
FIRE SPRINKLER INDEX

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SECTION 210500 - GENERAL (FIRE SPRINKLER) PROVISIONS**PART 1 - GENERAL****1.1 Scope of Work**

- A. The Sprinkler Contractor shall be licensed for sprinkler work.
- B. The Sprinkler Contractor shall provide all materials and labor necessary to install a complete and operating sprinkler system in accordance with the Engineering Drawings and as specified herein.

1.2 Quality Assurance

- A. All work shall be in accordance with State Building Codes, National Fire Protection Association and all applicable codes.
- B. The Notice to Bidders, Instructions to Bidders, General Conditions, and Supplementary General Conditions are a part of these specifications.
- C. Any inspection and test charges required for the sprinkler work by approving authorities and Owners and any permits needed for installation of a complete system shall be secured and paid for by the Sprinkler Contractor.
- D. Where the words "Approved", "Approval", or "Approved Equivalent" appear, it is intended that items other than the model number specified shall be subject to approval of the Engineer.
- E. "Provide" as used herein shall mean that the Contractor responsible shall furnish and install said item or equipment. "Furnish" as used herein shall mean that the Contractor responsible shall require and make available said item or equipment and that installation shall be by others. "Install" as used herein shall mean that the Contractor responsible shall make installation of items or equipment furnished by others.
- F. All material and equipment that the Contractor proposes to substitute in lieu of those specified, shall be submitted to the Engineer ten (10) days before the bid date for evaluation. The submittal shall include a full description of the material or equipment and all pertinent engineering data required. Items that are submitted for approval after this date will not be accepted.
- G. The Sprinkler Contractor shall refer to the General Conditions for provisions of temporary utilities required under this Contract.
- H. All work shall be performed in accordance with U. S. Department of Labor, Occupational Safety and Health Standards.
- I. The entire system will be accepted as a unit. There will be no partial acceptance.
- J. The Owner shall provide heat in the building to protect the wet pipe system after acceptance of the system and provide all fire extinguishers.

1.3 Submittals

- A. See General and Supplementary General Conditions.
- B. Within ten days after notification of the award of contract and written notice to begin work the Contractor shall submit to the Architect/Engineer for approval, a detailed list of equipment and material which he

proposes to use. Items requiring submittal data for approval will be noted at this time. Four sets of submittal data shall be provided for approval.

- C. Each submittal shall bear the approval of the Contractor indicating he has reviewed the data and found it to meet the requirements of the specifications as well as space limitations and other project conditions. The submittals shall be clearly identified showing project name, manufacturer's catalog number and all necessary performance and fabrication data. Detailed submittal data shall be provided when items are to be considered as substitutions for specified items. Acceptance for approval shall be in writing from the Engineer.
- D. Contractor shall provide calculations and shop drawings signed by NICCT Level III designer and registered professional engineer.
- E. Shop drawings and data sheets shall provide all pertinent information for proper evaluation of each item. The drawings are diagrammatic only and are not intended to show minor details and exact locations. Locations of pipes, ducts, electrical raceways, panels, equipment, light fixtures, ceiling diffusers, etc., shall be reviewed, and anticipated interferences shall be coordinated with other Prime Contractors prior to installation. Lines, whose elevation cannot be changed, shall have the right-of-way, and larger lines shall have the right-of-way over smaller lines. Shop drawings shall show all principal dimensions, "tie-in" dimensions, sizes and locations.

1.4 Product Delivery, Storage and Handling

- A. All material and equipment shall be delivered and unloaded by the Contractor within the project site as noted herein or as directed by the Owner. Designated areas for material storage will be established by the Owner, and each Contractor will be responsible for maintaining his own area.
- B. The Contractor shall protect all material and equipment from breakage, theft, or weather damage. No material or equipment shall be stored on the ground.
- C. The material and equipment shall remain the property of the Contractor until the project has been completed and turned over to the Owner.

1.5 Work Conditions and Coordination

- A. The Contractor shall review the plans of all other Prime Contractors on the job and inform them of anticipated areas of conflict prior to installation of fire protection system.
- B. The Contractor shall review the electrical requirements for the equipment provided and establish points of connection and the extent of electrical work to be provided in his Contract. All electrical work shall be performed by a licensed electrical contracting firm.
- C. The Contractor will be responsible for the final electrical connections to all equipment installed as part of his contract. Unless otherwise noted, this Contractor shall wire from his equipment to disconnect switches, junction boxes, or panelboard circuit breakers as provided by the Electrical Contractor.
- D. Electrical work by this Contractor shall be in accordance with all state and national codes, and as specified in Division 26 contained herein.
- E. Pipe sleeves and chases required for the installation of a complete fire protection system shall be furnished by this Contractor, and he shall be responsible for coordinating the location and correct number of all required openings. The Contractor will be responsible to the General Contractor for coordinating this work with his schedule and will not cause him any undue hardship or loss of time.

