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SECTION 211200 - FIRE-SUPPRESSION STANDPIPES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Pipes, fittings, and specialties.
2. Fire-protection specialty valves.
3. Hose connections.
4. Alarm devices.
5. Manual control stations.
6. Control panels.
7. Pressure gages.

B. Related Requirements:

1. Section 210523 "General-Duty Valves for Water-Based Fire-Suppression Piping."
2. Section 211119 "Fire-Department Connections" for exposed wall-mounted and yard fire hydrants.
3. Section 211213 "Fire-Suppression Hoses and Nozzles" for rack-type hose stations, reel-type hose stations, and monitors.
4. Section 211313 "Wet-Pipe Sprinkler Systems" for wet-pipe sprinkler piping.
5. Section 211316 "Dry-Pipe Sprinkler Systems" for dry-pipe sprinkler piping.

6. [Section 283111 "Digital, Addressable Fire-Alarm System"] [Section 283112 "Zoned (DC Loop) Fire-Alarm System"] for connections to alarm devices.

1.3 DEFINITIONS

- A. High-Pressure Standpipe Piping: Fire-suppression standpipe piping designed to operate at working pressure higher than standard 175 psig (1200 kPa), but not higher than [250 psig (1725 kPa)] [300 psig (2070 kPa)].
- B. Standard-Pressure Standpipe Piping: Fire-suppression standpipe piping designed to operate at working pressure 175 psig (1200 kPa) maximum.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product. [**Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.**]
 1. Grooved joint couplings and fittings may be shown on drawings and product submittals, and shall be specifically identified by manufacturer's style and series designation.
- B. Shop Drawings: For fire-suppression standpipes.
 1. Include plans, elevations, sections, and attachment details.
 2. Include diagrams for power, signal, and control wiring.
- C. Delegated-Design Submittal: For standpipe systems indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.5 INFORMATIONAL SUBMITTALS

- A. 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:
 1. Domestic water piping.
 2. Compressed-air piping.
 3. HVAC hydronic piping.
 4. Nitrogen piping.
 5. <Insert item>.
- B. Qualification Data: For Installer [**and professional engineer**].
- C. Approved Standpipe Drawings: Working plans, prepared according to NFPA 14, that have been approved by authorities having jurisdiction, including hydraulic calculations if applicable.
- D. Welding certificates.
- E. Fire-hydrant flow test report.

- F. Field Test Reports and Certificates: Indicate and interpret test results for compliance with performance requirements and as described in NFPA 14. Include "Contractor's Material and Test Certificate for Aboveground Piping" and "Contractor's Material and Test Certificate for Underground Piping."
- G. Field quality-control reports.

1.6 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For fire-suppression standpipes specialties to include in emergency, operation, and maintenance manuals.

1.7 QUALITY ASSURANCE

A. Installer Qualifications:

1. Installer's responsibilities include designing, fabricating, and installing fire-suppression standpipes and providing professional engineering services needed to assume engineering responsibility. Base calculations on results of fire-hydrant flow test.
 - a. Engineering Responsibility: Preparation of working plans, calculations, and field test reports by a qualified professional engineer.

- B. Welding Qualifications: Qualify procedures and operators according to ASME Boiler and Pressure Vessel Code.

- C. 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.

- D. NFPA Standards: Fire-suppression standpipe equipment, specialties, accessories, installation, and testing shall comply with NFPA 14.

1.8 PROJECT CONDITIONS

- A. Interruption of Existing Fire-Suppression Standpipe Service: Do not interrupt fire-suppression standpipe service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary fire-suppression standpipe service according to requirements indicated:

1. Notify [Architect] [Construction Manager] [Owner] no fewer than [two] <Insert number> days in advance of proposed interruption of fire-suppression standpipe service.
2. Do not proceed with interruption of fire-suppression standpipe service without [Architect's] [Construction Manager's] [Owner's] written permission.

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTIONS

- A. Automatic Wet-Type, Class I Standpipe System: Includes NPS 2-1/2 (DN 65) hose connections. Has open water-supply valve with pressure maintained and is capable of supplying water demand.
- B. Automatic Wet-Type, Class II Standpipe System: Includes NPS 1-1/2 (DN 40) hose stations. Has open water-supply valve with pressure maintained and is capable of supplying water demand.
- C. Automatic Wet-Type, Class III Standpipe System: Includes NPS 1-1/2 (DN 40) hose stations and NPS 2-1/2 (DN 65) hose connections. Has open water-supply valve with pressure maintained and is capable of supplying water demand.
- D. Automatic Dry-Type, Class I Standpipe System: Includes NPS 2-1/2 (DN 65) hose connections. 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.
- E. Automatic Dry-Type, Class II Standpipe System: Includes NPS 1-1/2 (DN 40) hose stations. 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.
- F. Automatic Dry-Type, Class III Standpipe System: Includes NPS 1-1/2 (DN 40) hose stations and NPS 2-1/2 (DN 65) hose connections. 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.
- G. Semiautomatic Dry-Type, Class I Standpipe System: Includes NPS 2-1/2 (DN 65) hose connections. 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.
- H. Semiautomatic Dry-Type, Class II Standpipe System: Includes NPS 1-1/2 (DN 40) hose stations. 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.
- I. Semiautomatic Dry-Type, Class III Standpipe System: Includes NPS 1-1/2 (DN 40) hose stations and NPS 2-1/2 (DN 65) hose connections. 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.
- J. Manual Wet-Type, Class I Standpipe System: Includes NPS 2-1/2 (DN 65) hose connections. Has small water supply to maintain water in standpipes. Piping is wet, but water must be pumped into standpipes to satisfy demand.
- K. Manual Dry-Type, Class I Standpipe System: Includes NPS 2-1/2 (DN 65) hose connections. Does not have permanent water supply. Piping is dry. Water must be pumped into standpipes to satisfy demand.

2.2 PERFORMANCE REQUIREMENTS

- A. Standard-Pressure, Fire-Suppression Standpipe System Component: Listed for **175-psi (1200-kPa)** minimum working pressure.
- B. High-Pressure, Fire-Suppression Standpipe System Component: Listed for [**250-psi (1725-kPa) minimum**] [**300-psi (2070-kPa)**] [**350-psi (2415-kPa)**] working pressure.
- C. Delegated Design: Design fire-suppression standpipes, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
 - 1. Available fire-hydrant flow test records indicate the following conditions:
 - a. Date: **<Insert test date>**.
 - b. Time: **<Insert time>** [a.m.] [p.m.]
 - c. Performed by: **<Insert operator's name>** of **<Insert firm>**.
 - d. Location of Residual Fire Hydrant R: **<Insert location>**.
 - e. Location of Flow Fire Hydrant F: **<Insert location>**.
 - f. Static Pressure at Residual Fire Hydrant R: **<Insert psi (kPa)>**.
 - g. Measured Flow at Flow Fire Hydrant F: **<Insert gpm (L/s)>**.
 - h. Residual Pressure at Residual Fire Hydrant R: **<Insert psi (kPa)>**.
- D. Fire-suppression standpipe design shall be approved by authorities having jurisdiction.
 - 1. Minimum residual pressure at each hose-connection outlet is as follows:
 - a. **NPS 1-1/2 (DN 40)** Hose Connections: [**65 psi (450 kPa)**] **<Insert value>**.
 - b. **NPS 2-1/2 (DN 65)** Hose Connections: [**100 psi (690 kPa)**] **<Insert value>**.
- E. Seismic Performance: Fire-suppression standpipes shall withstand the effects of earthquake motions determined according to NFPA 13 and [**ASCE/SEI 7**] **<Insert requirement>**.

