

SECTION 21 13 13

WET-PIPE SPRINKLER SYSTEMS

PART 1 – GENERAL

1.01 DESCRIPTION OF WORK:

- A. Extent of the work is indicated on the Drawings and Schedules and by the requirements of this Section.
- B. The construction requirements herein shall include appurtenant structures and buildings to which the system is to be installed.

1.02 DESIGN CRITERIA:

- A. Provide a hydraulically designed, complete automatic sprinkler system with the following hazard types: Restrooms, hallways, courtrooms, offices - Light Hazard. Parking, storage, mechanical – Ordinary Hazard Group I.
- B. Wet systems serving Light Hazard area systems shall be hydraulically calculated to a design density of 0.1 gpm/sf over the most remote 1,500 sf. Wet systems serving Ordinary Hazard Group I areas shall be hydraulically calculated to a design density of 0.15 gpm/sf over the most remote 1,500sf.
- C. Gridded sprinkler systems may be used on wet pipe systems where they are practical.
- D. All areas of the building, except as noted, shall be completely sprinklered including the following areas:
 - 1. Electrical Rooms that are not enclosed within two-hour walls
 - 2. Elevator Shafts
 - 3. Telephone Rooms
 - 4. Stairwells (at top level and below lowest level)

1.03 QUALITY ASSURANCE:

- A. All materials and equipment shall comply with requirements as specified in this section of these specifications.
- B. All materials and equipment furnished and installed under this section of these specifications shall be new and in first class condition.
- C. All materials and equipment furnished and/or installed by Contractor found to be in non-compliance with these specifications shall be removed and replaced with materials complying with this section of these specifications at Contractor's expense.
- D. Codes and regulations referred to are minimum standards. Where the requirements of these specifications or drawings exceed those of the codes and regulations, the drawings and specifications shall govern.
- E. Manufacturing firms shall be regularly engaged in the manufacture of fire protection products, of types, materials, and sizes required, whose products have been in satisfactory use in similar service for not less than five (5) years.
- F. Installation Firms shall have at least five (5) years of successful installation experience on projects with fire protection work similar to that required for the project.

1.04 SUPPLEMENTAL STANDARDS:

- A. Provide fire protection products which are Factory Mutual Approved or UL Listed.
- B. Comply with local Fire Department regulations for sizes, hose threads and arrangement of connections for fire department equipment to fire department valves, and fire department connections.

1.05 DESCRIPTION AND REQUIREMENTS:

- A. The work under this section of the specifications includes labor, materials, supervision and testing of the automatic sprinkler and associated systems.
- B. The automatic sprinkler and associated systems shall be complete with all component equipment and material items, and installed and tested in full conformity with the requirements of all applicable codes, National Fire Protection Associations Standards, authorities having jurisdiction and the Owner's insurance company.
- C. Provide chrome metal wall plates and/or escutcheons on all exposed piping which penetrates walls, floors, etc. Plastic wall plates are not acceptable.
- D. The installed layout of the sprinkler system shall be coordinated to avoid interference with the structural, electrical, mechanical, and plumbing work in the building.
- E. Sprinklers shall be located as required to provide coverage as required by applicable standards and the Contract Documents.
- F. Sprinklers shall be located to avoid interference with lights, diffusers, grilles, or other ceiling mounted equipment. Sprinklers located in ceiling tile shall not be closer than 12 inches to "T" bars and centered. The sprinkler layout shall conform to the typical pattern.
- G. Provide vane-type electric flow switch on each riser. Also provide tamper switches on all control valves to be interfaced with fire control panel. Wiring shall be by characteristics of each switch necessary for compatibility with the fire alarm control panel.
- H. Locate all inspector tests and drain lines in mechanical room and "back-of-house" type spaces. Main drains and auxiliary drains are to be extended through the nearest exterior wall.
- I. Provide backflow prevention. Backflow preventer OS&Y valves shall be equipped with tamper switches.
- J. All piping in exposed structure areas shall be installed above the bottom chord of the bar joists.

1.06 APPROVALS:

- A. Contractor shall submit for approval to the Architect, the Owner's insurance company and local authorities having jurisdiction, shop drawings, including site plans and details of installation, product submittal data and copies of all material and test certificates.