- F. All work shall be coordinated with other trades. Cutting of new work and subsequent patching shall be at the Contractor's expense at no extra cost to the Owner.

1.6 Guarantee

- A. Contractor will provide extent and length of warranty and guarantee for all products with his submittals. If no warranties are available or offered, it shall be understood that the Contractor shall guarantee and warrant all materials and labor done under his contract for 12 months from the date of acceptance.
- B. Where extended warranties or guaranties are available from the manufacturer, the Contractor shall prepare the necessary Contract Documents to validate these warranties as required by the manufacturer and present them to the Owner.

PART 2 - PRODUCT

- 2.1 Materials and equipment shall be new, unless noted otherwise, of the highest grade and quality and free from defects or other imperfections. Materials and equipment found defective shall be removed and replaced at the Contractor's expense.
- 2.2 The Contractor shall provide nameplates for identification of all equipment, switches, panels, etc. The nameplates shall be laminated phenolic plastic, black front and back with white core, white engraved letters (1/4" minimum) etched into the white core.
- 2.3 All materials, products and equipment and components thereof which make up a complete fire protection system, shall be such as appear on the Fire Underwriters Equipment List of the Underwriters Laboratories, Inc.

PART 3 - EXECUTION

3.1 Inspection

- A. This Contractor shall examine all areas of completed work prior to installation of the fire protection systems and insure that no defects or errors are present which would result in the poor application or installation of subsequent work.
- B. It is the responsibility of this Contractor to coordinate all work performed by others for this Contractor. Upon inspection, should errors or omissions be found, it will be the responsibility of this Contractor to resolve the problem at no cost to the Owner.

3.2 Installation

- A. All work shall be performed in a manner indicating proficiency in the trade.
- B. All pipes, conduit, etc., shall be either parallel to the building walls or plumb where installed in a vertical position, unless otherwise noted, and shall be concealed when located in architecturally finished areas.
- C. Any cutting or patching required for installation of this Contractor's work shall be kept to a minimum. Written approval shall be required by the Architect/Engineer if cutting of primary structure is involved.
- D. All patching shall be done in such a manner as to restore the areas or surfaces to match existing finishes.
- E. This Contractor shall familiarize himself with the method and schedule of installation of poured concrete floors and walls. He shall lay out his work in advance and furnish all sleeves and opening locations to the

General Contractor for installation. This Contractor shall provide and install all inserts and hangers required to support his equipment, pipes, conduit, etc.

- F. All piping and conduit shall be accurately roughed in according to manufacturer's installation dimensions so that no offset adaptors, flexible connections or other imprecision not required by the manufacturer are necessary. All incorrect work shall be torn out and corrected and walls and floors patched at no expense to the Owner.
- G. Items such as alarms, valves, test connections, drains, etc., shall be accessible for operating, servicing, maintaining and repairing. Those which are installed in unsuitable locations shall be relocated as directed by the Architect/Engineer at no cost to the Owner.
- H. Connections to water, soil and waste lines shall be made at locations shown on the drawings.

3.3 Erection

- A. All support steel, angles, channels, pipes or structural steel studs and anchoring devices that may be required to rigidly support or anchor material and equipment shall be provided and installed by this Contractor, unless otherwise noted.

3.4 Field Quality Control

A. Testing and Flushing

1. Upon completion of work, inspection and tests shall be made by the Contractor's representative and witnessed by an Owner's representative. All defects shall be corrected and system left in service before a final certificate is issued. The NFPA Contractor's Material and Test Certificate shall be completed and signed by both representatives. Copies shall be prepared for approving authorities, Owner and Contractor.
2. The entire fire protection system, including yard piping, shall be hydrostatically tested at not less than 200 pounds per square inch pressure for two hours or at 50 pounds per square inch in excess of the maximum static pressure when the maximum static pressure is in excess of 150 pounds. The hydrostatic test pressure shall be measured at the low point of the individual system or zone being tested.
3. The inside sprinkler piping shall be installed in such a manner that there will be no visible leakage when the system is subjected to the hydrostatic pressure test.
4. The yard piping test shall be made before the joints are covered in order that any leaks may be readily detected. Leakage shall not exceed 2 quarts per hour per 100 joints. It is important to backfill the trench between joints before testing to prevent movement of pipe. The yard piping shall be flushed before connecting to the internal sprinkler system.
5. Instruments, specialties and equipment subject to damage shall be isolated during tests.
6. Prior to final acceptance, each control valve shall be closed and opened under pressure, to insure proper operation.
7. Test of drainage facilities shall be made while the control valve is wide open. The main drain valve shall be opened and remain open until the system pressure stabilizes.
8. Final report forms shall be prepared, delivered to and approval obtained from local authorities, IRI, and any other agency having approval authority and delivered to the Owner. Contractor's Certificate covering materials and tests shall be prepared and delivered to the Owner.

