



Coffee Break Training - Fire Protection Series

Commercial Cooking: Saponification

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Learning Objective: The student will be able to explain the saponification process.

Firefighters learn early in their careers that removing one or more legs of the traditional “fire triangle” will cause a fire to be extinguished. With hoselines and portable fire extinguishers, we learn to use diverse materials (e.g., dry chemical, foam, dry powder, water) that perform one or more of the functions of removing heat, oxygen or fuel from a fire.

In the commercial cooking environment, pre-engineered fire protection systems are designed and installed to extinguish fires in a variety of different liquid fuels. Modern wet chemical suppression systems rely on the interaction with the suppression chemical and the cooking oil to saponify (convert the oils into soapy like substances), resulting in effective fire control and easier post-fire cleanup.

Saponification describes the chemical reaction where the animal or vegetable fats are mixed with a strong alkali resulting in soap, water and glycerin. When the fire protection system operates manually or automatically, it introduces the alkali solution that reacts with the fatty acids in the cooking oil. The combination of substances creates a foamy blanket that restricts the release of additional oil vapors and cools the cooking oil surface below its ignition temperature.

The agent is discharged as a fine mist from the fire suppression nozzle to make it more likely to spread gently on the oil surface to prevent turbulence. As water leaks from the foam blanket, it helps cool the cooking oil.

Class K portable fire extinguishers are provided in the cooking area to be used to repair the foam blanket should any part of it be disturbed. (See Coffee Break Training 2006-38.) The Class K extinguisher should be used only after the fire suppression system has operated.

Wet chemical fire suppression systems for cooking surfaces have become the modern standard in commercial kitchens. Dry chemical systems, that were popular until the late 1990s, should by now have been phased out, unless they are protecting the cooking fuels and equipment for which they originally were designed and installed.

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.



The roiling bubbles of the oil in the deep fryer provide a target medium for the alkaline fire suppression fluid.



Eligible for Continuing Education Units (CEUs)
at www.usfa.fema.gov/nfaonline

For archived downloads, go to:

http://www.usfa.fema.gov/training/coffee_break/