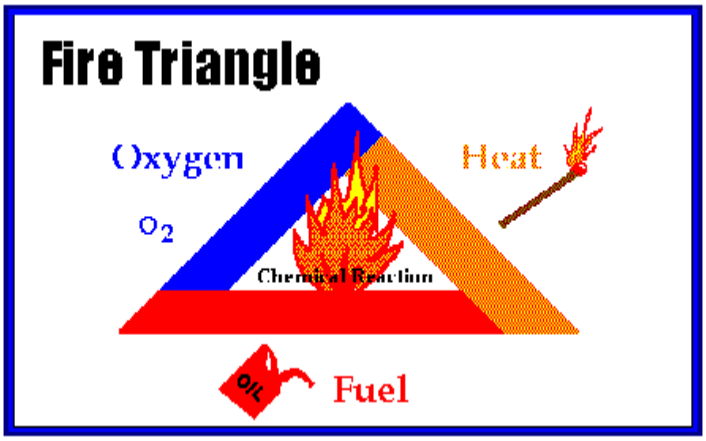
ST MARY's FIRE EXTINGUISHER TRAINING MANUAL



Fire safety, at its most basic, is based upon the principle of keeping fuel sources and ignition sources separate.

Three things must be present at the same time to produce fire:

1. Enough Oxygen to sustain combustion
2. Enough Heat to reach ignition temperature
3. Some Fuel or combustible material

Together, they produce the chemical reaction that is fire. Take away any of these things and the fire will be extinguished.

FUEL CLASSIFICATIONS

Fires are classified according to the type of fuel that is burning. If you use the wrong type of extinguisher on the wrong class of fire, you might make matters worse. It is very important to understand the different fire (fuel) classifications:

Class A: Wood, paper, cloth, rubbish, plastics—solids that are not metals.

Class B: Fires involving flammable liquids. For example petrol and spirits. Ideally NOT COOKING OIL or large quantities of alcohol.

Class C: Fires involving flammable gasses. For example propane and butane.

Class D: Metals—potassium, sodium, aluminum, magnesium. Requires Metal-X, foam, and other special extinguishing agents.

Class E: Fires involving electrical equipment. For example photocopiers, fax machines and computers, in particular when plugged in and energised.

Class F: Fires involving cooking oil and fat. For example olive oil, maize oil, lard and butter.

Fire extinguishers are colour coded and will have a pictograph label telling you which type of fire the extinguisher is designed to fight and those it is not suitable for. There should also be a wall mounted sign next to the extinguisher mount providing the same information. These signs glow in the dark for a while after the lights are extinguished so are easy to find.

Fire extinguishers must be checked on a yearly basis by a qualified maintainer to ensure that they are fully operational. More regular routine checks are valuable to ensure unreported extinguisher use is picked up. If an extinguisher is used it must be serviced immediately.

TYPES OF FIRE EXTINGUISHERS

Different types of fire extinguishers are designed to fight different classes of fire. Remember they have limited capacity and will typically work for about 10 - 30 seconds depending on size, so use wisely. The most common types of fire extinguishers are:

1. Water (Air Pressurised Water - APW)

These are large, red fire extinguishers that stand about 600 mm tall and weigh about 14 kg when full. They are filled with ordinary tap water, usually mixed with anti-rust additives, and pressurised air. Some add surfactants to increase penetration into the fuel. They are essentially large squirt guns. They have a range of about 10 m.

APW extinguishers extinguish fire by taking away the “Heat” element of the Fire Triangle. They are designed for Class A fires **only**: Wood, paper, cloth etc. They are good for preventing fire re-ignition with class A materials as the water soaks the fuel. Here are a couple of reasons you need to be careful about which extinguisher you use:

- Using water on a flammable liquid fire could cause the fire to spread.
- Using water on an electrical fire increases the risk of electrocution. If you have no choice but to use an APW extinguisher on an electrical fire, make sure the electrical equipment is unplugged and therefore de-energized.

This extinguisher is normally coloured red. Modern versions often have a pressure gauge. This should be indicating in the green zone. The pictures below show an example wall sign and extinguisher.

2. Carbon Dioxide (CO_2)

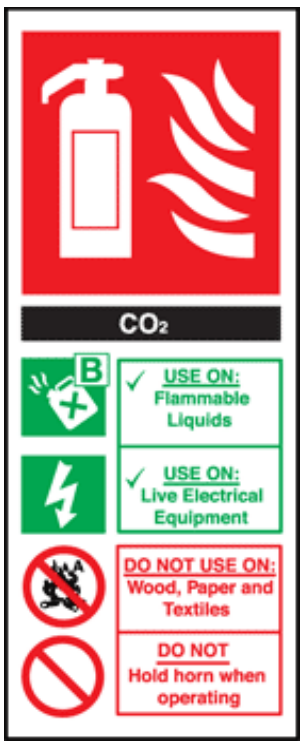
CO_2 extinguishers are found where electrical appliances or flammable liquids are situated. They leave no mess. They are safe to use on electrical fires as there is nothing to conduct electricity to the user. They normally range in size from 2 kg to 4.5 kg. They have a short range of one to three meters and are best used in short bursts.

