

Table of Contents

<u>SCOPE</u>	1
<u>GUIDELINES</u>	1
<u>SECTION 1: PLAN REVIEW SUBMITTAL</u>	1
<u>1.1 General</u>	1
<u>1.2 Application</u>	1
<u>1.2.1 Alarm Systems</u>	1
<u>1.2.1.1 Battery Type and Capacity</u>	1
<u>1.2.1.2 Wire Size Calculations</u>	2
<u>1.2.1.3 Point-to-Point Wiring Diagram</u>	2
<u>1.2.1.4 Riser Diagram</u>	2
<u>1.2.2 Sprinkler Systems</u>	2
<u>1.2.2.1 NFPA 13 Design</u>	2
<u>1.2.2.2 Hydraulic Calculations</u>	2
<u>1.2.2.3 Gridded Systems</u>	2
<u>1.2.3 Kitchen Hood Extinguishing Systems</u>	2
<u>1.2.4 Standpipes</u>	2
<u>1.2.5 Carbon Dioxide</u>	3
<u>1.2.6 Other Detection and/or Protection Systems</u>	3
<u>1.3 Manuals</u>	3
<u>1.4 Approval Process</u>	3
<u>1.4.1 Alternative Materials and Methods</u>	3
<u>1.5 Rejection Process</u>	3
<u>1.6 Components</u>	3
<u>1.7 Table-of-Contents and Equipment List</u>	3
<u>1.8 Required Fire Flow</u>	3
<u>SECTION 2: DEFINITIONS</u>	4
<u>SECTION 3: GENERAL COMMERCIAL/MULTI-FAMILY REQUIREMENTS FOR FIRE DETECTION SYSTEMS</u>	6
<u>3.1 General</u>	6
<u>3.1.1 Re-inspections</u>	6
<u>3.2 Primary Fire Alarm Panel</u>	6
<u>3.2.1 Alarm Verification</u>	6
<u>3.2.2 Wet Locations</u>	6
<u>3.3 Alarm Panel Instructions</u>	6
<u>3.4 Remote Annunciators Alarm Panel</u>	6
<u>3.3 Alarm Panel Instructions</u>	6
<u>3.5 Fire Alarm Panels</u>	6
<u>3.5.1 Graphic Map</u>	6
<u>3.5.2 Electronic Copies</u>	6
<u>3.6 Transmission of Alarm Signals</u>	7

Table of Contents

3.7 Labels	7
3.8 System Information Identification Label	7
3.8.1 Power Identification	7
3.8.2 Breaker	7
3.9 Alarm Visual Signals	7
3.10 Alarm Audibility	7
3.10.1 Exempt Locations	7
3.10.2 Alarm Tempo	7
3.11 Ambient Noise	7
3.12 Audible and Visible Signals	7
3.13 Key Box	8
3.14 Smoke and/or Combination Detection	8
3.15 Ionization Detectors	8
3.16 Thermal Detection	8
3.17 Duct Detection	8
3.18 Manual Pull Stations	8
3.19 Communication	9
3.20 Special Tools	9
3.20.1 Elevator Key Boxes	9
3.21 Wire	9
3.21.1 Labels	9
3.22 Primary Power	9
3.23 DIY, MIY, or Owner Installed Systems	9
3.24 Tests and Inspections	9

SECTION 4: GENERAL COMMERCIAL/MULTI-FAMILY REQUIREMENTS FOR FIRE PROTECTION SYSTEMS.....10

4.1 General	10
4.2 Fire Alarm Requirements	10
4.3 Transmission of Alarm Signals	11
4.4 Supervision	11
4.5 Labels	11
4.6 Outside Horn and Strobe	11
4.7 Key Box	11
4.8 Special Tools	11
4.8.1 Elevator Key Boxes	11
4.8.2 Sprinkler Wrenches	11
4.9 Cross Contamination	11
4.9.1 Reduced Pressure Zone (RPZ)	12
4.9.2 Backflow installation and changes	12
4.10 Control Valves	12
4.11 Fire Department Connection (FDC)	12
4.11.1 Accessibility	12
4.11.2 Caps	12
4.12 Main Drains	12

Table of Contents

4.13 Water Flow Alarm Switch	12
4.14 Alarm Test Connection	12
4.15 Sprinkler Riser Location(s)	12
4.15.1 Clear Working Area	12
4.16 Underground Entry	13
4.17 Sprig-ups	13
4.18 Sprinkler Riser Rooms	13
4.19 Hydrostatic Tests for Existing Buildings	13
4.20 Multiple Anti-Freeze Systems	13
4.21 Anti-Freeze	13
4.22 Vaults and Limited Access Areas	13
4.23 Insulation	13
4.24 HVLS Fans	13
4.25 Tests and Inspections	13
<u>SECTION 5: GENERAL REQUIREMENTS FOR KITCHEN HOOD</u>	
<u>EXTINGUISHING SYSTEMS</u>	14
5.1 General	14
5.1.1 Re-inspections	14
5.2 Appliances	14
5.2.1 Notification	14
5.3 Kitchen Hood Connection	14
5.4 Certification	14
5.5 Pre-Piped Hoods	14
5.6 Mobile Food Trucks	14
5.6.1 Exterior Notification	14
5.7 Electronic Activation Switches	15
5.7.1 Circuit Testing	15
<u>SECTION 6: GENERAL REQUIREMENTS FOR SPECIAL DETECTION OR</u>	
<u>EXTINGUISHING SYSTEMS</u>	16
6.1 General	16
6.1.1 Re-inspections	16
6.2 Signal	16
6.3 Environmental Alarms Other than Carbon Monoxide	16
6.4 Monitoring	16
<u>SECTION 7: SPECIAL REQUIREMENTS FOR FIRE ALARM SYSTEMS</u>	17
7.1 General	17
<u>SECTION 8: EMERGENCY VOICE/ALARM COMMUNICATION SYSTEMS</u>	17
8.1 General	17
8.1.1 Re-inspections	17
8.2 Audibility	17
8.3 Multipurpose Systems	17

