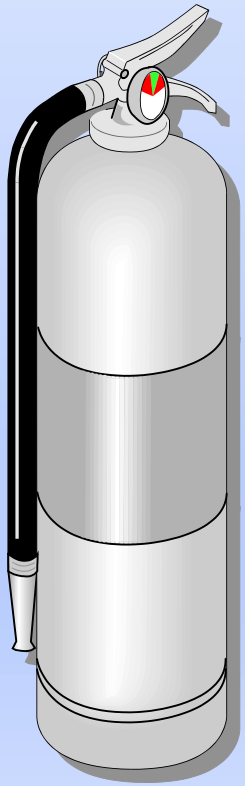
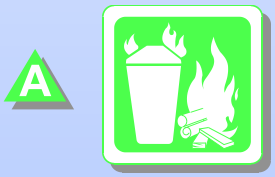
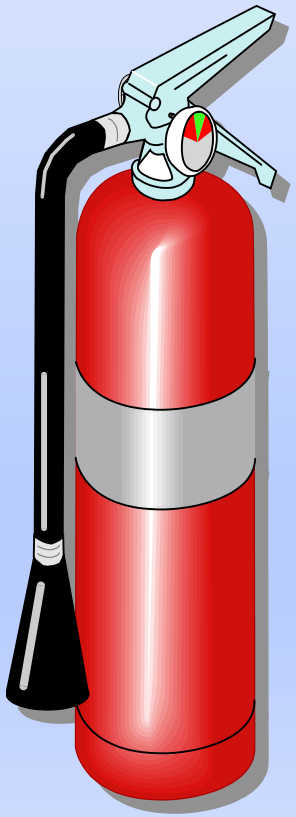
Saad H. Khammash and Sons Company

FIRE EXTINGUISHER TRAINING





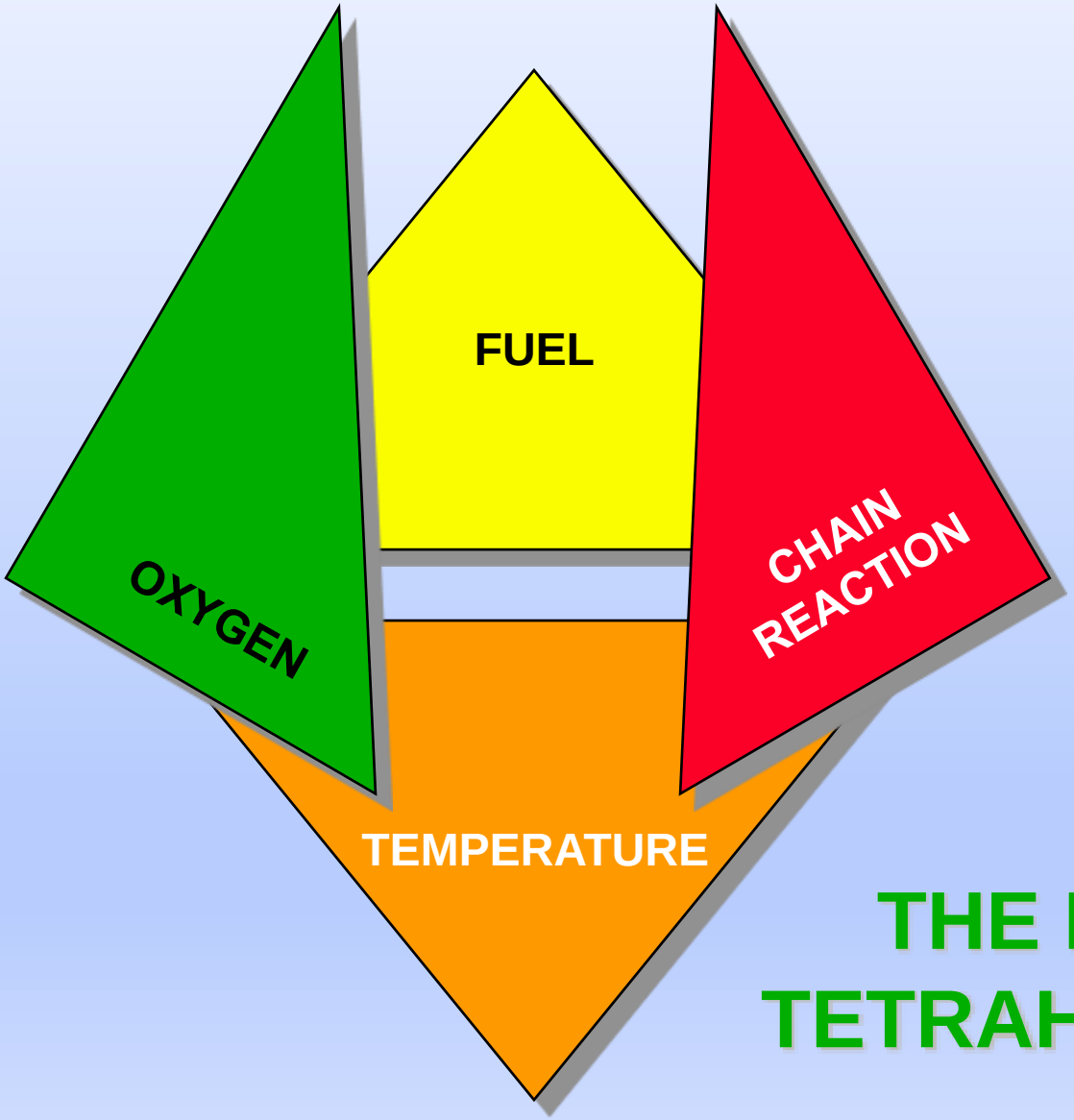
Pushparajan
SAFETY OFFICER
Saad H. Khammash and Sons Company



