



- 1.1.1.2 **Wire Size Calculations.** The plan submittal shall include a statement that a wire size calculation has been performed and that the proposed system meets the equipment manufacturer specifications. The AHJ may require supporting documentation. Voltage drop calculations & supporting documentation are required.
- 1.1.1.3 **Point to Point Wiring Diagram.** The AHJ may require a point-to-point wiring diagram showing the exact number of devices per circuit superimposed over a floor plan.
- 1.1.1.4 **Riser Diagram.** Riser diagram shall indicate the zone configuration and designate the number of devices per floor as required by the AHJ.
- 1.1.2 **Sprinkler Systems.** Specification sheets shall provide information on all component operational functions. An equipment list shall be provided with the number of devices, part numbers, and description of equipment.
  - 1.1.2.1 **Hydraulic Calculations.** The water demand requirements, on new or existing sprinkler systems using the hydraulic calculation method shall provide at least a 10 percent or 10 psi safety factor (whichever is higher) between the system demand curve and the water supply curve. Hydrant data source, used for hydraulic calculations, shall be approved by the AHJ.
  - 1.1.2.2 **Gridded Systems.** Hydraulic calculations for gridded systems shall be peaked to verify the most hydraulically demanding combination of sprinklers.
  - 1.1.2.3 **Owner's Certificate.** An owner's certificate shall be submitted with all drawings, cut sheets, and specifications for all NFPA 13, NFPA 13D and/or NFPA 13R systems.
- 1.1.3 **Kitchen Hood Systems.** Specification sheets shall provide information on all component operational functions. An equipment list shall be provided with the number of devices, part numbers, and description of equipment. The submittal shall also include a schematic of the appliance layout.
- 1.1.4 **Standpipes.** Submittals shall be required to be separate from other submittals. Specification sheets shall provide information on all component operational functions. An equipment list shall be provided with the number of devices, part numbers, and description of equipment.
- 1.1.5 **Other Detection and/or Protection Systems.** Specification sheets shall provide information on all component operational functions. An equipment list shall be provided with the number of devices, part numbers, and description of equipment.
- 1.2 **Manuals.** Operation and maintenance manuals shall be provided to the customer as required by the AHJ.
- 1.3 **Approval Process.** Following the fire department review, a letter may be sent to the applicant indicating items that require corrections. One approved set of plans or drawings will be retained by the AHJ. Approved plans and permit card shall be kept on site during construction. The applicant shall be responsible for corrections before receiving final acceptance on the system.
  - 1.3.1 With **PRIOR** approval from the AHJ, alternative materials or methods may be substituted for those outlined in this policy. Proposed changes shall meet the intent of the policy. The burden

of proof lies with the person requesting approval of the alternate materials or method of construction.

1.3.2 **Rejection Process.** The AHJ may reject the submitted plans if they do not meet the requirements of the application process and/or review process. A re-submittal fee shall be required. See Fee Schedule for details.

1.4 **Components.** All fire protection and life safety system components shall be UL or FM listed and approved by the AHJ. Components shall be installed per the manufacturer's instructions, in locations approved by the AHJ.

1.5 **Table of Contents and Equipment List.** This information shall be provided for a quick reference during the plan review.

## **SECTION 2:** **DEFINITIONS**

2.1 **Environmental Life Safety Alarm:** For the purposes of this policy, an environmental life safety alarm shall be limited to carbon monoxide, gas alarms, oxygen deficient atmospheric detection devices, and other detection that insures the functionality of monitored life safety systems.

2.2 **Environmental Supervisory Alarm:** For the purposes of this policy, an environmental supervisory alarm shall be an alarm device used to detect an environmental condition that might threaten the function of the life safety equipment, such as low temperature detection that provides a notification to prevent a sprinkler system from freezing.

2.3 **Fire Area:** The aggregate floor area enclosed and bounded by fire walls and exterior walls of a building.

2.4 **Kitchen Hood Extinguishing System:** This is the manual or automatic activation of the extinguishing system. The extinguishing switch is an initiating device.

2.5 **Riser:** The supply pipes from the service provider (curb stop) to the system cross mains or branch lines. The riser includes all valves, check valves, expansion tanks, reduced pressure devices (RPZ), and the like.

2.6 **Sprinkler Low Air:** Results from the loss of air pressure in a dry pipe sprinkler system. The activation of a low air alarm shall not sound an evacuation alarm. A sprinkler low air switch is an initiating device.

2.7 **Sprinkler Water Flow:** The discharge of water from a sprinkler system activates a water flow switch. A water flow switch is an initiating device.

2.8 **Supervision:** A visual and audible alarm signal given at the central safety station to indicate when the system is in operation or when a condition that would impair the satisfactory operation of the system exists. Supervisory alarms shall give a distinct indication for each individual system component that is monitored.

2.9 **Trouble Signal:** This is a signal indicating a problem occurring with any circuits, devices, or wiring associated with the fire alarm system.

2.10 **Valve Tamper:** Results from the closing of any sprinkler and/or standpipe control valve. The activation of any tamper alarm shall not sound an evacuation alarm. A valve tamper switch is a supervisory signal.

2.11 **Voluntary Systems:** Voluntary systems are those that are not required by the Fire Code and installed at the option of the owner. For the purposes of this policy, voluntary systems shall meet the same requirements as a required system.

