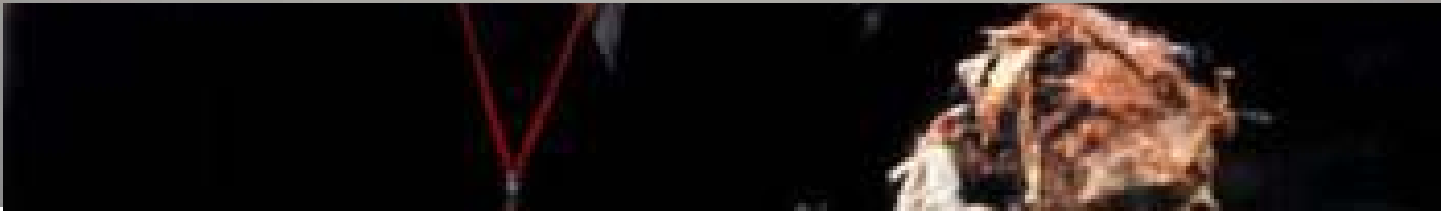


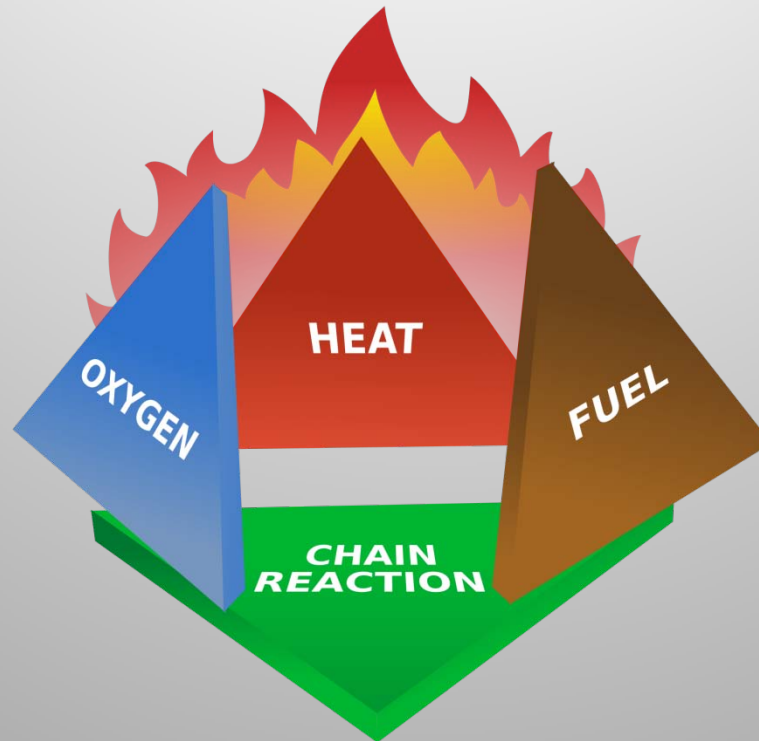


Fire Extinguisher Training

By Ryan Beckwith



The Fire Tetrahedron



Fire Safety is based upon the principle of keeping fuel sources and ignition sources separate.

The Fire Tetrahedron

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 sustained CHEMICAL REACTION that is fire

Take away any of these things and the fire will be *extinguished*.

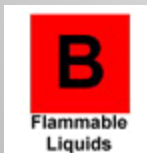
Types of Fires

- Fires are classified according to the type of fuel that is burning.
- If you use the wrong type of fire extinguisher on the wrong class of fire, you might make matters worse.
- There are five different fire (fuel) classifications...

Types of Fuels



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



Class B: Flammable liquids—gasoline, oil, grease, acetone. Includes flammable gases.



Class C: Electrical—energized electrical equipment. As long as it's "plugged in."



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



Class K: Vegetable oils, animal oils, or fats in cooking equipment- used in commercial kitchens

Types of Fuels

Most fire extinguishers will have a pictograph label telling you which types of fire the extinguisher is designed to fight.

