

SECTION 13916 - FIRE-SUPPRESSION SPRINKLERS

PART 1 - GENERAL

SUMMARY

This Section includes fire-suppression, wet-pipe and dry-pipe sprinklers, piping, and equipment extended from existing system in Children's Center.

See Division 13 Section "Fire Alarm" for alarm devices not in this Section.

SUBMITTALS

Product Data: For valves, alarm devices, fire department connections, and sprinklers indicated.

Fire-hydrant flow test report.

Approved Sprinkler Piping Drawings: Working plans, prepared according to NFPA 13, that have been approved by authorities having jurisdiction. Include hydraulic calculations, if applicable.

Field quality-control test reports.

QUALITY ASSURANCE

Manufacturer Qualifications: Firms whose equipment, specialties, and accessories are listed by product name and manufacturer in UL's "Fire Protection Equipment Directory" and FMG's "Fire Protection Approval Guide" and that comply with other requirements indicated.

Engineering Responsibility: Preparation of working plans, calculations, and field test reports by a qualified sprinkler designer. Base calculations on results of fire-hydrant flow test.

Sprinkler Components: Listing/approval stamp, label, or other marking by a testing agency acceptable to authorities having jurisdiction.

Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

NFPA Standards: Equipment, specialties, accessories, installation, and testing complying with the following:

NFPA 13, "Installation of Sprinkler Systems."

PART 2 - PRODUCTS

MANUFACTURERS

In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:

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Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

PIPES, TUBES, AND FITTINGS

Standard-Weight Steel Pipe: ASTM A 53, ASTM A 135, or ASTM A 795; Schedule 40 in **NPS 6 (DN 150)** and smaller, and Schedule 30 in **NPS 8 (DN 200)** and larger.

Thinwall, Threadable Steel Pipe: ASTM A 135 or ASTM A 795, with wall thickness less than Schedule 40 and greater than Schedule 10.

Schedule 10 Steel Pipe: ASTM A 135 or ASTM A 795, 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)**.

Cast-Iron Threaded Flanges: ASME B16.1.

Cast-Iron Threaded Fittings: ASME B16.4.

Steel, Threaded Couplings: ASTM A 865.

Steel Flanges and Flanged Fittings: ASME B16.5.

Steel, Grooved-End Fittings: UL-listed and FMG-approved, **ASTM A 47 (ASTM A 47M)**, malleable iron or ASTM A 536, ductile iron; with dimensions matching steel pipe and ends factory grooved according to AWWA C606.

Joining Materials: Refer to Division 15 Section "Basic Mechanical Materials and Methods" for pipe-flange gasket materials and welding filler metals.

VALVES

Fire-Protection-Service Valves: UL listed and FMG approved, with minimum **175-psig (1200-kPa)** nonshock working-pressure rating. Valves for grooved-end piping may be furnished with grooved ends instead of type of ends specified.

Manufacturers:

Central Sprink, Inc.
Central Sprinkler Corp.
Grinnell Corp.
McWane, Inc.; Kennedy Valve Div.
Nibco, Inc.
Stockham Valves & Fittings, Inc.
Victaulic Co. of America.

Gate Valves, **NPS 2 (DN 50)** and Smaller: UL 262; cast-bronze, threaded ends; solid wedge; OS&Y; and rising stem.

Indicating Valves, **NPS 2-1/2 (DN 65)** and Smaller: UL 1091; butterfly or ball-type, bronze body with threaded ends; and visual integral indicating device.

Gate Valves, **NPS 2-1/2 (DN 65)** and Larger: UL 262, iron body, bronze mounted, taper wedge, OS&Y, and rising stem. Include replaceable, bronze, wedge facing rings and flanged ends.

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Swing Check Valves, **NPS 2 (DN 50)** and Smaller: UL 312 or MSS SP-80, Class 150; bronze body with bronze disc and threaded ends.

Swing Check Valves, **NPS 2-1/2 (DN 65)** and Larger: UL 312, cast-iron body and bolted cap, with bronze disc or cast-iron disc with bronze-disc ring and flanged ends.

Specialty Valves:

Manufacturers:

Badger Fire Protection, Inc.
Central Sprinkler Corp.
Firematic Sprinkler Devices, Inc.
Globe Fire Sprinkler Corp.
Grinnell Corp.
Reliable Automatic Sprinkler Co., Inc.
Star Sprinkler Corp.
Viking Corp.

