Fire Safety,

Extinguishers

AR Training

Updated 2012

DMME

Division of Mineral Mining

Fire Evacuation, Practice Drills, and Assistance
4 VAC 25-40-500, 630, & 640

(Study Guide Pages 29-30)

- Fire warning, evacuation, and fighting procedures shall be established at all operations.
- If employees are assigned to “fire fighting” duties, they must be trained, and practice skills every 6 months.
- Prior arrangements shall be made to obtaining fire fighting assistance.

Fire Emergency Procedures 4VAC25-40-500

- Must be established for:
  - fire warning signal
  - emergency evacuation
  - firefighting
- Note: Serious fires must be reported to DMM (those taking longer than 30 min. to put out).

Flammable & Combustible Liquid Tanks
4 VAC 25-40-510

- Areas around flammable and combustible liquid storage tanks shall be:
  - kept free of combustible materials for at least 25 feet
  - posted with readily visible fire hazard warning signs


DANGER
WATCH FOR FALLING MATERIAL
FIRE
EXTINGUISHER
EMERGENCY CONVEYOR STOP
DANGER
FLAMMABLE MATERIAL
NO SMOKING
OR OPEN FLAMES
KEROSENE
KEROSENE

Storage Buildings or Areas
4 VAC 25-40-540

- Buildings or areas used for storage of flammable or combustible materials shall be:
  1. fire resistant construction;
  2. well ventilated;
  3. kept clean and orderly;
  4. posted with warning signs;
  5. provide for spill containment.

Storage of oxygen cylinders
4 VAC 25-40-1220

Oxygen cylinders shall never be stored in areas near oil or grease.

Securing Cylinders
4 VAC 25-40-1250

- Compressed gas and liquid gas cylinders shall be safely secured in an upright position at all times.
- Do you see any problems here?


NOTICE
CLOSE VALVES
WHEN NOT IN USE!
DANGER
NO
SMOKING
EXTINGUISHER

Welding Operations
4 VAC 25-40-620

Welding shall be conducted so as to ensure that sparks or other hot materials do not result in a fire.

Removing flammable and combustible gases from containers.
4 VAC 25-40-660

Prior to applying heat, cutting, or welding on pipes or containers that have contained flammable or combustible material:

- **they shall be drained**
- **they shall be cleaned, ventilated and**
- **filled with an inert gas or inert material**

Fire Extinguishers
4 VAC 25-40-610

Equipment used to detect, warn, or extinguish fires must be:

1. suitable for type of fire which may be encountered;
2. maintained;
3. strategically located, accessible, and identified;
4. type, size and quantity to extinguish any anticipated fire; and
5. inspected monthly.

Fire Extinguishers
4 VAC 25-40-670.A

Whenever a fire or its effects could impede escape from self-propelled equipment, a fire extinguisher shall be placed on the equipment.

Fire Extinguishers
4 VAC 25-40-670.B

Where fire or its effects could affect the escape of persons in an area, a fire extinguisher must be either on the equipment or within 100 feet of the equipment.

Fire Extinguishers

Dry Chemical

- Ordinary Base **"BC"**
  - Sodium Bicarbonate
  - Potassium Bicarbonate
  - Potassium Chloride

Do not use on "A" fires, will put out only surface area, heated core may re-ignite

- Multipurpose **"ABC"**
  - Monoammonium Phosphate
  - Ammonium Phosphate
  - Barium Sulfate