- B. Installing Contractor shall anticipate a minimum of 30 days turn-around for reviewing sprinkler shop drawings by Architect-Engineer and Owner's insurance company. Installing Contractor shall submit shop drawings for review on a timely schedule so as not to impact construction schedule.
- C. Floor plans on all shop drawings shall be prepared at a scale of 1/8"=1' unless local jurisdictional authority requires drawings be prepared at larger scales, in which case local requirements shall be met. Details and part plans may be at larger scales as appropriate. Prepare shop drawings on sheets 30" by 42". Except as indicated herein, drawings shall be in accordance with the requirements for working drawings as outlined in NFPA 13.
- D. Plans submitted for approval to Architect shall be in the form of one reproducible set in rolled form, not folded. All other plan submittals to Owner's insurance company and local authorities shall be standard blue-line prints in quantities as required by those persons.
- E. All submittals (except for insurance submittal) for shop drawing review must be submitted directly to Architect. No submittals shall be made direct to Engineers. Submittals shall be made in one submission only; no partial submittals will be accepted. Partial submittals will be held until all components are received and may delay shop drawing review.

1.07 SUBMITTALS:

- A. The following information is required for sprinkler plan submission:
 - 1. Physical Characteristics (Cross Section Through Building)
 - a. Storage height.
 - b. Roof height.
 - 2. Sprinkler Design
 - a. Densities.
 - b. Areas of operation. (Include key plan on each drawing.)
 - 3. Water Supply
 - a. Static pressure, residual pressure, and flow.
 - b. Date of flow test.
 - c. Location of flow test hydrants shown on site plan.
 - d. Elevation referenced to finished floor level.
 - e. Source of water.
 - f. On-site verification water flow test as referenced under "Flow Tests".
 - 4. Manufacturer's Data
 - a. Pipe, fittings, and mechanical couplings.
 - b. Alarm valves.
 - c. All control, globe, and check valves.
 - d. Water motor alarm and gongs.
 - e. Sprinklers.
 - f. Pipe hangers and supports.
 - g. Water flow and tamper switches.
 - h. Fire department connection
 - i. Chrome metal wall plates and escutcheons.
 - j. Underground pipe, valves, fittings and hydrants.
 - k. Hose stations.
 - l. Backflow preventer with pressure loss curves.
 - 5. A machine copy of the hydraulic calculation nameplate properly filled out for each system shall be submitted to the Architect-Engineer along with the manufacturer's submittal data and shop drawings referenced above.

- B. Site Plan Drawing
 - 1. Installing Contractor is to submit with interior sprinkler shop drawings a complete site plan drawing prepared by the sprinkler contractor showing location of all underground fire mains, size and type of pipe and hydraulic calculation reference points. This requirement is necessary even though the actual installation of the final underground piping layout may not be in the Contractor's scope of work.
 - 2. Indicate location and type of all fire hydrants.
 - 3. Detail construction of all meter pits, etc., required by code or local authorities.
 - 4. Show results of water flow test.
 - 5. Indicate elevation at all hydrant reference points.
 - 6. Show location of flow test hydrants and source of water.
 - 7. Scale of site plan shall be as required to fit site on sheet; preferably the same scale of civil engineering drawings provided for this project where they are provided.
 - C. Hydraulic calculations shall be submitted with drawings and manufacturer's data sheets. Calculations shall include all documentation as required by NFPA 13 current edition, including cover sheet.
- 1.08 RECORD "AS BUILT" DRAWINGS:
- A. Provide as-built drawings to the Contractor to be turned over to the Owner at the completion of the project.
- 1.09 FLOW TESTS:
- A. Flow test data may be provided as part of the contract documents and may be used as a preliminary indicator of available water supply only. Flow test data may also be available from the local water supplier and should also be considered only as preliminary.
 - B. Each contractor submitting a bid on this project shall verify flow test information in the vicinity of the project by his own water flow test at the indicated hydrants. No requests for change orders will be accepted because successful contractor did not verify water supply information obtained from local authorities or did not run his own test prior to submitting his bid.
 - C. All flow test data shall be subject to the "10% rule" as defined in this paragraph. Before any calculations or supply curve plotting, reduce the reported static and residual pressures by 10%. Make no reduction to the flow rate reported.
 - D. Provide a reserve supply of sprinklers as required by NFPA 13 current edition. The sprinklers and tools shall be contained in a metal carrying case.
- 1.10 DELIVERY, STORAGE AND HANDLING:
- A. Deliver materials to job site in new and in first class condition.
 - B. Store materials and equipment utilizing suitable means so as to protect from weather, construction work traffic and contamination. Where materials and equipment are stored outdoors, Contractor shall cover in a suitable manner to prevent contamination from water, dirt, mud and/or debris. Materials and equipment shall not be laid on grade for storage.