2.3 PIPING MATERIALS

- A. 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.

2.4 BLACK STEEL PIPE AND ASSOCIATED FITTINGS

- A. Schedule 40: ASTM A 53/A 53M, Type E, Grade B; with factory- or field-formed ends to accommodate joining method.
- B. Schedule 40: ASTM A 135/A 135M, Grade A; with factory- or field-formed ends to accommodate joining method.
- C. Schedule 40: ASTM A 795/A 795M, Type E, Grade A; with factory- or field-formed ends to accommodate joining method.

- D. Schedule 30: ASTM A 53/A 53M, Type E, Grade B; with factory- or field-formed ends to accommodate joining method.
- E. Schedule 30: ASTM A 135/A 135M, Grade A; with factory- or field-formed ends to accommodate joining method.
- F. Schedule 30: ASTM A 795/A 795M, Type E, Grade A; with factory- or field-formed ends to accommodate joining method.
- G. Thinwall: ASTM A 53/A 53M, Type E; with wall thickness less than Schedule 30 and equal to or greater than Schedule 10; and with factory- or field-formed ends to accommodate joining method.
- H. Thinwall: ASTM A 135/A 135M, Grade A; with wall thickness less than Schedule 30 and equal to or greater than Schedule 10; and with factory- or field-formed ends to accommodate joining method.
- I. Thinwall: ASTM A 795/A 795M, Type E, Grade A; with wall thickness less than Schedule 30 and equal to or greater than Schedule 10; and with factory- or field-formed ends to accommodate joining method.
- J. Schedule 10: ASTM A 135/A 135M or ASTM A 795/A 795M, Schedule 10 in **NPS 5 (DN 125)** and smaller; and NFPA 13-specified wall thickness in **NPS 6 to NPS 10 (DN 150 to DN 250)**, plain end.
- K. Lightwall: ASTM A 135/A 135M, [**Grade A**] <Insert grade>; ASTM A 795/A 795M, [**Type E**] <Insert type>, [**Grade A**] <Insert grade>, with wall thickness less than Schedule 10 and greater than Schedule 5.
- L. Uncoated, Steel Couplings: ASTM A 865/A 865M, threaded.
- M. Uncoated, Gray-Iron Threaded Fittings: ASME B16.4, Class 125, standard pattern.
- N. Malleable- or Ductile-Iron Unions: UL 860.
- O. Cast-Iron Flanges: ASME B16.1, Class 125.
- P. Steel Flanges and Flanged Fittings: ASME B16.5, Class 150.
- Q. Steel Welding Fittings: ASTM A 234/A 234M and ASME B16.9.
- R. Grooved-Joint, Steel-Pipe Appurtenances:
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Victaulic Company; <Insert product name or designation> of comparable product by one of the following:
 - a. <Insert engineer approved manufacturer's name>.
 - 2. Pressure Rating: [**175 psig (1200 kPa)**] [**250 psig (1725 kPa)**] [**300 psig (2070 kPa)**] minimum.

3. **[Galvanized] [and] [Uncoated]**, Grooved-End Fittings for Steel Piping: ASTM A 536, ductile-iron casting; short pattern, with flow equal to standard pattern, with dimensions matching steel pipe.
4. Grooved-End-Pipe Couplings for Steel Piping: AWWA C606 and UL 213, rigid pattern, unless otherwise indicated, for steel-pipe dimensions. Include ferrous housing sections, EPDM-rubber gasket, and ASTM A 449 electroplated steel bolts and nuts.
 - a. Rigid Type Couplings: Housings cast with offsetting, angle-pattern bolt pads to provide joint rigidity and support and hanging in accordance with NFPA-13. Couplings shall be fully installed at visual pad-to-pad offset contact. Tongue-and-recess type couplings, or any coupling that requires exact gapping of bolt pads at required torque ratings, are not permitted.
 - 1) Basis-of-Design Product: Subject to compliance with requirements, provide Victaulic Company; Style 009-EZ and Style 107H, Installation-Ready, or comparable product by one of the following:
 - a) **<Insert engineer approved manufacturer's name>**.
 - 2) Installation: Suitable for direct stab installation without field disassembly.
 - b. Rigid Type Couplings: Housings cast with offsetting, angle-pattern bolt pads to provide joint rigidity and support and hanging in accordance with NFPA-13. Couplings shall be fully installed at visual pad-to-pad offset contact. Tongue-and-recess type couplings, or any coupling that requires exact gapping of bolt pads at required torque ratings, are not permitted.
 - 1) Basis-of-Design Product: Subject to compliance with requirements, provide Victaulic Company; Victaulic FireLock Style 005 and Zero-lex Style 07, or comparable product by one of the following:
 - a) **<Insert engineer approved manufacturer's name>**.
 - c. Flexible Type: For use in locations where vibration attenuation and stress relief are required.
 - 1) Basis-of-Design Product: Subject to compliance with requirements, provide Victaulic Company; Installation-Ready Style 177, or comparable product by one of the following:
 - a) **<Insert engineer approved manufacturer's name>**.
 - 2) Installation: Suitable for direct stab installation without field disassembly.
 - d. Flexible Type: For use in locations where vibration attenuation and stress relief are required.
 - 1) Basis-of-Design Product: Subject to compliance with requirements, provide Victaulic Company; Style 75 and Style 77 or comparable product by one of the following:

- a) **<Insert engineer approved manufacturer's name>.**
- e. Flange Adapter: For direct connection to ANSI Class 125 or 150 flanged connections.
 - 1) Basis-of-Design Product: Subject to compliance with requirements, provide Victaulic Company; Style 741 and Style 744 or comparable product by one of the following:
 - a) **<Insert engineer approved manufacturer's name>.**
- f. Flange Adapter: For ANSI Class 300 connections.
 - 1) Basis-of-Design Product: Subject to compliance with requirements, provide Victaulic Company; Style 743 or comparable product by one of the following:
 - a) **<Insert engineer approved manufacturer's name>.**
- S. Stainless Steel Pressure-Seal Fittings: FM-approved, **500-psig (3450-kPa)** maximum pressure rating with stainless steel housing, elastomer O-rings, and pipe stop; for use with fitting manufacturer's pressure-seal tool Series PFT-510.
 - 1. Pipe: Schedule 10S, type 304/304L, conforming to ASTM A 312.
 - 2. Basis-of-Design Product: Subject to compliance with requirements, provide Victaulic Company; "Vic-Press" or comparable product by one of the following:
 - a. **<Insert engineer approved manufacturer's name>.**