Extinguisher Classification

Type(s) of fire it can put out

How much fire a "lay person" can put out

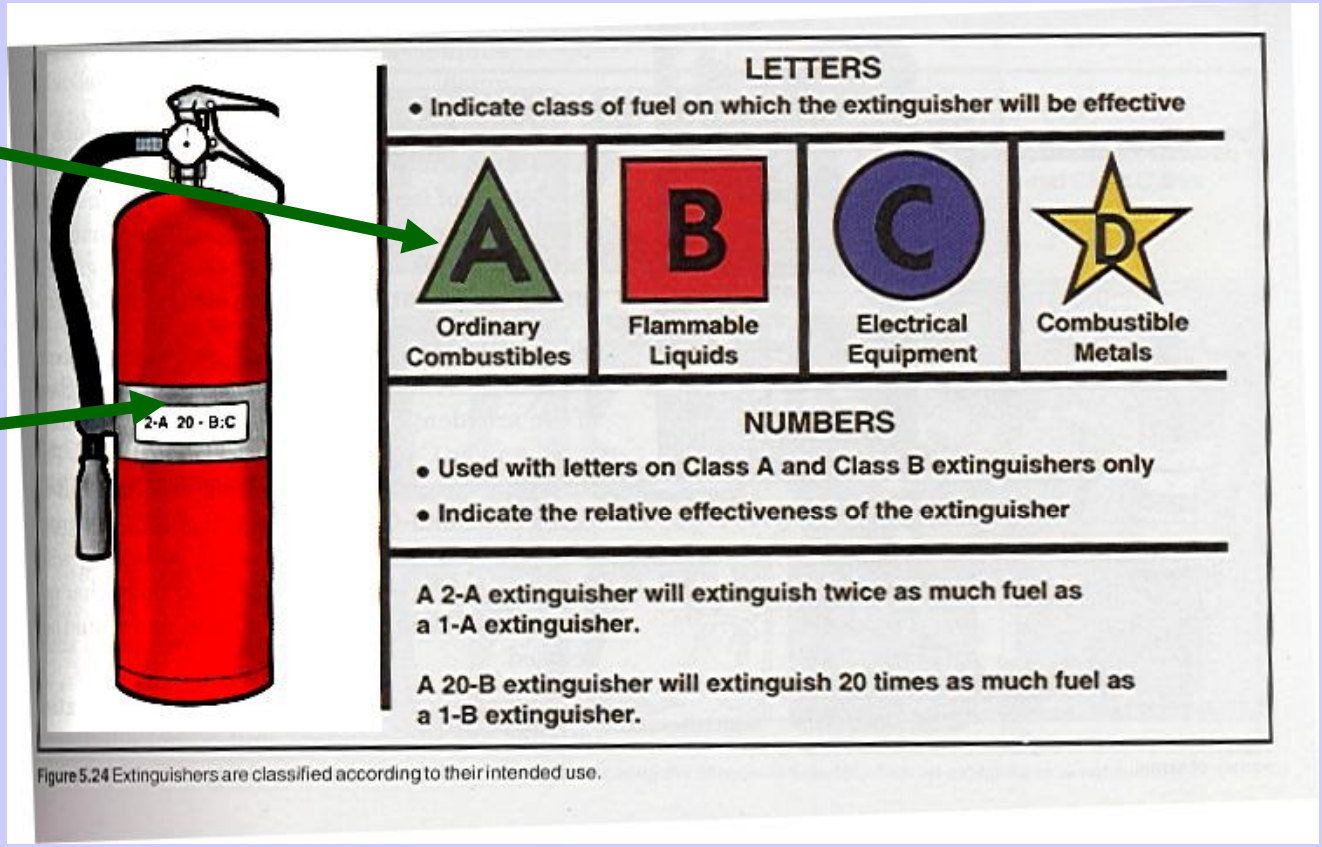


Figure 5.24 Extinguishers are classified according to their intended use.

For example, a 5:A will put out five square foot surface area of Class A fire

A 20:BC will put out a twenty square foot surface area of Class B or C fire.

A properly trained person can extinguish 2 to 3 times the amount listed on the rating.