**SECTION 3:**  
**GENERAL COMMERCIAL/MULTI-FAMILY REQUIREMENTS**  
**FOR FIRE ALARM SYSTEMS**

3.1 **Primary Fire Alarm Panel.** All fire alarm panels shall be installed in an environment consistent with manufacturer requirements and as approved by the AHJ.

3.1.1 A single silence switch shall control the evacuation alarms inside the building and the outside horn. All strobes shall remain activated (flashing) until the system has been reset. Outside horns may be required to remain active.

3.1.2 Alarm verification shall be required as a feature of the primary fire alarm panel. The method of alarm verification shall be approved by the AHJ.

3.2 **Alarm Panel Instructions.** A written narrative detailing the operation of the alarm panel shall be attached to the alarm panel prior to final inspection.

3.3 **Remote Annunciators.** Complexes with multiple buildings, remote access points, large areas, or a 24-hour front desk, may require remote panel annunciators. Remote buildings served by a common Fire Command Center shall be capable of providing retransmission signals as shown in this section. All remote annunciators shall be equipped with a passcode or key lockout that prevents use of the annunciator by unauthorized personnel.

3.4 **Fire Alarm Panels.** Addressable fire alarm panels shall be used for all fire alarm systems unless approved otherwise by the AHJ. Should a zoned panel be approved, zoning shall meet the requirements of the AHJ.

**EXCEPTION: 1.** The zone for a kitchen hood extinguishing system may not be required to sound an evacuation alarm.

3.4.1 All addressable fire alarm systems shall have an approved graphic illustration installed in an approved location. This illustration shall outline all points identified by the addressable fire alarm system. Minimum size of 18" X 24".

3.5 **Transmission of Alarm Signals.** The following signals are required to be transmitted separately and distinctly by the alarm panel.

	Trouble	Supervisory	Sprinkler Low Air	Sprinkler Flow	Environmental Fire Alarm	Environmental Supervisory Alarms	Environmental Life Safety Alarms	Kitchen Hood Suppression
Dispatch to Fire Department				X	X		X	X
Dispatch to Owner	X	X	X	X	X	X	X	X

**EXCEPTIONS:** 1. Magnetic hold-open devices. 2. Remote annunciator if lamp test switch provided. 3. Remote indicating lights.

- 3.6 **Labeling.** The fire alarm, remote annunciator, remote indicating lights, mini-horns, and firefighter telephones shall have labels that are word graphic, of a durable material, and permanently attached. The use of temporary or non-factory labels is prohibited.
- 3.7 **System Information Identification Label.** A label identifying the contracted service and monitoring company, business telephone number, 24-hour telephone number, and emergency telephone number shall be placed on the front of the primary fire alarm panel.
- 3.7.1 A permanent label shall be affixed to the inside door of the fire alarm panel indicating the breaker box location (room), box name or number, and breaker number.
- 3.8 **Alarm Visual Signals.** All interior strobes shall remain flashing during a silence function. All exterior horns and strobes shall remain active until the system is reset.
- 3.9 **Alarm Audibility.** Alarm audibility shall meet the requirements of the most current edition of NFPA 72. The fire alarm contractor shall be responsible for providing an ANSI Type II decibel meter at the time of final inspection.
- 3.9.1 Audible alarm devices signaling an evacuation alarm shall not be installed in an elevator car, in a stair tower, within 25 feet of the Fire Command Center, next to the primary fire alarm panel, or next to a fire fighter voice communication system. Emergency voice communication system speakers shall be required in stair towers.
- 3.9.2 Evacuation signal characteristics shall be in accordance with the fire alarm systems output section, as outlined in the most current edition of NFPA 72.
- 3.10 **Ambient Noise.** The fire alarm system shall automatically disconnect power to the sound system of any occupancy with amplified sound.
- 3.11 **Audible and Visible Signals.** A clear or white outside flashing light (110 candela minimum) and an outside audible alarm (85 dBA minimum) shall be activated upon any general alarm activation. The location of the outside alarm horn and strobes shall be approved by the AHJ. Additional strobes may be required. All strobes shall remain flashing during a silence function.
- 3.12 **Key Box.** Access shall be provided for structures with a life safety system or elevators as required by the most currently adopted edition of the IFC as amended. A Knox™ key box shall be installed in an **approved location** and sized appropriately for the maximum number of keys used or as determined by the AHJ.
- 3.13 **Smoke Detection.** All system smoke detectors shall have an indicating light when in an alarm condition. They shall reset from the fire alarm panel.
- 3.13.1 Smoke detectors shall not be installed on the mounting plate until the building is cleaned, construction is finished, and the area is ready for Certificate of Occupancy. If detectors are installed prior to the above conditions, the AHJ may require all devices to be replaced.
- 3.13.2 An alternative means of protection may be required in areas susceptible to adverse environmental conditions.

**EXCEPTION:** Wireless detectors which automatically reset and are installed in accordance with their listing and NFPA 72. These devices must be able to transmit a distinct signal with location information.