- C. Materials and equipment found to be contaminated with water, dirt, mud and/or other debris shall be cleaned and restored to new condition to the satisfaction of the Architect. Contaminated materials and equipment shall not be used until inspected. Materials and equipment determined to be unsuitable for use by the Architect shall not be used and shall be removed from the job site at the Contractor's expense.

PART 2 - PRODUCTS

2.01 MATERIALS AND PRODUCTS:

- A. Provide piping materials and factory fabricated piping products of sizes, types, pressure ratings, temperature ratings, and capacities as indicated. Provide sizes and types of materials to match piping and equipment connections; provide fittings of materials which match piping materials used in fire protection systems.

2.02 PIPE:

A. Above Ground Piping

1. All piping shall be new, designed for 175 PSI working pressure conforming to ASTM specifications and approved for fire sprinkler specifications.
2. All pipe shall be black steel unless galvanized is indicated for particular pipe sections on the drawings.
3. Schedule 40 piping may be used for piping 2" and smaller and may be joined by threading, roll grooving, or welding.
4. Schedule 10 piping may be used in all sizes and may be joined by roll grooving or welding only.

B. Fittings

1. Screwed fittings shall be standard approved, Class 250, cast iron or Class 150 malleable iron.
2. Flanged fittings shall be approved, short body, Class 250, black cast iron. Gaskets shall be full face, 1/8" minimum thickness red rubber.
3. All welded fittings shall be of the approved type and all welding according to NFPA requirements. No field welding will be permitted.
4. Mechanical couplings shall be approved for grooved end connections equivalent to Victaulic Style 75. All grooved couplings and fittings used throughout this project shall be from the same manufacturer. Grooved couplings and fittings shall be Grinnell Gruvlok, Gustin Bacon, or Victaulic.
5. Slip on fittings shall not be used. "Victaulic Fit" and "Victaulic Pressfit" and similar products are forbidden on this basis.
6. All inspector tests, drains and drum drips shall be Schedule 40 threaded.
7. Strap on tees or outlets may not be used. "Victaulic Snap-Let" or similar products and "Victaulic Style 921" or similar products are forbidden on this basis.
8. "Victaulic Style 920" mechanical tee or cross or similar products may be used.

C. Underground Piping

1. Underground pipe shall be PVC, C 900, Class 150 or Class 200. Fittings shall be Class 250 and installed in strict accordance with NFPA 24. All bends shall be rodded and thrust blocked.
2. Pipe passing under building grade beams shall have a 6" minimum clearance to prevent possible damage from building settlement.
3. All underground piping shall be flushed in accordance with NFPA #24.

2.04 JOINTS:

- A. Threaded joints shall be made up with piping compound or teflon tape applied to the male threads only.
- B. Welded joints shall be done by qualified welders per the requirements of Division 23.
- C. Flanged joints shall be made up with rubber gaskets and assembled with machine bolts with hexagon heads made of open hearth steel.
- D. Soldered joints shall be made using suitable flux and solder as specified.

2.05 BASIC HANGERS AND SUPPORTS:

- A. Refer to Division 23, Pipe Hangers, Supports, and Anchor, Section 23 05 29.
- B. Supports shall comply with provisions of NFPA 13 except where superseded by these herein and Section 23 05 29.

2.06 VALVES:

- A. Valves as indicated shall be provided by Milwaukee, Nibco, Victaulic, Grinnell or Mueller.
- B. All valves shall be designed and manufactured with back seating features to allow them to be repacked under pressure when in the fully opened position.
- C. Provide valves of one manufacturer wherever practical to achieve maximum possible uniformity and facilitate maintenance.
- D. All valves must be listed for use in sprinklers systems in the latest edition of Factory Mutual Approval Guide and U.L. listed.
 - 1. Gate valves 2" and smaller shall be of Class 250, with body and bonnet, cast bronze composition, threaded ends, OS&Y, solid disc.
 - 2. Gate valves 2-1/2" and larger shall be rated 250 psi WWP, iron body, bronze mounted, with body and bonnet, Class B cast iron, OS&Y, flanged or threaded end.
 - 3. Ball valves 2" and smaller shall be constructed of commercial brass rod, with Teflon seats, blowout proof stem.
 - 4. Butterfly valves 4" through 12" may be substituted for gate valves, where appropriate. Valves shall be rated for 250 PSIG working pressures. Valve bodies may be ductile iron or aluminum bronze and wafer or lug style.
 - 5. Check valves 2-1/2" - 12" shall be rated 250 PSI WWP, iron body, bronze mounted, OS&Y flanged end.
 - 6. Pressure ratings of valves shall be as required to meet the pressure conditions to which they are likely to be exposed or the ratings listed above, whichever is greater.

