SECTION 210000

FIRE SUPPRESSION

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**NOTE TO SPECIFIER**

*Use this Specification Section for Mail Processing Facilities.*

***This is a Type 1 Specification with completely editable text; therefore, any portion of the text can be modified by the A/E preparing the Solicitation Package to suit the project.***

*For Design/Build projects, do not delete the Notes to Specifier in this Section so that they may be available to Design/Build entity when preparing the Construction Documents.*

*For the Design/Build entity, this specification is intended as a guide for the Architect/Engineer preparing the Construction Documents.*

*The MPF specifications may also be used for Design/Bid/Build projects. In either case, it is the responsibility of the design professional to edit the Specifications Sections as appropriate for the project.*

*Text shown in brackets must be modified as needed for project specific requirements.* *See the “Using the USPS Guide Specifications” document in Folder C for more information.*

*The last date that USPS revised this standard specification section occurs in two places, at the end of this section and in the Table of Contents. If the date in this section matches the date in the Table of Contents, then you are using the latest version. Do not delete or revise the “last revised” date at the end of the section during the development of the Project Manual.*

*The footer in this section should be edited to replace the text, “USPS MPF SPECIFICATION” with the project name, and the blank date in the center should be replaced with the submission date, for interim design reviews, or the issue date of the completed Project Manual.*

***Provide sprinkler systems where required by local code or as directed by USPS. Follow code requirements based on occupancy, size of facility, and construction type for installation of a fire sprinkler suppression system. See Handbook AS-503, Standard Design Criteria, 0-2.1 Compliance with Building Codes and Standards, for more information om code requirements.***

***Design sprinkler systems in accordance with NFPA 13, Installation of Sprinkler Systems, using the hydraulic method for pipe sizing. Fire Protection design engineer shall obtain chemical analysis of water supply from utility or other source prior to designing the fire sprinkler water system so that any necessary water treatment for control of microbiologically influenced contamination (MIC) is properly provided in the design. Install backflow prevention as required by local codes.***

***Use dry systems for any area where freezing temperatures could occur. Equip all flow switches with a retard device to prevent false alarms due to pressure surges.***

***The use of halon or carbon dioxide extinguishing systems in new construction projects is strictly prohibited. In lieu of halon or carbon dioxide, automatic sprinkler protection is recommended. In order to minimize damage to computers or other equipment located in sprinkler protected areas, NFPA 75 requires a disconnect means to interrupt the power to all electronic equipment in the computer room. Fire wall separations are also recommended as a means to control and limit damage. The design of computer room fire suppression systems should consider an on-off sprinkler (pre-action) system using smoke/heat detectors.***

***See Handbook AS-503, Standard Design Criteria, Paragraph 4-5, Fire Protection, in Modules 1 and 2A for more information.***

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1. GENERAL
	1. SUMMARY
		1. Section Includes:
			1. Fire Protection Basic Materials and Methods:
				1. Hangers and Supports.
				2. Pipe and Fittings.
				3. Piping Specialties.
				4. Valves.
			2. Wet-Pipe Fire Suppression Sprinklers:
				1. System design, installation, and certification.
				2. Fire department connections.

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**NOTE TO SPECIFIER**

Include if Dry Pipe System is required.

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* + - 1. Dry-Pipe Fire Suppression Sprinklers:
				1. System design, installation, and certification.
				2. Fire department connections.

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**NOTE TO SPECIFIER**

Include if Fire Pump Required. Edit Type of Driver (Motor or Engine). Use electric drive pump when the facility is equipped with emergency power generator.

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* + - 1. Fire Pumps:
				1. Fire pump package.
				2. Fire pump [motor.] [engine.]
				3. Electric jockey pump.
				4. Controllers.
		1. Related Documents: The Contract Documents, as defined in Section 011000 - Summary of Work, apply to the Work of this Section. Additional requirements and information necessary to complete the Work of this Section may be found in other documents.
		2. Related Sections:
			1. Section 312300 - Excavation and Fill: Earthwork for utilities.
			2. Section 331100 - Water Utility Distribution Piping: Fire protection water system.
			3. Section 283100 - Fire Detection and Alarm: Interconnection of systems.
	1. REFERENCES
		1. American National Standards Institute (ANSI):
			1. ANSI B 16.1 - Cast Iron Pipe Flanges and Flanged Fittings, Class 25, 125, and 250.
			2. ANSI B 16.3 - Malleable-Iron Threaded Fittings, Class 150 and 300.
			3. ANSI B 16.4 - Gray Iron Threaded Fittings.
			4. ANSI A 21.10 - Ductile Iron and Gray Iron Fittings, 2 in. through 48 in., for Water and Other Liquids.
			5. ANSI A 21.51 - Ductile-Iron Pipe, Centrifugally Cast.
		2. American Society of Mechanical Engineers (ASME):
			1. ASME B16.1 - Cast Iron Pipe Flanges and Flanged Fittings.
			2. ASME B16.3 - Malleable Iron Threaded Fittings.
			3. ASME B16.4 - Gray Iron Threaded Fittings.
			4. ASME B16.5 - Pipe Flanges and Flanged Fittings.
			5. ASME B16.9 - Factory-made Wrought Steel Buttwelding Fittings.
			6. ASME B16.25 - Buttwelding Ends.
			7. ASME Sec 9 - Welding and Brazing Qualifications.

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**NOTE TO SPECIFIER**

Use ASSE when backflow preventers are required.

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* + 1. American Society of Sanitary Engineering (ASSE);
			1. ASSE 1047 - Reduced Pressure Detector Assembly Backflow Preventer.
			2. ASSE 1048 - Double Check Detector Assembly Backflow Preventer.
		2. American Society for Testing and Materials (ASTM):
			1. ASTM A 53 - Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
			2. ASTM A 47 - Specification for Malleable Iron Castings.
			3. ASTM A 135 - Specification for Electric-Resistance-Welded Steel Pipe.
			4. ASTM A 234 - Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service.
			5. ASTM A 795 - Specification for Black and Hot-dipped Zinc-coated (Galvanized) Welded and Seamless Steel Pipe for Fire Protection Use.
		3. Factory Mutual (FM):

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**NOTE TO SPECIFIER**

Edit editions– FM Data Sheet 2-8N will be replaced by Data Sheet 2-0 later in 2009, edit accordingly.

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* + - 1. FM - Approval Guide, [2002] [ ] Edition.
			2. FM Data Sheet 2-8N, [2002] [ ] Edition.
		1. National Fire Protection Association (NFPA):

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**NOTE TO SPECIFIER**

Edit editions.

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* + - 1. NFPA 13, [2007] [ ] Edition - Installation of Sprinkler Systems.

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**NOTE TO SPECIFIER**

Use if Fire Pump is required.

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* + - 1. NFPA 20, [2007] [ ] Edition - Standard for the Installation of Stationary Pumps for Fire Protection.
			2. NFPA 24, [2007] [ \_\_\_ ] Edition – Standard for the Installation of Private Fire Service Mains and Their Appurtenances
			3. NFPA 70, [2008] [ ] Edition - National Electrical Code.
			4. NFPA 72, [2007] [ ] Edition - National Fire Alarm Code.
			5. NFPA 291, [2007] [ \_\_\_ ] Edition – Recommended Practice for Fire Flow Testing and Marking of Hydrants.
		1. Underwriters Laboratories, Inc. (UL):

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**NOTE TO SPECIFIER**

Edit Edition.

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* + - 1. UL Fire Directory B, Product Directory - Fire Protection Equipment Directory, [2009] [ ] Edition.
			2. UL 193 - Alarm Valves for Fire Protection Service.
			3. UL 199 - Automatic Sprinklers for Fire Protection Service.
			4. UL 346 - Water Flow Indicators for Fire Protective Signaling Systems.
			5. UL 405 - Standard for Fire Department Connections.
			6. UL 753 - Alarm Accessories for Automatic Water Supply Control Valves for Fire Protection Service.

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**NOTE TO SPECIFIER**

Use if hose cabinets or racks are required

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* + - 1. UL 668 - Hose Valves for Fire Protection Services.

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**NOTE TO SPECIFIER**

Use if Fire Pump is required

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* + - 1. UL 448 - Pumps for Fire Protection Service.

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**NOTE TO SPECIFIER**

Use if Fire Pump is required. Do not use if the facility is equipped with emergency power generator and electric motor is used in instead of diesel engine.