Table of Contents

8.3.1 Priority	17
8.3.2 Operation Instructions.....	17
8.4 Mass Notification.....	17
<u>SECTION 9: EMERGENCY RESPONDER RADIO COVERAGE SYSTEMS.....</u>	18
9.1 Firefighter Communications	18
9.2 Emergency Responder Radio Coverage	18
9.2.1 State Requirement.....	18
9.3 Tests and Inspections.....	18
<u>SECTION 10: MONITORING</u>	19
10.1 Alarm Monitoring	19
10.2 Recording	19
10.3 Transmission of Alarm Codes	19
10.4 Transmission of Carbon Monoxide Alarm	19
<u>SECTION 11: HOUSEHOLD SIGNALING SYSTEMS.....</u>	20
11.1 General.....	20
11.1.1 Re-inspections.....	20
11.2 Design	20
11.3 Verification	20
11.4 Key Box	20
11.5 Reset Instructions.....	20
11.6 Emergency Contact.....	20
11.7 Components	20
11.8 Detector Locations.....	20
11.8.1 Reset.....	20
11.8.2 Detector Installation During Construction.....	21
11.9 Ionization Detectors.....	21
11.10 Thermal Detection	21
11.10.1 Garage Spaces.....	21
11.10.2 Panel Protection	21
11.11 Alarm Audibility.....	21
11.11.1 Interior Sounders.....	21
11.11.2 Interior Sounder Location.....	21
11.12 Exterior Audible and Visual Signals.....	21
11.13 Transmission of Alarm Codes	22
11.13.1 Timer Test.....	22
11.13.2 Performance Based Technologies.....	22
11.14 Wire.....	22
11.14.1 Labels.....	22
11.15 Retrofitted Fire Alarm Systems	22
11.16 DIY, MIY, or Owner Installed Systems	22
11.17 Tests and Inspections	22

Table of Contents

<u>SECTION 12: ONE- AND TWO-FAMILY DWELLINGS AND MANUFACTURED HOMES</u>	23
<u>12.1 General</u>	23
<u>12.1.1 Re-inspections</u>	23
<u>12.2 Submittals</u>	23
<u>12.3 Required Systems</u>	23
<u>12.3.1 Water Supply</u>	23
<u>12.3.2 Garages</u>	23
<u>12.3.3 Design Area</u>	23
<u>12.3.4 Design Safety Factor</u>	23
<u>12.3.5 System Components</u>	23
<u>12.3.6 Pumps and Compressors</u>	24
<u>12.3.7 Anti-Freeze</u>	24
<u>12.3.8 Anti-Freeze Test Ports</u>	24
<u>12.3.9 Roof Pitches</u>	24
<u>12.4 Key Box</u>	24
<u>12.5 Alarm Audibility</u>	24
<u>12.6 Fire Department Connection (FDC)</u>	24
<u>12.7 Flush Tests</u>	24
<u>12.8 Hydrostatic Tests</u>	24
<u>12.9 Insulation</u>	25
<u>12.10 Tests and Inspections</u>	25
<u>SECTION 13: INSPECTIONS, TESTS AND SYSTEM CERTIFICATION FOR ALL DETECTION SYSTEMS</u>	25
<u>13.1 Rough-in Inspections</u>	25
<u>13.2 Final Acceptance Test</u>	25
<u>13.2.1 Procedure</u>	25
<u>13.2.2 Documentation</u>	25
<u>13.2.3 Post Test</u>	25
<u>13.3 Inspection Scheduling</u>	25
<u>13.4 As-built Drawings</u>	25
<u>13.5 Tests and Inspections</u>	25
<u>SECTION 14: INSPECTIONS, TESTS AND SYSTEM CERTIFICATION FOR ALL FIRE PROTECTION SYSTEMS</u>	26
<u>14.1 Rough-in Inspections</u>	26
<u>14.2 Hydrostatic Test Inspections</u>	26
<u>14.3 Pump and Tank Systems</u>	26
<u>14.4 Final Acceptance Tests</u>	26
<u>14.4.1 Procedure</u>	26
<u>14.4.2 Documentation</u>	26
<u>14.4.3 Additional Documents for NFPA 13 and/or NFPA 13R Systems</u>	26
<u>14.5 Inspection Scheduling</u>	26
<u>14.6 As-built Drawings</u>	26

Table of Contents

14.7 Cross Contamination Devices	27
14.8 Tests and Inspections	27
SECTION 15: INSPECTIONS, TESTS AND SYSTEM CERTIFICATION FOR SPECIAL EXTINGUISHING SYSTEMS	27
15.1 Final Acceptance Test	27
15.1.1 Procedure	27
15.1.2 Documentation	27
15.2 Tests and Inspections	27
SECTION 16: INSPECTIONS, TESTS AND SYSTEM CERTIFICATION FOR STANDPIPE SYSTEMS	28
16.1 Flow Tests	28
16.1.1 Procedure	28
16.1.2 Documentation	28
16.2 Tests and Inspections	28

Summit County Life Safety Standards Guide

SCOPE:

The intent of this guide is to establish countywide uniformity of fire protection and life safety systems while reducing the occurrence of false activations. This guide provides additional details not covered by the National Fire Protection Association (NFPA), and the currently adopted IFC, as amended. The "authority having jurisdiction" (AHJ) is the organization or individual responsible for approving equipment, installation, or a procedure.

GUIDELINES:

SECTION 1: PLAN REVIEW SUBMITTAL

- 1.1 **General.** Every fire suppression and detection system plan submitted for review must contain the items required in this section. Fire protection and life safety systems shall comply with, be designed to, and be installed and maintained in accordance with the most current adopted edition of the IFC, as amended; the most current edition of NFPA standards; other nationally recognized standards; and manufacturers' requirements. See Sections 11 - 14, for residential occupancy requirements. All submittals shall include a copy of the plans, calculations, and specifications in a portable document format (PDF). Design specific components shall be **highlighted** or **outlined** on the submittals.
- 1.2 **Application.** The plan review submittal shall include an application form, plans, specification sheets, calculations, and fees. Work shall not start until all documentation and fees have been submitted and paid. If this procedure is not followed, then the AHJ reserves the right to investigate and assess additional fees, as outlined on the Fire District's Fee Schedule.
- 1.2.1 **Alarm Systems.** Technical specification sheets shall be provided for system components, primary panel configuration, communication equipment, and all devices. Specification sheets shall include information on component operation and device operation. Design specific components and battery draw (in standby and alarm modes) shall be highlighted or outlined. An equipment list shall be provided, and it shall include the number of devices, part numbers, and equipment descriptions. All plans shall be submitted by a NICET Level III or equivalent certified designer.
- 1.2.1.1 **Battery Type and Capacity.** Battery calculations and manufacturer specifications shall be provided. At a minimum, the batteries shall support 24 hours of standby time plus 5 minutes of alarm time. The AHJ can require an additional safety factor of 1-amp hour above the minimum calculated battery

size. (e.g. a 7 amp/hour system may require an 8 amp/hour battery)

