This training program was established to create a broader awareness for the safety of the University of Northern Iowa students, faculty and staff and their environment.
Introduction

- Fire extinguishers are designed to put out or control small fires. A small fire, if not checked immediately, will soon spread out of control. It is important, therefore, that we equip our facilities with the proper fire extinguishers as part of our fire protection plan.
Staying Informed & Up-To-Date.

• Implementing a fire extinguisher safety program and informing occupants of the specific building’s fire safety procedures are essential.

• Knowing about the different classes of fires and different types of fire extinguishers CAN save lives.
A fire is the most common type of emergency for which all businesses must plan. A critical decision when planning is whether or not employees should fight a small fire with a portable fire extinguisher or simply evacuate. Small fires can often be put out quickly with a portable fire extinguisher. However, to do this safely, the employee must understand the use and limitation of a portable fire extinguisher and the hazards associated with fighting fires.
For Fires to Exist...

...the following four elements must be present at the same time.

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

\[
\text{Oxygen} + \text{heat} + \text{fuel} = \text{fire}
\]

*Remove any one, no fire*
Four Classes of Fires.

Fuel Sources

- **A**: wood-based, cloth, paper, rubber, certain plastics
- **B**: flammable liquids, gases, greases, Petroleum products
- **C**: energized electrical equipment, Conductors, or appliances
- **D**: combustible metals, such as Sodium, potassium, magnesium
How Fire Extinguishers Work?

Portable fire extinguishers apply an extinguishing agent that will either cool burning fuel, displace or remove oxygen, or stop the chemical reaction so a fire cannot continue to burn. When the handle of an extinguisher is compressed, it opens an inner canister of high-pressure gas that forces the extinguishing agent from the main cylinder through a siphon tube and out the nozzle. A fire extinguisher works much like a can of hair spray.
For a fire extinguisher to be effective...
...the following conditions must be met.

- The extinguisher must be right for the type of fire.
- It must be located where it can be easily reached.
- It must be in good working order.
- The fire must be discovered while it is still small.
- The person using the extinguisher must be trained to use it properly.
Labeling the Extinguisher.

All portable fire extinguishers must be approved by a nationally recognized testing laboratory such as Underwriters Laboratories, Inc. (UL) or Factory Mutual Research (FM) to verify compliance with applicable standards 1910.157(c)(2).

Equipment that passes the laboratory's tests are labeled and given an alphanumeric classification based on the type and size of fire it will extinguish.
For Example...

1-A:10-BC

The letters (A, B, and C) represent the types of fires for which the extinguisher has been approved.

The number in front of the rating indicates how much water the extinguisher is equal to and represents 1.25 gallons of water for every unit of one. For example, a 4-A rated extinguisher would be equal to five (4 x 1.25) gallons of water.

The number in front of the B rating represents the area in square feet of a class B fire that a non-expert user should be able to extinguish. Using the above example, a non-expert user should be able to put out a flammable liquid fire that is as large as 10 square feet.
Different types of fire extinguishers are designed to fight different types of fires. The three most common types of fire extinguishers are:

- Air pressurized water extinguishers
- Carbon Dioxide extinguishers
- Dry Chemical Extinguishers
Air-pressurized water extinguishers

- Water is one of the most commonly used extinguishing agents for type A fires. You can recognize an APW by its large silver container. They are filled about two-thirds of the way with ordinary water, then pressurized with air. In some cases, detergents are added to the water to produce a foam. They stand about two to three feet tall and weigh approximately 25 pounds when full.

- APWs extinguish fire by cooling the surface of the fuel to remove the "heat" element of the fire triangle.

- APWs are designed for Class A (wood, paper, cloth, rubber, and certain plastics) fires only.
• **Never use water to extinguish flammable liquid fires.** Water is extremely ineffective at extinguishing this type of fire and may make matters worse by the spreading the fire.

• **Never use water to extinguish an electrical fire.** Water is a good conductor and may lead to electrocution if used to extinguish an electrical fire. Electrical equipment must be unplugged and/or de-energized before using a water extinguisher on an electrical fire.
Carbon Dioxide extinguishers

- This type of extinguisher is filled with Carbon Dioxide (CO₂), a non-flammable gas under extreme pressure. These extinguishers put out fires by displacing oxygen, or taking away the oxygen element of the fire triangle. Because of its high pressure, when you use this extinguisher pieces of dry ice shoot from the horn, which also has a cooling effect on the fire. You can recognize this type of extinguisher by its hard horn and absent pressure gauge.