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* + - 1. UL 1247 - Diesel Engines for Driving Centrifugal Fire Pumps.
			2. UL 1468 - Direct-Acting Pressure Reducing and Pressure-Control Valves for Fire Protection Service.
			3. UL 1478 - Fire Pump Relief Valves.
	1. DEFINITIONS
		1. Authority Having Jurisdiction: See Public Authorities.
		2. Delegated Engineer: A Professional Engineer Registered in the State where the project is located who undertakes final design of the fire protection system.
		3. Owner: Any designated representative of the owner.
		4. Professional of Record: Architect or Engineer of Record indicated on the Contract Documents.
		5. Public Authorities: Local, State or Federal government body having jurisdiction over any portion of the project. This includes, but is not limited to building departments, Fire Departments, Fire Marshals Offices, Water Departments, Insurance Regulatory Boards, Utility Companies or Districts, Cross Connection Control Departments, Transportation Departments, etc.
	2. SYSTEM DESCRIPTION
		1. Design Requirements:
			1. System to provide coverage for entire building.

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**NOTE TO SPECIFIER**

Use for Ordinary Hazard Group 2 Locations

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* + - 1. Retail Areas, Canopies, Workroom and General Storage areas.
				1. Density: 0.20 gpm/ft2 for most hydraulically remote 1500 ft2, with 250 gpm hose stream allowance. If Area is less than 1500 ft2, calculate at 0.20 gpm/ft2 for entire area with 250 gpm hose stream allowance.
				2. Sprinkler Temperature Rating: Ordinary. High in combustible concealed spaces or near heat producing equipment.
				3. Spacing: 130 ft2 per sprinkler maximum.
				4. Occupancy: Mercantile, Ordinary Hazard Group 2 per NFPA 13.

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**NOTE TO SPECIFIER**

Use for Light Hazard Locations

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* + - 1. Office Areas and Restrooms
				1. Density: 0.10 gpm/ft2 for most hydraulically remote 1500 ft2, with 100 gpm hose stream allowance. If area is less than 1500 ft2, calculate at 0.10 gpm/ft2 for entire area with 100 gpm hose stream allowance.
				2. Sprinkler Temperature Rating: Ordinary. High near heat producing equipment.
				3. Spacing: 225 ft2 per sprinkler maximum, 15 feet spacing maximum.
				4. Occupancy: Light Hazard per NFPA 13.

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**NOTE TO SPECIFIER**

Use for Locations with Combustible Concealed Spaces

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* + - 1. Combustible Concealed Spaces
				1. Density: 0.10 gpm/ft2 for most hydraulically remote 1500 ft2, with 100 gpm hose stream allowance. If area is less than 1500 ft2, calculate at 0.10 gpm/ft2 for entire area with 100 gpm hose stream allowance.
				2. Sprinkler Temperature rating: Intermediate. High near heat producing equipment.
				3. Spacing: 130 ft2 per sprinkler maximum, 15 feet spacing maximum.
				4. Occupancy: Light Hazard per NFPA 13.

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**NOTE TO SPECIFIER**

Use if water flow test data is known, verified and is to be the “Design Basis Fact”.

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* + - 1. Design sprinkler systems using the following [water] [fire pump] supply: [ \_\_\_\_ ] psi [static] [churn], [ \_\_\_\_ ] psi residual flowing [ \_\_\_\_ ] gpm [, and [ \_\_\_\_ ] psi residual flowing [ \_\_\_\_ ] gpm]. This test effective at [hydrant located] [ \_\_\_\_ ] and provided by [ \_\_\_\_ ].

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**NOTE TO SPECIFIER**

Use if Delegated Engineer is required to perform water flow.

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* + - 1. The Delegated Engineer shall perform a water flow test to determine the available water supply for fire protection system design. The following parameters shall be followed in conducting the water flow test:
				1. Conduct flow test in accordance with NFPA 291. Coordinate flow tests validity with Public Authorities and Contracting Officer.
				2. Contact the Public Authorities before conducting the flow test. Public Authority appointed representative must be present during the flow test.
				3. Conduct a water flow pressure test as close to the proposed location as practical. The water flow pressure test shall consist of three separate pressure tests conducted at the same location. The first water flow pressure test shall be conducted at zero flow (initial static condition). The second water flow pressure test shall be conducted flowing at or more than [ ] [700] gpm (residual condition). The final water flow pressure test (final static condition) shall be conducted immediately following the second at zero flow, to determine if pumps or other pressure/flow modifying devices may have been engaged. Conduct test during peak hour demand conditions. If test cannot be conducted during peak hour, adjust results to peak hour demand.

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**NOTE TO SPECIFIER**

Edit Safety Factor Values Based on project/Public Authority Requirements

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* + - 1. Safety Factor: 10 percent of static and residual PSI.
			2. Hydraulic calculation areas of application shall be based on actual floor area protected by sprinklers. Use 1.2 multiplied by the square root of the area for design criteria.

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**NOTE TO SPECIFIER**

Use if Dry Pipe System Required

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* + - 1. Hydraulic calculations for all dry pipe system piping shall be based on a C Value of 100.

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**NOTE TO SPECIFIER**

Use if Hose Cabinets or Racks are Required

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* + - 1. Install 1-1/2 inch Fire Department hose valves and racks with 100 feet of hose. Locate as [indicated on Drawings and as] required by Public Authorities. Final location and quantity subject to approval of Contracting Officer and Public Authorities.
			2. System control valve shall be a post indicting valve located a minimum of 40 feet from building.

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**NOTE TO SPECIFIER**

Use if Fire Pump is NOT Required

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* + - 1. Entire hose allowance (gpm) shall be included in hydraulic calculations at the connection to the city water main or a yard hydrant, whichever is closer to the system riser. [If inside hose cabinets, racks, or connections are required then include 100 gpm of the total hose allowance at point of connection of hose system piping to automatic fire sprinkler system piping.]

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**NOTE TO SPECIFIER**

Use if Fire Pump is Required

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* + - 1. Entire hose allowance (gpm) required in schedule shall be included in hydraulic calculations at pump discharge flange. [If inside hose cabinets, racks, or connections are required then include 100 gpm of the total hose allowance at point of connection of hose system piping to automatic fire sprinkler system piping.]
		1. Scope of Work: Design, fabrication, and installation of Fire Protection System Including the Following:
			1. Complete fire protection system as outlined in these Contract Documents, including all labor, materials, shop drawings and hydraulic needed to furnish and install a complete and functional fire protection system. System shall comply with NFPA 13, Public Authorities, Contracting Officer and Contract Documents.
			2. Visit site to determine conditions and extent of work.
			3. Coordination of work with Contract Documents and all trades, including building design loads.
			4. The work under this section shall yield to all other trades.
			5. Warranty on new materials and labor.
			6. Provide all necessary permits, taxes, and fees, including Public Authorities inspection and testing fees necessary to complete the specified work.
			7. Provide any required core drilling of walls, and required UL listed, non-combustible firestopping materials at all new sprinkler piping penetrations. Patch as required. New piping penetrations shall be adequately firestopped to maintain the fire resistance rating required.
			8. Access panels for service and access to valves in enclosed ceiling and walls.
			9. Provide coordination and interface of alarm initiating and supervisory devices with the fire alarm system.
			10. The fire protection piping, and sprinkler layout shall function in such a manner so as not to interfere with lighting fixtures, air distribution devices, equipment, piping, beams, and ductwork. The work under this section shall yield to all other trades.
			11. Furnish, install, and adjust as necessary all waterflow and valve supervisory switches.
			12. Fire protection systems complete with supervised control valves, inspector’s test and main drain assemblies, vane type waterflow alarm switches, pressure gauge, main drain, auxiliary drains, and local alarm devices.
			13. Provide required signs at all new control valves, main drains, auxiliary drains and inspector’s test connections, hydraulic placards, etc.
			14. System testing.
			15. Underground pipe modifications, including all necessary fittings, clamps, thrust blocking, backflow preventers, excavating and backfilling, etc.
			16. Fire department connection with check valve and ball drip, including interconnecting supply piping to sprinkler riser.
			17. If sprinkler system in any area is subject to freezing, then use non‑freeze system (dry or anti-freeze).
			18. Drawings must indicate specific method of freeze protection for all areas.

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**NOTE TO SPECIFIER**

Use if Fire Pump is Required. Use electric drive pump when the facility is equipped with emergency power generator.

