COLORADO SPRINGS FIRE DEPARTMENT, DIVISION OF THE FIRE MARSHAL

SPECIAL HAZARD FIRE SUPPRESSION SYSTEMS

General Requirements per Chapter 9 of the Locally Amended 2015 International Fire Code and the Applicable NFPA Codes.

Fire Construction Services
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PURPOSE

This guidance document has been developed in an effort to provide the highest level of service to the customers of the CSFD. The major goal of plan reviews is to ensure the design of special hazard fire suppression systems meet the minimum requirements of the adopted codes, standards and ordinances. To meet this goal, the submitted plans and supporting documentation must contain the information needed to conduct a thorough review

SCOPE

This guidance document outlines the minimum requirements set forth in the International Fire Code, local amendments, and departmental policies and procedures as they relate to the installation of special hazard fire suppression systems (excluding wet chemical, foam water spray, or halon systems). This guidance document is not intended to provide an all-inclusive listing of submittal and inspection requirements, as it would be virtually impossible to cover all situations. Also included is information covering items required to be included on the working drawings and supporting documents.

DEFINITIONS

CSFD	Colorado Springs Fire Department
CO2	Carbon Dioxide
FACP	Fire Alarm Control Panel
Ft^2	Square feet
IFC	International Fire Code
NFPA	National Fire Protection Association
PSI	Pounds force per square inch
RBD	Regional Building Department

GUIDELINES

I. INTRODUCTION.

A. APPLICABLE CODES AND STANDARDS.

1. 2015 International Fire Code and local amendments.
2. 2018 Edition of NFPA 12 Carbon Dioxide Extinguishing Systems.
3. 2017 Edition of NFPA 17 Dry Chemical Extinguishing Systems.
4. 2019 Edition of NFPA 72 National Fire Alarm and Signaling Code.
5. 2018 Edition of NFPA 2001 Clean Agent Fire Extinguishing Systems.
6. Colorado Springs City Ordinances.
7. CSFD Administrative Rulings/Interpretations.

B. ADMINISTRATIVE REQUIREMENTS.

1. **Approved Contractors**. All contractors working on special hazard fire suppression systems must obtain a Fire Suppression Contractor B (FSC-B) License in order to design, install, add to, alter, service, maintain, repair, test and inspect special hazard fire suppression systems, in accordance with Pikes Peak Regional Building Code, Section 207. Please contact Regional Building Department, Contractor Licensing at 719-327-2887 for additional information on obtaining a license.
2. **Service Technicians.** A Colorado Springs licensed Service Technician (FST-B) shall be on-site for all installations, additions, alterations, repair and inspections of special hazard fire suppression systems in accordance with Pikes Peak Regional Building Code, Section

207. Please contact Regional Building Department, Contractor Licensing at 719-327-2887 for additional information on obtaining a license.

3. **Code/Standard Editions**. Special hazard fire systems shall meet the criteria of the adopted codes as amended and all applicable requirements of the most recent edition of the NFPA standards. NFPA standards are effective on January 1st of the year following the effective date printed in the standard.
4. **Permits/Inspections**. Required plan submittal with approvals and permits must be secured through CSFD prior to the start of any work. Permitted work must be inspected by CSFD.
5. **Special Circumstances**. Depending upon the scope of work, different types of submittals may be required; therefore, you may want to contact Fire Construction Services for additional information.
6. **Alternative Methods**. If special building conditions and/or restrictions exist that may prohibit any of the requirements set forth in this guidance document from being met, approval from CSFD for an alternative means and methods approach is required. The alternative means and methods must be approved before installation of the system begins.
7. **Revisions.** All revisions shall be clouded and identified with a sequential numbering or lettering system, such as Revision A, B, etc. or Revision 1, 2, etc. Revisions are date sensitive, thus each revised sheet must bear the date of the revision.
8. **As-Built Plans.** All deviations from approved plans shall be documented and submitted to CSFD to archive. Reviews will not be conducted on as-built plans, unless specifically required by the fire inspector, as these field changes are often verified as compliant by the fire inspector. All as-built plans shall be conspicuously marked as such.

II. SUBMITTAL INFORMATION.

This section of the guidance document provides information regarding documentation and shop drawings that shall be provided at the time of plan submittal. This documentation is required to assure the plan submittal package contains the necessary information for a complete plan review.

