SECTION 211200 - FIRE-SUPPRESSION STANDPIPES

Revise this Section by deleting and inserting text to meet Project-specific requirements.

1. GENERAL
	* + 1. RELATED DOCUMENTS
				1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
			2. SUMMARY
				1. Section Includes:

Pipes, fittings, and specialties.

Fire-protection specialty valves.

Hose connections.

Alarm devices.

Manual control stations.

Control panels.

Pressure gauges.

* + - * 1. Related Requirements:

Determine Related Requirements identified in other specification sections which apply to the project

Section 104413 “Fire Protection Cabinets” for hose connection and hose station cabinets.”

Section 210523 “General Duty Valves for Water Based Fire Suppression Piping.”

Section 211119 “Fire Department Connections” for exposed, flush, and yard pipe type fire department connections.

Section 211100 “Facility Fire Suppression Water Service Piping” for water service piping; ductile iron expansion joints and deflection fittings; tubular and split sleeve, pipe coupling transition fittings; water meters; detector check valves; backflow preventers, and protective enclosures.

Section 211213 “Fire Suppression Hoses and Nozzles” for rack type hose stations, reel type hose stations, and monitors.

Section 211316 “Dry Pipe Sprinkler Systems” for dry pipe sprinkler piping.

* + - 1. DEFINITIONS

Retain terms that remain after this Section has been edited for a project.

Some fire-protection products for high-pressure sprinkler piping are only rated for 250 psig. If 300-psig piping is required, verify product pressure ratings.

* + - * 1. High-Pressure Standpipe Piping: Fire-suppression standpipe piping designed to operate at working pressure of higher than standard 175 psig, but not higher than [**250 psig**] [**300 psig**].
				2. Standard-Pressure Standpipe Piping: Fire-suppression standpipe piping designed to operate at maximum working pressure of 175 psig.
			1. SUBMITTALS
				1. Submittals for this section are subject to the re-evaluation fee identified in Article 4 of the General Conditions.
				2. Manufacturer’s installation instructions shall be provided along with product data.
				3. Submittals shall be provided in the order in which they are specified and tabbed (for combined submittals).
				4. Fire Protection Engineer Qualification:

Where required by this specification or the project drawings to provide the services of a professional Director’s Representative, the professional Director’s Representative shall be a licensed Fire Protection Engineer, who is actively licensed in the State of New York.

A licensed Fire Protection Engineer shall be defined as a registered professional Director’s Representative (P.E.) who has passed the fire protection engineering written examination administered by the National Council of Examiners for Engineering and Surveys (NCEES) or who has obtained a B.S. or M.S. Degree in “Fire Protection Engineering” from an accredited engineering program at a recognized University or Institute.

* + - * 1. Product data for each type of product: catalog sheets, specifications, and installation instruction. indicating UL or FM approved for each product.

Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

USE PARAGRAPH BELOW WITH EPD REQUIREMENT WHEN PROJECT ESTIMATE IS $1M OR MORE.

* + - * 1. Submit an Environmental Product Declaration (EPD) from the manufacturer for steel pipe within this specification section, if available. A statement of the contractor’s good faith effort to obtain the EPD shall be provided if not available.

Manufacturer-provided EPDs must be Product Specific Type III (Third-Party Reviewed), in adherence with ISO 14025 *Environmental labels and declarations*, ISO 14044 *Environmental management – Life cycle assessment*, and ISO 21930 *Core rules for environmental product declarations of construction products and services*.

* + - * 1. Shop Drawings: For fire-suppression standpipes. As per NFPA 13 “Standard for the Installation of Sprinkler Systems” Plans and Calculations and NFPA 14 "Standard for the Installation of Standpipe and Hose Systems” standards.

Include plans, elevations, sections, and attachment details.

Retain subparagraph below if equipment includes wiring.

Include diagrams for power, signal, and control wiring.

Include Hydraulic Calculations, computer and cross reference to the appropriate drawings.

The shop drawings shall be developed by and the hydraulic calculations shall be performed by person(s) meeting one of the following minimum qualification levels (without substitution):

National Institute for Certification in Engineering Technologies (NICET) Level III for Water-Based Fire Protection Systems certified technicians, OR

National Institute for Certification in Engineering Technologies (NICET) Level IV for Water-Based Fire Protection Systems certified technicians, OR

A licensed Professional Fire Protection Engineer, licensed in the State of New York, and as defined by this specification.

Where a certified NICET Level III or IV Technician in “Water-Based Fire Protection System Layout” performs the shop drawings and hydraulic calculations, the drawings and hydraulic calculations shall bear the seal and signature of the NICET Technician.

Where a licensed Professional Fire Protection Engineer performs the shop drawings and hydraulic calculations, the drawings and hydraulic calculations shall bear the seal and signature of the licensed Professional Fire Protection Engineer.

* + - * 1. Seismic Submittals: Provide seismic sway bracing Seismic Shop drawings per NFPA 13 Section 9.3 and the requirements of the Contract Documents.

Include plans, elevations, section, and location of attachments with details incorporating sway bracing, flexibility clearances, and anchoring.

Seismic Bracing Calculations.

* + - * 1. Quality Control Submittals:

Design Data: All portions of the sprinkler system shall be sized in accordance with NFPA requirements for Hydraulically Designed Systems. Submit Drawings and hydraulic calculations for approval.

Certificates: As required under Quality Assurance Article.

Company Field Advisor Data: Include:

Name, business address and telephone number of Company Field Advisor secured for the required services.

Certified statement from the Company listing the qualifications of the Company Field Advisor.

Services and each product for which authorization is given by the Company, listed specifically for the project.

Copy of:

NICET Letter of Approval of advisor indicating Level III for Water-Based Fire Protection Systems certification or

NICET Letter of Approval of advisor indicating Level IV for Water-Based Fire Protection Systems certification OR

Licensure certificate for Professional Engineering in the State of New York, AND National Council of Examiners for Engineering and Surveying (NCEES) record/certificate for verification of completion of the Principles of Practice of Fire Protection Engineering Exam of copy of certified B.S. or M.S. degree from an accredited Fire Protection Engineering program.

Contractor’s Qualifications Data:

Contractor’s name, business address and telephone number

Names and addresses of 3 similar projects that each person has worked on during the past 5 years.

Name of Project Manager for the project that is National Institute for Certification in Engineering Technologies (NICET) certified as Level III or IV for Water-Based Fire Protection Systems, or is a registered Professional Fire Protection Engineering in the State of New York. Provide a copy of Project Manager’s:

NICET Letter of Approval indicating Level III for Water-Based Fire Protection Systems certification, OR

NICET Letter of Approval indicating Level IV for Water-Based Fire Protection Systems certification, OR

Licensure certificate for Professional Engineering in the State of New York, AND National Council of Examiners for Engineering and Surveying (NCEES) record/certificate for verification of completion of the Principles of Practice of Fire Protection Engineering Exam or copy of certified B.S. or M.S. degree from an accredited Fire Protection Engineering program.

Installer’s Qualifications Data:

Name of each person will be performing the Work and their employer’s name, business address and telephone number.

Names and addresses of 3 similar projects that each person has worked on during the past 5 years.

Working Drawing/Hydraulic Calculation Preparer Qualification Data. Working drawings and hydraulic calculations shall be prepared by either a:

National Institute for Certification in Engineering Technologies (NICET) certified as Level III for Water-Based Fire Protection Systems technician.

National Institute for Certification in Engineering Technologies (NICET) certified as Level IV for Water-Based Fire Protection Systems technician.

A licensed Professional Fire Protection Engineer, licensed in the State of New York, and as defined by this specification.

Name of each person who will be preparing working drawings/hydraulic calculations, required for the Work.

Upon request, furnish names and addresses of the required number of similar projects that each person has worked on which meet the experience criteria.

For the Working Drawing/Hydraulic Calculation Preparer qualification data, provide a copy of:

NICET Letter of Approval of supervisor indicating Level III for Water-Based Fire Protection Systems certification OR

NICET Letter of Approval of supervisor indicating Level IV for Water-Based Fire Protection Systems certification OR

Licensure certificate for Professional Engineering in the State of New York, AND National Council of Examiners for Engineering and Surveying (NCEES) record/certificate for verification of completion of the Principles of Practice of Fire Protection Engineering Exam or copy of certified B.S. or M.S. degree from an accredited Fire Protection Engineering program.

* + - * 1. Fire-hydrant flow test report as per NFPA 13 "Standard for the Installation of Sprinkler Systems” and NFPA 291 “Recommended Practice for Water Flow Testing and Marking od Hydrants”. Test shall be conducted no more than 12 months prior to the working plan submittal.
				2. Field Test Reports: Test Certificates and Test Forms to be used for projects. Each report chosen to which is applicable for each project specific. [**Retain or delete if applicable**] [**NFPA 14**-**Contractor’s Material and Test Certificate for Aboveground Piping Standpipe System**] [**NFPA 24** **Contractor’s Material and Test Certificate for Underground Piping**] [**NYSDOH Form 1013 Report on Test** **and Maintenance of Backflow Prevention Device]**

Retain "Coordination Drawings" Paragraph below for situations where limited space necessitates maximum utilization for efficient installation of different components or if coordination is required for installation of products and materials by separate installers. Coordinate paragraph with other Sections specifying products listed below. Preparation of coordination drawings requires the participation of each trade involved in installations within the limited space.

* + - * 1. Coordination Drawings: Fire-suppression standpipes, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved: Comply with requirements in Section 013350 “Computer Aided Design Coordination Drawings” **[(D & C Master Spec)**].

Domestic water piping and mechanical

HVAC Ductwork and units.

Electrical conduit and Breaker panels.

Structural elements.

