

# HAZARD GUIDE RESTAURANTS

## Restaurants Overview

Restaurants present an array of exposures and hazards that lend themselves to mitigation measures. According to the USFA National Fire Incident Reporting System (NFIRS), an estimated 5,600 restaurant fires were reported to fire departments annually in the United States, resulting in \$116 million in property damage.

Primary loss areas are centered on two broad categories including fire from commercial cooking as well as spoilage and business interruptions from equipment breakdown. According to NFIRS 5.0, over 63% of restaurant fires are caused by cooking.



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Commercial Cooking

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Suppression Systems

Cleaning and Maintenance

Spoilage

Spoilage Mitigation

Solid Fuel Hazards

Solid Fuel Loss Mitigation

Unique Cooking Installations

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## Commercial Cooking

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### Hazards

#### Grease Laden Vapors

All cooking is capable of producing grease laden vapors, especially when utilizing lipids (oil, butter, lard, grease). Grease laden vapors are produced when heat and steam rise from a cooking surface that contains grease. The passage of grease laden vapors through the ventilation system result in deposits on the interior surfaces. A severe fire hazard exists if the accumulated grease within the ventilation system is not removed. The most prevalent sources of grease laden vapor production are deep fat fryers, followed by woks, broilers, grills and stove top frying. The hazard associated with grease laden vapors is exacerbated by the close proximity of ignition sources, such as open flames or hot appliances, and a large supply of surrounding combustibles.

#### Greasy Towels and Rags

Folded towels are commonly used in restaurants for handling hot pots, pan handles, trays, etc. This simple practice creates a fire hazard as towels collect grease from the surrounding cooking environment. Grease laden towels present a significant fire hazard. They can retain a grease residue even after they've been washed. Once they're removed from a hot dryer the combination of residual grease and heat could lead to spontaneous combustion. Dirty towels should be stored in metal cans with a tight fitting lid until they can be removed from the building daily or cleaned. The solution is to either use a professional cleaning service or allow the towels to cool before folding and stacking.

### Loss Mitigation

A restaurant's potential for loss can be dramatically reduced with the combination of a ventilation system, fire suppression system and scheduled cleaning program. According to the NFPA, approximately 30% of suppression systems failed to operate during a fire event with lack of proper maintenance contributing to 44% of these failures. Commercial cooking installations are governed by these model codes: NFPA 96, NFPA 17A and UP-300. The minimum requirements for a safe installation include:

- Proper 16" clearance between deep fat fryers and sources of ignition
- Scheduled professional cleaning and servicing of the systems
- Stainless steel hood and ductwork with externally welded, leak proof seams
- Tight fitting grease baffles
- Type K portable fire extinguisher
- UL-300 compliant, wet type automatic suppression system

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## Ventilation Systems



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A properly designed, installed and functional ventilation system is critical for building fire safety. It is required to remove smoke odors and grease laden vapors from the cooking area to the exterior of the building. For this reason, it is imperative that the system is operating during all cooking periods and should operate for a minimum of 15 minutes after cooking has stopped. Below are recommendations for optimal ventilation system performance.

- ▶ Ventilation systems should be constructed of stainless steel rather than galvanized or aluminum, which are cheaper but do not provide sufficient protection in a fire event.
- ▶ All seams should be externally welded to prevent grease from escaping and the hood should cover all cooking appliances.
- ▶ Insufficient clearance between the hood and ductwork to surrounding combustible building members creates a severe fire hazard. Over time, high heat levels can lower the ignition temperature of wood to combustible walls, ceilings, roofing members, etc. This can be mitigated by increasing the air space between the metal duct/hood and the frame building members, utilizing mineral wool insulation or installing stainless steel on spacers or insulation. NFPA 96 should be consulted for guidance.
- ▶ Fans should be mounted on the exterior of the building and cleaned on a regular basis. Their exact location is governed by the building construction and NFPA requirements, which include fan clearance to doors, windows, roof slope clearance, etc.
- ▶ Place baffles in the hood area to minimize the amount of grease that is drawn into the duct system. They should be of stainless steel construction, installed at a 45° angle and must be tight fitting. Baffles and grease trays should be cleaned daily. Older systems utilize galvanized baffles or mesh type grease filters. Grease filters should be replaced with up to code stainless steel baffles as they absorb grease, creating a fire hazard.

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## Automatic Suppression Systems

Automatic suppression systems are vital for protection against fire in commercial cooking. The system has fusible links installed in the hood plenum area and, when a fire occurs, the link separates and activates the suppression system. A suppression agent is released from a series of nozzles, smothering the fire and creating a foam blanket to prevent re-ignition. In addition, activation of the system shuts off the fuel supply. The suppression system needs to be UL-300 Compliant, meaning it is specifically designed for modern commercial cooking appliances that use vegetable oil instead of animal fat. Modern commercial high efficiency appliances retain heat for longer periods of time and are therefore more difficult to suppress during a fire. Modern suppression systems are complex and require semi-annual servicing to ensure proper functioning in the event of fire.



Older suppression systems use dry powder as a suppression agent, which will not create a foam barrier with vegetable oil appliances and could lead to re-ignition. For this reason, older dry powder systems need to be replaced with a UL-300 compliant wet type system.



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## Cleaning and Maintenance

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A scheduled cleaning program prevents excessive buildup of grease in the hood, duct work and fan. Grease accumulations lead to an increased fire risk. Semi-annual cleaning of the ventilation system is often recommended, however, this is not an effective cleaning schedule as the amount of potential grease accumulations varies drastically based on the type and intensity of cooking. The NFPA 96 requires cleaning intervals based on the type and frequency of cooking.

Type of Cooking Volume	Inspection Frequency
Solid fuel cooking operations (wood burners)	Monthly
High-volume cooking operations (24 hour cooking, charbroiling or wok cooking)	Quarterly
Systems serving moderate-volume cooking operations	Semi-annually
Systems serving low-volume cooking operations (churches, day camps, seasonal businesses or senior centers)	Annually

Ventilation systems should be cleaned by a professional service that specializes in commercial cooking ventilation systems as they can be difficult to clean due to the large number of concealed spaces. Contractors must be able to gain access to the interior of the duct work to properly clean the system. NFPA 96 chapter 7 outlines the requirements for access panels. Access panels are designed to allow interior cleaning without damaging the integrity of the metal duct work. Briefly stated, some of the basic requirements are as follows:

- Multi-story vertical ducts require one access panel per floor
- Horizontal ducts shall have at least one 20" opening for personnel access
- Openings of sufficient size to permit thorough cleaning every 12ft.
- For hoods with dampers, an access panel for cleaning and inspection shall be provided in the duct or hood within 18" of damper

It is also a good practice for the baffles and grease pans to be cleaned daily.

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