# GENERAL

## SECTION INCLUDES

### Pipe, fittings, valves, and connections for a combined automatic wet-pipe sprinkler system and wet-pipe standpipe system.

### System design, installation, and certification.

### Fire department connections.

### Post indicator valves.

### Water main connections.

## REFERENCE SECTION 21 05 00 FOR THE FOLLOWING:

### REFERENCES

#### NFPA 13 ‑ Installation of Sprinkler Systems.

#### NFPA 14 – Installation of Standpipe and Hose Systems.

#### NFPA 24 ‑ Installation of Private Fire Service Mains and Their Appurtenances

### PROJECT RECORD DOCUMENTS

#### Record actual locations of sprinklers and deviations of piping from drawings. Indicate drain and test locations.

### OPERATION AND MAINTENANCE DATA

### DELIVERY, STORAGE, AND HANDLING

#### Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.

## SYSTEM DESCRIPTION

### System to provide coverage for entire building.

### System shall be a combined automatic sprinkler and wet-pipe standpipe system conforming to NFPA 14 Class I systems. Wet pipe sprinkler system conforming to NFPA 13 Light Hazard, Ordinary Hazard – Group 1, and Ordinary Hazard – Group 2 occupancy requirements. See drawings for zoning requirements and additional information.

### Determine volume and pressure of incoming water supply from water flow test data. Obtain water flow test data from Owner’s Representative. See drawings for further information.

### Interface system with building fire and smoke alarm system. Fire alarm specialties related to the sprinkler system (i.e. flow switches, supervisory valves, etc.) shall be provided and installed by the sprinkler contractor. However, these devices shall be wired under Division 26.

### Provide fire department connections as indicated. Coordinate fire department connection type with local fire department.

### Although not specifically specified, the Contractor shall provide and install all supplementary and/or miscellaneous items and devices as required for a complete, code compliant and operational sprinkler and standpipe system.

## SUBMITTALS

### Shop Drawings: Indicate hydraulic calculations, detailed pipe layout, hangers and supports, components and accessories. Indicate system controls. Indicate pipe materials used, jointing methods, supports, floor and wall penetration seals. Indicate installation, layout, weights, mounting and support details, and piping connections.

### Product Data: Provide data on sprinkler heads, valves, and specialties, including manufacturer’s catalogue information. Submit performance ratings rough‑in details, weights, support requirements, and piping connections.

### Submit shop drawings, product data, hydraulic calculations to authority having jurisdiction (local and state Fire Marshall if required) and Owner's insurance underwriter for approval. Submit proof of approval to Architect/Engineer.

## QUALITY ASSURANCE

### Designer and Installer: Company specializing in performing work of this Section with minimum three years’ experience.

### Standpipe and Sprinkler Systems: Perform work to NFPA 13 and NFPA 14. Contractor shall hydraulically calculate system pipe sizes in accordance with NFPA 13 and NFPA 14. Calculations and design drawings shall be sealed by a licensed Professional Engineer registered in the State of Nebraska.

### Equipment and Components: Bear UL and FM label or marking.

### Valves: Bear UL and FM label or marking. Provide manufacturer's name and pressure rating marked on valve body.

## REGULATORY REQUIREMENTS

### Hydraulic Calculations, Product Data, Shop Drawings: Bear stamp of approval of authority having jurisdiction (including Fire Marshall if required); Shall be sealed by a licensed Professional Engineer registered in Nebraska.