3.5 Closeout Documents

- A. The Contractor shall submit to the Engineer a set of accurately marked plans indicating all changes encountered during the construction. Final payment will be contingent on receipt of these As-Built Plans.
- B. The Contractor shall furnish four (4) bound sets of maintenance and operating instructions, parts lists, electrical circuit wiring diagrams, all submittal data and sufficient manufacturer's literature to operate and maintain all equipment.
- C. The Contractor shall submit to the Owner all certificates required for operating system in compliance with state and federal regulations.

END OF SECTION 210500

SECTION 210513 - ELECTRICAL WORK IN FIRE SPRINKLER CONTRACT**PART 1 - GENERAL**

- 1.1 This Contractor shall be responsible for the final electrical and the entire control system and control connections to all equipment installed as part of his contract.
- 1.2 Wiring from disconnect switches, junction boxes, panel board circuit breakers, etc. up to mechanical equipment shall be by the electrical contractor. Final electrical connections to mechanical equipment shall be by this contractor.
- 1.3 All power and control wiring shall be in conduits.
- 1.4 All electrical work shall be performed by a licensed electrician.
- 1.5 All electrical work shall be in accordance with the State Building Code and all its supplements and the latest edition of the National Electrical Code.

PART 2 - PRODUCT

- 2.1 All motor starters, disconnects, switches, relays, conduits, conductors, etc. that are required for a complete electrical power and/or control system shall conform to the requirements set forth by NEC.
- 2.2 Refer to the plans for the type, size and electrical characteristics of the starters, disconnects, switches, relays, conductor and conduits.
- 2.3 All conductors and conduits shall be sized as noted on the plans or as required per NEC.

PART 3 - EXECUTION

- 3.1 All motor starters, disconnects, and switches shall be installed on or as close to the equipment they are serving as possible, or where shown on the plans.
- 3.2 Electrical connection to equipment subject to vibration which develops objectionable noises shall be made from the conduit system with short lengths of flexible "Liquid- Tite" conduit. Connection to other equipment shall be made with rigid conduit.
- 3.3 Conduits shall be run in a concealed space such as wall cavities, ceiling cavities, etc. except in the mechanical rooms where conduit may be run exposed.

END OF SECTION 210513

SECTION 210523 - FIRE SPRINKLER SYSTEM PIPING**PART 1 - GENERAL**

- 1.1 The Sprinkler Contractor shall provide all materials and labor for the installation and make operational a complete sprinkler system.
 - A. Sprinklers shall be referred to on drawings, submittals, and other documentation, by the sprinkler identification or model number as specifically published in the appropriate agency listing or approval. Trade names or other abbreviated designations shall not be allowed.
- 1.2 The sprinkler system shall meet all NFPA Standards and approval by governing authorities, and all other authorities having approval jurisdiction shall be received prior to and after installation.
- 1.3 All materials shall be new, and all materials, products and equipment and components thereof shall be such as appear on the Fire Underwriters' Equipment List of the Underwriters' Laboratories, Inc.
- 1.4 All grooved joint couplings, fittings, valves, and specialties shall be of a single manufacturer. Grooving tools shall be of the same manufacturer as the grooved components.
- 1.5 The Contractor shall provide the Owner with instruction charts describing operation and proper maintenance of sprinkler devices, and a copy of the publication, NFPA No. 13A, latest edition, entitled "Care and Maintenance of Sprinkler Systems".
- 1.6 Before asking final approval of automatic sprinkler equipment by the authorities have jurisdiction, the Contractor shall furnish a written statement to the effect that the work covered by his Contract has been completed and tested in accordance with the approved specifications and drawings.
- 1.7 See Section 210500, 3.5, Field Quality Control.
- 1.8 Testing of all piping shall be made in the presence of the Engineer or designated representative of the Owner. No piping shall be covered or put into operation before such testing has been approved.

