



Coffee Break Training - Fire Protection Series

Commercial Cooking: Cooking Oil Characteristics

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Learning Objective: The student will be able to describe the flammable characteristics of some oils used in commercial cooking.

When fire safety officials evaluate the characteristics of common flammable and combustible liquids, they often refer to guidance found in National Fire Protection Association 30, *Flammable and Combustible Liquids Code* or their model fire codes. There, they find commonly used terms such as flash point, boiling temperature, and autoignition temperature, as well as the test protocols to determine liquid classifications.

With cooking oils, however, the typical classification process is somewhat different. (See Coffee Break Training 2008-12 for flammable and combustible liquid classifications.) When dealing with hazardous, ignitable liquids, we often refer to their boiling point (the sea level temperature at which the liquid will boil) and their flash point (the lowest temperature at which sufficient vapor is given off to form an ignitable mixture with the air). Cooking oil adds the dimension of “melting point” (where it turns from a solid to a liquid) and “smoke point,” explained below.

Establishing the boiling point of a cooking oil is difficult because once it is used, it is contaminated by moisture and food products whose presence affect the boiling temperature. Also, before it reaches its boiling point, oil will start to smoke. This is called the smoke point, and in cooking, the smoke point of an oil or fat is the temperature at which, under defined conditions, enough volatile compounds emerge from the oil that a bluish smoke becomes clearly visible. This is critical to the chef who is selecting the oil for the food that is being prepared. The smoke point is a few degrees below — again, influenced by contaminants — the temperature at which the heated liquid will ignite.

The following table provides characteristics of some common cooking oils.

Product	Source	Melting Point		Boiling Point		Smoke Point	
		F	C	F	C	F	C
Butter	Animal	90-95	32-25	212	100	250-300	
Canola oil	Vegetable	14	-10			375-450	190-232
Corn oil	Vegetable	12	-11	475	246	352	178
Cottonseed oil	Vegetable	-55	-48			420	216
Grapeseed oil	Vegetable	14	10			420	216
Lard	Animal	86-113	30-45			390	192
Olive oil	Vegetable	21.2	-6	572	300	375-405	191-207
Palm oil	Vegetable	75	24			455	235
Peanut oil	Vegetable	37	3	440	227	320	160
Safflower oil	Vegetable	2	-17	510	266	225-510	107-266
Sesame oil	Vegetable	21	-6			350-450	177-232
Soybean oil	Vegetable	3	-16	495	257	350-460	177-238
Sunflower oil	Vegetable	1	-17			320-450	107-232



Heated cooking oils can create an ignitable vapor:air mixture in the commercial kitchen.

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.



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