* + - 1. CLOSEOUT SUBMITTALS
				1. Operation and Maintenance Data: For wet-pipe sprinkler systems and specialties to include in emergency, operation, maintenance manuals, parts list for mechanical and electric devices, and Publication NFPA 25 "Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems” Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems. Submit one (1) set of copies to the Director’s Representative and a second set of copies to be inserted into the AS Built Drawing Cabinet located in the Fire Sprinkler Riser Room.
				2. Warranty Information: Providing one-year parts and labor warranty certificate. Submit one copy to the Director’s Representative and provide a second copy to be inserted into the AS Built Drawing Cabinet located in the Fire Sprinkler Riser Room.
				3. As-Built Drawings and Hydraulic Calculations: After final acceptance of the system all drawings and calculations shall have the NICET level III or IV Technician stamp and a NYS Registered Professional Fire Protection Engineer seal and signature. Or a seal and signature by a NYS Registered Professional Fire Protection Engineer. Submit one (1) set of copies to the Director’s Representative as a hard copy electronically and as a .pdf and .dwg. files. Then provide a second set of hard copies to be inserted into the AS Built Drawing Cabinet located in the Fire Sprinkler Riser Room.
				4. As per IFC follow requirements in 901.2.1 Statement of compliance. Before requesting final approval of the installation, the installing contractor shall furnish a written statement to the fire code official that the subject fire protection system has been installed in accordance with approved plans and has been tested in accordance with the manufacture’s specifications and the appropriate installation standard. Any deviation from the design standards shall be noted and copies of the approvals for such deviations shall be attached to the written statement. Submit pdf copy to the Director’s Representative and provide a second hard copy and pdf to be inserted into the AS Built Drawing Cabinet located in the Fire Sprinkler Riser Room.
				5. Field Test Reports: Completed NFPA Test Certificates and Test Forms signed by Installing Contractor and witnessed by Director’s Representative including their signature. Submit all related test reports in pdf to the Director’s Representative and provide the same related test reports in hard copy and pdf to be inserted into the AS Built Drawing Cabinet located in the Fire Sprinkler Riser Room.

Indicate and interpret test results for compliance with performance requirements and as described in NFPA 14 include “Contractor’s Material and Test for Aboveground Piping Standpipe System, NFPA 24 “Contractor’s Material and Test Certificate for Underground Piping” and NYSDOH Form 1013-Report on Test and Maintenance of Backflow Prevention Device.

* + - 1. MAINTENANCE MATERIAL SUBMITTALS
				1. An AS Built Drawing Cabinet shall be installed at each project that has a new fire standpipe system, alteration and fit-up which shall be located in the Fire Sprinkler Riser Room. All close out submittals for the project record documents shall be stored in the AS Built Drawing Cabinet.

AS Built Drawing Cabinet:

Rigid 16 gage steel construction/ Red powder coat finish.

Dimensions: 26.35”H x 14.25” W x 4” H.

Full-length, stainless steel piano hinge w/Boston lock

Surface mount w/ wall mount holes.

* + - * 1. Laminated 11x17 paper: Emergency and Working Procedures and System Riser Diagram: Fasten to wall located in the Fire Sprinkler Riser Room.

Start-up procedures.

Shut-down procedures.

Riser diagram showing valve locations and equipment with brass identification tags.

Alarm Co. & Monitoring Co. contact information.

Installing Contractors information.

* + - * 1. Laminated 11x17 Building Map: Fasten to wall located in Fire Sprinkler Room.

Showing Riser Detail Location: Include Main Control Valves, Main Drains, Low Point Drains, Inspectors Test Stations, Fire Alarm Control Panel, and Annunciator Panel.

Each System numbered and color coded in what areas they cover of the building.

* + - 1. COMPANY FIELD ADVISOR
				1. Company Field Advisor with qualifications identified above. Secure the services of a Company Field Advisor for the following:

Rend advice regarding installation and final adjustment of the system.

Witness final system test and then certify with an affidavit that the system is installed in accordance with the Contract Documents and is operating properly.

Train facility personnel in operation, and routine maintenance of the system.

The Company Field Advisor shall be certified per:

National Institute for Certification in Engineering Technologies (NICET) Level III for Water-Based Fire Protection Systems certified technicians, OR

National Institute for Certification in Engineering Technologies (NICET) Level IV for Water-Based Fire Protection Systems certified technicians, OR

A licensed Professional Fire Protection Engineer, licensed in the State of New York, and as defined by this specification.

* + - * 1. Contractor Qualifications: The Contractor performing the Work of this Section shall be experienced in sprinkler work and shall have been regularly engaged in the installation of sprinkler systems for a minimum of 10 years and shall, upon request, furnish to the Director’s Representative the names and addresses of 5 similar projects which the Contractor worked on during the last 5 years.

The Project Manager employed to supervise the Work shall be National Institute for Certification in Engineering Technologies (NICET) certified as Level III or IV for Water-Based Fire Protection Systems, OR shall be a professional Fire Protection Engineer (as defined by this specification) licensed in the State of New York. The services of a Project Manager shall include, but are not limited to, the following:

Attendance at meetings during construction.

Render advice regarding installation and final adjustment of the system.

Witness final system test and then certify with an affidavit that the system is installed in accordance with the Contract Documents and is operating properly.

Performance of hydraulic calculations and development of Working Drawings.

* + - * 1. Installer Qualifications: The workers and supervisors performing the Work of this Section shall be personally experienced in sprinkler systems Work and shall have been regularly employed by a company engaging in the installation of sprinkler systems for a minimum of 5 years and shall, upon request, furnish to the Director’s Representative the names and addresses of 5 similar projects which they have worked on during the last 5 years.
				2. Working Drawing/Hydraulic Calculation Preparer Qualifications:

The persons employed to prepare these documents for the Work shall be personally experienced in sprinkler work and shall have been regularly performing such work for a minimum of 5 years while in the employ of a company or companies engaged in the installation of fire protection systems.

Upon request, furnish to the Director’s Representative the names and addresses of five similar projects which the foregoing people have prepared working drawings/hydraulic calculations on during the past 3 years.

The persons employed to prepare these documents for the Work shall be performed by person(s) meeting one of the following minimum qualification levels (without substitution):

National Institute for Certification in Engineering Technologies (NICET) Level III for Water-Based Fire Protection Systems certified technicians, OR

National Institute for Certification in Engineering Technologies (NICET) Level IV for Water-Based Fire Protection Systems certified technicians, OR

A licensed Professional Fire Protection Engineer, licensed in the State of New York, and as defined by this specification.

* + - * 1. Welding Qualifications: Qualify procedures and operators according to ASME Boiler and Pressure Vessel Code.
				2. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70 “Standard for Electrical Safety in the Workplace”, by a qualified testing agency, and marked for intended location and application.
				3. NFPA Standards: Fire-suppression standpipe equipment, specialties, accessories, installation, and testing shall comply with NFPA 14 “Standard for the Installation of Standpipe and Hose Systems”.
			1. FIELD CONDITIONS
				1. Interruption of Existing Fire Standpipe Service: Do not interrupt fire standpipe service to facilities occupied by Personnel or others unless permitted under the following conditions and then only after arranging to provide temporary fire standpipe service according to requirements indicated:

Follow the Impairment Procedures as per NFPA 25 “Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems” & NFPA 13 “Standard for the Installation of Sprinkler Systems” standards.

Notify Director’s Representative no fewer than two (2) days in advance of proposed interruption of fire-standpipe service.as per IFC follow requirements in 901.7 Systems out of service. Approved fire watch shall be provided for all occupants left unprotected by the shutdown until the fire protection has been returned to service.

Before shutting down the fire- standpipe service to perform the work, notify the Directors Representative in writing, and the local fire department that the system is to be shut down temporarily. Give schedule which states date and time of proposed shut down and approximate length of time that the system will be out of service. Request instructions for precautions that should be taken during the shutdown period.

Do not shut down system until schedule is approved by the Directors Representative.

Return the existing system to pre-shutdown operation immediately after work has been completed. Give written notice to the Directors Representative that the system has been returned to pre-shutdown operation.

1. PRODUCTS

Manufacturers and products listed in SpecAgent and MasterWorks Paragraph Builder are neither recommended nor endorsed by the AIA or Deltek. Before inserting names, verify that manufacturers and products listed there comply with requirements retained or revised in descriptions and are both available and suitable for the intended applications.

* + - 1. SYSTEM DESCRIPTIONS

Retain one or more of 11 paragraphs in this article. If using more than one standpipe or sprinkler system, identify each system on Drawings. Delete descriptions of systems not included in this Section.