Class A

Materials are:

Solids

- Wood
- Paper
- Plastic Rubber
- Coal

"A" stands for "ash"

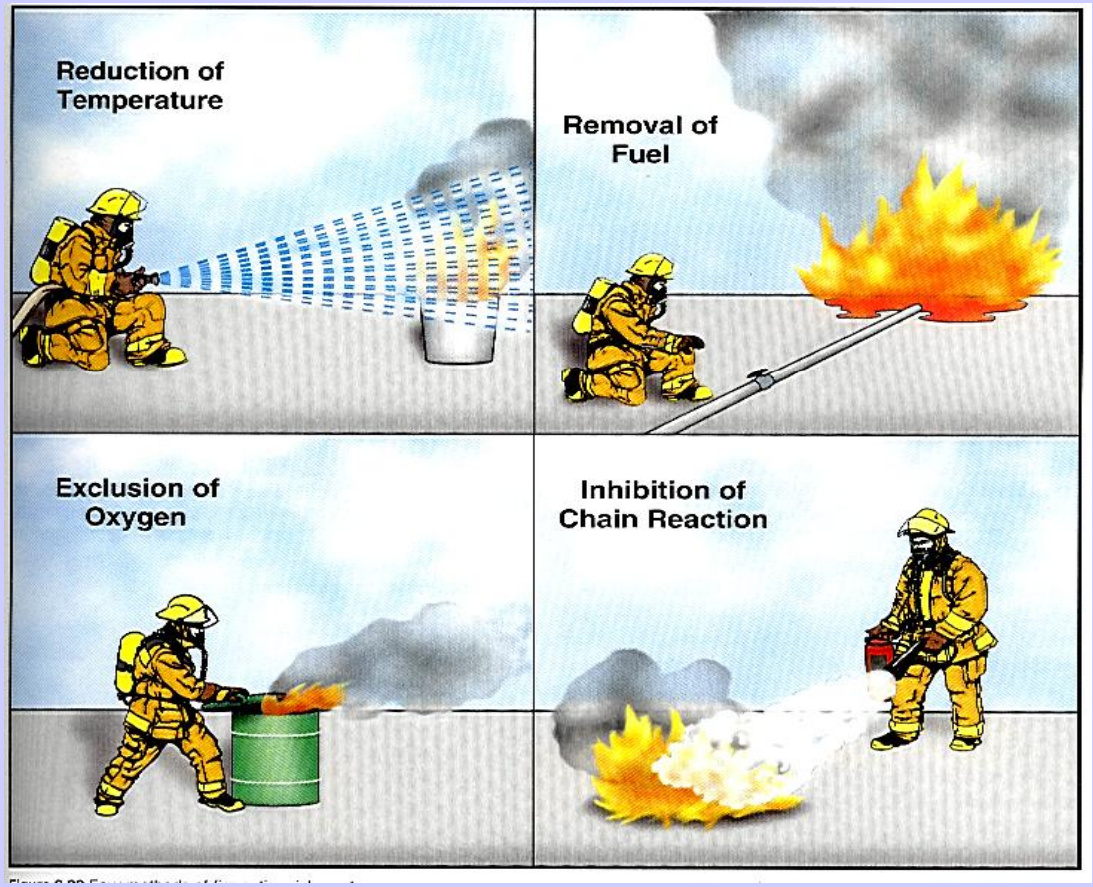
How to extinguish a Class A fire

Adding water

Class A fires only

Pit a lid on it,

Usually oily rags or paper in a waste container



Limit material burning

