KITCHEN SUPPRESSION SYSTEMS

Part 2: Specifications, Requirements, & Controls

2 VIRTUAL TRAINING

FED®

LEARNING CENTER

ICC PREFERRED EDUCATION PROVIDER

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#NFPA17A #NFPA10
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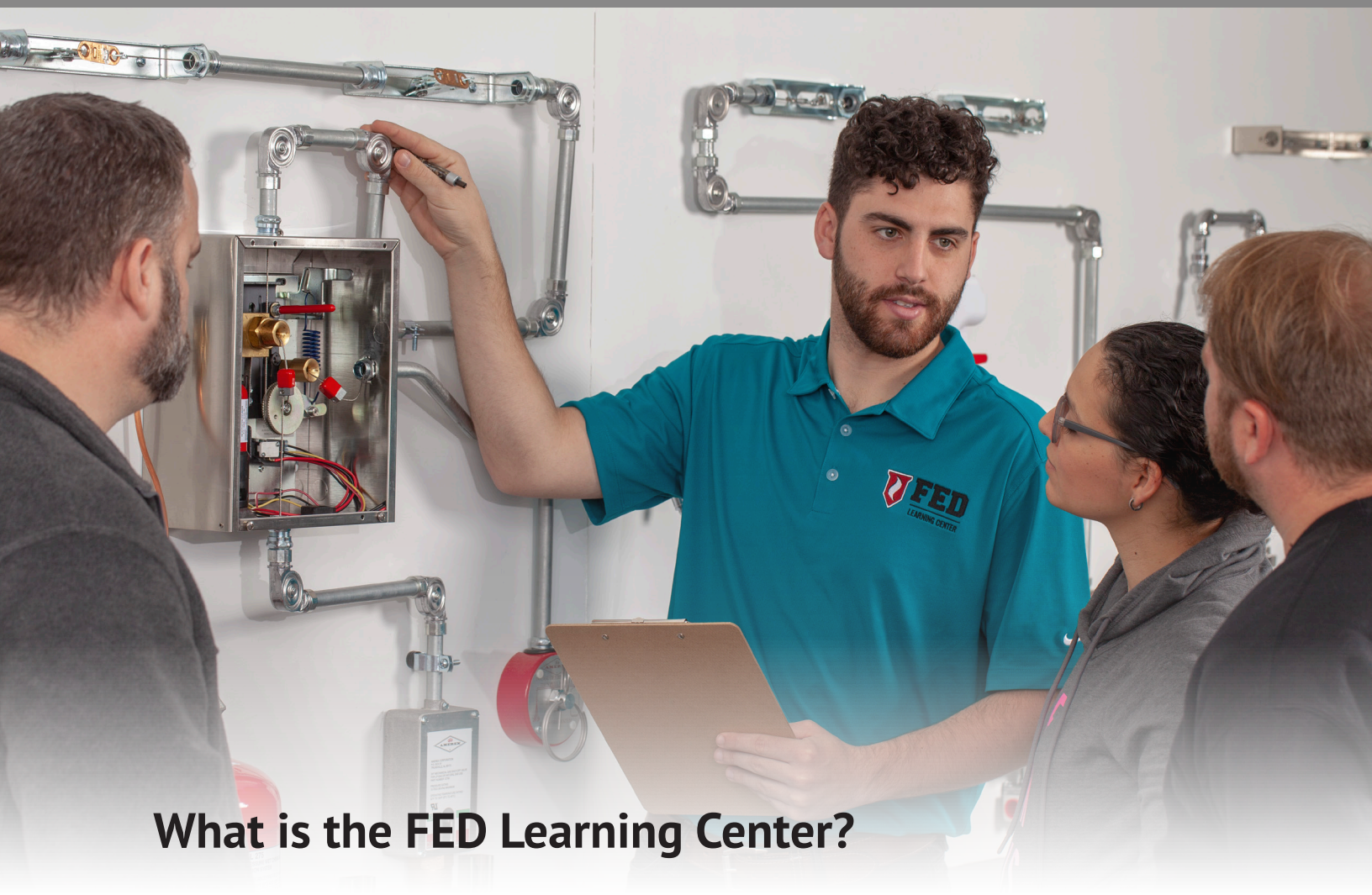


What is the FED Learning Center?

