

Fact Sheet No. 3

Class F fires and Wet Chemical extinguishers

Class F fires are fires involving cooking oils or fats. Class F fires differ from conventional liquid fires due to the high temperatures involved. In order for any flammable liquid to burn the temperature must exceed the flash point. Above this temperature the liquid will ignite when an ignition source is applied. For a flammable liquid to spontaneously ignite the auto ignition temperature needs to be reached. Typical flammable liquids e.g. petrol have low flash and auto ignition temperatures and are relatively easy to extinguish. Cooking oil or fat fires have auto ignition temperatures in excess of 340°C and are very difficult to extinguish using conventional extinguishers having a class B capability.

The industry recognised the difficulties and inadequacies of conventional class B extinguishers and therefore created a new standard BS7937: 2000 to cover the special risks involved.

The problems of extreme heat

To extinguish a fire created by auto ignition the flames must be extinguished and the temperature of the burning liquid reduced below the auto ignition temperature. The amount of heat involved with the liquid above 340°C is high and the use of the incorrect extinguisher can be extremely dangerous. For example a water jet extinguisher directed at the surface of burning cooking oil will create an explosion as the water is quickly converted into steam resulting in the expulsion of burning oil possibly spreading the fire and harming the operator.

Conventional portable fire extinguishers

Conventional foam extinguishers have been proven to extinguish the flame, but the heat involved quickly destroys the foam blanket, exposing the surface of the oil, allowing re-ignition. Carbon Dioxide and multi-purpose powder extinguishers are effective in extinguishing the flame, but without sealing the surface of the liquid from oxygen the oil rapidly re-ignites.

Splash risk

The other danger of using conventional Class B fire extinguishers on deep fats is the risk of splashing the burning liquid and spreading the fire.

Wet Chemical extinguishers

Extinguishers designed for cooking oil fires typically include "wet chemical", "dry chemical"

or are foam based with special additives. These special materials react with the hot burning oil to create a thick soapy heat resistant crust on top of the cooking oil surface, preventing the flammable vapours reacting with oxygen. The name given to the reaction is "saponification". The alkalinity of the extinguishing material quickly reacts with the burning oil to create the soap layer.

Some of the "foam based with special additive" extinguishers work by covering the hot burning oil with a thick heat resistant crust on top of the surface as above whilst at the same time cooling the burning oil by converting the extinguishing water into steam in a controlled manner.

Why extinguishers?

Fire blankets are only suitable for small cooking oil fires up to three litres. They also require the operator to position the blanket over the fire. If the operator attempts to remove the blanket they risk fanning the fire. Extinguishers provide the benefit of control for interruption and direction and allow the operator to stand further away from the fire

The British Standard 7937

The creation of BS7937: 2000 took into account not only the recognition of the special risk for burning cooking oil, but also the need to limit risks to the operator. The standard includes:

- requirements for special features to reduce splashing by extending minimum discharge times compared to a standard AFFF extinguisher. This slower rate of application is less likely to splash burning oil;
- a rigid lance of 400mm minimum length. This feature allows the operator to stand slightly further away from the fire;
- kitchens and cooking areas have many electrical appliances therefore BS7937 requires all extinguishers to pass the 35kv dielectric test from BS EN3;
- An area coloured canary yellow between 3-10% of the surface area of the cylinder. A new class F pictogram was also created to allow easy recognition.