Objectives

- **Understand the combustion process and different fire classes.**
- **Understand fire extinguisher types, operating procedures, capabilities, and limitations.**
- **Understand basic firefighting concepts:**
  - ***R.A.C.E.***
  - ***P.A.S.S.***

The Combustion Process



THE FIRE TETRAHEDRON

Fire Classes

A Trash Wood Paper

- *wood*
- *cloth*
- *paper*
- *rubber*
- *many plastics*

C Electrical Equipment

- *energized electrical equipment*

B Liquids Grease

- *gasoline*
- *oil*
- *grease*
- *tar*
- *oil-based paint*
- *lacquer*
- *flammable gases*

- *magnesium*
- *sodium*
- *potassium*
- *titanium*
- *zirconium*
- *other flammable metals*

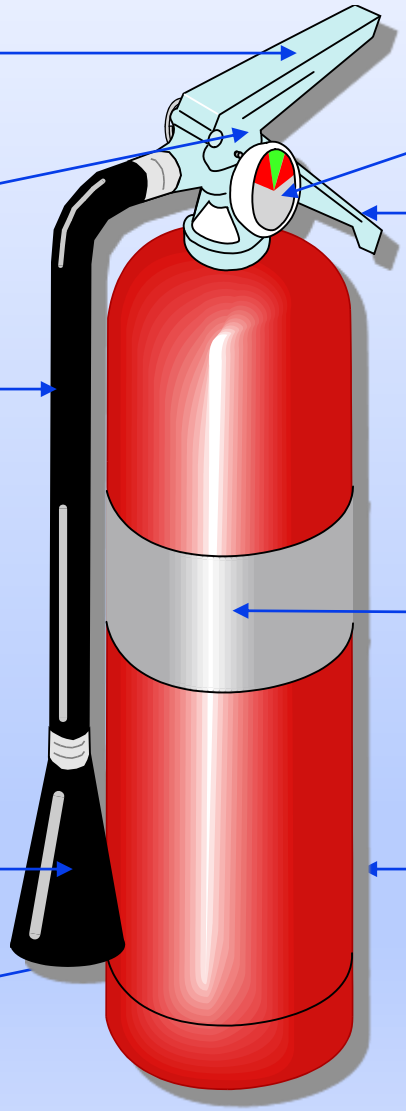
Fire Classes (cont.)

