

Petroleum and the risks of fire



The threat of fires in the petroleum industry is an ever-present risk to lives and property. This Fact Sheet covers fire safety points specific for this industry. For more general information please refer to the How to Choose and Use Fire Extinguishers, and the Fire Safety In The Workplace Fact Sheets.

The basics

The fire triangle shows us that we need three elements for any fire to start and survive. In the petroleum industry this may be as follows:

- Fuel as vapour
- Oxygen in the air
- Heat or energy

The **fire point** is formally 5-8 degrees higher than the flash point of a product. At this temperature there is sufficient vapour produced to maintain a combustible atmosphere. Once alight it will continue to burn.

The **auto-ignition temperature** is where the vapour is so hot it will burst to flames without the application of a flame. The heat source could either be radiated heat or a hot surface. For white oils, the heavier the grade, the lower the auto ignition.

A **combustible atmosphere** is an air vapour mixture, which can be ignited? The ratio of vapour to air, which can be ignited, varies with the product type.

Flammable limits are the range of ratios of a product vapour to air, which is combustible. For white oils the general range is from 1% (the lower explosive limit) to 14% (the upper explosive limit) Outside these parameters the mixture is either too lean or too rich.

The **flash point** is the lowest temperature at which the product will give off sufficient vapour

to momentarily flash, but NOT continue to burn.

Fire Action

According to the fire triangle, there are three ways to extinguish a fire:

- Starvation
- Smothering
- Cooling

In the event of a fire, as forecourt personnel you should ask these questions:

- What type of fire is it?
- Do I need to isolate electrics?
- Where are the nearest fire extinguishers?
- Are the fire extinguishers suitable?
- Does the staff know how to use them?

Running Fire

If the fire is running down a vertical or inclined surface, attack with dry powder, after you have isolated all electrics and stopped the flow of liquid. Usually two fire fighters are required on either side of the surface. Start at the base of the fire and sweep it away with dry powder towards the source of the fuel. Beware of the fire flashing back, even when the fire is extinguished, cool down all metal work with foam or water.

Spill Fire

If a spillage of flammable liquid catches fire, the quickest way to kill the flames, after stopping the source of the spillage, is with portable dry powder extinguisher. If there is still risk of ignition then you should cool the area with foam to prevent vapourisation.

Tyre Fire

Water is the best extinguisher and should be used liberally. If dry powder is used it will only control the flames and will re-ignite at some point. **Never** approach a burning tyre or wheel face on, it may still be pressurized and could explode, so stand to the side.

Cab and Engine Fire

Switch off all tanker electrics, master switch if fitted and turn off the engine. If they pull into your petrol station you should consider isolation too. Take precautions in case of hot surfaces, after extinguishing flames on the outside, then carefully open the bonnet or door just far enough to get the nozzle into the gap. Opening it too far will increase the oxygen and the flames will increase. When dealing with these fires forecourt personnel should protect the site and comply with company policies if using your own fire extinguishers.