Shovel away material

Add rock dust to remaining fuel

Use a fire extinguisher

Usually Class A, B & C fires

Class B

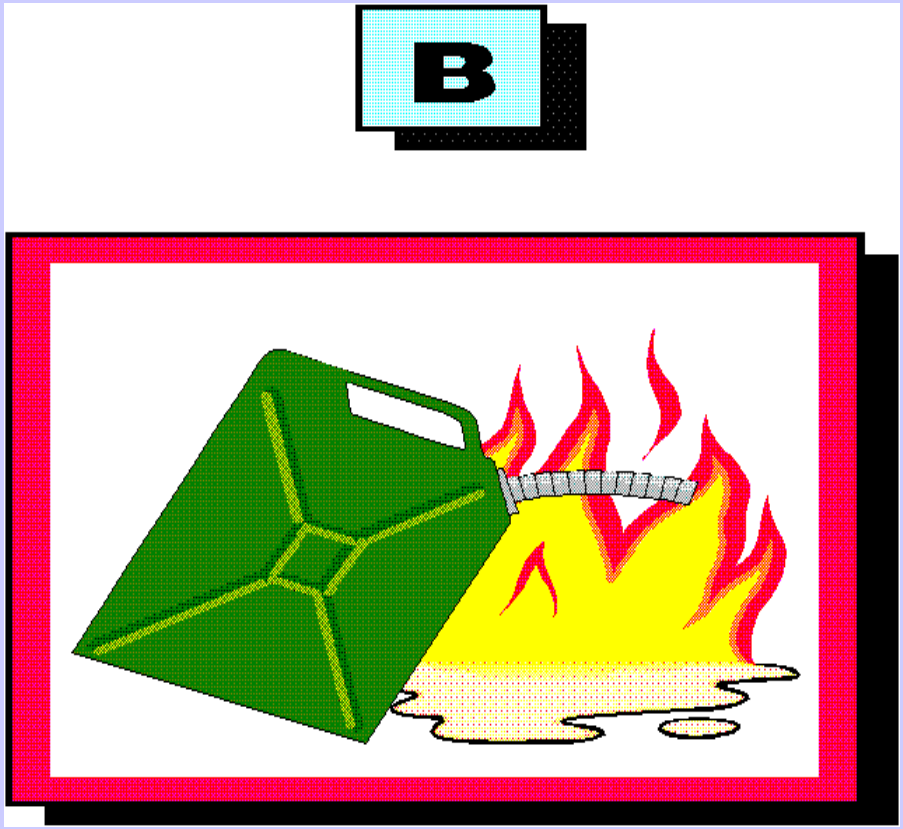
Materials are:

Liquids

- Gasoline, Oil, Diesel fuel
- Greases, Hydraulic fluid
- Gases; i.e.

Acetylene, Propane

Natural Gas



"B" stands for "boil"