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* + - 1. If necessary, Contractor shall furnish and install one UL Listed and [or] FM Approved [electric motor] [diesel engine] driven horizontal split case fire pump. Each unit shall include a pump, base, coupling, coupling guard, necessary fittings, and an automatic controller.

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**NOTE TO SPECIFIER**

Use if Fire Pump is Required. Edit Values. Use electric drive pump when the facility is equipped with emergency power generator.

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* + - 1. The fire pump shall be rated at:
				1. Pump Capacity: [1000] [ ] gpm at [219] [ ] feet head, [95] [ ] psi.
				2. The net pump shutoff (churn) pressure plus the maximum static suction pressure, adjusted for elevation, shall not exceed the pressure for which the system components are rated.
				3. Maximum permissible pump speed shall not exceed [2100] [ ] rpm.
				4. Maximum permissible [engine] [motor] speed shall not exceed [2100] [ ] rpm.
				5. Maximum permissible [engine] [motor] horse power shall not exceed [75] [ ] hp.
				6. Static suction pressure available: [ ] psi maximum and [ ] psi minimum.
				7. Suction pressure at rated gpm: [ ] psi maximum and [ ] psi minimum.
				8. Suction pressure at 150 percent rated gpm: [ ] psi maximum and [ ] psi minimum.
				9. Maximum permissible static pressure on discharge flange of pump (including maximum static suction and maximum churn pressure: [150] [ ] psi.
				10. Unit shall be designed to deliver not less than 150 percent of rated capacity at 65 percent of rated capacity.
				11. Ambient temperature range: [125] [ ] degrees F maximum to [40] [ ] degrees F minimum.
				12. The unit will be installed at approximately [20] [ ] feet elevation above sea level.
				13. Pump start: At a minimum operating design pressure of [130] [ ] psi
				14. Maximum demand: Shall not exceed 120 percent of pump's rated capacity.
				15. Pump: Supplied from [public water main] [suction tank].

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**NOTE TO SPECIFIER**

Use if Fire Pump is Required. Edit Values

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* + - 1. Performance of Jockey Pump on Fire Pump System:
				1. Pump Capacity: [5] [ ] gpm , at [231] [ ] feet head, [100] [ ] psi.
				2. Maximum permissible pump churn pressure shall not exceed [120] [ ] percent of rated pressure ([120] [ ] psi maximum)
				3. Motor: [1.5] [ ] hp.

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**NOTE TO SPECIFIER**

Use if Fire Pump is Required

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* + - 1. If fire pump is necessary, all equipment furnished, and the complete installation of the fire pump shall be in accordance with NFPA 20. Pumps and controllers shall be UL Listed and [or] FM Approved.
				1. Assembled pump configuration must be installed per manufacturer's recommendations.
				2. Purchase pumps, driver, controllers, and accessories under unit contract.

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**NOTE TO SPECIFIER**

Use if Fire Pump and Pump Suction Control Valve is Required.

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* + - * 1. Provide pump suction control valve.
	1. SUBMITTALS
		1. Section 013300 - Submittal Procedures: Procedures for Submittals.
			1. Product Data:
				1. Sprinkler heads, valves, and specialties.
				2. Performance ratings rough-in details, weights, support requirements, and piping connections.
			2. Preliminary Shop Drawings: Prior to detailed submission, submit preliminary layout of finished ceiling areas indicating only sprinkler locations coordinated with ceiling installation.
			3. Shop Drawings: Indicate hydraulic calculations, detailed pipe layout, hangers and supports, components and accessories. Indicate system controls. Prior to commencement of installation, submit licensed Professional Engineer's sprinkler system drawings (signed and sealed by Delegated Engineer) specified in "Quality Assurance" Article to Designated Reviewers. Include system hydraulic calculations and equipment data. Submittals shall be complete and in bound sets.
			4. Sprinkler system drawings, prepared according to NFPA 13 and FM 2-8N and Contract Documents. Submittals shall be made to Designated reviewers. Designated Reviewers are:
				1. Additional Submittal: Submit shop drawings, product data, and hydraulic calculations to Public Authorities for approval. Submit proof of approval to Contracting Officer.
				2. Submittals to Contracting Officer:

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**NOTE TO SPECIFIER**

Use the following for Florida, South Carolina, Kentucky, and Louisiana, and as required by the project

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* + - * 1. Submittals to [Fire Protection Engineer] [Professional] of Record:
			1. Assurance/Control Submittals:
				1. Design Data:
				2. Test Reports: Submit the following reports directly to Contracting Officer from Testing Laboratory, with copy to Contractor. Prepare reports in conformance with Section 014000 - Quality Requirements.

Pre-test.

Acceptance test.

* + - * 1. Certificates: Manufacturer's certificate certifying that components and Products meet or exceed specified requirements.
				2. Qualification Documentation:

Submit documentation of manufacturer and installer experience indicating compliance with specified qualification requirements. Include lists of completed projects with project names and addresses, and names of Engineers and Contracting Officers.

Fire protection contractor license issued by State or local authority having jurisdiction.

* + - * 1. Manufacturer's Field Reports: Submit the following reports directly to Contracting Officer from Manufacturer's Quality Control Inspector, with copy to Contractor. Prepare reports in conformance with Section 014000 - Quality Requirements.

Preparatory inspection.

Initial inspection.

Follow-up inspection.

Final inspection.

* + 1. Section 017704 - Closeout Procedures and Training: Procedures for closeout submittals.
			1. Project Record Documents: Accurately record the following.
				1. Sprinklers and deviations of piping from Drawings.
				2. Drain and test locations.
			2. Operation and Maintenance Data:
				1. Components of system, servicing requirements, inspection data, replacement part numbers and availability, and location and numbers of service depot.
	1. QUALITY ASSURANCE
		1. Qualifications:
			1. Manufacturer: Company specializing in manufacturing the Products specified in this Section, whose equipment, specialties, and accessories are listed by product name and manufacturer in UL Fire Protection Equipment Directory and FM Approval Guide and that conform to other requirements indicated.
			2. Installer: Company specializing in performing the Work of this Section with minimum of 3 years documented experience and approved by Public Authorities in the State and Jurisdiction where the project is located. Company qualified to install and alter fire protection piping, equipment, specialties, and accessories, and repair and service equipment. Company familiar with, and in compliance with, requirements of authorities having jurisdiction.
			3. Delegated Engineer: Design fire protection system, develop working plans and shop drawings, and perform shop and site work under direct supervision of a Delegated Engineer experienced in design of this work and licensed in the State where the Project is located.

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**NOTE TO SPECIFIER**

Use if Fire Pump is Required

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* + 1. If a fire pump is required, the manufacturer shall provide the services of a qualified Field Engineer to assist in the proper installation of equipment, make necessary mechanical adjustments, and align fire pump flexible coupling. Arrange, conduct and provide all required test equipment for Field Acceptance Test. Test shall be witnessed by the Public Authorities and Contracting Officer.