A. MINIMUM REQUIREMENTS OF SUBMITTAL.

1. **Drawings/Plans.** Drawings shall be submitted on sheets no less than 11 x 17 inches. Plans shall be scaled or suitably dimensioned and reproducible. Plans shall contain the information and/or details indicated in the checklist in the appendix.
2. **Plan Review Number**. Submittals associated with a construction project shall be provided with the CSFD Plan Review Number. This number is an eight digit numeric code located on the back of the construction plans. Suppression system work only projects shall be indicated as such on the submittal so that it can be assigned a plan review number.
3. **Number of Drawing Sets**. A minimum of two (2) sets of drawings are required to be submitted to CSFD. A maximum of three (3) original sets will be stamped with CSFD approval.
4. **Cut Sheets/Specifications**. A minimum of one (1) set of manufacturer's product information shall be provided. This is to include information on all devices that are part of or being connected to, the special hazard fire suppression system; such as piping, valves, hangers, method of supporting/mounting equipment, pipe, and conduit, etc. Any cut sheets showing multiple models/type of devices, the specific item being installed shall be highlighted. As an example, there are several models of nozzles used; the specific nozzle protection shall be highlighted. Please provide only those pages from the design manual that are applicable to the system being installed. Stamped cut sheets will be returned to the contractor and must remain on the job site with the approved plans.

CSFD accepts cut sheets on CD. The CD must have the individual cut sheets for the materials specific to the job. Note: we will not accept manufacturer's CD's! If the option to submit cut sheets via CD is chosen, CSFD will stamp, date and initial the CD – it is then the contractor's responsibility to provide the means of reviewing that disk upon the fire inspector's request.

5. **Calculations**. A minimum of two (2) complete sets of calculations (as necessary depending on the type of system) are required to be submitted to CSFD and shall include the items found in the checklist provided with in the appendix. One set will be retained by CSFD for our records.

6. **Code Study**. In some cases, CSFD will require a code study of the design criteria for the system being submitted. Each step is required to be detailed, referencing each code or standard section used in arriving at the design criteria for the system.

7. **Submittal of Plans.** The fire alarm/detection associated with the special hazard fire suppression system can be submitted with the special hazard suppression system for a single permit, or the fire alarm/detection can be submitted separately as its own permit. If separate submittals are provided, then their scopes of work must match. See the CSFD Fire Alarm Guidance Document for fire alarm submittal requirements.

III. GENERAL INFORMATION AND REQUIREMENTS.

A. MONITORING. Where a building fire alarm system is provided, special hazard fire suppression systems shall be monitored by the building fire alarm system (IFC 904.3.5).

Buildings provided with a dedicated function system (such as elevator recall or sprinkler monitoring) that is not already monitored, are not required to monitor the special hazard suppression system.

B. SEQUENCE OF OPERATIONS. The manufacturer's sequence of operation requirements shall be followed for the type of system being installed.

C. SYSTEM ACTIVATION NOTIFICATION. An audible and visual alarm along with warning signs shall be provided outside the protected area that indicates pre-discharge alarm and system discharge (IFC 904.3.4, NFPA 11: 4.5.6, NFPA 17: 4.10, NFPA 2001: 4.3.5).

D. NEW! Decommissioning Systems. When systems are to be permanently removed from service, a letter shall be submitted to CSFD Fire Construction Services detailing the reason(s) for the system being removed. Information on the building, occupancy classification and occupant load shall be included (IFC 105.7.21). This documentation shall show why the suppression system is no longer required and can be removed. If the building is equipped with fire sprinklers, a separate submittal will be required showing that sprinkler heads are being re-installed in the area originally protected by the special hazard fire suppression system.

IV. SPECIFIC SYSTEM INFORMATION.

A. DRY CHEMICAL EXTINGUISHING SYSTEMS (NFPA 17).

1. Fuel and /or electrical power supply, shall be arranged to shut off all equipment or hazards, including but not limited to conveyors and flowing flammable or combustible fluids or gases, protected by the system when it is actuated. All shutoff systems shall require manual resetting.

2. Where two or more hazards can be simultaneously involved in fire by reason of proximity, the hazards shall be protected by either multiple systems installed to operate simultaneously or one system designed to protected all hazards that can be simultaneously involved.

3. Ventilation systems may or may not be required to shut down depending on the type of application (local application, total flooding, etc.) and what you are protecting and the system manufacture's requirements. Please contact the CSFD Fire Construction Services for additional information if you are not sure.