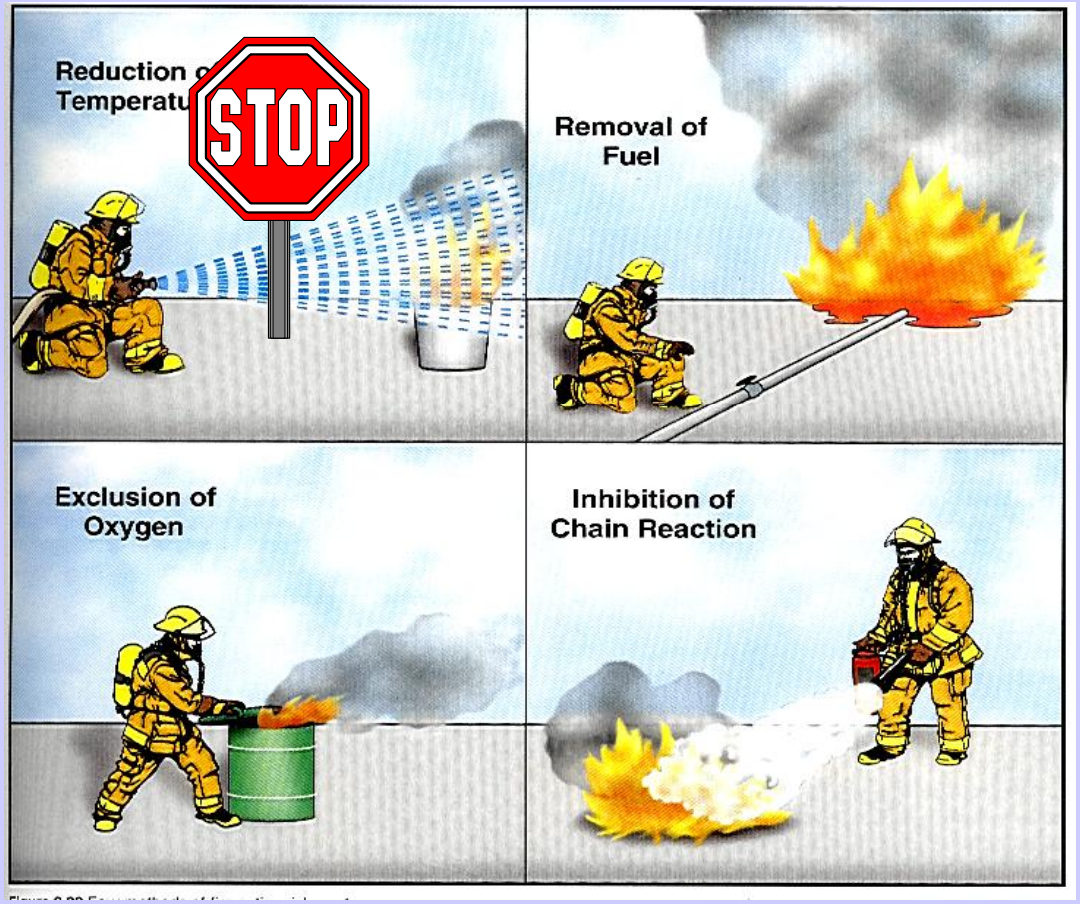
How to extinguish a Class B fire

Not recommended

Water can cause the fire to spread

Put a lid on it

No oxygen, no fire



Remove excess liquid fuel or shut off bottled gas cylinders

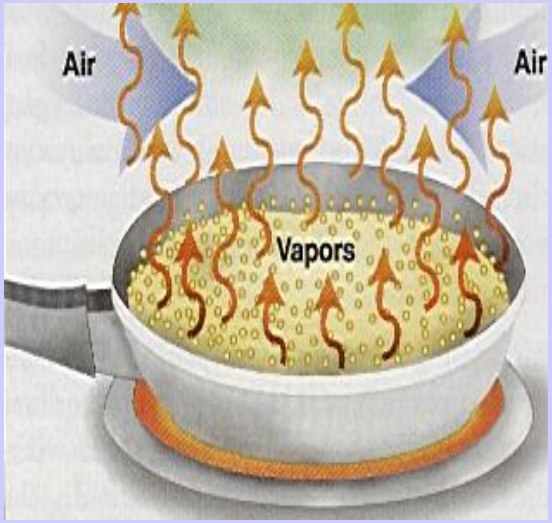
Use a BC or ABC fire extinguisher

Special care when using flammable and combustible liquids

The " flash point" is when at

the right temperature,

vapors are released that will ignite



Flammable Liquids

Flash point under 100ºF

- **Gasoline(-42ºF)**
- **Toluene(73ºF)**
- **Benzene(12ºF)**
- **Cleaning fluids**