- 3.14 **Ionization Detectors.** Factory certification of the altitude range for ionization smoke detectors shall be submitted with the plan review package and the detector shall be suitable for this environment.
- 3.15 **Thermal Detection.** Heat detectors shall be used in areas that are unsuitable for smoke detectors. The device shall have their own zone or system address. **Rate of rise detectors shall not be allowed.**
- 3.16 **Duct Detection.** Where required by the most currently adopted edition of the IMC, duct detectors meeting the requirements of UL 268A, shall be provided in all return air handling systems exceeding 2,000 cubic feet per minute (CFM). All duct detectors shall have a red remote indicating light, a reset/test switch, be appropriately labeled, and be installed in an approved location. All duct detectors shall sound a trouble signal only at the panel. The monitoring company shall notify the building owner or the building manager in the event of a trouble signal.
- 3.16.1 Opening access shall comply with the International Mechanical Code and be a minimum opening area of ten inches by ten inches (10" X 10") to allow for inspection and work on the detector, sampling tube, or sampling port.
- 3.16.2 The installing contractor shall provide the access panel in the duct where the sampling tube or port is located to verify orientation and proper installation.
- 3.17 **Manual Pull Stations.** Manual pull stations may be required. They shall be located as required by the AHJ, at a minimum behind the front desk, in the Fire Command Center, and in all mechanical and pool/spa equipment rooms. All manual pull stations shall be double action and may require an approved cover.
- 3.18 **Communications.** Fire cellular transponders, IP communicators, DSL, and cable modem systems shall be equipped with a separate communicator utilizing a different technology for the secondary communication pathway.
- EXCEPTION:** When approved by the AHJ, single path or sole path communicators that meet the requirements of NFPA 72 may be used.
- 3.19 **Special Tools.** Any keys, tools, and/or key pad codes required for resetting or opening any life safety system or elevator shall be provided by the system contractor and placed in an approved location in accordance with the International Fire Code.
- 3.20 **Wire.** Fire alarm wire shall be red in color, and shall not be painted. Fire alarm wire run through conduit shall have all junction box covers painted red or labeled "Fire Alarm System." Romex® wire will be allowed if the requirements of 3.20.1 are met.
- 3.20.1 Wire shall be labeled "Fire Wire" on a red background with minimum one inch (1") white letters. The spacing of labels shall be every ten feet (10') for Romex® wire and twenty feet (20') for other listed fire wire. The wire shall also be labeled on each side of all walls and any other penetrations. Vertical wire risers shall be labeled on each floor.
- 3.21 **Inspections and Testing.** See Section 13 for details on inspections and testing.

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

- 4.1 Fire protection and life safety systems shall conform with, be designed, installed, and maintained in accordance with this policy, the most currently adopted edition of the International Codes, as amended; the most current edition of NFPA Standards; and all other nationally recognized standards.
- 4.1.1 Prior to connecting the sprinkler system riser to the water service line, the underground piping shall be flushed by the installer of the underground main, who is registered to perform such test, as required by the State of Colorado and NFPA. Flushing of the underground piping shall be witnessed by the AHJ or an AHJ approved designee. A “Contractor’s Material and Test Certificate for Underground Piping” shall be filled out by a state licensed contractor and be provided to the fire department.
- 4.1.2 Multi-story buildings with commercial and residential occupancies may be required to be designed using NFPA 13 when the fire area is greater than 50% commercial. Concealed areas of these buildings shall be tempered to prevent freezing of the sprinkler lines.
- 4.1.3 Combustible decks, patios, or balconies with open-flame cooking devices or open-flame decorative devices shall provide sprinkler protection of the deck, patio or balcony area.
- 4.2 **Fire Alarm Zones.** The system designer shall work with the AHJ to establish zones as described below. The following zones are required to 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 (must be approved by AHJ).
  3. Sprinkler Low Air.
  4. Valve Tamper.
  5. Each Kitchen Hood Extinguishing System.
- EXCEPTION:** The zones for a kitchen hood extinguishing system and a sprinkler low air alarm may not be required to sound an evacuation alarm.
- 4.3 **Transmission of Alarm Signals.** The following signals are required to be transmitted separately and distinctly by the alarm panel. 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.** The 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 **Labeling.** All fire sprinkler systems shall have identification signs for system components and hydraulic labels that are word graphic, of a durable material, and permanently attached prior to the final inspection, as outlined in NFPA 13 and NFPA 13R. All lettering and/or numbers shall be a minimum of one inch (1") in height on a contrasting background.
- 4.6 **Outside Horn and Strobe.** A clear or white outside flashing strobe (110 candela minimum) and an outside audible alarm (minimum 85 dBA) shall be activated upon any general alarm activation. The location of the outside alarm horn and strobe shall be approved by the AHJ.
- 4.7 **Key Box.** Access shall be provided for structures with a life safety system or elevators as required by the most currently adopted edition of the IFC as amended. A Knox™ key box shall be installed in an **approved location** and sized appropriately for the maximum number and type of keys the building may have.
- 4.8 **Special Tools.** Any keys or tools required for resetting or opening any life safety system or elevator shall be provided by the system contractor and placed in an approved location in accordance with the International Fire Code.
- 4.8.1 If a socket is provided for the installation of sprinklers, an approved handle is also required.
- 4.9 **Cross Contamination.** The sprinkler contractor shall be responsible for contacting the local water department for approval on the type of cross contamination device to be installed on all sprinkler systems. Buildings undergoing remodels or system changes shall limit the potential for cross contamination by isolating the riser by distance or other AHJ approved means.
- 4.9.1 RPZ cross contamination devices shall drain to the exterior of the building or to an approved floor drain. The drain system design shall be constructed per manufacturer's recommendation.
- 4.9.2 Changes/replacements of backflow prevention devices or RPZs shall submit a Scope of Work document, equipment specifications, and system calculations to both the AHJ and the water department.
- 4.10 **Control Valves.** All indicating control valves shall be provided with approved supervision. If required a length of chain and an approved fire department lock for securing all indicating control valves shall be provided by the system installer or building owner. The size of chain and control valve shall be compatible.
- 4.10.1 Indicating control valves shall be provided for each zone as required by the AHJ.
- 4.11 **Fire Department Connection.** All NFPA 13 and NFPA 13R systems and standpipes shall have an AHJ approved connection with 2½" hose connections. The hose connections shall use National Hose Threads, shall be installed 36" to 48" above grade, and shall be accessible.
- 4.11.1 The fire department connection shall be protected in an approved manner to maintain accessibility including an all-weather pathway (minimum three foot (3') wide pathway) that is free from ice and snow build-up
- 4.11.2 Caps shall be provided by the installer or building owner to protect the FDC as required by the AHJ.
- 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 flow alarm switch shall be equipped with delay capabilities. The delay setting shall be set between 30 and 40 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 Locations.** Sprinkler risers shall be in accessible locations, not including crawl spaces, closets or other inaccessible locations as determined by the AHJ. Sprinkler risers shall have a minimum of a three foot (3') clear working area around the riser. This includes around tanks, pumps, and other special equipment associated with the sprinkler system.
- 4.16 **Underground Entry.** Piping entering the building through concrete or masonry material shall have a minimum of a 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 Hydraulic design calculations shall include elevation gain for sprig-ups located within the design area.
- 4.18 **Sprinkler Riser Rooms.** Sprinkler riser rooms shall not be interconnected to the Fire Command Center or the room that contains the fire alarm control panel or power supplies.
- 4.19 **System Upgrade Hydrostatic Testing.** The AHJ reserves the right to require hydrostatic testing, of the area affected by construction, in accordance with NFPA for systems undergoing repairs or upgrades with not more than 20 heads affected. This includes systems with piping that is replaced or added. Hydrostatic testing of the FDC may be required, if it is in an affected area, as may be required by the AHJ.
- 4.20 **Mixed 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.
- 4.21 **Anti-Freeze Systems.** Systems approved prior to any NFPA Tentative Interim Amendments (TIA) shall be allowed to refill the system to the originally designed concentrations.
- 4.22 **Vaults and Limited Access Areas.** Areas with limited access or confined space access as determined by the AHJ shall be equipped with separate flow switches and valves that are accessible from outside the limited access or confined space area.
- 4.23 **Insulation.** Insulation in open ceilings and/or attics shall be secured by the insulation installer or builder as required by the AHJ to prevent the insulation from obstructing the sprinkler heads.
- 4.24 **Inspections and Testing.** See Section 14 for details on inspections and testing.
- 4.25 **HVLS Fans.** The fire alarm system shall automatically turn off all High Volume Low Speed (HVLS) fans upon activation of the water flow switch serving the fan area.