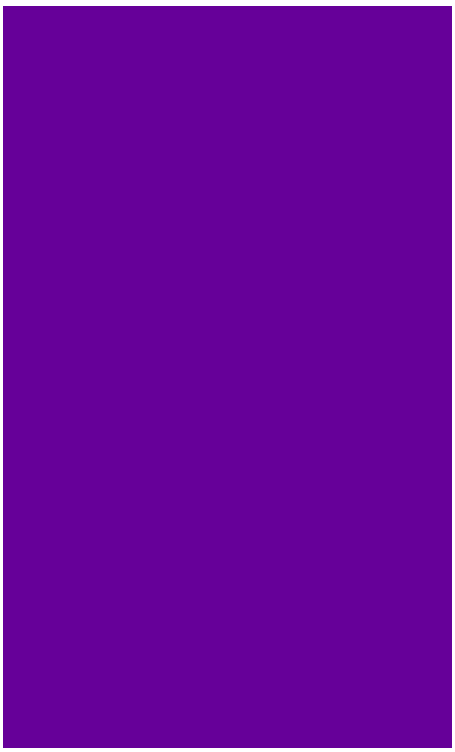
Carbon dioxide is a non-flammable gas that takes away the oxygen element of the Fire Triangle. CO_2 is very cold as it comes out of the extinguisher, so it cools the fuel as well. In confined spaces there is an asphyxiation risk as the CO_2 displaces the oxygen our bodies need.

A CO_2 extinguisher may not be very effective in extinguishing a Class A fire because it may not be able to displace enough oxygen to successfully put the fire out. Class A materials may also smolder and re-ignite.

Care must be taken with using CO_2 extinguishers in that the horn and hose can get very cold and cause skin damage. Ice can also form on the horn. Keep hands away from the horn outlet and only hold the horn lightly at its base if you have to using a piece of cloth or other insulating material. Some horns are better insulated than others. It is better however to only hold the main body of the extinguisher after rotating the horn so it points away from the extinguisher body. Be aware that the pressure in a CO_2 extinguisher is so great that bits of dry ice might shoot out of the horn!

This extinguisher is normally coloured red with a black band. The pictures below show an example wall sign and extinguisher.





3. Foam Spray (Aqueous Film-Forming Foam or AFFF).

Foam spray extinguishers are ideal for use against class A & B fires. They are highly effective against non polar volatile flammable liquids such as petrol. They have a range of about two to five meters.

The foams are mainly water based, with a foaming agent so that the foam can float on top of the burning liquid or surface and break the interaction between the flames and the fuel surface. Ordinary foams work better if "poured" but it is not critical. The flame smothering seal created by the foam over the surface thus take away the oxygen element of the Fire Triangle. This seal also prevents re-ignition. They are ideal for multi risk usage in areas such as workshops and garages. Standard foams are not ideal with large quantities of alcohol (a polar liquid) as it breaks down the foam.

As they are water based, foam extinguishers are not suitable for electrical fires unless they use special foams that are non conductive. Using water on an electrical fire increases the risk of electrocution. If you have no choice but to use a foam extinguisher on an electrical fire, make sure the electrical equipment is unplugged and therefore de-energized.

This extinguisher is normally coloured red with a cream band though some older ones omit the band. Modern versions often have a pressure gauge. This should be indicating in the green zone. The pictures below show an example wall sign and extinguisher.

4. Dry Powder (ABC, AD, BC)

Dry powder extinguishers are filled with a fine low melting point powder. The extinguishers are pressurised with nitrogen or carbon dioxide. They have a range of about two to five meters.

Dry powder extinguishers put out fire by coating the fuel with a thin layer of slag created by the powder melting. This separates the fuel from the oxygen in the air and thus takes away the oxygen element of the Fire Triangle. The powder also works to interrupt the chemical reaction of fire by extracting heat from the flames. These extinguishers are very effective at putting out fire. The seal created by the powder also prevents re-ignition. They do however create a lot of mess to clear up. Electrical equipment is usually irreparably damaged.

Dry powder extinguishers come in a variety of types. You may see them labeled:

- ABC (can be used on Class A, B, or C fires)
- BC (can be used on Class B or C fires)
- AD (for fires involving metals)

It is extremely important to identify the type of dry powder fire extinguishers available before use. The dry powder extinguishers at St Mary's are type ABC and are suitable for use on any fire type that we might experience. ABC powder is usually the best agent for fires involving multiple classes. However it is less effective against three-dimensional class A fires, or those with a complex or porous structure. Foams or water are better in those cases.

This extinguisher is normally coloured red with a blue band. Modern versions often have a pressure gauge. This should be indicating in the green zone. The pictures below show the wall sign and an example extinguisher.

5. Fire Blanket

Fire blankets are used to smother flames e.g. a burning chip pan or a person on fire.

Once they have been used they should be replaced.

When used to smother a person's burning clothes, wrap the blanket around the person and get them on the ground as quickly as possible to prevent the flames getting to the head.

The blanket holder is normally coloured red. The pictures below show an example wall sign and fire blanket holder.

