# Fact Sheet: FIRE EXTINGUISHERS

# Emergencies Adventure Skills

In this factsheet we will look at different types of fire extinguishers and how they help in putting out fires. However it is vital that we understand fire and what makes a fire burn.

## What is Fire?

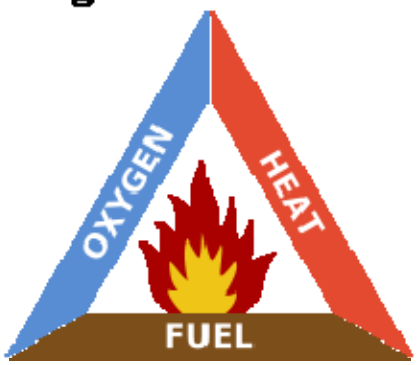
Fire is the rapid oxidation of a material in the chemical process of combustion which releases heat and light amongst other things. The flame is the visible portion of the fire and consists of glowing hot gases. Depending on the substances alight, and any impurities outside, the colour of the flame and the fire's intensity will vary.

Fire in its most common form can be very intense and uncontrollable which has the potential to cause physical damage through burning and a threat to life. Fire is an important process that affects ecological systems across the globe. The positive effects of fire include stimulating growth and maintaining various ecological systems. Fire has been used by humans for cooking, generating heat, signalling, and to power transport. The negative effects of fire include decreased water purity, increased soil erosion, an increase in atmospheric pollutants and an increased hazard to human life.

## Fire Triangle

The fire triangle, see Image 1 below, or combustion triangle is a simple model for understanding the ingredients necessary for the majority of fires.

**Image 1**




The triangle illustrates that a fire requires three elements:

1. heat
2. fuel
3. an oxidizing agent (usually oxygen)

A fire is prevented or extinguished by removing any one of the elements above. A fire naturally occurs when these elements are combined in the right mixture. Without sufficient heat, a fire cannot begin, and it cannot continue. Heat can be removed by the application of a substance which reduces the amount of heat available to the fire reaction. Without fuel, a fire will stop. Fuel can be removed naturally, i.e. the fire has

consumed all the burnable fuel, or manually, by mechanically or chemically removing the fuel from the fire. Without sufficient oxygen, a fire cannot begin, and it cannot continue. With a decreased oxygen concentration, the combustion process slows.

## Class of Fire

Based on the combustible material involved, the fire can be classified. In the European standard EN 3: Portable fire extinguishers, the fires are classified as:

- **Class A** fire: Ordinary combustibles such as wood, paper, carton, textile, and PVC;
- **Class B** fire: Flammable liquids and solids which can take a liquid form, such as benzene, gasoline, oil;
- **Class C** fire: Flammable gases, such as butane, propane, and natural gas;
- **Class D** fire: Combustible metals, such as iron, aluminium, sodium, and magnesium;

A fire involving energized electrical equipment is not classified by its electrical property. Electrical can fall into any of the classifications. However if you use a water extinguisher you must isolate the electric supply first as you could be electrocuted. In addition it must be remembered that certain electrical apparatus maintains a lethal charge for some time after it has been switch off.

In the UK, there is also an additional class

- **Class F** fire, representing heated oil.

## Fire Extinguishers

A fire extinguisher is an active fire protection device used to extinguish or control small fires, often in emergency situations. It is not intended for use on an out-of-control fire, such as one which has reached the ceiling or endangers the user (i.e. potential to block escape route, smoke, explosion hazard, etc.). Typically, a fire extinguisher consists of a hand-held cylindrical pressure vessel containing an agent which can be discharged to extinguish a fire.

Different fire extinguishers are designed to safely remove one of the elements in the fire triangle and are categorised into the classes above, please see image 2. Care should be taken to ensure the correct extinguisher is being used for the fire being tackled. For example a $CO_2$ extinguisher will remove the oxygen from a fire, however if used on a liquid fuel, such as fats or oils, it would spread the fire further.

**Image 2**

| Type | Old Code | BS EN 3 Colour Code | Fire Class |
|---|---|---|---|
| Water | Signal Red | Signal Red | A |
| Foam | Cream | Signal Red with a cream panel above the operating Instructions | A B |
| Dry Powder | French Blue | Red with a Blue panel above the operating instructions | A, B, C |
| Carbon Dioxide | Black | Red with a Black panel above the operating instructions | A(limited),B |
| Halon | Emerald Green | No longer produced - illegal in the UK | A |
| Wet Chemical | Not in use | Red with a Canary Yellow panel above the operating instructions | A,F |
| Special Powders | French Blue | Red with a Blue panel above the operating instructions | D |

## *Before you tackle a fire.*

Many people put out small fires quite safely. However, some people die or are injured by tackling a fires which are beyond their capabilities. Here is a simple fire code to help you decide whether to put out or get out.

- Always put your own and other peoples safety first
- Get everyone out of the building immediately, closing all doors behind you as you go. Then ensure the fire brigade has been called.
- Only tackle a fire in its very early stages.
- Make sure you can escape if you need to and never let a fire block you exit
- Never tackle a fire if it is starting to spread or has spread to other items in the room
- Never tackle a fire if the room is filling with smoke
    - Around 70% of fire deaths are caused by people being overcome by smoke and fumes
- If you cannot put out the fire or if the extinguisher becomes empty, get out and stay out