

**SECTION 13901 – BASIC FIRE PROTECTION REQUIREMENTS**

---

**PART 1 - GENERAL****RELATED DOCUMENTS**

Drawings and general provisions of the Contract, including General and Supplementary conditions, (if any) and other General Requirements, apply to the work specified in this section.

Sections are as follows:

Wet Pipe Sprinkler System: Section 13910

Fire Pump Systems: Section 13920

**SUMMARY**

This Section includes general administrative and procedural requirements for fire protection installations and expands the requirements specified in Division 01. These requirements are: Contractor's Qualifications, Quality Assurance, Reference Codes and Standards, Permits and Inspections, Equipment and Materials, Examination of Premises, Submittals, Coordination Drawings, Record Documents, Project Closeout, Warranty, Measurements, Operation Prior to Substantial Completion, Electrical Work, Painting, Protection of Equipment and Work, Rough-ins, Fire Protection Installations, and Cutting and Patching. The Section applies to all Division 13 Fire Protection sections.

**DEFINITIONS:**

The following definitions apply to all Division 13 Fire Protection sections.

**Furnish:** Except as otherwise defined in greater detail, term "furnish" is used to mean supply and deliver to project site, ready for unloading, unpacking, assembly, installation, etc., as applicable in each instance.

**Install:** Except as otherwise defined in greater detail, term "install" is used to describe operations at project site including unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning and similar operations, as applicable in each instance.

**Provide:** Except as otherwise defined in greater detail, term "provide" means furnish and install, complete and ready for intended use, as applicable in each instance.

**Installer:** The term "Installer" is defined as the entity (person or firm) engaged by the Contractor or its subcontractor or sub-subcontractor for performance of a particular unit of work at the project site, including installation, erection, application and similar required operations. Installers shall be skilled in the work they are to perform.

**Specialist:** The term "Specialist" means an individual or firm of established reputation (or, if newly organized, whose personnel have previously established a reputation in the same field), which is regularly engaged in, and which maintains a regular force of workmen skilled in either

(as applicable) manufacturing or fabricating items required by the contract, installing items required by the contract, or otherwise performing work required by the contract. Where the contract specification requires installation by a specialist, that term shall also be deemed to mean either the manufacturer of the item, an individual or firm licensed by the manufacturer, or an individual or firm who will perform the work under the manufacturer's direct supervision.

**Finished Spaces:** Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct shafts, unheated spaces immediately below the roof, spaces above ceilings, unexcavated spaces, crawl spaces, and tunnels.

**Exposed Interior Installations:** Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.

**Exposed Exterior Installations:** Exposed to view outdoors, or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.

**Concealed Interior Installations:** Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in duct shafts.

**Concealed Exterior Installations:** Concealed from view and protected from weather conditions and physical contact by building occupants, but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.

### SCOPE

The following requirements apply to the work necessary to provide fire protection systems, as specified in the various Division 13 Fire Protection sections.

### CONTRACTOR'S QUALIFICATIONS

An acceptable contractor for the work under this Division shall be a specialist in this field and have the personal experience, training and skill and the organization to provide a practical working system. He shall have experience and licenses, permits, and certificates required under Louisiana Revised Statutes 40:1628, 40:1653, and 40:1657. If required, he shall be able to furnish acceptable evidence of having contracted for and installed not less than 3 systems of comparable size and type to this one, that have served their owners satisfactorily for not less than 3 years. The foreman for this work shall have had experience in installing not less than 3 such systems and shall be approved before work is begun.

### QUALITY ASSURANCE

**Meetings:**

Prior to preparing the shop drawings for submittal, organize a meeting between the Architect and Contractor to establish a full understanding of the design intent. The meeting shall include the Architect, Engineer, Contractor, and trades involved in the preparation of the shop drawings.

**Manufacturers:**

Trade names, manufacturers and catalog numbers are mentioned herein and on the Drawings solely in order to establish a standard for the type, general design and quality of product

required. Other products similar in design, of equal quality and complying with the Drawings and Specifications will be considered after the contract is let only for those items with which the expression "or equal" is used. Where two or more manufacturers or materials are named, the Contractor may submit any of those named, provided they conform to the Specification. Identification in the project documents of any product by name, manufacturer or model number does not include either expressed or implied warranty of unqualified product acceptance. All products must be capable of proper installation in the spaces provided, readily maintained and must satisfy other requirements contained in the contract documents.

Motors provided under Sections 139XX shall comply with NFPA 70 and shall be listed by a Nationally Recognized Testing Laboratory as defined in OSHA Regulation 19107.

### REFERENCE CODES AND STANDARDS

Requirements set forth in reference codes and standards are minimum for equipment, material and work. In instances where capacities, size, etc., of equipment, devices or materials listed in the Contract Documents exceed these minimums, listed or shown capacities, etc. shall prevail.

Comply with applicable laws, ordinances, codes and rules, with latest revisions, of the following governing agencies:

1. Office of the State Fire Marshal
2. Standard Building Code

Industry standards and specifications issued by the following organizations shall apply to materials and workmanship:

1. NFPA - National Fire Protection Association
2. ETL - Engineering Testing Laboratory
3. NEMA - National Electrical Manufacturers' Association
4. FM - Factory Mutual
5. UL - Underwriters' Laboratories, Inc.

Local laws and codes take precedence over industry standards.

### PERMITS AND INSPECTIONS

Permits and Fees: Obtain and pay for all permits. Pay for all inspections in connection with the work required under local codes.

Certificates of Inspection: Upon completion of the work, furnish certificates of inspection from all inspection or regulatory agencies having jurisdiction over work of Sections 139XX.

### EQUIPMENT AND MATERIALS

Each item of equipment shall bear a name plate showing the manufacturer's name, trade name, model number, serial number, ratings and other information necessary to fully identify it. The plate shall be permanently mounted in a prominent location and shall not be concealed, insulated or painted.

The label of the approving agency, such as UL, FM, by which a standard has been established for the particular item, shall be in full view.

The equipment shall be essentially the standard product of a manufacturer regularly engaged in the production of such equipment and shall be the manufacturer's latest design.

Deliver equipment and materials to the site and store in original containers, suitably sheltered from physical damage and the elements, but readily accessible for inspection. Equipment damaged in shipment will not be acceptable.

### EXAMINATION OF PREMISES

Visit the site of the proposed work before bidding. Inspect the site and become familiar with the difficulties and restrictions attending the execution of the contract.

No additional compensation will be allowed for failure to be informed of site conditions.