2.5 GALVANIZED-STEEL PIPE AND ASSOCIATED FITTINGS

- A. Schedule 40: ASTM A 53/A 53M, Type E, Grade B; with factory- or field-formed ends to accommodate joining method.
- B. Schedule 40: ASTM A 135/A 135M, Grade A; with factory- or field-formed ends to accommodate joining method.
- C. Schedule 40: ASTM A 795/A 795M, Type E, Grade A; with factory- or field-formed ends to accommodate joining method.
- D. Galvanized-Steel Pipe Nipples: ASTM A 733, made of ASTM A 53/A 53M or ASTM A 106/A 106M, Standard Weight, seamless steel pipe with threaded ends.
- E. Galvanized, Gray-Iron Threaded Fittings: ASME B16.4, Class 125, standard pattern.
- F. Malleable-Iron Unions:
 - 1. ASME B16.39, Class 150.
 - 2. Hexagonal-stock body.
 - 3. Ball-and-socket, metal-to-metal, bronze seating surface.

4. Threaded ends.

G. Flanges: ASME B16.1, Class 125, cast iron.

H. Appurtenances for Grooved-End, Galvanized-Steel Pipe:

1. Basis-of-Design Product: Subject to compliance with requirements, provide Victaulic Company; **<Insert product name or designation>** comparable product by one of the following:
 - a. **<Insert engineer approved manufacturer's name>**.
2. Fittings for Grooved-End, Galvanized-Steel Pipe: Galvanized, ASTM A 536, ductile-iron casting; short pattern, with flow equal to standard pattern, and with dimensions matching steel pipe.
 - a. Basis-of-Design Product: Subject to compliance with requirements, provide Victaulic Company; FireLock or comparable product by one of the following:
 - 1) **<Insert engineer approved manufacturer's name>**.
 - b. In sizes where short pattern fittings are not available, Victaulic standard fittings may be used.
3. Fittings for Grooved-End, Galvanized-Steel Pipe:
 - a. AWWA C606 for steel-pipe dimensions.
 - b. Ferrous housing sections.
 - c. EPDM-rubber gaskets suitable for hot and cold water.
 - d. Bolts and nuts.
 - e. Rigid Type Couplings: Housings cast with offsetting, angle-pattern bolt pads to provide joint rigidity and support and hanging in accordance with NFPA-13. Couplings shall be fully installed at visual pad-to-pad offset contact. Tongue-and-recess type couplings, or any coupling that requires exact gapping of bolt pads at required torque ratings, are not permitted.
 - 1) Basis-of-Design Product: Subject to compliance with requirements, provide Victaulic Company; Style 009-EZ and Style 107H, Installation-Ready, or comparable product by one of the following:
 - a) **<Insert engineer approved manufacturer's name>**.
 - 2) Installation: Suitable for direct stab installation without field assembly.
 - f. Rigid Type Couplings: Housings cast with offsetting, angle-pattern bolt pads to provide joint rigidity and support and hanging in accordance with NFPA-13. Couplings shall be fully installed at visual pad-to-pad offset contact. Tongue-and-recess type couplings, or any coupling that requires exact gapping of bolt pads at required torque ratings, are not permitted.

- 1) Basis-of-Design Product: Subject to compliance with requirements, provide Victaulic Company; Victaulic FireLock Style 005 and Zero-Flex Style 07, or comparable product by one of the following:
 - a) <Insert engineer approved manufacturer's name>.
- g. Flexible Type: For use in locations where vibration attenuation and stress relief are required.
 - 1) Basis-of-Design Product: Subject to compliance with requirements, provide Victaulic Company; Installation-Ready Style 177 or comparable product by one of the following:
 - a) <Insert engineer approved manufacturer's name>.
 - 2) Installation: Suitable for direct stab installation without field assembly.
- h. Flexible Type: For use in locations where vibration attenuation and stress relief are required.
 - 1) Basis-of-Design Product: Subject to compliance with requirements, provide Victaulic Company; Style 75 and Style 77 or comparable product by one of the following:
 - a) <Insert engineer approved manufacturer's name>.

2.6 COPPER TUBE AND ASSOCIATED FITTINGS

- A. Hard Copper Tube: [ASTM B 88, Type L (ASTM B 88M, Type B)] [and] [ASTM B 88, Type M (ASTM B 88M, Type C)] water tube, drawn temper.
- B. Cast-Copper, Solder-Joint Fittings: ASME B16.18, pressure fittings.
- C. Wrought-Copper, Solder-Joint Fittings: ASME B16.22, pressure fittings.
- D. Bronze Flanges: ASME B16.24, Class 150, with solder-joint ends.
- E. Copper Unions: MSS SP-123, cast-copper-alloy, hexagonal-stock body, with ball-and-socket, metal-to-metal seating surfaces, and solder-joint or threaded ends.
- F. Grooved-Joint, Copper-Tube Appurtenances:
 1. Basis-of-Design Product: Subject to compliance with requirements, provide Victaulic Company; <Insert product name or designation> or comparable product by one of the following:
 - a. <Insert engineer approved manufacturer's name>.
 2. Grooved-End, Copper Fittings: ASME B 16.22 wrought copper and ASTM B 75 (ASTM B 75M), copper tube or ASME B16.18 and ASTM B 584, bronze castings.

3. Grooved-End-Tube Couplings: To fit copper tube dimensions, with design similar to AWWA C606. Include ferrous housing sections, cast with offsetting, angle-pattern, bolt pads, EPDM elastomer gasket suitable for hot and cold water, and electroplated bolts and nuts conforming to ASTM A 449.
 - a. Basis-of-Design Product: Subject to compliance with requirements, provide Victaulic Company; Style 607H, Installation-Ready or comparable product by one of the following:
 - 1) **<Insert engineer approved manufacturer's name>**.
 - b. Installation: Suitable for direct stab installation without field assembly.

2.7 PIPING JOINING MATERIALS

- A. Pipe-Flange Gasket Materials: [AWWA C110, rubber, flat face, **1/8 inch (3.2 mm) thick**] [or] [ASME B16.21, nonmetallic and asbestos free].
 1. Class 125, Cast-Iron Flanges and Class 150, Bronze Flat-Face Flanges: Full-face gaskets.
 2. Class 250, Cast-Iron Flanges and Class 300, Steel Raised-Face Flanges: Ring-type gaskets.
- B. Metal, Pipe-Flange Bolts and Nuts: ASME B18.2.1, carbon steel unless otherwise indicated.
- C. Grooved Joint lubricant: Compatible with gasket elastomer and fluid media. Supplied by coupling manufacturer.
 1. Basis-of-Design Product: Subject to compliance with requirements, provide Victaulic Company; Vic-Lube or comparable product by one of the following:
 - a. **<Insert engineer approved manufacturer's name>**.
- D. Brazing Filler Metals: AWS A5.8/A5.8M, BCuP Series, copper-phosphorus alloys for general-duty brazing unless otherwise indicated.
- E. Welding Filler Metals: Comply with AWS D10.12/D10.12M for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.