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**NOTE TO SPECIFIER**

Edit standards

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* + 1. Regulatory Requirements:
			1. Perform Work in accordance with NFPA [13, 20, 24, 70, 72 and 291].
			2. Equipment and Components: UL listed and FM approved with appropriate label or marking.
			3. Hydraulic Calculations, Product Data, Shop Drawings: Bear stamp of approval of Public Authorities.
			4. Welding Materials and Procedures: Conform to AWS D10.9.
			5. Products Requiring Electrical Connection: Listed and classified as suitable for the purpose specified and indicated.
			6. Comply with requirements of Public Authorities for submittals, approvals, materials, hose threads, installation, inspections, and testing.
			7. Comply with requirements of Contracting Officer and Owner’s insurance underwriter for submittals, approvals, materials, installation, inspections, and testing.
			8. Provide certificate of compliance from Public Authorities indicating approval of field acceptance tests.
			9. Conform to applicable code for submission of design and calculations, reviewed shop and erection drawings and as required for acquiring permits.
			10. Cooperate with regulatory agency or authority and provide data as requested.
		2. Pre-Installation Meetings:
			1. Convene a pre-installation meeting one week prior to commencing Work of this Section.
			2. Require attendance of parties directly affecting Work of this Section.
			3. Review conditions of operations, procedures and coordination with related Work.
			4. Agenda:
				1. Tour, inspect, and discuss conditions of building and building structure.
				2. Review fire sprinkler system design and requirements.
				3. Review required submittals, both completed and yet to be completed.
				4. Review fire protection system Drawings and data.
				5. Review and finalize construction schedule related to fire sprinkler system and verify availability of materials, personnel, equipment, and facilities needed to make progress and avoid delays.
				6. Review required inspections, testing, certifying, and material usage accounting procedures.
	1. DELIVERY, STORAGE, AND HANDLING
		1. Section 016000 - Product Requirements: Transport, handle, store, and protect Products.
		2. Store products in shipping containers and maintain in place until installation. Provide temporary inlet and outlet caps. Maintain caps in place until installation.
		3. Deliver and store valves in shipping containers, with labeling in place.
		4. Provide temporary protective coating on cast iron and steel valves.
		5. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.
	2. MAINTENANCE
		1. Section 017704 - Closeout Procedures and Training: Procedures for closeout submittals.
		2. Extra Products: At completion of installation, deliver to Contracting Officer.
			1. Provide extra sprinklers under provision of NFPA 13.
			2. Provide suitable wrenches for each head type.
			3. Provide metal storage cabinet in location designated. Cabinet to be of sufficient size to store sprinklers, wrenches, and copy of all fire protection submittal documents.
1. PRODUCTS
	1. MANUFACTURERS
		1. Subject to compliance with project requirements, manufacturers offering Products which may be incorporated in the Work include the following:
			1. Ames Company, Incorporated, Woodland, CA (530) 666-2493.
			2. Cla-Val Company, Costa Mesa, CA, (800) 942-6326.
			3. Febco, Fresno, CA, (209) 252-0791.
			4. The Viking Corporation, Hastings, MI (800) 968-9501.
			5. Watts Industries, North Andover, MA (978) 688-1811.
			6. Wilkins Regulator Division, Zurn Industries, Incorporated, Erie, PA (814) 455-0921.
		2. Section 016000 - Product Requirements: Product options and substitutions. Substitutions: Permitted.
	2. FIRE PROTECTION PIPING - BELOW GROUND
		1. Cast Iron Pipe: Class 200, with flanged joints, ASA 21.2 or bell and spigot ASA 21.6. Cement-mortar lined, ASA 21.4.
			1. Fittings: Cast Iron Flanged, ASA B16.1 Class 125; bell and spigot ASA 21.10; fittings to be cement mortar lined ASA21.4.
		2. Polyvinyl Chloride (PVC) Pipe: ASTM D1784-60T, ASTM D2241-64AT. Commercial Standard CS 256-63. Designed for Maximum working pressure of 160 psi at 73 degrees F.
			1. Rubber ring joints: Ring Tite PVC Pipe, by Manville.
			2. Substitutions: Under provisions of Section 016000.
		3. Ductile Iron Pipe: Class 50
		4. Indicator Posts:
			1. No. A-20805, with tamper switch (double contact), by Mueller.
			2. Substitutions: Under provisions of Section 016000.
		5. Gate Valves: AWWA C500-59T.
	3. FIRE PROTECTION PIPING - ABOVE GROUND
		1. Black Steel Pipe: ANSI/ASTM A53; ASTM A795; ASTM A135; ANSI B36.10M; Schedule 10 or 40 (Schedule 30 for 8 inch pipe and larger).
			1. Steel Fittings: ANSI/ASME B16.9, wrought steel, butt welded; ANSI/ASME B16.25, battled ends; ASTM A234, wrought carbon steel and alloy steel; ANSI/ASME B16.5, steel flanges and fittings; ANSI/ASME B16.11, forged steel socket welded and threaded.
			2. Cast Iron Fittings: ANSI/ASME B16.1, flanges and fittings; ANSI/ASME B16.4, screwed fittings.
			3. Malleable Iron Fittings: ANSI/ASME B16.3, screwed type. ANSI/ASTM A47.
			4. Mechanical Grooved Couplings: Malleable iron housing clamps to engage and lock, "C" shaped composition sealing gasket, steel bolts, nuts, and washers; [Victaulic FlushSeal gasket required for dry pipe, preaction and double interlock dry systems.]
			5. Fitting type to match pipe. Galvanized required for dry pipe systems.
		2. Alternate Products: Acceptable alternatives to Schedule 10 and Schedule 40 pipe.
			1. "Superflow" Non-threadable Lightwall, by Allied.
			2. "Dyna-Flow" Non-threadable Lightwall, by American Tube.
			3. Schedule 5 pipe used with Victaulic "Pressfit" system.
			4. "Eddylite," by Bullmoose.
			5. Flexible sprinkler system assembly by SprinkFLEX, for the final connection between the branch line and the sprinkler head.
		3. Pipe must meet the following conditions:
			1. Threads: Shop cut according to applicable ANSI standards.
			2. Pipe Fittings: Specifically rated for use with pipe.

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**NOTE TO SPECIFIER**

Use BACKFLOW PREVENTERS where required by local authority having jurisdiction.

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* 1. BACKFLOW PREVENTER
		1. Manufacturers: Subject to compliance with project requirements, manufacturers offering Products which may be incorporated in the Work include the following:
			1. Ames Company, Incorporated, Woodland, CA (530) 666-2493.
			2. Cla-Val Company, Costa Mesa, CA, (800) 942-6326.
			3. Febco, Fresno, CA, (209) 252-0791.
			4. The Viking Corporation, Hastings, MI (800) 968-9501.
			5. Watts Industries, North Andover, MA (978) 688-1811.
			6. Wilkins Regulator Division, Zurn Industries, Incorporated, Erie, PA (814) 455-0921.
			7. Section 016000 - Product Requirements: Product options and substitutions. Substitutions: Permitted.
		2. ASSE standard type, size, maximum flow rate, and maximum pressure loss as indicated on Drawings. Bronze, cast-iron, steel, or stainless-steel body, corrosion-resistant interior components, FDA-approved epoxy coating for cast-iron or steel body, 150 psig working pressure.

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**NOTE TO SPECIFIER**

OPTION 1: Use REDUCED PRESSURE BACKFLOW type when required by authority having jurisdiction

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* + 1. Reduced-Pressure Backflow Preventer: ASSE 1013, consisting of OS&Y gate valves on inlet and outlet and strainer on inlet with test cocks and pressure-differential relief valve with ASME A 112.1.2 air gap fitting located between two positive-seating check valves.

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**NOTE TO SPECIFIER**

OPTION 2: Use DOUBLE-CHECK BACKFLOW type when required by authority having jurisdiction.

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* + 1. Double-Check Backflow Prevention Assemblies: ASSE 1015, consisting of shutoff valves on inlet and outlet and strainer on inlet with test cocks and two positive-seating check valves.

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**NOTE TO SPECIFIER**

OPTION 3: Use REDUCED PRESSURE DETECTOR type when required by authority having jurisdiction.

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* + 1. Reduced-Pressure Detector Assembly Backflow Preventer: UL 312 and ASSE 1047, consisting of OS&Y gate valves on inlet and outlet, and strainer on inlet, with pressure-differential relief valve with ASME A112.1.2 air-gap fitting between two positive-seating check valves and test cocks, and bypass with displacement-type water meter, valves, and reduced-pressure backflow preventer.

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**NOTE TO SPECIFIER**

OPTION 4: Use DOUBLE CHECK DETECTOR type when required by authority having jurisdiction.