4. At least one manual pull station shall be provided for each system and shall be located in a path of egress. Multiple pull stations shall be provided with signage as to what system they are connected to and/or what appliances/hazards they protect.
5. All discharge nozzles shall be provided with caps or other suitable devices to prevent the entrance of grease, vapors, moisture or other foreign material into the piping.

B. CARBON DIOXIDE EXTINGUISHING SYSTEMS (NFPA 12).

1. Warning signs shall be provided in every protected space, entrances to protected spaces, anywhere CO2 may migrate, storage rooms containing CO2 system cylinders, at every manual pull station location, etc.
2. All system components shall be located so as to maintain minimum clearances from live electrical components. Please note at altitudes above 3,300 feet, the clearances must be increased.
3. Abort switches are NOT allowed to be used with CO2 systems.
4. At least one manual control for actuation shall be provided.
5. The location, storage, arrangement and security of CO2 cylinders shall be approved by the Division of the Fire Marshal. Please contact 719-385-5978 to speak with one of the Hazardous Materials inspectors for additional information.

E. CLEAN AGENT EXTINGUISHING SYSTEMS (NFPA 2001).

1. Initiating and releasing circuits shall be installed in raceways.
2. Abort switches shall be located within the protected area and shall be located near the means of egress for that area. Abort switches shall be of the "dead-man" type, requiring constant pressure. A telephone should be located near the abort switch. Manual pull station shall always override an abort switch.
3. Warning signs shall be provided in every protected space and entrances to protected spaces.
4. All discharge nozzles shall be provided with caps or other suitable devices to prevent the entrance of grease, vapors, moisture or other foreign material into the piping.
5. Removal of electric actuator from the agent storage container discharge valve that it controls shall result in an audible and visual indication of system impairment at the system releasing control panel.

V. INSTALLATION.

Fire protection systems shall be maintained in accordance with the original installation standard for that system. (IFC 901.4)

A. ADMINISTRATIVE PERMITS.

1. **Work at Risk**. If you need to start work prior to issuance of a permit, approval shall be obtained from CSFD Fire Construction Services to begin work. A letter is to be submitted to CSFD requesting the work at risk, and defining the justification for the request. The approved work at risk letter shall be posted on the job site until such time the installation permit is issued (IFC 105.3.4.1). The work at risk should be the last option you turn to, to avoid abuse of the system.

    a. Request for Work at Risk (WAR) shall be submitted to CSFD Fire Construction Services on the fire suppression contractor's letter head.

    b. The letter must include the Name and address of the project, CSFD plan review number, proposed date that work will begin, the proposed work that will be performed prior to issuance of a permit, justification for the work at risk request, and the signature of the company's Responsible Managing Employee (RME).

c. Other considerations that will be taken in to account will be: the backlog of plans waiting for review and the number of expedited review requests currently in the office. Contractor performance history in both quality of plans and installations will be considered in granting a work at risk.

d. The holder of the work at risk shall be authorized to proceed at their own risk with the installation or modification of the special hazard fire suppression system, but shall not entitle them to any required inspections of the system or work until drawings are approved and the required construction permit is posted on site.

e. Any work performed on special hazard fire suppression systems will be done at the risk of the installing contractor. Any required changes or modifications based upon approved plan review or inspection activities will be the responsibility of the contractor.

f. The granting of a work at risk does not eliminate the contractor's responsibility to maintain up to date red line drawings on site. Any red line modifications made prior to the contractor receiving approved plans and permit must be transcribed onto the approval plans in a timely fashion (prior to initial inspection).

g. All work performed under the work at risk must remain visible until CSFD inspection of the work after obtaining approved plans and permit.

h. An individual work at risk, a company's ability to participate in the work at risk program, or the entire work at risk program can be suspended at any time at the discretion of the Fire Code Official.

2. Demolition Permit. Approval shall be obtained from CSFD Fire Construction Services to permanently remove a special hazard fire suppression system from a building. The approval shall be posted on the job site until such time as CSFD has inspected the complete demolition of the system (See decommissioning systems section).

B. CONSTRUCTION PERMITS.

1. The installation of the special hazard fire suppression system is not to commence, including any pre-piping until the working plans have been reviewed and approved by CSFD and a permit secured on site, per IFC 105.1.2.

2. A construction permit is required for installation of or modification to a special hazard fire suppression system unless the scope of work does not impact the tank size, number of tanks required, quantity of suppression agent required, or the system control equipment. Work such as re-arrangement of piping for a new room layout would not require a permit, as long as the amount of agent or the number of tanks does not change.