### SUBMITTALS

General:

Submit for review shop drawings, product data and samples. Comply with requirements of Section 01300 and the following. Mark each individual item with pertinent specification section and paragraph number. Shop drawings, product data, and hydraulic calculations shall be submitted at one time for a single review. Piecemeal submittals are not acceptable and will be returned unreviewed.

If the submittal deviates from the requirements of the Contract Documents, the deviation shall be identified in writing on the first page of the submittal. Identify where within the Contract Documents the deviation occurs. The deviation shall only be considered acceptable if the identified deviation has been initialed by the Engineer. Any deviation not initialed may be assumed to be rejected. All coordination required due to the deviation, such as space allocation, changes to electrical service, or any other required changes shall be born as Work of Sections 139XX but accomplished by Installers skilled in the Work being performed. No costs incurred by the approved deviation shall be born by the Owner.

Review of shop drawings and submittals does not relieve the Contractor of responsibility for compliance with the specific requirements of the Contract Documents, or for fitting the equipment in the space allotted, with proper space for connection of piping and for servicing or for coordination of the work with work of other trades. Approval of deviations also does not relieve the Contractor of responsibility for compliance with all other aspects of the Contract Documents.

Review is for general conformance with the design concept of the project, general compliance with the information given in the project documents, and for compliance with the Rules and Regulations of the Office of the State Fire Marshal. Responsibility for confirming and correlating all quantities and dimensions, selecting fabrication processes and establishing techniques of construction resides with Contractor. Include dimensional data and weights of equipment. Include motor manufacturers' names. Submittals and Drawings will be returned after review indicating whether or not exceptions are taken and the required procedure to be followed thereafter. Revised and acceptable submittals and shop drawings are required before submittal

to the Office of the State Fire Marshal. Pen and ink changes to the drawings are not acceptable. Because of the complexity of the review, a minimum of 28 calendar days can be expected to elapse before work will be allowed to commence. The Owner will not be responsible for any delays caused by an incomplete or deficient submittal. The Architect or his consultants shall be sole judge as to whether the submittal is incomplete or deficient.

Submission of samples may be required by the Architect, particularly where equipment is visible in finished areas. Arrange demonstrations of a product's ability to perform as specified if required.

#### Shop Drawings:

Submit shop drawings covering equipment rooms, equipment foundations, equipment supports, field-fabricated equipment, pipe work and any other drawings specifically called for in other 139XX Sections or NFPA Codes 13, 14, and 20 as applicable. Shop drawings shall consist of plans, sections, elevations and details to scale (no smaller than 1/4" per foot), with dimensions clearly showing the installation. Floor plans may be submitted at 1/8" per foot scale if approved in advance. Direct copies of small scale project drawings issued to the Contractor are not acceptable. Drawings shall take into account equipment furnished under other Divisions and shall show space allotted for it. Include construction details and materials. Submit shop drawings as required in the individual sections. Shop drawings shall comply with both the Contract Drawings and the requirements of the Office of the State Fire Marshal.

#### **[For work in existing buildings or work connecting to existing systems, include the following.]**

The drawings show existing construction components and systems as on record by the Owner. Field verify location and size of structural members, location of partitions, and existing systems shown. If field measurements differ from the information on the drawings which causes a conflict in the Work, promptly consult the Architect for resolution. The Owner shall not be responsible for any delays in construction due to the Contractor failing to field verify information shown on the drawings as existing.

#### Product Data:

Submit product data after award of the contract and before any equipment or materials are purchased. Product data is defined as manufacturers' printed literature specifically marked to indicate size and model and accompanied by rating sheets listing values showing that equipment meets scheduled or specified values. Properly coded stamp "No Exceptions Taken" on submittal is required before ordering equipment unless otherwise noted. All items that affect the hydraulic calculations shall be submitted including all existing meters, backflow preventers, and flow switches. Equipment being provided by other trades that impact the hydraulic calculations shall also be submitted with the product data identifying the pressure loss caused by the equipment at the flow rate indicated in the hydraulic calculations. Submittals without this information will be considered incomplete.

Submit items identified in Sections 139XX and as required by NFPA 13, 14, and 20 .

#### COORDINATION DRAWINGS

Prepare coordination drawings in accordance with Division 01 Sections and the following. Drawings shall be to a minimum scale of 1/4" = 1'-0" detailing major elements, components, and

systems of fire protection equipment and materials in relationship with other building systems, installations, and components. Floor plans may be prepared at a scale of 1/8" per foot if approved in advance. Indicate locations where space is limited for installation and access and where sequencing and coordination of installations are of importance to the efficient flow of the work.

Indicate the proposed locations of piping, equipment, and materials and include vertical measurement from floor to center of piping and to bottom of elevated equipment. Piping drawings shall include access panel locations, valves, sleeves, location of supports, etc. Vertical measurement shall be indicated at all changes in direction of piping. Measurement shall be made to the middle of piping. Measurements shall include clearances for servicing and maintaining equipment; space for equipment disassembly for periodic maintenance; and showing areas for equipment removal. Provide details of connections and supports, exterior wall and foundation penetrations, sizes and locations of concrete housekeeping pads, and indicate space for valve stem movement. Indicate scheduling, sequencing, movement, and positioning of large equipment into the building during construction.

Prepare floor plans, elevations, and details to indicate penetrations in floors, walls, and ceilings and their relationship to other penetrations and installations. Include location of sleeves in floors, walls, and ceilings. Co-operate with work of other Divisions in the preparation of reflected ceiling plans. Ensure sprinklers are adequately shown on the reflected ceiling plans and that they do not conflict with other ceiling mounted items such as diffusers, grilles, lights, detectors, speakers, etc.

Fire protection CAD drawings may be made available to the Contractor for a fee for his use in preparing submittal drawings and coordination drawings. The transmitted CAD files are intended as an aid to the Contractor's development of shop and coordination drawings. Architectural floor plans and sections will not be provided with the fire protection CAD work provided under this paragraph.

### RECORD DOCUMENTS

Prepare record documents in accordance with the requirements in paragraph "Project Closeout". As a minimum, record documents shall show piping, sprinkler heads, valves, alarm switches, tamper switches, access panels, etc. Reference prominent building lines when showing dimensions of equipment, pipe, and access panels. Identify installations different from the original plans due to product substitutions, Contract Modifications, and actual equipment and material installed. Provide new hydraulic calculations to reflect the changes if required by the Architect or the Office of the State Fire Marshal. All elements underground shall be shown giving actual inverts and horizontal locations. Engage the services of a Land Surveyor or Professional Engineer registered in the State of Louisiana to record locations and invert elevations of underground installations. Complete this survey work prior to the covering of the underground installation.