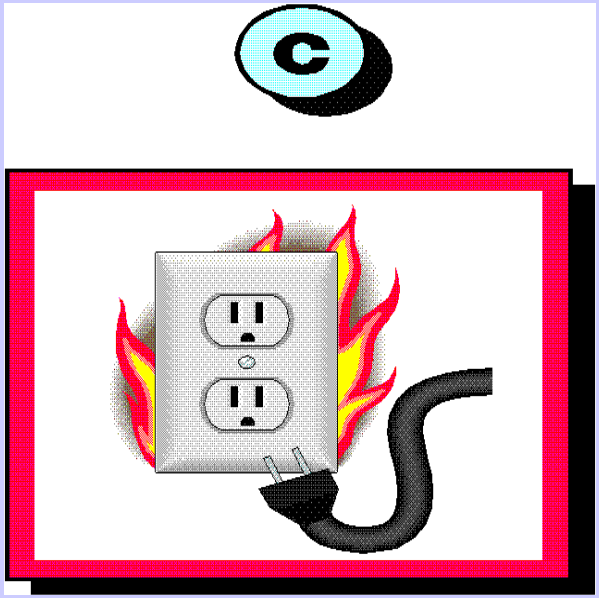
Combustible Liquids

Flash point over 100ºF & under 164ºF

- **Diesel fuel(110ºF)**
- **Kerosene(102ºF)**
- **Home heating fuel(120ºF)**
- **Hydraulic fluids**

Class C

Materials are:



“Energized” Electrical Equipment & Cables

Always treat “C” fires as though power is still on!

- **Once the power has been removed, you can probably treat it like a Class A or B fire, but remember that cables & equipment can hold electricity even after the power is off!**

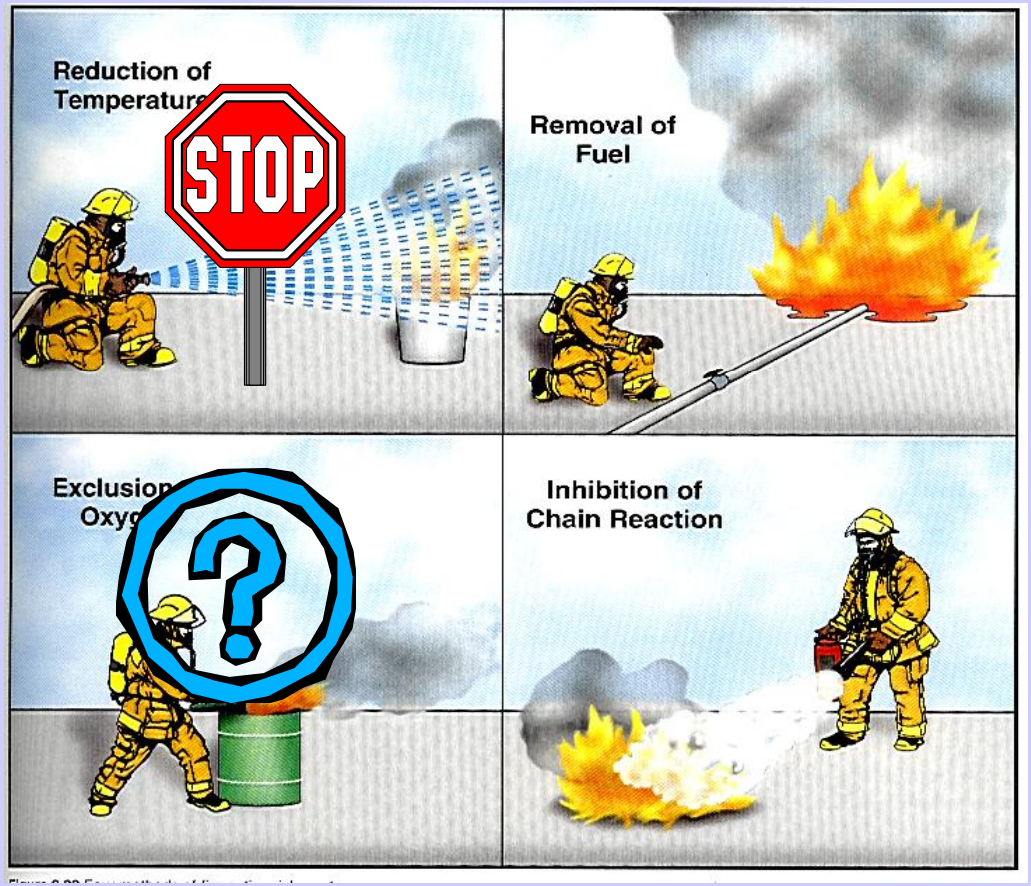
“C” stands for “current”