- 1.2.1.2 **Wire Size Calculations.** The plan submittal shall include wire size calculations and a statement that the proposed system meets the equipment manufacturer specifications. Voltage drop calculations and supporting documentation shall be required.
- 1.2.1.3 **Point-to-Point Wiring Diagram.** The AHJ may require a point-to-point wiring diagram that shows the exact number of devices per circuit.
- 1.2.1.4 **Riser Diagram.** The riser diagram shall indicate the zone configuration and designate the number of devices per floor.
- 1.2.2 **Sprinkler Systems.** Specification sheets shall provide information on all component operational functions. An equipment list shall be provided. It shall include the number of devices, part numbers, and equipment descriptions.
 - 1.2.2.1 **NFPA 13 Design.** Multi story buildings with mixed commercial and residential occupancies shall be designed using NFPA 13 when the fire area is less than 50% residential space. Accessory uses shall not be used to calculate residential space.
 - 1.2.2.2 **Hydraulic Calculations.** The hydraulic calculation method shall be used to provide at least a 10 percent or 10 psi safety factor (whichever is greater) between the system demand curve and the water supply curve. The hydrant data source shall be approved by the AHJ.
 - 1.2.2.3 **Gridded Systems.** Hydraulic calculations for gridded systems shall be peaked to verify the most hydraulically demanding combination of sprinklers.
- 1.2.3 **Kitchen Hood Extinguishing Systems.** Specification sheets shall provide information on all component operational functions. An equipment list shall include the number of devices, part numbers, and equipment descriptions. A schematic diagram of the appliance layout shall be required.
- 1.2.4 **Standpipes.** Standpipe submittals shall be separate from fire protection 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 equipment descriptions.

The maximum design distance from any hose connection shall not be more than 140 feet.

- 1.2.5 **Carbon Dioxide.** Carbon dioxide systems more than 100 pounds and/or Refrigerants more than 220 lbs of A1 or 30 lbs. of any other group shall require a permit.
- 1.2.5 **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 equipment descriptions.
- 1.3 **Manuals.** Operation and maintenance manuals shall be provided to the customer.
- 1.4 **Approval Process.** Following the fire department's review, an approved notification may be sent to the applicant indicating items that require correction. The approved plans and permit shall be available during inspections. The applicant shall be responsible for corrections prior to receiving final approval for the system.
 - 1.4.1 **Alternative Materials and Methods.** Alternative materials and methods may be substituted for those outlined in this guide. However, **PRIOR** approval from the AHJ shall be required. Proposed changes shall meet the intent of this guide. The burden of proof lies with the person requesting approval of alternate materials and methods.
- 1.5 **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 more information.
- 1.6 **Components.** All fire protection and life safety system components shall be listed for their intended use by a third party listing agent, and approved by the AHJ. Components shall be installed per the manufacturer's instructions and in locations approved by the AHJ.
- 1.7 **Table of Contents and Equipment List.** A quick reference list shall be provided for the plan review.
- 1.8 **Required Fire Flow.** The required fire flow shown in Appendix B of the IFC, as amended shall not be reduced by more than fifty (50) percent for the installation of a fire sprinkler system.

SECTION 2: DEFINITIONS

- 2.1 **Addressable Device.** A fire alarm system component, with an input, output, or combination function, that is discretely identified by a unique address.
- 2.2 **Approved.** Acceptable to the authority having jurisdiction (AHJ)
- 2.3 **Authority Having Jurisdiction (AHJ)** An organization, office, or individual responsible for enforcing the requirements of the code or standard, or for approving equipment, materials, an installation, or a procedure.
- 2.4 **Clean.** All other trades shall have completed their construction activities, including, but not limited to, drywall work and floor covering installations. The premises shall be move-in ready.
- 2.5 **Environmental Life Safety Alarm.** For the purposes of this guide, an environmental life safety alarm shall be limited to carbon dioxide, carbon monoxide, gas, oxygen deficient atmosphere, and other detection that ensures the functionality of monitored life safety systems.
- 2.6 **Environmental Supervisory Alarm.** For the purposes of this guide, 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 (e.g. low temperature detection that provides notification to prevent a sprinkler system from freezing).
- 2.7 **Fire Area.** The aggregate floor area enclosed and bounded by fire walls meeting the requirements of Section 706 of the International Building Code and fire barriers, exterior walls or horizontal assemblies of a building. Areas of the building not provided with surrounding walls shall be included in the fire area if such areas are included within the horizontal projection of the roof or floor above. For buildings constructed under the International Residential Code, the fire area is the aggregate floor area enclosed and bounded by exterior walls of a building.
- 2.8 **Household Fire Alarm System.** A system of devices that uses a listed fire alarm control unit to produce an alarm signal in the household for the purpose of notifying the occupants of the presence of a fire so that they will evacuate the premises.
- 2.9 **International Fire Code (IFC).** Currently adopted fire code and amendments by the AHJ.
- 2.10 **Kitchen Hood Extinguishing System.** A kitchen hood extinguishing system releases wet chemical extinguishing agents or utilizes a special design of the building fire sprinkler system. In wet agent systems, chemicals react with grease to create a harmless soapy substance that can't re-ignite. This process, called saponification, protects the hoods, appliances, and plenum areas from the ravages of fire. For added safety, the system also shuts off the electricity and gas to appliances under the commercial hood. The extinguishing system micro-switch is an initiating device.
- 2.11 **Listed for Fire.** Equipment, materials, or services included in a list published by an organization that is acceptable to the AHJ, and concerned with evaluation products or

services, that maintains periodic inspection of production of listed equipment or materials or periodic evaluation of services, and whose listing states that either the equipment, material, or service meets appropriate designated standards or has been tested and found suitable for a specified purpose (e.g. fire protection or fire detection).

- 2.12 **Node.** A device with direct communication into a fire alarm control panel (FACP). Any device that detects fire, smoke, or heat, (e.g. smoke detector or sprinkler flow switch).
- 2.13 **Point.** A point can be any device that detects fire, smoke, or heat (e.g. smoke detector or water flow switch).
- 2.14 **Riser.** The supply pipes from the service provider (curb stop) to the system cross main or branch lines. The riser includes all gauges, valves, backflows, check valves, expansion tanks, and/or reduced pressure devices (RPZ).
- 2.15 **Shall.** Indicates a mandatory requirement.
- 2.16 **Should or May.** Indicates a recommendation or that which is advised, but not required.
- 2.17 **Sprinkler Low Air.** The loss of air pressure in a dry pipe sprinkler system. A sprinkler low air switch is an initiating device.
- 2.18 **Sprinkler Water Flow.** The discharge of water from a sprinkler system that activates a water flow switch. A water flow switch is an initiating device.
- 2.19 **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 signal for each individual system component.
- 2.20 **Thermal Detection.** Thermal detection is an alarm device designed to respond when the convection thermal energy of a fire increases the temperature of a heat sensitive element. Thermal detectors have two main classifications of operation, "rate-of-rise" and "fixed temperature". The detector is used to help in the reduction of property damage.
- 2.21 **Trouble Signal.** A signal indicating a problem occurring with any circuits, devices, or wiring associated with the alarm system.
- 2.22 **Valve Tamper.** A signal that indicates the closing of any sprinkler and/or standpipe control valve. A valve tamper switch initiates a supervisory signal.
- 2.23 **Voluntary Systems.** Voluntary systems are systems that are installed at the option of the owner and are not required by the Fire Code or the AHJ. For the purposes of this guide, voluntary systems shall meet the same requirements as required systems.

