

**SUBJECT: BASICS OF FIRE SCIENCE**

**INTRODUCTION TO FIRE AND ITS TYPES**

**Presented by**

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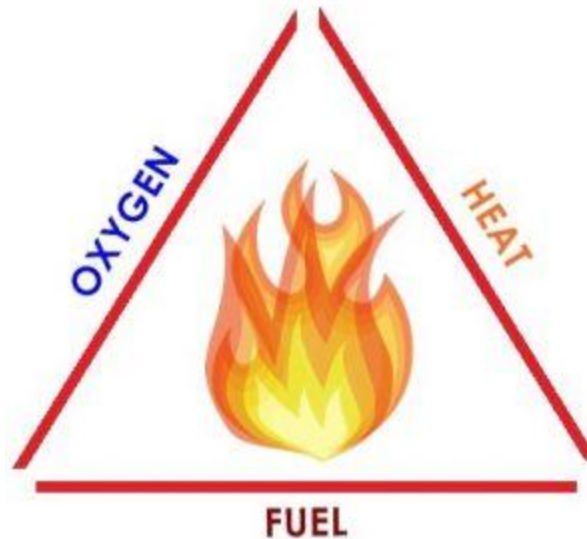
GITAM, KABLANA

## Fire Triangle

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Fire is a rapid chemical reaction of oxidant with fuel accompanied by the release of energy, indicated by incandescence or flame.

Fire has three elements as shown in figure given below:

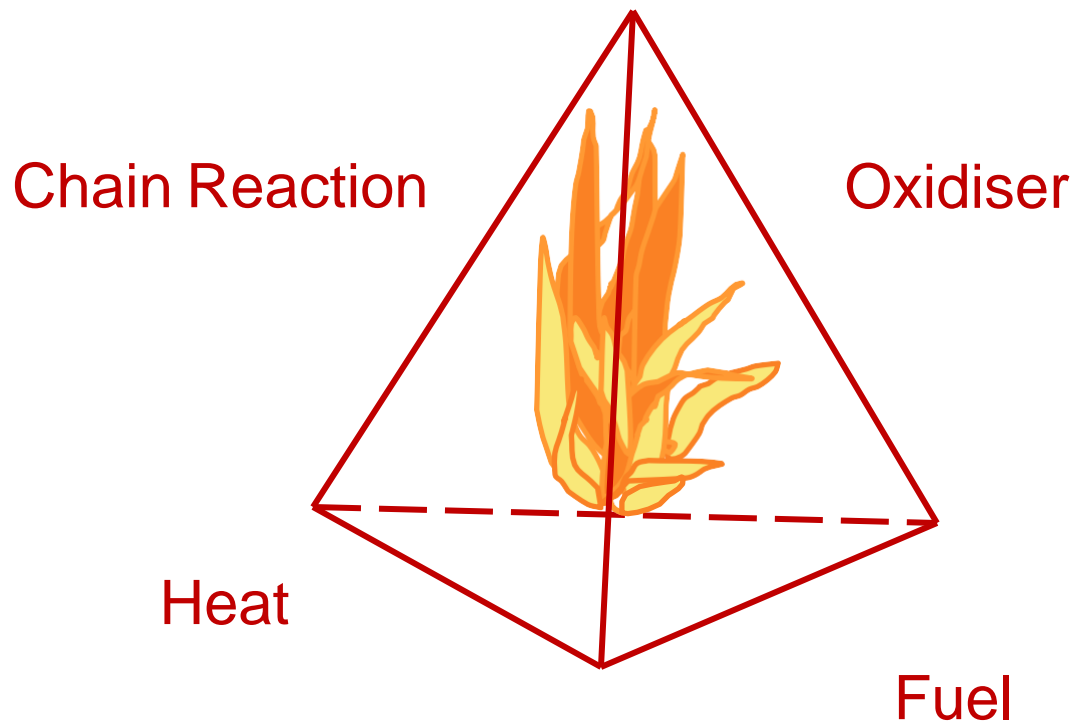


Fire Triangle

# Fire Tetrahedron

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Other than all basics elements of Fire, one more elements is added, that is uninhabitable Chain Reaction.



**Fire Tetrahedron**

# Fire

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For a fire to happen, the following elements are essential

- **Oxidiser** to sustain combustion.
- **Heat** to reach ignition temperature.
- **Fuel** or combustible material.

This results in a **chemical chain reaction** which starts a fire.  
Removing any of these elements will extinguish the fire.

# Classification of Fire

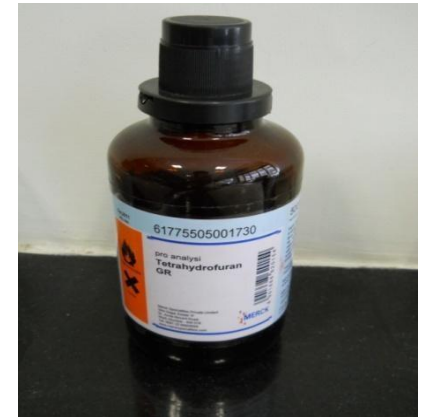
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On the basis of the type of fuel, fires are classified into the following

**Class A Fires** — solid combustible materials of organic nature such as wood, paper, rubber, plastics, etc.



**Class B Fires** — flammable liquids



# Classification of Fire

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**Class C Fires** — flammable gases under pressure including liquefied gases.



**Class D Fires** — combustible metals, such as magnesium, sodium, potassium, etc,



# Basic Terminology

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- **Ignition** is the process of initiating self sustained combustion.
- The **ignition temperature** of a substance is the minimum temperature to which it must be heated for it to ignite.
- **Flash point** is the lowest temperature at which a liquid produces enough vapor to form an ignitable mixture.
- Lower the flash point of a flammable liquid, greater the hazard.

# Sources of Ignition

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- Electrical equipments –
  - Arcing,
  - damaged wiring,
  - over heating of cables due to excess loads,
  - loose electrical connections,
  - heat from electric bulbs etc.
- Open flame
- Hot surfaces
- Sparks from welding operations
- Chemical reaction between incompatible chemicals
- Smoking
- Batteries



# Extinguishing Fire

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Fire can be extinguished by

- **Cooling** the fuel by removing heat (e.g., by applying water).



# Extinguishing Fire

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Fire can be extinguished by

- **Smothering** by cutting off oxygen supply (e.g., by applying foam, carbon dioxide).



# Extinguishing Fire

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Fire can be extinguished by

- **Starving** the fire by removing the fuel.(e.g., stopping gas flow during a pipeline fire).
- **Inhibition** by stopping the chain reaction.(e.g., by applying dry chemical powder).



# Consequences of Fire

- **Loss of life**
- **Loss of friends or family**
- **Injury or disability**
- **Loss of home, workplace, income, job**
- **Loss of irreplaceable belongings**
- **Financial (uninsured losses and premiums)**

**THANKS**