SECTION 21 30 00

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. All electric driven fire pumps shall be connected to an emergency generator as a secondary source of power.

C. Provide pumps, controllers, transfer switches 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 University Project Manager of such conflicts prior to taking action.

1.2 SYSTEM DECRIPTION

A. A new motor-driven split-case horizontal fire pump is to take suction from the University 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 22 06 10.13 and 33 10 00.

1.3 QUALITY ASSURANCE

A. Provide equipment and components of type and manufacture which are listed by Underwriter's Laboratories and approved by Factory Mutual (FM) 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 University reserves the right to reject any contractor who fails to demonstrate the experience required by 1.3B and 1.3C.

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.
   2. National Fire Protection Association Standards No. 70 - National Electrical Code
   4. FM Global Property Loss Prevention Data Sheet 3-7, Fire Protection Pumps
   6. California Code of Regulations, Title 24, Part 9, California Fire Code

1.5 SUBMITTALS

A. Shop drawings shall be submitted to the Stanford University Fire Marshal's Office (SUFMO) for approval prior to purchase, and installation of equipment and to submitting to the local jurisdiction. After written response addressing SUFMO comments has been received, submit four (4) hardcopy sets for wet stamp by SUFMO. The contractor then will submit the three (3) sets of SUFMO approved/stamped submittals and approval to the Santa Clara County Fire Marshal’s Office (SCCFMO), or other jurisdiction if outside SCC, for plan review and permit.

A. Shop Drawings and other submittals: Shop drawings shall be computer generated (CAD) drawings, compatible with Stanford 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.
   3. Complete catalog data for all components to be installed.
   4. Complete shop drawings of equipment to be installed including factory pump curves.
   5. Testing schedule.
   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 provided prior to project close-out.
   8. Recommended spare parts list with any special tools required, wiring schematics, installation/operation/maintenance (IO&M) manuals, and as-built drawings, at project close-out.
   9. Report showing results of Field Acceptance Test, signed by contractor, within two (2) work days of test completion.
   10. Maintenance and testing schedule, as required by Title 19 submitted with IO&M manuals, and as-built drawings at project close-out.

PART 2 PRODUCTS

2.1 JOCKEY PUMP AND CONTROLLER
A. Provide an UL listed, and FM approved (UL/FM) automatic, 120/208/220/480 VAC, 60Hz, 3 phase motor driven centrifugal jockey pump. Provide a pump capable of providing discharge volume and pressure sufficient to maintain the desire fire protection system performance.

B. Provide a UL/FM 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 UL/FM horizontal, split-case, centrifugal fire pump with 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 UL/FM 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. Contacts for connection of fire alarm system wiring for required fire alarm signals
   6. Locked rotor overcurrent protection
   7. Pressure recorder
   8. Reduced voltage starting
   9. Controller should not have "Auto-Stop" functionality; pump should be arranged for manual stopping only.

D. All controller and transfer switch components shall be housed in a NEMA Type 4 water tight enclosure with fully gasketed door and a drip shield.

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 UL/FM 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 isolating 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 thermal 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 filed 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 pump suction 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 Potter OS&Y valve supervisory switches. See Section(s) 21 13 00 and 28 31 00.

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 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 a UL listed and FM approved fire pump flow meter.

2.9 SYSTEM TEST HEADER
   A. Provide a UL listed, or FM approved manifold type test header. Do not use “rose-bud” type (spherical) test header.

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 or room area.

   B. All equipment herein shall be installed within the required fire rated fire pump enclosure. Coordinate installation with other specification sections.

   C. Fire Pump Piping
      1. Install all fire pump piping and full-way pump bypass.
      2. Connect all piping to the supply, discharge, and fire pump test connection piping provided under Section 22 06 10.13 and 31 10 00.

   D. Mount jockey pump control may be wall mounted at a height to allow visibility and ready access to all controls and lights.

   E. Fire pump controllers shall be floor mounted on concrete pad seismically anchored in direct line of sight to the fire pump. Mounting location shall be as shown on the drawings.

   FDC shall be installed on the discharge side of the fire pump.

   F. Wire all equipment to complete a fully operational fire pump installation. Coordinate with Section 26 05 83 and 28 31 00. The Fire pump shall be monitored by the fire alarm system panel as required by all referenced codes and standards on a point by point basis by the fire alarm system and campus Remote Supervising Station.
      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 28 31 00.

   G. 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 shall be of the venturi type. Meter shall be provided with sensing taps. Indicating meter shall be fixed mounted with 6-inch round dial minimum. 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 signage.

H. Flow Meter shall be installed such that its discharge can be routed to the test header and to a no-discharge recirculation path.

I. Install all equipment plumb, level, and true.

J. Provide all signs for the fire pump enclosure and valves, and provide all labels for each piece of equipment and piping. Unique identifiers shall be provided for each valve. Provide a single-line diagram of the fire pump system inside the fire pump enclosure.

K. Document Cabinet & Materials: Provide an adequately sized cabinet in the fire pump enclosure to include the Controller, Fire Pump, and Flow Meter O&M manuals.

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 University Project Manager, SUFMO, SCCFMO (or other local jurisdiction) and other Contractors. Provide 72 hours minimum advance notice to all parties prior to testing.

B. An authorized representative of the fire pump and controller manufacturer(s) shall be present during the fire pump test.

C. Ensure that no damage to property will occur during the fire pump test.

D. Ensure water discharge is appropriately contained or treated prior to entering storm or sanitary sewer drainage systems. Contact the Stanford Water Department for consultation and approval.

E. Contractor shall repair and retest any items found to be defective in any way, to the satisfaction of the University.

3.4 TRAINING

A. Conduct minimum four (4) hours of training at the time of choosing by the University for SUFMO.
B. Provide training in the operation, testing, and maintenance of:
   1. Valves, check valves, drain valves, test valve
   2. Fire pump, jockey pump
   3. Fire and jockey pump controllers
   4. Flow Meters
   5. Completion of State required Title 19 inspection, testing and maintenance annual and monthly forms.

3.5 CLEANUP

A. Cleanup shall be to the satisfaction of the University

B. Remove all construction debris from the property

C. Leave work areas broom clean

END OF SECTION