* + - * 1. Automatic Wet-Type, Class I Standpipe System: Includes NPS 2-1/2 hose connections, has open water-supply valve with pressure maintained, and is capable of supplying water demand.
				2. Automatic Wet-Type, Class II Standpipe System: Includes NPS 1-1/2 hose stations, has open water-supply valve with pressure maintained, and is capable of supplying water demand.
				3. Automatic Wet-Type, Class III Standpipe System: Includes NPS 1-1/2 hose stations and NPS 2-1/2 hose connections, has open water-supply valve with pressure maintained, and is capable of supplying water demand.
				4. Automatic Dry-Type, Class I Standpipe System: Includes NPS 2-1/2 hose connections and has open water-supply valve and dry-pipe valve, with standpipes containing compressed air or nitrogen. Opening fire-hose valve releases compressed air and permits water pressure to open dry-pipe valve. Water then flows into standpipes.
				5. Automatic Dry-Type, Class II Standpipe System: Includes NPS 1-1/2 hose stations and has open water-supply valve and dry-pipe valve, with standpipes containing compressed air or nitrogen. Opening fire-hose valve releases compressed air and permits water pressure to open dry-pipe valve. Water then flows into standpipes.
				6. Automatic Dry-Type, Class III Standpipe System: Includes NPS 1-1/2 hose stations and NPS 2-1/2 hose connections and has open water-supply valve and dry-pipe valve, with standpipes containing compressed air or nitrogen. Opening fire-hose valve releases compressed air and permits water pressure to open dry-pipe valve. Water then flows into standpipes.
				7. Semiautomatic Dry-Type, Class I Standpipe System: Includes NPS 2-1/2 hose connections and has open water-supply valve and deluge valve, with standpipes containing air. Actuation of detection device permits water pressure to open deluge valve. Water then flows into standpipes.
				8. Semiautomatic Dry-Type, Class II Standpipe System: Includes NPS 1-1/2 hose stations and has open water-supply valve and deluge valve, with standpipes containing air. Actuation of detection device permits water pressure to open deluge valve. Water then flows into standpipes.
				9. Semiautomatic Dry-Type, Class III Standpipe System: Includes NPS 1-1/2 hose stations and NPS 2-1/2 hose connections and has open water-supply valve and deluge valve, with standpipes containing air. Actuation of detection device permits water pressure to open deluge valve. Water then flows into standpipes.
				10. Manual Wet-Type, Class I Standpipe System: Includes NPS 2-1/2 hose connections and has small water supply to maintain water in standpipes. Piping is wet, but water must be pumped into standpipes to satisfy demand.
				11. Manual Dry-Type, Class I Standpipe System: Includes NPS 2-1/2 hose connections, but does not have permanent water supply. Piping is dry. Water must be pumped into standpipes to satisfy demand.
			1. PERFORMANCE REQUIREMENTS
				1. Standard-Pressure, Fire-Suppression Standpipe System Component: Listed for 175-psig minimum working pressure.
				2. High-Pressure, Fire-Suppression Standpipe System Component: Listed for [**250-psig minimum**] [**300-psig**] [**350-psig**] working pressure.
				3. NICET Level III or IV Technician: Provide Fire Standpipe System Layout with seal and signature of a NYS Registered Professional Fire Protection Engineer using performance requirements, design criteria, IFC, and NFPA standards that are indicated in this specification and design documentation.
				4. NYS Registered Professional Fire Protection Engineer. Provide Fire Standpipe System Layout using performance requirements, design criteria, IFC, and NFPA standards that are indicated in this specification and design documentation.

Retain data in subparagraph below if known and if Owner wants to furnish test data to Contractor.

Available fire-hydrant flow test records indicate the following conditions:

Date: <**Insert test date**>.

Time: <**Insert time**> [**a.m.**] [**p.m.**]

Performed by: <**Insert operator's name**> of <**Insert firm**>.

Location of Residual Fire Hydrant R: <**Insert location**>.

Location of Flow Fire Hydrant F: <**Insert location**>.

Static Pressure at Residual Fire Hydrant R: <**Insert psig**>.

Measured Flow at Flow Fire Hydrant F: <**Insert gpm**>.

Residual Pressure at Residual Fire Hydrant R: <**Insert psig**>.

Retain first two paragraphs below if system design has not been approved by authorities having jurisdiction.

* + - * 1. Fire-suppression standpipe design shall be approved by authorities having jurisdiction.

Minimum residual pressure at each hose-connection outlet is as follows:

NPS 1-1/2 Hose Connections: [**65 psig**] <**Insert value**>.

NPS 2-1/2 Hose Connections: [**100 psig**] <**Insert value**>.

Coordinate "Seismic Performance" Paragraph below with Section 210548 "Vibration and Seismic Controls for Fire-Suppression Piping and Equipment."

* + - * 1. Seismic Performance: Fire-suppression standpipes shall withstand the effects of earthquake motions determined in accordance with NFPA 13 “Standard for the Installation of Sprinkler Systems” and [**ASCE/SEI 7**] <**Insert requirement**>. See Section 210548 "Vibration and Seismic Controls for Fire-Suppression Piping and Equipment."
			1. PIPING MATERIALS

See "Writing Guide" Article in the Evaluations for a discussion on this Section's organization and the most efficient way to revise this Section. See "Piping Materials and Standards" Article in the Evaluations for a discussion on availability of piping materials covered by referenced standards in corresponding pipe sizes.

* + - * 1. Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, and fitting materials and for joining methods for specific services, service locations, and pipe sizes.
			1. BLACK STEEL PIPE AND ASSOCIATED FITTINGS

Steel pipes in this article are arranged in order of decreasing wall thickness.

All of the steel piping in this article is suitable for 175-psig minimum working pressure.

Retain "Schedule 40," "Schedule 30," "Thinwall," "Schedule 10," or "Lightwall" Paragraph below for use with flanged, cut- or roll-grooved, plain-end-pipe, threaded, and welded joints. Retain desired options for retained material.

* + - * 1. Schedule 40: ASTM A 53 “Standard Specification for Pipe, Steel, Black and Hot-Dipper, Zinc-Coated, Welded and Seamless”, Type E, Grade B; with factory- or field-formed ends to accommodate joining method. As per Part 3-Pipe Schedule.
				2. Schedule 40: ASTM A 135 “Standard Specification for Electric-Resistance-Welded Steel Pipe”, Grade A; with factory- or field-formed ends to accommodate joining method. As per Part 3-Pipe Schedule.
				3. Schedule 40: ASTM A 795 “Standard Specification for Black and Hot-Dipper Zinc-Coated (Galvanized) Welded and Seamless Steel Pipe for Fire Protection Use”, Type E, Grade A; with factory- or field-formed ends to accommodate joining method. As per Part 3-Pipe Schedule.

Nipples in "(Galvanized-) (and) (Black-)Steel Pipe Nipples" Paragraph below are available in NPS 1/8 to NPS 12.

* + - * 1. Galvanized and Black Steel Pipe Nipples: ASTM A 733 “Standard Specification for Welded and Seamless Carbon Steel and Austenitic Stainless Steel Pipe Nipples” made of ASTM A 53 “Standard Specification for Pipe, Steel, Black and Hot-Dipper, Zinc-Coated, Welded and Seamless”, standard-weight, seamless steel pipe with threaded ends.

Couplings in "(Galvanized-) (and) (Uncoated-)Steel Couplings" Paragraph below are available in NPS 1/8 to NPS 20.

* + - * 1. Galvanized and Black Steel Couplings: ASTM A 865 “Standard Specification for Threaded Couplings, Steel, Black or Zinc-Coated (Galvanized) Welded or Seamless, for Use in Steel Pipe Joints”, threaded.

Fittings in "(Galvanized) (and) (Uncoated), Gray-Iron Threaded Fittings" Paragraph below are available in NPS 1/4 to NPS 12.

* + - * 1. Galvanized and Uncoated, Gray-Iron Threaded Fittings: ASME B 16.4 “Gray Iron Threaded Fittings Classes 125 and 250”, Class 125, standard pattern.

Unions in "Malleable- or Ductile-Iron Unions" Paragraph below are available in NPS 1/4 to NPS 3, but NFPA limits them to NPS 2 and smaller.

* + - * 1. Malleable- or Ductile-Iron Unions: UL 860 “Pipe Unions for Flammable and Combustible Fluids and Fire-Protection Service”.

Flanges in "Cast-Iron Flanges" Paragraph below are available in NPS 1 to NPS 96.

* + - * 1. Cast-Iron Flanges: ASME B16.1 “Gray Iron Pipe Flanges and Flanges Fittings Classes 25, 125 and 250”, Class 125.

Flanges and fittings in "Steel Flanges and Flanged Fittings" Paragraph below are available in NPS 1/2 to NPS 24.

* + - * 1. Steel Flanges and Flanged Fittings: ASME B16.5 “Pipe Flanges & Flanged Fittings”, Class 150.

Pipe-Flange Gasket Materials: AWWA C110 “Standard for Ductile-Iron and Gray-Iron Fittings”, rubber, flat face, 1/8 inch thick.

Class 125 and Class 250, Cast-Iron, Flat-Face Flanges: Full-face gaskets.

Class 150 and Class 300, Ductile-Iron or -Steel, Raised-Face Flanges: Ring-type gaskets.

Metal, Pipe-Flange Bolts and Nuts: Carbon steel unless otherwise indicated.

Fittings in "Steel Welding Fittings" Paragraph below are available in NPS 1/2 to NPS 48.

* + - * 1. Steel Welding Fittings: ASTM A 234 “Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service” and ASME B16.9 “Factory-Made Wrought Buttwelding Fittings”.

Welding Filler Metals: Comply with AWS D10.12 “Guide for Welding Mild Steel Pipe” for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.

* + - * 1. Grooved-Joint, Steel-Pipe Appurtenances:

Pressure Rating: [**175-psig**] [**250-psig**] [**300-psig**] minimum.

[**Galvanized**] [**Painted**] Grooved-End Fittings for Steel Piping: ASTM A 47 “Standard Specification for Ferritic Malleable Iron Castings”, malleable-iron casting or ASTM A 536 “Standard Specification for Ductile Iron Castings”, ductile-iron casting, with dimensions matching steel pipe.

AWWA C606 “Standard for Grooved and Shouldered Joints” and UL 213 “Standard for Rubber Gasketed Fittings for Fire-Protection Service” cover couplings in "Grooved-End-Pipe Couplings for Steel Piping" Subparagraph below in NPS 3/4 to at least NPS 12.

Grooved-End-Pipe Couplings for Steel Piping: AWWA C606 “Standard for Grooved and Shouldered Joints” and UL 213 “Standard for Rubber Gasketed Fittings for Fire-Protection Service” rigid pattern, unless otherwise indicated, for steel-pipe dimensions. Include ferrous housing sections, EPDM-rubber gasket, and bolts and nuts.

