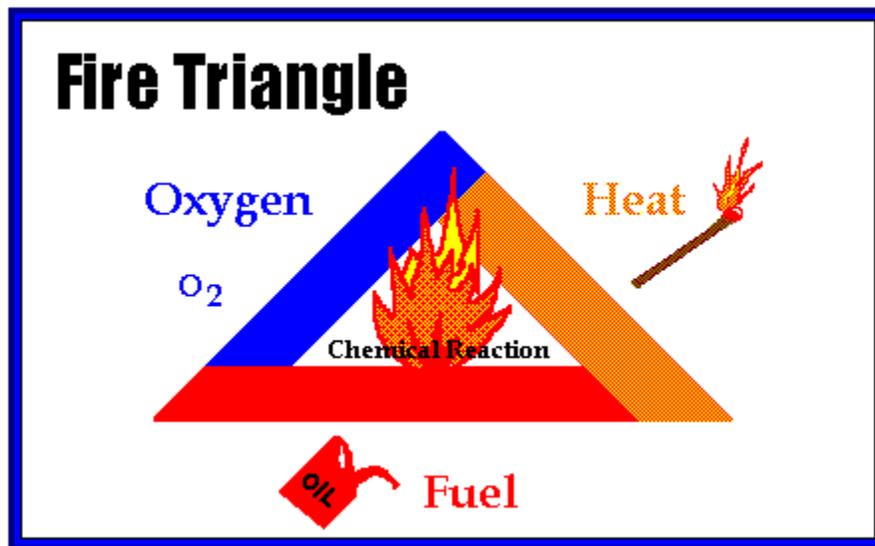


Fire Extinguisher Safety at UTIA

What are the four things that must be present at the same time to produce fire?

- Enough **oxygen** to sustain combustion,
- Enough **heat** to raise the material to its ignition temperature,
- Some sort of **fuel** or combustible material, and
- The **chemical, exothermic reaction** that is fire.



Oxygen, heat, and fuel are frequently referred to as the "fire triangle." Add in the fourth element, the chemical reaction, and you actually have a fire "tetrahedron." The important thing to remember is: **take any of these four things away, and you will not have a fire or the fire will be extinguished.**

Essentially, fire extinguishers put out fire by taking away one or more elements of the fire triangle/tetrahedron.

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

Fire Extinguisher Safety at UTIA

What are the four primary classifications of fuels?

Not all fires are the same, and they 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 can, in fact, make matters worse. It is therefore very important to understand the four different fire classifications.



Class A - Wood, paper, cloth, trash, plastics

Solid combustible materials that are not metals. (Class **A** fires generally leave an **Ash**.)



Class B - Flammable liquids: gasoline, oil, grease, acetone

Any non-metal in a liquid state, on fire. This classification also includes flammable gases. (Class **B** fires generally involve materials that **Boil** or **Bubble**.)



Class C - Electrical: energized electrical equipment

As long as it's "plugged in," it would be considered a class C fire. (Class **C** fires generally deal with electrical **Current**.)



Class D - Metals: potassium, sodium, aluminum, magnesium

Unless you work in a laboratory or in an industry that uses these materials, it is unlikely you'll have to deal with a Class D fire. It takes special extinguishing agents (Metal-X, foam) to fight such a fire.

What are the different types of fire extinguishers at UTIA?

Carbon Dioxide – filled with non-flammable carbon dioxide gas under pressure for Class B and Class C fires.

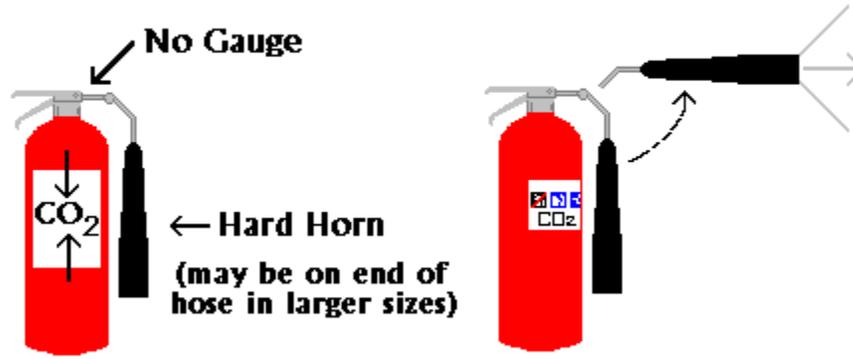
Dry Chemical – filled with a dry extinguishing agent for Class A, Class B, and Class C fires.

Dry Powder – filled with a dry extinguishing agent for Class D fires.