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* + 1. Double-Check Detector Assembly Backflow Preventer: UL 312 and ASSE 1048, consisting of OS&Y gate valves on inlet and outlet and strainer on inlet with two positive-seating check valves and test cocks, and bypass with displacement-type water meter, valves, and double-check backflow preventer.
	1. GATE VALVES
		1. Manufacturers: Subject to compliance with project requirements, manufacturers offering Products which may be incorporated in the Work include the following:
			1. Grinnell Supply Sales, Company, Grinnell Corporation.
			2. Nibco, Incorporated.
			3. Stockham Valves and Fittings, Incorporated.
			4. Section 016000 - Product Requirements: Product options and substitutions. Substitutions: Permitted.
		2. Gate Valves (Up to and including 2 inches): Bronze body, bronze trim, rising stem, handwheel, inside screw, single wedge or disc, solder or threaded ends.
		3. Gate Valves(Over 2 inches): Iron body, bronze trim, rising stem, handwheel, OS&Y, single wedge, flanged ends.
	2. GLOBE OR ANGLE VALVES
		1. Manufacturers: Subject to compliance with project requirements, manufacturers offering Products which may be incorporated in the Work include the following:
			1. Grinnell Supply Sales, Company, Grinnell Corporation, Exeter, NH (603) 778-9200.
			2. Nibco, Incorporated, Elkhart, IN (800) 642-5463.
			3. Stockham Valves and Fittings, Incorporated, Cullman, AL (800) 786-2542.
			4. Section 016000 - Product Requirements: Product options and substitutions. Substitutions: Permitted.
		2. Up to 2 inches: Bronze body, bronze trim, rising stem and handwheel, inside screw, renewable composition disc, solder or screwed ends, with backseating capacity.
		3. Over 2 inches: Iron body, bronze trim, rising stem, handwheel, OS&Y, plug-type disc, flanged ends, renewable seat and disc.
	3. BUTTERFLY VALVES
		1. Manufacturers: Subject to compliance with project requirements, manufacturers offering Products which may be incorporated in the Work include the following:
			1. Grinnell Supply Sales, Company, Grinnell Corporation, Exeter, NH (603) 778-9200.
			2. Nibco, Incorporated, Elkhart, IN (800) 642-5463.
			3. Stockham Valves and Fittings, Incorporated, Cullman, AL (800) 786-2542.
			4. Section 016000 - Product Requirements: Product options and substitutions. Substitutions: Permitted.
		2. Cast or ductile iron body; chrome plated ductile iron disc, resilient replaceable EPDM seat; wafer, lug, or grooved ends; extended neck; handwheel and gear drive and integral indicating device; built-in tamper proof switch.
	4. CHECK VALVES
		1. Manufacturers: Subject to compliance with project requirements, manufacturers offering Products which may be incorporated in the Work include the following:
			1. Grinnell Supply Sales, Company, Grinnell Corporation, Exeter, NH (603) 778-9200.
			2. Nibco, Incorporated, Elkhart, IN (800) 642-5463.
			3. Stockham Valves and Fittings, Incorporated, Cullman, AL (800) 786-2542.
			4. Section 016000 - Product Requirements: Product options and substitutions. Substitutions: Permitted.
		2. Up to and including 2 inches: Bronze swing disc, solder or screwed ends.
		3. Over 2 inches: Iron body, bronze trim, stainless steel spring, renewable composition disc, screwed, wafer, flanged, or grooved ends.
	5. DRAIN VALVES
		1. Manufacturers: Subject to compliance with project requirements, manufacturers offering Products which may be incorporated in the Work include the following:
			1. Grinnell Supply Sales, Company, Grinnell Corporation, Exeter, NH (603) 778-9200.
			2. Nibco, Incorporated, Elkhart, IN (800) 642-5463.
			3. Stockham Valves and Fittings, Incorporated, Cullman, AL (800) 786-2542.
			4. Section 016000 - Product Requirements: Product options and substitutions. Substitutions: Permitted.
		2. Bronze compression stop with hose thread, nipple and cap. Use hose thread, nipple and cap only where piping to outside or other approved drainage facility is not readily available.
		3. Brass ball valve with cap and chain, 3/4 inch hose thread.
		4. Use hose thread, nipple and cap.
	6. ALARM CHECK VALVES
		1. Manufacturers: Subject to compliance with project requirements, manufacturers offering Products which may be incorporated in the Work include the following:
			1. Grinnell Supply Sales, Company, Grinnell Corporation, Exeter, NH (603) 778-9200.
			2. Viking Corporation, Hastings, MI (800) 968-9501.
			3. Section 016000 - Product Requirements: Product options and substitutions. Substitutions: Permitted.
	7. DRY PIPE VALVES
		1. Manufacturers: Subject to compliance with project requirements, manufacturers offering Products which may be incorporated in the Work include the following:
			1. Grinnell Supply Sales, Company, Grinnell Corporation, Exeter, NH (603) 778-9200.
			2. The Viking Corporation, Hastings, MI (800) 968-9501.
			3. Section 016000 - Product Requirements: Product options and substitutions. Substitutions: Permitted.
	8. MAINTENANCE AIR COMPRESSOR
		1. If applicable, Subject to compliance with requirements, provide maintenance air compressor of one of the following manufacturers:
			1. Reliable Fire Equipment Co, Mt. Vernon, NY (914) 668-3470.
			2. The Viking Corporation, Hastings, MI (800) 968-9501.
			3. Section 016000 - Product Requirements: Product options and substitutions. Substitutions: Permitted.
		2. If applicable, provide electric, air cooled, tank mounted, inlet filter silencer, fly wheel, belt guard, automatic start‑stop control, tank, air dryer, motor with a thermal overload protection rated for continuous operation at the rated capacity, motor control with adjustable pressure switch set to start compressor at 75 percent of the normal pressure to prevent short cycling. Provide desiccator (air dryer) between compressor and dry pipe single stage oilless compressor, equip with check valve, centrifugal pressure and moisture unloader, and pressure switch. Exact location to be approved by Public Authorities, and Contracting Officer.
	9. SPRINKLERS
		1. Manufacturers: Subject to compliance with project requirements, manufacturers offering Products which may be incorporated in the Work include the following:
			1. Gem Sprinkler Company, Division of Grinnell Corporation, Exeter, NH (603) 778-9200.
			2. Reliable Automatic Sprinkler Company, Incorporated, Mt. Vernon, NY (914) 668-3470.
			3. The Viking Corporation Hastings, MI (800) 968-9501.
			4. Section 016000 - Product Requirements: Product options and substitutions. Substitutions: Permitted.

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**NOTE TO SPECIFIER**

Edit Finish as Appropriate.

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* + 1. Subject to compliance with requirements, provide automatic sprinklers, with 1/2 inch, 17/32 inch orifice; or 0.64 inch (extra-large) orifice, unless noted otherwise. Sidewall sprinklers are not acceptable, unless noted otherwise.
			1. Areas With Exposed Structure Above:
				1. Standard Sprinklers: Upright sprinkler, [ \_\_\_\_ ] [bronze].
				2. Extra Large Orifice Sprinklers: [ \_\_\_\_ ] [bronze].
			2. Areas With Finished Ceilings, Not Visible To The Public: Pendent sprinkler, [ \_\_\_\_ ] [chrome], with two‑piece [ \_\_\_\_ ] [chrome] escutcheon plate.
			3. Areas With Finished Ceilings 10 Feet Above Finish Floor or Higher, Visible to the Public: Pendent sprinkler, [ \_\_\_\_ ] [chrome], with two‑piece [ \_\_\_\_ ] [chrome] escutcheon plate.
			4. Areas With Finished Ceilings Below 10 Feet Above Finish Floor, Visible to the Public: Pendent sprinkler, [ \_\_\_\_ ] [chrome], with two‑piece 1/2 inch recessed [ \_\_\_\_ ] [chrome] escutcheon plate.
			5. Areas With Finished Ceilings Below 7 Feet Above Finish Floor, Not visible to the Public: Recessed Pendent sprinkler, [ \_\_\_\_ ] [chrome], with two‑piece 1/2 inch recessed [ \_\_\_\_ ] [chrome] escutcheon plate and one piece formed wire cage.
	1. SLEEVES AND ESCUTCHEONS
		1. Sleeves through structural concrete members and sleeves for walls below grade and floors on grade shall be standard weight galvanized Schedule 40 steel pipe. Sleeves through other than structural components of the building shall be 20 gage galvanized sheet metal with lock seam joints. Sleeve shall extend two inches past finished surface. USG Thermafiber safing insulation shall be installed between sleeve and pipe.
		2. Pipe escutcheon plates to be installed where exposed piping passes through walls, ceilings, and floors of building shall be minimum 20 gage steel, [ \_\_\_\_ ] [chrome].
	2. ACCESSORIES
		1. Hangers and Supports: Provide hangers and supports as required by NFPA 13 and Public Authorities. Provide seismic bracing in accordance with NFPA 13, as required by state and local codes, and Public Authorities.
		2. Flushing Connections: Provide threaded, capped nipple or mechanical groove end cap on ends of cross mains. If nipple provided, diameter shall be same as pipe, but not larger than 2 inches.
		3. Auxiliary Drains:
			1. 5 gallons or greater: provide minimum 1 inch globe valve with hose adapter and cap.
			2. Less than 5 gallons: provide minimum 1 inch nipple and cap.
			3. All auxiliary drain facilities shall be placed to allow easy access.
		4. If piping or components of Inspector’s test connection are modified as a result of this Work, then provide as required by Contractor.
		5. If inspector test valve and auxiliary drain valve are piped together then test drain assembly shall be an approved manufactured assembled unit. Subject to compliance with requirements, provide valves of one of the following manufacturers:
			1. "Test Master", by Victaulic, Easton, PA (610) 559-3300.
			2. Central Sprinkler Corp., Lansdale, PA (800) 523-6512.
			3. Globe Fire Sprinkler Corp., Standish, MI (800) 248-0278.
			4. Section 016000 - Product Requirements: Product options and substitutions. Substitutions: Permitted.