CLASS K FIRES

K Cooking Media

- *Recently recognized by NFPA 10.*
- *Fires involving combustible vegetable or animal non-saturated cooking fats in commercial cooking equipment.*

Fire Extinguisher Anatomy



DISCHARGE LEVER

PRESSURE GAUGE
(not found on CO_2 extinguishers)

DISCHARGE LOCKING PIN AND SEAL

CARRYING HANDLE

DISCHARGE HOSE

DATA PLATE

DISCHARGE NOZZLE

BODY

DISCHARGE ORIFICE

Fire Extinguisher Ratings

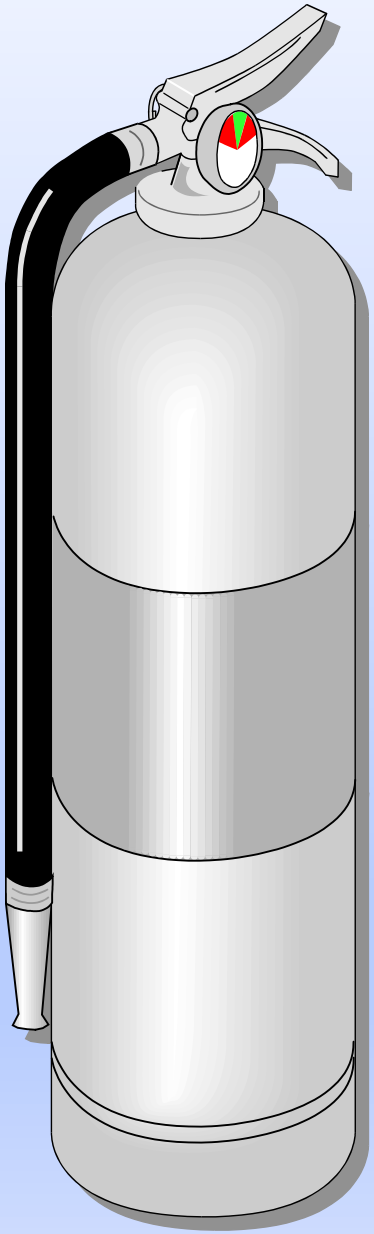
NUMERAL	FIRE CLASS	RANGE
DIRECT INDEX OF THE SIZE FIRE THE QUANTITY OF AGENT CAN HANDLE	A Trash Wood Paper 	1-A thru 40-A
INDICATION OF THE SQUARE FOOT AREA OF FLAMMABLE LIQUID THE EXTINGUISHER WILL HANDLE	B Liquids Grease 	1-B thru 640-B
NO NUMERAL IS USED BECAUSE THERE ARE NO DEGREES OF SAFETY WHERE ELECTRICITY IS CONCERNED	C Electrical Equipment 	N/A
NOT APPLICABLE BECAUSE OF THE SPECIALIZED NATURE OF THE BURNING MATERIAL	COMBUSTIBLE  METALS	N/A
DIRECT INDEX OF THE SIZE FIRE THE QUANTITY OF AGENT CAN HANDLE	K Cooking Media 	1-A:C:K or 2-A:C:K

Fire Extinguisher Applications

FIRE CLASS	EFFECTIVE EXTINGUISHER TYPES
A Trash Wood Paper 	PRESSURIZED WATER, MULTIPURPOSE DRY CHEMICAL, LARGER SIZE HALON, WET CHEMICAL
B Liquids Grease 	MULTIPURPOSE DRY CHEMICAL, CARBON DIOXIDE, HALON
C Electrical Equipment 	MULTIPURPOSE DRY CHEMICAL, CARBON DIOXIDE, HALON, WET CHEMICAL
COMBUSTIBLE  METALS	COMBUSTIBLE METAL
K Cooking Media 	WET CHEMICAL