2.8 SPECIALTY VALVES

- A. General Requirements:
 1. Standard: UL's "Fire Protection Equipment Directory" listing or FM Global's "Approval Guide."
 2. Pressure Rating:
 - a. Standard-Pressure Piping Specialty Valves: **175 psig (1200 kPa)** minimum.
 - b. High-Pressure Piping Specialty Valves: [**250 psig (1725 kPa) minimum**] [**300 psig (2070 kPa)**].

3. Body Material: Cast or ductile iron.
4. Size: Same as connected piping.
5. End Connections: Flanged or grooved.

B. Alarm Valves:

1. Basis-of-Design Product: Subject to compliance with requirements, provide Victaulic Company; Series 751 or comparable product by one of the following:
 - a. **<Insert engineer approved manufacturer's name>**.
2. Standard: UL 193.
3. Design: For vertical installation.
4. Internal components shall be replaceable without removing valve from installed position.
5. Include trim sets for bypass, drain, electrical sprinkler alarm switch, pressure gages,[**retarding chamber**,] and fill-line attachment with strainer.
6. Drip Cup Assembly: Pipe drain without valves and separate from main drain piping.
7. Drip Cup Assembly: Pipe drain with check valve to main drain piping.

C. Dry-Pipe Valves:

1. Basis-of-Design Product: Subject to compliance with requirements, provide Victaulic Company; Series 768-NXT or comparable product by one of the following:
 - a. **<Insert engineer approved manufacturer's name>**.
2. Standard: UL 260.
3. Required Air Pressure: **13-psig (90-kPa)**.
4. Design: Differential-pressure type.
5. Internal components shall be replaceable without removing valve from installed position.
6. Valve shall be externally resettable.
7. Include UL 1486, quick-opening devices, trim sets for air supply, drain, priming level, alarm connections, ball drip valves, pressure gages, priming chamber attachment, and fill-line attachment.
8. Air-Pressure Maintenance Device:
 - a. Basis-of-Design Product: Subject to compliance with requirements, provide Victaulic Company; **<Insert product name or designation>** or comparable product by one of the following:
 - 1) **<Insert engineer approved manufacturer's name>**.
 - b. Standard: UL 260.
 - c. Type: Automatic device to maintain minimum air pressure in piping.
 - d. 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 (95- to 410-kPa)** adjustable range, and **[175-psig (1200-kPa)] [300-psig (2070-kPa)]** outlet pressure.
9. Air Compressor:

- a. Manufacturers: Subject to compliance with requirements, **[provide products by the following] [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:**
- b. Basis-of-Design Product: Subject to compliance with requirements, provide **[product indicated on Drawings] <Insert manufacturer's name; product name or designation>** or comparable product by one of the following:
 - 1) Gast Manufacturing Inc.
 - 2) **<Insert engineer approved manufacturer's name>**.
- c. Standard: UL's "Fire Protection Equipment Directory" listing.
- d. Motor Horsepower: Fractional.
- e. Power: 120-V ac, 60 Hz, single phase.

D. Deluge Valves:

1. Basis-of-Design Product: Subject to compliance with requirements, provide Victaulic Company; Series 769-NXT or comparable product by one of the following:
 - a. **<Insert engineer approved manufacturer's name>**.
2. Standard: UL 260.
3. Valve: Externally resettable.
4. Internal Components: Replaceable without removing valve from installed position.
5. Design: Hydraulically operated, differential-pressure type.
6. Include trim sets for bypass, drain, electrical sprinkler alarm switch, pressure gages, drip cup assembly piped without valves and separate from main drain line, fill-line attachment with strainer, and push-rod chamber supply connection.
7. Wet, Pilot-Line Trim Set: Include gage to read push-rod chamber pressure, globe valve for manual operation of deluge valve, and connection for actuation device.
8. Dry, Pilot-Line Trim Set: Include dry, pilot-line actuator; air- and water-pressure gages; 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.
9. Air-Pressure Maintenance Device:
 - a. Basis-of-Design Product: Subject to compliance with requirements, provide Victaulic Company; **<Insert product name or designation>** or comparable product by one of the following:
 - 1) **<Insert engineer approved manufacturer's name>**.
 - b. Standard: UL 260.
 - c. Type: Automatic device to maintain minimum air pressure in piping.
 - d. 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 (95- to 410-kPa)** adjustable range, and **[175-psig (1200-kPa)] [300-psig (2070-kPa)]** outlet pressure.

10. Air Compressor:

- a. Manufacturers: Subject to compliance with requirements, **[provide products by the following] [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:**
- b. Basis-of-Design Product: Subject to compliance with requirements, provide **[product indicated on Drawings] <Insert manufacturer's name; product name or designation>** or comparable product by one of the following:
 - 1) Gast Manufacturing Inc.
 - 2) **<Insert engineer approved manufacturer's name>**.
- c. Standard: UL's "Fire Protection Equipment Directory" listing.
- d. Motor Horsepower: Fractional.
- e. Power: 120-V ac, 60 Hz, single phase.

E. Pressure-Reducing Valves:

1. Manufacturers: Subject to compliance with requirements, **[provide products by the following] [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:**
2. Basis-of-Design Product: Subject to compliance with requirements, provide **[product indicated on Drawings] <Insert manufacturer's name; product name or designation>** or comparable product by one of the following:
 - a. CLA-VAL Automatic Control Valves.
 - b. Fire-End & Croker Corporation.
 - c. Fire Protection Products, Inc.
 - d. Guardian Fire Equipment, Inc.
 - e. OCV Control Valves.
 - f. Potter Roemer.
 - g. Zurn Plumbing Products Group; Wilkins Water Control Products Division.
 - h. **<Insert manufacturer's name>**.
3. UL 668 hose valve, with integral UL 1468 reducing device.
4. Pressure Rating: **300 psig (2070 kPa)** minimum.
5. Material: Brass or bronze.
6. Inlet: Female pipe threads.
7. Outlet: Threaded with or without adapter having male hose threads.
8. Pattern: **[Angle] [or] [gate]**.
9. Finish: **[Polished chrome-plated] [Rough brass or bronze] [Rough chrome-plated]**.

F. Automatic (Ball Drip) Drain Valves:

1. Manufacturers: Subject to compliance with requirements, **[provide products by the following] [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:**

2. Basis-of-Design Product: Subject to compliance with requirements, provide [**product indicated on Drawings**] <Insert manufacturer's name; product name or designation> or comparable product by one of the following:
 - a. Reliable Automatic Sprinkler Co., Inc.
 - b. <Insert manufacturer's name>.
3. Standard: UL 1726.
4. Pressure Rating: 175 psig (1200 kPa) minimum.
5. Type: Automatic draining, ball check.
6. Size: NPS 3/4 (DN 20).
7. End Connections: Threaded.