For example, a simple water extinguisher might have a label like this...



...which means it should only be used on Class A fires.

Types of Fire Extinguishers

Different types of fire extinguishers are designed to fight different classes of fire.

The 4 most common types of fire extinguishers are:

1. Water
2. Carbon Dioxide (CO₂)
3. Dry Chemical (ABC)
4. Wet Chemical (K)

Types of Fire Extinguishers



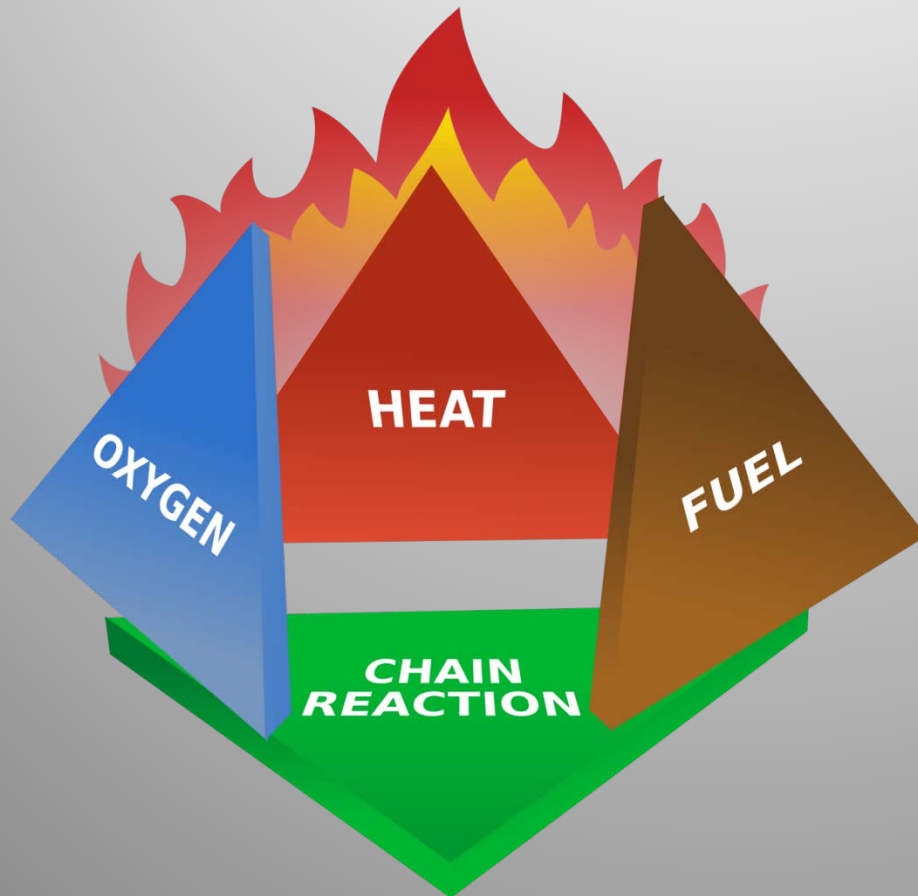
1. Water Fire Extinguishers

Large silver fire extinguishers that stand about 2 feet tall and weigh about 25 pounds when full.

Filled with ordinary tap water and pressurized air, they are essentially large squirt guns.

Types of Fire Extinguishers

1. Water Fire Extinguishers



Water Fire Extinguishers extinguish fire by taking away the "heat" element of the Fire Tetrahedron.

Types of Fire Extinguishers

1. Water Fire Extinguishers

- Water Extinguishers are designed for Class A fires **only**: Wood, paper, cloth.
- Using water on a flammable liquid fire could cause the fire to spread.
- Using water on an electrical fire increases the risk of electrocution.

Types of Fire Extinguishers

2. Carbon Dioxide Fire Extinguishers



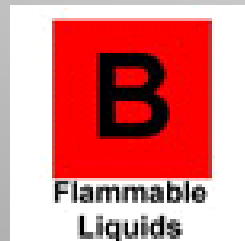
A CO₂ extinguisher lacks a gauge which is common on other types of extinguishers.