Fire Extinguisher Types

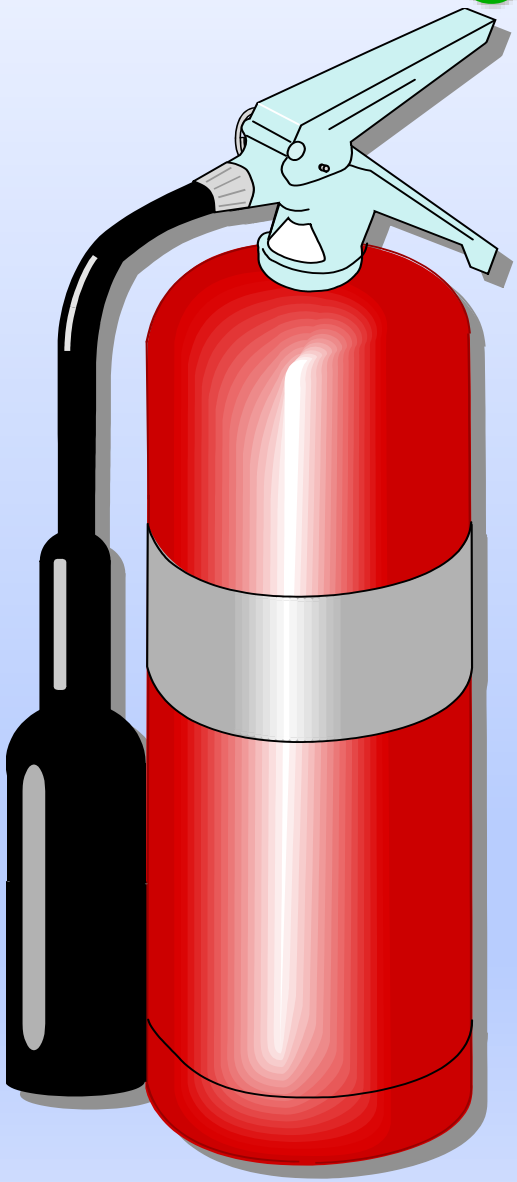
PRESSURIZED WATER

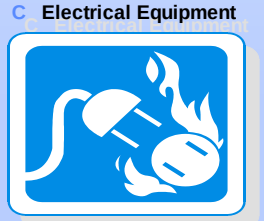


- Class “A” fires only.
- 2.5 gal. water at 150-175 psi *(up to 1 minute discharge time).*
- Has pressure gauge to allow visual capacity check.
- 30-40 ft. maximum effective range.
- Can be started and stopped as necessary.
- Extinguishes by ***cooling*** burning material below the ignition point.

Fire Extinguisher Types (cont.)

CARBON DIOXIDE (CO_2)