### PROJECT CLOSEOUT

Mark and otherwise correct a set of reproducible drawings to reflect the final location of all work installed under Sections 139XX, to serve as record documents. Locate valves, tamper switches, flow alarm switches and other concealed items requiring adjustment or maintenance.

Supplement with additional sketches on tracing paper for clarification, if necessary. Certify in writing that record drawings have been checked and are accurate. Submittal of these documents is a prerequisite for certification of substantial completion. Contractor may obtain a set of reproducible drawings from the Architect and shall pay for them.

### WARRANTY

Warrant all equipment, materials, and workmanship for a period of one year. Repair or replace promptly defects due to faulty materials, methods of installation or workmanship, with the least inconvenience and without expense to the Owner and at time designated by the Architect within the one-year period. Additional specific performance or extended time warranties called for in the individual sections must be provided.

The warranty period for fire protection work shall commence on the date certified by the architect that the contract is substantially complete in accordance with the plans and specifications, or upon beneficial use by the Owner, whichever occurs first. When beneficial use is for only a portion of the work, the warranty shall commence only on that portion of the work.

### MEASUREMENTS

Because of the small scale of the Drawings, it is not possible to indicate all offsets and fittings or to locate every accessory. Study carefully the sizes and locations of structural members, wall and partition locations, attic spaces, ceiling furring, chase spaces and room dimensions and take actual measurements on the job. Locate piping, equipment and accessories, with sufficient space for installing and servicing. Contractor is responsible for accuracy of his measurements and shall not order materials or perform work without verification. No extra compensation will be allowed because field measurements vary from the dimensions on the Drawings. If field measurements show that equipment or piping can not be fitted, the Architect shall be consulted. All equipment, apparatus and materials must fit into the available, designated spaces, with proper clearances for maintenance, service and repair.

If sprinkler pipe routing is shown on the drawings, it is shown to indicate design intent unless noted otherwise. An alternate routing may be chosen if it is acceptable to the Architect. The alternate routing shall only be considered if it is at no cost to the Owner with consideration to all changes made necessary due to the change in routing.

### OPERATION PRIOR TO SUBSTANTIAL COMPLETION

Owner shall have the right to operate systems and equipment prior to substantial completion, as soon as tested and operational, provided all safety devices have been installed. Agreement between Owner and Contractor relative to time and hours of operation and responsibility for start up and shutdown is required. Do not permit operation which may damage equipment or cause damage to the building or to the work of other contractors. Air filters must be in place on air conditioning units and strainers must be in place in all piping systems prior to operation.

### ELECTRICAL WORK

General:

Electrical service shall be as indicated on the Drawings. All power wiring and all circuit breakers, starters, disconnect switches, pilot lights, hand-off-automatic (H-O-A) switches,

pushbutton stations, except such items which are provided as part of "packaged" fire protection equipment or specifically noted herein, shall be furnished, set in operating position, and electrically connected as work of Division 16, Electrical. All fire alarm connections shall be made as work of Division 16, Electrical.

Should the Contractor desire to use equipment requiring larger motors or electrical characteristics differing from those shown, it is the responsibility of work requirements under Sections 139XX to inform other affected parties of the proposed changes to permit them to supply proper wiring, disconnects and starters. Additional costs incurred to work of other Divisions caused by such changes shall be borne as work of Sections 139XX. Coordination to establish areas of possible change between Sections 139XX work and work of another Division shall occur prior to equipment delivery from the manufacturer.

Starters: Motor starters furnished with fire protection equipment covered by this section shall conform to the requirements of Division 16. Provide motor overload protection requirements for sizing overload protection device for motor starters furnished under Division 16.

Conduit and Wiring: As work of Sections 139XX, all interlock conduit and wiring and control conduit and wiring shall be provided, and all control elements shall be set in position and connected. Provide control transformers and additional relays required for interface with the electrical system. Unless indicated otherwise, power wiring and conduit for all devices shall be work of Division 16.

Motors: Unless otherwise specified herein, all motors shall be of the squirrel-cage, high-efficiency type, constant speed, general purpose for operation on phase and voltage shown in the Contract Documents. Motors shall be guaranteed to operate continuously at full load at 10 percent voltage variation above or below specified voltage and with temperature rise not to exceed 40 degrees C in any part. Provide internal thermal overload protection. Protection automatically opens control circuit when winding temperature exceeds the safe value calibrated to the temperature rating of the motor insulation. Motors not exposed to the weather shall have open-type enclosures; motors exposed to the weather shall be of the enclosed type. Motors shall have dripproof and leak-proof sleeve bearings or prelubricated ball bearings. Fractional horsepower motors shall be single phase, capacitor start, capacitor run. Variable speed motors for use with solid state drives shall be energy efficient, squirrel-cage induction, design B units with ratings, characteristics and features coordinated with and approved by the drive manufacturer. Motor manufacturer acceptable equals are Louis Allis, Allis Chalmers, Electric Machinery, General Electric or Century.

### PAINTING

Painting shall be done under Section 09900, except for touch-up of factory finishes on equipment located inside and outside. Obtain matched color coatings from the manufacturer and apply as directed. Prime coating of certain equipment is specified under individual equipment specification. If corrosion is found during inspection on the surface of any equipment, clean, prime, and paint in accordance with requirements of Section 09900.

**PART 2 - PRODUCTS** - Not applicable to this Section.

**PART 3 - EXECUTION****PROTECTION OF EQUIPMENT AND WORK**

Continuously maintain adequate protection of stored materials and installed work. Tightly cover fixtures and equipment, with sheet polyethylene or waterproof tarpaulin as protection against dirt, rust and moisture. Provide heat to equipment being stored to prevent condensation. Do not store materials and equipment outside, directly on the ground, or in areas where it may be subject to physical injury from vehicular traffic or construction machinery. Piping installed under this Division shall not be used by other trades as supports for scaffolds or personnel. Do not deliver flow switches and tamper switches, or other delicate equipment to the job site unless they can be placed in protected areas. At the completion of the work, clean equipment and piping, including hangers and supports to the satisfaction of the Architect.

**FIRE PROTECTION INSTALLATIONS**

Sequence, coordinate, and integrate the various elements of fire protection systems, materials, and equipment with other building components. Verify all dimensions by field measurements. Arrange for chases, slots, and openings in other building components during progress of construction to allow for fire protection installations. Coordinate the installation of required supporting devices and sleeves to be set in poured-in-place concrete and other structural components, as they are constructed. Sequence and coordinate installation of large pieces of equipment prior to closing in the building.

