

SECTION 4:
GENERAL COMMERCIAL/MULTI-FAMILY REQUIREMENTS
FOR FIRE PROTECTION SYSTEMS

- 4.1 **General.** Fire protection and life safety systems shall comply with, be designed, installed, and maintained in accordance with this guide, the most current adopted edition of the IFC, as amended; the most current edition of NFPA Standards; and all other nationally recognized standards. Occupant notification shall be required for buildings containing fire sprinkler systems.
- 4.1.1 **Flush Test.** The installer shall flush the underground piping for the underground water main before connecting the sprinkler system riser to the water service line. The installer shall be certified to perform this test, as required by the State of Colorado and NFPA. The AHJ, or a designee approved by the AHJ, shall witness the flush of the underground piping. A State licensed contractor shall fill out a “Contractor’s Material and Test Certificate for Underground Piping.”
- 4.1.2 **Anti-Freeze.** All new fire sprinkler system designs submitted after 3/31/2023 shall comply with the current anti-freeze requirements published by the National Fire Protection Association. Sprinkler systems should be designed to protect all piping from freezing without using an anti-freeze solution.
- Existing buildings shall have anti-freeze installed in concentrations required to meet the freeze protection design of the system at the time the system was approved.
- 4.1.3 **Combustible decks, patios, and balconies.** Combustible decks, patios, and/or balconies with open-flame cooking devices or decorative devices shall be provided with sprinkler protection.
- 4.1.4 **Re-inspections.** Any failed inspection or test may be subject to a re-inspection fee per the District’s Fee Schedule. Additional inspections or tests cannot be scheduled until the re-inspection fee is paid. See the AHJ for details.
- 4.2 **Fire Alarm Requirements.** The system designer shall work with the AHJ to establish nodes as described below. The following nodes shall be monitored, where applicable. All alarm-initiating devices located within the listed zones shall sound an evacuation alarm. See exception below. Fire areas may be used to define individual buildings.
1. Main Sprinkler Water Flow
 2. Sprinkler Water Flow – by floor, by unit, by area, or portion thereof, and AHJ approved
 3. Sprinkler Low Air
 4. Valve Tamper

Exception: The zones for kitchen hood extinguishing systems, valve tampers, and sprinkler low-air alarms may not be required to sound an evacuation alarm.

- 4.3 Transmission of Alarm Signals.** The fire alarm panel shall transmit the following signals separately and distinctly. See the AHJ for signal requirements for fire pump systems
1. Main Sprinkler Water Flow
 2. Sprinkler Water Flow – by zone
 3. Supervisory
 4. Trouble
 5. Kitchen Hood Extinguishing System
 6. Fire Pump Activation – and other signals as outlined in NFPA 72
- 4.4 Supervision.** System devices shall be supervised. Removal of the signal circuit or loss of power to any device shall cause a system trouble signal per zone, both audibly and visually, at the fire alarm control panel.
- 4.5 Labels.** All fire sprinkler systems shall have identification signs for system components and hydraulic information. Labels shall be of word graphic, on a durable material, and permanently attached before the final inspection, as outlined in NFPA 13 and/or NFPA 13R. All lettering and/or numbers shall be a minimum of one inch (1”) in height on a contrasting background or as the AHJ approves.
- 4.6 Outside Horn and Strobe.** A clear or white outside flashing strobe (110-candela minimum), unless otherwise approved by the AHJ, and an outside audible alarm (85 dBA minimum). The AHJ shall approve the location of the outside horn(s) and strobe(s). Additional horns or strobes may be required.
- 4.7 Key Box.** Structures with a life safety system or elevator (as required by the most current adopted edition of the IFC, as amended) shall be accessible. A Knox™ key box shall be installed in an **approved location**. It shall be a Knox™ Vault or other approved size as determined by the AHJ. The Knox™ Home Box shall not be allowed.
- 4.8 Special Tools.** The system contractor shall provide any keys or tools required for resetting or opening any life safety system or elevator and place them in an approved location.
- 4.8.1 Elevator Key Boxes.** A Knox™ Elevator Key Box shall be required at each elevator bank at the lobby nearest to the lowest level of fire department access or other approved location. The key box shall contain the elevator fire service and door drop keys. If there are multiple elevator banks, each may require an elevator key box.

