

Fire Extinguishers



No single extinguisher can be used to tackle every fire, and because each type of fire extinguisher has different categories of fire on which it is effective, selection can be a minefield. The good news is that portable fire extinguishers are effective and are saving lives.

The first step is to look at what materials are present in the area to be protected from fire. These can be divided into six fire classes involving different substances:

- **Class A** fire caused by combustible carbon-based solids such as paper, wood or textiles
- **Class B** fire caused by flammable liquids paraffin, petrol, diesel or oil (but not cooking oil)
- **Class C** fire caused by flammable gases, butane, propane or methane
- **Class D** fire caused by burning metals, aluminium, lithium or magnesium
- Fires caused by electrical equipment (indicated by an **electric spark symbol and not the letter E**)
- **Class F** fire caused by fats and cooking oils.

The prices of all extinguishers vary widely according to supplier, so purchasers are advised to shop around. When purchasing a fire extinguisher, consider the future cost of maintaining the unit.

Five main types of fire extinguishers

There are five different fire extinguishers, which are:

- **Water, water mist or water spray** fire extinguishers
- **Foam** fire extinguishers
- **Dry Powder** – standard or specialist fire extinguishers
- **Carbon Dioxide** ('CO₂') fire extinguishers
- **Wet Chemical** fire extinguishers

Fire Extinguisher Types and Uses

Water Fire Extinguishers

Water extinguishers are only used for Class A fires. Therefore, red coded extinguishers can be used to tackle fires caused by ignited paper, wood, straw, coal, rubber, solid plastics and soft furnishings. Water fire extinguishers work by spraying water from the spray nozzle, which helps to cover larger surface area. They are the simplest, most common, and least expensive type of extinguisher.

Water extinguishers are the easiest to maintain variety and the least hazardous, since they only contain water. They cool the fire by soaking it and the materials with water. This extinguishes the flames, absorbing heat from burning objects.

They are often found in shops, offices, retail premises, schools, hotels, warehouses and domestic premises. They may have spray or jet nozzles and are usually able to put out a fire completely. A drawback is that they cannot be used on burning fat or oil (Class F), burning metals (Class D), burning liquids (Class B) or electrical appliance fires.

Water Mist Extinguishers

The newest type of extinguisher. These very powerful, but smaller, devices exude an ultra-fine mist of microscopic 'dry' de-mineralized water particles. They are safe and effective to use on Class A, B, C and F fires, making it unnecessary to supply more than one type of extinguisher in most premises. Some water mist extinguishers are also suitable for use on electrical fires on equipment up to 1,000 Volts, such as computers and printers.

They work by cooling the fire and reducing the oxygen supply. These devices are likely to replace wet chemical extinguishers for the extinction of deep fat fryer fires, and leave no residue or collateral damage. Like water extinguishers, they are recyclable and do not contain any chemicals. However, they cannot be used on Class D fires (metals).

Water Spray Fire Extinguishers

Available in three and six liter, water spray fire extinguishers are suitable to fires involving organic solid materials such as wood, cloth, paper, plastics or coal. Use on burning fat or oil or on electrical appliances is a big no-no.

Use involves pointing the jet at the base of the flames and moving it constantly and steadily across the fire until extinguished.

Example of a CO2 fire extinguisher and water-based fire extinguisher in an office

A jet nozzle is eschewed in favor of a spray nozzle, which creates a fine spray courtesy of the higher pressure. Hitting a broader surface area this extracts heat more rapidly. Surfactants can be added to help the water penetrate further into burning material.

Foam Extinguishers

The foam smothers the fire in solids and liquids (Class A and B), but not in burning fats or cooking oils (Class F), so foam fire extinguishers are used on burning liquids such as petrol, paint or turpentine. A foam extinguisher can also be used on some electrical fires if they have been tested and you are 3 or more feet away. However, they leave a residue that has to be cleaned up, and they are more expensive than water extinguishers.

Dry Powder Extinguishers

Powder fire extinguishers are used for fighting burning solids, liquids and gases (Class A, B and C fires). **Specialist powder extinguishers** are designed to tackle type D fires involving combustible metals such as lithium, magnesium, or Aluminum.

They work by the powder forming a crust which smothers the fire and stops it from spreading.

Disadvantages are that the powder does not soak into materials and does not have an effective cooling effect on the fire, which can result in the fire reigniting. The powder is hazardous if inhaled, so they should be used in well-ventilated areas and are not suitable for offices and domestic premises. The powder damages soft furnishings, machinery, etc. and needs a lot of cleaning up after use. They cannot be used on chip pan fires (Class F).

CO2 Extinguishers

These contain only pressurized carbon dioxide gas and therefore leave no residue. Carbon Dioxide (CO₂) extinguishers are used on fires involving burning liquids (Class B), and electrical fires, such as of large computer equipment, so are practical in offices. CO₂ works by suffocating the fire and does not cause damage to the electrical items or cause the system to short circuit.

However, CO₂ extinguishers get very cold during discharge, and those that are not fitted with double-lined, frost-free swivel horns may cause fingers to freeze to the horn during deployment. They can asphyxiate in confined spaces, and they are not suitable for deep fat fryers, as the strong jet from the extinguisher can carry the burning fat out of the fryer. Fires can quickly re-ignite once the CO₂ has dissipated into the atmosphere, so they do not offer post-fire security.

Wet Chemical Extinguishers

These are the only extinguishers apart from water mist suitable for Class F oil fires (fats and cooking oils) and are mainly used in kitchens with deep fat fryers. They can also be used on Class A and some can be used on Class B fires. They consist of a pressurized solution of alkali salts in water, which, when operated, creates a fine mist, cooling the flames and preventing splashing.

Which fire extinguisher types to use

- **Class A** fire extinguisher – water, water mist, foam, dry powder, wet chemical
- **Class B** fire extinguisher – water mist, foam, dry powder, CO₂, some wet chemical
- **Class C** fire extinguisher – water mist, dry powder
- **Class D** fire extinguisher – specialist dry powder
- **Electrical** fire extinguisher – CO₂
- **Class F** fire extinguisher – water mist, wet chemical.

For more information on choosing and using a Fire Extinguisher visit

<https://www.usfa.fema.gov/prevention/home-fires/prepare-for-fire/fire-extinguishers/index.html>