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

- 3.1 **General.** Fire detection and life safety systems shall comply with and be designed, installed, and maintained in accordance with this guide, the most current adopted edition of the International Codes, as amended; the most current edition of NFPA Standards; and all other nationally recognized standards. The system installer shall be a NICET Level II or equivalent certification. Occupant notification shall be required for buildings containing fire sprinkler systems.
- 3.1.1 **Re-inspections.** Any inspection or test that fails 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.
- 3.2 **Primary Fire Alarm Panel.** All fire alarm panels shall be installed in an environment consistent with manufacturer requirements and as approved by the AHJ.
- 3.2.1 **Alarm Verification.** Alarm verification shall be required as a feature of the primary fire alarm panel and annunciator panel(s), if installed. The AHJ shall approve the method of alarm verification.
- 3.2.2 **Wet Locations.** A fire alarm panel that would be in a potential wet environment shall be listed for a waterproof or water-resistant environment.
- 3.3 **Alarm Panel Instructions.** A written narrative detailing the operation of the alarm panel shall be attached to the alarm panel prior to the final acceptance test.
- 3.4 **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.
- 3.5 **Fire Alarm Panels.** All fire alarm systems shall be addressable unless approved otherwise by the AHJ. If a zoned panel is allowed, then the zones shall be approved by the AHJ.
- 3.5.1 **Graphic Map.** All fire alarm systems shall have an approved graphic map installed in a location approved by the AHJ. The map shall identify all points (nodes) and/or zones on the fire alarm system. The map shall be sized as required by the AHJ. The map shall be legible with a minimum font size of 10 in Calibri font.
- 3.5.2 **Electronic Copies.** Approved plans and as built drawings shall be stored in an approved plans box with USB access.

3.6 **Transmission of Alarm Signals.** The fire alarm panel shall transmit all signals separately and distinctly.

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

3.7 **Labels.** 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.

3.8 **System Information Identification Label.** A label identifying the contracted service, monitoring company, account number, business telephone number, 24-hour telephone number, and emergency telephone number shall be placed on the inside front cover of the primary fire alarm panel.

3.8.1 **Power Identification.** A permanent label shall be affixed to the inside cover of the fire alarm panel indicating the breaker box location (room), box name or number, and breaker number.

3.8.2 **Breaker.** The breaker, inside the electrical panel, shall be red in color and locked to prevent tampering.

3.9 **Alarm Visual Signals.** All interior and exterior horns and strobes shall remain active until the system is reset, unless required otherwise by the AHJ.

3.10 **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 or approved Application at the time of final inspection.

3.10.1 **Exempt Locations.** 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 firefighter voice communication system.

EXCEPTION: Emergency voice communication system speakers shall be required in stair towers.

3.10.2 **Alarm Tempo.** Evacuation signal characteristics shall be in accordance with the fire alarm systems output section, as outlined in the most current edition of NFPA 72.

3.11 **Ambient Noise.** The fire alarm system shall automatically disconnect power to the sound system of any occupancy with amplified sound.

3.12 **Audible and Visible Signals.** All general alarms shall activate 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.

- 3.13 **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.
- 3.14 **Smoke and/or Combination Detection.** All system smoke detectors shall have an indicating light when in an alarm condition. They shall reset from the fire alarm panel.

EXCEPTION: Wireless detectors (that automatically reset and are installed in accordance with their listing and NFPA 72) shall transmit a distinct signal with location information sent to the Fire Alarm Control Panel.

3.14.1 **Detector installation during construction.** Smoke detectors shall not be installed on the mounting plate until the building is CLEAN and construction is finished and ready for a Certificate of Occupancy.

3.14.2 **Adverse Environmental Conditions.** An alternative means of protection may be required in areas susceptible to adverse environmental conditions.

- 3.15 **Ionization Detectors.** The plan review package shall include factory certification of the altitude range for ionization smoke detectors. Ionization smoke detectors shall be certified for elevations above 8,000 feet above sea level.

- 3.16 **Thermal Detection.** Heat detectors may be required in areas that are not suitable for smoke detectors. Heat detectors shall be addressable or on a separate zone from the smoke loop. *Rate of rise detectors shall not be allowed in areas with known temperature fluctuations that fall within the time/temperature thresholds.*

- 3.17 **Duct Detection.** Where required by the most current adopted edition of the International Mechanical Code (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 be labeled appropriately, installed in an approved location, have a red remote indicating light, and have a reset/test switch. All duct detectors shall sound a trouble signal at the panel only. The monitoring company shall notify the building owner or the building manager when they receive a trouble signal.

3.17.1 **Access.** Opening access shall comply with the IMC and provide a minimum opening area of ten inches by ten inches (10" X 10") to allow for inspection and maintenance of the detector, sampling tube, or sampling port. The detector, sampling tube, and/or sampling port shall be within 3 feet of the opening. The reset switch for duct detectors shall be accessible without the use of special tools or equipment (i.e. ladder).

- 3.18 **Manual Pull Stations.** Manual pull stations may be required. They shall be located as required by the AHJ. All manual pull stations shall be double action and may require an approved cover. Fire alarm manual pull stations shall be separated from other fire protection pull stations by a distance as required by the AHJ or other codes or standards.

- 3.19 **Communication.** Listed communicators shall be required. Different technologies shall be used for the primary and secondary communication pathways. If a POTS (Plain Old Telephone Service) line is used for primary communication, then it shall be on a dedicated line. If a POTS line is used for secondary communication, then line seizure shall be required. When approved by the AHJ, single path or sole path communicators that meet the requirements of the most current edition of NFPA 72 may be used.
- 3.20 **Special Tools.** Any keys, tools, and/or keypad 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.
- 3.20.1 **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 key and door drop key. If there are multiple elevator banks, then each elevator bank may require an elevator key box.
- 3.21 **Wire.** Fire alarm wire shall be red or red striped in color, unless approved otherwise by the AHJ. The wire shall not be painted. When fire alarm wire is installed in conduit, then the conduit shall be red in color. All junction box covers shall be painted red and labeled “Fire Alarm System” with minimum one-half inch (1/2”) white letters. Romex® wire is allowed if the requirements of 3.21.1 are met.
- 3.21.1 **Labels.** When the wire does not meet the requirement of 3.21, the wire shall be labeled “Fire Wire” on a red background with minimum one-half inch (1/2”) 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.
- 3.22 **Primary Power.** Fire alarm systems shall be on a dedicated electrical circuit. The breaker, inside the electrical panel, shall be red in color and locked to prevent tampering.
- 3.23 **Secondary Power.** The AHJ can require an additional safety factor of 1-amp hour above the minimum calculated battery size. (e.g. a 7 amp/hour system may require an 8 amp/hour battery)
- 3.23 **DIY, MIY, or Owner Installed Systems.** Fire alarm systems that do not meet the listing requirements of this guide, and/or the current edition of NFPA 72, shall not be allowed. This includes but is not limited to Comcast, IFTTT, SimpliSafe, Smartthings, Ring, Nest, or the like.
- 3.24 **Tests and Inspections.** See Section 13 for details on tests and inspections.