The FED Learning Center is an educational platform supporting training and developmental needs of the Fire and Life Safety industry.

In late 2017, Fire and Life Safety industry leaders came together to address challenges in employee hiring, retention, and training. Specific focus was given to the need for technical training, as it relates to the field technician responsible for maintenance, inspection, and repair in fire suppression applications. Continued research and planning, by BHC, resulted in the development of the FED Learning Center. The plan was officially announced in the spring of 2018, with courses held later that summer.

The FED Learning Center was created to fulfill the need for educational opportunities on a variety of topics affecting the Fire and Life Safety industry. To strengthen the educational value the program provides, several industry experts have participated in developing the facilities and content, including many Engineers, Product Specialists, Code Professionals, and Facility Experts. Additionally, great care has been given to Instructional Design so that learners of all types benefit from the courses offered within the program.

Our Work Saves Lives

What We Believe?

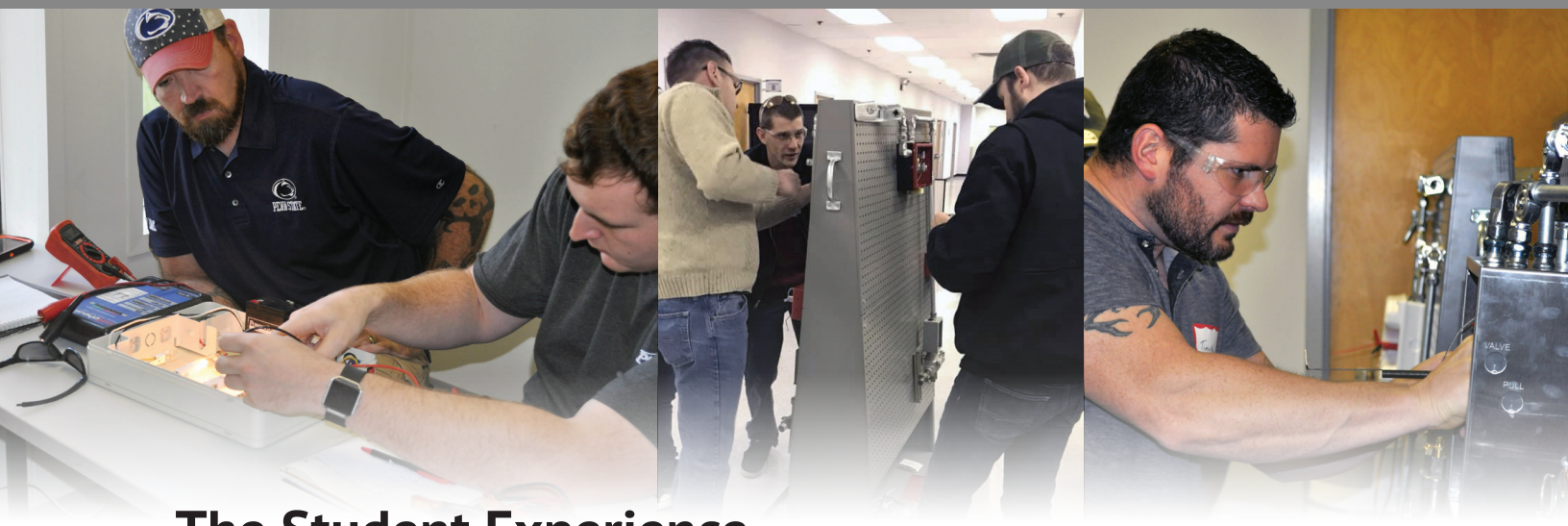
Our **POSITION** is simple. We believe that the better educated we are as a community of fire and life safety professionals, the safer we all are. Understanding safety is a **CHALLENGE** and keeping others safe is a **CALLING**. So the team at the FED Learning Center is committed to doing everything within our reach to promote and provide educational opportunities that support the needs of those who hear the calling and have accepted the challenge.

