



FIRE SAFETY

OKLAHOMA STATE UNIVERSITY



Current as of January
2023

OBJECTIVES

- Types of fires
 - Fire triangle/tetrahedron
 - Evacuation
 - Fire prevention
 - Types of extinguishers
 - How to use an extinguisher
 - Rules for fires
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WHY FIRE SAFETY IS IMPORTANT

According to the US Department of Labor, workplace fires and explosions kill approximately 200 and injure more than 5,000 workers each year

CLASS OF FIRES

Fires are classified by the type of fuel they burn.

The four types are

- A
 - B
 - C
 - D
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CLASS A FIRES

- Wood
- Paper
- Plastic
- Rags



CLASS B FIRES

- Gasoline
- Oil
- Grease
- Paint



CLASS C FIRES

- **Electrical fires**
 - Office equipment
 - Motors
 - Switchgear
 - Heaters



CLASS D FIRES

- **Metals**

- Potassium
- Sodium
- Aluminum
- Magnesium



FIRE TRIANGLE/TETRAHEDRON

- **A fire requires**
 - Oxygen
 - Fuel
 - Heat
 - Uninhibited chemical chain reaction



OXYGEN

- Air is required as a catalyst
 - It can be oxygen from the air **OR** from the fuel itself
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FUEL

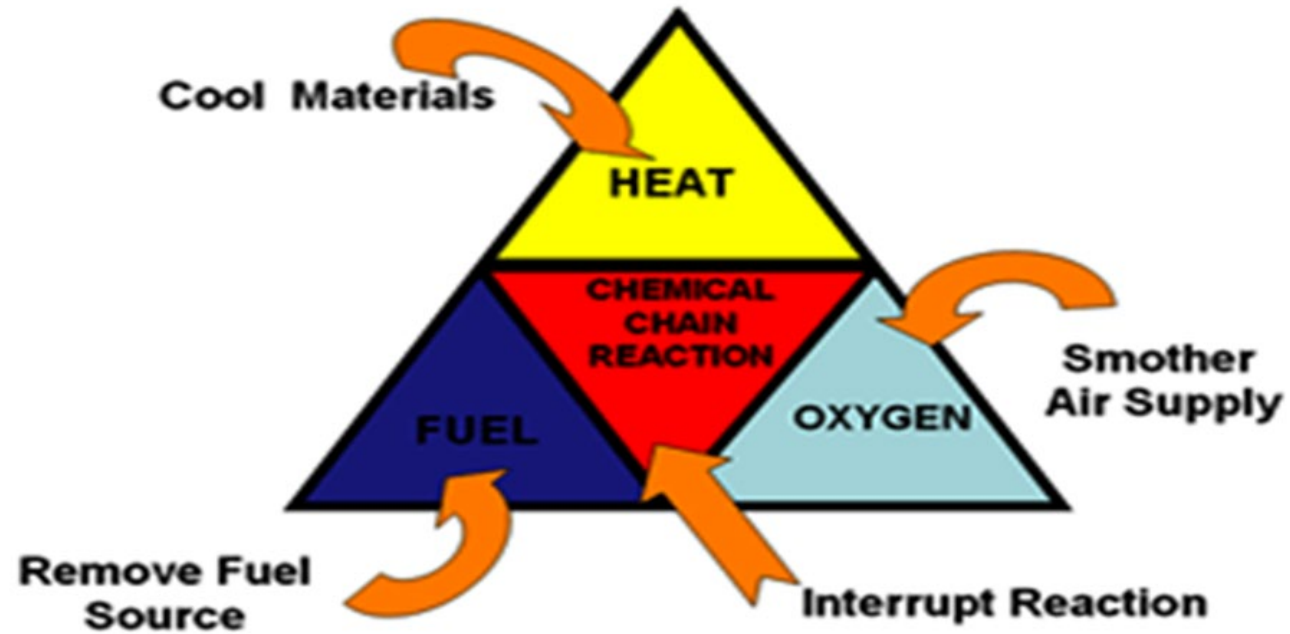
- For a fire to start, there must be something to burn
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HEAT

- For a fire to start, there must be a heat or ignition source
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CHEMICAL CHAIN REACTION