How to extinguish a Class C fire

Not recommended

Water can conduct electricity

May not work because of the high temperature of the electric arc



Shut off the power

May still have A or B fire remaining

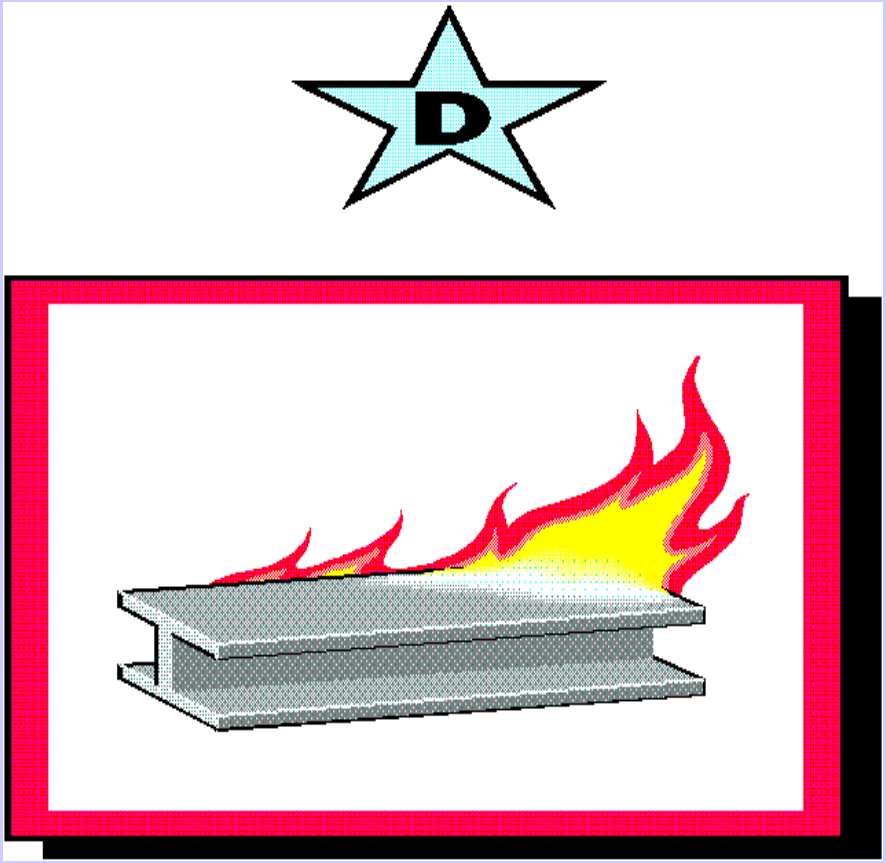
Use a BC or ABC fire extinguisher

Class D

materials include

Combustible Metals

- Magnesium
- Titanium
- Zirconium
- Sodium
- Potassium
- Lithium
- Calcium
- Zinc



D stands for “ding”