2.9 HOSE CONNECTIONS

A. Adjustable-Valve Hose Connections:

1. Manufacturers: Subject to compliance with requirements, [**provide products by the following**] [**provide products by one of the following**] [**available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following**]:
2. Basis-of-Design Product: Subject to compliance with requirements, provide [**product indicated on Drawings**] <Insert manufacturer's name; product name or designation> or comparable product by one of the following:
 - a. Brooks Equipment Co., Inc.
 - b. Elkhart Brass Mfg. Company, Inc.
 - c. Fire-End & Croker Corporation.
 - d. <Insert engineer approved manufacturer's name>.
3. Standard: UL 668 hose valve, with integral UL 1468 reducing or restricting pressure-control device, for connecting fire hose.
4. Pressure Rating: 300 psig (2070 kPa) minimum.
5. Material: Brass or bronze.
6. Size: NPS 1-1/2 or NPS 2-1/2 (DN 40 or DN 65), as indicated.
7. Inlet: Female pipe threads.
8. Outlet: Male hose threads with lugged cap, gasket, and chain. Include hose valve threads according to NFPA 1963 and matching local fire-department threads.
9. Pattern: [**Angle**] [**or**] [**gate**].
10. Pressure-Control Device Type: Pressure [**reducing**] [**restricting**].
11. Design Outlet Pressure Setting: <Insert psig (kPa)>.
12. Finish: [**Polished chrome-plated**] [**Rough brass or bronze**] [**Rough chrome-plated**].

B. Nonadjustable-Valve Hose Connections:

1. Manufacturers: Subject to compliance with requirements, [**provide products by the following**] [**provide products by one of the following**] [**available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following**]:

2. Basis-of-Design Product: Subject to compliance with requirements, provide [**product indicated on Drawings**] <Insert manufacturer's name; product name or designation> or comparable product by one of the following:
 - a. Brooks Equipment Co., Inc.
 - b. NIBCO INC.
 - c. Viking Corporation.
 - d. <Insert engineer approved manufacturer's name>.
3. Standard: UL 668 hose valve for connecting fire hose.
4. Pressure Rating: 300 psig (2070 kPa) minimum.
5. Material: Brass or bronze.
6. Size: NPS 1-1/2 or NPS 2-1/2 (DN 40 or DN 65), as indicated.
7. Inlet: Female pipe threads.
8. Outlet: Male hose threads with lugged cap, gasket, and chain. Include hose valve threads according to NFPA 1963 and matching local fire-department threads.
9. Pattern: [Angle] [or] [gate].
10. Finish: [Polished chrome-plated] [Rough brass or bronze] [Rough chrome-plated].

2.10 ALARM DEVICES

A. Alarm-device types shall match piping and equipment connections.

B. Water-Motor-Operated Alarm:

1. Basis-of-Design Product: Subject to compliance with requirements, provide Victaulic Company; <Insert product name or designation> or comparable product by one of the following:
 - a. <Insert engineer approved manufacturer's name>.
2. Standard: UL 753.
3. Type: Mechanically operated, with pelton wheel.
4. Alarm Gong: Cast aluminum with red-enamel factory finish.
5. Size: 10-inch (250-mm) diameter.
6. Components: Shaft length, bearings, and sleeve to suit wall construction.
7. Inlet: NPS 3/4 (DN 20).
8. Outlet: NPS 1 (DN 25) drain connection.

C. Electrically Operated Alarm Bell:

1. Manufacturers: Subject to compliance with requirements, [provide products by the following] [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:
 - a. Fire-Lite Alarms, Inc.; a Honeywell company.
 - b. Notifier; a Honeywell company.
 - c. Potter Electric Signal Company.
 - d. <Insert manufacturer's name>.

2. Standard: UL 464.
3. Type: Vibrating, metal alarm bell.
4. Size: [**6-inch (150-mm) minimum**] [**8-inch (200-mm) minimum**] [**10-inch (250-mm)**] diameter.
5. Finish: Red-enamel factory finish, suitable for outdoor use.

D. Water-Flow Indicators:

1. Manufacturers: Subject to compliance with requirements, **[provide products by the following] [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:**
 - a. System Sensor; a Honeywell company.
 - b. Viking Corporation.
 - c. Watts Industries (Canada) Inc.
 - d. **<Insert engineer approved manufacturer's name>**.
2. Standard: UL 346.
3. Water-Flow Detector: Electrically supervised.
4. 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.
5. Type: Paddle operated.
6. Pressure Rating: **250 psig (1725 kPa)**.
7. Design Installation: Horizontal or vertical.

E. Pressure Switches:

1. Manufacturers: Subject to compliance with requirements, **[provide products by the following] [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:**
 - a. Potter Electric Signal Company.
 - b. System Sensor; a Honeywell company.
 - c. Viking Corporation.
 - d. **<Insert engineer approved manufacturer's name>**.
2. Standard: UL 346.
3. Type: Electrically supervised water-flow switch with retard feature.
4. Components: Single-pole, double-throw switch with normally closed contacts.
5. Design Operation: Rising pressure signals water flow.

F. Valve Supervisory Switches:

1. Manufacturers: Subject to compliance with requirements, **[provide products by the following] [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:**

- a. Fire-Lite Alarms, Inc.; a Honeywell company.
 - b. Potter Electric Signal Company.
 - c. System Sensor; a Honeywell company.
 - d. <Insert engineer approved manufacturer's name>.
2. Standard: UL 346.
 3. Type: Electrically supervised.
 4. Components: Single-pole, double-throw switch with normally closed contacts.
 5. Design: Signals that controlled valve is in other than fully open position.
- G. Indicator-Post Supervisory Switches:
1. Manufacturers: Subject to compliance with requirements, **[provide products by the following] [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:**
 - a. Potter Electric Signal Company.
 - b. System Sensor; a Honeywell company.
 - c. <Insert manufacturer's name>.
 2. Standard: UL 346.
 3. Type: Electrically supervised.
 4. Components: Single-pole, double-throw switch with normally closed contacts.
 5. Design: Signals that controlled indicator-post valve is in other than fully open position.

2.11 MANUAL CONTROL STATIONS

- A. Description: UL listed or FM Global approved, hydraulic operation, with union, **NPS 1/2 (DN 15)** 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.

2.12 CONTROL PANELS

- A. Description: Single-area, two-area, or single-area cross-zoned control panel as indicated, including NEMA ICS 6, 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.
1. 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.
 2. 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.
 3. Manual Control Stations: Hydraulic operation, with union, **NPS 1/2 (DN 15)** 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.