- When fire molecules bind together to form a fire



EVACUATION

FIRE PROCEDURES IN GENERAL CAMPUS BUILDINGS

- Immediately activate the building fire alarm system
 - Assist any person in immediate danger to safety if it can be accomplished without risk to yourself
 - If the fire is small enough, use a nearby fire extinguisher to control and extinguish the fire. Don't fight the fire if these conditions exist:
 - The fire is too large or out of control (larger than the size of a small trash can)
 - If the atmosphere is toxic
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EVACUATION

- If the first attempts to put out the fire do not succeed, evacuate the building immediately
 - Doors, and if possible, windows should be closed as the last person leaves a room or area
 - When exiting through a closed interior door, check the door with the back of your hand for excessive heat in case the fire is on the other side
 - Do not use elevators – use building stairwells
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EVACUATION

- When you hear the fire alarm sound, all persons in the building must evacuate immediately
 - Once outside of the building, cross the nearest street to allow emergency crews access. **DIAL 911** from a safe location if emergency personnel have not arrived
 - Do not re-enter the building until given permission
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EVACUATION

IF YOU ARE TRAPPED IN SMOKE OR HEAT

- Before you open any door, feel the door with the back of your hand. If the door is warm to the touch, DO NOT attempt to open the door
 - Stuff the cracks around doors with towels, rags, clothing or tape and cover vents to keep out smoke
 - Stay low to the floor and if possible, cover your mouth and nose with a damp cloth or dust mask to help you breathe
 - If there is a phone in the room where you are trapped, call 911 to tell them exactly where you are located
 - Do this even if you see emergency personnel on the street below
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EVACUATION IF YOU ARE TRAPPED IN SMOKE OR HEAT

- Wait at a window and signal for help. Do not panic or jump!
WAIT!
- If possible, open the window at the top or bottom, but do not break it. You may need to close the window if smoke rushes in
- Be patient. Rescuing all the occupants of a building can take several hours



OSU Domestic Science
Building 1914

BE PREPARED

- Check the location of fire alarms and know how they work
- Learn your building evacuation plan
- Know where your two nearest exits are located
- Know how doors swing and where stairs lead
- Make sure nothing blocks fire pulls, extinguishers and emergency exits
- Learn the sound of your building fire alarm
- Post emergency numbers (including security and first aid) near your telephone



OSU Morrill Hall Fire
1914 Boys Dormitory

FIRE PREVENTION



Class A Fires:

- Make sure combustible materials do not come in contact with potential heat sources such as floor furnaces, pilot lights, light bulbs, space heaters and electrical sources
 - Practice good housekeeping. Don't let piles of newspapers or oily rags build up
 - Dispose of cigarettes properly
 - Keep matches and other lighters away from children
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FIRE PREVENTION



Class B Fires:

- Always be careful when using flammable or combustible liquids. Most of these liquids emit fumes that are heavier than air. These fumes can travel long distances and may be ignited by ignition sources such as pilot lights, electrical sparks, or even static discharges
 - Store gasoline in approved safety cans only
 - Wait until gasoline powered equipment has cooled off before refueling
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FIRE PREVENTION



Class C Fires:

- Don't overload wall outlets
- Make sure cords and wires are in good condition
- Replace them if they become frayed or damaged
- Don't run cords under carpets or through doors or windows



FIRE PREVENTION



Class D Fires:

- Involve combustible metals like Magnesium, Aluminum, Titanium, Sodium, Lithium, etc.
 - Care must be taken when handling or machining
 - These type of fires are extinguished by removing the oxygen by smothering the material
 - Common extinguishing agents may cause the severity of the fire to increase
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TYPES OF EXTINGUISHERS

- Types of fire extinguishers are classified by the type of fires on which they may be used



FIRE EXTINGUISHER GAUGE



CLASS A

Used on

- Wood
- Paper
- Plastic



Dry Chemical

CLASS B

Used on flammable liquid fires



Carbon Dioxide (CO₂)



Dry Chemical

CLASS C

Used on electrical fires



Carbon Dioxide (CO₂)



