

The Fire Triangle

Fire Safety, at its most basic, is based upon the principle of keeping fuel sources and ignition sources separate.

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 CHEMICAL REACTION that is fire. Take away any of these things and the fire will be extinguished.

Fuel Classifications

- 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.
- Its very important to understand the four different fire (fuel) classifications...



Class A: A bright green square icon with a fire and a trash can inside of it. Wood, paper, cloth, trash, plastics—solids that are not metals.



Class B: A red icon with a gas container and fire inside of it. Flammable liquids—gasoline, oil, grease, acetone. Includes flammable gases.



Class C: A bright blue icon with a plug inside of it. Electrical—energized electrical equipment. As long as it's "plugged in."



Class D: A yellow icon iwth a capital letter D inside of it. Metals—potassium, sodium, aluminum, magnesium. Requires Metal-X, foam, and other special extinguishing agents.

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 or APW extinguisher might have a label with a green icon and two black icons with slashes through them.



This 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 3 most common types of fire extinguishers are:

1. Water (APW)
2. Carbon Dioxide (CO₂)
3. Dry Chemical (ABC, BC, DC)

1. Water (APW) Fire Extinguishers

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

APW stands for "Air-Pressurized Water."

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

These type of fire extinguishers were used many years ago in buildings but were replaced by CO₂ and Dry Chemical.

APW's extinguish fire by taking away the "heat" element of the Fire Triangle.





APW's 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. If you have no choice but to use an APW on an electrical fire, make sure the electrical equipment is un-plugged or de-energized.

2. Carbon Dioxide Fire Extinguishers

The pressure in a CO₂ extinguisher is so great, bits of dry ice may shoot out of the horn!

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.



CO₂'s are designed for Class B and C (Flammable Liquids and Electrical Sources) fires only! This pictograph has a black square with a slash through it, followed by the red icon for flammable liquids. and blue icon for electrical fires.

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

In accordance with NFPA regulations (and manufacturers' recommendations), all CO₂ extinguishers are to undergo hydrostatic testing and re-charge every 5 years.

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

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

A CO₂ may be ineffective in extinguishing a Class A fire because it may not be able to displace enough oxygen to successfully put it out.

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. Class A materials may also smolder and re-ignite.

3. Dry Chemical (ABC) Fire Extinguishers

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

ABC extinguishers are red. They normally range in size from 5 to 20 lbs.

District VII primarily uses these type of fire extinguishers for buildings, vehicles and equipment.

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)

It is extremely important to identify which types of dry chemical extinguishers are located in your area!





An "ABC" extinguisher will have a row of three square labels with a white icon inside of it. The colors will be bright green, red and then yellow, indicating it may be used on Class A, B and C fires.

You don't want to mistakenly use a "BC" extinguisher on a Class A fire thinking that it was an "ABC" extinguisher.

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

In District VII you will find ABC's in hallways, break rooms, offices, chemical storage areas, mechanical rooms, and DOT vehicles, etc.

How to Use a Fire Extinguisher

It's easy to remember how to use a fire extinguisher if you remember the

acronym "PASS:"

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

Pull the pin. This will allow you to discharge the extinguisher.

Aim at the base of the fire. Hit the fuel. If you aim at the flames the extinguisher will fly right through and do no good.

Squeeze the top handle. This depresses a button that releases the pressurized extinguishing agent.

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

Fires can be very dangerous and you should always be certain that you will not endanger yourself or others when attempting to put out a fire.

For this reason, when a fire is discovered...

1. Assist any person in immediate danger to safety, if it can be accomplished without risk to yourself.
2. Call 911 or activate the building fire alarm. The fire alarm will notify the fire department and other building occupants and shut off the air handling system to prevent the spread of smoke.

If the fire is small (and only after having done these 2 things), you may voluntarily attempt to use an extinguisher to put it out.

Remember: Fire extinguishers are made for fighting small fires. The average fire extinguisher will completely discharge in 8-30 seconds.

However before deciding to fight the fire, keep these things in mind:

1. Know what is burning. If you don't know what's burning, you won't know what kind of extinguisher to use.
2. Even if you have an ABC fire extinguisher, there may be something in the fire that is going to explode or produce toxic fumes.
3. Is the fire spreading rapidly beyond the point where it started? The time to use an extinguisher is at the beginning stages of the fire.
4. If the fire is already spreading quickly, it is best to simply evacuate the building.

Chances are you will know what's burning, or at least have a pretty good idea, but if you don't, let the fire department handle it.

As you evacuate a building, close doors and windows behind you as you leave. This will help to slow the spread of smoke and fire.

- **You don't have adequate or appropriate equipment.**
If you don't have the correct type or large enough extinguisher, it is best not to try fighting the fire.

- **You might inhale toxic smoke.**

When synthetic materials such as the nylon in carpeting or foam padding in a sofa burn, they can produce hydrogen cyanide, acrolein, and ammonia in addition to carbon monoxide. These gases can be fatal in very small amounts.

- **Your instincts tell you not to.**

If you are uncomfortable with the situation for any reason, just let the fire department do their job.

The final rule is to always position yourself with an exit or means of escape at your back before you attempt to use an extinguisher to put out a fire. In case the extinguisher malfunctions, or something unexpected happens, you need to be able to get out quickly. You don't want to become trapped.

Taking the Quiz

The link to the quiz is located at the bottom of this page or on the home page of this CBT. You will be required to setup up an account that will keep track of your score. Select the appropriate test from the list. You must receive a Passing grade of 100%. If not, feel free to take it until you make the passing grade. After passing the quiz you will see the screen that displays your information and Final grade. Print this out and submit a copy of your sheet to your Safety Representative who will forward it to the Loss Control Department at Mail Station 7-1050 for you to receive credit in Tress.

End of Training