6. Wet potassium salts / Wet Chemical

These extinguishers are designed for class F cooking oil fires. They look similar to water extinguishers. The extinguishers spray the agent out as a fine mist. The mist acts to cool the flame front, while the potassium salts saponify (changes the fat into a soap) the surface of the burning cooking oil, producing a layer of foam over the surface. This solution thus provides a similar blanketing effect to a foam extinguisher, but with a greater cooling effect. The saponification only works on animal fats and vegetable oils, so class F extinguishers cannot be used for class B fires. The misting also helps to prevent splashing the blazing oil.

HOW TO USE A FIRE EXTINGUISHER

It is easy to remember how to use a fire extinguisher if you remember the acronym, "PASS."

Pull

Aim

Squeeze

Sweep

Pull the pin

This will allow you to discharge the extinguisher.

Get the hose or nozzle ready for use.

Aim at the base of the fire

Hit the fuel…if you aim at the flames, the extinguishing agent will pass right through and do no good.

Squeeze the top handle

This depresses a button that releases the pressurised extinguishing agent.

Sweep from side-to-side until the fire is completely out.

Remember: Start using the extinguisher from a safe distance away, say 2 - 3 m, and then slowly move forward. Once the fire is out, keep an eye on the area in case it re-ignites.

GENERAL RULES FOR FIGHTING FIRES

Fires can be very dangerous and you should always be certain that you will not endanger yourself or others when attempting to put out a fire. For this reason, when a fire is discovered,

1. Assist any person in immediate danger to safety, if it can be accomplished without risk to yourself. Make other building occupants aware of the fire.

2. Activate the building fire alarm if there is one and call 999.

If the fire is small (and ONLY after having done these two things), you may attempt to use an extinguisher to put it out.

However, before deciding to fight the fire, keep these things in mind:

- **Know what is burning**. If you don't know what is burning, you won't know what kind of extinguisher to use.

- Even if you have an ABC rated fire extinguisher, there might be something in the fire that is going to explode or produce toxic fumes.

  Chances are you will know what is burning, or at least have a pretty good idea, but if you don't, let the fire brigade handle it.

- Is the fire spreading rapidly beyond the point where it started? The time to use an extinguisher is at the beginning stages of the fire.

- If the fire is already spreading quickly, it is best to simply evacuate the building.

As you evacuate a building, close doors and windows behind you as you leave.

This will help to slow the spread of smoke and fire.

Do not fight the fire if:

- You don't have adequate or appropriate equipment.
  If you don't have the correct type or large enough extinguisher, it is best not to try fighting the fire.

- You might inhale toxic smoke.
  When synthetic materials such as the nylon in carpeting or foam padding in a sofa burn, they can produce hydrogen cyanide, acrolein, and ammonia in addition to carbon monoxide. These gases can be fatal in very small amounts.

- Your instincts tell you not to.
  If you are uncomfortable with the situation for any reason, in particular if the fire is getting out of control, leave the fire for the fire brigade.

It is always best to fight the fire with someone else so you can look out for each other.

The final rule is to always position yourself with an exit or means of escape at your back before you attempt to use an extinguisher to put out a fire. In case the extinguisher malfunctions, or something unexpected happens, you need to be able to get out quickly. Never walk over an extinguished area just in case it re-ignites. You don't want to become trapped.

Once the fire is out keep it under watch to ensure it does not re-ignite. If it does, use the fire extinguisher again. If the Fire Brigade has been called ask them to inspect the fire scene to ensure the fire is fully extinguished.

Don't forget to ensure that the building owners known the fire extinguishers have been used so they can be replenished/replaced.

FIRE EXTINGUISHER TRAINING QUIZ

1. An example of two “Class B” fuels would be:
    a. Cardboard, newspapers
    b. Lamp, hot plate
    c. Grease, paint thinner
2. An APW (water extinguisher) is safe to use on an electrical fire.
    a. True
    b. False
3. Carbon Dioxide extinguishers are designed for which types of fuels?
    a. Class B and Electrical
    b. Class A, B and C
    c. Class A and C
    d. Class A and B
4. Which type of extinguisher has a hard horn on the end of a flexible hose or metal arm?
    a. APW (air-pressurized water)
    b. CO_2 (carbon dioxide)
    c. ABC (dry powder)
5. As a general rule, you should not attempt to fight a fire if it is spreading rapidly.
    a. True
    b. False
6. ABC fire extinguishers primarily extinguish fire by cooling it down.
    a. True
    b. False
7. Water will not extinguish most flammable liquid fires.
    a. True
    b. False
8. You should always keep an exit or means of escape at your back when trying to fight a fire.
    a. True
    b. False
9. The three elements of the fire triangle are:
    a. Water, a heat source, and fuel
    b. Oxygen, water, and fuel
    c. Oxygen, fuel, and a heat source
    d. Fuel, oxygen, and earth
10. Do you know where the fire extinguishers are in the church buildings?
    a. Yes
    b. No

Answers

1. C
2. B
3. A
4. B
5. A
6. B
7. A
8. A
9. C
10. A