2.13 PRESSURE GAGES

- A. Manufacturers: Subject to compliance with requirements, **[provide products by the following]** **[provide products by one of the following]** **[available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:**
1. AMETEK; U.S. Gauge Division.
 2. Ashcroft Inc.
 3. Brecco Corporation.
 4. WIKA Instrument Corporation.
 5. **<Insert manufacturer's name>**.
- B. Standard: UL 393.
- C. Dial Size: **3-1/2- to 4-1/2-inch** (90- to 115-mm) diameter.
- D. Pressure Gage Range: **[Zero to 250 psig (Zero to 1725 kPa) minimum]** **[Zero to 300 psig (Zero to 2070 kPa)]**.
- E. Water System Piping Gage: Include "WATER" or "AIR/WATER" label on dial face.
- F. Air System Piping Gage: Include **[retard feature and]** "AIR" or "AIR/WATER" label on dial face.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Perform fire-hydrant flow test according to NFPA 14 and NFPA 291. Use results for system design calculations required in "Quality Assurance" Article.
- B. Report test results promptly and in writing.

3.2 EXAMINATION

- A. Examine roughing-in for hose connections and stations to verify actual locations of piping connections before installation.
- B. 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.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 SERVICE-ENTRANCE PIPING

- A. 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."
- B. Install shutoff valve,[**backflow preventer**,] pressure gage, drain, and other accessories at connection to fire-suppression water-service piping.[**Comply with requirements for backflow preventers in Section 211100 "Facility Fire-Suppression Water-Service Piping."**]
- C. Install shutoff valve, check valve, pressure gage, and drain at connection to water service.

3.4 WATER-SUPPLY CONNECTIONS

- A. Connect fire-suppression standpipe piping to building's interior water-distribution piping. Comply with requirements for interior piping in Section 221116 "Domestic Water Piping."
- B. Install shutoff valve,[**backflow preventer**,] pressure gage, drain, and other accessories at connection to water-distribution piping.[**Comply with requirements for backflow preventers in Section 221119 "Domestic Water Piping Specialties."**]
- C. Install shutoff valve, check valve, pressure gage, and drain at connection to water supply.

3.5 PIPING INSTALLATION

- A. Locations and Arrangements: Drawing plans, schematics, and diagrams indicate general location and arrangement of piping. Install piping as indicated, as far as practical.
 - 1. Deviations from approved working plans for piping require written approval from authorities having jurisdiction. File written approval with Architect before deviating from approved working plans.
- B. Piping Standard: Comply with requirements in NFPA 14 for installation of fire-suppression standpipe piping.
- C. Install seismic restraints on piping. Comply with requirements in NFPA 13 for seismic-restraint device materials and installation.
- D. Install listed fittings to make changes in direction, branch takeoffs from mains, and reductions in pipe sizes.
- E. Install drain valves on standpipes. Extend drain piping to outside of building.
- F. Install automatic (ball drip) drain valves to drain piping between fire-department connections and check valves. Drain to floor drain or outside building.
- G. Install alarm devices in piping systems.
- H. Install hangers and supports for standpipe system piping according to NFPA 14. Comply with requirements in NFPA 13 for hanger materials.

- I. Install pressure gages on riser or feed main and at top of each standpipe. Include pressure gages with connection not less than **NPS 1/4 (DN 8)** and with soft-metal seated globe valve, arranged for draining pipe between gage and valve. Install gages to permit removal, and install where they are not subject to freezing.
- J. Drain dry-type standpipe system piping.
- K. Pressurize and check dry-type standpipe system piping and [**air-pressure maintenance devices**] [**air compressors**].
- L. Fill wet-type standpipe system piping with water.
- M. 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."
- N. Connect compressed-air or nitrogen supply to dry-pipe sprinkler piping.
- O. Connect air compressor to the following piping and wiring:
 - 1. Pressure gages and controls.
 - 2. Electrical power system.
 - 3. Fire-alarm devices, including low-pressure alarm.
- P. 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."
- Q. 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."
- R. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Section 210518 "Escutcheons for Fire-Suppression Piping."

3.6 JOINT CONSTRUCTION

- A. 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.
- B. Install unions adjacent to each valve in pipes **NPS 2 (DN 50)** and smaller.
- C. Install flanges, flange adapters, or couplings for grooved-end piping on valves, apparatus, and equipment having **NPS 2-1/2 (DN 65)** and larger end connections.
- D. Ream ends of pipes and tubes, and remove burrs. Bevel plain ends of steel pipe.

- E. Remove scale, slag, dirt, and debris from inside and outside of pipes, tubes, and fittings before assembly.
- F. Flanged Joints: Select appropriate gasket material in size, type, and thickness suitable for water service. Join flanges with gasket and bolts according to ASME B31.9.
- G. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. 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:
 - 1. Apply appropriate tape or thread compound to external pipe threads.
 - 2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged.
- H. Steel-Piping, Cut-Grooved Joints: Cut square-edge groove in end of pipe according to AWWA C606. Assemble coupling with housing, gasket, lubricant, and bolts. Join steel pipe and grooved-end fittings according to AWWA C606 for steel-pipe joints.
 - 1. Assure grooved ends are clean and free from indentations, projections, or roll marks.
 - 2. Use gaskets molded and produced by coupling manufacturer of an elastomer suitable for intended service.
 - 3. On-site Training: For contractor's field personnel in use of grooving tools and installation of product shall be provided by coupling manufacturer's factory-trained representative. (Distributor representative is not considered qualified to conduct the training.)
 - 4. Job Site Visitation: Manufacturer's representative shall periodically visit jobsite to ensure best practices in grooved product installation are followed.
 - 5. The installing contractor shall be certified by the grooved coupling manufacturer for the installation of their product. A manufacturer's factory trained representative (direct employee) shall provide on-site certification training for the installing contractor's field personnel in the use of grooving tools, application of groove, and product installation
 - 6. A field training program must be designed, developed, administered and evaluated in accordance to the ANSI/IACET Standard for Continuing Education and Training. (IACET-International Association for Continuing Education and Training)
 - 7. All installation professionals and pipe fitters must be able to provide proof of successful course completion upon request
- I. Steel-Piping, Roll-Grooved Joints: Roll rounded-edge groove in end of pipe according to AWWA C606. Assemble coupling with housing, gasket, lubricant, and bolts. Join steel pipe and grooved-end fittings according to AWWA C606 for steel-pipe grooved joints.
 - 1. Assure grooved ends are clean and free from indentations, projections, or roll marks.
 - 2. Use gaskets molded and produced by coupling manufacturer of an elastomer suitable for intended service.
 - 3. On-site Training: For contractor's field personnel in use of grooving tools and installation of product shall be provided by coupling manufacturer's factory-trained representative. (Distributor representative is not considered qualified to conduct the training.)
 - 4. Job Site Visitation: Manufacturer's representative shall periodically visit jobsite to ensure best practices in grooved product installation are followed.