Coordinate connection of fire protection with exterior underground utilities and services. Comply with requirements of governing regulations, franchised service companies, and controlling agencies. Provide required connection for each service.

Install systems, materials, and equipment to conform with approved submittal data, including coordination drawings, to greatest extent possible. Conform to arrangements indicated by the Contract Documents, recognizing that portions of the Work are shown only in diagrammatic form. Where coordination requirements conflict with individual system requirements, refer conflict to the Architect with a suggested resolution. Install systems, materials, and equipment level and plumb, parallel and perpendicular to other building components, where installed exposed. Where mounting heights are not detailed or dimensioned, install systems, materials, and equipment to provide the maximum headroom possible.

Install fire protection equipment to facilitate servicing, maintenance, and repair or replacement of equipment components. As much as practical, connect equipment for ease of disconnecting, with minimum of interference with other installations. Install access panel or doors where equipment is concealed behind finished surfaces. See Division 8 Section "Access Doors."

Install systems, materials, and equipment giving right-of-way priority to systems required to be installed at a specified slope. In general, ductwork shall take precedence over piping. Set system elevations to minimize offsets where systems cross. Remove and relocate, without additional compensation, any item that is installed and is later found to encroach on space assigned to another use.

**CUTTING AND PATCHING**

General: Engage experienced Installers in cutting and patching this work. Installers' qualifications refer to the materials and methods required for the surface and building components being patched. Protect adjacent installations during all cutting and patching operations.

Perform cutting, fitting, and patching for fire protection equipment and material installation. Uncover work to provide for installation of ill-timed work. Remove and replace defective fire protection work and work not conforming to requirements of the Contract Documents. Install equipment and materials in existing structures. Patch finished surfaces and building components using new materials specified for the original installation and experienced Installers.

Upon written instructions from the Architect, uncover and restore work to provide for Architect observation of concealed work covered prior to inspection. Uncovering and restoring work required to be observed by the Architect prior to covering as identified in the Contract Documents will be at no cost to the Owner.

END OF SECTION 13901

**SECTION 13910 - WET-PIPE SPRINKLER SYSTEM**

---

**PART 1 - GENERAL****RELATED DOCUMENTS:**

The general provisions of the Contract, including General and Supplementary conditions, (if any) and other General Requirements, apply to the work specified in this section.

**WORK INCLUDES, BUT IS NOT LIMITED TO:**

Combination Sprinkler and Stand-Pipe System

Cutting and Patching

Excavating, trenching and backfilling.

Drains to exterior disposal points.

Escutcheons at finished walls and partitions.

Fire pump and jockey pump installation and piping.

**WORK NOT INCLUDED:**

All electrical wiring of sprinkler system water flow switches, position tamper valve switches, and connections from all components in these systems to building central fire alarm system is work of Division 16. Coordinate all work and materials with work for the fire alarm system specified in Division 16.

**QUALIFICATIONS:**

Be fully qualified to install the systems required. Where sprinklers are required, have a minimum 3 years experience in the regular installation of sprinklers. Understand the procedures for calculating the system hydraulics for sizing and submittal requirements for code and regulatory agencies.

**SHOP DRAWING AND SUBMITTALS:**

Make shop drawings and submittals in accordance with Sections 01300 and 13901. Governing authorities and regulatory agencies (Industrial Risk Insurers (IRI), Factory Mutual (FM), Property Insurance Association of Louisiana (PIAL)), if required by the Owner, shall review the shop drawings. Provide additional copy of the submittal for review by the regulatory agency if required by the Owner. Once submitted to the Architect, one copy will be provided to the regulatory agency for his review. When returned to the Architect by the regulatory agency, the shop drawings will be then returned to the Contractor for incorporation of the regulatory agencies comments approved by the Owner. Pay for all reviews as part of this Section.

Submittals shall include:

Sprinklers	Valves
Alarm Switches	Roof Manifold
Tamper Switches	Piping Materials
Hangers	Fire Department Connections
Gauges	Pressure Gauges
Drains	Hydraulic Calculations
Accessories	Backflow Preventer
Water Meter	

Submit sample of valve tag required under Part 3 below. Submit sprinkler system diagram charting valves with designated valve number, function and location. Diagram shall be the same as one mounted and hung under Part 3 below.

#### CODES AND STANDARDS:

Systems shall conform to NFPA 101, Life Safety Code; NFPA 13, Sprinkler Systems; NFPA 14, Standpipe & Hose Systems; and NFPA 20, Centrifugal Fire Pumps. Use the editions enforced by the local governing authority or as directed by the Architect.

Where Underwriters Laboratories has established a standard for an item of equipment, use only a UL-approved item.

Additional codes and standards as adopted by the local governing authority shall apply. Use IRI, FM, PIAL, or other insurance standards where requested by the Owner. Inlet and outlet threads on devices connected to by the local fire department shall conform to their requirements. These requirements shall take precedence over connection sizes described elsewhere.

#### INSPECTIONS AND TESTS:

Arrange and pay for all inspections, examinations and pressure and operational tests required by the authorities and/or agencies and according to applicable NFPA Standards specified. Complete and forward a copy of the Contractor's material and test certificate and forward to the authorities having jurisdiction.

#### COORDINATION:

Coordinate standpipes, sprinklers, piping and other system components with the final layout drawings and with work of other sections in order to avoid conflict with other work in the area. Give particular attention to the location of sprinklers to avoid conflict with air conditioning grilles, diffusers, and lights. In general, run horizontal sprinkler piping as high as the structure will allow, offset to avoid obstructions. Ductwork shall have preference. Offset overheads, horizontal runs, and piping around all ductwork and obstructions of any kind. Make offsets

around structural members as necessary. See Division 16, Fire Alarm System to determine what is being furnished under that system, and coordinate work under this section with work under Division 16.

In areas with finished ceilings, the piping shall be run concealed. If finished ceiling is attached directly to the structural beams, coordinate installation above the ceiling with structural work. Locate sleeves within concrete beams prior to pouring concrete. Piping shall not be installed below the finished ceiling.

Slope horizontal piping to permit system drainage. Where horizontal piping must be vertically offset, provide complete valved and capped drains, and vents to allow complete drainage of system per NFPA 13:4-14.3.5.

#### WARRANTIES:

Applicable paragraphs on warranties in other specification divisions and sections listed above apply to all portions of this section.