Our **VISION** is to provide an industry-specific, educational platform for all members of the Fire and Life Safety community, because we are on a **MISSION** to educate as many people as possible on what it takes to protect the world from safety hazards, in accordance with codes and NFPA standards.

We accept the **CORPORATE RESPONSIBILITY** necessary to provide a professional, non-political environment, where the" business" of fire protection is put aside, allowing 100% of the focus to be on gaining knowledge and developing skills. And we proudly wear the **SOCIAL IMPACT** we are making like a badge of honor, as we do our part in increasing the number of properly trained professionals in the field.

We all share the **GOAL** of protecting people and property, but every-day hazards change, technology develops, and the way we interact in the world evolves. The work we do saves lives, so we must all make the **COMMITMENT** to develop and evolve too.

Hear the Calling
Take the Challenge
Get Trained
Stay Trained



The Student Experience

Feel Your Vibe: You're in charge of the vibe you want to experience during training. Do you want to send one person to a general session course? How about sending a small group to create comradery amongst the team? On the other hand, what about a private session to combine technical training and teamwork? You are in charge, so you choose! Luckily, the more you send, the greater the discount!

Find Your Venue: If being at an FED Learning Center campus is important to you, select from one of our four campuses spanning the East Coast and the Midwest. Alternatively, off-site sessions may be better for your travel time.

Select Your Course: Our course catalog is always growing. Determine what your instructional needs are now and select from the courses available. Every effort is made to offer multiple product disciplines within a course week, so those who want to stay for multiple courses can do so.

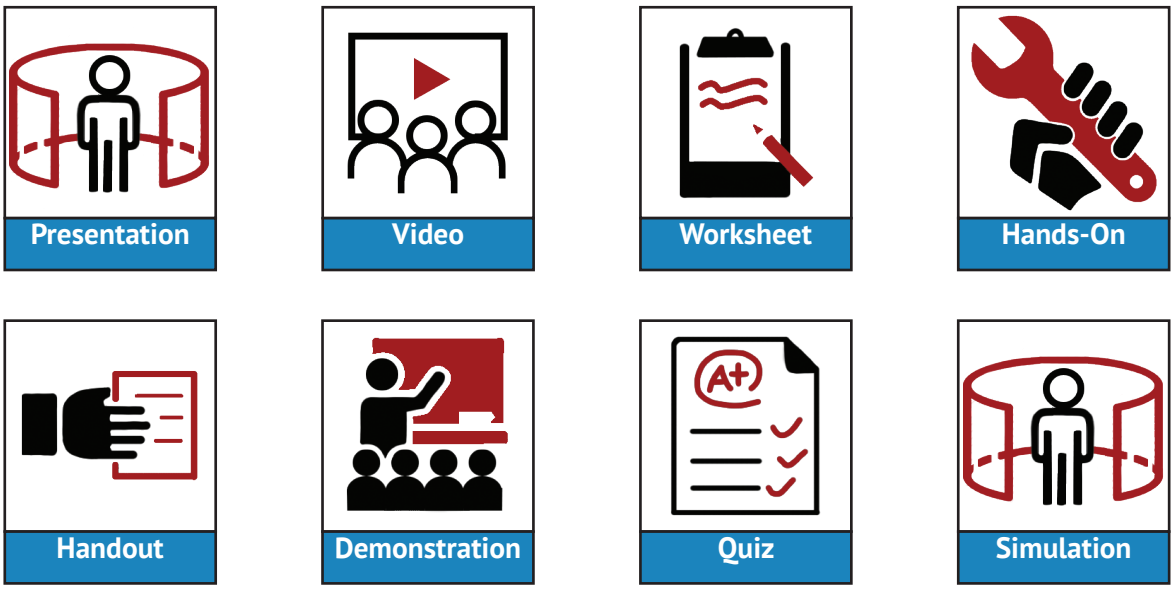
Secure Your Seats: When you're ready, log on to www.FEDLearningCenter.com and secure your seats through our super-simple registration process. Once registered, you will receive a confirmation email, receipt, calendar reminders, and course details for later reference. Don't worry if the venue you are looking for is full, put yourself on the wait list, and we'll do our best to get you in the course or create another course that matches your needs.

