

Cooking Oil Fires

Why Class F should be used

INFORMATION BULLETIN

Class F portable fire extinguishers, commonly known as “wet chemical”, are a relatively new innovation. They first appeared in 1999 when the deficiencies of traditional extinguishing media such as powder or fire blankets were seen to perform badly when confronting cooking fat or oil fires. Even though they have been in use for six or more years with outstanding success in many places there still remains a misunderstanding as to how they work and the enormous advantage they have over the more established media.



Class F fires involving cooking oils or fats differ from conventional liquid fires primarily 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 burn when an ignition source is present. For a flammable liquid to spontaneously ignite the auto ignition temperature needs to be reached. Typical flammable liquids such as petrol have low flash and auto ignition temperatures and are relatively easy to extinguish. Cooking oil fires have auto ignition temperatures in excess of 340°C and are very difficult to extinguish using conventional extinguishers such as powder or foam.

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 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 ABC powder extinguishers are effective in extinguishing the flame, but without seal-

ing the surface of the liquid from oxygen the oil rapidly re-ignites. Conventional powder, foam or CO₂ extinguishers are normally too powerful and direct and can easily splash the burning liquid and spread the fire. A fast high rate discharge may be ideal for a petrol fire, but is very dangerous for fires involving burning cooking oils or fats. A fire blanket could be adequate for small cooking oil fires but they require the operator to position the blanket over the fire and if the operator attempts to remove the blanket they risk fanning the flames.

Wet chemical extinguisher materials are typically based on alkaline potassium salts of citrate, acetate, lactate, carbonate or mixtures of these. The potassium helps to quickly knockdown the flame whilst the radical of citrate, acetate or carbonate emulsifies the oil into a soap layer, sealing the surface and preventing re-ignition. The wet chemical can be water based or added to AFFF or FFFP foams to create a saponifying media. The commonly used materials are potassium citrate or acetate that provides good extinguishing characteristics.



There will be occasions when even someone considered an expert will not appreciate the enormous advantage of the new technology but having read this will have a far better understanding of the reasons for using an extinguisher designed specifically for one of the most high risk fire situations.

For those that wish for an even more in depth understanding logon to <http://www.feta.org.uk/toppub.htm> class F Fires Fact File number 15.