#### COMBINATION SPRINKLER-STANDPIPE:

Provide a combination sprinkler-standpipe system of sprinklers and 2½" fire department hose valves for the entire building. Small areas, such as outside loading docks may be protected by use of antifreeze as defined in NFPA 13 or dry pipe nipples and sprinklers as indicated on the drawings. System shall include sprinklers, piping, valves, valve supervisory switches, flow indicators, alarms, flow switches, gauges, drains and other necessary accessories. Provide all piping, valves, and connections required for fire pump and jockey pump installation of Section 13920. Provide layout plans, elevations and details, and obtain approval as outlined above before submittal to the Architect.

Lay out sprinklers for each occupancy classification based on materials of construction, structure, obstructions, ceiling location, and other parameters affecting the layout per NFPA 13. Hydraulically size piping grid.

Perform hydraulic design calculations and size piping to meet the demand of both the standpipe and the sprinklers simultaneously. Use area and density requirements of NFPA 13:5-2.3. Use occupancy hazard classification as indicated on the drawings and as defined in NFPA 13:1-4.7.

The design area may be reduced in accordance with NFPA 13:5-2.3.2.4 if the area and sprinklers used meet the criteria of this paragraph.

System shall include fire pump, jockey pump, controls for both, and necessary hydraulic connection. See Section 13920 for fire and jockey pump requirements. Electrical work is under Division 16.

## **PART 2 - PRODUCTS**

### HANGERS:

Provide all NFPA 13 and 14, and UL 203 approved hangers, supports, braces, dampers, rods, inserts, flanges, anchors, guides, trapeze, and other supports to fully support horizontal and vertical runs of piping.

#### SPRINKLERS AND ESCUTCHEONS:

Install sprinklers upright or pendent, as conditions require. Install the following types and in finish indicated for the building areas designated.

No ceiling: exposed, thermosensitive glass-bulb type, quick response, rough, unplated.

Spaces with ceilings, such as storage areas, closets, other non-public areas of similar use: thermosensitive glass-bulb type, quick response, brass finish, white escutcheons. Where required to be installed above the ceiling, they shall be as specified for no-ceiling areas.

All finished spaces with ceilings: pendent, semi-recessed thermosensitive glass-bulb type, quick response, with white escutcheons.

In Lobby area: pendent, thermosensitive glass-bulb type, flush mounted with cover painted by manufacturer to match ceiling color.

Exterior Loading Docks: dry horizontal sidewall, thermosensitive glass-bulb type, quick response, chrome finish with chrome escutcheon.

Sidewall Applications: sidewall, semi-recessed thermosensitive glass-bulb type, quick response, with white escutcheon or color as selected by the architect.

Provide extended coverage upright or pendent sprinklers in areas as shown on the drawings. The sprinklers shall be listed and designed for the minimum flow corresponding to the density contained in Part 1 above. Sprinkler shall have a thermosensitive glass bulb in either light hazard or ordinary hazard versions as required.

Use 155°F quick response ordinary degree range sprinkler temperature rating; except, in the vicinity of high heat-producing equipment, as defined in NFPA 13, increase temperature rating accordingly.

Sprinkle all elevator shafts from top of shaft, and equip with a 24 volt electric solenoid valve and automatic "ON-OFF" type sprinklers. The solenoid valve shall be activated by an ionization-type smoke detector located at the top of each hoistway. Smoke detectors shall be furnished under Division 16. Alternately, provide supervised manual valve and solenoid operated valve with standard sprinkler. Sprinkle bottom of pit using sidewall sprinklers mounted not more than two feet from the bottom of the pit. Include a 24 volt electric solenoid valve ahead of sprinkler in pit.

#### FLOW DETECTING VALVES, ALARM CHECKS, FLOW AND SUPERVISORY SWITCHES:

Provide and install flow-detecting valves and/or alarm check or similar approved proprietary valves with necessary attachments as required by NFPA #13. Provide supervisory open position tamper switch on valves. Switch shall have 2-S.P.D.T. contacts rated for load served. Provide the required flow switches to detect waterflow. Switch contact shall be rated for the load served. Work of Division 16 shall provide all conduit and wiring from flow alarm and

supervisory position switches to the central fire alarm system and local and remote annunciators. Coordinate equipment to be compatible to equipment provided under Division 16.

#### PIPE AND FITTINGS:

Provide piping system of either steel capable of withstanding a working pressure of 175 psig or higher pressures as required.

Provide Schedule 40 welded or seamless black steel with screwed fittings, ASTM A53 pipe for pipe 1 1/2" and smaller. Provide Schedule 10, rolled groove joint, ASTM A53 pipe for pipe 2" and larger. For couplings and fittings, use screwed, 175# WOG cast iron and/or 300# banded, malleable iron through 1 1/2"; for 2" and above, use 175# (WOG) cast iron flanged with matching screw-on or welding flanges of similar pressure rating.

In lieu of the above fittings for pipe 2" and larger, an approved grooved mechanical joint system may be used using mechanical couplings and grooved fittings and ASTM A135 or A795 pipe for fire protection use. Fittings shall meet ASTM A395 and ASTM A536. Light weight pipe shall have a corrosion resistance rating (CRR) of 1.0 when compared to threadable Schedule 40 pipe. Use only roll groove joints in light weight piping and on welded seam, Schedule 40 pipe.

#### MANUAL CONTROL VALVES - CHECK VALVES:

Provide manual control valves/check valves in accordance with the minimum requirements of NFPA 13 and the local authorities having jurisdiction.

Provide shutoff valves, solid-wedge OS&Y type (indicating type of position of stem), FM & UL, 175# minimum WOG; threaded through 2", equal to Jenkins Fig. 275-U; and flanged in 2 1/2" and up, equal to Jenkins Fig. 825A. Provide check valves, UL and FM, swing-type regrind-renew disc and seat ring, flanged 2 1/2" and up, equal to Jenkins Fig. 629.

In lieu of gate valves as shutoffs, provide UL butterfly valves of tapped lug body type, 175# minimum WOG, Buna N resilient seat for drop tight shut-off. Locate valves between self-sealing companion flanges. Butterfly valve shall have body of ductile iron; stem, stainless steel; disc, aluminum bronze; ring, phenolic. Gear operate valve through handwheel with crank having a disc position indicator and padlocking provision. Provide zero leakage valve. Butterfly valves shall not be substituted for OS&Y valves on the suction side of the fire pump and jockey pump.

Provide an electric valve-position monitoring switch with 2 SPDT contacts rated for load served to register an alarm when the valve is moved toward the closed position. Wiring for this switch will be under Division 16.