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 main prior to 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 as published by the National Fire Protection Association. Sprinkler systems should be designed to protect all piping from freezing without the use of anti-freeze.
- 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 that have open-flame cooking devices or open-flame decorative devices on them shall be provided with sprinkler protection.
- 4.1.4 **Re-inspections.** Any inspection or test that fails 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 (must be 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 prior to 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 otherwise approved by the AHJ.
- 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.** 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.
- 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 key and door drop key. If there are multiple elevator banks, then each elevator bank may require an elevator key box.
- 4.8.2 **Sprinkler Wrenches.** If a socket is provided for the installation of sprinklers, then an approved handle shall be provided. Sprinkler tools shall be maintained in an approved location.
- 4.9 **Cross Contamination.** The sprinkler contractor shall be responsible for contacting the local water purveyor for approval of the cross contamination device for the sprinkler

system. 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 to 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, changes, 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, then the system installer or building owner shall provide the chain. The chain shall be compatible with the control valve.
 - 4.10.1 **Types.** Indicating control valves shall be provided for each zone as required by the AHJ.
- 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. FDC's 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 in an approved manner. A concrete pad and pathway (minimum three foot (3') wide) may be required. The AHJ may approve alternative materials. The pathway shall be maintained. Snow and ice build-up shall not be allowed.
 - 4.11.2 **Caps.** Caps shall be provided by the installer or building owner 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 located 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 tanks, pumps, and other special equipment associated with the sprinkler system.

- 4.15.1 **Clear working area.** Striping may be required on the floor to indicate the proper clearance for firefighter access.
- 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 **Sprig-ups.** Hydraulic design calculations shall include elevation gain for sprig-ups located within the design area.
- 4.18 **Sprinkler Riser Rooms.** Sprinkler riser(s) shall not be in the Fire Command Room or in a room interconnected to it. 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 pipe. If the FDC is in the affected area, then it may require testing.
- 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 distance of separation or other approved method of isolation.
- 4.21 **Anti-Freeze.** All new fire sprinkler system designs submitted after 3/31/2023 shall comply with the current anti-freeze requirements as published by the National Fire Protection Association. Sprinkler systems should be designed to protect all piping from freezing without the use of anti-freeze.
- 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 in a manner to prevent interference with sprinkler system operation.
- 4.24 **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.
- 4.25 **Tests and Inspections.** See Section 14 for details on tests and inspections.

SECTION 5:
GENERAL REQUIREMENTS FOR KITCHEN HOOD
EXTINGUISHING SYSTEMS

- 5.1 **General.** Fire extinguishing systems for commercial kitchen hoods shall be designed and installed in accordance with this Guide, applicable NFPA and UL standards, manufacturer's recommendations, and other nationally recognized standards.
- 5.1.1 **Re-inspections.** Any inspection or test that fails 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.
- 5.2 **Appliances.** Appliances with built-in fire suppression systems shall be installed and maintained per manufacturers' specifications. Appliances shall be reviewed on a case-by-case basis.
- 5.2.1 **Solid fuel burning Appliances.** The design of solid fuel burning appliances shall have noncombustible materials from the point of cooking extending through the termination of the chimney.
- 5.2.1.1 **Exhaust.** The exhaust shall be designed to prevent the emittance of sparks to the atmosphere.
- 5.3 **Kitchen Hood Connection.** The kitchen hood system shall interconnect with the building fire alarm system. If the building does not have a fire alarm system, then the kitchen hood system may be required to sound an evacuation alarm as approved by the AHJ.
- 5.3.1 **Notification.** Appliances, with a built-in fire suppression system, shall be required to have audible and visual notification. The notification device can be mounted on the appliance.
- 5.4 **Certification.** Technicians or companies registered or licensed by the hood manufacturer shall perform installation, maintenance, and/or service on kitchen fire suppression system(s).
- 5.5 **Pre-Piped Hoods.** All piping for a pre-piped hood shall be inspected by the AHJ prior to concealing the piping or installing the hood.
- 5.6 **Mobile Food Trucks.** Mobile food trucks and/or trailers shall comply with the most current adopted version of the IFC, as amended, 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.
- 5.6.1 **Exterior Notification.** Mobile Food Trucks may be required to install an exterior horn and strobe. The horn strobe requirement shall be determined during the design and/or construction phase of the mobile food truck. If the kitchen hood extinguishing system is triggered, then the exterior horn and strobe shall activate.

5.7 **Electronic Activation Switches.** Kitchen suppression systems that utilize an electronic switch to activate the system, shall have a permanent sign that reads “In the Event of Fire, Push Button to Activate Hood System.” The letters shall be a minimum of one-half inch ($\frac{1}{2}$ ”). Letters shall be white on a red background. The sign shall be posted directly above the switch. The switch shall be red and have the word “PUSH” on the activator.

5.7.1 **Circuit Testing.** The installer is required to provide all equipment required to test the electrical currents of the system. This equipment shall be available during inspections.

SECTION 6:
GENERAL REQUIREMENTS FOR SPECIAL DETECTION OR
EXTINGUISHING SYSTEMS

- 6.1 **General.** Special detection or extinguishing systems shall be designed and installed in accordance with this guide, applicable NFPA standards, manufacturer’s recommendations, and other nationally recognized standards.
- 6.1.1 **Re-inspections.** Any inspection or test that fails 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.
- 6.2 **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.
- Exception:** Code compliant CO₂ and refrigerant systems installed in locations without an existing fire alarm system.
- 6.3 **Environmental Alarms Other than Carbon Monoxide.** Audible and visual signals from environmental alarms shall latch and shall only be resettable by authorized personnel. These alarms shall initiate a visual signal at the Knox Box or other AHJ approved location with an amber light. 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.”
- 6.4 **Monitoring.** Special extinguishing systems shall be monitored.
Add exceptions for CO₂ and refrigerants. e.g. *Exception. Carbon Dioxide and Refrigerant Systems may not be required to be monitored.*
- Exception:** Code compliant CO₂ and refrigerant systems installed in locations without an existing fire alarm system.