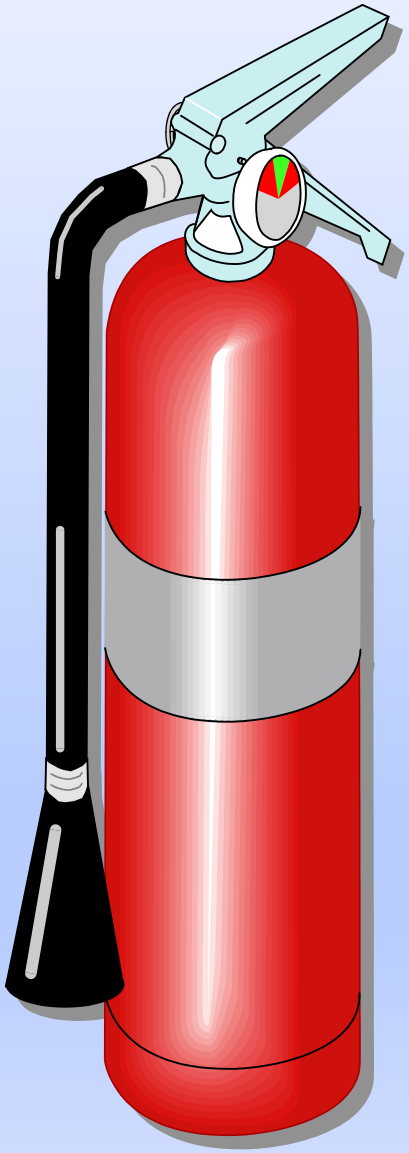


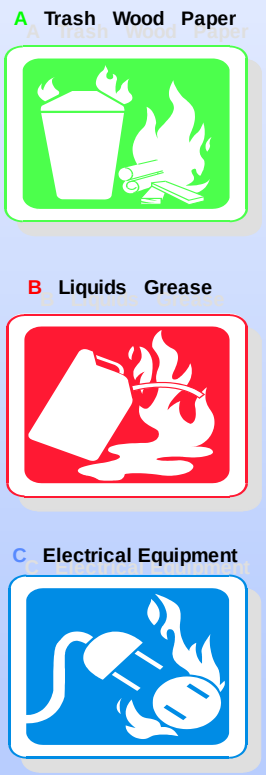


- Class “B” or “C” fires.
- 2.5-100 lb. of CO_2 gas at 150-200 psi *(8-30 seconds discharge time).*
- Has ***NO*** pressure gauge--capacity verified by weight.
- 3-8 ft. maximum effective range.
- Extinguishes by ***smothering*** burning materials.
- Effectiveness ***decreases*** as temperature of burning material increases.

Fire Extinguisher Types (cont.)