**SECTION 5:**  
**GENERAL REQUIREMENTS FOR KITCHEN HOOD**  
**EXTINGUISHING SYSTEMS**

- 5.1 **Kitchen Hood Systems.** Fire extinguishing systems for commercial kitchen hoods shall be designed and installed in accordance with this policy, applicable NFPA standards, manufacturer's recommendations, and other nationally recognized standards.

- 5.2 **Kitchen Hood Zone.** The kitchen hood zone may not be required to sound an evacuation alarm as approved by the AHJ.
- 5.3 **Certification.** Only technicians or companies registered or licensed by the manufacturer shall perform installations, maintenance, and/or service on the hood system.
- 5.4 **Mobile Food Trucks.** Mobile food trucks and/or trailers shall comply with the adopted version of the International Fire Code, NFPA 17A, NFPA 58, NFPA 70, NFPA 96, and other codes or policies adopted by the AHJ pertaining to food trucks operating under 6-CCR-1010-2.

**SECTION 6:**  
**GENERAL REQUIREMENTS FOR SPECIAL DETECTION OR**  
**EXTINGUISHING SYSTEMS**

- 6.1 **System.** Special detection or extinguishing systems shall be designed and installed in accordance with this policy, applicable NFPA standards, manufacturer’s recommendations, and other nationally recognized standards.
  - 6.1.1 **Signal.** All signals shall be addressable. Special extinguishing systems shall sound an evacuation alarm and send a distinct signal to the monitoring company. See Section 5 for Kitchen Hood Extinguishing Systems.
  - 6.1.2 **Environmental Alarms Other than Carbon Monoxide.** Audible and visual signals from environmental alarms shall be latching and only resettable by authorized personnel. These alarms shall also initiate a visual signal at the Knox Box with an amber light or other AHJ approved location. A sign shall be installed under the light, with a minimum of 1 inch (1”) letters on a contrasting background to read, “Hazardous, low oxygen conditions exist inside structure, DO NOT ENTER WITHOUT APPROPRIATE EQUIPMENT.”
- 6.2 **Monitoring.** Special extinguishing systems shall be monitored.

**SECTION 7:**  
**SPECIAL REQUIREMENTS FOR FIRE ALARM SYSTEMS**

- 7.1 **Alarm Systems within Elevator Shafts.** Special provisions for elevators shall comply with the most currently adopted edition of the International Codes, as amended, the most current edition of NFPA 72, ASME standards, and other local elevator regulations.

**SECTION 8:**  
**EMERGENCY VOICE COMMUNICATION SYSTEMS**

- 8.1 **Alarm Systems with Emergency Voice Communications.** Emergency Voice Communication Systems (EVCS) shall be installed in buildings that are more than four floors in height and/or larger than 50,000 square feet. The design of the system shall be approved by the AHJ.
  - 8.1.1 The EVCS shall provide audibility in accordance with Section 3.9.