## EXTRA MATERIALS

### Furnish under provisions of appropriate Division 1 specification section.

### Provide extra sprinklers and storage cabinets under provisions of NFPA 13.

### Provide suitable wrenches for each head type.

# PRODUCTS

## STANDPIPE AND SPRINKLER PIPING, BURIED

### Ductile Iron Pipe: ASTM A377, AWWA C106, Class 150.

#### Fittings: AWWA C110, ductile iron, standard thickness.

#### Joints: Mechanical joints with ANSI/AWWA C111 rubber gasket.

## STANDPIPE AND SPRINKLER PIPING, ABOVE GROUND

### Steel Pipe: ASTM A53 or ASTM A795; Schedule 40 black steel.

#### Steel Fittings: ANSI/ASME B16.5, steel flanges and fittings.

#### Cast Iron Fittings: ANSI/ASME B16.4, screwed fittings.

#### Malleable Iron Fittings: ANSI/ASME B16.3, screwed type.

#### Joints: Flanged, grooved or threaded.

#### Mechanical Grooved Couplings: Victaulic 005 Firelock Rigid rolled groove fittings, no equivalent. Cut grooves or O-ring type socket fittings are not allowed.

### Pipe hangers shall conform to NFPA standard 13 requirements and shall be FM/UL approved for use in fire sprinkler systems. Refer to specification section 21 05 29 for additional information.

## FLEXIBLE SPRINKLER HOSE

### Basic Use:

#### Flexible stainless steel hose assemblies and a bracketing system that connect sprinkler heads to the branch lines. Each flexible hose assembly shall be provided with a mounting bracket and a 1-piece, leak tested sprinkler drop. The mounting bracket shall be compatible with application.

#### Flexible hose assembly shall be pressure/leak tested system available in 2’ – 6’ hose lengths.

#### All flexible hose assembly shall Factory Mutual (FM) approved and UL 2443 listed and are manufactured in an FM/UL audited facility.

#### Compatible with any FM/UL approved sprinkler head.

#### 100% leak tested system.

#### Industrial grade, all welded, no O-ring construction, with all stainless steel components.

#### Adjustable height and sprinkler alignment / center-of-tile uniformity.

#### Rated up to 300 psi (2066 kPa) with no additional hangers required.

#### Approved for use in suspended ceiling systems with light, medium and heavy load grids (ASTM C635, C636)

#### True-bore 1” internal corrugated hose diameter, which produces friction loss values similar to hard pipe armovers.

#### IBC and SEI/ASCE 7-02 compliant for sprinklers installed in seismic design classes C and D/E/F.

### Composition and Materials:

#### Every flexible hose assembly shall come complete with the flexible hose. Each connection shall be made from 100% factory tested Type 304 stainless steel. The hose nipples shall be 304 stainless steel and be fully welded. Flexible hose assembly shall be leak tested to 175 psi. It shall have burst pressure of over 2000 psi.

#### The bracket system shall be factory or shop fabricated made from galvanized sheet metal and is approved and compatible for application. Coordinate with flexible hose manufacturer.

## GATE VALVES

### Up to and including 2 Inches: Bronze body, bronze trim, non‑rising stem, handwheel, inside screw, solid wedge disc, threaded ends, class 175, UL/FM approved.

### Over 2 Inches: Iron body, bronze trim, rising stem, handwheel, OS&Y, solid wedge disk, flanged or grooved ends, class 175, UL/FM approved.

## ANGLE VALVES

### Up to 2 Inches: Bronze body, bronze trim, rising stem and handwheel, inside screw, renewable composition disc, screwed ends, with backseating capacity, class 175, UL/FM approved.

### Over 2 Inches: Iron body, bronze trim, rising stem, handwheel, OS&Y, plug‑type disc, flanged ends, renewable seat and disc, class 175, UL/FM approved.

## BALL VALVES

### Up to and including 2 Inches: Bronze two piece body, stainless steel ball, Teflon seats and stuffing box ring, lever handle threaded ends, blowout proof stem, full port, 600 WOG, UL/FM approved.

## BUTTERFLY VALVES

### Cast or ductile iron body, aluminum bronze disc, resilient replaceable EPDM seat, wafer or lug ends, extended neck, handwheel and gear drive and integral indicating device and built‑in tamper proof switch rated, UL/FM approved.

## CHECK VALVES

### Up to and including 2 Inches: Bronze swing disc, screwed ends, class 200, UL/FM approved.

### Over 2 Inches: Iron body, bronze trim, swing disc, renewable disc and seat, flanged, screwed or grooved ends, UL/FM approved.