CO₂ cylinders are red. They range in size from 5 lbs to 100 lbs or larger. On larger sizes, the horn will be at the end of a long, flexible hose.

Types of Fire Extinguishers

2. Carbon Dioxide Fire Extinguishers

CO₂'s are designed for Class B and C (Flammable Liquids and Electrical Sources) fires only!

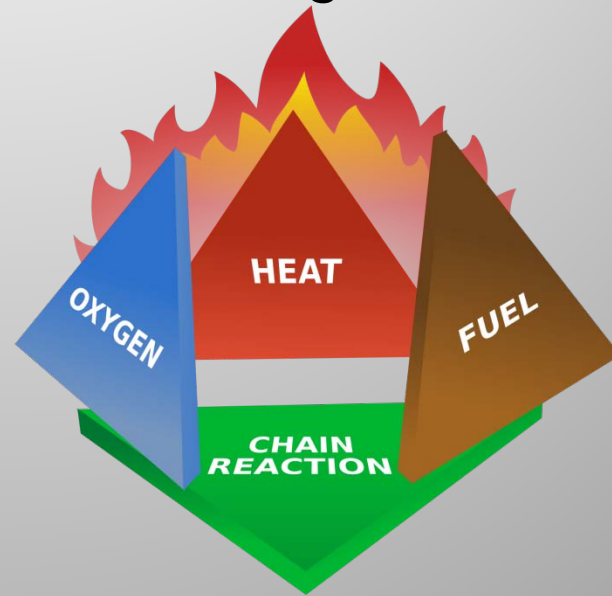


CO₂ extinguishers will frequently be found in laboratories, mechanical rooms, kitchens, and flammable liquid storage areas.

Types of Fire Extinguishers

2. Carbon Dioxide Fire Extinguishers

Carbon dioxide is a non-flammable gas that takes away the oxygen element of the fire tetrahedron. Without oxygen, there is no fire.



CO₂ is very cold as it comes out of the extinguisher, so it cools the fuel as well.

Types of Fire Extinguishers

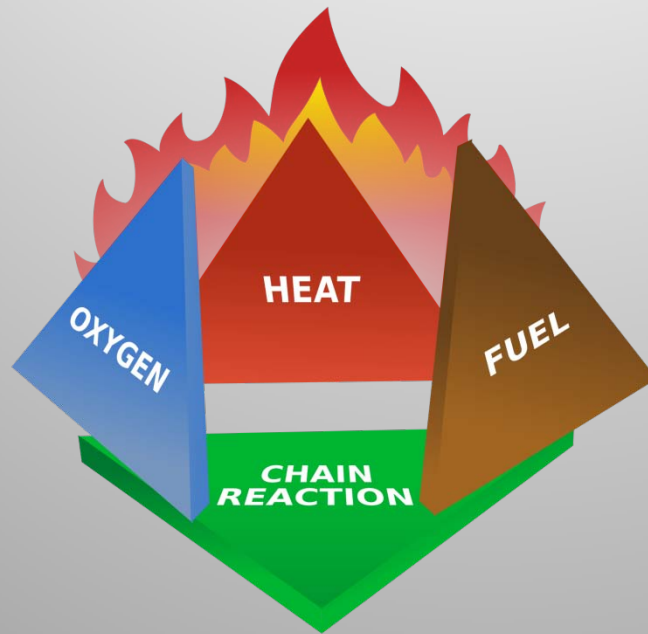
2. Carbon Dioxide Fire Extinguishers



A CO₂ may be ineffective 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.

Types of Fire Extinguishers

3. Dry Chemical (ABC) Fire Extinguishers



Dry chemical extinguishers put out fire by coating the fuel with a thin layer of dust. This separates the fuel from the oxygen in the air.

The powder also works to interrupt the chemical reaction of fire. These extinguishers are very effective at putting out fire.