**SECTION 9:**  
**FIREFIGHTER COMMUNICATION SYSTEMS**

9.1 **Firefighter Communications.** Firefighter communication systems shall be installed in buildings that are more than four floors in height or in buildings where normal methods of firefighter communication may be restricted. Approved shielded cable shall be installed for all firefighter communication systems.

**EXCEPTION.** In buildings where radio amplification is installed in accordance with local codes and policies, firefighter communication systems may not be required by the AHJ.

9.2 The AHJ shall approve all firefighter telephone locations. Each telephone shall be labeled with its location.

9.2.1 All firefighter telephones shall be hard wired and stored by a secured method.

9.2.2 A permanently installed fire department telephone handset shall be provided in the main sprinkler control valve room and fire pump room.

**SECTION 10:**  
**MONITORING**

10.1 **Fire Alarm Monitoring.** Fire suppression and detection systems shall be monitored at an approved location.

10.2 **Sprinklered Buildings.** Fire suppression systems shall be monitored at an approved location.

10.3 **Transmission Alarm Codes.** Alarm signals shall send a distinct and separate code for each fire alarm signal. A reset code shall be transmitted when the alarm or trouble condition is cleared. Transmission of alarm signals shall be by an approved method.

**SECTION 11:**  
**RESIDENTIAL FIRE ALARM SYSTEM REQUIREMENTS**

This section shall apply to all fire alarm and monitoring equipment installed in detached one and two family dwellings, including townhomes. Fire protection and life safety systems shall conform with the most currently adopted edition of the International Codes as amended; and be designed, installed, and maintained in accordance with the most current edition of NFPA 72; and other nationally recognized standards.

11.1 See Section 1 for submittal requirements for Residential Fire Alarm Systems.

11.2 **Required Systems.** Required fire protection and life safety systems are systems that meet obligations imposed by the most currently adopted International Codes, as amended, County Mitigation Codes, and/or the AHJ.

11.3 **Verification.** Alarm monitoring companies shall attempt to voice verify an alarm at the residence ONCE prior to dispatching the fire department. If the alarm is verified as false, the fire department shall not be notified. The method of verification shall be approved by the AHJ.

11.4 **Key Box.** A Knox™ key box as required by the AHJ shall be provided on the exterior of the dwelling in an approved location. The location of the key box shall be shown on the plans submitted for review. The key box shall be installed prior to the final acceptance test and the AHJ provided with a key to the house.

- 11.5 **Components.** All fire protection and life safety system components shall be UL or FM listed. Components shall be installed per the manufacturer's instructions, in locations approved by the AHJ.
- 11.6 **Smoke Detector Locations.** In required systems, smoke detectors shall be located in accordance with the most currently adopted editions of the International Codes, as amended; and the most current edition of NFPA 72.
- 11.6.1 All system smoke detectors shall reset from the fire alarm panel.
- 11.6.2 Smoke detectors shall not be installed on the mounting plate until the building is cleaned, construction is finished, and the area is ready for a final acceptance test. If detectors are installed prior to the above conditions, the AHJ may require all devices to be replaced.
- 11.7 **Ionization Detectors.** Factory certification of the altitude range for ionization smoke detectors shall be submitted with the plan review package and the detector shall be suitable for this environment.
- 11.8 **Thermal Detection.** Heat detectors shall be used in areas that are unsuitable for smoke detectors. The device shall have its own zone or system address. **Rate of rise detectors shall not be allowed.**
- 11.8.1 **Garage Spaces.** Garages with living area above shall be protected with thermal detection.
- 11.8.2 **Panel Protection.** The fire alarm system control panel, not the keypads, shall be protected with a smoke detector or a heat detector if the conditions of the environment are not suitable for a smoke detector.
- 11.9 **Alarm Audibility.** All fire alarm systems shall provide a sound level of not less than 75 dBA at all areas of a sleeping room with all intervening doors closed. All other areas of the home shall have a sound level of not less than 70 dBA. No single audible appliance shall be more than 120 dBA.
- 11.9.1 **Interior Sounders.** Interior sounders connected to the fire alarm system shall be labeled "Fire." The use of temporary or non-factory labels is prohibited. These devices shall be white or red in color.
- 11.9.2 **Interior Sounder Location.** Interior sounders shall be installed in the ceiling or above the entry door to the room, unless otherwise approved by the AHJ.
- 11.10 **Exterior Audible and Visual Signals.** A clear or white outside flashing light (75 candela minimum) and an outside audible alarm (85 dBA minimum) shall be activated upon any general alarm activation. The location of the outside alarm horn and strobe(s) shall be approved by the AHJ. Additional strobes may be required.
- 11.11 **Transmission Alarm Codes.** Alarm signals shall send a distinct and separate code for each fire alarm signal. A reset code shall be transmitted when the alarm or trouble condition is cleared. Transmission of alarm signals shall be by an approved method. Phone seizure shall be implemented where only one phone line is utilized.
- 11.11.1 Monitored fire alarm systems shall have an automatic test signal sent to the monitoring company every 24 hours.