3. Permits for special hazard fire suppression systems expire one year after date of issue. A 30-day grace period is allowed to renew the permit. After the grace period expires, if inspections have been conducted in the past 13 months, new plans and permit is not required to be submitted for issuance of a new permit. If the grace period has expired and no inspections have occurred in the past 13 months, new plans shall be submitted prior to issuance of a new permit.

4. Maintenance is defined as the work necessary to keep equipment operable or to make repairs. Replacement of fusible links or repairing damaged components is considered maintenance and does not require a permit.

C. RELEASING PANELS.

1. Dedicated releasing panels shall be located inside the protected space or within 10-feet of the main entry door to the protected space. The panel shall be visible and accessible at all times.

2. If a dedicated releasing panel is used, a sign shall be located adjacent to the fire alarm control panel which identifies the location of the releasing panel.

3. If the dedicated releasing panel protects multiple rooms, a sign identifying the location of the releasing panel shall be provided within each room.

VI. INSPECTIONS AND TESTING.

It shall be the duty of the person doing the work authorized by a permit to notify CSFD that the work is ready for inspection. It shall also be the responsibility of the person requesting the inspection to provide access to and means for proper inspection of the work.

Be advised that approval as the result of an inspection shall not be construed to be an approval of a violation of the provision of the adopted fire code, standards or of other ordinances of the City of Colorado Springs. Inspections presuming to give authority to violate or cancel provision of this code or of other ordinances of the jurisdiction shall not be valid (IFC 106.4).

A. **VISUAL INSPECTION.** Piping shall be visually inspected to verify proper materials and installation methods. Nozzles shall be provided with caps to prevent debris or other foreign material from entering the piping system.

B. **NEW! ROOM INTEGRITY TEST.** A room integrity test (door fan test) if applicable for the system being installed shall be performed by the installing contractor. This test is not required to be witnessed by CSFD, but the contractor shall provide documentation of this test to the fire inspector.

C. **SYSTEMS OPERATIONAL TESTS**. A puff test or a full discharge test will be required, depending on the specific type of system. Please check with the applicable standard and system manufacturer's instructions for additional information. Please contact Fire Construction Services if you have questions.

D. **COMPLETION DOCUMENTS**.

1. A copy of the completed Installer's Certificate shall be provided to the fire inspector as well as the building owner.

2. Owner's manual and installation instructions shall be provided to the building owner.

REFERENCES AND LINKS

Administrative Rulings and IFC Amendments can be found on the CSFD web site at:
https://coloradosprings.gov/fire-department/page/fire-code-amendments-and-administrative-rulings?mlid=9796

APPENDIX

Working Drawing Submittal Checklist

Plan Requirements for Special Hazard Suppression Systems

Working Drawings

Title Block shall contain the following:

- ❑ Name of owner and occupant
- ❑ Location including full street address as assigned by RBD Enumerations
- ❑ Name, address, phone, fax number and email address of designer and installing contractor
- ❑ CSFD Plan Review number
- ❑ A scale including graphic representation OR suitably dimensioned.
- ❑ Detailed scope of work in narrative format
- ❑ Editions of IFC and NFPA standards used

Information required on Drawings:

DRY CHEMICAL SUPPRESSION SYSTEMS (NFPA 17)

Building Information:

- ❑ Location and construction of protected enclosure walls and partitions
- ❑ Enclosure cross section, full height or schematic diagram including location and construction of building floor/ceiling assemblies above and below, raised access floor and suspended ceiling
- ❑ Building key plan if required

System Information:

- ❑ Agent being used and the amount provided
- ❑ Description of occupancies and/or hazards being protected, designating whether or not the enclosure is normally occupied
- ❑ Description of exposures surrounding the enclosure or protected area
- ❑ Description of agent storage containers used including internal volume, storage pressure, and nominal capacity expressed in units of agent mass or volume at standard conditions of temperature and pressure
- ❑ Description of nozzles used including size, orifice port, configuration and equivalent orifice area and material
- ❑ Description of pipe and fittings used including material specifications, grade and pressure rating
- ❑ Equipment schedule or bill of materials
- ❑ Plan view of the protected area showing enclosure partitions; agent distribution system including agent storage containers, piping and nozzles, location of controlled

devices such as dampers and shutters and location of instructional signage, location of manual pull station, location of notification devices

