SYSTEM DESCRIPTION:

- A. A new motor-driven split-case horizontal fire pump is to take suction from the approved water source main and supply sprinkler systems and standpipes, when required.
- B. The fire pump and associated equipment is to be housed in a space where shown on the drawings.
- C. All piping pertaining to appurtenances of the fire pump shall be covered by this Section. Other piping (suction from supply, discharge to system) shall be provided to the fire pump under Section 15440.

1.3 QUALITY ASSURANCE:

- A. Provide equipment and components of type and manufactures which are listed by Underwriter's Laboratories and approved by Factory Mutual and have been successfully applied in installations similar to ones within the scope of this section.
- B. The Contractor shall be regularly engaged in the installation of fire pumps, jockey pumps, controllers, and associated piping. Provide evidence of such recent experience.
- C. Contractor shall submit references for at least three projects of similar type and size installed over the last five years.
- D. The Medical Center reserves the right to reject any contractor who fails to demonstrate the experience required by 1.03B

1.4 REFERENCE CODES AND STANDARDS:

- A. The fire pump installation, including piping and appurtenances, shall be in full compliance with the following, including all codes and standards, referenced therein.
  - 1. National Fire Protection Association Standards No. 20 – Fire Pumps
  - 2. National Fire Protection Association Standards No. 70 – National Electric Code

1.5 SUBMITTALS:

- A. General: Shop drawings shall be submitted to the Project Manager for approval prior to the purchase and installation of equipment. The Project Manager will submit the shop drawings to the University Fire Marshal and SHC Engineering & Maintenance Fire Alarm Shop for internal review. After receiving review comments from the University Fire Marshal and the E&M Fire Alarm Shop, the contractor shall make appropriate changes to the shop drawings. Thereafter, the Project Manager will submit the shop drawings to the appropriate jurisdictional agency for required permit, review, and approval.
- B. Shop Drawings and other submittals: Shop drawings shall be computer generated (CAD) drawings, compatible with the University Maps and Records department standards. All items shall be submitted for approval within the time specified in this section, and shall include the following, as a minimum.
  - 1. Evidence of recent experience in installation of motor-driven fire pumps and appurtenances in similar projects prior to contract award.
  - 2. Schedule of performance, showing all major milestones, within 14 calendar days after contract award.
  - 3. Complete catalog data for all components to be installed, within 21 calendar days of contract award.
  - 4. Complete shop drawings of equipment to be installed, including piping, and any calculations, within 28 calendar days of contract award.
  - 5. Testing schedule, 14 calendar days prior to scheduled start of testing.
  - 6. Test procedure, at same time as Testing Schedule. Test procedure shall include testing alternate power supply and automatic transfer switch, when provided.
  - 7. Training syllabus, 14 calendar days prior to schedule training.

8. Recommended spare parts list with any special tools required, wiring schematics, installation/operation/maintenance manuals, and as-built drawings, at same time as training syllabus.
9. Report showing results of Field Acceptance Test, signed by contractor, within two (2) work days of test completion.
10. Maintenance and testing schedule, submitted at the same time as 1.5.B.9

1.6 SAFETY AND INDEMNITY:

- A. Safety: The Contractor shall be solely and completely responsible for conditions of the job site, including safety of all persons and property during performance of the work. This requirement will apply continuously and not be limited to normal working hours.

1.7 GUARANTEE:

- A. The Contractor shall issue a certificate of guarantee certifying that all materials and workmanship supplied and/or installed by the Contractor shall be free from defects for a period of not less than one year from the date of substantial completion or beneficial occupancy, whichever occurs first.

PART 2 - PRODUCTS

2.1 JOCKEY PUMP AND CONTROLLER

- A. Provide an automatic, 120/208/480 VAC, 60Hz, 3 phase motor driven centrifugal jockey pump. Provide a pump capable of providing discharge volume and pressure sufficient to maintain the desired fire protection system performance.
- B. Provide a controller suitable for the jockey pump with:
  1. NEMA Type 2 drip-proof enclosure, wall-mounted
  2. Fusible disconnect switch
  3. Running period timer
  4. Pressure switch with range of 0-300 psi
  5. Operating voltage 120, 208, 220 or 480 VAC, 3-phase
  6. Hands-off-automatic selector switch

2.2 FIRE PUMP AND CONTROLLER

- A. Provide a horizontal, split-case, centrifugal fire pump rated to provide a combined volume and pressure sufficient to maintain the designed fire protection system performance, minimum.

- B. Provide a 208/220/480 VAC, 60Hz, 3-phase motor driver listed for use with the fire pump to be used.
- C. Provide a controller listed for motor-driven fire pump service, suitable for use with the electric motor to be used. Provide a controller with:
  - 1. Means for wall mounting
  - 2. Manual shutdown only
  - 3. Running period timer
  - 4. Pressure switch with range of 0-300 psi
  - 5. NEMA Type 4 water tight enclosure
  - 6. Contacts for connection of fire alarm system wiring for required fire alarm signals
  - 7. Locked rotor overcurrent protection
  - 8. Pressure recorder
  - 9. Wye-delta closed circuit transition starting
- D. All components shall be housed in a NEMA Type 4 water tight enclosure with fully gasketed door and drip shield.
- E. The controller shall be equipped with a single handle, single throw operator for the isolating switch and circuit breaker. This operator shall be flange mounted and cycle the isolating switch and circuit breaker so that the circuit breaker always makes and breaks the utility service from the load (fire pump motor). This operator shall be interlocked with the controller door so that personnel must disconnect the controller from the service feed before they can enter the electrical compartment

