



Coffee Break Training - Fire Protection Series

Commercial Cooking: The Cooking Environment

No. FP-2015-19 May 12, 2015

Learning Objective: The student will be able to describe the hazardous conditions associated with commercial cooking operations.

The area around commercial cooking operations is remarkably hazardous and requires a high degree of protection to prevent unwanted fires.

We will begin a short series of Coffee Break Training sessions on commercial cooking hazards and protection techniques. Due to the severity of the threat, these environments are addressed in detail in the International Code Council and National Fire Protection Association model codes and standards. Be certain to review your locally adopted codes, so you know that you are applying the correct mitigation strategies.

Depending on the preferred cuisine or cooking style, animal or vegetable fats or oils may be preheated to at or near their boiling points. Open flames abound — including some added intentionally by the chef — and the busy working environment invites accidents. Remember that the boiling point of a combustible liquid is the temperature at which — at sea level — the liquid will begin to boil. Liquids will boil at lower temperatures at higher elevations.

Customer taste, health preferences and cuisine drive the selection of cooking oils used in surface and deep frying. The most commonly used products include olive oil, palm oil, peanut oil, canola oil (rapeseed oil), pumpkin seed oil, soybean oil, corn oil, safflower oil, grapeseed oil, sesame oil, sunflower oil and other vegetable oils, as well as animal-based oils like butter and lard. Each has its particular characteristics suited to the style of cooking, and each has differences in flash point and boiling temperature — the two elements of greatest concern to the fire code official.

Cooking emissions from these products can include (individually or in combination) alkanes, alkenes, alkanolic acids, carbonyls, aromatic amines and polycyclic aromatic hydrocarbons. The main volatile compounds are aldehydes, alcohols, ketones, alkanes, phenols and esters.¹ While fire inspectors may not need to have ready recall of this information, it is essential for fire extinguishing system designers to develop improved suppression products. Modern wet chemical suppression systems rely on the interaction between the chemical and the cooking oil to saponify (convert the oils into soapy like substances), resulting in effective fire control and easier post-fire cleanup.

For more information, consider enrolling in the National Fire Academy (NFA) course “Fire Inspection Principles” (R/N0220). Information and applications can be obtained at <http://apps.usfa.fema.gov/nfacourses/catalog/details/47>. The course is available at the NFA in Emmitsburg, Maryland, or through your state fire service training agency.

¹ International Agency for Research on Cancer (n.d.) *High Temperature Frying*. Lyon, France: World Health Organization.



With the proximity of open flame to volatile fuels, the area beneath a commercial cooking hood should be considered hazardous.