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**NOTE TO SPECIFIER**

Option 1 - Use if Local Alarm is Water Motor Alarm Gong.

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* + 1. Water Motor Alarm Gong: Provide water‑operated alarm gong on exterior of building adjacent to sprinkler system riser. Electric alarm bell (gong) not permitted.

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**NOTE TO SPECIFIER**

Option 2 - Use if Local Alarm is Electric Bell. Edit Location.

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* + 1. Electric Bell: Provide 10 inch diameter electric bell on exterior of building [adjacent to sprinkler system riser] [locate as indicated on drawings] [locate as required by Public Authorities].

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**NOTE TO SPECIFIER**

Option 3 - Use if Local Alarm is Horn. Edit Location.

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* + 1. Horn and Strobe: Provide horn and strobe on exterior of building [adjacent to sprinkler system riser] [locate as indicated on drawings] [locate as required by Public Authorities].
		2. Wet Sprinkler System Water Flow Detectors: Equip sprinkler system risers with double pole vane type flow detector, Model No. VSR‑F, by Potter Electric Signal of St. Louis, Missouri, (800) 325-3936. Set adjustable delayed signal at 30 seconds. Connect to alarm system.
			1. Substitutions: Under provisions of Section 016000.

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**NOTE TO SPECIFIER**

Use if Dry Pipe System Required

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* + 1. Dry Sprinkler System Water Flow Detector: Equip Dry System risers with pressure activated flow detector by Potter Electric Signal of St. Louis, Missouri, (800) 325-3936. Connect to alarm system.
			1. Section 016000 - Product Requirements: Product options and substitutions. Substitutions: Permitted.
		2. Control Valve Supervisory Switches:
			1. Equip post indicator valves with tamper switches, Model No. PCVS, as manufactured by Potter Electric Signal of St. Louis, Missouri. Connect to alarm system.
			2. Equip outside screw and yoke valves with tamper switches, Model No. OSYSU-A2 as manufactured by Potter Electric Signal of St. Louis, Missouri. Connect to alarm system.
			3. All valves capable of controlling water supply shall have tamper switches. Connect to alarm system.
			4. If control valve is located remote from store building, provide 3/4 inch conduit, with pull string, from remote location to nearest electrical room.
			5. Section 016000 - Product Requirements: Product options and substitutions. Substitutions: Permitted.
		3. Fire Department Connections: Fire Department connections in accordance with NFPA 13 and Public Authorities. Equip with threads/connections compatible with hoses utilized by the local fire department.
			1. Drain: 3/4 inch automatic drip, piped to approved drainage location.
			2. Label: "Auto Sprinkler".
			3. Finish: Red enamel.

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**NOTE TO SPECIFIER**

Edit Thread Type Based on Project/Public Authority Requirements.

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* + - 1. Thread/Connection: [NST] [Storz] [\_\_\_\_], verify with Public Authorities.
		1. Wire Cage Sprinkler Guards: Fig. 6160, by Potter-Roemer or acceptable substitute.
			1. Provide sprinkler guards on sprinkler pendants that are located below 8 feet above finished floor, except at semi-recessed sprinklers.
		2. Relief Valves: For gridded sprinkler systems, provide a relief valve not less than 1/4 inch size and set to operate at 175 psi or 10 psi in excess of the maximum system pressure, whichever is greater. Location of relief valves to be in accordance with NFPA 13.

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**NOTE TO SPECIFIER**

Use if Fire Hose Cabinets or Racks are Required

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* + 1. Fire Hose Connection:
			1. Provide [1 1/2] [2 1/2] [\_\_\_\_] inch hose stations throughout [Building] as [indicated][per Contract Documents].
			2. Provide each hose station with:
				1. Valve: UL 668, 300 psig (2070 kpa) rated, brass, non-adjustable type, 90 degree angle pattern, female NPS inlet and male hose outlet. Size [1 1/2] [2 1/2] [\_\_\_\_] inches. Hose value threads in accordance with NFPA 1963 and match local fire department threads.
				2. Hose: 300 lb. test, 100 percent polyester jacket and synthetic rubber lining. Size [1 1/2] [2 1/2] [\_\_\_\_] inch. Length [75] [100] [\_\_\_\_] feet. [\_\_\_\_\_] [2 1/2 inch by 1 1/2 inch reducer.]
				3. Nozzle: UL 401, [brass] [polycarbonate plastic] adjustable from shutoff to fog spray to straight stream.

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**NOTE TO SPECIFIER**

Use if PSI exceeds 175.

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* + - * 1. Valve: UL 1468, 400 psig (2760 kpa) rated, brass, pressure-regulating type, 90 degree angle pattern, female NPS inlet and male hose outlet. Design in accordance with NFPA 1963 and match local fire department threads.

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**NOTE TO SPECIFIER**

Use if Fire Pump required.

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* 1. FIRE PUMP MANUFACTURERS
		1. Subject to compliance with requirements, provide pumps of one of the following manufacturers:
			1. Aurora Pump, North Aurora, IL (800) 316-7720.
			2. Fairbanks Morse Pumps, Kansas City, KS (913) 371-5000.
			3. ITT A-C Pump, Cincinnati, OH.
			4. Peerless Pump, Indianapolis, IN (317) 925-9661.
			5. Section 016000 - Product Requirements: Product options and substitutions. Substitutions: Permitted.

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**NOTE TO SPECIFIER**

Use if Fire Pump required.

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* 1. HORIZONTAL BASE MOUNTED PUMPS
		1. Type: UL listed and [or] FM approved. Conform to UL 448, horizontal shaft, double suction, direct connected, horizontally split case, for 250 psig maximum working pressure, labeled specifically "FOR FIRE SERVICE".
		2. Casing: Cast iron, with suction and discharge gage ports, renewable bronze casing wearing rings, seal flush connection, drain plug, suction and discharge flange machined to ASME B16-1 dimensions, 250 psi pressure rating.
		3. Impeller: Bronze double suction fully enclosed, statically and dynamically balanced and keyed directly to motorshaft.
		4. Bearings: Grease lubricated ball bearings.
		5. Shaft: Alloy steel with replaceable bronze shaft sleeve.
		6. Seals: Packing gland with minimum four rings graphite impregnated packing and Teflon antern rings, 230 degrees F (110 degrees C) maximum continuous operating temperature.
		7. Drive: Flexible coupling with metal coupling guard.
		8. Base plate: Cast iron or fabricated steel with integral drain rim, provide 3/4 inch threaded outlet for drain
		9. Pump manufacturer shall have unit responsibility for proper operation of the complete unit, and provide services of a factory trained technician to supervise installation, and to attend final field acceptance tests.
		10. Each pump shall be hydrostatically and run tested at the factory before shipment.

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**NOTE TO SPECIFIER**

Use if Fire Pump required.

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* 1. FIRE PUMP ACCESSORIES
		1. Eccentric suction reducer and OS&Y valve on suction side of pump.
		2. Concentric increaser and check valve in pump discharge and butterfly valve on system side of check valve.
		3. Suction pressure gage (compound type), with snubber, valve cock and lever handle.
		4. Discharge pressure gage, with snubber, valve cock and lever handle.
		5. Casing 3/4 inch relief valve minimum.
		6. Float operated 1 inch automatic air release valve.
		7. Hose valve manifold with 2 1/2 inch hose gate valves with caps and chains. Size per NFPA 20.

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**NOTE TO SPECIFIER**

Use if the facility is equipped with emergency power generator and fire Pump Bypass is required for electric drive engine.

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* + 1. Fire pump bypass on electric pump fitted with butterfly valves and check valve.

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***NOTE TO SPECIFIER***

Use if Fire Pump IS Required and the facility is equipped with emergency power generator and electric drive pump is used.

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* 1. ELECTRIC MOTOR DRIVER
		1. Motor: Squirrel cage induction type; in open drip proof NEMA MG-1 enclosure.
		2. Power: 480 volt, three phase, 60 Hz.