### 2.3 POWER TRANSFER SWITCH:

- A. The electric fire pump controller shall be factory assembled and wired with a power transfer switch conforming to the latest edition of NFPA 20 and 70. The transfer switch shall be listed for fire pump service.
- B. The power transfer switch shall include a combination isolating disconnect switch/circuit breaker to provide short circuit locked rotor and running current protection for the fire pump controller and motor when on the emergency power source.
- C. The combination isolation disconnect switch/circuit breaker shall be operated with a single externally mounted handle. When moving the handle from "OFF" to "ON" the interlock mechanism shall sequence the isolating disconnect switch closed first and then the circuit breaker. When the handle is moved from "ON" to "OFF" the interlocking mechanism shall sequence the circuit breaker open first and then the isolating disconnect switch.
- D. The transfer switch circuitry shall be capable of sensing both the normal power source and the emergency power source. The normal power source pickup shall be set at 95%

nominal voltage and dropout at 85% nominal voltage. The emergency power source shall be set to pickup at 90% nominal voltage and 95% frequency. All voltage sensing, frequency sensing, and time delays shall be field adjustable to accommodate individual installation requirements. The transfer signal shall be delayed for one second, delaying the transfer so as to override momentary normal power outages.

- E. The transfer switch shall have “Transfer Switch Normal”, “Transfer Switch Emergency” and “Emergency Isolating Switch Off” pilot lights. “Test” and “Transfer Bypass” switches, audible alarm and “Silence Alarm” push buttons mounted on the flange of the enclosure. No indicating lights or switch devices shall be mounted on the enclosure door. Auxiliary contacts shall also be provided and wired to terminals to indicate the transfer switch position. The transfer switch shall be electrically operated and mechanically held, and shall be capable of being operated by a manual transfer mechanism located on the switch.

#### 2.4 PUMP BY-PASS:

- A. Provide full-way pump bypass with check valve

#### 2.5 VALVES

- A. All control valves shall be Outside-Screw-and-Yoke gate valves, complete with tamper switches. Valves on discharge side of the pump shall be high pressure rated valves as required. Valves shall be provided with valve supervisory switches. See Section 15440.

#### 2.6 CHECK VALVES

- A. Check valves shall be swing type. Check valves shall be capable of withstanding highest pressure developed by pump.

#### 2.7 SYSTEM TEST VALVES

- A. Provide a  $\frac{3}{4}$  inch system test valve and test connection, with sufficient piping to an adequate drain.

#### 2.8 FIRE PUMP FLOW METER SYSTEM

- A. Provide and install fire pump flow meter. Locate meter on test section of piping to provide necessary length of straight pipe downstream of the meter in accordance with manufacturer’s recommendations. Flow meter to be of the venture type. Meter shall be provided with sensing taps. Indicating meter shall be fixed mounted with 6-inch round dial. Scale shall be calibrated to read directly in gpm and scaled to read from 0 to 200% of rated pump capacity. Meter shall have external zero and range adjusting screws. Provide identification tag.

## PART 3 – EXECUTION

### 3.1 INSTALLATION:

- A. Install motor-driven fire pump, jockey pump, electric motor, controllers, transfer switch, piping, valves, check valves, test loop, test header, hose valves, and all appurtenances, as required, in compliance with the Reference Codes and Standards. Contractor is responsible for size, location and arrangement of pumps and controllers to fit in proposed pump house area.
- B. All equipment herein shall be installed within the fire pump enclosure. Coordinate installation with other specification sections.
- C. Fire Pump Piping:
  - 1. Install all fire pump piping and fullway pump bypass.
  - 2. Connect all piping to the supply, discharge, and fire pump test connection piping provided under Section 15440.
- D. Mount jockey and fire pump controllers on the wall at such height as to allow visibility and ready access to all controls and lights. Approximate mounting location is shown on the drawings.
- E. Prepare pipe, valve, and fitting surfaces, and paint fire engine red.
- F. Wire all equipment to complete a fully operational fire pump installation.
  - 1. Provide wiring to the fire pump controller, jockey pump controller, fire pump motor, and jockey pump motor.
  - 2. Tamper and water flow switches shall be wired by others under Section 13850.
- G. Install all approved or listed equipment in accordance with the limitations of its approval or listing.
- H. Install all equipment plumb, level, and true.

### 3.2 FIELD QUALITY CONTROL

- A. Protect all materials and equipment from the weather during delivery, storage, and installation.
- B. Restore all building elements destroyed by this work to as-found condition.

### 3.3 TESTS

- A. Coordinate Field Acceptance Test with SOM Project Manager, University Fire Marshal, SHC Engineering & Maintenance Shop and appropriate jurisdictional agency. Provide 72 hours minimum advance notice to all parties prior to testing.
- B. Conduct Field Acceptance Test in the SOM Project Manager, University Fire Marshal, SHC Engineering & Maintenance Shop, and the appropriate jurisdictional agency. Test procedures shall be as submitted per section 1.5.A.6 and approved by the University Fire Marshal.
- C. An authorized representative of the fire pump and controller manufacture(s) shall be present during the fire pump test.
- D. Ensure that no damage to property will occur during the fire pump test.
- E. Contractor shall repair and retest any items found to be defective in any way, to the satisfaction of the SOM Project Manager.

### 3.4 TRAINING:

- A. Conduct minimum four (4) hours of training at the time of choosing by the SHC Engineering & Maintenance Shop.
- B. Provide training in the operation, testing, and maintenance of:
  - 1. Valves, check valves, drain valves, test valves
  - 2. Fire pump, jockey pump
  - 3. Fire and jockey pump controllers.

### 3.5 CLEAN-UP

- A. Upon completion of the Work under this Section, immediately remove all surplus materials, rubbish and equipment associated with or used in performance of this portion of the Work.
- B. Leave area broom clean

END OF SECTION