Grooved-End-Pipe Couplings for Steel Piping: AWWA C606 “Standard for Grooved and Shouldered Joints” and UL 213 “Standard for Rubber Gasketed Fittings for Fire-Protection Service” flexible pattern, unless otherwise indicated, for steel-pipe dimensions. Include ferrous housing sections, EPDM-rubber gasket, bolts and nuts.

Fittings in "Steel Pressure-Seal Fittings" Paragraph below are available in NPS 3/4 to NPS 2.

* + - * 1. Mechanical-T Bolted Branch Outlets: ASTM A-536 “Standard Specification for Ductile Iron Castings”, ASTM A-449 and ASTM A-183

Pressure Rated up to 500psi maximum working pressure.

Painted or galvanized.

Sizes from 2”x1/2” through 8”x4”

Grooved outlet or Female threaded outlet.

Pipe in "Standard-Weight, (Galvanized-) (and) (Black-)Steel Pipe" Paragraph below is intended for use with flanged, cut- or roll-grooved, plain-end-pipe, threaded, and welded joints. Pipe is generally available in NPS 1/8 to NPS 26. Use only black-steel pipe for roll-grooved and welded joints. Match options for fitting and pipe finish.

* + - 1. GALVANIZED-STEEL PIPE AND ASSOCIATED FITTINGS
				1. Schedule 40: ASTM A 53 “Standard Specification for Pipe, Steel, Black and Hot-Dipper, Zinc-Coated, Welded and Seamless”, Type E, Grade B; with factory- or field-formed ends to accommodate joining method. As per 3.14 Pipe Schedule.
				2. Schedule 40: ASTM A 135 “Standard Specification for Electric-Resistance-Welded Steel Pipe”, Grade A; with factory- or field-formed ends to accommodate joining method. As per 3.14 Pipe Schedule.
				3. Schedule 40: ASTM A 795 “Standard Specification for Black and Hot-Dipper Zinc-Coated (Galvanized) Welded and Seamless Steel Pipe for Fire Protection Use”, Type E, Grade A; with factory- or field-formed ends to accommodate joining method. As per 3.14 Pipe Schedule.
				4. Galvanized-Steel Pipe Nipples: ASTM A 733 “Standard Specification for Welded and Seamless Carbon Steel and Austenitic Stainless Steel Pipe Nipples”, made of ASTM A 53 “Standard Specification for Pipe, Steel, Black and Hot-Dipper, Zinc-Coated, Welded and Seamless” or ASTM A 106 “Standard Specification for Seamless Pressure Pipe”, Standard Weight, seamless steel pipe with threaded ends.
				5. Galvanized, Gray-Iron Threaded Fittings: ASME B16.4 “Gray Iron Threaded Fittings Classes 125 and 250”, Class 125, standard pattern.
				6. Malleable-Iron Unions:

ASME B16.39 “Malleable Iron Threaded Pipe Unions: Classes 150, 250, and 300”, Class 150.

Hexagonal-stock body.

Ball-and-socket, metal-to-metal, bronze seating surface.

Threaded ends.

* + - * 1. Flanges: ASME B16.1 “Gray Iron Pipe Flanges and Flanges Fittings Classes 25, 125 and 250”, Class 125, cast iron.
				2. Appurtenances for Grooved-End, Galvanized-Steel Pipe:

Fittings for Grooved-End, Galvanized-Steel Pipe: Galvanized, ASTM A 47 “Standard Specification for Ferritic Malleable Iron Castings”, malleable-iron casting; ASTM A 106 “Standard Specification for Seamless Pressure Pipe”, steel pipe; or ASTM A 536 “Standard Specification for Ductile Iron Castings”, ductile-iron casting; with dimensions matching steel pipe.

Fittings for Grooved-End, Galvanized-Steel Pipe:

AWWA C606 “Standard for Grooved and Shouldered Joints” for steel-pipe dimensions.

[**Painted**], and [**Galvanized**]Ferrous housing sections.

[Rigid Pattern] and [Flexible Pattern]

EPDM-rubber gaskets Grade “E” Type A Flush Seal Gasket, suitable for wet and dry (oil free air) sprinkler services.

Bolts and nuts.

Pressure Rating: [**175-psig**] [**250-psig**] [**300-psig**] minimum.

* + - 1. PIPING JOINING MATERIALS
				1. Pipe-Flange Gasket Materials: [**AWWA C110/A21.10, rubber, flat face, 1/8 inch thick**] [**or**] [**ASME B16.21, nonmetallic and asbestos free**].

Class 125, Cast-Iron Flanges and Class 150, Bronze Flat-Face Flanges: Full-face gaskets.

Class 250, Cast-Iron Flanges and Class 300, Steel Raised-Face Flanges: Ring-type gaskets.

* + - * 1. Metal, Pipe-Flange Bolts and Nuts: ASME B18.2.1 “Square, Hex, Heavy Hex, and Askew Head Bolts and Hex, Heavy Hex, Hex Flange, Lobed Head, and Lag Screws” carbon steel unless otherwise indicated.
				2. Brazing Filler Metals: AWS A5.8 “Filler Metals for Brazing & Braze Welding”, BCuP Series, copper-phosphorus alloys for general-duty brazing unless otherwise indicated.
				3. Welding Filler Metals: Comply with AWS D10.12 “Guide for Welding Mild Steel Pipe” for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.
			1. SPECIALTY VALVES
				1. General Requirements:

Standard: UL's "Fire Protection Equipment Directory" or FM Global's "Approval Guide."

Pressure Rating:

Standard-Pressure Piping Specialty Valves: 175-psig minimum.

High-Pressure Piping Specialty Valves: [**250-psig minimum**] [**300 psig**].

Body Material: Cast or ductile iron.

Size: Same as connected piping.

End Connections: Flanged or grooved.

Valves in "Alarm Valves" Paragraph below are available in NPS 1-1/2 to NPS 8.

* + - * 1. Alarm Valves:

Manufacturers:

Reliable Automatic Sprinkler Co., Inc.

Tyco

Victaulic

Approved equivalent.

Standard: UL 193 “Alarm Valves for Fire-Protection Service”.

Design: For horizontal or vertical installation.

Delete option in first subparagraph below if water-supply pressure is constant.

Include trim sets for bypass, drain, electrical sprinkler alarm switch, pressure gauges,[**retarding chamber,**] and fill-line attachment with strainer.

Retain one of two options in "Drip Cup Assembly" Subparagraph below. Retain first option if retarding chamber is required. Retain second option if retarding chamber is not required.

Drip Cup Assembly: Pipe drain [**without valves and separate from**] [**with check valve to**] main drain piping.

* + - * 1. Riser Check Valve:

UL & FM listed.

Design: For horizontal or vertical installation.

Trim kit with main drain, two (2) 3-way globe valves w/ plugs, two (2) 300psi water gauges.

* + - * 1. Floor Control Assembly used for multi-story buildings to separate each floor by its own control floor control assembly:

UL & FM listed.

Design: For horizontal or vertical installation.

Trim kit with Test & Drain valve with [**relief valve**], one (1) 3-way globe valve w/ plug, one (1) 300 psi water gauge.

Water flow indicator- (Flow Switch)

Retain "Dry-Pipe Valves" Paragraph below for dry-type standpipes. Valves are available in NPS 1-1/2 to NPS 8.

* + - * 1. Dry-Pipe Valves:

Standard: UL 260 “Dry Pipe and Deluge Valves for Fire-Protection Service”.

Design: Differential-pressure type.

Include UL 1486 “Quick Opening Devices for Dry Pipe Valves for Fire Protection Service” quick-opening devices, trim sets for air supply, drain, priming level, alarm connections, ball drip valves, pressure gauges, priming chamber attachment, and fill-line attachment.

Retain "Air-Pressure Maintenance Device" Subparagraph below if system uses an air-pressure maintenance device. If retaining below, delete "Air Compressor" Subparagraph below.

Air-Pressure Maintenance Device:

[Manufacturers:](http://www.specagent.com/LookUp/?ulid=1379&mf=&src=wd)

General Air Products, Inc.

Dixon

Tyco

[Reliable Automatic Sprinkler Co., Inc.](https://products-specpoint.mydeltek.com/products/company/d9dd9775-56b9-47b8-afdb-86ff82953e9c?groupby=sectionNumber%2520false%252CproductType%2520false&sortby=sectionNumber%252CproductType%252Ctype%252ClastUpdated%2520desc&ia=true&defaultFilter=true&sp=%27211000+-+WATER-BASED+FIRE-SUPPRESSION+SYSTEMS%27%25%7C%25%27Alarm+Valves%27)

Viking Group Inc.

Approved equivalent.

Standard: UL 260 “Dry Pipe and Deluge Valves for Fire-Protection Service”.

Type: Automatic device to maintain minimum air pressure in piping.

Include shutoff valves to permit servicing without shutting down sprinkler piping, bypass valve for quick filling, pressure regulator or switch to maintain pressure, strainer, pressure ratings with 14- to 60-psig adjustable range, and [**175-psig**] [**300-psig**] outlet pressure.

Retain "Air Compressor" Subparagraph below if system contains an air compressor. If retaining below, delete "Air-Pressure Maintenance Device" Subparagraph above.

Air Compressor:

[Manufacturers:](http://www.specagent.com/LookUp/?ulid=1379&mf=&src=wd)

General Air Products, Inc.

Gast Manufacturing, Inc.

C-Aire Compressors

Approved equivalent.

Standard: UL's "Fire Protection Equipment Directory." Or FM Global “Approval Guide.”