## SPRINKLER SYSTEM CONTROL VALVES

### Cast- or ductile-iron body, flanged or grooved ends, 175 psig minimum pressure rating, UL/FM approved.

## DRAIN VALVES

### Brass ball valve with cap and chain, 3/4 inch hose thread, UL/FM approved.

## PIPING SPECIALTIES

### Wet Pipe Sprinkler Alarm Valve: Check type valve with divided seat ring, rubber faced clapper to automatically actuate electrically operated alarms, with pressure retard chamber and variable pressure trim.

### Electric Alarm: Electrically operated red enameled gong with pressure alarm switch.

### Water Flow Switch: Electrically supervised vane type switch for mounting horizontal or vertical, with two contacts.

### Fire Department Connection:

#### Type: See plans.

#### Outlets: Two way with thread size to suit local fire department hardware; threaded dust cap and chain of matching material and finish. Cover plate and eyelet cover not acceptable.

#### UL/FM approved, class 250 Check valve with 3/4 inch automatic drip drain, connected to drain.

#### Drain: Automatic drip, discharged location(s) shown on drawings.

#### Escutcheon Engraving for Fire Department Connection: “AUTO SPRINKLER & STANDPIPE SYSTEM”.

### Indicator Post: UL 789, FM approved, vertical type, cast iron body with operating wrench, extension rod. Provide adjustable cast iron barrel of sufficient length to allow for bury depth of valve and surface elevation.

### Curb stops: Bronze body, ground key plug or ball, wide tee head with inlet and outlet to match service piping. Conform to all local water department requirements.

#### Service box for curb stop: Cast iron box with telescoping top section as required for valve bury depth. Include cover with lettering "WATER," and bottom section with base of size to fit over curb stop and barrel. Conform to all local water department requirements.

### Tapping sleeve and valve: Complete assembly, including two piece cast iron bolted sleeve with outlet connections suitable for use with size and type of piping being connected.

## FLOW ALARM SWITCHES

### FM/UL approved, water flow switches which will close contact when flow is detected.

## SPRINKLERS

### Refer to the fire sprinkler plans for sprinkler type.

### Sprinklers shall FM/UL listed and shall be Standard model E, Viking type M Grimes, or approved equivalent.

### Ceiling pendent are to be semi‑recessed type, white finish, with matching white escutcheon plate.

#### In corridors, dining areas, lobbies, conference rooms, and other public areas, provide concealed type ceiling pendant sprinklers with white cover plate and matching white escutcheon.

### Exposed areas shall be standard upright type, brass finish. Provide sprinkler head guards in mechanical rooms, electrical rooms, A/V rooms, high traffic areas and areas where heads are lower than 7'- 6" above the finished floor and/or where heads may be vandalized.

### Sidewall type in finish walls shall be white finish semi‑recessed type with matching white escutcheon plate.

### Fusible Link: Glass bulb type temperature rated for specific area hazard.

## VALVE SUPERVISORY SWITCHES

### Standard: UL 346

### 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.

## HOSE CONNECTIONS

### Connection: UL 668, brass or bronze, 300 psig minimum pressure rating, NPS 2-1/2 hose valve compatible with local fire department requirements, with lugged cap, gasket, and chain. Provide chrome-plated finish.

### Cabinet: Recessed mounting, 18”x18”x8” fire-rated enclosure, solid panel door with continuous steel piano hinge, white baked acrylic enamel finish, type 304 stainless steel, door and frame materials, with appropriate labeling.

# EXECUTION

## PREPARATION

### Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.

### Remove scale and foreign material, from inside and outside, before assembly.

### Prepare piping connections to equipment with flanges or unions.

## INSTALLATION

### Install piping in accordance with NFPA 13, NFPA 14, and NFPA 24 as applicable.

### Provide thrust blocks for each change of direction in underground fire service pipe in accordance with NFPA 24.

### Route piping in orderly manner, plumb and parallel to building structure. Maintain gradient. Place pipe runs to minimize obstruction to other work.