5. The installing contractor shall be certified by the grooved coupling manufacturer for the installation of their product. A manufacturer's factory trained representative (direct employee) shall provide on-site certification training for the installing contractor's field personnel in the use of grooving tools, application of groove, and product installation
 6. A field training program must be designed, developed, administered and evaluated in accordance to the ANSI/IACET Standard for Continuing Education and Training. (IACET-International Association for Continuing Education and Training)
 7. All installation professionals and pipe fitters must be able to provide proof of successful course completion upon request
- J. Welded Joints: Construct joints according to AWS D10.12/D10.12M, using qualified processes and welding operators according to "Quality Assurance" Article.
1. Shop weld pipe joints where welded piping is indicated. Do not use welded joints for galvanized-steel pipe.
- K. Brazed Joints: Join copper tube and fittings according to CDA's "Copper Tube Handbook," "Braze Joints" Chapter.
- L. Copper-Tubing Grooved Joints: Roll rounded-edge groove in end of tube according to AWWA C606. Assemble coupling with housing, gasket, lubricant, and bolts. Join copper tube and grooved-end fittings according to AWWA C606 for steel-pipe grooved joints.
- M. Dissimilar-Material Piping Joints: Make joints using adapters compatible with materials of both piping systems.

3.7 VALVE AND SPECIALTIES INSTALLATION

- A. Install listed fire-protection valves, trim and drain valves, specialty valves and trim, controls, and specialties according to NFPA 14 and authorities having jurisdiction.
- B. Install listed fire-protection shutoff valves supervised-open, located to control sources of water supply except from fire-department connections. Install permanent identification signs indicating portion of system controlled by each valve.
- C. Install check valve in each water-supply connection. Install backflow preventers instead of check valves in potable-water-supply sources.
- D. Specialty Valves:
1. General Requirements: Install in vertical position for proper direction of flow, in main supply to system.
 2. Alarm Valves: Install bypass check valve and retarding chamber drain-line connection.
 3. **[Dry-Pipe] [and] [Deluge]** Valves: Install trim sets for air supply, drain, priming level, alarm connections, ball drip valves, pressure gages, priming chamber attachment, and fill-line attachment.
 - a. Install air compressor and compressed-air supply piping.
 - b. 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 (95- to 410-kPa)] <Insert value> adjustable range; and [175-psig (1200-kPa)] <Insert value> maximum inlet pressure.

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

3.8 HOSE-CONNECTION INSTALLATION

- A. Install hose connections adjacent to standpipes.
- B. Install freestanding hose connections for access and minimum passage restriction.
- C. Install NPS 1-1/2 (DN 40) hose-connection valves with flow-restricting device.
- D. Install NPS 2-1/2 (DN 65) hose connections with quick-disconnect NPS 2-1/2 by NPS 1-1/2 (DN 65 by DN 40) reducer adapter and flow-restricting device.
- E. 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."

3.9 HOSE-STATION INSTALLATION

- A. Install freestanding hose stations for access and minimum passage restriction.
- B. Install NPS 1-1/2 (DN 40) hose-station valves with flow-restricting device unless otherwise indicated.
- C. Install NPS 2-1/2 (DN 65) hose connections with quick-disconnect NPS 2-1/2 by NPS 1-1/2 (DN 65 by DN 40) reducer adapter and flow-restricting device unless otherwise indicated.
- D. Install freestanding hose stations with support or bracket attached to standpipe.
- E. 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."
- F. Install hose-reel hose stations on wall with bracket.

3.10 FIRE-DEPARTMENT CONNECTION INSTALLATION

- A. Install wall-type fire-department connections.
- B. Install yard-type fire-department connections in concrete slab support. Comply with requirements for concrete in Section 033000 "Cast-in-Place Concrete."

1. 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."
- C. Install automatic (ball drip) drain valve at each check valve for fire-department connection.
- D. At the low point near each fire department connection, install a 90-degree elbow with drain connection to allow for system drainage to prevent freezing. Basis-of-Design: Victaulic #10-DR.

3.11 IDENTIFICATION

- A. Install labeling and pipe markers on equipment and piping according to requirements in NFPA 14.
- B. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

3.12 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
- B. Tests and Inspections:
 1. Leak Test: After installation, charge systems and test for leaks. Repair leaks and retest until no leaks exist.
 2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
 3. Flush, test, and inspect standpipe systems according to NFPA 14, "System Acceptance" Chapter.
 4. Energize circuits to electrical equipment and devices.
 5. Start and run air compressors.
 6. Coordinate with fire-alarm tests. Operate as required.
 7. Coordinate with fire-pump tests. Operate as required.
 8. Verify that equipment hose threads are same as local fire-department equipment.
- C. Fire-suppression standpipe system will be considered defective if it does not pass tests and inspections.
- D. Prepare test and inspection reports.

3.13 DEMONSTRATION

- A. **[Engage a factory-authorized service representative to train] [Train]** Owner's maintenance personnel to adjust, operate, and maintain specialty valves.

3.14 PIPING SCHEDULE

- A. Piping between Fire-Department Connections and Check Valves: Galvanized, standard-weight steel pipe with **[threaded ends; cast-iron threaded fittings; and threaded]** **[grooved ends; grooved-end fittings; grooved-end-pipe couplings; and grooved]** joints.
- B. Standard-pressure, wet-type fire-suppression standpipe piping, **[NPS 4 (DN 100) and smaller]** **<Insert pipe size range>**, shall be **[one of]** the following:
1. **[Schedule 40]** **[or]** **[Schedule 30]**, black-steel pipe with threaded ends; uncoated, gray-iron threaded fittings; and threaded joints.
 2. **[Schedule 40]** **[Schedule 30]** **[or]** **[thinwall]**, galvanized-steel pipe with threaded ends; galvanized, gray-iron threaded fittings; and threaded joints.
 3. **[Schedule 40]** **[or]** **[Schedule 30]**, 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.
 4. **[Schedule 40]** **[or]** **[Schedule 30]**, galvanized-steel pipe with cut-grooved ends; galvanized, grooved-end fittings for steel piping; grooved-end-pipe couplings for steel piping; and grooved joints.
 5. **[Schedule 40]** **[or]** **[Schedule 30]**, black-steel pipe with plain ends; steel welding fittings; and welded joints.
 6. **[Thinwall]** **[Schedule 10,]** **[or]** **[lightwall]** black-steel pipe with roll-grooved ends; uncoated, grooved-end fittings for steel piping; grooved-end-pipe couplings for steel piping; and grooved joints.
 7. **[Thinwall]** **[Schedule 10,]** **[or]** **[lightwall]** black-steel pipe with plain ends; welding fittings; and welded joints.
 8. **[Type L (Type B)]** **[Type M (Type C)]**, hard copper tube with plain ends; **[cast-]** **[or]** **[wrought-]**copper solder-joint fittings; and brazed joints.
 9. **[Type L (Type B)]** **[Type M (Type B)]**, hard copper tube with roll-grooved ends; copper, grooved-end fittings; grooved-end-tube couplings; and grooved joints.
- C. Standard-pressure, wet-type fire-suppression standpipe piping, **[NPS 5 to NPS 8 (DN 125 to DN 200)]** **<Insert pipe size range>**, shall be **[one of]** the following:
1. **[Schedule 40]** **[Schedule 30]** **[or]** **[thinwall]**, black-steel pipe with threaded ends; uncoated, gray-iron threaded fittings; and threaded joints.
 2. **[Schedule 40]** **[or]** **[Schedule 30]**, galvanized-steel pipe with threaded ends; galvanized, gray-iron threaded fittings; and threaded joints.
 3. **[Schedule 40]** **[or]** **[Schedule 30]**, 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.
 4. **[Schedule 40]** **[or]** **[Schedule 30]**, galvanized-steel pipe with cut-grooved ends; galvanized, grooved-end fittings for steel piping; grooved-end-pipe couplings for steel piping; and grooved joints.
 5. **[Schedule 40]** **[or]** **[Schedule 30]**, black-steel pipe with plain ends; steel welding fittings; and welded joints.
 6. **[Thinwall]** **[Schedule 10,]** **[or]** **[lightwall]** black-steel pipe with roll-grooved ends; uncoated, grooved-end fittings for steel piping; grooved-end-pipe couplings for steel piping; and grooved joints.
 7. **[Thinwall]** **[Schedule 10,]** **[or]** **[lightwall]** black-steel pipe with plain ends; welding fittings; and welded joints.
 8. **[Type L (Type B)]** **[Type M (Type C)]**, hard copper tube with plain ends; **[cast-]** **[or]** **[wrought-]**copper solder-joint fittings; and brazed joints.