Dry Chemical

CLASS D

Used on metal fires



Extinguishing Agent Sodium Chloride

TYPE K

Used in commercial kitchens to extinguish boiling oil fires



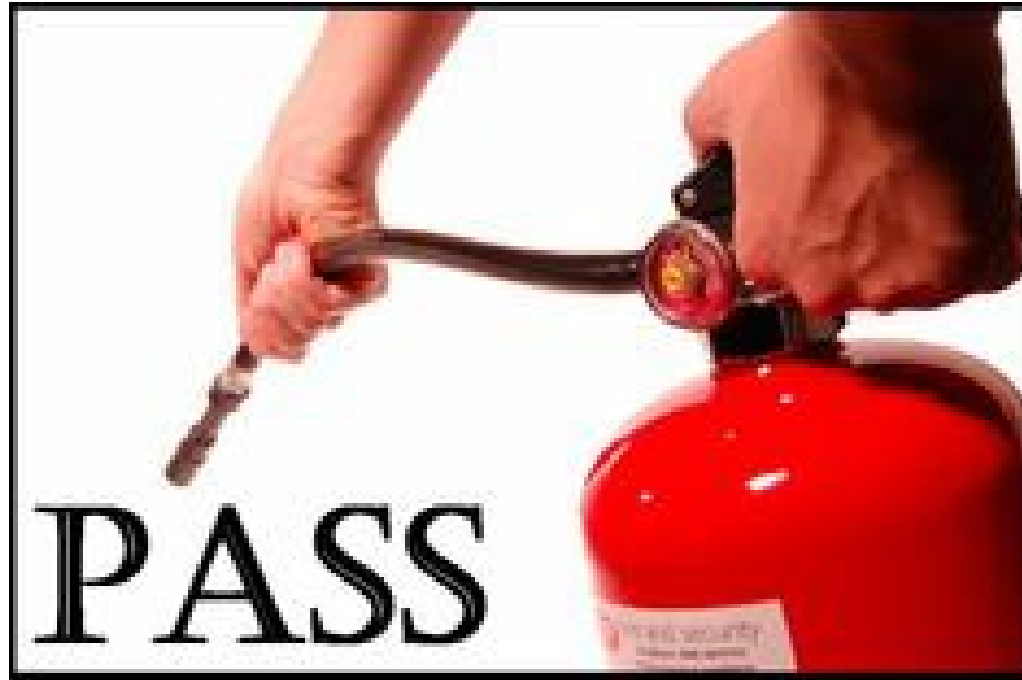
Extinguishing Agent Potassium Acetate

In the event of a fire, your personal safety is your most important concern

Remember – you are not required to fight a fire.

USING A FIRE EXTINGUISHER

Use the PASS System

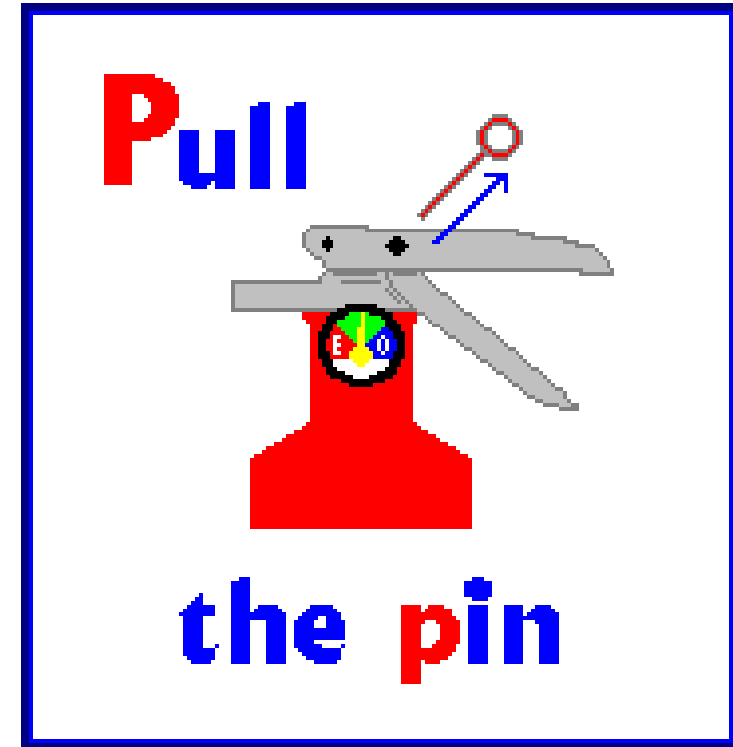


PASS

- Pull
 - Aim
 - Squeeze
 - Sweep
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PULL