### Install piping to conserve building space, and not interfere with use of space and other work. It shall be the primary responsibility of sprinkler contractor to coordinate with other building trades to avoid architectural, structural, mechanical and electrical interference’s. All necessary additional sprinklers, piping, and other equipment required to avoid such interferences shall be provided as part of the sprinkler contract without additional compensation after the bid is submitted. However, should a change be made in the work of other contractors or trades from that shown on the drawings which results in additional work for the sprinkler contractor, a reasonable and equitable adjustment in the contract sum may be made.

### Sprinkler locations shown on drawings are recommendations only. Sprinkler/standpipe design engineer shall verify and modify locations as necessary to provide a code-compliant, functional system. Sprinkler locations will be subject to review of the Owner and Architect/Engineer during the shop drawing review phase.

### Wherever possible, install piping as high as possible so as not to interfere with the work of others. Wherever possible, place piping in concealed spaces above finished ceilings.

### Group piping whenever practical at common elevations.

### Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment. Slope piping and arrange systems to drain at low points.

### If it is discovered during installation that any component of the sprinkler system will be exposed to freezing conditions, the contractor shall notify the Architect/Engineer immediately.

### Prepare all exposed pipe, fittings, supports, and accessories for finish painting. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to welding. Paint to match finish of adjacent walls surfaces.

### Do not penetrate building structural members unless specifically indicated.

### Provide sleeves when penetrating footings, fire rated floors and fire rated walls. Seal pipe and sleeve penetrations to achieve fire resistance equivalent to fire separation required.

### Die cut screw joints with full cut standard taper pipe threads with red lead and linseed oil or other non‑toxic joint compound applied to male threads only.

### Install valves with stems upright or horizontal, not inverted.

### Provide gate, ball or butterfly valves for shut‑off or isolating service.

### Provide drain valves at main shut‑off valves, low points of piping and apparatus.

### Pipe main system drain valve and test connection to location outside building. See drawings.

### Install equipment in accordance with manufacturer’s instructions.

### Install buried shut‑off valves in valve box. Provide post indicator.

### Provide backflow preventer as shown on drawings.

### Locate fire department connection with sufficient clearance from walls, obstructions, or adjacent fire department connections to allow full swing of fire department wrench handle.

### Install outside alarm gong on building wall in location coordinated with the Architect / Engineer.

### All sprinklers installed in lay-in ceiling tiles shall be centered within the individual ceiling tile. Contractor shall provide all swing joints and/or offsets required to accomplish center locations. Ensure sprinklers are installed level with adjacent ceiling surface.

### Apply masking tape or paper cover to ensure concealed sprinkler head cover plates do not receive field paint finish.

### Flush entire piping system of foreign matter.

### Install pressure gauge on riser or feed main, at each sprinkler test connection, and at top of each standpipe.

### Install sprinkler storage cabinet in penthouse mechanical room. Coordinate location with other trades.

### Install all valves, flow switches, and other accessories in accessible locations. Where these components are located in a concealed area, provide access panels.

### Sprinkler or standpipe piping shall not be installed above any electrical panels, electrical transformers, fire alarm panels, or EMCS panels, regardless of distance above.

## FIELD QUALITY CONTROL

### Hydrostatically test entire system per NFPA 13 and NFPA 14. Test shall be witnessed by authority having jurisdiction.

### Perform a system test with a fire department pumper truck to verify acceptable pressure (typically 100 psig) at the most-remote standpipe hose connection. Connect pumper truck to fire department connection for test. Coordinate with authority having jurisdiction and local fire department.

### Note each test in Pipe Pressure Test Log. Submit test log to Engineer for review before final project closeout. Furnish copy of test log with operation and maintenance data.

### The contractor shall furnish and sign copy of Contractor’s Material and Test Certificate as provided in NFPA, Section 8-1 (Figure 8-1). Submit certificate to Engineer for review before final project closeout. Furnish copy of certificate with operation and maintenance data.

END OF SECTION 21 13 13