- 11.11.2 When an approved alternative communication system is used, it shall meet the requirements of NFPA 72.
- 11.12 **Wire.** Fire alarm wire shall be red in color, and shall not be painted. Fire alarm wire run through conduit shall have all junction box covers painted red or labeled "Fire Alarm System." Romex® wire will be allowed if the requirements of 11.12.1 are met.
- 11.12.1 Wire shall be labeled "Fire Wire" on a red background with minimum one inch (1") white letters. The spacing of labels shall be every ten feet (10') for Romex® wire and twenty feet (20') for other listed fire wire. The wire shall also be labeled on each side of all walls and any other penetrations. Vertical wire risers shall be labeled on each floor.
- 11.13 **Retrofitted Fire Alarm Systems.** A monitored retrofitted fire alarm system shall provide, as a minimum, an approved detection device on each floor and in the basement of the dwelling unit. An approved smoke alarm shall be located in every sleeping room. See Section 11.9 for audibility requirements.
- 11.14 **Device Location.** Initiating device locations shall comply with NFPA. Alternative locations will be handled on a case-by-case basis by the AHJ.
- 11.15 **Inspections and Testing.** See Section 13 for details on inspections and testing.

## **SECTION 12:** **RESIDENTIAL SPRINKLER REQUIREMENTS**

This section shall apply to all fire extinguishing systems installed in detached one and two family dwellings including townhomes. Fire protection and life safety systems shall conform to the most currently adopted edition of the International Codes, as amended; and be designed, installed, and maintained in accordance with this policy, the most current edition of NFPA 13D, and other nationally recognized standards.

- 12.1 See Section 1 for submittal requirements for Residential Sprinkler Systems.
- 12.2 **Required Systems.** Required fire protection and life safety systems are systems that meet obligations imposed by the most currently adopted edition of the International Codes as amended.
- 12.2.1 The quantity of water required for NFPA 13D systems that use stored water as the sole source of supply, shall be based on water demand of the system and the driving time of the fire department to that location, but no less than 10 minutes of water supply for the three (3) head design or as required by the AHJ.
- 12.2.2 Sprinkler protection shall be provided within all attached garages in all NFPA 13D systems.
- 12.2.3 The hydraulic design criteria for a NFPA 13D system shall be a minimum of three (3) flowing sprinkler heads. The system shall provide a discharge of not less than 13 gpm per sprinkler head, but the discharge shall not be less than the listing of the sprinkler head.
- 12.2.4 Sprinkler system components including but not limited to the riser, tanks, and pumps shall not be located in areas with limited access. This includes crawl spaces and other areas as determined by the AHJ.

- 12.2.5 Sprinkler system pumps shall be located a minimum of four inches (4") above the floor. All materials used to construct the mounting platform shall be of water proof materials or pressure treated wood. The pump must be securely mounted to the platform and the platform securely mounted to the floor.
- 12.2.6 The sprinkler riser piping shall be braced to prevent movement during normal system operation.
- 12.2.7 Anti-freeze systems approved prior to any NFPA Tentative Interim Amendments (TIA) shall be allowed to refill the system to the originally designed concentrations.
- 12.2.8 Insulation in open ceilings and/or attics shall be secured, as required by the AHJ, to prevent the insulation from obstructing sprinkler heads.
- 12.2.9 System design for slopes greater than 8:12 shall be per the sprinkler head manufacturer's design criteria.
- 12.3 **Key Box.** See Section 3.12
- 12.4 **Alarm Audibility.** All fire extinguishing systems shall meet the audibility requirements in Section 11.
- 12.5 **Fire Department Connection.** Per AHJ requirements NFPA 13D systems may require an approved single 2½" hose connection. The hose connections shall use National Hose Threads. The fire department connection shall be located between 36" and 48" above the finished grade. See AHJ for specific exceptions.
- 12.6 **Transmission Alarm Codes.** Alarm signals shall send a distinct and separate code for each fire alarm signal. A reset code shall be transmitted when the alarm or trouble condition is cleared. Transmission of alarm signals shall be by an approved method. All NFPA 13D systems shall comply with Section 11.11.
- 12.7 **Flushing.** All underground line(s) connected to any fire sprinkler system shall have an AHJ or AHJ approved designee witnessed flush, prior to any system components being attached to the line(s).
- 12.8 **Hydrostatic Testing.** Shall comply with Section 14 and NFPA.
- 12.9 **Inspections and Testing.** See Section 14 for details on inspections and testing.

**SECTION 13:**  
**INSPECTIONS, TESTING, AND SYSTEM CERTIFICATION OF**  
**ALL FIRE ALARM SYSTEMS**

- 13.1 **Inspections.** A rough-in inspection is required of all system components **PRIOR** to the installation of insulation and or any wall coverings.
- 13.2 **Final Acceptance Testing for Fire Alarm Systems.** All fire alarm systems shall be pre-tested by the installer **PRIOR** to the final acceptance test. All fire alarm systems shall have a final acceptance test and a completed "Fire Alarm Testing and Inspection Form" from the installer before a Certificate of Occupancy will be issued and the system can be monitored. A copy of the "Fire Alarm Testing and Inspection Form" can be found in the most current edition of NFPA 72.
- 13.2.1 The fire department will witness a test of the fire alarm system as designed and approved. During the final testing the installer shall provide all needed test equipment. All initiating devices, audible appliances, visual appliances and resetting devices shall be tested.