PART 2 - PRODUCT

- 2.1 Piping
 - A. Piping 2 1/2" and larger shall be schedule 10, and piping 2 " and smaller shall be schedule 40, black steel pipe conforming to ASTM Specification A795. Other type piping may be submitted for approval only if listed, and it meets the standards cited in NFPA.
 - B. Standard weight welding fittings shall be used and shall conform to ANSI B16.11.
 - C. Screwed fittings shall be malleable iron, 150 pounds s.w.p. with banded pattern conforming to ANSI B16.3.
 - D. Standard riser plate signage shall be provided on each system riser.
 - E. Grooved end fittings shall be ductile iron and conform to ASTM A536, Grade 65-45-12. Short-pattern, with flow equal to standard pattern fittings. Basis of Design: Victaulic FireLock.
 - F. Grooved Joint Couplings: Manufactured in two segments of cast ductile iron, conforming to ASTM A-536, Grade 65-45-12, with pressure-responsive elastomer gasket conforming to ASTM D-2000, and zinc-

electroplated carbon steel bolts and nuts conforming to ASTM A-449 and ASTM A-183. Couplings shall comply with ASTM F1476.

- G. Rigid Type: Coupling housings with offsetting, angle-pattern bolt pads shall be used to provide system rigidity and support and hanging in accordance with NFPA-13. Victaulic Style 009H and 107H/107N (Quick-Vic™). Installation ready rigid coupling for direct stab installation without field disassembly.
- H. Couplings shall be fully installed at visual pad-to-pad offset contact. Tongue and recess type couplings, which require the use of a torque wrench to achieve the exact required gap between housings, are not permitted.
- I. Flexible Type: Use in locations where vibration attenuation and stress relief are required. Victaulic Installation-Ready Style 177 or Style 77.

2.2 Sprinkler Heads

- A. Only listed sprinkler heads shall be used. Sprinkler heads shall not be altered in any respect, nor have any type of ornamentation or coatings applied after shipment from the place of manufacture.
- B. Sprinkler body shall be integrally cast with a hex shaped wrench boss to reduce the risk of damage during installation. Wrenches shall be provided by the sprinkler manufacturer that directly engage the wrench boss. (Sprinklers shall not contain rubber O-rings.)
- C. Guards shall be furnished wherever heads will be subject to damage.
- D. Guards and escutcheons shall be listed, supplied, and approved for use with the sprinkler by the sprinkler manufacturer.
- E. The Contractor shall provide the Owner a cabinet containing a minimum of 6 spare sprinklers of each type used in the installation. A special sprinkler wrench shall also be provided to be used in the removal and installation of sprinklers. Mount cabinet adjacent to riser.
- F. Where possible, all sprinkler heads shall be trimmed with materials to allow ceiling tile replacement.
- G. Multiple-Use Flexible Drop System: [cULus, and/or FM] In lieu of rigid pipe offsets or return bends for sprinkler drops, the Victaulic VicFlex™ Multiple-Use Flexible Stainless Steel Sprinkler Drop System may be used to locate sprinklers as required by final finished ceiling tiles and walls.
 - 1. The drop shall include a UL approved Series AH2 braided hose with a bend radius to 2" to allow for proper installation in confined spaces. The hose shall be listed for [(4) bends at 31" length] [(5) bends at 36" length] [(8) bends at 48" length] [(10) bends at 60" length] [(12) bends at 72" length].
 - 2. Union joints shall be provided for ease of installation.
 - 3. The flexible drop shall attach to the ceiling grid using a one-piece open gate Series AB1 bracket. The bracket shall allow installation before the ceiling tile is in place.
 - 4. The braided drop system is UL listed and FM Approved for sprinkler services to 175 psi (1206 kPa).

2.3 Sprinkler Alarms

- A. Alarm check valve of the approved type with water motor alarm gong, riser trim, drain valves and riser lines shall be located at the main system control valve as indicated on the Drawings. Basis of Design: Victaulic Series 751.

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1. Valve internal components shall be replaceable without removing the valve from the installed position.
 - B. Water flow switches are to be furnished and installed by the Sprinkler Contractor.
 - C. Wiring from flow switches and alarm valves to fire alarm control panel shall be by Electrical Contractor.
 - D. Sprinkler alarms shall be installed as required by NFPA or local authorities for a complete sprinkler system.
 - E. Wiring from tamper switches and flow switches to fire alarm control panel shall be by the Electrical Contractor.