Motor characteristics, such as NEMA designation, temperature rating, service factor, enclosure type, and efficiency, are specified in Section 210513 "Common Motor Requirements for Fire Suppression Equipment." If different characteristics are required, insert subparagraphs below to suit Project.

Motor Horsepower: [**Edit HP for motor size**] [**1/6**] [**1/3**] [**1/2**] [**3/4**] [**1**] [**1-1/2**] [**2]**

Power: Dedicated circuit as per NFPA 13 “Standard for the Installation of Sprinkler Systems”. [**Edit power supply**] [**115/208/230**] [**208/230**].

* + - * 1. Deluge Valves:

Manufacturers:

Reliable Automatic Sprinkler Co, Inc.

Bermad

Viking Group Inc.

Cla-Val

Tyco

Approved equivalent.

Standard: UL 260 “Dry Pipe and Deluge Valves for Fire-Protection Service”.

Design: Hydraulically operated, differential-pressure type.

Include trim sets for bypass, drain, electrical sprinkler alarm switch, pressure gauges, drip cup assembly piped without valves and separate from main drain line, fill-line attachment with strainer, and push-rod chamber supply connection.

Retain "Wet, Pilot-Line Trim Set" Subparagraph below for wet-type standpipes, hydraulic manual control, or solenoid-valve actuation.

Wet, Pilot-Line Trim Set: Include gauge to read push-rod chamber pressure, globe valve for manual operation of deluge valve, and connection for actuation device.

Retain "Dry, Pilot-Line Trim Set" Subparagraph below for dry-type standpipes; provide air supply.

Dry, Pilot-Line Trim Set: Include dry, pilot-line actuator; air- and water-pressure gauges; low-air-pressure warning switch; air-relief valve; and actuation device. Dry, pilot-line actuator includes cast-iron, operated, diaphragm-type valve with resilient facing plate, resilient diaphragm, and replaceable bronze seat. Valve includes threaded water and air inlets and water outlet. Loss of air pressure on dry, pilot-line side allows pilot-line actuator to open and causes deluge valve to open immediately.

Retain "Air-Pressure Maintenance Device" Subparagraph below if system uses air-pressure maintenance devices. If retaining below, delete "Air Compressor" Subparagraph below.

Air-Pressure Maintenance Device:

[Manufacturers:](http://www.specagent.com/LookUp/?ulid=1379&mf=&src=wd)

General Air Products, Inc.

[Reliable Automatic Sprinkler Co., Inc.](https://products-specpoint.mydeltek.com/products/company/d9dd9775-56b9-47b8-afdb-86ff82953e9c?groupby=sectionNumber%2520false%252CproductType%2520false&sortby=sectionNumber%252CproductType%252Ctype%252ClastUpdated%2520desc&ia=true&defaultFilter=true&sp=%27211000+-+WATER-BASED+FIRE-SUPPRESSION+SYSTEMS%27%25%7C%25%27Alarm+Valves%27)

Viking Group Inc.

Approved equivalent.

Standard: UL 260 “Dry Pipe and Deluge Valves for Fire-Protection Service”.

Type: Automatic device to maintain minimum air pressure in piping.

Include shutoff valves to permit servicing without shutting down sprinkler piping, bypass valve for quick filling, pressure regulator, or switch to maintain pressure, strainer, pressure ratings with 14- to 60-psig adjustable range, and [**175-psig**] [**300-psig**] outlet pressure.

Retain "Air Compressor" Subparagraph below if system contains an air compressor. If retaining below, delete "Air-Pressure Maintenance Device" Subparagraph above.

Air Compressor:

[Manufacturers:](http://www.specagent.com/LookUp/?ulid=1379&mf=&src=wd)

General Air Products, Inc.

Gast Manufacturing, Inc.

C-Aire Compressors

Approved equivalent.

Types: [**Oil Less-Riser Mounted**] [**Tank Mounted-Oil Less**] [**Base Mounted-Oil** **Lubricated**] [**Tank Mounted-Oil Lubricated**] [**Dry Air Pac].**

Standard: UL's "Fire Protection Equipment Directory." Or FM Global “Approved Guide.”

Motor characteristics, such as NEMA designation, temperature rating, service factor, enclosure type, and efficiency, are specified in Section 210513 "Common Motor Requirements for Fire Suppression Equipment." If different characteristics are required, insert subparagraphs below to suit Project.

Motor Horsepower: [**Edit HP for motor size]** [**1/6**] [**1/3**] [**1/2**] [**3/4**] [**1**] [**1-1/2**] [**2].**

Power: Dedicated circuit as per NFPA 13. [**Edit Power Supply**] [**115/208/230**] [**208/230]**.

Valves in "Pressure-Reducing Valves" Paragraph below are used on standpipe risers.

* + - * 1. Pressure-Reducing Valves:

[Manufacturers:](http://www.specagent.com/LookUp/?ulid=1386&mf=&src=wd)

Caleffi North America.

Bermad

Zurn Wilkins

Elkhart Brass Manufacturing Company, LLC

Approved equivalent.

Indicate valve size and inlet and outlet pressures on Drawings for each pressure-reducing valve

UL 668 “Hose Valves for Fire-Protection Service” hose valve, with integral UL 1468 “Direct Acting Pressure Reducing and Pressure Restricting Valves” reducing device.

Pressure Rating: 300-psig minimum.

Material: Brass or bronze.

Inlet: Female pipe threads.

Outlet: Threaded with or without adapter having male hose threads.

Pattern: [**Angle**] [**or**] [**gate**].

Finish: [**Polished chrome plated**] [**Rough brass or bronze**] [**Rough chrome plated**].

* + - * 1. Automatic (Ball Drip) Drain Valves:

Manufacturers:

Reliable Automatic Sprinkler Co., Inc.

Tyco

Dixon

Viking Group Inc.

Approved equivalent.

Standard: UL 1726 “Automatic Drain Valves for Standpipe Systems”.

Pressure Rating: 175-psig minimum.

Type: Automatic draining, ball check.

Size: NPS 3/4.

End Connections: Threaded.

* + - 1. HOSE CONNECTIONS

Coordinate cabinets with Section 104413 "Fire Protection Cabinets." Indicate size and design outlet pressure setting on Drawings for each hose connection.

* + - * 1. Adjustable-Valve Hose Connections:

Manufacturers:

Zurn.

Croker

Elkhart Brass Manufacturing Company, LLC

Approved equivalent.

Standard: UL 668 “Hose Valves for Fire-Protection Service” hose valve, with integral UL 1468 “Direct Acting Pressure Reducing and Pressure Restricting Valves” reducing or restricting pressure-control device, for connecting fire hose.

Pressure Rating: 300-psig minimum.

Material: Brass or bronze.

Size: NPS 1-1/2 or NPS 2-1/2, as indicated.

Inlet: Female pipe threads.

Outlet: Male hose threads with lugged cap, gasket, and chain. Include hose valve threads in accordance with NFPA 1963 “Standard for Fire Hose Connections” and matching local fire-department threads.

Pattern: [**Angle**] [**or**] [**gate**].

Pressure-Control Device Type: Pressure [**reducing**] [**restricting**].

Design Outlet Pressure Setting: <**Insert psig**>.

Finish: [**Polished chrome plated**] [**Rough brass or bronze**] [**Rough chrome plated**].

* + - * 1. Nonadjustable-Valve Hose Connections:

Manufacturers:

Zurn.

Croker

Potter Roemer

Approved equivalent.

Standard: UL 668 “Hose Valves for Fire-Protection Service” hose valve for connecting fire hose.

Pressure Rating: 300-psig minimum.

Material: Brass or bronze.

Size: NPS 1-1/2 or NPS 2-1/2, as indicated.

Inlet: Female pipe threads.

Outlet: Male hose threads with lugged cap, gasket, and chain. Include hose valve threads in accordance with NFPA 1963 “Standard for Fire Hose Connections” and matching local fire-department threads.

Pattern: [**Angle**] [**or**] [**gate**].

Finish: [**Polished chrome plated**] [**Rough brass or bronze**] [**Rough chrome plated**].

* + - 1. ALARM DEVICES
				1. Match alarm-device material and connection types to piping and equipment materials and connection types.

Retain remaining paragraphs if devices are specified in this Section.

Standard: UL 753 “Standard for Alarm Accessories for Automatic Water-Supply Control Valves for Fire Protection Service”.

Type: Mechanically operated, with Pelton wheel.

Alarm Gong: Cast aluminum with red-enamel factory finish.

Size: 8-1/2”- diameter.

Components: Shaft length, bearings, and sleeve to suit wall construction.

Inlet: NPS 3/4.

Outlet: NPS 1 drain connection

As per manufactures installation requirements and NFPA 13 “Standard for the Installation of Sprinkler Systems” standards.

* + - * 1. Exterior Sprinkler Alarm Strobe Horn/ Sign Combination:

Standard: UL listed.

Type: Horn/Strobe weather proof.

Size: 9-1/4”h x 10” w x 4” d.

Finish: Red-with White lettering, suitable for outdoor use.

Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

As per IFC, NFPA 13 “Standard for the Installation of Sprinkler Systems”, NFPA 72 “National Fire Alarm and Signaling Code” and manufactures installation requirements.

* + - * 1. Water-Flow Indicators:

Manufacturers:

Viking Group.

[Potter Electric Signal Company, LLC.](https://products-specpoint.mydeltek.com/products/company/0af43550-934c-4239-9f8a-99d7f920d688?groupby=sectionNumber%2520false%252CproductType%2520false&sortby=sectionNumber%252CproductType%252Ctype%252ClastUpdated%2520desc&ia=true&defaultFilter=true&df=%27Potter+Electric+Signal+Company%5Cu002c+LLC%27%25%7C%25%27Potter+Electric+Signal+Company%5Cu002c+LLC%27)

Approved equivalent.