Fire Extinguisher Safety at UTIA

Carbon Dioxide Extinguishers

Carbon Dioxide Extinguisher



Carbon Dioxide extinguishers are filled with non-flammable carbon dioxide gas under extreme pressure. You can recognize a CO₂ extinguisher by its hard horn and lack of pressure gauge. The pressure in the cylinder is so great that when you use one of these extinguishers, bits of dry ice may shoot out the horn.

CO₂ cylinders are red and range in size from 5 lbs to 100 lbs or larger. In the larger sizes, the hard horn will be located on the end of a long, flexible hose.



CO₂s are designed for Class B and C (flammable liquid and electrical) fires only.

Carbon Dioxide is a non-flammable gas that extinguishes fire by displacing oxygen, or taking away the oxygen element of the fire triangle. The carbon dioxide is also very cold as it comes out of the extinguisher, so it cools the fuel as well. CO₂s may be ineffective at extinguishing Class A fires because they may not be able to displace enough oxygen to successfully put the fire out. Class A materials may also smolder and re-ignite.

CO₂s will frequently be found in laboratories, mechanical rooms, kitchens, and flammable liquid storage areas.

Fire Extinguisher Safety at UTIA

Dry Chemical Extinguishers

Dry Chemical Extinguisher (ABC)



Dry Chemical Extinguishers come in a variety of types. You may see them labeled:

- 1 "DC" short for "dry chem"
- 2 "ABC" indicating that they are designed to extinguish class A,B,and C fires, or
- 3 "BC" indicating that they are designed to extinguish class B and C fires.

Read the labels and know their locations! You don't want to mistakenly use a "BC" extinguisher on a Class A fire, thinking that it was an "ABC" extinguisher.



An "ABC" extinguisher will have a label like this, indicating that it may be used on class A, B and C fires.

Dry chemical extinguishers put out fire by coating the fuel with a thin layer of dust, separating the fuel from the oxygen in the air. The powder also works to interrupt the chemical reaction of fire, so these extinguishers are extremely effective at putting out fire.

These extinguishers will be found in a variety of locations. New buildings will have them located in public hallways. They may also be found in laboratories, mechanical rooms, break rooms, chemical storage areas, offices, university vehicles, etc.

Fire Extinguisher Safety at UTIA

Dry Powder Extinguishers



Dry Powder extinguishers are similar to dry chemical except that they extinguish the fire by separating the fuel from the oxygen element or by removing the heat element of the fire triangle.

However, dry powder extinguishers are for Class D or combustible metal fires, only. They are ineffective on all other classes of fires.

Fire Extinguisher Safety at UTIA

What are the basic steps for using a fire extinguisher?

It's easy to remember how to use a fire extinguisher if you can remember the acronym **PASS**, which stands for **Pull**, **Aim**, **Squeeze**, and **Sweep**.



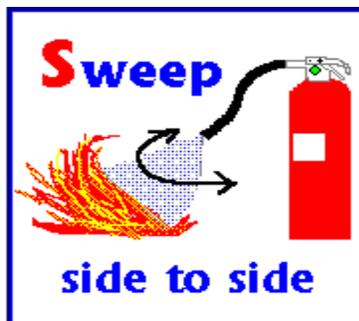
Pull the pin.
This will allow you to discharge the extinguisher.



Aim at the base of the fire.
If you aim at the flames (which is frequently the temptation), the extinguishing agent will fly right through and do no good. You want to hit the fuel.



Squeeze the top handle or lever.
This depresses a button that releases the pressurized extinguishing agent in the extinguisher.



Sweep from side to side
until the fire is completely out. Start using the extinguisher from a safe distance away, then move forward. Once the fire is out, keep an eye on the area in case it re-ignites.

Fire Extinguisher Safety at UTIA

What are some basic 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 you.
2. Activate the building fire alarm system or notify the fire department by dialing 911 (or designating someone else to notify them for you). When you activate the building fire alarm system, it may automatically notify the fire department and get help on the way. It will also sound the building alarms to notify other occupants.
3. Only after having done these two things, if the fire is small, you may attempt to use an extinguisher to put it out.

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

Know what is burning. If you don't know what is burning, you don't know what type of extinguisher to use. Even if you have an ABC extinguisher, there may be something in the fire that is going to explode or produce highly toxic smoke. 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.

The fire is spreading rapidly beyond the spot where it started. The time to use an extinguisher is in the incipient, or beginning, stages of a fire. If the fire is already spreading quickly, it is best to simply evacuate the building, closing doors and windows behind you as you leave.

Do Not Fight the Fire If:

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 to fight the fire.

You might inhale toxic smoke. If the fire is producing large amounts of smoke that you would have to breathe in order to fight it, it is best not to try. Any sort of combustion will produce some amount of carbon monoxide, but when synthetic materials such as

Fire Extinguisher Safety at UTIA

the nylon in carpeting or foam padding in a sofa burn, they can produce highly toxic gases such as 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, and you don't want to become trapped. Just remember; **always keep an exit at your back.**