9. **[Type L (Type B)] [Type M (Type C)]**, hard copper tube with roll-grooved ends; copper, grooved-end fittings; grooved-end-tube couplings; and grooved joints.
- D. Standard-pressure, wet-type fire-suppression standpipe piping, **[NPS 10 and NPS 12 (DN 250 and DN 300)]** <Insert pipe size range>, shall be **[one of]** the following:
1. **[Schedule 40] [or] [Schedule 30]**, black-steel pipe with threaded ends; uncoated, gray-iron threaded fittings; and threaded joints.
 2. **[Schedule 40] [or] [Schedule 30]**, galvanized-steel pipe with threaded ends; galvanized, gray-iron threaded fittings; and threaded joints.
 3. **[Schedule 40] [or] [Schedule 30]**, 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.
 4. **[Schedule 40] [or] [Schedule 30]**, galvanized-steel pipe with cut-grooved ends; galvanized, grooved-end fittings for steel piping; grooved-end-pipe couplings for steel piping; and grooved joints.
 5. **[Schedule 40] [or] [Schedule 30]**, black-steel pipe with plain ends; steel welding fittings; and welded joints.
 6. **[Thinwall] [Schedule 10,] [or] [lightwall]** black-steel pipe with plain ends; welding fittings; and welded joints.
- E. High-pressure, wet-type fire-suppression standpipe piping, **[NPS 4 (DN 100) and smaller]** <Insert pipe size range>, shall be **[one of]** the following:
1. **[Schedule 40] [or] [Schedule 30]**, black-steel pipe with threaded ends; uncoated, gray-iron threaded fittings; and threaded joints.
 2. **[Schedule 40] [or] [Schedule 30]**, galvanized-steel pipe with threaded ends; galvanized, gray-iron threaded fittings; and threaded joints.
 3. **[Schedule 40] [or] [Schedule 30]**, 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.
 4. **[Schedule 40] [or] [Schedule 30]**, galvanized-steel pipe with cut-grooved ends; galvanized, grooved-end fittings for steel piping; grooved-end-pipe couplings for steel piping; and grooved joints.
 5. **[Schedule 40] [or] [Schedule 30]**, black-steel pipe with plain ends; steel welding fittings; and welded joints.
 6. **[Thinwall] [Schedule 10,] [or] [lightwall]** black-steel pipe with plain ends; welding fittings; and welded joints.
- F. High-pressure, wet-type fire-suppression standpipe piping, **[NPS 5 (DN 125) and larger]** <Insert pipe size range>, shall be **[one of]** the following:
1. **[Schedule 40] [or] [Schedule 30]**, black-steel pipe with threaded ends; uncoated, gray-iron threaded fittings; and threaded joints.
 2. **[Schedule 40] [or] [Schedule 30]**, galvanized-steel pipe with threaded ends; galvanized, gray-iron threaded fittings; and threaded joints.
 3. **[Schedule 40] [or] [Schedule 30]**, 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.

4. [Schedule 40] [or] [Schedule 30], galvanized-steel pipe with cut-grooved ends; galvanized, grooved-end fittings for steel piping; grooved-end-pipe couplings for steel piping; and grooved joints.
 5. [Schedule 40] [or] [Schedule 30], black-steel pipe with plain ends; steel welding fittings; and welded joints.
 6. [Thinwall] [Schedule 10,] [or] [lightwall] black-steel pipe with plain ends; welding fittings; and welded joints.
- G. Standard-pressure, dry-type fire-suppression standpipe piping, [NPS 4 (DN 100) and smaller] <Insert pipe size range>, shall be [one of] the following:
1. [Schedule 40] [or] [Schedule 30], galvanized-steel pipe with threaded ends; galvanized, gray-iron threaded fittings; and threaded joints.
 2. [Schedule 40] [or] [Schedule 30], galvanized-steel pipe with cut-grooved ends; galvanized, grooved-end fittings for steel piping; grooved-end-pipe couplings for steel piping; and grooved joints.
 3. [Type L (Type B)] [Type M (Type C)], hard copper tube with plain ends; [cast-] [or] [wrought-]copper solder-joint fittings; and brazed joints.
 4. [Type L (Type B)] [Type M (Type C)], hard copper tube with roll-grooved ends; copper, grooved-end fittings; grooved-end-tube couplings; and grooved joints.
- H. Standard-pressure, dry-type fire-suppression standpipe piping, [NPS 5 and NPS 6 (DN 125 and DN 150)] <Insert pipe size range>, shall be [one of] the following:
1. [Schedule 40] [or] [Schedule 30], galvanized-steel pipe with threaded ends; galvanized, gray-iron threaded fittings; and threaded joints.
 2. [Schedule 40] [or] [Schedule 30], galvanized-steel pipe with cut-grooved ends; galvanized, grooved-end fittings for steel piping; grooved-end-pipe couplings for steel piping; and grooved joints.
 3. [Type L (Type B)] [Type M (Type C)], hard copper tube with plain ends; [cast-] [or] [wrought-]copper solder-joint fittings; and brazed joints.
 4. [Type L (Type B)] [Type M (Type C)], hard copper tube with roll-grooved ends; copper, grooved-end fittings; grooved-end-tube couplings; and grooved joints.

END OF SECTION 211200