Alarm Check Valves: UL 193, **175-psig (1200-kPa)** working pressure, designed for horizontal or vertical installation, with cast-iron flanged inlet and outlet, bronze grooved seat with O-ring seals, and single-hinge pin and latch design. Include trim sets for bypass, drain, electric sprinkler alarm switch, pressure gages, retarding chamber, and fill-line attachment with strainer, and drip cup assembly.

Ball Drip Valves: UL 1726, automatic drain valve, **NPS 3/4 (DN 20)**, ball check device with threaded ends.

SPRINKLERS

Manufacturers:

Badger Fire Protection, Inc.
Central Sprinkler Corp.
Firematic Sprinkler Devices, Inc.
Globe Fire Sprinkler Corp.
Grinnell Corp.
Reliable Automatic Sprinkler Co., Inc.
Star Sprinkler Corp.
Viking Corp.

Automatic Sprinklers: With heat-responsive element complying with the following:

UL 199, for applications except residential.

Sprinkler Types and Categories: Nominal **1/2-inch (12.7-mm)** orifice for "Ordinary" temperature classification rating, unless otherwise indicated or required by application.

Sprinkler types, features, and options include the following:

Flush ceiling sprinklers, including escutcheon.
Pendent sprinklers.
Upright sprinklers, in utility spaces and no occupied spaces.

Sprinkler Finishes: Chrome-plated, bronze, and painted.

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Sprinkler Escutcheons: Materials, types, and finishes for the following sprinkler mounting applications. Escutcheons for concealed, flush, and recessed-type sprinklers are specified with sprinklers.

Ceiling Mounting: Plastic, white finish, one piece, flat.

SPECIALTY SPRINKLER FITTINGS

Specialty Sprinkler Fittings: UL listed and FMG approved; made of steel, ductile iron, or other materials compatible with piping.

Mechanical-T Fittings: UL 213, ductile-iron housing with pressure-responsive gasket, bolts, and threaded or locking-lug outlet.

Mechanical-Cross Fittings: UL 213, ductile-iron housing with pressure-responsive gaskets, bolts, and threaded or locking-lug outlets.

Drop-Nipple Fittings: UL 1474, with threaded inlet, threaded outlet, and seals; adjustable.

Sprinkler, Drain and Alarm Test Fittings: UL-listed, cast- or ductile-iron body; with threaded inlet and outlet, test valve, and orifice and sight glass.

Manufacturers:

Elkhart Brass Mfg. Co., Inc.
Fire-End and Croker Corp.
Smith Industries, Inc.; Potter-Roemer Div.

Sprinkler, Branch-Line Test Fittings: UL-listed, brass body; with threaded inlet and capped drain outlet and threaded outlet for sprinkler.

Manufacturers:

Fire-End and Croker Corp.
G/J Innovations, Inc.
Triple R Specialty of Ajax, Inc.

Sprinkler, Inspector's Test Fittings: UL-listed, cast- or ductile-iron housing; with threaded inlet and drain outlet and sight glass.

Manufacturers:

Central Sprinkler Corp.
Fire-End and Croker Corp.
Grinnell Corp.
Victaulic Co. of America.

ALARM DEVICES

Water-Flow Indicators and Supervisory Switches:

Manufacturers:

Gamewell Co.

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Grinnell Corp.
Pittway Corp.; System Sensor Div.
Potter Electric Signal Co.
Reliable Automatic Sprinkler Co., Inc.
Viking Corp.
Watts Industries, Inc.; Water Products Div.

Water-Flow Indicators: UL 346; electrical-supervision, vane-type water-flow detector; with 250-psig (1725-kPa) pressure rating; and designed for horizontal or vertical installation. Include 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.

Pressure Switches: UL 753; electrical-supervision-type, water-flow switch with retard feature. Include single-pole, double-throw, normally closed contacts and design that operates on rising pressure and signals water flow.

Valve Supervisory Switches: UL 753; electrical; single-pole, double throw; with normally closed contacts. Include design that signals controlled valve is in other than fully open position.

PRESSURE GAGES

Pressure Gages: UL 393, 3-1/2- to 4-1/2-inch- (90- to 115-mm-) diameter dial with dial range of 0 to 250 psig (0 to 1725 kPa).