- CO₂ cylinders are red and range in size from five to 100 pounds or larger.

- CO₂ extinguishers are designed for Class B and C (flammable liquid and electrical) fires only.
CO₂ extinguishers
Carbon Dioxide

- CO₂ is not recommended for Class A fires because they may continue to smolder and re-ignite after the CO₂ dissipates.

- Never use CO₂ extinguishers in a confined space while people are present without proper respiratory protection.
Dry Chemical extinguishers

• Dry chemical extinguishers put out fires by coating the fuel with a thin layer of fire retardant powder, separating the fuel from the oxygen. The powder also works to interrupt the chemical reaction, which makes these extinguishers extremely effective.

• Dry chemical extinguishers are usually rated for class B and C fires and may be marked multiple purpose for use in A, B, and C fires. They contain an extinguishing agent and use a compressed, non-flammable gas as a propellant.

• Dry Chemical extinguishers will have a label indicating they may be used on class A, B, and/or C fires.
Where to find fire extinguishers?

• **Locations:**

  Extinguishers will frequently be found in industrial vehicles, hallways, mechanical rooms, offices, computer labs, and flammable liquid storage areas.
Using a Fire Extinguisher

The following steps should be followed when responding to *incipient stage fire*:

- Sound the fire alarm and call **911**, and/or UNI Public Safety.
- Select a safe evacuation path before approaching the fire, do not allow the heat, smoke, or fire come between you and the evacuation path.
- Discharge the fire extinguisher with its appropriate range using the **P.A.S.S** techniques (pull, aim, squeeze, sweep).
- Back away from an extinguished fire in case it flames up.
- Evacuate immediately if the fire extinguisher is empty and the fire is not yet out.
- Evacuate immediately if the fire progresses passed the *incipient stage*. While in the process of evacuating double checking letting others aware of the fire taking place.

* *Incipient stage fire*:

The fire is limited to the original material ignited, it is contained (such as in a waste basket) and has not spread to other materials. The flames are no higher than the firefighter's head.
Following the P.A.S.S Technique

- **Pull...**
- **Aim...**
- **Squeeze...**
- **Sweep...**
Following the **P.A.S.S** Technique

**Pull...**

...Pull the pin. This will also break the tamper seal.

If you have the slightest doubt about your ability to fight a fire... **EVACUATE IMMEDIATELY!**
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**Aim…**

…Aim low, pointing the extinguisher nozzle (or its horn or hoses) at the base of the fire.

**Note:** Do not touch the plastic discharge horn on CO2 extinguishers, it gets very cold and may damage skin.
Following the **P.A.S.S Technique**

**Squeeze...**

...Squeeze the handle so that it will release the extinguishing agent.

⚠️ If you have the slightest doubt about your ability to fight a fire... **EVACUATE IMMEDIATELY!**
Following the **P.A.S.S Technique**

**Sweep...**

...Sweep from side to side at the base of the fire until the extinguisher is completely empty assuring that the fire is out.

⚠️ If you have the slightest doubt about your ability to fight a fire... **EVACUATE IMMEDIATELY!**
University of Northern Iowa
Employee training options...

**Computer Interactive Training:** “Fire Safety” approximately 2 hour basic training available on computers in the Environmental Health and Safety Office. Call 273-7269 for information or to schedule a session.


**Web based video:** People First, UNI procedures to follow in case of a fire.

Go to [http://www.vpaf.uni.edu/ehso/safety/fire_safety.shtml](http://www.vpaf.uni.edu/ehso/safety/fire_safety.shtml) to view.

**Special Session:** Contact the Environmental Health and Safety office at 273-7269.
For more information:

Contact the Environmental Health and Safety Office: 319.273.7269

OR

Visit: http://www.vpaf.uni.edu/ehso/index.shtml
Resources:

OSHA

Hanford Fire Department

Oklahoma State Environmental Health and Safety