"Tell me and I forget,
teach me and I remember,
involve me and I learn."

~ Benjamin Franklin

Instructional Design Variety

No two students learn the exact same way, so at the FED Learning Center, great care is given to ensure the instructional design offers something for everyone. It's our intent to offer a variety of styles and methods in course instruction, ensuring that all students have the opportunity to learn.



Course Objectives

Upon completion of this course, you will have learned:

- The hazards technicians may run into while working in Commercial Kitchens.
- Fire safety basics and the elements needed to create fire.
- The four things that must happen to extinguish a fire.
- The type of fires found in Commercial Kitchens.
- The Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations.
- The Standard for Wet Chemical Extinguishing Systems.
- The Standard for Portable Fire Extinguishers.
- What "shall" and "should" mean within NFPA Standards.
- Who is responsible for enforcement of Standards within a jurisdiction.
- The timing of Standard adoptions within locations.
- An example of skilled workforce labor in the fire safety ecosystem.
- The importance of being properly trained to protect human life and property.
- What percentage of fires are caused by cooking equipment.
- What type of suppression systems that most Commercial Kitchens use.
- Why water should never be put on a grease fire.
- Why Commercial Kitchen Appliances should never be moved from the spot originally placed.
- What NFPA Manual and chapter addresses Commercial Kitchen Cooking Appliance location requirements.
- What two common violations a fire safety technician may see in the field.
- What Manual is referenced for nozzle placement and positioning.

Course Objectives (Cont-)

- What happens to the gas and electric power when a system activates.
- What process to reset shutoff devices before the fuel or power can be restored.
- Who is responsible for the protection of common exhaust ducts used by more than one tenant, and who is responsible for protection up to the point of common connection.
- What inspection means within NFPA Standards.
- What maintenance means within NFPA Standards.
- The actions that must be taken during a Semi-Annual Maintenance check.
- What is always required to be replaced in a Semi-Annual Maintenance check.
- What “red tagged” means.
- What Annual Maintenance means.
- What to do when it is the first maintenance visit for your company at a location.
- What tool is recommended for writing installation dates on cylinders.

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SPECIFICATIONS & REQUIREMENTS

Wet Chemical

- **Wet Chemical** is a liquid fire extinguishing agent specifically designed for grease or similar cooking media fires.
- It reacts with the grease to form a thick foam blanket.
- This reaction is called Saponification.

Storage of Wet Chemical[1]

- Wet chemical used for recharging systems must be stored in the original shipping container supplied by the manufacturer or distributor.
- It must be kept in the original sealed container until it is needed for use.
- These containers are never opened until the system is to be recharged.
- Wet chemical recharge containers are stored within the temperature range stipulated on the container.

Hood and Ventilation Systems[2]

Purpose

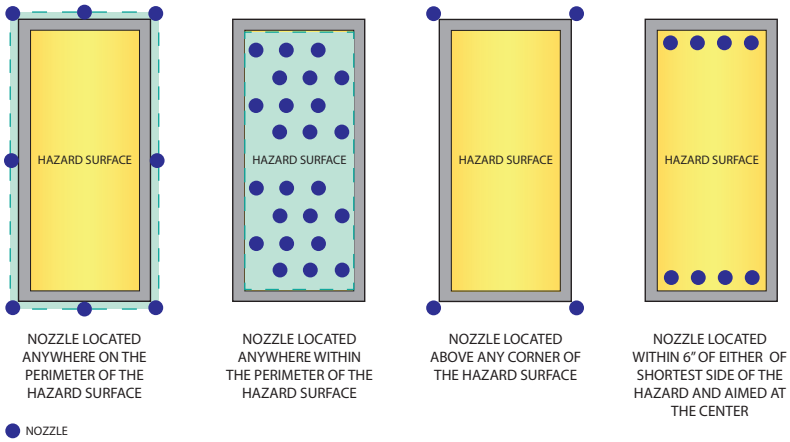
- The purpose of an application is to capture, contain, and remove the hot gases and effluent-containing combustibles from the kitchen.