- Isometric view of agent distribution system showing the length and diameter of each pipe segment, fittings including reducers and strainers; and orientation of tees, nozzles including size, orifice port configuration
- Details of each unique rigid pipe support configuration showing method of securement to the pipe and to the building structure
- Details of the method of container securement showing method to the container and to the building structure
- Details of any special features

CARBON DIOXIDE SUPPRESSION SYSTEMS (NFPA 12)

Building Information:

- Location and construction of protected enclosure walls and partitions
- Enclosure cross section, full height or schematic diagram including location and construction of building floor/ceiling assemblies above and below, raised access floor and suspended ceiling
- Building key plan if required, showing location of the hazards

System Information:

- Amount of CO2 provided to include calculations
- Description of occupancies, materials and/or hazards being protected, designating whether or not the enclosure is normally occupied
- Description of exposures surrounding the enclosure or protected area
- Description of agent storage containers used including internal volume, storage pressure, and nominal capacity expressed in units of agent mass or volume at standard conditions of temperature and pressure
- Description of nozzles used including size, orifice port, configuration and equivalent orifice area and material
- Location and flow rate of each nozzle, including equivalent orifice area
- Description of pipe and fittings used including material specifications, grade and pressure rating.
- Location, size and equivalent lengths of pipe, fittings and hose, pipe reduction methods and orientation of tees.
- Information pertaining to the location and function of the detection devices
- Plan view of the protected area showing enclosure partitions; agent distribution system including agent storage containers, piping and nozzles, location of controlled devices such as dampers and shutters and location of instructional signage, location of notification devices, location of warning signs, location of manual pull station

- Isometric view of agent distribution system showing the length and diameter of each pipe segment, fittings including reducers and strainers; and orientation of tees, nozzles including size, orifice port configuration
- Details of the method of container securement showing method to the container and to the building structure
- High or low pressure storage cylinders/systems
- Local Application or total flooding
- Flash/Surface fire or deep seated
- Location and function of detection devices
- Location of operating devices
- Auxiliary equipment if any
- Location of the hazards
- Enclosure or limits and isolation of the hazards
- Surrounding area that could affect the protected hazards
- Location and size of CO2 storage facility or area
- Length of time delay for pre-discharge alarms
- Details of any special features
- Equipment schedule or bill of materials

CLEAN AGENT SUPPRESSION SYSTEMS (NFPA 2001)

Building Information:

- Location and construction of protected enclosure walls and partitions.
- Enclosure cross section, full height or schematic diagram including location and construction of building floor/ceiling assemblies above and below, raised access floor and suspended ceiling
- Building key plan if required, showing location of the hazards

System Information:

- Agent being used and location
- Description of occupancies, materials and/or hazards being protected, designating whether or not the enclosure is normally occupied
- Description of exposures surrounding the enclosure or protected area
- Description of agent storage containers used including internal volume, storage pressure, and nominal capacity expressed in units of agent mass or volume at standard conditions of temperature and pressure
- Description of nozzles used including size, orifice port, configuration and equivalent orifice area and material
- Location and flow rate of each nozzle, including equivalent orifice area

- Description of pipe and fittings used including material specifications, grade and pressure rating
- Location, size and equivalent lengths of pipe, fittings and hose, pipe reduction methods and orientation of tees
- Information pertaining to the location and function of the detection devices.
- Plan view of the protected area showing enclosure partitions; agent distribution system including agent storage containers, piping and nozzles, location of controlled devices such as dampers and shutters and location of instructional signage, location of manual pull station, location of notification devices, location of warning signs
- Isometric view of agent distribution system showing the length and diameter of each pipe segment, fittings including reducers and strainers; and orientation of tees, nozzles including size, orifice port configuration
- Details of the method of container securement showing method to the container and to the building structure
- High or low pressure storage cylinders/systems
- Local Application or total flooding
- Flash/Surface fire or deep seated
- Location and function of detection devices
- Extinguishing or inerting concentration
- Refer to CSFD Fire Alarm Guidance Document for information on the alarm and detection portion of these systems
- Calculations to include:
    - Enclosure volume
    - Quantity of agent
    - Container storage pressure
    - Internal volume of container
    - Location, type, flow rate of each nozzle including equivalent orifice area
    - Location, size and equivalent lengths of pipe, fittings and hose
    - Location and size of storage area/facility
- Location of operating devices
- Auxiliary equipment if any
- Location of the hazards
- Enclosure or limits and isolation of the hazards
- Surrounding area that could affect the protected hazards
- Length of time delay for pre-discharge alarms
- Details of any special features
- Equipment schedule or bill of materials