2.4 Gauges

- A. Approved pressure gauges shall be installed as indicated on the Drawings. The gauge connection shall be equipped with a shut-off valve and with provision for draining.
- B. The pressure gauges shall be of approved type and shall have a maximum limit not less than twice the normal working pressure at the point where installed. They shall be installed to permit removal and shall be located where they will not be subject to freezing.

2.5 Fire Department Connections

- A. Approved equipment shall be by Crocker, Seco, Standard, W. D. Allen, or Elkhart, or approved equivalent.

2.6 Valves

- A. Shut-off valves shall be grooved end Victaulic Series 705 or lug/wafer type by Jenkins Figure 825-A, or approved equivalent by Crane or Nibco. The valve seat shall be pressure responsive, and the stem shall be offset from the disc centerline to allow complete 360 degree circumferential seating. Valve shall be provided with a weatherproof actuator with two SPDT supervisory switches.
- B. Check valves shall be grooved end Victaulic Series 717 or flanged type by Jenkins Figure 629, or approved equivalent by Crane or Nibco.
- C. Inspector's Test Valve: Provide inspector's test valve and piping as shown on the Drawings. Basis of Design: Victaulic Style 720 TestMaster II.
- D. Standard design identification signs shall be provided on all control drain, test and alarm valves.

PART 3 - EXECUTION

- 3.1 Pipe 2" and smaller shall have screwed joints.
- 3.2 Pipe 2 1/2" and larger shall be welded or Victaulic grooved ends. Welding of pipe shall be in accordance with NFPA 13, Chapter 3-3.12.4.
- 3.3 Welding ties or weldolets shall be used.
- 3.4 No "stub-in" shall be permitted.
- 3.5 When risers are 3" and larger in size, a flange joint shall be used at the riser where required.

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- 3.6 Screwed unions shall not be used on pipe larger than 2". Couplings and unions of other than screwed type shall be of types approved specifically for use in the sprinkler systems.
- 3.7 Grooved joint couplings and fittings shall be installed in accordance with the manufacturer's written installation instructions. Grooved ends shall be clean and free from indentations, projections, and roll marks in the area from pipe end to groove. Gaskets shall be verified as suitable for the intended service prior to installation. Gaskets shall be molded and produced by the coupling manufacturer. The grooved coupling manufacturer's factory trained representative shall provide on-site training for contractor's field personnel in the use of grooving tools, application of groove, and installation of grooved joint products. The manufacturer's representative shall periodically visit the jobsite and review installation. Contractor shall remove and replace any joints deemed improperly installed.
- 3.8 A one-piece reducing fitting shall be used wherever a change is made in the size of the pipe, except hexagonal or face bushings may be used in reducing the size of the openings of fittings when standard fittings of the required size are not available.
- 3.9 Hangers supporting horizontal piping shall be installed and spaced in accordance with NFPA 13, Chapter 3-3.14.
- 3.10 Sleeves shall be provided wherever pipes pass through walls, floors, and ceilings. Sleeves shall be schedule 40, black steel, 1/2" in diameter larger than the pipe or insulation on the pipe. Sleeves through wall and ceiling shall be flush. Sleeves through floors shall extend one inch above finished floor. Sleeves in exterior walls shall be caulked and made watertight. Pipes passing through sleeves shall be painted with a rust inhibiting paint. Pipes passing through fire walls or floors shall be sealed to conform to Underwriters' Laboratories requirements.
- 3.11 Installation of hangers and inserts shall be coordinated with all other Contractors on a priority basis. Each Contractor shall be responsible for providing all inserts, hangers, and rods necessary for the installation of his work.
- 3.12 Spacing, location and position of sprinkler heads and piping are approved on plans and shall be in accordance with minimum standards set forth in NFPA 13, Chapter 3.
- 3.13 All sprinkler heads, unless otherwise noted, will be centered in ceiling tiles.
- 3.14 All sprinkler heads, unless otherwise noted, will be installed on a swing connection.
- 3.15 Do not install sprinklers that have been dropped or show a visible loss of fluid. Never install sprinklers with cracked bulbs.
- 3.16 The sprinkler bulb protector must remain in place until the sprinkler is completely installed and before the system is placed in service. Remove bulb protectors carefully by hand after installation. Do not use any tools to remove bulb protectors.
- 3.17 All piping tests for the sprinkler system shall be in accordance with NFPA 13, Chapter 1-1.11.3. A Contractor's Material and Test Certificate Part "C" will be filled out for each riser by the Contractor and signed with copies prepared for approving authorities, Owner, and Architect/Engineer. Any leaks that occur shall be repaired and another test started. All defects shall be corrected and the system left in service before the Contractor leaves the job.

END OF SECTION 210523