Types of Fire Extinguishers

3. Dry Chemical (ABC) Fire Extinguishers



ABC extinguishers are red and have a gauge on the top of them. They usually have a flexible rubber hose on them.

Types of Fire Extinguishers

3. Dry Chemical (ABC) Fire Extinguishers

- Dry chemical extinguishers are filled with either foam or powder, usually sodium bicarbonate (baking soda) or potassium bicarbonate, and pressurized with nitrogen.
- Baking soda is effective because it decomposes at 158 degrees Fahrenheit and releases carbon dioxide (which smothers oxygen) once it decomposes.
- Dry chemical extinguishers interrupt the chemical reaction of the fire by coating the fuel with a thin layer of powder or foam, separating the fuel from the surrounding oxygen.

Types of Fire Extinguishers

3. Dry Chemical (ABC) Fire Extinguishers



Dry chemical extinguishers come in a variety of types...

You may see them labeled:

- DC (for "Dry Chemical")
- ABC (can be used on Class A, B, or C fires)
- BC (designed for use on Class B and C fires)

Types of Fire Extinguishers

3. Dry Chemical (ABC) Fire Extinguishers



Dry chemical extinguishers with powder designed for Class B and C fires ("BC" extinguishers) may be located in places such as kitchens and areas with flammable liquids.

Types of Fire Extinguishers

4. Class K (wet chemical) Fire Extinguishers



These fire extinguishers work on the principal of saponification. Saponification takes place when alkaline mixtures such as potassium acetate, potassium citrate or potassium carbonate are applied to burning cooking oil or fat.