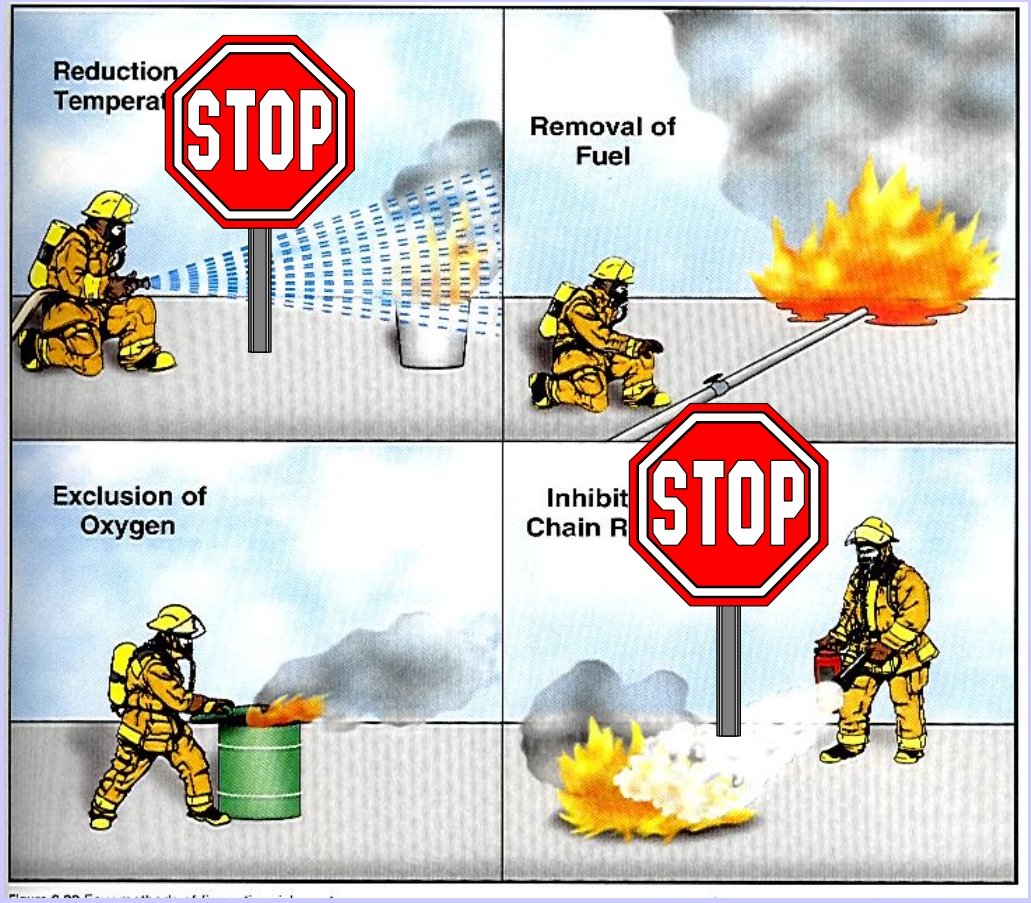
Class D materials are usually in alloy type metals

They are usually started by a Class A-B-C fire, and will burn at extremely high temperatures

Not recommended-

The O_2 and H_2 in the water will accelerate the fire

Attempt to isolate the fire by covering with sand or rock dust



Shovel away all materials that can be ignited by the high heat generated

Not recommended-

Unsure if ABC extinguisher will put out

Unsure of dangerous by-product from the reaction of the chemicals

Class K

This covers the new synthetic oils & greases that are on the market & the new ones being developed

New synthetic oils & greases for industry

Problem… ABC type fire extinguishers may not work on these fires, a special Class K extinguisher may be needed!

Inquire about what new products that are available on mine sites that would fall into this new category

When are fire extinguishers to be inspected?

Industrial Minerals-Surface

Fire extinguishers shall be inspected visually at least once a month to determine that they are fully charged and operable.

At least once every twelve months, maintenance checks shall be made of mechanical parts, the amount and condition of extinguishing agent and expellant, and the condition of the hose, nozzle, and vessel to determine that the fire extinguishers will operate effectively.

Industrial Minerals-Underground

Fire extinguishers shall be inspected visually at least once a month to determine that they are fully charged and operable.

At least once every twelve months, maintenance checks shall be made of mechanical parts, the amount and condition of extinguishing agent and expellant, and the condition of the hose, nozzle, and vessel to determine that the fire extinguishers will operate effectively.

When using a fire extinguisher, remember the phrase "P.A.S.S."

- P. Pull the pin
- A. Aim low
- S. Squeeze the trigger/handle
- S. Sweep side to side

It is important that you should attend an actual "hands on" fire extinguisher class to be proficient in their use