SECTION 7:
SPECIAL REQUIREMENTS FOR FIRE ALARM SYSTEMS

- 7.1 **General.** Special provisions for technologies (e.g. elevators, phone, and radio systems) shall comply with the most current adopted edition of the IFC, as amended, the most current edition of NFPA standards, ASME standards, and locally enforced elevator/conveyance requirements.

SECTION 8:
EMERGENCY VOICE/ALARM COMMUNICATION SYSTEMS

- 8.1 **General.** Emergency Voice/Alarm Communication Systems (EVCS) shall be installed in buildings that are four stories ~~or more~~ in height or greater and/or larger than 50,000 square feet. The design of the system shall be approved by the AHJ.
- 8.1.1 **Re-inspections.** Any inspection or test that fails 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.
- 8.2 **Audibility.** The EVCS shall provide audibility in accordance with Section 3.10
- 8.3 **Multipurpose Systems.** EVCS systems interconnected with other public address systems shall use equipment LISTED for fire protection notification.
- 8.3.1 **Priority.** The fire alarm system shall have the ability to take priority of the public address system if it is in use at the time of a fire alarm activation or by activation of the EVCS microphone.
- 8.3.2 **Operation Instructions.** System use instructions (operating instructions) shall be provided in both written and pictorial format. They shall be permanently mounted next to the FACP.
- 8.4 **Mass Notification.** Mass notification systems shall comply with this section of the guide

SECTION 9:
EMERGENCY RESPONDER RADIO COVERAGE SYSTEMS

9.1 **Firefighter Communications.** Firefighter communication systems shall only be installed in locations where Emergency Responder Communication Systems are unable to be installed and as approved by the AHJ

9.2 **Emergency Responder Radio Coverage.** A radio system shall be installed in all buildings in compliance with the most current edition of the IFC, as amended and this guide.

EXCEPTION: 1 and 2 family dwellings built under the IRC and buildings exempted through testing in accordance with the most current edition of the IFC, as amended.

9.2.1 **State Requirement.** The Emergency Responder Communication System shall have the ability to receive and transmit signals to the State of Colorado 800 MHz DTR system.

9.3 **Test and Inspection.** The owner of the building or owner's authorized agent shall have the emergency responder radio coverage system inspected and tested annually or where structural changes occur including additions or remodels that could materially change the original field performance tests.

SECTION 10:
MONITORING

10.1 **Alarm Monitoring.** detection systems required by the IFC, as amended, and/or the AHJ, shall be monitored at an approved location. (i.e. Listed fire alarm central station).

Exception: Voluntary, non-required, residential fire alarm systems.

10.2 **Recording.** The property owner, shall record a Restrictive Covenant for the required fire alarm system at the time of system design. Proof of recording shall be provided prior to issuance of a Certificate of Occupancy.

Exception: Voluntary, non-required, residential fire alarm systems.

10.3 **Transmission of Alarm Codes.** Alarm signals shall send a distinct and separate code for each type of 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.

10.4 **Transmission of Carbon Monoxide Alarm.** Carbon monoxide alarm signals shall dispatch the fire department. "Proper Code" shall not cancel a fire department response.

SECTION 11:
HOUSEHOLD SIGNALING SYSTEMS

- 11.1 **General.** This section shall apply to all alarm and monitoring equipment installed in detached one- and two-family dwellings, including townhouses. Fire protection and life safety systems shall comply with the most current adopted edition of the IFC as amended; and be designed, installed, and maintained in accordance with the most current edition of NFPA 72; and other nationally recognized standards. The system installer shall be NICET Level II or possess an equivalent certification, as approved by the AHJ. Occupant notification shall be required for buildings containing fire sprinkler systems.
- 11.1.1 **Re-inspections.** Any inspection or test that fails 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.
- 11.2 **Design.** Fire protection and life safety systems shall meet the requirements imposed by the adopted fire code, as amended, and/or the AHJ.
- 11.3 **Verification.** Alarm monitoring companies shall attempt to voice verify a fire alarm at a residence ONCE prior to notifying the fire department. If the alarm is verified as false, then the fire department shall not be notified. The method of verification shall be approved by the AHJ.
- Exception:** Carbon monoxide alarms shall not be verified and the fire department shall be dispatched.
- 11.4 **Key Box.** Structures with a life safety system shall be accessible. A Knox™ key box shall be installed in an **approved location**. The Knox™ Home Box shall not be allowed.
- 11.5 **Reset Instructions.** A card with the reset code and instructions on how to reset the FACP, shall be placed inside the key box. The reset code shall be separate from the owner's code. The reset code should be programmed in the last available slot for alarm codes.
- 11.6 **Emergency Contact.** Emergency contact information shall be provided by the building owner. This information shall be provided through the creation of a Community Connect™ account prior to final inspection.
- 11.7 **Components.** All fire protection and life safety system components shall be LISTED for their intended use. Components shall be installed per the manufacturer's instructions, in locations approved by the AHJ.
- 11.8 **Detector Locations.** Detectors shall be located in accordance with the most current adopted editions of the IFC, as amended, and the most current edition of NFPA 72. Detectors shall be located in an effort to prevent false alarms.
- 11.8.1 **Reset.** All system detectors shall reset from the alarm keypad.

11.8.2 **Detector installation during construction.** Smoke detectors shall not be installed on the mounting plate until the building is CLEAN and construction is finished and ready for a Certificate of Occupancy.

Exception: Heat detectors.

11.9 **Ionization Detectors.** The plan review package shall include factory certification of the altitude range for ionization smoke detectors. Ionization smoke detectors shall be certified for elevations above 8,000 feet above sea level.

11.10 **Thermal Detection.** Heat detectors may be required in areas that are not suitable for smoke detectors. Heat detectors shall be addressable or on a separate zone from the smoke loop. *Rate of rise detectors shall not be allowed in areas with known temperature fluctuations that fall within the time/temperature thresholds.*

11.10.1 **Garage Spaces.** Thermal Detection shall be required in garages with living area above.

Exception: Garages protected with an approved fire sprinkler system.

11.10.2 **Panel Protection.** The alarm system control panel, not the keypad(s), shall be protected. A smoke detector is preferred; however, a heat detector may be allowed if the environment is not suitable for a smoke detector, when approved by the AHJ.