#### OUTSIDE FIRE DEPARTMENT CONNECTIONS:

Supply two-way flush mounted, chrome plated brass. Use siamese type, double clapper, straight inlets and outlets, 2 1/2" hose thread, spanner-wrench operable, body marked "auto-sprinkler". Provide chain-secured caps. Locate fire department connections as shown on the drawings and/or where required by regulatory agencies. Size inlet as shown on drawings.

#### SPARE SPRINKLERS:

Provide sprinkler cabinets with spare sprinklers as required by NFPA 13 and with wrenches and lock. Provide number of each type in the same ratio as those installed.

PRESSURE GAUGES:

Provide UL-listed pressure gauges above and below the water flow detector and/or alarm valve and other points required by Code. Provide valved and plugged connections where needed for test purposes.

FIRE DEPARTMENT CONNECTION (FDC):

Provide brass 2½" fire department connection valves with cap and chain. Cap and chain shall be cast brass with female hose thread, pin lugs and chain.

ROOF MANIFOLD:

Provide roof manifold of cast brass, 2-outlet, horizontal type as required by inlet size, with 2½" rough, cast brass angle valves painted red, with caps and chains. Provide spanner wrench for cap. Size inlet to match standpipe size.

**PART 3 - EXECUTION**

PIPING:

Install exposed piping parallel to, or at right angles to the column lines of the building wherever possible. Where pipe and sprinklers are indicated as exposed in finished areas and become a part of the space aesthetics, (architectural feature), careful coordination is required in the routing of pipe and layout of sprinklers which must be checked and approved by the Architect.

Conceal all piping, except in mechanical equipment rooms, laboratories, stairwells, or where otherwise indicated on the Drawings. Where finished ceiling is mounted directly to the support members, provided sleeved or cored openings in concrete beams and punched holes through sheet metal studs or C-channels. Coordinate all required penetrations through structural members with structural work.

Cold springing piping will not be permitted. Install piping with adequate support to prevent strain on the equipment.

Grade all piping to eliminate traps and pockets. Where air pockets or water traps cannot be avoided, provide manual air vent valves.

Install unions or flanges at equipment connections, and elsewhere as indicated on the Drawings.

Install piping in accordance with NFPA 13, 14, and 20 requirements. Screwed steel piping may be used through 1 ½" size and special joining methods specified herein are allowed. Cut grooves are allowed in mechanical joint systems where schedule 40 pipe is used; only a rolled groove is allowed on lightweight steel mechanically coupled piping.

Approved ball and butterfly valves may be used in lieu of gate or globe valves except on the suction side of the fire and jockey pumps.

Paint all exposed piping red, excluding valve operators and sprinklers, using 2 coats enamel per Section 09900.

#### TEST CONNECTIONS:

Provide necessary test connection for the system.

#### DRAINS:

Install all sprinkler pipe and fittings so that the system may be drained. Discharge all system main drains either outside or to drainage points indicated. Discharge drain in conformity with health department or plumbing regulations. Provide auxiliary drain per NFPA 13:4-14.3. when a change in piping elevation prevents drainage of sections of piping through the main drain valve.

#### FIRE AND JOCKEY PUMP INSTALLATION:

Install the fire and jockey pump as shown on the drawings. Provide 12" high housekeeping pad for the fire pump. Ensure all electrical components for the fire pump controller are a minimum of 12" higher than the surrounding floor. See Section 13920 for fire pump, jockey pump, and associated controllers requirements.

#### VALVE SEALS, TAGS, CHARTS:

Provide copper wire and approved seal for each manually-operated shut-off valve required to be sealed in open position.

Provide identification signs of standard design; fasten securely at designated locations per NFPA 13. Provide brass tags between 2" and 3" diameter; stamp with designating numbers; secure with 12 gauge copper wire to spindle of all control valves. Provide 2 copies of approved sprinkler system diagram and valves charting designating number, function, location of each valve. Mount in painted, glazed frames and hang where directed.

Secure a placard to the control valve at each point of connection to a riser showing the individual design for floor or area served.

#### PRESSURE TEST:

Perform pressure test of the systems per NFPA 13 and 14, at not less than 200 psi for 2 hours.

#### SYSTEM TESTS:

Flush all mains per rates in NFPA 13 until water is clear. Make provision for disposal of flushing water so as to avoid property damage.

Complete functional test of sprinklers, valves and controls. Complete all data and tests listed under "Contractor's Material and Test Certificate" of NFPA 13.

INSPECTIONS AND TESTS:

All inspections, examinations, and tests required by the authorities and/or agencies specified hereinbefore shall be arranged and paid for as part of this Section, as necessary, to obtain complete and final acceptance of the system as installed. The certificates of inspection shall be in quadruplicate, and shall be delivered to the Architect for distribution.

PERIODIC INSPECTION SERVICE:

After completion of the automatic sprinkler system, and at the beginning of the guarantee period, execute the National Automatic Sprinkler and Fire Control Association, Inc., Standard Form of "Inspection Agreement," without charge to the Owner, calling for four inspections of the sprinkler system during the warranty period. During the warranty period, inspections shall be as per the Inspection Agreement, plus the following maintenance to be performed during the course of the fourth inspection:

1. Operation of all control valves.
2. Lubrication of operating stems of all interior valves.
3. Operation of water gong, electric alarm, supervisory panel, air compression, alarm trip switches, flow switches, and similar items.
4. Cleaning of alarm valves.
5. Lubrication of Fire Department hose connection inlet.

These inspections shall be performed at no cost to the Owner and by a Firm qualified to do the inspections.

INSPECTION REPORT:

The Standard Form of the National Automatic Sprinkler and Fire Control Association, Inc., "Report of Inspection," shall be filled out in triplicate after each inspection, and the copies sent to the Architect.

END OF SECTION 13910

**SECTION 13920 – FIRE PUMP SYSTEMS**

---

**PART 1 - GENERAL****RELATED DOCUMENTS:**

The general provisions of the Contract, including General and Supplementary conditions, (if any) and other General Requirements, apply to the work specified in this section.

**WORK INCLUDES, BUT IS NOT LIMITED TO:**

Fire Pump and Controller

Jockey Pump and Controller

Fire Pump and Jockey Pump Accessories

**WORK NOT INCLUDED:**

All power wiring to factory wired control panel for fire and jockey pump, and tie-in from all components in these systems to building central fire alarm system is work of Division 16. Coordinate all work and materials with work for the fire alarm system specified in Division 16. Piping for fire and jockey pumps is under Section 13910.