2.07 WATERFLOW INDICATOR:

- A. Waterflow indicator shall be vane type with adjustable retard and two sets of single pole, double throw contacts for A.C. or D.C. operation.

- 2.08 O.S. & Y. VALVE SUPERVISORY SWITCH:
- A. Valve supervisory switch for O.S. & Y. gate valves shall be provided with tamperproof cover and two sets of single pole, double throw contacts for A.C. or D.C. operation, bracket and J-bolts. Unit shall be U.L. Listed and F.M. Approved.
- 2.09 SPRINKLERS:
- A. 1/2" brass pendent sprinkler, ordinary temperature, with concealing bracket and cover assembly. Cover shall be factory painted in a color selected by the Architect to match finish of ceiling in which it is installed, for use in all gypsum board ceilings.
 - B. 1/2" chrome pendent sprinkler, ordinary temperature, with chrome plated, semi-recessed escutcheon, for use in all lay-in tile ceilings.
 - C. 1/2" brass upright sprinkler, ordinary temperature, for use in areas without ceilings.
 - D. 1/2" brass upright sprinkler, intermediate temperature, for use in areas above high ceiling space and electrical rooms.
 - E. Acceptable sprinkler manufacturers are: Viking, Tyco, and Victaulic.

PART 3 - EXECUTION

- 3.01 GENERAL:
- A. Contractor shall not fabricate and/or install fire sprinkler systems until Architect/Engineer has reviewed shop drawings / submittals for compliance with engineer design concept.
 - B. Any fire sprinkler systems fabricated and/or installed prior to the Architect/Engineer's review found to be in non-compliance shall be removed or corrected as per instructions from Architect/Engineer at Contractor's expense.
- 3.02 PROCEDURE:
- A. Valves in horizontal piping shall be installed with stems at or above the pipe centerline.
 - B. Automatic air vents shall be installed with gate valves.
 - C. Provide gate, globe and check valves throughout systems where shown and where necessary to properly regulate and control the systems. Valves shall be the full size of the lines and shall be designed for low pressure drop. Gate and globe valves shall have provision for repacking when open and under pressure.
- 3.03 SPRINKLERS:
- A. Provide basket type guards over all upright sprinklers.
 - B. Sprinklers shall be provided above and below all ductwork or other obstructions greater than 4'-0" in width.
 - C. Sprinklers shall be centered in 2 x 2 ceiling tiles and at least 12" from each of 2 x 4 ceiling tiles.

- D. Provide shields on all sprinklers located near electric panels to limit the sprinkler discharge on the panels.
- E. Install sprinklers so that heads are located no closer than 1'-0" to lights, diffusers, or other obstructions.
- F. Where sprinklers are exposed to exterior sprinklers must be wax coated to protect exposed surfaces from corrosion.

3.04 INSTALLATION:

- A. The fire protection system shall include all signs, test connections, and drains required by NFPA 13.
- B. Comply with requirements of NFPA 13 for installation of fire protection piping materials. Install piping products where indicated, in accordance with manufacturer's written instructions.
- C. Coordinate with other work, including plumbing piping, as necessary to interface components of fire protection piping properly with other work.
- D. Fire mains, crossmains, and branch piping shall not be installed inside or above the ceiling of Electrical Equipment Rooms, Telephone Rooms, Elevator Equipment Rooms, or other rooms of similar usage. Only sprinkler branch piping which serves sprinklers located inside such rooms shall be permitted to be installed within room.
- E. Automatic sprinklers protecting elevator shafts shall have a supervised control valve located in an accessible location outside of the room, so that sprinkler heads in these areas may be shut down separately.
- F. All valves in direct flow of water to sprinklers, standpipes or exterior connections shall be provided with valve position supervisory switches.
- G. Waterflow indicators shall be mounted horizontally or vertically on top of pipe. Adjust retard to provide maximum of 30 second delay. Schedule 40 pipe must be provided for waterflow indicator.
- H. O.S. & Y. valve stem shall be carefully filed to accommodate stem of valve switch.