PART 3 - EXECUTION

PREPARATION

Perform fire-hydrant flow test according to NFPA 13 and NFPA 291. Use results for system design calculations required in "Quality Assurance" Article in Part 1 of this Section. Report test results promptly and in writing.

APPLICATIONS

Flanges, unions, and transition and special fittings with pressure ratings the same as or higher than system's pressure rating may be used in aboveground applications, unless otherwise indicated.

Sprinkler Feed Mains and Risers:

NPS 4 (DN 100) and Smaller: Schedule 10 steel pipe with roll-grooved ends; steel, grooved-end fittings; and grooved joints.

Sprinkler Branch Piping:

NPS 1-1/2 (DN 40) and Smaller: Thinwall, threadable steel pipe with threaded ends; cast- or malleable-iron threaded fittings; and threaded joints.

NPS 2 (DN 50): Schedule 10 steel pipe with roll-grooved ends; steel, grooved-end fittings; steel, keyed couplings; and grooved joints.

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NPS 2-1/2 to NPS 3-1/2 (DN 65 to DN 90): Schedule 10 steel pipe with roll-grooved ends; steel, grooved-end fittings; and grooved joints.

JOINT CONSTRUCTION

Steel-Piping, Grooved Joints: Use Schedule 40 steel pipe with cut or roll-grooved ends and thinner steel pipe with roll-grooved ends; steel, grooved-end fittings; and steel, keyed couplings. Assemble joints with couplings, gaskets, lubricant, and bolts according to coupling manufacturer's written instructions. Use gaskets listed for dry-pipe service for dry piping.

Dissimilar-Piping-Material Joints: Construct joints using adapters or couplings compatible with both piping materials. Use dielectric fittings if both piping materials are metal. Refer to Division 15 Section "Basic Mechanical Materials and Methods" for dielectric fittings.

PIPING INSTALLATIONS

Refer to Division 15 Section "Basic Mechanical Materials and Methods" for basic piping installation.

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 Architect before deviating from approved working plans.

Use approved fittings to make changes in direction, branch takeoffs from mains, and reductions in pipe sizes.

Install unions adjacent to each valve in pipes **NPS 2 (DN 50)** and smaller. Unions are not required on flanged devices or in piping installations using grooved joints.

Install flanges or flange adapters on valves, apparatus, and equipment having **NPS 2-1/2 (DN 65)** and larger connections.

Install "Inspector's Test Connections" in sprinkler piping, complete with shutoff valve, sized and located according to NFPA 13.

Install sprinkler piping with drains for complete system drainage.

Install sprinkler zone control valves, test assemblies, and drain risers adjacent to sprinkler risers when sprinkler branch piping is connected to sprinkler risers.

Install alarm devices in piping systems.

Hangers and Supports: Comply with NFPA 13 for hanger materials and installation.

Install piping with grooved joints according to manufacturer's written instructions. Construct rigid piping joints, unless otherwise indicated.

Install pressure gages on riser or feed main and at each sprinkler test connection. 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 will not be subject to freezing.

Install specialty sprinkler fittings according to manufacturer's written instructions.

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VALVE INSTALLATIONS

Install fire-protection specialty valves, trim, fittings, controls, and specialties according to NFPA 13, manufacturer's written instructions, and authorities having jurisdiction.

Alarm Check Valves: Install in vertical position for proper direction of flow, including bypass check valve and retard chamber drain-line connection. Install excess-pressure pumps, controls, devices, and supports according to manufacturer's written installation instructions for wet-pipe sprinkler system application. Install mounted on wall, where indicated.

SPRINKLER APPLICATIONS

Install sprinklers in suspended ceilings in center of narrow dimension of acoustical panels.

Do not install pendent or sidewall, wet-type sprinklers in areas subject to freezing. Use glycol loop for sprinklers in attic space.

CONNECTIONS

Connect water supplies to sprinklers.

Connect piping to specialty valves, specialties, fire department connections, and accessories.

Electrical Connections: Power wiring is specified in Division 16.

Connect alarm devices to fire alarm.

LABELING AND IDENTIFICATION

Install labeling and pipe markers on equipment and piping according to requirements in NFPA 13.

FIELD QUALITY CONTROL

Flush, test, and inspect sprinkler piping according to NFPA 13, "System Acceptance" Chapter.

END OF SECTION 13916