**QUALIFICATIONS:**

Be fully qualified to install the systems required. Where sprinklers are required, have a minimum 3 years experience in the regular installation of sprinklers. Understand the procedures for calculating the system hydraulics for sizing and submittal requirements for code and regulatory agencies.

**SHOP DRAWING AND SUBMITTALS:**

Make shop drawings and submittals in accordance with Sections 01300, Section 13901, and 13910. Submittals shall include:

Fire Pump

Jockey Pump

Accessories

Control Panels

**CODES AND STANDARDS:**

Equipment shall conform to requirements of NFPA 20, Centrifugal Fire Pumps, 1996 Edition.

Where Underwriters Laboratories has established a standard for an item of equipment, use only a UL-approved item.

Additional codes and standards as adopted by the local governing authority shall apply. Use IRI, FM, PIAL, or other insurance standards where requested by the Owner. These requirements shall take precedence over connection sizes described elsewhere.

COORDINATION:

Coordinate final layout drawings with work of other sections in order to avoid conflict with other work in the area. See Division 16, Fire Alarm System to determine what is being furnished under that system, and coordinate work under this section with electrical power work under Division 16.

WARRANTIES:

Applicable paragraphs on warranties in Division 1 Sections, Section 13901 and 13910 apply to all portions of this section.

**PART 2 - PRODUCTS**

FIRE PUMP:

Furnish and install UL-listed fire pump(s) of the horizontal-split case, double-suction type, designed to deliver the capacity at pressure scheduled on the drawings.

Deliver not less than 150 percent of rated capacity at a pressure not less than 65 percent of rated head. Do not exceed 120 percent of the rated pressure at shutoff. Pump shall be Peerless or equal.

Meet all requirements of NFPA 20. Pump shall be listed by Underwriters' Laboratories and/or approved by IRI or FM, as required by the owner.

Include the following accessories with the pump unit:

- Inside-Threaded Hose Head (Valved outlets as required)
- Eccentric suction reducer
- Concentric discharge increaser
- Circulation relief valve
- Suction and discharge pressure gauges
- Automatic air release valve

Mount pump and motor on a common baseplate of either cast iron or fabricated steel and connect through a flexible coupling, with coupling guard meeting the requirements of ANSI

B15.1, Section 8 and OSHA 1910.219 C.2 and with a viewing slot so pump shaft rotation can be viewed.

Hydrostatically test to twice the working pressure but in no case to less than 300 psig. Perform a complete performance test and provide characteristic curves prepared from the test results.

Provide electric open, dripproof motor having minimum horsepower as scheduled, with capacity such that 115 percent of the full load ampere rating will not be exceeded at any condition of pump load. Use motor for a temperature rise not exceeding 40°C, when carrying a full rated load continuously and with an overload of 15 percent without stress or injurious rise in temperature. Do not exceed locked rotor current specified in NFPA 20. Provide ball or roller-type bearings. Motor shall be specifically listed for fire pump service. Motors shall comply with NEMA Standard MG-1 and be marked as complying with NEMA Design B Standards.

#### JOCKEY PUMP:

Provide a close-coupled, turbine-type, mechanical-seal pump equal to PACOTURB, or a close-coupled centrifugal, mechanical seal pump equal to Peerless TMUB, as required for gpm and head as scheduled.

#### FIRE PUMP CONTROLLER:

Provide motor control equipment completely assembled, wired and tested at the factory and specifically approved for fire pump purposes. All control elements for the fire pump shall be included in one NEMA enclosure. Mark "Electric Fire Pump Controller."

Provide an electrical schematic diagram permanently attached to the inside of the controller enclosure. All field wiring terminals shall be plainly marked to correspond with the field connection diagram provided. Provide complete instructions covering the operation of the controller conspicuously mounted on the controller.

Provide device labels and signs and instructions as required by NFPA No. 20. Provide an automatic type controller for the Fire Pump incorporating the following:

Isolating means: Provide manual type, externally operable motor circuit switch or molded case switch, with horsepower rating equal to or greater than motor horsepower. A molded case switch having an ampere rating at least 115% of motor rated full load current and suitable for interrupting the motor locked rotor current shall be permitted.

Operating handle shall have a spring latch so arranged that it requires the use of the other hand to hold the latch released in order to permit opening or closing of the isolating switch.

Alternately, mechanically interlock the isolating means and disconnect switch so that the isolating means can neither be opened nor closed while the disconnecting means is closed.

Provide the following warning on or immediately adjacent to the isolating switch: "WARNING - DO NOT OPEN OR CLOSE THIS SWITCH WHILE THE CIRCUIT BREAKER (DISCONNECTING MEANS) IS IN CLOSED POSITION."

Provide mechanical interlock on isolating means to prevent opening of panel door with handle in "ON" position and mechanical defeater mechanism to override mechanical door interlock. Provide means of padlocking isolating means in "off" and "on" positions.

Disconnecting Means: Protect the motor branch circuit with a circuit breaker connected directly to the load side of the isolating switch with one pole for each ungrounded branch circuit conductor. The circuit breaker shall be externally operable and shall trip free of the handle. The circuit breaker shall have a continuous current rating not less than 115% of motor rated full load current, overcurrent sensing elements of the non-thermal type, provide instantaneous short circuit overcurrent protection set at 300% of motor nameplate full load amps, have an interrupting rating equal to or greater than its circuit available short circuit current, permit normal starting of the motor without tripping, having a time delay tripping time between 8 and 20 seconds at locked rotor current, an instantaneous trip setting of not more than 20 times the full load current, and normal and emergency run mechanical starting of the motor without tripping. On the outside of the controller enclosure adjacent to the means for operating the circuit breaker, locate a nameplate with the legend "CIRCUIT BREAKER-DISCONNECTING MEANS" in letters not less than 3/8 inches high.

Motor Starter: Provide primary resistor, reduced voltage, magnetic type with a contact in each ungrounded branch circuit conductor. Resistors shall be designed to permit one 5-second starting operation in each 80 second interval for a period of not less than one hour. Starter operating coil for the main contactor shall be supplied directly from the main power voltage source to the controller. For reduced voltage controllers, provide timed automatic acceleration of the motor with acceleration not exceeding 10 seconds.