3.05 DRAINS:

- A. All trapped sprinkler piping shall be provided with drain valves and shall be routed to and discharged over the nearest suitable floor drain, hub drain or service sink. Drain valve shall be located at the point of discharge.
- B. All drains and inspector's test connections located on exterior walls shall be painted to match exterior and penetration shall be sealed and provided with chrome plated escutcheon secured to wall.

3.06 ANCHORAGES:

- A. General: Provide concrete thrust block anchorages for underground tees, plugs, caps, and bends in accordance with NFPA 24. Provide rods and clamps on fittings located underground inside building as shown on drawings.
- B. After installation, apply a full coat of asphalt or other acceptable corrosion retarding material to surfaces of rods and clamps.

3.07 IDENTIFICATION:

- A. Install signs on all inspector's test connections, auxiliary drains, drain valves, etc., in accordance with NFPA 13.
- B. Access panels provided for valves concealed above ceilings or inside partitions must be provided with permanently attached signs identifying control valve or drain.

3.08 ADJUST AND CLEAN:

- A. Sprinkler Piping Flushing: Prior to connecting sprinkler risers for flushing, flush water feed mains, lead in connections and control portions of sprinkler piping. After fire sprinkler piping installation has been completed and before piping is placed in service, flush entire sprinkler system as required to remove foreign substances, under pressure as specified by NFPA 13, current edition. Continue flushing until water is clear, and check to ensure that debris has not clogged sprinklers.

3.09 TESTING:

- A. Hydrostatic Testing: After flushing system, test fire sprinkler piping hydrostatically, for a period of 2 hours, as follows:
 - 1. 150 psi or less, test pressure 200 psi
 - 2. 151 psi or more, test pressure 50 psi above normal operating pressure
- B. Check system for leakage at joints. Measure hydrostatic pressure at low point of each system or zone being tested. No drop in pressure is permitted.

3.10 PAINTING:

- A. Painting of properly prepared sprinkler piping and equipment shall be by the Contractor.
- B. The Contractor is to remove all labels, stickers, fabrication identification tags, excess pipe dope and teflon tape from sprinkler piping before system is painted.
- C. The Contractor is to install protective plastic bags on all sprinkler heads in areas where roof deck and/or structural system is to be painted.
- D. The Contractor will remove all plastic bags after the final painting is complete.
- E. The Contractor shall furnish a signed statement on his letterhead and place it in the operating instruction and maintenance manuals that he has verified that all plastic bags have been removed.
- F. Any sprinkler head not protected from painting and subsequently receiving paint coating shall be replaced. Cleaning of sprinkler heads to remove paint is not acceptable.

3.11 WARRANTY:

- A. Provide a written warranty in accordance with the general conditions.
- B. This warranty shall further provide that in the event of the failure of any system or its component equipment items or the improper functioning thereof, during the period of the warranty, the contractor shall have available and "on call" competent service personnel for the restoration of all systems and equipment for complete operation. Should the nature of the failure be such as to present an emergency in the opinion of the Owner, such personnel shall be promptly available regardless of the hour of the day or the day of the week. Should the failure be such as to fall under the warranty, the cost of the service shall be borne by the contractor -otherwise, the Owner will pay therefor at the prevailing rate for such services.
- C. If service personnel of the installing contractor are not promptly available "on call," the Owner may employ such personnel as are available to him, at the expense of the installing contractor.
- D. Inspection and Tests
 - 1. All inspections, examinations and tests required by NFPA, local authority having jurisdiction, and Owner's insurance company shall be arranged as necessary to obtain complete and final acceptance of the sprinkler system. The Contractor shall deliver certificates of all inspections and tests to Architect.
 - 2. At job conclusion the entire system shall be flushed out and left clean in every respect.
 - 3. After systems have been installed, tested and accepted, contractor is to provide three (3) copies of operating instructions and maintenance manuals complete with a copy of approved shop drawings, copy of NFPA-25, spare parts lists and phone numbers of emergency repair personnel to Architect. A copy of hydraulic calculation nameplate as installed on each riser shall be included in O & M manuals.
 - 4. Provide three (3) copies of underground material and test certificate.