Ventilation System

- Exhaust is the ventilation process that removes air with entrained particulates and vapors from a cooking area and delivers it to a safe location.
- Common exhaust ducts contain the exhaust air from two or more branch ducts.
- All ducts are led directly outside the building by a fan that is located at the end of the ductwork.

Nozzle Placement

- Manufacturer Manuals dictate how nozzle protection should be installed.



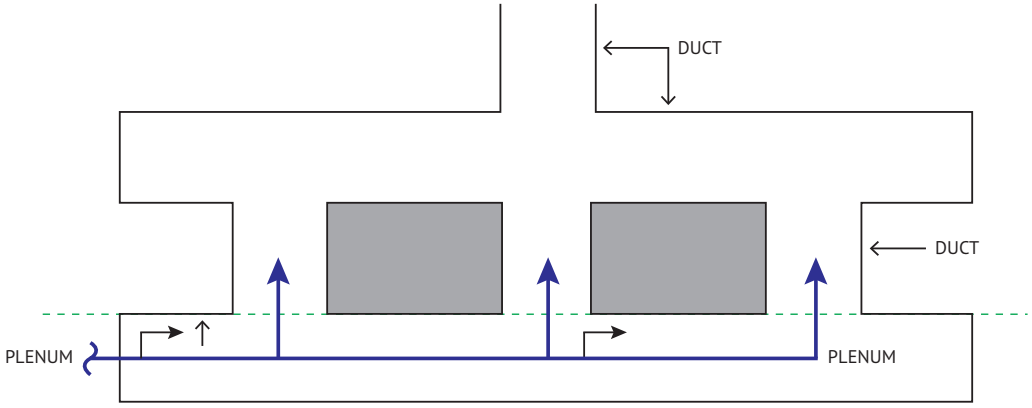
[1]NFPA, NFPA 17A 2024 Chapter 8, *https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=17A.*
[2]NFPA 96 2024 Chapter 6, *https://link.nfpa.org/free-access/publications/96/2024.*

Hazard Proximity

- If two or more hazards are close enough that a fire could involve them at the same time, protection must be provided by one of the following:
  - Individual systems for each hazard that operate together, or
  - A single system capable of protecting all hazards that could be affected simultaneously. (NFPA 17A 2024 5.1.2.2).

Duct Protection

- Duct protection requires that a nozzle be positioned to discharge into the duct.
- Manufacturer Manuals define proper nozzle positioning.
- At least one fusible link or heat detector shall be installed within each duct opening in accordance with the manufacturer's listing. (NFPA 17A 2024 5.6.1.4).



Indicators

- An Indicator is a mechanical or electrical device that shows when the extinguishing system is ready to operate or if it has already operated.
- Wet chemical systems are provided with an audible indicator, visual indicator, or both.
  - The indicator shows that the system is in a condition that is ready to operate.
  - An audible or visual indicator shows that the system has operated, that personnel response is needed, and that the system is in need of recharge.

Example of an Indicator

Controls

- All sources of fuel and electric power producing heat to appliances protected by the system are required to be automatically shut off upon actuation of the suppression system. [17A, 4.4.4.1]
- Also, all gas appliances not requiring protection but located under the same ventilation equipment as the protected appliances are also required to be automatically shut off upon actuation of the suppression system. [17A, 4.4.4.2]
- All sources of fuel or electric power producing heat to appliances served by a common exhaust duct are required to be shut off upon actuation of any suppression system. [17A, 5.6.2.2]
- Where expellant gas pneumatically operates shutoff devices, the gas connection must be prior to entry into the agent container. [17A, 4.4.4.5]
- Definition of Shutoff Devices - Components that operate simultaneously with the operation of the extinguishing system to shut off fuel and power to appliances protected by the system and other appliances required to be shut off upon operation of the system. [17A, 3.3.20]
- Shutoff devices shall require manual resetting prior to fuel or power being restored. [17A, 4.4.4.6]
- When the suppression system actuates, the makeup air supplied internally to the hood is required to be shut off. [17A, 4.4.4.7.1 and 96, 8.3.2]
- Steam provided to cooking appliances is not required to be shut down. [17A, 4.4.4.3]
- Solid fuel cooking operations are also not required to be shut down. [17A, 4.4.4.4].