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**NOTE TO SPECIFIER**

Use if Fire Pump required.

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* 1. FIRE PUMP CONTROLLER
		1. Subject to compliance with requirements, provide fire pump controller of one of the following manufacturers:
			1. Firetrol, Inc., Cary, NC (919) 460-5200.
			2. Master Control, Lake Bluff, IL (847) 295-1010.
			3. Metron, Inc., Denver, CO (303) 592-1903.
			4. Section 016000 - Product Requirements: Product options and substitutions. Substitutions: Permitted.

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**NOTE TO SPECIFIER**

Use if Fire Pump required. Edit Values

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* + 1. Controller: UL listed and [or] FM approved for fire pump service with across-the-line starter, in NEMA 4 enclosure, including the following:
			1. Disconnect Switch: Externally operable, quick break type.
			2. Circuit Breaker: Trips in each phase calibrated at least to 300 percent of the motor full-load current, interrupting capacity shall be equal to or exceed maximum fault current at site, but shall in no case be less than [ ] [150,000] amps RMS symmetrical at 480 VAC.
			3. Motor Starter: Energized automatically through pressure switch or manually by externally operable handle.
			4. Pressure Switch: Bourdon Tube Type with adjustable independent high and low set points and a range of 10 psi to 300 psi.
			5. Running Period Timer: Keeps motor in operation when started automatically, for a minimum of 10 minutes.
			6. Ammeter test link and voltmeter test studs.
			7. Remote start switch relay.
			8. Manual Selector Station: On enclosure marked "Automatic" and "Non-Automatic."
			9. Normally open dry contacts for remote indication of all tamper switches (common), circuit breaker open, low pump house temperature (below 45º F), power available, low pressure, local start, remote start, phase failure, phase reversal, pump running, run timer on, and all signals required by NFPA 20.
			10. Weekly Test Start: Provide ability to set day of week, time of day and running timer for the test period (0 to 30 minutes).
			11. Supervised control circuit which automatically starts pump upon failure of control power transformer or control relays.
			12. Externally mounted visible indicators for power available, low pump house temperature, low pressure, local start, remote start, phase failure, phase reversal, pump running and run timer on.
			13. Automatic shut-off timer set for 10 minutes, to operate only after starting causes return to normal.
			14. Front mounted, front wired, and front accessible controller components, including circuit breaker and contactors.
			15. Grounding lug and bonding provisions.

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**NOTE TO SPECIFIER**

Use if Fire Pump required.

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* 1. PRESSURE BOOSTER (JOCKEY) PUMPS
		1. Subject to compliance with requirements, provide pressure booster (jockey) pump of one of the following manufacturers:
			1. Aurora Pump, North Aurora, IL (800) 316-7720.
			2. Grundfos Pump, Clovis, CA (209) 292-8000.
			3. Peerless Pump, Indianapolis, IN (317) 925-9661.
			4. Section 016000 - Product Requirements: Product options and substitutions. Substitutions: Permitted.

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**NOTE TO SPECIFIER**

Use if Fire Pump required. Edit Values

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* + 1. Power: [480] [208] volt, three phase, 60 Hz.
		2. Type: Electrically operated, vertical multi-stage type with standard open drip-proof motor, factory assembled and factory tested.
		3. Casing: Cast iron, with suction and discharge connections of size indicated. threaded, or flanged and machined to ASME B16.1 dimensions, and 250 psig minimum pressure rating.
		4. Impeller: Bronze or stainless steel.
		5. Shaft: Stainless steel.
		6. Seals: Mechanical.
		7. Controller: Enclosed in floor mounted NEMA 4 steel housing, UL listed and labeled. Factory assembled, wired, and tested, with full voltage starter. Provide separate controller for jockey pump, with magnetic contactor, fusible disconnect switch, pressure switch and minimum run period timer.
1. EXECUTION
	1. EXAMINATION
		1. Section 017300 - Execution: Verification of existing conditions before starting work.
		2. Verification of Conditions: Verify that field measurements, surfaces, substrates and conditions are as required, and ready to receive Work.
			1. Examine areas in which Work of this Section is to be performed.
			2. Verify that surfaces and site conditions are ready to receive Work.
		3. Report in writing to Contracting Officer prevailing conditions that will adversely affect satisfactory execution of the Work of this Section. Do not proceed with Work until unsatisfactory conditions have been corrected.
		4. By beginning Work, Contractor accepts conditions and assumes responsibility for correcting unsuitable conditions encountered at no additional cost to the United States Postal Service.
	2. PREPARATION
		1. Coordinate work of this Section with other affected work [and construction schedule].
		2. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.
		3. Remove scale and foreign material, from inside and outside, before assembly.
		4. Prepare piping connections to equipment with flanges or unions.
		5. Install system and equipment in accordance with manufacturer’s instructions, and NFPA Standards.
	3. INSTALLATION - BELOW GROUND PIPING
		1. Install piping and system components in accordance with NFPA 24. Verify that main feed from water supply source to building is as specified.
		2. Support barrel of pipe for entire length on compacted pipe bedding. Excavate for couplings, fittings and valves.
		3. Lay pipe to lines and grades as required.
		4. Keep interior of pipe free from dirt and other foreign material as installation progresses. Plug open ends when work is stopped. Join lengths with couplings in accordance with pipe manufacturer's instructions. Join to fittings and valves that have rubber ring bells with same groove dimensions and tolerance as pipe.
		5. Provide valves and fittings as necessary.
		6. Install concrete thrust blocks as required. Place concrete between undisturbed soil with fittings anchored. Do not cover coupling flanges or other joints with concrete.
	4. INSTALLATION - ABOVE GROUND PIPING
		1. Install piping in accordance with NFPA 13. Install sprinkler piping products in accordance with recognized industry practices to ensure that fire protection sprinkler piping complies with requirements and serves intended purposes.
		2. Route piping in orderly manner, plumb and parallel to building structure. Maintain gradient. Use eccentric reducers to maintain top of pipe level. Slope piping and arrange systems to drain. Size drain piping as required to drain sprinkler system properly. Provide drain valves at main shut-off valves and low points of piping.

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**NOTE TO SPECIFIER**

Use if Subject to Freezing

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* + - 1. Pitch piping as required in dry pipe systems. If applicable:
				1. Dry pipe Branch lines: Slope 1/2 inch for every 10 feet.
				2. Dry pipe Mains: Slope 1/4 inch for every 10 feet.
		1. Install piping to conserve building space. Do not interfere with use of building space and other work.
		2. Group piping whenever practical at common elevations.
		3. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.
		4. All system components shall be concealed above ceilings where ceilings exist.
		5. Replace sprinklers having paint other than factory finish with new sprinklers. Cleaning and reuse of painted sprinklers is prohibited.
		6. Do not penetrate building structural members. Examine other work indicated on the Contract Documents and conditions at job site. Coordinate routing of work with other construction trades to avoid interference with other installations. Do not cut building structural members, beams, joists, etc. for routing of sprinkler piping. In the event of conflicts, consult Contracting Officer, and their decision shall govern.
		7. Provide sleeves when penetrating floors and walls. Seal pipe and sleeve penetrations to achieve fire resistance equivalent to fire separation required. Provide wall plates at all penetrations.
		8. Die cut screw joints with full cut standard taper pipe threads with non-toxic joint compound applied to male threads only. Recoat threads on galvanized pipe with galvanized coating.
		9. Install valves with stems upright or horizontal, not inverted. Remove protective coatings prior to installation.
		10. Route piping and locate sprinklers as required to avoid building structure equipment, plumbing piping, heating and air conditioning piping, ductwork, lighting fixtures, electrical conduits and bus ducts, and similar work.
			1. Final location of lighting will have priority over final sprinkler locations.
		11. Provide pipe offsets as required to complete installation. Modify shop prefabricated piping, pipe hangers, and other components as required to fit the job site conditions.
		12. Shop drill and weld weld‑o‑lets on piping.
		13. Conceal piping in chases, walls, furred spaces and above ceiling in areas with dropped ceilings.
		14. If piping or components of Inspector's Test Connection are modified as a result of this Work, then:
			1. Provide one inspector's test valve for each system at the most remote point of the system along the exterior wall, piped to non-public areas.
			2. Install inspector's test valves at five feet (minimum) to seven feet (maximum) above finish floor to facilitate bi-monthly tests.
			3. Coordinate test valve locations with Contracting Officer.
			4. Test connection shall discharge at location approved by Contracting Officer.
			5. Outlet shall have same orifice as sprinklers.
		15. Piping shall maintain clearance from electrical equipment as required by NEC and Public Authorities. Drains and Inspector's test connection shall not be piped into or through electrical rooms/areas.
		16. Sprinkler piping that passes through unheated spaces in or under structures and are exposed to freezing shall be protected from freezing as indicated or in accordance with applicable methods in NFPA 13.
		17. Provide valves as required to comply with NFPA Standards and requirements of Public Authorities. Provide backflow prevention devices, check valves, and drains where required by Public Authorities.
		18. Make reductions in pipe sizes with one‑piece reducing fittings. Bushings are not acceptable. Use flanged fittings at base of risers.
		19. Contractor shall notify Contracting Officer one week prior to any sprinkler system shutdown or work performed.