Standard: UL 346 “Waterflow Indicators for Fire Protective Signaling Systems”.

Water-Flow Detector: Electrically supervised.

Components: Two single-pole, double-throw circuit switches for isolated alarm and auxiliary contacts, 7 A, 125-V ac and 0.25 A, 24-V dc; complete with factory-set, field-adjustable retard element to prevent false signals and tamperproof cover that sends signal if removed.

Type: Paddle operated.

Pressure Rating: 250 psig.

Design Installation: Horizontal or vertical.

As per FC (Fire Code), NFPA 13 “Standard for the Installation of Sprinkler Systems”, NFPA 70 “Standard for Electrical Safety in the Workplace”, NFPA 72 “National Fire Alarm and Signaling Code”, and manufactures installation requirements.

* + - * 1. Pressure Switches:

Manufacturers:

Potter Electric Signal Company, LLC.

Tyco Fire Products; brand of Johnson Controls international plc, Building Solutions North America

Reliable Automatic Sprinkler Co, Inc.

Approved equivalent.

Standard: UL 346 “Waterflow Indicators for Fire Protective Signaling Systems”.

Type: Electrically supervised water-flow switch with retard feature.

Components: Single-pole, double-throw switch with normally closed contacts.

Design Operation: Rising pressure signals water flow.

As per FC (Fire Code), NFPA 13 “Standard for the Installation of Sprinkler Systems”, NFPA 70 “Standard for Electrical Safety in the Workplace”, NFPA 72 “National Fire Alarm and Signaling Code”, and manufactures installation requirements.

* + - * 1. Valve Supervisory Switches:

Manufacturers:

Potter Electric Signal Company, LLC.

Fire-Lite Alarms; Honeywell International, Inc.

Kennedy Valve Company; a division of McWane, Inc.

Approved equivalent.

Standard: UL 346 “Waterflow Indicators for Fire Protective Signaling Systems”.

Type: Electrically supervised.

Components: Single-pole, double-throw switch with normally closed contacts.

Design: Signals that controlled valve is in other than fully open position.

As per FC (Fire Code), NFPA 13 “Standard for the Installation of Sprinkler Systems”, NFPA 70 “Standard for Electrical Safety in the Workplace”, NFPA 72 “National Fire Alarm and Signaling Code”, and manufactures installation requirements.

* + - * 1. Indicator-Post Supervisory Switches:

Manufacturers:

Potter Electric Signal Company, LLC.

Tyco

Southern Valve & Fitting USA, Inc. (SOVAL)

Approved equivalent.

Standard: UL 346 “Waterflow Indicators for Fire Protective Signaling Systems”.

Type: Electrically supervised.

Components: Single-pole, double-throw switch with normally closed contacts.

Design: Signals that controlled indicator-post valve is in other than fully open position.

As per FC (Fire Code), NFPA 13 “Standard for the Installation of Sprinkler Systems”, NFPA 70 “Standard for Electrical Safety in the Workplace”, NFPA 72 “National Fire Alarm and Signaling Code”, and manufactures installation requirements.

* + - * 1. Air Pressure Supervisory Switch:

Standard: UL 346 “Waterflow Indicators for Fire Protective Signaling Systems”.

Type: Electrical supervised low air switch.

Include with BLV bleeder valve for adjusting air pressure.

As per IFC, NFPA 13 “Standard for the Installation of Sprinkler Systems”, NFPA 70 “Standard for Electrical Safety in the Workplace”, NFPA 72 “National Fire Alarm and Signaling Code”, and manufactures installation requirements.

* + - 1. MANUAL CONTROL STATIONS

Retain this article for dry-type standpipe system piping.

* + - * 1. Description: UL listed or FM Global approved, hydraulic operation, with union, NPS 1/2 pipe nipple, and bronze ball valve. Include metal enclosure, labeled "MANUAL CONTROL STATION," with operating instructions and cover held closed by breakable strut to prevent accidental opening.
			1. CONTROL PANELS

Retain this article for dry-type standpipe system piping.

* + - * 1. Description: Single-area, two-area, or single-area cross-zoned control panel as indicated, including NEMA ICS 6 “Industrial Control and Systems: Enclosures”, Type 1 enclosure, detector, alarm, and solenoid-valve circuitry for operation of deluge valves. Panels contain power supply; battery charger; standby batteries; field-wiring terminal strip; electrically supervised solenoid valves and polarized fire-alarm bell; lamp test facility; single-pole, double-throw auxiliary alarm contacts; and rectifier.

Panels: UL listed and FM Global approved when used with thermal detectors and Class A detector circuit wiring. Electrical characteristics are 120-V ac, 60 Hz, with 24-V dc rechargeable batteries.

Retain "Manual Control Stations, Electric Operation" or "Manual Control Stations, Hydraulic Operation" Subparagraph below.

Manual Control Stations, Electric Operation: Metal enclosure, labeled "MANUAL CONTROL STATION," with operating instructions and cover held closed by breakable strut to prevent accidental opening.

Manual Control Stations, Hydraulic Operation: Provide union, NPS 1/2 pipe nipple, and bronze ball valve. Include metal enclosure, labeled "MANUAL CONTROL STATION," with operating instructions and cover held closed by breakable strut to prevent accidental opening.

* + - 1. PRESSURE GAUGES
				1. [Manufacturers:](http://www.specagent.com/LookUp/?ulid=1400&mf=&src=wd)

AGF Manufacturing, Inc.

Viking

Ashcroft

Approved equivalent.

* + - * 1. Standard: UL 393 “Standard for Indicating Pressure Gages for Fire-Protection Service”.
				2. Dial Size: 3-1/2- to 4-1/2-inch diameter.
				3. Pressure Gauge Range: [**Zero to 300 psig**].
				4. Water System Piping Gauge: Include "WATER" or "AIR/WATER" label on dial face.
				5. Air System Piping Gauge: Include[**retard feature and**] "AIR" or "AIR/WATER" label on dial face.
1. EXECUTION
	* + 1. PREPARATION

Retain this article if fire-hydrant flow test is required or if Owner has not provided flow information.

* + - * 1. Contractor shall perform a current fire-hydrant flow test if the record flow test data on the contract documents is not within the12 month period to start preparing the shop drawings as per NFPA 13 “Standard for the Installation of Sprinkler Systems”. Present fire-hydrant flow tests shall be performed as per NFPA 291 “Recommended Practice for Water Flow Testing and Marking od Hydrants”. Use results for system design calculations required in "Quality Assurance" Article.
				2. Report test results promptly and in writing to NYS Licensed Designer of Record.
			1. EXAMINATION
				1. Examine roughing-in for hose connections and stations to verify actual locations of piping connections before installation.
				2. Examine walls and partitions for suitable thickness, fire- and smoke-rated construction, framing for hose-station cabinets, and other conditions where hose connections and stations are to be installed.
				3. Proceed with installation only after unsatisfactory conditions have been corrected.
			2. FIRE PROTECTION WATER SERVICE PIPING

Retain this article and delete "Water-Supply Connections" Article if connection to building's water-service piping is required.

* + - * 1. Connect fire-suppression standpipe piping to water-service piping at service entrance into building. Comply with requirements for exterior piping in Section 211100 "Facility Fire-Suppression Water-Service Piping" for exterior piping. Comply with Local Water Supply Company regulations, Plumbing Code, and NYS DOH.

Retain one of two paragraphs below. Backflow preventers are recommended and are usually required by authorities having jurisdiction. Do not specify backflow preventers here if they are specified in Section 211100 "Facility Fire-Suppression Water-Service Piping."

* + - * 1. Install shutoff valve,[**backflow preventer,**] pressure gauge, drain, and other accessories at connection to fire-suppression water-service piping.[**Comply with requirements for backflow preventers in Section 210524 “Backflow Preventers” & Section 211100 "Facility Fire-Suppression Water-Service Piping."**]
				2. Install shutoff valve, check valve, pressure gauge, and drain with in.
			1. WATER-SUPPLY CONNECTIONS (INTERIOR)

Retain this article and delete "Service-Entrance Piping" Article if connection to building's water-distribution piping is required.

* + - * 1. Connect fire-suppression standpipe piping to building's interior water-distribution piping. Comply with requirements for interior piping in Section 221116 "Domestic Water Piping." for exterior piping. Comply with Local Water Supply Company regulations, Plumbing Code, and NYS DOH.

Retain one of two paragraphs below. Backflow preventers are recommended and are usually required by authorities having jurisdiction.

* + - * 1. Install shutoff valve,[**backflow preventer,**] pressure gauge, drain, and other accessories at connection to water-distribution piping.[**Comply with requirements for backflow preventers in Section 210524 “Backflow Preventers”** ]. Comply with Local Water Supply Company regulations, Plumbing Code, and NYSDOH.
				2. Install shutoff valve, check valve, pressure gauge, and drain with in.
			1. PIPING INSTALLATION
				1. Locations and Arrangements: Drawing plans, schematics, and diagrams indicate general location and arrangement of piping. Install piping as indicated, as far as practical.

Deviations from approved working plans for piping require written approval from authorities having jurisdiction. File written approval with Director’s Representative before deviating from approved working plans.

* + - * 1. Piping Standard: Comply with requirements in NFPA 14 “Standard for the Installation of Standpipe and Hose Systems” for installation of fire-suppression standpipe piping.

Retain first paragraph below if piping is required to withstand seismic design loads.