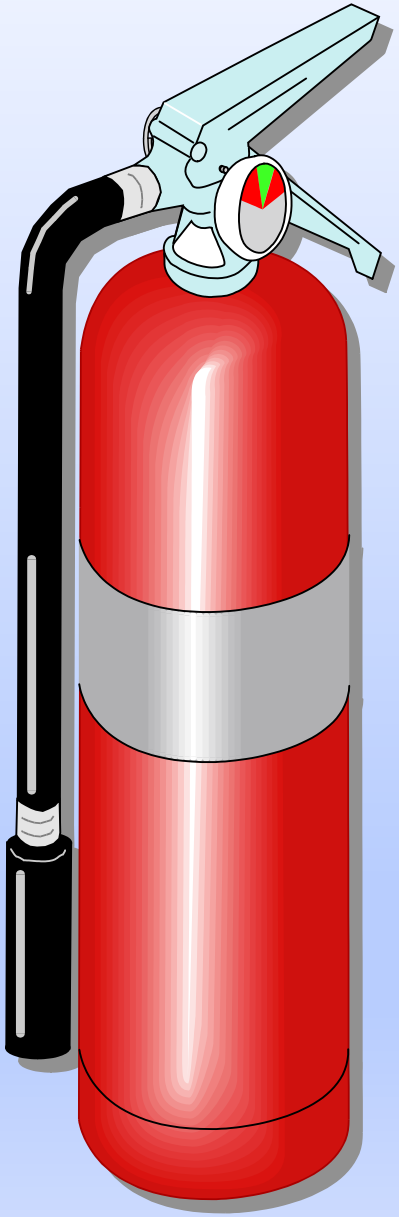
MULTIPURPOSE DRY CHEMICAL

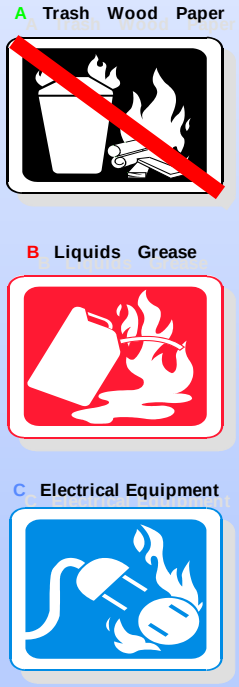




- Class “A”, “B”, or “C” fires.
- 2.5-20 lb. dry chemical *(ammonium phosphate)* pressurized to 50-200 psi by nitrogen gas *(8-25 seconds discharge time).*
- Has pressure gauge to allow visual capacity check.
- 5-20 ft. maximum effective range.
- Extinguishes by ***smothering*** burning materials.

Fire Extinguisher Types (cont.)



