

Combustion and Flame

How do We Control Fire

Control Fire

Any fire needs three things to be present:

- 1) Combustible substance (Fuel)
- 2) Air
- 3) Heat

Fire can be extinguished in 3 ways:

- 1) By removing the fuel
- 2) By removing the heat
- 3) By cutting off the air supply to the burning substance

Remove the fuel

When fire starts in a room, all the combustible substances should be removed at once so that fire may not spread. If possible, cooking gas cylinder should be removed and electricity should be switched off.

Remove the heat

Water is used to remove heat from a burning substance and to make it too cool to burn further.

Water extinguishes heat by cooling the burning substance. When water is thrown on a burning substance, it gets cooled below its ignition temperature and also stops burning.

When fire brigade men throw a strong stream of water on a building on fire, the burning material gets cooled to below their ignition temperature and fire is extinguished. The water vapour produced by the action of heat of fire on water surrounds the burning material and helps in cutting off the supply of air. Firemen extinguish the fire by throwing water under pressure on the burning things.

Generally, water is used to control fire. Water brings down the temperature of the combustible substance below its ignition temperature. The water vapour surrounds the combustible material, thus helping in cutting off the supply of air. So, that the fire is extinguished.

Note: Fire produced by the burning of oil or petrol cannot be controlled by throwing water on it because water being heavier than oil, settles down the oil and oil continues to burn.

In the case of fires caused by burning liquid fuels, such as kerosene oil can be controlled by throwing sand or soil over it.

We know that there are 3 conditions necessary for producing and sustaining combustion.

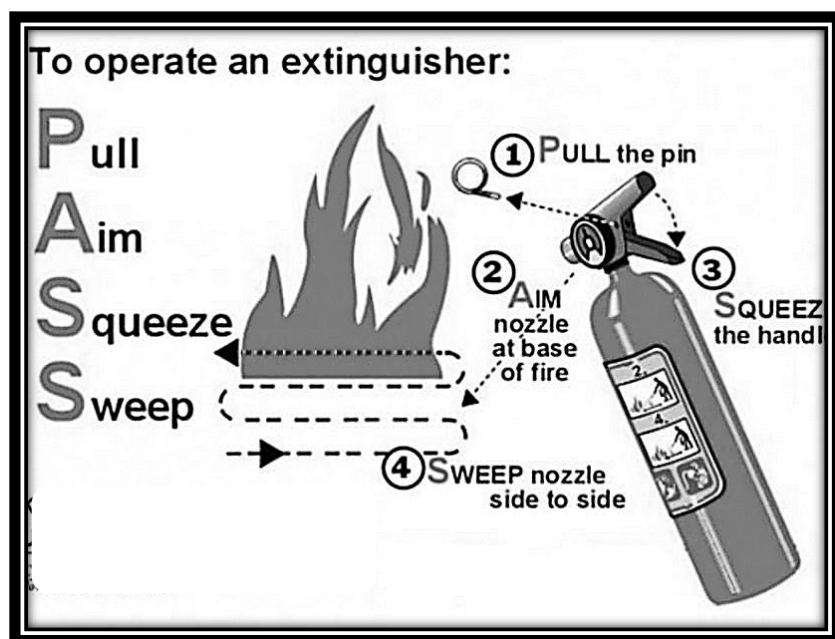
- (1) Presence of a combustible substance.
- (2) Presence of a supporter of combustion.
- (3) Attainment of ignition or kindling temperature.

Thus, fire can be controlled by removing one or more of these requirements of fire control.

The fire extinguisher also try to cut off the supply of air or bring down the temperature of the fuel or both, to control the fire. The combustible substance as such cannot be eliminated in most of the cases from the place of fire.

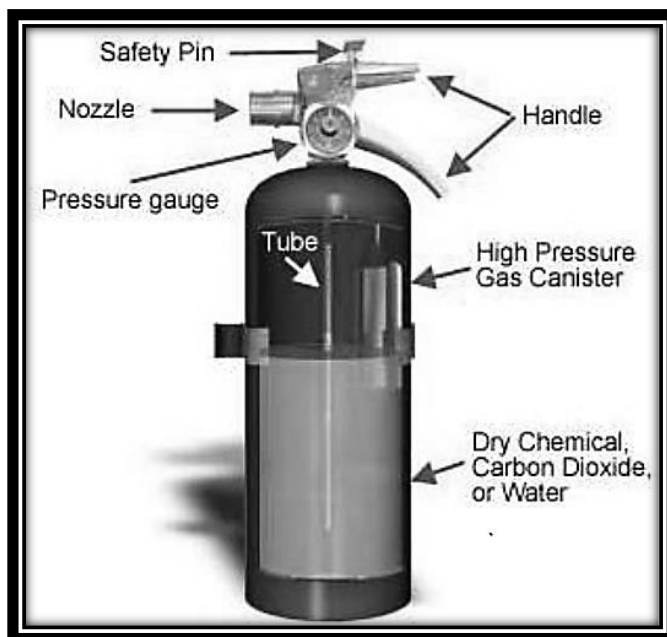
There are various types of fire extinguishers used for controlling a fire. The job of a fire extinguisher is to cut off the supply of air or bring down the temperature of the fuel.

To operate extinguisher



Soda - acid fire extinguisher: Carbon dioxide liberated by the reaction of sulphuric acid with sodium bicarbonate solution comes out with a stream of liquid water at high pressure. Water puts

off the fire by lowering the temperature of the combustible material below its ignition temperature and carbon dioxide cut off the supply of air to the combustible substance.



Types of combustion

Combustion is mainly of three types

- (1) Rapid combustion
- (2) Spontaneous combustion
- (3) Explosion

1. Rapid combustion: The combustion in which the gas burns rapidly and produces heat and light is called rapid combustion.

For example: When a burning matchstick is brought near a gas burner and the gas tap is opened, the gas immediately starts burning with the production of heat and light. Eg. Petrol, LPG, spirit, etc.,

2. Spontaneous combustion: The combustion in which no external heat is given is known as spontaneous combustion.

For example: Burning of white phosphorus in air.

3. Explosion: The combustion in which large amount of gases are evolved with the production of a tremendous amount of heat; light and sound is called explosion,

For example: When a cracker is ignited, a sudden reaction, oxidation process takes place, and in which at high-speed large amount of gas is evolved with the production of tremendous amount of heat, light and sound.