



## Fire Protection of Commercial Cooking Operations

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One of the more lasting facts I remember from my not-so-distant college days is that students love to eat. Of course there were many other important lessons and various bits of wisdom imparted on me, but I specifically remember that college students love to eat and they love to eat often. In many cases, the deeper the food is fried or the greasier the meal is, the more likely students will seek it out at all hours of the day and night. However, whether this food is prepared in campus dining halls, fraternities, sororities, or a small local restaurant located below off-campus student housing, the grease produced from these cooking processes poses a serious fire threat; building safety and student lives are put at risk.

Cooking operations are inherently major causes of fire due in part to readily available sources of ignition and pre-heated fuels. NFPA research shows that 75% of reported structure fires involving dormitories, fraternities, sororities, and barracks are found to have cooking equipment as the leading cause of fire (Flynn, 2009). While this represents a large majority, these cooking equipment fires are only responsible for 6% of direct property loss for structure fires in these occupancies. This is due in part to typically having an alert, unimpaired adult nearby and able to take the proper actions to keep the fire from growing. More severe fires, that involve much greater property loss, occur in commercial cooking operations where fire spreads to duct work that contains fuel from grease build-up. When this occurs, the fire can become difficult to attack and require large amounts of water to provide extinguishment.

Admittedly, a large number of kitchen fires occur in residential occupancies where much of the fire prevention tactics fall under more common sense practices, such as not leaving cooking appliances unattended and not cooking when tired or impaired (Cooking safety tips for residential uses can be found at <http://www.nfpa.org/assets/files/PDF/CookingExecutiveSummary.pdf> ).

There are many situations however involving commercial cooking operations where the protection must be extended beyond simply using these safe operating procedures. The protection requirements for such cooking operations are specified in NFPA 96, Standard for the Ventilation Control and Fire Protection of Commercial Cooking Operations. The scope of the standard is to provide the minimum fire safety requirements (preventative and operative) related to the design, installation, operation, inspection, and maintenance of all public and private cooking operations.

The leading driver of following NFPA 96 requirements is the cooking process itself. Where the equipment is used in a process that produces smoke or grease laden vapors, an exhaust system must be installed to comply with all of the equipment and performance requirements of the standard. NFPA 96 does not apply to cooking equipment located in a single dwelling unit but does apply to residential cooking equipment used for commercial cooking operations. The requirements of the standard also do not apply in facilities where only residential equipment is being used, fire extinguishers are located in all kitchen areas in accordance with NFPA 10, the facility is not classified as an assembly occupancy, or where the authority having jurisdiction has approved the installation.

Where it is determined that cooking equipment is required to be protected in accordance with NFPA 96, requirements are provided on clearance to combustibles, hoods, grease removal devices, exhaust duct systems, air movement, auxiliary equipment, fire-extinguishing equipment, inspection, testing and maintenance, and minimum safety requirements for cooking equipment. The installation requirements look to ensure that enough distance is kept between the ventilation equipment and combustible materials to reduce the chances of a fire within an exhaust duct radiating to the outside and spreading. The fire-extinguishing equipment, including fixed suppression systems having passed UL 300 and port-

able extinguishers in accordance with NFPA 10, are intended to prevent cooking fires from propagating into the duct work in the first place. The inspection, testing, and maintenance requirements are put in place to ensure that after a system has been built in accordance with NFPA 96, it is maintained to perform as necessary.

While it is important to have an understanding of what the construction requirements are and how they are intended to protect a facility, over the lifetime of a building the requirements that play the most important role are the procedures for the use, inspection, testing, and maintenance of equipment as outlined in Chapter 11 of NFPA 96. Requirements for these operating procedures include the exhaust system be running whenever cooking equipment is turned on and the cooking equipment is not permitted to be operating while its fire-extinguishing system or exhaust system is nonoperational or impaired. Maintenance of fire-extinguishing equipment is required to be performed every 6 months by a properly trained, qualified, and certified person acceptable to the authority having jurisdiction. An inspection for grease buildup is required to be performed at the frequency as shown below in Table 11.4. Where this inspection finds the exhaust system to be contaminated with deposits from grease-laden vapors, the contaminated portions are required to be cleaned, also by a properly trained, qualified, and certified person acceptable to the authority having jurisdiction.

Those responsible for student safety and emergency planning must understand the requirements outlined in NFPA 96 for commercial cooking operations because

cooking fires pose too great of a risk to ignore. Where these systems are used in fraternity or sorority housing, the importance of maintaining the system should be stressed to those responsible. Working with the local authorities can also help to ensure ventilation systems used off-campus in buildings frequented by students are maintained as required. If we do our part to make sure systems installed in accordance with NFPA 96 are maintained, we can help to ensure the safety of students, maintain campus building safety, and allow the students to keep on eating whatever and whenever they like.

Table 11.4 Schedule of Inspection for Grease Buildup

| Type or Volume of Cooking  | Inspection Frequency |
|--|----------------------|
| Systems serving solid fuel cooking operations  | Monthly              |
| Systems serving high-volume cooking operations, such as 24-hour cooking, charbroiling, or wok cooking              | Quarterly            |
| Systems serving moderate-volume cooking operations   | Semiannually         |
| Systems serving low-volume cooking operations, such as churches, day camps, seasonal businesses, or senior centers | Annually             |

[www.nfpa.org](http://www.nfpa.org)



Sources:

1. Flynn, Jennifer D., Dormitories, Fraternities, Sororities and Barracks, NFPA Fire Analysis and Research Division, Quincy, MA, August 2009.
2. NFPA 96, Standard for the Ventilation Control and Fire Protection of Commercial Cooking Operations, NFPA, Quincy, MA, 2011 Edition

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