- 13.2.2 After the final fire alarm acceptance test, the system fire alarm panel shall be clear of all alarm and trouble conditions prior to occupancy.
- 13.3 **Inspection Scheduling.** All rough-in inspections and final acceptance testing shall be requested at least 48 hours **PRIOR** to the inspection. It is recommended that inspections for commercial systems be scheduled seven (7) days in advance. The system installer shall request and be present for all inspections.
- 13.4 As-built drawings and/or calculations of commercial fire alarm systems shall be submitted in an electronic format acceptable to the AHJ.
- 13.5 **Test and Inspection Reports.** Annual test and inspection reports of fire alarm systems shall be performed in compliance with the most current edition of NFPA 72. A copy of the report shall be submitted to the AHJ electronically, unless otherwise specified, within 30 days of completion of the test.

**SECTION 14:**  
**INSPECTIONS, TESTING, AND SYSTEM CERTIFICATION OF**  
**ALL FIRE PROTECTION SYSTEMS**

- 14.1 **Inspections.** A rough-in inspection is required of all system components **PRIOR** to the installation of any insulation and/or wall coverings. Hydrostatic testing of the sprinkler systems shall include all portions of the systems, including fire department connections.
- 14.2 When the sprinkler system water is supplied by an individual tank and pump system, or pump assist system, the sprinkler contractor shall conduct a functional flow test on all NFPA 13,13D, and 13R systems. Contact the AHJ for details on the procedures for a functional flow test.
- 14.3 **Final Acceptance Testing.** All fire extinguishing systems shall be **pre-tested** by the installer **PRIOR** to the final acceptance test.
- 14.3.1 The sprinkler contractor shall provide the AHJ with a copy of the “Contractor’s Material and Test Certificate for Aboveground Piping” at the time of the final acceptance test. The Contractor’s Certificate is required before the AHJ signs off on a Certificate of Occupancy with the Building Department.
- 14.3.2 The sprinkler contractor shall provide proof to the AHJ that the owner or their representative has received a current edition of NFPA 25 from the installer for all NFPA 13, and/or NFPA 13R systems. NFPA 13R systems shall be provided with an approved placard attached to the riser. An example of the placard is attached as Annex A.
- 14.4 All rough-in inspections, hydrostatic tests, and final acceptance tests shall be requested at least 48 hours **PRIOR** to the inspection. Any fire extinguishing system that fails an inspection or acceptance test may be subject to re-inspection fees per the District Fee Schedule. The fee shall be paid before any additional inspections or tests can be scheduled. See the AHJ for details.
- 14.5 The fire department will witness a test of the fire extinguishing system as designed and approved. During the final testing the installer must provide all needed test equipment. All initiating devices, audible appliances, visual appliances, and resetting devices shall be tested.
- 14.6 As-built drawings of commercial fire extinguishing systems shall be submitted in an electronic format acceptable to the AHJ. Additional hydraulic calculation may also be required by the AHJ.

- 14.7 Sprinkler systems utilizing pressurized water supplies shall have the cross contamination devices tested and certified by the installer in accordance with local water department and state requirements.
- 14.8 **Test and Inspection Reports.** Annual test and inspection reports of fire protection systems shall be performed in compliance with the most current edition of applicable NFPA standards, and a copy of the report shall be submitted to the AHJ electronically unless otherwise specified within 30 days of completion of the test.

**SECTION 15:**  
**INSPECTIONS, TESTING, AND SYSTEM CERTIFICATION OF**  
**SPECIAL EXTINGUISHING SYSTEMS**

- 15.1 **Final Acceptance Testing.** All fire extinguishing systems shall be **pre-tested** by the installer **PRIOR** to the final acceptance test
- 15.2 The fire department will witness a test of the fire extinguishing system as designed and approved. During the final testing the installer must provide all needed test equipment. All initiating devices, audible appliances, visual appliances, and resetting devices are required to be tested.
- 15.3 **Test and Inspection Reports.** Annual test and inspection reports of special extinguishing systems shall be performed in compliance with the most current edition of applicable NFPA standards, and a copy of the report shall be submitted to the AHJ electronically, unless otherwise specified, within 30 days of completion of the test.

**SECTION 16:**  
**INSPECTIONS, TESTING, AND SYSTEM CERTIFICATION OF**  
**STANDPIPE SYSTEMS**

- 16.1 **Flow Testing.** Standpipe systems shall be designed to allow flow testing of the system at installation and for Testing and Inspection requirements of NFPA.
- 16.2 **Test and Inspection Reports.** Test and inspection reports of standpipe systems shall be performed in compliance with the most current edition of applicable NFPA standards, and a copy of the report shall be submitted to the AHJ electronically, unless otherwise specified, within 30 days of completion of the test.



# Know Your FIRE SPRINKLER SYSTEM

## KNOW YOUR SYSTEM'S WATER CONTROLS

**Your home has a built-in fire sprinkler system. If you have a fire, the sprinklers will put it out or control it with water. The system protects your family and home from the dangers of fire, 24 hours a day.**

In most cases, fire sprinkler systems are supplied by the **Water Main**, where water comes into a home. The fire sprinkler system connects to the water main. In some systems the water flows through a **Backflow Valve**. A main water control valve is on the pipe that supplies the sprinkler system. This **Control Valve** turns the water flow on and off. Your system may have additional or different features.