11.11 **Alarm Audibility.** Fire alarm systems shall provide a minimum sound level of 75 dBA in all areas of a sleeping room with all intervening doors closed. All other areas of the home shall have a minimum sound level of 70 dBA. A single audible appliance shall not exceed 110 dBA. The fire alarm contractor shall be responsible for providing an ANSI Type II decibel meter or approved Application at the time of final inspection.

11.11.1 **Interior Sounders.** Interior sounders connected to the fire alarm system shall be labeled "Fire." Temporary or non-factory labels shall be prohibited. Sounder devices shall be white or red in color, unless otherwise approved by the AHJ.

11.11.2 **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.

11.12 **Exterior Audible and Visual Signals.** Devices used on the exterior of a home shall be weatherproof and listed for an outdoor environment. All life safety alarms shall activate a clear or white outside flashing strobe (15/75 candela minimum), unless otherwise approved by the AHJ. The outside horn shall be audible at a minimum of 85 dBA. The AHJ shall approve the location of the outside horn(s) and strobe(s). Additional horns or strobes may be required.

- 11.13 **Transmission Alarm Codes.** Alarm signals shall send a separate and distinct 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.
- 11.13.1 **Timer Test.** Monitored fire alarm systems shall have an automatic test signal sent to the monitoring company at least once every 24 hours.
- 11.13.2 **Performance Based Technologies.** When an approved alternative communication system is used, it shall meet the requirements of NFPA 72.
- 11.14 **Wire.** Fire alarm wire shall be red in color, unless otherwise approved by the AHJ, and shall not be painted. When fire alarm wire is installed in conduit, then the conduit shall be red in color. All junction box covers shall be painted red and labeled “Fire Alarm System”. Romex® wire is allowed if the requirements of 11.14.1 are met.
- 11.14.1 **Labels.** When the wire does not meet the requirement of 11.14, the wire shall be labeled “Fire Wire” on a red background with minimum one-half inch (1/2”) 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.
- 11.15 **Retrofitted Fire Alarm Systems.** A monitored retrofitted fire alarm system shall provide, as a minimum, an approved detection device on each floor of the dwelling unit. An approved alarm shall be installed in every sleeping room and in the egress from the sleeping room. See Section 11.11 for audibility requirements.
- 11.16 **DIY, MIY, or Owner Installed Systems.** Fire alarm systems that do not meet the listing requirements of this guide, and/or the current edition of NFPA 72, shall not be allowed. This includes but is not limited to Comcast, IFTTT, SimpliSafe, Smarthings, Ring, Nest, or the like.
- 11.17 **Tests and Inspections.** See Section 13 for details on tests and inspections.

SECTION 12:
ONE- AND TWO-FAMILY DWELLINGS AND MANUFACTURED HOMES
FIRE PROTECTION SYSTEMS

- 12.1 **General.** This section shall apply to all fire extinguishing systems installed in detached one- and two-family dwellings including townhouses. Fire protection and life safety systems shall comply with the most current adopted edition of the IFC, as amended; and be designed, installed, and maintained in accordance with this guide; the most current edition of NFPA 13D and other nationally recognized standards. P2904 systems shall be allowed. Occupant notification shall be required for buildings containing fire sprinkler systems.
- 12.1.1 **Re-inspections.** Any inspection or test that fails 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.
- 12.2 **Submittals.** See Section 1 for submittal requirements for Residential Sprinkler Systems.
- 12.3 **Required Systems.** Required fire protection and life safety systems are systems that meet requirements imposed by the adopted edition of the IFC, as amended or AHJ.
- 12.3.1 **Water Supply.** The quantity of water required for NFPA 13D systems that use stored water as the sole source of supply shall be based on the following:
- Water demand for the system plus drive time for the fire department to reach the home;
 - The water supply shall not be less than 10 minutes; and
 - The design area shall be a minimum of three (3) heads or as required by the AHJ.
- 12.3.2 **Garages.** Sprinkler protection shall be required within all attached garages.
- 12.3.3 **Design Area.** The hydraulic design criteria for a NFPA 13D system shall be a minimum of three (3) flowing sprinkler heads. The system shall provide a minimum of 13 gallons per minute (GPM) per sprinkler head. The discharge shall not be less than the listing for the sprinkler head.
- 12.3.4 **Design Safety Factor.** The hydraulic calculation method shall be used to provide at least a 10 percent or 10 psi safety factor (whichever is greater) between the system demand curve and the water supply curve. The hydrant data source shall be approved by the AHJ.
- 12.3.5 **System Components.** Sprinkler system components with an expectation of maintenance including but not limited to the riser,

tanks, and pumps shall not be in areas with limited access. This includes crawl spaces and other areas as determined by the AHJ.

12.3.6 **Pumps and Compressors.** Sprinkler system pumps and compressors shall be located at least four inches (4”) above the floor or as required by the National Electric Code, whichever is greater. All materials, used to construct the mounting platform, shall be waterproofed materials or pressure treated wood. The pump and compressor shall be securely mounted to the platform. The platform shall be securely mounted to the floor.

12.3.7 **Anti-Freeze.** All new fire sprinkler system designs submitted after 3/31/2023 shall comply with the current anti-freeze requirements as published by the National Fire Protection Association. Sprinkler systems should be designed to protect all piping from freezing without the use of anti-freeze.

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.

12.3.8 **Anti-freeze Test Ports.** A remote test port (auxiliary drain) shall be installed in an accessible location. A placard noting the location of the drain shall be attached to the sprinkler riser.

12.3.9 **Roof Pitches.** The system design for ceiling slopes greater than 8:12 shall follow the sprinkler head manufacturer’s design criteria.

12.4 **Key Box.** Structures with a life safety system shall be accessible. A Knox™ key box shall be installed in an **approved location**. The Knox™ Home Box shall not be allowed.

12.5 **Alarm Audibility.** All fire extinguishing systems shall meet the audibility requirements in Sections 11.11 and 11.12.

12.6 **Fire Department Connection (FDC).** NFPA 13D systems may require an approved single 2½” hose connection. The hose connection shall be the National Hose Thread type. The FDC shall be located between 36” and 48” above finished grade. FDCs shall be accessible as required in Section 4.11. See AHJ for specific exceptions.

12.7 **Flush Tests.** The installer shall flush the underground piping for the underground main prior to connecting the sprinkler system riser to the water service line. The installer shall be registered 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 flushing of the underground piping. A State licensed contractor shall fill out a “Contractor’s Material and Test Certificate for Underground Piping.”

12.8 **Hydrostatic Tests.** Hydrostatic testing shall comply with the most current edition of NFPA 13D.

- 12.9 **Insulation.** Installation of insulation shall meet the requirements of NFPA 13D, and approved by the AHJ.
- 12.10 **Tests and Inspections.** See Section 14 for details on tests and inspections.