- 4.8.2 **Sprinkler Wrenches.** If a socket is provided for installing sprinklers, an approved handle shall be provided. Sprinkler tools shall be maintained in an approved location.
- 4.9 **Cross Contamination.** The sprinkler contractor shall contact the local water purveyor for approval of the sprinkler system's cross-contamination device. Buildings undergoing remodels or system changes shall limit the potential for cross-contamination in a manner approved by the local water purveyor.
- 4.9.1 **Reduced Pressure Zone (RPZ).** RPZ cross-contamination devices shall drain to the exterior of the building or an approved floor drain. The drain design shall be constructed per the manufacturer's specifications and approved by the AHJ.
- 4.9.2 **Backflow installation and changes.** Installers shall submit a Scope of Work document, equipment specifications, and system calculations to the AHJ and the water department for installations, modifications, and/or replacements of backflow prevention devices and RPZs. Means shall be provided to conduct a "Forward Flow Test."
- 4.10 **Control Valves.** All indicating control valves shall be supervised. A length of chain and an approved fire department lock may be required. If required, the system installer or building owner shall provide the chain, which shall be compatible with the control valve.
- 4.11 **Fire Department Connection (FDC).** All NFPA 13 and NFPA 13R systems and standpipes shall have an AHJ-approved FDC with 2½" hose connections. The hose connections shall be the National Hose Thread type. FDCs shall be installed 36" to 48" above grade and shall be accessible.
- 4.11.1 **Accessibility.** The FDC shall be accessible. The FDC shall be protected and approved. A concrete pad and pathway (minimum three feet (3') wide) may be required. The AHJ may approve alternative materials. The path shall be maintained. Snow and ice build-up shall not be allowed.
- 4.11.2 **Caps.** The installer or building owner shall provide caps to protect the FDC as required by the AHJ. Knox™ Locking FDC Caps may be required by the AHJ to prevent tampering.
- 4.12 **Main Drains.** Main drains from all risers shall be piped to the exterior of the building or to an approved drain capable of handling the flow rate of the main drain test.
- 4.13 **Water Flow Alarm Switch.** The water flow alarm switch shall be equipped with delay capabilities. The delay setting shall be set between 30 and 45 seconds.
- 4.14 **Alarm Test Connection.** The test connection shall be installed in an approved location. The discharge shall be at a point where it can be readily observed.

- 4.15 **Sprinkler Riser Location(s).** Sprinkler risers shall be in accessible locations. Sprinkler risers shall not be in crawl spaces, closets, or other inaccessible locations as determined by the AHJ. Sprinkler risers shall have a minimum of a three (3) foot clear working area around the riser. This includes areas around the sprinkler system's tanks, pumps, and other special equipment.
- 4.16 **Underground Entry.** Piping entering the building through concrete or masonry material shall have a minimum of one inch (1") gap around the pipe that is protected to ensure the pipe does not rub on the concrete or masonry material.
- 4.17 **Sprig-ups.** Hydraulic design calculations shall include elevation gain for sprig-ups within the design area.
- 4.18 **Sprinkler Riser Rooms.** Sprinkler riser(s) shall not be in the Fire Command Room or in an interconnected room. Fire alarm control panels and/or power supplies shall not be installed in riser rooms.
- 4.19 **Hydrostatic Tests for Existing Buildings.** The AHJ may require a hydrostatic test for systems undergoing repairs or upgrades when less than 20 sprinkler heads are affected. This includes systems that add or replace pipes. If the FDC is in the affected area, testing may be required.
- 4.20 **Multiple Anti-Freeze Systems.** Unless otherwise approved by the AHJ, sprinkler systems shall be limited to one type of anti-freeze system (glycerin or glycol) per building. If more than one system is approved, the AHJ will specify the minimum separation distance or other approved isolation methods.
- 4.21 **Anti-Freeze.** All new fire sprinkler system designs submitted after 3/31/2023 shall comply with the current anti-freeze requirements published by the National Fire Protection Association. Sprinkler systems should be designed to protect all piping from freezing without using an anti-freeze solution.
- Existing buildings shall have anti-freeze installed in concentrations required to meet the freeze protection design of the system at the time the system was approved.
- 4.22 **Vaults and Limited Access Areas.** Areas with limited access or confined space access, as determined by the AHJ, shall be equipped with a separate flow switch and valve(s) that are accessible from outside of the limited access or confined space area. Sprinkler coverage requirements may be evaluated on a case-by-case basis.
- 4.23 **Insulation.** The insulation installer or builder shall ensure compatibility between fire protection equipment and the insulation material used. Insulation shall be installed to prevent interference with the sprinkler system's operation.
- 4.24 **HVLS Fans.** The fire alarm system shall automatically turn off all High-Volume Low Speed (HVLS) fans upon activating the water flow switch serving the fan area.

4.25 **Tests and Inspections.** See Section 14 for details on tests and inspections.