3.12 QUARTERLY INSPECTIONS:

- A. Installing Sprinkler Contractor is to provide a minimum of four (4) on-site sprinkler system inspections during the one (1) year warranty period.
 - 1. Inspections to consist of all items outlined in NFPA-25 such as lubricating valve stem of valves, replacement of F.D.C. (fire department connection) break-off caps if missing, etc.
 - 2. After each quarterly inspection, copies of inspection reports outlining results and listing any problems observed shall be forwarded to the Owner, Owner's insurance company, and Architect and Engineer of Record.

END OF SECTION 211313

SECTION 21 31 13
ELECTRIC-DRIVE, CENTRIFUGAL FIRE PUMPS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. All work specified in this section is subject to the provisions of Section 23 00 01 "Mechanical General."

1.2 DESCRIPTION:

- A. This section and related drawings describe the requirements for an electric motor drive fire pump, jockey pump, and all related piping accessories and controls.

1.3 QUALITY ASSURANCE:

- A. Manufacturing firms shall be regularly engaged in the manufacture of fire pumps and equipment of the type and sizes required, whose products have been in satisfactory use in similar service for not less than five (5) years.
- B. UL and NEMA Compliances - Provide electric motors and electrical components required as part of fire pump equipment, which have been listed and labeled by Underwriters Laboratories and comply with NEMA standards.
- C. NEC Compliance - Comply with National Electrical Code (ANSI/NFPA 70) as applicable to installation an electrical connections of ancillary electrical components of fire pump equipment.

1.4 CODES AND STANDARDS:

- A. Install fire pump and controllers in accordance with NFPA 20 "Centrifugal Fire Pumps."

1.5 SUBMITTALS:

- A. Product Data - Submit manufacturer's fire pump equipment specifications, installation and start-up instructions, and capacity and ratings, with selection points clearly indicated.
- B. Shop Drawings - Submit assembly type shop drawings indicating dimensions, weights, required clearances, and methods of assembly of all components.
- C. Wiring Diagrams - Submit ladder type wiring diagrams for all components, clearly indicating all required field electrical connections.
- D. Maintenance Data - Submit maintenance data and parts lists for each item of fire protection equipment. Include "trouble-shooting" maintenance guides. Include this data in maintenance manual.

1.6 PRODUCT DELIVERY, STORAGE AND HANDLING:

- A. Handle pumps and components carefully to prevent damage, breaking, denting and scoring.

Do not install damaged fire pumps or components; replace with new.

- B. Store pumps and components in clean dry place. Protect from weather, dirt, fumes, water, construction debris, and physical damage.
- C. Comply with Manufacturer's rigging and installation instructions for unloading pumps, and moving them to final location.

PART 2 - PRODUCTS

2.1 FIRE PUMP:

- A. The fire pump shall be designed to deliver the capacity as indicated on the drawings. If drawings do not indicate pump specification, selection shall be as required for hydraulic characteristics and compatible with electric service.
- B. The pump shall deliver not less than 150% of the rated capacity at a pressure not less than 65% of the rated head. The shut-off pressure shall not exceed 120% of the rated pressure. Pump speed shall be selected by the manufacturer to meet the specified ratings.
- C. The pump shall be horizontal split case, single stage, double suction type with bronze or stainless steel shaft sleeves.
- D. The pump unit shall meet requirements of the NFPA 20 and shall be listed by Underwriter's Laboratories and approved by Factory Mutual at the design flow conditions.
- E. The following accessories shall be included with the pump unit:
 - 1. 1" casing relief valve set at 250 psig.
 - 2. Compound suction gauge, -15 to 250 psi and 0 to 400 psi discharge gauge.
 - 3. Automatic air release valve.
 - 4. Discharge increaser, concentric type, 250 lb. flanges, if required.
 - 5. Suction reducer, eccentric type, if required.
 - 6. Coupling guard.
- F. Pump and driver shall be mounted on a common base plate and direct connected through a flexible coupling. Pump suction and discharge shall be arranged to conform to piping arrangement shown on drawings.
- G. The pump system shall be hydrostatically tested in the factory to twice the working pressure but in no case to less than 250 lbs. per square inch.
- H. The fire pump unit shall be given a complete performance test by the manufacturer and certified characteristics curves prepared from the shop test results shall be bound in the Operations and Maintenance Manuals.
- I. Driver for the fire pump shall be a standard NEMA design B, open drip proof, ball bearing, squirrel cage, induction type electric motor with 1.15 service factor. Locked motor current shall not exceed the values specified in NFPA 20. Coordinate electrical characteristics with electrical drawings and specifications. Horsepower rating shall be as required for FM approval and UL listing.
- J. Provide a Fire Pump Suction Control valve equivalent to Watts ACV figure 116-1FM at the discharge of the fire pump if any of the following criteria are met:

1. drawings indicate such control valve
2. calculations indicate the pump suction pressure is less than 20 psi at the greatest system demand
3. the water supply is known to be variable or unreliable

K. Fire pump shall be by Fairbanks Morse, Peerless, Patterson, or Aurora.

2.2 FIRE PUMP CONTROLLER:

- A. The fire pump controller shall be completely assembled, wired and tested at the factory and assembly shall be specifically approved for fire pump purposes. All equipment shall be enclosed in one or more UL approved NEMA 12 drip tight enclosures.
- B. If the electrical drawings indicate, or the authority having jurisdiction requires, that the fire pump is to be connected to the emergency generator (or other alternate power source). In such case, the controller shall have a built in automatic transfer switch.
- C. The controller shall be of the combined manual and automatic reduced voltage type incorporating the following:
1. Disconnect switch, externally operable, quickbreak type.
 2. Motor starter and automatic transfer switch (if included) shall be capable of being energized automatically through the pressure switch or manually by means of an externally operable handle.
 3. Starter shall be of the Solid State Reduced Voltage.
 4. Running period timer set to keep motor in operation, when started automatically, for a minimum period of one minute for each 10 HP motor rating but not to exceed 7 minutes.
 5. Control power shall be supervised by starting the fire pump upon loss of control power.
 6. Controller shall be service entrance rated.
- K. The Solid State Controller shall be Firetrol Series FTA 1900 or equivalent.

2.3 JOCKEY PUMP:

- A. The jockey pump shall be supplied by the fire pump manufacturer and shall be a bronze fitted centrifugal vertical, multi-stage or a peripheral turbine type with casing arranged so that pump is self venting and cannot be air or vapor locked; pump shall have mechanical seal and stainless steel shaft; casing pressure rating shall be at least 50 psi higher than the specified discharge pressure at the fire pump.
- B. Pump shall be closed coupled to a 3500 RPM, open drip proof electric motor. Coordinate electrical connections with electrical drawings. Pump shall have a minimum capacity as noted on drawings.
- C. Set the pressure switch for a 10 psig differential with the cut-in-point 10 psig above the cut-in point of the fire pump control.
- D. Provide in the pump discharge a relief valve.
- E. Furnish a spare mechanical shaft seal for the jockey pump.
- F. Jockey pump shall be by Goulds or Grundfos.

2.4 JOCKEY PUMP CONTROLLER:

- A. Provide a UL listed jockey pump controller consisting of an across the line magnetic starter with thermal overload relay, pressure switch, fused disconnect switch, and hand-off-automatic selector switch, 0-10 minute minimum run timer, all in NEMA 1A general purpose enclosure.

PART 3 - EXECUTION

3.1 INSTALLATION:

- A. Install the pumps and accessories in accordance with the manufacturer's recommendations and the requirements of Section 23 00 01 "Mechanical General."
- B. Provide water pressure connection piping for the fire pump and jockey pump controls, pipe pump drip pockets to floor drain.

3.2 TESTING:

- A. Fire pump and Controller shall be completely shop tested by the pump manufacturer before shipment and copies of certified test pump curves shall be delivered to the Engineer. Notify Architect/Engineer two weeks prior to testing so that he may send his representative to witness test if he so chooses. Confirm all tests in writing and submit two copies to Architect/Engineer.
- B. Perform field acceptance tests of the pumps as required by NFPA 20 and the Authority having jurisdiction; coordinate the testing with tests of sprinkler system.
- C. The pump manufacturer shall provide the services of a qualified service technician to conduct the final acceptance test of this pump and control equipment. Alignment shall be checked with a dial indicator. The pump representative shall furnish the necessary fire hose, play pipes, test gauges and other equipment necessary to conduct the acceptance test.
- D. All tests shall be conducted in the presence of, and to the satisfaction of the authority having jurisdiction and the Engineer, each of whom shall be notified seven (7) days in advance of any such tests.

END OF SECTION