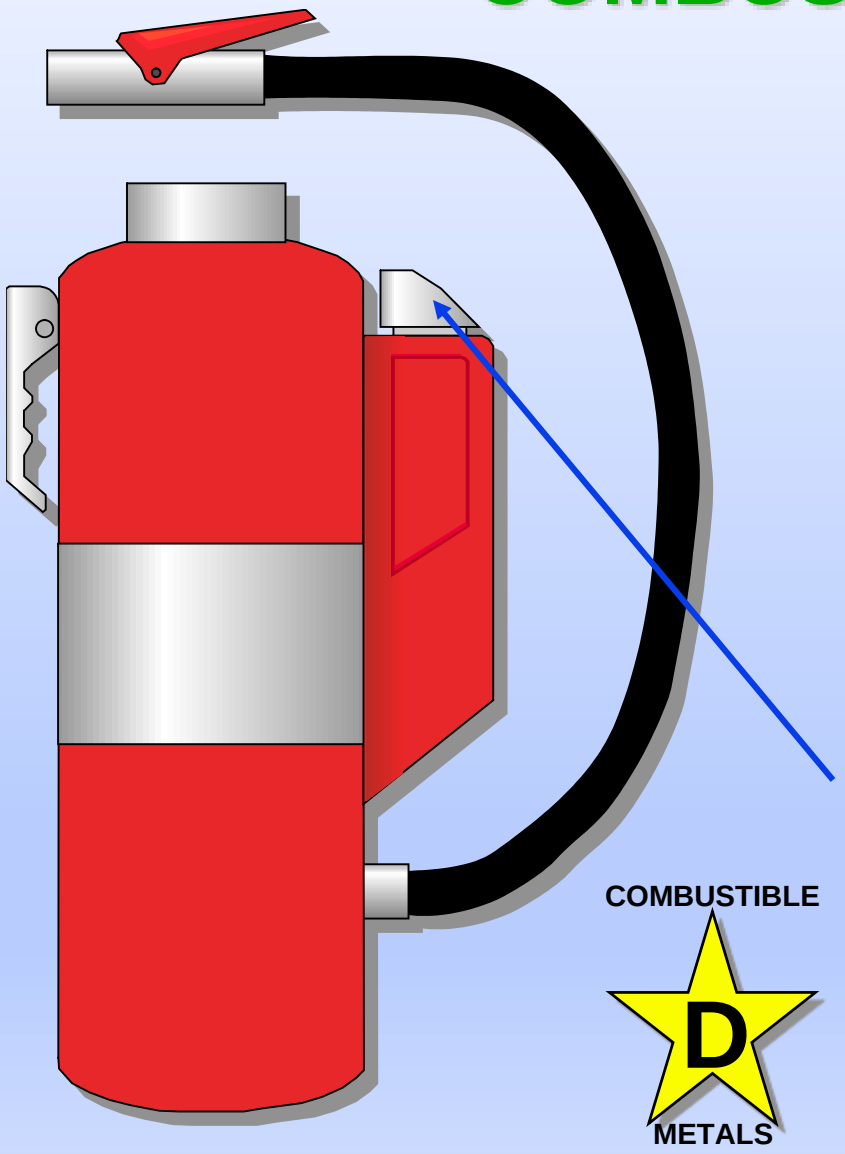


HALON

- Class “A”, “B”, or “C” fires *(smaller sizes ineffective against Class “A”).*
- 9-17 lb. Halon 1211 (pressurized liquid) released as vapor *(8-18 seconds discharge time).*
- Has pressure gauge to allow visual capacity check.
- 9-16 ft. maximum effective range.
- Works best in confined area--ideal for electronics fire due to lack of residue.
- Extinguishes by ***smothering*** burning materials.
- Fumes toxic if inhaled.
- Halon is ozone depleting chemical--production halted in Jan ‘94.

Fire Extinguisher Types (cont.)

COMBUSTIBLE METAL



- Class “D” combustible metal fires only.
- 30 lb. pressurized dry powder optimized for specific combustible metal *(also available in bulk containers for hand scooping onto fire to extinguish).*
- 6-8 ft. maximum effective range.
- To activate, must first open nitrogen cylinder on back to pressurize body.
- Extinguishes by ***smothering*** burning materials.

Fire Extinguisher Types

WET CHEMICAL

- Class “A”, “C”, and “K” fires.
- 1.5 gal. of stored pressure PRX wet chemical extinguishing agent *(40 sec. discharge time)*.
- 10-12 ft. maximum effective range.
- On Class “K” fires, don’t use until ***after*** fixed extinguishing system has activated.
- Extinguishes by ***cooling*** and forming foam blanket to prevent re ignition.

Fire Extinguisher Summary

EXTINGUISHER TYPE	WORKS BY	EFFECTIVE AGAINST
PRESSURIZED WATER	COOLING	A 
CARBON DIOXIDE	SMOTHERING	B  C 
MULTIPURPOSE DRY CHEMICAL	SMOTHERING	A  B  C 
HALON	SMOTHERING	A  B  C 
COMBUSTIBLE METAL	SMOTHERING	
WET CHEMICAL	COOLING/ SMOTHERING	A  C  

Fire Emergency Response

R **Rescue**

A **Alarm**

C **Contain**

E **Extinguish**

Firefighting Decision Criteria

- **Know department emergency procedures and evacuation routes.**
- **Know locations of extinguishers in your area and how to use them.**
- **Always sound the alarm regardless of fire size.**
- **Avoid smoky conditions.**
- **Ensure area is evacuated.**
- **Don't attempt to fight unless:**
  - ***Alarm is sounded.***
  - ***Fire is small and contained.***
  - ***You have safe egress route (can be reached without exposure to fire).***
  - ***Available extinguishers are rated for size and type of fire.***
- **If in doubt, evacuate!**

Fighting the Fire

P Pull the pin

A Aim low at the base of flames

S Squeeze the handle

S Sweep side to side

Summary

- **Combustion process *(Fire Tetrahedron).***
- **Class A, B, C, D, K fires.**
- **Types of portable fire extinguishers:**
  - ***Operating procedures.***
  - ***Capabilities and limitations.***
- **Basic firefighting concepts:**

R.A.C.E.

- ***P.A.S.S.***

Inappropriate use of extinguishers

- **The fire is large and has grown beyond its original confined space**
- **Your escape path is threatened**
- **You are not sure if you have the correct type of fire extinguisher**

Personal hazards

- **Smoke and noxious fumes**
- **Smoke and fumes cause unconsciousness**
- **Death may result**

PASS method of fighting fires

Hold the extinguisher upright

- **Pull the pin**
- **Aim at the base of the fire**
- **Squeeze the handle**
- **Sweep the base of the fire**

- **Do not aim high at the flames**

Prevention methods

- **Keep work areas clean and clutter-free**
- **Know how to handle and store chemicals**
- **Know what you are expected to do in an emergency**

Prevention methods

- **Know about the chemicals you work with**
- **Become familiar with emergency action plan for fires**