* + - * 1. Install seismic restraints on piping. Comply with NFPA 13/9.3 requirements for seismic-restraint device materials and installation requirements for seismic design. Such as couplings-flexible, seismic separations, clearances, and sway braces.
				2. Install listed fittings to make changes in direction, branch takeoffs from mains, and reductions in pipe sizes.
				3. Install drain valves on standpipes. Extend drain piping to outside of building.
				4. Install automatic (ball drip) drain valves to drain piping between fire-department connections and check valves. Drain to floor drain or outside building.
				5. Install alarm devices in piping systems.

See Editing Instruction No. 3 in the Evaluations for cautions about pipe hangers.

* + - * 1. Install hangers and supports for standpipe system piping in accordance with NFPA 14 “Standard for the Installation of Standpipe and Hose Systems”. Comply with requirements in NFPA 13 “Standard for the Installation of Sprinkler Systems” for hanger materials.
				2. Install pressure gauges on riser or feed main and at top of each standpipe. Include pressure gauges with connection of not less than NPS 1/4 and with soft-metal seated globe valve, arranged for draining pipe between gauge and valve. Install gauges to permit removal, and install where they are not subject to freezing.
				3. Drain dry-type standpipe system piping.
				4. Pressurize and check dry-type standpipe system piping and [**air-pressure maintenance devices**] [**air compressors**].
				5. Fill wet-type standpipe system piping with water.
				6. Install electric heating cables and pipe insulation on wet-type fire-suppression standpipe piping in areas subject to freezing. Comply with requirements for heating cables in Section 210533 "Heat Tracing for Fire-Suppression Piping" and for piping insulation in Section 210700 "Fire-Suppression Systems Insulation."

Retain one of first two paragraphs below.

* + - * 1. Connect compressed-air or nitrogen supply to dry-pipe sprinkler piping.
				2. Connect air compressor to the following piping:

Pressure gauges and controls.

Fire-alarm devices, including low-pressure alarm.

* + - * 1. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Section 210517 "Sleeves and Sleeve Seals for Fire-Suppression Piping."

Retain first paragraph below for piping that penetrates an exterior concrete wall or concrete slab.

* + - * 1. Install sleeve seals for piping penetrations of concrete walls and slabs. Comply with requirements for sleeve seals specified in Section 210517 "Sleeves and Sleeve Seals for Fire-Suppression Piping."
				2. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Section 210518 "Escutcheons for Fire-Suppression Piping."
			1. JOINT CONSTRUCTION
				1. Install couplings, flanges, flanged fittings, unions, nipples, and transition and special fittings that have finish and pressure ratings same as or higher than system's pressure rating for aboveground applications unless otherwise indicated.
				2. Install unions adjacent to each valve in pipes NPS 2 and smaller.
				3. Install flanges, flange adapters, or couplings for grooved-end piping on valves, apparatus, and equipment having NPS 2-1/2 and larger end connections.
				4. Ream ends of pipes and tubes, and remove burrs. Bevel plain ends of steel pipe.
				5. Remove scale, slag, dirt, and debris from inside and outside of pipes, tubes, and fittings before assembly.
				6. Flanged Joints: Select appropriate gasket material in size, type, and thickness suitable for water service. Join flanges with gasket and bolts in accordance with ASME B31.9 “Building Services Piping”.
				7. Threaded Joints: Thread pipe with tapered pipe threads in accordance with ASME B1.20.1 “Pipe Threads, General Purpose, Inch”. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:

Apply appropriate tape or thread compound to external pipe threads.

Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged.

* + - * 1. Steel-Piping, Roll-Grooved Joints: Roll rounded-edge groove in end of pipe in accordance with AWWA C606 “Standard for Grooved and Shouldered Joints”. Assemble coupling with housing, gasket, lubricant, and bolts. Join steel pipe and grooved-end fittings in accordance with AWWA C606 “Standard for Grooved and Shouldered Joints” for steel-pipe grooved joints.
				2. Welded Joints: Construct joints according to AWS D10.12 “Guide for Welding Mild Steel Pipe”, using qualified processes and welding operators according to "Quality Assurance" Article.

Shop weld pipe joints where welded piping is indicated. Do not use welded joints for galvanized-steel pipe.

* + - * 1. Dissimilar-Material Piping Joints: Make joints using adapters compatible with materials of both piping systems.
			1. VALVE AND SPECIALTIES INSTALLATION
				1. Install listed fire-protection valves, trim and drain valves, specialty valves and trim, controls, and specialties in accordance with NFPA 14 “Standard for the Installation of Standpipe and Hose Systems”, authorities having jurisdiction and manufacturer's instructions.
				2. Install listed fire-protection supervised-open shutoff valves, located to control sources of water supply, except from fire-department connections. Install permanent identification signs indicating portion of system controlled by each valve.
				3. Install check valve in each water-supply connection. Install backflow preventers instead of check valves in potable-water-supply sources.
				4. Specialty Valves:

General Requirements: Install in vertical position for proper direction of flow, in main supply to system.

Alarm Valves: Install bypass check valve and retarding chamber drain-line connection.

[**Dry-Pipe**] [**and**] [**Deluge**] Valves: Install trim sets for air supply, drain, priming level, alarm connections, ball drip valves, pressure gauges, priming chamber attachment, and fill-line attachment.

Retain first subparagraph or second and third subparagraphs below.

Install air compressor and compressed-air-supply piping.

Air-Pressure Maintenance Device: Install shutoff valves to permit servicing without shutting down sprinkler system; bypass valve for quick system filling; pressure regulator or switch to maintain system pressure; strainer; pressure ratings with [**14- to 60-psig**] <**Insert value**> adjustable range; and [**175-psig**] <**Insert value**> maximum inlet pressure.

Install compressed-air-supply piping from building's compressed-air piping system.

* + - 1. HOSE-CONNECTION INSTALLATION

Indicate hose-connection locations, sizes, and special devices on Drawings.

* + - * 1. Install hose connections adjacent to standpipes.
				2. Install freestanding hose connections for access and minimum passage restriction.
				3. Install NPS 1-1/2 hose-connection valves with flow-restricting device.
				4. Install NPS 2-1/2 hose connections with quick-disconnect NPS 2-1/2 by NPS 1-1/2 reducer adapter and flow-restricting device.
				5. Install wall-mounted-type hose connections in cabinets. Include pipe escutcheons, with finish matching valves, inside cabinet where water-supply piping penetrates cabinet. Install valves at angle required for connection of fire hose. Comply with requirements for cabinets in Section 104413 "Fire Protection Cabinets."
			1. HOSE-STATION INSTALLATION

Indicate hose-station locations, sizes, and special devices on Drawings.

* + - * 1. Install freestanding hose stations for access and minimum passage restriction.
				2. Install NPS 1-1/2 hose-station valves with flow-restricting device unless otherwise indicated.
				3. Install NPS 2-1/2 hose connections with quick-disconnect NPS 2-1/2 by NPS 1-1/2 reducer adapter and flow-restricting device unless otherwise indicated.
				4. Install freestanding hose stations with support or bracket attached to standpipe.
				5. Install wall-mounted, rack hose stations in cabinets. Include pipe escutcheons, with finish matching valves, inside cabinet where water-supply piping penetrates cabinet. Install valves at angle required for connection of fire hose. Comply with requirements for cabinets in Section 104413 "Fire Protection Cabinets."
				6. Install hose-reel hose stations on wall with bracket.
			1. FIRE-DEPARTMENT CONNECTION INSTALLATION
				1. Install wall-type fire-department connections. Comply with requirements for Fire Department Connections in Section 211119 “Fire Department Connections”.
				2. Install yard-type fire-department connections in concrete slab support. Comply with requirements for concrete in Section 033000 "Cast-in-Place Concrete.”

Install [**two**] [**three**] <**Insert number**> protective pipe bollards [**around**] [**on sides of**] each fire-department connection. Comply with requirements for bollards in Section 055000 "Metal Fabrications.”

* + - * 1. Install automatic (ball drip) drain valve at each check valve for fire-department connection.
			1. IDENTIFICATION
				1. Install labeling and pipe markers on equipment and piping according to requirements in NFPA 13. Comply with requirements for labeling and identifying equipment, piping, control valves, and drains specified in Section 210553 “Identification for Fire-Suppression Piping and Equipment”.
				2. Identify system components, wiring, cabling, and terminals.
				3. Hydraulic Design Information Sign as per NFPA 14 “Standard for the Installation of Standpipe and Hose Systems”: Provide a sign identifying the basis of the system design on a permanently marked weatherproof metal or rigid plastic sign secured with corrosion resistant wire, chain, or other approved means. Such signs shall be placed at located at the water supply control valve for automatic or semiautomatic standpipe systems and at an approved location for manual systems. The sign shall indicate the following:

Location of the two hydraulic most remote hose connections.

Design flow rate for each remote hose connection identified above.

Design residual inlet and outlet pressures for the connections identified above.

Design static pressure and the design system demand (i.e., flow and residual pressure) at the system control valve, or at the pump discharge flange where a pump is installed, and at each fire department connection.

* + - * 1. General Information Sign as per NFPA 13 “Standard for the Installation of Sprinkler Systems”: Such signs shall be placed at each system control riser, antifreeze loop, and auxiliary system control valve. The sign shall include the following information:

Name and location of the facility protected

Occupancy classification

Commodity classification

Presence of high-piled and /or rack storage

Maximum height of storage planned

Aisle width planned

Encapsulation of pallet loads

Presence of solid shelving

Flow test data

Presence of flammable/combustible liquids

Presence of hazardous materials

Presence of other special storage

Location of auxiliary drains and low point drains on dry pipe and preaction systems

Original results of main drain flow test

Name of installing contractor or designer

Indication of presence and location of antifreeze or auxiliary systems

Where injection systems are installed to treat MIC or corrosion, the type of chemical, concentration of the chemical, and where information can be found as to the proper disposal of the chemical

* + - * 1. Caution signs shall be attached to all valves controlling sprinklers as per NFPA 13: The caution sign shall be worded as follows: “This valve controls fire protection equipment. Do not close until after fire has been extinguished. Use auxiliary valves when necessary to shut off supply to auxiliary equipment.”
			1. FIELD QUALITY CONTROL
				1. Perform tests and inspections as per NFPA 14 "Standard for the Installation of Standpipe and Hose Systems” standards that is being installed. Witnessed with the Directors Representative and fire code official.