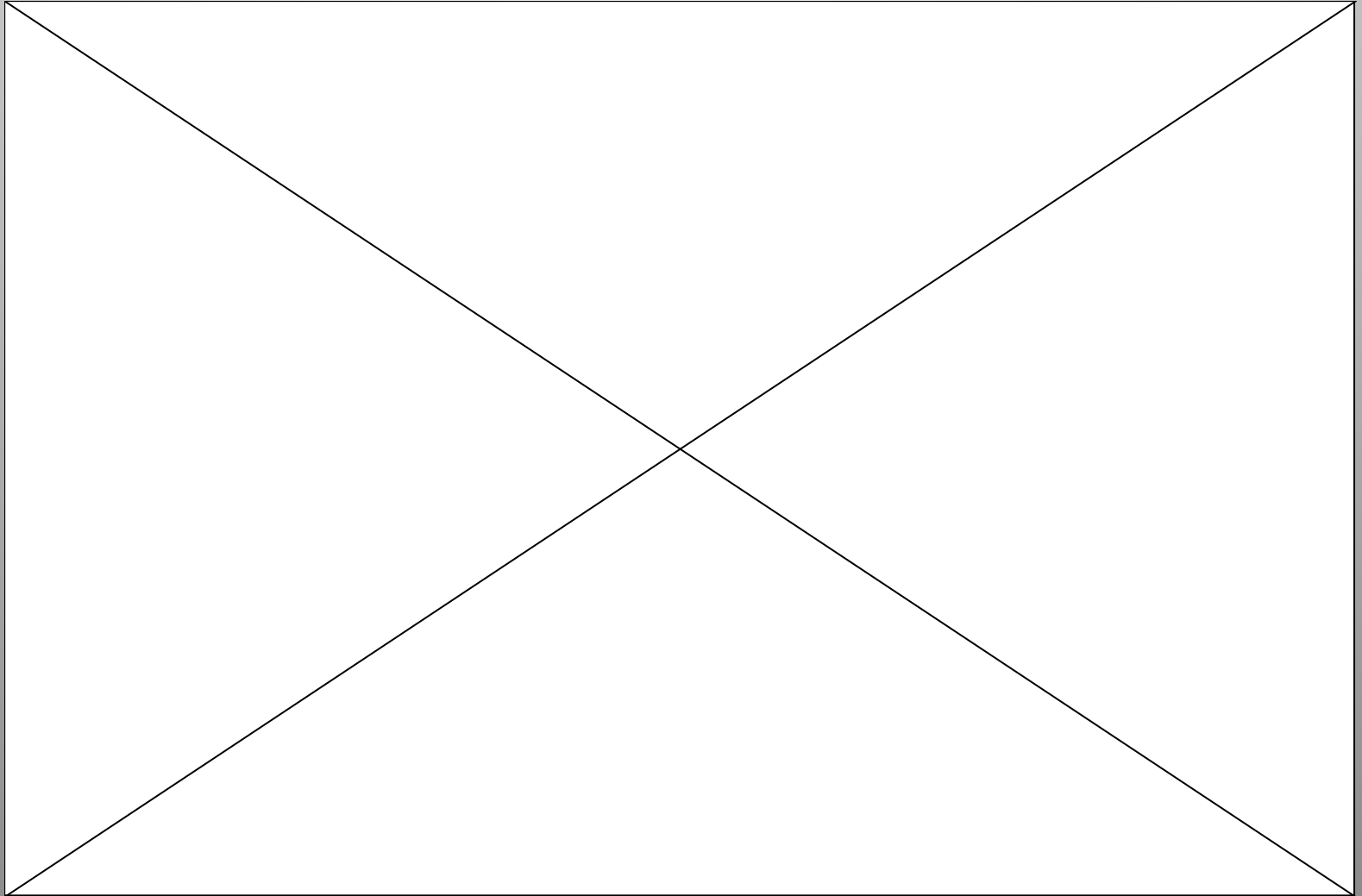
Types of Fire Extinguishers

4. Class K (wet chemical) Fire Extinguishers

The alkaline mixture combined with the fatty acid create a soapy foam on the surface which holds in the vapors and steam and extinguishes the fire. All commercial kitchens are required to have a class K extinguisher.



How it's made



How to Use a Fire Extinguisher

It's easy to remember how to use a fire extinguisher if you remember the acronym **PASS**:

- **P**ull
- **A**im
- **S**queeze
- **S**weep



How to Use a Fire Extinguisher

Pull the pin...

**This will allow
you to
discharge the
extinguisher**



How to Use a Fire Extinguisher

Aim at the base of the fire...

**Hit the fuel.
If you aim at
the flames...**



... the extinguishing agent will fly right through and do no good.

How to Use a Fire Extinguisher

Squeeze the top handle...

This depresses a button that releases the pressurized extinguishing agent.



How to Use a Fire Extinguisher

Sweep from side to side...

.. until the fire is completely out.

Start using the extinguisher from a safe distance away, then slowly move forward.



Once the fire is out, keep an eye on the area in case it re-ignites.

Rules for Fighting Fires

Before deciding to fight a fire, be certain that....

- The fire is small and not spreading. A fire can double in size within two or three minutes.
- You have the proper fire extinguisher for what is burning.
- The fire won't block your exit if you can't control it. A good way to ensure this is to keep the exit at your back.
- You know how to use your fire extinguisher. There's not enough time to read instructions when a fire occurs

Rules for Fighting Fires

How to fight a fire safely:

- Always stand with an exit at your back.
- Stand several feet away from the fire, moving closer once the fire starts to diminish.
- Use a sweeping motion and aim at the base of the fire.
- If possible, use a "buddy system" to have someone back you up or call for help if something goes wrong.
- Be sure to watch the area for awhile to ensure it doesn't re-ignite.

Use Caution When Fighting Fires

Never fight a fire if:

- **The fire is spreading rapidly.** Only use a fire extinguisher when the fire is in its early stages
- **You don't know what is burning.** Unless you know what is burning, you won't know what type of fire extinguisher to use.
- **You don't have the proper fire extinguisher.** The wrong type of extinguisher can be dangerous or life-threatening.
- **There is too much smoke or you are at risk of inhaling smoke.** Seven out of ten fire-related deaths occur from breathing poisonous gases produced by the fire.

Sources

- www.fire-extinguisher101.com
- www.fireextinguisher.com

Questions?