Starter shall be automatically controlled by an adjustable pressure switch responsive to fire protection system water pressure and located between the pump discharge check valve and discharge control valve. Provide pressure switch controller with high (cut out) and low (cut in) settings. Pressure switch shall withstand a momentary 400 psig surge without loss of accuracy or repeatability. Provide means of relieving pressure to the switch to allow testing of controller and pumping unit. The pressure sensing line shall be 1/2" minimum size, copper or 316 stainless steel. The adjustable pressure switch controller shall be located within the controller cabinet. Provide a minimum run time timer to prevent motor running for a minimum of 7 minutes after starting. Provide two check valves in the pressure sensing line at least 5 ft. apart with a 3/32 inch hole drilled in the clapper to serve as dampening.

The motor starter shall also be manually operable via electrically initiated and manual mechanically initiated means. Manual electric control shall be via panel-mounted start pushbuttons which will close the motor starter contacts independent of any electrical control circuits.

Provide panel mounted visible indicator, connected to a pair of power supply conductors directly on the line side of motor starter (load side of disconnecting means) to indicate operating voltage is available to the contactor coil. Provide a means to read all line currents and all line voltages within + or - 5% of full scale. Provide a visible indicator of phase reversal on the line side of the motor contactor.

Provide a UL listed pressure recording device to sense and record the pressure in the controller pressure-sensing line at the input to the controller. Recorder shall be capable of operating a minimum of seven days without being reset. The sensor shall be able to withstand a momentary pressure surge of up to 400 psi. without losing accuracy. Provide a means to read the pressure recorder without opening the fire pump controller enclosure.

Provide dry SPDT contacts, brought to terminal blocks, rated 120 VAC, 5 amps, for connection to remote supervised circuit to indicate: a) pump operating; b) power available; c) loss of phase on line side of motor contactor, and d) phase reversal on line side of motor starter.

All control units shall be rated NEMA-2.

Power Transfer Switch: Provide power transfer switch as part of Controller. The combination Fire Pump Controller and Power Transfer Switch shall be a listed, combined device per NFPA 20, Arrangement I. Provide a barriered compartment or separate enclosure attached to the enclosure to house the self-contained power transfer switch. Mark the compartment or enclosure with "Fire Pump Power Transfer Switch." Provide an isolating switch within the power transfer switch enclosure ahead of the alternate input terminals of the transfer switch. The switch shall comply with the requirements contained in the paragraph "Isolating means" above. Provide a circuit to light a lamp on the controller when the isolating switch is in an open position.

Provide a power transfer switch that is specifically listed for fire pump service, suitable for the available short-circuit currents at the transfer switch normal and alternate input terminals, and electrically operated and mechanically held. It shall have a horsepower rating not less than the motor horsepower, or, if rated in amperes, shall have any ampere rating equal to or greater than 115% of the motor full-load current and also suitable for switching the motor locked rotor current. Provide a means for manual operation of the power transfer switch.

Provide under voltage sensing devices to monitor all ungrounded lines of the normal power source. Automatically initiate transfer to the alternate source upon any drop in voltage below 85% of the motor rated voltage on any phase as measured at the load terminals of the circuit breaker within the fire pump controller. Phase reversal of the normal power source shall cause a simulated normal source power failure upon sensing phase reversal. Where voltage on all phases of the normal source returns above 90% of the motor rated voltage, the fire pump controller shall retransfer to the normal source.

Provide voltage and frequency sensing devices to monitor at least one ungrounded conductor of the alternate power source. Until adequate voltage and frequency to serve the fire pump load is available from the alternate source, transfer to this source shall be inhibited. Provide externally visible indicators using lighted lamps to indicate which power source the fire pump controller is connected. Provide a means to delay retransfer from the alternate to the normal source until the voltage and frequency of the normal source has stabilized. Prevent higher than normal inrush currents when transferring the fire pump motor from one source to another.

Provide a device to delay starting the alternate generator to prevent nuisance starting in the event of momentary dips and interruptions of the normal source. Provide a circuit loop to the alternate source generator whereby either the opening or closing of the circuit will start the alternate source generator, when commanded by the power transfer switch. Prevent the sending of the signal to start the alternate source generator if the isolation switch on the alternate source side of the transfer switch is open. On the enclosure, provide an externally operable momentary test switch that will simulate a normal source power failure.

#### JOCKEY PUMP CONTROLLER:

Provide jockey pump controller, UL listed, factory assembled, wired, and tested, specifically designed for jockey pump application.

The controller shall incorporate a full voltage, non-reversing type, magnetic motor starter; fusible disconnect switch; 3 position selector switch, labeled "hand-off-automatic," start pushbutton, pressure switch controller, with high (cut-out) and low (cut-in) setpoints.

The disconnect switch shall be mechanically interlocked to prevent opening panel door with handle in "on" position and mechanical defeater mechanism to override mechanical door interlock. Provide means of padlocking disconnect switch in the "off" and "on" position.

With the H-O-A switch in the "auto" position the jockey pump shall be started and stopped by pressure switch control, sensing jockey pipe discharge water pressure. Locate pressure switch controller in control panel and use 1/2" minimum, copper or 316 stainless steel tubing to connect pressure sensor to pressure controller. Provide two check valves in the pressure sensing line at least 5 ft. apart with 3/32 inch hole drilled in the clapper to serve as dampening. Provide run period timer to prevent more than six automatic starts per hour of the jockey pump and to keep motor running a minimum of three minutes (adjustable) after automatic start.

Provide start pushbutton wired in series with hand position of selector switch to manually start jockey pump.

With selector switch in "off" position the jockey pump will be disabled.

Provide control panel mounted audible alarm and push-to-test pilot light to indicate "jockey pump" failure. Provide "alarm acknowledge" push button to silence audible alarm. Power shall be from jockey pump power source on load side of disconnect, line side of motor starter contactors.

### **PART 3 - EXECUTION**

#### **FIRE PUMP CONTROLLER TEST:**

The manufacturer shall test fire pump controller as a completed assembly prior to shipment to assure function as described above.

Provide identification labels, signs, interconnection diagrams and instructions on or inside controller to assist operators in operating and trouble shooting controller. All work associated with providing and start-up checking of the Fire and Jockey Pump and their controllers shall be work of this division, except power wiring to the controller and between controller and the pumps and wiring of supervised alarm/status signals from controller to fire alarm system which is work of Division 16.

#### **INSTALLATION:**

Install fire and jockey pump in accordance with requirements of Section 13910.

#### **INSPECTIONS AND TESTS:**

All inspections, examinations, and tests required by the authorities and/or agencies specified hereinbefore shall be arranged and paid for as part of this Section, as necessary, to obtain complete and final acceptance of the system as installed. The certificates of inspection shall be in quadruplicate, and shall be delivered to the Architect for distribution.

END OF SECTION 13920