- **Pull the pin**
 - This will allow you to discharge the extinguisher



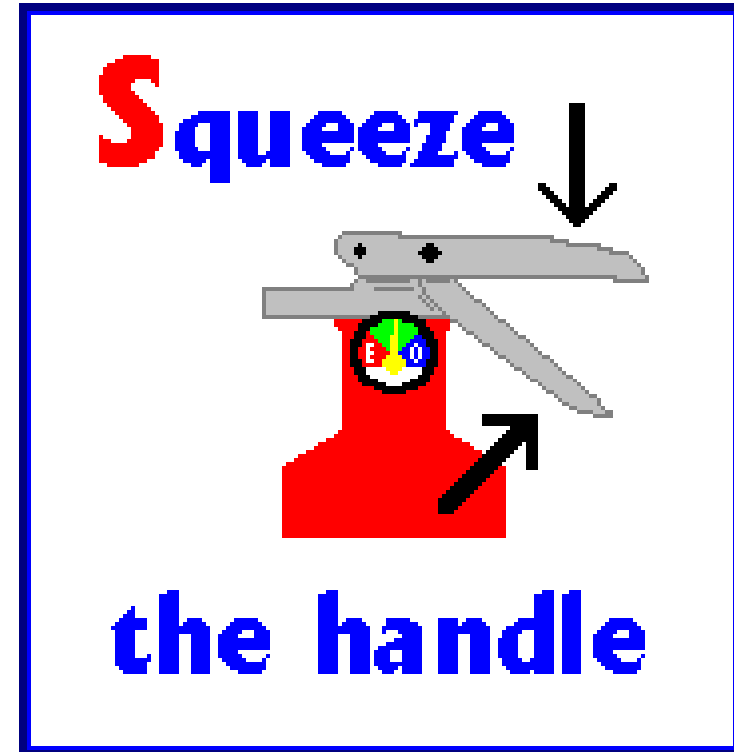
AIM

- **Aim at the base of the fire**
 - If you aim at the flames, the extinguishing agent will fly right through and do no good. You want to hit the fuel



SQUEEZE

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



SWEEP

- Sweep from side to side until the fire is completely out



DEMONSTRATION

PORTABLE FIRE EXTINGUISHER



FIRE RULES

- Fires are very dangerous
 - Be certain that you will not endanger yourself or others when attempting to put out a fire
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FIRE RULES

- **Pull the fire alarm**
 - Located at exterior doors primarily used as exits
 - **Call 911**
 - State the emergency
 - Location (address or name of location if possible)
 - **Assist anyone in danger**
 - People with physical disabilities
 - Elderly
 - Children
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FIRE RULES

- **Never fight a fire if you don't 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 which is going to explode or produce highly toxic smoke
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FIRE RULES

- **Never fight a fire if the fire is spreading rapidly beyond the spot where it started**
 - The time to use an extinguisher is in the 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
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FIRE RULES

- **Never fight a 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
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FIRE RULES

- **Never fight a fire if 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 is best not to try
 - Gases from man-made materials can be fatal in very small amounts
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FIRE RULES

- **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**
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TAKEAWAYS

- Types of fires
 - Fire triangle/tetrahedron
 - Evacuation
 - Fire prevention
 - Types of extinguishers
 - How to use an extinguisher
 - Rules for fires
-

PROGRAMS AND SERVICES

ENVIRONMENTAL HEALTH AND SAFETY

- Fire Protection Engineering
- Life Safety and Emergency Preparedness
- Environmental Compliance
- Laboratory Safety
- Occupational Safety
- Occupational Health and Medical Surveillance
- Materials Management
- Industrial Hygiene
- Chemical Hygiene
- Safety Training



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QUESTIONS?