SECTION 13:
INSPECTIONS, TESTS, AND SYSTEM CERTIFICATION FOR ALL
DETECTION SYSTEMS

- 13.1 **Rough-in Inspections.** A visual inspection shall be required to verify proper installation of system components **PRIOR** to the installation of insulation and/or wall coverings.
- 13.2 **Final Acceptance Test.** All fire alarm system components shall be pre-tested by the installer **PRIOR** to the final acceptance test.
- 13.2.1 **Procedure.** The AHJ shall witness a test of the fire alarm system as designed and approved. The installer shall provide all needed test equipment. The installer shall test all initiating devices, audible appliances, visual appliances, and reset devices prior to the final acceptance test by the AHJ.
- 14.3.2 **Documentation.** The fire alarm contractor shall provide the AHJ with a copy of the “System Record of Inspection and Testing” at the time of the final acceptance test. This document shall be required before the AHJ will sign the Building Department form for the Issuance of a Certificate of Occupancy. A sample form is in the most current edition of NFPA 72.
- 13.2.2 **Post-Test.** The fire alarm panel shall be clear of all alarm and trouble conditions prior to AHJ approval for the Certificate of Occupancy.
- 13.3 **Inspection Scheduling.** All rough-in inspections and final acceptance tests shall be requested at least 48 hours **PRIOR** to the inspection. Seven (7) days advance notice is recommended for commercial system inspections. The system installer shall request and be present for all inspections.
- 13.4 **As-built Drawings.** The installer shall submit as-built drawings and/or calculations for commercial fire alarm systems in an electronic format acceptable to the AHJ. Plans shall be secured, and include, but not limited to FA, sprinkler, standpipe, floor plans, and a site plan.
- 13.5 **Tests and Inspections.** Certified fire alarm contractors shall perform tests and inspections for fire alarm systems. The test and inspection shall comply with the most current edition of NFPA 72. The contractor shall submit the test and inspection report electronically to the AHJ within 30 days of completion of the test.

SECTION 14:
INSPECTIONS, TESTS, AND SYSTEM CERTIFICATION FOR
ALL FIRE PROTECTION SYSTEMS

- 14.1 **Rough-in Inspections.** A visual inspection shall be required to verify proper installation of system components **PRIOR** to the installation of insulation and/or wall coverings.
- 14.2 **Hydrostatic Test Inspections.** Hydrostatic tests for sprinkler systems shall include all portions of the system, including the FDC(s).
- 14.3 **Pump and Tank Systems.** The sprinkler contractor shall conduct a functional flow test for all NFPA 13,13D, and 13R systems when the sprinkler system water is supplied by an individual pump and tank or pump-assist system. Contact the AHJ for details on the functional flow test procedures.
- 14.4 **Final Acceptance Tests.** All fire suppression systems shall be **pre-tested** by the installer **PRIOR** to the final acceptance test.
- 14.4.1 **Procedure.** The AHJ shall witness a test of the fire suppression system as designed and approved. The installer shall provide all needed test equipment. The installer shall test all initiating devices, audible appliances, visual appliances and reset devices prior to the final acceptance test by the AHJ.
- 14.4.2 **Documentation.** 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. This document shall be provided before the AHJ can sign the Building Department form for the Issuance of a Certificate of Occupancy. A sample form is in the most current edition of NFPA 13.
- 14.4.3 **Additional Documents for NFPA 13 and/or NFPA 13R systems.** The sprinkler contractor shall provide the most current edition of NFPA 25 to the owner or their representative. The AHJ may request to witness the delivery of the document at the time of final inspection.
- 14.5 **Inspection Scheduling.** All rough-in inspections and final acceptance tests shall be requested at least 48 hours **PRIOR** to the inspection. Seven (7) days advance notice is recommended for commercial system inspections. The system installer shall request and be present for all inspections.
- 14.6 **As-built Drawings.** The installer shall submit as-built drawings for commercial fire suppression systems in an electronic format acceptable to the AHJ. The AHJ may also require additional hydraulic calculations.

Plans shall be secured, and include, but not limited to FA, sprinkler, standpipe, floor plans, and a site plan.

- 14.7 **Cross Contamination Devices.** The sprinkler contractor shall be responsible for contacting the local water purveyor for approval of the cross-contamination device for the sprinkler system. Buildings undergoing remodels or system changes shall limit the potential for cross contamination in a manner approved by the local water purveyor.
- 14.8 **Tests and Inspections.** Certified fire suppression system contractors shall perform tests and inspections for fire suppression systems. The test and inspection shall comply with the most current edition of applicable NFPA standards. The contractor shall submit the test and inspection report electronically to the AHJ within 30 days of completion of the test.

SECTION 15:
INSPECTIONS, TESTS, AND SYSTEM CERTIFICATION FOR
SPECIAL EXTINGUISHING SYSTEMS

- 15.1 **Final Acceptance Test.** All fire extinguishing systems shall be **pre-tested** by the installer **PRIOR** to the final acceptance test.
- 15.1.1 **Procedure.** The AHJ shall witness a test of the fire extinguishing system as designed and approved. The installer shall provide all needed test equipment. The installer shall test all initiating devices, audible appliances, visual appliances and reset devices prior to the final acceptance test by the AHJ.
- 15.1.2 **Documentation.** The contractor shall provide the AHJ with a copy of the Test Certificate at the time of the final acceptance test. This document shall be required before the AHJ will sign any forms approving the system.
- 15.2 **Tests and Inspections.** Certified contractors shall perform tests and inspections for special extinguishing systems. The test and inspection shall comply with the most current edition of applicable NFPA standard(s). The contractor shall submit the test and inspection report to the AHJ, by a format acceptable to the AHJ, within 30 days of completion of the test.

SECTION 16:
INSPECTIONS, TESTS, AND SYSTEM CERTIFICATION FOR
STANDPIPE SYSTEMS

- 16.1 **Flow Tests.** Standpipe systems shall be required to pass a flow test that complies with the most current editions of NFPA 14 and NFPA 25.
- 16.1.1 **Procedure.** Standpipe systems shall require a flow test. The test method shall be approved by the AHJ. The installer shall provide all needed test equipment. The installer shall test the integrity and certify the minimum flow of the system prior to final acceptance by the AHJ.
- 16.1.2 **Documentation.** The contractor shall provide the AHJ with a copy of the Test Certificate at the time of the final acceptance test. This document is required before the AHJ will sign any forms approving the system.
- 16.2 **Tests and Inspections.** Certified system contractors shall perform tests and inspections for standpipe systems. The test and inspection shall comply with the most current edition of applicable NFPA standards. The contractor shall submit the test and inspection report electronically to the AHJ within 30 days of completion of the test.