**Turning off the water to your home will also turn off the water to your fire sprinkler system.**

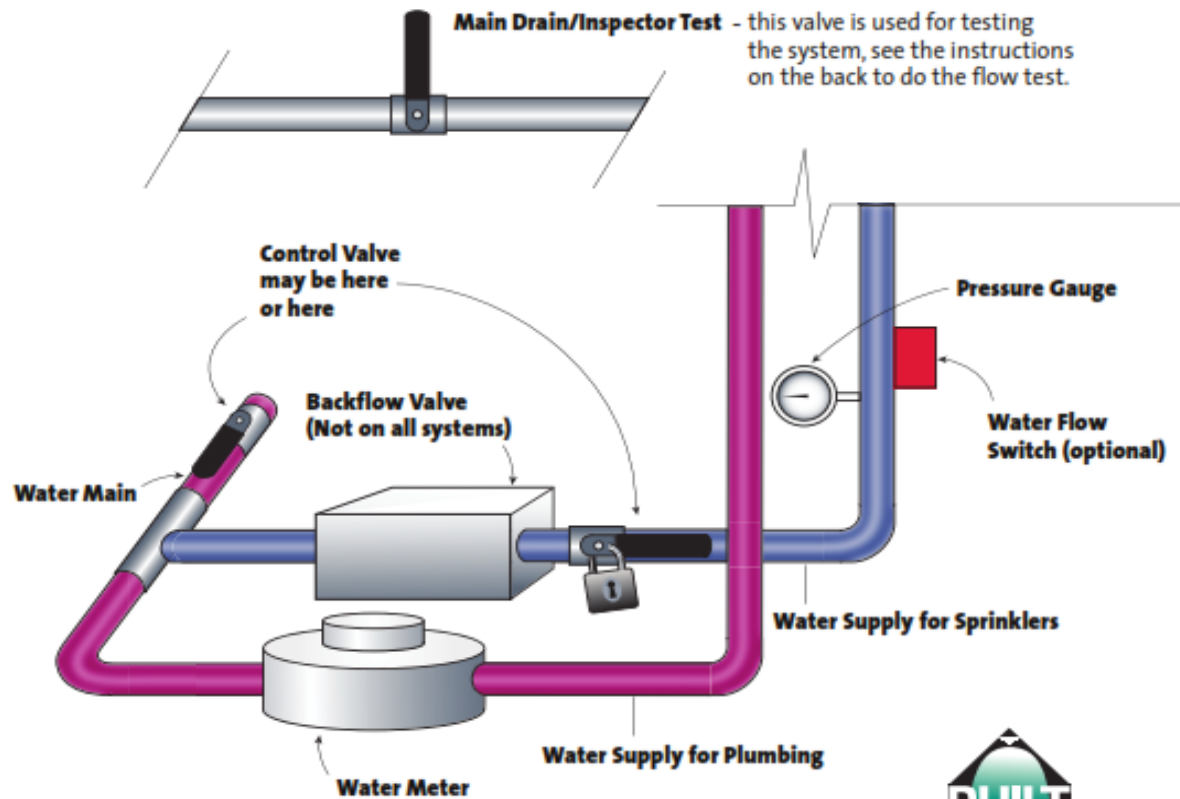
Contact your fire sprinkler contractor if you have questions.

\_\_\_\_\_

fire sprinkler contractor

\_\_\_\_\_

phone number



## KEEP YOUR FIRE SPRINKLER SYSTEM WORKING THE WAY IT SHOULD

### CONTROL VALVES MUST BE OPEN OR TURNED ON.

The control is **OPEN** when it is in line with the pipe.

The control is **CLOSED** ("turned off") when it is perpendicular to or makes a corner to the pipe.

Use a padlock to keep the valve **LOCKED OPEN**.

Tape the padlock key to the pipes or a wall nearby so you can find it when you need it.

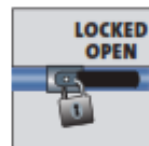
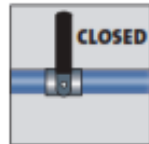
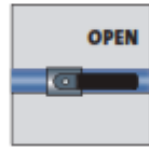
**Keep the area around your water controls clear.**

Do not store anything within 1 foot (30 cm) of your water controls.

**If sprinkler water control valves are ever turned "off," be sure to turn them back on.**

The water needs to be turned on so the sprinklers can work to protect you from a fire.

#### WATER CONTROLS



### PROTECT YOUR FIRE SPRINKLERS.

**Make sure nothing is blocking your sprinklers.**

Keep pictures and large furniture away from sprinklers on walls.

Hang lamps and plants away from ceiling sprinklers.

**Do not hang anything on sprinklers or pipes.**

Even lightweight items can damage sprinklers.

Keep paint away from sprinklers or sprinkler covers.

While doing messy work, such as painting, cover the sprinklers with plastic. Remove the plastic as soon as you are finished.

Be careful when you are moving large or tall items.

Don't bump sprinklers or exposed pipes. Teach children not to touch or play with sprinklers.

#### FIRE SPRINKLERS NEED SPACE



### DO A WATER FLOW TEST ABOUT ONCE A YEAR.

You can do this yourself (see below). Or your fire sprinkler contractor can do it for you.

**To do a water flow test:**

1. Find your water flow test control valve. It may be labeled **main drain**, **inspector test** or **test and drain**.
2. If your sprinklers are connected to a central alarm, inform the fire department that you are going to do a test.
3. Slowly turn the control valve on (bring the valve in line with the pipe).
4. This will start water running. Let the water run for about 60 seconds. If your system has an alarm, you will hear it.
5. Slowly turn the control valve off (the valve will be perpendicular to or make a corner to the pipe).
6. Write down the date you tested your water flow switch.

#### FLOW TEST



**Write down the date of each test here:**

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_



LWSCard-g/13-2M-BFC