NFPA 96 2024 Chapter, *https://link.nfpa.org/free-access/publications/96/2024.*
NFPA, NFPA 17A 2024 Chapter 7, *https://link.nfpa.org/free-access/publications/17a/2024.*

Controls (Cont-)

- Exhaust fans and dampers are not required to be shut down on system actuation, as the systems have been tested with the fans off and at high-velocity. Typically, the systems are installed so that the fans are running when the system is discharged. This helps ensure that the extinguishing agent reaches all portions of the ductwork. [96, 8.2.3.1]

Supervision

- Electrically operated fire systems must be supervised by an alarm with a backup power source [17A, 5.3.1]
- An indication of trouble must be provided where supervision of any or all of the following is required: [17A, 5.3.1.1]

- Signals indicating the failure of supervised devices or equipment are required to provide prompt and positive indication of any failure and be distinct from signals indicating operation or hazardous conditions [17A, 5.3.1.2]
- Electrical power monitoring is not required for suppression systems that are interconnected or interlocked with the power sources for cooking appliances if all sources of fuel and heat to cooking appliances serviced by that hood automatically shut off during a power failure. [17A, 5.3.3]

Responsibility of Protection & Penetration

Responsibility for Protection

- Ultimately, the building owner is responsible for the protection of a common exhaust ducts used by more than one tenant.
- The tenant's responsibility for protection extends up to the point of connection to the building owner's common exhaust duct.

Penetrations

- Where piping or other conduit penetrates a duct or hood, the penetration must have a liquid-tight, continuous external weld or the penetration must be sealed by a listed method or device.

NOTE: Note: Any abandoned pipe or conduit from a previous installation shall be removed from within the hood, plenum and Exhaust Duct.

Appliance Locations

- Cooking appliances have approved locations relative to the locations of nozzles for the wet chemical fire protection system.
- Since many appliances have wheels, it is easy for them to be moved and not returned to their approved locations, either by the kitchen staff or the hood and duct cleaning crew.
- NFPA 96, Chapter 13, addresses cooking appliance locations and states that, "An approved method shall be provided that will ensure that the appliance is returned to an approved design location". (13.1.2.3.1)*.

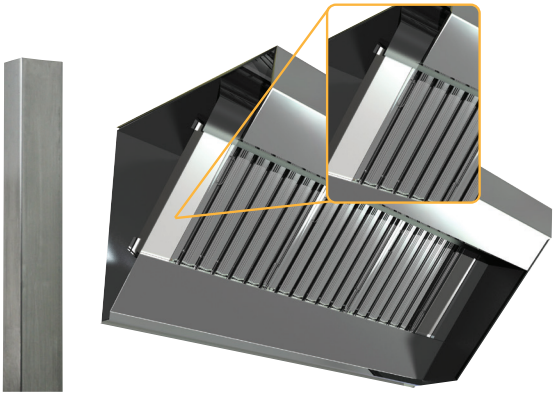
Wheel Chocks or other means must be provided for movable cooking equipment so that the equipment is correctly positioned in relation to the suppression system.

Baffle Panels

- Many fryer installations are in violation of the NFPA rules on spacing and baffle panels.
- NFPA 96, Chapter 13, requires that a 16-inch space be provided between the fryer and the surface flames of adjacent cooking appliances. [96, 13.1.2.4]
- Paragraph 13.1.2.5 of NFPA 96 allows steel baffle panels to be installed if the spacing can not be achieved.
- For solid fuel cooking, filters shall be a minimum of 4' above the appliance cooking surface. [96, 15.5.3]
- During installation of appliances, these requirements are often overlooked. Many restaurants may have been in violation from the day they opened, which could have been many years ago.