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**NOTE TO SPECIFIER**

Use if System components are to be painted

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* + 1. All system components (i.e. pipe, fittings, supports, and accessories), except sprinklers, not concealed shall be prepared for finish painting. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to welding. Apply masking tape or paper cover to ensure sprinkler do not receive field paint finish. Remove tape or paper after painting.

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**NOTE TO SPECIFIER**

Use if Subject to Freezing

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* + 1. Locate sprinklers in suspended ceiling tiles along the centerline of the two foot dimension, and at one foot increments from the edge in the four foot dimension direction. Provide piping offsets as necessary to locate sprinklers.
		2. Dry Pendent Sprinklers: Install concealed above ceilings where ceilings are used.
		3. Anti-freeze Systems (where required): Install "Loop", concealed, above ceilings where ceilings are used, or as required by Public Authorities, and Contracting Officer.
		4. If applicable, install maintenance air compressor adjacent to dry pipe riser. Connect 1/4 inch compressor outlet with the 1/4 inch pipe through a shutoff valve to the system side of dry pipe valve. Adjust pressure switch to the required setting.
		5. Locate wet pipe (and dry pipe if required) inspector test valves and associated sight glasses at remote ends of system, in accessible locations. Provide drain pipes as required by Contracting Officer.

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**NOTE TO SPECIFIER**

Use if Fire Pump required.

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* 1. FIRE PUMP
		1. Provide direct feed power supply to fire pump controller from power source with no fuses or breakers in the circuit. See Section 013300 for electrical diagram submittal requirements.
		2. Provide access space around pumps for service. Provide no less than minimum as recommended by manufacturer.
		3. Support piping adjacent to pump such that no weight is carried on pump casings. For base mounted pumps, provide supports under elbows on pump suction and discharge.
		4. Provide drains for bases and seals, piped to and discharging into floor drains.
		5. Mount unit on vibration isolators.
		6. Provide for connection to electrical service.
		7. Lubricate pumps before start-up.
		8. Check, align, and certify base mounted pumps by qualified millwright prior to start-up.

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***NOTE TO SPECIFIER***

*Use if the facility is equipped with emergency power generator and electric drive pump is used.*

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* + 1. Electric Fire Pump System:
			1. Suction pipe, valve, and fittings.
			2. Discharge pipe, valve and fittings.
			3. Bypass pipe, valves and fitting.
			4. Jockey pump suction and discharge pipe, valves and fittings.
			5. Controllers mounted, pipe and wired.
			6. Gland drip pockets piped to common drain for skid.
			7. Gauges and air release valve installed.
			8. Structural steel skid with checkered steel floor plate.
			9. Piping, equipment and structural skid painted red.
			10. Provide testing and operation instructions on laminated/weather protected wall mounted sign. Submit example to of Record for approval prior to installation.
		2. Locate Fire Department connection on discharge side of pump.
		3. Locate controller as close to motor as practical and within sight. Provide controller with suitable protection as necessary to protect against water escaping from pump or connections. Elevate controller minimum of 12 inches above finished floor.
	1. PROTECTION OF WORK
		1. Protect work from danger of freezing, breakage, dirt, foreign materials, etc., and replace work so damaged. Use every precaution to protect work of others.
	2. IDENTIFICATION
		1. Apply signs to control, drain, test and alarm valves, etc., to identify their purposes and functions. Provide lettering sizes and styles selected by Contracting Officer from NFPA's suggested styles.
		2. Stencil riser/zone numbers on risers.
		3. Provide hydraulic placard for each sprinkler system in accordance with NFPA 13.
	3. CLEANING AND FLUSHING
		1. Prior to connecting overhead system piping to underground supply system piping, flush underground supply system piping per NFPA 13 and 24.
	4. FIELD QUALITY CONTROL
		1. Section 014000 - Quality Requirements: Procedures for field inspection and testing of installation.
		2. Site Tests - Leaks from System:
			1. Contractor shall identify to Contracting Officer any leaks or damage that occur within the system as a result of testing. Contractor shall take necessary precautions to limit any potential damage. Corrective action shall be performed at Contractors expense.
		3. Site Tests - Above Ground Fire Protection Piping:
			1. Test system pressure piping for leakage as required by and in presence of Public Authorities, and Contracting Officer Test to consist of holding the test pressure at the high end for a period of two hours. Test pressure: 200 psi or 50 psi over normal operating pressure, whichever is greater. Conduct test in accordance with NFPA 13. Send completed copy of the material and test certificate to Contracting Officer.
			2. All required tests shall be witnessed by Public Authorities, and Contracting Officer.
			3. Inspection of welds, and/or verification of welder's qualifications may be required by Public Authorities. Contractor shall comply with all requirements of Public Authorities, including but not limited to :
				1. Provide written documentation of welders qualifications and certification.
				2. Stamp imprint of welders identification adjacent to all welds.
				3. Provide provisions for, schedule and conduct inspection of all welds . Inspection shall be scheduled at project site, with pipe at grade level, prior to installation.
		4. Site Tests - Under Ground Fire Protection Piping:
			1. Test pressure piping for leakage in presence of Public Authorities and Contracting Officer. Test to consist of holding the test pressure in each section of line tested for a period of two hours. Test pressure at the high end of each test section shall be 200 psi or 50 psi over normal operating pressure whichever is greater. Conduct test in accordance with NFPA 24.
			2. Flush underground mains and lead-in connections thoroughly before connection is made to above ground system piping to remove foreign material. Minimum flow rate shall not be less than the maximum water flow demand rate of the system and not less than necessary to provide a velocity of 10 feet per second. Continue flushing for sufficient time to ensure thorough cleaning. Provide proper disposal of water from flushing operation.
			3. All required tests shall be witnessed by Public Authorities, and Contracting Officer.
			4. Contractor shall identify to Contracting Officer any leaks or damage that occur within the system as a result of testing. Contractor shall take necessary precautions to limit any potential damage. Corrective action shall be performed at Contractors expense

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**NOTE TO SPECIFIER**

Use if Fire Pump required.

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* + 1. Site Tests - Fire Pump:
			1. Test pump in accordance with NFPA 20. Send completed copy of the material and test certificate to Public Authorities, and Contracting Officer.
			2. Contractor shall be responsible for providing all personnel and equipment necessary for complete start up and acceptance testing purposes. Minimum equipment required:
				1. Three (3) 50 feet sections of 2 1/2 inch 300 pound test rubber lined with 100 percent polyester jacket, equivalent to Potter Roemer Fig. 2902. Provide with Double Lug Couplings, equivalent to Potter Roemer Fig. 2936.
				2. Three (3) Underwriters Play Pipes with swivel handle and marlin wound brass pipe. Provide each with 1 3/4 inch tip orifice, equivalent to Potter Roemer Fig. 2949
				3. One (1) Pitot tube equipped with calibrated bourdon tube gauge, with storage case. Provide each with flow rate computation table, equivalent to Potter Roemer.
			3. Notify Public Authorities, and Contracting Officer two weeks prior to any fire pump acceptance test so a representative may witness testing.
			4. Factory Test: All equipment will be factory tested in accordance with the requirements of NFPA, U.L. and FM.
			5. Start‑Up Service: The service of a factory trained representative for the controllers, and pumps shall be available on the job site to check installation, conduct field acceptance testing, conduct start‑up, and instruct personnel.
		2. All required tests shall be witnessed by Public Authorities, and Contracting Officer.

END OF SECTION

USPS MPF Specification Last Revised: 10/1/2022