Retain "Tests and Inspections" Paragraph below to describe tests and inspections to be performed.

* + - * 1. Tests and Inspections:

Dry Standpipe System: Air pressure leakage test: In additional to the standard hydrostatic test, an air pressure leakage test at 40 psi shall be conducted for 24 hours. Any leakage that results in a loss of pressure in excess of 1-1/2 psi for 24 hours shall be corrected.

Flush test, Hydrostatic tests as per NFPA. Cleaning and pressure testing of system to 200 psi for 2 hours and inspect standpipe systems according to NFPA 14 “Standard for the Installation of Standpipe and Hose Systems”, System Acceptance.

System Operational Tests: Trip Test on Dry Standpipe Systems for delivery through remote hose valve.

Flow Test: Flow water from the hydraulic most remote stand pipe outlet(s).

Testing Pressure Regulating Devices.

Coordinate with fire-alarm tests. Operate as required.

Main Drain Flow Test.

Coordinate with fire-pump tests. Operate as required.

Verify that equipment hose threads are same as local fire-department equipment.

Tests performed on Backflow Preventer. As per Cross Connection Control, NYS DOH, and NFPA 13 “Standard for the Installation of Sprinkler Systems”.

See Section 014000 "Quality Requirements" for retesting and reinspecting requirements and Section 017300 "Execution" for requirements for correcting the Work.

* + - * 1. Fire-suppression standpipe system will be considered defective if it does not pass tests and inspections.
				2. Prepare test and inspection reports.
			1. DEMONSTRATION
				1. Engage the Company Field Advisor certified NICET III or IV Technician representative from the installing contractor to train Facilities Maintenance personnel on the normal operation, functions, and maintenance of equipment and components including response to alarm conditions, status reports, system operation, and emergency operation.
			2. PIPING SCHEDULE

Retain piping applications in this article. Coordinate with materials specified in Part 2.

* + - * 1. Piping between Fire-Department Connections and Check Valves: Galvanized, standard-weight steel pipe with grooved end to threaded joints.

Retain "one of" option in first paragraph below to allow Contractor to select piping materials from those retained.

* + - * 1. Standard-pressure, wet-type fire-suppression standpipe piping, [**NPS 4 and smaller**] <**Insert pipe size range**>, shall be[**one of**] the following:

Retain one or more of nine subparagraphs below. If using more than one type of material and joining method, identify various materials on Drawings, and show points of transition from one material to another.

[**Schedule 40**], black-steel pipe with threaded ends; uncoated, gray-iron threaded fittings; and threaded joints.

[**Schedule 40**], galvanized-steel pipe with threaded ends; galvanized, gray-iron threaded fittings; and threaded joints.

[**Schedule 40**], black-steel pipe with [**cut-**] [**or**] [**roll-**]grooved ends; uncoated, grooved-end fittings for steel piping; grooved-end-pipe couplings for steel piping; and grooved joints.

[**Schedule 40**], galvanized-steel pipe with cut-grooved ends; galvanized, grooved-end fittings for steel piping; grooved-end-pipe couplings for steel piping; and grooved joints.

[**Schedule 40**], black-steel pipe with plain ends; steel welding fittings; and welded joints.

Retain "one of" option in first paragraph below to allow Contractor to select piping materials from those retained.

* + - * 1. Standard-pressure, wet-type fire-suppression standpipe piping, [**NPS 5 to NPS 8**] <**Insert pipe size range**>, shall be[**one of**] the following:

Retain one or more of seven subparagraphs below. If using more than one type of material and joining method, identify various materials on Drawings, and show points of transition from one material to another.

[**Schedule 40**], black-steel pipe with threaded ends; uncoated, gray-iron threaded fittings; and threaded joints.

[**Schedule 40**], black-steel pipe with [**cut-**] [**or**] [**roll-**]grooved ends; uncoated, grooved-end fittings for steel piping; grooved-end-pipe couplings for steel piping; and grooved joints.

[**Schedule 40**] , black-steel pipe with plain ends; steel welding fittings; and welded joints.

[**Schedule 40**], galvanized-steel pipe with [**roll**]-grooved ends; galvanized, grooved-end fittings for steel piping; grooved-end-pipe couplings for steel piping; and grooved joints.

 [**Schedule 40**], black-steel pipe with plain ends; steel welding fittings; and welded joints.

Retain "one of" option in first paragraph below to allow Contractor to select piping materials from those retained.

* + - * 1. Standard-pressure, wet-type fire-suppression standpipe piping, [**NPS 10 and NPS 12**] <**Insert pipe size range**>, shall be[**one of**] the following:

Retain one or more of four subparagraphs below. If using more than one type of material and joining method, identify various materials on Drawings, and show points of transition from one material to another.

[**Schedule 40**], black-steel pipe with threaded ends; uncoated, gray-iron threaded fittings; and threaded joints.

[**Schedule 40**], black-steel pipe with [**cut-**]grooved ends; uncoated, grooved-end fittings for steel piping; grooved-end-pipe couplings for steel piping; and grooved joints.

[**Schedule 40**], black-steel pipe with plain ends; steel welding fittings; and welded joints.

[**Schedule 40**], galvanized-steel pipe with [**roll**]-grooved ends; galvanized, grooved-end fittings for steel piping; grooved-end-pipe couplings for steel piping; and grooved joints.

 [**Schedule 40**], black-steel pipe with plain ends; steel welding fittings; and welded joints.

Retain "one of" option in first paragraph below to allow Contractor to select piping materials from those retained.

* + - * 1. High-pressure, wet-type fire-suppression standpipe piping, [**NPS 4 and smaller**] <**Insert pipe size range**>, shall be[**one of**] the following:

Retain one or more of four subparagraphs below. If using more than one type of material and joining method, identify various materials on Drawings, and show points of transition from one material to another.

[**Schedule 40**] , black-steel pipe with threaded ends; uncoated, gray-iron threaded fittings; and threaded joints.

[**Schedule 40**], black-steel pipe with [**cut**] [**cut- or roll**] [**roll**]-grooved ends; uncoated, grooved-end fittings for steel piping; grooved-end-pipe couplings for steel piping; and grooved joints.

[**Schedule 40**], black-steel pipe with plain ends; steel welding fittings; and welded joints.

[**Schedule 40**], galvanized-steel pipe with [**roll**]-grooved ends; galvanized, grooved-end fittings for steel piping; grooved-end-pipe couplings for steel piping; and grooved joints.

 [**Schedule 40**], black-steel pipe with plain ends; steel welding fittings; and welded joints.

Retain "one of" option in first paragraph below to allow Contractor to select piping materials from those retained.

* + - * 1. High-pressure, wet-type fire-suppression standpipe piping, [**NPS 5 and larger**] <**Insert pipe size range**>, shall be[**one of**] the following:

Retain one or more of four subparagraphs below. If using more than one type of material and joining method, identify various materials on Drawings, and show points of transition from one material to another.

[**Schedule 40**] ,black-steel pipe with threaded ends; uncoated, gray-iron threaded fittings; and threaded joints.

[**Schedule 40**] , black-steel pipe with [**cut-**] [**or**] [**roll-**]grooved ends; uncoated, grooved-end fittings for steel piping; grooved-end-pipe couplings for steel piping; and grooved joints.

[**Schedule 40**], black-steel pipe with plain ends; steel welding fittings; and welded joints.

[**Schedule 40**], galvanized-steel pipe with [**roll**]-grooved ends; galvanized, grooved-end fittings for steel piping; grooved-end-pipe couplings for steel piping; and grooved joints.

 [**Schedule 40**], black-steel pipe with plain ends; steel welding fittings; and welded joints.

Retain "one of" option in first paragraph below to allow Contractor to select piping materials from those retained.

* + - * 1. Standard-pressure, dry-type fire-suppression standpipe piping, [**NPS 4 and smaller**] <**Insert pipe size range**>, shall be[**one of**] the following:

Retain one or more of two subparagraphs below. If using more than one type of material and joining method, identify various materials on Drawings, and show points of transition from one material to another.

[**Schedule 40**], galvanized-steel pipe with threaded ends; galvanized, gray-iron threaded fittings; and threaded joints.

[**Schedule 40**], galvanized-steel pipe with [**cut**]-grooved ends; galvanized, grooved-end fittings for steel piping; grooved-end-pipe couplings for steel piping; and grooved joints.

Retain "one of" option in paragraph below to allow Contractor to select piping materials from those retained.

* + - * 1. Standard-pressure, dry-type fire-suppression standpipe piping, [**NPS 5 and NPS 6**] <**Insert pipe size range**>, shall be[**one of**] the following:

Retain one or more of two subparagraphs below. If using more than one type of material and joining method, identify various materials on Drawings, and show points of transition from one material to another

[**Schedule 40**], galvanized-steel pipe with threaded ends; galvanized, gray-iron threaded fittings; and threaded joints.

[**Schedule 40**], galvanized-steel pipe with [**cut**]-grooved ends; galvanized, grooved-end fittings for steel piping; grooved-end-pipe couplings for steel piping; and grooved joints.

END OF SECTION 211200