Filter Spacers

- NFPA 96 requires exhaust air to pass through hood grease filters. The intent is to catch grease and direct exhaust air to a safe location. The requirement states that, "Grease filters shall be arranged so that all exhaust air passes through the grease filters" (NFPA 96 6.2.3.4). For this to work, gap fillers are often needed.
- Stainless steel filter spacers are used to fill gaps at the sides of the grease filters, ensuring that all exhaust air passes through the filters. When grease filters are removed for cleaning, the spacers are sometimes also removed and misplaced.



KNOWLEDGE CHECK

Q: Explain why it is important that commercial kitchen appliances are never moved from the spot where originally placed?

A: Commercial kitchen appliances should never be moved from the spot originally placed, because these dedicated locations are relative to the location of nozzles for the wet chemical fire protection system

Q: NFPA _____, Chapter _____ addresses commercial kitchen cooking appliance location requirements.

A: 96, Chapter 13

Q: In addition to appliance location, what are two other common violations a fire safety technician may see in the field?

A: Baffle filters, filter spacers

Q: What document should be referenced for specific nozzle placement and positioning?

A: Manufacturer manual

Q: Once the system is activated, all sources of _____ and_____ should shut down.

A: Gas, electric power

Q: True or False. Shutoff devices must be manually reset prior to fuel or power being restored.

A: True

Q: The _____ is responsible for the protection of common exhaust ducts, while the _____ is responsible for protection up to the point of common connection.

A: Building owner, tenant

Glossary of Terms

- **Agent Tank** – The container of liquid agent connected to system piping.
- **AHJ** – Authority Having Jurisdiction.
- **Blow-Off Cap** – A cap which covers the nozzle and prevents grease from plugging the nozzle orifice.
- **Cartridge** – A sealed, steel pressure vessel containing nitrogen or carbon dioxide gas.
- **Detector** – A device, which includes the detector bracket, detector linkage, and fusible link, used for automatic operation of the fire suppression system.
- **Ducts** – A continuous passageway for the transmission of air and vapors.
- **Flow Number** – Term used in system design to describe the flow capacity of each nozzle used to determine the quantity of tanks needed to cover a certain group of hazards.
- **Fusible Links** – A form of fixed-temperature, heat-detecting device employed to restrain the operation of a mechanical control until its designed temperature is reached.
- **Gas Valve** – A device used to shut off the gas supply to the cooking equipment when the system is actuated.
- **Hood** – A device provided for cooking appliances to direct and capture grease-laden vapors and exhaust gases. It shall be constructed in a manner that meets the requirements of NFPA 96.
- **Nozzle** – A device designed to deliver the liquid agent with a specific flow rate and stream pattern
- **Plenum** – The space enclosed by filters, and the portion of the hood above the filters.
- **Pulley Elbow (Corner Pulley)** – A device used to change the direction of the wire rope, which runs between the regulated release mechanism and the detectors, the regulated release mechanism and the mechanical gas valve, and/or the regulated release mechanism and the remote manual pull station.
- **Regulator** – A device used to regulate the pressure from the nitrogen cartridge into the agent tank(s) when the system is actuated.
- **Remote Manual Pull Station** – A device that provides manual actuation of the system from a remote location.
- **Terminal Detector** – The last in a series of detectors, or the only detector used in a single-detector system. The detector is thus named, because it is the last point at which the wire rope ends or "terminates." There is only one terminal detector per detection system.
- **UL** – Underwriters Laboratories, Inc.
- **NFPA** – National Fire Protection Association.
- **ICC** – International Code Council.

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#NFPA10 #FireSafety #NFPA
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#NFPA17A #FireExtinguisher
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#NFPA96 #KitchenSuppression #FireProtection

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